

Little Willow Creek Total Maximum Daily Loads Draft Strategy Paper

Staff:

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Introduction:

Little Willow Creek is a fourth-order (Strahler 1957) north side tributary to the Lower Payette River with approximately 23 miles of perennial stream (Figure A). The watershed is subdivided into assessment units (AU) that are indicative of stream order, with the AU of focus in this report identified as ID17050122SW018_04, hereafter abbreviated as AU 18_04. Little Willow Creek drains approximately 154 square miles of agricultural and low-density urban land between the foothills of West Mountain and the Payette River. The stream flows across terrain with slopes ranging from <1-42 %, with the steepest slopes forming the eastern half of the watershed. The soils in the watershed are described as sandy to stony loams with erosion indices (K-factors) ranging from 0.24 to 0.35 (on a scale of 0 to 1); indicating moderate erosive potential. The mainstem of Little Willow Creek, in AU 018_04, has reported measured flows that range from 1.4 cubic feet per second (cfs) to 31.1 cfs. Up to 99% of the land use in the watershed is agricultural and rangeland, with surface water identified as the only other land use (DEQ 1999, 2010).

Little Willow Creek has presumed uses of Cold Water Aquatic Life (COLD) and Secondary Contact Recreation (SCR). Data analysis for a five-year review of the lower Payette River TMDL was completed in 2010 and identified that pollutants in this watershed are almost exclusively nonpoint source in nature (DEQ 2010). Data collected by the Idaho State Department of Agriculture (ISDA 2007) in 2007 indicate that suspended sediment and possibly bacteria concentrations and temperature are impairing beneficial uses. In order to improve development of the TMDL, DEQ collected additional water quality data in 2012, updating the 2007 bacteria and temperature data that initially appeared to have potentially exceeded Idaho Water Quality Standards (WQS).

Segments Listed in the 303(d) List:

The water quality limited segments in subbasin, AU 018_04, are shown in Table 1 and Figure A as listed in the 2010 Integrated Report (DEQ 2010b: <http://www.deq.idaho.gov/media/725927-2010-integrated-report.pdf>) and based on data collected in 2007 by ISDA.

Table 1: Water Quality limited segments in Little Willow Creek

Year	Assessment Unit	Watershed	Listed pollutants
2010	ID17050122SW018_04 Indian Creek to mouth AU 18_04	Little Willow Creek	Sediment

ISDA collected water quality data in 2007 from three locations in AU 018_04 (Figure A) and documented suspended sediment concentrations (SSC) ranging from 3.3 to > 160.0 milligrams per liter (mg/L) and single-sample bacteria concentrations ranging from 23 to 2,400 colony forming units per 100 milliliters (cfu/100mL). Data was also collected for instantaneous discharge, surface water temperature, dissolved oxygen, pH, and total Phosphorous. In 2003,

DEQ attempted to collect Beneficial Use Reconnaissance Program (BURP) data at AU 018_04 but failed due to non-wadeable conditions.

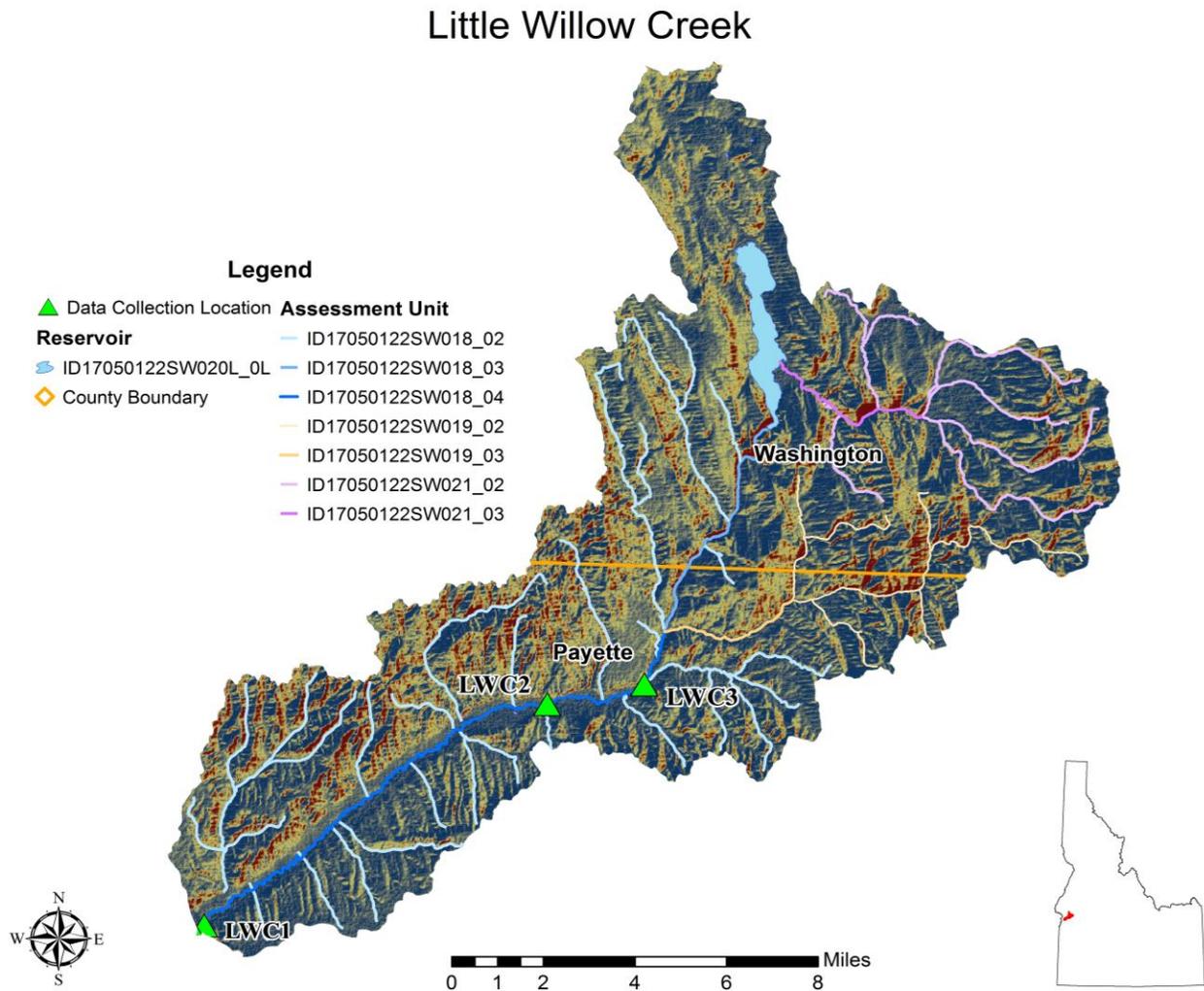


Figure A. Little Willow Creek watershed assessment units and 2007 Idaho State Department of Agriculture (ISDA) data collection locations (LWC1, 2, and 3). In 2012, DEQ sampled *E. coli* at LWC1 and LWC2 and used thermographs to record stream temperature data at LWC2.

In order to verify the existing bacterial concentrations and accurately calculate the geometric mean (geomean) relative to water quality targets, DEQ conducted additional water quality sampling for *E. coli* in 2012. The sampling was in accordance with WQS, and included 5 samples taken every 3 to 7 days within a 30-day period. Based on the peak bacterial loading presented in the 2007 ISDA data, the samples were collected during the month of June at locations similar to those sampled by ISDA (LWC1, and LWC2). The calculated *E. coli* geomeans exceeded WQS at both sampling locations (LWC1 = 838 cfu/100ml; LWC2 = 982 cfu/100ml).

Additionally, in order to accurately determine the existing stream temperatures, two thermographs were placed in Little Willow Creek (LWC2) on June 26, 2012 and were removed on October 1, 2012. Subsequent downloading of the temperature data and comparison to WQS indicate that a temperature TMDL also needs to be written for Little Willow Creek.

There are no known additional data needs at this time.

Load Allocation Approach:

The 2007 and 2012 water quality data will be assessed against WQS in the subbasin assessment for AU 018_04. We will identify numeric targets for sediment, bacteria, and temperature and employ a percent reduction approach relative to natural background conditions, if necessary. Additionally, due to the topography of the area and because the sources of pollutants are almost exclusively non-point source (rangelands and irrigated agriculture), we will utilize a stream corridor approach to allocate loads to various non-point source land uses.

Proposed Target Development:

Bacteria WQS will be used to set in-stream targets (i.e. *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* (IDAPA §58.01.02.251.01.a)). This target will likely be met by implementing Best Management Practices (BMPs) that improve the quality of agriculture and livestock-related runoff prior to entering Little Willow Creek.

Temperature WQS will be used to set in-stream targets, if necessary. (i.e. *Water temperatures of twenty-two (22) degrees C or less with a maximum daily average of no greater than nineteen (19) degrees C* (IDAPA §58.01.02.250.02.b)). This target will likely be met by first utilizing a Potential Natural Vegetation model (DEQ 2009) to establish natural background conditions and then implementing Best Management Practices (BMPs) that promote: 1) establishing and maintaining potential native vegetation along Little Willow Creek, and 2) focusing on land use practices in the Little Willow Creek watershed that may facilitate reaching natural background conditions.

Sediment WQS related to beneficial use impairment are narrative (i.e. *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...*(IDAPA §58.01.02.200.08)). Building upon existing scientific and technical literature, DEQ and WAG input, and EPA-approved TMDLs (for example, Succor Creek and Bissel Creek TMDLs) an acceptable range of suspended sediment target concentrations will be identified that support beneficial uses, specifically cold water aquatic life. Based upon a preliminary review of DEQ-compiled sediment studies relating to aquatic life toxicity and previously completed TMDL's in the region, the suspended sediment annual average is likely to be between 20 mg/L – 30 mg/L.

WAG Facilitation:

The Lower Payette WAG is familiar with the TMDL process, beneficial uses and applicable water quality criteria, and DEQ personnel will ensure they are involved throughout the TMDL development.

TMDL Timeline:

The recently-revised TMDL process ensures WAG input while also streamlining TMDL development. By combining the pollutants (sediment, bacteria, and possibly temperature) into one TMDL process, the development timeframe is considerably shortened.

October 2012: Little Willow Creek TMDL development strategy presented to WAG.
Nov.-Dec. 2012: Determine sediment and E coli strategies and targets.
Jan.-Feb. 2013: Develop TMDL.
March 2013: Determine temperature targets; Draft TMDL review by WAG.
April 2013: Public Comment.
May 2013: Finalize TMDL.

Technical Services:

DEQ Technical Services will be utilized to review the TMDL. The technical services hours required for this review should be less than 10 hours. Additional TS resources are unforeseen at this time.

Policy Decisions:

It is unknown what policy decisions will be needed for the Little Willow Creek SBA-TMDL.

References:

DEQ. 1999. Lower Payette River Subbasin Assessment and Total Maximum Daily Load.
DEQ. 2003. Bissel Creek Subbasin Assessment and Total Maximum Daily Load.
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DEQ. 2010b. Idaho's 2010 Integrated Report: Final.
ISDA. 2007. Little Willow Creek Water Quality Monitoring Report; April through October, 2007.
Strahler, A.N. 1957. Quantitative analysis of watershed geomorphology. Transactions American Geophysical Union 38:913-920.