IMPLEMENTATION OF THE INLAND BAYS CCMP

Work Plan for the Period October 1, 2010 - September 30, 2011

DELAWARE

Limulus polyphemus

CENTER FOR THE INLAND BAYS

Rehoboth Indian River Little Assawoman

TABLE OF CONTENTS

Implementation of the Delaware Inland Bays CCMP

Abstract

The Delaware Center for the Inland Bays, Inc. will implement the Inland Bays Comprehensive Conservation and Management Plan (CCMP) through a series of new and ongoing projects in FY2011. These projects implement various CCMP Action Plans and Tactics and may include, but are not limited to the following:

Completed

CIB09-001	Coastal Communities Stormwater Retrofit Initiative: Anchorage Canal Drainage Area Retrofit Assessment Project
CIB09-006	Great Cypress Swamp Wetland Restoration Project: hydrological enhancement via water level control structures
CIB09-009	Lord Baltimore School Native Habitat Restoration
CIB09-010	Rehoboth Beach Yacht & Country Club (RBYCC) Coastal Restoration and Natural Resource Management Program
CIB09-011	Restoration of a Tidal Transition Wetland along the Indian River at Sandy Beach near Dagsboro, DE
CIB09-012	Demonstration Model to Retrofit Condos and Communities to Save Our Environment: A Community Education and Outreach Request
CIB09-014	Inland Bays Wetland Education and Citizen Stewardship Opportunities
CIB09-15	Macroalgae Distribution and Abundance as a Eutrophication and Habitat Indicator in the Inland Bays

On-going

CIB09-002	Acreage and Condition Trends for Marshes of Delaware's Inland Bays as an Environmental Indicator and Management Tool (USEPA RARE GRANT)
CIB09-003	Statistical Analysis of Environmental Indicators with Application to Delaware's Inland Bays
CIB09-004	Long-term continuous saltmarsh monitoring in the Inland Bays
CIB09-005	Center for the Inland Bays Environmental Indicators Project
CIB09-007	Benthic diatoms as indicators of water quality in Delaware's Inland Bays
CIB09-008	Eelgrass Planting Project in Delaware's Inland Bays
CIB09-013	Volunteer Intensive and Representative Condition Assessment of the Bays (VIRCAB)
CIB10-001	Sensitive Shallow Water Area Markings
CIB10-002	James Farm Kiosk & Educational Signage
CIB10-003	Aquaculture Charette
CIB10-004	1000 Raingardens for the Inland Bays
CIB10-005	Hard Clam Density and Distribution Survey
CIB11-001	Inland Bays CCMP Project Management & Oversight
CIB11-022	Schoolyard Habitats in the Inland Bays Watershed

Proposed

CIB11-002	Anchorage Canal Drainage Area Stormwater Retrofit Project Phase 1: Seacolony Ditch to Wetswale
CIB11-003	Eelgrass Habitat Suitability Mapping Project
CIB11-004	Bethany Lakes Alternative Shoreline Stabilization Project
CIB11-005	West Millsboro Wetland Enhancement Project
CIB11-007	Massey's Landing Dredge Spoil Project
CIB11-008	Martins Way Shoreline Stabilization
CIB11-009	Headwater stream restoration project
CIB11-011	Bethany Beach Nature Center

Preface

This document is written to meet EPA requirements for an annual work plan for award of funds pursuant to Section 320 of the Clean Water Act. This Work Plan serves as an agreement between the Center for the Inland Bays and the U.S. Environmental Protection Agency for work to be carried out during Fiscal Year 2011 (October 1, 2010 through September 30, 2011). The focus of this Work Plan is the implementation of the Delaware Inland Bays Comprehensive Conservation and Management Plan via research, demonstration, education/outreach, and habitat restoration activities.

Introduction

Delaware's Inland Bays and their encompassing watershed have been the subject of study since 1969. Since 1988, the Inland Bays have been part of the National Estuary Program, established under the Federal Clean Water Act and administered by the Environmental Protection Agency. This estuary program effort has culminated in a Comprehensive Conservation and Management Plan for the Inland Bays, which is in the implementation phase. To support this implementation effort and to ensure that an open and collaborative process continues for future conservation efforts in the watershed, the Center for the Inland Bays, Inc. was established by the Delaware General Assembly in 1994 under the auspices of the Inland Bays Watershed Enhancement Act.

The purposes of the Center are:

1. To build, maintain, and foster the partnership among the general public, the private sector, and local, state, and federal governments, which is essential for establishing and sustaining policy, programs, and the political will to preserve and restore the resources of the Inland Bays watershed;

2. To sponsor and support educational activities, restoration efforts, and land acquisition programs that lead to the present and future preservation and enhancement of the Inland Bays watershed; and

3. To serve as a neutral forum where Inland Bays watershed issues may be analyzed and considered for the purposes of providing responsible officials and the public with a basis for making informed decisions concerning the management of the resources of the Inland Bays watershed.

The mission of the Center is:

to promote the wise use and enhancement of Delaware's Inland Bays and their watersheds.

2009/2010 Project Reports Completed

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Coastal Communities Stormwater Retrofit Initiative: Anchorage Canal Drainage Area Retrofit Assessment Project*

Lead Contractor: Center for Watershed Protection

Responsible Partners, Contact Info, and Roles:
Chris Bason, CIB, 302 226-8105
Jay Headman, Town of South Bethany,(302) 537-6541
Brian Mulvenna, USACE, (215) 656-6599
Marianne Walch, DelDOT, (302) 760-2195
Greg Hoffman, Center for Watershed Protection
Larry Trout, JMT

Project Status: Completed

Work Pan ID : CIB09-001

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,IMS-A,LU-B	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1C,G1E,G2,G2C,G2F, G3,G4,G4C,G8,G8C	Develop and implement a comprehensive stormwater management program

CCMP/Work Plan Goal:

Begins the process of implementing voluntary stormwater retrofit goals of the PCS.

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

This pilot is a demonstration pollution control project focused on low impact design stormwater retrofitting of an urban area near the Town of South Bethany developed prior to stormwater regulations. The project area is representative of much of the developed coastal corridor along Route 1. Pollutants of concern include excess nutrients, sediments, and hydrocarbons entering a dead end lagoon system on the most polluted of the Inland Bays, Little Assawoman. Education, monitoring, watershed assessment and retrofit planning, and finally implementation will occur in a community based, collaborative fashion. Results of the project and lessons learned will be used in expanding

stormwater retrofitting throughout the coastal corridor to address a tactic of the forthcoming Inland Bays Pollution Control Strategy.

Intended Results:

Development of a prioritized community collaborative stormwater retrofit strategy through a detailed assessment of the Anchorage Canal Drainage Area. The strategy goal will be to reduce nutrient and bacteria concentrations to meet TMDL reduction targets in Little Assawoman Bay and residential canals. This is a demonstration pilot project for planning and implementing stormwater retrofits in the Inland Bays watershed.

Outputs/Deliverables:

1. Office and Field Assessment
2. Draft stormwater retrofit strategy with prioritized conceptualized projects
3. Final stormwater retrofit strategy with prioritized conceptualized projects
4. Media and community outrach on pollution control goals and stormwater retrofits
5. Community presentation of final strategy

Milestones:

1. Field Assessment (Completed: August, 2009)
2. Draft Strategy & Presentation (Completed: November, 2009)
3. Final Strategy & Presentation (Completed: May, 2010)
4. Report & Data Delivery (Completed: June, 2010)

Short-Term Outcomes

Increased awareness and understanding of pollution sources and controls for individual residences and businesses and communities. Improvement in attitudes towards participating and supporting stormwater retrofits in drainage area. Increased interest from other communities in participating in stormwater retrofits through positive media exposures.

Intermediate Outcomes:

Implementation of new retrofits, ordinances, and other pollution controls in the drainage area and in the Town of South Bethany. Increased cooperation and communication between stakeholders in the drainage area. Increase in Enhancing Delaware's Highways management actions within the Inland Bays watershed and resulting outcomes including improved roadside habitat and potentially reduced maintenance costs.

Long-Term Outcomes

Attainment of TMDL target reductions for nutrients and bacteria loads from the drainage area. Reduction in sediment loads from the drainage area. Improvement in dissolved oxygen and aquatic habitat within residential canals and Little Assawoman Bay.

Project Progress

Progress To Date:

1. Request for technical services was issued and bids were received. Review team is assembled and is currently reviewing the bids. CIB and Town of South Bethany are coordinating with community stakeholders to bring them to table.
2. Agreement signed with Center for Watershed Protection and JMT Engineering to conduct assessment.
3. Project materials delivered to consultants.
4. Assessment kickoff meeting with full attendance completed.
5. Assessment scheduled.

6. Continous WQ meter setup and calibrated.
7. Continuous WQ meter deployed and data collected and processed.
8. Assessment field day completed.
9. Draft strategy and comments meeting completed.
10. Recieved input and submitted for implementation funds for the highest priority retrofits.
11. Final community meeting completed and final report and data received.

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS:

OTHER FUNDS: $35,000.00

MATCHING FUNDS: $35,000.00

AMENDMENT FUNDS:

TOTAL: $70,000.00

Project Location

Municipality : Bethany Beach, Middlesex Beach, South Bethany Beach

Watershed/Waterbody : Little Assawoman Bay, Little Assawoman Bay WS

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title: CONCEPTUAL POLLUTION AND STORMWATER CONTROL STRATEGY FOR THE ANCHORAGE CANAL DRAINAGE AREA

Author : Center for Watershed

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Great Cypress Swamp Wetland Restoration Project: hydrological enhancement via water level control structures*

Lead Contractor: Delaware Wild Lands

Responsible Partners, Contact Info, and Roles:
Peter S. Martin
315 Main Street
P.O. Box 505
Odessa, Delaware 19730-0505
302-378-2736

Project Status: Completed

Work Pan ID : CIB09-006

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
AG-C	Manage and plant forested/vegetative buffers
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

Delaware Wild Lands, Inc. is a private, non-profit, tax-exempt organization dedicated to the conservation and preservation of natural areas through the acquisition and management of strategic parcels of land.

The Great Cypress Swamp represents the largest contiguous acreage holding of Delaware Wild Lands, and perhaps the largest private single owner contiguous forest land on the DELMARVA Peninsula. This 11,000 acre property contains the headwaters of the Pocomoke River as well as significant forested and agricultural wetlands altered by a private ditch system that feeds into Delaware's Inland Bays via Vine's Creek. Our current holdings represent most of

the remnants of what was estimated to be a swamp of 50,000 to 60,000 acres dominated by Atlantic White Cedar and Bald cypress. This property contains about 1,000 acres in Maryland with the remainder located in Delaware.

Since our initial acquisition, Delaware Wild Lands has investigated numerous management strategies that would protect, preserve, restore, and enhance the natural attributes of the Great Cypress Swamp. We have sought various partners in our efforts, including Federal and State partnerships that have yielded much research on the hydrology of the area and a baseline Natural Heritage flora and fauna investigation. These studies, in conjunction with more recent work in partnership with the Baltimore District of the U.S. Army Corps of Engineers have left us with a basic framework to develop an effective long term comprehensive management plan for the Great Cypress Swamp.

The hydrological enhancement via water level control structures project is designed to partially restore some of the historic wetland functions and values within the most heavily ditched portion of the swamp. Figures 1. And 2. Show the property location and ditch configuration. The proposed earthen plugs and water control structures (Figure 3.) are expected to increase the zone and duration of interstitial saturation but are not expected to result in inundation greater than that normally associated with seasonal variation. The resulting improvements in hydrology will help insure the success of Atlantic White Cedar and Bald cypress community restoration efforts currently underway with the support of our partners.

Intended Results:

To partially restore some of the historic wetland functions and values within the most heavily ditched portion of the swamp. To insure the success of Atlantic White Cedar and Bald cypress community restoration efforts currently underway.

Outputs/Deliverables:

1. Installwater level control structures at selected location in the Great Cypress Swamp as part of a larger ecosystem restoration project.

Milestones:

1. Obtain water control structures (Completed: March 2008)
2. Obtain subaqueous lands permit (Completed: February 2009)
3. Complete installation of water control structures (Target: August 2009, Completed Fall, 2009)

Short-Term Outcomes

NA

Intermediate Outcomes:

Restoration of freshwater wetland functions and values

Long-Term Outcomes

Restoration of an ecologically significant plant community in the Inland Bays watershed. Potential increase in the numbers of rare plant species. Potential increase in wetland water quality function and water storage.

Project Progress

Progress To Date:

State of Delaware Subaqueous Lands Permit obtained in February, 2009. Four 24 inch structures obtained August, 2008. Two 48 inch structures under construction. 35 acres Atlantic White Cedar planted March, 2008.

Project complete, one page project report complete. Pics available at

Year Reported 2010

Date : 06/29/2010

http://picasaweb.google.com/rmac2385/GCS#

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $8,958.00

OTHER FUNDS:

MATCHING FUNDS: $45,000.00

AMENDMENT FUNDS:

TOTAL: $53,958.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Little Assawoman Bay, Little Assawoman Bay WS

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title: NA

Author : NA

Abstract : NA

Restoration ☑

Habitat Type : freshwater wetland

Restoration type : Rehabilitation

Acreage : 1000

Partners : Delaware Wildlands

Completion Date:

Cost : $0.00

QAPP ☐

Date Completed :

Date Approved :

Location :

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Lord Baltimore School Native Habitat Restoration*

Lead Contractor: Gardeners by the Sea

Responsible Partners, Contact Info, and Roles: Pat Wood -- Project Coordinator
58 Daisey Avenue
Ocean View, Delaware 19970
302-539-5173
pkwood@mchsi.com

Project Status: Completed

Work Pan ID : CIB09-009

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1A,G1E,G5,G5B,G5D, G7,G7B,G9,G9E	Emphasize programs In the public schools

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

This project will restore a wetlands area located in the school yard; (B) establish a buffer of trees along the eastern fence line (Banks Tax Ditch) and (C) create an area of seed-bearing trees and shrubs designed to attract birds and to reduce the amount of storm water run-off and pollution that eventually flows into the Inland Bays.

A) Wetland Restoration: A previously existing wetland area includes an outdoor classroom that has fallen into disuse. Remodeling of the school and excavation of portions of the school yard in order to install a geothermal heating system resulted in compression of the area behind the school, redirected the natural flow of rainwater, clogged the drainage pipe and dried up the wetland. With assistance of a CIB grant the Club would be able to have the existing drainage

pipe cleaned out, or replaced if necessary, in order to allow water to flow more freely into the area. Just to the north of the now-dry wetland area is a drainage ditch that currently is directly receiving the parking lot runoff without the benefit of capture and filtration in the available wetland area. Site enhancement, surface stabilization and replanting in the area will further enhance the site and aid the area in more effectively capturing the runoff from the bus driveway located to the northwest of the wetlands area

(B) Tree Buffer: The Club would like to create a buffer of trees along the eastern property line. New commercial and residential construction has largely removed the buffer of trees that previously existed along that side of the property and did not retain the required buffer between their property and the existing drainage ditch - adding significantly to runoff problems as well as noise and disruption to the school yard due to commercial activities.

(C) Bird-seed, nut and/or berry Garden: A small pond was created by the Lions Club a number of years ago in the northeast corner of the school property. The addition of several seed, nut or berry-bearing trees and shrubs in the area behind the pond would provide a buffer from the nearby commercial area and assist in reducing runoff into the drainage ditch bordering the property. In addition it would complement the existing pond in providing food and cover for the birds. While Delaware is the migratory path for a tremendous number of birds, few are sighted at the school - as there is little in the way of cover or food supply for them. New plantings would serve as an attraction for birds. In addition to supporting the habitat, such a garden would provide an excellent teaching tool for the students. Younger students can learn to identify the birds and the older students would be able to conduct bird counts and learn about their migratory habits - important steps in developing their sense of land stewardship.

Intended Results:

1. Restore a native habitat to the Lord Baltimore Elementary School.
2. Work with the Indian River School District Science Advisor and the teachers, to incorporate the concept of habitat restoration into the curriculum as well as develop some outdoor activities.

Outputs/Deliverables:

• Make arrangements to have drainage pipe cleaned out and/or replaced
• Contact a number of the reputable garden centers in order to obtain the best price (and quality) of trees and seed, nut or berry-bearing shrubs
• Commence planting as quickly as possible upon receipt of the grant.

Milestones:

1. Planting of native species (Completed: September, 2009)

Short-Term Outcomes

Increase knowledge and awareness of students regarding Inland Bays resources

Intermediate Outcomes:

Changes in the school's maintenance and operations of its stormwater runoff

Long-Term Outcomes

Project Progress

Progress To Date:

Club members found that it was far more difficult to engage the interest, enthusiasm and support of the school (students, staff and teachers) than initially expected . However, we have begun to see increased interest and support with the development of the garden bed along the east side. Members of the maintenance crew have become more helpful - moving a number of railroad ties along the garden bed - to create an attractive border to the bed - after

having resisted the idea for a number of months. There also were an increased number of signs of support at the school festival (scheduled shortly after the mayor spring planting) at which time the Gardeners by the Sea had a booth explaining the nature of our efforts at the school and the benefits of native plants. We also distributed free seed packets to the student. We hope to continue to build on that enthusiasm this fall.

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $4,000.00

OTHER FUNDS:

MATCHING FUNDS: $1,000.00

AMENDMENT FUNDS:

TOTAL: $5,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Indian River Bay, Indian River Bay WS

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☑

Habitat Type : upland

Restoration type : Re-establishment

Acreage : 1

Partners :

Completion Date:

Cost : $0.00

QAPP ☐

Date Completed :

Date Approved :

Location :

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Rehoboth Beach Yacht & Country Club (RBYCC) Coastal Restoration and Natural Resource Management Program*

Lead Contractor: RBYCC Home Owners' Association

Responsible Partners, Contact Info, and Roles: Envirotech Environmental Consulting, Inc.
c/o Todd Fritchman
34634 Bay Crossing Blvd., Suite Lewes, DE 19958
Deborah Kaplan
(302) 226-2044
debikap@aol.com

Project Status: Completed

Work Pan ID : CIB09-010

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
HP-F	Promote natural alternatives to bulkheading
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2F,G6,G6G,G7	Enhance and restore impacted shallow and nearshore habitats

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The project will create a resource management plan for the proposed area using Integrated Vegetation Management (IVM) practices. The IVM practices are specific and selective for the control/eradication of exotic, invasive and/or native, nuisance species. In addition, vegetative enhancement plantings will assist in the colonization of native flora as well as improving overall habitat and aesthetics. The HOA will also establish restrictions regarding the impacts to the enhanced conservation areas. The project will also stabilize and eroding shoreline using biologs with plantings of Salt Meadow Cordgrass.

Opportunities for public education will also be promoted in the 2.35 acre common ground public area, which adjoins the coastal habitat. This area is protected and allows for open space green infrastructure, such as signage and wayside exhibits to further environmental stewardship though Inland Bays outreach. Public access to this area along the coastline will allow for recreational and other community activities.

Intended Results:

To demonstrate methods and techniques which reduce nutrients, improve water quality, and improve coastal habitats. To increase biodiversity on the property and reduce negative impacts associated with exotic species.

Outputs/Deliverables:

• Implement IVM practices and site preparation; trash and refuse removal; vegetation pruning/trimming (OCT '08 – FEB '09)
• Vegetation installation and plantings (MAR '09)
• Continue implementing IVM practices; vegetation mortality replacement (APR – SEP '09)
• Overall monitoring of management practices and progress; final report (OCT '09)

Milestones:

• Implement IVM practices and site preparation; trash and refuse removal; vegetation pruning/trimming (OCT '08 – FEB '09)
• Vegetation installation and plantings (MAR '09)
• Continue implementing IVM practices; vegetation mortality replacement (APR – SEP '09)

Short-Term Outcomes

Educate citizens about the need and methods for conservation and protection of the Inland Bays
Create a natural area that supports a diversity of wildlife and reduces nutrient contributions to the Inland Bays

Intermediate Outcomes:

Eradicate invasive species and reduce tidal erosion

Long-Term Outcomes

Create a natural area that supports a diversity of wildlife and reduces nutrient contributions to the Inland Bays. Restoration of saltmarsh to native vegetation.

Project Progress

Progress To Date:

The exotic invasive and native nuisance vegetation has been treated and removed as part of the IVM plan. Native beneficial species have begun to colonize the areas once dominated by Phragmites australis. The IVM plan will continue to spot treat any exotic invasive or native nuisance species.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $1,000.00

OTHER FUNDS:

MATCHING FUNDS: $1,000.00

AMENDMENT FUNDS:

TOTAL: $2,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☑

Habitat Type : salt marsh

Restoration type : Re-establishment

Acreage : 1

Partners :

Completion Date: 09/30/2009

Cost : $0.00

QAPP ☐

Date Completed :

Date Approved :

Location :

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Restoration of a Tidal Transition Wetland along the Indian River at Sandy Beach near Dagsboro, DE*

Lead Contractor: DNREC - DWR - WSLS

Responsible Partners, Contact Info, and Roles:
Jim Chaconas, Environmental Scientist
Melanie Tymes, Environmental Scientist
DNREC – WSLS
89 Kings Highway
Dover, DE 19901
Phone: 302-739-9943

Sandy Beach Homeowners Association
c/o Cal Epperly
131 Pebble Drive
Dagsboro, DE 19939

Project Status: Completed

Work Pan ID : CIB09-011

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
HP-F	Promote natural alternatives to bulkheading
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2F,G7	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The Sandy Beach Community fronts on the Indian River and features in excess of 1,000 feet of shoreline between the

ends of Sandy Beach Drive and Pebble Drive located near Dagsboro, DE. The shoreline is comprised of transition marsh including low and high marsh wetlands. The low marsh wetland is comprised of Smooth Cordgrass (Spartina alterniflora). The high marsh is comprised of a variety of brackish marsh plants such as Salt Marsh Hay (Spartina patens), Spike Grass (Distichlis spicata), Common Three-square (Scirpus pungens), Salt Marsh Bulrush (Scirpus robustus), Water Hemp (Amaranthus cannabinus), Seaside Goldenrod (Solidago sempervirens) and Groundsel Tree (Baccharis halimifolia). Several sections of the marsh are actively eroding and the erosion is threatening the long term viability of the marsh to provide ecological benefits as well as protect the shore of the community. In 2006 the community invested in the installation of biologs and additional vegetation plantings along the most highly eroded portions of the shoreline in an attempt to protect the marsh and shoreline. Due largely to the high degree of fetch (the site faces north along a section of the Indian River that is over 1,000 feet in width) the biologs and much of the planted vegetation failed.

The work proposed for this grant would install a marsh toe sill comprised of low profile rip-rap and low marsh plantings in front of portions of the shoreline. As money allows, the more actively eroding sections of shoreline will be targeted for marsh toe sill installation first, followed by the toe sill installation in front of less eroded shoreline. The placement of the low profile rip-rap is designed to break the wave energy and protect the vegetation behind it. Adjacent wetland areas may also receive some degree of protection from the marsh toe sill installation. Openings will be placed in the low-profile rip-rap to allow for fish passage.

The project will restore a unique eroding transition marsh by providing an enhanced level of protection via the marsh toe sill design. The project could be partially installed this fall by placement of the low profile rip-rap followed by planting in the spring of 2009.

CCMP elements satisfied by this project are discussed under CCMP Element above. Additional public participation will be achieved because the HOA currently conducts Phragmites control to protect the existing marsh. Also the primary contractor on the project, Envirotech Environmental Consulting, Inc. is donating their expertise and the planting labor to the project.

Intended Results:

Restore and provide long term protection to an eroding transition marsh. These types of marshes are becoming less common in the Inland Bays. The restoration would involve restoring the ecological function and the physical integrity of the pre-existing marsh, as well as provide protection for an eroding shoreline.

• to provide an educational opportunity for the residents of the Sandy Beach Community. Additionally, the project should generate some good publicity in the form of a news or magazine article highlighting the cooperative efforts of a homeowners association, the Inland Bays Center, the State and the donated services of a private environmental contractor to restore a unique wetland system in the Inland Bays.

Outputs/Deliverables:

• placement of the low profile rip-rap (Completed: Fall 2008)
• planting (Completed: Spring 2009)

Milestones:

Short-Term Outcomes

Educate citizens about the need and methods for wetland protection
Reduce tidal erosion
Long-term: restore a tidal marsh
Changes in pressure targets: increase in tidal wetland acreage

Intermediate Outcomes:

Reduce tidal erosion

Year Reported 2010

Date : 06/29/2010

Long-Term Outcomes

Restore and protect 10,000 sq. feet of rare type of tidal marsh

Project Progress

Progress To Date:

1. State Subaqueous Lands and Army Corps of Engineers permits have been obtained to install the marsh toe sill at this site. The application fee for the Subaqueous Lands Permit was paid for by the Sandy Beach Homeowners Association.

2. An agreement between the Sandy Beach Homeowners Association and the Department has been finalized. The agreement provides DNREC and their contractor access to the wetland area and outlines the responsibilities of both parties relevant to the project.

3. A purchase order signed by the Department's Acting Secretary and contract authorizing Precision Marine Construction, Inc. of Rehoboth Beach to construct the rock toe sill has been finalized. Precision Marine Construction anticipates starting the work in June of this year.

4. In all, 250 linear feet of rock toe sill was constructed and 2,300 Spartina plants were planted. The Spartina plantings were comprised of 1,150 Spartina alterniflora plants, planted in the intertidal zone and 1,150 Spartina patens plants planted within the upper intertidal zone and lower backshore zone. The plants were planted on one foot centers in the most severely eroded areas of the shoreline.

4. EnviroTech, Inc. is preparing a cost estimate for the plants that will be used to vegetate the intertidal zone following installation of the rock sill. They are donating their expertise and the planting labor to the project.

6. Placement of rip-rap and planting completed Fall 2008

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $10,000.00

OTHER FUNDS:

MATCHING FUNDS: $20,000.00

AMENDMENT FUNDS:

TOTAL: $30,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Indian River Bay

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Year Reported 2010

Date : 06/29/2010

Abstract :

Restoration ☑		**QAPP** ☐	
Habitat Type :	salt marsh	**Date Completed :**	
Restoration type :	Protection	**Date Approved :**	
Acreage :	1	**Location :**	
Partners :	DNREC - DWR - WSLS		
Completion Date:			
Cost :	$0.00		

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Demonstration Model to Retrofit Condos and Communities to Save Our Environment: A Community Education and Outreach Request*

Lead Contractor: Sea Chase Condominium Association

Responsible Partners, Contact Info, and Roles:
Nancy Feichtl
Member of Board of Directors; Chairperson of "Green Committee"
Sea Chase Condominium Association
16 Leighs Way
Rehoboth Beach, DE 19971
302.227.4037
jfeichtl@yahoo.com

Project Status: Completed

Work Pan ID : CIB09-012

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

Recognizing that many communities and condos were built over the years when there were very few regulations governing the land development and construction practices of developers who operated very close to our wetlands and waterways, we at Sea Chase have developed policies and plans to have our community actively change our way of operating and to become a model of a green community, even though it involves undoing past problems.

Sea Chase is a condominium association of 69 units that is within a half mile of Arnell Creek. Within the last decade, hundreds of homes have been built within our immediate area, forests have been destroyed, and we have all, thus, contributed negatively to the watershed. As another new development started ground work next to us, we started seeing , first hand, the inherent problems and recognizing that we were collectively creating a huge environmental footprint, we adopted a “Green Policy” (Attachment #1), into which we are moving now, much of which is to protect ground / storm water. Quoting directly from that policy:

“Last, as part of our movement to retrofit our community into a “Green Friendly” one, we will document and share all of our positive practices e.g. share written policies, pictures , lists of good products we discover, etc. with surrounding communities in order to encourage a rapid, orderly move to such practices in all of our surrounding and/ or neighboring environs.”

Intended Results:

1. To install a single demonstration model of a non-toxic grid parking space which involves locating a vendor, installing, and using to see if it is easily damaged, unsightly, etc. to pilot for future use.
2. To document and showcase this and all “Green” activities to any community who wishes to see.ficial plantings.

Outputs/Deliverables:

1. Installation of pervious paver parking areas as demonstration project
2. Evaluation and results communiciation to other communities

Milestones:

1. Installation of pavers (Completed: July, 2009)
2. Evaluation of paver performance (Completed: September, 2009)

Short-Term Outcomes

Explore with contracted grounds keepers the use of more organic and earth friendly products; explore plants that will be disallowed in the community even if within “personal space raise awareness by the HOA regarding stormwater practices and native plants.

Intermediate Outcomes:

Increased potential for continued installation of pervious parking as needed versus impervious areas.

Long-Term Outcomes

Contribution to water quality improvement through the reduction of nitrogen and phophorus loads from parking areas.

Project Progress

Progress To Date:

1. Installed paver material.
2. repairing all energy losing exteriors of our homes, i.e. rewrapping windows, insulating crawl spaces, etc.
3. We have written policies to set in place the right to install solar panels, and intend to redo all our grounds to native plants and use earth-friendly (and therefore water runoff friendly) fertilizers and such.
4. pavers deemed durable and and grass has made them almost invisible and they remain permeable.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $1,000.00

OTHER FUNDS:

MATCHING FUNDS: $1,800.00

AMENDMENT FUNDS:

TOTAL: $2,800.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Inland Bays Wetland Education and Citizen Stewardship Opportunities*

Lead Contractor: DNREC - DWR - WAS

Responsible Partners, Contact Info, and Roles:
Rebecca Rothweiler
Watershed Assessment Section
820 Silver Lake Blvd., Suite 220
Dover, DE 19904
Office: 302-739-9939

Project Status: Completed

Work Pan ID : CIB09-014

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,HP-D,LU-B	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1E,G2,G3,G3B,G7,G7B,G9,G9A	Provide maximum protection of waterways, groundwater, natural areas, open space, and tidal and non-tidal wetlands

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis, Strengthening Water Quality Standards

Overview:

The goal of this project is to heighten citizen awareness and wetland stewardship in the Inland Bays watershed. To achieve this we will use two methods of outreach including a guidebook and a workshop to present the contents of the guidebook.

1.) Guidebook
We will produce a guidebook for residents summarizing the data garnered on wetland conditions of the Inland Bays

watershed. Our intent is to better inform residents of the value of wetland resources and to encourage their support and appreciation of wetlands. The guidebook will provide the public with tools and opportunities to translate their awareness into wetland protection, restoration, and watershed stewardship. The guidebook will be distributed to the workshop audience and additional copies will be made for interested parties.
The guidebook will be designed to serve as a standalone resource or in conjunction with the workshop.

2.) Workshop
The intent of the workshop component, to be hosted in September of 2009, is to disseminate the guidebook contents in an audience friendly manner while offering an occasion to address the public's questions and concerns and create discussion regarding the watershed's wetland
resources. Our plan is to distribute the guidebook to interested residents and to clarify and lead them through the contents. We will begin with an introduction of the wetland assessment data garnered by the Wetland Monitoring and Assessment Program (WMAP) to enhance the
attendees' comprehension of the status of the wetlands in their watershed and the pressures and stressors these habitats bear. Following, we will lead the audience through the guidebook while covering the contents in summary form. Presentations will be made to familiarize the participants with the wetland habitat types of their watershed including their functions and values, assessed condition, and current or potential threats. Finally, restoration and protection options for landowners will be covered briefly while referring the audience to the appropriate agencies for more information. Volunteer programs in the region will be summarized to stimulate volunteer recruitment and participation. Residents will be informed of wise choices that they can make when managing their property as stewards of the watershed and provided with do-it-yourself options. We will set aside time to address the audiences' questions and concerns. Two weeks prior to the workshop, paid radio and print advertising will be enlisted to invite residents in the Inland Bays. Earned media will also be utilized to minimize costs.

Intended Results:

1. To increase wetland protection and minimize wetland degradation by recruiting the support and involvement of the public
2. To provide information on the stewardship tools that are available and motivate individuals to participate in voluntary programs by sharing the data we have garnered from comprehensive field sampling and the values of the wetland resources in their local watershed.
3. To reduce the negative impacts endured by wetlands

Outputs/Deliverables:

1. Wetland guidebook.
2. Approximately 6 workshops educating citizen groups on involvment in wetland decision making and promoting the guidebook.

Milestones:

Updated Milestones after Project Reorganization
1. Development of Guidebook (Completed: December 2009)
2. Printing of Guidebook (Completed: April 2010)
3. Development of Workshops (Completed: December 2009)
4. Hosting of Workshops (Initiated: Winter 2010, Target Spring through Summer, 2010)

Short-Term Outcomes

Inform residents about the function and value of wetland resources.

Intermediate Outcomes:

Increase wetland protection and minimize wetland degradation by recruiting the support and involvement of the public

Year Reported 2010

Date : 06/29/2010

Long-Term Outcomes

Prevent loss of wetland resources through improved decision making.

Project Progress

Progress To Date:

Project approach refined with coordination with the education and outreach coordinator with CIB.

1.) Guidebook published and distributed.

2.) Workshop
Discussions have taken place between Sally Boswell and Rebecca Rothweiler to outline how the audiences would be reached. A new strategy has been chosen to focus the presentations on environmentally aware and active groups in the watershed in order to provide them with the most recent data and facts regarding the health of the wetlands in the watershed to better inform their mission and their outreach to the public and decision makers. Template presentations have been created outlining the condition of Inland Bays wetlands.
Preentations:
1. CIB BOD 12/18/09
2. DNS Wilmington DE 1/7/2010
3. Delaware Wetlands Conference 1/20/10 Dover, DE
4. Dining with Progressives 2/21/2010 - Lewes, DE
5. Sussex County League of Women Voters Forum - 3/10/2010, Georgetown, DE
6. DNS Healthy Wetlands Healthy You, Georgetown DE 4/22/2010
7. Center for the Inland Bays CAC, TBD, Rehoboth Beach

3). Report Card/Indicator Document produced and presented to CIB Board and media late 2009.

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $3,500.00
OTHER FUNDS:
MATCHING FUNDS: $2,000.00
AMENDMENT FUNDS:
TOTAL: $5,500.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Watersheds

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☐ **Habitat Type :** **Restoration type :** **Acreage :** **Partners :** **Completion Date:** **Cost :**	**QAPP** ☐ **Date Completed :** **Date Approved :** **Location :**	

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Macroalgae Distribution and Abundance as a Eutrophication and Habitat Indicator in the Inland Bays*

Lead Contractor: DNREC -- Environmental Lab

Responsible Partners, Contact Info, and Roles:

Robin M. Tyler Ph.D., Project Manager
Delaware Department of Natural Resources and Environmental Control
Division of Water Resources
Environmental Laboratory Section
89 Kings Highway
Dover, DE 19901
Phone: 302-739-9294
Fax: 302-739-3491
E-mail: robin.tyler@state.de.us

Chris Bason, CIB, QA Manager

Project Status: Completed **Work Pan ID :** CIB09-15

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
HP-A,IMS-A	Meet the nutrient reduction goals of the Pollution Control Strategy
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A,G2E,G2F	Enhance monitoring and response strategies

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality
Monitoring

Overview:

Macroalgae distribution and abundance has not been monitored in the Inland Bays since a special study conducted during the spring and summer of 1999 (Tyler 2000). In the 10 years since, a Total Maximum Daily Load (TMDL) for

the Inland Bays has been completed (State of Delaware 1998), followed by implementation of a Pollution Control Strategy (State of Delaware 2008). In the Inland Bays, the recovery of eelgrass Zostera marina is a major goal of the CCMP. Eelgrass recovery may be hindered by multiple phenomena and in the Inland Bays the most significant inhibitory factor may well be heavy growth of macroalgae. Thus, in the Inland Bays, without knowledge of macroalgae density it is not possible to know whether environmental conditions will support eelgrass. The objectives of this study are to (1) see if macroalgae types, distribution and density appear remarkably different than levels observed 10 years ago (2) assess the abundance and distribution of macroalgae over a full growing season in Indian River Bay and Rehoboth Bay (3) develop a formal Standard Operating Procedure for the method being used to sample macroalgae in this study so that it can be repeated by subsequent samplers and (4) evaluate the feasibility of applying the rapid macroalgae sampling approach employed in this study as a practical means for more regular monitoring of macroalgae abundance and distribution using citizen volunteers.

Intended Results:

Quantifiication of macroalgae volume in Rehoboth and Indian River Bays for May to October 2009 and comparison with data from 1999 to explore differences between those time periods with inference to chagnes in estimated pollution loads. SOP fo future monitoring procedures and assessment of method transferance to volunteer monitors.

Outputs/Deliverables:

1. Project Data
2. Project Final Report
3. Presentation to STAC
4. Project SOPs
5. Discussion on continued monitoring

Milestones:

1. Develop QAPP (Completed: April, 2009)
2. Secure volunteer support (Completed: May, 2009)
3. Complete data collection (Completed: October, 2009)
4. Prepare final report (Initiated March, 2010. Target: April, 2010)
5. Prepare SOPs (Target: April, 2010)
6. Determine capacity for volunteer monitoring (Target: April, 2010)

Short-Term Outcomes

1. Increased understanding and awareness of status of an important Bay indicator
2. Increased understading of interrelation of the Bays ecological components
3. Increased cooperation of DNREC scientists and volunteer monitors

Intermediate Outcomes:

1. Increase in informed decision making for nutrient reduction and restoration strategies for the Bays based on project results.

Long-Term Outcomes

1. Potential for more effective resource management through decision making.

Project Progress

Progress To Date:

1. Develop QAPP (Completed: April, 2009)
2. Secure volunteer support (Completed: May, 2009)

3. Complete data collection (Completed: October, 2009)
4. Presentation of draft results at March 2010 STAC (Completed: March 2010).
5. Report Preparation (Initiated: 75% complete).

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS:	$10,000.00
OTHER FUNDS:	
MATCHING FUNDS:	$12,250.00
AMENDMENT FUNDS:	
TOTAL:	$22,250.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay, Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐

Habitat Type :

Restoration type :

Acreage :

Partners :

Completion Date:

Cost :

QAPP ☑

Date Completed : 4/3/2009

Date Approved : 4/3/2009

Location : CIB Science Coordinators Files

2009-2011 Project Reports
Ongoing

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Acreage and Condition Trends for Marshes of Delaware's Inland Bays as an Environmental Indicator and Management Tool (USEPA RARE GRANT)*

Lead Contractor: University of Delaware -- Center for Remote Sensing

Responsible Partners, Contact Info, and Roles: Chris Bason, CIB, (302) 226-8105
Amy Jacobs, DNREC (302) 672-1153
Marty Chintala, EPA, (401) 782-3090
Richard Field, UDCMES

Project Status: On-going

Work Pan ID : CIB09-002

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,HP-D,HP-F,LU-B	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1E,G2,G2E,G2F,G3,G3B,G7,G7A,G7B,G7E,G9	Integrate projected sea level rise into shoreline planning and activities

CCMP/Work Plan Goal:

Develops information to guide CCMP shoreline and wetland management goals. Addresses climate change impacts.

CWA Program Implementation: Improving Water Quality
Monitoring

Overview:

This project will integrate remote sensing tools including historical and contemporary aerial photography and satellite imagery at different spatial resolutions to provide a comprehensive history of acreage and condition change in the Inland Bays watershed and attempt to identify the major factors influencing these rates. Rates and causes will allow informed predictions about marsh acreage and condition in the future and lead to the development of management strategies for the resource. The study's methodology and results will be directly transferable to other mid-Atlantic watersheds and communicated at science and technical meetings such as NEP meetings, Society of Wetland Scientists, and the Estuarine Research Federation.

Intended Results:

1.Spatially explicit rates of marsh loss and change in condition
2.An assessment of the factors influencing these rates with a particular focus on the sudden wetland dieback event of 2006.
3.Informing state policy and restoration strategies with this information.
4.Development of an established and affordable environmental indicator for the Inland Bays.
5.Potential map of marsh migration rates for state and county landuse planning purposes.

Outputs/Deliverables:

1. Full research quality management project plan
2. Final report of data assemblage and analysis leading to a comprehensive history of acreage and condition change in the Inland Bays watershed and analysis of potentially influential factors
3. Arragned data sharing agreement (possible data transfer on harddrive as solution).
4. Marsh acreage and condition environmental indicator results and SOP
5. Management and research recommendations

Milestones:

1. Acquisition of imagery and preprocessing (Initiated: April 2010)
2. Imagery analaysis and database development (Initiated: August 2010)
3. Historical analysis of aerial photography (Target: August 2011)
4. Begin Analysis of process factors (Target: August 2011)
5. Complete factor and time series analyses (Target: August 2012)
6. Complete interview process (Target: August 2012)
7. Final Report (Target: January 2013)

Short-Term Outcomes

Increased scientific understanding of the rates of saltmarsh acreage and condition change and factors influencing these changes.

Intermediate Outcomes:

Increased public understanding of trends in acreage and condition for a valuable public resource. Increased understanding and a learning tool for resource managers involved in planning protection and restoration strategies for wetlands.

Long-Term Outcomes

Probable reduction in wetland loss due to better informed planning and policy. Potential for higher level of protection for saltmarsh resources in this and other watersheds of the State.

Project Progress

Progress To Date:

1. Interviewing project technical cooperators.
2. Selected UD Center for Remote Sensing as cooperator
3. Completed project proposal and application package to USEPA.
4. Received and addressed peer reviewer comments on proposal.
5. Awaiting award from EPA promised by end of fy09.
6. Upon delayed EPA funding developed a Prelude Project agreement and began data acquisition work.
7. Hired GIS specialist PhD candidate.
7. 75% Completed QAPP.

Year Reported 2010

Date : 06/29/2010

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $0.00
OTHER FUNDS: $60,000.00
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $60,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐ **Habitat Type :** **Restoration type :** **Acreage :** **Partners :** **Completion Date:** **Cost :**	**QAPP** ☐ **Date Completed :** **Date Approved :** **Location :**	

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Statistical Analysis of Environmental Indicators with Application to Delaware's Inland Bays*

Lead Contractor: University of Delaware -- College of Earth, Ocean, and Environment

Responsible Partners, Contact Info, and Roles: Doug Miller, Principal Investigator / Project Manager Partner
Cannon Marine Laboratory
College of Marine and Earth Studies
700 Pilottown Road
University of Delaware
Lewes, DE 19958

Project Status: On-going

Work Pan ID : CIB09-003

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
AG-A	Continue conservation planning through the Sussex Conservation District
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1	Establish and Implement a comprehensive nonpoint source pollution control program

CCMP/Work Plan Goal:

This project satisfies a number of CIB priority Work Plan goals including, 1) improving the utility of existing environmental indicators, (2) facilitating the development of new diagnostic indicators, and (3) enhancing the reliability and presentation of indicator-based decisions regarding environmental quality in the Inland Bays.

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis, Improving Water Quality Monitoring

Overview:

Environmental indicators are often used to summarize and present environmental data. Their utility derives from the ability to capture in a simple, single value the complexities and interrelationships of multivariate physical-chemical, ecological and biological data. A summary of many such factors can then be presented on a scale that is both easily interpreted and directly related to an expert judgment of system state and health.

In 2004, the CIB Scientific and Technical Advisory Committee (STAC) reported2 on eleven key environmental

indicators of particular utility to Delaware's Inland Bays. Over the past several months, the STAC has begun a process of reviewing both these existing measures and entertaining potentially new condition indicators. A special emphasis is being given to indicators that are diagnostic, i.e., indicative of a causal relationship between the environmental parameters and potential stressors. The STAC review process is deliberately incremental in order to garner as much perspective and input from as wide an audience as possible.

Factors critical to the selection of useful indicators have been outlined in a recent EPA report3 (and extended as part of the STAC update process), and these include: type of question, spatial scale, temporal scale, and environmental context (i.e., landscape and land use). Since questions of scale, acquisition of data and ensuing analysis are necessarily quantitative in nature, the effective and reliable use of these metrics should be guided by statistical principles. In practice, multiple indicators are typically used simultaneously to assess overall environmental condition, and thus use of indicators is inherently multivariate in nature. Effective interpretation and presentation of such indicators will greatly benefit from
methods, techniques and tools of multivariate statistics.

The overall goal of this project is to assist the CIB and its STAC in their re-evaluation of environmental indicators for the Inland Bays. While the final choice will be guided by the collective wisdom of the STAC, it must also be statistically sound, address as many dimensions of the environment and possible stressors as possible (but avoiding redundancy and correlation), and be easily computable and readily explainable to a wide variety of audiences. Multivariate analyses are routinely employed in environmental and ecological research studies supporting management decisions, and they are starting to appear in
materials intended for a wider audience, for example, the multidimensional scaling plot of chlorophyll, macroalgae and isotope ratios in a recent newsletter4.

Over the next year, the overall goal of this project will be met through statistical consultation that is coordinated and guided by the STAC indicator evaluation process. The proposed effort will begin with an evaluation of existing and candidate indicators with respect to established criteria3 and especially their statistical properties combined with the working table used by the STAC, resulting in a preliminary ranking. This will be followed by workshops in statistical methods, techniques and interpretation as needed by the STAC and the CIB staff. These will be led by the PI/PM Miller and a graduate assistant well-versed in all aspects of programming and data analysis. Possible topics include: overall principles of statistical inference, hand-on tutorials on standard statistical packages, and overviews of sampling designs for field studies, tests, regressions and correlations, time series and spatial data, multivariate analyses (ordination by PCA, MDS, biplots), and display and exploratory data analysis.

Additional presentations and recommendations may also be made on specific topics as communicated through the STAC and CIB staff, and possibilities include: utility of various macrobenthic indices, recommendation of resource and reference materials, evaluation of particular software or statistical applications, or review of technical reports published by or submitted to the CIB. Throughout the project period, the PI/PM will be on site one day per month (or biweekly for mornings or afternoons) to provide walk-in assistance as needed. The timetable of this project intentionally mirrors the STAC review process in order to provide input as needed throughout the effort.

While the suite of recommended indicators and chosen methods of analysis and presentation will be determined specifically for the Inland Bays, environmental indicators and multivariate analyses are used widely and should be evaluated within that broad context. Continuity of existing, proven indicators, use of historical data, and congruence of Inland Bays indicators with others used in the region is highly desirable.
Primary Objectives/Opportunity
• To improve the utility of existing environmental indicators
• To facilitate the development of new diagnostic indicators
• To enhance the statistical reliability and effective presentation of indicator-based decisions regarding environmental quality in the Inland Bays.

To achieve these objectives, we will:
- Provide statistically based comparison of candidate indicators, both existing and new, and review sampling designs to ensure maximum utility of collected data
- Conduct multivariate analysis to identify correlated (or redundant) environmental variables and ensure efficient use of

field sampling and data collection efforts
- Support the CIB, its STAC and funded researchers with statistical consultation as indicators are recorded and developed
- Offer statistical analysis workshops, hands-on experience with standard and multivariate statistical packages, graphical presentation, and walk-in consulting services.

Intended Results:

1. Development and provision of unified water quality database.
2. SOPs for data transfer to database procedures.
2. Statistical support and analyses in support of water quality index development.

Outputs/Deliverables:

1. Development and provision of unified water quality database.
2. SOPs for data transfer to database procedures.
2. Statistical support and analyses in support of water quality index development.

Milestones:

1. QAPP (Completed: January, 2009)
2. Introductory water quality subcommitee meetings (Completed: November, 2009)
3. Standardize and merge water quality databases (Completed: November, 2009)
4. Completed statistical analyses to support indicator development (Target: August, 2010)
5. Provision of SOPs for all database and statistical procedures (Target: November 2010)

Short-Term Outcomes

Increased understanding of water quality status of inland bays over period 1998 to 2009. Increased cooperation between University and DNREC scientists. Increased statistical capacity of CIB Science program. Increased public understanding of bay condition. Increased understanding of effectiveness of chemical and physical waterquality standards to facilitate restoration of desired biological endpoints.

Intermediate Outcomes:

Increased understanding of Inland Bays ecological trends, increased understanding and a learning tool for resource managers involved in planning protection and restoration strategies.

Long-Term Outcomes

Enhance monitoring capabilities of partner programs and agencies. Potential for increased resource condition due to increased public awareness.

Project Progress

Progress To Date:

1. Reached agreement on project direction and focus.
2. Participated in project WQI meetings.
3. Developed statistical approach.
4. Completed 100% of QAPP.
5. Received and began analysis of UDCMP and partial DNREC dataset.
6. Successfully merged UDCMP, DNREC, and CISNET dataset.
7. Completed development of DO subindex.
8. Began development of sampling scheme

Year Reported 2010

Date : 06/29/2010

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $10,000.00

OTHER FUNDS:

MATCHING FUNDS: $1,160.00

AMENDMENT FUNDS:

TOTAL: $11,160.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐

Habitat Type :

Restoration type :

Acreage :

Partners :

Completion Date:

Cost :

QAPP ☑

Date Completed : 6/21/2009

Date Approved : 6/21/2009

Location : CIB and UDCMES

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Long-term continuous saltmarsh monitoring in the Inland Bays*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles: Chris Bason -- CIB: Project Coordination, Data Collection, Data Analysis and Reporting
Amy Jacobs -- DNREC, WAS, WMAP: Project Coordination
Bart Wilson -- DNREC, CP: Monitoring Setup and Partial Data Analysis and Reporting

Project Status: On-going

Work Pan ID : CIB09-004

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2E,G3,G7,G7B,G7E,G9	Enhance monitoring and response strategies

CCMP/Work Plan Goal:

Enhancing Inland Bays monitoring by developing a continuous program for rapidly changing resource responding to climate change. Builds capacity for decision making CCMP goals related to shoreline and wetland management.

CWA Program Implementation: Improving Water Quality Monitoring

Overview:

A long-term continuous monitoring site is being managed in a representative fringing saltmarsh of the Inland Bays to gather baseline data on weather, hydrology, chemistry, and marsh elevation and to relate these parameters to each other, sea level rise, and any potential new sudden wetland dieback events that may occur in this or other marshes of the Inland Bays. Two continuous monitoring stations will record ground water and surface water depth, pH, salinity and water temperature. Regular chemistry sampling will also occur for selected parameters. Three sediment elevation tables will be installed. One weather station is installed. The project will provide needed background data on the natural variation in the above parameters and their interactions. The project will attempt to relate these parameters to each other, sea-level rise and potential new sudden wetland dieback events to better understand the stressors affecting the highly impacted saltmarshes of the inland Bays.

Intended Results:

1. Purchase and install all monitoring instruments (partially completed).
2. Collect data and maintain instruments.
3. Develop long-term monitoring plan.
4. Summarize and publish data at regular intervals for the scientific community.
5. Pursue funding to expand the site to a continuous monitoring network for Inland Bays saltmarshes.
6. Opportunity to use information in formulation of wetland protection and restoration strategy for the Inland Bays.

Outputs/Deliverables:

1. Fully operational, long-term, continuous hydro-metero marsh monitoring site
2. Baseline monitoring data on marsh processes
3. Capacity for continuous monitoring data during SWD event.
4. Network of 4 marsh elevation monitoring stations in the Inland Bays.
5. Monitoring data to inform wetland management.

Milestones:

1. Initial monitoring station setup (Completed: September 2009)
2. Begin and maintain data collection (Ongoing)
3. Initial data analysis (Ongoing)
4. Complete installation of additional Sediment Elevation Tables (Target: March 2011)
5. First data report (Target: February 2011)

Short-Term Outcomes

Increased knowledge of local saltmarsh hydrophysiochemistry and marsh elevation using continuous monitoring techniques.

Intermediate Outcomes:

Increased knowledge of local saltmarsh hydrophysiochemistry using continuous monitoring techniques. Technical transfer to larger scientific community. Increased understanding of inter-relation of study parameters.

Long-Term Outcomes

Increased knowledge of local saltmarsh hydrophysiochemistry using continuous monitoring techniques. Increased understanding of inter-relation of study parameters. Use of this information in future restoration projects and in restoration and protection strategy for Inland Bays saltmarshes.

Project Progress

Progress To Date:

1. Installed monitoring equipment and have begun to collect data.
2. Maintained monitoring equipment.
3. Began to select sites for new SET tables.
4. Repaired malfunctioning level loggers, reinstalled GW wells, measured SETS.
5. Selected new SET sites.
6. Conducted fall 2009 SET sampling.
7. Identified and replaced additional malfunctioning level loggers.
8. Re-re-installed groundwater wells.
9. Recalibrated anemometer.
10. Began installation of new SET marshes at Slough's Gut and Piney Point.
11. Received full set of meters to replace malfunctioning equipment.
12. Began investigating method to repair faulty SET components.

Additional Project Information

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $2,500.00

OTHER FUNDS: $25,800.00

MATCHING FUNDS:

AMENDMENT FUNDS:

TOTAL: $28,300.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title: NA

Author : NA

Abstract : NA

Restoration ☐

Habitat Type :

Restoration type :

Acreage :

Partners :

Completion Date:

Cost :

QAPP ☑

Date Completed : 12/1/2008

Date Approved : 12/1/2008

Location : Center for the Inland Bays

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Center for the Inland Bays Environmental Indicators Project*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles: Chris Bason -- CIB, 302 226-8105, Project Coordination
Sally Boswell -- CIB, Outreach and Publication Assistance
CIB STAC subcommittees, Project Support and publication review

Project Status: On-going

Work Pan ID : CIB09-005

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,IMS-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2E,G3,G8,G8C,G9,G9F	Enhance monitoring and response strategies

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis, Improving Water Quality Monitoring

Overview:

The CIB STAC will update and assess the current environmental indicators, explore the need for and identify new indicators, and develop a strategy to effectively collect and report this information over time to the public and policy makers. This initiative will also include a comprehensive assessment of progress made towards implementing the CCMP. The purpose of this process is to develop the Inland Bays Environmental Indicators into the most complete and coherent explanation of the current ecological condition of the Bays and their watershed, and to relate this to the progress towards their restoration in a manner that regularly informs and involves the public.

Year Reported 2010

Date : 06/29/2010

Intended Results:

1. Develop and implement a plan to revise and expand the existing environmental indicators into the most complete and coherent explanation of the current condition of the Inland Bays and their watershed.
2. Relate stressors and management actions to changes in bay health.
3. Develop and implement a long term indicator reporting strategy.

Outputs/Deliverables:

• Review and update existing environmental indicators (completed).
• Select and conceptually develop new environmental indicators (ongoing).
• Develop and implement an environmental indicators reporting strategy.

Milestones:

1. Review and update existing environmental indicators (ongoing)
2. New indicator release (Interim Timeperiod): Recreational Water Quality and Wetland Condition (Completed December 2010)
3. Indicator release 2010 (Target: 3 Individual releases throughout 2010, Initiated: Recreational Water Quality Report 2nd ed. June 2010).
4. Final Indicator Report (Target: January 2011).

Short-Term Outcomes

Increased stakeholder understanding about trends in watershed health over time. Increased resource manager understanding of the interrelations between watershed stressors and condition.

Intermediate Outcomes:

Expected significantly more informed expectant attitudes in general public and policy makers for increased and maintained pollution control.

Long-Term Outcomes

Overall improved environmental condition (chemical and biological) in response to increased action from provision of easily understandable condition assessment.

Project Progress

Progress To Date:

1. Organized the Frontiers in Nutrient Management Conference that highlighted some of the indicators work.
2. Contracted with Doug Miller of UDCMES to refine a water quality index.
3. Coordinated 2 WQI subcommittee meetings, administered statistical support project.
4. Continued analysis of bacteria data.
5. Produced, distributed, and presented recreational water quality indicato
6. Began work on wetland condition indicator.
7. Developed timeline for project completion.
8. Produced, distributed, and presented wetland condition indicator.
9. 50% completed entire project.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $10,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $0.00
AMENDMENT FUNDS:
TOTAL: $10,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Benthic diatoms as indicators of water quality in Delaware's Inland Bays*

Lead Contractor: UDCMES

Responsible Partners, Contact Info, and Roles:
Kathryn J. Coyne, Assistant Professor
University of Delaware, College of Marine and Earth Studies
700 Pilottown Rd., Lewes, DE 19958
Phone: 302-645-4236, FAX: 302-645-4007
kcoyne@udel.edu

Project Status: On-going

Work Pan ID : CIB09-007

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G8,G8C,G9	Ensure, to the maximum extent possible, all planning and management activities related to the Inland Bays involve public participati, iniInformation and education e

CCMP/Work Plan Goal:

This project satisfies a number of CIB priority Work Plan goals including, (1) facilitating the development of new diagnostic indicators, and (2) enhancing the reliability and presentation of indicator-based decisions regarding environmental quality in the Inland Bays.

CWA Program Implementation: Improving Water Quality
Monitoring

Overview:

Benthic diatoms are excellent indicators of environmental change in aquatic ecosystems and are routinely used to monitor water quality in freshwater ecosystems in the US and Europe (e.g. Potapova and Charles 2007). Diatoms have several attributes which make them ideal for water quality assessments (summarized from McCormack and Cairns 1994):

1. Diatoms are ubiquitous and biologically relevant. Diatoms are components of virtually every aquatic habitat and many species are globally distributed. As primary producers, diatoms are also vital members of aquatic ecosystems

and function at the interface between biotic and abiotic components of the food web. In addition, diatom assemblages generally contain a large number of species, so that changes in population structure provide an “information-rich” system for ecological analysis.

2. Diatom assemblages provide excellent continuity through time and space. Although seasonal changes in diatom populations occur, community-level characteristics are maintained throughout the year. Furthermore, the ubiquity of diatom assemblages within a geographical region provides spatial continuity for fine-scale resolution of environmental impacts.

3. Diatoms are sensitive to a broad range of environmental stressors over small temporal and spatial scales. Benthic diatoms have relatively high growth rates and respond rapidly and predictably to alterations in water chemistry. When compared to minimally-impacted reference sites, the ecological conditions of other sites along a gradient are reflected by differences in diatom abundance and diversity.

4. Diatom indicators provide information about ecosystem health that is complementary to information provided by other indicator organisms. As direct recipients of increased nutrient loading, changes in diatom community structure are reliable indicators of changes in trophic status. Other commonly used indicators, such as invertebrate and fish populations, respond better to changes in their physical habitat, such as increased sediment loading or temperature.

5. Sampling protocols for diatoms have little impact on the environment. While sampling higher organisms may be destructive to the environment or detrimental to indigenous populations, diatom sampling rarely impacts the environment or other trophic levels.

6. Diatoms indicators are cost effective. In contrast to indicators species from higher trophic levels, large numbers of benthic samples can be easily collected and rapidly processed for molecular analysis of diatom species.

Although the value of diatom indices for water quality assessment in freshwater ecosystems has long been recognized, recent research has also demonstrated the utility of benthic diatoms as reliable indicators of water quality within marine systems (e.g., Frankovich et al, 2006; Weckstrom and Juggins 2005; Webber et al., 2005; Marshall et al., 2003). In Delaware’s Inland Bays (DIB), however, there has been only one study of benthic diatoms, as paleoecological indicators of climate change (Beasley, 1987). This investigation revealed an increase in diatom diatom abundance and decrease in diversity with increased agricultural activities (and nutrient input) over time. In the most recent sediments, Beasley (1987) also identified diatom species indicative of nitrogen pollution with declining oxygen levels. A study of representative salt marsh habitats in nearby Canary Creek, Lewes, DE also investigated the effects of nutrient enrichment on diatom assemblages and found that long-term exposure to nutrient stress resulted in a shift in community structure and a decrease in diatom diversity (Sullivan 1976). These results, along with the considerable amount of data provided in studies on other systems, suggest that diatom assemblages in Delaware’s Inland Bays may be useful indicators of environmental conditions over a range of temporal and spatial scales.

Intended Results:

• Explore the impact of nutrients in structuring benthic diatom assemblages in Delaware’s Inland Bays.
• Evaluate tolerance of potential indicator species within diatom assemblages to nutrient input.
• Make recommendations for appropriate diatom indicators to CIB and DNREC.

Outputs/Deliverables:

1. Analyze archived DNA from sediments, statistical analysis of results (Fall ’08)
2. Sequence DNA for species identification (Fall ‘08/Winter ’09)
3. Develop and test high-throughput assays (Winter ‘09/Spring ’09)
4. Collect and analyze sediments from selected sites of interest (Spring ‘09/Summer ’09)
• Mesocosm experiments (Summer ’09)
• Analyze and evaluate results mesocosm experiments (Summer ’09)
• Write reports, make recommendations for diatom indicator species (Summer ‘09/Fall ’09)

Year Reported 2010

Date : 06/29/2010

Milestones:

1. Complete data analysis (Target: September 2010)
2. Complete final report with recommendations for indicator (Initiated: 2009, Target: August 2010, Extended: SEP 2010).

Short-Term Outcomes

New Inland Bays environmental indicator.

Intermediate Outcomes:

Increased understanding of Inland Bays ecological and water quality trends; increased understanding and a learning tool for resource managers involved in planning protection and restoration strategies.

Long-Term Outcomes

Potential enhancement of monitoring capabilities of partner programs and agencies.

Project Progress

Progress To Date:

Updated project to include sites from Maryland Coastal Bays for comparison.

DNA extracted from sediments that were collected by Kevin Portune during a previous CIB-funded project were PCR-amplified and fractionated by denaturing gradient gel electrophoresis. Gel images were evaluated to determine if diatom communities within bays were more similar to each other than diatom communities between bays (they are not), and are now being evaluated with respect to nutrient concentrations, habitat and land-use. I also established a collaboration with Eric Schott (UMD), and exchanged DNA collected from the DIB with samples collected during his research on inland bays from Maryland.

Collected samples from the DIB this past summer and fall, and from several sites in the MD coastal bays over the summer. These samples have been analyzed by DGGE and will be included in our statistical analysis, along with chlorophyll, total organic carbon and other sediment characteristics.

Patchiness in the diatom assemblages sampled from 4 sites in the DIB was evaluated and seasonal changes are currently being evaluated. Field and mesocosm experiments are underway to determine the relative effects of light versus nutrient concentrations on the diatom community. A final more expanded round of sampling will occur in the Inland Bays and Maryland Coastal Bays in summer 2010 and indicator species will also be selected using statistical software. Target date for completion is SEP 30, 2010.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $17,395.00
OTHER FUNDS:
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $17,395.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay, Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☐

Habitat Type :

Restoration type :

Acreage :

Partners :

Completion Date:

Cost :

QAPP ☑

Date Completed : ##########

Date Approved : 10/20/2008

Location : Center for the Inland Bays

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Eelgrass Planting Project in Delaware's Inland Bays*

Lead Contractor: DNREC - DSWC - SWMS

Responsible Partners, Contact Info, and Roles:
Ariane K. Nichols, Environmental Scientist II
Division of Soil and Water Conservation
Shoreline and Waterway Management Sec.
89 Kings Highway
Dover, Delaware 19901
(302) 739-9921

Project Status: On-going

Work Pan ID : CIB09-008

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
HP-A	Create a Resource Protection Area management plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A	Promote recurrence of submerged aquatic vegetation

CCMP/Work Plan Goal:

This project directly correlates with the objectives of the CCMP, Habitat Protection Action Plan. Within this Action Plan it is stated that: "There are presently no substantial SAV beds in the Inland Bays; potential habitat may currently be limited and existing habitat is marginal. For these reasons, and because of other concurrent uses of the Bays, protecting areas where planting is being attempted is both feasible and desirable. If SAV is to become re-established, it must be protected. Healthy SAV beds will become primarily shellfish spawning sanctuaries and finfish nursery areas."

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The proposed project involves collecting eelgrass seeds from plants within Virginia's Chesapeake Bay, storing these seeds in a controlled storage tank, and distributing the seeds into areas within the Inland Bays that are deemed likely to support the growth of these seeds. This project would also involve surveying the areas within the Inland Bays that have existing eelgrass beds. Information that will be gathered at these sites will include water depths, salinity, and dissolved oxygen. This information will then be used to determine where the best sites are for establishing new eelgrass beds.

Collection of the seeds would be done manually with human labor collecting the seeds by hand in the spring.

Collecting the seeds would be done in coordination with Virginia's SAV restoration program and done in a manor to reduce any damage to the established plants within the Chesapeake Bay.

After the seeds were collected they would be divided into two halves. Half of the seeds would be dispersed in the spring using a floating tethered bag method shortly after the seeds are collected. The other half of the seeds would be placed in a pool and maintained in a cool and dark area to reduce the chances of any algal growth within the pool. This pool will be located at the Division of Soil and Water Conservations new facility in Lewes, Delaware. These seeds that will be pool kept through the summer will then be broadcast by hand in the fall, shortly before germination of the seeds will occur. Monitoring of the seeds will occur throughout the year to determine the success of the planting efforts.

Intended Results:

• to increase the population of eelgrass within the Inland Bays
• provide for increased benthic habitat because eelgrass beds provide habitat for juvenile fisheries species.
• to survey the existing eelgrass beds within the Bays and gather information on characteristics of these areas that support the growth of these bed
• to establish a system for eelgrass seed collection, dispersal, and monitoring that will become an annual program within the Department and Division.

Outputs/Deliverables:

Survey of existing eelgrass beds
Collect seeds in Chesapeake Bay, disperse half of the seeds in tethered floating bag method, place half of seeds in a monitored pool.
Monitor pool with eelgrass seeds.
Hand dispersal of seeds that have been in pool.
Monitor data on seed dispersal areas for germination.

Milestones:

Updated after project setbacks in 2009.
1. Information transfer meeting with DNREC, CIB (Target: February, 2010)
2. Setup of storage tanks for eelgrass seeds (Initiated June, 2010. Target: April, 2010)
3. Collection of eelgrass seeds (Completed: June, 2010)
4. Complete distribution of seeds (Target: October, 2010)
5. Germination monitoring (Target: April, 2011)
6. Final Report (Target: May, 2011)

Short-Term Outcomes

Transfer of institutional knowledge of Inland Bays SAV restoration efforts to new group of practicioners. Development of relationships necessary to secure seed source for restoration.

Intermediate Outcomes:

Exploration of an alternative SAV restoration methodology.

Long-Term Outcomes

Increase in acres of SAV and associated water quality improvements.

Project Progress

Progress To Date:

a. Contacts are being made with representatives from other areas that have an establish eelgrass population to make arrangements for seed procurement. Eelgrass beds within the Inland Bays are being monitored to determine if seeds will be available from those plants. When a time for harvesting seeds has been determined, the necessary equipment will be purchase for this harvesting and storage needs.
b. Dates are being scheduled and coordinated with the Soil and Water survey team to map the boundaries of existing eelgrass bed.
c. A building has been secured to be used for the storage of seeds through the summer months for the next two years. An area within the Soil and Water Lewes facility is being identified for the building of a structure to store seeds and continue restoration initiatives in future years.
D. Project timeline for 2010 set up.
E. Eelgrass seeds collected from Maryland Coastal Bays in June 2010 for summer storage in UD facility.

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $4,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $4,000.00
AMENDMENT FUNDS:
TOTAL: $8,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title: NA

Author : NA

Abstract : NA

Restoration ☑

Habitat Type : subtidal

Restoration type : Re-establishment

Acreage :

Partners :

Completion Date:

Cost : $0.00

QAPP ☐

Date Completed :

Date Approved :

Location :

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Volunteer Intensive and Representative Condition Assessment of the Bays (VIRCAB)*

Lead Contractor: University of Delaware Seagrant Citizen Monitoring Program

Responsible Partners, Contact Info, and Roles:

Joseph G. Farrell, UD SGMAS Marine Resource Management Specialist, and Program Manager, UD Citizen Monitoring Program
University of Delaware, College of Marine and Earth Studies
204H Cannon Laboratory, 700 Pilottown Road, Lewes, DE 19958
302-645-4250 (phone)
jfarrell@udel.edu (e-mail)

Edward Whereat, Ph.D., Program Coordinator,
UD Citizen Monitoring Program University of Delaware, College of Marine and Earth Studies
105 Pollution Ecology Lab
700 Pilottown Road
Lewes, DE 19958
302-645-4252 (phone);
whereat@udel.edu (e-mail)

Robin Tyler, Ph.D.
Department of Natural Resources & Environmental Control
Laboratory Services Section
89 Kings Highway
Dover, DE 19903
(302) 739-9941
robin.tyler@state.de.us

Project Status: On-going **Work Pan ID :** CIB09-013

Project Description

Year Reported 2010

Date : 06/29/2010

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality Monitoring

Overview:

The UD Citizen Monitoring Program has been collecting water quality data in the Inland Bays since 1991, primarily from shoreline bulkheads, docks or piers in tributaries and the main bays.

Our data provides valuable trend information over 17 years. In general, our coverage is more comprehensive in the tributaries than the main bays where we have recruited volunteers from the many tributary based waterfront communities. On the other hand, the existing suite of environmental water quality indicators have been based on the habitat requirements of Eelgrass (Zostera marina), the keystone species of submerged aquatic vegetation (SAV) for the Inland Bays, and as such, they are only applicable to the main bays (Secchi depth, Chlorophyll a, Total Suspended Solids, Dissolved Inorganic Nitrogen and Phosphorus). Over the years, our volunteers have expressed interest in boat sampling. To be effective, this effort would require additional oversight and modified sampling design. It would, however, provide a new dimension to our Citizen Monitoring Program effort and offer the potential benefit of an additional data source for an SAV indicator.

This pilot project will extend our monitoring capabilities to sample open water bay sites by boat, and will provide sequential monthly assessments from May through September that will be reported to the public on our web page. The project will offer comparisons to previous research on the habitat requirement of Eelgrass in the Inland Bays done by researchers at the UD CMES and DNREC.

In addition, other pertinent indicators will also be included in the study, such as Dissolved Oxygen, the abundance of Macroalgae and Harmful Phytoplankton blooms, and the levels of fecal bacteria that are used as an indicator of the safety of recreational contact (Total Enterococcus).

In the past, the Center for Inland Bays has supported our previous pilot efforts, including the Phytoplankton Monitoring Program, which has become a highly successful core program.

Intended Results:

• To form a small group of volunteers (6 boats, with teams of 2-3 volunteers per boat) committed to using their personal vessels to collect water quality samples from the main bays on a monthly basis during summer 2009.
• To focus on measuring parameters that are core diagnostic environmental indicators for

Eelgrass habitat requirements (*), or other indicators routinely used by EPA or DNREC (**i.e. things for which standards exist).

Parameters measured by volunteers on boat: Secchi Depth* and Water Depth, Water Temperature and Salinity, Dissolved Oxygen, Macroalgae abundance (by grapple hook), Parameters measured by laboratory analysis: Chlorophyll a* and Total Suspended Solids, Dissolved Inorganic Nitrogen* and Phosphorous, HAB identification and enumeration, Total Enterococcus**

• To compare data from the main bays to data collected from existing shoreline sites which largely are in the tributaries.

• To compare results to previous environmental indicator studies, and to form a low cost option of continuing sampling of the bays by volunteers with boats in future years.

Outputs/Deliverables:

• October 1, 2008 to April 30, 2009- Coordination, Planning and Training of Volunteers
• May 1, 2009 to September 30, 2009- Sampling, Analysis and Reporting

Milestones:

Updated milestones after project extension to 2010
1. Produce new project timeline (Initiated: January 2010, Target: March 2010).

Short-Term Outcomes

expand citizens' monitoring effort

Intermediate Outcomes:

provide additional monitoring data sets

Long-Term Outcomes

enhance monitoring capabilities of partner programs and agencies

Project Progress

Progress To Date:

1. Project meeting with CIB decided that project will be put on hold to wait for the results of Tyler's 2009 macro algae study's volunteer work and the Environmental Indicators Project Water Quality Subcommittee recommendations on how to increase sampling representation and efficiency between DNREC and UDCMP initiatives.
2. Project extension for FY2010 was applied for and granted.
3. Initial project proposal redefined to incorporate macro-algae results and subcommittee meeting results.
4. Two mainstem dissolved oxygen sampling events were completed.
5. Modified shoreline algae sampling method developed and initiated at a sub-set of existing sites.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $25,000.00
OTHER FUNDS:
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $25,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Significant

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☑	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Sensitive Shallow Water Area Markings*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:
E.J. Chalabala -- Project Manager
Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, DE 19971
(302) 226-8105
restoration@inlandbays.org

Project Status: On-going

Work Pan ID : CIB10-001

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,HP-A,HP-C	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A,G2F,G3,G3B,G6,G6D,G9,G9F	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality
Monitoring

Overview:

Boating on the bays may cause a number of environmental impacts, including increasing the amount of turbidity in the bays. These impacts, though not often visible, can impact bottom-dwelling plant and animal communities. Existing boating regulations in the Inland Bays include restricting boat speed in designated areas (no-wake zones), which include some shoreline shallow areas. However, many shallow water sensitive areas remain unmarked and susceptible to impacts of watercraft. In addition, educational materials (Inland Bays Boaters' Guide) are available, which inform the public about shallow water impacts, but they may not be reaching all pertinent boaters. The Inland Bays Water Use Plan Implementation Committee (WUPIC) has identified marking sensitive shallow water areas as a

priority action. The WUPIC will collaborate with the Department of Natural Resources & Environmental Control and the USCG to inventory and map sensitive shallow water areas (e.g. resource protection areas or habitat restoration sites) in the bays. Subsequently, appropriate signage will be created and installed near these sensitive shallow water areas to restrict speed of craft in sensitive areas, not just for safety or property concerns, but to protect living resources as well.

Intended Results:

1. Evaluate and document the progress towards implementation of the Inland Bays Water Use Plan.
2. Suggest plausible strategies to ensure achieving successful execution of the plan.

Outputs/Deliverables:

1. Inventory and map of shallow water areas
2. Developed signs.
3. Installed signs.

Milestones:

1. Inventory and map sensitive shallow water areas (e.g. resource protection areas or habitat restoration sites) in the bay.
2. Develop and install appropriate signage near sensitive shallow water areas to restrict speed of craft in sensitive areas, not just for safety or property concerns, but to protect living resources as well.

Short-Term Outcomes

Intermediate Outcomes:

Long-Term Outcomes

1. Minimize environmental impacts, avoid user conflicts, and improve conditions related to water use activities in Delaware's Inland Bays.

Project Progress

Progress To Date:

In collaboration with the Division of Fish & Wildlife/Enforcement Section, the Inland Bays Water Use Plan Implementation Committee (WUPIC) evaluated areas where boating safety and environmental impacts are a serious concern. The navigable channel known as Massey's Ditch, which connects Rehoboth Bay and Indian River Bay, was identified as a priority area because of heavy boat congestion and boat wake mpacts on colonial-nesting waterbird habitat. In response, the WUPIC recommended actions, including extending the "Shallow- No Wake" zone past Middle Island in Indian River Bay and establishing a new navigable channel around Lynch Thicket. A bathymetric survey was completed by the Department of Natural Resources & Environmental Control/Dredge Section, which confirmed that sufficient depth exists for a marked channel. CIB staff has contacted a local marine construction company to obtain quotes for the installation of navigational markers in the new channel. It is anticipated that markers will be produced and installed before the end of summer 2010.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $5,000.00
OTHER FUNDS:
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $5,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *James Farm Kiosk & Educational Signage*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles: Sally Boswell -- Project Manager
E.J. Chalabala
Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, DE 19971
(302) 226-8105
outreach@inlandbays.org

Project Status: On-going

Work Pan ID : CIB10-002

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G9,G9C,G9F	Ensure, to the maximum extent possible, all planning and management activities related to the Inland Bays involve public participati, iniInformation and education e

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality Monitoring

Overview:

The James Farm Ecological Preserve is owned by Sussex County and managed by the Center for the Inland Bays. It is open to the public every day of the year from sun up to sun down. In addition to thousands of visits by residents and visitors each year, James Farm is host to about 1,000 7th and 8th grade middle school students who come to the Farm for a full day of instruction each school year. A kiosk was built next to the parking lot as a point for providing information to visitors, but permanent signage, waterproof 'cabinets' for posting information, and waterproof brochure

racks need to be designed, built and installed to make the kiosk functional for its intended use.

Intended Results:

Improve the education of visitors to the James Farm through an updated educational kiosk.

Outputs/Deliverables:

Improved educational kiosk at the James Farm.
Permanent trail markers to direct students and visitors

Milestones:

1. Assess and evaluate current information provided on signage at the James Farm (Target:_____)
2. Contract with sign fabricator for design and fabrication of new signage for the James Farm Ecological Preserve (Target:_____)
3.Install new signage and complete needed improvements on existing kiosk (Target:_____)

Short-Term Outcomes

1. Provide citizens and students with timely, seasonal information about conditions and opportunities at the James Farm Ecological Preserve.

Intermediate Outcomes:

1. Change the behavior of visitors through education and awareness regarding their impact on the Ecological Preserve and the watershed.

Long-Term Outcomes

1. Provide a 'satellite location' for watershed education and citizen awareness.
2. Increase in watershed education for residents and out of state visitors

Project Progress

Progress To Date:

Trail markers
Contractor has been identified to produce trail markers
Location of trail markers has been determined
Design of trail markers has been completed and approved

Kiosk
Evaluation of kiosk content needs has been completed.
Designer has been selected

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $5,000.00

OTHER FUNDS:

MATCHING FUNDS:

AMENDMENT FUNDS:

TOTAL: $5,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Indian River Bay, Indian River Bay WS

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Aquaculture Charette*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles: EJ Chalabala -- Project Manager

Project Status: On-going

Work Pan ID : CIB10-003

Project Description

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G6,G6A,G6D,G9,G9C	Identify existing use patterns and develop preferred use areas

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality
Monitoring

Overview:

Over the past several years, the CIB, in collaboration with the University of Delaware's Marine Advisory Program and Delaware State University, has successfully demonstrated the viability of growing shellfish in the Inland Bays using a variety of aquaculture techniques and methods. These include the off-bottom culture of oysters using Taylor floats and other commercial aquaculture gear. In response to recent inquiries regarding the potential for commercial shellfish aquaculture operations in Delaware's Inland Bays, the CIB proposes to organize and host a one-day charrette to explore the feasibility of shellfish aquaculture operations in Delaware's Inland Bays. Invited guests will include technical experts, resource managers, and policy and decision –makers. Proceedings from the charrette will be published and distributed to local policy and decision-makers as key findings concerning this emerging issue.

Year Reported 2010

Date : 06/29/2010

Intended Results:

Successful execution of a charette to examine the feasibility of aquaculture operations in the Inland Bays and transfer of the results to policy makers.

Outputs/Deliverables:

1. Charrette
2. Charette proceedings and summary for decision makers.

Milestones:

1. Plan, develop, and schedule a one-day charrette on commercial aquaculture in the Inland Bays
2. Host one-day charrette at a preferred location in the Inland Bays watershed
3. Compile data, record comments/notes and publish the proceedings from the charette
4. Distribute published proceedings to key policy and decision-makers.

Short-Term Outcomes

1. Increase awareness about the potential for and feasibility of establishing commercial shellfish aquaculture ventures in Delaware's Inland Bays.

Intermediate Outcomes:

Long-Term Outcomes

Project Progress

Progress To Date:

CIB staff met with the Aquaculture Specialist from the University of Delaware/Sea Grant Marine Advisory Service to initiate planning activities. The "charette" concept was abandoned in favor of a "workshop" titled "Shellfish Aquaculture in Delaware's Inland Bays: Status, Constraints & Opportunities." A $2,500 grant was awarded to CIB by the University of Delaware/Coastal Communities Sustainability Initiative to support the workshop. Historical background concerning the shellfish industry in Delaware (Inland Bays and Delaware Bay), shellfish research and restoration, and opportunities and benefits of shellfish aquaculture was assembled in preparation for the workshop.

Additional Project Information

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $3,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $0.00
AMENDMENT FUNDS:
TOTAL: $3,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay, Indian River Bay WS

Latitude:

Longitude:

Project Leveraging Role

Year Reported 2010

Date : 06/29/2010

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *1000 Raingardens for the Inland Bays*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:
Sally Boswell -- Project Manager
Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, DE 19971
(302) 226-8105
outreach@inlandbays.org

Project Status: On-going

Work Pan ID : CIB10-004

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1C,G1E,G2,G3	Adopt the most effective Best Management Practices's to provide maximum ground and surface water protection

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The CIB, in collaboration with EPA Region III, will engage in an ambitious three year initiative to create 1,000 rain gardens in the Inland Bays watershed. Preliminary activities have already started in the spring of 2009 with the launch of the Center for Inland Bays local campaign. This will be followed by intensive efforts to promote and install rain gardens in 2010 and 2011.

Intended Results:

1. Coordination with other partnerships and stakeholders with activities such as programs such as the Delaware Nature Society's Backyard Habitat program, Project NEMO, etc.
2. Increased community and neighborhood involvement in improving water quality
3. Promotion of low-impact development
4. Dissemination of information about rain gardens and green solutions
5. Promotion of native plants and local biodiversity
6. Training for partners and participants
7. Education of students, Scouts, clubs, and related groups
8. Raiin garden registration and monitoring
9. Marketing through the media
10. Outreach at farmers' markets, fairs, and festivals
11. Friendly cross-jurisdictional competitions,
12. Special outreach efforts to reach youth, at-risk youth, the elderly, the disabled and foreign-language communities
13. Adoption of policies and/or ordinances that promote green best management practices to prevent pollution and mitigate stormwater run-off to our Estuaries

Outputs/Deliverables:

Milestones:

Coordination and Collaboration:
1. Continue to convene Partners Forum to assist in Campaign design and implementation
2. Identify sponsors and fundraising opportunities

Education and Outreach:
1. Udate/distribute outreach/marketing materials, as needed
2. Maintain Campaign website
3. Update media packets
4. Conduct training workshop (by request)

Implementation:
1. Seek needed authorities and permission to install demonstration rain gardens
2. Design and install rain gardens in public places (to increase visibility)
3. Work with willing local governments to integrate 'green design' into policies and programs
4. Intiate a Rain Garden Competition (Estuary – wide)
5. Intiate a Corporate Lands RG focus in coordination w/partners working w/corporations (DNS, etc.)

Short-Term Outcomes

1. educate property owners, businesses, developers, and students about water quality, native plants, and green solutions
2. engage citizens in practical "backyard" solutions for water quality improvement

Intermediate Outcomes:

1. increased community and neighborhood involvement in improving water quality
2. adoption of policies and/or ordinances that promote green best management practices to prevent pollution and mitigate stormwater run-off

Long-Term Outcomes

1. Increase in the number of rain gardens implemented in the Inland Bays watershed
2. Decrease in nutrient contributions to the Inland Bays

Project Progress

Year Reported 2010

Date : 06/29/2010

Progress To Date:

-Completion of 1000 Rain Gardens for the Inland Bays brochure--2,500 copies printed. The brochure will be distributed at community events, libraries, speaking engagements and on line on our website.
-Speaking engagements completed with 3 garden clubs, 2 Homeowner Associations, 1 Scout troop, and the Environmental Committee of the Town of Fenwick Island about the benefits of rain gardens and how to create them
-Funding approved to create demonstration rain gardens at three sites in the watershed through the regional Rain Gardens for the Bays initiative
-Plans approved and funding obtained to create the first demonstration rain garden at a church in the watershed--partnering with a local church and a Girl Scout troop
-Produced a 1000 Rain Gardens for the Inland Bays exhibit. It was the theme of the 2009 Gardening for the Bays Native Plant Sales and was visited by approximately 250 people at that event. We did three special programs entitled, "Rain Gardens for Backyard Habitats," Native Plants for your Rain Garden, and Attracting Pollinators to your Rain Garden. Approximately 75 people attended one of these events.
-We also exhibited at a Green Fair at a local church where it was seen by approximately 250 people and at the 2009 Coast Day event where it was visited by approximately 500 people.

Additional Project Information

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $10,000.00
OTHER FUNDS:
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $10,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Watersheds

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐ **Habitat Type :** **Restoration type :** **Acreage :** **Partners :** **Completion Date:** **Cost :**	**QAPP** ☐ **Date Completed :** **Date Approved :** **Location :**	

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Hard Clam Density and Distribution Survey*

Lead Contractor: DNREC - WAS

Responsible Partners, Contact Info, and Roles:
Mike Bott -- Project Manager
DNREC - WAS

Chris Bason -- Project QA Manager
Center for the Inland Bays

Seasonal Intern -- Research Assistant
Center for the Inland Bays

Rick Cole -- Data Modeler
DNREC -- FWS

Project Status: On-going

Work Pan ID : CIB10-005

Project Description

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2B,G2E,G3,G3D	Enhance monitoring and response strategies

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality Monitoring

Overview:

This two year project will resurvey the Inland Bays for hard clam and other shellfish density and distribution. Hard clams are the bays most valuable commercial and recreational fishery and have not been surveyed since the 1980s. Their biomass, year class, and distribution will be repeat surveyed in Rehoboth Bay in 2010 and in Indian River and

Little Assawoman Bay in 2011. Data will be compared with previous measurements and provided to the DNREC FWS for use in management models and the Inland Bays Shellfish Management Plan. Final report and a report for public consumption will be prepared. Data will be used as an environmental indicatorData is necessary for any aquaculture practices to occur.

Intended Results:

1. Biomass and distribution survey of hard clam resource in the Inland Bays.
2. Ancillary information on other shellfish speices in the Inland Bays.
3. Scientific and public reports.

Outputs/Deliverables:

1. Final report
2. Full data delivery to DNREC FWS
3. Public education product/indicator product
4. Potential scientific journal article.

Milestones:

1. Develop QAPP (Initiated: October, 2009; Target: March, 2010, Completed: March, 2010)
2. Finalize Inland Bays Boat use procedures (Initiated: October 2009; Target: March 2010, Completed: March, 2010).
3. Complete sampling for Rehoboth Bay (Initiated: May 2010, Target: October 2010)
4. Complete data analysis and preparation for Rehoboth Bay (Target: April, 2011)
5. Complete sampling for Indian River and Little Assawoman Bay (Target: October, 2011)
6. Complete data analysis and preparation for Indian River and Little Assawoman Bay (Target: April, 2012)

Short-Term Outcomes

1. Increased understanding of the status of hard clam resource by resource managers and decision makers.
2. Increased awareness by public of the economic and environmental importance of hard clam resoure.

Intermediate Outcomes:

1. Development of improved hard clam management models using new data through contemporary information that can set limits for sustainable harvest and other management goals
2. Improved monitoring capacity for hard clams.
3. Information necessary to decide on feasibility of aquaculture operations.

Long-Term Outcomes

NA

Project Progress

Progress To Date:

1. Initiated work on QAPP and project agreement.
2. Pursuing bids for equipment fabrication and purchase.
3. Identified DNREC FWS partner for scientific publication.
4. Initiated Inland Bays boater use policy work in CIB.
5. Completed QAPP, boat policy, equipment purchase, and staff procurement.
6. Initiated sampling and QAPP excercises.

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination : Sole Source

Amendment: ☑

Amendment Source: CE9939900

CIB FUNDS: $10,000.00

OTHER FUNDS:

MATCHING FUNDS:

AMENDMENT FUNDS: $5,500.00

TOTAL: $15,500.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☑	
Habitat Type :	**Date Completed :** 3/1/2010	
Restoration type :	**Date Approved :** 3/1/2010	
Acreage :	**Location :** CIB	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Inland Bays CCMP Project Management & Oversight*

Lead Contractor: Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:

Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, DE 19971
(302) 226-8105

Edward A. Lewandowski
Executive Director
director@inlandbays.org

Project Status: On-going

Work Pan ID : CIB11-001

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
IMS-A	Meet the nutrient reduction goals of the Pollution Control Strategy
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1A,G1E,G2,G2E,G9	
CCMP/Work Plan Goal:	

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis, Developing Total Maximum Daily Loads, Improving Water Quality Monitoring, Strengthening National Pollutant Discharge Elimination System Permits, Strengthening Water Quality Standards, Supporting Sustainable Wastewater

Infrastructure

Overview:

The Center for the Inland Bays, Inc. is an innovative management approach to watershed restoration and protection. Critical to the success of CCMP implementation activities is effective research and demonstration project oversight, grant development and management, contract administration, and coordination with organizations responsible for various work elements as well as tracking and communication of progress. The Board of Directors, the office of the Executive Director and other appropriate staff, will be responsible for these tasks.
The Delaware Inland Bays National Estuary Program was established in 1988 through a Congressional designation and is under the administration of the U.S. Environmental Protection Agency/Office of Water/Office of Wetlands, Oceans & Watersheds/Oceans & Coastal Protection Division/Coastal Management Branch. The non-profit Center for the Inland Bays, Inc., enabled by the Delaware General Assembly in July 1994, oversees implementation of the Inland Bays Comprehensive Conservation and Management Plan.

The CIB is administered by a nine member Board of Directors consisting of the following members: Secretary of the Department of Agriculture, Secretary of Dept of Natural Resources & Environmental Control, a representative from the Sussex Conservation District, the Sussex County Council, a representative from the Sussex County Association of Towns, the Chair of the Scientific and Technical Advisory Committee, the Chair of the Citizens Advisory Committee, a designee of the President Pro-Tem of the Delaware State Senate, and a designee of the Speaker of Delaware State House of Representatives. The EPA is an Ex-Officio member.

Intended Results:

- Provide for effective project management and oversight
- Engage in restoration, research/demonstration, education & outreach projects and the development of sound public policy
- Coordinate with responsible organizations and partners
- Track and communicate progress

Outputs/Deliverables:

CCMP inclusive

Milestones:

Task 1: Secure state funding and other match sources to support the Section 320 grant and CIB Work Plan

Task 2: Pepare and distribute program updates and associated progress reports to the Board of Directors and EPA (quarterly)

Task 3: Hiire and/or retain appropriate support staff as needed (on-going).

Task 4: Monitor budgetary and financial reconciling procedures; secure annual A-133 audit; report results to Environmental Protection Agency and Board of Directors

Task 5: Provide administrative (meeting arrangements, notifications, minutes, etc) support for the Board of Directors, Scientific and Technical Advisory Committee, Citizen's Advisory Committee and other CIB committees (on-going).

Task 6: Provide communication documents, including the Inland Bays Journal (three times per annum-spring/summer/fall), to public and private groups/individuals, state, county, and local governments.

Task 7: Publish a CIB annual report and distribute to select audiences, including the Delaware General Assembly, as required by HB540- the Inland Bays Watershed Enhancement Act.

Task 8: Facilitate implementation and monitor/track the progress of lead agencies responsible for implementation of

CCMP tactics (on-going).

Task 9: Provide educational programs to schools, homeowners, and other publics to show better management practices within the Inland Bays watershed; methods will include programs, lectures, slide shows, seminars, as well as media interaction (radio, TV, news articles, etc).

Task 10: Continue to support the promulgation of Inland Bays Pollution Control Strategy regulations in cooperation with the Delaware Department of Natural Resources & Environmental Control.

Task 11: Continue restoration initiatives at the James Farm Ecological Preserve as well as other public and private sites.

Task 12: Serve on state-wide and regional committees and task-forces to promote sound environmental policies based on best available science.

Task 13: Continue oversight and management of the Inland Bays Shellfish Restoration Program in cooperation with the College of Marine Studies (U.D.) and Delaware State University

Task 14: Travel to national and regional EPA meetings and estuary-related conferences; provide technical assistance to other programs.

Task 15: Serve in an advisory capacity to elected officials, public policy makers and civic leaders.

Task 16: Organize and host special events, such as the Governor's Wade-In, the Native Plant Sale, the Inland Bays Clean-up, and other public outreach activities.

Task 17: Augment the CIB's membership program and sustain opportunities for volunteer participation.

Task 18: Collaborate with the Inland Bays Water Use Plan Implementation Committee to develop strategies to reduce user conflicts and protect/restore habitats

Task 19: Collaborate with the Inland Bays Citizens' Advisory Committee to expand the activities of its Outreach and Public Policy subcommittees

Task 20: Diversify sources of non-federal income to support the CIB's programs and activities.

Short-Term Outcomes

CCMP inclusive

Intermediate Outcomes:

CCMP inclusive

Long-Term Outcomes

CCMP inclusive

Project Progress

Progress To Date:

Task 1: Secure state funding and other match sources to support the Section 320 grant and implementation of CIB Work Plan- successfully completed

Task 2: Prepare and distribute program updates and associated progress reports to the Board of Directors and EPA

(quarterly)- ongoing

Task 3: Hire and/or retain appropriate support staff as needed- ongoing

Task 4: Monitor budgetary and financial reconciling procedures- ongoing/audit completed

Task 5: Provide administrative (meeting arrangements, notifications, minutes, etc) support for the Board of Directors, Scientific and Technical Advisory Committee, Citizen's Advisory Committee and other CIB committees- ongoing

Task 6: Provide communication documents, including the Inland Bays Journal (three times per annum- spring/summer/fall), to public and private groups/individuals, state, county, and local governments- winter & spring newsletters completed; summer newsletter published mid-July

Additional Project Information

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS: $591,750.00
OTHER FUNDS: $275,400.00
MATCHING FUNDS: $867,150.00
AMENDMENT FUNDS:
TOTAL: $1,734,300.00

Project Location

Municipality : Bethany Beach, Middlesex Beach, South Bethany Beach

Watershed/Waterbody : Little Assawoman Bay, Little Assawoman Bay WS

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2010

Date : 06/29/2010

Project Report

Project Name: *Schoolyard Habitats in the Inland Bays Watershed*

Lead Contractor: Sally Boswell, Project Coordinator

Responsible Partners, Contact Info, and Roles: Center for the Inland Bays
Indian River School District

Project Status: On-going

Work Pan ID : CIB11-022

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A	Implement the Comprehensive Public Participation and Education Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A,G9,G9E	Ensure, to the maximum extent possible, all planning and management activities related to the Inland Bays involve public participati, iniInformation and education e

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

In 2006, CIB created a partnership with the Indian River School District to bring a Schoolyard Habitat Program (SHP) to every district school in the watershed so that watershed education becomes a part of every student's learning experience throughout the entire school year. As of spring 2010, Cib will have introduced this program to ten (10) schools. In 2009, with the support of a grant from the Chichester duPont Foundation to build capacity for this growing program, CIB hired a part-time Schoolyard Habitat Coordinator. Responsibilities for this position include overseeing introduction of the program to new schools; working with existing SHP schools and their graduating students on legacy programs each spring to expand the habitats; developing curriculum-aligned activities for each grade level for outdoor experiential education; and, providing oversight of volunteer educators and community volunteers who assist teachers and their students in these activities. A supplemental grant from the Chichester duPont Foundation in 2010 allowed

CIB to continue to build capacity to support the growth of this successful program. Because Foundation support is not likely to be sustained beyond 2010, CIB needs to support this position from its operating funds so that additional schools can be added and existing schools can continue to grow their schoolyard habitats.

Intended Results:

1. To develop and implement schoolyard habitat programs at every school in the Inland Bays watershed
2. To bring watershed awareness and education to teachers/students
3. To create awareness within the schools of their connection to the watershed and their impacts on the Inland Bays

Outputs/Deliverables:

1. Habitat enhancement at schools in the watershed
2. Greater awareness of stormwater management and stormwater impacts at schools
3. Increased opportunities for watershed education for students

Milestones:

1. Create schoolyard habitat wetlands at two schools each spring to begin their SHP
2. Develop leadership within the SHP
3. Develop and pilot curriculum-aligned activities for each grade level in support of watershed education for use in outdoor learning
4. Create a Legacy Program at each school and work with graduating students to expand the footprint of their schoolyard habitat

Short-Term Outcomes

Increase awareness about stormwater management on school property; construct a wetland habitat; remove non-native plants and introduce a variety of native plants

Intermediate Outcomes:

Provide students with experiential outdoor learning opportunities by working with teachers to introduce curriculum-aligned lesson plans on water quality, habitat diversity, and other ecological concepts for use in the habitats

Long-Term Outcomes

Change the culture of schools and the awareness of students to regard the school and its grounds as the schoolyard habitat so that understanding of their place in the watershed and the impacts of their decisions and actions at their schools is part of their every day experience.

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2010

Date : 06/29/2010

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS: $20,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $0.00
AMENDMENT FUNDS: _____
TOTAL: $20,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

2011 Project Reports
Proposed

Year Reported 2011

Date : 06/30/2010

Project Report

Project Name: *Anchorage Canal Drainage Area Stormwater Retrofit Project Phase 1: Seacolony Ditch to Wetswale*

Lead Contractor:

Responsible Partners, Contact Info, and Roles:
Chris Bason, CIB, 302 226-8105
Jay Headman, Town of South Bethany,(302) 537-6541
Marianne Walch, DelDOT, (302) 760-2195
Larry Trout, JMT
John Gilbert, Seacolony
Susan Barton, UD College of AG & NR

Project Status: Proposed

Work Pan ID : CIB11-002

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
IMS-A	Meet the nutrient reduction goals of the Pollution Control Strategy
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1A,G1E,G2,G2E,G9	Establish and Implement a comprehensive nonpoint source pollution control program

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis, Improving Water Quality Monitoring

Overview:

In 2008, the Center for the Inland Bays (CIB), the Town of South Bethany, and DelDOT formed a partnership to develop a stormwater retrofit assessment and strategy with other communities in the drainage area. The Center for Watershed Protection (CWP) has produced a draft strategy that conceptualizes and prioritizes retrofitsprojects. The primary goal of the strategy is to reduce nitrogen and phosphorus loads entering the Canal and LAB by 40% through retrofits in accordance with the PCS. We propose to begin implementation of the strategy by retrofitting an existing

ditch within the DelDOT right of way adjacent to the Sea Colony high-rise complex. The project will convert an existing ditch to a wet swale with a sediment control forebay, check dams, and vegetated filter strips to incrementally improve treatment of runoff from residences, businesses, roads, and a large area of the Sea Colony parking lot. The Town of South Bethany's monitoring committee will measure anticipated changes in nutrients and dissolved oxygen concentrations within the Canal by continuing its program of continuous and spot-sample data collection. This data meets federal standards for citizen monitoring through EPA approved QA plans through the CIB and the University of Delaware Citizen's Monitoring Program. The project will also achieve significant public outreach and will have continued community cooperation and informal education on stormwater impacts and treatment.

The project seeks additional funds from the CIB to implement additional study, design, and installation either within the southern portion of the Sea Colony ditch, or within the DelDOT highway medians. Additional funding will improve project efficiencies particularly in design and mobilization costs and increase pollutant reductions.

Intended Results:

The project will convert an existing ditch to a wet swale with a sediment control forebay, check dams, and vegetated filter strips to incrementally improve treatment of runoff from residences, businesses, roads, and a large area of the Sea Colony parking lot.

Outputs/Deliverables:

1. Installation of sediment control forebay at northern end of sea colony ditch.
2. Conversion of northern end of the ditch to a wet swale with vegetated filter strips and sediment control forebays.
3. Continued dissolved oxygen monitoring data and reports for the Anchorage Canal forebay area.
4. Project amendments from other sources will optionally increase a) scope of retrofit design to the southern portion of the Sea Colony ditch, b) scope of design and installation on southern portion of the ditch, c) scope of design and installation to incorporate a section of DelDOT highway median.

Milestones:

1. Select contractor (Target: MAY 2010)
2. Final study design review and approval meeting (Target: NOV 2010)
3. Finish construction (Target: FEB 2011)
4. Final Report (Target: APR 2011)

Short-Term Outcomes

1. Increased cooperation among CIB and communities within drainage to reduce pollution to LAB.
2. Increased knowledge of general public about impacts to Bays from urban stormwater runoff.
3. Improved attitude among communities to involving resources in pollution control.

Intermediate Outcomes:

1. Continued willingness of communities within the drainage and nearby to address stormwater pollution coming from their properties.
2. Contribution of match and effort to implement pollution control.

Long-Term Outcomes

1. Remove an estimated 12.2 lbs of total nitrogen and 0.78 lbs of total phosphorus per year from 31 urban acres with 85% impervious cover.
2. Filter strips will remove approximately 72% of total suspended solids.
3. Ancillary benefits to bacteria loads to LAB.
4. Ancillary benefits to community beautification and use of native species.

Project Progress

Year Reported 2011

Date : 06/30/2010

Progress To Date:

None

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☑

Amendment Source: CE9939900

CIB FUNDS: $20,000.00
OTHER FUNDS: $6,000.00
MATCHING FUNDS: $95,886.00
AMENDMENT FUNDS: $20,000.00
TOTAL: $141,886.00

Project Location

Municipality : Bethany Beach, Middlesex Beach, South Bethany Beach

Watershed/Waterbody : Little Assawoman Bay, Little Assawoman Bay WS

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

DELAWARE CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Eelgrass Habitat Suitability Mapping Project*

Lead Contractor:

Responsible Partners, Contact Info, and Roles: Chris Bason, CIB -- Project Coordinator
Bart Wilson, DNREC CP -- Sediment Mapping
Eva Marie Koch, UMD -- Potential Contractor
E

Project Status: Proposed

Work Pan ID : CIB11-003

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
AG-B,HP-A	Develop nutrient utilization and distribution alternatives
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The most basic objective of the Inland Baysmanagement plan is to reverse eutrophication and habitat loss. Submerged vascular plant (SVP) meadows are keystone species of coastal lagoons and are signature habitats for fish and shellfish. They also control water qaulity and bottom sediment movement. The Total Maximum Daily Loads and the Pollution Control Strategy for the Inland Bays were developed in part to achieve conditions that allow for the growth and re-establishment of SVPs. Eelgrass and widgeon grass meadows may once have covered a majority of Rehoboth Bay and much of Indian River Bay. Unfortunately, the Inland Bays is nearly devoid of these keystone species after disease and eutrophic conditions caused their extirpation.

A concerted restoration initiative in the late 1990s and early 2000s was succesful in restoring one known acre of

eelgrass in Indian River Bay. Water quality data suggest that eutrophic conditions have subsided to the extent that SVP could re-establish. The limiting factor for their self re-establishment is likely the lack of a sufficient seed source. Interest exists to renew a SVP restoration program in the Inland Bays. However, information is needed to identify the locations within the Bays that would most likley allow re-establishment. The primary factors affecting re-establishment include water clarity and sediment type. Water clarity is determined by suspended sediment and phytoplankton concentrations and water depth. Sediment type varies by location within the Bays. Water velocity and macroalgal accumulation have a secondary affects on re-establishment and growth. In the Maryland Coastal Bays, habitat suitability maps for eelgrass have been generated using these variables.

This project proposes to develop eelgrass habitat suitability maps for the Inland Bays using existing data sources including bathymetry, water clarity, suspended solids concentrations, and chlorophyll concentrations; and sediment type for which data is needed. The maps will be used to 1.) identify and prioritize areas for eelgrass restoration projects, 2.) develop an ecologically relevant long-term goal for eelgrass restoration and coverage, 3.) develop a environmental indicator for eelgrass that communicates bay condition and program success, and 4.) inform the selection and establishment of resource protection areas (RPAs) in the Inland Bays. The project will primarily focus on eelgrass about which the most is known and could be continued to develop maps for widgeon grass.

Intended Results:

1. Aggregation of existing data relevant to SVP habitat suitability.
2. Cooperation with DNREC to map sediment type within Rehoboth and Indian River Bay.
3. Production of habitat suitability maps for eelgrass.
4. Development of a restoration goal (acreage) and environmental indicator.
5. Inform RPA selection.
6. Exploration of mapping for widgeon grass.

Outputs/Deliverables:

1. GIS project with aggregated data on eelgrass habitat suitability.
2. Sediment type data for Rehoboth and Indian River Bay
3. Final report and suitability maps.
4. Environmental indicator draft for eelgrass.

Milestones:

1. Explore avenues for collecting sediment type data with DNREC CP (Target: February 2011).
2. Solicit contractor to prepare maps (Target: February 2011).
3. Project partner meeting (Target: March 2011).
4. Begin aggregation and provision of existing data (Target: March 2011).
5. Begin map construction (Target: April 2011).
6. Complete sediment type mapping (Target: October 2011 potentially Summer 2012).
7. Complete final maps and reports (Target: January 2013)
8. Complete environmental indicator (Target: January 2013)

Short-Term Outcomes

1. Increased understanding of areas within the Bays that are suitable for eelgrass re-establishment.
2. Increased awareness within the DNREC Coastal Programs of the goals and objectives of the CIB.
3. Increased understanding of the public and CIB partners about the importance of SVP.
4. Updated understanding of the sediment dynamics within the Inland Bay by CIB STAC and other scientists.

Intermediate Outcomes:

1. Improve the efficiency and success of SVP restoration efforts.
2. Better informed establishment of Resource Protection Areas.
3. Potential for shoreline practices that are conducted with more sensitivty towards eelgrass restoration goals.

Year Reported 2011

Date : 06/30/2010

Long-Term Outcomes

1. Should lead to the more successful restoration of SVP and thus improved water quality, less variable sediment dynamics, increased fish diversity, and improved shellfish habitat.

Project Progress

Progress To Date:

None

Additional Project Information

Project Financing

Funding Determination : RFP

Amendment: ☐

Amendment Source:

CIB FUNDS: $20,000.00
OTHER FUNDS:
MATCHING FUNDS:
AMENDMENT FUNDS:
TOTAL: $20,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay, Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Primary

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

Project Report

Project Name: *Bethany Lakes Alternative Shoreline Stabilization Project*

Lead Contractor: Delaware Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:
Eric Buehl
EJ Chalabala
Delaware Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, Delaware 19971

Robert Collins, HOA Rep.
Bethany Lakes Subdivision

Project Status: Proposed

Work Pan ID : CIB11-004

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
HP-F	Promote natural alternatives to bulkheading
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G1,G1E,G2,G7	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The goal of the project is to stabilize 600 linear feet of eroding shoreline to protect active Great Blue Heron nesting habitat. Coir fiber logs and vegetative plantings will be used to stabilize the shoreline.

Intended Results:

1. Reduce shoreline erosion.
2. Promote the use of alternative shoreline stabilization techniques.
3. Protect nesting habitat for Great Blue Heron.
4. Enhance water quality through sediment reduction.

Outputs/Deliverables:

1. 600 linear feet of stabilized shoreline.
2. Aquatic vegetation established on 600 linear feet of shoreline.

Milestones:

1. October 2010-Secure landowner permission.
2. November 2010-Submit cost-share request and state permits.
3. February 2011-Begin construction.
4. March 2011-Begin plantings.
5. April 2011-Project plantings complete.

Short-Term Outcomes

1. Residents and project visitors will be made aware of alternatives to using bulkheads and rip-rap.

Intermediate Outcomes:

1. Through exposure to the project, those undertaking shoreline stabilization projects will implement alternative shoreline stabilization techniques in lieu of more 'hardened' techniques.

Long-Term Outcomes

1. Water quality enhancement due to a decrease in erosion and sedimentation.
2. 600 linear feet of shoreline properly stabilized.
3. Upland (Great Blue Heron) nesting habitat protected from loss through erosion

Project Progress

Progress To Date:

None

Additional Project Information

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS:	$2,500.00
OTHER FUNDS:	$0.00
MATCHING FUNDS:	$2,000.00
AMENDMENT FUNDS:	
TOTAL:	$4,500.00

Project Location

Municipality : Bethany Beach

Watershed/Waterbody : Indian River Bay

Latitude:

Longitude:

Project Leveraging Role

Year Reported 2011

Date : 06/30/2010

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

Project Report

Project Name: *West Millsboro Wetland Enhancement Project*

Lead Contractor: Delaware Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:

Eric Buehl
Delaware Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, Delaware 19971

Kurt Anderson
Ducks Unlimited
34 Defense Highway
Suite 200
Annapolis, Maryland 21401

Richard McCorkle
U.S. Fish & Wildlife Service
2610 Whitehall Neck Road
Smyrna, Delaware 19977

Project Status: Proposed

Work Pan ID : CIB11-005

Project Description

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
AG-C	Manage and plant forested/vegetative buffers
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G3,G3B,G7,G7B	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Year Reported 2011

Date : 06/30/2010

Overview:

The goal of this project is to enhance approximately one-half acre of marginal farmed wetlands and to enhance approximately one-half acre of adjacent upland area. Enhancement will be accomplished through plantings, water diversion, and other projects based on site conditions.

Intended Results:

1. Enhance wetland habitat for important wildlife species.
2. Enhance upland habitat for important wildlife species.
3. Protect nesting habitat for Great Blue Heron.
4. Enhance water quality by enhancing degraded wetlands.

Outputs/Deliverables:

1. One-half acre of degraded wetlands enhanced.
2. One-half acre of upland wildlife habitat enhanced or restored.

Milestones:

1. October 2010-Secure landowner permission.
2. November 2010-Submit cost-share request.
3. March 2011-Begin upland habitat plantings.
4. June 2011-Begin work on wetland enhancement.
5. September 2011-Complete wetland plantings.

Short-Term Outcomes

1. Project visitors will be made aware of the restoration potential of degraded wetlands and farmed upland areas.

Intermediate Outcomes:

1. Those seeking to enhance or restore degraded habitats on their property will implement appropriate practices learned by visiting this project.

Long-Term Outcomes

1. Water quality will be improved.
2. Wetland and upland wildlife habitat will be improved.
3. One acre of combined wetland and upland habitat will be enhanced.

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2011

Date : 06/30/2010

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS: $12,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $1,000.00
AMENDMENT FUNDS:
TOTAL: $13,000.00

Project Location

Municipality : Millsboro

Watershed/Waterbody : Indian River Bay, Indian River Bay WS

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

Project Report

Project Name: *Massey's Landing Dredge Spoil Project*

Lead Contractor: Delaware Center for the Inland Bays

Responsible Partners, Contact Info, and Roles:

Eric Buehl
Delaware Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, Delaware 19971

Chuck Williams
Delaware Department of Natural Resources and Environmental Control
Division of Soil & Water Conservation
89 Kings Highway
Dover, Delaware 19901

Project Status: Proposed

Work Pan ID : CIB11-007

Project Description

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
HP-G	Review, update, and codify the Inland Bays Dredge Plan
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2B,G2F,G6,G6D	Enhance and restore impacted shallow and nearshore habitats

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

The goal of this project is to restore or enhance a shallow-water or intertidal area near Massey's Landing through the beneficial re-use of dredge spoil. The project accomodates public use of the waterway while creating or enhancing habitat for birds and reptiles.

Year Reported 2011

Date : 06/30/2010

Intended Results:

1. Protect and restore underwater and shallow water habitat areas.
2. Promote the beneficial re-use of dredge spoil.
3. Enhance upland habitat for colonial nesting bird species.
4. Enhance boating safety.

Outputs/Deliverables:

1. A safe, navigable channel will be re-established.
2. Beneficial re-use of dredge spoil will be promoted.
3. Underwater and shallow water habitat areas will be protected.
4. Upland and inter-tidal habitat will be restored or enhanced.

Milestones:

1. October 2010-Secure landowner permission.
2. November 2010-Refine scope project.
3. November 2010 thru February 2011-prepare state and federal permits.
4. Fall 2011/Winter 2012-Complete project dredging.
5. Spring 2012-Complete plantings if required.

Short-Term Outcomes

1. A safe, navigable channel will be re-established.
2. Project visitors will see that there are beneficial uses for dredge spoils.

Intermediate Outcomes:

1. Aquatic habitat areas will be protected from boat groundings and prop scarring.
2. Habitat for reptiles and nesting birds will be restored or enhanced.

Long-Term Outcomes

1. Key species numbers will be enhanced through protected nesting and breeding areas.

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2011

Date : 06/30/2010

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS: $15,700.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $80,000.00
AMENDMENT FUNDS:
TOTAL: $95,700.00

Project Location

Municipality : Millsboro

Watershed/Waterbody : Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

DELAWARE
Limulus polyphemus
CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Martins Way Shoreline Stabilization*

Lead Contractor: Mike Lewis HOA

Responsible Partners, Contact Info, and Roles: Mike Lewis

E.J. Chalabala
DE Center for the Inland Bays
302-228-8954

Project Status: Proposed

Work Pan ID : CIB11-008

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
ED-A,HP-F	Promote natural alternatives to bulkheading
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2C,G2F,G3,G3B,G4,G4E	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Strengthening Water Quality Standards

Overview:

-Stabilization of salt marsh bank using a blend of materials, mainly Coir logs and Stone Sill

-Install approximately 800 linear feet of 16" diameter Coir Logs. Install per manufacturers recommendations with input from the DNREC, the CIB and local biologists.

-At the end of Whites Creek canal, install 100' of marsh toe rip-rap to protect the exposed end of the marsh on the south sid of the canal.

-At the west end of the bulk headed side of the canal, on north side, install a 50' jetty to protect th ancillary channel as well as to protect the salt marsh.

-Plant spartina behind bio log (2nd phase)

Intended Results:

1. Reduce shoreline erosion
2. Promote the use of alternative shoreline techniques
3. Increase amount of functioning wetlands.
4. Enhance water quality through sediment reduction.
5. Protecting wetlands from wave energy and storm events

Outputs/Deliverables:

1. 800 Linear Feet of shorline stabilized
2. 1 acre of wetlands protected
3. Increase wetlands and vegetation

Milestones:

February 2010- tour and come up with design of project
March 2010- finalize design and call manufacturers for pricing
April 2010- bring DNREC and experts out for a site visit and ask about permitting
May 2010- send in information to be permitted
Sep 2010- begin project
Oct 2010- final project

Short-Term Outcomes

1. Residents and project visitors will be made aware of alternatives to using bulkheads and rip-rap.
2. Wave energy will be dicipated immensly

Intermediate Outcomes:

1. People that are thinking about doing these types of project will have an example showing an alternative to bulkheads and rip-rap.

Long-Term Outcomes

1. 800 Linear feet or shorline stabilized
2. 1 acre of wetlands protected
3. 1/2 acre of wetlands created and vegetized
4. Increased habitat for nesting birds
5. Icreased water quality from the stabilization of sediment

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2011

Date : 06/30/2010

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS: $1,000.00
OTHER FUNDS: $0.00
MATCHING FUNDS: $40,000.00
AMENDMENT FUNDS:
TOTAL: $41,000.00

Project Location

Municipality : Ocean View

Watershed/Waterbody : Indian River Bay, Indian River Bay WS

Latitude:

Longitude:

Project Leveraging Role

Support

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

DELAWARE
Limulus polyphemus
CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Headwater stream restoration project*

Lead Contractor: DE CIB

Responsible Partners, Contact Info, and Roles: E.J. Chalabala
Eric Buehl
DE Center for the Inland Bays

Project Status: Proposed

Work Pan ID : CIB11-009

Project Description

Strategic Alignment:

CCMP Action Plan ID :	Primary Action Plan ID Title :
AG-B,AG-C,HP-F,IMS-A	Manage and plant forested/vegetative buffers
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2F,G3,G3B,G4,G4E,G5,G5C	Protect, restore, and enhance living resources by improving water quality and protecting and enhancing habitat

CCMP/Work Plan Goal:

CWA Program Implementation: Improving Water Quality Monitoring, Strengthening Water Quality Standards

Overview:

A degraded headwater stream would be identified and assesed for functionabilty. Pre and post project water sampling would occur to justify and compare the work that was done.

The goal of this project is to restore, enhance and demonstrate how a headwater stream and it's immediate surroundings can be improved to better habitat and water quality.

This can be as inexpensive or expensive as we want to go. From just allowing a mowed edge to grow, to reducing erosoin of the channel using bio logs and plantings. Also the eradication of non-native species will be done.

We hope to make this a public demonstation project that will have good public visibility.

Intended Results:

1. Increase water quality at a head water stream
2. Increase beneficial habitat for wildlife and aquatic species
3. Obtain baseline data for water quality before and after project implementation
4. Serve as a public demonstration project for stream channel restoration

Outputs/Deliverables:

1. Approx 300 feet for headwater stream restored to a more natural state
2. 1+ acres of riparian/vegetative buffer restored
3. Water quality improvements and erosion control
4. Creating a more natural stream and environment
5. Demonstration project and public awareness

Milestones:

October 2010- Secure landowner permission
November-December 2010- Refine scope of project and determine needs and availiability of partners
March 2011- asses location and begin water quality monitoring
April 2011- Begin actual planting and improving project
June-Sept 2011- Monitor water quality

Short-Term Outcomes

1. The public will see and be made aware how important it is to maintain our headwater streams.
2. Transforming unproteductive buffer
3. Improve erosion

Intermediate Outcomes:

1. The public will get an idea of how beatiful the natural environment can be.
2. Increased understanding and a learning tool for resource managers involved in planning protection and restoration strategies for wetlands and buffers.
3. Basline data to help understand how buffers around headwater streams help water quality.

Long-Term Outcomes

1. Headwater stream protection and better water quality
2. Wildilfe, plants, and aquatic organism habitat
3. Water quality data to be used in determining future headwater stream restoration
4. A public awareness and demonstration project.
5. Solidifying partnerships

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2011

Date : 06/30/2010

Project Financing

Funding Determination :

Amendment: ☐

Amendment Source:

CIB FUNDS: $10,000.00
OTHER FUNDS: $5,000.00
MATCHING FUNDS: $0.00
AMENDMENT FUNDS: _____
TOTAL: $15,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : All Bays, All Watersheds

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

Year Reported 2011

Date : 06/30/2010

DELAWARE
Limulus polyphemus
CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman

Project Report

Project Name: *Bethany Beach Nature Center*

Lead Contractor: CIB

Responsible Partners, Contact Info, and Roles:

Sally Boswell, Project Manager
Center for the Inland Bays
39375 Inlet Road
Rehoboth Beach, DE 19971

Cliff Graviet & Lisa Daisey
Bethany Nature Center
Garfield Parkway
Bethany Beach, DE 19930
(302) 537-7680

Project Status: Proposed

Work Pan ID : CIB11-011

Project Description

Strategic Alignment:

CCMP Action Plan ID :	**Primary Action Plan ID Title :**
AG-B,HP-A	Develop nutrient utilization and distribution alternatives
CCMP Goal Objective ID :	**Primary Goal Objective ID Title :**
G2,G2A	

CCMP/Work Plan Goal:

CWA Program Implementation: Controlling Nonpoint Source Pollution on a Watershed Basis

Overview:

CIB will create a partnership with the Town of Bethany Beach at their Bethany Beach Nature Center to have a point of contact for education and outreach in the southern resort area of the Inland Bays watershed to reach residents and visitors to the coastal area of our watershed.

Intended Results:

To provide resources and programming to educate and inform residents and visitors about the unique coastal habitats that have been preserved and protected at the Bethany Beach Nature Center

Outputs/Deliverables:

1. Develop a partnership with the Town of Bethany Beach at the Bethany Nature Center
2. Develop and deliver a weekly children's program that incorporates watershed education
3. Develop and deliver summer programs for visitors to the watershed

Milestones:

1. Assist the town manager in identifying a director for the Bethany Beach Nature Center
2. Assist with developing exhibits to tell the Inland Bays story
3. Provide brochures and other materials for distribution at the BBNC
4. Hire a CIB Lead Teacher to develop watershed-focused educational activities and assist with children's programs
Provide CIB teacher volunteers to lead and assist with programs

Short-Term Outcomes

1. Raise awareness about the work of the CIB through our identification with and presence at the Bethany Beach Nature Center.
2. Development of Inland Bays exhibits and displays at the BBNC

Intermediate Outcomes:

1. Provide a location for distribution of Inland Bays outreach/education materials to residents and tourists who visit BBNC.
2. Launch of programs for children and adults that highlight watershed education and inform and educate these residents and visitors

Long-Term Outcomes

1. An on-going outreach/education center in the south coastal area of the watershed through partnership with a local municipality.
2. A center for outreach to summer visitors to the watershed.

Project Progress

Progress To Date:

None

Additional Project Information

Year Reported 2011

Date : 06/30/2010

Project Financing

Funding Determination : Sole Source

Amendment: ☐

Amendment Source:

CIB FUNDS:

OTHER FUNDS: $3,000.00

MATCHING FUNDS: $0.00

AMENDMENT FUNDS:

TOTAL: $3,000.00

Project Location

Municipality : All Coastal Communities

Watershed/Waterbody : Indian River Bay, Rehoboth Bay

Latitude:

Longitude:

Project Leveraging Role

Report Information

Report Title:

Author :

Abstract :

Restoration ☐	**QAPP** ☐	
Habitat Type :	**Date Completed :**	
Restoration type :	**Date Approved :**	
Acreage :	**Location :**	
Partners :		
Completion Date:		
Cost :		

ADMINISTRATIVE

Staff Descriptions

The **Executive Director**, under the supervision of the Board of Directors, is the administrative head of the Center charged with the responsibility of the day to day operations and business of the Center, and has responsibilities required by the Inland bays Watershed Enhancement Act, including but not limited to: 1) Board Administration and Support -- Supports operations and administration of Board and its committees by advising and informing members, interfacing between Board and staff, and supporting Board's evaluation of CIB performance; prepares and provides an annual/activity report and quarterly progress reports to the Board and Environmental Protection Agency, 2) Implementation of the *Inland Bays Comprehensive Conservation & Management Plan* -- Determines priorities for restoration, enhancement, and protection of resources in the watershed; prepares an annual plan of action in accordance with EPA guidance for approval by the Board of Directors; oversee efforts to implement the Program's annual work plan, including the development of partnerships with key stakeholders; tracks and monitors progress towards implementation of the CCMP, 3) Financial, Tax, Risk and Facilities/Properties Management – Prepares and recommends annual budget for Board approval and prudently manages the Program's resources within those budget guidelines according to current laws and regulations; monitor budgetary and financial reconciling procedures to ensure that generally accepted accounting practices are being followed; engage accountants and auditors to examine and report on financial status of the organization and prepare required tax documents; provide for effective care of CIB facilities and real properties, 4) Human Resource Management -- Effectively manages the human resources (personnel, salaries & benefits) of the organization according to authorized personnel policies and procedures that fully conform to current laws and regulations; hire and/or retain appropriate support staff as needed, 5) Community and Public Relations -- Assures the organization and its mission, programs, and services are consistently presented in a strong, positive image to relevant stakeholders; facilitates an ongoing dialogue on issues concerning Inland Bays protection; provides communication documents to public, private groups/individuals, state, county, and local government; serves on state-wide and regional committees and task-forces to promote sound environmental policies based on best available science; travels to national and regional EPA meetings, estuary-related conferences and meetings; provides technical assistance to other programs; serves in an advisory capacity to elected officials, policy makers, resource managers, and civic leaders; performs duties associated with the Board of Directors of the Association of National Estuary Programs, and 6) Fundraising & Membership -- Responsible for procurement and administration of federal, state and private monies to fulfill the responsibilities pursuant to implementation of the Inland Bays CCMP; oversees fundraising planning and implementation, including identifying resource requirements, researching funding sources, establishing strategies to approach funding partners, and management of endowment fund and investments; identifies and cultivates individual donors for major gifts; in conjunction with the Finance Committee, develops an annual fundraising plan;

leads efforts to position CIB in the community and attract new members and volunteers

The **Deputy Director** serves the Executive Director by defining the research, reporting and analytical needs of the CIB and developing a vision to deliver against these requirements. The Deputy Director will also work in close collaboration with the Executive Director to manage priority issues and align project outcomes with organizational goals and objectives. In addition, the Deputy Director will actively promote the mission of the CIB externally and maximize the potential impacts of key partnerships and opportunities. With guidance from the Executive Director, the Deputy Director will work collaboratively with the CIB's professional staff to develop and implement internal systems to ensure efficient and effective delivery of critical programs and services. In keeping with the mission of the CIB, the Deputy Director will interact with the CIB's Board and Committee members to sustain an empowering environment and will serve as a leader in the effort to foster a results-oriented atmosphere among members and staff. The Deputy Director is also the default contact for the assorted committees and other bodies that need to interact with the CIB

The **Administrative Assistant** serves the Executive Director and provides program and office administrative services including development, reconciliation, and tracking of the operation budget; managing payroll and benefits packages; managing financial requirements for federal, state, and local assistance awards; maintaining membership and mailing lists; answering phones; drafting general letters and correspondence; ordering basic supplies; faxing; copying; maintaining program calendars and scheduling; filing; mailing; processing and tracking paperwork for staff travel authorizations and reimbursements; taking minutes of meetings; and other duties as assigned by the Executive Director.

The **Education and Outreach Coordinator** serves the Executive Director of the Center for the Inland Bays by managing the activities of the Inland Bays Comprehensive Public Participation and Education Plan component of the Inland Bays Comprehensive Conservation and Management Plan; Directs and supervises the on-going James Farm Education Program for middle school students in Indian River School District; recruits and trains teachers; maintains equipment and secures new equipment and supplies as needed; evaluates the program; coordinate school participation; maintains a partnership with the administration and schools to correlate our watershed/estuary education activities with the curriculum goals of the Delaware State Education Standards; Directs and supervises the part time Schoolyard Habitat Coordinator and manages the grant that supports the program; works with the superintendent, principals teachers and staff at Schoolyard Habitat Schools to promote the growth of their habitats and develop curriculum-based activities for use in the Habitats; identifies schools to bring into the program; works with partners to bring the program to the school; provides Schoolyard Habitat outreach plan, planning of Wetlands training/plants in the classrooms, and oversees the design and planting of the new Habitats; identifies CIB volunteers to support each Schoolyard Habitat Project; Directs and supervises the part time (volunteer) Volunteer Coordinator; works with her to recruit and interview new volunteers; places volunteers according to their skills, experience and interests; maintains regular contact with volunteers; develops and promotes volunteer participation and training opportunities, maintains volunteer records, plans the annual Volunteer recognition/thank you event; Responsible for CIB 'branding' to promote CIB name recognition and to raise awareness of the mission and work of the organization; works with a graphic designer to insure that new promotional products reinforce the brand in the graphic messages going out to the public; Editor of the Inland Bays Journal, published three times yearly; oversees distribution of the Inland Bays Journal to members, contributors, visitor centers and chambers of commerce, libraries, schools and community events; develops content, edit and publish the Annual Report; Oversees the Inland Bays website; works with the web consultant on design and updates as

needed, develops new content and maintains the site; Produces and publishes brochures, flyers, postcards, exhibits, display elements, signage and other education/outreach tools and materials as needed; Serves as primary press liaison; develops and distributes press releases on CIB activities; invites the press to meetings and events; provides information and sources to them as needed; Coordinates CIB's participation in community events throughout the watershed and oversees the planning of the annual *Gardening for the Bays Native Plant Sale*; Provides presentations to community groups throughout the watershed as requested; Serves as staff liaison/advisor to the CAC Outreach Sub-committee; serves as staff advisor and coordinator of the Citizens' Advisory Committee Speakers Bureau; Assists with other projects and duties as assigned by the Executive Director

The **Habitat Coordinator** serves the Executive Director by managing the Habitat Protection Action Plan component of the Inland Bays Comprehensive Conservation and Management Plan. Primary responsibilities include the development and implementation of a watershed-wide habitat restoration plan which includes developing a plan consistent with the goals of the Comprehensive Conservation and Management Plan (CCMP) and development of programmatic infrastructure to secure funding and oversee project implementation to meet the goals stated in the plan; coordinating program and planning efforts of federal, state, county, and local governmental agencies and other non-governmental agencies and groups related to habitat and habitat restoration within the watershed with an emphasis on keeping Inland Bays habitat and environmental issues at the forefront of other agency/group planning and consideration; representing the CIB at meetings convened by federal, state, county, and local governmental agencies and other non-governmental agencies and groups for the purposes of addressing Inland Bays and other environmental issues which include but are not limited to the Delaware Invasive Species Council, Sussex County/DelDOT Transportation Plan Committees, USDA-Delaware State Technical Committee, CIB Habitat Plan Development Committee, the State Biodiversity Initiative Committee and related subcommittees, and on the CIB Finance Committee; Soliciting, identifying and developing grant proposals to pursue financial assistance to fund habitat restoration projects sponsored by the CIB; managing grant funded projects as awarded; Serving as assistant liaison the Citizens Advisory Committee, which includes preparing and announcing meeting agendas, facility preparation, and scheduling regular meetings; Assisting with outdoor learning activities at the James Farm Ecological Preserve, as requested; Submitting regular habitat and special topic articles to the Education and Outreach Coordinator for the quarterly newsletter and other program publications, including brochures, technical reports, and issue papers; Developing and submitting press releases related to habitat to the Education and Outreach Coordinator for local media distribution, as necessary; Submitting information to the Education and Outreach Coordinator for use on CIB's web site, DISC web site, and CIB tracking system; Planning and developing topics of interest for participation in weekly radio broadcasts as scheduled; Attending to a variety of special support projects and other duties as assigned by the Executive Director.

The **Restoration Coordinator** serves the Executive Director and works in conjunction with the Habitat Coordinator to implement actions in the Habitat Protection Action Plan; The Restoration Coordinator manages and oversees the day to day operation of the James Farm Ecological Preserve; monitors the James Farm Ecological Preserve for various wildlife activities, identifying key animal and plant species as a base line for future comparative studies and also for comparison to historical data; replenishes species by learned management techniques; helps to coordinate internships at the Center for the Inland Bays; manages the Inland Bays Shellfish Restoration Program, including the oyster gardening program; coordinates with the State Forest Service to implement the Urban and Community Forestry Program in the Inland Bays watershed; represents the Center on committees including the State Forestry Council and the Board of Directors of the

Delaware Quality Deer Management Association; participates in public relation/outreach activities sponsored by the CIB; represents the CIB at meetings convened by county, state, and federal agencies or organizations for the purposes of addressing Inland Bays and other environmental issues.

The **Development Coordinator** serves the Executive Director and is responsible for planning, coordinating and implementing the financial plan for the CIB, which includes building and maintaining relationships and securing financial support from current and prospective donors. This individual will also plan and coordinate special events activities. Principal duties and responsibilities include increasing "Friends of the Bays" memberships, organizing mailing lists, identifying donor base, developing prospect research tools, cultivating individual and corporate donors, managing the CIB's endowment fund and annual campaigns, developing, organizing and marketing programs and annual events to the community and target audiences, and identifying and pursuing grant funding opportunities.

CENTER FOR THE INLAND BAYS, INC.
Delaware Inland Bays Estuary Program
Proposed Travel Budget

Estimated Travel Expenses for Fiscal Year 2011

Position	Event/Reason	Date(s)	Location	Mode	Cost
Executive Director	Fall National Estuary Program Meeting	Nov. 8-10, 2010	Charlotte Harbor, FL	Transportation/Mileage/ Hotel/Food	$1,600
Executive Director	Spring National Estuary Program Meeting	February 2011	Washington, D.C.	Mileage/ Hotel/Food	$1,200
Executive Director	CCMP Project Implementation	N/A	N/A	*Local Mileage	$3872
Deputy Director/Science	Spring National Estuary Program Meeting	February 2011	Washington, D.C.	Mileage/ Hotel/Food	$1,200
Deputy Director/Science	CCMP Project Implementation	N/A	N/A	*Local Mileage	$3,332
Education & Outreach Coordinator	Fall National Estuary Program Meeting	Nov. 8-10, 2010	Charlotte Harbor, FL	Transportation/Mileage/ Hotel/Food	$1,600
Education & Outreach Coordinator	CCMP Project Implementation	N/A	N/A	*Local Mileage	$1,400
Habitat Coordinator	CCMP Project Implementation	N/A	N/A	*Local Mileage	$3000
Restoration Coordinator	CCMP Project Implementation	N/A	N/A	*Local Mileage	$3000

TOTAL $20,204

* Mileage reimbursed at the established federal rate of $0.50/mile

Allowance for Meals
Per CIB's Office Policy Manual, meals at authorized technical transfer functions will be reimbursed at the rates listed below, unless covered with registration. In some cases, meal costs will be higher in certain cities.

Breakfast up to $10
Lunch up to $15
Dinner up to $20

DE Center for the Inland Bays
Verifiable Match Sources–CE 993990-10-2
FY 2011

DE State Line Funds	$ 13,432
Other-Donations	$ 4,000
NON-CASH MATCH	
Thatcher's Landing Property	$ 124,900
Volunteer Hours – 5205 hrs @ $20.85	$ 108,524
James Farm Ecological Preserve County Property	$ 569,144

- ***The James Farm Ecological Preserve value was calculated by a professional real-estate appraiser, based on fair market values, should the CIB lease the property commercially to support estuary programs; $ 569,144 represents part of the total value. The James Farm is a 150-acre demonstration and education center. Both watershed and marine science is taught to school groups and adults. The site also serves as a research site for aquaculture techniques and demonstration projects.***

- ***The Thatcher's Landing Property value was calculated May 2009 by a professional real estate appraiser, based on a fair market value of this 1.6 acre waterfront property. The value of $124,900 represents the total value.***

- ***The Volunteer Hours calculation was provided by EPA Office of Wetlands, Oceans, and Watersheds using Independentsector.org. $20.85 value represents the year 2009.***

Total Match Funds $ 820,000

Board of directors

MR. RICHARD EAKLE, CHAIR; APPOINTEE OF THE PRESIDENT PRO TEMPORE OF THE DELAWARE SENATE
DR. WILLIAM MCGOWAN, VICE-CHAIR; SUSSEX CONSERVATION DISTRICT REPRESENTATIVE
MR. RON WUSLICH, SECRETARY; CITIZENS' ADVISORY COMMITTEE CHAIR
MS. DELL TUSH, TREASURER; SUSSEX COUNTY ASSOCIATION OF TOWNS
MS. JOANNE CABRY; APPOINTEE OF THE SPEAKER OF THE DELAWARE HOUSE OF REPRESENTATIVES
DR. WILLIAM ULLMAN, SCIENTIFIC & TECHNICAL ADVISORY COMMITTEE CHAIR
MR. DAVID BAKER; SUSSEX COUNTY ADMINISTRATOR
SECRETARY EDWIN KEE; DELAWARE DEPARTMENT OF AGRICULTURE
SECRETARY COLLIN O'MARA; DELAWARE DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
MR. ED AMBROGIO; U.S. EPA (EX-OFFICIO)

Staff directory

MR. EDWARD LEWANDOWSKI, EXECUTIVE DIRECTOR .....*director@inlandbays.org*
MS. LORETTA SMITH, ADMINISTRATIVE ASSISTANT .....*office@inlandbays.org*
MR. ERIC BUEHL, HABITAT COORDINATOR .....*habitat@inlandbays.org*
MS. SALLY BOSWELL, EDUCATION & OUTREACH COORDINATOR .....*outreach@inlandbays.org*
MR. E.J. CHALABALA, RESTORATION COORDINATOR .....*restoration@inlandbays.org*
MS. JENN JONES, DEVELOPMENT COORDINATOR.....*development@inlandbays.org*
MR. CHRIS BASON, SCIENCE & TECHNICAL COORDINATOR.....*chrisbason@inlandbays.org*

The CENTER FOR THE INLAND BAYS (CIB) is a private, non-profit organization dedicated to promoting the wise use and enhancement of Delaware's Inland Bays and associated watersheds. The CIB was established by the Delaware General Assembly in 1994 under the auspices of the Inland Bays Watershed Enhancement Act and is administered by the U.S. EPA's National Estuary Program.

CENTER FOR THE INLAND BAYS
39375 Inlet Road
Rehoboth Beach, DE
Phone: (302) 226-8105
Fax: (302) 226-8109
Web: www.inlandbays.org

CENTER FOR THE INLAND BAYS
Rehoboth Indian River Little Assawoman