NEBRASKA
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DEPT. OF NATURAL RESOURCES

Red Willow Creek near Bayard, Nebraska
06684000

LOCATION

Latitude and Longitude

41.71402 -103.2536

Road Log

Reached from Bayard, NE, Morrill County by driving south on U.S. Highway 26 about half a mile from railroad tracks at south edge of town to first east-west road. Turn east (left) 3½ miles on County Road 104, then south (right) on County Road 83 along Red Willow Creek. One-mile south-improved road turns east, continue south approximately one mile farther to gage at end of County Road 83. On left, bank 30 feet upstream from Timber Farm Bridge, 0.2 miles downstream from Wild Horse Creek, and 4.5 miles southeast of Bayard, NE.

Nearby Features

0.8 miles upstream from mouth with the North Platte River and 0.2 mile downstream from Wild Horse Creek

Equipment Details

Recording Gage

SUTRON CBS flow meter and a SATLINK DCP radio connected to stream with an open-end orifice. Instrument logs data at 15-minute intervals and transmits via satellite each hour to the downlink stations.

Real-time data through the internet at https://nednr.nebraska.gov/RealTime

External Gage

Wire weight check bar 10.10 feet elevation by levels 08/24/2018

Bench Mark and Reference Marks

Datum of gage is 3715.29 feet above mean sea level datum of 1919. Western Wyoming Supplementary adjustment of 1940 when established gage.

R.M.s #1, #3, #4 #7 and staffs destroyed.

R.M. #2 is standard bronze tablet in a concrete post on left bank 6 feet east and 48-feet south of shelter door latch.

Elevation 8.61 feet by levels dated 10/25/2022.

R.M. #5 is a spike in top of middle post piling on left downstream edge of Timber Farm Bridge

8.34 feet elevation to gage datum from levels dated 08/24/2018.

Elevation 8.33 feet by levels dated 10/25/2022.

R.M. #6 is angle iron in a concrete post 7 feet east and 40 feet north of shelter door latch or 2 feet east of power pole.

7.00 feet elevation to gage datum from levels dated 08/24/2018. (**Origin**)

Elevation 7.00 feet by levels dated 10/25/2022 (Origin).

RM#8 is an X in the angle iron on the left downstream wing wall, 18 feet west and 31 feet south of the metal gage house.

Elevation of 11.27 feet by levels 08/24/2018.

Elevation 11.27 feet by levels dated 10/25/2022.

Wire weight check bar

10.10 feet elevation to gage datum from levels dated 08/24/2018.

Changed from 10.10 feet elevation to 10.07 feet elevation for gage datum from levels dated 10/25/2022. Wire weight will be used as base gage.

Hydrology

Drainage Area

Not determined.

Channel and Control

Channel control will be in effect for low and medium stages.

Discharge Measurements

Wading measurements up to 300 cubic feet per second near a stage of 2.75 feet made in vicinity of gage. Flow will be swift and without angles. Measurements of flow above a stage of 2.75 feet made by bridgeboard from concrete bridge downstream of station.

Floods

High flow occurs as the result of a combination of rain runoff and spilling from irrigation canals. Maximum discharge of 2320 cubic feet per second occurred on July 3, 1956 [stage = 8.33 feet]. Maximum stage of 8.80 feet [present datum] occurred on May 10, 1942.

Extremes for Period of Record

Peak discharge 2,320 cubic feet per second July 3, 1956, gage height 8.33 feet, present datum; maximum gage height 8.8 feet May 10, 1942, from flood mark, present datum; minimum daily discharge 15 cubic feet per second April 23, 1935, April 26, 1962.

Point of Zero Flow

Variable. PZF -0.03 feet August 8, 2018

Winter Flow

Snow may blow into channel causing backwater conditions. Ice conditions will only occur during time of extreme wind chill index.

Regulation and Diversions

Alliance Canal diverts from this stream 1.5 mile upstream. Tri-State Canal spills into creek several miles upstream. Runoff from several irrigation projects returns to this creek via Wild Horse drain which confluences with Red Willow Creek approximately 0.2 mile upstream.

Accuracy

Record is good. High flow events monitored closely and discharge measurements made above 200 cubic feet per second . Estimated days are poor.

Establishment and History

Staff gage established January 30, 1932 by Geological Survey on right bank 10 feet below Timber Farm Access Bridge at datum 2.0 foot higher.

Stevens A-35 water-stage recorder installed in 3-foot wooden look-in shelter over a 48-inch CMP well on November 18, 1938.

Datum lowered 1.0 foot April 15, 1946.

On June 13, 1957, shelter, CMP well and instruments relocated to left bank 75 feet downstream from farm Access Bridge at same datum.

On December 20, 1976, a digital recorder [15-minute punch] installed and operated in conjunction with A-35 water-stage recorder.

On May 2, 1977 datum was lowered 1.0 foot.

On October 1, 1979, the digital recorder removed and operation of station became sole responsibility of Department of Water Resources.

On September 28, 1989, a Stevens data logger was installed and operated in conjunction with A-35 water-stage recorder. Data logger became base recording instrument.

On April 17, 1990, Stevens data logger was removed. A-35 water-stage recorder became base recording instrument.

On January 24, 1991, a Telog data logger installed and became base recording instrument. A-35 water-stage recorder continued to operate as backup instrument.

On March 11, 1994, a new 48 inch CMP shelter attached to a metal platform was installed and relocated on the left bank upstream of farm access bridge. A Sta—Com manometer with a gas purge system was installed that drives the A-35 and Telog data logger. Manometer connected to stream with open-end orifice.

On April 13, 1995, Sta-Com manometer, A-35 and Telog Data logger removed. An ISCO Model 4230 Bubbler flow meter connected to the stream with an open-end orifice installed.

Instrument referenced to water surface using an enameled staff [0.00-3.34] attached to a 2x6 timber bolted to a grader blade and driven in stream near orifice.

On August 3, 1995, a new high water staff [3.34-6.74] installed on left upstream bridge wing wall.

On October 14, 1997, a new low water staff installed on left downstream bridge post piling at same datum.

On October 22, 2009, a wire weight gage installed on new bridge. Concrete bridge installed in the fall of 2008. Wooden bridge removed along with staff gage. Wire weight used as base gage.

On August 30, 2016, the ISCO Model 4230 Bubbler flow meter and cell phone equipment removed and replaced with SUTRON CBS flow meter and a SATLINK DCP.

On September 12, 2023 Radar was installed along the upstream side of bridge.

On October 23, 2023, the Bubbler was removed and Satlink with Radar was moved to a new Stainless Steel station located approx. 5’ SW of CMP Station.

Revision History

Original Prepared 03/24/1932 by unknown

Revised 08/30/1932 by unknown

Revised 10/12/1935 by unknown

Revised 10/ 8/1938 by unknown

Revised 04/13/1953 by G.W.C.

Revised 06/03/1958 by G.G.Jamison

Revised 09/27/1971 by J.W.Vassos

Revised 03/07/1987 by J.W.Vassos

Revised 04/18/1988 by J.W.Vassos

Revised 02/25/1991 by J.W.Vassos

Revised 04/ 06/1994 by J.C.Retchless

Revised 03/14/1995 by J.W.Vassos

Revised 05/ 07/1996 by J.C.Retchless

Revised 03/24/1998 by J.W.Vassos

Revised 02/10/2000 by J.C.Retchless

Revised 01/30/2002 by J.W.Vassos

Revised 2/08/2006 by J.C.Retchless

Revised 02/08/2011 by A.S.Leisy

Revised 01/11/2017 by J.A. Marburger

Revised 12/05/2017 by J.Nichols

Revised 12/13/2017 by S. Figuric

Revised 02/27/2019 by J.A. Marburger

Revised 10/28/2022 by C. Gustafson