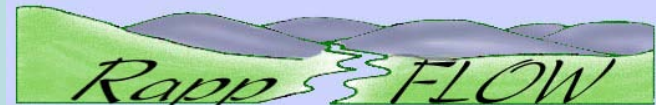


# Water Temperature Study 2010 Thornton and Rush Rivers



Presented By:  
B.J. Valentine  
President, RappFLOW

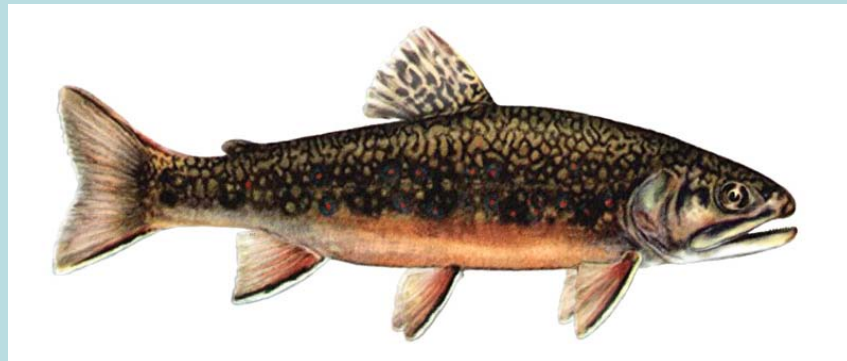


# Project Background

- The Eastern Brook Trout's numbers are being threatened mainly by high water temperatures. Temperatures below 68°F are ideal, while temperatures above 77°F are not capable of supporting Eastern Brook Trout
- Poor land management, lack of riparian buffer and stream fragmentation due to road construction or other factors are also contributing to their loss of available habitat

# Project Overview

- In 2009, RappFLOW and Trout Unlimited began a project to study Brook Trout and their habitat availability in Rappahannock County
- 8 sites were monitored for water temperature over a 5 month span (May to October) to monitor the high temperatures observed during summer months to determine the reaches of the brook trout habitat due to water temperatures



# Study Sites

- Due to the Eastern Brook Trout's habitat in Rappahannock County being isolated to the upper reaches of the Hazel, Hughes, Rush and Thornton Rivers originating in Shenandoah National Park, these sites will be the basis of our study. For the first year, the study has been limited to the Thornton and the Rush rivers (8 sites)

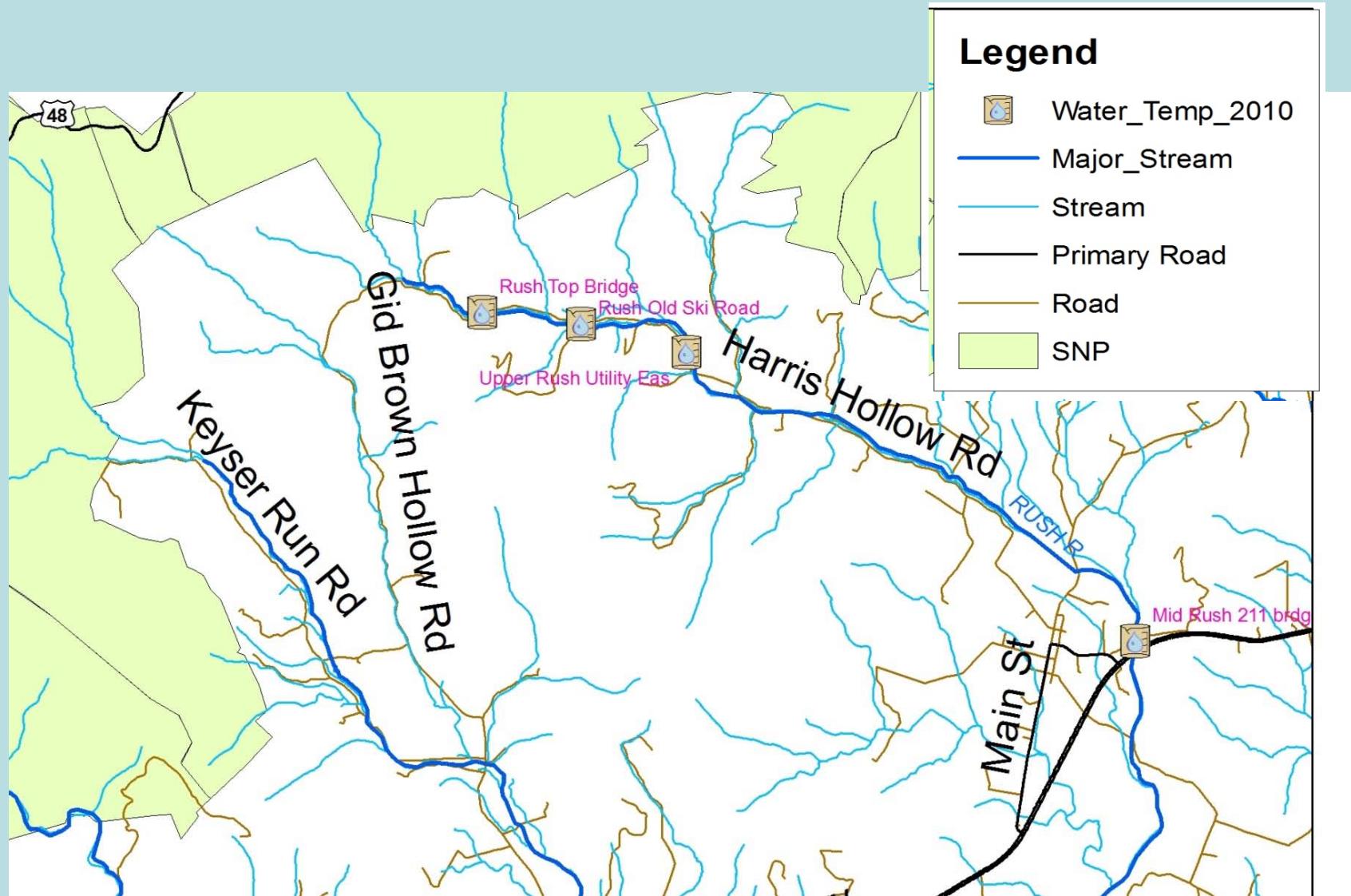


# Temperature Measuring Devices

Eight *HOBO Pro V2* temperature data loggers were used to measure the temperature of the water at the 8 different sites at hourly increments for the 5 month period. These data loggers are accurate within  $0.36^{\circ}\text{F}$



# Upper Rush River Sites



# Upper Rush River Sites

## *Clarke Property*

Installed: 6/30/10

Removed: 9/13/10

Average Temperature Recorded: 71.2°F

Maximum Temperature: 87.6°F

Minimum Temperature: 61.6°F

## *Old Ski Lodge*

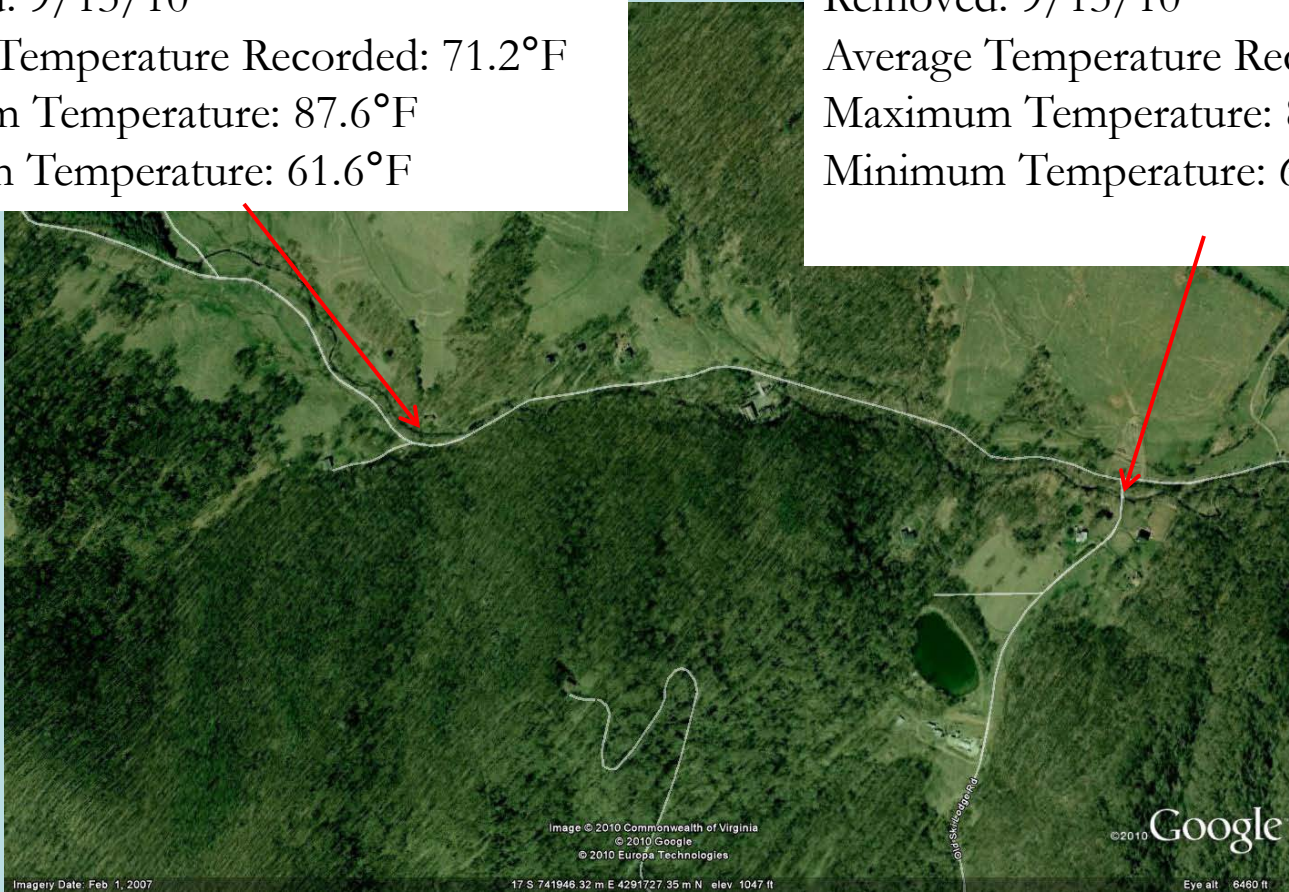
Installed: 6/30/10

Removed: 9/13/10

Average Temperature Recorded: 71.2°F

Maximum Temperature: 89.2°F

Minimum Temperature: 61.4°F



# Upper Rush Site

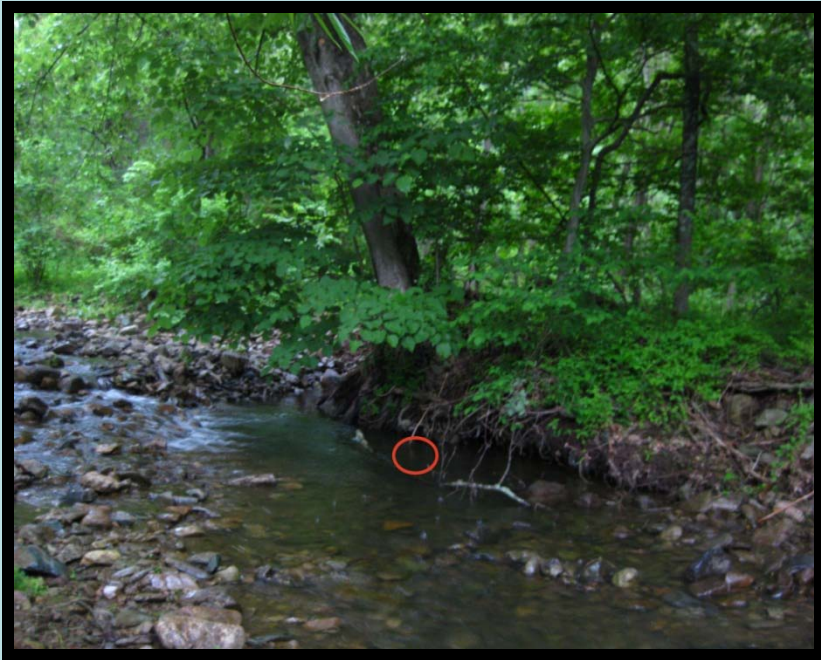
## *Harris Hollow Road*

Installed 5/19/2010 removed 10/13/10

Average Temperature Recorded: 67.8°F

Maximum Temperature: 78°F

Minimum Temperature: 54.5°F





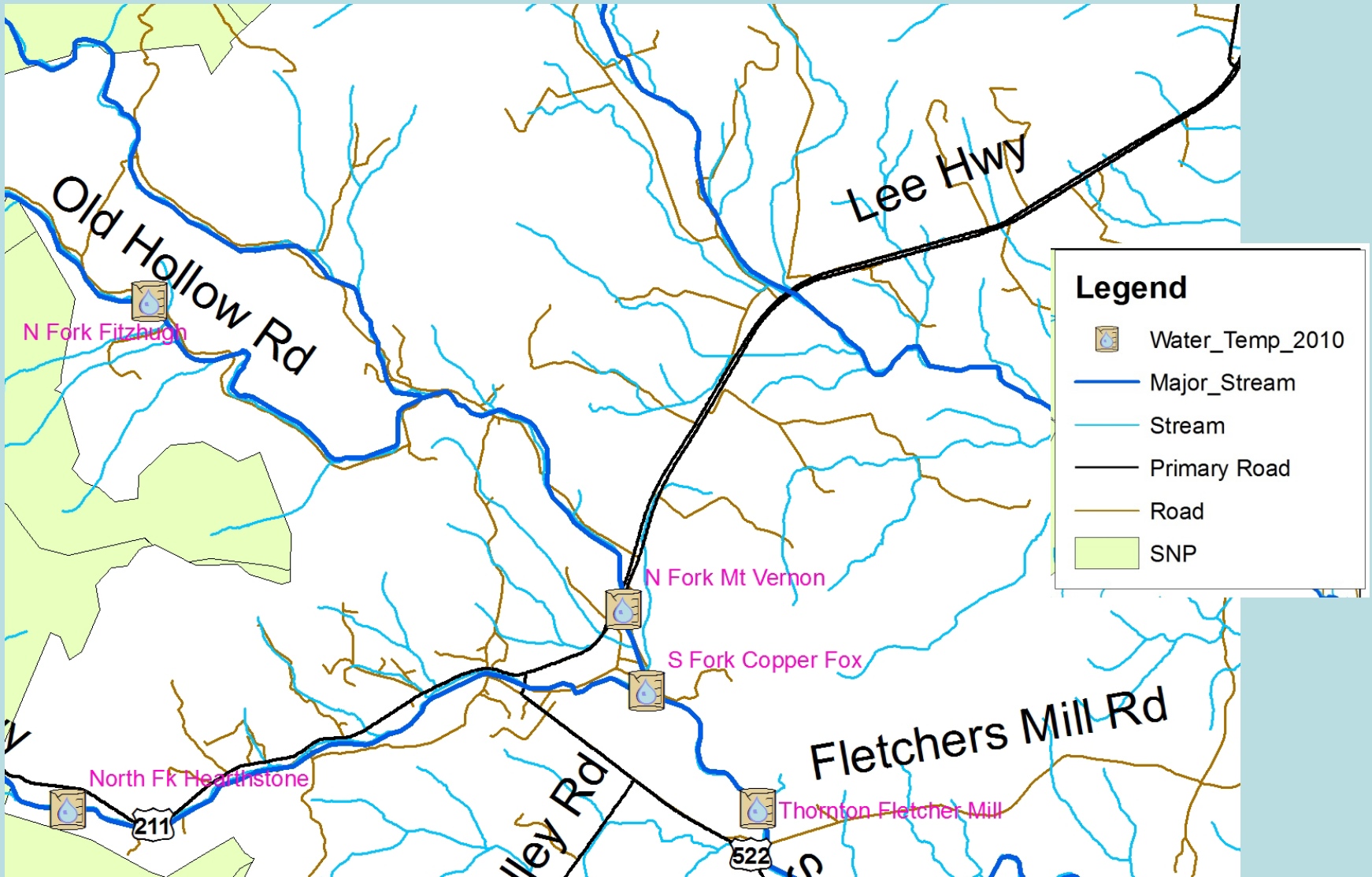
# Middle Rush River Site

## *US 211 Bridge*

Installed 5/19/2010 removed 10/13/10  
Average Temperature Recorded: 71.4°F  
Maximum Temperature: 102.6°F  
Minimum Temperature: 54.5°F



# Thornton River Sites



# Upper North Fork Thornton River Site

*Fitzhugh's Property*

Installed: 5/20/10

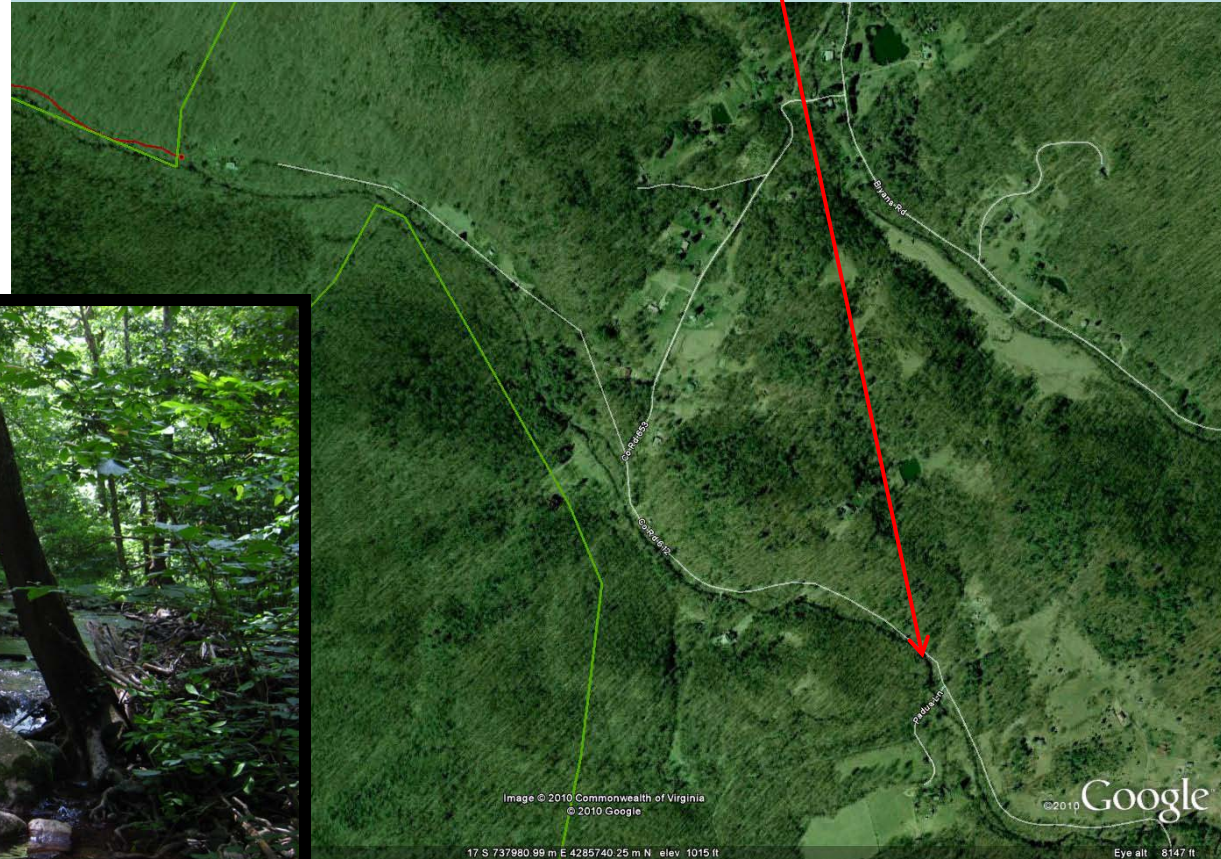
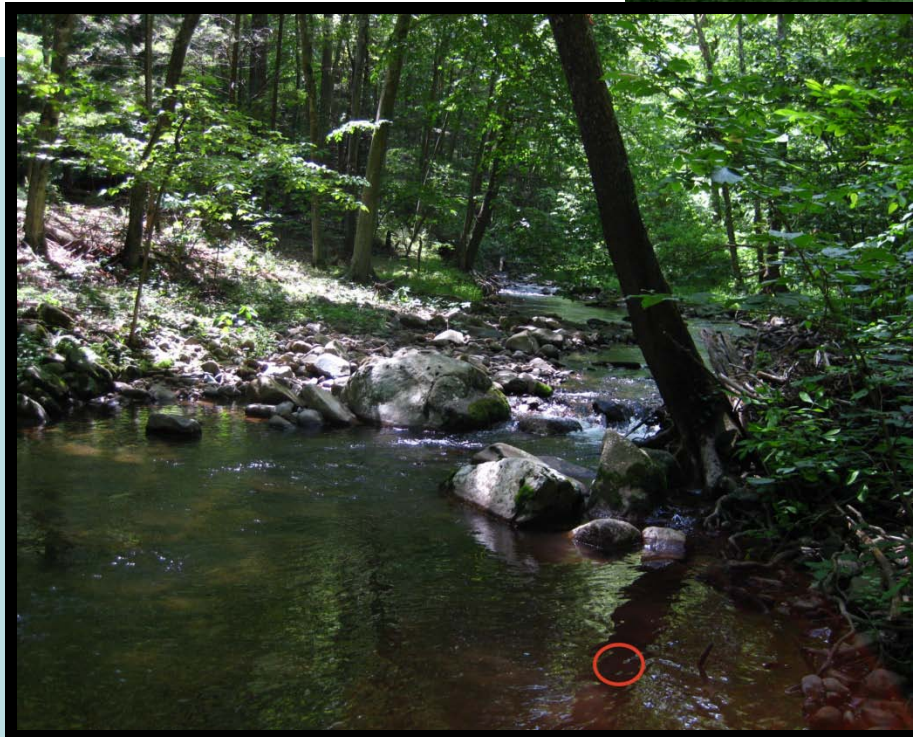
Removed: 10/13/10

Average Temperature

Recorded: 66°F

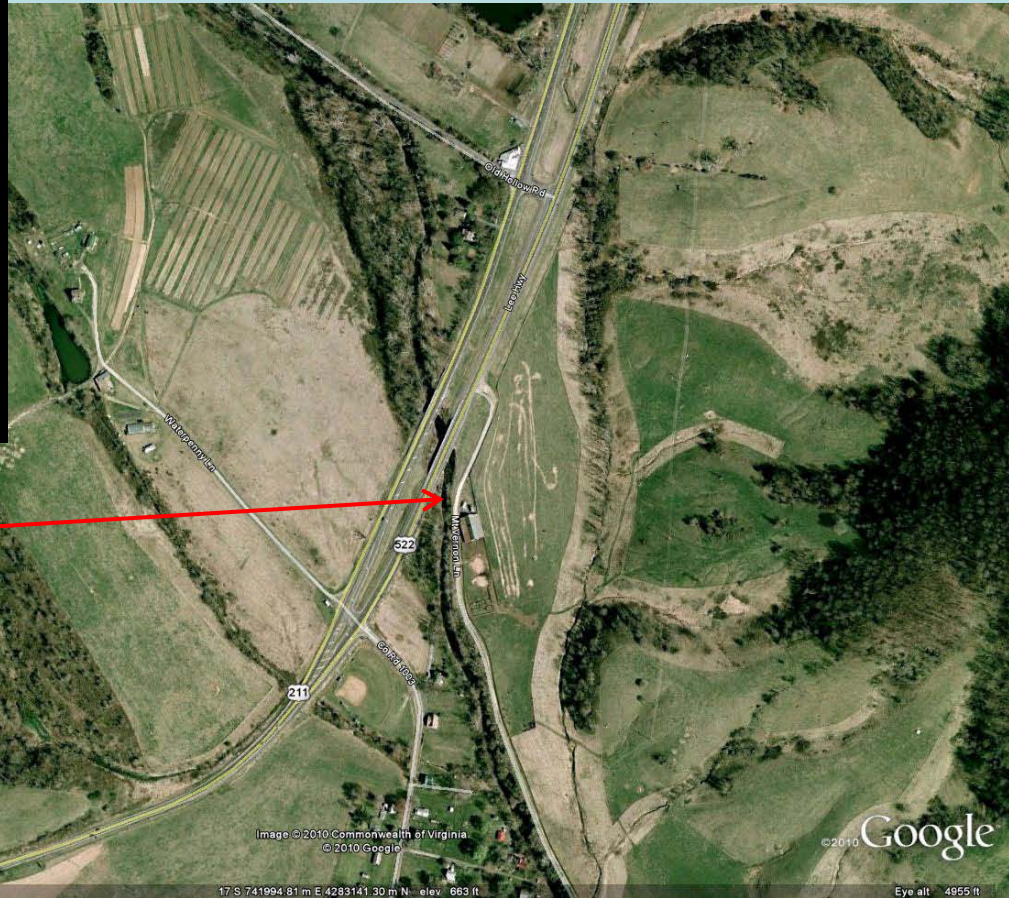
Maximum Temperature: 75.8°F

Minimum Temperature: 53.3°F



# Lower North Fork Thornton River Site

## *Mount Vernon Farm*



Installed: 5/20/10

Removed: 10/13/10

Average Temperature Recorded: 70.3°F

Maximum Temperature: 90°F

Minimum Temperature: 50.4°F

# Upper South Fork Thornton River Site

## *Hearthstone School*

Installed: 7/19/10

Removed: 10/13/10

Average Temperature Recorded: 67.4°F

Maximum Temperature: 78°F

Minimum Temperature: 54.1°F

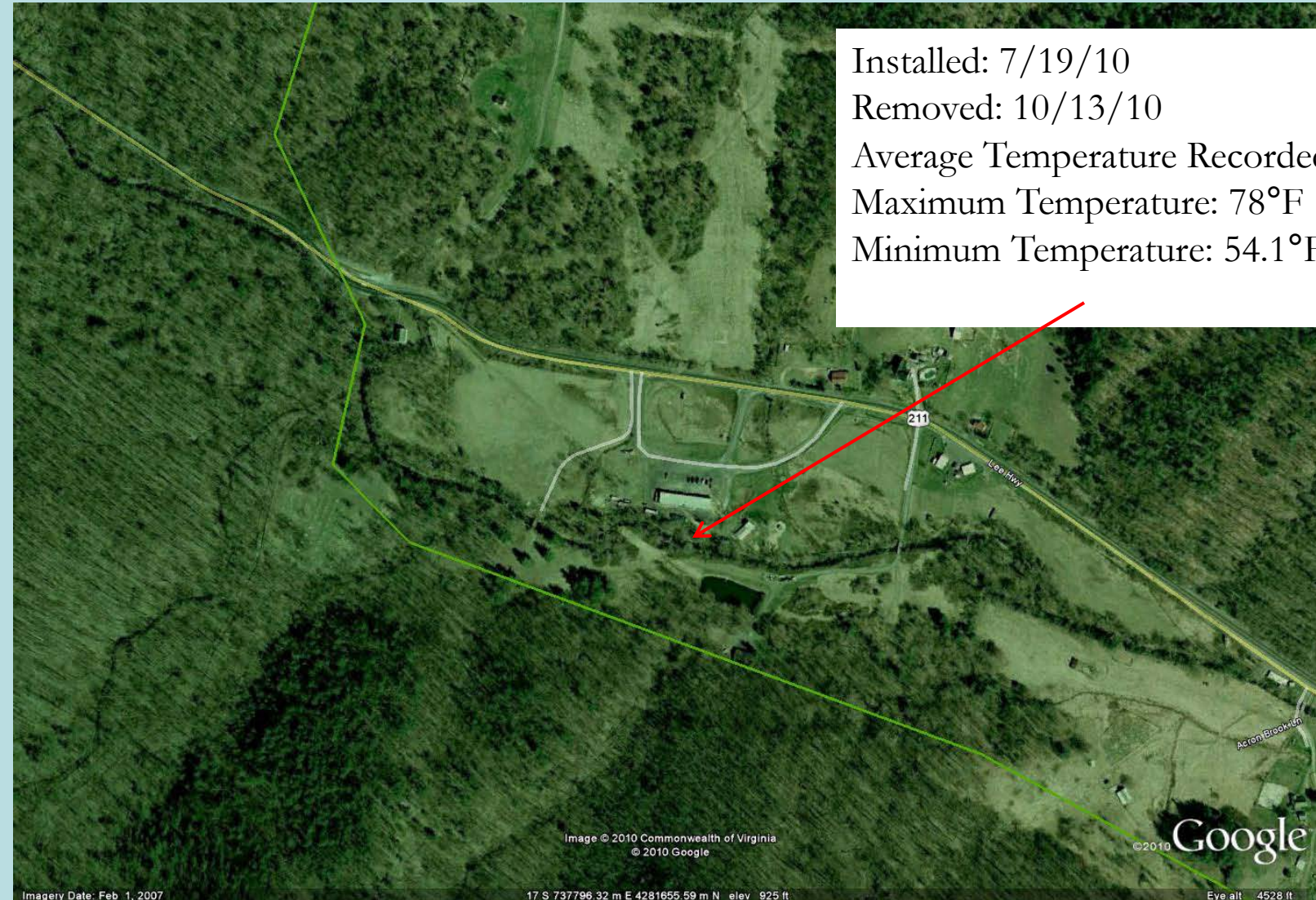


Image © 2010 Commonwealth of Virginia  
© 2010 Google

© 2010 Google

# Lower South Fork Thornton Site



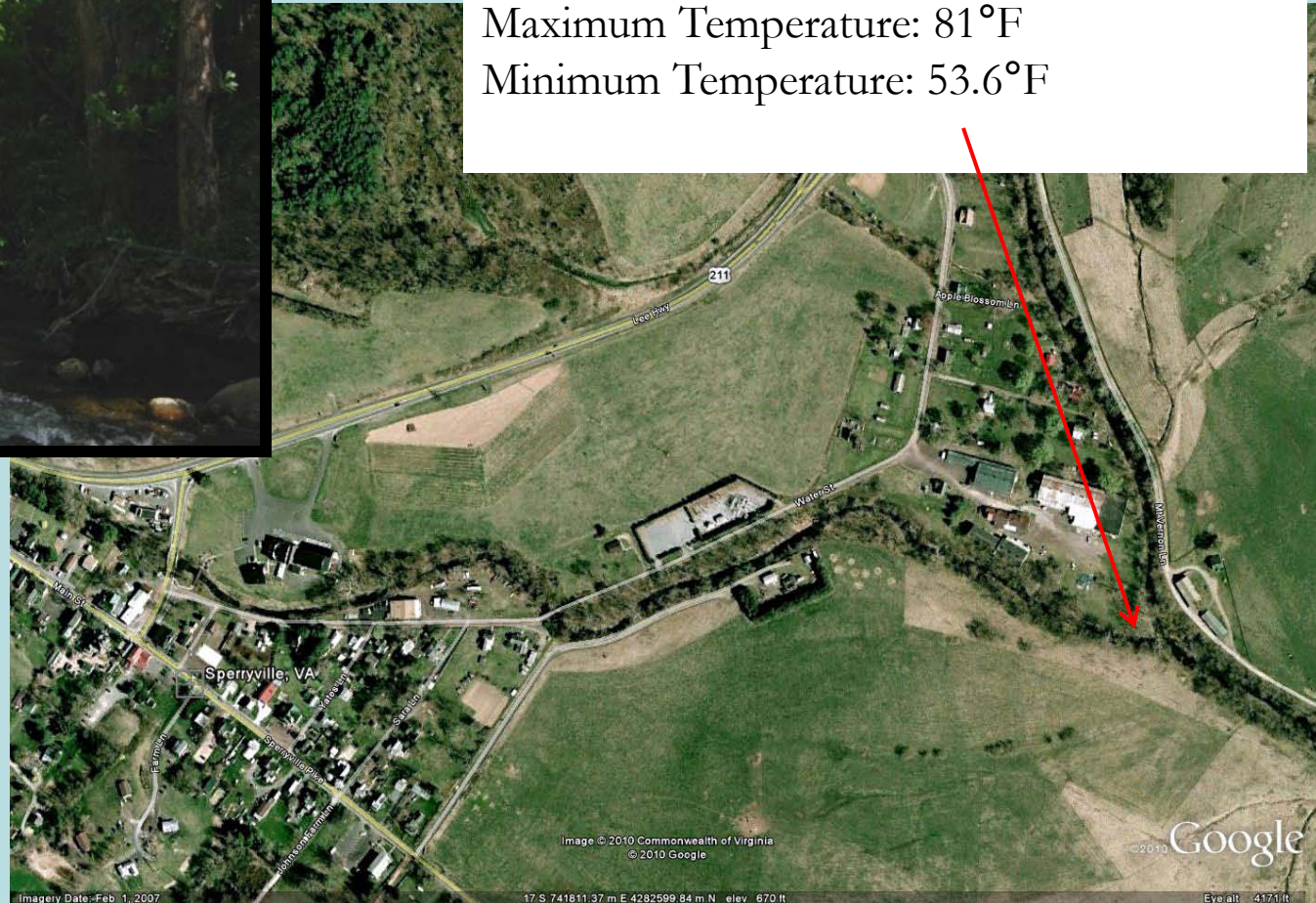
Installed: 5/20/10

Removed: 10/13/10

Average Temperature Recorded: 69.5°F

Maximum Temperature: 81°F

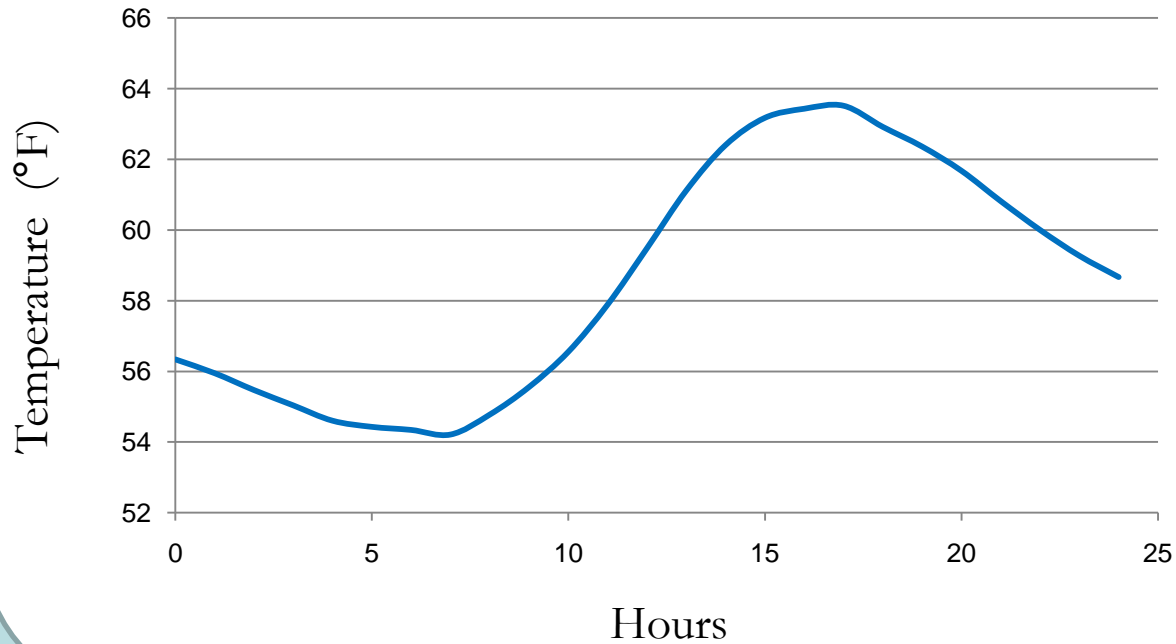
Minimum Temperature: 53.6°F



*Copper Fox*

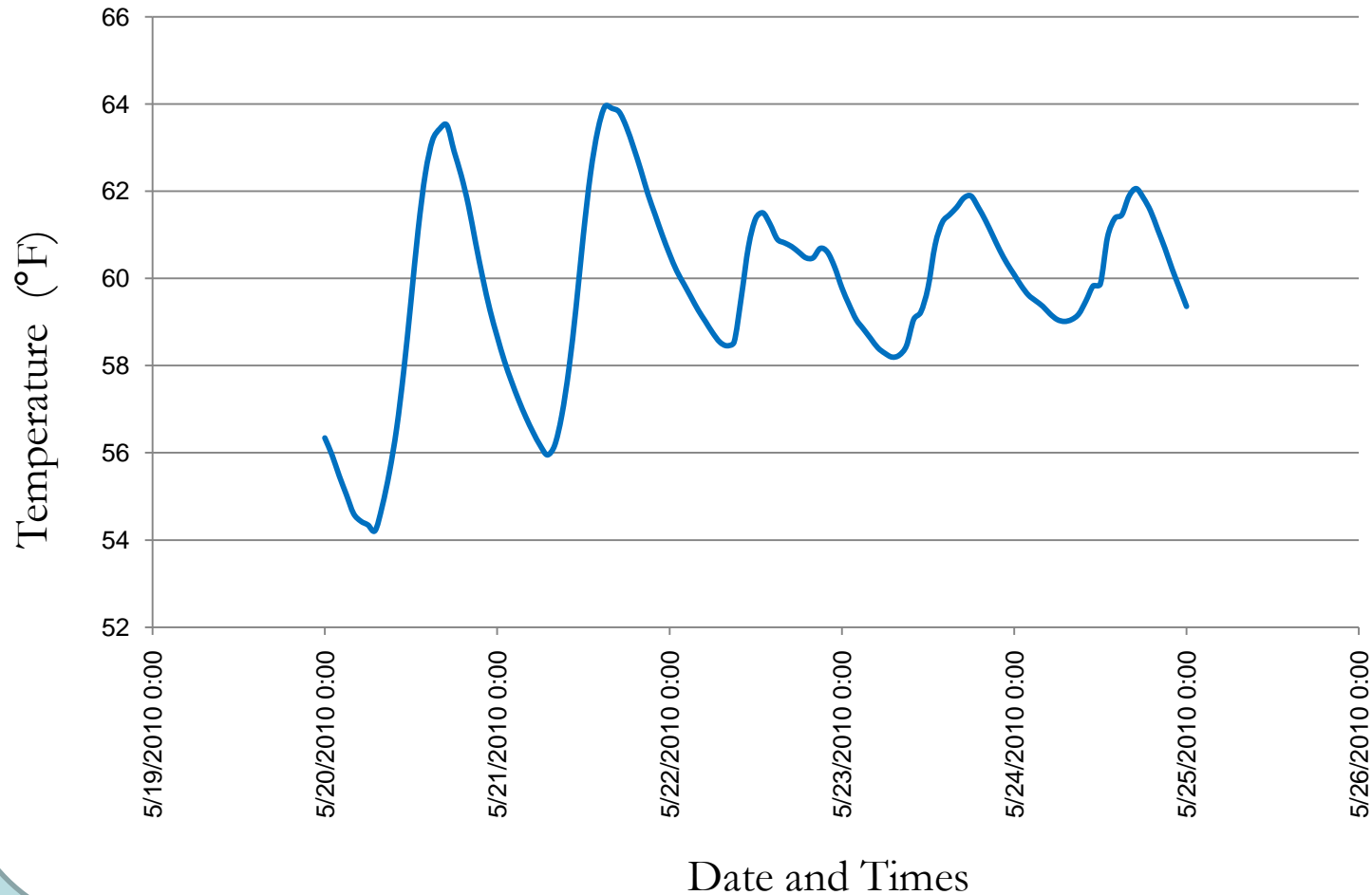
# Water Temperature Graphs

**Harris Hollow Rd Water Temperature Over a 24 hour Period on 5/22/2010**



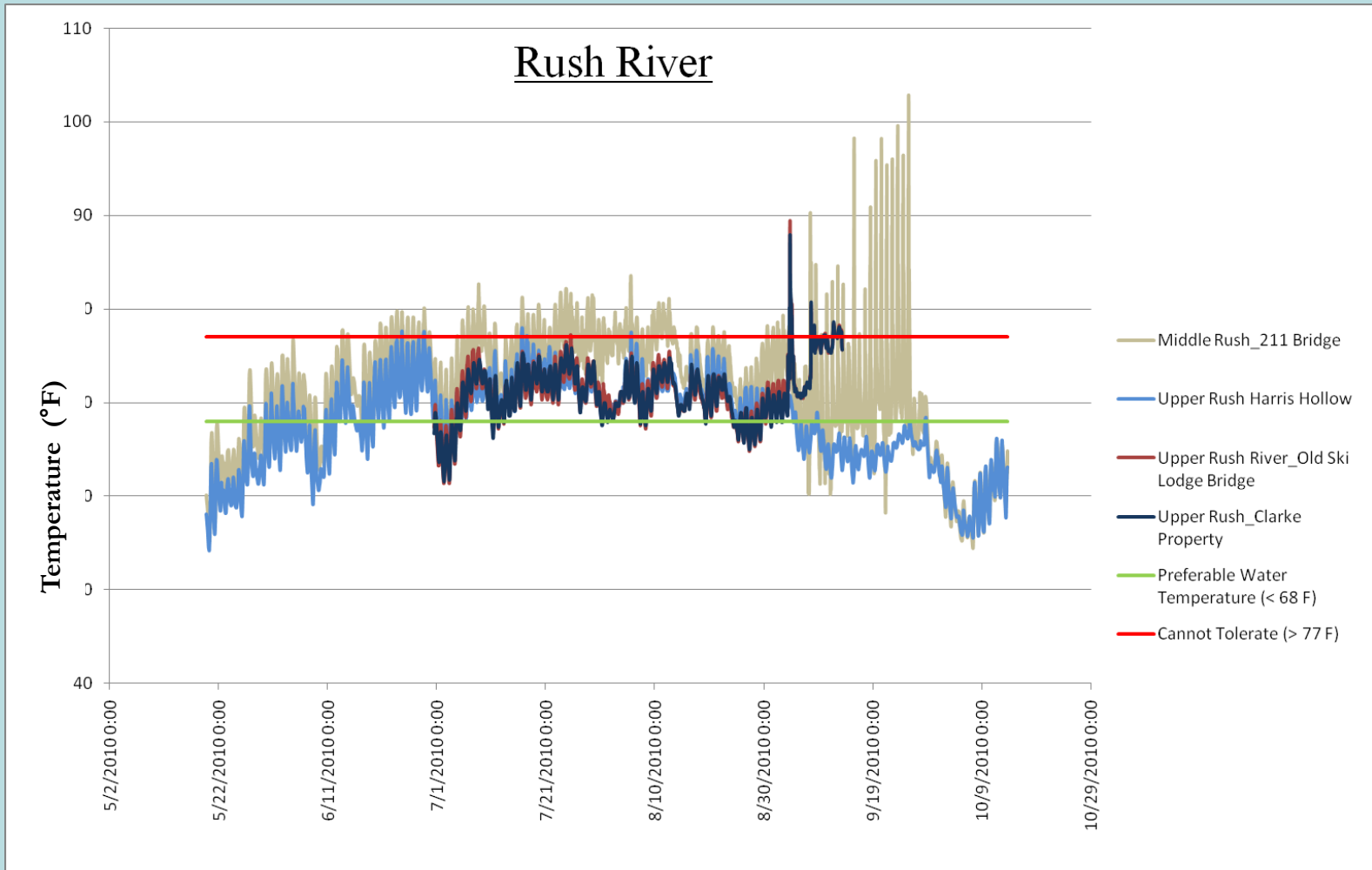
# Water Temperature Graphs

## Harris Hollow Rd Water Temp. Over 5 Days



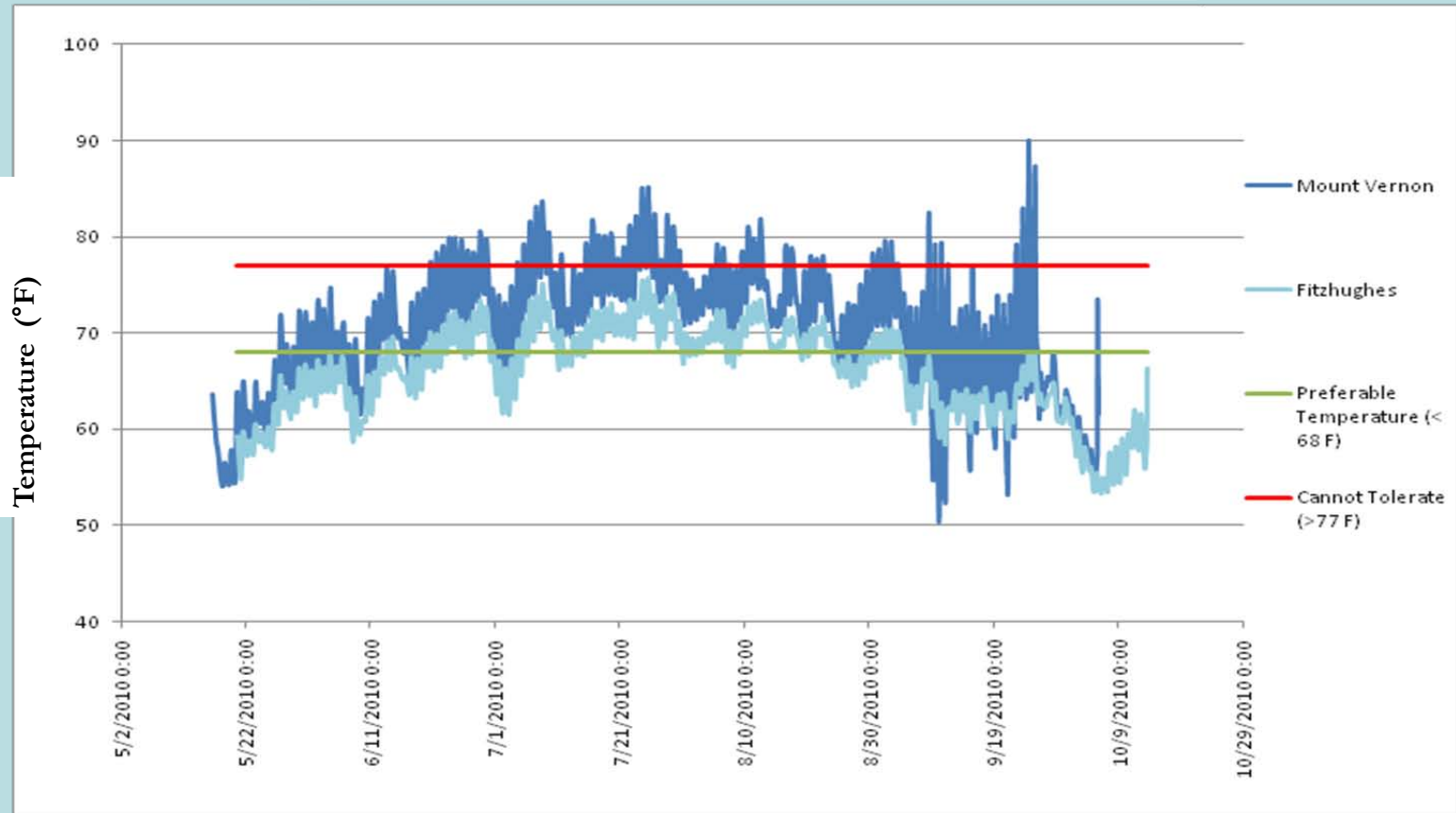


# Data Graph: Rush River



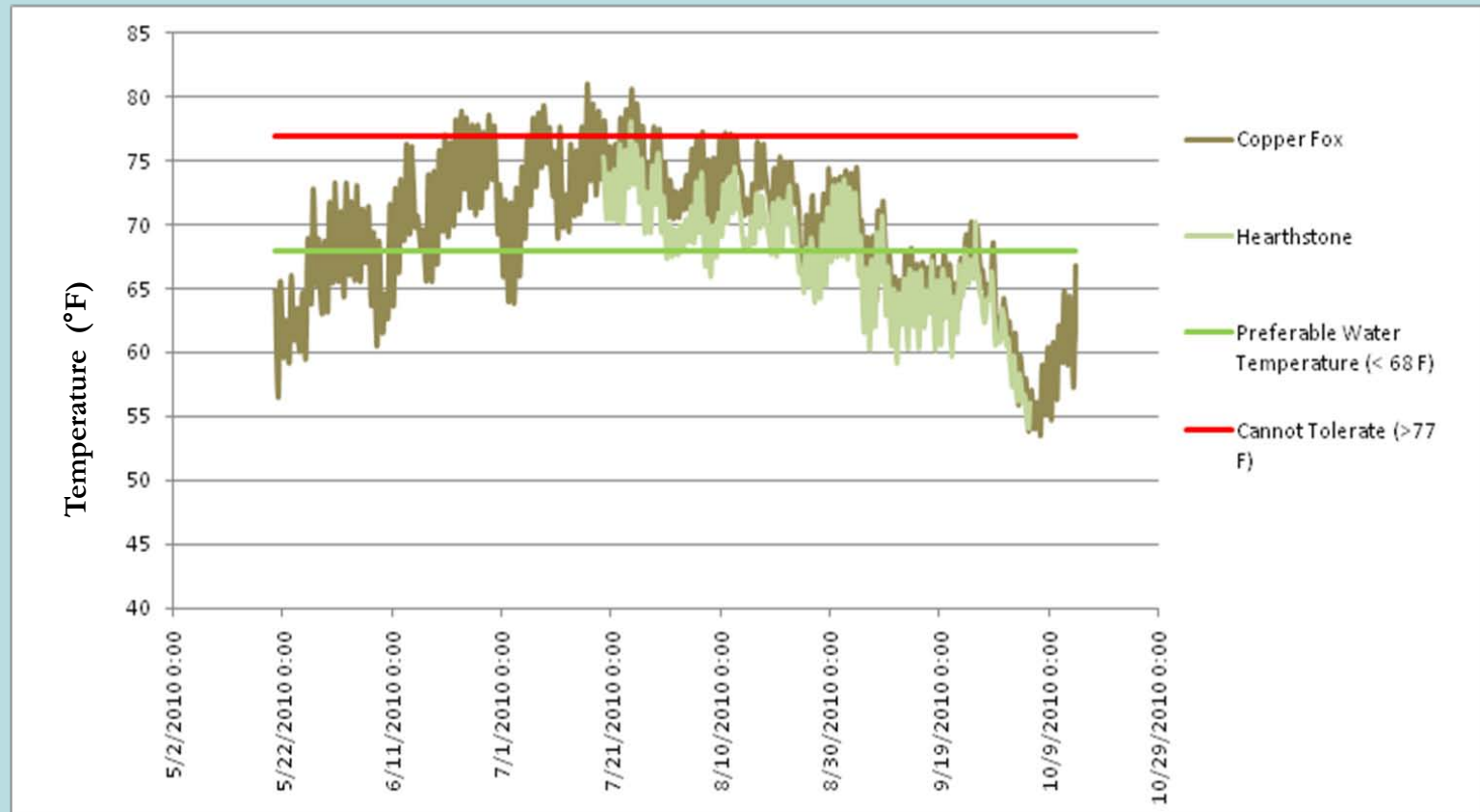
# Data Graph: North Fork Thornton

## North Fork of the Thornton River



# Data Graph: South Fork Thornton

## South Fork of the Thornton River



# Data Overview

- Most all loggers recorded temperatures that were over Eastern Brook Trout's preferred max temp range (above 68°F) between the beginning of June and the middle of September
- Loggers in the lower reaches of the watersheds exceeded temperatures of 78°F for several consecutive days, indicating that brook trout could not survive in these waters during that time



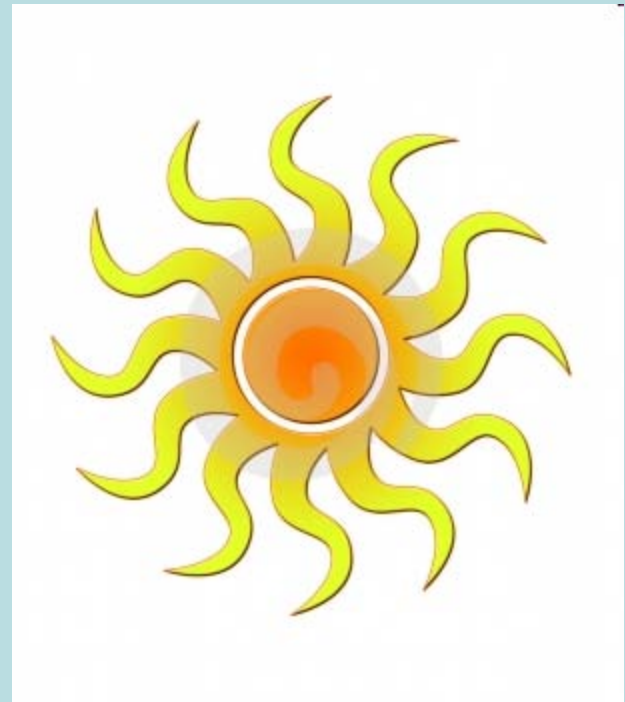
# Data Overview

- Some temperature loggers recorded erratic data near the beginning of September, indicating that the data loggers may have been out of the water during the driest part of the summer



# Data Overview

- The 211 bridge probe displayed a maximum temperature of 102.6° F, which was higher than the air temperature. This indicates that the probe was in direct sunlight



# 2010 Study Conclusions

- Although many sites exceeded the maximum temperatures for brook trout during the warmest months, all show temperatures that favor brook trout during late spring and early fall
- Further improvements of riparian buffers in lower reaches of the watersheds may help support brook trout habitat later in the spring and earlier in the fall

# The Future

- RappFLOW and Trout Unlimited will continue to monitor water temperature in the coming years and will be adding more monitoring sites in other watersheds that may contain Eastern Brook Trout
- With the help of PEC we will be working on establishing and improving riparian buffers along streams to protect and enhance the habitat for brook trout.



# Other Related Information

- Rapidan Chapter of Trout Unlimited
  - [www.rapidantu.org](http://www.rapidantu.org)
- RappFLOW
  - [www.rappflow.org](http://www.rappflow.org)
- Trout Unlimited
  - [www.tu.org](http://www.tu.org)
- Piedmont Environmental Council
  - [www.pecva.org](http://www.pecva.org)