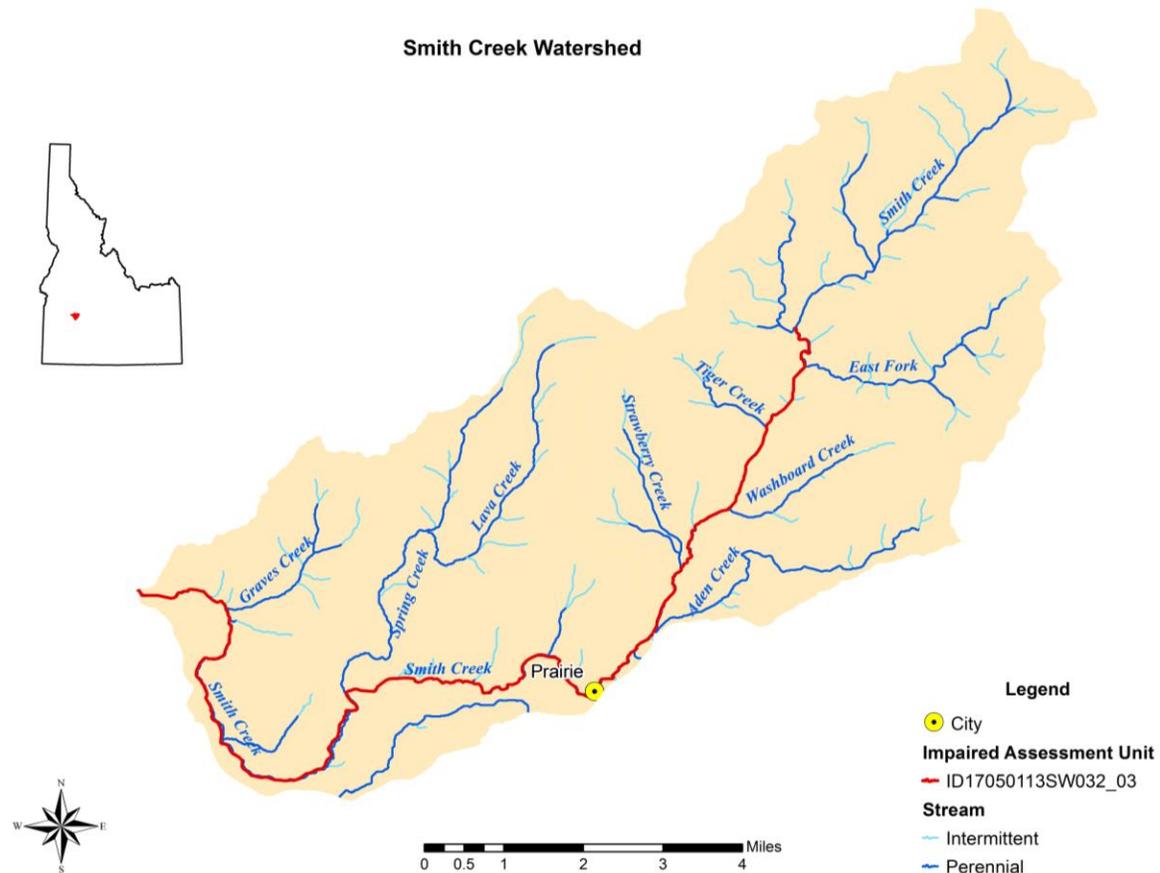


## **Smith Creek Assessment and Total Maximum Daily Loads Conceptual Approach Report**

**Introduction:** Smith Creek is a third-order (Strahler 1957) east side tributary to the South Fork Boise River, upstream of Arrowrock Reservoir, with approximately 66 miles of perennial stream (U.S. Geological Survey 2009), located in the east-central portion of the South Fork Boise River subbasin; also identified as Hydrologic Unit Code (HUC) 17050113 with the water body identification (WBID) label: ID17050113SW032\_03, hereafter abbreviated as AU 032\_03 (Figure A). Smith Creek drains approximately 52 square miles of forested mountain, agricultural, and low-density rural land between the foothills of the Boise Ridge and the Sawtooth Range. The stream flows across terrain with slopes ranging from 14 to 52 %, with the steepest slopes forming the north and north-east boundary of the watershed. The watershed lithology is dominated by Idaho Batholith granitics overlain by Plio-Pleistocene basalt flows with narrow lenses of Quaternary alluvium that frame the present-day perennial streams. The soils in the watershed are described as gravel-sand loam to sand-clay-loam with erosion indices (K-factors) ranging from 0.02 to 0.31 (on a scale of 0 to 1); indicating little to mild erosive potential. Smith Creek is estimated to have flow velocities that range from 6 cubic feet per second (cfs) to 211 cfs. It is estimated that 92% of the land use in the watershed is agricultural, with 0% identified as urban; and less than 1% of the area is impervious (USGS 2009—StreamStats).

The identified pollutants in this watershed are temperature and bacteria, and are presumed to be anthropogenic. A temperature TMDL was developed for Smith Creek and approved by EPA in March 2009.



**Figure A. Smith Creek watershed streams on Idaho’s current 303(d) list.**

**Segments Listed in the 303(d) List:**

The water quality limited segments of the subbasin are listed in Table 1 and shown in Figure A. These listings are based on data collected since 1996 by DEQ.

**Table 1: Water Quality limited segments in Smith Creek**

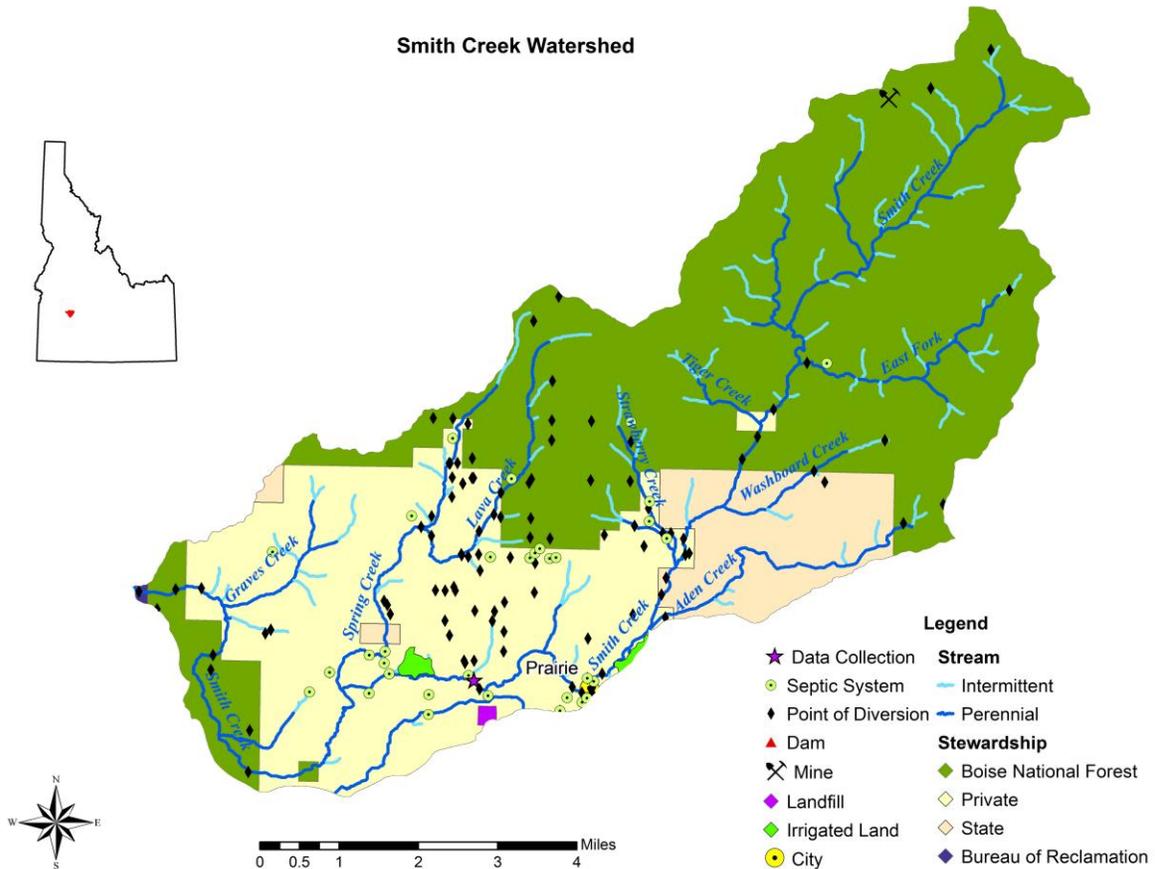
Year	Assessment Unit	Watershed	Listed pollutants
1996	Headwaters to SF Boise River	Smith Creek	Sediment
1998	Tiger Creek to SF Boise River	Smith Creek	Sediment
2002	032_03	Smith Creek	Unknown, Temperature
2008	032_03	Smith Creek	Combined Biota/Habitat
2010	032_03	Smith Creek	<i>Escherichia Coli</i>

AU 032\_03 is listed in the 2010 Integrated Report as impaired by *Escherichia Coli* (*E. coli*) (Table 1). This report is available at:

<http://www.deq.idaho.gov/media/725927-2010-integrated-report.pdf>. Data collected by DEQ between 1996 and 2010 is used to identify pollutants and potential sources, and quantify pollutant loads.

DEQ collected Beneficial Use Reconnaissance Program (BURP) data from AU 032\_03 nine times between 1994 and 2010, resulting in a passing score for aquatic fauna and habitat. DEQ also collected *E. coli* bacteria samples five times in July and August 2006 from which a geomean value of 797 colony forming units (cfu) per 100 milliliters (mL) of sample has been calculated (Table 2). Because Idaho water quality standards (WQS) for recreational use support require a geomean value of 126 cfu/100mL, this AU is considered to be impaired by bacteria (*E. coli*).

There are no (zero) permitted point source discharges in the watershed; and the potential sources are estimated to be domestic stock animals, domestic pets, irrigation conveyance systems, domestic septic systems (Figure 2), and wildlife. As Idaho WQS are numeric and not source-specific, a water quality management plan is required and best management practices (BMPs) for controllable sources must be implemented until the recreational use of the AU is supported.



**Figure B. Location of data collection and potential sources in the Smith Creek watershed.**

**Table 2. Summary of water quality data sources, determination of beneficial use support, and pollutant type for impaired assessment units in the Smith Creek watershed.**

Assessment Unit (2010 Integrated Report)	Stream Segment Description	Collection Agency	Data Collected	Year
032_03	3rd order Smith Creek, and tributaries.	DEQ	BURP data, bacteria samples, satellite photo image review, GIS data.	1994-2010

**TMDL Load Allocation Approach**

The goal of a TMDL is to restore beneficial use support to streams, lakes, and rivers. Idaho describes beneficial uses as existing, designated, or presumed. The beneficial uses that apply to Smith Creek are listed in Table 3.

***Beneficial Uses***

Idaho WQS require that surface waters of the state be protected for beneficial uses, wherever attainable (IDAPA 58.01.02.050.02). These beneficial uses are interpreted as existing uses, designated uses, and presumed uses as briefly described in the following paragraphs. The *Water Body Assessment Guidance*, second edition (WBAG II) (Grafe et al. 2002) gives a more detailed description of beneficial use identification for use assessment purposes.

***Existing Uses***

Existing uses under the CWA are “those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.” The existing in-stream water uses and the level of water quality necessary to protect the uses shall be maintained and protected (IDAPA 58.01.02.050.02, .02.051.01, and .02.053). Existing uses include uses actually occurring, whether or not the level of quality to fully support the uses exists. A practical application of this concept would be to apply the existing use of salmonid spawning (SS) to a water that could support salmonid spawning, but salmonid spawning is not occurring due to other factors, such as dams blocking migration.

***Designated Uses***

Designated uses under the CWA are “those uses specified in water quality standards for each water body or segment, whether or not they are being attained.” Designated uses are simply uses officially recognized by the state. In Idaho these include uses such as aquatic life support, recreation in and on the water, domestic water supply, and agricultural uses. Water quality must be sufficiently maintained to meet the most sensitive use. Designated uses may be added or removed using specific procedures provided for in state law, but the effect must not be to preclude protection of an existing higher quality use such as cold water aquatic life (COLD) or salmonid spawning. Designated uses are specifically listed for water bodies in Idaho in tables in the Idaho WQS (see IDAPA 58.01.02.003.27 and .02.109-.02.160 in addition to citations for existing uses).

**Presumed Uses**

In Idaho, most water bodies listed in the tables of designated uses in the WQS do not yet have specific use designations. These undesignated uses are to be designated. In the interim, and absent information on existing uses, DEQ presumes that most waters in the state will support cold water aquatic life and either primary or secondary contact recreation (IDAPA 58.01.02.101.01). To protect these so-called “presumed uses,” DEQ will apply the numeric cold water criteria and primary or secondary contact recreation criteria to undesignated waters. If in addition to these presumed uses, an additional existing use, (e.g., salmonid spawning) exists, because of the requirement to protect levels of water quality for existing uses, then the additional numeric criteria for salmonid spawning would additionally apply (e.g. intergravel dissolved oxygen, temperature).

**Table 3. Beneficial uses of §303(d) listed (2008) streams in the Willow Creek watershed.**

Assessment Unit	Beneficial Uses	Listed Impairments (2010)
032_03	Designated: COLD, SS, PCR	Temperature, <i>E. coli</i>

COLD – cold water aquatic life, SS—salmonid spawning, PCR— primary contact recreation

In determining beneficial use support, Idaho WQS allow for less weight to be given to departures from criteria that are brief or infrequent (< 10%) if habitat and biological data indicate that aquatic life beneficial uses (i.e. COLD) are otherwise supported. Based on the available data, *E. coli* concentrations in AU 032\_03 exceed Idaho WQS criteria for the designated beneficial uses of Smith Creek and are the cause for non-support of recreational uses in Smith Creek.

**Proposed Targets for Load Allocations and Proposed Method to Derive Targets**

***E. coli***

Five bacteria samples were collected by DEQ in 2006 from one location in AU 032\_03. These data indicate that 60% of all samples collected exceed the single-sample maximum criteria for beneficial use support, with all documented single-sample exceedances occurring in July and August. These five samples were collected at 3 to 21-day intervals in order to calculate a geomean value as required by Idaho WQS when a single sample exceeds 406 cfu per 100 mL of sample water. The pollutant load is allocated to all sources using the same rationale, observations, and methods used to develop other approved TMDLs, such as Bissel Creek (DEQ 2003).

Targets are selected using the calculated geomean values to determine the required percent reduction to meet the WQS geomean criterion (Table 9) as the target concentration which applies to all locations in the creek during the entire year. As there are no identified point sources in the watershed, the entire load reduction for this pollutant is allocated to nonpoint sources, which may or may not have permit limits.

## **Data**

The South Fork Boise River Watershed Advisory Group (WAG) meets on a regular basis and has been involved in the development of all TMDLs developed for waters in the South Fork Boise River subbasin.

Data collected while the document is being developed is used for trend analysis and for Five-Year Reviews.

## **Process**

1. The draft document is developed by DEQ with regular review and input from the Watershed Advisory Group (WAG).
2. The WAG reviews the completed draft document and provides DEQ with editorial suggestions or alternative targets/reductions.
3. Alternatives proposed by the WAG are considered by DEQ and revisions are made to the document.
4. The document is available for public comment for 30 days.
5. DEQ reviews the public comments and revises the document.
6. DEQ submits the document to EPA for approval.
7. Implementation Plan is developed by the WAG within 18 months of EPA approval.
8. TMDL implementation and beneficial use support

## **References**

Grafe, C.S., et al. 2002. The Idaho Department of Environmental Quality water body assessment guidance, second edition-final. Department of Environmental Quality. Boise, ID. 114 p.

Idaho Department of Environmental Quality (DEQ). 2011. Idaho's 2010 Integrated Report. 776 p.

-----2003. Bissel Creek Subbasin Assessment and Total Maximum Daily Load. 125 p.

## **GIS**

United States Geological Survey (USGS) StreamStats 2009: USGS, Boise, ID USA. Retrieved from <http://water.usgs.gov/osw/streamstats/ssinfo.html>.