

Draft Standards Determination Document
Stag Mountain Allotment
Appendix M – Water Quality Data

Water Quality Data

BLM collected discharge measurements, water quality samples and hourly water temperature data on East Fork Beaver Creek (EFBC) and Cabin Creek between 2006 and 2014. These data were used to determine whether state water quality criteria are met to make the determination for Standard 2. The water quality standards for streams in the allotment are detailed in Nevada Administrative Code (NAC) chapter 445A.1458 and are shown in table 1. There are no water quality standards expressed for waterbodies within the allotment in the NAC, however; streams within the allotment flow into the North Fork of the Humboldt River (NFHR) and therefore the standards for the NFHR apply under the “tributary rule” BLM’s water quality “grab” sample results are shown in Table 2. Continuous temperature monitoring results are displayed in graphs. An analysis of sampling results by parameter, followed by data tables and graphs is presented below:

pH

The beneficial uses requiring the most stringent pH criteria are aquatic life, wildlife and contact recreation. The Criterion to meet these beneficial uses is a pH value between 6.5 and 9.0. The pH was criterion was exceeded zero out of 16 times on Lower EFBC, one out of 18 times on Middle EFBC, zero out of three times on upper EFBL and two out of 17 times on Cabin Creek. The number of samples outside the acceptable criterion was below the minimum number of exceedences to categorize a standard as not met (NDEP 2012 p.18).

Total Phosphorus

The beneficial uses requiring the most stringent total phosphorus criteria are aquatic life and contact recreation. The Criteria to meet these beneficial uses is a total phosphorus concentration of less than 0.10 mg/l. The standard was exceeded zero out of 10 times on Lower and upper EFBC, one out of three times on upper EFBC, and one out of nine samples on Cabin Creek. The number of samples outside the acceptable criterion was below the minimum number of exceedences to categorize a standard as not met (NDEP 2012 p.18).

Dissolved Oxygen

The beneficial use which requires the most stringent dissolved oxygen criteria is aquatic life. To meet the criteria for aquatic life dissolved oxygen concentration must be greater than 6.0 mg/l. Total dissolved oxygen was measured 14 times on lower EFBC, 15 times on middle EFBC, three times on upper EFBC, and 14 times on Cabin Creek. No exceedences of the standard occurred in these measurements.

Total Ammonia

The beneficial use which requires the most stringent dissolved oxygen criteria is aquatic life. The allowable concentration is dependent upon water temperature at the time the sample was taken. Total ammonia was only measured once on lower, middle, and upper EFBC and none was detected. Exceedences in total ammonia are very rare except in water-bodies that are influenced by sewage or industrial discharge.

Total Dissolved Solids

The beneficial use which requires the most stringent total dissolved solids criteria is municipal supply. To meet the criterion for municipal supply the total dissolved solids concentration must be less than 500 mg/l. Sampling results show concentrations well below the criteria for all samples taken. This is also supported by the many field data samples of electrical conductivity which can be used as a surrogate for total dissolved solids.

E-Coli Bacteria

The beneficial use which requires the most stringent E-Coli Bacteria criterion is recreation involving contact with the water. To meet the criterion for this beneficial use the sample must not produce more than 410 colony forming units (cfu) per 100 ml sample or samples must not have an annual geometric mean (AGM) of greater than 126 cfu per 100 ml sample. The E-Coli standard was exceeded in one out of five samples on lower EFBC, two out of five samples on middle EFBC, two out of three samples on upper EFBC, and one out of four samples on Cabin Creek. The number of samples outside the acceptable criterion was below the minimum number of exceedences to categorize a standard as not met (NDEP 2012 p.18). There were never enough samples taken in any given year to apply the (AGM) standard.

Fecal Coliform Bacteria

The beneficial use which requires the most stringent fecal coliform criterion is irrigation. To meet the criterion for this beneficial use the sample must not produce more than 1000 colony forming units (cfu) per 100 ml sample. This standard was exceeded for one out of seven samples on lower EFBC, two out of seven samples on middle EFBC, one out of three samples on upper EFBC, and one out of six samples on Cabin Creek. The number of samples outside the acceptable criterion was below the minimum number of exceedences to categorize a standard as not met (NDEP 2012 p.18).

Temperature

The beneficial use which requires the most stringent water temperature criterion is aquatic life, specifically those for a trout. The criterion is violated when temperature rises over 20° Celcius (C). if the streams had been identified as a cold water fishery the criterion would have been 24° C. NDEP specifies that when continuous monitoring is used, maximum daily values are evaluated against the standard. If the standard is violated for more than 10% of the days being considered, then the standard is violated for the year.

BLM collected stream temperature data by deploying thermal data loggers in East Fork Beaver Creek and Cabin Creek. Data were recorded from 2006 to 2012 with some data missing during some years. The number of days where maximum water temperature exceeded 20° C for these streams is shown below. The number of days where maximum temperature exceeded 24° C is also shown for comparison.

	Days maximum water temperature over 24° C					
	2007	2008	2009	2010	2011	2012
Cabin Creek	80	40	2	41	52	79
East Fork Beaver Creek, Lower	46		18	19	13	38
East Fork Beaver Creek, Middle		58	16	41	45	73

	Days maximum water temperature over 20° C					
	2007	2008	2009	2010	2011	2012
Cabin Creek	93	75	69	92	99	128
East Fork Beaver Creek, Lower	87		80	70	80	101
East Fork Beaver Creek, Middle		73	77	75	87	112

The temperature criterion was exceeded during every year the streams in the allotment. The NDEP has identified these streams as not supporting the aquatic life beneficial use. Even if these streams were identified as a warm water fishery, and the standard was 24° C rather than 20° C, the standard would still not be met.

Table 1

NAC 445A.1458 Humboldt Region: Humboldt River, North Fork at Beaver Creek. ([NRS 445A.425](#), [445A.520](#)) The limits of this table apply to the body of water known as the North Fork of the Humboldt River from the national forest boundary to its confluence with Beaver Creek. This segment of the North Fork of the Humboldt River is located in Elko County.

STANDARDS OF WATER QUALITY
Humboldt River, North Fork at Beaver Creek

PARAMETER	REQUIREMENTS TO MAINTAIN EXISTING HIGHER QUALITY	WATER QUALITY STANDARDS FOR BENEFICIAL USES	Beneficial Use ^a										
			Livestock	Irrigation	Aquatic	Contact	Noncontact	Municipal	Industrial	Wildlife	Aesthetic	Enhance	Marsh
Beneficial Uses			X	X	X	X	X	X	X	X			
Aquatic Life Species of Concern			Trout.										
Temperature - °C ΔT ^b - °C		S.V. ≤ 20 ΔT = 0			*	X							
pH - SU		S.V. 6.5 - 9.0	X	X	*	*		X	X	*			
Dissolved Oxygen - mg/l		S.V. ≥ 6.0	X		*	X	X	X		X			
Total Phosphorus (as P) - mg/l		S.V. ≤ 0.10			*	*	X	X					
Total Ammonia (as N) - mg/l		^c			*			X					
Total Dissolved Solids - mg/l		≤ 500 or the 95th S.V. percentile (whichever is less).	X	X				*					
E. coli - No./100 ml		A.G.M. ≤ 126 S.V. ≤ 410				*	X						
Fecal Coliform - No./100 ml		S.V. ≤ 1,000	X	*			X	X		X			

* = The most restrictive beneficial use.

X = Beneficial use.

^a Refer to [NAC 445A.122](#) and [445A.1432](#) for beneficial use terminology.

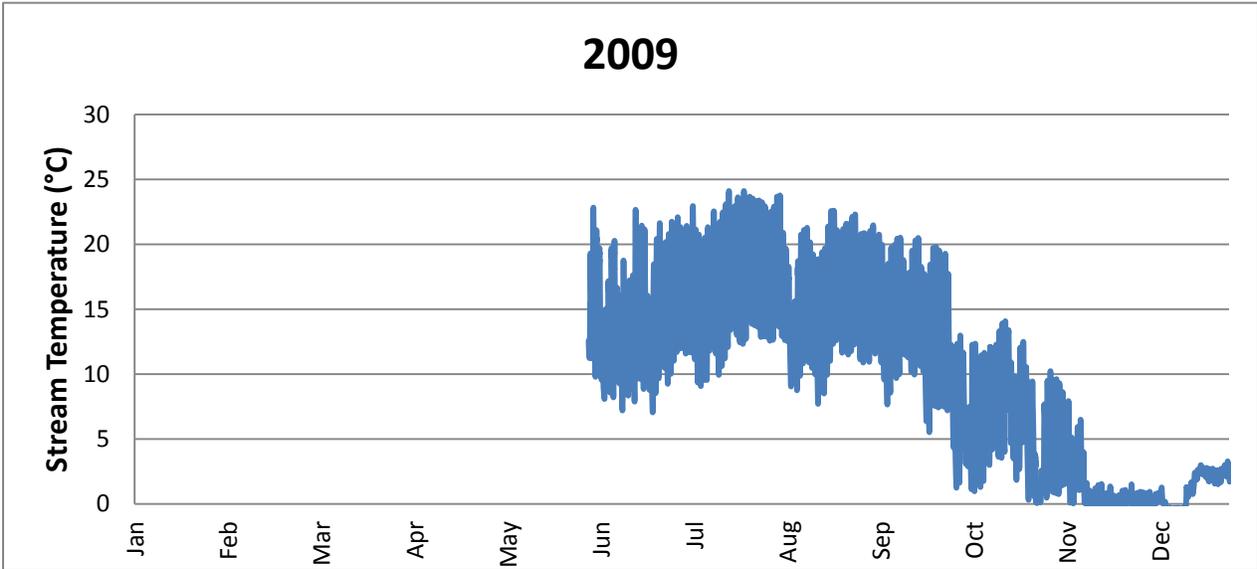
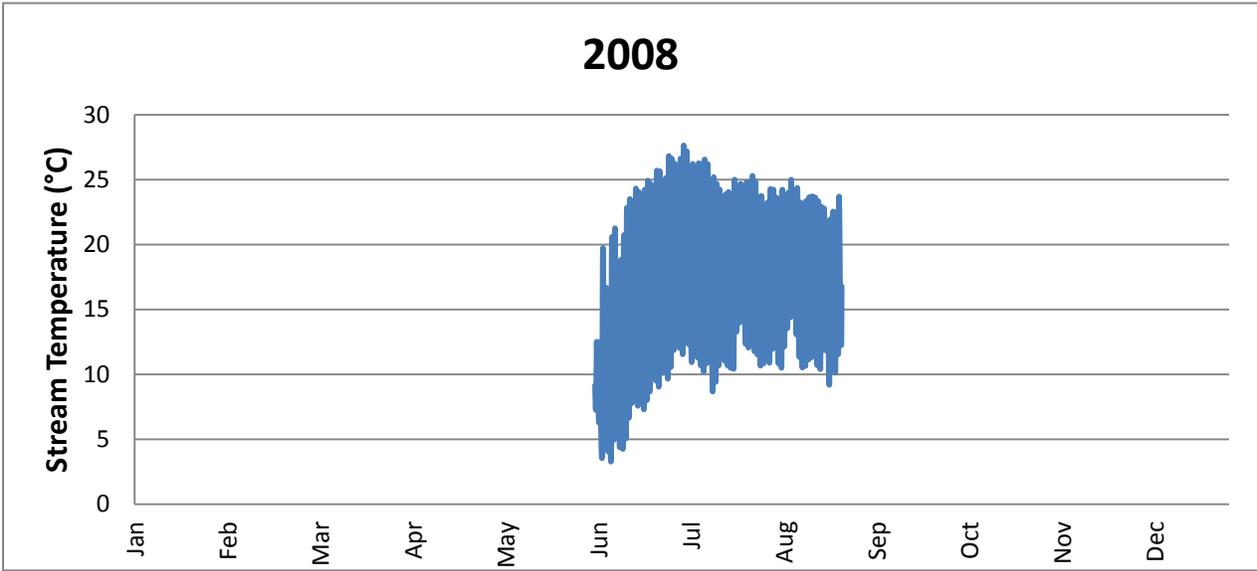
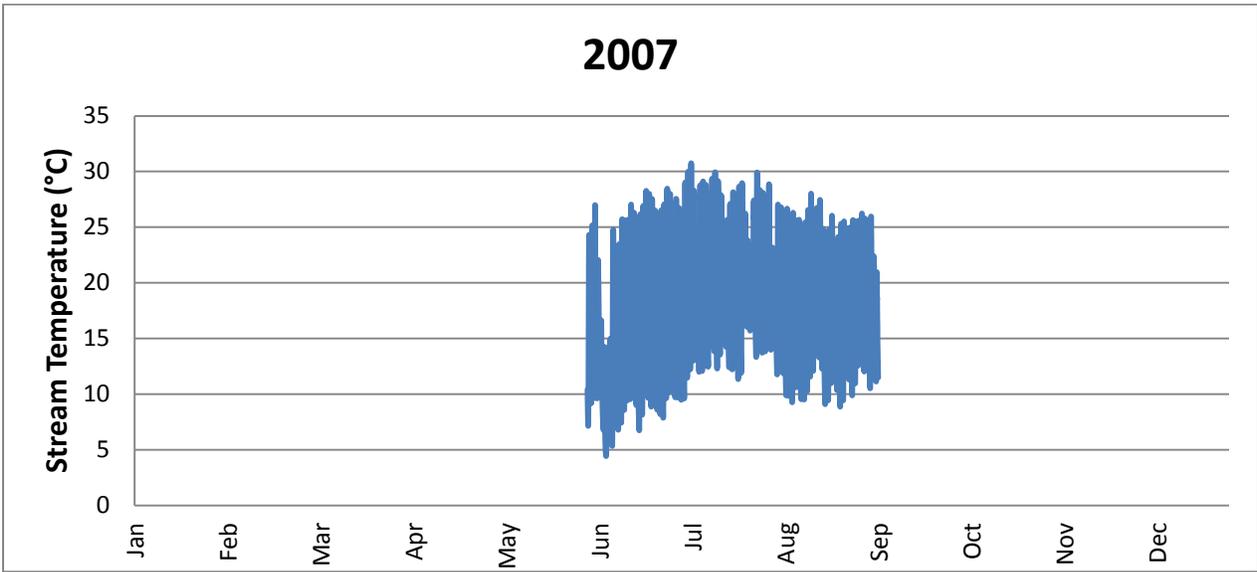
^b Maximum allowable increase in temperature above water temperature at the boundary of an approved mixing zone, but the increase must not cause a violation of the single value standard.

^c The ambient water quality criteria for ammonia are specified in [NAC 445A.118](#).

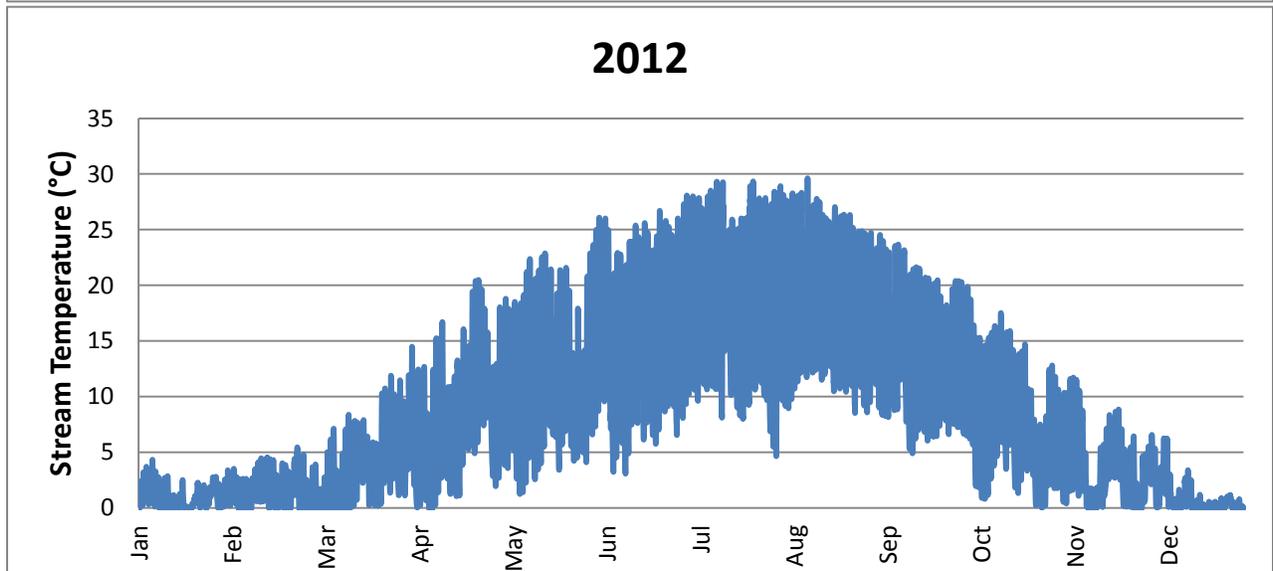
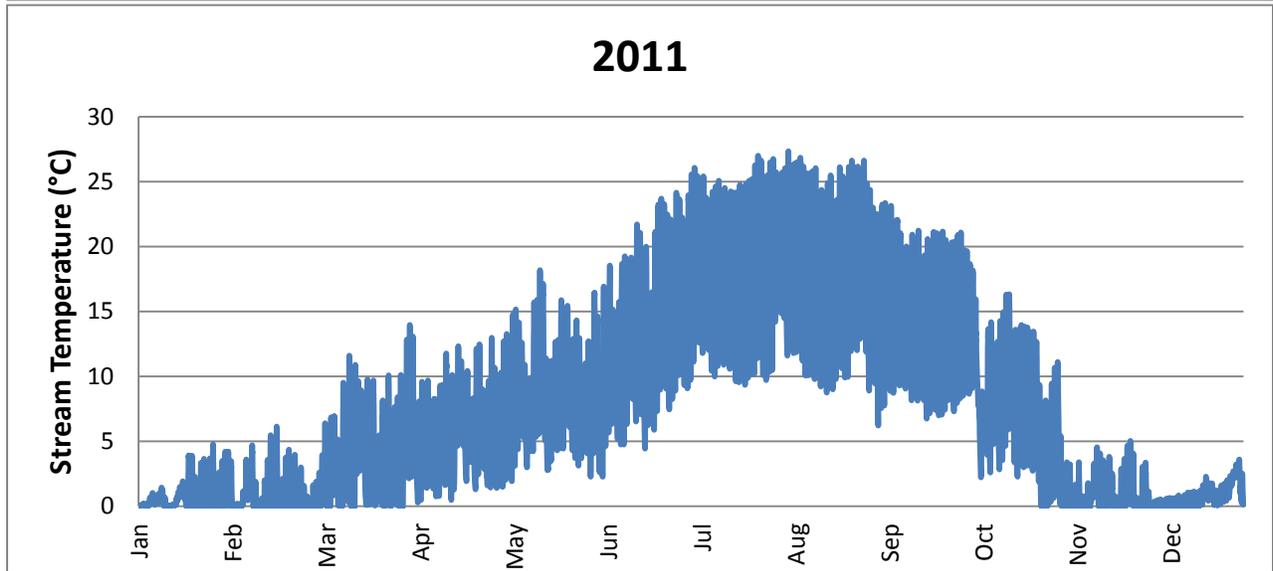
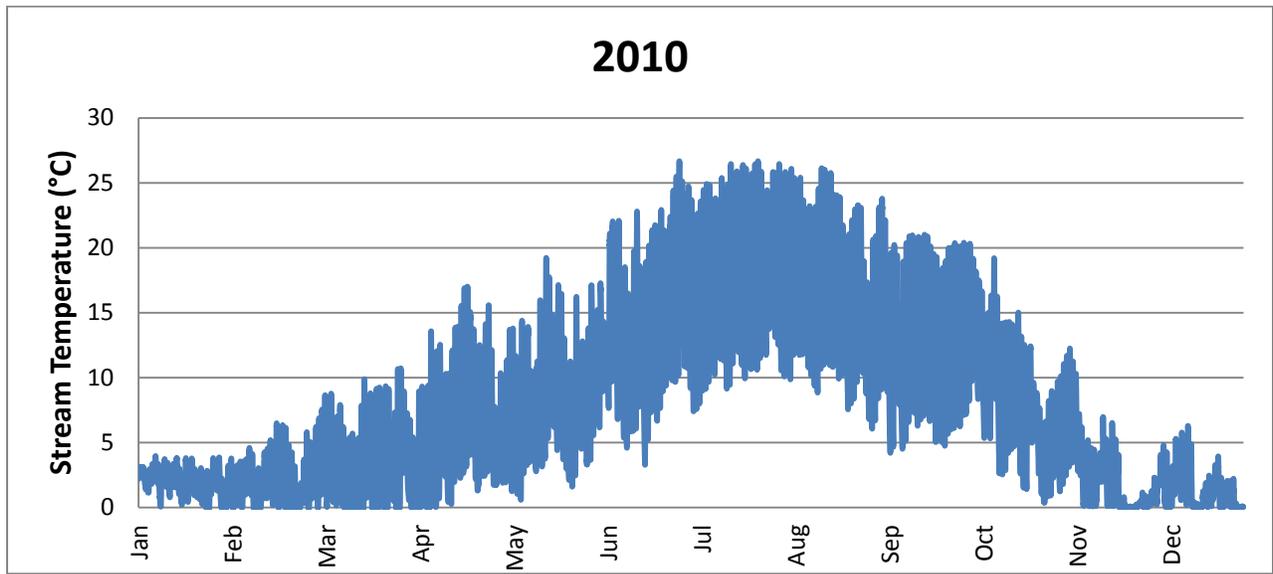
Table 2 - Stag Mountain Allotment Water Quality Data

Source Name	Sample Date (YYYYMMDD)	Parameters analyzed by BLM personnel and equipment					Parameters Analyzed by a Certified Laboratory										
		Flow (CFS)	pH	Dissolved Oxygen (mg/L)	Turb. (NTU)	EC (uS/cm)	Nitrate Nitrogen (mg/L)	Nitrite Nitrogen (mg/L)	Ammonia Nitrogen (mg/L)	Total Phosphorus (mg/L)	Fecal Coliform (#/100ml)	Total Coliform (#/100ml)	E Coli (#/100 ml)	Total Dissolved Solids (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Hardness (mg/l as CaCO3)
East Fork Beaver Creek, Lower	20060710	2.14	8.29	8.65	7.5	141											
	20070522	2.39	8.62	9.84	9.6	160				0.05			130				
	20070808	0.701	8.62	10.09	10.7				0.048				150				
	20070906	1.04	8.14	13.16	11.4	207											
	20080602	6.8	8.75			128											
	20080716	1.11	8.72	8.87		186				0.077	72		160				
	20080825	0.7494	8.51	8.768	3.5	162.9	<1.0	<0.010		0.056							
	20090526	3.88482		11.88	11.6	146	0.1	<0.010		0.053	260	>2419.6	11				
	20090721	2.93	8.63	8.71	9	165	<1.0	<0.010		0.061	20	>2419.6	14				
	20090921	0.95					<1.0	<0.010		0.084	112	>2419.6	39				
	20100915	0.814	8.54	9.94	9.1	149											
	20110614	8.97	8.82	8.9	20.8	117											
	20110823	1.1	8.42	8.85	13.3	144	<0.010	<0.010		0.08	77						
	20120524	2.36	8.4			166											
	20130605	1.55	8.3			191											
20130827	0.62	7.79	8.1	6	158	0.084	ND		0.031	240	>2419.6	298.7	16	3.4	53		
20140707	0.137	8.11	8	7.6	191												
20140820	0.56	8.25	8.9	17.1	163	0.039	ND	ND	0.057	1400	>2419.6	>2419.6					
East Fork Beaver Creek, Middle	20060710	1.8	7.97	8.05	10.1	123											
	20070522	1.28	8.58	10.01	7.1	144				0.044			120				
	20070808	0.29	8.62	8.96	7.5				0.048				150				
	20070906	0.334	8.26	12.03	10.4	176											
	20080602	3.8	8.4			117											
	20080716	0.72	8.55	10.56		160				0.093	20		150				
	20080825	0.2719	9.01	10.313	2.2	160.8	<1.0	<0.010		0.084							
	20090526	2.67101	8.60	11.65	4.7	137	<0.010	<0.010		0.056	70	>2419.6	3.1				
	20090721	2.09	8.96	10.34	9.6	143	0.07	<0.010		0.094	62	>2419.6	23				
	20090921	0.68	8.62	10.4	7.3	128	0.062	0.073		0.06	166	>2419.6	72				
	20100915	0.561	8.57	9.7	6.3	139.7											
	20110617	3.85	8.61	8.2	8	114											
	20110823	0.543	8.6	8.9	15.5	143	<0.010	<0.010		0.099	4140						
	20120524	1.58	8.4			144											
	20130605	0.801	8.5			148											
	20130827	0.344	7.7	8.1	39	154	0.11	0.069		0.062	tntc	>2419.6	>2419.6	14	3.1	47	
	20140707	0.094	8.74	9.7	9.9	169											
20140820	0.35	8.6	10.1	7.7	158	0.015	ND	ND	0.046	240	>2419.6	770					
East Fork Beaver Creek, Upper	20130827	0.6	7.53	7.5	9	147	0.22	0.069		0.07	tntc	>2419.6	>2419.6	12	2.4	39	
	20140707	0.211	8.05	7.8	9.9	168											
	20140820	0.479	7.6	7.5	12.3	145	0.17	ND	ND	0.1	200	>2419.6	816.4				

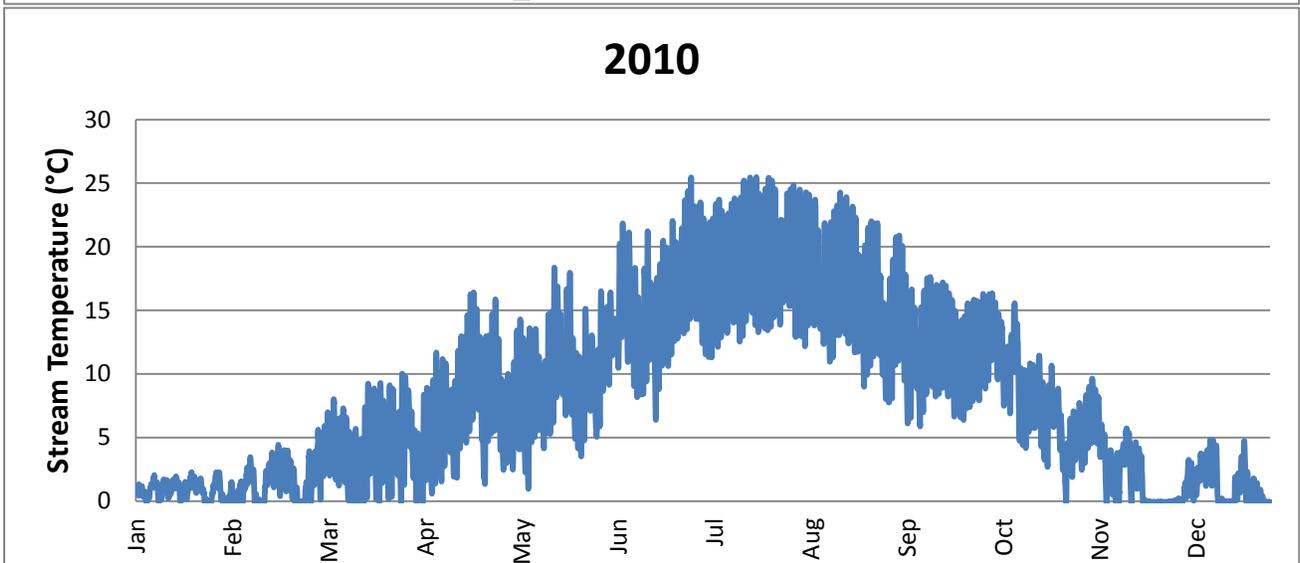
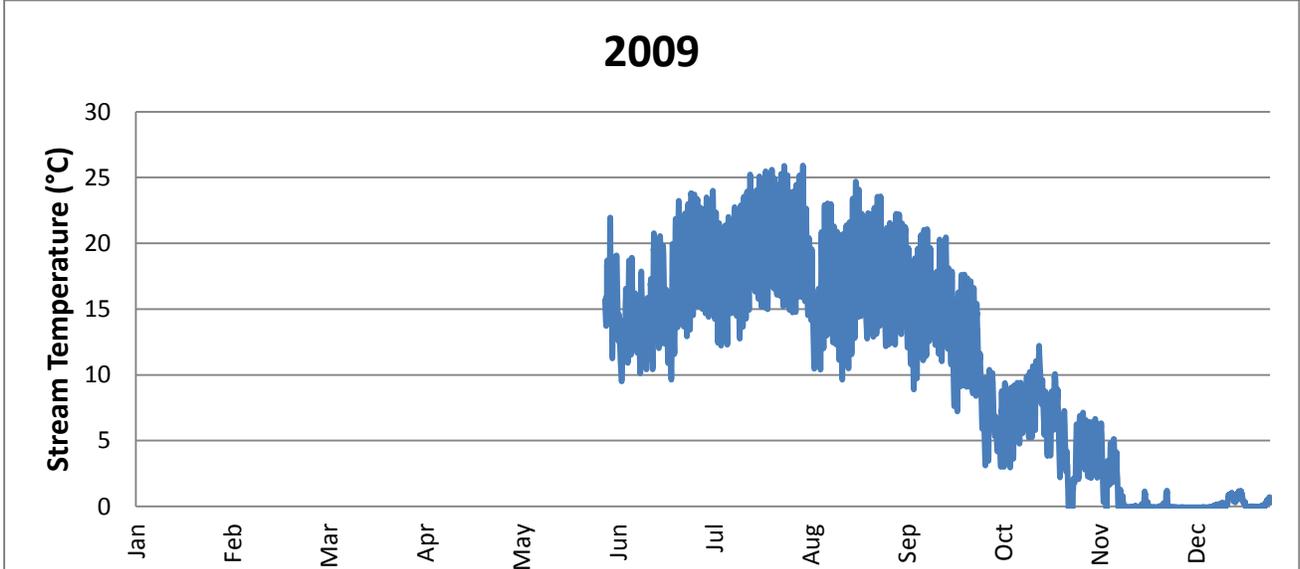
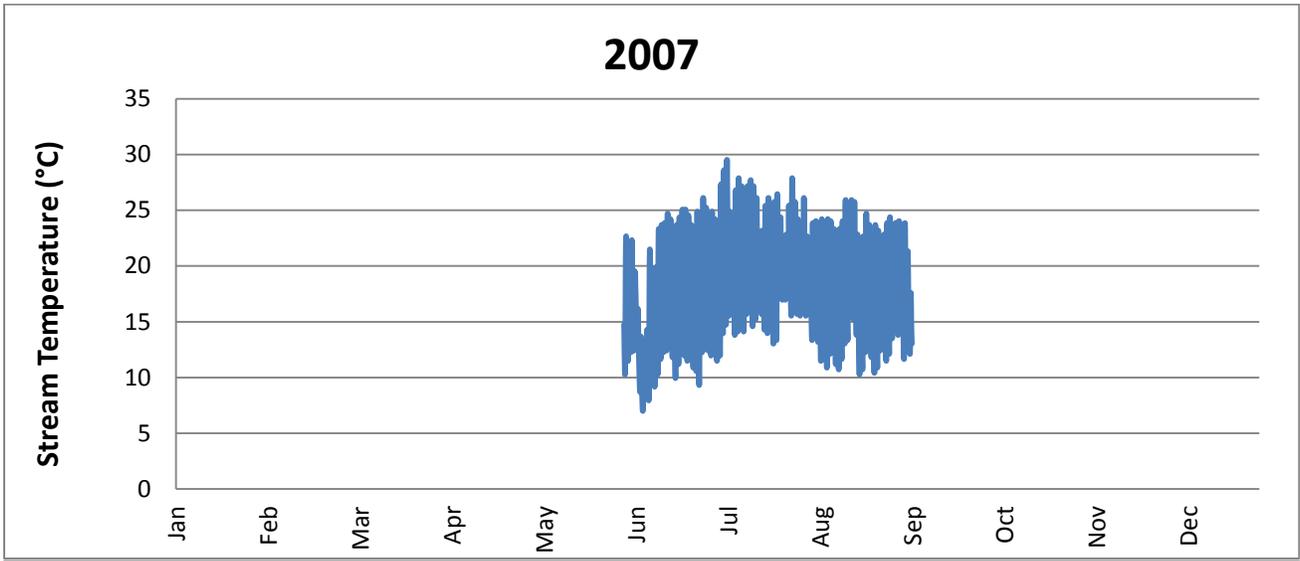
Stream Temperature Graphs
Cabin Creek Stream Temperature



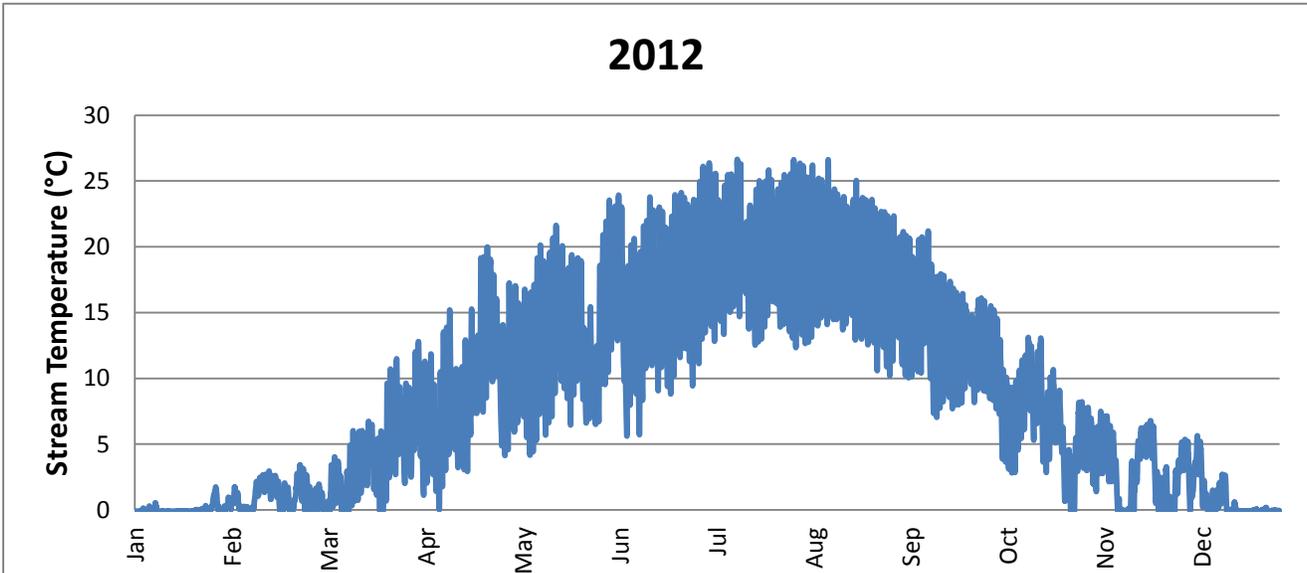
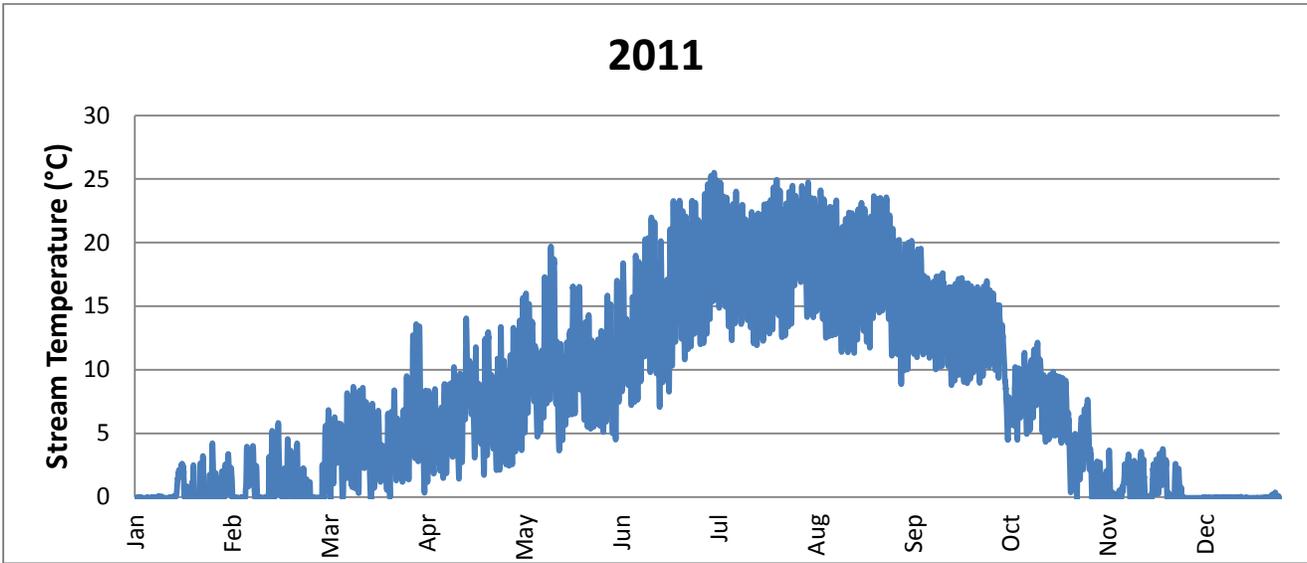
Cabin Creek Stream Temperature



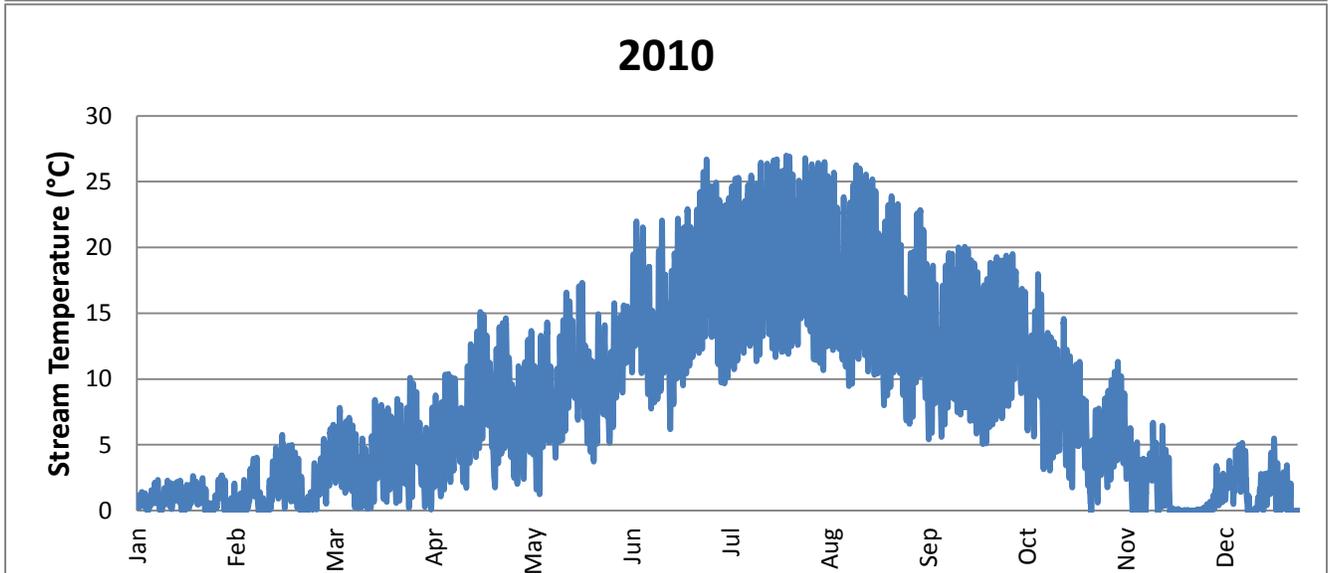
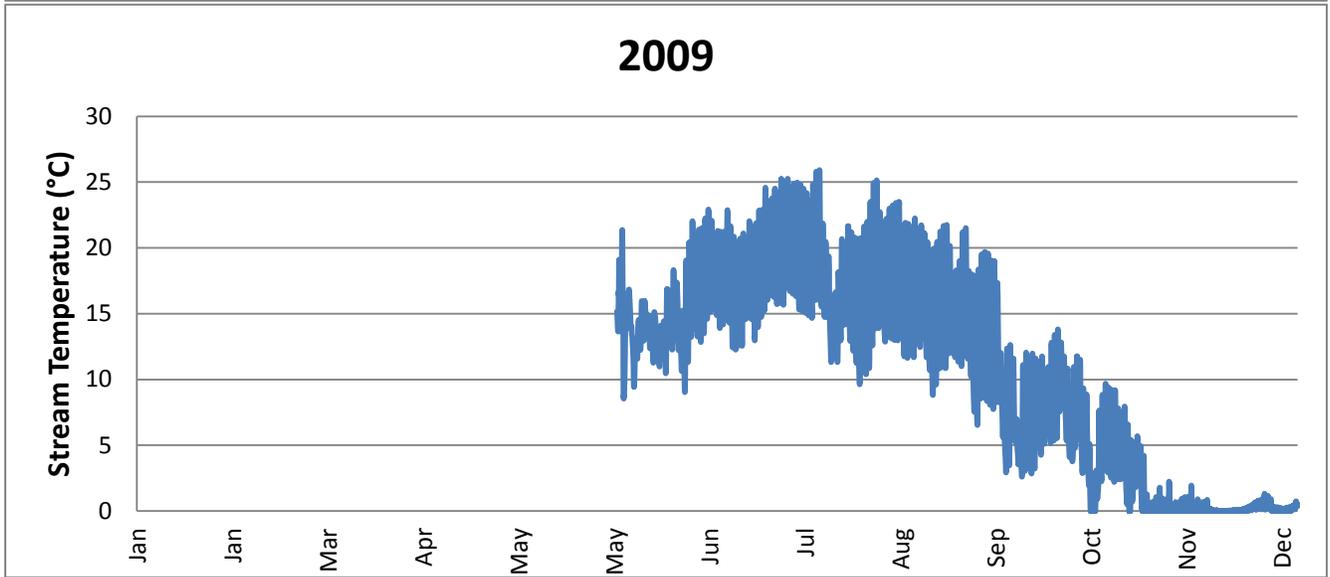
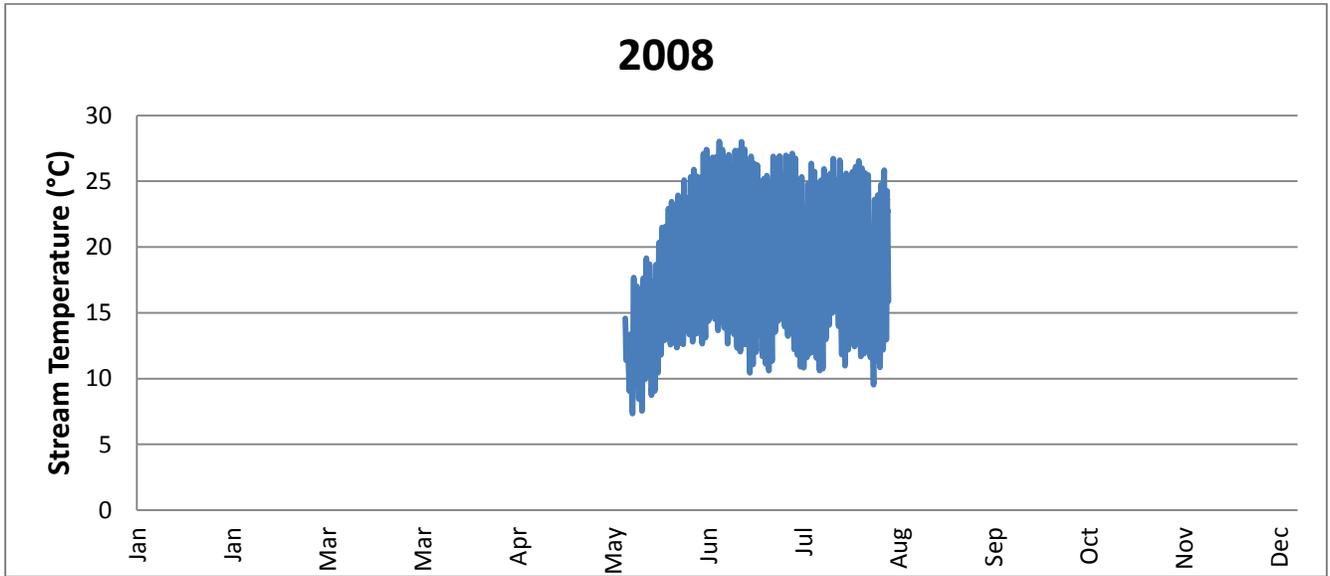
East Fork Beaver Creek, Lower Stream Temperature



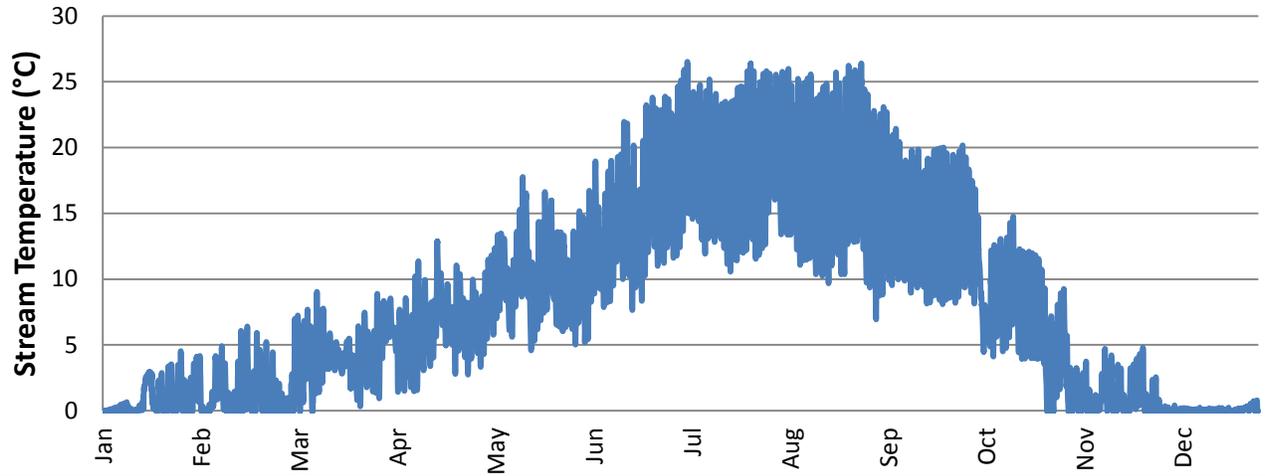
East Fork Beaver Creek, Lower Stream Temperature



East Fork Beaver Creek, Lower Stream Temperature



2011



2012

