

## Recommended Sediment Target for the Little Willow Creek TMDL

Please provide comments to:

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### Introduction

Because the Idaho water quality standard for sediment is narrative (see below), there is no predetermined numeric value against which sediment conditions in Little Willow Creek can be compared to determine if it is supportive of cold water aquatic life beneficial uses.

**IDAPA 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 utilized as described in Section 350.”

Instead, several factors must be collectively considered and evaluated to determine an appropriate sediment target for the Little Willow Creek Total Maximum Daily Load (TMDL), including site-specific conditions and data, academic and technical research, and a comparison with local case studies.

Based the evidence presented above, I recommend the Little Willow Creek TMDL sediment concentration target be set at:

- 22 mg/L during the average irrigation season (May 1 – September 30).

### Academic and Technical Research

In determining an appropriate sediment target for Little Willow Creek, the first step is to recognize and understand the broad spectrum of academic and technical research that has previously analyzed the relationships between cold water aquatic life and sediment concentrations (<http://www.deq.idaho.gov/regional-offices-issues/boise/basin-watershed-advisory-groups/lower-payette-river-wag.aspx>).

The research results are somewhat variable depending on many factors, including the studies’ geographic location, species of interest, laboratory vs. field data, and the combinations of sediment concentration, duration, and magnitude evaluated. Given the inherent research variability, however, general trends indicate that sediment concentrations between approximately 20 – 30 mg/L are probably protective of cold water aquatic life, including juvenile salmonids.

### Local Case Studies

Next, we evaluate sediment targets that have already been established for streams in similar watersheds with comparable ecological/functional conditions. For example, Succor and Bissel Creek TMDL (DEQ 2003a, 2003b) sediment targets were both set at 22 mg/L (represented as the dashed line in Figure 1). These sediment concentrations are believed to support cold water

aquatic life beneficial uses in these waters, and represent approximate background conditions for those streams. In both instances, the target was applied during the critical time of year (May 1 – September 30) when agricultural operations are in full swing and the resulting sediment loads are at their highest.

Similarly, the lower Boise River sediment TMDL (DEQ 1999) established that sediment concentrations in the river above Middleton (20 mg/L) were not causing impairment of cold water aquatic life beneficial uses, including salmonid spawning. More recently, ongoing analyses for the development of TMDLs for several tributaries to the lower Boise River are pointing toward a probable seasonal target 22 – 30 mg/L, as being protective of cold water aquatic life, based on completed TMDLs and academic/technical research.

Although a Little Willow Creek sediment target may not be directly correlated with the targets set for Succor Creek, Bissel Creek, and Boise River tributaries, the natural and functioning ecological conditions in Little Willow Creek are similar enough to these streams to warrant a comparison.

#### Little Willow Creek Site Conditions

Finally, we focus on site-specific conditions and available data for Little Willow Creek (sample locations are identified on Figure 3). For example, the data represented in Figure 1, indicates that outside of the irrigation season (before ~May 1 and after ~September 30), most of the background sediment concentrations in the creek are below approximately 20 – 30 mg/L. Conversely, during irrigation season (approximately May 1 – September 30) sediment concentrations at the two lower sampling sites largely exceed the background condition (especially at the lowest elevation site, LWC1).

Further, Figure 2 illustrates that the relationship between sediment concentration and Little Willow Creek discharge is not direct; rather, sediment concentrations do not directly correspond with the rate, magnitude, or timing of the stream discharge. This indicates that instream flow dynamics are not necessarily correlated with increased sediment delivery, and that sediment loads exceeding background conditions are likely the result of delivery to the stream from outside the channel or riparian area (for example, irrigation returns).

#### Recommended Target

Based the evidence presented above, I recommend the Little Willow Creek TMDL sediment concentration target be set at:

- 22 mg/L during the average irrigation season (May 1 – September 30).

This Little Willow Creek sediment concentration target: A) is comparable to estimated background conditions (approximately 20 – 30 mg/L), B) is protective of cold water aquatic life beneficial uses, as identified in local case studies and academic/technical research, and C) is applied throughout the average irrigation season (May 1 – September 30) when sediment loadings to the stream are at their highest.

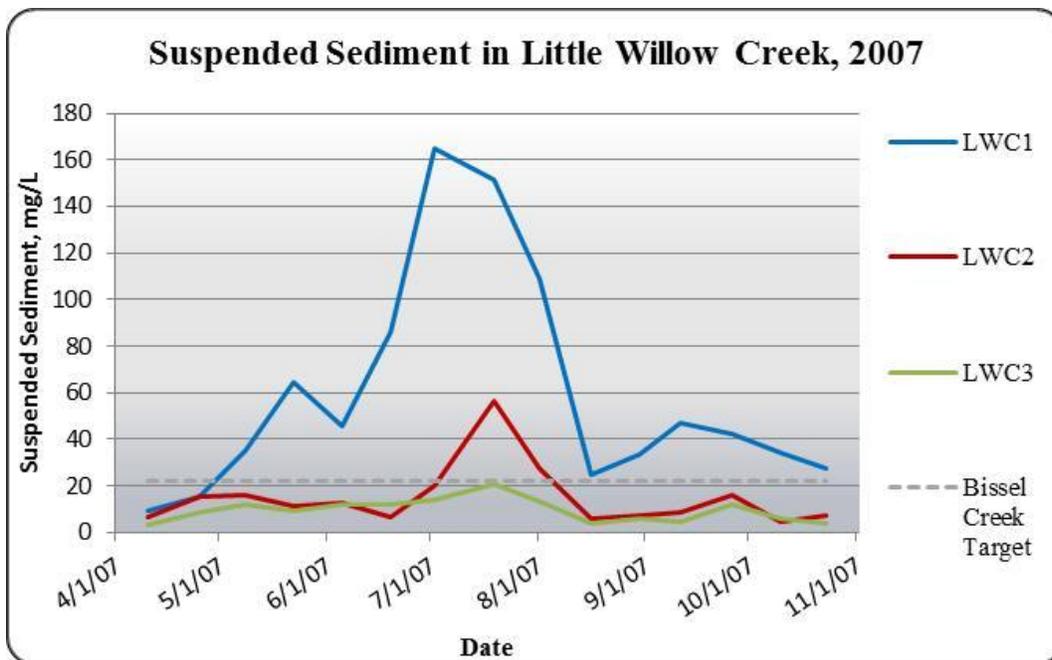
References

DEQ. 1999. Lower Boise River TMDL Subbasin Assessment, Total Maximum Daily Loads. December 18, 1998; Revised September 29, 1999.

DEQ. 2003a. Bissel Creek Subbasin Assessment and Total Maximum Daily Load. August 2003.

DEQ. 2003b. Mid Snake River/Succor Creek Subbasin Assessment and Total Maximum Daily Load. April 2003.

Figures



**Figure 1. Suspended sediment loads in Little Willow Creek in 2007, as reported by the Idaho State Department of Agriculture (ISDA).**

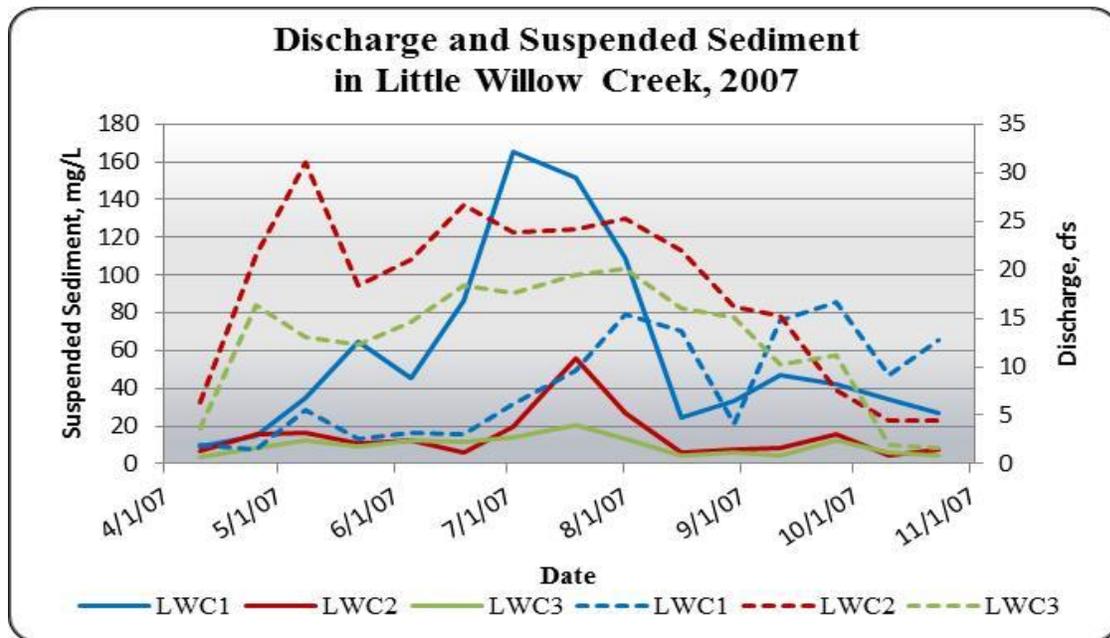


Figure 2. Discharge and suspended sediment concentrations in Little Willow Creek in 2007, as reported by the Idaho State Department of Agriculture (ISDA).

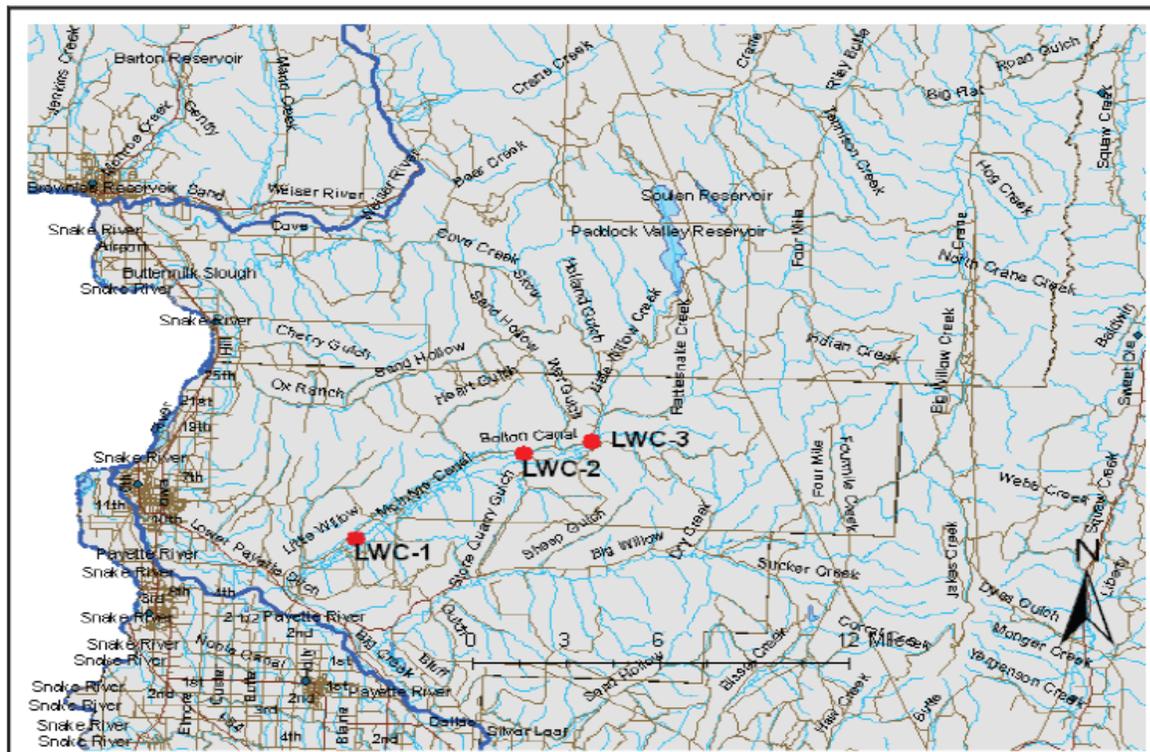


Figure 3. Sampling locations in Little Willow Creek in 2007, as reported by the Idaho State Department of Agriculture (ISDA).