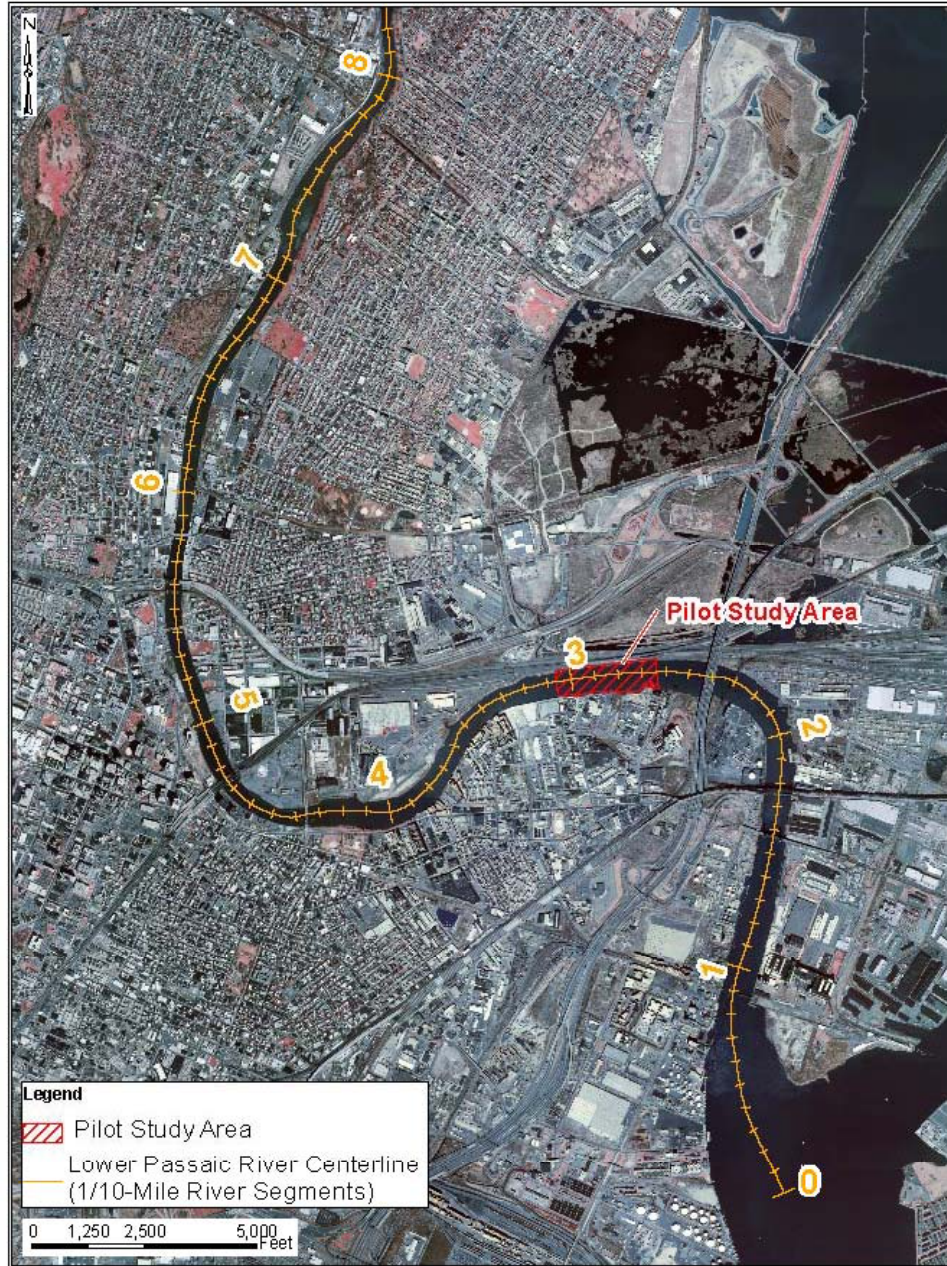


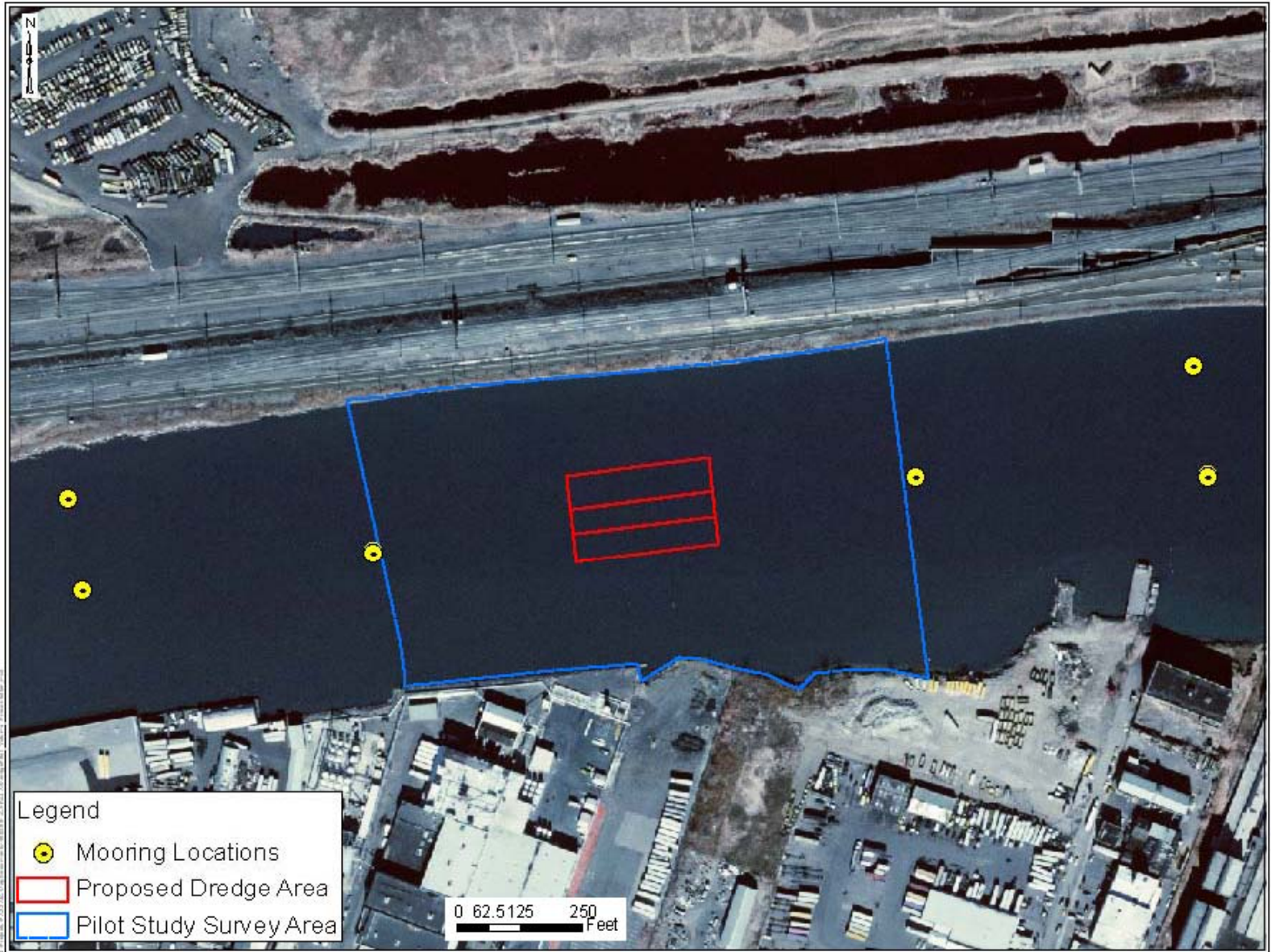
# Revision and Updates to the Environmental Dredging Pilot Study

## Lower Passaic River Restoration Project

Project Delivery Team Meeting  
March 4, 2009







# Outline

- Design and Objectives of Pilot Study
- Revisions and Updates
  - Volume of Sediments Dredged
  - Productivity Analysis
  - Resuspension
- Conclusion and Next Steps

# Design & Objectives

Pilot Study designed to examine production environmental dredging

One mechanical dredging system equipped with an 8-CY clamshell bucket

Three target depths over approximately 1 acre of area in 5 work days

Evaluate productivity, vertical accuracy, and Best Management Practices

Evaluate dredge-related resuspension through a monitoring program

Evaluate decontamination technologies

# Design & Objective

Date	Dredging Activity
December 5	13-foot MLW cut
December 6	11-foot MLW cut
December 7	15-foot MLW cut
December 8	15-foot MLW cut
December 9	No dredging due to storm
December 10	15-foot MLW cut

# Pilot Study was NOT intended to report on....

- Other dredging performance features and technologies
- Other remedial alternatives such as capping
- Clean-up passes or residuals
- Material handling and decontamination technology (separate reports)
- Cost implications for a full-scale dredging operation
- Quality of life issues

**Feasibility study will extrapolate Pilot Study data to estimate a full-scale operation**

# Revision on Volume of Sediments Dredged



# Revision on Volume of Sediments Dredged

## Method 1

Compare the river bottom elevations before and after the dredging operation by using the pre-dredge and post-dredge surveys

## Method 2





Sum the daily dredge volumes by evaluating daily bathymetric surveys to the pre-dredge survey



# Method 1

Pre-dredge Versus Post-dredge Survey  
3,800 ±100 Cubic Yards

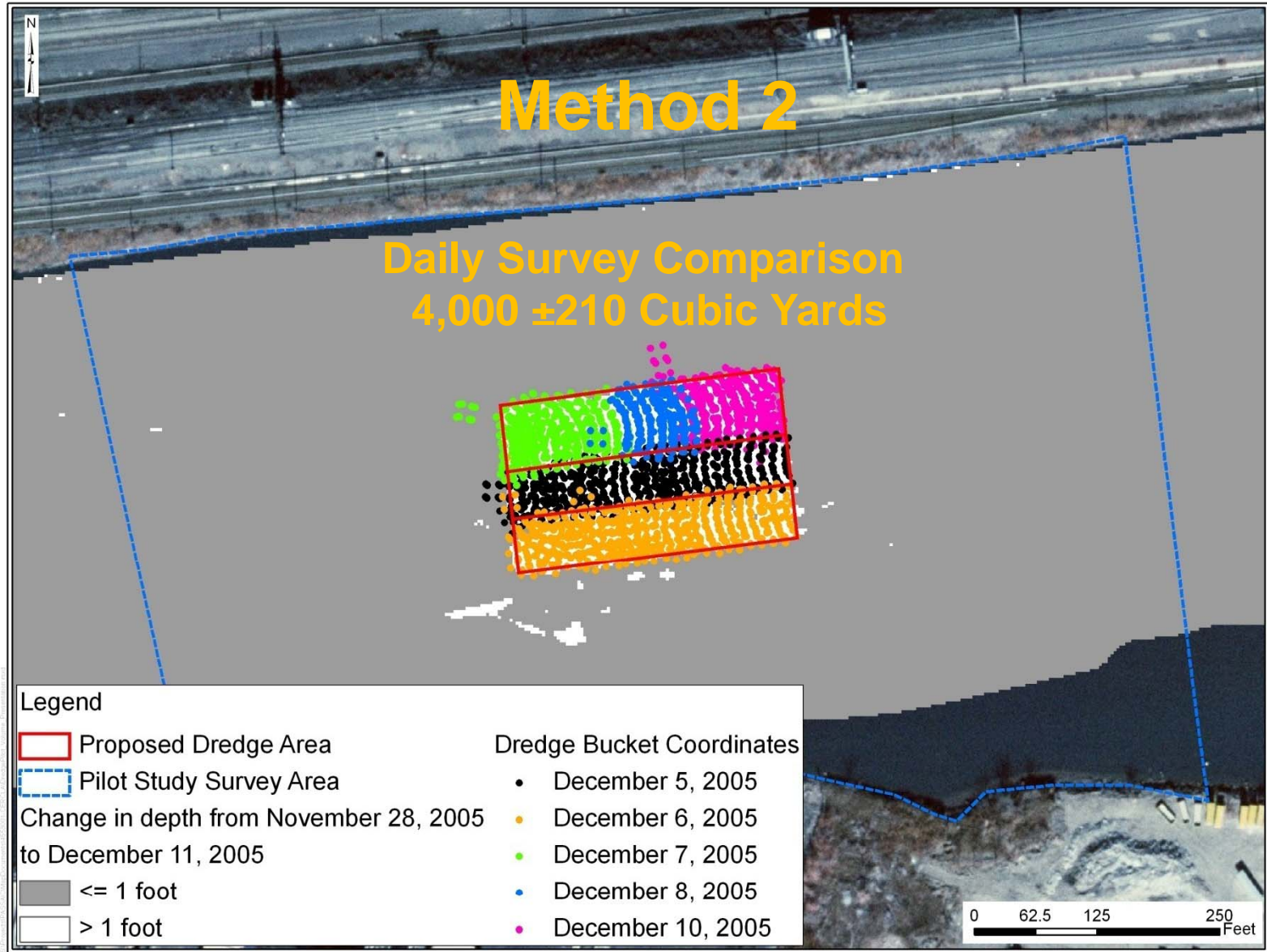
### Legend

-  Proposed Dredge Area Change in depth from November 28, 2005
-  Pilot Study Survey Area to December 11, 2005
-  ≤ 1 foot
-  > 1 foot

0 62.5 125 250 Feet

# Method 2

## Daily Survey Comparison 4,000 ±210 Cubic Yards



# Revision on Volume of Sediments Dredged

Date	Malcolm Pirnie (Cubic Yards)	Jay Cashman (Cubic Yards)
December 5	890 ±20	940
December 6	1,200 ±30	1,400
December 7	770 ±20	830
December 8	490 ±10	490
December 10	630 ±20	520
<b>Total Volume</b>	<b>4,000 ±210</b>	<b>4,200</b>

\* Values rounded to two significant figures



# Revision of Productivity Analysis



# Revision of Productivity Analysis

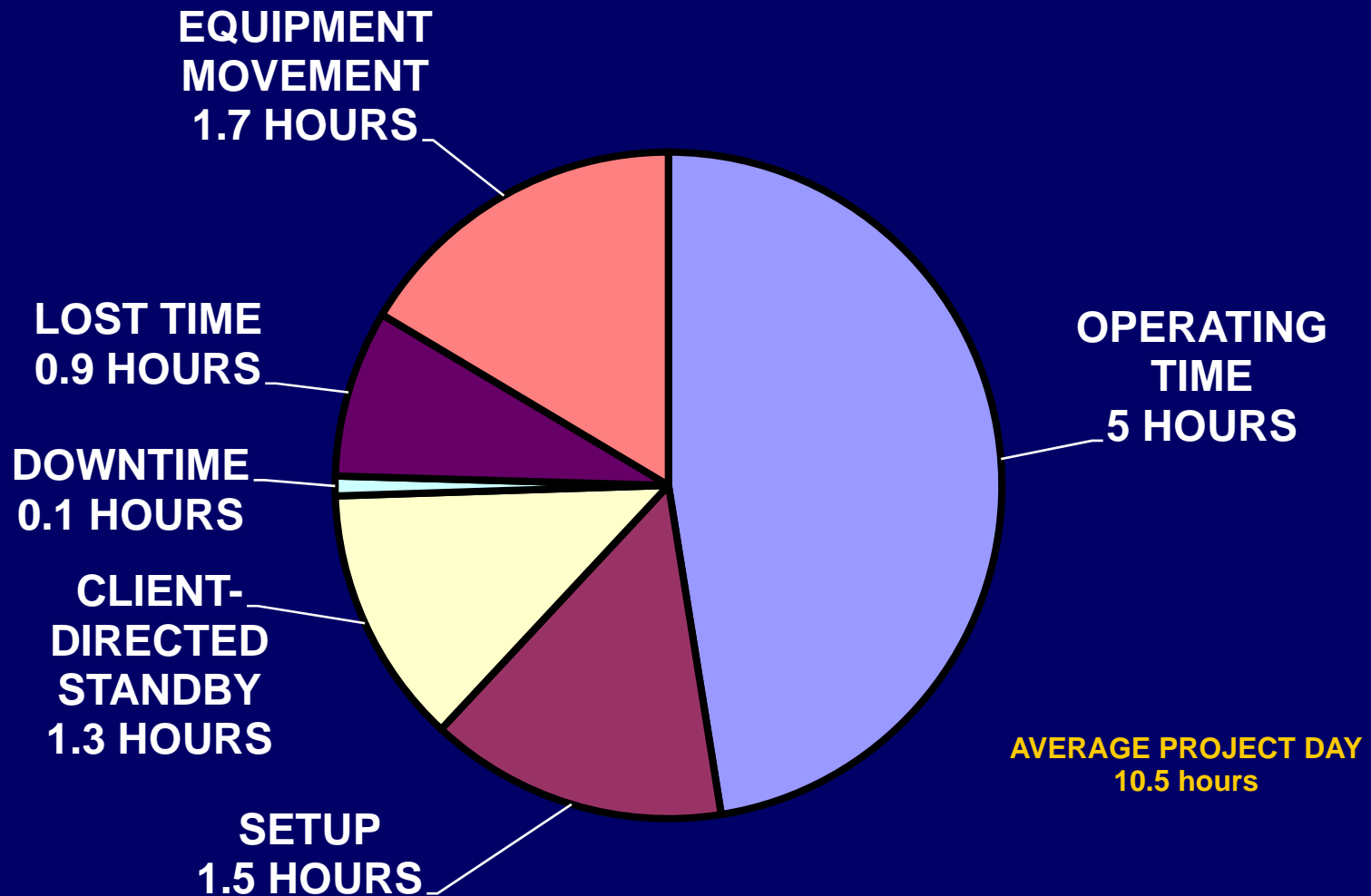
- Daily surveys were used to estimate productivity
- Revised work time breakdown based on ClamVision data for actual dredge time
- Linked cycle time (ClamVision data) to the work time analysis to separate equipment movement from dredge time

# Revision of Productivity Analysis

Evaluation decreased dredge time and increased equipment movement, which will cause an increase in productivity.

Parameter	Draft Dredge Pilot Value	Revised Value
Average Dredging Time	6.2 hours	5.0 hours
Average Working Day	11 hours	10.5 hours
Work Day minus Client Standby	9.6 hours	9.2 hours

# Revision on Productivity Analysis



# Revision of Productivity Analysis

Date	Draft Dredge Pilot Value	Revised Value
December 5, 2005	70 CY/hr	73 CY/hr
December 6, 2005	98 CY/hr	110 CY/hr
December 7, 2005	89 CY/hr	100 CY/hr
December 8, 2005	99 CY/hr	99 CY/hr
December 10, 2005	91 CY/hr	110 CY/hr

\* Revised values based on USACE ERDC/EL TR-08-29 “Technical Guidelines for Environmental Dredging of Contaminated Sediments”

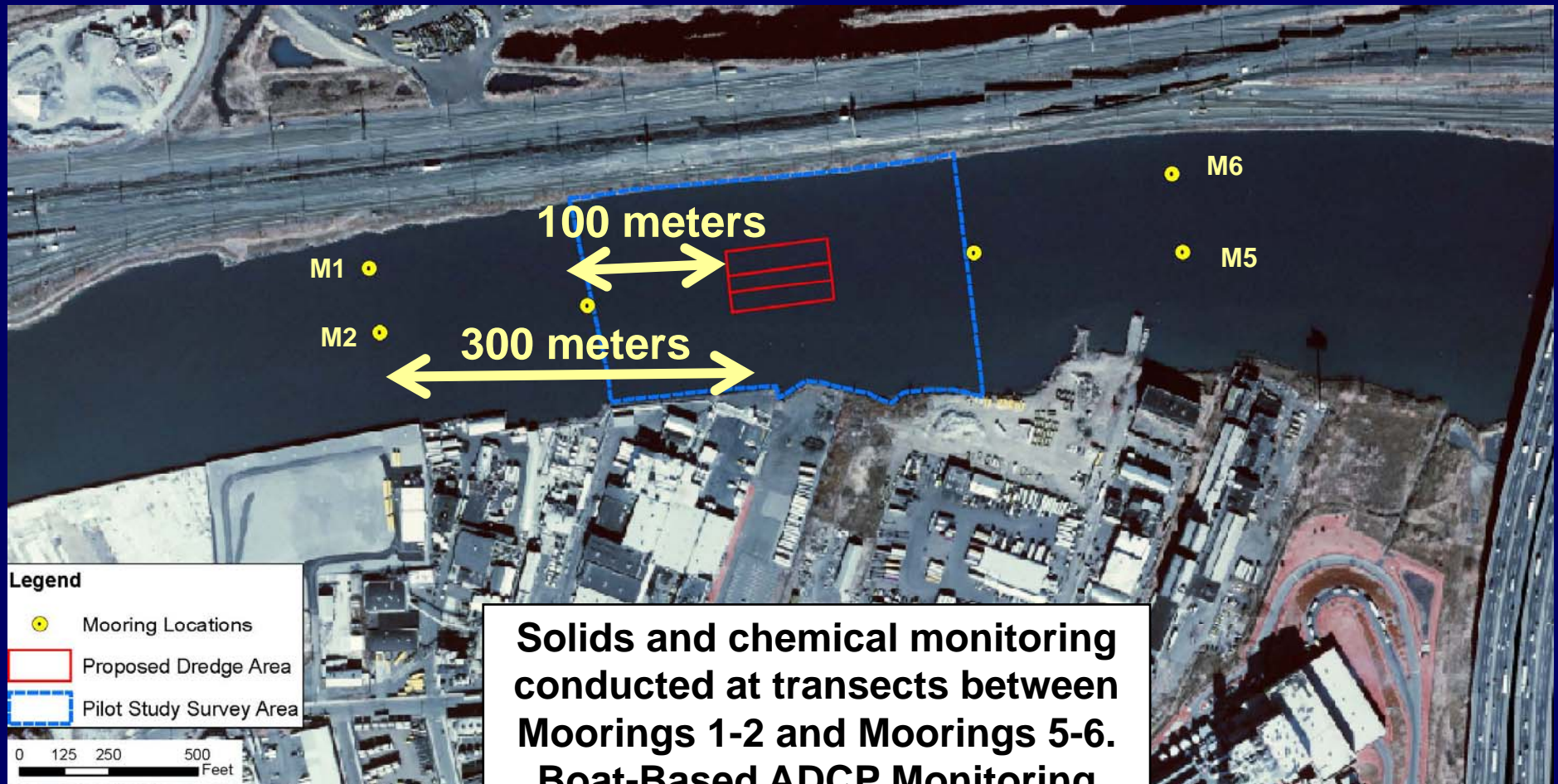
# Revision of Productivity Analysis

Date	Average Operating Production Rate	Uptime	Mathematical 24-hour
December 5-6	90 CY/hr	45 percent	2,200 CY
December 7-8 and 10	100 CY/hr	79 percent	2,500 CY

# Revision of Resuspension Analysis



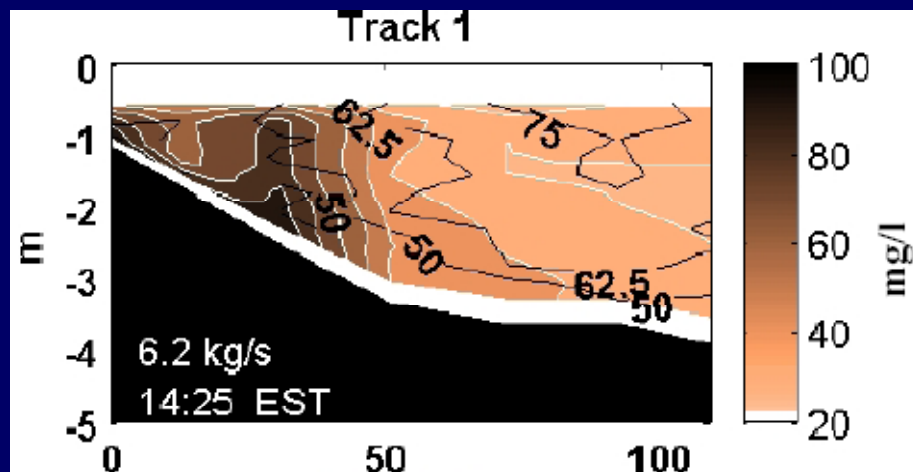
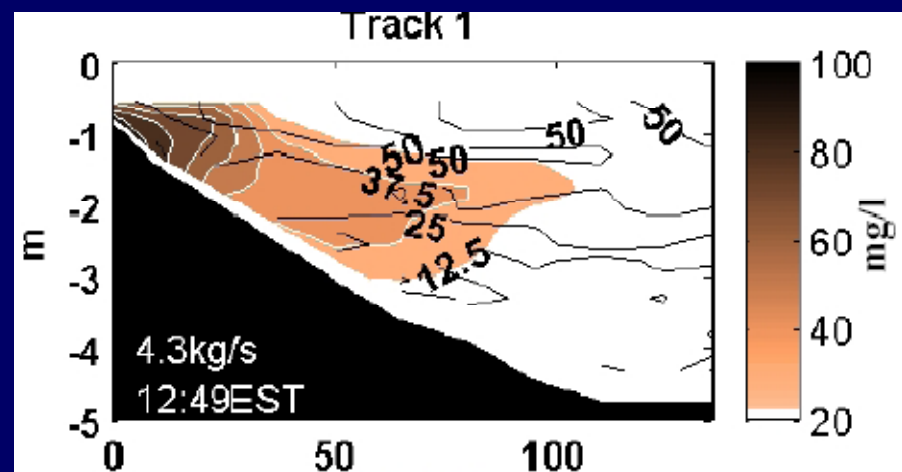
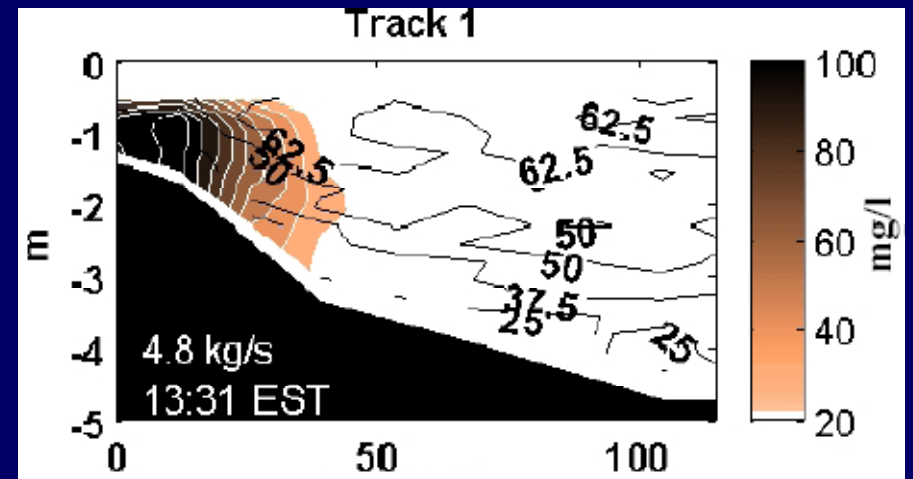
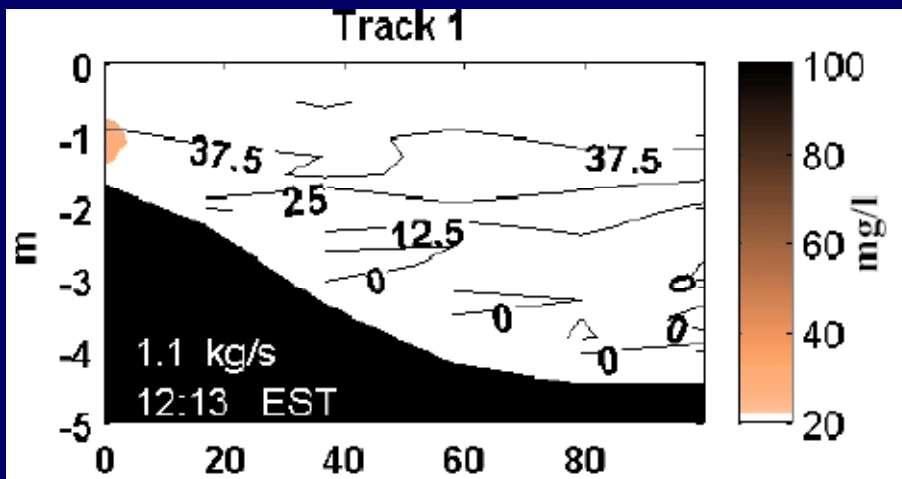
# Revision of Resuspension



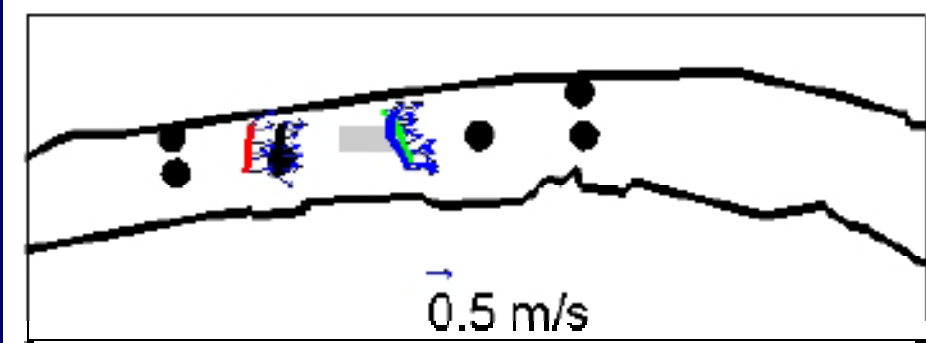
**Solids and chemical monitoring conducted at transects between Moorings 1-2 and Moorings 5-6. Boat-Based ADCP Monitoring Throughout Pilot Study Area**

# Dredging Resuspension Assessment is difficult due to Resuspension from Tidal Currents

Upriver Tracks on December 5, 2005 during Ebb Tide

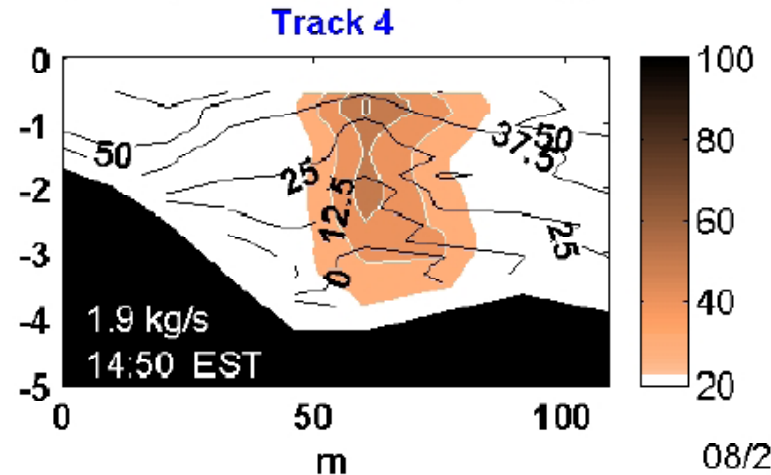
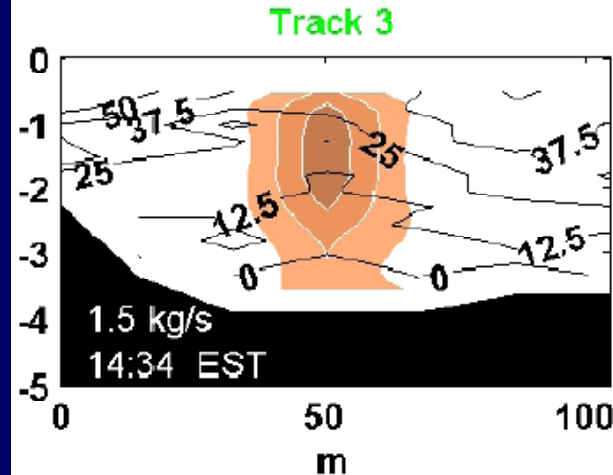
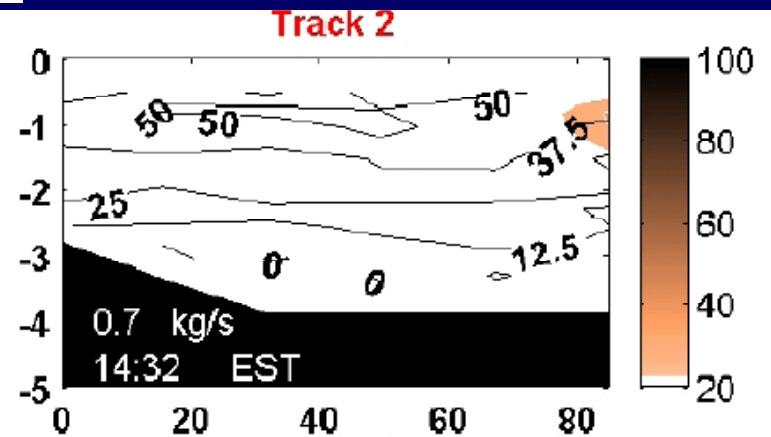
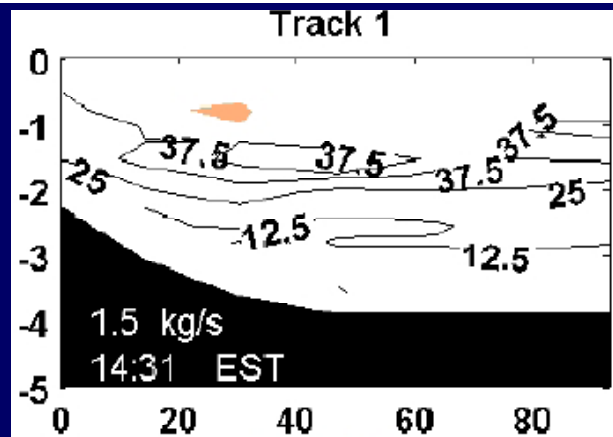


# ADCP Profiles on December 7, 2005 during Ebb Tide



Very Near-Field (<50 meters)  
Boat-Based Monitoring Can  
Detect Resuspension

Depth (m)

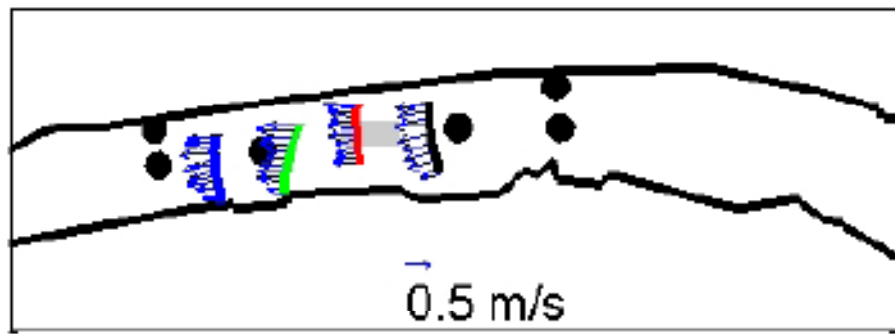


TSS (mg/L)

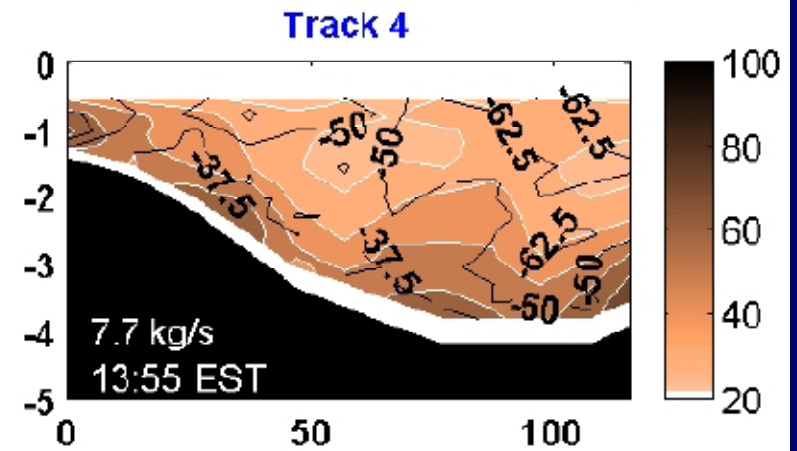
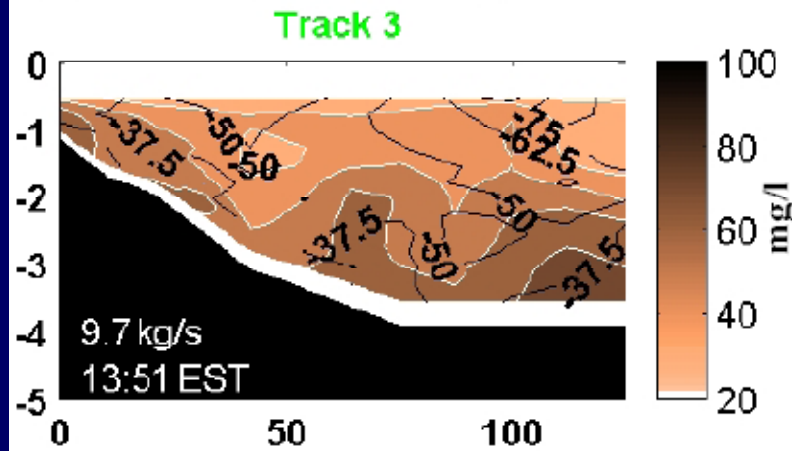
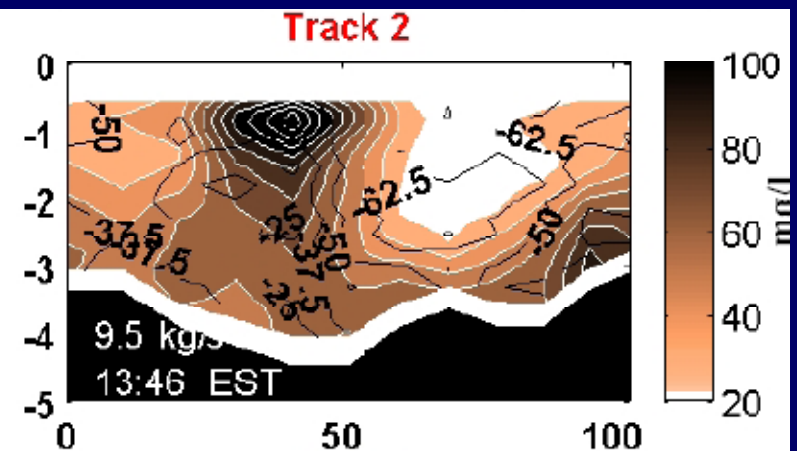
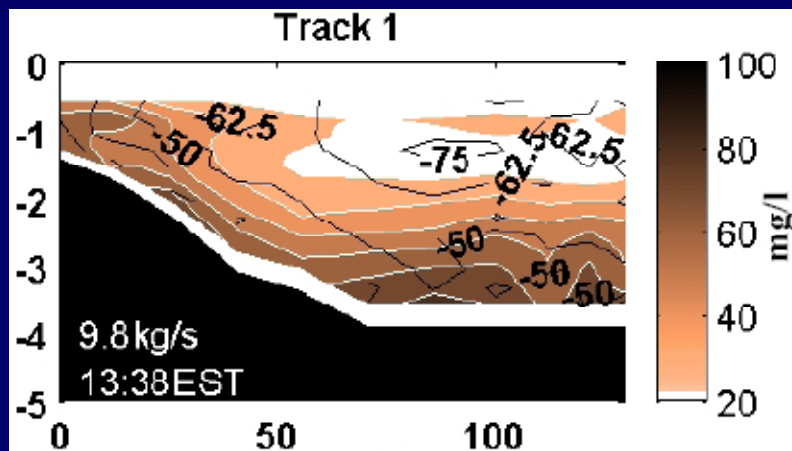
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# ADCP Profiles on December 10, 2005 during Flood Tide

Boat-Based Monitoring  
Demonstrates the Rapid  
Dispersion of Resuspension  
Plume



Depth (m)



TSS (mg/L)

# Revision of Resuspension Analysis

Date	Production Rate (kg/s)	Average Release Rate (kg/s)	Very Near-Field Percent Resuspension
December 5, 2005	19	1.1	5.5%
December 6, 2005	29	1.7	5.9%
December 7, 2005	16	0.35	2.3%
December 8, 2005	14	0.19	1.3%
December 10, 2005	14	0.83	5.8%

# Revision of Resuspension Analysis

**Best Management Practices were evaluated to optimize dredging operations while minimizing resuspension.**

Optimize the cycle time between grabs by adjusting the depth of cut, the lift speed, and hang time

Optimize the use of winching and cabling in place of tugboats for repositioning the rinse tank

# Revision on Productivity Analysis

Date	Uptime	Mathematical 24-hour	Resuspension
December 5-6 Shakedown	45 percent	2,200 CY	5-6%
December 7-8 BMP Optimized	79 percent	2,500 CY	1-2%

# Revision of Resuspension

- Release during dredging generally masked by background TSS due to movement of salt wedge and tidal resuspension.
- Dredge signal was detectable ONLY in very near-field (< 50 m) of dredging operation, despite wide variation in the background sediment load.
- Dredge signal not readily discernable at far-field of Pilot Study Area (300 meters away).
- No chemical signal due to dredging.
- Very near-field dredging release is less than 2% of solids removal under environmental dredging conditions with Best Management Practices.

# Conclusions and Next Steps

- Pilot Study Report will be revised:
  - 4,000 CY of sediment removed
  - 9.2 hours for the work day (minus client standby time)
  - 79% Uptime with Best Management Practice
  - 1-2% Resuspension using Best Management Practice
- Additional supporting data will be added into the report and provided as appendices



**Final Report anticipated**  
**June 2009**