

Amphibian Migrations and Road Crossings Webinar Series: Introduction to Vernal Pools
January 25, 2022, 5:00 – 6:30 pm
Hudson River Estuary Program Conservation and Land Use Webinar Series

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00:00:01.260 --> 00:00:08.339

Good evening, everyone. Welcome.

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00:00:08.339 --> 00:00:22.559

My name is Laura Heady. I'm with the Hudson River Estuary Program, and before I start a formal introduction, I'd just like to go over some Webex webinar details for those of you who might be new to this platform.

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See, you may have already connected to audio when you join the webinar, but if not, you can connect to the audio, either through your computer,

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or by phone, and we do recommend phone, especially if you have a poor Internet connection, or have problems with the audio through your computer.

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If you have problems with computer audio, you can select switch audio by clicking on the 3 dots at the lower part of the screen.

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And once you click on "switch audio," you'll have options to either receive a call by entering your phone number in a "call me at" box, or you can call in yourself.

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00:01:12.625 --> 00:01:18.625

And you may need your unique ID number from the webinar registration.

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You can also adjust your speaker settings or switch audio at the top menu.

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00:01:27.269 --> 00:01:35.310

If you go to the top pull down menu under audio and video. And if you're still having difficulties, you can let us know in the chat box.

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00:01:37.135 --> 00:01:44.905

During the webinar, though, I am going to ask that you direct any questions about the presentations to the speaker in the Q and A box.

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00:01:45.204 --> 00:01:59.995

And if you're not seeing the Q and A box in your screen, you can click on the 3 white dots next to the chat in the lower righthand corner, and note that once we get started, I'll mostly be monitoring the questions for our speaker in the Q and A box

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00:02:00.385 --> 00:02:01.495

not in the chat.

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00:02:01.829 --> 00:02:05.489

And I will hold the Q and A to the end.

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00:02:06.534 --> 00:02:16.344

So, let's review our Webex news from the AV club. If you have problems with Webex, technical difficulties, let us know in the chat.

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00:02:16.854 --> 00:02:23.604

If you have questions about today's presentation or questions for our speaker, use the Q and A box.

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00:02:23.849 --> 00:02:37.229

Note that all attendees tonight are muted, and you don't need your video. The webinar is being recorded and will be made available to view on the DEC website. And we'll share that link in a follow up email.

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There'll be a brief survey at the end of the webinar, and we really value feedback from our participants. So I would really appreciate if you could take a moment to fill out those few questions before you leave us for the rest of your evening.

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00:02:51.960 --> 00:03:04.889

And finally, we'll be sending out an email confirmation of attendance right after the event. You should receive that and you can submit that for municipal training credit should you be on a planning or zoning board, or need to document your participation.

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00:03:05.965 --> 00:03:19.014

I want to take a minute before I go on to thank my colleagues at the Hudson River Estuary Program, Ingrid Haeckel I from the conservation and land use team and Emma Clements who assists with the amphibian migrations and road crossings project.

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00:03:19.044 --> 00:03:24.775

They're co-piloting tonight's webinar and they will try to assist you, should you have technical

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00:03:25.050 --> 00:03:28.169

difficulties, in the chat box.

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00:03:29.879 --> 00:03:36.474

So with that now that we've covered the mechanics of the Webex webinar, I'd like to welcome you more officially.

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Now,

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00:03:36.895 --> 00:03:37.645

my name is Laura Heady,

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00:03:38.664 --> 00:03:46.764

I'm the conservation and land use program coordinator at the DEC Hudson River Estuary Program through a partnership with Cornell University's

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00:03:46.764 --> 00:03:48.294

Department of Natural Resources

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00:03:48.294 --> 00:03:56.965

and the Environment, and I'm really thrilled to be kicking off our webinar series for the amphibian migrations and road crossings project,

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which is a volunteer project I started at the program back in 2009.

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I'm very excited. This is our 14th year of the project, and while we offer trainings and programs, specifically for project volunteers, this webinar series was designed for an even broader audience

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00:04:17.514 --> 00:04:25.045

to more deeply explore the ecology and the conservation of vernal pools and pool breeding amphibians with experts in the field.

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00:04:25.254 --> 00:04:33.535

And I'm really hoping it's going to inspire our amphibian migration volunteers as well as local municipal officials,

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00:04:33.564 --> 00:04:40.884

landowners and land managers and others to think about how we all can collectively conserve these habitats more effectively.

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00:04:41.158 --> 00:04:54.389

For tonight's program, I'm going to give a little update, and overview of the amphibian migrations and road crossings project before I hand the mic over to our wonderful presenter. Dr Mary Beth.

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00:04:56.423 --> 00:04:56.783

So,

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00:04:56.783 --> 00:04:59.843

the amphibian migration and road crossing project,

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00:04:59.843 --> 00:05:03.264

I'll refer to as the "AM and RC project" for brevity,

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00:05:03.533 --> 00:05:03.954

,

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00:05:03.983 --> 00:05:05.663

that project as well,

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00:05:05.663 --> 00:05:10.463

as this webinar series are all part of our work at the Hudson River Estuary Program,

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00:05:10.733 --> 00:05:13.223

which is a unique program at the New York State

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00:05:13.223 --> 00:05:25.524

DEC, the New York State Department of Environmental Conservation, and the program was established to help people enjoy, protect, and revitalize the Hudson River Estuary and its watershed.

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00:05:25.853 --> 00:05:32.754

And the history program is guided by a 5 year Action Agenda, which we just kicked off last year and covers 2021

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00:05:32.754 --> 00:05:33.113

to 2025.

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00:05:33.113 --> 00:05:34.553

And we work throughout the watershed counties,

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00:05:34.553 --> 00:05:37.374

bordering the tidal portion of the Hudson River,

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00:05:37.403 --> 00:05:39.024

which goes from New York City,

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00:05:39.024 --> 00:05:41.843

and the upper New York harbor up near Albany

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00:05:41.934 --> 00:05:52.403

and beyond to the federal dam in Troy. And we're working to achieve the key benefits that are listed here and you can learn more about the program and our work,

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00:05:52.403 --> 00:05:54.353

or read the action agenda at the website.

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I think Ingrid will put that in the chat box for you.

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00:06:03.113 --> 00:06:08.754

And our work on the Conservation and Land Use team at the program is guided by that Action Agenda.

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00:06:09.113 --> 00:06:19.824

And the goal we're working toward in this current 5 year, period, is that lands and waters that are recognized as regional priorities for wildlife and fish habitat, clean water,

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00:06:20.098 --> 00:06:28.074

climate resilience, and scenery are incorporated into conservation and land use plans and policies in the watershed. Through acquisition,

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00:06:28.103 --> 00:06:35.814

key sites are permanently protected and connectivity of conserved habitats and natural areas in the estuary watershed is achieved.

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00:06:36.384 --> 00:06:44.694

And I share this with you to provide greater context for the AMRC project and for the topics we're exploring in this webinar series.

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00:06:44.874 --> 00:06:45.024

You know,

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most of our efforts to achieve this goal are centered around local land use and conservation planning.

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00:06:51.713 --> 00:07:03.324

And we work with many municipalities. There's over well, there's about 260 different town, cities, and villages in the actual watershed. We work with many of those towns, cities, and villages as well as land trusts and other partners.

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00:07:04.014 --> 00:07:07.553

And if you'd like to learn more about this core work,

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00:07:07.704 --> 00:07:08.874

that our team does,

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00:07:08.874 --> 00:07:10.434

I encourage you to visit our website,

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00:07:10.434 --> 00:07:14.124

which is a clearinghouse of information about natural areas,

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00:07:14.124 --> 00:07:28.343

and biodiversity in the estuary watershed, conservation and land use planning, and resources to assist in these efforts. And hopefully Ingrid putting that website in the chat box as well.

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00:07:30.564 --> 00:07:40.314

Well, we're here today to talk specifically about one aspect of biodiversity conservation in the watershed, but really, it's relevant beyond into other parts of New York and the Northeast.

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As I mentioned earlier, this webinar series is part of our Amphibian Migrations and Road Crossings project.

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And the AM&RC project focuses on a group of amphibian species that live in the forest and migrate to wooden pools for breeding in early spring. And then they return back to the forest.

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And if you remember earlier,

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I mentioned that our team's goal includes preserving habitat connectivity,

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which is critical for species that need to move from one type of habitat to another,

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00:08:13.254 --> 00:08:15.684

as part of their daily or seasonal activities,

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00:08:15.684 --> 00:08:17.514

such as foraging over winter,

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00:08:17.514 --> 00:08:18.744

spring or breeding.

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00:08:20.363 --> 00:08:21.653

In the case of vernal pool,

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00:08:21.653 --> 00:08:26.124

amphibians it is there a movement between their non breeding forest habitat,

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00:08:26.124 --> 00:08:34.073

and their aquatic breeding habitat that can make them vulnerable. In particular because they often encounter roads on these overland journeys,

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00:08:34.344 --> 00:08:36.474

which can be as long as a quarter of a mile

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00:08:36.808 --> 00:08:47.933

for some species. And research has shown that even in low traffic areas mortality can be high for these slow moving frogs and salamanders that have just emerged from overwintering.

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00:08:48.323 --> 00:08:59.423

And because their migrations are what are known as exclusive, with many, many individuals, all moving at once, road mortality can have serious impacts on local populations.

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00:08:59.874 --> 00:09:07.313

And so conservation concern for this group of amphibians due to road mortality as well as the vulnerability of their habitats,

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which we're gonna learn more about tonight, is one of the reasons I started that amphibian migrations and road crossings project to help learn about and address these conservation needs.

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00:09:20.219 --> 00:09:32.729

So, how does this relate back to our Conservation and Land Use planning goal? asks our friendly spotted salamander well, far as species like blue spotted, Jeffersons, and marble salamander

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00:09:32.729 --> 00:09:37.438

are all species of conservation concern in New York, and throughout the Northeast.

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00:09:38.094 --> 00:09:44.724

Their forest and wetland habitats are vulnerable as most privately owned forests are not protected,

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00:09:44.724 --> 00:09:48.384

and often can be fragmented into smaller pieces,

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00:09:49.224 --> 00:09:53.364

which can introduce roads and other development into important habitats.

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00:09:53.692 --> 00:10:04.793

And vernal pools are usually too small or isolated to qualify for state or federal wetland protection, federal wetland, protection something that once again is making news.

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00:10:05.458 --> 00:10:19.649

But the good news is with good information and increased understanding, local planning decisions can protect these habitats and the important connections between them. And as we learn more, other conservation partners can help contribute to this as well.

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00:10:21.173 --> 00:10:35.903

And so the goals of the amphibian migrations and road crossings projects are such: that to raise awareness about woodland pool and forest habitat, Hudson Valley biodiversity, and the impact again of

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00:10:35.903 --> 00:10:40.403

land use decisions, how we develop the landscape, on connectivity.

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00:10:40.403 --> 00:10:42.024

And thus this webinar series.

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I also wanted to provide a rewarding volunteer experience and connect people to an aspect of nature that most people don't get to witness and didn't even know about. I'm included in that group. It wasn't until in the last 20 years that I even knew this happened.

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00:10:59.754 --> 00:11:02.964

I also hoped that through this volunteer engagement,

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we could locate road crossings,

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00:11:04.884 --> 00:11:12.563

reduce road mortality of migrating amphibians, and identify conservation opportunities to either reduce to,

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00:11:12.803 --> 00:11:18.234

or to prevent this mortality and these habitat threats. And with this data hopefully,

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00:11:18.234 --> 00:11:21.594

we can create a foundation for asking more questions to help us better,

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00:11:21.594 --> 00:11:31.043

understand migrations and habitat needs and then also build support for community conservation initiatives like road closures or wildlife tunnels.

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Like, we'll learn about next week in case studies from New Hampshire and Maine.

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00:11:38.548 --> 00:11:49.193

So, with those goals in mind before I wrap up, I just wanted to share some highlights from the project. So, in terms of raising awareness, I'm thrilled that interest in the project continues to grow.

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00:11:49.583 --> 00:12:02.244

We have 1,444 current subscribers to our DEC Delivers email list and they're just subscribed to receive alerts and updates about the Migrations as well as announcements about opportunities like this webinar series.

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00:12:04.828 --> 00:12:15.298

Our outreach materials continue to receive a lot of interest on the DEC website like, for example, we have a YouTube video that has almost 8,000 views.

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And that's just since it was posted in 2018 and we get consistent coverage by the press. In this case, a major outlet, but really more and more of importance is this local newspaper coverage. That's so important.

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00:12:27.264 --> 00:12:30.833

And these local newspapers were themselves becoming a species of conservation concern.

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00:12:33.953 --> 00:12:47.183

And then we have hundreds of people interested in this topic just for tonight, as of this morning we had over 400 people registered for tonight's webinar and that really is encouraging. And I hope each of you will share what you learned tonight, with at least one other person.

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00:12:47.183 --> 00:12:49.702

So we can continue to just raise awareness together.

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00:12:51.774 --> 00:12:54.443

In terms of engaging volunteers,

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00:12:54.472 --> 00:12:54.683

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00:12:54.714 --> 00:12:58.974

we've held in person virtual and recorded trainings and programs,

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00:12:59.274 --> 00:13:05.124

Here's a photo of volunteers at an indoor training during one of our mock migration exercises,

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00:13:05.124 --> 00:13:07.913

where we actually simulate a migration indoors.

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00:13:08.153 --> 00:13:19.073

And then since 2009, there have been at least 850 volunteers and the interest is definitely growing. Just a quick calculation helped me realize that just in the last 3 years

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00:13:21.269 --> 00:13:36.024

we've had more new volunteers than we had in the previous 10 years, since the project started in 2009. It's not clear whether that's covid related and people are at home with more time or if interest is growing. But I know similar trends have been seen

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00:13:36.024 --> 00:13:37.943

in other states, in the Northeast.

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00:13:40.313 --> 00:13:53.153

But also helping with volunteer engagement, and raising awareness is our growing number of project partners who are helping to organize and implement this project at the local level.

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00:13:53.453 --> 00:14:02.333

So, for example, Teatown Lake Reservation, land trusts, like Wallkill Valley Land Trust, Columbia Land Conservancy, Hudson Highlands Land Trust,

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00:14:02.394 --> 00:14:12.894

Also the Sawkill Watershed Community in Dutchess County as well as municipal conservation advisory councils or conservation commissions in the towns of Bedford, Red Hook,

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00:14:12.894 --> 00:14:24.083

and Pound Ridge, the Climate Task Force in Rhinebeck and so forth. And so these partnerships are incredibly valuable, because we have very limited staff to work on this and we're covering a large geographic area.

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00:14:24.114 --> 00:14:30.053

So, if you have interest in helping us, as a project partner, certainly be in touch after today's webinar.

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00:14:32.004 --> 00:14:38.543

In terms of progress in documenting migrations and reducing road mortality in the last 13 years,

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00:14:38.543 --> 00:14:49.913

our volunteers have counted over 32,000 live and sadly, almost 14,000 dead, amphibians on roads, during surveys and they've assisted over 27,000 amphibians across roads to safety.

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00:14:52.438 --> 00:15:05.908

They've monitored roads from Albany to New York City, throughout the watershed. And although this project is focused on the estuary watershed we've even had volunteers submit data from locations and other parts of New York state.

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00:15:06.989 --> 00:15:11.849

And so finally, the heavy task at hand,

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regarding this idea of helping us ask more questions, more research questions and conservation questions, is to finish screening, cleaning, and organizing the data from the last 13 years.

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00:15:23.903 --> 00:15:36.923

And the summer I'll be working with, Elisa Edwards, a Cornell PhD student to conduct some analyses of those data. And then we'll be sharing that with partners to explore conservation opportunities.

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00:15:36.923 --> 00:15:49.583

So we can target areas that maybe need more volunteer efforts. Maybe where there's places that could have migration activity that, on roads that we'd like to send volunteers to look at. And also what conservation actions are needed.

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00:15:52.229 --> 00:16:05.428

So the next two webinars in the series will focus on how those good, consistently collected data sets, conservation actions, and good planning can address or prevent some of the threats to vernal pool

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breeding amphibians and their habitats, and I hope you can join us for those and for anyone interested in volunteering with AM&RC

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00:16:13.823 --> 00:16:23.394

We'll be holding a virtual training on February 22nd, and the registration is not up yet, but we'll send out information about that soon. Possibly, as the follow up to tonight's webinar.

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But I just want to reiterate the best way to hear about news alerts about upcoming migrations in in March,

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And sometimes even February, is by joining the DEC Delivers email lists,

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where we also send out information about programs like tonight,

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00:16:42.413 --> 00:16:48.203

and you can do that on the AM&RC web page, on the DEC website.

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00:16:48.234 --> 00:16:55.703

And I just want to let, you know, so there's, I've highlighted there's a subscription box specifically on that page for this project embedded.

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00:16:56.033 --> 00:17:06.443

And it's different than the pop up that you get when you first enter the DEC site. We're not you can't sign up for this list through that pop up box.

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00:17:06.443 --> 00:17:14.034

We have to make sure you get to the website, the web page rather and go to that box specifically that says you want to receive alerts for amphibian migrations.

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00:17:17.453 --> 00:17:27.804

Okay, so with that, I'm going to look at the Q and A panel. Q and A, as Mary Beth is speaking and I'll get to those questions later during our Q and A.

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00:17:27.804 --> 00:17:40.884

So, for now, though, I'd love to wrap up my update of the AM&RC project. And I'm very happy to introduce today's speaker Dr. Mary Beth Kolozsvary. Mary Beth brings a depth of experience

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00:17:40.949 --> 00:17:53.394

and expertise, research experience as well on vernal pools to this webinar series. And I'm really happy this is how we're kicking it off. Mary Beth is an associate professor of environmental studies and sciences at Siena College.

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00:17:53.814 --> 00:17:58.554

She has broad interests in biodiversity, conservation, and ecosystem ecology.

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00:17:59.423 --> 00:18:07.644

And much of her research has focused on pool breeding amphibians and ecological importance of vernal pools as key habitats for those species.

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Her research is also included evaluating the effectiveness of vernal pool construction, and of state regulatory policies and approaches.

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00:18:17.094 --> 00:18:29.903

Mary Beth is a member of the North Atlantic Landscape Conservation Cooperative Steering Committee, and she co-leads the Northeast Partners in Amphibian and Reptile Conservation's vernal pool working group. So welcome. Mary Beth.

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00:18:29.933 --> 00:18:36.864

I'm gonna stop sharing my screen. So, you can start sharing yours and let me just give you the

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00:18:37.739 --> 00:18:41.189

the presenter.

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00:18:41.189 --> 00:18:45.028

Okay, you know what just give me a second.

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00:18:45.028 --> 00:18:49.199

I can't actually see you on my list because everything is so tiny on my screen.

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00:18:49.199 --> 00:18:58.229

There we go. Okay, so you should be able to change your screen and, just to remind everyone as Mary Beth loads up her slides.

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00:18:58.229 --> 00:19:10.679

We welcome questions in the Q and A box, and we'll get to them after Mary Beth's presentation. So thank you all for listening to the intro on the amphibian migrations and road crossings project and enjoy the presentation.

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00:19:16.199 --> 00:19:22.199

So, it look good. I think sounds great. It looks great. Mary Beth, I can hear you. Fine.

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00:19:22.463 --> 00:19:32.784

Mary Beth Kolozsvary: All right, thank you so much. All right. Awesome. Thank you so much for inviting me to come and speak about vernal pools, one of my favorite subjects to talk about.

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00:19:32.814 --> 00:19:36.624

I've been studying vernal pools across the Midwest,

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00:19:36.773 --> 00:19:38.034

northern Maine,

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00:19:38.153 --> 00:19:38.542

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00:19:38.574 --> 00:19:49.284

a lot of different regions and so I'm definitely I'm very excited to be able to just talk a little bit about vernal pools and what I know, and am interested in with them.

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00:19:50.128 --> 00:19:54.419

So, a little bit about the outline of the talk, I'm going to

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00:19:54.419 --> 00:20:02.219

explain what vernal pools are kind of, give the definition. So we're all on the same page.

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And then go into why they're so interesting from an ecological perspective. And also I'll speak about some of the focal charismatic species that are associated with vernal pools.

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So we'll get into that a little bit.

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00:20:18.088 --> 00:20:30.598

And then I'll identify, why they are particular conservation interests. What are some of their major threats, whether they're direct or indirect threats.

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And then with the remaining time, I would like to highlight some,

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00:20:38.459 --> 00:20:41.423

talk about some highlights from a research project,

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00:20:41.693 --> 00:20:47.544

where we can take a little bit of a closer look at vernal pools and the vernal pool ecology,

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00:20:47.693 --> 00:20:54.564

and maybe getting you to think about how they fit in with their landscape setting and what we know about them.

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00:20:54.564 --> 00:20:56.723

And what we still do not.

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00:20:59.753 --> 00:21:00.114

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00:21:00.233 --> 00:21:02.243

So first off vernal pools,

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00:21:02.784 --> 00:21:04.044

so vernal pools,

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00:21:04.044 --> 00:21:13.854

the term vernal means relating to the spring and that's the time when vernal pools are at their deepest.

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00:21:13.884 --> 00:21:21.173

The term vernal pools have been specifically applied to seasonal pools in Mediterranean environments.

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00:21:21.564 --> 00:21:25.884

So hot dry summers. Cool,

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00:21:25.884 --> 00:21:40.344

wet winters. So, on the western coast of continents so, places like California, California has vernal pools, specific vernal pools in California and they're very different from the pools,

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00:21:40.374 --> 00:21:46.673

the vernal pools that we have. In the Northeast California, vernal pools are gonna be in a more open

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00:21:47.068 --> 00:22:01.943

Habitat, open landscape, whereas here in the Northeast, our vernal pools are associated with northeastern deciduous or Eastern deciduous forest landscapes. So they're a little bit different. There are a couple other terms.

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00:22:01.943 --> 00:22:14.334

You might run across "woodland pools", "seasonal forested pools," "temporary ponds" other terms that are used to the describe vernal pools.

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00:22:14.608 --> 00:22:24.144

So just getting out to the same terminology, but it's very common in the Northeast and Midwest to call these vernal, referred to them as vernal pools.

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00:22:24.653 --> 00:22:33.233

So, this is showing on the slide, shows the same vernal pool during different parts during different seasons in a given year.

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00:22:33.473 --> 00:22:46.013

So, on the far left is, in the winter or late winter, when there's, I still on the pond, , the middle one is early spring when, before leaf out.

179

00:22:46.554 --> 00:22:59.453

And on the far right is towards the end of summer when the pool is dry. So that's your typical cycle on a vernal pool of what it looks like throughout the year. So what are vernal pools?

180

00:22:59.483 --> 00:23:04.433

Vernal pools are seasonally flooded shallow depressions.

181

00:23:04.709 --> 00:23:08.398

And they contain water for part of the year.

182

00:23:08.398 --> 00:23:15.298

They can fill from snow melt or some pools

183

00:23:15.298 --> 00:23:20.153

we call them autumnal pools, can fill actually in the fall.

184

00:23:20.364 --> 00:23:20.634

So,

185

00:23:20.634 --> 00:23:23.304

when you get that might dry out by the end of summer,

186

00:23:23.304 --> 00:23:23.993

but when you get those,

187

00:23:23.993 --> 00:23:27.713

nor Easterns coming up the East Coast or groundwater,

188

00:23:27.713 --> 00:23:35.634

may rise a little, some pools may actually fill in the fall. And it's really that length of the timing,

189

00:23:35.634 --> 00:23:44.963

and length of duration, or inundation of the pool that drives the ecology of the pool. So that's key

190

00:23:45.443 --> 00:23:55.794

key to these systems affecting what the physical or abiotic or non-living characteristics of the pool. So that pool hydrology, the temperature,

191

00:23:55.824 --> 00:24:09.983

how quickly it dries out, as well as drives what types of species can occur there. So it drives the biota as well. Ones that can, whether or not they can actually exploit this pool.

192

00:24:10.348 --> 00:24:13.648

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193

00:24:14.729 --> 00:24:21.354

They're also considered isolated waters. So what do I mean, by isolated?

194

00:24:21.534 --> 00:24:35.243

So, it means that they are not connected to any permanent water body. So there's no permanent open water connection to lakes or streams and they have that cyclic drying.

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00:24:35.243 --> 00:24:48.144

So, either they dry every year, many of them dry, they fill by late winter, early spring, hold water to like, mid summer. Maybe late summer, and they'll dry every year.

196

00:24:48.894 --> 00:24:49.134

,

197

00:24:49.163 --> 00:24:52.614

Some pools may hold water in some years,

198

00:24:52.884 --> 00:24:57.084

but even semi permanent pools that have that cyclic drying phase,

199

00:24:57.294 --> 00:25:04.044

help drive the ecology and basically filter out some species that are not going to be able to exploit it.

200

00:25:04.044 --> 00:25:06.354

So, it really drives the ecology there.

201

00:25:06.689 --> 00:25:11.608

And there are often associated with forests so again.

202

00:25:11.608 --> 00:25:24.719

The forested vernal pools in the Northeast, their association with forests are going to drive the ecology of the pool itself as well as the species that can exploit them.

203

00:25:27.084 --> 00:25:38.604

There it is. And I always put this slide in there to help emphasize. Well, what does the cyclic drying and the seasonal drying mean for the pool and what why why does it make it so important?

204

00:25:38.634 --> 00:25:52.433

Well, one of those filters one of those species, that are not able to exploit these pools are ones that are fish. So fish are often predatory species, and in permanent water bodies

205

00:25:52.433 --> 00:25:59.034

they can be major predators and really affect what other species are able to exploit those areas.

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00:25:59.848 --> 00:26:00.834

The species that,

207

00:26:00.983 --> 00:26:01.374

,

208

00:26:01.433 --> 00:26:04.794

rely and are very highly associated with vernal pools,

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00:26:05.003 --> 00:26:08.183

do very well in this seasonal,

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00:26:09.624 --> 00:26:15.263

seasonally flooded environments that lack fish and other major predators.

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00:26:15.384 --> 00:26:21.144

There's still predators there, but they just don't have that same amount of predation pressure.

212

00:26:22.223 --> 00:26:26.993

And I'll just one more emphasis before I move to the next slide is again,

213

00:26:26.993 --> 00:26:30.144

the emphasis with the forest associating,

214

00:26:30.173 --> 00:26:30.564

,

215

00:26:30.653 --> 00:26:42.114

Energy, the deciduous leaves that fall into the pools are going to be a very important energy base for the communities that live in these pools.

216

00:26:44.038 --> 00:26:52.558

So, to highlight some of the key species, the focal species that are associated with our vernal pools.

217

00:26:52.558 --> 00:27:07.439

So, fairy shrimp, wood frogs, and mole salamanders. So, and I'm going to go into a little bit more detail on each of these groups. So, what, fairy shrimp.

218

00:27:08.064 --> 00:27:18.144

Wood frogs and the family of mole salamanders. These vernal pools,

219

00:27:18.173 --> 00:27:28.223

each of these species are able to exploit this seasonally flooded area for critical breeding habitat for these species.

220

00:27:31.074 --> 00:27:43.614

And depending on where you are in the landscape, in many landscapes, vernal, these vernal pools are the only places that you're gonna be able to see, these species are going to do well in.

221

00:27:44.183 --> 00:27:57.233

It'll vary. Fairy shrimp on the top left. Those species are obligate species. They're not gonna, they're only going to be found in vernal pools. They're very susceptible to predation.

222

00:27:58.104 --> 00:28:12.443

Some of the other, the wood frogs and some of the mole salamanders can exploit some non-vernal pool habitat but in some landscapes vernal pools are all they have and really sustains their populations.

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00:28:12.443 --> 00:28:21.894

And I'm going to talk a lot about the connections between these species and the surrounding forest, these species, the vernal pools, and the surrounding forest.

224

00:28:23.459 --> 00:28:27.568

So first off fairy shrimp. Fairy shrimp are

225

00:28:28.703 --> 00:28:41.963

incredibly great to be able to see upfront and in person. They're small crustaceans. They're orange to green and they are, this is a photo of a male and female.

226

00:28:41.963 --> 00:28:51.713

The male is on top and the female is on the bottom, and when they're in these vernal pools, they're these are showing that right there they're lying on their back.

227

00:28:51.773 --> 00:29:03.503

So, they're swimming on their on their, on their, with their back to the ground and you'll see these abdominal appendages. They're, they wave them through the water.

228

00:29:04.074 --> 00:29:18.953

And they help it helps them to filter water and they gain oxygen that way as well. So it's a respiratory structure as well. The female is on the bottom and to tell the female from the male, I'm not sure if you can see my pointer

229

00:29:19.163 --> 00:29:29.784

So I'm just going to say at the base of the abdomen, you see this big, bulge, and that is the, .

230

00:29:30.388 --> 00:29:33.659

The brood pouch of the female.

231

00:29:34.104 --> 00:29:47.903

And the male that's on top you can tell, it's a male cause it has, it looks like an enlarged head or a helmet. Those are its claspers. So those are the males and females and their filter feeder. So lying on their backs.

232

00:29:47.903 --> 00:29:55.374

They're swimming through the pools, they're filtering bacteria and feeding on filter, bacteria, phytoplankton. .

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00:29:56.183 --> 00:30:05.903

Detritus, zooplankton, whatever they can they can take in. They have you only see them in the very beginning of the pool cycle.

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00:30:05.903 --> 00:30:11.183

So, , late winter, as soon as it's open water, early spring and then you're actually not gonna see them

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00:30:12.173 --> 00:30:21.594

much longer after that. They have these dessication resistant eggs. So their eggs, how do they survive the dry phase?

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00:30:21.773 --> 00:30:28.614

They lay eggs that are dessication resistant so they can stay in the mud over the summer when the,

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00:30:28.644 --> 00:30:33.023

the pool dries over winter, and then when the pool refills in the spring,

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00:30:33.263 --> 00:30:36.084

then the eggs hatch.

239

00:30:36.683 --> 00:30:38.213

They don't have,

240

00:30:38.483 --> 00:30:40.733

they don't have an aerial life stage.

241

00:30:40.763 --> 00:30:49.854

So, they can't disperse on their own, but how they move from one pool to another, how they can disperse, would be the dessication resistant

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00:30:50.183 --> 00:31:02.423

eggs, if they're attached to mud, if an animal walks through and brings them from one pool to another, et cetera, maybe wind, dispersal because they're so small et cetera, that's how they get from one place to another.

243

00:31:02.844 --> 00:31:15.624

They do not last very long. Oops. Let's see if I can go back. Okay. They don't last very long . When the temperature gets to about 50 degrees, then the adults die.

244

00:31:15.713 --> 00:31:18.804

So you're really only gonna see them in the beginning of the season.

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00:31:19.108 --> 00:31:29.909

And these are obligates, these are sitting ducks waiting for a predator to come by and chomp them. So they don't last long in the pools.

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00:31:30.263 --> 00:31:36.384

Wood frogs, another one of the focal key species , for vernal pools.

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00:31:36.653 --> 00:31:36.894

,

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00:31:36.894 --> 00:31:39.324

Wood frogs is a medium size,

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00:31:39.354 --> 00:31:39.624

,

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00:31:39.653 --> 00:31:44.693

as an adult frog they're varying coloration from light tan to,

251

00:31:44.723 --> 00:31:44.993

,

252

00:31:44.993 --> 00:31:53.544

reddish orange and they have this mask that this dark mask that runs from the eye back towards and through the tympanum,

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00:31:54.354 --> 00:31:56.153

which you can't see that's the eardrum.

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00:31:56.183 --> 00:32:03.054

It's dark, so you can't really see them on the slide, but they have like, this, this mask and it's, , and their common name is wood

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00:32:03.054 --> 00:32:17.753

frog and as you can maybe guess they spend their adult life foraging in moist or mesic woodland areas and they only move to breeding sites or for

256

00:32:17.753 --> 00:32:18.294

breeding

257

00:32:18.324 --> 00:32:26.034

and when they over winter, the rest of the time, they're in forest. They're not associated with ponds or streams or anything like that.

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00:32:26.398 --> 00:32:40.824

Speaking of over wintering, I'm not sure if you know this or not, but they can freeze they over winter and they are truly a frog that is adapted for the North. They're one that can actually freeze over winter.

259

00:32:41.334 --> 00:32:53.723

So where do they over winter? They over winter in the leaf litter on the base of the forest floor so they're not be below the freeze line and they freeze solid. The frogsicle I think you can call it.

260

00:32:53.753 --> 00:33:04.703

They have these proteins in their blood that caused the water and their blood to freeze and then this ice in turn sucks water,

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00:33:04.913 --> 00:33:17.784

most of the water out of the frog cells, cause if the cells had water in them and the ice expanded, it can burst the cells, it brings out much of the water, not all of the water out of there.

262

00:33:18.054 --> 00:33:32.784

And so that the cells won't burst and then their liver starts producing glucose, which is like an antifreeze and so that helps, protect them through this frozen state.

263

00:33:32.844 --> 00:33:40.223

They have no heartbeat. They have no brain activity and they're little frogsicles around, throughout the winter.

264

00:33:40.943 --> 00:33:53.903

And then when the temperature begins to warm, and the ice melts, the frogs begin to thaw. So the water slowly thoughts, I wish I had a video. Definitely check out YouTube.

265

00:33:53.903 --> 00:34:00.983

You can find some videos of freezing frogs. The blood starts to flow. The liver begin, uh.

266

00:34:01.888 --> 00:34:11.579

The blood begins to circulate and they, eventually thaw out and as soon as they thaw out, they had to the breeding pools.

267

00:34:13.103 --> 00:34:25.434

So, I have this awesome video, and I wasn't able to play the audio that goes to it, but I, I will play the I will play the picture. This is, as soon as, they're considered explosive breeders.

268

00:34:25.523 --> 00:34:32.273

So, as soon as the thaw out, they go to the breeding ponds immediately, and they set up for breeding.

269

00:34:32.454 --> 00:34:46.193

And so the males will arrive at the site and they'll set up these territories and they sound like a bunch of quacking ducks or clucking ducks or something like that. I don't know they have this huge chorus.

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00:34:46.224 --> 00:34:54.384

And and you'd be like, why, why do I hear ducks quacking in the woods in the middle of the night? Well, it's probably wood frogs if it's the early spring.

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00:34:54.773 --> 00:35:08.123

And so they have this explosive breeding event where the males set up these little territories as they're calling, trying to attract the females. I'm going to play the video briefly, even though I know you can't hear it, just

272

00:35:08.123 --> 00:35:12.864

so you can look at the nervous water and maybe be able to see the frogs setting up their territories.

273

00:35:13.108 --> 00:35:16.559

Well, I didn't do it, right?

274

00:35:37.289 --> 00:35:51.028

They attract the females, the males will fight for the females. It's a, it's a feeding frenzy, but it's not a feeding frenzy. It's a mating frenzy. The male will

275

00:35:51.028 --> 00:35:59.099

hop on to the female, grab onto the female with the front leg, and then the female

276

00:35:59.099 --> 00:36:13.284

swims over to, like, a branch or something, some attachment site that she can lay her egg masses. So on the top right of the video shows, a few of the egg masses from wood frogs. So they lay their eggs out.

277

00:36:13.284 --> 00:36:24.054

They have external fertilization. So, the female begins to exude the eggs and the male that's gripping her from the top.

278

00:36:24.384 --> 00:36:38.903

releases sperm and fertilizes the eggs as she deposits the eggs on these branches. And what's interesting that all these wood frogs you'll see a bunch of wood frog egg masses. Each wood frog lays one of these egg masses.

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00:36:38.903 --> 00:36:42.264

It can hold up to 1,500 eggs in it. They're very loose.

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00:36:42.713 --> 00:36:56.003

They look like tapioca pudding from the outside before they start to disintegrate and they'll lay their eggs in this communal mass also called an eggraft in the warmest part of the pool. Wood

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00:36:56.003 --> 00:37:09.653

frogs are adapted, well adapted for Northern environments, for winter. They're also really wired to have to reproduce really quickly.

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00:37:09.653 --> 00:37:15.293

The eggs hatch really quickly. So warm temperatures are going to help the eggs hatch

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00:37:16.648 --> 00:37:23.818

quicker and the, the larva develop quicker. , and they're definitely wired to

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00:37:23.818 --> 00:37:31.438

to go do their thing, grow as quickly as they can, and get out of the pool before it dries up.

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00:37:32.123 --> 00:37:46.284

So those are the egg masses and let's see on the lower right I show what the tadpole stage is. Eggs last, I don't know, 2 weeks till a month before the

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00:37:46.853 --> 00:37:50.213

tadpoles begin to hatch out. The tadpoles the first,

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00:37:50.213 --> 00:37:51.023

couple of days,

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00:37:51.023 --> 00:37:54.954

they'll be hanging right around the egg masses cause there'll be algae on the egg masses,

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00:37:54.954 --> 00:38:02.634

and they'll be eating there, and then they disperse throughout the pool such as in the in the lower photo.

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00:38:03.023 --> 00:38:03.414

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291

00:38:04.164 --> 00:38:18.264

They are filter feeders, so they'll feed on algae in the water columns. They're going to move actively, , and they're trying to get as much food as they possibly can in such, a competitive environment.

292

00:38:18.264 --> 00:38:30.864

So, although they might not have predators, there's a lot of their brothers and sisters out there trying to get food, and so they're all trying to get food, grow as quickly as they can so that they can make it to their metamorphosis,

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00:38:30.864 --> 00:38:34.793

So they can transform into adults before the vernal pool dries up.

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00:38:37.019 --> 00:38:47.940

And the rest of the time, I, the only other thing I want to mention about wood frogs is emphasize that they over winter

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00:38:47.940 --> 00:38:55.409

and then as soon as they thaw they head to the breeding pools and the rest of their adult life they're

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00:38:55.409 --> 00:39:05.400

dispersed throughout the forest, foraging. So there's that association between the vernal pool and the surrounding forest, very important for this species.

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00:39:05.400 --> 00:39:19.409

Spotted salamanders are also early spring breeders. The top photo, the top left photos shows a spotted salamander moving towards the breeding pond and you'll often see them

298

00:39:19.409 --> 00:39:33.985

crawling over snow. They cannot freeze over winter, so they burrow underground, old, small mammal burrows, but they don't have an adaptation to be able to freeze. So they have to, they can't freeze.

299

00:39:33.985 --> 00:39:40.465

So they need to stay warm enough. And then as soon as their burrow, or whatever, thaws out, snow melts,

300

00:39:40.920 --> 00:39:45.179

they're going to head to the ponds.

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00:39:46.164 --> 00:39:48.025

The males typically arrive first,

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00:39:48.054 --> 00:39:57.894

and then the females follow after, and they have also have interesting breeding displays,

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00:39:58.014 --> 00:39:58.315

,

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00:39:58.315 --> 00:40:01.855

the males when you get all the males and females arriving at these pools,

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00:40:02.034 --> 00:40:04.585

they'll you'll have what we call a breeding congress.

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00:40:04.614 --> 00:40:15.715

Well, you'll have the males and the female swimming and swarming around as the males are trying to court the females and trying to attract them. So that they can mate with them. They do not have.

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00:40:15.744 --> 00:40:16.164

,

308

00:40:16.195 --> 00:40:18.625

So they have internal fertilization,

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00:40:19.554 --> 00:40:24.144

but it's a little different than maybe you imagine. The lower left photo shows,

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00:40:24.744 --> 00:40:27.565

the ground of a vernal,

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00:40:27.565 --> 00:40:30.954

the bottom of a vernal pool and it has these little white

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00:40:31.945 --> 00:40:36.684

dots on there, and those are what we call spur metaphors or sperm packets.

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00:40:36.715 --> 00:40:49.764

So the males and females are doing their little swarming thing, their congress and then the male ago and deposit the sperm packets on the ground. And then hopefully a female will have liked him.

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00:40:50.034 --> 00:41:00.594

And they'll go over there and then take the coaca, and go over the sperm pack packet and suck it up. So that's how they have their internal fertilization. So, it's really interesting.

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00:41:00.594 --> 00:41:11.425

And if you get to see that, if you have a vernal pool, and you get a chance to be able to see that in the witness that in the spring, the spotted salamander congregates, it's pretty awesome.

316

00:41:12.864 --> 00:41:26.905

So, they also lay their eggs and egg masses. They have between, like, 30 and 250 in an egg mass. The females of lay 1 to 2 egg masses. They're a little bit or they're more firm than the wood frog masses.

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00:41:26.905 --> 00:41:34.824

So you can tell them apart, they have this outer coating around the edge, which helps protect them a little bit more from predators.

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00:41:34.824 --> 00:41:46.855

So, it takes spotted salamander eggs maybe a month 6 weeks, 2 months, depending on water temperature to develop before the larva can hatch out . Wood frogs are a lot quicker.

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00:41:49.469 --> 00:42:04.050

There are there are some egg predators, on spotted salamander egg masses. Caddisfly larvae, some of those can prey on the eggs. Leeches, spotted turtles.

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00:42:04.050 --> 00:42:09.630

Then the eggs hatch out into little larvae.

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00:42:09.630 --> 00:42:17.369

Spotted salamander larva again they take a little bit longer than wood frogs to develop, but they also, .

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00:42:17.369 --> 00:42:20.550

emerge from the pod, let's say, may be in July.

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00:42:20.815 --> 00:42:26.184

Depending on the, the actual drying regime of the pond and they are predators.

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00:42:26.215 --> 00:42:35.815

So they'll feed on they'll, they'll feed on so, plankton, smaller invertebrates, et cetera as a larva or even little baby tadpoles as well.

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00:42:36.119 --> 00:42:40.650

And both wood frog tadpoles and spotted

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00:42:40.650 --> 00:42:44.335

salamander larva do have predators in these pools.

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00:42:44.335 --> 00:42:56.394

? are really specialists in these vernal pools, and they'll feed on, other invertebrates in these pools as well as the wood frog tadpoles and spotted salamander larva as well.

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00:42:56.425 --> 00:43:03.085

So, there are predators in these pools, but it's just not as intense as the permanent ponds, such as.

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00:43:04.320 --> 00:43:08.639

permanent ponds yeah.

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00:43:08.639 --> 00:43:17.190

Fish, that's what I was gonna say, fish. I'm not going to cover the other mole salamanders. We've got some other great

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00:43:17.215 --> 00:43:28.284

iconic focal key species in the Northeast, the marble salamanders, which actually lay their eggs in the fall in the dry basin before it fills.

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00:43:28.554 --> 00:43:32.905

And they'll breed in these autumnal pools that fill up over winter.

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00:43:33.085 --> 00:43:46.945

So they get a head start on species like the spotted salamanders and then you've got the Jeffersons complex and the blue spotted hybrids, and they'll tend to, at least the Jeffersons, r breed a little bit earlier than the spotted salamanders.

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00:43:46.945 --> 00:43:55.914

So, they get a little headstart as well, but their life history is similar to the spotted salamander and just as with the wood frogs

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00:43:56.130 --> 00:44:11.070

spotted salamanders are only here at the pools to breed. The rest of the time soon as they're done breeding, they take off and they're forging in the uplands surrounding the pools and dispersing through out the forest.

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00:44:14.065 --> 00:44:24.594

And one last thing I want to mention about vernal pools, and why they're so interesting and important. So moving beyond the focal, iconic, focal species.

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00:44:24.894 --> 00:44:30.985

Some of the more recent research looking at more of a holistic

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00:44:31.260 --> 00:44:40.855

research into the pools in terms of looking at it in terms of the ecology and more than just the species that occur there. How do these species fit in with the surrounding pool?

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00:44:41.125 --> 00:44:41.605

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00:44:41.635 --> 00:44:42.054

with,

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00:44:42.085 --> 00:44:42.534

,

342

00:44:42.715 --> 00:44:43.675

the food web,

343

00:44:43.704 --> 00:44:44.605

et cetera,

344

00:44:44.844 --> 00:44:45.085

so,

345

00:44:45.085 --> 00:44:46.255

these pools,

346

00:44:46.405 --> 00:44:47.905

because of their,

347

00:44:48.114 --> 00:45:02.664

just imagine these little tiny pools in the middle of a big forest complex, here and they're scattered around. Hold water for a little bit in the spring dry out every year masses of these amphibians and these species go

348

00:45:02.664 --> 00:45:11.755

hang out there and they feed and they breed and whatever. Pool dries and then they disperse around out into the surrounding forest landscape.

349

00:45:12.175 --> 00:45:25.074

So there's been a lot of work that's done, so again, putting that into context. So thinking about these pools, so they're although they're small and size, and they're very small features within this forest and landscape.

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00:45:25.465 --> 00:45:35.275

They have been shown to have very high chemical reaction rates. So, as a result of that seasonal the seasonal wet and drying cycle.

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00:45:35.514 --> 00:45:45.025

So, it's actually, it's they're really hotspots for microbial activity, which helps break down leaf litter.

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00:45:45.204 --> 00:45:55.074

So, thinking about the breaking down the leaf litter, making it available for the base of the food web of the organisms that are occupying these pools.

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00:45:55.105 --> 00:46:08.905

So think wood frogs and salamanders and all these other species that are taking that energy that came from the trees as the leaves gets deposited into the pools and it's getting it's breaking up into nutrients,

354

00:46:08.905 --> 00:46:10.164

et cetera breaking down.

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00:46:10.375 --> 00:46:20.574

Then getting incorporated into these organisms. The, wood frogs, salamanders and other critters, and then they're moving these energy and nutrients from that area out

356

00:46:20.849 --> 00:46:34.704

surrounding and dispersing it through the forest, so kind of looking at it into more of that type of level. So these are really hot spots, really biodiversity, hotspots, biogeochemical hotspots.

357

00:46:34.945 --> 00:46:42.025

Great, you know, ecological hotspots in this forested matrix. So, they're really important.

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00:46:43.974 --> 00:46:49.135

So, hopefully I've established why they're so interesting and why they're so important.

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00:46:49.255 --> 00:47:02.574

And, now I just want to talk a little bit about some of the key threats to these really special habitats, special systems and why they're

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00:47:03.775 --> 00:47:17.454

being lost under and threatened, et cetera. So one, they're very small in size so think about it, , oftentimes, and they dry up. A lot of times people don't even know a vernal pool is there cause it's only holds water for a little while.

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00:47:17.784 --> 00:47:19.195

So they don't know.

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00:47:19.195 --> 00:47:19.644

So,

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00:47:19.675 --> 00:47:20.034

,

364

00:47:20.065 --> 00:47:23.485

they're and they're so they're difficult to detect people don't know,

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00:47:23.485 --> 00:47:25.135

necessarily know where they are,

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00:47:25.494 --> 00:47:25.945

,

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00:47:26.155 --> 00:47:32.335

satellite imagery and aerial photography, you can pick up some virtual tools that way,

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00:47:32.514 --> 00:47:35.574

but it's really difficult, because also think about you've got that

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00:47:35.603 --> 00:47:36.025

,

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00:47:36.324 --> 00:47:37.554

canopy cover.

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00:47:37.704 --> 00:47:43.164

They're small. They're hidden, and it's really hard to get signatures and be able to detect these vernal pools.

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00:47:43.195 --> 00:47:55.554

So, we've got really spotty mapping of where vernal pools are here and there, people know where they are, because they found them, or people did an extensive mapping project or field based project, looking for them, et cetera.

373

00:47:55.855 --> 00:48:09.264

But we've got so much gaps in our knowledge, and in a few weeks, when Matt and Ron speak, Matt, we'll talk a little bit about that as well, as some of the work that he's been doing in New York state.

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00:48:09.715 --> 00:48:14.184

So, they're difficult to map, small in size. You can miss them.

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00:48:14.664 --> 00:48:26.065

And then as well as with other as as wetlands in general if you look into the historical context and research, they have not been historically, they have not been appreciated or valued.

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00:48:26.304 --> 00:48:39.684

You can, it's really funny to actually read some of the attitudes people had, they were scared, or they were fearful for, for, from fearful of wetlands and vernal pools have not been appreciated.

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00:48:39.684 --> 00:48:48.625

Some people think that, oh, it's just a little ditch or a hole in the woods. Well, as hopefully, you know, now, , no, there's a lot more to it. It's not just a little ditch.

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00:48:48.744 --> 00:48:59.094

There's a lot of life in there and, a lot of how they fit in with their surrounding forest as well. So historically, unfortunately, they've not been appreciated.

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00:49:01.045 --> 00:49:14.094

And so because of that, you know, they're small size and their lack of connection to permanent water bodies, they fall through a variety of regulatory cracks. So.

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00:49:14.429 --> 00:49:19.050

You know, they're they, they tend to lack federal

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00:49:19.050 --> 00:49:32.755

Protection, only sometimes maybe, and there's always the court cases and decisions going on, and I'm actually not sure what's going on right now. But they fall through the cracks in terms of the federal regulations.

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00:49:32.934 --> 00:49:41.034

In New York state, your state only regulates, in terms of freshwater wetlands, larger wetlands. So 12.4 our larger

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00:49:42.119 --> 00:49:50.429

acres or larger wetlands in the state. So, again, falling through the regulatory

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00:49:50.429 --> 00:49:59.340

cracks, however, New York state, and I think Matt will probably talk about that in a few weeks,

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00:49:59.340 --> 00:50:12.090

does have, allow for regulating smaller wetlands of unusual local importance. So that, again I'm giving more of a push for Matt's talk, but

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00:50:12.114 --> 00:50:23.635

check it out, learn a little bit more about that particular study and learn a little bit more about how they're trying to understand a little bit more about vernal pools throughout the New York state.

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00:50:23.695 --> 00:50:30.355

And trying to identify, you know, which ones of these vernal pools maybe would,

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00:50:30.659 --> 00:50:41.670

maybe could fit that criteria. I don't want to steal his thunder so I'll leave it at that. But so they, you know, they, they fall through the regulatory cracks.

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00:50:42.204 --> 00:50:53.934

So, because they fall through the regulatory cracks, they are susceptible for filling and draining either intentionally or unintentionally when people don't even know what they are.

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00:50:54.235 --> 00:50:58.375

So it could be filling and draining for things like

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00:50:59.280 --> 00:51:04.380

agriculture, development, .

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00:51:04.380 --> 00:51:12.179

And so, of the pool itself, because they're not regulated. And also,

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00:51:12.295 --> 00:51:26.184

remember think about that connection with the pool and how it's situated and, , you know, the deciduous forest, and the landscape surrounding it and the pools and just a pool. If you cut down all the forest around it,

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00:51:26.215 --> 00:51:31.224

you build up roads all around outside the pool...it's really, you know, it's not gonna.

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00:51:31.530 --> 00:51:36.599

be a vernal pool anymore, cause it's not going to be able to support those species that

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00:51:36.985 --> 00:51:37.764

use the pool.

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00:51:37.914 --> 00:51:39.954

So the pool itself,

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00:51:39.954 --> 00:51:41.905

it can be filling in draining or,

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00:51:41.934 --> 00:51:42.264

you know,

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00:51:42.264 --> 00:51:44.545
so the destruction of the pool,

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00:51:44.784 --> 00:51:45.235

,

402

00:51:45.445 --> 00:51:48.864
the destruction of the surrounding landscape,

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00:51:48.864 --> 00:51:50.184
the forested landscape,

404

00:51:50.215 --> 00:51:53.005
what helps protect the quality of the water.

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00:51:53.545 --> 00:51:55.344
So, you know.

406

00:51:55.769 --> 00:52:07.980
removing forested vegetation and increasing pollutants in the vernal pools can make it not habitable by these species or the

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00:52:07.980 --> 00:52:13.974
yeah, degradation, loss of I think that's where I was going with that. Okay. Here's my picture.

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00:52:14.364 --> 00:52:14.784

,

409

00:52:15.204 --> 00:52:15.505
and,

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00:52:15.534 --> 00:52:15.715
yeah,

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00:52:15.715 --> 00:52:21.505

and here's my picture that shows an example of at the center you've got your a little vernal pool,

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00:52:21.715 --> 00:52:25.434

and then you've got think about not just a vernal pool,

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00:52:25.675 --> 00:52:32.635

but how it situated in the landscape in terms of forest, that these species need the forest,

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00:52:32.664 --> 00:52:36.085

and if you cut down on the forest around the pools,

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00:52:36.295 --> 00:52:39.985

you're just not gonna have the species to be able to,

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00:52:40.284 --> 00:52:40.795

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00:52:41.130 --> 00:52:47.519

occupy those pools. And then also along with that destruction of habitat,

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00:52:48.144 --> 00:53:02.275

as with the road crossings project that Laura was talking about, thinking about roads as barriers or other or other barriers to migration. So what frogs and spotted salamanders? They move out into the surrounding forest.

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00:53:02.304 --> 00:53:10.675

They spend all their time out there as part of the food web, bringing that energy and nutrients that, , they produced and that

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00:53:10.949 --> 00:53:25.224

produce their biomass moving it out throughout the forest, as part of the food web, and as they're, you know, preying on other animals and vertebrates, et cetera out there. And then they over winter and they don't over winter right

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00:53:25.224 --> 00:53:38.545

next to the pool, they overwinter in these upland areas. And then when the spring rains come, high thirties around 40 degrees, and it's raining at night, you'll get these steady rains, you'll get these migrations of

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00:53:39.235 --> 00:53:48.355

Amphibians. So wood frogs, spotted salamanders, a whole group's walking, migrating towards these pools because again, they're early spring breeders.

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00:53:48.775 --> 00:54:02.875

And so when they've got roads as a barrier to migration, they're susceptible to roadkill along those areas. Again. You're gonna have a couple other seminars that are going to discuss that a little bit more, but that can also isolate a pool.

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00:54:02.875 --> 00:54:16.675

It can affect its ability to support species on the species and with that connection, it affects the connection to the forest. And I'm bringing this one last picture.

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00:54:16.675 --> 00:54:18.295

I wanted to show in there.

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00:54:19.469 --> 00:54:22.860

I'm only showing pictures, you know of a

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00:54:22.860 --> 00:54:36.690

vernal pool talking about the surrounding the forest and landscapes around it, but think of it on a larger context. So, a whole forest with lots of little vernal pools around, or forest connecting them.

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00:54:37.614 --> 00:54:40.434

And Rob's going to talk about that at least,

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00:54:40.434 --> 00:54:41.304

in some extent,

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00:54:42.054 --> 00:54:42.894

to some extent,

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00:54:43.315 --> 00:54:44.514

in a few weeks,

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00:54:44.514 --> 00:54:47.545

when she talks about the approaches that they've used in Maine,

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00:54:47.784 --> 00:54:55.375

where they've tried to take this landscape approach and try to identify important areas and set asides to help,

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00:54:56.394 --> 00:54:56.724

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00:54:56.724 --> 00:55:02.695

protect important vernal pools as well as that connection between the vernal pools and having,

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00:55:02.784 --> 00:55:03.264

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00:55:03.570 --> 00:55:16.019

that the ability for wood frogs and spotted salamanders to be able to disperse between pools and to connect them as part of a larger forest-vernal pool complex.

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00:55:16.019 --> 00:55:27.179

So this is where I take a look at the time to make sure I've got enough time. Oh, I don't really have much time. So I wanted to talk a little bit about

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00:55:27.179 --> 00:55:38.699

a study that I think I've got, like, 6 more minutes, 8 more minutes, something like that. So I'm gonna kind of highlight a particular study that I undertook, but I'm going to go through it

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00:55:38.699 --> 00:55:51.235

and just hit on the high points. So we talked a little bit about efforts to conserve vernal pools, the problems with the regulatory approach. There's public education.

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00:55:51.445 --> 00:55:56.755

You'll be hearing some other initiatives, and a couple of weeks about how to protect vernal pools.

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00:55:56.934 --> 00:55:57.264

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00:55:57.324 --> 00:55:59.005

One of the more recent,

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00:55:59.065 --> 00:55:59.364

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00:55:59.394 --> 00:56:02.875

efforts have been taken is become popular in some areas,

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00:56:03.085 --> 00:56:11.005

is to try to create vernal pools to try to mitigate their loss or to enhance forest habitat.

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00:56:11.094 --> 00:56:12.175

And on the surface,

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00:56:12.175 --> 00:56:16.494

this sounds like oh, wow. That might be a good idea, but

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00:56:18.030 --> 00:56:25.469

vernal pools, and think about how they fit and their unique hydrologies and their setting in a forested

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00:56:25.469 --> 00:56:37.344

complex, how difficult it is, it may be to be able to replicate something like that. So, these are actually one of the most difficult wetland systems to create.

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00:56:37.974 --> 00:56:41.244

So proceed with caution.

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00:56:41.695 --> 00:56:56.005

And another problem what initiated the study, that I'm just gonna give a quick run through, is that the the monitoring that was being done was insufficient, and really hasn't been long term.

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00:56:56.034 --> 00:57:10.014

So, there as mitigation for a vernal pool loss, or wetland loss, or enhancing, sometimes there's required mitigation, but our monitoring of the pools and insufficient criteria.

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00:57:10.045 --> 00:57:19.315

maybe just looking for some type of breeding. But we felt, my colleague and I felt that it had been insufficient and not long term enough.

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00:57:19.344 --> 00:57:33.655

So, we undertook a study to try to evaluate the success of some of these mitigation projects creating vernal pools cause because to date the projects had been

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00:57:33.929 --> 00:57:37.860

limited in terms of the scope of the monitoring.

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00:57:37.860 --> 00:57:40.949

So, there were about 12

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00:57:41.364 --> 00:57:48.114

vernal pools that were created in Orange County near Stewart airport back in 2006.

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00:57:48.114 --> 00:57:59.605

These vernal pools had been monitored for 10 years. Of the 12 pools that they had constructed 5 pools did not help hold water at all.

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00:57:59.635 --> 00:58:03.775

So right off the bat before I even started my study, that's a problem.

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00:58:03.985 --> 00:58:04.585

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00:58:04.644 --> 00:58:05.094

so again,

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00:58:05.094 --> 00:58:09.264

giving more evidence that vernal pools can be tough to

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00:58:09.264 --> 00:58:09.474

,

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00:58:09.474 --> 00:58:09.565

create.

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00:58:09.565 --> 00:58:09.864

,

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00:58:09.864 --> 00:58:13.465

I had a colleague at Yale Smyers Forest,

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00:58:13.494 --> 00:58:13.735

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00:58:13.735 --> 00:58:28.614

and we wanted to compare these created pools to natural vernal pools or pools that had a long history of wood frog and spotted salamander breeding. So we compared the pools at Stewart that I studied

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00:58:28.614 --> 00:58:30.235

with the pools at Yale's Myers forest.

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00:58:30.235 --> 00:58:32.994

And this is my colleague Meredith Holderson

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00:58:36.030 --> 00:58:44.639

, who we worked on the study, it was published in 2016. And in 2013 and 2014 we looked at

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00:58:44.639 --> 00:58:57.474

physical habitat, water chemistry, and look at the amphibians and invertebrates leaf litter and algae.

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00:58:57.474 --> 00:59:00.085

So, try to look at it much more holistically.

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00:59:00.480 --> 00:59:13.320

We looked at we took measurements of the pool basin characteristics I'm just gonna because, , the of the time factor, , I'm gonna.

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00:59:13.465 --> 00:59:26.815

Go a little quicker. We measured things like the pool basin. So how deep was the pool? What was the size of the pool? Did the edges of the pool have this gradual?

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00:59:26.844 --> 00:59:28.554

, .

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00:59:28.860 --> 00:59:41.579

Or was it a sharp drop off or it was a gradual decline or edge? We also looked at vegetation and we looked at the substrate.

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00:59:41.579 --> 00:59:51.119

So, percent of leaf litter, rocks, logs, potential attachment sites. And the top right looks at

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00:59:51.119 --> 00:59:58.349

canopy cover. So we took these fish eye lens little views

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00:59:58.349 --> 01:00:09.960

of the canopy to look at how open or closed the canopy, and we took them when the leaves were off and when the leaves were fully on. And the top

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01:00:09.960 --> 01:00:13.590

, photo shows a pool that has

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01:00:13.590 --> 01:00:28.224

a much more open canopy so maybe not much is much more sunlight coming in maybe not as much leaflet or coming in. Whereas the one at the bottom on the top photo of the bottom one has a lot more trees over and in full leaf out

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01:00:28.224 --> 01:00:33.324

it's gonna be a much more shaded, maybe have a lot more leaflet or input to the pools.

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01:00:33.719 --> 01:00:44.130

We also measured nutrients in these pools. We measured water chemistry, on conductivity and the water temperature.

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01:00:44.130 --> 01:00:48.300

Of these pools.

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01:00:49.045 --> 01:00:57.804

And we tried to be holistic and we measured algae. So we put microscope slides out and had algae growing on them,

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01:00:57.835 --> 01:01:04.164

took water samples of phytoplankton and we went out

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01:01:04.440 --> 01:01:18.389

a couple times or twice a month to sample amphibian larva. We counted numbers of egg masses, and we also went out with dip nets to collect macroinvertebrates.

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01:01:20.184 --> 01:01:20.724

So,

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01:01:21.175 --> 01:01:24.175

just going right to the results ,

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01:01:24.385 --> 01:01:26.635

what we found were different,

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01:01:26.635 --> 01:01:26.905

some,

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01:01:26.934 --> 01:01:30.114

some of the key differences in the created versus the,

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01:01:30.144 --> 01:01:30.655

,

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01:01:30.684 --> 01:01:33.114

reference or the natural vernal pools,

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01:01:33.445 --> 01:01:36.534

the created pools were smaller in size.

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01:01:36.894 --> 01:01:40.105

and they also had a much more open canopy.

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01:01:42.414 --> 01:01:56.304

And if you remember in the beginning of the talk of, or throughout the talk, I've talked about how that seasonal drying of the pools that say, quick drying was so important to driving the biota and what species can occur there.

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01:01:56.545 --> 01:02:08.784

And it affects the predators that occur here. With the creative pools, only 5 of them drive seasonally. So basically, 2 of them held water year round. So of the 7 that had water period.

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01:02:09.025 --> 01:02:13.525

And the 7 that I studied, 2 of them were like small woodland ponds.

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01:02:14.130 --> 01:02:17.820

So, not similar to

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01:02:17.820 --> 01:02:22.409

a natural vernal pool.

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01:02:22.409 --> 01:02:34.829

We also captured leaf litter and in an earlier slide, I didn't really show it. We went out and in the fall, when the leaves began to fall, we had these big tomato cages or these big

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01:02:35.094 --> 01:02:39.835

baskets that we put on the pool and then leaves would fall in and we would collect them.

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01:02:39.864 --> 01:02:52.224

So we were able to quantify how much leaf litter was entering the pool cause remember that forest food base for the, for the pools is that leaf litter.

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01:02:52.224 --> 01:02:54.505

So we quantify that ,

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01:02:54.775 --> 01:02:55.045

,

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01:02:55.525 --> 01:02:56.335

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01:02:56.364 --> 01:02:57.355
by capturing it,

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01:02:57.744 --> 01:02:58.074

,

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01:02:58.105 --> 01:02:58.945
and this shows,

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01:02:58.974 --> 01:03:01.164
this graph to shows that,

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01:03:01.195 --> 01:03:01.914
although,

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01:03:02.094 --> 01:03:02.514

,

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01:03:02.545 --> 01:03:05.844
the average leaf litter for the created and the,

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01:03:05.875 --> 01:03:06.355
the,

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01:03:06.414 --> 01:03:08.994
the reference vernal pools were,

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01:03:09.085 --> 01:03:09.594

,

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01:03:09.715 --> 01:03:10.855
very similar,

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01:03:11.099 --> 01:03:16.860

The graph, the,

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01:03:16.860 --> 01:03:24.059

The plot on the left that created pool had a lot more variability. So really.

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01:03:24.059 --> 01:03:36.954

What it came down to is one of the vernal pools that they created had really, heavy forest open canopy. A lot of leaf litter coming in was very similar to the reference pools.

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01:03:37.255 --> 01:03:46.795

But, the other pools really didn't have a lot of that leaf litter coming in and that's gonna be one of the keys to our

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01:03:47.070 --> 01:03:50.519

final recommendations from the study.

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01:03:50.519 --> 01:03:54.000

We also looked at.

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01:03:54.505 --> 01:03:54.715

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01:03:54.715 --> 01:04:00.085

the vegetation so vegetation very similar in the pools,

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01:04:00.114 --> 01:04:01.465

except for,

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01:04:01.675 --> 01:04:02.034

,

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01:04:02.063 --> 01:04:04.074

both the created in the created vernal pools,

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01:04:04.375 --> 01:04:04.764

,

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01:04:04.914 --> 01:04:07.014

that we had duck weed,

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01:04:07.074 --> 01:04:09.985

which is on the one of the lower pictures is duckweed,

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01:04:10.554 --> 01:04:13.974

which is not a typical species that is found in

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01:04:14.005 --> 01:04:14.514

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537

01:04:15.175 --> 01:04:29.724

vernal pools. It's found in more open areas. Phragmites, which is a non native species, was in the vernal pools and cattails. Those are vegetation that was much more abundant

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01:04:30.059 --> 01:04:39.750

in the created pools as compared to the natural vernal pools, which don't have any of that really in it. Very different vegetation.

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01:04:40.405 --> 01:04:55.014

Nutrients increase throughout the season, which makes sense with the drying of the pools, the concentration of the nutrients. And then if you have a lot of wood frogs and spotted salamanders again, more nutrients in there.

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01:04:55.344 --> 01:05:02.905

Water temperature was higher in the created pools. Likely that was a result of

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01:05:03.210 --> 01:05:16.769

the more open canopy. The quality of the water was differ was different in the

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01:05:16.769 --> 01:05:19.135

in the created vernal pools as well.

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01:05:19.344 --> 01:05:20.094

So,

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01:05:20.244 --> 01:05:20.574

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01:05:20.574 --> 01:05:23.994

higher pH could be more in the landscape of the area,

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01:05:23.994 --> 01:05:25.375

but the conductivity,

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01:05:25.614 --> 01:05:26.034

,

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01:05:26.304 --> 01:05:27.534

these pools,

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01:05:27.565 --> 01:05:34.644

some of the pools were within 100 meters of this new access road and we found much higher levels of,

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01:05:34.675 --> 01:05:35.335

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01:05:35.364 --> 01:05:36.025

,

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01:05:36.534 --> 01:05:38.155

conductivity in the,

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01:05:38.514 --> 01:05:39.534

the

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01:05:39.534 --> 01:05:41.005

the pools near the roads.

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01:05:42.090 --> 01:05:46.769

So, Laura is the time is that why you're popping on.

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01:05:48.000 --> 01:05:53.969

Okay, so we're getting close to opening up for Q and A. All right so I'm, I'm going to.

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01:05:53.969 --> 01:05:57.449

click through these slides.

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01:05:57.684 --> 01:06:05.635

To the the bottom line slide and Laura will be sharing the slides with you.

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01:06:05.994 --> 01:06:16.465

So you'll have those. I'm going to share my email at the end as well and there's a published paper. So we can chat later.

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01:06:16.769 --> 01:06:21.840

I wasn't sure if I was, should be able to go into this or not. So.

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01:06:21.840 --> 01:06:24.869

I think I'm just going to.

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01:06:27.239 --> 01:06:31.079

We need to go on to the chat. Oh, my God. I see the time now.

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01:06:34.255 --> 01:06:47.545

I guess the bottom line was, we didn't do very well in terms of creating the vernal pools we can do a lot better. One of the key findings we found were, it was really difficult to get the flooding right.

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01:06:47.574 --> 01:06:58.824

The, , that that cyclic drying phase, and that's gonna be an important driver for the water chemistry the hydrology and the species that occur there and also

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01:06:59.219 --> 01:07:10.590

they need to take into consideration that canopy cover much more. So, if you saw those little images of the canopy overheads, where there wasn't

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01:07:10.590 --> 01:07:20.010

much, a lot of sunlight was coming in, not a lot of leaf litters coming in, those are not mimicking natural vernal pools.

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01:07:20.010 --> 01:07:24.119

So, we can do better.

Proceed with caution.

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01:07:26.670 --> 01:07:40.079

That's it. You can email me. We can open up for questions and answers, but I definitely encourage you guys to feel free to email me and contact me and take a look at those slides.

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01:07:41.250 --> 01:07:46.530

Laura Heady: Great Thank you so much. Mary Beth.

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01:07:46.855 --> 01:07:52.284

Well, if you want to leave that up for a few minutes, so people can get down your email and we can look at the beautiful photos.

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01:07:53.094 --> 01:08:06.715

I have lots of questions that I can ask, you know, they're really great question so much, because you definitely got people's wheels spinning. And I'm getting lots of messages that people have been enjoying the presentation. So thank you.

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01:08:06.715 --> 01:08:19.885

First of all. So, I'll let you take a sip of water if you want for a minute. And I'll just there were a couple of questions related to just the amphibian migration road crossing project.

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01:08:19.885 --> 01:08:27.864

And somebody talked about wanting to potentially start something similar. And I didn't have a chance to point out that on the DEC webpage

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01:08:28.194 --> 01:08:42.564

we have links to 5 different recorded training modules that are kind of recorded PowerPoints on YouTube. They cover everything from why vernal pools and forests are important, to amphibian identification, how to volunteer.

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01:08:42.564 --> 01:08:45.145

So those are all linked on the DEC

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01:08:45.779 --> 01:08:58.045

webpage for the project. There's also a volunteer handbook, which was adapted from other programs in the Northeast. So there's some consistency there. And you're welcome to download that.

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01:08:58.045 --> 01:09:11.185

And there's also, I have set up kind of a teaching lesson on the mock migration for indoor trainings, which I know we can't do right now because of covid, but if that's something of interest to you, I'm happy to share that as well.

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01:09:11.784 --> 01:09:20.454

You just need to send me an email to get that, and maybe one of my colleagues, or I can put it in the chat as Mary Beth starts answering questions.

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01:09:20.454 --> 01:09:32.154

I'll put my email in the chat box, but in the meantime, going back to the beginning of your talk Mary Beth, somebody asks about fairy shrimp, if there's multiple species or only one.

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01:09:32.460 --> 01:09:36.840

How long are they present in pools and who is their predator?

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01:09:36.840 --> 01:09:41.909

Mary Beth: So there are multiple species.

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01:09:41.909 --> 01:09:50.369

Of fairy shrimp, some more common than others. They are only in the adult

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01:09:50.369 --> 01:09:55.949

phase in the very beginning of the poo. Like, if you show up.

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01:09:56.875 --> 01:10:10.104

after the wood frogs lay their eggs, it might be too late. I might be wrong about the timing there. And so they actually go through a couple of breeding cycles in that beginning, but there's a couple of different species.

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01:10:10.135 --> 01:10:23.064

What was the other question and who is who preys on them? I'm not sure who preys on them and the and I think that's part of the timing of why they're actually they're so early.

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01:10:23.395 --> 01:10:35.574

They are, they grow bigger. They hatch out, they grow bigger and the, anything that would be feeding on them is too small. I don't know what actually takes them. Laura Heady: I think birds.

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01:10:35.635 --> 01:10:40.854

I think birds do too probably birds and ducks and things like that. That land and pools. Wood ducks are often...

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01:10:41.550 --> 01:10:51.510

I'm just speculating, I'm not a fairy shrimp expert. Me neither I guess. , but they're fascinating and I do think of them as being there earlier.

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01:10:51.534 --> 01:11:01.194

Like, I feel like, if you get to the pools, you know, you think you're there at the beginning of the season, and often the shrimp are already done. So exactly.

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01:11:01.555 --> 01:11:10.585

So there was also questions about, the very interesting, frozen wood frog. So, you know, one is if you've ever found one yourself.

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01:11:10.979 --> 01:11:17.579

But also, , what is the trigger for their heart to resume beating when it thaws?

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01:11:17.579 --> 01:11:23.550

Do you know that? Mary Beth: So I am not an expert on.

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01:11:23.550 --> 01:11:29.340

The freezing frogs, but I think.

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01:11:29.340 --> 01:11:40.914

That as it warms, I think, I don't know, I'm assuming as as it begins to melt and it begins to warm up. It's a slow process. The, the, , I, I can't comment on that. Laura Heady: Yeah, no, that's okay.

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01:11:41.244 --> 01:11:54.805

But you can something you can probably comment on is, how to wood frogs find vernal pools? And I think the question might have been asked about salamanders as well. Do they return to the same pools?

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01:11:55.074 --> 01:11:58.645

Are they following the same migration patterns over generations?

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01:11:58.890 --> 01:12:01.949

Mary Beth: Well, .

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01:12:01.949 --> 01:12:05.220

So there is, .

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01:12:05.220 --> 01:12:16.854

Spots that are salamanders in general. They often return. They there have been long term studies where they've looked to see if the same individual comes back to the same pools.

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01:12:17.064 --> 01:12:24.654

And there is a high return of adults returning to where they were born. But

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01:12:26.064 --> 01:12:39.204

spotted salamanders and the other mole salamanders they're actually more long lived and so they'll breed several, they'll have several breeding episodes throughout their life, and there's been some long term, tagging studies

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01:12:39.204 --> 01:12:54.175

I think, with marble salamanders where they've seen where they switch pools. So, they're not necessarily tied to that specific pool. Yeah wood frogs breed once maybe if they're lucky twice in their life, that's it.

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01:12:55.104 --> 01:13:07.914

I forgot. Yeah, yeah. Laura Heady: I didn't know that I thought wood frogs were breeding every year.

Mary Beth: Yeah, they the new new ones or different ones. So you'll have, they don't they do not live very long.

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01:13:08.185 --> 01:13:08.784

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01:13:08.814 --> 01:13:11.154

And if you actually, one thing,

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01:13:11.154 --> 01:13:13.435

I did forget that that breeding frenzy is a little crazy,

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01:13:13.435 --> 01:13:15.114

and you'll often,

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01:13:15.114 --> 01:13:16.885

and the males are,

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01:13:16.885 --> 01:13:17.185

like,

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01:13:17.215 --> 01:13:24.114

really grabbing onto the females are very aggressive and you'll often see dead wood frogs on the side of the pool.

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01:13:24.114 --> 01:13:31.765

right at the end, right after the breeding frenzy is over. So the females probably only make it once. Mm. Hmm.

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01:13:32.340 --> 01:13:41.069

Laura Heady: So somebody also asked getting out in the field if there's any tips to identify pools during the dry period.

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01:13:42.930 --> 01:13:43.465

Which I know,

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01:13:43.465 --> 01:13:44.664

we look for things,

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01:13:44.664 --> 01:13:50.604

like first of all there's a depression in the forest and often you'll notice that the leaves look different because,

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01:13:50.635 --> 01:13:50.904

you know,

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01:13:50.965 --> 01:13:52.494

leaves that have been submerged under water,

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01:13:52.494 --> 01:13:58.194

kind of flatten out in a different way than what's in the surrounding area and there might be some siltation marks,

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01:13:58.225 --> 01:13:58.524

you know,

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01:13:58.524 --> 01:13:59.125

in the,

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01:13:59.154 --> 01:14:05.965

the bottom of the leaves or or even showing kind of the water level on the trees that might be in or on the margins of the pool.

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01:14:06.210 --> 01:14:14.159

But also, if you scrape in and look at the soil, it often looks a little bit more organic and you might even find clam shrimp shells to.

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01:14:15.210 --> 01:14:20.369

Also, some, some aquatic vegetation, like, sphagnum, I mean, .

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01:14:20.369 --> 01:14:25.619

Oh, my gosh, it's late in the day for me. What is it? , why am I oh....

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01:14:25.619 --> 01:14:34.680

tussock sedge, it might be, you know, hanging out where you don't expect it to be, but any other thoughts on that?

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01:14:35.904 --> 01:14:49.824

Mary Beth: Yeah, I think I think you hit the depression and then, you know, just think about that, the hotspots of microbial activity and decomposition. Yeah. The, it's going to be just a little bit different there. Yeah, but, yeah, sometimes it's hard to tell.

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01:14:50.159 --> 01:15:04.260

Laura Heady: And then, so, I don't know if you're, you know, this, and we're probably going to hear about this from Matt Schlesinger at the last webinar of the series. Matt is from the New York Natural Heritage program and

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01:15:04.260 --> 01:15:16.229

going to be talking about the vernal pool mapping project in New York state, but do you know right now, is there any online site for people to report locations of vernal pools? Like kind of an atlas

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01:15:16.229 --> 01:15:22.260

project I thought there was something, but I don't know the latest. Mary Beth: I think there is.

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01:15:22.260 --> 01:15:26.069

so tune in yeah.

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01:15:26.095 --> 01:15:35.034

Okay, great because I'm sure though, I don't know that I don't think they are running it, but I think I do think they're, I thought, yeah, I do too.

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01:15:35.034 --> 01:15:49.854

Laura Heady: And so that's something that's something that I can add to the follow up email if I get if I get that. But I see it looks like a number of people, too, who were asking questions also plan on coming to the subsequent webinars.

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01:15:50.095 --> 01:15:53.904

Let me just check real fast how we're doing on time. Okay, great.

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01:15:54.239 --> 01:16:01.680

So, are you aware Mary Beth, of any studies of vernal pools out in Long Island?

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01:16:01.680 --> 01:16:13.319

I mean, there's certainly different because they have Tiger salamander that's one species that we don't have in the Hudson River Estuary, that's out on Long Island and I know that they, did use the state.

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01:16:13.524 --> 01:16:14.125

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01:16:14.604 --> 01:16:15.234

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01:16:15.354 --> 01:16:17.755

the wetland designation unusually local,

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01:16:18.414 --> 01:16:21.204

unusual local importance for those vernal pools,

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01:16:21.204 --> 01:16:24.145

because they were too small to be protected by New York state,

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01:16:24.175 --> 01:16:24.564

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01:16:24.595 --> 01:16:27.295

in the kind of the more standard regulatory methods,

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01:16:27.295 --> 01:16:29.515

but they were able to get that designation.

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01:16:29.515 --> 01:16:34.045

But do you know of anything else different about vernal pools out on Long Island? I've never actually seen them myself.

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01:16:34.319 --> 01:16:39.779

Mary Beth: so there are some longterm studies.

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01:16:39.779 --> 01:16:45.239

going on at Brookhaven National Lab. So they have a whole,

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01:16:45.239 --> 01:16:59.095

behind gates and closed doors, you can't necessarily get into, but they've got long term research going on there and they have a bunch of Tiger salamanders and pools there and yes. The, the pools on Long Island are a little bit different.

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01:16:59.095 --> 01:17:08.725

I think that they're groundwater fed or being affected by that on Long Island and they've got the tiger salamanders. So it's a whole different beast down there.

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01:17:09.354 --> 01:17:14.814

But I don't know of anybody in particular other than the folks that Brookhaven that are actually researching out there.

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01:17:15.149 --> 01:17:26.699

Laura Heady: Okay, thank you. Mary Beth: but, yes, they're, they're on people's there's there on people's watch list, like you said, yeah. Protected under unusual local importance. So some of them and, .

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01:17:26.699 --> 01:17:31.619

Laura Heady: Along those lines, let me see, I just lost my place here. .

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01:17:32.364 --> 01:17:43.944

Oh, I don't know if you want to speak at all about, somebody asks who designates and maps vernal pools in New York State forests. Does does New York State have any protections in place for vernal pools?

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01:17:43.944 --> 01:17:53.784

I don't know if you want to, you already touched on this, do you want to expand on that at all? Or do you want me to? So, the question is whether, who designated maps vernal pools in New York state for us.

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01:17:54.060 --> 01:17:57.420

Does New York state have any protections in place for renal pools?

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01:17:57.835 --> 01:18:12.475

Mary Beth: So they don't have any protections in place for vernal pools. You can tell me if I'm lying Laura, and they don't have anybody going out there and mapping. There is the work that Matt's going to be talking about. But that's not necessarily

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01:18:12.625 --> 01:18:27.354

I don't, I don't believe that was restricted to state properties at all. Maybe it was, but there's not a comprehensive there's not a comprehensive effort. Like there have been in other states. Laura Heady: And some states actually have programs to designate pools

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01:18:27.354 --> 01:18:36.265

Bb certain indicators. New York state doesn't have that and the way the New York state regulations are and Mary Beth, I think, mentioned this

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01:18:36.539 --> 01:18:50.125

The wetlands need to be 12.4 acres and larger, and most vernal pools are, you know, maybe a quarter or half an acre, an acre and New York state in addition to the size threshold in order to be eligible for wealth and protection,

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01:18:50.125 --> 01:19:03.895

they have to be on the New York state, freshwater wetland map, and, as Mary Beth alluded to vernal pools are very difficult to map. It's very labor intensive. So that's the answer to the first part of the question. So there isn't really a

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01:19:07.824 --> 01:19:16.015

A ready, a way that New York state is protecting vernal pools, in the typical way they protect freshwater wetlands.

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01:19:16.015 --> 01:19:25.824

With the exception of when they've used the designation of unusual local importance for a threatened or endangered species. Like they did for the small wetlands,

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01:19:26.125 --> 01:19:39.534

the small pools used by Tiger salamander in Long Island. But there are other ways that vernal pools get protected: through wildlife management areas, through different state parks, different other DEC

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01:19:39.534 --> 01:19:47.034

forest preserves. Things like that. But there isn't a statewide effort currently.

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01:19:47.845 --> 01:20:02.604

We both have said the webinar later this month with Matt Schlesinger, he's going to talk about a research project looking at vernal pools in New York state, which might be helping to kind of set the stage for future mapping or future investigation.

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01:20:02.909 --> 01:20:06.000

I hope that answered the whole question.

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01:20:06.000 --> 01:20:19.645

I also wanted to swing back to the idea of created pools. One attendee commented that, if it's hard to create vernal pools, it just highlights how important it is to protect them.

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01:20:19.675 --> 01:20:22.314

This was not a failed experiment, which I thought was great.

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01:20:22.314 --> 01:20:35.664

And I think it also points to the idea that any wetland creation is difficult, because each one is so incredibly unique for the set of circumstances that, you know, determinants, hydrology and chemistry and all of that.

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01:20:35.664 --> 01:20:41.305

And, and along those lines along those lines, somebody asked if the created pools had liners.

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01:20:41.850 --> 01:20:51.210

Mary Beth: I think that these ones did I, I did not create these pools. These, this was particular did I think they were.

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01:20:51.210 --> 01:20:57.750

Like, a clay liner, so they tried to.

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01:20:58.255 --> 01:21:09.414

Laura Heady: I think folks are interested too, and learning more about creation of vernal pools. I know the Susquehanna watershed area have done a lot.

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01:21:09.954 --> 01:21:21.864

They were trying to create pools up in the watershed there and then also getting back to your research too,

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01:21:23.454 --> 01:21:36.444

Mary Beth: And I'll just mention that that would be a good thing to send out into maybe at a follow up email to contact information for the upper Susquehanna coalition, because they have been they've come a long way and they've been,

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01:21:36.475 --> 01:21:36.895

you know,

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01:21:37.015 --> 01:21:39.204

I don't I don't know exactly what their program is,

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01:21:39.204 --> 01:21:44.574

but they're definitely looking at their protection program from a more landscape perspective.

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01:21:44.935 --> 01:21:49.435

Right great. I think they're putting them in the forest now, instead of the open.

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01:21:49.494 --> 01:22:01.284

Laura Heady: Are you aware of any research on impacts of invasive woody species on the health and quality of vernal pools or species like, jumping worm?

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01:22:01.890 --> 01:22:07.590

Mary Beth: I am not sure so.

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01:22:07.614 --> 01:22:20.845

Jumping worms in a vernal pool. Laura Heady: Well, in the forest, I would think too, you know how it affects to me. They're a real threat for forest habitat for, for salamanders and frogs that live in the forest floor. Yeah.

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01:22:20.875 --> 01:22:28.494

Mary Beth: Not for the vernal pool itself, because I'm assuming because of the flooding and their life cycle wouldn't mesh.

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01:22:29.039 --> 01:22:32.970

, but, yeah, I mean, they're a problem.

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01:22:32.970 --> 01:22:47.699

Laura Heady: Yeah, just be the fact that they're turning leaf litter so quickly that there's really no, that micro habitat for amphibians that need the moisture in the forest floor is removed. Anything about invasive species that are impacting health and quality vernal pools?

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01:22:47.845 --> 01:22:58.494

Mary Beth: Well, so, I'm trying to think off the top of my head...one of the big problems that we have. I don't know if you could call this invasive species or not,

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01:22:58.494 --> 01:23:05.904

but a lot of the diseases. So rana virus is a disease that has

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01:23:06.720 --> 01:23:17.729

exploded since the since I was in Acadia so like around 2000. It's spread from pool to pool and can

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01:23:17.729 --> 01:23:30.024

cause mortality. Rana virus so it's more of a, a lot of the diseases and the movement, and the spread of diseases between pools, and the effects on the populations can be detrimental.

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01:23:30.324 --> 01:23:34.914

And there's a lot of research into that.

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01:23:35.279 --> 01:23:50.274

I, you know, maybe these, I, I don't know of any particular invasive species as being introduced. These created pools had a lot of invasive non native species, but remember these pools were not natural pools, right right.

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01:23:50.274 --> 01:23:50.545

Yeah.

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01:23:52.529 --> 01:24:07.255

Laura Heady: Somebody asked about with the AM&RC project, is there a list or map of road crossings in the Hudson Valley? Currently we don't have a map that we publicize in terms of specific locations in part just because of concern of collection,

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01:24:07.284 --> 01:24:15.984

which amphibians and reptiles are vulnerable to, because, I mean, just look at the picture of that spotted salamander on Mary Beth's last slide here.

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01:24:15.984 --> 01:24:27.534

It's certainly charismatic species that somebody might like to have in a, in a tank and an aquarium tank, and they have in the past been selected illegally. And so

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01:24:27.810 --> 01:24:41.635

what I do have and what we do, what we include in the annual reports is kind of more of a region wide map that gives general locations of where volunteers have gone out. And you can see that again on our DEC project page. I want to just check on the time.

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01:24:41.664 --> 01:24:54.114

We're getting close to time. I'm going to ask you to just stop sharing your screen for now, just so that I can, let's see, here I just want to bring up the

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01:24:54.449 --> 01:25:01.800

W dates just to remind everybody about the

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01:25:01.800 --> 01:25:11.729

presentations that are coming up in the webinar series later this month, or next month or either we're at the end of this month.

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01:25:12.114 --> 01:25:13.914

Let's see here. Let me just scroll back.

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01:25:13.944 --> 01:25:14.154

Yeah,

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01:25:14.185 --> 01:25:18.984

just to remind everyone that on February 1st,

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01:25:19.045 --> 01:25:24.625

we have two presenters that are going to be giving case studies of how we can use the data that

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01:25:24.654 --> 01:25:31.645

we're collecting and our knowledge of where there are high mortality road crossings to try to mitigate that.

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01:25:31.645 --> 01:25:37.164

And so we'll hear from Brett Amy Thelan from New Hampshire about road closures that they were able to,

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01:25:37.164 --> 01:25:40.045

or a road closure that they were able to put into place,

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01:25:40.375 --> 01:25:40.675

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01:25:40.704 --> 01:25:47.125

based on migration data. And then a case study from Vermont here from Chris from

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01:25:47.125 --> 01:25:53.875

from the Vermont transportation department about an under road tunnel that was put in place for wildlife,

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01:25:53.904 --> 01:25:54.984

particularly salamanders.

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01:25:54.984 --> 01:25:58.494

He's got great footage. And then on the

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01:25:58.920 --> 01:26:10.135

15th, we have the webinar with Dr. Calhoun from University of Maine and Dr Schlesinger from the New York Natural Heritage Program.

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01:26:10.135 --> 01:26:19.345

And again, I know Mary Beth alluded to this already, but they'll be talking more about some of the habitat conservation considerations for vernal pool protection.

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01:26:19.345 --> 01:26:32.965

And Maine does have a more aggressive program in place now for trying to mitigate vernal pool habitat and Matt will talk about the mapping.

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01:26:32.965 --> 01:26:45.805

And then I also wanted to save the remind you to save the date. If you're interested in AM&RC virtual volunteer training. That's on February 22nd at 5 pm and we'll hopefully be sharing that announcement when we follow up on this webinar.

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01:26:46.890 --> 01:26:55.409

I'm going to stop sharing and just maybe see if we can just wrap up with a few more questions. Actually, I don't even need to stop sharing.

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01:26:56.609 --> 01:27:05.880

Right. I wanted to ask you too if you know anything about road salt, somebody brought up whether road salt is known to be a problem for pools and vernal amphibians.

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01:27:05.880 --> 01:27:17.189

Mary Beth: It is. There's been quite a few studies on that. It can affect the growth in the development of the larva. And that's that was one of the

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01:27:17.189 --> 01:27:23.550

things I wanted to show on that particular slide because the created pools have been put

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01:27:23.550 --> 01:27:34.770

in by the Stewart airport access road, and several of them, like, several of them were close to the road within the, the buffer distance that

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01:27:34.770 --> 01:27:41.729

it has been shown of the road effects of salts in the pools. That's why we were doing out there

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01:27:41.729 --> 01:27:45.899

measuring conductivity of the pools.

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01:27:46.135 --> 01:27:58.255

High conductivity, high road salts and we found just as within the other research within, I can't remember how many meters, you have a lot of effects from the road. So that is a very important thing to talk about.

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01:27:58.314 --> 01:28:06.175

Not just the, you know, it's degrade degradation of the pool and affecting the species that can occur there.

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01:28:07.885 --> 01:28:18.505

Laura Heady: I feel like my computer is telling me it's time to end the webinar, because I'm suddenly getting all these black boxes with no writing showing up over the Webex. Let's see.

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01:28:20.909 --> 01:28:27.479

Oh, I just wanted to, right somebody asked you to explain what you mean by conductivity in the water quality testing, you were doing.

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01:28:27.479 --> 01:28:39.960

What that means, okay, if you've got just brought it up. Mary Beth: Yeah. So if you got particles, you get the electrical conductivity, the ability to move electrical

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01:28:39.960 --> 01:28:48.149

conductivity through water. So, if you have particles, like, , you know, like the, .

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01:28:48.149 --> 01:28:54.689

from road salts in there, that's going to increase the conductivity. Polluted waters tend to have higher conductivity.

729

01:28:56.784 --> 01:29:09.505

Laura Heady: Okay on that, let's conduct ourselves appropriately here and webinar on time. And just to remind everybody that we did record today's session and we will be posting it on the DEC website.

730

01:29:09.505 --> 01:29:23.664

And so we'll share that link with you as well as PDF, a PDF file of the slides and lots of links and other resources to follow up. I'm sorry, we didn't get to everybody's questions, but we'll save those and try to see if we can't follow up and address some of them.

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01:29:23.935 --> 01:29:32.574

And I just want to say, thank you so much to Mary Beth for sharing your enthusiasm and your expertise. And, clearly, it's a topic of great interest.

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01:29:32.574 --> 01:29:41.784

And we're what is it January 20 something, 5th we're about a month and a half away from the activity starting to get underway, so

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01:29:42.149 --> 01:29:47.640

hope to see you all continuing learning in this webinar series. And, as I said that, you know.

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01:29:47.640 --> 01:29:56.399

Ingrid been posting the links for all of these, registration and websites and so forth in the chat box. So please follow up or follow up with us.

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01:29:56.399 --> 01:30:00.270

All right, well, thanks everyone I'm going to stop recording and say so long.

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01:30:01.829 --> 01:30:04.710

Thanks again Mary Beth. Bye Thank you.