

# Fish Grow on Trees

## Communicating the importance of forested riparian areas for Brook Trout

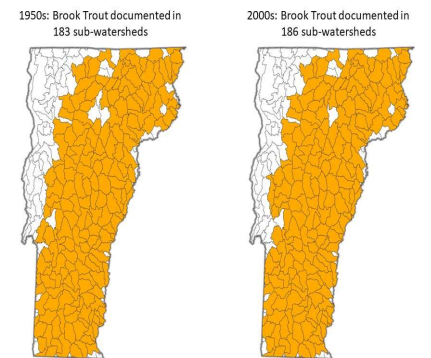


Will Eldridge

Aquatic Habitat Biologist, VFWD

Riparian Buffer Practitioners' Meeting

March 10, 2021



# Stream trout of Vermont



Brook Trout – light spots on dark background



Brown Trout – dark spots on light background



Rainbow Trout – dark spots

# VFWD 2020 Angler Survey

Brook trout is the species most preferred by resident anglers

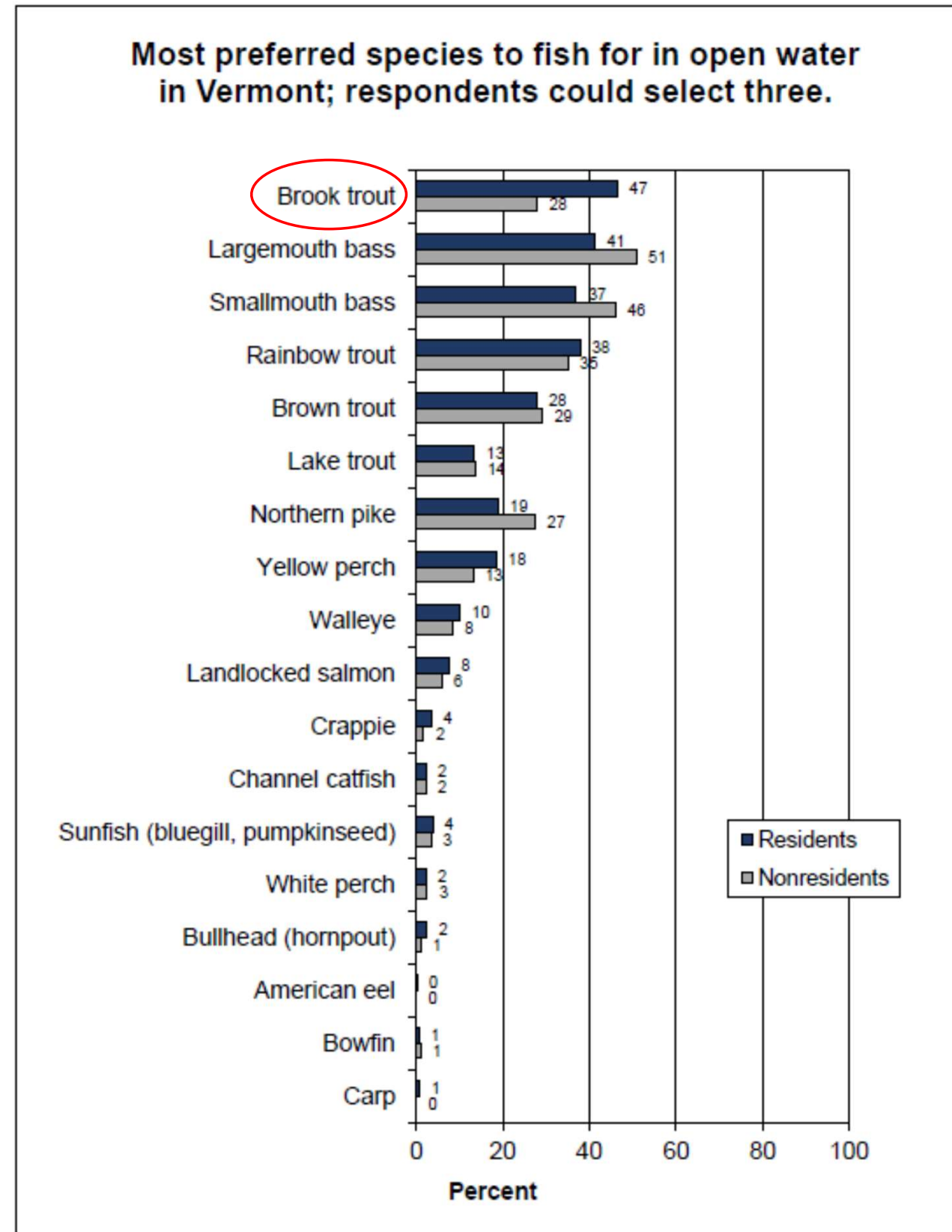
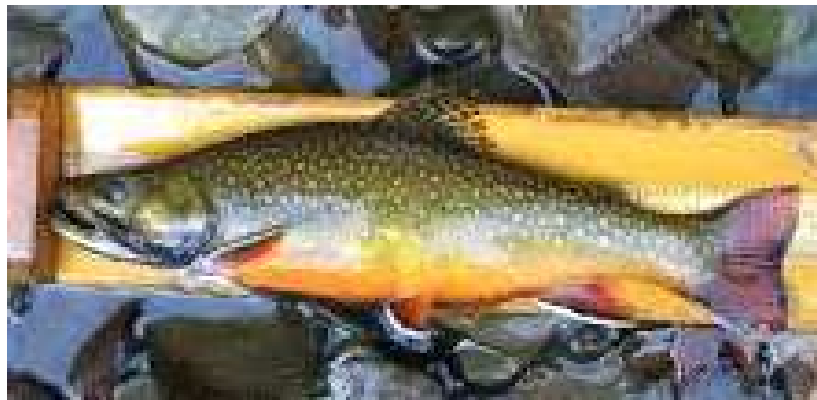
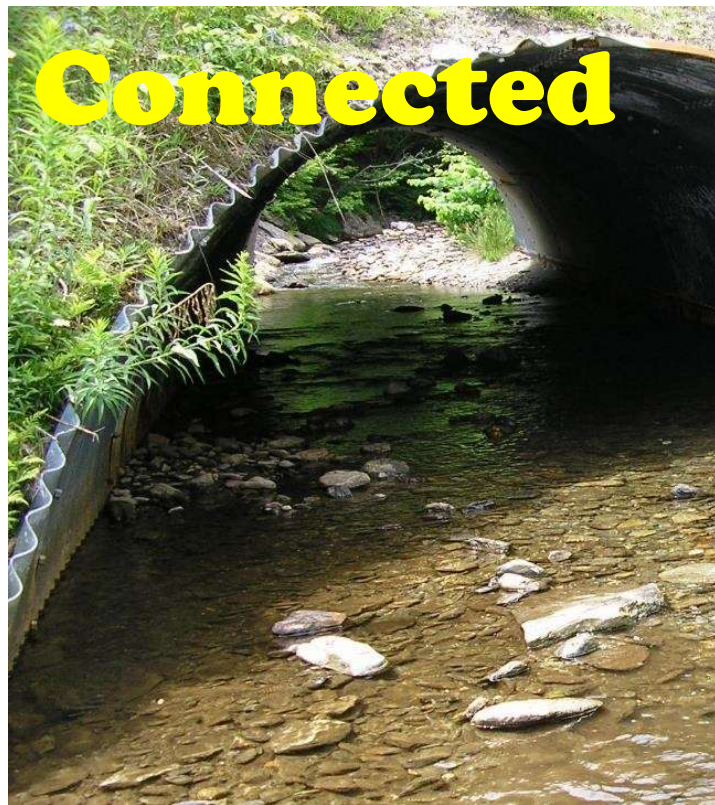
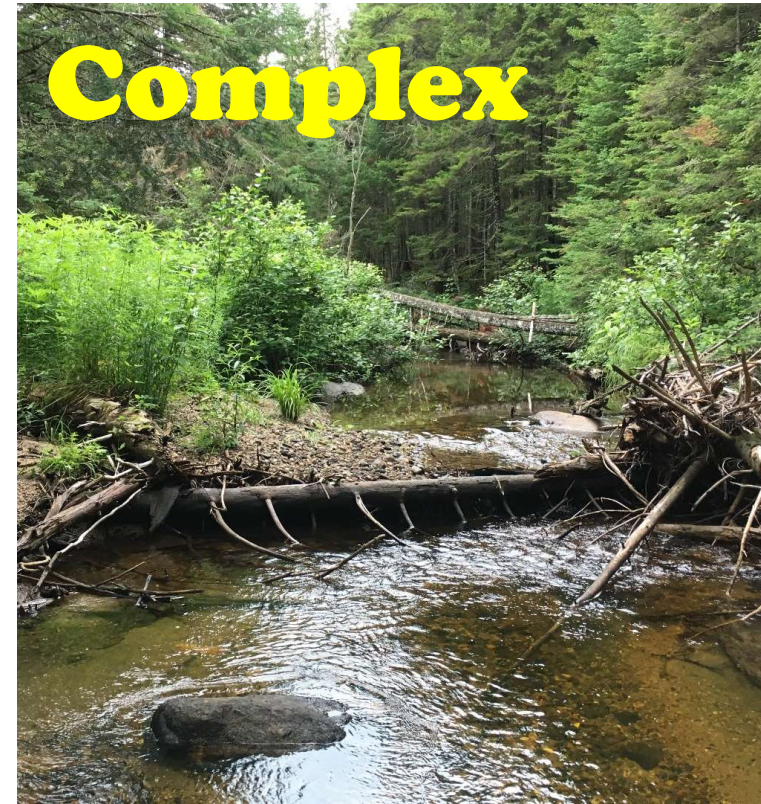
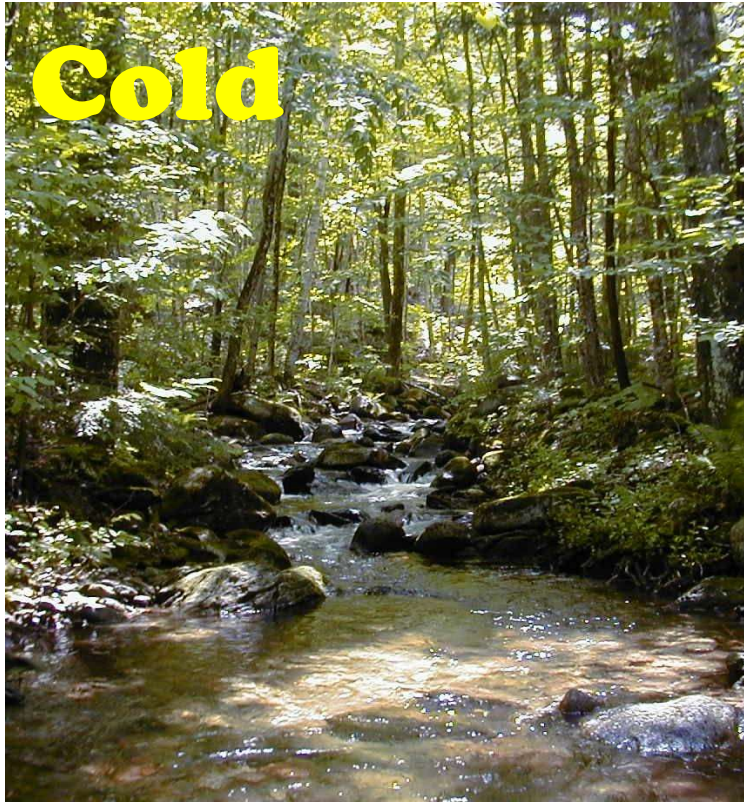


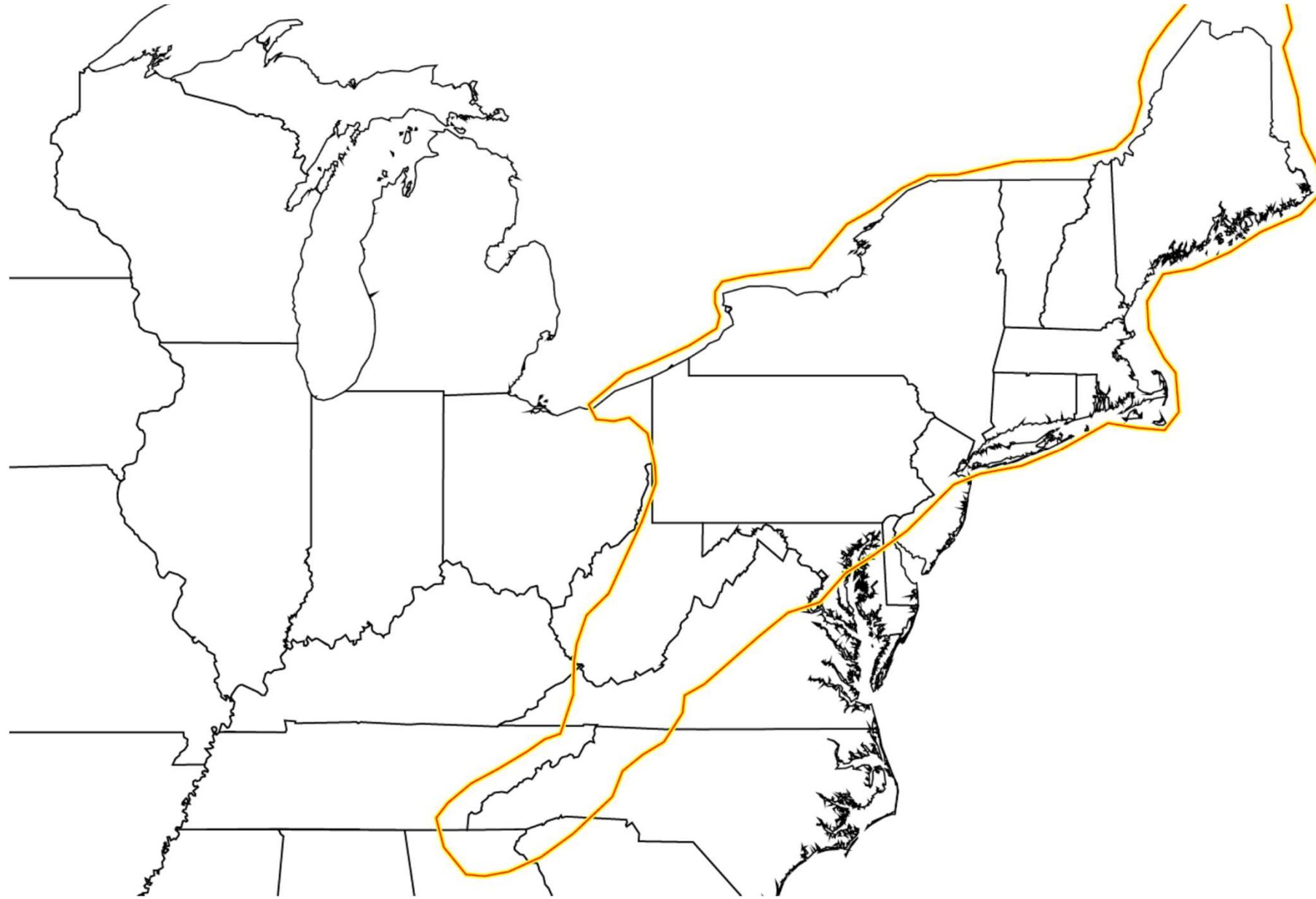
Figure 6. Top Three Preferred Species in Open Water in Vermont

# Brook Trout (*Salvelinus fontinalis*)

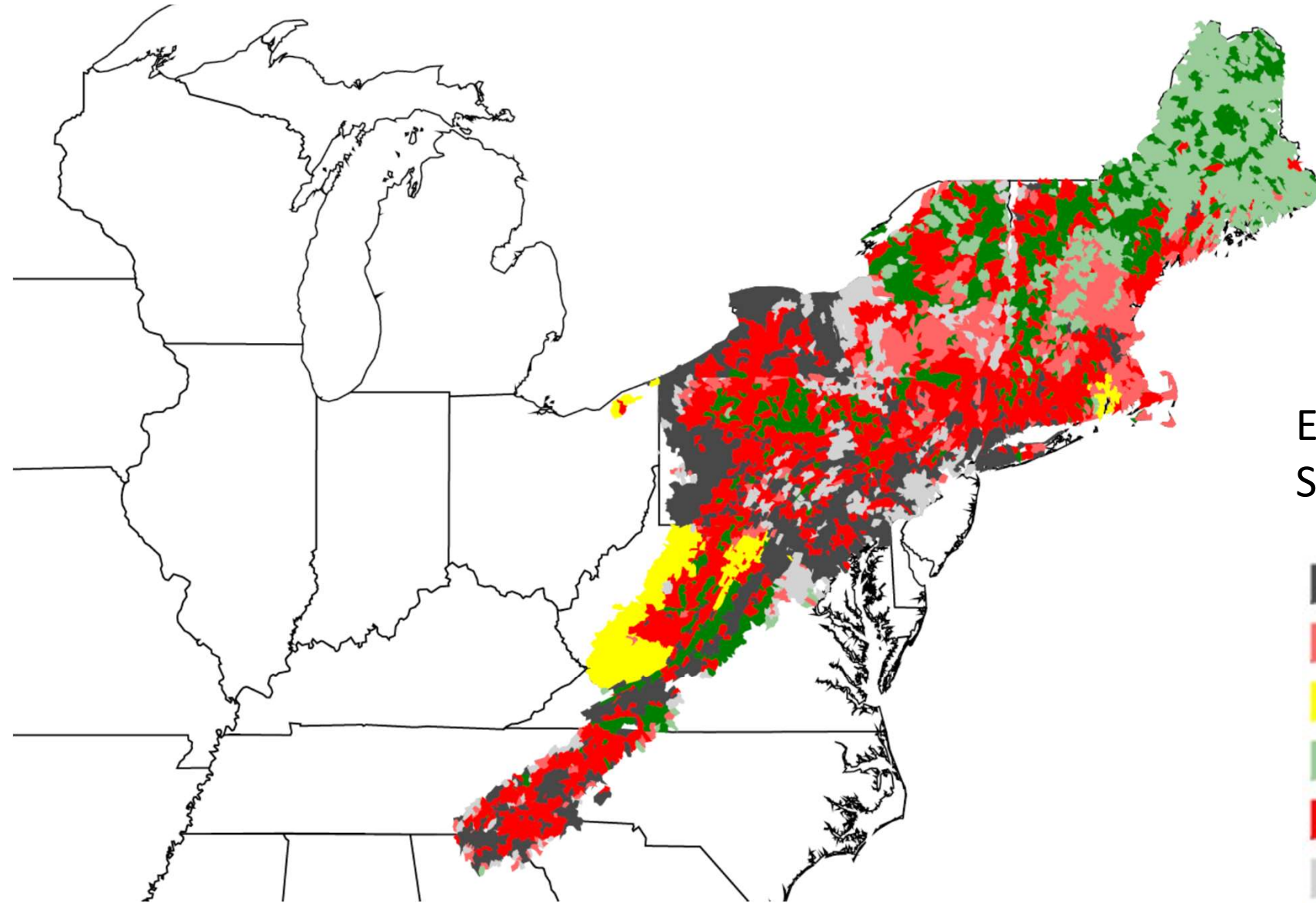




# Brook Trout Range in Eastern US



# Brook Trout Status



## Eastern Brook Trout Joint Venture Subwatershed Assessment

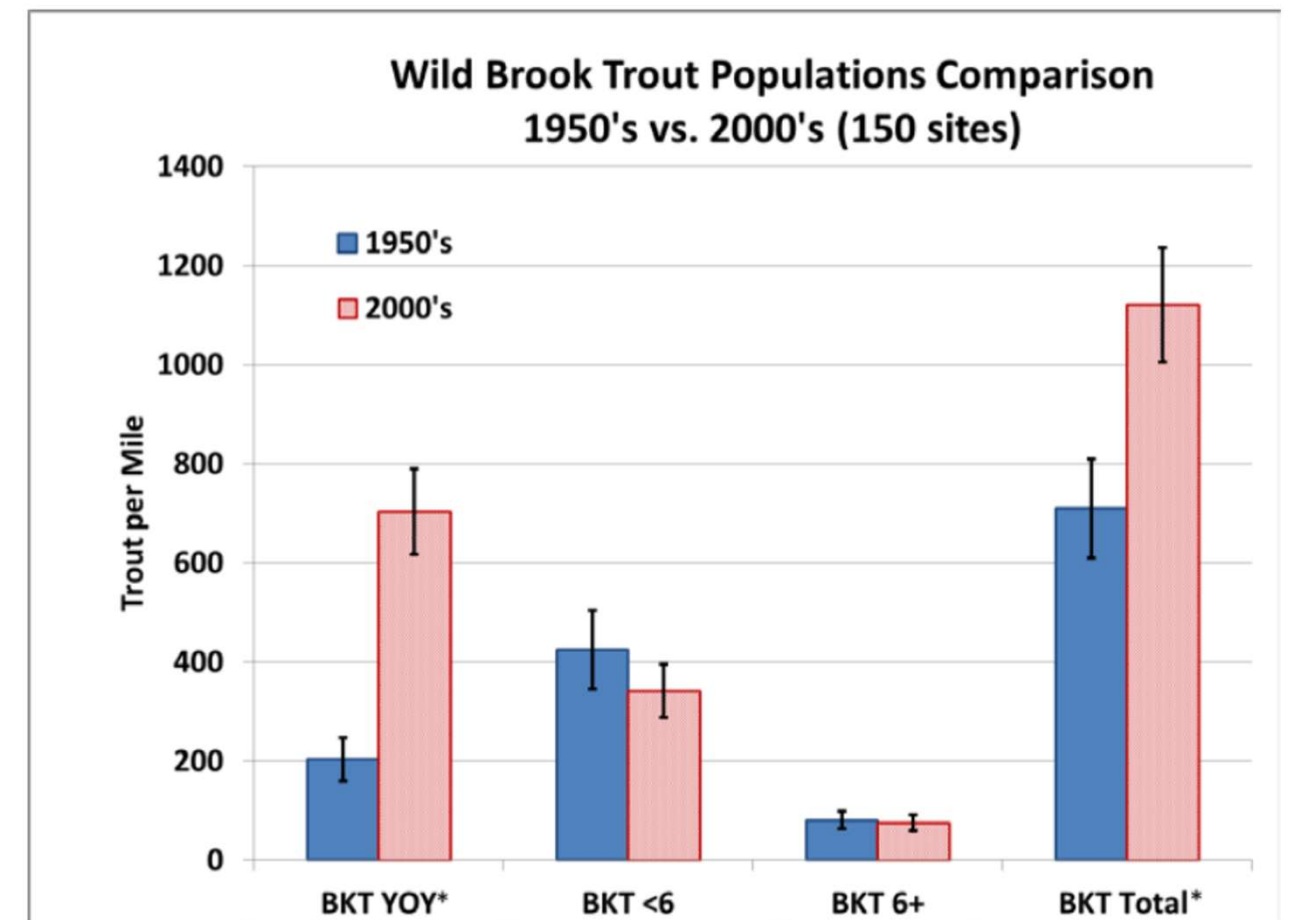
- 0 - Extirpated
- 1p - Predicted: Reduced
- 1.1 - Absent: Unknown history
- 2p - Predicted: Intact
- 1 - Reduced
- 0p - Predicted: Extirpated
- 2 - Intact

# Brook Trout Status in Vermont

1950s: Brook Trout documented in 183 sub-watersheds



2000s: Brook Trout documented in 186 sub-watersheds

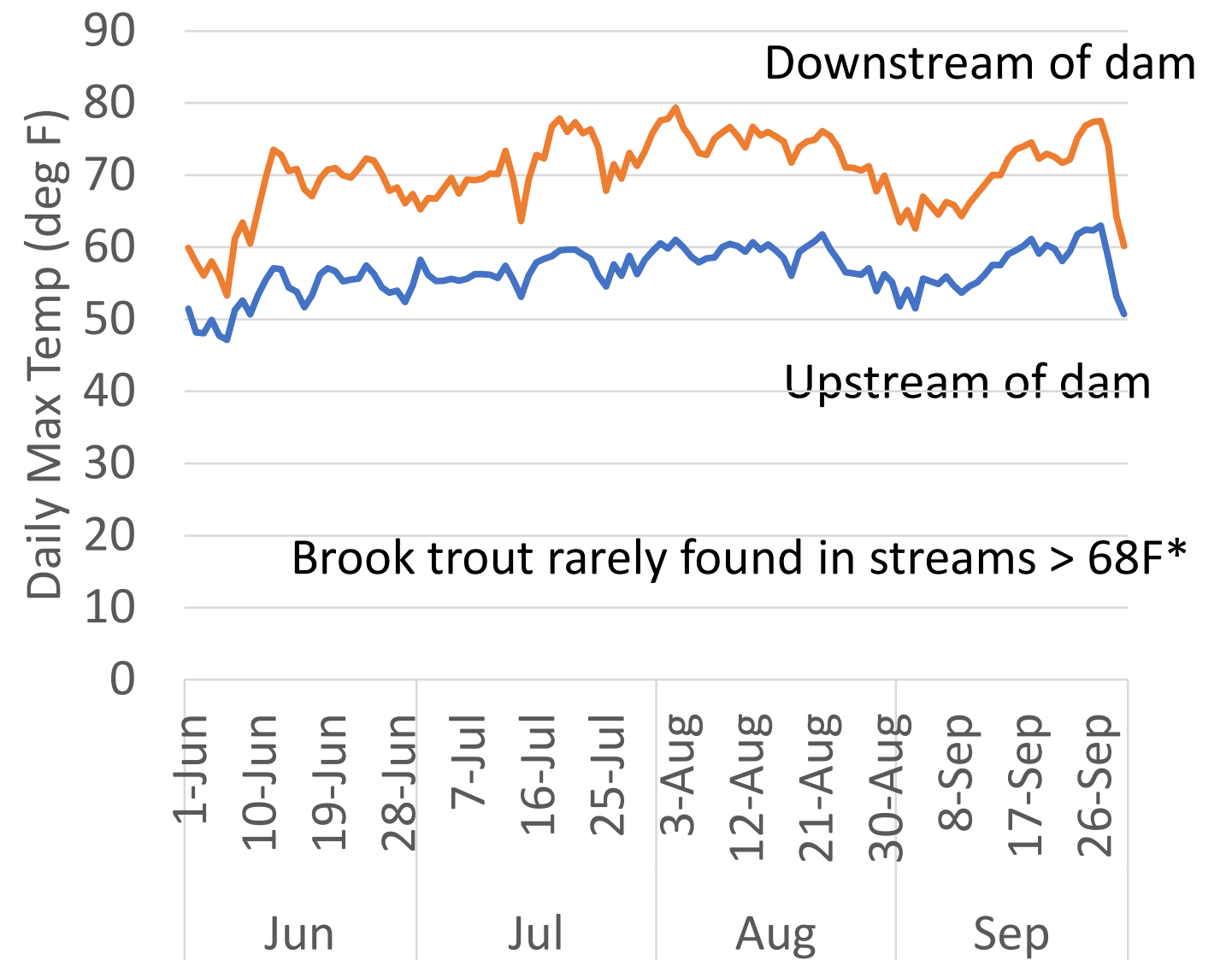


**Figure 1.** Mean wild brook trout densities and 95% confidence interval bars from 150 sites sampled during the 1950s and 2000s. (\* denotes significant differences between time periods  $p < 0.05$ ; t-test).



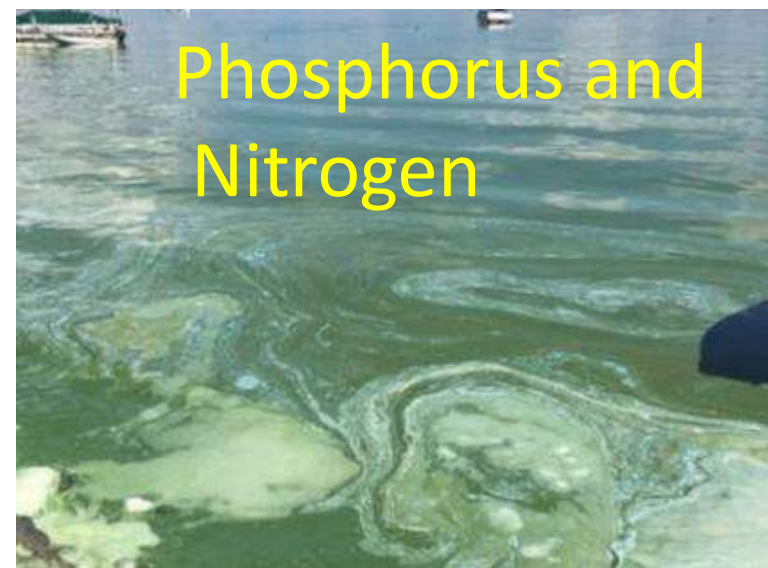
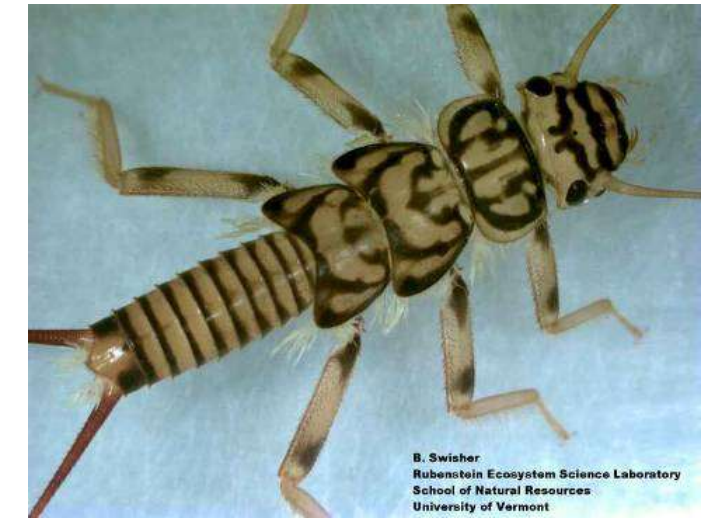
# Brook Trout threats - Temperature

Temperature is the most important factor limiting Brook Trout distribution in Vermont\*



\*Kratzer and Warren 2017. NAJFM

# Brook Trout threats - Sediment

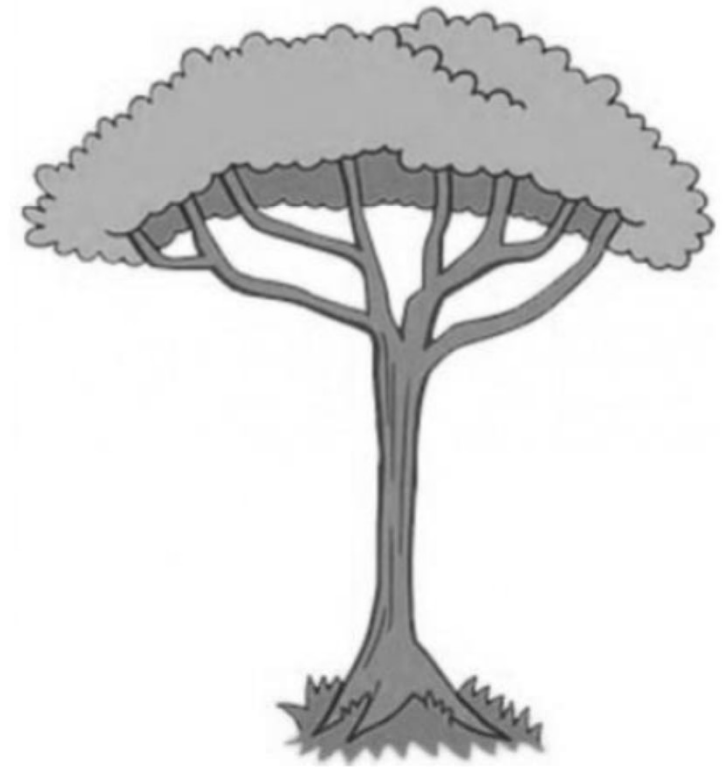


# Brook Trout threats – Physical Habitat Alteration



# Importance of forested riparian areas

## - Trout Grow on Trees



The FISH... eat the INSECTS... on the LEAVES.... that come from TREES!

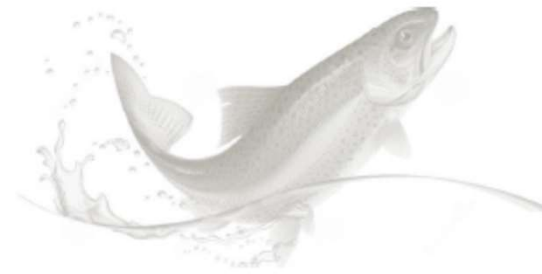
# Trout Grow on Trees®

## Activity Guide



**STROUD**  
WATER RESEARCH CENTER  
[www.stroudcenter.org](http://www.stroudcenter.org)

<https://stroudcenter.org/education/trout/>



## Trout Grow on Trees®

### Grade Level

4-12

### Subject Areas

Life Science,  
Environmental Education

### Duration

Preparation time: 10 minutes

Activity time: 20 minutes

### Group Size

1 group of 30 students

### Setting/Season

Optimal time is during or  
at trout release day, and  
when trees are leafed out.  
Indoors or outdoors

### Key Terms

Stream health, trout, trees,  
riparian zone, nutrients,  
macroinvertebrates,  
food web, watershed tea

### Skills

Organizing, interpreting,  
identifying relationships,  
applying learned  
information, presenting

### Objectives

At the conclusion of the activity, students will be able to:

- State three reasons why trees are important for stream health
- Explain how trout, leaves, aquatic insects, and trees are connected
- Describe what trout need in order to live in the wild

### Materials

- Fingerling trout in a small aquarium with aeration OR an image of brook trout (or your native trout species)
- Live tree seedling OR an image of a tree
- Small pile of tree leaves
- Live aquatic macroinvertebrates in a pan with stream water OR macroinvertebrate images (<https://stroudcenter.org/macros/gallery/>)

### Making Connections

A discussion linking trees, leaves, insects, and trout will make a connection to students about the importance of trees near streams. Many have understood one part of the equation but not the entire picture. Some will know the importance of trees to streams, the food web, and that leaves provide food for a stream. Students will learn why and how trout grow on, or rather grow from, trees!

### Background

Brook trout once inhabited every coldwater stream in the mid-Atlantic and northeast region of the United States but populations have dramatically declined during the past 200 years. The removal of streamside forests has greatly contributed to this decline and habitat loss for the brook trout. Hence, the restoration of streamside forests is a way to improve water and habitat quality of streams and a necessary prerequisite to help restore healthy trout populations.

Trout Grow on Trees® - Stroud Water Research Center - 2015

**STROUD**  
WATER RESEARCH CENTER

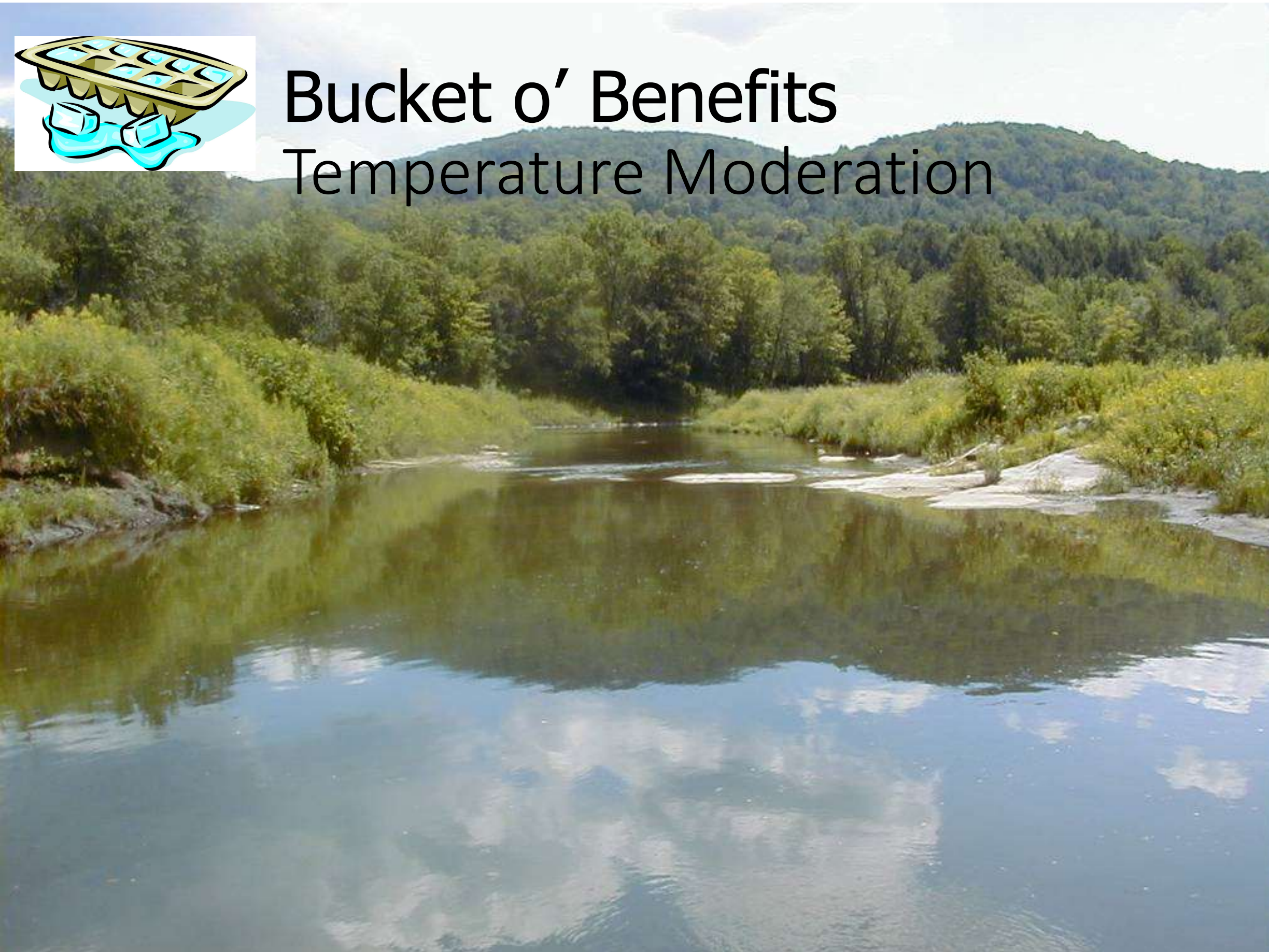
# Appendix A: Bucket o' Benefits

## *15 Reasons Why Streams Need Trees!*

**With a 5-gal bucket, put in symbols representing why trees might be important to maintain the health of streams, wildlife, and more!**

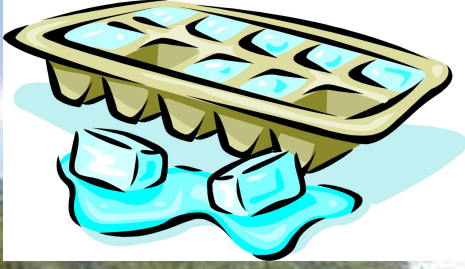
**Symbols include:** bottle of water (purify water), sea salt (keep pollution out of streams), ice tray (keep temperatures cool), sardines (fresh water for fisheries), sunblock (UV protection), battery/leaves/tea bag (food source, habitat for aquatic insects), sponge (absorb pollutants), filter mask (improve air quality, oxygen), fly swatter (control insect pests), stick/wood (habitat within streams for fish), broom (clean water), rubber duck (not pictured — habitat, shelter, food for wildlife), toilet paper (wastewater treatment).





# Bucket o' Benefits

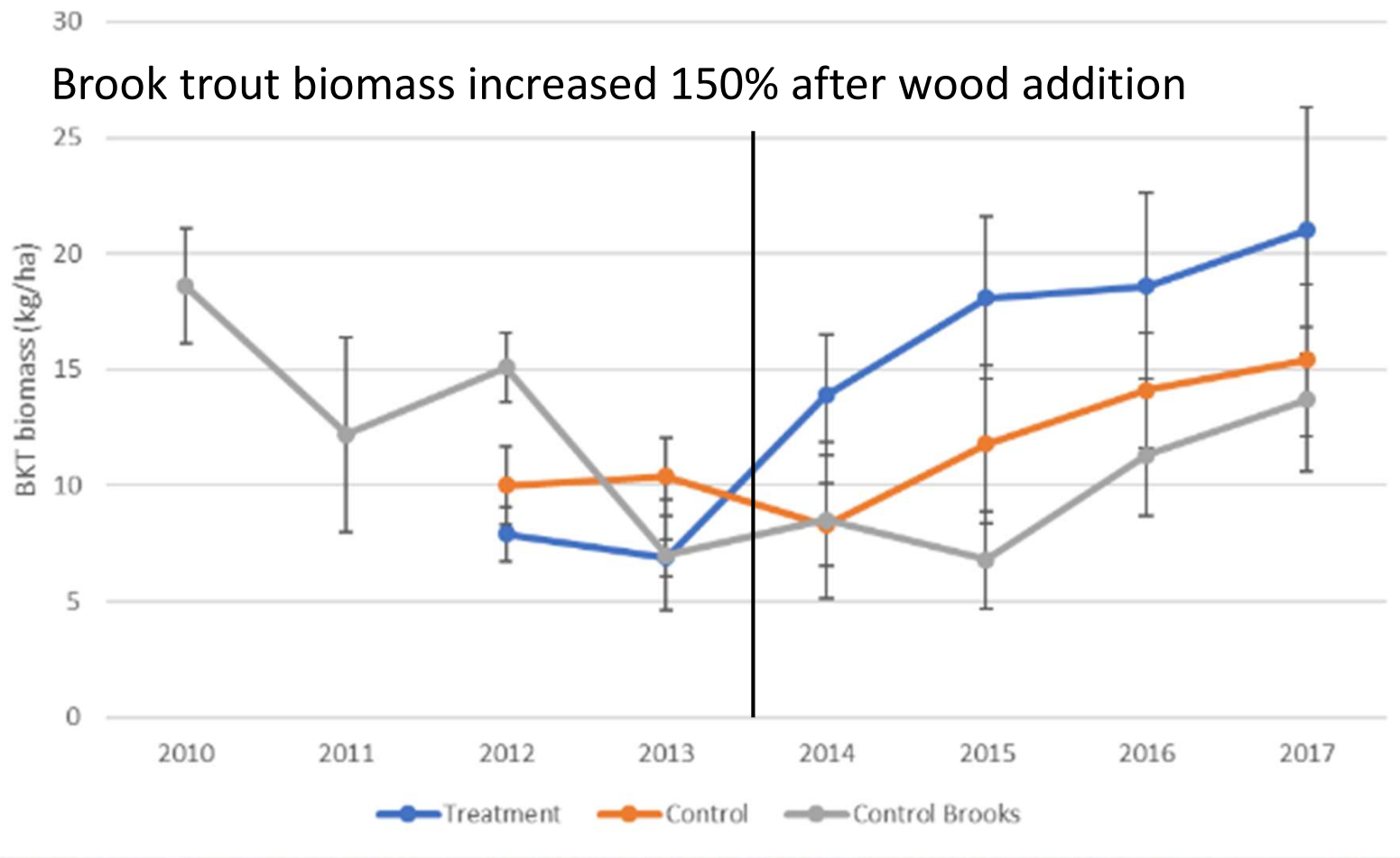
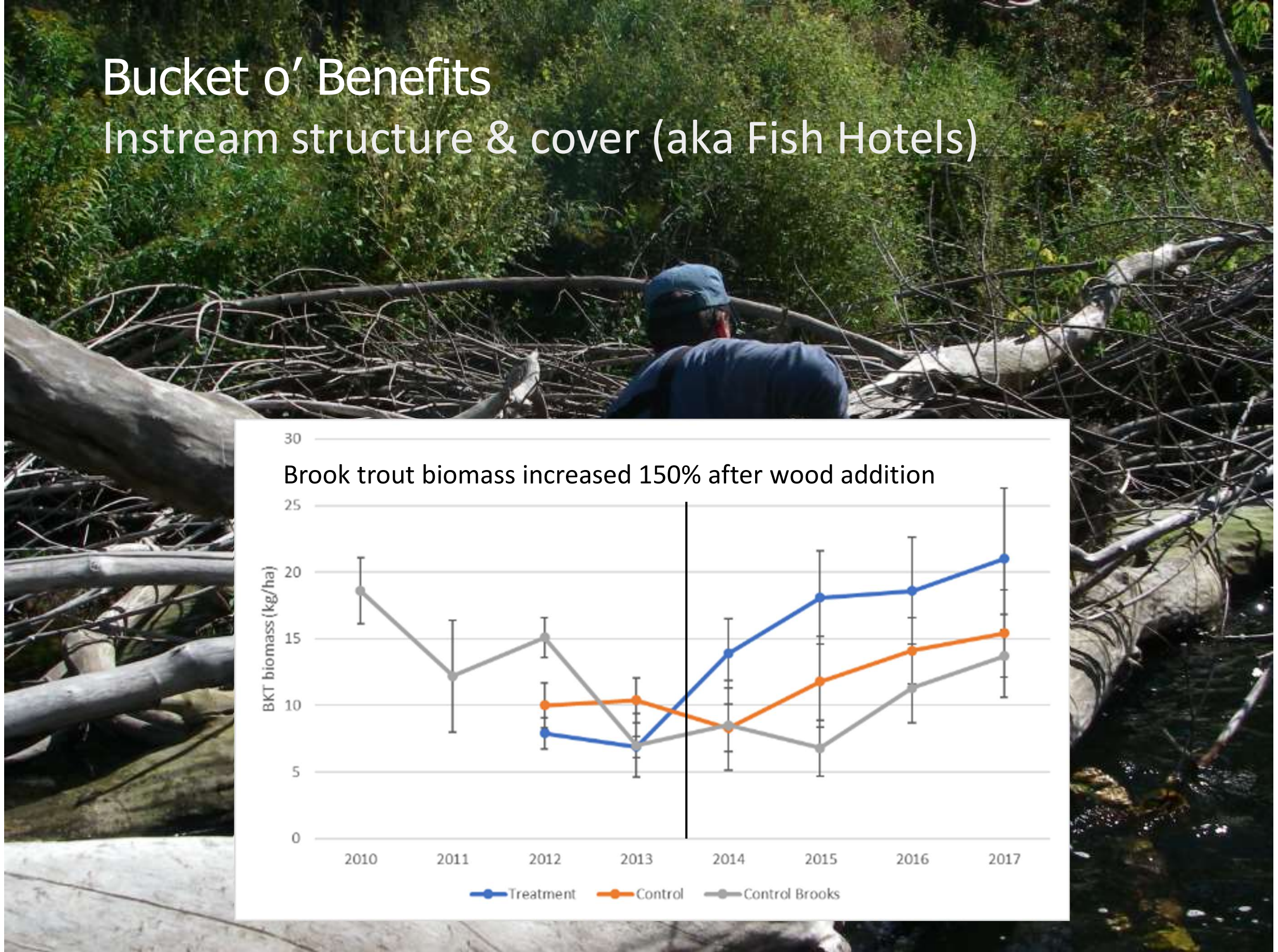
## Temperature Moderation





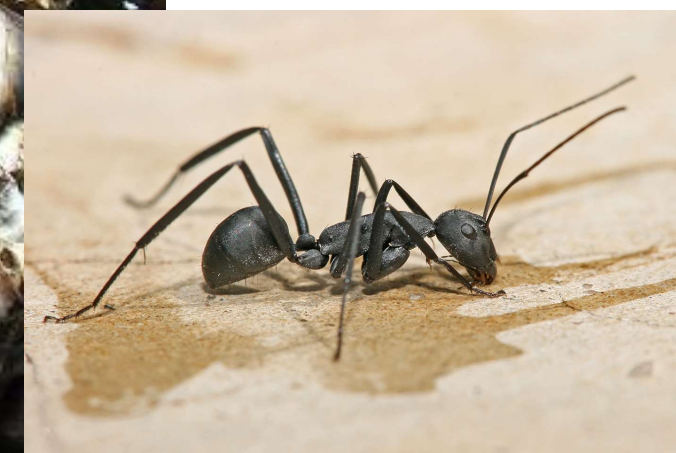
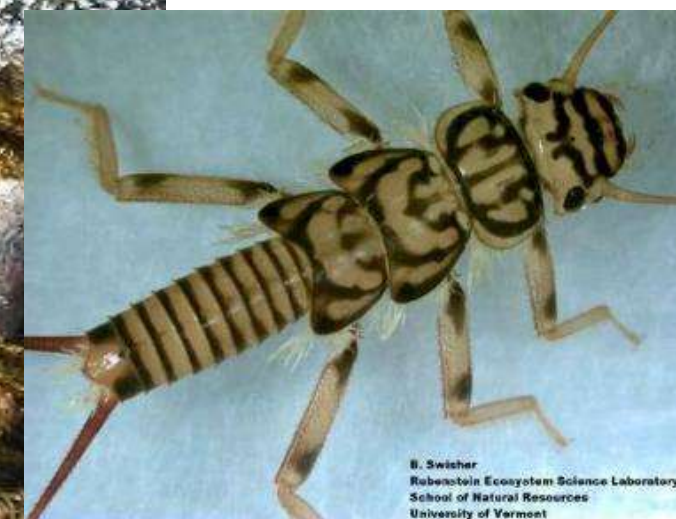
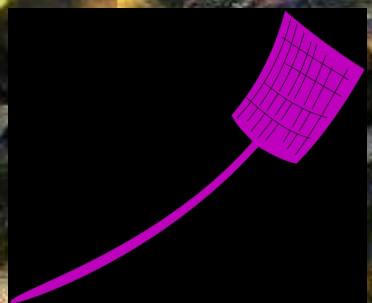
# Bucket o' Benefits

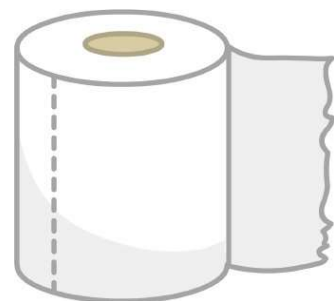
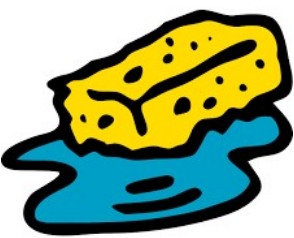
## Instream structure & cover (aka Fish Hotels)





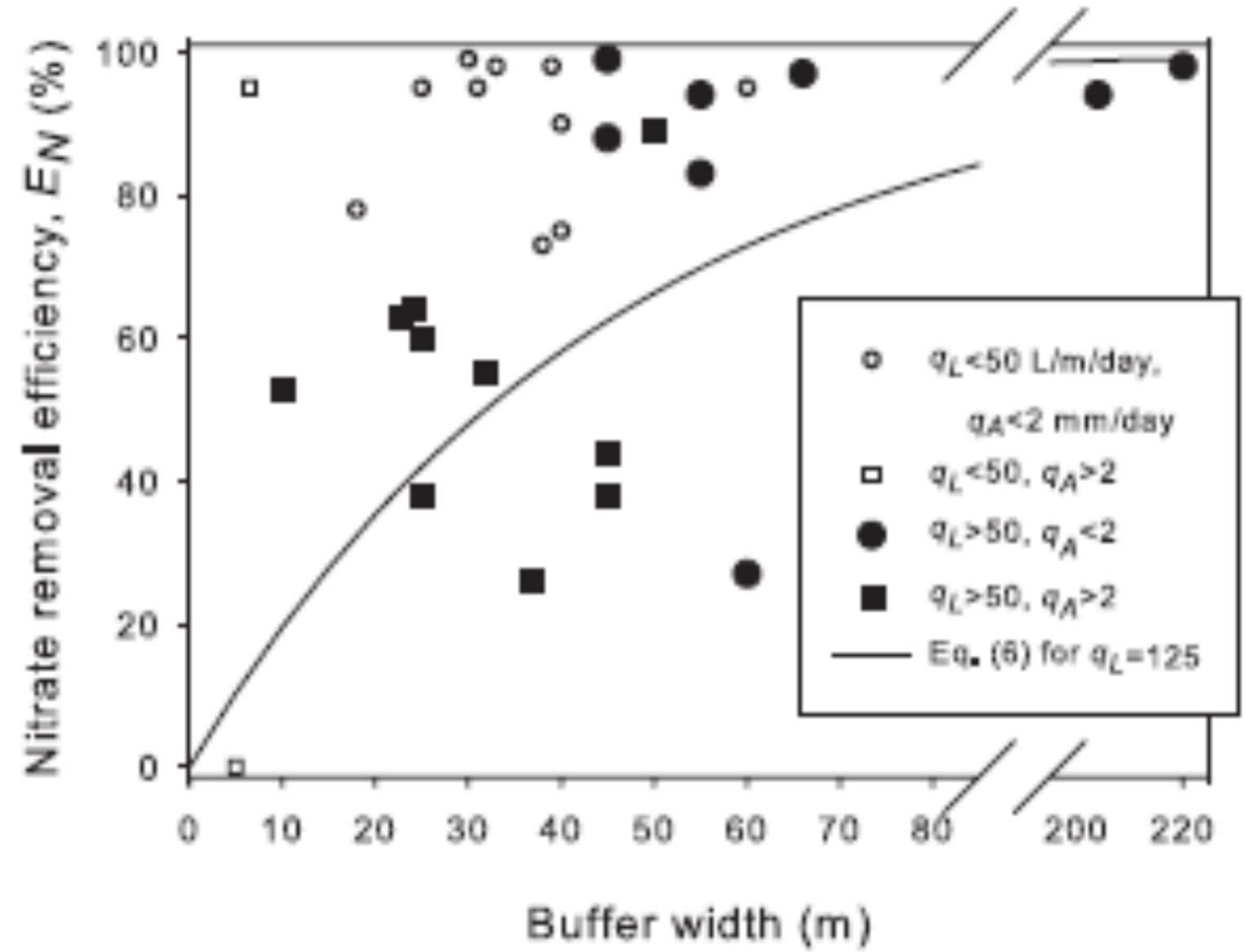
# Bucket o' Benefits Organic Input & Retention



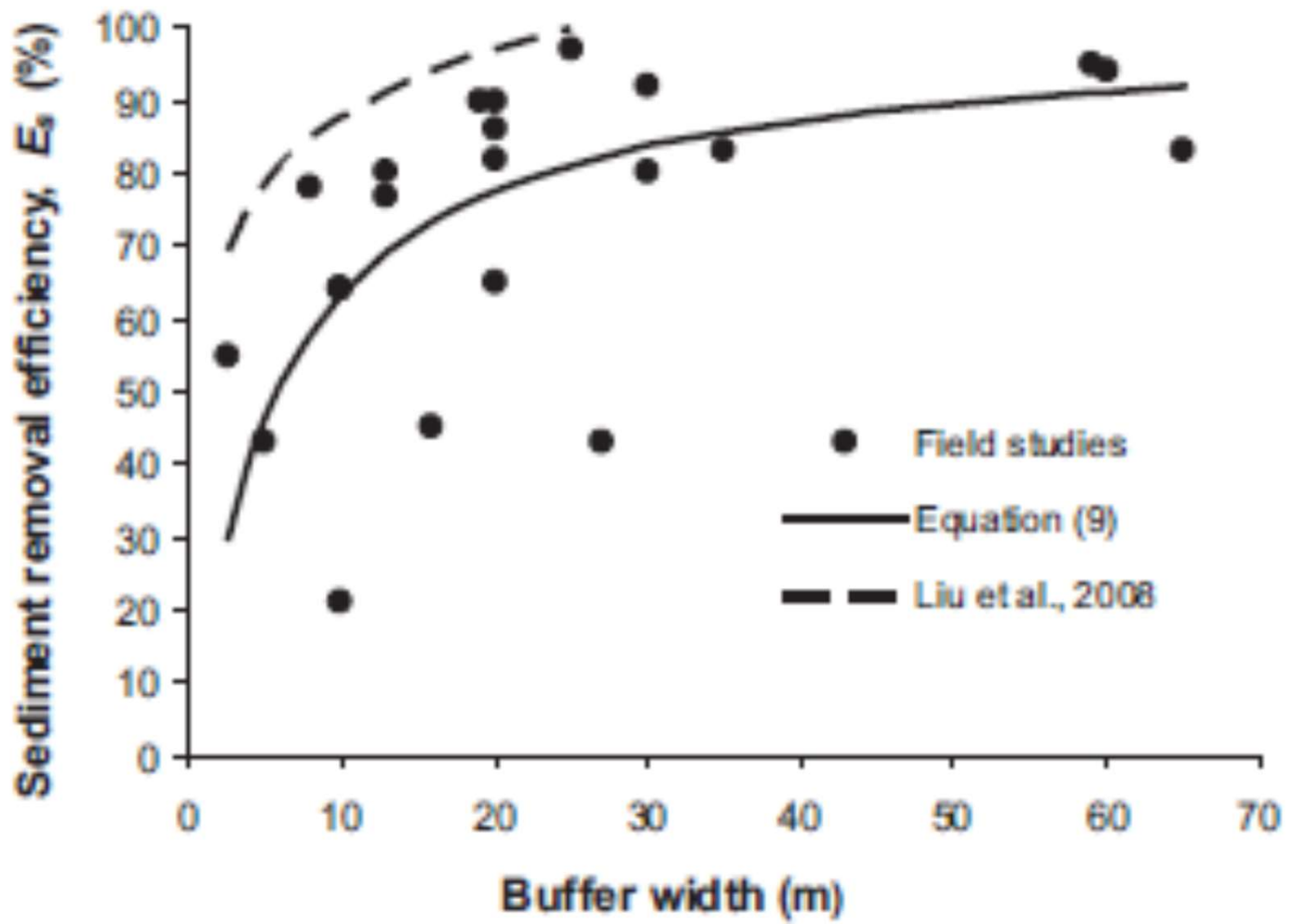


# Bucket o' Benefits Water Quality

Nitrate removal increases with buffer width



Sediment removal increases with buffer width



## B. Riparian Management Zone - Desired Conditions:

- Natural vegetation with species and structure appropriate to the natural community of the site. For sites that would be expected to have a forested natural community: community-appropriate species diversity, a range of tree ages and stem diameters (including large, old, young, small), vertical and horizontal structural complexity, and naturally abundant standing and downed dead trees of a range of species and diameters.
- Complete, continuous and diverse forest canopy, appropriate to the natural community of the site, to maximize temperature moderation function.
- Natural topography.
- Forest floor comprised of natural duff layer providing for infiltration and diffuse overland treatment of surface runoff.
- Complex instream, riparian and floodplain habitats comprised of large wood features which provide stable channel boundaries, including adequate roughness elements to moderate velocities and promote natural rates of sediment/organic material transport and retention.
- Forest conditions characterized by native species, natural disturbance processes, unaltered soils and natural hydrology.
- Connectivity to suitable upland habitats; streamside connectivity; hydrologic connectivity with other waterbodies.
- Low risk of widespread windthrow.
- Width – 100'

Riparian Management Guidelines for  
Agency of Natural Resources Lands



VERMONT  
Agency of Natural Resources  
December 2015

Questions?

