Headwater Streams: Values and Threats

November 3, 2021 3:00 – 5:00 pm

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00:00:04.674 --> 00:00:18.594
All right, well, hi, everyone. Thank you for joining us today. My name is Nate Nardi-Cyrus, and I'm a conservation and land use specialist here at the DEC's Hudson River Estuary Program through a partnership with Cornell University.

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00:00:19.164 --> 00:00:32.694
And I'm really happy to welcome you to our 1st, webinar of our 3-part webinar series about headwater streams. The program is offered thanks to a partnership between the Hudson River Estuary Program and Cornell University.

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00:00:32.939 --> 00:00:43.945
But we'll also be showcasing presenters from the Hudson River Watershed Alliance, Gordon and Svenson, and the Town of Poughkeepsie in some of our later sessions.

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00:00:43.975 --> 00:00:54.354
So, back to today, our speakers are gonna be looking at physical components, benefits of, and threats to perennial and intermittent headwater streams.

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00:00:57.384 --> 00:01:11.814
Before we get started, I just want to run through a quick review of some important webinar details. You should be able to connect to audio through your computer or by phone, and you can find different audio options at the bottom of your screen by clicking the 3 dots.

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00:01:11.844 --> 00:01:16.254
That'll bring up a menu where you could choose your audio preferences.

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00:01:16.674 --> 00:01:31.105
If you're having difficulties with your audio, I recommend calling in by phone or requesting a call, and we're going to have, my colleague Beth is gonna place in the chat this number here. So you don't have to write that down real quick in case you're having trouble connecting the audio.

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00:01:32.635 --> 00:01:45.204
If you're having other difficulties, you can direct those questions to the chat box. You should use the question and answer function for any questions to presenters. But please don't put those in the chat.

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00:01:45.204 --> 00:01:48.534

If you can help save that for kind of technical issues.

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00:01:50.034 --> 00:02:03.504
The note that your phones are muted and your videos are off, so relax and enjoy yourself. And at the end of the webinar, there's going to be a 3 question survey that pops up. So please take that survey.

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00:02:03.504 --> 00:02:06.174
We appreciate, you know, any feedback you can give on our program.

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00:02:06.659 --> 00:02:17.280
Lastly, for those of you who are seeking municipal training credit, there will be a follow up email from Webex which you can use to certify your attendance to this and our other webinars.

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00:02:18.474 --> 00:02:32.335
For those of you who are new to our series, and maybe our program, the Hudson River Estuary Program is a unique program at the New York State Department of Environmental Conservation established to help people enjoy, protect, and revitalize the Hudson River and its Valley.

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00:02:33.025 --> 00:02:43.254
So our program works throughout the 10 counties that are adjacent to the tidal Hudson River from upper New York harbor to the federal dam at Troy to achieve many key benefits,

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00:02:43.254 --> 00:02:51.504
including clean water, community resilience to climate change, the vital ecosystem, and its fish, wildlife, and habitats,

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00:02:52.194 --> 00:03:07.074
natural scenery of the valley, and opportunities for education, access, recreation and inspiration. So I encourage you all to check out our very brand new Hudson River Estuary Program Action Agenda. That's available on our program website.

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00:03:07.104 --> 00:03:15.205
It's going to be kind of outlining the direction of our program. And, you know, we're happy for you to review that. Within the Estuary Program,

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00:03:15.205 --> 00:03:26.064
our conservation in land use team works with municipalities and our regional partners to make sure that natural areas and habitats are incorporated into land use planning and decision making.

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00:03:26.604 --> 00:03:34.884
And so our program website, which is through Cornell University, is a clearinghouse for guidance documents, and other resources on these topics.

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00:03:35.215 --> 00:03:48.865
My colleague Beth again is going to be sharing the link to this website in the chat box and keep in mind as we share stuff through the chat, we're also going to be sharing some of these chat resources in a follow up email.

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00:03:48.865 --> 00:03:51.685
So, you don't have to worry if you can't get to them right now.

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00:03:51.990 --> 00:04:03.090
As I said before, this is the 1st session in our headwater stream series and so we're really hoping you come back and watch the next two sessions. But each session is

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00:04:03.090 --> 00:04:17.814
designed to kind of stand alone, so don't worry if you end up missing those. Next week, which is November 10th, we're gonna be exploring methods for mapping streams, as well as watershed planning.

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00:04:17.814 --> 00:04:32.334
That'll be at the same time. Same place. But on the 10th on the 17th, we're gonna be concluding the series with a deeper dive into regulatory protections for streams, both the federal, state, and local, municipal level.

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00:04:34.194 --> 00:04:48.803
Okay, so, before we get started our firs, presenter today is Gretchen Stevens, she's the director of Bioiversity Resources Center at Hudsonia, which is a nonprofit environmental research and education institute that's based in Dutchess County.

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00:04:49.403 --> 00:05:02.874
Gretchen has over 35 years of experience as a field biologist. And Hudsonia has been a long time partner in delivering our educational programs in partnership with the program to land use decision makers like yourself and other interested citizens.

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00:05:02.874 --> 00:05:10.584
So, after Gretchen talks, we're going to hear a presentation from again my colleague Beth Roessler from here at the Estuary Program

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00:05:10.584 --> 00:05:24.353
on the importance of riparian buffers, and then I'll finish the presentation or the webinar rather today by looking at the threats to our headwater streams and then a brief overview of some of the methods for their protection.

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00:05:24.353 --> 00:05:28.944
So, with that, I'm going to pass the ball on over to Gretchen, and she's going to get us started.

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00:05:32.548 --> 00:05:36.478
All right Grettchen, you're free to share. Okay.

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00:05:36.478 --> 00:05:40.079
Oops.

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00:05:41.129 --> 00:05:45.689
Gretchen Stevens: Are you seeing that opening screen?

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00:05:46.829 --> 00:05:50.369
Nate Nardi-Cyrus: Yep, you just have to put it in presenter mode.

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00:05:50.369 --> 00:05:55.499
Gretchen Stevens: Is it not presenter mode? Okay. I guess it's a little bit. We're all set now.

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00:05:55.499 --> 00:06:02.999
It's a little delayed. Yeah. So, thank you, Nate.

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00:06:02.999 --> 00:06:08.488
I think I'd like to start by

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00:06:09.084 --> 00:06:09.774
defining,

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00:06:09.834 --> 00:06:10.043
,

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00:06:10.074 --> 00:06:11.124
first of all what we mean

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00:06:11.124 --> 00:06:11.783
by a stream,

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00:06:12.384 --> 00:06:22.434
the definition from a hydrological or ecological point of view might be quite different from a definition that appears in a stream protection law,

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00:06:22.494 --> 00:06:23.213
for example.

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00:06:23.754 --> 00:06:24.353
For now,

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00:06:24.653 --> 00:06:25.014
though,

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00:06:25.043 --> 00:06:36.353
let's just think about the physical and biological aspects without concern for all the competing interests and practicalities that need to be considered when you're when you're drafting a law.

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00:06:37.494 --> 00:06:44.033
For example, would you call the feature in this photo a stream?

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00:06:44.459 --> 00:06:49.649
Think for a minute about why, or why not.

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00:06:50.759 --> 00:06:58.678
And here's another, here's another feature.

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00:07:02.153 --> 00:07:16.374
Some of the things that you might use to define a stream are first, that of course it carries flowing water. But things to consider are how often and for how long it carries that water.

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00:07:16.613 --> 00:07:27.774

If water flows for only a short period after a big rain. Is that a stream? Is it a stream if it runs for only a few hours in the course of a typical year?

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00:07:28.079 --> 00:07:33.959
Does the stream need to carry some minimum water volume?

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00:07:34.673 --> 00:07:48.713
Does it need to have clearly discernible bed and banks? Does it need to flow into another water body such as a larger stream, or a wetland or a pond or lake? What if it disappears

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00:07:49.913 --> 00:08:00.803
Underground? This does some time occur, especially in areas with limestone bedrock, but occasionally in other places too. Does the stream need to support fish?

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00:08:02.514 --> 00:08:05.454
Are there other characteristics that you can think of that,

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00:08:05.574 --> 00:08:06.024
,

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00:08:06.053 --> 00:08:09.384
that would help you define a stream? If you,

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00:08:09.774 --> 00:08:11.423
we don't have a chat box here but,

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00:08:11.454 --> 00:08:11.754
,

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00:08:11.754 --> 00:08:13.494
if you think of other characteristics,

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00:08:13.704 --> 00:08:14.603
put them in the,

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00:08:14.694 --> 00:08:15.624
the Q and A,

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00:08:16.134 --> 00:08:16.673
and we,

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00:08:16.704 --> 00:08:17.064
,

64
00:08:17.124 --> 00:08:18.744
can talk about them later on.

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00:08:19.048 --> 00:08:22.108
From a.

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00:08:22.163 --> 00:08:29.934
Hydrological and water resource perspective. You might define a stream as any place

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00:08:29.934 --> 00:08:42.923
that routinely collects and concentrates water, and directs water to down gradient water bodies, or wetlands. That definition would capture its

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00:08:42.923 --> 00:08:53.214
significance for feeding other streams and ponds and wetlands and even groundwater and would probably suffice from an ecological perspective too. But you might need to

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00:08:53.519 --> 00:09:00.389
include some other elements so that every little rill and swale is not necessarily included.

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00:09:01.254 --> 00:09:05.813
In your roles as planning board or conservation commission members,

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00:09:05.813 --> 00:09:07.583
or as land managers,

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00:09:07.583 --> 00:09:10.224
or policy makers for land trusts,

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00:09:10.254 --> 00:09:11.364
or state parks,

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00:09:11.364 --> 00:09:13.913
or as landowners yourselves when

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00:09:13.913 --> 00:09:18.984
considering protections for streams, I encourage you to think about their roles in the landscape.

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00:09:19.403 --> 00:09:30.833
If a place is collecting and concentrating surface water and feeding it to downgrading areas, maybe that's sufficient to merit your conservation attention

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00:09:30.833 --> 00:09:36.894
whether or not there any formal, that is legal protections in place.

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00:09:37.379 --> 00:09:41.908
Of course, for regulatory purposes

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00:09:41.908 --> 00:09:51.533
that is for stream protection laws and regulations, the characteristics of a regulated stream must be clearly defined and easily discernible.

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00:09:52.163 --> 00:10:03.323
Understandably, the thresholds for jurisdiction often have more to do with those practical considerations and with political feasibility, than with science.

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00:10:04.073 --> 00:10:17.994
But we'll put those regulatory situations aside for the moment. Here's some examples of stream definitions in the zoning laws of a couple of Hudson Valley communities.

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00:10:18.114 --> 00:10:31.644
The town of Cortlandt in Westchester County defines a stream or watercourse, as they say, as quote" any definable channel through which water flows continuously or intermittently" and that's pretty broad.

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00:10:32.903 --> 00:10:36.803
The town of Woodstock in Ulster county has a more detailed definition:

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00:10:37.104 --> 00:10:50.423
“A watercourse is any natural, artificial, permanent, seasonal or intermittent water segment, with a discernible channel bed and or banks and that usually flows in a particular direction.”

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00:10:51.563 --> 00:11:03.683
“A ditch is considered to be jurisdictional. A jurisdictional watercourse, only if it discharges directly into a naturally occurring wetland water body or water course.”

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00:11:05.183 --> 00:11:09.774
So, why are we bothering with these definitions in this webinar series?

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00:11:09.803 --> 00:11:18.563
We will be discussing the various values of headwater streams and will ask you to think about what kinds of streams may deserve protection,

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00:11:19.104 --> 00:11:21.384
what kinds of protections,

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00:11:21.384 --> 00:11:27.894
and whether or not those protections are offered by existing legislation. In the final session ,

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00:11:27.953 --> 00:11:28.403
on day

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00:11:28.403 --> 00:11:37.913
Three, we'll talk about ways to extend stream protections to deserving streams through local action should you care to do that.

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00:11:41.124 --> 00:11:45.653
In this program, we are especially focusing on what we call headwater streams.

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00:11:46.043 --> 00:11:47.394
A typical definition,

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00:11:47.453 --> 00:11:47.724
,

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00:11:47.754 --> 00:11:51.053
of a headwater stream is a stream segment

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00:11:51.173 --> 00:11:51.443
,

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00:11:51.443 --> 00:11:53.903
in the upper reach of a non tidal stream,

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00:11:53.903 --> 00:11:58.224
where the average annual flow of the segment is 5 cubic feet per second

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00:11:58.254 --> 00:12:06.173
or less. Headwater streams may include stream segments with perennial, intermittent, or ephemeral flow.

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00:12:08.274 --> 00:12:21.203
According to the US Geological Survey headwaters streams typically constitute more than 75% of the stream length in any watershed. And in total they drain approximately 70% of the land area in the continental U.S.

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00:12:21.203 --> 00:12:25.043
So by these figures alone, you can see

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00:12:26.068 --> 00:12:31.198
that headwater streams are a very significant component of our landscapes.

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00:12:33.354 --> 00:12:48.083
Here's an illustration of the basic physical components of the stream in cross section. We have the stream bed and banks and the stream water level during normal and high flows. During flow events

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00:12:48.203 --> 00:13:00.683
the stream spreads out onto the floodplain, depending on the stream size the catchment area, and the local topography the, the floodplain can be a few meters wide

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00:13:00.989 --> 00:13:13.798

in some locations or a mile wide or wider, for a large stream. Even a headwater stream can have a floodplain extending hundreds of feet from the stream, from the stream channel itself.

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00:13:14.849 --> 00:13:26.219
Here's a schematic illustration of the watershed of a stream that flows into the Hudson. You can see the main strand stem of the stream is joined by 5 tributaries.

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00:13:26.219 --> 00:13:37.198
The watershed of the main stem is delineated by the broken red line, indicating the entire land area that drains to that stream before the stream joins the Hudson River.

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00:13:37.198 --> 00:13:43.979
The area outlined with the broken blue line is a land area that drains to that upper part of the stream.

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00:13:45.264 --> 00:13:59.244
Each of the smaller tributaries has their own smaller watershed or sub-basin, and such as this area outlined in yellow representing the land area that is drained by this small stream before it joins the larger stream.

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00:14:00.384 --> 00:14:10.073
The headwaters are the upper reaches of each of these stream segments. Here are the headwaters of the mainstem, and here are the headwaters of the smaller tributaries.

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00:14:10.433 --> 00:14:18.354
All of these headwater areas can also be considered headwaters of the stream and of the Hudson River, itself.

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00:14:21.683 --> 00:14:35.394
I want to give you some definitions of some terms that will crop up here and there in this program and, and that you'll see in scientific literature and in stream protection laws.

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00:14:35.754 --> 00:14:43.464
First of all, a perennial stream is defined as surface water flowing, continuously year round during a typical year.

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00:14:44.063 --> 00:14:54.744
An intermittent stream is defined as surface water flowing continuously during certain times of a typical year, not merely indirect response to precipitation.

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00:14:55.168 --> 00:15:07.918
An ephemeral stream is defined as surface water flowing or pooling only in direct response to immediate precipitation such as rain or snowfall or a snow melt event.

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00:15:09.568 --> 00:15:23.788
Headwater streams can take on lots of different appearances, depending on their landscape setting. Some are even in urban areas, where they've often been artificially channelized.

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00:15:23.788 --> 00:15:36.479
But many headwater streams are quite inconspicuous many are unnamed, unmapped and undocumented in any way. They're highly

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00:15:36.479 --> 00:15:46.828
vulnerable to our treatment of the land in their watersheds and they're often abused, by us and the way we treat the land.

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00:15:47.333 --> 00:15:47.693
Also,

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00:15:47.693 --> 00:15:54.114
they represent a huge percentage of the total stream lengths in our landscapes and cumulatively,

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00:15:54.144 --> 00:15:54.504
,

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00:15:54.533 --> 00:16:03.173
have an equally huge influence on all the downstream waters that they flow into when we're thinking about protection of

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00:16:04.433 --> 00:16:10.793
headwaters streams a complication is that most are on privately held lands.

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00:16:11.394 --> 00:16:11.634
,

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00:16:11.634 --> 00:16:20.783

So it's difficult actually to inform everyone about the values of these dreams and how best to protect them. Those of you in public positions

126
00:16:20.813 --> 00:16:22.673
or on the staffs of regional

127
00:16:23.063 --> 00:16:23.364
,

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00:16:23.394 --> 00:16:24.354
NGOs,

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00:16:24.384 --> 00:16:24.683
,

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00:16:24.683 --> 00:16:33.683
though do have a platform for reaching hundreds or thousands in some cases thousands of landowners in your policy-

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00:16:33.683 --> 00:16:36.053
making your environmental reviews,

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00:16:36.354 --> 00:16:37.524
your public planning,

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00:16:38.063 --> 00:16:43.614
or your public education work in addition to your interactions with individual landowners.

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00:16:45.504 --> 00:16:56.813
That’s much of what I wanted to say by way of introducing headwaters streams, and now I want to say a few words about the ecological values of headwaters streams.

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00:16:57.323 --> 00:17:07.134
People often assume that our large streams and rivers have greater ecological importance simply by virtue of their size but that's far from the truth.

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00:17:07.614 --> 00:17:08.423

In fact,

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00:17:08.483 --> 00:17:09.713
the large streams,

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00:17:09.864 --> 00:17:10.163
,

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00:17:10.193 --> 00:17:20.213
actually would not even exist without all the smaller streams that feed them water nutrients and organisms and the condition of the larger streams,

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00:17:20.243 --> 00:17:21.413
the water volumes,

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00:17:21.534 --> 00:17:28.913
water quality, the habitat quality is highly dependent on the condition of the smaller streams beginning with the headwaters.

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00:17:29.903 --> 00:17:36.653
But quite apart from that ,headwaters streams have tremendous habitat and water resource values in their own

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00:17:36.653 --> 00:17:45.294
right. For example, these small streams are highly diverse in both their landscape settings and their in-stream habitat.

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00:17:46.403 --> 00:17:57.564
They contain habitats and micro habitats that are not duplicated in the larger streams and are essential to the many organisms that benefit from the small size,

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00:17:57.594 --> 00:18:01.463
the shallow water, and the diverse habitat conditions.

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00:18:02.669 --> 00:18:15.054
A whole array of in stream habitats, such as pools, riffles, and runs are used by fishes and turtles, salamanders, and invertebrates in different seasons at different life stages.

147
00:18:15.054 --> 00:18:22.584
And for different purposes, such as hunting, resting and shelter and in different environmental conditions, such as heat waves

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00:18:22.584 --> 00:18:32.753
and high flows and low flows and over winter, and are essential to the survival and perpetuation of the aquatic populations.

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00:18:33.179 --> 00:18:47.489
Riffles, rapids, and falls help to incorporate oxygen into the stream water. Dissolved oxygen is an essential habitat component for most stream animals.

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00:18:49.614 --> 00:19:01.013
Headwaters streams support distinctive biological communities, including specialists that do not survive in larger streams for a variety of reasons.

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00:19:01.344 --> 00:19:13.763
For example, some fish species move into headwater areas to spawn both because the stream substrates are more suitable for egg incubation

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00:19:14.273 --> 00:19:21.233
and because the nests and young are less subject to the predators that troll the larger stream segments.

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00:19:22.763 --> 00:19:23.334
The invertebrate

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00:19:23.453 --> 00:19:31.104
communities of headwater streams are often diverse and abundant making these rich feeding grounds,

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00:19:31.193 --> 00:19:31.673
,

156
00:19:31.703 --> 00:19:40.614
for their predators and also to help supply downstream segments with essential organisms that support the entire stream ecosystem.

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00:19:42.773 --> 00:19:57.473

Headwater streams often provide refuge from extremes of temperatures and a flow volumes in downstream segments and also refuge from competitors, creditors and non-native species of lower reaches.

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00:19:59.634 --> 00:20:08.784
Headwater streams supply invertebrates and organic detritus, which serve as food and structural elements for downstream habitats.

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00:20:09.324 --> 00:20:15.144
Headwater streams are intimately tied to the forest and meadows that they flow through.

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00:20:15.564 --> 00:20:28.433
They receive organic detritus, leaves, twigs, branches, seeds that provide structural materials for in-stream habitats and form the basis of the aquatic food web.

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00:20:30.144 --> 00:20:35.723
The invertebrates, fungi, and the substrates of headquarter segments

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00:20:35.723 --> 00:20:45.202
serve key roles in processing nutrients and making them available to the aquatic ecosystems and the nearby terrestrial systems.

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00:20:47.394 --> 00:20:48.834
When downstream reaches,

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00:20:49.374 --> 00:20:49.673
,

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00:20:49.703 --> 00:20:51.953
have been overwhelmed by flood flows,

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00:20:52.703 --> 00:20:53.993
the stream organisms,

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00:20:54.023 --> 00:20:54.564
,

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00:20:55.523 --> 00:20:59.394
in many cases have been washed away or buried by settlements,

169
00:20:59.723 --> 00:21:00.713
headwaters streams

170
00:21:00.743 --> 00:21:01.374
supply

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00:21:01.403 --> 00:21:05.334
new colonists to replenish the downstream populations.

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00:21:07.019 --> 00:21:17.548
The corridors of headwater streams provide cool, moist travel ways for animal movement in and along the stream.

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00:21:17.874 --> 00:21:29.243
Headwaters streams also provide habitat for both aquatic and terrestrial animals, serving large areas of, the surrounding options.

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00:21:29.544 --> 00:21:39.953
Of course, beaver often dam a perennial segment of a headwater stream, creating an empoundment that serves as a rich habitat itself for a great variety of plants

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00:21:39.953 --> 00:21:42.713
and animals of marshes and open water areas,

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00:21:43.013 --> 00:21:50.153
such as great blue heron and green heron tree swallow, snapping turtle, painted turtle, spotted turtle,

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00:21:50.394 --> 00:21:51.773
green frog and fishes.

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00:21:52.223 --> 00:22:07.074
American mink and river rotter hunt along headwaters streams and beaver ponds. Raccoons forage for frogs, turtles, and insects along streams. The Louisiana

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00:22:07.074 --> 00:22:07.884
water thrush,

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00:22:08.153 --> 00:22:08.243
,

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00:22:08.243 --> 00:22:14.784
A New York state species of greatest conservation need nests along perennial streams of headwaters

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00:22:15.173 --> 00:22:22.644
, and in lower, lower segments, especially those that run through forests.

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00:22:22.644 --> 00:22:32.064
The wood turtle is a New York state species of special concern and spends much of its time in and near perennial streams, including headwater segments.

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00:22:34.013 --> 00:22:34.943
I could go on,

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00:22:34.943 --> 00:22:44.784
but I hope this brief introduction to some of the ecological values of headwater streams does convince you of the great importance,

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00:22:44.814 --> 00:22:45.203
,

187
00:22:45.233 --> 00:22:46.344
of these habitats,

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00:22:46.344 --> 00:22:49.044
both as habitats and their own right

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00:22:49.044 --> 00:22:55.673
And as sources of water and nutrients and structural materials and organisms to downstream reaches.

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00:22:57.564 --> 00:23:06.834

The conditions of headwater streams are much affected by the condition of the land in their watersheds - that is all the land that drains to them.

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00:23:06.834 --> 00:23:16.673
And that could be a few square meters in some of the uppermost reaches and or several acres or hundreds of acres in some cases.

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00:23:18.354 --> 00:23:31.973
Whether the land is forested or open or paved or unpaved vegetated or bare soil, all affect the water temperature the water, water clarity, the quality of the detritus, the nutrient status,

193
00:23:32.334 --> 00:23:34.943
and the structural quality of the stream habitat.

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00:23:36.864 --> 00:23:40.013
Stream can be damaged by alterations

195
00:23:40.044 --> 00:23:40.374
,

196
00:23:40.403 --> 00:23:42.773
to the volumes or timing of surface

197
00:23:42.773 --> 00:23:43.673
run off

198
00:23:43.733 --> 00:23:43.973
,

199
00:23:43.973 --> 00:23:47.094
that reaches it. Deforestation or pavement,

200
00:23:47.094 --> 00:23:47.844
for example,

201
00:23:47.844 --> 00:23:57.983

can raise the stream water temperature and increase the flashy-ness of the stream flows, causing large flows for short periods during and after storm events,

202
00:23:58.284 --> 00:24:01.614
and then reducing base flows during dryer periods.

203
00:24:01.824 --> 00:24:07.703
These changes can greatly alter the aquatic community that's able to survive and thrive in the stream.

204
00:24:09.233 --> 00:24:19.374
A stream that's allowed to spread out over a well vegetated floodplain during high water events instead of being channeled by artificial berms or hardened banks,

205
00:24:19.403 --> 00:24:22.134
or bulkheads will benefit

206
00:24:22.163 --> 00:24:22.463
,

207
00:24:22.463 --> 00:24:23.844
in habitat quality,

208
00:24:23.874 --> 00:24:24.144
,

209
00:24:24.173 --> 00:24:26.213
diversity and stability.

210
00:24:29.094 --> 00:24:41.723
Streams that are unimpeded by artificial dams or inadequate or suspended culverts are more likely to maintain the full complement of habitats and species from the headwaters to the mouths of the stream

211
00:24:42.114 --> 00:24:45.263
where it, where it joins another water body.

212
00:24:46.913 --> 00:25:01.134

Streams that are free of non-native fishes, such as brown trout, bluegill, largemouth bass, and other species introduced for recreational fishing or non-native crayfish species introduced as bait,
213
00:25:01.554 --> 00:25:11.513
and other non-native species are more likely to support the native aquatic communities that have developed and maintained the stream ecosystem over thousands of years.

214
00:25:14.183 --> 00:25:15.144
In a few minutes,

215
00:25:15.503 --> 00:25:16.044
,

216
00:25:16.493 --> 00:25:17.003
,

217
00:25:17.034 --> 00:25:18.384
later on in the program,

218
00:25:18.413 --> 00:25:18.894
,

219
00:25:18.953 --> 00:25:21.683
Nate will say more about the threats,

220
00:25:21.713 --> 00:25:22.044
,

221
00:25:22.044 --> 00:25:24.294
that can diminish the water quality,

222
00:25:24.713 --> 00:25:29.663
habitat quality, and the ecosystem services provided by headwater streams.

223
00:25:31.644 --> 00:25:35.034
Headwaters streams also have outsized importance in

224

00:25:35.064 --> 00:25:35.334
,

225
00:25:35.334 --> 00:25:49.973
this era of the changing climate. They can provide thermal refuge for species that cannot tolerate the warming temperatures in downstream areas. Headwater streams that are fed by springs and seeps supplying a

226
00:25:49.973 --> 00:25:51.263
constant flow of cool

227
00:25:51.263 --> 00:25:53.993
water can be especially valuable for this purpose.

228
00:25:55.374 --> 00:26:09.804
Headwater streams can provide cool and moist travel corridors for plants and animals that need to migrate to cooler habitats at higher elevations as their traditional habitats are rendered

229
00:26:09.834 --> 00:26:12.263
unsuitable by the warming temperatures.

230
00:26:13.763 --> 00:26:28.314
Climate scientists predict more frequent and more intense large rainstorms causing catastrophic flood events that can be highly disruptive to downstream reaches. Headwater streams can serve the irreplaceable function

231
00:26:28.648 --> 00:26:36.388
of replenishing organisms and organic materials to help restore the larger stream systems.

232
00:26:37.044 --> 00:26:51.653
Climate scientists also predict more frequent and more prolonged droughts over the coming decades. Headwater streams serve a valuable role in recharging ground water supplies, especially during the wetter times of year.

233
00:26:51.959 --> 00:27:06.929
Groundwater is not only the primary source of drinking water for most rural parts of the state and of the Hudson Valley, but is also a significant source of water for wetlands streams and upland habitats.

234

00:27:09.384 --> 00:27:23.094
Headwater streams typically contribute a large portion of the water reaching downstream segments estimated at 55 to 70 percent of the total water volume and so are essential to maintaining the flows that sustain those systems.

235
00:27:26.034 --> 00:27:33.233
The condition of the corridor along a stream the riparian corridor is key to the hydrology of the stream,

236
00:27:33.263 --> 00:27:34.314
the water quality,

237
00:27:34.554 --> 00:27:36.023
and the habitat quality,

238
00:27:36.473 --> 00:27:37.163
whether it's well,

239
00:27:37.163 --> 00:27:40.973
vegetated or paved or the bare soil of a crop field,

240
00:27:41.483 --> 00:27:44.753
whether it's forested or open, whether it's connected to the stream,

241
00:27:44.753 --> 00:27:47.634
or is separated by artificial berms and walls.

242
00:27:48.384 --> 00:28:00.023
Beth is going to talk next about the great importance of riparian buffers along had water streams.

243
00:28:00.689 --> 00:28:15.689
But this is much of what I wanted to say about the habitat and water resource values of headwater streams. I am happy to answer any questions that you've posted in the Q and A.

244
00:28:15.689 --> 00:28:21.118
So, I'm going to stop sharing and

245
00:28:21.118 --> 00:28:25.199

send this back to Nate.

246
00:28:26.634 --> 00:28:33.443
Nate Nardi-Cyrus: All right, thank you so much, Gretchen that was that was a really great presentation. I apologize to everyone for the beeps.

247
00:28:33.443 --> 00:28:46.584
I've gotten many notifications about that and that is just a default setting on the platform and so, unfortunately, I can't make that change. Now, it happens any time someone leaves or enters the room. , so just

248
00:28:46.798 --> 00:29:01.703
be patient with us, and then during the next two presentation, or the next two webinar sessions, we will address that problem. Okay. So I'm gonna, answer some, or ask Gretchen some of the questions. We have quite a bit of time for questions.

249
00:29:01.703 --> 00:29:13.344
So the first one I'm seeing here is, curious as to why the red dotted line on your map earlier defined under the designation run off

250
00:29:13.709 --> 00:29:25.798
the arrow to the left was outside the area defined as the watershed boundary, the blue dotted area. So, I think, Gretchen, that was the map that you had of the watershed

251
00:29:25.798 --> 00:29:33.952
with, you know, the headwater streams identified within that map. Mm. Hmm. So I'm not quite sure what the question's asking.

252
00:29:33.952 --> 00:29:47.483
I think I noticed as well that one of the tributaries was that you circled was not within the mapped watershed boundary and maybe that's what she's referring to. But I, I think that that was just, you know, .

253
00:29:47.788 --> 00:29:54.328
Gretchen Stevens: Yeah, yep I would say that would have been a stupid graphic error.

254
00:29:55.284 --> 00:30:01.973
And that the person who noticed that would be correct.

255
00:30:03.023 --> 00:30:14.273
And I don't actually remember exactly how that was drawn but anything it all should have been noted as being part of the watershed.

256
00:30:16.439 --> 00:30:25.439
Nate Nardi Cyrus: All right, thanks, Gretchen. The next question I have someone wants you to share the screenshot of the multiple insects again.

257
00:30:25.439 --> 00:30:39.118
I'm not going to make Gretchen do that. We will be sharing all of these presentations as PDFs after in a follow up email later on this week. So you'll be able to get that shot in that PDF at that point.

258
00:30:39.118 --> 00:30:47.909
Another question someone wants to know: how do you define a headwater stream, Gretchen?

259
00:30:47.909 --> 00:30:51.088
.

260
00:30:51.088 --> 00:30:54.179
Gretchen: I think I would default to the,

261
00:30:54.894 --> 00:30:55.284
well,

262
00:30:55.314 --> 00:30:55.943
first of all,

263
00:30:55.943 --> 00:30:56.874
I would go with the,

264
00:30:57.054 --> 00:30:57.413
you know,

265
00:30:57.413 --> 00:30:59.453
5 cubic feet per second,

266

00:30:59.483 --> 00:30:59.814
,

267
00:30:59.844 --> 00:31:03.023
just because that's a term that has been used,

268
00:31:03.594 --> 00:31:04.134
,

269
00:31:04.163 --> 00:31:05.213
for decades,

270
00:31:05.334 --> 00:31:05.903
,

271
00:31:06.294 --> 00:31:06.864
by,

272
00:31:06.864 --> 00:31:07.403
,

273
00:31:07.433 --> 00:31:10.344
by lots of other people who are who are,

274
00:31:10.374 --> 00:31:10.703
,

275
00:31:10.733 --> 00:31:12.804
dealing with streams in various ways.

276
00:31:13.193 --> 00:31:13.794
.

277
00:31:14.759 --> 00:31:19.409
And how would I define a stream in general?

278

00:31:19.409 --> 00:31:20.098
,

279
00:31:20.334 --> 00:31:23.034
The very earliest part of the presentation,

280
00:31:23.693 --> 00:31:25.013
I think ,

281
00:31:25.253 --> 00:31:26.364
I think I would,

282
00:31:26.513 --> 00:31:27.594
,

283
00:31:28.104 --> 00:31:28.973
say,

284
00:31:28.973 --> 00:31:29.273
you know,

285
00:31:29.273 --> 00:31:32.364
a place that that gathers and concentrates

286
00:31:32.784 --> 00:31:33.054
,

287
00:31:33.054 --> 00:31:36.263
water and carries it to another water body.

288
00:31:36.263 --> 00:31:47.634
Although I would include carries it to ground water, in a concentrated way, to include streams that may disappear on the surface.

289
00:31:47.729 --> 00:31:51.269
And the

290
00:31:51.269 --> 00:31:56.699
whether or not, it needs a discernible bed or banks. I, I think I would.

291
00:31:56.699 --> 00:32:05.368
say that it should have something discernible that remains after the water is not flowing.

292
00:32:05.663 --> 00:32:12.503
Not necessarily a highly defined bank or bed.

293
00:32:12.983 --> 00:32:13.463
,

294
00:32:13.703 --> 00:32:15.443
I think the important thing is,

295
00:32:15.683 --> 00:32:15.953
you know,

296
00:32:15.953 --> 00:32:19.763
whatever your purpose for defining a stream is that you,

297
00:32:19.763 --> 00:32:23.423
you think about that purpose. If you're concerned about the,

298
00:32:23.814 --> 00:32:24.203
,

299
00:32:24.384 --> 00:32:28.584
water volumes or water quality or anything of downstream areas,

300
00:32:29.094 --> 00:32:30.203
consider any,

301
00:32:30.233 --> 00:32:37.104
any place where water is flowing to those areas whether it's concentrated in a stream or in other ways.

302
00:32:37.374 --> 00:32:43.943
So, and I will also say, I don't think there is a firm or

303
00:32:44.278 --> 00:32:56.818
necessarily, you know, , there doesn't need to be an official, definition, except when you are trying to define it for jurisdictional purposes. And then you need something very clear

304
00:32:56.818 --> 00:33:03.868
and identifiable. Nate Nardi Cyrus: Great. We have a a little bit

305
00:33:04.223 --> 00:33:18.834
more time. I think one more. You actually hit on another one of the questions, which was, some streams flow overland, and then disappear in the groundwater without flowing into another surface body of water. Do you want to kind of talk a little bit more about disappearing streams just briefly?

306
00:33:19.074 --> 00:33:23.513
Sure. And I don't know all the kinds of places where that happens.

307
00:33:23.544 --> 00:33:37.403
It does certainly happen in limestone regions where the limestone bedrock, which is quite soluble in water develops lots of crevices and cavities which can open up.

308
00:33:37.403 --> 00:33:42.173
This is the cause of, you know, sinkholes and things. That some of you may be familiar with.

309
00:33:42.503 --> 00:33:52.794
When a streams are runs into one of those areas, runs over one of those cavities, and erodes away whatever superficial material might be there,

310
00:33:52.913 --> 00:34:06.263
it will just, just disappear underground. But I've seen other such disappearing streams in non limestone areas, including up in the Catskills.

311
00:34:06.953 --> 00:34:21.353
It's just a place where the bedrock geology I would say, opens up for, you know, and that can happen in for a variety of reasons. There are lots of cracks and crevices, in even our least soluble kinds of bedrock.

312

00:34:23.753 --> 00:34:24.204
Nate Nardi Cyrus: All right,

313
00:34:24.204 --> 00:34:24.414
well,

314
00:34:24.414 --> 00:34:25.253
thank you so much,

315
00:34:25.253 --> 00:34:25.764
Gretchen,

316
00:34:26.753 --> 00:34:30.143
we can address some more questions at the end. I didn't mention before,

317
00:34:30.143 --> 00:34:30.653
but we,

318
00:34:30.893 --> 00:34:33.443
we will also stay on the call after 4:45 and,

319
00:34:33.443 --> 00:34:33.893
,

320
00:34:33.893 --> 00:34:36.353
take questions for another 15 minutes or so,

321
00:34:36.353 --> 00:34:40.373
if they're there or have a further conversation if folks want to do that as well.

322
00:34:40.373 --> 00:34:41.873
So keep that in mind.

323
00:34:42.688 --> 00:34:53.278
All right, well, the next presenter we're going to have is Beth Roessler. So, Beth, if you want to post your presentation to the screen.

324
00:34:59.278 --> 00:35:05.789
Beth Roessler: Hey, can you hear me? I can you hear me? Nate Nardi Cyrus: Yes, I can. Yes.

325
00:35:05.789 --> 00:35:11.548
Yes, and you just need to shift that to presenter mode.

326
00:35:13.289 --> 00:35:20.009
Beth Roessler: Okay, are you seeing the whole slideshow and not the.

327
00:35:20.009 --> 00:35:23.518
Gretchen Stevens and Nate Nardi Cyrus: Yes, yep. There it is.

328
00:35:23.724 --> 00:35:24.353
Great thanks.

329
00:35:24.353 --> 00:35:28.554
Nate Nardi Cyrus: All right a brief background on on Beth ,

330
00:35:28.793 --> 00:35:31.014
she provides outreached in focus,

331
00:35:31.043 --> 00:35:31.253
,

332
00:35:31.253 --> 00:35:34.253
that focuses on stream corridor restoration and protection,

333
00:35:34.523 --> 00:35:34.733
,

334
00:35:34.733 --> 00:35:38.693
and coordinates the Hudson River Estuary Program’s trees for tribs program,

335
00:35:38.963 --> 00:35:40.434
which works with nonprofits,

336
00:35:40.434 --> 00:35:41.304
municipalities,

337
00:35:41.304 --> 00:35:44.423
private landowners and volunteers to complete streamside

338
00:35:44.423 --> 00:35:54.293
planting and other projects aimed at protecting water quality, in the watershed's tributary streams. So thank you so much Beth and, let you take it away.

339
00:35:54.599 --> 00:36:02.849
Beth Roessler: Okay, thanks, Nate. So I'm going to talk about stream buffers and I'm going to define those. So don't worry if you're not sure what that means

340
00:36:02.849 --> 00:36:07.469
for a headwater stream. Oh.

341
00:36:08.998 --> 00:36:12.088
And I'm going to figure out how to advance my slides.

342
00:36:14.699 --> 00:36:23.548
Nate Nardi Cyrus: you're having trouble yeah.

343
00:36:23.548 --> 00:36:28.108
Beth Roessler: There you go, they're advancing now. Okay. Gonna have to do it different from how I thought I would.

344
00:36:28.434 --> 00:36:41.994
Anyway, okay, so Gretchen had mentioned a watershed and she showed you some pictures of that and I would define it as the area of land from which water drains into a river, lake, or other water body.

345
00:36:42.653 --> 00:36:48.804
And it's very important to think about what happens on the land. Because what happens on the land affects those streams.

346
00:36:49.289 --> 00:36:53.518
There's a very strong relationship between the land and stream

347
00:36:53.518 --> 00:36:58.739
Wow, I keep losing my

348
00:36:59.969 --> 00:37:07.498
control here sorry…Sure. What's happening.

349
00:37:07.498 --> 00:37:10.648
Nate Nardi Cyrus: Beth, if you want to give me control, I could advance it.

350
00:37:11.963 --> 00:37:23.304
Beth Roessler: I think I've got it now. I apologize. So, yeah, the land use is in the water shed has major impacts on the stream and so if you have a watershed that's fully forested

351
00:37:23.304 --> 00:37:38.063
you're going to get very different inputs then if you have what's on the top left there or even on the bottom left you have or a bottom right, sorry top right bottom right. You're going to have erosion from some of these places that don't have vegetation.

352
00:37:38.063 --> 00:37:48.653
You're going to have run off from those, those parking lots, and maybe some animal waste and all those things end up in the stream and that is even more true when you talk about the area

353
00:37:48.653 --> 00:38:00.204
that's right next to the stream, which we call the riparian area and the word riparian just sort of means associated or near stream. So it's a big word, but it's not that complicated.

354
00:38:00.503 --> 00:38:07.074
And when we're talking about the riparian area, we're talking about that interface between the land and the water body, and it is

355
00:38:07.918 --> 00:38:17.010
influenced by the soil and the wetness of the soils and how close that area is. And you can see sort of on the right side of this picture

356
00:38:17.010 --> 00:38:20.519
there is.

357
00:38:20.519 --> 00:38:31.710
you know, this, it extends a little bit farther on this side because the soils are wet and they're influencing the stream a lot more. And maybe on this side where it's steep, you're not seeing as much influence.

358
00:38:31.710 --> 00:38:39.449
But you still, you still have influence up this area that maybe isn't as wet soils, because the run off happens so fast.

359
00:38:39.449 --> 00:38:43.559
And you can see in the

360
00:38:43.559 --> 00:38:49.829
right hand side here what it might look like from above, which is a little bit,

361
00:38:49.829 --> 00:38:58.260
it's not, it's not the same. And every different part of the stream, and this is actually a picture, an overhead of the Wallkill River

362
00:38:58.260 --> 00:39:06.780
going through the middle here, and this is a smaller stream draining into it. And so, and these maybe are some wetlands areas and so you're going to get different kinds of

363
00:39:06.780 --> 00:39:10.650
areas around a stream that have the most influence. And

364
00:39:10.650 --> 00:39:18.690
the land is influencing the water and the water is also influencing the land because that location was a very unique area.

365
00:39:21.594 --> 00:39:35.155
And I think Gretchen mentioned floodplains and we think about these FEMA mapped flood plains, they often overlap the riparian area but they're not usually exactly the same because those areas aren't wet all the time. They don't have wet soils all the time.

366
00:39:35.155 --> 00:39:37.105
They, they tend to be wet during big events.

367

00:39:37.199 --> 00:39:51.690
And we're going to see that from above in just a second, so here you can see the 100 year flood plain on one end. That's the FEMA special flood hazard area. And those tend to be really large around these larger streams.

368
00:39:51.690 --> 00:40:00.869
But then the riparian area, you're seeing sort of this smaller stream, having a little bit more coverage from that. It's more influential on these smaller stream.

369
00:40:00.869 --> 00:40:09.360
And just just so that you can see the difference, I put this fixed width buffer around or the fixed width around the streams on that on that far

370
00:40:09.360 --> 00:40:21.449
right side and that shows you that it is different. It's not the same as just 100 feet around a stream and it varies a lot with, you know, if there's wetlands or if there's other things that would be influencing that.

371
00:40:21.449 --> 00:40:25.860
How much that that land is influencing the stream.

372
00:40:28.405 --> 00:40:38.965
And I mentioned the word buffer by mistake, but so we often talk about riparian areas and those are the natural areas that are going to be influencing a stream. But we more often we talk about buffers.

373
00:40:39.175 --> 00:40:47.125
And when we're talking about a buffer, we're talking about a protected area, a vegetated area that buffers between the human use

374
00:40:47.519 --> 00:40:57.179
and the water body, and you can see in this side, we have a much bigger buffer on this side of stream. This side has a buffer, but it's a little bit smaller.

375
00:40:59.550 --> 00:41:03.210
And what do they look like from an aerial photography?

376
00:41:03.210 --> 00:41:06.539
So you can, .

377

00:41:06.539 --> 00:41:10.530
All right hold on, there's s a stream.

378
00:41:10.530 --> 00:41:23.940
And it looks like it doesn't have a very good buffer. And so you can see it on this photo, but sometimes streams photos, the small streams, except the headwater streams are going to look like this meandering set of trees.

379
00:41:23.940 --> 00:41:29.159
So, there's one and that's a buffer that's a little bit better from the one that we saw before.

380
00:41:29.159 --> 00:41:35.280
And here's here's another buffer that's on the bigger stream.

381
00:41:36.300 --> 00:41:50.940
And there's another one, not very big and then we can see one over here that's a lot wider. And I don't know if you could see it, but there is sort of this meandering stream going through there. And so if you're trying to find it out a map, you can see sort of what these different kinds of buffers look like.

382
00:41:52.614 --> 00:42:07.525
And so, why do we want healthy buffers? And this overlaps very much with what Gretchen was just talking about. It's a lot of the same reasons. We want those clean streams, but the buffers act to prevent stream pollution. So keeping those pollutants from getting into the stream.

383
00:42:07.525 --> 00:42:12.925
They filter the run off before it gets into the stream, reducing erosion along with stream.

384
00:42:13.199 --> 00:42:17.550
And cooling the stream, so that shade

385
00:42:17.550 --> 00:42:22.559
really cools down the stream, but also run off sometimes has a lot of temperature,

386
00:42:22.559 --> 00:42:32.219
higher temperatures from it and so cooling it off before it goes in. And I think it's, it's also important to know that headwater stream because they don't have

387
00:42:32.219 --> 00:42:38.699

huge amounts of water going into them. They are more vulnerable to pollution themselves.

388
00:42:38.844 --> 00:42:51.954
Right, because there's not as much water to dilute them, but also they are huge contributors to the downstream. And so it's really, you know, if we can keep the pollutants from getting into those streams, you know, we're keeping it from getting into the downstream areas as well.

389
00:42:52.224 --> 00:42:59.125
So, it's that dual role, the buffers protect those headwater streams and the headwater streams protect the downwater stream.

390
00:43:00.054 --> 00:43:08.155
So, and it's also there's been some research showing that that a good healthy buffer helps maintain stream health.

391
00:43:08.155 --> 00:43:16.704
So, even if some of those pollutants get in, the stream will is better at processing nutrients if it has those roots, and that the trees around it.

392
00:43:20.394 --> 00:43:34.675
And in the same way, I think Gretchen mentioned, you know, that these headwater streams are really important for reducing flooding. Well, if we can keep that water from going slower into the headwaters streams, we're keeping the water from going downstream as fast. So, we're reducing some of that damage in that way.

393
00:43:34.914 --> 00:43:38.994
And often they're associated with wetlands, which also can hold a lot of that water.

394
00:43:39.239 --> 00:43:42.360
Those buffers also

395
00:43:42.360 --> 00:43:50.820
lead to groundwater recharge and that water itself is important for the streams often when it's dry times that can feed into the streams for, for.

396
00:43:51.385 --> 00:44:05.965
when there isn't a lot of rain coming down, I mentioned that these areas are very unique. They're unique soil, they have unique plants because of their location near the stream. And so that in that way, they provide this habitat that isn't anywhere else.

397
00:44:07.255 --> 00:44:09.295
They've been shown to improve property values.

398
00:44:09.389 --> 00:44:16.199
And they can also support recreation even if you're not getting your boat on that very small stream, just downstream from there

399
00:44:16.199 --> 00:44:19.710
And in then the larger streams, they might be important.

400
00:44:19.710 --> 00:44:32.130
And I also want to mention the economic value of buffers. There's a study that was done on the Delaware River basin and they estimated that each acre

401
00:44:32.130 --> 00:44:36.449
of a stream buffer is worth about 10,000 dollars per year.

402
00:44:36.449 --> 00:44:49.619
And they didn't even look at things like flood mitigation and wildlife habitat, because those things weren't things that they felt that they could monetize. And in that study that also noted

403
00:44:49.619 --> 00:44:54.900
that these low order streams, which is the smaller streams are often the headwater streams

404
00:44:54.900 --> 00:44:58.050
are

405
00:44:58.050 --> 00:45:02.039
more effective from an economic standpoint.

406
00:45:02.039 --> 00:45:09.179
And some of those larger streams, and so those buffers along those smaller screens are particularly important in this

407
00:45:09.179 --> 00:45:13.650
valuation, .

408
00:45:13.650 --> 00:45:25.920
Fish grow on trees. Well not really, but the trees that are along the stream and the shrubs, and the other things that are native are really important to the fish in the stream. And it's partly as

409
00:45:25.920 --> 00:45:33.420
Gretchen noted these organisms live in the stream, and they are very particular about what kinds of leaves

410
00:45:33.420 --> 00:45:47.550
that they want to be to have in their systems and so having good native vegetation, putting those leaves in, it makes a big difference to the kinds of things, that the kinds of insects that you're going to see in the stream. When trees fall down

411
00:45:47.550 --> 00:45:51.570
or when there's debris in this stream, it provides habitat or.

412
00:45:51.570 --> 00:46:03.119
a refuge I'm sorry for the fish to hide in and, and the insects provide the food for the or the fish and so, all of that

413
00:46:03.119 --> 00:46:08.760
is important and then the shade that I mentioned before, especially important for these cold water

414
00:46:08.760 --> 00:46:12.510
fish that need those, those colder streams.

415
00:46:12.510 --> 00:46:24.210
And I'm not going to go into any details about this and I noticed that Gretchen also had the Louisiana waterthrush on the wood turtle. And those are two organisms that really need both

416
00:46:24.210 --> 00:46:35.039
Those: the streams, but also the forest around the streams, or the vegetated areas around the streams in order to have safe passage between those. And so

417
00:46:35.039 --> 00:46:43.920
we see some declines in those numbers when those buffers are not available. And again so because those stream buffers are

418
00:46:43.920 --> 00:46:52.050
their transition corridors, so they're really valuable in that way and they're also travel corridors for many animals.

419
00:46:53.844 --> 00:47:07.945
So, just a few pictures of what does a healthy buffer look like. First of all it's going to be as wide as possible. And we're back with that picture where we have this sort of wide buffer on one side, and the narrower one on the other side.

420
00:47:08.219 --> 00:47:12.150
And I'm going to go into the more detail about that in a minute.

421
00:47:12.150 --> 00:47:19.860
It has many types of plants, and I didn't write it in here, but I wanted to just make sure to mention that ideally, those are native plants.

422
00:47:20.485 --> 00:47:29.335
Everything in the system has adapted to the native plants that are there, like those insects that are in the stream that want to eat the native leaves.

423
00:47:30.505 --> 00:47:35.724
And so, as much as possible, if we can have those plants around them to be to be native.

424
00:47:36.030 --> 00:47:44.875
That is helpful to the system. Many sizes in shapes of plants. I like to say, sometimes they look a little messy right? They're not neat rows and things like that.

425
00:47:44.875 --> 00:47:53.125
We've got, we've got some understory and some overstory and those kinds of things and that really helps to sort of provide habitat for many different things.

426
00:47:53.219 --> 00:47:57.780
Shady, we've mentioned that before and they have leaf litter.

427
00:47:57.780 --> 00:48:09.780
Again, as I mentioned before losing my cursor and here's just another picture, a little bit bigger of a great little forested stream.

428
00:48:09.780 --> 00:48:24.239
Again, you're seeing there's low growing stuff and there's tall stuff and there's lots of rocks and there's lots of there's lots of leaf litter in the stream and there's a little bit of debris and all those. Things are natural and normal and things that we would expect in healthy stream

429
00:48:25.195 --> 00:48:38.755
from a healthy buffer. And so I talked about how we want wide buffers and I think, you know, how people always want to know how wide does it need to be and I think it really has to do with what what your goal is

430
00:48:38.755 --> 00:48:50.155
and what you're trying to to make sure that that buffer is providing. And these ones are, they have grade graded color. So you can get some nutrient removal, maybe around 20 feet.

431
00:48:50.400 --> 00:48:58.050
Of buffer, but if you have a much wider, when you're going to get much better nutrient removal and sediment control.

432
00:48:58.885 --> 00:49:10.554
And you don't even get start getting flood control until you're getting to a wider buffer. And that's from the buffer itself. And wildlife habitat, there's, there's just a plus sign at the end of that because it really depends which wildlife you're talking about.

433
00:49:11.094 --> 00:49:21.894
Some wildlife are going to need very large buffers, and some of them might be okay with some of these smaller buffers. So it's good if you're if you're thinking about protecting buffers, it's good to think about what your goals are.

434
00:49:22.170 --> 00:49:33.179
And I've got another slide about this. So again, people are always asking what is the minimum recommended buffer with and I've just put a couple,

435
00:49:33.179 --> 00:49:35.485
put the information from a couple of resources in here,

436
00:49:35.485 --> 00:49:50.275

and I'm happy to share these with people offline if they want to dig in deep but there's a great resource called Conservation Thresholds that they said 100 meters is really what's best the minimum for water quality and wildlife if you're interested in all

437
00:49:50.275 --> 00:49:50.905
of those things.

438
00:49:50.905 --> 00:49:51.264
.

439
00:49:52.530 --> 00:49:56.639
And then they do a literature view where they look at lots of different

440
00:49:56.639 --> 00:50:07.079
studies that were done and so you could look deeper into that if you were interested in one particular thing. A more recent one in 2014 by Sweeney and Newbold

441
00:50:07.079 --> 00:50:13.860
is saying that 100 feet of forest it is the minimum that they're recommending, sort of, across the board.

442
00:50:13.860 --> 00:50:18.869
Another one that looked just at headwater streams at 50 feet.

443
00:50:18.869 --> 00:50:22.559
I also wanted to mention over here this picture:

444
00:50:22.559 --> 00:50:35.304
A three-tiered approach. So this is something that the USDA had proposed, because it's hard sometimes to get 100 feet around your stream and what you can do is have the area closest to the stream be fully forested.

445
00:50:35.304 --> 00:50:47.724
So, maybe that's 50 feet where you don't cut anything, but maybe the next zone over, you would allow some, some cutting and maybe some other, some other things happening but you still mostly maintain a forest.

446
00:50:47.724 --> 00:50:54.655

And maybe the next zone over would be grasses, which actually can, you know, tall native grasses can be used

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00:50:55.409 --> 00:51:03.539
to stop surface run off and so the combination of those, you don't lose as much land, but you're getting some of those benefits still.

448
00:51:03.539 --> 00:51:07.349
And lastly I wanted to

449
00:51:07.349 --> 00:51:12.539
mentioned the variable width which we saw this before.

450
00:51:13.045 --> 00:51:26.994
This is most likely to catch the influence of that, that immediate area if you're looking at just what's in that variable with around the stream. And I know that this from a legislator, like, you're trying to pass a law,

451
00:51:27.025 --> 00:51:34.494
this might be a difficult one to do. But, depending on what you're how you're trying to think about it, this might give you some clues as to where there's the most influence,

452
00:51:34.590 --> 00:51:38.610
if you're looking at the width of the buffer.

453
00:51:38.610 --> 00:51:48.420
And I just quickly because I know that Nate's going to go into more of this. But what does an unhealthy buffer look like? And this is not everything. But here are some photos of some places.

454
00:51:48.420 --> 00:51:57.389
You know if it's paved or built, so you have roads all around it, you've got only lawn, you may see things like this where you have this

455
00:51:57.389 --> 00:52:03.900
crazy erosion happening. It's just not holding it on and that's also going to be a very hot stream.

456
00:52:03.900 --> 00:52:08.639
Invasive plants I mentioned that that the

457
00:52:08.639 --> 00:52:13.019
the creatures in the stream are adapted to the native plants.

458
00:52:13.019 --> 00:52:27.989
Walls and berms and rocks and this one you've got you've got a lot of geese that are using the space because it's so big. So out in the open and there are a few trees, but there's nothing in the understories. So we're not seeing that good messiness.

459
00:52:29.965 --> 00:52:44.724
And I also wanted to mention this isn't really the buffer itself, but one of the things that I often see, when I go out and look at sites is that people are wondering why their buffers aren't working, but they've got a pipe or a ditch streamlining all of the water passed

460
00:52:45.000 --> 00:52:50.400
these great forests that they have, and just putting it straight into the stream. So you're not going to get the filtering,

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00:52:50.400 --> 00:53:02.610
the kinds of filtering happening when you have the pipe going straight in. And so we want that water and that run off to end up into our buffer

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00:53:02.610 --> 00:53:05.820
not go around it that. You know, those buffers,

463
00:53:05.820 --> 00:53:12.750
the trees might still be providing shade and some other things, but it's going to work a lot better if the water's going into it.

464
00:53:13.255 --> 00:53:23.875
This is my last slide very closely related to what's what a bad buffer is, but the threats to riparian buffers. So we talked about invasive species and here's a picture of multiflora rose.

465
00:53:24.204 --> 00:53:33.355
There's been studies shown that this is one of those leaves that the insects and native insects don't really like, but also deforestation from

466
00:53:33.659 --> 00:53:40.769

from forest pests is a big problem, Hemlock woolly adelgid and the emerald ash borer.

467
00:53:41.784 --> 00:53:52.704
Climate change, which also affects that vegetation and maybe we'll be, you know, it changes the water that's coming and going and the amount of precipitation and the temperatures.

468
00:53:52.704 --> 00:53:58.614
And so we have some die off of trees and some problems with some of the vegetation that's going to affect our riparian buffers.

469
00:53:58.889 --> 00:54:05.369
Development of course, you know, if we pave all the way right up to the edge of the stream we, there's none of those buffering

470
00:54:05.369 --> 00:54:08.699
functions are going to happen.

471
00:54:08.699 --> 00:54:15.179
What my boss likes to call the tidy stream attitude. So here we see a small stream that that

472
00:54:15.179 --> 00:54:28.650
really was, it was completely forested and the developer that was working around it decided it would be better off if he made it straight and he removed all the vegetation from around it. And it's just really too bad that was

473
00:54:28.650 --> 00:54:36.929
the decision. And we, we did actually go back and replant that, but it's too bad that the mature vegetation that around it was taken down.

474
00:54:36.929 --> 00:54:43.920
And I think that we have an attitude against messy. We think that things that are messy, maybe are not good.

475
00:54:43.920 --> 00:54:50.579
So, sort of have to get by that and not want grass everywhere. And the last one I wanted to mention was deer.

476
00:54:50.579 --> 00:54:59.489

, , they're not technically an invasive species because they are native, but their numbers are much higher than that. They've been in the past due to

477
00:54:59.489 --> 00:55:04.289
many things that I'm not going to go into, but they really are

478
00:55:04.289 --> 00:55:10.559
keeping our many of our forests, including our riparian forests from revegetating.

479
00:55:10.559 --> 00:55:16.530
So, those deer really are quite a big problem, especially for those seedlings.

480
00:55:16.530 --> 00:55:22.289
So, when we have these matures trees that start to die off, the seedlings can't grow and then

481
00:55:22.289 --> 00:55:25.349
we end up with buffers that are not as healthy.

482
00:55:25.349 --> 00:55:28.769
And with that, I'm going to

483
00:55:28.769 --> 00:55:36.000
finish my presentation and here's my contact information, but you can also contact Nate.

484
00:55:36.000 --> 00:55:39.000
And I'm happy to take questions.

485
00:55:40.170 --> 00:55:49.074
Nate Nardi Cyrus: Thank you Beth. That was really great. Just if I can comment on the tidy stream attitude, I think that's such a interesting concept.

486
00:55:49.074 --> 00:56:00.715
And I know that even language within our conservation community has changed where we used to refer to downed material as, as woody debris.

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00:56:01.614 --> 00:56:05.244
Right. And everyone was always talking about debris in the stream and how great that is.

488
00:56:05.244 --> 00:56:17.275
And now the language has changed to just call it wood, or, you know, woody material , because, you know, debris has such a negative connotation and it's, it's such a value to these ecosystems.

489
00:56:18.300 --> 00:56:24.269
Let me look at some of these questions here and people feel free to continue to post your questions.

490
00:56:24.744 --> 00:56:34.255
I have a question is the mapping of the riparian area determined by elevation, by testing, I assume soil testing, , or is there something else involved?

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00:56:34.255 --> 00:56:43.494
Beth Roessler: Yeah, so the map that I showed, I mean, I think if you were gonna do something, even more high resolution, you might want to add more things to it. But the map that I showed, it looked at, .

492
00:56:43.889 --> 00:56:49.110
soils to sort of assess where there's hydric soils, where there's wetlands type soils.

493
00:56:49.110 --> 00:56:52.349
Elevation, slope, .

494
00:56:52.349 --> 00:57:03.000
And so that one actually a sort of mocking almost what is a like, a 50 year floo plain as opposed to 100 year floodplain. So, places that are inundated much more often.

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00:57:03.000 --> 00:57:10.679
So that's the way that that one was mapped, and it is available on the Hudson Valley natural resource mapper.

496
00:57:10.679 --> 00:57:13.769
And as a layer called riparian buffers

497
00:57:13.769 --> 00:57:24.264
if people want to be able to pull that up. Nate Nardi Cyrus: great, , we have an opportunity for a couple more questions.

498

00:57:24.264 --> 00:57:28.795
So, if people are want to get that in, , now is the time.

499
00:57:33.175 --> 00:57:45.324
Regarding okay, here we got one regarding model language for a town zoning ordinance, extending a 100 foot buffer to say, 200, is there a link or a set of criteria?

500
00:57:46.889 --> 00:58:00.840
I'm not sure that I understand that question Beth Roessler: if they're asking about model local law language. I mean, I think there is the Department of State recently, put out a resource for model local laws and I can

501
00:58:00.840 --> 00:58:06.059
I don't have that that link right in front of me, but I can certainly write down

502
00:58:06.059 --> 00:58:10.710
A note that we will, we will share that with participants.

503
00:58:10.710 --> 00:58:20.940
And and that would be, you might be able to use that to find other places. I think the conservation thresholds document that I mentioned

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00:58:20.940 --> 00:58:27.000
would give a lot of scientific background that would support different widths

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00:58:27.000 --> 00:58:31.469
that that you might choose as well as the other resource that I mentioned.

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00:58:31.469 --> 00:58:40.739
With Sweeney and Newbold, all of those, you know, they dug deep into the science behind it, which you might want to use in order to support your

507
00:58:40.739 --> 00:58:43.769
your language in your law.

508
00:58:45.594 --> 00:58:53.574
Nate Nardi Cyrus: Yeah, that's great. And I would encourage you to attend our third session, which is gonna be November 17th.

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00:58:53.574 --> 00:59:04.704
We're gonna be talking a lot more about local legislation for these stream ordinances and we're gonna be having featuring an example from the town of Poughkeepsie.

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00:59:04.704 --> 00:59:08.695
, and they'll talk about, you know, their law enforcement of their law.

511
00:59:08.695 --> 00:59:20.065
So that would be a, you should definitely attend that to learn more about those ordinances, but we will share that model, local law publication, , in our follow up email for sure.

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00:59:22.559 --> 00:59:27.360
Okay, well, I think we were good to move along and we definitely have time to.

513
00:59:27.360 --> 00:59:41.010
answer some more questions at the end. So if you think of anything else, just hold that with you. And, , and we'll just open questions up to the rest of the panel afterwards. So I am going to, , share my screen.

514
00:59:41.010 --> 00:59:44.280
Beth Roessler: Great. And while he's doing that.

515
00:59:44.280 --> 00:59:48.000
I'm going to introduce Nate.

516
00:59:48.000 --> 00:59:52.619
Nate is a conservation and land use specialist with the Hudson River Estuary Program.

517
00:59:52.619 --> 00:59:59.309
Where he works with municipalities land, trusts and other partners to incorporate conservation science into land use planning.

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00:59:59.309 --> 01:00:06.300
He provides extension programs, tools and technical assistance to communities and organizations throughout the Hudson.

519
01:00:06.300 --> 01:00:11.610

Estuary program watershed. Before coming to the Estuary Program, Nate

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01:00:11.610 --> 01:00:18.360
conducted natural resource management and conservation easement monitoring for Scenic Hudson land trust.

521
01:00:20.190 --> 01:00:33.684
Nate Nardi Cyrus: All right, well, thank you, Beth. I have the really unhappy task of focusing on threats to our headwaters streams. But, you know, a lot of this will be, somewhat of a review from what Gretchen and Beth had just presented.

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01:00:34.014 --> 01:00:42.565
And we'll end on a positive note with some ways that we can protect our headwater streams. And like I said, our future sessions will kind of

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01:00:42.869 --> 01:00:46.050
look at these a little bit more thoroughly, as far as protection goes.

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01:00:47.159 --> 01:00:58.619
So, what are the major threats? We have hydrologic alteration and again very jargon, jargon, type term but I'll unpack that in just a second.

525
01:00:58.619 --> 01:01:03.000
Pollutants, climate change of course,

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01:01:03.000 --> 01:01:15.989
invasive species, ininadequate buffers. So you know, we, we give me a lot of overlap, but I think it's worth kind of reiterating some of these ideas that that Gretchen and Beth brought up first.

527
01:01:17.155 --> 01:01:24.594
So, hydrologic alteration is really, you know, any human caused disruption of the magnitude or timing of natural flows.

528
01:01:24.835 --> 01:01:38.034
So really, just any way that humans have disrupted the natural water cycle, and the way that water flows on top of and underneath our landscape. , and this, I feel like this infographic is very useful, , starting from the left here.

529

01:01:38.034 --> 01:01:45.684
It says, you know, groundwater extraction and depletion; we have surface water, empoundment and diversion,

530
01:01:46.164 --> 01:01:59.905
alteration of the land surface that's getting at what Gretchen was talking about with changing land cover and how that affects the drainage into the watershed and then altered surface drainage networks. So we're gonna get into these even more detailed.

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01:01:59.905 --> 01:02:08.125
But this is kind of what it might look like across the landscape and you can see that, you know, water is just directed in all kinds of places it was really never meant to go.

532
01:02:10.440 --> 01:02:14.400
It's the first example, are barriers so.

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01:03:42.329 --> 01:03:51.985
And what our program has been focusing on quite a bit is the action of them as actual barriers to the movement of animals across aquatic habitats.

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01:03:51.985 --> 01:03:58.583
So, in this case, I have our friend, the brook trout, trying to move upstream of this dam or this culvert.

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01:03:58.764 --> 01:04:09.864
And there's a number of species that are affected things like fish, American eel, hering species that use the Hudson River, these are all impacted by these barriers.

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01:04:10.105 --> 01:04:22.795
And also make a note that terrestrial species things like, or other animals, that kind of run along the side of the, they usually make their habitat in riparian areas.

537
01:04:22.945 --> 01:04:32.425
You know, if there's a culvert here, and it crosses the road, you know, they're restricted, and sometimes can't pass underneath the culvert. So, you know, their, their movement is also blocked as well.

538
01:04:36.565 --> 01:04:45.474
Another that the hydrology can be altered in a watershed is withdrawals and diversions and this is a pretty obvious one here.

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01:04:45.505 --> 01:04:56.335
I'm really we're focusing on the installation of wells, and when a well is considerably close to a stream or a riparian area, they can disrupt the flow of groundwater into that stream.

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01:04:56.364 --> 01:05:10.885
And these wells can be for home, for drinking water, or it could be for agriculture, or for irrigation. And in some cases, water is actually diverted out of the stream to irrigate fields. Though that's not common throughout the Hudson Valley.

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01:05:11.784 --> 01:05:20.244
I thought I'd bring up this example, because it's I think it's a really powerful one. This is an example of the University of Connecticut actually, pumping their river dry.

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01:05:20.275 --> 01:05:25.644
They have a series of well heads that are immediately adjacent to the Fenton river and,

543
01:05:25.675 --> 01:05:26.065
you know,

544
01:05:26.065 --> 01:05:30.114
in a period of a kind of high drought right before the students arrived,

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01:05:30.144 --> 01:05:30.594
,

546
01:05:30.594 --> 01:05:44.425
the pumping was not reduced and they ended up actually depleting all of the groundwater immediately adjacent to this portion of the river and the river completely dried up and resulting in massive fish kills and other

547
01:05:44.514 --> 01:05:44.815
,

548
01:05:44.844 --> 01:05:46.494
aquatic invertebrates died.

549
01:05:46.704 --> 01:05:57.025

And, of course, this made kind of great fodder for future study, but was a really unfortunate event for this stream and something that was noticed by the larger community.

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01:05:59.070 --> 01:06:08.664
Another example is channelization and I think this goes really well with the idea of the tidy stream aesthetic. You know, you notice here, these two examples of small channelized streams.

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01:06:08.664 --> 01:06:19.375
This is a ditch along the rail trail that was originally a railroad, up hear was the was the former railroad. And the ditching is common in those areas, but also along roads.

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01:06:19.405 --> 01:06:31.313
And so, you know, often in maintenance of these, these streams, you know, they straighten them and then they also generally remove all of the woody material within those areas, and that obviously, has consequences.

553
01:06:31.554 --> 01:06:40.164
So oftentimes you'll see this channelization around new development, or in areas, maybe where a stream is crossing underneath a road.

554
01:06:44.039 --> 01:06:59.010
Okay, here we have a pond creation, which is in some ways that kind of a pet peeve of mine. But this is a great example of a small stream in my neighborhood that the land owner excavated all all of the wetlands

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01:06:59.065 --> 01:07:13.855
around that and filled it up as pond, you can see this lovely aerator here. That's there because they mode all of the vegetation around the pond and so it gets pretty algae-y and choked with vegetation every single summer.

556
01:07:14.125 --> 01:07:20.065
But, you know, this is basically, you know, you can imagine that, you know, this habitat here.

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01:07:20.545 --> 01:07:33.264
was a kind of riparian buffer that was providing benefits to the stream and now all of those benefits are removed. Another a kind of a potential issue here is that there was a new dam constructed here.

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01:07:33.264 --> 01:07:47.545

And anytime you're constructing dams, or you have to think about the fact that, you know, there could be a failure of that dam and downstream sort of infrastructure might not be ready for this whole slug the water to get released all at once.

559
01:07:47.574 --> 01:07:59.244
So, they can be problematic in that way as well. And, like I discussed before with barriers, you know, this is also a reservoir, sediment. Eventually this will become wetland again as sediment accrues here,

560
01:07:59.364 --> 01:08:04.284
but it does rob the downstream reaches of those sediments and nutrients.

561
01:08:06.239 --> 01:08:18.534
I'm not going to go into this a lot, because we're actually going to be discussing this in the future session. But burying streams, which happens often in urban areas can really affect the hydrology of the site.

562
01:08:18.595 --> 01:08:33.354
Here you can see, this is the Sawmill river in Yonkers. This is what it looked like before, and they actually ended up having a project to daylight or, you know, expose this formally under underground river and they're just so many benefits associated with this practice.

563
01:08:33.505 --> 01:08:47.784
You know, there's actually the ability for vegetation, , and, and in stream start taking up pollutants that are in the river. You actually have use of this river by ducks even though it's in a very urban area, there can be some wildlife usage here.

564
01:08:47.965 --> 01:09:01.284
And there's also flood control benefits, you know, when you have all that water channels into this little area here , you can imagine that the, the velocities increase, and there's flooding to the adjacent neighborhood that's over the top of this.

565
01:09:01.284 --> 01:09:06.654
And here, this kind of allows a much larger area for water to accumulate in flood events.

566
01:09:09.029 --> 01:09:22.555
Here we have that kind of note on the changes in the landscape. We talked about this already a couple of times, but if you, you know, pave over an area that formally natural land cover, eventually that water has to go somewhere.

567
01:09:22.555 --> 01:09:32.664

And it's usually captured in a storm drain, like this and shipped off to some natural area or directly into that water body. It has to go somewhere eventually.

568
01:09:32.904 --> 01:09:47.005
And so that ultimately changes the hydrology because in high flow events, if there's a rainstorm per se, that water goes immediately into the river, instead of percolating into the groundwater, and then flowing slowly and recharging that stream.

569
01:09:47.034 --> 01:09:47.215
So,

570
01:09:47.215 --> 01:09:48.265
you end up with,

571
01:09:48.295 --> 01:09:48.595
you know,

572
01:09:48.595 --> 01:09:49.494
in storm events,

573
01:09:49.524 --> 01:09:49.885
,

574
01:09:49.914 --> 01:09:50.875
more flooding,

575
01:09:50.875 --> 01:09:51.715
higher flows,

576
01:09:51.715 --> 01:09:57.414
higher velocities and then in times of drought you end up with lower levels and,

577
01:09:57.414 --> 01:09:57.805
,

578
01:09:57.835 --> 01:09:59.755
and in situations where,

579
01:09:59.845 --> 01:10:00.085
you know,

580
01:10:00.085 --> 01:10:00.864
in some cases,

581
01:10:00.864 --> 01:10:03.024
a small stream might dry up being completely.

582
01:10:03.114 --> 01:10:08.154
So, again, these can have real consequences on our headwaters streams.

583
01:10:09.954 --> 01:10:21.864
All right, that was it for, for Hydrological ALteration. You may have forgot you were in a subcategory there. Another issue is pollutants. So, again, I've divided this into point source pollution.

584
01:10:21.864 --> 01:10:36.295
So, here, this is really the outfalls for manufacturing facilities and consolidated sewer overflows. Areas that, you know, either where sewage is treated and released or areas that during high flow events

585
01:10:36.744 --> 01:10:38.095
raw sewage is, .

586
01:10:38.430 --> 01:10:46.050
directly discharged into a water body, and both of these are permitted actions through the DEC, but they, they do obviously have

587
01:10:46.050 --> 01:10:57.659
Pretty notable, environmental impacts. And then there's the nefarious nonpoint source solution, which involves, you know, things like run off from your lawn. If you

588
01:10:57.659 --> 01:11:08.125
use things like fertilizers or pesticides on your lawn that eventually probably ends up in a water body somewhere. Things like septic, especially septic that's failing

589
01:11:08.154 --> 01:11:17.125

where you're not operating properly and that effluent is contaminating groundwater directly, that flows into streams.

590
01:11:17.364 --> 01:11:31.524
And then things like dumping, you know, dumping tires or a refrigerator down a ravine. That ravine is probably a small stream. Maybe it's just ephemeral. But those pollutants will kind of leach contaminants as long as they're at that site.

591
01:11:32.664 --> 01:11:36.295
This might be what you were thinking of when you thought of threats to streams,

592
01:11:36.475 --> 01:11:36.864
,

593
01:11:36.895 --> 01:11:38.215
things like recreation,

594
01:11:38.244 --> 01:11:38.784
,

595
01:11:38.994 --> 01:11:41.425
sinking your ATV and the small stream here,

596
01:11:41.604 --> 01:11:41.814
,

597
01:11:41.845 --> 01:11:47.814
or some construction activity where a modification to the bed or banks occurs.

598
01:11:47.814 --> 01:11:53.064
There's armoring here. No real plan for revegetation. Not not the best example.

599
01:11:56.215 --> 01:12:07.824
I'm glad that Gretchen highlighted beavers on the landscape and their importance to headwater streams. Here we, I just wanted to again call attention to their association with great blue herons.

600
01:12:08.215 --> 01:12:22.314

They nest in dead trees that were killed off in the empoundment behind the beaver dam. And so really the success of the reintroduction to beavers in the 20th century coincided with the great success that great blue herons have now.

601
01:12:22.314 --> 01:12:28.015
So if you see a lot of great blue herons in your neighborhood, you can thank your local beaver for that.

602
01:12:30.204 --> 01:12:42.564
We just had a great presentation on vegetated buffer or vegetated buffers rather. So we'll remind everyone of, you know, the risks that are posed to headwaters streams when they're not vegetated.

603
01:12:42.564 --> 01:12:45.805
You can see, you know, direct disturbance to the banks here.

604
01:12:45.953 --> 01:12:58.914
They're kind of eroding away, there's livestock using this area, and probably within this fencing as well on this side, and that's gonna be, you know, having direct contamination as that runs off into the stream.

605
01:12:58.944 --> 01:13:03.324
So, , just one of many downsides of unvegetated buffers.

606
01:13:05.069 --> 01:13:13.409
Invasive species there are so many. Gretchen brought up in stream species, like largemouth bass .

607
01:13:13.704 --> 01:13:26.994
And those definitely affect the ecology of those areas, but we have also plants things like knotweed here, which rapidly colonize and stream side riparian areas, excluding out all other native vegetation generally.

608
01:13:27.265 --> 01:13:39.354
And it also does a really bad job of holding soil. So, you basically have a situation where you have this huge stand of knotweed, a big storm comes, rips it all out, but that knotweed, it doesn't need seeds.

609
01:13:39.354 --> 01:13:50.994
It can reproduce just by any fragment of its material. So, it really just gets moved downstream on these disturbed areas and it never really help stabilize the banks, but it excludes species

610

01:13:51.024 --> 01:14:00.595
that might actually do a good job of creating a sustainable riparian area. And then I wanted to mention a forest pest issue.

611
01:14:00.595 --> 01:14:12.534
This is the emerald ash borer here, and a very common riparian tree was the American ash or the green ash and those species now have died off in a massive way.

612
01:14:12.534 --> 01:14:26.875
So you have new areas that were formally forested now with kind of these ghost forests and not necessarily a lot of regeneration to restore those afterwards. So just two invasive species threats.

613
01:14:26.904 --> 01:14:27.895
But there are many.

614
01:14:29.814 --> 01:14:36.505
And, of course, climate change, we're expecting changes in rainfall with an increased instances of drought and flood.

615
01:14:36.715 --> 01:14:45.324
And, you know, in this case, there's also an increased temperature, from a global climate change in general.

616
01:14:45.595 --> 01:15:00.055
And that can produce less oxygen in streams as the temperature rises and that can lead to die offs to things like our friend, the brook trout here. ,So, , again, just one of many downsides to climate change and how it might

617
01:15:00.390 --> 01:15:13.404
impact our headwaters streams. Okay. I want to end this, this first, part of my presentation by just looking at a small stream individually. I want to, you know, put a face to the name.

618
01:15:13.404 --> 01:15:14.064
Let's say,

619
01:15:14.215 --> 01:15:14.395
,

620

01:15:14.395 --> 01:15:16.524
this kind of an anonymous one doesn't have a name,

621
01:15:16.704 --> 01:15:17.935
but it's home to,

622
01:15:17.935 --> 01:15:18.145
,

623
01:15:18.175 --> 01:15:18.715
our friend,

624
01:15:18.715 --> 01:15:19.944
the dusky salamander,

625
01:15:19.944 --> 01:15:20.305
which,

626
01:15:20.755 --> 01:15:21.114
you know,

627
01:15:21.204 --> 01:15:25.914
is a fairly common species that that lives in these headwater streams,

628
01:15:26.064 --> 01:15:26.274
,

629
01:15:26.274 --> 01:15:29.185
and lives under these rocks and exists in this area.

630
01:15:29.185 --> 01:15:36.024
So, I just wanted to ask the question, you know, what specifically threatens the dusky salamander, out of what we've just discussed.

631
01:15:37.255 --> 01:15:48.234
So here on this site, let's say we have a new development going in, or even just a single house. This existing kind of trail makes a sensical location for a road to go in there.

632
01:15:48.234 --> 01:15:55.854
So you have potential disturbance of the bed and banks by machinery that probably would put some kind of culvert or

633
01:15:55.854 --> 01:15:56.244
,

634
01:15:56.274 --> 01:15:56.635
you know,

635
01:15:56.635 --> 01:16:05.755
potentially a bridge in here but a culvert is more likely and it would probably either backup this into a small empoundment,

636
01:16:05.845 --> 01:16:06.414
or,

637
01:16:06.414 --> 01:16:09.055
you know could present other problems there,

638
01:16:09.444 --> 01:16:11.814
and they'll also be an increase in impervious surface.

639
01:16:11.814 --> 01:16:21.505
They'll likely be clearing for a law. There's the building itself, and that's gonna change the hydrology of this small watershed that feeds this headwater stream.

640
01:16:22.824 --> 01:16:36.685
There's likely to be pollution either from, you know, management practices around the house, the septic system and in any kind of pollution that enters the stream. Salamanders are especially affected because of their kind of

641
01:16:36.989 --> 01:16:42.720
porous skin that, , you know, makes them particularly sensitive to pollutants.

642
01:16:42.720 --> 01:16:53.189

There's quite a bit of ash in this area so you know you have kind of a die off and there's more light in here and that

643
01:16:53.454 --> 01:17:07.765
makes the stream more susceptible to drought events where there's bright sun and dessication, or, you know, the drying up of the, the stream itself. And to add to that the house is going to need water. So maybe a well is installed close.

644
01:17:07.765 --> 01:17:20.454
and that puts even more strain on the water level and to add to that we have climate change that might well, that's going to be increasing the instance of drought. So, again, this kind of paints a picture

645
01:17:20.484 --> 01:17:31.135
that is pretty bleak for our friend. Luckily, I will let everyone know that, you know, they are still living in this stream. Probably. This is a protected area in the Catskills.

646
01:17:31.135 --> 01:17:41.395
So, this guy is safe, but how do we protect all of the other creatures that live in these small streams? As well as just the streams themselves?

647
01:17:43.140 --> 01:17:52.435
Okay, so the last bit of presentation, I'm just going to run over some types of protection just to give you a broad overview. We have regulatory protection.

648
01:17:52.435 --> 01:18:03.715
So this is things like, you know, federal state and local laws that regulate and restrict land use adjacent to these features. And we're really looking at the best level,

649
01:18:03.744 --> 01:18:14.875
the highest level of protection really comes at the municipal level here, because a lot of state and federal regulation doesn't cover these very small streams and they're often unmapped.

650
01:18:15.149 --> 01:18:23.489
And then there's voluntary protection, so things that we can be encouraging landowners to do, but they don't necessarily have that force of regulation.

651
01:18:23.489 --> 01:18:31.289
So, I want to talk about some of the things that can be done either as a voluntary or regulatory protection.

652
01:18:31.289 --> 01:18:46.225
For folks that are doing project review, reducing the impervious surface that's added to a site - shrinking parking, lots, encouraging things like green infrastructure on a site. Those two things

653
01:18:46.859 --> 01:19:01.345
and help, kind of get at the land use water development issues, and kind of help regular flows in streams and also help, you know, uptake some of the pollution, or at least limit some of the pollution that's entering these streams.

654
01:19:01.404 --> 01:19:15.024
And then there's the protection of buffer areas. Right? We some, there are municipal regulate, municipal and state kind of regulations that get at stream quality buffer areas, really only applied at the municipal level,

655
01:19:15.265 --> 01:19:21.595
but there's also a possibility to encourage landowners to keep buffers even if you're not forcing them to.

656
01:19:22.465 --> 01:19:37.404
And I just want to kind of look at an example of this, the city of Poughkeepsie recently completed a natural resources inventory, or a compilation of all their natural resources in the community and they've actually integrated it formally into their planning board review.

657
01:19:37.465 --> 01:19:49.914
So, they require applicants to put together an assessment of their site using that information and then they come to the planning board and there isn't a specific sort of regulation around small streams

658
01:19:50.125 --> 01:20:01.614
but they are required to mitigate the damages generally. And so they have to work with the planning board to create a project that's less impactful. And so that's kind of a way where voluntary kind of meets regulatory.

659
01:20:02.244 --> 01:20:09.595
But, as I said, before, we're gonna go into regulatory measures in our third session, which is November 17th.

660
01:20:10.675 --> 01:20:21.895

Some voluntary conservation, obviously, purchasing a park, a piece of land as a park or preserved by a land trust or municipality is a great way to do it. I will highlight that

661
01:20:21.895 --> 01:20:25.704
there still could be impacts to that resource, to this headwaters streams.

662
01:20:25.885 --> 01:20:38.274
So, it's important that, you know, there should be a management plan in place for any park or preserve to kind of direct use away from these sensitive resources, or make sure that proper trail siting or parking

663
01:20:38.335 --> 01:20:41.814
parking placement is observed.

664
01:20:42.744 --> 01:20:55.795
And then there's things called conservation easement, and these are legal agreements between a private land owner, and a land trust, or municipality where, you know, they designate an area this is the conservation easement.

665
01:20:56.005 --> 01:21:08.154
but then there's also terms that dictate, you know, that basically the regulation within this area to be enforced by the municipality or the land trust. And so, in this case you could highlight this small stream that flows here.

666
01:21:08.274 --> 01:21:14.663
And then you could define terms that specifically protect that. So, in this example, you know this

667
01:21:14.939 --> 01:21:25.225
Prohibits creating access, new access roads, putting structures, grazing, livestock cultivation, or tree cutting in these areas.

668
01:21:25.255 --> 01:21:31.494
And that's a great way to target protection at that resource but allow other uses outside of the, the area.

669
01:21:33.210 --> 01:21:42.000
Obviously education like we're doing today is critical and something that is well, within the wheelhouse of land trusts and municipal staff.

670

01:21:42.000 --> 01:21:54.090
And discouraging dumping and trash, clean ups. I know a lot of organizations do trash clean ups, but things like aggressively posting boundaries, especially in, you know, owned,

671
01:21:54.090 --> 01:22:05.279
preserved land, can be really helpful because this situation is obviously not, , it's not helping the downstream pollution landscape let's say.

672
01:22:07.164 --> 01:22:16.435
And finally, you know, again trail siting, , you know, making sure that any siting of infrastructure is done in a responsible way just generally, even outside of a management plan.

673
01:22:16.765 --> 01:22:27.475
And I want to leave you all, with an example this is, from up in Rensselaer county. And this was, you can see this is a kind of a barrier here

674
01:22:27.595 --> 01:22:36.744
and there's some debris accumulated on it, but it's blocking the passage of fish moving up here and it was a problem for, for decades.

675
01:22:37.435 --> 01:22:42.055
And so recently the Estuary program funded the removal of the structure here,

676
01:22:42.055 --> 01:22:44.215
you can kind of see where it was bolted in,

677
01:22:44.425 --> 01:22:44.965
,

678
01:22:44.994 --> 01:22:47.635
before and so now there's free flow of

679
01:22:47.664 --> 01:22:48.234
,

680
01:22:48.354 --> 01:22:49.284
all kinds of,

681
01:22:49.284 --> 01:22:49.494
like,

682
01:22:50.694 --> 01:22:55.255
nutrients and fish and settlement back and forth.

683
01:22:55.314 --> 01:23:09.774
And so, for the first, time, in again, decades, herring species were able to come up from the ocean and spawn in the Wynantskill. And it was really just a partnership between local municipal officials and the state to do this.

684
01:23:09.804 --> 01:23:16.765
So, successes within your reach. Tt's just identifying projects and understanding the resource which you're well on your way to do.

685
01:23:18.720 --> 01:23:24.989
Okay, well that's that's all I had. So I am going to open it up to questions and Beth.

686
01:23:24.989 --> 01:23:29.909
I'll let you ask me and if there are any. Beth Roessler: Thanks, Nate.

687
01:23:29.909 --> 01:23:33.659
We have a couple of questions, .

688
01:23:33.659 --> 01:23:47.189
The 1st question that came in was from Michelle, which specific types of recent, and she puts in parentheses last 5 years Hydrologic alterations have been witnessed in our respective river basin.

689
01:23:48.055 --> 01:24:00.954
Nate Nardi-Cyrus: Oh, jeez, I mean, countless really cause the scale of the scale of this, especially as they relate to headwater stream, you know, you think about it a headwater stream could be a stream that only flows part of the year.

690
01:24:01.164 --> 01:24:12.715
And so they really don't get a lot of recognition generally. Oftentimes they're unnamed and so, you know, things like damning a small stream to make an empounment.

691

01:24:12.774 --> 01:24:16.164
that might not that's not necessarily prohibited.

692
01:24:16.194 --> 01:24:27.925
And it's a common practice. Other, you know, other anytime a road is built and a culvert is installed and is not put in in a proper way to allow fish passage

693
01:24:28.104 --> 01:24:32.725
that's that's an alteration to to the, to the hydrology.

694
01:24:33.119 --> 01:24:44.520
So, I mean, I'll let, I don't know if Gretchen wants to weigh in on this too, but I would just say that, you know, it's really these things are commonplace, they happen all the time. And

695
01:24:44.520 --> 01:24:58.079
Beth Roessler: Okay, and there's another one specifically for you, have you spoken to your neighbor about the unfortunate pond? And how would, how would you go about having this conversation?

696
01:24:58.079 --> 01:25:02.279
Nate Nardi-Cyrus: That's a really good question. , I think.

697
01:25:02.279 --> 01:25:06.479
As anyone who lives in a neighborhood knows,

698
01:25:07.765 --> 01:25:21.595
You have to balance your you know, your neighborhood dynamic let's say, and this individual actually really enjoys buying properties and building ponds on them. , and so I'm, you know, I think that the way.

699
01:25:23.185 --> 01:25:37.164
The way that I've gone about this is I've just talked about how the areas of the river that aren't damned how much I enjoy them in conversation generally, and it's coming from an authentic place just how much I value, you know, the area upstream.

700
01:25:37.164 --> 01:25:51.444
That's you know, just a really beautiful woods, And I just kind of leave it at that because, my in my neighborhood, it's, it's a difficult thing. That's not a very satisfying answer. I know.

701
01:25:51.654 --> 01:26:02.515

Maybe Beth has had some experience in this with the dam removal folks at our program is to the best ways to approach these, these tricky situations with dam removal.

702
01:26:03.715 --> 01:26:15.385
Beth Roessler: Sure, I don't know that I can speak to dam removal, but I certainly can speak about working with landowners who are wanting different kinds of aesthetics or different kinds of things along their streams.

703
01:26:16.914 --> 01:26:24.444
I'm going to start by mentioning a resource that you can Google. But I can also send it out. It's *Living at the Water's Edge.*

704
01:26:25.645 --> 01:26:30.505
Which just sort of goes over the basics of sort of how to care for a stream if you're living by it.

705
01:26:30.895 --> 01:26:33.234
I think a lot of times people just don't understand,

706
01:26:33.505 --> 01:26:33.984
and so,

707
01:26:34.494 --> 01:26:40.914
even just starting the conversation is really useful and there was a question another similar question,

708
01:26:40.914 --> 01:26:41.965
which I think was actually,

709
01:26:42.265 --> 01:26:51.895
for me about how local land trust can inform landowners about the best ways to treat buffers and I think there's a lot of resources out there and I'm happy to follow up with those.

710
01:26:52.229 --> 01:26:55.439
But often, it really is just a conversation.

711
01:26:55.439 --> 01:27:02.699
And really letting people know, I think specifically, I'll say one of the things I run into a lot is a lot of people who think

712
01:27:02.699 --> 01:27:15.630
that, I don't know, for example, some very invasive plant, like, barberry is a great thing to plant because it survives really well. And I, it might be better than nothing, but it

713
01:27:15.630 --> 01:27:30.149
I think if if they had someone to talk to you about it, and they know that someone to inform them, that maybe they could choose something native instead. Most people are willing to hear those conversations and have those conversations if you approach them the right way.

714
01:27:30.149 --> 01:27:39.984
So I I'd say, and I know that the dam removal, I can't give you details about that, but certainly, it's a long conversation. It's not a quick conversation.

715
01:27:39.984 --> 01:27:47.515
You have to talk about all of the different intricacies of it and who's benefiting and what the long term goals are. So.

716
01:27:47.819 --> 01:27:51.329
There's no, no easy answer, but I think.

717
01:27:51.329 --> 01:27:54.960
Starting the conversation is, is, you know

718
01:27:55.675 --> 01:27:58.164
Important. Nate Nardi Cyrus: I will say,

719
01:27:58.164 --> 01:27:58.465
actually,

720
01:27:58.465 --> 01:27:59.694
that that reminded me,

721
01:27:59.935 --> 01:28:00.085
,

722
01:28:00.085 --> 01:28:01.135
one thing that I do,

723
01:28:01.135 --> 01:28:01.314
,

724
01:28:02.064 --> 01:28:03.234
as a landowner,

725
01:28:03.234 --> 01:28:05.064
not as a professional,

726
01:28:05.064 --> 01:28:11.635
is that I tried to inform people of the availability of trees to plant along buffers.

727
01:28:11.664 --> 01:28:14.845
I see the pond as being something that is irksome to me,

728
01:28:15.145 --> 01:28:25.795
but I I see an opportunity in the fact that they're moving all the way down to the edge and they're having water quality issues and trees are beautiful and so I you know,

729
01:28:26.364 --> 01:28:29.484
and useful for those purposes so I,

730
01:28:29.484 --> 01:28:29.904
,

731
01:28:30.114 --> 01:28:34.314
I do try to share Beth's information for trees for tribs.

732
01:28:34.345 --> 01:28:47.274
, I often buy a lot of plans for my own property from the DEC Saratoga tree nursery. , and sometimes I'll give them to my neighbors as gifts. I don't know if they see that as a backhanded way. , but it's something that I do do.

733
01:28:47.545 --> 01:29:01.555

And, and I, you know, I tried to model good behavior on my property. You know, I've created a riparian buffer on my property and, you know, anytime I have to talk about it, or, you know, show it off, make it beautiful, I do.

734
01:29:01.555 --> 01:29:07.015
So and, you know, that can often have a really positive impact, at least within your neighborhood.

735
01:29:10.140 --> 01:29:16.170
Beth Roessler: So, I'm not seeing any other questions that are specific to you, Nate.

736
01:29:16.614 --> 01:29:31.494
There are some other things that we could discuss towards the end. There was a question for me that you also might be able to help answer and also, Gretchen, but about invasives and if they provide some habitat that would be lost if they're ripped out?

737
01:29:31.800 --> 01:29:39.960
And I think that's a great question, because I think invasives can be a really complicated thing to deal with. And it,

738
01:29:39.960 --> 01:29:52.439
I do think you have to think about what your goal is for the site. So if you're looking for a pristine habitat for a specific kind of organism, you may want to think about ways to sort of

739
01:29:52.439 --> 01:30:02.189
slowly replace the habitat. If erosion is the biggest problem and you've got something invasive that's really holding the bank right now,

740
01:30:02.189 --> 01:30:14.010
there are ways to slowly replace those invasives, but you don't want to rip them out all at once because you're just going to exacerbate the problem and it's going to be very hard to fix. And so

741
01:30:14.010 --> 01:30:18.810
I think it's hard if there's not an easy answer with invasives. Just

742
01:30:18.810 --> 01:30:28.170
don't take them all out or take them all away. I think that they need to be managed in a way that's really thinking about the long term and

743

01:30:28.170 --> 01:30:31.260
that's going to happen while they are establishing

744
01:30:31.260 --> 01:30:35.250
or the new plants are establishing, what are you going to replace them with? Okay.

745
01:30:36.539 --> 01:30:40.409
Nate Nardi Cyrus: Yeah, just to piggyback on that a little.

746
01:30:40.409 --> 01:30:47.244
And they showed that picture of the ravine with all the trash. And, that's an interesting example.

747
01:30:47.274 --> 01:30:47.484
,

748
01:30:47.484 --> 01:30:48.114
because,

749
01:30:48.385 --> 01:30:48.715
you know,

750
01:30:49.404 --> 01:30:52.555
that's a particular part of Columbia County that I used to work in,

751
01:30:52.555 --> 01:30:54.145
were a lot of the ravines,

752
01:30:54.295 --> 01:30:54.954
which were,

753
01:30:54.984 --> 01:30:55.194
you know,

754
01:30:55.225 --> 01:31:04.435
probably ephemeral drainages were full trash and so much though that they actually were stabilizing the bank at that point.

755
01:31:04.465 --> 01:31:08.545
Like, if you were to go in and just pull all of that trash out, you might be

756
01:31:09.024 --> 01:31:23.215
destabilizing the stream course, and actually allowing a lot more sediment to come out. So, there's a lot of considerations that have to go into any kind of planning, for these type of things. But I think Beth said, too, kind of a careful approach,

757
01:31:23.244 --> 01:31:27.595
a tiered approach, not doing too much all at once is probably a good rule of thumb.

758
01:31:29.335 --> 01:31:33.534
Gretchen Stevens: Yes, and I'll just, I'll just weigh in too, on invasives.

759
01:31:33.774 --> 01:31:34.015
,

760
01:31:34.045 --> 01:31:37.284
I agree with everything that Beth and Nate have just said,

761
01:31:37.314 --> 01:31:39.654
and the importance of maybe,

762
01:31:39.835 --> 01:31:40.045
you know,

763
01:31:40.045 --> 01:31:40.465
first,

764
01:31:40.465 --> 01:31:44.875
understanding something about the ecology of the invasives, understanding,

765
01:31:44.875 --> 01:31:51.414
why they are there and what maintains them there, and understanding how they,

766
01:31:51.864 --> 01:31:52.164

you know,

767
01:31:52.164 --> 01:31:52.345
the,

768
01:31:52.375 --> 01:31:52.614
the,

769
01:31:52.614 --> 01:31:54.984
the ways that they might actually be serving,

770
01:31:55.074 --> 01:31:55.734
,

771
01:31:55.914 --> 01:31:56.244
,

772
01:31:56.244 --> 01:31:56.875
some,

773
01:31:57.024 --> 01:31:57.444
,

774
01:31:57.475 --> 01:31:58.795
some function,

775
01:31:59.335 --> 01:32:00.895
some positive function there.

776
01:32:01.314 --> 01:32:13.375
The approach of sort of gradually replacing them, in an incremental way with natives, I think is a very good one and, , I will also

777
01:32:13.859 --> 01:32:14.963
Put in a,

778

01:32:14.963 --> 01:32:15.144
,

779
01:32:15.203 --> 01:32:19.884
a plug here for what I think are some very good best management practices that,

780
01:32:19.944 --> 01:32:20.333
,

781
01:32:20.694 --> 01:32:20.873
,

782
01:32:20.904 --> 01:32:28.764
fact sheets that Hudsonia put together a few years ago on the ecology and management of invasives ,

783
01:32:28.793 --> 01:32:33.384
giving some ideas about how about non toxic treatments

784
01:32:33.628 --> 01:32:34.109
,

785
01:32:34.163 --> 01:32:35.304
to help control,

786
01:32:35.333 --> 01:32:43.344
invasive and information about their ecology that can help you understand why certain methods do and do not work,

787
01:32:43.373 --> 01:32:43.734
,

788
01:32:44.033 --> 01:32:48.024
and also ways to prevent them from becoming established or spreading,

789
01:32:48.054 --> 01:32:48.413
,

790
01:32:48.474 --> 01:32:49.344
in the first place.

791
01:32:49.583 --> 01:32:55.043
And that's something that maybe we can send as a follow up to these webinars.

792
01:32:57.448 --> 01:33:08.333
Thanks, Gretchen. , I just want to let everyone know this is really the formal end of our webinar right now and we're happy. We have a lot of questions in the queue and I think we're gonna stay in and answer those questions.

793
01:33:08.333 --> 01:33:09.623
But if you do have to leave,

794
01:33:09.623 --> 01:33:09.743
or,

795
01:33:09.743 --> 01:33:10.703
if you are leaving,

796
01:33:10.884 --> 01:33:14.154
just a reminder to complete the 3 question evaluation,

797
01:33:14.154 --> 01:33:23.993
it's gonna be coming as soon as you close down your screen and also a note for those who are seeking municipal training credit that email will be forthcoming probably tomorrow,

798
01:33:24.144 --> 01:33:24.293
,

799
01:33:24.293 --> 01:33:29.844
confirming that you visited and you can use that to self-certify for your local agency.

800
01:33:30.144 --> 01:33:38.064
But, yeah, let's continue to have the conversation cause these are great questions. I have one right here. .

801
01:33:40.194 --> 01:33:53.394
I'm actually interested in this, given the passing of the state constitutional amendment, reserving the right for clean water air and environment. Do you think it will have any impact on local government, how local government manage watersheds?

802
01:33:53.663 --> 01:33:54.083
,

803
01:33:54.533 --> 01:33:56.634
I'm not sure that any of us can answer that question now,

804
01:33:56.634 --> 01:33:57.444
but that is,

805
01:33:57.444 --> 01:33:57.713
,

806
01:33:57.743 --> 01:33:58.014
,

807
01:33:58.613 --> 01:34:02.184
it'll be interesting to see how this new,

808
01:34:02.184 --> 01:34:02.543
,

809
01:34:02.543 --> 01:34:04.104
amendment to our Constitution,

810
01:34:04.163 --> 01:34:04.404
,

811
01:34:04.404 --> 01:34:05.453
is is realized,

812
01:34:05.453 --> 01:34:06.984

but I guess I'll,

813
01:34:07.134 --> 01:34:10.613
I'll let Gretchen way and if you want to. Gretchen Stevens: yeah,

814
01:34:10.613 --> 01:34:12.444
I'm afraid I have not,

815
01:34:12.503 --> 01:34:12.833
,

816
01:34:12.894 --> 01:34:13.974
tried to,

817
01:34:14.003 --> 01:34:14.453
,

818
01:34:14.873 --> 01:34:17.663
figure out all the possible consequences.

819
01:34:18.113 --> 01:34:32.184
so I really don't have much to add. I mean, the, the consequences could be huge and long lasting and, and I, I can imagine lots of ways it could be very positive. There might be ways, a lot of legal confusion in the meantime. And opponents of this amendment have brought up the possibility of all kinds of lawsuits coming preventing anything positive from coming out of this and I think that's probably quite likely. I'm sorry I don't have any great wisdom on this but I will be paying attention with a great deal of interest.

820
01:35:14.279 --> 01:35:19.469
Beth Roessler: It looks like we might have lost Nate.

821
01:35:19.469 --> 01:35:23.849
Nate, are you there? Okay.

822
01:35:23.849 --> 01:35:27.179
Well, .

823
01:35:27.179 --> 01:35:34.168

There was well, I'm going to respond to a question that came to me privately, but I think could be

824
01:35:34.168 --> 01:35:45.418
of interest to everyone, it's just a question to repeat some of the benefits of headwater streams and I can repeat my list. But Gretchen, you also could

825
01:35:45.418 --> 01:35:52.859
specifically oh, no, they were I'm sorry they were specifically asking about where.

826
01:35:52.859 --> 01:36:00.838
Where buffers would be most influential what functions are most influential for headwater streams.

827
01:36:00.838 --> 01:36:04.198
And so I, I mean, I think that

828
01:36:04.198 --> 01:36:07.769
It's hard to sort of parse out this specific stream because

829
01:36:07.769 --> 01:36:12.599
you know, it, it really has to do with the location, but, you know.

830
01:36:12.599 --> 01:36:20.668
All all streams, if you, if you enhance those buffers, there's gotta be water quality benefits for sure. There.

831
01:36:20.668 --> 01:36:35.248
You know, depending on the situation that that those benefits might be different, but certainly habitat benefits in any, any buffer anywhere if it's being maintained in a way that is appropriate for its location.
.

832
01:36:35.248 --> 01:36:39.569
And many of them will have flood benefits.

833
01:36:39.569 --> 01:36:47.609
But that again, it depends on where they're situated, how close they are to the, to the places where there's where there's flooding.

834

01:36:47.609 --> 01:36:56.279
And I think I talked about the fact that it also helps with instream processing. So if there's inputs upstream,

835
01:36:56.279 --> 01:37:03.658
a benefit buffers downstream will help with some of that instream processing. All of them are important to fish for sure.

836
01:37:04.884 --> 01:37:19.734
And especially because headwater streams are those, those high up in the watershed, those as they call them first orders are those first streams that come into the system, they're gonna affect everything downstream.

837
01:37:22.469 --> 01:37:27.899
And I did mention that it's going to be recorded, so you can go back and look at my slides.

838
01:37:30.298 --> 01:37:33.988
Looks like,

839
01:37:37.139 --> 01:37:40.469
Look through the, the remaining questions here.

840
01:37:40.469 --> 01:37:46.588

841
01:37:48.149 --> 01:37:51.868
Oh, well, I mean, I don't know if this is very

842
01:37:53.279 --> 01:38:00.929
are there forests that may be identified as having stressed trees that are expected to die where no trees are expected to replace them?

843
01:38:00.929 --> 01:38:08.189
So, I guess that's a question about what happens when some of these invasive pests come in and kill the trees.

844
01:38:09.804 --> 01:38:24.564

I think there have been some studies done on what will be replacing hemlock trees, and I'm not going to get all the things perfect, but I off the top of my head, I think that so hemlock's are often in some of these wet places that red maples.

845
01:38:24.838 --> 01:38:30.658
And black birches, or some of these very fast growing

846
01:38:30.658 --> 01:38:34.828
trees might be replacing those and those have a very different habitat

847
01:38:34.828 --> 01:38:41.069
component to them ecological component to them. So we may be seeing some changes.

848
01:38:41.069 --> 01:38:53.759
Ash trees I have I know that some people have studied that, but I don't know off the top of my head, what they're thinking will replace them, but I will mention that the prevalence of deer mean that when we have these big die off,

849
01:38:53.759 --> 01:39:01.109
Sometimes those seedling trees are not able to survive and so we don't see.

850
01:39:01.109 --> 01:39:05.519
We often don't see trees coming back. We'll see things that deer don't eat

851
01:39:05.519 --> 01:39:13.649
like multiflora rows and some other things like that sort of dominating those spaces where we have big tree die offs.

852
01:39:26.788 --> 01:39:30.748

853
01:39:32.038 --> 01:39:38.939
And then there was a question about mitigation measures that could be used to save a forest.

854
01:39:38.939 --> 01:39:49.109
I think that's a tough one. I mean, some of these pests, there are groups working on bio controls.

855

01:39:49.109 --> 01:39:55.288
I mean, it does depend on what's happening here for us. If deer are the problem,

856
01:39:55.288 --> 01:40:04.708
certainly, there are things like fences or tubes and other kinds of protection that can be put in temporarily to allow trees to reestablish.

857
01:40:04.708 --> 01:40:14.009
Gretchen Stevens: I'll just say one thing about that.

858
01:40:14.009 --> 01:40:22.314
You know, we're gonna be losing a lot of a lot of our trees of, of particular species this summer.

859
01:40:22.314 --> 01:40:32.573
I just lived through a gypsy moth infestation on the dry oaky hill where I live and, very interesting.

860
01:40:32.604 --> 01:40:37.463
The whole thing fascinating to watch. The

861
01:40:37.918 --> 01:40:52.283
One thing that I did notice, though, is that it W, it seemed to me that the it was the biodiversity of the forest, and will continue to be the biodiversity of the forest, that helps the forest recover.

862
01:40:52.673 --> 01:41:01.043
You know, one years infestation is not going to kill off even the trees that were most effected probably.

863
01:41:01.043 --> 01:41:02.304
But several years could,

864
01:41:02.663 --> 01:41:03.293
but,

865
01:41:03.354 --> 01:41:03.804
,

866
01:41:04.194 --> 01:41:04.463
,

867
01:41:04.493 --> 01:41:05.904
a forest that has,

868
01:41:05.934 --> 01:41:06.684
,

869
01:41:06.743 --> 01:41:07.524
a lot of,

870
01:41:07.554 --> 01:41:08.003
,

871
01:41:08.274 --> 01:41:08.963
a lot of,

872
01:41:08.993 --> 01:41:09.384
,

873
01:41:09.413 --> 01:41:11.663
things going for it in terms of its,

874
01:41:11.694 --> 01:41:11.993
,

875
01:41:12.234 --> 01:41:15.833
of its structure and the species of plants and animals that are there,

876
01:41:16.104 --> 01:41:16.314
,

877
01:41:16.314 --> 01:41:17.363
.

878
01:41:17.394 --> 01:41:29.663

Those are gonna be the forests that are best equipped to recover from some of these great losses. They won't recover with the same species of trees.

879
01:41:29.694 --> 01:41:29.934
,

880
01:41:29.963 --> 01:41:31.944
Lots of things will probably change,

881
01:41:31.974 --> 01:41:32.243
,

882
01:41:32.274 --> 01:41:33.024
even on the,

883
01:41:33.203 --> 01:41:34.373
on the forest floor,

884
01:41:34.734 --> 01:41:35.724
but the,

885
01:41:35.724 --> 01:41:36.024
,

886
01:41:36.024 --> 01:41:41.753
the sort of the basic ecological functions of the forest may still survive.

887
01:41:41.783 --> 01:41:42.264
,

888
01:41:42.713 --> 01:41:43.043
,

889
01:41:43.073 --> 01:41:46.194
The more that you can simply maintain your forest in,

890

01:41:46.224 --> 01:41:46.583
in,

891
01:41:46.854 --> 01:41:47.213
in,

892
01:41:47.243 --> 01:41:47.514
in,

893
01:41:47.634 --> 01:41:48.354
in good health,

894
01:41:48.354 --> 01:41:51.743
which often means leaving them alone as much as possible,

895
01:41:52.043 --> 01:42:02.064
the more likely the forest, I think will be to maintain itself at a sort of high functioning level.

896
01:42:05.219 --> 01:42:11.009
Nate Nardi Cyrus: I have returned from getting booted.

897
01:42:11.009 --> 01:42:15.689
off my Internet connection. So, thank you for continuing on without me.

898
01:42:15.689 --> 01:42:19.649
But I don't know. Is there is there any other questions?

899
01:42:21.359 --> 01:42:26.368
Beth Roessler: Well, there was a question about,

900
01:42:26.368 --> 01:42:31.378
given the slide showing hydroelectric barrier,

901
01:42:31.378 --> 01:42:34.529
Is there a ramped up interest

902

01:42:34.529 --> 01:42:40.708
There's ramped up interest in using multiple ways to generate electric. What plans for responsible hydro or available?

903
01:42:40.708 --> 01:42:46.649
And that's not, it's probably beyond us to answer that question in detail.

904
01:42:46.649 --> 01:42:53.158
but I did just look over and ask my boss if he had any recommendations and he did say that there was a study.

905
01:42:53.158 --> 01:43:00.719
Through Bard where they kind of looked at where, where hydro might make sense.

906
01:43:00.719 --> 01:43:09.088
And he has a lot more to say about that. So if someone is interested, they can contact me and I'll put them in touch with him.

907
01:43:10.229 --> 01:43:14.128
And I don't know if Gretchen were you involved in that study?

908
01:43:14.128 --> 01:43:25.349
Gretchen Stevens: I was somewhat involved in a particular study on the Sawkill which, which runs through Bard and it was, , we looked at 2 dams and the

909
01:43:25.673 --> 01:43:38.213
potential effects of redeveloping one of them a small Hydro installation. , yeah.

910
01:43:38.453 --> 01:43:50.724
And, you know, that's a case where there already are dams, they've been there for you know, a 150 years or more. ,hey are already they are significant barriers to the stream.

911
01:43:50.724 --> 01:44:03.684
So it's not as if, , a new dam would be creating, , you know, new barriers. , that was one of the reasons why it seemed, it might make sense to put small hydro in there.

912
01:44:03.684 --> 01:44:14.573

And on of the plans was to actually include a ladder you know, fish ladder to improve the connectivity of the stream for fish and other organisms.

913
01:44:14.783 --> 01:44:24.594
While redeveloping the dam for hydroelectric purposes.

914
01:44:25.948 --> 01:44:35.368
Beth Roessler: I just want to let everybody know I put the link to the resource that I was mentioning in in the chat.

915
01:44:50.038 --> 01:44:54.328
Nate Nardi Cyrus: Well, if there's not any more questions, we

916
01:44:54.328 --> 01:45:07.524
end a little bit early, but thank you all for joining us again we're going to have a follow up email and we're going to share in that the contact information for Gretchen, Beth, and myself. And so you can definitely follow up with us any time.

917
01:45:07.524 --> 01:45:16.583
If you want more resources, and, as I said before, we'll also be following up with an email with some of the resources that we got today. So thank you all for joining us.

918
01:45:16.583 --> 01:45:23.423
And we hope to see you in our coming sessions that are going to be next Wednesday and then the Wednesday after that. So.

919
01:45:26.338 --> 01:45:30.275
Thank you.