# Headwater Streams: Mapping and Planning Webinar

November 10, 2021, 3:00 – 5:00 pm

Hudson River Estuary Program Conservation and Land Use Webinar Series

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00:00:02.664 --> 00:00:08.364
All right, everyone, I think we're going to get started. Now, my name is Nate Nardi Cyrus.

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00:00:08.454 --> 00:00:21.954
I'm a conservation in land use specialist at the New York state, DEC's Hudson River Estuary Program, through a partnership with Cornell University and I'm really excited to welcome you to the second session of our 3 part webinar series about headwater streams.

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00:00:22.583 --> 00:00:26.184
This program is offered through a partnership between the Hudson River Estuary Program,

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00:00:26.184 --> 00:00:27.954
Cornell University and

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00:00:27.954 --> 00:00:28.493
Hudsonia,

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00:00:28.643 --> 00:00:32.664
and we'll be showcasing presentations from the Hudson River watershed alliance,

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00:00:32.694 --> 00:00:33.024
Gordon and Svenson LLP

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00:00:33.024 --> 00:00:37.704
and the town of Poughkeepsie in their consultants today.

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00:00:37.704 --> 00:00:42.804
Our speakers will be starting the discussion with remote identification of headwater streams,

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00:00:42.804 --> 00:00:45.234
using online resources and a

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00:00:45.234 --> 00:00:49.374
and paper topographic maps and then we're going to transition to,

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00:00:49.404 --> 00:00:49.853
,

13
00:00:50.243 --> 00:00:58.164
to using streams in local planning and incorporating them into that and give you a glimpse into the world of urban

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00:00:58.194 --> 00:00:59.154
small streams.

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00:00:59.183 --> 00:01:00.954
So really looking forward to the program today.

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00:01:04.105 --> 00:01:18.534
Before we get started, let me quickly review a few, important webinar details. You should be able to connect to the audio through your computer or phone and you can find the different options at the bottom of the screen by clicking this dot, dot, dot button here.

17
00:01:18.894 --> 00:01:21.025
And if you're having difficulties with the audio.

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00:01:21.269 --> 00:01:33.924
Through your computer I recommend calling in using this option through your phone system. And if you have any problems, you can follow up in the chat box. Beth Roessler, who just posted the numbers there, she's going to be doing our tech support today.

19
00:01:34.075 --> 00:01:37.314
So she should be able to help answer your questions for you.

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00:01:39.534 --> 00:01:54.415
If you're having other difficulties, again, direct all of those questions to the chat box in the bottom right hand side of the screen, you should use the question and answer function, which is separate from the chat, to submit questions for the presenters.

21
00:01:54.474 --> 00:02:05.334

So, please try to do that. Also note that your phone lines have been muted. So you don't have to worry about that or your cameras. The webinar is being recorded and we'll notify you when that recording is available.

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00:02:05.334 --> 00:02:19.914
We're going to send a follow up email after this that will include that video recording as well as important links that we're going to be discussing today. At the end of the webinar, there's gonna be a 3 question survey, and we really appreciate if you could give us feedback on our programs through that.

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00:02:20.305 --> 00:02:31.254
And lastly, if you're seeking municipal training credit, you're going to get an automated email from the web service about 5 o'clock or so certifying that you've attended the webinar.

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00:02:33.264 --> 00:02:45.264
Okay, for those of you who are new to our series, 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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00:02:45.324 --> 00:03:00.294
So our program works throughout the 10 counties bordering the tidal Hudson from the New York harbor to the federal dam and Troy to achieve many key benefits that include clean water, community resilience to climate change, the vital estuaries ecosystem,

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00:03:00.294 --> 00:03:09.985
it's fish, wildlife, habitats, natural scenery of the valley, and opportunities for education, access, recreation and inspiration on the river.

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00:03:10.314 --> 00:03:20.935
So, to learn more about that, I encourage you to read our brand new, released action agenda and that'll give you some more information on our program and the direction that we're going to be taking moving forward.

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00:03:22.439 --> 00:03:23.814
Within the program,

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00:03:23.814 --> 00:03:25.525
our conservation and land use team,

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00:03:25.794 --> 00:03:35.814

which is myself, Laura Heady and Ingrid Haeckel work, with municipalities and regional conservation partners to incorporate important habitats and natural areas into local land

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00:03:35.814 --> 00:03:36.085
use

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00:03:36.085 --> 00:03:39.055
planning and decision making and our program website,

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00:03:39.055 --> 00:03:45.474
which I have shown up here is a clearinghouse for guidance and resources on these topics and hopefully,

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00:03:45.805 --> 00:03:48.115
my colleague Beth will be sharing some of these links.

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00:03:48.264 --> 00:03:56.185
But as I said, we're gonna be getting, we're gonna be sending this out via email. So, I don't want you to have to worry about that during the webinar.

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00:03:56.995 --> 00:04:07.284
Okay, last week in our series  we looked at values and threats to headwater streams.

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00:04:07.435 --> 00:04:21.444
So that was really the physical components of the stream itself, the benefits that streams, especially small headwater streams, provide, and then threats to those streams and some potential protections.

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00:04:22.019 --> 00:04:30.269
After today's a webinar on mapping and planning, next week, we're going to be looking at measures for

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00:04:30.269 --> 00:04:44.369
protection, so I encourage you all to tune in for that, register, and we're gonna be looking at protections at the federal state and local level, including a case study from the town of Poughkeepsie. So you won't want to miss that.

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00:04:45.478 --> 00:05:00.444
Hey, I'm going to be the first presenter today, and I'm going to give you an overview of some online stream mapping resources and then from there, Gretchen Stevens from Hudsonia is going to give an introduction to mapping small streams, using topographic maps.

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00:05:00.444 --> 00:05:15.204
And we have an exercise for that as well. We're gonna end of the day with Emily Vail, who's gonna be talking about planning for headwater stream protection and that includes watershed planning and municipal planning.

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00:05:15.384 --> 00:05:25.103
And she's going to talk about a passion of hers, urban streams, and especially those small urban headwater streams that are oftentimes buried underground.

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00:05:26.999 --> 00:05:33.413
Okay, so, let me kick this off. Like I said, I'm going to talk about online resources for mapping streams.

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00:05:33.413 --> 00:05:42.473
And this is very helpful for planning board, zoning boards, any kind of municipal review body that's looking at development proposals.

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00:05:42.624 --> 00:05:53.124
These are some methods that you can use to look at a site and determine if there are likely to be important stream resources

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00:05:53.783 --> 00:05:54.744
there so,

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00:05:54.744 --> 00:05:55.853
let's keep going,

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00:05:56.754 --> 00:05:58.074
I'm going to look at  four

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00:05:58.074 --> 00:05:58.463
,

50
00:05:58.494 --> 00:05:59.033
tools,

51
00:05:59.033 --> 00:06:00.713

primarily the Hudson Valley,

52
00:06:00.713 --> 00:06:01.853
Natural Resource Mapper,

53
00:06:02.184 --> 00:06:04.343
national hydrography dataset,

54
00:06:04.613 --> 00:06:04.884
,

55
00:06:04.913 --> 00:06:09.533
Orthoimagery via the state Discover GIS NY

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00:06:09.564 --> 00:06:12.744
website and the stream stats tool.

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00:06:15.418 --> 00:06:29.033
First, I'm going to share something near and dear to our heart here at the Estuary Program. This is the Hudson Valley Natural Resource Mapper, which is an online and interactive mapper that hosts a lot of data, specific and unique to our region.

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00:06:29.213 --> 00:06:41.303
But also data that can be found state and nationwide as well. So I encourage you to you know, visit the website for this. We have a lot of training that's specifically targeted to this mapper.

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00:06:41.334 --> 00:06:48.684
But in this case, I just want to showcase some of the data that you can view to help you map small headwaters streams and watersheds.

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00:06:50.848 --> 00:07:05.603
So, when you first arrive at the mapper, it's pretty easy to, you know, to do Google search it. So, if you Google search “Hudson Valley Natural Resource Mapper,” it'll take you to a landing page and then you'll end up, finally end up here after clicking through some disclaimers.

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00:07:05.783 --> 00:07:18.803

The first thing that I recommend doing is to make the screen into full screen mode by clicking this button right here and that'll expand the screen and allow you to see the application better. All of the data that's available for this

62
00:07:18.803 --> 00:07:32.663
mapper is visible on the left hand side of the screen and these kind of accordion tabs. Once you click on the tab it will open it up and you can see these little check boxes here. You can click stuff on and off and you should be able to see that on the screen.

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00:07:32.843 --> 00:07:45.413
I will note that some of this data is scale dependent. So if you're way out, like, we are right now looking at the entire watershed boundary here, you're not going to be able to see a whole lot, so you really have to zoom into the site level.

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00:07:45.593 --> 00:07:52.913
And you'll see this kind of the text here around the layer will be grayed out, if you're not viewing it because you're at the incorrect scale.

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00:07:54.238 --> 00:08:00.329
And this isn't the only layer in this tab. You can easily scroll using this scroll button.

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00:08:01.283 --> 00:08:15.894
Okay, if you're looking for a specific location, you can go to the search tab, which is the very top and type in the location. In this case, you can put in addresses, but we're going to put “Willow, New York” in here, which is a small hamlet of the town of Woodstock.

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00:08:16.163 --> 00:08:18.593
So you can see that noted on the red square there.

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00:08:19.733 --> 00:08:27.774
And we'll look at our first available dataset. This is the DEC stream classification and a trout standard data set.

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00:08:27.803 --> 00:08:38.484
And so, what this shows right here is basically the regulatory authority of the New York state DECs protections of water regulations. So,

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00:08:39.864 --> 00:08:54.203

You'll notice that there's 2 different colors here One is a known trout stream. One is other stream. The reason why we draw that distinction is primarily for non-regulatory reasons. Trout are often indicators of high quality stream habitat.

71
00:08:54.234 --> 00:08:55.884
They require this kind of cool

72
00:08:56.124 --> 00:09:09.833
well-oxygenated waters, clean waters and so they can kind of be a proxy for water quality there. But if you click on individual segments of these streams, like, you can see, we did up here,

73
00:09:10.014 --> 00:09:21.323
it'll tell you the classification of that stream. So, a class C-t would indicate that it's a class C stream with a trout standard, which means that it is in fact regulated by the DEC.

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00:09:22.374 --> 00:09:35.964
And if this is unfamiliar to you, I strongly recommend that you tune in for our next week's webinar, which is going to be looking at statewide protections which this is a part of. But so you can see these are all divided into little segments here

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00:09:35.964 --> 00:09:49.884
this only covers this small bit of the stream. If you click the area, just immediately upstream of it. You'll notice that that's actually classified this class B, which has even more stringent requirements to meet those permit obligations. So, the way that the way the regulations are written, any stream that's mapped above this, so it's pretty likely that there is continued stream length that is above this section. This mapping is pretty low accuracy overall. Any perennial stream that flows to this segment is regulated at according to the segment just downstream of it. Any perennial stream flowing in here would also be class B with trout standard. If it is an intermittent stream, that is automatically regulated as a class D stream that is afforded no protection at this time.

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00:10:28.229 --> 00:10:37.344
Another data layer that we have here is the stream condition index. This provides slightly more information, at least more on stream length.

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00:10:37.374 --> 00:10:45.234
It was used, , it was created, using the National hydrography dataset, which I'll go into a little later, or an earlier version of that.

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00:10:45.293 --> 00:10:53.874
And it modeled, the quality of water in these streams, using basic, kind of land cover data sources.

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00:10:53.874 --> 00:11:03.624
So, none of these were field verified. It really is just kind of a best guess, as far as what the water quality is based on what the surrounding landscape looks like.

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00:11:03.864 --> 00:11:15.203
So you can get an idea of what your, maybe your highest quality streams are in your municipality or watershed. So if you click on this straight stream segment, you'll see again, that there's quite a lot of information provided.

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00:11:15.354 --> 00:11:24.864
And so you can get an idea of, you know, why this length was rated the way it was based on, you know, all of these factors that went into the model.

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00:11:27.239 --> 00:11:42.053
Two layers that we have here: the first is the riparian buffers area. If any of you attended last week's talk Beth Roessler talked extensively about riparian buffers and the value that they have to streams.

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00:11:42.173 --> 00:11:52.163
This is a variable width buffer that was generated through modeling done by the New York Natural Heritage Program. And you can see here, this is modeled on the 50 year flood event.

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00:11:52.224 --> 00:12:03.864
You may be familiar with FEMA flooding, flood mapping, which is for the a 100 and 500 year storms respectively. So this is for a much smaller storm, and it also has adjacent wetlands.

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00:12:03.864 --> 00:12:12.984
So it gives you an idea of kind of the most important area for the streams and you can see that right on the Hudson Valley Natural Resource Mapper. If you click within the watershed,

86
00:12:15.149 --> 00:12:27.958
you actually get some watershed specific information that shows up in this little tab. Here. In this case, the Beaverkill Esopus Creek, which you can kind of see the boundary on these sides of the screen here has

87
00:12:27.958 --> 00:12:35.874
an impervious area of .31% and a percent forest cover of 80. So this is a very forested watershed.

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00:12:35.874 --> 00:12:49.884
And so you would assume, based on these metrics that the streams in this area are pretty high quality overall, and that's borne out by looking at the stream condition index, which seems to indicate that, you know, these streams are very high quality.

89
00:12:53.158 --> 00:13:06.599
Also note that you can, you can actually look at aerial images using this tool. So if you go to the right hand side of the screen, you can see this base map, and you can change that out. So, in this case, we're looking at kind of a blank base map to start.

90
00:13:06.599 --> 00:13:19.673
We click on New York state aerial, and that'll give us much more detail. This is a color leaf off. ,This was a aerial image taken in spring time so you can see you know, the deciduous trees have no leaves.

91
00:13:19.673 --> 00:13:33.894
You can see down to the ground, can see the conifiers, the deciduous forest. But you can also really start to see the small streams on the landscape. So, I invite you to try to look at this and pick out some small streams that aren't mapped.

92
00:13:33.953 --> 00:13:46.403
We have the map streams here from the stream condition index this large area. You can see how inaccurate they are at the scale. But you might notice this set of streams as well.

93
00:13:46.769 --> 00:13:49.859
That would be considered a headwater stream. That's unmapped.

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00:13:49.859 --> 00:13:59.158
And then in that right hand corner there, you can see the stream here. So you can use this data to identify streams just by aerial interpretation.

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00:14:00.958 --> 00:14:05.099
What about this? We again, we have this other stream segment here.

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00:14:05.099 --> 00:14:09.269
Can see that it continues up in this direction.

97
00:14:09.269 --> 00:14:14.158
And you may be able to pick out a smaller little tributary that comes up through these ponds here.

98
00:14:17.129 --> 00:14:20.693
Okay, moving on to the National Hydrography database.

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00:14:20.693 --> 00:14:23.903
I already kind of brought this up once,

100
00:14:24.384 --> 00:14:24.803
but there's,

101
00:14:24.803 --> 00:14:27.234
there's a number of sub datasets in this,

102
00:14:27.443 --> 00:14:27.714
,

103
00:14:27.744 --> 00:14:29.244
there's the high resolution,

104
00:14:29.453 --> 00:14:32.244
so 1 to 24,000 scale or better,

105
00:14:32.274 --> 00:14:34.974
and this was developed by New York state DEC,

106
00:14:34.974 --> 00:14:36.474
based on USGS topo,

107
00:14:36.474 --> 00:14:41.063
quads and DEC's constantly working to better align,

108
00:14:41.094 --> 00:14:41.394
,

109
00:14:41.394 --> 00:14:46.494
the stream segments with Orthoimagery. You could see how off they were,

110
00:14:46.494 --> 00:14:47.933
and the image that we saw,

111
00:14:47.933 --> 00:14:51.384
they're using aerial imagery to correct that.

112
00:14:51.474 --> 00:15:00.624
So this is available for most of the States. You should be able to get pretty easy access to that. Some places have even higher resolution. This is 1 to 8,000

113
00:15:02.693 --> 00:15:17.543
or better and that's available in the New York City Watershed. The New York City Department of environmental protection created this data set, based on 1 meter elevation and that's also available for Ulster county at large. If you're lucky enough to be in that county.

114
00:15:19.823 --> 00:15:28.703
This is best viewed through online through the national map, because, you know, that's going to be more regularly updated and there's constantly being updates to this dataset.

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00:15:28.793 --> 00:15:39.144
And they have a way that you can indicate whether a stream is perennial versus intermittent. They, they try to differentiate, but often that's wrong.

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00:15:39.173 --> 00:15:49.943
A lot of this work is done remotely and not feel verified and so, I wouldn't tend to trust that you're really gonna have to rely on a site visit for confirming all of these resources.

117
00:15:53.094 --> 00:15:54.803
All right, so you can see right here.

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00:15:54.803 --> 00:16:06.083
This is that area of Willow we were looking at and you can just see how many more streams this high resolution data is picking up and how much would be lost if you're doing a review and you're just relying on this,

119
00:16:06.293 --> 00:16:06.624
,

120
00:16:06.624 --> 00:16:07.104
first,

121
00:16:07.104 --> 00:16:09.053
what was available through

122
00:16:09.053 --> 00:16:11.063
the enhanced NHD here,

123
00:16:11.484 --> 00:16:12.024
.

124
00:16:12.328 --> 00:16:26.453
as a comparison. You're gonna be viewing this through the national map. This is again the best viewer to be able to see this data and if you click the search box here, you can type in Willow, New York.

125
00:16:26.453 --> 00:16:31.703
That's how we've been getting here. It gives you a little point there to to orient yourself.

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00:16:31.979 --> 00:16:38.548
You can have a much wider base map gallery and including a pretty neat

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00:16:38.548 --> 00:16:46.524
USGS. topo map where they actually stitched them all together. These are independent quadrangles that were originally developed.

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00:16:46.553 --> 00:16:56.484
And this is kind of a continuous surface of really good quality topo maps and Gretchen's gonna be talking more about how to map small streams using this,

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00:16:56.964 --> 00:17:08.513
using topo maps and so I invite you to if you have a lower resolution NHD data, you could do your own mapping and kind of fill out the picture there, at potential small streams that might have been missed.

130
00:17:10.618 --> 00:17:22.048
Okay, so you can go into this little layer button here if you want to get to the National hydrography dataset because there's, , quite a few, information sources in the national map and you click there.

131
00:17:22.048 --> 00:17:33.868
And you're gonna get kind of this busy set of data looks kind of complicated. It does have things like flow direction, which might be interesting to you. But, you know, there's certain

132
00:17:33.868 --> 00:17:37.919
, data points that you can kind of weed this out from.

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00:17:37.919 --> 00:17:48.594
Before I get to that if you click on this button here, that'll turn it into a legend. So you can kind of better understand what all of these symbols mean, if you do want to have a more complicated map.

134
00:17:48.834 --> 00:17:59.483
But, like I said, if you want to just look at what the pertinent information is, you really want to focus in on this flow line large scale. That's gonna be the product that edits most simplest.

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00:18:02.394 --> 00:18:15.443
There's a lot of other neat features in this mapper. Here we have the draw function. So again, if you wanted to have those topo maps on in the background, you can draw your own additional potential streams and print this out ultimately, and

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00:18:15.443 --> 00:18:24.054
And that can be, that can be really great for bringing to a planning board meeting or a, you know, anything that's reviewing development on the site.

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00:18:26.394 --> 00:18:41.034
Really cool - you can actually upload your own data. So if you are a GIS user, you can upload a file of your own stream mapping and compare that against what NHD has. So we happen to have a really great file.

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00:18:41.368 --> 00:18:49.019
This is a mapping project that was done by Hudsonia. My colleague Ingrid Haeckel actually did a lot of work for this.

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00:18:49.973 --> 00:19:03.084
Where in 2011, there was extensive field work and remote sensing and looking at aerial and topo maps across the entire municipality and they developed this really high resolution, local scale mapping.

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00:19:03.324 --> 00:19:17.663
And I already said we had that, you know, 1 to 8,000 level mapping. Let me just toggle between these 2 screens you can see that's that original map. And this is how many more small headwater streams were identified from this kind of intensive mapping process.

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00:19:17.663 --> 00:19:26.993
So there's a lot that we don't see on the landscape. So, there's a lot of opportunity to go find this stuff on your own. Even if you don't have these products available to

142
00:20:03.203 --> 00:20:15.773
You. If you do happen to have high resolution data, this is the markup app where eyou can suggest change to NHD. If you contracted for it with a consultant you can actually upload these and getting it on the national map. I really suggest your doing this because if they do accept that as reliable and post it to the map you'd be helping a lot of other organizations doing conservation efforts throughout in your municipality or your service area in the case of a land trust. Moving on this is Discover GIS Data NY, which is the New York State site for accessing, orthoimagery.

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00:20:15.983 --> 00:20:27.173
There are images since 1994, and depending on where you are in the state, different images happen at different times and that automatically shows what images are available based on the extent of your map.

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00:20:30.239 --> 00:20:30.719
,

145
00:20:30.773 --> 00:20:32.844
So in 1904 and 2001 imagery is available in color infrared and,

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00:20:32.844 --> 00:20:33.263
,

147
00:20:33.473 --> 00:20:37.013
I'll show you an example of that in just a second,

148
00:20:37.013 --> 00:20:37.554
but it's a,

149
00:20:37.554 --> 00:20:37.794
it's a,

150
00:20:37.794 --> 00:20:39.773
a way of taking pictures where you,

151
00:20:39.773 --> 00:20:40.104
,

152
00:20:40.134 --> 00:20:51.023
you're able to capture different wavelengths and ultimately you can get higher contrast images so that you can really see small streams and wetlands.

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00:20:51.023 --> 00:21:02.903
They, they really pop out because they show up as black against the largely kind of red and blue scale map. And you'll notice that vegetation is pink and red and these maps and that's by design.

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00:21:02.903 --> 00:21:08.034
It's really a reflection of photosynthesizing that's happening at that time of year.

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00:21:10.499 --> 00:21:22.344
There are limitations, , as I said, you can really see those evergreen and conifer canopy areas, and that could obscure some small streams so hat'll be difficult to map using that.

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00:21:22.403 --> 00:21:31.794
And then if you're in very steep topography, the shadows from trees, and the land itself can often make it difficult to pick out the black of the small streams.

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00:21:33.088 --> 00:21:39.328
So, here we are at the platform Discover GIS data NY

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00:21:39.328 --> 00:21:44.548
Go to this tool symbol up in the right hand corner of your screen.

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00:21:44.548 --> 00:21:54.598
And you can search a location here, we could search willow, but we decided to switch it up and we searched Sickler Road in Woodstock, which is in Willow

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00:21:54.598 --> 00:22:02.729

And here are the images that are available for this section of road. Like I said, that that will change based on where you are.

161
00:22:03.384 --> 00:22:15.773
So, I'm going to run through those images, so you can get an idea of how this could be useful for picking out small streams. This is what I was talking about, where you can see the red from the color infrared here.

162
00:22:15.923 --> 00:22:30.834
The very dark red is conifer forest. Note that the deciduous forest is this, like, deep blue color. So that allows you to quickly and easily pick out areas of deciduous forest, land cover.

163
00:22:31.314 --> 00:22:34.883
You'll also see that. There's these areas that show up in red.

164
00:22:35.243 --> 00:22:50.213
Those are generally agricultural fields or or lawns that are photosynthesizing because this is taken in early spring. In the areas of darker color are generally much more natural meadow type areas and there's a whole nuance to

165
00:22:50.544 --> 00:22:51.534
detecting things,

166
00:22:51.743 --> 00:22:53.574
but I'll draw your attention to the streams.

167
00:22:53.723 --> 00:23:01.044
This is pretty obviously a stream somewhat larger stream here, but it's that black color that really shows up well.

168
00:23:01.348 --> 00:23:11.338
This is an image from 2001. it's a slightly more accurate, at a 1 foot, , scale.

169
00:23:13.104 --> 00:23:26.243
Now, we're moving into natural color from 2013 and, it's, you know, you can see how the contrast isn't as great as it is for the color infrared. So I do encourage you to kind of flip back and forth between all of these.

170

00:23:26.243 --> 00:23:28.344
Because some things are going to show up better than others.

171
00:23:29.489 --> 00:23:41.308
And this is the latest for this site, 2016, and it almost looks darker. It's a higher resolution, but it's almost it more difficult to pick out those small streams from this extent.

172
00:23:43.888 --> 00:23:50.128
So, can you find the small streams here? I'll let you take a look at this really quick and see if your eye is drawn to them.

173
00:23:52.949 --> 00:23:57.388
All right hopefully you saw this one and this one.

174
00:23:57.388 --> 00:24:06.598
And there may be some adjacent to the second one here. It's hard to tell, but at the very least these two show up pretty well.

175
00:24:08.304 --> 00:24:19.763
And for both the Discover GIS Data NY Mapper and the Hudson Valley natural resource mapper, we both have tax parcel data that's available and streaming.

176
00:24:20.003 --> 00:24:28.733
So, this should make it pretty easy to identify a parcel that you're looking at and orient yourself to the map to see where that stream is.

177
00:24:31.348 --> 00:24:42.084
Okay, the final tool I'm going to be discussing is stream stats and that should allow you to delineate drainage areas and watersheds, which I'll show you an example of.

178
00:24:42.114 --> 00:24:53.634
But it also does a lot more if you're kind of tech savvy and wanna get into it. There's flow estimates that it provides,  flow lines, which can suggest the location of the small streams.

179
00:24:53.903 --> 00:25:05.124
This is a data that's based on a digital elevation models. So it's kind of predicting where streams would be based on the typography. So that could be a good starting point if you're looking at that scale as well.

180

00:25:05.489 --> 00:25:12.388
So this is the stream stats map again this is hosted by USGS and you can

181
00:25:12.388 --> 00:25:21.838
type in your location, Willow, and it'll take you right to this spot where we've been going. So you can select a state as the study area. Click there.

182
00:25:21.838 --> 00:25:31.169
And then you delineate a site after you click on the map. So, in this case, we're going to look to delineate

183
00:25:31.169 --> 00:25:45.023
the watershed that feeds this point. So you see the small stream here, everything that drains into this stream that flows to that point is gonna be mapped and so we have to wait sometimes, you have to wait quite a bit.

184
00:25:45.023 --> 00:25:52.644
So don't be concerned about that, and then you'll get these really awesome maps. This is a very strange looking watershed to me but

185
00:25:52.919 --> 00:25:59.423
you know, there's no other mapping available at this scale for watersheds and a great application of this:

186
00:25:59.453 --> 00:26:12.354
I was on my municipal conservation advisory council, and we're doing an inventory of natural resources, inventory update, and we have some surface water reservoirs that are pretty small.

187
00:26:12.624 --> 00:26:15.923
And so I was able to use this to actually map pretty easily

188
00:26:15.923 --> 00:26:28.943
the watershed of our reservoirs or the multiple watersheds of our reservoirs so that can be used in planning to make sure that land use within those areas is noted and is compatible with that use.

189
00:26:29.423 --> 00:26:42.233
And how I did that was that you're actually allowed to take this image and easily export it as a shapefile for users. So it makes it really easy, or you could just have it in a map like this right here.

190
00:26:42.263 --> 00:26:45.953

So, that can be effective as well, depending on what you're doing.

191
00:26:48.324 --> 00:27:02.963
Okay, that's pretty much all I had. I'm not going to go into this, because we're gonna hear a lot more about urban streams, but tracking down buried streams can be a lot more difficult as Emily can attest to, often

192
00:27:02.963 --> 00:27:15.983
you'll see, there'll be at the surface at some points. And then they'll be buried for a while. And so the stream stats tool can be useful in that way, because it's using the elevation to predict where streams are.

193
00:27:15.983 --> 00:27:29.153
So it could give you an idea of where a buried stream might be. There's also a lot of other resources that are here that you could do some research and try to find where those are, but it's a little bit more time intensive. We don't have a great

194
00:27:29.459 --> 00:27:34.769
buried streams mapper quite yet. Okay.

195
00:27:34.769 --> 00:27:41.818
Well, that's all I had. I'm happy to take some questions if Beth is willing to cue those up for me, thank you all.

196
00:27:41.818 --> 00:27:54.838
Beth Roessler: Yeah, thanks, Nate and I just want to let everybody know I put links to each one of the mappers that Nate talked about in the chat. Okay so there's a couple of questions Nate.

197
00:27:54.838 --> 00:28:05.874
The first one is, can you download data or stream profiles for select areas as shapefiles to import as layers into your own GIS projects from this tool?

198
00:28:05.903 --> 00:28:10.733
And I believe that came in during when you were talking about the national map, but maybe you could address

199
00:28:11.124 --> 00:28:25.403

all the or other mappers you know about for that. Nate Nardi Cyrus: Sure. Yeah. Let me hit that on a mapper by mapper scale. So, as far as the Hudson Valley natural resource mapper, you'll notice that next to each kind of clickable area, there's an info button.

200
00:28:25.403 --> 00:28:38.663
It's just an “I” with a box around it and you can click on that, and that'll bring you to the link where you can download that information. You can't upload anything to that map, but you can certainly be directed to the areas where you can download that information.

201
00:28:38.963 --> 00:28:46.884
In the national map, the data is available for download and you can go to the website there to figure out how to do that.

202
00:28:47.124 --> 00:28:59.693
It's a little bit of a process, but it'll give you kind of that full set of data that you're able to see, it's my understanding that you can't upload data to the national map at least, for your own purposes.

203
00:28:59.844 --> 00:29:14.394
But you can again use that app that I showed to submit your data, and they can review it and decide whether or not, they'll amend it to the national hydrography dataset. The final mapper the,

204
00:29:14.699 --> 00:29:21.659
now, I'm blanking on it, the stream stats mapper. You can actually bring data into that. So that's,

205
00:29:21.659 --> 00:29:33.929
Or maybe, I'm maybe I'm confusing things now. You can't bring it into the stream stats. You can, you can export the stream stats data, and you can bring the data into the National mapper.

206
00:29:33.929 --> 00:29:39.719
I got confused. Sorry I'm trying to think of this on the fly. Beth Roessler: So I think that's correct. Yeah.

207
00:29:40.828 --> 00:29:44.608
Nate Nardi Cyrus: Hopefully, I had all the points there. Beth Roessler: I think so thank you.

208
00:29:44.608 --> 00:29:54.148
So, let's remember, , okay, we have one more question and it says, will the HD be made available in dutchess county at some point in the future?

209

00:29:54.804 --> 00:30:05.693
Nate Nardi Cyrus: Yeah, and so I'm assuming you're referring to that 1 to 8,000 scale, high resolution mapping. That would have to be done through partnership with another organization. Probably.

210
00:30:05.693 --> 00:30:13.403
I'm not aware of any state level plans to do high resolution stream mapping in that county. In Ulster county

211
00:30:14.394 --> 00:30:26.933
that was only able to be achieved because the New York City Department of environmental protection wanted to fund it for protection efforts in the watershed to protect New York city water supply. So that's the reason why that data's available there.

212
00:30:26.933 --> 00:30:39.144
So, if there is a partner in dutchess County , or the region that is interested in that, and could fund something like that, it does require, , you know additional funding to get that done.

213
00:30:42.328 --> 00:30:48.959
Beth Roessler: That's all the questions we have right now. Nate Nardi Cyrus: Wonderful. Okay. I'm going to.

214
00:30:50.489 --> 00:31:03.509
Stop sharing right now. , and I'm going to pass it on to Gretchen Stevens. So I'll let, Gretchen do you wanna get your PowerPoint set up?

215
00:31:05.189 --> 00:31:09.298
Oh, I'm sorry, that's my fault. I have to.

216
00:31:11.429 --> 00:31:16.078
Let me pass the ball to you. Okay you should be able to do that now, Gretchen.

217
00:31:17.398 --> 00:31:30.473
And while Gretchen is queuing that up, I just want to introduce her. Gretchen is the biodiversity, the director of biodiversity resources at Hudsonia, a nonprofit environmental research education institute, based in dutchess county.

218
00:31:30.953 --> 00:31:42.503

She has over 35 years of experience as a field biologist, and has been a long time partner in delivering environmental education programming with the Estuary program to local land use decision makers throughout the Valley.

219
00:31:43.618 --> 00:31:50.608
So, with that, I'll let you take it away, Gretchen.  Gretchen Stevens: Yes. Hello everyone.

220
00:31:50.608 --> 00:31:53.818
Tthis is this.

221
00:31:53.818 --> 00:31:57.358
a more hands on segment .

222
00:31:57.358 --> 00:32:01.439
of this webinar. We're

223
00:32:01.439 --> 00:32:13.709
going to be demonstrating how to find many of the unmapped headwater streams, using graphic maps, , and give you a chance to practice these techniques. Just a

224
00:32:13.709 --> 00:32:22.288
reminder which was illustrated very well in in one of Nate's slides that

225
00:32:22.288 --> 00:32:30.413
a great many of the headwater streams are not mapped at all on any of the publicly available maps.

226
00:32:30.743 --> 00:32:44.003
There's a lot that you can do yourself to find those from topographic maps and certainly, of course, from visiting a site yourself.

227
00:32:44.278 --> 00:32:47.669
Many of you I'm sure.

228
00:32:47.669 --> 00:32:58.858
Let's see, Nate, my thing is not advancing. What do we do about that? Nate Nardi Cyrus: It seems like the same. Can you click on the screen and then try advancing.

229

00:32:58.858 --> 00:33:02.398
Gretchen Stevens: Okay, good that works.

230
00:33:06.084 --> 00:33:07.013
Many of you,

231
00:33:07.314 --> 00:33:07.854
,

232
00:33:08.124 --> 00:33:22.673
I'm sure are accustomed to using top graphic maps of one kind or another for hiking and orienteering and maybe for other purposes and you may also be accustomed to seeing elevation contour lines on site

233
00:33:22.673 --> 00:33:29.544
plans and subdivision plants and other drawings depicting the sites of proposed land development projects,

234
00:33:29.544 --> 00:33:30.713
or say,

235
00:33:30.743 --> 00:33:33.953
lands for public recreational uses.

236
00:33:58.884 --> 00:34:13.074
This session is especially to show you how to use topographic maps to find all the streams that do not appear on publicly available maps and though ecologically important are often overlooked in project planning and environmental reviews. Because the contour lines indicate many aspects of the terrain: Places that are higher and lower in the landscape . aspect. Steep slopes, gentle slopes, flat areas, benches, swells and basins. You can use the contours to predict where water is likely to collect and flow.

237
00:34:13.943 --> 00:34:14.454
.

238
00:34:15.148 --> 00:34:20.009
Even where ponds, wetlands, and streams have not been explicitly mapped.

239
00:34:20.483 --> 00:34:32.963

Each contour line connects points of equal elevation in the landscape and neighboring contour lines are spaced at a standard elevation distance on each map. On a site plan

240
00:34:33.384 --> 00:34:37.134
like this one the contour interval is often 2 feet.

241
00:34:37.974 --> 00:34:47.903
On a USGS topographic map in the 7.5 minute series the contour interval will be 10 feet or 3 meters in much of the landscape,

242
00:34:47.903 --> 00:34:53.003
but 20 feet or 6 meters on quadrangles where there's lots of steep terrain.

243
00:34:55.523 --> 00:35:01.704
Typically, a few of the contour lines are labeled with the actual elevation above sea level.

244
00:35:02.304 --> 00:35:11.184
This line, for example, circled in blue is at 960 feet above sea level and this one near it is at 950 feet.

245
00:35:11.184 --> 00:35:21.534
That's if you're moving from west to east, from left to right between those lines, you'd be moving downhill and you'd be moving downhill and moving down 10 feet in elevation.

246
00:35:24.748 --> 00:35:30.688
Remembering that each contract line indicates points of equal elevation.

247
00:35:31.284 --> 00:35:45.083
On this site map, if you're walking on a path along this contour line, which I'm outlining in red, you'd be at a constant elevation of 960 feet above sea level, this map has 2 foot contour interval.

248
00:35:45.083 --> 00:35:56.963
So, if you turn right and walk down to the neighboring contour line and follow it south, you'd then be walking at a constant elevation of 958 feet 2 feet below the first line.

249
00:36:00.833 --> 00:36:14.063
On all maps with elevation contour lines, steeper slopes are indicated where the contour lines are closer together and gentler slopes or flat areas are indicated where the contours are farther apart.

250
00:36:14.634 --> 00:36:24.114
So, here in the upper right is an area of steep slopes that I've circled in orange. And here's another area in the lower right.

251
00:36:24.659 --> 00:36:38.099
And over here on the left is an area of gentler slopes where the contour lines are far apart,  where I've circled in green and here's another area of gentler slopes.

252
00:36:42.478 --> 00:36:55.349
This is an aerial view of a fairly dramatic forested landscape. There's a road running North to South top to bottom, through the center of this image.

253
00:36:55.349 --> 00:37:04.284
With a few fields near the road and, and the road appears to be flagged by hills that rise steeply on each side. In some places.

254
00:37:04.643 --> 00:37:10.583
Just by the shadows, you can detect where there are a steep slopes swells and ravines.

255
00:37:10.858 --> 00:37:16.438
Here's a USGS topographic map segment of the same area.

256
00:37:16.438 --> 00:37:22.829
In this close up of the topographic map, several streams are mapped with blue lines.

257
00:37:22.829 --> 00:37:36.688
Noticed the shape of the contour lines in the vicinities of those streams, the streams all occur in places where are these series of V shaped contours with the v's pointing up slope.

258
00:37:36.688 --> 00:37:42.148
That is the basic signature of a stream on a topographic map.

259
00:37:42.148 --> 00:37:52.619
Here the streams are mapped, but on other map segments that same configuration of contour lines can lead you to streams that have not been mapped.

260
00:37:54.534 --> 00:38:09.293

Here's an example of a different topographic map section. To find unmapped streams, on this map first, you'll want to figure out which areas are higher and which areas are lower on the map.

261
00:38:11.634 --> 00:38:23.483
We can see from a couple of labeled elevations that the land is high in the Northwest quadrant at 550 feet and higher and lower to the South and Southeast.

262
00:38:23.483 --> 00:38:32.634
There is a contour labeled 400 feet. Finding those few labeled contour lines is often the quickest way to,

263
00:38:32.634 --> 00:38:32.724
,

264
00:38:32.724 --> 00:38:39.503
tell what is high and what is low on your map. In the southern part of this map.

265
00:38:39.503 --> 00:38:52.523
There is one mapped stream, shown as a blue line on the lower part of this hillside, but from the contrary lines elsewhere on this map, I'll guess it, there are several unmapped streams in this map segment

266
00:38:55.074 --> 00:39:06.385
Starting at the northeast corner at the upper right I predict a stream right here. I'm drawing it in green up in the northeast corner. And another one right here.

267
00:39:06.594 --> 00:39:13.195
You see that I'm drawing the stream through the series of V shaped contour lines.

268
00:39:13.440 --> 00:39:25.349
And another stream here running into this depression at the bottom, which is probably an unmapped pond, I'm going to color it in there.

269
00:39:25.349 --> 00:39:38.460
At the southern stream that was already mapped in blue see, that the, the V shaped contour lines continue farther up the hill. So I'm guessing that the stream actually starts way up here.

270
00:39:39.989 --> 00:39:44.820
You see that way up there and then joins the mapped part of the stream.

271
00:39:48.054 --> 00:40:01.405
And here's another topographic map section for you to practice on. This is one of the maps that we sent you, the Nate sent you by email earlier today. So I hope you have a print out of this in front of you.

272
00:40:02.250 --> 00:40:10.889
We'd like you to find and draw all the unmapped streams that you can see on this map.

273
00:40:12.324 --> 00:40:20.844
First, you'd want to figure out which places are high and which are low in different parts of the map. There are a few labeled contour lines.

274
00:40:20.844 --> 00:40:28.795
That will give you some clues. Also remember that the land rises on either side of the mapped streams, or their floodplains.

275
00:40:29.280 --> 00:40:40.469
Then look for the V shaped contour lines with the v's pointing up hill. There are other places where v's point downhill. Those are not streams.

276
00:40:41.550 --> 00:40:50.190
Here, I've exaggerated the streams that are already mapped. They show up as thinner blue lines on the map print outs that you have.

277
00:40:50.425 --> 00:40:54.804
Here are a few examples of stream delineations to get you started. Ah,

278
00:40:54.835 --> 00:40:57.175
here in the in the center left,

279
00:40:57.204 --> 00:40:57.414
,

280
00:40:57.414 --> 00:41:00.864
One stream emerges from this little flat area,

281
00:41:01.465 --> 00:41:01.735

,

282
00:41:01.764 --> 00:41:06.264
and runs down this fairly steep hillside to join the mapped stream

283
00:41:06.385 --> 00:41:06.775
,

284
00:41:06.985 --> 00:41:07.284
,

285
00:41:07.315 --> 00:41:08.815
across the road at the bottom.

286
00:41:09.625 --> 00:41:16.554
It looks like another stream runs north eastward from that same flat area and runs down to feed a small pond,

287
00:41:16.675 --> 00:41:19.764
which is then drained by the mapped stream shown in blue.

288
00:41:21.300 --> 00:41:27.750
Over here on the west side is another stream and another one nearby.

289
00:41:27.750 --> 00:41:32.190
And here's one up in the northeast.

290
00:41:32.190 --> 00:41:46.619
We'd like you to continue to find and draw all the other unmapped streams on this map section. I found at least 19 unmapped stream segments. There may be more.

291
00:41:46.619 --> 00:41:57.925
When you're doing this, make sure that you're drawing streams only where the series of V shaped contour lines point uphill. I just want to caution you though about that.

292
00:41:58.224 --> 00:42:10.614

There are other places where there are V shaped contour lines that point downhill. For example, right here in the center left. I'm drawing in yellow a

293
00:42:11.514 --> 00:42:24.474
line up through some of those V shaped lines that are pointing downhill. That is not a stream. That's more like a promontory. And over here in the lower right

294
00:42:24.505 --> 00:42:39.235
is another situation where those, V shaped or U shaped contour lines are all in a series, but there, they are pointing downhill and not uphill. That is not a stream. So be cautious about that.

295
00:42:39.690 --> 00:42:44.429
So, take a few minutes, and

296
00:42:44.429 --> 00:42:57.030
look at this stream, draw everything that you can that you believe is, or may be an unmapped stream and

297
00:42:57.030 --> 00:43:02.969
in a couple of minutes we'll get back together and see what we found.

298
00:44:44.639 --> 00:44:52.980
Okay, so let's get back together and I'm going to show you.

299
00:44:52.980 --> 00:44:56.400
Hello.

300
00:44:56.400 --> 00:44:59.460
Here are shown in red.

301
00:44:59.460 --> 00:45:08.699
Are all the stream segments that I found on this map. You may have found some more

302
00:45:15.269 --> 00:45:28.409
And if you did, we can talk about them in the in the Q and A section later on, but just take a minute to compare this map with the one that you were drawing.

303

00:45:53.184 --> 00:46:08.005
Okay, so I'm gonna move on. This is another topographic map. This is of the Millbrook preserve a part of it in the town of New Paltz.

304
00:46:09.840 --> 00:46:17.159
We'd like you to find all the unmapped streams on this map. This is another of the maps that we sent you by email. So we hope that you all have a printout of this in front of you. The streams shown in blue are from the national hydrography dataset from the USGS and they are drawn fairly coarsely so they don't track the contour lines closely. You should ignore that imprecision and draw your own additional streams as precisely as you can according to the contour lines.

305
00:46:48.510 --> 00:46:58.675
You'll notice that there are no labels indicating the elevation above sea level on any of the contour lines. So how else would you figure out which areas are higher and which areas are lower?

306
00:46:59.875 --> 00:47:00.985
You need to know that,

307
00:47:00.985 --> 00:47:15.925
in order to predict which areas are likely to collect and carry water and to identify unmapped streams where the V shaped contour lines point uu ill not downhill. Streams are in places that collect water from the surrounding

308
00:47:15.925 --> 00:47:16.465
landscape

309
00:47:16.465 --> 00:47:27.775
oo are always at lower elevations in the land that is immediately adjacent to the stream, or its floodplain. Of course streams can occur at high elevations and on high, steep hillsides,

310
00:47:27.775 --> 00:47:36.385
but always the land immediately flanking the stream will be at a higher elevation than the stream itself at that location. So in this map

311
00:47:37.554 --> 00:47:51.744
much of the map stream lengths run through these broad, flat areas that appear to be the flood plains of those map[ed streams. I say that because the contrary lines are widely spaced, indicating flat or gently sloped terrain.

312
00:47:51.985 --> 00:48:02.425
And when you see this along a stream is typically a current or former floodplain, then you can be sure that the land rises instead of dropping on either side of those floodplains.

313
00:48:03.119 --> 00:48:10.824
That's all you really need to know to understand the highs and lows for this exercise. I'm gonna put a few more high and low labels up there.

314
00:48:11.394 --> 00:48:24.985
And I'll leave this this image on the screen, but we, we'd like you to take a few minutes to find all the unmapped streams here. Then we'll get back together and you can compare your findings to mine.

315
00:48:25.405 --> 00:48:29.815
So, I'm just gonna leave you for a minute or so and see what you can find.

316
00:49:54.630 --> 00:50:02.940
Okay, so let's get back together. I want to show you the ones that I came up with.

317
00:50:03.204 --> 00:50:17.635
Get to the next slide. All of these, the ones shown in red are the streams that I found on this segment. There are a number of other places where you'll find V shaped contours

318
00:50:17.994 --> 00:50:18.474
.

319
00:50:19.139 --> 00:50:30.059
in a series, but in most of those cases, they are pointing downhill and not uphill. So they're not mapped as potential streams.

320
00:50:31.500 --> 00:50:36.030
So, I'll just give you a little bit

321
00:50:36.030 --> 00:50:39.239
time to compare this with your own map.

322
00:50:55.230 --> 00:51:03.929
So, if there are any questions, I'm happy to answer them now and

323
00:51:03.929 --> 00:51:11.849
then I want to say a few things about field visits to verify your stream predictions.

324
00:51:16.739 --> 00:51:21.929
Nate Nardi Cyrus: Alright, Gretchen, we don't have anything in the chat or the Q and A.

325
00:51:21.929 --> 00:51:31.739
So, okay, give it a minute or so, and then we can move on to your next part of the talk. Okay maybe maybe 30 seconds. Yeah.

326
00:51:42.420 --> 00:51:54.449
All right well I think if you do have any questions for Gretchen that come up, I encourage you to save those and you can ask again after she finishes this next part of the presentation.

327
00:51:55.949 --> 00:52:03.119
Gretchen Stevens: Okay, so oh, let's see, let's make sure this advances.

328
00:52:04.014 --> 00:52:17.215
For any of you who conduct environmental reviews of land development projects, at the municipal or state level or if you're in any other position of planning for development or management of a land area.

329
00:52:18.210 --> 00:52:22.050
We strongly encourage you to visit every site.

330
00:52:22.050 --> 00:52:33.750
A site visit can open your eyes to important features that are not evident on maps alone and are not necessarily conveyed to you by a landowner or a developer.

331
00:52:33.750 --> 00:52:42.480
The purposes of field visits are several. Certainly to identify

332
00:52:42.480 --> 00:52:48.090
Important natural features that can't be detected remotely.

333
00:52:48.565 --> 00:53:03.534

Also to assess the character and quality of streams and other habitats; to assess the jurisdictional status of features such as streams and wetlands. That is, do they qualify for local state or federal

334
00:53:03.534 --> 00:53:04.164
Protection?

335
00:53:04.559 --> 00:53:18.929
And to assess the potential impacts from proposed land uses, those impacts are often much easier to visualize in the field than on a map back at the town hall or in your office. Before a field visit for such purposes you should prepare by first analyzing topographic maps and aerial photos to identify potential unmapped streams or other features such as wetlands or steep slopes or large forests or other natural features that might be of interest or concern to you. You should acquaint yourself with local regulations that might be relevant to the site. If there's a stream protection ordinance for example, what are the minimum criteria for jurisdiction? What are the setback requirements? What are the use limitations?

336
00:54:00.780 --> 00:54:13.735
Figure out what questions, need to be answered in the field, and then plan your field itinerary so that you can efficiently get around to all the important places to answer those questions.

337
00:54:13.945 --> 00:54:19.014
This is especially important for large sites where, you know, you'll be unable to see everything.

338
00:54:19.980 --> 00:54:30.000
Bring site plans, other sitemaps, topographic maps and other relevant documents that might provide useful information while you're looking at the site.

339
00:54:32.335 --> 00:54:34.135
A camera is always handy,

340
00:54:34.164 --> 00:54:34.554
,

341
00:54:35.304 --> 00:54:41.905
in case you need to illustrate some significant features for your colleagues when you're on the site,

342
00:54:41.965 --> 00:54:43.195
have the land owner,

343

00:54:43.255 --> 00:54:43.885
,

344
00:54:43.974 --> 00:54:44.545
or,

345
00:54:44.635 --> 00:54:45.025
,

346
00:54:45.054 --> 00:54:45.684
applicant,

347
00:54:45.684 --> 00:54:48.025
or their representative show you,

348
00:54:48.025 --> 00:54:51.684
the locations and limits of proposed development features.

349
00:54:51.954 --> 00:55:05.905
This is much better than trying to figure those things out for yourself, and also have them explain proposed mitigation for adverse impacts if needed. Be sure to see the whole site, not just the development footprint.

350
00:55:05.994 --> 00:55:20.304
If it's a 5 acre site, and the proposed development is only on 2 acres, then look at the rest of the site too, because there may be features such as streams that are outside of the development footprint or on a neighboring property that

351
00:55:20.610 --> 00:55:34.289
would be affected, and because plans might change and the development footprint might shift to other areas before the project plan is final. You want to have all the relevant information right up front.

352
00:55:34.289 --> 00:55:43.050
Be sure to see all the places of interest and potential concern, not just the places that the applicant wants to show you.

353
00:55:43.050 --> 00:55:56.309

And don't take too narrow a view, if you're concerned about streams, for example, look closely at how the upland areas are supporting the streams and consider how the proposed land uses might alter that relationship.

354
00:55:57.630 --> 00:56:07.199
Take photos to document features of special interest and take notes that will help you describe your observations to your colleagues later on.

355
00:56:07.199 --> 00:56:10.440
We are

356
00:56:10.440 --> 00:56:23.309
sending you a link to a virtual field visit, to the Millbrook preserve in, in New Paltz, the, the place here you were just, , looking for unmapped streams.

357
00:56:23.309 --> 00:56:36.690
It takes you around to several small streams and, shows you what they look like, discusses their physical attributes and ecology , and their connections to the, to the surrounding landscape.

358
00:56:38.605 --> 00:56:50.275
So, that's all that I needed to say right now, and I'll pass this on pass this back to Nate and next we'll hear from Emily

359
00:56:50.275 --> 00:56:54.264
Vail who'll be talking about urban streams and watershed planning.

360
00:56:56.789 --> 00:57:10.164
Nate Nardi Cyrus: Great, thank you, Gretchen so much. That was terrific. It seemed like that helped out a lot of folks. I want everyone to know that I did post a virtual field trip in the chat box, but I'll be sharing it again in our follow up email.

361
00:57:10.434 --> 00:57:17.965
So, and again, continue to post questions in the queue and Q and A, and we should have time at the end.

362
00:57:17.965 --> 00:57:25.914
So, if you remember any questions that you want to ask, Gretchen or just a larger conversation, throw that in the Q and A now and we can, we can address that later.

363
00:57:26.400 --> 00:57:31.440
Okay, so let me just get Emily all squared away.

364
00:57:32.909 --> 00:57:41.789
Okay alright, Emily. You, you've been granted privileges. Emily Vail - Great. Thank you so much. See.

365
00:57:42.445 --> 00:57:50.844
Nate Nardi Cyrus -While Emily is setting up her presentation I want to introduce her. She's been the executive director of the Hudson River watershed alliance since 2019.

366
00:57:50.844 --> 00:57:58.885
She served for 8 years as the watershed outreach specialist for the New York State Department of Environmental Conservation's, Hudson River Estuary Program in collaboration

367
00:57:58.914 --> 00:58:10.614
with the New York State Water Resources Institute at Cornell University, and her work has supported community-based watershed groups, municipalities, and other partners throughout the region to improve water quality in the Hudson Valley.

368
00:58:10.614 --> 00:58:17.275
Her research has focused on green infrastructure, urban streams, and intersections of art and community engagement.

369
00:58:18.719 --> 00:58:32.190
And for a little extra, she has a BA in environmental studies from Vassar College and M.S. in Natural Resources from Cornell University. So, thank you so much. We're very lucky to have Emily with us today. Take it away.

370
00:58:32.574 --> 00:58:44.394
Emily Vail - Great thanks so much Nate and thanks to Nate and Gretchen for teeing up this conversation. It's really great to be a part of this series and thanks to you all for joining in on this important topic.

371
00:58:44.425 --> 00:58:55.585
So, I'm going to be talking today about small urban streams. So, those headwater streams that are in are more densely developed cities, villages, urban centers along with watershed planning.

372
00:58:56.364 --> 00:59:08.635

So I'll talk about where these small urban streams are, and how they transition to being thought of, as more of a natural resource into infrastructure, some of the challenges and opportunities associated with that.

373
00:59:08.934 --> 00:59:16.195
I will talk a little bit about city of Kingston. And the Tannery Brook case study, which has Nate mentioned is very near and dear to my heart.

374
00:59:16.554 --> 00:59:26.994
I'll give an overview of watershed planning and other conservation plans that can be used to incorporate maps of small streams and talk a little bit about what's next. And future opportunities.

375
00:59:27.329 --> 00:59:30.480
So, let's start with small urban streams.

376
01:00:42.204 --> 01:00:50.034
Where are all these small urban streams? When you look across the landscape and we look at the types of mappers that Nate showed, we see lots of blue lines throughout our rural areas. And then suddenly they stop in our urban areas. And of course small streams used to be just as common in urban areas. There was a study that came out of Baltimore that found that 73% of headwater streams that were in the city of Baltimore have been buried. And you can see this map, in the city of Baltimore, all those streams are buried. And when you get further afield, all of a sudden those streams show up. And these are in large part small headwater streams that used to be in cities. So where did they go? Many small streams were buried as part of a storm sewer or combined sewer system. So they were incorporated into municipal infrastructure, in some cases to convey waste. For example the Beaver creek in Albany. This small stream that you can still see evidence of in this ravine used to be a flowing stream and now is part of a big combined sewer overflow restoration project. Small streams were also incorporated to storm sewers or just buried. they still show up through infiltration.

377
01:00:50.034 --> 01:01:00.684
So, in some cases, even when they weren't designed to be conveying waste or storm water, those areas that are low lying that are collecting run off

378
01:01:01.074 --> 01:01:13.945
may still infiltrate into pipes. So in large part, our streams and cities are considered infrastructure they may physically be in the storm sewer, or the sanitary sewer, or they may be channelized or buried.

379
01:01:13.945 --> 01:01:20.094
So it's a much more infrastructure kind of relationship with water in cities.

380

01:01:22.014 --> 01:01:30.054
When we bury streams or channelize streams, it results in a decreased connection with the soil the riparian area and

381
01:01:30.054 --> 01:01:32.545
And the floodplain. And last week's session

382
01:01:33.114 --> 01:01:48.085
talked about the importance of this connection with soil,  the connection with the riparian area and floodplain to have alterations of nutrients, to break down certain pollutants, to make sure there's a place for floodwaters to go.

383
01:01:48.235 --> 01:01:59.125
And so, when we channelize and vbury urban streams, we end up having water, quality and quantity issues. We also have an increase connection with impervious surfaces and urban runoff.

384
01:01:59.125 --> 01:02:11.605
So we have our roads, parking lots ,rooftops connected to these small streams that are very combined channels. You can see here in Kingston with the building right here next to the Tannery Brook.

385
01:02:13.375 --> 01:02:21.175
And small streams can still cause big problems. So, again, we'll be talking more about the Tannery Brook in a couple of minutes, but these are a couple of photos.

386
01:02:21.324 --> 01:02:33.565
This is where the Tannery brook crosses under Washington Avenue in the city of Kingston, which was the site of a massive sinkhole that caused millions of dollars in damage and repairs to the city,

387
01:02:33.869 --> 01:02:47.275
disrupting a very important roadway. And then more recently, this is an example of some localized flooding again in a neighborhood that's impacted by the Tannery brook and this is not a mapped floodplain.

388
01:02:47.394 --> 01:02:47.635
,

389
01:02:47.635 --> 01:02:50.065
This is not a stream that shows up on many maps,

390
01:02:50.065 --> 01:02:58.494
because it is so small and yet you can see the devastation that the people in this neighborhood had to deal with in a heavy rainstorm,

391
01:02:58.675 --> 01:03:03.474
but not even a hurricane or a named storm or anything like that. So,

392
01:03:03.625 --> 01:03:05.784
even though we have small streams,

393
01:03:05.784 --> 01:03:07.945
they can still cause very big problems.

394
01:03:07.945 --> 01:03:14.815
What's important to map them, know where they are, and be thinking about opportunities to improve these scenarios.

395
01:03:16.284 --> 01:03:28.585
So daylighting is one option to restore various streams a day. Daylighting is a process that restores the stream channel and allows that water to come to the surface and see the light of day.

396
01:03:29.574 --> 01:03:34.255
And many folks are familiar with the Sawmill River stream daylighting in Yonkers.

397
01:03:34.255 --> 01:03:47.155
This was a major project at the mouth of the Sawmill river, not a small stream. Big project, but also really huge impact, bringing that stream and creating a park around it in Yonkers.

398
01:03:47.184 --> 01:03:55.764
But there are also examples of very small headwater streams that have been buried and then daylighted or day-lit as a restoration opportunity.

399
01:03:55.764 --> 01:04:03.565
So, this photo shows, one of those in the village of New Paltz. This is a section of a stream that was buried in the Peace park.

400
01:04:03.835 --> 01:04:15.355

And what the village of New Paltz found was that it was actually cheaper to do a stream day lighting restoration project, then to repair the sewer infrastructure. So this stream was causing damage to their storm sewers.

401
01:04:15.534 --> 01:04:30.505
And it was more expensive to do a project underneath the sidewalk alongside the road in the right of way then to bring that stream in where it used to actually be through the Peace park and have the stream be an amenity to the park along with obviously

402
01:04:30.505 --> 01:04:32.695
the water quality and quantity improvements.

403
01:05:20.550 --> 01:05:25.465
If you can do a stream daylighting project, like Yonkers and the Sawmill, that's fantastic.

404
01:05:25.465 --> 01:05:40.074
Another example is in the village of Ravena in Albany County. The village of Ravena has received several NYS grants to turn an unused municipal parking lot into a park add green infrastructure and bioretention and also to daylight a tributary to the Hannacroix Creek. So you can see here theres this tributary right before it enters the parking lot and once it enters the parking lot its actually underneath this storm sewer. It goes under this guardrail. You can see this next manhole cover. This is an area that is very prone to flooding. This building has been flooded many times. So you can see bringing this stream up, doing this daylighting project there clear water quality, flooding, habitat benefits. So if you can do a stream daylighting project like Yonkers and the Sawmill river, that's fantastic.  But this is just to say that even our small urban streams can be restored in ways that are fundable through grant programs that are manageable, and actually may be more cost effective than some of the more traditional hard infrastructure

405
01:05:40.074 --> 01:05:40.824
approaches.

406
01:05:42.835 --> 01:05:57.474
So, urban small streams come with water quality, quantity and infrastructure challenges, and you may be very limited in the kinds of stream channel improvements that you can make. So, if you have areas that are prone to flooding it would be great if you have an opportunity like the municipal parking lot in Ravena or the Peace Park in New Paltz, to have a place for those flood waters to go. But in many of our urban areas, our cities and villages, you have development right along the urban stream. You have crossing private property and you may be very limited in space constraints with what you can do. So look up into the sewershed into the watershed to think about opportunities for green infrastructure and other types of restoration projects to filter and infiltrate runoff before it enters the stream. So we can think about many of the functions that Beth talked about last week in her riparian areas talk and think about how those might translate perhaps not directly alongside the stream but if there's ways to

replicate those benefits throughout the watershed or if it's part of a sewer, thinking about the sewershed and those impervious connections.

407
01:06:59.034 --> 01:07:06.114
So some examples of green infrastructure for stormwater management include green gardens, bioswales, pervious pavement.

408
01:07:06.144 --> 01:07:18.835
These are practices that allow the rain to hit the paved surface and enter into a greener practice often using plants and vegetation to infiltrate that runoff right into the ground.

409
01:07:18.864 --> 01:07:26.364
This is an example of a municipal parking lot in Kingston that has extensive green infrastructure throughout to really help

410
01:07:26.789 --> 01:07:36.445
reduce the impact on small streams, like the Tannery Brook. Other opportunities include street trees, open space, like parks, even yards.

411
01:07:36.594 --> 01:07:47.545
All of these can help improve urban streams and thinking about the timing and the intensity with which the water will hit that that urban stream.

412
01:07:50.155 --> 01:07:57.565
So I have a real passion for urban streams and tracking them down and Nate all already gave you,

413
01:07:57.715 --> 01:07:57.925
,

414
01:07:57.954 --> 01:08:01.224
sort of an overview of of how to think about this.

415
01:08:01.284 --> 01:08:03.445
I did a lot of work on my Tannery Brook project,

416
01:08:03.445 --> 01:08:05.155
which I'll talk about in one moment,

417
01:08:05.815 --> 01:08:10.465
but how do you find these buried streams once they are not at the surface and they're,

418
01:08:10.525 --> 01:08:11.275
they're hidden?

419
01:08:11.695 --> 01:08:21.145
I have found that the Library of Congress is an excellent resource. You can find lots of municipal maps, particularly from the late 1800s. There are

420
01:08:21.510 --> 01:08:28.680
lots of land use maps that are really useful that are very accessible through the Library of Congress.

421
01:08:28.914 --> 01:08:41.694
Looking through your local archives, local libraries, municipal archives, historical societies, and it's also really important to check in with your engineering and public works departments at your municipality.

422
01:08:42.204 --> 01:08:48.385
What I found in Kingston is that the engineering department had extensive archives that showed exactly when,

423
01:08:48.385 --> 01:08:57.385
and where sewers came in, and streams were analyzed, and it was really a fantastic resource. And same with public works department-

424
01:08:57.385 --> 01:09:09.175
they know the areas that are prone to localized flooding. They are able to to document and know some of these problem areas that may or may not be on the radar of people outside a very specific neighborhood.

425
01:09:09.204 --> 01:09:10.314
So again,

426
01:09:10.314 --> 01:09:13.795
thinking about how these urban streams of transition from being thought of,

427
01:09:13.795 --> 01:09:17.215

as more of a natural resource to more of an engineering problem,

428
01:09:17.364 --> 01:09:26.694
it's really important for those of us who are interested in conservation and watersheds and natural resources to be in conversation with the people who know

429
01:09:26.784 --> 01:09:28.435
and manage the infrastructure.

430
01:09:28.435 --> 01:09:31.465
So those conversations and those linkages are really important.

431
01:09:32.274 --> 01:09:41.064
Nate also mentioned stream stats and I have found the stream stats is an excellent tool to predict where you might expect a stream to be,

432
01:09:41.064 --> 01:09:51.385
or have been, again because it's based on topography and it uses those models even if those streams are no longer at the surface there are still actually…

433
01:09:52.859 --> 01:09:56.784
it leaves a, it leaves a trace, right?

434
01:09:56.784 --> 01:10:09.145
It, it leaves the small channel, the indentation, and so the stream stats models are actually really effective at picking those up and predicting places where small streams might be buried.

435
01:10:09.954 --> 01:10:20.064
One thing that I want to add too is that we found during Hurricane Ida, that many many places were flooded where we did not see

436
01:10:20.399 --> 01:10:23.725
water at the surface, we did not see streams on the surface.

437
01:10:23.725 --> 01:10:37.555
And so that really brought home the significance of knowing where streams have been, and where they have been buried and knowing where people might actually be at risk where they don't realize it, because they're not in mapped floodplain areas. So

438
01:10:37.920 --> 01:10:44.489
I think this is really significant for water quality, but also public health and safety as well.

439
01:11:14.670 --> 01:11:28.404
So I”ve talked a little bit about Tannery Brook. This is a very small stream in Kingston. It’s a first order stream. And this stream, although it has been really important for the city of Kingston over its long history in more recent times has been channelized, buried, rerouted. It has a very complex hydrology. And the Tannery Brook has also caused major infrastructure damage in Kingston. Like the sinkhole on Washington Avenue and flooding in certain neighborhoods. So in 2018, I did a project called tracing Tannery Brook. If you're interested in seeing some of that work, you can go on my website and I poured through old maps. I documented where the stream was, looking at its shape over time. How residents in the City of Kingston used the stream starting from the 1500s and on. The earliest map I found of the stream was from 1683. And I also created a couple of different public engagement art space opportunities for people to talk about their relationship with the stream and explore that. So this photo is from the O+ festival from 2018 it’s an arts, music, and wellness festival. And tis parking lot has the Tannery Brook buried under it. You can see this storm drain. That’s the stream and you could look in there and see the water running. And we asked people who came, “What belongs in a healthy stream?” And they traced the stream the channel but they also drew people, and plants, animals, fish and other things that they know belong in a healthy stream.

440
01:12:23.279 --> 01:12:35.159
I also as part of this project had a gallery exhibit where I showed replicas copies of many of the historic maps that I had found with interpretive text.

441
01:12:35.159 --> 01:12:46.739
Primary source documents, photos before, and after and so on and we had so many people come out and find their houses on these historic maps and it really helped

442
01:12:46.739 --> 01:12:57.569
folks understand what conditions used to be like, what they might be, like, going forward and thinking about what some of these restoration opportunities might really be.

443
01:13:00.505 --> 01:13:13.255
This is a map of the city of Kingston as part of the open space plan this was adopted in 2019 with 10 different top priority goals. And I want to zoom in on this section in particular.

444
01:13:13.255 --> 01:13:19.164
Not only, because it includes the Tannery Brook and the main street brook, it's main tributary,

445

01:13:19.194 --> 01:13:19.404
,

446
01:13:19.404 --> 01:13:20.484
but also,

447
01:13:20.664 --> 01:13:29.515
because we were really excited to see that one of the top goals of the open space plan was to have 2500 linear feet of stream corridor restored thinking about re-

448
01:13:29.515 --> 01:13:35.335
naturalizing the ecosystem where feasible, helping to manage storm waterflow, and improving water

449
01:13:35.335 --> 01:13:36.475
quality and anesthetics.

450
01:13:39.359 --> 01:13:53.965
So, this is really exciting to see this small stream mapped, prioritized for restoration, and thinking both about the stream channel and the watershed as opportunities to improve these features. So, how, how did this happen?

451
01:13:54.324 --> 01:13:56.664
This was a long time coming. So.

452
01:13:57.444 --> 01:14:03.444
in 2009 and 2014 City of Kingston worked with Hudsonia to document significant habitats within the city boundaries.

453
01:14:03.444 --> 01:14:18.295
And this was really the first time in the more modern era that we saw really great maps of the Tannery brook and the Main street brook that were clearly documented by people who had watched the streams and really understood where they were.

454
01:14:18.295 --> 01:14:19.314
where they were.

455
01:14:21.720 --> 01:14:29.670

These maps were brought into the Hudson River Estuary Program's Habitat Summary in 2014 for the city of Kingston.

456
01:14:30.564 --> 01:14:31.015
In 2015,

457
01:14:31.015 --> 01:14:34.404
the city of Kingston did a tidal Rondout Creek

458
01:14:34.404 --> 01:14:39.385
watershed management plan and even though the Tannery brook flows into the Esopus Creek,

459
01:14:39.385 --> 01:14:47.935
it actually is diverted into the Twelfthkill and the Rondout and the tidal Rondout creek described this and also some opportunities for restoration,

460
01:14:47.935 --> 01:14:51.895
so always helpful to document this complex Hydrology,

461
01:14:51.895 --> 01:14:52.135
,

462
01:14:52.435 --> 01:14:54.954
in addition to the mapping.

463
01:14:56.100 --> 01:15:09.779
In 2018, city of Kingston created a natural resource inventory, which also described this complex hydrology, these interconnections and the Tannery Brook, Main street brook and Twelfthkill.

464
01:15:10.944 --> 01:15:11.664
My project,

465
01:15:11.664 --> 01:15:12.895
both the gallery exhibit,

466
01:15:12.925 --> 01:15:19.435
and the O positive interactive event those both took place in 2018,

467
01:15:19.435 --> 01:15:25.975
and I was able to bring some of that public enthusiasm to the open space planning process in 2019.

468
01:15:25.975 --> 01:15:28.194
So having these events with the Tannery

469
01:15:28.345 --> 01:15:32.994
brook really brought it to the surface of our conversations as a municipality,

470
01:15:32.994 --> 01:15:41.064
the interactive exhibit in particular we really thought of that as a cultural daylighting.

471
01:15:41.064 --> 01:15:47.215
So you can do a physical delighting and actually do stream restoration and heavy engineering work but in this case,

472
01:15:47.215 --> 01:15:51.774
by telling the story by sharing these maps, by helping people connect with the stream,

473
01:15:52.074 --> 01:15:58.225
we really thought of it as more of a cultural daylighting and that showed up really strong in the open space plan.

474
01:15:58.225 --> 01:16:04.704
People in Kingston are talking about these issues, they're noticing flooding. They're making some of these connections and they're getting involved.

475
01:16:07.614 --> 01:16:07.914
In 2020,

476
01:16:07.914 --> 01:16:15.774
the open space plan was adapted into an adopted into Kingston comprehensive plan and even more recently in 2021,

477
01:16:15.774 --> 01:16:16.524
the Main street brook,

478
01:16:16.524 --> 01:16:22.885
which is the main tributariy to the Tannery brook, here they join underground here before they go into the Esopus creek

479
01:16:22.885 --> 01:16:37.675
, so the Main street brook will be getting a flood study that includes Hydrologic and hydraulic analysis to understand impacts to flooding and where there may be opportunities to improve conditions. So, this is a.

480
01:16:41.609 --> 01:16:55.704
Sort of a timeline of how you can start with these mapping and documenting this information and it can continue to be influenced through all of these different types of municipal plans and projects hitting highlights like water

481
01:16:55.704 --> 01:16:56.185
quality,

482
01:16:56.185 --> 01:16:58.255
natural resources, and flooding.

483
01:16:59.640 --> 01:17:09.960
So, I'm going to shift gears and talk a little bit about watershed planning, building off of this idea of conservation planning and ways to incorporate small streams into these plans.

484
01:17:11.005 --> 01:17:24.175
So, a watershed plan is defined as planning for future conditions, using a watershed framework and scale. Other conservation plans may use a municipal boundary. In this particular case we're looking at the watershed boundary.

485
01:17:24.175 --> 01:17:26.755
So it may include multiple municipalities.

486
01:17:27.090 --> 01:17:35.489
watershed plans often have a focus on water quality and natural resources, but they can also include other issues using a watershed scale.

487
01:17:36.145 --> 01:17:39.774

Watershed plans include a characterization of existing information,

488
01:17:40.074 --> 01:17:53.454
and also specific actions to meet key goals and the process and the product of watershed planning will allow us to build consensus and develop strategies with a team that's ready to move forward and implement those.

489
01:17:54.840 --> 01:18:09.239
So, the watershed planning process is like other conservation plans. We'll start with defining your goals and then also delineating a watershed and thinking about what the most appropriate scale might be to address the specific concerns.

490
01:18:09.239 --> 01:18:18.329
Bringing together, stakeholders and compiling existing data. I want to talk a little bit about this compile existing data aspect.

491
01:18:18.329 --> 01:18:23.880
My God, this cat loves watershed planning. Can't not be involved.

492
01:18:23.880 --> 01:18:33.324
So, this step of compiling existing data is really important in bringing together physical characteristics. Where are the streams?

493
01:18:33.414 --> 01:18:47.095
Where are the other water bodies? and water resources?  water, quality, quantity and land cover habitat water infrastructure. Don't forget the water infrastructure, demographic, social data, local laws and policies and previous plans.

494
01:18:47.310 --> 01:18:54.420
All of that information can come together into a watershed characterization, which can be its own document.

495
01:18:54.864 --> 01:19:02.335
As you're going through this process, the next step might be to ask what additional information do, you need to plan.

496
01:19:02.335 --> 01:19:14.064
So by compiling all this information and putting it together, you'll be able to find gaps and prioritize what some key next steps might be. So, that might include monitoring,

497
01:19:14.369 --> 01:19:21.210
Modeling, or assessing local priorities, goals, needs and values, and having conversations with residents.

498
01:19:21.744 --> 01:19:33.295
This is also a great opportunity to map and document your small streams either ahead of time or you may go through this watershed characterization, planning process and realize that there are really important gaps.

499
01:19:33.295 --> 01:19:37.375
And you don't have that information mapped and documented yet.

500
01:19:37.800 --> 01:19:44.010
So, we can think about the watershed planning process as two different

501
01:19:44.010 --> 01:19:54.119
overall steps, so we can have these three steps of delineating a watershed, bringing together an advisory committee, and compiling existing data as a characterization.

502
01:19:54.119 --> 01:19:57.239
And we can think about these steps,

503
01:19:57.324 --> 01:20:11.515
As developing an action plan. These, these are, this terminology, comes out of the Department of State's watershed planning guidance document, which is what's used for department of state funded watershed plans. I'll talk about that in a minute.

504
01:20:11.694 --> 01:20:22.885
But this type of planning process really shows up broadly across conservation planning. So you can also think about it as the steps to develop a natural resources inventory as more of a characterization.

505
01:20:23.189 --> 01:20:37.314
And an open space plan as the action plan. So whether this process happens at a municipal scale with a process and tool like a natural resource inventory, or open space plan, or at the watershed scale, you know, it's still a lot of these same basic steps.

506
01:20:37.314 --> 01:20:49.375

And, and obviously having a watershed plan or a natural resources inventory, these things can really work together and achieve a lot of these same benefits. So it's great to have one, the other, or both.

507
01:20:50.664 --> 01:21:00.895
At the end of the watershed planning process, you'll have a group of people on board ready to work on issues and priorities that watershed characterization to summarize current conditions.

508
01:21:01.074 --> 01:21:15.414
And then if you do that, second part as well, you'll have that prioritized specific and strategic actions to improve watershed health. So, just to go back to the slide for a moment, you know, we can think about just like a natural resource inventory is one discreet document.

509
01:21:15.414 --> 01:21:23.154
And an open space plan is the second, we can do that same process for watershed planning as well and start with a characterization.

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01:21:23.395 --> 01:21:35.694
You can also start with an action plan if you have a good sense of what key actions are needed as well. So, we can think about how these different steps relate to each other and often they can be iterative.

511
01:21:38.305 --> 01:21:50.965
Obviously, there are limitations to planning, you can't plan for everything, you will also need to respond to new issues as they arise. But having a plan in place will help, you be prepared for issues.

512
01:21:50.994 --> 01:22:00.204
So one example is flooding, you know, especially understanding where your small urban streams are, can help understand where future flood risks may be.

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01:22:00.744 --> 01:22:06.625
But really an excellent example of this is in the Quassaick creek watershed management plan, which was done in 2015.

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01:22:06.625 --> 01:22:12.265
They created detailed maps and documented exactly how the city of Newburgh’s

515
01:22:12.265 --> 01:22:13.074
drinking water supply,

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01:22:13.104 --> 01:22:19.854
how that system worked and this is really the first time this has shown up in a public place,

517
01:22:19.854 --> 01:22:24.114
and talk about small urban streams with a big impact.

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01:22:24.114 --> 01:22:36.864
We've got Silver stream. We've got something called Murphy's ditch and these little small streams that are diverting water and transferring the water supply really became extremely significant

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01:22:36.864 --> 01:22:46.734
when drinking water supply was found to be contaminated with PFAS chemicals. And so, again, it's not like we could have prevented that issue.

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01:22:46.734 --> 01:22:58.345
But having these maps in place and having the Quassaick Watershed Alliance that really understood how these interconnections took place really was critical to getting started with resolving the PFAS contamination,

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01:22:58.555 --> 01:23:03.055
which obviously is an ongoing and critical issue.

522
01:23:05.039 --> 01:23:18.659
So, in terms of different types of watershed plans, you want to think about what your goal is water, quality, flooding, erosion. There are other goals again, thinking about strategic actions. Maybe you need an action plan.

523
01:23:18.659 --> 01:23:29.425
Thinking about what your watershed is like, and what scale might be most appropriate. You can look at a really big scale like the Wal kill river watershed plan, which probably won't include many small streams.

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01:23:29.664 --> 01:23:40.194
But in 2019, a group came together on Monhagen Brooke, to develop a much smaller scale watershed plan that mapped underground sections and other small streams.

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01:23:40.194 --> 01:23:47.185
So, I think it's helpful to think about the type of scale of planning and the opportunities that are available through those. So again watershed characterization and assessment can be the first step to inventory existing information and it may include some next steps. And funding is available from the

Hudson River Estuary Program to support watershed characterization and planning. A good example is the Sawmill River watershed. Department of State funds watershed plans and they have a watershed planning framework that is very useful. A couple of examples include the Tidal Rondout Creek and the Quassaick Creek plan. If you are interested in watershed planning for sources of drinking water, the DWSP2 program provides technical assistance through NYS Department of Environmental Conservation and the Department of Health. If your municipality is interested in that you can submit an application for free technical assistance.

526
01:24:41.274 --> 01:24:55.494
If you're concerned about flooding or erosion, you might want to consider Hydrologic and hydraulic flood studies. Like what's being done from the Main street brook this year or stream management plans that consider watershed impacts on the stream channel.

527
01:24:56.994 --> 01:25:11.515
And you might also consider planning at a watershed scale for other specific goals that might include stormwater, aquatic connectivity, habitat, riparian buffers. And so, on so often these types of plans focus on opportunities to implement best management practices.

528
01:25:11.725 --> 01:25:24.295
And as an example, here is the Patroon creek green infrastructure plan here in the city of Albany the Patroon creek is in a very densely developed watershed. You can see all that red is impervious surface cover.

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01:25:24.505 --> 01:25:37.404
And really, in this case, a green infrastructure plan is going to help protect some of these small streams in thinking about again, looking up into the watershed and using green infrastructure practices for improvements.

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01:25:37.710 --> 01:25:49.140
Watershed plans are eligible for New York state climate smart community certification points, including watershed plans for water quality, source water protection, and flood mitigation plans.

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01:25:49.914 --> 01:25:50.545
So,

532
01:25:50.784 --> 01:25:52.255
in terms of next steps,

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01:25:52.314 --> 01:25:55.074
we encourage you to think about opportunities to both protect,

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01:25:55.074 --> 01:25:57.744
but also to restore small urban streams,

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01:25:58.045 --> 01:26:02.274
look to the watershed or sewershed to restore the functions of urban suburban,

536
01:26:02.274 --> 01:26:17.125
small streams and to consider watershed planning as a tool to map and protect small streams incorporating the kinds of work that Gretchen showed in her talk of ways to document those small streams that that might not show up on maps currently.

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01:26:17.784 --> 01:26:21.625
So, thank you so much for having me today and

538
01:26:22.590 --> 01:26:26.880
I think I have one additional slide from Gretchen before we go into Q and A.

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01:26:30.265 --> 01:26:30.835
Nate Nardi Cyrus: All right Yep,

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01:26:32.935 --> 01:26:33.324
Gretchen Stevens: yeah,

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01:26:33.324 --> 01:26:34.585
I just wanted to,

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01:26:34.614 --> 01:26:35.095
,

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01:26:35.364 --> 01:26:35.755
,

544
01:26:35.784 --> 01:26:37.345
mentioned this we,

545

01:26:37.404 --> 01:26:37.734
,

546
01:26:37.854 --> 01:26:38.545
we have a,

547
01:26:38.604 --> 01:26:40.314
a bit of homework for,

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01:26:40.375 --> 01:26:40.675
,

549
01:26:40.704 --> 01:26:41.635
for you all,

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01:26:41.664 --> 01:26:42.024
,

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01:26:42.085 --> 01:26:45.864
something to do before the session that we'll be holding next week.

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01:26:46.465 --> 01:26:52.074
We'd like you to look up the stream protection regulations in your community.

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01:26:52.409 --> 01:26:55.710
For most municipalities, local laws are available through on th e municipal website or through links that you can find there. Many town have also put their local regulations on the site e-code which is easily searchable using key words such as stream or watercourse. In your town or city ordinance, for example, how are jurisdictional streams defined?

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01:27:21.510 --> 01:27:34.920
Are there required setbacks or buffer zones , along streams? Is there a stream or flood plain overlay district with special land use restrictions?

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01:27:36.024 --> 01:27:43.555
Does a conservation subdivision law have specifications related to streams?

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01:27:43.585 --> 01:27:51.173
is there a designated critical environmental area related to streams? or are there any other provisions,

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01:27:51.204 --> 01:27:51.505
,

558
01:27:51.534 --> 01:27:54.114
that are especially related to streams,

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01:27:54.145 --> 01:27:54.444
,

560
01:27:54.475 --> 01:27:59.664
and stream protection? If you have any such regulations, take some notes

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01:27:59.755 --> 01:28:14.725
so that we can discuss them in the next session on next Wednesday, the 17th of November when we'll be talking about existing protections for streams and the limitations of those protections at the federal state and local level.

562
01:28:16.229 --> 01:28:21.840
So, that's all I needed to say, and we'll send it back to you, Nate.

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01:28:22.885 --> 01:28:35.005
Nate Nardi Cyrus: Great, I have something in the chat that's saying, to send out the homework again to folks via email and we were actually already planning on doing that. I am going to send those to folks that are registered for that webinar.

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01:28:35.005 --> 01:28:49.194
So, everyone that's registered for the protection webinar of our headwater stream series. So I encourage you to sign up as soon as possible. So that you get that email and I'll also remind people in the follow up email.

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01:28:49.585 --> 01:29:03.265
So, and, yes, I'm seeing a chat that's saying to send a reminder for the link registration link next week and I will do that at the end of this week. I'll send all that information along, but yeah. Thanks, Gretchen.

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01:29:03.295 --> 01:29:05.335

That was, that was terrific.

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01:29:05.364 --> 01:29:06.024
And thank you,

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01:29:06.024 --> 01:29:06.625
Emily,

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01:29:06.744 --> 01:29:21.534
I wanted to add Emily was going through the laundry list of funding sources and she had mentioned that NRIs and open space plans are kind of the characterization and watershed plans analogies at the municipal scale.

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01:29:21.564 --> 01:29:33.984
And I just wanted to remind everyone that the Hudson River Estuary Program funds the creation of both and open space plans and open space inventories, through our grants program.

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01:29:33.984 --> 01:29:37.345
So we'll share all the funding sources as well.

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01:29:37.585 --> 01:29:49.435
It's gonna be a very long email, so get prepared for a lot of links but if you do have other questions, feel free to reach out to our presenters, because we're all willing to answer questions

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01:29:50.550 --> 01:29:54.090
specifically directed to us.

574
01:29:54.090 --> 01:29:58.289
Okay, we do have some questions.

575
01:29:58.289 --> 01:30:05.755
Question directed at Emily - in the photo of the chalk are, is there a low damp line on the pavement?

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01:30:06.145 --> 01:30:16.854
and I think just broadly, you know, maybe answer some of the other evidence of streams being buried that you might be able to see from a site visit.

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01:30:17.845 --> 01:30:32.215
Emily Vail: Sure. , so, yes, well, that wasn't necessarily a damp line, but you saw the seam in the between the asphalt and in that parking lot, the asphalt was crumbling around that

578
01:30:33.324 --> 01:30:47.034
around the storm drain, there's a couple storm drains. One of them ended up having like, a traffic cone on top of it to prevent people from having damage to their car. But certainly having a buried stream shows up. Right?

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01:30:47.034 --> 01:30:54.984
It doesn't just disappear. And so that that seam wasn't that wasn't damage, and it wasn't necessarily the water, but if you go there during a rain storm, which I've done many times, you can see the water pooling in that seam, it so wants to be a stream again. In terms of hints for when you are walking around, my personal favorite is looking for a guardrail. Often times, people bury streams, but they leave up the guardrail. So if you are walking around and you see just like a funny guardrail and there's nothing there, when we were doing that stream walk in Ravena that was one of the things that helped us when we were walking around. Going after it rains is helpful. You can follow your ear and listen to

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01:31:40.225 --> 01:31:49.345
different storm drains. Passersby may or may not think you dropped your keys down the storm drain, but that's just an occupational hazard. You can show them. You're fine.

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01:31:49.585 --> 01:32:03.295
Other things include, you know, looking for those, those gullies like that, those low lying areas or places that are wet that are surprising. So, I showed a picture

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01:32:03.628 --> 01:32:18.444
and maybe I can go back to it really quickly of an area that used to have an empoundment in Kingston and it's often very damp after a  storm. So, let me just actually share my screen. If I can.

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01:32:18.444 --> 01:32:19.224
Thank you Nate.

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01:32:20.634 --> 01:32:34.854
Right so here next to the stream, this used to be a skating pond in the late 1800s and early 1900s and the, the history shows up in the landscape you can see that it's still wants to be kind of a wet, low lying,

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01:32:34.913 --> 01:32:35.963
you know…

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01:32:36.899 --> 01:32:51.748
pond there. So those are some other clues obviously it is right next to the stream so that's a little bit easier but this also might show up in other places like parks, ball fields, basements and so on.

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01:32:55.554 --> 01:32:57.474
Nate Nardi Cyrus: All right, great, thank you, Emily.

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01:32:57.774 --> 01:33:11.873
We don't have any other questions cued up, but I'd like to invite everyone to take one last chance and, you can provide questions to myself or Emily or Gretchen, and we'll, we'll try to address those.

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01:33:12.149 --> 01:33:19.498
Beth Roessler: So, Nate, there was one question that came right after you finished your talk that we didn't get a chance to answer and that is.

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01:33:19.498 --> 01:33:26.939
Does the stream have to be mapped to use the watershed mapping tool? The USGS mapper? I think they mean stream stats.

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01:33:28.043 --> 01:33:36.054
Nate Nardi Cyrus: Yes, so that, , it doesn't have to be it'll map the basin, for whatever point that you click on.

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01:33:36.083 --> 01:33:50.213
, I'm not sure if there is accuracy issues with that, because they do provide kind of  the stream, the drawn streams on there. But I actually went back and checked and it will delineate a basin around random areas.

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01:33:50.243 --> 01:33:54.684
The basin looks a little weird. So, I don't know if I necessarily trust it.

594
01:33:54.958 --> 01:34:00.179
You may want to focus on on just developing watersheds for unique streams.

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01:34:01.559 --> 01:34:05.368
Beth Roessler: Yeah, and I'll add to that, I think stream stats.

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01:34:05.368 --> 01:34:18.024
It creates flow lines in places that are sort of low, low, lying areas. And so sometimes it, it looks like there are a lot of streams on the map and you might go out there and not see a stream flowing all the time.

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01:34:18.323 --> 01:34:26.753
But it's actually it is a great way to find those streams as well. So you can find watersheds for anything that they map as a flowline.

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01:34:31.109 --> 01:34:39.298
All right, well, I'm not seeing any other questions. so I will, no need to hold everyone hostage here for that. Thank you all for attending. I want to remind everyone that we do have next week at 3 pm, same time, same place. We'll be looking at municipal, state, and federal protections for small streams.

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01:34:59.963 --> 01:35:09.234
Please register for that, and if not at the end of this webinar, there'll be a 3 question survey. We really appreciate any feedback you could give us once this window closes.

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01:35:09.953 --> 01:35:24.623
And also, if you're looking for municipal training credit, that email will arrive sometime after this meeting. And so be patient, if you don't get anything follow up with me and I'll make sure that you get your credit if you attended. Alright we have a chat.

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01:35:24.654 --> 01:35:35.724
I don't know if people are just thanking us. Yep just happy customers. So anyway, take care. Everyone have a great night. Thank you again to our presenters and we'll see you all next week.