# Memorandum

**To:** Alan Shelvey, City Engineer

**From:** Evan Pilachowski, Associate City Engineer EP

**Date:** 10/20/2008

**Re:** 2008 Brook Temperature Monitoring Summary

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I have analyzed the temperature monitoring data from 2008. Two temperature sensors were recovered on the stream bank out of the water. This most likely occurred during the heavy rain on June 14th of this year. The two temperature sensors that were found out of the water were the sensors at the outfalls of Combination Pond and Piedmont Pond, and therefore this data should be viewed accordingly.

Graphs are attached that summarize my findings. In addition to the graphs, I have analyzed the habitat suitability of Moon Brook for brook trout in relation to temperature and the accuracy of the determination of Moon Brook as a Coldwater Fishery according to standards established by the Surface Water Quality Bureau of the New Mexico Environment Department (Bureau). According to a study conducted by the Bureau in July of 1999, a coldwater fishery is classified as having instantaneous temperatures below 75.2 °F (24 °C), no single day with temperatures above 68 °F (20 °C) for more than 8 hours, and no more than three days in a row with maximum temperatures above 68 °F (20 °C). The following table was prepared using these standards for the 152 day period from May 9, 2008 to October 7, 2008.

| Location | Number of Day Outside Coldwater Fisheries Criteria |
|---|---|
| Paint Mine Brook | 1 |
| Mussey Brook Above Fairgrounds | 20 |
| Mussey Brook Below Fairgrounds | 35 |
| Moon Brook Above Combination Pond | 0 |
| Moon Brook Below Combination Pond Outfall | 60 |
| Moon Brook Above Piedmont Pond | 41 |
| Moon Brook Below Piedmont Pond Outfall | 43 |
| Moon Brook at White's Playground | 25 |
| Moon Brook at Forest St | 25 |

## Alan Shelvey

**From:** "Pease, Jim" <Jim.Pease@state.vt.us>
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**Cc:** "Swift, Ethan" <Ethan.Swift@state.vt.us>; "McGuire, Nanci - Rutland, VT" <nanci.mcguire@vt.nacdnet.net>; "Mary Nealon" <bearcrk@sover.net>; "Pytlik, Shannon" <Shannon.Pytlik@state.vt.us>
**Sent:** Wednesday, October 22, 2008 9:46 AM
**Attach:** lunker.jpg; fishpooldesign.bmp
**Subject:** Moon Brook monitoring data

Alan, Evan:

Thank you for forwarding the 2008 temperature data for Moon Brook to me. If the two probes below each pond are likely to be in error after June 14 I would suggest throwing out the data after that date and if possible resending it to me and I will forward it on to the lab and to Rich Langdon. I think the data for "Moon Brook above Piedmont Pond" and "Moon Brook at White's Playground" suffice to show the impacts of the two in-line ponds. I think this data further supports what we all are in agreement about which is that the ponds do artificially raise the temperature and impact the fishery. Similarly with the VT state fairgrounds above and below monitoring.

One suggestion I would have for the immediate future and perhaps in conjunction with anything done on Mussey Brook would be to do some additional habitat improvements in the reach below Combination Pond and above Piedmont Pond (roughly 2000'). The idea would be to contact the homeowners who abut the stream and see if they would be willing to certain modifications to their property to improve/lower the water temperature. This would be items like redirecting or infiltrating any roof runoff water, plantings-buffers along the stream edge and fish habitat structures. I am guessing, and Mary would need to verify, that at least some of this reach is fairly stable and could support structures like fish lunkers or stone pools (an example is attached). This is work that VYCC could do well if permission and materials were available. This would be more of a one on one with the landowner approach but the costs could be kept low and the benefits in terms of fishery improvement would be high. There are brook & brown trout above and below this reach.

Jim

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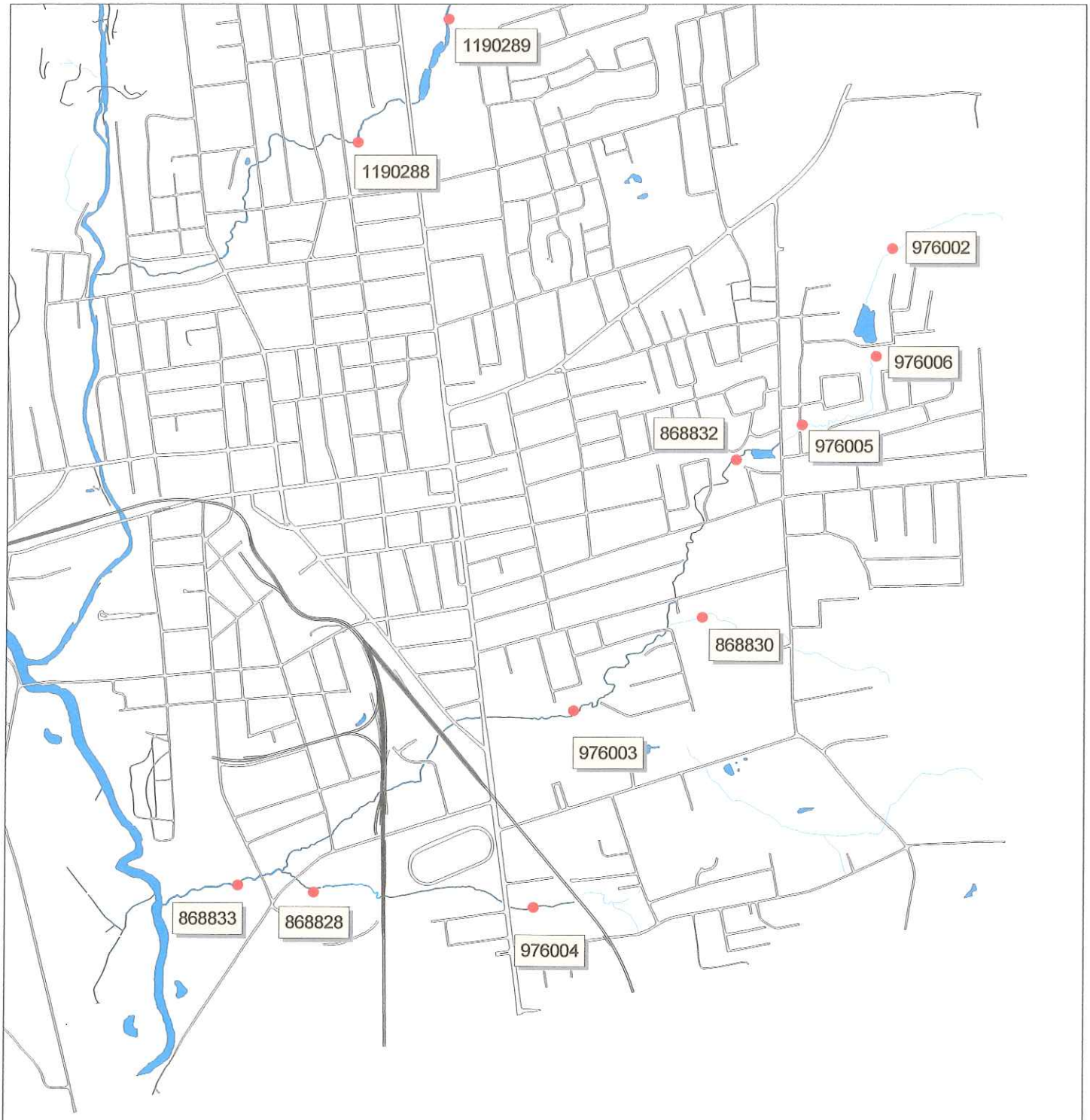
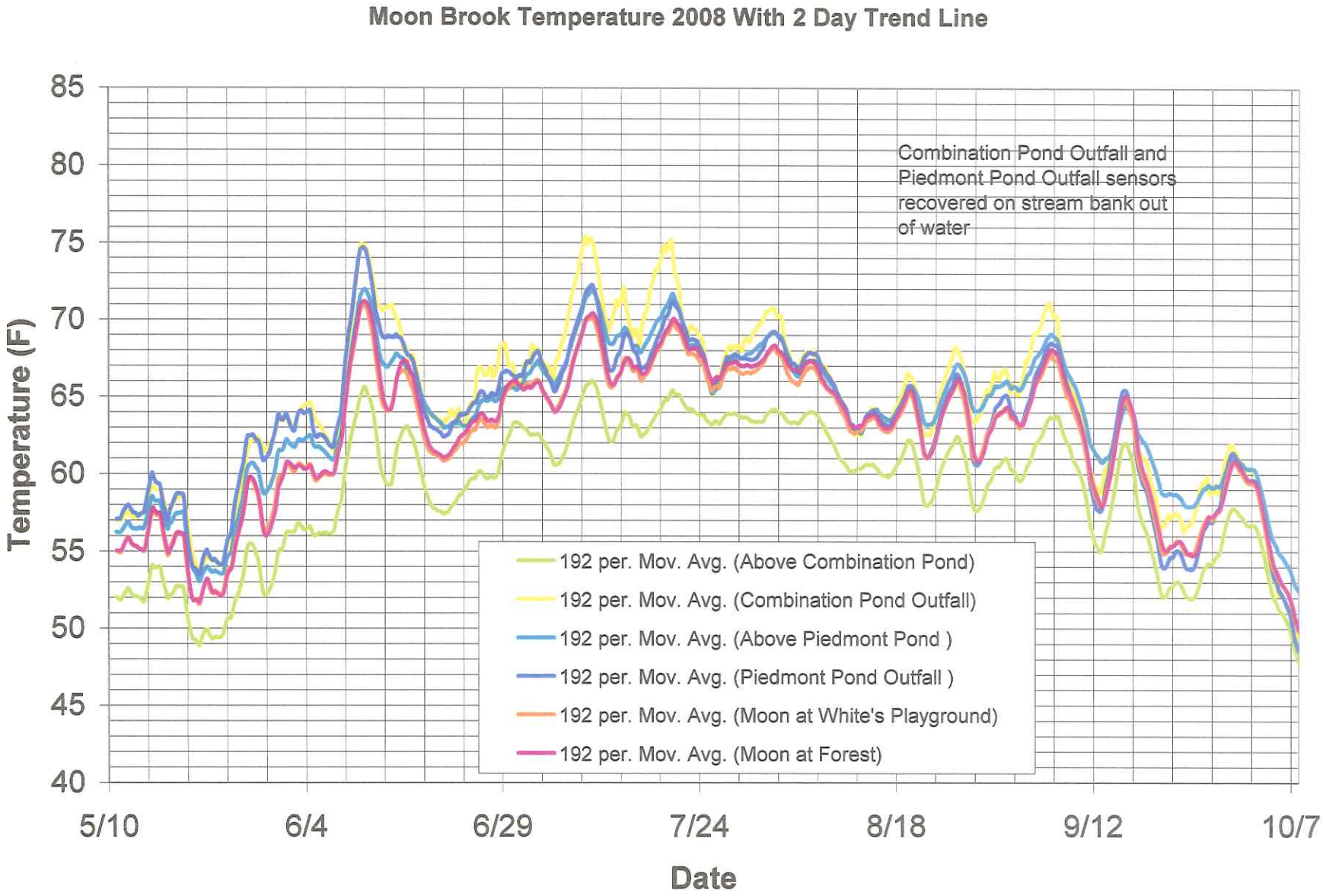


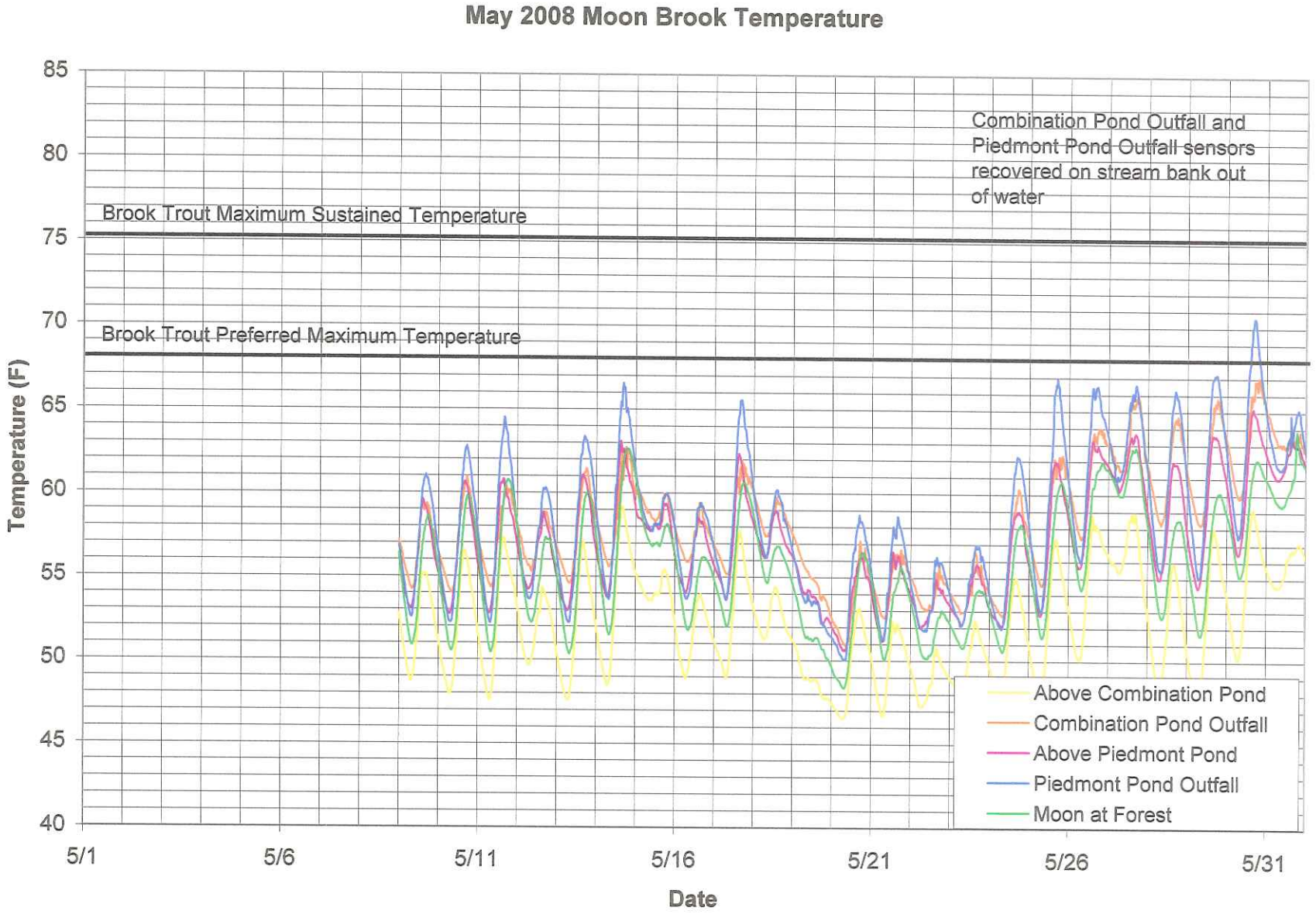

**2008 HOBO Locations**
**Stream Temperature Monitoring**
**City of Rutland**

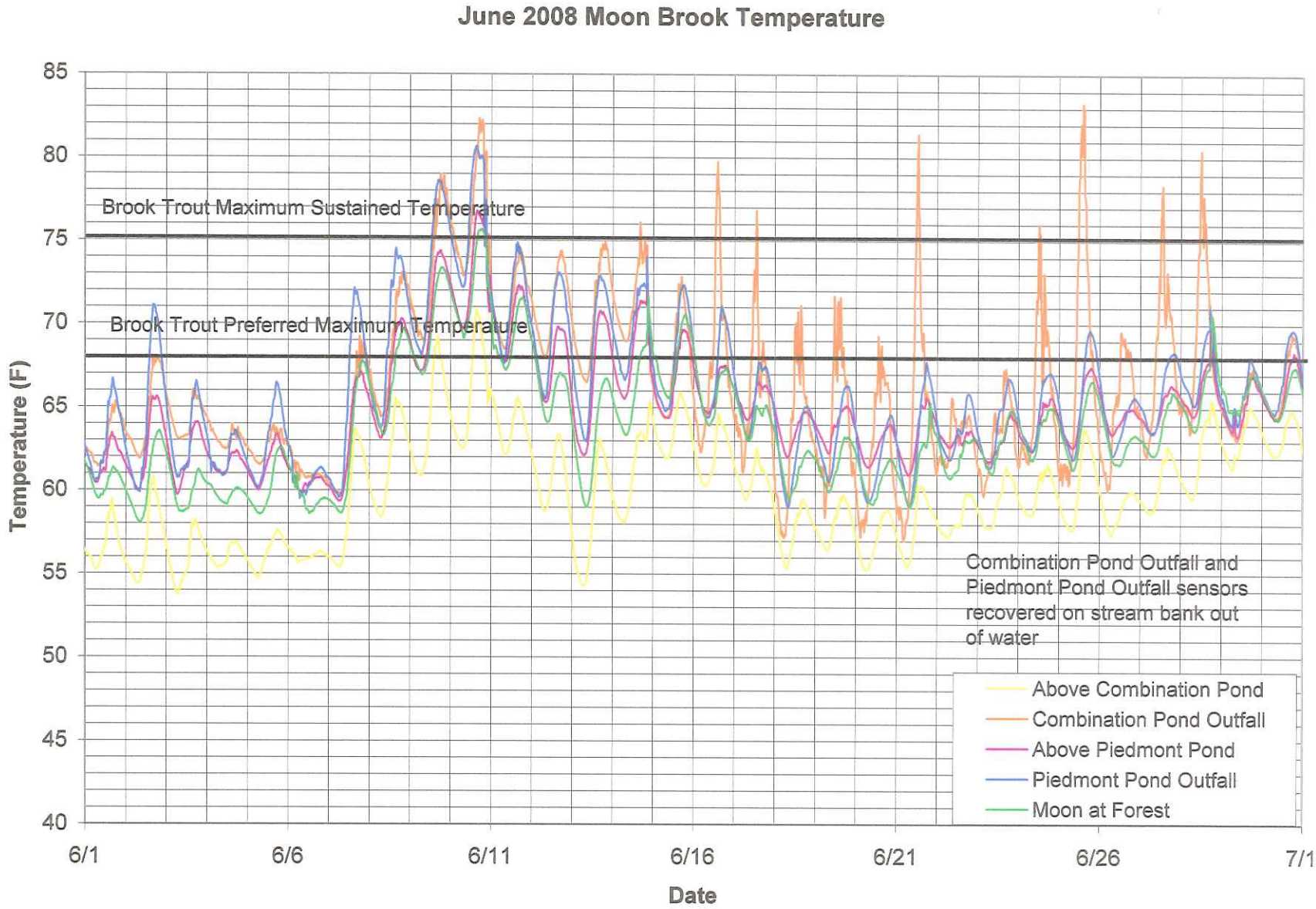
October 14, 2008

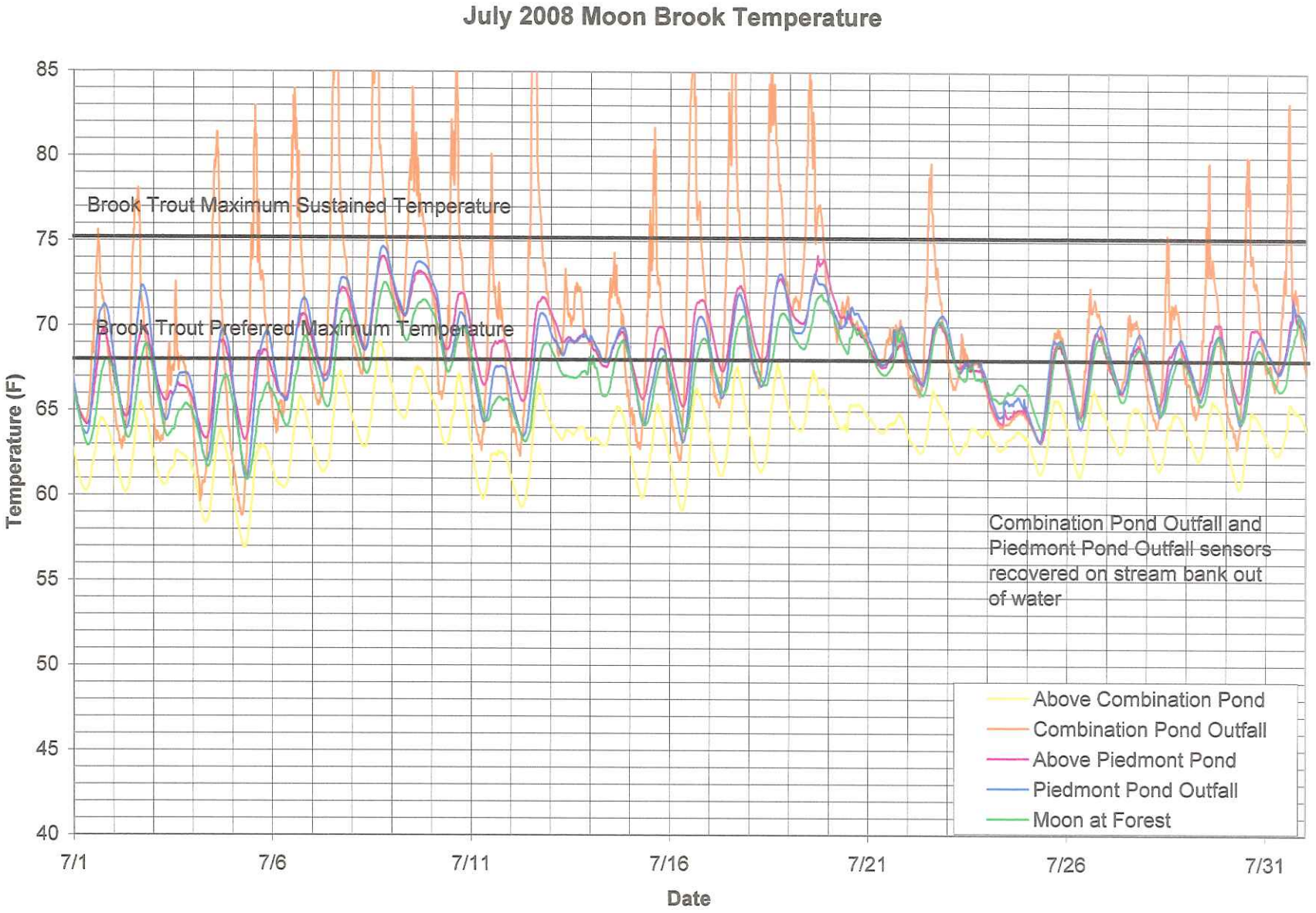
N
W E
S

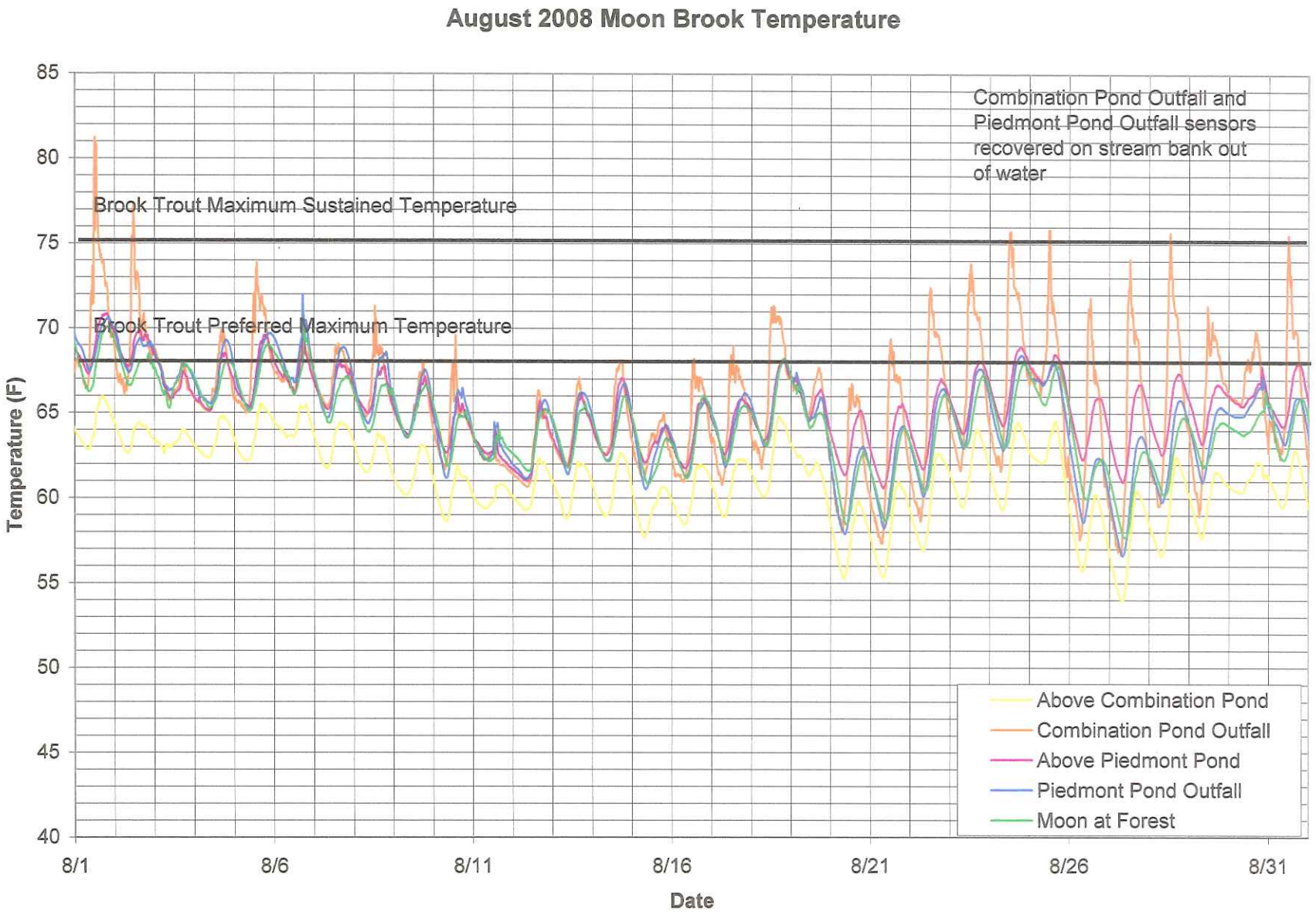
2000 0 2000 Feet

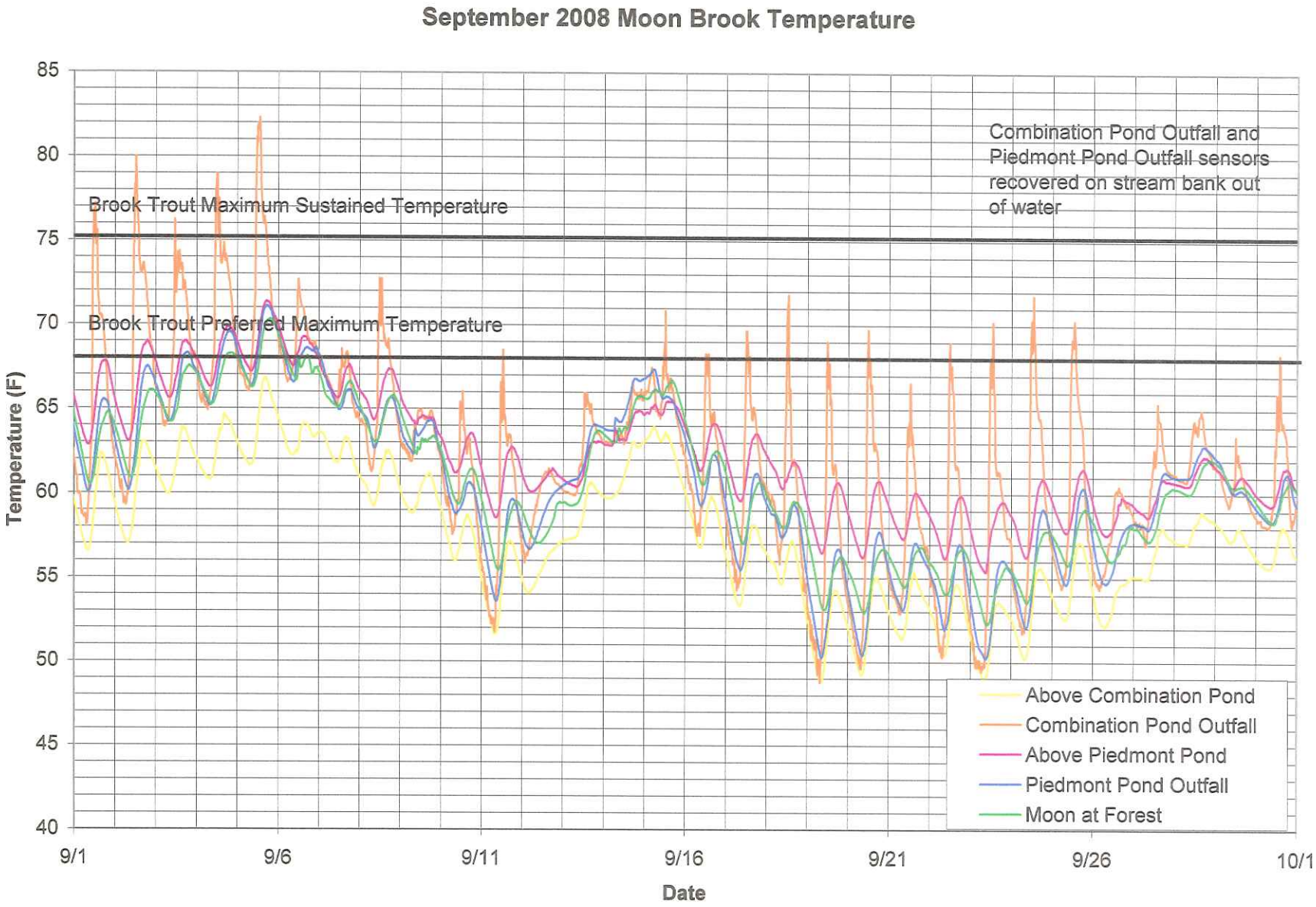

Moon Brook Temperature 2008 With 2 Day Trend Line
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
192 per. Mov. Avg. (Above Combination Pond)
192 per. Mov. Avg. (Combination Pond Outfall)
192 per. Mov. Avg. (Above Piedmont Pond )
192 per. Mov. Avg. (Piedmont Pond Outfall )
192 per. Mov. Avg. (Moon at White's Playground)
192 per. Mov. Avg. (Moon at Forest)
Temperature (F)
85
80
75
70
65
60
55
50
45
40
5/10
6/4
6/29
7/24
8/18
9/12
10/7
Date

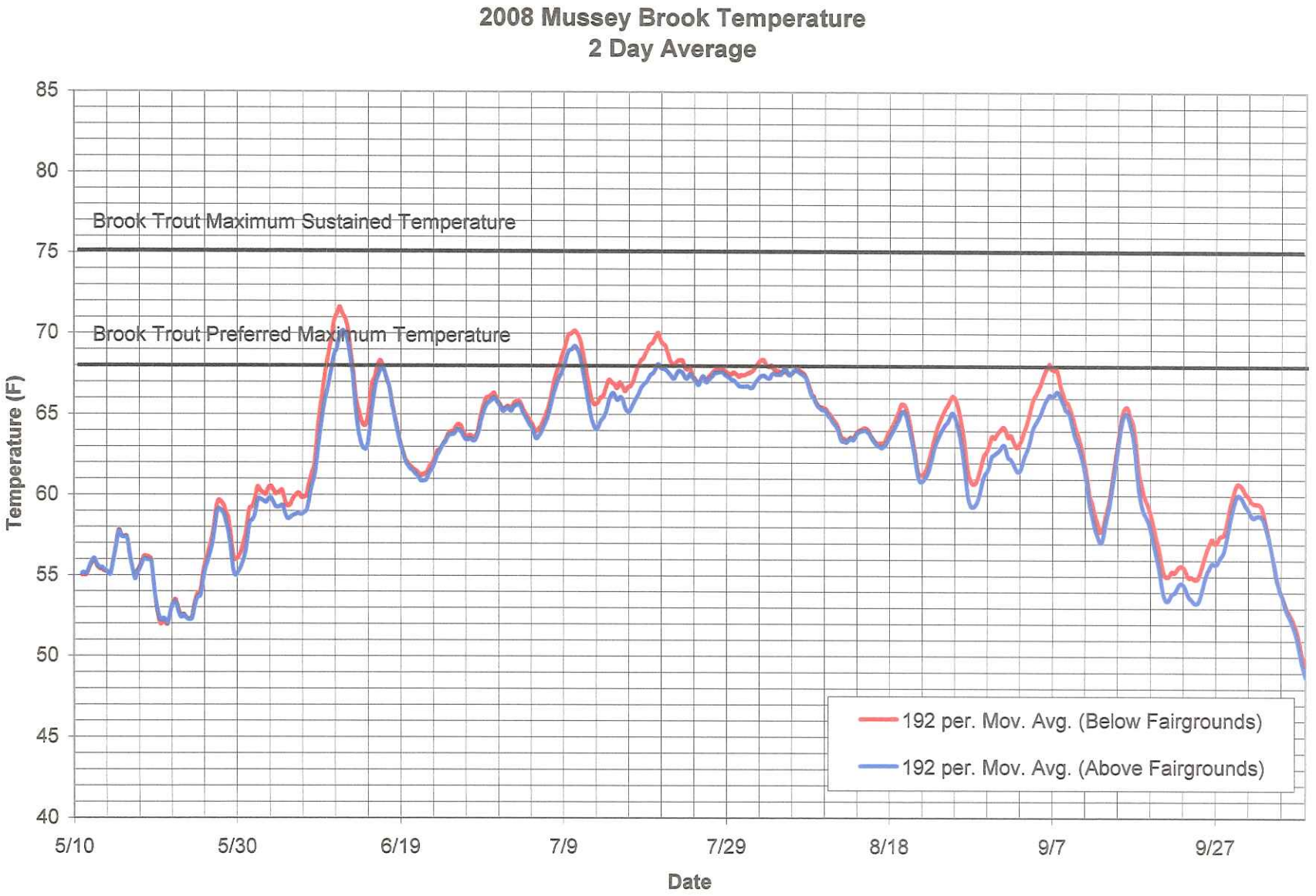
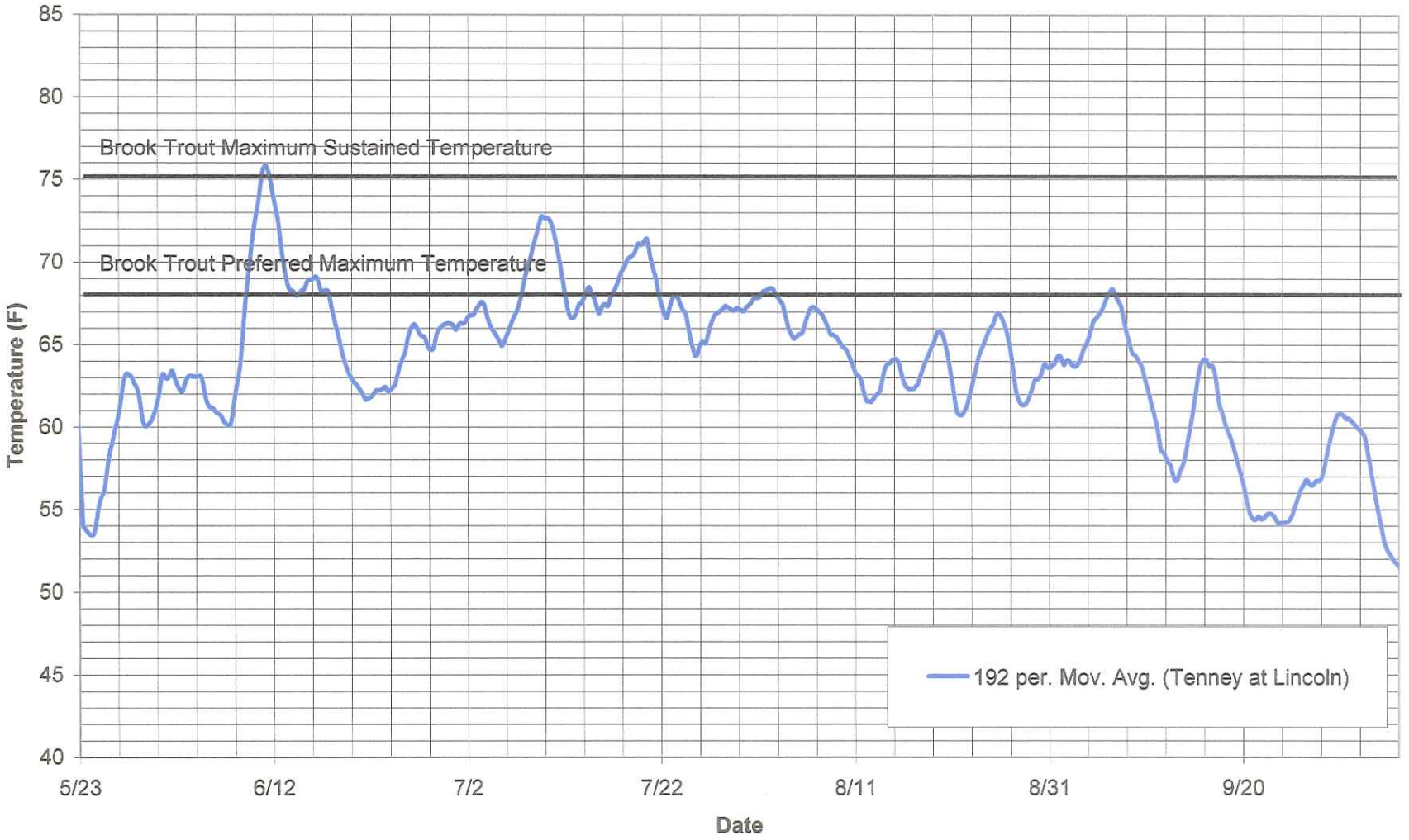

May 2008 Moon Brook Temperature
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
Temperature (F)
85
80
75
70
65
60
55
50
45
40
5/1
5/6
5/11
5/16
5/21
5/26
5/31
Date
Above Combination Pond
Combination Pond Outfall
Above Piedmont Pond
Piedmont Pond Outfall
Moon at Forest


June 2008 Moon Brook Temperature
Temperature (F)
85
80
75
70
65
60
55
50
45
40
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
Above Combination Pond
Combination Pond Outfall
Above Piedmont Pond
Piedmont Pond Outfall
Moon at Forest
6/1
6/6
6/11
6/16
6/21
6/26
7/1
Date


July 2008 Moon Brook Temperature
Temperature (F)
85
80
75
70
65
60
55
50
45
40
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
Above Combination Pond
Combination Pond Outfall
Above Piedmont Pond
Piedmont Pond Outfall
Moon at Forest
7/1
7/6
7/11
7/16
7/21
7/26
7/31
Date


August 2008 Moon Brook Temperature
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
Temperature (F)
85
80
75
70
65
60
55
50
45
40
8/1
8/6
8/11
8/16
8/21
8/26
8/31
Date
Above Combination Pond
Combination Pond Outfall
Above Piedmont Pond
Piedmont Pond Outfall
Moon at Forest


September 2008 Moon Brook Temperature
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
Combination Pond Outfall and Piedmont Pond Outfall sensors recovered on stream bank out of water
Above Combination Pond
Combination Pond Outfall
Above Piedmont Pond
Piedmont Pond Outfall
Moon at Forest
Temperature (F)
85
80
75
70
65
60
55
50
45
40
9/1
9/6
9/11
9/16
9/21
9/26
10/1
Date


2008 Mussey Brook Temperature
2 Day Average
Brook Trout Maximum Sustained Temperature
Brook Trout Preferred Maximum Temperature
192 per. Mov. Avg. (Below Fairgrounds)
192 per. Mov. Avg. (Above Fairgrounds)
Temperature (F)
85
80
75
70
65
60
55
50
45
40
5/10
5/30
6/19
7/9
7/29
8/18
9/7
9/27
Date

## 2008 Tenney Brook Temperature
## 2 Day Average