

# LOWER PLATTE NORTH NRD INTEGRATED MANAGEMENT PLAN 2023 ANNUAL REPORT

AUGUST 2 , 2023, AT 6 P.M.  
LPNNRD OFFICE, WAHOO, NE

Daryl Andersen  
Water Resources Manager



Tyler Martin  
IWM Coordinator



# PURPOSE

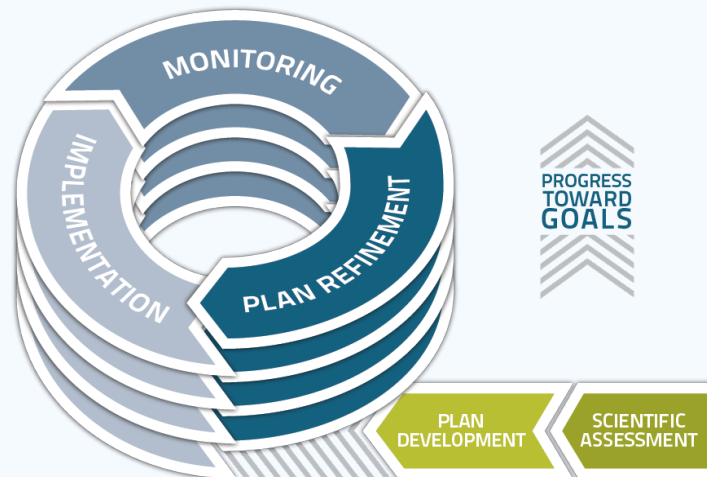
- IMP Process
- Surface and Groundwater Data Collection and Monitoring
  - NeDNR and LPNNRD
- Consortium Plan Implementation
- Action Plan

# IMP OVERVIEW

# WHY CONDUCT IMP REVIEWS?

Joint management of hydrologically connected (HC) groundwater and surface water:

- Identify new opportunities and challenges
- Increase understanding of HC areas (data, studies)
- Evaluate and convey progress towards goals and objectives
- Prioritize joint management actions for upcoming years



# IMP GOALS

## Goal 1

Develop and maintain a District-wide water supply inventory.

## Goal 2

Develop and maintain a District-wide water demand inventory.

## Goal 3

Develop and implement water use policies and practices with the purpose of achieving and sustaining a balance between water uses and supplies.

## Goal 4

Communicate to the public that Nebraska has a great supply of water, and we need to continue to manage it well.

## Goal 5

Coordinate with Lower Platte River Basin NRDs, and appropriate groups and agencies, to develop a water management plan for the Lower Platte River Basin that maintains a balance between current and future water supplies and demands.

# LPNNRD IMP CONTROL AREAS

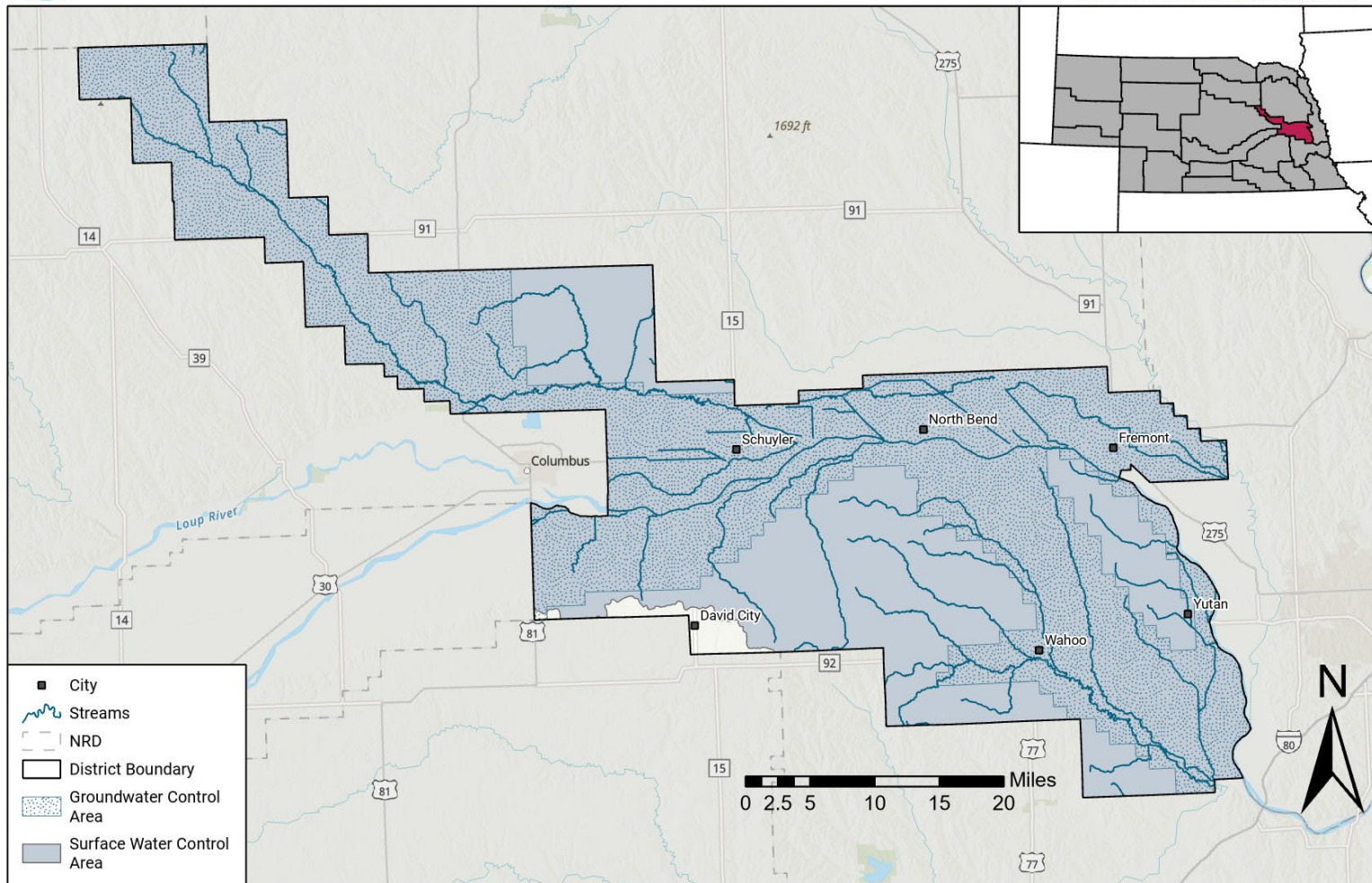


LOWER PLATTE NORTH  
Natural Resources District

Voluntary Integrated  
Management Plan Control Areas

NEBRASKA

DEPT. OF NATURAL RESOURCES



# IMP CONTROLS

- Groundwater

- Limit new groundwater uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment
- Require annual use reports for municipal groundwater users

- Surface water

- Limit new groundwater uses to 50% of the annually available stream depletions over the Basin Plan's first five-year increment
- Require annual use reports for municipal surface water permit holders and municipal groundwater transfer permit holders

# SURFACE WATER AND GROUNDWATER MONITORING



# NeDNR DATA COLLECTION & MONITORING

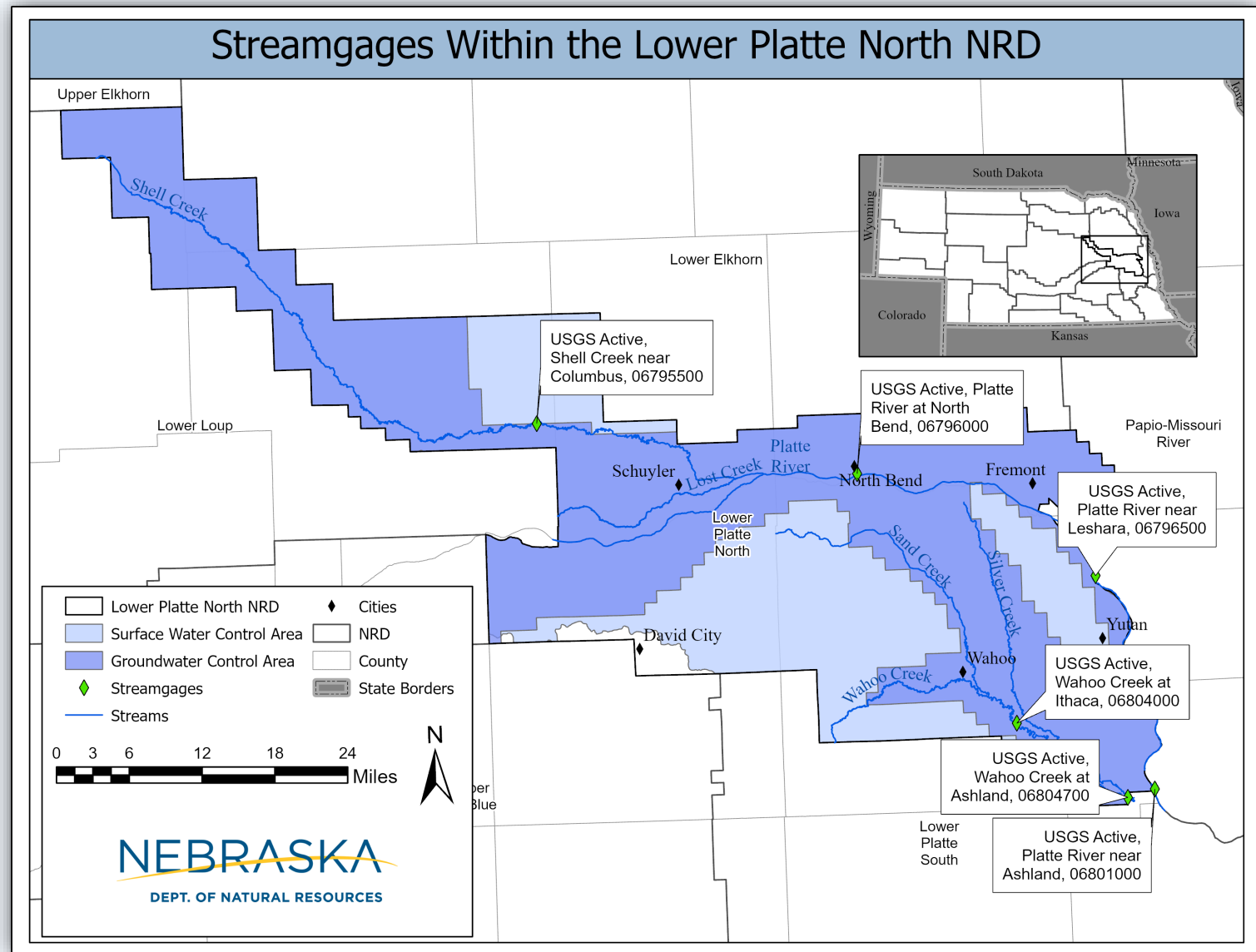
## NeDNR Monitoring

- Surface water monitoring—locations and 6 gages
- Surface water pump site inspections
- Surface water administration
- Voluntary surface water use reporting

## Other

- Headwaters Inventory Program (HIP)
  - New data collection effort

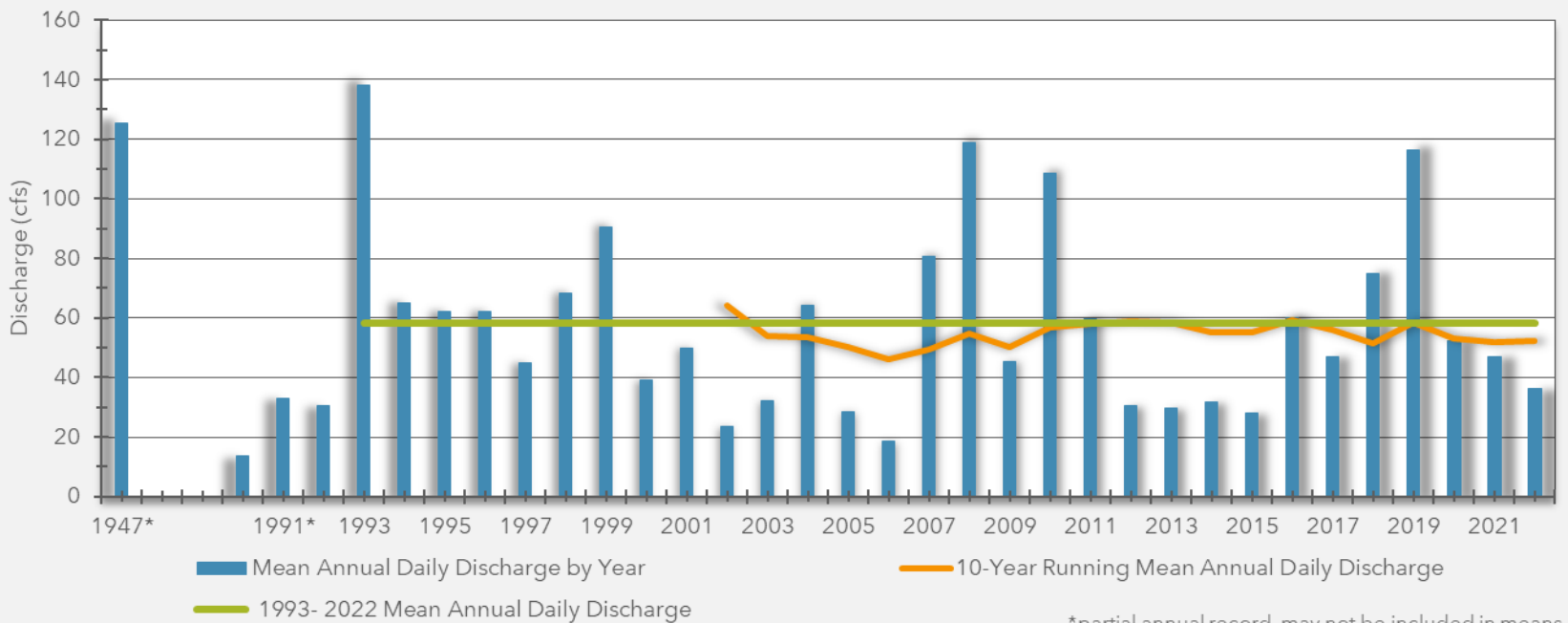
# USGS STREAMGAGE LOCATIONS IN LPNNRD



# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on Shell Creek near Columbus, NE 1947, 1990-2022

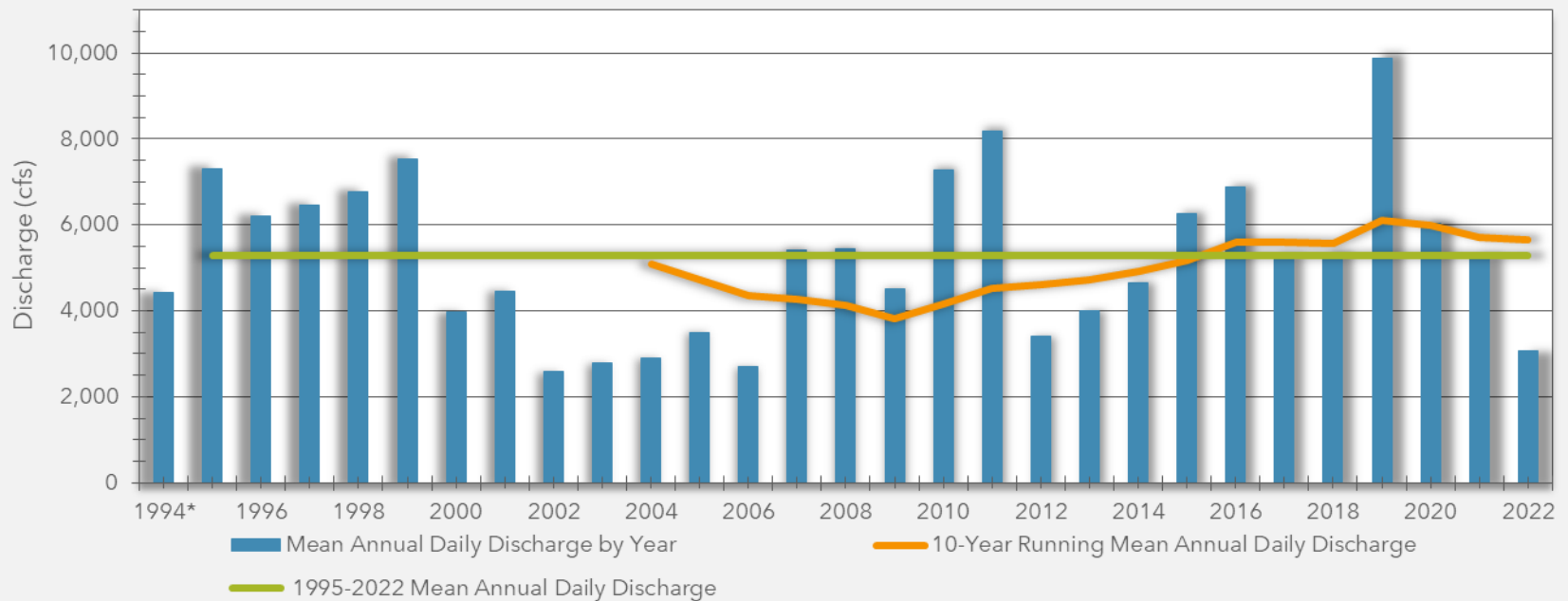
USGS streamgage 06795500



# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on the Platte River near Leshara, NE, 1994-2022

USGS Streamgage #06796500

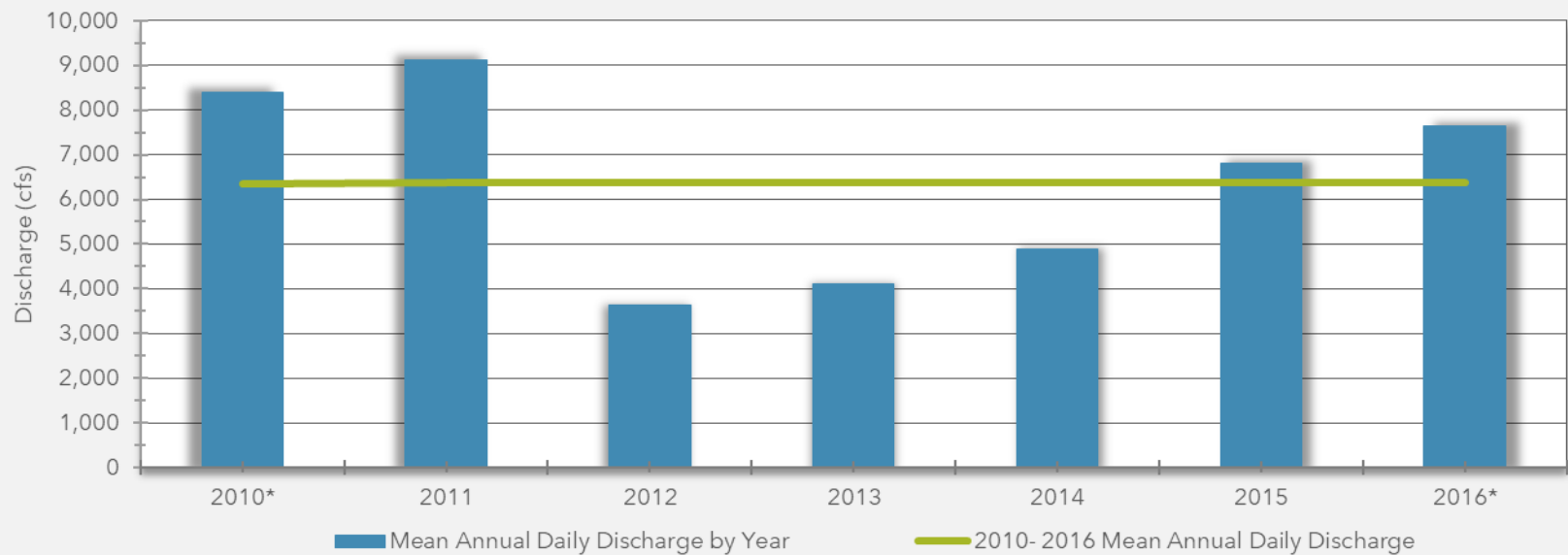


\*partial annual record, may not be included for means

# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on the Platte River near Venice, NE 2010-2016

USGS streamgage 06796550

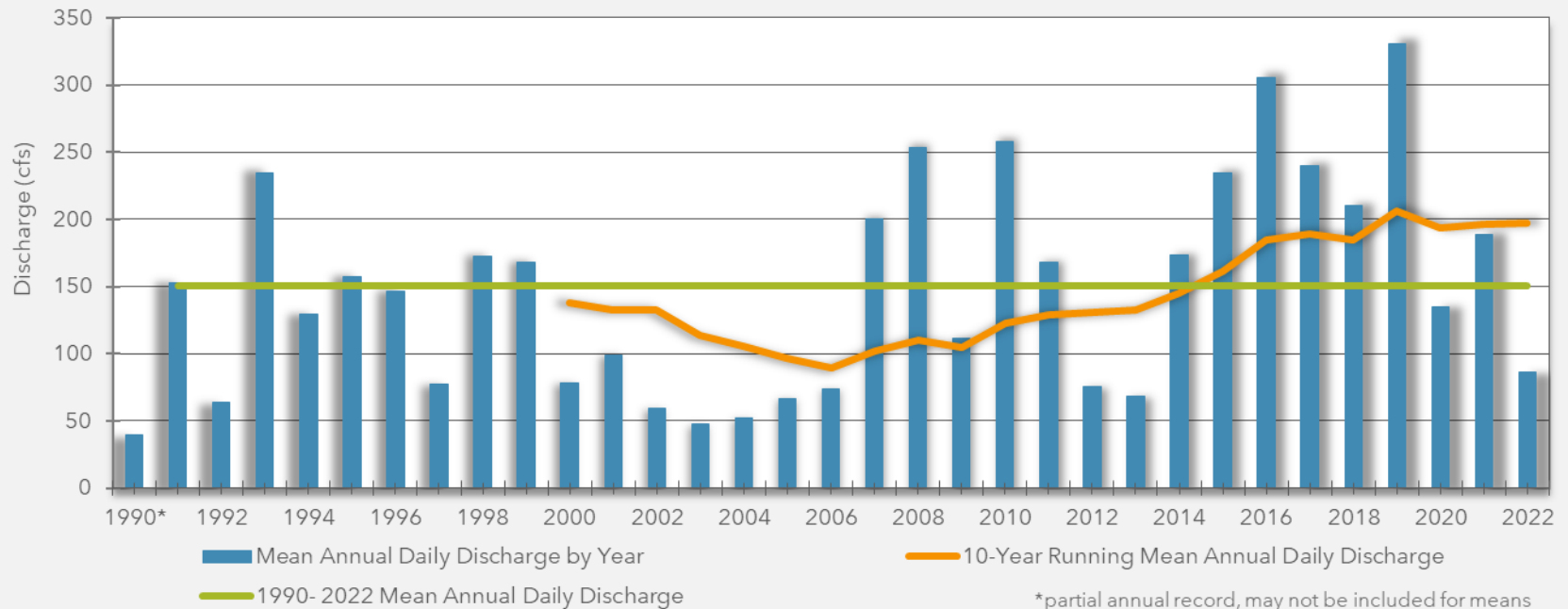


\*partial annual record, may not be included in means

# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on Wahoo Creek near Ashland, NE 1990-2022

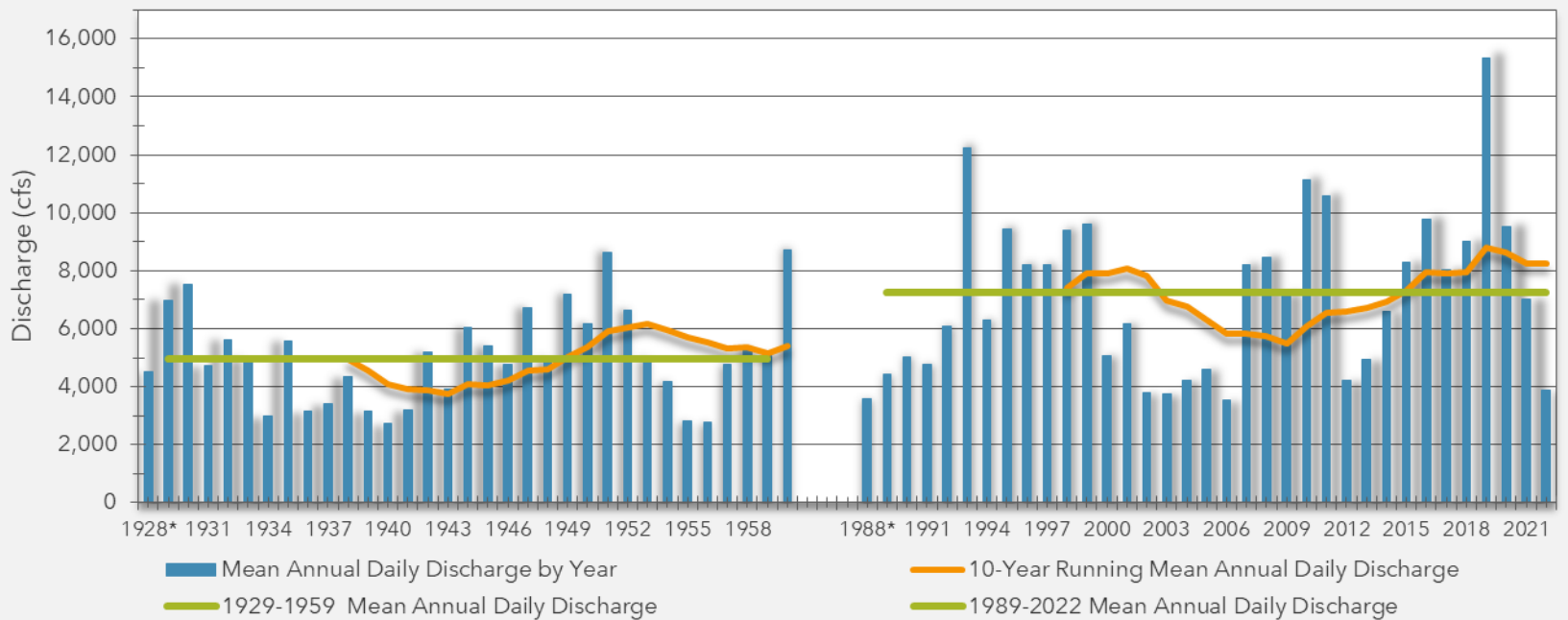
USGS streamgage 06804700



# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on the Platte River near Ashland, NE, 1928-1960, 1988-2022

USGS Streamgage #06801000

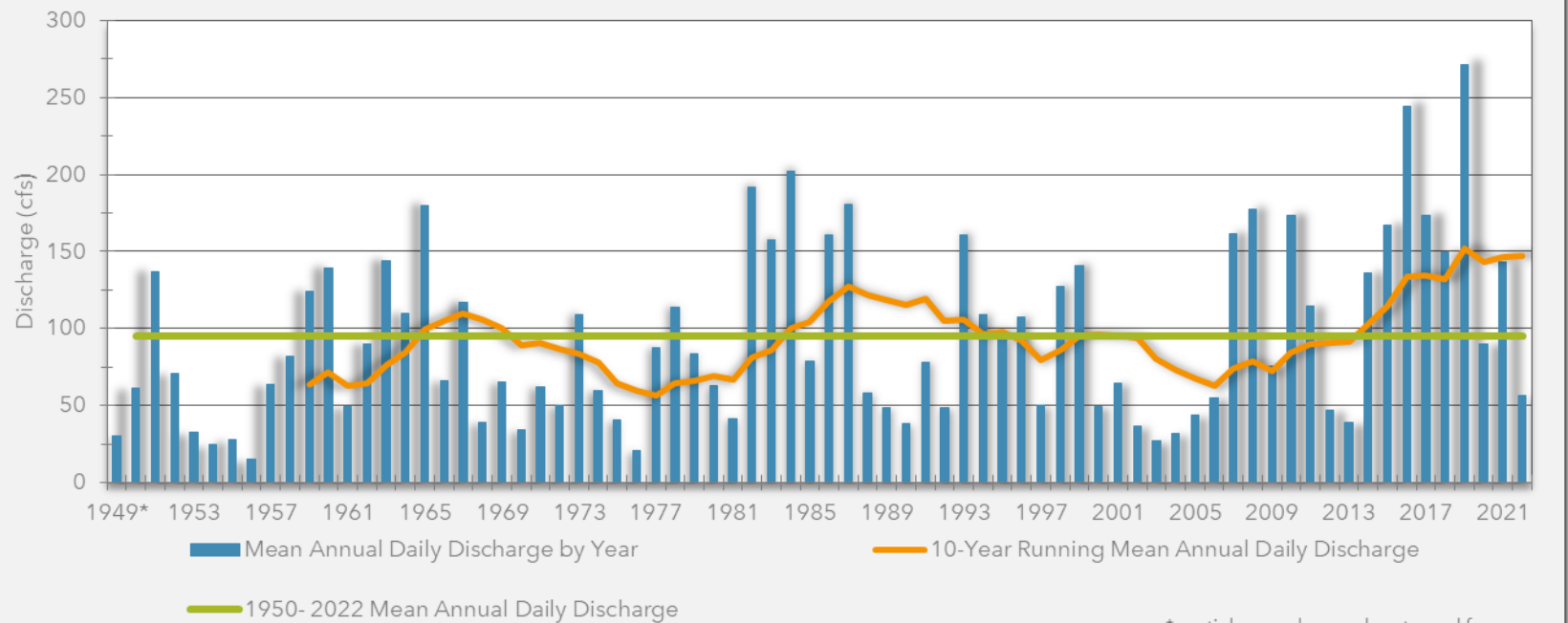


\*partial annual record, may not be used for means

# SURFACE WATER MONITORING

## Annual Mean Daily Discharge on Wahoo Creek near Ithaca, NE 1949-2022

USGS Streamgage 06804000



\*partial annual record, not used for means



# NeDNR SURFACE WATER PUMP SITE INSPECTIONS

During Summer 2022, the Department inspected 131 pumpsites within the LPNNRD. Of the sites visited:

- 27 had pumpsites set up for irrigation.
- 40 appeared to be using or have access to groundwater
- 64 appeared to be dryland

*As time and conditions allow, the NeDNR field office staff visit pump sites for each appropriation to check for compliance and collect various data.*

# NE DNR SURFACE WATER PUMP SITE INSPECTIONS

2022 Surface Water Pump Site Inspections			
NRD	Total Number of Permits	Number of pump site Inspections	Number of pump sites set up for irrigation
Lower Elkhorn	350	219	60
Lower Loup	760	616	369
Lower Platte North	153	131	27
Lower Platte South	134	136	8
Papio-Missouri River	49	26	6
Upper Elkhorn	68	65	5
Upper Loup	20	18	2
Total	1534	1211	477

# NEEDNR VOLUNTARY SURFACE WATER USE REPORTING FOR LPNNRD

	Surface Water Only	Groundwater Only	Co- mingled	Dryland	Average Inches
<b>2022 Water Use Acres and Source</b>					
# Responses	14	8	4	9	
Acres Irrigated	1,163.7	549.6	295	625.1	
<b>2022 Estimated Water Use*</b>					
# Responses	8		3		6.74
Acres Irrigated	666.7		275		

*\*The estimated water applied is reported by a sub-set of the total voluntary responses. The estimate here represents those who included water use data in their response.*

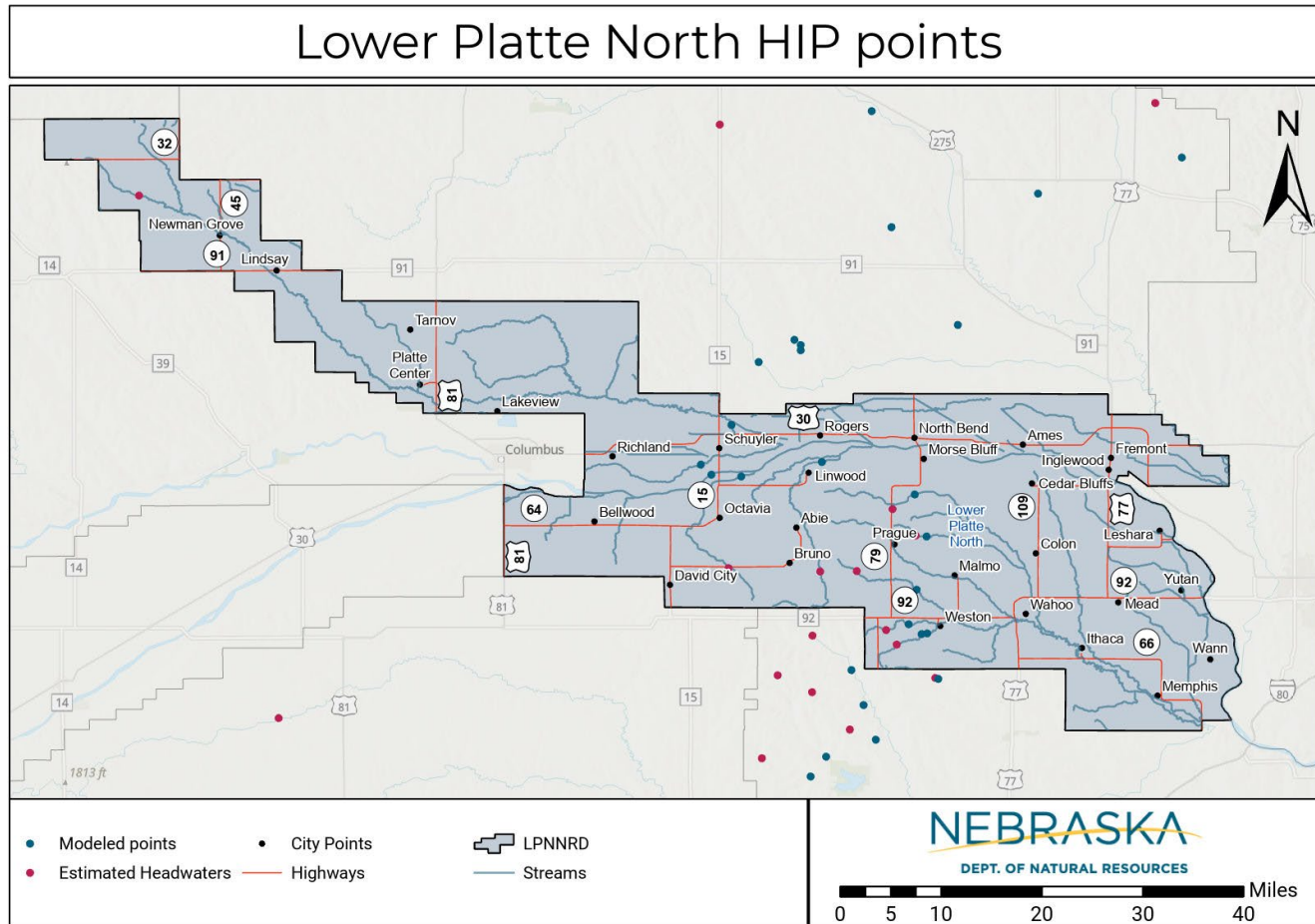
# HEADWATERS INVENTORY PROGRAM (HIP)

*A stream's modeled headwater* is a modeled point where groundwater first begins to add flow to a stream, creating a wet reach.

Points are:

- imported into ArcGIS and plotted using a basin's coordinate grid system,
  - attached to the represented stream using the National Hydrology Database, and
  - used by DNR staff conducting the field survey as a benchmark point, allowing them to check the accuracy of the model at a point.
- 
- Field verification is done by NeDNR staff who walk the modeled point to check that it is the actual location.
  - Known headwaters will be revisited on a monthly basis throughout the year to assess groundwater levels.
  - Initial locational point surveys are currently underway.

# HEADWATERS INVENTORY PROGRAM



# **NeDNR SURFACE WATER ADMINISTRATION**

No surface water administration was required on rights within the LPNNRD during 2022.

# MUNICIPAL & INDUSTRIAL SURFACE WATER USES

- No new surface water applications for municipal or industrial uses were approved during 2022.

# NeDNR GROUNDWATER & SURFACE WATER PERMITTING ACTIONS

## Groundwater

- Permits cancelled = 0
- Permits issued = 0

## Surface Water

- Approved for expedited transfer = 0
- Applications approved = 0



# NEDNR GROUNDWATER PERMITTING ACTIONS

Groundwater permits cancelled = 0

Groundwater permits issued = 0

*Includes groundwater permits for the following uses:*

- Application to Drill Without Regard to Spacing
- Industrial Groundwater Transfers
- Industrial Transfer Notice
- Municipal Groundwater Transfers
- Municipal Notice of Intent
- Permit to Violate Well Spacing
- Permit to Transfer to Adjoining State

# NeDNR DATA COLLECTION & MONITORING

## Surface Water Appropriations Expired, Cancelled-in-Part or Cancelled-in-Full in 2022 Within the Voluntary IMP Area

Appropriation Number	Cancel Date	Source	NeDNR Action	Location Diversion or Reservoir	Use	Begin Acres	Cancelled			Estimated Date of Last Use	Basis for NeDNR Action
							Acres	Grant (cfs)	Grant (af)		
A-14265	11/9/2022	Wilson Cr.	Cancelled in Full	S11-T16N-R01E	IR	83.6	83.6	NA	1.19	2000	REL. 9775

# LPNNRD

## DATA COLLECTION & MONITORING

IMP includes 14 collection and monitoring activities for the NRD

- NRD Monitoring
  - Irrigated acres expansion
  - Groundwater level measurements
  - Municipal water use
- Other
  - Studies and Planning
  - Education/Outreach Collaborations

# LPNNRD

## DATA COLLECTION AND MONITORING

- Groundwater elevation data
  - Report was given to Committee/Board June 2022 and in LPNNRD Annual Lower Platte Basin Plan Report
- Certified irrigated groundwater acres
  - (HCA - Hydrological Connected Area)
  - Total Irrigated - 391,684.14 acres
  - HCA Area - 334,902 acres
  - Non HCA - 56,781.70 acres
- Municipal and industrial groundwater uses
  - 24 communities reported

*\*Access data from the LPNNRD's 2019 Report for the Lower Platte River Basin-Wide Management Plan—put in a HyperLink*

# LPNNRD

## DATA COLLECTION AND MONITORING

### Flow meter data - 2022

- 1175 flow meters reported
  - SQS#1 - 6.28" in/ac
  - SQS#2 - 7.64" in/ac.
    - Both areas combined - 7.18" in/ac.
  - Corn Avg. 7.16" in/ac. (Min. 1.00"; Max. 12.52")
  - Soybean Avg. 4.24" in/ac. (Min. 1.72"; Max. 6.77")
- Rest of the District:
  - Pivot/Corn Avg. 8.3" in/acre (Min. 1.06"; Max. 35.88")
  - Pivot/Soybeans Avg. 6.38" in/acre (Min. 1.68"; Max. 19.01")
  - Gravity/Corn Avg. 19.40" in/acre (Min. 12.64"; Max 38.53")
  - Gravity/Soybeans Avg. 19.66" in/acre (Min. 10.15"; Max. 26.45")

# LPNNRD

## DATA COLLECTION AND MONITORING

- New groundwater consumptive uses (agricultural, municipal, industrial)
  - Agricultural: 278.03 Acre Feet
  - None for industrial or municipal
    - These are for wells permitted by the NRD
- Transfer of acres for groundwater consumptive uses (agricultural, municipal, industrial)
  - Agricultural - 16.52 Acre Feet
    - Butler and Platte County
- Credit groundwater consumptive uses
  - Credit of 365.38 Acre Feet
  - Acres approved for irrigation but not developed, 2017-2020

# IMP MODELING UPDATES

- LPNNRD hydrogeologic framework study with UNL-CSD
  - Jesse Korus and Nafyad continue the modeling process in the SQS #2 area.
  - Jesse and Nafyad are converting the LPMT Regional Model data to fit into the refined grid model being developed

# ESTIMATED STREAM DEPLETIONS



# NEW DEPLETIONS ACCOUNTING

## LOWER PLATTE RIVER BASIN 2016-2022

NRD	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	2022 NRD Reported NET Depletion (AF)	NeDNR Reported Depletion (AF)	NRD Prior Years Peak Season CU Use (AF)	2022 NRD Peak Season CU (AF)	NRD Total Peak Season CU Use (AF)	NeDNR Total Peak Season CU (AF)	Total New Peak Season Depletion	Total New Peak Season CU	Remaining 5-YR Allowable Depletion (AF)	Percent of Remaining 5-YR Allowable Depletion
Upper Loup NRD	5,435	41.5	0.0	723.4	236.2	959.6	0.0	41.5	959.6	5,393.5	99.2%
Lower Loup NRD	11,910	-80.8	62.1	2,192.8	155.1	2,347.9	62.1	-18.7	2,410.0	11,928.7	100.2%
Upper Elkhorn NRD	2,965	37.8	0.0	629.7	56.4	686.1	0.0	37.8	686.1	2,927.3	98.7%
Lower Elkhorn NRD	8,346	0.0	-10.0	2,826.6	0.0	2,826.6	-10.0	-10.0	2,816.6	8,356.0	100.1%
Papio-Missouri River NRD	1,826	14.6	0.0	60.8	26.7	87.5	0.0	14.6	87.5	1,811.4	99.2%
Lower Platte South NRD	2,098	3.3	19.2	23.6	3.3	26.6	19.2	22.5	45.8	2,075.5	98.9%
Lower Platte North NRD	3,736	-54.8	0.0	1,918.4	-70.8	1,847.5	0.0	-54.8	1,847.5	3,790.8	101.5%
<b>TOTALS</b>	<b>36,316</b>	<b>(38)</b>	<b>71</b>	<b>8,375</b>	<b>407</b>	<b>8,782</b>	<b>71</b>	<b>33</b>	<b>8853</b>	<b>36,283</b>	<b>100%</b>

CU = Consumptive Use    AF = Acre Feet

# BASIN COALITION PLAN IMPLEMENTATION

# MODELING UPDATES

## SUB-REGIONAL MODEL

	Begin	Conclude
Grant Work	December 2022	August 2023
Model Construction	June 2023	August 2024
Model Calibration	October 2024	June 2025
Documentation	February 2024	June 2025
Basin Analysis	April 2025	December 2026

# BASIN-WIDE MODELING EFFORTS

- Lower Elkhorn NRD Model
- CENEB Model
  - Loup NRDs and Upper Elkhorn NRD
- Lower Platte Basin Missouri-Tribs Model
  - The Lower Platte Basin NRD water board managers met with NeDNR April 27th and June 15th this year to begin discussion on the construction of district models, similar to what was done with LENRD
  - Most of the discussion centered around model objectives for the each NRD and NeDNR so that the final model product would be beneficial to both NeDNR and the NRDs
  - The decision was made to apply for WSF funding so that State funds could be leveraged against model construction costs
  - WSF Grant approved July 19, 2023, after which model objectives and design will be discussed with the partnership and prospective contractors
  - Goal is to start August 2023 on the modeling process

# BASIN-WIDE ACTIVITIES

LPNNRD and NeDNR participate in the Lower Platte River Basin Coalition (LPRBC)

- Managers' and Technical Team meetings
- Annual reporting (see next slide)
- Annual Reporting Database
  - Tool to report and store annual water use data
- Lower Platte Missouri Tributaries Model
  - Tool to analyze aquifer-stream interactions
- Geological Framework Project--Papio, NeDNR and LPNNRD
  - Completion deadline of January 1, 2022 was met

# LPNNRD

## EDUCATION & OUTREACH ACTIVITIES, 2022

### NeDNR

- State Fair
- Husker Harvest Days

### LPNNRD

- Nitrogen Certification Classes
- Spring Conservation
- School Presentations

# LPNNRD & NEDNR 2022 MEETINGS

- Meetings:
  - Quarterly Meetings
  - Annual Meeting August 31, 2022
- Topics and Discussions:
  - Modeling updates
    - LPNNRD hydrogeologic framework study
    - Lower Platte Basin hydrologically connected area refinement
  - Lower Platte River Basin Coalition
    - INSIGHT Analysis
    - Data Collection
    - New 5-year ILCA to continue Plan

# ACTIONS AND GOALS



# JOINTLY IDENTIFIED ACTIONS FOR NEXT TWO YEARS

- Continue to
  - Cooperate on efforts to increase sources of available surface & groundwater data
  - Collaborate on hydrogeologic investigations of the LPNNRD through with UNL's Conservation and Survey Division
  - Update Lower Platte-Missouri Tributaries groundwater model with AEM data
  - Participate in basin-wide and regional planning efforts such as
    - ENWRA, the Lower Platte River Consortium (drought planning), and Lower Platte River Basin Coalition (LPRBC)
  - Develop depletion/consumptive use tracking database with LPRBC
- Participate in education and outreach events in the LPNNRD, as available
- Review data from local studies, as available

# QUESTIONS?

# THANK YOU!

Daryl Andersen  
Water Resources Manager  
[dandersen@lpnnrd.org](mailto:dandersen@lpnnrd.org)



Tyler Martin  
IWM Coordinator  
[tyler.martin@nebraska.gov](mailto:tyler.martin@nebraska.gov)

