

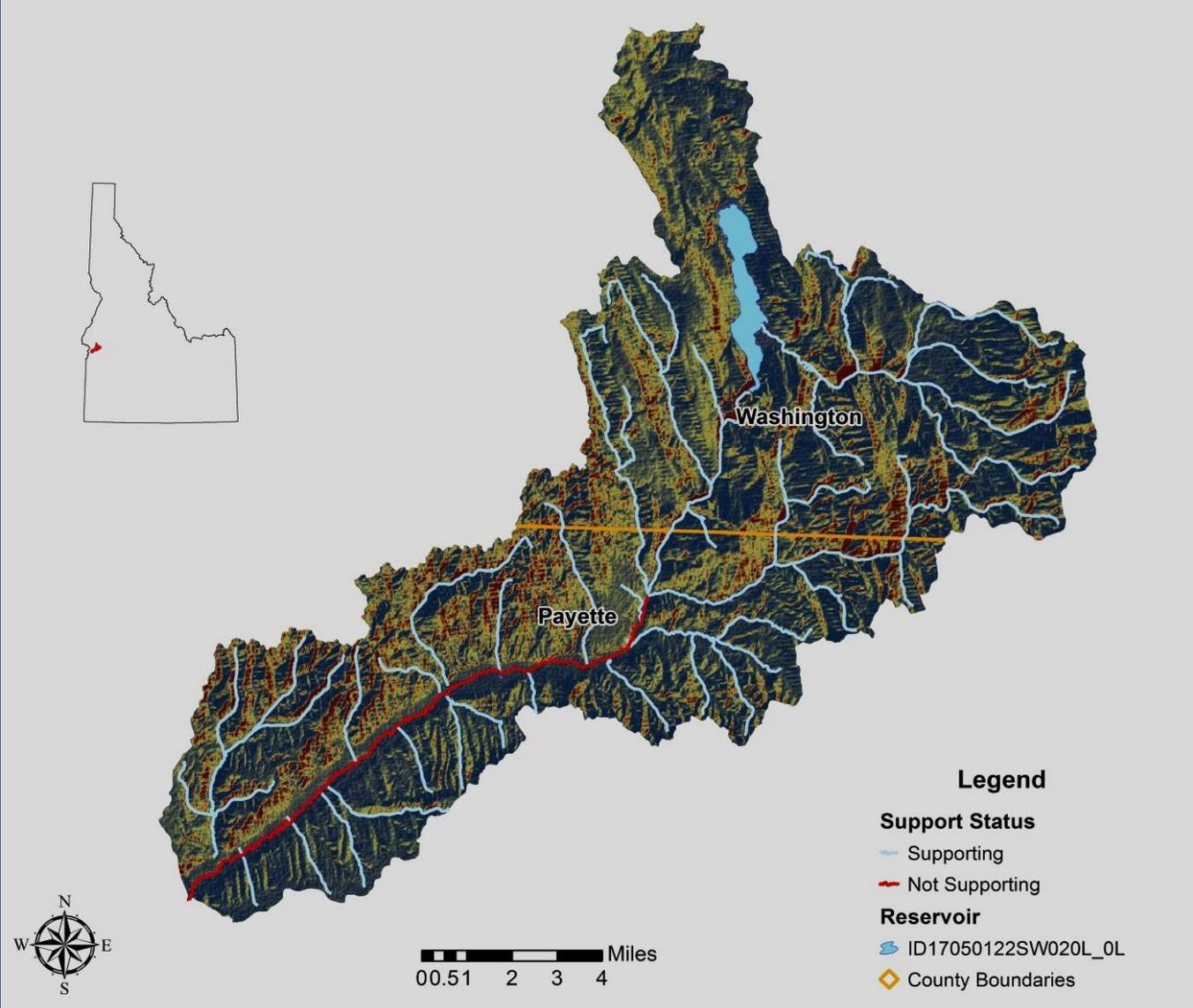
Little Willow Creek TMDL Watershed Advisory Group Meeting January 30, 2013

TMDL Development for Little Willow Creek

Troy Smith
Watershed Coordinator



Little Willow Creek Watershed



Assessment Unit & Pollutants

Little Willow Creek

Assessment Unit	Beneficial Use	Pollutant(s)
ID17050122SW018_04 Indian Creek to mouth	Cold Water Aquatic Life (COLD) Secondary Contact Recreation	Sedimentation/Siltation

Additional Constituents

- Bacteria (E. coli)
- Temperature



WAG Participation in TMDL Process

- DEQ develops a strategy paper and updates the WAG.
- DEQ requests WQ data, if necessary, and shares WQ data with WAG.
- DEQ drafts the SBA with WAG input.
- DEQ develops WQ targets, TMDL load analysis, and with WAG input.
- DEQ provides draft TMDL to WAG for review.
- DEQ considers/incorporates/responds to WAG comments.
- Tech Editing
- EPA review
- WAG Review - If WAG is not in agreement with an SBA/TMDL, the position and the basis for it will be documented in the notice of public availability.
- Public Comment opportunity
- If the WAG still disagrees with the SBA/TMDL after public comments have been considered and incorporated, DEQ must incorporate the WAG's dissenting opinion in the TMDL that is submitted to U.S. EPA.
- DEQ submits TMDL to the U.S. EPA for approval.
- DEQ and WAG develop an implementation plan for goals of the TMDL.

Protection for Cold Water Aquatic Life and Secondary Recreation Beneficial Uses

Approach 1: Sediment Concentration

- 20 mg/L TSS 4-month average
- Critical Period (April 1 – September 30)

Approach 2: E. coli bacteria

- 126 cfu 100 mg/L
- Year-Round

Approach 3: Temperature

- Potential Natural Vegetation

Idaho Water Quality Standards

- **58.01.02.200.08. Sediment.** Sediment shall not exceed quantities specified in Sections 250 and 252, or, in the absence of specific sediment criteria, quantities which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information.
 - **250.02.e (Cold Water Aquatic Life)** – Turbidity, below any applicable mixing zone set by the Department, shall not exceed background turbidity by more than 50 NTU instantaneously or more than 25 NTU for more than 10 consecutive days.
 - **252.01.b.1 (Water Supply Use)** – Increased by more than 5 NTU above natural background, measured at a location upstream from or not influenced by any human induced nonpoint source activity, when background turbidity is 50 NTU or less.
 - **252.01.b.2 (Water Supply Use)** – Increased by more than 10% above natural background, measured at a location upstream from or not influenced by any human induced nonpoint source activity, not to exceed 25 NTU, when background turbidity is greater than 50 NTU.

Sediment and Aquatic Life

- Newcombe and Jensen (1996)
 - Meta-analysis: 80 studies
 - How does sediment affect fish?
 - Grouping of fish
 - Concentration of sediment
 - Duration of sediment
- 1 Answer = Severity of Effect on fish

Juvenile Salmonids

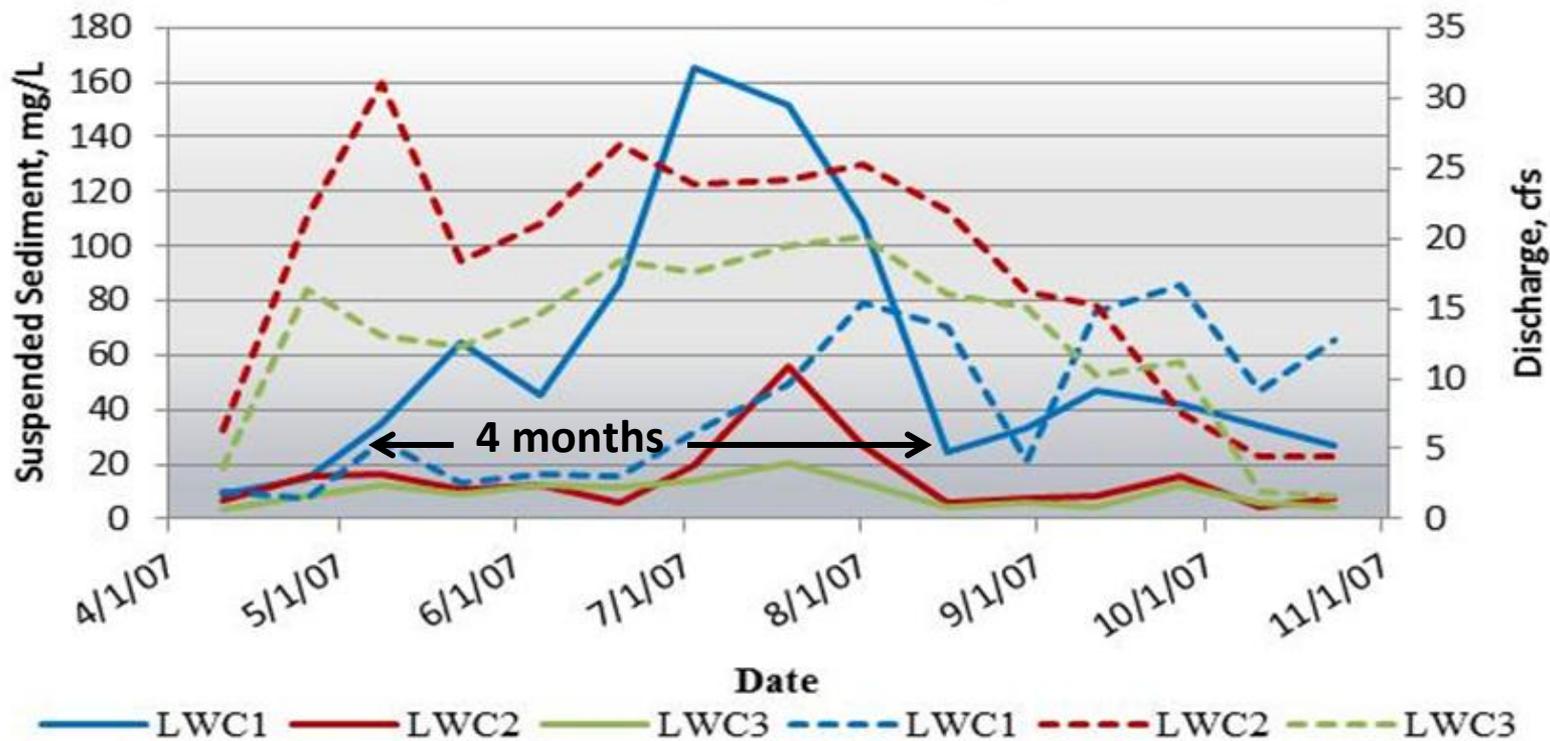
Duration of exposure to SS (\log_e hours)

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

(B) Average severity-of-ill-effect scores (calculated)

Concentration (mg SS/L)	162755	9	10	11	11	12	13	14	14	-	-	-	12	(\log_e mg SS/L)
	59874	9	9	10	11	11	12	13	14	14	-	-	11	
	22026	8	9	9	10	11	11	12	13	13	14	-	10	
	8103	7	8	9	9	10	11	11	12	13	13	14	9	
	2981	6	7	8	9	9	10	11	11	12	13	13	8	
	1097	6	6	7	8	9	9	10	11	11	12	13	7	
	403	5	6	6	7	8	9	9	10	11	11	12	6	
	148	4	5	6	6	7	8	9	9	10	11	11	5	
	55	4	4	5	6	6	7	8	8	9	10	11	4	
	20	3	4	4	5	6	6	7	8	8	9	10	3	
	7	2	3	4	4	5	6	6	7	8	8	9	2	
	3	1	2	3	4	4	5	6	6	7	8	8	1	
	1	1	1	2	3	4	4	5	6	6	7	8	0	
	1	3	7	1	2	6	2	7	4	11	30			
	Hours			Days			Weeks		Months					

Discharge and Suspended Sediment in Little Willow Creek, 2007



Locations	Season Average Flow (cfs)	Season Average SSC Concentration (mg/L)	Season Average SSC Load (lbs/day)	Season Average SSC Load (tons/day)
LWC1	8.6	73.1	3394.8	1.7
LWC2	21.0	17.0	1927.8	1.0
LWC3	15.3	10.9	900.6	0.5

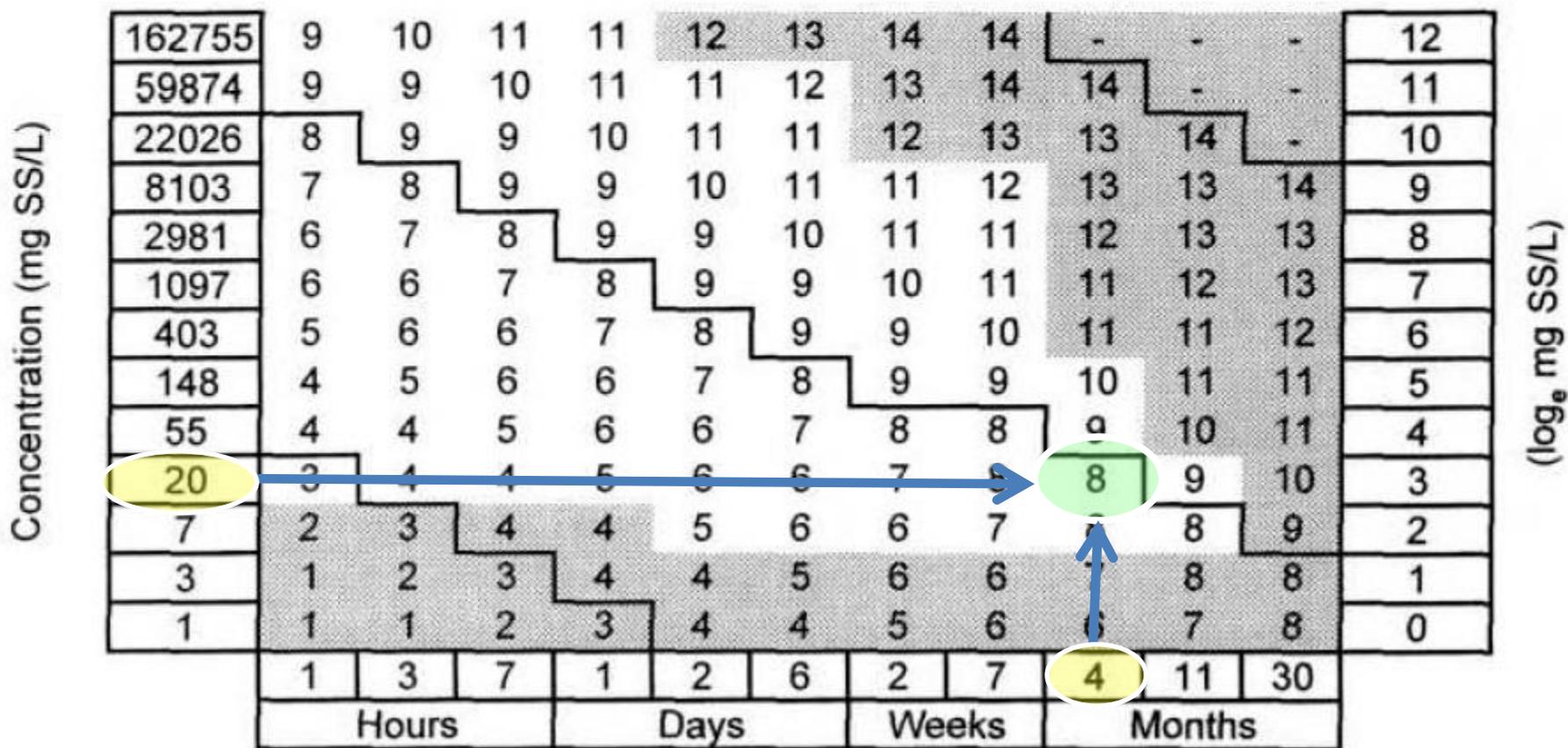
**Idaho State Department of Agricultural 2007 Report

Juvenile Salmonids

Duration of exposure to SS (\log_e hours)

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

(B) Average severity-of-ill-effect scores (calculated)



DRAFT

Location	Average Flow (cfs)	Average TSS Concentration (mg/L)	Average TSS Load (tons/day)	Load Capacity at 20 mg/L (tons/day)	Load Reduction
LWC1	8.6	73.1	1.7	0.5	1.2 tons/day; 70.5%
LWC2	21.0	17.0	1.0	1.1	0 tons/day; 0%
LWC3	15.3	10.9	0.5	0.9	0 tons/day; 0%

Idaho Water Quality Standards

- **58.01.02.251.01. E. Coli Bacteria.** Waters designated for recreation are not to contain E.coli bacteria, used as indicators of human pathogens, in concentrations exceeding:
 - **a. Geometric Mean Criterion.** Waters designated for primary or secondary contact recreation are not to contain E. coli bacteria in concentrations exceeding a geometric mean of 126 E. coli organisms per 100 ml based on a minimum of 5 samples taken every 3 to 7 days over a 30 day period.
 - **b. Use of Single Sample Values.** A water sample exceeding the E. coli single sample maximums below...is not alone a violation of water quality standards...
 - **i.** For waters designated as secondary contact recreation, a single sample maximum of 576 E. coli organisms per one 100 ml; or
 - **ii.** For waters designated as primary contact recreation, a single sample maximum of 406 E. coli organisms per one 100 ml;

Little Willow Creek E. coli

Table 1. E-coli (CFUs) results for Little Willow Creek.

Date	LWC-1	LWC-2	LWC-3
4/10/2007	75	190	310
4/25/2007	150	520	410
5/8/2007	1600	440	190
5/22/2007	2400	310	580
6/5/2007	1700	650	690
6/19/2007	2000	280	300
7/2/2007	1700	1000	200
7/19/2007	920	2000	210
8/1/2007	730	920	330
8/16/2007	610	650	140
8/30/2007	690	920	440
9/11/2007	730	220	200
9/26/2007	280	270	160
10/10/2007	180	490	100
10/23/2007	93	290	23

<u>Date</u>	<u>E. coli</u>
6/1/2012	613.1
6/7/2012	1515.0
6/13/2012	1332.7
6/20/2012	727.3
<u>6/26/2012</u>	<u>1012.2</u>
Geomean	981.6

E. Coli Analysis

- Average seasonal geomean based on 2007 ISDA data = 398 cfu/100mL

$$398 - 126 = 172$$

$$(398-172)/398 * 100 = 57\%$$

*A 57% average reduction need to meet WQS

Idaho Water Quality Standards

- **58.01.02.250.02 Cold Water.** Waters designated for cold water aquatic life are not to vary from the following characteristics due to human activities:
 - **b.** Water temperatures of 22 degrees C or less with a maximum daily average of no greater than 19 degrees C.

Little Willow Creek Temperature 2007

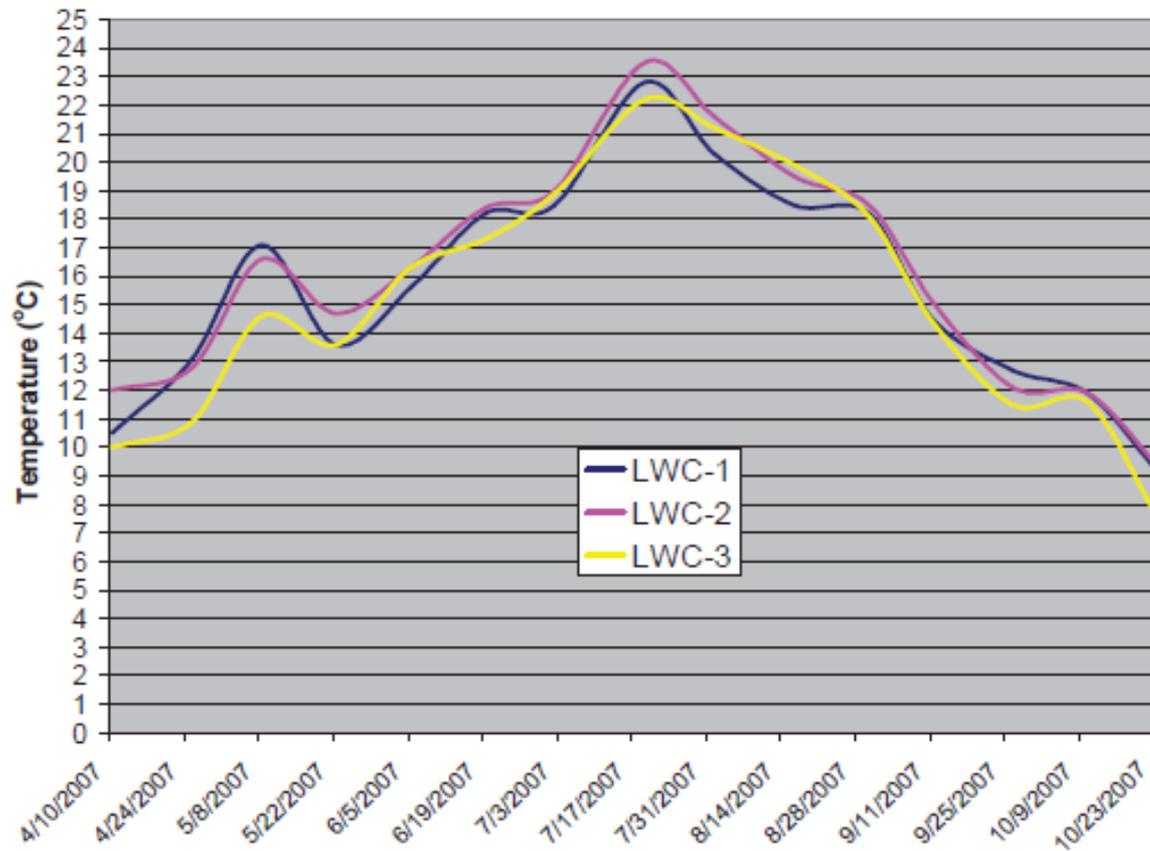
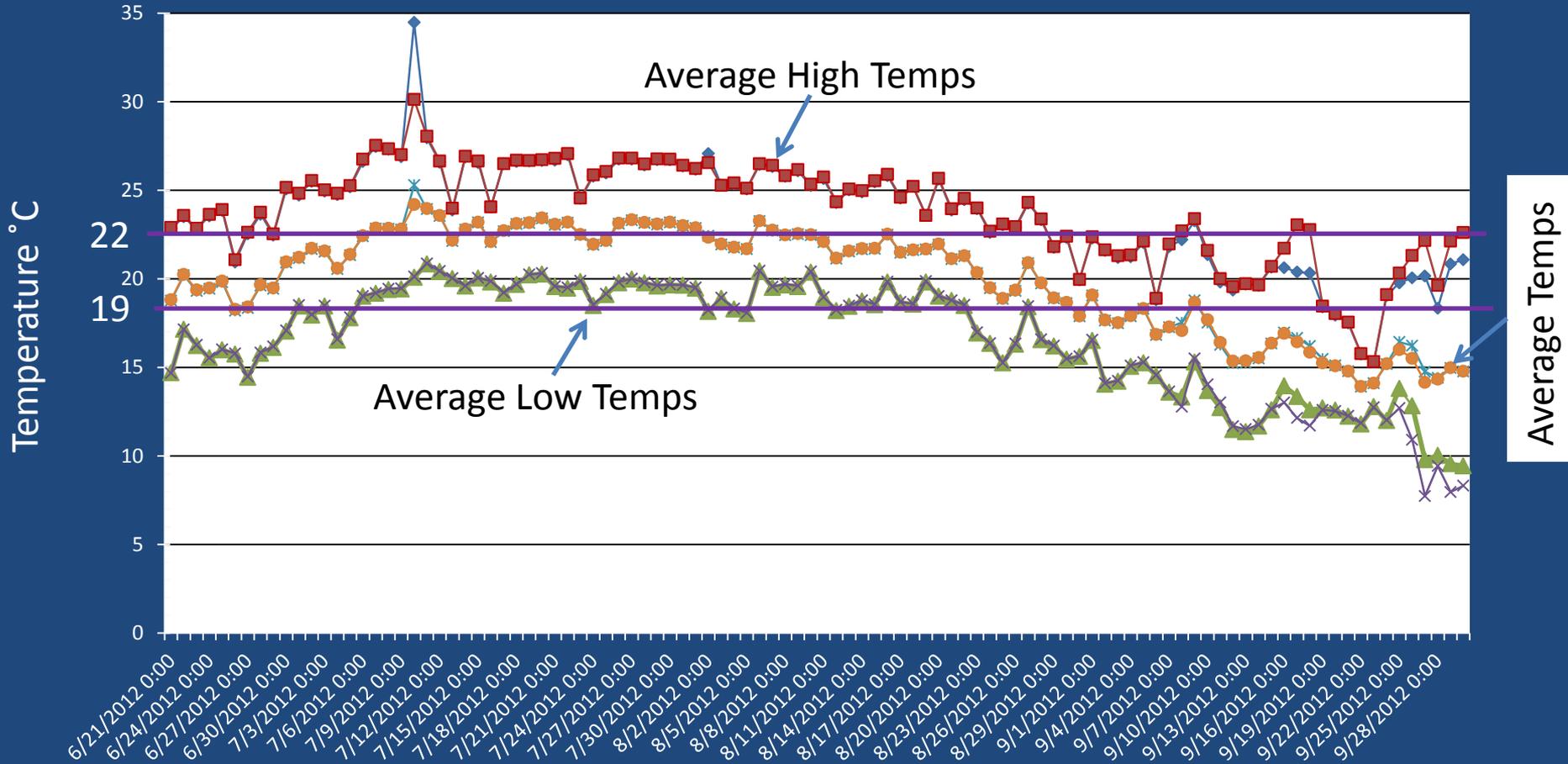


Figure 5. Temperature levels Little Willow Creek.

Little Willow Creek Temperature 2012



Little Willow Creek TMDL Approach

- Sediment (Narrative Criteria)
 - Target: 20 mg/L TSS for 4 consecutive months
 - Examples: LBR Tribs, Succor & Bissel Creeks
 - Scientific literature and impacts to COLD
- E. coli (Numeric Standard)
 - Target: 126 CFU/100 mL
- Temp. (Numeric Standard: 22°C Max / 19°C Avg)
 - Target: Potential Natural Vegetation
 - Examples: West Fork King Hill Creek TMDL
- Margin of Safety – Explicit vs. Implicit

Proposed Timeline

- ✓ October 2012: Present TMDL strategy to WAG
- ✓ Nov. – Dec. 2012: Determine sediment & E. coli strategies/targets
- ✓ Jan. – Feb. 2013: Develop TMDL
- ✓ Feb. 2013: Josh Schultz to lead Little Willow TMDL
- April/May 2013: Verify Potential Natural Vegetation; Draft TMDL review by WAG
- May/June 2013: Public Comment
- June/July 2013: Finalize TMDL

Contact Information

~~Troy Smith~~ Josh Schultz

Idaho Department of Environmental Quality

Boise Regional Office

1445 N. Orchard St.

Boise, ID 83706

208-373-~~0434~~ 0470

~~Troy.Smith~~ Josh.Schultz@deq.idaho.gov

Comments/Questions????