

## Summary of 2014 Surveys in the Beebe River Watershed







### Stream electrofishing at 19 locations

- 100 meters
- All fish collected and enumerated
- Macroinvertebrates Collected
- Observations/Potential Restoration Projects Noted



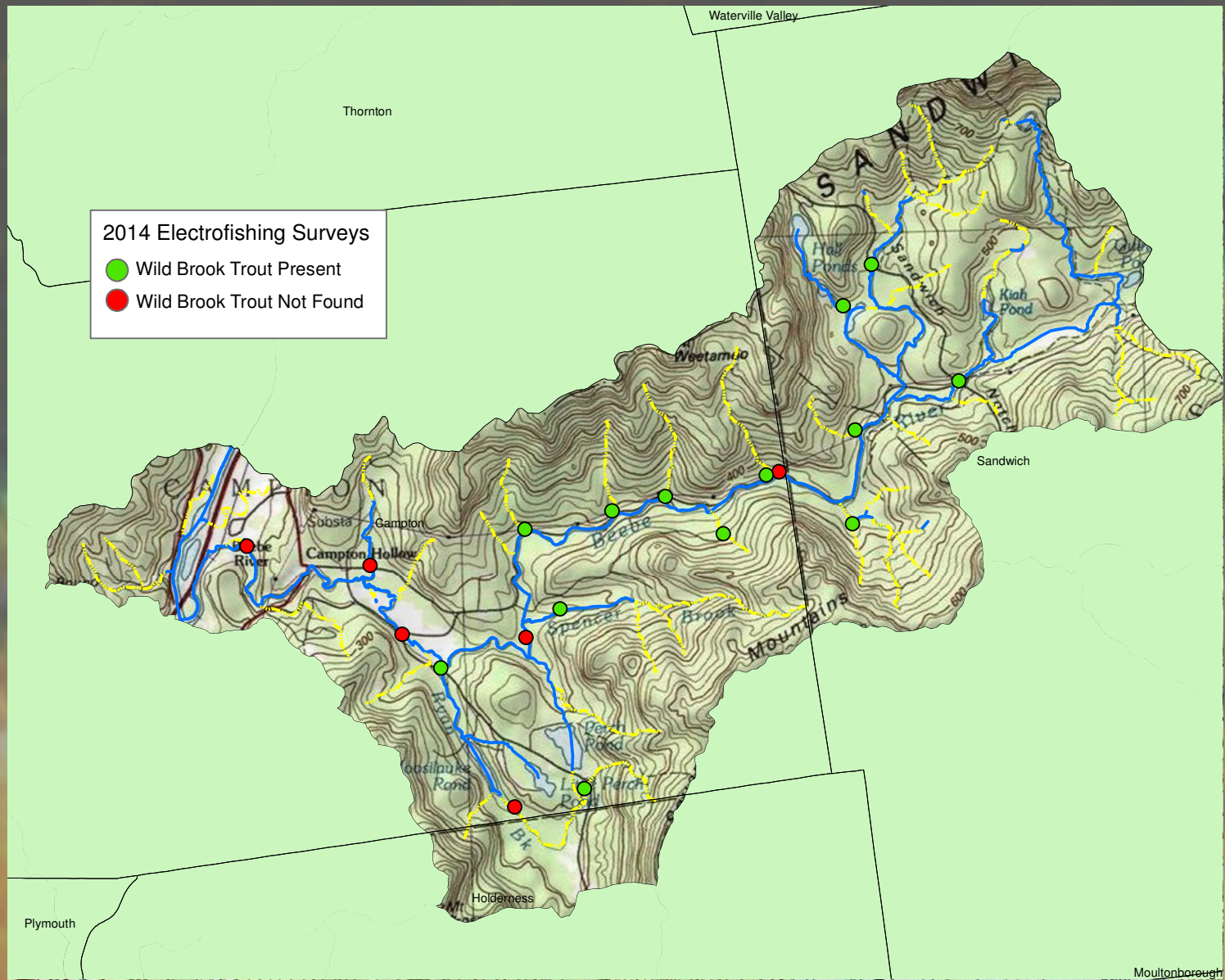


### Road/Stream Crossing Assessments

- 7 crossings evaluated within the Beebe River Property
- Some preliminary results available
- Other analysis is ongoing



## Watershed Level Electrofishing Surveys



Wild Brook Trout were found at 13 of the 19 locations (68%)



# Watershed Level Surveys

## Macroinvertebrate Surveys

Efforts to quantify water quality

Volunteer Biological Assessment Program (VBAP) NHDES

3 macro collection stations at every electrofishing site

Based on group tolerance values and total number of each group present

$$\text{Water Quality Score} = \frac{\text{Total Biotic Score}}{\text{Total \# of individuals for all groups}}$$

### Water Quality Score

0 – 3.5 Excellent  
>3.5 - 4.8 Good  
> 4.8 Fairly Poor





## Watershed Level Surveys

### Water Quality Scores (VBAP) and Wild Brook Trout Presence



#### Excellent Water Quality (0-3.5)

82% of survey locations\*

Wild Brook Trout Average Density:

362.8 Brook Trout/Acre

#### Good Water Quality (>3.5-4.8)

18% of survey locations

Wild Brook Trout Average Density:

60.0 Brook Trout/Acre

#### Fairly Poor Water Quality (>4.8)

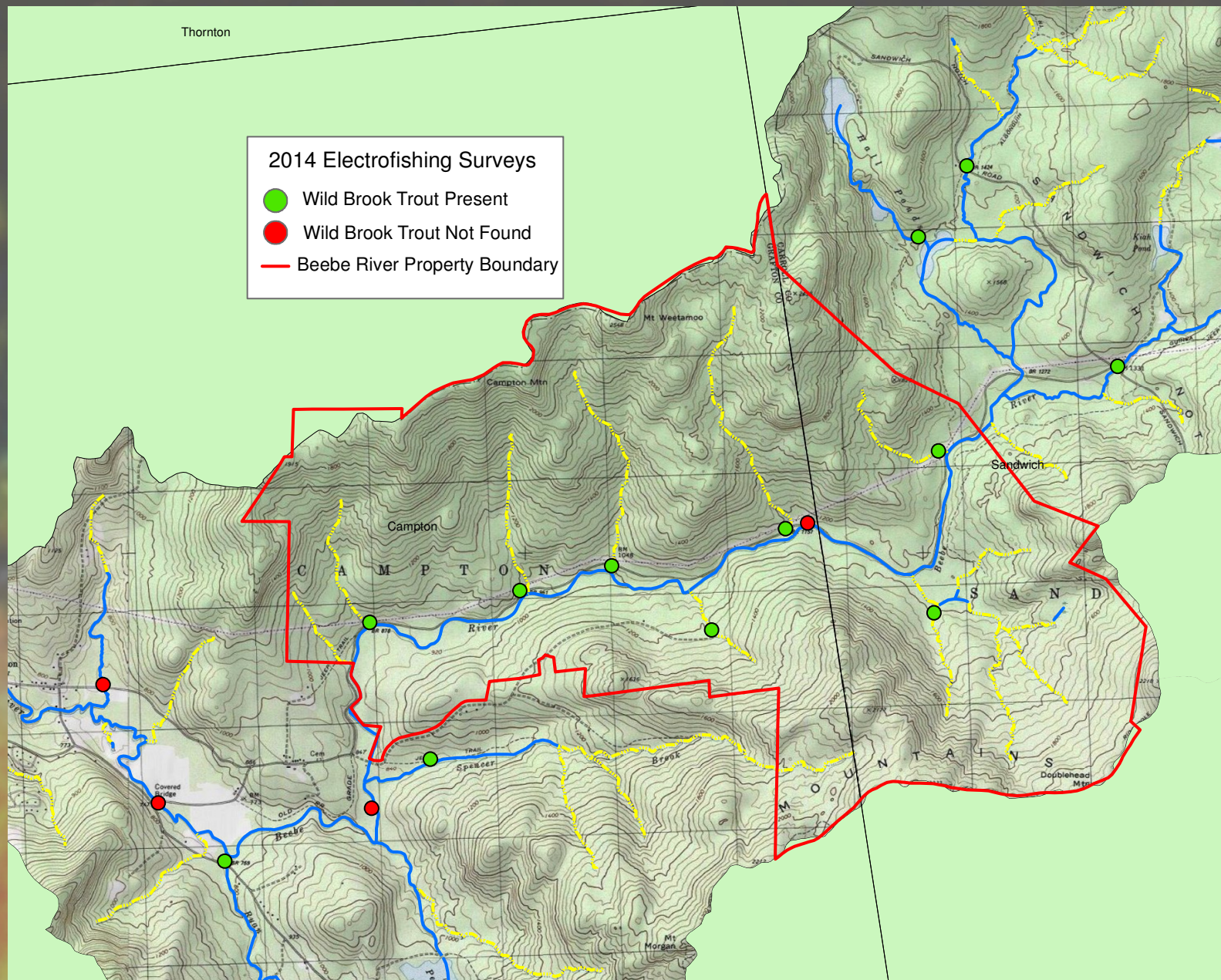
No streams in this category

\*All streams within the Beebe River Property were classified as having excellent water quality





## Results within the Beebe River Property



Wild Brook Trout were found at 7 of the 8 locations (88%)



## Other fish species observed within the Beebe River Watershed



\*Found within Beebe  
River Property





## Results within the Beebe River Property

7 tributary streams- brook trout at all sites

1 Beebe River location- no wild brook trout  
Hatchery brook trout found

Water temperature may limit the presence  
of wild brook trout in the mainstem





## Influence of upland ponds and wetlands on water temperatures



One time temperature readings during surveys (June)

Water temperature loggers may be useful in 2015 (May-September)



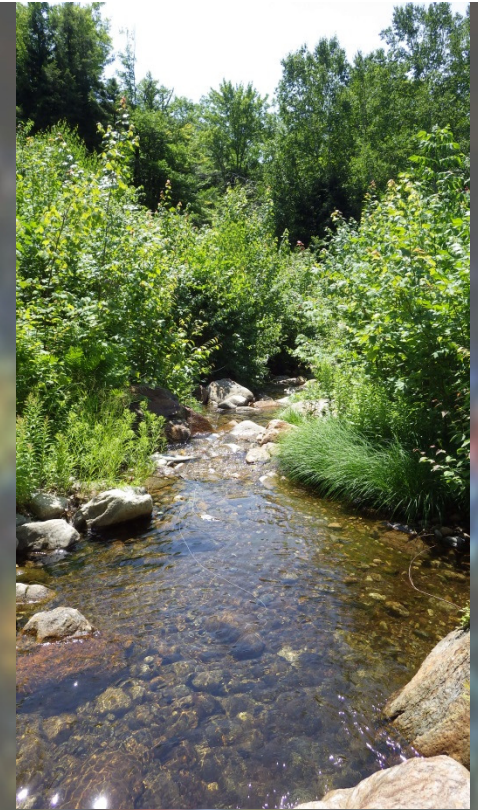
## Noted Impacts within the Beebe River Property

### Loss of canopy in tributaries under power lines

- Increase in water temperatures
- Lack of habitat variety/cover

### Undersized Stream Crossings

- When perched, crossings preventing brook trout from accessing cooler habitats/spawning areas
- When undersized, aggradation and erosion rates may be amplified
  - Lack of spawning gravel below crossings can reduce recruitment success- excessive scouring
  - Accumulation of sediments (aggradation) upstream of crossings can impair passage and compromise roads



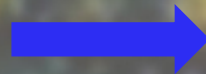


## Crossing Assessments

Aquatic Organism Passage- the ability for species to move freely upstream and downstream

### Variables

- Outlet flow type
- Distance of outlet drop
- Obstructions in culvert
- Substrate in culvert
- Water depth in culvert
- Depth of downstream pool
- Number of structures



- Ranked efficiency of passage

Vermont Rivers Management Program

Geomorphic Compatibility of Crossings- the rate of alteration of natural stream dynamics

### Variables

- Percent bankful width
- Sediments (deposition and scour)
- Slope (structure vs channel)
- Approach of stream into structure
- Bank armoring and erosion



- Level of impact
- Vulnerability of the structure

Vermont Culvert Geomorphic Compatibility Screening Tool



## Aquatic Organism Passage Results



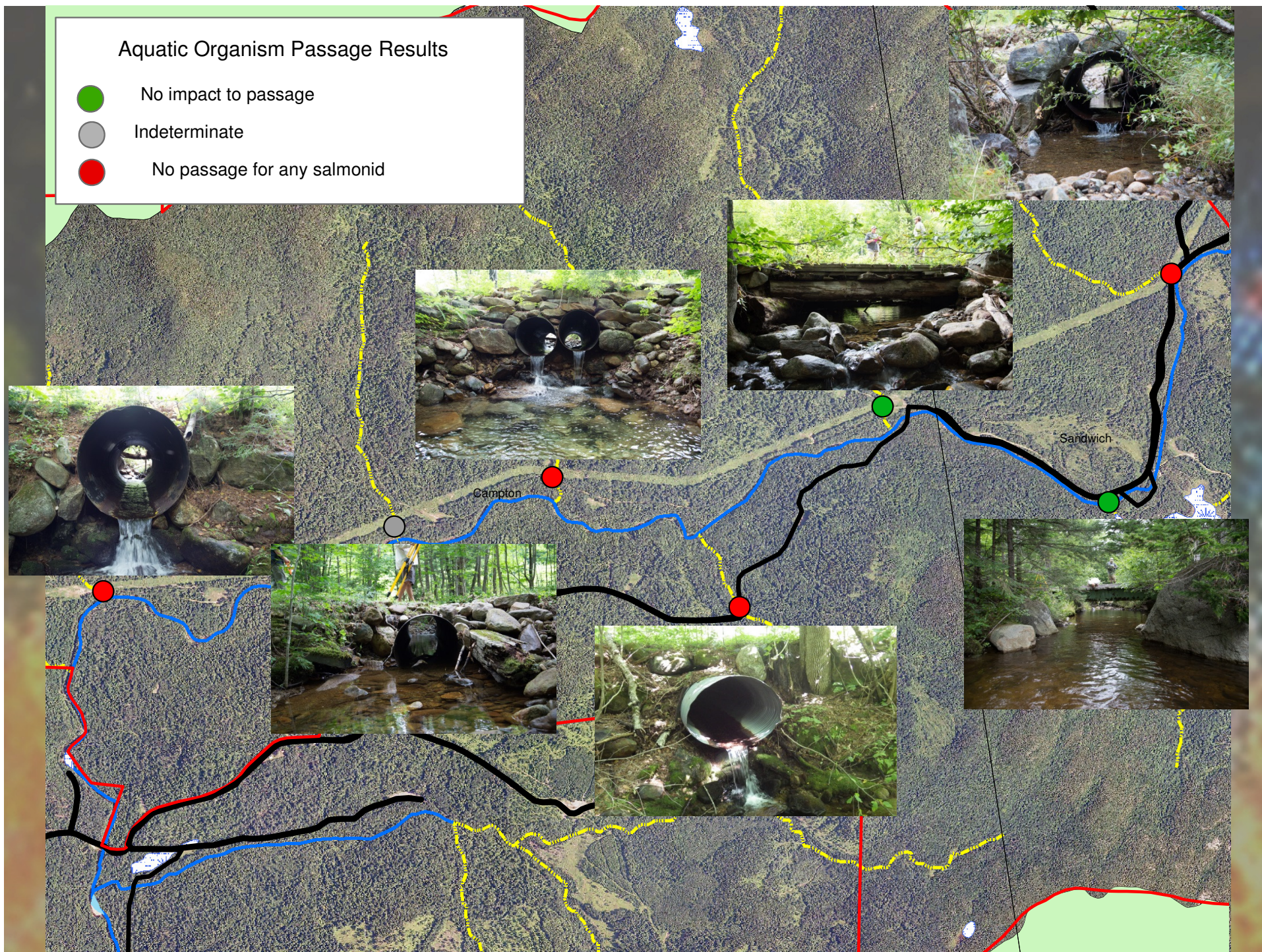
No impact to passage



Indeterminate



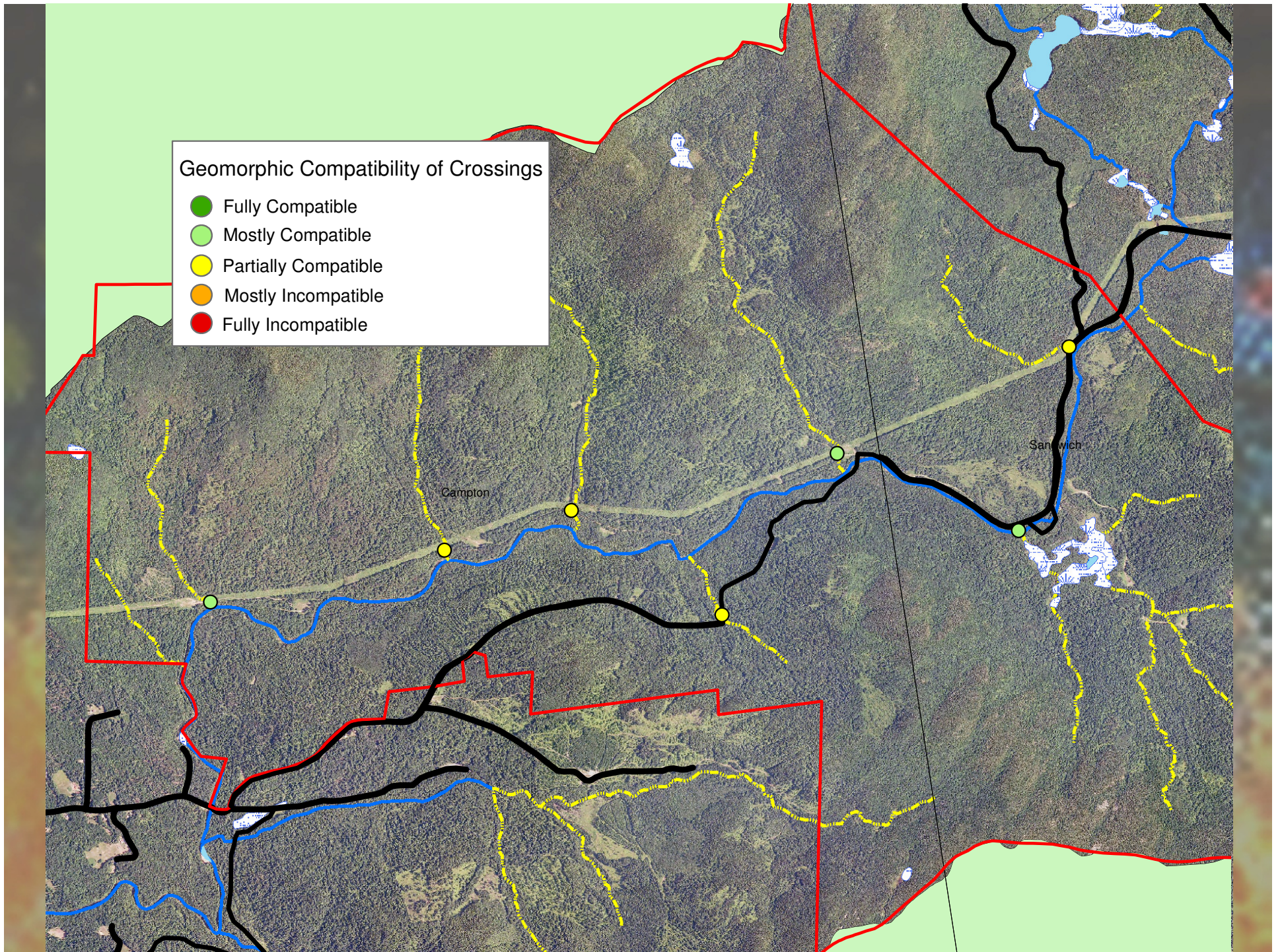
No passage for any salmonid





### Geomorphic Compatibility of Crossings

- Fully Compatible
- Mostly Compatible
- Partially Compatible
- Mostly Incompatible
- Fully Incompatible





## Geomorphic Compatibility

### Mostly Compatible



Category Name	Screen Score	Threshold Conditions	Description of structure-channel geomorphic compatibility
Fully compatible	20-GC≤25	n/a	Structure fully compatible with natural channel form and process. There is a low risk of failure. No replacement anticipated over the lifetime of the structure. A similar structure is recommended when replacement is needed.
Mostly compatible	15-GC≤20	n/a	Structure mostly compatible with current channel form and process. There is a low risk of failure. No replacement anticipated over the lifetime of the structure. Minor design adjustments recommended when replacement is needed to make fully compatible.
Partially compatible	10-GC≤15	n/a	Structure compatible with either current form or process, but not both. Compatibility likely short term. There is a moderate risk of structure failure and replacement may be needed. Re-design suggested to improve geomorphic compatibility.
Mostly incompatible	5-GC≤10	% Bankfull Width + Approach Angle scores ≤ 2	Structure mostly incompatible with current form and process, with a moderate to high risk of structure failure. Re-design and replacement planning should be initiated to improve geomorphic compatibility.
Fully incompatible	0-GC≤5	% Bankfull Width + Approach Angle scores ≤ 2 AND Sediment Continuity + Erosion and Armoring scores ≤ 2	Structure fully incompatible with channel and high risk of failure. Re-design and replacement should be performed as soon as possible to improve geomorphic compatibility.

### Partially Compatible





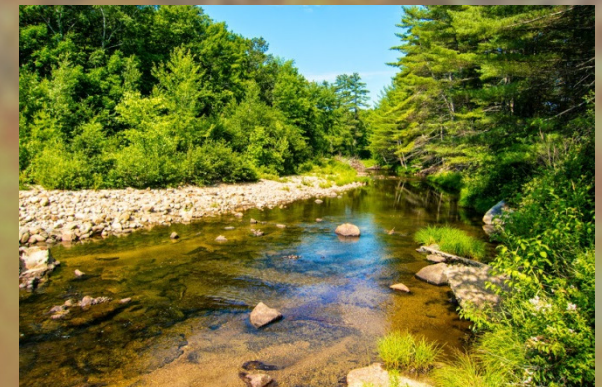


### Restoration/Protection Opportunities

- Crossing Replacements (prioritize, funding)
- Wood Additions below the downstream sides of crossings to improve cover and spawning substrate
- Develop a fisheries component to the land management plan

### 2015 Research Needs

- Water Temperature Monitoring
- Efish more mainstem sites for a better understanding wild brook trout distribution
- Efish tributaries upstream of power lines to help prioritize crossing replacements
- Assess the potential for wood additions in the mainstem







[Thank you to all those who helped in 2014. See you in 2015!](#)

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