



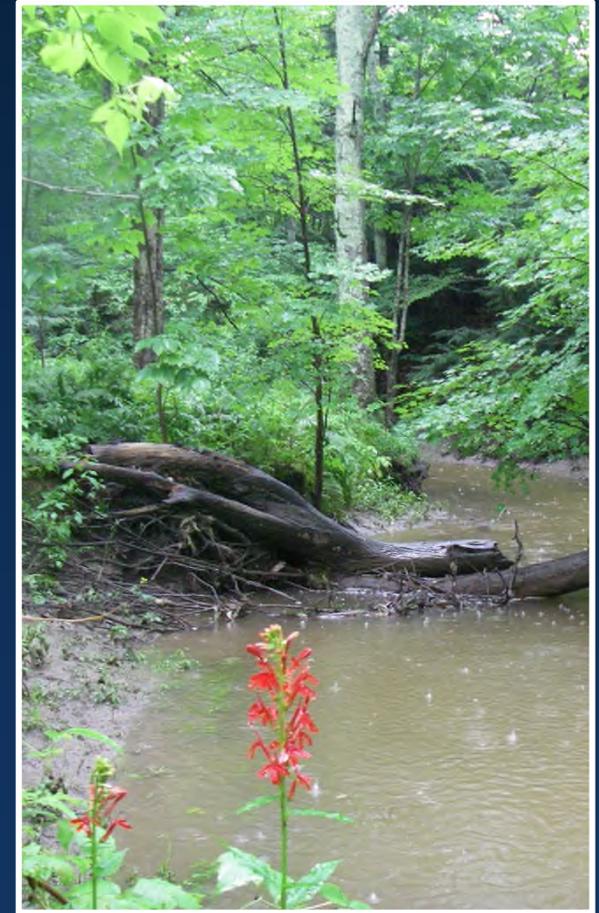
DROWNING IN DATA

Leveraging Multi-Parameter Datasets to Inform Adaptive Management-Based Restoration in the Long Creek Watershed, an Impaired Stream In Coastal Maine

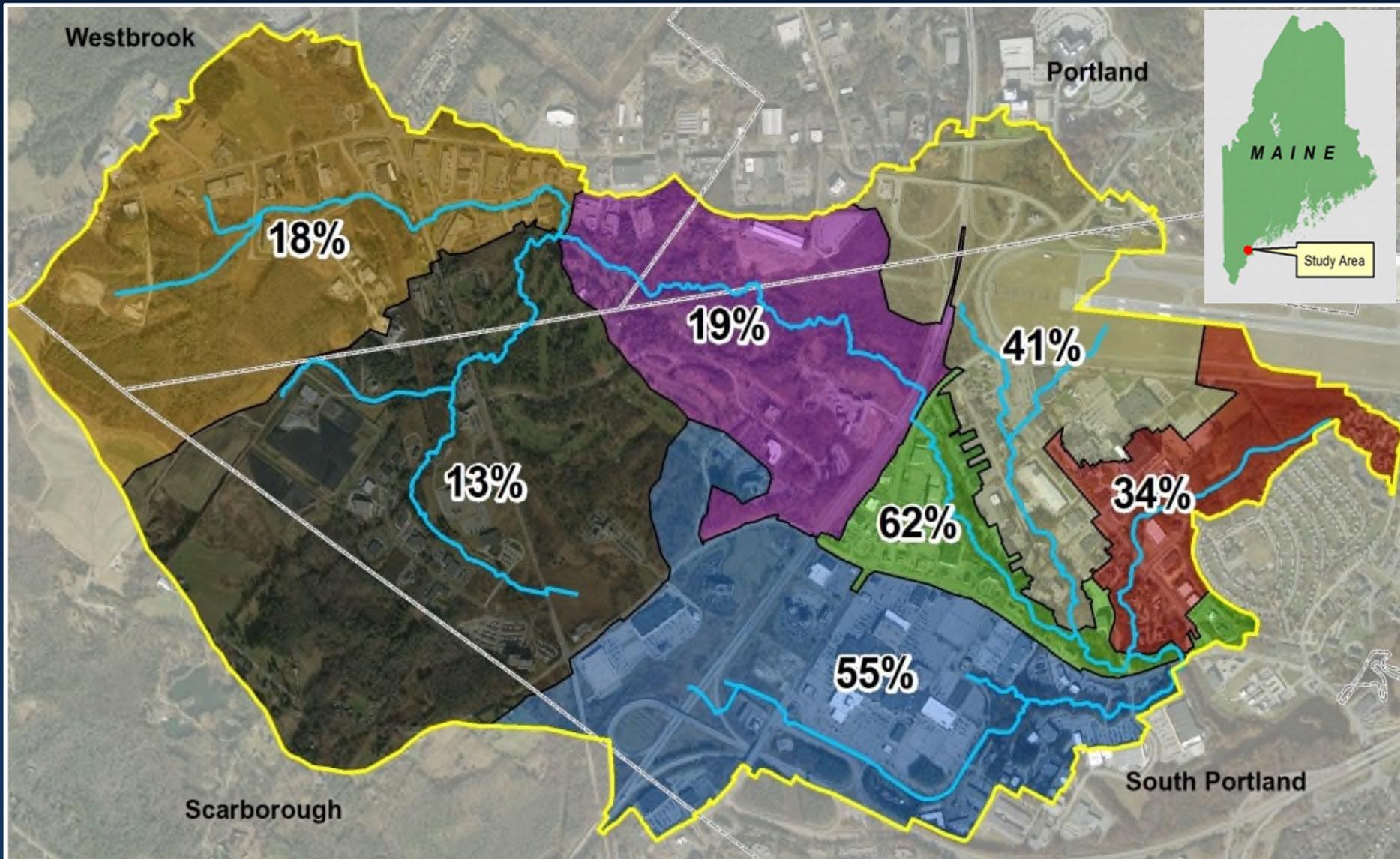
Kate McDonald, Cumberland County Soil & Water Conservation District
Frederik Schuele & Karen Savage, URS Corporation

Agenda

- **What is Long Creek?**
- **How are we managing Long Creek?**
 - *Structural Retrofits*
 - *Nonstructural Management*
 - *Riparian Corridor Restoration*
- **Where does monitoring fit in?**
 - *Program overview*
 - *The purpose of the program is not ...*
- **Adaptive management in action**
- **Where do we go from here?**



Watershed Statistics



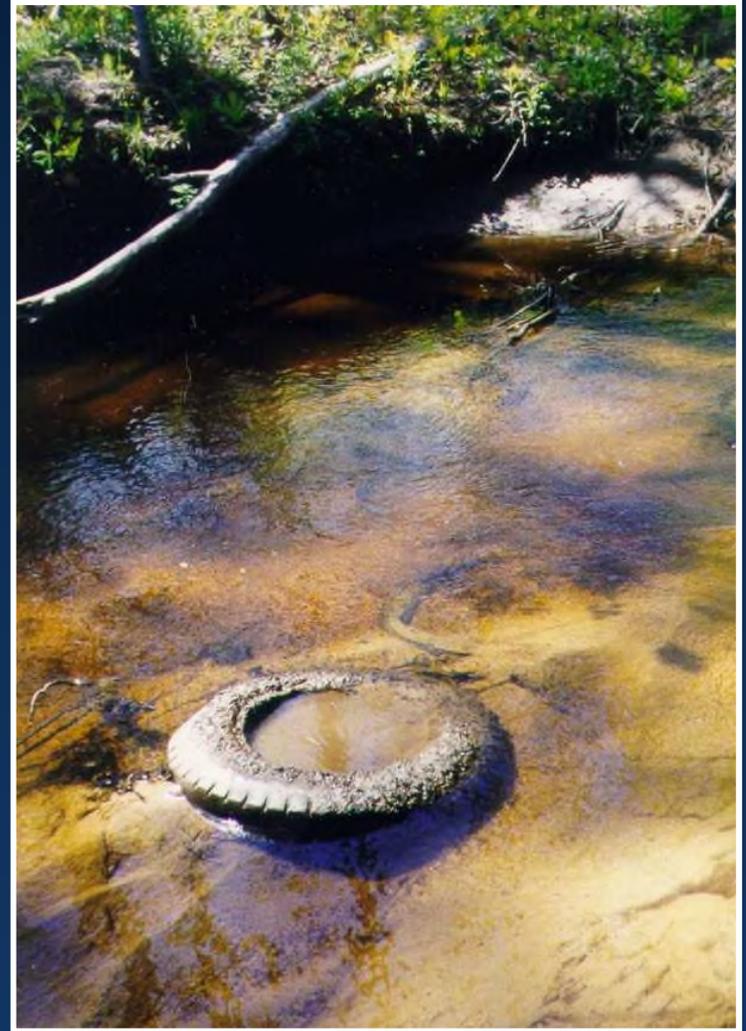
Long Creek is Impaired

- Stream flow has been altered



Long Creek is Impaired

- Stream flow has been altered
- Lack of woody debris



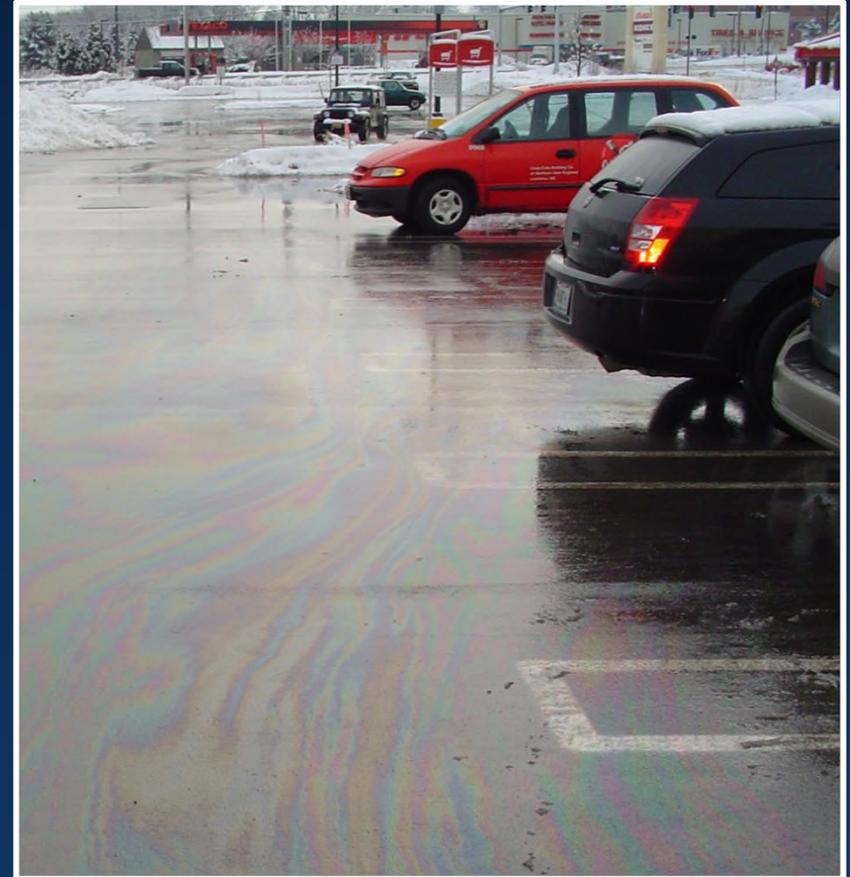
Long Creek is Impaired

- Stream flow has been altered
- Lack of woody debris
- Dissolved oxygen is low



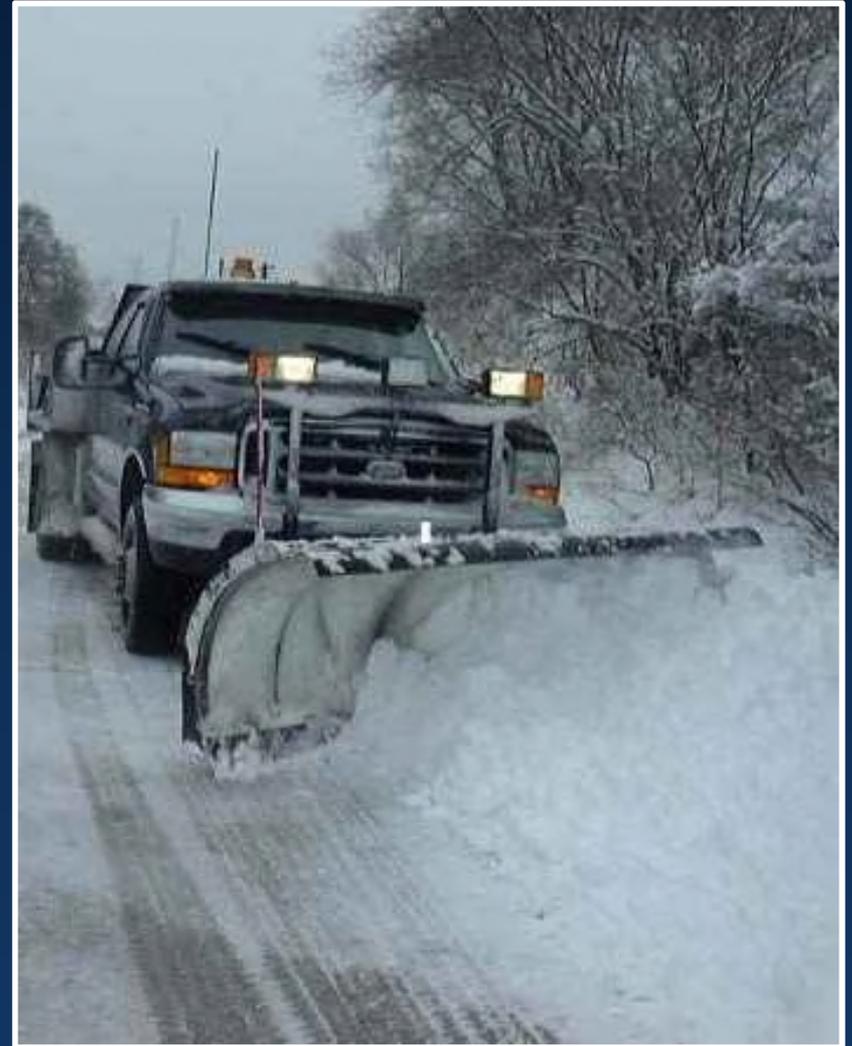
Long Creek is Impaired

- Stream flow has been altered
- Lack of woody debris
- Dissolved oxygen is low
- High levels of toxic substances



Long Creek is Impaired

- Stream flow has been altered
- Lack of woody debris
- Dissolved oxygen is low
- High levels of toxic substances
- High levels of chloride

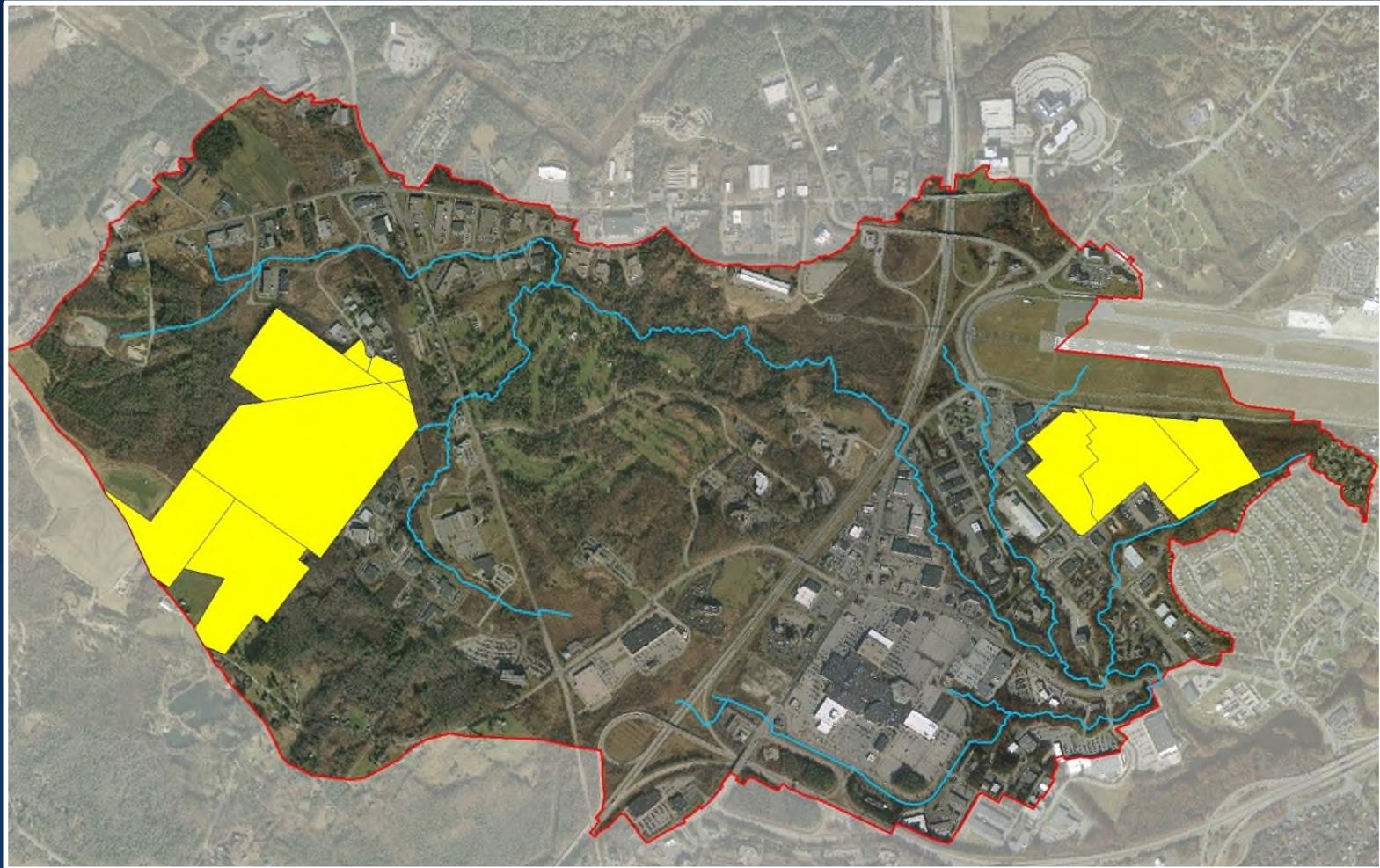


Residual Designation Decision

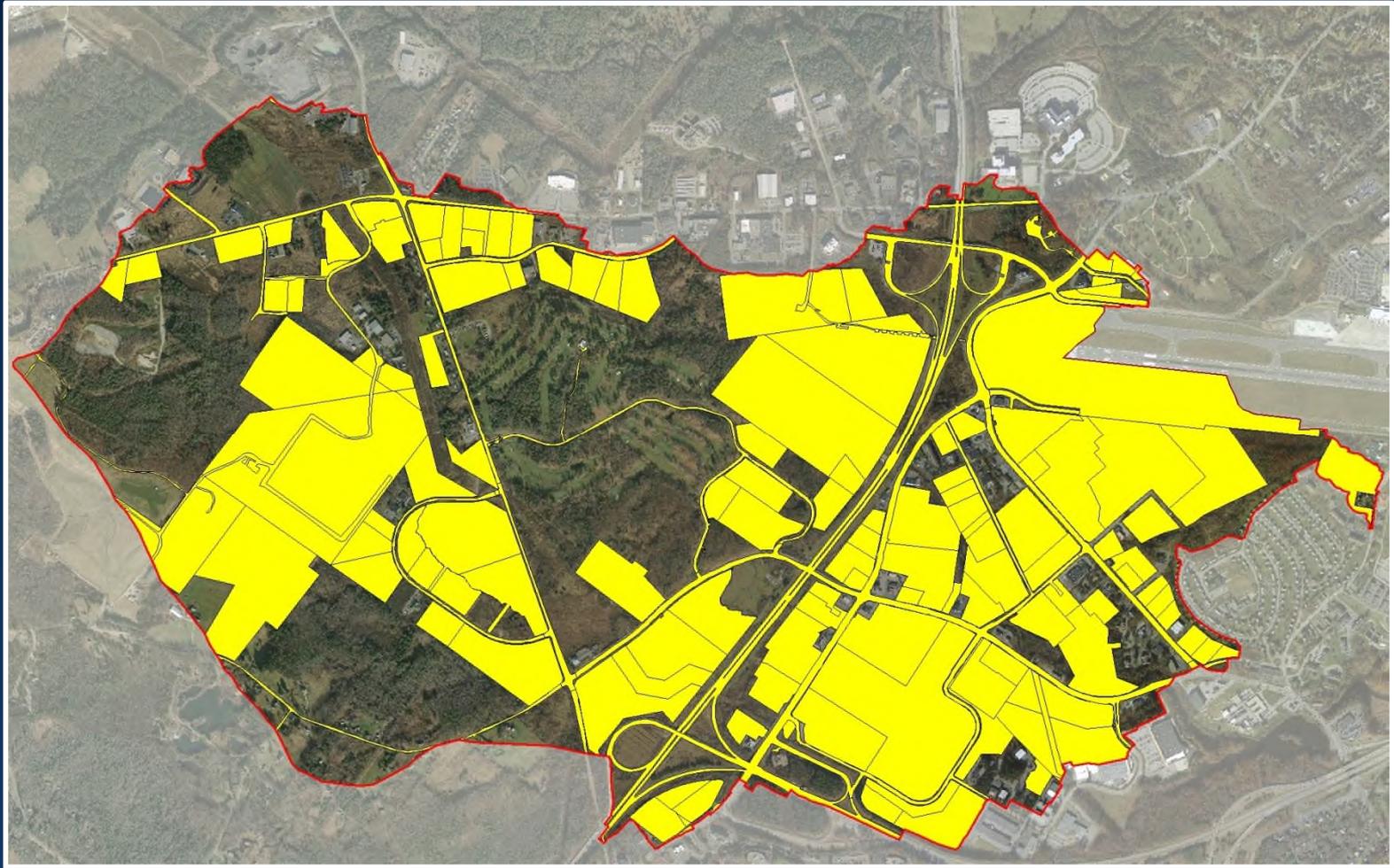
- March 2008: Conservation Law Foundation petitioned EPA
- December 2008: EPA preliminary decision to designate
- October 2009: Final decision published
- Discharge permits required for parcels with at least 1 acre of impervious surface



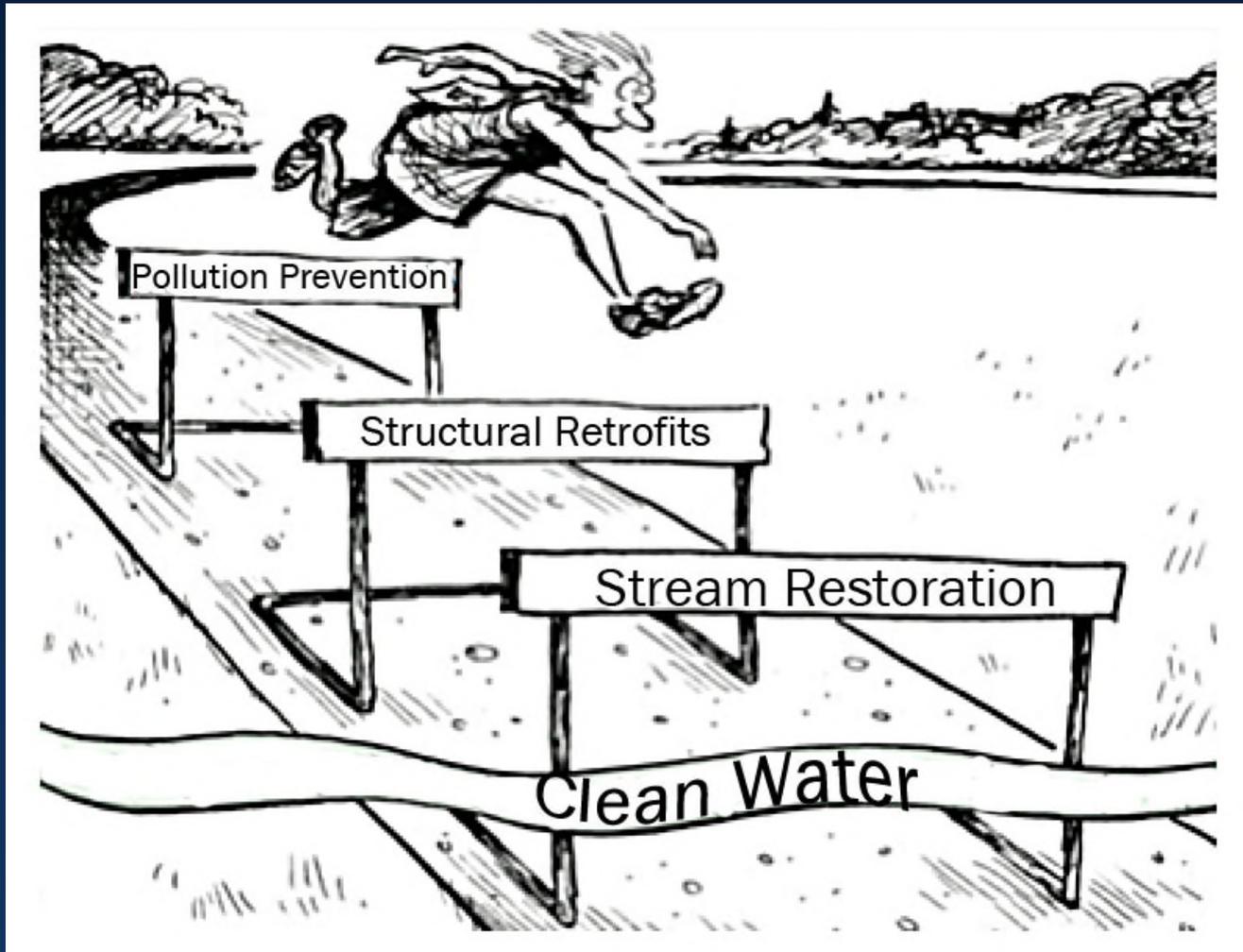
Previously Regulated Parcels



Now Regulated Under Long Creek General Permit



Implementation Strategies



Goal: Meet water quality standards by 2020



Structural Retrofits

Treat 150 impervious acres to address volume of water, metals, nutrients, dissolved oxygen, and temperature.

63.42 acres treated (42%) to date



Nonstructural Pollution Prevention

Implement non-structural measures to address chloride, metals and nutrients.



Nonstructural Highlight: Winter Maintenance

- Chloride management is a regional problem and should have a regional solution.
- LCWMD requested that the Maine DEP explore developing state-wide salt application BMPs.



Habitat Restoration

Improve habitat at 10 sites to address dissolved oxygen, temperature, in-stream habitat, and fish passage.

2 completed (20%) to date



Monitoring Our Progress

- What the monitoring program is.
- What the monitoring program is not.
- Where does monitoring fit in?



The Monitoring Program is...

- Continuous (Feb-Nov)
 - Dissolved oxygen
 - Specific conductance
 - Temperature
 - Stream stage
- Periodic Storm & Baseflow
 - Spring melt, June & September
 - Metals (Cu, Ni, Zn)
 - Chloride
 - Phosphorus
- Every 3-5 years
 - Macroinvertebrates
- As needed
 - PAHs
 - Sediment chemistry
 - Additional monitoring locations
- Special programs
 - H&H Study
 - In Situ Toxicity Testing
- Two weather stations
 - NOAA (Portland Jetport)
 - Temp/Precip (Northwest watershed)



The Monitoring Program does not...

- Monitor the receiving waterbody
- Monitor individual BMPs
- Evaluate individual stressors
- Currently provide a statistically robust dataset for every constituent



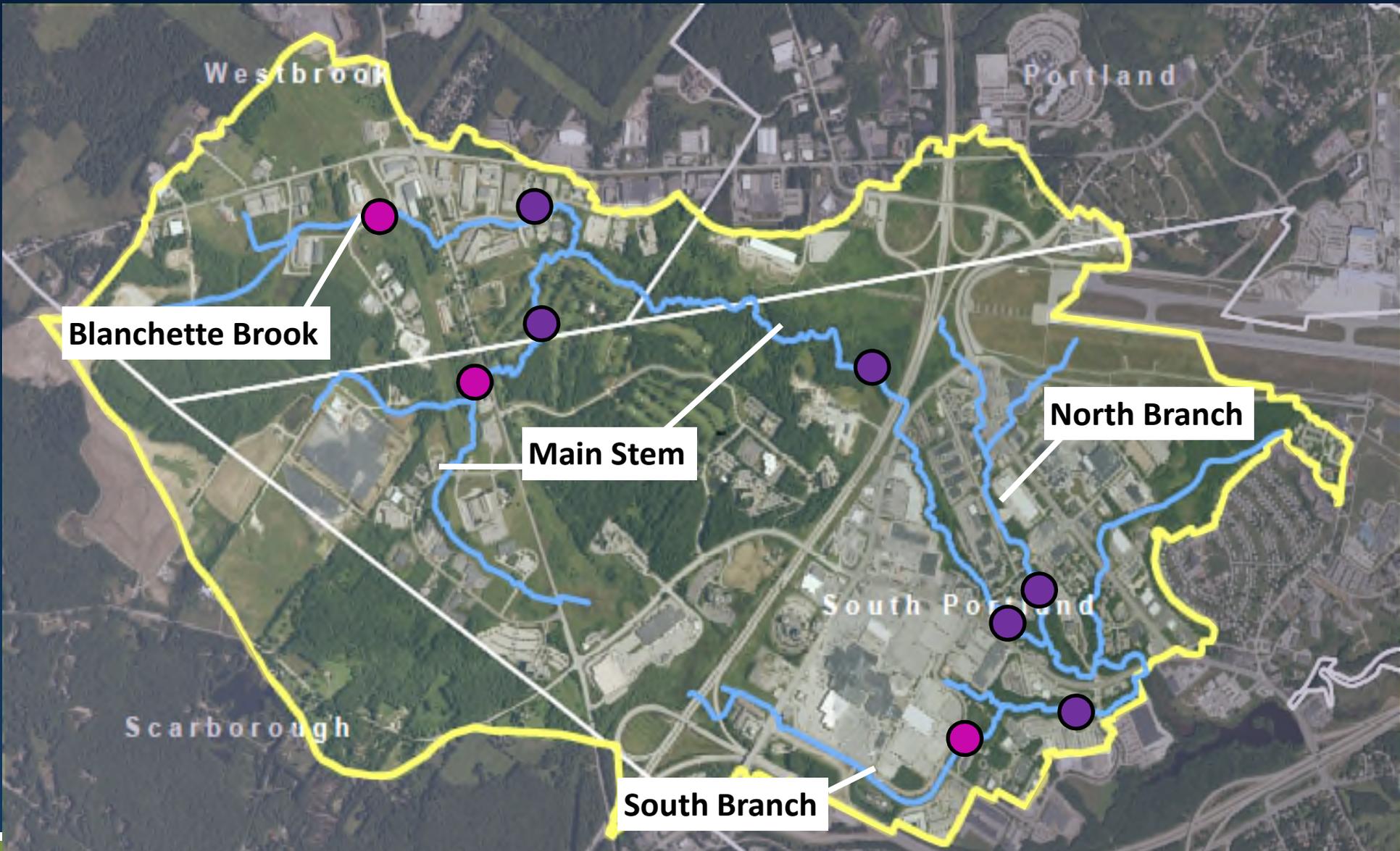
Photo courtesy Chris Bales, New England Organics



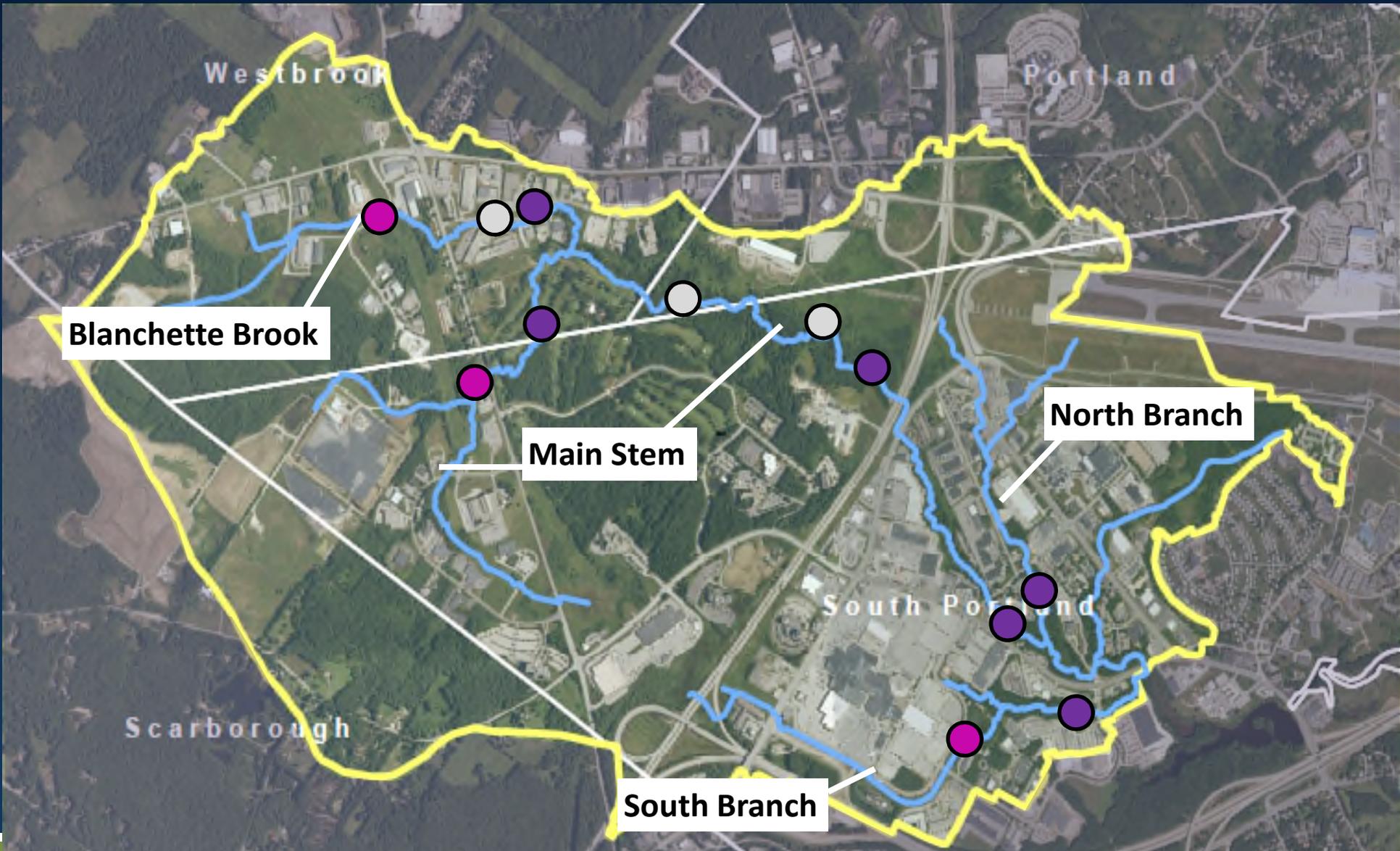
Monitoring Data

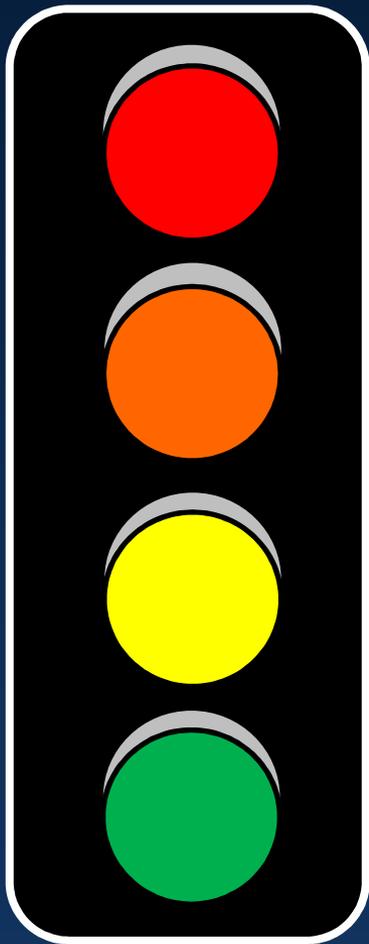


Monitoring Data



Monitoring Data





Consistently does not meet standards

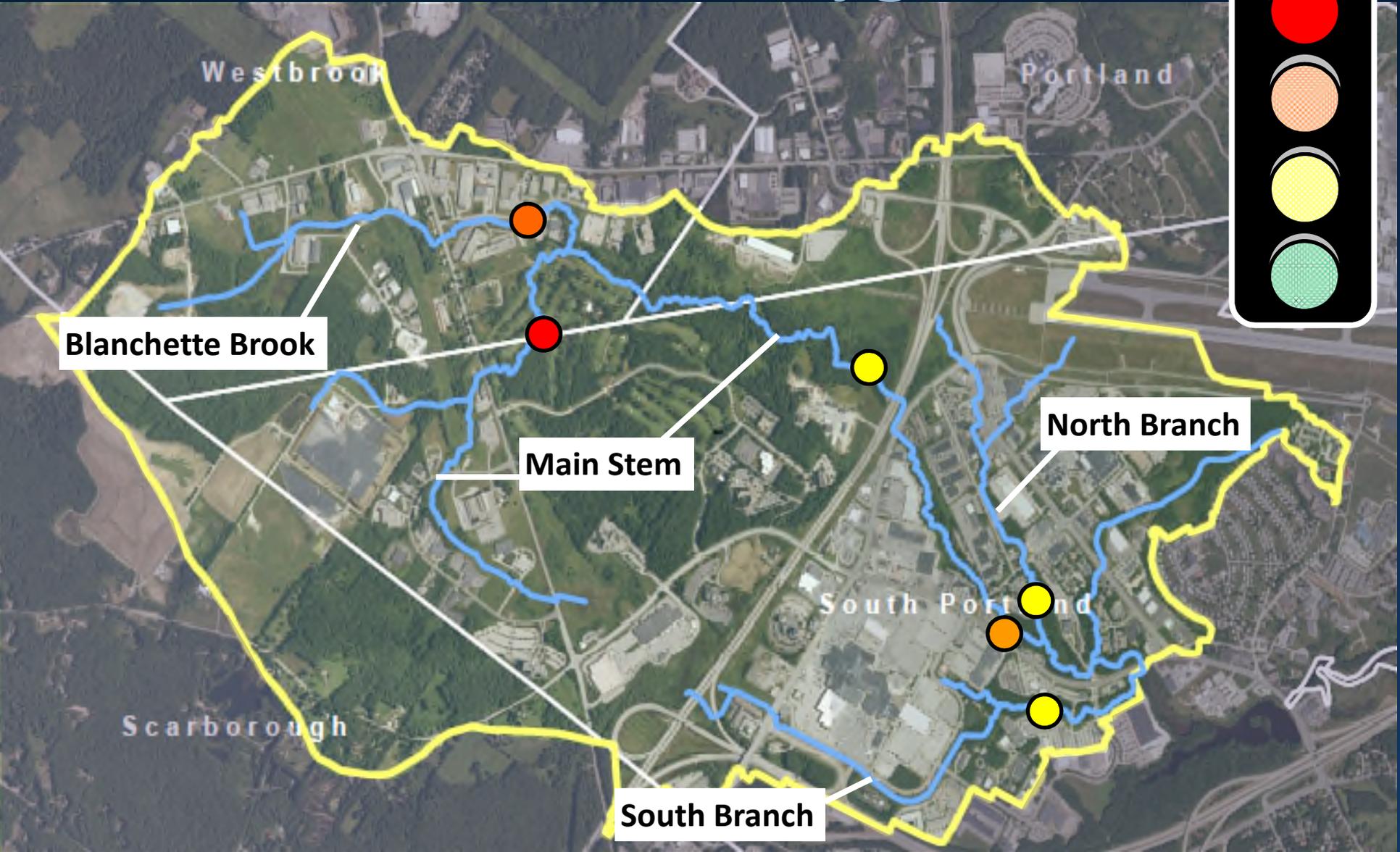
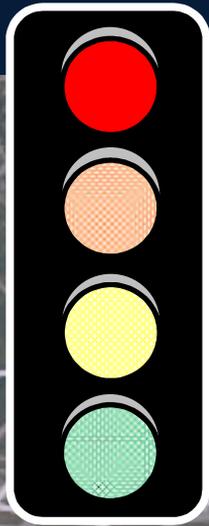
Frequently does not meet standards

Occasionally does not meet standards

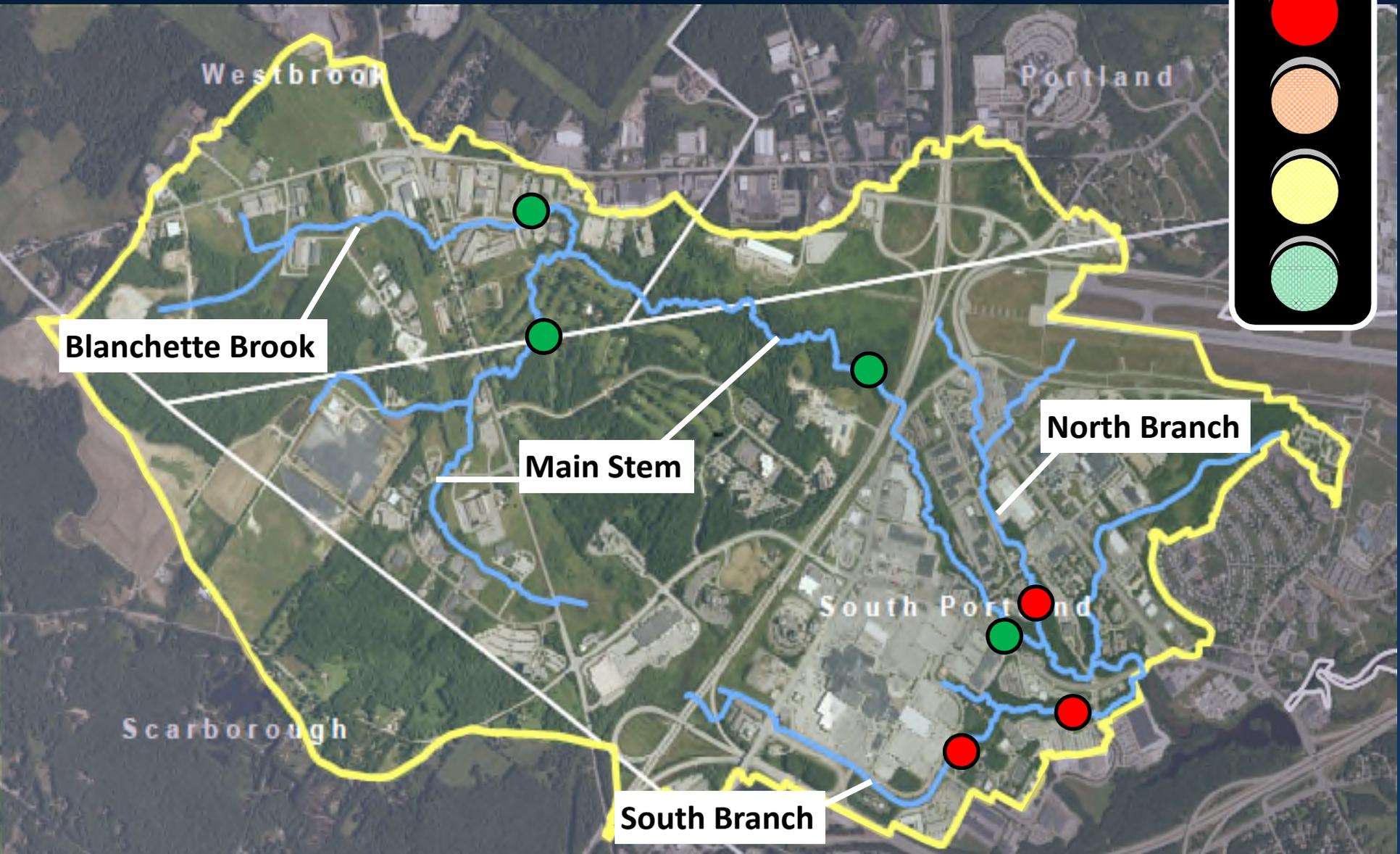
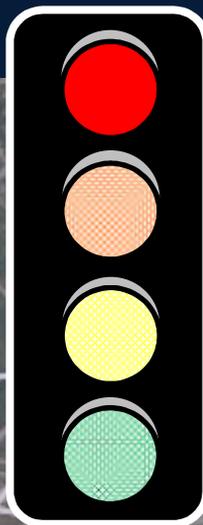
Meets standards



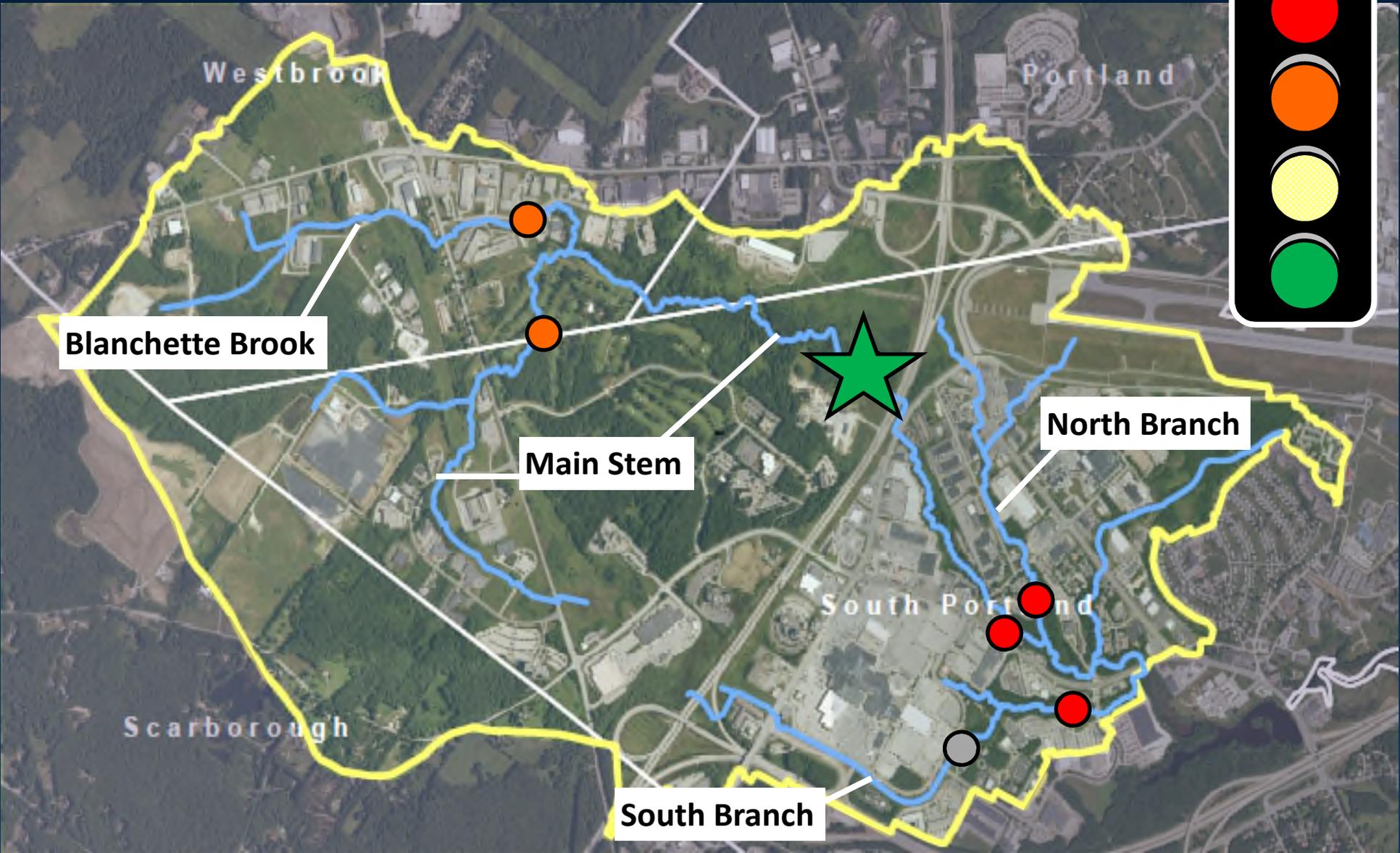
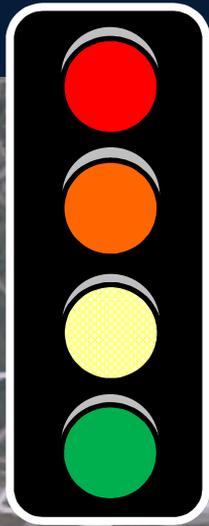
Dissolved Oxygen



Chloride



Macroinvertebrates - 2010



2011: Blanchette Brook Riparian Corridor Restoration

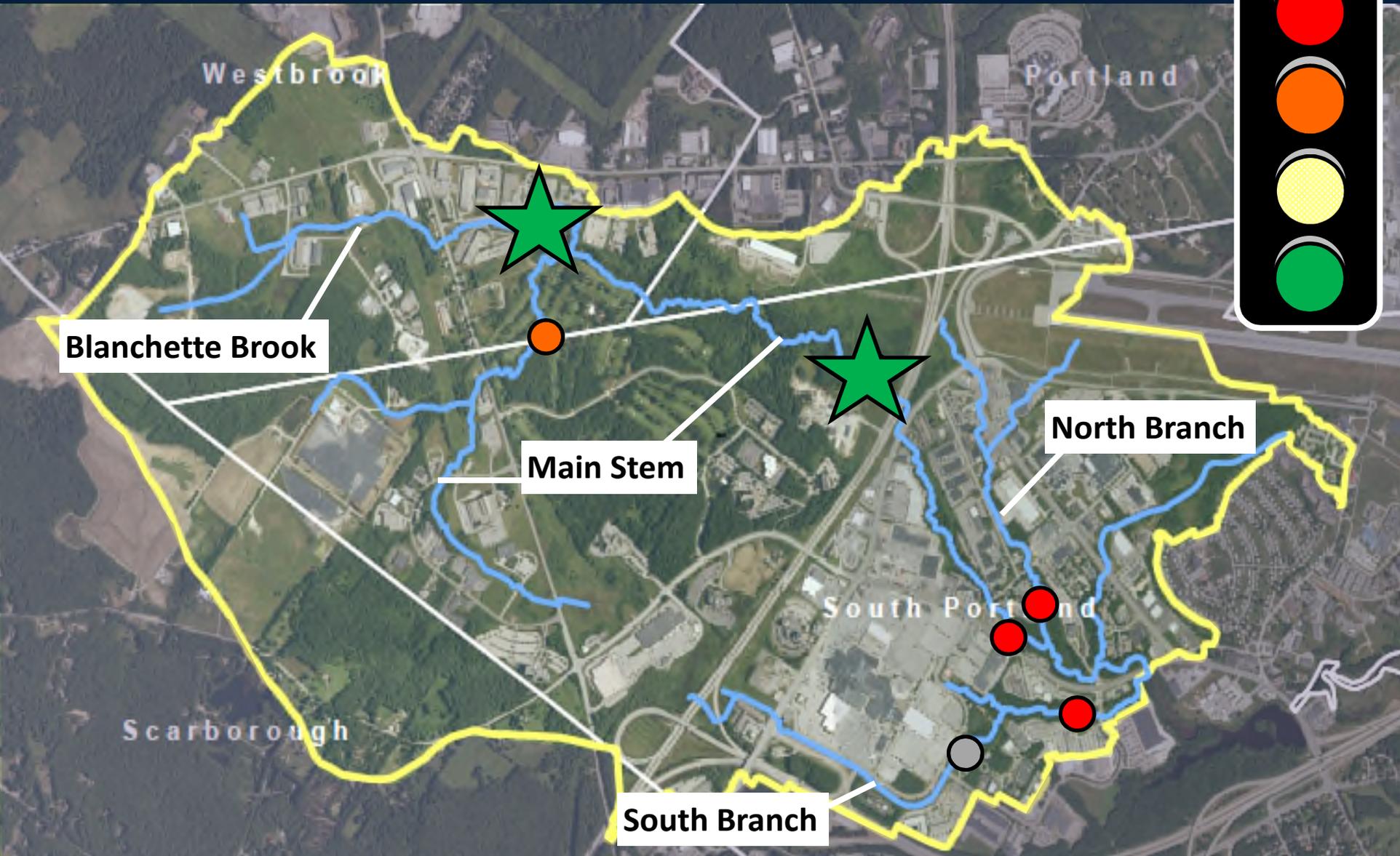
Before



After



Macroinvertebrates - 2013



Adaptive Management

- Creative structural solutions
 - Greening of the Maine Mall
 - Maine Mall Road Porous Pavement
- Watershed-wide and regional nonstructural approaches
 - Vacuum sweeping (all parcels, minimum once/year)
 - Catch basin cleaning (all parcels, minimum once/3 years)
 - Supporting a state-wide or regional road salt approach.



Where do we go from here?



TMDL

Stressor ID

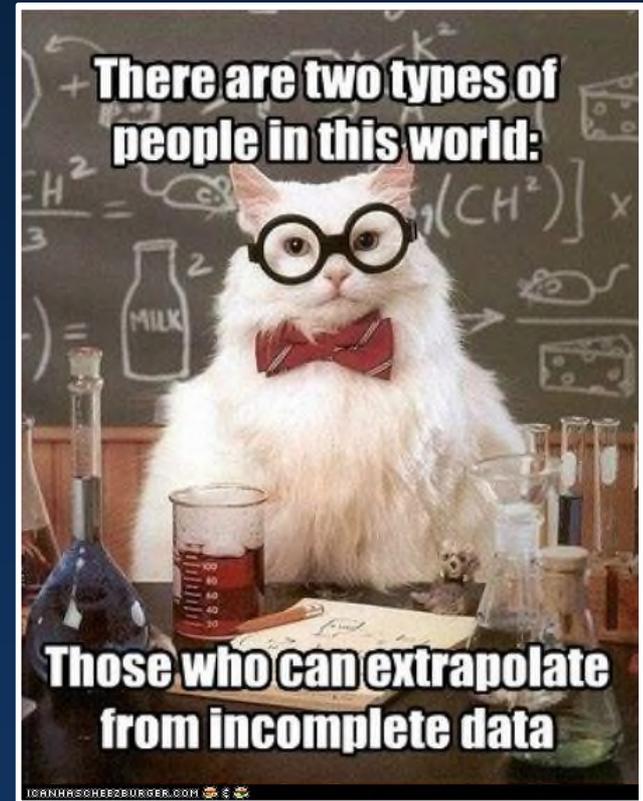
Total Maximum Daily Load

Impervious Cover

- Salt
- Nutrients, metals, PAHs
- Erosion, sedimentation, channel alteration, poor habitat
- Elevated temperature
- Low dissolved oxygen

Target IC for restoration is ~10%

Long Creek Plan reduces IC from 33% to 24.6%



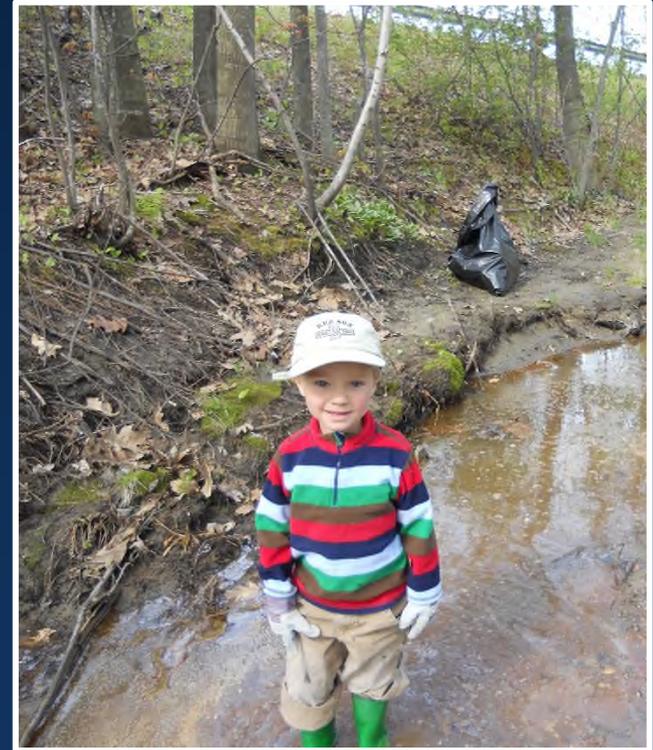
How Do We Target Our Approach?

- What are the highest priority stressors?
 - Where should we focus our efforts?
 - Where should we invest in alternative methods?



What's Next?

- In situ toxicity testing
- Calibrate the H&H model and apply to the proposed and completed catchment retrofits
- Complete retrofits and in-stream restoration projects in the Watershed Management Plan



Expert Review Panel

Convened to evaluate the watershed approach

- Structural retrofits
- Riparian corridor restoration
- Nonstructural
- Hydraulics & hydrology
- Water chemistry
- Stream stage

Workshop: June 16, 2014



Strategy for Restoration

- Implement the Plan
 - Structural
 - Nonstructural
 - Restoration
- Expert Review Panel
- Monitor progress
 - Targeted sampling
 - Macroinvertebrates
 - Hydrology





www.RestoreLongCreek.org

Kate McDonald

kmcdonald@cumberlandswcd.org

