

Nebraska Water Use Data

Water Use Data Workshop
August 15, 2022

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Nebraska Department of Natural Resources

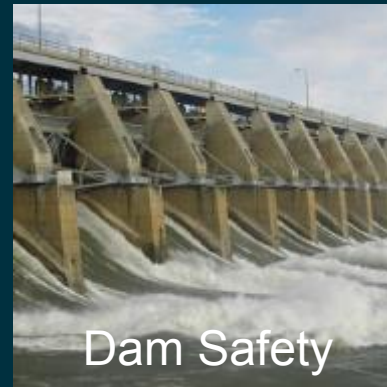
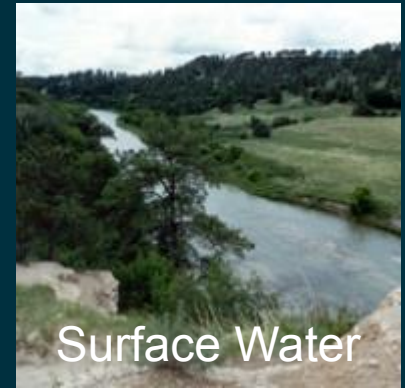
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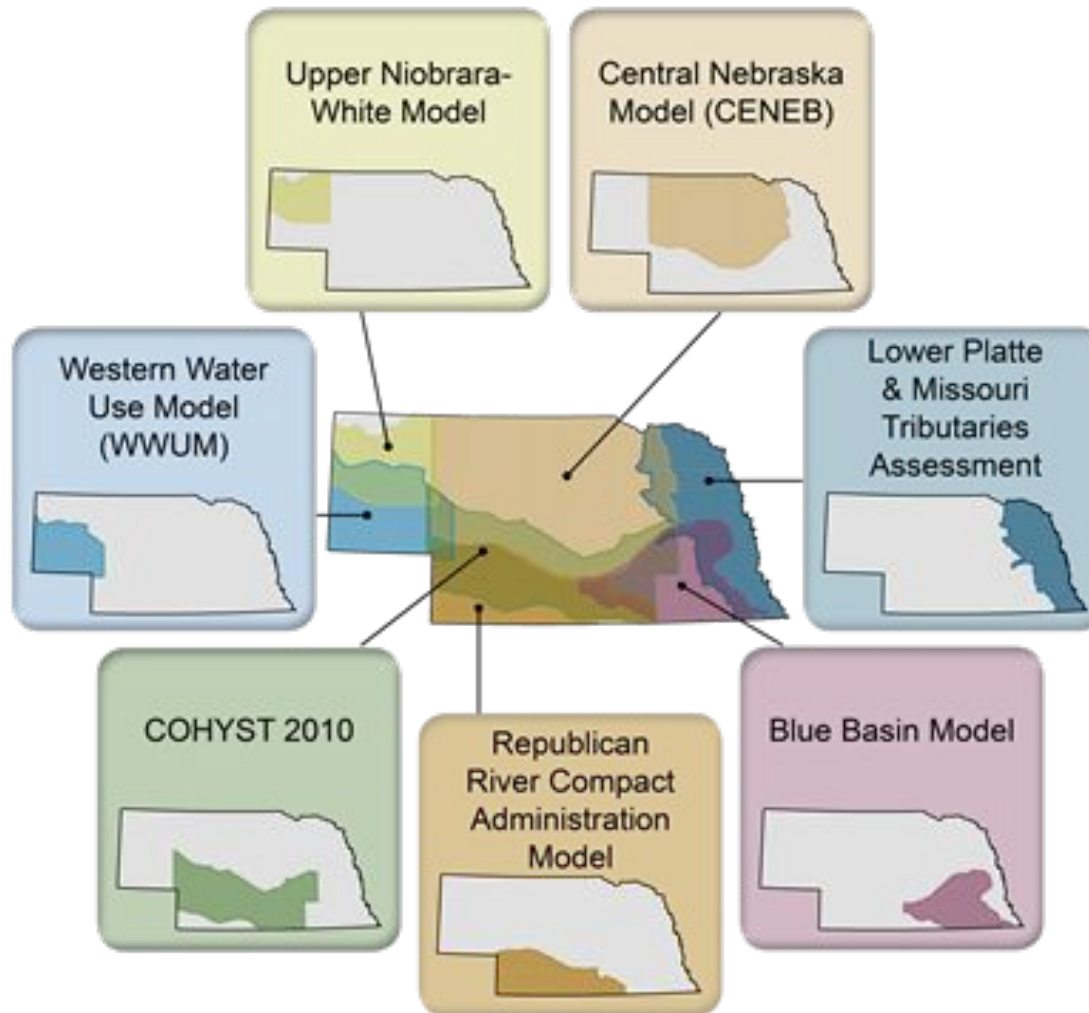


Overview

- Water Use Data Foundational Elements
- Non-Irrigation Uses – WUDR Grant Phase I
- Lower Platte Dashboard
- Permitted Acres for Irrigation

Science Foundation

Current Model Areas



Stakeholders and Science



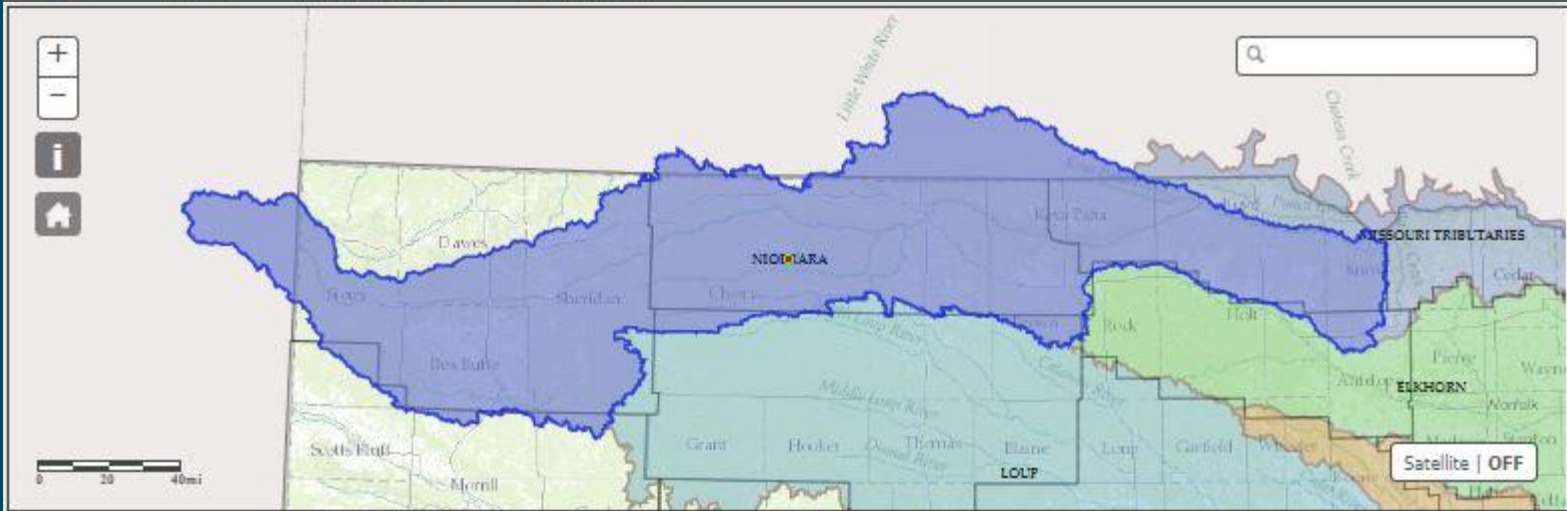
An Integrated Network of Scientific Information & GeoHydrologic Tools

HOME ABOUT MODELING DATA STREAM GAGING



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Basin Overview **Big Picture** Supply Demand Nature & Extent of Use Balance

At a Glance

Basin:	NIORARA
Approximate Area:	11,600 square miles
Basin Water Supply:	1,479,507 acre-feet/year
Near Term Water Demand:	1,310,479 acre-feet/year
Long Term Water Demand:	1,439,563 acre-feet/year
Projected Water Demand:	1,511,541 acre-feet/year
Number of Irrigated Acres:	590,152 acres *

Average Consumption by Sector (Acre-Feet)

	Surface Water		Groundwater	
Irrigation	68,109	100%	190,809	99%
Municipal	0	0%	992	1%
Industry	0	0%	164	0%

* Fields suffixed with a * display the most recent year's total. All other data displayed above is computed as an average of available years of record.

NIORARA

The Niobrara Basin is located mostly along the northern boundary of Nebraska and extends westward into Wyoming. The Niobrara Basin has an area of approximately 13,500 square miles, of which about 11,600 square miles are in Nebraska.

At its farthest western extent, the Niobrara River arises near Manville, Niobrara County, Wyoming, about 40 miles west of Harrison, Nebraska. The Niobrara extends to its confluence with the Missouri River, northwest of Niobrara, Knox County, Nebraska.

According to the 2010 U.S. Census, the largest city in the basin is Alliance, with a population of about 8,500. The next largest cities include Valentine (2,700), Ainsworth (1,700), Gordon (1,600), and Atkinson (1,200).

The topography of the western third of the Niobrara Basin consists primarily of plains and dissected plains. The upland plains are land which is flat to gently rolling, and dissected plains are where streams have cut into former plains creating hilly land with steep slopes and sharp ridge crests, along with remnants of the plains on the hilltops. The central third of the basin is mostly sand hills, which are sand dunes stabilized in place by a grass cover. The eastern third of the basin consists of sand hills, plains, and dissected plains. There are narrow valleys in the Niobrara Basin, which are the

Phase I WUDR grant — Data Acquisition Process Development

Specific activities in this first phase of the Project included:

- 1. Review existing state water data acquisition programs
- 2. Develop data acquisition and estimation processes for non-irrigation water uses
- 3. Develop a prototype database for storing and querying annual water use
- 4. Coordinate with USGS and other Cooperating Agencies on methods and data exchange protocols

8 Water Uses

- Public Supply
- Self-Supplied Domestic
- Self-Supplied Industrial and Commercial
- Livestock
- Thermoelectric
- Hydroelectric
- Mining
- Aquaculture

Non-irrigation uses

Water Management Agencies Engaged in Development

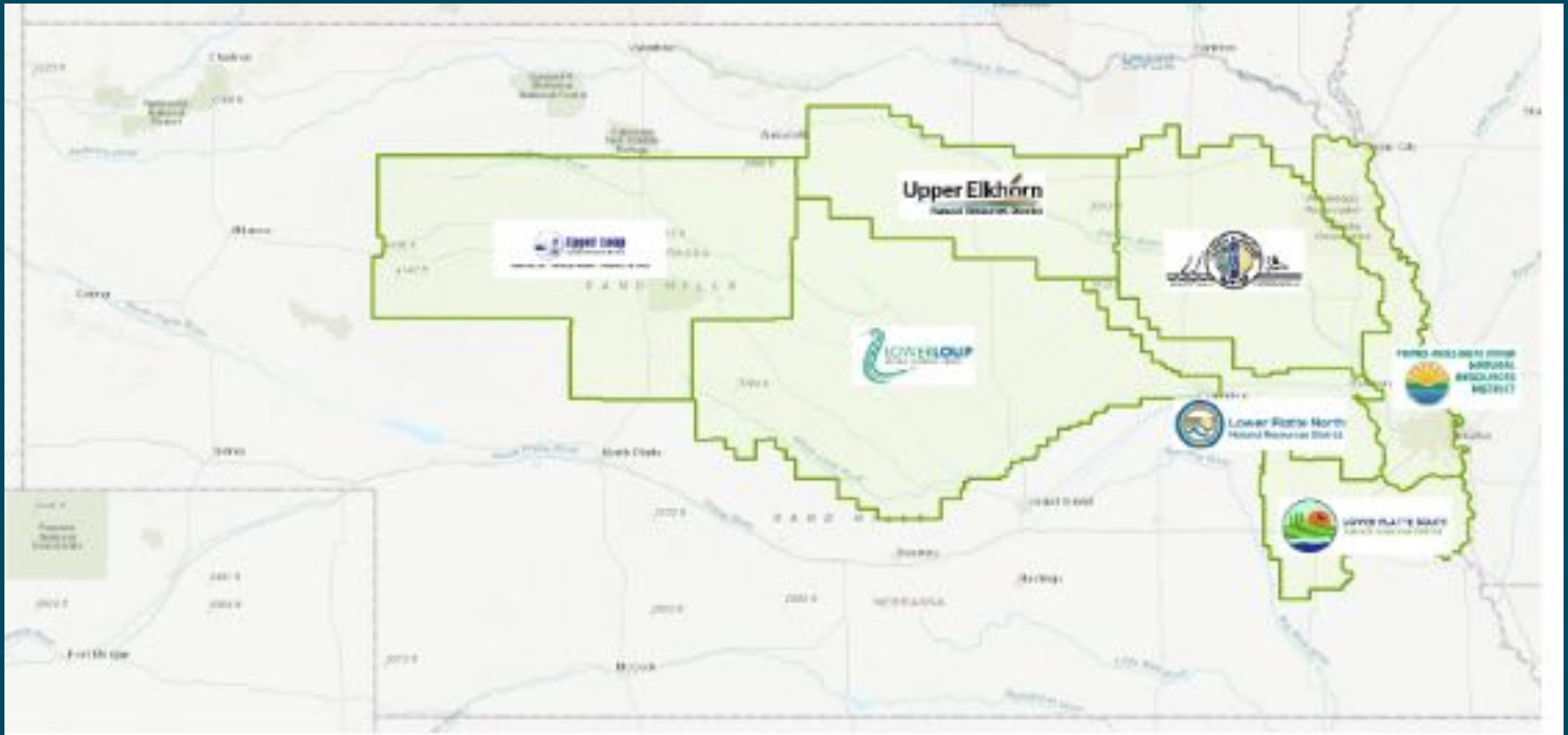
State Agencies

- Department of Health and Human Services
 - Public water supplies
- Department of Environment and Energy
 - Waste water permitting
- Lower Platte Basin Coalition
 - Groundwater use

Other

- Public Water Suppliers
 - Varying size and sophistication
- Nebraska Public Power District
 - Thermo- and hydro-electric
- ADM Ethanol Plant
 - Large industry

Lower Platte Coalition Partners



Products - Data Acquisition Process Development

- Template Database Structure for each water-use type
- Process Document for compilation of the data
- Lower Platte Coalition Reporting Database

The image displays two overlapping Excel spreadsheets. The top spreadsheet is a summary table of water systems, and the bottom spreadsheet is a detailed report for a specific system.

Water System Name	County(s) Served	City(s) Served	Population Served	Primary Water Source Type	PW
HASTINGS, CITY OF	ADAMS	HASTINGS	25,224	Ground water	Act
KENESAW, VILLAGE OF	ADAMS	KENESAW	909	Ground water	Act
JUNIATA, VILLAGE OF	ADAMS	JUNIATA	000	Ground water	Act
ROSELAND, VILLAGE OF	ADAMS	ROSELAND	000	Ground water	Act
HOLSTEIN, VILLAGE OF	ADAMS	HOLSTEIN	000	Ground water	Act
K & K MANUFACTURED HOME COMMUNITY	ADAMS	HASTINGS	000	Ground water	Act
NEBRASKAN MANUFACTURED HOME COMMUNITY	ADAMS	HASTINGS	000	Ground water	Act
PROSSER, VILLAGE OF	ADAMS	PROSSER	000	Ground water	Act
HASTINGS REGIONAL CENTER	ADAMS	HASTINGS	000	Ground water	Act
NELIGH, CITY OF	ANTELOPE	NELIGH	000	Ground water	Act
ELGIN, CITY OF	ANTELOPE	ELGIN	000	Ground water	Act
CLEARWATER, VILLAGE OF	ANTELOPE	CLEARWATER	000	Ground water	Act

Annual Water Usage (Mgal/yr)												
Year	2018	2018	2018	2018	2018	2015	2015	2015	2015	2018	2018	2018
County	Public Supply GW	Public Supply SW	Self Supplied GW	Com./Ind. GW	Com./Ind. SW	Livestock	Thermoelectric GW	Thermoelectric SW	Mining	Aquaculture GW	Aquaculture SW	Annual
USGS 2015 Estimate	79,570.00	20,878.00	6,935.00	15,330.00	846.80	40,150.00	6,132.00	1,058,500.00	5,843.65	3,832.50	5,840.00	1,243,800.00
%Δ USGS->New	-5.37%	124.85%	77.16%	231.39%	1632.75%	-11.84%	0.09%	3.46%	-73.11%	566.52%	331.73%	1
7 Total	75,298.78	46,944.12	12,285.77	50,802.02	14,672.92	35,395.13	6,137.69	1,095,144.31	1,571.57	25,544.55	25,213.30	1,389,000.00
8 Adams	2,130.56	0.00	150.51	277.73	0.00	312.27	743.46	0.00	0.00	463.19	0.00	4,000.00
9 Antelope	271.72	0.00	113.08	65.76	0.00	843.34	0.00	0.00	0.00	7.88	0.00	1,300.00
10 Arthur	0.00	0.00	18.84	0.00	0.00	173.62	0.00	0.00	0.00	2.37	0.00	1,000.00
11 Clearwater	13.69	0.00	23.50	129.16	0.00	217.71	0.00	0.00	32.85	237.70	0.00	6,000.00
12 Elgin	8.75	0.00	14.87	0.00	0.00	192.35	0.00	0.00	0.00	0.00	0.00	2,000.00
13 Neligh	240.60	0.00	85.08	328.67	0.00	613.58	0.00	0.00	0.00	17.74	0.00	1,700.00
14 Roseland	849.54	0.00	59.23	8.56	0.00	239.89	0.00	0.00	0.00	0.00	0.00	1,100.00
15 Holstein	119.04	0.00	16.29	0.00	0.00	283.44	0.00	0.00	0.00	0.00	0.00	4,000.00
16 Adams	163.25	0.00	38.08	18.71	209.96	679.12	0.00	0.00	0.00	458.06	0.00	1,500.00
17 Douglas	1,032.45	0.00	480.14	953.37	0.00	438.23	0.00	0.00	0.00	0.00	0.00	4,500.00
18 Jefferson	457.66	0.00	8.86	15.52	0.00	277.13	0.00	0.00	0.00	118.26	0.00	5,000.00
19 Keith	363.47	0.00	134.35	103.36	0.00	277.13	0.00	0.00	0.00	394.20	0.00	1,700.00
20 Keith	1,560.45	208.78	77.91	281.18	799.73	50.56	0.00	0.00	0.00	0.00	0.00	2,500.00
21 Keith	339.25	206.50	53.72	94.16	0.00	598.37	0.00	0.00	0.00	3.94	0.00	1,700.00
22 Lincoln	231.96	0.00	53.84	19.22	0.00	618.00	0.00	0.00	0.27	0.00	0.00	6,000.00
23 Nemaha	282.60	0.00	102.71	29.88	0.00	1,268.61	0.00	0.00	0.00	102.10	31.93	1,500.00
24 Otoe	730.82	0.00	52.71	64.45	0.00	195.89	0.00	0.00	137.44	0.00	0.00	1,100.00
25 Otoe	270.00	0.00	55.67	77.22	0.00	207.14	0.00	0.00	0.00	709.99	0.00	1,400.00

Lower Platte Database

Lower Platte Coalition Database

LPBC Dashboard

Well and Water metrics

Dashboard »

LPBC Reports

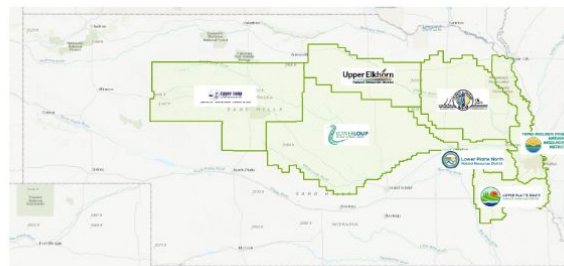
Well and Water Reporting

Reports »

LPBC Upload

Import Well and Water data

Upload »




Lower Platte Dashboard


LPBC Dashboard


All NRDs


All Counties

 **45**
New Wells

 **520**
Total Wells

 **298.37**
Irrigated Acres

 **726.85**
Transfer To (acres)

 **717.95**
Transfer From (acres)

Wells [Change In Irrigated Acres](#) [New Surface Water Appropriation](#) [Non Irr Depletion Change](#)

Show entries Search:

NRD Abbr	NRD Permit ID	LPBC Well ID	DNR Well Reg	Use	NRD Approval Date	Install Date	Status	Pump Capacity (gpm)	Replacement Well
LE	LE-16-01-R	LE_LE-16-01-R	G-033883	I	2/23/2016 12:00:00 AM			850	<input checked="" type="checkbox"/>
LE	LE-16-02-R	LE_LE-16-02-R	G-145713	I	3/18/2016 12:00:00 AM			750	<input checked="" type="checkbox"/>
LE	LE-16-03-L	LE_LE-16-03-L	G-180554	S	3/18/2016 12:00:00 AM			300	<input type="checkbox"/>
LE	LE-16-04-R	LE_LE-16-04-R	G-149885	I	4/11/2016 12:00:00 AM			950	<input checked="" type="checkbox"/>
LE	LE-16-05-R	LE_LE-16-05-R	G-037506	I	4/11/2016 12:00:00 AM			900	<input checked="" type="checkbox"/>
LE	LE-16-06-L	LE_LE-16-06-L		S	4/12/2016 12:00:00 AM			250	<input type="checkbox"/>
LE	LE-16-07-R	LE_LE-16-07-R	G-065483	I	4/25/2016 12:00:00 AM			1000	<input checked="" type="checkbox"/>
LE	LE-16-08-L	LE_LE-16-08-L	G-184551	S	4/25/2016 12:00:00 AM			200	<input type="checkbox"/>
LE	LE-16-09-R	LE_LE-16-09-R	G-080511	I	4/26/2016 12:00:00 AM			750	<input checked="" type="checkbox"/>
LE	LE-16-10-R	LE_LE-16-10-R	G-051125	I	4/26/2016 12:00:00 AM			900	<input checked="" type="checkbox"/>

Showing 1 to 10 of 520 entries

Previous **1** 2 3 4 5 ... 52 Next

Lower Platte Dashboard Upload

Lower Platte Coalition LPBC Dashboard Reporting Upload Staging About Contact

LPBC - Import New Well, Certified Acre Changes, Surface Water and Depletion data

New data can be imported using the standardized [LPBC Import Template](#). Uploaded data will be processed and verified for accuracy and completeness. If any errors are encountered, an Excel error summary can be generated and downloaded.

Choose File No file chosen

Dev import testing

Lower Platte Dashboard Reporting

Lower Platte Coalition LPBC Dashboard Reporting Upload Staging About Contact

Report Type: High Capacity Well Permits

High Capacity Well Permits
New Irrigated Acres
Total Depletion Accounting
Transfers by County

Report Filters

NRD Name County
All NRDs All Counties

HUC 8 Name HUC 12 Code
All HUC 8s All HUC 12s

*Codes - HUC12 Names are not distinct

Approve-Date Range

Start End
01/01/2016 12:00 AM 08/16/2022 12:00 AM

Report Grouping

No Grouping

Export to Excel

Tentative Schedule & Future Development

Jan - Sept 2022:

- Work with consultant to bring database and web application to NeDNR website.

Sept - Dec 2022

- Test web application with 7 NRD partners.
- Ensure all data from 2016 is uploaded to database and is accurate.
- Complete application for annual information exchange.

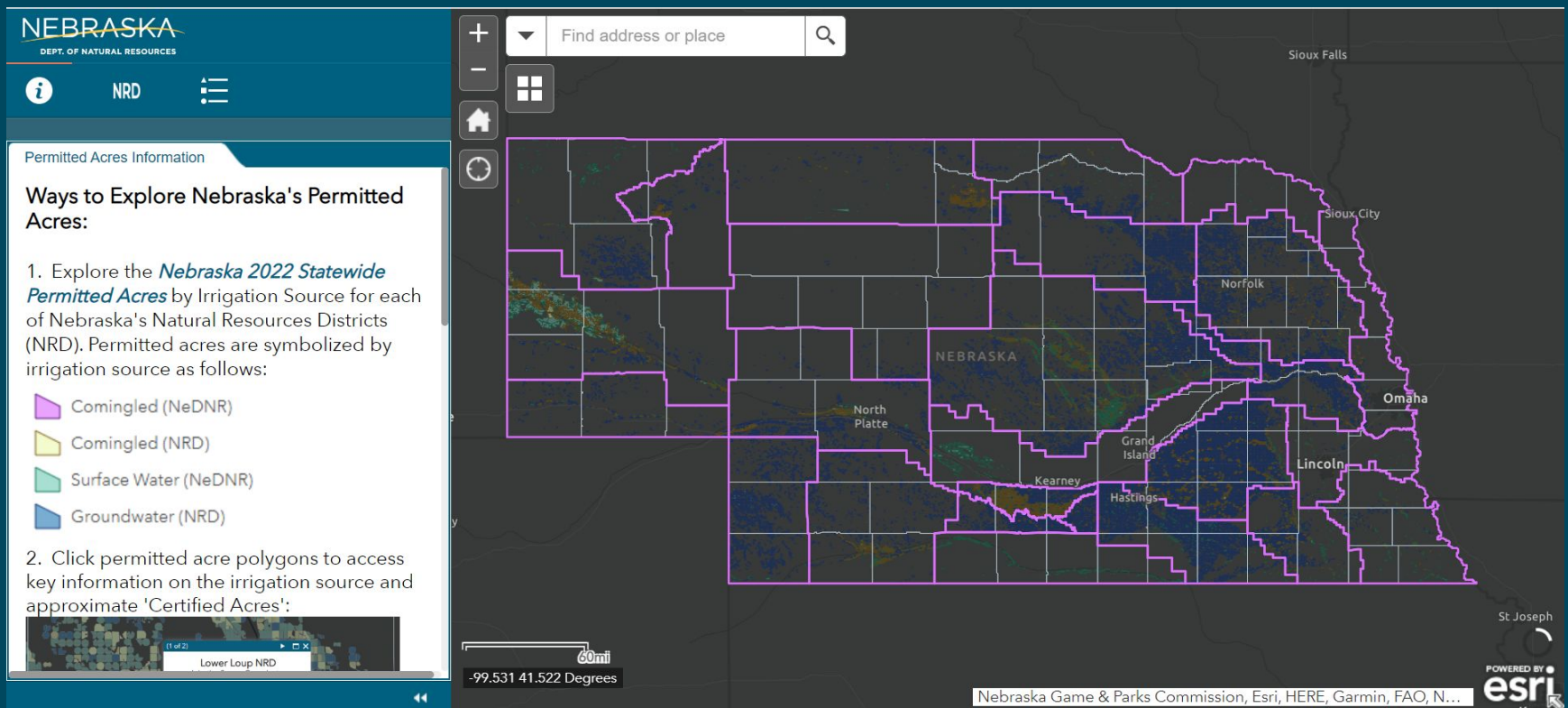
Jan 2023 – Mar 2023

- Begin use of database to upload and summarize annual data for spring 2023 basin-wide plan meetings
- Collect feedback on application.

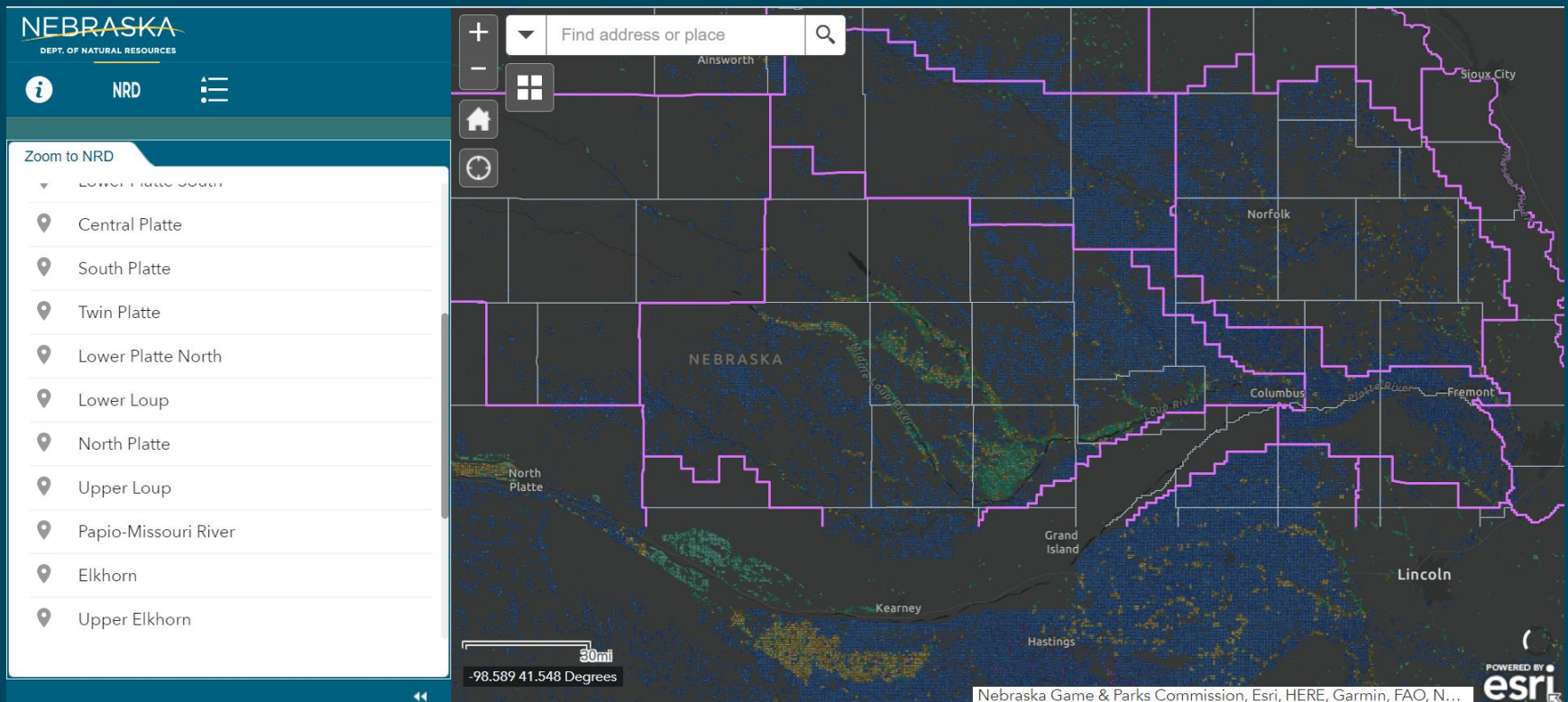
Apr 2023+

- Expand to other NRDs in the State
- Collect feedback on application
- Incorporate other 8 Water uses developed with WUDR grant

Nebraska Permitted Acres for Irrigation



Permitted Acres – Zoom to NRD



Permitted Acres – Zoom to Fields

The screenshot displays the Nebraska Department of Natural Resources (NRD) web application interface. The top left corner features the NRD logo and navigation icons. A search bar at the top center contains the text "Find address or place". On the left side, a "Zoom to NRD" dropdown menu is open, listing various regions: Lower Platte South, Central Platte, South Platte, Twin Platte, Lower Platte North, Lower Loup, North Platte, Upper Loup, Papio-Missouri River, Elkhorn, and Upper Elkhorn. The main map area shows a dark background with numerous blue circular markers representing permitted acres. The city of Greeley is labeled on the map. A scale bar at the bottom left indicates a distance of 2 miles. The bottom right corner of the map area includes the text "Nebraska Game & Parks Commission, Esri, HERE, Garmin, SafeGra..." and the Esri logo.

Permitted Acres – Open ET link

1 of 2

Lower Loup NRD

Irrigation Source: Groundwater (NRD)

280.5 Certified Acres (approximate)

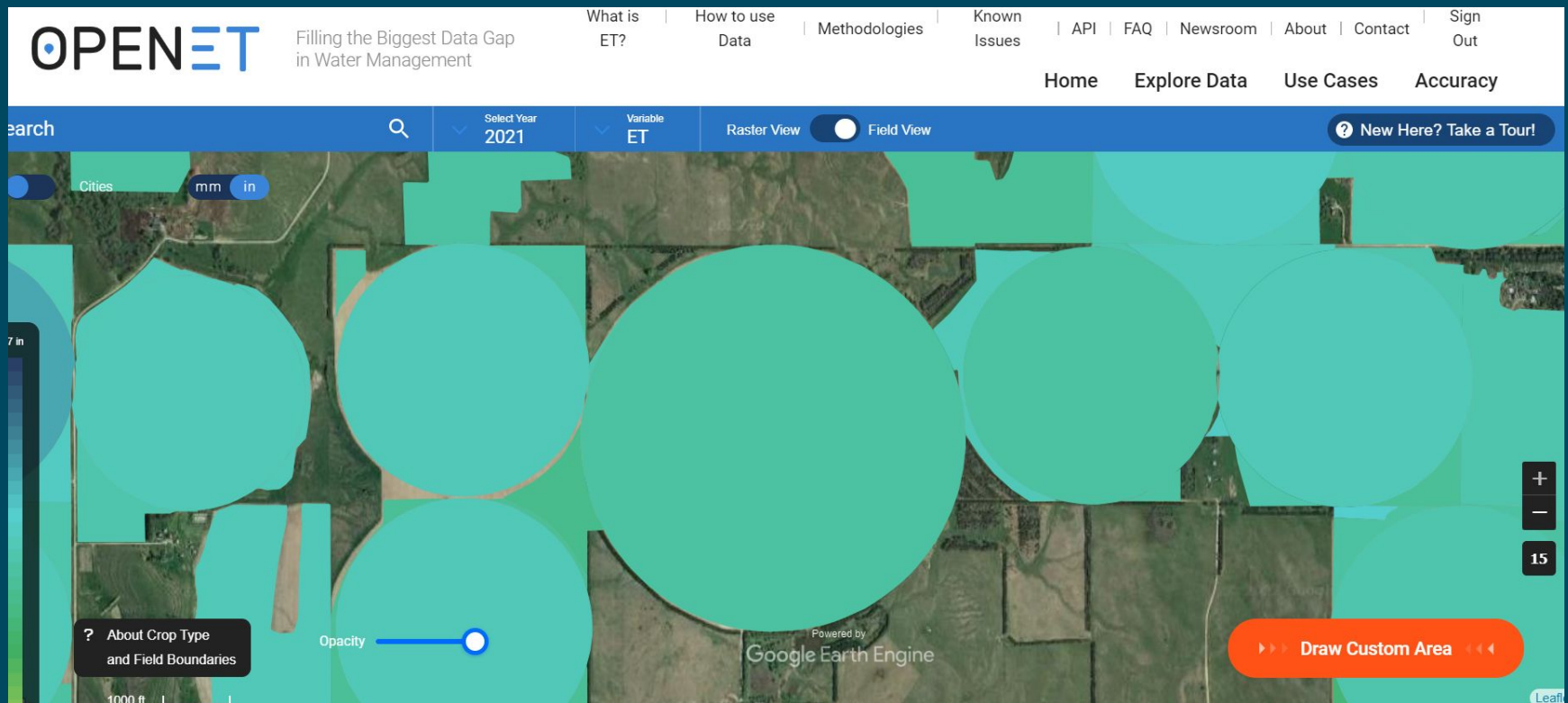
Click this [OpenET](#) link to view
satellite-based estimates of
evapotranspiration (ET) for this area.

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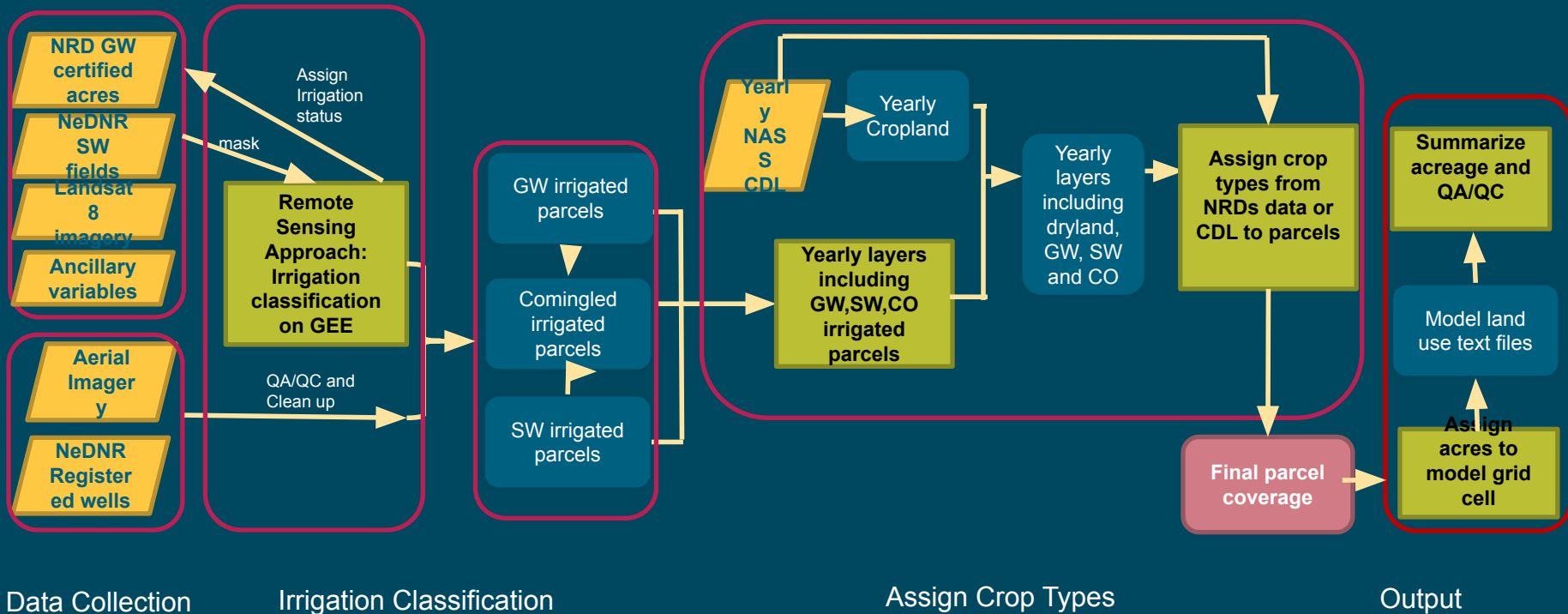
Permitted Acres – Open ET Fields



Permitted Acres – Open ET Field Data



Flowchart of Land-use Process



Project Goals:

- ▣ **Data Collection:** Compile a statewide GIS dataset of Certified Acres designated with source as surface water, groundwater, or comingled.
- ▣ **Water Modeling:** Improve statewide and regional Water Modeling efforts and integrate best available science products.
- ▣ **Application Development:** Develop a simple web mapping application to facilitate the exchange of information. Visualize the dataset and provide a tool to extract water modeling information, estimated pumping, recharge, and crop types directly from the application.
- ▣ **Future Goals:** Integrate a simplified process to update the dataset annually and illustrate year over year changes.

Tentative Schedule & Future Development

Jan – July 2022:

- Work with NRDs to complete compilation of Beta Statewide Dataset.
- Quality check of geometry and topology adjustments.
- Begin Beta Application Development.

Aug - ?

- Integration of available water modeling, irrigation, climate, and land use products with application.
- Begin process and tool development for annual update.

Oct-Dec 2022?

- Complete Beta Application for information exchange.
- NRD engagement: present beta application through NRD open houses, webinar, and/or committee meetings

Jan 2023 - ?

- Conduct annual update of statewide dataset.
- Release Beta Application
- Collect feedback on application

Other Water Use Data

□ INSIGHT webportal

- 1985 to 2012 data on the balance of water use and supply
- Updates as model (Modflow and CropSim) updates are completed
 - Republican and Upper Platte Basin have been updated since 2012
- Data aggregated to model cell and provided by basin and sub-basin

□ DSS – Platte River Decision Support for Excess Flows

- <https://gis.ne.gov/portal/apps/experiencebuilder/experience/?id=f26a3b4a2fd1446f9ce0ce2bf0754b14>

□ Aquarius – Stream Gage and Canal Diversion Data

□ Voluntary Water Use Reporting for Non-Canal SW Users

□ Drought Planning Tools

- <https://gis.ne.gov/portal/apps/experiencebuilder/experience/?id=c0b751c512a24b83a6ad1c3214941ea8>

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THANK YOU

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