Evaluating the changing response of bacteria levels to storm events in the Narragansett Bay watershed

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Narragansett Bay Commission

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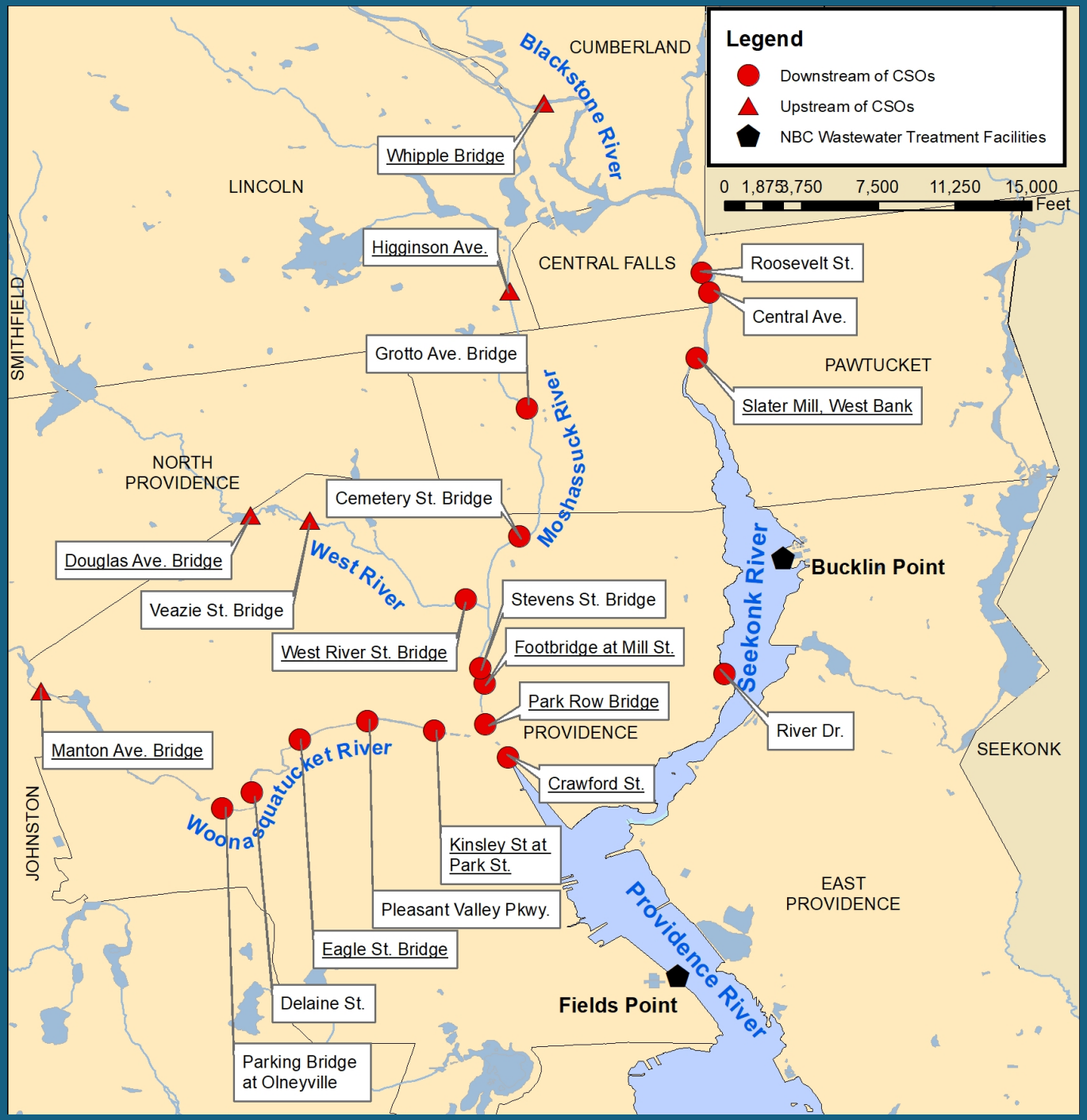
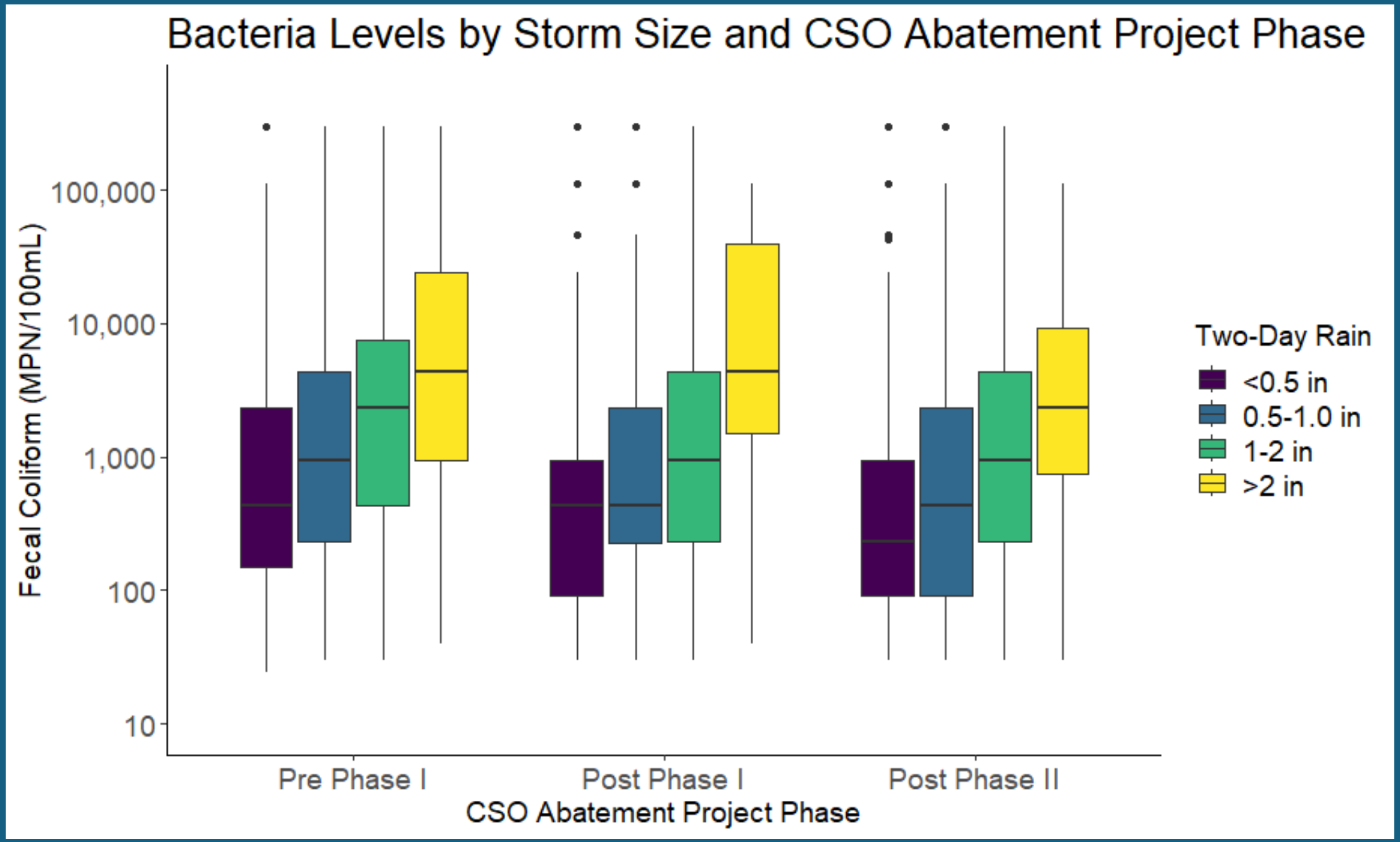
NBC Combined Sewer Overflow (CSO) Abatement Project

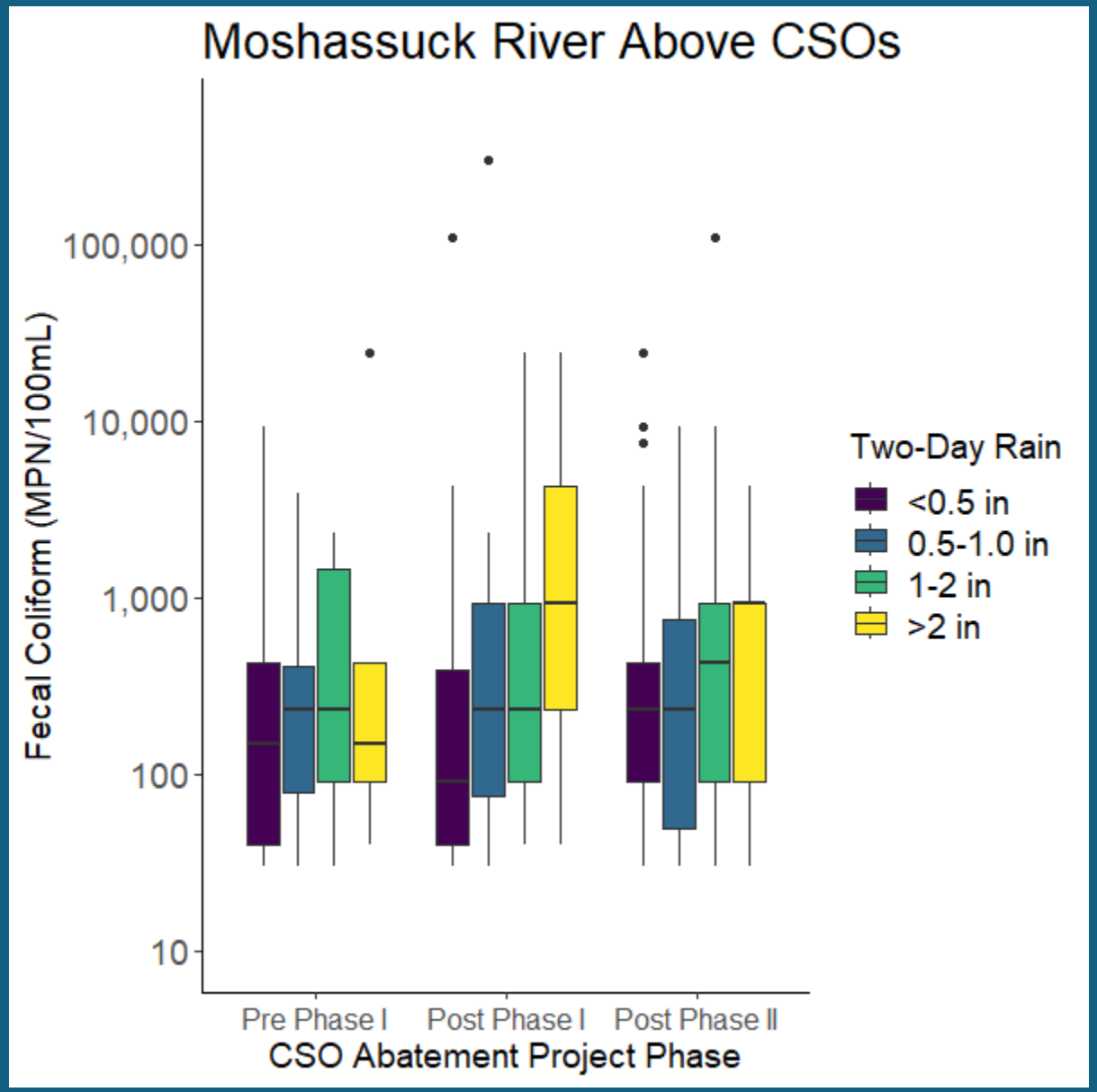
- Approx. $1.2 billion
- Goal: Reduce CSO discharges and restore water quality to support goals of “fishable” and “swimmable” waters
- Phase I completed October 2008
- Phase II completed December 2014
- Phase III in progress

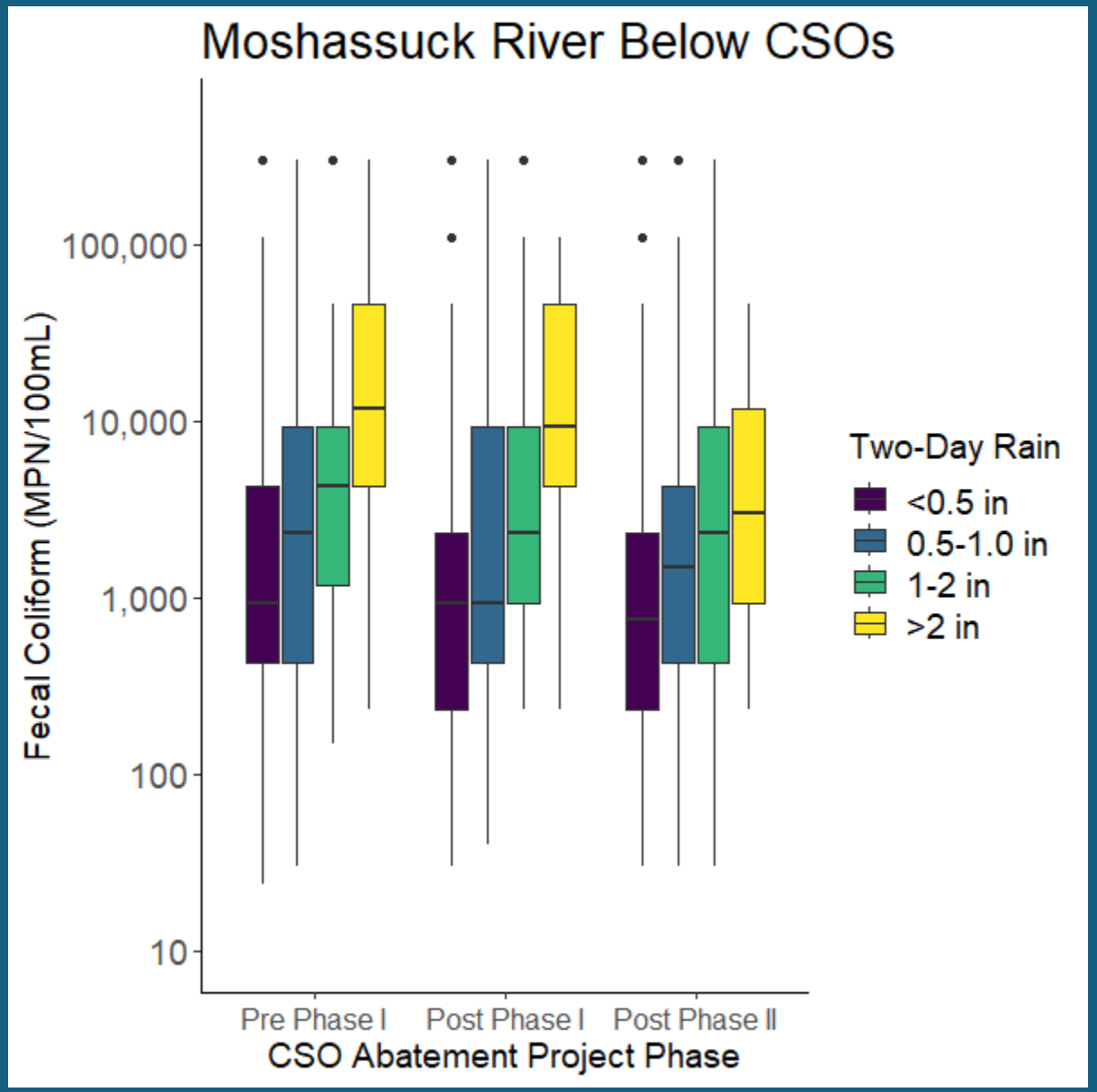


NBC Urban River Sample Locations

- Two decades of data: 2004-2023
- Four main tributaries to Providence River including sites upstream and downstream of CSOs
- Each site is sampled at least once per week


Bacteria Levels by Storm Size and CSO Abatement Project Phase
Fecal Coliform (MPN/100mL)
100,000
10,000
1,000
100
10
Pre Phase I
Post Phase I
Post Phase II
CSO Abatement Project Phase
Two-Day Rain
<0.5 in
0.5-1.0 in
1-2 in
>2 in


Moshassuck River Above CSOs
Fecal Coliform (MPN/100mL)
100,000
10,000
1,000
100
10
Pre Phase I
Post Phase I
Post Phase II
CSO Abatement Project Phase
Two-Day Rain
<0.5 in
0.5-1.0 in
1-2 in
>2 in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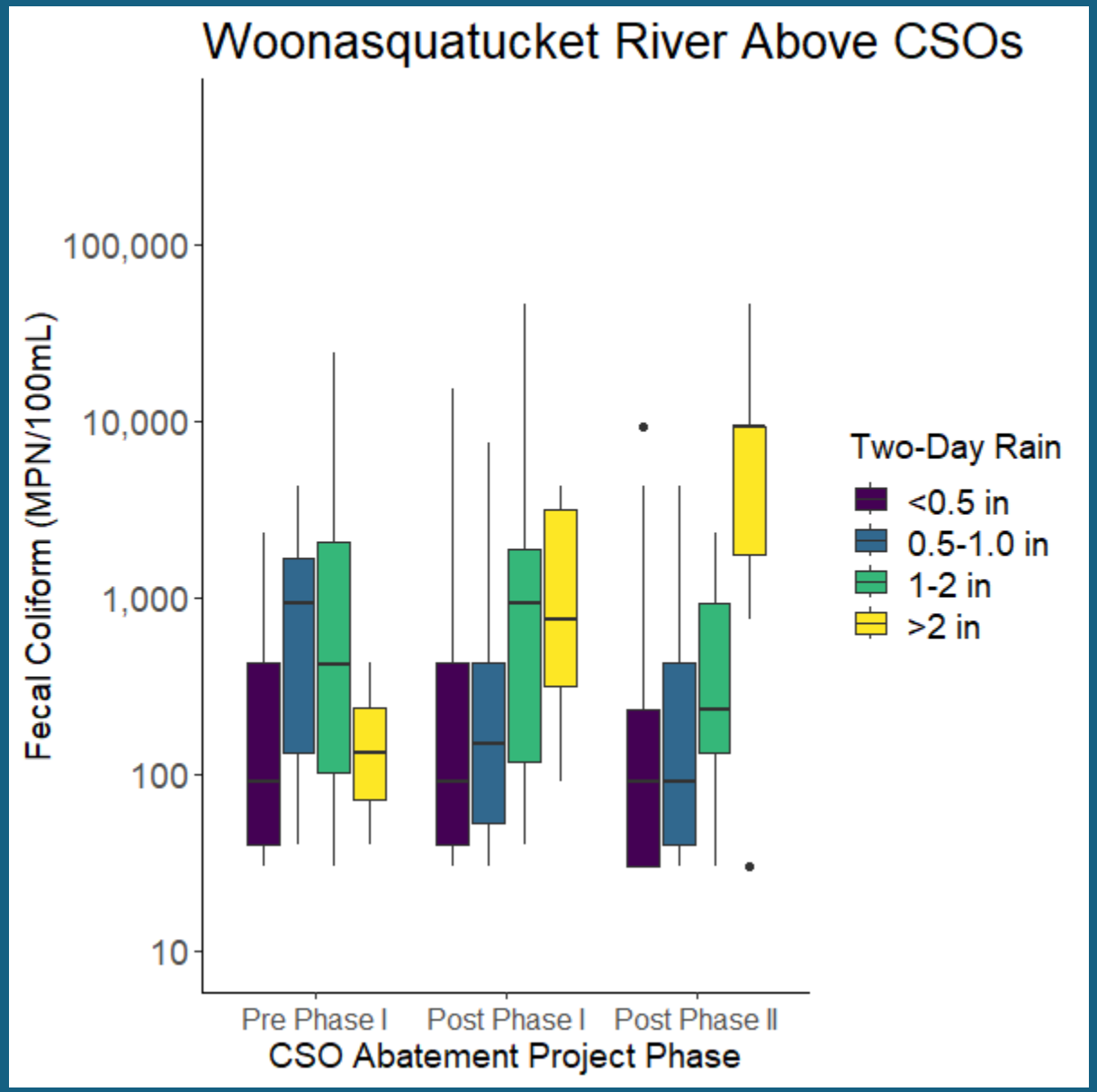
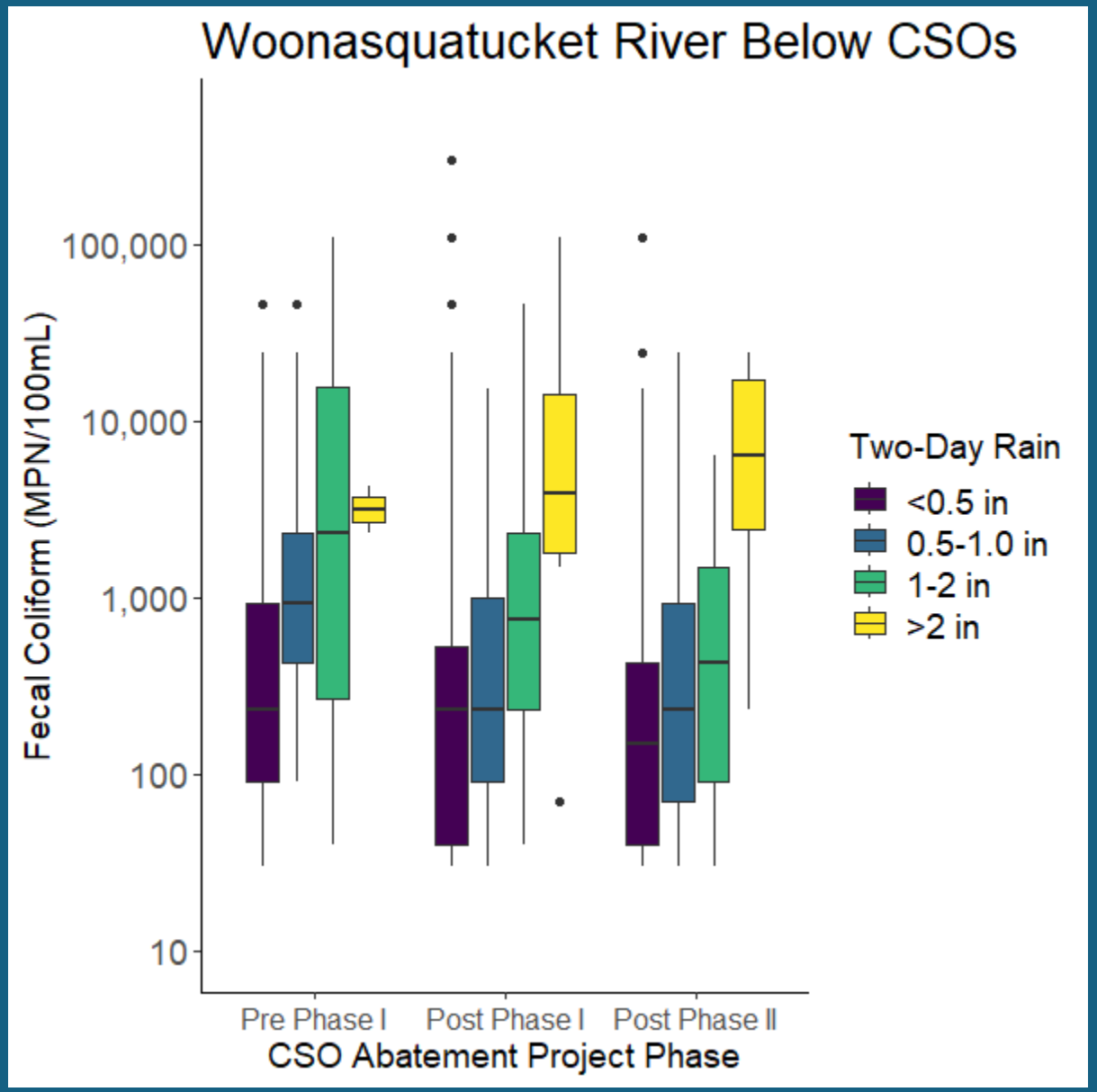

Woonasquatucket River Above CSOs
Fecal Coliform (MPN/100mL)
100,000
10,000
1,000
100
10
Pre Phase I
Post Phase I
Post Phase II
CSO Abatement Project Phase
Two-Day Rain
<0.5 in
0.5-1.0 in
1-2 in
>2 in


Woonasquatucket River Below CSOs
Fecal Coliform (MPN/100mL)
100,000
10,000
1,000
100
10
Pre Phase I
Post Phase I
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CSO Abatement Project Phase
Two-Day Rain
<0.5 in
0.5-1.0 in
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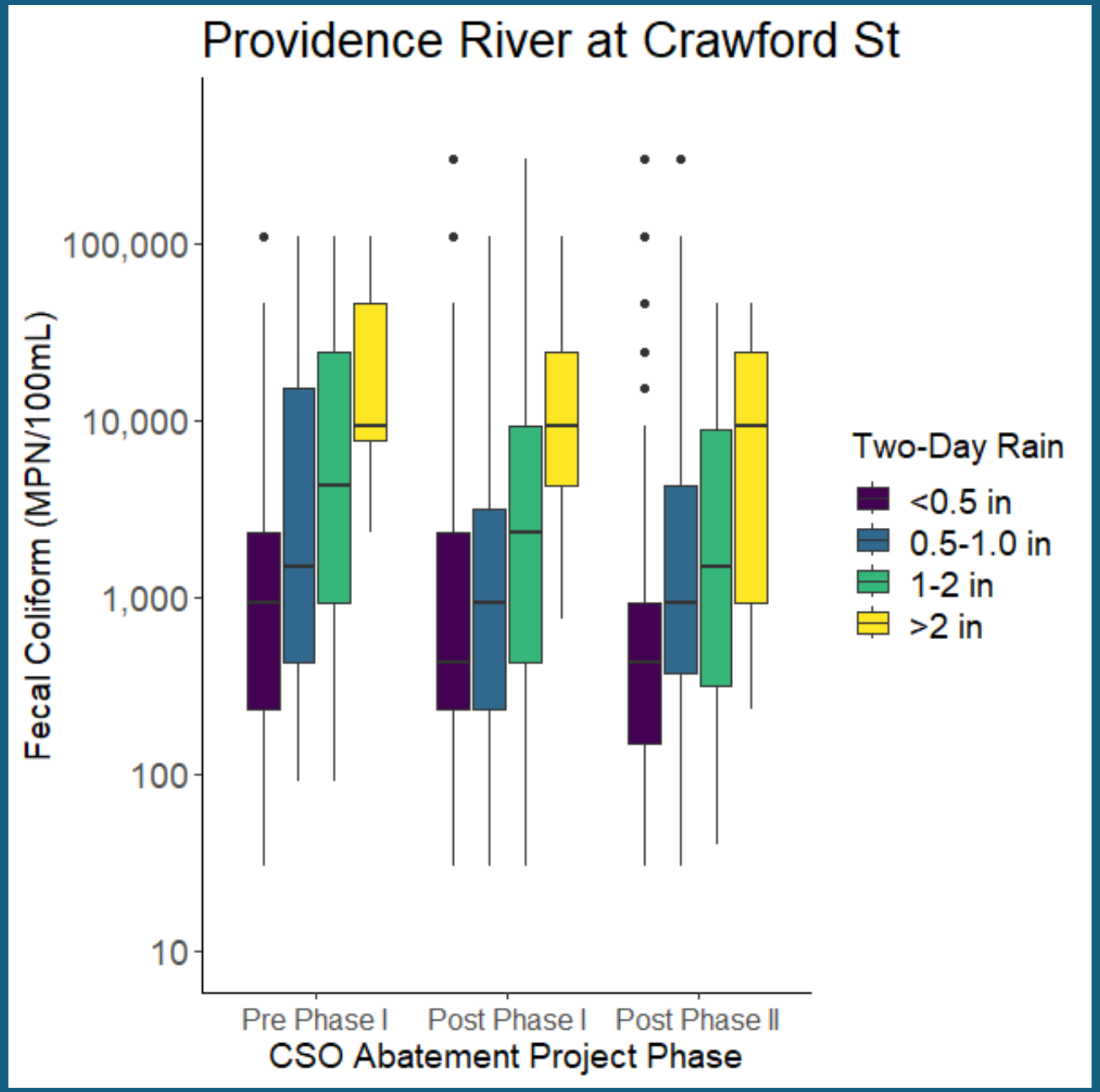
>2 in



Two-Day Rain	Change in Median Fecal Coliform Pre Phase 1 – Post Phase II
<0.5 in	-53.8%
0.5-1.0 in	-38.0%
1-2 in	-65.1%
>2 in	0.0%

Conclusions

- Evidence of greatest impact of CSO Abatement observed after mid-size storms
- The magnitude of change in fecal coliform concentrations across storm sizes outweighs the magnitude of change across CSO abatement phases
- High variability in bacteria levels complicates conclusions and predictability of water quality after storm events

Thank you!

- Environmental Monitoring staff for collecting samples for this long-term dataset in all weather conditions
- Laboratory staff for performing the analyses
- Technical Analysis and Compliance staff including Eliza Moore, Jim Kelly, and Nicole Skyleson for their contributions in pulling these data together

View our data

snapshot.narrabay.com

Contact

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