Minnesota River at Henderson, MN19
STATION ID: H33-032-001
USGS ID: 05326450
NWS ID: HENM5

LOCATION:
Lat: 44° 31' 46.3"N
Long: 93° 54' 02.4"W
UTMX: 428434.2
UTMY: 4931084.8
PLS: 112N 26W 1 SW SW

County: Sibley
Drainage area (acres): 408,223.15
Driving directions: From the intersection of MN State Hwy. 19 and MN State Hwy. 93 in Henderson, travel east 0.3 miles to bridge (Bridge #40001) and gage.
Cooperation: Minnesota Department of Natural Resources (MN DNR) and National Weather Service (NWS).

History: Original gage established by USGS on 8/17/98 by E. S. Wakeman, D. W. Daly, W. W. Larson and J. E. Samuelson. Bank sloughing and sedimentation required a change in the location of the station. Gage moved to the upstream side of the Hwy. 19 Bridge. Bubbler system replaced with a bridge mounted radar sensor on 11/18/03 by G. Kruse, L Bendtsen and C. Rundberg. Monitoring station on levee with high stage bubbler line installed by DNR on 11/13/2010. Upgraded Hach radar sensor installed and wired to monitoring station by MN DNR on 9/29/11. Old radar removed on 10/7/11. High stage orifice line also in place for when Radar is removed due to high flow debris concerns.

GAGE: A Design Analysis H-350XL Data logger and H-355 Gas Purge System are housed in a 2' x 1.5' x 6' Hoffman look-in type shelter. A Hach RLS is installed on US side of bridge approximately 50 ft west of wire weight, sensor is controlled by 350XL in monitoring station. High stage orifice line also installed for when Radar removed during high flow debris concerns. Instruments are powered by a 1.2 ampere solar panel run to a deep cycle marine battery through a Sunsaver power regulator. Solar panel and a rain gage are attached to side of shelter on a 10' mast. Data collected at 15-minute intervals and transmitted via Goes satellite at 1-hour intervals. Radar stage (RemStg) is transmitted as primary stage, bubbler system as secondary stage. Bubbler system flat-lined unless flood stages are reached.

Goes ID: 55304660
Primary Channel: 38
Transmit Time (GMT): 003500
Random Channel: 124
Azimuth: 231
Elevation: 24

CHANNEL AND CONTROL: Soft mud channel, brush and tree covered banks are control for all, but extreme stages where bridge steel beam at an elevation of 736.0ft is the control.

DISCHARGE MEASUREMENTS:
Low flow: Off upstream side of the bridge.
High flow: Off upstream side of the bridge. As a last resort, measurements can be made off the US Hwy 169 Bridge several miles upstream. If this is done, the Rush River should also be measured and added to the Hwy 169 discharge. Flow over road begins at approximately 733ft and can be waded up to stage of approximately 736ft.

REFERENCE MARKS:
B.M. 1 (BASE): Minnesota Department of Transportation brass tablet No. 7206G on left upstream abutment.
Elevation: 740.63ft NGVD29 (740.65 NAVD88)
R.M. 1: Threads, painted orange, of upper stream ward bolt on the right end of the downstream cement guardrail.
Elevation: 742.64ft NGVD29 (742.66 NAVD88)
R.M. 2: Wire weight located on upstream side of the bridge.
Elevation: 742.41ft NGVD29 (742.43ft NAVD88)

Primary Reference: R.M.2 (742.41ft NGVD29)

Gage datum: 700.00ft NGVD29 (700.02ft NAVD88)