The Rueger Springs Total Maximum Daily Load (TMDL)

of the

Lake Walcott Watershed Management Plan (Lake Walcott TMDL)

by

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INFORMATION AT A GLANCE	
303(d) Water body	Snake River
Non 303(d) Water body	Rueger Springs Creek
Pollutants of Concern	Sediment, nutrients, bacteria
National Pollutant Discharge Elimination System (NPDES) Permitted Facilities	ID-0001104 – American Falls Fish Hatchery
Approved TMDL	Lake Walcott TMDL
Appendix A	Rueger Spring Creek Drainage & Fish Hatchery
Appendix B	Response to Public Comments

I. INTENT AND PURPOSE

The intent and purpose of the Rueger Springs Creek Total Maximum Daily Load (TMDL) is to establish water quality load allocations for sediment, nutrients and bacteria in Rueger Springs Creek as part of the overall Lake Walcott TMDL. Rueger Springs Creek is not a §303(d) listed water body. However, it is generally described in the Lake Walcott TMDL as one of many "scattered springs … throughout the region" (Lay 2000 [p 15]). The receiving water body of Rueger Springs Creek is the Snake River, which is §303(d) listed. Consequently, the Rueger Springs Creek TMDL is necessary to protect the beneficial uses of the Snake River as part of the Lake Walcott TMDL.

The Rueger Springs Creek TMDL is not a TMDL modification. Rather, it is an addition to the Lake Walcott TMDL and does not modify in any way the Lake Walcott TMDL, but it does bring the aquaculture facility associated with Rueger Springs Creek into alignment with the NPDES General Aquaculture Permit, so that a wasteload allocation can be applied this facility under the Lake Walcott TMDL and meet water quality provisions for the Snake River. The Rueger Springs Creek TMDL, therefore, is an iterative watershed management tool for implementing state water quality standards and is based on the relationship between pollution sources and instream water quality conditions.

The Rueger Springs Creek TMDL establishes the allowable loadings or other quantifiable parameters for Rueger Springs Creek and thereby provides the basis for the state to establish water quality-based controls. These controls should provide the pollution reduction necessary for Rueger Springs Creek to achieve downstream water quality standards and beneficial uses of the Snake River. The Rueger Springs Creek TMDL may require more stringent reductions through implementation of other best management practices or limitations if water quality standards and beneficial uses are not achieved.

II. IDENTIFICATION OF WATER BODY, POLLUTANTS OF CONCERN, POLLUTANT SOURCES, AND PRIORITY RANKING

Identification of Water body

Rueger Springs Creek is not specifically identified by Lay (2000) in the Lake Walcott TMDL, but it is a tributary to the Snake River. Its confluence is at approximately River Mile 713.4, and it is identified as part of the Idaho Fish and Game (IDFG) "State Fish Hatchery" (Lay 2000 [p 172]) or as the "IDFG Fish Hatchery" (Lay 2000, p 129, Table 31. See Appendix A).

Rueger Springs Creek is also an undesignated water body (relative to its beneficial uses) under IDAPA §58.01.02.150.11. However, the following designations and ground truthing provide the basis for assessing Rueger Springs Creek as a spring fed system:

1. *Spring Source*. Rueger Springs is defined by the Idaho Department of Water Resources (IDWR) as a spring source in Section 31, Township 7S, Range 31E in Power County, Idaho and as a tributary of the Snake River (IDWR 1998, IDWR 2006). Two water rights are associated with Rueger Springs and the IDFG American Falls Fish Hatchery: (1) Water Right No. 35-00053 for fish propagation at 5.0 cubic feet per second (cfs) and irrigation for 0.12 cfs; and, (2) Water Right No. 35-02916 for fish propagation at 14.1 cfs. In both water rights, Rueger Springs is identified as the spring source and a tributary to the Snake River.

2. *Ground Truthing*. Site visitation and ground truthing by DEQ personnel on March 10, 2006 indicated the following:

    a. *The Source of Rueger Springs*. As presently illustrated on U. S. Geological Survey (USGS) maps prior to 2000 and confirmed by the IDFG American Falls Fish Hatchery, Rueger Springs is actually located over a large pond-looking area (shown on the topographic maps) just west of the Snake River at approximately River Mile 713.5. (See Appendix A.) However, this pond is no longer in existence, because it has been buried or covered by soil. Therefore, Rueger Springs discharges to the Snake River by way of surface conveyances and through groundwater.

    b. *Surface Conveyances*. There are two surface discharges (or surface conveyances) from Rueger Springs into the Snake River:

        (1) *Abandoned Raceways*. The first surface conveyance is from an abandoned set of constructed fish propagation raceways that flow in a southeasterly direction into the Snake River. The Rueger Springs water originates from the springs-seeps-groundwater table (which is outside of the main Rueger Springs "basin"). It also originates from the upwelling of water through the abandoned raceway floors. It is estimated, based on the historical knowledge and experience of the IDFG American Falls Fish Hatchery personnel, that the flow is approximately 50 gallons per minute (gpm) or approximately 0.1114 cfs. The flow is also seasonal in nature. DEQ estimates (based on a USGS topographical map) that the discharge to the Snake River from

these abandoned raceways is at approximately River Mile 713.6; or just upstream from the main set of fish hatchery raceways that are more recently constructed.

(2) _Recent Set of Raceways_. As previously noted, the pond (as depicted on USGS maps) has been buried or covered with soil. The water is collected underground via a spider web of perforated pipe. The water is then transported underground into a more recent set of constructed raceways and the hatchery building. However, groundwater is not necessarily collected in this underground spider web network. Rather, it emanates directly into the discharge channel, which discharges into the Snake River. Hatchery personnel estimate this groundwater discharge source amounts to a flow of approximately 1.0 to 1.5 cfs. This flow estimate includes the groundwater flow that originates from outside the Rueger Springs "basin". DEQ estimates (again based on a USGS topographical map) that the discharge to the Snake River from the constructed channel is at approximately River Mile 713.4. The discharge to the Snake River averages 19.8 cfs (and this includes the fish hatchery flow), with a midpoint range value of 21.9 cfs, a minimum of 15.0 cfs, and a maximum of 23.9 cfs (based on the fish hatchery's discharge monitoring reports for the period of record from January 1996 to December 2005; or a database of N = 117 values).

3. _Combing Both Discharge Flows_. As described in item 2b (above), Rueger Springs Creek discharges to the Snake River at two locations. Combining both flows, the discharge via the abandoned raceways amounts to an average of 0.56% of the total flow, and the through-the-fish-hatchery discharge an average of 99.44% of the total flow. The effluent discharge from the IDFG American Falls Fish Hatchery is only through the more recent set of raceways and not through the abandoned raceways. Therefore, the discharge of the effluent is through the larger amount of the total flow.

Pollutant Sources and Pollutants of Concern

As defined in the Lake Walcott TMDL, Rueger Springs Creek discharges into Segment 1 of the Lake Walcott Snake River Reach (Lay 2000, p 144). Segment 1 of the Snake River reach runs from American Falls to Massacre Rocks. Segment 1 is defined according to the mass balance model that was used in the Lake Walcott TMDL to establish the loading analysis (Lay 2000, pp 143-144. See Appendix A for a map of the Rueger Springs Creek Area.).) Additionally, Segment 1 is a free-flowing segment in the basalt gorge of the Snake River with a channel slope of approximately 9.6 feet per mile, which is considered relatively steep (Lay 2000, p 48).

Because it is the receiving water body, the pollutants of concern are based on the water quality impairments to the Snake River.water body. Rueger Springs Creek is located in the American Falls to Massacre Rocks Reach of the Snake River; which is an approximately five-mile reach based on the River Mile Index of the Lake Walcott TMDL from American Falls to the Eagle Rock Dam Site (Lay 2000, pp 172, Appendix A). The primary pollutant-of-concern is sediment because the §303(d) pollutant listing is primarily based on sediment. However, as described in the Lake Walcott TMDL (Lay 2000, pp 46-47), two primary sources of pollutants known to exist in the Lake Walcott subbasin are (1) sediment as the major pollutant and (2) phosphorus, bacteria, and other pollutants as "other sources" (IDHW 1992). Therefore, for TMDL purposes and as predicated by other nearby TMDLs (i.e. Upper Snake Rock TMDL), the pollutants of concern that will be considered in the Rueger Spring Creek TMDL to meet the beneficial uses of the Snake River will be sediment (i.e. total suspended solids or TSS), nutrients (i.e. total phosphorus or TP), and bacteria (i.e. *Escherichia coli* or *E. Coli*).

Within Segment 1, the major pollutant sources as defined in the Lake Walcott TMDL include non-irrigated cropland and irrigated cropland (Lay 2000, p 47, Table 6), and the primary pollutant is sediment. However, because these same sources have been shown in other TMDLs (i.e. Upper Snake Rock TMDL) to include sediment, nutrients, and bacteria as primary pollutants, for purposes of the Rueger Springs Creek TMDL, the pollutants that will be considered at this time are TSS, TP and *E. coli*.

Priority Ranking

The priority ranking for the Snake River American Falls Dam to Massacre Rocks Reach is high and this reach is presently under implementation planning as a post-TMDL component in the Lake Walcott TMDL process. For this high priority stream to meet its beneficial uses, it is necessary that all tributaries, whether defined as §303(d) or not, that discharge into the high priority stream undergo the TMDL process. Therefore, those water bodies that are not §303(d) listed would be included as informational TMDLs for the high priority stream (i.e. the Snake River) to meet its beneficial uses. As a result, certain high priority provisions apply once the TMDL is completed:

(1) Until a TMDL or equivalent process is completed for a high priority water quality limited water body, new or increased discharge of pollutants that have caused the water quality limited listing may be allowed if interim changes, such as pollutant trading or some other approach for the pollutant(s) of concern, are implemented and the total load remains constant or decreases within the watershed. In this situation, the Lake Walcott TMDL was completed in 2000 and approved by EPA (Lay 2000). The information contained in the Lake Walcott TMDL states that the fish hatchery on Rueger Springs Creek was in operation at the time the TMDL was developed, finalized, and approved (Lay 2000, p 129, Table 31), as an existing point source and was assigned a Waste Load Allocation (WLA) of 0.256 ton/year for TSS (Lay 2000, p 145, Table 45) or 512 lb/day TSS without taking into account the design flow of the facility. Since then, the development of EPA's Idaho General Aquaculture Permit has occurred, and the facility operation requires WLAs for TP and TSS that are more in line with its operational nature, thus making it necessary to more formally develop the Rueger Springs Creek TMDL as a component of the Lake Walcott TMDL. As such, the TMDL process for the Snake River (as the water quality limited water body) in the Lake Walcott Subbasin is still in effect. Consequently, the Rueger Springs Creek TMDL is only an additional component of that same process that more fully addresses the sources of pollutants that eventually discharge (through Rueger Springs Creek) into the Snake River.

(2) Once the TMDL or equivalent process is completed (as has occurred with the Lake Walcott TMDL), any new or increased discharge of causative pollutants (as in the case of the Rueger Springs Creek fish facility and nonpoint source) will be allowed only if consistent with the approved Lake Walcott TMDL. Therefore, the Rueger Springs Creek TMDL is written to meet the overall

intent of the Lake Walcott TMDL. As such, the TMDL defines consistency for pollutant sources in meeting the loading capacity of Rueger Springs Creek to meet the loading capacity of the Snake River as the high priority stream under the Lake Walcott TMDL.

(3) Nothing in the development and implementation of the Rueger Springs Creek TMDL (as a component of the Lake Walcott TMDL) is intended or shall be interpreted as requiring best management practices for agricultural operations that are not adopted on a voluntary basis.

III. DESCRIPTION OF THE APPLICABLE WATER QUALITY STANDARDS AND NUMERIC WATER QUALITY TARGET

The American Falls to Massacre Rocks Reach of the Snake River is designated for primary contact recreation, secondary contact recreation, cold water aquatic life, drinking water supply, and agricultural water supply (Lay 2000, p 54, Table 9). As previously noted in Section II, this reach is defined as Segment 1 of the Lake Walcott Snake River Reach in the Lake Walcott TMDL.

Segment 1 is listed in the 2002 Integrated Report (DEQ 2005, p 326) and has a pollutant listing as *Unknown*. The 1998 303(d) list shows Segment 1 (American Falls to Eagle Rock) initially listed in 1996 for sediment. Table 1 shows the National Assessment Database (EPA 2002) listing for the Lake Walcott Watershed, providing the assessment units (AUs) catalog number, and water quality status of this segment..

Table 1. Lake Walcott Segment 1 Reach Assessment Units and Water Quality Status

SEGMENT 1	SNAKE RIVER SEGMENT 1 ASSESSMENT UNIT(S)	WATER QUALITY STATUS PER AU
American Falls Dam to Rock Creek	ID17040209SK001_02,07,03	I, I, NA
AU = Assessment Unit. ID = Idaho. I = Impaired. NA = Not Assessed.		

The numeric water quality standards that will be used in the Rueger Springs Creek TMDL are based on the assumptions promulgated by the Lake Walcott TMDL. These standards are described as follows:

1. Sediment (TSS). Water quality in this reach of the Snake River has been reported to have TSS at 19.0 mg/L (mean) and maximum concentrations of 156.0 mg/L TSS (Lay 2000, p 67, Table 12). The recommended instream water quality target for TSS is 25 mg/L (average monthly) in the Snake River and 50 mg/L (average monthly) in the tributaries (Lay 2000, p 138). The loading capacity for sediment (as TSS) for the Snake River reach is 318 ton/day (Lay 2000, p 145, Table 45). Of this total loading capacity, 28.582 ton/day is allocated as load allocation for nonpoint sources. Thus, the nonpoint source component represents 8.99% of the total loading capacity. For point sources, the wasteload allocation component is 0.418 ton/day or 0.13% of the total loading capacity.

2. Nutrients (TP). Water quality in this reach of the Snake River has been reported to have TP at 0.064 mg/L (mean) and a maximum concentration of 0.660 mg/L TP (Lay 2000, p 67, Table 12). The recommended instream water quality target for TP is 0.080 mg/L in the Milner Pool (Lay 2000, p 143), but no loading capacity for TP is set in the Snake River reach. Segment 1 also does

not have a nutrient limitation for TP as defined in the Lake Walcott TMDL. Therefore, the application of IDAPA §58.01.02.051.01 is applied in that the existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected as part of the antidegradation policy. Since a TMDL for nutrients (TP) was not defined in the Lake Walcott TMDL, the application of the 0.080 mg/L TP instream concentration as a conservative approach is applied to Milner Pool as the receiving water body in the Snake River from this upstream reach of the Snake River. Consequently, the Rueger Springs Creek instream concentration is set at 0.080 mg/L of TP to meet the same instream concentration in the Snake River.

3. Bacteria (*E. coli*). Water quality in this reach of the Snake River has been reported to have fecal coliform at 73 colony forming units (CFU) per 100 mL (mean), but this reach has also been shown to have maximum concentrations of 3,300 CFU/100 mL (Lay 2000, p 67, Table 12). Bacteria as *E. coli* were not assessed in the Lake Walcott TMDL because at the time fecal coliform was used as a surrogate for *E. coli* in determining water quality standards. Since then, *E. coli* has been incorporated as a water quality standard (IDAPA §58.01.02.251.01) for primary recreation at 406 CFU/100 mL as an instantaneous sample and 126 CFU/100 mL as a geometric mean. Based on the Lake Walcott TMDL, fecal coliform has exceeded the numeric standards at certain times. From a conservative approach, it can only be assumed that since fecal coliform was a surrogate for *E. coli*, then the *E. coli* criteria was also exceeded under certain circumstances. Therefore, the application of the primary contact recreation geometric mean (126 CFU/100 mL) will be applied on Rueger Springs Creek to meet the beneficial uses of the Snake River.

IV. LOADING CAPACITY – LINKING WATER QUALITY AND POLLUTANT SOURCES

The loading capacity (LC) is the greatest amount of loading that a water body can receive without violating water quality standards. In the case of Rueger Springs Creek, the LC is dictated, in great measure, by the LC of the Snake River as the receiving §303(d) listed water body. For the Snake River to meet water quality standards, it is imperative that the tributaries to the Snake River meet water quality standards as well. Otherwise, attainment of water quality standards (and beneficial uses) cannot be achieved in the Snake River.

To determine the overall LC for Rueger Springs Creek (the components of the LC are described in Section VI), it is necessary to have a flow estimate of the creek prior to discharge into the Snake River. Unfortunately, the Rueger Springs Creek average flow is unknown and is therefore defined as a data gap. However, as previously described in Section II, the flow from Rueger Springs Creek can be estimated based on the effluent flow discharge from the IDFG American Falls Fish Hatchery and the estimated flow from groundwater that discharges into Rueger Springs Creek. Both of these flows combined provide a preliminary estimate of the flow from Rueger Springs Creek:

1. The IDFG American Falls Fish Hatchery (based on the discharge monitoring reports for the period of record from January 1996 to December 2005, or N = 117 values) indicates an average flow of 19.8 cfs. The coefficient of variation (CV) for the repeated monthly discharge values is 0.090 (or 9.0%) as a measure of dispersion of the discharge flow distribution. Relatively speaking, a CV value less than 10% is considered to have very low variability in its flow

measurements. The standard deviation is ± 1.78 cfs; therefore, the flow (generally speaking) falls in the range of 19.8 ± 1.78 cfs; or, more conservatively, the flow is 21.6 cfs (i.e. 19.8 cfs + 1.78 cfs = 21.58 cfs ≈ 21.6 cfs).

2. The underground flow is conservatively estimated to be 1.0 - 1.5 cfs, but the personnel at the IDFG American Falls Fish Hatchery are uncertain if this estimate is accurate. Therefore, DEQ applied a more conservative estimate of 2.0 cfs based on the provision that the higher 1.5 cfs estimate would be rounded to 2.0 cfs.

3. Therefore, the Rueger Springs Creek estimate is as follows:

IDFG American Falls Fish Hatchery:	21.6 cfs
Groundwater into Rueger Springs Creek:	2.0 cfs .
Overall Total Discharge Estimate:	23.6 cfs ≈ 24.0 cfs

The 24.0 cfs flow estimate approximates the maximum value of 23.9 cfs from the IDFG American Falls Fish Hatchery. Therefore, DEQ applied the 24.0 cfs rounded value as a conservative approach to the overall flow from Rueger Springs Creek. The DEQ Twin Falls Regional Office (DEQ-TFRO) intends to fill in this data gap by providing some level of flow monitoring in the total flow of Rueger Springs Creek prior to the next iteration of the Lake Walcott TMDL.

Based on the Lake Walcott TMDL provisions for instream water quality standards (or targets),, the Rueger Springs Creek LC for TSS, TP and *E. coli* is defined as follows (as previously described in Section III):

1. Sediment (TSS): The water quality target for TSS is 50 mg/L (average monthly) in the tributaries. Rueger Springs Creek average flow is 24.0 cfs. Therefore, based on the TMDL formula for calculating the LC for TSS for Rueger Springs Creek:

   TSS LC = Water Quality Target x Flow, cfs x 5.4
   TSS LC = 50 mg/L TSS x 24.0 cfs x 5.4
   TSS LC = 6,480.0 lb/day TSS

2. Nutrients (TP): The recommended instream water quality target for TP is 0.080 mg/L TP as previously described in Section III. Therefore, based on the TMDL formula for calculating the LC for TP for Rueger Springs Creek:

   TP LC = Water Quality Target x Flow, cfs x 5.4
   TP LC = 0.080 mg/L TP x 24.0 cfs x 5.4
   TP LC = 10.37 lb/day TP

3. Bacteria (*E. coli*): The primary recreational standard for the Snake River is 126 CFU/100 mL geometric mean based on a minimum of five (5) samples taken every three (3) to five (5) days over a 30-day period at equal intervals between samples. The "trigger" for this target will be an instantaneous value of 406 *E. coli* organisms/100 mL based on the primary contact recreational

standard of the Snake River (IDAPA §58.01.02.251.01.b.i). Therefore, based on the TMDL formula for calculating LC of *E. coli* for Rueger Springs Creek:

E. coli LC = Water Quality Target x Flow, cfs x 0.02445
E. coli LC = 126 CFU/100 mL *E. coli* x 24.0 cfs x 0.02445
E. coli LC = 73.9 CFU^9/day *E. coli*

The existing load for Rueger Springs Creek is uncertain because actual monitoring that incorporates a characterization of the point source from the nonpoint source has not been determined. However, the existing water quality condition of the creek may be estimated based on the IDFG American Falls Fish Hatchery discharge monitoring reports for the period of record (January 1996 through December 2005) as shown in Table 2.

Table 2. Effluent water quality values for the IDFG American Falls Fish Hatchery

WATER QUALITY STATISTIC	TSS, mg/L INFLUENT	EFFUENT	NET	TP, mg/L INFLUENT	EFFUENT	NET
N	27	51	51	28	28	28
Minimum	< 1.0	< 1.0	< 1.0	0.012	0.012	0.002
Maximum	< 1.0	5.4	5.4	0.024	0.053	0.029
Mean	< 1.0	< 1.0	0.5	0.017	0.029	0.012
Median	< 1.0	< 1.0	0.5	0.017	0.029	0.012
Midpoint Value	< 1.0	3.2	2.9	0.021	0.041	0.020
Standard Deviation	0.000	1.077	1.084	0.002	0.007	0.006
Coefficient of Variation	0.000	1.095	2.383	0.126	0.233	0.517

TSS = Total Suspended Solids. TP = Total Phosphorus. N = the number of values in the data set for the period of record (January 1996 through December 2005). In the data sets for the determination of the mean and median, the values are indeed similar. *E. coli* values were not sampled in the effluent water since cold blooded fish do not generate these in their intestines.

The values reported in Table 2 describe the TSS and TP concentrations of Rueger Springs Creek as influent and effluent from the IDFG American Falls Fish Hatchery. The influent values represent groundwater quality from the Eastern Snake River Plain Aquifer. Under the influent maximum concentration values, the TSS for Rueger Springs Creek is < 1.0 mg/L and TP is < 0.024 mg/L. The effluent discharge from the fish hatchery shows an increase (on a maximum basis) to 5.4 mg/L TSS and 0.053 mg/L TP. Based on the provisions of the Lake Walcott TMDL for instream water quality standards (or targets), the TSS remained below 50.0 mg/L and TP remained below 0.080 mg/L. Consequently, DEQ concludes that it is unlikely that any additional water quality impairment from Rueger Springs Creek to the Snake River, above the water quality targets of the Lake Walcott TMDL, would occur assuming the concentration values for TSS and TP did not exceed the existing maximum water quality conditions.

V. WASTELOAD ALLOCATIONS (WLAs)

The wasteload allocation (WLA) is the portion of a receiving water's LC that is allocated to one of its existing or future point sources of pollution. The WLA is the allocation for an individual point source that ensures that the level of water quality to be achieved by the point source is derived from and complies with all applicable water quality standards.

Rueger Springs Creek is not currently on the §303(d) list of the federal Clean Water Act; the application of the water quality standards is based on achieving the beneficial uses of the Snake River (which is §303(d) listed). Therefore, Rueger Springs Creek must meet the water quality standard of the Snake River by having its own LC for that express purpose.

Only one (1) point source is known to exist on Rueger Springs Creek: the IDFG American Falls Fish Hatchery Facility (NPDES No. ID-13003). The WLA for this facility is based on the discharge monitoring records for the period of record from January 1996 to December 2005 (or N = 117 for flow). The average facility flow is 19.8 cfs. The following describes the WLAs for TSS, TP, and *E. coli*:

1. TSS WLA. The TSS limitation for raceway effluent discharges is 5.0 mg/L Net TSS. The Net is based on the difference between the effluent load and the influent load. This limitation has foundation and precedence from the NPDES permit limit in the Mid-Snake fish hatcheries of the Upper Snake Rock TMDL (Buhidar, 1997, Buhidar 1999, Buhidar 2000, and Buhidar 2005). DEQ concludes that the application of this limitation on IDFG American Falls Fish Hatchery is consistent and therefore provides a rational basis for use of this provision. Therefore, based on the TMDL formula for calculating the TSS WLA for the facility:

   TSS WLA = Limitation Target x Facility Flow x 5.4
   TSS WLA = 5.0 mg/L TSS x 19.8 cfs x 5.4
   TSS WLA = 534.6 lb/day TSS

   Based on the discharge monitoring reports for the period of record, the raceway average TSS net load in relationship to the TSS WLA was exceeded once in 51 sampling months (or 1.96% of the time); indicating that 98.04% of time the raceway average TSS net load met the TSS WLA. There is no offline settling pond associated with this facility.

2. TP WLA. The TP WLA is based on a concentration target that will meet the water quality standard for the Snake River (as the receiving water body) in the Lake Walcott subbasin. To follow precedence and maintain consistency, and thus provide a rational basis for such logic, the use of the Lake Walcott TMDL (the 0.080 mg/L TP instream target in the Snake River) was applied (Lay 2000 ,p 143). Therefore, a concentration-based target of 0.080 mg/L TP was used to set the TP limitations for the facility; based on the 0.080 mg/L TP in the Snake River as previously discussed in Section IV and based on an average flow rate of 19.8 cfs through the facility. Therefore, based on the TMDL formula for calculating the TP WLA for the facility:

   TP WLA = Limitation Target x Facility Flow x 5.4
   TP WLA = 0.080 mg/L TP x 19.8 cfs x 5.4
   TP WLA = 8.55 lb/day TP

3. *E. coli* WLA. No information was available from the discharge monitoring reports for the *E. coli* load for the period of record. As stipulated in Buhidar and Sharpnack (2003):

   > Relative to the aquaculture industry in the Upper Snake Rock subbasin, the fecal coliform or *E. coli* criteria are not indigenous to cold water fish hatcheries or warm water fish hatcheries. Total coliform bacteria are a collection of relatively harmless microorganisms that live in man and warm- and cold-blooded animals. They aid in the digestion of food. A specific subgroup of

> this collection is the fecal coliform bacteria, the most common member being *E. coli*. Fecal coliform bacteria and *E. coli* are generated in the intestines of man or warm-blooded animals. Fish, whether raised in cold water or warm water, are cold-blooded animals and do not generate fecal coliform bacteria or *E. coli* in their intestines.

Consequently, no limitations are imposed for *E. coli* on the fish hatchery of Rueger Springs Creek. The WLA for *E. coli* is zero.

VI. LOAD ALLOCATIONS (LAs)

The load allocation (LA) is the portion of the receiving water's LC attributed either to existing or future nonpoint sources (NPS) of pollution. It can also be attributed to natural background (NBK) sources. Therefore, we may generally describe the LA in the following equation:

LA = NPS + NBK

To define the LA for Rueger Springs Creek, the starting point is with the LC. The LC, as previously described (Section IV) is the greatest amount of loading that the water body can receive without violating water quality standards. By definition, the components that make up the LC cannot be individually or accumulatively greater than the LC itself. Consequently, the LA for nonpoint sources combined with the WLA for point sources must be less than the LC. Also, woven into each WLA and LA is the element of future growth, or consideration for future growth, as an assumption in the TMDL process.

To these components must be added the definition of "available load" (AL), which represents the load that is actually available for allocation between point sources and nonpoint sources after the uncertainty component is considered. That uncertainty component is best defined as the margin of safety (MOS), which is further described in Section VII. Essentially, the available load is the LC minus the MOS, therefore:

LC = (NPS + NBK) + WLA + MOS = LA + WLA + MOS
AL = LA + WLA = LC – MOS
LA = LC – MOS – WLA = LC - (MOS + WLA)

Based on these equations, we can establish the LA for Rueger Springs Creek using the TMDL LA formula for TSS, TP and *E. coli* as follows:

TSS LA = LC – (MOS + WLA)
TSS LA = 6,480.0 lb/day TSS – (648.0 lb/day + 534.6 lb/day)
TSS LA = 5,297.4 lb/day TSS

TP LA = LC – (MOS + WLA)
TP LA = 10.37 lb/day TP – (1.04 lb/day + 8.55 lb/day)
TP LA = 0.78 lb/day TP

E. coli LA = LC - (MOS + WLA)
E. coli LA = 73.9 CFU^9/day *E. coli* - (7.4 CFU^9/day + 0.0 CFU^9/day)
E. coli LA = 66.5 CFU^9/day *E.coli*

Within the structure of the Rueger Springs Creek TMDL, the LA was further divided into the following four (4) general categories: :

1. Permitted Nonpoint Source Facilities. The first general category deals with permitted nonpoint source facilities associated with the Federal Energy Regulatory Commission (FERC) permitted hydropower facilities; all land application facilities (LAFs) that may or may not require a permit from the state; and all confined feeding operations (CFOs) that may or may not require an NPDES permit from EPA for a 24-hour, 25 year storm event.

2. Agriculture and Grazing Lands. The second general category deals with all agricultural lands (inclusive of irrigated and non irrigated lands farmlands); grazing on public lands and state lands; private land ownership that includes all nonpoint source activities; and those activities that are more closely related to the Rueger Springs Creek stream corridor that are not necessarily associated with the other sub components of this second general category.

3. Stormwater Construction Activities. The third general category deals with all construction-type activities that may require a Construction General Permit from EPA (depending on the size of the land disturbing area), which may have a direct impact to Rueger Springs Creek; thus requiring erosion and sediment controls. This third category utilizes a 2% reserve from the overall nonpoint source category, which would revert back to the general nonpoint source category once the construction activity is finished. Precedence and justification for this 2% approach may be shown in Buhidar (2005). Calculations for this category are summarized as follows:

    Construction Activities = Pollutant LA x 2%

    TSS Construction Activities = TSS LA x 2%
    TSS Construction Activities = 5,297.4 lb/day x 2%
    TSS Construction Activities = 105.9 lb/day TSS

    TP Construction Activities = TP LA x 2%
    TP Construction Activities = 0.78 lb/day x 2%
    TP Construction = 0.02 lb/day TP

    E. coli Construction Activities = *E. coli* LA x 2%
    E. coli Construction Activities = 66.5 CFU^9/day x 2%
    E. coli Construction Activities = 1.3 CFU^9/day *E. coli*

   The definition of construction activities as defined under the TMDL process has to do with any land disturbing activity which has the potential to create erosion and sedimentation. It is not limited to just septic systems associated with rural subdivisions or other similar ventures which normally are not associated with such land disturbances. This identification of construction activities is a component of nonpoint sources and is a requirement under the TMDL process. In addition, the application of the 2% for stormwater construction activities is primarily for activities that that occur within the stream corridor of Rueger Springs Creek (as a 2-mile corridor measured as 1-mile buffers on both sides of the stream).

4. Natural Background (NBK). Rueger Springs Creek is a spring fed system that emanates from the Eastern Snake River Plain Aquifer. Natural background effects to water quality are so minimal that they are considered implicit to the LA and are therefore incorporated through conservative assumptions in the analysis as a minimal part of the LA. Therefore, NBK is not segregated out as a separate component to the LA.

In terms of future growth for nonpoint sources, no specific allocation was set aside for this; component, therefore the allocation is zero. However, as a general consideration, it is noted that future growth of the Rueger Springs Creek drainage that incorporates a landuse change (such as agricultural or grazing lands being converted to subdivision developments) may occur. Such changes or any similar to it will still be considered a part of the overall nonpoint source category that is associated with the LA and must demonstrate compliance with the overall water quality goals of the Rueger Springs Creek TMDL to be in compliance with the TMDL process.

VII. MARGIN OF SAFETY (MOS)

A 10% margin of safety (MOS) was used to account for any lack of knowledge or uncertainty concerning the relationship between effluent limitations and water quality. The 10% MOS is taken from the LC. Therefore, based on the TMDL formula for calculating the MOS for TSS, TP and *E. coli*:

TSS MOS = TSS LC x 10%
TSS MOS = 6,480.0 lb/day TSS LC x 10%
TSS MOS = 648.0 lb/day

TP MOS = TP LC x 10%
TP MOS = 10.37 lb/day TP LC x 10%
TP MOS = 1.04 lb/day

E. coli MOS = *E. coli* LC x 10%
E. coli MOS = 73.9 CFU^9/day *E. coli* LC x 10%
E. coli MOS = 7.4 CFU^9/day

VIII. SEASONAL VARIATION

Seasonal variation is a component of a TMDL. The application of a seasonal component into the TMDL for Rueger Springs Creek was not considered because little information existed to allow for it, therefore the seasonal variation is zero. However, it is reasonable to assume that future iterations of the Rueger Springs Creek TMDL may require seasonal considerations and are therefore deferred until such time as more information is provided to justify this.

IX. OVERALL TMDL TABLE BASED ON THE LC FOR FALL CREEK

Table 3, the overall TMDL table, summarizes Sections IV, V, VI, VII and VIII. This table is based on the water quality targets set for Rueger Springs Creek on instream water quality targets for TSS (50.0 mg/L), TP (0.080 mg/L) and *E. coli* (126 CFU/100 mL). The flow provisions are based on average flows of 24.0 cfs for Rueger Springs Creek (as described in Section IV).

Table 3. Rueger Springs Creek Overall TMDL Table

TMDL COMPONENTS	TSS, lb/day	TP, lb/day	*E. coli*, CFU^9/day
NONPOINT SOURCES			
FERC, LAFs, CFOs	0.0	0.0	0.0

Ag, Graze, Private, Corridor	5,191.5	0.76	65.2
Stormwater – Construction – 2%	105.9	0.02	1.3
NPDES PERMITTED POINT SOURCES			
IDFG American Falls FH	534.6	8.55	0.0
MARGIN OF SAFETY & LOADING CAPACITY			
Margin of Safety – 10%	648.0	1.04	7.4
Loading Capacity	6,480.0	10.37	73.9
E. coli = *Escherichia coli*. TSS = Total Suspended Solids. TP = Total Phosphorus. WLA = Wasteload Allocation for an NPDES permitted point source facility. Seasonal variation is not a component in the Fall Creek TMDL at this time. FERC = Federal Energy Regulatory Commission permitted hydropower facilities. LAFs = Land Application Facilities. CFOs = Confined Feeding Operations like dairies and feedlots of all sizes. Ag = All agricultural cropland and farmland combined. Graze = All grazing lands. Private = All privately owned lands. Corridor = All stream corridor components associated with Rueger Springs Creek. FH = Fish Hatchery. Seasonality is not a component that was considered in Table 3, as discussed in §VIII.			

Relative to TSS, the overall nonpoint source category (5,297.4 lb/day TSS) represents 81.75% of the TSS LC. The point source category (534.6 lb/day TSS) represents 8.25% of the TSS LC. The remaining 10% is attributable to the TSS MOS. These values (TSS water quality targets) are based on meeting the TSS LC for Rueger Springs Creek at a flow of 24.0 cfs. These nonpoint source targets are appropriate given a water quality concentration target of 50.0 mg/L as TSS. This same logic and approach has been used in other TMDLs in Southcentral Idaho on nonpoint source streams with support from the nonpoint source community, agricultural industry stakeholders and the associated watershed advisory group.

Relative to TP, the overall nonpoint source category (0.78 lb/day TP) represents 7.52% of the TP LC. The point source category (8.55 lb/day TP) represents 82.45% of the TP LC. The remaining 10% is attributable to the TP MOS.

Relative to *E. coli*, the overall nonpoint source category (66.5 CFU^9/day *E. coli*) represents 90.0% of the *E. coli* LC. The point source category (0.0 CFU^9/day *E. coli*) represents 0.0% of the *E. coli* LC. The remaining 10% is attributable to the *E. coli* MOS. IDEQ recognizes that general construction type activities do not of themselves generate *E. coli* as previously discussed in Section VI, item 3 (Stormwater Construction Activities). However, the ground disturbing aspects of those activities tend to promote sedimentation which provides a source of *E. coli* as a direct impairment to the receiving water body, because *E. coli* may already be entrained in the sediment. That entrainment is associated with feces from warm blooded animals, which is the source of the *E. coli*. The recognition of these latent or unseen sources of *E. coli* is recognized all over Southcentral Idaho and therefore (and as a consequence of the TMDL process) encourages the nonpoint source community to apply best management practices on all ground disturbing activities that may have water quality impairment influences on the receiving water body.

X. REASONABLE ASSURANCES

Providing reasonable assurance that point sources and nonpoint sources will meet the LC of Rueger Springs Creek is a necessary requirement of the Rueger Springs Creek TMDL to meet the beneficial uses of the Snake River. By determining the LC for Rueger Springs Creek (for TSS, TP and *E. coli*) and by allocating allowable limits within the LC is the first step towards providing reasonable assurance that the LC can be met by both the point sources and the nonpoint sources (assuming both sources meet their water quality targets). The second step is described as follows:

1. Point Sources. Point sources (fish hatcheries) will receive WLAs that are described in Table 3, which are within the LC of the Rueger Springs Creek water body. The LC is specifically set up to meet the beneficial uses of the

Snake River. Therefore, the DEQ Twin Falls Regional Office (DEQ-TFRO), in conjunction with EPA, will coordinate with the permitted facility to incorporate the WLAs through the NPDES permitting process since TP makes up 82.45% of the TP LC in the point source category (as shown in Table 3).

2. Nonpoint Sources. Nonpoint sources will receive LAs that are below and within the LC of the Rueger Springs Creek water body. The LC is specifically set up to meet the beneficial uses of the Snake River. Therefore, DEQ-TFRO in conjunction with the land management agencies will coordinate with public and private land ownerships to incorporate water quality cleanup projects specifically targeted to reducing erosion and sediment sources since TSS makes up 81.75% of the TSS LC in the nonpoint source category (as shown in Table 3). Associated with this is 90.0% of the *E. coli* that is attributable to the nonpoint source category.

In the case of Rueger Springs Creek and the third step, both the point source and nonpoint source industries will provide management strategies as part of implementation planning that support reasonable assurances in meeting the water quality standards and beneficial uses of Rueger Springs Creek and the Snake River jointly.

XI. MONITORING PLAN TO TRACK TMDL EFFECTIVENESS

The overall purpose and intent of water quality monitoring is to assess beneficial use and water quality standards attainment on Rueger Springs Creek. The monitoring plan that will be used on Rueger Springs Creek will involve four approaches. First, the NPDES permitted facility will conduct monitoring as it pertains to their NPDES permit as defined by EPA.

Second, DEQ intends to monitor (depending on available resources) Rueger Springs Creek, especially as it pertains to any water quality cleanup projects (as referenced in Section XII). Monitoring will include the flowing: (1) headwaters reach if applicable, and (2) just above the point of discharge into the Snake River. As previously noted, flow monitoring of the Rueger Springs Creek water body will be an important component in this monitoring scheme.

Third, the Beneficial Use Reconnaissance Program (BURP) will be utilized to ascertain the status of beneficial uses on Rueger Springs Creek as defined by the BURP protocols.

Fourth, other monitoring will be used that involves private landowners, public land management agencies, and the Idaho Soil Conservation Commission. Erosion assessments will be used as monitoring is further developed over the next 5 years.

XII. IMPLEMENTATION PLANNING

The Rueger Creek TMDL is a part of the Lake Walcott Implementation Plan. DEQ is presently in the process of assessing potential water quality cleanup projects on Rueger Springs Creek with the assistance of the Lake Walcott Watershed Advisory Group and the ISCC.

XIII. PUBLIC PARTICIPATION

Prior to finalization of the draft Rueger Springs Creek TMDL, DEQ visited the Rueger Springs Creek watershed and the NPDES permitted facility to gather the necessary information for establishing the TMDL. DEQ conducted a 30-day public comment period from August 17, 2006 through September 18, 2006. Comments are found in Appendix B.

XIV. REFERENCES

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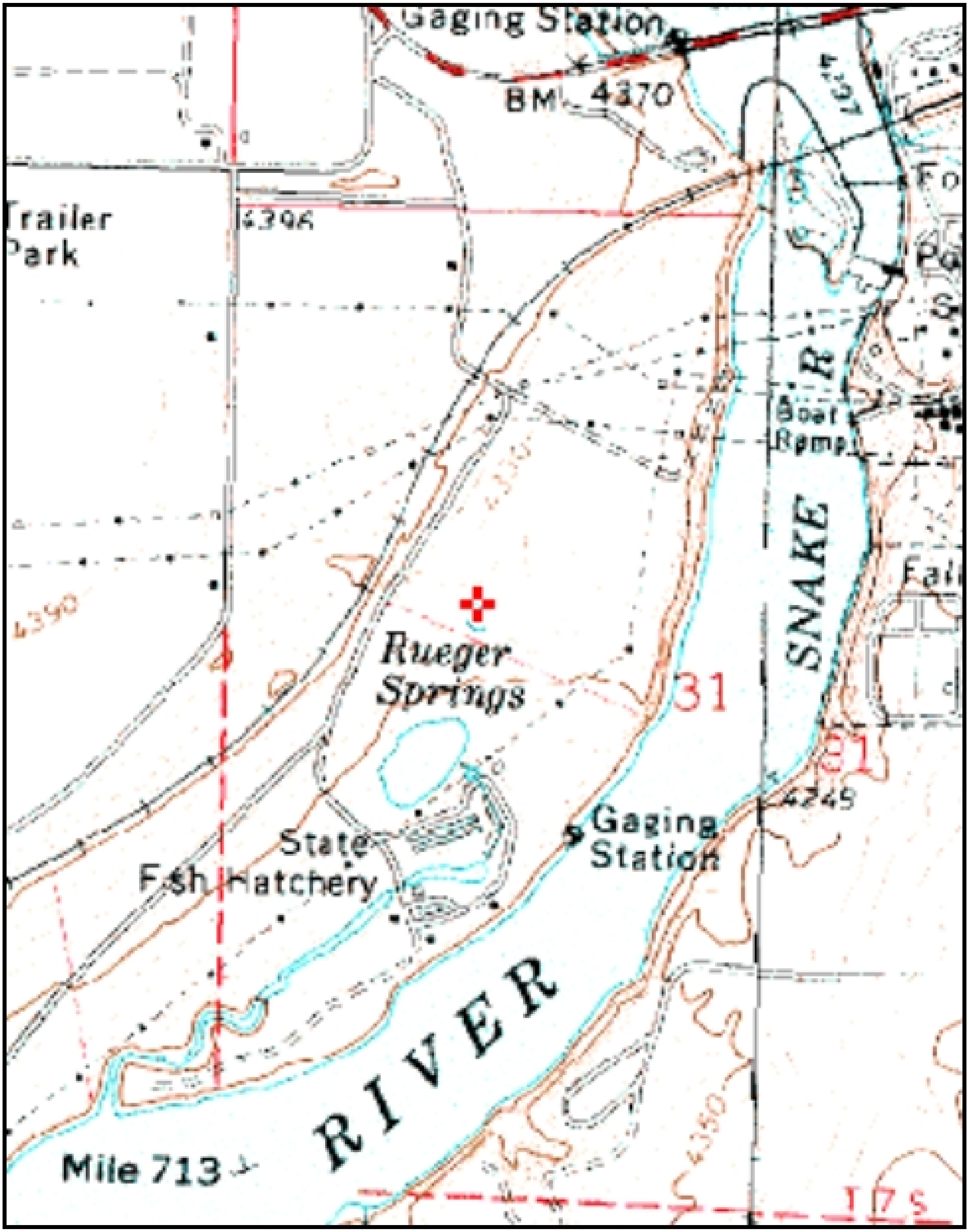
APPENDIX A. RUEGER SPRINGS CREEK AREA.



APPENDIX B. Response to Public Comment on the Rueger Springs Creek TMDL

Start of Public Comment Period: August 17, 2006
End of Public Comment Period: September 18, 2006

The only comments that were received were from the U. S. Environmental Protection Agency on September 28, 2006. These are summarized, with DEQ's responses, in Table 4.

Table 4. Response to comments on the Rueger Springs Creek TMDL

SOURCE OF COMMENT	COMMENTS AND RESPONSES
William C. Stewart U. S. EPA – Boise, Idaho	*Comment 1*. The Section of the document that describes the complex hydrology around the IDFG American Falls Fish Hatchery at Rueger Springs is somewhat difficult to follow. You may want to re-work this section.
	Response 1. DEQ concurs with EPA and has tried to simplify the description already because it is indeed a very complex hydrology. DEQ will attempt to re-work this section to make it clearer.
William C. Stewart U. S. EPA – Boise, Idaho	*Comment 2*. The logic in determining these WLAs is clear and easy to understand and is consistent with the WLAs on the rest of the Snake River aquaculture facilities.
	Response 2. DEQ appreciates EPA's review and assessment of the WLAs for the Rueger Springs Creek TMDL.
William C. Stewart U. S. EPA – Boise, Idaho	*Comment 3*. The over all nonpoint source load allocations for all three of these TMDL modification documents (Fall Creek, Jacks Creek and Rueger Springs Creek) are very small. These may be difficult to meet in the watersheds.
	DEQ Multiple Response to Comment 2
	Response 3a. The Rueger Springs Creek TMDL is not a TMDL modification of the Lake Walcott TMDL. It is an addition to the Lake Walcott TMDL and does not modify in any way the TMDL that presently exists in the Snake River. Rather, the intent is to bring the aquaculture facility associated with Rueger Springs Creek into alignment with the NPDES General Aquaculture Permit that is presently undergoing revision so that WLAs can be applied to this facility under the Lake Walcott TMDL and meet water quality provisions for the Snake River.
	Response 3b. Table 3 (page 12) of the Rueger Springs Creek TMDL shows an overall TSS loading capacity of 6,480.0 lb/day. As described in Section IX, the nonpoint source community, represented by FERC, LAFs, CFOs, agriculture, grazing, private land ownership and the Rueger Springs Creek stream corridor, account for 81.75%. The point source category, represented by the two aquaculture facilities, account for 8.25%. The remaining 10.0% is attributable to a margin of safety. The basis of these values (water quality targets) is found in the calculations in Section IV and Section VI. To meet the loading capacity for Rueger Springs Creek at a flow rate of 24.0 cfs, and based on the best available flow information at the time, these nonpoint source targets are appropriate given a water quality concentration target of 50.0 mg/L as TSS. This same logic and approach has been used in other TMDLs in Southcentral Idaho on nonpoint source streams with support from the nonpoint source community and agricultural industry stakeholders.
William C. Stewart U. S. EPA – Boise, Idaho	*Comment 3*. The load allocation for *E. coli* listed for construction activities was confusing. The explanation for excluding it could be the same one that was used for aquaculture facilities. Construction activities don't produce *E. coli* by themselves. If you are referring to septic tanks from the new construction, 1.3 CFU^9/day doesn't seem to be a workable concentration.
	DEQ Multiple Response to Comment 3
	Response 3a. The definition of construction activities as defined under the TMDL process has to do with any land disturbing with the potential to create erosion and sedimentation. It is not limited to just septic systems associated with rural subdivisions or other similar ventures which normally are not associated with such land disturbances. Also, it is associated with EPA's Construction General Permit depending on the size of the activity. As such, the application of best management practices to limit water pollution from such construction sites is paramount and falls within the guidelines and policies of the state's and federal land management agencies. This identification of construction activities is a component of nonpoint sources and is a requirement under the TMDL process.

	Response 3b. The confusion that may be apparent as described in category 3 in Section VI on page 11 has to do with using 2% of the overall nonpoint source load for any construction activity that occurs within the stream corridor of Rueger Springs Creek. It does not apply outside of that stream corridor. DEQ refers to this 2% as a “reserve” because it is reserved for such construction activities and only those construction activities. Once the activity is finalized, then the 2% is reverted back to the nonpoint source load for use in other nonpoint source areas of Rueger Springs Creek of a similar nature.
	Response 3c. The use of 1.3 CFU^9/day is appropriate for such land disturbing activities based on support from the Lake Walcott WAG. Table 26 (p 107) of the Lake Walcott TMDL refers to these activities as Suburban Nonpoint Source and includes construction. It also is in line with DEQ’s No Net Increase Policy as described in the Lake Walcott TMDL (pp 120-121). This value is not reflected in the Lake Walcott TMDL because at that time EPA did not warrant its inclusion as part of the TMDL approval process. Since then it has been incorporated into all TMDLs as a TMDL requirement.
	Response 3d. DEQ concurs that general construction type activities do not of themselves generate *E. coli*. However, the ground disturbing aspects of those activities tend to promote sedimentation which provides a source of *E. coli* as direct impairments to streams because the *E. coli* may already be entrained in the sediment associated with feces from warm blooded animals. The recognition of these latent sources is recognized all over Southcentral Idaho and therefore (and as a consequence of the TMDL process) encourages the nonpoint source community to apply best management practices on all ground disturbing activities that may have an water quality impairment influence on the receiving water body.

(END)