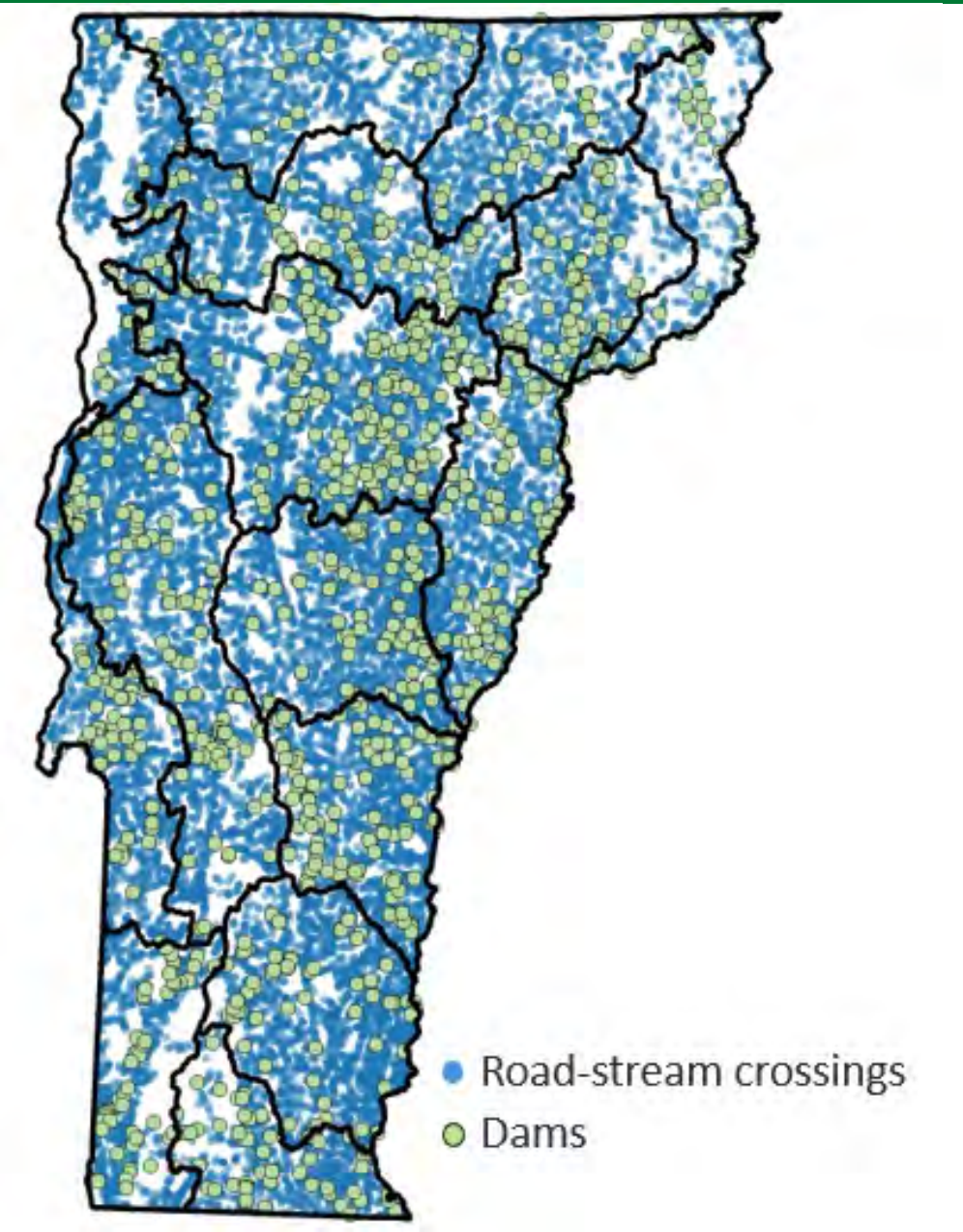
Project Management: How to Identify Strong Barrier Removal Projects

Reconnecting Waterways Workshop | December 5th 2024 | South Burlington, VT

Mary Russ, White River Partnership; David Minkoff, US Fish and Wildlife Service; Keith Fritschie, VT DEC

Session Outline

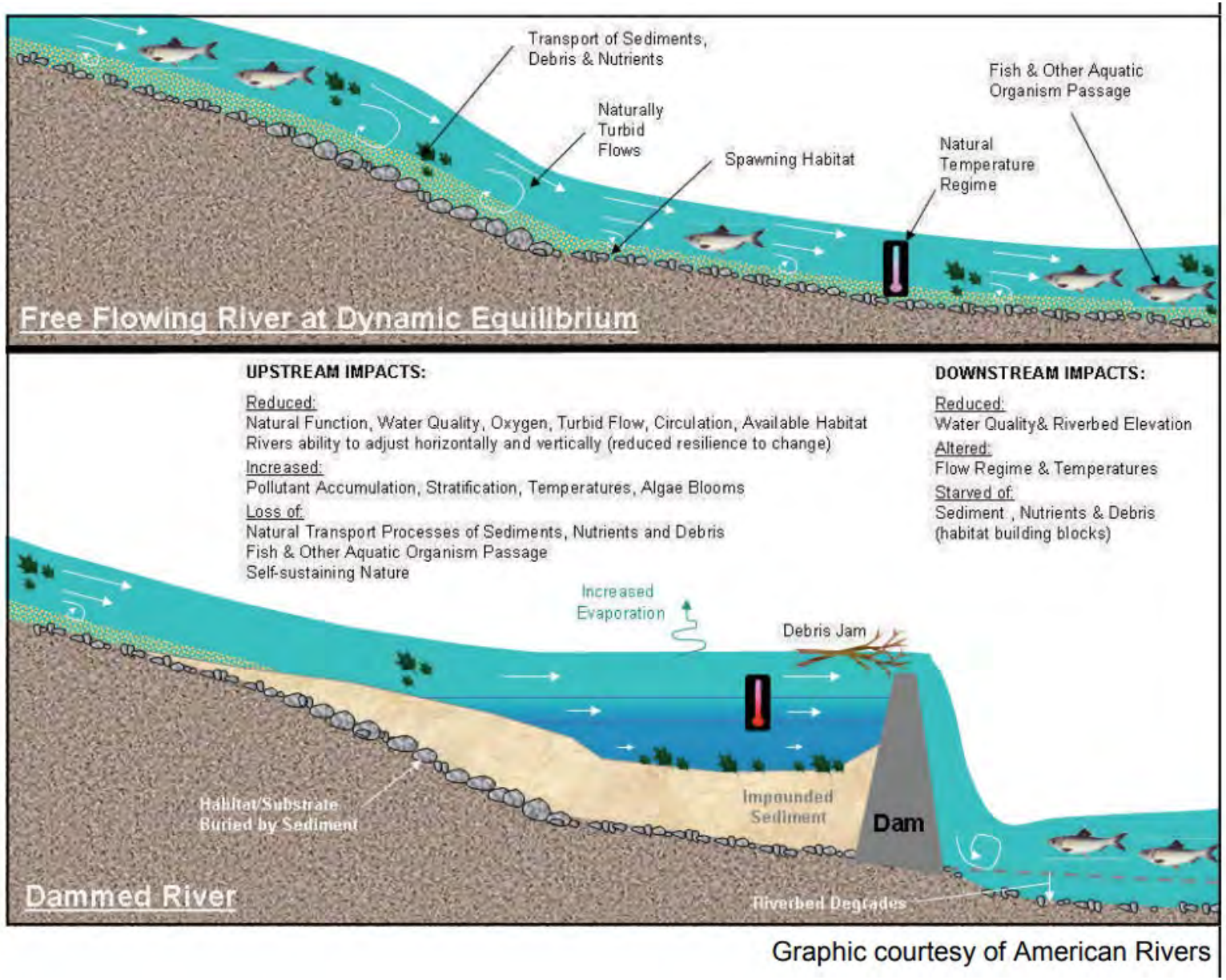
1. Conceptual framework for project selection
2. On-the-ground examples of the selection process
3. Questions/discussion



Why prioritize?

- **Identify and develop projects**
- Engage partners early for future coordination success
- Quickly assess the benefit of emerging barrier removal opportunities in relation to your org's goals
- Develop competitive funding proposals

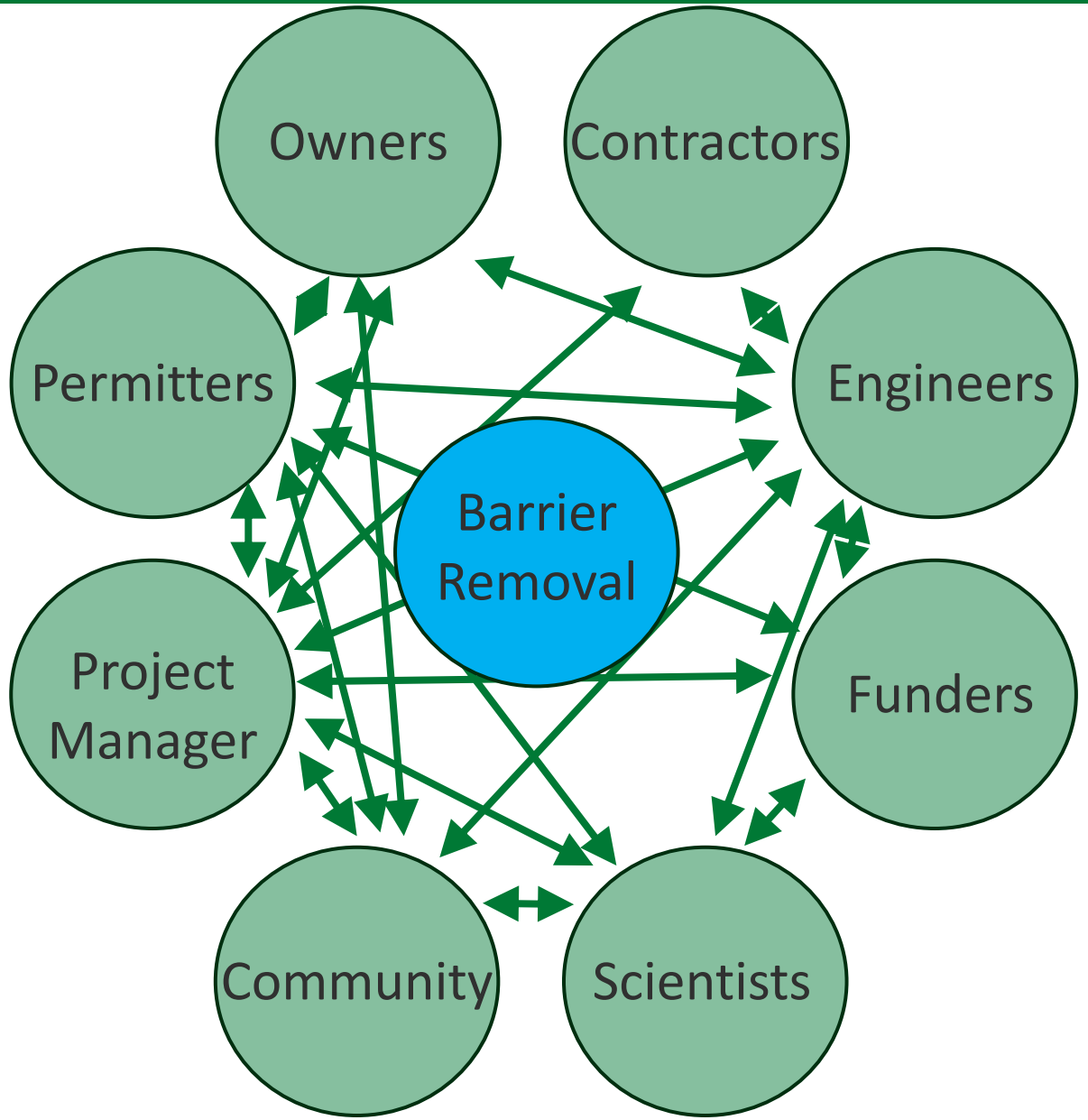
Environmental impacts shape restoration goals

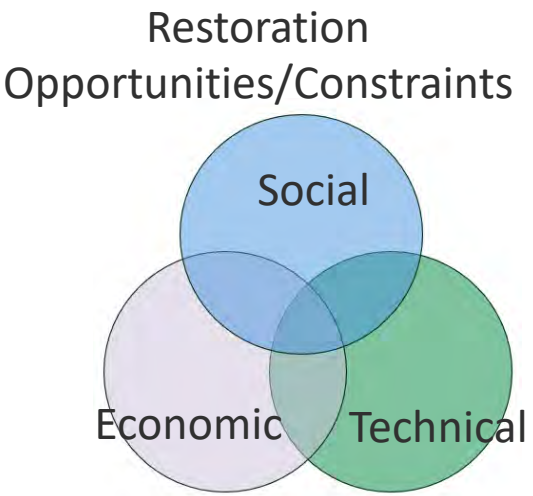


Graphic courtesy of American Rivers

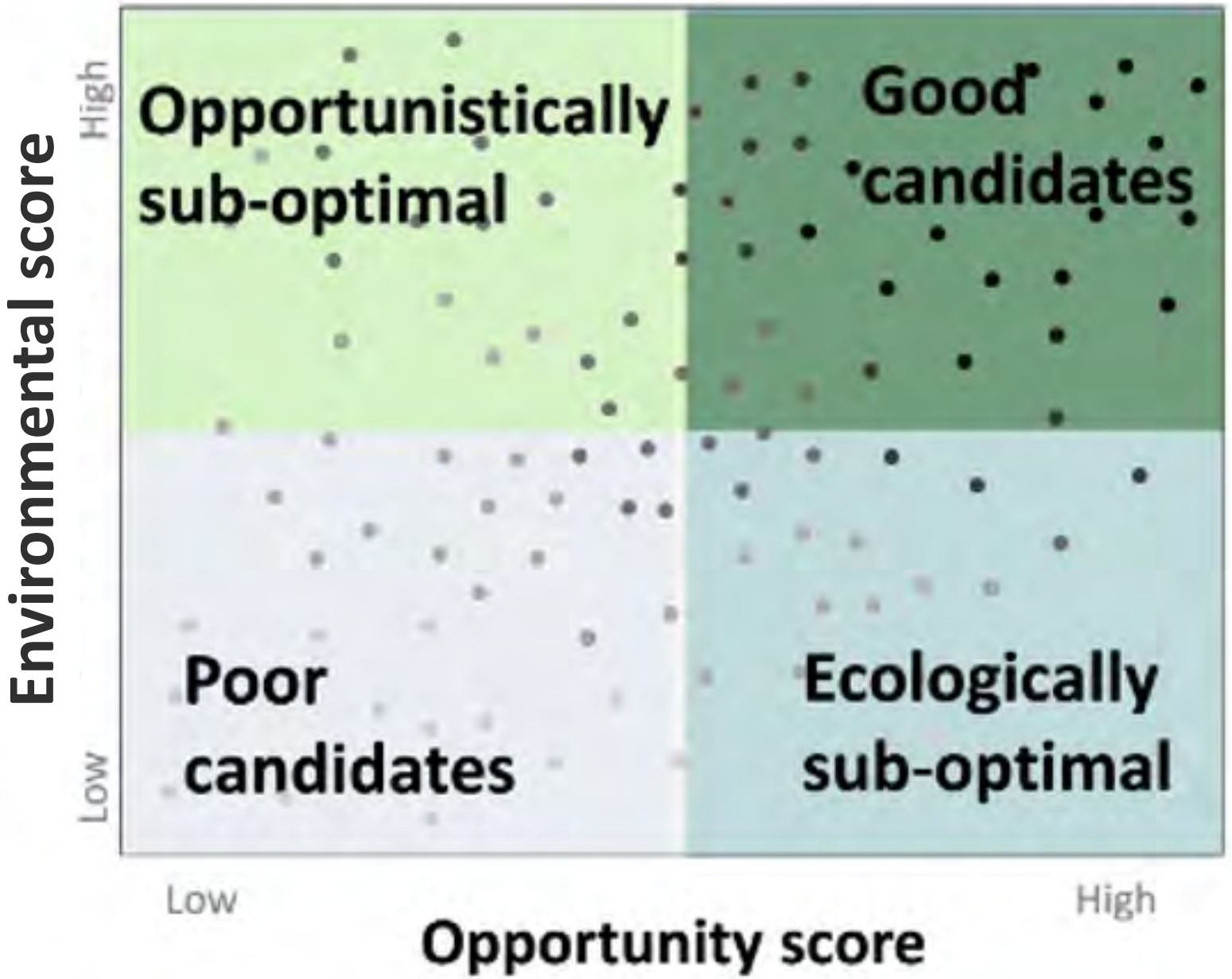
Restoration Goals

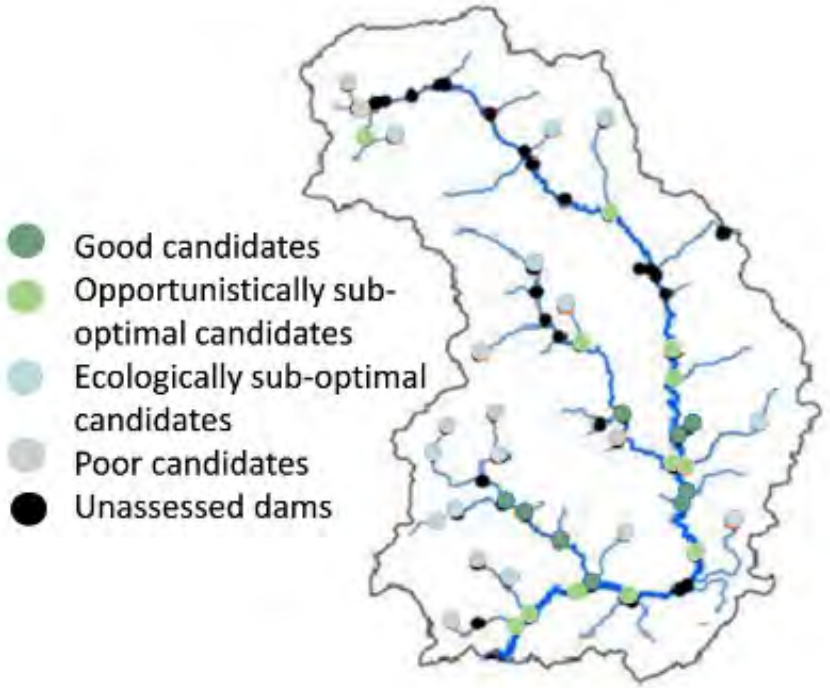
Complexity shapes opportunities/constraints





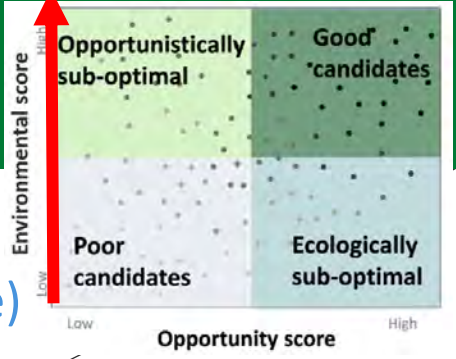
A framework for balancing benefits and opportunities





Jumani et al. 2023, *Environmental Challenges*

Potential Environmental Benefit Factors



Habitat Goal

Access to critical adjacent habitats

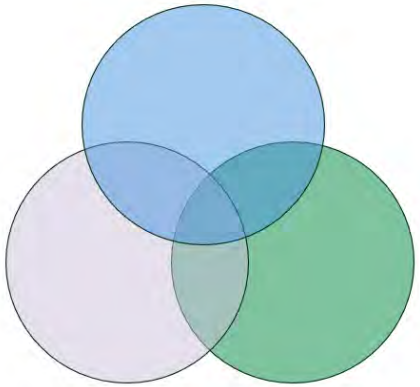
Local water quality impacts

Species of concern (threatened or invasive)

Upstream climate resilience

Mileage restored

Barrier Passability



Geomorphology/sediment transport

Microbial communities (e. coli, cyanobacteria)

Nutrients

Temperature

Dissolved Oxygen

Water Quality Goal

Catastrophic flooding below failed structures

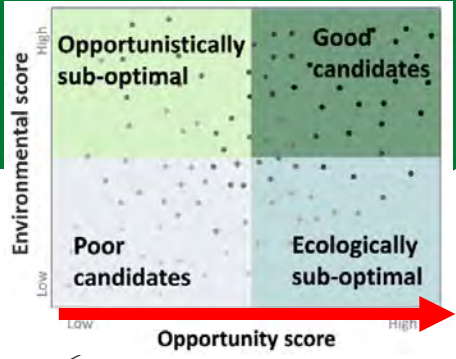
Backwatering/inundation flooding above dam

Natural flow regime vs. flow regulation

Downstream incision and loss of floodplain access

Flood Resilience Goal

Potential Opportunity Factors



Social

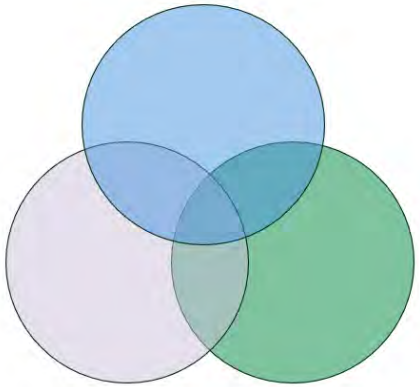
Community connection

Previous community experience with barrier removal

Local vs. outsider decision-making

Recreational/aesthetic value

Historic preservation



Economic

Ownership

Maintenance schedules/costs

Removal costs

Current function/purpose and design life

Property values

Technical

Sediment contamination

Structure condition

Safety hazard class

Transportation network criticality

Dam size

License renewal

Adjacent infrastructure

Example VT Datasets or Prioritization Tools

Environmental Goals/Factors

Opportunity Goals/Factors

Habitat | Water Quality | Flood Resilience | Technical | Economic | Social

Northeast Barrier Removal Tool

VT Functioning Floodplain Initiative

VTrans TRP Tool

LCBP Comms with Disadvantages

Local Hazard Mitigation Plans

Dam Removal Cost Calculator

TNC Dam Screening Tool

Temp/DO

VT Culverts

Community support

Nutrients

CT MEF Report

VT Dam Inventory

Culvert rplcmnt costs

Owner support

VT AOP and Geomorph Screening Tools

VNRC Dam Mapper

Maintenance Costs

Historic status

USGS ICE

Functional life

TU BKT Cons. Portfolio

Property value Δ

TBPs (HQ or Impaired Waters)

Sediment mgmt needs

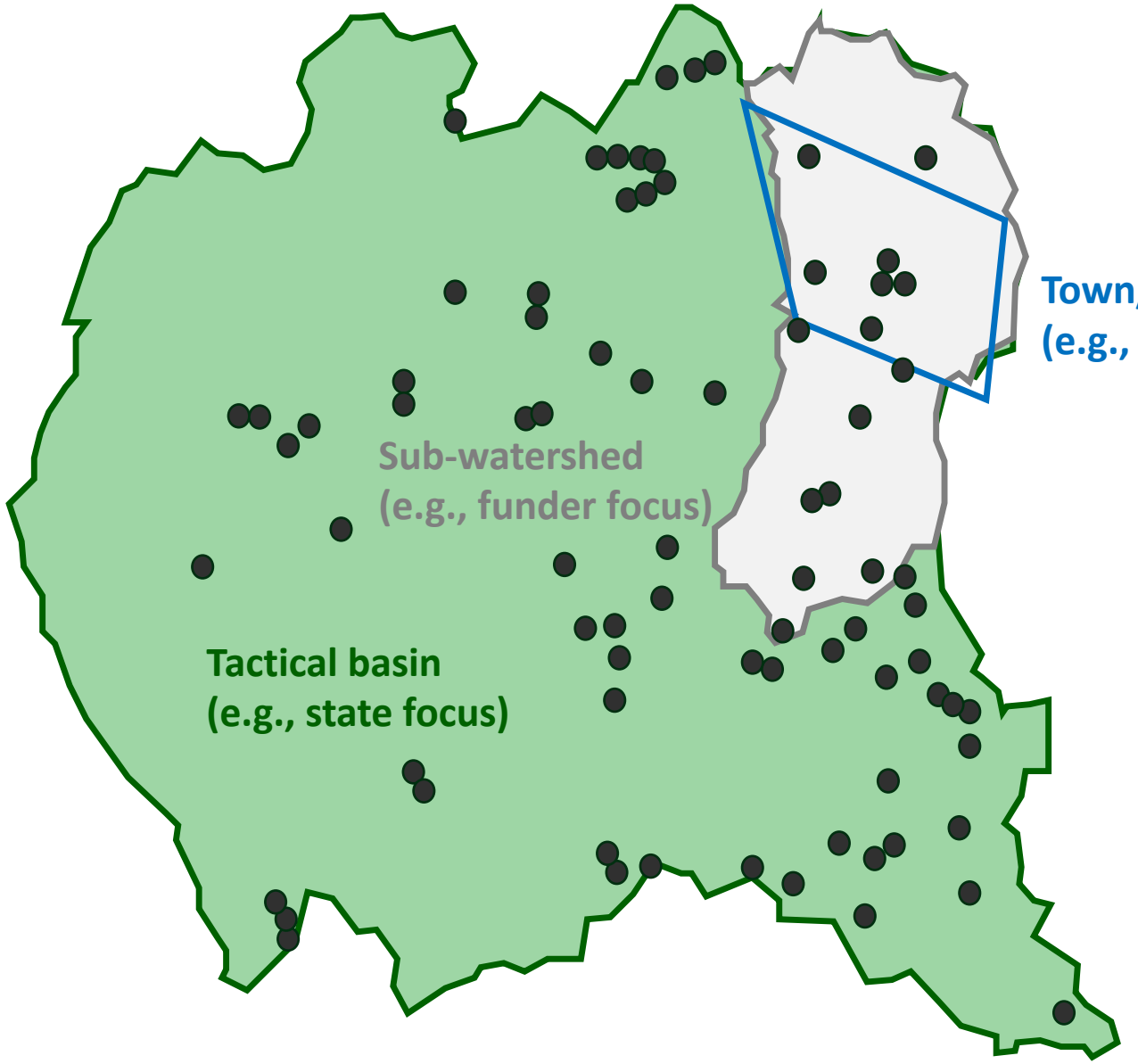
USGS Temperature

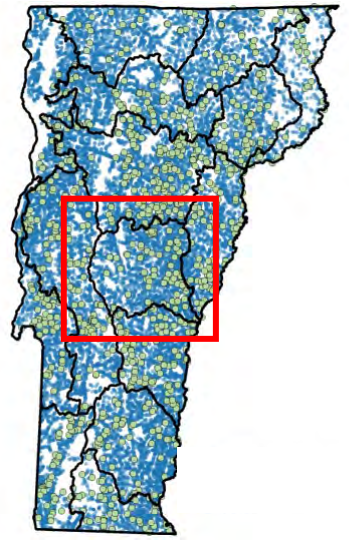
Explicit Barrier Prioritization Tool/Report

Raw Data/Some Factor Rankings Available

Data Gaps – or places for project development

Prioritization at what scale?





White River watershed examples

WHITE RIVER PARTNERSHIP

Mary Russ, Executive Director
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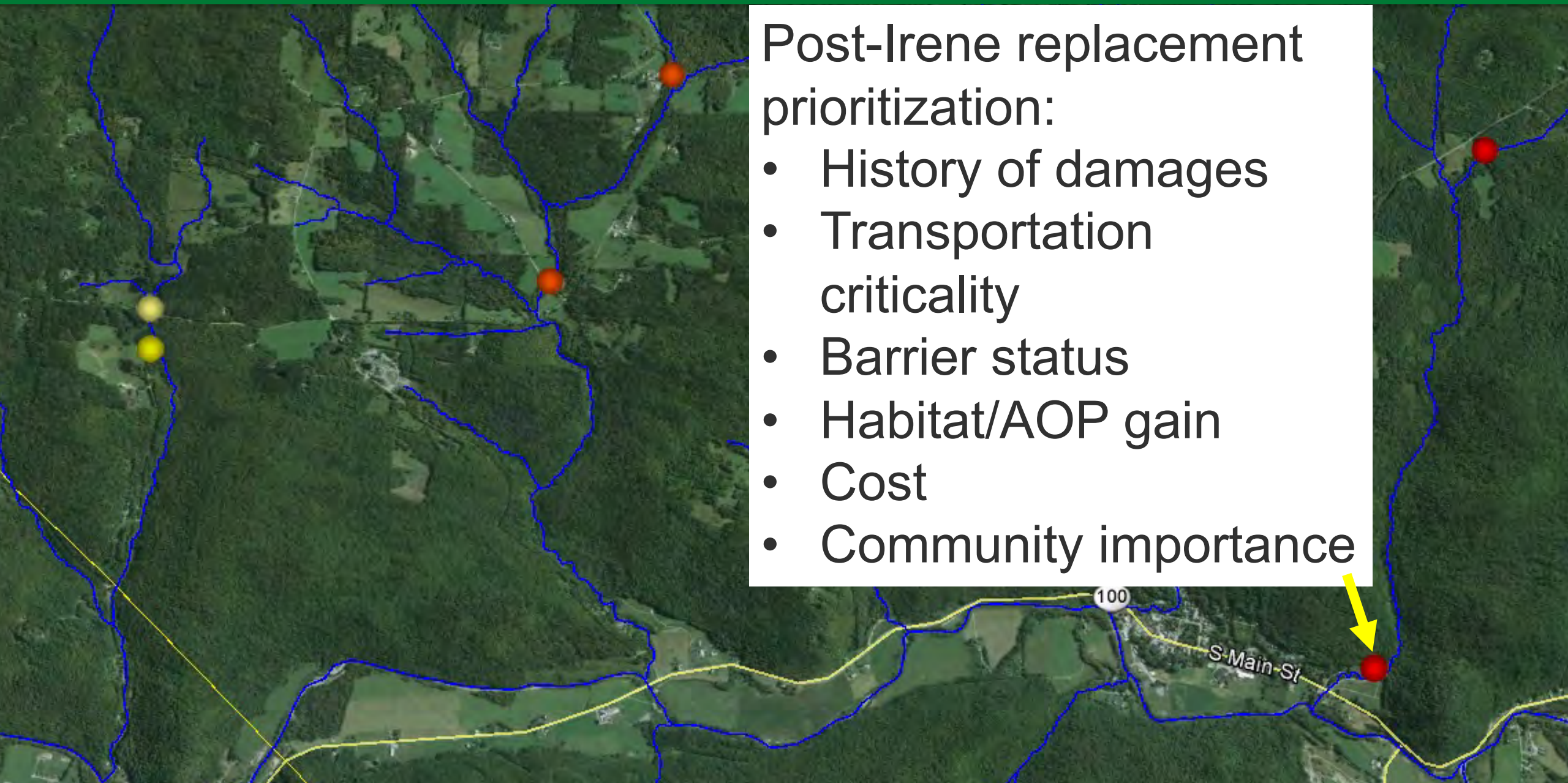
mary@whiteriverpartnership.org

Overview

- Post-Irene culvert replacement prioritization
- Upper White culvert prioritization
- First/Second/Third Branches dam removal prioritization

Post-Irene culvert replacements in Rochester

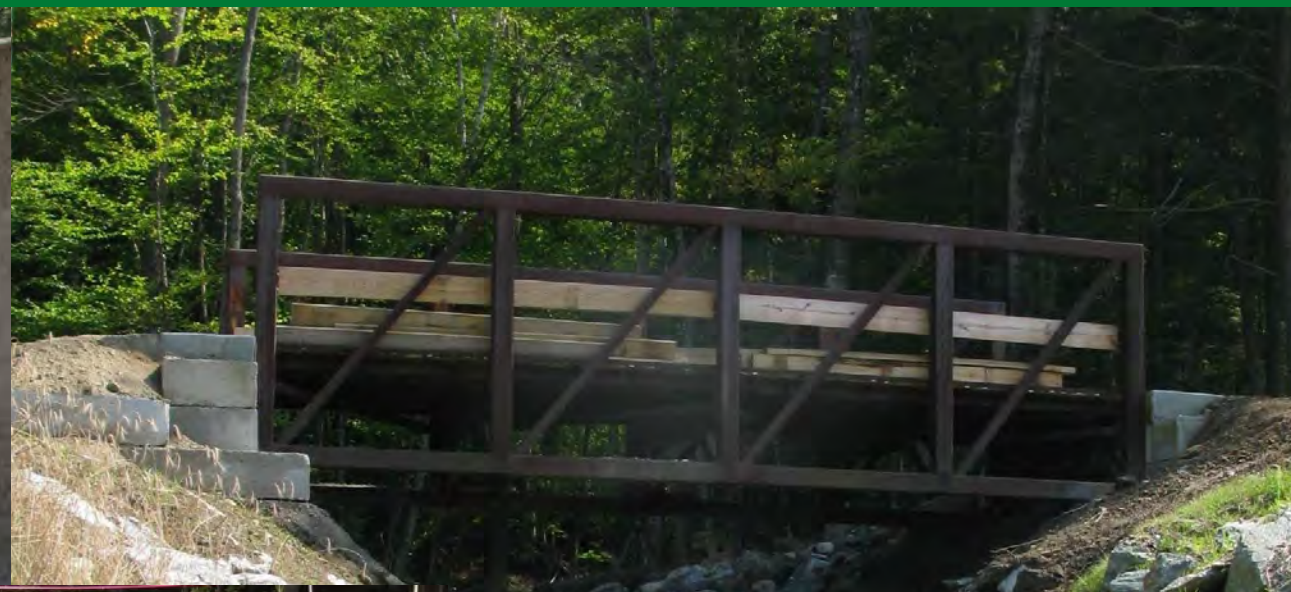


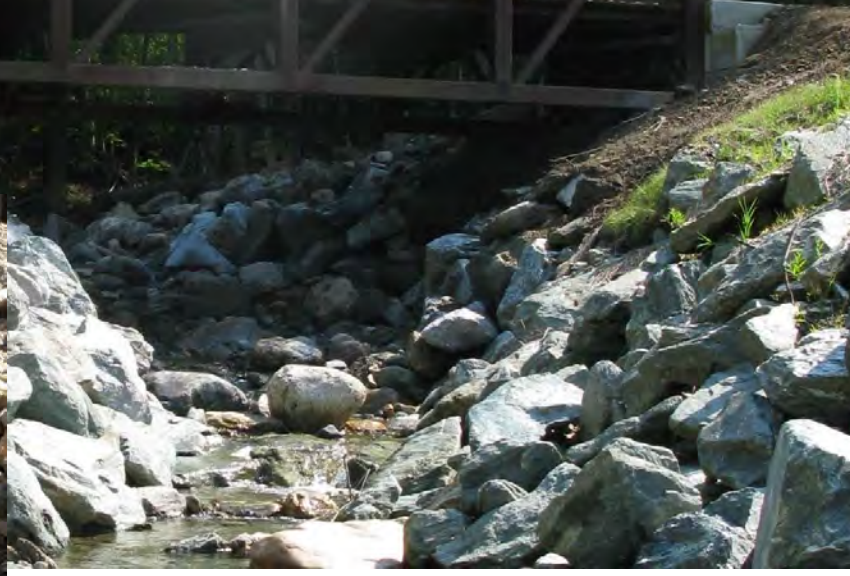
Post-Irene replacement prioritization:

- History of damages
- Transportation criticality
- Barrier status
- Habitat/AOP gain
- Cost
- Community importance

Nason Brook at Woodlawn Cemetery, Rochester, VT

Nason Brook at Woodlawn Cemetery, Rochester, VT





Before: 11-foot pipe arch

After: 34-foot bridge

Lesson Learned #1: Community relationships

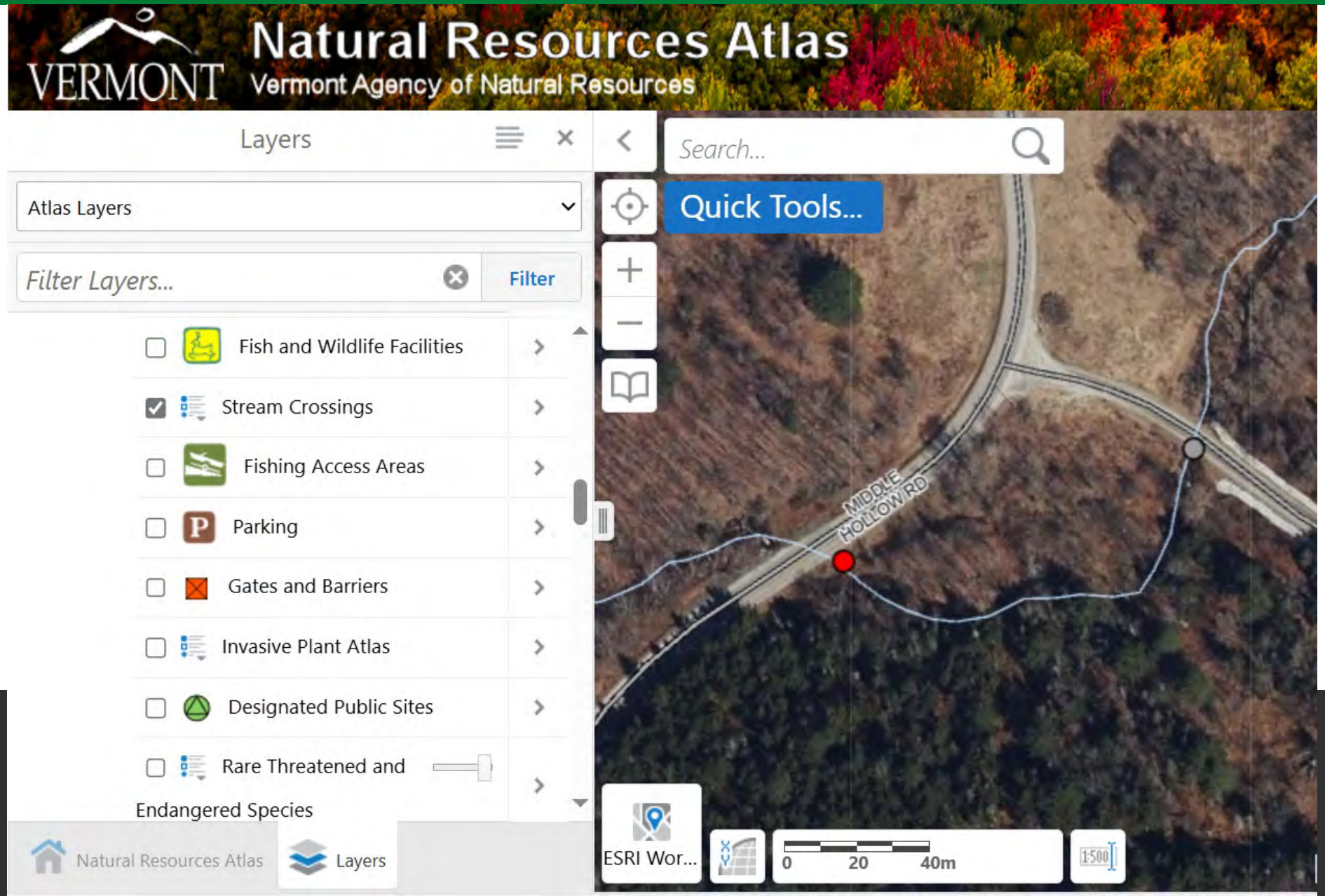
Upper White culvert replacement prioritization: Tool 1

Vermont Stream Geomorphic Assessment

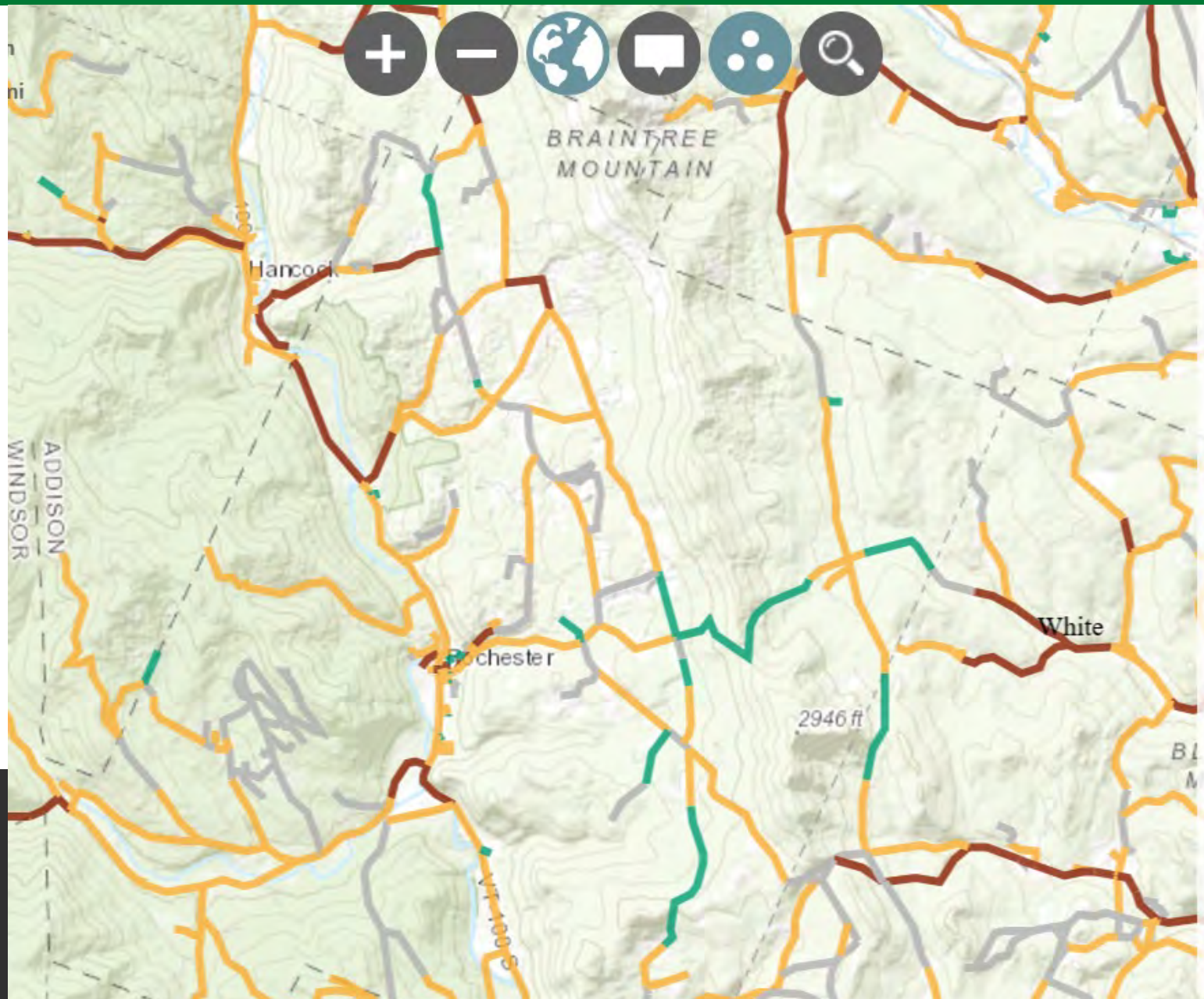
Appendix G

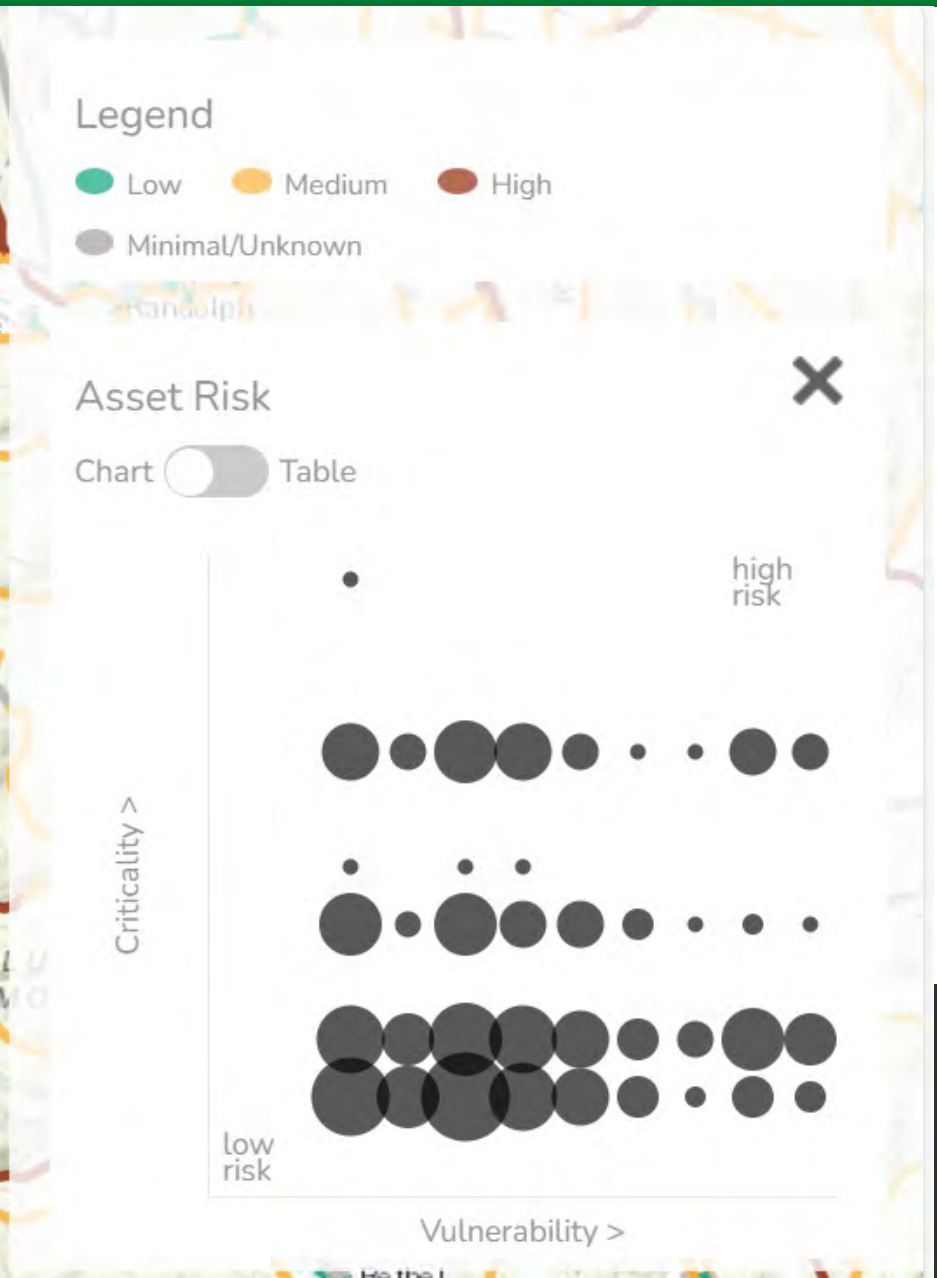
Bridge and Culvert Assessment

Upper White culvert replacement prioritization: Tool 2



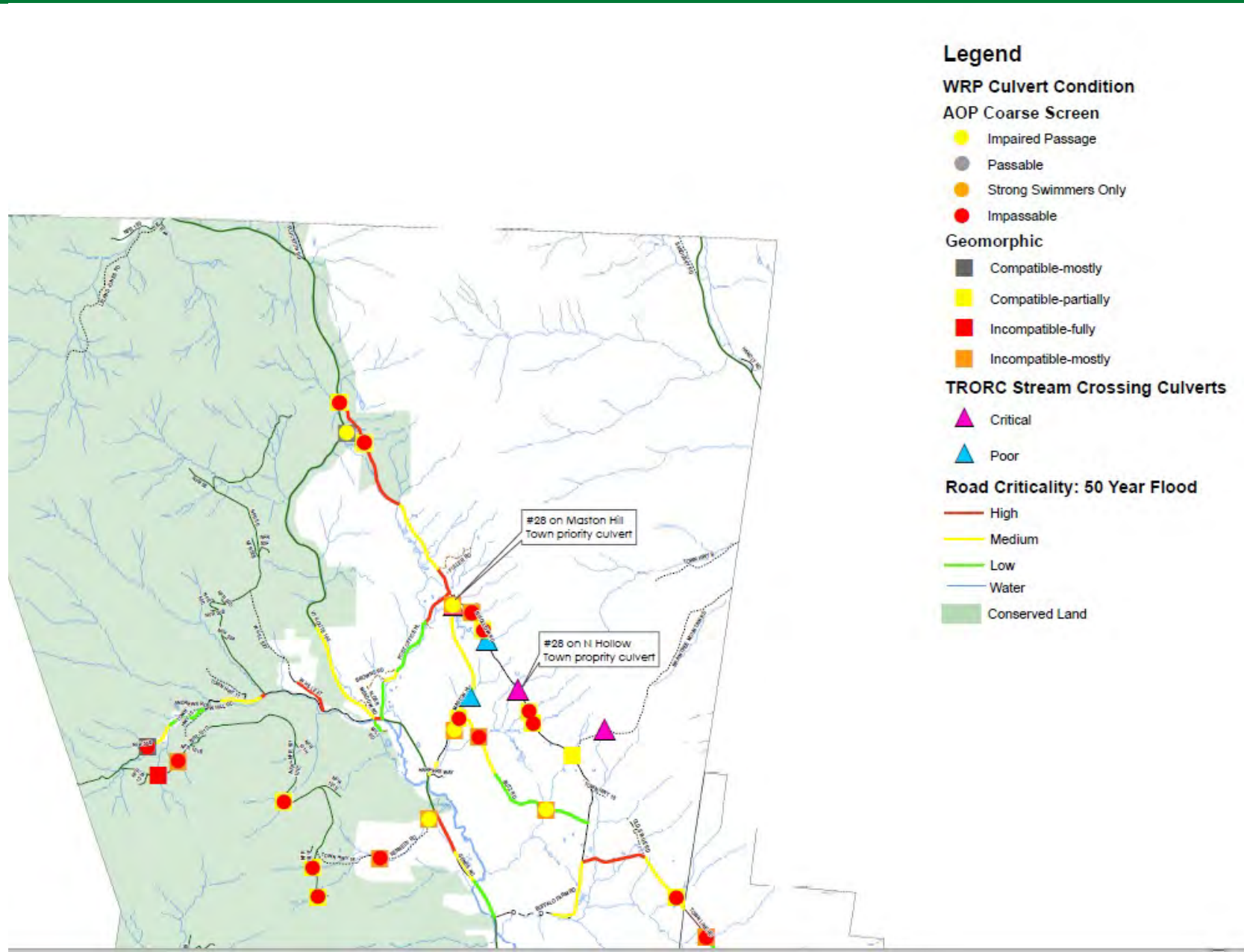
Upper White culvert replacement prioritization: Tool 3





Upper White culvert replacement prioritization: Tool 4

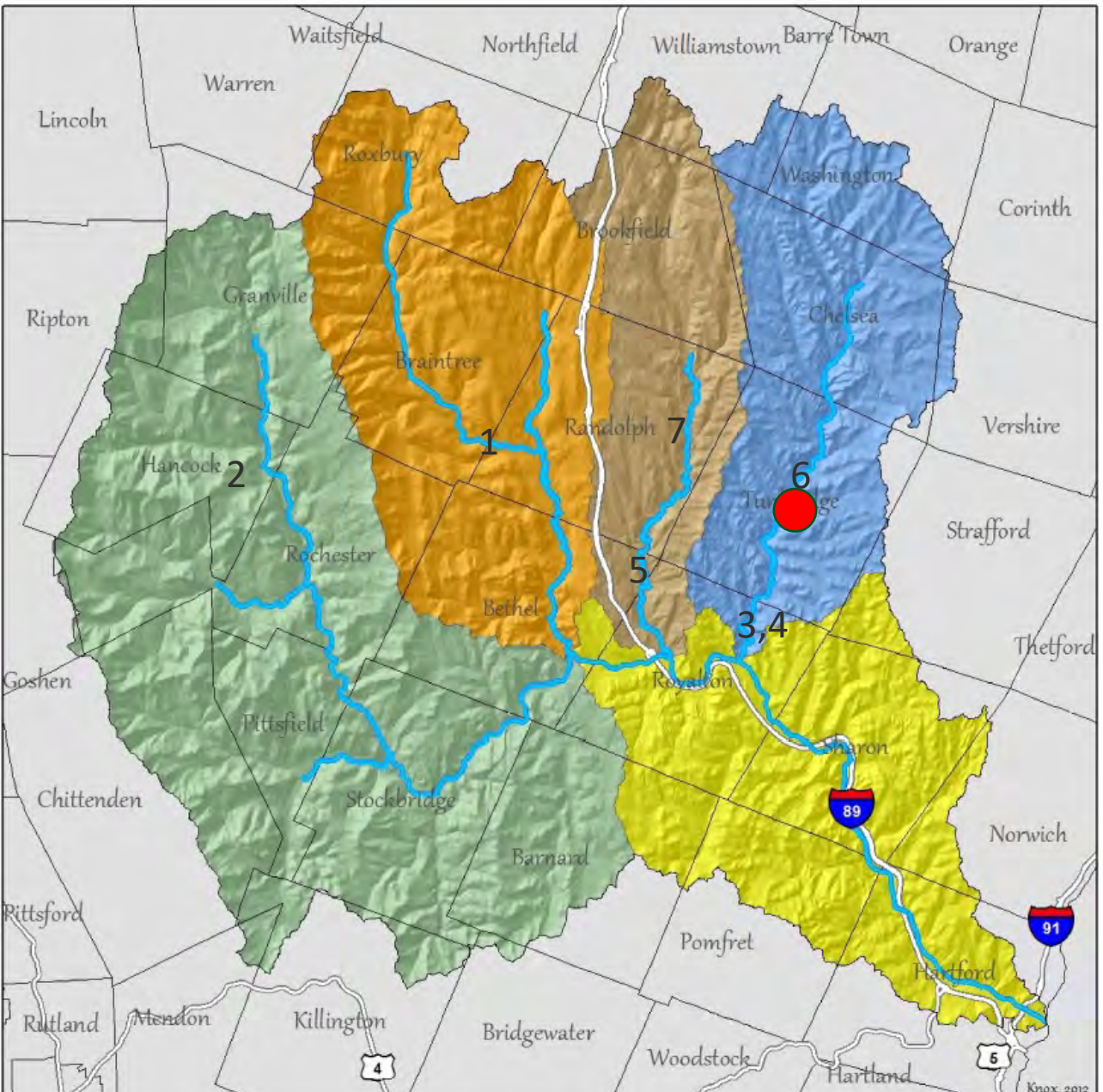
- Habitat criteria
  - Habitat gain
    - >1 mile
  - AOP screening priorities
    - Red / Orange / Yellow
- Geomorphic criteria
  - Bankfull width
    - >10 feet
  - Geomorphic compatibility screening priorities
    - Red / Orange / Yellow
- Condition criteria
  - TRORC assessment
    - Critical / Poor
  - Town replacement priority
    - High / Medium / Low
- Transportation criticality
  - Critical road segment
    - Yes / No
  - Flood resilience/safety concern
    - Yes / No



Lesson Learned #2: Partners = Capacity

White River dam removal prioritization

White River dam removal prioritization



Dam removal prioritization:

- Opportunity
- Habitat, AOP gain
- Water quality impacts

White River dam removal prioritization: Tool 1

River Name (Stream Order)	Dam State Id No.	Dam Name (H - Hydroelectric Dam)	Total Miles Upstream of Dam (A)	Total Miles Down-stream of Dam (B)	Migratory Miles (A + B)	Number of Dams, Culverts, and or Waterfalls Downstream to the CT River	Down-Stream Fish Passage	Contains Identified In-stream Resident Resources
Ompompanoosuc River-TR (4)	206.01	Lake Fairlee	14	2	16	5	no	no
Jail Brook (4)	47.04	Lyons Mill	13	2	15	7	no	no
Ammonoosuc River (5)	017.02	Ammonoosuc River Dam (H)	12	5	17	1	yes	yes
Pearl Lake (3)	138.06	Pearl Lake Dam	12	4	16	3	no	yes
Ricker Pond-TR (4)	88.05	Lake Groton	12	1	13	3	no	no
Passumpsic River (6)	179.01	Arnold Falls (H)	11	2	13	3	yes	no
Passumpsic River (6)	12.03	Passumpsic (H)	11	5	16	1	yes	no
Marden Brook (3)	131.30	Marden Brook Hydro	10	7	17	1	no	no
Ogontz Brook (3)	145.04	Ogontz Camp Dam	10	3	13	4	no	yes
First Branch White River (5)	171.03	Eaton (Upper)	10	0.1	10	1	no	no

White River dam removal prioritization: Tool 2

The Nature Conservancy
Protecting nature. Preserving life.™

The Nature Conservancy & Northeast Association of Fish and Wildlife Agencies

Northeast Aquatic Connectivity

An Assessment of Dams on Northeastern Rivers

The Nature Conservancy CRCS Land Freshwater

USGS
science for a changing world

ICE | Stream Temperature and Brook Trout Occupancy in the Northeast U.S.

White River dam removal prioritization: Tool 3

VT09-04	01	First Branch White River, Mouth to rm 15.2	CR	ESCHERICHIA COLI (E. coli)
VT09-05	01	Second Branch White River, Mouth to rm 9.8	CR	ESCHERICHIA COLI (E. coli)
VT09-06	01	Smith Brook (Mouth to rm 0.3)	AES, ALS	IRON
	02	Third Branch White River, Mouth to rm 4.3	CR	ESCHERICHIA COLI (E. coli)

STATE OF VERMONT

2020

- DRAFT -

Stressed Rivers and Streams List

VT09-04	01	First Branch White River, Mouth to rm 15.2	ALS, CRB	TEMPERATURE, SEDIMENTATION/ SILTATION
VT09-05	02	Kingsbury Brook	ALS	NUTRIENTS, TEMPERATURE
VT09-06	02	Third Branch White River, Mouth to rm 4.3	AES, ALS	SEDIMENTATION/SILTATION, NUTRIENTS
	04	Third Branch White River, River Mile 4.3 to Ayers Brook	AES, ALS	NUTRIENTS, SEDIMENTATION/ SILTATION

White River dam removal prioritization: Tool 4

FIRST BRANCH WHITE RIVER WATERSHED

STREAM GEOMORPHIC ASSESSMENT and RIVER CORRIDOR PLAN 2012-2013

July 17, 2014

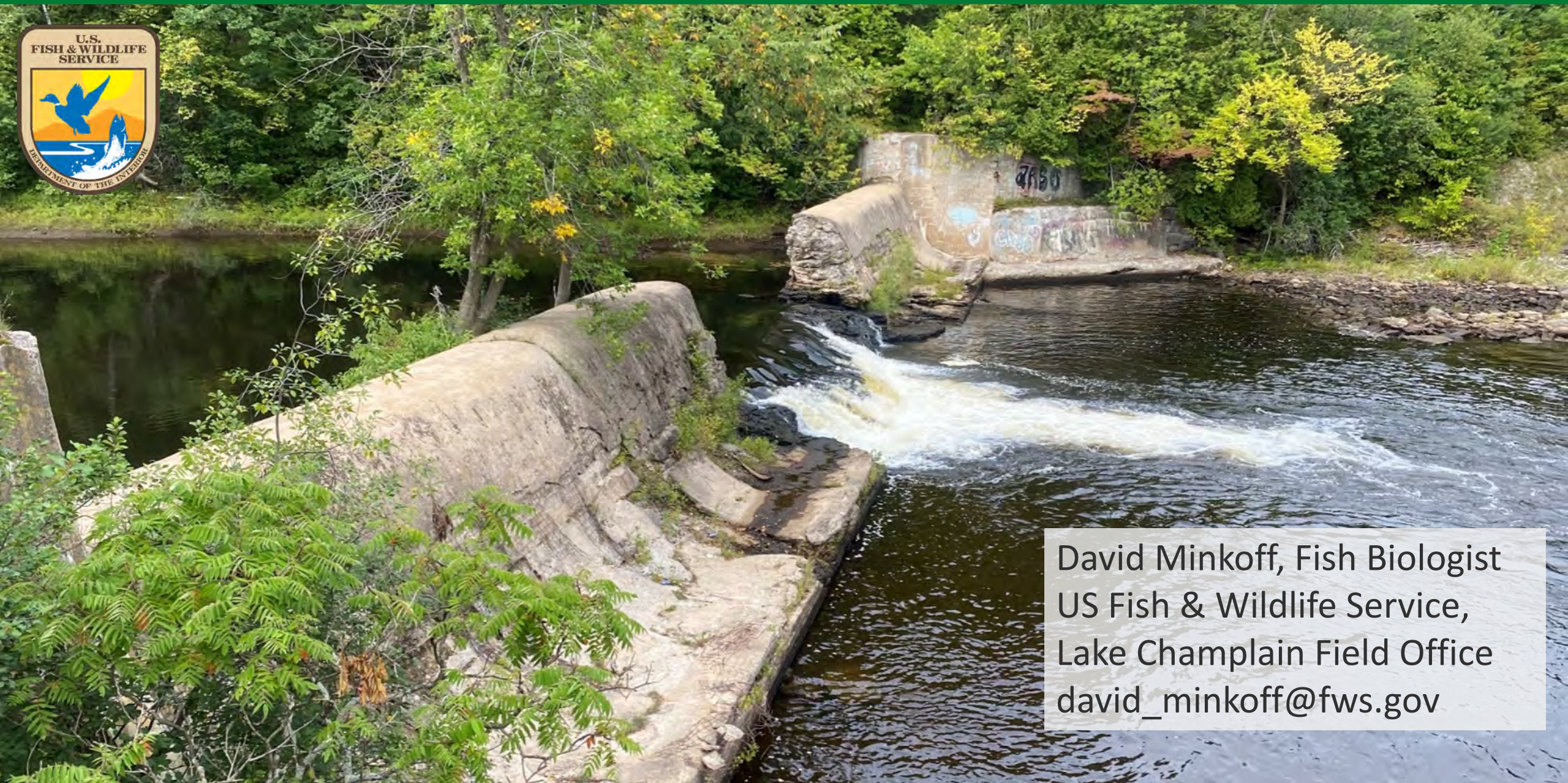
Reach Priority	*Watershed Priority*	*Completed Independent of Other Practices*	*Next Steps and Other Project Notes*
Low	Low	Y	Create/protect buffer, then probably enough currently existing to allow natural regeneration if excluded from mowing; recommend Royalton NFIP Floodway map for minimum width (additional 65 ft; recommend 100 ft min), clarify stable planform (FEH zone) is even further out; treat honeysuckle
High	High	N	Removal of bridge abutment on US end and two dams at DS end would all be likely to affect development within corridor; removal of Lower Eaton dam has been extensively discussed in the past - social constraints (landowner priorities, Historic Register); constraints increase value of floodplain and corridor protection in US reaches

Lesson Learned #3: Timelines

Hyde: 2016-2024

Eaton: 2002-2020

Project ID & Prioritization: USFWS Priorities/Methods



David Minkoff, Fish Biologist
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USFWS Prioritization: Species Driven

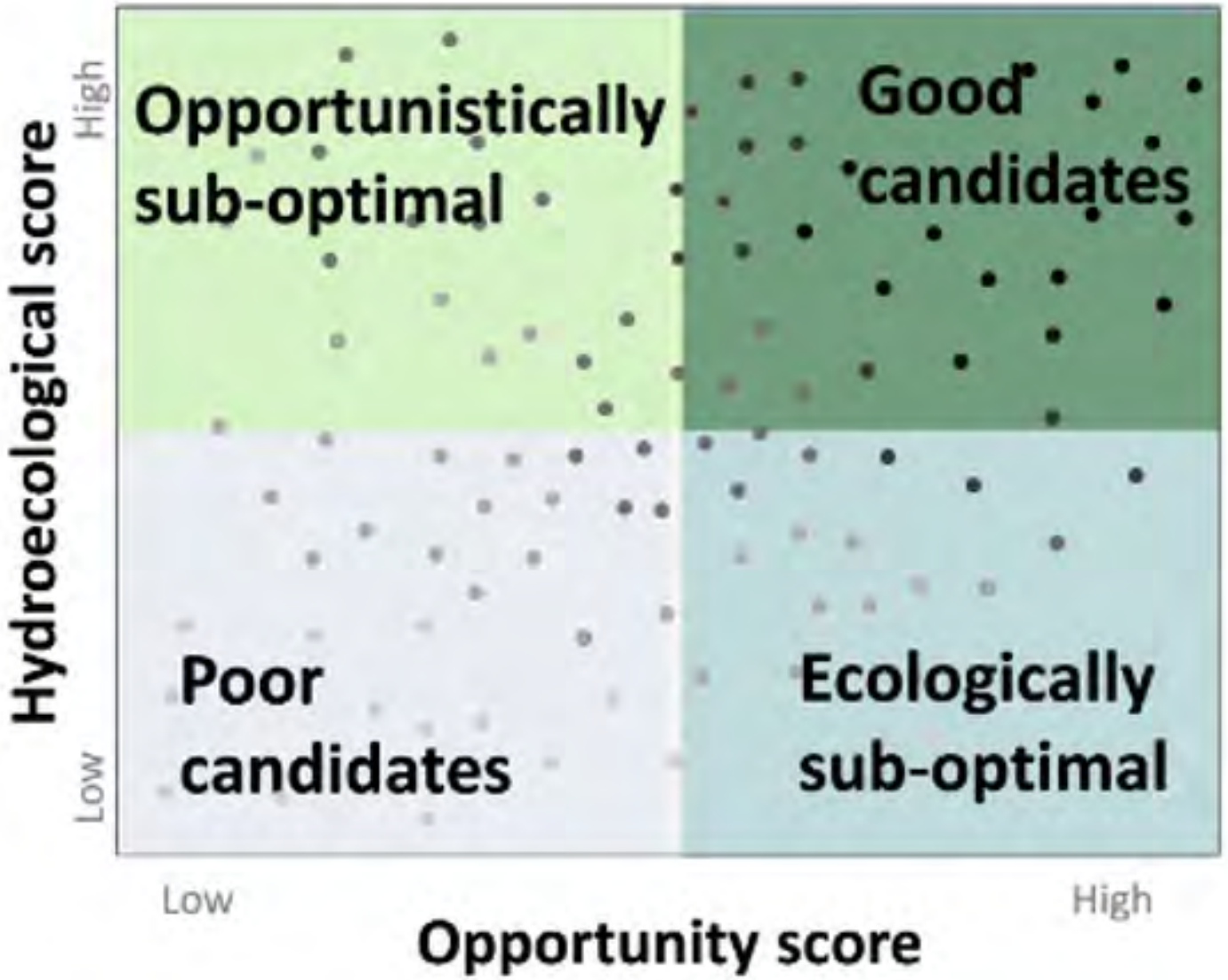
Lake Champlain Basin

- Brook Trout
- Landlocked Atlantic salmon
- American eel
- Lake sturgeon
- Wood turtle

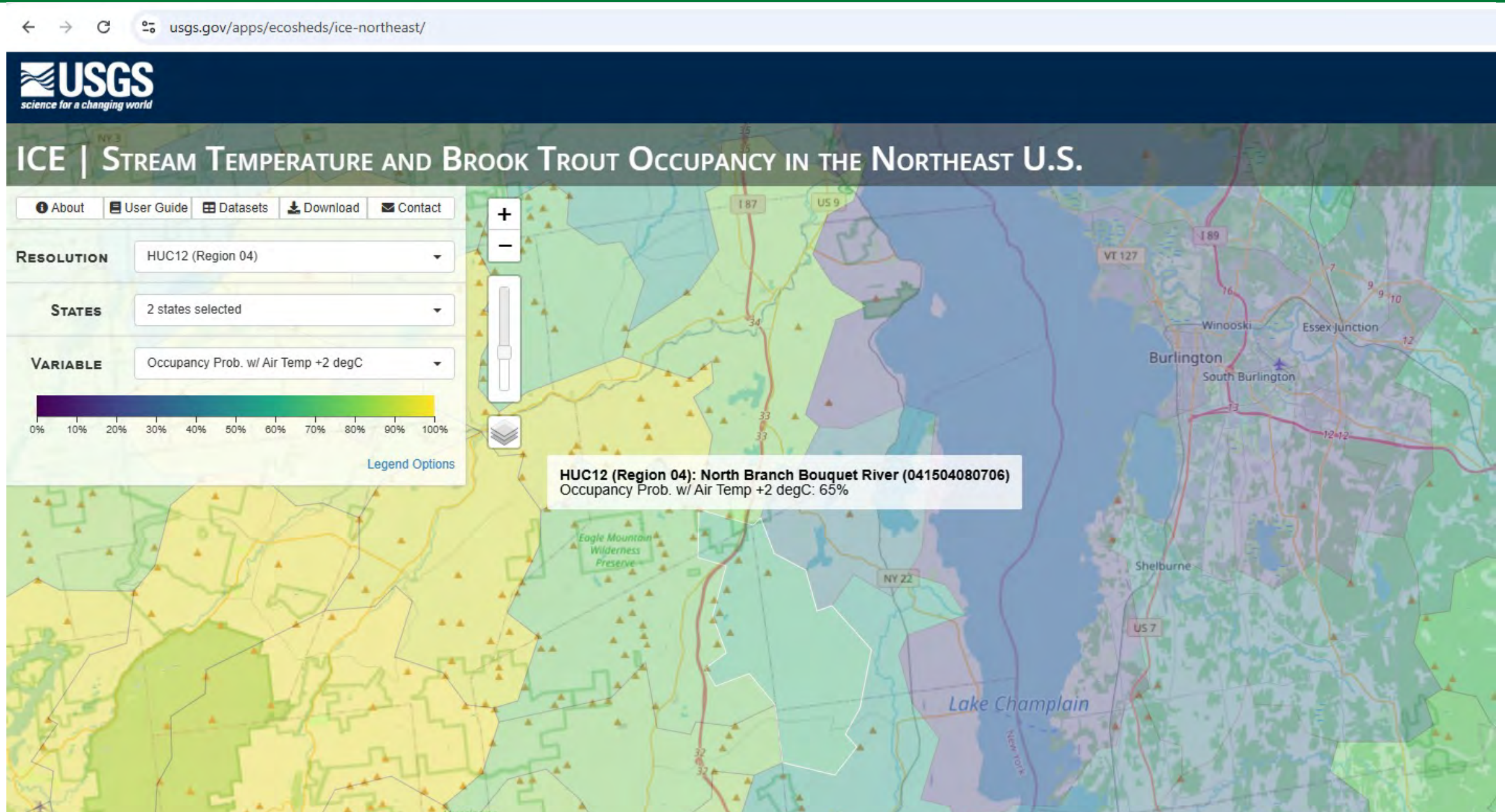
Outline

1. Project scoping tools
2. Partnerships
3. Example prioritization SOP

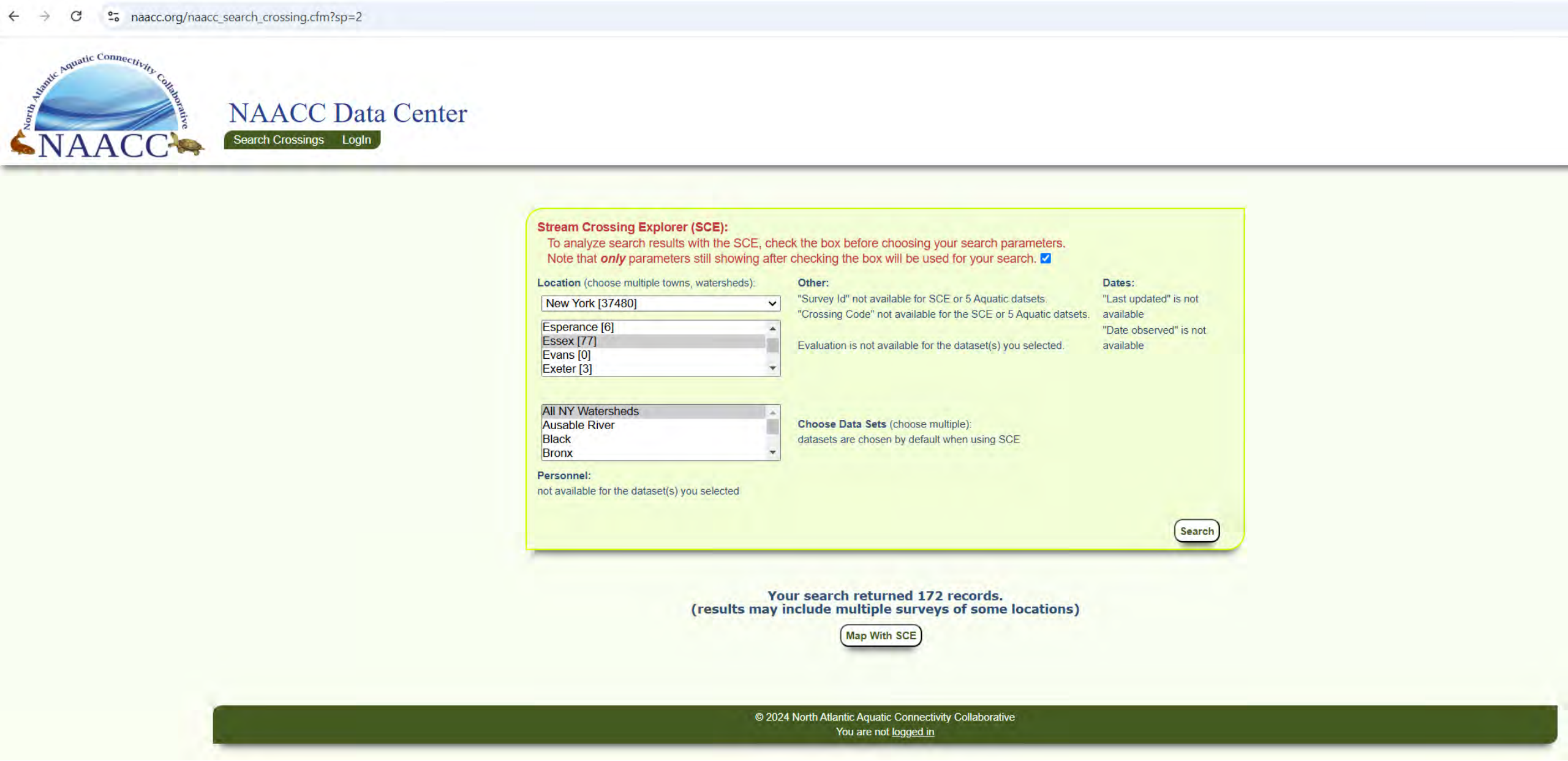
“Good” Projects



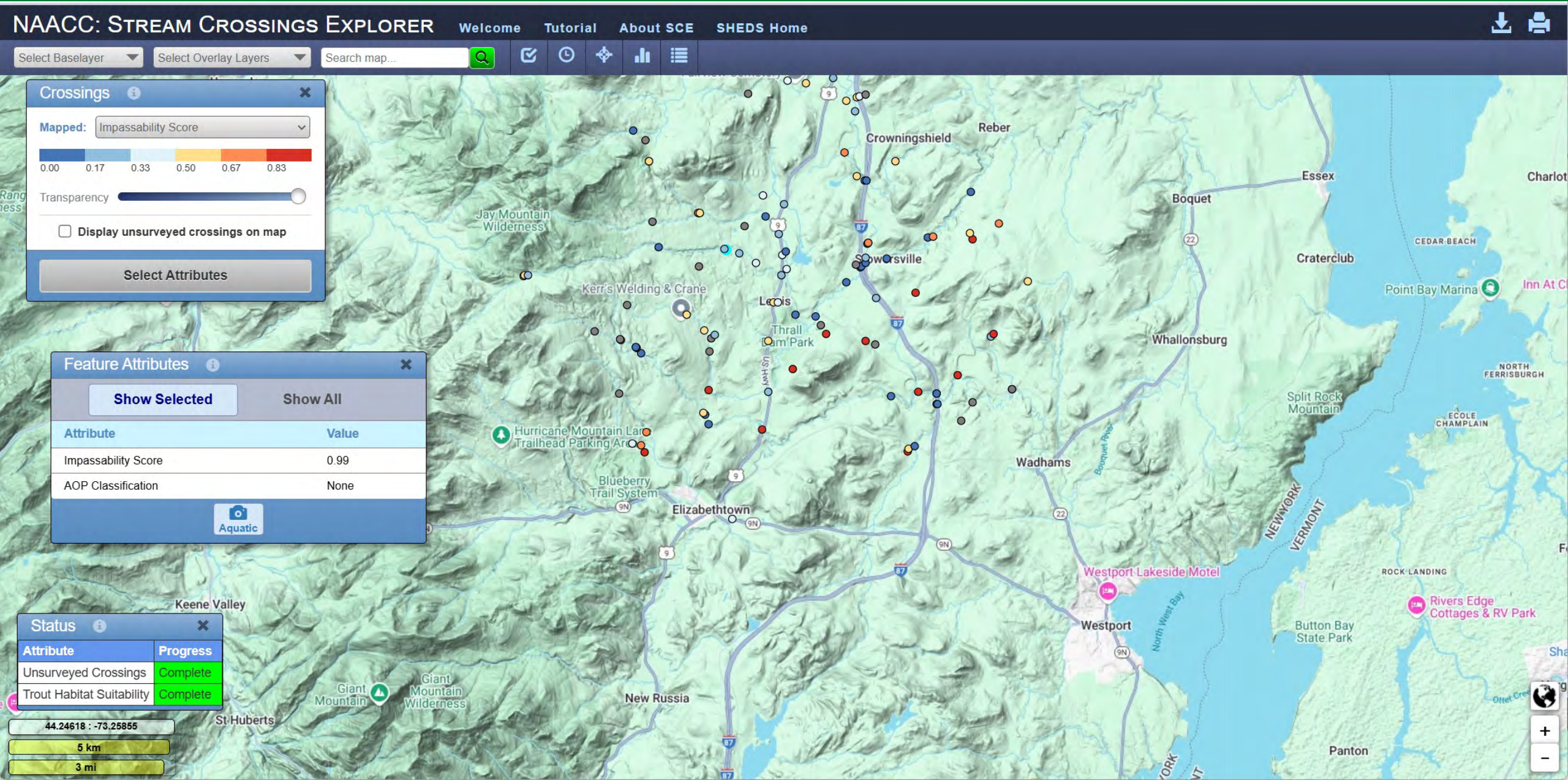
Tools: USGS Interactive Catchment Explorer (ICE)



Tools: NAACC Data Center



Tools: NAACC Data Center



Tools: NAACC Data Center

xy4428927073584253(downstream)8-20-2019.jpg

xy4428927073584253(inlet)8-20-2019.jpg

xy4428927073584253(outlet)8-20-2019.jpg

xy4428927073584253(upstream)8-20-2019.jpg

Non-tidal Aquatic Connectivity Crossing Data

Database Entry By: Daniel Sinopoli

Entry Date: 08-20-2019

Coordinator: Luke McNally

Last Updated: 08-20-2019

GPS to Crossing Distance (meters): 20.0

NHD-HUC8 Watershed: Lake Champlain

Crossing Code: xy4428927073584253

Local ID: No data

Date Observed: 08-20-2019

Lead Observer: Elizabeth Metzger

Town/County: Lewis (Essex), NY

Stream/River: Spruce Mill Brook

Road: Wells Hill Road

Type: Paved

GPS: Lat: 44.28939, Long: -73.58444

Location Description: About quarter mile past intersection with Goff Rd

Crossing Type: Culvert

Number of Culverts/Bridge Cells: 1

Flow Condition: Typical low-flow

Crossing Condition: OK

Tidal Site: No

Alignment: Flow-Aligned

Road Fill Height (feet) : 5

Bankfull Width (feet): No data

Bankfull Width Confidence: No data

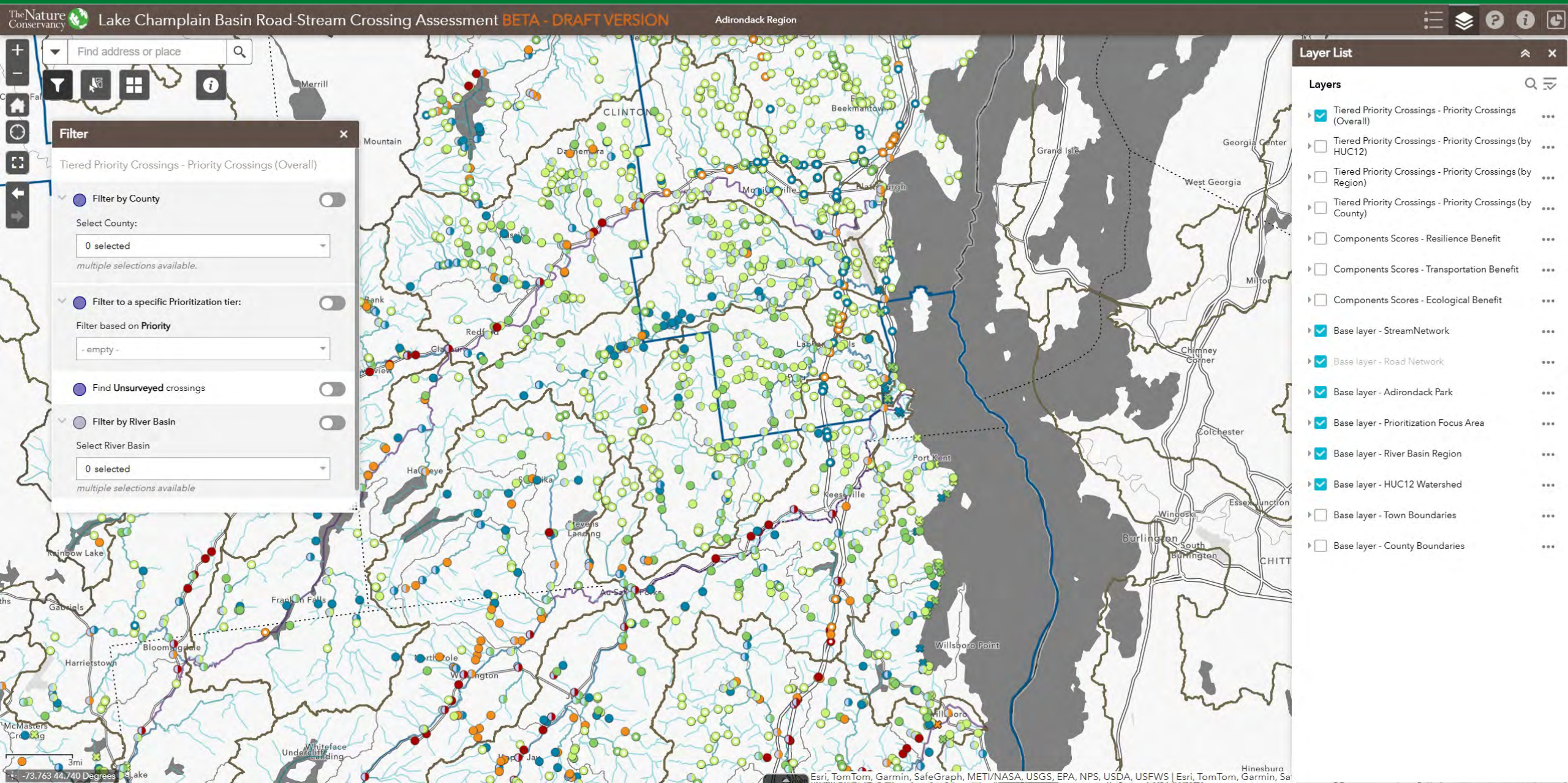
Constriction: Severe

Tailwater Scour Pool: Large

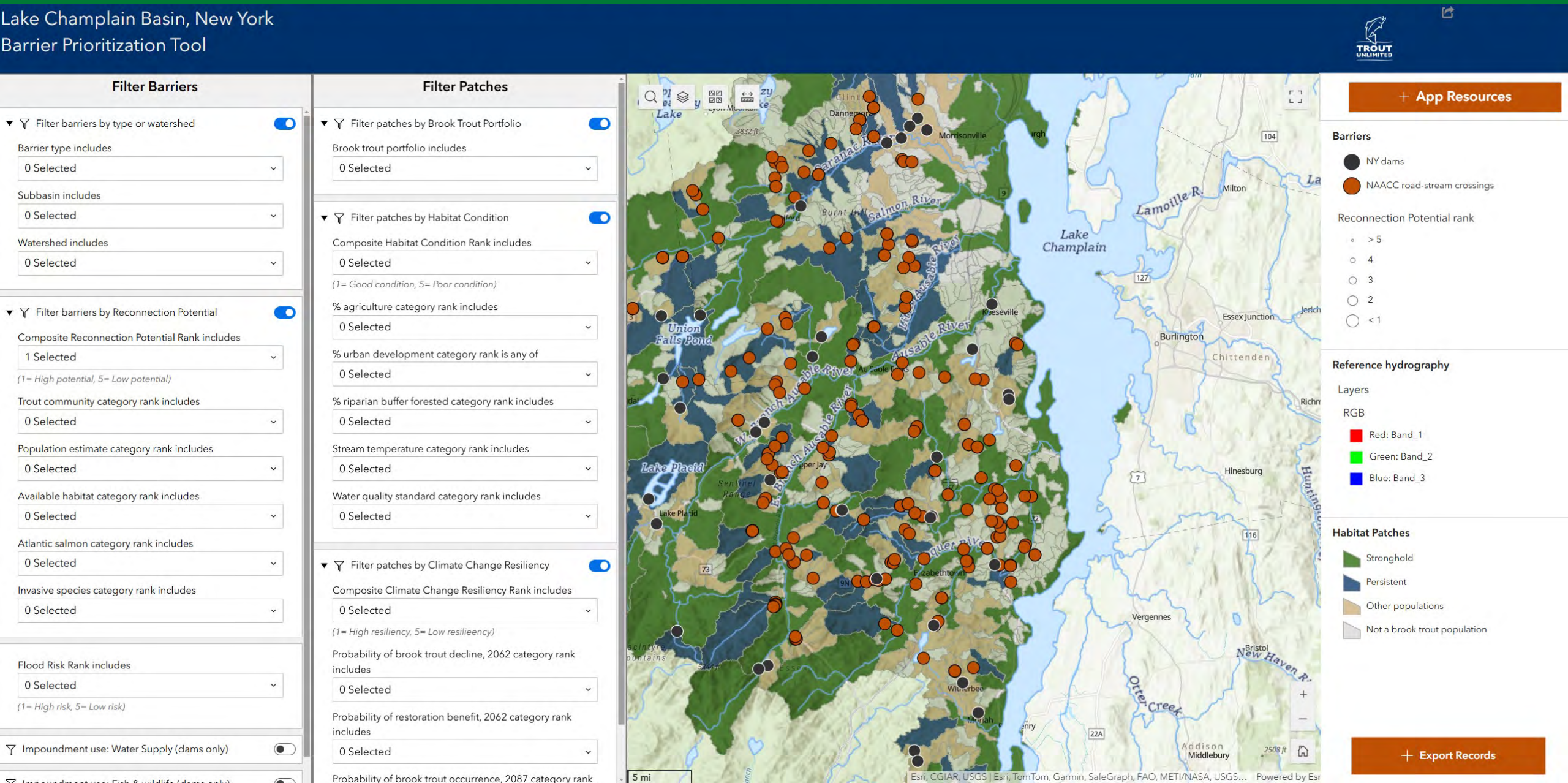
Crossing Comments: No data

Evaluation of this stream crossing is estimated as: SEVERE BARRIER

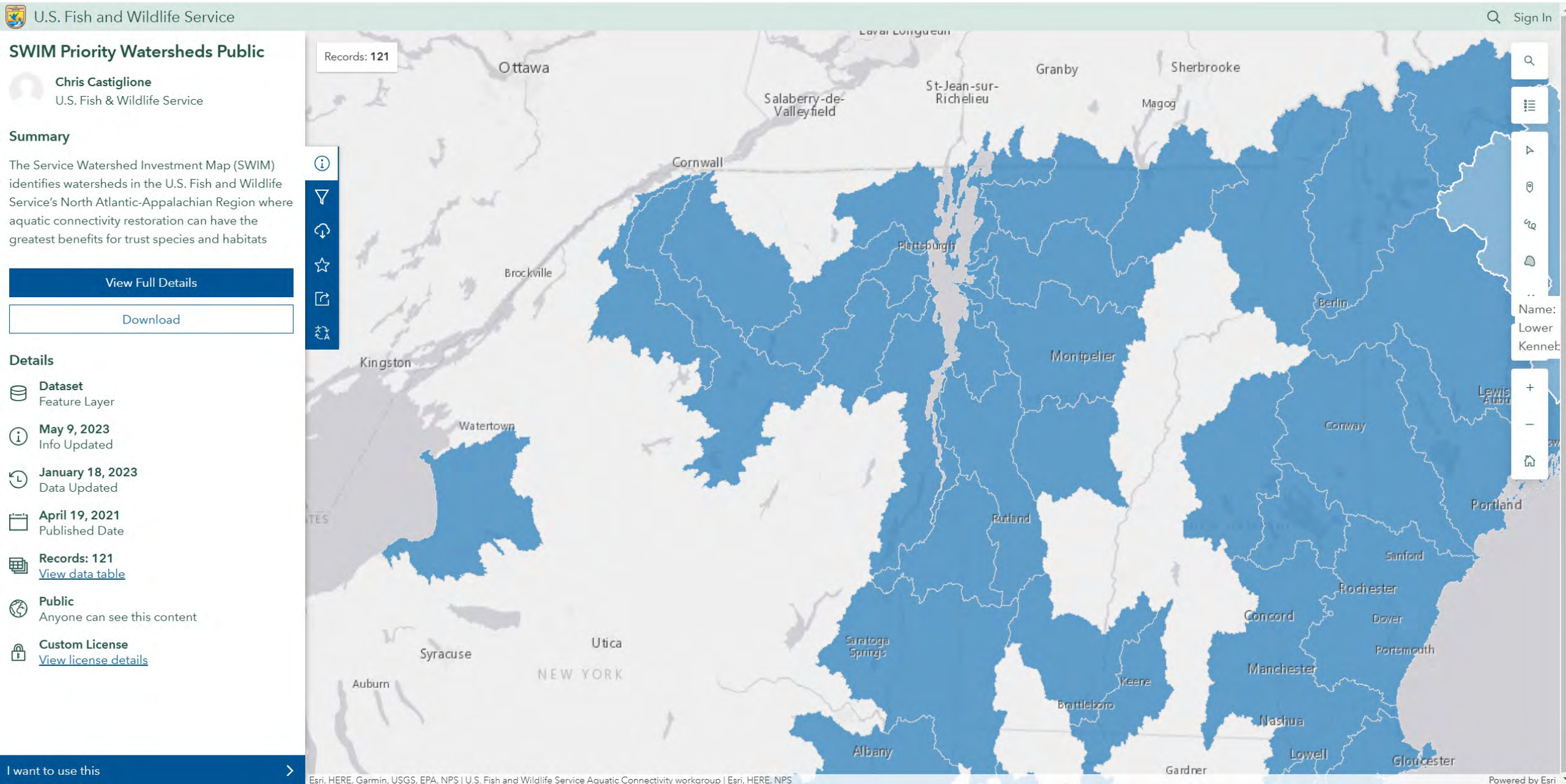
Tools: TNC LCB Road-Stream Crossing Assessment



Tools: TU LCB, NY Barrier Prioritization Tool



Tools: USFWS Service Watershed Investment Map



Partnerships are Critical!

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<u>NY State Partners included</u>:

NY State DEC
Patriot Hydro
NY State Electric & Gas
Trout Unlimited (LC Chapter, NY)
Trout Unlimited (Regional)
SLR Engineering
USFWS – LC Field Office
USFWS – Ecological Services
Lake Champlain Basin Program
FERC (Fed. Energy Reg. Commission)
City of Plattsburgh
Town of Plattsburgh
GW Tatro Construction Inc
Ward Logging LLC
Rugar Self Storage
Northern Forest Canoe Trail
The Nature Conservancy
SUNY Plattsburgh
Essex and Clinton Counties
Adirondack Explorer

Partnerships made this possible

SOP Created by Upper Missisquoi AOP Workgroup

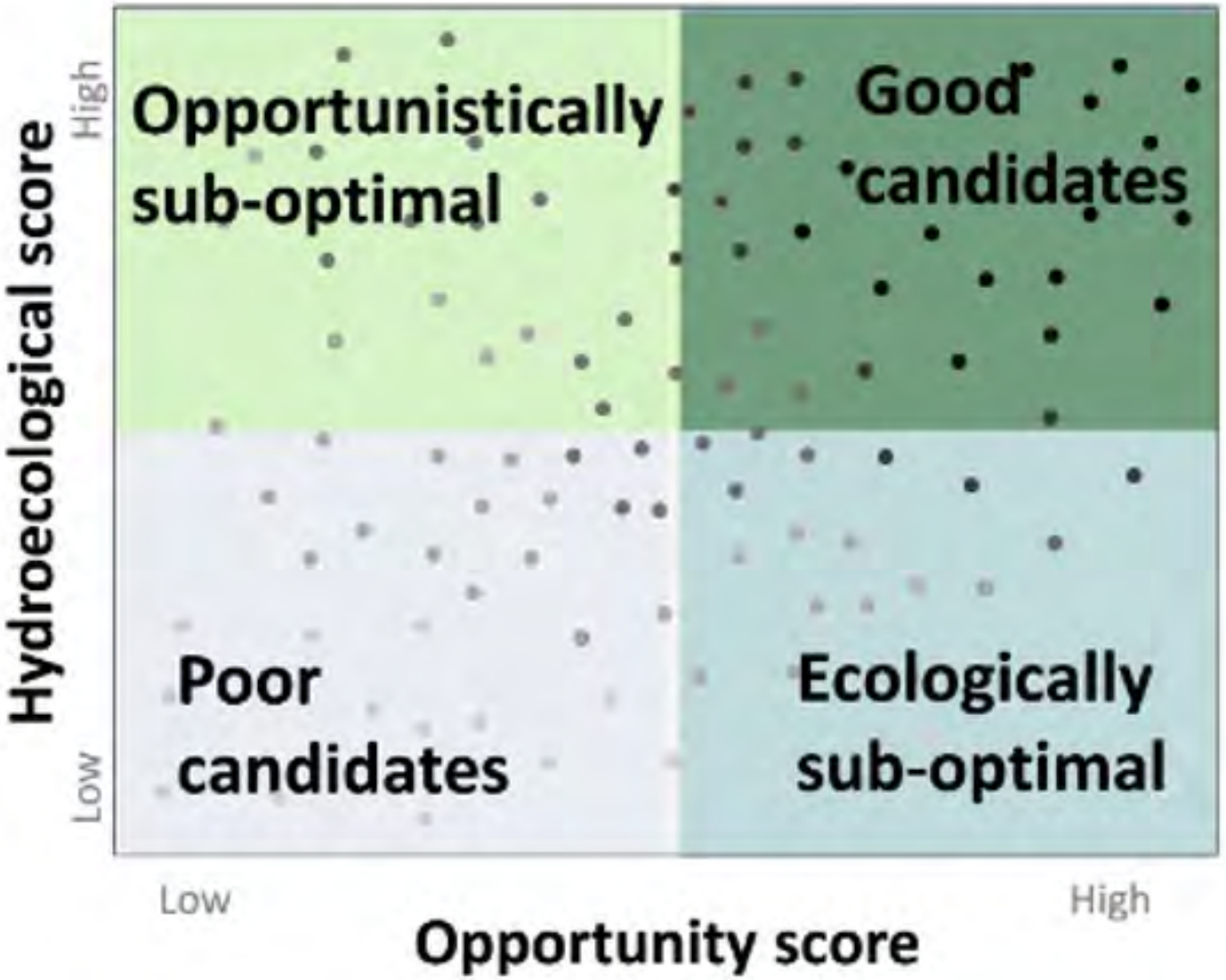
Partners include:

- Luke Briccetti & Katherine Helmer, Eco Americorps
- Lauren Weston, Franklin County NRCD
- Sarah Damsell, Ted Sedell, Orleans NRCD
- Lee Simard & Will Eldridge, VT FWD
- Staci Pomeroy, VT DEC
- Lindsey Wight, Missisquoi River Basin Association
- Bethany Remmers, Northwest Regional Planning Commission
- Nicky Paquette, Chase Whiting, Clark Amadon, TU
- David Minkoff, Chris Smith, USFWS

Resources

- USFWS SWIM Map: https://gis-fws.opendata.arcgis.com/datasets/6acf5fd506e04cf5a1d0f143b8851e98_0/explore?location=44.027337%2C-73.418935%2C8.43
- TU Lake Champlain Basin, New York Barrier Prioritization Tool: https://experience.arcgis.com/experience/e91d759ca472438398c8c51edabb5135/page/Barrier-Screening-Tool/?views=View%202%2CView%203%2CView%202%2CView%203
- TNC Lake Champlain Basin Road-Stream Crossing Assessment: https://tnc.maps.arcgis.com/apps/webappviewer/index.html?id=7fad86b436f848379a2d469750430613
- USGS Interactive Catchment Explorer: https://www.usgs.gov/apps/ecosheds/ice-northeast/
- North Atlantic Aquatic Connectivity Collaborative (NAACC) Database: https://naacc.org/naacc_data_center_home.cfm
- The Vermont Culvert Aquatic Organism Passage Screening Tool: https://dec.vermont.gov/sites/dec/files/wsm/rivers/docs/rv_VTAOPScreeningTool.pdf

Wrap Up


Opportunistically sub-optimal
Good candidates
Poor candidates
Ecologically sub-optimal
Hydroecological score
High
Low
Low
High
Opportunity score

Questions?

Questions?

1. Do you/partners prioritize before pursuing barrier removal projects?
2. What are the general goals that you/partners most often pursue?
3. Are any datasets/prioritization tools particularly helpful?
4. Are datasets and prioritization tools missing but needed (e.g., for any factors listed earlier in the presentation)?
5. How does prioritization differ for you between dams and culverts?