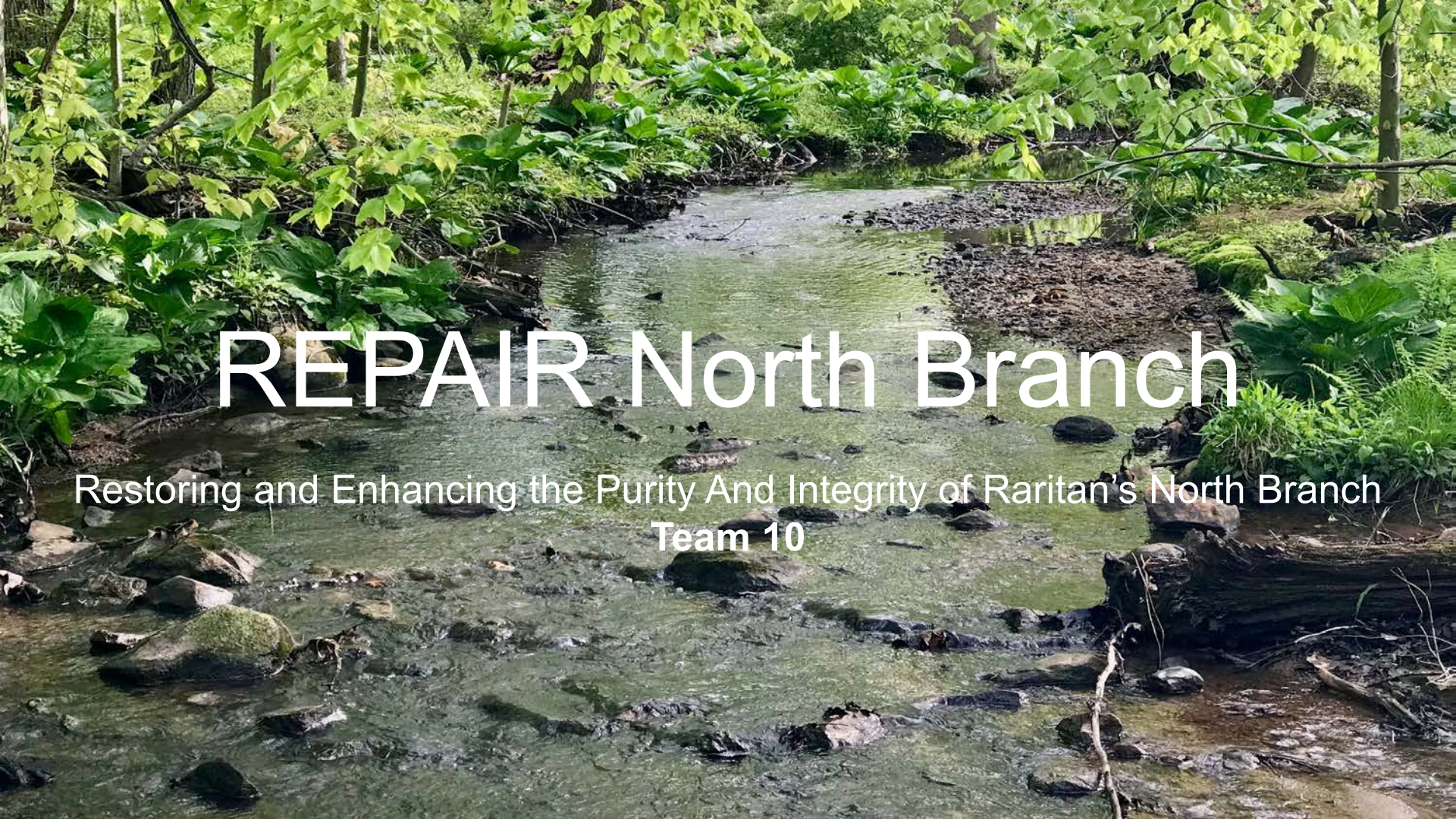


REPAIR North Branch

Restoring and Enhancing the Purity And Integrity of Raritan's North Branch

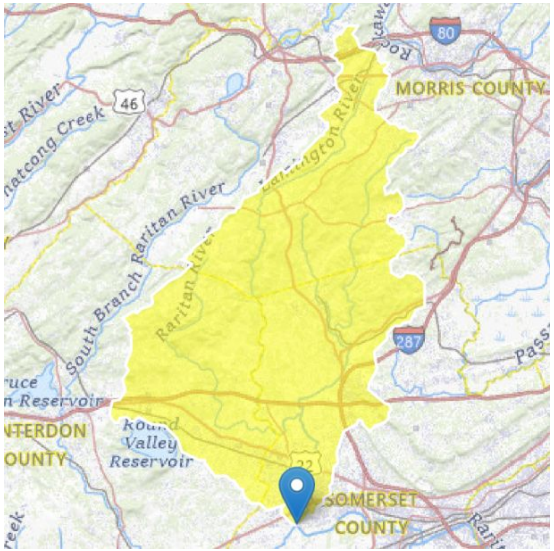
Team 10

Outline

- Mission Statement
- Background
- History
- Existing Policies and Plans
- Problem and Solution 1
- Problem and Solution 2
- Problem and Solution 3
- Conclusions

Mission Statement

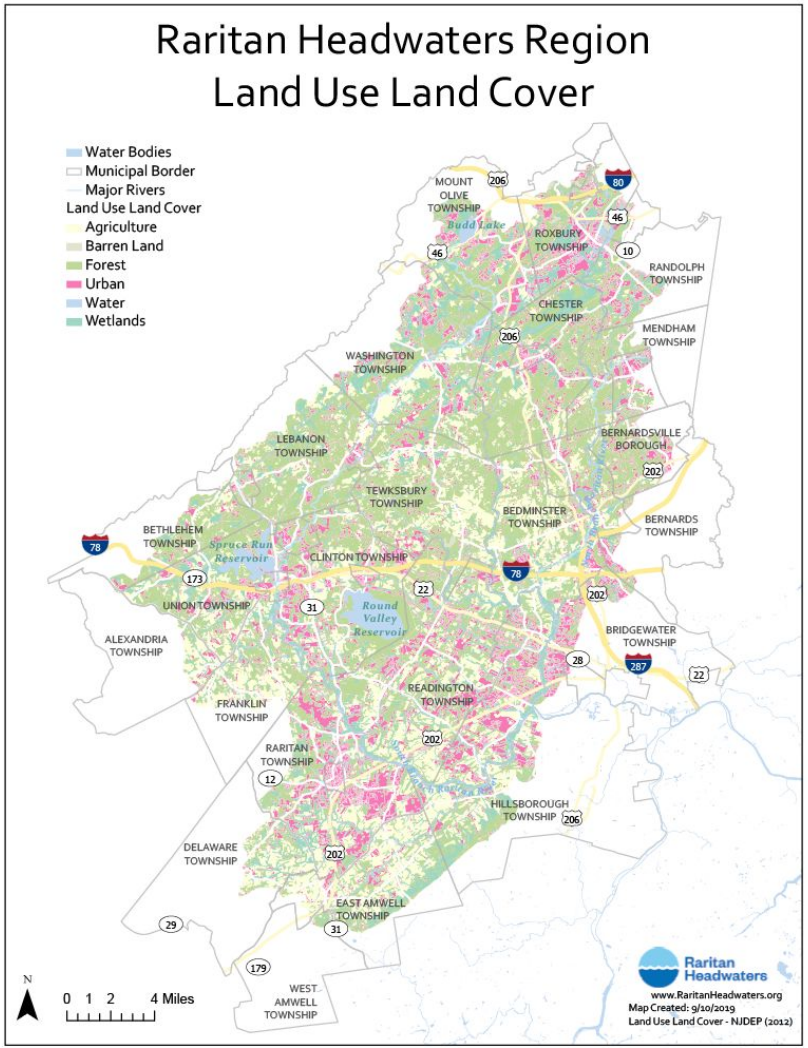
The goal of REPAIR North Branch is to address anthropogenic issues which threaten the health of the North Branch Raritan River Watershed in Morris and Somerset Counties in New Jersey. The Raritan River provides drinking water to 1.8 million people, so ensuring the health of its headwaters is crucial. This plan will introduce strategies to reduce major human-related pollutants below acceptable levels, measurably improve the ecosystem health of this watershed by removing dams for fish passage, and bring all tributaries to an acceptable stream temperature condition by 2040.



Background

- Around 10 municipalities lie at least partly within the watershed
- Large mix of land uses
- Drainage area of 189 sq mi
- Population density of 470 people per square mile
- Entire basin serves 1.8 million people
- North and South Branch collectively designated as NJDEP WMA 08
- Raritan is the longest river that flows within NJ

Source: Streamstats, NJDEP, Raritan Headwaters Association



History

- The North Branch rises in Morris County in eastern Mendham Borough and flows south through Somerset County. The Lenape called the confluence of the two branches "Tucca-Ramma-Hacking," meaning "the flowing together of water".
- The first people to settle the valley were the Naraticongs, a branch of the Lenape, who hunted the forests, fished the river, and farmed the fertile floodplain.
- Colonial settlers built mill dams throughout the 1700s-1800s, fragmenting fish passage - shad populations collapsed from tens of millions of pounds annually to a fraction of that by the 20th century.
- The American Cyanamid facility in Bridgewater discharged chemical wastes directly into the Raritan River for decades starting in the 1920s - mercury, chromium, arsenic, lead, and PCBs - leading to its designation as a Superfund site in 1983.
- Comprehensive restoration measures in recent decades have helped recover fish populations, and efforts to reopen migratory fish passage are ongoing through dam removals and fishway construction.

Source: Raritan Headwaters Association

Existing Organization: Raritan Headwaters Association

- Two organizations formed 1959; Merged 2010
- Aims to ensure clean water quality in the Raritan River watershed
- North and South Branch Raritan Watershed Conservation Plan
  - Divides headwaters into 52 subwatersheds
  - Uses data to rank each subwatershed
  - Has overarching goals, but no quantitative metrics

Source: Raritan Headwaters Association

Existing Policies: NJDEP

- Total Maximum Daily Loads (TDML)
- Various Types of Monitoring
- Watershed Management Plans (WMP)
- Limiting Pesticide Use
- Permitting

Example Legislation:

- Freshwater Wetlands Protection Act
- Stream Cleaning Act
- Flood Hazard Area Control Act

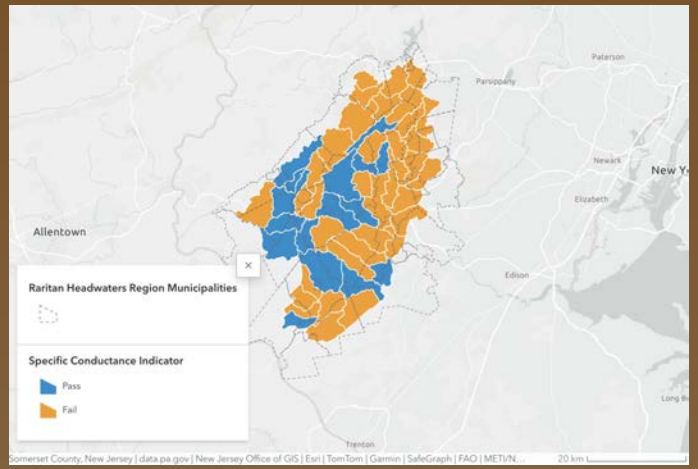
Source: NJDEP

Problem 1: High Specific Conductance

The Raritan earned an F in the 2024 RHA Report Card for specific conductance.

- Road salt applied to impervious surfaces washes into streams during storm events and snowmelt.
- Chloride can leach into groundwater and re-emerge at the surface later in the year, meaning conductance stays elevated even outside of winter salting season.
- Specific conductance rises with impervious surface cover, and chloride criteria frequently spikes at sites with greater than 9-10% impervious cover.
- Freshwater organisms are adapted to low-salinity environments elevated chloride disrupts macroinvertebrates, amphibians, and fish
- Most large-scale drinking water treatment plants in NJ cannot remove salt.

No state-level regulation currently caps how much salt municipalities or contractors can apply. It's entirely discretionary.



Solution 1: Smart Salting & Source Reduction

Road salt pollution is almost entirely preventable with better practices.

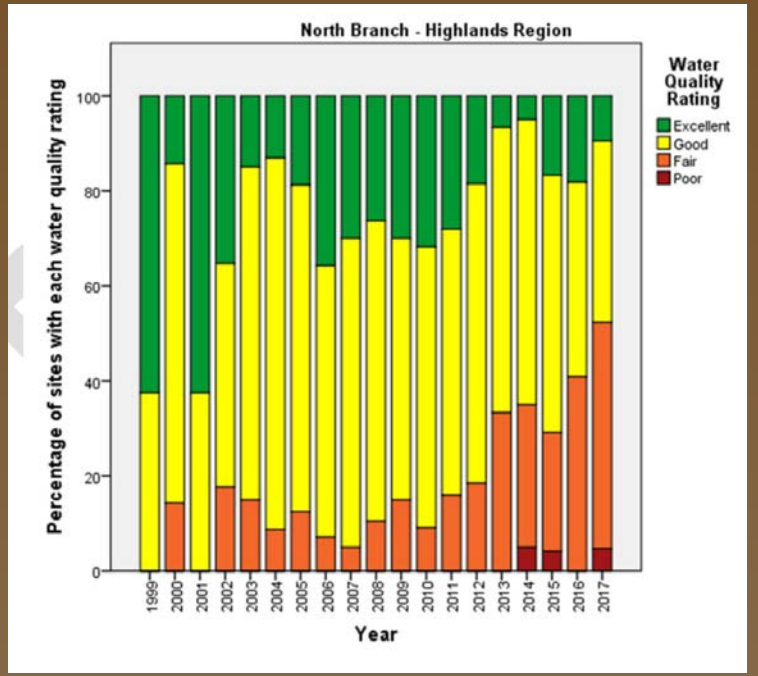
- Train municipal road crews and private contractors on application rates, timing, and equipment calibration
    - Start with a ride-along on a public works salting operation, and observe what factors/locations are leading to oversalting
    - Properly calibrated spreaders can cut salt use by 30-70% with no loss of safety (Sustainable Jersey, 2023)
- Applying liquid brine before a storm prevents bonding to pavement and requires far less salt than treating packed snow
- Upgrade wastewater treatment to remove salts
    - Municipal and industrial wastewater discharge is a secondary conductance source

Target: reduce specific conductance at all failing sites to 388 µS/cm, moving the North Branch from an F to a passing grade by 2035 and bringing back sensitive aquatic insects

Problem 2: Poor Ecosystem Health

- Ecosystem health is measured both by the quality of the riparian habitat and by the High Gradient Macroinvertebrate Index (HGMI)
  - Excellent and good streams are decreasing, while fair is increasing
- Key Factors
  - Scour and erosion from fast-moving runoff
  - Dams and weirs blocking organism passage
- Hinders the access of organisms to critical habitats

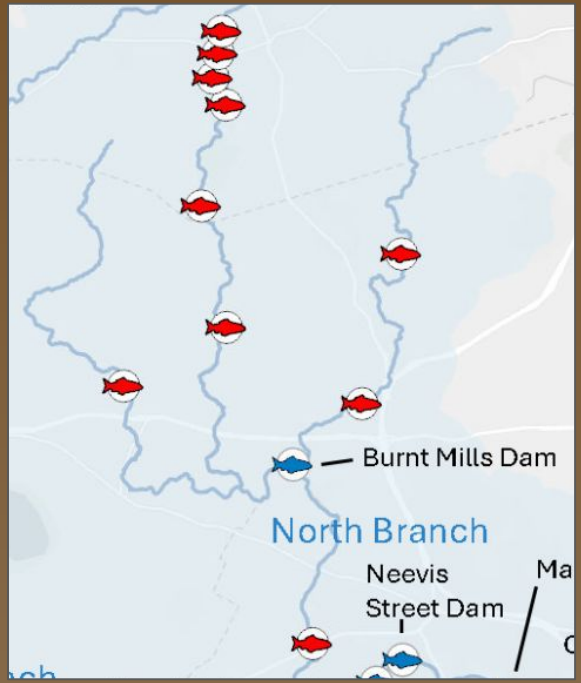
HGMI Trends 1999-2017



Solution 2: Dam Removal

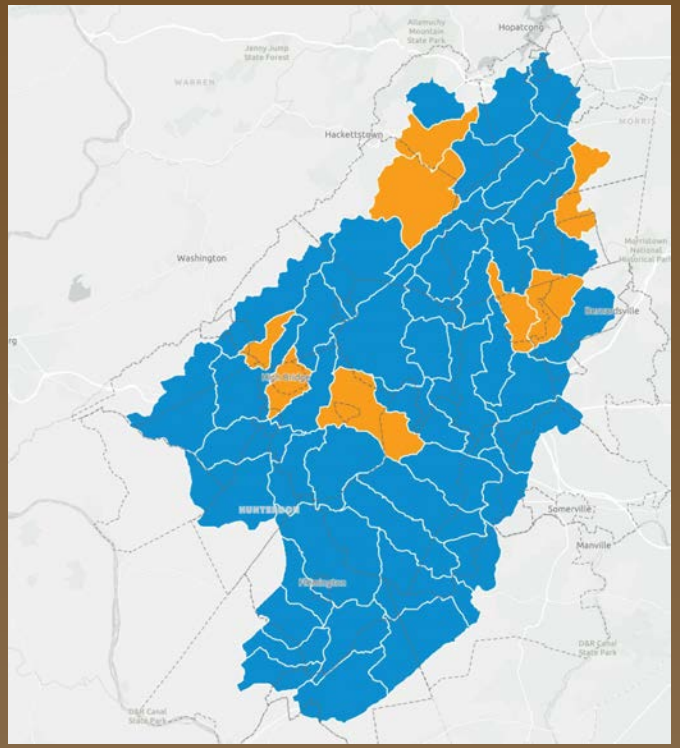
- Secure Increased Funding for Dam Removal
  - Expand the Raritan River Fish Passage Initiative by enlisting dedicated grant-writers
  - Obtain funding from local superfund and NRDA settlements, conservation organizations, and federal programs
  - **Measurable Goal:** Remove 7 upstream dams by 2040, at a rate of 1 per 2 years, to reduce scour downstream, expand healthy riparian habitat, and provide fish passage

10 existing dams on North Branch (red)



Problem 3: High Stream Temperature

- In the North Branch watershed, many streams border on, or exceed, safe temperatures for organisms
    - Peapack Creek, Rockaway Creek, and parts of the North Branch itself
- Warmer water leads to excess growth of cyanobacteria, causing harmful algal blooms
- Insects and fish mature faster but struggle to reproduce



Solution 3: Buffers and Basins

Expand Buffers

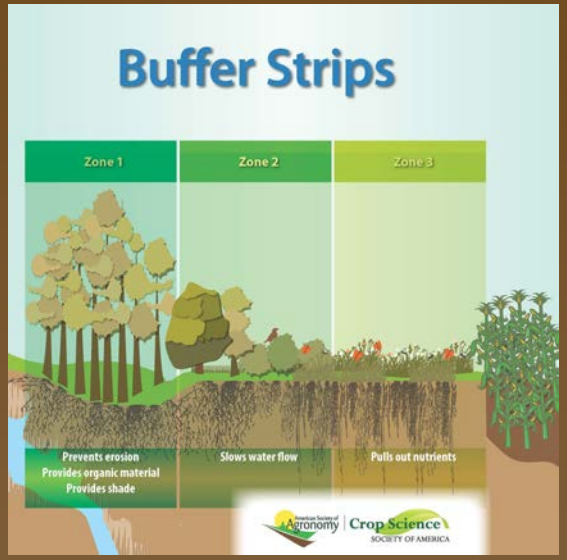
- Map areas of highest impervious surface
- Plant 50 ft buffer in 25% of suburban streams by 2035
- Controls temperature, erosion, litter, and nutrient and pesticide runoff

Control temperature at the source

- Plant shade trees on existing unshaded streets
- Retrofit retention basins into infiltration basins
    - Loosen soil, flatten base, plant native vegetation
- Work with regional planners to encourage green stormwater management in code

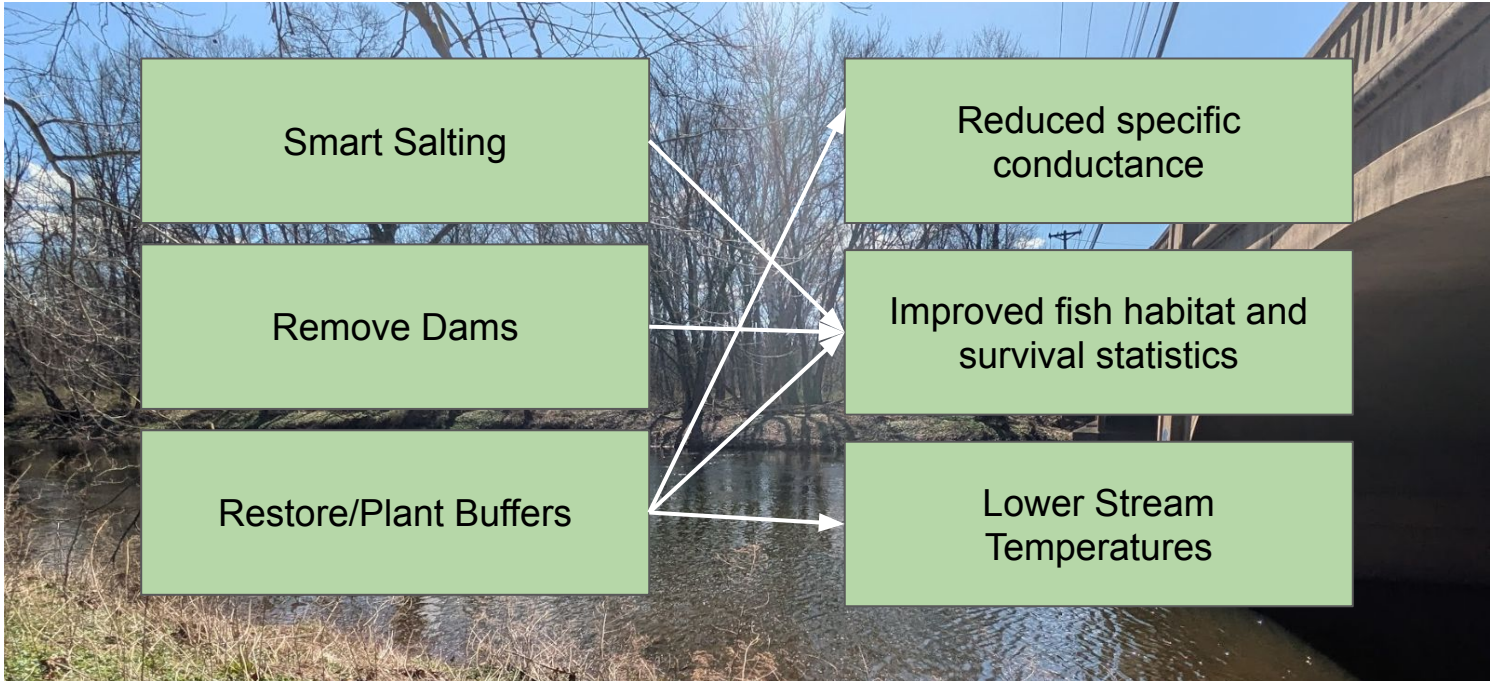
Measurable Goal

- Ensure that all tributaries of the North Raritan River do not exceed 70^{o} MWMT by 2040
    - Important to not just address the problem streams of today, but also the ones that are near the threshold due to climate change



Conclusion and Recommendations

- Solutions are intertwined, and have multiple effects on different goals



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