



Image: Delaina LeBlanc, BTNEP

MONITORING PLANS TECHNICAL SUMMARY

Data collection, analysis, and uses

The 2017 revision to the BTNEP CCMP sets goals to restore and maintain the chemical, physical, and biological integrity of the BTES for its people and the people of the nation. BTNEP Action Plans, which are divided up into four categories including Coordinated Planning and Implementation, Ecological Management, Sustained Recognition and Citizen Involvement, and Economic Growth, contain detailed monitoring information.

Measuring the effectiveness of CCMP actions in bringing about environmental change is accomplished with the monitoring of a suite of indicators. This monitoring summary graphically organizes priorities, lead agencies, types of data gathered, timetable for gathering data, methods for sharing data, and other pertinent information.

The monitoring plan summary is provided as a technical supplement of the CCMP, and, as such, focuses on the technical aspects of monitoring data collection, analysis, and uses. Please refer to the CCMP Action Plans for full descriptions of developed management strategies to meet adopted goals and targets and the actions needed to accomplish those strategies.

This plan provides a framework that builds on existing monitoring programs within the BTNEP study area administered by organizations involved in the development and implementation of the CCMP. Actions addressed within the monitoring plans, responsible entities, the data they collect, data gaps, frequency of collecting and reporting the monitoring data, and how the data are shared, reported, and used can be found in complete Action Plans in Chapter 5.



Coordination, collaboration, and long-term support for monitoring are key elements to success of the monitoring plan. BTNEP will continue to work with multiple agencies and partners to obtain, share, and evaluate monitoring data and to communicate findings to the public, decision makers, and stakeholders. During this process, the methods used and data collected and analyzed are checked for current relevance, applicability to emerging needs, and potential changes for protocols as necessitated by improvements in technology.

This monitoring plan summary does not intend to be an integrated monitoring plan that pulls all of

the activities happening in the estuary together. BTNEP is neither in a position nor does it have the financial resources to develop and coordinate such a comprehensive unified plan for the entire estuary. Rather, this monitoring summary plan will help BTNEP and our partners monitor and measure the status and effectiveness of actions to evaluate the success of the CCMP.

The monitoring summary table on the following pages includes the efforts of federal, state, and local government agencies, NGOs, and all partners of BTNEP who are working to collectively implement the CCMP.



Bird researchers evaluate the health of a migratory bird as part of ongoing monitoring. Image: BTNEP

MONITORING SUMMARY TABLE

Category 1 Coordinated Planning and Implementation

PI-1 MANAGEMENT CONFERENCE

Lead Agency	BTNEP MC	Parties Responsible	BTNEP MC
Data Gathered	<ul style="list-style-type: none"> • BTNEP MC meeting agendas and presentations • annual reports to EPA and as required • annual reports to State as directed 		
Timetable for Gathering Data	quarterly, annually, and as requested	How Data is Shared	web

PI-2 PROGRAM OFFICE

Lead Agency	BTNEP MC	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • BTNEP MC meeting agendas and presentations • annual reports to EPA and as required • annual reports to State as directed • annual work plan outputs 		
Timetable for Gathering Data	quarterly, annually, and as requested	How Data is Shared	web

PI-3 POINTS-OF-CONTACT

Lead Agency	BTPO and BTNEP MC	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • BTNEP MC meeting agendas and presentations • annual reports to EPA and as required • annual reports to State as directed 		
Timetable for Gathering Data	quarterly, annually, and as requested	How Data is Shared	web

CP-1 GOVERNMENTAL AFFAIRS AND EDUCATION

Lead Agency	BTPO	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • number of events • number of attendees at events • number of meetings held by the Governmental Affairs Workgroup 		
Timetable for Gathering Data	annually and as requested	How Data is Shared	web

Category 1 Coordinated Planning and Implementation (cont'd)

CP-2 EMERGENCY RESPONSE, RECOVERY, and RESILIENCE

Lead Agency	BTPO	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • summary of activities 		
Timetable for Gathering Data	unknown	How Data is Shared	web
CP-3 COMMUNICATION OF RULES, REGULATIONS, AND GUIDELINES			
Lead Agency	BTNEP MC	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • BTNEP MC meeting agendas • information sharing at any one of the four annual BTNEP MC meetings • quarterly updates on activities to the stakeholders at related BTNEP MC meetings • various reports to EPA about BTPO activities • reports to the State on Performance Indicators as required related to sharing public information about rules, regulations, and guidelines • BTNEP MC meeting presentation • EPA reports as required • annual reports to State as directed 		
Timetable for Gathering Data	quarterly, annually, and as requested	How Data is Shared	web

Category 2 Ecological Management

EM-1 HYDROLOGIC RESTORATION FOR MARSH/SWAMP MANAGEMENT

Lead Agency	CWPPRA and CPRA	Parties Responsible	CWPPRA and CPRA
Data Gathered	Related CRMS sites: <ul style="list-style-type: none"> • accretion data • feldspars • forested swamp vegetation • herbaceous marsh vegetation • hydrograph information • soil properties • surface elevation over time 		
Timetable for Gathering Data	CRMS collects data annually. Project specific data may also be provided as available.	How Data is Shared	agency websites

Category 2 Ecological Management (cont'd)

EM-2 RIVER REINTRODUCTIONS

Lead Agency	CPRA, USACE New Orleans District, LDNR, CWPPRA Task Force, and other Federal Agencies	Parties Responsible	CPRA, CWPPRA, LSU AgCenter, LA Sea Grant, and other state and federal resource agencies including EPA, NOAA/NMFS, USFWS, USDA/NRCS, USGS, LDWF, LDNR, LDEQ, LDH, etc.
Data Gathered	<ul style="list-style-type: none"> • metrics of diversion performance include water levels • sediment accretion/erosion • vegetative response • habitat change • land/water ratios • operational details of the diversion itself • soil quality metrics such as bulk density & organic versus mineral content • socioeconomic effects including changes in commercial fisheries • effects on other living resources such as fish and wildlife • migratory birds, marine mammals, and threatened & endangered species • impacts to navigation/boating access • many aspects of water quality including temperature, salinity, dissolved oxygen, nutrients, suspended sediment, and contaminants 		
Timetable for Gathering Data	Monitoring should include historical, real-time, and long-term data sets collected throughout the project life from planning through operations.	How Data is Shared	Data from the CRMS is shared via interactive website, and the development of the SWAMP promises to expand on data parameters covered by CRMS. Additional parameters should be shared on project-specific websites.

EM-3 FRESHWATER REINTRODUCTION INTO BAYOU LAFOURCHE

Lead Agency	BLFWD, CPRA, USACE, EPA, USFWS, NRCS	Parties Responsible	BLFWD and CPRA
Data Gathered	<ul style="list-style-type: none"> • operational activities • proposed millages • cost estimates for upcoming work 		
Timetable for Gathering Data	monthly reports and as requested	How Data is Shared	web

Category 2 Ecological Management (cont'd)

EM-4 BENEFICIAL USE OF DREDGED MATERIAL AND DEDICATED DREDGING

Lead Agency	OCM, State of Louisiana, CWPPRA Task Force, CPRA, and USACE New Orleans District	Parties Responsible	State of Louisiana, CWPPRA Task Force, CPRA, and USACE New Orleans District
Data Gathered	<ul style="list-style-type: none"> • CWPPRA keeps track of acres created and maintained • list of the millions of cubic yards used • USACE completes BUDMAT reports • list of acres created • State of Louisiana keeps track of acres created or maintained • CPRA's Coastal Reference Monitoring Stations collect water quality and vegetation data on most restoration sites 		
Timetable for Gathering Data	annual report	How Data is Shared	agency websites

EM-5 PRESERVATION AND RESTORATION OF BARRIER ISLANDS

Lead Agency	CWPPRA Task Force, CPRA, State of Louisiana, and USACE, New Orleans District	Parties Responsible	CWPPRA, State of Louisiana, and USACE
Data Gathered	<ul style="list-style-type: none"> • development of a historical bathymetric database with up-to-date 2006 bathymetric analysis that provides a current seafloor change for the shoreline extending from Sandy Point to Racoon Island and the northern Chandeleur Islands • compilation of videography and photography of the 2005 hurricane impacts • construction of a unified historic shoreline change database for the Louisiana coastal zone • LiDAR • surveys for the sandy shorelines of the coastal zone • BICM monitoring • USACE maintains completed reports on all BUDMAT activities • CWPPRA maintains public reporting to keep track of barrier island restoration projects completed • CWPPRA uses CRMS for gathering water quality and vegetative cover data • State of Louisiana through CPRA keeps track of acres created or maintained 		
Timetable for Gathering Data	annual report	How Data is Shared	agency websites

Category 2 Ecological Management (cont'd)

EM-6 SHORELINE STABILIZATION, INDUCED SEDIMENT DEPOSITION, AND LIVING SHORELINES

Lead Agency	BLFWD, CPRA, USACE, EPA, USFWS, NRCS	Parties Responsible	CPRA, USACE, and CWPPRA
Data Gathered	<ul style="list-style-type: none"> • design plans with project areas • expected benefits • results of geotechnical analyses • construction documents with as-built elevations and volumes of material • monitoring and maintenance reports • inspections to monitor the project and its effects 		
Timetable for Gathering Data	annual reports	How Data is Shared	agency websites

EM-7 FLOOD RISK REDUCTION AND COASTAL RESILIENCY

Lead Agency	USACE New Orleans District, CPRA, and TLCD	Parties Responsible	USACE, State of Louisiana, and TLCD
Data Gathered	<ul style="list-style-type: none"> • All responsible organizations maintain a list of ongoing and planned flood risk reduction projects and corresponding fact sheets. • The State and USACE maintain a list of acres restored/protected for HSDRRS mitigation projects. • TLCD maintains an up-to-date emergency contingency plan for operations of structural flood protection components during storms or flood events. • CWPPRA maintains acres created/restored for coastal restoration projects. 		
Timetable for Gathering Data	Annual Levee Inspection Reports	How Data is Shared	agency websites

EM-8 POLLUTANT IDENTIFICATION AND ASSESSMENT

Lead Agency	See Table EM-8.2	Parties Responsible	See Table EM-8.2
Data Gathered	<ul style="list-style-type: none"> • website links on BTNEP website to agency data websites • website links to GIS apps • refer to Table EM-8.2 		
Timetable for Gathering Data	reporting as required by agencies	How Data is Shared	agency websites and agency contact

Category 2 Ecological Management (cont'd)

EM-9 OIL AND PRODUCED WATER SPILL PREVENTION AND EARLY DETECTION

Lead Agency	LDEQ, USEPA, USCG, DPS/LOSCO, and LDNR/OC	Parties Responsible	LDEQ, NRC, USCG, USEPA, LOSCO, and LDNR
Data Gathered	<ul style="list-style-type: none"> • EM-9 establishes an accessible, comprehensive computerized spill database of petroleum and related fluids spills in the BTES. • Interpretive information from the database will be provided to agency and industry personnel and the public to keep them informed of the magnitude and impacts of oilfield related spills. The usefulness of the database and transfer of information will be evident in increased awareness of the impacts of such spills and eventually increased prevention of such spills in BTES. • Record number and volume of spills which should be reduced along with petroleum-related contaminants in the BTES. 		
Timetable for Gathering Data	A timeline developed jointly by the funding agency and the implementer will provide the basis for the monitor to assess plan implementation. Because of the multiple components, interactions of components, and involvement of many agencies, a more detailed timeline should be developed to track the progress of the development of the plan.	How Data is Shared	appropriate digital media and outreach venues

EM-10 IMPROVEMENT OF WATER QUALITY THROUGH REDUCTION OF SEWAGE POLLUTION

Lead Agency	LDEQ, LDH, LDWF, LDNR, USCG, local government, and SCPDC	Parties Responsible	LDEQ and LDH
Data Gathered	<ul style="list-style-type: none"> • LDEQ collects water samples associated with the Ambient Water Quality Network Program. • LDH maintains sewage system databases, beach monitoring, and molluscan shellfish data. • LDEQ conducts ecoregion surveys. • LDEQ conducts TMDLs Monitoring. 		

Category 2 Ecological Management (cont'd)

EM-10 IMPROVEMENT OF WATER QUALITY THROUGH REDUCTION OF SEWAGE POLLUTION (cont'd)

Data Gathered	<ul style="list-style-type: none"> • LDEQ conducts Special Watershed Project monitoring. • LDEQ conducts incident investigations. • LDEQ conducts compliance sampling projects. 		
Timetable for Gathering Data	daily, weekly, monthly, and five-year rotation	How Data is Shared	LDEQ public website and EPA website

EM-11 IMPROVEMENT OF WATER QUALITY THROUGH THE REDUCTION OF AGRICULTURAL POLLUTION

Lead Agency	LDAF, LDEQ, and USDA-NRCS	Parties Responsible	LDAF, LDEQ, and USDA-NRCS
Data Gathered	<ul style="list-style-type: none"> • types of conservation practices • acres of conservation practices • water quality data • watershed impairments 		
Timetable for Gathering Data	semi-annual, annual, and two-year reports	How Data is Shared	group meetings, agency websites, teleconferences, field days, and training workshops

EM-12 IMPROVEMENT OF WATER QUALITY THROUGH STORMWATER MANAGEMENT

Lead Agency	(See next BTNEP and local parish governments for Stormwater Redirection Projects; BTNEP, local city governments, and local parish governments for Stormwater Infiltration Basin Projects and Urban Stream Restoration Projects; and BTNEP for Urban Green Space page)	Parties Responsible	BTNEP, local parish, and city governments
Data Gathered	Stormwater Redirection Projects: <ul style="list-style-type: none"> • sediment elevation, water quality data, and vegetative cover Infiltration Basin: <ul style="list-style-type: none"> • total volume water retained Urban Stream Restoration: <ul style="list-style-type: none"> • pre- and post-data: water quality data, number of animal species, and number of plant species 		

Category 2 Ecological Management (cont'd)

EM-12 IMPROVEMENT OF WATER QUALITY THROUGH STORMWATER MANAGEMENT (cont'd)

Timetable for Gathering Data	pre- and post-project	How Data is Shared	BTNEP MC meetings, on-line through current online technologies where appropriate
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EM-13 URBAN GREEN SPACES

Lead Agency	BTNEP	Parties Responsible	BTNEP, EPA, individual communities, and LDEQ
Data Gathered	<ul style="list-style-type: none"> • visitor surveys • number of visitors • water quality samples 		
Timetable for Gathering Data	semi-annually and annually	How Data is Shared	educational outreach

EM-14 ASSESSMENT OF HARMFUL ALGAL BLOOMS (HABs)

Lead Agency	LDAF, LDEQ, NRCS, EPA, BTNEP, LDH, LDWF, USDA, FDA, LEEC, LUMCON, LDOE, Louisiana Sea Grant College Program, and EPA/National Environment Programs/Gulf of Mexico Program/Gulf of Mexico Alliance-Private	Parties Responsible	central host of materials and web page
Data Gathered	<p>Identify:</p> <ul style="list-style-type: none"> • taxonomic and toxin experts • number of experts engaged in an advisory capacity in the panel of experts • number of web pages developed and of times updated • number of fliers, brochures, and informational advisory outputs developed • number of community submissions/reports of potential HAB events <p>Employ:</p> <ul style="list-style-type: none"> • spatial analysis system • mapping reports of HABs, NOAA – National Estuarine Eutrophication Assessment • reporting events to the national HAB reporting system (LUMCON) 		
Timetable for Gathering Data	annual data summary	How Data is Shared	web page and public communications

Category 2 Ecological Management (cont'd)

EM-15 PROTECTION OF NATIVE PLANTS AND ANIMALS

Lead Agency	LDWF, LDNR, CPRA, LDAF, USDA, NRCS, USFWS, USGS, and NOAA's NMFS	Parties Responsible	BTNEP
Data Gathered	<ul style="list-style-type: none"> • existing datasets • CRMS vegetative surveys • agency lists of acres/square feet of pollinator habitat restored • specific assessments for T&E species 		
Timetable for Gathering Data	timelines vary	How Data is Shared	agency web sites, annual reports, and specific requests

EM-16 REDUCTION OF IMPACTS FROM INVASIVE SPECIES

Lead Agency	BTNEP	Parties Responsible	BTNEP and BTNEP MC
Data Gathered	<ul style="list-style-type: none"> • surveys to identify animal and plant species under various scopes of work that can be used to identify invasive species presence/absence 		
Timetable for Gathering Data	annual and special reports from state and federal agencies	How Data is Shared	quarterly report activity at BTNEP MC meetings, document meetings and activities of the ISAPT, and regularly report to EPA

EM-17 IMPROVEMENT OF WATER QUALITY THROUGH REDUCTION OF INSHORE AND MARINE DEBRIS

Lead Agency	BTPO with BTNEP MC, EPA, GOMP, Louisiana Sea Grant, LDWF, LDEQ, NOAA, KLB, KAB, LSU, and BTEF	Parties Responsible	BTNEP staff and its partners
Data Gathered	<ul style="list-style-type: none"> • document marine debris collected • document meetings and activities of the BTNEP staff • report regularly to BTMC and appropriate partners 		
Timetable for Gathering Data	as required by funding source entities	How Data is Shared	BTNEP website and/or partner websites

Category 2 Ecological Management (cont'd)

EM-18 PROTECTION OF DRINKING WATER SOURCES

Lead Agency	LDH, LDEQ, LDNR, USDA/NRCS, LDAF, local water districts and water providers, BTNEP MC, local citizens, and water advisories	Parties Responsible	LDEQ, LDH, local water districts, USDA NRCS, LDAF, BTNEP staff, and BTNEP MC
Data Gathered	<ul style="list-style-type: none"> • locations of wells • locations and sources of drinking water as a database • delineation of water protection areas • SPSOC locations including information that is associated with possible concerns • sewage survey data and associated GIS layers on maps • ambient water monitor • water intakes • groundwater wells • DNR layer • infrastructure for the water system as GIS layers • drinking water watch data • water systems CCR from individual water works • pump station data • treatment plant reports • results from Lower Mississippi River Waterworks Warning Network • local water districts' drinking water reports, consumer confidence reports, and local water district commission reports • mixing station reports • Farm/Nutrient and Management Plans • current BMPs • reports on opportunities to provide support to improvements of clean drinking water, water professionals, and water infrastructure ing data • aquifer water monitoring data 		
Timetable for Gathering Data	A time line for reporting data gathered is developed by the funding agency, and the implementer and will provide the basis for the monitor to assess plan implementation.	How Data is Shared	online at the various agencies and print materials distributed to the public

Category 3 Sustained Recognition & Citizen Involvement

SR-1 COMMUNITY ENGAGEMENT

Lead Agency	BTNEP staff	Parties Responsible	BTNEP MC and BTNEP staff
Data Gathered	<ul style="list-style-type: none"> • number of unique volunteers • number of volunteer hours recorded per year • number of volunteer events per year, per region of the BTES • number of waypoints identified and mapped 		
Timetable for Gathering Data	regularly for EPA and quarterly for BTNEP MC	How Data is Shared	media reports and BTNEP MC quarterly meetings

SR-2 CIVIC ENGAGEMENT

Lead Agency	BTPO and BTNEP MC	Parties Responsible	BTPO
Data Gathered	<ul style="list-style-type: none"> • most effective format for conveying the message of the BTES • number of materials given out at different events/locations • number of hits on specific web sites or social media posts 		
Timetable for Gathering Data	ongoing	How Data is Shared	quarterly social media report to BTNEP MC, track dissemination of materials, and quarterly Speakers Bureau report to BTNEP MC

SR-3 MEDIA ENGAGEMENT

Lead Agency	BTNEP staff	Parties Responsible	BTNEP MC, BTNEP staff, and paid monitoring services
Data Gathered	<ul style="list-style-type: none"> • number of requests for interviews and information from news organizations • level of awareness and interest in BTNEP, its mission, and projects by local and national media • analytics from website and social media sites, number of inquiries, views, etc. 		
Timetable for Gathering Data	regularly for EPA, quarterly for BTNEP MC, and as events occur or projects progress	How Data is Shared	media reports, BTNEP MC quarterly meetings, and electronically

Category 3 Sustained Recognition & Citizen Involvement (cont'd)

SR-4 PUBLIC ENGAGEMENT

Lead Agency	BTNEP MC, BTPO, EPA, and consultants	Parties Responsible	BTNEP MC, BTNEP staff, and partners
Data Gathered	<ul style="list-style-type: none"> • number of materials given out at different events/locations • most effective format for conveying the message of the BTES • analytics on specific web sites or social media posts 		
Timetable for Gathering Data	regularly for EPA and quarterly for BTNEP MC	How Data is Shared	media reports and BTNEP MC quarterly meetings

SR-5 ESTUARINE CURRICULUM DEVELOPMENT

Lead Agency	BTNEP Education APT	Parties Responsible	BTNEP Education APT and BTNEP MC
Data Gathered	<ul style="list-style-type: none"> • quarterly report curriculum activity • document meetings and activities of the Education APT • document inventory of existing materials and its presentation to the BTNEP MC • regularly report to EPA 		
Timetable for Gathering Data	annually BTNEP Education APT and quarterly BTNEP MC	How Data is Shared	web

SR-6 CONTINUING EDUCATION PROGRAMS & INFORMAL EDUCATION PROGRAMS

Lead Agency	BTNEP Education APT and BTNEP MC	Parties Responsible	BTNEP MC and Education APT
Data Gathered	<ul style="list-style-type: none"> • document meetings and activities of the Education APT • quarterly report activities to the BTNEP MC • regularly report to EPA 		
Timetable for Gathering Data	quarterly to BTPO and BTEF	How Data is Shared	public meeting

Category 3 Sustained Recognition & Citizen Involvement (cont'd)

SR-7 FINANCIAL SUPPORT FOR EDUCATIONAL INITIATIVE

Lead Agency	BTEF, BTPO, BTNEP MC, and stakeholders	Parties Responsible	BTEF, BTPO, and BTNEP MC
Data Gathered	<ul style="list-style-type: none"> • BTEF quarterly report • quarterly reporting of activities to the BTNEP MC 		
Timetable for Gathering Data	quarterly to BTPO and BTEF	How Data is Shared	public meeting

SR-8 CULTURAL HERITAGE AND LIFEWAYS

Lead Agency	BTNEP MC and BTPO	Parties Responsible	BTNEP MC and BTPO
Data Gathered	<ul style="list-style-type: none"> • quarterly report activities to the BTNEP MC • document meetings and activities related to Cultural Heritage in the BTES • regularly report to EPA 		
Timetable for Gathering Data	quarterly BTNEP MC	How Data is Shared	web and social media

Category 4 Economic Growth

EG-1, EG-4 (PE-1) PLACE-BASED BENEFITS OF THE BARATARIA-TERREBONNE ESTUARY SYSTEM

Lead Agency	BTNEP, Lafourche Convention and Visitors Bureau, LDCRT, and Louisiana Travel Promotion Association	Parties Responsible	BTNEP
Data Gathered	<ul style="list-style-type: none"> • digital materials 		
Timetable for Gathering Data	pre- and post-surveys and annual reports	How Data is Shared	presentations, conversations, online, and archives

Category 4 Economic Growth (cont'd)

EG-1, EG-2 (PE-2) SCIENTIFIC LITERACY ON WATER

Lead Agency	BTNEP, Research Park Corporation/NexusLA, and Good Work Network	Parties Responsible	BTNEP and collaborative teams
Data Gathered	<ul style="list-style-type: none"> • digital recordings 		
Timetable for Gathering Data	pre- and post-surveys and annual reports	How Data is Shared	presentations, conversations, online, and archives

EG-1, EG-2, EG-4 (PE-3) SEAFOOD PROMOTION, TECHNOLOGY, AND MARKETING

Lead Agency	BTNEP	Parties Responsible	BTNEP, BTNEP MC, and collaborative partners
Data Gathered	<ul style="list-style-type: none"> • presentations • curricula developed 		
Timetable for Gathering Data	annual reports	How Data is Shared	presentations, conversations, online, and archives

EG-2, EG-3 (PE-4) DEVELOPMENT AT PORT FOURCHON

Lead Agency	GLPC, BTNEP MC, BTNEP, BTEF, WIG, NSU, LSU, Environmental NGOs and non-profits, CPRA, the energy industry, and media	Parties Responsible	GLPC, BTNEP, and other agency and NGO partners
Data Gathered	<ul style="list-style-type: none"> • acres of property developed and restored in the region • the number of volunteer events and hours • hours of staff time spent on outreach and technical assistance • media coverage and exposure • the number of outreach events and contacts generated 		
Timetable for Gathering Data	commencing in Fall 2017 with commencement of Slip D mitigation development	How Data is Shared	email, reporting tools (to be developed), social media, media, etc.

Category 4 Economic Growth (cont'd)

EG-1, EG-2, EG-4 (PE-5) CLIMATE CHANGE AS AN ECONOMIC DRIVER

Lead Agency	BTNEP	Parties Responsible	BTNEP, BTNEP MC, and collaborative partners
Data Gathered	<ul style="list-style-type: none"> • presentations • curricula developed 		
Timetable for Gathering Data	annual reports	How Data is Shared	presentations, conversations, online, and archives

EG-1, EG-2, EG-3, EG-4 (PE-6) BUSINESS FINANCIAL ASSISTANCE

Lead Agency	collaborative partners	Parties Responsible	SBDC, SCPDC, SLEC, TED, and TEDA
Data Gathered	<ul style="list-style-type: none"> • information on BTES and resource-based businesses 		
Timetable for Gathering Data	annually	How Data is Shared	web, BTNEP MC, and BTNEP's communication network

EG-1, EG-2, EG-3, EG-4 (PE-7) LIAISON ROLES OF BTNEP

Lead Agency	BTNEP, BTNEP MC, partners	Parties Responsible	BTNEP, BTNEP MC, partners
Data Gathered	<ul style="list-style-type: none"> • types and location of eco-tourism based business operations • best practices for eco-based operations • information specific to a pending problem of issue 		
Timetable for Gathering Data	continual	How Data is Shared	web and communication network

EG-1, EG-2, EG-3 (PE-8) BUSINESS EDUCATION AND TRAINING

Lead Agency	BTNEP and collaborative partners	Parties Responsible	BTNEP and collaborative partners
Data Gathered	<ul style="list-style-type: none"> • number of programs created • number of students completing the programs • percentage of students who receive jobs in the industry 		
Timetable for Gathering Data	continual	How Data is Shared	web and communication network

Category 4 Economic Growth (cont'd)

EG-4 (PE-9) MARKETING THE BARATARIA-TERREBONNE NATIONAL ESTUARY PROGRAM

Lead Agency	BTNEP	Parties Responsible	BTNEP
Data Gathered	<ul style="list-style-type: none"> • number of marketing initiatives created 		
Timetable for Gathering Data	continual	How Data is Shared	web and communication network



BTNEP supports conservation efforts that monitor migratory birds such as the Red Knot. Image: Erik I. Johnson

Implications of Beach Restoration on Piping Plover (*Charadrius melodus*)

in Louisiana at Caminada Headland Beach & Dune Restoration Projects (BA-45/BA-143)

Introduction

Currently in construction, the Caminada Headland Beach and Dune Restoration Projects (BA-45/BA-143) in Lafourche Parish, Louisiana are designed to protect and preserve the structural integrity of the barrier shoreline and provide for restoration of geologic and ecosystem processes such as longshore transport and overwash. Benefits of restoring the headlands Gulf shoreline would protect and sustain significant and unique coastal habitats important to the threatened and endangered populations of Piping Plover (*Charadrius melodus*).



Figure 1: Caminada Headland Beach before start of construction (left) and as of March 13, 2014 (right).

Methods

Following the Louisiana Piping Plover Non-Breeding Season Survey Guidelines, the study site is divided up into 4 - 5 sections and is surveyed on foot. Surveyors walk the length of each section, using binoculars and spotting scopes to identify target species and document band combinations.

Data collected includes: number of individuals, coordinates, location on the beach, activity, color band combinations and photographs.

On April 1 & 2, 2013, 28 pre-construction benthic samples were collected at 4 sites and analyzed for population, density, diversity and total biomass of infaunal organisms known to be prey items for shorebirds. The following year, these 4 sites were re-visited to assess changes in the macro-invertebrate population structure. Nine additional sites, including 3 bay stations, were surveyed to provide a baseline for additional restoration. Only 14 of the 70 samples collected in 2014 consisted of newly constructed beach. Additional post construction benthic analysis will also be performed.



Figure 2: Surveyor using spotting scope to identify target species.

Preliminary Results

Twice monthly surveys were initiated on January 11, 2013 with construction activities commencing in May 2013 on the Caminada Headland. Forty-six surveys have been executed as of May 6, 2015. An average of 94 Piping Plover were detected per survey, with a range from a low of 0 to a high of 147. A total of 84 re-sighted color banded birds have been recorded. On average, 25 marked individuals are observed per survey.

Census numbers thus far have not indicated major changes in the number of birds encountered between pre-construction and active construction areas. Preliminary data of resighted banded Piping Plover show many of the birds exhibit site fidelity (n=33), with individual site usage ranging from 19.47 km to 0.35 km.



Figure 3: Clockwise from top left: Banded Piping Plover foraging, Surveyor collecting intertidal core sample, Polychaete, Amphipods.

Benthic sampling indicated that *Scolecopsis squamata* and *Lepidactylus triarticulatus*, which are common inhabitants of intertidal and near-shore benthic habitats from the barrier island and mainland beaches from the Florida panhandle area to Texas, likewise dominated the intertidal benthic community at Caminada Headland Beach. Overall, macro-benthic density values were higher in 2013. The 2014 benthic analysis of the 2 sites surveyed both pre and post construction, only represents a post fill time frame of 4 months and 8 months. Additional benthic samplings are scheduled post construction.

Thus far, surveys indicate active restoration has caused no Piping Plover "incidental takes". Additionally of note, on the September 11, 2013 survey, Piping Plover on the construction site were located foraging directly along the Gulf shoreline with Wilson's Plover, Snowy Plover, Black-bellied Plover and Sanderlings where water was slowly seeping from the dredge outfall area ~91 meters from major construction activities.

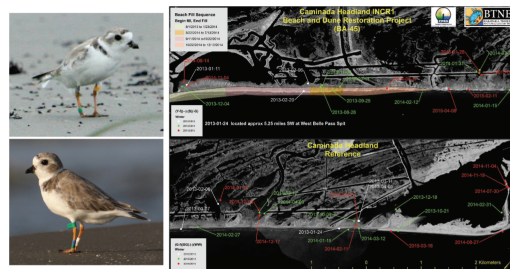


Figure 4: Distribution of two representative individuals in project area and reference.

Conclusion

Preliminary results indicate that survey intensity is capturing consistent Piping Plover numbers and that the regular surveys have determined not only numbers of birds but patterns of usage as well. Indications are also that the construction activities along the initial area of the Caminada Headland have had little impact to wintering Piping Plovers. Further analysis of the surveys should provide valuable indications of changes in Piping Plover as well as benthic community distributions and potential for future use of the restored shoreline.

Determining short-term impacts of active barrier island restoration projects on the threatened and endangered Piping Plover could have consequences for future barrier island restoration as most beaches along the state are considered critical habitat for this particular species and are included in Louisiana's Comprehensive Master Plan for a Sustainable Coast. Shoreline restoration projects have become larger, leading to increased construction durations. These increased durations could mean increased disturbances throughout multiple wintering seasons. Results of this project will help in development of best management practices (BMP's) available to the State for construction activities, as well as help regulators better access actual shorebird use and possible impacts of construction activities.

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