- I think with insects, I didn't love every insect as a kid. And yeah, they definitely get a lot of bad press. Nobody really likes, well, I shouldn't say nobody, but there's certain insects that people just don't wanna know more about because they're so annoying, like mosquitoes.

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- [Announcer] This is the ORISE Featurecast. Join host Michael Holtz for conversations with ORISE experts on STEM workforce development, scientific and technical reviews, and the evaluation of radiation exposure and environmental contamination. You'll also hear from ORISE research program participants and their mentors as they talk about their experiences and how they are helping shape the future of science. Welcome to the ORISE Featurecast.

- Welcome to the ORISE Featurecast. As you may have noticed, I'm not Michael Holtz, I'm the backup but the main man today, my name is Matthew Underwood. I have been a co-host with Michael for several episodes, so you are a little bit familiar with me, hopefully. Today we're super excited about this conversation as has become kind of a tradition with some of these episodes. We have an ORISE fellow to with us to talk about the research and kind of how Marie Russell got to where she is today. So Marie, welcome to the podcast.

- Thanks for having me. Yeah, I'm excited to talk about my background and the work that I've been able to do with ORISE.

- Awesome. So first of all, just kind of tell me, introduce yourself to our audience and just tell me who you are and how you got to where you are today.

- Sure. I'm Marie Russell. I started as a biology major in undergrad. I always loved biology. From there, I thought a career in public health would be really fulfilling, so I did a masters in public health. I had a fellowship at the EPA after my masters, but it wasn't ORISE yet, it was a different one. And I thought I was always fascinated by mosquitoes and I thought if I could do my PhD in mosquito ecology that would be really cool. And I was lucky enough to have that opportunity. So I went to the UK to do my PhD in mosquito ecology. And I did a one year postdoc after that, but then I got the ORISE opportunity to do a postdoc at EPA and I was really excited about it. It was an interdisciplinary opportunity and we were gonna be looking at connections between climate change and human health, which really encompassed a lot of my interests. So I thought this is perfect. And that is how I got to be here at EPA as an ORISE postdoc.

- Awesome. So you talked a little bit about some of the things that interest you in your research that you've been doing. I know you recently had in the EcoHealth, you published about the mosquito research you've been doing. Kind of talk a little bit about that, kind of that experience with that research and then what it was like seeing it all come to fruition with the publication.

- Sure. Yeah. The EcoHealth publication was a little bit unique for me among my other work because it was a perspective piece and it was a shorter paper than my others because there wasn't as much original data collection. But it was an interesting paper because I got to bring together a couple of different ideas and I have had a lot of people interested in that paper, which has been exciting. So the main idea of that paper is to use an existing framework of ecological degradation that had already been in use. It's called the beneficial use impairment framework. It started in the '80s and there were 14 different items that were identified as beneficial use impairments. And so at that time, the beneficial use impairment framework, it was based in the Great Lakes region, and at the time that it was developed, mosquito-borne disease wasn't a big concern. But we know that with climate change, we're gonna be a little bit more concerned about mosquito-borne disease in the future, even in places as far north as the Great Lakes region. So I looked at that beneficial use impairment framework, and I found a couple of existing beneficial use impairments and I connected those to the risk of mosquito-borne disease in the Great Lakes area. So one example is looking at aesthetics, so along the Great Lakes beaches if there's a lot of litter, that reduces the aesthetics and people don't wanna go to the beach anymore. So that's an example. Degradation of aesthetics is an example of a beneficial use impairment because it's preventing people from benefiting from the Great Lakes. The connection there to mosquitoes is that some of the invasive mosquitoes really like to lay their eggs in artificial containers like what you would have with beach litter. And so beach litter would also potentially increase the populations of invasive mosquitoes. So that's just another reason why we don't want beach litter. So that was sort of the focus of the paper, was to look at these existing things and say, also what's the connection here to mosquito-borne disease? So it was really fun, it was a great opportunity.

- So not only does the litter not look great and not make people wanna go, it can also lead to these mosquitoes which is kind of a, you don't think about those two being connected, but it is fascinating that there is that connection between those two things.

- Right.

- So tell me, has science always been something that's been an interest to you? Where did you first kind of pick up, is it as a young child? Where did you first pick up that sense of, oh, science is gonna be something that I wanna pursue?

- I was a generalist I think growing up, definitely in middle school I thought I could do anything, and it made it really hard to pick something that for sure was my calling or something like that. I'm still not convinced on the whole calling perspective or that you could, you should know at the age of 10 what your purpose is and everything and what your career is. But I think with biology there's always more to learn and I loved that. And I loved getting a deeper understanding of things that I thought I already knew. There's always more detail with biology and you can really delve in and understand something so much better than you did before. And I loved that.

- But just the continuation of being able to learn new things then.

- Yeah, always learning. It's really fascinating. I love the natural world and I didn't really get involved in entomology until I was in college. But that was really a good example. There's a lot of examples in entomology of thinking that you know something and then taking a closer look and finding so much more detail and interesting pieces of information that you just never thought of before. I think with insects, I didn't love every insect as a kid. And yeah, they definitely get a lot of bad press. Nobody really likes, well, I shouldn't say nobody, but there are certain insects that people just don't wanna know more about because they're so annoying, like mosquitoes.

- I'm on that list. I don't like insects, so I'm sure there are some people that do, but I'm not one of them, so I understand.

- But sometimes when you look at them under the microscope, there's so much intricacy even in the morphology, just the way they look. And you without a microscope, you never notice these things. And then when you get into like the evolution and ecology of insects, that can get even more interesting, why do they have that morphology? How did that evolve? So I maybe going on a tangent here, but...

- No, you're good.

- I didn't know as a kid that I would be studying mosquitoes as closely as I did. It sort of developed in a one research experience after another. Maybe the most pivotal research experience I had was an internship in Hawaii where I got to study avian malaria, and that was the first time where I was collecting mosquitoes and looking at them under the microscope. And it didn't really, when I selected that internship, I think I was more interested in the birds than the mosquitoes at the time. But then because it's avian malaria, of course, there was a lot to learn about mosquitoes. And so that's where my interest in mosquitoes really started. And that was in undergrad.

- Okay. So along your career you've talked about a few different internships that you've been a part of and then kind of your process of going through college. What are some major obstacles that stick out to you that you've had to overcome to get where you are?

- I think that overall time management is something that's hard for me sometimes. And I think that I have gotten better with that over the years. When I was younger, there was more like self-doubt, like because it wasn't a calling, you're always questioning like, is this the right decision? I don't know. And yeah, that does go away after a while, which is great, I do. I think I have more confidence now than I did in undergrad. And it is hard as a college student, how do you choose the right path and everything and mentors really matter a lot. I was lucky to have a really good mentor through my ORISE experience at EPA and it can really shape your path, especially early on. I still remember some of the mentors that I had as an undergraduate.

- So just kind of delve a little bit deeper into that, like some of your mentors that you've had, how have they really impacted your journey to get to where you are today?

- Yeah, good question. I like that. I've had several at this point, I feel like it's hard to choose one, but the first professor I worked for in entomology was a woman. And I think that working for her was really important for me to do early on to see that women can be science professors, women can be leaders in science like that. I think that was really important for me to have that role model early on. Let's see. There's so many to choose from. I've also had just people who were coworkers at the time, so I guess there's examples of scientists who took a different path after we worked together, but then they come back and sometimes you're reunited with people you've worked years ago. That can be helpful too, just to have friends in the field. I guess it's hard to say like the degree to which your mentors shape you because you do have to make some of your own decisions. Nobody can tell you what to do. And some of the best mentors will say that to you. They'll say, I can't make this decision for you, but here are some things to consider. So that's probably the type of mentorship that I like the most.

- Yeah, I think that's good 'cause mentors can lead you along that path, but at the end of the day you do have to kind of step out and make those decisions for your own. And especially like you mentioned earlier with that self-confidence, being able to make those decisions really makes an impact. I do think it's fascinating though that you talk about this, not to say fear, but hesitation about am I in the right place? I think it is cool that one of those early mentors was a female professor to where I'm sure you got the feeling of, oh yeah, I can do this because I've seen people that can do this that are women. And it gave you that confidence to be in the field and know that this is where you belong.

- Yeah, I mean sometimes with science and in the field that I was in, in ecology, there is a lot of field work and I really enjoyed the field work, but that can be one of the areas where like physical strength comes into play a lot. And I was never like the strongest physically, like sometimes they're asking you like, carry 10 poles into the forest now and I could only do like five at a time. And then you are like, you're sitting there wondering like, oh, like maybe this wasn't the right job. So it's helpful to have other people to talk to who are like, oh no, like, yeah, I face that too. And it's really not a big deal because there's so many other parts of the job that don't require physical strength. The statistical analysis don't require you to be like a weightlifter or anything. And the of course the writing the papers. So yeah, it's really helpful to have that encouragement from other people who have sort of faced like similar thoughts. So yeah, I'm very happy that I stayed in the field of biology and ecology and I didn't let those hesitations get to me.

- For sure. So you talk about your mentors that you've had, let's kind of flip that on the other side. Have you had any opportunities to mentor other people and kind of what did you, what are some lessons that you tried to teach them along the way as well?

- Yeah, during my PhD, I had the opportunity to mentor a first year undergraduate. It was in the UK, so they don't say freshmen, they say first year. And it was really fulfilling because she voiced some of the same concerns that I had had just a few years prior, especially with coding in R, she was saying, it's always so confusing, I don't think I can do it. And I didn't really enjoy my first course on statistics in R either, but I didn't give up and I persevered and then I got really good at it, and I thought that made me a much better teacher for her when she came along and said, "I don't think I can ever be good at R." I said, "Hold on."

- I was just there, I remember.

- Yeah. And it was great because I had code that I could share with her and I commented my code, so it was more of like a step-by-step process and she told me like, that was so helpful, I think it did really help and she felt more confident. So I was really happy to have that opportunity.

- That's awesome. So you kind of talked about earlier, you learned things from mentors, but you kind also learned things from other scientists that you're working with. With science it's collaboration is so key. So specifically in your ORISE fellowship, kind of how has collaboration kind of worked to teach you things that you may not have known before?

- Yeah, I have actually a really good example of that. One of my main projects during this fellowship is on combined sewer overflows and gastrointestinal illness. And I am working closely with Dr. Beth Haley, and she did her PhD at Boston University on the topic of combined sewer overflows and gastrointestinal illness. So she's really an expert in the topic area. I bring expertise of systematic review, so the methods of this project involves systematic review, but I consult with Beth all the time. She has taught me a lot about combined sewer overflows and I think we worked really well together. And that project is getting close to completion, but there's lots of steps involved. So we have a pretty good manuscript at this point. It hasn't been published officially yet though.

- Good. Well, we can look forward to that. That's a little teaser to look forward to once it gets done. All right, so we've talked a lot about your fellowship and the work that you've been doing, the research. And so kind of take me once you get done with this, what are the next steps? Where do you see yourself in the future? Where do you wanna end up?

- I'm in a very good place to answer that question right now because I recently accepted a federal position with the EPA. I am going to be a biologist in the Office of Water, and I'm very excited. We're looking at water quality guidelines and also some original research on contaminants and drinking water as well as recreational water. I'm really excited. Definitely, this is one of the careers I've been considering since undergrad. I know I mentioned I'm not someone who knew immediately what I wanted to do, but it is comforting, like this is something I wanted for a long time. I had been considering a government scientist role of some kind for a very long time. So I'm very happy and I think ORISE did help me get the job that I'm about to start it. I'll start on June 3rd.

- Oh, really soon then.

- Yeah.

- That's awesome. I'm glad you're excited. And obviously the EPA, your experience with the EPA as a whole has been pleasant if you decided to accept a long-term position. So it's good to hear that everything went well and you enjoyed where you're at.

- Yeah, yeah, I'm very happy.

- Good. So final question as we wrap things up. This is kind of a question that we end all of our podcasts with these fellows, and it's a simple one that's kind of outside of what you're doing, and it's just simply, what brings you joy?

- What brings me joy? I think helping other people brings me joy. And sometimes as a scientist, you're doing that in an indirect way. And so you might not realize it on a day-to-day basis, but for example, protecting water quality and making sure everyone has safe drinking water is definitely helping people. But you might not see that directly while you're just analyzing the data. So yes, I think helping people is what brings me the most joy.

- Awesome. I love that answer. Well, Marie, thank you so much for joining us today and letting us learn a little bit about you and your ORISE fellowship, and good luck with your future endeavors as well now that we know where you're gonna end up at least for a little while. So I appreciate your time today.

- Thank you. Thanks for having me.

- [Announcer] Thank you for listening to the ORISE Featurecast. To learn more about the Oak Ridge Institute for Science and Education, visit orise.orau.gov, or find us on Facebook, Twitter, and Instagram at ORISEConnect. If you like the ORISE Featurecast, give us a review wherever you listen to podcasts. The Oak Ridge Institute for Science and Education is managed by ORAU for the US Department of Energy.