

Case Study

Restoring Three Mile Creek via a Comprehensive Watershed Management Plan

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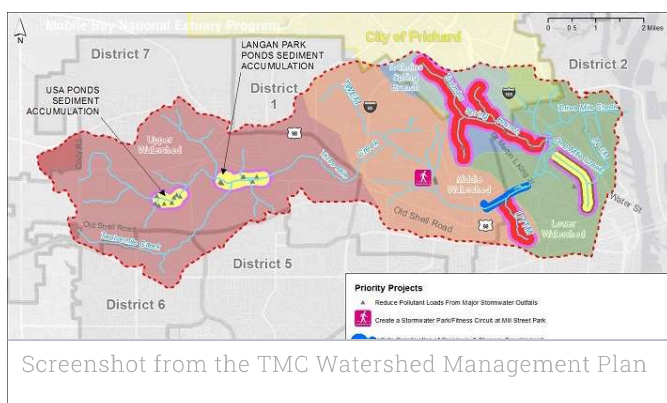
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Screenshot from the TMC Watershed Management Plan

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Project Summary

A comprehensive watershed management plan was developed to help guide the restoration of Three Mile Creek, an urban watershed located near Mobile, Alabama. Three Mile Creek suffers significant non-point source pollution and sedimentation issues, and is also vulnerable to climate change impacts, including sea level rise and increasing storm surge. The Mobile Bay National Estuarine Program hired Dewberry, an environmental contracting firm, to develop a comprehensive watershed plan that addresses pollution issues and enhances the resilience of natural habitats and communities located in the watershed.

Background

Three Mile Creek is a 14-mile, tidally influenced urban stream that flows through the city of Mobile, Alabama. Three Mile Creek drains a fairly large urban area, and like many watersheds in coastal Mississippi and Alabama, has significant water quality issues related to non-point source pollution (trash, sewage pathogens, fertilizer/nutrients) and sedimentation, problems that are exacerbated by stormwater runoff and flood episodes. Due to its tidal influence, Three Mile Creek and adjacent natural and human communities are also vulnerable to saltwater intrusion, inundation, and changes in freshwater availability as a result of sea level rise and increasing storm surge and storm intensity. These issues have historically contributed to Three Mile Creek being viewed as a city liability rather than an asset.

In an effort to transform Three Mile Creek into a local amenity, the Mobile Bay National Estuary Program partnered with a variety of groups to develop a Comprehensive Watershed Management Plan (CWMP). The CWMP is designed to restore Three Mile Creek's hydrology and water quality, increase recreational and public access, protect and enhance public and natural resource health, enhance heritage and cultural watershed connections, and to incorporate climate adaptation principles to ensure watershed and community resilience. Plan development was led by the contracting firm Dewberry with significant collaboration with the Mobile Bay National Estuary Program, Mississippi-Alabama Sea Grant Consortium, local municipalities, and the public. Plan development cost roughly \$750,000, including \$16,000 from the Environmental Protection Agency to specifically examine climate change impacts.

resilient restoration of this urban creek. Using existing studies and reports, Dewberry compiled information on current watershed characteristics and conditions and identified major challenges facing the watershed. These challenges include: stormwater runoff, wastewater contamination, altered and degraded ecological characteristics, lack of access, and vulnerability to sea level rise and shifting storm frequency. These challenges were also confirmed and evaluated by the public. During plan development, Dewberry held a series of 13 public meetings to discuss current challenges and outline a desired future for the watershed.

The CWMP also integrates new data and modeling. Dewberry and partners conducted field studies to gather additional water quality data related to surface water, groundwater, and sediment. They also identified critical data gaps that need to be addressed in the future to enhance the CWMP, including pollutant loads and sources. Dewberry also conducted sea level rise and storm surge modeling to understand future watershed impacts related to climate change. The Sea Level Rise Affecting Marshes Model (SLAMM) was used to evaluate how sea level rise and erosion may affect habitat types and current land uses, and to identify best management practices (BMPs) that could be used to complement water quality goals in the watershed. SLAMM identified that non-tidal/cypress swamp and inland fresh marshes in the Three Mile Creek watershed were likely to be inundated under even the lowest sea level rise scenarios, and that saltmarsh, tidal flats, and open estuarine habitats were likely to expand with sea level rise. Dewberry also used the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model in combination with SLAMM to model how storm surge and sea level rise may interact to affect habitats and community flood risk, finding that existing infrastructure becomes increasingly vulnerable as sea level rises.

Current conditions, public opinions and values, and additional data and modeling results were then used to generate a list of recommended BMPs for the Three Mile Creek Watershed. Management recommendations were grouped into four categories: non-structural BMPs (e.g., education, invasive species removal), structural BMPs (e.g., low-impact development and green infrastructure projects), long-range sustainability projects (e.g., tidal marsh restoration, rolling easements), and recreation projects (e.g., greenways and blueways). BMPs were also assigned to different geographical areas of the watershed to reflect and meet site-specific challenges. These BMPs were ranked and prioritized by a Technical Committee and through an online survey, as well as compared to the EPA's Nine Elements of a Watershed Plan framework. Actions identified in the CWMP were also compared and integrated with the Mobile Bay National Estuarine Program Comprehensive Conservation and Management Plan to ensure that the watershed actions help promote complementary management goals in the local estuary.

A shortlist of prioritized actions for near-term implementation were selected based on their ability to provide early and immediate benefits to water quality within the Three Mile Creek watershed. Six out of the nine suggested actions help enhance resilience, and two—tidal marsh restoration, and flood risk assessment and education based on sea level rise and storm surge modeling—are explicitly focused on climate adaptation.

Outcomes and Conclusions

The Three Mile Creek Comprehensive Watershed Management Plan was published in September 2014, and includes a 10-year implementation outline for prioritized restoration actions. The next challenge is to procure implementation funding. The plan outlines potential costs and funding mechanisms and sources for all prioritized actions; successful planning and implementation of all proposed strategies is projected to total between \$65–188 million dollars. Strong regional partnerships amongst the community of Mobile, adjacent municipalities, the Mobile Bay National Estuary Program, and other stakeholders will likely be critical in securing funding for these various projects.

Similar to other comprehensive watershed management plans, the Three Mile Creek Comprehensive Watershed Management Plan is designed to be a living document. Monitoring is an integral component of the plan, and an adaptive management approach based on monitoring results is emphasized. Dewberry recommends that project partners track progress and alter management strategies accordingly on an annual basis, as well as complete in-depth reviews of plan components and action effectiveness every 3-5 years. To date, activities implemented include:

- invasive species removal from riparian habitat;
- developing recommendations to improve stormwater management and reduce flooding;
- engaging with local residents in community climate adaptation planning; and
- creating a community rain barrel program to educate residents about the environmental and economic costs of stormwater runoff.

Citation

Restoring Three Mile Creek via a Comprehensive Watershed Management Plan [Case study on a project of Auburn University, Mobile Bay National Estuary Program, and Dewberry]. Version 2.0. Product of EcoAdapt's [State of Adaptation Program](#) Retrieved from CAKE: <http://www.cakex.org/case-studies/restoring-three-mile-creek-comprehensi...>(Last updated October 2021)

Project Documents

[Restoring Three Mile Creek - One Neighborhood at a Time.pdf](#)

[Three Mile Creek Watershed Management Plan 2014.pdf](#)

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Affiliated Organizations



[Mobile Bay National Estuary Program](#)

The Mobile Bay National Estuary Program is a voluntary, non-regulatory program bringing together citizens, government agencies, business/industry, conservation and environmental organizations, and academic institutions to promote a community and culturally-based approach to watershed management: working together to address the environmental issues outlined in the CCMP.

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Region
[Southeast & Caribbean](#)

Effort Stage
[In progress](#)

Adaptation Phase
[Planning](#)

Scale of Project
[Community / Local](#)

- [Public Health](#)
- [Tourism / Recreation](#)
- [Water Resources](#)
- [Wildlife](#)

Habitat/Biome Type
[Aquatic](#)
[Estuarine](#)

Sociopolitical Setting
[Rural](#)

Target Climate Changes and Impacts
[Culture / communities](#)
[Tourism](#)
[Water quality](#)


Type of Adaptation Action/Strategy
[Natural Resource Management / Conservation](#)
[Incorporate climate-smart guidelines into restoration](#)
[Reduce non-climate stressors](#)
[Capacity Building](#)
[Conduct scenario planning exercise](#)
[Governance and Policy](#)
[Develop / implement adaptive management strategies](#)

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