3.4.6 - Application of Scenario Planning in Practice

The future scenario planning exercises synthesized above enable SWD to plan within the context of an uncertain and rapidly changing future. The strategic implications identified for each set of scenarios serve as a basis for the strategies for action outlined in the next chapter—the Vision, Goals, and Objectives that set the framework for how SWD will respond over the next 15 years.

The future scenarios are also intended to serve as an ongoing and living reference for SWD throughout implementation of the Strategic Plan. The Division and its Districts will continue to use the scenarios to identify specific gaps and enablers to outline detailed actions and critical pathways. The scenarios will also support the benchmarking of success in achieving the Strategic Plan over time. Specific tactics, projects, and partnerships can be tracked against how they help to enable a more positive future, either moving SWD and the region in a more positive direction along an axis within the set of scenarios and/or supporting a more positive outcome within a given scenario. This more dynamic approach to benchmarking measures success as advancing positive outcomes for the region, while adapting to changes over time. This can be paired with a more USACE-focused benchmarking of progress towards implementation of identified strategies and actions.

4

A Framework for Action

Meeting the increasing challenges of today and planning for an uncertain future requires a paradigm shift in how the Southwestern Division approaches its work. The following Vision, cross-cutting Goals, and strategic Objectives lay a framework for how SWD will continue to meet the USACE Civil Works Mission and provide value to the Nation over the next decades (see Figure 22).

This strategy map builds on the action opportunities identified in the scenario planning exercises to address the key drivers of future risk and demand for Civil Works in the region, as well as the inherent uncertainties within them. The Goals and Objectives were developed by pairing the analysis on future trends with strengths, weaknesses, opportunities, and threats identified through a series of interviews with USACE staff and leadership at SWD, SWG, SWF, SWT, and SWL as well as meetings with local partners and stakeholders at each District

Central to this vision and framework for action is a focus on Integrated Water Resources Management (IWRM). IWRM is a holistic, coordinated, and cross-sectoral approach to the development and management of water, land, and related resources to maximize economic benefits, ecosystem quality, and health and public safety. Operationalizing IWRM requires an integrated approach to project development, organizational processes and procedures, and partnership building.

To advance the SWD Civil Works Vision, the Goals outlined here are intentionally cross-cutting across Mission Areas and Business Lines. Each Goal includes specific strategic Objectives towards achieving that Goal (see Figure 23, Figure 24, Figure 25, and Figure 26, respectively). These Objectives are organized by those relating to projects, processes, and partnerships, providing a framework for future implementation plans that align with these three areas.

SWD Civil Works Vision

*SWD works towards a **safe, reliable, sustainable, and resilient water future** for the communities we serve and the value they provide to the Nation, meeting the increasing challenges and demands on the region's water resources through an **integrated approach** to their management.*

GOAL 1:
Enable innovative solutions to complex challenges.

PARTNERSHIP OBJECTIVES

1.1 Coordinate to identify and develop solutions at **regional watershed and landscape scales**

PROCESS OBJECTIVES

1.2 Coordinate Business Lines and project timelines around key **nexus opportunities and tradeoffs**

1.3 Optimize workflows and processes to be more **agile, flexible, faster, and less risk averse** while maintaining safety and reliability

1.4 Enable and encourage **interdisciplinary and creative** approaches to problem solving

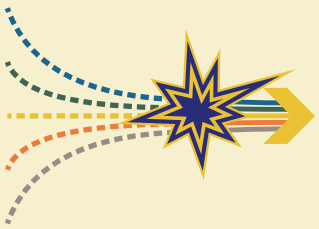
PROJECT OBJECTIVES

1.5 Encourage and prioritize **multi-use and multi-benefit** projects

1.6 Reevaluate **cost and benefit considerations** in decision making to be more inclusive

1.7 Consider **structural and non-structural approaches** in safe and reliable flood risk management that can be implemented by USACE or with partners.

GOAL 2:
Shift towards a proactive response mode.



PARTNERSHIP OBJECTIVES

2.1 Engage with academia to **build the workforce needed for the future**

PROCESS OBJECTIVES

2.2 Develop tools and processes to regularly **project future demands for civil works**

2.3 Update **technology** to meet **industry standards**

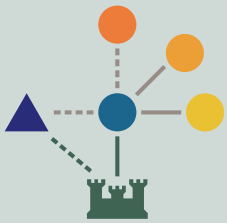
PROJECT OBJECTIVES

2.4 Invest in **pre-disaster** planning and **resilience** improvements

2.5 Incorporate **future trends** in population, land use, weather, and the economy into **planning and project design**

Figure 22 - Strategic Goals and Objectives

GOAL 3:
Re-envision role as a collaborative partner.



PARTNERSHIP OBJECTIVES

3.1 Raise awareness of the USACE Mission at the local, state, and national level through **targeted outreach**

3.2 Develop a strategy for working with and benefitting **underserved communities**

3.3 Take a leadership role in **coordinating federal decisionmakers and stakeholders**

3.4 Expand participation in **interagency water resource management** teams and working groups

PROCESS OBJECTIVES

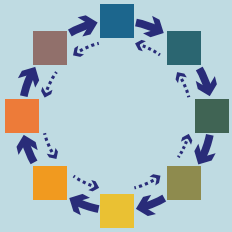
3.5 Ensure **consistent messaging and communication** from leadership through project teams

PROJECT OBJECTIVES

3.6 Identify action strategies for **studies that result in recommended approaches outside of USACE authority**

3.7 Support the **leadership of state and local agencies** in regional water resources strategic planning initiatives

GOAL 4:
Adaptively manage full lifecycle of water resources infrastructure.



PARTNERSHIP OBJECTIVES

4.1 Consider **public-private partnership options** and delegation of authority in developing, rehabilitating, and improving water resource infrastructure

PROCESS OBJECTIVES

4.2 Integrate project monitoring and metrics as part of an **adaptive management approach**

4.3 Develop a **Division-wide operations and prioritization plan** for Civil Works funding.

PROJECT OBJECTIVES

4.4 Design **new projects** with a **plan for long-term operations and maintenance**

4.5 Consider the benefits of **natural and nature-based features** (NNBF) and other approaches in improving and extending project performance over time

4.6 Evaluate the most efficient and cost-effective ways to meet current needs, including **opportunities to revamp existing projects**

4.1 - Goal 1: Enable Innovative Solutions to Complex Challenges

Figure 23 - Goal 1 Paradigm Shift

SWD and the region it serves are facing increasingly complex challenges in water resources management. Siloed approaches to problem solving, where discreet solutions are developed to address discreet challenges within individual Business Lines, are increasingly inadequate to manage the interconnected challenges posed by natural hazards, changing populations, and evolving economies. SWD will shift towards an integrated systems-based approach, working across Mission Areas, disciplines, jurisdictions, and agencies, to deliver comprehensive water resource solutions for the region. This approach promotes the efficient use of limited resources to address multiple challenges in a coordinated way that better meet the needs and interests of local communities and stakeholders. Moreover, this approach will position SWD to effectively navigate the increasingly complex tradeoffs in water resources management for its various Missions and be nimble in adjusting capacity to meet demand under a variety of future scenarios.

4.1.1 - Goal 1 Objectives

Partnerships

Objective 1.1
Coordinate to identify and develop solutions at regional watershed and landscape scales.

The external drivers of future risks for the region, such as extreme weather events and land use change, often have impacts far broader than traditional project scales. At the same time, other entities at the federal, state, and local scale are working to identify their own solutions to these challenges in ways that may also impact execution of the USACE Mission. Within USACE, projects in one AOR may impact other Districts and Divisions that are, for example, downstream in the same watershed. SWD will work towards addressing problems at the regional and landscape scales, building more coordination mechanisms across Districts and facilitating partnerships across multiple jurisdictions of government.

Processes

Objective 1.2
Coordinate Business Lines and project timelines around key nexus opportunities and tradeoffs.

As the challenges of the future become increasingly complex and interconnected, there are several key areas where external drivers and multiple USACE Mission Areas consistently intersect and require coordinated planning to navigate tradeoffs or maximize benefits. SWD will develop strategies, processes, and procedures to coordinate and integrate Mission Areas and Business Line planning around key nexus issues. For example, identifying ways to evaluate and meet increasing demands for Water Supply in the face of a growing population and extreme weather threats without compromising primary Missions such as Flood Risk Management, Navigation, and Hydropower.

Objective 1.3
Optimize workflows and processes to be more agile, flexible, faster, and less risk averse while maintaining safety and reliability.

Pressure from external drivers, such as increasing population at risk from flooding during extreme storms, drives an urgent need for rapid mitigating action that is felt keenly by stakeholders and potential non-federal sponsors. Streamlining processes to reduce project planning and implementation times will engender confidence in SWD and encourage other entities to continue forward with federal co-sponsored projects that make full use of USACE knowledge and capabilities.

Objective 1.4
Enable and encourage interdisciplinary and creative approaches to problem solving.

Identifying integrated solutions to complex problems and understanding the broad positive and negative consequences those solutions may have on communities, infrastructure, and the environment, requires teams with diverse backgrounds and multidisciplinary expertise. SWD and its Districts will identify opportunities to increase and operationalize interdisciplinary teamwork and cross-training, leveraging internal and external expertise across multiple fields to identify and develop innovative solutions to integrated water resources challenges.

Projects

Objective 1.5
Encourage and prioritize multi-use and multi-benefit projects.

SWD will prioritize the design and renovation of projects that serve more than one purpose and address multiple water resources goals, such as providing water supply, flood risk management, and recreation opportunities. This strategy will encompass new projects that provide multiple benefits; co-timed projects that allow efficient use of resources, such as beneficial use of dredge material; holistic scoping of planning studies; and identification of opportunities for project renovations that incorporate multiple uses and benefits. To enable this, SWD will work with project sponsors and HQUSACE to advocate to OMB and Congress to allow for study authorizations to incorporate more than one authority for project studies and project authorizations.

Objective 1.6
Reevaluate cost and benefit considerations in decision making to be more inclusive.

USACE is working nationally to update and modernize the agency's framework for evaluating and selecting major water projects to better account for a wider range of social, economic, and environmental benefits. Specifically, the Principles, Requirements and Guidelines (PR&G), a framework for evaluating and selecting major water projects, was updated in 2014 and now prescribes that projects to identify, analyze, and consider all benefits across the four accounts of National Economic Development (NED), Environmental Quality (EQ), Regional Economic Development (RED), and Other Social Effects (OSE). Historically, feasibility studies have undercounted RED and OSE benefits, including project impacts to life safety and local and regional economies. In addition to providing input to shape that framework to align with needs within the region, SWD and its Districts will continually advance the practical use of this guidance to more comprehensively and equitably evaluate project benefits and costs.

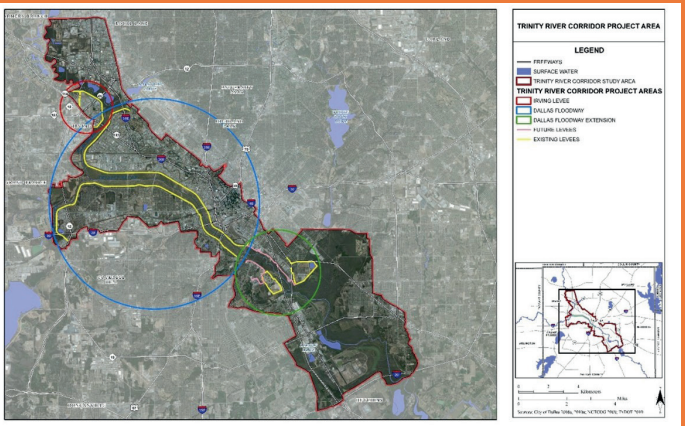
Objective 1.7
Consider structural and non-structural approaches in safe and reliable flood risk management that can be implemented by USACE or with partners.

A comprehensive approach to coastal and inland flood risk reduction and water resources management requires a range of structural measures (such as levees, floodwalls, storm surge barriers, and pump stations), natural and nature-based features (such as living shorelines, wetlands, barrier islands, reefs, beaches and dunes, riparian restoration, and green stormwater infrastructure), and non-structural measures (such as building codes and retrofits, acquisition and relocation, land use planning, and enhanced flood warning and evacuation planning). SWD and its Districts will promote and implement comprehensive risk reduction and adaption solutions across its regulatory, planning, and operations roles.

GOALS IN ACTION

Tulsa-West Tulsa Levees

Tulsa Levee in 2019 Flood



Dallas Floodway Project Map

Tulsa-West Tulsa Levee Feasibility Study: Use of Life Safety

Feasibility studies most often use a National Economic Development (NED) approach to account for project benefits. For the Tulsa-West Tulsa Feasibility study, which focused on potential alternatives to upgrade the levee system in the area, the Tulsa District approached the project from the standpoint of the benefits the levee would provide in reducing risk to human life. A Chief's Report for the Final Feasibility Report and Integrated Environmental Assessment for the Tulsa-West Tulsa Levees Feasibility Study was signed on 23 April 2020. The Chief's Report identified, evaluated, and disclosed all associated impacts that would result from the construction and operation of the recommended plan to improve life safety during flood events within the levee protected areas; the selected plan met the study objectives for reducing flood risk to the public. This effort was innovative in multiple ways, including being: 1) the first Planning Feasibility Study in the Nation to be formulated based on a "life safety" justification rather than NED; 2) the first Assistant Secretary of the Army for Civil Works (ASA(CW)) approval of a NED exemption memorandum for a planning feasibility study; 3) the first investigation study in the Nation to be completed under the authority of the Bipartisan Budget Act of 2018; and 4) the first planning study to be completed significantly ahead of schedule (18 vs. 36 months) and under budget ($2.2M vs. $3M). Completion of this study resulted in execution of a precedent setting initiative that has and will continue to inform national USACE policy for years to come. Including consideration of life safety vs. NED is a tactical advancement of **Objective 1.3: Optimize workflows and processes to be more agile, flexible, faster, and less risk adverse.**

Dallas Floodway Feasibility Project

Feasibility studies within USACE did not historically include a risk assessment to determine, for example, the potential risk an existing levee infrastructure project might have to the community if it were to fail. The Dallas Floodway Feasibility project, conducted by the Fort Worth District in 2009-2014, was the first feasibility study to utilize a risk assessment to inform project formulation. At the time of the study, the Dallas Floodway project included more than 22 miles of levees to protect regions of Dallas from flooding of the Elm Fork, West Fork, and Trinity River. The Risk Management Center (RMC) conducted this Levee Risk Assessment pilot project to evaluate potential failure modes of the levee system under current conditions and future-without-action, along with the consequences of those failures in terms of loss of life and impact to structures. The study determined that internal erosion would likely lead to levee failure without action and recommended a slurry cut-off wall through the center of the levee system. The subsequent formulation considering the Levee Risk Assessment recommended a small amount of levee toe cut-off wall and a minimal levee raise to reduce the risk of overtopping of the system at an estimated cost of $14M. The use of risk assessments in project formulation is an example of advancing **Objective 1.3: Optimize workflows and processes to be more agile, flexible, faster, and less risk averse while maintaining safety and reliability.**

4.2 - Goal 2: Shift Towards a Proactive Response Mode

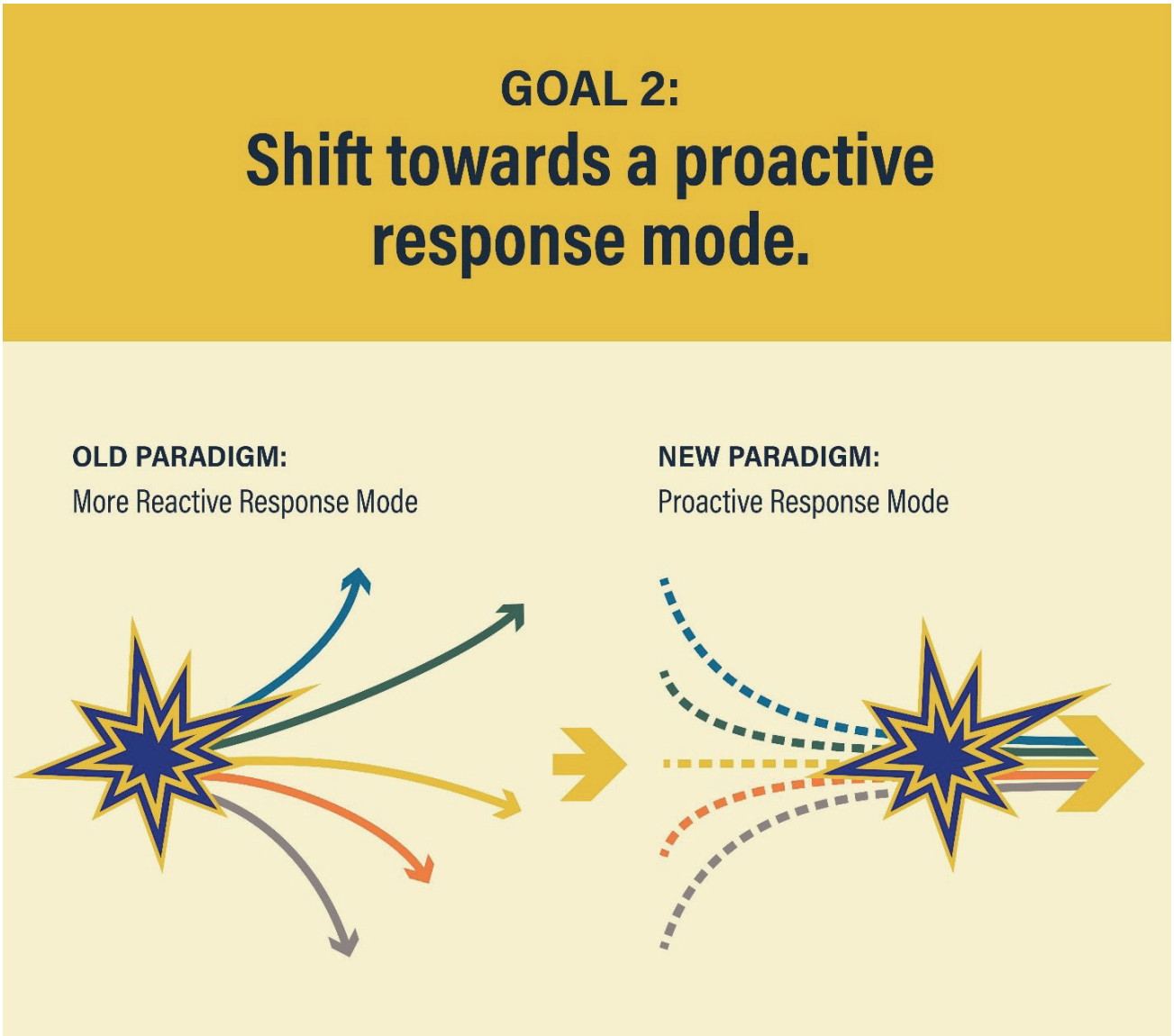


Figure 24 - Goal 2 Paradigm Shift

Meeting the demands of the future requires action today. SWD will shift away from a reactive response mode and towards more advance planning. In doing so, the Division can reduce overall costs and increase confidence in USACE by, for example, minimizing the potential devastating impacts of drought and extreme storms before they occur. Because planning for the future requires robust predictions of future demands, the Division and its Districts will incorporate trends and projection data into operations and project planning and use the best available tools and expertise to advance creative solutions. This includes proactively directing and/or nimbly redirecting resources where they are needed depending on which future scenario(s) are realized.

4.2.1 - Goal 2 Objectives

Partnerships

Objective 2.1
Engage with academia to build the workforce needed for the future.

USACE has a unique opportunity to build careers through the agency's work. SWD and its Districts will identify the full range of skill sets needed to meet new challenges and will strengthen relationships with local academic institutions to cultivate the right people to do the jobs needed over the timeframe of this plan.

Processes

Objective 2.2
Develop tools and processes to regularly project future demands for civil works.

Although existing data and tools will be leveraged in projecting future demands for Civil Works projects where available, in some cases the proper tools may not yet exist. SWD will regularly evaluate key gaps where more precise predictions of infrastructure demand and project performance would significantly improve the cost-effectiveness or efficiency of infrastructure development or maintenance. SWD will then close those priority gaps through internal development or engagement of external research and development programs.

Objective 2.3
Update technology to meet industry standards.

The past decades have brought a surge in technology in everything from project management software to models for real-time forecasting of flood risk to remote systems for infrastructure operation. Budget constraints and the challenges of updating technology in large-scale operations such as USACE have led to difficulties keeping software and hardware current with industry standards. SWD will identify key technology gaps where investing in improvements will ultimately lead to more cost-effective and efficient operations.

Projects

Objective 2.4
Invest in pre-disaster planning and resilience improvements.

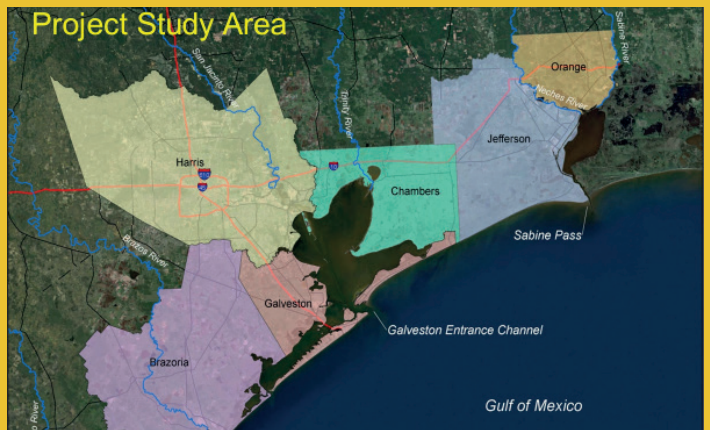
Investing in pre-disaster planning saves lives and protects homes, businesses, and critical and essential infrastructure. SWD will consider funding models that support projects to reduce the potential impacts of future storms, droughts, and other disasters.

Objective 2.5
Incorporate future trends in population, land use, weather, and the economy into planning and project design.

Projections such as population change and variability in weather patterns can directly inform future needs for infrastructure such as hydropower and freshwater demand, allowing capacity to be properly right-sized for need through the end of the project design lifespan. Current USACE planning guidance allows for incorporating some, but not all, future conditions into planning analysis. For example, USACE incorporates future sea level rise and storm event frequency curves into CSRM and FRM project studies, but it does not attempt to incorporate future land use patterns into CSRM and FRM future conditions analysis. SWD will use available data and model output to evaluate how a comprehensive set of trends in drivers may modulate infrastructure capacity needs and design, and create adaptable plans to meet conditions under various future scenarios.

GOALS IN ACTION

GIWW Aerial Photo



Sabine Pass Project Study Area

Gulf Intracoastal Waterway (GIWW) Coastal Resiliency Study (CRS)

The Gulf Intracoastal Waterway (GIWW) is an inland navigable channel stretching along the Gulf of Mexico coast more than 1,000 miles from Florida to Texas. The GIWW Coastal Resiliency Study (CRS) is being conducted to evaluate methods of making a portion of the GIWW within the SWD's AOR resilient to future storms and coastal processes. This is a proactive, pre-disaster planning approach to improve the system and reduce the need to expend funds to restore the GIWW after a disaster, instead of continually responding to repair damage caused by extreme weather and coastal change disasters that impact the GIWW. The overall, cumulative cost of this proactive approach is expected to be less than those incurred with a reactive paradigm. This study illustrates how innovative approaches can be used to advance **Objective 2.4: Invest in pre-disaster planning and resilience improvements.**

Pass to Galveston Bay Feasibility Study

Hurricane Harvey made landfall along the Texas Coast on August 25, 2017 and caused an estimated $150 billion in damages. This event exposed the vulnerabilities of the region to extreme storms and coastal flooding, which are likely to continue to be a threat moving into the future based on analysis of environmental trends. The Sabine Pass to Galveston Bay (S2G) Feasibility Study was designed to identify and recommend Coastal Storm Risk Management (CSRM) projects that could reduce the damage of future storms in the area. The Chief's Report for this study, produced in December 2017, recommended improvements to and construction of three CSRM projects along the Texas Coast. After Hurricane Harvey, Congress passed legislation PL115-123 that authorized $3.8 billion in full federal funding to support the S2G project. This funding has catalyzed execution of the S2G project and reduced the implementation time from ten years to six years, reducing the period for which the region must wait for these additional protections by four years. This project is an example of advancing **Objective 2.4: Invest in pre-disaster planning and resilience improvements, as well as Objective 2.5: Incorporate future trends in population, land use, weather, and the economy into planning and project design.**

4.3 - Goal 3: Re-Envision Role as a Collaborative Partner

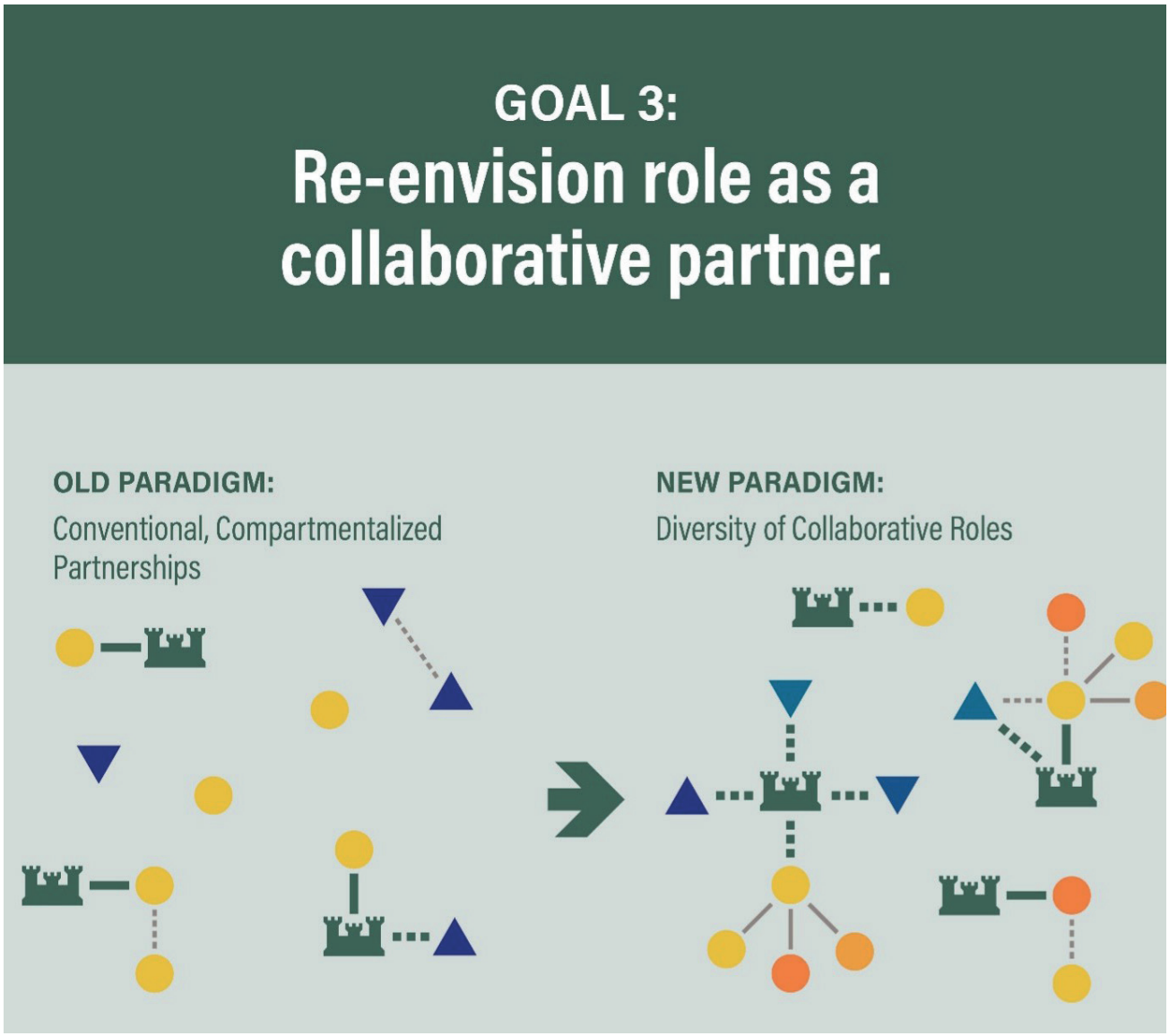


Figure 25 - Goal 3 Paradigm Shift

Addressing the increasing diversity of challenges and demands on SWD Civil Works requires more diverse partnerships with a wide range of local stakeholders and federal partners. Where needs intersect core USACE Mission Areas, such as maintenance of navigable waterways, USACE may further serve the region by leading and facilitating collaboration across federal, state, and local partners. Where USACE has technical expertise without a project execution role, such as municipal flood risk management, USACE may fill a supporting or advisory role under the leadership of other agencies. SWD will work towards deepening and expanding partnerships with local, state, and federal entities and flexibly approaching those partnerships to adapt the right USACE role appropriate to the context. SWD will also work to broaden the communities it serves, with a particular focus on equitably addressing the disproportionate risk faced by vulnerable and underserved populations, such as black, indigenous, and people of color; older adults and people with disabilities; rural communities; and communities with lower property values.

4.3.1 - Goal 3 Objectives

Partnerships

Objective 3.1
Raise awareness of the USACE Mission at the local, state, and national level through targeted outreach.

Because the role USACE plays in water resource management includes planning, regulation, development, and operation across a wide spectrum of issues, many local stakeholders may be unaware of opportunities to work with SWD Districts as a non-federal sponsor or to tap USACE expertise in project planning and development. Even at the state and national level, potential partner organizations and entities may have preconceived ideas of when and how to work with USACE that does not capture the organization's shift toward more holistic, integrated water resource management. SWD will work to close this gap through targeted local outreach and the development of communication strategies for raising awareness at the state and national level.

Objective 3.2
Develop a strategy for working with and benefitting underserved communities.

Communities traditionally underserved by water resources infrastructure—such as rural communities, lower-income communities, Indigenous, and people of color—are in many cases also at greatest risk of water resources challenges. SWD will develop targeted strategies to address common challenges in project funding in underserved communities, such as more comprehensive approaches to benefit-cost calculations and more diverse partnerships to meet cost-share requirements. SWD will also identify opportunities to provide additional engagement, and technical and planning support to underserved communities.

Objective 3.3
Take a leadership role in coordinating federal decision makers and stakeholders.

SWD Districts are significantly involved in water resource infrastructure development through their regulatory and planning roles, even in projects that are not ultimately built or maintained by the federal government. For this reason, USACE is well-positioned to take a leadership role in advancing IWRM across Mission Areas through coordination of local, state, and federal partners. SWD will identify and leverage these opportunities, such as by convening working groups focused on reducing regional flood risk through a combination of approaches.

Objective 3.4
Expand participation in interagency water resource management teams and working groups.

USACE has extensive experience in managing a wide range of water resource management issues; at the same time, other entities possess complimentary skills sets and have synergistic missions in, for example, floodplain management (FEMA). Sharing this expertise and working together to holistically address water resource management enables a broader range of solutions to be simultaneously considered and potentially executed. SWD will identify and expand opportunities for interagency engagement at the local, state, and federal level through participating in, for example, programs like the Silver Jackets.

Processes

Objective 3.5
Ensure consistent messaging and communication from leadership through project teams.

One challenge of an organization as large and complex as USACE is ensuring consistent communication to stakeholders and partners, which is vital for maintaining credibility and trust in the organization. For example, if on-the-ground improvements in reducing Navigation project construction time are not seen after USACE leadership indicates that they are a priority, stakeholders may begin to see these messages as empty promises, lose confidence in the Districts, and execute their projects with limited federal involvement. SWD will synchronize communication from project development teams up through management to ensure consistency and engender stakeholder trust.

Projects

Objective 3.6
Identify action strategies for studies that result in recommended approaches outside of USACE authority.

Planning studies can often result in a best-case course of action that is outside of USACE project construction authority. For example, reducing the amount of impervious surfaces in an urban area can reduce flooding if infrastructure project options have been exhausted to the limit that is feasible or are less cost-effective overall. SWD will expand mechanisms for transferring the analysis and results of these planning efforts to other management entities and provide support where possible in developing and executing non-USACE projects, such as through further leveraging of the Interagency Flood Risk Management program (https://webapps.usgs.gov/infrm/). SWD will also explore opportunities for supporting projects that serve multiple functions, including those that fall within USACE Mission and Authority, that may be implemented through a diversity of layered funding sources.

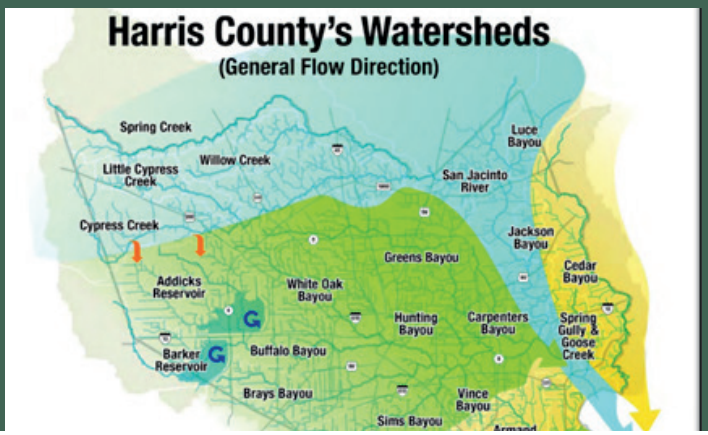
Objective 3.7
Support the leadership of state and local agencies in regional water resources strategic planning initiatives.

Decades of experience in water resources management have fostered extensive institutional knowledge within USACE addressing issues including flood risk management, dredging, and environmental restoration. This expertise can be invaluable in efforts led by partners in which the USACE Mission dictates SWD play a supporting rather than lead role. SWD will identify and expand opportunities to share this technical and planning expertise with other entities through use of, for example, the Planning Assistance to States (PAS) program.

GOALS IN ACTION

SILVER JACKETS
Many Partners, One Team

Logo of the Silver Jackets Program



Flow Direction in Harris County's Watersheds

Silver Jackets Program

Mitigating the risk of flooding is a challenging problem in part because numerous federal, state, and local agencies have varying focus and authority related to the issue. The Silver Jackets Program brings together state and federal partners to facilitate a coordinated approach to flood risk management in each state. In Texas, participating agencies include USACE SWF and SWG, Federal Emergency Management Agency (FEMA) Region VI, the U.S. Geological Survey (USGS), and the National Weather Service (NWS), in addition to several Texas state agencies. This multi-agency partnership has been identifying tools and strategies to support local communities in advancing Texas' Hazard Mitigation Plan, including a proposed Texas Floodplain Prioritization Tool and strategies for procuring undeveloped land within the floodplain. The work being advanced by the Texas Silver Jackets partnership seeks to engage stakeholders within priority watersheds in Texas to better understand flood risk management needs at a regional scale. USACE can leverage this partnership and ongoing work to help identify opportunities to advance both **Objective 2.4: Invest in pre-disaster planning and resilience improvements and Objective 3.3: Take a leadership role in coordinating federal decision makers and stakeholders.**

Houston Regional Watershed Assessment, Stakeholder Engagement

The Metropolitan Houston Regional Watershed Assessment is an in-progress, comprehensive evaluation of the region's 22 watersheds and the various institutional levers being used to implement flood risk reduction efforts. The Assessment will characterize successes and identify gaps of ongoing efforts and recommend actions that can improve the effectiveness of FRM efforts and expenditures. The recommendations will include coordination efforts, technical assistance, policy changes, funding priorities, and alternative consideration of risks when evaluating structural and non-structural flood risk management measures. Those recommendations include efforts that can be undertaken by residents, communities, USACE, and local stakeholders to reduce flood risk in the Houston Metropolitan Area now and into the future. The process has involved regular coordination between USACE, various stakeholders, and other federal agencies. In developing a watershed plan that leverages USACE and sponsor authority, USACE can further **Objective 3.3: Take a leadership role in coordinating federal decision-makers and stakeholders.**

4.4 - Goal 4: Adaptively Manage Full Lifecycle of Water Resources Infrastructure

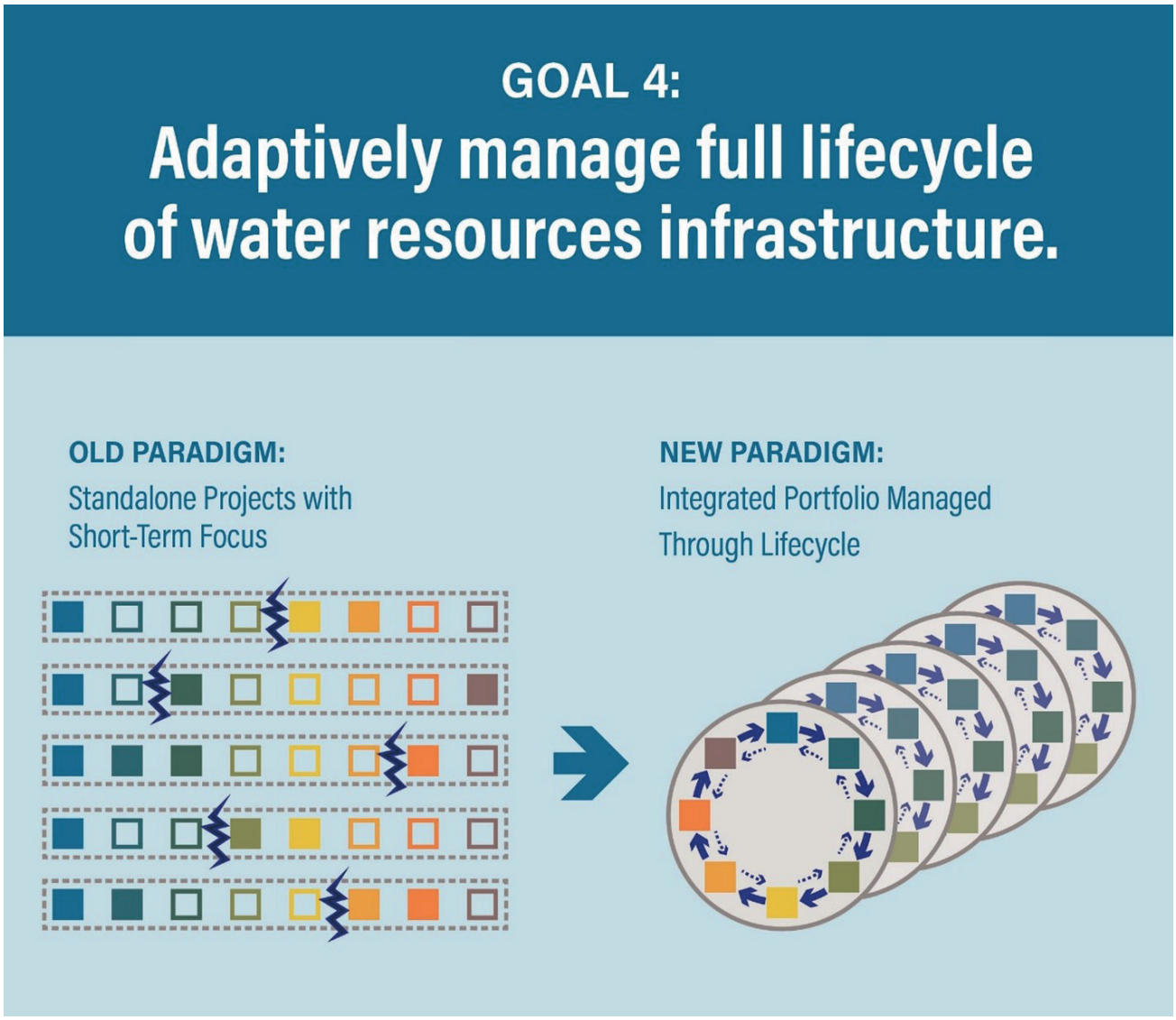


Figure 26 - Goal 4 Paradigm Shift

The combination of aging water resources infrastructure and increased infrastructure capacity demands driven by population growth, development, and extreme weather requires a more coordinated and adaptive approach to asset management. Use of this approach will facilitate resolving existing backlogs of infrastructure maintenance as well as reduce the cost of operations moving into the future. SWD will manage the full lifecycle of its water resources assets, taking a holistic approach to the design, construction, operations, and maintenance of its projects over their planning life. SWD and its Districts will monitor the full portfolio of water resources infrastructure using an adaptive management framework, promoting flexible and iterative decisions about new starts, renovations of existing infrastructure, and long-term operations and maintenance plans.

4.1.1 - Goal 4 Objectives

Partnerships

Objective 4.1
Consider public-private partnership options and delegation of authority in developing, rehabilitating, maintaining, and improving water resource infrastructure.

Public-private partnerships (P3) are a mechanism for increasing the involvement of the private sector in the development of projects that may have historically been developed through more traditional USACE funding models. P3s can reduce the time it takes to get projects on the ground by providing new funding streams and leveraging greater involvement of local entities, while also allowing for increased risk-sharing in project execution. SWD Districts will evaluate the potential for use of P3s and other non-traditional approaches such as delegation of authority in developing, managing, and maintaining the full portfolio of water resource management infrastructure.

Processes

Objective 4.2
Integrate project monitoring and metrics as part of an adaptive management approach.

Developing clear project objectives and articulating metrics that can be used to benchmark success in achieving those objectives requires upfront investment in project development, but the payout can be immense. Doing so allows early warning signs to be identified if a project has or begins to fail to meet its objectives, allowing early intervention ahead of more catastrophic failure. Evaluation of quantitative metrics also enables future projects to leverage strategies and approaches that have been proven to be the most effective in the past. SWD Districts will incorporate the development and use of success metrics throughout project development, as well as in operations and maintenance. Implementation of this objective also requires evaluating policies and project funding mechanisms to increase opportunities for practical implementation of adaptive management approaches.

Objective 4.3
Develop a Division-wide operations and prioritization plan for Civil Works funding.

The network of CW infrastructure that SWD Districts maintain on the landscape has grown considerably over the decades, which has resulted in a backlog of maintenance and necessary improvements as that infrastructure has aged and the capacity needs have increased. At the same time, new projects are needed to address added stressors and partner needs in, for example, Flood Risk Management and Navigation. SWD will develop a Division-wide plan for prioritizing projects that defines and prioritizes the most pressing needs in both O&M and new starts, while also comprehensively addressing the full portfolio of needs in the longer term.

Projects

Objective 4.4
Design new projects with a plan for long-term operations and maintenance.

Pressure points such as flooding and inadequate water supply result in the development of new water resources infrastructure as short-term priority. Because the lifespan of these projects spans from years to decades, the long-term costs of operation must be considered to ensure the full project portfolio can be managed in future years. SWD Districts will consider the long-term cost of operation and maintenance in project development, including identifying ways to reduce that burden through project design.

Objective 4.5
Consider the benefits of natural and nature-based features (NNBF) and other approaches in improving and extending project performance over time.

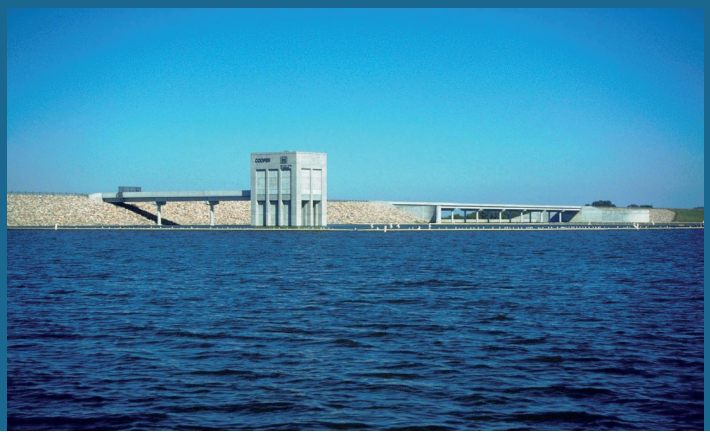
Hard infrastructure such as levees and dams incur annual maintenance and operation costs and will degrade over time, eventually needing to be replaced or reengineered. Innovative approaches including natural and nature-based features may present an ultimately more cost-efficient solution in some cases if both the up-front and maintenance costs are considered in tradeoff analysis. SWD will expand consideration of innovative approaches such as NNBF in cases where they may ultimately be more cost effective over project lifetime.

Objective 4.6
Evaluate the most efficient and cost-effective ways to meet current needs, including opportunities to revamp existing projects.

The extensive role SWD Districts have played over the last decades has led to an expansive portfolio of levees, reservoirs, and other water resource infrastructure that are currently maintained by USACE. In some cases, this infrastructure is approaching the end of its design life and/or is approaching or exceeding design capacity. SWD will evaluate the complete spectrum of potential approaches to meeting the needs of the region, including renovating existing projects, decommissioning projects no longer necessary, and building new infrastructure.

GOALS IN ACTION

Maintenance and Operations of the MKARNS



Cooper Dam and Jim Chapman Lake

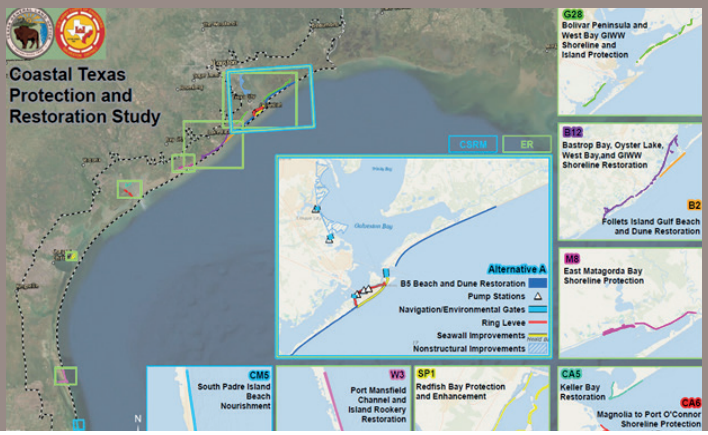
McClellan-Kerr Arkansas River Navigation System (MKARNS)

As the MKARNS infrastructure turns 50 years old, the need for maintenance or rehabilitation is increasing, especially as growing extreme weather variability and other key drivers exert additional pressures on the aging system. With these challenges in mind, SWD and its affected Districts are collaborating with key stakeholders to identify the MKARNS' most critical needs now and for the future. For example, a pilot investment tool has been developed to assist in justifying and validating the priorities of the system to manage and budget for efficiency and cost effectiveness. The use of this tool assists and facilitates the implementation of **Objective 4.3: Develop a Division wide operations and prioritization plan for Civil Works funding; and Objective 4.6: Evaluate the most efficient and cost-effective ways to meet current needs, including opportunities to revamp existing projects.**

Water Supply Study

Providing water supply storage and conducting studies to assist states and local interests with future needs are the main functions of the Water Supply Business Line, and SWD serves as the center for water supply studies across the nation. Sustainably managing population-driven increased demands for water supply without compromising other Division Missions may become increasingly difficult in the future, as populations and other threats such as extreme weather variability continue to grow. Water supply studies are an important tool for preparing for future needs and changing conditions. Increased collaboration is critical to analyzing future water supply needs and includes USACE partnering with local stakeholders to develop water supply plans to find the most efficient, cost-effective, and environmentally sustainable methods of providing water to customers throughout the Division's AOR. Often the most cost-effective way involves continued examination of USACE storage to meet those needs, and in turn, the local stakeholder provides funds to maintain infrastructure. Conducting water supply studies in this sustainable and cost-effective manner can further **Objective 4.1 Consider public-private partnership options and delegation of authority in developing, rehabilitating, maintaining, and improving water resource infrastructure; and Objective 4.6: Evaluate the most efficient and cost-effective ways to meet current needs, including opportunities to revamp existing projects.**

GOALS IN ACTION



Selection of Coastal Management Projects along the Texas Coast

Coastal Texas Protection and Restoration Feasibility Study (Coastal Texas Study)

The Coastal Texas Study is authorized to "develop a comprehensive plan to determine the feasibility of carrying out projects for flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration in the coastal areas of the State of Texas." The Coastal Texas study was initiated in 2014 to evaluate large-scale coastal storm risk management (CSRM) and ecosystem restoration (ER) alternatives aimed at providing the coastal communities of Texas with a comprehensive plan of multiple lines of defense. These projects are designed to function as a system to reduce the risk of coastal storm damages using natural and built infrastructure along the Texas Coast and provide resiliency and redundancy to those areas. The ER features are designed to restore degraded coastal ecosystems, increase resiliency along the coast, and to provide future adaptations to sea level change. Texas has been a staunch supporter of this effort and plans to use the draft feasibility report in working with the Texas legislature to support the non-Federal responsibilities of the study.

Formulation included pre-disaster planning to enhance the resiliency, redundancy, and robustness of the proposed systems. Measures were created to:

- Form Multiple Lines of Defense: By combining various lines of defense (e.g. barrier islands, living shorelines, coastal marshes, etc.), redundant levels of protection and restoration are provided for both humans and coastal ecosystems. Multi-use and multiple benefit features such as beach and dune systems not only provide primary CSRM benefits to Bolivar and Galveston reaches, but also incidental ER benefits for various habitats.
- Be Comprehensive: The CSRM alternatives were assembled using a systems approach to work in concert with other measures considered, connect to existing systems, and be adaptable over time to address sea level change. The system includes structural, natural, and nature-based features.

Cost and benefits assessments for the effort looked beyond traditional National Economic Development (NED) metrics and took into consideration to include a non-standard benefit category for the assessment of the NED benefit for the recommended plan. These benefits are calculated with the Regional Economics Model, Inc (REMI model), which quantifies the non-physical impacts or direct losses to petroleum refinery outputs and the corresponding national impacts from a storm event.

This study is an example of a comprehensive approach to advancing multiple objectives of the CWSP, including **Objectives 1.5, Encourage and prioritize multi-use and multi-benefit projects; 1.6, Reevaluate cost and benefit considerations in decision making to be more inclusive; 1.7, Consider structural and non-structural approaches in flood risk management that can be implemented by USACE or with partners; 2.4 Invest in pre-disaster planning and resilience improvements; 2.5, Incorporate future trends in population, land use, weather, and the economy into planning and project design; 3.7, Support the leadership of state and local agencies in regional water resources strategic planning initiatives; 4.4, Design new projects with a plan for long-term operations and maintenance; and 4.5, Consider the benefits of natural and nature-based features (NNBF) and other approaches in improving and extending project performance over time.**