	METROPOLITAN SEWER DISTRICT OF GREATER CINCINNATI FINAL MEETING SUMMARY	DIN:	
PROJECT GROUNDWORK your pipeline to clean water		Project ID:	11140010
		Page:	1 of 3

Project Name: SSO 700 Integrated Watershed Action Plan					
Meeting Date:	2/25/2016	Meeting Time:	7:30 AM	Location:	Evendale Recreation Center
Meeting Manager: Andrew Spurgeon					
Scribe: Kyle Van Dyk			Timekeeper:		

Objective: **Project Steering Committee Meeting**

The purpose of this meeting was to review the status of the project scope and schedule and to present and discuss key project data and developments with the Steering Committee.

Attendees (see attached sign-in sheet):

Hamilton County/County Monitor

- Commissioner Chris Monzel (for intro)
- Jeff Proctor
- Joe Graf
- Karen Ball
- Brian Bohl, Soil & Water Conservation Dist.
- Steve Johns, Planning & Development
- Brian Wamsley, Planning & Development
- Gena Bell

MSDGC

- Andy Spurgeon
- Tony Yee
- Pat Arnette

CH2M

- Frank Duran
- Katie Bollmer
- Kyle Van Dyk

Browne Engineering

- Don Cuthbert

Watershed Jurisdictions

- Jeff Agricola, Springdale
- Bob Ashbrock, Reading/CACC
- Richard Osgood, Sharonville
- Gordon Perry, Blue Ash
- James Jeffers, Evendale
- Jim Bothe, Evendale
- Patrick Ross, Reading

Other Entities

- Bruce Koehler, OKI Regional Council of Governments
- Marilyn Wall, Sierra Club
- Brandon Brummett, USACE Louisville
- Glen Vonderembse, Ohio EPA

Topic	Discussion
Welcome and Introduction	Commissioner Chris Monzel (CM) provided opening remarks and commended the project team for a safe and successful sampling program. Steve Johns (SJ) reviewed key project events thus far. Staff from the consultant team, County Monitor, Hamilton County, MSDGC, municipalities, and other organizations attended. See attached for a copy of the meeting presentation slides.
Project Overview & Summary of Key Project Tasks	Frank Duran (FD) reviewed the goal of the SSO 700 IWAP and the status of the project, including the project schedule. The project is currently focused on the development of the collection system model and water quality models. The project is on schedule. Katie Bollmer (KB) reviewed key project tasks including the Inventory and Gap Analysis, political jurisdiction meetings completed with municipalities covering 75% of the study area, the collection system model recalibration and the water quality model development. The water quality model framework is comprised of five individual models. At the start of the IWAP project, three of the

Topic	Discussion
	models were available, but required recalibration or further development to support the IWAP. Two of the models did not exist in any form and are being developed for this project.
Water Quality Data Collection Program	KB discussed the gaps in the available water quality data identified during the Inventory and Gap Analysis task and the Water Quality Model Assessment task. The Water Quality Data Collection Program was developed to fill these gaps and was comprised of the following three components: • Dry Weather Sampling • Wet Weather Sampling • Instream Flow Measurements KB thanked those who supported the Water Quality Data Collection Program, including staff from the political jurisdictions and MSDGC. The consultant team for the program was comprised of the following members: CH2M, LimnoTech, Browne E&C, and Alloway Laboratories. The sampling program involved sampling at 17 locations during dry weather events and 31 locations during wet weather events. Instream flow data were collected at 7 tributary locations. A sampling location map was provided to meeting attendees and is included in this meeting summary. The following is a breakdown of sampling locations: • 12 In-stream locations • 5 Upstream Tributary Locations • 6 CSOs and SSOs • 7 Storm Outfall Locations • SSO 700 Storage and Treatment Facility Effluent Samples were collected during 3 dry weather events (plus one partial dry weather event that was interrupted by rainfall) and 4 wet weather events from June through November of 2015. Sampling events captured a range of dry and wet weather conditions, including low-flow conditions and varying rainfall depths and intensities. Wet weather samples were collected at intervals capturing the full hydrograph for each rainfall event. 103 dry weather samples and 496 wet weather samples were collected. Samples were analyzed by Alloway Laboratory for parameters that correspond to the likely causes of impairments to the stream network. KB summarized the data collected for *E. coli* at outfall locations including CSO, SSO, and storm outfalls. As expected, CSO and SSO outfalls had the highest *E. coli* concentrations. KB also summarized the *E. coli* data collected at the in-stream locations. As anticipated, median *E. coli* concentrations were higher during wet weather than during dry weather. The sampling program provided many unforeseen challenges. Forecasting rainfall timing and intensity proved to be very difficult. The logistics behind mobilizing/demobilizing an on-call labor force to collect 17 nearly simultaneous samples for a 24 hour sampling period were complex. Despite the challenges, the Water Quality Data Collection Program accomplished all objectives for accuracy, precision, completeness, representativeness, and sensitivity set forth in the program's Quality Assurance Project Plan and Sampling and Analysis Plan. No health and safety issues were reported during the program. Additionally, the program collected sufficient data for use in calibrating the SSO 700 IWAP water quality models.

Topic	Discussion
Status of Project Modeling	KB provided an overview of the models being developed under the water quality model framework and their current status. The collection system model is currently being recalibrated for a pilot metershed. Once approved by MSDGC/County staff, the remainder of the watershed will be recalibrated. Subcatchments for the SWMM watershed runoff model have been developed, and the model is currently being calibrated for flow. The model grids for the EFDC and WASP models were extended up into the primary tributaries, and the hydraulics of the EFDC model are currently being calibrated.
Status of Schedule & Next Steps of the IWAP	The next steps for the SSO 700 IWAP study are the following: • Finalize and calibrate the hydraulic and water quality models (May/June 2016). • Identify pollution sources & evaluate the collection system and waterway response (July-August 2016). • Develop a Summary Report (Late 2016 and Early 2017). FD indicated that input on potential projects from political jurisdictions and County/MSDGC staff will be critical from July through December 2016. The Steering Committee should expect the project team to be reaching out more frequently in the coming months as the project alternatives begin to be analyzed.
Questions & Review of Action Items	• Marilynn Wall (MW) asked whether possible jurisdictional ordinances, zoning changes, or downspout disconnection regulations were being looked at as a part of this project. FD replied that the primary goal of the project is to identify a mix of grey infrastructure, green infrastructure, and watershed-based controls for implementation to comply with MSDGC's consent decree obligations. As part of this effort, the project team may also make recommendations for ordinance changes; however, because ordinances take a long time to change and then implement, these would not be a focal point of the IWAP. MW asked what the timeline for ordinance recommendations would be. FD said recommended alternatives would be presented at the end of 2016. • Bruce Koehler (BK) asked if the stream flow data indicates that stream flows appeared to relate directly to rainfall or if other industrial discharges may be the sources of considerable flow. FD responded that the data indicate that flow in the mainstem and tributaries within the study area is runoff dependent. • MW asked how the collection system model work will be coordinated with MSDGC's System Wide Model. FD indicated that the re-calibrated SSO 700 IWAP model will be given back to MSDGC for incorporation into the System Wide Model. • Brian Bohl (BB) asked whether stream ecology/biology was being examined as part of this project. FD replied that stream biology was examined under a separate project managed by Midwest Biodiversity Institute (MBI). MBI's data are being used to inform the SSO 700 IWAP project.

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Metropolitan Sewer District of Greater Cincinnati

Meeting Attendance Sheet

Project ID:	11140010
Page No.:	1 of 1

Subject: SSO 700 IWAP - Stakeholder Steering Committee Meeting

Meeting Date/Time: 2/25/2016 7:30 AM

Meeting Manager: Andrew Spurgeon

Location/Room: Evendale Recreation Center

Name	Company	Phone	Email	Signature
Patrick Ross	City of Reading	513-376-2501	PROSS@READINGOHIO.ORG	
Gena Bell	Hamilton County	513-946-4410	gena.bell@hamilton-co.org	
Don Cuthbert	Browne Eng	5191050	don@brownee.com	
James Jeffers	EVENDALE	543-5183	JJEFFERS@JACE.NET	
Bill Ashbrock	READING	563-0767	rjrjzshbrock@fuse.net	
Brandon Brummett	USACE Louisville	502 315 6883	brandon.r.brummett@usace.army.mil	
Glen Vonderembse	Ohio EPA	937.285.6033	glen.vonderembse@epa.ohio.gov	
Joe Graf	Hamilton County	6544322746	joe.graf@plantemoran.com	
Gordon Perry	City of Blue Ash	513-745-8545	gperry@blueash.com	
Patrick Annette	MSDGC	513-244-1344	PAT.ANNETTE@CINCINNATI-OH.GOV	
Jeff Americola	Springdale	513-346-5570	JAMERICOLA@SPRINGDALE.ORG	
Brian Bohl	UCSWCD	513-772-7645	brian.bohl@hamilton-co.org	
Jim Bothe	V. Evendale	513-563-4838	J.Bothe@Evendaleohio.org	
Katie Bollmer	CH2M	513.207.5579	KATIE.BOLLMER@CH2M.COM	
Kyle Van Dyk	CH2M	513-924-3158	Kyle.VanDyk@CH2M.com	

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Metropolitan Sewer District of Greater Cincinnati

Meeting Attendance Sheet

Project ID:	11140010
Page No.:	1 of 1

Subject: SSO 700 IWAP - Stakeholder Steering Committee Meeting

Meeting Date/Time: 2/25/2016 7:30 AM

Meeting Manager: Andrew Spurgeon

Location/Room: Evendale Recreation Center

Name	Company	Phone	Email	Signature
STEVE JOHNS	HAMILTON COUNTY	946-4457	steve.johns@hamilton-co.org	
Tony YEE	MSD	244 5180	Anthony.Yee	
Andrew Spurgeon	MSD	244-3919	andrew.spurgeon@cincinnati-oh.gov	
Bruce Koehler	OKI Regional Council of Gov't's.	513-619-7675	bkoehler@oki.org	Bruce Koehler
FRANK DREW	CH2M	378-9274	frank.drew@ch2m.com	
Marilyn Wall	Sierra Club	226-9235	marilyn.wall@sierraclub.org	MW
Jeff Proctor	Hamilton County Monitor	203.8386	jeffrey.proctor@hatchmott.com	
Brian Wansley	Ham Co Planning	946-4496	brian.wansley@hamilton-co.org	
Richard Osgood	City of Sharonville	563-0033	rosgood@cityofs	
Karen Ball	Hamilton Co.	557-5972	karen.ball@hamilton-co.org	

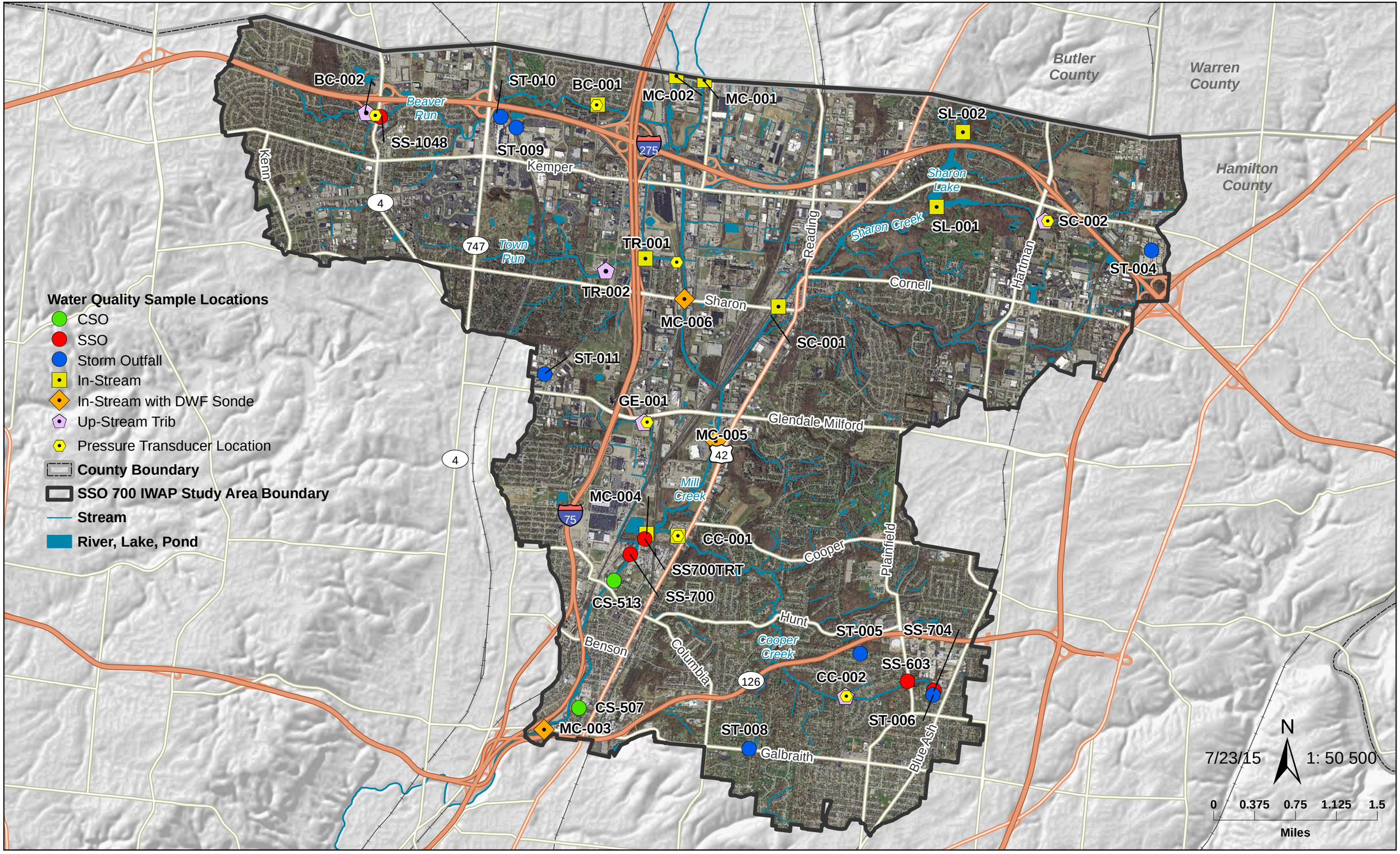
	METROPOLITAN SEWER DISTRICT OF GREATER CINCINNATI MEETING AGENDA	DIN:	
PROJECT GROUNDWORK your pipeline to clean water		Project ID:	11140010
		Page:	1 of 1

Project Name: SSO 700 Integrated Watershed Action Plan (IWAP) Study Project					
Meeting Date:	2/25/2016	Meeting Time:	7:30 – 8:30	Location:	Evendale Recreation Center
Meeting Manager: Andrew Spurgeon					
Scribe: Kyle Van Dyk			Timekeeper:		

Objective: **Project Steering Committee Meeting**

The purpose of this meeting is to review the status of project scope and schedule and to present and discuss key project data and developments with the Steering Committee.

Duration	Item	Lead
7:30	***Welcome and Introduction***	***Johns***
7:35	***Project Overview & Summary of Key Project Tasks***	***Duran & Bollmer***
7:45	***Water Quality Data Collection Program*** • Overview of Program Approach • Challenges & Successes • Summary of Data Collected	***Bollmer***
8:10	***Status of Project Modeling*** • Collection System Modeling • Water Quality Modeling	***Bollmer***
8:15	***Status of Schedule & Next Steps of the IWAP***	***Duran***
8:20	***Questions & Review of Action Items***	***Duran***



CH2MHILL.

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SSO 700 Integrated Watershed Action Plan

Steering Committee Meeting
February 25, 2016

INTRODUCTION

- On December 4, 2013, the Board of County Commissioners voted to authorize an IWAP for the SSO 700 area.
- MSDGC contracted with CH2M on November 20, 2014 to lead the consultant team.
- An initial step in the process was to determine the data needs. That was completed in May 2015
- After the previous stakeholder meeting in June 2015, the work of gathering the sampling data for the waterways within the SSO 700 watershed was initiated.
- The field sampling work took place from June through November.
- The presentation today will update you on the overall project progress, the completion of the sampling program, some of the data collected during the sampling program, and an update of the other project tasks.

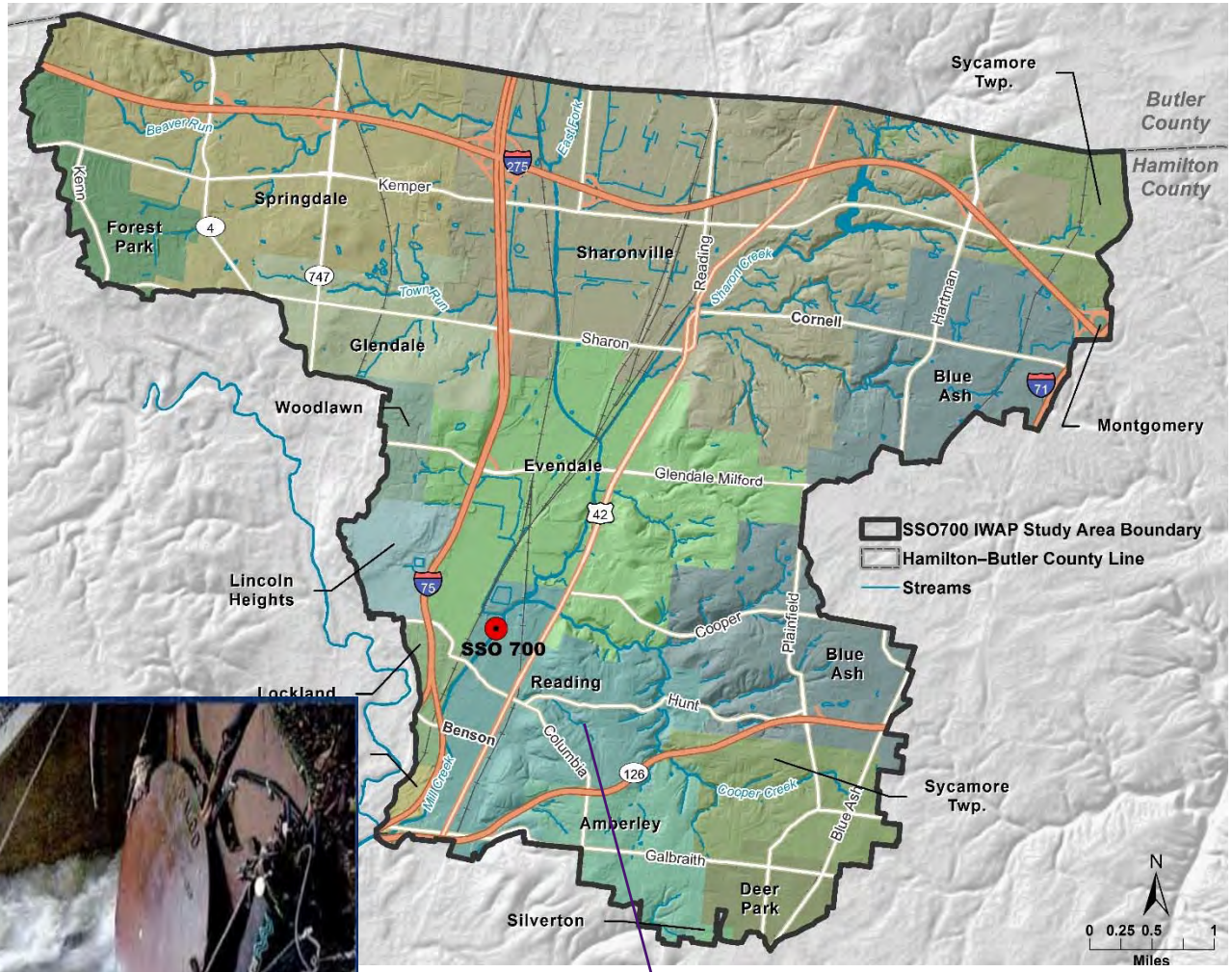
Agenda

- Welcome and Introduction
- Project Overview
- Review of Key Project Tasks
- Water Quality Data Collection Program
- Status of Project Modeling
- Status of Schedule & Next Steps
- Questions & Review of Action Items

Project Overview

Problem

- SSO 700 is the largest SSO in MSDGC's service area (approx. 38 MG of overflow annually to Mill Creek)
- MSDGC's Consent Decree requires elimination of overflow.
- Gray solution = $230 million, with no localized benefits
- BOCC directed that a watershed planning project be performed to develop a solution that will cost less and do more.



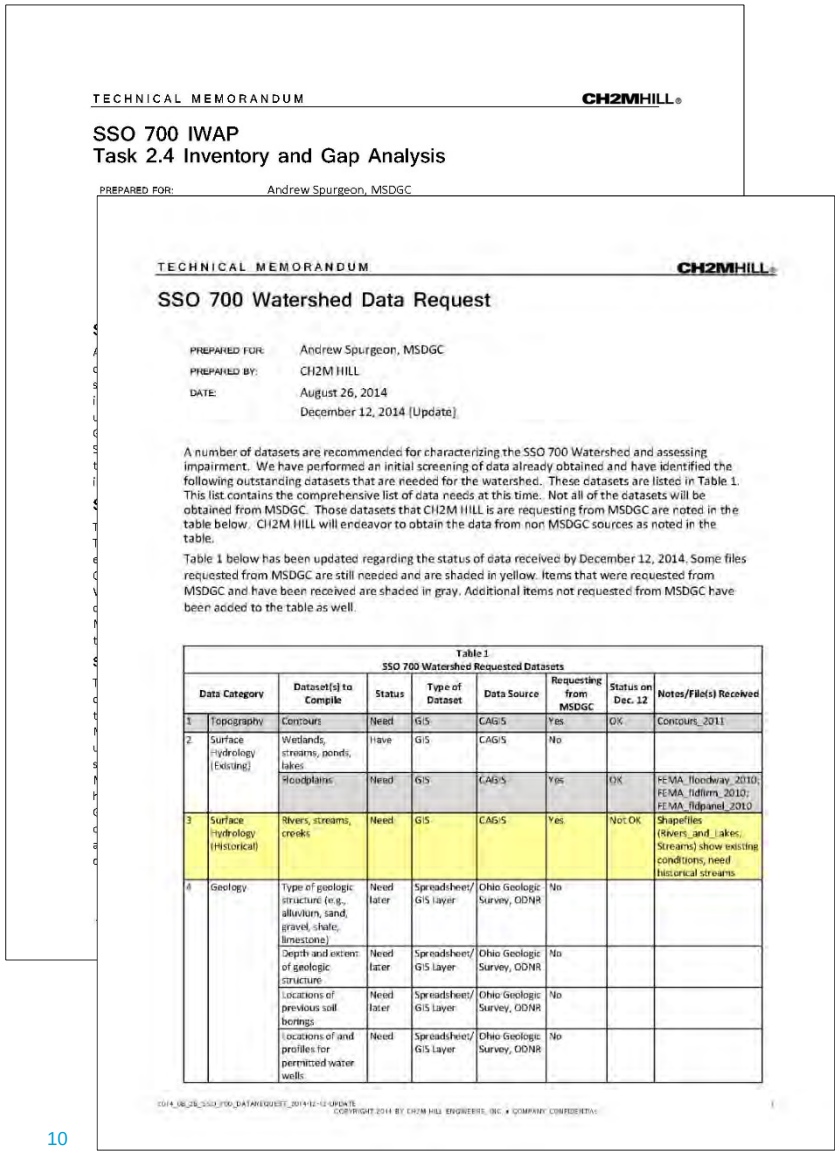
SSO 700 Sewershed = 35 Sq Miles; 16 Political Jurisdictions

Project Goal

A Plan to maximize improvement to in-stream water quality, obtain regulatory approval, and advance the economic development and quality of life for local watershed jurisdictions through an optimized and affordable suite of gray, sustainable, and watershed controls.

Review of Key Project Tasks

Data Collection & Gap Analysis



TECHNICAL MEMORANDUM CH2MHILL

SSO 700 IWAP
Task 2.4 Inventory and Gap Analysis

PREPARED FOR: Andrew Spurgeon, MSDGC

TECHNICAL MEMORANDUM CH2MHILL

SSO 700 Watershed Data Request

PREPARED FOR: Andrew Spurgeon, MSDGC
PREPARED BY: CH2M HILL
DATE: August 26, 2014
December 12, 2014 [Update]

A number of datasets are recommended for characterizing the SSO 700 Watershed and assessing impairment. We have performed an initial screening of data already obtained and have identified the following outstanding datasets that are needed for the watershed. These datasets are listed in Table 1. This list contains the comprehensive list of data needs at this time. Not all of the datasets will be obtained from MSDGC. Those datasets that CH2M HILL is are requesting from MSDGC are noted in the table below. CH2M HILL will endeavor to obtain the data from non MSDGC sources as noted in the table.

Table 1 below has been updated regarding the status of data received by December 12, 2014. Some files requested from MSDGC are still needed and are shaded in yellow. Items that were requested from MSDGC and have been received are shaded in gray. Additional items not requested from MSDGC have been added to the table as well.

Table 1
SSO 700 Watershed Requested Datasets

	Data Category	Dataset(s) to Compile	Status	Type of Dataset	Data Source	Requesting from MSDGC	Status on Dec. 12	Notes/File(s) Received
1	Topography	Contours	Need	GIS	CAGIS	Yes	OK	Contours_2011
2	Surface Hydrology (Existing)	Wetlands, streams, ponds, lakes	Have	GIS	CAGIS	No		
		Floodplains	Need	GIS	CAGIS	Yes	OK	FEMA_floodway_2010; FEMA_fldfirm_2010; FEMA_fldpanel_2010
3	Surface Hydrology (Historical)	Rivers, streams, creeks	Need	GIS	CAGIS	Yes	Not OK	Shapefiles (Rivers_and_Lakes; Streams) show existing conditions; need historical streams
4	Geology	Type of geologic structure (e.g., alluvium, sand, gravel, shale, limestone)	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Depth and extent of geologic structure	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Locations of previous soil borings	Need later	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		
		Locations of and profiles for permitted water wells	Need	Spreadsheet/ GIS Layer	Ohio Geologic Survey, ODNR	No		

2014_08_26_SSO_700_DATAREQUEST_2014-12-12-UPDATE
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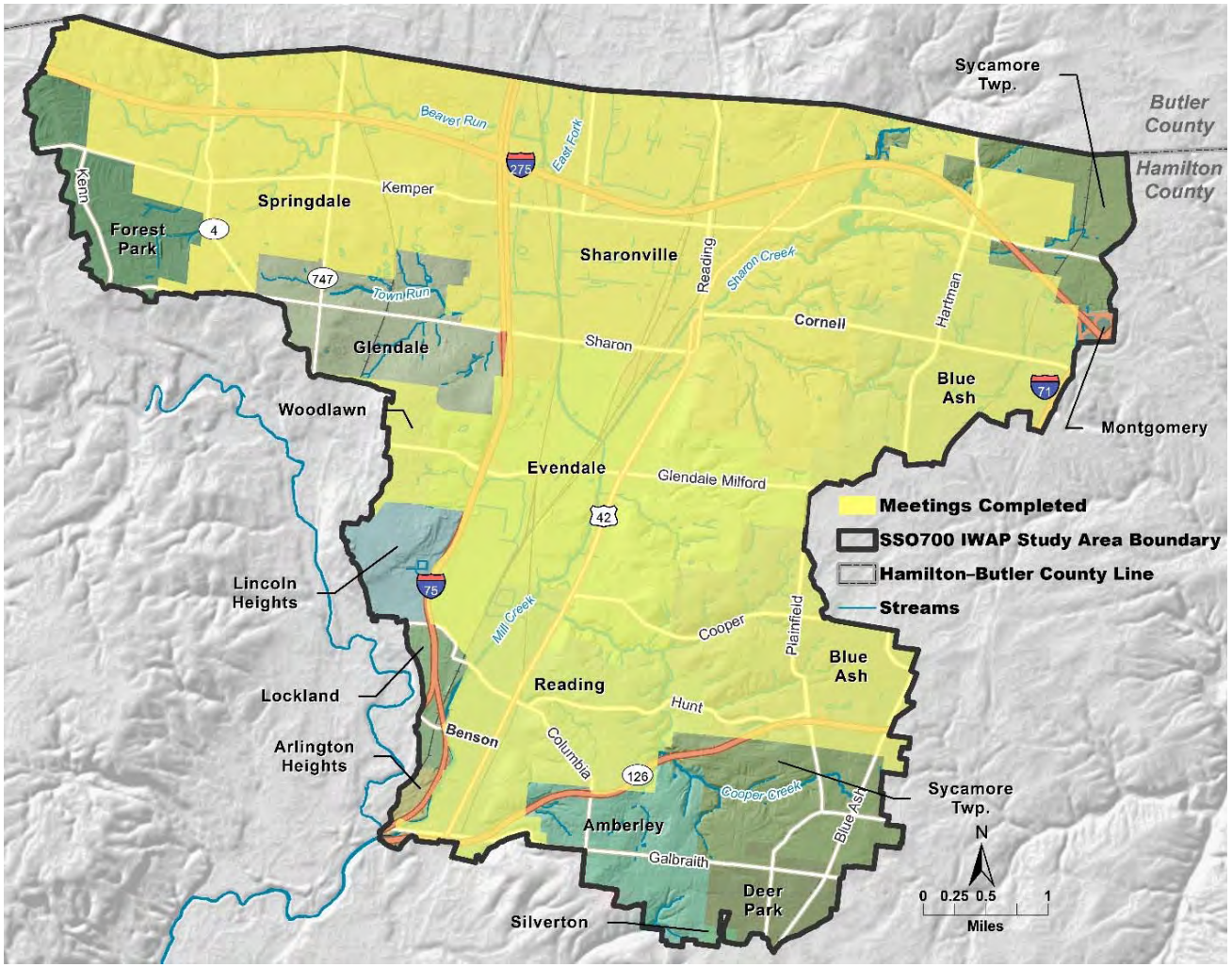
- Wide range of data collection needs summarized in Data Request Technical Memorandum:
  - Natural Systems: Topography, Surface Hydrology, Soils and Geology
  - Built Systems: Land Use, Land Cover, Sewers, Infrastructure,
  - Receiving Water Characteristics
  - Potential Pollutant Sources
  - Hydraulic Modeling Resources: System-wide Model, Flow Data, Rainfall Data
  - Water Quality Modeling Resources: WQ Model, WQ monitoring data, stream geometry
- Final Inventory and Gap Analysis TM submitted on September 23rd.

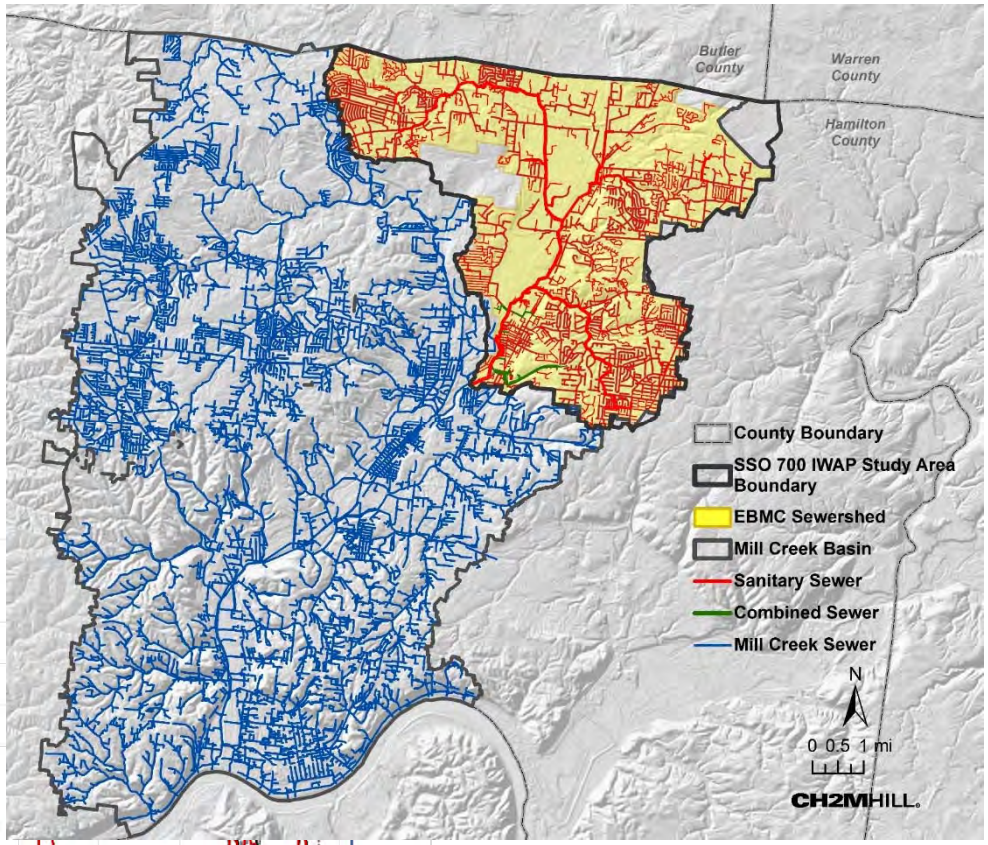
Meetings with Political Jurisdictions

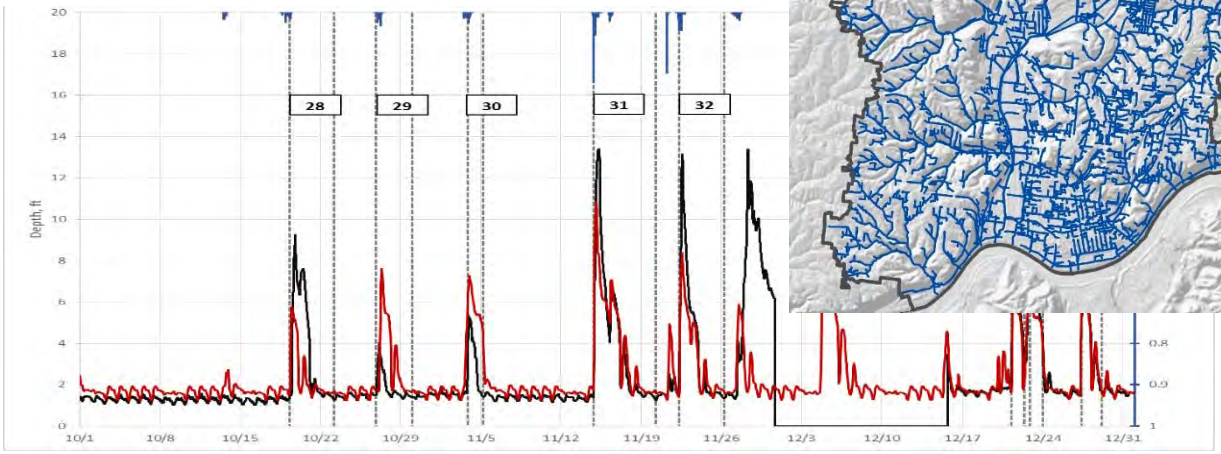
- Completed: Reading, Sharonville, Woodlawn, Blue Ash, Springdale, Evendale (75% of Watershed)
- Additional meetings with political jurisdictions in future phases of project.



Collection System Model Assessment

- Validated MSDGC's Collection System model for study area.
- None of the 15 flow monitoring locations validated to all 3 flow parameters.
- **Recommendation:** The entire East Branch Mill Creek sewershed hydraulic model should be recalibrated to meet current MSDGC modeling standards.





Water Quality Model Assessment & Recommended Modeling Framework for SSO 700 IWAP

SWMM Collection System
- Calculate SSO and CSO volumes
- Apply EMCs to calculate loads

SWMM Runoff
- Calculate runoff from pervious and impervious surfaces in separate sewer and unsewered areas
- Route flow and calculate travel time to outlet
- Apply EMCs to calculate loads

UpstreamFlow
- Develop timeseries of flow at County boundary based on scaling of USGS gage data
- Apply EMCs or monitored data if available

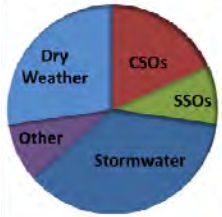
Hourly output of SWMM flow and pollutant load at multiple locations is processed and converted to EFDC input timeseries.

EFDC
- Estimate hydrodynamics of Mill Creek and major tributaries
- Calculate transport of conservative pollutants (chloride)
- Calculate transport and 1st order decay of pollutants (bacteria)
- Calculate transport and simple fate of pollutants (sediment and sediment associated parameters)

Models are integrated to directly pass variables back and forth.

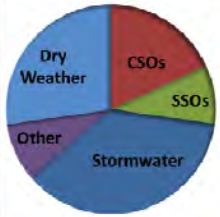
WASP
- Detailed water quality model to estimate
  - Nutrient cycling
  - Algal populations
  - Eutrophication
  - Dissolved Oxygen

Sources



Component Analysis

Impairment Causes



Water Quality Data Collection Program

Background

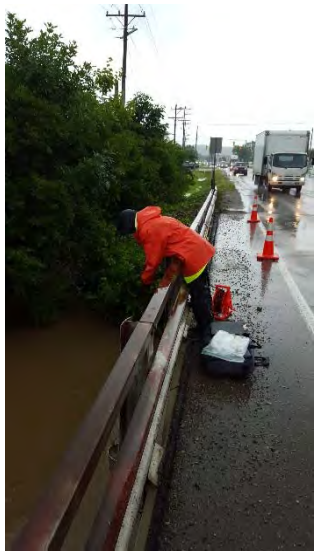
Gap analyses identified **three primary data gaps**:

- **Dry and wet weather measurements** of parameters of interest to characterize and calibrate watershed and surface water quality models
- **Observations from different land use types** for parameters of interest to characterize and calibrate watershed models
- **Flow data for tributaries** with which to calibrate watershed runoff model

Water Quality Data Collection Program developed to fill these requirements.

Sampling Components

- **Dry Weather Sampling:** water quality sampling in the Mill Creek and its tributaries
- **Wet Weather Sampling:** water quality sampling in the Mill Creek, its tributaries, and CSO, SSO and stormwater outfall locations
- **Instream Flow Measurement:** in tributary and upstream reaches to provide datasets for enhancing the hydrologic and hydraulic calibrations of the watershed and water quality models



Wet weather sampling at MC-001

Autosampler deployed at CSO-507 sampling manhole

Pressure transducer installation at TR-001

Program Roles

MSDGC – Provided use of Galbraith Facility & access to Telog alerts

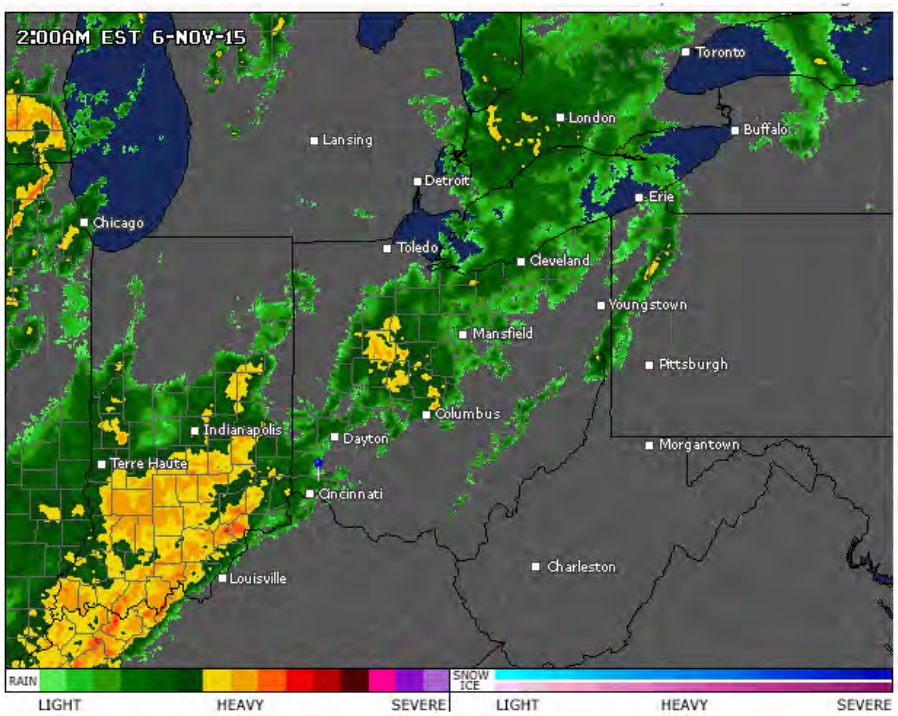
Political Jurisdictions – Assistance in identifying sample locations; Use of storm sewer.

CH2M – Project Management, Sampling Coordination, Technical Oversight

LimnoTech – Technical Oversight, Field Sampling Support

Browne E & C Services - Field Sampling

Alloway Laboratories – Sample Analysis



Radar at Hour 0 of Wet Weather Event 4

Summary of Water Quality Collection Sampling Components

Sampling Type	Condition	Sampling	Sampling Locations
Dry Weather In-Stream	Dry, no rain for previous 3 days	Grab Samples and in-situ physical measurements at all locations[1]	12 In-Stream Locations 5 Upstream Tributary Locations Sondes at three locations (MC003, MC005, and MC006)
Wet Weather In-Stream	Forecast for more than 0.5“ rain	Grab Samples and in-situ physical measurements 0.5-2.5 hours 4-6 hours 8-10 hours 14-16 hours22-24 hours	12 In-Stream Locations
Upstream Tributary Locations	Forecast for more than 0.5“ rain	Grab Samples - Pre-First Flush - First Flush - 30 min - 60 min	5 Upstream Tributary Locations
Wet Weather Outfall	Forecast for more than 0.5“ rain	- First Flush - 30 min - 60 min	13 Outfall Locations via autosampler 1 SSO 700 Treatment Facility Location: effluent via autosampler
Flow Characterization	Distributed over 90 day deployment	Pressure Transducers Manual flow measurements	7 Tributary Locations (BC-001, BC-002, SC-002, CC-001, CC-002, GE-001, TR-001)

[1] CSO, SSO, and Stormwater outfalls were not included in the dry weather sampling since there should be no flow during these periods.

SSO 700 IWAP Sampling Locations

Analytical and Field Parameters

Parameter	Description	Sampling Program	Type of Measurement
E. coli	Escherichia coliform	Dry, Wet	Grab
TSS	Total suspended solids	Dry, Wet	Grab
Cl-	Chloride	Dry, Wet	Grab
Copper	Total recoverable copper	Dry, Wet	Grab
Lead	Total recoverable lead	Dry, Wet	Grab
Zinc	Total recoverable zinc	Dry, Wet	Grab
Hardness	Hardness	Dry, Wet	Grab
CBOD5	5-day Carbonaceous Oxygen Demand	Dry, Wet	Grab(s)[1]
NH3	Total ammonia (NH3)	Dry, Wet	Grab(s)[1]
NO3+NO2	Nitrate plus nitrite (NO3+NO2)	Dry, Wet	Grab(s)[1]
TKN	Total Kjeldahl nitrogen	Dry, Wet	Grab(s)[1]
TP	Total Phosphorus	Dry, Wet	Grab(s)[1]
oPO4	ortho-Phosphate	Dry, Wet	Grab(s)[1]
Chl a	Chlorophyll a	Dry	Grab(s)[1]
TOC	Total organic carbon	Dry, Wet	Grab(s)[1]
DO	Dissolved oxygen	Dry, Wet	In-situ
		Dry	Continuous 3-5 days[1]
wTemp	Water temperature	Dry, Wet	In-situ
		Dry	Continuous 3-5 days[1]
pH	pH	Dry, Wet	In-situ
		Dry	Continuous 3-5 days[1]
Cond	Conductivity	Dry, Wet	In-situ

[1] The continuous DO monitoring were conducted at three locations in Mill Creek (see Table 1-1). Additional grabs for nutrient and BOD parameters were collected once per day during the continuous DO monitoring period at these three Mill Creek locations and at the Sharon Creek at Reading Road location where the USGS gauge is located.

Dry Weather Sampling Events

Dry Event Number	Start Date/Time	End Date/Time	Sampling Type	# of Grab Samples Collected
1	6/24/2015		Grab	17
	6/22/2015	6/25/2015	Continuous	12
2 (Partial)	8/17/2015		Grab	15
	8/16/2015	8/17/2015	Continuous	4
2	8/25/2015		Grab	15
	8/24/2015	8/28/2015	Continuous	12
3	10/5/2015		Grab	16
	10/9/2015	10/9/2015	Continuous	12

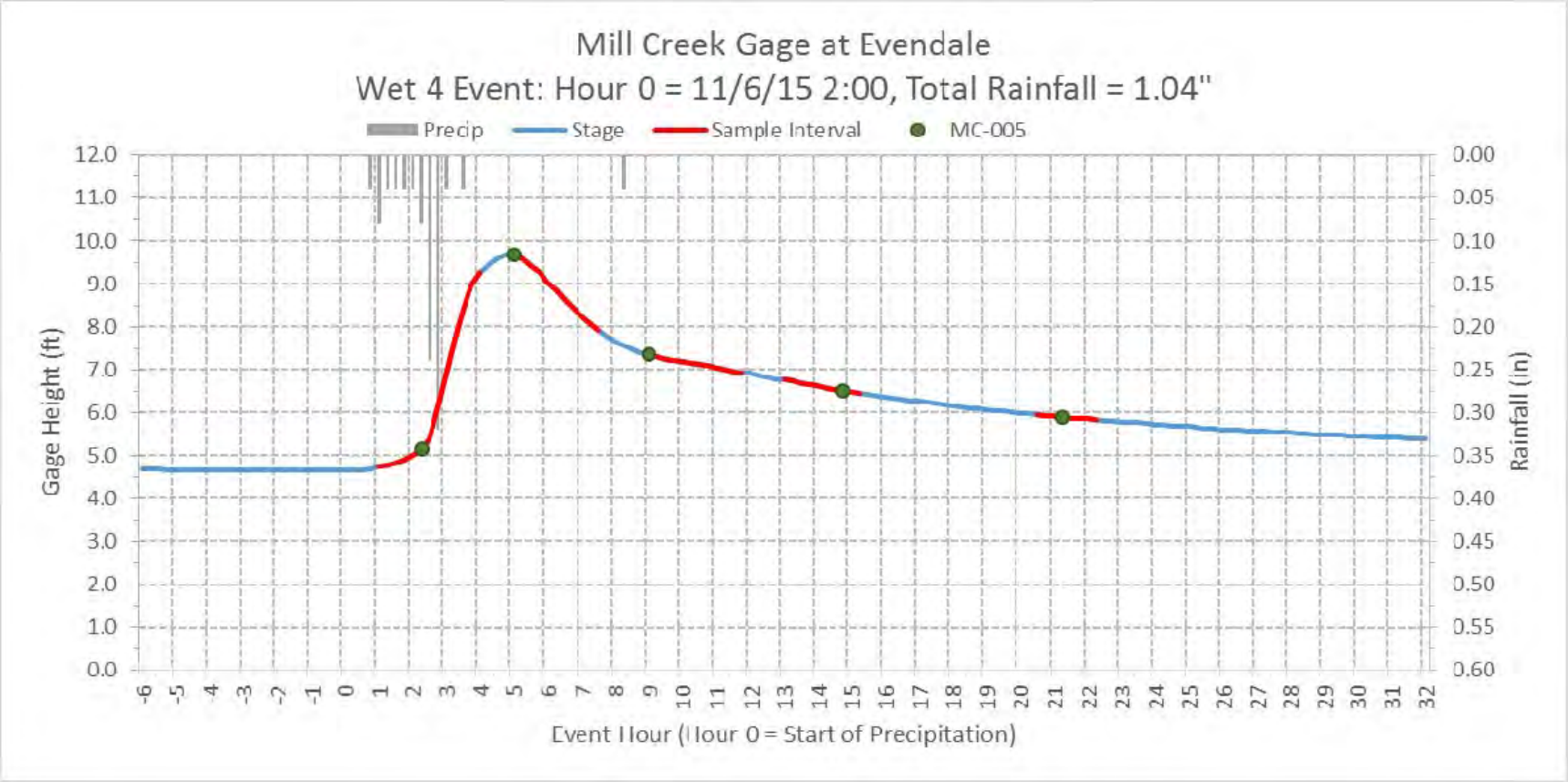
Total Dry Weather Samples Collected = 103

Wet Weather Sampling Events

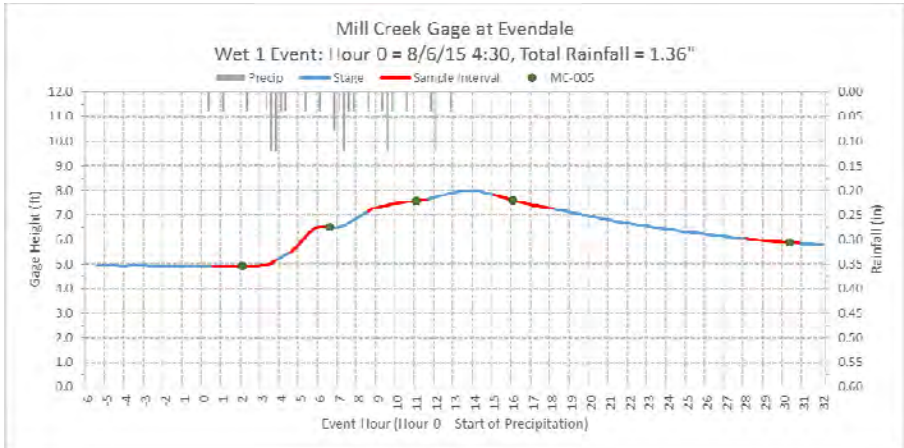
Wet Event Number	Start Date/Time	End Date/ Time	Rainfall Depth	Maximum Hourly Rainfall Intensity	# of Grab Samples Collected
1	8/5/2015	8/6/2015	1.36 in. (<3 mo.)	0.28 in/hr	In-stream: 61 Upstream Tribs: 20 Outfalls: 25
2	9/29/2015	9/30/2015	0.48 in. (<2 mo.)	0.08 in/hr	In-stream: 78 Upstream Tribs: 18 Outfalls: 9
3	10/27/2015	10/28/2015	2.44 in. (1 year)	0.32 in/hr	In-stream: 90 Upstream Tribs: 19 Outfalls: 47
4	11/6/2015	11/7/2015	1.04 in. (<2 mo.)	0.68 in/hr	In-stream: 78 Upstream Tribs: 19 Outfalls: 32

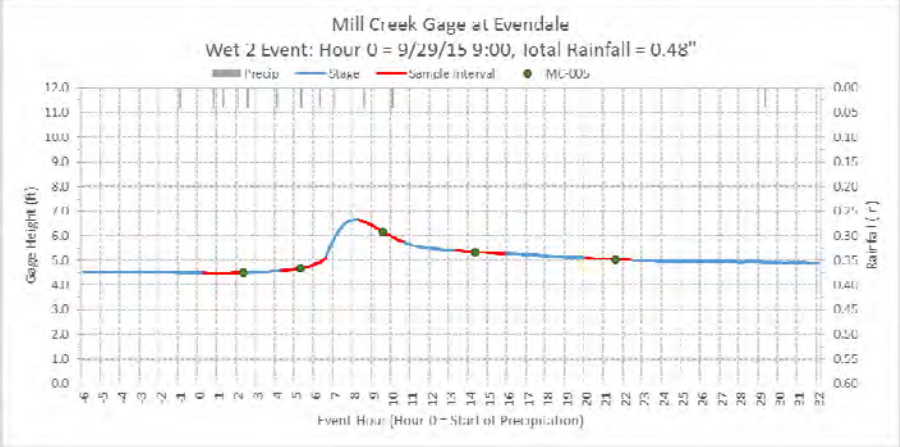
Total Wet Weather Samples Collected = 496

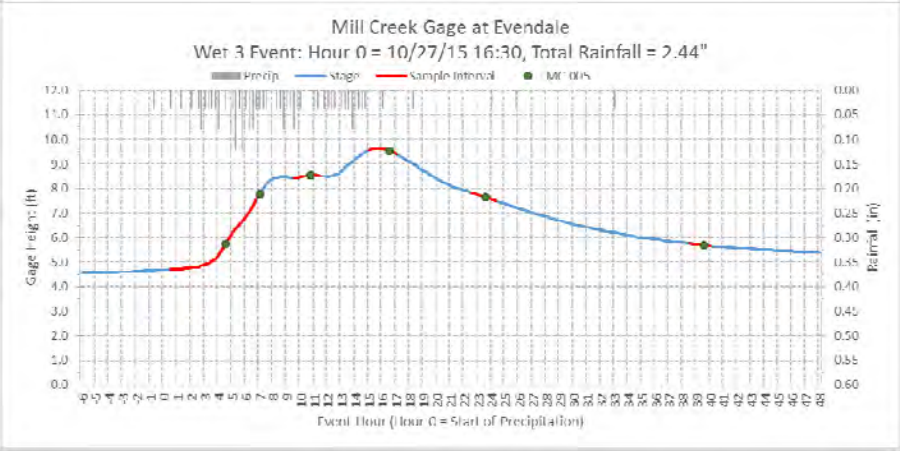
Representativeness of Wet Weather Sampling

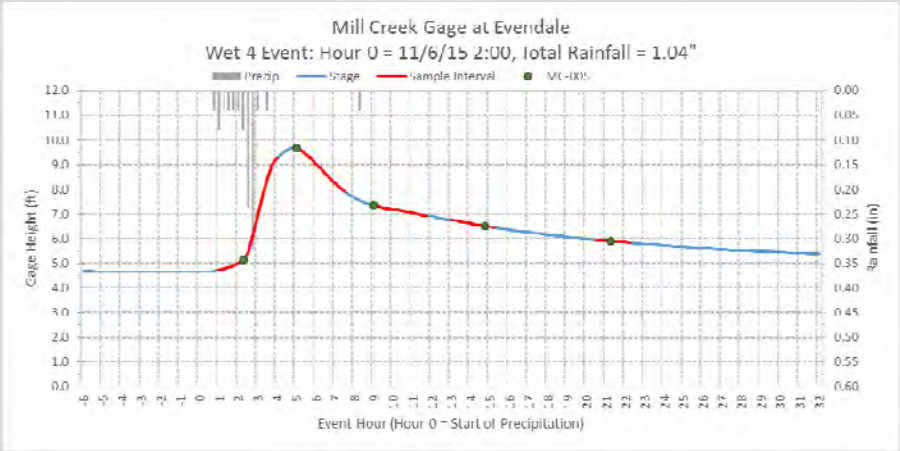


Representativeness of Wet Weather Sampling



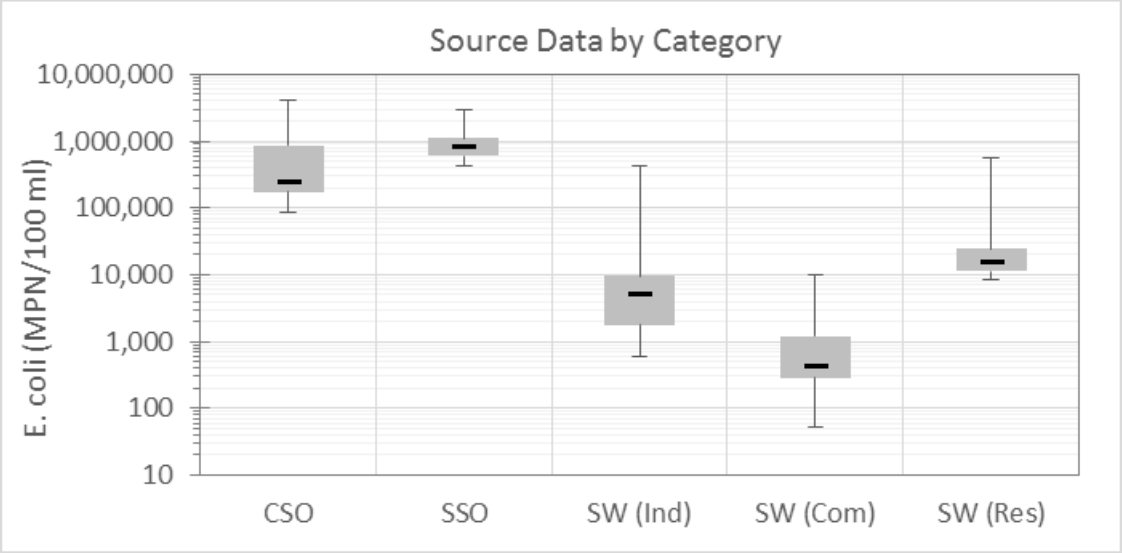




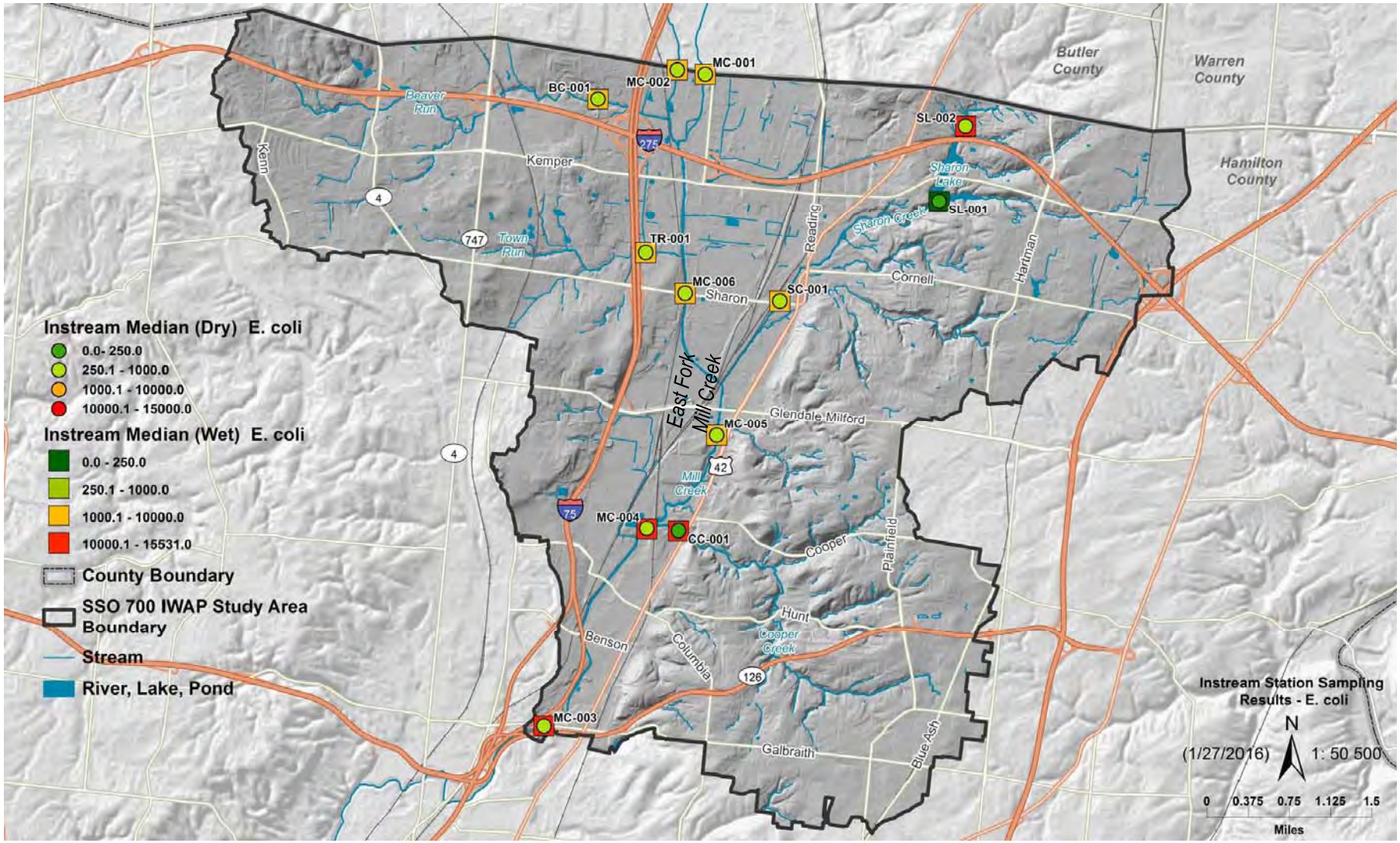


Outfall Statistics *E. coli* (MPN/100 ml)

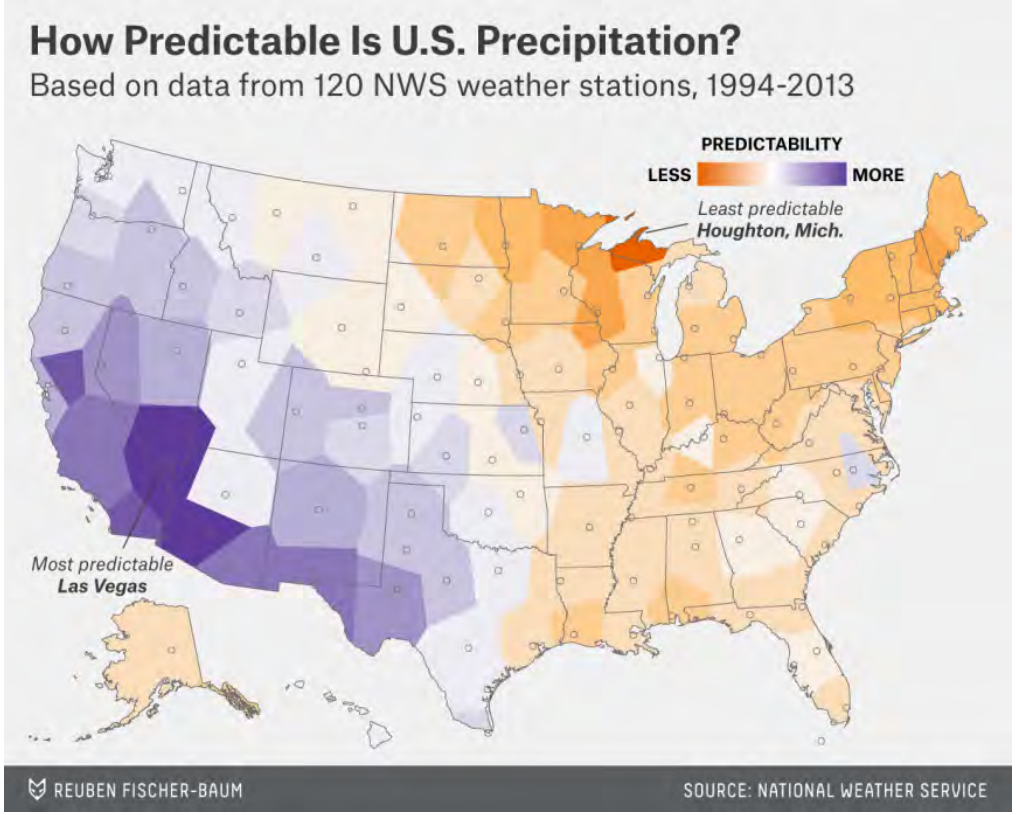
All Locations	Number of Samples Collected	Minimum Concentration	Median Concentration	Average Concentration	Maximum Concentration
CSO	13	84,000	256,000	849,077	4,106,000
SSO	15	414,000	857,000	963,733	2,909,000
SW (Ind.)	27	605	5,172	30,252	426,000
SW (Com.)	22	52	447	1,449	10,000
SW (Res.)	21	8,664	15,531	47,582	565,000



Instream Sampling Results – *E. coli*



Water Quality Data Collection Program – Lessons Learned

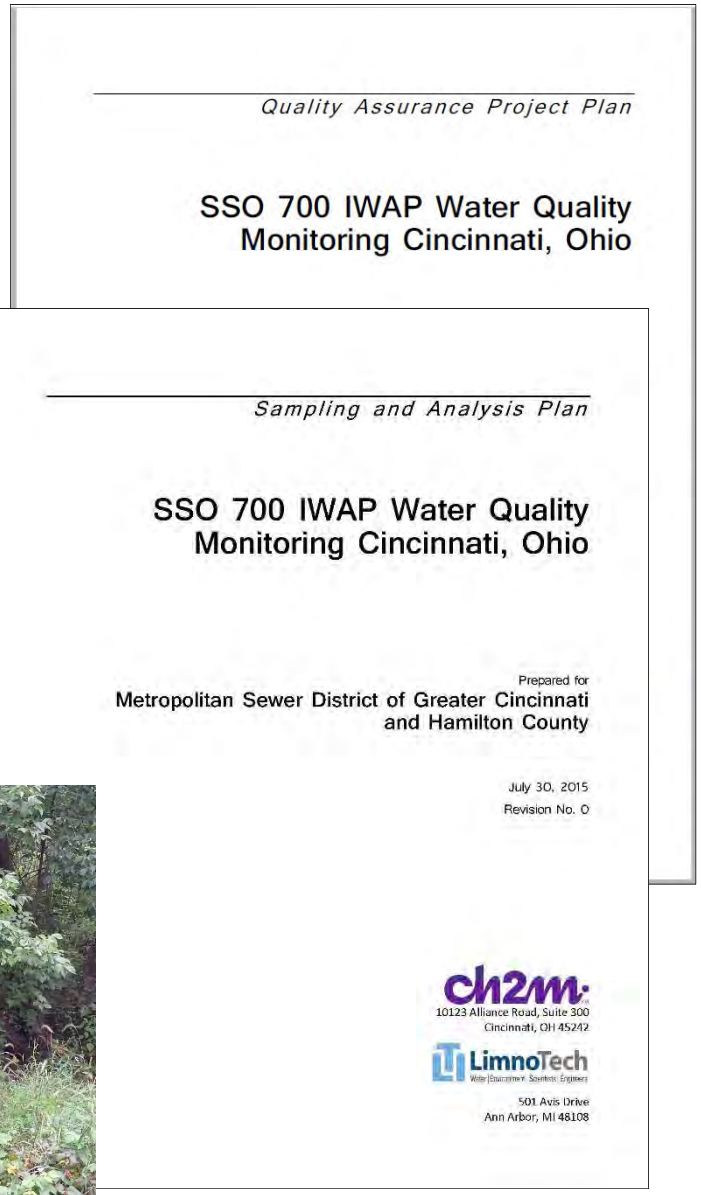


Challenges:

- Forecasting the timing and amount of rainfall is challenging.
- 17 nearly simultaneous grab samples and sampling for 24 hours requires a significant labor effort during wet weather events.
- Use of large force of on-call labor limits flexibility in mobilization and demobilization.
  - Event must be targeted early:
    - 24-hour advance warning of targeted event.
    - 3-hour advance authorization to mobilize around estimated start of rain.
  - Demobilization and remobilization to address changing weather conditions not realistic.

Mission Accomplished

- Objectives of the QAPP and SAP were met: accuracy, precision, completeness, representativeness, sensitivity
- Data collected for a variety of wet weather and dry weather conditions.
- Data meets needs for model calibration.
- No health and safety issues.



Quality Assurance Project Plan

SSO 700 IWAP Water Quality Monitoring Cincinnati, Ohio

Sampling and Analysis Plan

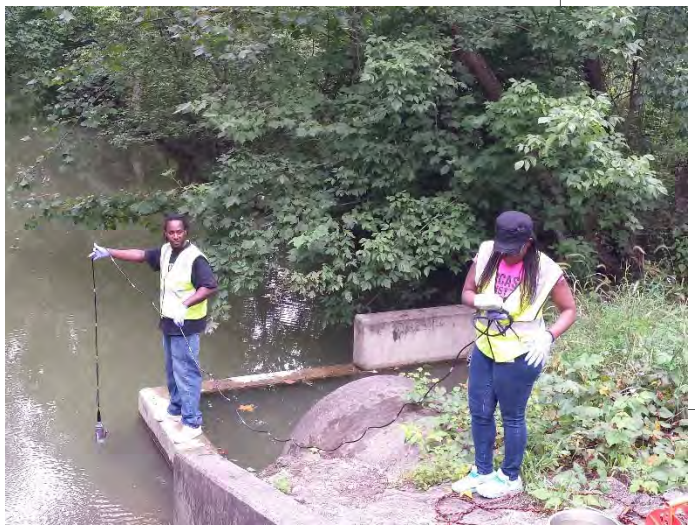
SSO 700 IWAP Water Quality Monitoring Cincinnati, Ohio

Prepared for
Metropolitan Sewer District of Greater Cincinnati and Hamilton County

July 30, 2015
Revision No. 0

ch2m
10123 Alliance Road, Suite 300
Cincinnati, OH 45242

LimnoTech
501 Avis Drive
Ann Arbor, MI 48108



Status of Project Modeling

Recall: Modeling Framework for SSO 700 IWAP

SWMM Collection System
- Calculate SSO and CSO volumes
- Apply EMCs to calculate loads

SWMM Runoff
- Calculate runoff from pervious and impervious surfaces in separate sewer and unsewered areas
- Route flow and calculate travel time to outlet
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UpstreamFlow
- Develop timeseries of flow at County boundary based on scaling of USGS gage data
- Apply EMCs or monitored data if available

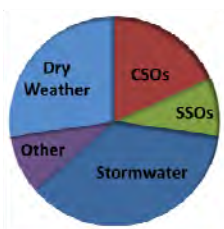
Hourly output of SWMM flow and pollutant load at multiple locations is processed and converted to EFDC input timeseries.

EFDC
- Estimate hydrodynamics of Mill Creek and major tributaries
- Calculate transport of conservative pollutants (chloride)
- Calculate transport and 1st order decay of pollutants (bacteria)
- Calculate transport and simple fate of pollutants (sediment and sediment associated parameters)

Models are integrated to directly pass variables back and forth.

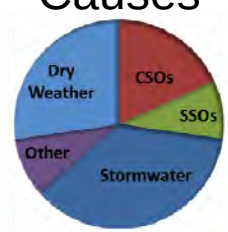
WASP
- Detailed water quality model to estimate
  - Nutrient cycling
  - Algal populations
  - Eutrophication
  - Dissolved Oxygen

Sources



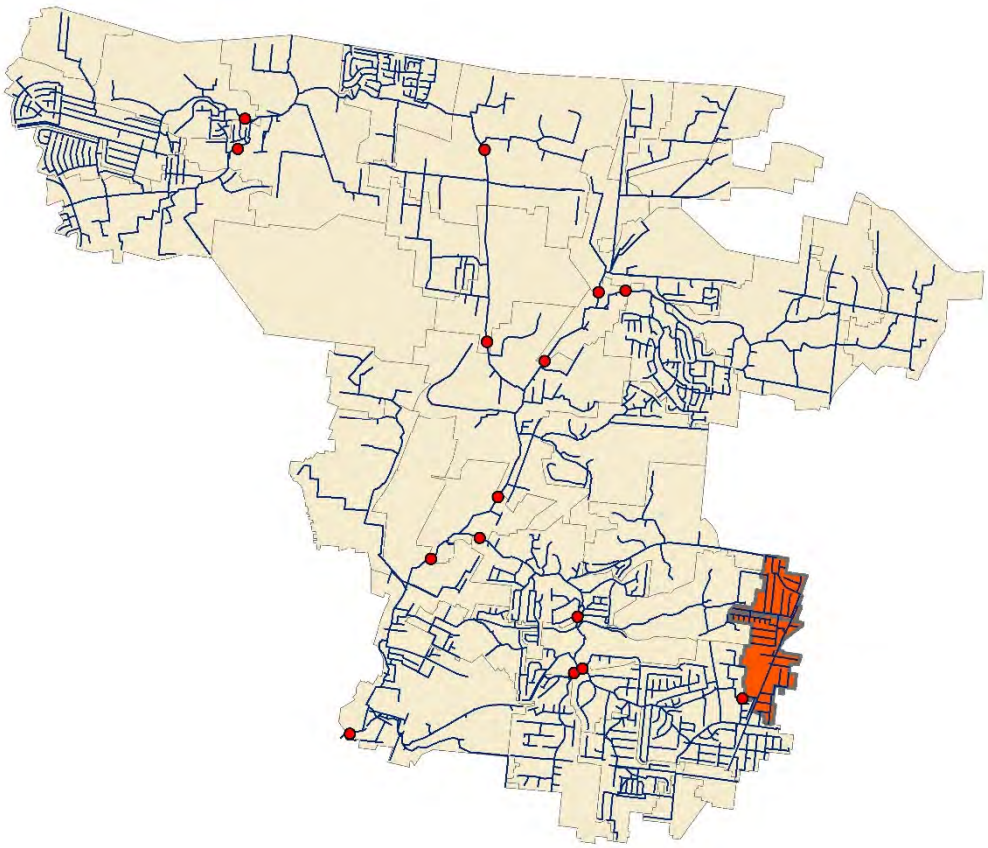
Component Analysis

Impairment Causes



Collection System Re-calibration Status

- Currently re-calibrating one pilot metershed.
- Once approved, remainder of sewershed will be re-calibrated.



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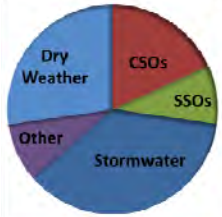

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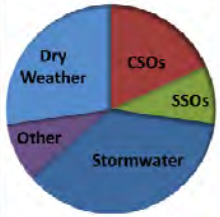
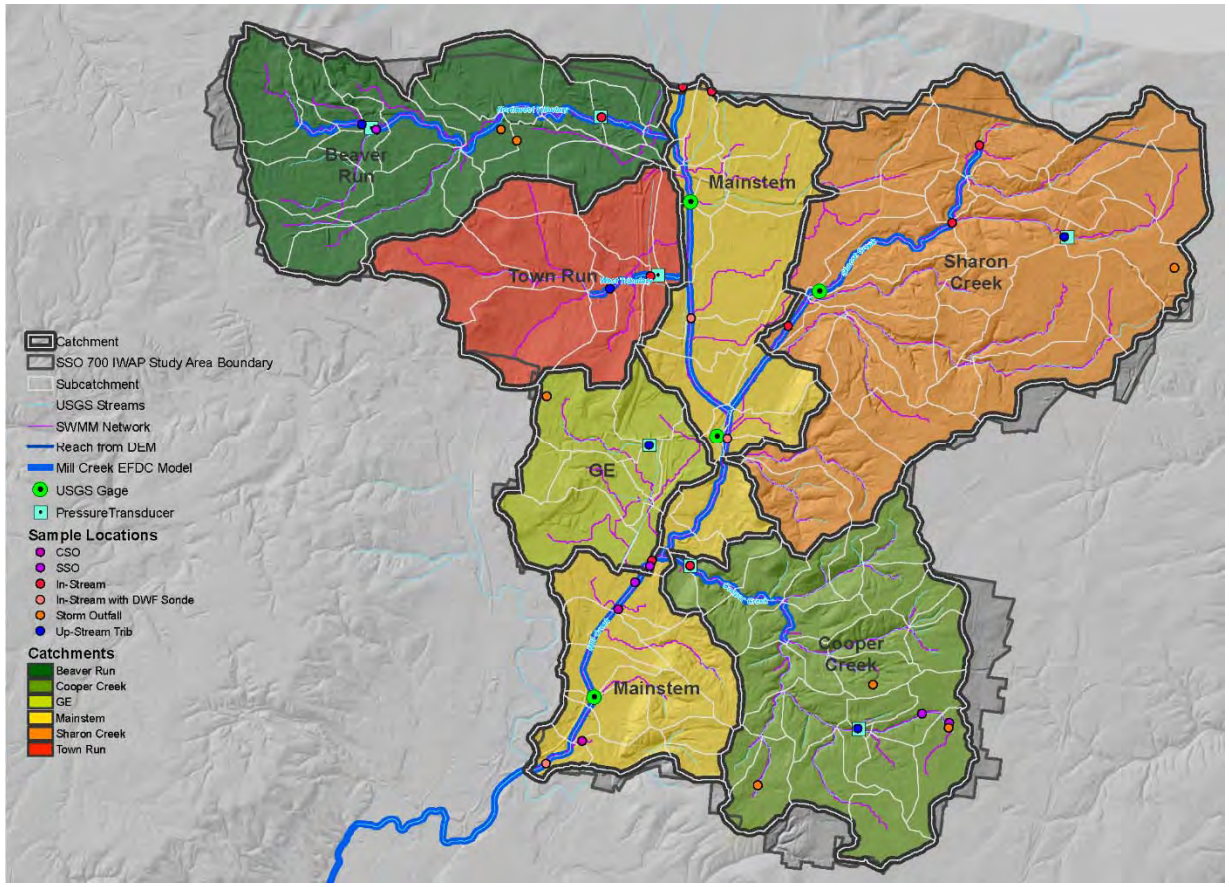


Watershed Modeling Status

- Develop Watershed Runoff Model:
  - Developed SWMM Subcatchments
  - Building SWMM model and populating parameters.
- Develop boundary condition flow and loading.



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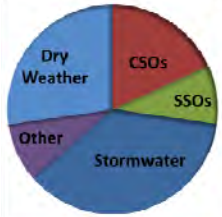

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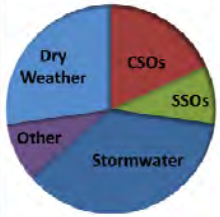
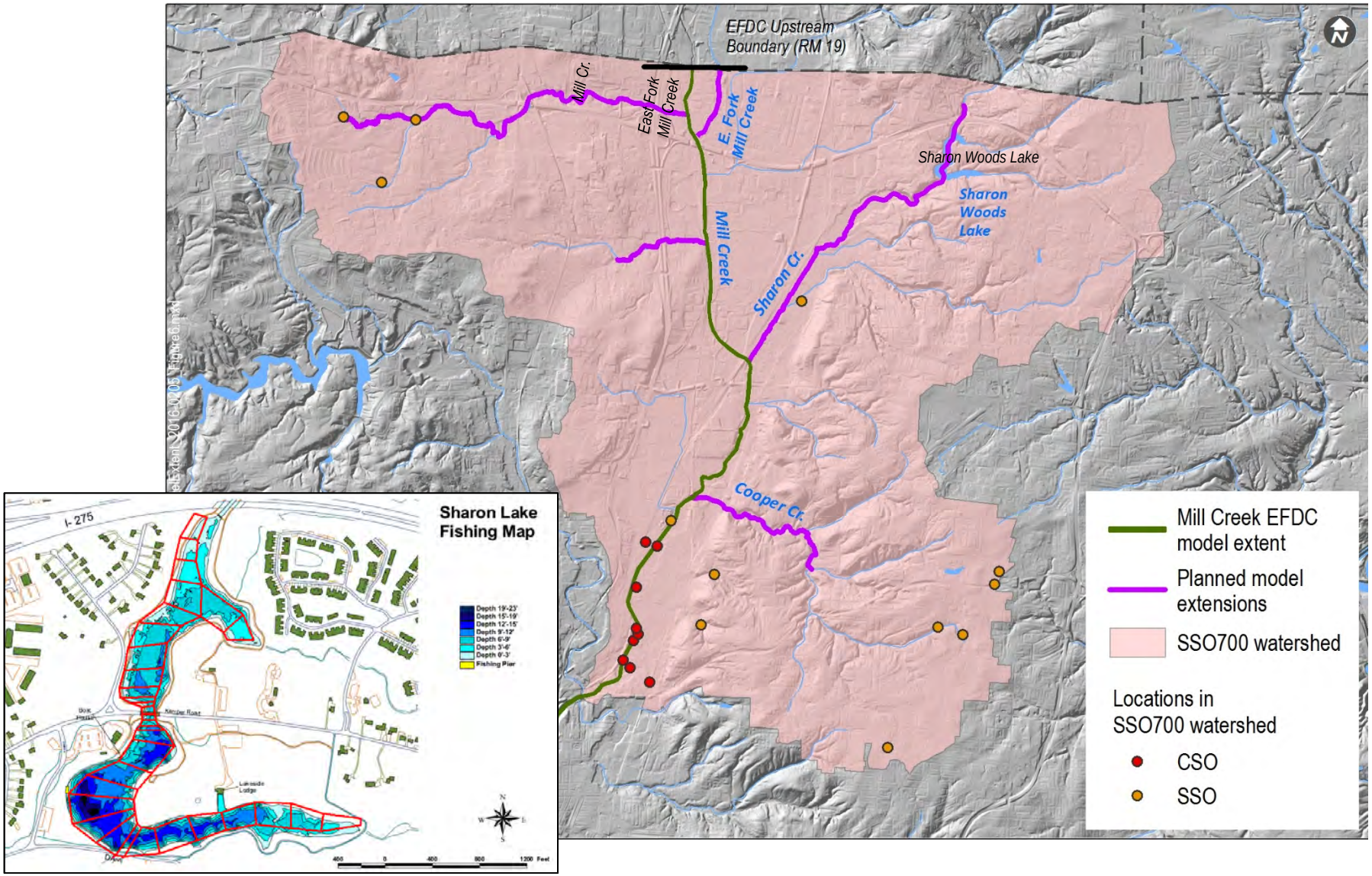
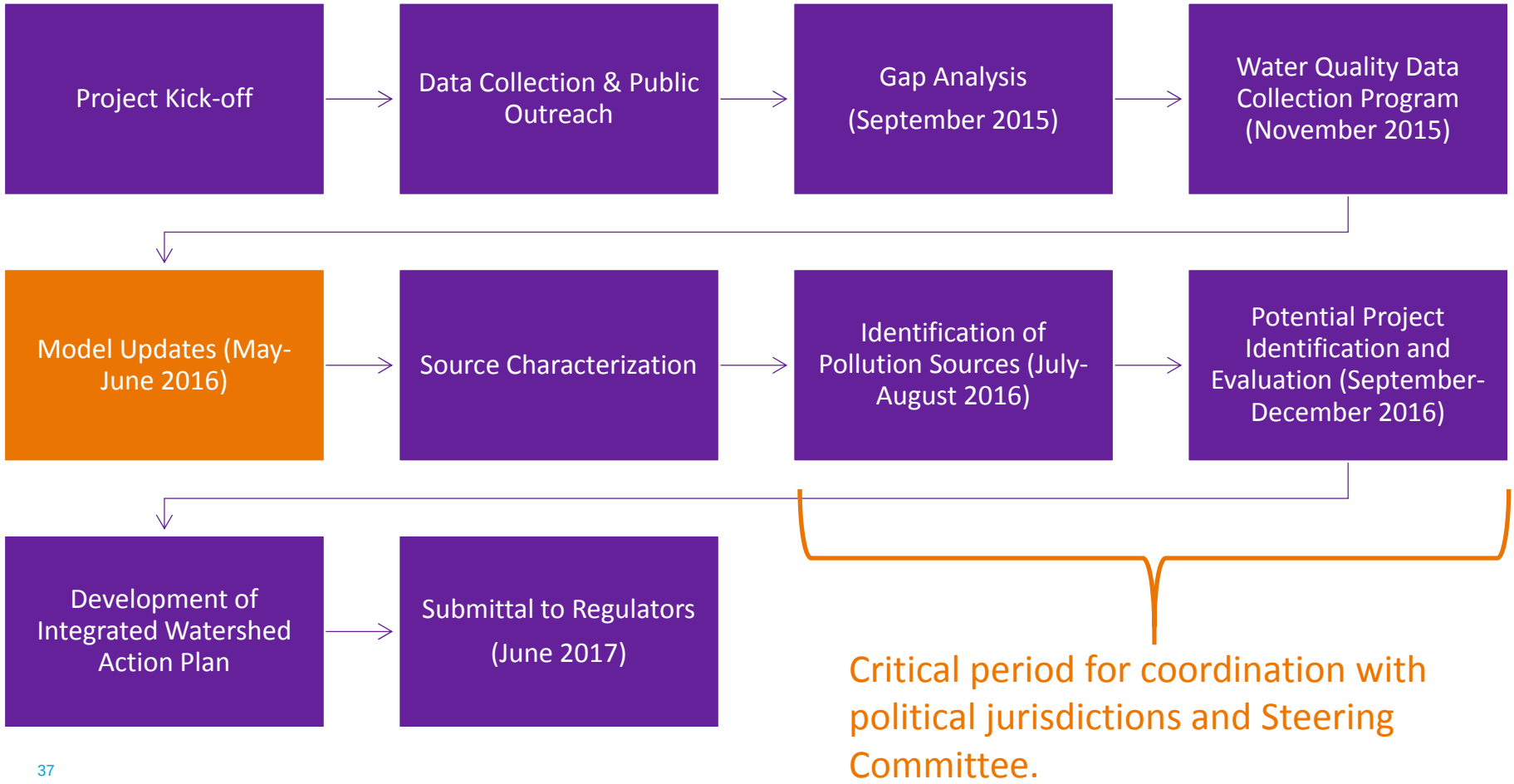


EFDC/WASP Model Grid Extension and Update



Status of Schedule & Next Steps

Where we are in the IWAP process



Questions & Review of Action Items

Thank You