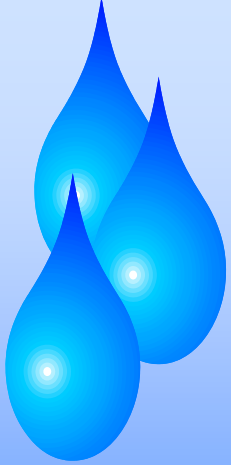


Sediment Monitoring for Pesticides

ERAC Meeting
April 18, 2014

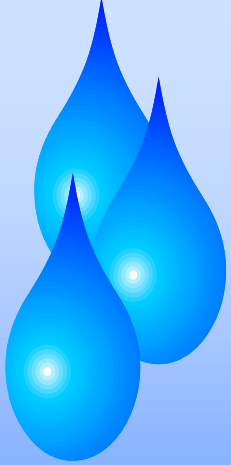
Mary Tomlinson
Maine Board of Pesticides Control
Maine Department of Agriculture, Conservation and Forestry





Outline of Presentation

- ME BPC Sediment Monitoring
 - Sites
 - Results
- National Monitoring
 - Urban/Coastal
 - Results
- Common Analyses
- Maine Protocols



Maine's Sediment Sampling Program

8 urban sites sampled

- Portland & South Portland
- Nov.-Dec., 2008-2010
- 3 urban streams & 5 tidal sites

Sampling Sites 2009-2010

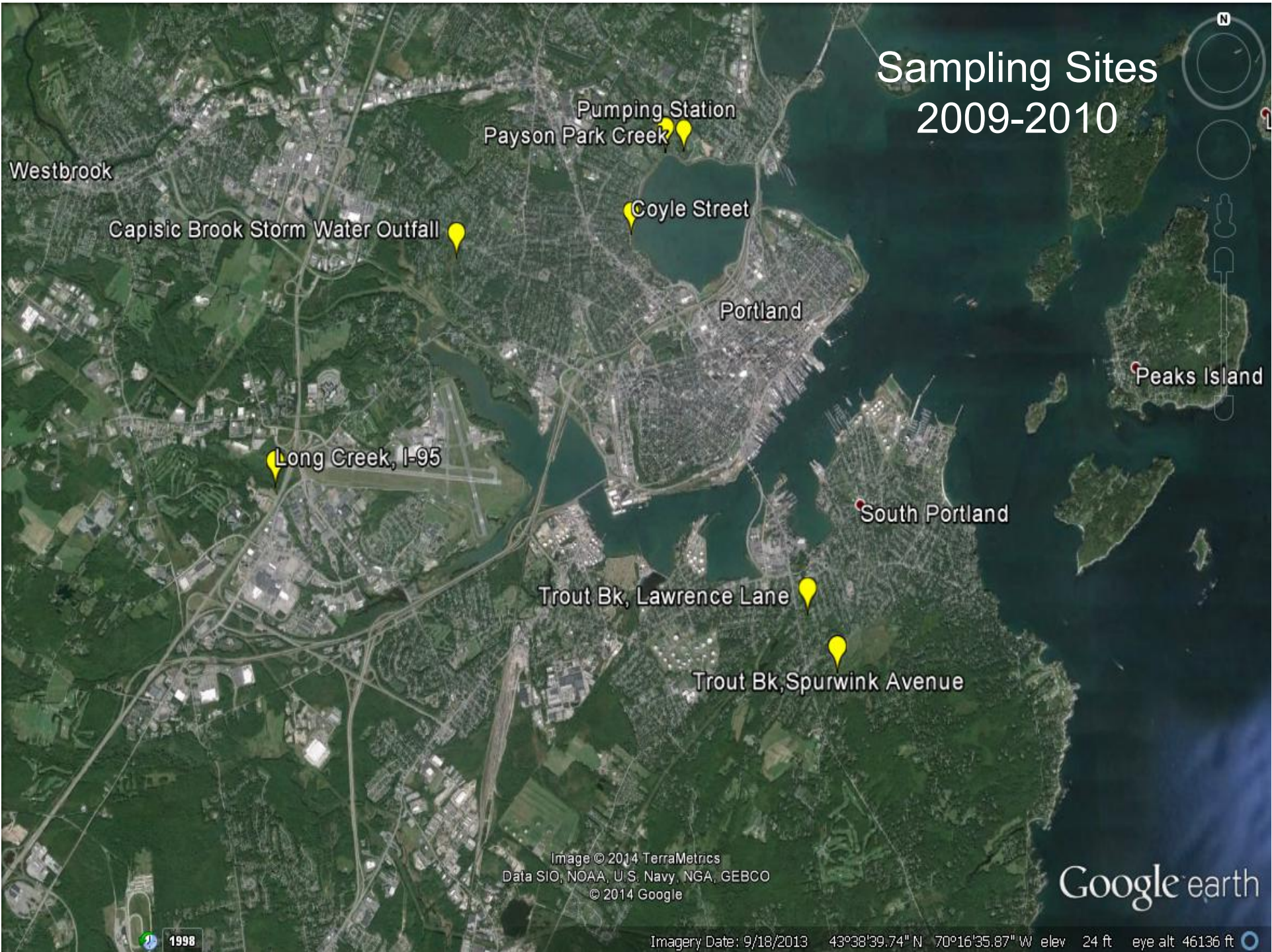
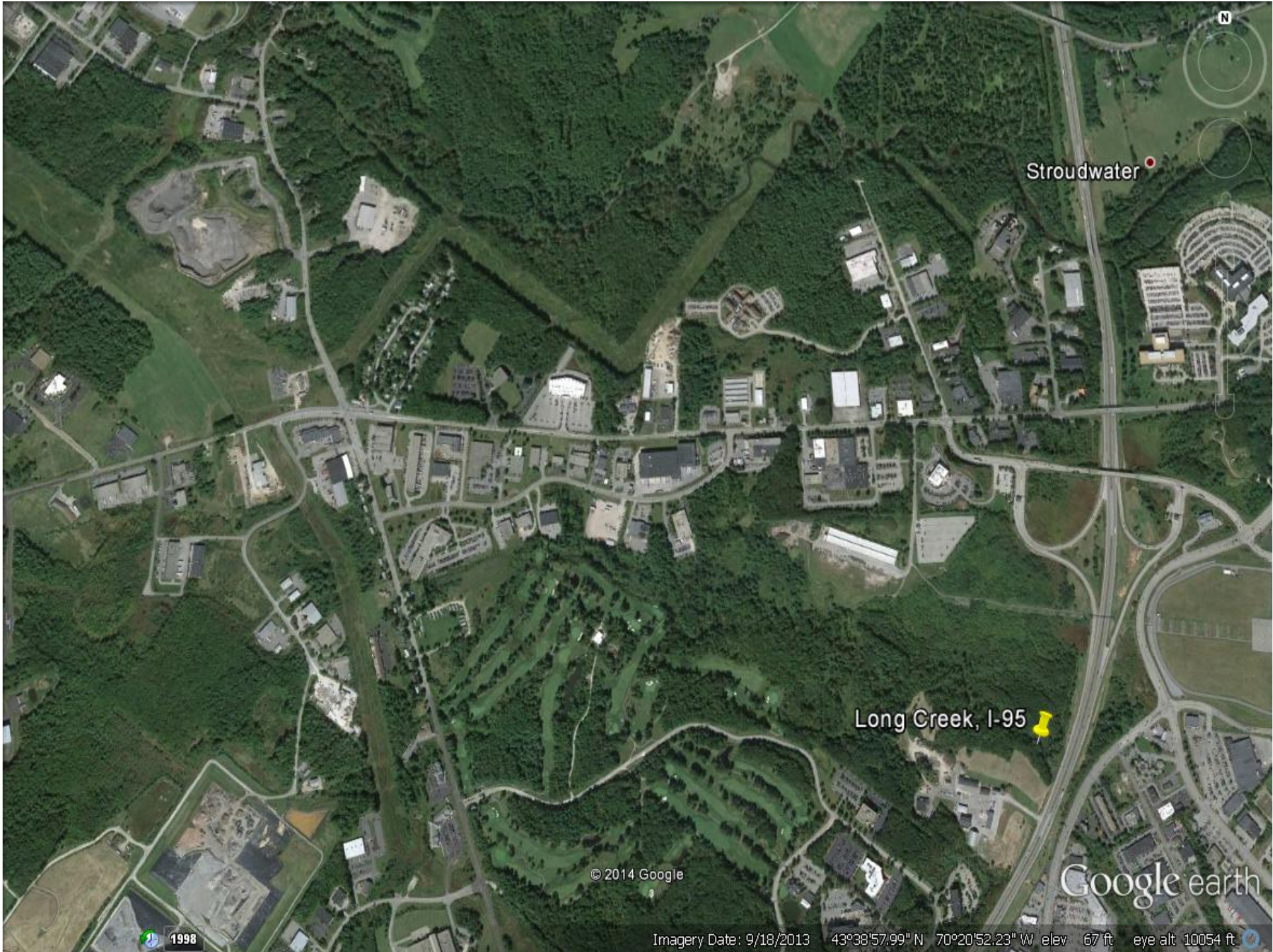


Image © 2014 TerraMetrics
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Google earth

1998

Imagery Date: 9/18/2013 43°38'39.74" N 70°16'35.87" W elev 24 ft eye alt 46136 ft



Stroudwater

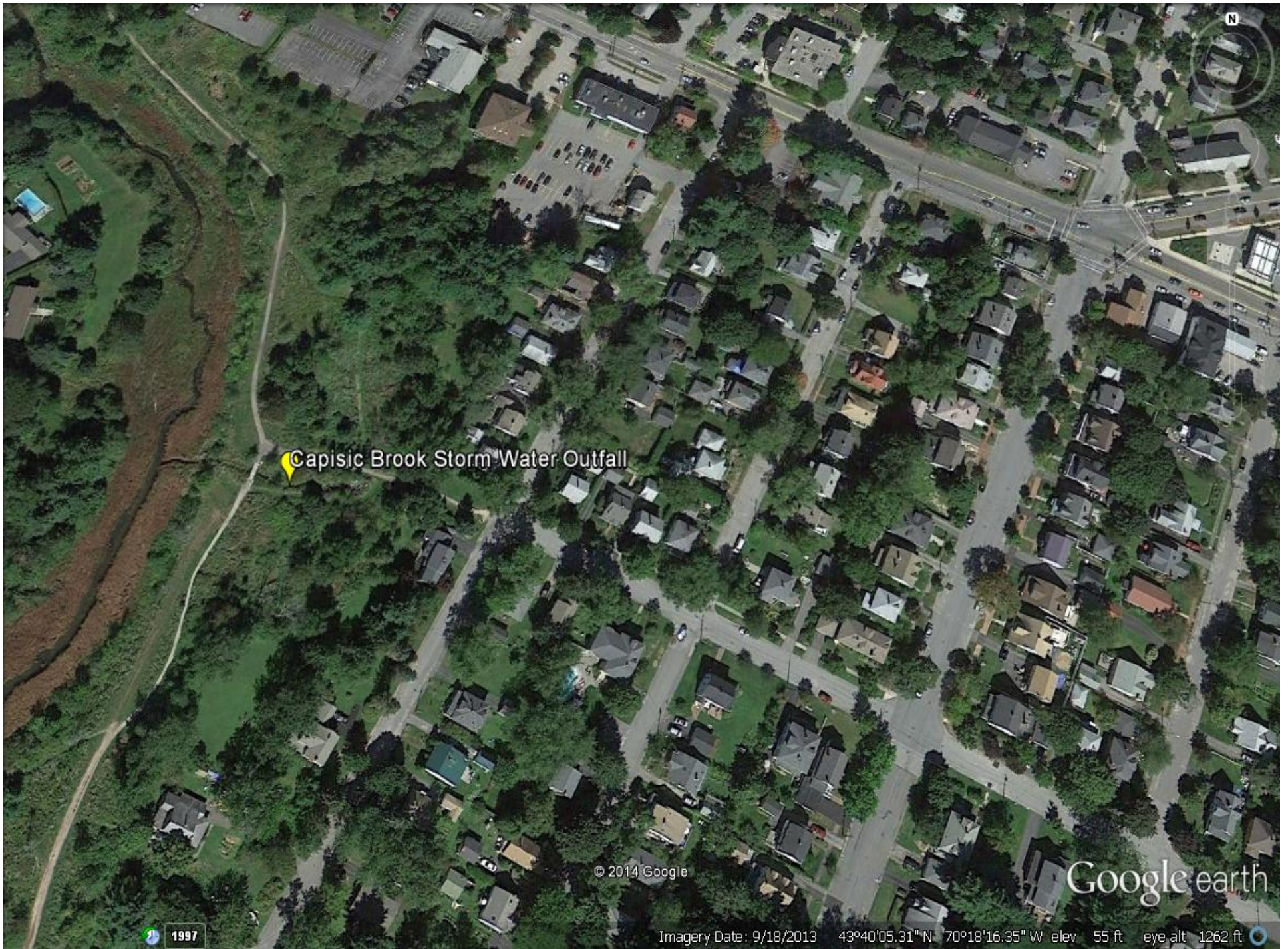
Long Creek, I-95

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1998

Imagery Date: 9/18/2013 43°38'57.99" N 70°20'52.23" W elev 67 ft eye alt 10054 ft



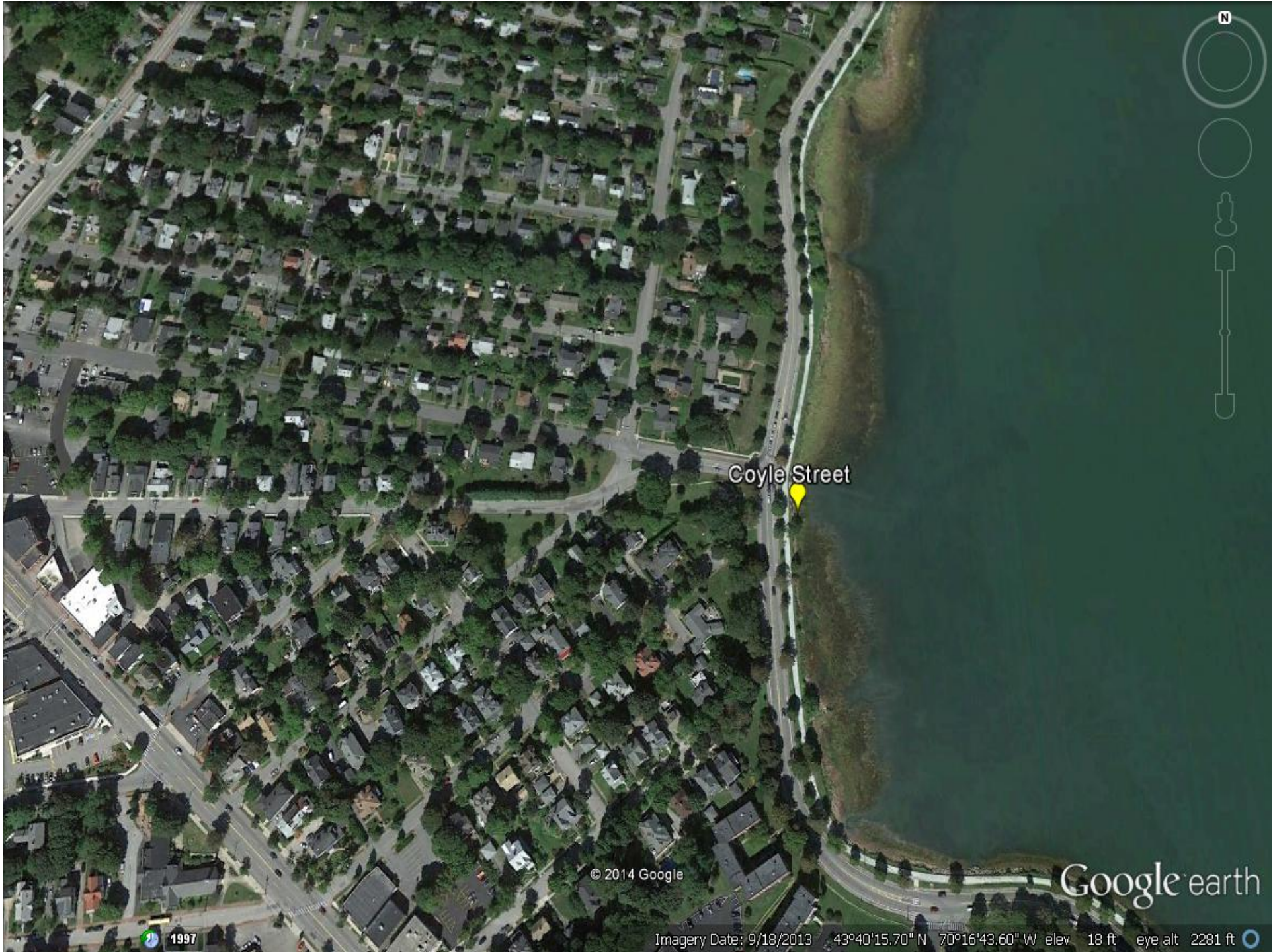
Capisic Brook Storm Water Outfall

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Google earth

1997

Imagery Date: 9/18/2013 43°40'05.31" N 70°18'16.35" W elev 55 ft eye alt 1262 ft



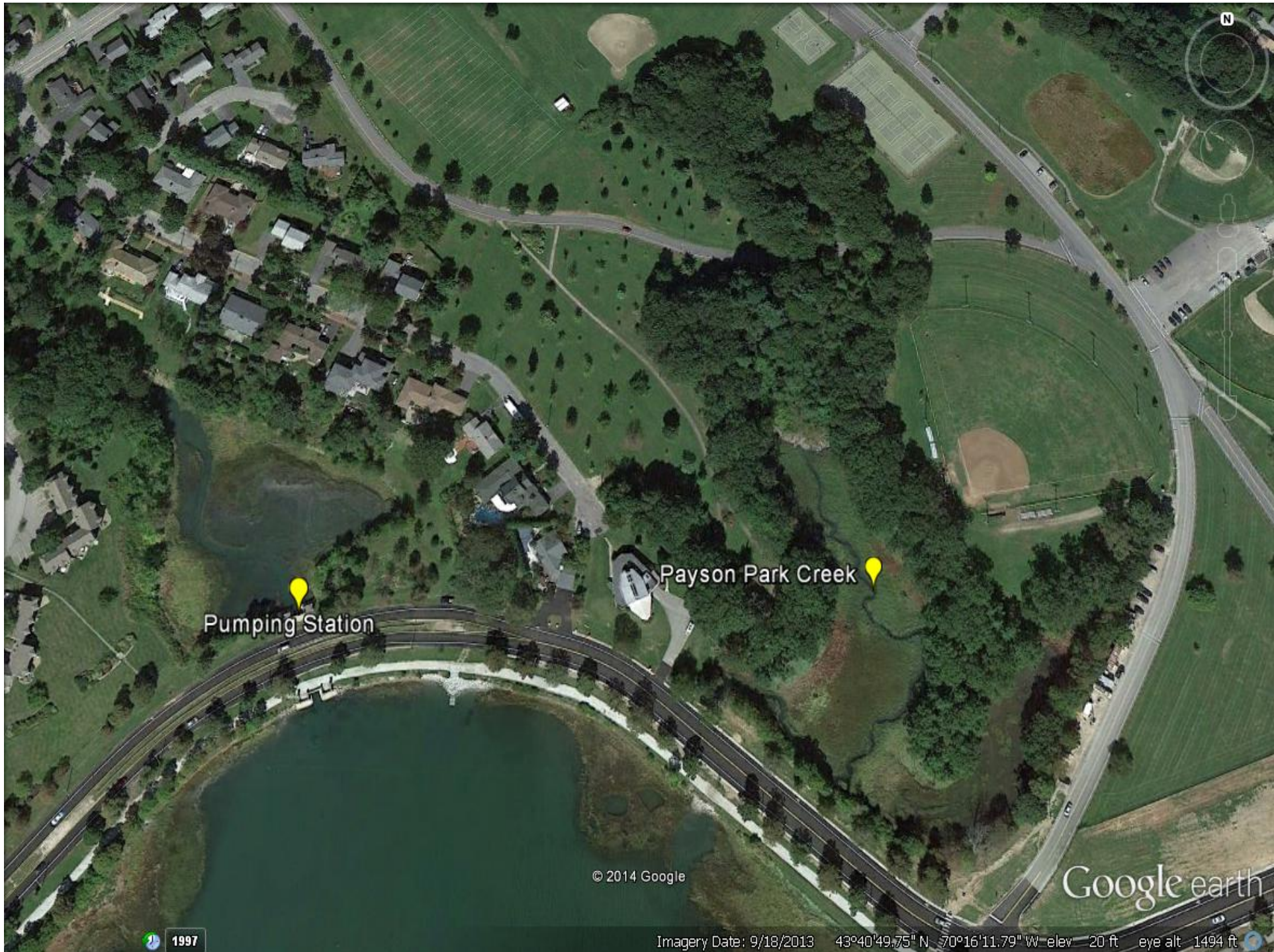
Coyle Street

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Imagery Date: 9/18/2013 43°40'15.70" N 70°16'43.60" W elev. 18 ft eye alt. 2281 ft

1997



Pumping Station

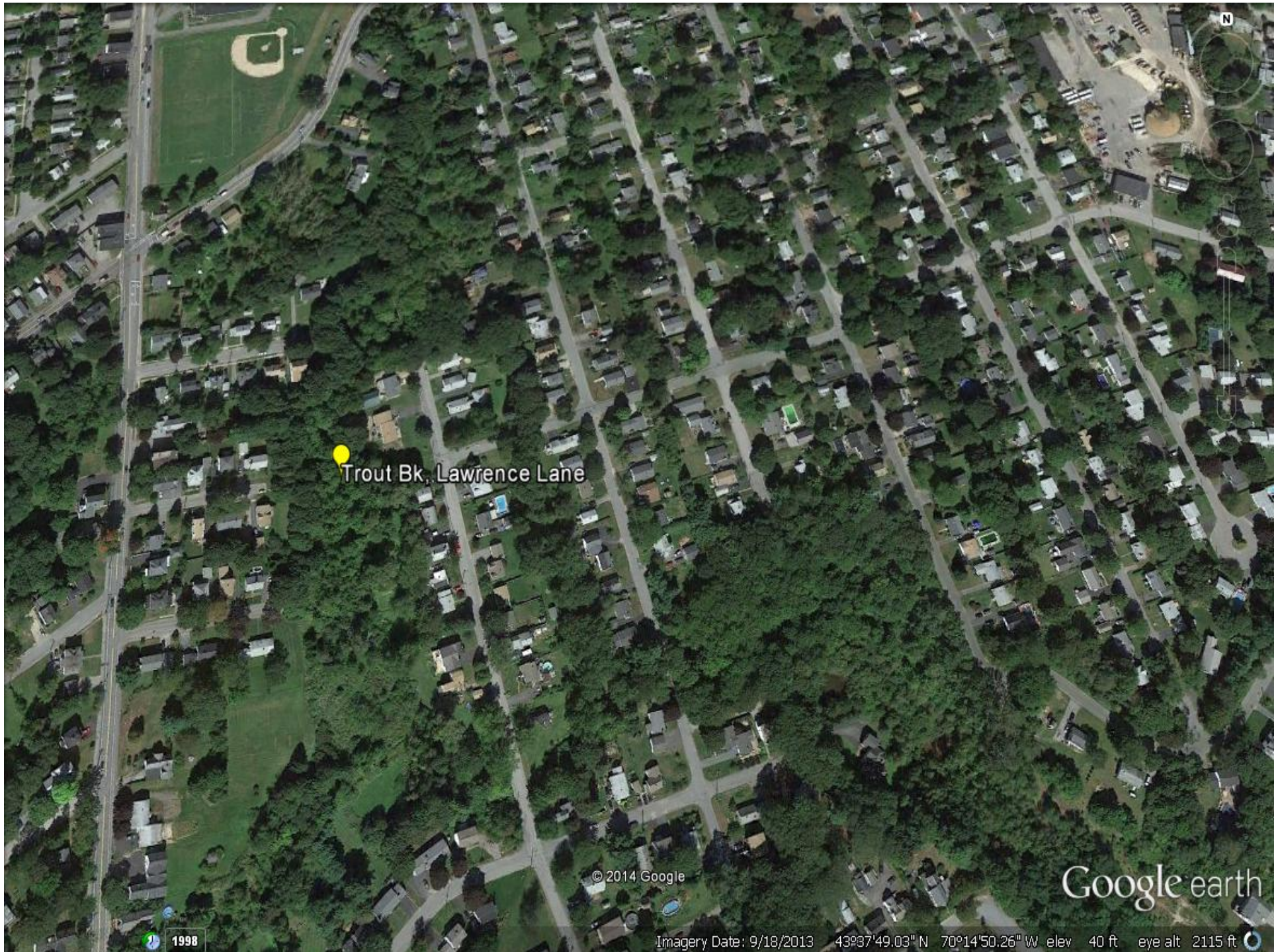
Payson Park Creek

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Google earth

1997

Imagery Date: 9/18/2013 43°40'49.75" N 70°16'11.79" W elev 20 ft eye alt 1494 ft



Trout Bk, Lawrence Lane

© 2014 Google

Google earth

1998

Imagery Date: 9/18/2013 43°37'49.03" N 70°14'50.26" W elev 40 ft eye alt 2115 ft

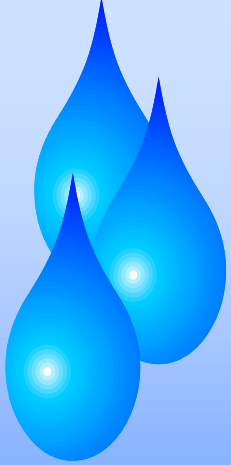


Trout Bk, Spurwink Avenue

Google earth

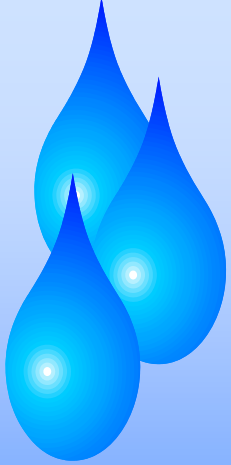
1998

Imagery Date: 9/18/2013 43°37'27.20" N 70°14'42.12" W elev 52 ft eye alt 634 ft



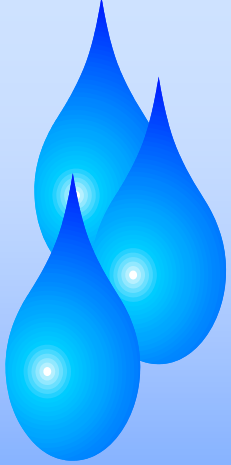
Maine's Sediment Sampling Program: Results

- Detections varied by site & year:
 - Bifenthrin, λ -cyhalothrin, permethrin, cyfluthrin, cypermethrin, sumithrin, esfenvalerate, piperonyl butoxide
- Interpretative constraints:
 - Evolving collection protocols
 - Evolving analytical methodology
 - Lack of applicable benchmarks



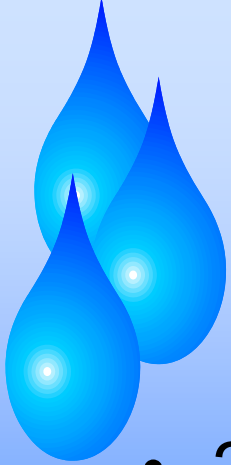
National Sediment Sampling Programs

- Multiple studies across US
- Primary focus on urban streams
- California – intensive monitoring of fresh water streams and coastal waters for multiple pesticides
- Other state programs: CT (streams & coastal), MT, ME
- USGS



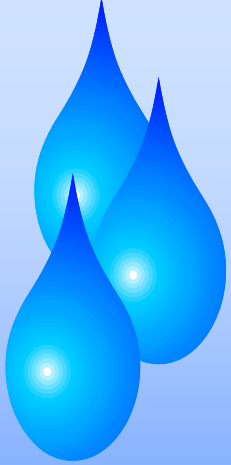
National Sediment Sampling Programs: Results

- 1997: San Francisco Bay – earliest known detection of bifenthrin
- 2007 study: 98 metropolitan urban streams (7 metropolitan areas) in GA, MA, NH, WI, TX, CO, WY, UT, WA
 - Detections: *bifenthrin, *λ-cyhalothrin, *cypermethrin, *permethrin, resmethrin



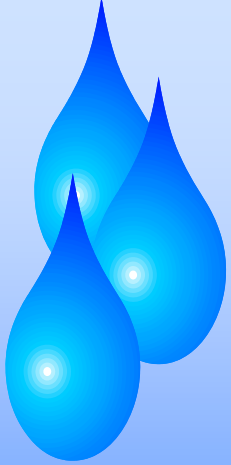
National Sediment Sampling Programs: Results

- 2010 study: southern CA coastal sediments
 - Detections: *bifenthrin, *permethrin, *cyfluthrin, *cypermethrin, λ -cyhalothrin, deltamethrin, esfenvalerate, fenpropathrin
- Current CA urban streams/storm outfall monitoring
 - Most common detections: bifenthrin (64% water, 69% sediment), cypermethrin, permethrin, λ -cyhalothrin
 - Fipronyl now detected in water & sediments



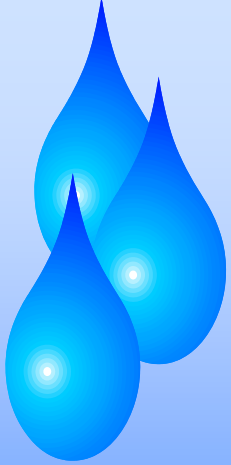
Common Analyses in National Studies and California

- Total organic carbon (TOC)
- Grain size
- Chemical analysis (water & sediment): pesticides of interest, other chemicals, DOC, pH, temperature
- Toxicity testing
 - Fresh water: *Hyallela azteca*
 - Marine water: *Eohaustorius estuarius*
- Toxic units: environmental conc./acute LC₅₀ value of target invertebrate (>5 usually highly toxic to amphipods)



Maine's Sediment Sampling Program: Protocols

- Evolving protocols
- Top 1-3 cm of sediment - exposed & submerged
- Composite sample each site
- Amber glass jars, teflon (HDPE) lined lids
 - Certified for semivolatiles and pesticides/PCBs
- Plastic scoop – new each site
- Chain of custody
- Frozen at lab until analyzed



Sediment Monitoring for Pesticides

Questions?

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