

Cedar River near Spalding, Nebraska 06791500

LOCATION

Latitude and Longitude

41.71163, -98.44693

Road Log

On left bank 15 ft. downstream from bridge on county road, 0.4 mile upstream from small tributary, and from Spalding, 2.9 miles west on Highway 91, 1.0 miles north on 503rd Ave and 1.1 miles west on 820th Road to gaging station.

Nearby Features

The Ericson Dam is located approximately 20 miles upstream of the gaging station on the Cedar River with automated control gates. Clear Creek joins the Cedar River approximately 5.0 miles upstream of the gaging station and the City of Spalding has a dam and a hydro power plant approximately 5.5 miles downstream of the gaging station.

Equipment Details

Recording Gage

An OTT Sutron Model SL3-ENC-DISP-1 data logger/transmitter, a Sutron Model GEO-ANT-GPS-K3 satellite antenna, regulator, a GPS timer, and an OTT RLS radar sensor, powered by a 12-volt battery and solar panel in a 5' x 5' Corps-type steel shelter. Attached to the left downstream wing wall is a CSI gage. Top elevation is 12.00 ft. (levels as of 7-26-22). The outside reference gage is a wire-weight mounted on the downstream guardrail near the left bank.

External Gage

"Type A" wire-weight gage mounted on downstream handrail of Bridge. Check bar reading is 14.03 feet 4/19/2019 Levels.

Bench Mark and Reference Marks

R.M. #1 (basic) is a chiseled "X" in concrete on left downstream wingwall, just left of end of downstream curb. Elevation 12.00 ft., gage datum, used as basic on 7-26-22.

R.M. #2 has been abandoned.

R.M. #3 is chiseled "X" in concrete of right downstream wingwall just right of downstream curb. Elevation 11.84 ft., gage datum, as determined by levels of 7-26-22.

R.M. #4 is a chiseled "<" at rounded corner on left end of upstream concrete deck curb. Elevation 12.88 ft., gage datum, established by levels of 7-26-22.

R.M. #5 is a chiseled "X" in the NW corner gage house leg. Elevation 10.96 ft., gage datum, as determined by levels of 7-26-22.

R.M. #5 - PID#LG0037 is a chiseled "o" on the northwest corner of bridge deck 3.5' east of west end and 1.6' south of curb. Elevation 11.89 ft., gage datum, as determined by levels of 7-26-22.

R.P. 1 is chiseled "X" on downstream handrail above third handrail support from left end of bridge. Elevation 15.00 ft., gage datum, as determined by levels of 7-26-22.

CSI gage is on the left downstream wing wall. Elevation of CSI is 12.00 ft., as determined by levels of 7-26-22.

62-2 - PID#AR0834 is an aluminum cap 32' south of centerline of road and 38' SE from the SE corner of the bridge. Elevation 7.16 ft., as determined by levels of 8-6-14.

Check bar elevation is 14.03 ft., gage datum, as determined by levels of 7-26-22.

Datum of gage was changed from 1,896.24 ft. above National Geodetic Vertical Datum of 1929, as determined from USC & GS BM C-310 (BM elevation 1,912.48 ft. above NGVD of 1929, supplementary adjustment of 1953) to 1897.041 ft. above North American Vertical Datum of 1988.

Hydrology

Drainage Area

762 sq. mi., approximately, of which about 50 sq. mi. contributes directly to surface runoff.

Channel and Control

The streambed is composed of soft, shifting sand. The banks are low and covered with grass and willows. The channel is the control for all stages. In 2010, during the Ericson Dam failure, the oxbow approximately 200' downstream of the gaging station was created changing the dynamics of the rating table.

Discharge Measurements

Normal low flows (Maximum gage height of approximately 3.50 ft.) can be measured by wading in the vicinity of the gage. High flows can be measured from the bridge.

Floods

Maximum daily discharge for the period of record is 7,500 CFS on March 15, 2019 (max. inst. gage height, 8.42 ft.). Previous maximum discharge for period of record was 5250 CFS on June 14, 2010 (gage height, 8.48 ft., site and datum then in use).

Flood Categories (in feet)

Major Flood Stage: 13

Moderate Flood Stage: 11

Flood Stage: 8

Action Stage: 7

Low Stage (in feet): 0

Extremes for Period of Record

Maximum daily discharge for the period of record is 7,500 CFS on March 15, 2019, with gage height of 8.42 feet.

Maximum instantaneous gage height is 8.47 feet on June 10, 2010.

Minimum daily discharge 30 cubic feet per second January 30, 1946.

Point of Zero Flow

Variable. Changes with conditions of scour and fill.

Winter Flow

Flow may be affected by ice November through March.

Regulation and Diversions

Flow regulated by dam at Lake Ericson 20 miles above station. Power plant operation at Lake Ericson was discontinued Sept. 1, 1975, due to generator failure. In the summer of 2004 six new radial gates were installed at Lake Ericson. The radial gates continue to have operating problems during storm events, especially lightning and ice. Natural flow of stream may be affected at times by ground water withdrawals and direct pump irrigation from stream.

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

On Mar. 8, 1945, a timber shelter and well and continuous recorder were installed on the right bank 30 ft. downstream from a county highway bridge approximately 6.5 mi. upstream from current site by the U. S. Bureau of Reclamation. The Geological Survey assumed operation of the gage as of Aug. 31, 1945.

A 48-inch corrugated metal pipe well and shelter with continuous recorder were established on July 10, 1946, on the right bank 40 ft. downstream from the county highway bridge and 10 ft. downstream from prior site. This gage was operated continuously until Sept. 30, 1953, when it was discontinued.

On Oct. 16, 1957, the station was reestablished 10 ft. downstream from prior site and 20 ft. downstream from original site. This gage operated continuously until Dec. 29, 1960, when it was moved. All above gages were to the same datum.

During the period Dec. 29, 1960 to Jan. 9, 1961, the gage was moved approximately 6.5 miles downstream and installed on the left bank 15 ft. downstream from bridge on county road. This present gage is at a different datum than previous gages. Digital recorder

installed on Aug. 28, 1963. Manometer installed on Mar. 27, 1972, and use of stilling well was discontinued.

On Apr. 20, 1988, the 48-inch CMP shelter was removed and the well filled. Instrumentation was moved to a 5' x 5' Corps-type steel shelter 40' to the left. Wire-weight gage replaced staff as outside reference gage and is located on the left downstream side guardrail.

On May 9, 1995, operation of gage was discontinued by the U.S.G.S. Digital water-stage recorder, Stevens A-35 water-stage recorder, and servo-manometer with 35 ft., range were removed.

The Nebraska Department of Water Resources assumed operation of the gage on May 15, 1995, when an ISCO 4230 bubbler flow meter was installed. On May 31, 1995, the ISCO 4230 was removed, and a G2 Fluid Data gage was installed, along with a Stevens A-71 chart recorder. All above gages were to the same datum.

On Sept. 12, 1996 a CSI gage was installed on left downstream wing wall.

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

On February 6, 2003 the Stevens A-71 recorder was replaced by a Stevens A-35 recorder, equipped with an Acro quartz clock.

On October 18, 2005, a Design Analysis H-500XL Waterlog Data Logging System, a H-222 GOES Transmitter, a H-330 shaft encoder, SunSaver 6 regulator, a GPS timer, and a H-223 GOES satellite antenna were installed. This information will provide remote real time data.

On June 6, 2013, a Design Analysis H-3553 Compact Combo Bubbler System and H-355-DES-2 desiccating air dryer were installed to replace the H-330 encoder, A-35 chart recorder, G-2 monometer, Safe Purge and compressed nitrogen tank.

On September 14, 2022, a Sutron SatLink 3 and RLS radar system were installed to replace the Design Analysis equipment that was here since 2013.

Revision History

Original description prepared 11-18-46 by D. D. Lewis

Revised 09-10-58 by A.F. Pendleton

Revised 08-11-61 by K. G. Polinoski

Revised 03-30-72 by H.D. Stephens

Revised 11-16-76 by H.D. Stephens

Revised 04-22-88 by R.A. Drudik

Revised 04-26-93 by R.A. Drudik

Revised 04-20-94 by R.A. Drudik

Revised 12-21-99 by T.L. Klanecky

Revised 04-04-01 by D.L. Studnicka

Revised 02-11-04 by T.L. Klanecky

Revised 03-27-06 by T.L. Klanecky

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

Revised 02-08-11 by S.R. Kolar

Revised 09-12-13 by S.R. Kolar

Revised 01-07-16 by S.R. Kolar

Revised 12-14-16 by S.R. Kolar

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

Revised 4-19-19 by S.R. Kolar

Revised 11-8-22 by S.R. Kolar