

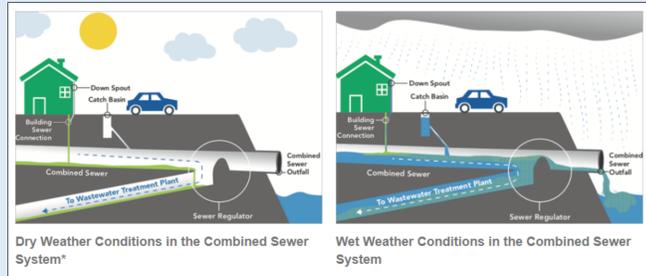


NARRAGANSETT BAY COMMISSION CSO ABATEMENT: HISTORY AND FUTURE PLANS

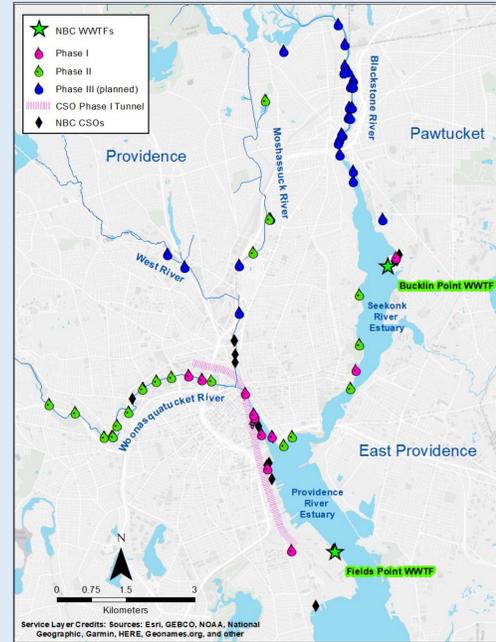
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 Narragansett Bay Commission – Providence, Rhode Island, USA
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Acknowledgements: Many Divisions and personnel at the NBC are involved in CSO Abatement. The Construction and Engineering Division is the authority on this Project; Kathryn Kelly is the CSO Program Manager. Thank you to her and her team for input and support on this poster. Jim Kelly, Bethany Lewis, Nicole Skyleson, and Walter Palm also contributed, and I thank them for their support.

- The **Narragansett Bay Commission** owns and operates the two largest wastewater treatment facilities in Rhode Island, USA.
- Combined sewers** are a legacy of historical sewer collection systems.
- Cholera epidemics** prompted Rhode Island to create pipes to move sewage from homes, businesses, and streets (e.g., horse waste) to nearest river for flushing.
- As **centralized WWTFs** became necessary, combined sewage was intercepted and directed to WWTF (Field's Point 1901).
- Original combined sewer outfalls remain as **emergency discharge points**.



<https://www.nyc.gov/site/dep/water/combined-sewer-overflows.page>



- Combined sewage overflows **violate the Clean Water Act (1972)**.
- NBC and Rhode Island Department of Environmental Management have **consent agreement** to achieve CWA compliance.
- NBC CSO Comprehensive Plan (1993)**
- Extensive **stakeholder engagement** as three-phase CSO Abatement Project designed.
- Water quality **goals** balanced with **affordability** for NBC ratepayers.
- “Addressing” CSOs** – sealed or modified to reduce discharge frequency
- 93% Decrease in CSO discharges projected** (upon completion of Phase III)
- Active project, details change frequently!
Contact us for most up-to-date information!

\$359 M Phase I

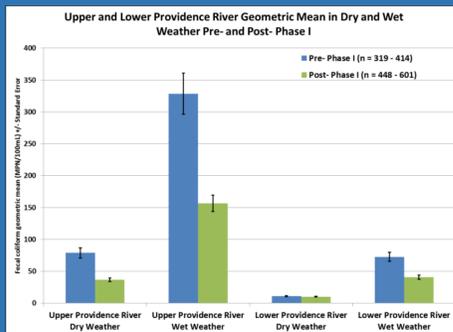
“The Biggest Project You’ll Never See”

- Providence Tunnel** - 26-ft diameter deep rock tunnel, 3 miles long, 300 ft. below ground
- 65-million-gallon capacity** - Stores flows for eventual pump-out to Field's Point WWTF
- Captures “first flush”
- Completed October 2008**
- Reduced discharges from CSOs by 50% (based on pre-construction modeled estimates of 2.2 billion gallons per year discharged, and actual tunnel capture).



But wait, there's more!

- New **wet weather treatment facilities** constructed at Bucklin Point (completed 2006), providing settling and disinfection for up to 116 MGD, reducing discharges from North Diversion Structure CSO by 95%.
- Phase I report** (available online at <http://snapshot.narrabay.com>) contains estimates of other pollutants captured.



Phase I Impacts

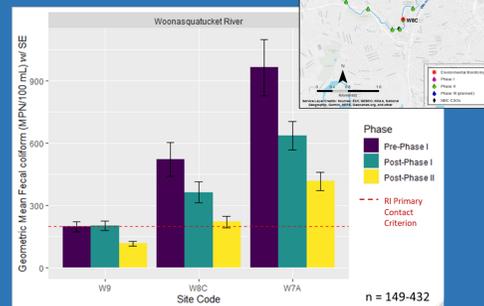
- Closure criteria for **conditional shellfishing area A** increased from 0.5" to 0.8" of rainfall; for area B, closure criteria increased from 1.0" to 1.5" of rainfall.
- NBC estimated this equated to 65 more days/year (A) and 45 more days/year (B) open for shellfishing!
- Beach closures** in the upper Bay also declined following Phase I!



\$197 M Phase II

Major Features

- Additional CSOs tied-in to Phase I Providence tunnel
- Sewer separation** (2 CSOs)
- Screening and storage facility and constructed wetland treatment area** (1 CSO).
- Completed June 2015** (some components completed earlier, impacts to rivers depend on local infrastructure changes)

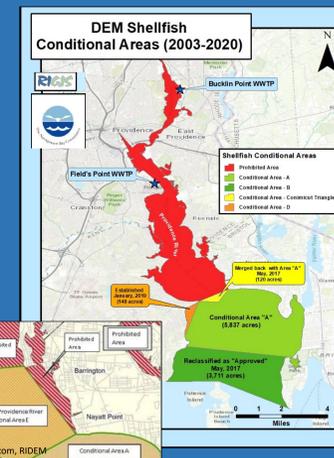


Phase II Impacts

- 3,711 acres of conditionally-open shellfish area (B) reclassified to “Approved” in 2017
- Further relaxation of rainfall limits to initiate closure of conditional area A (from 0.8" to 1.2")
- 2021 – **Conditional Area E opened**; first shellfishing in Providence River in 70+ years! 1,900+ acres.



- Phase II Report** planned
- Despite abatement efforts, some urban river sites still experience elevated bacteria (stormwater? Illicit connections?)



\$1.1 B Phase III

Pawtucket Tunnel

- Will be 30-ft diameter, 2.2 miles long, 125 ft. below ground in Pawtucket, Central Falls, East Providence
- More than **58-million-gallon capacity**
- Broke-ground 2021
- Expected completion: 2027**
- Estimated cost: \$850 M**



Additional Green Infrastructure

- Multiple projects, some already completed
- Including 2 athletic fields in Central Falls built atop stormwater capture infrastructure.
- Estimated cost** for sub-phases besides the Pawtucket Tunnel: **\$294 M (2018 dollars)**

How is Phase III being funded?

- Low interest loans through the USEPA Water Infrastructure Finance and Innovation Act (WIFIA) for 49% of the project's estimated cost.
- NBC will finance the rest through the Rhode Island Infrastructure Bank and/or the issuance of revenue bonds.
- All these capital sources are loans and will be paid by NBC's ratepayers. Although the project is federally mandated, there is currently no federal funding contribution. And, although the project has statewide benefit, there is no state contribution.
- Rates are projected to rise from \$43/month in 2021 for an average single-family residence to \$50/month in 2027