COLLABORATIVE SCIENCE FOR ESTUARIES
WEBINAR SERIES

Coowe Walker
Kachemak Bay NERR

Mark Rains
University of South Florida

Promoting Resilient Groundwater and Holistic Watershed Management in Alaska's Kenai Lowlands

National Estuarine
Research Reserve System
Science Collaborative

Date: Tuesday, April 27, 2021
Time: 2:00-3:00 PM ET

National Estuarine Research Reserve System

Questions

Use the **Q&A** feature to ask the speakers questions about the presentation. Upvote questions you like to make sure we see them!

Chat

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Need help?

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Presenters

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Mark Rains
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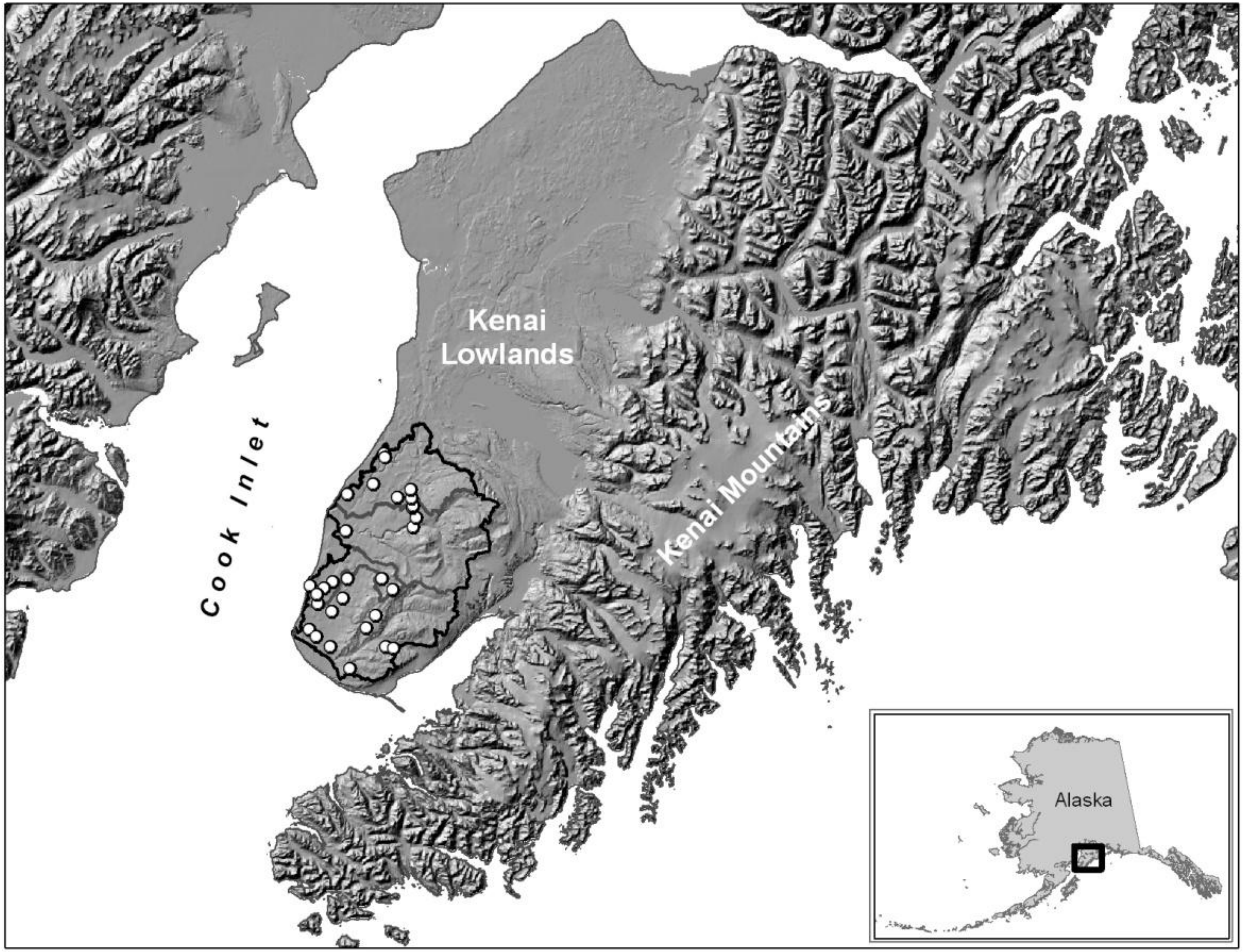
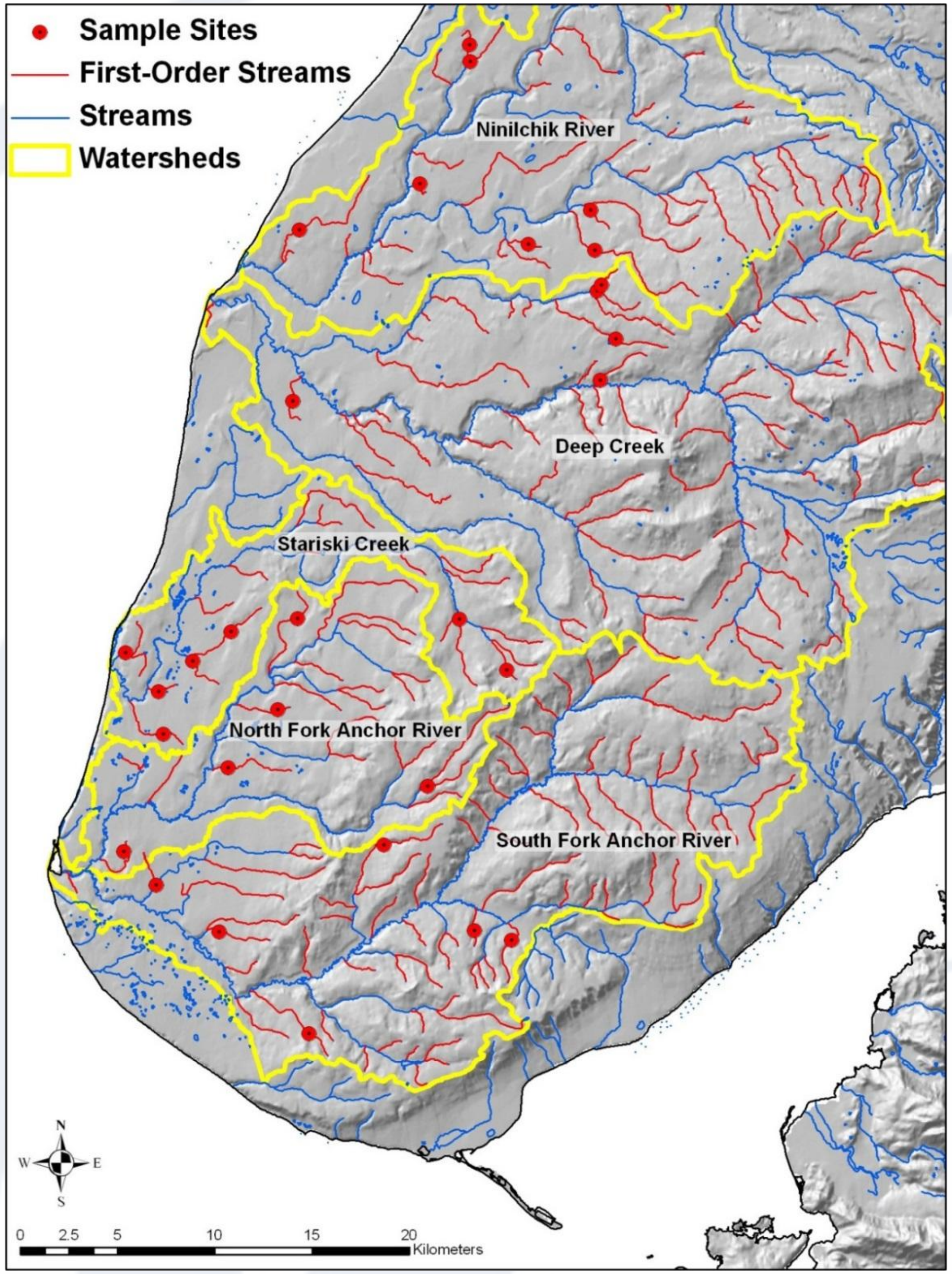

Kenai
Lowlands
Cook Inlet
Kenai Mountains
Alaska

Blue – Protected
Red – Not protected

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photarium
a product of Wild Fish Conservancy
for information: 425-788-1167

Alder, peatlands and groundwater drive stream productivity

Groundwater = stream temperature moderation

Polling time!

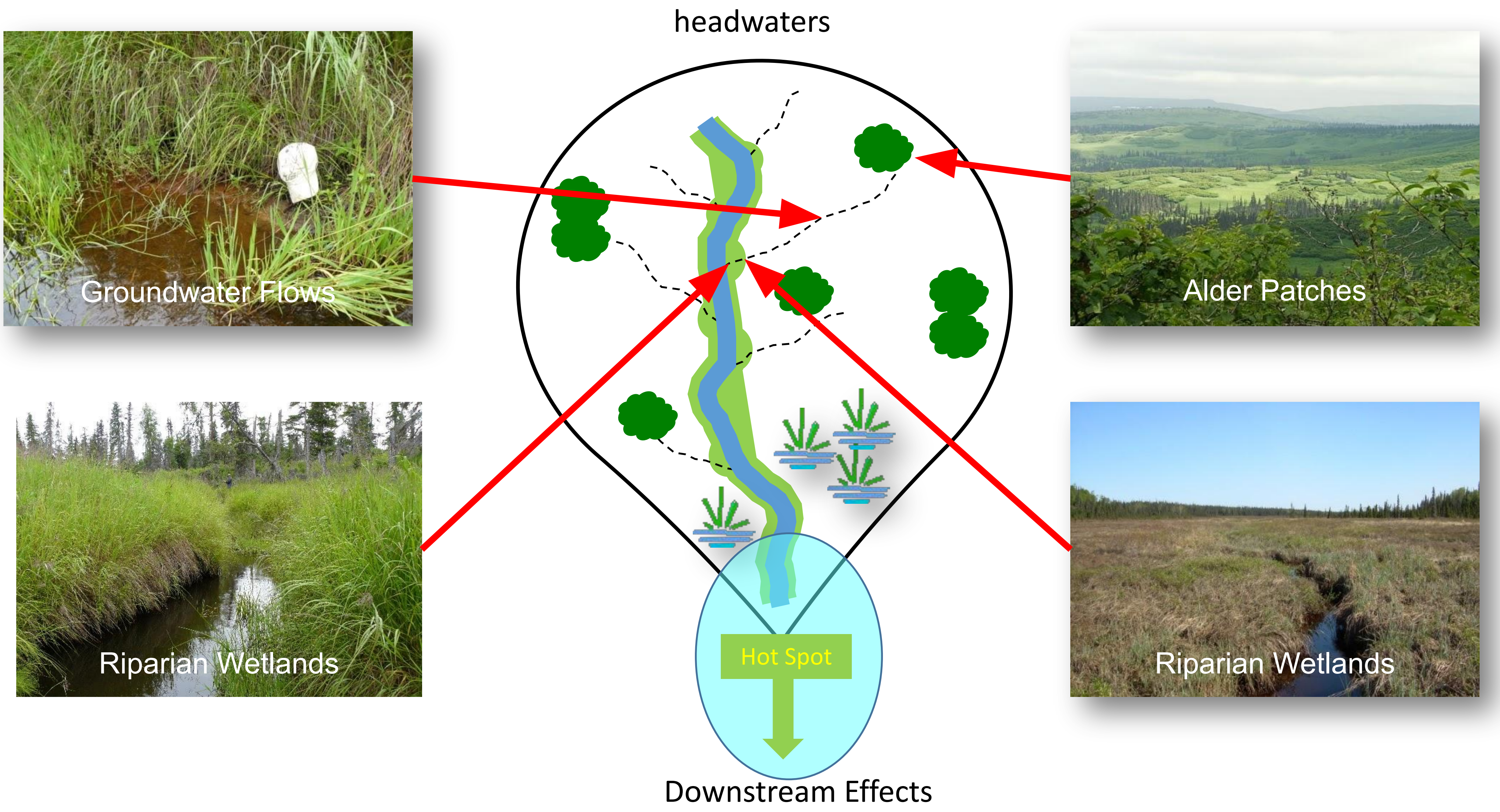
Groundwater for domestic and commercial use

Assessing Groundwater Vulnerability

Developing a model


TB

Landscape Support for Salmon



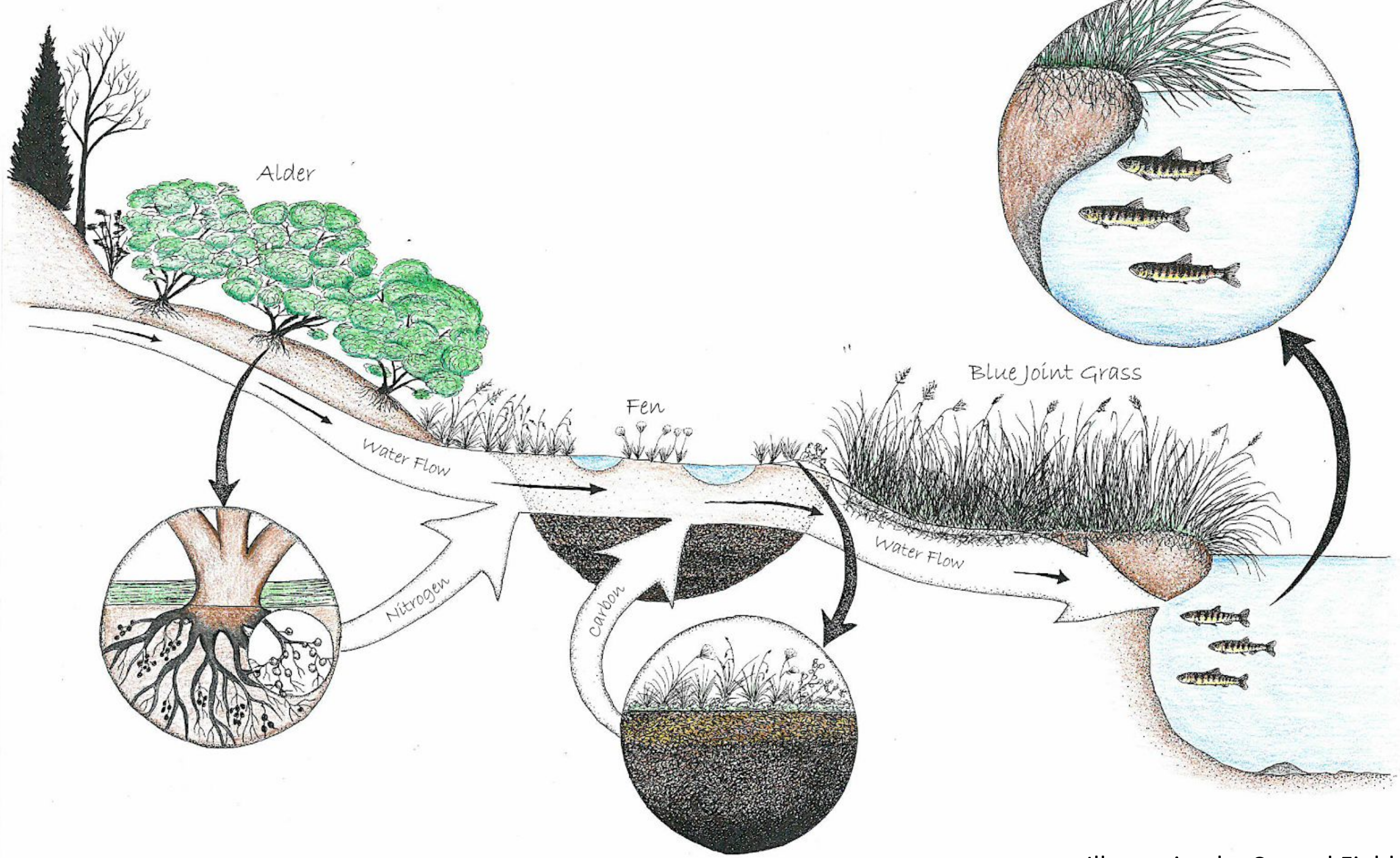
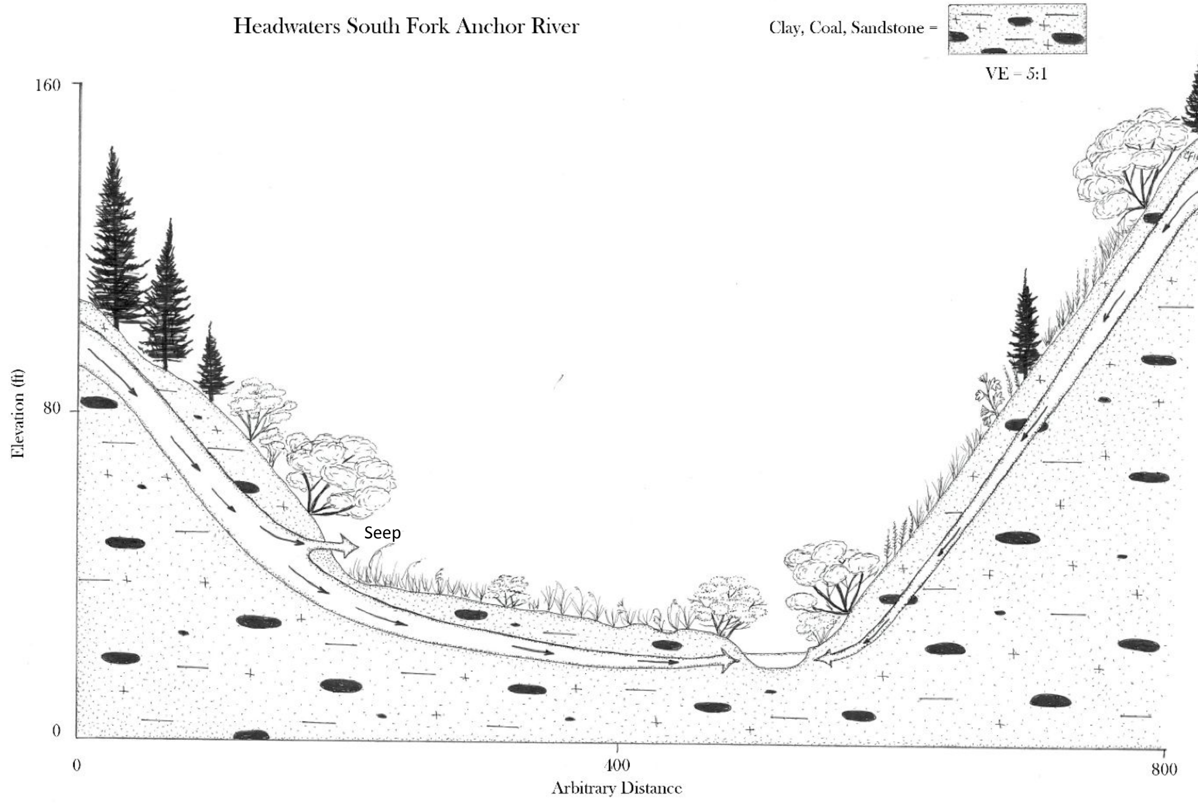
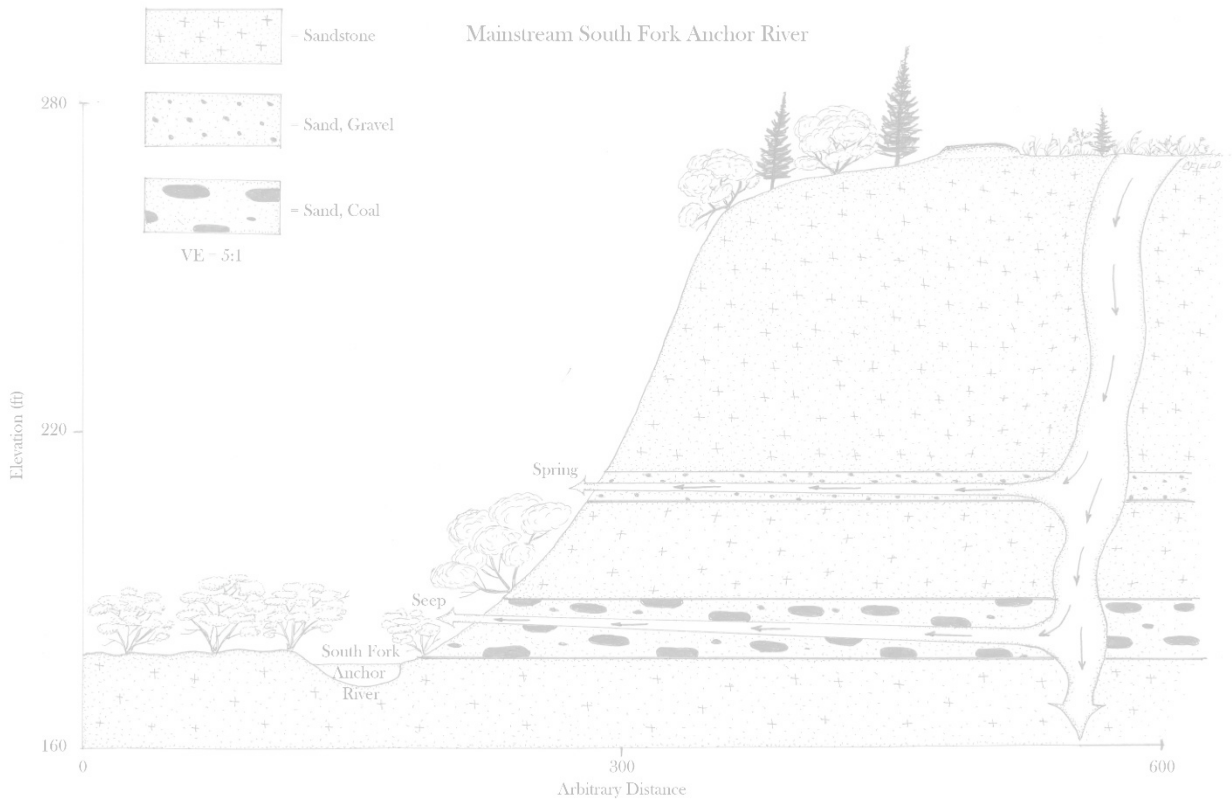


Illustration by Conrad Field, KBNERR

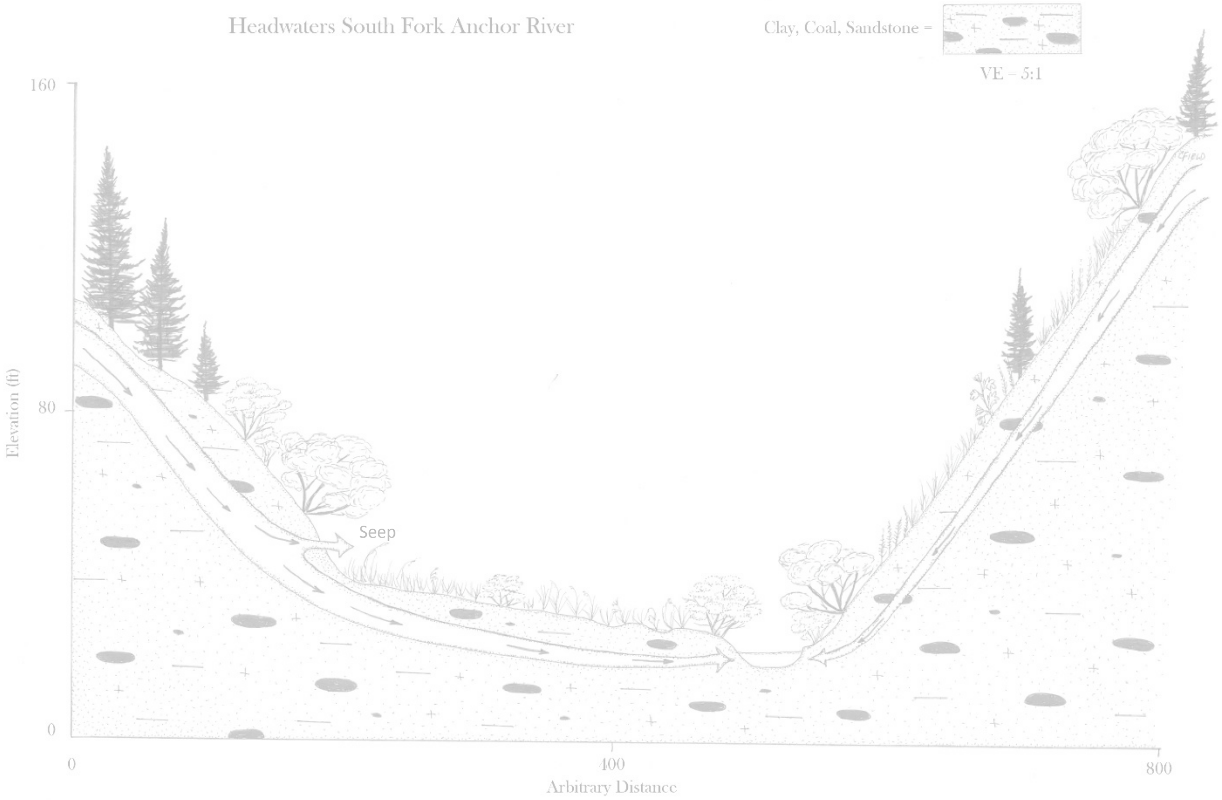




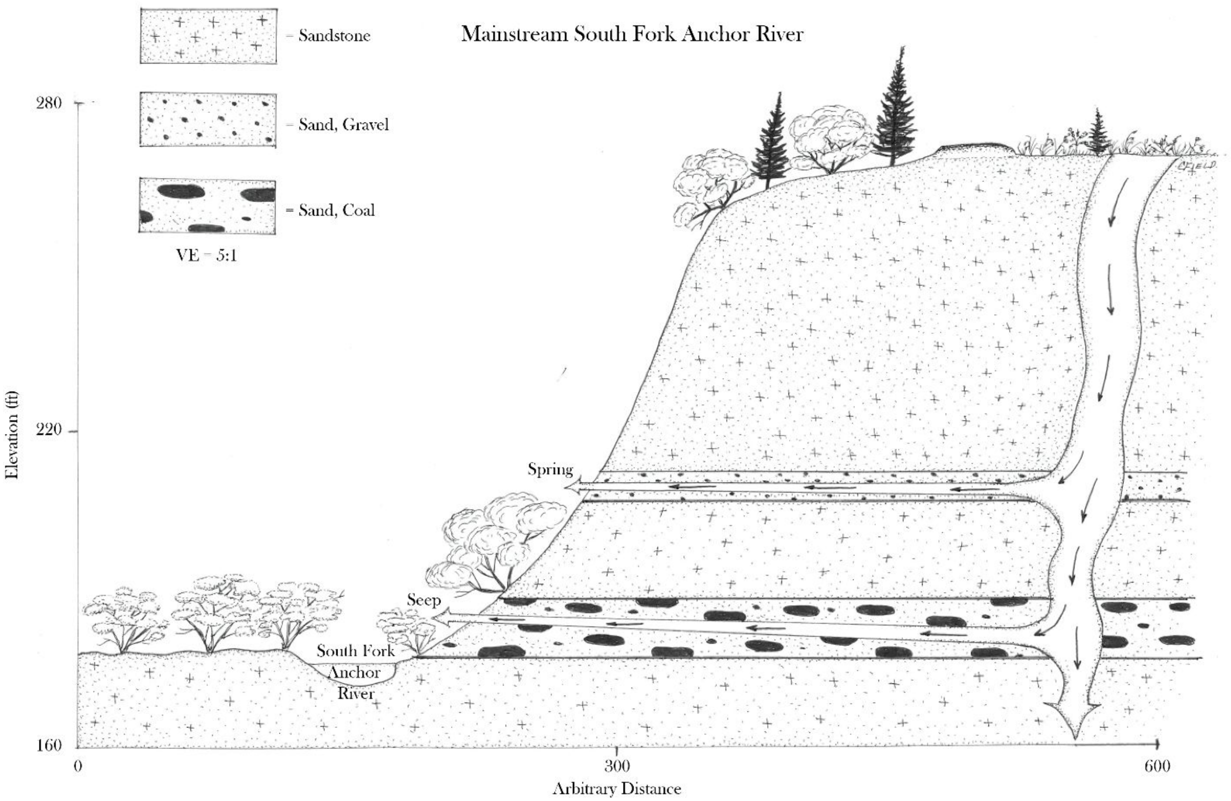
Recharge-Discharge—Hillslopes
Time Scale: Days-Years

Recharge-Discharge—Aquifers
Time Scale: Years-Millenia

Illustrations by Conrad Field, KBNERR

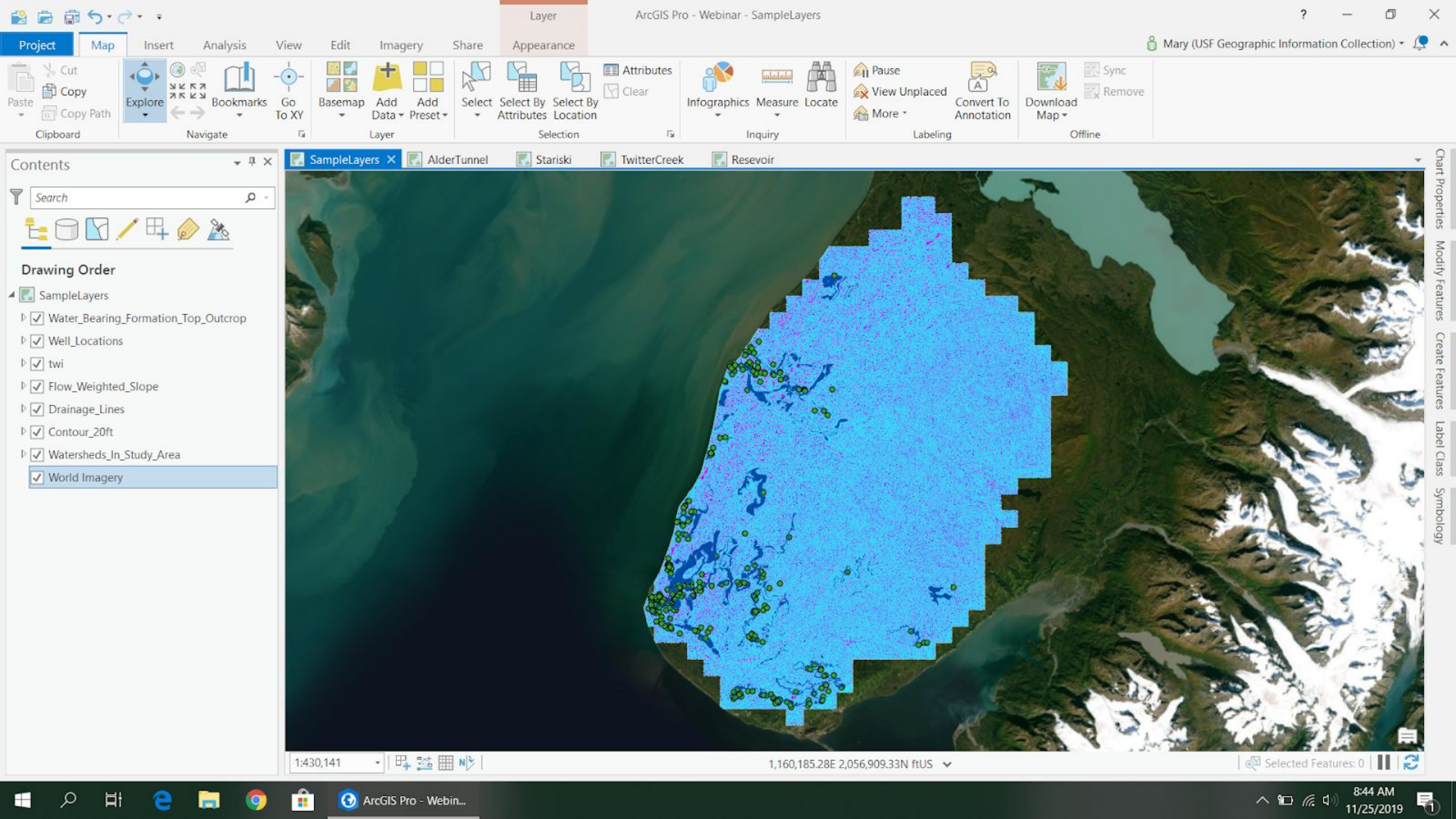


Recharge-Discharge—Hillslopes
Time Scale: Days-Years



Recharge-Discharge—Aquifers
Time Scale: Years-Millenia

Illustrations by Conrad Field, KBNERR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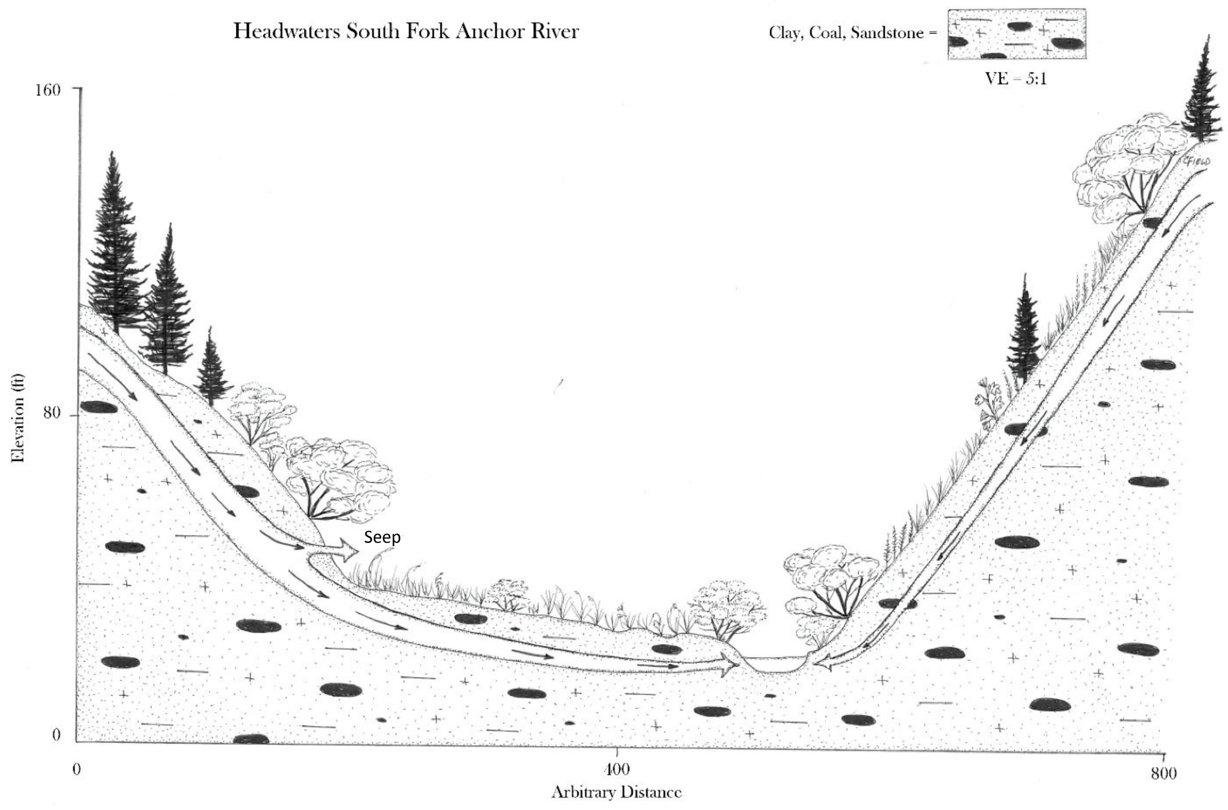
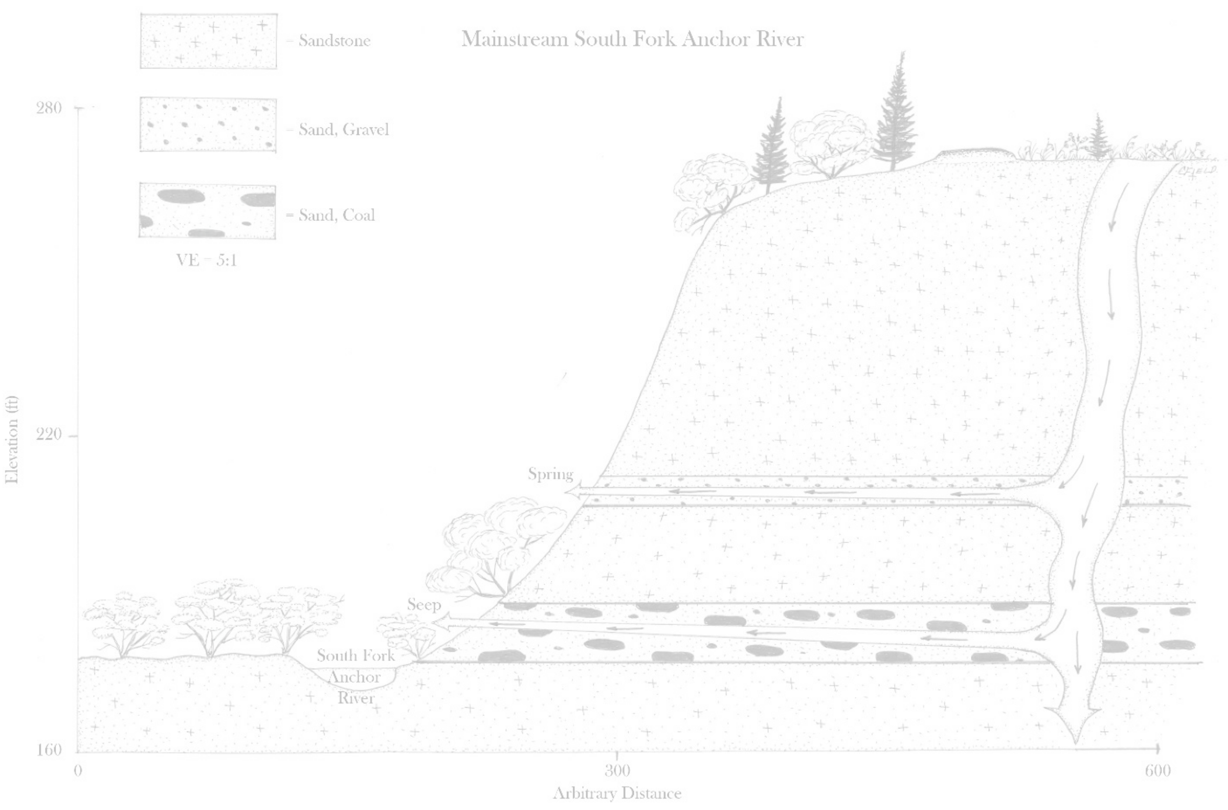
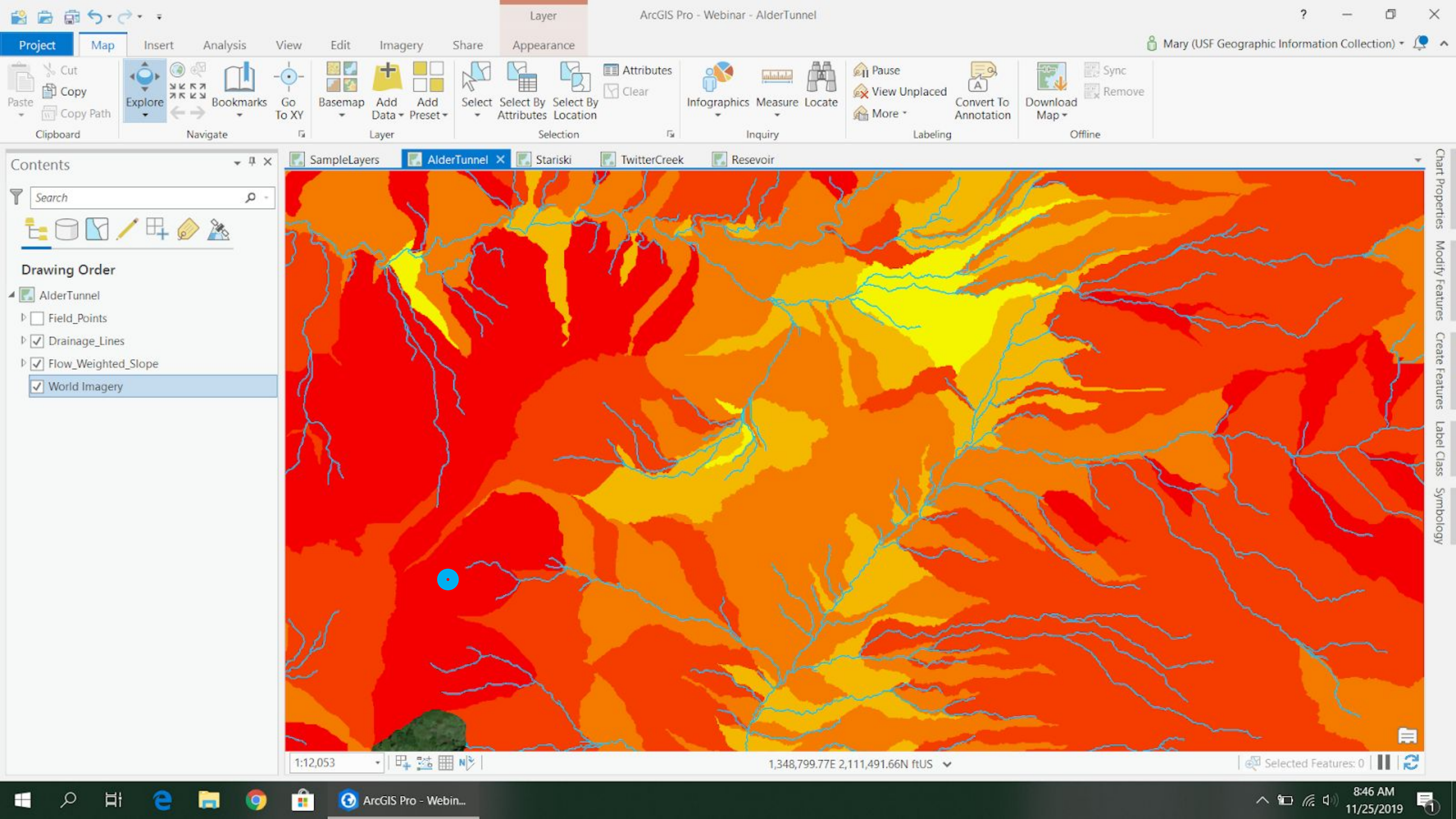




Recharge-Discharge—Hillslopes
Time Scale: Days-Years

Recharge-Discharge—Aquifers
Time Scale: Years-Millenia

Illustrations by Conrad Field, KBNERR



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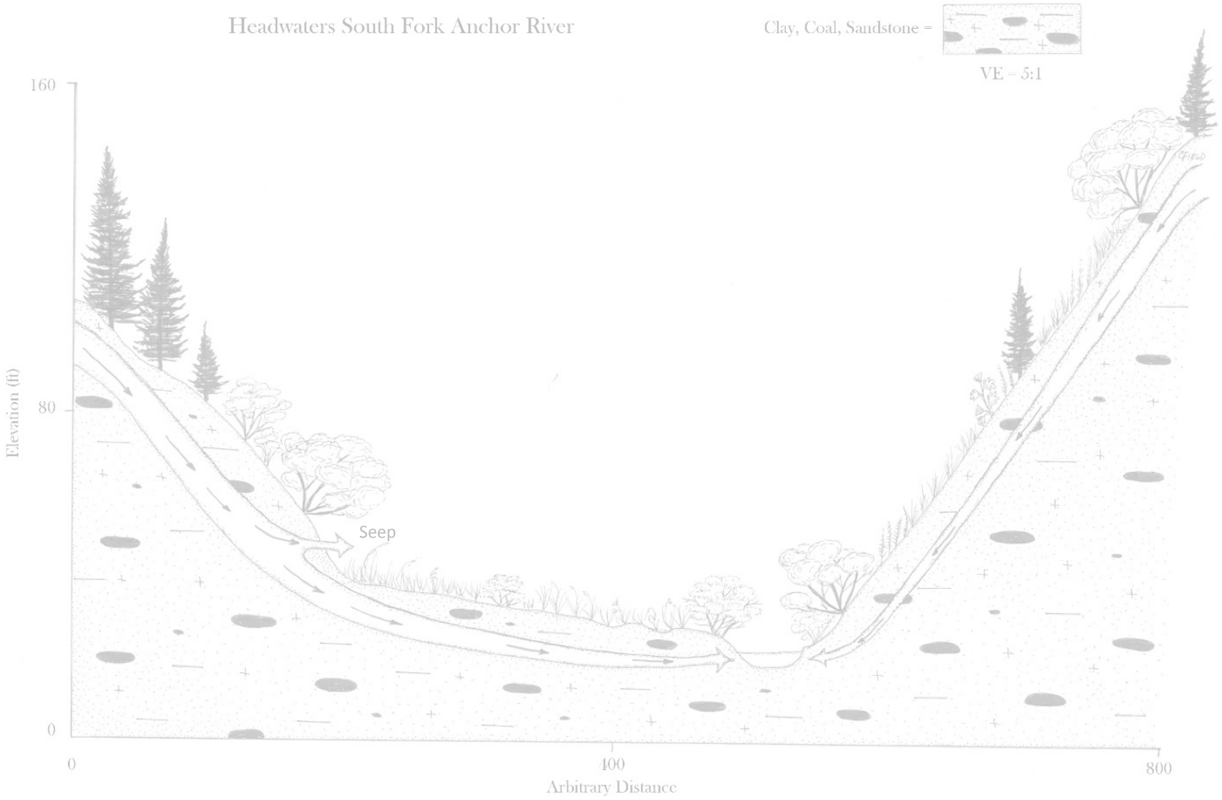

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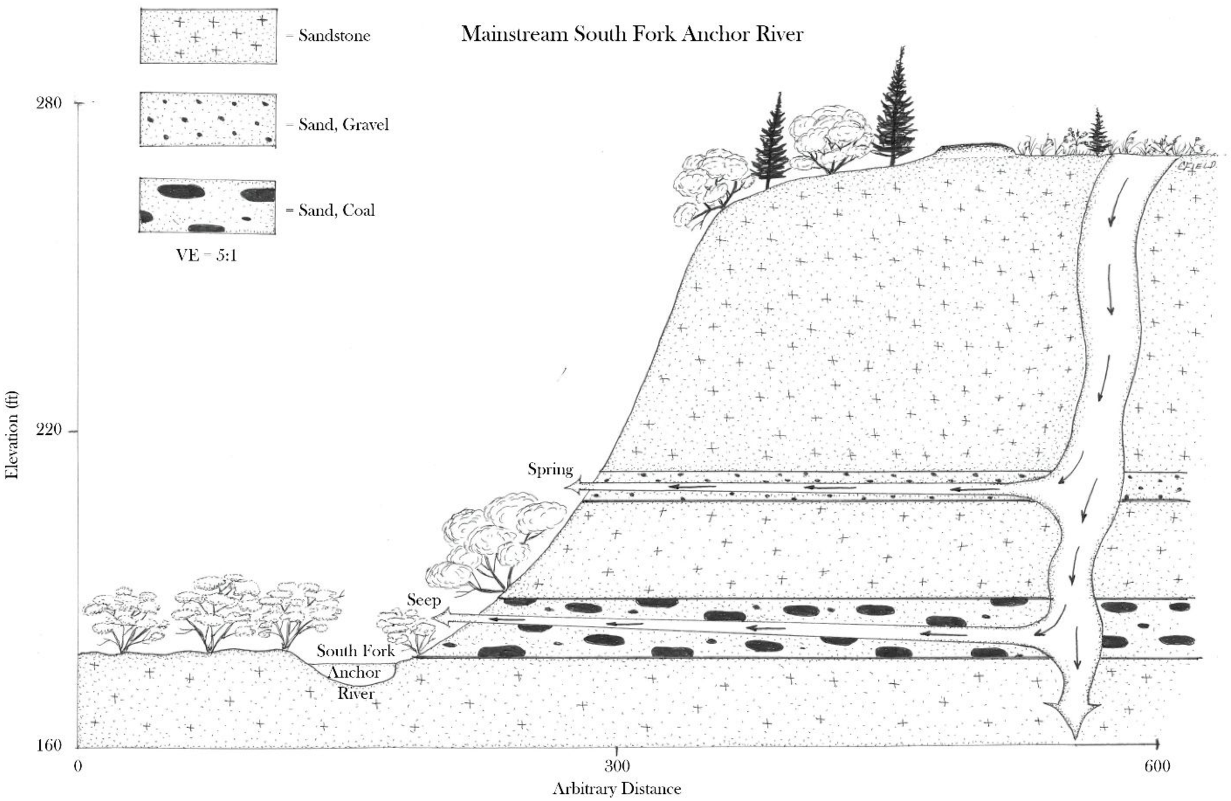
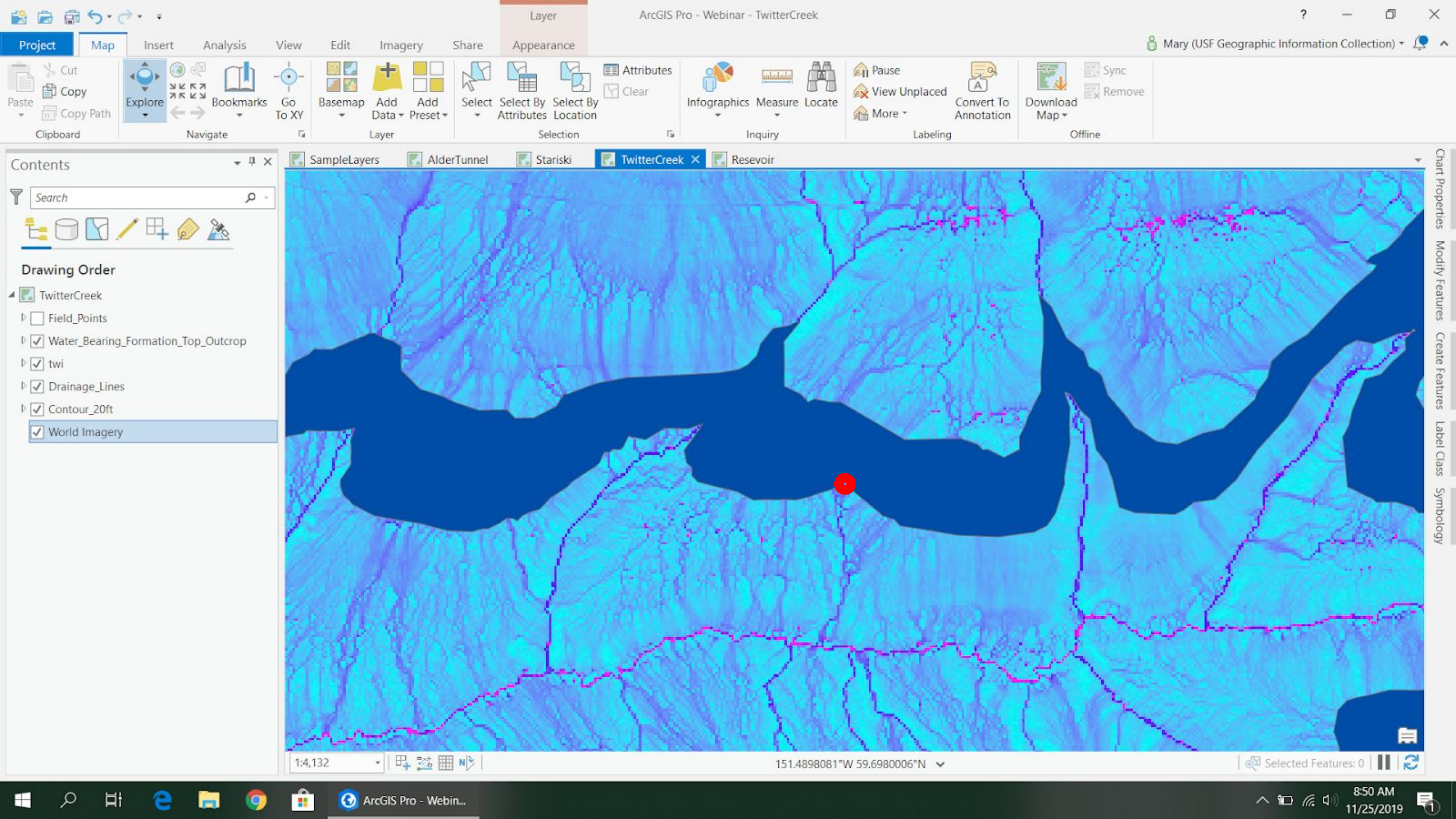
Time Scale: Days-Years



Recharge-Discharge—Aquifers
Time Scale: Years-Millenia

Illustrations by Conrad Field, KBNERR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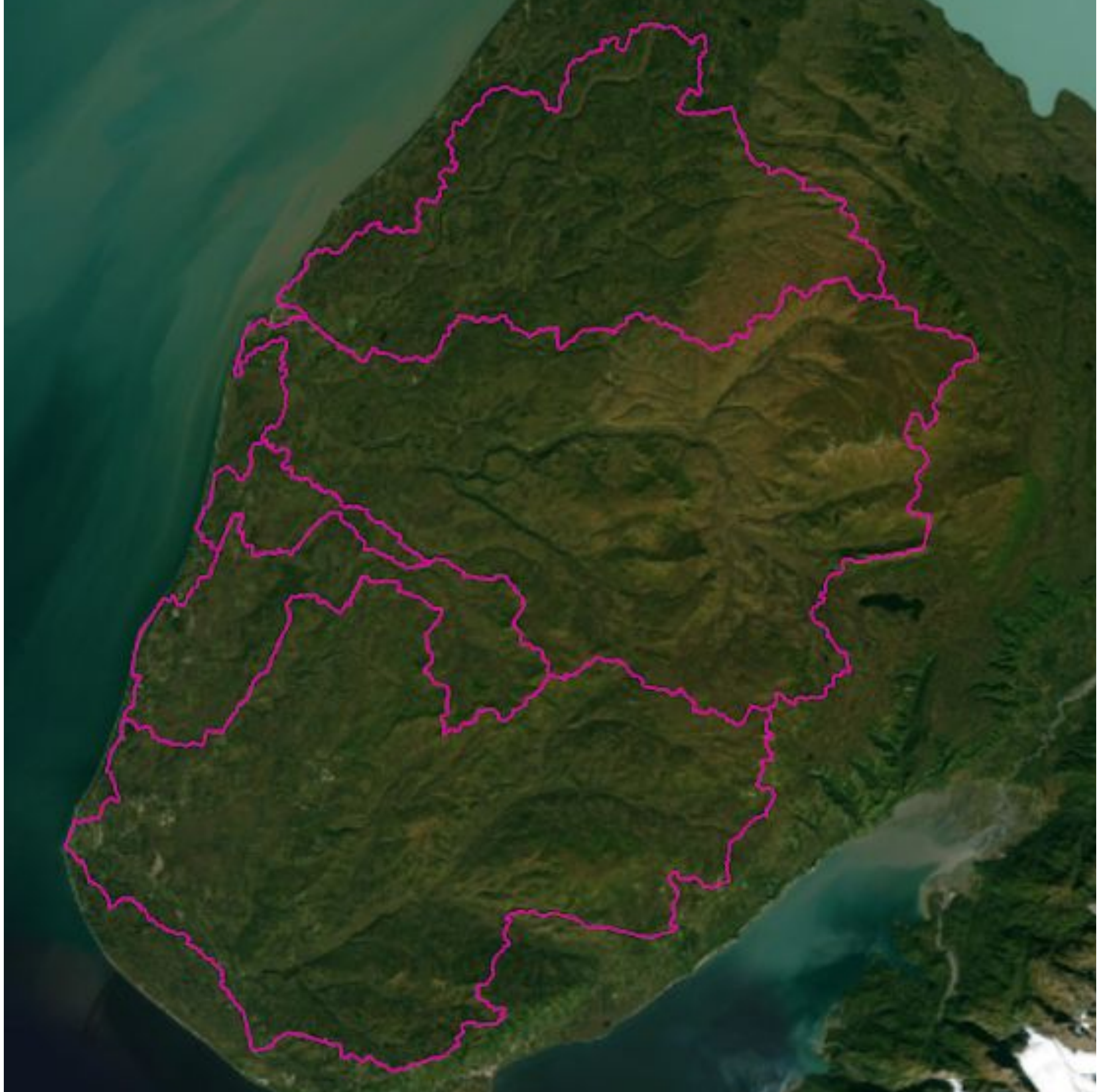
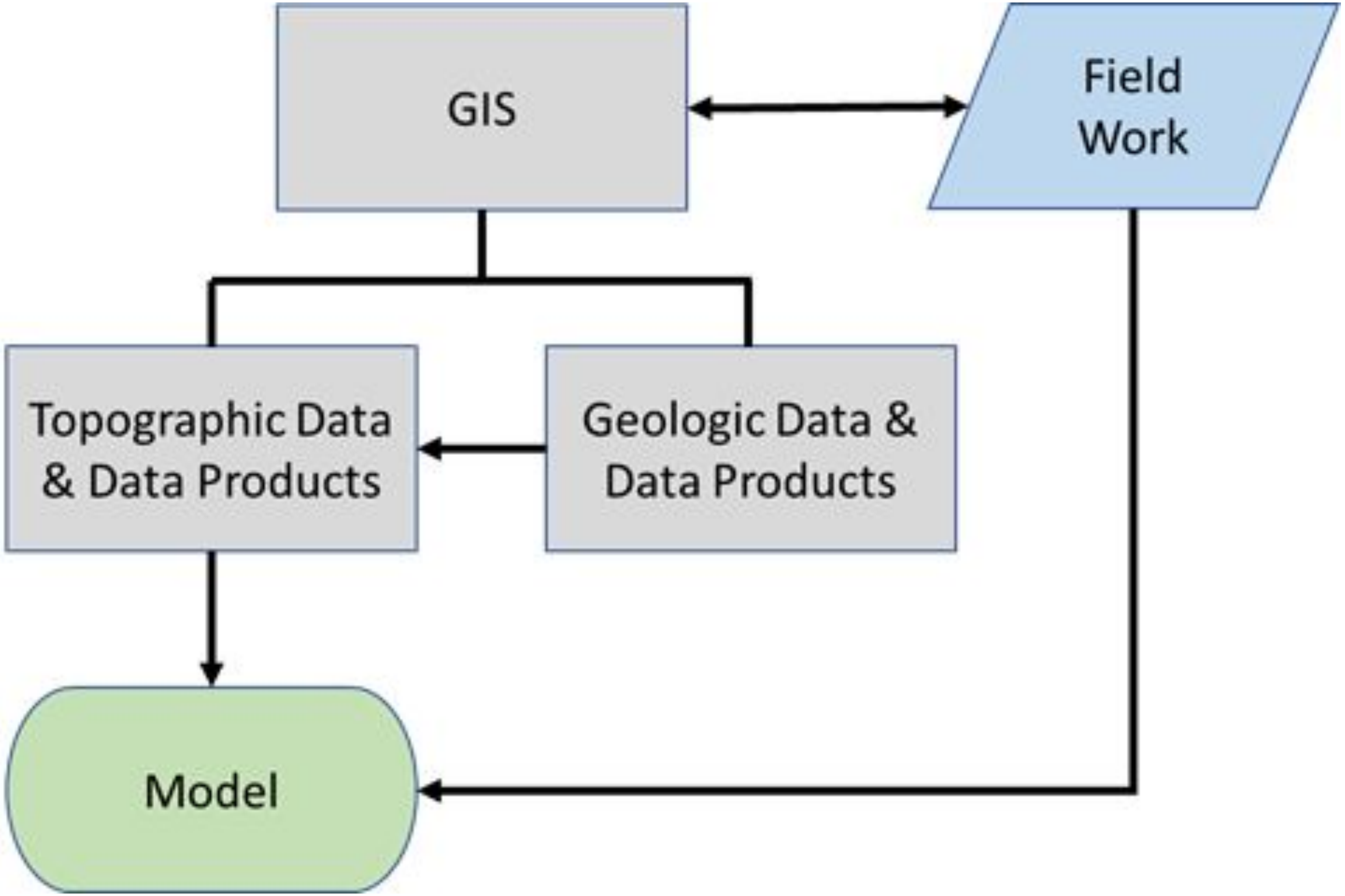
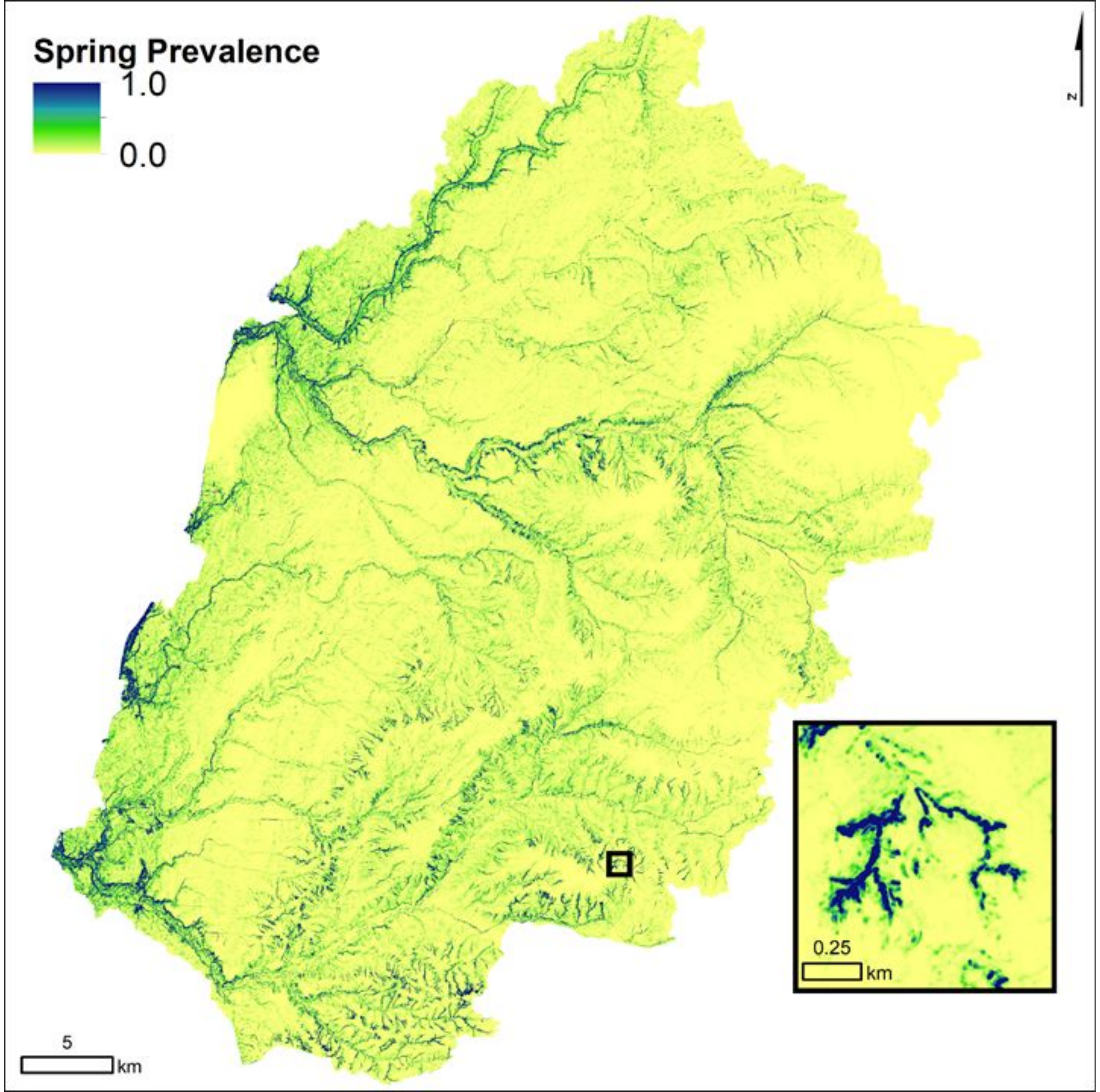



GIS
Field Work
Topographic Data & Data Products
Geologic Data & Data Products
Model



Spring Prevalence
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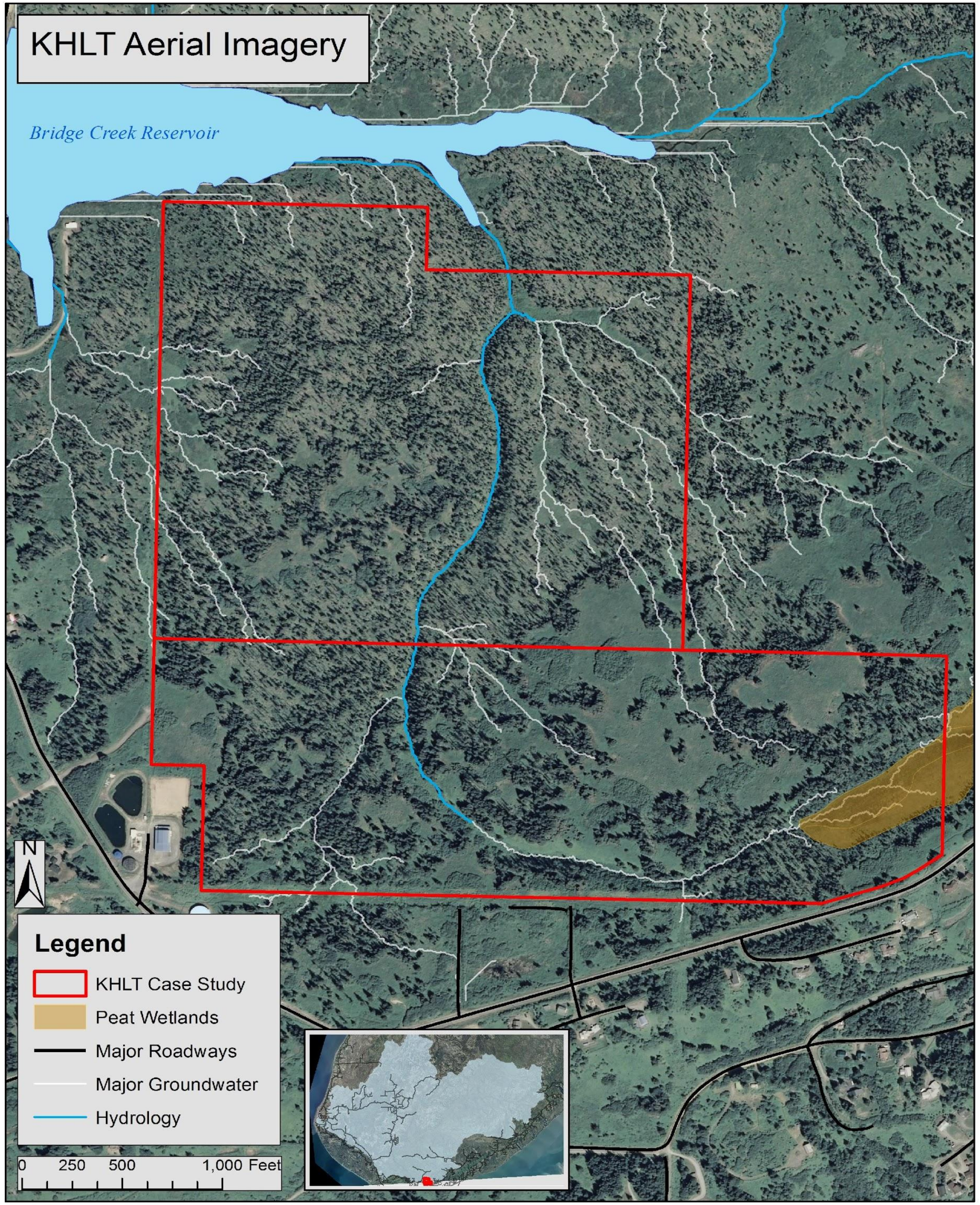
Engaging with End Users- groundwater support for public water supplies



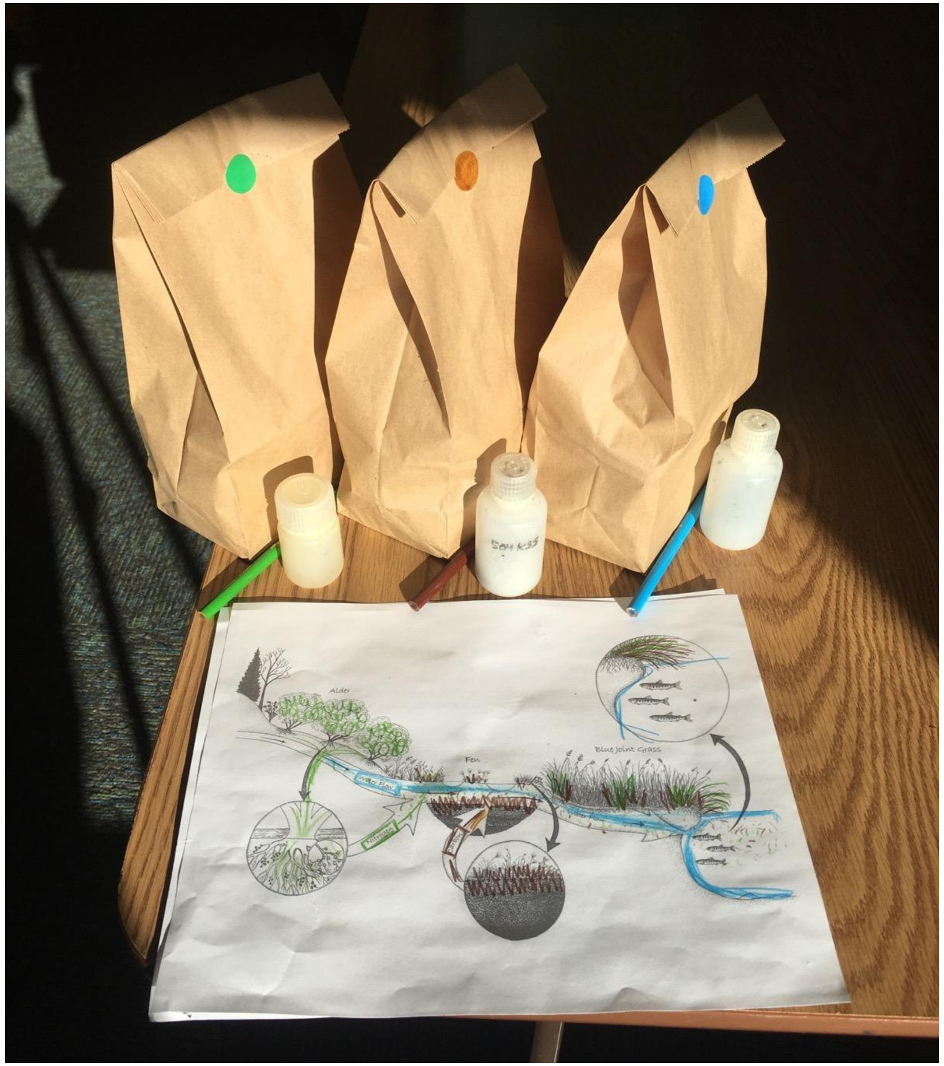
Engaging with End Users- Field trips

Engaging with End Users- Remote Alaska Native villages

Groundwater support for agriculture

Engaging with End Users- Middle School programs

Engaging with End Users: fishermen
Fish Need Land Too field trips



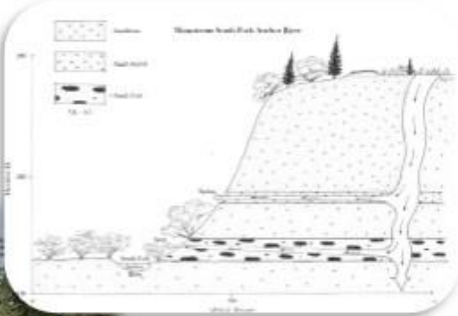
Covid field trips

Holistic Groundwater Management

Policies and practices that balance salmon and people needs

Inspired & meaningful communications with end users

Groundwater models and vulnerability assessments



- ***healthy salmon populations***
- ***cultural well-being***
- ***sustainable economics***
- ***Ecosystem services valued***
- ***Enhanced capacity for regional decision-making***

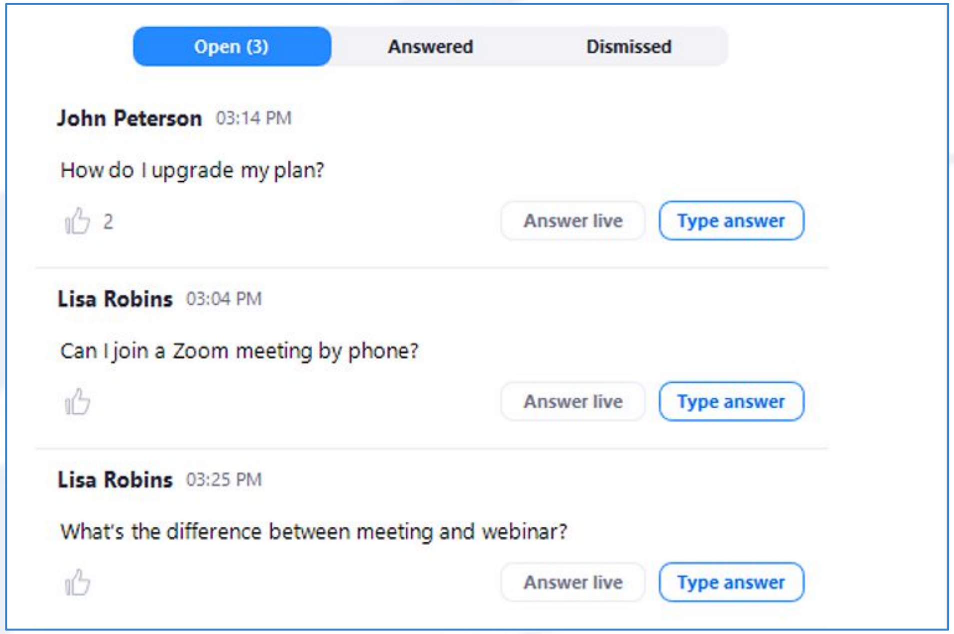
Project Outputs → **Longterm Outcomes**

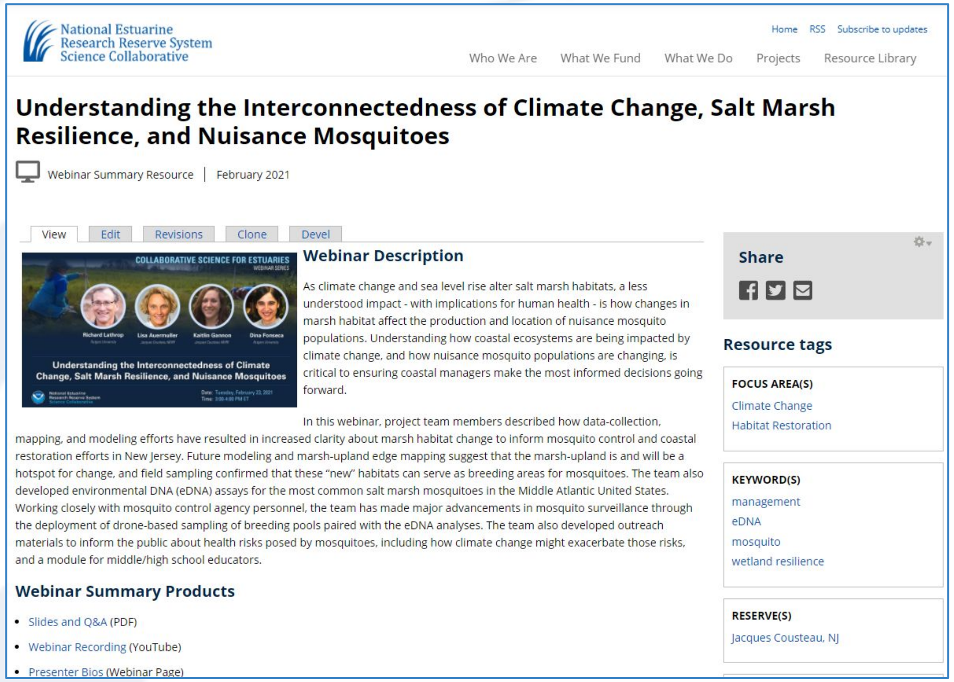
Q&A

Use the **Q&A** feature to pose questions to presenters.

Click the **thumbs-up** icon to upvote questions you like the most.

Unanswered questions will be added to the post-webinar summary.





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Q&A

Q: The seep predictions appeared to rely primarily on topography (with an unexplained connection to the geology) - given the importance of the buried, high permeability channels, what impact does the heterogeneity in permeability and (potentially unknown) spatial distribution of those channels affect the predictions of seep likelihood? Or is this all considered, and the buried channels are relatively well-mapped?

- **A:** The answer is somewhere in between; they're really well-mapped in some locations and unmapped in others, but we have indirect knowledge of where they are. We used the geologic information to find springs, then used that understanding to go back to the topographic data (the data we had everywhere) and we learned what we could see from the topography that would help us infer there was an aquifer outcrop. So we used that geologic information in some places to teach us how to see the geology from the topography in others, then we taught the computer how to use the topography itself.

Q: What was the biggest surprise for you in this work?

- **Coowe**: The biggest surprise for me was that we, as residents, are potentially competing for groundwater with salmon. This is potentially concerning because we have a lot of people moving into the region but little to no management around development.
- **Mark**: What was most surprising for me was how knowledgeable people already were about their groundwater, and how receptive they were to talking about it. Some of the homeowners are so connected to their landscape that they could tell you exactly where they drilled wells, how deep they drilled, and where seeps and springs were.

Q: Let's do an ologies question. What is the worst part of the job and what is the best part of the job?

- **Coowe**: Worst part: being in the office; best part: being outside and working with people.
- **Mark**: Worst part: COVID protocols preventing us from finishing work; best part: restrictions are lifting and we can finally finish it!

Q: As far as next steps, what are you most excited about?

- **Mark**: We have a Margaret A. Davidson fellow working on the vulnerability aspect of this groundwater work. We're interested in developing a more nuanced understanding of where the key pressure points exist between human and natural users of groundwater.
- **Coowe**: We're kicking up the engagement side of things. People are excited about the capabilities and limits of this database we're building, and we're also interested in figuring out how to equitably act as stewards of the landscape. In this low-regulatory environment, building this understanding of shared connectivity is a vital concern.

Q: What tips might you offer to another region or group that's just getting started understanding their groundwater resources?

- **Coowe**: The starting point for us is understanding who's using the groundwater (i.e. your end user landscape). Getting these end users involved from the beginning is a great way to make sure collaboration is built into the process from the start, and develop these trusted, lasting relationships. And find a groundwater expert, like Mark.
- **Mark**: I would say the first step, from a scientific perspective, is to scour every bit of existing data. Groundwater requires a lot of data, money, and time to study, and it can be very hard to see it.

Additional resources from the presenters