Today on Across the Fence Vermont school kids are getting hands-on lessons in aquatic science. The University of Vermont Watershed Alliance provides curriculum, equipment and instructors all for the benefit of Vermont kids. Good afternoon and thanks for joining us; I am Judy Simpson. Our goal this afternoon is to help connect you to the watershed you live in and to make you aware of the citizen science programs that the University of Vermont Watershed Alliance offers to schools and other youth groups. In just a moment we are going to explore a hands-on model of the Lake Champlain watershed but first I want to introduce Erin De Vries. Erin is the Aquatic Science Literacy Educator and coordinator of the UVM Watershed Alliance. Welcome.

Erin.: Hi; good morning.

Judy.: What is the UVM Watershed Alliance?

Erin.: The UVM Watershed Alliance is a partnership with UVM Extension, Lake Champlain Sea Grant which is a national program and the Rubenstein School of Environment and Natural Resources. The watershed alliance program is an educational program, mainly the go-to program in Vermont for teaching watershed science to middle and high school kids in the Lake Champlain basin.

Judy.: One of the most basic things that you teach is knowing your watershed. And you brought along a map for emphasis?

Erin.: I did yes. Judy what you see here is the entire Lake Champlain basin. This is the Vermont side and this is the New York side and the northern side portion of the basin is Quebec. This is the area that I focus on with students, learning about what is a watershed what their watershed address is. Everyone has a watershed address. Starting from the top part of the map here we have Missisquoi basin where there's a lot of farms. Franklin County is in the Missisquoi basin. Moving further down we have Lamoille watershed we're here in the Lake Champlain direct watershed but the Winooski River watershed flows from around here in Cabot all the way to the Winooski River.
Judy.: I think is really interesting because if you live in Cabot you could say I'd can't even see Lake Champlain of how can I possibly be in that watershed?

Erin.: Right but it's just the way the topography of the land has been shaped over tens of thousands of years. Millions of years really that a drip of rain coming down from Cabot eventually makes its way through different tributaries into the Winooski River which then flows into Lake Champlain. It's interesting that you can be in Cabot but you're really part of a larger system here.

Judy.: Once we know our watershed you have a hands-on model that explains how the watershed works.

Erin.: This is the watershed model that we bring into the classroom. It's sort of the introduction to what a watershed is. We have a number of different land uses that we focus on with the students. We have a farm and none of the things on here are typical to scale or particular to Vermont but it gives a good representation. We have a farm a residential area some development over in the corner roads of course. We have a fisher person here catching fish we have an industry than some forest. Kids always have a good time with this because we allow them to put different what we call nutrients or types of pollution onto the land. So for example road salt this time of year they put a lot of road salt on our roads to break up the ice. So we put road salt. Some people have grubs and whatnot on their property of some people put pesticides on their property to get rid of the grubs. That's something we want to avoid but we show them what's happening. Farmers use fertilizer. And then the rains or its snows and we have them using the squirt bottle here. We'll have a few of them when we do this in the classroom and make your rain and then we start to see that the road salt and material flows into the lake into the roads and we talk about how we can reduce those nutrients from getting into our rivers and into the lake. Those are called best management practices (BMP’s) and we work throughout this landscape to put those BMP's in place.

Judy.: So the UVM Watershed Alliance offers three different school-age programs and one of them is called Lake Champlain Live. How does that work?

Erin.: That is a trip on the research vessel Melosira which is UVM's research vessel. We go out for about 2 hours onto Lake Champlain and we do a nice long tour talking about the watershed showing them the map and we collect plankton and we collect aquatic invasive species. We talk about water quality testing in the lake so we look at the nutrients that are in the lake. We talk about the food web of life. What fish eat other fish and what do we eat from the lake and then we talk about the issues surrounding Lake Champlain and how we can best manage those as best management practices.

Judy.: Is that for the students or for the teachers.

Erin.: That's for the students.

Judy.: Really they get a chance to go out?

Erin.: Yes it's a 2 hour lab as I said. They are on the boat for those 2 hours doing their own testing. Off the side of the boat looking at how clear the water is collecting plankton samples we
have scopes on the boat so they can look and start to identify plankton with. We’ve some photos coming out now of students identifying the different plankton. I’m not sure if there's a photo but we have some big tubs where we collect invasive species like zebra mussel from the lake and other plant material that comes up with it and we start to measure in identify what's down in the bottom and talk a little bit more about reducing those elements in the lake that are causing an impact.

Judy.: Why is it important do you think for kids to get a hands-on experience and what they learn when they're actually looking at the things they've collected in the microscope.

Erin.: That's a good question I think it's really important because it gives the students a sense of place in their environment and because it's so hands-on and they're actually seeing it and it's not just lectured to them or they're looking at it in a book that there actually scientists themselves when they’re on the boat looking under the scope and using the charts that we have to identify organisms. I think it gets them excited about learning science which I think it is amazing.

Judy.: There's learning science and there's hands on learning which is a whole different thing. It's not just the book but you also get to see for yourself what's going on.

Erin.: Sure.

Judy.: You also offer a program called Stream Monitoring and Stewardship. We're going to see in some of the pictures that you brought along that that program is very hands-on as well.

Erin.: Right yes. Here's some photos of students from Edmonds Middle School last year getting out. We have some kick nets that I will show you in a minute where they’re collecting bugs in the stream and here's a teacher and students identifying or trying to identify some of the bugs they've caught from the kick net. This program is our most popular program because there's in classroom time but the majority of the experience is out in a local stream. The students were at Potash Brook just right down the street from where we are today. They are taught in the classroom what these bugs represent. They represent the health of their local stream so the students are getting out into the stream playing around in the spring summer and fall. They can now know what's living in their stream and how healthy that stream is. Here's one of our cards we have I believe this is a student who said “This is it!” after he read about it, and looked at it and we have some magnifying lenses that they use to get up real close to identify the bugs. That's a stone fly right there.

Judy.: Who doesn't love bugs?. So the program as you mentioned also introduces kids to some of the equipment that's used in this kind of research and you brought some along with you.

Erin.: These are always quite fun: the lobster gloves as we call them. The kids go out into the stream and they are scrubbing rocks if they're not using the kick net. Here it is; this is a kick net that they would put into the stream and kick it with rubber boots that we have and try to get some of those bugs off the rocks and from out of the muck in the stream. Then they dump it into a tub and that's where they start to identify what's actually living in the stream. This I also brought along is a turbidity tube and it really is just measuring water clarity. The students will get into the stream and fill it up to the top and at the bottom there's a disc that's black and white. They have their partner release some of the water and measure how clear the water is based on how soon or when they can see that black and white disc. This is a really handy tool that professional
scientists use as well. It's a neat for the students to be using equipment that professional stream ecologists use.

Judy.: You mention there's an outreach or a watershed stewardship program that's required as part of this. Can you give us some examples of that?

Erin.: Sure the Stream Monitoring and Stewardship Program requires the schools and the students to work with a community partner and sometimes that's a natural resource conservation district or a nonprofit organization or a watershed group. They work together to develop we have stewardship projects where they're actually going out and removing invasive species like buckthorn and honeysuckle. Then they will plant some trees in place of those invasive species along the riparian area or river corridor. Another type of stewardship project is an outreach where students create topical brochures for their schools and give presentations to the school to younger students. We've had high school kids creating posters and presenting them to middle school students so educating the younger scientists of the crowd and we've also had U-32 present at the Montpelier Conservation Commission. They've been studying water quality in the Winooski River for over 15 years I believe. They present every year to the conservation commission what they've learned and their results.

Judy.: Have you mention the riparian project. I know we have some video of a school project doing just this. Maybe you can explain what the kids were doing?

Erin.: This video is them out. Those are some crayfish they've caught in Williston this is actually them out in the stream doing their lab and identifying the organisms and then they worked with the town planning commission to plant some trees and remove honeysuckle. But see if we get to them a little bit but this is just them out there identifying. We use ice cube trays and they put different organisms in different cubes.

Judy.: It's easier to study. You have a third program which is newly updated it's called Keeping the Balance tell us what that is?

Erin.: Keeping the Balance – I am really excited about this spring. We have just finished updating it yesterday actually. It's typically done in the Rubenstein Laboratory which is down on the waterfront next to Echo. We have a big food web activity that we play with string and the students are representing different organisms in the lake. Then we have them talk about eutrophication, algal blooms of which happen in the summertime I'm sure you've heard of. Then we have this game where we talk about solutions to the pollution. So all of our different programs are pretty similar. It’s aquatic science literacy that we're trying to build and teach watershed science. We have the students looking at plankton in the Keeping the Balance lab so they've gone and collected it from the slip. They come back inside and start to identify these very small organisms that feed the rest of the lake. Keeping the Balance is us teaching them how we can keep the balance in the lake so it doesn't become too polluted or nutrient rich.

Judy.: What kind of feedback do you get from the students and from teachers?

Erin.: I get some really good feedback actually. Last fall I had a student come in off a Lake Champlain Live lab, she looked around the laboratory and she said this is what I want to do. I want to be a scientist and I want to go to UVM and I want to be in the water and learn about what's in the lake. That’s exactly what we had just done and she got so excited about it. It was
one of those shining moments. I was so happy that she had that ah ha moment. Also when we're in the classroom kids are so excited about this model and when we go out into the stream they want to get in there. Sometimes it's hard to hold them back for a minute or two before they are diving in and collecting their data.

Judy.: If someone is interested what should they do to get more information?

Erin.: They should contact me; my name is Erin De Vries UVM Watershed Alliance you can find us on the web. My phone number is up on the screen right now. Our programs begin in the spring around the end of April and run until the snow flies in November. So give a call soon.

Judy.: Excellent Erin and thanks so much. That's our program for today. I'm Judy Simpson we will see you again next time on Across the Fence.

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