ECCD OUTLOOK

A publication of the Eastern Connecticut Conservation District, Inc. **Summer 2019 Edition**

ECCD Project Protects Latimer Brook

In August, the Eastern Connecticut Conservation completed the installation of a stormwater management practice that will protect Latimer Brook in East Lyme. The project, conducted in partnership with the East Lyme Highway Department and Board of Education, will divert almost 1 million gallons of stormwater per year from a parking lot at East Lyme High School and soak it into deep sand and gravel layers under the parking lot. The stormwater management practice, which consists of three pairs of eight-foot wide by six-foot deep drywells, was installed by Anton Paving & Construction, LLC of Old Lyme. The drywells are connected to the existing stormdrain system under the 1.4-acre parking lot and are designed to infiltrate the first 1-inch of stormwater runoff, which is the portion of runoff most likely to contain the most pollution. A series of three catch basins in the center of the parking lot were replaced with manholes. New catchbasins were installed at 90 degrees to each manhole to collect stormwater runoff. These new catchbasins will divert runoff first to the drywells and then back to the manhole and into the existing stormdrain system if the drywells fill up. Previously, polluted runoff from the parking lot was discharged directly to Latimer Brook with no water quality treatment.

This project is the latest in a series of water quality improvements ECCD has conducted in the Niantic River watershed to improve and protect the water quality of the Niantic River and its tributaries, including Latimer Brook. This project was funded in part by the Connecticut Department of Energy & Environmental Protection through a Clean Water Act Section 319 Nonpoint Source Program grant and funds from the East Lyme Board of Education. A companion rain garden, which was funded by the Dominion Energy Charitable Foundation Environmental Stewardship grant program, was installed in 2018 by volunteers from the Millstone Environmental Stewardship Team.

A section of drywell is lowered into place at a parking lot at East Lyme High School. The drywell will infiltrate stormwater runoff into deep sand and gravel layers under the parking lot.

Anguilla Brook Bacteria Trackdown and Watershed-Based Plan Project

Over the winter of 2019, ECCD launched the Anguilla Brook bacteria trackdown and watershed-based plan project. Approximately 30 stakeholders from the local community, watershed municipalities, land use and shellfish commissions, educational institutions, land trusts, non-profits and state agencies attended a January 2019 kick-off meeting in Stonington to learn about the project and lend their support.

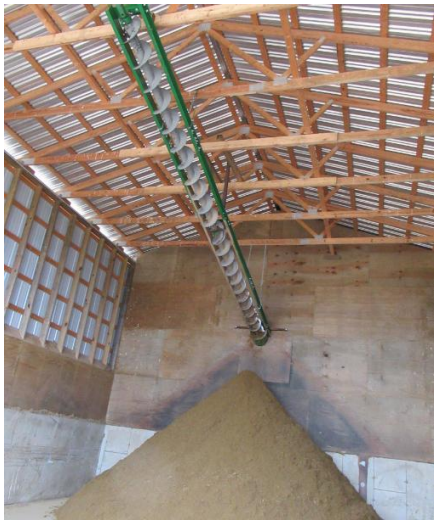
Anguilla Brook is the main tributary to Wequetequock Cove, a tidal estuary of Little Narragansett Bay, located in Stonington. Wequetequock Cove does not meet Connecticut water quality standards for aquatic habitat, recreation or the direct consumption of shellfish due to excessive nutrients and fecal bacteria from stormwater and other upstream sources. Over the next year, community stakeholders will assist ECCD with the evaluation of the Anguilla Brook watershed in order to identify potential sources of nutrients and bacteria that are impacting Wequetequock Cove.

Stream bacteria sampling began in June and will wrap up in August. This sampling will quantify fecal bacteria levels in streams that discharge to Wequetequock Cove and will be used to identify bacteria "hotspots" - areas with high bacteria levels that may be contributing to bacteria levels observed in the Cove. During the mid- to late summer, ECCD and volunteers will conduct stream corridor assessments of several streams that discharge to Wequetequock Cove.

These assessments identify conditions such as stormwater outfalls, excess plant and algae growth, water discoloration and odor, and impacted riparian buffers that may contribute to or be indicative of water quality and stream corridor degradation. This information will be used to develop a watershed plan, which, in addition to identifying natural and cultural resources in the Anguilla Brook watershed, will provide recommendations to reduce the sources of pollution identified during the watershed investigation.

A volunteer documents water quality data during a stream bacteria sampling event in June 2019.

Homeowners and farmers interested in participating in **USDA Conservation Programs** can learn more by visiting USDA's Natural Resources Conservation Service website at: **www.ct.nrcs.usda.gov/**



A screw auger moves bedding from the liquid-solid separator to the storage room.

Fairvue Farm Agricultural Waste Management Practices Project

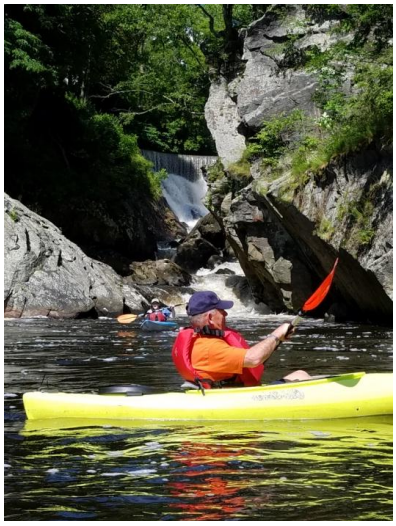
ECCD, collaborating with Fairvue Farm, has completed construction of an agricultural runoff and manure management project in Woodstock, CT. Installing a suite of best management practices on the farm to control and collect manure and agricultural runoff, the project will positively impact water quality in the Little River. The Little River provides drinking water to the town of Putnam and has been designated by the Natural Resources Conservation Service as a National Water Quality Initiative watershed.

Over the past two years, Fairvue has installed subsurface drainage beneath its silage bunkers to keep clean ground water separate from silage leachate. The farm also installed a new concrete floor on the silage bunker, as well as a leachate collection system with a high/low flow separator. Additionally, two concrete receiving tanks and a pumping plant were constructed to manage the leachate and manure. Part and parcel of the pumping plant was the inclusion of a liquid-solid separator to remove the solids from the manure and create a value-added product for the farm -- bedding for Fairvue's herd of dairy cows.

To convey the runoff, leachate and manure to the receiving tanks, an underground piping system was installed. In addition to the receiving tanks, Fairvue constructed two large SlurryStore manure storage tanks. These latter two tanks were funded by the Natural Resources Conservation Service with significant contributions from Fairvue itself. The other elements of the project were funded in part by the CT DEEP through the US EPA Nonpoint Source grant program, under Section 319 of the Clean Water Act. Fairvue Farm also contributed funds, labor and equipment to these practices.

Thames River Basin Partnership Floating Workshop XIX

The Thames River Basin Partnership Floating Workshop XIX was held on June 14. The theme of the workshop was *Discover the Yantic River*. The day began with an optional morning paddle or hike from Norwich Harbor to Uncas Leap led by Norwich City officials. The keynote speaker for the event was Neal Hagstrom of CT DEEP, who educated workshop attendees on the CT DEEP Trout Management Program. After a stop to showcase a newly planted rain garden installed by ECCD and Trout Unlimited volunteers at the Bozrah Town Hall, participants were taught about fly fishing by members of the Trout Unlimited Thames Valley Chapter, water quality monitoring by Project O and riffle dwelling macroinvertebrates by a member of the Lebanon IWWC at the nearby Bozrah Yantic River Trail.



2019 Connecticut Envirothon Winners

Catered & Hosted by: The Country Butcher, located at Spring Meadow Farms, Tolland, CT

Congratulations to all the high school students and teachers/advisors who participated in this year's competition!

First place: Housatonic Valley High School - Team 1
Second place: Rockville High School
Third place: Academy of Aerospace & Engineering

Monitoring and Assessing the Effectiveness of a Woodchip Bioreactor

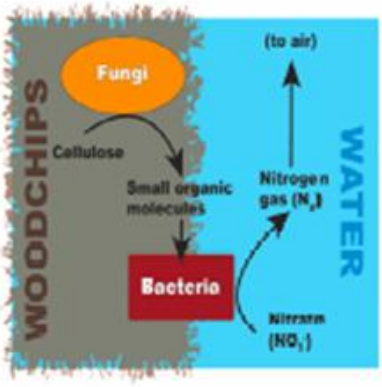
In 2017, a bed of chipped hardwood was installed underground in a plastic-lined chamber to intercept the outflow from an agricultural tile drainage system in a hay field in Woodstock, CT. The woodchips were buried with two feet of soil and planted with grass. This system, known as a *woodchip bioreactor,* uses naturally occurring soil organisms to break down the woodchips, and in the process, uses up the surplus plant nutrients in the drainage water. The purpose of this demonstration project was to verify that this treatment system, successful at reducing soluble nutrients in tile drain flow in other parts of the country, would work as effectively in the Connecticut climate.

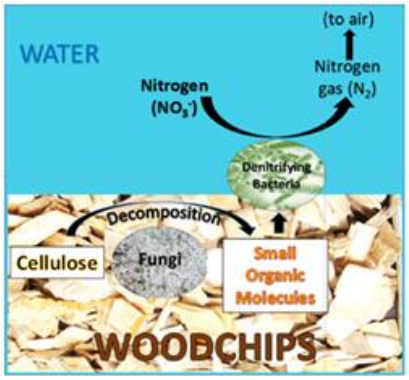
ECCD staff collected water samples from monitoring wells at each end of the bioreactor chamber for a year. The samples were analyzed for Total Nitrogen (TN), Nitrate-nitrogen (NO_3-N), Nitrite-nitrogen (NO_2-N), Ammonia-Nitrogen (NH_3-N), Organic nitrogen (org-N), Total Phosphorus (TP) and ortho-Phosphate (ortho-P). Additional samples were collected for Escherichia coli (E. coli) analysis. Twenty sample sets were collected representing all seasons of the year. Inlet and outlet samples were compared to determine if there were measurable changes between the two samples.

Results from this project showed that the system is very effective at removing dissolved nitrogen from agricultural tile drainage discharge. Total Nitrogen, which is comprised of NO_2-N, NO_3-N, NH_3-N and Organic N, was reduced by a range of 30 – 97%, averaging 76% over the 20 samples. NO_3-N, which is the dominant form of nitrogen in the inflow samples, was reduced by an average of 94% with a range of 41.3% to 100%. The results from the Phosphorus monitoring were variable. Total phosphorus (TP) is comprised of an inorganic soluble form (ortho-P) plus organic forms. The majority of phosphorus measured in the tile drainage was the soluble ortho-p form. Of the twenty sample sets analyzed, fifteen showed a reduction in TP between the inlet and the outlet samples and five showed an increase in TP at the outlet. The ortho-P ranged from a high of 93% reduction to a low of -181%, when ortho-P was sometimes exported from the system. The export of phosphates was experienced in summer after a prolonged dry spell followed by rain. Our summer sampling typically followed rain when there was flow going through the system. Therefore, the export of phosphates was limited during warmer weather by the lack of flow through the bioreactor for much of the summer.

The effectiveness of the bioreactor to reduce Escherichia coli (E. coli) was inconsistent. E. coli is a type of fecal bacteria found in the gut of warm-blooded animals. The simplicity of the testing method of E. coli makes it the preferred test for indicating water contaminated with fecal material. The results of the E. coli testing demonstrated that E. coli can be transported through the soil into the tile drains. The concentration of E. coli detected in the outflow of the tile drains increased significantly after manure was applied to the field in late summer. It decreased to near zero over the winter. It increased somewhat in late spring without any obvious new sources applied to the field. Of the three sample sets following a manure application in late summer, two showed a dramatic decrease of E. coli after going through the bioreactor. One showed a dramatic increase. The sample set that showed the increase was collected two days after a 4" rain storm.

Our conclusion after monitoring the woodchip bioreactor is that it is an effective means to reduce nitrate- nitrogen in agricultural tile drainage. It is not as effective at removing soluble phosphate. A secondary treatment system may be needed. The woodchip bioreactor was not a reliable means to reduce E. coli in tile drain effluent.
ECCD would like to thank the Young Family at Valleyside Farm in Woodstock for hosting this demonstration project and a farm tour to highlight this project to other agricultural producers. This project was funded by a US EPA Clean Water Act § 319 grant through the CT DEEP.





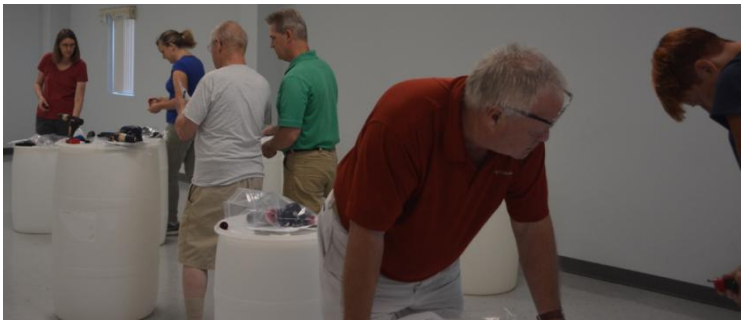
The Shewville Dam steeppass fishway will be the same type of fishway installed down river at Hallville Pond.

Shewville Dam Fishway Design

The District has taken its first steps toward developing an engineered design for a steeppass fishway at the Shewville Dam. On Friday, August 16, Dan Mullins, Executive Director of ECCD, and Steve Gephard, Supervising Fisheries Biologist, Fisheries Division, for the CT DEEP Inland Fisheries, hosted environmental engineering firms for a pre-bid site visit at the Shewville Dam in Ledyard, CT. Responding to a request for proposals, the firms visited the site to gain some preliminary background information about the project. In the coming weeks, ECCD will be selecting a contractor to develop the fishway design. Once selected, the firm will design the fishway in time for permitting during 2020 and construction in 2021. Once constructed, the fishway will extend breeding grounds and habitat for anadromous river herring in the Poquetanuck Brook system, following the breaching of the Straight Pond Dam and previous construction of a fishway at the Hallville Pond Dam. To design the fishway, ECCD received a grant from the Long Island Sound Futures Fund (LISFF) with funding provided by the U.S Environmental Protection Agency. CT DEEP is providing matching dollars to the LISFF grant through a mitigation fund.

Rain Gardens and Rain Barrels for Eastern CT

At the beginning of October, ECCD will be completing its project, Rain *Gardens and Rain Barrels for Eastern CT*. With a grant from the Long Island Sound Futures Fund and funds provided by the National Fish and Wildlife Foundation and EPA, ECCD, with its many project partners, installed more than 40 rain gardens and distributed 151 rain barrels. The District has also conducted 7 rain garden workshops and 6 rain barrel/ water conservation workshops. The latter workshops were sponsored by River Network and the Coca-Cola Company. Many thanks are extended to our funders, sponsors and more than 500 volunteers who made the project a phenomenal success.



Attendees at a workshop in Scotland, CT build rain barrels at the final rain barrel workshop of the LISFF Series.

ECCD Welcomes New Office Manager

ECCD welcomes Francine Brodeur to the District as its new office manager. Francine brings to the District a wealth of experience from the private sector in managing finances and providing staff with technical and graphic design support. The board of directors and District staff are excited to welcome Francine aboard and wish her the best of luck in her new adventure with ECCD.

Outreach Support to ECCD

We extend our many thanks to the following supporters of conservation for their generous assistance and outreach!

- ✧ 2018-19 Water Quality Monitoring Volunteers
- ✧ 2019 Plant Sale Volunteers
- ✧ Andrew Tate Memorial Fund
- ✧ The CT Audubon Society
- ✧ CT Dept. of Energy & Environmental Protection
- ✧ Green Team of Frito Lay-Pepsico, Dayville
- ✧ The Town of Lisbon
- ✧ Gungywamp Land, Inc.
- ✧ Lisbon Conservation Commission
- ✧ Pfizer
- ✧ Stonington Garden Club
- ✧ Ocean State Job Lot
- ✧ Retired Senior Volunteers
- ✧ Plainfield Conservation Commission
- ✧ The Last Green Valley, Inc.
- ✧ UConn Extension System
- ✧ USDA Natural Resources Conservation Service
- ✧ Windham County Agricultural Society, Brooklyn
- ✧ Alexander Lake Conservation
- ✧ Burr Farm, Inc.
- ✧ Groton Open Space Association
- ✧ 1772 Foundation

Town Support

We would like to thank the following towns for their 2018-19 contributions to ECCD which help to support regional conservation throughout eastern Connecticut.

Ashford, Brooklyn, Canterbury, Columbia, Eastford, Franklin, Hampton, Killingly, Ledyard, Lisbon, Mansfield, Norwich, Pomfret, Preston, Putnam, Sprague, Sterling, Thompson, Voluntown, Waterford and Woodstock.

Thank you for your acts of kindness that follow:

♥ ♥ ♥ ECCD wishes to express its respectful appreciation for donations ♥ ♥ ♥ fondly made on behalf of others in the name of conservation.

Alexander Lake Conservation & Re*ntal*s
In Memory of John L. Leader, Jr.

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In Honor of Mike Chapel

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In Honor of Kate's Last Hurrah

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In Memory of Stanley & Jane Sudol

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In Memory of Lori Swanson

ECCD Gives Thanks to Our Supporters

We extend our sincere appreciation to you for supporting natural resource conservation in eastern Connecticut. Your donations truly enhance our outreach and education, while keeping our 36 towns and coastal shorelines evolving into greater health and beauty through sound stewardship.

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