



EPA Region 7 TMDL Review

TMDL ID:KS-SO-15-266_8

State: KS

Document Name: SOLOMON RIVER

Basin(s): SOLOMON BASIN

HUC(s): 10260015

Water body(ies): SOLOMON RIVER

Tributary(ies): ANTELOPE CREEK, BATTLE CREEK, COAL CREEK, CRIS CREEK,
LINDSEY CREEK, MORTIMER CREEK, SAND CREEK

Pollutant(s): SUSPENDED SOLIDS

Submittal Date:7/16/2010

Approved:Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

This TMDL document was formally submitted by the Kansas Department Health and Environmental (KDHE). The United States Environmental Protection Agency (EPA) received this TMDL document by email on July 16, 2010. A revised version of the TMDL document was submitted by email attachment on March 7, 2011.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

Based on the total suspended solids (TSS) data collected at stream monitoring station (SC 266), Solomon River is impaired for designated use of Expected Aquatic Life. Water quality with regard to TSS in the Solomon River is consistently poor through all seasons except winter. Summary statistics from KDHE monitoring data indicates that in all seasons except winter the TSS median concentration at SC 266 exceeds 50 milligrams per liter (mg/L) and the over all median is also greater than 50 mg/L. The summer median concentrations are nearly 300 mg/L, which exceeds the median level 50 mg/L when a stream is unlikely to support a rich diversity of aquatic life.

The endpoint of this TMDL is to achieve the WQS by eliminating any of the impacts on aquatic life associated with excessive suspended solids as described in the narrative criteria pertaining to solids; "Suspended solids added to surface waters by artificial sources shall not interfere with the behavior, reproduction, physical habitat, or other factors related to the survival and propagation of aquatic or semi-aquatic life or terrestrial wildlife. In the application of this provision, suspended solids associated with discharges of sedimentation sludge from water treatment facilities shall be deemed noninjurious to aquatic and semi-aquatic life and terrestrial wildlife, if these discharges comply fully with the requirements of paragraphs (b)(6) and (8) and paragraph (c)(2)(D) of this regulation." (K.A.R. 28-16-28e(c)(2)(B)).

KDHE analyzed 15 years of TSS data and associated biological monitoring data. A strong threshold relationship exists at 50 mg/L median TSS, above which streams are unlikely to support a rich diversity of aquatic life. This TMDL will be established to meet the endpoint of reducing existing median concentrations of TSS on the lower reaches of Solomon River to the median TSS seen at the upstream station 50 mg/L to ensure good biological

conditions that can be fully restored on the lower reaches. The WQS is a narrative and the numeric biological indices targets are indirectly related to a numeric translation of the narrative standard.

The TMDL endpoint will be to achieve a median of 50 mg/L of TSS as suggested for fully supporting Expected Aquatic Life uses at monitoring station SC 266 to meet the narrative criterion. The LC for TSS at the 50th percentile flow exceedance is set at 12 tons/day or at the median concentration of 30 mg/L; this falls below the impairment level of 50 mg/L. The LC is expressed with a load duration curve (LDC), which uses stream discharges and a WQS target to define the LC at all percentiles of flow exceedance. The LC will result in the achievement of WQS and full restoration of the designated use in the targeted segments.

To accomplish the TMDL endpoint will be to achieve a median concentration by not exceeding 50 mg/L of TSS. An adopted approach of the best available reference site was used to determine what relationship between the discharge and TSS concentration would adequately protect aquatic life. A nearby large river, the Republican River at Clay Center was selected as the reference site. With the lowest median TSS values, a calculated regression of the monitoring data and discharge was used to determine an acceptable concentration limit for each daily discharge value. The Republican River was selected because the range of discharge values experienced is more similar to the Solomon discharge than other nearby streams.

The endpoint shall be to reduce concentration of TSS at any given discharge value to less than $\text{Log}_{10}\text{TSS} = (-0.472 + 0.679 * (\text{Log}_{10}\text{Discharge}))$, with TSS measured in mg/L and discharge measured in cubic feet per second for discharges greater than 750 cubic foot per second (cfs) and 30 mg/L for discharge value less than 750 cfs. These concentrations and loads should provide support for downstream reductions needed on the Smoky Hill River, while also protecting aquatic life within the Solomon River. This endpoint shall be to protect aquatic life from the harmful effects of suspended solids and will serve as a numeric translator of the narrative criteria. Full compliance with water quality standards shall be evaluated by the Department (KDHE) based on recovery of aquatic life diversity.

The resulting LC for TSS at the 50th percentile of flow exceedance at SC 266 is 12 tons/day. Achievement of the LC should result in WQS attainment.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

As indicated in the previous section, the endpoint of this TMDL is to achieve the WQS by eliminating any of the impacts to aquatic life associated with excessive suspended solids as described in the narrative criteria pertaining to solids. TSS can be highly variable in stream and river systems and have strong linkages to stream discharge. Kansas Administrative Regulations (KAR 28-16-28e(c)(2)(B)) specifies that "Suspended solids added to surface waters by artificial sources shall not interfere with the behavior, reproduction, physical habitat, or other factors related to the survival and propagation of aquatic or semi-aquatic life or terrestrial wildlife."

KDHE analyzed years of TSS data and associated biological monitoring data. A strong threshold relationship exists at 50 mg/L median TSS, above which streams are unlikely to support a rich diversity of aquatic life. This TMDL will be established to meet the endpoint of reducing existing median concentrations of TSS on the lower reaches of Solomon River to the median TSS seen at the upstream station (50 mg/L) to ensure good biological conditions that can be fully restored on the lower reaches. The WQS is a narrative and the numeric biological indices targets are indirectly related to a numeric translation of the narrative standard.

Solomon River main channels (Segments 1, 3, 5, 8 and 12)

- Primary Contact Recreation (Class C) on main stem segments 1, 3, 5 and 12
- Secondary Contact Recreation (Class B) on the remaining main stem segment (8) and tributaries,
- Expected Aquatic Life Support,
- Domestic Water Supply,
- Food Procurement,
- Ground Water Recharge,
- Irrigation Use,
- Industrial Water Supply and
- Livestock Watering.

Mortimer Creek (49) and Battle Creek (57)

- Secondary Contact Recreation (Class b)
- Expected Aquatic Life Support and
- Food Procurement.

Lindsey Creek (7), Sand Creek (4), Antelope Creek (58), Coal Creek (2) and Cris Creek (48)

- Secondary Contact Recreation (Class b),
- Expected Aquatic Life Support.

The concentration of TSS was selected to represent the numeric target for this TMDL because it enables the use of all available data and is included in monitoring data. The TMDL endpoint will achieve a median of 50 mg/L of TSS as suggested for fully supporting Expected Aquatic Life uses, at the monitoring station SC 266 to meet the narrative criterion. The LC for TSS at the 50th percentile flow exceedance is set at 12 tons/day or at the median concentration of 30 mg/L; this falls below the impairment level of 50 mg/L.

The use that is impaired is Expected Aquatic Life Support for all segments.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

The pollutant of concern for Solomon River is listed as TSS. In the absence of numeric standards for TSS in freshwater streams, a concentration of TSS was selected to represent the numeric target for this TMDL. Water quality with regard to TSS in the Solomon River is consistently poor through all seasons except winter. Summary statistics from KDHE monitoring data indicates that in all seasons except winter the TSS median concentration at SC 266 exceeds 50 mg/L, and the overall median is also greater than 50 mg/L. Summer median concentrations are nearly 300 mg/L.

Since there are no numeric WQS for TSS, it is necessary to determine an appropriate screening value for TSS concentrations that will protect Expected Aquatic Life Support use consistent with the applicable Kansas narrative WQS. The 2008 Kansas 303(d) List of Impaired Waters used a screening value of 50 mg/L based on an extensive analysis of data collected by KDHE biological and chemical monitoring programs. Because this value is based on data that is otherwise unpublished, they revert in this document to the previously published suggestion from "Ambient Water Quality Criteria Recommendations" EPA 822-B-01-014 (2001) that turbidity not exceed 22.13 Nephelometric Turbidity Units (NTU).

Because the WQS is narrative and specific to suspended solids, they converted the proposed limit of 22.13 NTU into TSS (mg/L) by comparison to a regression of NTU & TSS from two monitoring stations on the Solomon River downstream from Waconda Lake. The strong relationship ($R^2 = 85.5$ percent) is characterized on a log/log regression as $\text{Log}_{10}\text{TSS} = 0.549 + 0.900(\text{Log}_{10}\text{NTU})$. This results in an acceptable concentration of 57.5 mg/L TSS, which is greater than the value calculated for the downstream receiving water. Therefore, this document shall use the guidance from the Smoky Hill River TMDL to ensure that contributions from the Solomon River do not cause water quality exceedences on the Smoky Hill River. The endpoint established is 50 mg/L, is used hereafter in this document to indicate an initial acceptable objective. Conversion of this concentration to daily loads shall be accomplished by application of a concentration goal to the mean daily flow measured by the United States Geological Survey (USGS) gage stations. Evaluation of this goal shall be applied to median concentrations, as wide variation exists across the flow duration curve.

KDHE analyzed 15 years of suspended solids data and associated biological monitoring data. A strong threshold relationship exists at 50 mg/L median TSS, above which streams are unlikely to support a rich diversity of aquatic life. Species richness is strongly correlated with other measures of aquatic life use support, including the proportion of ephemeroptera, plecoptera and trichoptera species, a long-used indicator of acceptable biological condition in Kansas waters.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of

pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

There are eight National Pollutant Discharge Elimination System (NPDES) permits that exist within the contributing area. Three are small municipal wastewater treatment lagoons, one is a peaking power plant using non-contact cooling water and the remainder are expected to discharge only under storm conditions, or to municipal systems that further treat the effluent before release. These facilities are unlikely to contribute significantly to the TSS load observed in the Solomon River due to a combination of factors, including limited discharge (concrete) and small discharge volumes on the lagoon facilities. The permitted facilities are listed as follows: I-SO27-PR01 Abram Ready Mix, I-SO27-PO01 ADA Grain Elevator (GRNDWTR REM ED), M-SO06-OO02 City of Bennington, M-SO27-OO02 City of Minneapolis, I-SO27-CO02 Minneapolis Municipal Power Plant, P-SO27-OO01 C&R Plating, M-SO11-OO02 City of Delphos and I-SO44-PO02 Cloud Ceramics.

The STEPL modeled data seen at Niles suggest that the sediment supply sources in this watershed is fairly balanced between stream channel mobilization and field supply.

Land use area in this TMDL is dominated by cropland, particularly in the alluvial valley of the major rivers, and grassland in the upland areas. Timbered lands are expected to be sources of reductions in sediment and cropland is expected to result in increased sediment delivery, suggesting that croplands near the rivers are contributors to the elevated TSS concentrations. Conversion of cropland in sensitive areas, particularly areas within 300 feet of the rivers, to permanent vegetation has the potential to limit new loading from these areas with high delivery potential for newly eroded soils.

An unknown quantity of TSS is the result of resuspension of fine materials located on the river bed. No determination was possible at this time of the age or origin of the bed silt, or rate of supply and release. The records suggest that a sand/gravel bottom was the historic condition, with relatively low rates of bed silt supply. These factors suggest that absent a new supply of bed silt the existing legacy load in the channel would eventually wash out, eliminating this source of TSS. Some TSS load is expected from natural sources in rivers of all sizes. The overall background level without the impacts of bank erosion/sloughing and overland flow erosion events is likely a very small portion of the total load that occurs in this river. Stabilization of actively eroding streambanks and re-establishment of a wooded riparian corridor along the Solomon River will substantially reduce TSS loading in this area.

KDHE monitoring stations provide monitoring data on the Solomon River at Glasco, Pipe Creek and Salt Creek, which contribute water and sediment to this reach of the river. While gage data is not available for all monitoring stations, USGS estimated median and mean flow can be used to estimate loads originating from segments without gage data. To ensure consideration of both typical flows and high flows, a two pronged approach was adopted to estimate the relative sources of the TSS load observed at the outlet of the Solomon River. The largest contributor to the total load observed at SC 266 is the Solomon River between Glasco (SC 511), which is the upstream end of the reach covered by this TMDL document, and the Solomon River at Niles. The TSS concentration entering this reach of the Solomon River from the upstream portions monitored at SC 511 have substantially lower TSS median concentrations than those found at SC 266. Salt Creek (SC 512) also has elevated concentrations, but a relatively small portion of the total volume of water passing SC 266 comes from the Salt Creek watershed.

There are 44 certified, permitted or registered concentrated animal feeding operations (CAFOs) in the watershed (see appendix in the TMDL). The largest number are small beef operations (33), all but three of them with less than 1,000 head at any time. The remaining facilities include small swine operations (5), dairies (3) and a few other small operations. These facilities are likely to contribute relatively little to the sediment loads observed in the Solomon River due to existing pollution prevention and containment requirements, which include containing all runoff from a 25-year and 24-hour storm. Zero WLAs are assigned to these CAFOs because all of these facilities should have no discharges to Solomon River.

Permitted CAFOs identified in this TMDL are part of the assigned WLA. AFOs and unpermitted CAFOs are considered under the LA because there is currently not enough detailed information to know whether these facilities are required to obtain NPDES permits. This TMDL does not reflect a determination by EPA that such facility does not meet the definition of a CAFO nor that the facility does not need to obtain a permit. To the contrary, a CAFO that discharges has a duty to obtain a permit. If it is determined that any such operation is a CAFO that discharges, any future WLA assigned to the facility must not result in an exceedance of the sum of the WLAs in this TMDL as approved.

Any CAFO that does not obtain an NPDES permit must operate as a no discharge operation. Any discharge from an unpermitted CAFO is a violation of Section 301. It is EPA's position that all CAFOs should obtain an NPDES permit because it provides clarity of compliance requirements, authorization to discharge when the discharges are the result of large precipitation events (e.g., in excess of 25-year and 24-hour frequency/duration) or are from a man-made conveyance.

Sediment and suspended solids are part of the landscape in the soil profile as well as within the stream channels. There will always be extreme precipitation events that generate erosion from the land surface and transport solids into the stream channel as part of the aggregation/degradation process of fluvial geomorphology.

A number of sources of uncertainty exist that affect the ability of this TMDL document to completely characterize the sediment pollution issues affecting the Solomon River in this area. No analysis has yet been done to determine the magnitude of legacy sediment loads within the active channel. There may be more than 100 years accumulated sediment load present in the active channel. Other sources of uncertainty exist because a number of tributary streams do not have their own monitoring sites, limiting the ability to characterize their contribution to the total load observed at SC266.

In the absence of an NPDES permit, the discharges associated with sources were applied to the LA, as opposed to the WLA for purposes of this TMDL. The decision to allocate these sources to the LA does not reflect any determination by EPA as to whether these discharges are, in fact, unpermitted point source discharges within this watershed. In addition, by establishing these TMDLs with some sources treated as LAs, EPA is not determining that these discharges are exempt from NPDES permitting requirements. If sources of the allocated pollutant in this TMDL are found to be, or become, NPDES-regulated discharges, their loads must be considered as part of the calculated sum of the WLAs in this TMDL. The WLA in addition to that allocated here is not available.

All of the known TSS sources have been considered.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2 (i)]. If this is a phase II TMDL the change in LC will be documented in this section.

The LC is expressed with a LDC, which uses stream discharges and a WQS target to define the LC at all percentiles of flow exceedance. The LC for TSS at the 50th percentile flow (median flow) exceedance is 12 tons/day. The WLA is 0.15 tons/day at all flows. The LA is 11 tons/day at 50th percentile flow. The explicit MOS is 10 percent of the LC or 1.2 tons/day of TSS at median flow at monitoring station SC 266.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

There are eight NPDES permitted facilities potentially discharging to Solomon River. There are three small municipal wastewater treatment lagoons, one is a peaking power plant using non-contact cooling water. The remaining four facilities are expected to discharge only under storm conditions, or to municipal systems that further treat the effluent before release. These facilities are unlikely to contribute significantly to the TSS load observed in the Solomon River due to a combination of factors, including limited discharge (concrete) and small discharge volumes (< 1 cfs) on lagoon facilities. The WLAs for these facilities are given in the following table.

Permit Number	Facility Name	Design Flow	WLA (tons/day)
I-S027-PR01	ABRAM READYMIX	0	*
I-S027-PO01	ADA GRAIN ELEVATOR (GRNDWTR REMED)	0	*
M-S006-OO02	BENNINGTON, CITY OF	0.0877	0.03
M-S027-OO02	MINNEAPOLIS, CITY OF	0.2342	0.08

I-S027-CO02	MINNEAPOLIS MUNICIPAL POWER PLANT	0.603	0.03
P-SO27-OO01	C&R PLATING	0	*
M-SO11-OO02	DELPHOS, CITY OF	0.065	0.02
I-SO44-PO02	CLOUD CERAMICS-#-53 & #C-54, #184	0	*

*Meets compliance levels specified in permit when discharge occurs.

The WLA is meeting the compliance levels specified in the NPDES facilities when discharge occurs because the non-overflowing permitted facilities are prohibited from discharging. These facilities may contribute a nutrient load under extreme precipitation or flooding events. Such events would not occur at a frequency or duration sufficient to cause impairment in the watershed; therefore, none of these facilities were given a WLA (*) or considered in establishing the total WLA.

The Solomon River watershed covered by this TMDL has 44 certified, permitted or registered CAFOs in the watershed (see appendix in the TMDL). Because these feeding operation sites are non-discharging facilities, their WLA is assigned as zero.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

Water quality excursions are predominantly due to nonpoint source pollutants. Reduction of TSS levels to below 50 mg/L in the rivers should protect water quality and maintain the designated uses. To reduce TSS concentrations to this level will require a reduction of loading by 25 tons/day at median flow including the 10 percent MOS. The LA is defined as loads occurring across all flows. The LA for TSS at the 50 percentile flow exceedance is 11 tons/day.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

The MOS is explicit and provides some hedge against the uncertainty of daily allocated TSS loading in the Solomon River. For this TSS TMDL, the MOS will be 10 percent of the LC at SC 266, which accounts for 1.2 tons/day of TSS at median flow. At 50 percent flow exceedance, the TSS MOS at SC 266 is 1.0 ton/day.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

Seasonality and any critical flow conditions have been incorporated in the TMDL. This TMDL was developed using the LDC analysis. TSS concentration are highest in the summer months, though they begin to rise during the spring. TSS loads generally exceed acceptable levels during all seasons; the impacts of sediment on aquatic life are likely present through the year. Strategies that reduce TSS loads during their peak periods will likely also result in reductions during other seasons.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

The Solomon Basin advisory committee met to discuss this TMDL document on September 29, 2009 in Stockton, and March 4, 2010 in Beloit. An active Internet Website was established at www.kdbeks.gov/tmdl/index.htm to convey the TMDL information to the public on the general establishment of TMDLs in the Solomon Basin and this specific TMDL document. A public hearing on the Solomon Basin

was held on February 11, 2010 in Assaria, Kansas, to receive comments on this TMDL document. During the public notice period, one public comment was received by KDHE. This comment was addressed as appropriate and incorporated into the TMDL document.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Ongoing bimonthly sampling will continue at monitoring station SC 266. Future water quality monitoring will continue on the prescribed schedule at monitoring stations SC 511, SC 512, SC 667 and SC 651.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

States are not required under Section 303(d) of the CWA to develop TMDL implementation plans and EPA does not approve or disapprove them. However, KDHE included an implementation plan in this TMDL to provide information regarding how point and nonpoint sources can or should be controlled to ensure implementation efforts achieve the loading reductions identified in this TMDL. EPA recognizes that technical guidance and support are critical to determining the feasibility of and achieving the goals outlined in this TMDL. Therefore, discussion of reduction efforts relating to point and nonpoint sources can be found in the implementation section of the TMDL, and are briefly described below.

EPA believes that the point source permitting authority and nonpoint source measures discussed provides reasonable assurances that the TMDL allocations can be achieved. Kansas has identified several federal, state, local and non-government organizations that may be included in the implementation process.

KDHE has the authority to issue and enforce state operating permits. Inclusion of effluent limits into a state operating permit and requiring that effluent and instream monitoring be reported to KDHE should provide reasonable assurance that instream WQS will be met. Section 301 (b)(1)(C) requires that point source permits have effluent limits as stringent as necessary to meet WQS. However, for WLAs to serve that purpose, they must themselves be stringent enough so that (in conjunction with the water body's other loadings) they meet WQS. This generally occurs when the TMDLs combined nonpoint source LAs and point source WLAs do not exceed the WQS-based LC and there is reasonable assurance that the TMDL's allocations can be achieved.

The following authorities may be used to direct activities in the watershed to reduce pollution.

1. K.S.A. 65-171d empowers the Secretary of KDHE to prevent water pollution and to protect the beneficial uses of the waters of the state through required treatment of sewage and established water quality standards and to require permits by persons having a potential to discharge pollutants into the waters of the state.
2. K.S.A. 2-1915 empowers the State Conservation Commission to develop programs to assist the protection, conservation and management of soil and water resources in the state, including riparian areas.
3. K.S.A. 75-5657 empowers the State Conservation Commission to provide financial assistance for local project work plans developed to control nonpoint source pollution.
4. K.S.A. 82a-901, *et seq.* empowers the Kansas Water Office to develop a state water plan directing the protection and maintenance of surface water quality for the waters of the state.
5. K.S.A. 82a-951 creates the State Water Plan Fund to finance the implementation of the *Kansas Water Plan*.

The elevated TSS levels in the Solomon River TMDL are related to agricultural runoff and stream channel mobilization of channel sediment load. Stabilization of actively eroding streambanks and re-establishment of a wooded riparian corridor along the Solomon River will substantially reduce TSS loading in this area. Conversion of cropland in sensitive areas, particularly areas within 300 feet of the rivers, to permanent vegetation has the potential to limit new loading from these areas with high delivery potential for newly eroded soils.

The State Water Plan Fund annually generates \$16-18 million and is the primary funding mechanism for

implementing water quality protection and pollution reduction activities in the state through the *Kansas Water Plan*. The state water planning process, overseen by the Kansas Water Office, coordinates and directs programs and funding toward watersheds and water resources of highest priority. Typically, the state allocates at least 50 percent of the fund to programs supporting water quality protection through the Watershed Restoration and Protection Strategy program. This watershed and its TMDL is a High Priority consideration.