

TMDL FACT SHEET

SOUTH FORK RED RIVER AND SAND LICK FORK

Project Name: South Fork Red River: Chlorides/TDS/Salinity
Sand Lick Fork: Chlorides/TDS/Salinity
Stump Cave Branch: Chlorides/TDS/Salinity

Location: Powell County, Kentucky

Scope/Size: South Fork Red River: River mile 0.0 to 10.1
Sand Lick Fork: River mile 0.0 to 5.0
Stump Cave Branch: River mile 0.0 to 2.4

TMDL Issues: Point and Nonpoint Sources

Data Sources: Kentucky Dept. for Environmental Protection
Division of Water
(KDEP-DOW), SMC Martin Inc.

Control Measures: KPDES Regulations, Kentucky Non-point Source
TMDL Implementation Plan, Kentucky Watershed
Framework

Summary: The South Fork of the Red River and its major tributary, Sand Lick Fork, were determined as not supporting the designated use of aquatic life. Therefore, the streams were listed on the 303(d) list for Total Maximum Daily Load (TMDL) development. The two stream segments are impacted by chlorides (in conjunction with total dissolved solids [TDS], and salinity), the result of brine discharges to surface streams from oil production activities (stripper wells). While developing the TMDL

report, the decision was made to include a smaller tributary, Stump Cave Branch, also determined as having elevated levels of chlorides. The period of greatest impact is during low-flow conditions.

TMDL Development: Total maximum daily loads in pounds per day (lbs/day) were computed based on the allowable maximum concentration for chlorides (the standard for chronic exposure is 600 milligrams per liter [mg/l] for warm water aquatic habitat) and the estimated 7-day, 10-year low-flow value. The TMDL was done for chlorides because numerical criteria are available for chlorides but not for TDS or salinity. Because these parameters are so closely related to chlorides, the TMDL for chlorides will also account for impairments resulting from TDS and salinity.

**Summary of Total Maximum Daily Load Allocations
(in pounds per day)**

<u>Source:</u>	<u>South Fork Red River</u>	<u>Sand Lick Fork</u>	<u>Stump Cave Branch</u>
All Sources	1,030	323	128
Background	110	35	14
Waste Load Allocations (WLAs)			
Existing permits	20	0	0
New permits (no offset)	450	144	57
Maximum of (with offset)	720	230	91
Load Allocation (LAs)			
If no offset for WLAs	450	144	57
Minimum of (with offset)	180	58	23

Background loads are based on an in-stream concentration of 65 mg/l for the three streams. After background and permitted discharge loads were subtracted from the Total Maximum Daily Load from all sources, the Remaining Allowable Load (900 lbs/day for South Fork Red River, 288 lbs/day for Sand Lick Fork, and 114 lbs/day for Stump Cave Branch) for each stream will be allocated as follows:

(1) 50% of the Remaining Allowable Load will be made available for future permitted point source discharges (WLAs), 450 lbs/day for South Fork Red River, 144 lbs/day for Sand Lick Fork, and 57 lbs/day for Stump Cave Branch;

(2) 50% of the Remaining Allowable Load will be allocated for nonpoint source discharges (LAs), 450 lbs/day for South Fork Red River, 144 lbs/day for Sand Lick Fork, and 57 lbs/day for Stump Cave Branch.

In addition, if point discharge permit requests should exceed the above criteria (50% of the Remaining Allowable Load), then the KDEP-DOW will allow a permittee to remove an existing nonpoint source (such as an abandoned well, holding pond, or [holding] tank) such that the 50% value of the Remaining Allowable Load allocated for point discharges (WLAs) could be increased (referred to as an offset) based on an estimate in the reduction of the load contributed by the source(s), to the nonpoint source load to the stream (LA). However, the total amount of the Remaining Allowable Load allocated for permitted point source discharges (WLAs) shall not exceed 80% (720 lbs/day for South Fork Red River, 230 lbs/day for Sand Lick Fork,

and 91 lbs/day for Stump Cave Branch). This will allow for a potential nonpoint source (LA) contribution of 180 lbs/day for South Fork Red River, 58 lbs/day for Sand Lick Fork, and 23 lbs/day for Stump Cave Branch and constitutes an explicit margin of safety. The allocations were made in this manner because of the uncertainty of the impact of abandoned ponds and failing separator tanks.

Implementation

Controls: Discharge permits were required from oil producers starting in 1987. Many of these permits were not renewed by the producers because production has ceased or has significantly decreased. Production in Kentucky has dropped from 17,700 barrels in 1986 to 9,400 barrels in 1996. Correspondingly, production has decreased in the Sand Lick Fork and South Fork Red River basins. The drop in production is the result of a drop in crude oil prices worldwide, making production less economical, particularly for smaller producers. Chloride levels from nonpoint sources should decrease over time as dilution lowers concentration levels in existing ponds. Preliminary results of a synoptic survey of the two stream reaches made in September 1998 by KDEP-DOW personnel indicate that the levels of chloride, TDS, and salinity have decreased significantly from the 1984 synoptic survey levels. Fish were observed in all stream reaches during the 1998 synoptic survey. If oil production in the basins appreciably increases (which would most likely result from increasing oil prices or an oil supply shortage), permit compliance will be pursued and periodic monitoring of stream water quality including chloride, TDS, and salinity levels will be conducted as deemed appropriate.