North Loup River at Ord, Nebraska
06788500

LOCATION

Latitude and Longitude

41.6074, -98.92205

Road Log

On right bank 150 ft. downstream from bridge on State Highway 70 at Ord.

Nearby Features

Approximately 22 miles upstream, the Calamus River dumps into the North Loup River. There are 5 major seasonal diversions upstream on the two rivers: Taylor-Ord Canal, Burwell-Sumter Canal, Kent Canal, Mirdan Canal and the Calamus Fish Hatchery. Also approximately 1 mile downstream of the gage is the Ord-North Loup Canal, which acts as a control and is a seasonal diversion to the gage. There are 4 other creeks that add water to the North Loup River upstream of the gage downstream from the confluence of the Calamus River. Those are: Bean Creek, Turtle Creek, Haskel Creek and Dane Creek.

Equipment Details

Recording Gage

An OTT Sutron Model SL3-ENC-DISP-1 data logger/transmitter, a Sutron Model GEO-ANT-GPS-K3 OMNI directional satellite antenna, GPS timer, and an OTT RLS radar sensor, powered by a 12-volt battery and solar panel, in a 48-inch CMP well and shelter.

The recorder is referenced to the water by a Staff gage mounted on the right bank just downstream of the gage house and is screwed to a pressure treated 2’ X 6” which is lagged to a large piece of concrete riprap.

The Radar sensor is mounted adjacent to the Staff gage along the right bank.

External Gage

There is a R.P. (on bridge) is a chiseled ^ mark on top of downstream concrete guardrail 120.5 ft. left of right abutment (station 248.00). This will be used as a reference gage if the staff gage is damaged or destroyed. Elevation of 18.81’.

Bench Mark and Reference Marks

R.M. #1 has been abandoned.

R.M.'s 2 and 4 are buried.

R.M.’s 3, 5, 6 & 9 have been destroyed.

R.M. #7 is a chiseled in the southeast corner of a 17' x 10' concrete slab approximately 14' north of Sewage Treatment Plant, just west of gage. Established 8-1-91. Elevation 10.94 ft., levels as of 08-31-2020.

R.M. #8 is a chiseled in concrete located at the southeast corner of brick sewage treatment plant, just west of gage. RM #8 is approximately 40' south of RM #7. Established 8-1-91. Elevation 10.83 ft., levels as of 08-31-2020.

R.M. #10 is an NDOR stainless steel cap located in downstream concrete guardrail, 28.5 feet left of right end of bridge. Elevation 18.10 ft., levels as of 08-31-2020.

R.M. #11 is a chiseled in the downstream concrete guardrail, at downstream left end of concrete guardrail, Elevation 17.62 ft., levels as of 08-31-2020.

R.P. (on bridge) is a chiseled ^ mark on top of downstream concrete guardrail 120.5 ft. left of right abutment (station 248.00). Elevation 18.81 ft., re-established after construction of new bridge, levels as of 08-31-2020.

R.P. (inside) is the base gage and is a tape down attached to the front edge of the instrument shelf. Elevation is 10.28 ft., levels as of 08-31-2020.

The outside gage is two enameled staff plates attached to a 2x6 board. This board is attached to a large piece of concrete riprap just downstream of the gage house.

Elevation of top of staff plates is 6.73 ft., levels as of 08-31-2020.

DATUM OF GAGE - The elevation of the gage is 2012.967 feet, based on benchmark R.M. #5. Levels September 3, 2014 NAVD88, conversion (NAVD88 to NAVD29 -.251)

Hydrology

Drainage Area

3,960 sq. mi. approximately, of which about 770 sq. mi. contributes directly to surface runoff.

Channel and Control

The channel is quite straight for about 1,000 feet downstream from the highway bridge although it is an expanding section. The channel above the bridge is quite wide and shallow. The banks are low and are covered with vegetation and trees. The bridge and roadway continue the flow to a single section with no overflow channels. The streambed is composed of shifting fine sand. This station has a channel control which is not permanent.

Located approximately one mile downstream from the gaging station is the Hardenbrook Diversion Dam, head gate for the Ord-North Loup irrigation canal. This dam seemingly has a direct affect at the gaging station. Generally, the canal is in operation the first week in May until Mid-September. Radial gates are used to check up the river to run water into the canal. Negative shifts can be expected during operation. After the canal is off, a scour condition usually takes place, with shifts moving back to the positive. The Hardenbrook dam was removed after 2012 irrigation season and was rebuilt due to damages caused by

the 2010 flooding in the North Loup River valley. The new dam was in operation for the 2013 irrigation season.

Discharge Measurements

Wading measurements are made in the vicinity of the gage. Medium and high stages are made from the downstream side of the bridge. Slight to moderate angles can be expected at the bridge due to slight bend in the channel above it.

Floods

Maximum discharge during period of record is 13,500 CFS on March 13, 2019, (gage height 9.36 ft.), which was estimated due to ice conditions. Other maximum discharge for open water during period of record is 11,500 CFS on June 12, 2010, (gage height 6.85 ft.). Second was 10,100 CFS on June 7, 1962, (gage height 5.52 ft.). No data available on prior floods or flood stages.

Major Flood Stage: 6.5

Moderate Flood Stage: 6

Flood Stage: 5.5

Action Stage: 5

Extremes for Period of Record

Maximum discharge during period of record is 13,500 CFS on March 13, 2019, (gage height 9.36 ft.), which was estimated due to ice conditions.

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

Diversions above station for irrigation. Flow includes return water from North Loup and Twin Loups Irrigation projects. The largest diversion is located at the Calamus Reservoir upstream from Burwell beginning on April 8, 1987. Kent Diversion Dam was first used on April 12, 1995.

Accuracy

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

Cooperation

None. This gage is owned and operated by the Department of Natural Resources. Prior to May 5, 1995, it was operated by United States Geological Survey.

Classification

A hydrologic station to meet objective of defining regional stream flow characteristics.

Establishment and History

Cantilever chain gage established Nov. 25, 1936, by R. H. Armstrong and H. H. Odell of the U. S. Geological Survey. Gage was located 2 miles downstream from present location and was used until September 1938. The records were published as "near Ord" 1936 - 38. A staff gage was established April 27, 1948, at a site 0.9 mile downstream from present location at CB&Q railroad bridge approximately 300 ft. below Hardenbrook Dam which is the diversion structure for the Ord-North Loup Canal. The gage was used as a miscellaneous measurement station at this site. April 11, 1950, the staff was moved to a site 150 ft. above present location and retained its status as a miscellaneous measurement station. The recording station and staff gage 150 ft downstream at present site was established June 26, 1952, by J. O. Rostvedt of the U. S. Geological Survey. Digital recorder installed on July 30, 1965. With the start of the 1987 Water Year the outside staff gage was discontinued. The two enameled sections attached to a 2 x 6 on a concrete sewer effluent tube 150 ft. downstream were removed. On January 6, 1995 the digital water stage recorder was removed.

On May 5, 1995, operation of gage was discontinued by the U. S. Geological Survey. Nebraska Department of Water Resources assumed operation of the gage at this time.

On July 11, 1997 a staff gage was re-established approximately six feet downstream of the upper intake.

On July 1, 2000, the Department of Water Resources (under Roger Patterson) merged with the Natural Resources Commission (under Dayle Williamson) to become the Department of Natural Resources under Governor Mike Johanns.

On April 14, 2005 a Design Analysis waterlog series H-522+ data logging system with GOES transmitter, a H-330 shaft encoder, regulator, and a H-223 GOES satellite antenna, and a GPS timer were installed. This instrumentation will provide remote real time data.

Gage datum of NAVD88 was established on 9-3-2014 by DNR personnel out of the Lincoln Office.

On April 24, 2023 an OTT Sutron SatLink 3 data logger/transmitter, an OTT RLS Radar Sensor and Sutron OMNI directional antenna were installed replacing all WaterLog brand equipment and abandoned the use of the stilling well.

Revision History

Original written: 12-01-36 by H. H. Odell

Revised: 12-16-38 by R. Follansbee

Revised: 05-03-57 by D. T. Hartley

Revised: 02-18-59 by A.F. Pendleton

Revised: 07-09-71 by H. D. Stephens

Revised: 06-27-84 by R. Beard

Revised: 01-23-92 by R. B. Swanson

Revised: 06-27-94 by T. L. Klanecky

Revised: 03-27-95 by T. L. Klanecky

Revised: 03-03-04 by T. L. Klanecky

Revised: 02-02-05 by T. L. Klanecky

Revised: 02-28-06 by T. L. Klanecky

Revised: 03-19-07 by S.R. Kolar

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

Revised: 03-08-11 by S.R. Kolar

Revised: 08-13-14 by S.R. Kolar

Revised: 12-14-15 by S.R. Kolar

Revised: 12-04-17 by S.R. Kolar

Revised: 11-06-18 by S.R. Kolar

Revised: 10-21-19 by S.R. Kolar

Revised: 09-14-2020 by S.R. Kolar

Revised: 10-23-2023 by S.R. Kolar