

## Elm Creek at Amboy, Nebraska 06852000

### LOCATION

#### *Latitude and Longitude*

40.08898, -98.4347

#### *Road Log*

On left bank at downstream side of bridge on State Highway 136, at east edge of Amboy, 200 feet east of Burlington Northern Railroad track, 2.5 miles upstream from mouth, 4.5 miles east of Red Cloud, and 5.5 miles west of Guide Rock.

#### *Nearby Features*

Immediately downstream is a fence that will collect trash when high flows are present until the fence wire breaks. This will affect the backwater at this site on how it is prorated.

### Equipment Details

#### *Recording Gage*

Gage instrumentation is a Sutron Constant Flow Bubbler (CFB) connected to a Sutron SatLink recorder/transmitter.

The CFB is connected to the stream by a single bubble line, with the orifice in a muffler near the left bank

#### *External Gage*

**Wire weight** check bar elevation is 26.29 feet by levels July 23, 2019.

#### *Bench Mark and Reference Marks*

Datum of gage is 1,659.563 feet, National Geodetic Vertical Datum (NGVD) of 1988.

**RM #8, RM #9, RM #10, RP #3, and RP #4** have been destroyed.

**RM #7** is a chiseled "X" on top of right downstream wing wall. Elevation 24.93 feet, July 23, 2019 (Origin).

**RM #11** is a chiseled "X" on top of the southeast, concrete guard rail. Elevation 27.05 feet, July 23, 2019.

**RM #12** is a chiseled "X" on top of the northeast, concrete guard rail. Elevation 27.10 feet, July 23, 2019.

**RP #5** is a chiseled arrow (↓) on the downstream camber of the downstream guard rail approximately 1 foot east of wire weight location. Elevation 27.08 feet, October 3, 2016

**RP #6** is a chiseled arrow (↓) on the downstream camber of the downstream concrete guard

rail at approximately station 45. Elevation 27.03 feet, July 23, 2019.

## Hydrology

### *Drainage Area*

39.2 miles by USGS in 1959.

### *Channel and Control*

The channel is shallow and winding with wooded banks. The streambed is composed mostly of fine shifting sand. The channel bends sharply to the left as it approaches the bridge and straightens for a short distance below the gage.

### *Discharge Measurements*

Measurements of low and medium stages are made by wading in the vicinity of the gage and at high stages from highway bridge.

### *Floods*

Bank full stage is about 15 feet.

#### **National Weather Service FLOOD ELEVATIONS: as of September 27, 2011**

15 ft. Forecast Action Stage

17 ft. FLOOD STAGE

17 ft. Lowland and agricultural flooding occurs.

22 ft. Moderate Flood Stage

22 ft. Water reaches the bottom of the Highway 136 bridge. Lowland and agricultural flooding occurs.

25 ft. Major Flood Stage

25 ft. Water covers Highway 136 and considerable agricultural and lowland flooding occurs.

### *Extremes for Period of Record*

Peak discharge 9,540 cubic feet per second July 4, 2000 at gage height 17.10 feet; minimum daily discharge 6.2 cubic feet per second August 28, 1990.

### *Point of Zero Flow*

Variable; 6.66 gage height, August 1, 2017.

### *Winter Flow*

Seldom affected by formation of ice, and then usually for only short periods.

### *Regulation and Diversions*

None

### Accuracy

Stage discharge relationship will vary from year-to-year. The stage record is usually good and measuring conditions are fair.

### Establishment and History

Established September 10, 1946, by the U.S. Bureau of Reclamation; discontinued January 4, 1954. Reestablished as a partial record site by U.S. Geological Survey (USGS) from September 6, 1961 through September 30, 1977. The gage was changed to a continuous record gage and cooperatively operated by the USGS and the Nebraska Department of Natural Resources (DNR) from October 1, 1977 through September 30, 1993. From October 1, 1993, the gage has been operated by DNR.

Original gage was a vertical staff gage consisting of an enameled gage plate (0-3.34 feet) fastened to a steel fence post driven in streambed near right bank under upstream side of bridge. The operation of gage was taken over by the USGS on April 1, 1948. A wire-weight gage was installed February 10, 1949, on steel guardrail on left upstream wing wall. The check bar read 12.33 feet. The wire-weight gage was moved to the upstream guardrail of highway bridge at station 84.5 on May 11, 1949. Check bar read 12.86 feet. The gage was read twice daily by Percy D. Rasser. The wire-weight gage was removed and observer retired July 31, 1952. All gages prior to July 17, 1952, were at 1,666.33 feet NGVD of 1929.

A Stevens A-35 recorder in Lincoln Standard 48-inch corrugated iron pipe well and shelter was installed on right bank on low-water channel, 8 feet downstream from center pier of bridge on July 17, 1952. The stilling well was connected to stream by two 3-inch intake pipes. The inside gage consisted of graduated weighted steel tape and adjustable reference point attached to front of instrument shelf. Length of tape from zero point to bottom of weight and elevation of reference point was 15.38 feet. There were two outside staff gages. The station was discontinued on January 4, 1954. The datum of gage was lowered 1.00 foot on July 17, 1952 to 1,665.33 feet, NGVD of 1929.

A new highway bridge was constructed between 1954 and 1957. On September 6, 1961, the station was reestablished as a partial record site. A 1950 College Park-type crest stage gage (1 1/4-inch pipe) was fastened to the downstream side of bridge pier on the right bank. There was an aluminum indicator 14.0 feet long with bottom of indicator at 9.43 feet and top of indicator at 23.43 feet. The top of the rod is 3.49 feet below the top of the pipe; top of pipe 26.86. The datum of the gage was 6.26 feet lower than that of July 17, 1952, or 1,659.07 feet.

The station was discontinued as a partial record site on September 30, 1977.

The USGS operated the station from September 30, 1977 to September 30, 1993 in the co-op stream gaging program.

The Department of Natural Resources assumed operation of the gage and published record for this site on October 1, 1993. An ISCO Model 4230 water stage bubble system was installed on April 25, 1995. This system has a strip chart recorder which was programmed to start plotting above 8.5 feet of stage. Electronic data storage of data was dumped into a lap top computer or can be accessed by phone modem at (402) 746-2811 by the use of the ISCO

Flow Link software. This equipment was purchased by DEQ and the gage was operated by DNR after the station was dropped from the Co-op Agreement with the USGS. Water temperature was also recorded after July 18, 1995. The ISCO was connected to the stream by a single bubble line, with the orifice in a muffler near the left bank.

September 2002 the gage instrumentation was updated to a Fluid Data G-2 with a Sutron DCP from the USBR. The phone equipment and water temperature was removed.

May 12, 2003 the G-2 unit was removed and an AccuBar pressure transducer was installed.

June 13, 2013 the Sutron DCP and pressure transducer was removed and replaced with the Sutron CFB.

On April 22, 2015 the wire weight and crest stage gage were removed for bridge construction. At this time an enameled staff gage was installed downstream on the east side of a square concrete structure.

October 3, 2016 a new wire weight was installed on the downstream bridge guard rail.

October 4 – 6, 2016 the 4' x 4' corps type shelter was removed and replaced with a 24" x 30" x 72" stainless steel, gun cabinet style gage house.

## Revision History

Original Prepared by A. E. Hulme, 05-12-1949

Revised by A. F. Henry, 08-01-1952

Revised by C. R. Liggett, 09-27-1961

Revised by S. Druse, 03-31-1965

Revised by J. A. Marburger, 10-03-1989

Revised by J. A. Marburger, 07-31-1995

Revised by J. A. Marburger, 02-23-1996

Revised by J. A. Marburger, 12-11-1998

Revised by J. A. Marburger, 01-10-2000

Revised by J. A. Marburger, 08-10-2001

Revised by J. A. Marburger, 12-03-2003

Revised by J. A. Marburger, 06-07-2005

Revised by J. A. Marburger, 01-15-2009

Revised by J. A. Marburger, 04-09-2012

Revised by D. Gunderson, 04-08-2015

Revised by D. Gunderson, 02-04-2016

Revised by D. Gunderson, 12-04-2017

Revised by D. Gunderson 8-16-2019