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

Center for the Inland Bays

FY2015 Annual Progress Report and FY2016 Annual Work Plan

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- Beneficial Reuse of Dredge Material for Wetland Restoration (Demonstration Project)
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Implementation of the Delaware Inland Bays CCMP

The Center presents the following completed projects from the FY2015 workplan and presents the following on-going and new projects for its FY2016 workplan. These projects implement various CCMP actions and may include but are not limited to the following:

Ongoing

- Bio-enhancement to Improve Estuarine Habitat and Water Quality of Poorly-Flushed Residential Canals
- Inland Bays Monitoring Plan
- Inland Bays CCMP Project Management and Oversight
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- Your Creek

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- Anchorage Canal Drainage Area Stormwater Retrofit Demonstration -- Sandpiper Pines Bioretention Areas and Infiltration Trenches
- Financing for Clean Water Outreach Campaign
- Management of the James Farm Ecological Preserve
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- 2016 'State of the Inland Bays' report
- Ambient Water Quality Monitoring
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- Living Shorelines Project Siting and Concept Design Study
- Living Shoreline Demonstration Project #2
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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 2016 (October 1, 2015 through September 30, 2016). 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

Delawareôs 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 mission of the Center is:

> To preserve, protect and restore Delawareôs Inland Bays, the water that flows into them, and the watershed around them.

The goals of the Center are:

1. To facilitate the wise use and enhancement of the Inland BaysôWatershed through the coordinated implementation of the Inland Bays Comprehensive Conservation and Management Plan.
2. To provide a forum where science supports public education and decision making regarding the Inland Bays Watershed.
3. To foster a collaborative, consensus-building culture among watershed stakeholders crucial to support research, education, protection and restoration initiatives, and policy decisions.

Fiscal Year 2015 Accomplishments Summary

(OCT 01, 2015 to JUN 1, 2015)

INTRODUCTION

The Center concluded the Celebration of is 20th Anniversary Year in FY 2015. The 20th Anniversary Gala was the culmination of the celebration designed to raise awareness of the Centerôs accomplishments. Over 250 people attended the sold-out event that raised $30,244 (after expenses) to support Center operations. The Galaôs success is part of a growth trend in private unrestricted revenue for the Center, which averages 34% over the past three years. Project-specific CCMP implementation grants managed by the Center for this fiscal year to date have been numerous (6), but smaller in total ($61,386) than in previous years. A number of grant applications are intended for submission in the second half of 2015, which may improve this total source of revenue to fund CCMP implementation.

On October 1, 2015, the Center experienced the departure of three technical staff; the largest turnover in over ten years. The transition provided the opportunity to restructure to meet priorities that have changed over the course of a decade. The addition of two new staff, Robert Collins (full-time as the Program Manager as of OCT 01) and Dr. Marianne Walch (Science and Restoration Coordinator as of late FEB) has also brought fresh ideas and a renewed commitment and enthusiasm to the Center. As of FY16, the Center will have four full-time Coordinators reporting to the Executive Director which will allow an effective hierarchical structure for growth as plans for additional revenue are realized. This change in staffing was also preceded by a significant change in Board Members and Officers late in FY2014. As a result, in the late winter and early spring of 2015, the Centerôs Board of Directors approved its first Strategic Plan (attached as appendix) that details financial, CCMP implementation, and organizational operational goals to be achieved over the next three years.

Reorganization has resulted in slower than anticipated implementation progress over the first part of FY2015. Key projects have advanced. However, a group of projects associated with habitat restoration and restoration planning has had little to no progress and as such most are proposed for cancellation in alignment with the Strategic Plan. There have been a number of other projects added to the workplan since its approval. The following summary highlights accomplishments by area of operation.

RESEARCH & MONITORING HIGHLIGHTS

This fiscal year continued the Centerôs core added-value of providing monitoring and assessment to better understand and track changes in important components of the estuary. Citizen science programs the Shorezone Fish Community Volunteer Monitoring Program and the Annual Inland Bays Horseshoe Crab Survey and Tagging Project are in their 5th and 8th year, respectively. These programs not only generate data to inform environmental indicators of ecosystem health, they engage the citizenry in understanding and restoring the Bays. In the last full year of calculated participation (2014), volunteers gave 1,416 total hours of effort to these studies. Data from the Horseshoe Crab Survey is intended to be used as a new environmental indicator for the 2016 State of the Bays Report.

The Centerôs efforts to develop and test new technologies for water quality improvement are encapsulated in the project entitled, Bio-enhancement to Improve Estuarine Habitat and Water Quality of Poorly-Flushed Residential Canals, which had both considerable progress and delays this year. This project is testing the effect of 2,000 adult oysters in 100 floating oyster cages and 8 floating wetland

islands to improve water clarity and dissolved oxygen concentrations in poorly-flushed residential canals. The project was successful in designing and creating floating oyster cages and procuring floating wetland islands per the study design. Continuous, live data-streaming water quality monitors were also successfully installed. However, the oysters and wetlands were deployed a year later than anticipated due to overall delays and a late permit which caused a missed opportunity to procure live oysters. The project has been adaptively managed by simply extending the deployment and data collection by one year.

The Eelgrass Habitat Suitability Mapping Project identified six suitable areas around the Bays for eelgrass growth based on a coarse scale habitat suitability model and field scale light and temperature conditions. However, previous lack of restoration success in sites considered suitable combined with recent literature from the Chesapeake Bay demonstrating interactive effects between climate change and eutrophication on eelgrass establishment have informed the decision to put restoration efforts on hold until more data can be collected. The decision is consistent with the EPAôs requirement for climate-change vulnerability analysis of the CCMP and the need for climate resilient investments of federal dollars.

Finally, the environmental indicators report for the Love Creek portion of the Your Creek project has been taken to final draft form after STAC peer review. The indicators show significant landuse changes from forestland and agriculture to development along with alarming increases in bacteria concentrations within the creek. Potentially significant decreases in nitrogen concentrations were found. Love Creek also holds greater acreage of baygrass meadows than previously known. This finding is a result of the increased citizen engagement brought about by the Your Creek project. The draft final will be made final and designed for public distribution shortly.

EDUCATION AND OUTREACH

The project entitled, Demonstration and Training of Living Shoreline Techniques for Marine Contractors (now titled ñLiving Shoreline Trainingò), successfully trained 17 environmental consultants and marine contractors in the design and installation of living shorelines over two days. An important partnership with the Delaware Department of Natural Resources and Environmental Control, and the Partnership for the Delaware Estuary, this project was a component of the Centerôs initiative to maximize the amount of living shorelines in the Inland Bays, this was funded in part by a supplemental award from the EPA NEP. All participants that completed a post training survey requested opportunities for additional training which is proposed for FY2016.

The Center also continued its work to educate children about the Inland Bays through its James Farm Middle School Education Program that reached 475 eighth graders in the fall of FY2015 and 345 7th graders so far this spring; another 145 are scheduled for education for this semester. The Bethany Beach Nature Center Program reached more than 2,000 children and their families during the calendar year of 2014.

The Gardening for the Bays Native Plant Sale held its 11th annual event attracting 650 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 Bayôs major creeks and document the condition of the creeks in greater detail. A citizen stakeholder team for Dirickson Creek was developed in addition to Love Creek.

RESTORATION & ENHANCEMENT

The Hazardous Debris Removal from Indian River and Rehoboth Bay project resulted in the removal of 11 tons of partially submerged pilings and dilapidated bulkhead adjacent to a busy navigational area. This project was initiated by the Center's Water Use Plan Implementation Committee as an action of the CCMP's Water Use Plan. The removal of the highly hazardous debris will improve the safety of boating in the area per the Plan.

The James Farm Long Term Site Planning project was completed early this fiscal year resulting in a comprehensive Master Plan for the James Farm Ecological Preserve. The Master Plan will accommodate increased visitation to the Preserve over the next 20 years while protecting its significant diversity of natural resources. Major aspects of the Plan include 1) a separation of maintenance, restoration storage, and education functions and new facilities for each, 2) a redesign of the Preserve entry and parking area, 3) restructuring of the trail system for easier interpretation, adaptation to sea level rise, and better protection of interior forest habitat, and 4) an educational signage plan. Plan implementation was broken down into multiple phases and costs were refined to a reduced total of $811,630 including contingency. Currently, development for full construction design and permitting are being pursued through State and County grant opportunities. It is anticipated that these funds will be obtained by FY2016.

The Loop Canal Living Shoreline Demonstration Project was completed in May resulting in 350 feet of naturally-stabilized shoreline and the conditions necessary to establish 0.4 acres of saltmarsh on the Salt Pond near Bethany Beach. Utilization of logs to create an offshore breakwater combined with logs place perpendicularly to the marsh edge (which was itself stabilized with coir fiber logs) reduced wave energy and created conditions for sediment accretion to recreate wetlands. The first of five innovative demonstration projects to be created along the estuary in support of the Center's Living Shoreline Initiative, this site will be monitored for long term success.

The Anchorage Canal Drainage Area Stormwater Retrofit Project: East Side Storm Drains project was completed resulting in 17 bioretention facilities that will prevent 0.91 lbs./year of phosphorus and 6.70 lbs./year of nitrogen from entering Little Assawoman Bay.

ADMINISTRATIVE

Administrative improvements this past year include the development of a Strategic Plan and a staff restructuring to better accommodate organizational growth.

Major Project Changes from the FY2015 Workplan

The following is a summary of major project changes from the FY2015 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 canclled due to a number of unforeseen circumstances. Projects may also be added to meet special opportunities or to address contingencies.

CANCELLED PROJECTS

1. Upper Rehoboth Bay Land Conservation & Restoration Initiative. A parcel-level GIS analysis and ranking of potential habitat and nutrient best management practices (BMP) was completed. A letter soliciting involvement in BMP cost share programs to owners of the parcels was drafted. A project of the departed Land Conservation & Restoration Coordinator, it is cancelled due to low priority and lack of staff to support. Funds for staff time allotted under the original budget estimate of $10,416 was reallocated to personnel and projects.
2. Eelgrass planting in Delaware Inland Bays. The initiative to restore eelgrass that has been lessened in priority due to uncertainty about the restoration potential of eelgrass in the Inland Bays. New research in the Chesapeake Bay has demonstrated the interaction of increasing temperatures and eutrophication that may be preventing re-establishment. More research is needed to re-assess restoration potential of this and other bay grasses such as widgeon grass. This may be a higher priority in three years after the completion of a living shoreline initiative. Funds for staff time allotted under the original budget estimate of $10,173 was reallocated to personnel and projects.
3. Land Conservation PractitionersôWorkshop. Uninitiated project of departed Land Conservation and Restoration Coordinator.
4. Upper Indian River Watershed Study for Water Quality BMP Implementation. Targeted grant program did not fund the projectôs grant application. Funds for staff time allotted under the original budget estimate of $5,208 was reallocated to personnel and projects.
5. Inland Bays Habitat Plan & Restoration Strategy Synthesis. Uninitiated project of former Land Conservation and Restoration Coordinator. Funds for staff time allotted under the original budget estimate of $5,208 was reallocated to personnel and projects.
6. Poplar Thicket Restoration Plan. Initiated project of departed Land Conservation and Restoration Coordinator. Initial meetings held with landowner resulting in an unsuccessful reforestation project and a conceptual design for a submerged aquatic restoration bed creation relying on beneficial reuse of dredged material from a nearby private marina. Work will continue on reforesting the property although no overall restoration plan will be developed. Funds for staff time allotted under the original budget estimate of $5,208 was reallocated to personnel and projects.
7. Sunset Park Coastal Restoration Project. Concept design was developed and included in a $4.2 million grant request to the National Fish and Wildlife Foundation Hurricane Sandy Coastal Resiliency Grant Program but was not selected for funding. Project is cancelled because no other large scale funding sources are currently available to implement the design. Funds for staff time allotted under the original budget estimate of $10,000 was reallocated to personnel and projects.
8. Poplar Thicket Coastal Restoration Project. Concept design was developed and included in a $4.2 million grant request to the National Fish and Wildlife Foundation Hurricane Sandy Coastal Resiliency Grant Program but was not selected for funding. Project is cancelled because no other large scale funding sources are currently available to implement the design.

PROJECTS ADDED SINCE THE LAST WORKPLAN WAS ACCEPTED

1. Anchorage Canal Drainage Area Stormwater Retrofit Demonstration - Sandpiper Pines Bioretention Areas and Infiltration Trenches
2. Financing for Clean Water Outreach Campaign
3. Management of the James Farm Ecological Preserve

PROJECTS WITH SIGNIFICANT CHANGES IN SCOPE SINCE THE LAST WORKPLAN WAS ACCEPTED

1. The project entitled Migratory Fish Passage Project 1: Millsboro Pond Fish Ladder was changed to Migratory Fish Passage Designs for Dams on the Tributaries of the Inland Bays.
2. The project entitled Demonstration and Training of Living Shoreline Techniques for Marine Contractors was extended through additional funds for another year of training. The project was renamed Living Shoreline Training for clarity.

Fiscal Year 2016 Workplan Summary

CCMP GOALS

Focus will continue this year on Managing Living Resources and their Habitat with work towards Objective 2. Halt the continued loss of wetlands and reverse these loss trends by promoting projects to mitigate for previously lost wetlands, Objective 3. Provide access for native migratory fish to upstream areas for use as spawning and/or nursery sites, and Objective 5. Increase the economic and environmental benefits of shellfish.

Increased effort will be applied to all of the Objectives under the Outreach and Education Focus Area through the hire of an Outreach and Communication Assistant. This year will also produce a new State of the Bays report and an environmental indicator report for Dirickson Creek to specifically meet actions under Objective 5. Communicate environmental results to inform legislators and raise citizen awareness about the state of the Inland Bays and its watershed.

The hire of the Watershed Coordinator will increase work within the Water Quality Management Focus Area on Objective 1. Update the Inland Bays estuarine and watershed models with the latest scientific understanding and best available data, and make the updated models publicly available and Objective 2. Report on the implementation of the PCS, revise and prioritize remaining actions, and devise an implementation plan to meet the TMDLs within a given time period.

AREAS OF SPECIAL INTEREST

NUTRIENT MANAGEMENT AND CONTROL ACTIVITIES

Projects involving nutrient management and control activities in FY2016 will focus on planning. Ongoing development of the Shellfish Enhancement Plan will result in the outcomes of oyster reef creation and oyster-related shoreline enhancements that will increase nitrogen removal from the water column via denitrification and nitrogen and phosphorus assimilation into the biomass of oysters and associated fauna. The site selection and concept design of living shoreline project will result in preservation and expansion of marsh shorelines with maintenance and increase of both nutrient storage and denitrification services. This year, a newly hired Watershed Coordinator will begin work with partners to leverage resources for large-scale increases in implementing the Inland Bays Pollution Control Strategy to meet the Total Maximum Daily Loads for nitrogen and phosphorus. Direct results of this work are intended to result in subsequent years.

Two implementation projects will be initiated or continued this year that will result in direct nutrient reductions. A living shoreline demonstration project will have direct benefits for the maintenance and increase of nutrient storage and removal services of recreated marshes that will be quantified based on project design. Anticipated progress on the Poplar Thicket and Angola Neck reforestation projects will have direct nutrient reduction benefits through the replacement of cropland with forest. All reductions for nitrogen and phosphorus directly resulting from projects are reported in the individual project descriptions by year as estimates are generated.

CLIMATE RESILIENCE

Investments in climate resilience for this workplan focus on increasing sea level rise and storminess. Projects focused on promoting living shoreline management techniques will result in increased protection of saltmarsh resources that can reduce wave energy associated with

storms and increase the potential that the time during which managed shorelines will be allowed to migrate inland will be extended; thus extending their ecosystem functions. Living shoreline management techniques promote the concept of dynamic shorelines that do migrate inland, albeit more slowly than shorelines eroding under unmanaged conditions.

Long-term continuous monitoring of saltmarshes around the Bays will continue to develop information on the site-specific rates of marsh elevation change relative to sea-level that can inform planning for marsh restoration projects and overall estuary management under conditions of wide-spread marsh drowning due to sea level rise.

SUMMARY

This year's workplan continues a substantial planning and design component aimed at developing project concepts that can easily be submitted as grant proposals for supplemental funding. On-going project planning for shellfish enhancement projects and living shoreline demonstration sites are intended for completion in FY2016. The hire of a Watershed Coordinator will also result in enhanced partner coordination grant writing for CCMP implementation. These actions will prepare for an increased submission of project grant applications intended to meet the Center's strategic goal of an annual average of $500,000 in implementation project grant revenue. Design will occur for implementation of the James Farm Master Plan, 5 to 6 living shoreline demonstration sites, and migratory fish passage.

Work will continue on the Living Shorelines Initiative with five proposed and ongoing projects focused on science synthesis, contractor training, and demonstration site implementation.

Ongoing wetlands monitoring and citizen science programs will continue and a new State of the Bays report will be produced. Core childhood education programs at the Bethany Beach Nature Center and the James Farm will continue and focused community engagement and watershed education will occur through the Love Creek and Dirickson Creek Your Creek Teams.

COMPLETED PROJECTS

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.

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2014 DNREC Operating Grant	STATE-0000207936	$ 3,000.00	$ 0.00	$ 3,000.00
EPA	FY2015 EPA NEP Operating Grant	CE-993990-12-1	$ 584.56	$ 0.00	$ 584.56
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 5,538.00	$ 0.00	$ 5,538.00
Center for the Inland Bays	FY2014 Private Center Operating		$ 4,000.00	$ 0.00	$ 4,000.00
		Totals:	$ 13,122.56	$ 0.00	$ 13,122.56

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Completed

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	Completed	10/01/2013	07/01/2014			
Document Posted on Website	Completed	09/04/2014	12/01/2014			

Annual Report:

Bloom Metz Consulting was hired to produce the case statement. Multiple drafts were reviewed and revised. A final designed draft was completed in March of 2015 but was reject by Board Members as poorly written. The document was redesigned and rewritten. The final document is posted on the Center's website. The final case is a high quality and eloquent statement of the Center's mission, its accomplishments, and its general funding needs that is designed to also include project-specific cases.

Delays in production were due to priority being given to the 20th anniversary celebration during 2014. Problems arose in developmentwhen the consultant produced a lengthy written case with little operational knowledge of the Center and its mission. A long process by staff to distill the case into a shortened document ultimately failed and the case had to be rewritten and redesigned. In the future, CIB will be much more selective of its consultants and give higher consideration to completing projects associated with communicating the core message and accomplishments of the Center in house.

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 Represenative, Middlesex Beach Association, Community Representative

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

Supporting Project Partner Contacts:

Stephanie Briggs, 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 if 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, DelDOT, 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 in 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 DelDOT and the communities.

Outputs/Deliverables:

1. Design and construct two bio-retention areas within the DelDOT 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. Community 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

Clean Water Act Program Implementation Role: Significant

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2014	7
Phosphorus	2014	1
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 Improvment	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
DelDOT	DelDOT 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: Completed

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	Completed		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:

The project was successful with full design and construction of the seventeen bioretention areas in approximately twelve months ending in July of 2014. On average, each bioretention area treated about 0.7 acres of impervious. Delaware Urban Runoff Reduction Model V 2.0 computations of the site conducted by AMT estimated a total reduction of 0.51 and 3.72 lbs. /year of total phosphorus and total nitrogen loads attributable to the retrofits that drain to Anchorage Canal and total reduction of 0.40 and 2.98 lbs/year of total phosphorous and total nitrogen loads attributable to the remaining retrofits. The total reductions were 0.91 lbs./year for total phosphorus and 6.70 lbs./year for total nitrogen. The bioretention areas also remediate un-quantified amounts of greases, oils, and bacteria entering from the roads.

Shortly after their construction, several rain events occurred, testing the capacity of the areas to handle high levels of flow. The high flow pushed some floating mulch into the grates but the mulch was easily removed to allow flow through the inlets. It was also discovered that one of the bioretention areas on the east side in Middlesex Beach experienced erosion at the upstream inflow point. Riprap was added at the inflow point to stop the erosion. One of the bioretention facilities on the west side in Middlesex Beach developed a few sinkholes as soil was lost into pipe joint gaps in the stormdrain below. Geotextile was placed over the joints to prevent further loss of soil into the pipes. Overall, the areas performed very well allowing for detention and infiltration at design flows and for overflow into the stormdrain inlets at higher flows.

Maintenance agreements between DelDOT and the communities were signed with maintenance of facilities resting with the communities. Visiual inspection of the facilities will occur regularly. Monitoring of dissolved oxygen levels in the Anchorage Canal is on-going and conducted by the Town of South Bethany. The addition of these facilities supports the overall desmontration project for officials from other municipalities and the general public.

A total of 22 in-situ bioretention facilities were designed but once utility designation information was obtained from DelDOT, a total of only 17 in-situ bioretention facilities were constructed due to conflicts. Estimated nutrient reduction was less than anticipated due to site constraints and utility conflicts. This considerably reduced the cost per pound of nutrient reduced. As public funding for non-point source nutrient management projects and practices from federal (and in Delaware, state -) governments decreases, such projects become less and less feasible. Attention must be focused even more on the rural environment where restoration of green infrastructure is over an order of magnitude more cost effective at reducing nutrient loads.

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 -- Divison of Watershed Stewardship

Ariane Nichols, Environmental Scientist, DNREC -- Divison 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

Clean Water Act Program Implementation Role: Significant

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Tidal Wetland	Maintenance	Acres	47.00

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	$ 6,400.00	$ 0.00	$ 6,400.00
		Totals:	$ 6,400.00	$ 0.00	$ 6,400.00

PROJECT PROGRESS

Beginning Date: 02/01/2013 Project Status: Completed

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	Completed		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.	Completed		12/30/2014			

Annual Report:

The project was the first successful demonstration in Delaware of thin layer application of dredged spoil material to enhance saltmarshes at risk of drowning due to increased sea level rise and other factors. In 2013, roughly 6,000yd^3 of dredged benthic material from Pepper Creek was applied aerially to the surface of roughly 47 acres of tidal wetlands on the Piney Point Tract of the Assawoman Wildlife Area. The thin layer application of fine sediments were intended to replenish native sediments to emergent wetlands, boost the elevation platform and reduce interior marsh break-up, ultimately to prevent conversion to open water as water levels rise faster than natural accretion rates. Monitoring of biological and chemical conditions to determine if ecological lift was reached has been initiated. Monitoring was conducted before during and after the project (for two years) and focused on sediment accretion, elevation profile of the marsh, wetland condition assessments, and vegetation biomass.

The Center for the Inland Bays partnered with DNREC to develop the methodology to apply sediments to the marsh. Two years of monitoring on the site conducted by DNREC and CIB has been completed and one final year will be conducted by DNREC over 2015. Lessons learned from project included that the resolution of sediment depth applied and the range the sediment could be sprayed were less than anticipated. During application, small drainage features in the marsh were filled with sediment and did not scour out as anticipated. These lessons will affect what marshes can be targeted for thin layer application in the future and will inform future monitoring efforts.

As expected, elevation and accretion increased in areas of application and in areas distant to application due to the movement water carrying sediment across the marsh. Also as expected, marsh above and below ground biomass decreased after application and is expected to recover. Monitoring of sulfide concentrations found that these conditions were not inhibiting Spartina alterniflora from reestablishing after application. Monitoring results initially indicate the project was successful at enhancing the marsh platform in the face of increasing sea level rise.

The project received much attention from public and technical audiences, and field trips and a press event for State and EPA officials were completed. A description of the project and monitoring results was most recently reported in an edition of the Inland Bays Journal and at a CIB STAC meeting in 2015. The project was presented at the Delaware Esutary Summit, a technical conference. DNREC has

Annual Report:

completed a draft guidebook on beneficial reuse procedures and due the perception of the project as a success, intends to treat more marshes as it continues to dredge waterways in the Inland Bays. DNREC will complete at least one final year of monitoring on this site and may extend monitoring should vegetation biomass not recover as anticipated. DNREC intends to finalize the draft guidebook.

$2,440 in FY2015 funds estimated to be need to support NEP staff time on the project were not used due in part to the departure of the project manager from the CIB. These funds were reallocated to other personel and project costs.

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 anaylsis) for the Inland Bays using newly aquired (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 a 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

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
		Totals:	$ 4,390.00	$ 0.00	$ 4,390.00

PROJECT PROGRESS

Beginning Date: 01/01/2011 Project Status: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Begin aggregation and provision of existing data	Completed		09/01/2014			
Begin map construction	Completed		10/01/2014			
Complete final maps and reports	Completed		11/28/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete environmental indicator	Cancelled		03/28/2015			

Annual Report:

A GIS of suitable areas was developed utilizing sediment data, water depth, and the Center's water quality index. Continuous monitoring data for was collected from 8 general areas that were deemed suitable from the GIS supplemented by best professional judgement. Temperature and ambient light data were collected in Fall of 2013 and Spring of 2014 and related to threshold criteria for eelgrass survival. Potential restoration areas were mapped based on these results. Six of eight sites were found to have suitable conditions for restoration based on the data collected. These areas were included in the final report.

Since initiation of the project, new research from the Chesapeake Bay has demonstrated interacting effects on the survival of eelgrass between increasing water temperature due to climate change and reduced water clarity due to eutrophication. This, coupled with knowledge of continued die-offs of eelgrass in the Maryland Coastal Bays (presumably due to the same interation) and the low success rate of eelgrass restoration efforts in the Inland Bays has led to the decision to once again put on hold eelgrass restoration efforts. As such an environmental indicator was not produced as intended. Additional data collection on fine scale temperature and light levels in the selected locations is needed to confirm whether the interactions observed elsewhere would hamper and additional restoration efforts. It is proposed that the capacity to do so be re-evaluated after the completion of the Centers Living Shoreline Initiative as intended in three years.

This is an important example of adapting CCMP implementation to acheive climate resilient Federal investments.

$3,850 in FY2015 funds estimated to be need to support NEP staff time on the project were not used due in part to the findings above. These funds were reallocated to other personel and project costs.

Hazardous Debris Removal from Indian River and Rehoboth Bay

MANAGEMENT AND PARTNERS

CIB Project Manager: Roy Miller

Supporting Project Partner Contacts:

Ariane Nichols, Environmental Scientist, DNREC -- Divison 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 rasing funds to help improve navigable waterways. In 2014, a series of partially submerged pilings and an old wooden bulkhead, now detached from the shoreline, were identified for removal at Whitehouse Beach on Indian River Bay. This hazard will be removed by a contractor in the winter of 2014/2015.

Outputs/Deliverables:

1. Removal of 11 tons of hazardous debris posing a threat to navigational safety.
2. Public project report and outreach on the project.

Long-Term Outcomes:

1. Improved navigational saftey and reduction in risk of peronsal property loss and injury.
2. Potential increase in additional grant support for further navigational hazard removal.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

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	STATE-0000253060	$ 12,445.00	$ 0.00	$ 12,445.00
		Totals:	$ 17,531.40	$ 0.00	$ 17,531.40

PROJECT PROGRESS

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

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Onsite review of projects with contractor to determine scope and costs	Completed	05/29/2014	07/31/2014			
Apply to DNREC for funding	Completed	05/29/2014	08/29/2014			
Contractor to remove debris	Completed	05/29/2014	11/28/2014			
Media updates	Completed	05/29/2014	11/28/2014			

Annual Report:

Contractor, Droney Marine Construction, was selected to remove the debris. This debris ran north to south and was a former bulkhead that served as a wave break for a navigation channel that is shared by Pot Nets Bayside marina and White House Beach marina. It was made up of 180 linear feet of dilapidated bulkhead that and several deteriorated pilings that prove to be a navigational hazard for numerous boaters every year. The debris was estimated at 50 tons. A site inspection was conducted with DNREC Division of Watershed Stewardship personnel in the late fall of 2014. A grant from DNREC in the amount of $12,445 was recieved to complete the project. After several delays caused by mandated DNREC insurance requirements and some weather delays that affected the contractor, the actual removal was completed by May 27, 2015. A total of 11 tons was removed. A press release has been issued. A public project report will be completed by the end of June.

The project experienced significant delays due to unanticipated approval requirements from DRNEC and requirements for increased levels of insurance to receive the DNREC grant. Delays associated with contractor start and completion time have also been substantial. Future solicitations for such contractors will include timeliness and an associated track record in the contractor selection process.

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 restroation 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 feasibile. 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 accessbile 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

Clean Water Act Program Implementation Role: Primary

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: Completed

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 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 passag for eels and other fish separately. The Millsboro Pond dam was ranked highest and was selected 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 Resources and Environmental Control's Fish and Wildlife Service. After continued resistance by DNREC to a fish ladder to Millsboro Pond, the Burton Pond dam on Herring Creek was selected for conceptual design. Initial contact with the private owner of the Burton Pond dam confirmed willingness to allow the installation of a ladder.

Annual Report:

A power point project to communicate the effort was also produced and presented to the CIB STAC, CAC, and Board. The project was featured through multiple media channels. The report was finalized in June of 2014 and placed online, however the consultant was not able to produce a concept design due to lack of interest and turnover. After months of not acheiving progress with the consultant, it was decided to contract with another firm for the conceptual design. This project is completed and the conceptual design is now included in the project entitled Migratory Fish Passage Designs for Dams on the Tributaries of the Inland Bays proposed in the FY2016 workplan to EPA.

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 accomodate increased visitation while protecting natural resources and enhancing education opportunities at the Farm with costs for implemenation 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 recieve 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:

Protecting wetlands

Protecting coastal waters through the National Estuary Program

Protecting Large Aquatic Ecosystems

Clean Water Act Program Implementation Role: Primary

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: Completed

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	Completed	02/14/2014	07/18/2014			
Final Plan Delivery	Completed	02/14/2014	08/15/2014	09/26/2014		
Security Meeting Held	Completed	08/19/2014	08/19/2014			

Annual Report:

An RFP for proffessional 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 analsysis 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 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. On July 18, preliminary schematics concepts prepared by the consultant were reviewed and revised by staff incorporating input from the public. Interpretive concepts and locations were finalized. Organization for a meeting on security concerns was initiated. The delivery of the final plan was extended to SEP 26 to allow presentation at a Board Meeting. A stakeholder meeting on security that

Annual Report:

identified improvement actions was held. Improved signage and improved emergency responder communications were established. A final draft report was prepared, reviewed, and updated. The report was presented to the CIB Board of Directors and invited project funders. The final report was prepared and submitted and project data transferred. The report is available at inlandbays.org.

The Master Plan is currently being used to guide the fundraising efforts for construction design and permitting and phase one construction.

The project included climate adapation through the inclusion of sea level rise scenarios into site planning for an ecological preserve. This inclusion resulted in decisions to limit investments in infrastructure in vulnerable areas and to continually relocated trails and educational signage with sea level rise over the 25 year plan horizon.

The project recieved no major external constraints and was accomplished on time and just over budget.

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 -- Divison of Watershed Stewardship, co-planner

Stephanie Briggs, 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.
2. Development of shoreline project tracking database for DNREC regulators. (This output could not be acheived, please see 2015 Annual Report).
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

Addressing diffuse, nonpoint sources of pollution

Clean Water Act Program Implementation Role: Primary

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
EPA	FY2014 EPA NEP Operating Grant	CE993990-12-0	$ 3,200.00	$ 0.00	$ 3,200.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 3,250.00	$ 0.00	$ 3,250.00
		Totals:	$ 9,650.00	$ 0.00	$ 9,650.00

PROJECT PROGRESS

Beginning Date: 10/01/2013 Project Status: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Development of shoreline project tracking database for DNREC regulators.	Cancelled		09/15/2014			
Shoreline regulation and cost share program assessment will be completed by Committee	Completed		09/15/2014			
Revised living shoreline regulations completed	Completed		12/15/2014			

Annual Report:

The project was completed through the work of the Delaware Living Shoreline Committee formed and initially chaired by the Center for the Inland Bays. The Committee, composed of CIB, DNREC, and other technical and agency partners, examined the current state and federal policy constraints affecting the use of living shoreline management techniques in Delaware. Recommendations from the Committee focused on revising the Statewide Activities Approval (SAA) to define different types of living shoreline management techniques. The final draft revision of the SAA has created an expedited state permitting process for living shoreline techniques in Delaware. In 2015, a final draft of the revised SAA was accepted by DNREC. DNREC intends to adopt the SAA during 2015. As living shorelines continues to be promoted as a management technique, the SAA will facilitate simplified permitting that will result in more successful projects.

The project faced two major external constraints that limited its intended outputs. The first was that little funding was available for State of Delaware cost-share for living shoreline projects due to declining state revenue and associated budget reductions and priorities. The Center believes that cost share to promote living shorelines is an important tactic for the adoption of the management practice and will seek to provide assistance to private landowners that may partner with the Center to install living shoreline demonstration projects in the future. The second external constraint was the lack of capacity of DNREC to develop and maintain a shoreline permit tracking database. The Center intends to explore the development of a permit history quantifying the length of shoreline stabilization by hardening and living shoreline techniques. This research could provide initiative for DNREC to reassess the development of a tracking database.

Loop Canal Living Shoreline & Wetland Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

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:

Stephanie Briggs, 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 Living Shoreline project 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 refuge for small fish and macro-invertabrates; construction materials will be natural.

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 will provide design services; DE National Guard will provide access to the site; DNREC/ Mosquito Control Section will work as a contractor and provide technical assistance; the Town of Bethany Beach will provide access and funding.

The work proposed in this project is to stabilize approximately 350 feet of eroding shoreline and restore 0.4 acres of degraded tidal wetlands.

Outputs/Deliverables:

1. 350 feet of stabilized shoreline stabilized by a system of timber and coir logs that create a series of sediment-catching cells. This structure is located on the north side of the “Land Strip” that separates the Loop Canal and Salt Pond.
2. A series of revetments located in the Salt Pond, approximately 0.4 acres, designed to slow wave energy and capture sediment.
3. Increased wildlife habitat in the form of perching areas for shorebirds and cover for fish and crabs.
4. Demonstration of Living Shoreline construction techniques and materials.

Long-Term Outcomes:

1. Protection of 0.2 acres of land from wind-generated erosion.
2. Increased acreage of up to .4 acres of tidal marsh through accretion.
3. Increased habitat for wading bird and fish species.
4. Protection of a recreational boating resource (Loop Canal)

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Estuarine Shoreline	Protection	Feet	350.00
Tidal Wetland	Reestablishment	Acres	0.40

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2015	225

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
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	STATE-0000253060	$ 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: Completed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Conduct site survey and develop plans	Completed	05/28/2014				
Submit permit application	Completed		09/15/2014			
Implement project (shoreline and offshore work)	Completed	05/28/2015	09/15/2014			
Construction/ material installation	Completed	04/09/2015				

Annual Report:

Installation of all major project components completed May 22, 2015. Site clean-up at the National Guard/ Bethany Beach Training Site staging area has been completed. Inspection boat trips for VIP’s and members of the press have been conducted. This draws to a close the installation of an innovative living shoreline project.

The main success of this project was achieving cooperation from several entities to install this innovative design. The project involved three separate owners with separate requirements for permission and different levels of participation. However, each provided cooperation that was crucial. Contractors needed to cooperate with each other to get material to the staging sites area and hence out to the work site. It’s repetitive to say that that each individual task required the cooperation of at least one of the other entities to get this job done, but there needs to be emphasis of how important this is when a project is undertaken on a site that has difficult access (as many living shoreline projects are likely to have). This is exponentially true when undertaking a project that is new and innovative; the partners have to be patient, understanding and willing to try new approaches. All participants exhibited this spirit.

Annual Report:

The most significant external constraint was access to the construction site, and, as stated, this is likely to be a common expectation of living shoreline projects. It is not an unreasonable expectation that some minor unforeseen detail or circumstance will be amplified by poor access and cause serious delays or alterations in the scope of work. In this case, the initial design method of securing the revetment logs did not work, and a new method, using 2”x2”x4’ stakes had to be substituted; subsequently, a new method of driving these stakes hade to be devised. While the installation contractor, Mosquito Control Section, was patient, cooperative and innovative in this process, they were under time constraints. It is not difficult to imagine a scenario in which delays pushed the project later into the season, when their other job requirements (controlling mosquito larvae), could have forced them off the job for an extended period of time. So, in planning a project where the access is difficult, the installation contractor must be committed, contractually, to the likely possibility that thinking-on-ones-feet would require adaptation, methodology, time etc., on their part.

Also, the importance of having a design/ build concept should be emphasized. During those inevitable in-project adaptations, having the personnel who designed the project ready to offer insight is important. While we did not have this built into this project, the concept design person was available, and his help was invaluable at crucial times. Again, imagining a scenario in which this design person could not be reached in a timely fashion is not far-fetched, and suffering that fate could have resulted in significant delays.

A project like this cannot be completed unless stakeholders such as the Bethany Beach “Land Strip Committee” were involved. Their insistence to find and implement this solution was the driving force in getting it done.

For its original concept the project had intended 800 feet of living shoreline. As often happens in transfer from initial project concept to to formal concept to construction design, the feasibility of implementation becomes constrained by physical and financial factors. The transfer of project management from one manager to another has obscured the exact reason for the shift from an initial estimate of 800 feet to the actual implementation of 350 feet.

ON-GOING PROJECTS

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

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:

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.

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 6,916.80	$ 0.00	$ 6,916.80
EPA	FY2012 EPA NEP Operating Grant	CE993990-11-0	$ 15,000.00	$ 0.00	$ 15,000.00
		Totals:	$ 21,916.80	$ 0.00	$ 21,916.80

PROJECT PROGRESS

Beginning Date: 08/01/2014 Project Status: Ongoing "Major Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Systems Replacement Plan (SRP) RFP Prepared.	Completed	05/25/2015	03/01/2015			
Potential Consultants Identified.	Completed	05/25/2015	05/01/2015			
SRP Consultants Selected.	Not Initiated	05/25/2015	06/01/2015			
Financial Consultant Selected.	Not Initiated	05/25/2015	07/01/2015			
SRP Completed.	Not Initiated	05/25/2015	10/01/2015			
Financial Consultation Completed.	Not Initiated	05/25/2015	11/01/2015			
Financial Recommendations Implemented.	Not Initiated	05/25/2015	12/30/2015			

Annual Report:

Major project delays occurred related to organizational contingencies involving direction from the board of directors and priority fundraising opportunities. In 2014, 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 excericse 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 witht the consultant. However, the Center was advised by EPA that this organization could not be a sub-recipient. The Center requested and recieved a 9 month extension to complete the project.

Annual Report:

In 2015, staff turnover and the subsequent need to develop a strategic plan forced this project to a lower priority and progress did not occur. The CIB applied for a second extension for 12 months from the EPA. In spring of 2015, five potentially qualified contractors were identified and solicited with an RFP developed in late 2014. Project milestones have been updated to reflect a revised project timeline.

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 recieve 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 implmentation and Center financial sustainability.

Long-Term Outcomes:

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

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

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: Ongoing "Major Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Research financial sustainability.	Completed	05/08/2014	09/01/2014			
Conduct Interviews with Board Members on finances.	Not Initiated	05/08/2014	11/01/2014	07/30/2015		
Develop list of existing and new potential funding sources	Not Initiated	05/08/2014	03/01/2015	08/30/2015		
Draft report completed	Not Initiated	05/08/2014	08/01/2015	09/15/2015		
Final report complted	Not Initiated	05/08/2014	10/01/2015	10/01/2015		

Annual Report:

Research into financial plan requirements and financial sustainability initiated. Production of financial data from 2010 to present for operating budget, projects, and private development completed. Reporting of expenses in annual financial statement reviewed and improved. Project has experienced significant delays due to staff turnover and strategic plan development. Work will reconvene on the project in June of 2015.

Angola Neck Reforestation Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

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 detailed planting plan that defines acreage of each planting phase and a working list of desired seedling species for each phase.
2. Forty acres of reforested farmland in four phases. 30,000 seedlings will be planted.
3. Nitrogen reduced by 640 pounds per year at the end of the four phases.
4. Phosphorus reduced by 16 pounds per year at the end of the four phases.

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. Continued increased quality of wildlife habitat as land transitions from fallow to scrub/shrub to mature trees.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

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	STATE-0000253060	$ 10,415.00	$ 0.00	$ 10,415.00
EPA	FY2016 EPA NEP Operating Grant		$ 9,597.60	$ 0.00	$ 9,597.60
		Totals:	$ 46,184.60	$ 0.00	$ 46,184.60

PROJECT PROGRESS

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

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Initial project planning meeting	Completed	12/18/2013				

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop plant list, identify suppliers, and determine 2-3 planting cycle	Completed	05/28/2014				
Solicit additional funding	Initiated	09/02/2014	02/01/2016			
Initiate phase 1 planting	Completed		10/15/2014			
Monitor growth/mortality	Initiated	05/28/2015	06/10/2015			
Make preparations for phase 2 plantings	Initiated	05/28/2015	07/01/2015			
Implement Phase 2 planting	Not Initiated	05/28/2015	12/18/2015			
Complete planting plan for phases 3 and 4	Not Initiated	05/28/2015	01/15/2016			

Annual Report:

In December of 2014, 4200 seedlings were planted on 5.6 acres of the Angola Neck Preserve. Species included oak, hickory, shortleaf pine, American plum, northern bayberry according to specifications detailed in University of Tennessee extension publication SP663, Tree Planting Procedure for Small, Bare-Root Seedlings (David Mercker, Extension Specialist Forestry, Wildlife and Fisheries, 2005). Seedlings were procured from the Maryland State Nursery.

In early April, a walk of the planted area noted no abnormally high incidence of tree mortality; a further assessment is scheduled to take place in June of 2015, at which time the next planting phase of the project will be detailed. However, it is anticipated that an approximately six acre will be planted; this will be the second of four planned planting phase. Also to be determined at this time, in consultation with Division of Parks and Recreation staff, will be mowing weed control activities that employed on the first phase.

Annual Inland Bays Horseshoe Crab Survey and Tagging Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Sheila Eyler, US Fish & Wildlife Service, Tagging study lead

Supporting Project Partner Contacts:

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

Jordan 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:

The annual Inland Bays Horseshoe Crab Survey is an important component of the Center's Citizen Science Program. The program contributes valauble population data needed for local and regional conservation efforts. 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 50 to 60 volunteers.

This project also includes collaboration with the US Fish and Wildlife Service in tagging 400-1000 crabs each year and reporting sightings of tagged animals. The tagging studies provide additional data for the management of horseshoe crabs and their habitat up and down the Atlantic coast.

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. Completion of annual surveys and tagging.
3. Annual publicity about the Survey each year in local media when volunteers are recruited and the results of the annual survey are reported.

Outputs/Deliverables:

4. Annual project report.
5. Work with DNREC to refine data collection techniques and methodology in order to meet requirements for submission to the Atlantic States Marine Fisheries Commission.

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
2. Use data from the Inland Bays and Delaware Bays to better manage the resource for protection of horseshoe crabs and shorebird populations.

Clean Water Act Programs:

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

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
DNREC	FY2016 DNREC Operating Grant		$ 929.00	$ 0.00	$ 929.00
EPA	FY2016 EPA NEP Operating Grant		$ 2,819.00	$ 0.00	$ 2,819.00
		Totals:	$ 14,542.00	$ 0.00	$ 14,542.00

PROJECT PROGRESS

Beginning Date: 03/01/2014 Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Recruit 2014 team leaders	Completed	04/08/2014				
Train 2014 volunteers	Completed	04/08/2014				
Conduct 2014 survey and tagging	Completed	09/02/2014				
Recruit and train 2015 team leaders	Completed	04/05/2015				
Train 2015 volunteers	Completed	04/15/2015	04/15/2015			
Conduct 2015 survey and tagging	Initiated	05/20/2015	07/31/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop 2014 and 2015 annual reports	Initiated	09/30/2015	12/31/2015			
2016 training of volunteers and team leaders	Not Initiated	05/26/2015	04/15/2016			
2016 survey data collected and reviewed for QA/QC	Not Initiated	05/26/2015	09/01/2016			
Annual report on 2016 HSC data	Not Initiated	05/26/2015	03/01/2017			

Annual Report:

The 2014 annual data report was delayed, pending hire of a new Science and Restoration Coordinator. A meeting was held with DNREC Division of Fish and Wildlife to discuss protocol changes needed to enable inclusion of Inland Bays horseshoe crab survey data into the database used by the Delaware Bay surveys. Annual training of volunteers occurred on April 7, 2015. This training included the revised survey protocols, as well as enhanced safety training. 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 began tagging in May. Data for both the 2014 and 2015 seasons will be reported in 2015.

Bethany Beach Nature Center

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

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

Outputs/Deliverables:

Bethany Beach Nature Center.
3. A center for outreach to summer visitors to the watershed.
4. A location for distribution of Inland Bays outreach/education materials to residents and tourists in the southern coastal resort area of the watershed.
5. Programs offered for children and adults that highlight watershed education and inform and educate these residents and visitors

Long-Term Outcomes:

1. An on-going outreach/education center in the south coastal area of the watershed through partnership with a local municipality.
2. Visitors, part time residents and new homeowners are introduced to the Inland Bays and their watershed through the exhbiits, programs and interpretive trails at the BBNC.
3. Visitors are introduced to the CIB and our mission.

Clean Water Act Programs:

Protecting coastal waters through the National Estuary Program

Clean Water Act Program Implementation Role: Significant

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	$ 3,170.00	$ 19,400.00	$ 22,570.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 2,200.00	$ 0.00	$ 2,200.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 1,816.00	$ 0.00	$ 1,816.00
DNREC	FY2016 DNREC Operating Grant		$ 1,298.00	$ 0.00	$ 1,298.00
		Totals:	$ 8,484.00	$ 19,400.00	$ 27,884.00

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	Completed	03/09/2014	03/09/2014			
Identify needs for new outreach materials and exhibits	Completed	05/05/2014	09/30/2014			
Re-assess and recommend new opportunities for Saturday children's program	Completed	05/30/2014	01/16/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Provide monthly activity for Saturday program in water quality testing	Completed	04/30/2014	05/20/2014			
Begin monthly field trips for seining to James Farm for Saturday program	Completed	04/30/2014	05/30/2014			
Provide watershed activities and equipment to the BBNC	Completed	08/30/2014	09/30/2014			
Identify continuing environmental education opportunities for director	Completed	12/15/2014	02/01/2015			
Meet director to discuss summer program	Completed	05/07/2015	06/04/2015			
Meet with Director to review summer 2015 program	Initiated	08/25/2015	10/06/2015			
Work with BBNC Director to begin planning for 2016	Not Initiated	09/01/2015	11/05/2015			
Provide recommendations for five presenters for 2016 summer season	Not Initiated	08/31/2015	03/31/2016			
Provide outreach/education materials for 2016 summer season	Not Initiated	09/01/2015	03/30/2016			
Provide technical support for four family seining events in FY16 season	Not Initiated	09/01/2015	10/01/2014			
Reach 1200 children/family members with watershed experience at BBNC in FY16	Not Initiated	09/01/2015	09/30/2016			
Provide instructional support for 5 water quality testing activities and five seining activities	Not Initiated	09/01/2015	09/15/2016			
Provide outreach support through our website and social media to promote programs	Not Initiated	09/01/2015	09/15/2016			

Annual Report:

I met with the director several times this year to identify opportunities to enhance 'Inland Bays watershed' programming at the BBNC. Their new focus on offering programming that entertains visitors and residents of the south coastal area has been successful in attracting more people to the BBNC, particularly during the summer months and shoulder season. Last summer, they reported more than 4,300 visitors to the BBNC from May 16 to August 15. Though she takes a more 'entertainment' approach to program planning, I have worked with her to identify guest presenters and most programs are natural history/science/Inland Bays watershed related. Once a month during the warm months, there is a Saturday morning program in water quality testing at the pond at BBNC and once each month, the BBNC goes to James Farm Ecological Preserve for a seining experience.

Because the director is no longer using our CIB teacher for her programs, I decided to invest in bringing the director into the environmental education community to give her opportunities to learn, to identify resources for programming, and to make contacts with environmental educators who can offer programs at the BBNC. This winter, she attended sessions at the MD Association of

Annual Report:

Environmental and Outdoor Educators conference and the DE Association of Environmental Educators annual meeting and workshops.

While the current director is not using the teacher we had been providing, she is using the presenters that we recommend for her summer Saturday events which is the time when the greatest number of visitors are in attendance. This is the third director we have worked with since establishing this partnership. Her approach is different than the first two and our direct involvement is more limited than we have had under the former directors, however, the Bethany Beach Nature Center continues to be an important education and outreach opportunity for us, especially in reaching the summer visitor population, and this director has been very effective in increasing visitation to the programs. Through regular contact and communication, I am able to identify needs at the BBNC that we can assist with in furtherance of our mission. it is an important door to keep open and a successful program from which we continue to derive significant benefits though the education/outreach programs, the trails and habitat that have been protected there, the demonstration native plant garden, and the on-going working relationship with the Town of Bethany Beach that owns and operated the BBNC.

$201 less in FY2015 funds for staff time were spent on this project relative to the project cost estimate and were reallocted to other personnel and projects.

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

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

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

Mike Bott, Environmental Scientist, DNREC -- Divison of Watershed Stewardship, Technical partner

Supporting Project Partner Contacts:

Stephanie Briggs, Project Scientist, Cardno Entrix, Contractor

Jonathan Cohen, Assistant Professor, University of Delaware -- College of Earth, Ocean, and Environment, Zooplankton analyses

Kathryn Coyne, Associate Professor, University of Delaware -- College of Earth, Ocean, and Environment, Phytoplankton analyses

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 use oyster cages and floating treatment wetlands (FTW) installed along bulkheads in poorly-flushed residential canals to improve water quality and increase habitat for macro-invertebrate and fish communities. The project will provide research data to document the benefit of shellfish filtration in removing suspended solids, as well as the extent to which floating wetlands increase dissolved oxygen (DO) in limited circulation systems.

A total of 200 bushels of adult oysters will be installed into York Canal in South Bethany (completed in May 2015). A control canal, Carlisle Canal, was also selected, with similar flushing residence time. Floating treatment wetland (FTW) islands will be positioned adjacent to oyster cages to increase oxygen exchange, remove 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. TSS and DO monitoring stations will be positioned in both canals to document the spatial and temporal changes in TSS and

Project Overview:

DO values in response to oyster filtration and wetland processes. The University of Delaware will provide support by collecting zooplankton and phytoplankton data from both treatment and control canals. The zooplankton plankton surveys will also allow quantification of oyster larvae. Oyster castles and cultch baskets placed near several of the islands will allow us to assess whether spawned larvae are able to set and survive.

The Town of South Bethany is providing long-term water quality monitoring data from the neighboring canals, volunteer labor, and funding for the wetland plantings. Cardno Entrix is providing design and project management services.

Outputs/Deliverables:

1. Install 200 bushels of adult oysters and 960 sq. ft. of FTWs into York Canal.
2. Document oyster survival rates, disease burden, spawning and recruitment through two seasons.
3. Document impact of oysters and FTW's on DO, turbidity, TSS, Chlorophyll A, and plankton communities.
4. Press event near completion of project.
5. Public outreach materials and presentation.

Long-Term Outcomes:

1. Use of multiple-technique, natural approaches to water quality improvements in poorly flushed residential canals.
2. Improved water quality in residential canals.
3. Restoration of natural shellfish communities in areas of the bays where they currently do not exist.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

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
DNREC	FY2016 DNREC Operating Grant		$ 3,718.00	$ 0.00	$ 3,718.00
EPA	FY2016 EPA NEP Operating Grant		$ 8,274.00	$ 0.00	$ 8,274.00
		Totals:	$ 193,336.00	$ 50,528.00	$ 243,864.00

PROJECT PROGRESS

Beginning Date: 12/20/2013 Project Status: Ongoing "Minor Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Draft plan developed	Completed		06/01/2014			
Final plans development	Completed		06/28/2014			
Monitoring equipment Installed	Completed		06/28/2014	10/01/2014		
Floating wetlands planted and installed	Initiated		06/30/2015			
Oyster cages deployed in canal	Completed		05/15/2015			
Monitoring of site performance and maintenance of equipment as needed	Initiated		10/31/2016			
Final report completed	Not Initiated		12/31/2016			

Annual Report:

Water quality meters were deployed in the canals in the fall, and data are viewable at the website http://inlandbays.dreamhosters.com/. The project experienced delays, because the state failed to issue the required public notice for the subaqueous lands permit on time. This delay in issuing the final permit resulted in the loss of our contract to secure live oysters to fill the cages. The Center attempted to secure live oysters from the Chesapeake, but after some deliberation, DNREC would not permit the deployment of oysters from the Chesapeake. The decision was made to deploy the oysters and floating wetlands in spring 2015 when live oysters could again be secured from the Delaware Bay as planned. 100 cages of adult oysters (200 bushels) were installed into York Canal on May 14-15, 2015. A subsample of 60 oysters was sent to the Roger Williams University lab for disease testing, as required by the Division of Fish and Wildlife. The floating treatment wetlands will be installed in early- to mid-June. Arrangement has been made with the University of Delaware's College of Earth, Ocean & Environment to assist in monitoring zooplankton and phytoplankton communities in the treatment

Annual Report:

and control canals. The project will be extended for an additional year (Through December 2016) to incorporate two full seasons of monitoring.

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. The start of the Your Creek project has created a new opportunity for focusing the speakers bureau on Your Creek communities using Creek Teams to reach out to and educate their communities. Information on our Speakers Bureau can be found on our website inlandbays.org on the homepage under 'What we do' Community Outreach.

Outputs/Deliverables:

1. More than 750 people annually are reached through speaking engagements at homeowners organizations and civic associations.
2. Two existing powerpoint presentations will be updated and one new presentation will be produced.

Long-Term 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
3. 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:

Protecting coastal waters through the National Estuary Program

Clean Water Act Program Implementation Role: Primary

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
EPA	FY2016 EPA NEP Operating Grant		$ 1,622.00	$ 0.00	$ 1,622.00
		Totals:	$ 3,374.00	$ 2,200.00	$ 5,574.00

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	Completed	05/05/2014	10/30/2014			
Develop powerpoint for Love Creek watershed	Completed	05/05/2014	01/31/2015			
Train new speakers, focusing on Your Creek team members as community-based ambassadors	Initiated	05/30/2014	11/07/2014			
Staff and CIB volunteers present to 500 citizens in FY2015	Completed	05/30/2014	02/28/2015			
Develop powerpoint for Dirickson Creek	Initiated	08/30/2014	06/30/2015			
Update inventory of powerpoints on key topics	Initiated	05/26/2015	01/30/2016			
Staff and CIB volunteers present to 750 people in FY 2016	Completed	05/26/2015	09/30/2016			
Train Your Creek Team volunteers for creek-watershed presentations	Initiated	09/03/2015				
Update Love Creek powerpoint to include 'State of Love Creek' data	Not Initiated	09/01/2015	10/30/2015			
Identify ten venues for Love Creek presentations	Initiated					

Annual Report:

Between November 2014 and May 2015, we presented to 710 people at 18 presentations, both general presentations about the Inland Bays and CIB mission and special presentations on specific projects or tailored to community concerns. Most were given by staff members, but some members of the Your Creek Teams are trained and ready to take the 'Love Creek' message to organizations in the Love Creek watershed when outreach materials are completed this summer.

Annual Report:

The video produced last fall is being used as an inspirational introductory awareness and engagement tool for general audiences. In addition to its use by the Speaker's Bureau, it is available on the homepage of our website and on our Youtube page.

Listing of some of the presentations given in FY15
10/6/14 Presentation on the Center's Shellfish Aquaculture Initiative at Millville Firehall Meeting
10/14/14 Presentation on Integration of Clean Water Act Programs in the Context of a National Estuary Program at the 2014 Mid-Atlantic NPS/TMDL/WQS/WQM Workshop
10/20/15 Wilmington Univ Class-Citizen Science Opportunities at the CIB
11/12/15 General Presentation on CIB and its Priorities and Challenges to the DE Chapter of the American Water Resources Conference and the Water Resources Assoc. of the DE River Basin.
11/18 Your Creek Presentation to Dirickson Creek Community leaders
11/20 Wetlands of the Inland Bays and the Delaware Wetlands Advisory Committee Presentation
2/24/15 Presentation on Anchorage Canal Drainage Area Stormwater Retrofit Project: Sandpiper Pines Bioretention Areas
4/25/15 Your Creek Presentation-Retreat at Love Creek
5/2/15 Old Landing Woods HOA
5/7/15 Winding Creek HOA
5/21/15 Bayside Institute-class-Horseshoe Crabs
6/9/15 Bayside Institute-class-Horseshoe Crabs
6/17/15 Retreat Garden Club-Coastal Vegetative Zones
8/15/15 Fish Survey and Citizen Science Opportunities at CIB-Lewes Farmers Market

Gardening for the Bays Native Plant Sale

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

Katelin Frase, Senior Educator, Environmental Concern, Inc

Pat Drizd, Volunteer, CIB Volunteer Project Coordinators

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.

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

Intermediate Outcomes:

the native flora of the Inland Bays watershed and choose natiive 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, 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

Clean Water Act Program Implementation Role: Primary

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
Center for the Inland Bays	FY2016 Private Operating Revenue		$ 7,652.00	$ 4,968.00	$ 12,620.00
		Totals:	$ 8,752.00	$ 12,552.00	$ 21,304.00

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 committe	Completed	05/30/2014	01/16/2015			
Invite local nurseries to participate	Completed	05/30/2014	01/16/2015			
Invite master grdeners and other education partners to participate	Completed	05/30/2014	01/16/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete logistics plan	Completed	05/30/2014	03/13/2015			
Complete media plan for sale	Completed	05/30/2014	04/10/2015			
Schedule volunteers	Completed	05/30/2014	04/10/2015			
Plan special programs and events for 2015	Completed	02/27/2015	03/30/2015			
Complete promotion and media for 2015 sales	Completed	02/18/2015	04/15/2015			
Finalize volunteer schedule for 2015	Completed	02/27/2015	04/24/2015			
Finalize logistics planning for 2015 sale	Completed	03/03/2015	04/15/2015			
Plan for sale items to generate income at 2015 sale	Completed	03/03/2015	03/31/2015			
Set date for 2016 sale	Not Initiated	05/25/2015	10/30/2015			
Establish 2016 Planning Committee	Not Initiated	05/25/2015	01/08/2016			
Convene Planning Committee	Not Initiated	05/25/2015	02/05/2016			
Invite nurseries and nonprofits	Not Initiated	05/25/2015	11/30/2015			

Annual Report:

The 11th Annual Gardening for the Bays Native Plant Sale was our most successful to date in attendance and participation with more than 600 people attending, five nurseries selling native plants, and seven nonprofits including the Master Gardeners, Liveable Lawns, DE Nature Society with the Backyard Habitat Program, the Delaware Botanical Garden and the Sussex Bird Club presenting. The event was also an opportunity to highlight the Clean Water Initiative. Special programs included an early morning bird walk, a guided walk on the trails of James Farm, and presentations on gardening to attract butterflies and on home composting. We sold 25 rain barrels and other gardening items which netted $1,750.

After more than a decade, the Native Plant Sale has become a rite of spring for many, so attendance continues to build as those regular attenders return and new people discover it through the excellent local publicity we receive each year. This year, instead of having a CIB exhibit, we focused our staff time and effort on the welcome table and that proved to be a successful strategy; more than 75 new people signed up to be on our mailing/email list and many new contacts were made.

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: Pepare 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 managment 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
EPA	FY2016 EPA NEP Operating Grant		$ 278,965.00	$ 0.00	$ 278,965.00
		Totals:	$ 445,745.00	$ 201,283.00	$ 647,028.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "On Track"

Annual Report:

Progress on this project is ongoing, see quarterly reports to the Board of Directors.

Inland Bays Clean Up

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

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, Delaware State Parks and the Dewey Beach Lions Club. Volunteers are encouraged to join the partner organizations for a one-day clean-up of the 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 is the public boat ramp at Massey's Landing between Rehoboth and Indian River Bay; Mulberry Landing at Assawoman Wildlife Area in Little Assawoman Bay is used in various years, as well

The Water Use Plan Implementation Committee (WUPIC) plans and executes this event. WUPIC members help solicit boat captains, volunteers and event funding (tee shirts), help in publicity, and are active participants.

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. Numerous local businesses and organizations provide financial support for the event. Senator Lopez of the Delaware General Assembly also contributed grant assistance to fund the clean-ups. This is a long-term ongoing project that will continue every year. The 2015 Clean-Up will take place on June 13th 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

Long-Term Outcomes:

1. CIB, DNREC, Delaware Solid Waste Authority, businesses, community organizations and political leaders cooperate to remove trash from the Inland Bays watershed.

2. WUPIC takes a leadership role in planning and organizing the event.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

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	2014 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
DNREC	FY2016 DNREC Operating Grant		$ 1,316.00	$ 0.00	$ 1,316.00
		Totals:	$ 13,132.40	$ 0.00	$ 13,132.40

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			
WUPIC coordinates clean up	Completed	05/29/2014	06/30/2015			
Sign up volunteers	Completed	05/29/2014	06/30/2015			
Conduct Clean-Up	Completed	05/26/2015	06/13/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Planning meetings by WUPIC for 2016 Clean-up	Not Initiated	09/03/2015	06/01/2016			
Conduct Clean-Up	Not Initiated	09/03/2015	06/11/2016			

Annual Report:

The Water Use Plan Implementation Committee (WUPIC) has met on March 11, April 15 and May 6 to plan this year's IBCU, which is scheduled to take place June 13, 2015; staging area will be Massey's Landing. The WUPIC has secured donation of a dumpster and sponsorship in the Delaware Waste Authority's Community Clean-up Initiative. Publicity activities are underway and will lead up to the day of the event.

Inland Bays Monitoring Plan

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

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

Scott Andres, Senior Scientist, Delaware Geologic Survey, STAC chair

Bill Richardson, USEPA - Water Protection Division, Committee member

John Schneider, Watershed Assessment Section Manager, DNREC -- Divison of Watershed Stewardship, Workgroup member

Hassan Mirsajadi, WQ Modeler, DNREC -- Divison of Watershed Stewardship, Workgroup member

David Wolanski, Environmetnal Scientist, DNREC -- Divison of Watershed Stewardship, Workgroup member

Ed Whereat, Program Coordinator, University of Delaware -- Citizen Monitoring Program, Workgroup member

Kevin Brinson, Director, Delaware Environmental Observing System, Workgroup member

Tina Callahan, Lead Scientist, Delaware Environmental Monitoring & Analysis Center, Workgroup member

Bill Ullman, Professor, University of Delaware -- College of Earth, Ocean, and Environment, Workgroup member

Kathy Knowles, Laboratory Manager, DNREC -- Environmental Lab, Workgroup member

Supporting Project Partner Contacts:

Jim Eisenhardt, Senior Manager, Natural Resources, RK&K, Facilitator

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 key role of National Estuary Programs is to monitor the effectiveness of actions taken to implement their Comprehensive Conservation and Management Plans (CCMPs). During the Center for the Inland Bays (the Center's) original CCMP development process that culminated in 1995, the Inland Bays Monitoring Plan was produced. The plan assembled the metadata of relevant environmental parameters collected at the time and put forth hypotheses for their change based on CCMP implementation. Since then, collection of additional relevant parameters has been initiated, responsibilities for collection have changed, and both monitoring

Project Overview:

technology and the scientific understanding of the Bays have evolved significantly. This requires that the Plan be revised and provides an opportunity to re-engage stakeholders around its cooperative implementation. EPA's 2013 Program Evaluation requires this update to be done by October 2015.

This project will revise the plan to monitor the condition of the Inland Bays Estuary and Watershed used to evaluate the overall effectiveness of the CCMP. The plan will:

- serve as a comprehensive blueprint for monitoring activities that relate to the mission of the Center;
- consider data that are both used for environmental indicators for the Inland Bays and useful data that are not currently used for environmental indicators;
- consider data gaps;
- make recommendations for data synthesis (including modelling approaches) and for coordination among those organizations involved in data collection, processing and analysis, storage and provision, and presentation.

Update of the monitoring plan will include a number of concurrent activities. Review of the original Inland Bays Monitoring Plan will occur prior to plan development. A facilitated discussion or series of discussions with representatives of organizations involved in all aspects ambient water quality monitoring in the Inland Bays will also be a priority set of actions. The process initiated is intended to be ongoing through the formation of a Inland Bays Scientific and Technical Advisory Committee (STAC) water quality monitoring subcommittee.

Outputs/Deliverables:

1. Facilitated workshop to convene both monitoring partners and data users in order to outline monitoring program status and future needs.
2. Final Inland Bays monitoring plan for the next five years, including roles and responsibilities of partners and a strategy for funding.
3. Formation of a monitoring subcommittee of the STAC, which will provide annual review of the monitoring plan and data, and recommend updates or revisions.

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

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: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Establish the objectives	Completed		04/01/2015			
Engage facilitator for monitoring plan workshop.	Completed	04/01/2015	05/01/2015			
Conduct facilitated workshop and write workshop report.	Initiated	05/26/2015	08/31/2015			
Develop draft monitoring plan.	Not Initiated	05/26/2015	08/31/2015			
Final monitoring plan submitted.	Not Initiated	05/26/2015	10/01/2015			

Annual Report:

EPA's 2013 Program Evaluation requires the plan update by October 2015. A summary of Monitoring Plan goals, requirements and process was developed. Meetings were held with partners at DNREC Watershed Assessment, University of Delaware DEOS, and the Citizens Monitoring Program to discuss their participation. Jim Eisenhardt of RK&K has been retained to facilitate a workshop with key Inland Bays partners and agencies to assess current monitoring programs, identify data gaps, and begin development of a draft plan. This workshop will be held in August 2015.

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 was completed in October of 2014 (see James Farm Master Plan annual report in FY2016 workplan submittal for a description). The Plan to improve the Farm to protect natural resources and enhance educational opportunities while accomodating 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 anticpated 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, Sussex County, 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 and the Executive Director for grant development.

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 managment 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.

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	STATE-0000253060	$ 10,325.00	$ 0.00	$ 10,325.00
Sussex County	FY2015 Sussex County Operating		$ 11,600.00	$ 0.00	$ 11,600.00
DNREC	FY2016 DNREC Operating Grant		$ 4,769.00	$ 0.00	$ 4,769.00
		Totals:	$ 31,096.00	$ 0.00	$ 31,096.00

PROJECT PROGRESS

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

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Submit Grant Proposals	Initiated	05/06/2014	12/01/2014	11/01/2015	09/01/2016	
Develop Construction Design RFP	Not Initiated	05/06/2014	02/29/2016			
Complete Phase I Implementation	Not Initiated	05/30/2014	12/21/2017			
Develop fundraising plan	Initiated	11/30/2014	03/01/2015	11/30/2015	02/29/2016	

Annual Report:

Staff meetings to formulate a phased development plan were held. Details of implementation items were decided (i.e. type of trail construction and costs). Overall implemention costs that were roughly estimated in the Master Plan were revised to be more realistic and include likely in-kind match. A series of meetings have been held with staff from the Land and Water Conservation Trust Fund and Susex County to align matching grant funds for two potential levels of implementation. Presentations were also provided to the Sussex County Council and individual council people. The first level at $75,000 will complete construction design and permitting for the entire plan. The second level at $391,000 includes design, permitting and completion of phase one construction focusing on the entry way of the Farm, interpretative singage and boardwalk replacement. Additional meetings will continue until funding levels are determined in November. Initial milestones were changed as new information about the timing of grant opportunities became available.

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 ecosytems 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 ecosytems
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 it's four middle schools to provide watershed/estuarine science education on the Inland Bays in support of its science curriculum and our mission

Long-Term 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

Long-Term 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.
4. Students are exposed to the estuarine ecosystems of the Inland Bays and understand their importance to the overall coastal environment.
5. 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	STATE-0000253060	$ 7,020.00	$ 0.00	$ 7,020.00
DNREC	FY2016 DNREC Operating Grant		$ 10,204.00	$ 0.00	$ 10,204.00
EPA	FY2016 EPA NEP Operating Grant		$ 8,100.00	$ 0.00	$ 8,100.00
		Totals:	$ 32,744.00	$ 0.00	$ 32,744.00

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	Completed	05/30/2014	09/17/2014			
Spr 15-Send registration and program materials for spring semester	Initiated	05/30/2014	03/18/2015			
Spr 15-Evaluate 2014-15 program	Completed	05/30/2014	06/30/2015			
Spr 15-Coordinate with IR School District on Spring 2015 program	Completed	02/26/2015	03/15/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Spr 15-Hire/Prep teaching staff for Spring 2015 program	Completed	02/26/2015	04/20/2015			
Spr 15-Inventory/secure equipment	Completed	03/20/2015	04/20/2015			
Fall 15-Begin Staffing for Fall 2015 semester	Initiated	05/26/2015	09/09/2015			
Fall 15-Meet with school district to plan curriculum for Fall 2015 semester	Initiated	05/26/2015	09/01/2015			
Fall 15-Schedule teachers	Not Initiated	05/26/2015	09/08/2015			
Fall 15-Initiate contact with schools	Not Initiated	05/26/2015	09/10/2015			
Fall 15-Inventory equipment; purchase needed equip and supplies	Not Initiated	05/26/2015	09/15/2015			
Fall 15-Schedule teacher prep day	Not Initiated	05/26/2015	09/15/2015			
Fall 15-Provide a full day of watershed education to 450 8th grade students	Not Initiated	09/01/2015	11/06/2015			
Spr 16-Provide a full day of watershed education to 500 7th grade students	Not Initiated	09/01/2015	06/30/2016			
Spr 16-Send registration and program materials for spring semester	Not Initiated	09/01/2015	04/01/2016			
Fall 2016-Hold teacher prep day	Not Initiated	09/01/2015	09/15/2016			
Fall 2016-Plan for staffing-hire train teacher if needed	Not Initiated	09/01/2015	08/30/2016			
Fall 2016-Schedule teachers for fall semester	Not Initiated	09/01/2015	09/09/2016			
Spr 16-Inventory/secure equipment for spring 2016 semester	Not Initiated	09/01/2015	04/15/2016			
Fall 15-Send registration and program materials for fall semester	Not Initiated	09/01/2015	10/15/2015			
Fall 16-Inventory/secure equipment	Not Initiated	09/01/2016	09/15/2016			
Spr 16-Evaluate 2015-16 program	Not Initiated	09/01/2015	06/30/2016			

Annual Report:

Our staff of five certified teachers provided a full day of instruction at the James Farm Ecological Preserve to 475 8th grade students from Georgetown Middle School, Millsboro Middle School, Selbyville Middle School and Southern Delaware School of the Arts during the fall 2014 semester. Students learned about the saltmarsh food web and conducted marine vertebrate and marine aquatic plant surveys. The spring 2015 semester is still underway; 345 students from all Indian River School District Middle Schools have attended so far and 145 are scheduled during the remaing weeks. The 7th grade program includes water chemistry analysis, seining and, benthic

Annual Report:

survey, wetland identification, beachcombing and marsh exploration, and salt marsh energy flow.

Living Shoreline Training

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

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

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

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

Supporting Project Partner Contacts:

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

Marcia Fox, Environmental Scientist, DNREC -- Divison 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 enhance intertidal habitat.

To successfully promote the use of living shorelines as the preferred technique for addressing shoreline erosion, we will need to work on two fronts. 1) We will need to create a market for living shoreline installation services by educating potential customers of marine contractors about the practical and esthetic benefits of living shorelines so that customers are asking for living shoreline alternatives. 2) We will need to train marine contractors and consultants in the techniques and materials used in the installation of living shorelines, so that they are ready, willing and able to provide these services.

Outputs/Deliverables:

1. Input and recommendations are gathered from marine contractors and consultants on strategy for reaching additional contractors with training in living shoreline installation.
2. Opportunity for follow up training for contractors and consultants that attended February 2015 workshop is evaluated and pursued.
3. A living shoreline presentation highlighting the practical and esthetic benefits of living shorelines is developed for key target groups such as realtors and developers of waterfront property, and homeowners associations and their management companies for communities that have bay and creek frontage.
4. A list of contractors that have been trained and have demonstrated their ability to install approved living shoreline techniques is compiled and available on our website as a resource for owners and managers of waterfront property.
5. Living shoreline webpage is developed to provide living shoreline resources to property owners and managers of waterfront property and to marine contractors.
6. A map of living shoreline demonstration sites is developed and available on our website.

Long-Term Outcomes:

1. Owners of bayfront and creekfront property are aware of living shorelines as a preferred method of controlling erosion and seek these services from marine contractors
2. Marine contractors recognize the growing market for living shorelines as a preferred alterative to hardened shorelines.
3. Property owners and managers have choices of marine contractors that are trained in the design and construction of living shorelines

Clean Water Act Programs:

Addressing diffuse, nonpoint sources of pollution

Protecting wetlands

Clean Water Act Program Implementation Role: Primary

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	$ 0.00	$ 6,720.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 4,800.00	$ 0.00	$ 4,800.00
DNREC	FY2016 DNREC Operating Grant		$ 4,082.00	$ 0.00	$ 4,082.00
EPA	FY2016 EPA NEP Operating Grant		$ 4,582.00	$ 0.00	$ 4,582.00
		Totals:	$ 24,984.00	$ 0.00	$ 24,984.00

PROJECT PROGRESS

Beginning Date: 10/01/2012 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Conduct pre-training meetings and outreach sessions with local contractors	Completed	10/30/2014	03/15/2015			
Conduct training	Completed	08/29/2014	02/27/2015			
Set a date for Marine Contractor Training	Completed	11/14/2014	11/20/2014			
Identify and contract with a consultant to provide training to contractors	Completed	11/03/2014	11/14/2014			
Meet with statewide partners about follow up to Feb 2015 marine contractor training workshop	Completed	08/15/2014	02/28/2015			
Survey training participants	Completed	01/25/2015	03/01/2015			
Meet with partners to plan followup to the 2015 marine contractor training	Not Initiated	05/26/2015	10/15/2015			
Incorporate living shorelines into general powerpoint presentation	Not Initiated	05/26/2015	10/15/2015			
Develop a list of marine contractors trained in living shorelines as a resource for property owners.	Not Initiated	05/26/2015	03/30/2016			
Get input/recommendations from local contractors about new training opportunities	Not Initiated	05/26/2015	10/15/2015			
Liv Shoreline presentation highlighting the practical and esthetic benefits of LS is developed	Not Initiated	05/28/2015	10/30/2015			
Living Shoreline webpage is developed	Initiated	05/28/2015	07/15/2015			
A map of living shoreline demonstration sites is developed and available on our website.	Initiated	05/28/2015	07/15/2015			
Work with statewide partners on development of outreach brochure	Not Initiated	09/01/2015	03/31/2016			
Identify five communities on the Bays and provide living shorelines info through HOA'	Not Initiated	09/01/2015	09/30/2016			
Produce Living Shorelines exhibit	Initiated	09/01/2015	10/02/2015			

Annual Report:

Working with partners from DNREC Watershed Assessment and the Partnership for the DE Estuary, we held a two day workshop for marine consultants and contractors in Lewes, DE to instruct them on techniques and materials used in living shorelines. It was attended by 17 contractors and a staffer from the EPA. All participants were surveyed and 100% expressed interest in additional training. Tthe feedback gave us good direction for the areas we can focus on for future training.

Of those who attended, almost all were consultants. We had hoped to attract more contractors who work on the Inland Bays and who

Annual Report:

presently are installing 'hardened' shorelines for clients seeking erosion control. We did personally reach out to them, but none of those contacted attended. Since the workshop in February, we have reflected on the challenges of bringing marine contractors' onboard' with living shorelines. Because installation of living shorelines would require the use of materials and techniques that would be new to them; and because it would be a new business model, we will need to identify a couple of the larger contracting companies and get their input and recommendations. We will also solicit input from consultants who attended the training to get the names of contractors they have used to install their LS projects.

Development of our Living Shorelines webpage and a map of demonstration projects was delayed but will be completed this fall. We are coordinating with our state partners to complete a statewide 'storymap' of all LS demonstration projects and will link all partner websites to that map. Development of outreach materials is also being coordinated through the outreach committee of the statewide Living Shorelines inititive in order to assure consistancy of messaging and limit redundancy. Identification of additional LS demonstration sites which had been included in this project, are now a separate workplan project.

To successfully promote the use of living shorelines as the preferred technique for addressing shoreline erosion, we will need to reach the potential customers of marine contractors and consultants to highlight the practical and esthetic benefits of living shorelines so that customers are asking for living shoreline alternatives. We will identify these other important target groups, specificallly realtors and developers of waterfront property, and owners and managers of shoreline properties such as homeowners associations and their management companies and plan for outreach to these groups.

Long-term continuous saltmarsh monitoring in the Inland Bays

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

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 hydrology 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. Three marshes have been instrumented with three sediment elevation tables each 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. Data will determine if marshes are able to accrete elevation to keep pace with sea level rise and ultimately persist. The project has been ongoing since 2008.

For 2016, it is intended that a sub-award agreement will be established with the Delaware Dept. of Natural Resources and Environmental Control (DNREC) for collection and transmission of project data. DNREC's Wetlands Monitoring and Assessment Program will use the funds to carry out this work which supports its programmatic activities. This Program is funded primarily through EPA Wetlands Program Development Grants, and DNREC is responsible for complying with the Clean Water Act. The project is governed by a Quality Assurance Project Plan that both DNREC and CIB developed and any changes to the plan will be made with the concurrence of CIB and DNREC.

Outputs/Deliverables:

1. Fully operational, long-term, continuous hydrological marsh monitoring site and annual data collection and analysis.
2. Capacity for continuous monitoring data during SWD event.
3. Network of 3 marsh elevation monitoring stations in the Inland Bays and annual data collection and analysis.

Outputs/Deliverables:

Long-Term Outcomes:

1. Increased knowledge of local saltmarsh hydrophysiochemistry using continuous monitoring techniques.
2. Increased understanding of inter-relation of study parameters and capacity for the elevation of marshes in the Inland Bays to keep pace with sea level rise.
3. 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

Clean Water Act Program Implementation Role: Primary

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
DNREC	FY2016 DNREC Operating Grant		$ 929.00	$ 0.00	$ 929.00
EPA	FY2016 EPA NEP Operating Grant		$ 7,069.00	$ 0.00	$ 7,069.00
		Totals:	$ 13,118.00	$ 0.00	$ 13,118.00

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	12/01/2016		
Second data report	Not Initiated		05/15/2020			
Maintain data collection	Initiated		05/15/2020			
Complete agreement for services with DNREC	Initiated	09/03/2015	04/01/2016			
Revise project QAPP	Not Initiated	09/03/2015	04/01/2016			
Assess and repair as necessary monitoring stations	Initiated	09/03/2015	06/01/2016			

Annual Report:

Sampling of SETs occurred in Fall of 2014. A meeting with the DNREC Wetlands monitoring program was held to discuss transferring the data collection responsibility of this project through a sub-award. Initial verbal agreement for this was obtained. A meeting in 2015 will be held to develop the details of this agreement.

Middle Island Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Supporting Project Partner Contacts:

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

Chuck Williams, Program Manager, DNREC -- Divison 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 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. The State of Delaware invested $550,000 in FY2014 on design and has allocated $2.3 million for FY2016 on construction.

Partner Roles & Responsibilities:
CIB – In FY2016 CIB will assist with project nesting bird monitoring by participating in DNREC led surveys and providing a pilotted CIB vessel with CIB pilot for the surveys. Either the Science & Restoration Coordinator or Project and Program Manager will participate in the surveys. Project outreach will also be conducted by CIB to highlight the project and potentially coordinate outreach activities. CIB will also explore the potential to serve as a project facilitator for multiple project partners and media and this is dependent on the actual approach to project implementation which is likely dependent on project grants. CIB will potentially assist DNREC with securing additional grant funding for implementation. Funds will be directed towards staff time and vessel costs.

Project Overview:

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, 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 habitat.
3. Enhanced water quality.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Significant

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	FY2016 EPA NEP Operating Grant		$ 3,130.00	$ 0.00	$ 3,130.00
		Totals:	$ 8,716.00	$ 0.00	$ 8,716.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "Major Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Solicit additional funding for implementation	Not Initiated		08/31/2014	10/01/2016		
Complete design plans	Initiated		09/30/2014			
If funding is secured, begin permitting process	Initiated		10/01/2014	10/01/2016		
Complete participation in FY2016 nesting bird survey	Not Initiated	09/03/2015	08/01/2016			
Conduct project partner meeting to explore CIB's potential to act as facilitator	Not Initiated	09/03/2015	04/01/2016			

Annual Report:

Little progress to date has occurred on this project in 2015. DNREC continues to develop and revise project design. Anticipated implementation costs have increased to approximately $3 million, as the design was altered to allow successive disposals of dredge materials from successive channel dredge events. The Center assisted DNREC with nesting bird monitoring through the provision of its pilotted vessel. A story on the rookery on the island was published in the 2015 Spring/Summer Inland Bays Journal. Implementation funding is targetted through an annual bond bill appropriation begining in FY2016. However, increasing costs and declining revenues in the State of Delaware's budget and the apparent lack of poitical will to increase funding for waterway management through fee increases may delay or significantly reduce allocations to the project. $5,208 in FY2015 funds estimated to be used for staff time to support this project were not utilized and reallocated to other personnel and projects.

Oyster Gardening Program

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

Supporting Project Partner Contacts:

John Ewart, Aqauaculture 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, then adult, size. This larger size is preferred for stocking artificial oyster reefs and for other shellfish restoration and enhancement projects. Experience shows that larger oysters generally have better predator survival rates.

The Oyster Gardening Project, 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, the Town of South Bethany. In employs volunteer gardeners to care for small (6.35mm) spat, growing them to adult size (approximately 4cm) by keeping the oyster spat cleaned and protected from predators.

Each gardener is responsible for one site, and each site grows approximately one-hundred oysters. 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 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 two-hundred volunteer oyster gardeners at sixty-four locations helped supply fifty bushels of oysters suitable for planting 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” process. During early to mid-summer, the bags of oyster shell with fingernail sized spat are then distributed throughout the Inland Bays to the gardeners for grow-out in their Taylor Floats. Gardeners will be in possession of the oysters for about two years, when CIB will remove them and place them in various locations throughout the bays.

Gardeners are responsible for the general husbandry of the oysters. They are expected to clean the cages on an as-needed basis by

Project Overview:

removing the individual cages (two per Taylor float) and using a garden hose or pressure washer to spray off the fouling organisms. They are also expect to remove the cages from the Taylor floats in late fall and suspend them several inches off the bottom sediment for the winter. In the spring, prior to when water temperatures reach 10°C, cages should be replaced in the Taylor float. Gardeners are required to track and report all time required to maintain their stocks.

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 Assawoman Bay where native oyster populations did not 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 suitable 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 provide habitat that attracts communities of small bottom dwelling organisms like grass shrimp and worms which in turn support populations of commercially valuable crabs and fish. 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 project as an important public outreach tool and a source of mature oysters for restoration and enhancement project. In FY2015 the project manager will work with staff outreach and development coordinators 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. Produce 250 bags of spat using disease resistant larvae from Rutgers University.
2. Collect and distribute 30-50 total bushels of oysters to LAB, Rehoboth Bay, and IR Bay.
3. Secure and maintain 120 gardener sites
4. Make the program financially self-supporting by the end of FY2017 though funding from municipalities, home-owners associations, and individual gardeners.

Long-Term Outcomes:

1. Enhancement of the localized population of Eastern oysters to our Inland Bay by introducing 12,000 oysters in the two-year cycle. This will provide 1440 square feet of habitat, filter as much as 600,000 gallons of water per day, and sequester as much as 16.5 pounds of nitrogen per year.
2. Increasing general partnerships between participating organizations and the CIB. This includes College of Earth, Ocean and Environment, Town of South Bethany, and local Your Creek initiatives.

Long-Term Outcomes:

3. Increase development opportunities with water-front property owners through three-times-yearly electronic communications and the yearly Oyster Gardening Kick-off event.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2015	16

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	$ 0.00	$ 500.00
Town of South Bethany	Oyster Gardening Program		$ 800.00	$ 0.00	$ 800.00
Town of South Bethany	Oyster Gardening Program		$ 1,000.00	$ 0.00	$ 1,000.00
DNREC	FY2016 DNREC Operating Grant		$ 7,056.00	$ 0.00	$ 7,056.00
Center for the Inland Bays	FY2016 Private Operating Revenue		$ 2,312.00	$ 0.00	$ 2,312.00
		Totals:	$ 21,840.80	$ 0.00	$ 21,840.80

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	Completed	05/29/2014	06/30/2014			
expand number of gardeners	Completed	05/29/2014	07/31/2014			
plant collected oysters (30-50 bushels)	Completed	05/29/2014	07/18/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
report current program goals and outcomes	Completed	05/29/2014	10/02/2014			
incorporate development goals	Completed	05/29/2014	06/30/2014			
bag oyster shell and set oyster larvae	Completed	05/29/2014	06/12/2015			
distribute spat bags and collect gardener oysters	Completed	05/29/2014	07/31/2015	09/10/2015		
plant collected oysters	Completed	05/29/2014	08/21/2015			
incorporate development goals	Not Initiated	05/29/2014	06/30/2015	10/30/2015		
Oyster Gardening Kick-Off	Completed	05/26/2015	06/04/2015			
Expand Gardening sites to 120	Initiated	05/26/2015	07/31/2015			
Visit sites; collect 2 year-old oysters	Completed	05/26/2015	07/10/2015			
Distribute new spat	Initiated	05/26/2015	07/10/2015			
Plant 2 year old oysters	Initiated	05/26/2015	07/14/2015			

Annual Report:

The Oyster Gardening project is being revitalized by new Project Manager Bob Collins. In the second quarter of 2015, two electronic communications (Save-the Date, Kick-off Announcement) have been sent to the Oyster Gardens listed in the Bloomerang data-base. Planning of the Oyster Gardening Kick-off has been occurring in cooperation with John Ewart of University of Delaware for the June 4th event. Potential new gardeners are being recruited through various methods, including through the Your Creek project.

This Oyster Gardening project has been operational since 2003 and has provided a wealth of information about the benefits of oysters and how they will grow in the Inland Bays. It has also grown a corps of dedicated, long-time gardeners who will continue to inspire the project and there is strong interest by potential gardeners in many diverse areas of the watershed. So the long term outlook of the project is bright, not only to be able to have this as a tool to interact with bay-front homeowners, community associations and municipalities, but also as a continued, reliable source of oysters for restoration/ enhancement projects.

However, in the course of the project, many recording aspects have become sloppy, and precise data such as participant location, contact information, etc. do not appear to be accurate. Natural attrition, aging participants and the "moving-on" of the longtime project manager are responsible. But for Oyster Gardening to remain viable, there needs to be considerable effort in updating records, recruiting new participants and building communications. That will be the focus of the project in the upcoming “gardening season”

In FY2015 the project manager will work with staff outreach and development coordinators 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

Annual Report:

development materials would be made using non-EPA funds

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

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

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. But, for generations, spent oyster shells were used to build roads, driveways and houses and, 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 was developed to implement a shell collection project 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 realized the goal of setting up agreements with ten facilities and collecting over 300 bushels of shell. A part-time employee was hired to pick-up shell on at least a weekly basis. A curing facility is located at Fresh Pond Tract of Delaware Seashore State Park in order to handle and rotate all incoming shell. We anticipate that volunteers will be used to prepare the shell for enhancement projects in late summer or early fall of 2015.

Outputs/Deliverables:

1. Collection of 1,000 bushels of shell in the first year of collections (September 2014 through August 2015) Projected collection yield in FYE 2016 will increase to 1250 bushels. This represents approximately 20 tons of material the first operating year, and 25 tons of material in FYE 2016 diverted from landfills for use in oyster reef creation projects.
2. 1,000 program brochures on the ecological benefits of oysters including sponsor identification; 400 "Don't Chuck Your Shucks" promotional shucking knives.
3. Purchase and construction of recycling program infrastructure and materials for long-term project management.

Outputs/Deliverables:

4. Continuation of recycling agreements with at least ten restaurants; collection of shell from at least three other special events

Long-Term Outcomes:

1. Increased public awareness of the Bays and the ecological value of oysters and their shell.
2. A dependable source of oyster shell to use on restoration and enhancement projects
3: Development of restaurants and other facilities (fire companies, etc., who hold oyster-eating events)
4. Opportunities for sponsors and participants to volunteer to bag shell for restoration and enhancement projects.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

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 Recyling 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
The Nature Conservancy	FY2016 Oyster Shell Recycling		$ 2,500.00	$ 0.00	$ 2,500.00
		Totals:	$ 41,771.35	$ 670.00	$ 42,441.35

PROJECT PROGRESS

Beginning Date: 04/01/2014 Project Status: Ongoing "On Track"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Secure agreement for project site	Completed	05/29/2014	06/06/2014			
Secure grant contract and funding	Extended	05/29/2014	06/13/2014			
Obtain verbal agreements for service with local restaurants	Completed	05/29/2014	06/27/2014			
Build site for shell collection	Completed	05/29/2014	06/23/2014	05/01/2015	08/01/2015	
Design outreach material	Completed	05/29/2014	06/30/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Collect shell	Initiated	05/29/2014	06/30/2014			
Media Updates	Initiated	05/29/2014	07/31/2014			
Cure and use shell in Inland Bays	Initiated	05/29/2014	10/30/2015			
Increase restaurant participation	Completed	05/29/2014	04/30/2015			
Identify and secure local funding sources	Completed	05/29/2014	03/31/2015			

Annual Report:

The “Don’t Chuck Your Shucks” project collected some 300 bushels of shell since its inception in late summer 2014. Throughout the winter, once-weekly collection occurred. Twice weekly collection is scheduled to begin in June and continue through September. A part time employee has been making these pick-ups. We conservatively estimate collection of 700 more bushels by the end of the first collection year. In FYE 2016, it is anticipated that a 25% increase in collection is feasible through efficiencies, having restaurant buy-in to the program, and addition of at least one significant oyster-eating event that was not on the schedule in 2015.

Still, this amount is smaller than the 6000 bushels estimated by the previous project manager. Justification for that number is unknown and, frankly, unrealistic. This number exceeds the storage capacity three-fold.

Shell is being stored in a secured site at Fresh Pond tract. The first bin has just finished being filled; it is closed off, scheduled for turning, and will be cured for a several months. A volunteer bagging event is envisioned for the fall.

Completion of the bin area has proved difficult; purchase of waste cement bumper-blocks has proved difficult. A project extension was granted March 13, 2015. Division of Waste Management was notified May 4 of continued delays in purchase of container blocks.

Agreements have been reached with 12 restaurants. Outreach to restaurants in the summer season is being planned.

In fall of 2014, CIB entered into a partnership with Clean Green Horizon, LLC, to assist in collection. CIB later learned Clean Green Horizons developed a similar program that seemed to portray itself as a non-profit organization (CIB believes it is not). Furthermore, CIB believes that Clean Green Horizons is collecting shell for purposes other than restoration projects; we know of no other non-profit, restoration organization accepting their shell. Since CIB could not then, and cannot now, verify the sincerity of Clean Green Horizon’s intentions, that partnership was dissolved in December of 2014.

Poplar Thicket Upland Habitat Restoration Project

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

Primary Project Partner Contacts:

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

David Baird, Sussex Conservation District

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

Carl Neutzel, Owner, Carl W. Neutzel Landscape Services, Contractor

Supporting Project Partner Contacts:

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

Robert Palmer, Program Manager II, DNREC -- Divison 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 that will benefit Species of Greatest Conservation Need as identified in the Delaware Wildlife Action Plan.

Outputs/Deliverables:

1. When this phase is completed, approximately 10 acres of previously fallow agricultural land will be planted to scrub/shrub upland habitat. Approximately 4 acres of area, planted in 2013 but poorly established, will be replanted.
2. 5800 native trees and shrubs, selected for wildlife value, will planted.

Outputs/Deliverables:

3. Population of invasive plant species will reduced, allowing for more rapid establishment of desirable tree and shrub species.
4. Four existing deer exclosure structures will be repaired.

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. Habitats of Conservation Concern (HCC), as identified in the Delaware Wildlife Action Plan (DEWAP) for scrub/ shrub upland habitat, will be enhanced to benefit up to four Tier 1 and twelve Tier 2 Species of Greatest Conservation Need (SGCN).
3. Best Management Practices for conversion of fallow agricultural fields to HCC's will be identified and refined for the Inland Bays watershed.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Primary

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Forest/Woodland	Reestablishment	Acres	14.00

Pollutant Information:

Pollutant	Year Reduced	Lbs Reduced
Nitrogen	2016	100
Phosphorus	2016	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	$ 5,586.00	$ 0.00	$ 5,586.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 5,208.00	$ 0.00	$ 5,208.00
DNREC	FY2016 DNREC Operating Grant		$ 4,916.96	$ 0.00	$ 4,916.96
USFWS	”State Wildlife Grant- Conservation		$ 9,176.40	$ 4,277.20	$ 13,453.60
		Totals:	$ 24,887.36	$ 4,277.20	$ 29,164.56

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				
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	Initiated	05/28/2015	08/15/2014			
Evaluate potential to work on farmed/non-tidal wetlands onsite	Cancelled		09/15/2014			
Secure funding to restore/enhance farmed/non-tidal wetlands	Initiated	05/21/2015	06/30/2015	09/11/2015		
Select planting contractor	Not Initiated	05/28/2015	10/01/2015			
Repair exclosures	Not Initiated	05/28/2015	10/30/2015			
Fall weed control measures	Not Initiated	05/28/2015	10/30/2015	11/30/2015		
Spring/summer weed control measures	Not Initiated	05/28/2015	08/01/2016			
Plant trees	Not Initiated	05/28/2015	12/18/2015			

Annual Report:

In April of 2015, an application for grant funding was submitted through Delaware Division of Fish and Wildlife to the US Fish and Wildlife Service ”State Wildlife Grant- Conservation Partner Habitat Restoration and Enhancement”. This funding is for enhancement of Habitats of Conservation Concern (HCC) that benefits Species of Greatest Conservation Need (SGCN) as defined by the Delaware Wildlife Action Plan (DEWAP). This proposal addresses reforestation, invasive species control and other habitat enhancement projects at the Marion R. Okie Wildlife Preserve at Poplar Thicket, owned by the Delaware Division of Fish and Wildlife. The majority of the funding would be used for mechanical planting in late fall, planting 5800 bare-root seedlings on ten acres of previously fallow, former grain fields. An additional four acres of land that were previously planted inside deer exclosure structures experienced poor planting success due to drought and other factors. The exclosures will be repaired and supplemental planting will take place.

The proposed planting procedure is documented by University of Tennessee extension publication SP663, Tree Planting Procedure for Small, Bare-Root Seedlings (David Mercker, Extension Specialist Forestry, Wildlife and Fisheries, 2005). Planting would occur in the late fall using bare-root seedlings procured from the Maryland State Nursery. This method allows seedlings to develop root mass and become established prior to the droughty warm season months. Typically, the winter months are wetter and less stressful on seedlings than the summer months. The majority of plants would be installed with a tractor-mounted implement, but a substantial amount would be installed manually in a volunteer effort.

There would be efforts to control invasive plant species, primarily via herbicide applications. However, all control methods will involve an Integrated Pest Management (IPM) approach. This project, in conjunction with other reforestation projects employed by the CIB, will seek to identify, refine and employ Best Practices for invasive weed species control.

Shellfish Enhancement Action Plan

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

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

Supporting Project Partner Contacts:

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

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

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

Danielle Kreeger, Science Director, Partnership for the Delaware Estuary, Technical review

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 - 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

Project Overview:

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.

This Action Plan will outline a science-based strategy for selection of future shellfish restoration projects. It will include consideration of BMP's, suitable locations, historical restoration activities, ecosystem changes, permitting needs, public use, advancing technologies and other identified variables. Overall this action plan will serve as a resource that: (1) identifies and documents what past and current shellfish restoration/enhancement projects and activities have occurred and are occurring in Delaware's Inland Bays; (2) provides a list of priority restoration activities that can be implemented when funding sources and partnering opportunities are identified. Each specific identified potential project, and potential project locations, will have quantifiable outcomes. These may include: 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 formation of a workgroup cionsisting of partner organizations currently engaged in management or restoration oof shellfish populations, habitats or fisheries in the Inland Bays. They will assist the CIB in prioritizing goals and strategies for plan and in identifying funding sources and partners to assist in its implementation. We will be seeking grant funding for restoration consultant support in facilitating workgroup discussions and writing the final plan.

Outputs/Deliverables:

1. Formation of workgroup.
2. Document current and historical shellfish restoration projects in order to develop and document potentially successful restoration/enhancement projects and concepts.
3. Shellfish restoration plan developed to the project concept level, including potential project locations, GIS data, costs, strategies and methods, and environmental benefits.

Long-Term Outcomes:

1. Quantifiable increase in shellfish restoration projects implemented.
2. Quantifiable increase in nutrient reduction and restored acres of aquatic habitat.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Improving Water Quality Monitoring

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 "Major Delays"

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Identify workgroup members, goals and milestones	Initiated	05/28/2015	08/01/2015			
Pursue grant funding	Initiated	05/28/2015	11/01/2015			
Workgroup meeting	Not Initiated	05/28/2015	10/15/2015			
Draft plan	Not Initiated	05/28/2015	12/31/2015			
Final plan	Not Initiated	05/28/2015	02/01/2016			

Annual Report:

No progress was made on this project due to staff turnover. With the hire of a new Science and Restoration Coordinator, work on the plan will begin again in 2015.

Shorezone Fish Community Volunteer Monitoring Program

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Ron Kernehan, Volunteer, CIB Volunteer Project Coordinators, Coordinator

Supporting Project Partner Contacts:

Jordan 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 and Restoration Coordinator, using volunteer labor. Team leaders and volunteers will be trained annually, and the Science and Restoration Coordinator will ensure compliance with the QA goals. 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 continous long-term monitoring project. A steering committee that includes both state and university fisheries biologists meets annually to review the survey protocols and data.

Outputs/Deliverables:

1. Monitoring database of annual fish and physical findings.
2. Develop/update shorezone fish sampling QAPP.
3. Annual monitoring reports and presentation.
4. Public outreach through informal communication, formal presentation, and distribution of study educational brochures.
5. Status and trends reports every 5 years.

Long-Term Outcomes:

1. Tracking of long-term trends in shorezone fish populations and communities.
2. Determine the relationship between the nearshore and open water fish diversity and abundances.
3. Determine relationships between inshore fish communities and shoreline/habitat characteristics (such as hardening of shorelines).
4. Increased awareness of the Center for the Inland Bays and its mission among the general public.

Clean Water Act Programs:

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

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
DNREC	FY2016 DNREC Operating Grant		$ 929.00	$ 0.00	$ 929.00
EPA	FY2016 EPA NEP Operating Grant		$ 3,069.00	$ 0.00	$ 3,069.00
		Totals:	$ 12,648.00	$ 0.00	$ 12,648.00

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	Extended		05/15/2014	05/01/2015	12/31/2015	
Hold annual steering committee meetings to discuss findings and implementation (re-occuring yearly).	Completed		03/15/2015			
Complete annual QA/QC reports for monitoring (re-occuring yearly).	Not Initiated		12/15/2014			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete status and trends report after 5 years of sampling	Not Initiated		04/28/2016			
Complete Annual 2014 Report	Extended		06/15/2015	01/31/2016		
Complete Annual 2013 Report	Extended		12/30/2014	01/31/2016		
Hold 2016 steering committee meeting	Not Initiated	05/26/2015	03/18/2016			
Conducted 2016 volunteer and team leader training	Not Initiated	05/26/2015	03/18/2016			
Collect 2016 data and QA review	Not Initiated	05/26/2015	10/31/2016			
Complete annual report of 2015 data	Not Initiated	05/26/2015	01/31/2016	04/30/2016		
Complete annual report of 2016 data	Not Initiated	05/26/2015	01/31/2017			
Complete annual report of 2012 data.	Completed		04/30/2015			

Annual Report:

The 2014 sampling season was completed, twice monthly from April to November. The Inshore Fish Survey steering committee met on March 4, 2015. Results of previous year were reviewed at that meeting, The QAPP drafted in 2014 also was reviewed by the committee, and it was recommended that the QAPP be revised to better reflect current methodology. The Science and Restoration Coordinator will complete that revision by October 2015. The technical report of 2012 fish survey results was published in print and on the CIB website. Draft 2013 and 2014 sampling reports were completed. A volunteer orientation and training was held at CIB on March 12, 2015. The 2015 sampling season began in April.

Your Creek

MANAGEMENT AND PARTNERS

CIB Project Manager: Sally Boswell

Primary Project Partner Contacts:

Andrew Homsey, Gis Services Manager, University of Delaware -- Institute for Public Administration, Water Resources Agency

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.

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, land use, status of habitat, and potential threats or concerns specific to each watershed. The CIB Science and Restoration Coordinator will produce the data for these reports. A technical report that describes methods used to develop the indicators and their trends, and the data produced, will be developed for each creek, and indicators will be incorporated into outreach materials, including a 'State of the Creek' report.

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. Form a Creek Team for each Creek in the project and identify a Creek Team Leader.
2. Design and distribute a watershed survey in each Your Creek community to solicit information on concerns, opinions, and

Outputs/Deliverables:

understanding.
3. Plan at least one kayak trip and one field trip to a restoration or project sites in each creek watershed to familiarize creek teams with their creek and its watershed.
4. Design and produce education/outreach materials and media for each Creek including webpage, blog, and powerpoint.
5. Gather data on environmental indicators and produce a 'State of the Creek' report for each creek.
6. Using social and traditional media, website, disseminate the State of the Creek reports and information to creek communities.
7. Community presentations and and outreach events,
8. Engage Team members in citizen science and/or outreach activity in their creek watershed; maintain and/or improve water quality monitoring of creeks.

Long-Term Outcomes:

1. Increase awareness and support of the Inland Bays among communities and townships in the watershed.
2. Empower communities with knowledge and information to act on behalf of their local creek and its watershed; create connection and familiarity with the tributaries of the Inland Bays that results in increased public participation in public policy issues. As Creek Teams coalesce in sharing information and reaching out into their communities, it is anticipated that some Creek Teams will become "Friends of" groups.
3. Increased adoption of pollution control practices by residents; improved water qualtiy in Your Creek tributaries
4. Increased membership and support for CIB.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Developing Total Maximum Daily Loads

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

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	$ 0.00	$ 93.00
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	$ 9,927.00	$ 8,184.00	$ 18,111.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 185.00	$ 0.00	$ 185.00
EPA	FY2016 EPA NEP Operating Grant		$ 7,300.00	$ 0.00	$ 7,300.00
		Totals:	$ 21,829.00	$ 11,352.00	$ 33,181.00

PROJECT PROGRESS

Beginning Date: Project Status: Ongoing "Minor Delays"

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 Love Creek Team and identify leadership	Completed	11/21/2013	02/26/2014			
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 for Love Creek	Completed	02/26/2014	04/24/2014			
Host familiarazation kayak trip for the Love Creek Team	Completed	03/26/2014	05/19/2014			
Create webpage for Your Creek	Completed	11/21/2013	06/20/2014			
Distribute Love Creek Survey and evaluate results	Completed	05/30/2014	07/31/2014			
Selection of common indicators and creek-specific indicators for Love Creek	Completed	05/30/2014	07/18/2014			
Publish outreach/education brochure/flyer for Love Creek	Extended	05/30/2014	10/29/2014	08/31/2015		
Develop Your Creek exhibit	Extended	05/30/2014	10/29/2014	09/30/2015		
Develop powerpoint for Your Creek project	Completed	05/30/2014	01/30/2015			
Produce and install signs on Love Creek	Initiated	05/30/2014	08/31/2015			
Form Derickson Creek Team	Completed	12/01/2014	02/20/2015			
Dirickson Creek Publish outreach/education brochure	Extended	12/04/2014	03/31/2015			
Create powerpoint for Love Creek	Completed	12/04/2014	01/31/2015			
Dirickson Creek-Create powerpt	Extended	12/04/2014	03/31/2015			
Complete design and distribution on online survey for Dirickson Creek	Completed	05/25/2015	09/30/2015			
Create Dirickson Creek webpage	Initiated	05/25/2015	06/30/2015			
Create Love Creek blog	Completed	03/02/2015	05/15/2015			

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete State of Love Creek Report	Extended	11/28/2014	06/01/2015			
Complete environmental indicators for Dirickson Creek	Not Initiated	05/25/2015	09/30/2015			
State of Dirickson Creek report finalized	Not Initiated	05/25/2015	10/30/2015			
Organize a paddle trip on Dirickson Creek to familiarize Creek Team members with their Creek.	Completed	04/01/2015	07/30/2015			
Dirickson Creek Team begins community outreach-target of five presentations to HOA's/organizations	Initiated	05/26/2015	10/30/2015			
Draft State of Dirickson Creek report developed	Initiated	05/28/2015	09/01/2015			
Technical review of State of Dirickson Creek draft report	Not Initiated	05/28/2015	09/30/2015			
Love Creek Team presents to five HOA's/organizations in the creek watershed	Initiated	04/01/2015	12/31/2015			

Annual Report:

Launched this multi-year project focusing on Love Creek as our 'pilot' for the Your Creek initiative. A Love Creek Team leader was named; a Team formed, an online survey developed and distributed; two kayak trips were offered to inspire and educate Team members. Press was also invited which resulted in several news stories about the program. 'Your Creek' and 'Love Creek' pages were created on the website. Environmental indicators were selected and the data was compiled which will be published as a 'State of Love Creek' report to be distributed to team members and the community, and will available on our website. About fifty community members are on the email list of the Love Creek Team. Ten of them participated on a Love Creek field trip to the Angola Neck Preserve in April. Development of a Love Creek blog was just completed and will be announced through social media in June. Presentations were made to two HOA's in the Love Creek watershed reaching 52 people.

Due to the departure of a key staff member in September 2014, the work on the indicators for Love Creek was delayed, which held up completion of the State of Love Creek Report and various outreach/education materials that would be developed from them. We are back on track and expect to complete those materials by early fall 2015.

In November 2014, the first meeting of the Dirickson Creek Team was held and a Team Leader named. Development of the Dirickson Creek Survey is complete and it will be distributed this summer by members of the team and through social media. Several Team members are working with the UD Citizen Monitoring Program collecting water quality data on Dirickson Creek and five new Oyster Gardening sites will be established this season on Dirickson Creek.

At the start of this project, we had anticipated starting work on Vines/Pepper Creek soon after establishing the Dirickson Creek Team, but, on the challenge side, staff changes delayed work on the environmental indicators and compilation of data, and on the positive side, we could not have anticipated the tremendous opportunities for community partnerships that these Teams have presented. We have created a new model for community engagement and each Team presents new opportunities for involvement. As we move to

Annual Report:

each new creek, we are taking our lessons learned with us and building on them.

PROPOSED PROJECTS

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Scott Andres, Senior Scientist, Delaware Geologic Survey, Data provider and reviewer

Andrew Homsey, Gis Services Manager, University of Delaware -- Institute for Public Administration, Water Resources Agency,

Frank Piorko, Division Director, DNREC -- Divison of Watershed Stewardship, Data provider and reviewer

Ed Whereat, Program Coordinator, University of Delaware -- College of Earth, Ocean, and Environment, Data provider

Supporting Project Partner Contacts:

David Saveikis, Division Director, DNREC -- Division of Fish and Wildlife, Data provider

Virgil Holmes, Division Director, DNREC -- Division of Water, Data provider

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:

A suite of indicators were selected by the Indicators Subcommittee of the Inland Bays Scientific and Technical Advisory Committee. These were selected based on their usefulness to provide the following:

- Evaluate progress in the Inland Bays restoration effort;
- Monitor environmental condition and environmental response to restoration efforts;
- Provide information needed to establish restoration goals;
- Regularly inform and involve the public in achieving the restoration goals; and,
- Make detailed information and reference data available to others.

These indicators are used by the Center to produce a ‘State of the Inland Bays’ report, which, in part, assesses progress toward meeting the goals of the CCMP. The next report is due to be published in 2016. Indicators will be presented, in an accessible format, to show status and trends in watershed condition, nutrient loads and management, water quality, living resources, pathogens and contaminants, and climate.

Writing of the 2016 State of the Bays report will be led by the CIB Science and Restoration Coordinator, with assistance from other CIB staff, and the STAC.

Outputs/Deliverables:

1. ‘2016 State of the Inland Bays’ report.
2. Press event to announce the report’s publication.

Long-Term Outcomes:

1. Assessment of progress toward achieving goals of the Inland Bays CCMP.
2. Assessment of progress toward achieving goals of the Inland Bays Pollution Control Strategy and meeting TMDLs for nitrogen, phosphorus and bacteria.
3. Update and calibration of Inland Bays water quality and hydrodynamic models.

Clean Water Act Programs:

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2016 DNREC Operating Grant		$ 8,435.00	$ 0.00	$ 8,435.00
EPA	FY2016 EPA NEP Operating Grant		$ 38,049.00	$ 0.00	$ 38,049.00
		Totals:	$ 46,484.00	$ 0.00	$ 46,484.00

PROJECT PROGRESS

Beginning Date: 10/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Indicators and trends compiled.	Not Initiated	05/26/2015	03/01/2016			
Draft report written.	Not Initiated	05/26/2015	06/30/2016			
Final report printed.	Not Initiated	05/26/2015	08/31/2016			
Press event to announce the 2016 report release.	Not Initiated	05/26/2015	09/30/2016			

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Ed Whereat, Program Coordinator, University of Delaware -- College of Earth, Ocean, and Environment, Project Coordinator

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:

The University of Delaware Seagrant Marine Advisory Service's Citizen Monitoring Program (CMP) has been collecting samples for the analysis of Dissolved Inorganic Nitrogen and Dissolved Inorganic Phosphorous for over 15 years. CMP data are used, along with data from other sources, for the Center's 'State of the Inland Bays' reports. The next State of the Bays report is due in 2016, and the nutrient data are required to continue our trend analyses. In addition, CMP data are being used to develop indicator reports for each of the Center's Your Creek projects. The Center also has a goal of having the CMP nutrient data incorporated in DNREC's 305b reports.

Because of budget and staffing cuts, the CMP has not been able to keep up with nutrient analyses and has accumulated a backlog of filtered frozen samples. Currently, they are between 1 to 3 years behind on analyses depending on the site. Other parameters associated with the same samples include Total Suspended Solids and Chlorophyll a, but these analyses have been kept current. Longer term changes in CMP mission and budget will further limit any staff time that could be devoted to nutrient analyses. Therefore the Center will provide support to CMP for analysis of backlogged nutrient samples taken at nine stations that are key producing our State of the Bays and Your Creek indicator reports. Support will also be provided to continue nutrient analyses this year at thee nine stations and to reactivate one key station in Herring Creek that was recently discontinued by CMP.

The CMP maintains a QAPP for their monitoring program. The Center intends to enter into a sub-award agreement for the work. The work qualifies as a sub-award because the sub-recipient University of Delaware Seagrant Marine Advisory Service will use the funds to carry out the Citizen Monitoring Program which will maintain programmatic decision making. However, CIB and CMP have a long history of working cooperatively on monitoring. Further CIB would not conduct nutrient monitoring as a part of its normal business operations and the data are used for Clean Water Act assessment and reporting (303(d) list of impaired waters).

Outputs/Deliverables:

1. Submission to the Center by CMP of inorganic nitrogen and phosphorus data from backlogged frozen samples collected at nine stations.

Outputs/Deliverables:

2. Annual submission to the Center by CMP of inorganic nitrogen and phosphorus data collected at ten key Inland Bays stations.

Long-Term Outcomes:

1. Long-term nutrient trend analyses for 'State of the Inland Bays' and Your Creek indicator reports.
2. Assessment of progress toward achieving goals of the Inland Bays Pollution Control Strategy and meeting TMDLs for nitrogen, phosphorus and bacteria.
3. Update and calibration of Inland Bays water quality models.

Clean Water Act Programs:

Improving Water Quality Monitoring

Clean Water Act Program Implementation Role: Primary

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	$ 9,600.00	$ 0.00	$ 9,600.00
		Totals:	$ 9,600.00	$ 0.00	$ 9,600.00

PROJECT PROGRESS

Beginning Date: 06/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Backlog of frozen nutrient samples analyzed & reported to CIB.	Not Initiated	05/26/2015	09/01/2015			
Report of all nutrient data, by station, through December 2015 received from CMP.	Not Initiated	05/26/2015	01/01/2016			
Completion of updated QAPP.	Not Initiated		01/31/2016			

Anchorage Canal Drainage Area Stormwater Retrofit Demonstration -- Sandpiper Pines Bioretention Areas and Infiltration Trenches

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

George Junkin, Town Councilman, Town of South Bethany

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:

This project will provide full survey, design, permitting, and construction of 6 bioretention/infiltration trench areas and two infiltrations trenches within the Sand Piper Pines Subdivision of the Town of South Bethany to treat stormwater runoff from 10 acres of residential development. The objective for this project is to reduce the pollutant loads to the Anchorage Canal and Little Assawoman Bay by an estimated 14.97 pounds of nitrogen, 2.04 pounds of phosphorus, and 452.7 pounds of sediment per year in accordance with the Pollution Control Strategy action for stormwater retrofitting for the Inland Bays. A secondary objective of this project is the education of the community to the water quality issues within the South Bethany Canals and the Little Assawoman Bay. The project is funded primarily by a grant from the Delaware Water Infrastructure Advsiory Council Community Water Quality Improvement Grant Program. The project is the fifth major implementation effort to implement this Stormwater Retrofit Demonstration Initiative which began with a planning study in 2008. The Initiative has demonstrated a variety of coastal stormwater retrofits with a focus on low cost solutions and native coastal vegetation. This particular project follows the retrofit conceptual design report for the Sandpiper Pines Area completed in 2014 using funding from the EPA. The project is anticipated to begin with the grant award in January of 2015. The Center coordinated the grant proposal for the project and will provide project oversight and outreach assistance. The Town of South Bethany will be the fiscal agent for the project and will competitvely select a design build contractor.

Outputs/Deliverables:

1. Construction of 6 bioretention facilities and 2 infiltration trenches to treat stormwater runoff from 10 acres of residential development.
2. At least two education and outreach actions on the project including press releases to local media.

Intermediate Outcomes:

1. Reduction of an estimated 14.97 lbs of nitrogen to Anchorage Canal and Little Assawoman Bay annually.
2. Reduction of an estimated 2.04 lbs of phosphorus to Anchorage Canal and Little Assawoman Bay annually.
3. Reduction of an estimated 452.7 lbs of sediment to Anchorage Canal and Little Assawoman Bay annually.

Intermediate Outcomes:

4. Progress towards the Inland Bays Pollution Control Strategy Goal of treating 4,500 acres of lands developed prior to the State Stormwater Regulations.
5. Increased understanding of local population of stormwater impacts to water quality and their cleanup.

Long-Term Outcomes:

1. Improved water quality (reduced nutrient and algal concentrations and improved dissolved oxygen and water clarity) in the Anchorage Canal and Little Assawoman Bay.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Clean Water Act Program Implementation Role: Significant

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	$ 1,445.00	$ 0.00	$ 1,445.00
DNREC	Community Water Quality		$ 136,900.00	$ 0.00	$ 136,900.00
		Totals:	$ 138,345.00	$ 0.00	$ 138,345.00

PROJECT PROGRESS

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

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Contractor Selection	Completed	12/01/2014	03/15/2015			
Survey, Geotech, and Concept Plans Completed	Initiated	12/01/2014	07/15/2015			
Final Design Plans with Homeowner Input	Not Initiated	12/01/2014	09/30/2015			
Physical Construction Completed	Not Initiated	12/01/2014	04/30/2016			
Outreach Actions Complete	Initiated	12/01/2014	06/30/2016			

Annual Report:

Chris Bason presented the project to the Association of National Estuary Program and EPA Headquaters Meeting in Washington DC and at a meeting of Sussex County Municipalities to provide a forum on how municipalities are dealing with flooding and water quality concerns. In early spring 2015, South Bethany selected EA Engineering and A-Del Construction as project contractors. A kickoff meeting was held on May 8th. After reviewing the areas, slight adjustments to the concepts have been approved and design is underway. The project is running smoothly with no contingencies.

Assessment and Progress Report on the 2008 Inland Bays Pollution Control Strategy

MANAGEMENT AND PARTNERS

CIB Project Manager: Chris Bason

Primary Project Partner Contacts:

Frank Piorko, Division Director, DNREC -- Divison of Watershed Stewardship, Strategy Manager

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: Annually report on watershed agricultural BMP implementation including PCS goals for cover crop acreage, manure storage sheds, and manure relocated or put into alternative use.

Project Overview:

In 2008, the Delaware Dept. of Natural Resources and Environmental Control promulgated the Inland Bays Pollution Control Strategy (PCS). The result of a decade of agency deliberation and community input, the Strategy detailed 47 voluntary and regulatory actions necessary to achieve the Total Maximum Daily Loads of nitrogen and phosphorus to the Inland Bays and their tributaries. Full implementation of the strategy was estimated to cost over $25 million annually. However, no dedicated funding was made available for implementation. Therefore, the largely-voluntary strategy has had at best mixed results that have only been partially reported on once in the 2011 State of the Bays Report.

In 2014, the DNREC and CIB reached agreement that, due to limited resources within DNREC, CIB would lead the coordination and reporting of PCS implementation. This project meets a critical need for public reporting and engagement on large-scale actions to restore the water quality of the Bays. This project will develop the first annual progress report of the PCS for public consumption to be completed by September 2016. The report will include an assessment of the major actions by pollutant source and make recommendations for a revision of the strategy due in 2018. The Center's Watershed Coordinator will work with DNREC and parties responsible for implementing the Strategy to complete the assessment and recommendations. An annual reporting process and reporting commitments from responsible agencies will be developed. Design and release of the report will be coordinated with the release of the 2016 State of the Bays Report. The report will be made available to the public and promoted through media. The assessment working group and the Watershed Coordinator will determine the format and means of publication of the report during the project period. Partial report design will be accomplished by CIB staff and the working group may advise the use of a professional design contractor. EPA funds are budgeted for design and printing. The project has a goal of presenting the report to 750 individuals in person.

Outputs/Deliverables:

1. Progress report on implementation of the Inland Bays Pollution Control Strategy (PCS) including recommendations for Strategy revision.

Outputs/Deliverables:

2. Press event on the release of the report.
3. Presentation to 750 individuals on the report.
4. Annual reporting procedure and commitments from agencies responsible for implementing the Strategy.

Long-Term Outcomes:

1. Regular annual progress reports on the PCS.
2. Increased awareness by the general public and responsible agencies about progress towards implementing the PCS.
3. Accelerated implemenation of the PCS and acheivement of water quality standards due to improved agency coordination and awareness.

Clean Water Act Programs:

Identifying polluted waters and developing plans to restore them (total maximum daily loads)

Clean Water Act Program Implementation Role: Primary

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
EPA	FY2016 EPA NEP Operating Grant		$ 15,310.00	$ 0.00	$ 15,310.00
		Totals:	$ 15,310.00	$ 0.00	$ 15,310.00

PROJECT PROGRESS

Beginning Date: 10/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Convene PCS assessment and reporting working group	Not Initiated	05/24/2015	11/01/2015			
First draft of progress towards individual actions	Not Initiated	05/24/2015	05/01/2016			
First draft of recommended revisions for strategy	Not Initiated	05/24/2015	08/01/2016			
Final report designed and printed.	Not Initiated	05/24/2015	09/01/2016			
Press event on report.	Not Initiated	05/24/2015	09/30/2016			

CIB General Brochure

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:

We propose to design and produce a general information brochure about the Delaware Center for the Inland Bays; the areas of mission, challenges to be met, and work of the CIB and its partners to meet those challenges. It will highlight opportunities for citizen participation and support. It will replace the brochure that was published in 2005.

Community outreach, such as events and speaking engagements continue to be important opportunities to reach residents and visitors to our watershed, and this is an important tool in that endeavor. It will be used as an introduction to our organization at community outreach events, trainings, Speakers Bureau engagements and at major points of contact such as libraries, town halls and visitor centers. It will also be used for development purposes. We propose a tri-fold brochure, which will also be available as a pdf on our website. Completion date for this project: September 2016

Outputs/Deliverables:

Production of a brochure highlighting the mission and work of the Delaware Center for the Inland Bays for printed and digital distribution. Distribution of the brochure through community outreach opportunities and through social media.

Long-Term Outcomes:

Increased public outreach and awareness about the mission and work of the Delaware Center for the Inland Bays, and awareness of the opportunities for citizen participation and support over the next five years.

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 1,500.00	$ 0.00	$ 1,500.00
EPA	FY2016 EPA NEP Operating Grant		$ 2,311.00	$ 0.00	$ 2,311.00
		Totals:	$ 3,811.00	$ 0.00	$ 3,811.00

PROJECT PROGRESS

Beginning Date: 06/15/2016 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Develop concept	Not Initiated	05/20/2015	06/30/2016			
Write copy and obtain photos	Not Initiated	05/20/2015	07/30/2016			
To graphic designer-mockup, copy and photos to graphic designer	Not Initiated	05/20/2015	08/15/2016			
Print brochure	Not Initiated	05/20/2015	08/30/2016			
Develop plan for distribution of printed copies	Not Initiated	05/20/2015	08/30/2016			
Plant for digital distribution	Not Initiated	05/20/2015	08/30/2016			
Distribute via email blast to 3000 watershed residents and property owners when published	Not Initiated	09/01/2015	09/30/2016			
Post on website	Not Initiated					
Provide link on Facebook to brochure	Not Initiated					
Crosspromote on other social media including Twitter and Instagram	Not Initiated					

Ecological and Economic Benefits of Living Shorelines White Paper

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

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

Danielle Kreeger, Science Director, Partnership for the Delaware Estuary, Technical partner

Sunny Jardine, Assistant Professor, University of Delaware -- College of Earth, Ocean, and Environment, 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: Support legislative and/or regulatory changes needed to require that living shoreline techniques be employed wherever feasible for shoreline stabilization.

Project Overview:

The Center has undertaken an initiative to maximize the use of living shorelines stabilization techniques in order to protect the water quality and habitat of the estuary. The initiative is a focus of the Comprehensive Conservation and Management Plan (CCMP) for the Inland Bays. The ultimate goal of the initiative is policy to require the use of living shoreline management techniques when shorelines are altered and where physical conditions allow.

A key to addressing policy changes in the state will be providing data to the public and to decision makers about the holistic benefits of these practices. To this end, the Center will work with natural resources economists from the University of Delaware to develop and publish a white-paper literature synthesis that will compare the effects of shoreline management types (including living shoreline management techniques) on ecosystem components and services. The review will also focus on the economics of the techniques, using local data. U of D will be responsible for writing the paper. CIB will provide input and convene technical partners to assist. Technical input will be provided by members of the Delaware Statewide Living Shorelines Workgroup, which includes reporesentatives from DNREC, the Partnership for the Delaware Estuary and others with experience and expertise in this subject.

The Center intends to enter into a sub-award agreement with the University of Delaware for the preparation of the literature review and synthesis white paper. UD as the sub-recipient will be responsible for designing the methodology of the literature review and synthesis. The research is comensurate with the work of the sub-recipients principal investigator to investigate ecosystem services and develop bio-economic models. The researcher does not provide similar goods and services to many different partners nor operate in a traditionally competetive contractual environment.

Outputs/Deliverables:

1. White paper on the ecological and local economic benefits of natural, living and hardened shoreline management techniques.
2. Project report for public and legislative outreach.

Long-Term Outcomes:

1. State policy change, requiring use of living shoreline management techniques as the preferred alternative when shorelines are altered and where conditions allow.
2. Improved water quality through shoreline stabilization and enhanced ecosystem services.
3. Increased public awareness of the ecosystem services provided by natural shorelines and tidal marsh preservation/restoration.

Clean Water Act Programs:

Protecting wetlands

Protecting coastal waters through the National Estuary Program

Protecting Large Aquatic Ecosystems

Clean Water Act Program Implementation Role: Primary

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	$ 8,000.00	$ 0.00	$ 8,000.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 0.00	$ 0.00	$ 0.00
DNREC	FY2016 DNREC Operating Grant		$ 2,231.00	$ 0.00	$ 2,231.00
EPA	FY2016 EPA NEP Operating Grant		$ 4,965.00	$ 0.00	$ 4,965.00
Barnaget Bay Partnership	FY2016 EPA Blue Carbon Pass		$ 6,800.00	$ 0.00	$ 6,800.00
		Totals:	$ 21,996.00	$ 0.00	$ 21,996.00

PROJECT PROGRESS

Beginning Date: 06/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
White paper complete.	Not Initiated	05/26/2015	12/31/2015	05/01/2016		
Public outreach tools developed.	Not Initiated	05/26/2015	12/31/2015			
Outline of white paper developed.	Not Initiated	09/03/2015				

Financing for Clean Water Outreach Campaign

MANAGEMENT AND PARTNERS

CIB Project Manager: Roy Miller

Primary Project Partner Contacts:

Brenna Goggin, Environmental Advocate, Delaware Nature Society

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: Communicate the benefits to economic development, tourism, recreation and quality of life of achieving water quality goals as well as the risks of failure to achieve these goals (Public comment recommended).

Project Overview:

The Inland Bays Pollution Control Strategy is designed to meet the Total Maximum Daily Loads of nutrients that will result in healthy water quality and has an estimated cost of $25 million to implement annually. Implementation of the actions of this largely voluntary strategy since its promulgation in 2008 have had mixed results and overall slow progress due to a lack of dedicated funding. The Pollution Control Strategy is only one part of the Inland Bays CCMP. The need for increased financial support from the State of Delaware to acheive the goals of the PCS and the CCMP is of paramount importance for successful implementation.

In 2014, the Governor of Delaware proposed the "Clean Water for Delaware's Future" plan: a comprehensive plan for protecting public health and cleaning up Delaware’s bays, rivers and streams within a generation, while creating jobs and strengthening Delaware’s economy. The plan was based upon a fee for property owners that would be leveraged to generate a total of $120 annually for clean water projects involving wastewater, stormwater, agriculture, and toxic cleanup. The plan was well recieved in concept by the public but the particulars were little understood and many citizens were not aware that Delaware's waters needed to be cleaned up. As a result of what was learned throught the roll out of the plan in 2014, the CIB is partnering with other organizations involved in water quality education and restoration in Delaware to form the the Delaware Clean Water Alliance.

Over 2015, the Alliance will create and implement outreach/marketing materials to encourage outdoor enthusiasts to support sustainable funding for clean water in Delaware. CIB, will attend a minimum of 7 meetings of the Alliance and serve on the Alliance's Steering Committee. CIB will 1) participate in the development of outreach materials, 2) participate in a social media education campaign, 3) educate at least 5 local businesses, retailers, and interested parties on how clean water affects Delaware's outdoor recreational opportunities, and 4) conduct at least 5 community workshops, tabling events, etc... targeting outdoor enthusiasts related to understanding local water quality issues and citizen action. The intended outcome is that the identified user group increases their understanding of the connection between water quality and financing to improve water quality and that members of thes user groups take action to support improved financing for improved water quality. A grant award in the amount of $15,000 will be passed through the Delaware Nature Society from the William Penn Foundation to the Center to implement the Center's committment to the project.

Project Overview:

The Center is has contributed $1,000 of unrestricted funds to support a telephone poll aimed at discovering public attitudes towards clean water in Delaware. No EPA funds will be spent on this project.

Outputs/Deliverables:

1. Development of campaign outreach materials for exhibiting, physical distribution, and social media.
2. Participation in the social media education campaign.
3. Education of at least 5 local businesses, retailers, and interested parties on how clean water affects Delaware's outdoor recreational opportunities, and
4. 5 community workshops, tabling events, etc... targeting outdoor enthusiasts related to understanding local water quality issues and citizen action.
5. Survey report from contractor-conducted 20 question telephone survey of 400 Delaware residents on public percetpion of water quality and willingness to support sustained funding for improvement; including results of 2 - 4 focus group interviews.

Intermediate Outcomes:

1. Increased understanding of public perceptions of clean water and their willingness to support sustained funding for improvement.
2. Increased understanding of the general public and outdoor enthusiasts concerning water quality in Delaware and the relation between water quality and public financing for improvement.
3. Increased willingness of outdoor enthusiasts to support sustainable financing for water quality improvement.

Long-Term Outcomes:

1. The intention is for the general public and outdoor enthusiasts to take action to support sustainable public financing for water quality improvement.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Supporting Sustainable Wastewater Infrastructure

Clean Water Act Program Implementation Role: Significant

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
Center for the Inland Bays	FY2015 Private Operating Revenue		$ 1,000.00	$ 0.00	$ 1,000.00
Delaware Nature Society	Financing for Clean Water Outreach		$ 15,000.00	$ 0.00	$ 15,000.00
		Totals:	$ 16,000.00	$ 0.00	$ 16,000.00

PROJECT PROGRESS

Beginning Date: 11/24/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Development of outreach materials	Completed					
Completion of polling survey	Completed					
Education of 5 local entities	Completed					
Participation in community workshops	Completed					

Annual Report:

Telephone polling of 400 residents including focus group sessions in each County completed and report produced, received, and posted on the Center's website. Results indicated a large majority of residents support fees to fund clean water improvements; Sussex County residents want to know and trust the organization who will oversee the fees and that the fees will be spent on local waters.

Training provided to Alliance Members including three CIB staff and two Board Members on Adocacy for Non-profits. Six strategy meetings of the Clean Water Alliance were attended by CIB. Seventeen facilities were visited to discuss the campaign and distribute materials. The initiative was promoted at seven outreach events where 181 pledge cards were signed from 849 total attendees at the events. Press releases on the initiative were distributed and stories appeared in local papers.

Living Shoreline Demonstration Project #2

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Douglas Janiec, Natural Resources Program Manager, Sovereign Consulting, Inc., Contractor

Supporting Project Partner Contacts:

Sharon Webb, Environmental Scientist III, DNREC -- Divison of Watershed Stewardship

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:

The Center has undertaken an initiative to maximize the use of living shorelines stabilization techniques in order to protect the water quality and habitat of the estuary. The initiative is a focus of the Comprehensive Conservation and Management Plan (CCMP) for the Inland Bays. To date, the initiative has created a statewide technical workgroup to advance living shorelines, promoted living shorelines to the public, and trained marine contractors and consultants involved in shoreline stabilization. The ultimate goal of the initiative is policy to require the use of living shoreline management techniques when shorelines are altered and where physical conditions allow.

In contribution to this goal, a series of projects will be created to demonstrate living shoreline techniques across a variety of shoreline energy regimes in the developed landscape along the Inland Bays. The purpose of the projects is to improve water quality through shoreline stabilization and ecosystem enhancement while providing public education and shoreline contractor training opportunities. The first of these living shorelines, at the Bethany Beach Loop Canal, was completed in 2015. Funding will be sought to begin design and construction of a second project in FY 2016 as Demonstration Project #2. Another proposed 2016 project (Living Shorelines Project Siting and Concept Design Study) will identify and prioritize additional living shoreline demonstration projects to be completed in the Inland Bays over the next several years.

Outputs/Deliverables:

1. Demonstration site for living shoreline techniques, to be used for public outreach and contractor training.

Outputs/Deliverables:

2. Project report for outreach.
3. Press event.
4. Stabilization of x meters of shoreline.
5. Restoration of x acres of tidal wetland.

Long-Term Outcomes:

1. Increased wildlife habitat in the form of perching/breeding areas for shorebirds and cover for fish and invertebrates.
2. Increased acceptance of living shorelines as the preferred method of shorelione stabilization.

Clean Water Act Programs:

Improving Water Quality Monitoring

Protecting wetlands

Protecting coastal waters through the National Estuary Program

Clean Water Act Program Implementation Role: Primary

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2016 DNREC Operating Grant		$ 4,647.00	$ 0.00	$ 4,647.00
EPA	FY2016 EPA NEP Operating Grant		$ 10,860.00	$ 0.00	$ 10,860.00
		Totals:	$ 15,507.00	$ 0.00	$ 15,507.00

PROJECT PROGRESS

Beginning Date: 10/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Concept design	Not Initiated	05/25/2015	11/01/2015			
Grant funding secured	Not Initiated	05/25/2015	03/01/2016			
Required permits obtained	Not Initiated	05/25/2015	05/01/2016			
Construction complete	Not Initiated	05/25/2015	08/31/2016			
Final report and monitoring plan	Not Initiated	05/25/2015	09/30/2016			

Living Shorelines Project Siting and Concept Design Study

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

Douglas Janiec, Natural Resources Program Manager, Sovereign Consulting, Inc., Contractor

Supporting Project Partner Contacts:

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

Danielle Kreeger, Science Director, Partnership for the Delaware Estuary, Technical 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: Identify candidate sites for the creation and restoration of wetlands.

Project Overview:

Extensive nearshore development has resulted in the widespread alteration of the shorelines of the Inland Bays for the purpose of preventing erosion. Traditionally, erosion has been controlled by hardening the shorelines with bulkheads or rocks placed directly on the shorelines. These methods kill the shorelines and sever the ecological connection between the bay and its marshes and uplands. Habitat for turtles, crabs, fish, and birds are eliminated and water quality maintenance functions are degraded. Nearshore estuarine environments are also degraded, and adjacent shorelines can experience increased erosion due to deflected wave energy. The use of living shorelines is an alternative stabilization technique that focuses on the use of naturally occurring materials to maintain or enhance ecosystem services including trapping nutrients and sediments. A variety of natural structures can be used in living shorelines, such as shellfish reefs, submerged grass beds, and native wetland vegetation. Living shorelines are a class of green infrastructure projects that are growing in importance as sea level rise increases.

The Center has undertaken an initiative to maximize the use of living shorelines stabilization techniques in order to protect the water quality and habitat of the estuary. The initiative is a focus of the Comprehensive Conservation and Management Plan (CCMP) for the Inland Bays. To date, the initiative has created a statewide technical workgroup to advance living shorelines, promoted living shorelines to the public, trained marine contractors and consultants involved in shoreline stabilization. The ultimate goal of the initiative is policy to require the use of living shoreline management techniques when shorelines are altered and where physical conditions allow.

In contribution to this goal, a series of projects will be created to demonstrate living shoreline techniques across a variety of shoreline energy regimes in the developed landscape along the Inland Bays. The long-term goal of the projects is to improve water quality

Project Overview:

through shoreline stabilization and ecosystem enhancement while providing public education and shoreline contractor training opportunities. We will develop concept designs with cost and ecosystem service estimates (including nutrient and sediment removal) for five to six innovative living shoreline demonstration projects around the Inland Bays. Sites will be identified and selected through a watershed-level analysis of potential locations as informed by a number of ecological and social parameters. Sovereign Consulting Inc. will perform the site screening process and development of designs. The Partnership for the Delaware Estuary and The Nature Conservancy will serve as technical partners, providing review of sected sites and draft concept designs.

Additional funding likely will be required to complete this project, and grant support is being pursued.

Outputs/Deliverables:

1. Five to six prioritized living shoreline concept designs to be implemented in future years.
2. Final technical report, including site plans, cost estimates and ecosystem service estimates.

Long-Term Outcomes:

1. Public awareness of the values of living shorelines, and a set of local contractors trained in living shoreline techniques.
2. Demonstration/research of innovative living shoreline methodologies, for the purpose of furthering policy
3. Policy requiring or encouraging use of living shoreline management techniques as the preferred alternative when shorelines are altered and where physical conditions allow.
4. Improved water quality through shoreline stabilization and enhanced ecosystem services.

Clean Water Act Programs:

Strengthening Water Quality Standards

Protecting wetlands

Protecting coastal waters through the National Estuary Program

Clean Water Act Program Implementation Role: Primary

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Rocky Shoreline	Rehabilitation		
Tidal Wetland	Protection		

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	$ 32,500.00	$ 0.00	$ 32,500.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 0.00	$ 0.00	$ 0.00
DNREC	FY2016 DNREC Operating Grant		$ 4,647.00	$ 0.00	$ 4,647.00
EPA	FY2016 EPA NEP Operating Grant		$ 10,342.00	$ 0.00	$ 10,342.00
		Totals:	$ 47,489.00	$ 0.00	$ 47,489.00

PROJECT PROGRESS

Beginning Date: 06/15/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Watershed scale GIS analysis to identify areas meeting first-order selection criteria	Not Initiated	05/26/2015	09/01/2015			
Scoring and ranking of candidate sites	Not Initiated	05/26/2015	11/01/2015			
Site reconnaissance	Not Initiated	05/26/2015	12/01/2015			
Final report and concept plans	Not Initiated	05/26/2015	02/01/2016			
Additional grant support obtained.	Initiated	05/28/2015	12/31/2015			

Management of the James Farm Ecological Preserve

MANAGEMENT AND PARTNERS

CIB Project Manager: Bob Collins

Supporting Project Partner Contacts:

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

DESCRIPTION, OUTPUTS AND OUTCOMES

CCMP Focus Area: Administration

CCMP Objective: Management of CIB Facilities and Preserves

CCMP Action: Provide ecological, educational, and visitor management for the James Farm Ecological Preserve

Project Overview:

The James Farm is a 150-acre ecological preserve on the Indian River Bay that the Center has managed under an agreement with Sussex County for recreational and educational purposes related to the Inland Bays and their watershed since 1998. The Preserve holds a wide variety of ecosystems that are characteristic of the region including freshwater forested wetlands, a coastal plain pond, grassland, saltmarsh, tidal flats, successional forest, and upland forests. Approximately, 50 acres of forests, grasslands, and marsh have been restored under the Center's management.

Over 10,000 visits are made to the Preserve every year and passive and active adult and childhood educational activities concerning the ecosystems of the estuary and its watershed are provided by the CIB. These activities include the CIB's Middle School Education Program, passive education including signage and a kiosk, and community events such as the CIB's annual Native Plant Sale. The Preserve is an important component of the CIB's efforts to educate the public about the Inland Bays and their restoration. Over two miles of trails and multiple boardwalks and wildlife viewing stations are maintained. Visitation to the Preserve continues to increase, providing both ongoing challenges for its management and opportunities for educating a growing population. Ongoing activities include ecosystem management, invasive species control, trail and structure maintenance, education, community relations, and administration. A Master Plan for the Preserve designed to accommodate increasing visitation, enhance educational opportunities, and protect the existing ecosystems was developed in 2014 and will be implemented over five years. The Preserve is maintained by the CIB Property Manager supported by a group of community volunteers. Funding has traditionally been provided by the EPA, DNREC, Sussex County and private donations.

In FY2016, the CIB's management of the Preserve will focus on visitor management, invasive species control and supporting development actions for implementing the Master Plan. A grant to help protect bayshore dunes from erosion and to control invasive species was applied for in 2015 and if successful will be implemented in 2016. Effort will be made to increase monitoring of the preserve for bird species through the use of bird watchers using the Ebird website. Information regarding bird monitoring data will be made available to visitors at the kiosk and through social media in an effort to increase awareness and support of the CIB and the

Project Overview:

Inland Bays amongst birders, a group likely to support the organization and its mission.

Outputs/Deliverables:

Outputs/ Deliverables
1. Provide facilities for over 10,000 unsupervised visits by the local and non-local visiting public for purposes of recreation and environmental education.
2. Maintain the quality and function of 150 acres of natural ecosystems in the preserve per the objectives in the James Farm Master Plan.
3. Provide informal environmental educational opportunities through the maintenance of educational signage and a kiosk, guided educational tours, and online educational programming.
4. Maintain conditions to support the Center's James Farm Middle School Education Program (see separate workplan item).
5. For FY2016, provide habitat enhancement by controlling invasive plant species in twenty acres of successional forest and nine acres of high salt marsh.
6. Increased bird monitoring of the James Farm via E-Bird through promotion activities to bird watchers through 3 traditional and social media outlets.

Long-Term Outcomes:

1. Improved public knowledge about the watershed's ecosystems and estuarine organisms.
2. Increased likelihood of the public to support protection and restoration of the Inland Bays and their Watershed.
3. Increased likelihood of the public to financially support the Center and its programs and preserves.
4. Enhanced habitat for Species of Greatest Conservation Need as identified by the Delaware Wildlife Action Plan.

Clean Water Act Programs:

Protecting wetlands

Clean Water Act Program Implementation Role: Primary

Habitats:

Habitat Type	Restoration Type	Units	Restoration
Forest/Woodland	Maintenance	Acres	20.00
Tidal Wetland	Maintenance	Acres	9.00

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2016 DNREC Operating Grant		$ 19,660.00	$ 0.00	$ 19,660.00
EPA	FY2016 EPA NEP Operating Grant		$ 16,206.00	$ 0.00	$ 16,206.00
Center for the Inland Bays	FY2016 Private Operating Revenue		$ 500.00	$ 0.00	$ 500.00
Sussex County	FY2016 Sussex County Operating		$ 16,100.00	$ 0.00	$ 16,100.00
USFWS	”State Wildlife Grant- Conservation		$ 4,097.00	$ 2,138.60	$ 6,235.60
		Totals:	$ 56,563.00	$ 2,138.60	$ 58,701.60

PROJECT PROGRESS

Beginning Date: 10/01/2015 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete invasive species management grant requirements.	Not Initiated	04/13/2015	12/30/2016			
Promotion of bird monitoring at the James Farm via Ebird through 3 outlets.	Not Initiated	04/21/2015	09/30/2016			

Annual Report:

Management of the James Farm Ecological Preserve has been added to Bob Collins’ workplan in the Second Quarter of 2015. He has been the part-time Property Manager since 2012, and now is employed as a full time CIB employee.
Management of the James Farm should occupy approximately half of Mr. Collins’ time. Activities would include general day-to-day management of the facility, relationship maintenance with neighbors and visitors, oversight of the Eco-Bay Kayak (eco-tourism concessionaire). A contingent of volunteers helps to maintain the facility, and management of those persons is also part of the normal facility operations.

In 2014, a James Farm Master Plan was adopted. Pursuit of funding for the plan’s components is underway, with implementation of the various phases anticipated in spring of 2016. This would include improvements to the gateway area and west-side trail system, including some boardwalk areas. Construction planning and management would occupy a certain amount of the Property Manager’s time.

In April of 2015, an application for grant funding was submitted through Delaware Division of Fish and Wildlife to the US Fish and Wildlife Service ”State Wildlife Grant- Conservation Partner Habitat Restoration and Enhancement”. This funding is for enhancement of Habitats of Conservation Concern (HCC) that benefits Species of Greatest Conservation Need (SGCN) as defined by the Delaware Wildlife

Migratory Fish Passage Designs for Dams on the Tributaries of the Inland Bays

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Supporting Project Partner Contacts:

Larry Trout, RK&K, Contractor

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 Millsboro Pond on the Indian River and the Burton Pond Dam on Herring Creek were the highest priorities of the eight dams in the watershed for fish passage device installation. The Delaware Division of Fish and Wildlife is reluctant to approve installing a fish ladder at Millsboro Pond dam because of concerns over potential passage of nontarget species such as gizzard shad. DFW does not have these same concerns regarding installing fish passage at Burton Pond dam, so Burton Pond dam was selected for retrofitting of a device suitable for enhancing anadromous fish passage.

A total of 6.89 stream miles in the Rehoboth Bay watershed would be opened as habitat for the targeted species as a result of the passage. Per the recommendations of the study, concept design will be completed for a prefabricated Alaskan Steep pass fish ladder. Initial permission for installing the passage has already been granted by the owner of the dam. Engineering design and permitting will also be completed for three eelways on three separate dams on the Inland Bays per the study. These will be relatively inexpensive and easy to install, and they will provide at least for passage of larval eels at locations where full fish ladders are not feasible. The work will be conducted RK&K engineering under a Master of Services Agreement. The work will be used to pursue private and public grant funding for implementation of the passages.

Outputs/Deliverables:

1. Conceptual design report for Burton Pond Fish Ladder on Herring Creek.
2. Engineering design report for three eelways over priority ranked dams on tributaries of the Inland Bays.

Long-Term Outcomes:

1. Installation of fish ladder on herring creek and three eelways over priority ranked dams on tributaries of the Inland Bays.
2. Increased local populaitons of shad, herring, alewife, and American eel as measured by ongoing trawl surveys and potentially site specific monitoring.
3. Increased potential for reproduction of freshwater mussel species associated with target fish species.
4. Increased acceptance of the public and funders to continued fish passage restoration.

Clean Water Act Programs:

Protecting Large Aquatic Ecosystems

Clean Water Act Program Implementation Role: Primary

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	$ 28,899.00	$ 0.00	$ 28,899.00
DNREC	FY2015 DNREC Operating Grant	STATE-0000253060	$ 12,945.00	$ 0.00	$ 12,945.00
DNREC	FY2012 DNREC Operating Grant		$ 5,153.00	$ 0.00	$ 5,153.00
DNREC	FY2016 DNREC Operating Grant		$ 1,487.00	$ 0.00	$ 1,487.00
EPA	FY2016 EPA NEP Operating Grant		$ 3,310.00	$ 0.00	$ 3,310.00
		Totals:	$ 51,794.00	$ 0.00	$ 51,794.00

PROJECT PROGRESS

Beginning Date: 06/01/2014 Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Complete contractor task order including project milestones.	Initiated	05/25/2015	06/15/2015			
Pursue grant funding.	Not Initiated	09/03/2015	03/31/2016			
Complete eelway designs.	Not Initiated		03/31/2016			
Complete fish ladder design.	Not Initiated	09/03/2015	08/31/2016			
Construction of eel ladder complete.	Not Initiated	09/03/2015	04/01/2017			

Annual Report:

This project was changed from "Migratory Fish Passage Project 1: Millsboro Pond Fish Ladder" to "Migratory Fish Passage Designs for Dams on the Tributaries of the Inland Bays" in May of 2015 due to a number of factors. First, the Fish and Wildlife Service of the Delaware Department of Natural Resources and Environmental Control objected to a fish passage over the Millsboro Pond Dam due to concerns about the effects of gizzard shad introduction on the pond's large-mouth bass fishery. While conclusive evidence did not exist to support these concerns, the Center made the decision to pursue a fish passage over the Burton Pond Dam on Herring Creek. Second, the Center's consultant Versar was unable to produce a conceptual design for fish passage over the Burton Pond dam as included in the scope of work for the project entitled Inland Bays Migratory Fish Passage Restoration Feasibility and Planning Study. The decision was made to contract this work to RK&K who agreed to also complete design and permitting for three of the priority ranked eelways identified in the studay. In June 2015, RK&K will develop a scope of work and timeline that will be added to the project.

Shoreline Condition Assessment of Little Assawoman Bay & Update of Indian River Bay Assessment Data

MANAGEMENT AND PARTNERS

CIB Project Manager: Marianne Walch

Primary Project Partner Contacts:

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

Marcia Berman, Director, Virginia Institue 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 Center has undertaken an initiative to maximize the use of living shorelines stabilization techniques in order to protect the water quality and habitat of the estuary. The initiative is a focus of the Comprehensive Conservation and Management Plan (CCMP) for the Inland Bays.

A study to assess the shoreline conditions of Rehoboth and Indian River Bays was completed in 2012 by the Virginia Institute of Marine Science (VIMS), Center for Coastal Resources Management . The spatial data collected in the study were used to build a web-based mapping and analysis interface that anyone can use to assess the need for shoreline restoration along the shoreline of the two bays (http://cmap.vims.edu/ShlInv/Delaware/Delaware_shlinv.html). The assessment was not completed for Little Assawoman Bay at the time due to funding constraints. The shoreline condition database and online analysis tool comprise an important part of the information required for land owners, marine contractors, and State regulators to identify: (1) locations where shoreline restoration is needed; and (2) what type of shoreline restoration method would be most appropriate. In particular, the data may be used to help CIB and others prioritize sites for installation of Living Shoreline restorations in all three Inland Bays.

The Center will partner with VIMS and DNREC's Division of Watershed Stewardship to complete collection of data for a shoreline condition assessment of Little Assawoman Bay and incorporate it into the online mapping and analysis tool. We will also evaluate whether updates to the data collected for Indian River Bay (originally collected in 2006) may be needed.

The data developed for the inventory is based on a three-tiered shoreline assessment approach. This assessment characterizes conditions that can be observed from a small boat navigating along the shoreline. Hand-held GPS units and GPS registered

Project Overview:

videography were used to collect data on conditions observed in the field. The three tiered shoreline assessment approach divides the shorezone into three regions: 1) the immediate riparian zone, evaluated for land use; 2) the bank, evaluated for height, stability, cover and natural protection; and 3) the shoreline, describing the presence of shoreline structures for shore protection and recreational use. The inventory will be conducted by the VIMS Center for Coastal Resources Management using standardized inventory methodology. Data is provided as GIS layers, in an online viewer, and in a report. The data will be integrated with other metrics to select a pool of potential sites for prioritization and selection for design.

It is intended that a sole-source contract will be eveloped with VIMS for this work. VIMS has already completed the same shoreline assessments for Rehoboth Bay and Indian River Bay, as well as produced an online tool to view the geographical data, which is owned by the Institute. A sole-source contract is required to maintain consistency of data collection and display as well as data comparison between years for Indian River Bay. This work is dependent upon additional grant support and may not occur unless a grant is awarded. A grant application has been developed and will be submitted in June.

Outputs/Deliverables:

1. Shoreline condition database for Little Assawoman Bay.
2. Updates to data for Indian River Bay.
3. Incorporation of Little Assawoman Bay data into online mapping and analysis tool.
4. Final technical report.
5. Outreach tool for Living Shoreline Initiative & Your Creek.
6. Press event.

Long-Term Outcomes:

1. A publically available tool that can be used to help select sites for livings restorations.
2. Policy to require use of living shoreline management techniques as the preferred shoreline stabilzation technique where conditions allow.
3. Improved water quality through shoreline stabilization and enhanced ecosystem services.
4. Incorporation of shoreline condition data into the State of the Bays reports.

Clean Water Act Programs:

Controlling Nonpoint Source Pollution on a Watershed Basis

Protecting wetlands

Protecting coastal waters through the National Estuary Program

Clean Water Act Program Implementation Role: Primary

PROJECT FUNDING

Funding Organization	Fund Source Name	Contract Number	Project Cash	Project In Kind	Project Value
DNREC	FY2016 DNREC Operating Grant		$ 1,115.00	$ 0.00	$ 1,115.00
EPA	FY2016 EPA NEP Operating Grant		$ 2,482.00	$ 0.00	$ 2,482.00
		Totals:	$ 3,597.00	$ 0.00	$ 3,597.00

PROJECT PROGRESS

Beginning Date: Project Status: Proposed

Milestone	Status	Added	Target	Ext 1	Ext 2	Ext 3
Shoreline condition data collected for Little Assawoman Bay	Not Initiated	05/25/2015	01/31/2016			
Shoreline condition data updated for Indian River Bay	Not Initiated	05/25/2015	01/31/2016			
Data for all bays viewable online	Not Initiated	05/25/2015	03/01/2016			
Press event and outreach report	Not Initiated	05/28/2015	04/01/2016			
Final technical report completed.	Not Initiated	09/03/2015	08/31/2016			

Center for the Inland Bays

Estimated Travel Expenses for Fiscal Year 2016

Position	Event/Reason	Date(s)	Location	Mode	Cost
Executive Director	Fall National Estuary Program Tech Transfer Meeting	DEC 01-05 2015	San Juan, Puerto Rico	Automobile ($136)/Flight ($477)/Hotel($600)/Meals($422)/ Registration($300)	$1,935
Executive Director	Spring National Estuary Program Meeting	February?/March? 2016	Washington, D.C.	Automobile($243)/Hotel($687)/Food($248)/Registration ($200)	$1,378
Executive Director & Administrative Assistant	CCMP Project Implementation	FY2016	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile ($0.575 per mile federal rate. 76 trips at an avg. of 50 mi./trip)	$2,185
Science & Restoration Coordinator	Fall National Estuary Program Tech Transfer Meeting	DEC 01-05 2015	San Juan, Puerto Rico	Automobile ($136)/Flight ($477)/Hotel($600)/Meals($422)/ Registration($300)	$1,935
Science & Restoration Staff	CCMP Project Implementation	FY2016	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile ($0.575 per mile federal rate 70 trips at an avg. of 50 mi./trip) Registration, Meals, and Lodging for one regional tech transfer conference for Coordinator to be determined ($565).	$2,578
Education & Outreach Staff	CCMP Project Implementation	FY2016	Local and Regional Travel to project sites and project and tech transfer meetings	Automobile ($0.575 per mile federal rate 87 trips at an avg. of 50 mi./trip)	$2,500
				TOTAL	**$12,511**

Center for the Inland Bays

Estimated Travel Expenses for Fiscal Year 2016 (Continued)

Costs Expressed

Only the estimated travel expenses expected to be applied to the FY2016 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 $0.575/mile. Carpooling will be employed when possible.

Center for the Inland Bays

FY2015 Travel Report

Center for the Inland Bays
EPA Travel Report FY2015

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Name	Travel DATE	TO	MILES	Mileage Cost	Taxi/Train Tolls Parking	Perdiem Day(s)	Perdiem Cost	DESCRIPTION Provide Project/meeting name and purpose	Other Expense	Total Amount
E.J. Chalabala	09/08/14	S Bethany, DE	18.0	10.08				Bio Enhancement project drop of cages	$ -	$ 10.08
E.J. Chalabala	09/09/14	S Bethany, DE	18.0	10.08				Bio Enhancement project drop of cages	$ -	$ 10.08
Chris Bason	09/03/14	Lewes, DE	32.0	17.92	$ -			EPA Monitoring Plan Meeting with UD Citizen Monitoring Prog.	$ -	$ 17.92
Chris Bason	09/05/14	Lewes, DE	32	17.92				Beneficial Reuse of Dredged Material Project Mtg. with DNREC	$ -	$ 17.92
Chris Bason	09/09/14	Lewes, DE	32.0	17.92				Waterways Financing & MGMT Committee Meeting	$ -	$ 17.92
Chris Bason	09/10/14	Mispillion, DE	60.0	33.60				Sea Level Rise Awareness Week Press Conference		$ 33.60
Chris Bason	09/15/14	Dover, DE	102.0	57.12				Pollution Control Strategy Implementation Mtg. -- CCMP Oversight	$ -	$ 57.12
Chris Bason	09/20/14	Rehoboth Beach, DE	14.0	7.84				DNREC Coastal Cleanup Event (IB Cleanup)	$ -	$ 7.84
Chris Bason	09/22/14	Lewes, DE	32.0	17.92				Waterways Financing & MGMT Committee Meeting	$ -	$ 17.92
Chris Bason	09/25/14	Dover, DE	100.0	56.00				Wetlands Advisory Committee Mtg.	$ -	$ 56.00
Chris Bason	09/29/14	Hockessin, DE	198.0	110.88	$ 4.00			Delaware Nature Society Policy Mtg. with DNREC Secretary	$ -	$ 114.88
Chris Bason & J. Cabry	10/04/14	New Castle, DE						Partnership DE Estuary Meeting Registration		$ 205.98
Sally Boswell	10/03/14	Ocean View, DE	16.7	9.35				James Farm Education Program	$ -	$ 9.35
Sally Boswell	10/05/14	Lewes, DE	10.1	5.66				Coast Day	$ -	$ 5.66
Sally Boswell	10/24/14	Ocean View, DE	16.9	9.46				Volunteer Event at James Farm	$ -	$ 9.46
Sally Boswell	10/27/14	Ocean View, DE	16.8	9.41				James Farm Education Program-Media story-Molly Murray		$ 9.41
Sally Boswell	10/28/14	Bethany Beach, DE	15.8	8.85				Mtg with James Farm Teacher re Education Program	$ -	$ 8.85
Sally Boswell	10/30/14	Ocean View, DE	16.9	9.46				Mtg at James Farm	$ -	$ 9.46
Chris Bason	11/01/14	National Harbor, MD	133.0	74.48	$ 2.00	1/2	$ 53.25	Travel to National Harbor & parking garage.RAE Conf	$ -	$ 129.73
Chris Bason	11/03/14	National Harbor, MD		0.00		1	71	RAE CONF,National Harbor MD	$ -	$ 71.00
Chris Bason	11/04/14	National Harbor, MD		0.00		1	$ 71.00	RAE CONFERENCE AND EPA-NEP MEETING	$ -	$ 71.00
Chris Bason	11/05/14	National Harbor, MD		0.00		1	$ 71.00	RAE CONFERENCE		$ 71.00
Chris Bason	11/06/14	National Harbor, MD	133.0	74.48	$ 2.00	1/2	$ 53.25	Return home from conference	$ -	$ 129.73
Chris Bason	11/06/14	National Harbor, MD			$ 52.00			RAE Conference , Parking 11-2-11-6		$ 52.00
Chris Bason	11/06/14	National Harbor, MD						RAE Conference , Hotel 11-2-11-6		$ 801.96
Sally Boswell	11/02/14	National Harbor, MD						RAE Conference, Meals, 11/2-11/4/14		$ 117.43
Sally Boswell	11/02/14	National Harbor, MD		0.00				RAE Conference Nov 2-6, National Harbor MD,Registration		$ 300.00
Sally Boswell		National Harbor, MD		0.00				RAE Conf Nov 2-6, National Harbor,MD, Hotel		$ 736.71
								Subtotal		$ 3,100.01

Center for the Inland Bays

FY2015 Travel Report (continued)

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Name	Travel DATE	TO	MILES	Mileage Cost	Taxi/Train Tolls Parking	Perdiem Day(s)	Perdiem Cost	DESCRIPTION Provide Project/meeting name and purpose	Other Expense	Total Amount
Bob Collins	11/03/14	National Harbor, MD		0.00				RAE Conference Nov 3-5, housekeeping tip	$ 2.00	$ 2.00
Bob Collins	11/04/14	National Harbor, MD		0.00				RAE Conference, housekeeping tip	$ 2.00	$ 2.00
Bob Collins	11/05/14	National Harbor, MD		0.00				RAE conference, housekeeping & parking tip	$ 7.00	$ 7.00
Bob Collins	11/05/14	National Harbor, MD	135.0	75.60				RAE Conference, mileage from National Harbor, MD to Bethany Beach, DE	$ -	$ 75.60
Bob Collins	11/05/14	Annapolis, MD		0.00	$ 5.40			RAE Conference, WPL Bridge toll	$ -	$ 5.40
Chris Bason	11/12/14	Newark, DE	192.0	107.52	$ 3.00			DE AWRA Conference Presentation	$ -	$ 110.52
Chris Bason	11/18/14	Dover, Lewes, DE	102.0	57.12				Sea Grant Advisory Cncl Meeting, Wetlands Monitoring Meeting	$ -	$ 57.12
Chris Bason	11/20/14	Ocean View, DE	14.0	7.84				James Farm Master Plan Implementation Meeting		$ 7.84
Chris Bason	11/21/14	Dover, Lewes, DE	102.0	57.12				Meeting with Cape Gazette, Loop Canal Project Meeting	$ -	$ 57.12
Chris Bason	12/05/14	Lewes, DE	32.0	17.92				STAC Meeting	$ -	$ 17.92
Chris Bason	12/10/14	Dover, DE	104	58.24	0			Water Infrastructure Advisory Council Mtg., Kate Hackett Mtg.	$ -	$ 58.24
Chris Bason	12/12/14	Rehoboth Beach, DE	30.0	16.80				Board Meeting Holiday Party	$ -	$ 16.80
Chris Bason	12/15/14	Georgetown, DE	52.0	29.12				Shell Recycling Program Meeting		$ 29.12
Chris Bason	12/17/14	Rehoboth Beach, DE	24.0	13.44				CAC Meeting Discussion with Ball and Britz	$ -	$ 13.44
Chris Bason	12/18/14	Angola Neck, DE	30.0	16.80				Project Planting Day site visit for oversight and outreach	$ -	$ 16.80
Chris Bason	12/29/14	Lewes, DE	34.0	19.04				Ram Mohan WUPIC member meeting	$ -	$ 19.04
Chris Bason	12/29/14	Rehoboth Beach, DE	32.0	17.92				Science & Restoration Coordinator Interview Meeting	$ -	$ 17.92
Chris Bason	01/09/15	Georgetown, DE	51.0	28.56				Sussex County Board Member Mtg: James Farm, HOA prjct.	$ -	$ 29.33
Chris Bason	01/16/15	Rehoboth Beach, DE	24	13.44				CIB Board Member Meeting on CAC	$ -	$ 13.80
Chris Bason	01/29/15			0.00				Monitor Cable Converter for Computer	$ 9.27	$ 9.27
Sally Boswell	12/02/14	Selbyville, DE	51.0	29.33				Your Creek Project -Dirickson Creek	$ -	$ 29.33
Sally Boswell	01/13/15	Bethany Beach, DE	15.1	8.68				Bethany Beach Nature Center	$ -	$ 8.68
Sally Boswell	01/14/15	Dover, DE	85.3	49.05				Living Shorelines Meeting	$ -	$ 49.05
Bob Collins	01/30/15	Wye Mills, MD	141.0	78.96	$ -	$ -	$ -	State of the Science of Phosphorus symposium	$ -	$ 81.08
Marianne Walch	01/25/15	Cape May, NJ	21.5	12.36	$ 27.00		$ 10.80	Delaware Estuary Summit, Cape May NJ, Hotel Room	$ 93.20	$ 143.36
Marianne Walch	01/25/15	Cape May, NJ						Registration De Estuary Summit Jan 25-28	$ 190.00	$ 190.00
Marianne Walch	01/26/15	Cape May, NJ		0.00				Delaware Estuary Summit, Cape May NJ, Hotel Room	$ 93.20	$ 93.20
Marianne Walch	01/27/15	Cape May, NJ		0.00			$ 23.75	Delaware Estuary Summit, Cape May NJ	$ 93.20	$ 116.95
								Subtotal		$ 1,277.92

Center for the Inland Bays

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Name	Travel DATE	TO	MILES	Mileage Cost	Taxi/Train Tolls Parking	Perdiem Day(s)	Perdiem Cost	DESCRIPTION Provide Project/meeting name and purpose	Other Expense	Total Amount
Marianne Walch	01/28/15	Cape May, NJ	21.5	12.36	$ 23.00			Delaware Estuary Summit, Cape May NJ		$ 35.36
Marianne Walch	01/30/15	Wye Mills, Maryland						State of the Science of Phosphorus symposium Registration	$ 50.00	$ 50.00
Sally Boswell	01/25/15	Cape May NJ	3.4	1.96				Delaware Estuary Summit, mileage Ferry	$ -	$ 1.96
Sally Boswell	01/27/15	Cape May NJ	3.4	1.96				DE Estuary Summit Mileage Ferry	$ -	$ 1.96
Sally Boswell	01/25/15	Cape May NJ		0.00				Dinner, DEe Estuary Summit, Cape May NJ	$ 14.50	$ 14.50
Sally Boswell	01/25/15	Cape May, NJ						DE Estuary Summit - Ferry	$ 30.00	$ 30.00
Sally Boswell	01/25/15	Cape May, NJ						DE Estuary Summit - Hotel 2 days 1/23, 1/24	$ 182.40	$ 182.40
Sally Boswell	02/11/15	Dover, DE	85.4	49.11				Marine Contractor Training-planning meeting	$ -	$ 49.11
Sally Boswell	02/25/15	Lewes, DE	9.1	5.23				Marine Contractor Training Project	$ -	$ 5.23
Sally Boswell	02/26/15	Lewes, DE	9.1	5.23				Marine Contractor Training Project		$ 5.23
Chris Bason	02/22/15	Washington, DC	122.0	70.15	$24.00	1/2	$ 53.25	EPA ANEP Meeting/ mileage ,tolls to baltimore then train to metro to hotel	$ -	$ 147.40
Chris Bason	02/24/15	Washington, DC		0.00		1	$72	EPA MEETING	$ -	$ 72.00
Chris Bason	02/25/15	Washington, DC		0.00		1	$ 72.00	EPA MEETING	$ -	$ 72.00
Chris Bason	02/26/15	Washington, DC		0.00		1/2	$ 53.25	EPA MEETING	$ -	$ 53.25
Chris Bason	02/25/15	Washington, DC						EPA Meeting - Hotel		$ 209.83
Chris Bason	02/28/15	Ocean View,DE	122.0	70.15	$ 24.00			EPA ANEP Meeting / train and tolls to baltimore then milage home	$ -	$ 94.15
Marianne Walch	02/19/15	Newark, DE	183.0	105.23	$ 3.00			Meeting with STAC chair and DGS faculty, University of Delaware	$ -	$ 108.23
Marianne Walch	02/24/15	Dover, DE	92	52.90				Delaware Sea Grant Pre-Proposal Panel Session	$ -	$ 52.90
Bob Collins	02/10/15	St.Jones Reserve, DE	91.4	51.18	$ -	$ -	$ -	Project Design and Evaluation Workshop, Day 1	$ -	$ 52.56
Bob Collins	02/11/15	St.Jones Reserve, DE	91.4	51.18				Project Design and Evaluation Workshop, Day 2	$ -	$ 52.56
Marianne Walch	03/12/15	Lewes, DE	32.0	18.40				Fish survey steering committee meeting, Univ. of Delaware, Lewes campus	$ -	$ 18.40
Marianne Walch	03/08/15	Prime Hook NWR, DE	42	24.15				Meeting with DNREC Natural Heritage staff to discuss Inland Bays osprey monitoring and banding program	$ -	$ 24.15
Marianne Walch	03/12/15	Lewes, DE	32	18.40				Delaware Bay HSC survey team meeting	$ -	$ 18.40
Marianne Walch	03/26/15	Wilmington, DE	189.0	108.68	$ 4.00			Meeting with PDE Science Director to discuss monitoring plan	$ -	$ 112.68
Sally Boswell	03/10/15	Bethany Beach, DE	16.7	9.60				Anchorage Canal Signage	$ -	$ 9.60
Sally Boswell	03/01/15	Georgetown, DE	56.9	32.72				Stockley Project	$ -	$ 32.72
Sally Boswell	03/26/15	Millsboro, DE	34.8	20.01				Angola Neck Preserve		$ 20.01
Sally Boswell	03/28/15	Georgetown, DE	51.1	29.38				DAEE Meeting	$ -	$ 29.38
								Subtotal		$ 1,555.95

Center for the Inland Bays

FY2015 Travel Report (continued)

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Name	Travel DATE	TO	MILES	Mileage Cost	Taxi/Train Tolls Parking	Perdiem Day(s)	Perdiem Cost	DESCRIPTION Provide Project/meeting name and purpose	Other Expense	Total Amount
Sally Boswell	04/10/15	Dover, DE	103.7	59.63				Living Shorelines Meeting	$ -	$ 59.63
Sally Boswell	04/20/15	Ocean View, DE	18.3	10.52				James Farm Middle School Program	$ -	$ 10.52
Sally Boswell	04/23/15	Ocean View, DE	18.4	10.58				James Farm Middle School Program	$ -	$ 10.58
Sally Boswell	04/25/15	Lewes, DE	12.2	7.02				Presentation at Retreat at Love Creek		$ 7.02
Sally Boswell	04/27/15	Millsboro, DE	34.7	19.95				Love Creek Team-Angola Neck Nature Preserve		$ 19.95
Marianne Walch	04/09/15	Newark, DE	164.0	94.30	$ 3.50			DEAWRA Board meeting	$ -	$ 97.80
Marianne Walch	04/15/15	Bethany Beach, DE	12	6.90				Loop Canal living shoreline project	$ -	$ 6.90
Marianne Walch	04/16/15	Bethany Beach, DE	22	12.65				Loop Canal living shoreline project	$ -	$ 12.65
Marianne Walch	04/16/15	Dover, DE	83.0	47.73				Horseshoe crab survey meeting, St. Jones Reserve	$ -	$ 47.73
Marianne Walch	04/21/15	Bethany Beach, DE	18.0	10.35				Loop Canal living shoreline project	$ -	$ 10.35
Marianne Walch	04/22/15	Bethany Beach, DE	12.0	6.90				Loop Canal living shoreline project	$ -	$ 6.90
Marianne Walch	04/24/15	Lewes, DE	13.0	7.48				STAC meeting	$ -	$ 7.48
Marianne Walch	04/25/15	Lewes, DE	18.0	10.35				Your Creek presentation at the Retreat on Love Creek	$ -	$ 10.35
Marianne Walch	04/29/15	Dover, DE	78.0	44.85				Water Supply Coordinating Council meeting	$ -	$ 44.85
Marianne Walch	05/01/15	Georgetown, DE	37.0	21.28				Pickup display materials for Native Plant Sale	$ -	$ 21.28
Marianne Walch	05/01/15	South Bethany, DE	16	9.20				Bulkhead bio-enhancement project site visit	$ -	$ 9.20
Marianne Walch	05/02/15	Ocean View, DE	47	27.03				Native Plant Sale	$ -	$ 27.03
Marianne Walch	05/05/15	Bethany Beach, DE	12.0	6.90				Loop Canal site visit	$ -	$ 6.90
Marianne Walch	05/05/15	Bethany Beach, DE	14.0	8.05				Work on Loop Canal project	$ -	$ 8.05
Marianne Walch	05/08/15	Wilmington, DE	172.0	98.90	$ 4.25			DE Section ARWA board meeting	$ -	$ 103.15
Marianne Walch	05/11/15	Newark, DE	155.0	89.13	$ 3.00			Del. Assn. for Environ. Education board meeting	$ -	$ 92.13
Marianne Walch	05/13/15	Bethany Beach, DE	12.0	6.90				Loop Canal VIP/press tour	$ -	$ 6.90
Sally Boswell	05/13/15	Bethany Beach, DE	18.7	10.75				Press event-Loop Canal Project		$ 10.75
Sally Boswell	05/22/15	Georgetown, DE	49.8	28.64				Stockley Project-Sussex Central HS	$ -	$ 28.64
Marianne Walch	06/19/15	Bethany Beach, DE	19.0	10.93				Filming of Loop Canal Banks Harbor marina Living Shoreline sites	$ -	$ 10.93
Marianne Walch	06/22/15	Selbyville, DE	21.0	12.08				Your Creek project paddle trip on Dirickson Creek	$ -	$ 12.08
Marianne Walch	06/25/15	South Bethany, DE	17.0	9.78				Installation of floating treatment wetlands	$ -	$ 9.78
Chris Bason	06/03/15	Dover, DE	101.0	56.56				LIVING SHORELINES INIITIATIVE mtg. with PDE and DNREC	$ -	$ 58.08
								Subtotal		$ 757.56

Center for the Inland Bays

FY2015 Travel Report (continued)

Center for the Inland Bays
EPA Travel Report FY2015

CE993990-12-1

Name	Travel DATE	TO	MILES	Mileage Cost	Taxi/Train Tolls Parking	Perdiem Day(s)	Perdiem Cost	DESCRIPTION Provide Project/meeting name and purpose	Other Expense	Total Amount
Chris Bason	06/07/15	New Castle, DE	89	49.84	3			TRAVEL TO EPA Region III Leadership Meeting	$ -	$ 54.18
Chris Bason	06/08/15	Philadelphia, PA	37.0	20.72			$ 49.50	TRAVEL TO EPA Region III Leadership Meeting first/last day perdiem	$ -	$ 70.78
Chris Bason	06/08/15	Ocean View, DE	118.0	66.08	$ 3.00			Travel home from EPA Region III	$ -	$ 70.85
Chris Bason	06/15/15	Dover, DE	101.0	56.56				Meeting with DNREC on state procurement reqs. (admin.)	$ -	$ 58.08
Chris Bason	06/16/15	Rehoboth Beach, DE	16.0	8.96				Meeting with Dennis Forney on Love Crk. Property Protection	$ -	$ 9.20
Chris Bason	06/16/15	Rehoboth Beach, DE	16.0	8.96				Meeting with Delaney Consulting on Performance Eval. Consltng.	$ -	$ 9.20
Chris Bason	06/17/15	Dover, Lewes, DE	106.0	59.36				Water Infrastructure Advisory Cncl and Seagrant Presentations	$ -	$ 60.95
Chris Bason	06/26/15	SALISBURY, MD	62.0	34.72				Switchgrass as Poultry Bedding project mtg. at Perdue	$ -	$ 35.65
Sally Boswell	06/05/15	Salisbury, MD	84.6	48.65				Public Radio/TV interview-Horseshoe Crabs Survey	$ -	$ 48.65
Sally Boswell	06/22/15	Selbyville, DE	45.2	25.99				Dirickson Creek Team-Paddle	$ -	$ 25.99
Sally Boswell	06/23/15	Lewes, DE	6.3	3.62				Speaking Engagement-Osher UD	$ -	$ 3.62
Chris Bason	07/15/05	Lewes, DE	32.0	18.40				JOANNA YORK MTG. ON NITROGEN MODEL	$ -	$ 18.40
Chris Bason	07/16/15	Rehoboth, DE	14	8.05				PERFORMANCE SYSTEM DEVELOPMENT MEETING	$ -	$ 8.05
Chris Bason	07/28/15	Dover, DE	101.0	58.08				ENV. ROUNTABLE WITH SENATOR BONINI	$ -	$ 58.08
Marianne Walch	07/01/15	South Bethany, DE	16.0	9.20				Maintenance of floating wetlands and oyster cages	$ -	$ 9.20
Marianne Walch	07/13/15	Ocean View, DE	17.0	9.78				Planting oyster gardening oysters in Steels Cove		$ 9.78
Marianne Walch	07/23/15	Lewes, DE	11.0	6.33				Meeting on watershed model with Joanna York	$ -	$ 6.33
Marianne Walch	07/01/15	South Bethany, DE	16.0	9.20				Maintenance of floating wetlands and oyster cages	$ -	$ 9.20
Marianne Walch	07/30/15	Dover, DE	95.0	54.63				Monitoring Plan workshop	$ -	$ 54.63
								Subtotal		$ 620.78
								TOTAL EPA TRAVEL FY2015 CE993990-12-1		**$ 7,312.23**

REMAINING BALANCE FY2015 EPA TRAVEL= $1,887.77
THE BALANCE WILL BE SPENT ON LOCAL TRAVEL FOR THE REMAINDER OF FY2015.

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, 2) Implementation of the Inland Bays Comprehensive Conservation & Management Plan, 3) Financial, Tax, Risk and Facilities/Properties Management, 4) Human Resource Management, 5) Community and Public Relations, and 6) Fundraising.

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 Administrative Specialist works part time under the supervision of the Development Coordinator and the Executive Director to support the Marketing & Development Program (~75% of time) and the organization's administrative functions (~25% of time). The Program Assistant supports the daily activities of the Development Coordinator, the Executive Director, and the Administrative Assistant. Support activities include data entry and simple database operations, donor contacts and communications, assistance with event planning and preparation, meeting scheduling and preparation, developing and managing requests for proposals, purchasing and greeting visitors.

The Estuary Science & Restoration Coordinator (ES&RC) works under the supervision of the Executive Director and collaborates with all Center staff. The ES&RC is an experienced leader and manager who furthers the Center as a regional leader in the field of estuarine research and restoration. The ES&RC supports the Center's key role as the honest broker of information about the Inland Bays to the general public and decision makers. The ES&RC manages direct reports and leads teams of staff, partners, contractors, and volunteers to plan, fund, and implement a research and restoration project agenda to support the Comprehensive Conservation and Management Plan for the Inland Bays. The ES&RC is responsible for supervising and coordinating staff, partners, and volunteers to develop and implement a watershed monitoring plan and report on the status and trends of the Inland Bays and their watershed in a manner understandable to both technical audiences and the general public (e.g. State of the Bays reports). The knowledge developed and communicated by the position is often used to change public policy. The ES&RC also develops and oversees the implementation of partner-based plans to restore estuarine ecosystems such as baygrass meadows, oyster reefs, and saltmarshes. The ES&RC develops and implements monitoring projects to determine the effectiveness of best management practices for water quality and ecosystem restoration efforts. The ES&RC develops and maintains partnership networks with grantors, university scientists, resources managers, and other environmental organizations; and assists in the planning and coordination of the activities of the Inland Bays Scientific & Technical Advisory Committee.

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 Outreach & Communications Assistant supports the activities of the outreach and education program under the supervision of the Education & Outreach Coordinator. The Outreach & Communications Assistant will 1) produce and distribute content for social media outlets; report on analytics, 2) keep current with emerging digital media strategies, 3) create, procure, and distribute videos on various platforms, 4) assist with writing and production of newsletters, brochures, exhibits, signage and other education/outreach tools and materials as needed, 5) support media outreach; maintain press lists; write and distribute press releases as needed, 6) assist with administration of the Volunteer Program; maintain volunteer records and handle day to day communication with volunteers, 7) support community outreach activities; represent the CIB at outreach events; schedule and coordinate logistics, 8) maintain publication inventory and oversee distribution, 9) complete other tasks as assigned by the Education and Outreach Coordinator.

The Development Coordinator serves 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 Watershed Coordinator works under the supervision of the Executive Director and collaborates closely with Center staff. The Watershed Coordinator is an experienced planner who develops organizational partnerships that result in leveraged financial resources necessary for the large-scale implementation of the Inland Bays Comprehensive Conservation and Management Plan (CCMP) including the Inland Bays Pollution Control Strategy (PCS). He/she has a firm understanding of watershed ecology, particularly related to nutrient cycling, and works with the Science & Restoration Coordinator to ensure that best available science and technology drives plan implementation. The Watershed Coordinator develops operational plans for CCMP and PCS objectives, tracks and reports their progress, and coordinates their revision as necessary. This position has significant grant writing and administration responsibilities and may provide supervision contractors and/or an employee. The Coordinator has detailed knowledge of watershed pollution models and control techniques, writes or assists in writing ordinances relating to the CCMP, and can facilitate agreements.

The Program Manager serves the Executive Director and the Restoration Coordinator and is responsible for the facilities and environmental management of CIB properties and certain ecological restoration programs and projects. The Program Manager is responsible for assisting in the development of management plans and projects for CIB properties. The Program 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 and equipment owned and/or managed by the CIB. Programs and projects include the Oyster Shell Recycling Program and the Oyster Gardening Program. Restoration projects include living shoreline installations and reforestation projects on CIB and publicly and privately owned partner properties.

The Delaware Center for the Inland Bays

Three Year Strategic Plan
April 2015–April 2018

The Center is a private non-profit organization established in 1994 to oversee and facilitate the implementation of a long-term approach for the wise use and enhancement of the Inland Bays' Watershed. The Inland Bays are three shallow coastal lagoons where freshwater flowing from the land mixes with seawater that flows through inlets in barrier islands. The Center is one of 28 Congressionally designated National Estuary Programs working to improve the environmental health of the nation's estuaries.

For more information and to learn how you can support this important work please visit the Center's website at inlandbays.org.

DELAWARE CENTER FOR THE
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The Center is responsible for facilitating the implementation of the Inland Bays Comprehensive Conservation and Management Plan. This stakeholder-developed plan was produced in 1995 and updated with an addendum in 2012.

The Inland Bays are waters of exceptional recreational and ecological significance. More than 30 square miles of open water fringed by 10,000 acres of saltmarsh, the Bays are home to over 112 species of finfish and 40 species of shellfish. They support 300,000 recreational fishing trips each year and are important nursery grounds for commercially important fish and shellfish alike. An important stopover on the Atlantic flyway, the Inland Bays provide for the needs of scores of migratory bird species. The estuary also supports a vital horseshoe crab spawning population on its sandy beaches each spring. The Inland Bays are a mecca for eco-tourists, supporting Delaware's nearly $7 billion coastal economy.

Decades ago, the Bays were thought to be healthy: clear waters with plentiful bay grass meadows, productive oyster reefs, and healthy oxygen levels that supported diverse fish populations. But years of accumulated nutrient pollution and habitat loss have changed the Bays to generally murky waters that are dominated by algae, have very few bay grasses or oysters and do not support healthy oxygen levels in many areas. Thanks to over two decades of hard work and sacrifices of farmers, homeowners, businesses, boaters, elected officials, resource managers, and scientists, some indicators of environmental quality suggest that the Bays are moving back in a healthy direction.

With its many partners, the Center conducts public outreach and education, develops and implements restoration projects, encourages scientific inquiry, and sponsors research. The Center has worked with its partners to craft this Strategic Plan, that serves as the blueprint for the organization's internal and external work over the next three years. The plan includes goals categorized under six strategic priorities that together further the protection and restoration of the Bays. Also included is an accounting of strategic partnerships that will help to realize these goals.

Grass photo on cover courtesy of habitat.noaa.gov

Mission Statement

To preserve, protect and restore Delaware's Inland Bays, the water that flows into them, and the watershed around them.

Goals

1. To facilitate the wise use and enhancement of the Inland Bays' Watershed through the coordinated implementation of the Inland Bays Comprehensive Conservation and Management Plan.
2. To provide a forum where science supports public education and decision making regarding the Inland Bays Watershed.
3. To foster a collaborative, consensus-building culture among watershed stakeholders crucial to support research, education, protection and restoration initiatives, and policy decisions.

Strategic Priorities

1. **Increase and diversify funding to implement the Inland Bays Comprehensive Conservation and Management Plan (CCMP)**
2. **Increase Board participation and interaction to implement the CCMP as advised by Committee outputs**
3. **Increase and focus outreach and marketing**
4. **Maintain implementation of priority restoration and management objectives of the CCMP**
5. **Continue to provide assessments of ecosystem health and improve coordination of monitoring and research**
6. **Improve internal program integration and planning**

Strategic Priorities

1 ▶ Increase and diversify funding to implement the Inland Bays Comprehensive Conservation and Management Plan (CCMP)

1. Executive Director, Development Coordinator, and at least two Board Members will study the possibility of expanding the Board membership to include a Member or Members who would focus on increasing community support for the work of the Center. A recommendation will be brought to the full Board. *JUN 2015.*
2. Develop case statements for financial support. General Statement and schedule for project-specific statements. *APR 2015.*
3. Improve capability of current Board Members for fundraising through training and increased requests for participation in fundraising activities. *Initiate APR 2015. Ongoing.*
4. Maintain a part-time assistant position to serve Development and Administrative needs. *Hire by APR 2015.*
5. Utilize Board, staff, and volunteer leadership to raise an annual minimum of $100,000 in revenue from private sources by 2016/2017. *Ongoing.*
6. Support strategies to develop dedicated sources of public funding to implement clean water actions of the CCMP. *Ongoing.*
7. Achieve an annual average of $500,000 in project grant revenue by 2018 as supported by the hire of a Watershed Coordinator with grant writing responsibilities in 2015.

2 Increase Board participation and interaction to implement CCMP as advised by Committee outputs

1. Achieve and maintain diverse stakeholder representation on the Citizen Advisory Committee (CAC) to consistently provide researched and deliberated advice to the Board. *Ongoing.*
   a. Revise CAC Operating Rules and membership application. *JUN 2015.*
   b. Solicit representative membership from identified stakeholder groups. *JUN 2015 and Ongoing.*
2. Develop and implement strategy to increase participation of researchers on STAC and to increase the scientific review and synthesis outputs of the STAC to advise the Board. *2016. Strategy Development 2015. Implementation 2016 and Ongoing.*
3. Improve coordination of CCMP implementation, tracking, and reporting through the funding and hire of a Watershed Coordinator (OCT 2015). Coordinator works with CCMP signatories and others to leverage financial support for implementation grants. *Ongoing.*

3 Increase and focus outreach and marketing

1. Develop and fill Outreach Assistant position that includes volunteer engagement, social media, and face-to-face public engagement responsibilities. *JUN 2015.*
2. Develop annual education, outreach, and marketing action plans focused on watershed ecology, climate change & sea level rise, and impactful behavior change. Plans are aligned with strategic priorities, identify diverse target audiences, and are developed and implemented by staff, board members, and volunteers. *2015.*
3. Implement the Center's Speakers Bureau. *APR 2015.*
4. Maximize the use of a full suite of social media for outreach and marketing. *2015 and Ongoing.*
5. Utilize the Your Creek project as a framework for delivering outreach and marketing and for receiving community input while implementing CCMP actions. *2015 and Ongoing.*
6. Take advantage of the outreach opportunities presented by CCMP—relevant issues of public importance by developing and communicating the CIB's position on the issues. *2016.*

4 ▶ Maintain implementation of priority restoration and management objectives of the CCMP

1. **Shorelines**—Implement a total of six living shoreline demonstration projects while building key relationships and the economic & ecological data necessary to support policy requiring living shoreline management techniques where they are physically possible. *Ongoing.*

2. **Oysters**—Integrate recycling, gardening, and education efforts into a strategy to produce a shellfish enhancement plan by July 2016, and a demonstration reef creation, and/or a reef-based living shoreline site by 2018, while increasing outreach and development opportunities for project support. *Ongoing.*

3. **Fish**—Implement migratory fish passage on Herring Creek and construct three new eel passages by 2018 while continuing the shore zone fish survey and developing fish as a focus of education and outreach efforts.

4. **Nutrient Management**—Research the nutrient reduction and habitat restoration potential of home owners associations (by 2017) and increase targeted education at cost-effective pollution reduction techniques. Focus on implementing the most cost-effective nutrient management practices that restore the largest suite of ecosystem services across all sectors. Increase understanding of and accountability for reducing wastewater nutrient loads to the Bays. *Ongoing.*

5. **James Farm**—Develop financial support to maintain an extraordinarily well-managed Preserve and complete 50% of the Master Plan Implementation. *2017.*

6. **Potential Option**—Amend the Sussex County water quality buffer ordinance to better reflect the CIB Recommendations for a Water Quality Buffer System.

Continue to provide assessments of ecosystem health and improve coordination of monitoring and research

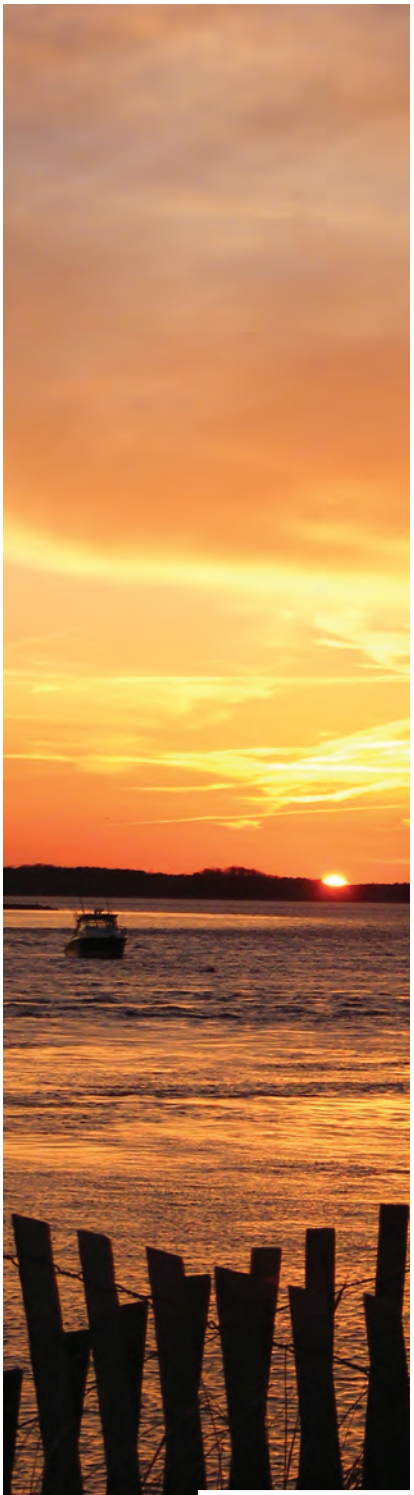
5

1. Complete an environmental Monitoring Plan by October 2015 and begin implementing objectives.
2. Create development case statement for environmental monitoring programs. *2016.*
3. Produce the 2016 State of the Bays Report. *DEC 2016.*
4. Complete State of the Creek reports for the Your Creek Project. *One to two creeks per year.*
5. Explore expansion of citizen science opportunities. *2015.* Potentially expand citizen science opportunities. *2016 and Ongoing.*

Improve internal program integration and planning

6

1. Develop annual work plans as a staff in accordance with National Estuary Program guidance with goals corresponding to the strategic plan. *Begin with fiscal year 2016 work plan and Ongoing.*
2. Coordinate cross-mission objectives (Science & Restoration, Development & Marketing, Education & Outreach) at project development stage. *2015 and Ongoing.*
3. Maximize the use of the CIB mission, goals, logo, and tagline into aspects of projects, events, and communications. *2015 and Ongoing.*



Strategic Partnerships

Universities & Colleges—research scientists are needed to serve STAC, answer major questions about the estuary, and support the Center's goal of providing science to inform education and decision making. UD, Seagrant, DelTech, DelState, and out-of-state institutions are potential new and on-going partners.

Environmental Organizations—Collaborate with the Partnership for the Delaware Estuary on the statewide living shoreline initiative. Cooperate with the Delaware Nature Society on policy objectives. Partner with organizations such as the Nature Conservancy, Ducks Unlimited, and Delaware Wildlands for conservation, technical and restoration assistance.

Legislators—a group willing to partner that must be engaged on specific legislative priorities and to increase State line item funding. Encourage Senator Chris Coons to serve as a legislative champion for Association of National Estuary Program efforts. Cultivate Senators Chris Coons, Tom Carper and Representative John Carney as legislative supporters of the CIB.

Local Business Community—currently a key partnership for development that can be broadened to increase financial support and involvement in key initiatives. Marine contractors and landscapers are a key group to support living shorelines and residential management objectives. Developers can be engaged to minimize ecological impact of development practices. The agricultural community can be engaged to develop practices that reduce nutrient loss from farms to the Bays.

Home Owner Associations (HOAs)—CIB can offer technical services and education that would lead to increased understanding and support of CIB's work.

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