

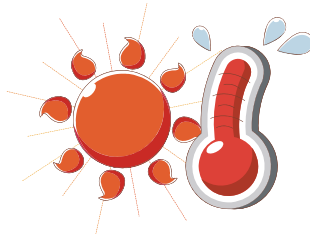
Fifteenmile Action to Stabilize Temperatures (FAST)

First Alert (June 27-July 3)
Summary of Measured Stream
Temperatures and
Model Forecast Performance

Measured Stream Temperatures 2013 (daily average Deg. F) on Fifteenmile Creek

	Elevation (ft)			
	200'	900'	1200'	1525'
6/27 - Alert	• 68.7	66.9	61.3	56.4
6/28 - Reg 1960	• 73.0	71.6	65.4	59.3
6/29	• 75.6	75.0	69.1	62.3
6/30	• 75.4	75.7	72.2	62.8
7/1	• 77.9	78.6	72.8	65.3
7/2 - Reg 1909	• 77.5	79.2	69.8	66.4
7/3 - End Alert	• 73.9	76.3	65.9	64.2
7/4	• 69.4	71.8	65.9	62.0

* Red color indicates above threshold for alert



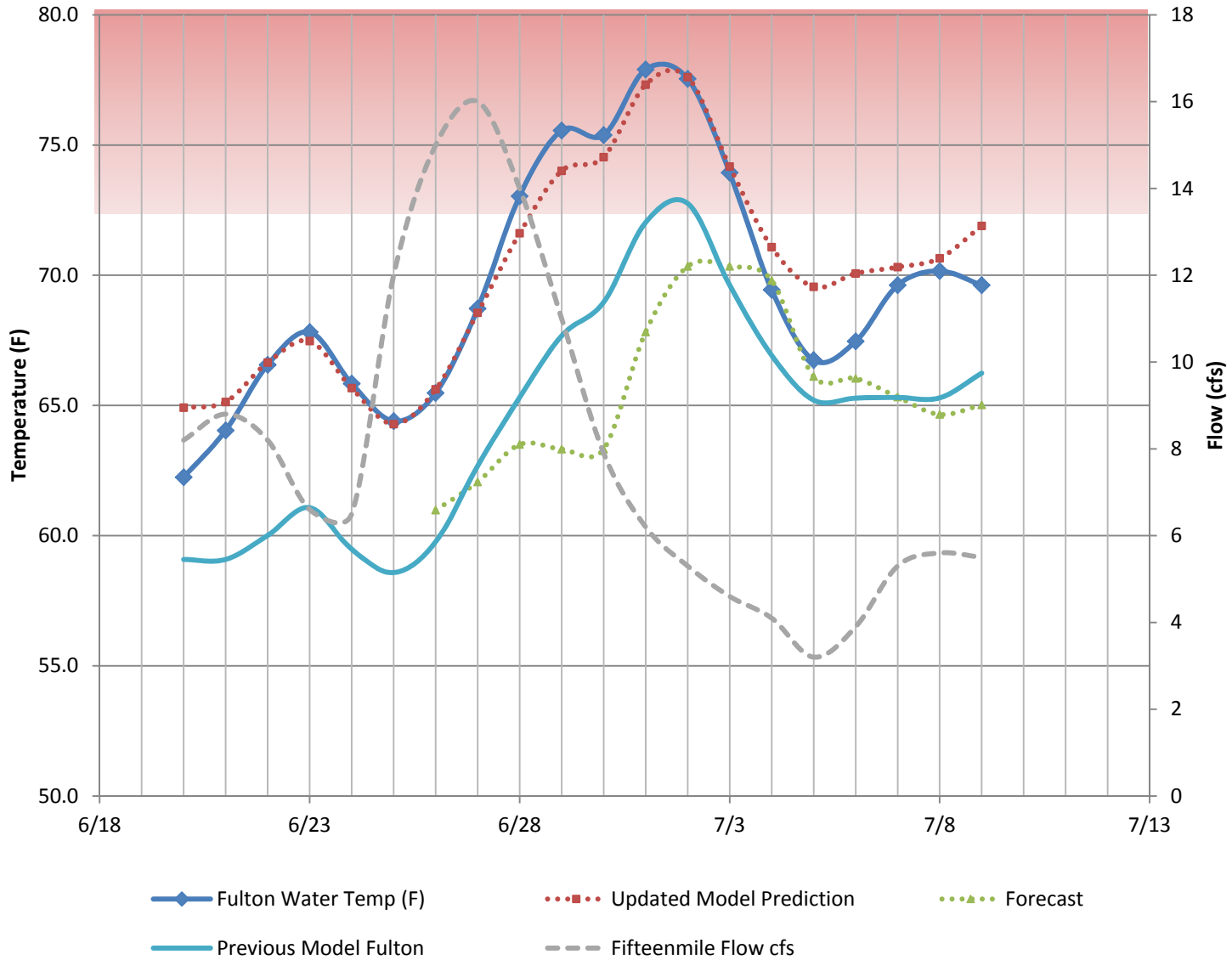
Fifteenmile Creek Water Temperatures - 2009

Date	200'	900'	Dufur-1200'
16-Jul-09	72.1	70.3	63.5
17-Jul-09	73.6	72.7	65.5
18-Jul-09	72.9	72.7	65.7
19-Jul-09	70.5	72.1	65.3
20-Jul-09	70.7	71.4	64.8
21-Jul-09	72.7	72.9	66.7
22-Jul-09	72.9	74.1	67.5
23-Jul-09	69.3	72.0	65.7
24-Jul-09	69.3	71.6	65.5
25-Jul-09	71.6	72.7	66.7
26-Jul-09	74.1	74.5	68.9
27-Jul-09	77.4	77.0	70.9
28-Jul-09	77.9	78.4	72.0
29-Jul-09	78.1	78.8	72.5
30-Jul-09	75.7	77.5	71.2
31-Jul-09	76.5	79.0	72.0
1-Aug-09	76.6	79.5	72.1
2-Aug-09	75.7	79.2	72.5
3-Aug-09	72.5	77.0	71.2
4-Aug-09	69.8	74.3	68.9
5-Aug-09	68.4	73.6	67.8
6-Aug-09	63.9	68.9	62.8
7-Aug-09	62.4	66.9	62.2
8-Aug-09	63.0	66.9	61.9
9-Aug-09	65.8	68.4	64.0
10-Aug-09	68.0	69.3	64.0
11-Aug-09	69.1	70.0	64.4
12-Aug-09	70.2	70.7	65.5
13-Aug-09	67.8	70.0	63.1
14-Aug-09	64.4	65.8	60.3
15-Aug-09	63.9	64.6	59.5

Fish Kill Observed (2009)

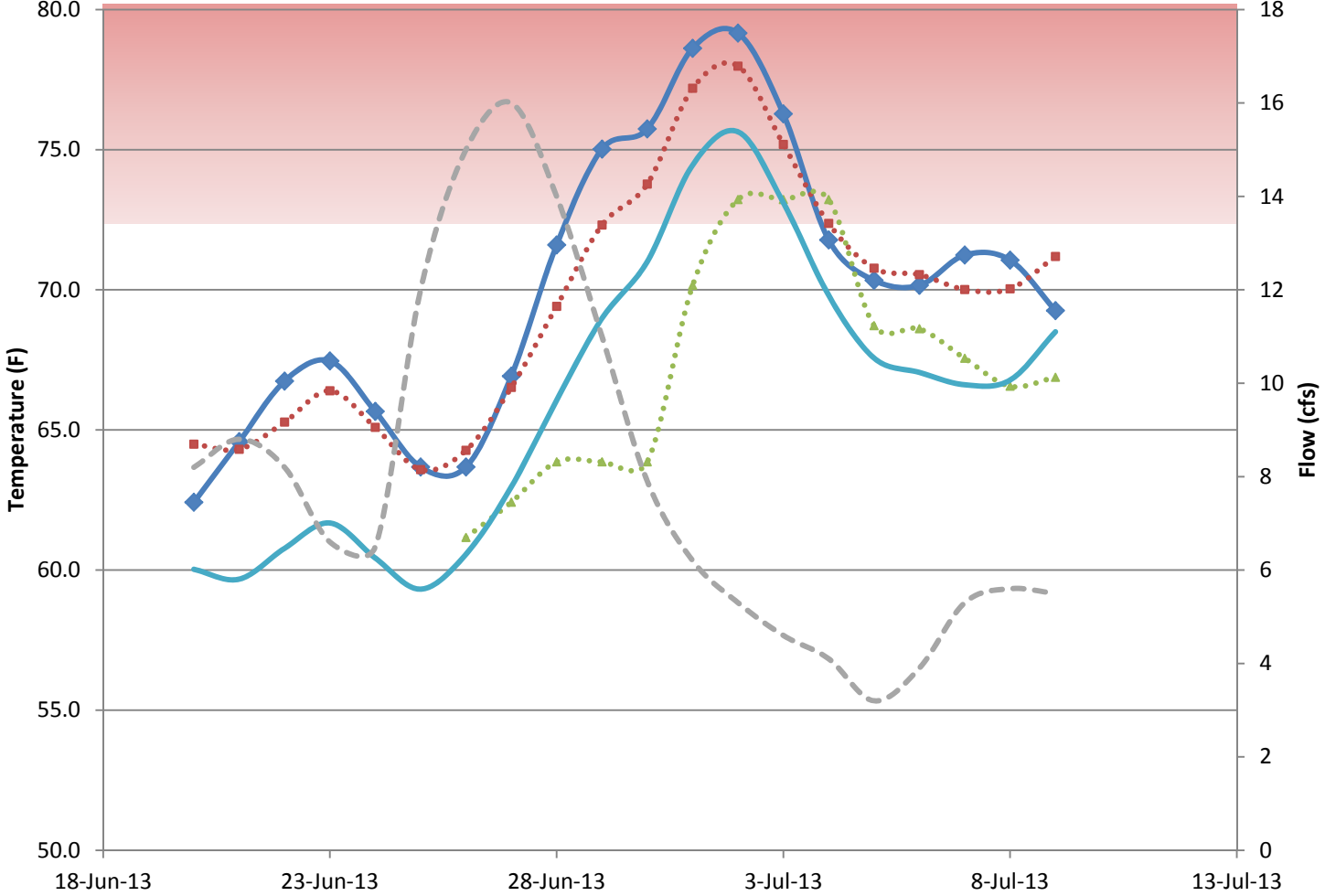


Fifteenmile Creek Mouth - 200' Elevation



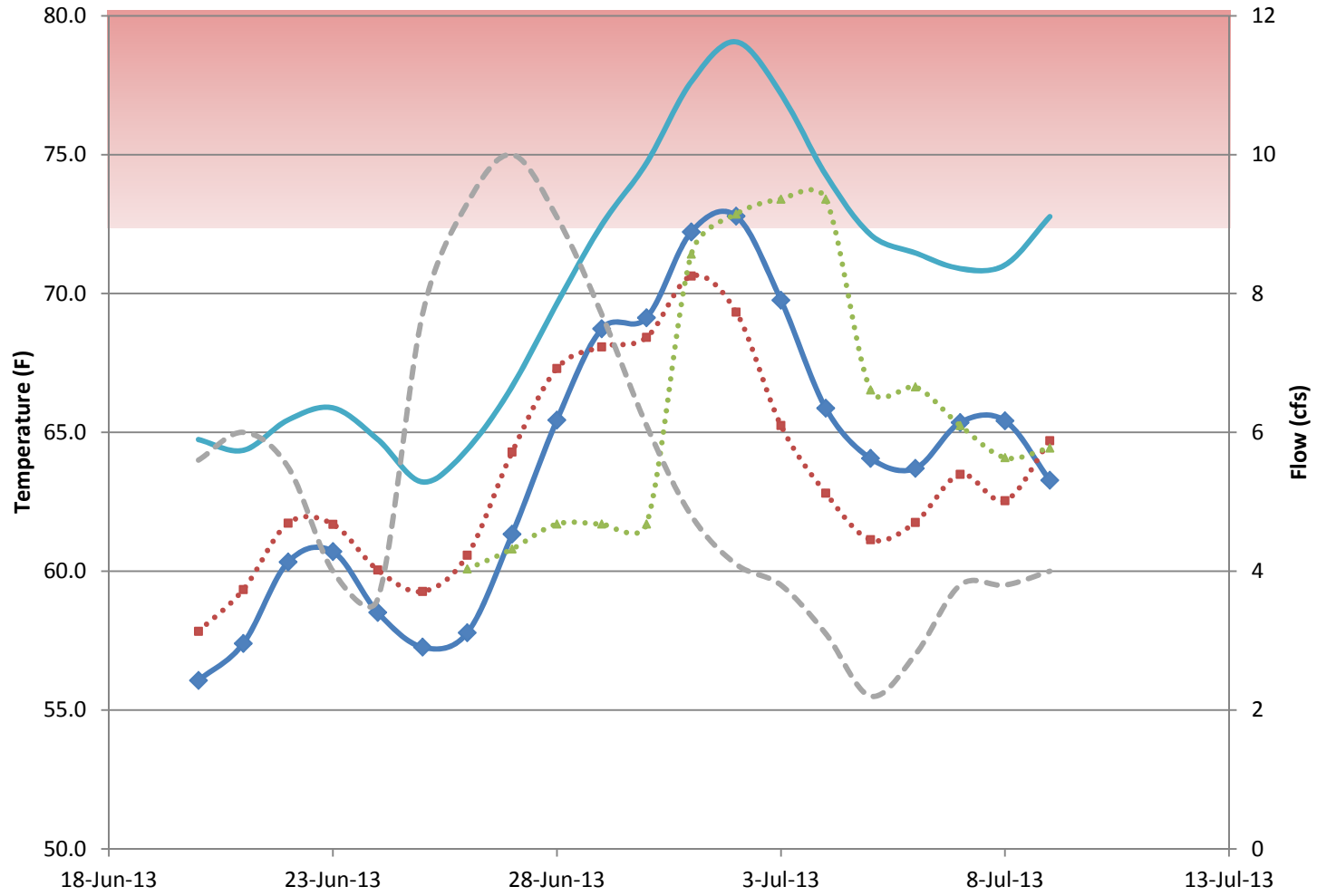
* During alert time-period, forecast was running only ½ the model predictors (green-dashed line), resulting in underestimation of stream temperatures. Model has since been updated (red-dashed line).

Fifteenmile Creek - 900' Elevation



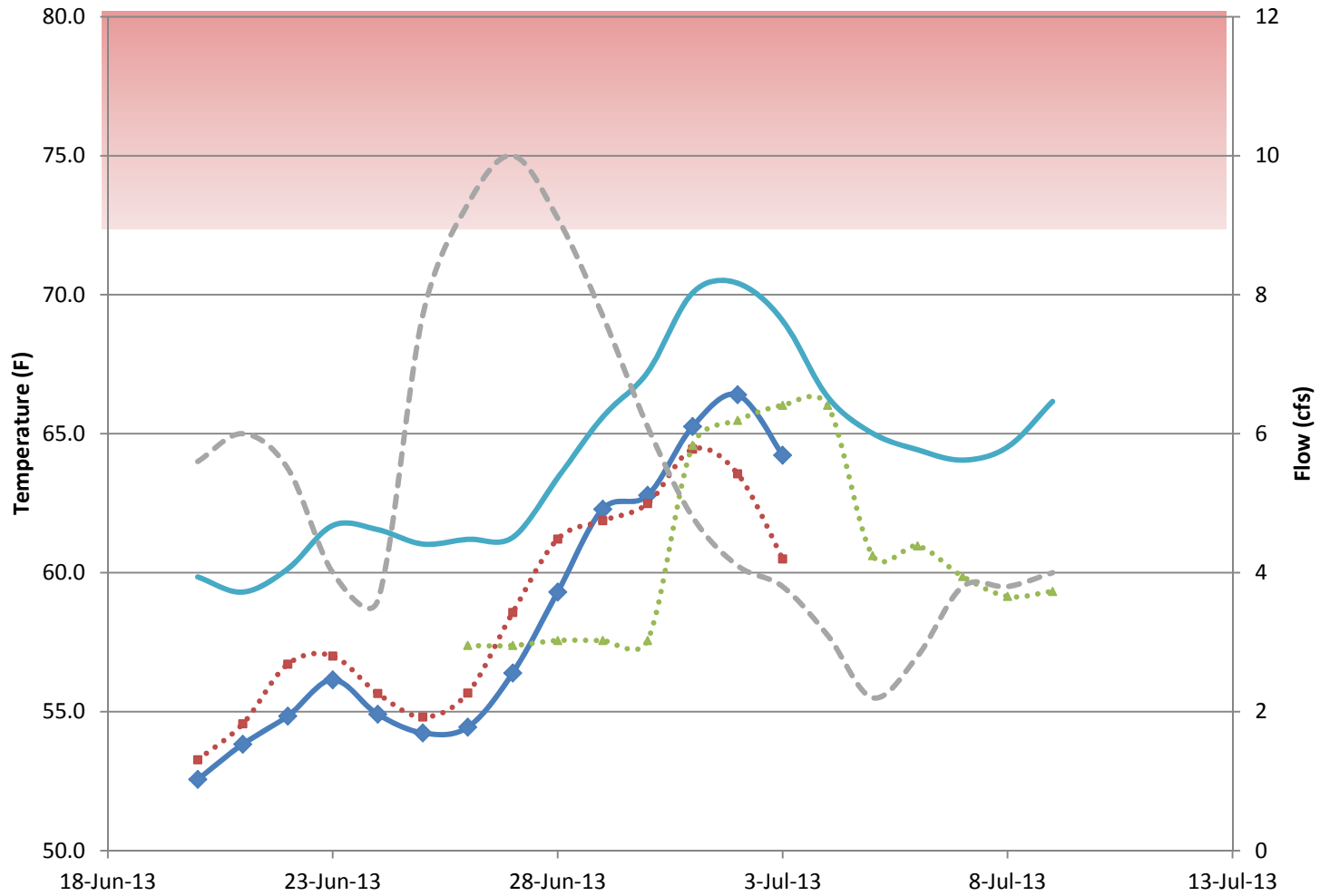
- ◆ Brewers Water Temp F
- Updated Model Prediction
- ▲ Forecast
- Previous Model Brewers
- - Fifteenmile Flow cfs

Fifteenmile Creek - 1200' Elevation



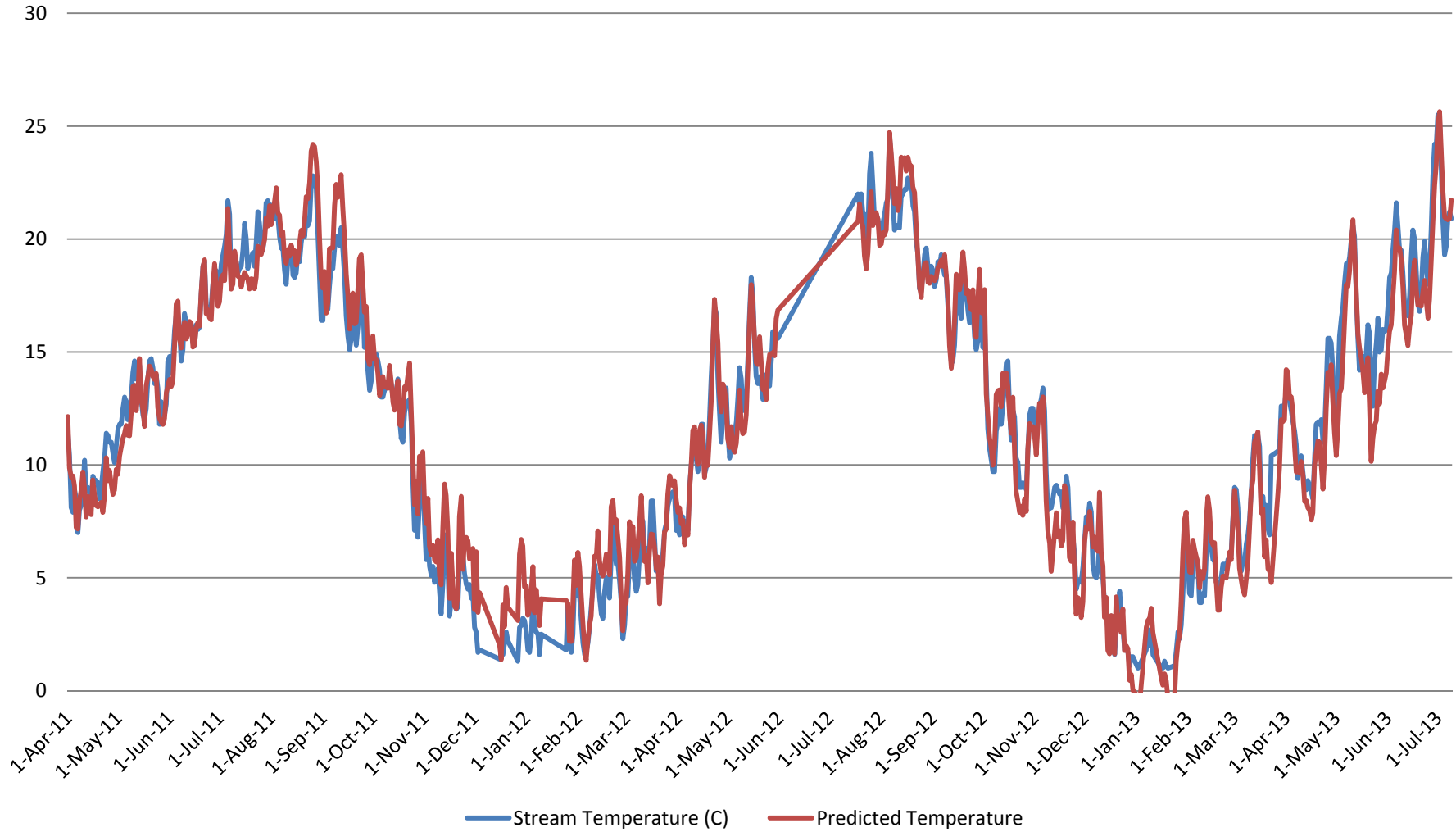
- Water Temp Ashbrook F
- Updated Model Prediction
- Forecast
- Previous Model Dufur
- Kaser Flow cfs

Fifteenmile Creek - 1525' Elevation



- ◆ Ramsey Water Temp Mean F
- Updated Model Prediction
- Forecast
- ◆ Kaser Flow cfs
- Previous Model Ramsey

200' Elevation - Measured vs. Predicted



Updated model performance over two-year time period of record.

Measured Stream Temperatures (Daily Average, Deg. F)
 Fifteenmile Creek Mouth – 200' Elevation

Date	Observed Water Temp (F)	Updated Model Prediction	Forecast
20-Jun-13	62.2	64.9	
21-Jun-13	64.0	65.1	
22-Jun-13	66.6	66.6	
23-Jun-13	67.8	67.5	
24-Jun-13	65.8	65.7	
25-Jun-13	64.4	64.3	
26-Jun-13	65.5	65.6	61.0
27-Jun-13	68.7	68.6	62.1
28-Jun-13	73.0	71.6	63.5
29-Jun-13	75.6	74.0	63.3
30-Jun-13	75.4	74.5	63.3
1-Jul-13	77.9	77.3	67.8
2-Jul-13	77.5	77.6	70.3
3-Jul-13	73.9	74.2	70.3
4-Jul-13	69.4	71.1	69.8
5-Jul-13	66.7	69.6	66.1
6-Jul-13	67.5	70.1	66.0
7-Jul-13	69.6	70.3	65.3
8-Jul-13	70.2	70.7	64.7
9-Jul-13	69.6	71.9	65.0

Measured Stream Temperatures (Daily Average, Deg. F)
 Fifteenmile Creek – 900' Elevation

Date	Brewers Water Temp F	Updated Model Prediction	Forecast
20-Jun-13	62.4	64.5	
21-Jun-13	64.6	64.3	
22-Jun-13	66.7	65.3	
23-Jun-13	67.5	66.4	
24-Jun-13	65.7	65.1	
25-Jun-13	63.7	63.6	
26-Jun-13	63.7	64.3	61.2
27-Jun-13	66.9	66.5	62.4
28-Jun-13	71.6	69.4	63.9
29-Jun-13	75.0	72.3	63.9
30-Jun-13	75.7	73.8	63.9
1-Jul-13	78.6	77.2	70.2
2-Jul-13	79.2	78.0	73.2
3-Jul-13	76.3	75.2	73.2
4-Jul-13	71.8	72.4	73.2
5-Jul-13	70.3	70.8	68.7
6-Jul-13	70.2	70.5	68.6
7-Jul-13	71.2	70.0	67.6
8-Jul-13	71.1	70.0	66.6
9-Jul-13	69.3	71.2	66.9

Measured Stream Temperatures (Daily Average, Deg. F)
 Fifteenmile Creek at Dufur – 1200' Elevation

Date	Water Temp Ashbrook F	Updated Model Prediction	Forecast
20-Jun-13	56.1	56.2	
21-Jun-13	57.4	57.8	
22-Jun-13	60.3	60.4	
23-Jun-13	60.7	60.2	
24-Jun-13	58.5	58.1	
25-Jun-13	57.3	57.6	
26-Jun-13	57.8	59.3	60.1
27-Jun-13	61.3	63.8	60.8
28-Jun-13	65.4	66.9	61.7
29-Jun-13	68.7	67.7	61.7
30-Jun-13	69.1	68.1	61.7
1-Jul-13	72.2	70.5	71.4
2-Jul-13	72.8	68.9	72.9
3-Jul-13	69.8	64.1	73.4
4-Jul-13	65.9	61.8	73.4
5-Jul-13	64.1	59.9	66.5
6-Jul-13	63.7	60.4	66.6
7-Jul-13	65.4	62.7	65.2
8-Jul-13	65.4	61.6	64.1
9-Jul-13	63.3	64.0	64.4

Measured Stream Temperatures (Daily Average, Deg. F)
 Fifteenmile Creek at Ramsey – 1525' Elevation

Date	Ramsey Water Temp Mean F	Updated Model Prediction	Forecast
20-Jun-13	52.6	53.3	
21-Jun-13	53.8	54.6	
22-Jun-13	54.8	56.7	
23-Jun-13	56.1	57.0	
24-Jun-13	54.9	55.7	
25-Jun-13	54.2	54.8	
26-Jun-13	54.4	55.7	57.4
27-Jun-13	56.4	58.6	57.4
28-Jun-13	59.3	61.2	57.6
29-Jun-13	62.3	61.9	57.6
30-Jun-13	62.8	62.5	57.6
1-Jul-13	65.3	64.4	64.6
2-Jul-13	66.4	63.6	65.5
3-Jul-13	64.2	60.5	66.0
4-Jul-13			66.0
5-Jul-13			60.6
6-Jul-13			61.0
7-Jul-13			59.9
8-Jul-13			59.1
9-Jul-13			59.3