

North-Central Section - 43rd Annual Meeting (2-3 April 2009)

Paper No. 10-4

Presentation Time: 2:10 PM-2:30 PM

SINKS AND RISES OF THE SOUTH BRANCH ROOT RIVER, FILLMORE CO., MN

ALEXANDER, E. Calvin Jr.¹, ALEXANDER, Scott C.², LUHMANN, Andrew J.³, ANGER, Cale T.⁴, GREEN, Jeffrey A.⁵, and PETERS, Andrew J.⁵, (1) Department of Geology and Geophysics, University of Minnesota, Minneapolis, MN 55455, alexa001@umn.edu, (2) Geology & Geophysics Department, University of Minnesota, 310 Pillsbury Dr. SE, Minneapolis, MN 55455, (3) Department of Geology and Geophysics, University of Minnesota, 310 Pillsbury Dr. SE, Minneapolis, MN 55455, (4) Geology & Geophysics Dept, University of Minnesota, 108 Pillsbury Hall, 310 Pillsbury Dr. SE, Minneapolis, MN 55455, (5) Division of Waters, Minnesota Department of Natural Resources, 2300 Silver Creek Rd. NE, Rochester, MN 55906

When the South Branch of the Root River (SBRR) reaches Mystery Cave I in Forestville Twp in Fillmore County, MN, its flow starts to sink underground at ~1225 ft elevation. At that point the SBRR is flowing on the Ordovician Dubuque Fm. in entrenched bedrock meanders. Under all but flood conditions the SBRR sinks in the next 0.25 to 2 miles of its channel. The terminal sinking point varies depending upon the river's stage. Perennial flow in the SBRR resumes at Seven Springs (MN23:A001) at ~1160 ft. Leveling surveys in Mystery Cave (Palmer and Palmer, 1995) document that most of that 65-foot head loss occurs close to the sinking points. The straight line distance between the Mystery I entrance and Seven Spring is about 1.5 miles. The distance along the SBRR channel between Mystery I and Seven Springs is about 5.5 miles. The river flows in two large entrenched meander loops that cross the Ordovician Stewartville Fm. The lower stream levels in Mystery Cave currently act as an underground meander cutoff for the SBRR.

A series of dye traces over the last 3+ decades have demonstrated that much of the water that sinks from the SBRR resurges in three major spring systems, Seven, Crayfish (MN23:A0080), and Saxifrage (MN23:A0113) Springs. These springs form the head of the perennial flow along a ~0.25 mile reach of the SBRR. The SBRR is a warm water stream above Mystery I, a coldwater stream below Seven Springs and typically dry inbetween.

Mohring (1983) found that water sinking at MN23:B0110 traced both to Seven and to Moth (MN23:A0002) and Grabau (MN23:A003) Springs. Moth and Grabau Springs are the source springs for Forestville Creek, a coldwater stream north of the SBRR in Forestville Twp. Moth and Grabau rise at ~1115 ft from the lower Ordovician Cummingsville Fm. An 18 Nov 2008 dye trace from sink MN23:B0061 found that the dye resurged in Crayfish, Seven and Saxifrage and in Moth and Grabau Springs confirming Mohring's results. Moth and Grabau are about 3.5 miles from B61.

The Sinks of the SBRR feed at least 3 identified springsheds and at least 5 major spring groups that are the source springs for 2 trout streams in 2 different watersheds. In a complex, stage-dependent fashion, Moth and Grabau are pirating flow from the SBRR into Forestville Creek.

North-Central Section - 43rd Annual Meeting (2-3 April 2009)
General Information for this Meeting

Session No. 10

Water Resources in Karst Terranes of the Midwestern U.S.

Northern Illinois University Rockford: 201

1:00 PM-5:00 PM, Thursday, 2 April 2009

Geological Society of America *Abstracts with Programs*, Vol 41, No. 4, p. 18