

A graphic showing water splashing from the top left, with bubbles and ripples extending across the top of the page. The background is a light blue gradient.

What's Good for the Tap is Good for the Creek!

*Reading Area Water Authority
marks five years of
Source Water Protection*





Reading Area Water Authority

- Provides water to 125,000 residents in and around the City of Reading
- Source water supply is Lake Ontelaunee, located north of Reading
- Completed a Source Water Protection Plan in 2007
- Lake Ontelaunee included on Pennsylvania's 303(d) list of impaired water bodies
- Lake Ontelaunee Total Maximum Daily Load (TMDL) completed in 2004





AWWA EXEMPLARY SWP AWARD

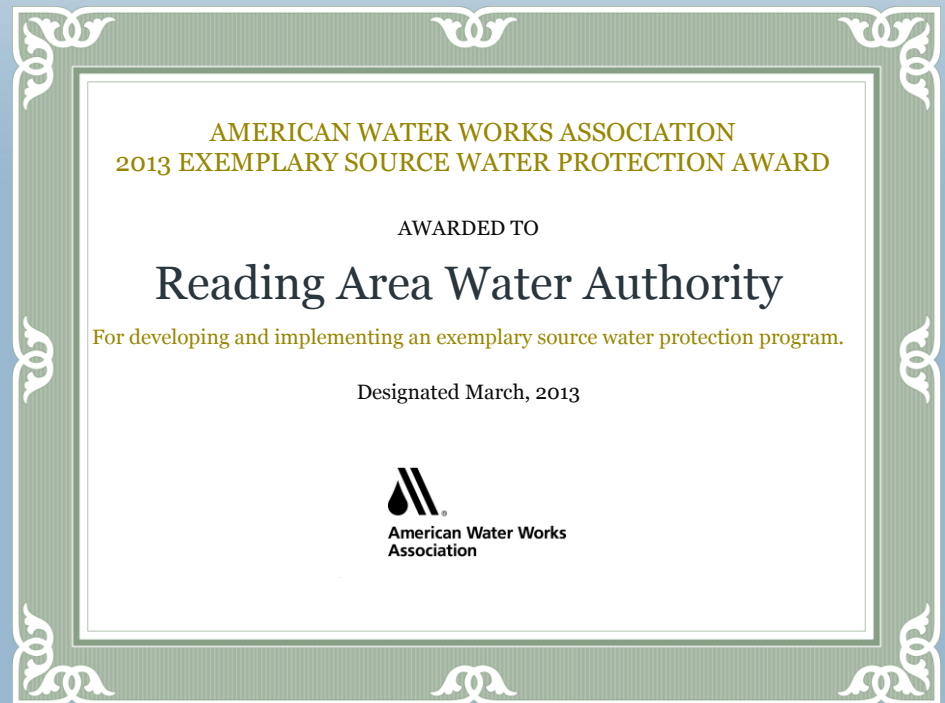
RAWA recently awarded the 2013 American Water Works Association Exemplary Source Water Protection Award for large water systems

Previous award winners:

- Boston, MA (2010)
- Wilmington, DE (2011)
- Portland, ME (2012)

Award Criteria:

- Vision
- Source water characterization
- Goals
- Action plan
- Implementation
- Evaluation and revision





RAWA's Vision

- Importance of Source Water Protection
- Steering committee will help with development of formal Vision
- Implementation of Management Strategies
- Connection between watershed residents and service area
- Team approach to Source Water Protection



RAWA Management Strategies

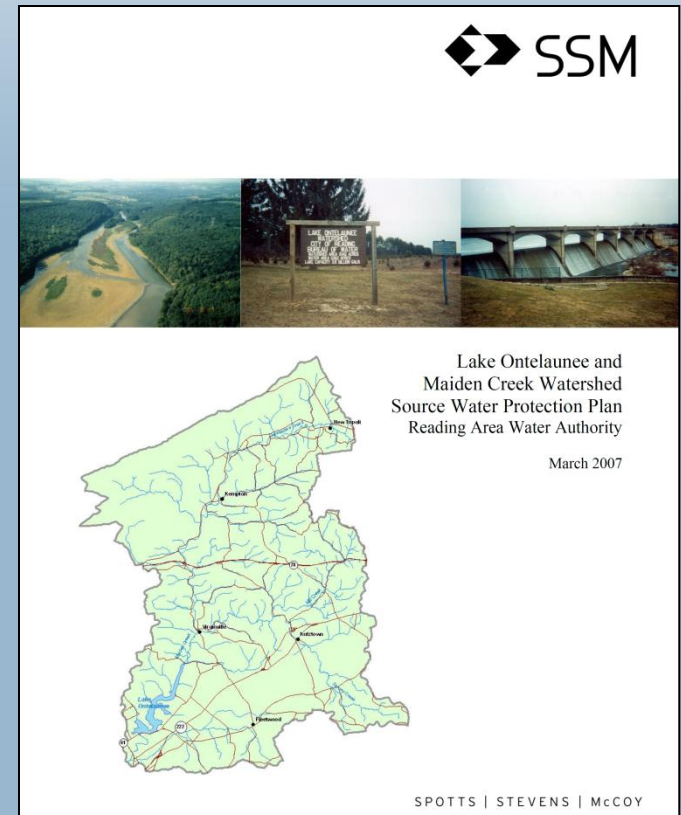
SOURCE WATER PROTECTION PLAN

Plan Development

- Received \$190,000+ grant from the PA DEP in May 2004
- Approved by PA DEP in September 2007

5-Year Plan Update

- Review of management options
- New steering committee
- Revise key components of plan
- Develop a formal SWP vision



Watershed Delineation Process

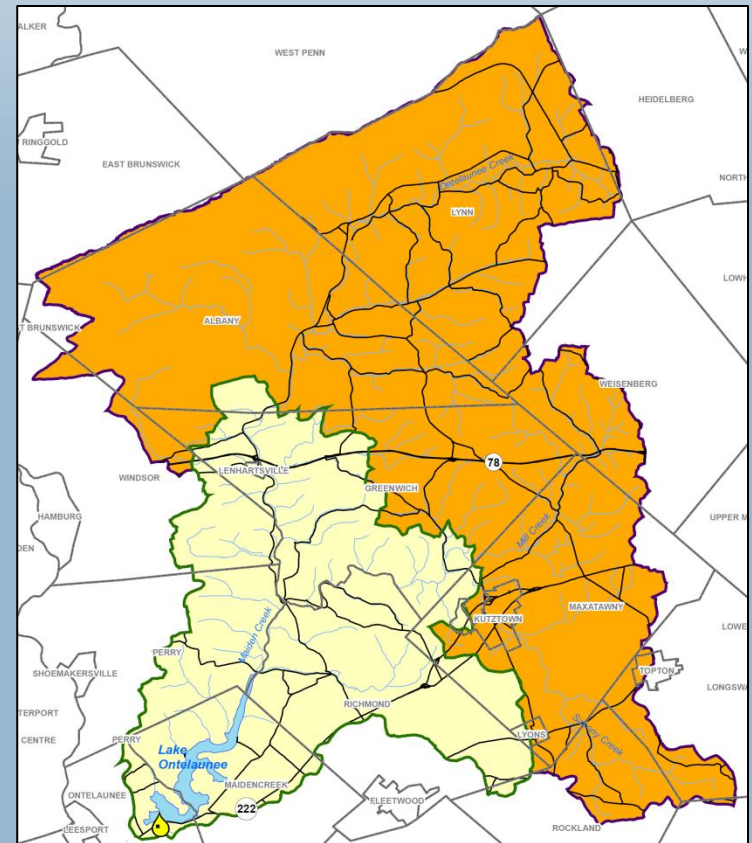
TIME-OF-TRAVEL STUDY

Surface Water Sources

- Lake Ontelaunee intake
- Emergency Intake

Protection Zones

- Zone A
 - 5 hour time-of-travel
 - 63 square miles
- Zone B
 - 25 hour time-of-travel
 - 153 square miles





RAWA Daily Operations

WATERSHED PROTECTION

- Land preservation
- Reforestation
- Litter control
- Lake eutrophication / algae control
- Invasive plant control on project farms
- Goose population control



Management Strategies

WATER SUPPLY AREA SIGNS

- 13 signs placed on state roads entering the watershed
- 6 signs placed on township roads
- Partially funded by a grant from the Water Resources Education Network



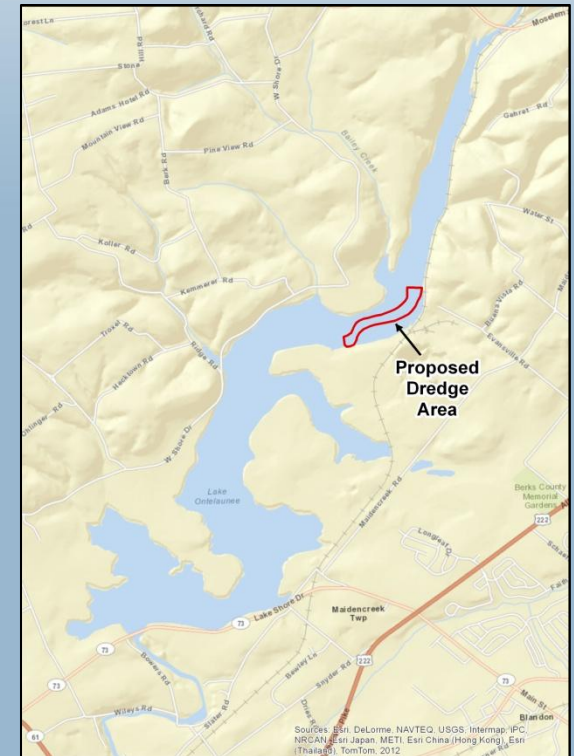
Management Strategies

LAKE ONTELAUNEE DREDGING PLANNING

- Remove sediment from upper neck of lake
- Increase lake capacity and reduce flood possibility
- Estimated project cost = \$2,000,000
- Dredged material may qualify for beneficial reuse
- Preliminary engineering evaluation for sediment diversion structures



Photo courtesy of Dredge America



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri, Japan, METI, Esri, China (Hong Kong), Esri (Thailand), TomTom, 2012



Management Strategies

EDUCATION

Educational Brochures

- Stream buffer brochure
- SWP brochures

In Progress

- Public Education
 - Reading Area High School
 - Reading School District I-Lead Charter School
- Kutztown University
 - Biology Department student volunteers
- SWP page on RAWA website ... coming soon!

<h3>What is a Watershed?</h3> <p>A watershed is all the land that drains to the same river or lake. Water travels from the highest points at the watershed edge to the lowest point at the bottom of the watershed. Wherever you are, you are in a watershed!</p> <p>When it rains, some water travels over the land surface to the nearest stream or creek. This water is called surface runoff or stormwater. As the stormwater flows, it picks up any contaminants lying on the surface – pesticides and fertilizer from lawns, manure from farms, sediment from construction sites, and oil and gas from roads. Small streams join to form larger and larger rivers, until the water – and any contaminants it is carrying – reaches the final lake or river.</p> <p>Some precipitation, instead of traveling over the land, will percolate into the soil and reach the groundwater. Similarly, the groundwater may pick up nitrates from failing septic systems, gasoline from leaky storage tanks, and industrial chemicals from improper dumping. The groundwater ultimately flows into one of the rivers or lakes in the watershed.</p>	<h3>Ways to Help</h3> <h4>What can you do?</h4> <ul style="list-style-type: none"> • Dispose of motor oil at a garage that will recycle it. Never pour oil on the ground or in a storm drain or sewer on the street. • Drop household hazardous waste – such as paint, varnishes, and other chemicals – to a county waste collection site. Check the Berks County Solid Waste Authority website at http://www.co.berks.pa.us/Dept/SWA/Pages/default.aspx for dates. • Minimize the use of pesticides and herbicides on your lawn and garden. • If you drill a new well, make sure the old one is properly closed and abandoned. • Do not dump swimming pool water into a creek or storm drain at the end of the season. If possible, direct the water into the sanitary sewer. Otherwise, wait until the chlorine dissipates and then direct pool water onto grass, forest, or other natural area. • Remember: anything you throw or store on the ground can find its way into the water supply. Store and handle chemicals properly. • Call the regional Department of Environmental Protection office at (877) 333-1004 immediately if you observe a chemical spill. <h4>For more information</h4> <p>Pennsylvania DEP www.dep.state.pa.us Watershed Protection www.dep.state.pa.us/watershed Center for Watershed Protection www.cwp.org Drinking Water www.drinkingwaterpa.org Source Water Collaborative www.sourcewater.org American Watersheds Association www.awa.org Water Resources Education Network (WREN) www.wren.org Maintaining Your Septic System www.epa.gov/septicinfo http://www.epa.gov/septicinfo</p>	<h3>HOMEOWNER GUIDE</h3> <h4>Protecting The Drinking Water</h4> <p>Reading Area Water Authority Source Water Protection Program</p> <p>For more information: Reading Area Water Authority 1931 Kutztown Road Reading, PA 19604 (610) 406-6300</p>
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Management Strategies

EMERGENCY MANAGEMENT

Cooperation with Emergency Management

- Berks County Emergency Services
- Lehigh County Emergency Services
- Local Emergency Planning Committee



Participation in the Delaware Valley Early Warning System

- DVEWS administered by the Philadelphia Water Department
- Water utilities share information and emergency event notifications in the Schuylkill River Watershed



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Management Strategies

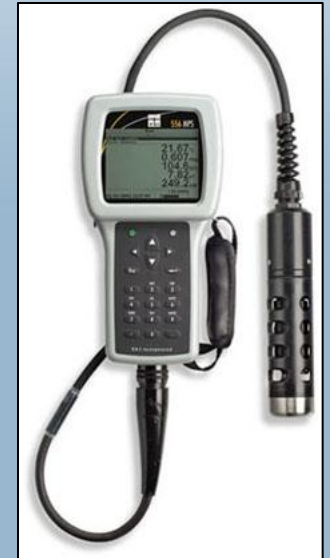
WATERSHED MONITORING PROGRAM GOALS

- Consistent, comprehensive program
- Establish baseline water quality and macroinvertebrate conditions
- Identify improving, deteriorating, or static conditions
- Indicate potential emergency issues
- Identify locations for watershed conservation projects
- Improve stream water quality and get streams delisted

Management Strategies

WATER QUALITY MONITORING PROGRAM

- RAWA staff / RAWA onsite lab / MJ Reider lab
- Data collection from June 2008 – present
- Ten (10) watershed monitoring locations
- Two (2) intake monitoring locations
- Chemical parameters monitored weekly or monthly



Management Strategies

MACROINVERTEBRATE MONITORING

Schuylkill Action Network (SAN)

- Five (5) agriculture project sites from 2005 – 2010 to monitor improvements in watershed

Additional RAVA sites on impaired streams




- Partner groups assisting with information



Schuylkill Action Network
2011 Macroinvertebrate Survey

Perry Township and Kutztown Borough, Berks County, Pennsylvania | www.SchuylkillWaters.org

A multi-disciplinary team conducted stream sampling on behalf of the Schuylkill Action Network's agriculture workshop in July 2011. The sampling team included representatives from the United States Environmental Protection Agency, Berks County Conservancy, Sport Stevens and McGee, the Partnership for the Delaware Estuary and Miller Environmental. Macroinvertebrate sampling observations noted progress in the health of tributaries in Madsen and Samsen Creeks near Virginville and Kutztown, Pennsylvania. The presence of mayflies, caddisflies, stoneflies, and cephids indicate that the work completed by the SAN along these tributaries is successfully contributing to the restoration of these important watersheds. Though the tributaries are not likely eligible for removal from Pennsylvania's list of impaired waters due to enhanced biological criteria requirements it is encouraging to witness the ongoing ecological and biological improvements showing that the streams are getting cleaner and healthier.



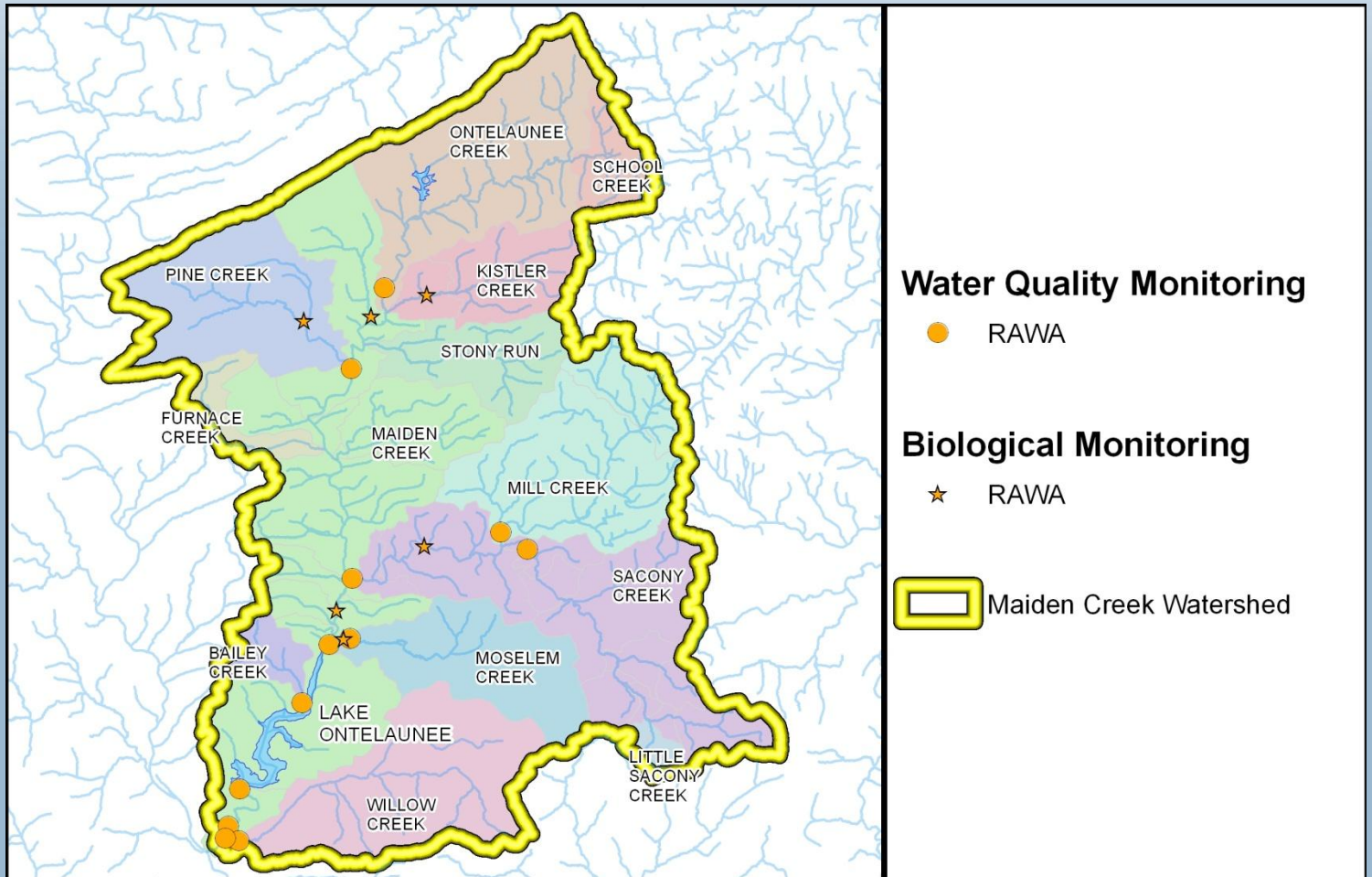
For additional photographs of the 2011 annual SAN macroinvertebrate survey, visit schuylkillwaters.org/schuylkill_photos.htm

The Schuylkill Action Network was formed in March 2003 to improve the water resources of the Schuylkill River Watershed. Members of this collaborative network include the United States Environmental Protection Agency, the Pennsylvania Department of Environmental Protection, the City of Philadelphia Water Department, the Delaware River Basin Commission, the Partnership for the Delaware Estuary, conservation districts, local officials, watershed and environmental organizations and other essential stakeholders joining with the crafting of local solutions.



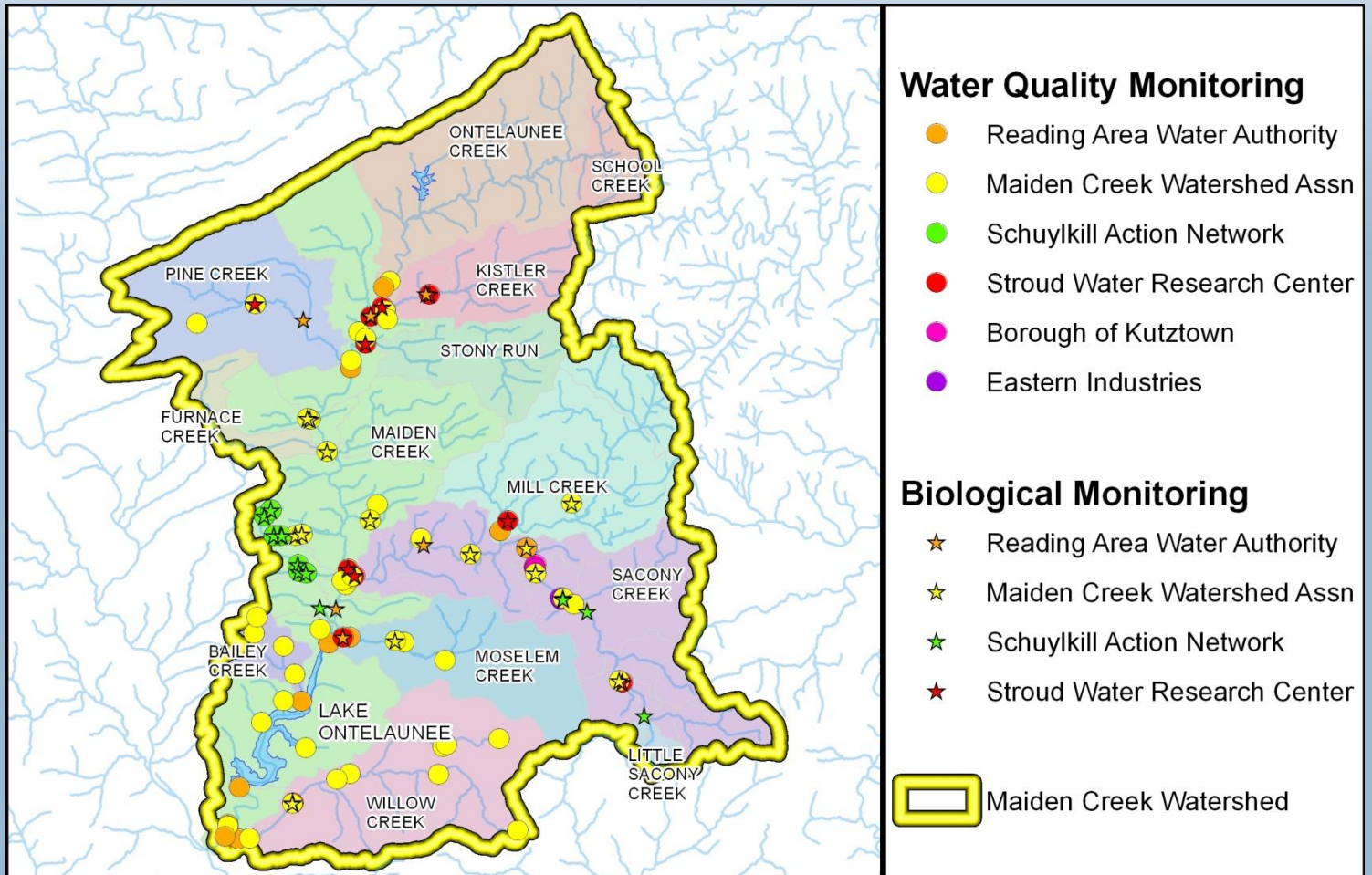
Management Strategies

MONITORING LOCATIONS



Management Strategies

MONITORING LOCATIONS



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Management Strategies

WATER QUALITY DATABASE

- Central database to catalog water quality data
- Easily extract and analyze data
- Partner groups sharing information
 - Maiden Creek Watershed Association and Schuylkill Action Network (ongoing)
 - Borough of Kutztown, Eastern Industries

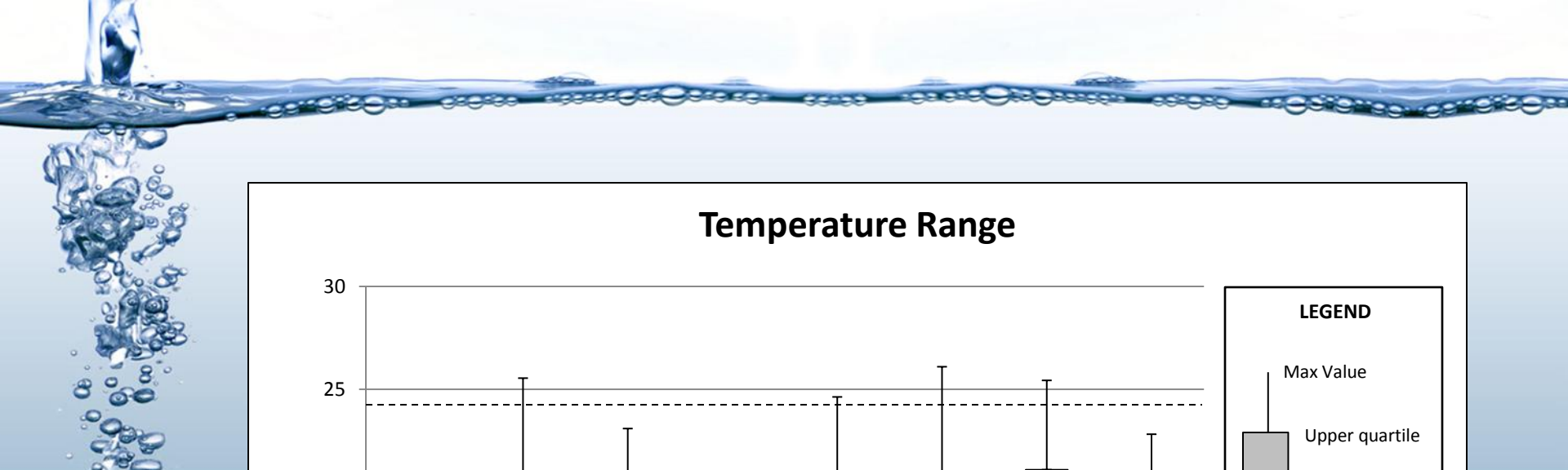
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Management Strategies

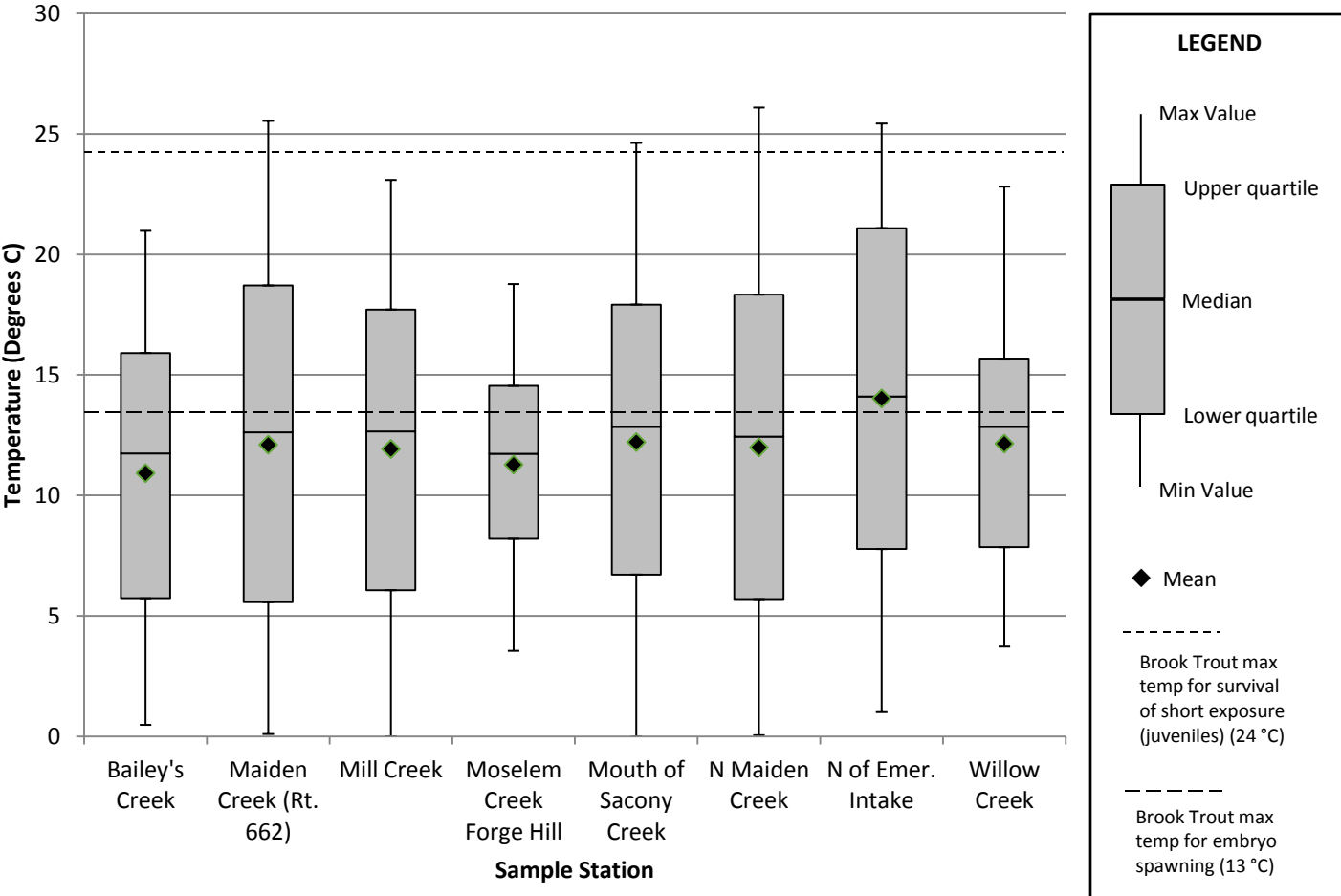
WATERSHED WATER QUALITY MONITORING RESULTS

Temperature

- Typically not elevated throughout watershed
- Seasonal fluctuations and ranges consistent with designated uses of streams



Temperature Range



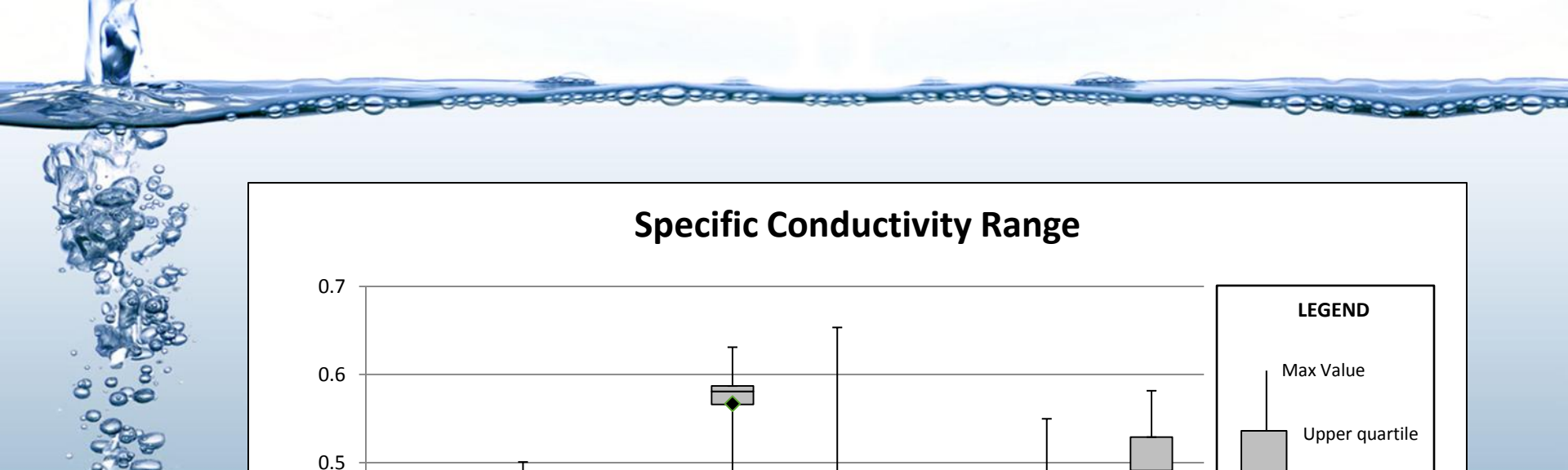
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Management Strategies

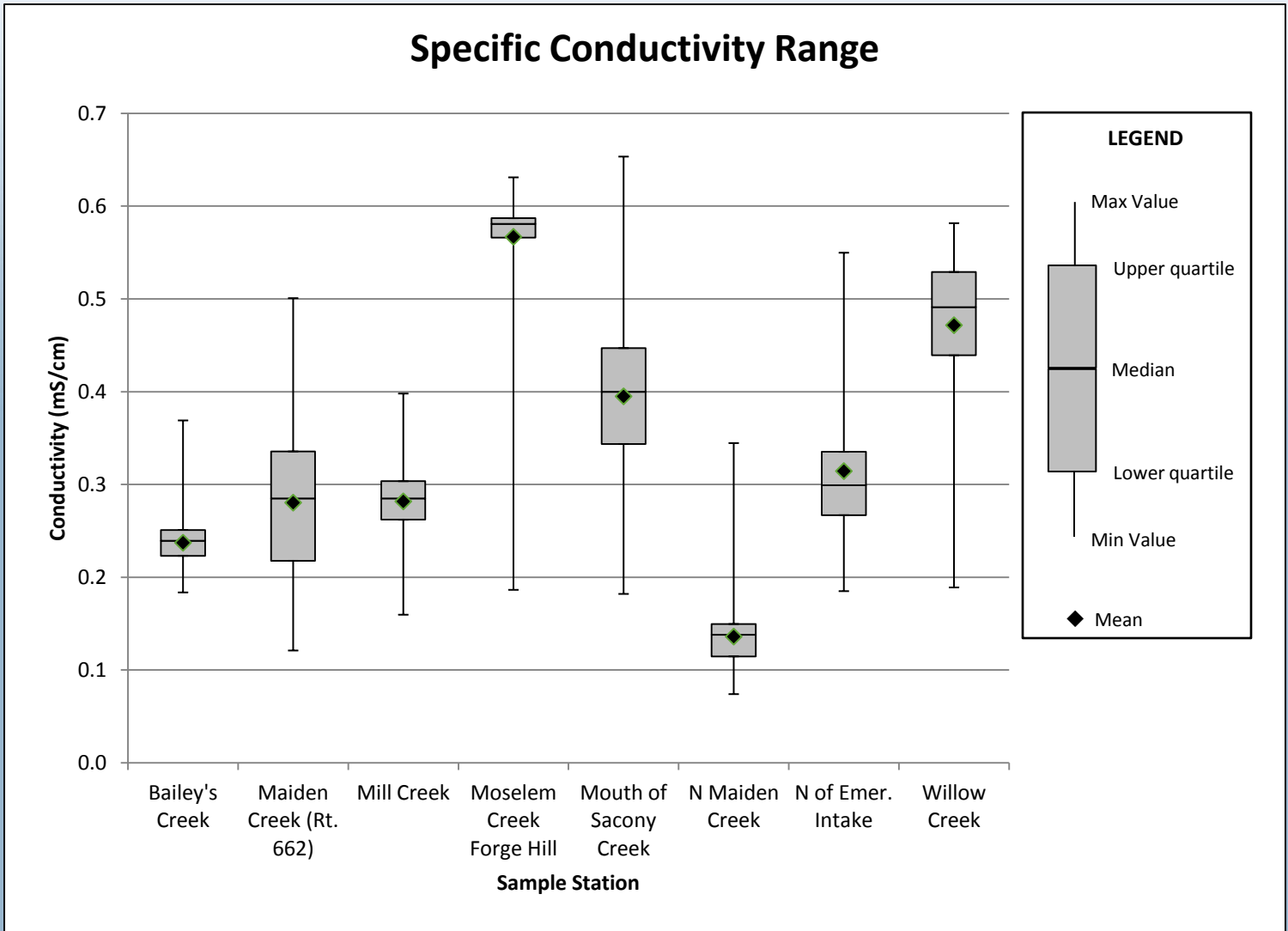
WATERSHED WATER QUALITY MONITORING RESULTS

Specific Conductivity

- Highest at Moselem Creek, Sacony Creek and Willow Creek
- These sites also have higher nitrate levels



Specific Conductivity Range



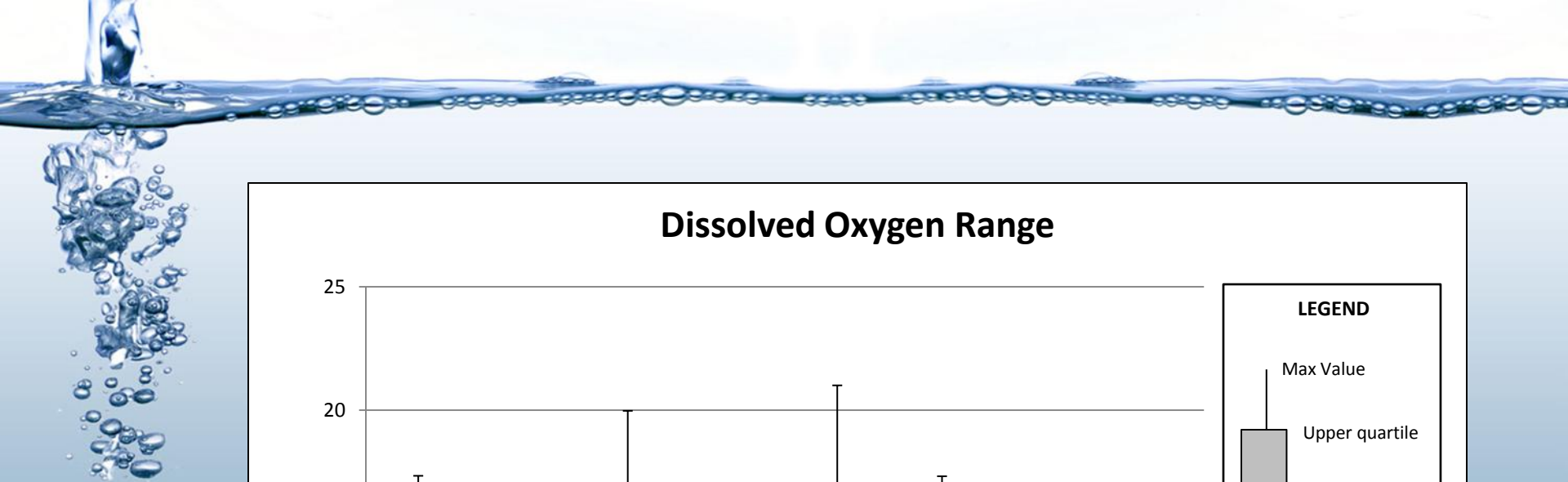
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Management Strategies

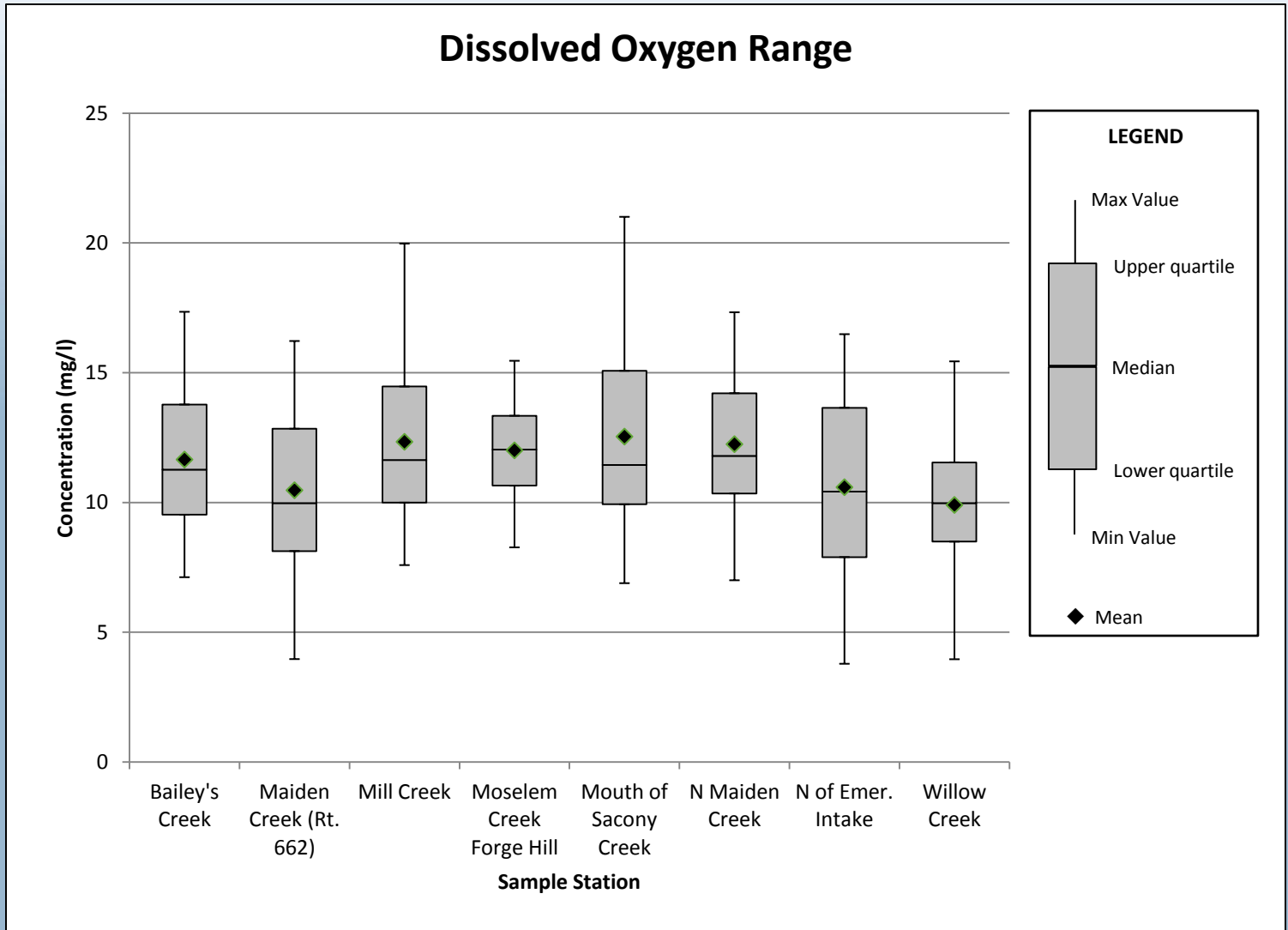
WATERSHED WATER QUALITY MONITORING RESULTS

Dissolved Oxygen (DO)

- Lowest DO concentrations:
 - Maiden Creek (@ Rt. 662)
 - Maiden Creek (North of Emergency Intake)
 - Willow Creek
- Saturated DO acceptable or better at most monitoring locations
- Saturated DO low in Willow Creek and Maiden Creek (at Route 662) during summer and early fall



Dissolved Oxygen Range



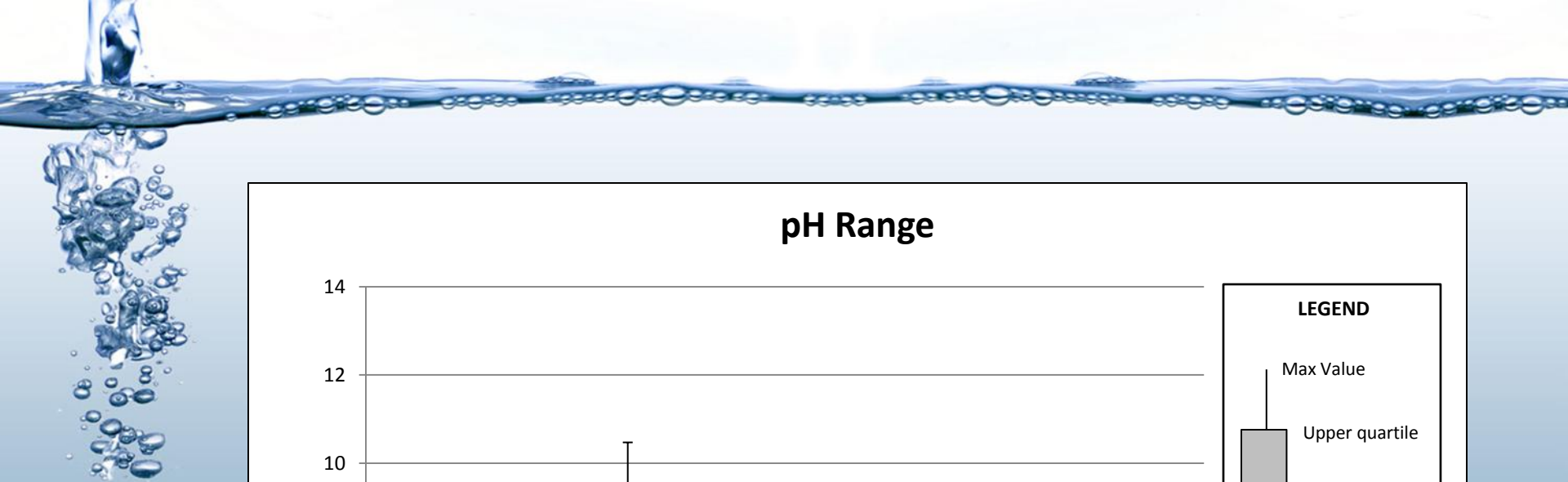
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Management Strategies

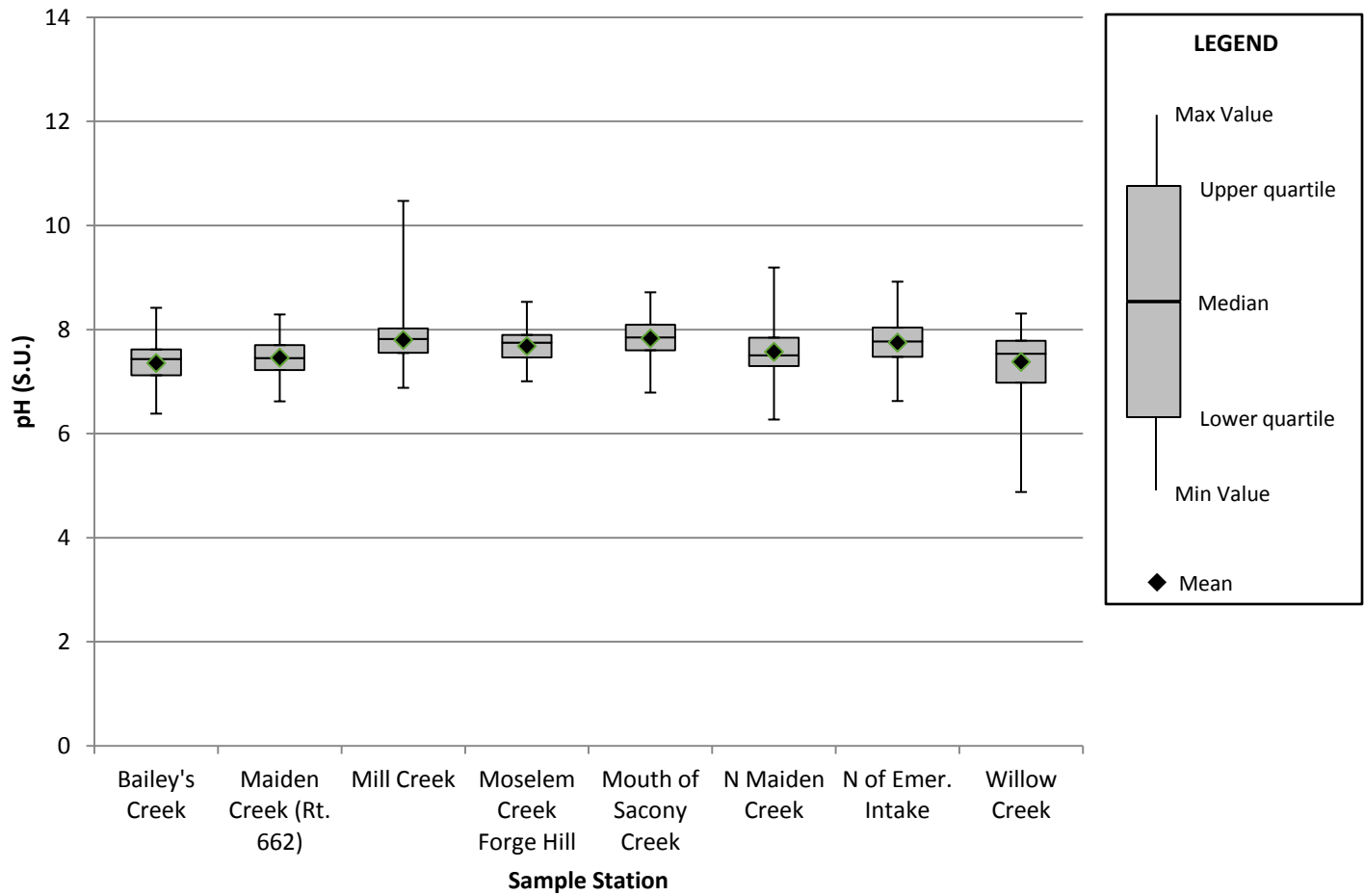
WATERSHED WATER QUALITY MONITORING RESULTS

pH

- Relatively consistent at each site and between sites
- Low pH (<5) observed in Willow Creek in March 2011
- High pH (>10) in Mill Creek attributed to meter malfunction



pH Range





Management Strategies

WATERSHED WATER QUALITY MONITORING RESULTS

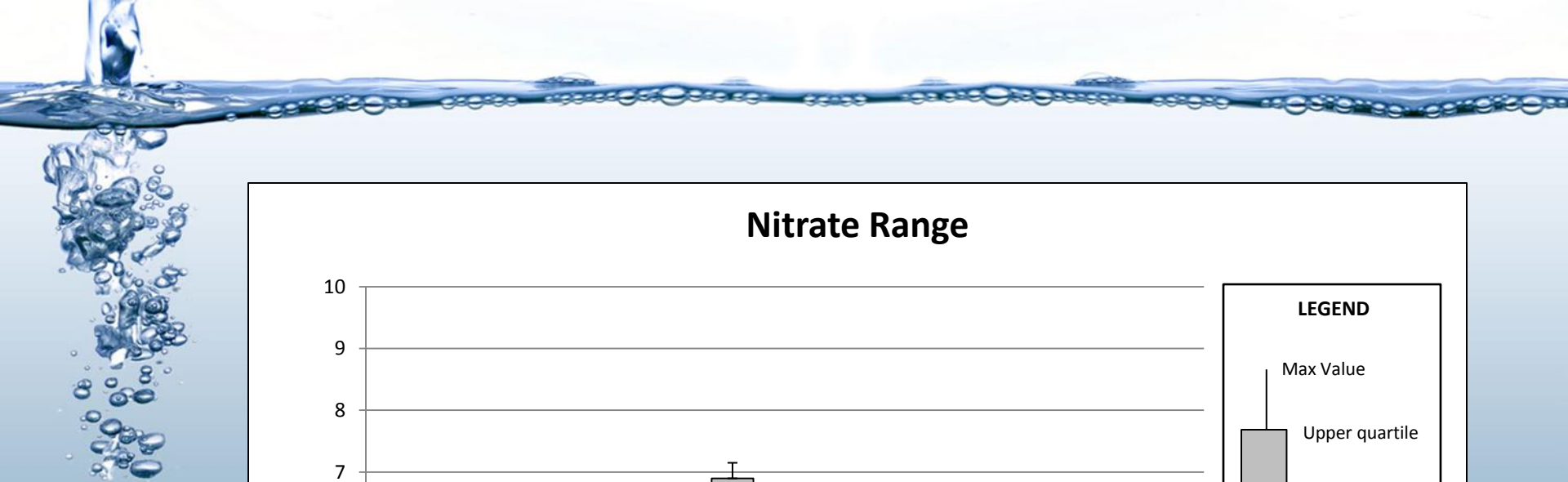
Total Coliform (TC) and E. coli bacteria

- Presence/absence testing
- TC and E. coli always present
- Monitoring discontinued in 2013
- May consider bacteria DNA testing in future to determine sources of fecal pollution

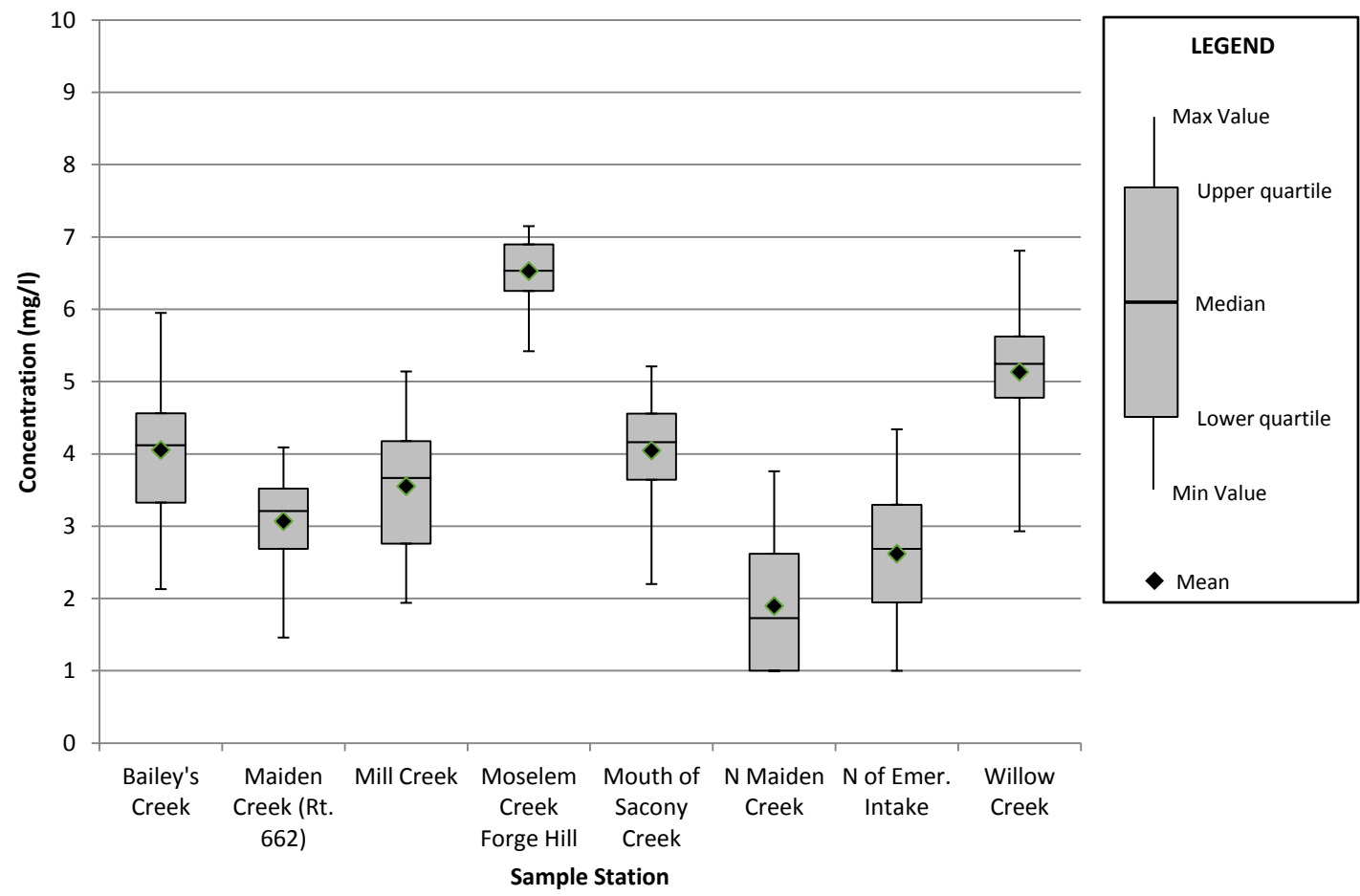
Nitrate

- All monitoring < 10 mg/L*
- Highest in Moselem Creek and Willow Creek

* PA DEP drinking water standard = 10 mg/L



Nitrate Range



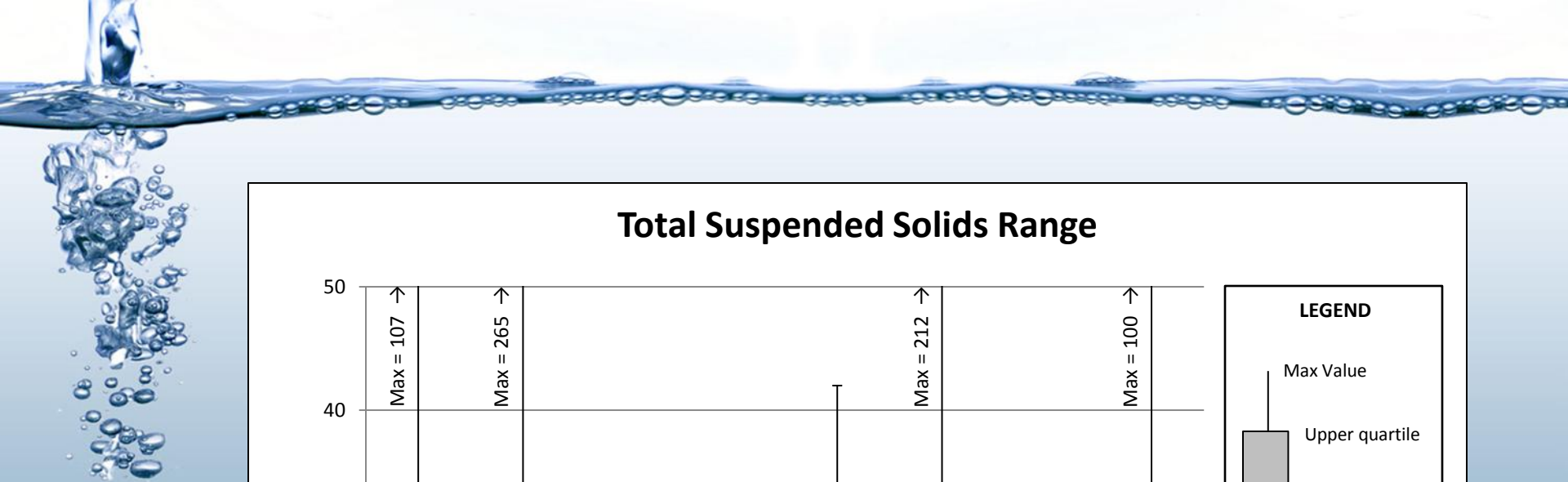


Management Strategies

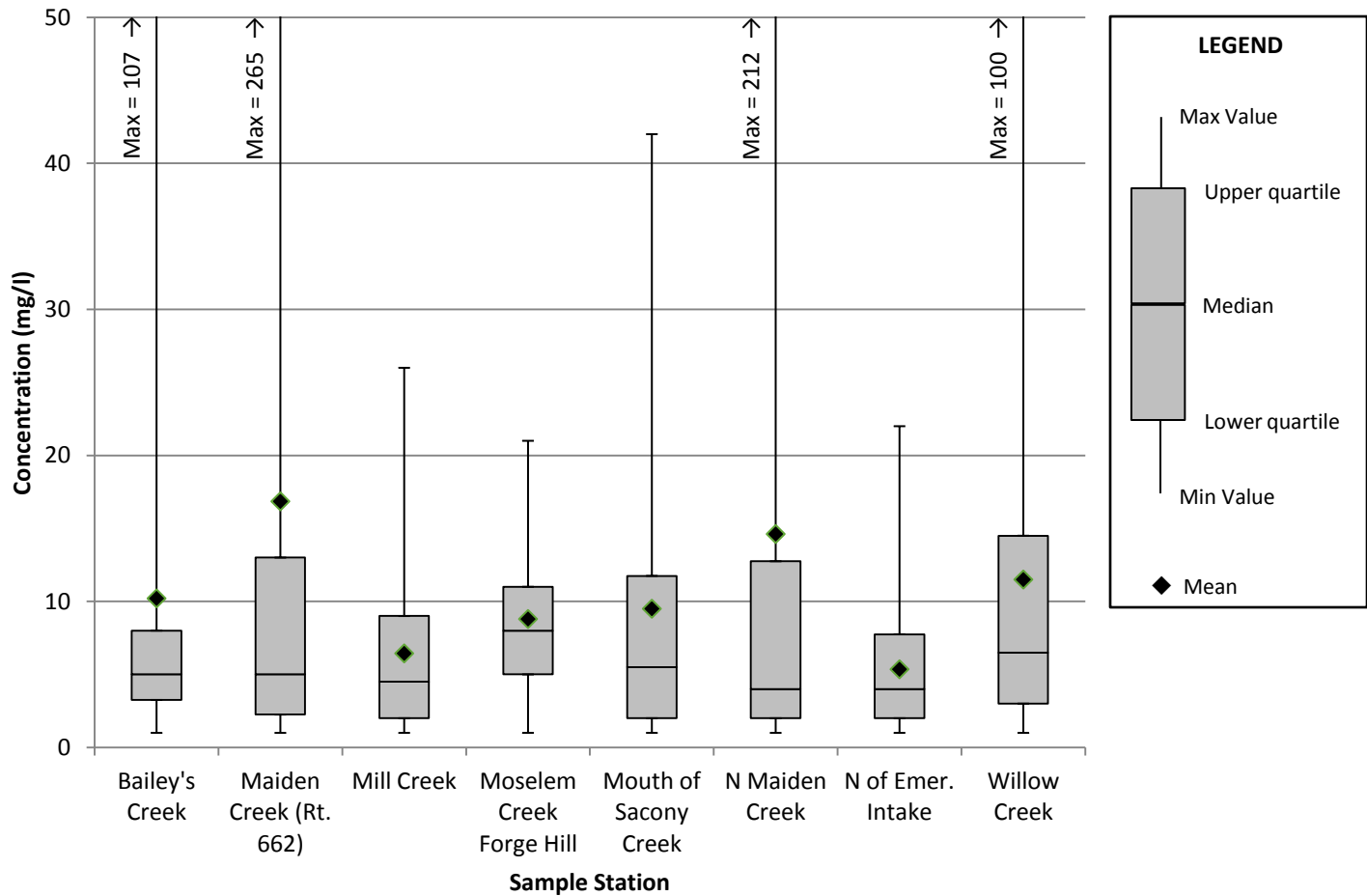
WATERSHED WATER QUALITY MONITORING RESULTS

Total Suspended Solids (TSS)

- Concentration spikes associated with large storm events
 - North Maiden Creek
 - Maiden Creek (@ Rt. 662)
 - Bailey's Creek
 - Sacony Creek
- Northern part of watershed appears to be large source of TSS
- Sampling location added at mouth of Onteleunee Creek



Total Suspended Solids Range



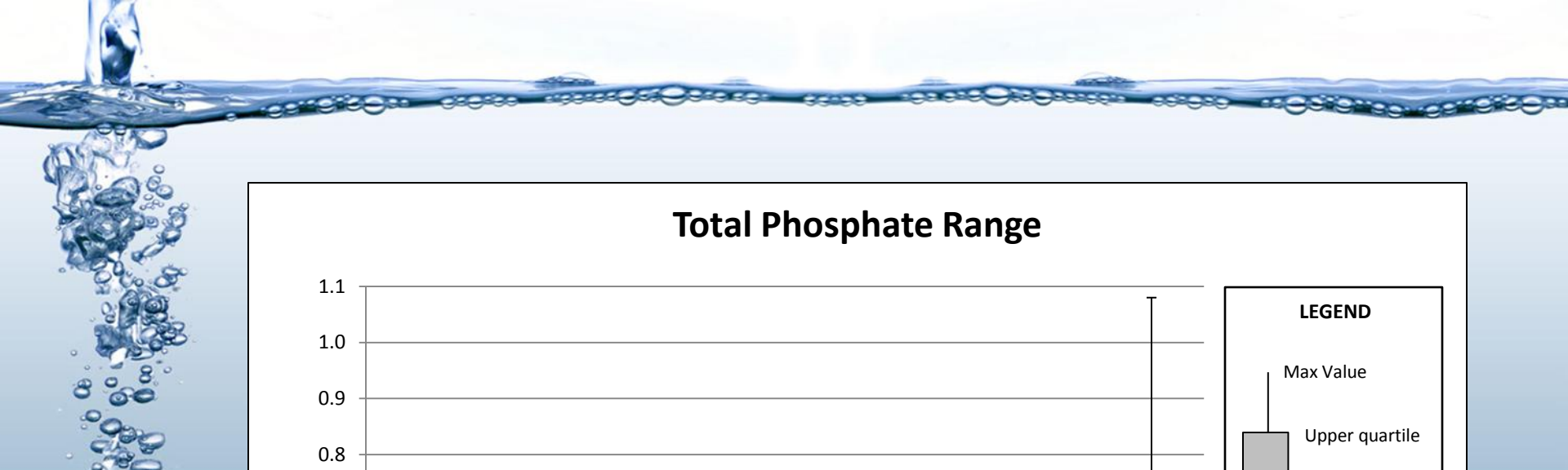


Management Strategies

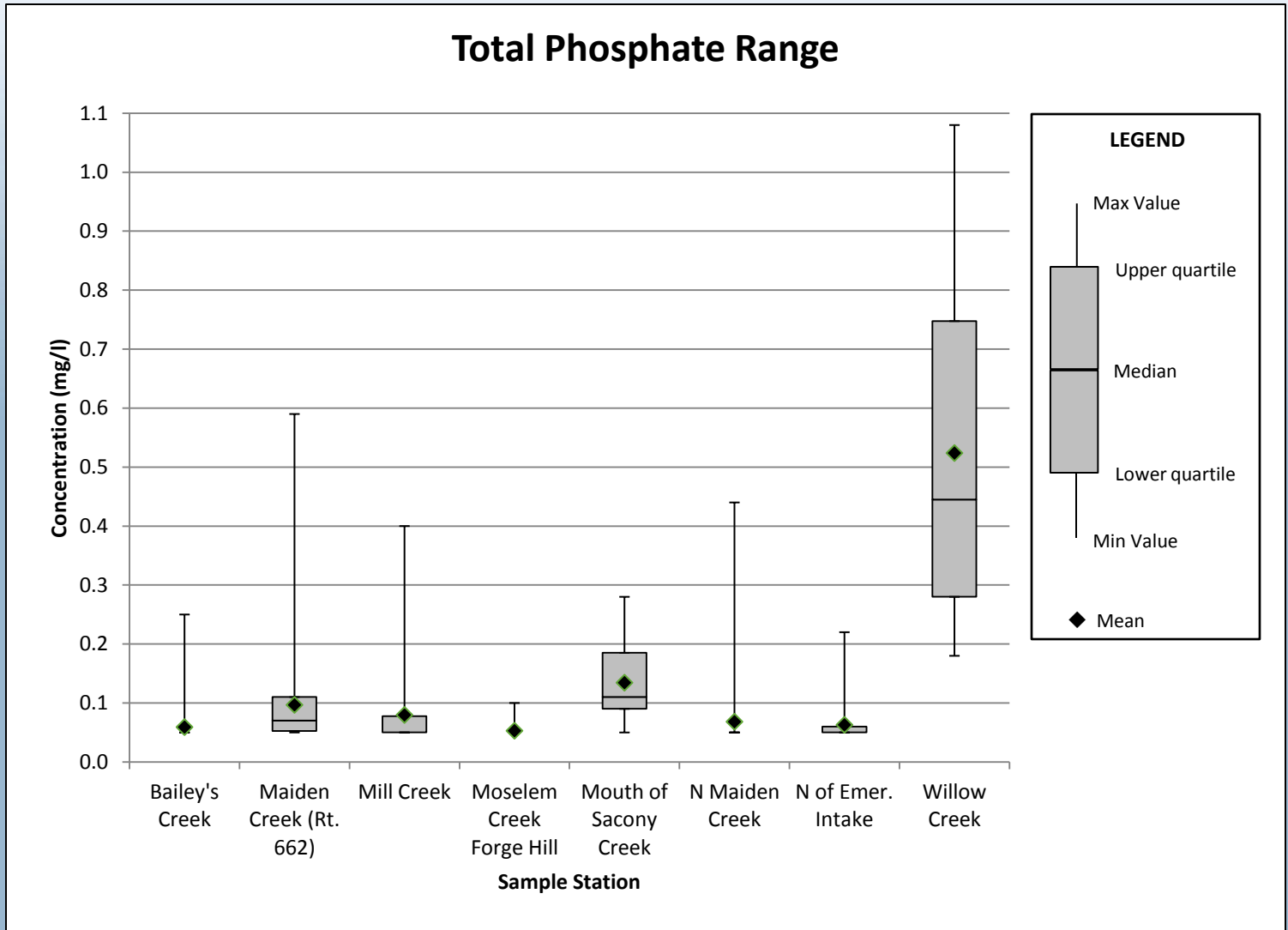
WATERSHED WATER QUALITY MONITORING RESULTS

Phosphorus (P)

- Monitoring Total Phosphorus and Orthophosphate
- Low or nondetectable concentrations:
 - North of Maiden Creek
 - Mill Creek
 - Moselem Creek
 - Bailey's Creek
 - Maiden Creek (North of Emergency Intake)
- Moderate concentrations:
 - Sacony Creek
 - Maiden Creek (@ Rt. 662)
- Elevated concentrations in Willow Creek
- Concentration spikes may be related to large storm events
- Sampling location added in Sacony Creek downstream of Kutztown



Total Phosphate Range



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Management Strategies

WATERSHED WATER QUALITY MONITORING RESULTS

Oxidation-Reduction Potential (ORP)

- Recently added in 2013
- Will be used to characterize manganese cycling in watershed

Manganese (Mn)

- Recently added in 2013
- Will be used to characterize manganese cycling in watershed

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Management Strategies

WATER QUALITY by TARGETTED WATERSHEDS

Total Suspended Solids

- North Maiden Creek and its tributaries
- Bailey's Creek
- Sacony Creek
- Willow Creek

Phosphorus

- Sacony Creek
- Willow Creek

Nitrate

- Moselem Creek
- Bailey's Creek
- Willow Creek



Management Strategies

AGRICULTURAL RESTORATION

Schuylkill Action Network Agricultural Workgroup



Agriculture Restoration Projects

- Exotic species removal on restoration sites
- Contribute funding for development of farm conservation planning and implementation





Management Strategies

AGRICULTURAL RESTORATION

- Sacony Creek
- Farm with swine operations



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Questions?

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