

Hudson River Estuary Grants for Watershed Studies and Reconnecting Streams

April 11, 2024

1:00 pm – 2:30 pm

Hudson River Estuary Grants Webinar Series

NYS DEC Hudson River Estuary Program

[Not recorded in automated transcript]

Ingrid Haeckel:

Good afternoon Everyone! My name is Ingrid Haeckel, and I am Manager of the Hudson River Estuary Program at the DEC. Welcome to our 3-part Hudson River Estuary Grant webinar series! Today's webinar will focus on grants for a variety of watershed-based studies and stewardship as well as projects to reconnect streams and restore aquatic habitats. We're very pleased to have three grantees with us to present their work including Mike Rubbo from Pace University, Tracy Brown from Trout Unlimited, and George Jackman from Riverkeeper. My colleagues Scott Cuppett and Susan Pepe are also on the line.

Before we get started, I am going to give some background about webinar logistics. And then we'll give some introduction to the estuary program and grants.

If you're having difficulty with the audio connection through your computer, you can choose to Switch Audio by clicking the three dots next to the red exit button at the bottom of the screen. There you will find the options to request a call back or to call in by phone.

If you need help, please reach out to us via the Chat icon in the bottom right corner of the screen. If you have questions for the speakers once they begin, please use the Q&A function. If it's not open already, you can access Q&A by clicking the three dots next to Chat in the bottom right corner. Note that your phone lines are muted. The webinar is being recorded and we will notify you when the recording is available. It will be posted to the Hudson River Estuary Grants webpage. And lastly, at the end of the webinar, we kindly request your feedback through a short survey that will pop up. Thanks very much.

The Hudson River Estuary Program is a special program at the New York State Department of Environmental Conservation that helps people conserve, restore, and enjoy the Hudson River and valley. We work in the counties bordering the tidal Hudson from New York City Harbor to Troy to achieve many benefits, including fish, wildlife, and habitats, clean water, healthy streams, conserved natural areas, climate adaptation, education, and access for all to the Hudson River. Our work relies on many partnerships and in addition to grants we offer a variety of outreach and technical assistance and fund research and restoration projects.

[Automated transcript begins]

1 Ingrid Haeckel

00:00:02.020 --> 00:00:14.100

The Hudson River Estuary Grants program started in 1999 and provides funding to municipalities and nonprofits located in the estuary watershed boundaries shown here on the right.

2 Ingrid Haeckel

00:00:16.100 --> 00:00:35.420

And these grants helped communities to improve water quality, enhance environmental education and river access and advanced stewardship of habitats and natural resources. Estuary grants implement priorities outlined in the Hudson River Estuary action Agenda with funding from the New York State Environmental Protection Fund.

3 Ingrid Haeckel

00:00:36.060 --> 00:00:45.300

And our recent grant opportunities have included local stewardship planning, tributary restoration and resiliency, river education, and river access.

4 Ingrid Haeckel

00:00:48.980 --> 00:01:01.060

And for more information you can visit the grants webpage, which is on the bottom of the page here. We'll share that in chat and Susan Pepe is our grants coordinator and she's on the line with us today as well to help answer questions.

5 Ingrid Haeckel

00:01:03.780 --> 00:01:23.260

The request for applications in 2024 is not currently open, but typically we offer grants on annual basis and the announcements are made through press release and shared through Hudson RiverNet, which is our newsletter, and you can sign up for that at the bottom of the main page for the Hudson River Estuary program and we'll put that in the chat as well.

6 Ingrid Haeckel

00:01:23.300 --> 00:01:43.540

So you can get that announcement when it comes out. This year applications will be submitted through the statewide financial system, the old Grants Gateway system has been retired. And we'll also be offering a webinar about each RFA with opportunity for Q and A.

7 Ingrid Haeckel

00:01:43.780 --> 00:01:46.540

And those details will be included in the RFA at the time of release.

8 Ingrid Haeckel

00:01:49.580 --> 00:02:08.460

Estuary program staff assist grantees with grant project management, and they also, you know, they often share data and can help provide interpretation. They can share examples from successful projects and review drafts of work, so in addition, our staff can help answer questions.

9 Ingrid Haeckel

00:02:08.780 --> 00:02:23.700

And work with communities that are thinking about putting together an application before the RFA period, so it's good to be proactive and reach out early on if you're interested and have questions. Once the RFAs are released, that process is, a little more restricted.

10 Ingrid Haeckel

00:02:25.700 --> 00:02:37.180

Susan Pepe and I will hold any general questions about the grants to the end of this webinar or we'll answer them through the Q and A.

11 Ingrid Haeckel

00:02:39.020 --> 00:02:54.820

And with that, I'm going to hand over the presentation to Scott Cuppett, who is the Hudson River Estuary Watershed Program Coordinator to speak further about the project types relating to Watershed work. So thanks a lot. I will stop sharing here.

13 Scott Cuppett

00:03:07.100 --> 00:03:10.540

Everyone, thank you, let me get my situation up here.

14 Scott Cuppett

00:03:15.420 --> 00:03:17.140

Can you see it? Can you hear me?

15 Ingrid Haeckel

00:03:17.260 --> 00:03:18.060

Good. Yep.

16 Scott Cuppett

00:03:18.660 --> 00:03:25.220

Okay, thanks Ingrid. Hello, everyone. Scott Cuppett and I coordinate the stewardship and tributary restoration components of the estuary grants and today I'm going to talk about The types of projects that we want to see, encourage, what our priorities are. I'm going to start by saying that our, our program and our grants are essentially encouraging at a basic level a watershed approach and that includes assessing conditions, communicating about what is learned, planning, and prioritizing and implementing projects. Taking a watershed approach is good for numerous reasons. it does help with making decisions that are coordinated and effective.

21 Scott Cuppett

00:04:16.739 --> 00:04:30.780

Our program and our team work in the stream. They work in the municipalities, in watersheds, and at a basin scale, so we operate at different scales depending on what we're trying to move forward.

23 Scott Cuppett

00:04:39.140 --> 00:04:58.500

Our watershed team works on the following general topics: restoring riparian areas, which is our Trees for Tribs, restoring vegetation, trees and shrubs, native trees and shrubs along our stream corridors and our stream buffers. Removing dams, improving our ability to cross aquatic organisms and water underneath roads or culverts. Monitoring water quality in the Hudson River and the tributaries.

26 Scott Cuppett

00:05:12.660 --> 00:05:31.300

And implementing priorities that are in existing Drinking Water Source Protection Plans, so drinking water plans that have been developed in communities. We are interested in helping them implement the priorities identified in those. And finally encouraging watershed planning and stewardship.

27 Scott Cuppett

00:05:34.860 --> 00:05:36.500

These are the people I'm fortunate to work with.

28 Scott Cuppett

00:05:38.100 --> 00:05:47.700

They range from all of the topics I mentioned earlier, and I put their names and the focus areas that they work on.

29 Scott Cuppett

00:05:51.900 --> 00:06:09.940

So in 2023 and the last few years before that, our program, our priorities for the watershed stewardship grants have been assessing and monitoring water quality, developing watershed characterizations, which Mike's going to talk about later from Pace. Planning and designing water quality improvement projects that address known sources of impairment or problems in streams and implementing drinking water plans.

31 Scott Cuppett

00:06:23.460 --> 00:06:28.620

That was our watershed stewardship program. We also have a tributary restoration grant program, which focuses on essentially dams and culverts or road-stream crossings, and today we're gonna hear from Tracy at Trout Unlimited about a culvert mitigation plan or a road

stream crossing plan for a town that she had worked in and we're gonna hear from George about some reconnaissance work around dam removal in the Hudson Valley.

35 Scott Cuppett

00:06:58.700 --> 00:07:01.700

So with that, I'm going to turn it over to Mike. I'm gonna stop sharing.

38 Scott Cuppett

00:07:12.180 --> 00:07:15.300

So Mike while you're putting your up your screen, I'll just give you a little bio that I created on my own here. Mike is currently a professor in the Department of Environmental Studies and Science at Pace University. His interests are wetland ecology, disease ecology and wildlife conservation and management. And I know he has a special fondness for reptiles and amphibians.

40 Scott Cuppett

00:07:37.140 --> 00:07:40.700

With that Mike, let's hear about your work in the Pocantico. Thank you.

41 Mike

00:07:41.540 --> 00:07:44.940

Okay, great. thanks, Scott. Can you all hear me and see my presentation?

42 Mike

00:07:48.580 --> 00:07:51.060

Yes, no. Yes. All right. thanks Scott.

44 Mike

00:07:51.780 --> 00:08:11.900

All right, thank you. Alright, so yeah, thanks Scott and Ingrid for inviting me to come here and talk to you all today about some of the work that we've been doing, hopefully it will be helpful to you that are listening. The way I structured my presentation is to first provide a little bit of background on the work that we've done prior to the grant that kind of helped set the stage for this grant to hopefully give you some context and that necessary background information.

46 Mike

00:08:22.060 --> 00:08:41.539

I'm gonna talk a little bit about how we design the project to fit in with the funding guidelines and then finally I'll give you a little taste of what we found so far. The grant is still in process we are wrapping it up shortly, but we're still going through some data analysis. I'm gonna talk about some of our preliminary findings and then our next steps.

47 Mike

00:08:41.700 --> 00:08:43.979

Where we go from here? What's our next step in this process?

48 Mike

00:08:46.100 --> 00:08:55.580

So, as a reminder, this grant was part of the 2022 funding cycle, so I guess it was Round 32. So, it's been a couple of years now.

49 Mike

00:08:57.860 --> 00:08:58.060

Alright.

50 Mike

00:09:01.020 --> 00:09:20.100

Okay, so in terms of background, the Pocantico watershed, we are in Westchester County. So here on the left is the Hudson River. So we're just north of Sleepy Hollow. Just south of Ossining.

51 Mike

00:09:20.300 --> 00:09:31.100

The watershed itself is about 9,500 acres. It's located in the towns of Ossining, Mount Pleasant, Newcastle and the villages of Briarcliff, Sleepy Hollow, and Pleasantville.

52 Mike

00:09:32.940 --> 00:09:53.340

It originates up in Echo Lake in the north, which is a small manmade lake. I don't know if you can see right here in the, the figure. The river itself originates at Echo Lake and then flows 9.5 miles to the south into the Hudson.

53 Mike

00:09:53.380 --> 00:10:13.780

In terms of major watershed features, in terms of open spaces down here in this other end, we have Rockefeller Park and Preserve, which is I think it's up to about 2,000 acres now. I think they just got some new land. There's a town park called the Hardscrabble Wilderness area. There's Pocantico Lake County Park. Those are all public facilities. Private facilities I don't know if you guys are familiar with Stone Barns, but Stone Barns Center for Food and Agriculture has a sizable portion of land.

54 Mike

00:10:13.940 --> 00:10:33.700

Then in terms of private areas of open space, there's the Edith Macy Conference Center, which is about four hundred acres. They're affiliated with the Girl Scouts and then there's Campfire Club, which is another couple hundred acres, which is in the northern end of the watershed.

55 Mike

00:10:36.500 --> 00:10:53.900

So a little bit of background on the watershed itself and conservation work within the Pocantico watershed. Historically, there have been two main watershed groups, which is kind of interesting for a smaller watershed. There's a group called the Pocantico River Watershed Conservancy, which I think is still in existence is a 501c3, it was founded in 2012.

56 Mike

00:10:54.940 --> 00:11:15.300

Then there's also the Pocantico River Watershed Alliance, which is more of a community-based watershed group, their focus is primarily been on education, both groups are currently inactive. The PRWA was fairly active prior to Covid and then since then it just hasn't gotten kind of restarted.

57 Mike

00:11:15.460 --> 00:11:30.460

There is a need to bring these groups together, I think part of the problem is they need to have some sort of strategy and goals for the conservation of the watershed to give the groups a focus and something to work on.

58 Mike

00:11:35.300 --> 00:11:54.740

In terms of some of the prior work that we've been doing in the watershed, and when I say we am referring to myself and colleagues at Pace, in 2016 we received an Estuary Program grant to map all of the habitats in the watershed, so that's what you're looking at right here. And the left-hand figure is the watershed itself.

59 Mike

00:11:55.180 --> 00:12:14.420

Everything in green, the dark green, is forested habitat. Everything that's whited out is developed areas. So for the watershed itself, is about fifty percent is developed and thirty percent is forested and then there's kind of a mix of other habitat types within the watershed.

60 Mike

00:12:15.700 --> 00:12:35.500

We use these data to really start to focus in on where are the major areas where we could focus on land conservation within the watershed. And that's in this figure to the right. We identified what we're calling "priority conservation areas", and those are just basically those large intact sections of forests you can see on the left.

61 Mike

00:12:36.780 --> 00:12:56.340

That's really the most significant patches of intact habitats still available in the watershed. The southern conservation areas primarily composed of Rockefeller Park. There's also a county park in there as well in Stone Barns as I mentioned. There is some private land, but not a lot.

62 Mike

00:12:56.620 --> 00:13:16.700

So most of that is already protected. So maybe the focus there would be more on stewardship and enhancement of that land. And in the northern section up here, that's composed of that town park I mentioned Hardscrabble Preserve and the Campfire Club and the Macy Center.

63 Mike

00:13:16.980 --> 00:13:37.380

So up here, the northern section, I'd say more than half of it is currently privately owned, so there is a need to think about how can we ensure their protection of that area. What I didn't include on this figure is any sort of corridors connecting these habitats, so that's another area where we're gonna start to think about how can we identify ways to connect these habitats so wildlife can move across these areas.

65 Mike

00:13:45.700 --> 00:13:57.260

We followed the habitat mapping up with some other work looking at biodiversity within the watershed. Really quickly, I'll just talk about a camera study we used. This was not funded by an Estuary Program grant. It's just more background information.

66 Mike

00:13:59.460 --> 00:14:18.940

You can see in the left we have a figure of the watershed. The dots represent camera locations, so we use wildlife cameras and the color of the dots represent the number of species. So red dots are kind of lower species richness, two to three species. Yellow or medium, four to five, and green are higher species richness, six species or so.

67 Mike

00:14:18.980 --> 00:14:38.820

We didn't find anything too surprising with this study, mostly the species you would expect to find especially in terms of carnivores, lots of coyotes, a fair amount of fox, some bobcat, but it did help us kind of get a better understanding of where the species are occurring in the watershed.

68 Mike

00:14:39.580 --> 00:14:50.140

Species like the bobcats seem to be restricted to the northern area and the southern area, those larger blocks of intact habitat. There also have been reports of fisher in the watershed. We didn't get those during this study, but they are in the area as well.

70 Mike

00:14:57.820 --> 00:15:17.220

So why did I tell you all that? It was basically to give you an idea of what the current knowledge base was of the watershed prior to this grant. There were some disparate studies that had been conducted, but nothing was really linked. It was just kind of the interest of individual researchers.

71 Mike

00:15:17.900 --> 00:15:37.900

Rockefeller Park has done some work as well on their preserve. So there's a need to really start to pull together this information so we can establish a baseline of the current conditions in the watershed. So that was really the need that kind of, that this grant arose from, is pulling all this information together so we can really have it all in one place and get a better picture of what's going on in the watershed.

73 Mike

00:15:45.500 --> 00:16:05.580

So when thinking about what we needed to do to make this happen, we identified a few key steps. So obviously the first and foremost is the collation of existing data, so getting the data from all those different players in the watershed and bringing it all in one place. We also realized that we were missing some data. We didn't know much about the condition of the river itself.

74 Mike

00:16:05.940 --> 00:16:08.780

We wanted to conduct some ecological assessments of the river.

75 Mike

00:16:10.500 --> 00:16:13.060

We also wanted to engage stakeholders in the river or in the watershed I should say.

76 Mike

00:16:15.540 --> 00:16:35.020

We wanted to get their thoughts on the condition of the river and what their concerns are. and beyond the major stakeholders we also wanted to engage the general public as well. There was an interest in conducting additional fish surveys. The DEC have done some fish surveys as well as other organizations such as Hudsonia.

77 Mike

00:16:35.660 --> 00:16:55.540

They've been kind of spread throughout the river, so we wanted to fill in the gaps and survey areas that had yet to be surveyed. And then finally, we wanted to conduct some water quality assessments to understand what's going on with the condition of the water in the river. I want

to be clear that this was not part of the grant. This is just kind of additional information that I'm going to be talking about today.

78 Mike

00:16:57.860 --> 00:17:15.780

When we were thinking about the project itself and getting ready to look for funding opportunities, when looking at the RFA that came out at that time, there was a category called water quality monitoring, watershed characterization, and water quality improvement.

79 Mike

00:17:16.459 --> 00:17:36.540

So this is all text directly from the RFA from 2020, and based on what our needs were, which were, were these that I'd mentioned earlier, we felt that we would fit best under a watershed characterization. It really kind of meshed nicely with that category.

80 Mike

00:17:36.900 --> 00:17:57.140

The goal of watershed characterizations is to prepare partners to create more comprehensive watershed-based management plans. Getting all of that information together to start to lead to the development of a watershed plan, is what the focus of a watershed characterization is. We felt based on our needs and based on the category in the RFA, there was a nice kind of logical fit here with the watershed characterization.

81 Mike

00:17:57.300 --> 00:18:16.940

Looking further within that category once you start applying there's a bunch of different subcategories and one is conservation impact, and once again, this is text from the RFA.

82 Mike

00:18:18.100 --> 00:18:38.060

For conservation impact, the goal is to identify how the project will lead to future conservation decisions. Once again, when thinking about our project in that context, as I said before, the goal of our project was to create a baseline of information on the watershed. Gather that data, fill in the gaps of knowledge, and use the data for future planning efforts.

83 Mike

00:18:38.180 --> 00:18:52.700

We felt it was pretty clear how, what the conservation impact of our project was, is, you know, the data that we were proposing to collect were absolutely necessary to create future plans for the conservation of the watershed. Once again, the first step in this process.

84 Mike

00:18:55.860 --> 00:19:14.660

This is a little bit about what we proposed to do, in our watershed characterization. As I said before, once again collect any existing data that was out there from the watershed. We reached out to DEC fisheries and other organizations that have done work in the watersheds such as Riverkeeper who've been doing water quality monitoring in the Pocantico for a number of years, as well as other scientists at Pace, researchers at Rockefeller and just local researchers as well. So, reaching out to all these groups, asking if they'd be willing to share data so we can help starting to build this knowledge base.

86 Mike

00:19:34.740 --> 00:19:54.700

As I said before, we realized there was these, the gaps in knowledge as well. We didn't know a lot about the river itself, so we proposed to conduct ecological assessments using the Stream Walk methodology, which is developed by the USDA and another methodology called the NRCS Stream Visual Assessment Protocol. We used both of these to document stream condition.

87 Mike

00:19:54.980 --> 00:20:15.420

We chose these methods because they're rapid assessments so they're quick. They're fairly simple to use, so students could be involved. We thought it was really a good initial step in looking for at least major issues in the river itself. And you can see in the upper picture I have some students out in the field, so.

88 Mike

00:20:16.100 --> 00:20:27.620

I would advise anyone that's listening to try to get better pictures. I'm terrible at getting good pictures. I always forget to take pictures. This is the only picture I have of students out in the field and they were out almost every day for two years in the summer.

89 Mike

00:20:29.660 --> 00:20:50.020

In addition to the assessments, we had proposed to do interviews of major stakeholders in the watershed as well as the general public to learn a little bit about their perceptions of the watershed and any concerns they may have, which would help us structure future work to address their concerns.

90 Mike

00:20:50.060 --> 00:21:01.380

We wanted to conducted water quality testing, but once again, this is not funded by the grant. To do water quality testing, it has to be carried out in a ELAP certified lab, which our lab at Pace is not ELAP certified.

91 Mike

00:21:03.140 --> 00:21:23.300

We did it outside of the grant once again, just to collect that information. We proposed a fish survey of those new locations to add to our existing data set, and then the last thing we proposed to do to share the data, instead of writing a typical report, which tends to end up on a shelf somewhere, we wanted to try something a little different and display all of our data through an ESRI story map.

92 Mike

00:21:23.420 --> 00:21:43.420

If you don't know what a story map is, it's a GIS based service that integrates maps, interactive maps with the website. You can see here this is just a screenshot of a draft of one of our pages that we're working on.

93 Mike

00:21:43.820 --> 00:22:03.660

In this map, you can click on it, it can expand, you can click on the little points in the map, and it brings up data tables where you can get water quality information for each point. This map is for, for species occurrence, so you should click on one of those dots, it'll bring up the species that were located at that specific point. You can integrate text to explain the content of the map and photos as well. We feel it's a really engaging way to present a lot of information to the public. That's really the last step that we propose in this process.

94 Mike

00:22:05.380 --> 00:22:24.420

In terms of what we found in our grant. These are data from the ecological assessments, the ecological assessments looks at a variety of different criteria, so you can see them here along the X axis of the graph. If it's red, it means it was considered poor. Orange was considered fair if you look at the scale here to the left, light green is considered good and dark green is considered excellent.

95 Mike

00:22:24.820 --> 00:22:44.900

All the way over here to the right is the overall score For the Pocantico River, which was a seven point two, which is considered fair.

96 Mike

00:22:45.220 --> 00:23:00.580

And you can see that there were a number of factors that were classified as low. In-stream fish cover, invertebrate habitat, canopy cover, those kinds of things.

97 Mike

00:23:02.700 --> 00:23:06.860

The only category that scored high was habitat hydrological alteration, which has to do with how modified the stream banks were.

98 Mike

00:23:08.900 --> 00:23:28.700

So once again I want to be clear with this, this is a rapid assessment. We did these every 200 meters along the length of the river. I think there were 76 sites in total. So, we definitely didn't cover every square foot or square meter of the river.

99 Mike

00:23:29.780 --> 00:23:49.180

But they give you a general idea of what's out there. So then they could be used to develop more detailed future studies. This is the ecological assessments data. The next thing we looked at as I mentioned, was, conducting a survey of our stakeholders.

100 Mike

00:23:49.500 --> 00:24:03.980

Stakeholder engagement in the RFA was a big part of the grant proposal, and the Estuary program wanted projects to demonstrate effective engagement of stakeholders in the process, and that was actually really important to us as well.

101 Mike

00:24:05.260 --> 00:24:25.620

To have a functioning watershed group, you'd need to have support from your major stakeholders in that watershed. So our first step was to identify key stakeholders, just based on our prior knowledge and discussion with other players in the community. We then created a master list of all potential stakeholders.

102 Mike

00:24:25.980 --> 00:24:41.060

We initially proposed to hold meetings and invite stakeholders and we quickly realized that that wasn't gonna work. We had to go to them. So I worked with a graduate student on this and she did phone interviews with, I think we ended up with close to around 15 people that agreed to meet with her.

103 Mike

00:24:42.660 --> 00:25:02.460

We reached out to state representatives, county and local officials, nonprofit organizations, as well as individuals at private organizations like golf courses or that that conference center I had mentioned earlier.

104 Mike

00:25:02.820 --> 00:25:23.020

We had good luck with the municipal officials. We had good luck with the nonprofits. We did not have good luck with individuals at private organizations. Once they realized that they were going to be recorded or be on the record, they didn't want to participate in the process. So we are currently working on analyzing the data for this.

105 Mike

00:25:23.740 --> 00:25:43.420

I'm an ecologist by training, I'm not a social scientist. We're working with some other social scientists in our department and some of these data are a lot more complicated than I thought they were gonna be. But we're making progress on that and we're gonna hopefully have a summary of the major stakeholder concerns and kind of summarization of their interviews shortly.

107 Mike

00:25:48.380 --> 00:26:07.460

As I said, we also did interviews with the public and these went really well. We had students go out and conduct rapid interviews, there were about five minutes each, mostly in public areas, so parks along hiking trails, along rail trails, those kinds of things. We ended up doing 65 interviews total.

108 Mike

00:26:07.620 --> 00:26:27.940

These were some of the most interesting data from the project, just hearing what the average public knew or thought about the river and the watershed. I should note all of these interviews were conducted within sight of the river itself.

109 Mike

00:26:28.660 --> 00:26:33.780

If you look at this first pie chart up here, "do you think the water is clean or dirty?". Eighty one percent of the people who are there thought that the river was clean, which is a good thing.

110 Mike

00:26:36.660 --> 00:26:44.620

The next one I thought this was interesting as well. "Do you know the name of the river?" Only about half of the people knew the name of the river itself. There's obviously need for some education there.

111 Mike

00:26:46.940 --> 00:27:06.020

The bar graph in the lower left is looking at, is asking "what types of environmental problems do you think might exist here?" and by far and away most people thought pollution was the

major environmental problem. And then one kind of parsing that out a bit further when looking at what specific types of pollution that's this pie chart to the right.

112 Mike

00:27:06.540 --> 00:27:14.020

Most people felt that the pollution was coming from roads or runoff. The next highest category was litter or dumping.

113 Mike

00:27:19.780 --> 00:27:40.140

People thought their river was clean. Was it clean? Well, the water quality data kind of argued otherwise. As I mentioned, we did the water quality data separate from the grant, but I think it's important as part of this whole story as part of this watershed characterization.

114 Mike

00:27:40.260 --> 00:27:45.260

We did testing all along the river, so you can see here each of these, dots is a water quality testing site. We tested for a variety of parameters.

115 Mike

00:27:46.820 --> 00:28:06.540

At the sites that are labeled in red, we tested for all of the parameters. At the blue sites, we also tested for bacteria at those areas. I'm not gonna present all of the data, as I said, we tested for the typical suite: oxygen, pH, conductivity etc.

116 Mike

00:28:07.220 --> 00:28:26.980

I'm going to present the parameters that showed some interesting patterns. So if you look at to the right, the upper graph is looking at phosphate levels in 2022, the lower graph is in 2023. We had fewer sites this year. We kind of pared it back a little bit.

117 Mike

00:28:28.260 --> 00:28:48.100

If you look at average values, there are no regulatory standards for phosphate, but general guidance values are typically below 0.1 milligrams per liter, and if you look at all of our averages, so 0.1 is down here almost all of our sites were continually or most of the time were above that 0.1 threshold. Same thing for 2023. So phosphate levels were high at all of the sites throughout the river.

118 Mike

00:28:50.500 --> 00:29:08.300

Looking at bacteria data, so we also looked at enterococcus along the river. Once again, the upper panel is 2022, the lower is 2023. EPA recommends beach advisories about 60 counts per one hundred milliliters and you could see we are way above that for both years.

119 Mike

00:29:09.220 --> 00:29:29.020

So the bacteria levels for the enterococcus were through the roof at every site from source to sink in the watershed. So that was also a concern. So even though people thought their river was clean, the water quality data are stating otherwise.

120 Mike

00:29:29.260 --> 00:29:48.820

One other thing I thought you might like to hear about. Which is another study a student just conducted this year was looking at wildlife use of culverts. He set up cameras at different culverts in the watershed and looked at open bottom versus closed bottom and a variety of different factors and it was pretty neat. He documented pretty extensive use of culverts by wildlife.

121 Mike

00:29:49.900 --> 00:30:09.940

You can see to the right, there's a bobcat, here's a coyote. We have some deer over here. I guess the major take home, this was a small pilot study, but the take home so far is that when you get any sort of exposed sediment like you see the bobcat walking on here, you're more likely to see more species using that cover, which obviously is common sense, but it was good to document that.

123 Mike

00:30:15.940 --> 00:30:36.140

How was all of this information gonna be used in future decision making? As I said, this project is the first step in creating a watershed plan for the Pocantico River Watershed. So what we did was summarize the info that was out there. We also collected new information. We're pulling all that together, to identify issues of concern.

124 Mike

00:30:36.540 --> 00:30:56.580

So obviously water quality is one right now. Hopefully this information can be used to help direct the future of the Pocantico River Watershed Alliance. As I said, the group is kind of dormant at the moment. It went dormant because it didn't really have a clear purpose, but now we're hoping with this watershed characterization where we've identified specific issues and the steps that we need to take to build the watershed plan, it'll give that group focus and we could reinvigorate the alliance.

126 Scott Cuppett

00:31:09.820 --> 00:31:11.980

Mike, you've got one minute. I'm just giving you a warning.

127 Mike

00:31:12.780 --> 00:31:32.420

Yeah, this is my last slide. I'm almost done. So our last step was to engage stakeholders, so hopefully if we're listening to those stakeholders, we'll get their support and some of this work will also hopefully be used to direct future research for Pace to help us better understand the watershed. Right now, I'm working with the student looking at the relationship between the bacteria levels and private septic systems in the watershed.

128 Mike

00:31:32.620 --> 00:31:38.980

All right, Scott, sorry, I went a little up to the wire.

129 Scott Cuppett

00:31:39.660 --> 00:31:40.740

Okay, thank you.

130 Scott Cuppett

00:31:42.500 --> 00:32:02.340

As you can see watershed planning and characterizing watersheds can be thorough, it's more than just water quality and land use. It can be wildlife and history and recreation, all the things that he talked about plus even more. So, thanks Mike, good job. I think we're gonna wait till the end for questions.

131 Scott Cuppett

00:32:02.780 --> 00:32:03.940

Is that right? Is that what we're doing?

132 Ingrid Haeckel

00:32:06.380 --> 00:32:21.660

Let's move along to Tracy's presentation if there are questions for Mike with folks could add them to the Q and A. Again, there's three dots next to chat to open up Q and A. Also if we have a few extra minutes at the end we could take those. Okay.

133 Scott Cuppett

00:32:22.820 --> 00:32:42.140

So Tracy, you're up, you can find share your screen. Tracy's the restoration manager for TU in New York and Connecticut and I think even the broader Northeast. Her interests primarily are working at least on this project with highway staff and getting boots on the ground to restore streams and connections for aquatic life and cold-water habitat.

134 Scott Cuppett

00:32:42.340 --> 00:32:53.300

I think she has a special love for our state fish as well, the brook trout. So with that. I'll turn it over to you Tracy.

136 Tracy Brown

00:32:57.700 --> 00:33:00.780

Okay, great. Can you see everything ok? Yeah.

137 Tracy Brown

00:33:02.220 --> 00:33:21.860

Thanks hi everyone. Scott, you're absolutely right. I do have a love affair with eastern brook trout. So we're so lucky to have that in New York. Mike, that was such an awesome presentation. I particularly loved the footage of the animals going through the culvert. That was super.

138 Tracy Brown

00:33:22.020 --> 00:33:38.700

And that is what I'm gonna talk about today. Just to do work with the towns and municipalities around New York and why we would be so interested in culverts in towns.

139 Tracy Brown

00:33:39.940 --> 00:33:45.740

So for those of you who don't know, Trout Unlimited is a national nonprofit. Our focus and goal is really to protect cool-water habitat and watersheds with a specific interest in wild and native trout.

140 Tracy Brown

00:33:47.220 --> 00:34:07.380

In New York, as we just mentioned Eastern Brook Trout is definitely a focus of ours. So today, specifically, I'm gonna talk about the town of Stephentown road-stream crossing management plan that was funded through the Hudson River Estuary Program. It does go back, this project started in 2022.

141 Tracy Brown

00:34:07.780 --> 00:34:27.580

It often takes us around two years to complete these types of projects. At this point, I think this, we easily have done this a half a dozen times, maybe more. The ultimate goal with these planning projects is to really understand and take this immense amount of data that we have.

142 Tracy Brown

00:34:28.060 --> 00:34:37.980

We know how many roads from crossings we have in New York, take that data and try to condense it into some type of manageable data set that we can use to prioritize.

143 Tracy Brown

00:34:39.700 --> 00:34:44.659

So the town of Stephentown is in Rensselaer County, not too far from Albany.

144 Tracy Brown

00:34:50.980 --> 00:35:09.900

So why would TU be so interested in road-stream crossings? It really is because it provides such a unique opportunity for us to work on the ground with our local communities, provide that resiliency, support, and then also remove barriers for aquatic life, like Eastern brook trout.

145 Tracy Brown

00:35:15.020 --> 00:35:33.700

Working with towns, the reason why we're so locally focused on towns is because they really end up in the state having the most roads and crossings. I mean they're responsible for a lot of road miles, they're responsible for numerous road-stream crossings. Far more than the state and the counties in most cases.

146 Tracy Brown

00:35:34.020 --> 00:35:53.940

They often have very small budgets. They have very small staff to implement road and crossing improvements. And through time what we have been able to do is by leveraging the Hudson River Estuary Program grants, we've been able to get this money to do the planning, the assessment, the prioritization, and then help with design and implementation.

148 Tracy Brown

00:36:04.660 --> 00:36:24.100

For this specific project, we have an important team, which has been fairly consistent through all of our work in Columbia County as well, but in this case, because we're in Rensselaer County, we've been working closely with the Rensselaer County Soil and Water Conservation District.

149 Tracy Brown

00:36:24.420 --> 00:36:44.620

Their role in the program was to collect all the road-stream crossing and aquatic barrier data using the NAC protocol, which many of you are probably very familiar with. They also are our local contacts, so they know our highway guys, they know the town boards, they know the landowners, so they have been our critical in making those local connections.

151 Tracy Brown

00:36:50.020 --> 00:37:08.820

Trout Unlimited's role is more...we received the grant, we manage the grant, we do the fundraising, but we also do more of the technical aspect of the project, so we take that data from NAC and we help prioritize it. We meet the highway folks to have those kinds of discussions and then we work on the road stream crossing replacement designs.

153 Tracy Brown

00:37:13.300 --> 00:37:18.220

And then Cornell Cooperative Extension who has been a partner with us from the beginning. They focus on supporting our education and outreach efforts, and then they do the final inventory documents so the towns end up with a resource and a reference for all of the road stream crossings in their town. And of course the Hudson River Estuary program, they are our project partners and also fund the project.

155 Tracy Brown

00:37:38.820 --> 00:37:57.580

So as I mentioned, our methods for this type of project is one collect the data. So we survey all the roads from crossings, we take that information and we prioritize it, and then we generate survey and designs for implementation.

156 Tracy Brown

00:37:58.060 --> 00:38:14.540

In the town of Stephentown, our specific goals for the project and the grant were to do the assessment and then end up with three top priorities for the town so we could generate two conceptual level designs with cost estimates for replacement projects and one final design with cost estimates and a replacement plan.

157 Tracy Brown

00:38:16.500 --> 00:38:36.260

In the town of Stephentown, there were a 187 crossings total that were assessed and of those 187, 76 of those were on town property, and so those were really our focus of the prioritization process. From that data 19 of those would be considered a severe or significant aquatic barrier according to the NAC modeling data. So that was really those 19 were our starting point for trying to understand priorities.

159 Tracy Brown

00:38:49.300 --> 00:39:09.500

But when we are setting priorities, we're looking at three different buckets of priorities. We've got this ecological benefits bucket where we're looking at freshwater type, that refers to whether or not the crossing is on a perennial stream or an intermittent stream. Or if it is just passing stormwater, so we're trying to tease out that kind of information.

160 Tracy Brown

00:39:09.620 --> 00:39:29.780

We're looking at the severity of the crossing. We're looking at the quality of the habitat upstream and downstream, and we're looking at connected miles both upstream and downstream to the next barrier. We really can get a sense of if we do remove that barrier, what the ecological benefits might be, we're also looking at resiliency benefits. We're doing the hydraulic capacity, trying to understand what the current capacity is of the structure.

161 Tracy Brown

00:39:30.060 --> 00:39:47.260

We're looking at alignment and how that could potentially interfere with the resiliency and long-term sustainability of the structure as well as structure condition. We typically have all of this information in our back pocket.

162 Tracy Brown

00:39:48.660 --> 00:40:08.940

That's when we go to the town to start the discussion with what their priorities are. And they're obviously focused on priorities that will help to improve maintenance if they have ongoing maintenance issues, like road condition, failing roads, shoulder of something of that nature, the age of the structure. They have anticipated that they might have failure soon because it's rusting out or whatever. Obviously flooding, ongoing flooding issues and just the idea of budgeting and feasibility of the project. So we take all of this information and we start doing a lot of reconnaissance to try and understand which ones will rise to the top.

164 Tracy Brown

00:40:29.780 --> 00:40:49.740

And definitely in the back of our head, we're trying to understand what are the most fundable projects. We don't always end up with the most fundable necessarily, but the other idea is that we, if we have our top three priorities, some of them are gonna be fundable through aquatic barrier removal types of projects, some through climate resiliency type projects, and some could then be more focused on town resources and in their budgeting process. So, once the priority structures are selected, we move to site surveys and the design process.

166 Tracy Brown

00:41:11.300 --> 00:41:15.580

For the town of Stephentown, we ended up with three priorities.

168 Tracy Brown

00:41:21.460 --> 00:41:41.020

This Calvin Cole Road project was I would say the ecological number one, as you can see, it is a barrier for aquatic habitat. It has a ton of upstream miles of really high quality, but it also from a town perspective, you can see that it's small, it floods, it collects debris upstream. So it was definitely one of those win-wins where it was gonna benefit and meet so many of those objectives.

170 Tracy Brown

00:41:48.940 --> 00:42:07.420

Our second priority was a Black River project and this was actually the number one town priority, but as you can see it's not an aquatic barrier, but it's obviously very undersized, you can see the scour on the downstream side of the culvert, which is just, you can kind of imagine as a floodwater goes through the culvert at high speed. It's just blasting out and it's taking out the downstream banks which are really good indicator that it's undersized.

171 Tracy Brown

00:42:07.620 --> 00:42:22.740

This particular site floods regularly, so it was an obvious one to add to the priority list.

172 Tracy Brown

00:42:24.220 --> 00:42:43.020

When we're thinking about priorities, when we don't necessarily have an aquatic barrier to start, we anticipate that if the town were, if this were to blow out in a flood emergency situation that it could turn into a barrier if they had to replace it with an undersized culvert.

173 Tracy Brown

00:42:45.380 --> 00:43:04.540

And then our final one was on Whitman Road, and this one was you can see that the cracking already happening on the town road, so obviously a maintenance concern, not high on anybody's list necessarily, but definitely one that through time was going to be a pretty high priority for the town, and an obvious aquatic barrier issue.

175 Tracy Brown

00:43:09.740 --> 00:43:29.220

So ultimately what we end up with is our top three priorities with the idea that we have everything that we need to justify moving forward with implementation and trying to figure out how to fund implementation.

176 Tracy Brown

00:43:29.620 --> 00:43:49.140

And so, from this table, you can see the road that we were just talking about, obviously the next score, the ecological and AOP score, the potential flooding score, and its impact, the maintenance and public safety, and then our recommended replacement structure that came about from our design activities and the structure cost.

177 Tracy Brown

00:43:49.940 --> 00:44:02.980

And so, from this, we provide the information to the town, we provide the designs to help them move forward on their own.

178 Tracy Brown

00:44:04.980 --> 00:44:16.100

We provide the cost estimates so they have a good idea how to do their budgeting. We have it written up in such a way where it's easy to go to permitting. It's easy to go to the next phase of implementation fundraising. And following this action, it really is our next step to find funds for replacement.

180 Tracy Brown

00:44:28.340 --> 00:44:46.140

So I wanted to also kind of give you an overview of how we've been able to take these planning dollars from the Hudson River Estuary Program and move them forward with additional state funding through the WQIP aquatic barrier removal program.

181 Tracy Brown

00:44:46.900 --> 00:45:07.140

So the town of Ghent went through the same planning process several years ago. We identified the top three priorities and TU submitted a WQIP grant to help support the town, do the implementation and the unique part of this is that the town itself was able to do the construction, and so that helps with the match component of the implementation grant.

182 Tracy Brown

00:45:07.380 --> 00:45:27.740

So you can see a before and after of the Stockport Road crossing, that was a barrier. This particular site was the top priority for the town because it flooded under most flood or most high-water events.

183 Tracy Brown

00:45:31.500 --> 00:45:36.020

This is another before and after looking downstream, following the installation.

185 Tracy Brown

00:45:43.820 --> 00:45:58.380

A unique part of this particular project was there are cattle upstream of the crossing and you can kind of see the maybe sketchy water quality impacts of that, but we were able to add to the shoulder a cattle crossing to be able to get the cattle out of the stream and move to the opposite field. That was kind of a cool addition.

186 Tracy Brown

00:46:00.100 --> 00:46:12.220

More projects floodplain connectivity, all of those great things that go into restoration and including the new structure.

187 Tracy Brown

00:46:15.260 --> 00:46:34.140

And, I love this photo so much because this, the gentleman that's standing looking at this ginormous culvert that we're putting at this moment, we're all wondering, did we size this right? How could we possibly need this size of a structure? But we were able to get it installed and it wasn't long before we had a high flow event. And here is the structure under that high flow event.

188 Tracy Brown

00:46:34.420 --> 00:46:54.460

It was the first time that that structure that that road had not flooded. So you can see not only was the structure at capacity, but also the floodplain was completely inundated with the flood waters. So super exciting.

189 Tracy Brown

00:46:54.860 --> 00:47:15.180

The other great takeaway from this project is because of the town's ability to save us money through the grant, we were able to also fund our next priority that came about through the planning process. The town will be doing the installation of our George Road Culvert replacement this year. And that was the TU number one priority for aquatic organisms.

190 Tracy Brown

00:47:15.380 --> 00:47:20.980

So from one grant, we've been able to stack in there 2 implementation projects. So we're super excited about that.

192 Tracy Brown

00:47:28.900 --> 00:47:47.580

And then one additional case study was our project in the town of Chatham. Chatham was our very first planning exercise, registering, processing, management, planning exercise, and at the time we had identified three priorities.

193 Tracy Brown

00:47:49.220 --> 00:48:09.020

To date, we removed a barrier with WQIP funding. We were able to retrofit Albany Turnpike and the reason why we did not do a replacement on this particular site is the town had installed that pipe probably a year prior to our planning exercise, so they weren't interested in doing any kind of replacement.

194 Tracy Brown

00:48:09.140 --> 00:48:18.500

It was passing flood waters. The implementation part of that, it just because of the bedrock, they weren't able to get the new pipe in.

195 Tracy Brown

00:48:19.940 --> 00:48:27.300

So we were able to remove a downstream dam at the same time where we were able to, to retrofit and create the steps to be able to allow for aquatic passage.

197 Tracy Brown

00:48:35.220 --> 00:48:46.860

So I think Scott and his crew wanted us to talk about lessons learned and over the last five, six, seven years we have learned a lot of lessons.

198 Tracy Brown

00:48:48.820 --> 00:49:08.540

One of those lessons is, I went through the list and you can see in the yellow box of all of the towns that we've done these road stream crossing management plans and how many priorities we've identified. And it looks when I did the calculation, we have 42 priority projects identified, so we have some level of design available for 42 crossings.

199 Tracy Brown

00:49:08.580 --> 00:49:25.900

And so far we've been able to implement seven. I wasn't exactly sure if that was a good or bad number, but I do feel like we're making progress. There's a lot of opportunity for anyone at any part of the world that wants to help with implementation because obviously we have a lot of data that we've collected that can move forward.

200 Tracy Brown

00:49:27.300 --> 00:49:47.380

I think a, a critical piece for us is to build your team and make sure you have a local voice. You know, TU, we are national, we have an awesome New York State team, but we're spread out all over. We don't necessarily live in each of the towns. We do have members in some cases that live in the town, but having partners that have that local connectivity is super important.

201 Tracy Brown

00:49:47.980 --> 00:50:06.860

Before doing any kind of planning activity where the towns, and specifically the town highway needs to be involved is just really making sure that you have buy in. It is a lot of impact on the town because we ask them to spend a lot of time with us thinking about priorities, visiting sites, revisiting sites, talking to them about, you know, potential options for implementation. So that, that kind of commitment is super important.

203 Tracy Brown

00:50:28.020 --> 00:50:48.260

The time it takes to communicate communication with towns and especially highways, guys, it's really challenging. They're very, very busy people and they have very limited time where they're near a phone or can get back to you or not too interested in email and all those kinds of things.

204 Tracy Brown

00:50:48.540 --> 00:51:08.580

So coming up with a strategy on how to communicate with your highway folks is super important, and then one thing that comes up fairly regular regularly for us is that when we're working towards implementation, we are working with the town on their within their right of way, but typically to make sure that our projects are installed and sustainable, we need to do instream work and that means that getting buy in from landowners upstream and downstream is super important.

205 Tracy Brown

00:51:08.940 --> 00:51:28.100

And we always talk about trying to do that early on if possible. Sometimes it's not possible until implementation, but I would definitely stress the need for doing that kind of outreach as early in the process as possible.

206 Tracy Brown

00:51:30.020 --> 00:51:36.220

And I think we would all agree who have gone with me, gone through the prioritization with me is that be prepared to throw out your top priority to be able to meet multiple objectives because ultimately getting one project done in each town would be a really good goal for us. Because we spend so much time with the highway guys talking about stream dynamics and that the need for capacity and different types of structures that that is, would, could be the ultimate benefit of these types of projects.

209 Tracy Brown

00:52:08.940 --> 00:52:12.300

So that is all I have. Happy to take questions.

210 Scott Cuppett

00:52:18.860 --> 00:52:23.060

Tracy, great job, really interesting talk.

211 Scott Cuppett

00:52:25.060 --> 00:52:31.220

Do we, are we doing questions? Do we have time for five minutes of questions or are we gonna wait till the end?

212 Ingrid Haeckel

00:52:31.460 --> 00:52:38.820

Yeah, yeah, we have, five minutes for questions right now. So folks could put their question in through Q and A.

213 Ingrid Haeckel

00:52:45.180 --> 00:52:46.660

That's an excellent presentation. Thank you.

214 Scott Cuppett

00:52:48.740 --> 00:52:51.500

And I think your numbers are pretty good with 7 out of 42.

215 Tracy Brown

00:52:52.060 --> 00:52:55.140

I couldn't tell, it was like I kind of felt good about it.

216 Scott Cuppett

00:52:55.780 --> 00:52:57.540

I don't know anyone doing better, so. Yeah.

217 Tracy Brown

00:52:59.060 --> 00:53:05.420

Well, I just want to say there's a lot of opportunities, so if anybody else wants to help with implementation, there's plenty to do.

218 Ingrid Haeckel

00:53:07.940 --> 00:53:23.540

I guess one question is, who takes the initiative to move then from the management plan to implementation? Is it an ongoing conversation you have keeping in touch with those towns? Who initiates seeking out the funding for the implementation?

220 Tracy Brown

00:53:27.900 --> 00:53:39.180

We've had to go a couple different ways, but I think definitely the case studies that I just highlighted those were, were spearheaded by TU.

221 Tracy Brown

00:53:40.980 --> 00:54:00.980

Then as we get to, you know, we have a really incredible relationship at sound of Chatham and we've been working with them for some, you know, so as, as time develops and moves on that relationship, you know, they'll reach out to us even if they're doing a replacement that we haven't prioritized. We had one great example of the town of Copake actually installed one of our priorities with their budget.

223 Tracy Brown

00:54:08.140 --> 00:54:22.540

Unbeknownst to us until it was done. It was awesome. It was really a great thing. I think that like the town of Taconic, they've been working really hard on, you know, developing grant applications so it can kind of go in a lot of different ways.

224 George Jackman

00:54:24.940 --> 00:54:29.380

Is there any way to force the towns to use arches instead of tubes?

225 Tracy Brown

00:54:33.100 --> 00:54:40.980

Well tubes are actually a good solution for some sites as long as you can bury it, and it's a low cost solution, so it is one that we will recommend as we did with the Stockport Road because we could get the capacity. We could keep the price down, and that was something that they could install. So, and if you're talking about tubes like the plastic ones?

227 George Jackman

00:54:56.900 --> 00:55:00.860

No, I mean just a round tube as opposed to an arch because over time, wouldn't all tubes become perched?

229 Tracy Brown

00:55:07.620 --> 00:55:13.820

Not unless their sized correctly, right? They do become perched because if there are squeezed, right, the water is scouring, scouring down. And through time it does become, it does add that perch. So if you get, you know, if you get them big and then buried...

231 Scott Cuppett

00:55:22.980 --> 00:55:43.220

I do have two questions in the chat I'd like to ask. At least one of them to see where we get with it. this one is I want I was wondering about the cost estimates you included in the table, are those generated in house? Most similar projects I've seen are about four times more expensive, so what are some strategies you use to get the replacement costs lower?

233 Tracy Brown

00:55:48.580 --> 00:55:52.300

Think it is, the types of projects that we are recommending. You know, we do try to keep our cost as low as possible and realize that not every town can and every site can afford a concrete box, which is gonna be our most expensive option. So as we were just talking with, with George, you know, we just we do recommend pipe arches if we don't have a particular slope.

235 Tracy Brown

00:56:14.180 --> 00:56:25.660

We have been using the pre-fabricated bridges, which is another low cost solution and you have a clear span.

236 Tracy Brown

00:56:27.060 --> 00:56:47.380

You know the single radius arches can be less, you know, less expensive. In the case of that table that you were looking at just to be clear, though, those were just the structure costs. And the reason why I only included the structure cost because that town of Stephentown is also interested in doing the work themselves, so that cuts out a lot of the expense.

237 Tracy Brown

00:56:48.220 --> 00:56:55.420

And if that goes, if it goes that way and you have a town doing the work, you definitely need to make sure that you're recommending a structure that they can you know, install with making sure that they have the big enough equipment to be able to do that.

239 Scott Cuppett

00:57:03.100 --> 00:57:17.460

Thanks I think we have room to squeeze in one question with a thirty second response. The last question is, can you talk more about the grant management role played by TU? I think you mentioned that was one of your roles.

240 Tracy Brown

00:57:18.180 --> 00:57:24.620

Yes, so I do most of the grant managing for the TU team in New York and that means that we are writing the grants and following up with all of the deliverables reporting, budgeting payments, contracting with vendors and construction contractors. Hope that answered the question.

243 Scott Cuppett

00:57:45.940 --> 00:58:06.100

Thanks. All right, thank you Tracy. We're gonna move on to George while you're getting your presentation up. I'll say that George is the habitat restoration director for Riverkeeper and he focuses on habitat and fisheries in the Hudson and its tributaries. He's a retired New York City police officer turned passionate habitat restorer. His interests are removing dams to reconnect critical habitats that migratory fish need to survive. I don't think he harbors any fond feelings for dams, and he speaks for the fish. So with that I'll turn it over to George.

245 Scott Cuppett

00:58:30.500 --> 00:58:33.180

If you're talking we can't hear you, just so you know that.

248 George Jackman

00:58:52.260 --> 00:58:57.900

Alright, sorry about that. Thank you Scott for the nice introduction and thank you Tracy and Mike for your discussions and your presentations and thank you for inviting me Ingrid and Scott.

251 George Jackman

00:59:12.820 --> 00:59:32.780

So in this presentation, I'm talking about a dam reconnaissance and dam removal feasibility study. Of course I didn't do this alone. I have, two partners that work with me Matt Best and Maddie Feaster, and I can consider Scott a partner in this work because he's a guy I looked...He's the guru of this stuff. He's the guy I looked for assistance when I need it and he, he knows all about creeks, dams, you name it, culverts. He's the guy.

254 George Jackman

00:59:52.660 --> 01:00:06.300

I'm here because I stand on the shoulders of the people that came before me and who currently work with me. I work for Riverkeeper. I'm really honored to work for this organization.

255 George Jackman

01:00:07.900 --> 01:00:28.180

We get a lot of stuff done because our integrity is good and people trust us. We are the original keeper organization. There's something like four hundred across the world now, but we started it and some old curmudgeon who refused to accept the status quo is the guy who started it. And he was an angler. And so we must never forget that anglers and sportsmen were the first conservationists.

256 George Jackman

01:00:28.660 --> 01:00:48.460

So I am glad to work for Riverkeeper and I'm really happy to do the job I'm doing for them. So anyway, what is the problem is nearly all the Hudson's tributaries are dammed or have natural barriers.

259 George Jackman

01:00:56.820 --> 01:01:16.900

AS you can see, this one on one of the creeks. Here's a natural barrier and it becomes an obstacle. However, that is not an obstacle to eels. An eel can easily surmount that barrier. The problem is, when the, the European settlement of the Hudson Valley, they started building dams and it started with grist mills and saw mills.

260 George Jackman

01:01:17.820 --> 01:01:37.300

But when you see that wall of water coming down, eels have a hard time passing that. And there was a famous, well, I guess famous in the fisheries world was a paper in 2007. Len Shoot and Karen Limberg and others discovered that ninety percent of the eels are blocked in the Hudson Valley by each dam.

261 George Jackman

01:01:37.420 --> 01:01:55.780

So if you start with a thousand eels entering a creek by the time you hit the third dam, only one is ascending that dam. So what happens to the other ninety percent? Well, they probably died trying and that's unfortunate.

263 George Jackman

01:01:59.860 --> 01:02:20.260

This is one of the largest water wheels. I think it was the largest water wheel ever in the world's history, it's on Burden Pond in Troy, and it's on the Wynantskill. This wheel was conceivably the inspiration for the Ferris wheel.

264 George Jackman

01:02:20.580 --> 01:02:40.700

Ferris went to RPI just up the road. He studied engineering and he came up with the Ferris Wheel probably from looking at this Burden Pond wheel. So how many dams do we have in the Hudson Valley? Oh I estimate I used to say it used to say there was 900, 1200, 1600, 2,000. It's conceivably as many as 3,000 because there are a lot of these small legacy dams everywhere.

265 George Jackman

01:02:41.060 --> 01:03:00.140

And I found big dams and small dams and that don't even exist on databases. And it's no disrespect to the state, it's not, you know, people just build these built these things willy nilly.

266 George Jackman

01:03:01.340 --> 01:03:03.940

They're a problem. Each dam acts like a blood clot in a circulatory system.

267 George Jackman

01:03:05.780 --> 01:03:15.900

And, but what happened unlike say when you walk in a forest where you see stone walls, these things were left standing and blocking our waterways.

268 George Jackman

01:03:18.580 --> 01:03:37.500

And a lot of these mills were abandoned, the dams were abandoned and on a public trust resource and we the people, and taxpayer money has to remove these barriers to improve the fisheries.

269 George Jackman

01:03:37.980 --> 01:03:40.060

So why do we want to remove dams? I love this picture because it explains so much.

270 George Jackman

01:03:41.700 --> 01:04:01.860

That impounded sediment is really important because we're a carbon-based life form. Most of that sediment is organic material, we call a [unintelligible] material that comes from the trees and the leaves and all that. And that is the foundation for life, and that carbon is vitally important to an estuary.

271 George Jackman

01:04:02.020 --> 01:04:21.780

That carbon production in the estuary is the reason why so many fish come in from the ocean to exploit the potential of carbon and that is the foundation of some of the richest ecosystems on planet Earth.

272 George Jackman

01:04:22.580 --> 01:04:42.780

And then what happens is it converts a, what's called a lotic system, a flowing river into a still pond. And then it spreads the water out and you lose your cover and then you get solar radiation and you get all that material trapped up there. The water becomes too hot for Tracy's trout especially.

274 George Jackman

01:04:48.820 --> 01:04:56.980

The brook trout. They have a very low tolerance, and once you start removing the trees and expanding and creating that solar radiation, and it's just not quality habitat for them anymore.

275 George Jackman

01:04:58.420 --> 01:05:13.260

So we know it disconnects habitat and that's the main part of the dam. It violently disrupts the river and transport, whether it's material or organisms, and it cannot, can no longer effectively work, and each dam acts as a reset point, the river is a continuum has to start over. I consider it equivalent to borrowing on your 401K.

277 George Jackman

01:05:36.100 --> 01:05:55.740

If you want to have something to retire, you better not be borrowing too much because every time you reset that, you're gonna lose that compounded interest. And also what happens is what happen organisms can become trapped between two dams, and if they are freshwater organisms, you get a loss of genetic diversity, and that's really, that's not good in the biological world.

278 George Jackman

01:05:56.100 --> 01:06:14.540

And then it alters a flow regime, which is critically important for organisms that have adapted their whole lifestyle to certain timings.

279 George Jackman

01:06:17.060 --> 01:06:37.420

A river is like a living organism. It needs to flow, it needs to expand, it needs to connect with its floodplains, it needs to have lateral expansion, vertical expansion.

280 George Jackman

01:06:37.700 --> 01:06:57.700

It needs to wind and flow, there's a term [unintelligible]. What it really means is rivers are sinusoidal and they bend and flow, but we have what we've done is we've channelized them and straightened them. And we, as we've harnessed our rivers, we've turned them really into personal plumbing systems.

282 George Jackman

01:07:03.940 --> 01:07:23.980

This is upstream of a dam. The water is incredibly clear, I was snorkeling it, I found wild trout. And this is downstream of a dam. You can see the water stained and you see the banks are heavily eroded. It's the same stream, just one is upstream of the dam and one is downstream.

283 George Jackman

01:07:24.420 --> 01:07:44.700

This is another problem with dams. As I said, they still the water, and they heat it up. So when you still the water, heat it up, and then you add nutrients, you got the potential for harmful algal blooms, which you see here. When you see that bright line green paint, it looks like paint that somebody splashed in the water.

284 George Jackman

01:07:44.900 --> 01:08:05.100

That's probably that's most likely a harmful algal bloom. What was sad, I saw a lot of turtles in that water, I saw egrets around there, and it was just a very sad site and that is the back end of a dam. And here's another problem.

285 George Jackman

01:08:05.620 --> 01:08:15.140

They call this the hungry river, and if you what happens when the river drops its sediment load because it hits the dam, the water becomes stilled and whatever sediment it's carried, it drops it behind the dam.

286 George Jackman

01:08:16.779 --> 01:08:37.100

Actually it drops it in the beginning of the impoundment and then it separates out and the finest materials wind up behind the dam, but now the river is hungry again, and it has the capacity to pick up more material.

287 George Jackman

01:08:37.339 --> 01:08:57.060

And what it does is downstream of a dam, you can see it causes a lot of erosion of the stream banks. And it creates scour holes and plunge pools and it degrades the substrate. So what was our project in in in this feasibility study?

288 George Jackman

01:08:57.740 --> 01:09:10.740

We wanted to reconnoiter dams to determine their feasibility of removal. So in essence, we treated this almost like a military campaign, and, you know, reconnaissance is really a military term.

289 George Jackman

01:09:12.900 --> 01:09:31.700

We were also looking to do is assess the biotic potential and the instream community assemblage of the organisms that we found there. And then we wanted to use a variety of information which is critically important that we need in order to remove dams.

290 George Jackman

01:09:32.940 --> 01:09:53.259

For instance, who owns the dam? What's behind it? What are the obstacles to removal? What's the community temperature? Are there water quality impoundments? Is there infrastructure around there? Are there dangerous hydraulic jumps?

291 George Jackman

01:09:53.380 --> 01:10:13.620

Hydraulic jump is when you have a super critical flow, meaning a subcritical flow, you get this recirculation of the water. In essence, the water as it falls down a dam, it is trying to replace itself. And it creates this washing machine effect and super aerated water.

292 George Jackman

01:10:13.980 --> 01:10:34.100

So if you were to get caught in that, that dam would then become dangerous regardless of the hazard rating of the dam. It has nothing to do with the hazard rating. There are some dams, most of the dams that are super dangerous are called just low head dams. And we wanted to know, are there hazards in those dams?

293 George Jackman

01:10:35.340 --> 01:10:54.540

Why? That's important because when we talk to the owner, we let them know that there's liability with owning that. And people need to understand that dams are not investments. They are absolute liabilities and especially in the era of climate change.

294 George Jackman

01:10:54.820 --> 01:11:15.140

But we also wanted to speak to the owners and convince them that we could take this liability from you and let you know that dam removal is probably the single best habitat restoration strategy that we could undertake and removal provides the greatest ecological gain per unit of investment.

295 George Jackman

01:11:16.260 --> 01:11:35.460

The impact is immediate. So we had to, in order to get this project underway, we had to create a QAPP, and it's the quality assurance project plan. And these are my two partners. These guys are the best.

296 George Jackman

01:11:35.860 --> 01:11:55.660

They're, as you can see them, they're in their superhero outfits and I can't tell you where that secret location is, but that's their backdrop. And, you know, they really are, my superheroes and we make a pretty formidable team. And I count on them for a lot of the work.

297 George Jackman

01:11:56.380 --> 01:12:16.260

So the QAPP is a scientific fact finding endeavor. It's a scientific document and it's an onerous document because I came into this project like, "Oh, I gotta write a QAPP, ok, I write a QAPP."

298 George Jackman

01:12:16.780 --> 01:12:18.700

It's not an essay. And Scott is...I'll tell you what, he's a hard driver. Scott was equivalent to a, you know, a committee member or a mentor and I was like, "Oh god...", I, you know, and he said "But you know what? The bottom line is you'll understand much more."

300 George Jackman

01:12:37.500 --> 01:12:57.020

It was all worthwhile, and, you know, Scott was the gatekeeper and in many ways. And so because the QAPP must be approved by New York State DEC, they're funding this project, and the data collection had to follow strict scientific protocol and the methodology had to be approved by DEC.

301 George Jackman

01:12:57.700 --> 01:13:00.300

And New York State DEC owns the document.

302 George Jackman

01:13:01.660 --> 01:13:21.820

And all the chemical analysis performed by a pre-approved ELAP laboratory. This stuff is not cheap. And the data result has to conform to New York state DEC standards. And, you know, this, like I said, it's like writing a manuscript with your mentors.

303 George Jackman

01:13:22.020 --> 01:13:42.300

It is not for the faint of heart, but if nothing about dam removal or science is really for the faint of heart, you really have to be passionate about what you're doing. But, the QAPP has to conform to accepted formats, but the good part is the QAPP can yield awesome results.

304 George Jackman

01:13:43.780 --> 01:14:02.940

And so we have to treat the QAPP, like a scientific method. What is your problem? What are your observations? You have to conduct a vast amount of research. You gotta go out in the field, collect a lot of data.

305 George Jackman

01:14:03.740 --> 01:14:11.980

You gotta analyze that data. You gotta draw up some conclusions. And then present your information.

306 George Jackman

01:14:14.820 --> 01:14:34.460

And that was the whole point of this. It is the scientific method and for us, it's for removing dams. So we reconnaissance in the military term is to seek information. So what are we hoping to learn? Well, here's a dam.

307 George Jackman

01:14:35.100 --> 01:14:55.420

And this dam is on its way of being removed, and this was during one of our intense rain events, and this is part of what the work we do regardless of the conditions, we go out and reconnoiter our target dams. As you can see, there's a lot of scour occurring. There's a lot of lateral scour.

308 George Jackman

01:14:55.820 --> 01:15:01.300

The water is actually jetting out to your right. There's a terrific head on that dam, meaning that the power behind that water is extraordinary.

310 George Jackman

01:15:06.980 --> 01:15:26.540

If you were to fall in that water at that time, you would probably not survive, and not only would you not survive, you see that white water, there's a boil there, an all that turbulent water is super oxygenated.

311 George Jackman

01:15:27.180 --> 01:15:47.220

You won't float well, and if you were to try to get out, you have to go down to the bottom, but here's the bottom and this is the same dam at low water. This was during a drought. So I used that time to get out to our dams and look and you could see there's cracks in the dam.

312 George Jackman

01:15:47.340 --> 01:16:07.460

There's cracks in the apron. Then, and during that storm, one of the retaining walls on the river right side of just downstream of that shot collapsed. So then the water started coming around the dam and one of the worst things that could happen is when the water starts to bypass the dam.

313 George Jackman

01:16:07.820 --> 01:16:28.180

Another reason why we wanted to remove that, there's a huge sewer line running parallel to the creek that we're trying to protect. That's where you see that cinder block retaining wall. So then we started looking at site assessments. What do we do?

314 George Jackman

01:16:28.260 --> 01:16:48.540

So we have to look at all these mapping tools. The cultural resource information systems, New York State and US EPA environmental justice. We look for super fund sites, environmental resource mappers. That's our desktop.

315 George Jackman

01:16:48.900 --> 01:16:58.180

Then we searched on the internet, but here's where if you see the picture on the left, this is a low level outlet.

316 George Jackman

01:17:00.420 --> 01:17:19.540

And what you see is, in that dam, you could be sucked into that and dragged through all that. There would be a tremendous vortex above that hole that if you were kayaking or somehow fell into that water, you would be readily sucked into that.

317 George Jackman

01:17:20.140 --> 01:17:40.300

I would not want to be sucked through that. But that is critical information which we go back to the owner and say, "Hey, we got a problem here." And here's another one of our dams on the right. That's undergoing engineering. Again, this one is another dangerous dam when it's got a head on it like that.

318 George Jackman

01:17:40.860 --> 01:17:49.460

Again, you just see the power of that. And so those are the images we need....

321 Scott Cuppett

01:17:51.620 --> 01:17:56.580

Sorry, I feel like there's a delay between the pictures and your talk. Do you have two pictures up right now or are there three?

322 George Jackman

01:17:57.900 --> 01:17:58.340

Two, two.

323 Scott Cuppett

01:17:58.540 --> 01:18:00.660

Two, ok. All right. Thanks. Sorry.

324 George Jackman

01:18:02.340 --> 01:18:22.620

So then you consult the DEC, do your internet searches and look at historical records and archives, and this is labor intensive work. You're out in the field, you use the mapping tools and it's boots on the ground. I would say there is we spent I don't know, as, as much time on the computer as in the field.

325 George Jackman

01:18:22.900 --> 01:18:42.860

Probably fifty percent, or fifty-fifty, and you need these physical inspections under all conditions. And then what we did, he, these are our results. This is my team, when we're doing various sampling and, and Matt and Maddie, they're gurus.

326 George Jackman

01:18:43.700 --> 01:19:03.500

And Matt created these ArcGIS mapping where we looked at all different water quality parameters and we profiled the impoundments. So what do we look at? We looked at ten dams that were targeted. By the time this QAPP was over, we had secured five dam removal contracts.

327 George Jackman

01:19:03.780 --> 01:19:24.100

We had one feasibility study initiated and positive traction with the owners on two others. Not too bad, so we got a positive traction on eight out of ten dams. What we also discovered huge humans have greatly impacted our waterways and we can assume that contaminants exist and persist behind all dams unless there's leakage or lots of cobbles or boulders.

328 George Jackman

01:19:24.300 --> 01:19:44.540

In areas where I thought they were absolutely pristine, there are no pristine...The agricultural industrial history is written into the sediment loads and the roadways and runoff impacts our creeks even today.

329 George Jackman

01:19:45.420 --> 01:20:04.940

We're finding heavy metals, transitional metals, PAHs, pesticides. It's all written into the sediments, and we gotta remember the Hudson River is the largest super fund site in the country because of a bad dam removal. So that's why the DEC has a process to remove a dam.

330 George Jackman

01:20:06.100 --> 01:20:25.340

We also looked at water quality profiles. When you change from a lotic to a lentic system, what we found, even looking at this map in the deeper water, they were oxygen [unintelligible] and there were high surface temperatures and the nitrification could foster HABs.

331 George Jackman

01:20:25.700 --> 01:20:45.100

In this case, there was fecal indicator bacteria, but we did not include that in this study. What were our ecological results? Well, this eel in the upper right hand... we were told there were no eels above the dam that was downstream.

332 George Jackman

01:20:46.220 --> 01:21:01.700

So we weren't so pleased with the surveys, so we went up and sure enough, we found them. and this was a really important eel. We found lots of eels, but this one was a big female.

333 George Jackman

01:21:03.460 --> 01:21:23.860

Downstream of that is naked turbines on a hydro dam. So we looked at seven tributaries. We surveyed of those seven tributaries, we found 28 species of fish. American eels form the dominant biomass in the streams. Upstream abundance and catch per unit of effort was negatively impacted by dams.

334 George Jackman

01:21:23.980 --> 01:21:44.340

We could see that our information aligns perfectly with Machut et al (2007). What we found is forested riparian corridors provide the greatest species diversity. In the creeks that had forested buffers, we had greatest species diversity.

335 George Jackman

01:21:44.580 --> 01:21:54.860

Interestingly, we used to call eels our only catadromous species, they're our only catadromous fish. But we have blue crabs that we can consider catadromous because these crabs are found in the tributaries, and we found them upstream of former dams and just about every tributary...

337 Scott Cuppett

01:22:06.220 --> 01:22:07.100

George, you have one minute.

338 George Jackman

01:22:08.100 --> 01:22:28.580

Okay, so let's move through. So what we found is environmental justice is intersectional with ecological justice, community engagement is critical. We screened a film, we gave barbecues, we asked the audience various questions.

339 George Jackman

01:22:28.580 --> 01:22:48.940

Our goal in the community engagement was to prevent in misinformation. We want to show that this dam removal before and after, and these are some of our dams. I'll just slide through quickly that we looked at. There's a story behind every one of them. This one is really interesting. This one's undergoing engineering right now.

340 George Jackman

01:22:50.900 --> 01:22:59.380

But if I could have one favorite dam, this would be the one I love the most. And those are beaver dams. So thank you very much.

341 Scott Cuppett

01:23:01.340 --> 01:23:05.220

Thank you George. Great presentation from you as well.

342 Scott Cuppett

01:23:08.980 --> 01:23:15.940

Just exciting stuff. I think all three presenters just I don't know, it makes me excited being part of this work. I appreciate all three of you.

343 Scott Cuppett

01:23:18.780 --> 01:23:25.580

So do we have any questions for George? I know we have one that would go back to Mike if you want to start there unless...

344 Scott Cuppett

01:23:26.900 --> 01:23:29.860

Mike is still on, right? I have to scroll to see if you're still on.

346 Scott Cuppett

01:23:35.140 --> 01:23:36.860

The questions for George first? Yeah.

347 Ingrid Haeckel

01:23:42.860 --> 01:23:52.260

I'm not seeing anything immediately for George, so what maybe we let's take that question for Mike and see if anything else comes in.

348 Scott Cuppett

01:23:52.460 --> 01:23:59.420

Mike, there was a question, what was the result for the fish report and the Pocantico River?

349 Mike

01:24:01.460 --> 01:24:02.700

What was the result...

351 Mike

01:24:05.220 --> 01:24:25.260

Yeah, I'm trying to think, we only did, we did a few sections, I wasn't part of it. We had hired a consultant to do it, in terms of anything interesting that came of that, I think one of the things that the consultant noted of interest was that in the upper Pocantico there was a lack of minnows, which was surprising to the consultant.

352 Mike

01:24:25.740 --> 01:24:34.380

But other than that, I think it was just, you know, the typical species you would expect to find.

353 Mike

01:24:36.660 --> 01:24:48.700

I don't have a list off the top of my head, but we could, you know, I'm happy to share any information. Scott and Ingrid if you want to share my email with anyone I'm happy to, you know, people can email me directly and I can give them more, you know, more detail.

354 Scott Cuppett

01:24:50.100 --> 01:25:05.500

Can you all pop your email into the chat? I think everyone should be able to see it, I think. question for George, did you assess freshwater mussels during your ecological surveys?

355 George Jackman

01:25:08.340 --> 01:25:09.860

If we came across them.

356 George Jackman

01:25:11.780 --> 01:25:26.020

We found, Eastern Elliptio was definitely the most common. In a lot of places we didn't find them. What was the other one? I think it was, a pond floater... An eastern pond floater or a pond mussel. That was the other one that we came across, and those were the only two that we came across unfortunately.

358 Ingrid Haeckel

01:25:41.900 --> 01:25:56.580

George, thanks for your excellent presentation. We also have a question asking about what approach you take for community engagement. She thought it was interesting to lead with the film screening and, and the barbecue idea.

359 George Jackman

01:25:57.220 --> 01:25:57.260

Yeah. Community engagement. We had to get into an area... What's considered by New York State and the US EPA as a marginalized environmental justice community.

361 George Jackman

01:26:05.060 --> 01:26:24.900

And how do we break into that? So we hired an outreach coordinator to help facilitate the lead.

362 George Jackman

01:26:25.540 --> 01:26:45.260

We stepped in and then we, once we had the opening, we engaged with the community and, you know, it was heart rending because, then what I always tell people. "I'm an ecologist, and I came here to help the fish, but I found the people along the way."

364 George Jackman

01:26:51.620 --> 01:27:11.820

On the economic spectrum, you got the critters are at the low end and then you got the impoverished people are just above, and they're often sited in suboptimal conditions because that was available. The prime location goes to the wealthy and the suboptimal conditions go to the poor.

365 George Jackman

01:27:12.140 --> 01:27:32.500

These people were in a floodplain, they experienced nuisance flooding due to dams. I remember somebody challenged me when I was traipsing around in the backyards and in the yards. And I was taking pictures. And he goes, "we got kids in these playgrounds, what are you doing here?"

366 George Jackman

01:27:32.580 --> 01:27:52.940

And I told him who we were, who I was and what I was doing, this guy just hugged me and said, "thank you". And, you know, it, it was really nice. I remember during a barbecue, I still remember this kid's name, I went outside and he was crying and I said, "what happened? What's the matter?"

367 George Jackman

01:27:54.020 --> 01:28:13.460

He said "I tripped and fell and I spilled my plate of food." He goes, "can I have more?" I said, "of course, come on." And his smile lit up, made my day and I still remember that kid's name is Andrew. And that's what I mean, it's really important because they're not just people. It's Andrew.

368 George Jackman

01:28:13.940 --> 01:28:33.740

Andrew, he will always be here, and that's the beauty of stepping into these communities because we're not just here for the fish. And what we've told the towns, we're not going anywhere. We're here. We're here to, you know, we're here with you. So that's what community engagement is. It's a long-term commitment.

369 Ingrid Haeckel

01:28:36.580 --> 01:28:37.060

Thank you so much.

370 Ingrid Haeckel

01:28:38.500 --> 01:28:48.660

I wanna echo Scott's sentiments too. these projects are really exciting and and I think really hopeful and that we hope that they will inspire more work in future grant projects by others.

371 Ingrid Haeckel

01:28:50.660 --> 01:29:10.500

So we really appreciate your time sharing your work and sharing lessons that you've learned as grantees about the grant process and I know it is past 2:30 so we should wrap up, I think there may still be another question or two, but we can pass those along and encourage anyone interested to follow up with you directly.

373 Ingrid Haeckel

01:29:18.180 --> 01:29:37.900

So again we will share the recording and feel free to pass that around to others who may have missed it. And I also just wanna make a quick pitch for the other two webinars in this series next Thursday at 1 PM will be presenting about local stewardship planning projects for conservation planning, including natural resource inventories and open space plans.

374 Ingrid Haeckel

01:29:38.140 --> 01:29:50.900

The following Wednesday, April 24th, there'll be a webinar about our river education grants and...

375 Ingrid Haeckel

01:29:53.580 --> 01:29:59.180

Why, did I, what was it? We'll send around the link to register, I guess, I was trying to copy the invitation here into the chat. Just see if that goes...

379 Ingrid Haeckel

01:30:08.140 --> 01:30:15.780

All right. Well, thank you everyone and have a great rest of your day. Thanks to our presenters.

380 Scott Cuppett

01:30:16.460 --> 01:30:16.780

Thank you. Take care, everyone.