LAKE PONTCHARTRAIN BASIN RESTORATION PROGRAM

DRAFT COMPREHENSIVE CONSERVATION MANAGEMENT PLAN

JANUARY 2026

LAKE PONTCHARTRAIN BASIN RESTORATION PROGRAM

The purpose of the Lake Pontchartrain Basin Restoration Program is to restore the ecological health of the basin by developing and funding restoration projects and related scientific and public education projects to reduce the risk of pollution.

CITATION

Lake Pontchartrain Basin Restoration Program. (2026). Draft Comprehensive Conservation Management Plan. (pp. 1-109).

ACKNOWLEDGEMENTS

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The document was prepared by members of the Theodore Roosevelt Conservation Partnership team (Royal Engineers and Consultants, LLC; Denise Reed, LLC; Emergent Method, LLC; and Louisiana State University). Input from Work Group members, Community Roundtable participants, the Executive Committee, USEPA, and other interested parties improved the document.

LETTER FROM THE CHAIRMAN

The 2026 Comprehensive Conservation Management Plan (CCMP) is the blueprint for the restoration of the Lake Pontchartrain Basin. It's been a multi-year effort and the tireless work of many. Its story begins long ago.

The 10,000 square mile Lake Pontchartrain Basin is eons old and rich in natural resources, history, and culture. Topography ranges from rolling woodlands in the north to barrier islands in the south and southeast. At its center is Lake Pontchartrain. The lake was created about 2,000 years ago when the meandering Mississippi River established the St. Bernard Delta embaying the wide expanse of water that Native Americans named Okawata. The brackish lake connects the Basin's freshwater rivers, bayous, and streams, with the salty waters of the Gulf making it a productive estuary.

Native Americans have lived in the Pontchartrain Basin for thousands of years. French explorers founded Baton Rouge in 1699 and La Nouvelle-Orléans in 1718. By the mid-1800s, New Orleans was the fifth most populus city in America. Today, the Pontchartrain Basin is home to two million.

Like all ecosystems, the Pontchartrain Basin has been affected by both natural and human forces. Throughout time, Pontchartrain's ecosystem adapted with nature to maintain its sustainability. Since the early 1900s, however, some human activities began to induce unintentional and often detrimental consequences to the Basin. Land use changes, building of levees and roadways, and dredging of waterways and canals, caused loss of habitats, increased pollution, and altered natural hydrology.

Fortunately, by the late 20th century, more and more recognized the adverse impacts. The catalyst for today's CCMP was To Restore Lake Pontchartrain by Tulane and UNO in 1989. It was followed by Phases I and II of the Comprehensive Management Plan (CMP) for the Lake Pontchartrain Basin in 1993 and 1995 respectively. These were supplemented by the Comprehensive Habitat Management Plan (CHMP) for Pontchartrain in 2005. The CHMP developed the multiple lines of defense strategy which became the cornerstone of ongoing efforts to save Louisiana's disappearing coast. Pontchartrain is healthier today due to many recommendations from these plans such as closure of the Mississippi River Gulf Outlet (MRGO) which significantly reduced saltwater intrusion and water quality improvements that resulted in delisting of several impaired water bodies.

The CCMP charts the path for Pontchartrain's future. It identifies current problems and presents alternative solutions/actions. The plan includes 132 specific actions organized into three critical themes: Water Quality, Habitat, and Education and Involvement. It addresses the root causes of issues—from upgrading aging wastewater infrastructure to restoring the wetlands that protect us from storms.

The CCMP is the product of the dedicated work led by professionals from the Theodore Roosevelt Conservation Partnership with input from federal, state, and local agencies; public and private organizations and groups; management conference members/stakeholders; and ordinary citizens. Guidance from the Environmental Protection Agency has been instrumental. Administration of the CCMP and ongoing management of over 300 water quality, habitat, and public access projects of the Lake Pontchartrain Basin Restoration Program by the UNO Research and Technology Foundation has been critical. Our Congressional delegation's interest and particularly, Senator Bill Cassidy's strong support for Pontchartrain have been crucial. Finally, the efforts of the countless who have

championed Pontchartrain's comeback over the last four decades will always be a cornerstone of this restoration.

In a nut shell, the CCMP's message is to live in harmony with and to mimic nature whenever feasible. Implementing its actions will continue to improve the Basin's water quality; make habitats more sustainable; enhance recreational opportunities; build resilience to future storms and floods; and enhance our region's economy. A healthy Pontchartrain Basin means healthy, thriving communities.

Pontchartrain is rich in resources, history, and culture. This plan and your support will ensure that it remains a vibrant, living legacy to benefit generations to come.

For Pontchartrain,

Carlton Dufrechou
Chairman, Executive Committee
Lake Pontchartrain Basin Restoration Program

EXECUTIVE SUMMARY

Lake Pontchartrain Basin Restoration Program

Recognizing the ecological and cultural importance of the Pontchartrain Basin, Congress passed the Lake Pontchartrain Basin Restoration Act of 2000, directing the U.S. Environmental Protection Agency (USEPA) to establish the Lake Pontchartrain Basin Restoration Program (PRP). USEPA Region 6 oversees the grant program, with the University of New Orleans Research and Technology Foundation (UNORTF) serving as the grant recipient and pass-through entity.

The purpose of the PRP is to restore the ecological health of the basin by developing and funding restoration projects and related scientific and public education projects to reduce the risk of pollution. A vital component of the PRP is the Comprehensive Conservation Management Plan (CCMP), originally developed in 1995 and now updated through a collaborative process involving expert Work Groups, the PRP Executive Committee, the PRP Management Conference, USEPA, and the public. The 1995 CCMP and the subsequent 2006 Comprehensive Habitat Management Plan (CHMP) have guided the PRP's investments and strategies to address challenges such as sewage and agricultural runoff, stormwater pollution, and wetland loss. From 2002 to 2022, USEPA awarded over $43 million for 274 projects ranging from sewer system upgrades and stormwater planning to habitat restoration and public outreach.

Since 1995, the Pontchartrain Basin has experienced significant changes in landscape, demographics, water quality, and habitat. Notable developments include the closure of the Mississippi River Gulf Outlet (MRGO) in 2009, improved water quality leading to the delisting of several water bodies from the 303(d) list, frequent openings of the Bonnet Carré Spillway, and significant restoration projects such as River Reintroduction into Maurepas Swamp. New challenges, such as environmental change, extreme weather events, and emerging contaminants, underscore the urgency for a revised CCMP.

2026 Comprehensive Conservation Management Plan

The goals for the 2026 CCMP were established early in the plan development process to ensure the CCMP focused on the identification of current issues and challenges within the basin and the development of actions to address them. The goals emphasize the PRP's purpose: water quality, habitat, and education and involvement:

1. Improve water quality through point and nonpoint pollutant source reduction to support ecological health

2. Promote sustainability of important land-based and aquatic habitat

3. Increase awareness of current and future ecological health issues to encourage active participation in efforts to increase environmental sustainability

The 2026 CCMP discusses current issues, actions needed to solve them, and performance tracking. It reflects local, state, federal, private, and nonprofit input, ensuring that both short- and long-term strategies align with regional needs. The CCMP also provides a framework for development of future Requests for Proposals, helping direct funds to the most pressing challenges.

To help readers navigate the draft CCMP, see below for a summary of the details included in the four main sections of the document and the eight appendices that contain more technical information.

- The **Framework for Plan Revision** section describes the overall framework and process for the CCMP revision, which includes updating goals and objectives and engaging with stakeholders and Work Groups.

- The **Issues and Challenges** section provides a summary of the characterizations of current Pontchartrain Basin issues related to water quality, habitat, and resilient communities, the reason the issues are occurring, and the potential consequences of them.

- The **Action Plan** section is organized around three main themes (Water Quality, Habitat, and Education and Involvement) and eight overall focus areas. It includes 132 total actions with strategies and measurable outcomes to guide program partners as they plan, fund, and implement policies, projects, and programs. For each action, potential partners, a timeframe for implementation, estimates for the cost range, and performance measures are identified.

- The **Toward CCMP Implementation** section discusses how various partners can contribute to the implementation of the CCMP and its actions according to their jurisdictions, missions, expertise, and availability. It also offers ideas on maintaining coordination and collaboration and tracking CCMP implementation.

The CCMP document is supported by eight appendices that provide technical detail and guidance. These appendices provide more detailed descriptions of the framework used to revise the CCMP, issues and challenges within the basin, how actions from the 1995 CCMP and 2006 CHMP compare to 2026 CCMP actions, the basin's environmental vulnerability, supporting strategies, a monitoring report for guiding plan implementation, and external engagement in the plan revision process.

Project Implementation

Requests for Proposals for restoration projects and related scientific and public education projects are issued by UNORTF on an approximately annual cycle. More information about the PRP, the CCMP, and funding for project implementation can be found by visiting the USEPA[1] and UNORTF[2] websites for the PRP or by emailing PRPgrant@thebeachuno.org.

[1]More information can be accessed via the following link: https://www.epa.gov/la/lake-pontchartrain-basin-restoration-program

[2]More information can be accessed via the following link: https://thebeachuno.org/lake-pontchartrain-basin-restoration-program/

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LIST OF ABBREVIATIONS

Abbreviation	Definition
ARBC	Amite River Basin Commission
ASLA	American Society of Landscape Architects
BMP	Best Management Practice
BREC	Recreation and Park Commission for the Parish of East Baton Rouge
BTNEP	Barataria-Terrebonne National Estuary Program
C&E	Department of Conservation and Energy
CCA	Coastal Conservation Association
CCMP	Comprehensive Conservation Management Plan
CHMP	Comprehensive Habitat Management Plan
CPRA	Coastal Protection and Restoration Authority
CRCL	Coalition to Restore Coastal Louisiana
CWA	Clean Water Act
CWPPRA	Coastal Wetlands Planning, Protection and Restoration Act
DWH	Deepwater Horizon
FEMA	Federal Emergency Management Agency
GI	Green Infrastructure
HSDRRS	Hurricane Storm Damage Risk Reduction System
IIJA	Infrastructure Investment and Jobs Act
LADOTD	Louisiana Department of Transportation and Development
LCTCS	Louisiana Community and Technical College System
LDAF	Louisiana Department of Agriculture and Forestry

Abbreviation	Definition
LDEQ	Louisiana Department of Environmental Quality
LDH	Louisiana Department of Health
LDoE	Louisiana Department of Education
LDWF	Louisiana Department of Wildlife and Fisheries
LLPI	Longleaf Pine Initiative
LPDES	Louisiana Pollutant Discharge Elimination System
LSU	Louisiana State University
LULC	Land Use Land Cover
LWC	Louisiana Workforce Commission
LWI	Louisiana Watershed Initiative
MRGO	Mississippi River Gulf Outlet
NBS	Nature-based Solutions
NEP	National Estuary Program
NGO	Non-governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
PCP	Pentachlorophenol
PDT	Plan Development Team
PFAS	Per- and Polyfluoroalkyl Substances
PPT	Parts per Thousand
PRP	Lake Pontchartrain Basin Restoration Program

Abbreviation	Definition
RESTORE Act	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
RFP	Request for Proposals
SAV	Submerged Aquatic Vegetation
SDM	Inland Swamps, Deltaic Coastal Marshes and Barrier Islands
SGCN	Species of Greatest Conservation Need
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Loads
TNC	The Nature Conservancy
UNO	University of New Orleans
UNORTF	University of New Orleans Research and Technology Foundation
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WWT	Wastewater Treatment
WWTP	Wastewater Treatment Plants

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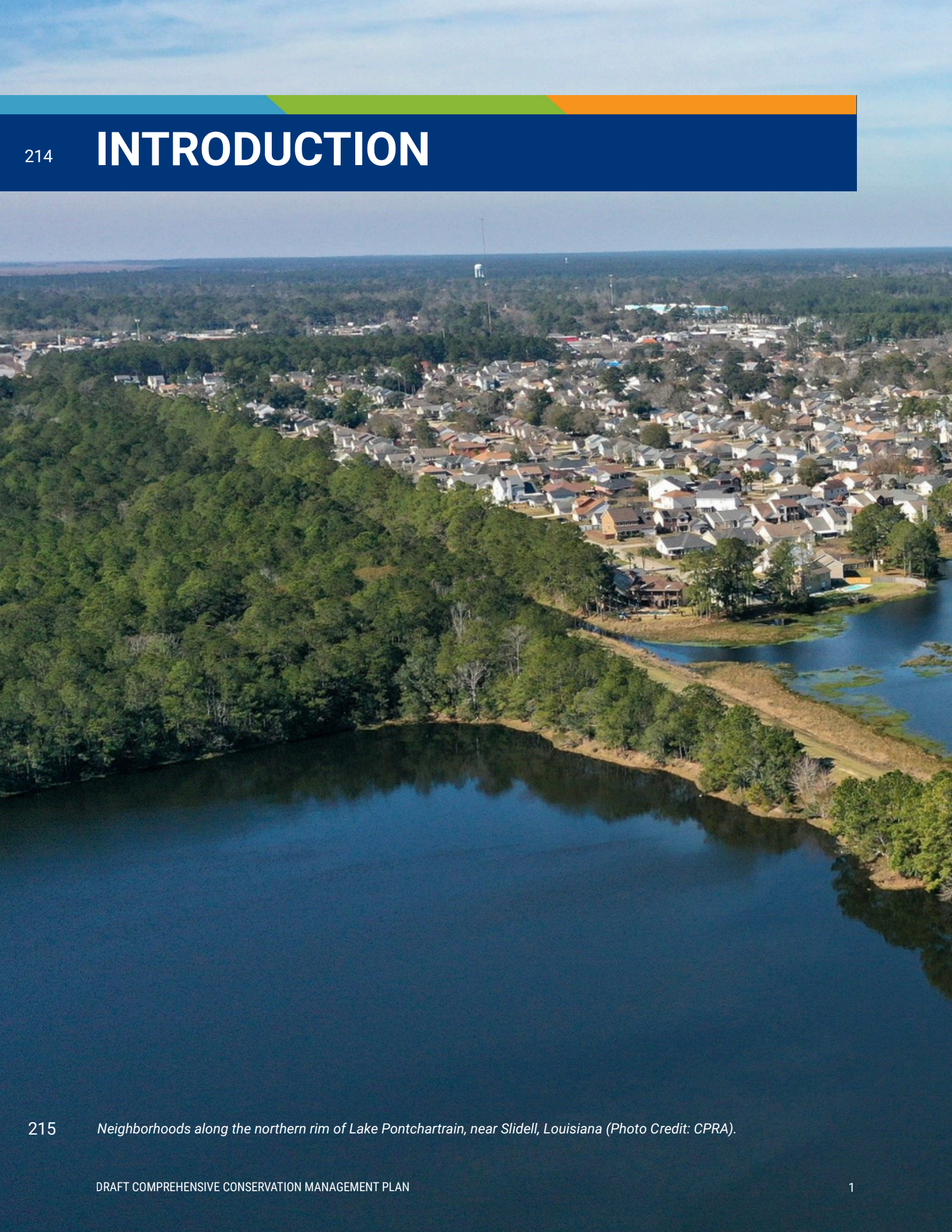
INTRODUCTION



215 *Neighborhoods along the northern rim of Lake Pontchartrain, near Slidell, Louisiana (Photo Credit: CPRA).*

The Lake Pontchartrain Basin Restoration Program

Recognizing the ecological and cultural importance of the Pontchartrain Basin, Congress passed the Lake Pontchartrain Basin Restoration Act of 2000, directing the U.S. Environmental Protection Agency (USEPA) to establish the Lake Pontchartrain Basin Restoration Program (PRP) (United States Government Accountability, 2023). USEPA Region 6 oversees the grant program, with the University of New Orleans Research and Technology Foundation (UNORTF) serving as the grant recipient and pass-through entity.

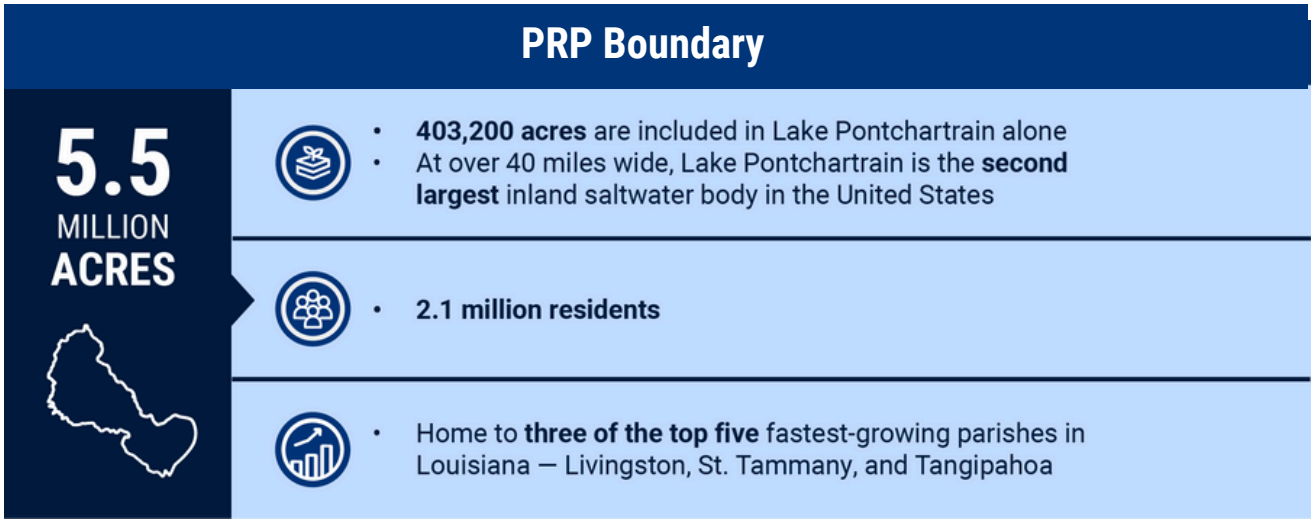
The PRP boundary spans over 5.5 million acres and encompasses 16 Louisiana parishes (Ascension, East Baton Rouge, East Feliciana, Iberville, Jefferson, Livingston, Orleans, Plaquemines, St. Bernard, St. Charles, St. Helena, St. James, St. John the Baptist, St. Tammany, Tangipahoa, Washington) and 4 Mississippi counties (Amite, Lincoln, Pike, Wilkinson) (Figure 1). It represents the center of southeastern Louisiana's unique cultural heritage, contains areas of economic significance, supports nearly 2.1 million residents ranging from rural farming communities to metropolitan New Orleans, and sustains major industries such as fishing, shrimping, crabbing, and oystering. The USEPA reported that the estimated value of agriculture, forestry, fisheries, and wildlife commodities in the Pontchartrain Basin was almost $900 million in 2018 (United States Government Accountability, 2023). The basin provides critical wildlife habitat, recreational opportunities, and natural flood protection during hurricanes and tropical storms.

Figure 1. PRP boundary with parish/county divisions.

The purpose of the Lake Pontchartrain Basin Restoration Program is to restore the ecological health of the basin by developing and funding restoration projects and related scientific and public education projects.

A vital component of the PRP is the Comprehensive Conservation Management Plan (CCMP), originally developed in 1995;[3] the 2006 Comprehensive Habitat Management Plan (CHMP) was developed as an addendum to the habitat portion of the 1995 CCMP. Both have now been updated in this revised CCMP through a collaborative process involving expert Work Groups, the PRP Executive Committee, the PRP Management Conference, USEPA, and the public.

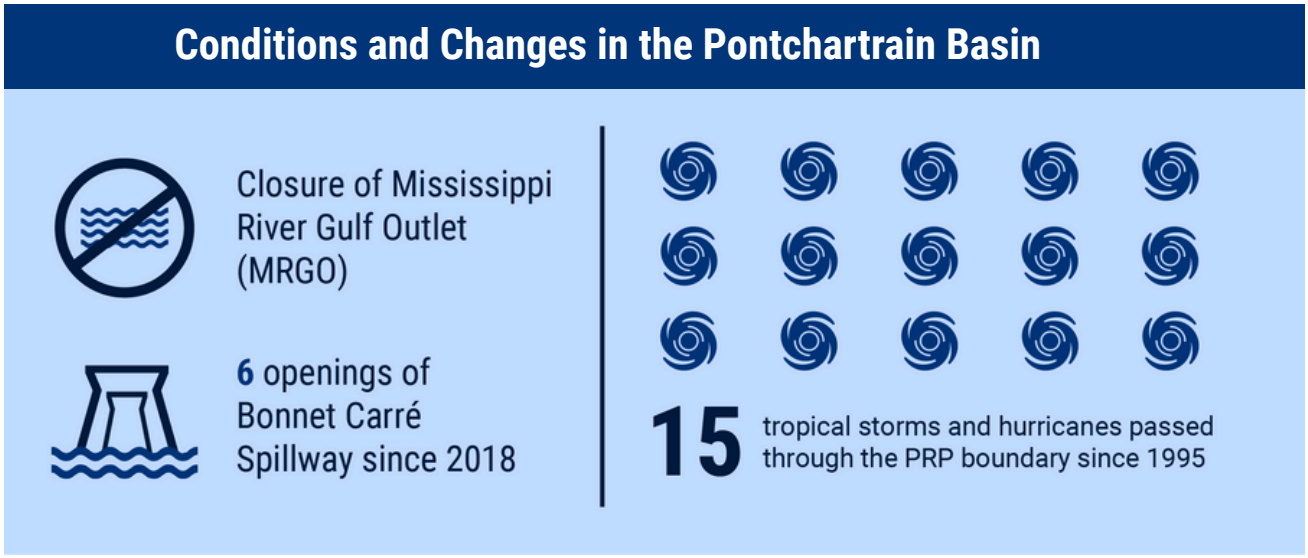
These earlier plans, 1995 CCMP and 2006 CHMP, guided investments and strategies to address challenges such as sewage and agricultural runoff, stormwater pollution, and wetland loss. From 2002 to 2022, USEPA awarded over $43 million for 274 projects ranging from sewer system upgrades and stormwater planning to habitat restoration and public outreach. The 2021 Infrastructure Investment and Jobs Act (IIJA) provided an additional $50 million in the near-term to fund actions that fulfill the PRP's purpose. These efforts demonstrate the PRP's ability to adapt, prioritize, and maximize the use of funds to deliver results.



[3]Though the 1995 document was titled Comprehensive Management Plan, the term Comprehensive Conservation Management Plan and the abbreviation CCMP are used throughout this document for consistency.

The Need for Plan Revision

Since the development of the earlier plans, the basin has experienced significant changes in landscape, demographics, water quality, and habitat. Notable developments include the closure of the Mississippi River Gulf Outlet (MRGO) in 2009, improved water quality leading to the delisting of several water bodies from the 303(d) list,[4] frequent openings of the Bonnet Carré Spillway, and significant restoration projects such as River Reintroduction into Maurepas Swamp. New challenges, such as environmental change, extreme weather events, and emerging contaminants, underscore the urgency for a revised CCMP. The updated plan addresses current issues, actions needed to address them, and integration of monitoring and performance tracking. It reflects local, state, federal, community, private, and nonprofit input, ensuring that both short- and long-term strategies align with regional needs. The CCMP also provides a framework for Requests for Proposals (RFPs), helping direct funds to the most pressing challenges.



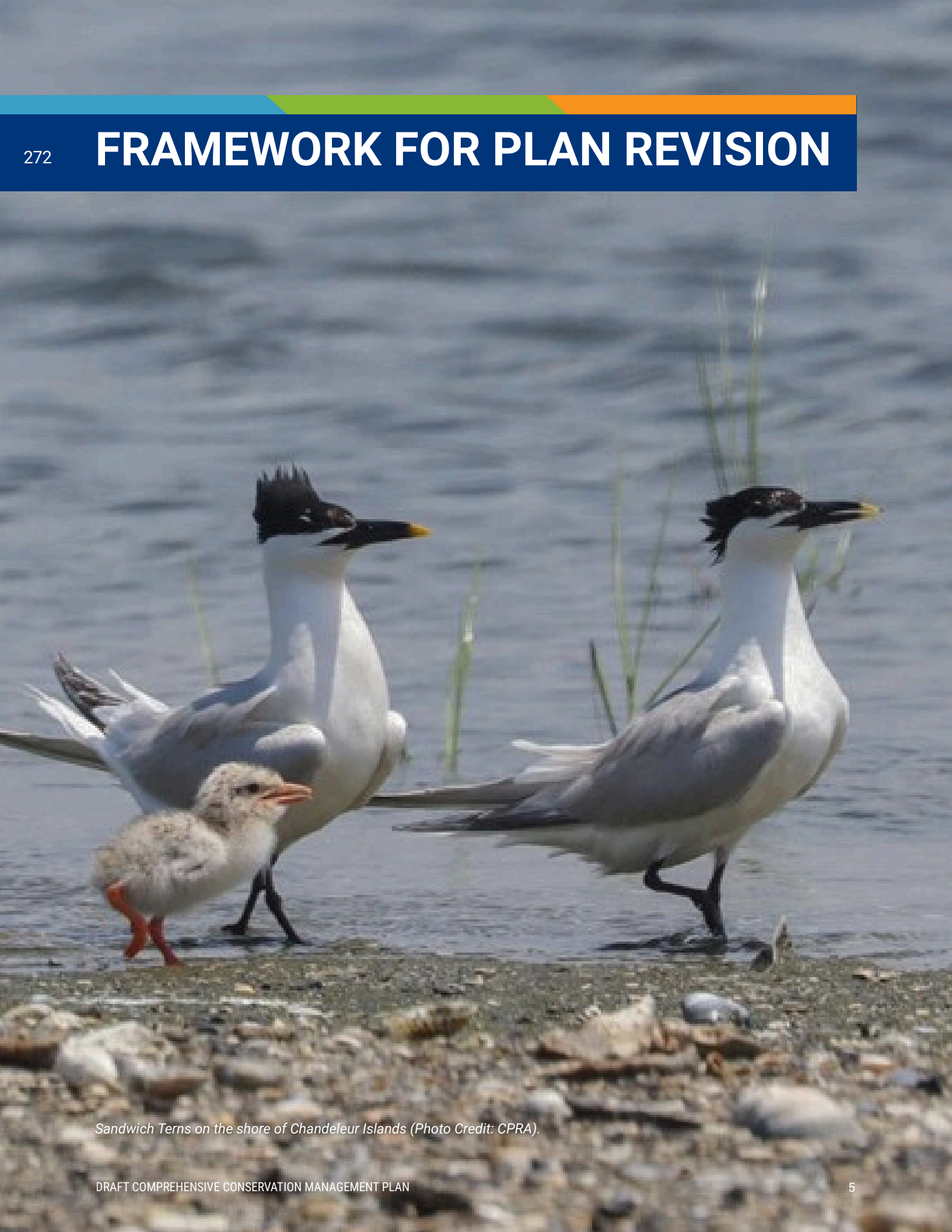
Structure of the CCMP

The CCMP is organized into four major sections following this introduction: 1) Framework for Plan Revision, 2) Issues and Challenges, 3) Action Plan, and 4) Toward CCMP Implementation. The action plan focuses on three thematic areas, eight focus areas within these themes, and 132 actions that include strategies and measurable outcomes to guide adaptive watershed management. These actions were vetted by 32 partner organizations (See Additional Acknowledgments section), the public, and USEPA to ensure alignment with local priorities and national program goals. The CCMP concludes with a section that outlines concepts that can guide CCMP implementation.

The main document is supported by eight Appendices that provide technical detail and guidance including a Framework Document (Appendix A), an Issue Report (Appendix B), a crosswalk of 1995 CCMP and 2006 CHMP actions to actions included in the 2026 Draft CCMP (Appendix C), a Vulnerability Assessment (Appendix D), a Monitoring Report (Appendix E), a Habitat Protection/Restoration Strategy (Appendix F), a Communications/Outreach Strategy (Appendix G), and an Engagement Report (Appendix H).

[4]More information can be accessed via the following link: https://www.epa.gov/tmdl/louisiana-2014-section-303d-list.

272 FRAMEWORK FOR PLAN REVISION



Sandwich Terns on the shore of Chandeleur Islands (Photo Credit: CPRA).

Introduction

This section outlines the process used to revise the 1995 CCMP and the companion 2006 CHMP. The process is founded on building consensus on foundational elements like objectives and actions. Revising the CCMP requires looking back to the main components of the previous version to understand what changes may need to be made and leveraging stakeholders' expertise and knowledge to gain context beyond the current CCMP's text.

> CCMPs are developed and implemented in keeping with Section 320 of the Clean Water Act (CWA). They are long-term plans that contain sustained actions to protect and restore water quality and living resources. CCMPs identify a study area or geographic boundary within which the plan is focused, and actions are implemented under Section 320 of the CWA. The challenges and actions in the CCMP reflect the study area and are determined by local, state, federal, private, and non-profit interests.

Development of the CCMP entailed a series of steps that build on each other, enabling the Plan Development Team (PDT) to engage with the public, the Executive Committee and Management Conference, and subject matter experts via Work Groups to craft the CCMP. Figure 2 shows CCMP revision framework; it is described in more detail in later sections.

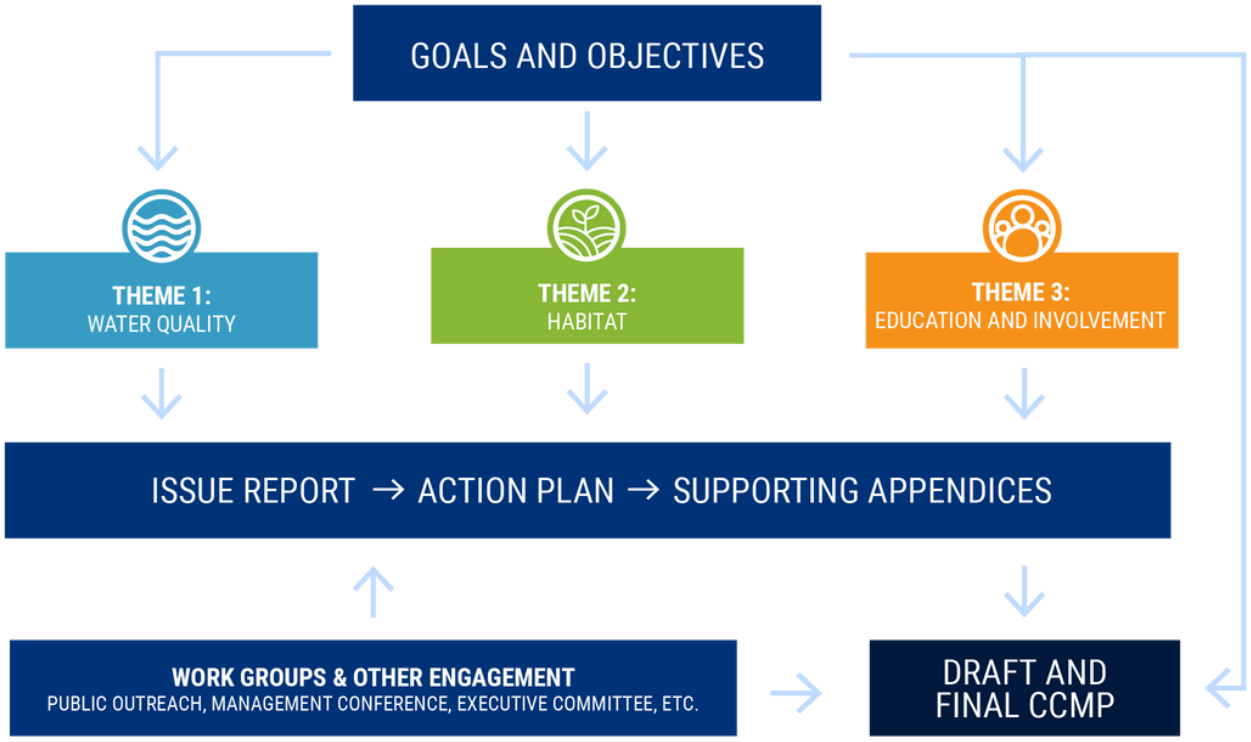


Figure 2. CCMP revision framework.

Work Groups are an essential part of revising the CCMP. Their role is to offer input and feedback throughout the process related to topical areas or planning elements that align with their expertise. This involved refining key issues and reviewing the Issue Report, supporting development of potential actions and reviewing the Action Plan, and seeking engagement from their networks for the CCMP. Four Work Groups were established: Water Quality, Habitats, Working Lands and Waters/Land Use, and Resilient Communities.

Goals and Objectives

The 1995 CCMP included four goals, each with multiple supporting objectives. The goals covered Water Quality, Education/Public Participation, Essential Habitat, and Plan Implementation. In addition, the 2006 CHMP sought to provide "general guidance as well as specific actions deemed appropriate to best restore and conserve the natural habitats of the Pontchartrain Basin within a 50 to 100 year time frame."

In considering how these goals and objectives may need to be revised to be pertinent to the present-day Pontchartrain Basin, the PDT identified several key issues the 1995 CCMP addressed that have changed in nature or magnitude as well as current issues and challenges related to water quality and habitats. These include closure of the MRGO in 2009, delisting of several water bodies from the EPA's list of impaired waters due to water quality improvements, relatively frequent openings of the Bonnet Carré Spillway in the last decade, and ongoing wetland restoration in the basin, although wetland destruction and degradation is also still occurring. In addition to these basin-specific issues, several issues that were only briefly mentioned in the mid-1990s are now front and center of many discussions about how to plan for future environmental management. These include environmental change, vulnerability to extreme weather events, and emerging contaminants. These topics and issues were considered during the review and revision of the goals and objectives for this CCMP.

The revised goals and objectives for the CCMP are listed in Table 1. The numbering of the goals and subsequent objectives does not imply prioritization; it is included simply to support reference to them in discussion and reporting (e.g., to relate them to proposed Actions).

Mississippi River Gulf Outlet along the rim of Lake Borgne (Photo Credit: CPRA).

311 **Table 1. Revised CCMP goals and objectives.**

312 *Note: For the Objectives column, WQ=Water Quality, H=Habitat, and E=Education and Involvement. The number following these abbreviations provides a sequential ordering for reference.*

GOALS	OBJECTIVES
GOAL 1: WATER QUALITY Improve Pontchartrain Basin water quality through point and nonpoint pollutant source reduction to support ecological health.	WQ1. Provide a technical basis for the formulation of water quality improvement actions through water quality monitoring, needs assessment, and research. WQ2. Reduce adverse impacts of runoff; sewage; and agricultural, industrial, and commercial activities by improving stormwater management, promoting best management practices, and implementing restoration projects.
GOAL 2: HABITAT Promote sustainability of important land-based and aquatic habitat in the Pontchartrain Basin.	H1. Reduce loss of wetlands and restore the hydrologic exchanges that sustain them where possible. H2. Promote sustainable aquatic habitats, including submerged aquatic vegetation, to support diverse native flora and fauna. H3. Manage invasive species to reduce impacts to ecological health. H4. Protect and restore habitat for species of greatest conservation need and threatened natural communities.
GOAL 3: EDUCATION AND INVOLVEMENT Increase awareness of current and future ecological health issues in the Pontchartrain Basin to encourage active participation in efforts to increase environmental sustainability.	E1. Educate the public on the effects of the changing ecological health of the basin to promote responsible stewardship. E2. Identify and promote local efforts to improve the ecological health of the basin. E3. Promote increased public participation in water quality improvement and habitat restoration projects.

Issue Report

The Issue Report (Appendix B) includes four main chapters: basin characterization, water quality, habitat, and resilient communities. No new primary data collection was conducted (except for garnering Work Group, Executive Committee, and public feedback on various aspects of the plan), but the identification of potential data gaps is a key outcome of this work and is examined in the Monitoring Report (Appendix E).

The Issue Report (Appendix B) is based on a compilation of available data or use of existing compiled sources and includes analysis of temporal and spatial patterns for key metrics of interest. The report is rooted in science and technical information and identifies potential underlying mechanisms for changes observed to assist with decision-making. It is designed to provide a foundation for summaries of the issues in the main CCMP that convey to a wide audience the changes that are occurring, the reason for the changes, and the potential consequences of the changes to the extent that information is available to support these determinations. For example, if analysis of water quality data indicated an increase in fecal coliforms, the report indicates potential causes of that increase (e.g., leaking septic tanks, sewer malfunctions) and discusses the consequences of the pollution (e.g., loss of commercial and recreational use).

Three meetings with each of the four Work Groups were held to inform the development of the Issue Report: the first to identify issues of concern, the second when a draft issue report was available, and the third after a near-final issue report had been made available. These meetings served as an opportunity for members to provide input on framing the issues and the report structure, as well as to discuss the evaluation of actions as the CCMP was developed.

Community Roundtable meeting in Violet, LA (Photo Credit: Royal).

Action Plan

With support from the Work Groups, the PDT developed an inventory of possible and/or planned actions that were identified from relevant, existing local, state, and federal plans and those of other pertinent organizations. The inventory served as a starting point for developing the action plan. New actions were developed by the PDT with the Work Groups providing input and feedback to fully address the issues.

The Action Plan, included later in this document, is structured around three themes, each of which has two or three focus areas as shown below (Figure 3). The themes link directly to the purpose of the PRP, and the focus areas reflect the key areas identified in the Issue Report.[5]

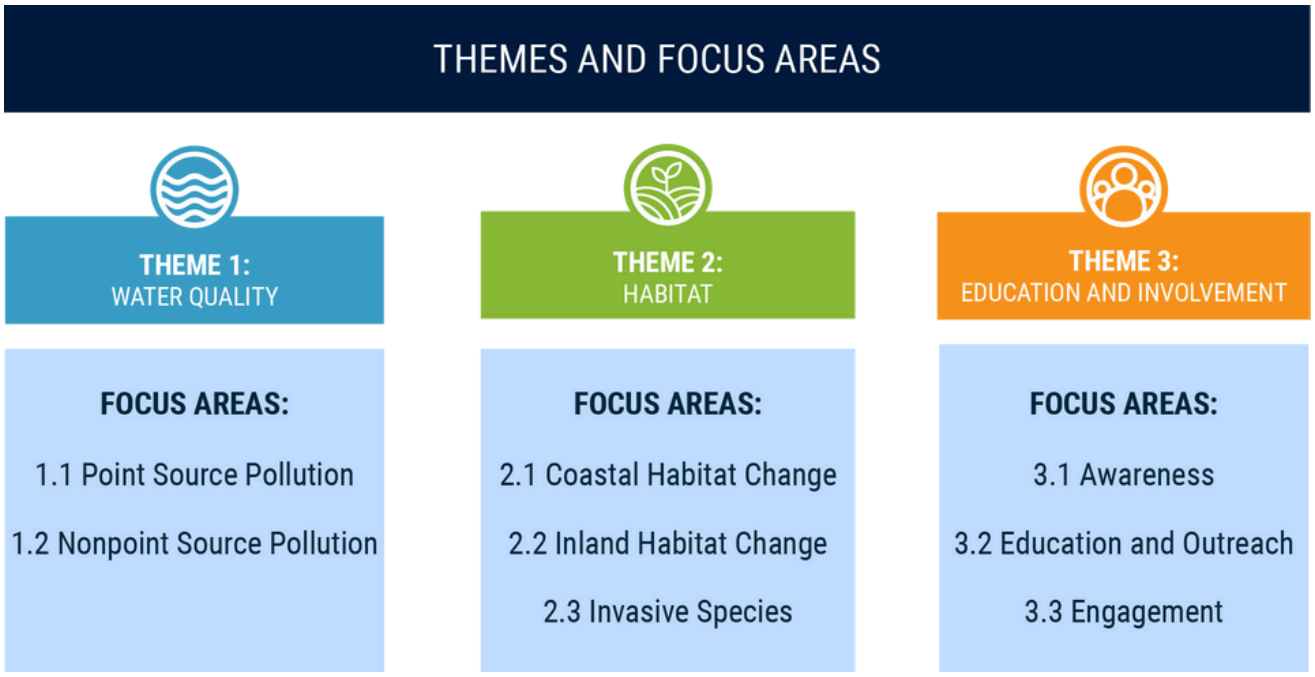


Figure 3. Action Plan themes and focus areas.

Summary tables (see Table 3 - Table 10) link actions to the objectives of the CCMP, identify likely partners, specify the timeframe for implementation, estimate the range of costs, and detail performance measures for tracking the impacts of each action.

[5]The Issue Report focused on Resilient Communities, but it seemed clear that progress on many of those issues is fundamentally hampered by gaps in accessible information and a lack of meaningful opportunities for residents to participate in planning. Thus, the related Action Plan theme is titled Education and Involvement. This name better reflects the foundational actions required to build true, lasting resilience across the basin.

Supporting Appendices

The CCMP is supported by several key documents including:

1. **Vulnerability Assessment (Appendix D).** This document was developed to determine how climate stressors might affect the goals and objectives of CCMP. The assessment followed the first five steps of the USEPA's Being Prepared for Climate Change Workbook (USEPA, 2014). It led to identification and prioritization of 69 risks that could impact the PRP's water quality, habitat, and education and involvement goals.

2. **Monitoring Report (Appendix E).** This document presents a summary of monitoring efforts relevant to the proposed water quality, habitat, and education and involvement actions. The CCMP goals, objectives, and actions serve as the foundation for identifying appropriate monitoring foci. The Monitoring Report identified 32 monitoring foci (9 water quality, 18 habitat, and 5 education and involvement), and these foci were linked to 91 data collection programs (26 water quality, 38 habitat, and 27 education and involvement).

3. **Habitat Protection/Restoration Strategy (Appendix F).** This document integrates the habitat components of the revised CCMP contained within the basin characterization and habitat chapters of the Issue Report and the habitat actions within the Action Plan into a habitat restoration/protection strategy.

4. **Communication/Outreach Strategy (Appendix G).** This document outlines the importance of communication and outreach to foster a broad understanding and support for the CCMP by clearly conveying its importance and ongoing efforts, cultivating informed participation, and ensuring its successful implementation. The Communication/Outreach Strategy details an approach and best practices to implement actions related to education and involvement.

5. **Engagement Report (Appendix H).** This document outlines the public participation and targeted outreach that has been a cornerstone of the CCMP revision process. This included participating in the PRP's Management Conference meetings, convening the Executive Committee, establishing and meeting regularly with Work Groups, and hosting Community Roundtable meetings across the Pontchartrain Basin.

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ISSUES AND CHALLENGES

Oil and gas infrastructure near Lake Maurepas in St. John the Baptist Parish (Photo Credit: CPRA).

Introduction

The Pontchartrain Basin is an expansive region defined by its diverse and changing landscape. The terrain transitions from rolling hills in the north down to a flat coastal plain that drains into freshwater and estuarine systems before transitioning to the barrier islands at the Gulf of America. The Amite, Tickfaw, and Tangipahoa rivers are the major tributaries within the basin, together accounting for 50% of the drainage area (see Figure 4 for surface hydrology of the Pontchartrain Basin). This basin not only encompasses the most densely-populated region of Louisiana with urban areas like New Orleans and Baton Rouge, but it also serves as one of the largest estuarine systems in the Gulf of America (Environmental Systems Research Institute [ESRI], n.d.). The land use and land cover[6] (LULC) in the Pontchartrain Basin is diverse, ranging from urban developments and agricultural fields to extensive wetlands and forests. The landscape of the basin transitions from woodlands in the north to coastal marshes in the south, with Lake Pontchartrain, a 403,200-acre, low-salinity lake, at its center (Alford, 2014).

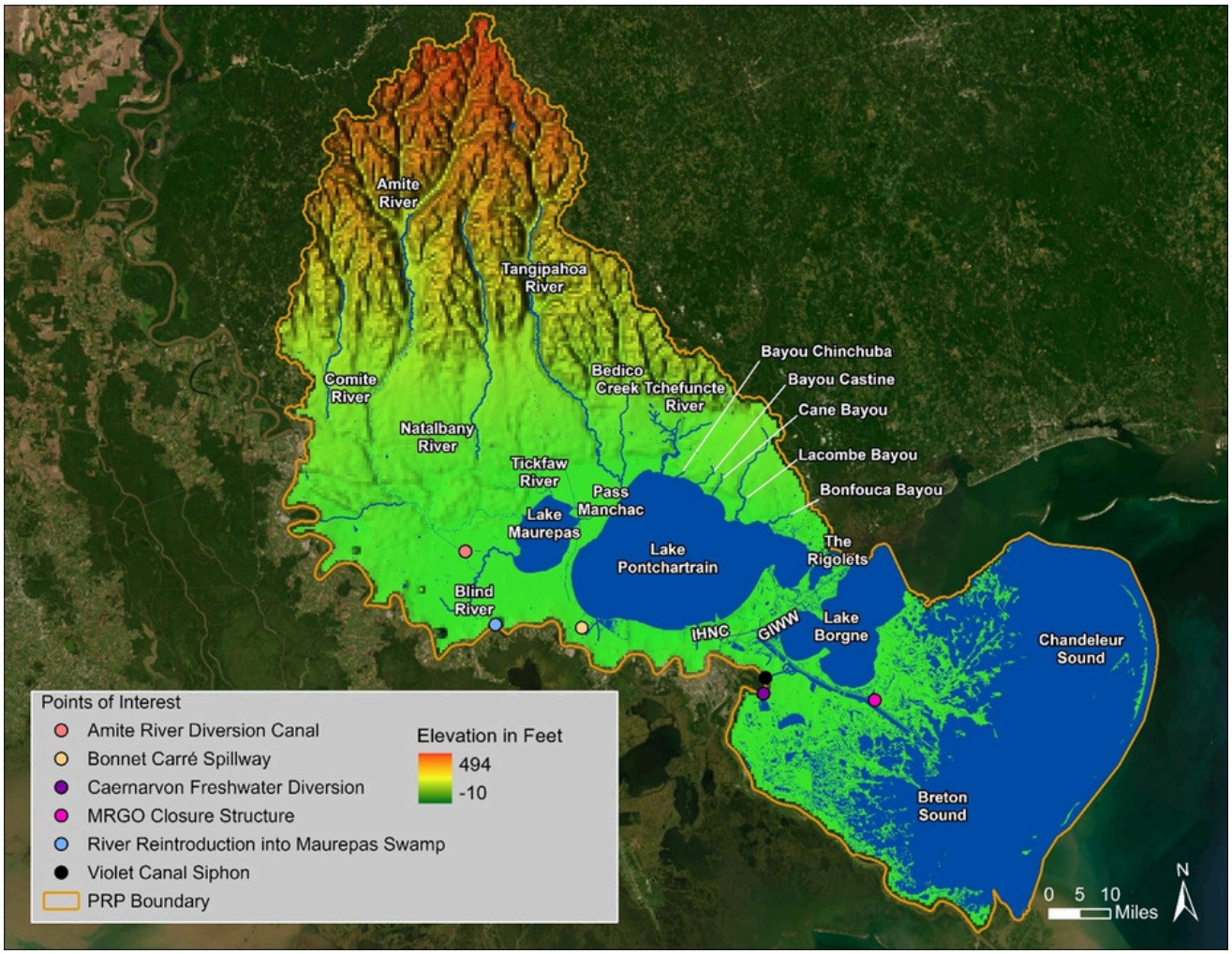


Figure 4. Surface hydrology and topography within the PRP boundary.

[6]Land use is the purpose for which humans utilize land, such as agriculture or housing, while land cover is the physical type of the land's surface, such as forests or wetlands.

Historically, the Pontchartrain Basin was dominated by vast upland forests, swamps, and marshes, supporting a wide array of aquatic habitats, including cypress-tupelo swamps, backwater sloughs, and bayous. Human activities such as agriculture, forestry, and urban development have significantly altered these landscapes (Alford, 2014). The demand for water resources has also increased due to the growth of metropolitan areas, leading to changes in land use practices, including channelization and clearing of streams for flood control and more efficient stormwater drainage (Lopez, 2009; Martinez & Penland, 2009).

Row crops in Tanigpahoa Parish (Photo Credit: M.P. Hayes).

The Pontchartrain Basin includes parts of four Level III ecoregions: Southeastern Plains, Mississippi Alluvial Plain, Mississippi Valley Loess Plains, and Southern Coastal Plain (Omernik, 1987; Figure 5). These make up 18%, 39%, 31% and 12%, respectively of the surface area of the Pontchartrain Basin (Dewitz, 2023). LULC is dominated by:

- *Open water* (mostly in the Mississippi Alluvial Plain ecoregion)
- *Woody wetlands* (15-25% of each ecoregion)
- *Evergreen forests* (25-37% of each ecoregion, except the Southeastern Plains, where they are a very minor component of land cover)
- *Emergent herbaceous wetlands* (mostly in the Mississippi Alluvial Plain ecoregion)

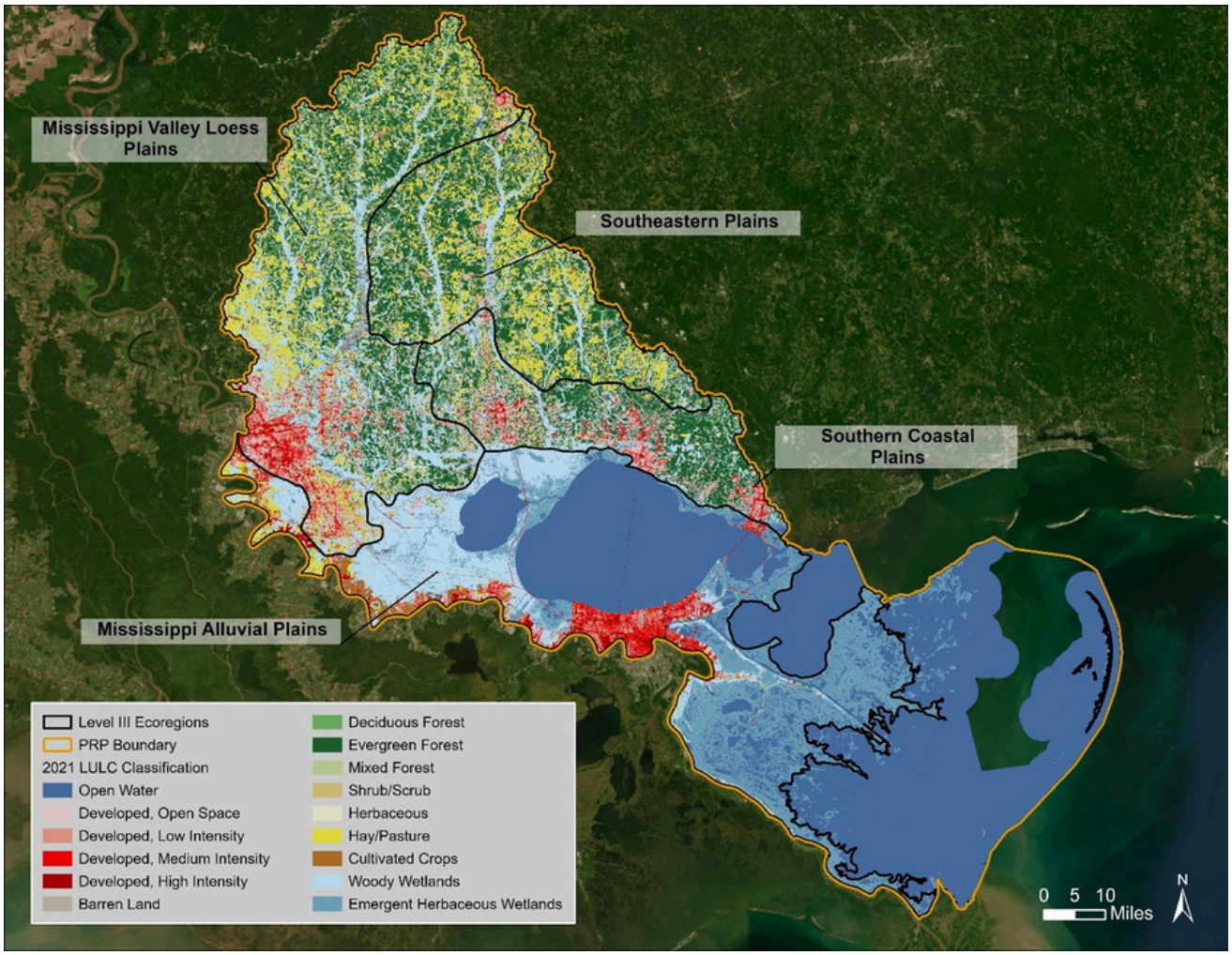


Figure 5. Map of LULC in the Pontchartrain Basin for 2021 (Dewitz, 2023).

Developed lands made up about 13% of the basin in 2021, with over 25% of the Southern Coastal Plain ecoregion being in one of the developed LULC classes. Agricultural land (i.e., pasture and hay cultivation) accounts for 11% of the basin, predominantly in the Southeastern Plains and Mississippi Valley Loess Plains ecoregions. Recent changes in the Pontchartrain Basin's LULC have significant implications for conservation, recreation, and commerce. Urban expansion and industrial activities have led to habitat fragmentation, loss of biodiversity, and changes in the hydrological regime of the basin. The historical development of the area—from settlement and levee construction to deforestation and pollution—has dramatically altered the natural landscape, resulting in the degradation of habitats and ecosystem services (Lopez, 2009).

Nature-based Solutions

Many of the ecological health issues presently facing the Pontchartrain Basin stem from changes in LULC, especially the increase in developed land and loss of natural land cover, including forests and wetlands. Remedies can include traditional engineering approaches but also the use of Nature-based Solutions (NBS). NBS use or imitate natural features and/or processes to address key challenges while providing sustainable benefits to people and the environment. This approach has been adopted by many state and federal agencies including USEPA, the Federal Emergency Management Agency (FEMA), and the U.S. Army Corps of Engineers (USACE).

NBS is an umbrella term that includes many different concepts depending on the landscape setting (e.g., urban versus rural) and issue being addressed (e.g., water quality versus habitat provision). These include green infrastructure (GI), living shorelines, and assimilation wetlands. A common thread in these concepts is using nature and natural processes, where possible, to solve problems and provide additional benefits to communities and ecosystems. NBS can be structural (constructed) such as coastal dunes or restored channel banks or nonstructural such as conservation easements, building and development codes, policies, and regulations that protect natural spaces.

The following sections outline key issues and challenges for the three Action Plan themes: Water Quality, Habitat, and Education and Involvement. More detail on these issues and challenges is provided in the Issue Report (Appendix B).

Water Quality Issues and Challenges

Most of the water quality issues in the Pontchartrain Basin watershed are due to human activities, including a wide variety of land use changes, population density, and economic activity. Following Hurricane Katrina in 2005, the population growth in the parishes north of Lake Pontchartrain accelerated, due in part to displacement from New Orleans and other coastal areas. This significant shift in population led to dramatic changes in land use development activities and increased pressure on existing stormwater infrastructure and wastewater treatment facilities.

Role of Natural Vegetated Systems In Water Quality

Wetlands and other vegetated natural areas play vital roles in water quality through nature-based processes. These processes include particle settling, nutrient transformations by microbes, nutrient uptake by plants, and sorption on to soil particles. Shrub and pasture lands provide surface roughness with plant cover to slow down runoff and capture sediments, nutrients, and contaminants. The space between the uplands, dominated by human activities, and the aquatic system, including rivers, lakes, streams, estuaries, and the coastal ocean, is often occupied by wetlands. Many wetland areas are therefore well positioned to mitigate runoff impacts from the upland areas as they slow down and store water, capture sediments, and capture or transform nutrients and contaminants that would otherwise be discharged to surface waters. These land cover types essentially slow down and absorb runoff, lessening the impact of severe flooding in the way a sponge captures and holds water.

Land Use Change

Land use changes in the basin can negatively impact water quality. As noted previously, area of LULC classes associated with development in the upper watershed has increased since 2001, particularly in the Southern Coastal Plain ecoregion. With the increased development of land, the watershed's natural landscapes have decreased. For example, there was a 63% decrease in cover of deciduous forest in the Southern Coastal Plain ecoregion between 2001 and 2021. In addition, cover of shrub, pastures, and woody wetlands decreased by 10% between 2001 and 2021. The greatest decline in wetland cover occurred in the Amite River watershed. The Amite River has the largest drainage area, covering almost 40% of the basin, and loss of wetland area can lead to degraded water quality. Generally, more developed lands lead to larger peak runoff flows and greater contaminant loading to surface waters unless there are sufficient stormwater retention/detention systems in place to store the runoff. This is because of the large amount of impervious surfaces as well as more compacted soil, which prevents infiltration and increases surface flooding.

Precipitation Variability

The Earth has a cycle of El Niño and La Niña events, a natural process resulting from changes in the Pacific Ocean's water temperatures. Over the past 25 years, the watershed has gone through five cycles of first El Niño, then La Niña events (Figure 6). During El Niño years, there has been 27% more rain during the wet season. The natural variability in the amount of rain can then cause greater flooding as more land becomes developed. When La Niña occurs, there is less rain, which can lead to more intense droughts, as what little rain there is runs off quickly. Changes in the amount of rain can impact water quality by either diluting concentrations, which gives the appearance of better water quality, or worsening water quality when little rain occurs, leading to higher concentrations.

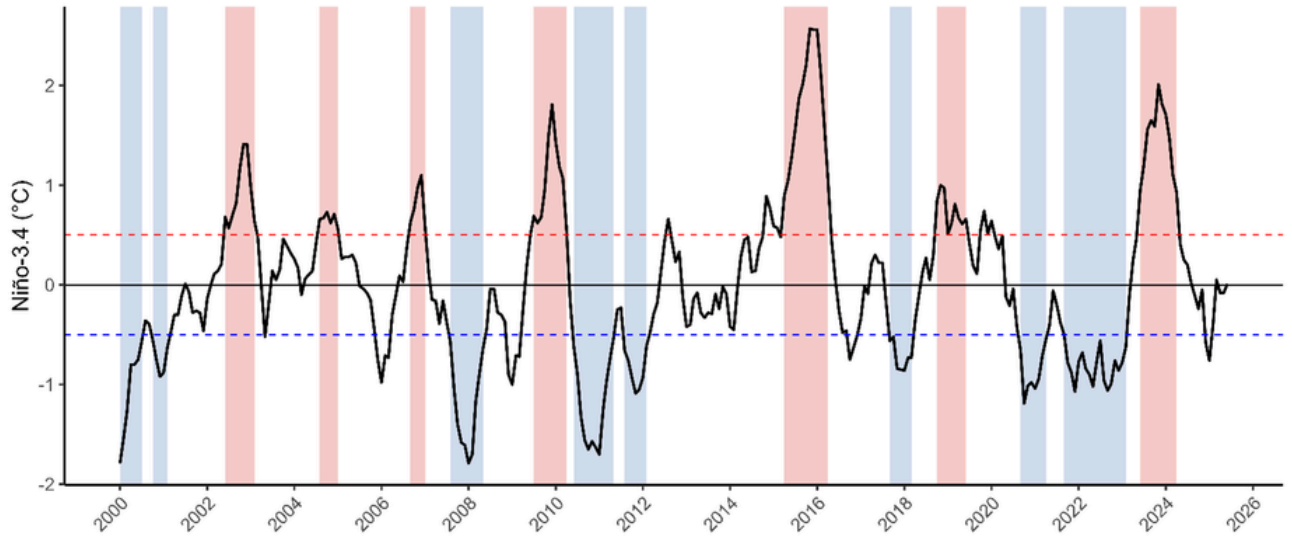


Figure 6. El Niño-Southern Oscillation (ENSO) time series from NOAA with El Niño (red) and La Niña (blue) conditions (2000-2024) defined as ≥5 consecutive months above +0.5 °C or below -0.5 °C, respectively. Dashed lines show ENSO thresholds. URL link to data source: https://psl.noaa.gov/data/timeseries/month/DS/Nino34/.

River Diversion Flood Mitigation

The Bonnet Carré Spillway is a flood release valve for the Mississippi River that is opened to protect New Orleans and other downstream communities once the river reaches flood stage at the Carrollton Gage in New Orleans or a flow rate of 1.25 million cubic feet per second. A full opening of all bays can discharge up to 20% of the river through the spillway at flood stage. The operation has significant implications for both the immediate and long-term water quality of the estuary and coastal ocean, including salinity depressions of the surface water, sediment deposition, and addition of thousands to tens of thousands of metric tons of nitrogen and phosphorus into the coastal aquatic system. The immediate consequences of this discharge are decreased salinity impacting coastal fisheries, while the long-term release of phosphorus from sediments can cause harmful algal blooms (HABs), leading to swimming advisories and beach closures. The spillway has been operated more frequently in the past 20 years when compared to the average use since its construction in 1931.

Linking with 1995 CCMP

The 1995 CCMP listed the major water quality issues and challenges within the PRP boundary as wastewater inputs, especially septic tank contribution to fecal coliform. Wetland loss has been, and continues to be, an issue in the basin. However, the primary causes of wetland loss were listed as erosion and saltwater intrusion, as well as previous dredging operations. While the first two are active today, wetland loss from dredging is far less common in recent years. Most recently, wetland loss has been driven by hurricane and tropical storms as well as marsh edge erosion from wind waves. While water quality assessment was previously focused on bacterial indicators, there are now significant monitoring networks in place for nutrients and other contaminants like mercury (see Appendix E). There have been increasing concerns over emerging contaminants over the past 30 years, while fecal coliform and now enterococcus (bacterial indicators of wastewater) are still significant issues today.

Future Outlook

The following three related environmental processes will continue to negatively affect the water quality of the Pontchartrain Basin into the future.

1. Rising sea level is slowly increasing the salinity of surface and groundwater resources, as well as slowing drainage across the very flat coastal parishes, leading to more flooding.

2. The impact of severe storms and land loss will continue to drive migration of people away from the coast, putting greater stress on the stormwater and wastewater infrastructure, like what was experienced after Hurricane Katrina.

3. Changes in population will lead to greater medium- and high-density land use, which typically leads to a decrease in wetland and natural areas in the basin. Loss of these areas increases the risk of flooding, especially in wet years when large rain events, like slow-moving tropical storms and hurricanes, are superimposed on wetter El Niño years. More urban land use also leads to higher concentrations of anthropogenic chemicals and emerging contaminants in runoff.

Major Water Quality Issues

Fecal Contamination | Dissolved Oxygen | Heavy Metals

Major water quality issues impact fisheries, recreational opportunities, agriculture, and tourism

Habitat Issues and Challenges

The Pontchartrain Basin is a diverse system – from coastal plains divided by streams that form low rolling hills and broad, gently sloping ridges in the north to flat deltaic and coastal plains that are dominated by a mix of freshwater and saline marshes. Figure 7 shows the distribution of LULC types by Level III ecoregion for 2021. The system has been altered dramatically, and in the last several decades, developed LULC classes have continued to increase at the expense of natural forests and wetlands. Across all ecoregions, the area of woody wetlands and deciduous forest decreased between 2001 and 2021, while evergreen forest and developed land (low, medium, and high intensity) categories increased (Figure 8).

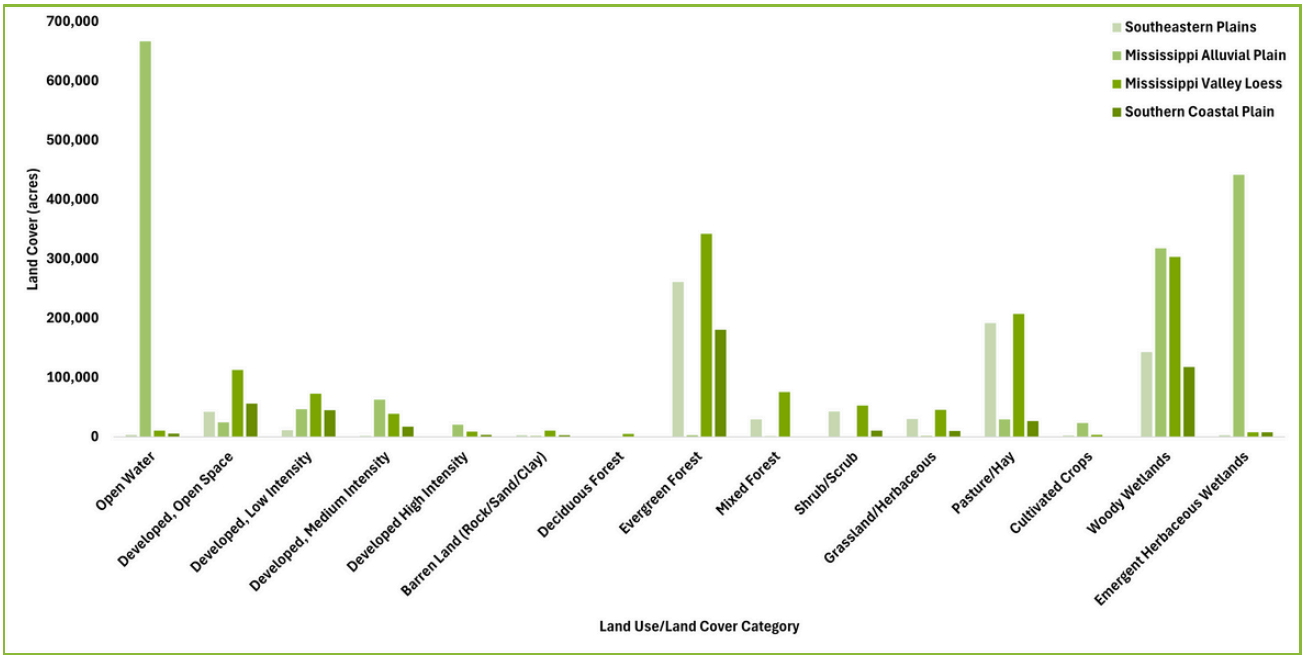


Figure 7. LULC by Level III ecoregion for 2021 (DeWitz, 2023).

Shoreline and Habitat Change

From 1988-2015, the Chandeleur Islands experienced shoreline change of nearly **100 feet per year**

From 1988-2015, Lake Borgne experienced a shoreline erosion rate of over **20 feet per year**

From 2001-2021, Mixed forests (including longleaf pine) **experienced a 19% loss in acreage**

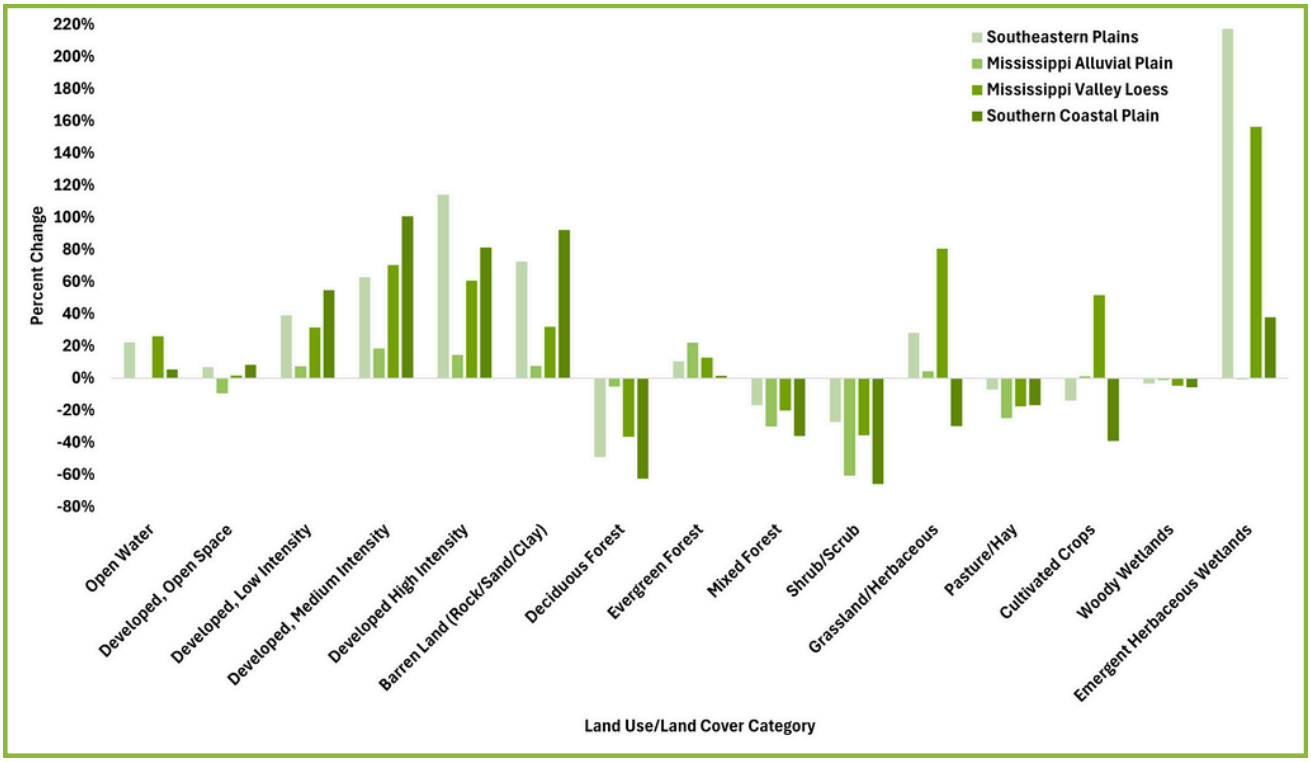


Figure 8. Percent change in LULC classes between 2001 and 2021 by Level III ecoregion.

The 2006 CHMP identified several impairments across the Pontchartrain Basin, including those in upland forests, upland river systems, and the lake and estuary. Many of these impairments remain and have ongoing or legacy impacts on habitats in the basin. For example, the effects of sand and gravel mining on riverine habitat continue, and invasion by exotic plants and animals remains a problem in many areas. The Mississippi River levees still isolate much of the basin from riverine inputs, except during high-water years when the Bonnet Carré Spillway is opened. However, the freshwater diversion at Caernarvon, the development of Mardi Gras Pass, and the expansion of Neptune Pass provide an ongoing connection between the Mississippi River and the waters of lower Breton Sound. The under-construction River Reintroduction into Maurepas Swamp project is expected to do the same west of Lake Pontchartrain.

Sand and gravel operation off of the Tangipahoa River (Photo Credit: William K. Rhinehart).

Within the overall context of land loss in coastal Louisiana, land area has continued to decline since the 1930s. The U.S. Geological Survey (USGS) has documented a loss of over 221,000 acres between 1932 and 2016 for the coastal area of the PRP (Couvillion et al., 2017), with a constant rate of loss of approximately 1,555 acres per year for the Pontchartrain coastal basin,[7] while the loss rate for the entire coast of Louisiana has varied from 6,919 to 20,510 acres per year. Much of the loss in the Pontchartrain Basin coastal area is associated with shoreline erosion in marshes and the barrier shoreline.

Longleaf pine forests once dominated the landscape of the southeastern United States. According to Longleaf Pine Initiative (LLPI), the major threats facing the future sustainability of longleaf forest systems include land fragmentation, development, conversion to other land uses or vegetative types, non-native invasive species, exclusion of natural fire regimes, and negative economic perceptions. Even though substantial resources are being invested to establish new longleaf pine stands across the region, the loss of mature stands remains a challenge.

Longleaf pine forest with pitcher plants (Photo Credit: Nelwyn McInnis).

Salinity changes associated with the MRGO was one of the sources of impairment discussed in the 2006 CHMP, which has been addressed in the years since. The closure of the MRGO navigation channel with a rock dam was authorized in 2008 and constructed by July 2009. The closure brought a noticeable reduction in salinity levels in Lake Pontchartrain and a decline in oyster populations in Lake Borgne. Freshening also impacted the distribution of species such as spotted seatrout (*Cynoscion nebulosus*). Additionally, Maurepas Landbridge shows early signs of natural swamp regeneration, with improving environmental conditions linked to the closure of the MRGO.

In the years since the 2006 CHMP, several other issues have arisen that impact habitats in the basin. These include the near- and long-term effects of the 2010 Deepwater Horizon (DWH) oil spill, the effects of tropical storms and hurricanes, and climate variability and environmental change.

[7]Note that the coastal basins used by Couvillion et al. (2017) do not conform to the Pontchartrain Basin.

Deepwater Horizon Oil Spill

Following the DWH explosion on April 20, 2010, oil traveled upward from the wellhead through the water column to form extensive surface oil slicks, which were transported to nearshore coastal ecosystems by wind and currents. The outer Biloxi marshes and the Chandeleur Islands were the most heavily oiled areas within the Pontchartrain Basin. Submerged aquatic vegetation (SAV) was injured by both oiling and response actions. Chandeleur Islands seagrass was particularly affected, with more than 270 acres destroyed. Because of the estuarine dependence of juveniles and adults of spotted seatrout and red drum (*Sciaenops ocellatus*), they were subject to exposure in marsh areas contaminated with oil.

Hurricane Effects

The Pontchartrain Basin has always been subject to hurricane impacts. The 2006 CHMP was released soon after Hurricane Katrina and included only a preliminary assessment of the effects on habitat. Several studies have been completed since, which provide additional insight into the effects of the hurricanes and tropical storms on habitat. Inland, Katrina altered the forest landscape to a mosaic of undisturbed and disturbed forest patches across the region, with disturbance intensity strongly associated with drainage network, indicating a high susceptibility of bottomland forests to hurricane damage. Animals that live in forests and wetlands can also be impacted. Studies conducted during the period impacted by hurricanes Ivan and Katrina in the swamp forests west of Lake Maurepas found that hurricane impacts decreased abundance and diversity and increased evenness of the herpetofaunal communities in marsh, levee, and forested swamp habitats.

Climate Variability and Environmental Change

The southeastern United States is subject to increasing eustatic sea level rise and coastal flooding, extreme heat, and heavy rain with longer dry spells. These all have implications for habitats. In turn, changes in LULC can exacerbate weather-related stress on habitats, such as reduced tree cover that decreases shading and increases water temperature in streams. Changes are already occurring. Analysis of weather stations across the basin show a clear and consistent warming signal beginning in the mid- to late-20th century, with the most pronounced increases occurring from the 1990s through the 2010s and into the 2020s (Appendix D). For sea level rise, NASA reports rising ocean level of 0.11 inches per year for the Louisiana coast between 1993 and 2019.[8]

The effects of these changes vary by habitat. For example, decreased rainfall can affect the health of baldcypress (*Taxodium distichum)* stands, which, with sea level rise, subsidence, and lack of freshwater input from rivers, almost solely rely on rainfall or wastewater discharges to keep groundwater salinity low enough for survival. Studies have shown that SAV species distribution responds to drought conditions when salinity and water clarity increase (e.g., rapid increase in the distribution and abundance of the euryhaline species widgeon grass [*Ruppia maritima*]). Additional studies found that stable higher salinities resulted in the establishment of higher salinity benthic communities with the hooked mussel (*Ischadium recurvum*) increasing abruptly and colonizing live Atlantic rangia (*Rangia cuneata*). Numerical modeling conducted for the 2023 Coastal Master Plan showed a shift in emergent coastal marsh types and a loss of land, especially in the Biloxi marshes under higher rates of relative sea level rise. Further discussion of the potential effects of climate variability and environmental change are described in Appendix D (Vulnerability Assessment).

[8]More information can be accessed via the following link: https://sealevel.nasa.gov/sea-level-evaluation-tool?psmsl_id=526

Future Outlook

Future progress on habitat restoration and conservation in the Pontchartrain Basin will need to confront several ongoing challenges within the system, some of which have been issues for decades (e.g., impacts of sand and gravel mining on river habitats and ongoing population increase and development). Other issues have developed more recently, including the need to consider flood storage and transport in habitat restoration and changing habitat-related regulations. However, there are new planning initiatives that provide opportunities for conservation and restoration (e.g., Amite River Basin Commission (ARBC) Master Plan and 2029 Coastal Master Plan). Several large-scale projects are likely to affect substantial areas, including the River Reintroduction into Maurepas Swamp project and the Lake Pontchartrain Storm Surge Reduction project, which is undergoing renewed study. Partnerships among state and federal agencies, local governments, non-governmental organizations (NGOs), and landowners offer opportunities for progress. Partnership examples such as America's Longleaf Restoration Initiative and the U.S. Department of Agriculture's (USDA) Working Lands for Wildlife partnership are focused on issues central to the future of important habitats.

Education and Involvement Issues and Challenges

The Pontchartrain Basin faces a complex set of challenges, from environmental stressors like flooding and relative sea level rise to socioeconomic issues. The initial investigation for this plan was framed through the lens of Resilient Communities, as resilience is the ultimate goal for a region confronting these interconnected pressures. This framework helped identify a wide range of critical issues, including gaps in regional coordination, the need for infrastructure redundancy, and unequal access to the basin's valuable recreational opportunities.

As the specific challenges were analyzed, a slightly different theme emerged as the most critical pathway forward. The root causes and potential solutions for many of the issues identified—such as fragmented planning, lack of public buy-in, and the undervaluation of the basin's ecological assets—consistently pointed back to a fundamental need for greater public awareness and deeper community engagement. The analysis revealed that progress is often hindered not by a lack of will, but by gaps in accessible information, a lack of meaningful opportunities for residents to participate in planning, and insufficient technical capacity among local leaders.

Therefore, to most effectively address the vulnerabilities detailed in this report, the corresponding theme within the Action Plan is titled Education and Involvement. This better reflects the foundational actions required to build true, lasting resilience across the basin. Rather than being a separate topic, education and involvement are the essential tools for achieving the desired solutions to identified issues.

Resilience Planning and Prioritization

The basin is vital to the region's economy and ecology, yet it faces frequent storms, flooding, and other environmental stresses. Keeping over 2.1 million residents safe and thriving requires clear communication, practical education, and sustained investment in resilience.

Resources for preparedness and response vary across the area. Not every parish or municipality has a resilience office or staff capacity, which leads to uneven protection and slower recovery, especially in rural and lower-income areas where out-migration and shrinking tax bases compound the problem. Often, rural local governments lack specialists in hazard mitigation, climate adaptation, and resilience planning. There are also challenges measuring the success of resilience investments. Resilience projects often pay off over extended periods, making benefits harder to track or defend in tight budgets and short political cycles. Communities need practical metrics, regular feedback, and a cost-benefit framework to build support and keep projects on track.

An overarching issue is resource shortages for local leaders. This can take several forms: funding, technical assistance, and other tools and resources. There is also a lack of infrastructure redundancies, which decreases resilience. Backups for power, communications, evacuation routes, and social support are uneven across the basin, increasing risk when single systems fail. Economic diversification is also important; one-industry towns are more fragile.

However, momentum and awareness of the need for resilience planning and investment are growing, particularly in urban areas, through NBS such as hazard mitigation, community resilience programs, GI, and coastal restoration. Local examples (living shorelines, complete streets, shoreline protection, home elevations) show how engineered and nature-based measures can work together.

Investment in Resilience

Bucktown Living Shoreline Project

Completed in 2022, the project creates a more resilient shoreline along Lake Pontchartrain, increases recreational access, and provides quality aquatic habitat

Lake Borgne Marsh Creation Project

Louisiana's largest marsh creation project by volume created over 2,700 acres of new marsh through dredging efforts

Hurricane & Storm Damage Risk Reduction System (HSDRRS)

Provides increased resilience to residents in and around the basin, providing 100-year flood protection to over 1 million people

River Reintroduction into Maurepas Swamp

Under construction as of 2025, this swamp restoration project is being built to reconnect freshwater from the Mississippi River back into the Maurepas Swamp, revitalizing essential habitat and fighting against saltwater intrusion

Lack of Awareness

A significant hurdle remains, however, in the form of low public awareness and a fragmented regional identity. General understanding of the Pontchartrain Basin—what it is, its vital importance, and the connection between daily life and its health—remains uneven across the population, especially in communities farther from Lake Pontchartrain. Compounding this issue, messaging regarding conservation efforts is scattered across many groups, and a unified identity for the PRP is still emerging. This lack of a clear, cohesive identity makes it difficult to foster widespread public buy-in, leading to lagging participation and weakening the collective effort required for effective, long-term conservation and resilience projects.

When residents are unaware of how their actions affect the Pontchartrain Basin, the consequences can be tangible and detrimental. A lack of understanding regarding issues like septic system maintenance, stormwater pathways, and proper waste disposal contributes directly to the pollution of waterways. This environmental degradation threatens the region's economic foundations by harming the fisheries, recreation, and tourism sectors that depend on healthy ecosystems. Furthermore, without accessible information and meaningful opportunities for engagement, public participation in conservation efforts lags, causing restoration projects to lose crucial community support and overlook valuable local knowledge.

Access to Recreational Opportunities

The Pontchartrain Basin is rich with natural assets that provide significant recreational opportunities, including parks, trails, boat launches, forests, and shorelines. These spaces are vital for the region, offering substantial health, social, and economic benefits to its residents. However, access to these valuable resources is unevenly distributed throughout the basin's communities. Many residents face challenges that prevent them from using these spaces, such as a lack of reliable transportation, prohibitive costs, poorly maintained or damaged facilities, and a simple lack of information about available opportunities. These challenges mean that the benefits of recreation are not shared by all, preventing the full potential of these community assets from being realized, especially in the rural areas of the basin.

Additional Resilience Challenges

Flood risk in the region extends from coastal surge to inland riverine flooding. Since Hurricane Katrina, the region has invested in major structural protections, watershed planning, and restoration projects, but subsidence, sea level rise, and extreme rainfall events keep the risk high. The Northshore and inland communities face fast-rising rivers; in other places, storm surge and backwater flooding dominate. Continued investment, maintenance, and non-structural measures designed with considerations for future climate projections are needed. Further, small, independent water systems, common in rural areas, struggle with aging infrastructure and an aging workforce. When operators retire without replacements, service reliability and water quality suffer. Tourism supports jobs and tax revenue but also adds environmental pressures and can strain cultural authenticity if unmanaged.

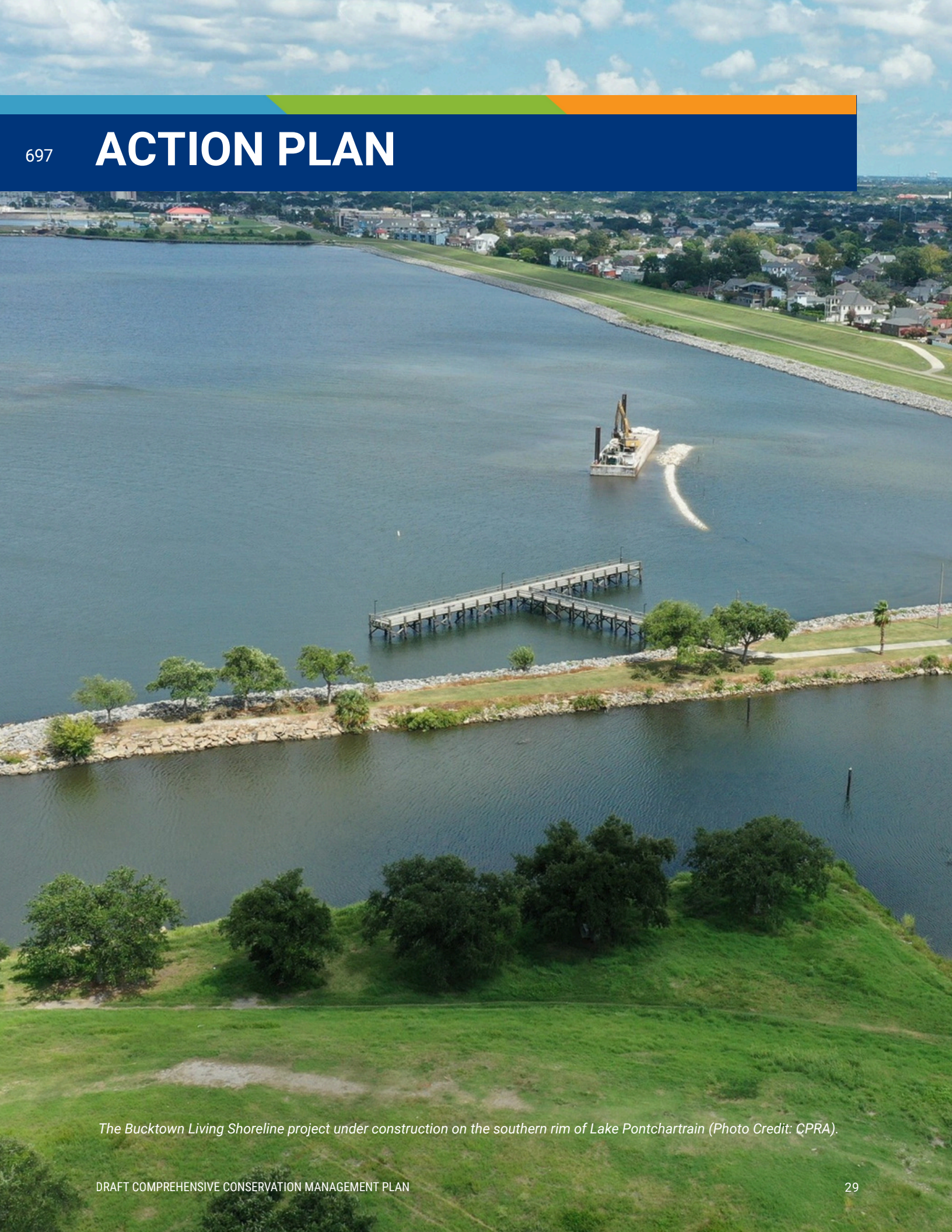
Vulnerability Assessment

A vulnerability assessment (Appendix D) was completed to evaluate how future environmental change may affect the Pontchartrain Basin and to ensure that CCMP priorities are responsive to these challenges. Following USEPA's Being Prepared for Climate Change workbook (2014), the process linked CCMP objectives to projected stressors in a five-step structure:

- **Step 1** engaged stakeholders to help frame concerns and priorities.
- **Step 2** defined the context by aligning the assessment with CCMP goals for water quality, habitat, and education and involvement.
- **Step 3** identified seven key stressors: warmer summers, warmer winters, warmer water, increasing drought, increasing storminess, eustatic sea level rise, and ocean acidification.
- **Step 4** evaluated risks using consequence, likelihood, spatial extent, and time horizon as scoring criteria.
- **Step 5** synthesized results into risk grids that illustrate where vulnerabilities are most concentrated.

The findings underscore that several stressors, especially warmer temperatures, stronger storms, and eustatic sea level rise, pose substantial risks to basin resources. These risks cascade from ecological systems to community benefits, influencing recreation, tourism, and the capacity for ongoing public involvement. By integrating ecological and human dimensions, the assessment establishes a shared foundation for adapting to environmental change and guiding the CCMP's implementation over time.

697 ACTION PLAN



The Bucktown Living Shoreline project under construction on the southern rim of Lake Pontchartrain (Photo Credit: CPRA).

Introduction

Actions are specific steps taken to achieve the goals and objectives of the PRP and, as such, are the key component of the CCMP. They are designed to collectively tackle the issues of concern that have been identified in the CCMP. Actions are tasks that can be assigned, tracked, and measured; execution of many of them may involve multiple partners and stakeholders, requiring collaboration and coordination to implement effectively. CCMP actions take many forms: on-the-ground activities to improve water quality or increase a particular type of habitat, studies or targeted data collection on emerging issues where insufficient information is available to fully understand the problem and develop effective actions, strategic activity across the basin, or policy changes.

Actions were identified based on review of the 1995 CCMP, the 2006 CHMP, and other relevant plans from local, state, federal, and other organizations. The development of actions was informed by the content of the Issue Report (Appendix B); input from Work Groups, the Executive Committee, and the Management Conference; and feedback gathered through direct engagement with community members. In collaboration with the Work Groups and the USEPA, actions were refined using best professional judgment. The Action Plan is structured into three main themes (Water Quality, Habitat, and Education and Involvement) each of which has several focus areas that are designed to guide program partners as they plan, fund, and implement policies, projects, and programs (Figure 9). The themes link directly to the purpose of the PRP, and the focus areas represent subcategories of those themes identified in the Issue Report.

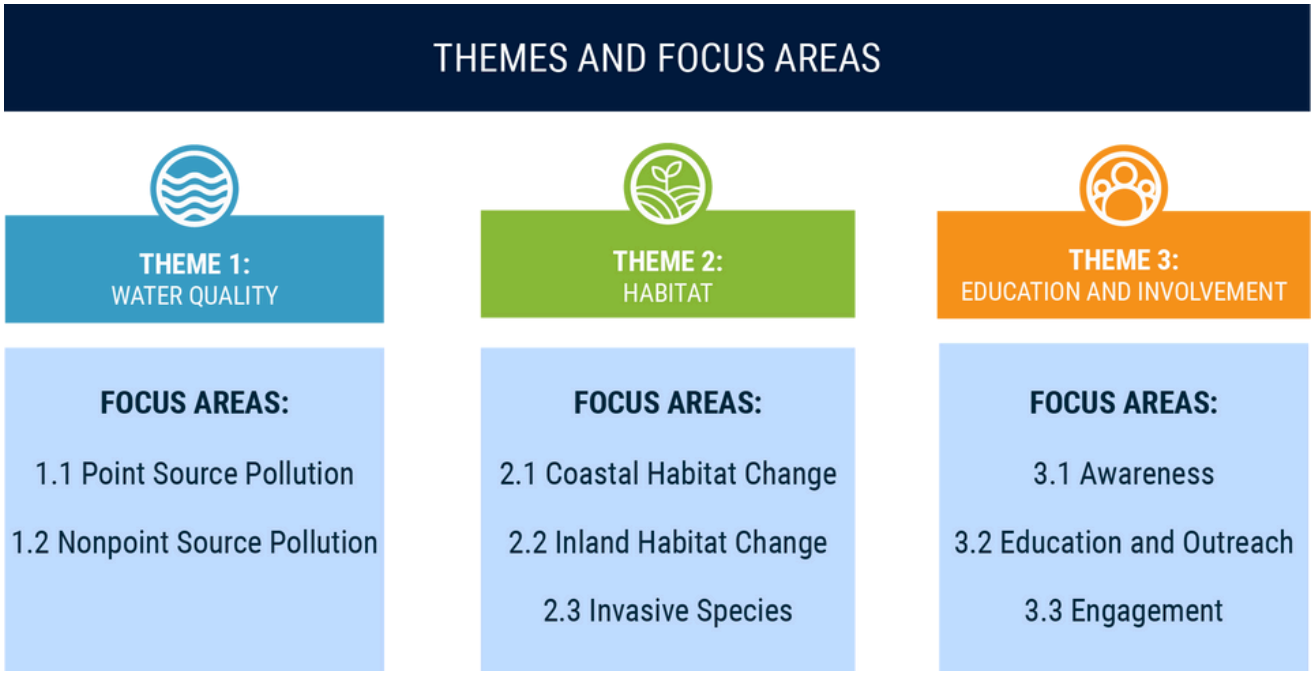


Figure 9. Action Plan themes and focus areas.

The organization of proposed actions into these themes helps to ensure that recommended solutions directly connect back to identified problems and issues facing the Pontchartrain Basin. While actions have each been assigned to a specific focus area, many of the actions may have benefits to another theme or focus area. For example, a wetland habitat restoration project may have benefits to water quality. As projects are developed by PRP and partners to implement the actions, the specific benefits (and impacts) will need to be documented and tracked. The following sections of this chapter will include a summary of each Focus Area and a list of associated actions. These summaries describe the connection these actions have to meeting objectives, resolving issues, and providing intended outcomes.

The CCMP Action Plan includes a total of 132 actions with 34 water quality actions, 56 habitat actions, and 42 education and involvement actions. Each action is numbered for clarity, ease of reference, and tracking. The Action Plan tables later in this section (Table 3 - Table 10) contain details about each action included in the CCMP and are organized according to Theme, then Focus Area.

Many of the actions identified can be implemented by PRP in coordination with additional partners. This allows leveraging of existing programs that may be able to provide funding, data, expertise, or other contributions to make actions a reality. Where there are relevant existing federal, state, and local programs, it will be important to align with existing practices and procedures. Many of the actions included will be subject to regulations (e.g., CWA, local ordinances, etc.); it is assumed that implementation of any action included in the CCMP will follow existing laws and regulations as well as best practices.

Theme 1: Water Quality

Focus Area: Point Source Pollution (1.1)

Under the CWA, the USEPA defines point source as “discernible, confined and discrete conveyance" from which pollutants are or may be discharged.[9] For water quality purposes, some examples of point sources of pollution include pipe outfalls, drainage ditches, ships, trash piles, abandoned quarries, and concentrated animal feeding operations. Common industrial and factory operations include oil refineries, pulp and paper mills, and chemical plants. Another common point source is wastewater treatment plants. Under the CWA, the National Pollutant Discharge Elimination Systems (NPDES) was created; it requires activities causing point source pollution to obtain a permit from the state[10] and USEPA before discharging the waste stream into waters of the United States. The permit limits what can be discharged, generally based on concentration, and will include monitoring and reporting requirements to ensure the discharge does not exceed the limit.

Point sources can discharge chemicals, pathogens, industrial effluents, nutrients, emerging contaminants including PFAS (per- and polyfluoroalkyl substances), drug compounds, and nanoparticles. Several factors can lead to poor performance of wastewater treatment, which will increase concentration of pollutants in discharges. For municipal wastewater treatment plants, the initial design can pose a hindrance to long-term compliance. This occurs as the population contributing wastewater increases, putting stress on a treatment system unable to effectively treat the increased wastewater load. Time is another factor, as wastewater treatment plants’ aging infrastructure can lead to treatment challenges. A common wastewater “polishing” treatment option is to discharge into a constructed wetland to further reduce the load of nutrients to surface waters. These systems should not be placed in a floodplain, which could decrease treatment effectiveness during high water events. Discharge into existing natural wetlands is not advisable unless those systems have been designed and modeled to treat such effluent. An additional point source of nutrients and sediments to Lake Pontchartrain is via annual episodic leakage through and periodic opening of the Bonnet Carré Spillway, which connects to the Mississippi River.

Water flowing from a pipe into a drainage ditch; representative of point source pollution (Photo Credit: Canva).

[9]More information can be accessed via the following link: https://www.epa.gov/laws-regulations/summary-clean-water-act
[10]More information on the Louisiana Pollutant Discharge Elimination System (LPDES) can be accessed via the following link: https://deq.louisiana.gov/page/lpdes

There are established efforts for monitoring and collecting water quality in the Pontchartrain Basin that are not specifically measuring discharge at a single point. Two of these include the comprehensive surface water quality monitoring led by the Louisiana Department of Environmental Quality (LDEQ), which conducts instream monitoring to capture changes in water quality with time (see Water Quality Section of Issue Report for sampling details). Another is led by the Pontchartrain Conservancy, which conducts weekly water quality assessments of several shore stations in Lake Pontchartrain (see Issue Report for details). These efforts are in addition to the discharge monitoring required for point sources per the NPDES program.

Increasing heavy rain events can increase stress to the wastewater treatment system where stormwater discharge is also tied into the wetland treatment system. With time, an increasing population will also stress aging and undersized systems, especially for dramatic increases in population in a small window of time. With increasing population comes more construction activities due to removal of natural areas and replacement with impervious surfaces like concrete. This removes natural processes such as infiltration and sorption to soil particles, therefore requiring more efforts toward ensuring compliance. One way of lessening the environmental impact of increasing built or conventional infrastructure is to include more green building principles/infrastructure and NBS. There is not a one size fits all model but rather diverse options for integrating natural systems and ecological principles into the built or constructed environment

> Funding sources available to improve water quality from point sources include USEPA, National Oceanic and Atmospheric Administration (NOAA), and the State Revolving Fund Programs. The State Revolving Loan Fund is the main source of USEPA funding for water quality infrastructure projects for centralized and decentralized wastewater treatment. In addition, the USEPA provides resources for funding GI.[11]

Actions

Wastewater

- Replace/retrofit aging or undersized wastewater treatment plant infrastructure and provide training to meet needed increased capacity to enhance water quality by leveraging funds with other U.S. Environmental Protection Agency funding sources, including the State Revolving Fund.

- Increase the use of assimilation wetlands from the subdivision up to municipal wastewater treatment plant scale to further improve water quality.

- Prioritize pathways/funding for low-cost solutions for incorporating homes and businesses on individual wastewater treatment systems to regionalized or centralized treatment systems where infrastructure is nearby.

[11]More information can be accessed via the following link: https://www.epa.gov/green-infrastructure/green-infrastructure-funding-and-technical-assistance-opportunities

- Provide funding to assist homeowners in closing open stormwater ditches to reduce mosquito breeding, resulting in improved health outcomes.

- Construct living shorelines along Lake Pontchartrain near canal/stormwater outfalls to help filter water and sequester nutrients, improving water quality.

- Provide additional funding to assist the homeowner in implementing mitigation measures for failing Aerobic Treatment Units and septic systems.

Planning and Compliance

- Supplement state funding and provide coordination with local/state/regional agencies for better oversight of activities discharging water bodies to identify non-compliance.

- Fund the development of master plans for parishes to optimize wastewater treatment approaches, including connection of unsewered areas to wastewater treatment systems, assessment of systems in need of capital expenditure improvements, alternative wastewater treatment processes to meet pollutants of the future (ammonia, nitrite/nitrate), and alternative wastewater disinfection processes to meet Disinfection By-Product goals, including haloacetic acids and trihalomethanes.

- Provide additional funding for home inspection programs in parishes utilizing Aerobic Treatment Units and septic systems as a mechanism to improve wastewater treatment.

- Coordinate with state and local agencies on regulation development to ensure individual wastewater systems users are in compliance.

Research and Data

- Identify existing and emerging contaminants of concern and support related mitigation.[12]

- Encourage participation in existing water quality databases (e.g., The National Water Quality Monitoring Council's Water Quality Portal) to improve data discovery and use.

- Fund studies to quantify the cost to taxpayers (economic analysis) for additional monitoring and pollutant reductions (reduction of permitted discharge limits) and improving wastewater infrastructure.

- Develop periodic State of the Basin reports to inform the public about the ecological health of the basin.

[12]More information can be accessed via the following link: https://www.epa.gov/npdes/stormwater-pollutants-emerging-concern

Focus Area: Nonpoint Source Pollution (1.2)

The USEPA defines nonpoint source pollution (NPS) as any source of water that does not meet the legal definition of "point source" in the CWA.[13] NPS generally results from precipitation, atmospheric deposition, runoff from land, drainage, or seepage. Different from point source pollution, contaminants can come from many different diffuse sources. Generally, precipitation moves over and through the soil, capturing both natural and human-made pollutants, which are then deposited in lakes, rivers, wetlands, and coastal waters, causing ecosystem degradation, concentrating in biota consumed by humans, and negatively impacting recreation opportunities. Pollutants can also be transported through infiltration into groundwater, threatening human health through exposure.

Common sources of pollutants linked to specific land uses include 1) herbicides, pesticides, and fertilizers from residential and agricultural lands; 2) oil (and products related to it) and toxic chemicals from both urban runoff and activities linked to energy production and use; 3) pathogens (bacteria and viruses) released from failing septic systems and livestock, wildlife, and pet excrement; and 4) sediment from floods, diversions of the Mississippi River, eroding streambanks, and crop and forest lands as well as denuded construction sites. There are also pollutants that are a result of atmospheric deposition from both natural (volcanoes, weathering of rocks, and minerals) and human sources (burning of fossil fuels, waste incineration, and mining). Another source is related to hydrologic modifications, including channelization, river straightening, and dredging to increase depth. The result of excess nitrogen and phosphorus released to the environment can lead to expressions of eutrophication, which include low dissolved oxygen and algal blooms, including HABs and associated toxins.

Increased frequency of heavy rain events can lead to greater NPS runoff through more frequent heavy rain events and floods, which can increase transport to surface waters. Changes in surface conditions can also increase NPS runoff, including removing natural vegetation and increasing impervious surface areas like roads and parking lots. Several best management practices (BMPs) have been developed through federal, state, and local efforts to help reduce NPS runoff. They include managing stormwater through capture (detention or retention), modifying agricultural practices, controlling erosion from construction projects, and mitigating riverbank erosion. Nature-based treatment features and GI are generally low-energy and low-cost maintenance solutions.

[13]More information can be accessed via the following link: https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution

Funding for water quality improvement projects to assist with NPS is available from the USDA, Natural Resources Conservation Service (NRCS), and Soil and Water Conservation Districts. Additional funding is available from the USEPA though the 319 program, in which funds are sent to the state to award projects to address NPS in areas with approved watershed protection plans. In Louisiana, the funds are administered by LDEQ for watershed planning, outreach, and septic system projects and by the Louisiana Department of Agriculture and Forestry (LDAF) for NPS pollutant reduction implementation projects in agricultural areas.

Actions

Source or Compliance

- Initiate sediment tracking of river sediments to identify sources of phosphorus to waterbodies (e.g., Lake Pontchartrain) to prioritize areas in the watershed needing reduction actions.
- Support efforts to understand, measure, and address toxic contaminants found in sediment, fish, and shellfish (heavy metals, PFAS, PCPs, emerging contaminants of concern, etc.) to protect public health.
- Support research and monitoring efforts to identify and predict harmful algal bloom (HAB) events within the basin, including conducting an inventory of existing HABs using publicly available data to prioritize data gaps.[14]
- Provide financial incentives to inspect and repair/replace faulty on-site wastewater treatment systems to help reduce pathogens in surface water.
- Provide funding to support efforts to sample additional water quality parameters to assess watershed health (e.g., reactive phosphorus, total dissolved metals, sediment, microplastics, radionuclides, etc.).
- Support efforts with state agencies on establishing Total Maximum Daily Loads for water quality parameters.
- Support local and state efforts to increase the capacity of existing centralized water treatment systems to reduce nonpoint source pollution.
- Provide guidance and incentives to leaseholders/landowners for adoption of the marshland upwelling system,[15] an on-site wastewater treatment system for coastal areas that uses the natural processes of the marsh soil to treat wastewater injected into the subsurface to reduce pathogens in surface waters and protect human health.

[14]More information can be accessed via the following link: https://www.epa.gov/habs
[15]For more details on the marshland upwelling system, see Watson & Rusch (2001).

- Create incentives (funding or fines) for local and state enforcement agencies to ensure compliance for sediment control for road or construction projects to reduce pollutants and runoff.

- Fund a review of legacy stormwater features to ensure they continue to function effectively, especially where they appear not to be well maintained (filled in, overgrown, etc.).

- Publicize/prioritize use of existing best management practices for stormwater, lawns, golf courses, agriculture, high-density development, etc., within associated neighborhoods/cities/parishes and consider linking to local permitting.

- Promote and reward (financial incentives) voluntary use of green infrastructure[16] and nature-based design in planning processes within the watershed.

- Support local and state efforts to address marine debris/trash/litter in the basin and promote the expansion of residential recycling programs.

- Coordinate with local government agencies (ordinances, development codes, and regulations) to implement best management practices, such as nature-based solutions and green infrastructure in new development and construction projects, to include detention and retention design features.

- Support coordination among agencies on the management of newly installed home wastewater systems. Specifically, wastewater systems must be able to meet discharge limitations that would support the designated uses of waterways.

Research

- Provide additional funding to expand monitoring of emerging contaminants of concern and support related mitigation efforts.[17]

- Fund long-term monitoring of specific best management practices features to better understand lifecycle costs and maintenance needs to ensure effective implementation over time.[18]

- Provide additional funding to continue establishing minimum flows and levels for rivers to prevent and mitigate impairments.

[16]More information can be accessed via the following link: https://swefc.unm.edu/gardb/
[17]More information can be accessed via the following link: https://www.epa.gov/npdes/stormwater-pollutants-emerging-concern
[18]More information can be accessed via the following links: https://swefc.unm.edu/iamf/, https://swefcamswitchboard.unm.edu/am/

Planning

- Coordinate with local, state, and federal agencies to identify sites not listed on the National Priority List.

- Support conducting an inventory/assessment of all water quality impacting plans in the area such as Federal Emergency Management Agency hazard mitigation plans, U.S. Department of Agriculture Natural Resources Conservation Service watershed assessments, existing U.S. Environmental Protection Agency-Accepted Watershed Implementation Plans, Total Maximum Daily Loads, etc. to better inform planning needs in the Pontchartrain Basin.

HAB in Lake Pontchartrain (Photo Credits: Wetland and Aquatic Research Center).

Theme 2: Habitat

Focus Area: Coastal Habitat Change (2.1)

Coastal habitats of the Pontchartrain Basin are included in the Inland Swamps and Deltaic Coastal Marshes and Barrier Islands Level IV ecoregions (Figure 10; Omernik & Griffith, 2014). The Inland Swamps represent a transition zone from freshwater environments to brackish and saline marshes near the coast. This area is characterized by baldcypress-tupelo gum swamp forests, with sedges, grasses, and rushes prevalent in frequently flooded areas. This is one of the most extensive areas of coastal forest in coastal Louisiana and provides important wildlife habitats (e.g., for bald eagle [*Haliaeetus leucocephalus*]). Adjacent to the swamps, the Deltaic Coastal Marshes and Barrier Islands lie on the flat deltaic and coastal plains and are dominated by a mix of freshwater and saline marshes. The ecoregion is under threat due to land loss from subsidence, sea level rise, erosion, and a lack of extensive sediment input. Nevertheless, these wetlands support vital wildlife habitats.

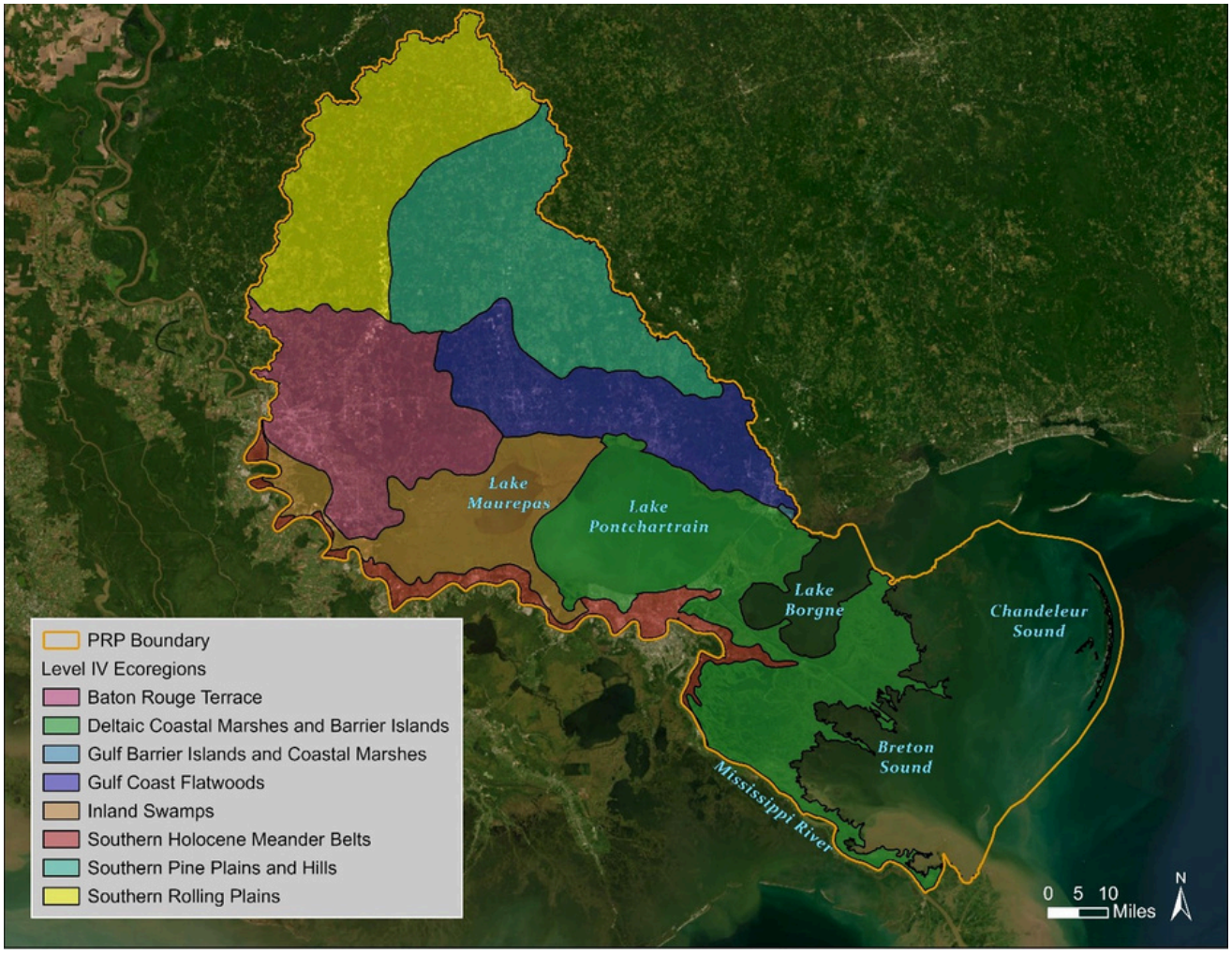


Figure 10. Level IV ecoregions (Omernik & Griffith, 2014).

It is also an area of change. While wetland loss during the 20th century was previously well documented (Penland et al., 2002), more recent data show that loss is continuing, with over 1,300 acres of woody wetlands and over 3,000 acres of emergent herbaceous wetland being lost between 2001 and 2021 (Appendix B). Opportunities for habitat restoration projects include marsh creation with dredged material, beneficial use of dredged material, shoreline protection, ridge restoration, barrier island restoration, hydrologic restoration, and diversion of Mississippi River water into the wetlands. Many specific project locations have been identified in government plans and reports, including the 2023 Coastal Master Plan (2023 CMP) (Figure 11), the 2024 St. Tammany Parish Coastal Master Plan (2024 STPCMP) (Figure 12), the 2020 Jefferson Parish Coastal Strategic Action Plan (2020 JPCSAP), and the 2021 St. Bernard Parish Coastal Strategy Document (2021 SBPCSD) (Figure 13). Examples of these projects are listed in Table 2. These plans will be updated over time as conditions change, and additional parish plans are under development. The Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) also identifies lists of wetland restoration projects on an annual basis, which may include those within the Pontchartrain Basin. In addition to these location-specific projects, actions to address habitat change can include an inventory of information to support planning, exploration of partnerships to support research and understanding of habitat restoration, and strategic application of different restoration approaches.

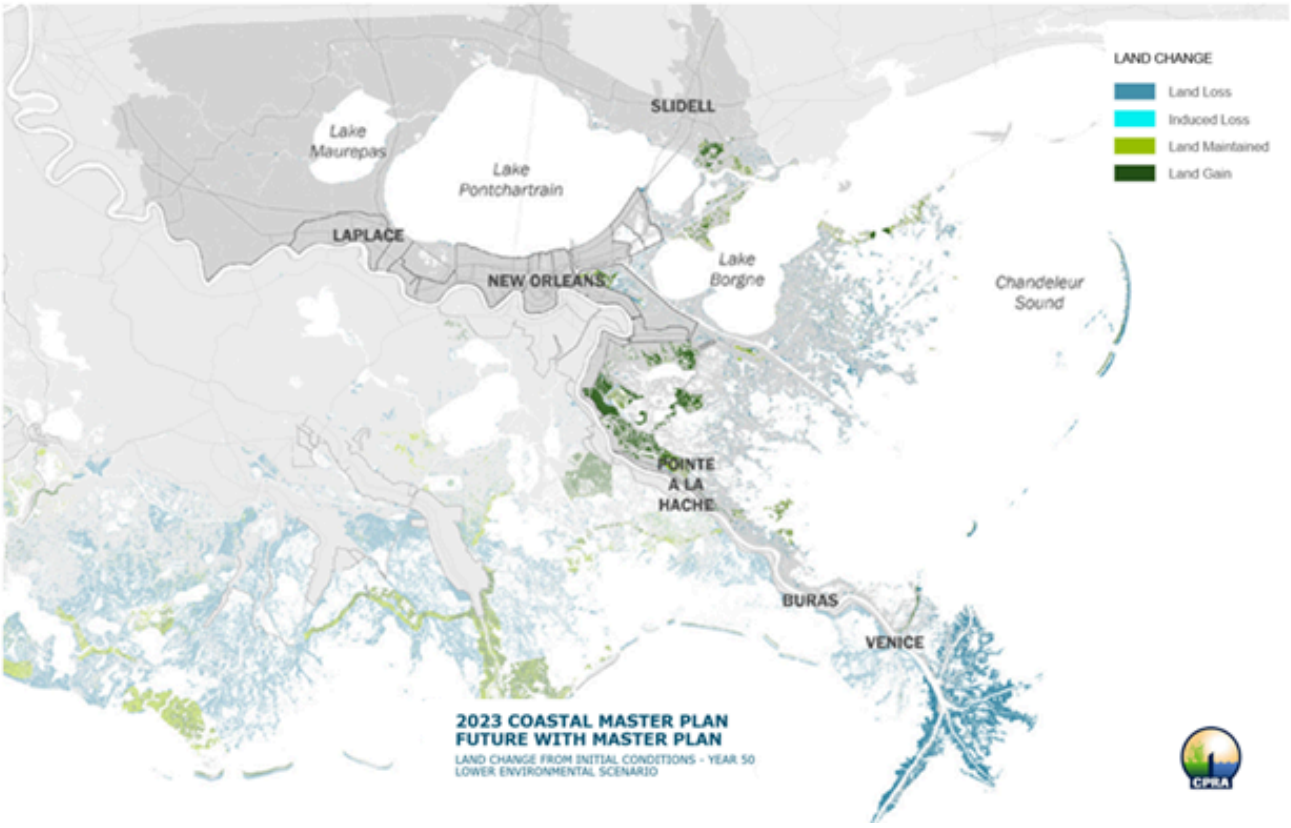
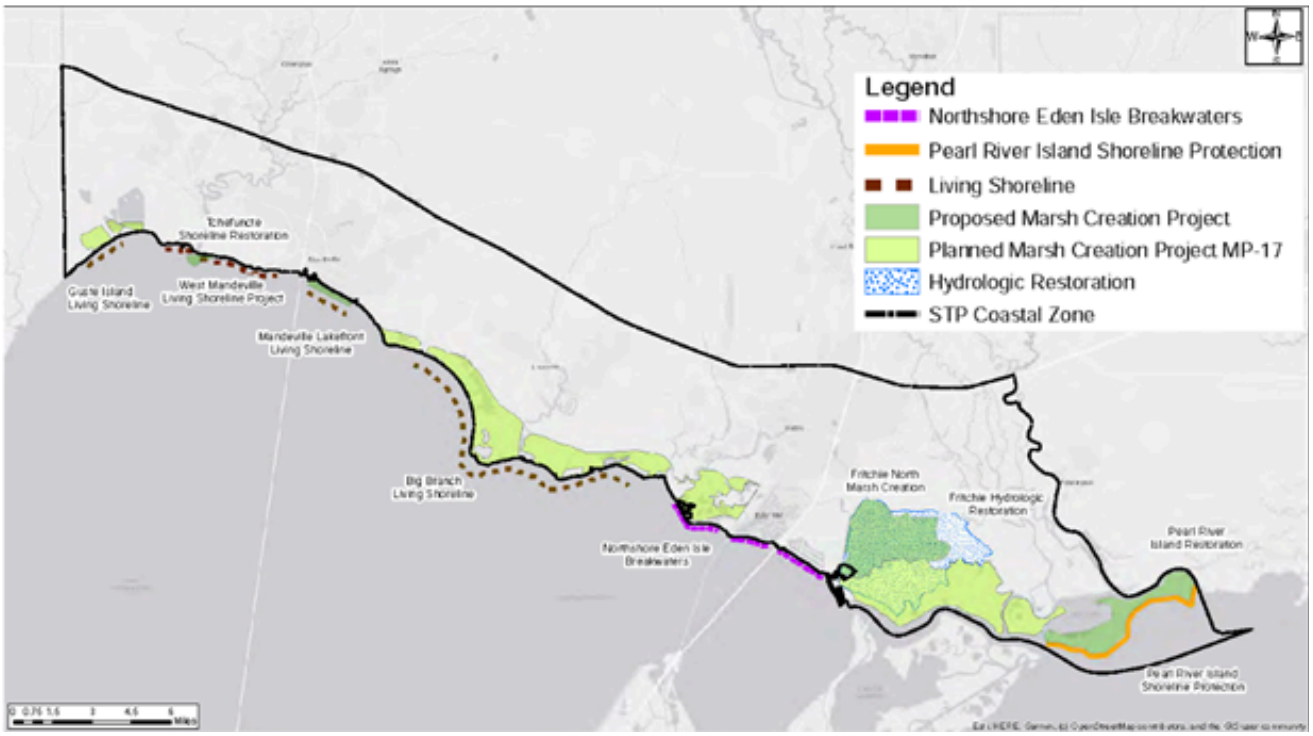
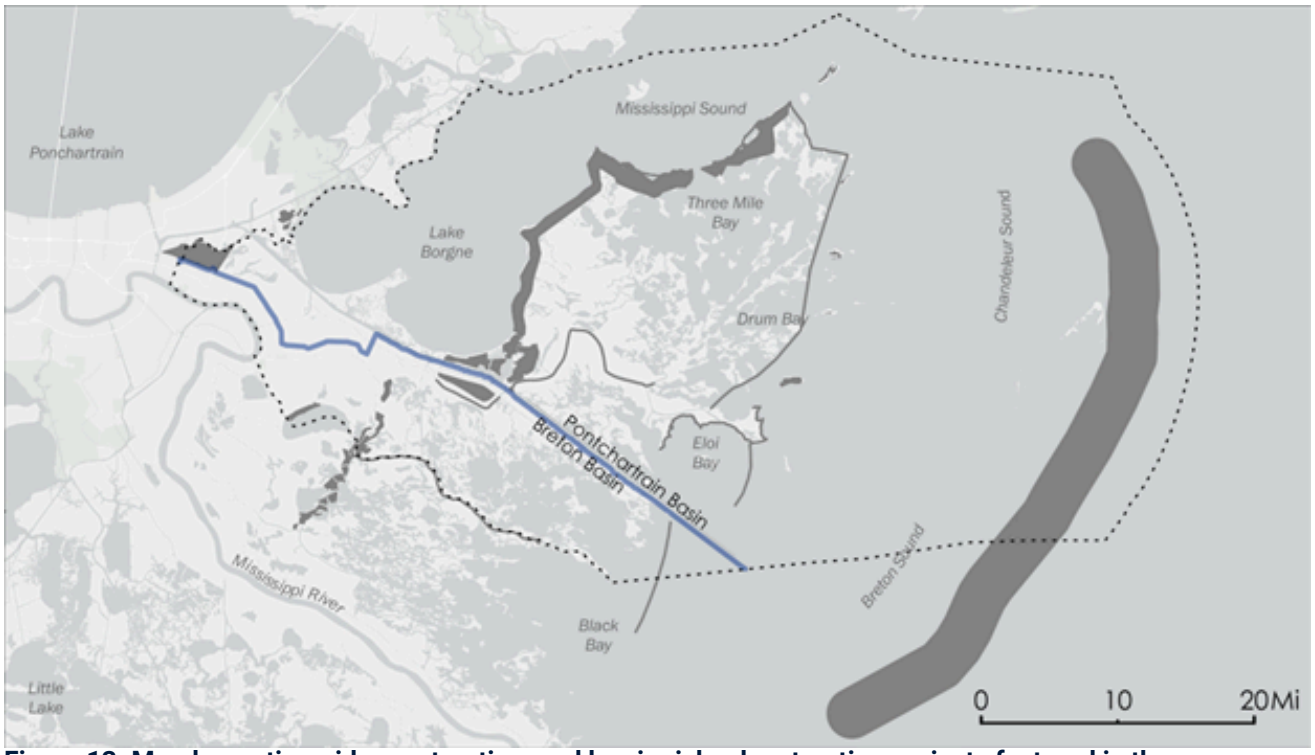


Figure 11. Land change in coastal habitats of the Pontchartrain Basin with the construction of the projects included in the 2023 Coastal Master Plan under the lower environmental scenario (Coastal Protection and Restoration Authority (CPRA) of Louisiana, 2023).



937 **Figure 12. St. Tammany Parish restoration projects (Neel-Schaffer, 2024).**



938 **Figure 13. Marsh creation, ridge restoration, and barrier island restoration projects featured in the 2021 St. Bernard Parish Coastal Strategy Document (McInnis et al., 2022).**

A variety of programs and funding sources are available, allowing state and local governments to initiate and actively participate in coastal habitat restoration initiatives. Actions listed in the CCMP should be continually evaluated in relation to funding sources. In addition to funding sources such as those associated with the DWH oil spill,[20] The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act), the Gulf of Mexico Energy Security Act (GOMESA),[21] CWPPRA, and USACE (e.g., Water Resources Development Act and Continuing Authorities Programs), additional disaster response funding, budget surplus funds from the state of Louisiana, and potential stimulus funds should be evaluated because funding sources often become available in a short period of time and often require "shovel ready" projects that can quickly proceed to construction.

Many parishes also allocate funds directly to habitat restoration activities. Some NGOs support habitat restoration projects that target key species, such as Ducks Unlimited's interest in coastal terraces to promote SAV. Supporting activities such as research, data collection, and monitoring may be funded through Louisiana Sea Grant, the Louisiana Center of Excellence, and by agencies such as the Louisiana Department of Wildlife and Fisheries (LDWF) that have interests in certain issues (e.g., oyster cultch).

In some instances, federal funds require a cost-share, which can come from various non-federal sources. Often, funds from several sources need to be pooled to fund the implementation of larger coastal restoration projects. For example, under the Section 1135 program, USACE can partner with a non-federal sponsor to modify projects constructed by the USACE to improve the quality of the environment, including areas where an existing USACE project contributed to the degradation of the environment.

Actions

Habitat Restoration and Management

- Support the implementation of restoration projects approved as part of federal, state, or parish planning documents that address coastal issues to increase the extent and quality of coastal habitats, including in areas accessible to the public, where projects can promote awareness and interest in restoration.

- Manage and maintain, in coordination with local and state agencies, a prescribed fire program for herbaceous marsh habitat dominated by *Spartina patens* (fire return interval 5 years), executed by Certified Prescribed Burners,[22] to help control woody and exotic species, remove excess accumulation of plant debris, and encourage growth of native vegetation.

[20]More information can be accessed via the following link: https://dwhprojecttracker.org/about-the-dwh-funding-programs/
[21]More information can be accessed via the following link: https://archive.revenuedata.doi.gov/how-it-works/gomesa/
[22]More information can be accessed via the following link: https://www.ldaf.la.gov/land/fire/prescribed-burning

- Maintain and reconnect natural flow pathways to facilitate fish movement and/or restore degraded habitats (e.g., on Bayou Sauvage National Wildlife Refuge).

- Strategically install cultch material, broodstock reefs, and living shorelines in critical areas to improve resilience for oysters.

- Opportunistically build marsh terraces in shallow coastal lakes and in areas where they can be accessed by the public to promote the growth of submerged aquatic vegetation and public awareness of their role.

- Add 'softening' adjacent to hardened shorelines (such as those with revetment or rock breakwaters) to restore edge habitat.

- Protect eroding shoreline habitats using living shorelines.

- Protect critical landscape features within coastal wetlands to provide nesting habitat for birds, including the restoration of near-shore shell berms on the edge of the Biloxi Marshes.

Research, Data, and Monitoring

- Prepare a comprehensive biodiversity and environmental resource inventory, including, but not limited to, wildlife habitats, wetlands, floodplains, endangered species habitats, submerged aquatic vegetation, and sediment sources for habitat restoration to support coastal habitat restoration and management by state and federal agencies, parishes, and others.

- Leverage available parish resources to support integration of research, monitoring, and targeted studies into the implementation of habitat restoration projects to improve understanding of habitat restoration effectiveness.

- Identify areas where the deployment of artificial reefs could improve recreational fishing opportunities.

- Explore increased utilization of repurposed materials including ground glass to support habitat restoration.

- Document and understand the effects of the River Reintroduction into Maurepas Swamp project on habitats for flora and fauna and food web interactions to inform future diversion projects.

- Explore the potential to improve the habitat of wetlands east and west of the Bonnet Carré Spillway, including benefits to water quality, habitats, and the Lake Pontchartrain ecosystem.

- Conduct research to determine upstream source populations of submerged aquatic vegetation and develop strategies for protection and conservation.

Using Recycled Glass in Habitat Restoration

The U.S. Fish and Wildlife Service (USFWS) partnered with Glass Half Full, Common Ground Relief, the Coalition to Restore Coastal Louisiana (CRCL), and LDWF to use recycled glass sand for a restoration project at Big Branch Marsh National Wildlife Refuge. A shoreline "blowout" caused by Hurricane Ida was allowing salt water from Lake Pontchartrain to enter the freshwater marsh, killing vegetation, and allowing for rapid sediment loss. Ninety-five volunteers worked over two days to plant 8,100 plugs of marsh grass and simultaneously construct a berm made of burlap sacks filled with recycled glass. The goal of the berm was to slow wave action and allow the freshly planted plugs of California bulrush (*Schoenoplectus californicus*) directly behind it to take root and begin to rebuild the marsh. Without the recycled glass sand berm, the wave action on the planting footprint would have been too high for the plants to root successfully.

Planting marsh grass plugs in Big Branch Marsh National Wildlife Refuge (Photo credit: CRCL).

Notable Investment in Wetland Restoration in the PRP Boundary

29 coastal restoration projects completed since 1995

15,264 acres benefited

49,782 linear feet protected

979 **Table 2. Examples of coastal habitat restoration projects identified in state and parish plans.**

Notes: Project Type: INT – integrated, MC – marsh creation, SP – shoreline protection, RR – ridge restoration, BI – barrier island restoration, DI – diversion, and HR – hydrologic restoration; 2024 STPCMP only includes the components of this project within St. Tammany Parish.

PROJECT NAME	PROJECT TYPE	PLAN	ESTIMATED COST
Three Mile Pass Marsh Creation and Hydrologic Restoration	INT	2023 CMP	$560M
Hopedale Marsh Creation	MC	2023 CMP 2021 SBPCSD	$160M
Central Wetlands Marsh Creation	MC	2023 CMP 2021 SBPCSD	$49M
Sunrise Point Marsh Creation	MC	2023 CMP	$47M
Uhlan Bay Marsh Creation	MC	2023 CMP	$33M
Pointe a la Hache and Carlisle Marsh Creation	MC	2023 CMP	$860M
Fritchie North Marsh Creation	MC	2023 CMP 2024 STPCMP	$110M
Oak River to Delacroix Marsh Creation	MC	2023 CMP 2021 SBPCSD	$170M
Spanish Lake Marsh Creation	MC	2023 CMP	$61M
Tiger Ridge/Maple Knoll Marsh Creation	MC	2023 CMP	$150M
West Delacroix Marsh Creation	MC	2023 CMP	$390M
Belle Pass Island Marsh Creation	MC	2023 CMP	$99M
North and East Lake Lery Marsh Creation	MC	2023 CMP	$890M
Chandeleur Sound Island Restoration Projects	MC	2023 CMP	$57M
Bayou LaLoutre Restoration	RR	2023 CMP 2021 SBPCSD	$26M
Tchefuncte River Ridge Restoration	RR	2023 CMP	$1.9M
Central Wetlands Diversion	DI	2023 CMP	$270M
Big Branch Living Shoreline	SP	2024 STPCMP	$144M
Fritchie Hydrologic Restoration	HR	2024 STPCMP	$7.4M

PROJECT NAME	PROJECT TYPE	PLAN	ESTIMATED COST
Guste Island Living Shoreline	SP	2024 STPCMP	$16M
Guste Island Marsh Creation	MC	2024 STPCMP	$57M
Mandeville Lakefront Living Shoreline	SP	2024 STPCMP	$14M
Mandeville Lakefront Wetlands Restoration	MC	2024 STPCMP	$4.8M
Northshore/Eden Isles Breakwater (Slidell Breakwaters)	SP	2024 STPCMP	$41M
Pearl River Island Shoreline Protection and Restoration	INT	2024 STPCMP	$131M
Cane Bayou Marsh Creation	MC	2024 STPCMP	$102M
Bayou Lacombe Marsh Creation	MC	2024 STPCMP	$79M
Faciane Canal Marsh Creation	MC	2024 STPCMP	$114M
Tchefuncte River Area, Wooded Island Protection, Peninsula Replacement, and Marsh Restoration	INT	2024 STPCMP	$16.4M
West Shoreline Protection	SP	2024 STPCMP	$23M
Black and Eloi Bay Ridge	RR	2021 SBPCSD	$394M
East Bank Sediment Pipeline	MC	2021 SBPCSD	$31.5M
Reggio Marsh Creation and Hydrologic Restoration	INT	2021 SBPCSD	$33.64M
North Delacroix Marsh Creation and Terracing	INT	2021 SBPCSD	$35.51M
East Delacroix Marsh Creation and Terracing	INT	2021 SBPCSD	$39.74M
Mardi Gras Pass Closure	HR	2021 SBPCSD	$38.27M
Biloxi Marsh Protection and Restoration	INT	2021 SBPCSD	$962M
Lake Pontchartrain Marsh Protection Feasibility Study West	SP	2020 JPCSAP	$1.5M
Laketown Breakwaters / Living Shoreline	SP	2020 JPCSAP	$7.5M
Severn Lakefront Restoration	SP	2020 JPCSAP	TBD

Focus Area: Inland Habitat Change (2.2)

The Southern Pine Plains and Hills ecoregion was historically dominated by longleaf pine (*Pinus palustris*) woodlands. These ecosystems, which supported species such as the gopher tortoise (*Gopherus polyphemus*) and the red-cockaded woodpecker (*Picoides borealis*), have largely been replaced by mixed forests of loblolly pine (*Pinus taeda*) and slash pine (*Pinus elliottii*) in wetter areas. To the south, the Gulf Coast Flatwoods and Gulf Barrier Islands and Coastal Marshes ecoregions also historically supported longleaf pine-dominated flatwoods and savannas. Frequent fires maintained this landscape. Today, most longleaf pine savannas have been lost. The few remaining areas of pine savannah are biodiversity hotspots. Over time, much of this area has been converted to pine plantations, mixed pine forests, pasture, and urban developments. To the west, in parishes like East Feliciana and St. Helena, the Baton Rouge Terrace and Southern Rolling Plains ecoregions are characterized by pine-oak forests, with shortleaf pine (*Pinus echinata*) and loblolly pine alongside white oak (*Quercus alba*) and live oak (*Quercus virginiana*). Figure 8 shows changes in LULC by Level III ecoregion between 2001 and 2021. Mixed forest, woody wetlands, and shrub/scrub habitats have declined with a marked increase in evergreen forest and developed areas.

Riverine habitats have also been altered. Gravel pits are located throughout many of the river basins. The formation of these gravel pits is a result of both active and historical sand and gravel mining operations. Extensive changes to both the river channel and overbank areas in the vicinity of these gravel pits are clearly visible in historical aerial imagery and terrain data, as characterized by the vast areas of unvegetated sand and gravel, widening of channels, reductions in historical sinuosity, erosion, aggradation, and degradation.

Habitat loss and degradation due to urban expansion, deforestation, and agricultural development result in the destruction of natural habitats. Rising temperatures, shifting precipitation patterns, and extreme weather events can render habitats unsuitable, disrupting migration patterns and breeding cycles.

In addition to direct habitat restoration, opportunities to improve inland habitats and/or reverse their degradation include adjusting local ordinances to limit the impacts of increased development, educating the public about the importance of key management practices such as burning, and leveraging conservation programs that focus on landowner incentives and partnerships.

The variety of actions needed to support inland habitats leads to a variety of different funding sources. Protection of habitat from development can be through acquisition or conservation easements, for example, which could entail expansion of publicly owned land, such as wildlife management areas, or leveraging conservation programs associated with the Farm Bill, such as the Conservation Reserve Program and the Environmental Quality Incentives Program.

Mitigation banks can also be an effective way of conserving existing habitat in the long term, and these are often privately funded. Note, however, that mitigation banks support habitat due to the loss of habitat in other areas.

The USDA NRCS offers technical and financial assistance to help farmers and forest landowners improve land management. The NRCS Longleaf Pine Initiative is also a potential source of information and funding.

In some areas of the basin, habitat restoration may be an outcome of work being conducted for other purposes, such as flood risk management. For example, the ARBC, whose primary mission is flood risk management, recognizes in its Master Plan that restoration of natural channels and addressing the legacy of sand and gravel mining can support habitat and reduce flood risk.

Educational and outreach materials may be supported by the Louisiana State University (LSU) Extension Service and the LSU AgCenter. Other local universities have expertise that can be leveraged to support wider understanding of habitat issues in the Pontchartrain Basin's forests and streams.

Actions

Forest and Land Management

- Develop and disseminate materials to educate landowners, adjacent residents, developers, local decision makers, and the general public about the crucial role of prescribed burning in the management of longleaf pine systems, the advantages of growing longleaf pine and associated herbaceous ground cover, and promote value-added products produced from longleaf pine to encourage landowners to replant longleaf pine instead of loblolly pine.

- Work with the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Agriculture and Forestry to provide cost-share funds to reduce or eliminate landowners' costs associated with conducting prescribed burns by Certified Prescribed Burners on their property.

- Target areas for acquisition from willing sellers for protection (e.g., servitudes, conservation easements) and stewardship implementation, including tracts that are degraded but restorable with timber harvesting and prescribed fire, those in aquifer recharge zones, and those near existing conservation areas, to increase the extent and quality of longleaf pine and other forested habitats.

Rivers and Floodplains

- Develop a comprehensive stream survey methodology for the Pontchartrain Basin, building on existing approaches and best practices, to ensure consistent documentation of geomorphic and habitat characteristics and the presence of species of greatest conservation need (e.g., freshwater mussels).

- Promote the value of instream, riparian, and floodplain habitat and its compatibility with flood storage and conveyance by developing and disseminating outreach materials (e.g., on the importance of adhering to no wake zones).

- Conduct a basin wide evaluation of unutilized gravel mines, including an assessment of the overall environmental impact and existing conditions, historical vegetation and hydrologic connectivity, surface elevations of the site, and whether any old or hazardous equipment remains on-site to support gravel pit restoration.

- Restore the natural channel and floodplain function within unstable reaches of the Upper Amite River in the vicinity of sand and gravel operations to improve habitat and reduce flood risk and downstream sediment loads.

- Preserve the existing undeveloped, natural floodplain along Bayou Fountain and Bayou Manchac to prevent development and preserve floodplain storage to reduce flood risk.

- Improve hydrologic connectivity in swamp forests to improve water quality and reduce stagnation (e.g., modifications to Highway 22 to reintroduce freshwater flows to McElroy Swamp in the lower Amite).

Planning, Policy, and Funding

- Identify priority areas for conservation, including those suitable as mitigation banks, and work with landowners to develop appropriate conservation strategies to sustain natural communities and provide habitat for species of greatest conservation need.

- Draft model ordinance amendments to ensure the protection of floodplains, wetlands, forested areas, natural communities, and other environmentally sensitive resource areas by addressing open space dedication standards (e.g., requiring that at least 50% of the total floodplain area within any new large residential development must be preserved as open space) ensuring the maintenance of wildlife habitats, the retention of natural floodwater storage, and groundwater recharge.

- Coordinate with local governments to assess parish ordinances, development and building codes, enforcement, and measures to mitigate wetland losses to encourage maximum protection of wetlands in all development.

- Foster the use of green infrastructure on public rights of way and public spaces (e.g., tree plantings) to improve habitat for native flora and fauna, promote water quality, and reduce nuisance flooding.

- Compile a list of resource materials to help landowners identify and apply for funding from federal programs (e.g., through the Farm Bill) that support habitat conservation on private lands.

- Provide financial incentives to private landowners to maintain existing riparian areas on private lands or to allow riparian habitat to naturally establish and be retained on sites associated with the drainages in the Pontchartrain Basin.

- Identify funding sources to support best management practices on working lands to improve habitat and offset costs to agriculture.

Red-Cockaded woodpecker (Dryobates borealis) are listed as threatened in the United States (Photo Credit: LDWF).

Focus Area: Invasive Species (2.3)

Invasive species are one of the most widespread and serious threats to species of greatest conservation need and their habitats in Louisiana (Louisiana Department of Wildlife and Fisheries (LDWF), 2019). Furthermore, the threat of invasive species continues to expand spatially and taxonomically and is often seen as a threat that may be best addressed by private landowners and managers. An invasive species is an organism that causes ecological or economic harm in a new environment where it is not native. They can harm both the natural resources in an ecosystem as well as threaten human use of these resources. Invasive species can cause extinctions of native plants and animals, reducing biodiversity, competing with native organisms for limited resources, and altering habitats. More detailed information about invasive species can be found in Appendix B.

Trapping, shooting, and the utilization of herbicides and pesticides are the most common methods of control of many invasive species. However, the rate at which invasive species spread is frequently faster than the rate at which these removal techniques can be implemented. This lag in response time is in part due to insufficient invasive species removal resources for land managers and state agencies. Properly educating the public about owning and safe handling of known or potentially invasive species may be the best chance of preventing further introductions and may help focus resources on addressing damage to our native wildlife and habitats.

Invasive species management often involves private landowners who are key partners in many management activities. However, they may not have the funds to support all the work that needs to be conducted. Many strategies for invasive species management include increased awareness, which may be supported by NGOs with interest or even philanthropic organizations.

NRCS has several programs to support farmers, including the Environmental Quality Incentives Program, which has already provided some support for feral hog management within the basin. The development of new tools and approaches may require funding from organizations such as the USDA Agricultural Research Service or the USFWS Aquatic Nuisance Species Task Force.

LDWF clearly has a key role in this area, is a continuing source of expertise and information, and has made grants available. For invasives management that requires prescribed burning as a management approach, LDAF has a certification program for Prescribed Burners, supported by training from the LSU AgCenter.

Parishes may take initiative where there are local problem areas that are impacting residents (e.g., to control water hyacinth).

Actions

General

- Educate the public on the impact of invasive species in the basin to prevent inadvertent introductions.

- Provide guides to identify invasive species to educate the public and those working outdoors on how they may be differentiated from similar native species.

- Release (or encourage/assist in the development of) public service announcements on the impacts of invasive species on the human environment and recommend actions people can take to prevent the spread of invasive species.

- Encourage the posting of educational signage at major boat ramps recommending efforts be undertaken to ensure exotic plants on boats and trailers are removed prior to placing potentially infested boats or trailers into the water.

- Work with Louisiana Master Naturalists, Louisiana Department of Wildlife and Fisheries, and other local organizations to conduct education and training programs for government employees, develop rapid response approaches for new invasions, and coordinate volunteer events focused on invasive species removal.

- Promote the utilization of federal cost-share programs (e.g., Natural Resources Conservation Service Farm Bill programs, U.S. Department of Agriculture Animal and Plant Health Inspection Service) to address invasive species problems.

- Conduct monitoring to better understand the role of invasive species in submerged aquatic vegetation change.

- Identify and pursue administrative and/or legislative changes to enable private landowners to control invasive flora without violating wetland regulations.

- Explore the potential for composting of invasive plant material to avoid potential on-site issues (e.g., related to water quality), reduce landfill demands, and promote awareness.

Apple Snails

- Support programs to address apple snail populations through application of Federal Insecticide, Fungicide, and Rodenticide Act-approved pesticides or coordination through the Louisiana Department of Agriculture and Forestry for experimental use permits in the use of other chemical applications (such as chelated copper) in addition to concurrent intensive manual collection of eggs and adults.

- Develop effective trapping techniques to improve control.

- Engage local stakeholders in the documentation of apple snail occurrence and active control of egg masses to limit distribution and abundance.

- Develop a program to introduce redear sunfish to retention ponds, ditches, and public water bodies to control juvenile apple snails.

Carp

- Develop passive trapping methods to aid in the reduction of numbers, possibly by using the jumping behavior of some species to assist in low by-catch trapping or by targeting areas of dense concentrations.

- Assess the success of management methods being used on other parts of the Mississippi River Basin and evaluate their potential applicability to the Pontchartrain Basin.

Feral Hogs

- Support research on swine-specific toxicants and immuno-contraceptives to control feral hog populations.

- Educate the public on disease transmission, zoonotic diseases, and the detriments of intentional translocation of feral hogs to limit spread.

- Promote hunting, trapping, and snaring, and explore the potential for a bounty program to provide financial incentives to increase control of feral hog populations.

Apple Snail and its eggs (Photo Credit: Canva).

Cogon Grass

- Conduct training on invasive species identification and encourage diligent cleaning of highway mowing equipment after use to prevent the spread of cogon grass.

- Conduct field surveys (e.g., ground surveys, remote sensing, drones) to enable timely detection of new occurrences of cogon grass, especially those outside the known range of cogon grass, and provide financial incentives to conduct intensive control.

- Support additional research on the control of cogon grass, including documentation of habitat recovery where control efforts have been implemented to support effective control efforts.

Chinese Tallow

- Encourage use of prescribed fire by Certified Prescribed Burners in rangeland and pasture management to limit recruitment of Chinese tallow trees in grassland habitats and promote native species.

- Prevent the spread of Chinese tallow trees and support native species by opportunistically degrading banks of dredged material associated with canals and infrastructure construction within wetlands.

Water Hyacinth and Giant Salvinia

- Research new control methodologies to determine the efficacy and cost-effectiveness versus current options.

- Support research into the long-term effectiveness of biological control agents to improve understanding and promote the use of such control when appropriate.

Theme 3: Education and Involvement

Focus Area: Awareness (3.1)

The Resilient Communities chapter of the Issue Report (Appendix B) noted that through research and on-the-ground experience, people in the Pontchartrain Basin were generally unaware of the PRP – both its existence and its purpose. Building awareness about the ecological health of the Pontchartrain Basin starts with spreading basic information about the PRP to regional leaders, the public, and all those who work and play in the Pontchartrain Basin.

To achieve this widespread understanding, a multifaceted approach will be required. A core element is to improve the PRP's brand identity, including the development of a distinctive logo, a concise slogan, and consistent key messages. This brand should be prominently displayed through signage in key locations across the basin, such as busy roads, bridges, and boat launches, helping to reinforce the concept of a unified geographic watershed with a common thread of understanding. Additionally, the creation and publicization of updated maps of the Pontchartrain Basin, clearly identifying boundaries and significant landmarks, will provide essential visual context for residents and visitors alike.

Ultimately, these efforts aim to increase the accessibility and availability of information about the PRP and the basin's ecological health to advance the PRP's ability to fulfill its purpose. By promoting a deeper understanding of the Pontchartrain Basin and the ongoing restoration efforts, the PRP aims to cultivate a sense of collective ownership and responsibility. This heightened awareness will empower communities to actively participate in conservation initiatives, promote ecological stewardship, and ensure the long-term health and vitality of this invaluable natural resource for generations to come.

Funding for awareness initiatives could come from a variety of sources, including federal grants, USEPA, or other entities supporting environmental education and restoration efforts, especially for larger campaigns and digital tools. Local non-profits in the region often secure funding through a mix of private donations, grants, and membership fees, which could be used as a framework for PRP funding. Corporate and individual donors could also be approached to provide branded promotional materials or event sponsorships for specific initiatives.

Actions

- Create a unified and recognizable PRP brand, including a logo, slogan, and key messages to promote a common thread among the communities within the PRP boundary.

- Create and publicize updated maps of the PRP boundary that identify significant geophysical, civic, and other landmarks.

- Produce and display signage in prominent areas within the PRP boundary (along busy roads, on bridges, at boat launches, etc.) that make people aware they are in the Pontchartrain Basin to promote a unified geographic watershed.

- Create a PRP website that serves as an information hub/clearinghouse that houses educational resources such as maps and figures, includes a calendar of restoration events, and makes other relevant information about the PRP publicly available.

- Develop an interactive, online mapping tool for the PRP website that allows users to better understand the basin and its watershed, its physical features, the recreational opportunities available, flora and fauna within it, and other information.

- Create a suite of booth materials (tablecloth, backdrops, cups, coasters, pens, etc.) to use at conferences, trade shows, cultural events, and other events where PRP representation may be beneficial in expanding awareness.

- Execute a public outreach campaign using traditional and social media to promote the PRP and its activities.

- Participate in local cultural events and festivals to promote the PRP to the general public.

- Co-sponsor events that promote recreation, responsible tourism, water quality improvement, and other ecological health benefits, making the PRP logo prominent and recognizable.

- Develop and distribute fish measuring magnets that include information about local fish populations and the PRP logo.

- Create and promote an Adopt-a-Stream program for streams, bayous, and other tributaries within the Pontchartrain watershed to assist in keeping urban waterways free of litter and other debris.

Focus Area: Education and Outreach (3.2)

Education and Outreach are critical components of ensuring the long-term ecological health of the Pontchartrain Basin. While awareness builds initial recognition, robust educational resources are essential for cultivating a deeper understanding of the basin's complex ecosystems, the challenges they face, and the proactive measures individuals and communities can take to contribute to restoration efforts. These resources serve to demystify scientific concepts, highlight the interconnectedness of human activities and environmental well-being, and ultimately empower residents with the knowledge needed to become effective stewards of their natural surroundings. By providing accessible and relevant information, the PRP can foster a more informed and engaged populace, eager to participate in and advocate for a healthier Pontchartrain Basin.

To maximize impact, these educational resources must be strategically disseminated through effective communication channels, meaningfully engaging a wide array of audiences across the Pontchartrain Basin. Interactive educational programs tailored for schools will introduce younger generations to the importance of water quality and ecological stewardship from an early age. For the general public, broad public campaigns will distribute informative materials, complemented by strategically placed signage at boat launches, parks, and nature trails, offering insights into the basin's history, significance, and actionable stewardship measures. Furthermore, establishing consistent lines of communication with elected officials, local governments, and water and sewer agencies will ensure that key stakeholders are well-informed and equipped to share vital information with their communities.

The success of the PRP hinges on the widespread availability of high-quality educational resources. These resources, from easy-to-understand water quality data summaries to multi-lingual materials and engaging workshops, are vital for breaking down barriers to understanding. By making this information widely accessible and digestible for all residents, PRP can ensure that everyone has the opportunity to learn about the basin's unique value and the critical role they play in its protection. This broad educational foundation will equip communities with the knowledge and tools needed to make informed decisions and actively participate in the ongoing efforts to restore and preserve the ecological health of the Pontchartrain Basin.

Educational efforts, including developing presentations, water quality guides, school programs, and workshops, could draw funding from various avenues. Federal grants focused on Science, Technology, Engineering, and Mathematics (STEM) education or environmental literacy are a strong possibility, especially for school-based programs and curriculum development. Partnerships with local colleges and universities, and organizations like Louisiana Sea Grant, could provide access to research grants and educational program funding. Foundations and private donors interested in environmental stewardship and community education could also support the creation and dissemination of educational materials, including translated resources.

Actions

- Develop a suite of educational slides that make up a comprehensive "Basin 101" presentation to give an overview of the PRP, its geographical area, and programs, and can be adjusted to fit the appropriate audience, from young students to technical experts.

- Develop and publish a guide to understanding water quality and habitat data by creating clear, concise, and non-technical summaries and definitions related to water quality and habitat monitoring.

- Make educational materials more accessible to a wider range of audiences within the basin, including making the materials available in multiple languages.

- Develop and execute a public campaign to distribute educational materials and information to the general public to promote increased stewardship of water quality and habitat preservation.

- Create signage to be placed at boat launches, wildlife management areas, state parks, along nature trails, and other prominent locations that showcases the history, importance, and potential stewardship measures that can be taken to improve the basin's ecological health.

- Develop a periodic newsletter to provide programmatic and project updates, funding opportunities, public engagement activities, etc.

- Create and display signage linking toxic contaminants in fish to negative health outcomes for humans.

- Create and execute interactive educational programs for schools in the Pontchartrain Basin to teach students about the importance of water quality and habitat protection.

- Organize workshops and immersive educational events to educate residents about water quality and habitat issues.

- Coordinate with local governments to create printable brochures on septic system maintenance and best practices to be distributed to local communities.

- Establish lines of communication with local governments, including water and sewer departments, to increase awareness about key habitat and water quality issues and have information and products to share with community members.

- Develop a water quality career readiness program to present to local high school and college students, informing them about job opportunities in promoting local ecological health.

- Partner with local technical and community colleges to assess workforce needs in fields that work to improve ecological health, such as independent water system managers.

- Develop and host professional workshops for engineers, landscape architects, and related fields to increase awareness, technical knowledge, and practical application of nature-based solutions and green infrastructure.

- Partner with schools to design and implement campus and classroom-based nature-based solutions and green infrastructure projects that demonstrate co-benefits and introduce students to their environmental and community importance.

- Identify current efforts to incorporate green infrastructure and nature-based solutions and educate the public on their importance and impact.

Students learning about river sedimentation in deltas during Ocean Commotion at LSU. (Photo Credit: John R. White).

Focus Area: Engagement (3.3)

Active engagement in the Pontchartrain Basin is evolving by leveraging the power of recreation, tourism, and immersive experiences to cultivate a vibrant, ecologically healthy future. This approach unites residents, community groups, businesses, and governmental bodies by creating a collaborative environment where enjoying the basin's natural beauty inspires its protection and restoration. Recreational opportunities provide meaningful experiences for individuals to connect with the ecosystem firsthand.

These engagement actions intend to address complex environmental challenges by turning awareness and education into action. By showcasing the basin as a premier destination for eco-tourism and recreation, the PRP can generate economic benefits and a dedicated community to support its long-term well-being. Through effective engagement, key issues such as mitigating pollution, restoring wetlands, managing freshwater diversions, and building resilience to coastal impacts can be reframed as shared responsibilities integral to preserving the recreational and ecological values of the basin.

Successful initiatives like Bucktown Harbor, with its living shorelines and learning pavilions, provide examples to continue building on this approach. These efforts provide hands-on, memorable experiences that educate visitors and locals about the unique ecology of the basin and the importance of conservation. Volunteer opportunities integrated into tourism, such as participating in shoreline clean-ups or citizen science monitoring of water quality and local species, further empower individuals to become active stewards of the Pontchartrain Basin.

A comprehensive engagement strategy is vital for translating awareness and education into tangible action within the Pontchartrain Basin. By prioritizing accessible recreational opportunities and creating inviting spaces for public participation, the program can ignite a deeper connection between residents and their environment. This approach will not only expand opportunities for enjoyment but also build a robust network of dedicated individuals and organizations committed to the ongoing health and vibrancy of the basin.

Initiatives aimed at engagement, such as assessing recreational infrastructure, creating access maps, improving recreational sites, and organizing community events and conservation efforts would require diverse funding streams. Federal grants related to outdoor recreation, conservation, or community development could support infrastructure improvements and trail programs. Local non-profits, which often have established funding networks through grants, donations, and membership, could be key partners in co-sponsoring and funding conservation events and recreational programs. Additionally, corporations and individual donors could be approached to sponsor specific campaigns like "Keep our Lake Beautiful," which aim to generate financial contributions for ecological improvement.

Actions

- Identify a comprehensive list of current and ongoing efforts to involve the public in improving ecological health and co-sponsor these efforts (invasive species removal, tree plantings, waterway cleanups, educational events, etc.).
- Conduct a basin wide assessment of the condition and accessibility of existing recreational infrastructure to identify priority areas for investment and improvement.
- Coordinate with local and state agencies to promote recreation opportunities (i.e., create and maintain PRP maps that show recreational access points for land-based fishing, swimming, and boating along the Pontchartrain Basin, Lake Maurepas, and their tributaries).
- Coordinate with local and state agencies to complete multi-benefit water quality projects that include recreational components (i.e., repairing existing boat launches and fishing piers at access points).
- Coordinate with local agencies to increase safe public swimming access along fishable swimmable waterways by funding facilities such as restrooms, picnic tables, and pavilions at existing recreational access points.
- Develop a printed guide to identifying birds commonly found in the Pontchartrain Basin and make it accessible at popular birding locations.
- Identify existing walking, biking, and recreational trails, and develop an immersive program that guides visitors while educating them on the local environment and ways to protect it.
- Coordinate with local partners on developing and sponsoring programs that offer free or low-cost recreational opportunities (fishing clinics, kayaking lessons, etc.).
- Sponsor field trips for students to participate in water quality monitoring activities.
- Sponsor and expand Adopt-a-Pond Program at stormwater ponds and accessible wetland areas.
- Coordinate and support a program to encourage and incentivize residents to plant native trees on private property.
- Develop a "Responsible Tourism Guide" to be printed and placed at visitor centers, rest stops, state parks, and other areas commonly visited by tourists.
- Partner with local public transportation services to establish a "PRP Recreation Pass" that provides free transportation to and from certain recreational access points.

- Create and launch a 'Backyard Refuge Program' that encourages residents and local businesses to enhance habitat for native wildlife by offering certification, educational resources, and materials to support improved habitat structure.

- Launch a "Green Solutions, Greater Benefits" campaign to educate the public on the environmental, health, and economic co-benefits of green infrastructure.

Volunteer tree planting (Photo Credit: CRCL).

Action Plan Tables

Each of the actions discussed above is listed under the themes and focus areas in Tables 3-10 below. The tables provide additional information on each of the actions as described in the bullets below.

- **Action Number:** Each action is numbered to enable cross-referencing within the CCMP and its appendices. The number is comprised of the Action Plan theme, the focus area, and a number. Numbering does not imply any prioritization. Within a focus area, actions are grouped with others that address similar issues.

- **Relevant Objective(s):** For each action, the CCMP objectives that the action is related to are listed. Note that these may be objectives not directly related to the theme/focus area. Table 1 includes the codes (underlined text) for each objective used in the action tables.

- **Potential Partners:** PRP will need to partner with other organizations to implement the actions. Both PRP and partners can play multiple roles in moving actions forward. These include advocating, educating, researching, regulating, planning, funding, implementing, and monitoring. Potential partners have been identified, but their specific roles have not yet been defined. Note that partners have not been contacted to establish their interest in the actions.

- **Timeframe:** The time needed to undertake/complete the action has been estimated in general terms:
  - Short term: Action would require 2-3 years or less to implement.
  - Long term: Action would require more than 3 years to implement.
  - Ongoing: Action would continue throughout the life of the CCMP.
  - Periodic: Action would be revisited regularly over the life of the CCMP

- **Activities:** A general outline of activities that would need to be undertaken to accomplish the action is provided to illustrate potential approaches. In many instances, there are several ways to move these actions forward.

- **Cost Range:** Specific costs are not available for most of the actions. Estimates have been provided based on available documentation and/or best professional judgment and represent a meaningful impact on the issue being addressed. Cost estimates are provided based on the ranges below.
  - $: Less than $25,000
  - $$: $25,000 to $99,999
  - $$$: $100,000 to $499,999
  - $$$$: $500,000 to $5,000,000
  - $$$$$: Over $5,000,000

- **Performance Measures:** Example performance measures are provided to show the kinds of information that would need to be tracked to identify progressive achievement of the action. These may include key steps that need to be taken to implement the action, deliverables, or outputs, as well as outcomes or changes that are expected within the Pontchartrain Basin because of the action.

Table 3. Actions for water quality theme and point source pollution focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.1.1	Replace/retrofit aging or undersized wastewater treatment plant infrastructure and provide training to meet needed increased capacity to enhance water quality by leveraging funds with other U.S. Environmental Protection Agency funding sources, including the State Revolving Fund.	WQ2	USEPA, LDEQ, LDH	Ongoing, Long term	Planning, design, construction	$$$$$	-Number of systems achieving permit compliance
1.1.2	Increase the use of assimilation wetlands from the subdivision up to municipal wastewater treatment plant scale to further improve water quality.	WQ2	LDEQ, LDH, Parishes	Ongoing, Long term	Design, build connection, monitoring	$$$$	-Number of new systems online
1.1.3	Prioritize pathways/funding for low-cost solutions for incorporating homes and businesses on individual wastewater treatment systems to regionalized or centralized treatment systems where infrastructure is nearby.	WQ2	USEPA, LDEQ, LDH	Ongoing, Long term	Design, connection	$$$$	-Number of units moved to centralized treatment system
1.1.4	Provide funding to assist homeowners in closing open stormwater ditches to reduce mosquito breeding, resulting in improved health outcomes.	WQ2	USEPA, LDEQ, LDH	Long term	Planning, design, construction	$$$$	-Linear feet of open ditch converted to pipe
1.1.5	Construct living shorelines along Lake Pontchartrain near canal/stormwater outfalls to help filter water and sequester nutrients, improving water quality.	WQ2	USEPA, LDEQ, CWPPRA, USACE	Short term	Planning, design, construction	$$$$	-Linear feet of shoreline constructed
1.1.6	Provide additional funding to assist the homeowner in implementing mitigation measures for failing Aerobic Treatment Units and septic systems.	WQ1, WQ2	USEPA, LDEQ	Short term	Inspections, funding	$$$$	-Number of systems inspected and improved

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.1.7	Supplement state funding and provide coordination with local/state/regional agencies for better oversight of activities discharging to water bodies to identify non-compliance.	WQ1, WQ2	LDEQ, Universities, LSU Extension, NGOs	Short term	Design materials, outreach to public	$$$	-Number of citizens educated -Materials distributed
1.1.8	Fund the development of master plans for parishes to optimize wastewater treatment approaches, including connection of unsewered areas to wastewater treatment systems, assessment of systems in need of capital expenditure improvements, alternative wastewater treatment processes to meet pollutants of the future (ammonia, nitrite/nitrate), and alternative wastewater disinfection processes to meet Disinfection By-Product goals, including haloacetic acids and trihalomethanes.	WQ1, WQ2	USEPA, LDEQ, Federal grant programs	Periodic	Planning, design	$$$	-Number of parishes with plans
1.1.9	Provide additional funding for home inspection programs in parishes utilizing Aerobic Treatment Units and septic systems as a mechanism to improve wastewater treatment.	WQ1	USEPA, LDEQ, LDH	Short term	Inspections	$$$	-Increase in number of inspections
1.1.10	Coordinate with state and local agencies on regulation development to ensure individual wastewater systems users are in compliance.	WQ1, WQ2	USEPA, LDEQ, State agencies, Parishes	Ongoing	Draft policy, adoption, enforcement	$$$	-New policy/regulation adopted
1.1.11	Identify existing and emerging contaminants of concern and support related mitigation.	WQ1	Universities, USEPA	Short term	Research, scaling	$$$	-Number of studies covering various emerging contaminants

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.1.12	Encourage participation in existing water quality databases (e.g., The National Water Quality Monitoring Council's Water Quality Portal) to improve data discovery and use.	WQ1	LDEQ (current dashboard), PC, USGS, USEPA, Universities, Non-profits	Ongoing	Publicity, design	$$$	-Amount of new data archived
1.1.13	Fund studies to quantify the cost to taxpayers (economic analysis) for additional monitoring and pollutant reductions (reduction of permitted discharge limits) and improving wastewater infrastructure.	WQ1	USEPA, Universities, Parishes	Short term	Research, publicity	$$$	-Increase in number of economic impact reports
1.1.14	Develop periodic State of the Basin reports to inform the public about the ecological health of the basin.	WQ1, WQ2, H1, H2, H3, H4, E1, E2, E3	USEPA, LDEQ, State agencies, Parishes, Universities	Periodic	Research	$$$	-Number of State of the Basin reports

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Table 4. Actions for water quality theme and nonpoint source pollution focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.2.1	Initiate sediment tracking of river sediments to identify sources of phosphorus to waterbodies (e.g., Lake Pontchartrain) to prioritize areas in the watershed needing reduction actions.	WQ1	LDEQ, USEPA	Periodic	Monitoring	$$$	-River miles mapped for sediment total phosphorus
1.2.2	Support efforts to understand, measure, and address toxic contaminants found in sediment, fish, and shellfish (heavy metals, PFAS, PCPs, emerging contaminants of concern, etc.) to protect public health.	WQ1	LDH, LDEQ, USEPA	Ongoing	Monitoring	$$$$	-Number of increased water bodies measured
1.2.3	Support research and monitoring efforts to identify and predict harmful algal bloom (HAB) events within the basin, including conducting an inventory of existing HABs using publicly available data to prioritize data gaps.	WQ1	USEPA, NOAA	Short term	Research, monitoring	$$$	-River miles mapped for HABs
1.2.4	Provide financial incentives to inspect and repair/replace faulty on-site wastewater treatment systems to help reduce pathogens in surface water.	WQ1	LDEQ, USEPA, LDH, Parishes	Ongoing	Monitoring, incentives to the public	$$$$	-Number of failing systems detected
1.2.5	Provide funding to support efforts to sample additional water quality parameters to assess watershed health (e.g., reactive phosphorus, total dissolved metals, sediment, microplastics, radionuclides, etc.).	WQ1	LDEQ, USEPA	Short term	Monitoring changes	$$$	-Number of monitoring plans to include dissolved reactive phosphorus
1.2.6	Support efforts with state agencies on establishing Total Maximum Daily Loads for water quality parameters.	WQ1, WQ2	LDEQ, LDH, USEPA	Ongoing	Research, monitoring	$$$$	-Number of additional TMDLs set

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.2.7	Support local and state efforts to increase capacity of existing centralized water treatment systems to reduce nonpoint source pollution.	WQ2	LDEQ, USEPA, Parish WWT	Ongoing, Long term	Planning, design, construction	$$$$$	-Percent increase of units on centralized WWT
1.2.8	Provide guidance and incentives to leaseholders/landowners for adoption of the marshland upwelling system, an on-site wastewater treatment system for coastal areas that uses the natural processes of the marsh soil to treat wastewater injected into the subsurface to reduce pathogens in surface waters and protect human health.	WQ2	LDEQ, LA Sea Grant, Parishes	Ongoing	Publicity, demonstration	$$$	-Percent increase in units adopting marshland upwelling system
1.2.9	Create incentives (funding or fines) for local and state enforcement agencies to ensure compliance for sediment control for road or construction projects to reduce pollutants and runoff.	WQ2	State agencies, Parishes, USDA,	Ongoing	Monitoring	$$$	-Number of BMPs projects assessed
1.2.10	Fund a review of legacy stormwater features to ensure they continue to function effectively, especially where they appear not to be well maintained (filled in, overgrown, etc.).	WQ1	USEPA, USDA, Parishes, Universities	Ongoing	Monitoring	$$	-Number of systems assessed
1.2.11	Publicize/prioritize use of existing best management practices for stormwater, lawns, golf courses, agriculture, high-density development, etc., within associated neighborhoods/cities/parishes and consider linking to local permitting.	WQ1, WQ2	LDEQ, Parishes, University extension	Short term	Design, monitoring, demonstration	$$$	-Permitting changes -Increase in number of voluntary participants
1.2.12	Promote and reward (financial incentives) voluntary use of green infrastructure and nature-based design in planning processes within the watershed.	WQ2	USEPA, LDEQ, Parishes	Long term	Planning, design, publicity	$$$$$	-Percent increase in units adopting green measures

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.2.13	Support local and state efforts to address marine debris/trash/litter in the basin and promote the expansion of residential recycling programs.	WQ2	NOAA, USEPA, LDEQ, Parishes, Schools	Short term	Monitoring, clean ups	$$$	-Increase in tons of trash removed
1.2.14	Coordinate with local government agencies (ordinances, development codes, and regulations) to implement best management practices, such as nature-based solutions and green infrastructure in new development and construction projects, to include detention and retention design features.	WQ1	State legislature, Parish planning departments	Long term	Design, monitoring, research	$$$	-All new construction
1.2.15	Support coordination among agencies on the management of newly installed home wastewater systems. Specifically, wastewater systems must be able to meet discharge limitations that would support the designated uses of waterways.	WQ1	LDEQ, LDH	Long term	Rulemaking, adoption	$$$	-Number of coordinated reviews
1.2.16	Provide additional funding to expand monitoring of emerging contaminants of concern and support related mitigation efforts.	WQ1	Universities, LDEQ	Short term	Research	$$$$	-Number of studies on important fish species
1.2.17	Fund long-term monitoring of specific best management practice features to better understand lifecycle costs and maintenance needs to ensure effective implementation over time.	WQ1, WQ2	USEPA, LDEQ, Universities	Ongoing	Research, monitoring	$$$$	-Number of BMP types assessed

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
1.2.18	Provide additional funding to continue establishing minimum flow and levels to prevent and mitigate impairments.	WQ1, WQ2	LDEQ, USGS	Short term	Research, monitoring	$$$$	-Number of rivers with established limits
1.2.19	Coordinate with local, state, and federal agencies to identify sites not listed on the National Priority List.	WQ1	USEPA, LDEQ, LDH	Periodic	Planning, design	$$$	-Number of new site plans produced
1.2.20	Support conducting an inventory/assessment of all water quality impacting plans in the area such as Federal Emergency Management Agency hazard mitigation plans, U.S. Department of Agriculture Natural Resources Conservation Service watershed assessments, existing U.S. Environmental Protection Agency-Accepted Watershed Implementation Plans, Total Maximum Daily Loads, etc. to better inform planning needs in the Pontchartrain Basin.	WQ1	USEPA, LDEQ, Universities	Periodic	Research, compilation	$$$	-Integrated report of all plans

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Table 5. Actions for habitat theme and coastal habitat change focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.1.1	Support the implementation of restoration projects approved as part of federal, state, or parish planning documents that address coastal issues to increase the extent and quality of coastal habitats, including in areas accessible to the public where projects can promote awareness and interest in restoration.	H1, H2, H4	CPRA, CWPPRA, Parishes, Landowners	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$$	-Change in extent of habitats -Number of projects in planning, E&D, construction, built
2.1.2	Manage and maintain, in coordination with local and state agencies, a prescribed fire program for herbaceous marsh habitat dominated by *Spartina patens* (fire return interval 5 years), executed by Certified Prescribed Burners, to help control woody and exotic species, remove excess accumulation of plant debris, and encourage growth of native vegetation.	H3	LDWF, Landowners	Periodic	Funding, land management, training	$$$	-Biomass of *Spartina patens* -Number of woody/exotic species
2.1.3	Maintain and reconnect natural flow pathways to facilitate fish movement and/or restore degraded habitats (e.g., on Bayou Sauvage National Wildlife Refuge).	H1, H2	LDWF, LADOTD, Parishes	Long term	Planning, engineering/ design, construction, monitoring	$$$$	-Stage fluctuations -Change in swamp health -Fish utilization of opened areas
2.1.4	Strategically install cultch material, broodstock reefs, and living shorelines in critical areas to improve resilience for oysters.	H2	LDWF, Parishes	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$	-Acres of cultch

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.1.5	Opportunistically build marsh terraces in shallow coastal lakes and in areas where they can be accessed by the public to promote the growth of submerged aquatic vegetation and public awareness of their role.	H1, H2, E2	CPRA, CWPPRA, Parishes, Landowners, NGOs	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$	-Extent of terracing -Extent of SAV
2.1.6	Add 'softening' adjacent to hardened shorelines (such as those with revetment or rock breakwaters) to restore edge habitat.	H1, H2	CPRA, CWPPRA, Parishes, Landowners, NGOs	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$	-Extent of hardened shoreline -Habitat utilization along shorelines
2.1.7	Protect eroding shoreline habitats using living shorelines.	H1, H2	CPRA, CWPPRA, Parishes, Landowners, NGOs	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$	-Rate of shoreline erosion -Habitat utilization along shorelines
2.1.8	Protect critical landscape features within coastal wetlands to provide nesting habitat for birds, including the restoration of near-shore shell berms on the edge of the Biloxi Marshes.	H1, H4	LDWF, USFWS, Landowners, NGOs	Ongoing	Planning, engineering/ design, construction, monitoring	$$$$	-Number of species nesting -Number of nests
2.1.9	Prepare a comprehensive biodiversity and environmental resource inventory including, but not limited to, wildlife habitats, wetlands, floodplains, endangered species habitats, submerged aquatic vegetation, and sediment sources for habitat restoration to support coastal habitat restoration and management by state and federal agencies, parishes, and others.	H1, H2, H4	State agencies, NGOs, Parishes	Short term	Field survey, mapping, reporting	$$$	-Scope for inventory -Data collection -Reporting

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.1.10	Leverage available parish resources to support integration of research, monitoring, and targeted studies into the implementation of habitat restoration projects to improve understanding of habitat restoration effectiveness.	H1, H2, H4	Parishes, Universities, NGOs	Ongoing	Networking, communicating	$$	-Number of projects with information in addition to baseline monitoring -Number of publications/theses/reports
2.1.11	Identify areas where the deployment of artificial reefs could improve recreational fishing opportunities.	H2	LDWF, Universities, NGOs	Short term	Field survey, research, reporting	$$	-Methodology -Mapping
2.1.12	Explore increased utilization of repurposed materials including ground glass to support habitat restoration.	H1	NGOs, Parishes	Short term	Research, pilot studies	$$	-Evaluation -Reporting
2.1.13	Document and understand the effects of the River Reintroduction into Maurepas Swamp project on habitats for flora and fauna and food web interactions to inform future diversion projects.	H1, H2, H4	CPRA, Universities, LDWF, LDEQ, NGOs	Long term	Field surveys, monitoring, modeling	$$$	-Data availability -Publicly accessible reports -Scholarly papers -Website
2.1.14	Explore the potential to improve the habitat of wetlands east and west of the Bonnet Carré Spillway, including benefits to water quality, habitats, and the Lake Pontchartrain ecosystem.	H1, H4	CPRA, Universities, LDWF, NGOs	Short term	Field surveys, monitoring	$$$	-Identification of options -Evaluation approach -Reporting
2.1.15	Conduct research to determine upstream source populations of submerged aquatic vegetation and develop strategies for protection and conservation.	H2	Universities, LDWF	Short term	Research design, conduct research, reporting, strategy development	$$$	-Research plan -Data -Report -Strategy

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Table 6. Actions for habitat theme and inland habitat change focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.2.1	Develop and disseminate materials to educate landowners, adjacent residents, developers, local decision makers, and the general public about the crucial role of prescribed burning in the management of longleaf pine systems, the advantages of growing longleaf pine and associated herbaceous ground cover, and promote value-added products produced from longleaf pine to encourage landowners to replant longleaf pine instead of loblolly pine.	H1, H4, E1	LDWF, TNC, LLPI	Ongoing	Design materials, identify target audiences, conduct outreach events	$$	-Number of educational events attended -Number of complaints about prescribed burning
2.2.2	Work with the Louisiana Department of Wildlife and Fisheries and the Louisiana Department of Agriculture and Forestry to provide cost-share funds to reduce or eliminate landowners' costs associated with conducting prescribed burns by Certified Prescribed Burners on their property.	H1, H4	LDWF, LDAF	Ongoing	Identify funding sources, develop material to inform landowners of opportunities	$$$	-Amount of funding provided as cost share
2.2.3	Target areas for acquisition from willing sellers for protection (e.g., servitudes, conservation easements) and stewardship implementation, including tracts that are degraded but restorable with timber harvesting and prescribed fire, those in aquifer recharge zones, and those near existing conservation areas to increase the extent and quality of longleaf pine habitat and other forested habitats.	H1, H4	LDWF, TNC, LLPI, USFS	Ongoing	Map longleaf pine habitat, identify recoverable areas	$$$$	-Acres of longleaf pine habitat in public/ conservation ownership

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.2.4	Develop a comprehensive stream survey methodology for the Pontchartrain Basin, building on existing approaches and best practices, to ensure consistent documentation of geomorphic and habitat characteristics and the presence of species of greatest conservation need (e.g., freshwater mussels).	H1, H2, H3, H4	Universities, LDWF	Short term	Literature review, collate existing monitoring, identify gaps/ develop approaches	$$	-Scope for inventory -Reporting
2.2.5	Promote the value of instream, riparian, and floodplain habitat, and its compatibility with flood storage and conveyance by developing and disseminating outreach materials (e.g., on the importance of adhering to no wake zones).	H1, H4, E1, E2	ARBC, LWI Regions, LDWF, LDEQ, GOHSEP	Ongoing	Identify target audiences, develop materials and outreach approach, launch campaign	$$	-Downloads -Use by local governments -Use by floodplain managers
2.2.6	Conduct a basin wide evaluation of unutilized gravel mines including an assessment of the overall environmental impact and existing conditions, historical vegetation and hydrologic connectivity, surface elevations of the site, and whether any old or hazardous equipment remains on-site to support gravel pit restoration.	H2, H4	ARBC, LDWF, LDEQ	Short term	Mapping, field surveys, reporting	$$$	-Completed evaluation
2.2.7	Restore the natural channel and floodplain function within unstable reaches of the Upper Amite River in the vicinity of sand and gravel operations to improve habitat and reduce flood risk and downstream sediment loads.	H2, H4	ARBC	Long term	Planning, engineering/ design, construction, monitoring	$$$$$	-Miles of river restored

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.2.8	Preserve the existing undeveloped, natural floodplain along Bayou Fountain and Bayou Manchac to prevent development and preserve floodplain storage to reduce flood risk.	H2, H4	ARBC	Ongoing	Identify areas for preservation, develop conservation strategies	$$$$	-Acres of floodplain restored
2.2.9	Improve hydrologic connectivity in swamp forests to improve water quality and reduce stagnation (e.g., modifications to Highway 22 to reintroduce freshwater flows to McElroy Swamp in the lower Amite).	H2, H4	ARBC	Short term	Planning, engineering/ design, construction, monitoring	$$$$	-Stage fluctuations in restored area
2.2.10	Identify priority areas for conservation, including those suitable as mitigation banks, and work with landowners to develop appropriate conservation strategies to sustain natural communities and provide habitat for species of greatest conservation need.	H1, H4	USDA, LLPI, Farm Bureau, TNC, LDWF	Short term	Mapping of target areas for conservation, identification of barriers/ opportunities for conservation, reporting/ dissemination	$$$	-Develop conservation criteria -Mapping by hydrologic unit code -Number of landowners engaged
2.2.11	Draft model ordinance amendments to ensure the protection of floodplains, wetlands, forested areas, natural communities, and other environmentally sensitive resource areas by addressing open space dedication standards (e.g., requiring that at least 50% of the total floodplain area within any new large residential development must be preserved as open space) ensuring the maintenance of wildlife habitats, the retention of natural floodwater storage, and groundwater recharge.	H1, H2, H4	Parishes, LDWF	Short term	Review existing ordinances, identify barriers to implementation, develop options for different circumstances	$$	-Final model ordinance -Number of parishes adopting

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.2.12	Coordinate with local governments to assess parish ordinances, development and building codes, enforcement, and measures to mitigate wetland losses to encourage maximum protection of wetlands in all development.	H1	Parishes	Ongoing	Review records of wetland loss, identify potential regulatory approaches, disseminate information on penalties	$$	-Acres of wetlands lost to development
2.2.13	Foster the use of green infrastructure on public Rights of Way and public spaces (e.g., tree plantings) to improve habitat for native flora and fauna, promote water quality, and reduce nuisance flooding.	H1, H3	Parishes, LWI, LADOTD	Ongoing	Develop guidelines, disseminate to parishes	$$$	-Guidelines -Extent of GI
2.2.14	Compile a list of resource materials to help landowners identify and apply for funding from federal programs (e.g., through the Farm Bill) that support habitat conservation on private lands.	H1, H4, E1	Farm Bureau, LSU Extension	Short term	Identify potential funding sources and their requirements, disseminate list	$$	-Development of list -Downloads -Funds obtained
2.2.15	Provide financial incentives to private landowners to maintain existing riparian areas on private lands or to allow riparian habitat to naturally establish and be retained on sites associated with the drainages in the Pontchartrain Basin.	H1	ARBC, LWI Regions, LADOTD, USDA	Ongoing	Identify funding sources, develop eligibility requirements, develop riparian habitat restoration guide	$$$$	-Number of incentives -Extent of riparian habitat

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.2.16	Identify funding sources to support best management practices on working lands to improve habitat and offset costs to agriculture.	H1, H4	Farm Bureau, LSU Extension	Short term	Identify potential funding sources and their requirements, disseminate list	$$	-Development of list -Downloads -Funds obtained

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Table 7. Actions for habitat theme and invasive species focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.1	Educate the public on the impact of invasive species in the basin to prevent inadvertent introductions.	H3, E1	LDWF, LDAF, NRCS, NGOs	Short term	Design materials, identify target audiences, conduct outreach events	$$$	-Number of educational materials distributed -Reach of campaign (e.g., social media impressions, website visits)
2.3.2	Provide guides to identify invasive species to educate the public and those working outdoors on how they may be differentiated from similar native species.	H3, E1	LDWF, LDAF, NRCS, NGOs	Short term	Design materials, identify target audiences	$$	-Number of guides developed
2.3.3	Release (or encourage/assist in the development of) public service announcements on the impacts of invasive species on the human environment and recommend actions people can take to prevent the spread of invasive species.	H3, E1	LDWF, LDAF, NRCS, NGOs	Ongoing	Prepare content, identify outlets, record, broadcast	$$	-Number of public service announcements broadcast
2.3.4	Encourage the posting of educational signage at major boat ramps recommending efforts be undertaken to ensure exotic plants on boats and trailers are removed prior to placing potentially infested boats or trailers into the water.	H3, E1	LDWF, Parishes, NGOs	Ongoing	Develop signage, identify launches, post and maintain displays	$$	-Number of signs produced and displayed -Geographic distribution of signage across the PRP boundary
2.3.5	Work with Louisiana Master Naturalists, Louisiana Department of Wildlife and Fisheries, and other local organizations to conduct education and training programs for government employees, develop rapid response approaches for new invasions, and coordinate volunteer events focused on invasive species removal.	H3, E3	Louisiana Master Naturalists, LDWF, NGOs	Ongoing	Design and plan events, conduct events	$$	-Number of events held -Number of participants

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.6	Promote the utilization of federal cost-share programs (e.g., Natural Resources Conservation Service Farm Bill programs, U.S. Department of Agriculture Animal and Plant Health Inspection Service) to address invasive species problems.	H3	LDWF, LDAF, NRCS, USDA, NGOs	Short term	Identification of appropriate cost-share programs, identification of potentially eligible recipients, support for applications	$$	-Number of programs leveraged -Funds leveraged from federal programs
2.3.7	Conduct monitoring to better understand the role of invasive species in submerged aquatic vegetation change.	H3	LDWF, Universities	Ongoing	Develop monitoring plan, execute monitoring, synthesize data, reporting	$$$	-Monitoring plan -Number of stations monitoring per year
2.3.8	Identify and pursue administrative and/or legislative changes to enable private landowners to control invasive flora without violating wetland regulations.	H3	Landowners, NGOs	Short term	Identify issues/barriers, develop and implement solutions	$$	-Issue report -Draft language for regulations/statutes
2.3.9	Explore the potential for composting of invasive plant material to avoid potential on-site issues (e.g., related to water quality), reduce landfill demands, and promote awareness.	H3	LDWF, Parishes, NGOs	Short term	Assess source of material, economic/ logistic feasibility study	$$	-Feasibility report -Draft implementation plan

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.10	Support programs to address apple snail populations through application of Federal Insecticide, Fungicide, and Rodenticide Act-approved pesticides or coordination through Louisiana Department of Agriculture and Forestry for experimental use permits in the use of other chemical applications (such as chelated copper) in addition to concurrent intensive manual collection of eggs and adults.	H3	LDWF, Landowners, Parishes	Ongoing	Identify priority areas for treatment, develop strategy for application, execute application	$$$$	-Extent of area populated by apple snails
2.3.11	Develop effective trapping techniques for apple snails to improve control.	H3	LDWF, Universities	Short term	Literature review, design tests, execute tests	$$$	- Number of designs tested
2.3.12	Engage local stakeholders in documentation of apple snail occurrence and active control of egg masses to limit distribution and abundance.	H3, E2, E3	LDWF, Parishes, NGOs	Ongoing	Identify priority areas for treatment, recruit stakeholders/ organization, conduct field campaigns	$$	- Number of control events organized - Number of participants
2.3.13	Develop a program to introduce redear sunfish to retention ponds, ditches, and public water bodies to control juvenile apple snails.	H3	LDWF, NGOs	Short term	Identify target areas, develop approach for rearing/stocking	$$	-Feasibility report -Draft implementation plan
2.3.14	Develop passive trapping methods to aid in reduction of Asian carp abundance, possibly by using the jumping behavior of some species to assist in low by-catch trapping or by targeting areas of dense concentrations.	H3	Universities	Short term	Literature review, design tests, execute tests	$$$	- Number of designs tested

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.15	Assess the success of management methods for Asian carp being used on other parts of the Mississippi River Basin and evaluate their potential applicability to the Pontchartrain Basin.	H3	LDWF, Universities, NGOs	Short term	Literature review, design tests, execute tests	$$$	- Number of reports/publications
2.3.16	Support research on swine-specific toxicants and immuno-contraceptives to control feral hog populations.	H3	LDAF, LDWF, NRCS, Universities	Long term	Literature review, design tests, execute tests	$$$	- Number of reports/publications
2.3.17	Educate the public on disease transmission, zoonotic diseases, and the detriments of intentional translocation of feral hogs to limit spread.	H3, E1	LDWF, LDAF, NRCS, NGOs	Ongoing	Design materials, identify target audiences, conduct outreach events	$$	-Number of educational materials distributed -Reach of campaign (e.g., social media impressions, website visits)
2.3.18	Promote hunting, trapping, and snaring, and explore the potential for a bounty program to provide financial incentives to increase control of feral hog populations.	H3	LDWF, USFWS, Levee districts, LSU AgCenter, LDAF, NRCS, NGOs, SWCDs, Landowners	Ongoing	Identify priority areas for treatment, recruit stakeholders/ organization, conduct field campaigns	$$	- Number of hogs trapped -Geographic distribution of control efforts

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.19	Conduct training on invasive species identification and encourage diligent cleaning of highway mowing equipment after use to prevent the spread of cogon grass.	H3	LDWF, LDAF, LADOTD, Parishes	Ongoing	Develop informational materials, identify relevant organizations, disseminate materials	$$	-Extent of cogon grass coverage
2.3.20	Conduct field surveys (e.g., ground surveys, remote sensing, drones) to enable timely detection of new occurrences of cogon grass, especially those outside the known range of cogon grass, and provide financial incentives to conduct intensive control.	H3	LDWF, LDAF, Universities, NGOs	Ongoing	Design field surveys, identify priority areas, execute control	$$$	-Survey results -Controls implemented
2.3.21	Support additional research on the control of cogon grass including documentation of habitat recovery where control efforts have been implemented to support effective control efforts.	H3	LDAF, LDWF, NRCS, Universities	Long term	Literature review, design tests, execute tests	$$$	- Number of reports/publications
2.3.22	Encourage use of prescribed fire by Certified Prescribed Burners in rangeland and pasture management to limit recruitment of Chinese tallow trees in grassland habitats and promote native species.	H3	LDAF, LDWF	Ongoing	Identify priority areas for treatment, recruit landowners, execute controlled burns	$$	-Area treated with prescribed burns

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
2.3.23	Prevent the spread of Chinese tallow trees and support native species by opportunistically degrading banks of dredged material associated with canals and infrastructure construction within wetlands.	H3	LDWF, Parishes, ARBC	Ongoing	Identify priority areas for treatment, recruit landowners, obtain permits, execute degrading	$$$$	-Length of canal banks degraded -Coverage by Chinese tallow
2.3.24	Conduct research on new herbicides for water hyacinth and giant salvinia to determine the efficacy and cost effectiveness versus current options.	H3	LDWF, Universities	Long term	Literature review, design tests, execute tests	$$$	- Number of reports/publications
2.3.25	Support research into the long-term effectiveness of biological control agents for water hyacinth and giant salvinia to improve understanding and promote the use of such control when appropriate.	H3	LDWF, BTNEP, Universities	Long term	Literature review, design tests, execute tests	$$$	-Number of reports/publications

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Table 8. Actions for education and involvement theme and awareness focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.1.1	Create a unified and recognizable PRP brand, including a logo, slogan, and key messages to promote a common thread among the communities within the PRP boundary.	E1, E3	N/A	Short term	Develop PRP brand, slogan, and key messages	$$	-Completion of logo, slogan, and key messages -Approval and adoption of the brand by relevant stakeholders -Integration of the new brand across all PRP communications and materials
3.1.2	Create and publicize updated maps of the PRP boundary that identify significant geophysical, civic, and other landmarks.	E1	USGS, UNO, USEPA	Short term, Continuous updates to maps	Create and publicize maps	$$	-Completion of updated maps -Number of maps distributed or made available to the public -Number of downloads/views if available digitally
3.1.3	Produce and display signage in prominent areas within the PRP boundary (along busy roads, on bridges, at boat launches, etc.) that make people aware they are in the Pontchartrain Basin to promote a unified geographic watershed.	E1, E3	LADOTD, Keep Louisiana Beautiful, PC	Short term, Continuous addition of signage	Create signage to place along busy roads, on bridges, at boat launches, etc.	$$$	-Number of signs produced and displayed -Reasonable geographic distribution of signage across the Pontchartrain Basin -Completion of display
3.1.4	Update and maintain the PRP website to serve as an information hub/clearinghouse that houses educational resources such as maps and figures, include a calendar of restoration events, and make other relevant information about the PRP publicly available.	E1, E3	UNO, USEPA	Short term, Continuous updates to website	Create a PRP website that includes maps, figures, and calendar of events	$$	-Website launched and fully functional -Availability of up-to-date water quality data -Number of educational resources available on the site -Regular updating of the restoration events calendar -Website traffic metrics (e.g., unique visitors, page views) once established

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.1.5	Develop an interactive, online mapping tool for the PRP website that allows users to better understand the basin and its watershed, its physical features, the recreational opportunities available, flora and fauna within it, and other information.	E1, E2, E3	Local Universities, USGS	Short term, Continuous updates to data viewer	Create an interactive data viewer map to go on the website	$$$	-Interactive data viewer developed and integrated into the website -Range and depth of data categories accessible through the viewer -User engagement with the data viewer (e.g., number of interactions, time spent)
3.1.6	Create a suite of booth materials (tablecloth, backdrops, cups, coasters, pens, etc.) to use at conferences, trade shows, cultural events, and other events where PRP representation may be beneficial in expanding awareness.	E1	N/A	Short term, Periodic updates/ additions to the booth materials and designs	Develop PRP-branded booth materials for various events	$	-Completion of booth materials production -Number of events attended where materials are used -Distribution of promotional items
3.1.7	Execute a public outreach campaign using traditional and social media to promote the PRP and its activities.	E1	PC, UNO	Short term, Continuous campaign updates	Launch a public outreach campaign	$$	-Launch and execution of the campaign -Media impressions (traditional and social media) -Social media engagement metrics (e.g., likes, shares, comments) -Reach of the campaign to target audiences
3.1.8	Participate in local cultural events and festivals to promote the PRP to the general public.	E1	N/A	Continuous	Identify events, register, participate	$	-Number of events attended -Number of people engaging with the PRP at these events

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.1.9	Co-sponsor events that promote recreation, responsible tourism, water quality improvement, and other ecological health benefits, making the PRP logo prominent and recognizable.	E2, E3	Local Universities, PC, Ducks Unlimited, Keep Louisiana Beautiful	Long term, Continuous participation in events	Promote PRP initiatives for environmental and community well-being	$$	-Number of co-sponsored events -Attendance at co-sponsored events -Qualitative feedback on event success and public awareness
3.1.10	Develop and distribute fish measuring magnets that include information about local fish populations and the PRP logo.	E1	CCA Louisiana, LDWF	Short term, Continuous distribution	Create and distribute fish measuring magnets	$	-Completion of magnet development and production -Number of magnets distributed or sold
3.1.11	Create and promote an Adopt-a-Stream program for streams, bayous, and other tributaries within the Pontchartrain watershed to assist in keeping urban waterways free of litter and other debris.	E1, E2, E3	C&E, Keep Louisiana Beautiful, Louisiana State Parks, PC	Short term, Continuous promotion	Establish and promote an Adopt-a-Stream program for waterways in the PRP	$$	-Program established and promoted -Number of streams/tributaries adopted -Number of volunteers participating in the program -Quantity of litter/debris removed from adopted waterways

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Table 9. Actions for education and involvement theme and education and outreach focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.2.1	Develop a suite of educational slides that make up a comprehensive "Basin 101" presentation that gives an overview of the PRP and its geographical areas and programs and can be adjusted to fit the appropriate audience, from young students to technical experts.	E1	N/A	Short term, Periodic updates to presentation	Develop a flexible "Basin 101" slide library	$	-Completion of the slide library -Number of presentations delivered using the library -Audience feedback on clarity and effectiveness of the presentation -Reported increase in audience understanding of the basin and PRP
3.2.2	Develop and publish a guide to understanding water quality and habitat data by creating clear, concise, and non-technical summaries and definitions related to water quality and habitat monitoring.	E1	Local colleges and universities, PC	Short term, Periodic updates to summaries	Create and publish a simple guide to understanding water quality and habitat data and monitoring	$	-Number of data summaries created and uploaded -Website traffic to data summary pages
3.2.3	Make educational materials more accessible to a wider range of audiences within the basin.	E1, E3	Local colleges and universities, Coastal Commun-ities Consulting	Short term, Periodic updates to language materials	Translate educational materials	$$	-Number of educational materials translated -Number of languages translated into
3.2.4	Develop and execute a public campaign to distribute educational materials and information to the public to promote increased stewardship of water quality and habitat preservation.	E1	N/A	Short term, Continuous efforts to distribute educational materials	Launch a public campaign distributing educational materials	$$	-Number of educational materials distributed -Reach of campaign (e.g., social media impressions, website visits)

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.2.5	Create signage to be placed at boat launches, wildlife management areas, state parks, along nature trails, and other prominent locations that showcases the history, importance, and potential stewardship measures that can be taken to improve the basin's ecological health.	E2, E3	LADOTD, LDWF, Keep Louisiana Beautiful	Short term, Continuous efforts to create signage	Create and install signage at key locations	$$$	-Number of signs created and installed -Number of locations with signage -Feedback from park/site managers
3.2.6	Develop a periodic newsletter to provide the public with updates on water quality data, PRP projects, recreational opportunities, engagement opportunities, and other relevant updates.	E1, E2	N/A	Short term, Continuous efforts to create newsletter and send out to public	Develop a newsletter	$	-Number of newsletters published -Subscriber growth -Open rates and click-through rates -Feedback from subscribers on content relevance and usefulness
3.2.7	Create and display signage linking toxic contaminants in fish to negative health outcomes for humans.	WQ1, E1	LDH, LDEQ, USEPA	Continuous	Design, creation	$$$	-Number of new signage created
3.2.8	Create and execute interactive educational programs for schools in the Pontchartrain Basin to teach students about the importance of water quality and habitat protection.	E1, E2, E3	LDoE, Local School Districts, 4-H, PC, LA Sea Grant, Keep Louisiana Beautiful, NOLA Rec Department, Children's Museum, LDEQ	Short term, Continuous efforts to teach students	Develop and implement water quality education in local schools	$$	-Number of schools participating -Number of students reached -Pre/post-program assessment scores on water quality knowledge

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.2.9	Organize workshops and immersive educational events to educate residents about water quality issues.	E1, E3	PC, CRCL	Short term, Continuous participation in workshops/ events	Organize workshops and educational events	$$	-Number of workshops/events held -Number of attendees
3.2.10	Coordinate with local governments to create printable brochures on septic system maintenance and best practices to be distributed to local communities.	E1, E2, E3	Local govern-ments, CWPPRA, Parish Presidents of Louisiana	Short term, Continuous distribution of brochures	Collaborate with local governments to create and distribute brochures on septic system maintenance	$	-Number of local governments participating -Number of brochures printed and distributed
3.2.11	Establish lines of communication and schedule regular touchpoints with elected officials, local governments, and water and sewer agencies to increase knowledge about key estuary and water quality issues and have information and products to share with community members	E1, E2, E3	Local govern-ments, water districts, CWPPRA, Parish Presidents of Louisiana	Short term, Continuous efforts to keep lines of communica-tion open	Establish regular communication with officials and agencies to share information with the community	$	-Number of meetings/touchpoints held -Number of officials/agencies engaged -Documented instances of information sharing
3.2.12	Develop a water quality career readiness program to present to local high school students, informing them about job opportunities in promoting ecological health, with a focus on the Pontchartrain Basin.	E1, E2, E3	LCTCS, LWC, Local colleges and universities	Short term, Periodic updates to program	Develop a water quality career readiness program	$$$	-Number of schools visited -Number of students participating -Student interest in water quality careers (e.g., survey data) -Anecdotal feedback from students and career counselors

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.2.13	Partner with local technical and community colleges to assess workforce needs in fields that work to improve ecological health, such as independent water system managers.	E1, E3	LCTCS, LWC, Local colleges and universities	Short term, Periodic assess-ments	Partner with local colleges	$	-Number of partnerships established -Completion of workforce needs assessment -Development of relevant curriculum or training programs -Reported interest from students in these fields
3.2.14	Develop and host professional workshops for engineers, landscape architects, and related fields to increase awareness, technical knowledge, and practical application of nature-based solutions and green infrastructure.	H1, E1	ASLA, Local universities, CPRA	Short term	Host seminars and hands-on field demonstrations of successful GI projects in the basin, design continuing education workshops accredited for professional development hours	$$$	-Number of workshops held and professionals trained -Number of professional development credits issued -Documented increase in incorporation of GI into local projects -Partner and participant feedback on improved knowledge and application

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.2.15	Partner with schools to design and implement campus and classroom-based nature-based solutions and green infrastructure projects that demonstrate co-benefits and introduce students to their environmental and community importance.	H1, E1	School districts, LSU AgCenter, LDWF	Continuous	Develop model GI projects, integrate project planning and monitoring into classroom curriculum through STEM activities, provide teacher training and resource guides to incorporate GI concepts into lesson plans	$$	-Number of schools implementing projects -Number of students reached through programming -Number of educators trained or provided resources
3.2.16	Identify current efforts/opportunities to incorporate green infrastructure and nature-based solutions and educate the public on their importance and impact.	E1, E2	Local Govern-ments, PC, LA Sea Grant, CPRA, Keep Louisiana Beautiful, LDEQ, CRCL	Short term	Identify GI projects implemented or planned within the PRP boundary, develop materials to educate the public on current efforts and their importance	$	-Number of ongoing initiatives identified -Number of educational materials distributed

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Table 10. Actions for education and involvement theme and engagement focus area.

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.3.1	Identify a comprehensive list of current and ongoing efforts to involve the public in improving ecological health (invasive species removal, tree plantings, waterway cleanups, educational events, etc.).	E2, E3	PC, CRCL, National Audubon Society, CPRA, LDWF, Keep Louisiana Beautiful, Louisiana State Parks	Continuous	Partner with organizations to co-sponsor public conservation efforts	$	-Number of co-sponsored public participation events held annually -Number of volunteers participating in these events -Total hours contributed by volunteers to physical conservation efforts -Acreage or linear feet of area improved/restored through these efforts -Media impressions or reach of the campaign -Completion of a comprehensive list of public involvement efforts
3.3.2	Conduct a basin wide assessment of the condition and accessibility of existing recreational infrastructure to identify priority areas for investment and improvement.	E2, E3	PC, USGS, LDWF	Short term	Assess recreation infrastructure	$$	-Completion of the basin wide assessment study -Identification of priority areas for investment and improvement -Number of recreational infrastructure sites assessed -Development of a report detailing findings and recommendations
3.3.3	Coordinate with local and state agencies to increase recreation opportunities (i.e., create and maintain PRP maps that show recreational access points for land-based fishing, swimming, and boating along the Pontchartrain Basin, Lake Maurepas, and their tributaries).	E1, E3	LDWF, USGS, Local Govern-ments	Long term	Create and maintain PRP maps	$$	-Completion and public availability of PRP recreational access maps -Number of access points identified and mapped

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.3.4	Coordinate with local and state agencies to complete multi-benefit water quality projects that include recreational components (i.e., repairing existing boat launches and fishing piers at access points).	E3	LDWF, LADOTD, Louisiana State Parks	Long term	Improve safe public fishing efforts	$$$	-Number of boat launches and fishing piers repaired or upgraded
3.3.5	Coordinate with local and state agencies to increase safe public swimming access along fishable swimmable waterways by funding facilities such as restrooms, picnic tables, and pavilions at existing recreational access points.	E3	LDWF, Louisiana State Parks, Keep Louisiana Beautiful	Long term	Increase safe public swimming access	$$$	-Number of recreational access points with improved facilities
3.3.6	Develop a printed guide to identify birds commonly found in the Pontchartrain Basin and make it accessible at popular birding locations.	E3	National Audubon Society, The Louisiana Bird Observatory	Short term	Create and distribute bird identification guides	$$	-Completion and printing of the bird identification guide -Number of birding locations where the guide is made accessible -Number of guides distributed
3.3.7	Identify existing walking, biking, and recreational trails, and develop an immersive program that guides visitors while educating them on the local environment and ways to protect it.	E3	PC, Louisiana State Parks, LDWF	Short term	Identify existing recreational trails and create new tourist programs	$$	-Development and launch of the immersive educational program -Number of participants in the immersive program
3.3.8	Coordinate with local partners on developing and sponsoring programs that offer free or low-cost recreational opportunities (fishing clinics, kayaking lessons, etc.).	E3	PC, CRCL, National Audubon Society	Continuous	Develop and sponsor free or low-cost recreational programs	$$	-Number of free or low-cost recreational programs developed and sponsored -Total attendance at recreational activities

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.3.9	Sponsor field trips for students to participate in water quality monitoring activities.	E1, E3	PC, Girl Scouts, BREC, USEPA	Periodic	Host student field trips for water quality monitoring	$$	-Number of field trips hosted annually -Number of students participating in water quality monitoring activities -Student comprehension of water quality concepts (e.g., through pre/post surveys or quizzes) -Number of water quality samples collected and analyzed by students
3.3.10	Sponsor and expand Adopt-a-Pond Program at stormwater ponds and accessible wetland areas.	WQ1, E1, E3	Parishes, School boards, NGOs	Ongoing	Coordinate with current programs to support existing activities	$$	-Number of schools and students participating
3.3.11	Coordinate and support a program to encourage and incentivize residents to plant native trees on private property.	E2, E3	Keep Louisiana Beautiful, PC, CRCL, National Audubon Society, Meraux Foundation	Long term	Develop incentives to plant native trees, promote the program, and coordinate to provide seeds or trees to plant	$$	-Number of native trees and/or seed packets distributed to residents -Number of households/residents participating in the program -Number of incentive mechanisms developed or offered (e.g., rebates, vouchers, free tree events)
3.3.12	Develop a "Responsible Tourism Guide" to be printed and placed at visitor centers, rest stops, state parks, and other areas commonly visited by tourists.	E1, E3	Louisiana State Parks, Keep Louisiana Beautiful, LADOTD	Short term	Develop and distribute a tourism guide at popular tourist locations	$	-Development and printing of the guide -Number of visitor centers, rest stops, and state parks where the guide is placed -Number of guides distributed

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.3.13	Partner with local public transportation services to establish a "PRP Recreation Pass" that provides free transportation to and from certain recreational access points.	E3	Local public transit offices, LADOTD, Keep Louisiana Beautiful, Louisiana State Parks	Long term	Partner with local transportation services	$$	-Establishment of the program -Number of public transportation routes integrated with recreational access points -Number of "PRP Recreation Passes" distributed -Ridership numbers using the "PRP Recreation Pass"
3.3.14	Create and launch a 'Backyard Refuge Program' that encourages residents and local businesses to enhance habitat for native wildlife by offering certifications, educational resources, and materials to support improved habitat structure.	E1, E3	Keep Louisiana Beautiful, Louisiana State Parks, CPRA, CRCL, National Audubon Society, Native Plant Initiative of Greater New Orleans	Long term	Design program framework, develop certification criteria, create outreach materials, distribute native plant and habitat guidance, recognize participants through certification	$$$	-Number of certified Backyard Refuges -Number of participants (residential and business) -Acreage or square footage of enhanced habitat created -Distribution of educational materials

ACTION NO.	ACTION	RELEVANT OBJECTIVE(S)	POTENTIAL PARTNERS	TIMEFRAME	ACTIVITIES	COST RANGE	PERFORMANCE MEASURES
3.3.15	Launch a "Green Solutions, Greater Benefits" campaign to educate the public on the environmental, health, and economic co-benefits of green infrastructure.	E1, E2, E3	LSU AgCenter, Louisiana Stormwater Coalition, Audubon Louisiana, Local municipal-ities, Native plant and landscape businesses	Short term	Develop a campaign brand and materials, host a series of community events and demonstration projects, create social media videos and infographics, feature local GI success stories, partner with businesses and civic groups to distribute campaign resources, measure awareness before and after the campaign	$$$	-Number of campaign events and participants -Distribution and engagement metrics for campaign materials -Pre/post survey results showing increased public understanding -Number of new GI projects reported following the campaign -Media coverage generated

Comparison to 1995 CCMP

There have been many changes in the Pontchartrain Basin since the 1995 CCMP was developed. New challenges have arisen, and some that were longstanding areas of concern in 1995 (e.g., the effects of MRGO) have been largely dealt with. Table 11 shows how the structure of the actions has changed. Note that Plan Implementation is not a specific component of this CCMP's Action Plan, but it is discussed in the next section of the CCMP.

Table 11. Overview of the structure of the 1995 CCMP compared to the 2026 Draft CCMP.

1995 CCMP	2026 CCMP
4 Goals and 20 Objectives	**3 Goals and 9 Objectives**

4 Action Plans
• Plan Implementation
• Water Quality
• Essential Habitat
• Education-Public Participation
	1 Action Plan with 3 Themes and 8 Focus Areas
	• Water Quality
	  ○ Point Source Pollution
	  ○ Nonpoint Source Pollution
	• Habitat
	  ○ Coastal Habitat Change
	  ○ Inland Habitat Change
	  ○ Invasive Species
	• Education and Involvement
	  ○ Awareness
	  ○ Education and Outreach
	  ○ Engagement

86 Actions/200 Sub-Actions
• Plan Implementation
  ○ 2 Actions/15 Sub-Actions
• Water Quality
  ○ 16 Actions/83 Sub-Actions
• Essential Habitat
  ○ 38 Actions/68 Sub-Actions
• Education-Public Participation
  ○ 30 Actions/34 Sub-Actions
	132 Actions
	• Water Quality
	  ○ 34 Actions
	• Habitat
	  ○ 56 Actions
	• Education and Involvement
	  ○ 42 Actions

While some of the approaches to issues have changed, many of the actions listed in Tables 3-10 align with actions identified in the 1995 CCMP. Appendix C provides a detailed crosswalk of 1995 CCMP and 2006 CHMP actions to the 2026 Draft CCMP actions.

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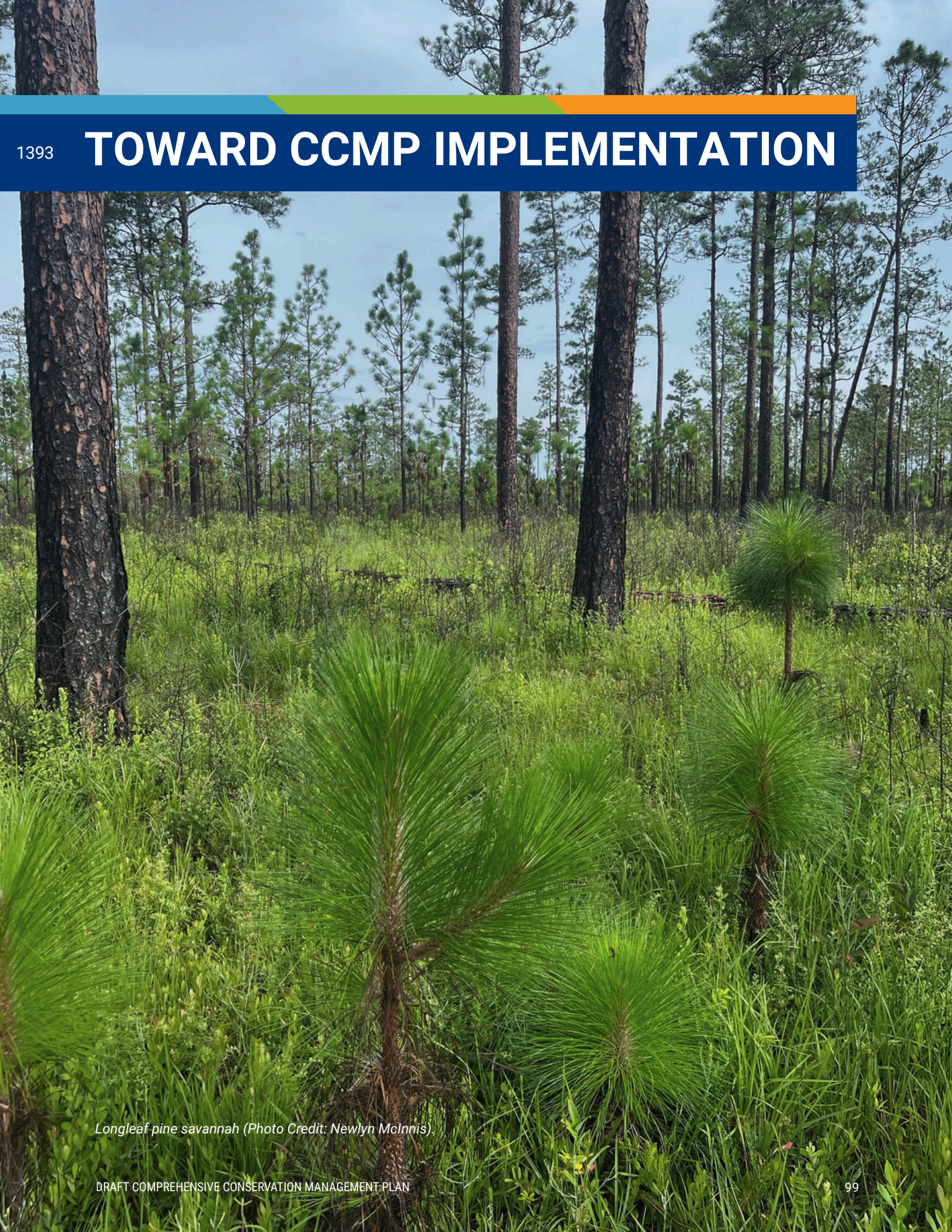
TOWARD CCMP IMPLEMENTATION



Longleaf pine savannah (Photo Credit: Newlyn McInnis).

Introduction

This CCMP includes 132 actions that address an array of important issues across the Pontchartrain Basin. Successful CCMP implementation will require extensive coordination and collaboration among a diverse set of organizations, including public and private entities. The need for this was recognized in the 1995 CMP, which identified a Plan Implementation Goal with two objectives:

- Plan Implementation Goal: Develop an organizational structure for the basin wide cleanup effort which will promote coordination among public and private entities whose actions affect the use, restoration, and/or preservation of the Lake Pontchartrain Basin.
  - Objective I: Promote coordination among public and private entities whose actions affect or could affect the use, restoration, and/or preservation of the Pontchartrain Basin
  - Objective II: Establish a mechanism to ensure public empowerment and participation in the education and planning process.

For each of the Actions (see Action Plan section), several partners were identified that PRP can work with to make the actions a reality. The diversity of interests represented will require ongoing coordination for years to come to follow through on the Action Plan and be responsive to emerging needs which arise.

While the CCMP does not include specific Actions for program implementation, this section identifies who will need to be engaged and their roles; it also provides some best practices, which have been used in other systems to support CCMP implementation.

Work Group meeting in Reserve, LA (Photo Credit: Emergent Method).

Partners and Roles

Diverse types of entities can engage with CCMP actions in different ways, according to their jurisdictions, missions, expertise, and availability. The following roles have been identified:

- **Plan.** Planning for PRP actions involves determining the specifics of what needs to be done, what resources (e.g., funds, expertise, data, etc.) are needed, and outlining an approach that will lead to a successful outcome. Federal, state, and local agencies are all experienced with planning infrastructure and other types of projects, and PRP actions that involve construction, restoration, or other physical actions on the ground will likely involve some agency staff.

- **Fund.** While PRP has some funding available, many of the actions identified in this CCMP will require more funding that is presently available through PRP. Federal and state agencies may have relevant programs with funding, in the form of grants or loans, while local governments may be able to raise funds for specific purposes (e.g., improving stormwater management systems through fees or by issuing bonds that are then repaid with income from fees). Private industry and NGOs may also bring funds to the table, and where they partner with federal, state, or local agencies, Public-Private Partnerships can leverage a variety of funds for project implementation.

- **Implement & Construct.** The PRP is unlikely to be the entity that implements or constructs water quality or habitat projects. Rather, even if PRP is providing funding and oversight, state or local agencies, and occasionally federal agencies, will be involved in the details of implementation. This may involve developing detailed designs, obtaining permits and land rights, and hiring contractors. Private businesses and NGOs also take on these roles for some projects.

- **Manage & Protect Land.** Many habitat-related actions involve ongoing activities to mimic natural processes, such as prescribed burns for marshes or forests or to control invasive species. Publicly owned land such as wildlife refuges, wildlife management areas, or parks is the responsibility of government agencies. However, some NGOs, such as The Nature Conservancy (TNC), own large tracts of land that they manage for conservation, and private landowners also have a role in implementing best management and land stewardship practices in support of the CCMP actions.

- **Regulate & Enforce.** Several CCMP actions entail ensuring that existing regulations can be more effectively implemented (e.g., to prevent impairment of water quality). Actions in wetland and 'waters of the United States' also require permits. Federal, state, and local agencies have the leading role in regulating activities and enforcing regulations.

- **Research & Monitor.** Monitoring programs are often the responsibility of state and federal agencies (Appendix E), and while ongoing monitoring programs may not be adjusted to provide additional data in relation to CCMP actions, they can be leveraged to provide information on system changes that can result from CCMP actions. Research, tailored to understand the results of the actions and improve knowledge about the system, is usually undertaken by universities and NGOs, as well as state and federal agency staff.

- **Educate.** PRP has a key role to play in terms of education about water quality and habitat issues to residents. Agencies, NGOs, and universities and colleges are also active in this area. The education can be formal or informal depending on the audience.

- **Create Materials & Resources.** Several of the CCMP actions for Education and Involvement involve creating materials that can be used to educate or advocate. The entities closest to the need for the actions are probably the most suited to create materials, but local governments or NGOs, for example, can create materials tailored to their residents or members.

- **Develop Programs.** Developing programs for education and involvement can occur at several levels, but local governments and NGOs may be the most active in this area. The source of funding and the issue of concern will also drive who is involved in program development.

- **Disseminate Information.** Dissemination is best conducted by groups closest to the target audience so that existing relationships can be leveraged and existing platforms enhanced to introduce new information. Local governments, NGOs, and universities and colleges can play key roles here by adding information about the PRP CCMP to their existing outreach.

- **Program Implementation.** Implementation of education and involvement programs is also best conducted by those with regular connections to residents, such as local governments and NGOs.

Table 12. Partners and their roles in relation to water quality actions.

WATER QUALITY	PLAN	FUND	IMPLEMENT & CONSTRUCT	REGULATE & ENFORCE	RESEARCH & MONITOR	EDUCATE
PRP	✓	✓				✓
Federal Agencies	✓	✓	✓	✓	✓	✓
State Govt.	✓	✓	✓	✓	✓	✓
Local Govt.	✓	✓	✓	✓	✓	✓
Academia & Research					✓	✓
NGOs		✓	✓		✓	✓
Private Business & Industry		✓	✓			

Table 13. Partners and their roles in relation to habitat actions.

HABITAT	PLAN	FUND	IMPLEMENT & CONSTRUCT	MANAGE & PROTECT LAND	REGULATE & ENFORCE	RESEARCH & MONITOR	EDUCATE
PRP	✓	✓					✓
Federal Agencies	✓	✓	✓	✓	✓	✓	✓
State Govt.	✓	✓	✓	✓	✓	✓	✓
Local Govt.	✓	✓	✓	✓	✓	✓	
Academia & Research						✓	✓
NGOs			✓	✓		✓	✓
Landowners/ Private Industry		✓	✓	✓			

Table 14. Partners and their roles in relation to education and involvement actions.

EDUCATION AND INVOLVEMENT	PLAN	FUND	CREATE MATERIALS & RESOURCES	DEVELOP PROGRAMS	DISSEMINATE INFORMATION	PROGRAM IMPLEMENTATION
PRP	✓	✓				
Federal Agencies	✓	✓				
State Govt.	✓	✓	✓			
Local Govt.	✓	✓	✓	✓	✓	✓
Academia & Research			✓	✓	✓	
NGOs & Community Groups			✓	✓	✓	✓
Private Business & Industry		✓				

Maintaining Coordination and Collaboration

While specific actions for Program Implementation have not been developed to support CCMP implementation, several 'best practices' have been identified to ensure a wide range of partners and interests remain engaged and committed. Some rely on program foundations that are already in place (e.g., Management Conference), others relate to increasing effective communication.

The Management Conference has established Operational Procedures/Organizational Parameters[22] that describe the make-up of the Executive Committee and outline the legal parameters for spending PRP funds. As CCMP implementation proceeds, additional approaches may be needed to support coordination and collaboration. These could include:

- Regular meetings of the Management Conference at locations across the basin to discuss local issues within the broader context of the CCMP, including presentations by partner organizations.
- Developing subcommittees with a focus on specific topics (e.g., the CCMP themes) or geographic areas (e.g., north of Lake Pontchartrain to Mississippi, south of Lake Pontchartrain) that could track activities not directly funded by PRP, but which support CCMP actions.
- Quarterly public webinars featuring updates on PRP activities with focused presentations on topics of interest from partner organizations. Grant recipients could be required to present as part of their contract to discuss lessons learned and barriers overcome as well as project specifics.
- Convening an annual or biannual State of the Basin conference focused on sharing progress, discussing emerging issues, and highlighting CCMP accomplishments.
- Keeping federal, state, and local government officials (elected and appointed) informed on the critical issues the PRP is addressing using approaches outlined in the Communication/Outreach Strategy (Appendix G) and focused on highlighting examples of CCMP actions in their area.

Maintaining the momentum and interest developed during the CCMP revision may require dedicated staff time, which could be challenging to support. Raising the PRPs profile by implementing actions from the CCMP actions may be the catalyst for greater support from partner organizations and successful advocacy for increased base program funding.

> Collaboration established through engagement on the CCMP can lead to further benefits for the basin. Federal, state, and local agencies can communicate with one another as they develop plans for national wildlife refuges, wildlife management areas, state parks, etc. rather than developing them in silos, potentially leveraging expertise and funding.

[22]More information can be accessed via the following link: https://www.epa.gov/system/files/documents/2024-07/operational-procedures-organizational-parameters-fy23.pdf

Tracking Progress

The Monitoring Report (Appendix E) includes 32 monitoring foci (9 water quality, 18 habitat, and 5 education and involvement). These foci are linked to 91 data collection programs (26 water quality, 38 habitat, and 27 education and involvement). This demonstrates the extensive information base already being generated that can be leveraged to show progress.

Presently, monitoring efforts are supported through a mix of federal, state, and local sources including contributions from non-profit and academic partners. Establishing additional partnerships and support through federal initiatives, state programs, philanthropic foundations, and innovative partnerships with private-sector organizations and community-based groups would enhance the ability to track progress on the actions identified in the CCMP and their role in improving the ecological health of the basin.

Collaboration will be essential to the success of the CCMP and documenting its achievements. A diverse group of agencies and partners play an active role in tracking the status of the system, and they can provide insight on existing monitoring efforts, identify emerging issues, and help determine new focuses for data collection. Partnerships with citizen science programs, K-12 schools, and universities can increase monitoring coverage, particularly in under-sampled areas, while also advancing public understanding of water quality and habitat issues.

In addition to routine data collection to document change (e.g., land change, change in water quality, etc.), tracking what is going on in the basin related to CCMP actions via metrics such as outreach events held, acres restored, impairments removed, BMPs in practice, number of studies funded, and similar can also be valuable ways of showing that progress is being made.

These collaborative approaches help cultivate a sense of stewardship in the region's residents and provide valuable data to inform management decisions. Weaving together institutional monitoring and grassroots engagement promotes a holistic and inclusive design for tracking and supporting the ecological health of the Pontchartrain Basin.

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LAKE PONTCHARTRAIN BASIN RESTORATION PROGRAM

DRAFT COMPREHENSIVE CONSERVATION MANAGEMENT PLAN