

Final Project Report
Trout Brook Restoration Project, Phase II (#2014RT09)



Grantee: Town of Cape Elizabeth
Project Coordinator: Jodie Keene, Cumberland County Soil & Water Conservation District
Project Start Date: February 15, 2014
Project Completion Date: December 31, 2016

Funding for this project, in part, was provided by the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act. The funding is administered by the Maine Department of Environmental Protection in partnership with EPA.

I. Project Overview

Project Purpose

The Trout Brook Watershed Management Plan (2012) identified five action items to help guide restoration: (1) address existing conditions; (2) prevent further decline of water quality; (3) implement a community outreach and education program; (4) conduct a monitoring program; and, (5) establish a Trout Brook Workgroup.

The intent of this project was to begin to address existing conditions within the watershed – the first action item identified in the Watershed Management Plan. The Watershed Management Plan identified three ways in which to address existing conditions: (1) reduce nutrient loading from upper watershed; (2) reduce chloride loading from middle watershed; and, (3) improve stream habitat and address low baseflow. This project focused on nutrient reduction in the upper watershed.

Project Highlights and Difficulties

By addressing stormwater and bank erosion at two properties along Ocean House Road, the Walnut Hill Equestrian Center (WHEC) and the Church of Jesus Christ of Latter-day Saints (LDS), significant progress was made toward nutrient reduction, stabilization of stream hydrology, reduction of water temperatures, and increasing of dissolved oxygen (DO) in the stream.

Further nutrient reduction was achieved by replacing two failing culverts at Down Home Farm (DHF) resulting in eliminating associated erosion. Finally, the installation of a tree-box filter at the Boothby Avenue crossing of Trout Brook in South Portland resulted in the treatment of 0.5 acres of impervious surface for total suspended solids (TSS), phosphorus, oils, and grease.

Highlights of this project included:

- Failing gutters and downspouts were replaced at the WHEC arena and rooftop runoff is now being captured in cisterns for later use.
- A covered manure storage facility was constructed south of the WHEC stable building to eliminate stormwater exposure of uncovered manure on the property.
- Approximately 35,000 square feet (0.80 acres) of roof runoff from LDS was directed into cisterns reducing the peak discharge to the stream and reducing water temperatures by eliminating contact time with pavement.
- The LDS detention basin was rehabilitated to address nutrients and better manage roof runoff to reduce flow rates into the basin.
- Stream bank erosion at the edge of the LDS property caused by parking lot runoff was corrected with bank stabilization measures. To prevent future erosion issues and treat parking lot runoff, flow was redirected to an underdrained filter that cools the water and delays the peak discharge time.
- Two failing culverts were replaced at Down Home Farm eliminating the erosion of roadway materials into Trout Brook.
- A StormTree unit was installed to treat 0.5 acres of impervious surface on Boothby Avenue in South Portland.

Difficulties encountered during the project included:

- Project management staff changed twice during this project, which posed challenges in maintaining smooth momentum of progress toward task completion.

- The anticipated construction costs associated with the gravel wetland for the Walnut Hill Equestrian Center (WHEC) were much more expensive than originally included in the project work plan. Although the DEP was able to direct another \$12,000 unused project funds to the project through a contract amendment, the additional funds were still below the amount that contractors bid on the project. As a result, the gravel wetland needed to be redesigned to fit into the available space and budget.
- The Walnut Hill Equestrian Center ceased operation after December 2015 and the property was put up for sale in 2016. The proposed gravel wetland was, therefore, never constructed. Although substitute project sites were identified and installed in November and December 2016, the changes resulted in shortfall in project match and the need to return about \$6,000 grant funds.

Key Personnel

- Maureen O’Meara, Cape Elizabeth Town Planner
- Fred Dillon, South Portland Stormwater Coordinator
- Wendy Garland, DEP Agreement Administrator
- Nick Tamarro, Down Home Farm Owner/Manager
- Will Savage, P.E., Assistant District Engineer at CCSWCD
- Jodie Keene, Project Manager/Coordinator at Cumberland County Soil and Water Conservation District (CCSWCD)
- Kate MacDonald and Chris Baldwin, former CCSWCD staff

Changes in Scope of Project

In February 2015, a contract amendment was finalized to provide an additional \$10,597 in grant funding for the WHEC gravel wetland. The project work plan was extended to December 31, 2016 to allow for completion of proposed projects. The work plan extension request was approved and the extension was within the timeframe of the signed Grant Agreement. The proposed gravel wetland project at WHEC fell through and alternative projects were identified. The installation of a tree-box filter unit on Boothby Avenue in South Portland and the replacement of two failing culverts at Down Home Farm were not originally proposed but were completed with the reallocation of funds originally intended for the gravel wetland project. After the gravel wetland project fell through, project staff and DEP agreed to adjust the scope of the monitoring and outreach tasks to allow staff to focus resources on identifying alternative projects.

II. Task Summary

Task 1. Project Management

The Town of Cape Elizabeth and MDEP signed a Grant Agreement outlining project roles, responsibilities and funding arrangements. CCSWCD completed a Letter of Agreement with The Town of Cape Elizabeth (Appendix A) designating roles in carrying out the work plan. CCSWCD served as project coordinator and facilitated cost sharing agreements with other project partners (WHEC, LDS, Town of South Portland, DHF). CCSWCD tracked project progress, expenses, and local match, completing five Progress Reports and one Final Project Report. CCSWCD provided pollutant controlled reports to DEP each year. CCSWCD updated Trout Brook’s “NPS Site Tracker” with all NPS problem sites encountered and addressed during the project. A summary of Trout Brook’s NPS Site Tracker was prepared as a deliverable.

Task 2. Data Collection

Data collection was completed in 2015 and included existing data (GIS, field survey, engineering reports, and drawings) as well as project-specific pre-design and design information (field survey, subcatchment delineations, HydroCad, and NRCS reports and designs).

Task 3. Engineering Design

3a. WHEC Stable Roof Gutters and Downspouts

Engineering design for the treatment of runoff from the WHEC stable roof gutters as part of the proposed gravel wetland was completed by AMEC in June 2015. The engineered plans were re-designed to maximize cost savings, at the request of WHEC management, in October 2015, by CCSWCD, but never constructed due to the business closing and the property being put up for sale.

3b. WHEC Drainage Swales and Gravel Wetland

Engineering design for the proposed gravel wetland and associated drainage swales at the WHEC was completed by AMEC in June 2015. The engineered plans were re-designed to maximize cost savings, at the request of WHEC management, in October 2015, by CCSWCD but never constructed due to the business closing and the property being put up for sale.

3c. WHEC Manure Storage Facility

Engineering Design for the manure storage facility was completed by CCSWCD District Engineer in spring of 2014 in collaboration with NRCS. Construction bids were solicited and received in late summer 2014. Design plans were revised in September 2014 and new construction bids were received in October 2014. Permitting through the Town of Cape Elizabeth was completed in November 2014.

3d. LDS Roof Gutters and Downspouts

Engineering design for the proposed treatment of rooftop runoff by a Focal Point treatment system at LDS was completed by AMEC in September 2014.

3e. LDS Detention Basin Rehabilitation

A preconstruction site visit was held on October 16, 2014 and attended by LDS staff. The existing detention basin at LDS was evaluated and a rehabilitation plan was developed by CCSWCD. The comprehensive Operation & Maintenance Plan was finalized and delivered in October 2014.

3f. LDS Underdrained Soil Filter and Bank Stabilization

Engineering design for the proposed Focal Point treatment system at LDS was completed by AMEC in September 2014.

3g. Additional NPS Sites

Boothby: Engineering design for the proposed StormTree treatment system at Boothby Avenue was completed by the City of South Portland working in coordination with Paul Iorio (StormTree) in September / October 2016.

Down Home Farm: Engineering design for the culvert replacement projects at Down Home Farm were completed by CCSWCD working in coordination with Nick Tamarro.

Task 4. Construction

4a. WHEC Stable Roof Gutters and Downspouts

As noted in 3a, the roof gutters and downspouts were planned to be treated by the gravel wetland, which was never constructed because WHEC ceased operation and the property was put up for sale.

4b. WHEC Drainage Swales and Gravel Wetland

The drainage swales and gravel wetland went through design and re-design, but were never constructed due to the closure of the Walnut Hill Equestrian Center business.

4c. Construction: WHEC Manure Storage Facility

The manure storage facility was constructed in April 30, 2015 and then painted at a later date. The building, as constructed, is 34.5' x 31.5' and provides covered storage for manure which is accessed by the public for use in compost and as fertilizer.

4d. LDS Roof Gutters and Downspouts

The drainage from the LDS roof was directed to the Focal Point System for treatment. Construction was completed in April 2015.

4e. LDS Detention Basin Rehabilitation

The detention basin rehabilitation was completed in conjunction with the Focal Point System construction in April 2015.

4f. LDS Underdrained Soil Filter and Bank Stabilization

The Focal Point system was installed and covered with mulch at LDS in April 2015. The Trout Brook YCC installed the plants and watered them through the spring and summer in 2015.

4g. Additional NPS Sites

Boothby: Installation of the StormTree treatment system at Boothby Avenue was completed by the City of South Portland on November 14-16, 2016.

Down Home Farm: Installation of the two culvert replacements at Down Home Farm was completed by Tamarro Landscaping/ Nick Tamarro in December 2016.

Task 5. Pre and Post Construction In-Stream Monitoring

A project Sampling and Analysis Plan (SAP) was created and approved by DEP in July 2014. In August and September 2014, four sets of pre-construction monitoring samples were collected following the protocol detailed in the CCSWCD QAPP (3 first flush storm sample pairs and 1 baseflow sample pair). YSI sondes were not available through CBEP in 2014 due to technical/repair difficulties. Post construction DO samples were retrieved in 2014. CBEP provided a YSI sonde in 2015 and 2016. Fred Dillon calibrated the sondes and deployed from June – October each year. Stream stage monitoring was attempted in September 2015 using DEP loggers, but the data was not usable due to equipment malfunction. Further sampling was not completed due to the changes in the project associated with the gravel wetland.

Task 6. Education and Outreach

6a. Press Releases

The City of South Portland prepared a press release resulting in an article in the Forecaster, highlighting the installation of the StormTree filter on Boothby Avenue. The project was also highlighted in the City's newsletter in November 2016.

6b. Outreach to Agricultural Groups

On January 1, 2015, Cape Planner, Maureen O'Meara, met with the Cape Farm Alliance. On January 15, 2015, Kate MacDonald delivered a presentation about the project and Trout Brook to the group. One-to-one outreach to Down Home Farm, a privately owned and managed farm in Cape Elizabeth, was initiated by Wendy Garland, resulting in two culvert replacement projects. Down Home Farm proved to be a reliable and dedicated project partner, completing the work in a short amount of time to work within the grant timeline.

Task 6c. Education and Outreach: Educational Tours & Signs

In addition to other sites in our region, Wendy Garland and Fred Dillon brought representatives from DEP and EPA to the Walnut Hill Equestrian Center and the Church of Jesus Christ of Latter Day Saints in October 2016 to highlight the work that had been done within the Trout Brook watershed. CCSWCD worked with DEP and the City of South Portland to create educational signage for the StormTree BMP installation site on Boothby Avenue.

Task 6d. Education and Outreach: Operation & Maintenance Plans

A comprehensive Operation and Maintenance plan was developed for each of the following: the rehabilitated stormwater pond and Focal Point system at LDS; the manure storage facility at WHEC; the StormTree system installed on Boothby Avenue; and the two culverts installed at DHF.

Task 7. Pollution Reduction Estimates

Pollutants Controlled Reports were submitted in December of 2015 and 2016 using the EPA Region 5 Load Estimation Model (<http://it.tetrattech-ffx.com/stepl/>) and the [STEPL](#) model. In total, the project resulted in pollutant load reductions of an estimated 1.6 tons of sediment, 51.5 pounds of phosphorus and 556 pounds of nitrogen. Complete soil loss estimates are included with this report under Appendix C.

III. Deliverables Summary

Description / Summary	Value
<p><i>1. Contract, Sub-agreements, Semi-Annual Progress Reports, and a Final Project Report</i></p>	
<ul style="list-style-type: none"> • DEP Grant Agreement / contract executed 03/17/14 • CCSWCD & Cape Elizabeth sub-contract executed 11/10/14 • LDS Agreement signed 10/30/14 • WHEC commitment letter only – signed 09/09/13 • DHF Agreement signed 12/13/16 • City of South Portland Agreement signed 12/08/16 • Amec Agreement signed 06/02/14 • Risbarra Agreement signed 11/11/14 • May - October 2014 progress report submitted 11/10/14 • November – April 2015 progress report submitted 05/05/15 • May – October 2015 progress report submitted 11/11/15 • November – April 2016 progress report submitted 05/16/16 • May – October 2016 progress report submitted 11/15/16 • Final Project Report submitted 12/31/16 	<p>High – grant requirement; provides standing for long-term O&M requirements</p>
<p><i>2. NPS Site Tracker Summary</i></p>	
<p>NPS Site Tracker was updated with projects completed under this grant agreement.</p>	<p>Medium – Helpful to have a running list of completed projects but there is a significant time investment</p>
<p><i>3. NPS Site Report for each of the six BMPs</i></p>	
<p>NPS Site Reports were completed for the five projects completed under this grant agreement:</p> <ul style="list-style-type: none"> • WHEC Manure Storage Facility • LDS Detention Basin Repair • LDS Focal Point Bioinfiltration Installation • South Portland StormTree Installation • DHF Culvert Replacements 	<p>High – provide a concise summary of work done at each site, helpful for final report and maintaining a history of projects</p>
<p><i>4. Project SAP</i></p>	
<p>The Trout Brook Watershed Sampling and Analysis Plan (SAP) was submitted and approved by DEP 07/22/14.</p>	<p>High – allows any monitoring staff to consistently obtain water quality samples</p>

<i>5. Summary of water quality monitoring results</i>	
A summary of water quality monitoring results was completed by Wendy Garland and submitted as a deliverable with this final report (Appendix E).	High – provides narrative summary of what WQ testing results suggest for pollutants and stressors present in the system
<i>6. Copies of press releases and signs</i>	
<p>A press release to the Forecaster resulted in the publication of an article covering the StormTree installation on Boothby Avenue: http://www.theforecaster.net/grant-to-south-portland-will-help-treat-trout-brook/</p> <p>South Portland also featured the StormTree installation in their City newsletter, following an announcement / press release dated 12/8/16.</p> <p>A sign was developed highlighting the StormTree unit on Boothby Avenue. (Appendix A)</p>	Low – press coverage is often through alternative means and press releases aren't always the most effective tool. The value of press COVERAGE is high, regardless of delivery method.
<i>7. Pollutants Controlled Reports each year until project completion</i>	
Pollutants Controlled Reports were completed in 2015 and 2016.	Low – this data does not inform what we do on a local level. Understandably more important at the state or federal level for easily summarizing effectiveness of grant-funded projects.

IV. Project Outcomes

Major Outcomes

As a result of this project a Focal Point system was installed at the Latter Day Saints property, to treat stormwater runoff from impervious surfaces on site. The existing detention basin on the Latter Day Saints property was rehabilitated to improve pollutant removal and stormwater storage capacity. A manure storage facility was constructed on the Walnut Hill Equestrian Center property to reduce the potential for pollutants from the manure to migrate into the stream. A StormTree treebox filter was installed on Boothby Avenue in South Portland, to treat roadway runoff before discharge to Trout Brook. Two failing culverts were replaced and adjacent slopes stabilized at Down Home Farm, reducing sedimentation into Trout Brook. A presentation to Cape Farm Alliance was held in January 2015 and the EPA and Maine DEP toured the sites with Wendy Garland and Fred Dillon in October 2016.

Environmental Results

Over 1 ton of sediment, 51 pounds of phosphorus and 550 pounds of nitrogen is no longer flowing into Trout Brook annually due to the BMPs installed at five abatement sites. (Appendix B)

Lessons Learned

The biggest challenge for this project was the cessation of operations of the Walnut Hill Equestrian Center and the property being put up for sale. Not only did this derail the gravel wetland project, but it leaves the fate of the manure storage shed to be determined.

The lessons learned are to 1) have the property owner sign the Cost-Share Agreement and 2) ensure project feasibility throughout the project timeline and especially prior to investing in design and re-design of plans for large construction projects. Project planning was done with the property manager without any direct communication with the actual owner.

Despite these challenges associated with the WHEC, several possible opportunities emerged. First, the Town is keenly interested in working with any buyers of the property to ensure that the property does not impact the stream. They will encourage the installation of the gravel wetland design, regardless of the land use. Also, if the property owner does not intend to have horses or other animals on the property, they will explore the possibility of allowing the manure storage facility to be relocated to the adjacent farm, which has expressed interest in using it for their pig manure.

The project's success in finding alternative construction projects in such a short time frame also demonstrated the presence of strong local partners and solid understanding of the watershed. Three construction projects were ultimately completed in the last two months of the project, and another 2-3 other projects (e.g., livestock exclusion fencing and rain garden) were also identified for the next project phase.

V. Summary of Total Expenditures

	Federal NPS Grant	Local Match	Total
Funds Originally Allocated:	\$120,185.00	\$72,979.00	\$193,164.00
Funds Expensed:	\$120,185.00	\$51,949.88	\$165,545.79
Funds Remaining:	\$0	\$21,029.12	\$27,618.21

VI. Non-Federal Match Documentation and Certification

See Appendix C. for the Table of Match Sources.
See Appendix D. for the Match Certification Form.

VII. Appendices

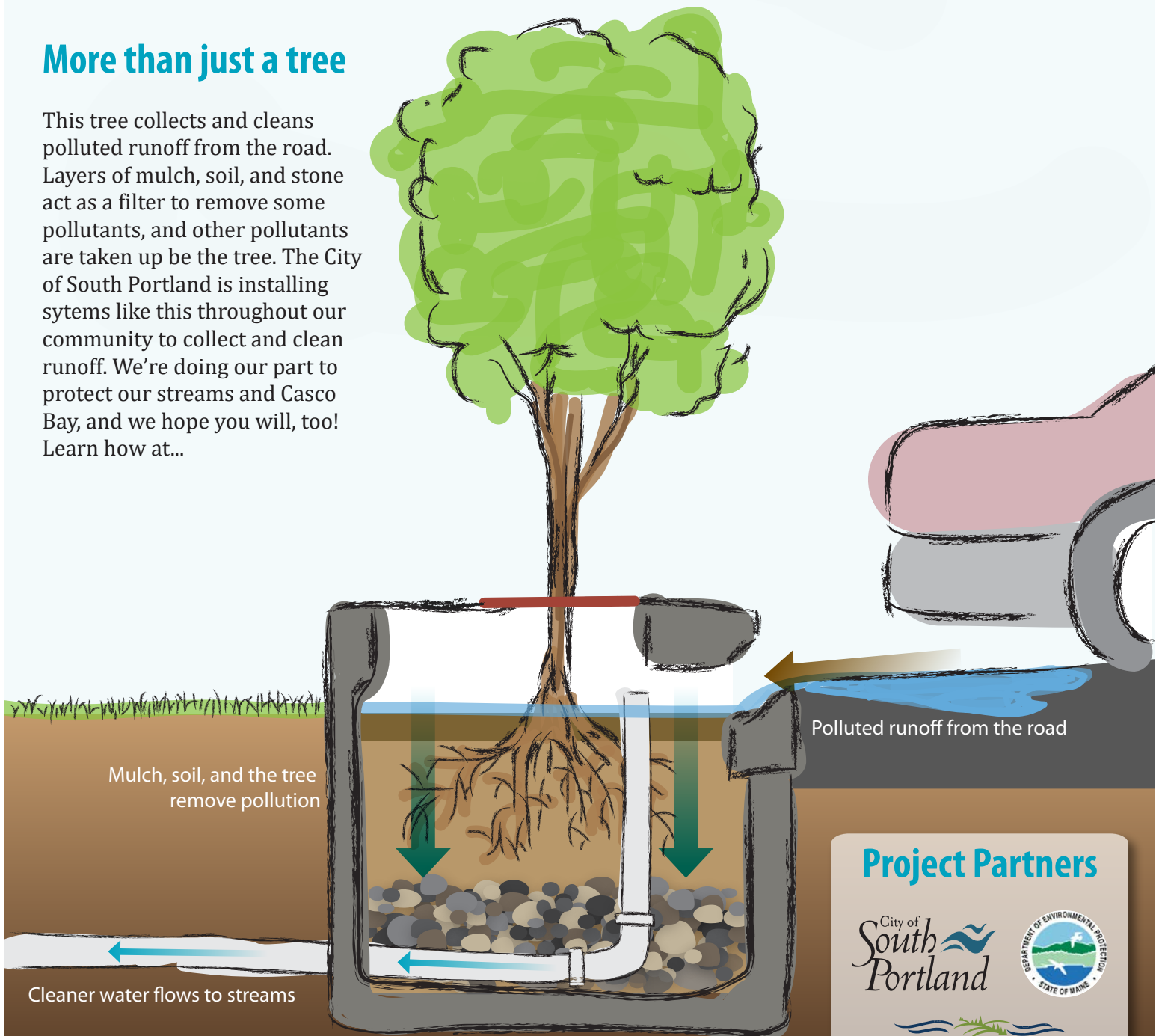
- Appendix A. StormTree signage for Boothby Avenue
- Appendix B. Pollutants Controlled Estimates
- Appendix C. Table of Match Sources
- Appendix D. Match Certification Form
- Appendix E. Summary of Monitoring Data

Tree Box Filter:

Growing for Clean Water

More than just a tree

This tree collects and cleans polluted runoff from the road. Layers of mulch, soil, and stone act as a filter to remove some pollutants, and other pollutants are taken up by the tree. The City of South Portland is installing systems like this throughout our community to collect and clean runoff. We're doing our part to protect our streams and Casco Bay, and we hope you will, too! Learn how at...



Project Partners

City of
*South
Portland*



Cumberland County Soil & Water
Conservation District

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Trout Brook Restoration Project, Phase II (2014RT08)

Pollutants Controlled Report

Site ID	Brief Description of NPS Site	Estimation Method Used	Sediment Tons / Yr	Phosphorus Pounds / Yr	Nitrogen Pounds / Yr
LDS-1	Installed Focal Point Bioinfiltration System in parking area	R5/FILTER (Used MFCTR Removal efficiencies)	0.207	0.44	2.9
LDS-2	Rehabilitated existing detention basin so that it would retain water (had previously been failing and was a flow-through system)	R5/FILTER	0.13	0	1
WHEC-1	Installed covered/contained manure storage facility to replace the open pile that was placed on fractured bedrock	R5/FEEDLOT	N/A	50	549
Storm Tree Boothby Site	Installed StormTree filter on Boothby Avenue, South Portland, to treat 0.5 acres of impervious area discharging to Trout Brook	STEPL	0.3	0.1	1.4
Down Home Farm - Culvert 1	Replaced failing culvert under farm road at Trout Brook Crossing at Down Home Farm	R5/CEE	0.5	0.5	0.9
Down Home Farm - Culvert 2	Replaced failing culvert under farm road at Trout Brook Crossing at Down Home Farm	R5/CEE	0.5	0.5	0.9
Totals			1.637	51.54	556.1

Date	Match Source	Description	Project	Hours	Rate	Total Match Amount
4/18/2014	Maureen O'Meara	Telcon w/ PM, PB scheduling	Admin	0.5	\$50.00	\$25.00
4/30/2014	WHEC-Carey & Kurt	Meeting with NRCS	WHEC	2	\$20.54	\$41.08
5/1/2014	WHEC-Carey & Kurt	Meeting with NRCS Surveyor	WHEC	2	\$20.54	\$41.08
5/1/2014	WHEC-Carey & Kurt	Return visit from AMEC	WHEC	2	\$20.54	\$41.08
5/20/2014	WHEC-Carey & Kurt	Site Visit with AMEC	WHEC	2	\$20.54	\$41.08
5/24/2014	Kurt & Carey	Paddock. 6 hours. Rock pick-up. 2 hours tilling with tractor	WHEC	8	\$20.54	\$164.32
5/25/2014	Tractor	2 hours tilling	WHEC	2	\$250.00	\$500.00
5/25/2014	WHEC-Carey & Kurt	Paddock. 6 hours. Tilling with tractor.	WHEC	6	\$20.54	\$123.24
5/25/2014	Tractor	6 hours tilling	WHEC	6	\$250.00	\$1,500.00
5/26/2014	WHEC-Carey & Kurt	Grass seed laid down.	WHEC	3	\$20.54	\$61.62
5/26/2014	Supplies	2 bags grass seed from Blue Seal Feeds. \$137.84/bag	WHEC	2	\$137.84	\$275.68
5/27/2014	Maureen O'Meara	mtg with Marass, Baldwin, emails on PB wkshop	Outreach	1.5	\$50.00	\$75.00
5/28/2014	Maureen O'Meara	Telcon with Harding re: contract, PB Wkshop	Outreach	0.5	\$50.00	\$25.00
5/30/2014	Maureen O'Meara	Email with mtG re: Amec contract, PB Wkshop	Outreach	0.5	\$50.00	\$25.00
6/2/2014	Maureen O'Meara	Amec contract signed, scanned, sent	WHEC	0.25	\$50.00	\$12.50
6/2/2014	Maureen O'Meara	Telcon with abutter Robertson re: PB Wkshop	Outreach	0.5	\$50.00	\$25.00
6/3/2014	Maureen O'Meara	Telcon with Marass re: wetland mapping	WHEC	0.5	\$50.00	\$25.00
6/3/2014	Maureen O'Meara	mtg with Dale Brewer re: wetland, billing	WHEC	0.25	\$50.00	\$12.50
6/11/2014	Maureen O'Meara	mtg with TM, Fin dir to set up accounts, pay Statewide invoice	Admin	0.5	\$50.00	\$25.00
6/28/2014	WHEC-Carey & Kurt	gravel wetland area. Bitter-root removal, dead tree and branch removal	WHEC	8	\$20.54	\$164.32
7/1/2014	WHEC-Carey & Kurt	gravel wetland area. Bitter-root removal, dead tree and branch removal	WHEC	5	\$20.54	\$102.70
7/2/2014	WHEC-Carey & Kurt	gravel wetland area. Bitter-root removal, dead tree and branch removal	WHEC	5	\$20.54	\$102.70
7/8/2014	Maureen O'Meara	site visit on buffers. LDS pkg lot	LDS	1.5	\$50.00	\$75.00
7/9/2014	WHEC-Carey & Kurt	Met with Cape CEO	WHEC	2	\$20.54	\$41.08
7/9/2014	Cape Code Enforcement (Ben)	Met with Cape CEO	WHEC	1	\$42.50	\$42.50
7/19/2014	WHEC-Carey & Kurt	gravel wetland area. Bitter-root removal, dead tree and branch removal	WHEC	3	\$20.54	\$61.62
7/21/2014	Maureen O'Meara	Plan Review	LDS Focal Point	1	\$50.00	\$50.00
7/21/2014	Maureen O'Meara	Plan Review	WHEC	1	\$50.00	\$50.00
7/30/2014	WHEC-Carey & Kurt	Prebid for Prep Work	WHEC	2	\$20.54	\$41.08
8/5/2014	Fred Dillon	Rising stage sample deployments	Monitoring	2	\$42.50	\$85.00
8/5/2014	Maureen O'Meara	Planning Board Meeting	LDS Focal Point	0.5	\$50.00	\$25.00
8/5/2014	Maureen O'Meara	Maureen O'Meara	Admin	0.5	\$50.00	\$25.00
8/9/2014	WHEC-Carey & Kurt	gravel wetland area. Bitter-root removal, dead tree and branch removal	WHEC	6	\$20.54	\$123.24
9/30/2014	Maureen O'Meara	Processing payments, etc	Admin	0.5	\$50.00	\$25.00
9/30/2014	WHEC-Carey & Kurt	Met about Bid Package #2	WHEC	2	\$20.54	\$41.08
10/16/2014	Maureen O'Meara	Phase II Preconstruction Visit & DEP Check in	Admin	3	\$50.00	\$150.00
10/16/2014	LDS - Max	Phase II Preconstruction Visit	LDS Focal Point	1	\$28.00	\$28.00
10/16/2014	LDS - Max's Boss	Phase II Preconstruction Visit	LDS Focal Point	1	\$28.00	\$28.00
10/16/2014	LDS - Gordon	Phase II Preconstruction Visit	LDS Focal Point	1	\$28.00	\$28.00
10/16/2014	WHEC-Carey	Phase II Preconstruction Visit	WHEC	0.5	\$20.54	\$10.27
10/16/2014	AMEC	Total invoiced: 5298.43; total actual cost is 8027.92. = Match equivalent 2649.21	LDS Focal Point	1	\$2,649.21	\$2,649.21
10/27/2014	WHEC-Carey & Kurt	Met about layout & setbacks	WHEC	2	\$20.54	\$41.08
1/1/2015	Attendees	Cape Farm Alliance Meeting -- January 2015	E&O	10	\$21.31	\$213.10
1/1/2015	Maureen O'Meara	Cape Farm Alliance Meeting -- January 2015	E&O	1	\$50.00	\$50.00
4/10/2015	WHEC-Carey & Kurt	MSF Gutters	WHEC	6	\$21.31	\$127.86
4/10/2015	WHEC-Carey & Kurt	Materials - MSF Gutters	WHEC	1	\$298.61	\$298.61
5/1/2015	LDS	Estimated match based on Risbara Construction	LDS Detention Basin	1	\$7,575.00	\$7,575.00
5/1/2015	Cape Elizabeth Cons Com	Cash Match	Admin	1	\$2,000.00	\$2,000.00
6/15/2015	WHEC-Carey & Kurt	First coat paint applied to MSF	WHEC	5	\$21.31	\$106.55
6/15/2015	WHEC-Carey & Kurt	Second coat paint applied to MSF	WHEC	4	\$21.31	\$85.24
6/15/2015	WHEC-Carey & Kurt	Paint & Supplies for Manure Storage Facility	WHEC	1	\$130.42	\$130.42
Apr-Sept 15	Maureen O'Meara	Permitting, Landowner meetings, working with design engineer	WHEC	5	\$50.00	\$250.00
Apr-Sept 15	WHEC-Carey & Kurt	Permitting, Landowner meetings, working with design engineer	WHEC	30	\$21.31	\$639.30
June-Sept 15	Caroline Gleason	Watering LDS Focal Point	LDS	30	\$21.31	\$639.30
02/04/16	Maureen O'Meara	Murray and gravel wetland RP	WHEC	0.5	\$50.00	\$25.00
3/30/2016	Maureen O'Meara	Kurt and WHEC	WHEC	0.5	\$50.00	\$25.00
5/14/2016	Maureen O'Meara	telecons with Wendy Garland on status	WHEC	0.5	\$50.00	\$25.00

Date	Match Source	Description	Project	Hours	Rate	Total Match Amount
5/6/2016	Maureen O'Meara	Maureen O'Meara	WHEC	0.5	\$50.00	\$25.00
5/6/2016	Maureen O'Meara	Process billing	WHEC	0.5	\$50.00	\$25.00
5/10/2016	Maureen O'Meara	Track down WHEC owner contact info	WHEC	1	\$50.00	\$50.00
11/11/2016	Maureen O'Meara	Outreach & Coordination re: reallocation of funds	Admin	1.5	\$50.00	\$75.00
12/6/2016	South Portland Cons Com	Phase I projects	YCC projects	1	\$6,501.00	\$6,501.00
12/6/2016	CCSWCD	Phase I contributions	YCC projects - support	1	\$2,250.00	\$2,250.00
12/12/2016	Down Home Farm / Nick Tamarro	site evaluation visits	Down Home Farm	3	\$150.00	\$450.00
12/12/2016	Down Home Farm / Nick Tamarro	Engineering site plans / designs	Down Home Farm	3	\$100.00	\$300.00
12/12/2016	Down Home Farm / Nick Tamarro	admin work / materials ordering	Down Home Farm	5	\$100.00	\$500.00
12/12/2016	Down Home Farm / Nick Tamarro	materials delivery	Down Home Farm	1	\$300.00	\$300.00
12/12/2016	Down Home Farm / Nick Tamarro	labor to install culvert #1	Down Home Farm	1	\$4,500.00	\$4,500.00
12/12/2016	Down Home Farm / Nick Tamarro	labor to install culvert #2	Down Home Farm	1	\$4,500.00	\$4,500.00
12/12/2016	Down Home Farm / Nick Tamarro	final site meeting	Down Home Farm	1	\$200.00	\$200.00
7/27/2016	Gretchen Anderson	Recon possible sites w/DEP for SW treatment systems	Boothby Ave	2	\$15.00	\$30.00
7/27/2016	Fred Dillon	Recon possible sites w/DEP for SW treatment systems	Boothby Ave	2	\$37.50	\$75.00
7/28/2016	Gretchen Anderson	map of potential project sites	Boothby Ave	3	\$15.00	\$45.00
8/18/2016	Fred Dillon	confer with DEP on possible site locations	Boothby Ave	0.5	\$37.50	\$18.75
9/6/2016	Fred Dillon	confer with DEP on possible site locations	Boothby Ave	0.5	\$37.50	\$18.75
9/7/2016	Fred Dillon	confer with DEP on possible site locations	Boothby Ave	0.25	\$37.50	\$9.38
9/7/2016	Collection Systems Manager	confer with DEP on possible site locations	Boothby Ave	0.25	\$45.00	\$11.25
9/22/2016	Fred Dillon	Develop RFP for SW treatment system	Boothby Ave	2	\$37.50	\$75.00
9/22/2016	Collection Systems Manager	Recon possible sites for SW treatment system - confirm Boothby	Boothby Ave	1	\$45.00	\$45.00
9/22/2016	Fred Dillon	Recon possible sites for SW treatment system - confirm Boothby	Boothby Ave	1	\$37.50	\$37.50
9/23/2016	Fred Dillon	Paul Iorio on StormTree for Boothby project	Boothby Ave	0.5	\$37.50	\$18.75
9/23/2016	Fred Dillon	scott gorneau on focal point for boothby	Boothby Ave	0.5	\$37.50	\$18.75
9/28/2016	Fred Dillon	Paul Iorio on StormTree for Boothby project	Boothby Ave	0.5	\$37.50	\$18.75
9/29/2016	Fred Dillon	wendy on stormtree for Boothby	Boothby Ave	0.5	\$37.50	\$18.75
9/30/2016	Fred Dillon	DEP PBR application; Chris Allen on Filterra for Boothby; Wendy on system siting	Boothby Ave	2	\$37.50	\$75.00
10/3/2016	Fred Dillon	Jeff Dennis on StormTree performance evaluation	Boothby Ave	0.5	\$37.50	\$18.75
10/3/2016	Fred Dillon	scott gorneau on focal point for boothby	Boothby Ave	0.5	\$37.50	\$18.75
10/4/2016	Fred Dillon	Rob Woodman on Focal point for Boothby	Boothby Ave	0.5	\$37.50	\$18.75
10/6/2016	Fred Dillon	Jeff Dennis on StormTree performance; Wendy Garland on comparison of proposals	Boothby Ave	1	\$37.50	\$37.50
10/6/2016	Collection Systems Manager	Jeff Dennis on StormTree performance; Wendy Garland on comparison of proposals	Boothby Ave	0.5	\$45.00	\$22.50
10/7/2016	Fred Dillon	Wendy on comparing SW system proposals	Boothby Ave	0.5	\$37.50	\$18.75
10/12/2016	Director	Review StormTree contract and confer with WRP director	Boothby Ave	1	\$57.00	\$57.00
10/12/2016	Collection Systems Manager	Review StormTree contract and confer with WRP director	Boothby Ave	1	\$45.00	\$45.00
10/12/2016	Fred Dillon	Review StormTree contract and confer with WRP director	Boothby Ave	1	\$37.50	\$37.50
10/12/2016	Fred Dillon	Paul Iorio on additional details for Boothby project	Boothby Ave	0.5	\$37.50	\$18.75
10/13/2016	Fred Dillon	Contract award notification to bidders	Boothby Ave	0.5	\$37.50	\$18.75
10/17/2016	Collection Systems Manager	Survey measurements for plan development	Boothby Ave	1	\$45.00	\$45.00
10/17/2016	CAD Tech	Survey measurements for plan development	Boothby Ave	1	\$37.50	\$37.50
10/18/2016	CAD Tech	Engineering site plans / designs	Boothby Ave	3	\$37.50	\$112.50
10/19/2016	Collection Systems Manager	Budget estimate & summary for terms of grant acceptance	Boothby Ave	0.5	\$45.00	\$22.50
10/19/2016	Fred Dillon	Budget estimate & summary for terms of grant acceptance	Boothby Ave	2	\$37.50	\$75.00
10/19/2016	Collection Systems Supervisor	Budget estimate & summary for terms of grant acceptance	Boothby Ave	0.5	\$37.50	\$18.75
10/19/2016	Fred Dillon	confirm DigSafe markings	Boothby Ave	0.5	\$37.50	\$18.75
10/20/2016	CAD Tech	revisions to plans	Boothby Ave	1	\$37.50	\$37.50
10/21/2016	Fred Dillon	Update budget to CCSWCD & DEP; DEP PBR app revisions & drop off at DEP	Boothby Ave	3	\$37.50	\$112.50
10/21/2016	Fred Dillon	Review presentation to council	Boothby Ave	0.25	\$37.50	\$9.38
10/21/2016	Collection Systems Manager	Review presentation to council	Boothby Ave	0.25	\$45.00	\$11.25
10/21/2016	Director	Review presentation to council	Boothby Ave	0.25	\$57.00	\$14.25
10/24/2016	Fred Dillon	CEO approval request	Boothby Ave	1	\$37.50	\$37.50
10/25/2016	Fred Dillon	Recommendation memo to City Manager	Boothby Ave	1	\$37.50	\$37.50
10/27/2016	Fred Dillon	CCSWCD on O&M plan	Boothby Ave	0.25	\$37.50	\$9.38
11/1/2016	Fred Dillon	amended CEP approval request per Steve Puleo	Boothby Ave	1	\$37.50	\$37.50
11/1/2016	Fred Dillon	position paper for council packet	Boothby Ave	0.5	\$37.50	\$18.75
11/7/2016	Fred Dillon	council presentation	Boothby Ave	1.5	\$37.50	\$56.25

Date	Match Source	Description	Project	Hours	Rate	Total Match Amount
11/17/2016	Collection Systems Supervisor	Order materials and coordinate construction schedule	Boothby Ave	2	\$37.50	\$75.00
11/8/2016	Fred Dillon	CCSWCD on cost share	Boothby Ave	0.25	\$37.50	\$9.38
11/10/2016	Fred Dillon	Project admin - cost tracking worksheet	Boothby Ave	2	\$37.50	\$75.00
11/8/2016	Construction Crew	Pick up tree at O'Donal's	Boothby Ave	2	\$28.00	\$56.00
11/10/2016	Fred Dillon	Project admin - cost tracking worksheet	Boothby Ave	2	\$37.50	\$75.00
11/14/2016	Fred Dillon	System installation - project admin	Boothby Ave	1	\$37.50	\$37.50
11/14/2016	Collection Systems Supervisor	System installation - project admin	Boothby Ave	2	\$37.50	\$75.00
11/14/2016	Construction Crew	System installation (4 staff @ 8 hours each)	Boothby Ave	32	\$28.00	\$896.00
11/16/2016	Construction Crew	curbing & apron installation	Boothby Ave	6	\$28.00	\$168.00
11/17/2016	Fred Dillon	draft crude interpretative sign	Boothby Ave	2	\$37.50	\$75.00
11/18/2016	Construction Crew	grating installation	Boothby Ave	2	\$28.00	\$56.00
11/21/2016	Fred Dillon	project admin	Boothby Ave	1	\$37.50	\$37.50
11/14/2016	Excavator	System installation	Boothby Ave	8	\$135.00	\$1,080.00
11/14/2016	Dump Truck	Dirt work	Boothby Ave	8	\$105.00	\$840.00
11/14/2016	Crew Truck	Ancillary equipment	Boothby Ave	8	\$75.00	\$600.00
11/14/2016	Dump Truck	Curbing	Boothby Ave	2	\$105.00	\$210.00
11/14/2016	Skid steer & curb machine	curbing	Boothby Ave	2	\$150.00	\$300.00
11/14/2016	Materials	Pipe, fittings, and rigid insulation	Boothby Ave	1	\$689.30	\$689.30
11/14/2016	Materials	sand, stone, and peat (filter media)	Boothby Ave	1	\$192.15	\$192.15
11/14/2016	Materials	ESC mix & rip rap	Boothby Ave	1	\$406.00	\$406.00
11/14/2016	Materials	Asphalt for curbing and apron	Boothby Ave	1	\$166.44	\$166.44
11/14/2016	Materials	4 yd. loam	Boothby Ave	1	\$72.00	\$72.00
7/28/2015	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
9/15/2015	Monitoring data collection	Sonde Rental	Monitoring	1	\$1,370.00	\$1,370.00
10/7/2015	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
7/6/2016	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
8/10/2016	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
9/7/2016	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
10/4/2016	Monitoring data collection	Sonde Rental	Monitoring	1	\$690.00	\$690.00
7/28/2015	Monitoring data collection	Sonde Deployment	Monitoring	1	\$240.00	\$240.00
9/15/2015	Monitoring data collection	Sonde Deployment	Monitoring	1	\$165.00	\$165.00
10/7/2015	Monitoring data collection	Sonde Deployment	Monitoring	1	\$165.00	\$165.00
7/6/2016	Monitoring data collection	Sonde Deployment	Monitoring	1	\$240.00	\$240.00
8/10/2016	Monitoring data collection	Sonde Deployment	Monitoring	1	\$165.00	\$165.00
9/7/2016	Monitoring data collection	Sonde Deployment	Monitoring	1	\$165.00	\$165.00
10/4/2016	Monitoring data collection	Sonde Deployment	Monitoring	1	\$165.00	\$165.00

Match Total

\$51,949.88

**Appendix E:
Trout Brook Restoration Project, Phase II (2014RT08)
Non-Federal Match Documentation and Certification**

GRANTEE INFORMATION:

Name: Town of Cape Elizabeth, Maine
Address: Maureen O'Meara, Town Planner
P.O. Box 6260
Cape Elizabeth, Maine 04107

Telephone: (207) 892-4700
Contact: Jodie W. Keene, CCSWCD on behalf of Cape Elizabeth

PROJECT INFORMATION

Project Title: Trout Brook Restoration Project, Phase II
Project ID#: 2014RT08

Match Amount planned under the Grant Agreement	<u>\$72,979.00</u>
Match Amount Claimed	<u>\$46,199.88</u>

CERTIFICATION STATEMENT

I certify that the non-federal match detailed in the attached information were expended in the course of completing work described in the Grant Agreement for the Project referenced above, and that the detailed documentation of the match information is on file and available for review at the Grantee address shown above.

Jodie W. Keene

Jodie W. Keene, Project Manager

Date: 12/21/16

Trout Brook Phase II Project Water Quality Monitoring Summary

Sampling and Analysis Plan

CCSWCD prepared a project Sampling and Analysis Plan (SAP) under their QAPP, and DEP approved the SAP in July 2014. The original plan was to collect water samples and have them analyzed for nutrients (low level total phosphorus, TKN and nitrate + nitrite). The samples would be collected during first-flush stormflow (using a rising stage sampler) and baseflow conditions, before and after, and above and below BMP installations in the upper Trout Brook watershed. Stream flow would also be measured at collection times. In addition, the City of South Portland would use Casco Bay Estuary Partnership (CBEP) sondes to collect continuous water quality data (temperature, dissolved oxygen and specific conductance) in the stream. This modest sampling effort was intended to evaluate the extent of nutrient load reductions to Trout Brook and whether dissolved oxygen conditions improved following BMP construction.

Overview of Monitoring Activities

Water chemistry data was collected above and below the BMP installation area prior to construction in July - September 2014. Two storm samples and one base flow sample were collected at each site. CCSWCD deployed a DEP stilling well and water level logger in the fall of 2014 to collect flow and discharge data; however, there were equipment malfunctions and the data proved to be unusable. Data sondes were not able to be deployed in 2014 since the CBEP equipment was undergoing repairs that summer. In 2015 and 2016, Fred Dillon (South Portland) calibrated and deployed the sondes from June – October. In the summer of 2016, the horse farm adjacent to the monitoring/BMP installation sites was placed on the market and the horses were moved to another location. As a result, additional water chemistry samples were not collected at the end of the project. Since the nutrient source had been removed from the watershed, the data was not deemed useful in meeting the original intended purpose. Project resources were directed to finding replacement abatement projects.

Results

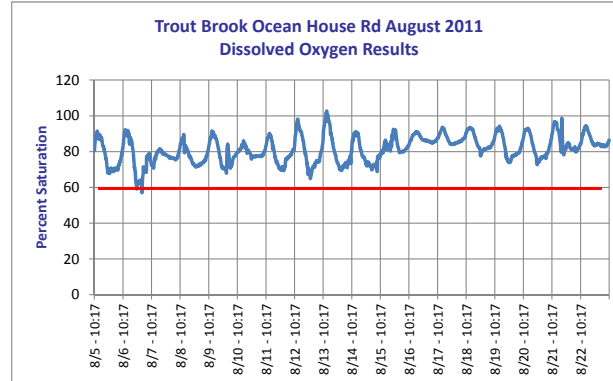
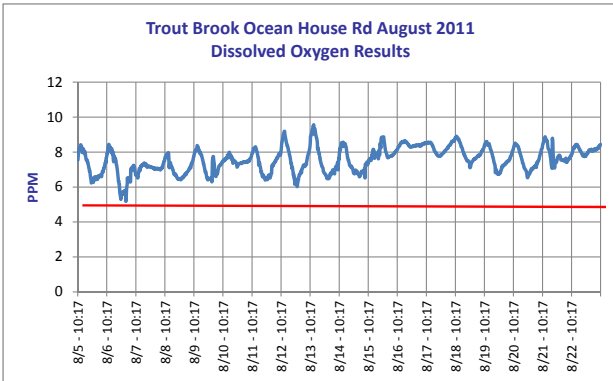
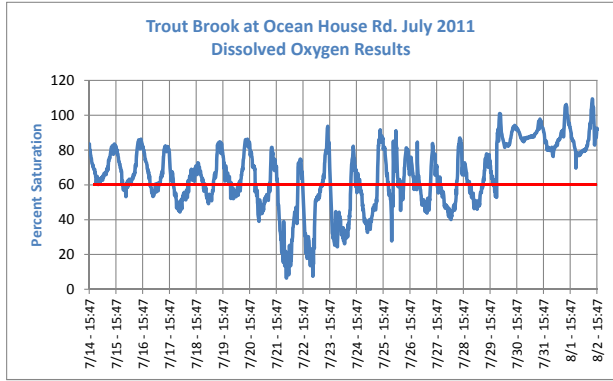
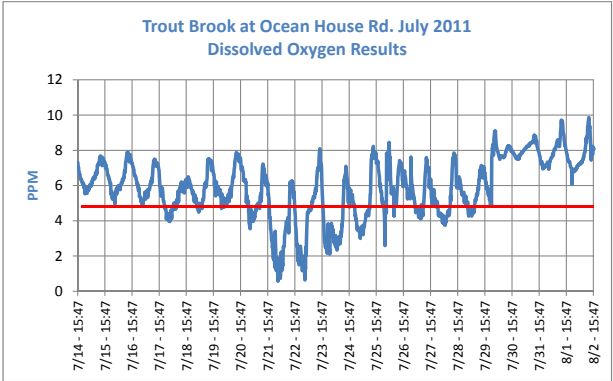
Although the sampling plan was not ultimately carried out as envisioned, the collected data does align with data collected in 2010-2012 as part of the watershed-based planning process (see charts on the following pages). Stream temperature and specific conductance continue to be relatively low in this segment of Trout Brook. However, early morning dissolved oxygen (DO) at the downstream station, which is below the former equestrian center and other farming operations, continued to fall below Class B and C standards and there were large diurnal DO swings (> 3 mg/L).

This confirms previous findings that low dissolved oxygen is a priority stressor for aquatic life. Further, the high diurnal DO swings indicate that nutrients are the likely cause of the depressed DO. Nutrients in the stream feed plants and algae in the water, which increase oxygen in the stream during daytime photosynthesis. Overnight plant respiration uses up the oxygen in the stream creating low oxygen condition in the early morning. Nutrient sampling conducted in 2012 and 2014 above and below the equestrian center also helped bracket the nutrient source as the adjacent horse farm rather than the other upstream farms.

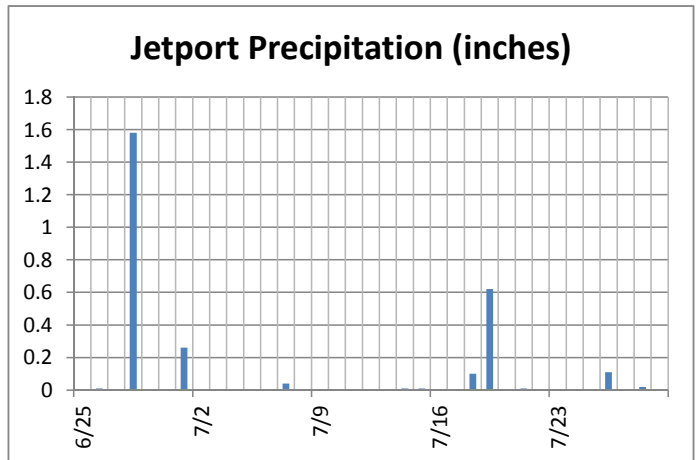
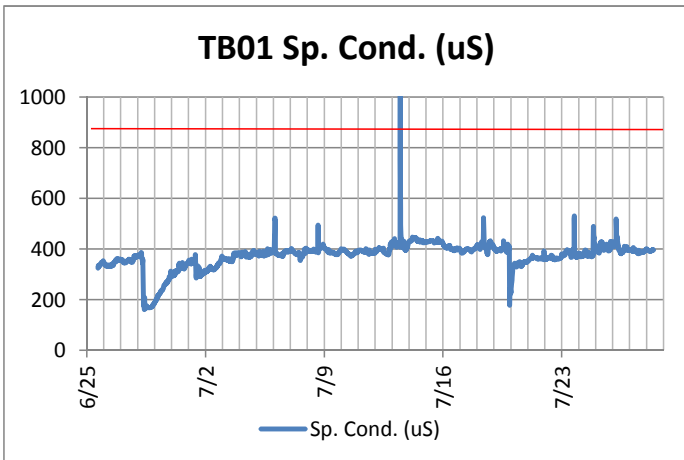
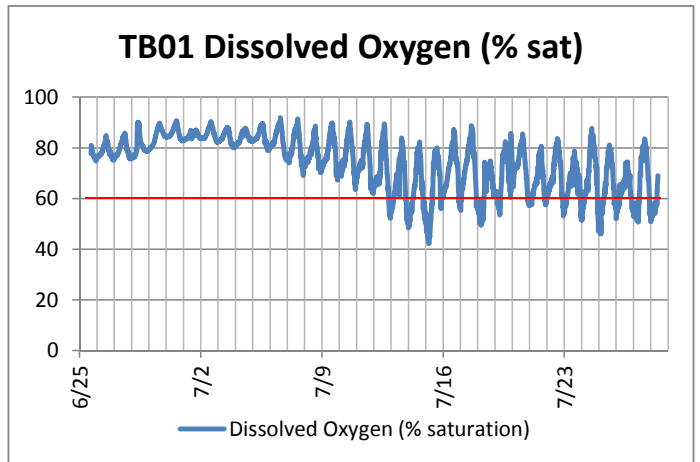
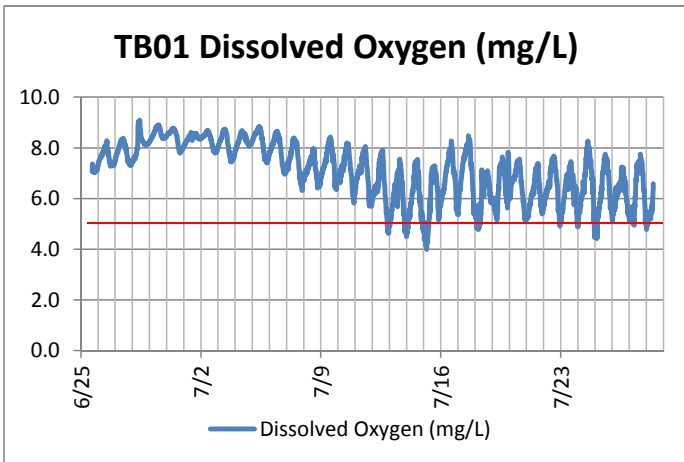
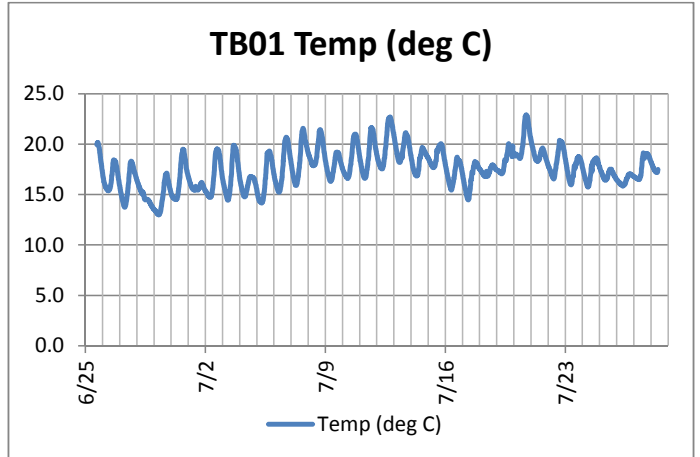
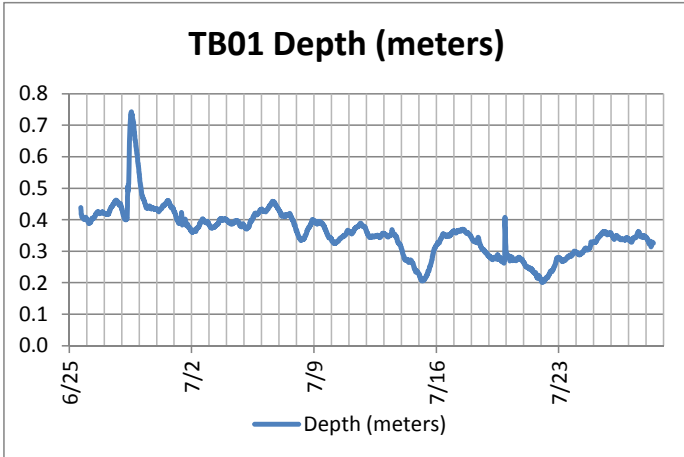
Next Steps

Ongoing monitoring to help detect water quality improvements will be a continued focus for this part of the stream. Biomonitoring by the Maine DEP will continue to take place every five years, and project partners will also continue to conduct volunteer kicknet sampling to help detect improvements over time. Long-term monitoring of dissolved oxygen through diurnal sampling or data sondes will also be useful, especially as more conservation practices are installed in the upper Trout Brook watershed. Nutrient sampling and flow monitoring will likely not be pursued further unless additional bracketing is needed to help identify pollution source areas.

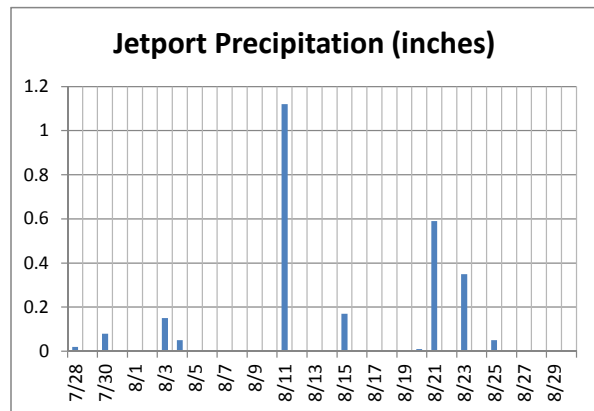
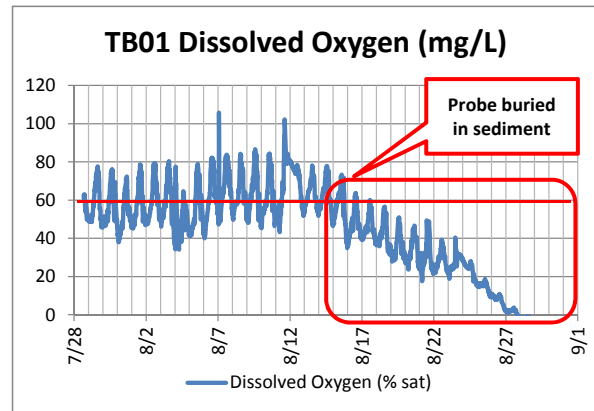
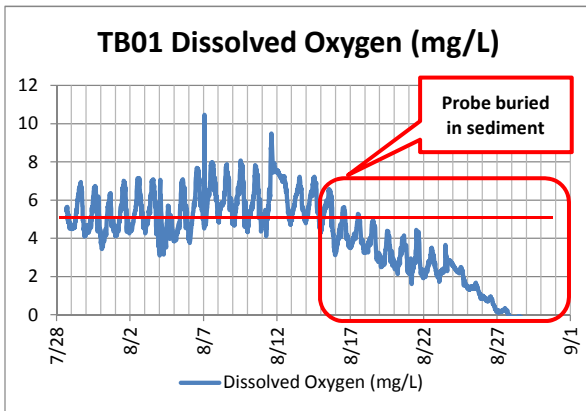
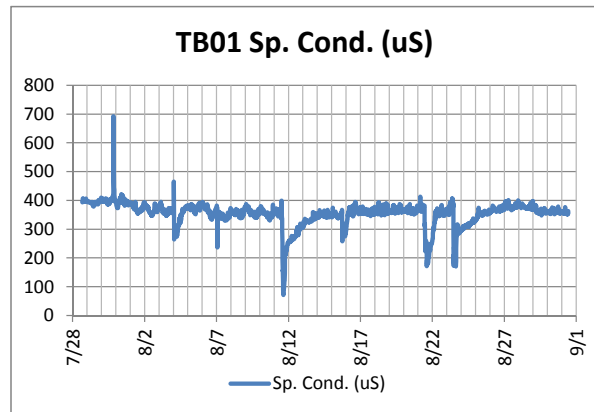
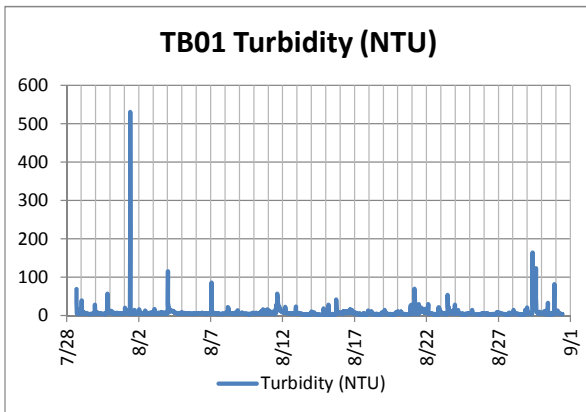
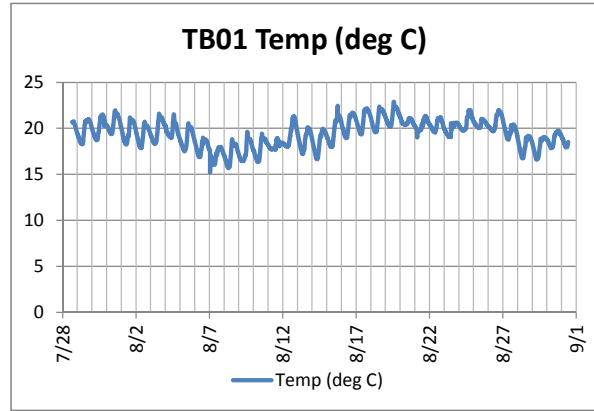
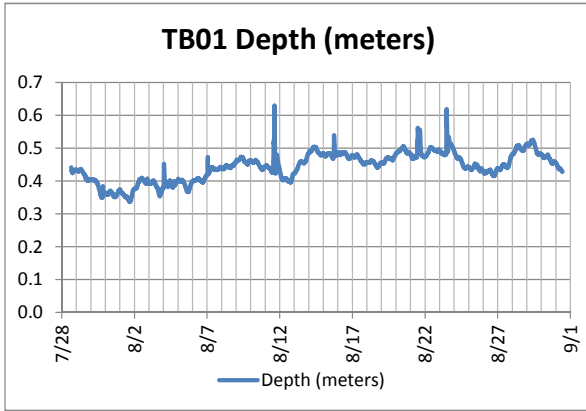
Trout Brook TB01 Sonde Data July 2011 Sonde Results



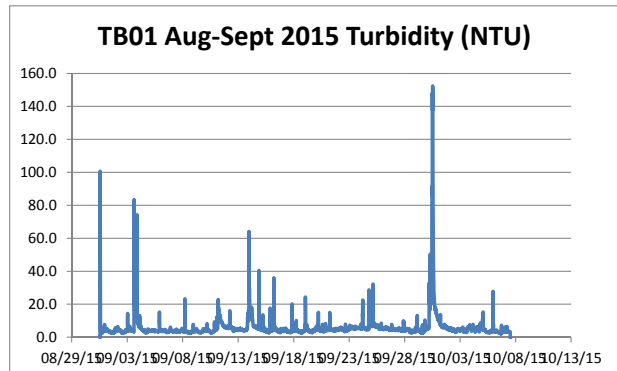
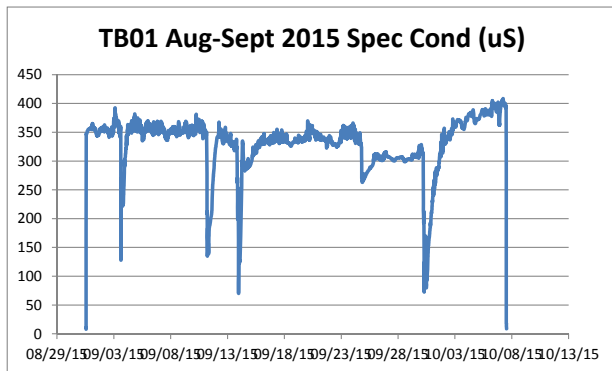
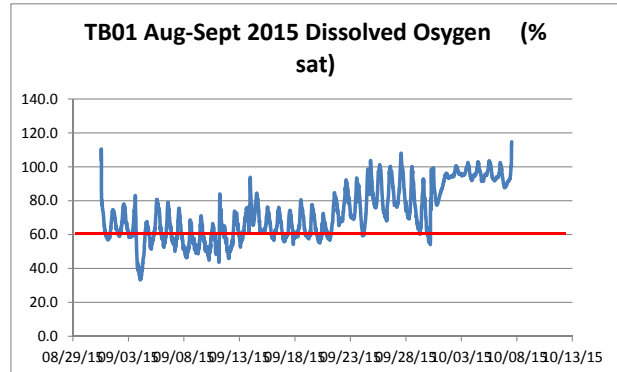
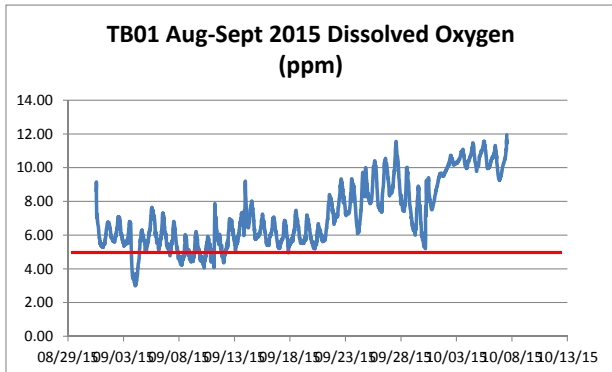
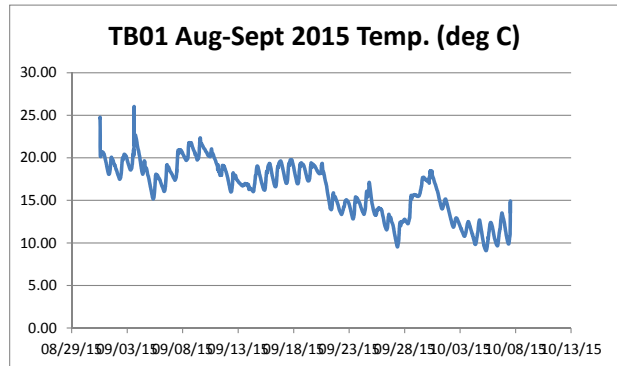
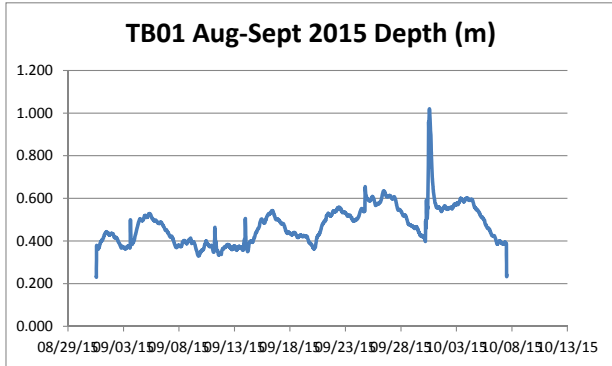
Trout Brook TB01 June-July 2015 Sonde Results

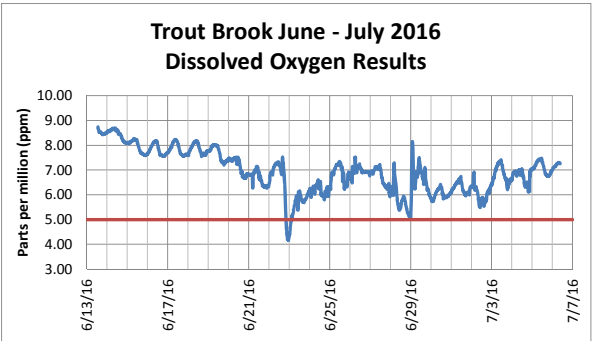
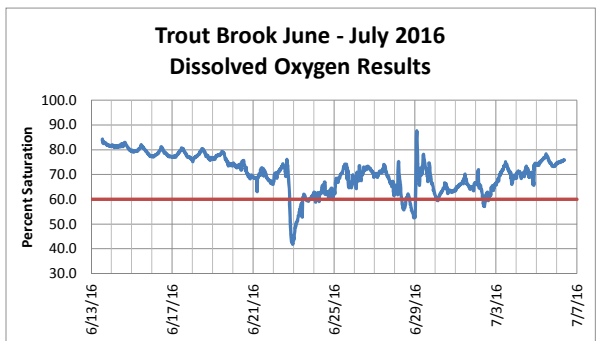
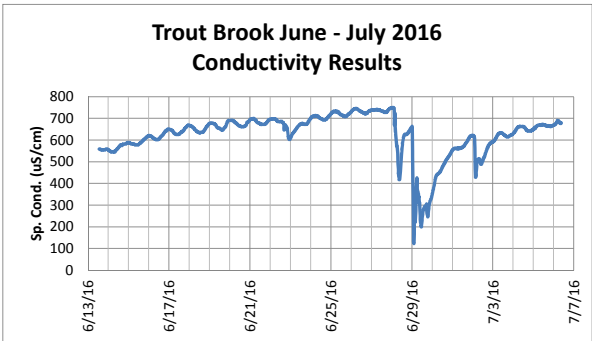
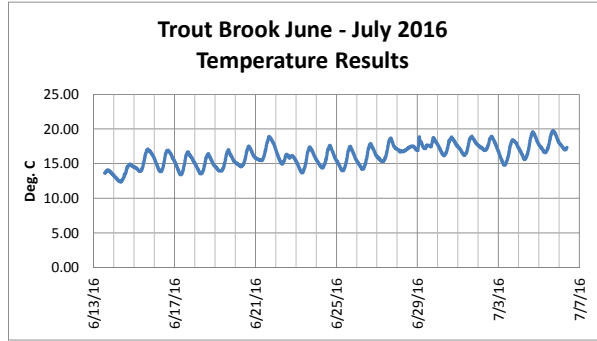
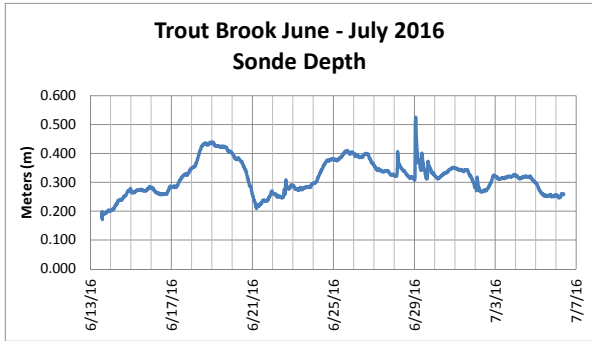


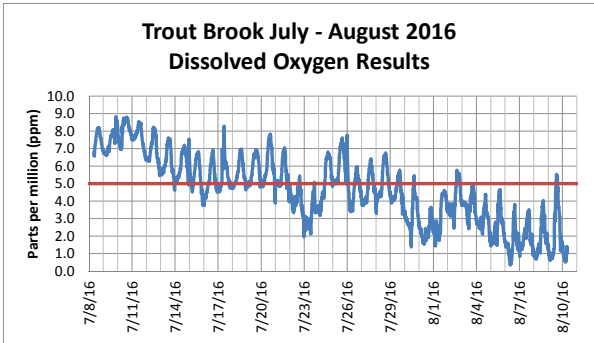
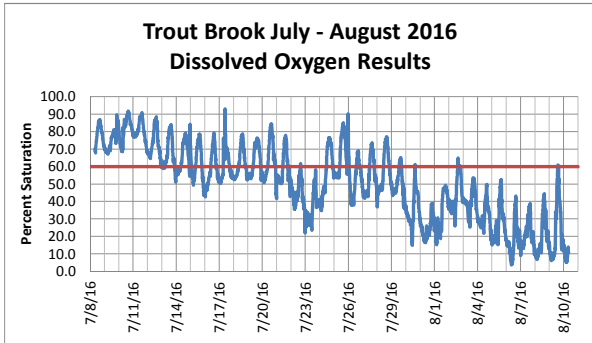
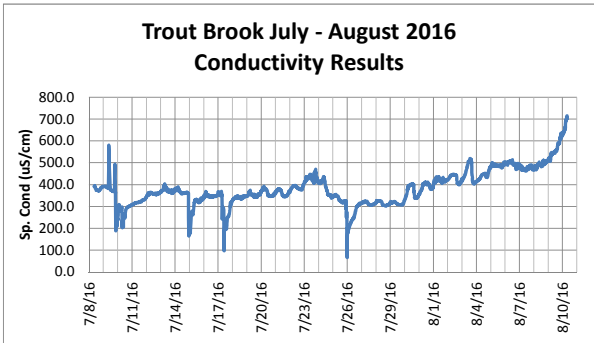
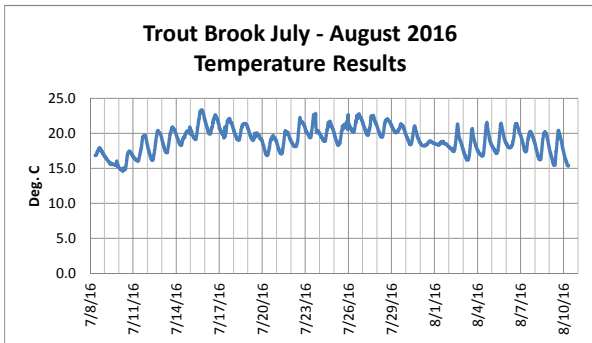
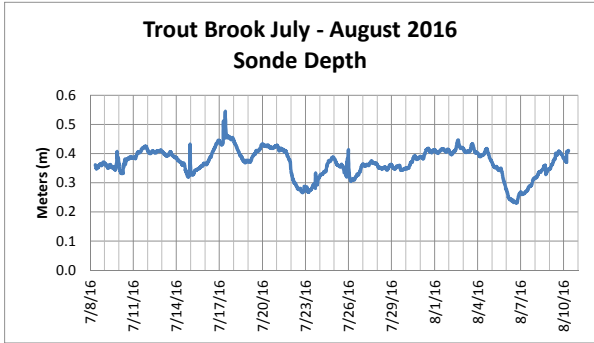
Trout Brook TB01 July-August 2015 Sonde Results

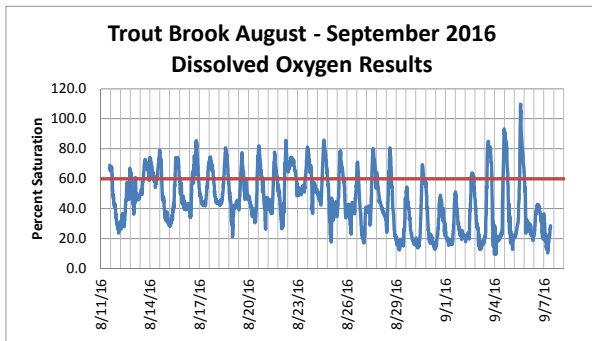
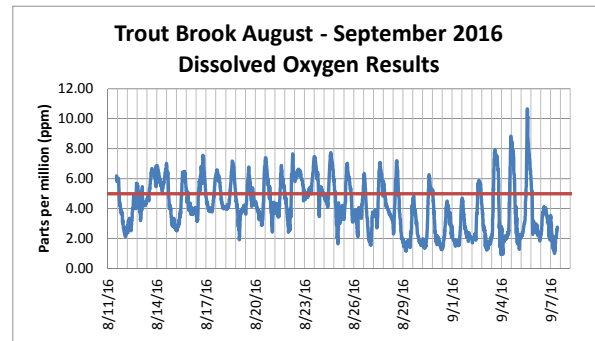
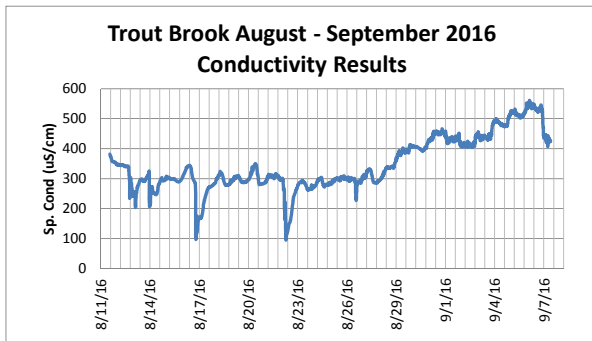
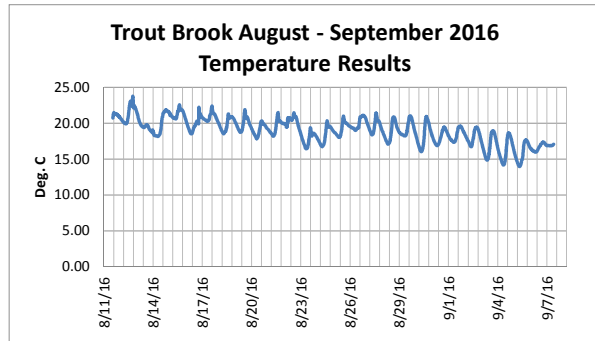
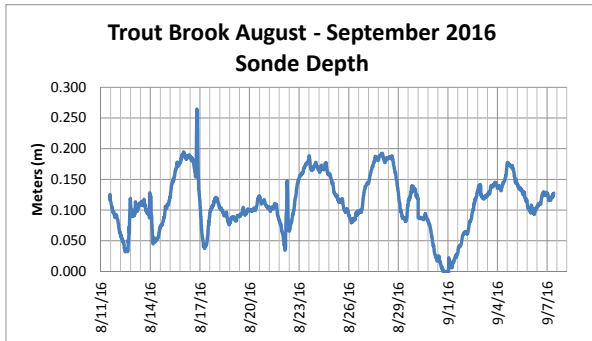


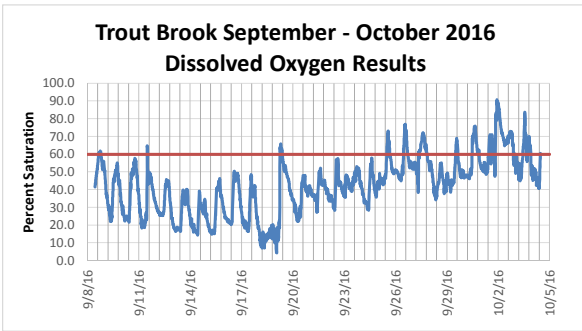
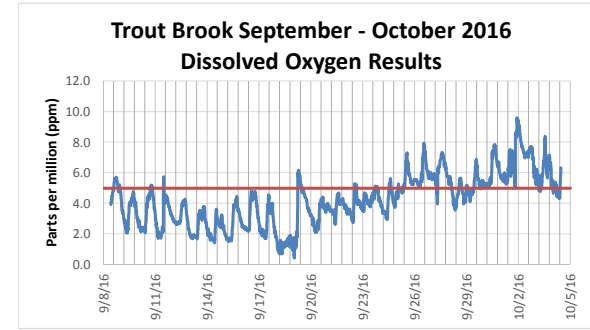
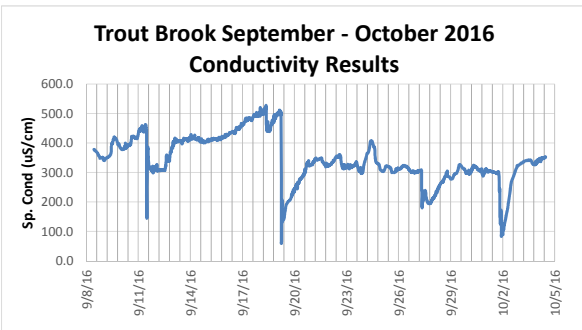
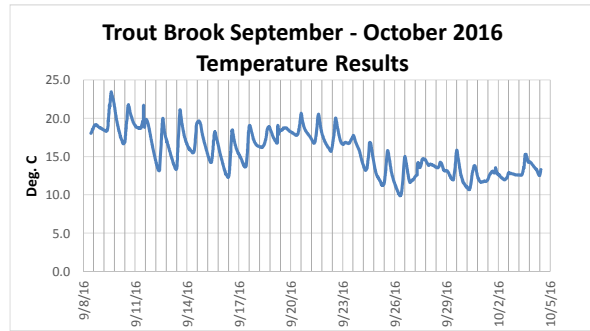
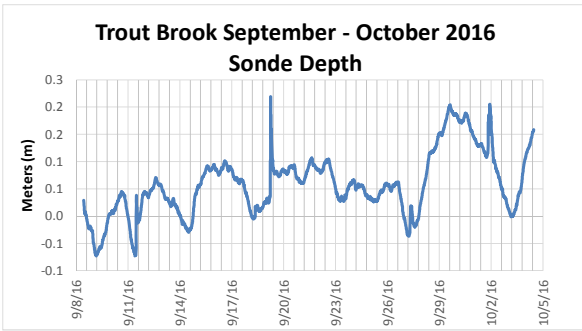
Trout Brook TB01 Aug. - Sept. 2015 Sonde Results











Trout Brook Nutrient Monitoring Summer 2014

