The Dam Atlas:

Fostering ecosystem health & community collaborations

Kelly Addy, Emily Vogler, Art Gold, Jason Parent & Elizabeth Herron

Dams in New England

- Over 14,500 dams
- Many built over a century ago; 1792 - Slater Dam
- Thousands in region will face decisions to repair, restructure or remove
- One of the greatest opportunities for large-scale restoration of New England rivers and watersheds (river connectivity; fish passage)

Impediments to river restoration

- Lack of consistent, comprehensive dam data
- Lack of regional and tributary-scale tools to help prioritize dam projects
- Ecological, economic or safety perspectives are not informed by community values

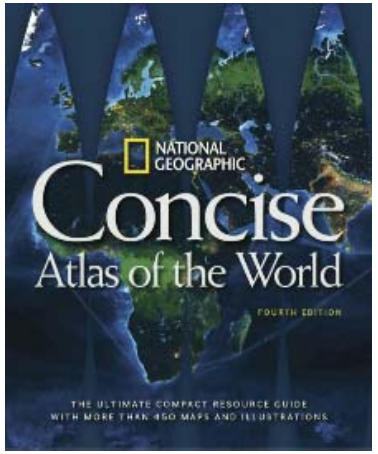
Content and values of a Dam Atlas?

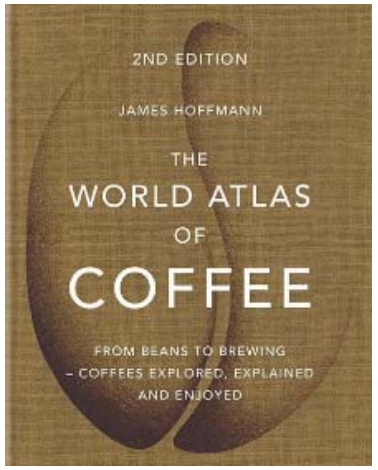
Quantitative rankings:

- Social (viewsheds; recreational uses)
- Ecological (values from removal of barrier for fish passage)
- Physical dimensions (age, construction, hazard ranking)

Uses:

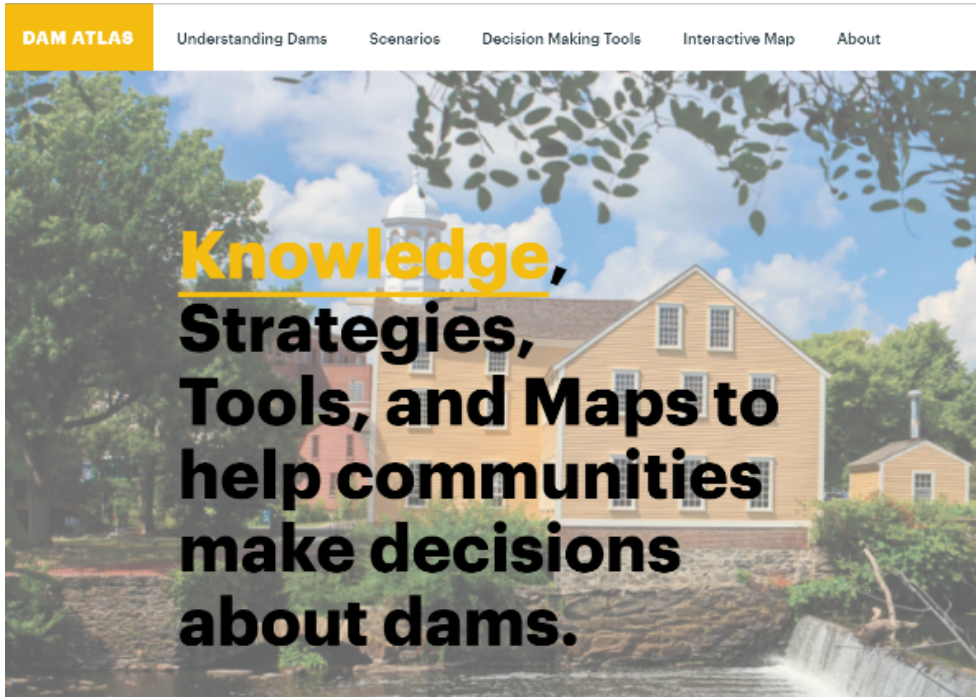
- Prioritize projects
- Unified and strategic approach to dam management
- Regional collaborations





“In-the-works” Dam Atlas

- Digital and printable tool
- Help educate public
- Provide action-oriented planning tools to help prioritize dam projects & facilitate conversations about the future of dams
- In current dam ranking tools, social dimensions are not included
- Proof-of-concept went well for Narragansett Bay watershed (SNEP grant hopeful!)



Understanding Dams:

Critical issues when evaluating a dam

Recreation on the Pond

Read More

Historical Significance

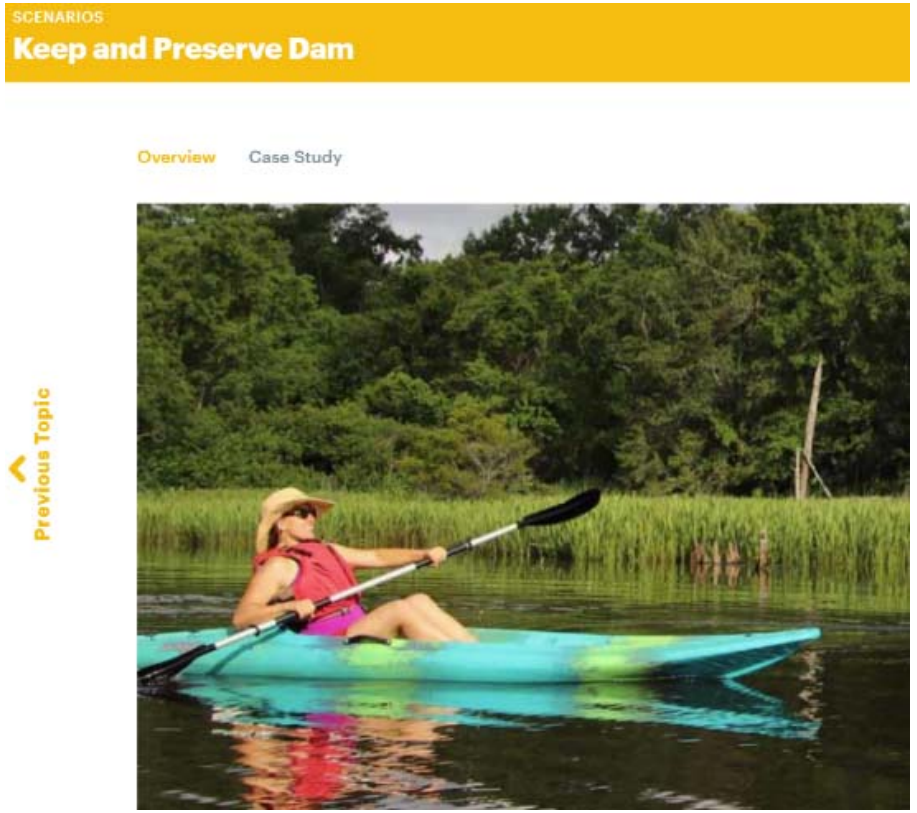
Read More

- Recreation on the pond
- Historical significance
- Fish passage up and downstream
- Conservation of upstream habitat
- Impact to surrounding landscape
- Up-front cost
- Long-term cost/maintenance
- Water quality
- Sense of place/aesthetics

Scenarios:

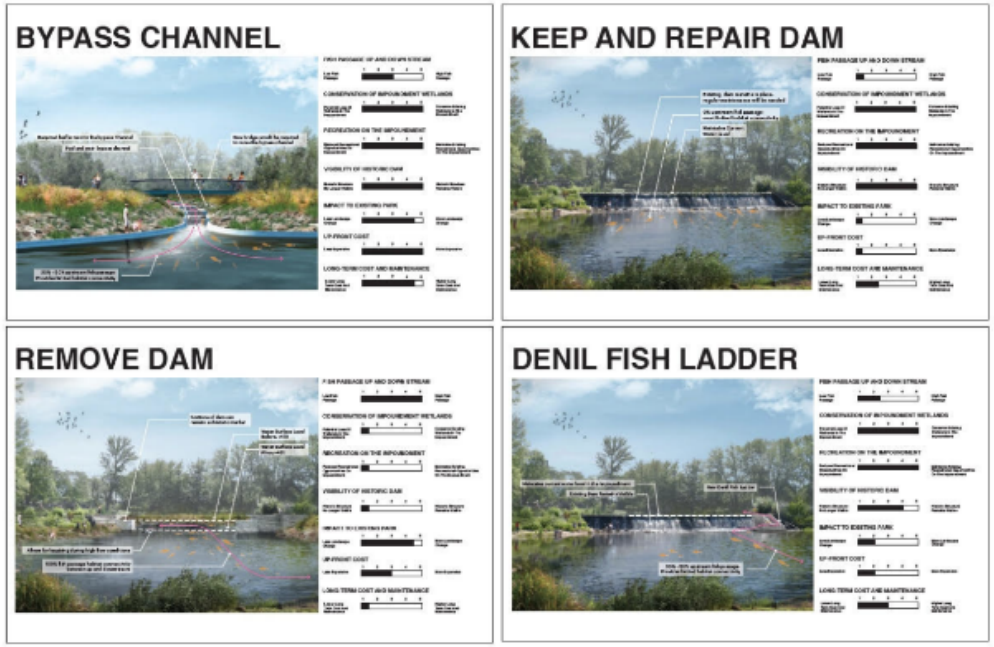
Possible solutions and alternatives to existing dams

- Keep & preserve the dam
- Remove the dam
- Modify dam with fishway (fish ladder)
- Nature-like fishway
- Modify dam with bypass channel
- Modify dam with micro-hydropower



Decision Making Tools

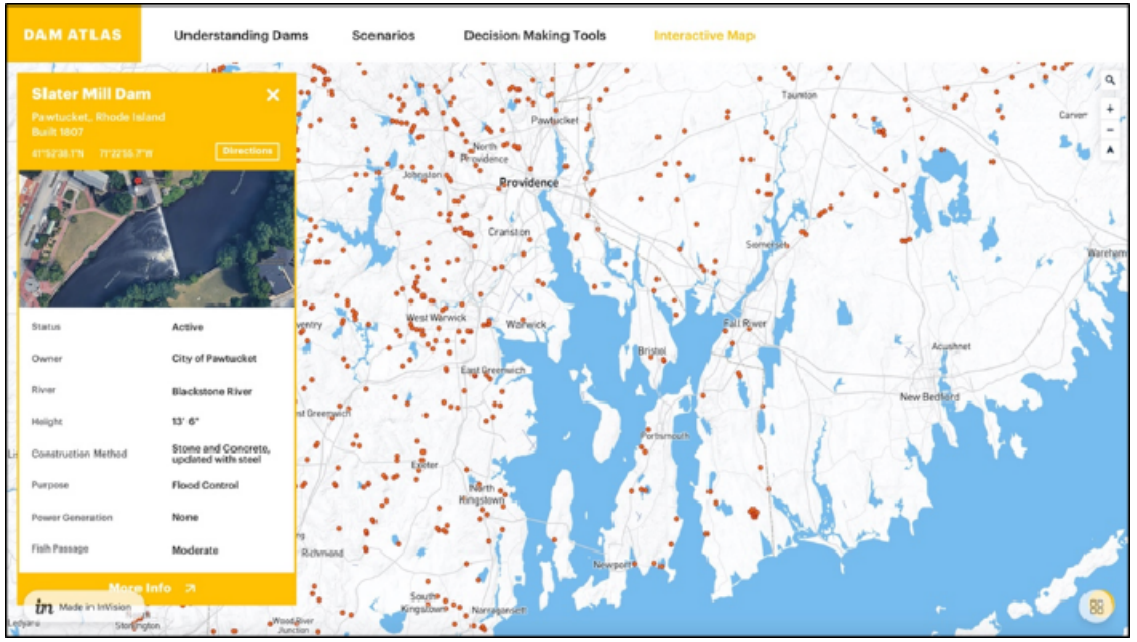
- The RISD team developed tools to help support decisions around dams that integrate structured decision making and community design charrettes
- Tested in community workshop in Keene, NH; more workshops planned to improve



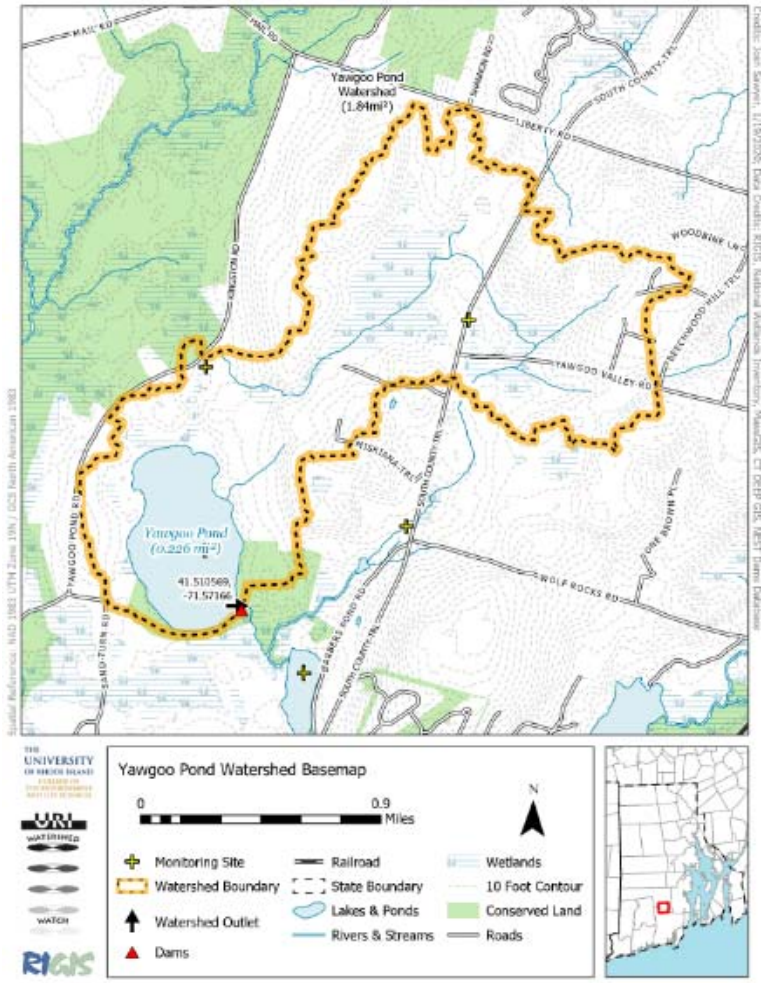
Includes:
- timelines
- agendas for leading public meetings
- graphic set of trade-off cards to facilitate discussions about participants' priorities and concerns
  - alternative cards that visually explain the various alternatives
  - matrix that can allow for impacts to be compared across a range of alternatives.

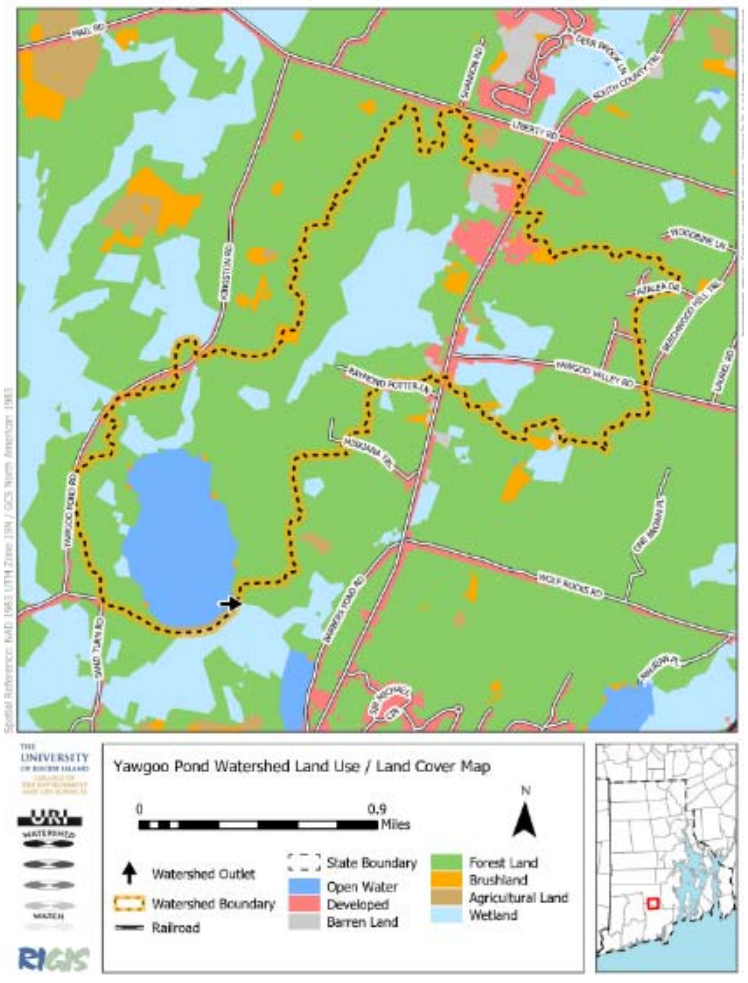
Interactive Map

- Multiple scales
- Watershed scale – impact of dams on watersheds, habitat connectivity and fish passage
- Site scale – social dimensions of the dams – landuse, viewshed
- Filter on different attributes
- Photos, detailed aerial imagery, and links to organizations & more



Printable Maps





Partners

- Share their perspectives of dams
- Help identify ecological and social dimension attributes of importance
- If SNEP funded, quarterly meetings (individually or in focus groups)
- Help develop a ranking system for the attributes

The Nature Conservancy
Protecting nature. Preserving life.

SAVE THE BAY
est. 1970
NARRAGANSETT BAY

NARRAGANSETT BAY ESTUARY PROGRAM

Rhode Island Rivers Council

NOAA 50 YEARS
NOAA FISHERIES

DEM
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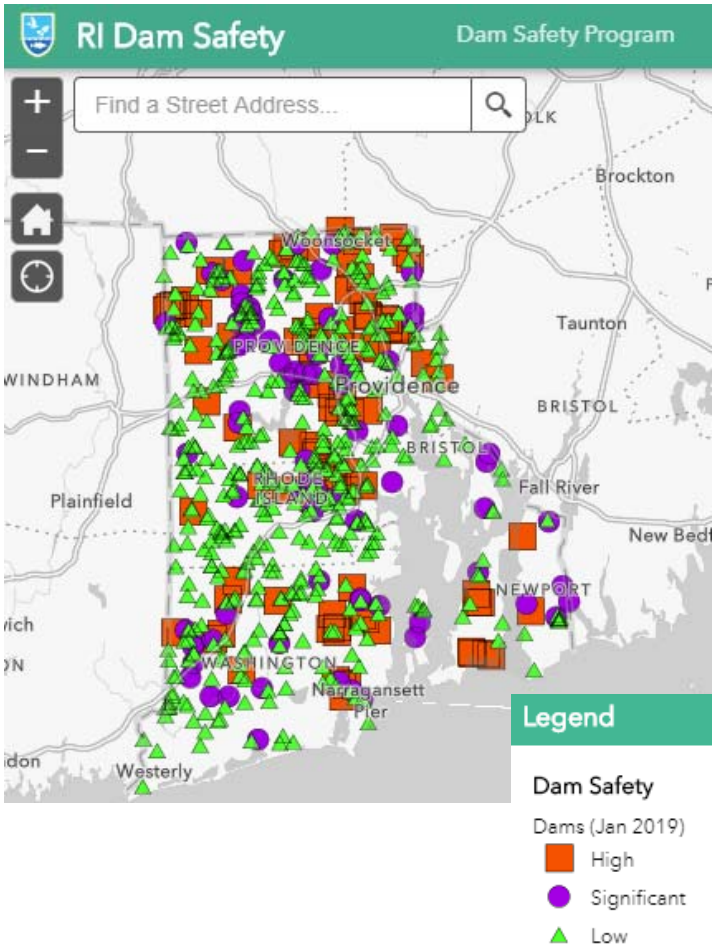
WPWA

Save The Lakes
Protecting Rhode Island's Fresh Water

Geospatial Data Collection

- Dam databases – state and NID
- Land Use Land Cover
- National Hydrology Dataset (HR)
  - Streamlines
  - Lakes/ponds/reservoirs
  - Wetlands
  - Stream order
- Parks, fishing, hiking/biking trails, roads
- Data input from agencies



Citizen Scientists Collecting Data

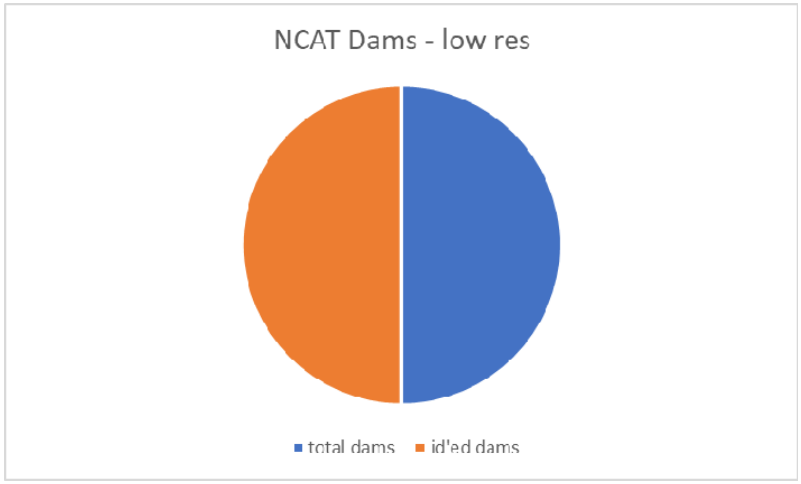
- Many dam databases have data gaps
- URI Watershed Watch and sister organizations are ideal to help collect local data. Trained to collect:
  - Location – lat/long, nearest road
  - Plaques near the dam – name, date built; photos
  - ID dam materials
  - ID fishway presence/absence
  - Estimate height/width of dam
  - ID waterfall presence/absence
  - Is the dam visible from a road?
  - Is there a reservoir/pond at the dam?
- Other archival data research

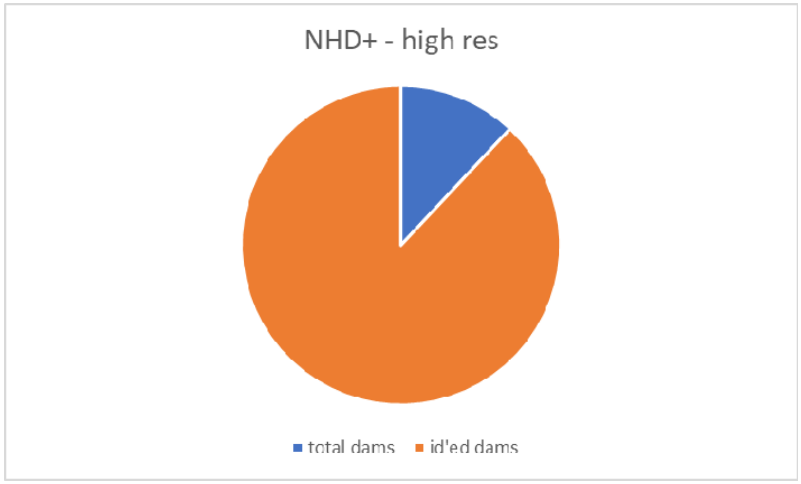
Ecological Attributes

- TNC & NE Assoc. of Fish & Wildlife Agencies
  - NCAT (Assessment of dams for Northeastern Rivers, 2011)
  - Set priorities for dam removal for fish passage
  - GIS tools developed – Barrier Analysis Tool (BAT)
- MA DER Analysis
- RI DEM - internal review of state owned dams, stream disturbance metrics related to water withdrawals, etc.
- Partners will review attributes, suggest new attributes, and be key in rankings

Higher Resolution = More Dams!

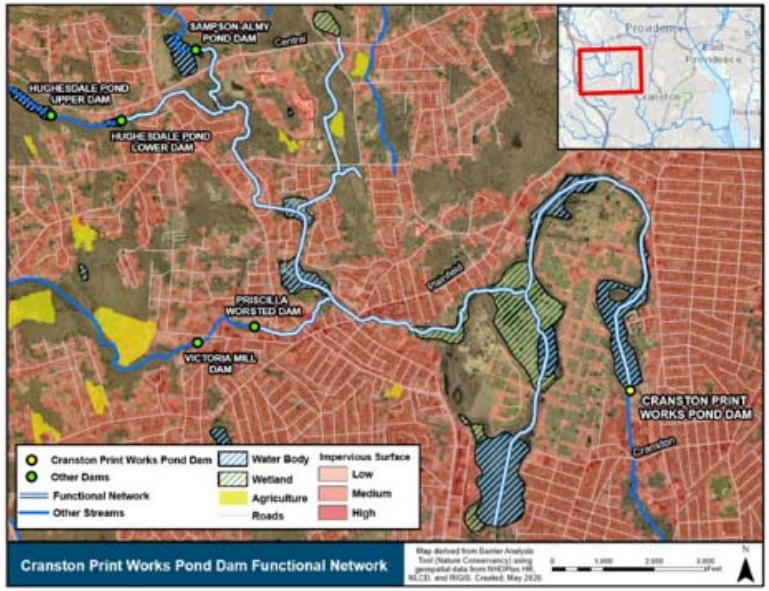
- Higher resolution = more detailed maps
- Allow us to see smaller dams on smaller streams (see & snap to streams)





Sample of Ecological Attributes

- Downstream and upstream dam density
- Impassable dam counts
- Upstream river length
- Extent of shallow pond habitat
- Functional network
- % impervious surface and developed land cover in watersheds



Ecological Metric	Data Output
Upstream Functional Network (Displayed on Map)	6.6 miles
Upstream Plus Downstream Functional Network	13.7 miles
Distance to River Mouth (Narragansett Bay)	11.6 miles
Number of Downstream Dams to the River Mouth	1
Number of Upstream Dams to the Headwaters	16
Waterbody Area Directly Connected to Functional Stream Network	96.8 acres
Wetland Area Directly Connected to Functional Stream Network	59.2 acres

Sample of Social Dimension Attributes

- Dam Hazard Ranking
- Developed vs. undeveloped land use
- Historic value
- Scenery value to dam & reservoir
- Recreational value on the reservoir

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Geoforum

Volume 70, March 2016, Pages 93-104

"You kill the dam, you are killing a part of me": Dam removal and the environmental politics of river restoration

Coleen A. Fox [a], Francis J. Magilligan [b], Christopher S. Sneddon [a]

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https://doi.org/10.1016/j.geoforum.2016.02.013

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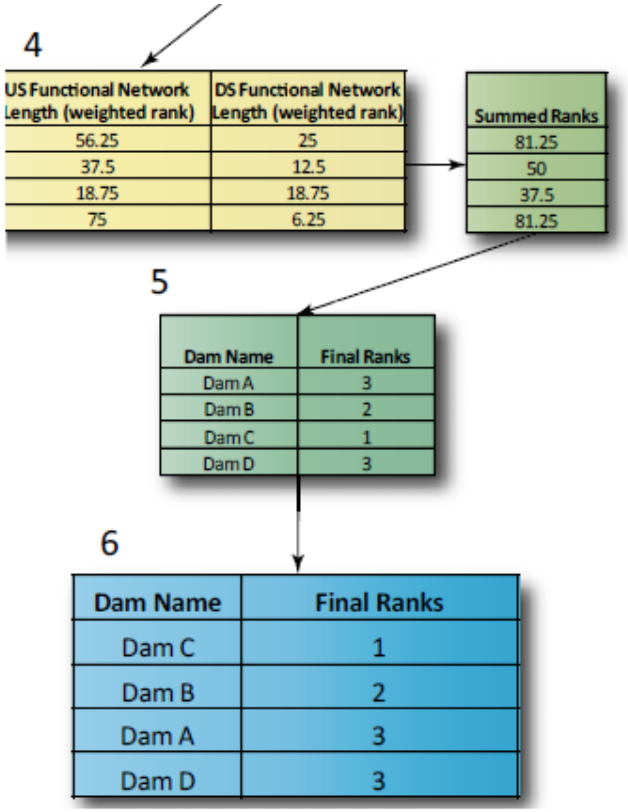
Highlights

- Dam removals in New England are often characterized by conflict.
- Dam removals are a lens through which to investigate the politics of ecological restoration.
- Cultural dynamics, micropolitics, and competing interpretations of nature help to explain resistance to removals.

Rankings

- Partner feedback needed (iterative process)
- Develop system of what is desirable vs. undesirable in terms of ecological function of dams AND what people want in their community dams (social dimensions)
- Ecological rankings
- Social rankings
- Final overall dam rankings



White Rock Dam & Removal

Kenyon Mills Dam & Nature-like-fishway