

Willow Creek Reservoir near Pierce, Nebraska 00410300

LOCATION

Latitude and Longitude

42.18028, -97.555

Road Log

Pierce county, 2 miles SW of Pierce, Nebraska below Willow Creek Reservoir. From Pierce on 549 Ave 2-miles south, one-mile west on 851 Road, and about one-mile north on 548 Ave to reach the Willow Creek Reservoir Dam.

Nearby Features

Willow Creek Reservoir and dam.

Equipment Details

Recording Gage

A Sutron SL3 attached to a Dome antenna and a Sutron Constant Flow Bubbler is installed in a 5 feet x 7 feet x 8 feet metal corps type shelter set on a channel iron frame on upstream face near principal spillway on Willow Creek Dam. Real-time data can be accessed through the internet at <https://nednr.nebraska.gov/RealTime>

External Gage

Staff gage composed of enameled gage plates that were fastened to the downstream side (east side) of the concrete drop inlet on January 10, 1984. When reservoir elevations fall below the staff gage, reservoir stage may be determined from a tape down using an RP #2 (Elevation 1630.65) or 30.07 feet gage height on the grate above the pool in the drop inlet.

Benchmark and Reference Marks

Gage Datum (NAVD88) is 1,600.581 feet April 10, 2014.

The following list includes all reference marks for the Reservoir Gage

RP #2 chiseled arrow on grate above pool on top of riser. Survey from September 8th, 2022 has RP# 2 at 30.08 feet gage height.

RP #5 is chiseled "X" on top of the riser near the center of the gage opening as you step onto the top of riser. Levels September 8th, 2022 at 30.17 feet gage height.

RP #6 is the top of the bolt on the inside of fence in the SE corner of the riser. Levels September 8th, 2022 at 30.30 feet gage height.

RP #7 is the top of bolt on the inside of fence in the SW corner of the riser. Levels September 8th, 2022 at 30.36 feet gage height.

RP #8 is top of bolt on the inside on fence in SW corner of the drawdown. Levels September 8th, 2022 at 30.39 feet gage height.

RP #9 is top of bolt in the NW corner of the inside fence of the drawdown. Levels September 8th, 2022 at 30.36 feet gage height.

RP #10 is top of bolt on the inside fence in the SW corner of the riser. Levels September 8th, 2022 at 30.31 feet gage height.

RP #11 is top of bolt on the inside of fence in the NE corner of the riser. Levels September 8th, 2022 at 30.24 feet gage height.

RP #12 is the top of fiberglass 1" rod which serves as a temporary orifice. Stage elevation is at 22.95' per levels on September 8th, 2022.

Hydrology

Drainage Area

210 square miles (134,400 acres).

Channel and Control

According to DNR levels of March 8, 2010, it appears the elevation of the crest of the riser has settled -.03 since 1995. Survey shows riser crest elevation is now 1625.30. Reservoir elevation above 1637.80' elevation is controlled by emergency spillway. Reservoir elevation between 1602 and 1625.30 are controlled by the drawdown.

Extremes for Period of Record

Maximum storage 2019 Water Year March 16, 2019 Reservoir stage 35.99' with 18,041-acre feet storage.

Minimum storage 1991 Calendar Year October 23 – 27 Reservoir stage 15.31 feet with 1,900-acre feet storage.

Accuracy

Records are good except for periods of estimation record, which are poor.

Upstream Diversions:

There are three stream diversions above the reservoir and extensive well irrigation in the vicinity that affect storage in reservoir.

Seasonal Conditions and Patterns:

Reservoir subject to complete ice cover. Increased reservoir elevations usually occur in spring from snow melt, heavy rains and groundwater release after frost goes out. Lower reservoir elevations usually in August and September due to evaporation, seepage, depletions from groundwater withdrawals and relief wells.

Permanent Pool Stage Elevation was considered stage 25.50' storing 6,890-acre feet (full reservoir at drop inlet crest). But as stated above, the crest has likely settled to 25.34

(elevation 1625.34) as of 1995. As of DNR levels of March 8, 2010, drop inlet crest has now settled to 1625.30 storing a permanent pool of 6,699-acre feet.

Establishment and History

Established by an agreement between State of Nebraska Department of Natural Resources and the Lower Elkhorn Natural Resources District. The purpose of the gage is to provide hydrologic and hydraulic data pertaining to Willow Creek Dam and Reservoir. Continuous reservoir elevation readings were obtained beginning September 28, 1983.

Initially, a Stevens A-71 water stage continuous recorder operated by a manometer was placed in operation January 10, 1984.

Base gage is a staff gage composed of enameled gage plates that were fastened to the downstream side (east side) of the concrete drop inlet on January 10, 1984.

As of November 6, 2004, recorder is an H-500 XL Data Logger with gas purge system. Goes satellite real-time retrieval. GOES satellite setup is an H-222 with YAGI Antenna with GPS. Equipment installed in 5 feet x 7 feet metal Corps type shelter set on a channel iron frame on upstream face near principal spillway on Willow Creek Dam. Acubar is connected to an open orifice in the drop inlet structure or a temporary open orifice near drop inlet.

On March 9, 2017 a H-3553 was installed to replace nitrogen tank. Reservoir stage may be determined by reading a staff gage attached to the downstream side of the drop inlet structure. When reservoir elevations fall below the staff gage, reservoir stage may be determined from a tape down using an RP #2 (Elevation 1630.65) or 30.07 feet gage height on the grate above the pool in the drop inlet.

On September 29, 2021, a Sutron Constant Flow Bubbler and Sutron Dome Antenna were installed.

Due to drought conditions, a temporary orifice was installed (RP#12) on September 6th, 2022. Levels were ran on September 8th, 2022 with a stage of 22.95'. On September 21st, 2022, the orifice was extended further into the reservoir, due to a continued drought. On October 3rd, 2022, the orifice was moved again due to a continued decrease in the reservoir's stage.

Revision History

Original by Wm. H. Birkel on 03-11-1994

Revised by Wm. H. Birkel on 09-13-1996

Revised by Wm. H. Birkel on 04-27-1998

Revised by Wm. H. Birkel on 11-09-1999

Revised by Wm. H. Birkel on 03-06-2003

Revised by Wm. H. Birkel on 03-30-2004

Revised by Wm. H. Birkel on 07-06-2005

Revised by Wm. H. Birkel on 08-10-2007
Revised by Wm. H. Birkel on 06-30-2008
Revised by Wm. H. Birkel on 04-07-2009
Revised by Kenneth M. Meikle on 06-08-2010
Revised by Wm. H. Birkel 09-22-2010
Revised by Kenneth M. Meikle 03-16-2011
Revised by Wm. H. Birkel 07-20-2012
Revised by Wm. H. Birkel 12-21-2013
Revised by Wm. H. Birkel 01-28-2014
Revised by Wm. H. Birkel 07-06-2016
Revised by M. Wieseler 01-17-2017
Revised by M. Wieseler 11/13/2017
Revised by Grant Beckman 11/28/2018
Revised by A. Houser 10/14/2019
Revised by A. Houser 09/30/2021
Revised by A. Houser 10/31/2022
Revised by A. Houser 10/03/2023