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DEPT. OF NATURAL RESOURCES

Cedar River near Fullerton, Nebraska
06792000

LOCATION

Latitude and Longitude

41.39463, -98.00358

Road Log

On left bank upstream of county road bridge, 3 miles northwest of Fullerton and 7.2 mi. upstream from the confluence with the Loup River. North of Fullerton, NE 2.2 miles on Hwy 14 and 1.5 miles west on North 120th Street.

Nearby Features

Timber Creek can be a major tributary and would flow into the Cedar approximately 4.5 miles upstream of the gage and the Loup River confluence with the Cedar River is approximately 9 miles downstream of the gage.

Equipment Details

Recording Gage

A Design Analysis H-522+ data logger with integrated transmitter, a H-223 GOES satellite antenna, a GPS timer, an 8” tipping bucket rain gauge, and a H-3553 compact combo bubbler system and H-355-DES-2 Desiccating Air Dryer powered by a 12-volt battery and solar panel, installed in Corps of Engineers type steel shelter. ¼” Bubble tube is enclosed in 1 ¼” PVC tube and galvanized pipe and is connected to an open orifice fastened to the sheet pile of the old bridge abutment under the present bridge on the left bank.

External Gage

The H-522+ is referenced to water level in the stream by a type “A” wire-weight gage mounted on the downstream side of bridge near orifice. Check bar elevation, 23.02 ft., gage datum. Levels of 7-26-22.

Bench Mark and Reference Marks

R.M.’s 1-8 have been destroyed.

R.M. 9 is a chiseled X on top of NW corner of channel iron post of gage house frame. Elevation is 18.80 ft., gage datum. Levels as of 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.M. 10 is top of U.S.G.S. brass marker on NE bridge abutment. Elevation is 21.63 ft., gage datum. Use as origin on 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.M. 11 is top of County brass cap marked on NW bridge abutment. Elevation is 20.55 ft., gage datum. Levels as of 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.P. 1 is a chiseled arrow on the north side of the bridge rail 10 ft. east of the wire weight. Elevation is 24.09', gage datum. Established on 6-17-04. Levels as of 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.P. 2 is a chiseled arrow on the north side of side of the bridge rail 15 ft. east of the wire weight. Elevation is 24.09', gage datum. Established on 6-17-04. Levels as of 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.P. 3 is a chiseled arrow on the south side of the bridge rail next to the wire weight. Elevation is 24.08', gage datum. Established on 7-21-04. Levels as of 7-26-22. Datum lowered 2.00 ft. on 10-27-05.

R.M. 12 is a chiseled square on the southeast corner of bridge deck 3' north of south edge and 3' west from east end. Elevation is 21.64', gage datum. Established on 9-2-2014. Levels as of 7-26-22.

R.M. 13 is a chiseled square on the northwest corner of bridge deck 3' south of north edge and 3' east from west end. Elevation 20.87', gage datum. Established on 9-2-2014. Levels as of 7-26-22.

Datum of gage was changed to 1,637.028 ft. above mean sea level, North American Vertical Datum of 1988 on Sept. 2, 2014.

Hydrology

Drainage Area

1,220 sq. mi. approximately, of which about 480 sq. mi. contribute directly to surface runoff.

Channel and Control

Channel is straight for 200 ft. upstream and 200 ft. downstream from gage and then it curves to the right. One channel at low and medium stages; flow at gage is smooth, at slight angle to bridge; velocity moderate up to medium/high stages. Bed of stream is composed of shifting fine sand. Banks are fairly high on left and there is overflow at about 7-foot stage on the right. Right bank is clear; left bank is fringed with trees. Under bridge on left bank extending approximately 10 feet into the channel is a sheet pile abutment from the old bridge.

Discharge Measurements

Wading measurements are made in the vicinity of the gage. High-water measurements are made from the downstream side of bridge using sounding weights from 30 lb. to 100 lb. Depending on stage and velocity. Initial point (station zero) for soundings is left abutment of bridge, right abutment is 240 ft. The handrail is marked at intervals of 5 from the initial point with red paint.

Floods

Flooding seldom occurs except during spring ice break up when ice jams produce backwater or from intense rains during the summer months. Overflow of the right bank can be expected when gage height exceeds 7 feet, complete ice cover is experienced during the winter months.

Maximum discharge for period of record, 64,700 CFS Aug. 13, 1966 (gage height 14.90 ft., datum of 1966, from high point on surge), from rating curve extended above 6,600 CFS on basis of flow-over-highway embankment and contracted opening measurement of peak flow (measurement made at highway bridge 4 mi. downstream).

Second Peak discharge for period of record, 45,500 CFS on March 13, 2019 (gage height 17.34 ft., datum of 2005, from high point on surge), Based on Indirect Measurement that was ran in cooperation with the USGS on May 9, 2019, of flow-over-highway embankment and contracted opening measurement of peak flow (measurement made at highway bridge 4 mi. downstream).

Major Flood Stage: 18

Moderate Flood Stage: 17

Flood Stage: 9

Action Stage: 8

Extremes for Period of Record

Maximum discharge for period of record, 64,700 CFS Aug. 13, 1966 (gage height 14.90 ft., datum of 1966, from high point on surge), from rating curve extended above 6,600 CFS on basis of flow-over-highway embankment and contracted opening measurement of peak flow (measurement made at highway bridge 4 mi. downstream).

Minimum daily discharge 30 cubic feet per second July 18, 1974.

Point of Zero Flow

PZF is variable due to shifting sand bed, not able to define.

Winter Flow

Flow may be affected by ice November through March.

Regulation and Diversions

Natural flow affected by power developments, groundwater and surface-water withdrawals for irrigation and return flow from irrigated areas. There are diversions for irrigation for approximately 4,000 acres.

Accuracy

Open-water records should be fair to good with sufficient measurements to define shifts. Records for winter period would be poor.

Establishment and History

Established Sept 14, 1931, at site used by State Engineer's office for miscellaneous measurements and maintained till June 30, 1932.

Gage was re-established on Oct. 3, 1940, by M. S. Dodd and C. H. Carstens. Staff gage and datum were changed. The original gage was a staff gage on the downstream end of left pier.

On Nov. 5, 1942, an A-35 water-stage recorder was installed in a wooden shelter over a 24" diameter corrugated metal pipe well by C. V. Burns and D. E. Olson. This gage was connected to the downstream end of the bridge pier and referenced to the same datum as original gage.

Prior to Nov. 5, 1942, staff gage, Nov. 5, 1942 - June 23, 1947, water-stage recorder, and June 24, 1947 - April 6, 1948, staff gage. Apr. 6, 1948, the recording gage was again placed in operation. Type "A" wire-weight gage installed on March 9, 1954. All at present site and datum of 1640.40 ft. above mean sea level, which is 2.01 ft. higher than present datum.

The wooden shelter was replaced by a Lincoln standard metal-cube shelter on May 24, 1960.

On Oct. 13, 1967, digital recorder was installed and A-35 recorder was removed.

On Apr. 16, 1971, bottom of well was lowered and datum of gage was lowered 2.01 ft. to elevation 1638.39 feet above sea level, due to channel degradation.

On Aug. 27, 1980, manometer, digital, and A-35 installed in Corps of Engineers type gage house on left bank upstream from bridge.

On Mar. 5, 1987, manometer, digital, and A-35 installed in Corps of Engineers type gage house on left bank moved 400'downstream of bridge due to construction of new bridge.

On Apr. 18, 1988, gage moved back to site established on Aug. 27, 1980 on left bank upstream from bridge.

Effective Oct. 1, 1995, Nebraska State Department of Water Resources (DWR) assumed responsibility for the records of this gage. On Jan. 1, 1996, DWR began operation of this site.

On Jan 16, 1996, USGS digital recorder was removed.

On April 11, 1996, manometer was removed. A G-2 Fluid Data gage was installed.

The Nebraska Department of Water Resources name was changed to Nebraska Department of Natural Resources as of July 1, 2000.

On July 8th, 2003 a Design Analysis H-500XL data logger and a shaft encoder were installed.

On April 27, 2004 a Design Analysis waterlog series H-222 GOES transmitter and a H-223 GOES satellite antenna, were installed. Other components of this installation include a GPS timer and a standard 8" tipping bucket rain gauge. This instrumentation will provide remote real time data.

On October 27, 2005 the type “A” wire weight gage was moved to the south side of the bridge. At this time the gage datum was lowered 2.00 feet, from elevation 1638.39 to elevation 1636.39 feet above sea level, due to channel degradation.

On November 16, 2011, a Design Analysis H-3553 compact combo bubbler system & H-355-DES-2 Desiccating Air Dryer was installed to replace the safe purge, H-331 encoder, G-2 monometer, Stevens A-71 pen recorder and nitrogen tank.

On May 23, 2014, a Fluid Data System Safepurge, Design Analysis H-350 Lite and nitrogen tank were installed to replace the Design Analysis H-3553 compact combo bubbler system that was in need of repairs.

On September 2, 2014, the datum of gage was changed from elevation 1,636.39 ft. above mean sea level, National Geodetic Vertical Datum of 1929, supplementary adjustment of 1953, based on USG&GS B.M. K86 1935, elevation 1,664.304 to current elevation 1637.028 ft. above mean sea level, North American Vertical Datum of 1988.

On May 5, 2015, the H-350 Lite and nitrogen tank were again replaced with a Design Analysis H-3553 compact combo bubbler & H-355-DES-2 desiccating air dryer.

On Aug. 26, 2016, the H-500XL and H-222 transmitter was changed out to an H-522+ due to equipment malfunctions.

Revision History

ORIGINAL DESCRIPTION PREPARED: 5-19-1960 by M. Kubicek

Revised 7-03-63 by G. G. Jamison

Revised 4-16-71 by A. E. Woitalewicz

Revised 1-19-81 by M. Kubicek

Revised 9-25-89 by M. Kubicek

Revised 1-20-00 by T.L. Klanecky

Revised 4-20-01 by D.L. Studnicka

Revised 2-18-04 by T.L. Klanecky

Revised 1-14-05 by T.L. Klanecky

Revised 4-20-06 by T.L. Klanecky

Revised 10-22-08 by S.R. Kolar

Revised 6-08-12 by S.R. Kolar

Revised 9-12-13 by S.R. Kolar

Revised 5-8-14 by S.R. Kolar

Revised 9-2-14 by S.R. Kolar

Revised 8-16-16 by S.R. Kolar

Revised 10-25-18 by S.R. Kolar

Revised 8-19-19 by S.R. Kolar

Revised 8-8-22 by S.R. Kolar