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# NA2747 Molly Schauffler, interviewed by Adam Lee Cilli

Molly Schauffler
*Co-Principal Investigator; University of Maine, Orono*

# ACCESSION SHEET
# Maine Folklife Center

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**Description:** **2747 Molly Schauffler,** interviewed by Adam Lee Cilli, February 10, 2014, in her office in Bryand Hall at the University of Maine, Orono. Schauffler talks about her research on spruce firs throughout Maine; her work with science teachers in data collection and interpretation; her pedagogical philosophy; the Climate Change Institute's role in educating the public on climate change; and the CCI's role in influencing climate change policy.

Text: 7 pp. transcript
Recording: **mfc_na2747_audio001** 36 minutes

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**Restrictions**

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**Notes**

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**Narrator:** Molly Schauffler

**Interviewer:** Adam Lee Cilli

**Transcriber:** Adam Lee Cilli

**Date of interview:** February 10, 2014

ABSTRACT: This interview took place in Molly Schauffler's office in Bryand Hall at the University of Maine in Orono. In the first half of the interview, Schauffler discussed her experiences studying spruce-fir forests at coastal and interior sites in Maine. Later, she discussed her work helping science teachers introduce students to data collection and interpretation. Most importantly, she advocated creating meaningful, personally relevant learning experiences for students, oriented towards their own lives and communities. Towards the end of the interview, she shared her views on the Climate Change Institute's role in educating the public and informing policy on climate change.

Note: This is the transcriber's best effort to convert audio to text, the audio is the primary material.

Cilli: This is an interview with Molly Schauffler. Today is February 10, 2014, and this is Adam Cilli conducting the interview. I'm wondering if you can tell me how did you become attracted to studying climate.

Schauffler: I came back to graduate school in 1990; I'd been out of school for a long time. And I actually came back to study botany, cause that was my undergraduate degree. I started out with Christa Swinser over in Deering Hall looking at Myrica Gale. And that fall I took a class with George Jacobson, the ecology course, a required graduate course. And in that class I got talking with George on our various field trips, and he kept asking me what I was interested in and I said I was interested in why plants grew where they grew. And as we talked he convinced me that studying myrica gale wasn't going to meet my interests so much as bogs. So we just talked about possible research projects that involved plants, but not so much about that nitrogen fixation. So I switched advisers and worked with George. So this was for a master's degree. And that's not so much with the Climate Change Institute. Although I did a study of road salt invasion in Alton bog up here on highway 95, and worked with Steve Norton on that as much as George. So, I got to know George and got to know the pollen lab over there, and so that's how I got interested in working in climate change for a PhD.

Cilli: Which you did right after masters?

Schauffler: So I hadn't planned on getting a PhD, but when that finished George found some money and we worked with Acadia National Park and the Rock Island, Eastern Maine Conservancy, and the Nature Conservancy, and I looked at pollen records in small forested hollows in some of these coastal sites up in Bickery [?] Preserve.

Cilli: Did you take cores?

Schauffler: Yes I did. I took small hollow cores in forested hollows, so it was about a meter of peat sediment in these forested hollows, and that gives a pollen record that's much more localized than a lake. I was interested in the changes in the local forest and when spruce appeared in Maine. And so that showed up in these small forested hollows.

Cilli: This record is more localized. Is that because the core you took was more shallow?

Schauffler: It's because the cores are in forests. If you core a lake, the sediment record collects from a wider area, since it's open, so pollen blows in from hundreds of square kilometers. But in a forest 50 percent of the pollen comes from the local forest itself, so you can actually get a signal for what kind of trees were growing at that location, for as long as the core goes back.

Cilli: And how far back was that core?

Schauffler: Well, they're all different. So, I took two cores from Ilaho, and those weren't as old the core from Black Woods camp ground in Acadia. So the Ilaho cores were two or three thousand years old, and Blackwood's core was over ten thousand years old, so it went all the way back to that last glaciation. The Rock Island core was also nine or ten thousand years old I think. Tell me about the methods you used to analyze those cores. So, I always joked, as much as I like to be outdoors for maybe two days in the field looking for the cores (you have to be able to find a place deep enough with undisturbed cores and then collecting the cores) and then it would be six months of analysis in the lab. So, you essential chop up the core into little half centimeter, or centimeter increments, sample from each increment. And one analysis is to isolate the pollen from the core, which means processing it with harsh chemicals, and that gets rid of all of the organics and crud that gets in there, besides the pollen. The pollen itself is very durable. It's one of the most resistant substances, so after processing it with acids and various compounds you end up with pretty much just the pollen and spores and things like that.

Cilli: Microscopic pollen. So, actual ten-thousand-year-old pollen that you're looking at?

Schauffler: Exactly.

Cilli: Fascinating.

Schauffler: It is. It was a wonderful study. The other analysis is going down through the core and sieving it through very fine meshes and sorting through it to find bits of charcoal, and also bits of plant material that you can use to date the core. So, I was looking for little pieces of wood, or a well-preserved leaf, that I could send off for a radiocarbon date.

Cilli: To where did you send them?

Schauffler: Those went out to Beta Analytic, which I think was in Arizona. And that's a lab. We have to pay for the samples…. And so that was part of the expense of the research, was paying for those examples.

Cilli: So what did your research tell you?

Schauffler: It is a pretty fun story. My question was essentially where did spruce grow since the last glacier? Because when we look at lake pollen from all over Maine, and those are collecting from wide-collection base (hundreds of square kilometers), and when we look at those cores it

looks like modern amounts of spruce and fir pollen didn't really come into Maine until 250 to 500 years ago, so really only very recently that Maine was so covered with spruce-fir forests. And yet when spruce pollen appears in the stratigraphies, it comes very quickly, so all of a sudden there's lots of spruce here. And my question was how could it have come so quickly? It must have been in small populations, isolated, for it to all of a sudden climate improved and spruce couldn't establish itself very quickly. So my question was, where was it growing? And my hypothesis is it was probably growing along the coast, where the cooler and moisture climate, as opposed to inland where it was a little bit warmer and dryer. And spruce is very vulnerable at the seedling stage. I don't know if you've ever pulled up the little spruce seedling, but it's got just a single taproot that goes down and it will stay in the forest that way for many decades until a tree blows down and a gap opens up and that seedling can grow, and that's why these forests perpetuate themselves so nicely. But to do that it really requires a cool enough and moist enough habitat to survive. So, my thinking was that it could've survived along the coast more likely than in the interior. So I tested that by having five sites along the coast, two in Ilaho, one in the Black Woods at Acadia, one at Schoodic, and one at Rock Island, so you could think of it as a transect going Down East. And the thought was that I should see pollen stratigraphy of much older spruce on the coastal sites, but I should see the ones on the inland sites coming in more recently, some 500 years ago. And that's pretty much what I saw. The farther east I went, the longer the spruce had been there, which fits climatically, because as you go east today there's 50 percent more fog at Eastport than there is at Bar Harbor. So it sort of showed that the last ten thousand years the climate has shifted in Maine, and because Maine is an ecological transition zone, we're right at the edge of the range for the spruce fir forests. So just that little bit of warming during the Holocene was enough to drive spruce into these small refugia, and then as it actually started to cool a little bit… spruce was able to come back in and spread. So it's kind of a neat story of how responsive spruce fir forests are to the kinds of changes that've happened in Maine over the last ten thousand years.

Cilli: Fascinating. So, what did you do after completing your PhD?

Schauffler: Well, I was much more interested in working with teachers and science education, than actually continuing on with research. I had two postdocs after I finished. One was another paleoecological study, and that was working in Acadia National Park with a much bigger project, the PRIMENet project, which was looking at mercury in Acadia National Park. The question was why are some watersheds in Maine high in mercury and some low? So, you can get fish out of a lake in Maine, and we didn't have a real good handle on why the fish in this lake would have high mercury but not in this lake. So this was looking at the effect of the 1947 forest fire that happened in Mount Desert Island, if we look at the history of two watersheds, one in the fire and one not in the fire, is mercury being processed differently in those two watersheds? Can we explain that by the forest fire? My job was to take the sediment core from each water shed and look at the fire history. I was mainly looking at charcoal and then looking at pollen stratigraphy, to see if indeed these particular watersheds burn and how vegetation changed when it did burn. So that was a one year project. Then I got a second postdoc fellowship with the National Science Foundaton, and this was completely different. It was working with science teachers, and finding out what it takes for science teachers to get their students out into their communities, measuring and monitoring things as part of their science learning. So, essentially using real environmental monitoring as a way of doing science education. Then from that, that was about the time that the center for research in STEM education formed here at the University of Maine,

and so I joined that center developed a course for teachers about helping them learn the skills of doing research, which many teachers never had. They never actually did research themselves. And I still teach that course every other fall.

Cilli: Is that specifically for teacher candidates, or for people who are already teaching.

Schauffler: Both. So, the RiSE Center, the Center for Research in STEM Education has a master's of science in teaching program. We have about 30 students; it's a thesis graduate program. So, they take a course but it's open to practicing teachers, and I always have a few practicing teachers at the same time. That's a fun course; it's really about environmental monitoring and how can we do this in schools and with kids. And what are the pedagogical considerations to doing the environmental monitoring, and how is it done by the big agencies. And how do you do the data, and so forth.

Cilli: So, did you become a member of the Institute upon completing your PhD?

Schauffler: Yeah, I guess when I started teaching the class, I needed to affiliate with a department. So, because Steve Norton was my mentor on the NSF project, I joined his department, the School of Earth and Climate Sciences. Then I joined the Climate Change Institute because, again, a lot of my work was environmental monitoring, which is related to climate change, and having my degree in the Climate Change Institute, it just seemed like a natural fit. So, you were around then when the Institute's name changed to the Climate Change Institute. What did you think about that?

Schauffler: It seemed to make sense. I work a lot with people not affiliated with the university at all; a lot of my interactions with teachers, and everybody struggled with the word Quaternary. So, it was a lot easier a name for people to process, and it seemed like a good adaptation to changing times.

Cilli: How do you think the Institute's changed since you became involved with it?

Schauffler: Well, I think that Paul has really done a lot to put the Institute out there in a much bigger way than it ever was before. I think the Quaternary Institute was certainly prominent in the field of Quaternary research and Hal and George were great leaders at that time, and I think it was a good idea to bring Paul in when he came, because he has of course a much bigger picture I think, in terms of… and then climate science exploded and it became of much greater public interest. So, it's been an evolution that's come with the times. It seems much more connected to the bigger research world now than it was before. But then, my time before was more as a graduate student, and not as a faculty person.

Cilli: I understand also that the size of the Institute grew enormously since Paul came.

Schauffler: I think so. There are a lot more people involved, whether they're directly involved in the day to day or affiliated in one way or another, it seems like it can only be a good thing, just because it's inclusive. But I must say, personally, I'm pretty much at the periphery, because I don't do climate research right now. The environmental monitoring is really for education, for a pedagogical purpose. It's science education, [but] not so much about outreach about climate. The education purpose that I pursue is much more about these kids have got to learn certain parts about science. For example one project I'm working on now is about data literacy. And it turns

out that students and teachers don't have a real strong… just reading graphs and speaking the language of data is not a strength for many high school and middle school students, so I've been working a lot on a project helping middle school and high school teachers figure out how to teach students to work with graphs and tell the story of data. And I try to use a lot of climate data to teach about that, but there are many kinds of climate data.

Cilli: So, what are some of the techniques you've learned to help make high school students better able to use the tools of science?

Schauffler: It's got to be meaningful to them. That's the bottom line. It's one of the things that both makes climate… it's an asset, teaching about climate. Climate is one of those things that students can get. They've heard about it, they see how it relates to them, but at the same time I think for a while there's been an overdose of climate change. So, for us in the data literacy project, a bottom line for us is to work with real data sets. And so, for example, the climate reanalyze which Sean Birkel has created, if we can get students to look at that and ask questions about that kind of data, if we can get students collecting various kinds of temperature data from across the state (you know, from their home towns), students can relate to that. It's hard to get excited about data if it doesn't mean anything to them. So, the climate stuff is a pretty good hook for students. But, that said, it's good for high school students, but many middle school students find it abstract. It's hard to talk about pollen cores with middle school students. They're just beginning to be abstract in their thinking. Unless you take them out in the woods with the core, and get the core, and talk about how old parts are. But as far as giving them a slid show goes, it goes right over their heads.

Cilli: Do you plan on working with teachers down the line?

Schauffler: I think so. I mean, that's kind of what I do now. I have a lot of connections with teachers, and I like keeping those alive. They need all the help they can get. There's just a lot on their shoulders for teaching to the standards and to the tests. So any enrichments, or any real science connections, the better.

Cilli: So you see standardized tests (and here I'm referring to the No Child Left Behind Act), do you see that as a problem or obstacle in teaching authentic scientific inquiry?

Schauffler: Absolutely. With this data literacy project, we have developed a bunch of practice data sets and real questions that students can investigate with real data sets. And teachers love them, but they do say "I just don't have time for this, because I have to cover the stuff for the tests." And they have so much on their plate that they have to teach… The ironic thing is that, looking at data, for example I could pull together a graph of ice core data, and the teacher will look at that and say, "That's great. That's really interesting, but my students have to learn about predator/prey." So then I think, alright I have to find predator/prey data. And that's one of the things that I try to do, is to find data that relates to what those teachers have to teach about. And climate is working its way into the standards and into the curriculum, but it's all changing so fast that it's very difficult for the curricula to keep up with it.

Cilli: One question I like to ask is… Within the scientific community, there's no real debate about the human role in climate change. But outside the scientific community it is hotly debated, and I'm wondering if you can speculate as to why that might be the case.

Schauffler: I hear from teachers all the time that they have students who don't acknowledge: "You know, it's not happening." And it's pretty clear that they get that from their parents. And so I think those ideas persist because it's perceived as a political issue, rather than a scientific one, and those political views get ever more polarized, and so I think they're very hard to change. People don't always perceive science as being a way to look at this stuff. And they think the scientists are working for political parties, or whatever. There's just a lot of mistrust. That's why my work with data, to me, is very important. Because if you can help students see data as evidence and think of what evidence is, that's… but I think these views just persist because of the way they're presented in the media. If the media feels it has to be "objective," it will go find the one person in the crowd that is the climate skeptic and interview them and treat them as equal to the scientist that's making a statement. So then, the perception is there's 50 percent for and 50 percent against. So I think the media often perpetuates this kind of thing. Apparently Hurricane Sandy changed this view a lot; afterwards, many more people thought climate change was a real thing.

Cilli: What do you think has been the Climate Change Institute's most important contribution to our understanding of climate?

Schauffler: That's a very big question and could be taken on many scales. I'll think of three contributions. One is at state level. I think the report the climate report that George and Ivan and a committee pulled together for Baldacci a few years ago was a huge contribution to the state.

Cilli: *Maine's Climate Future*?

Schauffler: Are you familiar with that?

Cilli: I've heard of it.

Schauffler: [pulls a copy of *Maine's Climate Future* from her shelf and hands it to AC] This. And so that was written in terms that most people could understand, and it's a survey of what the Institute and others ([and] what the data) say about how things are changing in Maine. So that, plus then the follow-on to that, was about climate adaptation in Maine. And that committee's still active and is still focusing on what we need to do to adapt to climate change. And that's much more where this science is now, I think. It's about adaptation, in terms of public… So this suite of contributions at that stat level, in terms of reaching out to policy, was a huge contribution. Scientifically, I would say probably the work with abrupt climate change has been a big, sort of global scale contribution. I can just think of so many things that people are doing. There's a lot with the climate modeling that's been a huge contribution. I think that the training of graduate students here is a huge contribution. Not all of them necessarily go on into climate research (I guess speaking for myself), but I just really value my graduate education in the Climate Change Institute, in terms of carrying on as an educator and scientist no longer really practicing in research. I mean, I do education research but it's not the same thing as climate research.

Cilli: Well, that's all the questions I have for now, but before concluding the interview I did want to give you a chance to add something that I didn't think to ask you about.

Schauffler: I think a big question for the Climate Change Institute, and with this anniversary coming up, it's always a good time to ask where we're headed or what are we doing that we could do more of or better or differently, and what I would really like to see is, while I think this has improved a lot, is the Climate Change Institute's involvement with policy and the people of Maine. I know there are a lot of people who have not even heard of the Climate Change Institute, and I know Paul has done a lot to try to remedy that. And I don't know what more necessarily can be done, but I think it's been a huge resource for the state of Maine. So, the whole idea of adapting is really a pretty big issue and is gonna be for the state. I always love to see bridges between the scientific community and the people of Maine, 'cause that's why we're here. Fulfilling that land grand mission is really central to me. And I think that's an important contribution that we can always do better at.

Cilli: Well, thank you for participating in this interview.

Schauffler: Well, thank you for coming, and you've asked great questions, and it'll be interesting to see what you come up with…. Thank you for doing this.