

**DEPARTMENT OF ECOLOGY**  
**ENVIRONMENTAL ASSESSMENT PROGRAM**  
**Quarterly Report**

February 18, 2009

**TO:** Tonnie Cummings, Project Lead, Water Quality Program, SWRO

**FROM:** Stephanie Brock, Project Manager, Environmental Assessment Program

**THROUGH:** George Onwumere, Unit Supervisor, Environmental Assessment Program

**SUBJECT:** Burnt Bridge Creek Total Maximum Daily Load (TMDL),  
Quarterly Progress Report #4

Project Code: 08-029-01-02

## Introduction

Burnt Bridge Creek and its tributaries lie within Water Resource Inventory Area (WRIA) 28 in southwestern Washington. Burnt Bridge Creek flows from east to west through the City of Vancouver draining approximately 27.6 square miles. From its headwaters near NE 162<sup>nd</sup> Avenue, Burnt Bridge Creek flows 12.7 river miles to its confluence with Vancouver Lake near Interstate-5 (Figure 1). The study area includes 16 waterbody segments impaired by *fecal coliform* bacteria, dissolved oxygen, and temperature, as listed in the 2004 Clean Water Act Section 303(d) list. The draft 2008 303(d) list potentially adds 12 segments impaired for *fecal coliform* bacteria, temperature, dissolved oxygen and pH. The impairments were identified based on sampling conducted by the City of Vancouver, Clark County, Ecology, and other entities. Field work for this study began in May 2008 to assess the current condition of the waterbodies and to identify and quantify factors contributing to the impairments.

This memorandum summarizes the progress for Quarter 4 (October - December) related to data collection and project communications. Data presented are provisional. Data quality has not been checked.

## Progress to Date

### Dissolved Oxygen, Temperature, Bacteria and Hydrogeology Data Collection

Field data collection began during the week of May 19, 2008 and will continue through August 2009. Figure 2 shows fixed-network sites where routine sampling occurs. Table 1 lists the sampling sites. Table 2 lists the types of data collected at each site and the site status.

The routine monitoring for fecal coliform bacteria that began in June 2008 has continued through December 2008. Samples were collected from the Burnt Bridge Creek and its tributaries twice a month during October through December 2008 and analyzed for fecal coliform bacteria. All sites had concentrations greater than 200/100 mL on at least one occasion. Table 3 presents the fecal coliform data collected through December 2008.

The instream piezometers and thermistors continued to log through the 4<sup>th</sup> quarter of 2008. Dissolved oxygen samples were collected at most sites during each bacteria sampling run. Additionally, instantaneous dissolved oxygen, temperature and pH was measured at each site during site visits.

During the next quarter (1<sup>st</sup> quarter 2009) the following activities are expected to commence for the study:

- Bi-monthly samples and flow measurements will be taken at all sites.
- Weather forecasts will be monitored in order to sample during storm events.
- Temperature data will be downloaded from instruments at all sites.

### Provisional Results

Table 3 provides provisional data compared to water quality criteria for each site for bacteria. Samples collected from Burnt Bridge Creek and its tributaries indicate all sites had concentrations greater than 200 colony forming units (cfu)/100 mL on at least one occasion during this sample period.

Table 4 presents the temperature data compared to water quality criteria. All sites exceeded the water quality standard for temperature (7-Day Average Daily Maximum of 17.5°C) except Cold Creek at the mouth (COL0.0). Peterson Ditch at SEH America (PET1.3) exceeded the temperature criterion set for the facilities NPDES permit of a daily maximum of 21°C ten days during sampling period.

Table 5 and Figure 3 presents the provisional temperature, dissolved oxygen, pH, and bacteria data collected to date compared to water quality criteria. Table 5 presents the number of days the samples exceed the water quality criteria. Figure 4 presents the percentage of time the water quality criteria are exceeded in comparison to the number of samples collected. The dissolved oxygen criterion (minimum of 8 mg/L) was exceeded at least once at all sites except at sites BBC1.6, COL0.0, BBC2.6, BBC3.4, and BBC4.3. The pH criterion was exceeded at least once at

each site during the sampling season except at sites BBC5.2, BBC5.9, BBC8.0, PET0.0, PET1.3, BBC8.8, and BBC9.5.

### Communication and Coordination

- None this quarter.

### Project Schedule and Upcoming Tasks

Routine bacteria and streamflow sampling will continue until August 2009. During this time, piezometer/surfacewater gradients will be measured on occasion and instream thermistors will be redeployed as needed.

Stormwater sampling remains necessary to complete the study. The two stormwater sampling events remaining, include 1) bacteria and streamflow data collection twice during one storm event and 2) a dry season storm sampled once for parameters such as nutrients, bacteria, total organic carbon, dissolved organic carbon, total suspended solids, and streamflow.

Attachment(s):

**Table 1.** Burnt Bridge Creek TMDL fixed network sampling locations.

**Table 2.** Sampling locations, routine data type collection and, status of continuous, temperature logging.

**Table 3.** Burnt Bridge Creek watershed provisional fecal coliform bacteria results.

**Table 4.** Burnt Bridge Creek watershed preliminary temperature results.

**Table 5.** Burnt Bridge Creek preliminary bacteria, temperature, dissolved oxygen and pH results.

**Figure 1.** Burnt Bridge Creek study area with 303(d) listed waterbody segments.

**Figure 2.** Burnt Bridge Creek TMDL fixed network sampling locations.

**Figure 3.** Percent of samples collected in Burnt Bridge Creek watershed that exceed water quality criteria for bacteria, temperature, dissolved oxygen and pH.

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## Tables

Table 1. Burnt Bridge Creek TMDL fixed network sampling locations.

Site ID	Description	NAD 83	
		Latitude	Longitude
BBC0.0	Burnt Bridge Ck downstream of Fruit Valley Rd	45.67520	-122.69253
BBC1.6	Burnt Bridge Ck at 2nd Ave near Alki Rd	45.66137	-122.66934
COL0.0	Cold Creek at Hazel Dell Ave BBC RM 1.6	45.66174	-122.66827
BBC2.6	Burnt Bridge Ck at Leverich Park	45.65339	-122.66180
BBC3.4	Burnt Bridge Ck near SR 500 at 41st Cr	45.65250	-122.65034
BBC4.3	Burnt Bridge Ck upstream of Saint Johns Blvd	45.64745	-122.63946
BBC5.2	Burnt Bridge Ck at Rossiter Ln	45.64112	-122.63094
BBC5.9	Burnt Bridge Ck at NE 18th St	45.63469	-122.62405
BBC7.0	Burnt Bridge Ck at NE 65th Ave	45.63456	-122.60497
BBC8.0	Burnt Bridge Ck NE 86th Ave, dwn/strm of Burton Ch.	45.63523	-122.58489
BUR0.0	Burton Channel at BBC RM 8.3 19th Cr & 92nd Ave	45.63672	-122.58121
BBC8.4	Burnt Bridge Ck at NE Burton Rd, blw Peterson Ditch	45.63802	-122.58246
PET0.0	Peterson Ditch confluence at 93rd Ave, BBC RM 8.8	45.64501	-122.57767
PET1.3	Peterson Ditch at 102nd Ave (SEH outfall 001)	45.65207	-122.55736
BBC8.8	Burnt Bridge Ck above Peterson Ditch at NE 93rd Ave	45.64468	-122.57837
BBC9.5	Burnt Bridge Ck at 98th, up/strm of Royal Oaks Dr	45.65148	-122.57191
BBC10.4	Burnt Bridge Ck at NE 110th Ave	45.65809	-122.55974
BBC10.8	Burnt Bridge Ck at NE 121st Ave	45.66031	-122.54881
BBC11.4	Burnt Bridge Ck at 131st Ave	45.66308	-122.53808

Table 2. Sampling locations, routine data type collection and, status of continuous temperature logging.

Site ID	Bact.	Stream Temp.	Air Temp.	RH	Piezo.	Streamflow		Temp. Data Logging Status
						Inst.	Cont.	
BBC0.0	x	x	x	x		x		ending <sup>1</sup>
BBC1.6	x	x	x		x	x	x	on going
COL0.0	x	x	x			x		ending <sup>1</sup>
BBC2.6	x	x	x		x	x		on going
BBC3.4	x	x	x	x	x	x		on going
BBC4.3	x	x	x		x	x		on going
BBC5.2	x	x	x		x	x		on going
BBC5.9	x	x	x		x	x		on going
BBC7.0	x	x	x		x	x		on going
BBC8.0	x	x	x			x		ending <sup>1</sup>
BUR0.0	x	x	x	x		x		ending <sup>1</sup>
BBC8.4	x	x	x	x	x	x	x	on going
PET0.0	x	x	x			x		on going
PET1.3	x	x				x	x	on going
BBC8.8	x	x	x		x	x		on going
BBC9.5	x	x	x		x	x		on going
BBC10.4	x	x	x		x	x	x	on going
BBC10.8	x	x	x		x	x		on going
BBC11.4	x	x	x	x	x	x		on going

Bact.= *fecal coliform* bacteria, Temp.= temperature, RH= relative humidity, Piezo.= piezometer, Inst.= instantaneous, Cont.=continuous.

<sup>1</sup>Continuous temperature data logging will resume May 2009 and end August 2009.

Table 3. Burnt Bridge Creek watershed provisional fecal coliform bacteria results. Data have not been quality assured.

Station ID	6/3 to 6/4/2008	6/17 to 6/18/2008	6/30 to 7/1/2008	7/15 to 7/16/2008	7/29 to 7/30/2008	8/12 to 8/13/2008	8/26 to 8/27/2008	9/9 to 9/10/2008	9/23 to 9/24/2008	10/6 to 10/7/2008	10/20 to 10/21/2008	11/3 to 11/4/2008	11/17 to 11/18/2008	12/1 to 12/2/2008	12/15 to 12/16/2008	12/28 to 12/29/2008	number of samples (n)	geometric mean	90th percentile	% samples exceed WQ Standard
BBC11.4	3200	120	190	80	46	22	69	29	57	26	35	47	11	3	7	400	16	52	421	13
BBC10.8	1500	85	110	96	93	47	63	31	28	41	20	20	5	6	7	200	16	44	280	6
BBC10.4	1400	92	160	100	40	220	150	40	69	190	280	120	14	10	29	560	16	101	525	25
BBC9.5	1900	46	92	81	37	100	71	41	51	88	430	210	15	7	8	680	16	77	533	25
BBC8.8	3200	38	65	35	44	75	110	40	37	63	180	140	26	21	13	570	16	75	425	13
PET1.3	880	8	5	18	27	1	11	13	3	16	3	19	280	3	1	29	16	12	122	13
PET0.0	4200	130	69	220	220	320	270	250	550	370	1100	280	250	700	63	85	16	289	1126	75
BBC8.4	3000	25	96	140	85	100	100	120	180	100	300	110	110	110	15	300	16	124	532	19
BUR0.0	3900	230	140	130	170	200	990	160	200	290	6300	130	100	430	57	330	16	295	1519	44
BBC8.0	2600	110	74	67	61	77	96	160	23	79	790	69	62	16	47	350	16	103	518	19
BBC7.0	2300	25	120	63	120	160	49	7	15	44	96	400	5	290	17	260	16	71	555	25
BBC5.9	1800	850	92	96	66	79	180	100	66	46	46	620	21	160	13	100	16	110	575	19
BBC5.2	870	300	92	210	65	84	200	140	200	77	56	520	100	350	26	600	16	160	550	38
BBC4.3	1100	130	130	120	110	100	190	270	200	150	170	480	40	600	43	1400	16	195	712	31
BBC3.4	830	75	110	110	100	88	140	270	150	170	92	340	29	480	80	6700	16	182	910	31
BBC2.6	1000	280	120	230	330	170	220	280	180	120	110	310	18	500	49	12000	16	238	1417	56
COL0.0	380	85	180	510	470	420	300	260	260	220	160	340	100	180	37	350	16	221	546	63
BBC1.6	670	130	140	420	140	140	160	260	260	270	120	330	34	440	63	12000	16	241	1248	50
BBC0.0			9	65	17	13	180	37	29	36	18	240	10	33	22	230	14	36	149	14

Gray highlights indicate samples that exceed 200 cfu/100 mL.

Yellow highlight indicates samples that exceed the WQ criteria for one or both portions of the standard.

Table 4. Burnt Bridge Creek preliminary temperature data.

Station	Days 7DADM above 17.5 deg-C	Number of Days on Record	% WQ Standard Violated
BBC11.4	11	154	7%
BBC10.8	9	154	6%
BBC10.4	7	154	5%
BBC9.5	26	154	17%
BBC8.8	85	153	56%
PET1.3	10	155	6%
PET0.0	87	153	57%
BBC8.4	94	153	61%
BUR0.0	26	113	23%
BBC8.0	95	138	69%
BBC7.0	109	153	71%
BBC5.9	103	153	67%
BBC5.2	92	152	61%
BBC4.3	86	152	57%
BBC3.4	93	152	61%
BBC2.6	92	155	59%
COL0.0	0	142	0%
BBC1.6	83	155	54%
BBC0.0	66	84	79%

Table 5. Burnt Bridge Creek provisional results for bacteria, temperature, dissolved oxygen, and pH compared to water quality criteria.

Site ID	Total number of days above water quality criteria			
	Bacteria > 200 cfu/100mL	Temperature <sup>1</sup> > 17.5°C	Dissolved Oxygen < 8 mg/L	pH 6.5 - 8.5
BBC11.4	2	11	16	1
BBC10.8	1	9	15	1
BBC10.4	4	7	15	1
BBC9.5	4	26	12	0
BBC8.8	2	85	1	0
PET1.3	2	10 (>21°C)	4	0
PET0	12	87	2	0
BBC8.4	3	94	3	1
BUR0	7	26	6	1
BBC8	3	95	5	0
BBC7	4	109	9	4
BBC5.9	3	103	11	0
BBC5.2	6	92	1	0
BBC4.3	5	86	0	1
BBC3.4	5	93	0	1
BBC2.6	9	92	0	1
COL0	10	0	0	1
BBC1.6	8	83	0	1
BBC0	2	66	1	4

<sup>1</sup> The highest annual running 7-day average of maximum temperatures.

# Figures

## Burnt Bridge Creek TMDL Study Area

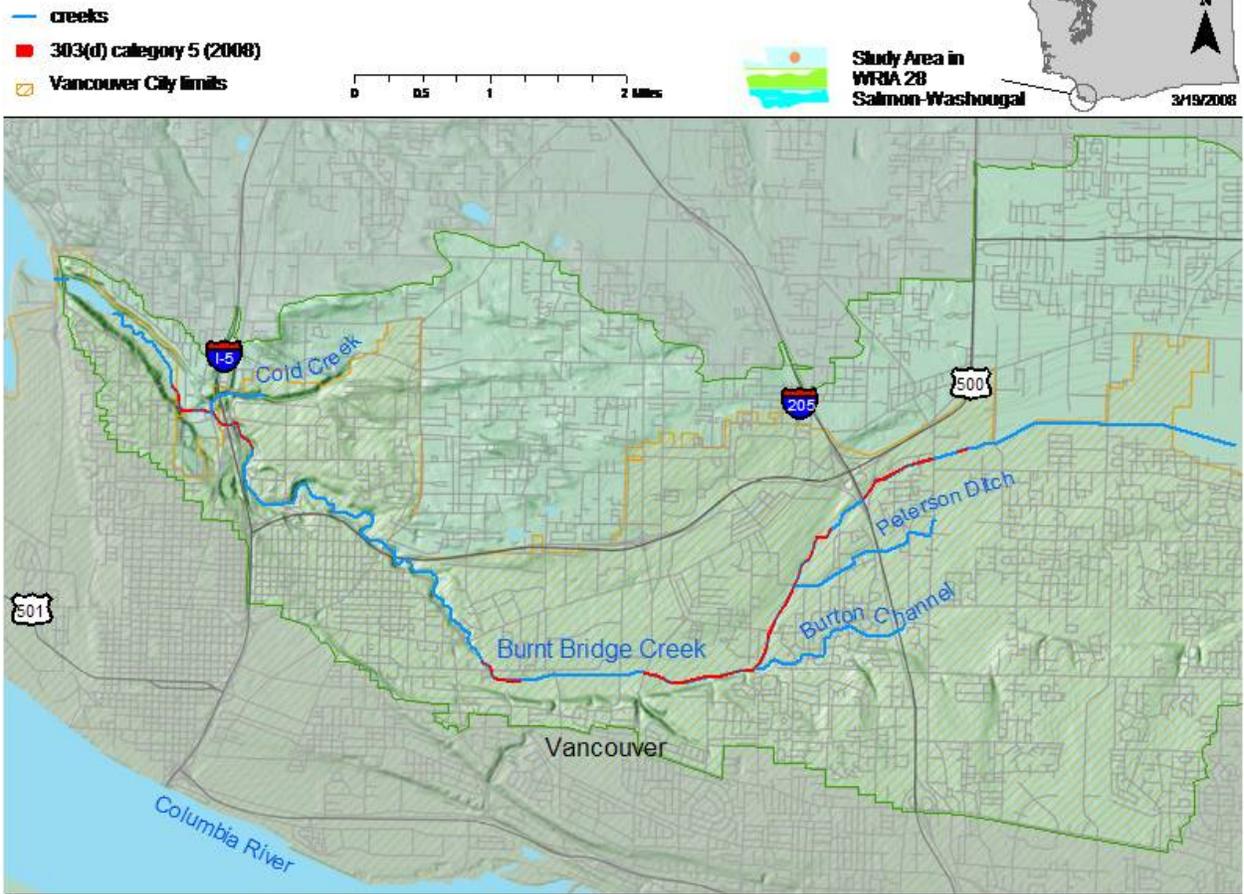


Figure 1. Burnt Bridge Creek study area with 303(d) listed waterbody segments.

# Burnt Bridge Creek TMDL Proposed Fixed-Network Monitoring Sites

- Monitoring Sites
- Creeks
- ▭ Vancouver City limits

0 0.5 1 2 Miles

Study Area in  
WRIA 28  
Salmon-Washougal

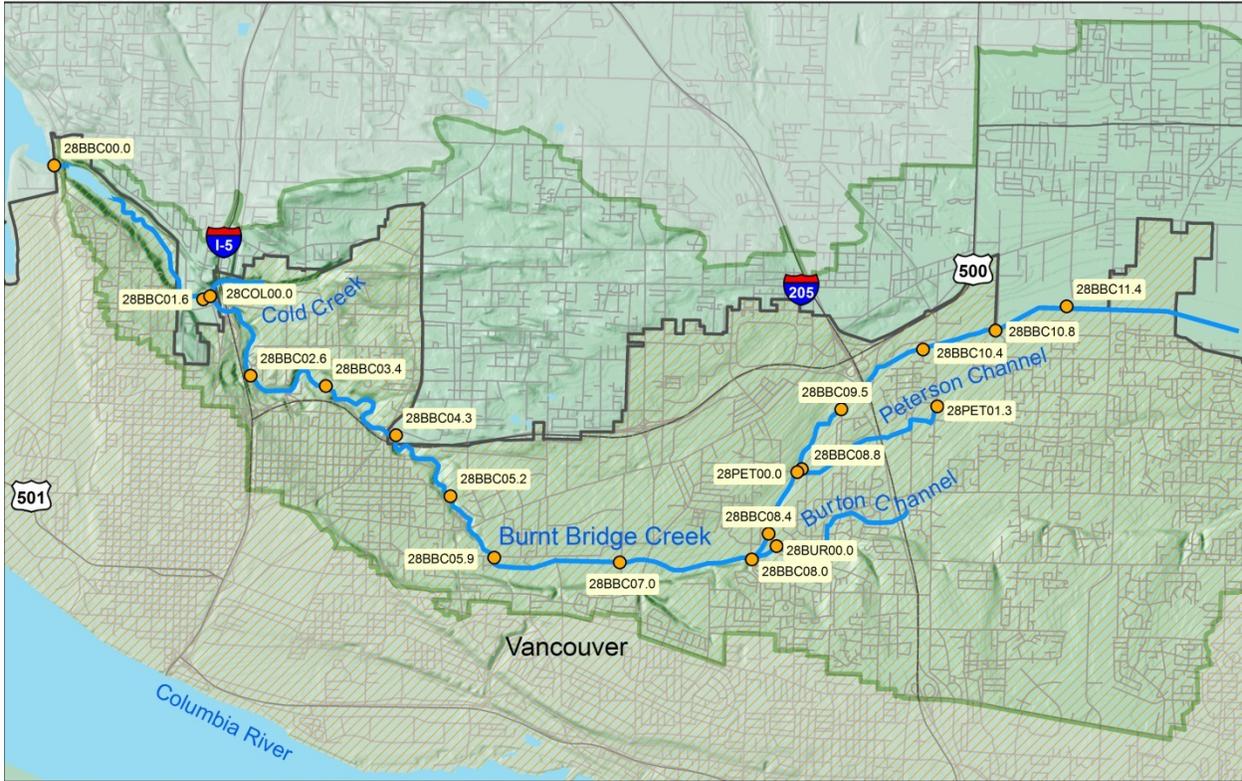


Figure 2. Burnt Bridge Creek TMDL fixed network sampling locations.

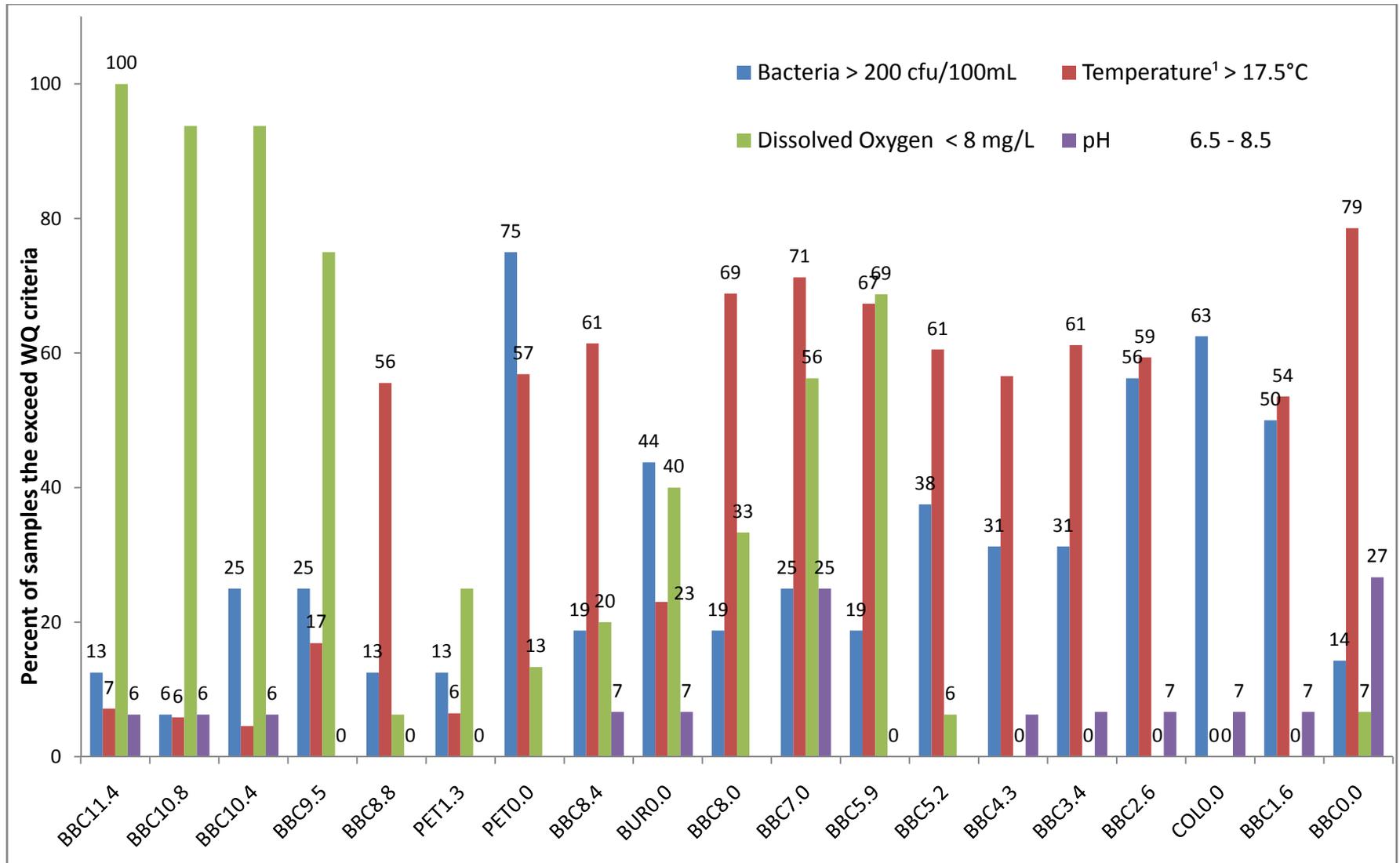


Figure 3. Percent of samples collected in Burnt Bridge Creek watershed that exceed water quality criteria for bacteria, temperature, dissolved oxygen and pH.