



DELAWARE CENTER FOR THE
INLAND BAYS
Research. Educate. Restore.

Center for the Inland Bays
FY2014 Annual Progress Report and FY2015 Annual Work Plan

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Implementation of the Delaware Inland Bays CCMP

Abstract

The Center presents the following completed projects from the FY2014 workplan and presents the following on-going and new projects for its FY2015 workplan. These projects implement various CCMP actions and may include but are not limited to the following:

Completed

- Land Conservation Options and Considerations Workshop
- Inland Bays Nitrogen and Phosphorus Total Maximum Daily Load Modelling Assessment
- Hazardous Debris Removal from Lewes/Rehoboth Canal
- Shoreline Monitoring and Assessment to aid in Restoration
- Schoolyard Habitats in the Inland Bays Watershed
- Sea Level Rise Awareness Week 2013
- Anchorage Canal Stormwater Retrofit Demonstration Project -- Sandpiper Pines Bioretention Area Concept Design

Ongoing

- Gardening for the Bays Native Plant Sale
- Long-term continuous saltmarsh monitoring in the Inland Bays
- Beneficial Reuse of Dredge Material for Wetland Restoration (Demonstration Project)
- Shellfish Enhancement Action Plan
- Angola Neck Reforestation Project
- Loop Canal Living Shoreline & Wetland Restoration Project
- Poplar Thicket Restoration Plan
- Poplar Thicket Upland Habitat Restoration Project
- Living Shoreline Restoration Permitting and Policy Development
- Upper Rehoboth Bay Land Conservation & Restoration Initiative
- Middle Island Restoration Project
- Your Creeks
- Eelgrass Habitat Suitability Mapping Project
- Bethany Beach Nature Center
- Shorezone Fish Community Volunteer Monitoring Program
- Inland Bays Clean Up
- Oyster Gardening Program
- Annual Inland Bays Horseshoe Crab Survey and Tagging Project
- CIB Speakers Bureau

DELAWARE CENTER FOR THE INLAND BAYS, INC.

Implementation of the Delaware Inland Bays CCMP

The Center presents the following completed projects from the FY2014 workplan and presents the following on-going and new projects for its FY2015 workplan. These projects implement various CCMP actions and may include but are not limited to the following:

Ongoing

- Eelgrass planting in Delaware Inland Bays
- James Farm Long Term Site Planning (James Farm Master Plan)
- Demonstration and Training of Living Shoreline Techniques for Marine Contractors
- Inland Bays Migratory Fish Passage Restoration Feasibility and Planning Study
- 2014 Delaware Inland Bays Case Statement
- Migratory Fish Passage Project 1: Millsboro Pond Fish Ladder
- James Farm Middle School Program
- Anchorage Canal Drainage Area Stormwater Retrofit Project: East Side Storm Drains
- Bio-enhancement to Improve Estuarine Habitat and Water Quality of Poorly-Flushed Residential Canals
- Hazardous Debris Removal from Indian River and Rehoboth Bay
- Inland Bays CCMP Project Management and Oversight
- Land Conservation Practitioners' Workshop
- Upper Indian River Watershed Study for Water Quality BMP Implementation
- Inland Bays Habitat Plan & Restoration Strategy Synthesis
- 2012 Center for the Inland Bays Facility Systems Replacement Plan and Financial Consultation

Proposed

- Oyster Shell Recycling Program "Don't Chuck Your Shucks"
- James Farm Master Plan Implementation Phase I
- 2015 Center for the Inland Bays Financial Plan
- Sunset Park Coastal Restoration Project
- Poplar Thicket Coastal Restoration Project
- EPA Monitoring Plan

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 2015 (October 1, 2014 through September 30, 2015). 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.

Fiscal Year 2014 Accomplishments Summary

The Center began the Celebration of its 20th Anniversary Year in FY2014. A special edition of the Center's Annual Report highlighted the successes shared by our partners over a fruitful two decades of CCMP implementation. These successes include the significant reduction in nutrient loads to the Bay from all major sources, the development of a comprehensive agency and volunteer-based estuary monitoring program, a major cleanup of the Bay's lone power plant, and multiple empirical indicators suggesting that the biology of the Bay is responding to restoration efforts. The Center is using its 20th Anniversary to increase private financial donations for CCMP implementation, and will hold a celebratory gala this August. A rebranding and enhanced marketing and outreach initiative completed in FY2014, have contributed to increased private donations. The Center has also continued an increase in project-specific grants. To date in FY2014, the Center was awarded four project grants totaling \$195,500. In conjunction with the Partnership for the Delaware Estuary and the Barnegat Bay Program, the Center has applied for another \$882,352 in grant funds from the National Fish and Wildlife Foundation to fund its Living Shoreline Initiative. Shorelines continue to be an important focus for the Center in FY2014 and 2015. As it moves forward into another 20 years, the Center remains grateful for the sustained and generous financial support of the EPA that makes possible the implementation of the Inland Bays CCMP. The following summary highlights accomplishments from FY2014 by area of mission.

RESEARCH & MONITORING

This fiscal year continued the Center's core added-value of providing timely applied research to address important management questions about the estuary. The Inland Bays Nitrogen and Phosphorus Total Maximum Daily Load Modelling Assessment revealed that the model used to develop the Inland Bays TMDL is not effective at simulating diel-cycling dissolved oxygen concentrations that are characteristic of shallow eutrophic estuaries such as the Inland Bays. Nor was the model effective at simulating chlorophyll concentrations used to represent phytoplankton. Therefore the model does not adequately capture a critically-important negative response of the estuary to eutrophication. This raises the potential that the model may have informed the selection of inadequate nutrient TMDLs for the estuary. The study recommended including important sub-models for benthic-pelagic coupling and primary production and respiration, which were absent from the existing model. The report also recommended 1) increasing model spatial resolution in tidal headwaters 2) including the 14 years of newly available data, and 3) re-assessing nutrient loading rates from the watershed. The Center's Scientific and Technical Advisory Committee (STAC) is convening a working group to develop a scope of work for an updated model based on the study's recommendations.

The Shoreline Monitoring and Assessment to Aid in Restoration project was completed. The study produced condition data on shorelines and riparian landuse for Rehoboth and Indian River Bay and will serve as the baseline for tracking condition and inform shoreline management goals. It will also be used to fill an important environmental indicator gap for shoreline condition after a subsequent round of sampling within 5 to 10 years. A web-based browser including all data and reports is publicly available at: cmap.vims.edu/ShlInv/Delaware/Delaware_shlinv.html.

The Eelgrass Habitat Suitability Habitat Mapping Project developed data on water temperature and light levels using seven sensors deployed during the fall and spring. The second year of the project will complete data collection. This data will be used with existing bathymetry, water clarity, suspended solids concentrations, chlorophyll concentrations, and sediment data to construct a suitability

model for eelgrass; and to a secondary extent, widgeon grass. Baygrass meadows are a signature ecological community of the Bays that were nearly completely eliminated due to eutrophication and hydro-modification. Restoring baygrass meadows is a key objective of the CCMP, but restoration efforts have resulted in little success due to a limited understanding of short scale variation in ambient water quality.

Citizen science continued at the Center in FY2014. The Shorezone fish Community Monitoring Project and the Horseshoe Crab Survey and Tagging Project entered their 4th and 7th years, respectively. These all-volunteer programs collect important biological indicator data for the estuary. This year the Horseshoe Crab Survey produced its first professionally designed report for public consumption.

www.inlandbays.org/wp-content/documents/2013_HSC_annual_report.pdf.

PUBLIC POLICY

The Center completed its policy work on the Shellfish Aquaculture Initiative. The Director continued to serve as a public policy educator on the issue after the previous year's issuance of the Initiative's final report. An important outcome of the project was that the Delaware Legislature unanimously approved a bill allowing shellfish aquaculture in the Inland Bays. The Center also provided comment at regulation development workshops during 2014, and on draft regulations in May to ensure that shellfish farming was compatible with the CCMP.

The Center provided education to support policy that resulted in the Delaware General Assembly declaring September 14 through September 22, 2013 Sea Level Rise Awareness Week. Education was also provided on legislation that formed a Wetlands Advisory Committee to make recommendations to the Delaware General Assembly on increasing protection and restoration of freshwater wetlands. The Inland Bays watershed lost 1,000 acres of freshwater wetlands between 1992 and 2007. Reversing this trend is a key element of the CCMP. The Executive Director now represents the Center on the Wetlands Advisory Committee.

As a thrust of the Center's Living Shoreline Subcommittee, Living Shoreline Restoration Permitting and Policy Development is well underway. An important action to meet the goal of maximizing living shorelines in Delaware is to identify and address regulatory and permitting challenges. The thirty-one member subcommittee has reviewed the regulatory and permitting information from Delaware and surrounding states and is forming recommendations to the Center's Board for consideration in FY2015.

EDUCATION & OUTREACH

Sea Level Rise Awareness Week was also a major public education effort for the Center and its partners. Fourteen Delaware organizations with environmental missions participated in a coordinated effort that resulted in 1) a resolution of the Delaware General Assembly to Declare September 14 through September 22, 2013, to be "Sea-Level Rise Awareness Week," 2) a professionally produced short documentary on sea level rise adaptation in Delaware entitled *Rising Tides: Delaware's Response to Sea Level Rise*, 3) a website entitled *S.O.S. Delaware* that educated about the Week, 4) a press release during which the Governor's Executive Order 41 requiring state agencies to work together to prepare Delaware for sea-level rise, and 5) a coordinated series of educational and participatory events about sea level rise.

Another completed partnership project was the Landowner and Conservation Workshop that was arranged by the Center and two local conservation groups: Delaware Wildlands and the Delaware Nature Society. The intent of the workshop was make specific landowners in the Rehoboth Bay Watershed aware of the various options available to them for land conservation. Speakers included representatives from local land trusts and state and federal agencies. Private consultations for attendees were performed by two attorneys that specialize in conservation land transactions and estate planning. There were 15 interested individuals that attended/participated in the workshop.

The Center also continued its work to educate children about the Inland Bays through its James Farm Middle School Education Program that reached 1,000 7th and 8th graders in FY2014, and the Bethany Beach Nature Center Program that reached more than 2,000 children and their families during the calendar year of 2013.

The Gardening for the Bays Native Plant Sale held its 10th annual event that attracted 500 – 700 attendees who purchased over 1,000 native plants from five local and regional vendors. The Native Plant Sale educates citizens about the benefits of planting native plants for wildlife as well as clean water. It is predicted that the population of Sussex County will increase by 35% by 2030 and much of the new homes supporting this growth have the choice to plant native or non-native and perhaps invasive plants.

The Your Creeks Project demonstrated progress this year. The Your Creek project seeks to create a greater sense of ownership by the local communities for each of the Bay's major creeks and document the condition of the Creeks in greater detail. A citizen stakeholder team for Love Creek was developed through the Citizen Advisory Committee, work began on a citizen survey, mapped watershed HOAs and farms, and began analyzing environmental indicator data for the project.

RESTORATION & ENHANCEMENT

The Inland Bays Migratory Fish Passage Restoration Feasibility and Planning Study is being completed at the time of this report. All eight dams on tributaries of the Inland Bays were inspected in terms of passage feasibility. Data on American shad, hickory shad, alewife, blueback herring, and American eel, as well as water quality parameters were used to develop suitability indexes to rank the dams for priority of passage. Millsboro Pond dam was chosen to receive a conceptual fish passage design.

The Hazardous Debris Removal from the Lewes & Rehoboth Canal Project removed 25 tons of hazardous creosote pilings, salt treated docking and miscellaneous debris (trees, trash and tires) from an important navigational waterway. This project was initiated by the Center's Water Use Plan Implementation Committee as an action of the CCMP's Water Use Plan. The public and agency response to the highly efficient project has led to continued funding for such work and continued recognition for the Center's stakeholder approach to promoting proper waterway maintenance.

The James Farm Long Term Site Planning project is well underway. Consultants Oasis Design Group and Biohabitats have developed an ecological site analysis and a conceptual improvement plan, and have led a public workshop to gather input on community interests in the Farm. The Plan will be final by end of the fiscal year.

ADMINISTRATIVE

Administrative improvements this past year include the completion of an update to the CCMP project implementation and tracking database, completion of the Center's rebranding and marketing initiative, and the near completion of a Case Statement for development. A part time Program Assistant was hired to support the work of Program Coordinators.

Major Project Changes from the FY2014 Workplan

The following is a summary of major project changes from the FY2014 CIB Workplan to the EPA. It is common occurrence that a small percentage of the total CCMP projects intended for implementation during a given Fiscal Year are either altered significantly in their scope or abandoned due to a number of potentially unforeseen circumstances. Projects may also be added to meet special opportunities or to address contingencies requiring a response.

PROJECTS REMOVED FROM THE WORKPLAN DUE TO LOW SIGNIFICANCE OR INACTIVITY

The Hopkins Dairy Farm Headwater Stream and Wetland Restoration Project – Phase 2 was removed from the workplan due to a lack of cooperation from a key landowner. Total project funds in the amount of \$13,000 were reallocated to the following existing projects:

1. Oyster Gardening Program; \$1,600 for labor to transport materials to gardeners.
2. Loop Canal Living Shoreline and Wetland Restoration Project; \$6,400 for increased implementation costs realized after concept design.
3. Angola Neck Reforestation Project; \$5,000 to increase planting density and contract out labor.

PROJECTS ADDED SINCE THE LAST WORKPLAN WAS ACCEPTED

1. Sea Level Rise Awareness Week 2013
2. Anchorage Canal Stormwater Retrofit Demonstration Project -- Sandpiper Pines Bioretention Area Concept Design

Fiscal Year 2015 Workplan Summary

This year's workplan continues a planning component aimed at developing project concepts that can easily be submitted as grant proposals for funding. On-going project planning for shellfish enhancement, land conservation in the Rehoboth Bay watershed, eelgrass restoration, and the James Farm Ecological Preserve Master Plan will be completed in FY2015 or in the remainder of FY2104. This strategy is intended to increase the number of implementation projects accomplished in the intermediate term through increased application for individual project grants and the potential availability of new implementation funds from the State's SRF based Water Quality Project Sponsorship Program. Planning for terrestrial protection and restoration projects as well as baygrass and shellfish restoration/enhancement efforts will increase the likelihood of receiving larger implementation grants and increase partner participation in projects.

New plans will also be developed per the requirements of the EPA's most recent 5-year program evaluation of the Center. A Finance Plan that addresses ways to diversify the Center's funding sources will be developed to explore funding sources for CCMP implementation and

the long term financial sustainability of the Center itself. The development of this financial strategy will be key to maintaining the level of growth in CCMP implementation the Center has experienced over the past two years. A Monitoring Plan will comprehensively revisit and document all monitoring activities of the Center and its partners, identify gaps in monitoring, and develop recommendations for filling the gaps. Devising a plan to update the estuary hydrodynamic and water quality model that informs the nutrient TMDL for the Bays will be part of this plan. Both plans will be completed by the end of FY2015.

Living Shorelines work will continue to be a focus of the Center. Two innovative Coastal Restoration Projects utilizing living shoreline concepts are anticipated for funding through the National Fish and Wildlife Foundation Hurricane Sandy grant. EPA funds will be designated to support Center management of the project beginning in FY2015. These projects involve innovative oyster and submerged aquatic vegetation restoration components. A third ongoing shoreline project, the Loop Canal Living Shoreline is planned for completion. These projects support the goal of demonstrating how to construct living shorelines so that eventually their construction could be required by regulation where feasible.

Finally, development of funding will occur for the implementation of the James Farm Master Plan's first Implementation Phase as well as for the fish ladder for the Indian River at Millsboro Pond. It is likely that both projects will begin construction in earnest in FY2015.

COMPLETED PROJECTS

Anchorage Canal Stormwater Retrofit Demonstration Project -- Sandpiper Pines Bioretention Area Concept Design

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

George Junkin, Town Councilman, Town of South Bethany, Municipal Coordinator

Michael Clar, P.E., Tetra Tech, Primary Consultant

Supporting Project Partner Contacts:

Nancy Laurson, USEPA National Estuary Program, Technical Assistance Sponsor/Funder

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Stormwater Management

CCMP Objective: Reduce nutrient contributions from stormwater to help achieve TMDLs.

CCMP Action: Create stormwater management facilities and source reduction strategies for 4,500 acres of urban and residential lands developed pre-1990.

Project Overview:

The Anchorage Canal Stormwater Retrofit Demonstration Project was undertaken to demonstrate cost effective stormwater retrofit practices in a highly urbanized coastal watershed draining to a poorly-flushed residential canal on Little Assawoman Bay (LAB). The goal of the overall project is to reduce nitrogen and phosphorus loads from the drainage by 40% in accordance with the TMDLs for LAB, while contributing to the overall Inland Bays Pollution Control Strategy goal of 4,500 acres of pre-1990 developed lands treated with stormwater retrofits. The Sandpiper Pines area of the Town of South Bethany drains to the Anchorage Canal but was not included in the original 2010 plan that conceptualized and prioritized retrofits for the drainage area. This project uses in-kind consulting services of Tetra Tech, as provided by the EPA Headquarters Green Infrastructure Technical Assistance to the NEPs, to develop concept design and plans including water quality improvement estimates for 14 bioretention areas. The bioretention areas were designed to intercept, infiltrate, and treat stormwater carrying nutrients, bacteria, and hydrocarbons to existing storm drains in Town right of ways. The final report will be used to pursue funding for the implementation of those bioretention areas determined feasible for construction. The Town of South Bethany acts as the municipal coordinator and landowner. The Center acts as the project facilitator and NEP sponsor.

Outputs/Deliverables:

1. Final report containing concept design, plans, pollution reduction estimates and cost estimates for 14 bioretention areas designed to intercept, infiltrate, and treat runoff entering existing storm drains.

Intermediate Outcomes:

1. The report will be used to develop a grant proposal for project implementation.
2. Town officials and landowners will have increased knowledge concerning stormwater runoff and its treatment.

Long-Term Outcomes:

1. The constructed bioretention areas will prevent a defined amount of nutrient, bacteria, and hydrocarbon pollution from entering the Little Assawoman Bay.
2. In concert with the results of other pollution reduction actions, the water quality of Little Assawoman Bay will improve.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis
 Improving Water Quality Monitoring

Pressure Targets:

Nutrient overloading
 Pathogens
 Toxic chemicals

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 1,414.00	\$ 0.00	\$ 1,414.00
EPA	EPA Green Infrastructure Technical		\$ 0.00	\$ 35,000.00	\$ 35,000.00
Town of South Bethany	South Bethany Volunteer Match 2014		\$ 0.00	\$ 420.00	\$ 420.00
Totals:			\$ 1,414.00	\$ 35,420.00	\$ 36,834.00

PROJECT PROGRESS

Beginning Date: 11/01/2013 Project Status: Completed

Annual Report:

Project is completed and report has been recieved and accepted.

Hazardous Debris Removal from Lewes/Rehoboth Canal

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

Ariane Nichols, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Planner

Scott Figurski, Environmental Scientist, DNREC -- Division of Water, Landowner rights

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Update and implement the Inland Bays Water Use Plan.

CCMP Action: Focus outreach on increasing waterway safety and channel marking.

Project Overview:

This project was completed in September of 2013. Located just north of the Rehoboth draw bridge in the Lewes/Rehoboth Canal, 25 tons of creosote pilings, salt treated docking and miscellaneous debris (trees, trash and tires) were removed at a cost of \$400 per ton.

The CIB's Water Use Plan Implementation Committee (WUPIC) put out a call for bids in which three were received and the lowest was used.

The WUPIC worked with partners and identified a stretch of the Lewes/Rehoboth Canal that had the most dangerous hazardous debris. Not only is it a navigational hazard and an eyesore, these old docks leach unwanted chemicals into the Bays. WUPIC is worked with local towns, DNREC, the Army Corp of Engineers and the Lewes/Rehoboth Canal Improvement Association to complete this project.

It's envisioned that this project will make way for a larger effort that would involve local communities in spreading information and raising funds to help improve the Lewes Rehoboth Canal further.

Outputs/Deliverables:

1. Removed 25 tons of dilapidated docks and miscellaneous debris that contained harmful chemicals including polycyclic aromatic hydrocarbons, phenol, cresols, chromated copper arsenate which leached into waterways and soils.
2. Removal of hazardous debris that impedes navigation

Intermediate Outcomes:

1. An instant beautification project that citizens can associate the CIB with.

Intermediate Outcomes:

2. Sets the stage for a possible water taxi docking location.
3. Energize local communities and business owners which may get them to contribute towards other canal clean ups.
4. Identifies who has actually abandoned this debris and sets the stage for penalization and/or better subaqueous leasing protocols.

Long-Term Outcomes:

1. Improved navigation safety
2. Clears way for a community town dock to be built.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Fish & Wildlife loss
- Habitat loss & degradation
- Toxic chemicals

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2013 EPA NEP Operating Grant	CE9939911-11-1	\$ 5,086.40	\$ 0.00	\$ 5,086.40
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 10,000.00	\$ 0.00	\$ 10,000.00
Totals:			\$ 15,086.40	\$ 0.00	\$ 15,086.40

PROJECT PROGRESS

Beginning Date: 06/01/2013 Project Status: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
identify hazardous debris areas	Completed	05/01/2013	06/28/2013			
identify landowners/subaqueous leases	Completed	05/22/2013	07/31/2013			
bid requests for debris removal	Completed	07/24/2013	08/09/2013			
hire contractor and remove debris	Completed	08/27/2013	09/30/2013			

Inland Bays Nitrogen and Phosphorus Total Maximum Daily Load Modelling Assessment

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Damian Brady, Ph.D., University of Maine, Contractor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Water Quality Management

CCMP Objective: Update the Inland Bays estuarine and watershed models with the latest scientific understanding and best available data, and make the updated models publicly available.

CCMP Action: Update the Inland Bays estuarine water quality and hydrodynamic model.

Project Overview:

The estuarine hydrodynamic and water quality models used to develop the Total Maximum Daily Loads (TMDLs) of Nitrogen and Phosphorus to Rehoboth Bay and Indian River Bay were some of the first sophisticated estuarine models created for this purpose. Originally developed in 1993, the models were updated with more current data to develop TMDL's for Little Assawoman Bay and the Tributaries of the Inland Bays in 2004. Since 1993, a great deal of advancement has occurred in estuarine modelling approaches and in the understanding the relationship between nutrient sources, loads, and response variables such as dissolved oxygen concentrations. Pepper Creek on Indian River Bay has since become the best studied system in the world for diel-cycling hypoxia and its effects on juvenile fishes. Additionally, a significant amount of new spot sampled and continuously monitored water quality data has become available throughout the Bays. This project will examine the performance of the existing TMDL model used by DNREC to determine the response of the estuary to nutrient loads as well as that of a newly draft model that integrates new knowledge on estuarine characteristics and function. Should the new model produce significantly different results, the CIB will 1) request that DNREC update the TMDLs and the TMDL regulations for the Inland Bays and 2) pursue the development of a publicly accessible estuarine model available to ask questions about management and climate change scenarios in the Inland Bays.

Outputs/Deliverables:

1. Final report comparing the performance of the original and new modelling approaches with recommendations on TMDL revision.
2. Presentation of the final report to STAC.
3. Workshop with DNREC Watershed Assessment Section to determine process for TMDL update, if needed, based upon DNREC and STAC discussion.

Intermediate Outcomes:

1. Information with which to determine if a TMDL estuarine and hydrodynamic model update is necessary.

Long-Term Outcomes:

1. Re-invigorated research interest in modelling what was once one of the most sophisticatedly modelled estuaries in the country.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Improving Water Quality Monitoring

Pressure Targets:

Fish & Wildlife loss

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 5,960.00	\$ 0.00	\$ 5,960.00
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 12,000.00	\$ 0.00	\$ 12,000.00
Totals:			\$ 17,960.00	\$ 0.00	\$ 17,960.00

PROJECT PROGRESS

Beginning Date: 10/01/2012 Project Status: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
DNREC Workshop	Completed		06/15/2014			

Annual Report:

The final report was submitted to the CIB and presented to STAC. The Inland Bays Nitrogen and Phosphorus Total Maximum Daily Load Modelling Assessment revealed that the model used to develop the Inland Bays TMDL is not effective at simulating diel-cycling dissolved oxygen concentrations that are characteristic of shallow eutrophic estuaries such as the Inland Bays. Nor was the model effective at simulating chlorophyll concentrations used to represent phytoplankton. Therefore the model does not adequately capture a critically-important negative response of the estuary to eutrophication. This raises the potential that the model may have informed the selection of inadequate nutrient TMDLs for the estuary. The study recommended including important sub-models for benthic-pelagic coupling and primary production and respiration, which were absent from the existing model. The report also recommended 1) increasing model spatial resolution in tidal headwaters 2) including the 14 years of newly available data, and 3) re-assessing nutrient

Annual Report:

loading rates from the watershed. A meeting was established by several STAC members to discuss the next steps that can be taken to use these results to potentially re-model the TMDL for the Inland Bays. In the short-term it was determined that a re-modeling was not feasible due to funding limitations and a lack of buy in from the potential DNREC and University of Delaware partners.

Land Conservation Options and Considerations Workshop

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Kate Hackett, Executive Director, Delaware Wild Lands, Primary

Ginger North, Associate Director for Natural Resources Conservation, Delaware Nature Society

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Use the Delaware Ecological Network and other appropriate information sources to prioritize the preservation of key habitat in the Inland Bays drainage system (Public comment recommended).

Project Overview:

The primary goal of this project is to host a workshop in Millsboro in late September 2013 for specific landowners to make them aware of the various options available to them to preserve their land for conservation purposes. Invitation will be based on criteria such as the size of a parcel of land or its adjacency to already protected or preserved land. The work proposed in this project is to hold a workshop to educate landowners about land conservation. Delaware Nature Society and Delaware Wild Lands will serve as the project leads and will oversee the development of GIS layers, landowner mailing lists, and conduct mailings. All partners will be responsible for cooperating on contacting vendors, exhibitors, and workshop logistics.

Outputs/Deliverables:

1. List of land parcels prioritized for conservation purposes.
2. Hold a land conservation workshop.
3. List of interested individuals who are interested in habitat restoration.

Since this was a county-wide workshop, 958 parcels owned by 744 landowners were identified. 37 were specific to the upper Rehoboth Bay totalling 2,354 acres. Mailings were sent to approximately 500 landowners. There were 15 interested individuals that attended/participated in the workshop.

Intermediate Outcomes:

1. Landowners will begin to consider their individual situation and land conservation options as it relates to potential income, taxes, and other perceived financial advantages.
2. Landowners will begin to consider their "legacy" of what they leave behind for their heirs or what they help to conserve for others to

Intermediate Outcomes:

enjoy.

Long-Term Outcomes:

1. Less wildlife habitat will be lost to land conversion.
2. Land that is more suited as wildlife habitat will not be converted to less-appropriate land uses.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Habitat loss & degradation
- Inappropriate land use

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 5,000.00	\$ 0.00	\$ 5,000.00
Totals:			\$ 5,000.00	\$ 0.00	\$ 5,000.00

PROJECT PROGRESS

Beginning Date: 05/15/2013 Project Status: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone Synopsis	Completed	05/28/2014				
Identify parcels	Completed	05/31/2013				
Initial landowner mailing	Completed	06/30/2013				
Initiate media contact	Completed	07/31/2013				
Direct landowner mailing	Completed	08/31/2013				
Conduct workshop	Completed	09/24/2013				

Annual Report:

Workshop was held on September 24 in Millsboro, Delaware. Speakers included representatives from local land trusts, conservation groups, state and federal agencies, as well as private consultations for attendees performed by 2 attorneys that specialize in

Annual Report:
conservation land transactions and estate planning.

Since this was a county-wide workshop, 958 parcels owned by 744 landowners were identified. 37 were specific to the upper Rehoboth Bay totalling 2,354 acres. Mailings were sent to approximately 500 landowners. There were 15 interested individuals that attended/participated in the workshop.

Schoolyard Habitats in the Inland Bays Watershed

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

Katelin Frase, Senior Educator, Environmental Concern, Inc, Educ-Tech consultant

Will Revel, Curriculum supervisor, Indian River School District, Administrator

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Develop and deliver watershed education programs for children.

CCMP SubAction: Continue to offer watershed education at schools through the Schoolyard Habitats Program.

Project Overview:

In 2006, in recognition of decreased resources for students to travel to offsite locations for watershed learning opportunities, and to reach students not reached through our James Farm Middle School Program, we expanded our partnership with the Indian River School District to bring a Schoolyard Habitat Program (SHP) to every district school in the watershed. Our goal: to provide a place and resources at each school for environmental education to become a part of every student's learning experience throughout the entire school year. At each school, we work with students, teachers, administrators and groundskeepers to plan and install a schoolyard wetland or rain garden as an outdoor learning 'classroom.' 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 to take the program to new schools; work with existing SHP schools; and develop curriculum-aligned activities for each grade level for outdoor experiential education. This spring, we completed our final project; eleven schools in the district now have a schoolyard habitat.

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

Intermediate Outcomes:

1. Students have experiential outdoor learning opportunities at their school.
2. Teachers have curriculum-aligned lesson plans on water quality, habitat diversity, and other ecological concepts for use at their

Intermediate Outcomes:

schoolyard habitats

Long-Term Outcomes:

1. 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.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
Chichester DuPont Foundation	Chichester School Yard Habitat Grant		\$ 3,288.00	\$ 418.00	\$ 3,706.00
Chichester DuPont Foundation	Chichester School Yard Habitat Grant		\$ 3,446.00	\$ 220.00	\$ 3,666.00
Totals:			\$ 6,734.00	\$ 638.00	\$ 7,372.00

PROJECT PROGRESS

Beginning Date: 09/06/2006

Project Status: Completed

Annual Report:

1. Held a "Planning our Rain Garden" workshop at Millsboro Middle School attended by students, teachers, administrators and groundskeepers.
2. Held a "Potting Day" to pot and distribute rain garden plants in every classroom so that students could care for them and learn about them before Planting Day.
3. Held a Planting Day; more than 300 students participated in planting the rain garden.
4. Completed schoolyard habitat Rain Garden at Millsboro Middle School.
5. This is the final schoolyard habitat to be created under this program. We will continue to offer programming as part of our education outreach to schoolage children with by inviting the participation of teachers and students at our SYH schools in the World Water Monitoring project.

Sea Level Rise Awareness Week 2013

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

Brenna Goggin, Environmental Advocate, Delaware Nature Society, Financial Agent/Coordinator

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Planning for Climate Change

CCMP Objective: Integrate projected sea level rise into land use planning and proposed development to protect shore zone ecosystems and bay water quality.

CCMP Action: Include climate change and sea level rise information in public outreach and education efforts.

Project Overview:

Sea Level Rise Awareness week is a partner project among 14 Delaware organizations with environmental missions that aims to increase awareness among the general public and decision makers about sea level rise and its effects on natural resources and infrastructure. The project was a state wide coordinated effort that resulted in 1) a resolution of the Delaware General Assembly to Declare September 14 through September 22, 2013, to be "Sea-Level Rise Awareness Week," 2) a professionally produced short documentary on sea level rise adaptation in Delaware entitled *Rising Tides: Delaware's Response to Sea Level Rise*, 3) a website entitled *S.O.S. Delaware* that educated about the Week, 4) a press release during which the Governor's Executive Order 41 requiring state agencies to work together to prepare Delaware for sea-level rise was passed, and 5) a coordinated series of educational and participatory events about sea level rise occurred. The website received 1,163 unique visits, a minimum of 865 people participated in events, and the video received 300 views, and a press release on the Inland Bays adaptation strategy was covered by 7 media outlets. The outcome was that more residents and decision makers were informed about sea level rise and adaptation to it. The role of the Center was to partially fund the video, assist with information development and communication, and sponsor and participate in events.

Outputs/Deliverables:

1. Sea Level Rise Awareness Week Resolution of the Delaware General Assembly.
2. *Rising Tides: Delaware's Response to Sea Level Rise* Video.
3. Educational participatory events on sea level rise and press coordination.
4. *S.O.S. Delaware* educational website about sea level rise and events during the SLR Awareness week.

Intermediate Outcomes:

1. 1,163 visitors to the *S.O.S. Delaware* website learned about SLR.
2. Awareness and understanding of sea level rise increased amongst the Delaware General Assembly.

Intermediate Outcomes:

- 3. 865 people participated in educational events on sea level rise.
- 4. Over 300 people viewed educational video entitled Rising Tides: Delaware's Response to Sea Level Rise.

Long-Term Outcomes:

- 1. Delaware residents and decision makers are more informed about sea level rise and its impacts on estuaries and are assumed to be more supportive of actions to prevent further sea level rise and to adapt to sea level rise.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

- Alteration of natural flow regimes
- Fish & Wildlife loss
- Habitat loss & degradation
- Inappropriate land use
- Lack of institutional capacity/leveraging

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2013 EPA NEP Operating Grant	CE9939911-11-1	\$ 2,777.00	\$ 0.00	\$ 2,777.00
DNREC	FY2012 DNREC Operating Grant		\$ 3,000.00	\$ 0.00	\$ 3,000.00
Totals:			\$ 5,777.00	\$ 0.00	\$ 5,777.00

PROJECT PROGRESS

Beginning Date: 03/28/2013 Project Status: Completed

Annual Report:

All outputs and otucomes are completed. See description.

Shoreline Monitoring and Assessment to aid in Restoration

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Andy Howard, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Funding and Coordination

Alison Rogerson, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Funding and Coordination

Marcia Berman, Director, Virginia Institute of Marine Science, Contractor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Assess and report on the condition of shorelines in the Inland Bays.

Project Overview:

The Inland Bays have ~356 miles of shoreline that fall under the jurisdiction of 13 municipalities, Sussex County, and the State of Delaware. A detailed field and GIS based shoreline assessment of the Inland Bays will aid in long-term assessment and restoration planning for the county and its watershed partners.

By assessing the status of shoreline and riparian areas in the three Inland Bays we will be able to identify critical or vulnerable shoreline areas and develop science based management recommendations for the areas most in need. The results of the assessment will be used to advocate the use of permitting for shoreline stabilization practices other than hardened shorelines and be a tool for reducing the amount of shoreline hardened in the Inland Bays. A field and GIS based assessment was conducted by VIMS, to assess the shoreline conditions of Indian River and Rehoboth Bays. This data was compiled into a final report and the spatial and tabular data is now available through a web based portal, created for this project.

Project actions and strategies include:

- Conduct geographic and priority best management practice targeting. This includes the development of a GIS database to target BMPs to the most effective locations on a whole watershed or on a sub-watershed basis.
- Halt the continued loss of non-tidal wetlands and reverse these loss trends by promoting projects to mitigate for previously lost

Project Overview:

wetlands.

- Using GIS and other identification and mapping technologies, identify candidate sites for re-creation of freshwater and tidal wetlands.
- Protect and enhance/restore/create additional freshwater and/or tidal wetlands each year based on the GIS and field analysis.
- Promote the use of living shorelines rather than hard structures for shoreline stabilization because the former better accommodates sea level rise than the latter. DNREC and other permitting agencies should increase their emphasis on living shorelines in their permitting process.

Outputs/Deliverables:

1. GIS data on assessment of shoreline conditions for Rehoboth, Little Assawoman Bay, and Indian River Bays.
2. Web-based portal for data retrieval by public.

Intermediate Outcomes:

1. Create GIS data and web based portal that can be used by the CIB, State partners, contractors, and the public to assess the conditions of the shorelines in the inland bays.

Long-Term Outcomes:

1. Create baseline shoreline assessment data that can be used to analysis longterm trends in shoreline condition.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

Inappropriate land use

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 25,414.00	\$ 0.00	\$ 25,414.00
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 1,989.00	\$ 0.00	\$ 1,989.00
DNREC	Wetlands Program Development	STATE-0000163832	\$ 48,900.00	\$ 2,400.00	\$ 51,300.00
Totals:			\$ 76,303.00	\$ 2,400.00	\$ 78,703.00

PROJECT PROGRESS

Beginning Date: 03/01/2012

Project Status: Completed

Annual Report:

The study produced condition data on shorelines and riparian landuse for Rehoboth and Indian River Bay and will serve as the baseline for tracking condition and inform shoreline management goals. It will also be used to fill an important environmental indicator gap for shoreline condition after a subsequent round of sampling within 5 to 10 years. A web-based browser including all data and reports is publicly available at: http://cmap.vims.edu/ShlInv/Delaware/Delaware_shlinv.html The data collection, GIS analysis, report, and web portal was completed by VIMS.

ON-GOING PROJECTS

2012 Center for the Inland Bays Facility Systems Replacement Plan and Financial Consultation

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

Alice R. Antonelli, Senior Consultant, Non-profit Finance Fund

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Administration

CCMP Objective: Provide financial development and planning for CCMP implementation

CCMP Action: Provide financial development and planning for CCMP implementation

Project Overview:

In 2006, the Center for the Inland Bays moved its offices to its Indian River Inlet Facility. The 5,000 square foot building was repurposed from an unused US Coast Guard barracks to a green demonstration facility to house the Center's operations and employees. The facility is 80% powered by renewable energy and it demonstrates recycled products and best management practices for water quality and wildlife habitat. As the building approaches ten years in age, its many systems are beginning to demonstrate the need for repair and replacement. To project for and secure the funds necessary to maintain the facility's systems in advance of their needs, the Center must quantify the costs of and plan for their expenditures. The Center will solicit and secure the services of a financial consultant to produce a Systems Replacement Plan for the facility that will detail the costs necessary to maintain the facility and project when those costs can be expected to be incurred based on the normal life of individual systems, such as solar panel and heating and cooling systems. The plan will guide the development, budgeting, and investment of maintenance funds for the life of the facility. This will allow to Center to conduct operations in an orderly and sustainable fashion without disruptions to work and will ultimately reduce overhead costs. The Center will also use the services of the consultant to advise the Center management on improving its operational budgets, budgeting process, and presentation of program finances. The Center has not significantly revised its budgets and budgeting process for over a decade, despite major growth of the organization. This consultation will result in a more efficient budgeting process and better financial planning and expression of finances. It is anticipated that this will improve the impressions of potential private donors and foundations to increase funding from these sources for CCMP implementation.

Outputs/Deliverables:

1. Systems replacement plan for the Indian River Inlet Facility.
2. Recommendations for improvement of organizational budgets and budgeting process.

Intermediate Outcomes:

1. Increased capacity to develop and invest funds for the maintenance of the systems of the Indian River Inlet Facility in advance of their needs.
2. Clearer and more efficient budgets and organizational budgeting process.

Long-Term Outcomes:

1. An adequately and sustainably maintained facility to support Center operations.
2. Reduced overhead costs for the Center.
3. Improved expression of organizational finances.
4. Increased revenue to support CCMP implementation.

Pressure Targets:

Lack of institutional capacity/leveraging

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2015 DNREC Operating Grant		\$ 6,916.80	null	null
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 15,000.00	\$ 0.00	\$ 15,000.00
Totals:			\$ 21,916.80	\$ 0.00	\$ 15,000.00

PROJECT PROGRESS

Beginning Date: 08/01/2014

Project Status: Ongoing "Major Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Finalize project agreement with consultant.	Not Initiated	07/22/2014	01/01/2015			
Recieve draft of systems replacement plan.	Not Initiated	07/22/2014	03/01/2015			
Finalize systems replacement plan	Not Initiated	07/22/2014	04/01/2015			
Commence budgeting consultation.	Not Initiated	07/22/2014	04/01/2015			
Recieve final budgeting recommendation and program budgets.	Not Initiated	07/22/2014	05/01/2015			
Solicit consultation services	Not Initiated	09/04/2014	11/01/2014			

Annual Report:

Major project delays occurred related to organizational contingencies involving direction from the board of directors and priority fundraising opportunities. Staff communications training directed by the Board was engaged in during the project time period and a one-time opportunity to pursue major Hurricane Sandy Coastal Resiliency Grant funds was pursued. The result was that this project, a long-term planning exercise with low immediate priority, was not able to be fully addressed. Initially, a non-profit financial consulting organization was engaged and provided advice on the project. The Center's intention was to enter into a sub-recipient agreement with the consultant. However, the Center was advised by EPA that this organization could not be a sub-recipient. The Center requested and received a 9 month extension to complete the project. The Center will now enter into a contractor solicitation process for consultation services to complete the project.

2014 Delaware Inland Bays Case Statement

MANAGEMENT AND PARTNERS

CIB Project Manager: Jenn Jones

Primary Project Partner Contacts:

Jeff Metz, CEO, Bloom Metz Consulting

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Communicate with stakeholders through a variety of media; to promote public involvement and influence behaviors, attitudes and actions to foster stewardship.

CCMP Action: Create and disseminate printed marketing materials such as brochures, postcards, flyer exhibits and signage to address specific education/outreach needs to target audiences.

Project Overview:

The Center contracted with Bloom Metz Consulting to produce a Case Statement that the Center's Board and staff can use to assist in generating financial support for operations. The Case Statement will explain why the Center is a good investment to fulfill its mission. The final document will be a professionally designed publication making a general case for support. Project specific cases for support will be able to be included in a folder style layout for future projects as they are ready to be developed for support. This meets a requirement of the Center's 2013 EPA Program Evaluation.

Outputs/Deliverables:

1. Professionally designed and printed case statement publication.

Intermediate Outcomes:

1. Increased understanding from both ongoing and potential financial supporters about the need for and value of supporting the Center's operations.
2. Increased capacity of Board Members to fundraise for the Center.

Long-Term Outcomes:

1. Maintenance of existing Center funding sources.
2. Increased income for operations from new funding sources.

Pressure Targets:

Lack of institutional capacity/leveraging

PROJECT PROGRESS

Beginning Date: 10/01/2013

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Hire Consultant	Completed	10/01/2013	01/01/2014			
Text Completed	Completed	10/01/2013	05/15/2014			
Document Produced	Initiated	10/01/2013	07/01/2014			
Document Posted on Website	Not Initiated	09/04/2014	12/01/2014			

Annual Report:

Bloom Metz Consulting was hired to produce the case statement. Multiple drafts have been reviewed and revised. CIB's marketing and branding information have been integrated. A final draft will be completed by MAY 15. Design and final production will be completed by JUL 01, 2014.

Anchorage Canal Drainage Area Stormwater Retrofit Project: East Side Storm Drains

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

George Junkin, Town Councilman, Town of South Bethany, Municipal Coordinator

Latonya Gilliam, NPDES Engineer, DELDOT, Technical Assistance

David Wiecking, Town Representative, Middlesex Beach Association, Community Representative

Susan Barton, Associate Professor, University of Delaware Department of Agriculture and Natural Resources, Planting Designer

Supporting Project Partner Contacts:

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

Larry Trout, Senior Consultant, A. Morton Thomas and Associates Inc., Contractor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Stormwater Management

CCMP Objective: Reduce nutrient contributions from stormwater to help achieve TMDLs.

CCMP Action: Create stormwater management facilities and source reduction strategies for 4,500 acres of urban and residential lands developed pre-1990.

Project Overview:

The Little Assawoman Bay (LAB) is impaired by excess nutrients and regularly violates primary contact recreation and instantaneous dissolved oxygen criteria. The excess nutrients have resulted in murky waters that prohibit growth of submerged aquatic grasses, and low dissolved oxygen levels have degraded the quality of the estuary as a fish nursery. In 2008, the Inland Bays Pollution Control Strategy (PCS) was promulgated to guide the reduction of nitrogen and phosphorus loads by the 40% necessary to meet the watershed's 2004 TMDL. The PCS has as one of its necessary actions the voluntary "[Creation] of stormwater management facilities and source reduction strategies for 4,500 acres of urban and residential lands developed pre-1990," which is to be implemented by DNREC, DELDOT, Sussex County, and the Sussex Conservation District.

Much of the development nearest LAB was completed prior to the 1990 State stormwater regulations, and now contributes large volumes of runoff with little or no treatment. This runoff is often directed into poorly flushed residential canal systems, which can have acute water quality problems. One such area is the Anchorage Canal Drainage Area. The Anchorage Canal is the northernmost canal in the Town of South Bethany (SB) and it is part of LAB. Relative to other canals in SB, it has a large drainage area (125 acres), about half of which is impervious (65% for the Town of South Bethany and 52% for Middlesex Beach). Areas of Highway One and its western

Project Overview:

commercial strip, as well as portions of the Sea Colony high rise complex, the Middlesex Beach community and SB drain into the canal. Much of the runoff is collected through a series of stormwater drains along Route 1 and is piped to the Loop Section of the canal. Studies show that 592 lbs. of nitrogen and 33 lbs. of phosphorus per year enter the canal from the storm drain system and that sediment loads and first flush Total Coliforms are significant. Continuous dissolved oxygen monitoring demonstrates severe hypoxia and algal blooms are common in this highly sensitive system.

The Center for the Inland Bays has selected the Anchorage Canal Drainage Area for a stormwater retrofitting pilot project to begin meeting the above PCS action. From 2008 to 2010, the Center for the Inland Bays (CIB), the Town of South Bethany, DeIDOT, and the communities of Sea Colony and Middlesex Beach worked with The Center for Watershed Protection (CWP) and JMT to produce a stormwater retrofit assessment and implementation strategy for the drainage area.

Implementation of the strategy began with a 2010 DNREC grant that was matched with funding from Sea Colony and CIB and that resulted in creation of wetswale bio-retention areas at Sea Colony in June 2011. A second implementation project created 16 highway median bio-retention areas in October 2011 and was funded by CIB, DNREC, South Bethany, Middlesex Beach, and DDA. The third phase is underway to create a wetpond and wetland complex adjacent to the Seacolony high-rise complex.

To continue progress toward a 40% reduction in nutrients to the Bay, we propose to begin implementation of the final phase of the implementation strategy for the Anchorage canal watershed, which would construct 20 in-situ bio-retention areas on the east side of SR 1 (Coastal Highway) located within portions of Middlesex Beach and the Town of South Bethany in Sussex County, Delaware. The Center will act as the project facilitator and financial manager. Maintenance of the areas will be assumed by DeIDOT and the communities.

Outputs/Deliverables:

1. Design and construct two bio-retention areas within the DeIDOT ROW and private lands adjacent to south-bound Highway One (SR-1 west side) to remove an estimated 6.5 pounds of nitrogen and 0.8 pounds of phosphorus per year from 2.5 urban acres with approximately 75% impervious cover.
2. Construct 17 in-situ bio-retention areas adjacent to the stormwater inlets (stormwater grates with aprons) on the east side of SR 1 (Coastal Highway) in the Town of South Bethany to remove an estimated 14.44 lbs. of total nitrogen, 2.01 lbs. of total phosphorus, and 433.09 lbs. of total suspended solids (TSS) per year from an urban drainage of approximately 17 acres.
3. Construct 3 Gabion and in-situ bio-retention areas adjacent to the stormwater inlets (culverts with swales) on the east side of SR 1 (Coastal Highway) in the community of Middlesex Beach to remove an estimated 2.91 lbs. of total nitrogen, 0.39 lbs. of total phosphorus, and 87.22 lbs. of total suspended solids (TSS) per year from an urban drainage of approximately 6 acres.
4. Secure maintenance agreements on projects.
5. Aid in the continued monitoring and education activities for the overall project.

Intermediate Outcomes:

1. Town and municipal officials and landowners will have increased knowledge of the sources and issues related to stormwater runoff and some of the means for its treatment.

Long-Term Outcomes:

1. Reduction in the loads of nitrogen and phosphorus, and volume of TSS that enters the dead-end canal system of Middlesex Beach and the Town of South Bethany.
2. The 22 bio-retention/gabbion BMP will be used to educate the public on the importance of reducing nutrient input into the Inland Bays Waterways.
3. The 22 bio-retention/gabbion BMP will be used as demonstration areas to show and education other coastal towns and municipalities what can be done to reduce the load on non-point source pollutants, while increasing the aesthetics of the storm drains within a community.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Nutrient overloading

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2014	17
Phosphorus	2014	2
Sediment	2014	520

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 8,676.00	\$ 0.00	\$ 8,676.00
DNREC	FY2012 DNREC Operating Grant		\$ 5,000.00	\$ 0.00	\$ 5,000.00
DNREC	Community Water Quality Improvement	CWQ 11-01	\$ 18,000.00	\$ 5,000.00	\$ 23,000.00
DNREC	Community Water Quality	CWQIG 12-01	\$ 131,153.00	\$ 49,133.00	\$ 180,286.00
Town of South Bethany	Leveraged Matching Cash		\$ 10,000.00	\$ 11,494.00	\$ 21,494.00
DeIDOT	DeIDOT Match		\$ 0.00	\$ 6,083.00	\$ 6,083.00
Totals:			\$ 172,829.00	\$ 71,710.00	\$ 244,539.00

PROJECT PROGRESS

Beginning Date: 03/10/2013

Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Monitoring of site performance and maintenance of sites and plantings as needed	Initiated		12/15/2014			
Final report completed	Not Initiated		12/28/2014			
Permits secured for construction.	Completed		05/30/2014			
Final design for excavation and planting design completed.	Completed		05/30/2014			
Utilities designation completed	Completed		05/23/2014			

Annual Report:

1. The planting design was completed by the University of Delaware, and was integrated into the draft engineering design.
2. The final utility designation, as to be conducted through DeIDOT, was delayed by over 6 months, but was completed in May.
3. The final engineering plan was completed based upon the results of the utility designation.
4. The Right of Use Agreements for Middlesex Beach and Town of South Bethany were approved and signed by DeIDOT, after a 4 month delay.
5. A Safety Permit, with a temporary pedestrian detour, was required by DeIDOT for a section within the Middlesex Beach construction area. This was completed prior to construction.
6. Bio-retention construction was enacted for all sites in Middlesex Beach and the Town of South Bethany.
7. The constructed bio-retention site were planted in accordance to the design.

Angola Neck Reforestation Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Robert Line, Natural Areas Program Coordinator, DNREC -- Division of Parks and Recreation

Supporting Project Partner Contacts:

Jake McPherson, Regional Biologist, Ducks Unlimited - Annapolis Office

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Update and implement the Inland Bays Habitat Protection Plan.

Project Overview:

The project site is on state-owned and managed land located in the eastern/northeastern portion of Angola Neck, just northwest of the mouth of Love Creek. The parcels, which are owned by DNREC State Parks and managed as open space lands, are approximately 190 acres in size, of which approximately 40 acres is currently tilled by a local farmer in a small grain-corn-soybean rotation. The lands to be reforested to a mixed hardwood (oak-hickory)/pine (shortleaf) forest community are in very close proximity to tidal wetlands, open water areas, streams, and sensitive wetland areas, and would create a forested corridor from Love Creek into and out of other wetland areas located further inland. The reforestation will benefit neotropical migratory songbirds including but not limited to Eastern Towhee, Yellow-breasted Chat, Grasshopper Sparrow, Northern Parula, American Redstart, and Worm-eating Warbler.

Project partners will coordinate planting activities with the farmer and will develop a draft planting plan identifying species, locations, and density. The work proposed in this project is to reforest 40 acres of farmed land. Based on the conversion of farmland to forest on 40 acres, it is estimated that this project will result in a nutrient load reduction of 640 lbs/yr for nitrogen and 16 lbs/yr for phosphorus.

Outputs/Deliverables:

1. A planting plan.
2. 40 acres of reforested farmland.
3. Nitrogen reduced by 640 pounds per year.
4. Phosphorus reduced by 16 pounds per year.

Intermediate Outcomes:

1. Increase in wildlife habitat as land transitions from fallow to scrub/shrub.
2. Enhanced water quality.
3. Less impact to water quality as soil is no longer exposed to precipitation.

Long-Term Outcomes:

1. Based on the Inland Bays Pollution Control Strategy estimated land-use Loading Rates (appendix E), the conversion from tilled land to forested area should result in a 76 percent decrease in total Nitrogen and a 50 percent decrease in total Phosphorus entering receiving waters from the re-forested farmland.
2. Increased quality of wildlife habitat as trees mature and produce seed/fruit.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Fish & Wildlife loss
- Habitat loss & degradation
- Inappropriate land use

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Agriculture/Ranch Land	Reestablishment	Acres	40.00

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2015	640
Phosphorus	2015	16

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 10,000.00	\$ 0.00	\$ 10,000.00
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 11,172.00	\$ 0.00	\$ 11,172.00
EPA	FY2013 EPA NEP Operating Grant	CE9939911-11-1	\$ 5,000.00	\$ 0.00	\$ 5,000.00
DNREC	FY2015 DNREC Operating Grant		\$ 10,416.00	\$ 0.00	\$ 10,416.00
Totals:			\$ 36,588.00	\$ 0.00	\$ 36,588.00

PROJECT PROGRESS

Beginning Date: 10/01/2013

Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
Initial project planning meeting	Completed	12/18/2013				
Develop plant list, identify suppliers, and determine 2-3 planting cycle	Initiated	05/28/2014				
Solicit additional funding	Initiated	09/02/2014				
Initiate phase 1 planting	Not Initiated		10/15/2014			
Monitor growth/mortality	Not Initiated		04/15/2015			
Make preparations for phase 2 plantings	Not Initiated		07/01/2015			

Annual Report:

A project planning meeting was held with DNREC Division of Parks & Recreation, who serve as the land managers. The focus of the meeting was to discuss funding availability, current management of the property, and desired species for the project site. A follow-up meeting is slated to occur onsite, after the new year.

Delays experienced on this project were related to coordinating a date for performing a site investigation and were caused by bad weather conditions during the winter and spring months, conflicting schedules with project partners (i.e. vacations, holidays, other meetings), as well as additional time required to complete other priority projects or deadlines.

The primary constraint on this project is related to additional funding required to complete the planting. USDA Natural Resources Conservation Service, US Fish and Wildlife Service, The Nature Conservancy, and DNREC were all approached about project fund availability. DNREC has committed to provide some additional funding towards a fall implementation, US Fish & Wildlife may be able to provide funding in FY2015 but can provide technical assistance, and TNC does not have funding at this time but can also provide technical assistance. Since the land is considered to be “public” lands, the USDA Natural Resources Conservation Service is restricted from providing funding directly to the landowner (the State of Delaware).

Annual Inland Bays Horseshoe Crab Survey and Tagging Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Dr. Doug Miller, Associate Professor, University of Delaware -- College of Earth, Ocean, and Environment, Technical Assistance

Supporting Project Partner Contacts:

Jordy Zimmerman, Environmental Scientist, DNREC -- Division of Fish and Wildlife, Technical Assistance

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Encourage more stakeholder support through volunteerism.

CCMP Action: Involve volunteers and stakeholders in demonstration projects that model desired changes in practices and citizen science research to increase their knowledge about the bays.

Project Overview:

For seven years the CIB has partnered with the University of Delaware, EOE in Lewes to conduct an annual Inland Bays Horseshoe Crab Survey. This also includes tagging crabs with tags provided by the US Fish and Wildlife Service. The surveys are conducted by CIB volunteers at six sites on all three bays. Surveys are done for three nights around the New Moon and Full Moons in May and June for a total of twelve surveys which are led by six trained, volunteer site leaders and approximately 40 to 50 volunteers. Project partners' roles will include providing technical assistance, updating the CIB on current Horseshoe Crab research, and storing water samples.

Outputs/Deliverables:

1. Training of a corp of volunteers with knowledge and experience to conduct citizen-science on the Inland Bays
2. Annual publicity about the Survey each year in local media when volunteers are recruited and the results of the annual survey are reported.
3. Based on annual survey results, develop an "annual report" brochure to highlight the project's results.

Intermediate Outcomes:

1. Expansion of the survey and available data as new survey sites are added.
2. Evaluate past and ongoing surveys to better understand the species spatial distribution within the bays.

Long-Term Outcomes:

1. Use data on horseshoe crab spawning on Inland Bays beaches to support conservation of sandy beach habitats on the Inland Bays

Long-Term Outcomes:

- 2. Use data from the Inland Bays and Delaware Bays to better manage the resource for protection of horseshoe crabs and shorebird populations.
- 3. Work with DNREC to refine data collection techniques and methodology in order to meet requirements for submission to the Atlantic States Marine Fisheries Commission.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,586.00	\$ 0.00	\$ 5,586.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 10,794.00	\$ 0.00	\$ 10,794.00

PROJECT PROGRESS

Beginning Date: 03/01/2014

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
Identify survey sites	Completed	04/01/2014				
Recruit team leaders	Completed	04/08/2014				
Train volunteers	Completed	04/08/2014				
Conduct survey and tagging	Completed	09/02/2014				
Develop annual report	Not Initiated		09/30/2014			
Recruit team leaders	Not Initiated	04/05/2015				
Train volunteers	Not Initiated	04/15/2015				
Conduct survey and tagging	Not Initiated	05/20/2015				

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop annual report	Not Initiated	09/30/2015				

Annual Report:

The annual Horseshoe Crab Survey Orientation (training) meeting held on April 8 and was attended by 40 volunteers. Speakers included CIB staff and UD Researchers. This was also an opportunity to distribute and discuss the newly developed Annual Report, based on the 2013 Survey results. The format that was established will be used to highlight subsequent surveys in a consistent, easy to read format.

Survey teams deployed in mid-April and began recording data during that month's new/full moon phase. Teams continue to deploy as scheduled and are anticipated to begin tagging in June.

Beneficial Reuse of Dredge Material for Wetland Restoration (Demonstration Project)

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Andy Howard, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Collaborator

Rob Gano, Regional Manager, DNREC -- Division of Fish and Wildlife, Planner

Alison Rogerson, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP

Supporting Project Partner Contacts:

Dan Brower, Program Manager II, DNREC -- Division of Watershed Stewardship

Ariane Nichols, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Planner

Melanie Tymes, Environmental Scientist, DNREC -- DWR - WSLs, Planner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Protect and enhance/restore additional wetland acreage.

Project Overview:

In an effort to utilize dredge material to aid in the restoration of tidal wetlands, the Fringe Wetland Restoration workgroup for the Inland Bays is currently in the process of finalizing a demonstration/ feasibility project to utilize dredge material from Pepper Creek to restore 25 acres of wetland. This workgroup is a cooperative effort consisting of representatives from DNREC's Shoreline and Waterway, Watershed Assessment, Wetland and Subaqueous Sections, and the Division of Fish and Wildlife, and the Center for the Inland Bays.

The navigational channel of Pepper Creek will be dredged in the Fall and Winter of 2012 to allow better access for boating traffic, and normally this silty material would be placed in a upland confined disposal facility. Current research has shown that removal of dredge material could result in a long-term deficient in the amount of sediment that is available to allow marshes to build and keep pace with rising sea-levels.

The fringe wetland workgroup is working to utilize dredge material for navigational dredging to restore tidal wetlands, with the first project to restore 25 acres of tidal wetlands adjacent to the Vines Creek Marina. 1 to 4 inches of sediments will be sprayed, through a high pressure nozzle, over the 25 acres. The project is expected to start in late October. The permit for this project is currently still in

Project Overview:

review with DNREC and the Army Corp of Engineers.

The lessons learned and experiences from this project will be used to plan and implement beneficial reuse projects on future DNREC navigational dredging projects.

Outputs/Deliverables:

1. 25 acres of enhanced/restored saltmarsh.
2. Press release and Inland Bays Journal Article on project outcome.
3. Presentation of findings at technical conference.
4. Development of a guidebook for beneficial reuse of dredge material that outlines application and monitoring guidelines, and lessons learned from the Pepper Creek project.

Intermediate Outcomes:

1. Increased utilization of dredged material for marsh restoration
2. Increased capacity of 25 acres of marsh to keep pace with rising sea level.

Long-Term Outcomes:

1. Institutionalized incorporation of dredged material for marsh restoration in the navigational and sediment management of the estuary.
2. Maintenance of full suite of marsh services for an undetermined number of years to due application of dredged sediments.
3. Reduction in overall costs for sediment management should through preservation of marsh ecosystem service value, reduction of costs associated with land-based disposal should the practice be institutionalized.
4. Demonstate that beneficial reuse of dredge material can successfully be used to restore tidal marshes.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 6,400.00	\$ 0.00	\$ 6,400.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 2,440.00	\$ 0.00	\$ 2,440.00
Totals:			\$ 8,840.00	\$ 0.00	\$ 8,840.00

PROJECT PROGRESS

Beginning Date: 02/01/2013

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Three years of site monitoring will be conducted to evaluate the effectiveness of restoration.	Initiated		12/15/2016			
Completion of beneficial reuse guidebook	Initiated		10/31/2014			
Demonstate that beneficial reuse of dredge material can be used in wetland restoration successfully	Completed		03/30/2013			
Assist DNREC with developing a means to institutionalize beneficial reuse with dredge projects.	Initiated		12/30/2014			

Annual Report:

1. The restoration of the second continuation area, 21 acre area, started in September, and was completed in December.
2. Several site visits were conducted to the Pepper Creek demonstration and second restoration area to monitor the progress of the 5.3 acre wetland restoration site and the progression of the 21 acres site.
3. A press event was held at the site, as part of Sea Level Rise Awareness Week.
4. The post-restoration site assessment has been completed for the 21 acre site. The 9 month post-replenishment site visit was conducted for the initial 5.3 acres demonstration site.
5. A beneficial reuse guidebook is in progress, and is being developed with DNREC's Watershed Assessment Section. This guidebook will outline the process of locating potential sites, site assessment methods, monitoring parameters, and lessons learned on this project.

Bethany Beach Nature Center

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

Nancy Lucy, Director-BBNC, Town of Bethany Beach, Director

Nancy Lucy, Director, BBNC, Town of Bethany Beach

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Develop and deliver watershed education programs for children.

CCMP SubAction: Offer community outreach and education to children, families, and visitors at the Bethany Beach Nature Center (BBNC).

Project Overview:

In 2009, the CIB established a formal partnership with the Town of Bethany Beach to provide watershed education and outdoor learning experiences at the town's Bethany Beach Nature Center. Located at the heart of the Inland Bays watershed in a rapidly developing area, it is our 'point of contact' location in the southern resort area to reach residents and visitors to the coastal area of our watershed. In addition to the Center which houses exhibits and education displays and materials, it is the largest parcel of undeveloped land within the Town of Bethany Beach and includes 3 acres of forested uplands, 9.6 acres of federal jurisdictional wetlands and 13.8 acres of Delaware-designated wetlands.

The CIB Education and Outreach Coordinator provides program and outreach support to the Director of the Bethany Beach Nature Center and a part-time teacher for the year-around Saturday morning children's program to assist with planning and teaching, and with procurement of materials and equipment in support of watershed/wetlands education programs. The CIB provides exhibits, brochures and other printed materials about the Inland Bays and watershed for use and distribution at the BBNC. Over 2,000 children and their families participate in programs or visit the Nature Center annually and the attendance is growing each year.

Other joint projects at the BBNC include a native plant demonstration garden at the Center completed in 2006, a state of the art I-Wall interactive exhibit completed in 2007 on watershed habitats and a demonstration rain garden at the BBNC completed in 2011.

Outputs/Deliverables:

1. To create a point-of-contact for education and outreach in the southern resort area of the Inland Bays watershed.
2. To educate and inform residents and visitors about the unique coastal habitats that have been preserved and protected at the Bethany Beach Nature Center.
3. A center for outreach to summer visitors to the watershed.

Intermediate Outcomes:

1. A location for distribution of Inland Bays outreach/education materials to residents and tourists in the southern coastal resort area of the watershed.
2. Programs offered for children and adults that highlight watershed education and inform and educate these residents and visitors
3. Residents and visitors experience and learn about watershed habitats on the trails and through the programs and exhibits at the BBNC.

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. Visitors, part time residents and new homeowners are introduced to the Inland Bays and their watershed through the exhibits, programs and interpretive trails at the BBNC.
3. Visitors are introduced to the CIB and our mission.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 3,371.00	\$ 19,400.00	\$ 22,771.00
DNREC	FY2015 DNREC Operating Grant		\$ 2,400.00	\$ 0.00	\$ 2,400.00
Totals:			\$ 5,771.00	\$ 19,400.00	\$ 25,171.00

PROJECT PROGRESS

Beginning Date: 05/08/2007

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Work with BBNC Director to re-evaluate programs and address the challenges and opportunities present	Initiated	03/09/2014	03/09/2014			
Identify needs for new outreach materials and exhibits	Not Initiated	05/05/2014	09/30/2014			
Re-assess and recommend new opportunities for Saturday children's program	Not Initiated	05/30/2014	01/16/2015			
Provide grant to implement recommendations	Not Initiated	05/30/2014	03/30/2015			

Annual Report:

Bio-enhancement to Improve Estuarine Habitat and Water Quality of Poorly-Flushed Residential Canals

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

George Junkin, Town Councilman, Town of South Bethany, Municipal Coordinator

Supporting Project Partner Contacts:

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

Larry Trout, Senior Consultant, A. Morton Thomas and Associates Inc., Contractor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Nutrient Management

CCMP Objective: Monitor the effectiveness of the nutrient management program and CAFO regulations, and suggest and implement revisions as needed.

CCMP Action: Secure and leverage funding for BMPs.

CCMP SubAction: Utilize DNREC's Water Quality Improvement Project Sponsorship Program (WQIPSP) to leverage funding for BMPs.

Project Overview:

This project proposes to develop a technique by which larger oyster cages and floating treatment wetlands (FTW) can be installed along bulkheads in dead-end canals to increase complex habitat for macro-invertebrate and fish communities. In turn, these techniques will provide the much needed research data to document the benefit of shellfish (e.g., oyster) filtration as it relates to water quality and document the extent that floating wetlands increase dissolved oxygen (DO) in limited circulation systems.

Bulkhead bio-enhancements strongly align with the Priorities for EPA's Future, with a focus on: Cleaning Up Our Communities, Building Strong State and Tribal Partnerships, and Protecting America's Waters. In addition, this research aligns with multiple targeted actions identified in the Inland Bays Comprehensive Conservation and Management Plan (CCMP).

It is hypothesized that the oyster communities will significantly reduce the TSS values in the tidal waters that pass these oyster cages. Each cage will contain ~ 32 bushels of oysters, with approximately 3 to 4 cages structures per canal. Assuming a filtration rate of 20 to 50 gallons per day, depending on the size of the oysters, the oysters in each canal could filter ~288,000 to 960,000 gallons of water a day. It is also expected that the cages will dramatically increase the abundance of the natural oyster community over time (through

Project Overview:

natural reproduction) within these canal systems, further increasing filtration over a broader area. The associated benefit to biodiversity within the benthic and sessile communities will also be translated through a higher availability of complex habitat on the bottom and sides of the canals.

A Floating treatment wetland island will be positioned adjacent to oyster cages or at dead end canal termini to increase oxygen exchange thereby reducing the incidence or severity of low dissolved oxygen events, removing excess nutrients, and offer an additional means of providing complex habitat. As water passes through the network of hanging roots underneath the floating wetland islands, these roots pass oxygen into the water and provide a biological haven for the development of biofilms that aid in various nutrient removal and biological treatment processes. This project has targeted up to 1,000 square feet of floating wetlands distributed between two canals.

Two canals will be selected, within the DE Inland Bays Estuary watershed, based upon their water volume and flushing residence time. These canals will be retrofitted with bulkhead oyster cages and floating wetlands. Two similar adjacent canals will be selected as reference site for comparison. TSS and DO monitoring stations will be positioned throughout the study sites and adjacent reference canal sites to document the spatial and temporal changes in TSS and DO values in response to oyster filtration and wetland processes. Cage, Island, and seine surveys will be conducted in the study and reference canals to document the macro-invertebrate and fish communities by potential local and regional academic partners with relevant expertise.

The Town of South Bethany will be providing: long-term water quality monitoring data from the neighboring canals, providing volunteer labor, and provide funding for the wetland plantings. Cardno and A. Morton Thomas will be providing design and project management services.

Outputs/Deliverables:

1. Develop a means of installing high-density oyster cages along bulkheads in dead-end canals to increase habitat for macro-invertebrate and fish communities.
2. Develop a means of installing floating treatment wetland (FTW) islands adjacent to the oyster cages to increase available surface area (in the root system) to pull pollutants from the water and provide habitat for macro-invertebrates and fish communities.
3. Demonstrate that 1) oysters can be successfully positioned in higher densities in dead-end canals and 2) survive through several growth seasons, and 3) spawn.
4. Document the extent to which oyster communities can successfully reduce TSS and Chlorophyll a, floating wetlands can increase DO, and increase the diversity in the benthic and sessile communities of the canals.
5. Demonstrate a multiple-technique, natural, and esthetic approach to water quality improvements in back canal areas.

Intermediate Outcomes:

1. Educational outreach opportunity for the Town of South Bethany, to show the residents the importance of reducing non-point source pollution into the canals.
2. Restore fish habitat to York Canal, through the installation of floating wetlands and oyster cages.
3. Reduce TSS and increase DO within York Canal.

Long-Term Outcomes:

1. Document the extent to which oyster communities can successfully reduce TSS and Chlorophyll a, floating wetlands can increase DO, and increase the diversity in the benthic and sessile communities of the canals.
2. Document a multiple-technique, natural, and esthetic approach to water quality improvements in back canal areas (this will include design specifications, contractors, and suppliers).

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis
 Improving Water Quality Monitoring

Pressure Targets:

Habitat loss & degradation
 Nutrient overloading

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Other	Enhancement	Acres	0.10
Tidal Wetland	Establishment	Acres	0.02

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 16,672.00	\$ 0.00	\$ 16,672.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 16,672.00	\$ 0.00	\$ 16,672.00
DNREC	Community Water Quality Grant	CWQIG 13-02	\$ 143,000.00	\$ 44,436.00	\$ 187,436.00
Town of South Bethany	Leveraged Matching Cash		\$ 5,000.00	\$ 6,092.00	\$ 11,092.00
Totals:			\$ 181,344.00	\$ 50,528.00	\$ 231,872.00

PROJECT PROGRESS

Beginning Date: 12/20/2013 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Draft plan developed	Initiated		06/01/2014			
Final plans development	Not Initiated		06/28/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Monitoring equipment Installed	Not Initiated		06/28/2014			
Floating wetlands planted and installed	Not Initiated		07/15/2014			
Oyster cages deployed in canal	Not Initiated		09/20/2014			
Monitoring of site performance and maintenance of equipment as needed	Not Initiated		10/15/2015			
Final report completed	Not Initiated		12/15/2015			

Annual Report:

1. The grant for this project was secured and successfully awarded.
2. Cardno ENTRIX was selected as the contractor to assist in the development of the project and a task order was developed and signed.
3. Preliminary site evaluations and meetings were conducted, which led to the development of a new site layout and design. Float oyster cages were selected over securing oyster cages to the bulkheads.
4. The final canal site was selected for the study and reference areas were approved by the working group.
5. Project preliminary design and layout were developed.
6. Draft plan for project was developed and presented to Town of South Bethany City Council and residence of York Canal.
9. The real-time monitoring equipment and layout plan were completed.

CIB Speakers Bureau

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Administer a Speakers Bureau.

Project Overview:

The Speakers Bureau was created to raise awareness about the Delaware Center for the Inland Bays and its mission; to educate citizens about issues, concerns and opportunities for participation in the work to restore and protect the Inland Bays, and promote citizen action in support of our mission through direct contact with homeowners associations and civic organizations throughout the watershed. The participation of the CIB Citizens Advisory Committee in the Speakers Bureau allows us to extend our reach into the watershed through the participation of CAC speakers and through the new contacts with community organizations that CAC volunteers can bring.

Outputs/Deliverables:

1. More than 500 people annually are reached through speaking engagements at homeowners organizations and civic associations.
2. Presentations are produced for priority projects and special interest audiences such as garden clubs as needed.

Intermediate Outcomes:

1. Citizens are provided with information creating a broader base of citizen support for issues affecting water quality in the Inland Bays and empowering them to have influence on public policy issues affecting water quality at the local and state level
2. Civic organizations and homeowner associations become members of the CIB, becoming investors in our mission and program and receive invitations to events, opportunities to assist on projects, and regular news and information from the CIB about the Inland Bays

Long-Term Outcomes:

1. As more and more citizens are reached, awareness of the condition of water quality in the Inland Bays by more stakeholders leads to increased support for initiatives to improve water quality in the Inland Bays, more financial support of our mission, and enhanced understanding of what citizen's individually can do to help the Bays.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:
Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 371.00	\$ 880.00	\$ 1,251.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 1,381.00	\$ 1,320.00	\$ 2,701.00
Totals:			\$ 1,752.00	\$ 2,200.00	\$ 3,952.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete production of inspirational video to introduce citizens to our work	Initiated	05/05/2014	10/30/2014			
Develop powerpoint for Love Creek watershed	Initiated	05/05/2014	10/24/2014			
Train new speakers, focusing on Your Creek team members as community-based ambassadors	Not Initiated	05/30/2014	11/07/2014			
Use 'Your Creek' team members to present to 500 citizens through HOAs and community organizations	Not Initiated	05/30/2014	09/30/2015			
Develop powerpoint for Dirickson Creek	Not Initiated	08/30/2014	06/30/2014			

Annual Report:

1. Updated powerpoints to reflect new branding.
2. Began work on the development of a inspirational video presentation to reach the uninitiated.
3. Incorporated the speakers bureau as in integral outreach element in the into the Your Creek initiative.
4. Trained two additional Citizen Advisory Committee members for the Speakers Bureau.
5. Reached 250 citizens in the 3rd quarter of 2013 and 1st quarter of 2014 through the speakers bureau.

Demonstration and Training of Living Shoreline Techniques for Marine Contractors

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

David Baird, Sussex Conservation District, Partner

Alison Rogerson, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Collaborator

Danielle Kreeger, Science Director, Partnership for the Delaware Estuary, Co-implementer and planner

Jessica Lister, Vice President for Restoration, Environmental Concern, Inc, Training Instructor

Supporting Project Partner Contacts:

Jim Sullivan, Planner, DNREC -- Division of Watershed Stewardship, Partner

Marcia Fox, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Partner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Conduct living shoreline demonstration projects to train installation and maintenance contractors.

Project Overview:

Rehoboth, Indian River, and Little Assawoman Bays all have experienced extensive shoreline erosion as the result of boat wakes, sea-level rise, and storm wave action. Within the watershed, the common techniques used by marine contractors to halt this erosion or attempt to restore these impacted shorelines is to use shoreline hardening techniques. Living or green shoreline techniques, can not only halt current and future shoreline erosion but also increase vegetated intertidal habitat. Living shorelines also can be more pleasing to the eye, than hardened shorelines, and can enhance landowners landscape with plantings of perennial and annual vegetation. Living shoreline demonstration areas will be created and monitored for success in the Inland Bays watershed using staff and contractual labor. A marine contractors training will be held to train a target of 12 contractors operating in the Inland Bays area on living shoreline demonstration techniques. Demonstration and training of contractors are critical to the acceptance of utilizing living shoreline techniques as a preferred and/or required method of shoreline management where site conditions allow.

Outputs/Deliverables:

1. Complete demonstration areas for living shoreline techniques
2. Secure permits for shoreline restoration and modification.
3. Develop and complete outreach material of techniques and benefits.
4. Develop list of contractors that have been trained and have demonstrated their ability to install approved living shoreline techniques.
5. Develop list of potential sites for further demonstration site installation.
6. Train a target of 25 marine contractors operating in and around the Inland Bays in living shoreline installation techniques.

Intermediate Outcomes:

1. Develop demonstration area through the Inland Bays that have been created by local contractors.
2. Create opportunities for public landowners to tour and evaluate potential alternatives for shoreline restoration at demonstration sites.
3. Cultivate the relationship between trained contractors and interested landowners.

Long-Term Outcomes:

1. Restore eroding shorelines, to help provide intertidal habitat and provide a heightened level of protection to habitats landward of the shoreline restoration.
2. Increase utilization of living shorelines techniques within the Inland Bays watersheds.
3. Monitor long-term effectiveness of living shoreline techniques used in Inland Bays, to evaluate the best practices for the Inland Bays.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 4,800.00	\$ 0.00	\$ 4,800.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 6,720.00	null	null
DNREC	FY2015 DNREC Operating Grant		\$ 4,800.00	\$ 0.00	\$ 4,800.00
Totals:			\$ 16,320.00	\$ 0.00	\$ 9,600.00

PROJECT PROGRESS

Beginning Date: 10/01/2012

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Secure funding for two demonstration areas	Initiated		06/30/2014			
Review project design, site priorities, and list of contractors that could benefit for training.	Initiated		09/15/2014			
Secure necessary permits	Initiated		04/15/2015			
Conduct pre-training meetings and outreach sessions with local contractors	Initiated		03/15/2015			
Conduct training and construction of living shorelines at demonstration site.	Not Initiated		07/15/2015			

Annual Report:

1. A grant was submitted to NFWF in December, which included two living shoreline/ restoration demonstration projects. The projects to be implemented include: Sunset Park in Dewey Beach (\$418, 126 requested; with total budget of \$452,685) and Poplar Thicket in Long Neck (\$373,099 requested; with a total budget of \$686,105).
2. Included in this grant is funding to conduct a contractor training program, for up to 50 marine contractors.
3. A rehabilitation and restoration plan was developed and implemented for a previously installed living shoreline at the DNREC Lewes Facility, which is showing signs of failure due to improper engineering. The redesigned living shoreline will be used as a demonstration site.

Eelgrass Habitat Suitability Mapping Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Supporting Project Partner Contacts:

Bob Murphy, Director, Ecosystems Solutions, Collaborator

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Promote recurrence of submerged bay grasses.

CCMP Action: Map areas of the Bays that have habitat characteristics supportive of the re-establishment of bay grass species that have been identified as suitable candidates for restoration.

Project Overview:

The most basic objective of the Inland Bays management 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 quality 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 parts 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 successful 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-reestablishment 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 likely 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 effects 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 (upon the completion of the data collection and analysis) for the Inland Bays using newly acquired (light penetration and temperature) data and existing data sources including bathymetry, water clarity, suspended solids concentrations, and chlorophyll concentrations; and sediment type. The maps, completed through this the project, 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 an environmental indicator for eelgrass that communicates bay condition and program

Project Overview:

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.

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.

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 sensitivity towards eelgrass restoration goals.

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.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 550.00	\$ 0.00	\$ 550.00
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 3,840.00	\$ 0.00	\$ 3,840.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 3,850.00	\$ 0.00	\$ 3,850.00
Totals:			\$ 8,240.00	\$ 0.00	\$ 8,240.00

PROJECT PROGRESS

Beginning Date: 01/01/2011

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Begin aggregation and provision of existing data	Initiated		09/01/2014			
Begin map construction	Not Initiated		10/01/2014			
Complete final maps and reports	Not Initiated		11/28/2014			
Complete environmental indicator	Not Initiated		03/28/2015			

Annual Report:

1. The 7 deployed temperature/light penetration sensors were retrieved and downloaded. Approximately 2 to 4 months of useable data were collected from each site.
2. It was decided that the sensors would be re-deployed in the spring, as additional summer/fall seasonal temperatures and light penetration data was necessary to adequately build a model.
3. The sensors were re-deployed in May and June.

Eelgrass planting in Delaware Inland Bays

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Promote recurrence of submerged bay grasses.

CCMP Action: Implement the bay grass restoration, protection, and monitoring plan.

Project Overview:

The most basic objective of the Inland Bays management plan is to reverse eutrophication and habitat loss. Submerged aquatic vegetation (SAV) meadows are keystone species of coastal lagoons and are signature habitats for fish and shellfish. They also control water quality 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 SAV's. This project involves various stages of the eelgrass lifecycle to end up with planted seeds and bare root seedlings in Inland Bay suitable locations. Eelgrass is a very limited natural resource in our Inland Bays and the ultimate goal of this project is to use various techniques and data collection methods to restore it.

Harvesting and planting seeds has proven to be minimally effective over the last three years, which is typical for this kind of restoration, but the few bare root seedlings that have been obtained have shown a greater percentage in growth and survivability in premonitoring data. Monitoring the seeds that were planted in pearl bags and in desired locations will be done in June of 2014. Bareroot seedlings will be harvested from Barnegat Bay in October 2014 and then planted soon after. Installed data loggers have identified suitable locations for eelgrass growth.

2015 will allow for increased monitoring and location suitability data to be collected. Bare root seedlings will be sought after in neighboring states and collected and planted in October of 2015. The SAV restoration plan will be implemented which also includes the incorporation of widgeon grass. 1.5 acres of restored eelgrass is expected to occur.

Outputs/Deliverables:

1. Installation of 7 data loggers to record (temp and light penetration)
2. SAV restoration plan for the Inland Bays implementation
4. collect growth and survival data at current project locations
5. continue collecting water quality parameters to enhance map of suitable desired locations for restoring SAV's

Intermediate Outcomes:

1. Collecting eelgrass seed and becoming familiar with the correct methods.
2. Restoring up to 1 acre of eelgrass in our Inland Bays.

Long-Term Outcomes:

1. Restore acres of eelgrass which in turn provides beneficial benthic habitat for many organisms.
2. Prove methods that can be used for restoring eelgrass successfully in Delaware's Inland Bays.
3. Provide a natural source of eelgrass and seeds that establish and recover on their own.
4. Create and Implement an SAV restoration plan specifically for Delaware's Inland Bays.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Alteration of natural flow regimes
 Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 14,012.80	\$ 0.00	\$ 14,012.80
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 10,172.80	\$ 0.00	\$ 10,172.80
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 5,000.00	\$ 0.00	\$ 5,000.00
Totals:			\$ 29,185.60	\$ 0.00	\$ 29,185.60

PROJECT PROGRESS

Beginning Date: 05/12/2012 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
SAV restoration plan to be completed	Initiated	05/29/2014	08/29/2014			
Monitor 2013 plantings and install data loggers	Initiated	05/29/2014	06/27/2014			
Collect bare root seedlings from Barnegat Bay, New Jersey	Initiated	05/29/2014	10/01/2014			
Plant seedlings in viable locations in the Inland Bays	Not Initiated	05/29/2014	10/31/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Implement SAV plan and identify funders	Not Initiated	05/29/2014	11/28/2014			
Monitor previous years plantings	Not Initiated	05/29/2014	06/30/2015			
Research neighboring states bare root seedling availability	Not Initiated	05/29/2014	07/31/2015			
Collect bare root seedlings from neighboring states	Not Initiated	05/29/2014	10/30/2015			
Plant seedlings in viable locations in the Inland Bays	Not Initiated	05/29/2014	10/31/2015			

Annual Report:

- Current SAV restoration work outlined in restoration plan
- monitoring of 2013 planted seeds completed
- 7 data loggers installed and suitable planting locations being determined based on the collected data

Gardening for the Bays Native Plant Sale

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Communicate with stakeholders through a variety of media; to promote public involvement and influence behaviors, attitudes and actions to foster stewardship.

CCMP Action: Create and disseminate printed marketing materials such as brochures, postcards, flyer exhibits and signage to address specific education/outreach needs to target audiences.

Project Overview:

The Gardening for the Bays Native Plant Sale celebrated its 10th anniversary this spring with five nurseries, many nonprofit partners providing advice and information, and over 500 people in attendance. In the last decade, tens of thousands of people have moved into the Inland Bays watershed and hundreds of new communities have been built around the Bays. Most of these new residents are retirees, many of them are part time residents, and nearly all of them are making landscaping decisions at their new homes; decisions can affect the future of our Inland Bays ecosystems, for better or for worse.

The native plant sale was created to reach new residents and gardeners to give them the opportunity to learn about and to purchase native plants for their gardens. It is still the only native plant sale held in Sussex County, Delaware. It was also created to bring gardeners interested in native plants and local nurseries together and to demonstrate to local nurseries that there is a growing interest in and market for Delaware native plants. Now a local institution, the Gardening for the Bays Native Plant Sale is an annual rite of spring at the James Farm Ecological Preserve.

This project does not involve EPA cash funding.

Outputs/Deliverables:

1. Over 500 people attend the Native Plant Sale each year to purchase native plants and learn from experts. Experts exhibiting at our annual sale provide information and advice to gardeners new to native planting.
2. Five nurseries sell over 1,000 native plants each year at the annual sale and are planted in gardens throughout the watershed
3. Over 40 volunteers are involved in planning and staffing the native plant sale each year

Intermediate Outcomes:

1. Homeowners in the watershed, many of whom have moved here from the Piedmont areas of MD, VA, DC, DE and PA, learn about the native flora of the Inland Bays watershed and choose native plants that are well-adapted to our soils and climatic conditions
2. Raised awareness among local nurseries about the interest in and market for native plants among homeowners
3. Increased knowledge about the role of native plants in our habitats raises awareness about their importance to native fauna,

Intermediate Outcomes:

especially pollinators.

4. Citizens who have not been involved with the CIB are introduced to our work and become involved as volunteers and contributors.
5. New active volunteers working on other Inland Bays projects who began their involvement with the native plant sale.

Long-Term Outcomes:

1. Increased interest in native plants from customers at nurseries
2. More availability of native plants at local nurseries
3. More media coverage locally of native plants and native plant gardening
4. Greater understanding the role of native plants in the health of habitats in our watershed leads to greater support for conservation of open space, elimination of invasive species, and selection of native species for landscaping.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Habitat loss & degradation
 Introduced species

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
Center for the Inland Bays	FY2014 Private Center Operating		\$ 600.00	\$ 3,784.00	\$ 4,384.00
Center for the Inland Bays	FY2015 Private Operating Revenue		\$ 500.00	\$ 3,800.00	\$ 4,300.00
Totals:			\$ 1,100.00	\$ 7,584.00	\$ 8,684.00

PROJECT PROGRESS

Beginning Date: 02/02/2005 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Form 2015 volunteer committee	Not Initiated	05/30/2014	01/16/2015			
Invite local nurseries to participate	Not Initiated	05/30/2014	01/16/2015			
Invite master gardeners and other education partners to participate	Not Initiated	05/30/2014	01/16/2015			
Complete logistics plan	Not Initiated	05/30/2014	03/13/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete media plan	Not Initiated	05/30/2014	04/10/2015			
Schedule volunteers	Not Initiated	05/30/2014	04/10/2015			

Annual Report:

1. On May 5, 2014, we celebrated the 10th Anniversary of the Gardening for the Bays Native Plant Sale, the first and only native plant sale held in southern Delaware.
2. 500-700 people attended the 10th anniversary of the Gardening for the Bays Native Plant Sale.
3. New partners at the sale included the Southern DE Botanical Garden and the Sussex Bird Club.
4. Held a pre-sale bird walk with Sussex Bird Club that attracted 22 participants.
5. Offered a new workshop in conjunction with the Master Gardeners on Pruning attended by 20 people
6. Two naturalists led walks around the James Farm Ecological Preserve attending by 24 people.
7. Five nurseries sold more than a thousand plants native to coastal Delaware.

Hazardous Debris Removal from Indian River and Rehoboth Bay

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

Ariane Nichols, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Planner

Scott Figurski, Environmental Scientist, DNREC -- Division of Water, Landowner rights

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Update and implement the Inland Bays Water Use Plan.

CCMP Action: Focus outreach on increasing waterway safety and channel marking.

Project Overview:

The CIB's Water Use Plan Implementation Committee (WUPIC) will work with partners to identify hazardous debris locations in the Inland Bays. A marine contractor will identify the costs to remove the debris and funding will be sought. Two priority locations will be chosen and cleaned up. Due to the success of the CIB's 2013 Hazardous Debris Removal Project, DNREC has expressed an interest in funding future related projects. It's envisioned that this project will keep making way for a larger effort that would involve local communities in spreading information and raising funds to help improve navigable waterways.

Outputs/Deliverables:

1. Removal of hazardous debris (tons) found in our Inland Bays which impedes navigation and poses a threat to navigational safety.
2. Removal of toxins which leach into our waters.

Intermediate Outcomes:

1. An instant beautification project that citizens can associate the CIB with.
2. Energize local communities and business owners which may get them to contribute towards other canal clean ups.
3. Identifies who has potentially abandoned this debris and sets the stage for penalization and/or better subaqueous leasing protocols.

Long-Term Outcomes:

1. Improved navigation safety
2. Future funding and partner support

Clean Water Act Programs:
Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:
Fish & Wildlife loss
Habitat loss & degradation
Toxic chemicals

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,086.40	\$ 0.00	\$ 5,086.40
DNREC	FY2015 DNREC Operating Grant		\$ 10,000.00	null	null
Totals:			\$ 15,086.40	\$ 0.00	\$ 5,086.40

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone Synopsis/Timeline	null	05/26/2014	10/31/2014			
Onsite review of projects with contractor to determine scope and costs	Not Initiated	05/29/2014	07/31/2014			
Apply to DNREC for funding	Not Initiated	05/29/2014	08/29/2014			
Contractor to remove debris	Not Initiated	05/29/2014	11/28/2014			
Media updates	Not Initiated	05/29/2014	11/28/2014			

Inland Bays CCMP Project Management and Oversight

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Administration

CCMP Objective: Provide administration and tracking of CCMP implementation

CCMP Action: Provide administration and tracking of CCMP implementation

Project Overview:

The Center for the Inland Bays, Inc. is an innovative management approach to watershed restoration and protection. 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.

Critical to the success of CCMP implementation activities is effective research and demonstration project oversight and reporting, grant development and management, contract administration, and coordination with organizations responsible for various work elements as well as tracking and communication of progress. Community and public relations, financial and property management, human resources management, and Management Conference support are also activities necessary to support the implementation of the CCMP. The Board of Directors, the office of the Executive Director and other appropriate staff, will be responsible for these on-going tasks listed below:

Task 1: Develop and secure public and private funding and in-kind resources as match to support the Section 320 NEP grant and CIB Work Plan.

Task 2: Prepare and distribute program updates and associated progress reports to the Board of Directors, State of Delaware, EPA, and general public.

Task 3: Recruit, hire, supervise, and evaluate appropriate support staff and volunteers as needed.

Task 4: Prepare, recommend, and monitor and manage program's resources through an annual budget; monitor budgetary and financial procedures to ensure financial policies are being followed; secure annual A-133 audit; report finances to Environmental

Project Overview:

Protection Agency and Board of Directors.

Task 5: Provide administrative (meeting arrangements, notifications, minutes, etc) support for the Board of Directors and their standing and ad-hoc committees including the Scientific and Technical Advisory Committee, Citizen's Advisory Committee, Strategic Planning Committee, Water Use Plan Implementation Committee, and Living Shorelines Committee. Provide advice to the Board of Directors and serve as liaison between Board and staff.

Task 6: Provide communication media, including the Inland Bays Journal and Annual report, to public and private groups/individuals, state, county, and local governments.

Task 7: Facilitate implementation and monitor/track the progress of lead agencies responsible for implementation of CCMP tactics.

Task 8: Provide educational programs to schools, homeowners, and other publics to show better management practices within the Inland Bays watershed; methods will include special events, programs, lectures, slide shows, seminars, as well as media interaction (radio, TV, news articles, social media, etc).

Task 9: Provide effective management of CIB facilities and real properties including the CIB Headquarters and James Farm Ecological Preserve.

Task 10: Serve on state-wide and regional committees and task-forces to promote sound environmental policies based on best available science.

Task 11: Travel to national and regional EPA meetings and estuary-related conferences; provide technical assistance to other programs.

Task 12: Serve in an advisory capacity to elected officials, public policy makers and civic leaders on public policy related to the CCMP.

Task 13: Augment the CIB's membership program and sustain opportunities for volunteer participation.

Outputs/Deliverables:

CCMP Inclusive (see project Overview).

Intermediate Outcomes:

CCMP Inclusive

Long-Term Outcomes:

CCMP Inclusive

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 166,780.00	\$ 201,283.00	\$ 368,063.00
Totals:			\$ 166,780.00	\$ 201,283.00	\$ 368,063.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "On Track"

Annual Report:
 On-going Progress -- See Project Overview and quaterly CIB BOD/EPA reports.

Inland Bays Clean Up

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

Nick Couch, Enforcement Officer, DNREC -- Division of Fish and Wildlife, Sponsor

Doug Long, Park Superintendent, DNREC -- Division of Parks and Recreation, Sponsor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Encourage more stakeholder support through volunteerism.

CCMP Action: Involve volunteers and stakeholders in demonstration projects that model desired changes in practices and citizen science research to increase their knowledge about the bays.

Project Overview:

The annual Inland Bays Clean-up is a partnership between the CIB's Water Use Plan Implementation Committee, the Division of Fish & Wildlife's Enforcement Section, and Delaware State Parks. Volunteers are encouraged to join the host agencies for a one-day clean-up of Delaware's three Inland Bays. Fish & Wildlife Enforcement Agents, CIB staff, and volunteer boat captains transport participants to selected areas around the Inland Bays for targeted clean up. Staging areas are the public boat ramps at Massey's Landing between Rehoboth and Indian River Bay and Mulberry Landing at the Assawoman Wildlife Area.

Since 2004 the event has attracted more than 700 volunteers, who collected a large quantity of debris, including soda bottles and cans, tires, hot water heaters, and a lot of plastic. Participants identify and record the debris that was collected for reporting to the National Marine Debris Monitoring Program (2004-2009). Numerous local businesses and organizations provide financial support for the event. Local delegates from the Delaware General Assembly also contributed grant assistance every so often to fund the clean-ups. This is a long-term ongoing project that will continue every year. The 2014 clean up will take place on July 12th at Massey's Landing.

Outputs/Deliverables:

1. Increase awareness by the general public about the Inland Bays and commitment to their cleanup by 75 volunteers
2. 6000 pounds of trash and debris collected
3. 75 volunteers and 21 boats
4. Opportunities to form new partnerships and attract new volunteers to the CIB

Intermediate Outcomes:

1. Decreases the potential for the dumping of trash, junk and debris by residents and visitors in the Inland Bays.

Intermediate Outcomes:

2. Decrease potential for wildlife deaths and/or injuries due to trash consumption and/or entrapment

Long-Term Outcomes:

1. The Inland Bays Clean-up is set to continue for the years to come. It is such a positive event that yields significant results in terms of tons of trash that are removed from our Inland Bays Watershed and as a positive public outreach event.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis
 Developing Total Maximum Daily Loads

Pressure Targets:

Fish & Wildlife loss
 Habitat loss & degradation
 Toxic chemicals

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,230.00	\$ 0.00	\$ 5,230.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,086.40	\$ 0.00	\$ 5,086.40
Dewey Beach Lions Club	Inland Bays Clean UP		\$ 1,000.00	\$ 0.00	\$ 1,000.00
State Farm Insurance	Inland Bays Clean UP		\$ 500.00	\$ 0.00	\$ 500.00
Totals:			\$ 11,816.40	\$ 0.00	\$ 11,816.40

PROJECT PROGRESS

Beginning Date: 05/21/2005 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
WUPIC coordinates clean up	Initiated	05/29/2014	07/12/2014			
Sign up volunteers	Initiated	05/29/2014	07/12/2014			
Conduct clean up	Not Initiated	05/29/2014	07/12/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
WUPIC coordinates clean up	Not Initiated	05/29/2014	06/30/2015			
Sign up volunteers	Not Initiated	05/29/2014	06/30/2015			
Conduct clean up	Not Initiated	05/29/2014	07/31/2015			

Annual Report:

1. Clean Up to be held at Massey's Landing on July 12th.
2. 62 volunteers
3. 2020 pounds of trash

Inland Bays Habitat Plan & Restoration Strategy Synthesis

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Supporting Project Partner Contacts:

Rick McCorkle, Biologist, US Fish & Wildlife Service, Technical Assistance

Mark Biddle, Program Manager, DNREC -- Division of Watershed Stewardship, Supporting

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Update and implement the Inland Bays Habitat Protection Plan.

Project Overview:

The goal of this project is to complete the GIS analysis and develop the Inland Bays Habitat Restoration Strategy. Once completed, newly developed data and projects will be used to update the Inland Habitat Restoration and Protection Plan. This will also include the development of a method to track project implementation.

The GIS analysis is an ESRI ArcGIS "Raster" analysis that will be utilizing the latest Delaware Ecological Network (DEN) layers in conjunction with water quality and habitat "weights" for each raster cell (previously developed by a committee of state, federal, and local resource experts). The result will be parcel-level information from which projects can be prioritized based on the weighting that came out of the Raster analysis. Information derived from the Raster analysis will be utilized to update the Inland Bays Habitat Restoration and Protection Plan as it will include a finer degree (parcel-level vs sub-watershed level) of project potential and will be based on the latest ecological and land-use information.

Project partners will provide support in the form of GIS analysis, preparing data/information to be distributed to the existing Habitat Restoration Strategy committee, and review/comment on a method to track implementation.

Outputs/Deliverables:

1. A Restoration Strategy that identifies resource needs and potential projects/actions to address them.
2. An updated Habitat Plan that identifies resource needs and potential projects/actions to address them.
3. A means to track project implementation related to completed Habitat Plan projects.
4. A Strategy and Plan that can be used to solicit funding for project implementation.

Intermediate Outcomes:

1. A Restoration Strategy that identifies resource needs and potential projects/actions to address them.
2. An updated Habitat Plan that identifies resource needs and potential projects/actions to address them.
3. A means to track project implementation related to completed Habitat Plan projects.

Long-Term Outcomes:

1. A Strategy and Plan that can be used to solicit funding for project implementation.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Fish & Wildlife loss
- Habitat loss & degradation
- Inappropriate land use
- Introduced species
- Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 5,208.00	\$ 0.00	\$ 5,208.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone Synopsis	Not Initiated	05/29/2014				
Complete GIS Analysis	Not Initiated		10/31/2014			
Develop draft Restoration Strategy	Not Initiated		11/30/2014			
Solicit comments on draft Strategy	Not Initiated		03/31/2015			
Perform synthesis of Strategy and Plan	Not Initiated		04/30/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop tracking system	Not Initiated		05/31/2015			
Complete Strategy and Plan	Not Initiated		07/31/2015			

Inland Bays Migratory Fish Passage Restoration Feasibility and Planning Study

MANAGEMENT AND PARTNERS

CIB Project Manager: Roy Miller

Primary Project Partner Contacts:

Ward Slacum, Ecologist, Versar, Inc.

Supporting Project Partner Contacts:

G. Williams, Andrews, Miller, and Associates

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Provide access for native migratory fish to upstream areas for use as spawning and/or nursery sites.

CCMP Action: Conduct a migratory fish passage restoration feasibility and planning study.

Project Overview:

Seven millpond dams are present in the Inland Bays watershed and are to varying degrees restricting passage of migratory anadromous and catadromous fish species such as striped bass, blueback herring, american shad, alewife, white perch, and American eel. Many of these fish species have suffered significant local population decreases thought to be due in part to reduction in lower salinity habitats associated with the increasing tidal prism of the Indian River Inlet beginning in earnest around 1970. The dams are affecting a significant proportion of stream miles in the watershed. Regional population decreases of many of these species have also occurred, to the extent that some border on listing as threatened species under the Federal Endangered Species Act. Restoration of fish passage to streams for the purposes of spawning has become an important regional restoration action to improve fisheries. The Inland Bays are an important estuarine habitat for many anadromous and catadromous fishes.

This project will hire a consultant to assess the feasibility of fish passage restoration and develop restoration concepts where feasible. Data on target species from the Inland Bays will be summarized and additional data needs identified and pursued as necessary. Restoration project concepts will be to 30% design where appropriate and include project alternatives and cost estimates as well as implementation plans. An Inland Bays fish passage restoration workgroup will be formed and managed to support this effort.

Outputs/Deliverables:

1. Fish passage restoration feasibility study including restoration concepts.
2. Recommendations for project implementation funding sources.
3. Education and Outreach material on migratory fish species of the Inland Bays and fish passage restoration including but not limited to

Outputs/Deliverables:

a power point presentation for the public.

Intermediate Outcomes:

1. Increases in the miles of streams accessible for fish migration and general and spawning habitat.

Long-Term Outcomes:

1. Increases in the populations of migratory fish species in the Inland Bays and their tributaries.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Alteration of natural flow regimes

Fish & Wildlife loss

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 20,000.00	\$ 0.00	\$ 20,000.00
DNREC	FY2012 DNREC Operating Grant		\$ 11,790.00	\$ 0.00	\$ 11,790.00
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	\$ 10,000.00	\$ 0.00	\$ 10,000.00
Totals:			\$ 41,790.00	\$ 0.00	\$ 41,790.00

PROJECT PROGRESS

Beginning Date: 10/01/2012

Project Status: Ongoing "On Track"

Annual Report:

Consultants Vesar, Inc. were hired to prepare a report of assessment and recommendations for fish passage devices including conceptual design of one fish passage project. The draft report was produced in April and is under review. The report inspected and reviewed all eight dams on tributaries of the Inland Bays. It assessed information on American shad, hickory shad, alewife, blueback herring, and American eel, as well as water quality parameters. It developed suitability indexes and ranked the dams for priority of passage. Millsboro Pond dam was chosen for a conceptual fish passage design. A white paper on the potential effects of introducing gizzard shad into freshwater ponds was also prepared by CIB to address concerns raised by the Delaware Department of Natural

Annual Report:

Resources and Environmental Control's Fish and Wildlife Service. A power point project to communicate the effort was also produced. The report will be finalized in June and will be used to pursue implementation funding for the Millsboro Pond passage.

James Farm Long Term Site Planning (James Farm Master Plan)

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

Scott Scarfone, Principal Planner, Oasis Design Group

Supporting Project Partner Contacts:

Ed Lewandowski, Coastal Communities Development Specialist, University of Delaware -- Seagrant, Funder

Todd Lawson, County Administrator, Sussex County, Funder/Property Owner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Develop and deliver watershed education programs for children.

CCMP SubAction: Programs for school age children are offered at the James Farm Ecological Preserve.

Project Overview:

The James Farm Ecological Preserve is a 150 acre tract of land located in Sussex County Delaware on the Indian River Bay north of Ocean View. The Preserve consists of upland fields, freshwater wetlands, a mixed hardwood forest, tidal salt marsh, a sandy bay beach and a saltwater cove. The property was donated to the Sussex County Council for preservation as natural, undeveloped open space for public use. In 1998, Sussex County Council began leasing the Farm to the Delaware Center for the Inland Bays under a management agreement to promote environmental education, recreation, and habitat restoration.

The Preserve is open to the public seven days a week, from dawn to dusk. An estimated 10,001 visits were made to the Farm in 2012. The comparable Holts Landing State Park, also located on Indian River Bay, received an estimated 6,448 visits in 2011. Each year nearly 1,000 students receive environmental education at the Farm and a kayak tour concession is operated on the beach. Overall visitation has grown dramatically due to population increase and a regionally increased demand for outdoor recreation. Sussex County's population increased by 35% from 148,897 in 1998 to 200,330 in 2011 ; and is projected to increase another 35% to 271,326 people in 2030. The Preserve contributes millions of dollars to the local economy through direct provision of ecosystem services that also indirectly raise the values of nearby properties and increase economic activity through ecotourism.

Project Overview:

A simple master plan for the farm focused on managing its natural habitats exists. However, the plan did not anticipate increased visitation nor address replacement of facilities. Many facilities now need replacement in a manner that can accommodate the increased visitation while protecting the preserves ecosystems and enhancing visitor experiences. Opportunities remain to increase the environmental educational value of the Preserve through signage. Furthermore, an analysis of current and future impacts from increased human use and sea level rise are needed to develop costs for adaptive management of the Preserve.

The CIB is partnering with Sussex County and the UD/Sustainable Coastal Communities Initiative to hire a professional site planning firm (Oasis Design Group) for the development of a long term management plan that enhances the Preserves designated uses of preservation and education and develops maintenance costs and system replacement costs. The planning process will build the support of public and private funders to implement the Plan and protect the Farm resulting in an increased number of individuals receiving environmental education, the long-term protection and restoration of ecosystems on the Farm, and increased private recognition and financial support of the Center. The CIB has budgeted \$20,000 for FY2013 to complete this project, UD and Sussex County will both contribute \$7,500.

Outputs/Deliverables:

1. Master Plan Document including site planning concepts to accommodate increased visitation while protecting natural resources and enhancing education opportunities at the Farm with costs for implementation in phases.
2. Educational media on the resources of the farm and the planning process including press releases, news article, and social media posts.

Intermediate Outcomes:

1. James Farm Master Plan will receive support for implementation from funding organizations.
2. James Farm Master Plan will be implemented in phases.

Long-Term Outcomes:

1. An increased number of individuals will receive education on the natural flora and fauna of native ecosystems, sea level rise, and the importance of natural habitat for clean water. These individuals will be more likely to take and support actions that protect and restore terrestrial and aquatic ecosystems.
2. Ecosystems of the Farm will be protected from increased visitation.
3. The Center for the Inland Bays organizational brand will be recognized by more people, increasing private financial support for the Center.
4. Further ecosystem restoration projects and project maintenance will occur at the Farm improving their ecological function.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Alteration of natural flow regimes

Pressure Targets:

Habitat loss & degradation

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 13,288.00	\$ 0.00	\$ 13,288.00
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 12,361.16	\$ 1,107.00	\$ 13,468.16
Sussex County	FY2014 Sussex County Operating		\$ 7,500.00	\$ 0.00	\$ 7,500.00
EPA	FY2013 EPA NEP Operating Grant	CE9939911-11-1	\$ 2,712.00	\$ 0.00	\$ 2,712.00
DNREC	FY2012 DNREC Operating Grant		\$ 4,000.00	\$ 0.00	\$ 4,000.00
University of Delaware	Sustainable Coastal Communities	UDEJFEP2013	\$ 7,500.00	\$ 0.00	\$ 7,500.00
Totals:			\$ 47,361.16	\$ 1,107.00	\$ 48,468.16

PROJECT PROGRESS

Beginning Date: 10/01/2012

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
RFP Released	Completed	10/01/2013	12/10/2013			
Consultant Selected	Completed	10/01/2013	02/14/2014			
Kick-Off Meeting	Completed	02/14/2014	04/09/2014			
Public Input Meeting	Completed	02/14/2014	05/22/2014			
Master Plan Presentation	Initiated	02/14/2014	07/18/2014			
Final Plan Delivery	Extended	02/14/2014	08/15/2014	09/26/2014		
Security Meeting Held	Completed	08/19/2014	08/19/2014			

Annual Report:

An RFP for professional services was prepared and released on DEC 10, 2013. The successful consultant, Oasis Design Group and their partner Biohabitats was notified of selection on FEB 14, 2014. Relevant GIS data and information on the Farm was assembled and transferred to the consultants. A kick-off meeting with CIB staff and the consultant was held on March 30, 2014. Site analysis work is underway and a press release and personal invitations announcing the public workshop to gather input on the plan on May 22, 2014 were distributed. Social media posts and a newspaper story on the project were completed. Site analysis and Interpretation

Annual Report:

Workshops were held on May 22, 2014. A public input meeting with 30 in attendance was held on May 22, 2014 and received excellent comments. The project is on track to finish by the end of the fiscal year.

James Farm Middle School Program

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

Kimberlee Kleinstuber, Ingram Pond-STEM teacher, Indian River School District, School Coordinator

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Develop and deliver watershed education programs for children.

CCMP SubAction: Programs for school age children are offered at the James Farm Ecological Preserve.

Project Overview:

The James Farm Middle School Program at the James Farm Ecological Preserve is the centerpiece of our formal education program to reach schoolage children in the watershed. In 1999, we formed a partnership with the Indian River School District to offer outdoor, experiential learning opportunities on water quality, wetlands, and other watershed ecosystems to all 7th and 8th grade students; these are not field trips, but 'extension activities' that are curriculum-aligned to reinforce their classroom instruction. Classes are offered in the spring and fall, serving approximately 1000 children annually; for many students, this is their first experience on the Bays and it is both inspirational and instructive. We have a staff of teachers, most retired, certified teachers, whose passion for the program, knowledge of the content, and ability to engage students make the program one that is valued by both district teachers and their students.

Outputs/Deliverables:

1. Development of curriculum-aligned activities that educate from 800 to 1,000 middle students annually about water quality, wetlands, plant zonation, watershed ecosystems
2. Dissemination of student activities through our website for the use of home schoolers, scout troops and other organizations.
3. A partnership with Indian River School District and its four middle schools to provide watershed/estuarine science education on the Inland Bays in support of its science curriculum and our mission

Intermediate Outcomes:

1. Students learn about the effects of water quality on the diversity and numbers of living organisms in the Inland Bays.
2. Students learn that the life processes of organisms are affected by their interactions with each other and their environment, and may

Intermediate Outcomes:

be altered by human activities.

3. Students understand how wetlands and streamside forests filter water as it runs off into local streams, rivers and bays or seeps into ground water.

Long-Term Outcomes:

1. Students are exposed to the estuarine ecosystems of the Inland Bays and understand their importance to the overall coastal environment.

2. Students understand and grasp abstract ecological concepts through hands-on experience.

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 7,420.00	\$ 0.00	\$ 7,420.00
DNREC	FY2015 DNREC Operating Grant		\$ 7,020.00	\$ 0.00	\$ 7,020.00
Totals:			\$ 14,440.00	\$ 0.00	\$ 14,440.00

PROJECT PROGRESS

Beginning Date:

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Evaluate spring 2014 semester	Completed	05/30/2014	06/30/2014			
Meet with IR School District to discuss new curriculum	Completed	05/30/2014	08/15/2014			
Revise 2014-15 activities based on new curriculum	Completed	05/30/2014	08/29/2014			
Plan for staffing-hire train teacher if needed	Completed	05/30/2014	08/20/2014			
Inventory equipment and procure	Completed	05/30/2014	09/10/2014			
Send registration and program materials for fall semester	Initiated	05/30/2014	09/17/2014			
Send registration and program materials for spring semester	Not Initiated	05/30/2014	03/18/2015			
Evaluate 2014-15 program	Not Initiated	05/30/2014	06/30/2015			

Annual Report:

1. This reporting year, we provided a full day of instruction to 500 8th grade students in the fall and 500 7th grade students in the spring semester from all four middle schools in the school district.

Annual Report:

2. We were able to bring back one of our middle schools that had not been able to attend last year due to state testing time conflicts.
3. We added two new teachers to our staff, one a retired certified teacher, the other with a degree in forestry and biology; a retired environmental law attorney with university teaching experience.

Land Conservation Practitioners' Workshop

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Kate Hackett, Executive Director, Delaware Wild Lands, Primary

Ginger North, Associate Director for Natural Resources Conservation, Delaware Nature Society, Supporting

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Use the Delaware Ecological Network and other appropriate information sources to prioritize the preservation of key habitat in the Inland Bays drainage system (Public comment recommended).

Project Overview:

The goal of this project is to hold an educational workshop/information exchange for government, NGO, and private sector individuals who work in the field of land conservation, easements, and estate planning. A working group of State and non-governmental organizations (NGO) identified gaps in knowledge as to what other groups were involved in land conservation, purchases, and easements. The working group also noted that various groups may have differing priorities, objectives, and funding.

Project partners will assist in identifying and contacting invitees, selecting an appropriate venue, and developing an agenda. This project is intended to increase awareness of who in Delaware is working in the field of land conservation, purchases, and easements, and to establish the framework of an information exchange and project-sharing network.

Outputs/Deliverables:

- Increased awareness of who is involved in land conservation, purchases, and easements.
- A greater understanding of where their priority areas are located, if they offer funding, and what their area(s) of expertise is.
- The creation of an information-sharing network to refer individuals or properties to others who may be more closely aligned with the landowner/property's needs or objectives.

Intermediate Outcomes:

An increase in awareness of who in Delaware is working in the field of land conservation, purchases, and easements.

Long-Term Outcomes:

The establishment of a framework for information exchange and a project-sharing network.
 An increase in acreage of land protected and/or conserved.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2013 DNREC Operating Grant		\$ 4,000.00	\$ 0.00	\$ 4,000.00
DNREC	FY2015 DNREC Operating Grant		\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 9,208.00	\$ 0.00	\$ 9,208.00

PROJECT PROGRESS

Beginning Date: 10/01/2014

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone Synopsis	Not Initiated	05/29/2014				
Project planning meeting	Not Initiated		10/15/2014			
Develop invitee list and agenda	Not Initiated		11/15/2014			
Finalize speakers and topics	Not Initiated		12/15/2014			
Hold workshop	Not Initiated		03/31/2015			

Living Shoreline Restoration Permitting and Policy Development

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

David Baird, Sussex Conservation District, Committee Member

Danielle Kreeger, Science Director, Partnership for the Delaware Estuary, Partner

Dominic Graziani, Environmental Scientist, DNREC -- DWR - WSLS, Co-planner

Supporting Project Partner Contacts:

Jim Chaconas, Environmental Scientist, DNREC -- DWR - WSLS, co-planner

Jim Sullivan, Planner, DNREC -- Division of Watershed Stewardship, co-planner

Doug Janiec, Senior Project Scientist, Cardno Entrix, co-planner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Support legislative and/or regulatory changes needed to require that living shoreline techniques be employed wherever feasible for shoreline stabilization.

Project Overview:

The Center for the Inland Bays multiyear project to maximize the amount of green or living shorelines that are installed in the Inland Bays (to reduce the hardening of the bays natural shorelines) has been initiated and the main objective for this initiative will be to better integrate sustainable and softer shoreline management techniques to optimize the natural resources and habitat along the shoreline, while creating a shoreline that will better evolve with rising sea levels.

To achieve this goal, a main focus will be to assess what regulatory and permitting challenges and changes can be done by DNREC and the ACOE to forward the utilization of living or greener shoreline restoration techniques. The CIB will take the role of chairing the sub-committee and coordinating all committee activities. CIB will assist the Partnership for the Delaware Estuary and DNREC Watershed Assessment Section to develop a centralized website repository that contains guidebooks for site assessment, guidebook of shoreline installation methods, information on regional projects, and information on permitting and regulations related to shorelines in Delaware. DNREC will be responsible for presenting an overview of the State of Delaware regulations, as they pertain to shorelines.

Project Overview:

They will also be responsible for assessing the regulations related to shoreline construction in neighboring states and they differ from Delaware's regulations. The CIB will also take the responsibility of initiating and providing oversight of the regulation assessment for the State of Delaware, through a regulations sub-committee, and lead the development of recommendation that will be presented to the Secretary of DNREC to address issues that are outlined in the shoreline assessment.

Much of this work will be done through the Inland Bays Shoreline Initiative Sub-committee.

Outputs/Deliverables:

1. Presentation and assessment of the regulations of the surrounding states. This will include highs on regulation components that could be incorporated into Delaware.
3. Development of shoreline project tracking database for DNREC regulators.
3. Shoreline regulation and cost share program assessment will be completed by Committee, with CIB staff as chair of committee, which will include recommendations to improve the regulations for living shorelines.
4. Revised living shoreline regulations.

Intermediate Outcomes:

1. A detailed review and assessment of changes that could be implemented with the regulations of the State of Delaware to require the use of greener shoreline restoration techniques.

Long-Term Outcomes:

1. An expansion of softer shoreline restoration techniques within the watershed.
2. A precipitous decline in the length of new hardened shoreline within the Inland Bays.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 3,200.00	\$ 0.00	\$ 3,200.00
DNREC	FY2015 DNREC Operating Grant		\$ 3,250.00	\$ 0.00	\$ 3,250.00
Totals:			\$ 6,450.00	\$ 0.00	\$ 6,450.00

PROJECT PROGRESS

Beginning Date: 10/01/2013

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Development of shoreline project tracking database for DNREC regulators.	Initiated		09/15/2014			
Shoreline regulation and cost share program assessment will be completed by Committee	Initiated		09/15/2014			
Revised living shoreline regulations completed	Not Initiated		12/15/2014			

Annual Report:

1. With the recent onset of the Living Shoreline committee, a focus of one of the sub-committees will be the development of recommendations of policy and regulatory changes that can be made at the state permitting level.
2. A presentation was given by DNREC’s Wetlands and Subaqueous Lands Section on State and Federal Permitting at the Living Shoreline Committee, as it pertains to shoreline enhancement and protection. This presentation served to help educate and initiate the discussion and planning for the sub-committee that will be working on policy needs.
3. Through the course of several meeting of the Regulatory, Policy, and Programmatic Development sub-committee occurred, the sub-committee has decided that a re-write of the SAA and cost share program for living shorelines should be conducted, to allow for new methodologies and increase usage of those programs.

Long-term continuous saltmarsh monitoring in the Inland Bays

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Andy Howard, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Project Coordination

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Planning for Climate Change

CCMP Objective: Integrate projected sea level rise into land use planning and proposed development to protect shore zone ecosystems and bay water quality.

CCMP Action: Model the distribution of tidal wetlands under different sea level rise scenarios to guide land use and protection decisions that maximize future tidal wetland extent.

Project 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 marshes have been instrumented with three sediment elevation tables to monitor changes in marsh elevation and are monitored at least annually. 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.

Outputs/Deliverables:

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

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.

Short-term Outcomes merged:

Intermediate Outcomes:

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

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.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Alteration of natural flow regimes

Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 2,560.00	\$ 0.00	\$ 2,560.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 2,560.00	\$ 0.00	\$ 2,560.00
Totals:			\$ 5,120.00	\$ 0.00	\$ 5,120.00

PROJECT PROGRESS

Beginning Date: 03/01/2008

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
First data report	Not Initiated		05/15/2015			
Second data report	Not Initiated		05/15/2020			
Maintain data collection	Initiated		05/15/2020			

Annual Report:

1. Sampling of SET tables at all three marshes was completed in the Summer/Fall of 2014.

Loop Canal Living Shoreline & Wetland Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Paul Zarebicki, Environmental Scientist, DNREC -- Division of Fish and Wildlife, Contractor

Brett Warner, Public Works Director, Town of Bethany Beach, Supporting

Steve Piron, The Land Strip Committee, Primary

Erich Berkintine, Southern Regional Forester, Delaware Forest Service, Technical Assistance

Supporting Project Partner Contacts:

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

Ron Vickers, Land Preservation Chief, DNREC -- Division of Parks and Recreation, Supporting

Charles Conaway, CW3, Delaware National Guard, Primary

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Demonstrate innovative living shoreline stabilization techniques utilizing bay grasses, shellfish, and other native biota where feasible.

Project Overview:

The project site is located on the Bethany Beach Loop Canal, just west of Route 1 and southwest of the National Guard Training Center at the south end of the Salt Pond. It is in the Lower Indian River Bay watershed and flows directly into the Assawoman Canal. A portion of the land is State-regulated tidal marsh and smaller upland portions are the remnants of old spoil berms from the construction of the Loop Canal approximately 100 years ago. The bank along the upland areas and northern edge of the tidal marsh are eroding on the northern (Salt Pond) side due to wave activity. Ownership is with the State of Delaware and the Town of Bethany Beach. Based on the combination of BMPs being implemented onsite, anticipated N reduction is 225 pounds per year and P reduction is 60 pounds per year.

To stop the loss of shoreline and restore lost tidal marsh, this project and its one-of-a-kind design proposes to utilize a combination of onshore/offshore practices made from tree logs and coir fiber logs that will be used to break up wave energy just offshore and to create "cells" along the shoreline that will trap sediment and begin the marsh rebuilding process. These practices will serve as excellent

Project Overview:

perching and foraging areas for wading birds, will serve as a refugia for small fish and macroinvertebrates, and will be made from all natural materials.

Project partners roles include: Land Strip Committee will be working with the local community to gain access, find volunteer, labor, and raise funds and awareness; Cardno-Entrix will provide design services; DE National Guard will provide access to the site; DNREC will work as a contractor and provide technical assistance; the Town of Bethany Beach will provide access and possibly funding; DDA Forest Service will provide materials and labor.

The work proposed in this project is to stabilize approximately 850 feet of eroding shoreline and restore 0.4 acres of degraded tidal wetlands.

Outputs/Deliverables:

Based on current grant funding:

1. 850 feet of stabilized shoreline along the Salt Pond.
2. Enhanced water quality through reductions in erosion and restoration of 0.4 acres of tidal marsh.
3. Decreases in sedimentation by reducing shoreline erosion.
4. Increased wildlife habitat through restoration of tidal marsh.

Intermediate Outcomes:

1. Demonstration of Living Shoreline practices.

Long-Term Outcomes:

1. Enhanced water quality from less erosion and sedimentation.
2. Increased acreage of tidal marsh (increase in habitat and improved water quality).

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Alteration of natural flow regimes

Fish & Wildlife loss

Habitat loss & degradation

Inappropriate land use

Habitats:

Habitat Type	Restoration Type	Units	Restoration
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Habitats:

Habitat Type	Restoration Type	Units	Restoration
Estuarine Shoreline	Protection	Feet	850.00
Tidal Wetland	Enhancement	Acres	0.40

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2015	225
Phosphorus	2015	60

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 11,172.00	\$ 0.00	\$ 11,172.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 12,288.00	\$ 0.00	\$ 12,288.00
EPA	FY2013 EPA NEP Operating Grant	CE9939911-11-1	\$ 6,400.00	\$ 0.00	\$ 6,400.00
DNREC	FY2015 DNREC Operating Grant		\$ 5,208.00	\$ 0.00	\$ 5,208.00
DNREC	Community Water Quality	CWQIG 13-01	\$ 28,500.00	\$ 0.00	\$ 28,500.00
Totals:			\$ 63,568.00	\$ 0.00	\$ 63,568.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014		12/31/2014		
Conduct site survey and develop plans	Completed	05/28/2014				
Submit permit application	Extended		09/15/2014			
Implement project (shoreline and offshore work)	Not Initiated		09/15/2014			

Annual Report:

Grant funding for the project was approved but was modified to not include beneficial re-use at this time. Several meetings were held with landowners and land managers to discuss the project. An interview was conducted with a local paper to inform local residents of the project. A permit was submitted to DNREC for temporary stabilization of 350 feet of shoreline until final plans could be drawn up by the project's engineer. Issues related to liability and indemnification were worked out with the Delaware National Guard.

Middle Island Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Supporting Project Partner Contacts:

Matthew Bailey, Wildlife Biologist, DNREC -- Division of Fish and Wildlife, Supporting

Chuck Williams, Program Manager, DNREC -- Division of Watershed Stewardship

G. Williams, Andrews, Miller, and Associates, Contractor

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Protect and enhance/restore additional wetland acreage.

Project Overview:

Located between Rehoboth and Indian River Bays, Middle Island is a privately owned island that serves as an important nesting area for various species of birds. It is approximately 5 acres in size although it appears to have eroded from an original size of about 11 acres due to wave action and currents. The island is mostly tidal *Spartina* spp marsh with a salt panne in the middle and a sand flat caused by regular overwash. The island was the site of a previous bird nesting project (Middle Island Heron Rookery) and is the focus of State American Oystercatcher nesting monitoring efforts.

Accomplishments - The 30% design concept plan was completed by Andrews, Miller & Associates in FY2012 and has been used to promote the project and seek funding for implementation. Andrews, Miller & Associates was selected in late FY2013 to complete the design plans by DNREC. Based on current funding, the project design is at approximately 60% and once completed, the State intends to work with the Andrews, Miller & Associates (the contractor) to start the permitting process until funding for implementation is secured.

Partner Roles & Responsibilities:

CIB – Serve as a Project Coordinator who will facilitate meetings with an ad hoc committee that has assisted with the project design concept, presenting project information to various regulatory agencies, and coordination with local landowners.

DNREC – Secure primary funding for project design and implementation and oversee contractor(s) on the project.

Andrews, Miller & Associates – prepare project design plans, secure permits, and serve as construction manager.

The work proposed in this project is to restore approximately 5 acres of tidal wetlands and 5 acres of upland nesting habitat at Middle Island via the beneficial re-use of dredge material. This should benefit various species of Heron, Egret, Tern, American Oystercatchers,

Project Overview:

Diamondback Terrapins, and Horseshoe Crabs.

Outputs/Deliverables:

1. Completed design plans.
2. Restoration of approximately 5 acres tidal marsh and 5 acres upland nesting habitat, contingent on final design, cost estimates, permit requirements, and availability of source material.
3. Enhancement of bird nesting habitat on Middle Island for approximately 20 species of birds.

Intermediate Outcomes:

1. Adoption of beneficial re-use of dredge material as a standard practice in certain types of habitat restoration projects.

Long-Term Outcomes:

1. Increases in bird nesting populations of American Oystercatchers and Terns.
2. Increase in tidal marsh habitat.
3. Enhanced water quality.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Island	Reestablishment	Acres	5.00
Tidal Wetland	Establishment	Acres	5.00

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,586.00	\$ 0.00	\$ 5,586.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 10,794.00	\$ 0.00	\$ 10,794.00

PROJECT PROGRESS

Beginning Date:

Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014		12/31/2014		
Solicit additional funding for implementation	Not Initiated		08/31/2014			
Complete design plans	Initiated		09/30/2014			
If funding is secured, begin permitting process	Not Initiated		10/01/2014			

Annual Report:

The State of Delaware received some funding in FY2013 that is being used to complete a design for the project in the event that funding for implementation can be acquired. The amount of funds allocated was insufficient to initiate project so additional funds will be required and solicitation will begin on July 1, 2014. Additionally, a grant application to a private foundation was prepared and submitted but was rejected.

The amount of funds allocated for FY2015 was insufficient to initiate the project so additional funds will be required. After the State of Delaware (Governor’s Office and the General Assembly) budget is approved at the end of June and the final project allocation is known, DNREC will determine its internal prioritization list and once released, additional funding may need to be solicited after July 1, 2014.

Migratory Fish Passage Project 1: Millsboro Pond Fish Ladder

MANAGEMENT AND PARTNERS

CIB Project Manager: Roy Miller

Primary Project Partner Contacts:

Ward Slacum, Ecologist, Versar, Inc.

Supporting Project Partner Contacts:

G. Williams, Andrews, Miller, and Associates

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Provide access for native migratory fish to upstream areas for use as spawning and/or nursery sites.

CCMP Action: Implement fish passage restoration projects.

Project Overview:

American shad, hickory shad, alewife, blueback herring, and American eel are all important species for commercial fisheries. Much of these species' historic spawning and nursery habitats have been lost due to impediments, such as dams and other man-made blockages, on their spawning and recruiting systems, and have directly contributed to the decline of the fisheries stocks of each of these species. The Delaware Inland Bays system is a productive estuary that has historically supported spawning and recruiting habitat for these species. In 2014, the Inland Bays migratory fish passage study determined through a priority ranking model that the Millsboro Pond Dam on the Indian River was the best candidate of the eight dams in the watershed for fish passage device installation. A total of 61.5 stream miles in the Indian River Bay watershed would be opened as habitat for the targeted species as a result of the passage. Per the recommendations of the study, a prefabricated Alaskan Steep pass fish ladder accompanied by a special passage for American eels will be designed, permitted, and installed for approximately \$230,000. The project will include a financial development component including grant application and private fundraising efforts. Outreach activities including public presentations, newsletter articles, and videos will educate the general public about the importance of migratory fish in the Inland Bays and the restoration of their habitat. Monitoring of fish passage at the ladder will occur after installation for a to be determined number of years using volunteers to determine success. It is likely that consultant Andrews, Miller, and Associates, who operate through a Master Services Agreement with the Center will be utilized to accomplish the project using their sub-consultant Versar.

Outputs/Deliverables:

1. Funding for the design, permitting, and installation of the fish ladder.
2. Design plans and specifications for fish ladder.

Outputs/Deliverables:

- 3. Installation of fish ladder.
- 4. Outreach activities, including video, and press on the importance of migratory fish species and the restoration of passage to their spawning and nursery areas.

Intermediate Outcomes:

- 1. Reopening of 61.5 miles of freshwater stream as spawning and nursery habitat for shad, herring, alewife, and American eel.
- 2. Increased awareness and understanding of the the public about importance of migratory fish species and the restoration of passage to their spawning and nursery areas.

Long-Term Outcomes:

- 1. Increased local populaitons of shad, herring, alewife, and American eel as measured by ongoing trawl surveys and potentially site specific monitoring.
- 2. Increased potential for reproduction of freshwater mussel species associated with target fish species.
- 3. Increased acceptance of the public and funders to continued fish passage restoration.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Alteration of natural flow regimes
- Fish & Wildlife loss
- Habitat loss & degradation

Habitats:

Habitat Type	Restoration Type	Units	Restoration
In-Stream	Reestablishment	Feet	324720.00

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2015 DNREC Operating Grant		\$ 12,945.00	\$ 0.00	\$ 12,945.00
DNREC	FY2012 DNREC Operating Grant		\$ 5,153.00	\$ 0.00	\$ 5,153.00
Totals:			\$ 18,098.00	\$ 0.00	\$ 18,098.00

PROJECT PROGRESS

Beginning Date: 06/01/2014

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Pursue project grants and funding	Not Initiated	05/06/2014	06/01/2014			
Convene stakeholder workgroup	Not Initiated	05/06/2014	06/01/2014			
Conduct public presentation on fish passage	Not Initiated	09/04/2014	06/01/2015			

Oyster Gardening Program

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

John Ewart, Aquaculture Specialist, University of Delaware -- Seagrant, Program Support

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Increase the economic and environmental benefits of shellfish.

CCMP Action: Enhance populations of eastern oysters.

Project Overview:

Oyster gardening is the nursery culture of small, hatchery-produced oysters, called “seed” or “spat” to a larger “juvenile” size. This larger size is preferred for stocking artificial oyster reefs and for other shellfish restoration projects. Experience shows that larger oysters generally have better predator survival rates. The bigger the oyster, the more difficult it is for crabs and other natural predators to have them for lunch.

The Oyster Gardening Program, initiated during the summer of 2003, is a cooperative effort among the Delaware Center for the Inland Bays (CIB), the Delaware Sea Grant Marine Advisory program, and citizen volunteers living along the waterfront on one of Delaware’s three coastal or “Inland” Bays: Rehoboth, Indian River and the Little Assawoman. Volunteer gardeners support the program by caring for small 0.25 inch spat attached to old oyster shell by holding them in baskets placed in Taylor floats tied to their docks. The gardeners keep the oyster spat clean and protected from predators. Oysters held off the bottom have better conditions for growth - increased water flow and greater access to particulate food - so they reach a planting size of 1-2 inches much more rapidly than oysters on the bottom. Losses to predators are greatly reduced resulting in larger and hardier oysters for field planting and for other restoration work. During the 2014 season more than 200 volunteer oyster gardeners at 64 locations helped to grow 50 bushels of plantable oysters within the three Inland Bays.

Oysters used in the gardening program are hatchery produced using broodstock lines bred for resistance to MSX and Dermo disease. In the hatchery, a million or more microscopic oyster larvae are exposed to bags of aged oyster shell to imitate the natural “setting” or attachment process that occurs annually in the bay. During early to mid-summer, the bags of oyster shell now with fingernail sized spat (see photo at left) are then distributed throughout the Inland Bays to the gardeners for grow-out in their Taylor Floats until the end of the season in late October and November. From deploying oysters at locations all around the Inland Bays we have learned that oysters grow well throughout the estuary and that seasonal growth ranges from good to excellent depending on location. This includes the Little

Project Overview:

Assawoman Bay where native oyster populations no longer exist. Juvenile oysters produced by the gardening program are kept in the floats for two seasons to give them a chance to mature and spawn before transplantation to rip rap areas located around the Inland Bays.

Besides their value to commercial and recreational fisheries, oysters, hard clams and other bivalve shellfish feed by filtering bay water to remove phytoplankton and other suspended particles. By serving as natural biological filters they perform an important ecological service to maintain water clarity and quality and to re-cycle nitrogen and phosphorous, two nutrients responsible for over-enrichment of the Inland Bays. Oysters and the shell clusters they form (above and left) provide habitat that attracts communities of small bottom dwelling organisms like grass shrimp and worms which in turn support populations of crabs, larger fish and other predators. Developing annually spawning adult oyster populations improves the potential for natural recruitment. Increased filtration of plankton by healthy shellfish populations can also help to keep Harmful Algal Blooms (HAB) from occurring.

This program has been a long-term ongoing program since 2003 and has succeeded in proving that oysters will grow in all locations in the Inland Bays. We are now using this program solely for an important public outreach tool that helps us plant an average of 30-50 bushels in the Inland Bays per year. In FY2015 the project manager will work with staff and our development coordinator to develop a plan to increase program financial support from potential oyster gardeners. This plan would include outreach efforts, communications, asking for donations/support from gardeners. This program has become popular enough to increase funding opportunities. All solicitations and development materials would be made using non-EPA funds.

Outputs/Deliverables:

1. Collect and distributed 30-50 total bushels of oysters to LAB, Rehoboth Bay, and IR Bay.
2. Expand to a total of 140 site locations with over 220 volunteers
3. Produce 250 bags of spat using disease resistant larvae from Rutgers University.
4. Personal outreach to over 220 citizens in our watershed.
5. updated project report
6. Media updates

Intermediate Outcomes:

1. Production of oysters for restoration purposes.
2. Making new partnerships with numerous organizations and citizens.

Long-Term Outcomes:

1. Restoring native oysters to our Inland Bays
2. Increasing general partnerships between participating organizations and the CIB.
3. Improving the quality of our waters through the filtering effect of these oysters

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,086.40	\$ 0.00	\$ 5,086.40
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,086.40	\$ 0.00	\$ 5,086.40
Center for the Inland Bays	FY2015 Private Operating Revenue		\$ 500.00	null	null
Town of South Bethany	Oyster Gardening Program		\$ 800.00	null	null
Totals:			\$ 11,472.80	\$ 0.00	\$ 10,172.80

PROJECT PROGRESS

Beginning Date: 04/15/2003

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
collect oysters from all gardeners	Initiated	05/29/2014	06/30/2014			
expand number of gardeners	Not Initiated	05/29/2014	07/31/2014			
plant collected oysters (30-50 bushels	Not Initiated	05/29/2014	07/18/2014			
report current program goals and outcomes	Not Initiated	05/29/2014	10/02/2014			
incorporate development goals	Not Initiated	05/29/2014	06/30/2014			
bag oyster shell and set oyster larvae	Not Initiated	05/29/2014	06/12/2015			
distribute spat bags and collect gardener oysters	Not Initiated	05/29/2014	07/31/2015			
plant collected oysters	Not Initiated	05/29/2014	08/21/2015			
incorporate development goals	Not Initiated	05/29/2014	06/30/2015			

Annual Report:

-collected gardener oysters from 130 locations

Annual Report:

-planted 35 bushels of oysters in rip rap throughout Inland Bays

-expanded program to 135 locations

-incorporated development ideas in regards to fundraising

-written report regarding oyster growth and survival, planting locations and gardener locations has been completed.

-success of project:

- Demonstration and documentation that oyster growth and survival is good to excellent in all three Inland Bays
- Little Assawoman Bay (contrary to conventional wisdom) supports good to excellent oyster and hard clam growth
- Significant increase in the number of OG volunteers (21 to 200) and sites (15 to 120).
- Financial support from Sussex County, Fenwick Island, and South Bethany plus private donations, in-kind volunteer hours and other community services exceeding \$200,000
- Participation of Delaware State University with additional graduate student funding of over \$200K for additional manpower and applied field research
- Opportunity to integrate educational opportunities with other community partners such as CIB James Farm environmental education programs, Delaware Technical and Community College Upward Bound Program for at Risk or Disadvantaged Youth, Inland Bays Citizen's Monitoring Committee, AmeriCorps, Boy Scouts etc.
- Transplantation of more than 150 bushels of juvenile and adult oysters (approximately 45,000 oysters) to enhance living shoreline habitat in Indian River and Little Assawoman Bays
- Completion of 3 Delaware State University MS thesis projects (2 on the habitat value of oyster aquaculture cages; 1 on Vibrio occurrence and distribution at gardening sites; and one on the effectiveness and habitat value of using riprap as a substrate for oyster restoration field plantings
- Observation of increased natural oyster recruitment In Indian River Bay and Little Assawoman Bay
- Establishment of a Shellfish Aquaculture Tiger Team (Stakeholder Work Group) to conduct spatial planning for bottom lease siting and to draft statutory code and regulatory language to reinstate a bottom leasing system for commercial shellfish aquaculture for the Inland Bays.

Poplar Thicket Restoration Plan

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Rob Gano, Regional Manager, DNREC -- Division of Fish and Wildlife

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Update and implement the Inland Bays Habitat Protection Plan.

Project Overview:

Located on the south side of the Long Neck peninsula east of the marina at Whitehouse Beach, the property is situated on the lower Indian River Bay watershed. The overall site is 229 acres and the focus is to identify potential areas for habitat restoration and to implement practices that improve water quality including uplands, wetlands, shallow-water, sandy beach/dune, and wooded or scrub/shrub areas. The property has a variety of land uses/land covers and will ultimately be managed as a bird sanctuary by the landowner and land manager, DNREC Division of Fish & Wildlife.

The work proposed in this project is to develop a comprehensive restoration plan for the property. Project partners will provide input into various potential restoration options and alternatives as well as ensuring the work is consistent with routine operation and maintenance of a nature preserve/bird sanctuary.

This project is directly consistent with the Habitat Plan sections/objectives including Tidal and Non-Tidal Wetland Restoration; Shoreline Stabilization; Submerged Aquatic Vegetation and Enhancement; Diamondback Terrapin, Horseshoe Crab, and Colonial Nesting Bird Habitat Restoration; and indirectly consistent with the goals of restoring and enhancing Neotropical migratory bird species habitat as suggested for the Pepper & Vines Creeks watersheds.

Outputs/Deliverables:

1. A site-specific plan that identifies the resource needs and potential projects/actions to address them.
2. A site-specific plan that can be used by any member of the Planning Committee to solicit funding for project implementation based on their organizations ability.

Intermediate Outcomes:

1. Better working relationships will result based on the consolidated effort to secure funding to implement the practices identified in the restoration plan.
2. Since project is intended to be a bird sanctuary, there should be increased opportunities to partner with or receive funding from bird conservation organizations.

Long-Term Outcomes:

1. Increases in the amount and diversity of wildlife habitat onsite.
2. Enhanced water quality.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Alteration of natural flow regimes
- Fish & Wildlife loss
- Habitat loss & degradation
- Introduced species

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,586.00	\$ 0.00	\$ 5,586.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 10,794.00	\$ 0.00	\$ 10,794.00

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014		03/31/2015		
Hold partner meeting	Cancelled		06/30/2014			
Begin individual plan development (aquatic, upland, wetland, shoreline)	Initiated	09/02/2014	07/31/2014			
Hold partner meeting after rough draft developed	Not Initiated		10/31/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete draft of plan	Not Initiated		11/30/2014			
Prioritize projects	Not Initiated		01/31/2015			
Solicit additional funding for implementation	Not Initiated		03/31/2015			
Post completed plan on website	Not Initiated		03/31/2015			

Annual Report:

Several meetings occurred with DNREC Division of Fish & Wildlife, who is the property's owner/manager. The purpose was to discuss goals, objectives, and their maintenance requirements and long-term management needs and to ensure that the deed restrictions related to being a bird sanctuary are honored. During this time period baseline bird use monitoring (presence/absence) was conducted. There was also a meeting held to discuss the potential for a Living Shoreline project onsite.

Delays and constraints experienced on this project were related to the amount of additional time required to complete other priority projects, unanticipated events, or deadlines. Two other priority implementation projects were up against seasonal (construction-related) and grant funding imposed deadlines.

Poplar Thicket Upland Habitat Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Rob Gano, Regional Manager, DNREC -- Division of Fish and Wildlife

David Baird, Sussex Conservation District

Erich Berkintine, Southern Regional Forester, Delaware Forest Service, Technical Assistance

Sam Topper, Senior Forester, Delaware Forest Service, Technical Assistance

Supporting Project Partner Contacts:

Matthew Bailey, Wildlife Biologist, DNREC -- Division of Fish and Wildlife

Robert Palmer, Program Manager II, DNREC -- Division of Watershed Stewardship, Funding

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Update and implement the Inland Bays Habitat Protection Plan.

Project Overview:

Located on the south side of the Long Neck peninsula east of the marina at Whitehouse Beach, the property is situated on the lower Indian River Bay watershed. The overall site is 229 acres and the focus of this project is the 70 acre tilled farm field in the center of the property. The area has been fallow since fall/winter of 2012 and was under cultivation since at least 1938 (oldest aerial photograph available). The property is owned by the State of Delaware (DNREC Division of Fish & Wildlife) and is to be managed as a bird sanctuary as required by deed stipulations.

Project partners will provide technical assistance, financial assistance, plant materials, and labor to implement restoration on the project site. The work proposed in this project is to restore upland wildlife habitat on 70 acres of farmed land.

Outputs/Deliverables:

1. Increase 70 acres of upland habitat for birds and other important species.
2. Increases in the amount of wildlife habitat.
3. Increased diversity of both vegetation and habitat types.

Intermediate Outcomes:

1. Support by all project partners to secure funding and implement practices needed to complete the project.
2. Improved water quality through decreased nutrient loss to receiving waterbodies.

Long-Term Outcomes:

1. Based on the Inland Bays Pollution Control Strategy estimated land-use Loading Rates (appendix E), the conversion from tilled land to forested area should result in a 76 percent decrease in total Nitrogen and a 50 percent decrease in total Phosphorus entering receiving waters from the re-forested farmland.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Alteration of natural flow regimes
- Fish & Wildlife loss
- Habitat loss & degradation

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Field/Meadow	Reestablishment	Acres	5.00

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 5,586.00	\$ 0.00	\$ 5,586.00
DNREC	FY2015 DNREC Operating Grant		\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 10,794.00	\$ 0.00	\$ 10,794.00

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
Investigate site conditions and develop planting options and alternatives	Completed	08/01/2013				
Develop grass, tree, shrub planting plan	Completed	08/15/2013				

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Secure funding for first phase of plantings	Completed	08/15/2013				
Plant trees, grasses, and shrubs	Completed	09/21/2013				
Monitor plant growth/survivability	Initiated	06/09/2014	06/15/2014			
Secure funding to continue planting	Not Initiated		08/15/2014			
Evaluate potential to work on farmed/non-tidal wetlands onsite	Not Initiated		09/15/2014			
Secure funding to restore/enhance farmed/non-tidal wetlands	Not Initiated		09/30/2014			

Annual Report:

There were 2,000 native trees, grasses, and shrubs planted in 5 key areas, each intended to provide food (berries/nuts) or nesting structure (shrubs/pines). Fencing was placed around the planting areas to minimize loss to deer browse. The 5 areas planted totaled approximately 4.5 acres in size and included 4 acres within the deer exclosures and a 0.5 acre buffer near tidal wetlands. Monitoring of mortality will begin in the spring of 2014.

Shellfish Enhancement Action Plan

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

Brian Boutin, Director of Conservation Programs, The Nature Conservancy -- Delaware Chapter, Committee member

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

John Ewart, Aquaculture Specialist, University of Delaware -- Seagrant, Committee Member

Mike Bott, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Committee Member

Michael Greco, Environmental Scientist, DNREC -- Division of Fish and Wildlife, Committee Member

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Increase the economic and environmental benefits of shellfish.

CCMP Action: Enhance populations of eastern oysters.

Project Overview:

Bivalve shellfish restoration projects are becoming increasingly common in the United States, spurred by increased public awareness of their important ecological role in coastal waters and increases in funding (primarily federal) available for such efforts. Community groups, school classes and others interested in promoting healthier coastal ecosystems are joining forces with government agencies at the local, state and federal level to help restore these important components of coastal ecosystems. This increased interest in restoration is due, in part, to the dramatic declines in shellfish fisheries that were once the mainstay of many coastal communities. This is also likely due to greater public awareness of the imperiled state of coastal environments in general, and a desire to restore the ecosystems such as /oyster reefs.

With this said, a clear plan and vision is needed for our Inland Bays in order to funnel these increased resources into desired and successful restoration projects. Shellfish, and in regards to this particular plan (eastern oysters=*Crassostrea virginica*, and hard clam=*Mercenaria mercenaria*) have been a part of the Delaware's Inland Bays ecosystem well before the engineered inlet was formed in the 1930's, and most certainly after. This plan will identify past restoration project successes and failures to help further identify potential successful shellfish restoration projects. The CIB's oyster gardening and restoration efforts have documented successful oyster survivability throughout the Inland Bays and this plan will identify and expand on efforts such as these in order to identify potential future restoration projects. Due to their filtration capabilities, shellfish are one of the most important natural resources we have in our Bays. We have a responsibility to enhance and restore shellfish populations through correct planning and appropriate methodologies.

Project Overview:

This Action Plan will outline what it takes to move forward with shellfish restoration project based strategies based on BMP's, suitable locations, historical restoration activities, ecosystem changes, permitting needs, public use, advancing technologies and other identified variables as we progress.

Overall this action plan will serve as a resource that identifies and documents what past and current shellfish restoration/enhancement projects and activities have occurred and are occurring in Delaware's Inland Bays; and more importantly this plan aims to serve as a project compendium where, when funding sources are identified, they can easily be steered to a number of already identified shellfish restoration projects in our Inland Bays. Each specific identified potential project, and potential project locations, will have quantifiable variables that would be analyzed. These are to include but not limited to the number of planted/restored organisms, filtering capacity, hourly daily and yearly nutrient uptake, and total number of restored acres and/or linear feet. The formation of this plan will involve seeking out grant funding for restoration consultant support.

A draft outline of the plan has been developed and committee members are being compiled.

Outputs/Deliverables:

1. Shellfish restoration plan developed to the project concept level including potential project locations, costs, materials, strategies and methods.
2. Document current and historical shellfish restoration projects in order to develop and document potentially successful restoration/enhancement projects and concepts.
3. To have all past, present and future potential shellfish restoration/enhancement projects and concepts in one document where, if funding becomes available, it will make for a faster/more streamlined process to identify projects and project concepts for the available funding.
4. A quantitative list of potential projects where potential project areas/acres to be restored; permits required; available technologies and methods; ecosystem services including but not limited to increased habitat; filtering capabilities and nutrient reduction will be identified.
5. GIS layer(s) and maps produced identifying and prioritizing locations where potential projects may occur, be most cost effective, and provide the most environmental value.

Intermediate Outcomes:

1. Past IB shellfish restoration projects and studies identified and compiled into one source/document.
2. Potential restoration sites/locations identified.
3. Funding sources and partners identified for future plan/projects implementation.
4. An outline that puts all pre-written variables into one document which will make it far easier to plan for restoration projects as well as filter surprise funding.

Long-Term Outcomes:

1. A quantifiable increase in shellfish restoration projects implemented.
2. Increase in available funding sources.
3. Increase in nutrient reduction and restored acres of aquatic habitat that will be quantifiable by each specific project implementation. This plan aims to identify and quantify these variables based on each potential identified project, but what actually is implemented on the ground, will result in the final calculations.
4. An action plan acting as a resource for other groups which will shed awareness on the NEP program.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis
 Improving Water Quality Monitoring

Pressure Targets:

Fish & Wildlife loss
 Habitat loss & degradation
 Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 2,654.00	\$ 0.00	\$ 2,654.00
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 15,611.40	\$ 0.00	\$ 15,611.40
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 4,450.60	\$ 0.00	\$ 4,450.60
Totals:			\$ 22,716.00	\$ 0.00	\$ 22,716.00

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014				
Pursue grant funding	Initiated	05/29/2014	10/31/2014			
Identify partners and possible workgroup	Not Initiated	05/29/2014	10/31/2014			
Discuss within workgroup, set goals and prioritize and write plan	Not Initiated	05/29/2014	11/28/2014			

Annual Report:

Due to other projects priorities that required unanticipated amounts of time this project has undergone minor delays. These projects included oyster shell recycling, oyster gardening and dead end canal bio-enhancement. Also, due to a turnover in the aquatic restoration coordinator staff position, this project is best thought to commence under the new hire. Milestones are up to date to reflect this change.

As for the outputs and the intermediate outcomes: This action plan is going to be written using a committee approach. Numerous stakeholders throughout the state will be involved and most outputs and outcomes will be determined through the wisdom and direction of the committee. Everything needs to be vetted and agreed upon to a certain extent in order for this action plan to succeed.

Shorezone Fish Community Volunteer Monitoring Program

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Rob Kernehan, Volunteer, CIB Volunteer Project Coordinators

Supporting Project Partner Contacts:

Jordy Zimmerman, Environmental Scientist, DNREC -- Division of Fish and Wildlife, Committee Member

John Clark, Administrator, DNREC -- Division of Fish and Wildlife, Committee Member

Tim Targett, Associate Professor, University of Delaware -- College of Earth, Ocean, and Environment, Committee Member

Charles Epifanio, Professor, University of Delaware -- College of Earth, Ocean, and Environment, Committee Member

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Encourage more stakeholder support through volunteerism.

CCMP Action: Involve volunteers and stakeholders in demonstration projects that model desired changes in practices and citizen science research to increase their knowledge about the bays.

Project Overview:

This is a long-term volunteer monitoring program to study the shorezone fish community of the Inland Bays. The shorezone fish community has its own unique characteristics and responses to water quality. In the past it has been studied sporadically, but no long term data exists to analyze for trends in community composition. This study will use volunteers supervised by the Center's scientist to accomplish long-term monitoring of this important community. The volunteer project coordinator is a fish biologist who will work with the Science Coordinator using volunteer labor. Volunteers will use beach seines to capture fish and enumerate them by species and size at approximately one dozen sites spanning a gradient of water quality around the Bays and their tributaries. Data will be entered, analyzed, and reported, by the project leads. Analyses will focus on fish diversity and numbers in relation to estuarine conditions. Data will be compared to past studies and analyzed for trends when enough data years have been collected. The project will have an education and outreach component. The seine sites will be visited twice a month from April to mid-October. The same sampling sites and temporal seining intervals will be conducted for each year of the continuous long-term monitoring project.

Outputs/Deliverables:

1. Long-term shorezone fish community monitoring plan.
2. Develop shorezone fish sampling QAPP.
2. Monitoring database of annual fish and physical findings.

Outputs/Deliverables:

3. Annual monitoring reports and presentation.
4. Public outreach through informal communication, formal presentation, and distribution of study educational brochures.
5. Develop template and annual update findings brochure.
6. Status and trends reports every 5 years.

Intermediate Outcomes:

1. Increased consideration of natural resources when making decisions on shoreline modification, dredging, and other land-use decisions.
2. Increased awareness of the Center for the Inland Bays and its mission among the general public.

Long-Term Outcomes:

1. Potential for related gains or reduction in losses of a balanced and diverse shorezone fish community.
2. Compare species and bay indices to the deep water trawl surveys indices to determine the relationship between the nearshore and open water fish diversity and abundances.

Clean Water Act Programs:

Improving Water Quality Monitoring

Pressure Targets:

Fish & Wildlife loss

Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 4,800.00	\$ 0.00	\$ 4,800.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 3,850.00	\$ 0.00	\$ 3,850.00
Totals:			\$ 8,650.00	\$ 0.00	\$ 8,650.00

PROJECT PROGRESS

Beginning Date: 01/01/2011

Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete QAPP for shoreline monitoring	Completed		05/15/2014			
Hold annual committee meetings to discuss findings and implementation (re-occurring yearly).	Initiated		03/15/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete annual QA/QC reports for monitoring (re-occurring yearly).	Initiated		12/15/2014			
Complete status and trends report after 5 years of sampling	Not Initiated		04/28/2016			
Complete Annual 2014 Report	Not Initiated		06/15/2015			
Complete Annual 2013 Report	Initiated		12/30/2014			

Annual Report:

1. The 2013 sampling season was completed, without any significant issues or lapses in QA/QC objectives.
2. The seine data was compiled into the catch database.
3. The 2012 shorezone sampling report was completed.
4. The annual fish survey committee meeting occurred in March.
5. The shorezone fish monitoring program QAPP was completed.
6. A draft of the 2013 sampling report is in development.

Upper Indian River Watershed Study for Water Quality BMP Implementation

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

David Baird, Sussex Conservation District, Contract Management

Supporting Project Partner Contacts:

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

Larry Trout, Senior Consultant, A. Morton Thomas and Associates Inc., Contractor

Brooks Cahall, Program Manager, DNREC -- Division of Watershed Stewardship, Technical Assistance

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Stormwater Management

CCMP Objective: Reduce nutrient contributions from stormwater to help achieve TMDLs.

CCMP Action: Create stormwater management facilities and source reduction strategies for 4,500 acres of urban and residential lands developed pre-1990.

Project Overview:

The project site is located in the Upper Indian River watershed downstream from the Town of Georgetown and involves evaluating the potential for implementing water quality Best Management Practices (BMPs) and involves planning only and no BMP implementation.

Partner Roles & Responsibilities:

CIB – Serve as a Project Coordinator who will facilitate meetings and participate in field evaluations.

Sussex Conservation District – Serve as contract administrator and hire the consulting engineers.

DNREC – Technical assistance related to drainageway and landowner information.

Consulting Engineers – Develop a detailed project timeline for implementation, perform desktop and field evaluations, prepare BMP lists and estimated load reductions, and draft project design plans.

The goal of the project is to utilize the expertise of the Sussex Conservation District (SCD), the Center for the Inland Bays (CIB), the Delaware Department of Natural Resources & Environmental Control - Division of Watershed Stewardship (DNREC), and consulting engineers to identify sites for BMPs and their potential to reduce nutrient and sediment loads for a given stream/tax ditch segment. Project partners' roles include field evaluation, design, contract management, and technical assistance.

Outputs/Deliverables:

1. The development of a list of potential BMP implementation sites and possible BMPs to be implemented.
2. The development of concept sketches.
3. The development of rough cost estimates to implement selected BMPs.
4. The development of estimated nutrient (Nitrogen and Phosphorus) and sediment (TSS) load reductions.
5. Completed plan delivered to the Sussex Conservation District.

Intermediate Outcomes:

The development of a plan that can be used to secure funding and landowner permission to implement BMPs.

Long-Term Outcomes:

Increases in water quality resulting from BMP installation.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Alteration of natural flow regimes
- Habitat loss & degradation
- Inappropriate land use

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 5,208.00	\$ 0.00	\$ 5,208.00
Totals:			\$ 5,208.00	\$ 0.00	\$ 5,208.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone Synopsis	Not Initiated	05/29/2014				
Prepare grant funding applications to implement project	Not Initiated		10/15/2014			
Secure grant funding for implementation	Not Initiated		04/15/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop contracts	Not Initiated					
Develop time schedule, perform desktop review, and do GIS analysis	Not Initiated					
Conduct field visits	Not Initiated					
Develop draft BMP list	Not Initiated					
Meet with stakeholders	Not Initiated					
Prepare final plan	Not Initiated					

Upper Rehoboth Bay Land Conservation & Restoration Initiative

MANAGEMENT AND PARTNERS

CIB Project Manager: Eric Buehl

Primary Project Partner Contacts:

Kate Hackett, Executive Director, Delaware Wild Lands, Supporting

Ginger North, Associate Director for Natural Resources Conservation, Delaware Nature Society, Supporting

Supporting Project Partner Contacts:

Bobby Gorski, Conservationist, USDA -- Natural Resources Conservation Service, Supporting

Rick McCorkle, Biologist, US Fish & Wildlife Service, supporting

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Coordinating Land and Water Use Decisions

CCMP Objective: Provide maximum protection of waterways, forested stream corridors, groundwater, natural areas, open space, tidal and non-tidal wetlands, and encourage additional acquisitions or conservation set-asides and protection.

CCMP Action: Update and implement the Inland Bays Habitat Protection Plan.

Project Overview:

The general area of focus of this planning project is the Upper Rehoboth Bay Watershed; Love Creek subwatershed, Angola Neck area, Rehoboth Marsh, and adjacent to the Lewes Rehoboth Canal. Emphasis will be placed on identify larger parcels (>50 acres) that are forested, contain sizeable areas of wetlands, or have agricultural land adjacent to waterbodies or wetlands that have the potential for BMP implementation or that are candidates for land conservation or preservation. It may also include smaller parcels with similar land uses that are adjacent to one another and can be combined to form a larger parcel.

Project partners will be involved in providing input on the development of a parcel ranking matrix. Their input will also be solicited as to components for inclusion in individual parcel restoration plans. The work proposed in this project is to identify parcels of land for restoration or conservation activities.

Outputs/Deliverables:

1. Development of new GIS layers and data.
2. List of potential landowners interested in land conservation or habitat restoration.
3. Development of a methodology and data that will aid in other land conservation initiatives.
4. The methodology will include utilizing new GIS data and chronicling the steps involved in identifying parcels, landowners, land use/land cover, and restoration potential.

Outputs/Deliverables:

5. Development of a project compendium that identifies a potential parcel's goal(s), partners, and work to be done.

Intermediate Outcomes:

1. Identification of key properties for habitat restoration or conservation.

Long-Term Outcomes:

1. Increased awareness by landowners of the significance of their property in relation to habitat and water quality.
2. Increased number of acres of land permanently protected through purchase or easement in the watershed.
3. Increased number of acres of habitats restored in the watershed.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Habitat loss & degradation
- Inappropriate land use

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 11,172.00	\$ 0.00	\$ 11,172.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 10,416.00	\$ 0.00	\$ 10,416.00
Totals:			\$ 21,588.00	\$ 0.00	\$ 21,588.00

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Milestone synopsis	Initiated	03/09/2014		03/31/2015		
Identify potential parcels	Completed	09/01/2014				
Develop ranking criteria	Initiated		09/19/2014			
Complete GIS analysis	Extended		09/30/2014			
Compile list of landowners	Initiated		09/30/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Contact landowners	Not Initiated		10/15/2014			
Develop parcel plans	Not Initiated		10/31/2014			
Landowner follow-up	Not Initiated		11/30/2014			
Landowner meetings	Not Initiated		03/31/2015			

Annual Report:

Worked with the project's partners to develop and review a draft ranking criteria to be used to select/prioritize parcels for restoration or conservation. Met with DNREC land managers to discuss high priority conservation areas in the watershed to assist in parcel selection and prioritization. Utilizing preliminary land use/land cover, a draft list of potential parcels and landowners has been developed. Parcel/landowner list and ranking criteria expected to be completed in Q3 after consultation with additional project partners.

Delays and constraints experienced on this project were related to the amount of additional time required to complete other priority projects, unanticipated events, or deadlines. Two other priority implementation projects were up against seasonal (construction-related) and grant funding imposed deadlines.

Your Creeks

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Communicate environmental results to inform legislators and raise citizen awareness about the state of the Inland Bays and its watershed.

CCMP Action: Results of Inland Bays environmental studies or projects are published.

Project Overview:

The Your Creek project seeks to create a greater sense of ownership by the local communities for each of the Bay's major creeks. This will be done by highlighting the values of those creeks and the potential threats to those values, and what residents can do to help. The project is a partnership with the CIB Citizens' Advisory Committee who's members will serve on Creek Teams and provide leadership to each team.

Your Creek is a multi-year project that will focus on the major tributaries of the Inland Bays. The project will include surveys of residents to gather information on the concerns, opinions, and understanding of local creeks by residents and property owners in each sub-watershed; development of indicators for each creek based on data available and citizen interests and concerns; and development of outreach products that will be taken into each Your Creek community to educate, inform and involve residents. Of priority interest in characterizing each creek will be: the status and trends of the nutrient concentrations, sources of nutrient input, LU/LC, status of habitat, and potential threats or concerns specific to each watershed.

A survey of residents will be conducted in the sub-watershed of each Creek that is included in this project. The surveys gather information on the concerns, opinions, and understanding of local creeks by residents and property owners and will be used in selecting specific indicators for each Creek and in development of outreach materials. The surveys and salary to manage will be funded through our State of Delaware Operating Grant.

Outputs/Deliverables:

1. Develop and distribute a survey to the community to solicit information on concerns, opinions, and understanding of the local creek.
2. Design and produce "Your Creek" report for each tributary watershed selected.
3. Develop general "Your Creek" exhibit for use at community events throughout Inland Bays watershed.
4. Host or otherwise facilitate outreach events for communities around major tributaries.

Intermediate Outcomes:

1. Increase awareness and support of the Inland Bays among communities and townships in the watershed.
2. Establishment of "Friends of..." groups for priority creeks.

Long-Term Outcomes:

1. Create connection and familiarity with the tributaries of the Inland Bays that results in increased public participation in public policy issues affecting the Inland Bays.
2. Increased membership and support for CIB.
3. Increased adoption of pollution control practices by residents.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis
 Improving Water Quality Monitoring

Pressure Targets:

Habitat loss & degradation
 Inappropriate land use
 Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	\$ 93.00	null	null
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 4,324.00	\$ 3,168.00	\$ 7,492.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 4,927.00	\$ 8,184.00	\$ 13,111.00
DNREC	FY2015 DNREC Operating Grant		\$ 185.00	null	null
Totals:			\$ 9,529.00	\$ 11,352.00	\$ 20,603.00

PROJECT PROGRESS

Beginning Date: 10/13/2013 **Project Status:** Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Meet with DelDot to explore possible of road signage for creeks	Completed	11/21/2013	12/16/2013			
Form CAC Love Creek Team and identify leadership	Completed	11/21/2013	02/26/2014			
Begin work on 'pilot' creek to develop template for future	Completed	11/21/2013	02/26/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
creeks						
Begin technical review of indicator data	Completed	11/21/2013	02/26/2014			
Develop Love Creek Survey to gauge citizen interests and concerns	Completed	02/26/2014	03/26/2014			
Begin development of indicators and mapping	Completed	02/26/2014	04/24/2014			
Take Love Creek team on the Creek	Completed	03/26/2014	05/19/2014			
Create webpage for Your Creek	Completed	11/21/2013	06/20/2014			
Distribute survey and evaluate results	Initiated	05/30/2014	07/31/2014			
Selection of common indicators and creek-specific indicators for Love Creek	Initiated	05/30/2014	07/18/2014			
Publish Creek Profile for Your Creek	Initiated	05/30/2014	10/29/2014			
Develop Your Creek exhibit	Initiated	05/30/2014	10/29/2014			
Develop powerpoints for Your Creek project	Not Initiated	05/30/2014	10/29/2014			
Produce and install signs on Love Creek	Initiated	05/30/2014	11/30/2014			
Begin work on Vines Creek-Pepper Creek	Not Initiated	05/30/2014	03/27/2015			
Begin work on Dirrickson Creek	Not Initiated	05/30/2014	10/30/2014			

Annual Report:

Love Creek is the first creek in this multi-year project. Because we are basically producing a 'template' for how we will carry out this project on each creek, a longer time is required on this first one to design our methodology and products. Each step must be considered for its usefulness and transferability to subsequent creeks; the creation of watershed surveys, the identification of the common environmental indicators that we will use on all creeks as we go forward, the selection of specific indicators for this first creek, creating formats for outreach materials, developing a process for identifying HOA's and community organizations within the watersheds, identifying and nurturing leadership for Teams, creating awareness for the program through the media, energizing our relationship with partners that team members can engage with long term such as the Citizen's Water Monitoring Program. This is all work that is foundational for the project and each step is being executed and evaluated for improvement.

1. Presented full plan for the Your Creek Project to January CAC meeting
2. February- First meeting of Your Creek Team; began work on Love Creek to create a model and template for other creeks; identified Creek Team Leader for Love Creek.
3. Identified HOA communities, settlements, farms and other features of the watershed and mapped them

Annual Report:

4. Researched options for survey distribution and began development of the Survey
5. Began development of indicators and mapping
6. Paddling trip was planned on Love Creek for Team members to acquaint them first-hand with the upper reaches of the creek.

PROPOSED PROJECTS

2015 Center for the Inland Bays Financial Plan

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Administration

CCMP Objective: Provide financial development and planning for CCMP implementation

CCMP Action: Provide financial development and planning for CCMP implementation

Project Overview:

Per the 2009 and 2013 EPA Program Evaluation of the Center, the EPA has required production of a Finance Plan that addresses ways to diversify the Center's funding sources. The Center will utilize the time of the Executive Director, the Center's Marketing and Development Coordinator, and Board Members to produce such a plan. The development of the Plan will explore funding sources for CCMP implementation and the long term financial sustainability of the Center itself. Existing and new funding sources will be ranked according to their potential for maintenance and growth based on criteria to be developed by the project participants. The Finance Plan will integrate the Center's Private Fundraising Plan. Work on the plan will begin in FY2015 and will be completed by OCT 1 2015. The plan will be an in-house document of the Center and will not receive professional design and production.

Outputs/Deliverables:

1. Finance plan guiding diversification of Center funding sources.

Intermediate Outcomes:

1. Increased participation from Board Members in supporting diversification of funding sources for CCMP implementation and Center financial sustainability.

Long-Term Outcomes:

1. Increased finances for CCMP implementation.
2. Diversification and of Center funding sources.
3. Improvement in Center financial sustainability.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Lack of institutional capacity/leveraging

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 18,843.00	\$ 0.00	\$ 18,843.00
Totals:			\$ 18,843.00	\$ 0.00	\$ 18,843.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Research financial sustainability.	Initiated	05/08/2014	09/01/2014			
Conduct Interviews with Board Members on finances.	Not Initiated	05/08/2014	11/01/2014			
Develop list of existing and new potential funding sources	Not Initiated	05/08/2014	03/01/2015			
Draft report completed	Not Initiated	05/08/2014	08/01/2015			
Final report completed	Not Initiated	05/08/2014	10/01/2015			

Annual Report:
None.

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Damian Brady, Ph.D., University of Maine, Workgroup Member

Judy Denver, USGS Principal Investigator, USGS, Collaborator

Robin Tyler, Marine Biologist, DNREC -- Division of Water, Collaborator

George Junkin, Town Councilman, Town of South Bethany, Workgroup Member

Alison Rogerson, Environmental Scientist, DNREC -- Watershed Assessment Section -- WMAP, Collaborator

Latonya Gilliam, NPDES Engineer, DELDOT, Workgroup Member

Scott Andres, Senior Scientist, Delaware Geologic Survey, Collaborator

Ed Whereat, Program Coordinator, University of Delaware -- Seagrant, Workgroup Member

Supporting Project Partner Contacts:

Doug Janiec, Senior Project Scientist, Cardno Entrix, Collaborator

Tim Targett, Associate Professor, University of Delaware -- College of Earth, Ocean, and Environment, Workgroup Member

Mike Bott, Environmental Scientist, DNREC -- Division of Watershed Stewardship, Workgroup member

Debbie Rouse, Program Manager, DNREC -- Division of Watershed Stewardship, Workgroup member

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Water Quality Management

CCMP Objective: Re-assess water quality monitoring efforts for their representativeness and capacity to detect trends, then develop recommendations for improvement.

CCMP Action: Develop recommendations to improve efficacy of monitoring efforts to detect trends.

Project Overview:

A systems monitoring design approach will be utilized to develop a comprehensive monitoring plan for the Delaware Inland Bays. The systems design places emphasis on the optimum design of the overall monitoring program that encompasses all monitoring that occurs within the Delaware Inland Bay Watersheds. The essential elements are the assessment of trade-offs between individual aspects of the monitoring program and the use of feedback mechanisms to modify individual monitoring program components based on periodic assessments of overall program performance. This approach is well suited for design problems that involve complex, highly variable systems, such as estuaries, and that involve a large number of investigators that must interact as a group to produce the product.

Project Overview:

The plan for implementing this approach to designing the monitoring program incorporates six major comments:

1. Defining the Objectives for the Monitoring plan.
2. Establish information requirements to meet the defined objectives.
3. Establish the objectives of all possible types of monitoring that occur in the watershed.
4. Individual program components and performance criteria are established for the monitoring plan.
5. Evaluation of trade-offs are assessed after the monitoring components are combined, and the best criteria and components are selected that meet the overall objectives.
6. Feedback to initial design step will be incorporated into the monitoring plan, and modifications to the system's design are made to improve the product's performance.

The overall objective of designing and implementing a monitoring plan is undertaken by estuary programs are to measure the effectiveness of management actions implemented as part of the CCMP.

Outputs/Deliverables:

1. Monitoring Plan which includes:
 - a. Assessment of the types of monitoring and forms of data occurring and available in the watershed.
 - b. Assessment of data gaps that exist throughout the watershed, as they pertain to monitoring that supports the evaluation of the effectiveness of the CCMP and trends within the identified indicators.
 - c. Workgroup agreement on steps to implement findings of monitoring plan and data gap assessment, over the course of 5 years.

Intermediate Outcomes:

1. Development of monitoring objectives and performance criteria.
2. Establishment of testable hypothesis on the effectiveness of existing monitoring parameters and metrics.
3. Evaluation of expected monitoring program performance.
4. Selection of analytical methods and alternative sampling designs that could be implemented to fill data gaps and needs.

Long-Term Outcomes:

1. Design and implementation of a data management plan.
2. Design and implementation of watershed wide monitoring plan to better track the effectiveness of the implementation of the CCMP and evaluate or identify trends within the identified watershed indicators.

Clean Water Act Programs:

Developing Total Maximum Daily Loads

Improving Water Quality Monitoring

Strengthening Water Quality Standards

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

Pressure Targets:

Lack of institutional capacity/leveraging
 Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 22,800.00	\$ 0.00	\$ 22,800.00
Totals:			\$ 22,800.00	\$ 0.00	\$ 22,800.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Objectives for the Monitoring plan	Not Initiated		10/31/2014			
Establish information requirements	Not Initiated		11/28/2014			
Establish the objectives	Not Initiated		12/28/2014			
Individual program components and performance criteria will be established	Not Initiated		01/28/2014			
Evaluation of trade-offs	Not Initiated		02/28/2015			
Assessment of data gaps	Not Initiated		04/28/2015			
Draft Monitoring plan developed for review.	Not Initiated		06/28/2014			
Workgroup agreement on steps to implement findings of monitoring plan	Not Initiated		09/28/2014			
Final Monitoring Plan completed and adopted.	Not Initiated		09/28/2014			

James Farm Master Plan Implementation Phase I

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Outreach and Education

CCMP Objective: Educate stakeholders in the watershed about their impacts on water quality in the Bays and how they can help.

CCMP Action: Develop and deliver watershed education programs for children.

CCMP SubAction: Programs for school age children are offered at the James Farm Ecological Preserve.

Project Overview:

The James Farm is a 150-acre ecological preserve on Indian River Bay that the Center manages for recreational and educational purposes related to the Inland Bays and their watershed. The James Farm Master Plan is scheduled for completion by August 2014 (see FY2014 annual report for a description). The Plan to improve the Farm to protect natural resources and enhance educational opportunities while accommodating increased visitation will be developed in phases. This project will implement the first phase of the plan which will be completed with schematics and costs. It is anticipated this phase will include a series of improvements including trail and parking area relocation. Interpretive signage is anticipated to be developed in a later phase. The implementation of this first phase will include a funding development component to be accomplished with non-federal funds. Potential supporting grant programs include the Delaware Community Foundation Capital Grant, the Delaware Land and Water Conservation Trust Fund, and the Longwood Foundation. This workplan item will be updated after plan completion to reflect specifics. EPA funding will support the salary and benefits of a project manager.

Outputs/Deliverables:

1. Successful grant awards and donations for project implementation.
2. Completed work project to implement Phase I of Master Plan.

Intermediate Outcomes:

1. Improved management and design of the Farm to handle increased visitation while protecting natural resources.
2. Increased awareness and understanding about the native habitats of the watershed and sea level rise by visitors to the Farm.

Long-Term Outcomes:

1. Increase in willingness to support water quality restoration actions for the Inland Bays.
2. Maintenance of the ecosystem services provided by the farm including wildlife habitat and the provision of clean water.

Pressure Targets:
 Fish & Wildlife loss
 Habitat loss & degradation

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 4,402.00	\$ 0.00	\$ 4,402.00
DNREC	FY2015 DNREC Operating Grant		\$ 10,325.00	\$ 0.00	\$ 10,325.00
Sussex County	FY2015 Sussex County Operating		\$ 11,600.00	\$ 0.00	\$ 11,600.00
Totals:			\$ 26,327.00	\$ 0.00	\$ 26,327.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Submit Grant Proposals	Not Initiated	05/06/2014	12/01/2014			
Hire Implementation Contractor	Not Initiated	05/06/2014	06/01/2015			
Complete Phase I Implementation	Not Initiated	05/30/2014	12/01/2015			

Oyster Shell Recycling Program "Don't Chuck Your Shucks"

MANAGEMENT AND PARTNERS

CIB Project Manager: EJ Chalabala

Supporting Project Partner Contacts:

Brian Boutin, Director of Conservation Programs, The Nature Conservancy -- Delaware Chapter, Technical Advisor/Funder

Pat Cooper, Regional Parks Director, DNREC -- Division of Parks and Recreation, Storage Facility Landowner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Increase the economic and environmental benefits of shellfish.

CCMP Action: Enhance populations of eastern oysters.

Project Overview:

Natural oyster shell is the best material on which to create oyster reefs. Scientists know that now, but for generations, spent oyster shells were used to build roads, driveways and houses. More recently the shell has ended up in landfills. Today, oyster shell is a scarce natural resource and thus highly valuable for improving estuaries. Given the critical shortage of shell for use in enhancing the Inland Bays' oyster population, the CIB has formed a partnership with the Delaware Chapter of The Nature Conservancy (TNC), DNREC, and local businesses to divert oyster shell from landfills for use in enhancement projects.

In 2014, infrastructure and materials will be developed to implement the first year of shell collection in support of oyster reef creation and shoreline enhancement projects throughout the Inland Bays as led by CIB and TNC. The projects will be conceptualized in the Inland Bays shellfish enhancement plan currently under development. The first year of this project will focus on hiring a part-time employee to help develop and implement this program. A goal of setting up contracts with 10 restaurants to recycle oysters is attainable. These oysters will be picked up on, at least, a weekly basis and taken to the drop off location where they will be unloaded and left to cure. Three bins on a concrete pad will be built in Fresh Pond State Park in order to handle and rotate all incoming shell. All cured shell will then be ready for enhancement projects. Volunteers will be used to prepare the shell for enhancement projects. Actual collection of the oyster shells will begin in May 2014. The role of the Center is as program implementer and partner coordinator.

Outputs/Deliverables:

1. 6,000 bushels of shell (~120 tons) diverted from landfills for use in oyster reef creation projects.
2. 1,000 program brochures on the ecological benefits of oysters including sponsor identification.
3. Purchase and construction of recycling program infrastructure and materials for long-term project management.
4. Establishment of recycling agreements with at least 10 restaurants.

Intermediate Outcomes:

1. Increased public awareness of the Bays and the ecological value of oysters and their shell.
3. Recognition of sponsors and participants for assisting in the restoration of the Inland Bays.
4. Opportunities for sponsors and participants to volunteer to bag shell for reef creation projects.

Long-Term Outcomes:

The shell collected and cured during this first year of the project will be used to result in:

1. 0.5 acres of 5" deep created oyster reef/living shoreline projects to result in a) habitat for at least 49 species of aquatic life with biomass of as much as 80,321 pounds,
2. 20 – 50 gallons of water filtered per day per oyster (8,750,000 gallons),
3. 424 pounds of nitrogen assimilated in reef biomass and 91.5 pounds of nitrogen removed from the Bays per year through microbial action.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

- Fish & Wildlife loss
- Habitat loss & degradation
- Nutrient overloading

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	\$ 4,959.24	\$ 0.00	\$ 4,959.24
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 10,299.96	\$ 0.00	\$ 10,299.96
DNREC	Universal Recycling Grant -- Oyster	NAT_14014_Recyclin	\$ 19,012.15	\$ 0.00	\$ 19,012.15
The Nature Conservancy	2014 Oyster Shell Recycling Grant		\$ 5,000.00	\$ 670.00	\$ 5,670.00
Totals:			\$ 39,271.35	\$ 670.00	\$ 39,941.35

PROJECT PROGRESS

Beginning Date: 04/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Secure agreement for project site	Initiated	05/29/2014	06/06/2014			
Secure grant contract and funding	Initiated	05/29/2014	06/13/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Obtain contracts with local restaurants	Not Initiated	05/29/2014	06/27/2014			
Build site for shell collection	Not Initiated	05/29/2014	06/23/2014			
Design outreach material	Initiated	05/29/2014	06/30/2014			
Collect shell	Not Initiated	05/29/2014	06/30/2014			
Media Updates	Not Initiated	05/29/2014	07/31/2014			
Cure and use shell in Inland Bays	Not Initiated	05/29/2014	06/30/2015			
Increase restaurant participation	Not Initiated	05/29/2014	04/30/2015			
Identify and secure local funding sources	Not Initiated	05/29/2014	03/31/2015			

Annual Report:

Grants in the amount of \$5,000 from The Delaware Chapter of the Nature Conservancy, and \$19,012.15 from the Delaware Department of Natural Resources and Environmental Control Universal Recycling Program were applied for and recieved. Another grant from the foundational arm of Perdue Farms in the amount of \$10,000 has been applied for. A storage and curing location has been established at a location central to targetted restaruants in Fresh Pond State Park as the result of a partnership with Delaware State Parks. A part time employee has been secured to conduct the pickup and drop offs and equipment has been priced out. Initial outreach and program promotional literature meetings have occurred. A number of restaruants have been contacted and demonstrated interest in participation. A press release on the DNREC grant and formation of the program was published in multiple newspapers and was covered as an independent story.

Poplar Thicket Coastal Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

Rob Gano, Regional Manager, DNREC -- Division of Fish and Wildlife, Land Owner and Planning Partner

David Baird, Sussex Conservation District, Contractor

Paul Zarebicki, Environmental Scientist, DNREC -- Division of Fish and Wildlife, Contractor

Erich Berkintine, Southern Regional Forester, Delaware Forest Service, Technical Assistance

Sam Topper, Senior Forester, Delaware Forest Service, Technical Assistance

Supporting Project Partner Contacts:

Jake McPherson, Regional Biologist, Ducks Unlimited - Annapolis Office, Partner

Brian Boutin, Director of Conservation Programs, The Nature Conservancy -- Delaware Chapter, Partner

Robert Palmer, Program Manager II, DNREC -- Division of Watershed Stewardship, Funding

G. Williams, Andrews, Miller, and Associates, Contractor

Melanie Tymes, Environmental Scientist, DNREC Wetland and Subaqueous Lands, Planning Partner

Wes Hegwood, Manager, Community of White House Beach, Partner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Conduct living shoreline demonstration projects to train installation and maintenance contractors.

Project Overview:

As part of a larger DNREC and CIB partnership to restore the Poplar Thicket Preserve to a bird sanctuary, a comprehensive project is proposed to restore and protect tidal wetland and sandy beach habitat along the preserve and to increase the resiliency of the area to coastal flooding and wave erosion. The Poplar Thicket is a 270 acre preserve, which contains a 72 acre upland portion that was taken out of agricultural production in late 2012, and is now the center of a cooperative upland re-vegetation project to provide upland food and forage habitat for migratory birds.

Project Overview:

Storm-based wave action has severely eroded the coastal wetlands and sandy beach habitat along the northern shore of Indian River Bay, including this Poplar Thicket Preserve. The tidal wetlands that buffer the open bay have experienced a loss of wetland area at the marsh edge and interior. The marsh edge has become undercut and large sections of the marsh continually cleave off into the open bay. Reducing the energy of storm based wave action is the only way to attempt to reduce this wetland loss. An immediate concern is a 3 acre spit of tidal marsh that aids in sheltering Boat House Cove, 93 acres of secluded backbarrier tidal wetlands and 32 acres of shallow water habitat, which provides critical roosting and foraging habitat for migratory shorebirds, wading birds, and waterfowl. The progression of shoreline recession for this spit has remained relatively constant over the past 60 years, with a rate of 0.33 m/year. A complete loss of this spit would increase the tidal prism and wave activity that this cove experiences, thereby threatening these vitally important natural resources. A loss of the spit would also increase the exposure of the only access road (State Road 23, Long Neck Road) to 718 homes to increased storm based inundation and erosion. This could result in a complicated emergency management response scenario during storm events with a potentially need to rescue 100's to 1,000's of residents, if this roads egress is compromised. The long-term inundation of the road would also lead to access issues to the State of Delaware's most used public boat ramp at Massey's Landing. The increased road maintenance would become a new cost for maintaining infrastructure, with increase storm and sea-level rise inundation.

This project would integrate the implementation of a hybrid shoreline restoration with the beneficial reuse of dredge material. A low profile sill, in four to five segments for a total of 450 feet, would be installed on the western extent of the preserve in front of the tidal wetland spit. The low profile sill would also include the installation of oyster breakwaters to aid in reducing wave energy along the flushing gaps between the sills. To the east of the sills, 500 feet of the eroding headland would be stabilized by laying 14 inch to 16 inch diameter sweet gum logs parallel to the beach face, along the base of the eroding headlands. The 30 foot long logs would be kept in place by partially excavating a trench for them to lie in and utilizing stainless steel anchors. These trees would serve as a natural wave break, in addition to becoming an accretionary sill. In partnership with the Delaware Forest Service, these trees would be beneficially reused from forestry thinning efforts in neighboring forest tracts. The community of White House Beach, 500 feet to the west of Poplar Thicket, is planning to hydraulically dredge ~24,600 cubic yards of sediment from their lagoons and waterways. The community and dredging operator are amenable to utilizing the material for beneficial reuse on the adjacent preserve.

The sand portion of the dredge material (~3,000 cubic yards) would be placed behind the low profile sills (~ 1 acre), with the upper portion to be replanted with *Spartina alterniflora*. All eroded peat blocks and hummocks that would be covered by the sills and sandy fill would be moved and replanted along the degrading back fringe, adjacent to the abandoned marina. At least ~5,000 cubic yards of fine grained dredge material would be used to fill the deep portions of the abandoned marina, to transform the limited circulation deep water hypoxic environment into ~0.94 acres of shallow water habitat. Turbidity curtains would be used to keep the material in the abandoned marina basin, with the overflow diverted through the degraded marsh spit. The overflow would have higher than normal suspended sediment concentrations and would passively deposit material throughout that 2.5 acre marsh. After the abandoned marina material settles (~ 12 to 18 months after placement), 0.5 acres of the basin would be planted with widgeon grass and would provide valuable feeding habitat for dabbling waterfowl.

The proposed comprehensive restoration of the Poplar Thicket Preserve would restore: vitally important sandy horseshoe crab spawning habitat, tidal wetlands (which will aid in improving water quality, buffer storm inundation, and provide intertidal habitat), and also increase the Preserve and adjacent roadways resiliency through flooding abatement, and decreasing wave based coastal erosion.

This project will serve as a demonstration area for the expanded use of hybrid shoreline restoration techniques, in conjunction with

Project Overview:

beneficially reusing dredge sediments and logs. This project was presented to several State of Delaware Wetlands and Subaqueous Lands regulators, and was received with overwhelming support.

A series of three minute videos, with keyword optimization, will be produced that will document the progression of the project. On-site educational signage will be used to educate the public on the importance of these types of restoration projects.

Outputs/Deliverables:

1. Installation of a low profile sill, in four to five segments for a total of 450 feet, would be installed on the western extent of the preserve in front of the tidal wetland spit.
2. Installation of 500 feet of logs will be installed to stabilize the eroding headland.
3. The sand portion of the dredge material (~3,000 cubic yards) would be placed behind the low profile sills (~ 1 acre), with the upper portion to be replanted with *Spartina alterniflora*.
4. At least ~5,000 cubic yards of fine grained dredge material would be used to fill the deep portions of the abandoned marina.
5. 2.5 acre tidal wetland would be restored through passively deposit of suspended material from the abandoned marina restoration.
6. 0.5 acres of the restored basin would be planted with widgeon grass and would provide valuable feeding habitat for dabbling waterfowl.
7. Monitoring report on the performance of the restoration project, that would outline the improvements that were completed to increase horseshoe crab spawning habitat, reduce coastal erosion, increase shoreline protection, reduce coastal flooding, increase dabbling duck feeding habitat, and increase fish habitat.

Intermediate Outcomes:

1. State, community, county officials and landowners will have increased knowledge of the issues that coastal erosion can have upon habitat loss and coastal flooding.
2. The installation of the low-toe sill and oyster castles, along with the shallow water habitat restoration, duck feeding habitat creation, and restoration of the wetlands through beneficial reuse of dredge material will be used as a training/ demonstration area for the local marine contractors.
3. Outreach videos will document the installation and beneficial reuse process, to enable training videos to be created.

Long-Term Outcomes:

1. Demonstration area will be created, with educational signage, to show alternate means of coastal restoration and shoreline protect, which increase fish and horseshoe crab habitat while reducing the use of stone, and how beneficial reuse of dredge material can restore tidal wetlands and beach habitat.
2. Reduced coastal erosion rates for Poplar Thicket.
3. Increased horseshoe crab spawning habitat in the region.
4. Increased dabbling duck feeding habitat.
5. Increases hard-bottom habitat creation, which increases the population of native oysters in the region.
6. Successful partnership with a private community on a beneficial reuse of dredge material project will be demonstrated to be achievable, and successful.

Clean Water Act Programs:
 Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:
 Alteration of natural flow regimes
 Fish & Wildlife loss
 Habitat loss & degradation

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Estuarine Shoreline	Protection	Feet	950.00
Submerged Aquatic	Establishment	Acres	0.50
Soft Bottom/Mud	Enhancement	Acres	0.45
Tidal Wetland	Rehabilitation	Acres	2.50

PROJECT PROGRESS

Beginning Date: 01/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Project Conceptual design will finalized and reviewed	Not Initiated		03/01/2015			
Engineering Plan Completed and Reviewed	Not Initiated		04/01/2015			
State and Federal Agency coordination, permit submittals, and approvals	Not Initiated		05/31/2015			
Construction Completed	Not Initiated		09/28/2015			
Wetland Restoration Completed	Not Initiated		05/15/2016			
Post Construction Monitoring	Not Initiated		11/28/2016			
Final Report Completed	Not Initiated		12/15/2016			

Sunset Park Coastal Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bart Wilson

Primary Project Partner Contacts:

David Baird, Sussex Conservation District, Contractor

Supporting Project Partner Contacts:

Jake McPherson, Regional Biologist, Ducks Unlimited - Annapolis Office, Partner

Brian Boutin, Director of Conservation Programs, The Nature Conservancy -- Delaware Chapter, Partner

Doug Janiec, Senior Project Scientist, Cardno Entrix, Contractor

Robert Palmer, Program Manager II, DNREC -- Division of Watershed Stewardship, Funding

Melanie Tymes, Environmental Scientist, DNREC Wetland and Subaqueous Lands, Planning Partner

Marc Appelbaum, Town Manager, Town of Dewey Beach, Partner

Blake Carey, President, Dewey Beach Lions Club, Partner

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Managing Living Resources and Their Habitat

CCMP Objective: Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands.

CCMP Action: Develop a living shoreline initiative to maximize the amount of natural Bay shorelines.

CCMP SubAction: Conduct living shoreline demonstration projects to train installation and maintenance contractors.

Project Overview:

Sunset Park, located on Rehoboth Bay in the Town of Dewey Beach, Delaware has experienced extensive erosion due to winds and wave activity that has resulted in a loss of beach and wetland, and simultaneously increased flooding in the community surrounding the park. This 0.5 acre park is surrounded to the north and south by over 3,200 feet of extensive bulkheaded and degraded shorelines, which have left little intertidal habitat within the Town limits for Horseshoe Crab spawning and recreationally important juvenile finfish. The Town of Dewey Beach contains a year round population of 341 residents (according to the 2010 census), with the summer time population swelling to over 30,000 on weekends. The Sunset Cove and Park was long-used by the residents of the Town as a place to explore and reconnect with the natural resources of Rehoboth Bay, and also served as an outdoor classroom for education programs provided by the Town of Dewey Beach, Dewey Beach Lions Club, and Envirotech LLC.

The loss of fringing tidal marsh and sandy beaches, in the Sunset Cove Area, from rising sea levels and storm erosion have resulted in

Project Overview:

a rapid deterioration of the natural and esthetic resources which the park formally provided to the residents of this community. The loss of the natural buffers in the cove have also exposed 4 businesses (2 restaurants, 1 hotel, and a store), 40 to 50 homes and condos, and the local Lions Club to increased erosion due to wave action and the ever-increasing threat of flooding.

The reduction of the cove's wave energy is paramount in any attempt to restore the coastal habitat and increase the coastal resiliency. The proposed project would install ~270 feet of wave attenuating devices (WAD's), and install ~ 500 to 600 square feet of oyster castles to reduce the wave energy before it can interact with the nearshore environment. Wave attenuation has been utilized as means to building a sustainable reduction in wave energy without the need to build rock breakwaters. WAD's allows for the energy to be defused through and around the structures, while not negatively affecting the egress of the biota. The wave attenuation structures would have an immediate effect on the wave energy within the cove. The site would then have ~0.50 acres of tidal wetland and ~0.40 acres of sandy beach restored, behind the WAD's and oyster habitat. The wetland creation areas would be buttressed with 550 feet of coir fiber logs, to stabilize the sediments until the tidal wetlands attain the desired levels of above-ground and below-ground biomass production, which will require two to three growing seasons. The performance of the WAD's, oyster castles, beach restoration, and wetland restoration would be monitored through quarterly (during the first year of the project) and annual elevation surveys, annual horseshoe crab spawning counts, and shellfish monitoring assessments.

A stormwater outfall of concern (in Sunset Beach Cove) would be incorporated into the restoration design, through a redesign to potentially extend the outfall and install a one-way tide gate. The stormwater along Dagsworthy Street currently does not adequately drain, due to rising water levels exceeding the pipe opening elevation, and would experience increased effectiveness in removing flood waters along Dagsworthy Street through these retrofits.

The wetland restoration area would be planted with a coverage of low marsh, high marsh, and supratidal vegetation. Sunset Park itself would have all invasive species eradicated, and then the park would be replanted with native upland coastal vegetation. The cove's osprey platform that was destroyed by Superstorm Sandy, would be replaced with two new platforms. The primary beach restoration goal would be to increase horseshoe crab spawning habitat while providing a restoration of recreation opportunities to the Town's residents. The beach fill would consist of a medium to coarse sand, with minor amounts of gravel, which is the optimal material for horseshoe crab spawning, and will create a more resilient shoreface to wave action.

The proposed comprehensive restoration of the Sunset Park Cove would restore: vitally important sandy horseshoe crab spawning habitat, tidal wetlands (which will aid in improving water quality, buffer storm inundation, and provide intertidal habitat), and also increase the town's resiliency through flooding abatement and increased drainage, decreasing wave-based coastal erosion, and increase accessibility and recreation for the residents of the area.

WAD's and oyster castles have yet to be utilized as a means of shoreline protection within the State of Delaware or the Delaware Estuary. This project will serve as a demonstration area for the expanded use of passive shoreline restoration techniques. There is a low risk for project failure, as wave diffusion has been document to be successful throughout the world, and as these structures are not permanent and therefore can be moved or adjusted, as needed, to respond to changing conditions. This project was presented to the Joint Permitting Program for the State of Delaware, and received overwhelming support from the State and Federal regulators in attendance.

Project Overview:

A series of three minute videos, with keyword optimization, will be produced that will document the progression of the project. On-site educational signage will be used to educate the public on the importance of these types of restoration projects.

Outputs/Deliverables:

1. Installation of ~270 feet of wave attenuating devices (WAD's).
2. Installation of ~ 500 to 600 square feet of oyster castles to reduce the wave energy.
3. The site would then have ~0.50 acres of tidal wetlands restored.
4. The site would then have ~0.40 acres of sandy beach restored.
5. The wetland creation areas would be buttressed with 550 feet of coir fiber logs.
6. Monitoring report on the performance of the restoration project, that would outline the improvements that were completed to increase horseshoe crab spawning habitat, increase shoreline protection, reduce coastal flooding, and increase fish habitat.

Intermediate Outcomes:

1. Town and municipal officials and landowners will have increased knowledge of the issues that coastal erosion can have upon habitat loss and coastal flooding.
2. The installation of the WAD's, oyster castles, and creation of the wetlands will be used as a training/ demonstration area for the local marine contractors.
3. Outreach videos will document the installation process, to enable training videos to be created.

Long-Term Outcomes:

1. Demonstration area will be created, with educational signage, to show alternate means of coastal restoration and shoreline protect, which increase fish and horseshoe crab habitat while reducing the use of stone.
2. Reduced coastal erosion rates for Sunset Park
3. Increased horseshoe crab spawning habitat in the region.
4. Increases hard-bottom habitat creation, which increases the population of native oysters in the region.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Pressure Targets:

Fish & Wildlife loss

Habitat loss & degradation

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Beach	Enhancement	Acres	0.50
Estuarine Shoreline	Protection	Feet	820.00
Hard Bottom	Establishment	Acres	0.10

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Tidal Wetland	Establishment	Acres	0.50

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	\$ 10,000.00	\$ 0.00	\$ 10,000.00
Totals:			\$ 10,000.00	\$ 0.00	\$ 10,000.00

PROJECT PROGRESS

Beginning Date: 10/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Project Conceptual design will finalized and reviewed	Not Initiated		03/01/2015			
Engineering Plan Completed and Reviewed	Not Initiated		04/01/2015			
State and Federal Agency coordination, permit submittals, and approvals	Not Initiated		05/01/2015			
WAD Deployment	Not Initiated		06/01/2015			
Wetland Project Construction	Not Initiated		07/01/2015			
Post- Construction Monitoring	Not Initiated		11/01/2016			
Final Report Completed	Not Initiated		12/28/2016			

CENTER FOR THE INLAND BAYS, INC.
Travel Budget
Estimated Travel Expenses for Fiscal Year 2015

Position	Event/Reason	Date(s)	Location	Mode	Cost
Executive Director	Fall National Estuary Program Meeting	NOV 02-05 2014	Washington D.C.	Automobile (\$140)/ Hotel(\$852)/Meals(\$284)/ Registration(\$300)	\$1,576
Executive Director	Spring National Estuary Program Meeting	February?/March? 2015	Washington, D.C.	Automobile/Hotel/Food	\$900
Executive Director & Administrative Assistant	CCMP Project Implementation	FY2015	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile (\$0.56 per mile federal rate. 19 trips at an avg. of 50 mi./trip)	\$524
Land Protection & Restoration Coordinator	CCMP Project Implementation	FY2015	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile (\$0.56 per mile federal rate. 42 trips at an avg. of 50 mi./trip)	\$1,200
Aquatic Restoration Coordinator	CCMP Project Implementation	FY2015	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile (\$0.56 per mile federal rate. 42 trips at an avg. of 50 mi./trip)	\$1,200
Science Coordinator	CCMP Project Implementation	FY2015	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile Automobile (\$0.56 per mile federal rate. 68 trips at an avg. of 50 mi./trip)	\$1,900
Education & Outreach Coordinator	CCMP Project Implementation	FY2015	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile (\$0.56 per mile federal rate. 68 trips at an avg. of 50 mi./trip)	\$1,900

TOTAL \$9,200

Costs Expressed

Only the estimated travel expenses expected to be applied to the FY2015 federal grant are shown.

Allowance for Meals

Meals at authorized functions will be reimbursed at the federal per diem rate for the destination city.

Automobile Travel

Mileage is calculated to exclude daily commute and is reimbursed at the established federal rate of \$0.56/mile. Carpooling will be employed when possible.

STAFF DESCRIPTIONS

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 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 Science & Technical Coordinator serves the Executive Director and is responsible for formulating, coordinating and implementing the research and demonstration project agenda of the Center for the Inland Bays, which includes building and maintaining relationships with scientists, resource professionals, and other associates responsible for analyzing and reporting on the condition of Delaware's Inland Bays. This individual will also assist in the planning and coordination of the activities of the Inland Bays Scientific & Technical Advisory Committee. The Science & Technical Coordinator provides vision, leadership, and experience to plan and execute those activities and tactics that satisfy implementation of the Inland Bays Comprehensive Conservation and Management Plan (CCMP) that pertain to the following: 1) Monitor existing research projects and provide guidance on future and potential research projects, 2) Analyze existing data and provide guidance and consultation on Inland Bays issues related to science and management, 3) Responsible for the CIB Quality Management Plan and creation, review, and approval Quality Assurance Project Plans for research

projects, 4) Prepare regular State of the Inland Bays Reports and other ecosystem condition assessments, 5) Prepare other scientific reports and documents as needed, 6) Effectively communicate complex scientific data and understanding to multiple audiences including: the general public, decision makers, and special interest groups, 7) Implement demonstration projects that meet CCMP objectives, 8) Serve as the staff liaison to the CIB STAC by providing committee support and assisting in the planning and implementation of STAC activities, 9) Assist staff and other CIB committees with science guidance, 10) Lead and serve on local, statewide, regional, and national committees and workgroups related to estuarine science and restoration, 11) Produce and maintain CIB's GIS including a standardized map catalog, 12) Procure grants relative to science and demonstration project priorities, 13) Perform other duties as assigned by Executive Director.

The Education and Outreach Coordinator serves the Executive Director and is responsible for developing and coordinating the implementation of the public participation and education action plan of the Center's Comprehensive Conservation and Management Plan (CCMP) for the Inland Bays, as well as the development of programmatic infrastructure to secure funding and oversee project implementation to meet the goals stated in the plan. This individual is responsible for developing and distributing educational information across all media types in regards to the Inland Bays and their restoration and tracking the effectiveness of targeted education campaigns. The Education & Outreach Coordinator will enable the general public to make sound decisions that contribute to the restoration of the Inland Bays and their watershed; to instill in stake holders, teachers, students, and municipal officials an environmental awareness with regard to the Inland Bays and their watershed; to promote watershed education in the school system and to stake holders through in-service programs, school visitations, all forms of educational media and publications, coordinated programs, and various educational seminars in cooperation with, among others, state agencies and local colleges/universities and others. The Education & Outreach Coordinator will 1) Work with CIB staff and partners to develop and conduct targeted education and outreach campaigns to achieve and document increased understanding of the Inland Bays and their resources and the behavior changes necessary to support their restoration, 2) Partner with governmental agencies and other groups on projects that promote citizen education and involvement in CCMP focus areas, 3) Represents the CIB at meetings convened by federal, state, county, and local governmental agencies and other non-governmental agencies and groups for the purposes of identifying opportunities for public participation and involvement in addressing CCMP focus areas, 4) Solicits, identifies, and develops grant proposals to pursue financial assistance to fund education and outreach projects sponsored by the CIB; manages grant funded projects as awarded, 5) Develop detailed annual plans of action for education and outreach activities, 6) Direct and supervise the James Farm Education Program, 7) Provide education activities/programs to schools and other organizations as requested, 8) Direct and supervise our education/outreach partnership with the Bethany Beach Nature Center, 9) Responsible for the coordination, writing, editing, design, production and distribution of the bi-annual Inland Bays Journal and Annual Report as well as other publications, reports, exhibits and interpretative signage as needed, 10) Develop content for the CIB website, 11) Supervise the part-time Volunteer Coordinator to provide direction and continuity to the CIB volunteer program, 12) Serve as primary press liaison, 13) Develop and Coordinate community educational events and exhibits throughout the watershed, 14) Develop and implement targeted education/outreach campaigns for priority projects, 15) Serve as the coordinator for the CIB speakers bureau; develop presentations and train speakers, 16) Serve as the liaison to the Citizens Advisory Committee, 17) Responsible for tracking and reporting on education and outreach actions and program success, 18) Perform other duties as assigned by Executive Director.

The Land Protection and Restoration Coordinator serves the Executive Director and is responsible for formulating, coordinating and implementing the land protection and restoration project agenda of the Center for the Inland Bays, which includes building and maintaining relationships with scientists, landowners, elected officials, resource professionals, and other associates responsible for protecting and restoring natural habitats per the goals of the Center's Habitat Plan, Comprehensive Conservation and Management Plan, Pollution Control Strategy and other relevant conservation initiatives. This individual will also assist with various in monitoring and educational activities related to the natural environments and resources of the Inland Bays watershed. The Land Protection and Restoration Coordinator will provide vision, leadership, and experience to plan and execute those actions that satisfy implementation of the Inland Bays Habitat Plan, CCMP, and other conservation initiatives that pertain to the following: 1) Primary responsibility is the development and implementation of a watershed-wide habitat protection and restoration plan. This includes continual refinement and prioritization of plans 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, 2) Coordinate program and planning efforts of federal, state, county, and local governmental agencies and other non-governmental agencies and groups related to natural lands protection and restoration within the watershed. Emphasis is on keeping Inland Bays' habitat and environmental issues at the forefront of other agency/group planning and consideration, 3) Implement natural lands protection and restoration projects that balance multiple objectives including achievement of priority conservation objectives, reduction of pollution loads to waterways, and provision of recreational and educational value, 4) Solicits, identifies, and develops grant proposals to pursue financial assistance to fund natural lands protection and restoration projects sponsored by the CIB; manages grant funded projects as awarded, 5) Works directly with landowners to advise on restoration and conservation options for private lands and carries out land conservation, acquisition, and restoration activities, 6) Lead and serve on local, statewide, regional, and national committees and workgroups related to natural lands protection and restoration, 7) Effectively communicate complex land restoration and protection data and concepts to multiple audiences including: the general public, decision makers, and special interest groups, 8) Serves as a reference for habitat related information and inquiries to staff and general public, 9) Produces and assists in the production of reports, educational, and outreach materials on habitat and its restoration to multiple audiences, 10) Responsible for tracking and reporting on program success, 11) Perform other duties as assigned by Executive Director.

The Aquatic Restoration Coordinator serves the Executive Director and is responsible for formulating, coordinating, implementing and reporting on the aquatic resources restoration and management agenda of the Center for the Inland Bays, which includes building and maintaining relationships with scientists, resource professionals, and other associates responsible for implementing aquatic restoration actions of the Inland Bays Comprehensive Conservation and Management Plan. This individual will also assist in the planning, coordination, and implementation of the activities of the Inland Bays Water Use Plan Implementation Committee. The Aquatic Restoration Coordinator will provide vision, leadership, and experience to plan and execute those activities and tactics that satisfy implementation of the Inland Bays Comprehensive Conservation and Management Plan (CCMP) that pertain to the following: 1) Develop, fund, and implement long-term, stakeholder-based plans for estuarine living resource restoration and enhancement including but not limited to finfish, shellfish, and baygrasses, 2) Develop demonstration projects for cost effective and efficient estuary restoration techniques and systems, 3) Monitor and report on the success of estuarine living resource restoration and enhancement projects, 4) Assist in the analysis and interpretation of restoration project monitoring data, 5) Serve as the manager of the CIB Oyster Gardening Program, 6) Solicit and manage volunteers and seasonal employees to assist in responsibilities, 7) Serve as the staff liaison to the CIB Water Use Plan Implementation Committee by providing committee support and assisting in the planning and implementation of WUPIC activities, 8) Build the capacity and will among partner organizations to participate in and fund restoration and water use plan implementation projects, 9) Procure grants relative to restoration and water use plan implementation project priorities and assist with private donor cultivation to fund restoration, 10) Build the physical/facilities capacity for large scale restoration and enhancement activities, 11) Conduct education and outreach activities on aquatic living resources and assist the Education & Coordinator with related materials preparation, 12) Effectively communicate complex estuary restoration concepts to multiple audiences including: the general public, decision makers, and special interest groups, 13) Lead and serve on local, statewide, regional, and national committees and workgroups related to estuarine restoration, 14) Perform other duties as assigned by Executive Director.

The Development Coordinator serves the Executive Director and The development coordinator works under the supervision of the Executive Director and is responsible for planning, coordinating and implementing the fundraising efforts of 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. The Development Coordinator will provide vision, leadership, and experience to plan and execute fundraising, marketing, and public relations efforts, including: 1) Increase mailing lists and donor base, 2) Develop prospect research tools and donor profiles, 3) Cultivate individual and corporate donors, 4) Annual fundraising events, 5) Major gifts campaigns, 6) Direct mail, CIB Endowment and Annual Fund campaigns, 7) Web site—Online giving, 8) Marketing programs and annual events to the community and target audiences, 9) The Development Coordinator will create a comprehensive strategic development/finance plan, and will take the lead in implementing all aspects of this plan.

The Environmental Policy Coordinator reports to the Executive Director and is responsible for working collaboratively with the Board of Directors, staff and committees to develop, disseminate and promote public policies dealing with issues of concern to Delaware's Inland Bays and the implementation of the Inland Bays Comprehensive Conservation & Management Plan (CCMP). The individual serves as a liaison between the CIB and decision-making groups, including legislators as well as county, municipal and other local elected officials, state agencies and other non-profit groups. Responsibilities include establishing and maintaining contact with decision-makers (Congressional Members, legislators, local elected and appointed officials, agency leaders, resource managers, etc.) to increase awareness of issues and initiatives identified for Delaware's Inland Bays; working with various Inland Bays stakeholder groups to assess current policy issues and needs and assists in designing public policy that leads to successful implementation of the Inland Bays CCMP; performing policy analyses and report preparation; providing policy guidance and technical support for Board and staff; assisting in developing and allocating financial resources in the form of grants and programmatic funding to ensure that Inland Bays policy implementation is effective and efficient.

The Property Manager serves the Executive Director and the Restoration Coordinator and is responsible for the management, care, and maintenance of CIB properties. The Property Manager is also responsible for assisting in the development of management plans and projects for CIB properties. The Property Manager works independently and as part of a team of paid CIB employees and unpaid CIB volunteers to manage, care for, and maintain existing and newly acquired properties owned and/or managed by the CIB. The Property Manager will manage CIB properties for the purposes of natural resource conservation, water quality improvement, and outstanding recreational and educational visitor experiences by: 1) Serving as a positive and enthusiastic representative of the CIB and its mission to property visitors, 2) Encouraging the safe and respectful use of CIB properties by residents, visitors, and special interest groups, 3) Utilizing volunteer labor to maximize the successful management of properties, 4) Improving and maintaining the cleanliness of CIB properties, equipment, and facilities, 5) Maintaining and improving relationships between the CIB and property visitors, concessionaires, neighbors, and local communities, 5) Managing the natural resources of CIB properties to maximize conservation and the recreational and education experiences of visitors, 6) Assisting with special events, education programs, research, and conservation projects on the properties, 7) Assisting with the development of property management plans.

The Schoolyard Habitat Coordinator works with the Education and Outreach Coordinator to manage the Schoolyard Habitat Program; activities including planning and constructing new schoolyard habitats at schools in the watershed and working with the schools where schoolyard habitats have already been established; responsibilities also include identifying and cultivating community volunteer Leaders, garden club partners, and coordinating school administration, staff and students.

