

## Beaver Creek at Loretto, Nebraska 06793500

### LOCATION

#### *Latitude and Longitude*

41.76341, -98.08625

#### *Road Log*

Boone County, Nebraska, Hydrologic Unit 10220009, on left bank 5 feet downstream from county highway bridge. 1/4 mile west of Loretto, NE on 205<sup>th</sup> Street from Highway 14. Six miles north of Albion on Highway 14 or six miles south of Petersburg, NE on Highway 14.

#### *Nearby Features*

Low banks with wide flood plain.

### Equipment Details

#### *Recording Gage*

OTT radar gun with a Sutron SL3 and Sutron Dome Antenna provide real time data. The equipment is housed in a 5 x 5 metal shelter. Gage height is measured from an OTT radar gun located on the middle downstream side of the bridge.

#### *External Gage*

Wire weight gage on the downstream side of the bridge 33 feet west from left abutment and near the OTT radar unit. July 8, 2020; a datum change of +2.00' stage was added to the gage site. This places the wire weight check bar elevation at 18.25 feet.

#### *Bench Mark and Reference Marks*

Datum of gage is 1784.772 feet above National Geodetic Vertical Datum of 1988 (NAVD88). July 8<sup>th</sup>, 2020 a datum change of +2.00' was done for this site. The datum of the gage is now 1782.772 feet above MSL (NAVD88).

**RM # 4 and #5** have been destroyed.

**RM #1** (survey reference November 15, 1984) is filed "x" on top of the H-beam pile located 64 feet upstream from the left upstream steel abutment pier. Elevation 10.24 feet from May 12, 2022 levels. ORIGIN

**RM #2** is a filed "x" on top of the H-beam pile located 72 feet from left upstream steel abutment pier and 12 feet upstream from RM #1. Elevation 10.30 feet above gage datum from May 12, 2022 levels.

**RM #3** is a filed "x" on top of the beam pile located near the left bank 60 feet north (upstream) from fourth upstream handrail upright from right end of bridge and 91 feet

upstream along bank from upstream side of bridge. Elevation 8.20 feet above gage datum from June 27, 2019 levels; not surveyed in 2022, but with gage datum change (07/08/2020), it is now 10.20'.

**RP #1** is chiseled arrow marked R.P. on downstream bridge handrail located 33 feet stream ward from left abutment and at wire weight gage. Elevation 19.36 feet above gage datum from May 12, 2022 levels.

**WWCB** Elevation 18.25 feet above gage datum from May 12, 2022 levels & July 8<sup>th</sup>, 2020 datum correction.

**RM #6** is a chiseled box on the northeast corner of the bridge deck established by survey crew. Elevation 17.85 feet from May 12, 2022 levels.

## Hydrology

### Drainage Area

311 square miles (199,000 acres) of which about 100 square miles contributes directly to surface runoff.

### Channel and Control

The channel is shallow, about 60 feet wide at the gage, and meandering in character. The banks are low and the flow is carried by one channel at medium and low stages. The bed is composed of fine sand and will scour and fill with changes in discharge.

### Discharge Measurements

Low and medium flows may be measured by wading in the vicinity of the gage. High water measurements may be made from the bridge. Usually there are not any angles of flow.

### Floods

Chronological order of largest floods for period of record in order of flow magnitude are as follows:

| Rank    | Flood Event | Peak Stage | MSL     | Instantaneous Discharge (cfs) |
|---------|-------------|------------|---------|-------------------------------|
| 1       | 03/18/87    | 11.88'     | 1797.83 | 5600                          |
| 2       | 3/14/19     | 11.03'     | 1797.80 | 4860                          |
| 3       | 06/02/50    | 11.74'     | 1797.69 | 4570                          |
| 4       | 05/30/08    | 10.73'     | 1796.22 | 2570                          |
| 5       | 07/05/00    | 9.45'      | 1795.44 | 2540                          |
| 6       | 06/14/11    | 9.30'      | 1794.79 | 2690                          |
| 7 (Tie) | 07/05/82    | 9.56'      | 1795.51 | 2300                          |
| 7(Tie)  | 06/18/98    | 10.59'     | 1796.54 | 2300                          |
| 8       | 04/26/85    | 8.88'      | 1794.83 | 2070                          |
| 9       | 05/30/82    | 9.34'      | 1795.29 | 2058                          |
| 10      | 05/16/91    | 9.54'      | 1795.49 | 1610                          |

### *Flood Stage*

As of 2022, the National Weather Service defines the following for this site:

|                      |          |
|----------------------|----------|
| Action Stage         | = 9.00'  |
| Flood Stage          | = 11.00' |
| Moderate Flood Stage | = 13.50' |
| Major Flood Stage    | = 16.00' |

### *Extremes for Period of Record*

Peak discharge 5,600 cubic feet per second March 18, 1987, gage height 11.88 feet;  
minimum daily discharge 12.0 cubic feet per second July 8, 1980.

### *Point of Zero Flow*

Variable due to shifting sand bed. The PZF was measured at +0.53' for Water Year 2022. The PZF was measured at +0.58' for Water Year 2023.

### *Winter Flow*

Partial to complete ice cover during winter period. Ice jamming is possible but usually limited in severity and duration.

### *Regulation and Diversions*

There are a number of irrigation pumps which divert flow in the summer above and below the gage.

### *Accuracy*

Good records are obtainable during open water. Winter records will generally be poor.

## **Establishment and History**

October 12, 1944 to May 16, 1945: staff gage on left upstream side of county bridge, 25 feet upstream from present gage at same datum, installed by U.S. Bureau of Reclamation. Operation assumed by USGS on September 5, 1945. Changes since are as follows:

May 17, 1945 to August 16, 1945: A-35 recorder in wooden well and installed by the U.S. Bureau of Reclamation. Operation assumed by USGS (September 5, 1945).

August 17, 1946 to September 30, 1954: A-35 recorded in 48" CMP well and shelter on left bank 5 feet downstream from present gage at same datum.

September 30, 1954 to October 11, 1979: Station was discontinued.

October 12, 1979: Station reactivated cooperatively by the Nebraska Department of Natural Resources and the USGS.

October 1, 1980: Operation assumed solely by Nebraska Department of Natural Resources.

January 30, 1990: Digital water stage recorder (30-minute punch) was removed.

January 22, 1997: DNR reinstalled a wire weight on downstream side of handrail. Check bar set to 16.24 feet above gage datum from levels of April 1, 1997.

June 12, 1997: A servo-manometer and gas purge system was removed.

June 13, 1997: G2-25 manometer and Safe Purge system installed replacing the obsolete servo-manometer.

August 20, 2002: A waterlog H-500 XL was installed with a modem chain driven from the G2-25 Manometer.

April 11, 2005: A DCP Satellite installed for real time data retrieval. Available at :  
<https://nednr.nebraska.gov/RealTime>

May 8, 2008: Handar Encoder removed and replaced with new Waterlog H-330 Encoder SN2287.

August 4, 2010: Waterlog H-330 encoder SN2287 was removed and replaced with an OTT CBS pump setup/bubble sensor at orifice.

July 8, 2020: Datum lowered by 2.00 feet, no levels at this time, check bar reading was changed from 16.23 to 18.25 feet. The gage datum is now at elevation 1782.772 feet MSL (NAVD88).

August 24, 2021: OTT CBS pump setup/bubble sensor removed, and an OTT radar gun was installed.

September 16, 2021: Old Satellite antenna and Waterlog encoder unhooked; Sutron SL3 and Sutron Dome Antenna installed.

### Cooperation

The station is presently owned and operated solely by the State of Nebraska Department of Natural Resources.

### Revision History

Original prepared by C.V. Burns 11/25/1946

Revised by Mark Nelson 06/05/1980

Revised by K.H. Calver 02/28/1981

Revised by Ken Meikle 02/05/1988

Revised by Wm. H. Birkel 02/19/1989

Revised by Wm. H. Birkel 02/23/1989

Revised by Wm. H. Birkel 06/23/1990

Revised by K M Meikle 02/15/1991

Revised by Wm. H. Birkel 02/18/1992

Revised by Wm. H. Birkel 02/24/1994

Revised by Wm. H. Birkel 10/03/1996  
Revised by Wm. H. Birkel 05/15/1997  
Revised by Wm. H. Birkel 06/02/1998  
Revised by Wm. H. Birkel 03/19/1999  
Revised by Wm. H. Birkel 03/01/2000  
Revised by Wm. H. Birkel 03/01/2001  
Revised by Wm. H. Birkel 03/15/2002  
Revised by Wm. H. Birkel 03/25/2003  
Revised by Wm. H. Birkel 04/08/2004  
Revised by Wm. H. Birkel 06/10/2005  
Revised by Wm. H. Birkel 08/03/2007  
Revised by Wm. H. Birkel 07/11/2008  
Revised by Wm. H. Birkel 03/24/2009  
Revised by Wm. H. Birkel 07/26/2010  
Revised by K M. Meikle 03/30/2011  
Revised by Wm. H. Birkel 10/18/2011  
Revised by Wm. H. Birkel 06/29/2012  
Revised by Wm. H. Birkel 04/23/2013  
Revised by Wm. H. Birkel 02//23/2015  
Revised by Wm. H. Birkel 08/07/2015  
Revised by Wm. H. Birkel 04/15/2016  
Revised by M. Wieseler 01/10/2017  
Revised by M. Wieseler 10/26/2017  
Revised by G. Beckman 11/26/2018  
Revised by A. Houser 10/2/2019  
Revised by J.A. Marburger 07/08/2020  
Revised by A. Houser 11/09/2022  
Revised by A. Houser 10/03/2023