Big Blue River at Surprise, Nebraska
0679900

LOCATION

Latitude and Longitude

41.10207, -97.31079

Road Log

On left bank 50 feet downstream from the bridge on county road at south edge of Surprise, Nebraska.

Nearby Features

The control is a broad-crested weir located about 800 feet downstream from the gage.

Equipment Details

A Sutron SatLink3 Logger/Transmitter connected to a Sutron Constant Flow Bubbler which transmits data each hour. The equipment is housed in a 30” X 42” stainless steel gage house.

Recording Gage

Sutron SatLink3 Logger/Transmitter

External Gage

A wire-weight gage is attached to the low guardrail on the downstream side of the bridge deck. The check-bar elevation is 13.92 feet, gage datum. Levels 03/25/2021.

Bench Mark and Reference Marks

RM's 1 and 2 destroyed.

RM 3 is the top of the curb on the streamward side of the steps of the community hall, 250 feet left of the left end of the bridge at the gage. The elevation is 14.63 feet, gage datum. Levels 03/25/2021.

RM 4 is a chiseled "X" on top of an "I" beam near the left end of the left downstream wing wall of the bridge. The elevation is 9.12 feet, gage datum. Levels 03/25/2021.

RM 5 is a chiseled "X" on the top of a bridge railing support, two feet left of the wire-weight gage. The elevation is 15.03 feet, gage datum. Levels 03/25/2021.

RM 6 is a chiseled "X" on the top of the streamward "I" beam on the right upstream wing wall. The elevation is 9.76 feet, gage datum. Levels 03/25/2021.

RM 7 is the northwest corner of the gage house slab. The elevation is 11.04 feet, gage datum. Levels 03/25/2021. This slab RM7 is moving.

BM1 NEW PID#LG0001. Aluminum Cap north and east of bridge and east from power pole with street light. The elevation is 10.67 feet by Levels 03/25/2021.

BM2 NEW PID#LG0005. Aluminum cap located south and eat from bridge and west from a power pole. The elevation is 11.80 feet by Levels 03/25/2021. Used as origin for levels.

Altitude and datum of gage is 1,523.503 NAVD88 by survey 03/25/2014.

Hydrology

Drainage Area

The drainage area is 345 square miles.

Channel and Control

The channel of the Big Blue River is cut into loess soil and is about 15 feet deep at the point where it enters the reservoir above the gage. The gage monitors the head on the small reservoir in the city park. The control is a broad-crested weir located about 800 feet downstream from the gage. The weir is 62 feet in length and 3.2 feet wide at the crest. A rectangular low-water slot, which is .5 foot deep and 12 feet long, is located near the center of the weir. Measurements made to date indicate this notch is quite insensitive due to accumulation of leaves, moss and debris.

A gated 2.5 feet diameter pipe is located in the base of the weir to drain the reservoir but is seldom opened. There is generally around 0.1 cubic feet per second leakage through this pipe. The low-water slot is effective from 0.3 cubic feet per second to 11 cubic feet per second. The weir is effective to around 600 cubic feet per econds when it becomes submerged.

Discharge Measurements

Low flow measurements can be made by wading on the low water slot and in extreme low flow by volumetric measurement. Medium flows can be measured from the bridge at the gage. High flows will have to be made from a bridge 1.25 miles downstream. Extreme high flows will probably have to be measured by indirect methods. Bankfull stage is approximately 5.0 feet, gage datum.

Floods

Big Blue River at Surprise, NE NWS Flood Warning Elevations.

NEW ACTION STAGE: 6.0 FT

FLOOD STAGE: 7.0 FT

NEW MODERATE STAGE: 10.0 FT

NEW MAJOR STAGE: 12.0 FT

FLOODING CONDITIONS ARE MORE SEVERE THAN ADVERTISED BY THE EXISTING

MODERATE AND MAJOR STAGES. AT 10 FEET A BRIDGE ON THE SOUTH SIDE OF

TOWN BEGINS TO CREATE BACKWATER EFFECTS AND CLOSE OFF A MAIN ROAD THROUGH SURPRISE. AT 12 FEET THERE WILL LIKELY BE HOMES FLOODED IN TOWN. MINOR FLOOD STAGE IS NOT CHANGING AND REMAINS REPRESENTATIVE FOR WHEN MINOR FLOODING BEGINS. Data revised by NWS on December 29, 2014.

Extremes for Period of Record

Maximum discharge 10,700 cfs July 19, 1965, gage height, 11.52 feet; No flow for many days in most years.

Point of Zero Flow

Gage height of 1.25 feet depending on moss growth and debris on control.

Winter Flow

Reservoir at gage will have complete ice cover. The notch is usually free of ice.

Regulation and Diversions

Capacity of reservoir is too small to create any appreciable regulation. There are diversions for irrigation at times above the station.

Accuracy

Records should be good above 5 cfs, fair below due to the lack of sensitivity of the weir and accumulation of moss, debris and leaves that collect on the broad crest. Estimated record is poor.

Establishment and History

Established April 1, 1964 by J. A. Anderson and E. K. Steele of the U.S. Geological Survey, Lincoln, Nebraska. Water-stage recorders were housed in a 48” CMP shelter with a Stevens A-35 strip chart recorder and a digital punch tape recorder activated by a servo manometer.

On September 30, 1994 the gage operation with the CO-OP Program between the USGS and the State of NE. Department of Water Resources was discontinued. The USGS equipment was removed on October 26, 1994 and DWR equipment was installed and total operation of the station was continued by the DWR.

On May 5, 2005 the ISCO Model 4230 electronic bubbler system was removed and new Waterlog H350 XL self-contained bubbler system with a transducer and Data Collection Platform gage equipment was installed.

On April 17, 2006 a tipping rain bucket gage was added to the system.

On August 15, 2018 muffler was removed and stainless steel open ended orifice was installed.

On September 15, 2021 installation of Sutron SatLink3 Logger/Transmitter was completed.

Revision History

Prepared by: E. K. Steele, 3-20-67

Revised by G. B. Engel, 7-19-76

Revised by S. H. Hull, 5-2-90

Revised by J. A. Marburger, 4-9-96

Revised by J. A. Marburger, .7-8-98

Revised by J. A. Marburger,12-29-98

Revised by J. A. Marburger, 7-09-01

Revised by J. A. Marburger, 6-30-04

Revised by J. A. Marburger, 6-17-05

Revised by J. A. Marburger, 11-06-06

Revised by J. A. Marburger, 06-27-07

Revised by J. A. Marburger, 09-20-11

Revised by J. A. Marburger, 08-31-15

Revised by J. J. Vifquain, 11-21-2017

Revised by J. D. Hladik, 11-1-2018

Revised by J. D. Hladik, 06-24-2021

Revised by J.D. Hladik, 09-29-2021

Revised by S. Figuric, 06-01-2022