North Platte River near Keystone, Nebraska
06690500

LOCATION

Latitude and Longitude

41.21113 -101.6321

Road Log

Keith County, on right bank 0.25 miles downstream from diversion dam of Sutherland Reservoir supply canal and 2.5 miles southwest of Keystone, NE. To reach this site starting from Keystone travel approximately 1-mile south on County Road "Keystone/Roscoe Road". Turn right on the north side of the Sutherland Canal towards the Keystone Diversion Dam for about 2 miles. Once at the dam turn right and follow the road/trail to the gage on the North Platte River outflow from Lake Ogallala below Lake McConaughy.

Nearby Features

Regulated releases from Lake McConaughy above the station and 0.25 miles downstream from diversion dam of Sutherland Reservoir supply canal.

Equipment Details

Recording Gage

Sutron CBS flow meter and Satlink DCP radio equipment installed. SUTRON CBS flow meter connected to the river line in the bottom of the stilling well. SATLINK DCP communications are near real time data is available in one-hour transmissions. Instrument powered from 12-volt gel cell battery connected to solar panel.

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

Three intakes connect the well to stream. The lower intake is connected to a funnel-flushing device.

CNPPID continues to monitor their encoder via microwave transmission to headquarters at Gothenburg.

External Gage

Instruments are referenced to **R.P. No.1** on front edge of instrument shelf. Elevation 15.46 feet to gage datum. Outside gage is an enameled staff gage in the stream near the intakes.

Bench Mark and Reference Marks

3105.59 FT NGVD29 / 3106.975 FT NAVD88

R.M. No. 2, R.M.No.3, R.M. No.4, R.M.No.7, R.M.No.8, R.M.No.9, and the high water staff have been destroyed.

R.M. No. 1: Pipe in top of south wing wall of ogee section of NPPD diversion dam. Elevation 23.91 feet to gage datum. Has not been used for a long time. May be destroyed.

R.M. No. 5: (X) in concrete floor of shelter one foot right of R.P. No. 1 Elevation 12.16 feet to gage datum from levels dated October 19, 2012. **(Origin)**

Elevation 12.16 feet to gage datum from levels dated July 23, 2018. **(Origin)**

R.M. No. 6: Standard bronze tablet set in concrete 78 feet east of southeast corner of shelter and 19 feet south of centerline of service road. Elevation 12.00 feet to gage datum from levels dated July 23, 2018.

R.P. No. 1: Base reference gage on the instrument shelf in the gage house. Elevation 15.46 feet to gage datum from levels dated July 23, 2018.

Low Water Staff: Located by intakes. Held 6.66 ft. Found 6.66 ft. from levels dated July 23, 2018.

Hydrology

Drainage Area

29,400 square miles, of which 25,890 square miles contributes to runoff (according to 1994 USGS publication).

Channel and Control

This channel has had considerable straightening and stabilizing in past 25 years. The channel from the diversion dam one-fourth mile above the gage to a short distance below the cableway 900 feet below the gage is straight. An artificial rock control spans the entire width of the channel 50 feet below the gage. This control is made from rocks of various sizes and remains stable throughout the entire range of stage variations. An artificial rock riffle also spans the width of the channel approximately 850 feet below the gage and approximately 50 feet above the cableway. This rock riffle also remains stable throughout all range of stage variations. Streambed composed of small to medium size rock that will collect moss growth during summer months of moss growing season. Floating moss along with moss dislodging from rocks will cause some minor stage-discharge relation variations. Stream banks are high enough eliminating any bank overflow during high stages. Flow past this gage is regulated entirely at diversion structure one-fourth mile upstream.

Discharge Measurements

Low and medium stages [2.10 to 3.90 feet] can be waded below the gage in the vicinity of the cableway. **(Cableway last inspected on May 10, 2013 and deficiencies were found and deemed not to be used until repairs are complete)** *High stages are measured from cableway below the gage. Cableway cable is marked at five-foot intervals*. High water measurements made from the bridge on County Road "Keystone/Roscoe Road". Wading and cable measurements will produce good results. Measurements for stages below 2.50 feet require extra care to account for uneven bottom and mossing conditions during summer months.

Floods

Maximum discharge 20,300 cubic feet per second occurred on June 30, 1917, from reports of State Engineer. [From graph based on daily gage readings].

Extremes for Period of Record

Peak discharge 20,300 cubic feet per second June 30, 1917; no flow during many years.

Point of Zero Flow

Somewhat unstable and near a gage height of 1.16 feet February 16, 2017.

Winter Flow

Short periods of ice effect may occur during prolonged cold temperature and very low wind chill index. Winter flows will range from zero to 25 cubic feet per second.

Regulation and Diversions

Flow completely regulated by required releases from Lake McConaughy. Sutherland Supply Canal for Nebraska Public Power District diverts from McConaughy releases one-fourth mile above gage.

Accuracy

Good records may be obtained with bi-weekly measurements supplemented by additional measurements during periods of sudden change in stage for discharges above 100 cubic feet per second. Records fair to poor for discharges below 100 cubic feet per second owing to insensitivity of rock control particularly at flows below 10 cubic feet per second.

Establishment and History

Established May 1, 1917 by Nebraska State Engineer. A vertical staff gage was attached to the downstream bridge piling on the south abutment of county highway bridge three-fourths mile southwest of Keystone. Gage elevation determined by the State Engineer was 3,100 feet above mean sea level NGVD 27. Station discontinued on September 18, 1917.

After construction of diversion dam [began operation Nov. 3, 1937], station was established one mile below the diversion dam on July 1, 1939. A vertical staff gage was attached to a steel post driven in streambed near the right bank. On April 12, 1940 levels indicated staff had moved. Staff was straightened and set at 0.5-foot lower datum. The gage datum determined by Nebraska State Engineer was 3,105.02 feet NGVD 29 [from levels November 6, 1940 and January 14, 1941] above mean sea level. Record available only for irrigation season, July to September 1939, May to September 1940.

On December 29, 1940 the U. S. Geological Survey assumed operation of the station. A continuous recorder was installed in a wooden shelter over a 36-inch corrugated pipe well. A chain gage of cantilever type was attached to downstream side of shelter and served as outside gage. Datum of gage was established as 3103.94 feet above mean sea level by starting from a benchmark of the Nebraska Public Power and Irrigation District, which was based on a benchmark set by U.S.B.R. in 1935. U.S.G.S. benchmark was based on U.S.C.

and G.S. level net in that vicinity. Based on levels notes, it appears the difference in elevation represents a change in datum. Station discontinued May 17, 1941.

Fragmentary record was obtained during the interim May 1941 to March 1942. The USGS resumed operation of the station March 1, 1942 using the same gage and datum.

On July 18, 1944, due to change in channel conditions, the station was relocated to present site one-quarter mile downstream from diversion dam at different datum. Nebraska State Engineer published datum of gage as 3,106.40 feet NGVD 29 above mean sea level in 1944. However, level notes dated May 17, 1945 indicate zero datum of gage to be 3107.16 feet NGVD 29 above mean sea level.

On May 11, 1945 some additional length was added to CMP well with no change in datum.

On November 4, 1950 the gage well was lowered and datum lowered 1.00 foot.

On April 3, 1953 the datum was lowered 0.5 foot due to scouring of the channel. Levels run on April 3, 1950 indicate datum of gage now 3,105.59 feet above mean sea level.

On April 23, 1958 old shelter was dismantled and replaced with a new and larger shelter.

Recording instrument from March 1, 1942 to April 29, 1964 was Stevens A-35 water-stage recorder. On April 30, 1964 a Fisher and Porter automated digital recorder was installed and become base recording instrument. A-35 water-stage recorder continued to operate in conjunction with digital instrument.

On March 5, 1991 wooden shelter was removed and replaced with a 5 feet x 5 feet x 8 feet precut metal shelter at same site with no change in datum.

On October 1, 1982 the digital recorder was removed making the Stevens A-35 water-stage recorder the base recording gage.

On October 1, 1991 the base recording instrument became the data logger installed by Central Nebraska Public Power and Irrigation District. A-35 water-stage recorder continued to operate in conjunction with data logger.

On December 11, 1996 a Stevens GS-93 data logger was installed and became base recording instrument. A-35 water-stage recorder continues to operate in conjunction with GS-93 data logger.

Cableway last inspected on May 10, 2013 and deficiencies were found and deemed not to be used until repairs are complete.

March 2, 2016 the Leupold-Stevens GS-93 data logger, cellular phone link was removed.

March 2, 2016 Sutron CBS flow meter and Satlink DCP radio equipment was installed

Revision History

Original Description Not Available.

Revised: 05/23/1953 by C.V.B.

Revised: 01/28/1997 by J.W. Vassos

Revised: 02/05/1998 by J.W. Vassos

Revised: 10/15/2000 by J.W. Vassos

Revised: 10/30/2002 by J.W. Vassos

Revised: 10/24/2003 by J.W. Vassos

Revised: 08/01/2011 by Andrew Leisy

Revised: 04/23/2014 by S. Wright

Revised: 01/03/2017 by J. A. Marburger

Revised: 12/04/2017 by J.A. Marburger

Revised: 03/14/2019 by J.A. Marburger

Revised: 11/14/2023 by K. Schwager