

NIORARA BASIN-WIDE PLANNING PUBLIC MEETING, JUNE 25, 2015

Tim Freed Sr., M.S., Integrated Water Mgmt Coordinator
Dennis Schueth, General Manager, Upper Elkhorn NRD

Upper Niobrara-White NRD



Middle Niobrara NRD

Upper Elkhorn NRD

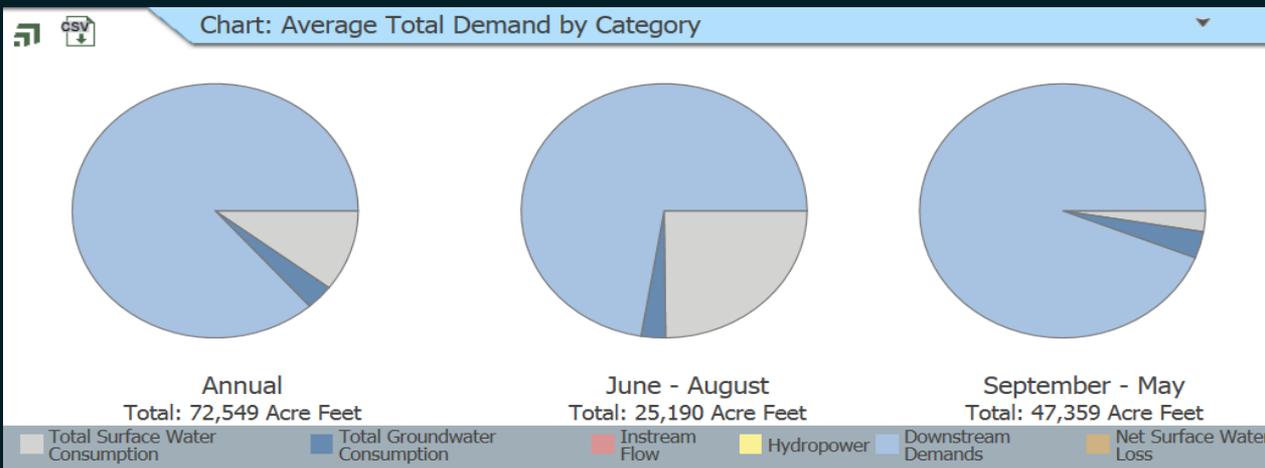
Lower Niobrara NRD

Upper Loup NRD

Uses, Supplies and Demand

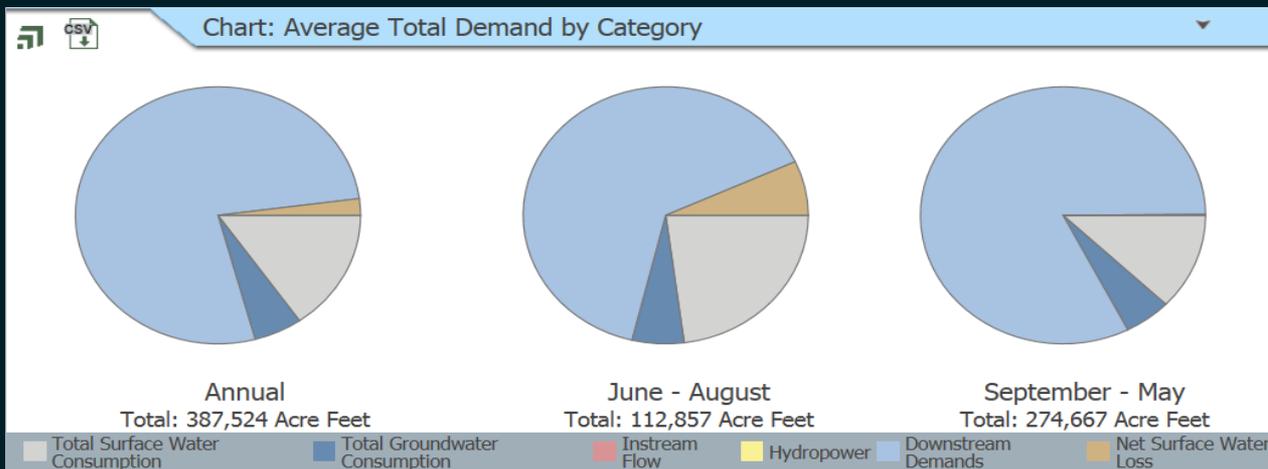
Water Uses

Niobrara River - above Box Butte



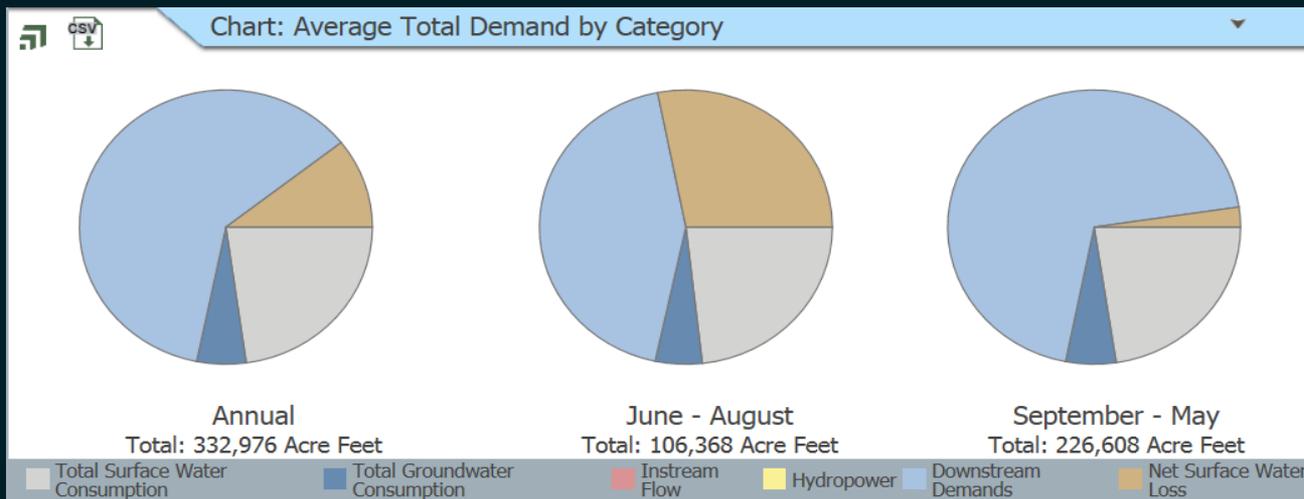
Water Uses

Niobrara River - Box Butte to Gordon



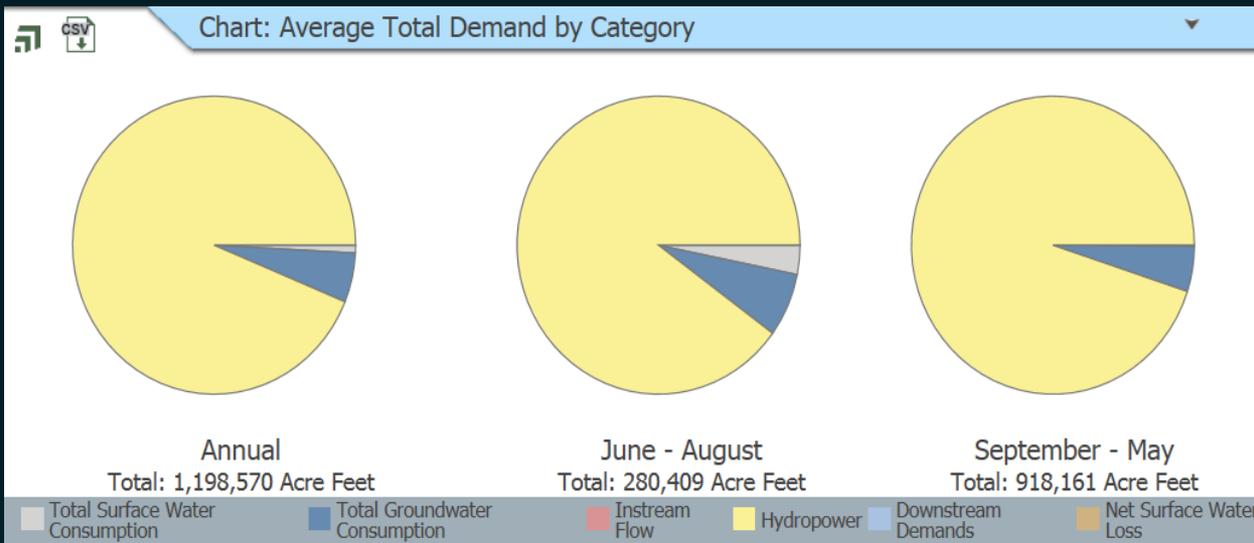
Water Uses

Niobrara River - Gordon To Sparks



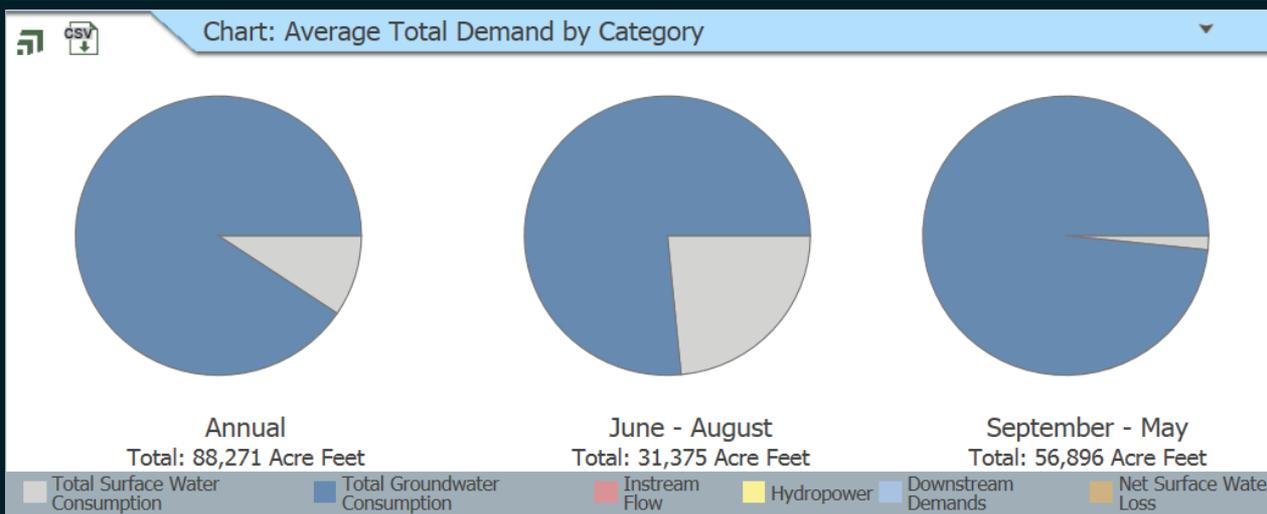
Water Uses

Niobrara River - Sparks to Spencer

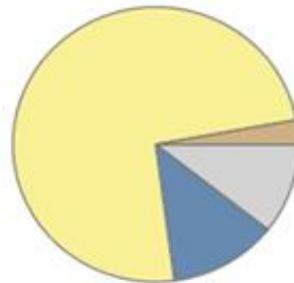


Water Uses

Niobrara River - Spencer to Niobrara River



Water Uses Niobrara Basin

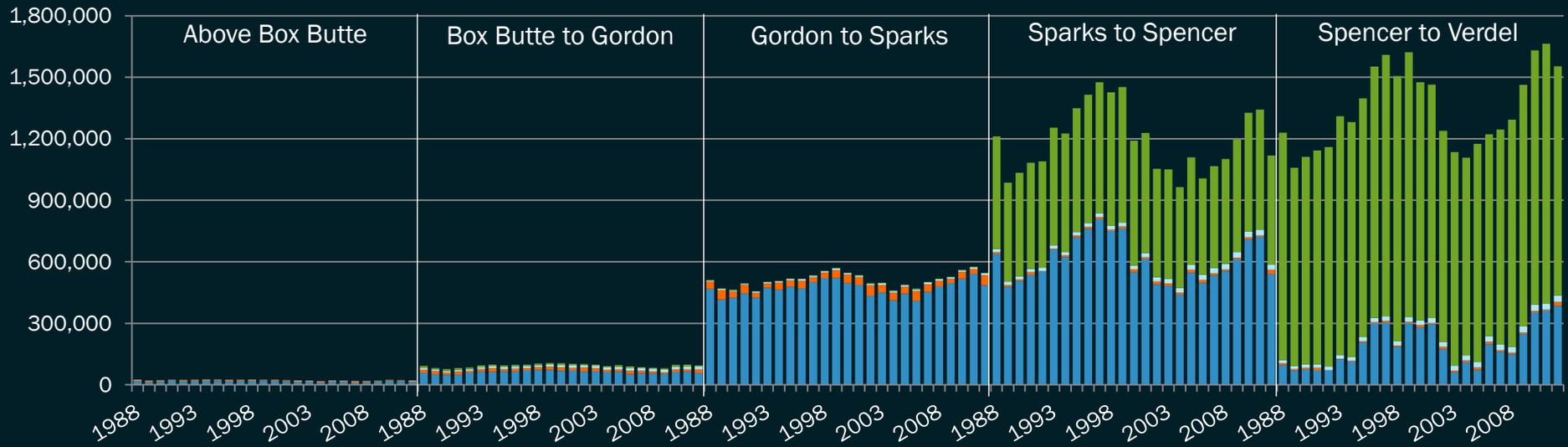


Niobrara
Total: 1,514,440 acre feet

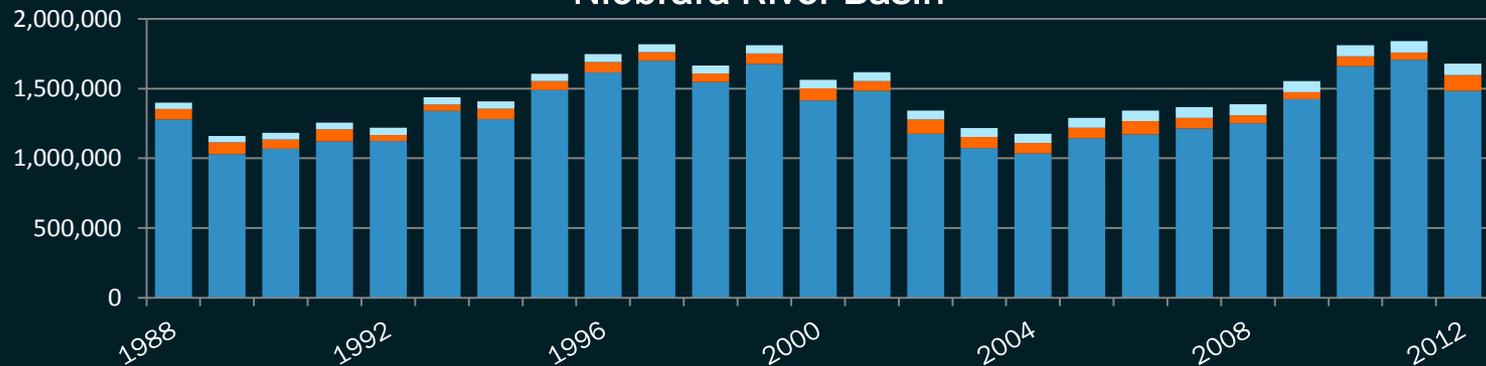


Annual Basin Water Supply (acre-feet)

Niobrara River Subbasins



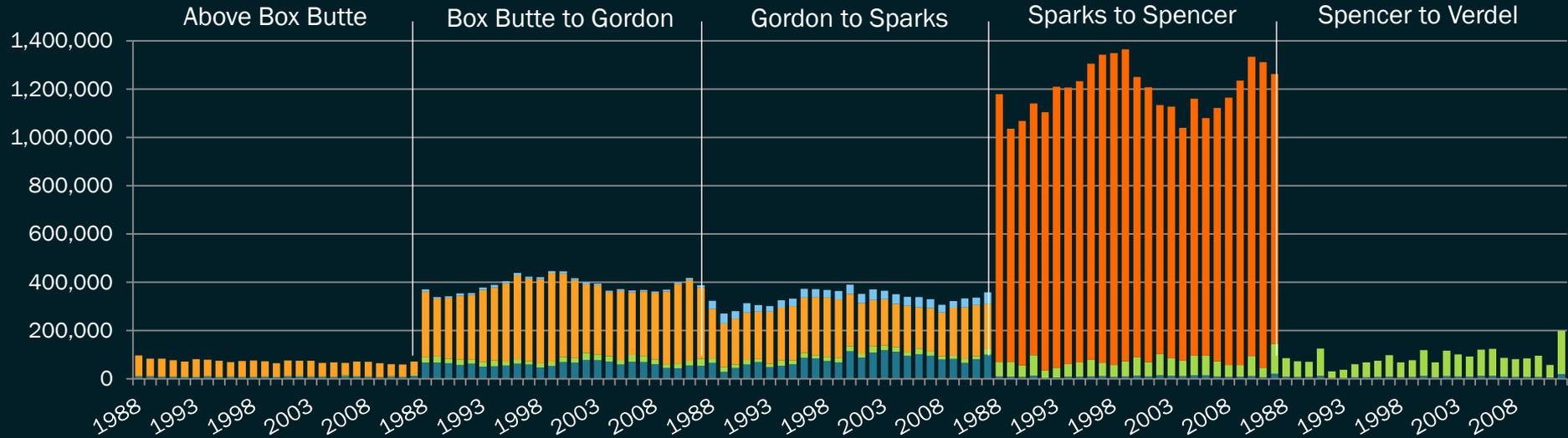
Niobrara River Basin



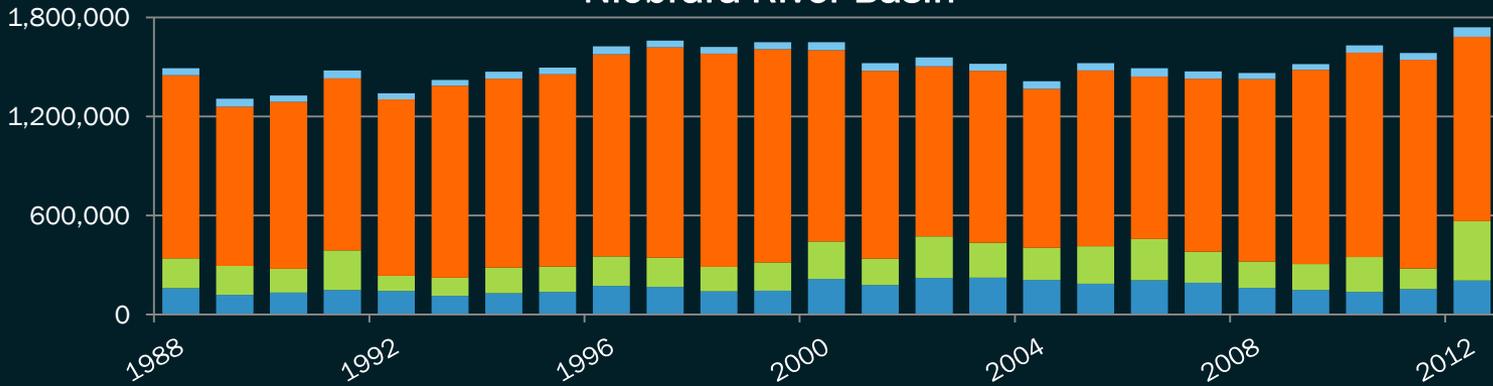
■ Streamflow
 ■ Surface Water Consumption
 ■ Groundwater Depletion
 ■ Basin Inflows

Annual Total Demand (acre-feet)

Niobrara River Subbasins



Niobrara River Basin

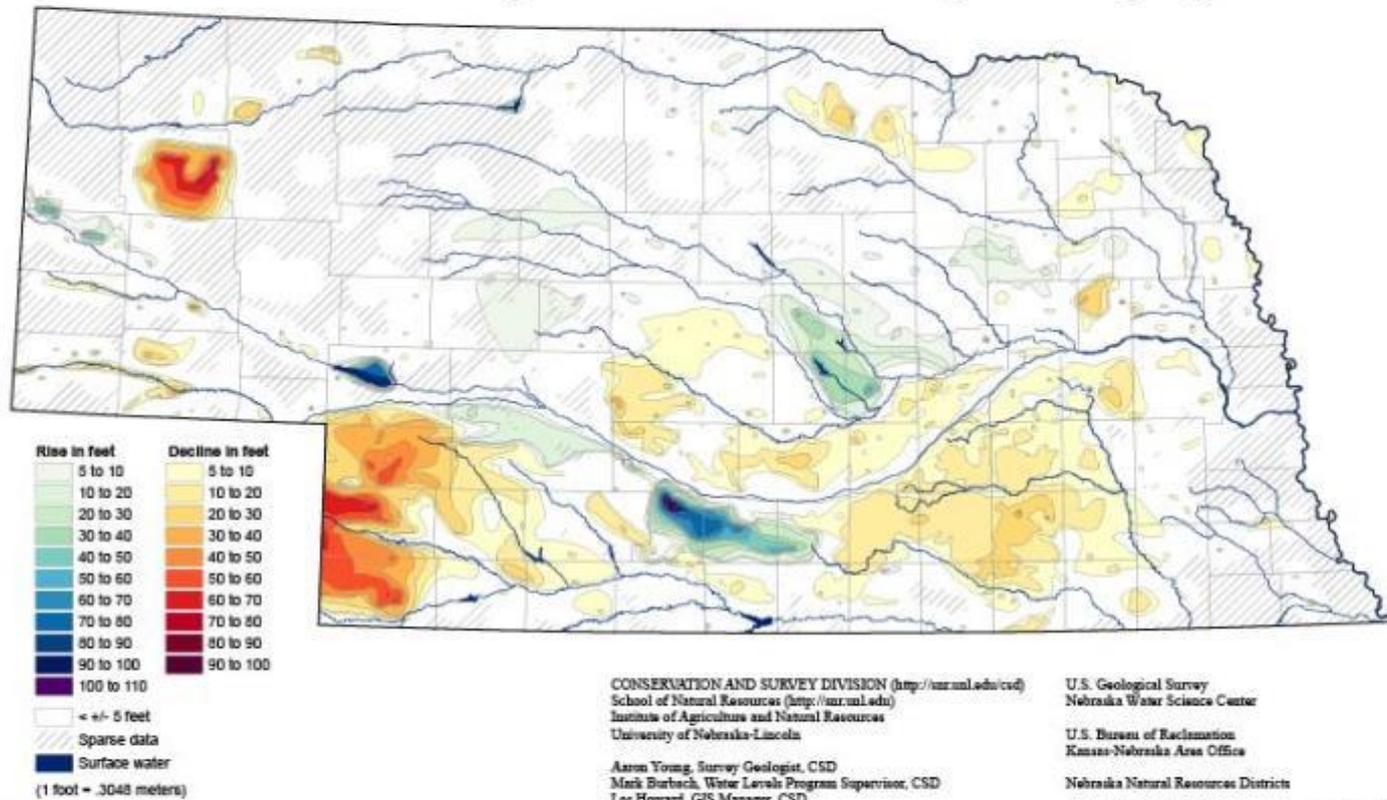


■ Surface Water
 ■ Groundwater
 ■ Instream Flow
 ■ Hydropower
 ■ Downstream Demand
 ■ Net Surface Water Loss

Groundwater Levels

Predevelopment to 2014

Groundwater-level Changes in Nebraska - Predevelopment to Spring 2014



CONSERVATION AND SURVEY DIVISION (<http://nsr.unl.edu/csd>)
 School of Natural Resources (<http://nsr.unl.edu>)
 Institute of Agriculture and Natural Resources
 University of Nebraska-Lincoln

Aaron Young, Survey Geologist, CSD
 Mark Burbach, Water Levels Program Supervisor, CSD
 Lee Howard, GIS Manager, CSD

U.S. Geological Survey
 Nebraska Water Science Center

U.S. Bureau of Reclamation
 Kansas-Nebraska Area Office

Nebraska Natural Resources Districts

Central Nebraska Public Power and Irrigation District

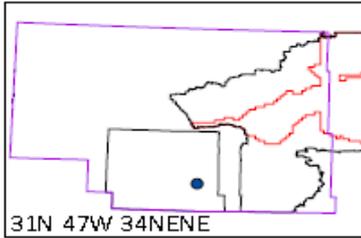

 School of Natural Resources
 Institute of Agriculture and Natural Resources
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December 2014

Groundwater level Near Alliance, NE

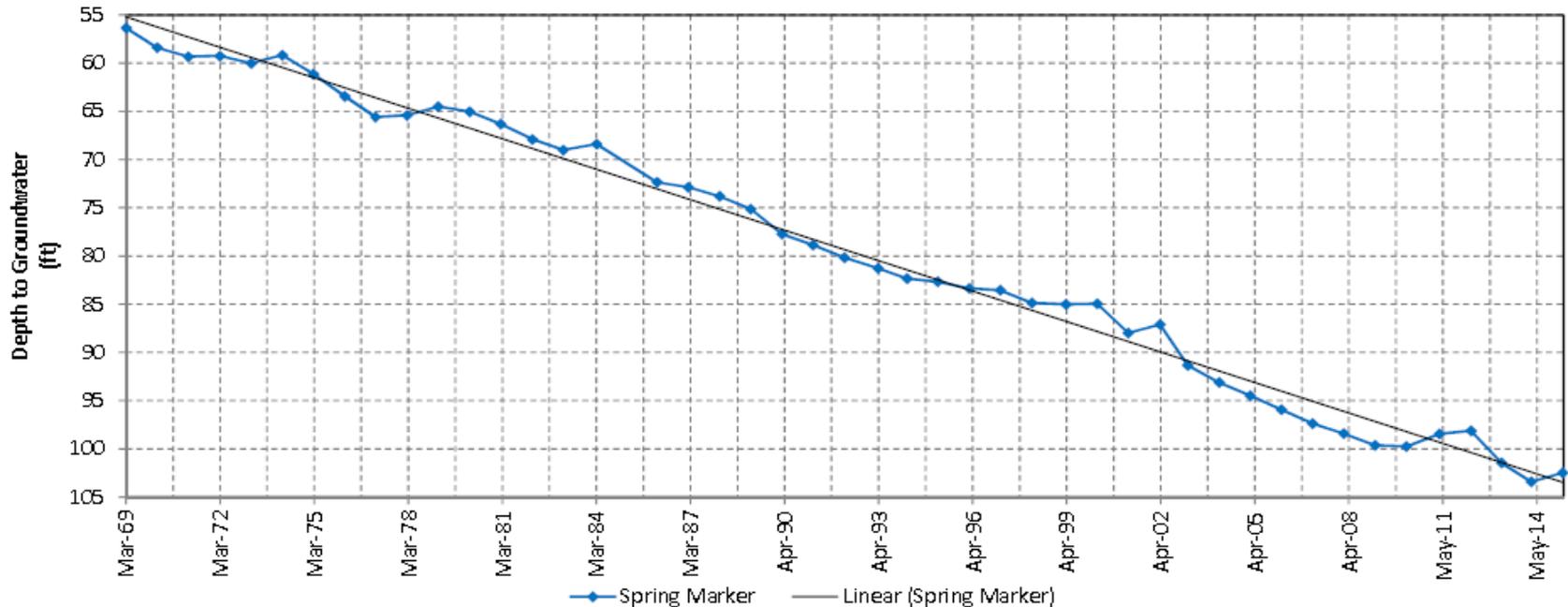
Spring time 1969 - 2015



Box Butte County, Nebraska
Hydrologic Unit Code 10150003
Latitude 42°09'09", Longitude 102°52'27" NAD27
Land-surface elevation 3,952.00 feet above NGVD29
The depth of the well is 260 feet below land surface.
This well is in the Sand and Gravel Deposits aquifer.
This well is completed in the Ogallala Formation aquifer.

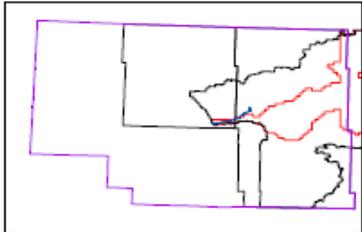
Upper Niobrara-White

USGS 420904102525201



Groundwater level Near Hay Springs, NE

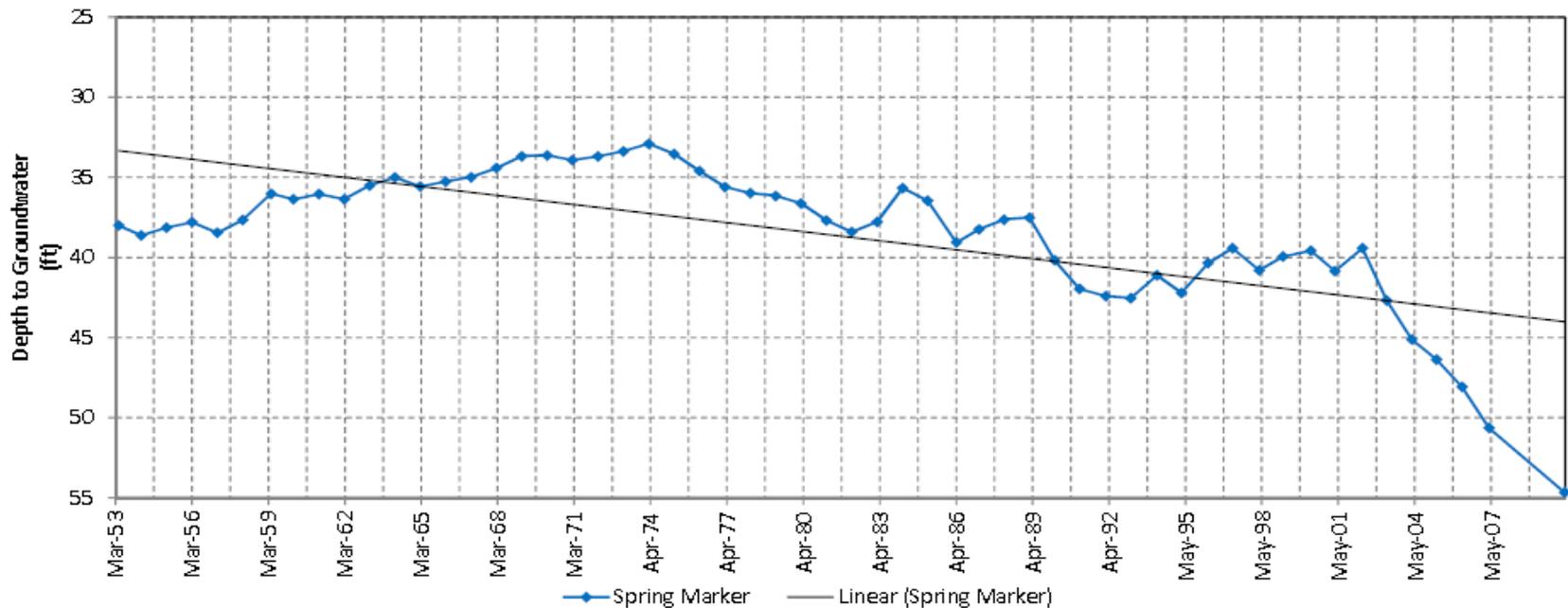
Spring time 1953 - 2010



Mirage Flats Project is in northwestern Nebraska on the Niobrara River. It includes Box Butte Dam and Reservoir, Dunlap Diversion Dam, Mirage Flats Canal, and distribution and drainage systems. Water is diverted from the Niobrara River to irrigate approximately 11,670 acres of fertile land on the north bank. This well is in the Sand and Gravel Deposits aquifer. Located in Dawes and Sheridan Counties

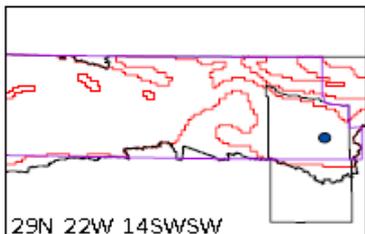
55

UNL Mirage Flats



Groundwater level Near Ainsworth, NE

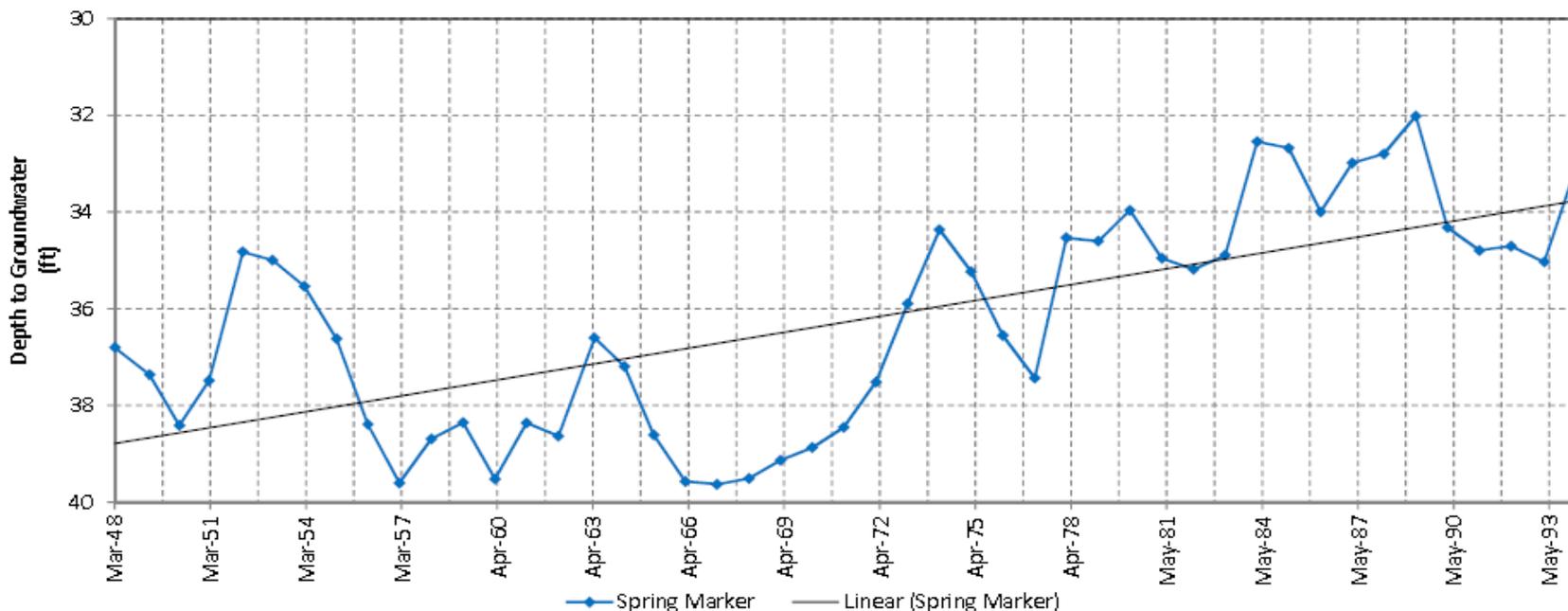
Spring time 1948 - 1995



Brown County, Nebraska
 Hydrologic Unit Code 10150004
 Latitude 42°33'07", Longitude 99°49'45" NAD27
 Land-surface elevation 2,511.00 feet above NGVD29
 The depth of the well is 52.0 feet below land surface.
 This well is in the Sand and Gravel Deposits aquifer.

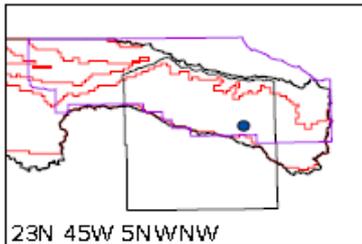
Middle Niobrara

USGS 423307099494501



Groundwater level Near O'Neill, NE

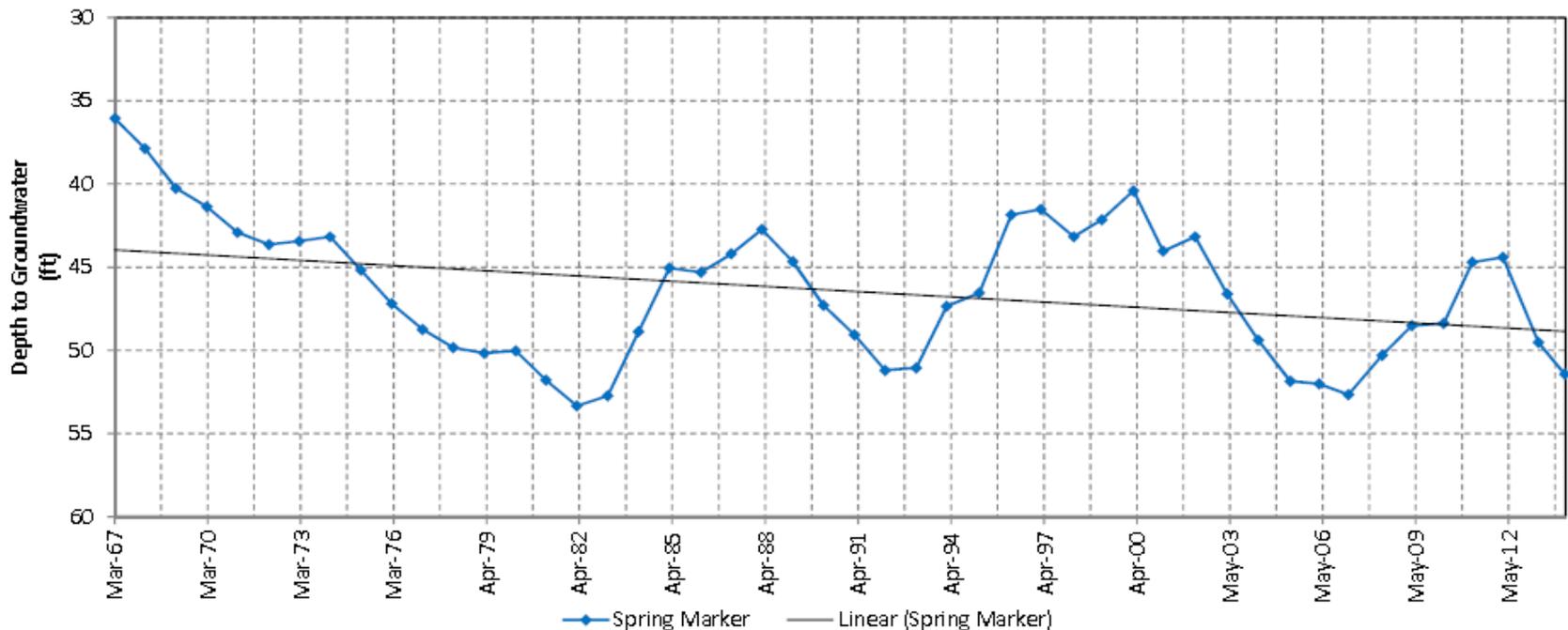
Spring time 1967 - 2015



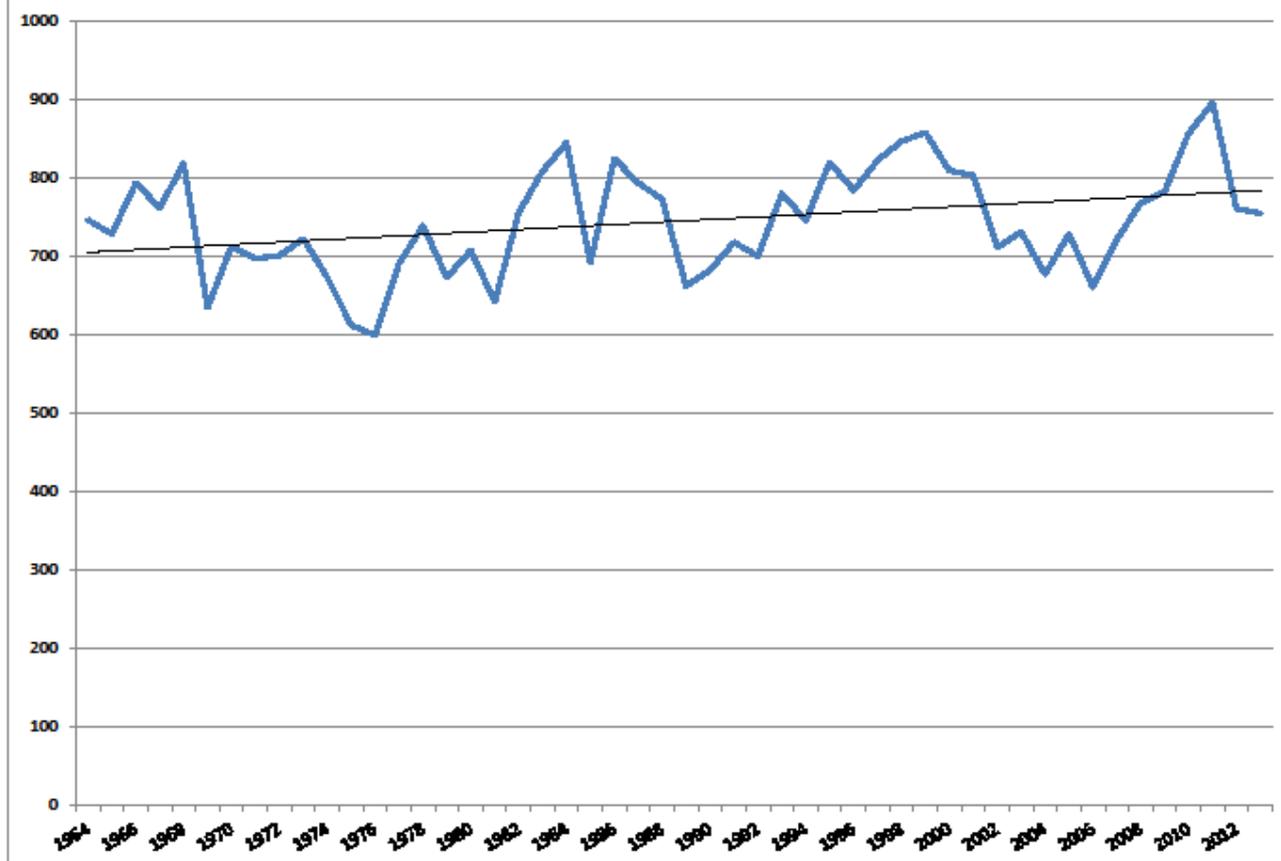
Holt County, Nebraska
Hydrologic Unit Code 10150007
Latitude 42°31'48", Longitude 98°30'06" NAD27
Land-surface elevation 1,952.00 feet above NGVD29
The depth of the well is 85.0 feet below land surface.
This well is in the Sand and Gravel Deposits aquifer.

Lower Niobrara

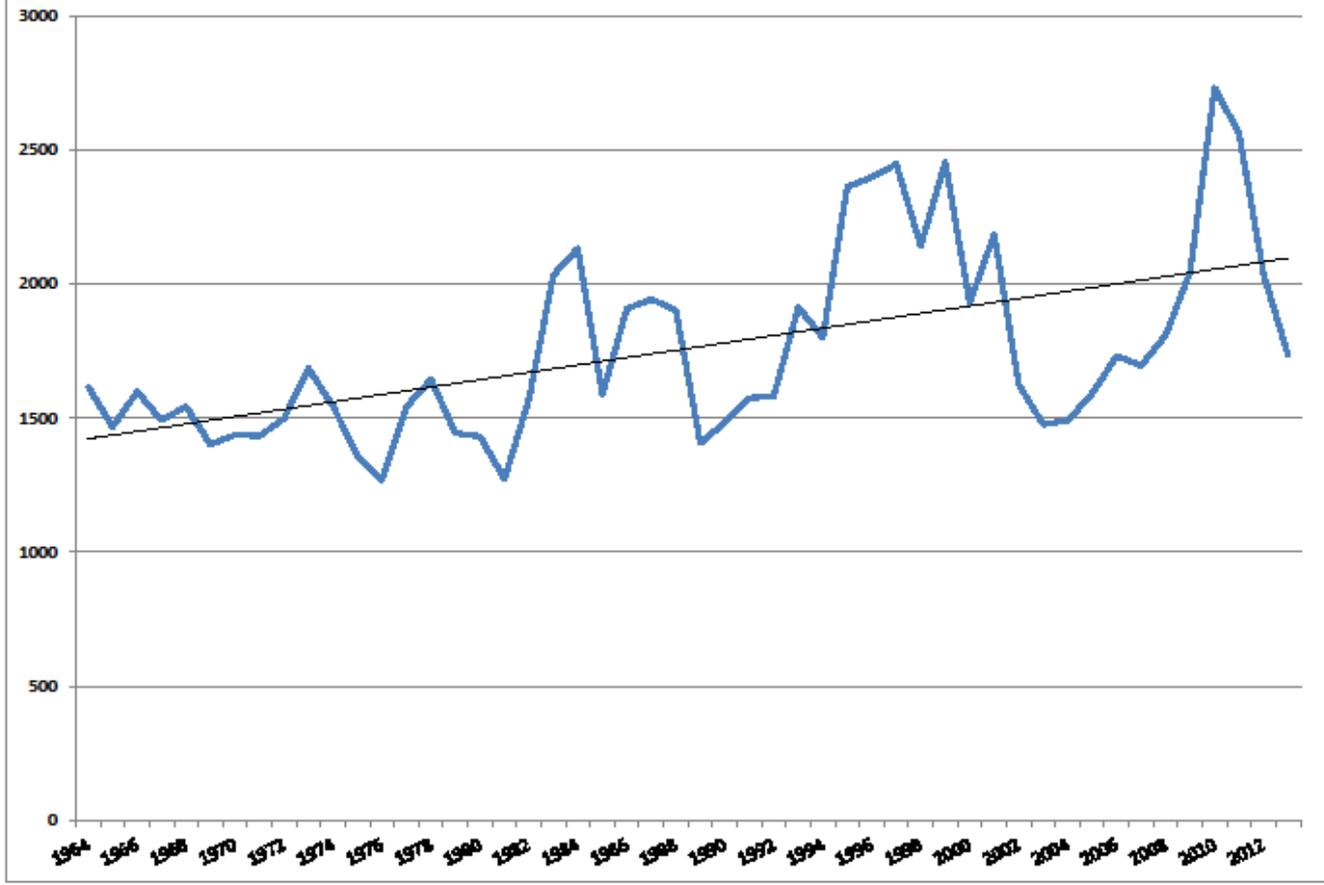
USGS 423148098300601



Niobrara River at Sparks Average Annual Discharge 1954-2013



Niobrara River at Verdel Average Annual Discharge 1954-2013



Additional Information :

Acres

Flowmeter Requirements

Groundwater Monitoring

Boards of Directors

Irrigated Acres by Niobrara Sub-basins 1950-2012 (Rounded)

2012	All GW Irrigated Acres	All SW Irrigated Acres
Niobrara River Above Box Butte Reservoir	7,005	4,907
Niobrara River Box Butte to Gordon	200,520	2,698
Niobrara River Gordon to Sparks, NE	32,893	6,135
Niobrara River Sparks to Spencer, NE	90,613	35,142
Niobrara River Spencer to Niobrara, NE	174,216	14,608
Total Irrigated Acres in Niobrara Subbasins	505,247	63,491
Total Acres in Entire Basin (NE)	7,424,000	
	7.5% of Land mass Irrigated.	

All NRDs are currently certifying their GW irrigated acres and through our water management efforts it will be a priority for the NDNR and NRDs to update all irrigated acres and other uses.

Other important Information

NRD	UNW-NRD	MN-NRD	LN-NRD	UL-NRD	UE-NRD
Started Certification of Irrigated Acres	2006 Complete	2008 Complete	2008 On-going	2008 Complete	2011 On-going
Expansion Acres in upcoming years	2016-0	2016-0	2016-0	2016 Up to 500 acres per sub-district	2016-0
Flowmeters Requirements	2006 Sub-Areas 5 & 6 Entire District was completed 2011	2011 LB483 Expanded Acres	2014 New or Modified acres	2008 Sub-dist. 1-3 (May 2020) Sub-dist. 4 (May 2018) Sub-dist. 5 (May 2017)	2009 New or Expanded Acres
Observation/monitoring/irrigation wells within basin- 518 sites (429 sites outside of basin)	178	182	88 (4)	3 (109)	67 (316)
Board of Directors	11	7	17	11	15

Potential Goals and Objectives

Goals and Objectives - Defined

- A **goal** is a desired outcome of actions taken in support of achieving the overall purpose of the Basin-wide Plan.
- An **objective** is an achievable and measurable action taken to attain the desired end result stated in the goal it supports.

Potential Goals

1. Develop and implement processes for the uniform collection of adequate hydrologic and other related data to assess water resources within the Basin.
2. To develop systematic approaches for the development and sustainability of water resources, while protecting existing uses and supplies, and allowing for growth and changes in use within the Basin.
3. To prevent, resolve, and minimize water related conflicts among and between surface water and groundwater users.
4. To develop and provide educational opportunities and outreach materials about hydrologically connected surface water and groundwater, water conservation, and to keep the constituents of the Basin informed about the Basin-wide Plan as it is implemented.

Objectives – Goal 1

Goal 1 Develop and implement processes for the uniform collection of adequate hydrologic and other related data to assess water resources within the Basin.

Objectives

- 1.1. To conduct data collection and analyses of water supplies and demands, utilizing the best available information, data, and science.
- 1.2. To conduct studies to identify hydrologically distinct sub-areas within the Basin for the purposes of integrated management.
- 1.3. To monitor changes in water uses within the Basin. (Monitor current and future water demands)
- 1.4. Develop and maintain a comprehensive inventory of the location and source of current and future water supplies, water uses and outflows.
- 1.5. Evaluate best management practices (ie: irrigation scheduling, soil sensor use, revised well spacing or well completion requirements)

Objectives – Goal 2

Goal 2 To develop systematic approaches for the development and sustainability of water resources, while protecting existing uses and supplies, and allowing for growth and changes in use within the Basin.

Objectives

- 2.1 To assess the potential impact of new surface water and groundwater uses on existing surface water and groundwater users within the Basin.
- 2.2 To consider acceptable levels of water development for the Basin, and by subbasin when designated.
- 2.3 To conduct studies to identify hydrologically distinct sub-areas within the Basin for the purposes of integrated management.
- 2.4 Explore water supply enhancement projects that a) increase groundwater supply, b) increase surface water storage, c) increase stream base flow, or d) make water available from an existing source.
- 2.5 Minimize invasive vegetation encroachment in the river channels.
- 2.6 Explore potential conjunctive management projects and activities within the Basin.
- 2.7 Evaluate, understand, and develop policies to address impacts on stream flows of uses outside of management control.
- 2.8 Evaluate and understand water banking options for the Basin.

Objectives – Goal 3

Goal 3 To prevent, resolve, and minimize water related conflicts among and between surface water and groundwater users.

Objectives

- 3.1. Establish guidelines for securing water for sustained future growth of domestic, municipal, agricultural, commercial, and industrial water users within the Basin.
- 3.2. Evaluate existing and new methods for transfers, variances, water banking, water leasing, or other actions of water management within the Basin, if necessary, to enhance equitable water use management, mitigate new uses, or to avoid conflicts.

Objectives – Goal 4

Goal 4 To develop and provide educational opportunities and outreach materials about hydrologically connected surface water and groundwater, water conservation, and to keep the constituents of the Basin informed about the Basin-wide Plan as it is implemented.

Objectives

- 4.1. To develop and disseminate water conservation guidelines for individuals to achieve sustainable water use.
- 4.2. To identify cost-share opportunities that may include collaborating with other agencies and the respective NRDs to implement plan objectives.
- 4.3 To encourage participation regarding information sharing with other organizations and agencies to conserve resources and prevent duplication of work.
- 4.4 Explore ways for reuse of water such as harvesting of rainwater, capture and reuse of storm water, reuse of municipal water, and reuse of irrigation water.

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Thank you

Tim Freed Sr., M.S., Integrated Water Mgmt Coordinator
Dennis Schueth, General Manager, Upper Elkhorn NRD

Upper Niobrara-White NRD



Middle Niobrara NRD

Upper Elkhorn NRD

Lower Niobrara

Upper Loup NRD