

CHAMPLAIN VALLEY CROP, SOIL & PASTURE TEAM



THE UNIVERSITY OF VERMONT
EXTENSION

WINTER 2020

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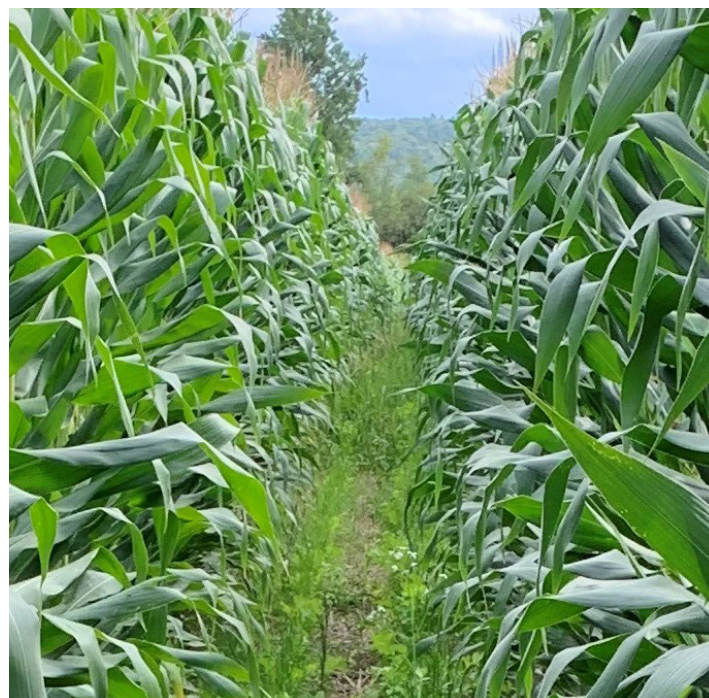
FOCUS ON AGRICULTURE: MAKE YOUR ACRES COUNT

By Jeff Carter, UVM Extension Agronomist

There is renewed focus in the state on farmland, with greater emphasis on wetlands management, field buffers, manure setbacks, farm inspections, accurate crop records and how to value ecosystem services provided by good farming practices.

A good year-end accounting of your farmland practices provides valuable insight as part of the larger story of how Vermont agriculture is adapting. Much has changed in soil management and land conservation over the past several years and this needs to be documented to complete the picture. Conservation practices funded in part by state and federal agencies – Vermont Agency of Agriculture, Food and Markets (VAAFM) and Natural Resource Conservation Service (NRCS) – track the practices paid for including cover crops, manure storage or equipment cost-share very carefully.

This tracking is used to calculate progress towards phosphorus (P) reduction goals and water quality improvements. However, farmers also install many conservation practices without VAAFM and NRCS funding, and until recently the state had no way to account for additional farmer practices in the progress of our collective goals.



We now have a new systematic method to account for soil and nutrient savings these actions provide to meet the Total Maximum Daily Load (TMDL) P goals set by the State of Vermont and Environmental Protection Agency (EPA). Every acre planted with no-till, covered with cover crops, injected with manure to avoid surface runoff, buffered with a new grass strip or grass waterway can and should be counted.

Thanks to the work of VAAFM, NRCS and Stone Environmental over the past few years, the Vermont Partner Database is now operational and will help us capture and give credit to farmers for practices farmers are implementing on their own. Sharing your information with planners will allow us to count your work (see pg 2).

A 2019 test project in Addison County, designed to capture information about the extent of no-till and cover crops at the same time as Farm Service Agency (FSA) crop reporting, included farmers in the East Creek and McKenzie Brook priority watersheds. This worked well, and hopefully this may be a quick method to get a better handle on farmer conservation efforts which change every year.

Our Extension team completed the 2019 field year just as you did - wet, cold and tired. We are wrapping up field trials in gypsum, manure injection, short season corn, and inter-seeded cover crops in 60-inch corn. We are also wrapping up work with Nutrient Mass Balance and P-Index analyses, grant applications for farmer equipment, cover crop and no-till economics, and much more.

We are here to help you with Nutrient Management Planning (NMP) updates, having discussions on current farming and legislation that affect local farmer (Champlain Valley Farmer Coalition meetings), and working with Joshua Faulkner and NRCS on the start-up of the Vermont Conservation Effects Assessment Project (CEAP) project in Addison County.

The Vermont Farm Show is the last week of January. Submit as many crops, maple, wool, home products, honey, wreaths and Christmas trees as you can. Entry tags are available at Extension offices or bring the entries to Farm Show on Monday, Jan. 27, 2020 by 4 p.m.

I hope your New Year is off to a good start.

Jeff

NEWS, EVENTS & INFO YOU SHOULD KNOW

NUTRIENT MANAGEMENT PLANNING (NMP) UPDATE SESSIONS

Did you know your NMP must be updated every year to stay in compliance with the State of Vermont? We hold update sessions for folks who've taken NMP classes with us, and have scheduled sessions on February 4 and February 18, at the Middlebury office, from 10 a.m. to 2 p.m. or call us (802-388-4969) to schedule a time to come in. Don't wait until the last minute! If your plan is out of date we are here to help you. Give us a call before you come in so that we can make sure you have what you need ahead of time!

CERTIFIED SMALL FARM OPERATIONS (CSFO) ANNUAL CERTIFICATIONS

All farms that fall within the State of Vermont's definition of CSFO must submit their certification by January 31, 2020. Examples of CSFOs include farms with more than 50 acres of annual crops or 50 or more mature dairy cows. For more information and to obtain the application form see the Vermont Agency of Agriculture, Food and Markets page, go.uvm.edu/vaafm-csfo.

MANAGEMENT DEVELOPMENT SEMINAR SERIES

Yankee Farm Credit is holding winter seminar series in Williston and Woodstock, Vt. For more information, contact kcoombs@yankeefarmcredit.com, call 800-639-3053, or visit yankeefarmcredit.com/seminar-registration for topics and to register.

VERMONT FARM SHOW, JANUARY 28, 29, 30

Join us for this annual affair and submit your agricultural products for judging and display. Each year the public enjoys the smell of hay in the dead of winter and learns about our state's agriculture. For information on product submission guidelines, contact Karen Gallott in our office at 802-388-4969, or visit the Farm Show website at www.vtfarmshow.com.

AGRITOURISM SURVEY

If you have visitors on your farm for any reason, UVM would like to hear from you! Examples of farm visits include a farm stand, U-pick, CSA, tastings, events, tours, hiking or overnight stays. This confidential survey should take about 10 minutes, and results will be used to develop tools and resources for farmers. Fill out the survey by January 31. Questions may be directed to Lisa Chase at lisa.chase@uvm.edu or 802-257-7967. Complete the survey at go.uvm.edu/agritourismsurvey.

Vermont Partner Database

The Partner Database (formally the Multi-Partner Agricultural Conservation Practice Tracking and Planning Geospatial Database) is a conservation tracking and planning tool administered by the Vermont Agency of Agriculture, Food and Markets (VAAFM). Conservation planning organizations including (but not limited to) University of Vermont Extension, the Natural Resource Conservation Districts (Districts), and the Vermont Association of Conservation Districts have access to the Partner Database to plan and track conservation practices implemented on farms. On an annual basis, these practices will be aggregated without identifiable farm information and sent to the Vermont Department of Environmental Conservation (DEC) to report nutrient reductions from agriculture towards meeting Total Daily Maximum Loads (TMDLs) required by the Environmental Protection Agency (EPA). Providing information related to conservation practices implemented on your farm, both with and without financial assistance, will help account for a more comprehensive account of the work farmers across the state are doing to improve water quality in Vermont.

Judson Peck, VAAFM
Water Quality Specialist
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NO-TILL AND COVER CROP SYMPOSIUM "GOING DEEPER FOR SOIL HEALTH" FEATURING DAVID BRANDT AND SCOTT MAGNAN WEDNESDAY, FEBRUARY 26, 2020 8:00 A.M. – 4:30 P.M.

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REGISTRATION DEADLINE IS FEBRUARY 21, 2020. THE FEE IS \$75 PER PERSON.
REGISTER ONLINE AT GO.UVM.EDU/NTCCS.



UVM has a new Non-Credit Course Catalog registration process. All payments need to be done online via this registration system. If you do not wish to use a credit card online, you must call UVM's Non-Credit Course office and register over the phone, 802-656-8407. USD funds only, if paying with check or cash. Register online at go.uvm.edu/ntccs.

There are no conference fee refunds. Call Karen Gallott at 802-388-4969 ext. 330 or 1-800-956-1125 with questions, or to request a disability related accommodation to participate in the conference, by January 31, 2020.

NO-TILL AND COVER CROP SYMPOSIUM (CONT.)

SPEAKERS

David Brandt farms 1,150 acres in Carroll, Ohio and utilizes cover crops and no-till to promote soil health. He is a cover crop seed dealer with Walnut Creek Seeds and has been profiled by NRCS. David has worked with and received awards from many conservation and farming groups, and is committed to participating in research.

Scott Magnan runs Scott Magnan Custom Services of St. Albans, which offers mowing, bunk packing, round baling, and manure spreading for farmers. The company is active in water quality practices, working with farms to help with state compliance and funding.

David and Scott are this year's featured speakers, with additional presentations by researchers and farmers. The Symposium is sponsored by University of Vermont (UVM) Extension's Champlain Valley Crop, Soil and Pasture Team in Middlebury and the Northwest Crops and Soils Program in St. Albans.

SYMPOSIUM AGENDA

UVM Extension:

Research results from UVM Extension projects with manure injection, tile drainage, cover cropping, no-till, interseeding, 60-inch corn and MORE! Updates from the field.

David Brandt – Plenary Session on Soil Health at Work:

Hear from this soil health champion on how he has made soil health a primary driver of a profitable cropping system on his farm for several decades. Want more? Attend his breakout session to ask specifics.

Scott Magnan – Plenary Session on Precision Agriculture:

Precision agriculture can play an important role on any farm, but especially on farms which use no-till, cover crops and manure. Scott will share the powerful ways to use it on Vermont farms. Want more? Attend his breakout session for a roundtable discussion and troubleshooting session.

Farmer Panel:

Jeff Sanders (UVM Extension) will facilitate a panel of successful no-till and cover crop farmers from Vermont on how they manage the "pinch points" of their cropping systems, and how they have navigated through these challenges to make improvements and refinements to maximize the benefits of these systems. Bring your questions!

Breakout Sessions: Roundtable Discussions

No-Till and Cover Cropping - David Brandt

Precision Agriculture - Scott Magnan

Are you making \$\$ with No-Till Cover Cropping - Betsy Miller

No-Till Manure - Eric Severy

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Attention Graduate Students – Seeking Poster Submissions

Share this information widely! Graduate students involved in regional (Northeast) research on cover crops, no-till or reduced tillage, and/or soil health are invited to submit a poster to present at the annual UVM Extension No-Till and Cover Crop Symposium. Research can involve any agricultural crop, though the focus of our symposium has traditionally been on dairy forages and grain crops. The poster session will be held during registration and two exhibitor/poster sessions throughout the day. Poster submission deadline is January 24, 2020. Students receive a discounted entry fee, but must register by calling our office.

EXHIBITORS

A&K AgriServices | Bourdeau Brothers of Middlebury | Casella Organics | Champlain Valley Farmer Coalition
Franklin & Grand Isle Watershed Alliance | Resource Management (RMI) | USDA-Risk Management Agency



NOW IS THE TIME TO REVIEW AND REVISE BUSINESS PLANS

Jake Jacobs, UVM Agricultural Risk Management and Crop Insurance Education

Winter is a good time to review business plans and make changes. What measures are in place to moderate the five areas of agricultural risk on your farm? Here is a risk management plan checklist:

- Have the primary sources of risk been identified and classified?
- Have the risk outcomes and their likelihood or probability of occurring been estimated?
- Has the financial capacity of the business or ability to bear risk been evaluated?
- Have the risk tolerances of the business operators been considered?
- Are risk goals written, and are they specific, measurable, attainable, relevant, and timed (SMART)?
- Have the goals been shared with everyone involved in the business?
- Have risk tools and strategies been identified to help manage risks which could prevent achieving established goals?
- Has a confident relationship been established with a team of risk management advisors, so they can help assess and manage business and personal risk exposure?

Farmers regularly rely on the input and advice of various professionals who provide services and consultation such as nutritionists, veterinarians, Extension educators, agronomists and financial advisors. These individuals contribute their expertise to your overall enterprise management. Have you ever gathered all of these team members to meet at one time? Consider how bringing all information and perspectives together can provide cohesive input across all facets of farm management.

When it comes to moderating production and market risks, crop insurance is one of the tools available to producers. Anyone who came into the 2019 crop year feeling unsure about potential weather impact on crops got a loud and clear answer – a relentless, wet answer. An indemnity payment cannot replace a good harvest, but farmers who had crop insurance with prevented planting coverage were able

5 AREAS OF AGRICULTURE RISK:

- **PRODUCTION**
- **PRICE OR MARKET**
- **FINANCIAL**
- **INSTITUTIONAL**
- **HUMAN OR PERSONAL**



to recoup some of their losses. Do you know what crop insurance is available through the Risk Management Agency for your farm? The 2018 Farm Bill includes a number of changes to crop insurance programs, making some improvements to existing insurance products, creating some new insurance options and strengthening outreach and compliance. Take some time this winter to learn about what is available so you can make an informed decision to enroll or not.

To get information on crop insurance contact a crop insurance agent, visit the UVM Agricultural Risk website (go.uvm.edu/ag-risk), or contact Jake Jacobs, director of the UVM Agricultural Risk Management and Crop Insurance Education project. If you would like assistance setting up a meeting of your farm management team members, contact Jake at jake.jacobs@uvm.edu.

SPOTLIGHT ON MCKENZIE BROOK WATERSHED: ELYSIAN FIELDS

By Cheryl Cesario, Grazing Outreach Professional

Joe and Kathleen Hescoc, along with their daughter Tirzah, own and operate Elysian Fields in Shoreham, Vt. The milk from their 320 cows is shipped to Horizon Organic, their milk buyer since 1997. The Hescocs manage a total of 600 head on 1,350 acres in the priority McKenzie Brook watershed.

The McKenzie Brook watershed is located in southwestern Addison County, comprising an area of approximately 21,000 acres. The area of the lake that the McKenzie Brook watershed drains to has some of the highest total phosphorus concentrations of any lake segment. This watershed, along with East Creek just to the south, and three watersheds in Franklin county, are receiving prioritized technical and financial assistance from NRCS over five years to assist the state in meeting the phosphorus TMDL for Lake Champlain.

As a pasture-based dairy, the Hescocs are committed to grazing. Their goal is for the milking herd to obtain 50% of their dry matter intake from pasture during the grazing season. The minimum required by the USDA organic regulations is 30%, but Joe and Kathleen see value in both feed savings and animal health by surpassing that benchmark. The two milking herds are moved to fresh pasture after every milking. Joe figures he needs a little more than one acre per cow as the overall stocking rate, (approximately 350 acres of pasture) to support the milking herds. Heifers go out to pasture at six months, obtaining all their feed from grazing in a rotational system. Heifers are kept in groups of 30 to 40 depending on age class and some are part of a leader-follower rotation with the milking herds.

The farm produces mostly haylage plus some dry hay and wrapped bales. Besides forages, Joe also grows hard red winter wheat, high moisture ear corn, barley and peas. The wheat is typically sold for milling, the ear corn is fed to the milking herd, and the barley and peas are blended for the calves. Joe relies on long-term rotations, typically 7 to 8 years, in hay before an annual crop. The longer



rotations are part of his fertility management and he gets better soil aggregation this way. He says, "I know our strength. We do a good job keeping soil aggregated and keeping soil on our farm."

"I KNOW OUR STRENGTH. WE DO A GOOD JOB KEEPING SOIL AGGREGATED AND KEEPING SOIL ON OUR FARM."

--JOE HESCOCK, ELYSIAN FIELDS

The Hescocs have utilized NRCS programs to help establish the infrastructure needed for management-intensive rotational grazing. In 2019, Joe says he was able to add 70 acres to his grazing system with the help of NRCS cost-share funding. He decided to take this acreage out of his rotation and keep it in perennial pasture forage.

Joe says this heavy clay parcel was "impossible in a rotation" to keep the soil loss under "T" (T meaning "tolerable" soil loss, to still maintain productivity) when it had annual crops, so it was an easy decision to keep it in perennial cover. Some of the practices included in the NRCS grazing contract included seeding (forage and biomass planting), high tensile fence, water line and water tubs, plus a laneway for easier accessibility. The 70 acres is adjacent to 120 acres already used by the second milking herd, so he will be able to support more cows on this acreage with the pasture expansion.

Joe says that while it is typical to look at per-cow output, he only does this during the winter. During the grazing season, he looks at output on a whole pasture basis, or milk per-acre. He says he can run cows at 120% of his capacity during the grazing season and this has significant economic benefits.

If you'd like help from Cheryl to implement or improve your grazing, contact her at 802-388-4969 ext. 346 or cheryl.cesario@uvm.edu.



MODELING WATER QUALITY: WATERSHED RESEARCH SHEDS LIGHT ON BASELINE CONDITIONS (PART ONE)

By Kristin Williams, Agronomy Outreach Professional

This article is written in partnership with Blaine Hastings and Angie Allens of the Department of Environmental Conservation (DEC), and is the first part of a two-part article describing this research in McKenzie Brook from 2017 to 2018 modeling baseline in-stream water quality, precipitation and streamflow.

How are water quality goals established?

The State of Vermont has a TMDL (Total Maximum Daily Load) regulation which the state is obligated to follow (per the EPA). This tells us how much phosphorus (P) should be entering Lake Champlain, and has influenced many state actions including the Required Agricultural Practices (RAPs). A TMDL might seem like an arbitrary value but the science behind it is very complex based on landscape modeling and water sampling data. If you are not familiar with "State of the Lake" report which describes basic water quality indicators in the lake, you can read more about this through the Lake Champlain Basin Program (sol.lcbp.org/en). It's understandable that folks may have skepticism about models since they are never perfect representations of reality. However, they are essential tools which enable environmental scientists to make meaning out of our world and determine best practices because it is literally impossible to directly measure everything. Of course some models work better than others at representing reality, and this is mostly due to the quality and quantity of data (related to the amount of money and time available) along with the correct analysis of that data. And of course, models are often improved upon through time as scientists collect more information and check model predictions against real world outcomes.

Why use a local watershed approach?

There has been increased focus on smaller Lake Champlain sub-watersheds in recent years, as many suspect that if we can focus work on specific areas and make substantial gains in those areas, we can make progress in meeting our lake-wide goals. The Natural Resource Conservation Service (NRCS) embarked upon a Strategic Planning Process by which they focused financial resources and technical assistance to specific smaller watersheds (view more at go.uvm.edu/nrcs-lcswpa). Our team continues to be a part of this program through grant funding. At the same time this process was underway, we began looking at the water quality data the DEC has available on their website, and asking site-specific questions. Attempting to improve lake water quality is a slow-moving process because of many factors, including the lag-time from practice implementation to water quality improvement, and other factors



such as climate and legacy P which cycles in the lake and impacts algae blooms. However, planners can look to in-stream data and models of changes in practices to see if progress is being made towards our loading reduction goals. As we began this work, we wanted a "baseline" dataset to use as a reference point.

Why McKenzie Brook Watershed?

McKenzie Brook Watershed is part of an area that drains directly to Lake Champlain, in what is called Lake Segment A, and where the TMDL requires a 60% reduction in P loading. We became increasingly interested in collecting data on McKenzie Brook and it is one of the locations we have focused on, with NRCS grant funding. McKenzie Brook encompasses approximately 21,000 acres with small sub-watersheds draining directly to the Lake, and about 16,350 are estimated to be used for agricultural production. The size, geology, stream types and relative land cover/land use within this study area differ considerably from other monitoring and loading studies conducted the Lake Champlain Basin. With financial support from the Lake Champlain Basin Program, the DEC designed a study to further investigate P loading in McKenzie Brook Watershed, and I participated in water sampling for the project.

How is total phosphorus (P) loading measured or estimated?

Water quality data is mostly based on what are called "grab samples" where a trained employee or volunteer goes to the stream and takes a sample at a given moment in time. It is important to determine concentrations of various substances in our waters, as they inform us about the health and status of the stream or lake into which it flows. However, nutrient loading or total delivery of a mass of that nutrient to a stream or lake is based on the concentration at a given streamflow rate and then totaled for a given time period. Without streamflow you don't actually know if a high concentration is resulting in high loading. For example, a moderate concentration with sustained flows can result in greater loading to the lake than high concentration with low or intermittent flow. So we need streamflow in order to get a handle on how grab samples related to TMDL goals. Measuring continuous streamflow estimates are much more difficult to gather than individual grab samples.

At scale it is extremely cost prohibitive, particularly when combined with water sampling at short repeated intervals (as is done in much smaller edge of field studies). Therefore, loading is often estimated based upon modeling, and we wanted local data on flow to calibrate a streamflow and loading model specific to this study area.

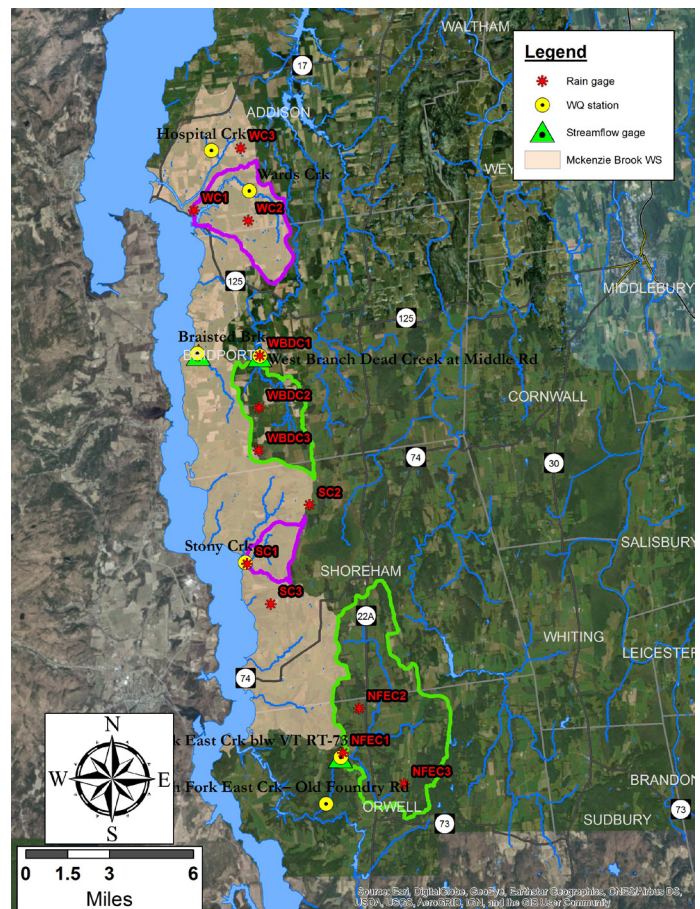
What methods did we use to estimate flow and loading?

Since practicalities require some ingenuity, we decided to model streamflows across the watershed area by measuring streamflow at a reduced number of locations, and utilize precipitation and landscape data to inform the model. It is common to estimate in-stream flow from precipitation, and much research has already been done to validate this approach. DEC designed a study whereby we would continuously measure rainfall at 12 locations in the watershed, along with collecting grab samples at 7 locations, done by a person going out weekly to capture both rain events and normal or baseflow (whereas regulatory sampling is specifically on baseflow). The DEC also installed streamflow monitoring at two locations. The concept was to mathematically relate the streamflow at the two measured locations with the rainfall to get an estimate of flow throughout all stream sites (April-November). From this streamflow information, we could then estimate loading at all sites based upon grab samples. Even with this study design we had limited options for flow measurements based on stream features. We actually ended up measuring streamflow at two streams that were directly next to, but not in the watershed. Therefore, the project scope was the McKenzie Brook Watershed, plus some adjacent waters. We helped folks at the DEC connect to farmers and other landowners to set up local rainfall gauges which the DEC maintained. I assisted with water sampling in 2017 and 2018, and the DEC analyzed the data in 2019.

What did we find and what is the use of these results?

We found rainfall in 2017 above normal in spring-summer, and normal or below normal in the fall. There was also a substantial rainfall event in July. In 2018, rainfall was above normal in April and November but well below normal in the summer, including many times when the streams were not flowing at all and therefore no water samples could be taken. Looking monthly, rainfall at all

locations was fairly similar with some exceptions. One consideration was whether there is a rain shadow, an area where precipitation doesn't fall. Some indications that this might be the case in 2017 were not as strongly present in 2018. Stony Creek in Shoreham had approximately two inches more rain in June 2017 than at other locations, one to two inches more



in July 2017, and one inch more in August. Other locations didn't vary as much from each other, though during that heavy month in July an inch more fell in some locations.

In 2018 the pattern did not continue, though there was substantially less rain during those months. Flow measurements were weakly correlated with high concentration events. The modeling equation DEC used is called the "Beale ratio with flow adjustment" and was chosen as the best-fit given the particular results, which suggested better accuracy than a regression or modified regression. Of the two measured sites, the North Fork of the East Creek (NFEC) in Orwell had maximum daily flows over twice that of West Branch of the Dead Creek (WBDC) in Bridport, and April flows approximately three times that of WBDC. It is useful to note that the drainage area of NFEC is more than 2.5x that of the WBDC. The estimated flow measurements of the other creeks also varied a good deal. We were able to measure more water quality events in 2017 with greater flows, whereas in 2018 streams ran dry or stagnant for a long period of time. Given that loading is a combination of flow and concentration, we found that the NFEC (at two places, where we measured and where we modeled flow) had the greatest total P loading in 2017 (April 1 to Nov 30), whereas in 2018 WBDC had the greatest total P loading (April 1 to Nov 30). On a per-acre basis (based on drainage area calculation), Hospital Creek had the greatest loading in 2017, while WBDC had the greatest loading in 2018.

What does this mean? We will look more closely at the results and how they might be used in an upcoming newsletter article (part 2).





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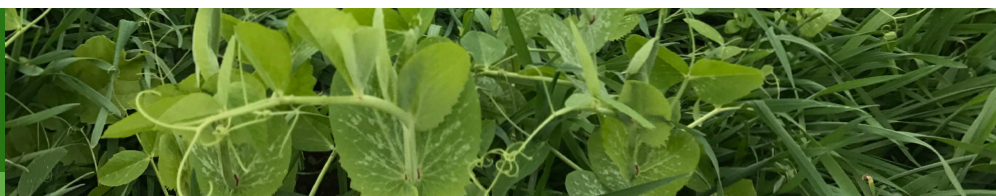
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