

Bergen County Utilities Authority
Supplemental CSO Team - Meeting #7
BCUA Administration Building, Public Meeting Room
December 4, 2018, 10:00 AM
DRAFT Meeting Minutes

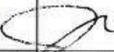
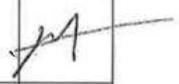
Attendees – See attached sign in sheet

- 1) Introduction
 - a) The meeting opened at 10:00 AM
 - b) The team members introduced themselves and the new members were welcomed.
 - c) John Dening began with a safety minute on cold weather.
 - d) John Dening reviewed the topics discussed at the last quarterly meeting held in October and asked if there were any questions from the prior meeting. No questions were asked at that time about previous topics.
- 2) Presentation by Frank Brilhante about the modeling of green infrastructure.
 - a) Presentation slides are attached.
 - b) There was a question regarding the modeling parameters selected for the green infrastructure. Mr. Brilhante indicated they were typical values based on NYC projects.
 - c) There was a question regarding the cost of green practices. The presentation was returned to the costs slide which showed that depending on the practice and size the costs per acre of impervious treated could vary greatly.
 - d) The results of the analysis are based on reduction in overflow volumes and do not directly account for pollutant reductions achieved by the green infrastructure practices.
- 3) Presentation by Richard Isleib on the regional water quality model.
 - a) Presentation slides are attached.
 - b) There was a question regarding where the receiving water salinity was measured. Mr. Isleib indicated they looked at both the surface and the bottom layer of the water.
- 4) The member's engineers were asked to give a brief overview of their ongoing alternatives work.
 - a) Fort Lee
 - i) Looking at storage, but available area is limited, and any facilities would need to go on private property.
 - b) Hackensack
 - i) Looking at inflow and infiltration reduction.
 - ii) Investigating sewer separation.
 - c) Ridgefield Park
 - i) Evaluating available space for facilities.
 - ii) Evaluating green infrastructure locations.
 - iii) Evaluating volume controls
 - d) BCUA

- i) Investigating interceptor capacity
 - ii) Investigating secondary treatment bypass.
- 5) NJDEP comments on the Public Participation Process Report
 - a) A 30-day extension was granted and responses are due by Jan 6th.
 - b) The BCUA CSO Group members are meeting to discuss the draft responses.
- 6) Characterization Report
 - a) NJDEP indicated comments are being finalized and should be expected by the end of the year.
- 7) Discussions on date for next CSO Supplemental Team meeting.
 - a) March 12, 2019 is the tentative date for the next meeting
- 8) Meeting concluded at 11:15 am.

Minutes submitted by John Dening

Bergen County Utilities Authority
Supplemental CSO Team
Meeting Number 7
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Name	Organization	Email	initials
John Rolak	Mott MacDonald	John.rolak@mottmac.com	
John Dening	Mott MacDonald	John.dening@mottmac.com	
Donna Gregory	Mott MacDonald	Donna.gregory@mottmac.com	
Susan McVeigh	Health Officer, Hackensack	smcveigh@hackensack.org	
Francis Reiner	Senior Urban Designer, LLA-PP	francisr@dmrarchitects.com	
Mark Olson	Chairman, Green Team	Mark-olson@verizon.net	
Stephen Quinn	Ridgefield Park Environmental Commission	stephencquinn@aol.com	
Bob Applebaum	Borough of Fort Lee	Bappelbaum@aol.com	
Jan Goldberg	Borough of Fort Lee	j-goldberg@fortleenj.org	
Captain Bill Sheehan	Hackensack Riverkeeper	captain@hackensackriverkeeper.org	
Michelle Langa	Hackensack Riverkeeper, attorney	legal@hackensackriverkeeper.org	
Wayne Vreisema	Hackensack Health Department	wvriesema@hackensack.org	
Alan O'Grady	Ridgefield Park	aog560@aol.com	
Del Bove, Mark	Arcadis	Mark.DelBove@arcadis.com	
Dominic DiSalvo	BCUA	ddisalvo@bcua.org	
Edward Mignone	Fort Lee	E-Mignone@fortleeni.org	
Gary Grey	HDR	Gary.Grey@hdrinc.com	
Robert Laux	BCUA	rlaux@BCUA.org	

left HDR

Name	Organization	Email	initials
Frank Belardo	Arcadis	frank.belardo@arcadis.com	FB
David Stahl	HDR	david.stahl@hdrinc.com	
MIKE McALoon	SUBURBAN FACILITIES Engineers	MMcALoon@SUBURBANfacilities.com	MM
Sul Pagano	Fant Lee	nylas123@aol.com	SP
Richard Isleil	HDR	richard.isleil@hdrinc.com	RI
Frank Brillante	HDR	fbrillan@hdrinc.com	FB
S. Rosenwinkel	NJDEP	susan.rosenwinkel@dep.nj.gov	SR
Rachael Pepe	NJDEP	Rachael.Pepe@dep.nj.gov	RP

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MACDONALD

Receiving Water Quality and Green Infrastructure Modeling

BCUA CSO Group
Supplemental CSO Team
Meeting #7
December 4, 2018



Safety Topic

Cold Weather Safety

Hazards

- Frost Bite
- Hypothermia
- Getting stranded
- Fire

Recommendations

- Know the risk
- Cover exposed skin
- Dress in layers
- Keep car stocked with emergency supplies
- Use appropriate heat sources
 - No ovens
 - Take care with space heaters



Mott MacDonald | Presentation 2 December 4, 2018

14/12/2018

BCUA CSO Group Supplemental Team
Meeting No. 7 Agenda

Refresher – In meeting No. 6 we covered:

- **Development and Evaluation of Alternatives**
 - What is the Goal of Alternative Control?
 - What are the Regulatory Requirements?
 - Overview of Alternatives
 - Treatment of CSO discharge
Bayonne Pilot Study



Mott MacDonald | Presentation 3 December 4, 2018

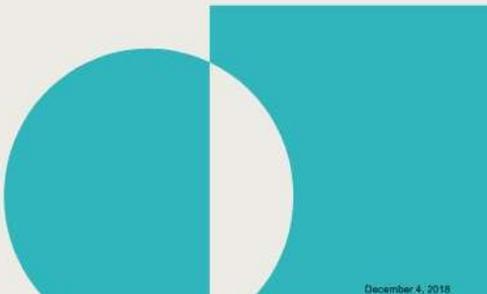
BCUA CSO Group Supplemental CSO Team
Meeting No. 7 Agenda

Alternatives Modeling

- Receiving water quality modeling
- Green Infrastructure Modeling

Status Reports

- Fort Lee
- Hackensack
- Ridgefield Park



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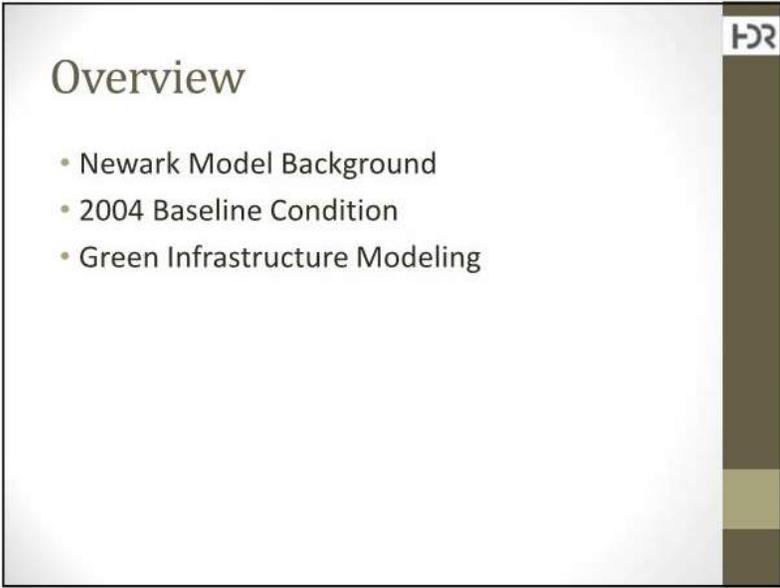


The slide features the HDR logo in the top left corner. The main title is "Newark Green Infrastructure Modeling" in a large, serif font. Below the title, the presenters' names "Frank Brilhante, Chenchen Li" and the event information "BCUA Supplemental CSO Team Meeting Dec 4, 2018" are listed in a smaller font. The slide has a light gray background with a dark brown vertical bar on the right side.

HDR

Newark Green Infrastructure Modeling

Frank Brilhante, Chenchen Li
BCUA Supplemental CSO Team Meeting Dec 4, 2018

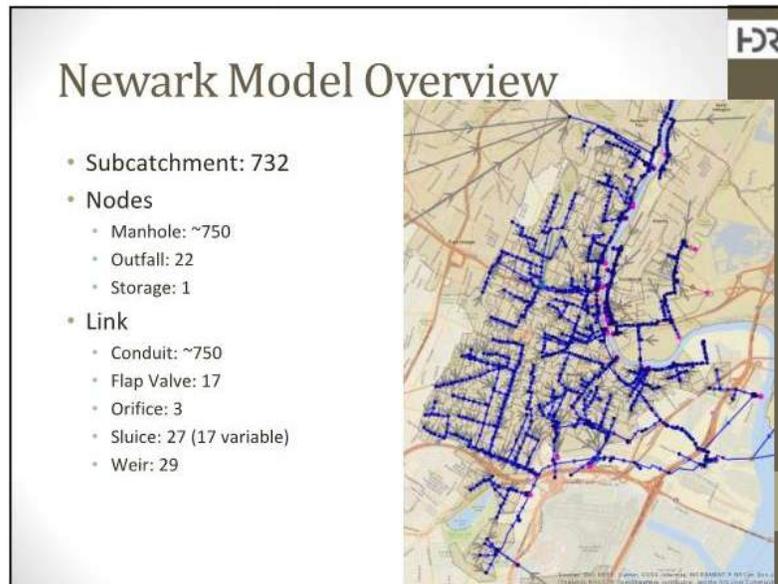
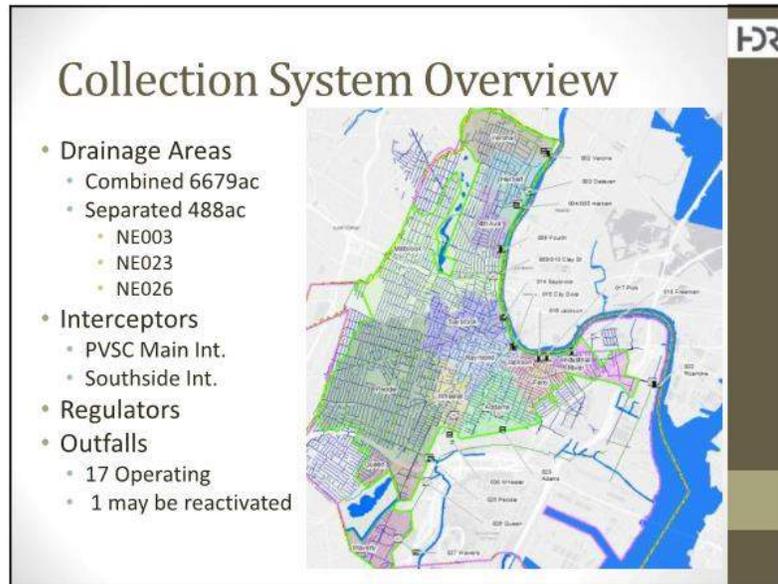


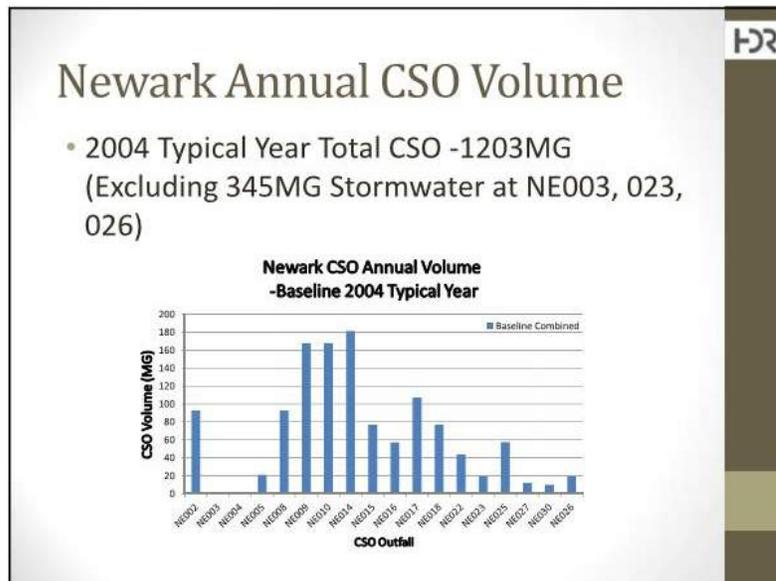
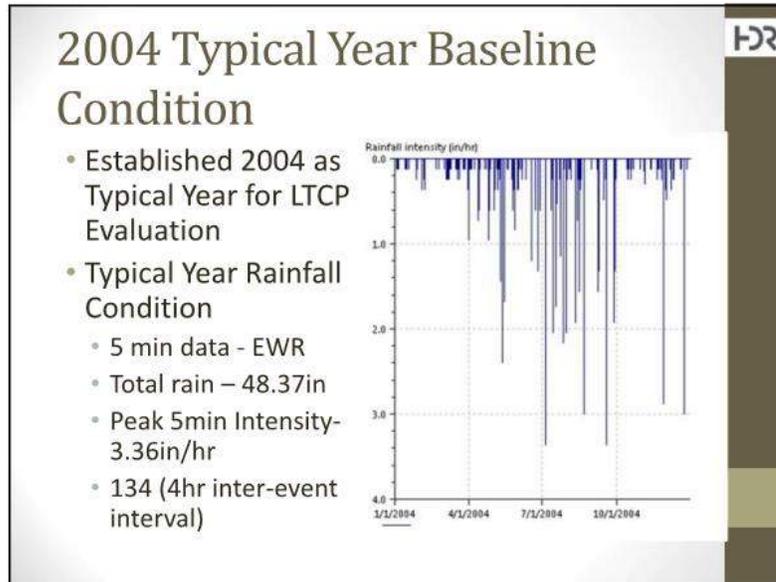
The slide features the HDR logo in the top right corner. The main title is "Overview" in a large, serif font. Below the title, there is a bulleted list of three items: "Newark Model Background", "2004 Baseline Condition", and "Green Infrastructure Modeling". The slide has a light gray background with a dark brown vertical bar on the right side.

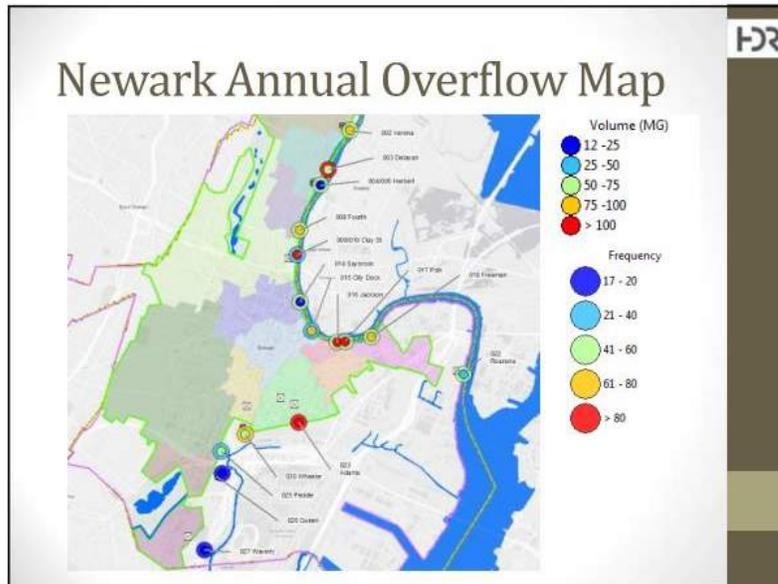
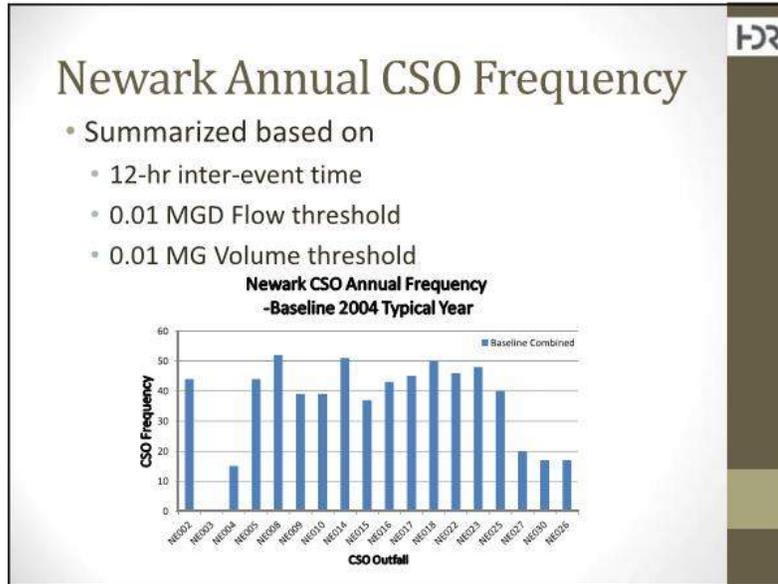
HDR

Overview

- Newark Model Background
- 2004 Baseline Condition
- Green Infrastructure Modeling

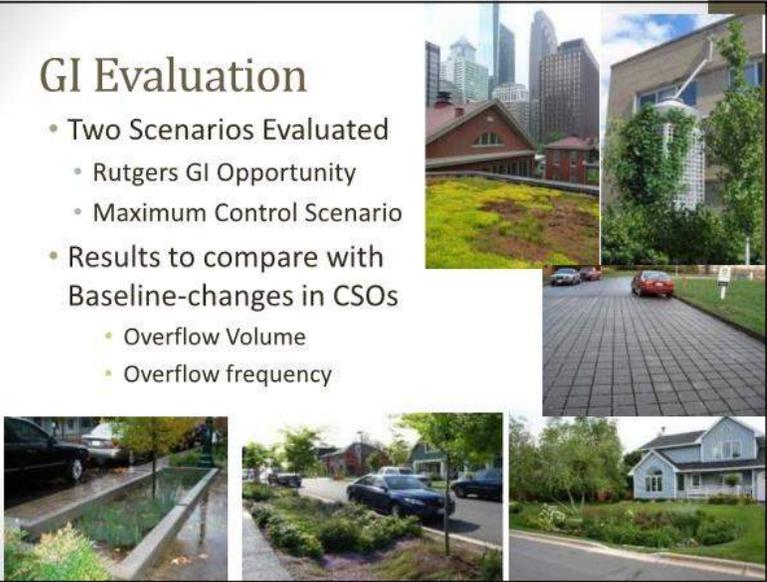






GI Evaluation

- Two Scenarios Evaluated
 - Rutgers GI Opportunity
 - Maximum Control Scenario
- Results to compare with Baseline-changes in CSOs
 - Overflow Volume
 - Overflow frequency

A collage of six images illustrating green infrastructure and urban environments. The top-left image shows a modern building with a green roof. The top-right image shows a residential building with a vertical garden. The middle image shows a paved street with a green median. The bottom-left image shows a residential street with a green median. The bottom-middle image shows a residential street with a green median. The bottom-right image shows a residential street with a green median.

Rutgers GI Opportunity



- 4 Volumes
 - GI Opportunities Summarized
 - Located in GIS based on block and lot
 - Correlated to Model Subcatchment

Draft
Impervious Cover Reduction Action Plan
for
Newark, Essex County, New Jersey – Volume 1
Prepared for the City of Newark by the
Rutgers Cooperative Extension Water Resources Program
April 16, 2018



12/14/2018

Rutgers GI Opportunity

DR

Subwatershed/Use Name/ID Priority	Potential Mitigation Area		Roofing Potential (sq ft)	TSS Potential (lb/yr)	New Volume Reduction Potential (gal/yr)	Peak Flowing Reduction Potential (cfs)	Sec of 100Y	Unit Cost (\$/sq ft)	VNR	Total Cost (\$)	% TSS Red %	
	Area (sq ft)	Area (ac)										
1.11. 100-000 10th Avenue Corridor by Garden	1,875	0.04	10,000	1	100	0.00	0.00	1	SP	\$	1,000	100.0%
1.12. 1st St. School Catchment	415	0.01	10,000	2	300	0.00	0.00	2	SP	\$	500	100.0%
1.13. 1st St. School Catchment	400	0.01	10,000	2	300	0.00	0.00	2	SP	\$	400	100.0%
1.14. Georges Washington Center Elementary School	10,800	0.25	10,000	100	7,000	2.74	6,000	5	SP	\$	100,000	20.0%
1.14. 100-000 Avenue Hester Elementary School	1,800	0.11	10,000	35	15,000	0.00	1,500	5	SP	\$	2,500	90.0%
1.14. 100-000 Avenue Hester Elementary School	1,800	0.08	10,000	15	5,700	0.00	1,200	5	SP	\$	15,000	6.0%
1.15. 100-000 10th Avenue Garden	400	0.01	10,000	1	200	0.00	200	5	SP	\$	400	100.0%
1.16. 100-000 10th Avenue Garden	700	0.02	10,000	2	400	0.00	400	5	SP	\$	600	100.0%
1.16. 100-000 10th Avenue Garden	30,000	0.68	10,000	100	60,000	3.00	6,000	5	SP	\$	100,000	41.0%
1.17. 100-000 10th Avenue School	10,000	0.23	10,000	100	50,000	2.50	6,000	5	SP	\$	100,000	20.0%
1.18. 100-000 10th Avenue West Corridor by Garden	1,000	0.02	10,000	4	1,000	0.00	200	5	SP	\$	10,000	200.0%
1.19. 100-000 10th Avenue West Corridor by Garden	1,000	0.04	10,000	7	1,000	0.00	400	5	SP	\$	1,000	20.0%
1.20. 100-000 10th Avenue West Corridor by Garden	1,000	0.14	10,000	30	10,000	0.00	1,000	5	SP	\$	10,000	100.0%
1.21. 100-000 10th Avenue West Corridor by Garden	1,000	0.08	10,000	15	5,000	0.00	200	5	SP	\$	10,000	20.0%
1.22. 100-000 10th Avenue West Corridor by Garden	1,000	0.06	10,000	10	4,000	0.00	400	5	SP	\$	1,000	20.0%
1.23. 100-000 10th Avenue West Corridor by Garden	1,000	0.17	10,000	50	10,000	0.00	1,000	5	SP	\$	10,000	20.0%
1.24. 100-000 10th Avenue West Corridor by Garden	10,000	0.23	10,000	100	50,000	2.50	6,000	5	SP	\$	100,000	20.0%
1.25. 100-000 10th Avenue West Corridor by Garden	10,000	0.23	10,000	100	50,000	2.50	6,000	5	SP	\$	100,000	20.0%

Art of Survival Garden

Address: 100-000 10th Avenue
Block: 1000, Lot 7.0

GREEN INFRASTRUCTURE RECOMMENDATIONS

Rutgers GI Opportunity

DR

- 63 Sites (52 model catchments)
- Six Types of GI
 - Bio-retention
 - Green roof
 - Pervious Pavement
 - Planter Boxes
 - Rain Water Harvesting
 - Stormwater Planter
- Total Manageable Area -11.7 ac

GI Scenario Assumptions HDR

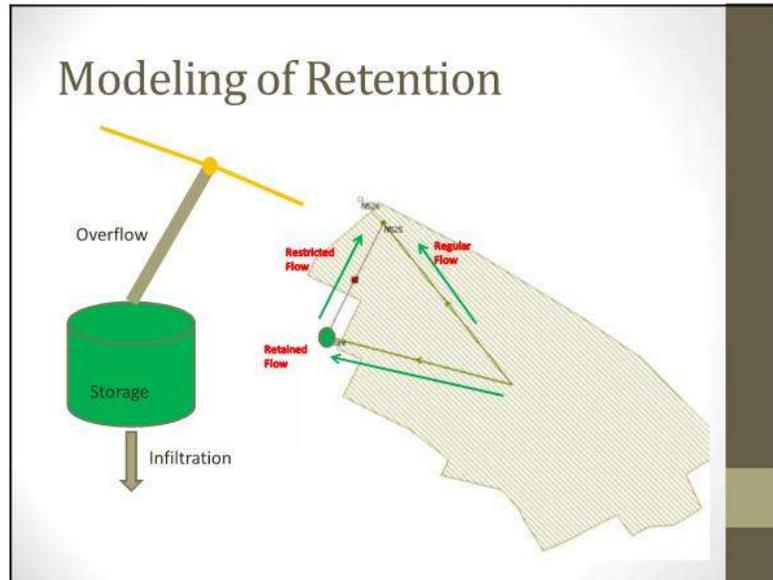
- Simplified GI type to ROW Bio-Swale - Retention
 - Easy to access and implement in reality
 - Most GI types involves runoff intersect, store, infiltrate (evapotranspiration) and overflow.
 - Parameters used in NYC LTCP evaluation available



Modeling of Retention



Retention Facility (Bioswale) at Site Scale **Neighborhood Scale Modeling of Retention Facilities**

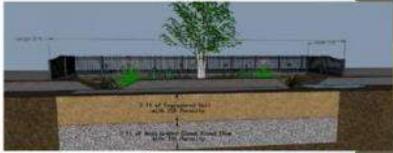


- ### GI Scenario Assumptions
- GI managed area is 100% impervious (75% with depression storage, 25% without depression storage)
 - Directly connected to manholes, no internal routing to previous areas first
 - For maximization scenario, 10% impervious will be the targeted management areas.
 - Ratio of management area to GI footprint area is 30 to 1. (assuming 3000sqft management area to 10'x2.5' ROW bioswale)

GI Scenario Assumptions

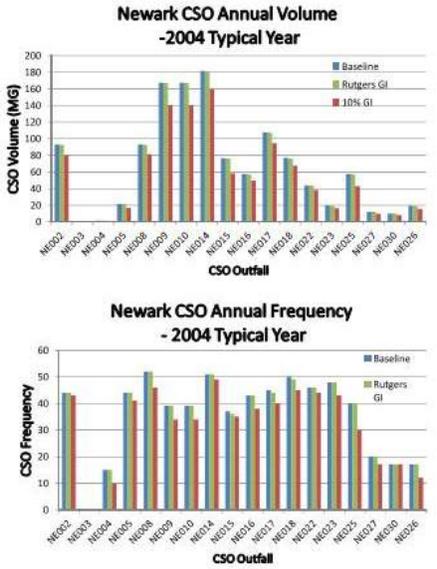


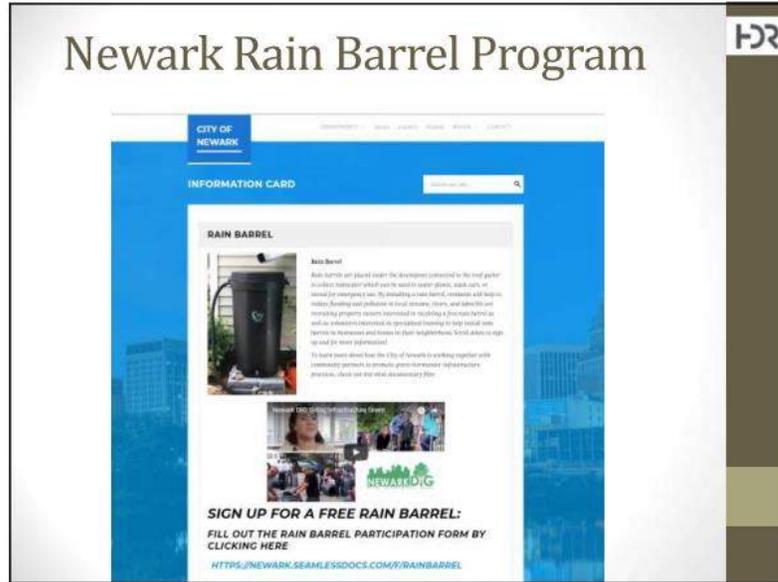
- Bio-swale Parameters (from NYC LTCP)
 - Size 10'x2.5'
 - Depth 4.223ft
 - Media porosity 0.29
 - Infiltration rate is 1.75in/hr, effective through the base area, not through sides of the sites
 - Overflow represented with a weir. Weir length 1ft per 100sqft site areas



Results

- Total Reduction
 - Volume
 - Rutgers – 0.3%
 - 10% GI – 14.1%
 - Frequency
 - Rutgers – 1 at three locations
 - 10% GI – 1~10 at all locations except three





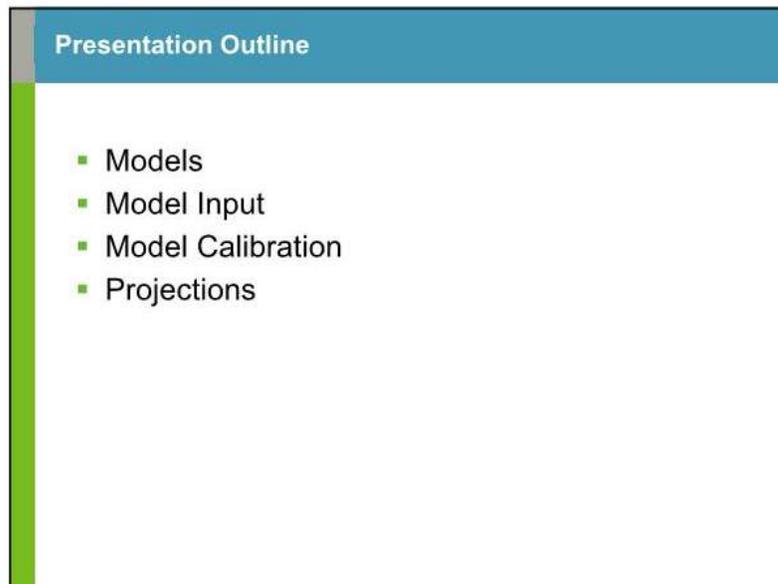
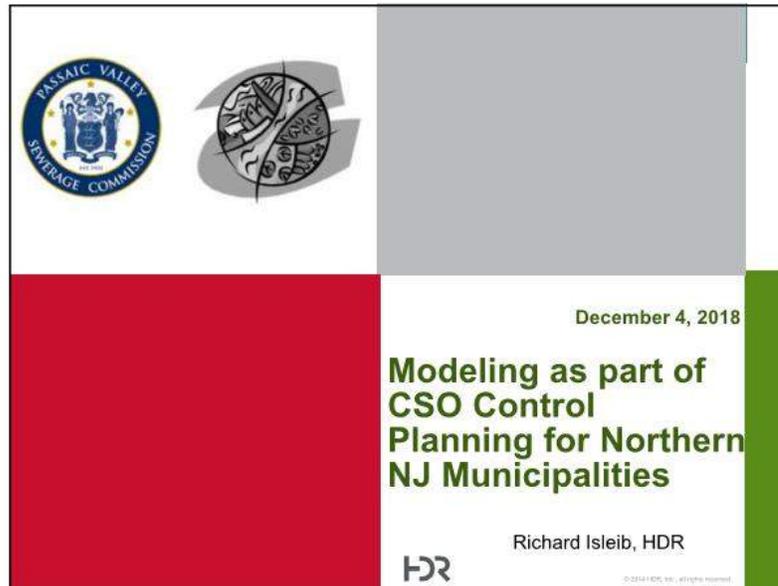
Newark Rain Barrel Program

- 66 Rain barrels installed
- 45 scheduled or signed up for installation
- Modeled Similarly to GI
 - Manages roof area of connected down spouts
 - Storage volume = barrel volume
 - Volume in excess of storage runs off
- Assumptions
 - Manages roof area of connected down spouts
 - Barrels are empty at start of each event

Newark Rain Barrel Program

- Installed
- Signed up to receive
- Volunteered to install
- Group interested in installing
- Scheduled for install
- Not interested

12/14/2018



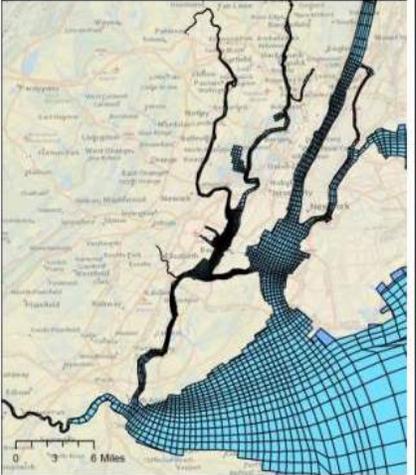
Models

- Hydrodynamic Model (ECOMSED)
 - Water Elevation
 - Currents
 - Temperature
 - Salinity
- WQ Model (RCA)
 - Salinity
 - Tracer
 - E. coli
 - Fecal coliform
 - Enterococci
- Both models are run on the same grid (segmentation)
 - 10 vertical layers



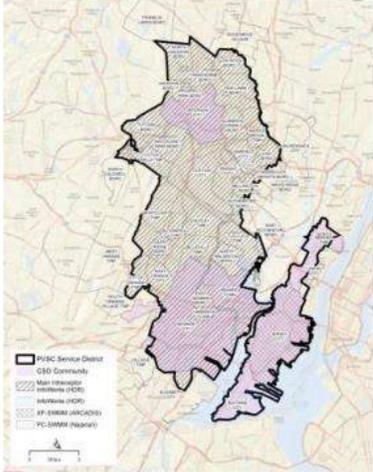
Required Hydrodynamic Model Inputs

- Physical Dimensions
 - Shoreline
 - Bathymetry
- Boundary Conditions
 - Tides
 - Temperature
 - Salinity
- Freshwater Sources
 - Rivers
 - CSOs
 - Storm Sewers
 - Direct Drainage
 - WWTPs
- Meteorology



Required WQ Model Inputs

- Hydrodynamics
- Loads
 - CSOs
 - Storm Sewers
 - Direct Drainage
 - Dry-weather sources
 - WWTPs
- Boundary Conditions
 - Rivers
 - Ocean
- Constants and Parameters
 - Die-off rates
 - Additional constants or parameters as necessary

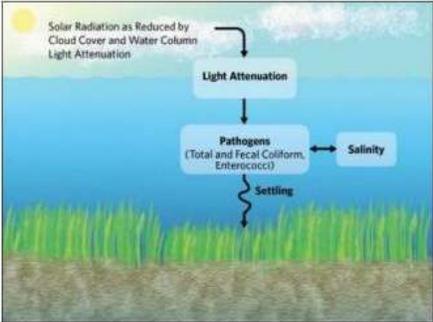


The map shows the PISC Service District boundary in black. The CSO Community is shaded in light purple. Main Wastewater Inflow (CSO) is indicated by a diagonal hatched pattern. Inflow (PFO) is shown with a dotted pattern. PFO (Other Sources) is shown with a cross-hatched pattern. PFO (Sewer Inflow) is shown with a solid light blue pattern. A legend in the bottom left corner identifies these symbols. A scale bar and north arrow are also present.

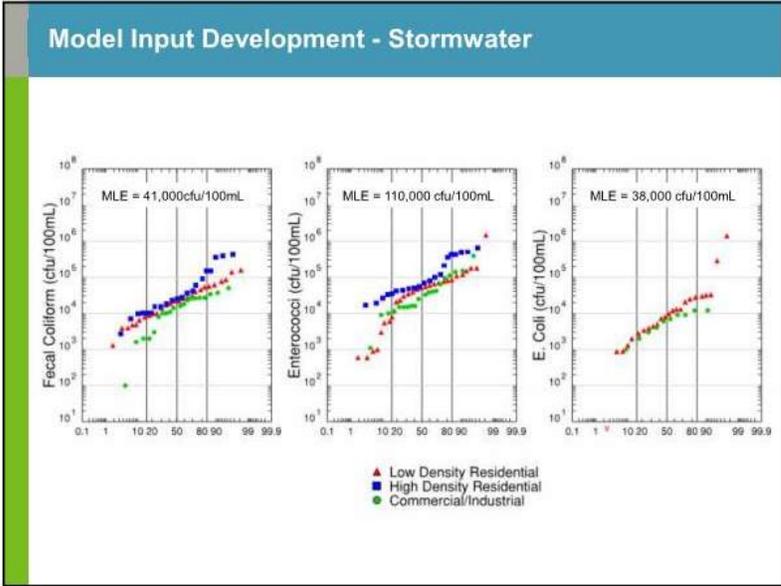
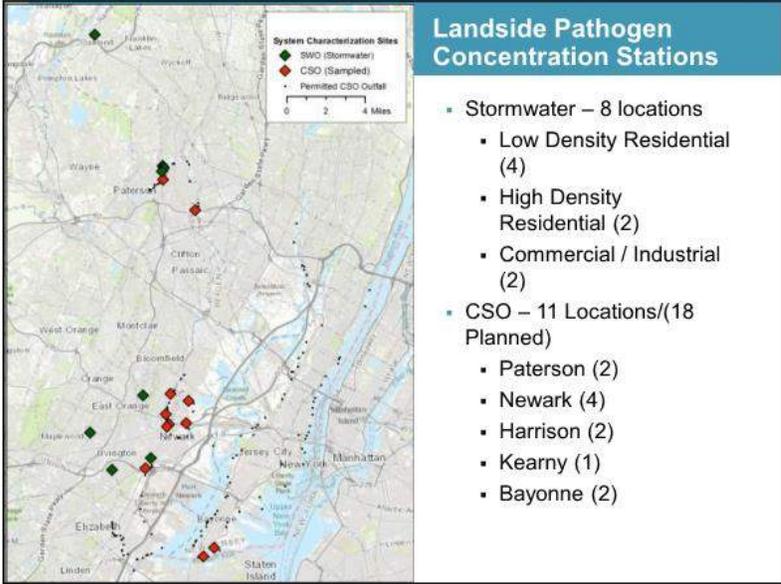
Pathogen Model

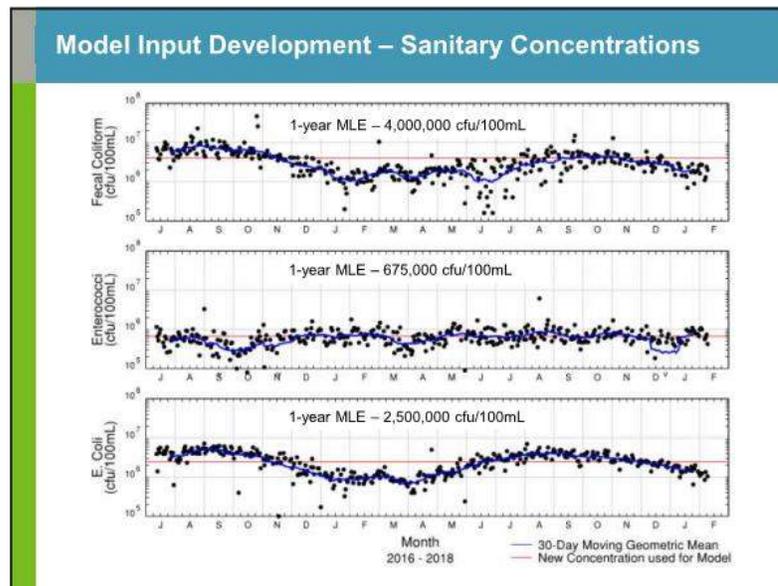
Factors that affect bacteria

- Natural die-off
- Temperature
- Solar radiation
- Salinity
- Settling



The diagram illustrates the pathogen model. At the top, a sun icon is labeled 'Solar Radiation as Reduced by Cloud Cover and Water Column Light Attenuation'. An arrow points down to a box labeled 'Light Attenuation'. Another arrow points down to a box labeled 'Pathogens (Total and Fecal Coliform, Enterococci)'. A double-headed arrow connects this box to a box labeled 'Salinity'. A wavy arrow labeled 'Settling' points down from the pathogens box to a layer of green grass and brown soil at the bottom.

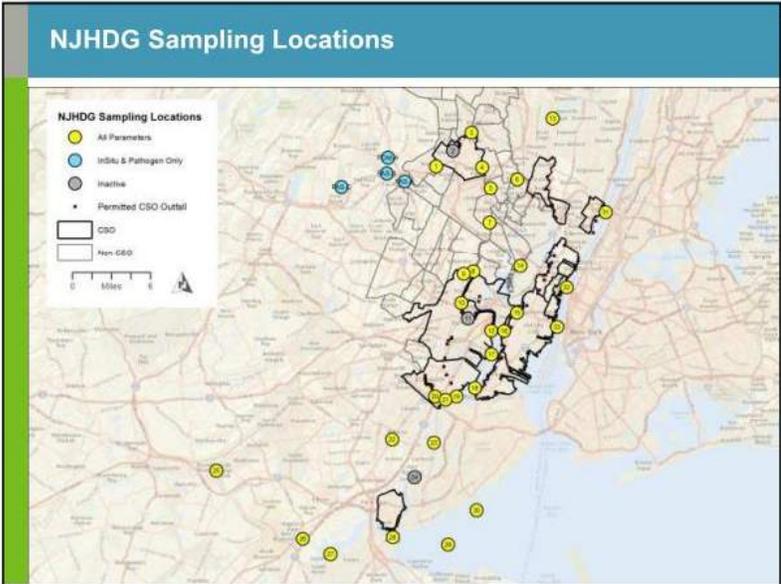
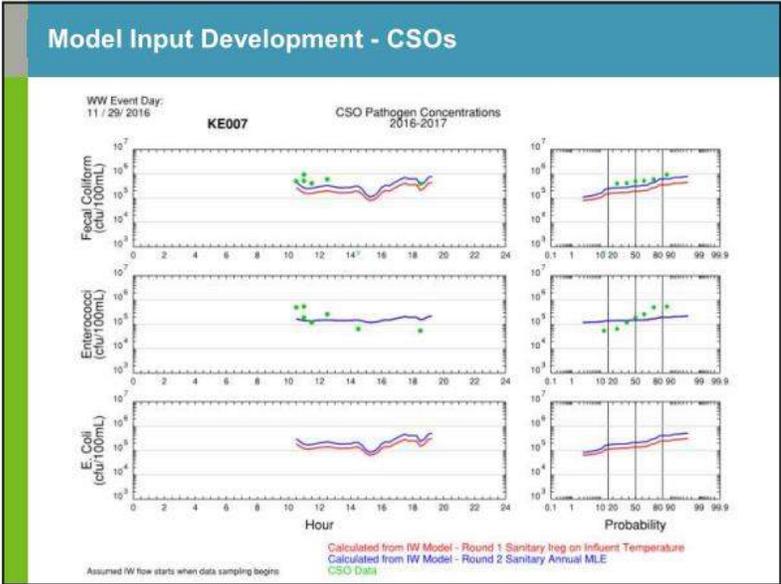


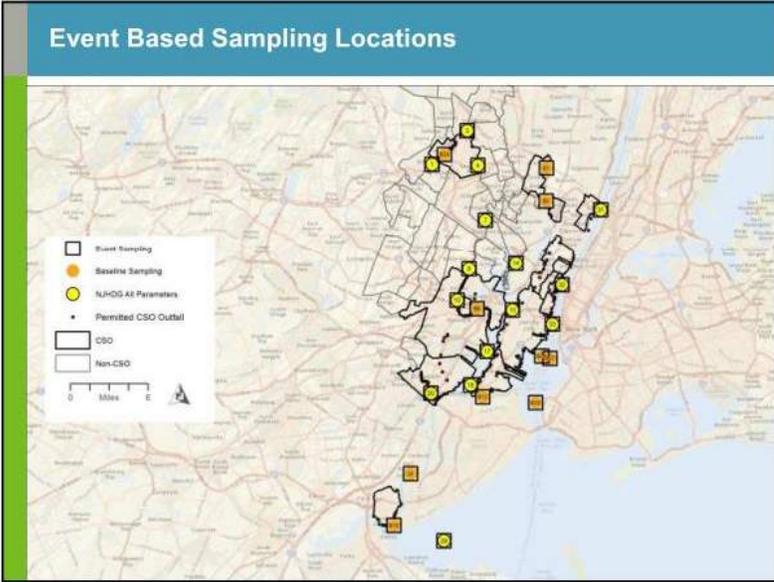
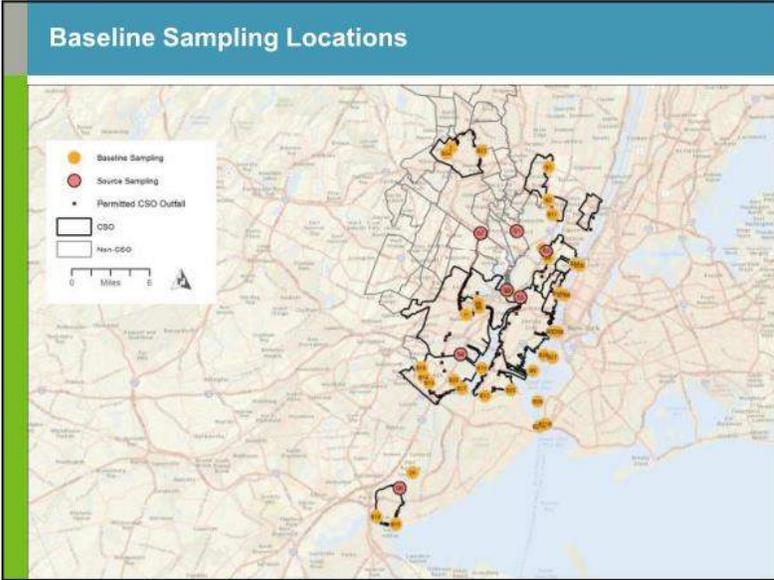


Model Input Development - CSOs

Mass Balance Approach

- The hydraulic models provided flow and the sanitary/stormwater flow fractions.
- CSO concentrations were calculated using sanitary and stormwater concentrations.
- Estimated CSO concentrations were compared to CSO concentration data.

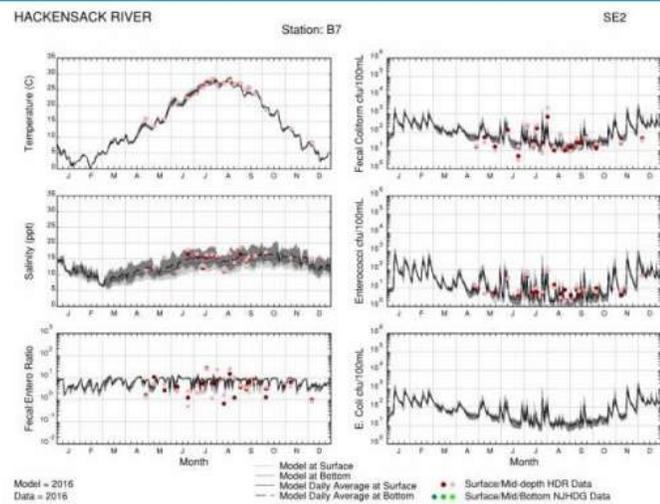


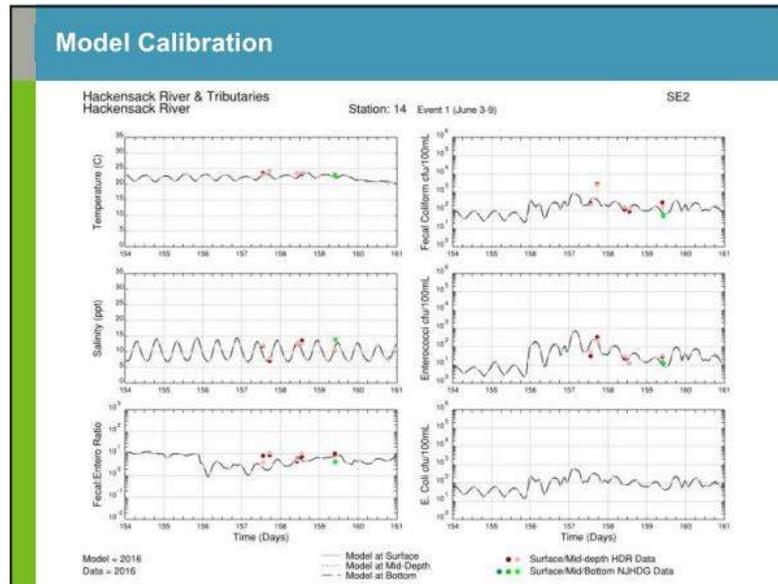


Calibration Assessment

- Graphical Comparisons
 - Spatial transect plots of model output versus observed
 - Graphical time-series plots of observed and predicted data
 - Comparisons between observed and calculated probability distributions
 - Scatter plots of observed versus predicted values
- Model Evaluation Group (MEG)
 - Landside Modeling – Wayne Huber – Oregon State University
 - Hydrodynamic Modeling – Alan Blumberg – Stevens Institute of Technology
 - WQ Modeling – Steven Chapra – Tufts University

Model Calibration





- ### Pathogen Criteria
- **Shellfish Harvesting:** Bacterial Indicators shall not exceed, in all shellfish waters, the standard for approved shellfish waters as established by the National Shellfish Sanitation Program as set forth in its current manual of operations.
 - **Primary Contact Recreation:**
 - Enterococci levels shall not exceed a geometric mean of 35/100 ml, or a single sample maximum of 104/100 ml. (SE1 and SC)
 - E. Coli levels shall not exceed a geometric mean of 126/100 ml or a single sample maximum of 235/100 ml. (All FW2)
 - **Secondary Contact Recreation:**
 - Fecal coliform levels shall not exceed a geometric mean of 770/100 ml. (SE2)
 - Fecal coliform levels shall not exceed a geometric mean of 1500/100ml. (SE3)

Projection Runs

- Baseline
- Gap Analysis (100% CSO Removal)
- Component Analysis
 - NYC Sources
 - NJ CSOs
 - NJ Non-CSOs
 - Upstream/Downstream Boundary Conditions
- CSO Control Alternatives
 - Permittee Related
 - Area-Wide
 - Final Selected Plan

- The model output can be used to assess the “benefits” portion of a cost-benefits curve for a knee-of-the curve analysis.

Questions

- Richard Isleib (HDR)
- richard.isleib@hdrinc.com

14/12/2018

Upcoming Schedule

January 25, 2019 – Quarterly Report Due to NJDEP

March 2019 – Anticipated Next Supplemental CSO Team Meeting

June 2019 – Supplemental CSO Team Meeting

July 1, 2019 – Development and Evaluation of Alternatives Report Due to NJDEP

- Develop Comprehensive List of Alternatives
- Screen Alternatives
- Evaluate Alternatives
- Cost Estimates
- Coordinate with other Members of BCUA Group
- Produce and Submit Report

Mott MacDonald | Presentation

5

December 4, 2018

Final Questions?

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6

14 December 2018

