SOLS WASH NEAR MATTHIE
FCD GAGE ID# 50807

STATION DESCRIPTION

LOCATION – The gage site is located northwest of downtown Wickenburg, approximately 1.2 miles west of Vulture Mine Road. The instrumentation is located on the right bank of the upstream side of the railroad bridge across Sols Wash. Latitude N 33° 59' 15.4", Longitude W 112° 47' 36.4". Located in SE1/4 SE1/4 S32 T8N R5W in the Vulture Peak 7.5-minute quadrangle.

ESTABLISHMENT – The gage was established August 4, 1995.

DRAINAGE AREA – 118.5 mi^2

GAGE – The gage is an orifice/gas purge system connected to a non-submersible pressure transducer. The orifice line is about 160 feet from the left bank. The orifice elevation is 1.10 feet gage height, levels of June 9, 2021.

There are no staff gages at this location.

There is one crest-stage gage at this location. Pin elevation is 1.69 feet gage height, levels of June 9, 2021.

ZERO GAGE HEIGHT – Zero gage height is defined as an arbitrary location based on the original orifice elevation. Zero gage height is defined as 2,230.537 feet NAVD88.

HISTORY – There is no previous gaging history at this location. Station and gaging established on August 4, 1995. A crest stage gage was installed January 19, 2000. The crest gage was raised on August 31, 2000 following an event where the bottom intake of the gage was buried. An orifice/bubbler non-submersible pressure transducer system was installed on April 25, 2001. An orifice line was installed in the current low flow, about 160 feet from the left bank. A survey of May 7, 2001 revealed that the new orifice line is at 0.48 feet gage height (old gage datum.) A request was made to lower the orifice line. A survey of January 8, 2002 indicated that the orifice line was at -0.58 feet gage height (old gage height datum.) To avoid negative elevations, the gage datum was shifted down exactly 1.00 feet and made effective as of October 1, 2001 (WY 2002). A survey of May 29, 2002 indicated that the orifice elevation in new gage height datum is 0.36 feet. A second crest-stage gage was added in July 2002. This crest-stage gage was destroyed, but replaced on July 20, 2004. The left bank crest-stage gage was again destroyed and has not been replaced. Zero gage height was updated in 2017 to reflect new NAVD88 data from a more recent survey. The orifice line was found at a higher

than previously found elevation on March 29, 2021. The move date for the orifice is unknown. The crest-gage was lowered on June 3, 2021.

REFERENCE MARKS –

RM-SOLSMTHE is an FCD brass cap located on the northeast side of the Sols Wash crossing of the railroad bridge. Elevation 2,246.297 feet NAVD88, levels by others from 2016. Northing 1088011.287 feet; Easting 434452.996 feet. Gage height elevation is 15.760 feet, levels of June 9, 2021.

RM-1 is the stake on the right bank of the upstream side of the railroad bridge. It is at elevation 8.637 feet gage height and 2,239.174 feet NAVD88, levels of June 9, 2021.

RM-2 is a bolt on the upstream side of the right side of the railroad bridge. It is at elevation 9.589 feet gage height and 2,240.126 feet NAVD88, levels of June 9, 2021.

RM-3 is the lower bolt painted white on right side of railroad bridge, elevation = 7.318 feet gage height and 2,237.855 feet NAVD88, levels of June 9, 2021.

RP-1 was renamed as RM-1.

RP-2 is the lower shoreward bolt on the crest gage bracket, painted white. It is at elevation 2.389 feet gage height, levels of June 9, 2021.

There are three monumented cross sections for discharge measurements using indirect methods. Left bank markers were added on May 7, 2001. They were surveyed with a GPS survey unit. Left bank marks are nails at ground level that are likely gone as of 2021.

X1R: Brass tablet located on the right bank, about 100 feet from the right channel bank. It is at elevation 24.74 feet (not tied to gage height.) It is approximately 460 feet from X2R with an angle of 114 degrees, 45 minutes to X2R. Cross section 1 is at an angle of 4 degrees, 20 minutes from X1R.

X2R: Brass tablet located approximately 460 feet from X1R at an angle of 294 degrees 45 minutes to X1R, or 480 feet from X3R with an angle of 94 degrees 05 minutes to X3R. It is the right bank end of the cross section with an elevation of 19.76 feet (not tied to gage height.) Cross section 2 is at an angle of 352 degrees 00 minutes from X2R.

RM: Reference marker from a previous survey located between X2R and X3R. It is stamped Cross Corp L.S. 4529. It has a white pole showing its location. It is at an elevation of 17.84 feet (not tied to gage height) from our survey and at an angle of 47 degrees 30 minutes from X2R.

X3R: Brass tablet located 480 feet from X2R with angle of 274 degrees 05 minutes to X2R. It is at elevation 14.96 feet (not tied to gage height.) Cross section 3 is at an angle of 10 degrees 30 minutes from X3R.

CHANNEL AND CONTROL – The channel at the gage cross section is natural sand and gravel with natural side slopes. The channel is relatively straight up and downstream. However, upstream of the gage, the channel does bend from the west to the north, and downstream of the gage, the channel bends to the east.

The control at the gage is the restriction of the railroad bridge. The bottom width of the channel at the bridge section is approximately 283 feet. It appeared that the flood of September 25-26, 1997 reached the low chord of the bridge near the right bank.

RATING – The current rating is Rating #5, dated October 1, 2019. It was developed from surveyed cross sections up and downstream of the railroad bridge from February 19, 2020. Survey data were used to develop an HEC-RAS model for analysis.

The previous rating is Rating 3.1. This rating incorporates the shift in datum for WY 2002.

Rating #3 is a modification of Rating #2 to include two slope area computations following the August 29, 2000 event and the October 21, 2000 event. The rating was applied beginning August 1, 2000.

The first rating was developed by Donaldson in August 1994 using an HEC-2 model from the Cella Barr and Associates Flood Delineation Study and survey data by TMD and TWL to develop an HEC-2 step backwater model. In December 1996, cross sections were established for use in indirect measurements following floods. A flood on September 25-26, 1997 occurred. A survey was conducted on September 29, 1997 to measure high water marks. A slope-area calculation was done and compared to the existing rating. The SAC findings indicated that the discharge was approximately 7500 cfs that compared well to the rated discharge of 7300 cfs. No changes were made to the existing rating.

Rating No. 2 was developed while putting together the WY 98 records when it was noticed that Rating No. 1 did not reflect the low end of the curve very well. Scour of the middle third of the channel lowered the zero flow elevation to about -1.0 feet g.h. and added conveyance below the PT. The peak discharge for a small event on Aug. 12, 1998 was estimated at 300 cfs at about 0.3 feet g.h. at the transducer. Based on this estimate the low end of Rating No. 1 was modified somewhat to create Rating No. 2 which was applied to the Water Year 1998 records.

DISCHARGE MEASUREMENTS – Wading measurements could be made in the channel downstream of the bridge. High flow measurements may be possible from the bridge with proper permission from the BNSF railroad.

POINT OF ZERO FLOW – The PZF at the gage cross section is at 0.75 feet gage height, levels of February 19, 2020.

FLOODS – A flood of about 10,800 cfs at 5.16 feet gage height occurred on October 21, 2000. A flood of 7,500 cfs at 4.5 feet gage height occurred on September 25, 1997. A flood of approximately 5,200 cfs occurred at 3.4 feet gage height on August 29, 2000.

REGULATION – There are stock tanks in the upper watershed.

DIVERSIONS – None known.

ACCURACY – Fair

JUSTIFICATION – Monitor flows in Sols Wash for warning to the town of Wickenburg and specifically Vulture Mine Road, about 1.2 miles downstream.

UPDATE - June 10, 2021
D E Gardner