

Three Mile Creek Watershed Management Plan

Appendix A – GIS and Literature Data Review

Key Information

Several items obtained during our data collection efforts reveal key information that form the basis of this study and inform the required steps ahead. In 2004, the USGS published the report titled “Assessment of Water Quality, Benthic Invertebrates, and Periphyton in the Three Mile Creek Basin, Mobile, Alabama, 1999-2003”. This report summarizes the results of extensive water quality and biological monitoring performed between 1999 and 2003 in the creek and two tributaries. Surface water flow monitoring was performed in conjunction with sample collection and laboratory analysis for a wide range of parameters, including nutrients, oxygen demand parameters, pathogens, benthic invertebrates, periphyton, and even potential wastewater compounds. This report documented the water quality and biological conditions within TMC at the time and identified key stressors to the surface water system. Due to the elevated values of certain pollutants including pathogens and wastewater compounds in Toulmin Springs Branch (TSB), CEN, and the downstream end of the watershed, there appears to be a contribution from the groundwater system in these areas (possibly from legacy or continued instances of sewer system leaks and/or overflows).

In 2006, ADEM published the Final Total Maximum Daily Load (TMDL) report for Organic Enrichment/Dissolved Oxygen (DO) for all three segments of TMC which calculated the limits of pollutant/load contributions which would not diminish healthy DO levels. ADEM performed modeling in conjunction with field monitoring to develop the TMDLs for nitrogenous biochemical oxygen demand (NBOD) and carbonaceous biochemical oxygen demand (CBOD) for both point and non-point pollution sources. These TMDLs established and required NBOD and CBOD load reductions to improve water quality and gradually increase ambient dissolved oxygen concentrations throughout the creek, specifically improving dissolved oxygen conditions throughout the creek.

In 2009, Final TMDLs were developed by ADEM for pathogens in TSB and CEN. TMDLs are expected from ADEM this year for pathogens throughout TMC, and nutrients for both TSB and CEN. Once these TMDLs are completed, the required load reductions will be specified for all primary pollutants of concern in the TMC basin. The primary pollutants of concern include: NBOD/CBOD (impacting ambient dissolved oxygen concentrations); nutrients; and pathogens. There is a secondary concern related to industrial and wastewater compounds in specific areas.

In the 1980's, the USACE prepared preliminary design documents and an environmental assessment report for the TMC which recommended channel improvements to reduce flooding. These documents provided valuable information related to the design

of the improvements including channel straightening, channel widening, and the installation of numerous weirs/water control structures.

Literature Data

Currently, 88 reports, tables, spreadsheets and maps have been collected for the TMC watershed. Data has been collected from multiple agencies including the Alabama Department of Environmental Management (ADEM), the US Army Corps of Engineers (USACE), the City of Mobile (Mobile), the Mobile Area Water and Sewer System (MAWSS), and the Mobile Bay National Estuary Program (MBNEP). The files have been grouped into the following categories based upon the type of file; Data Source Reports, Email, Environmental Reports, Maps, Modeling Reports, Outreach and Engagement, Photos, Sample Projects, Software, Spreadsheets, and Water Quality Reports (see Attachment A).

Data Source Reports

Data source reports were collected from ADEM and Tetra Tech as well as internally created by the project team. The ADEM and internal reports include information that was collected for this current watershed assessment. The Tetra Tech report, dated 2003, contains a summary of the data that was collected for a previous water quality modeling effort.

Email

Email was received by the MBNEP from a concerned citizen. This citizen regularly kayaks TMC and its tributaries and documents the conditions of the watershed. Several of the emails contain links to a database of photographs of current conditions. Additionally, the data request email to USACE for the current watershed assessment was archived.

Environmental Reports

Environmental reports contain documents from multiple sources including ADEM, MBNEP, MAWSS, USACE, the South Alabama Regional Planning Commission (SARPC), the Alabama Department of Public Health (ADPH), and Dewberry. ADEM provided documents on the Phase 1 site assessments of two brownfield sites located within the watershed at the Hickory Street Landfill and the Mobile Gas Works. Both reports are dated 2002.

Dewberry provided maps and tables of planned, active and completed roadway projects within the watershed. The projects vary in scope from roadway resurfacing to expansion of roadway lanes.

MBNEP provided the Comprehensive Conservation and Management Plan, completed in 2002, which contains an overview of

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the NEP process, priority environmental projects and health of the estuary, implementation plans, and the structure of the MBNEP. A single volume update to the program was also provided. It contains an overview of the projects completed to date and the plans and timelines for future projects. The final item provided by the MBNEP is the TMC Planning Packet. This document includes maps and tables of proposed projects in the watershed and proposed funding sources.

The SARPC report, dated 2004, is a Coastal Alabama River Basin Management Plan which is intended to guide efforts to coordinate measures implemented to reduce pollutants in critical areas of watershed.

The ADPH report, dated 2006, reviews potential health hazards at the Hickory Street Landfill. Although the landfill previously received hazardous materials, it is not considered to be harmful to human health.

The USACE Section 1135 report, dated 2008, evaluates restoration options for TMC between Conception Street Road and Martin Luther King, Jr. Avenue. A previous Section 206 report, dated 2003, provided a preliminary plan to address aquatic ecosystem restoration in the same location. A 1984 USACE Report provides some general climate and biological information for the Mississippi Sound and surrounding areas.

A USGS and MAWSS study of TMC analyzed the water quality and aquatic communities throughout the watershed. The study was conducted over a four year timeframe and published in 2004.

Maps

ADEM provided maps, dated 2013, that indicated the 303 (d) segments within the watershed, overlaid on a map of the watershed boundary, ADEM monitoring locations TMDL segments, and NPDES discharge locations.

The City of Mobile provided a visioning map that indicated locations for redevelopment within the City dated 2008.

Modeling Reports

The modeling report appendix, written by Tetra Tech explains the hydrodynamic and water quality modeling of the TMC watershed that was completed in 2006. The models used include EFDC and WASP/EUTRO.

A PowerPoint presentation by Tetra Tech, dated 2006, that explains the systems of models created to manage the water quality in Mobile Bay was also collected.

Outreach and Engagement

Outreach and Engagement items include news articles and presentation slides. There are two Mobile Press-Register articles about community planning for bike paths and a TMC field visit by members of the Environmental Protection Agency (USEPA), MBNEP, and the Southern Environmental Law Center. Also included are presentation slides from the bicycle path plan and the TMC restoration plan. There are two internal documents from a Technical Stakeholder Questionnaire that was completed as a part of this watershed assessment.

Photos

Several field visits have occurred during the watershed assessment. Photos were taken on January 30, 2013, April 3, 2013, April 4, 2013, and July 1, 2013. Additional maps and field notes from these trips have also been collected and documented.

Sample Projects

A USACE article titled “Turning the Blue River Green”, has been collected. It discusses the stream restoration projects that the USACE completed in urban areas of Kansas City, Kansas.

Auburn University created a WMP for Eight Mile Creek to the north of the TMC watershed. This plan was written and implemented due to the 303 (d) listing of the creek for pathogens.

Software

An install file for HydroDesktop v 1.5 was provided. It is an open source GIS enabled desktop application that allows the user to analyze hydrologic and climate data that is registered with the CUAHSI Hydrologic Information System.

Spreadsheets

ADEM provided field data from monitoring gages as well as fish sampling. The monitoring gages include INCM-1, INCM-2, TM-1, TMCM-1, TMCM-3, TMCM-4, TMCM-5, TMCM-6, TMCM-7, TSBM-1, TSBM-2, and UTTM-1 and provide the number of samples, minimum, maximum, and average values for the data collected since 1990. Additional pathogen sampling was provided for TMCM-4, TMCM-5, TMCM-6 and TM-1 from 2007 to 2012.

Additionally, ADEM provided a series of spreadsheets with fish sampling results. The fish were monitored for heavy metals, pesticides, and other toxic substances. Fish sampling has occurred at several locations in the watershed beginning in 1999. The

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most recent data collected includes sampling results from 2012.

Water Quality Reports

During the data collection process, 20 water quality reports and design plans have been gathered from ADEM, Barry A. Vittor & Associates, Dewberry, USACE, USEPA, and Volkert and Associates.

ADEM provided a series of tables and reports of the 303 (d) listed waterways as of 2012 and the TMDL schedule for each watershed. They additionally provided a study of the impervious areas within TMC that determined there is not a direct correlation between impervious surface area and water quality. There are also TMDL reports for the upper segment of TMC (pathogens), Toulmins Spring Branch (pathogens), an unnamed tributary to TMC (fecal coliform), TMC (organic enrichment/dissolved oxygen), Mobile Bay (pathogens), and the lower segment of TMC (pathogens).

The report from Barry A. Vittor & Associates indicates the results of dye testing that was conducted in the TMC trunk line in 2004.

The USACE provided an Interim Survey Report in 1982 after two years of significant flooding damaged property within the watershed. In 1984, design plans and a cost share contract were provided to the City of Mobile to provide some flooding relief to residents of the watershed. The plans were based upon recommendations provided in the Interim Survey Report.

The USEPA authored reports on the delisting of the unnamed tributary to TMC for pathogens in 2009 and an analysis of the TMC watershed for the creation of the 3-d water quality model in 2001.

Additionally, Volkert and Associates completed a study of the wastewater management system and made recommendations to decentralize portions of the system within the TMC watershed. The date of the report is unknown.

GIS Data

Currently, more than 470 GIS data sets have been collected for the TMC watershed. Data has been collected from multiple agencies including the Alabama State Water Program, the City of Mobile, the Mobile Area Water and Sewer System (MAWSS), the U.S. Census Bureau, the U.S. Department of Agriculture, the U.S. Geologic Survey, the Geological Survey of Alabama, NASA, Mobile County, the Mobile County Revenue Commission, and the US Army Corps of Engineers (USACE). The files are grouped based on the source and a spreadsheet of all individual data sets has been compiled. Following is a listing of the types of data and

the primary data sets acquired. It is not intended to be exhaustive, but covers the most relevant information.

Elevation Data

Elevation data was collected from a number of sources. LiDAR data acquired in 2010 was received from MAWSS as contour files and as point data from Mobile County. Additionally, 3 meter DEMs were collected from the U.S. Department of Agriculture Natural Resource Conservation Service and small area of LiDAR data was acquired from the U.S. Geological Survey that was part of a study of the TMC and Mobile-Tensas Delta.

Demographic/Socio-Economic Data

Demographic and socio-economic data was collected for the project from the U.S. Census Bureau and the City of Mobile. This data included 2010 Census data for tracts, block groups and blocks that make up the project area.

Environmental Data

Environmental data was collected from a number of agencies. From the Alabama State Water Program data pertaining for islands and constructed ponds was collected in addition to PLSS data, National Wetland Inventory data, and HUC unit boundaries.

The City of Mobile provided storm water outfall locations, water body locations, wetlands data, landfill locations, and the location of swamps.

The largest set of environmental data was acquired from the Geological Survey of Alabama. This data was part of a previous compilation created in 2005. The compilation titled “Alabama Comprehensive GIS Inventory of Coastal Resources “includes physical characteristics (geology, hydrography, terrain), natural resources (mining, oil and gas) biological resources (ecoregions, oyster reefs, submerged grass beds), environmental quality (air quality, hazardous waste and materials, water quality), and natural hazard information (flood zones, land slide areas). Raster images were acquired from NASA illustrating the changes in land use and land cover from 1974 to 2008.

Infrastructure Data

Infrastructure data was collected from a number of sources for the project area. The City of Mobile provided the largest amount of infrastructure data. Data from the city included bike routes, bus routes, industrial parks, railroads, school locations, streets, and walking trails. Planimetric data from 2010 was also obtained from the City. This data included bridges, building footprints,

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cemeteries, dams, drainage features as both lines and points, driveways, fire hydrants, landfills, manholes, pipelines, pavement edges, pump stations, recreation facilities, runways, substations, sidewalks, swimming pools, towers, tree points, unpaved roads, and utility poles. As mentioned earlier, the City was also the source for storm water outfall locations. The Mobile County Revenue Commission, as part of the package of parcel and ownership data, provided a variety of data sets that delineate right-of-way lines throughout the project area.

Base Map Data

In addition to the data detailed above, a great deal of base map data was also collected for the project. Base map data collected from the City of Mobile included city council district boundaries, church locations, municipal and county boundaries, historic districts and sites, locations for multi-family residential and public housing developments, neighborhood boundaries, public parks, subdivisions, voting ward boundaries, and streets data.

From the Mobile Area Water and Sewer System (MAWSS) high resolution aerial imagery from 2010 was collected in the form of MrSID files.