

Update on NeDNR Modeling and Technical Activities

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NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

Outline

Review current available tools, data, information

- Groundwater models

- INSIGHT and interactive maps

- Website, NeRain, Streamgaging

Overview of planned activities

- Data exchange platforms

- Groundwater models and model update efficiency

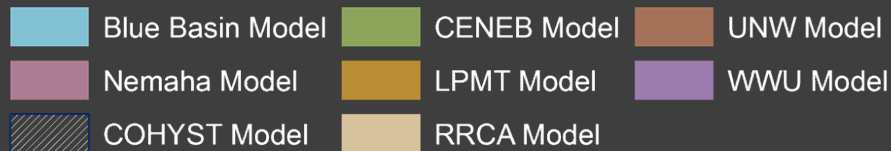
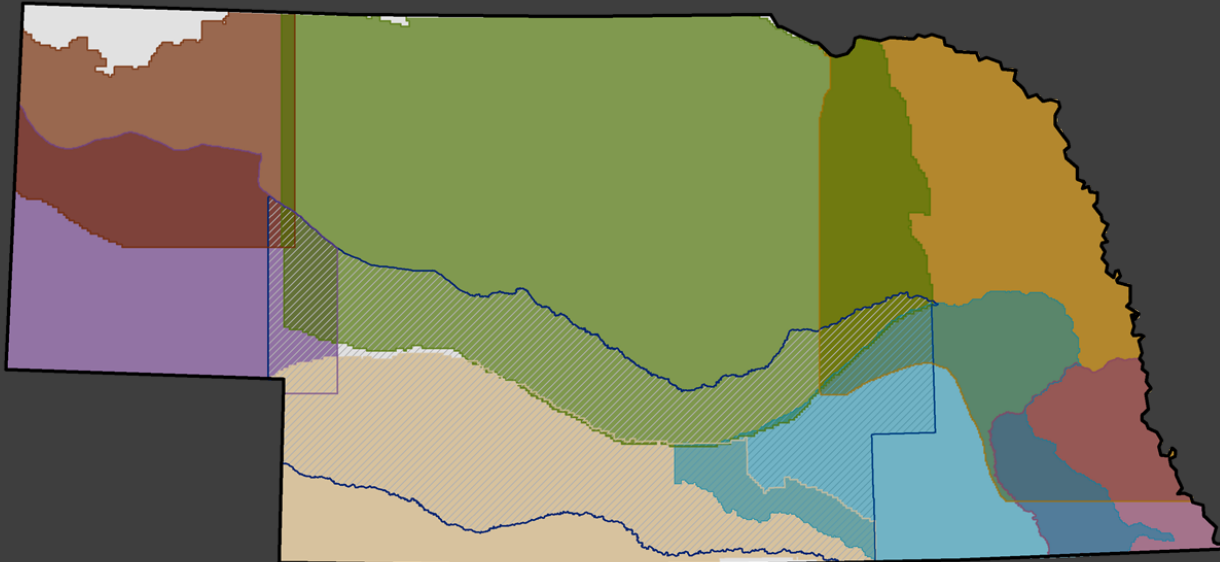
- IMP related analyses

- Decision support tools

- Education and outreach tools

Future tools – Model Application Tool

Groundwater Models



Goal is to have statewide groundwater modeling tools

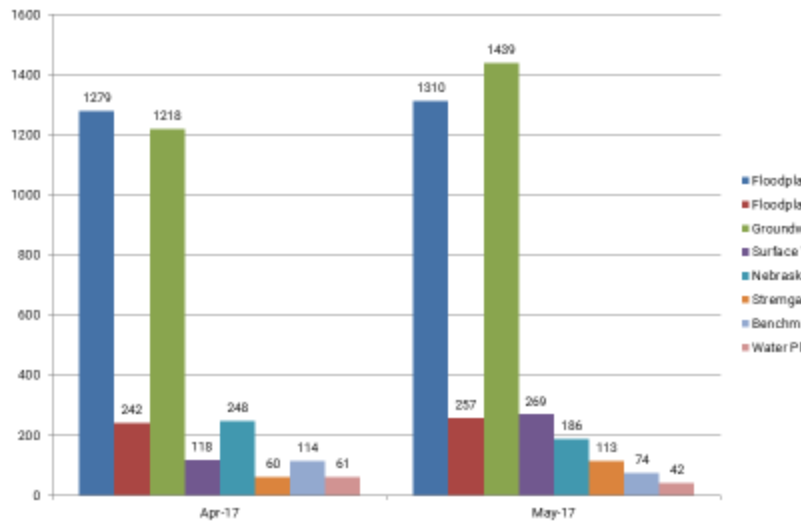
Interactive Maps

Department of Natural Resources

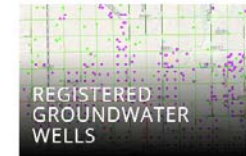
Submitted June 15, 2017

Monthly Met

NeDNR Interactive Map Usage by Month



Maps



NOTE: If you need access to any of the older interactive maps, send an email using the [feedback link](#).

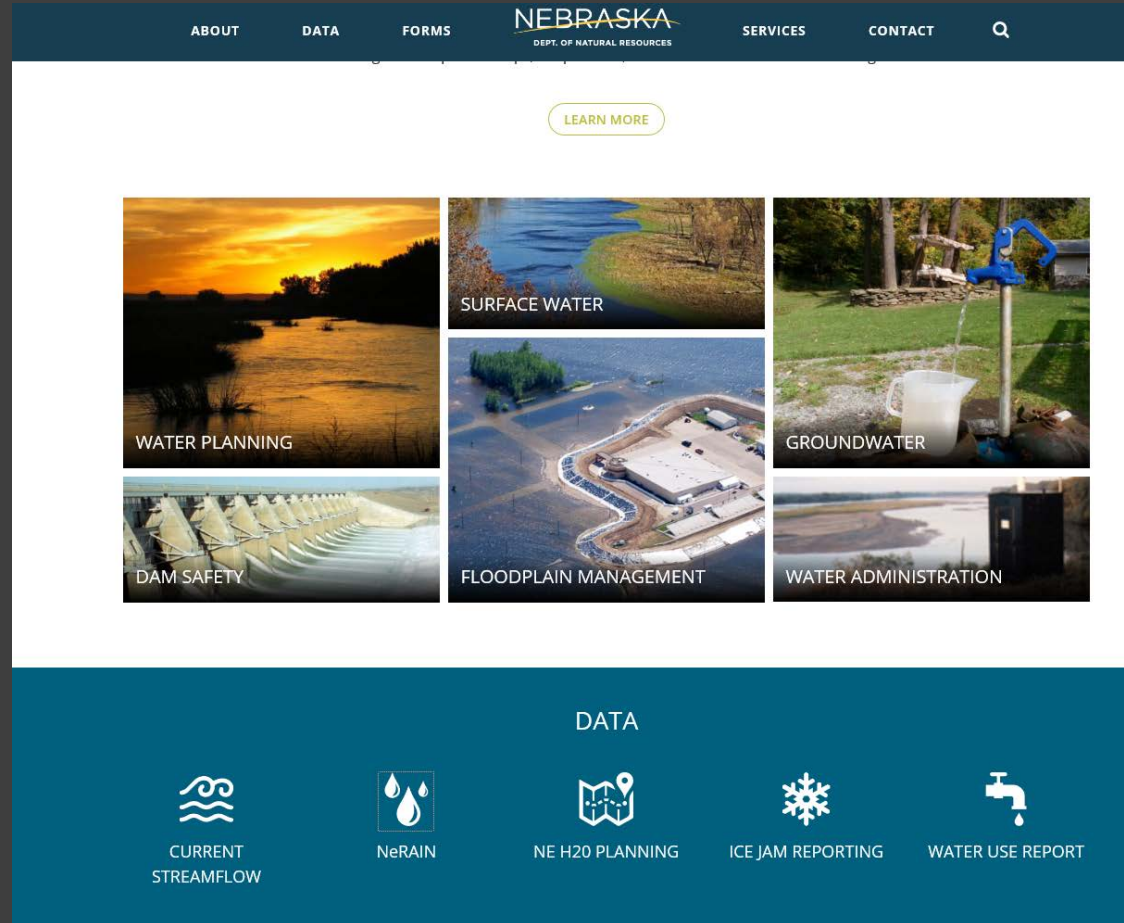
Website

New form and organization

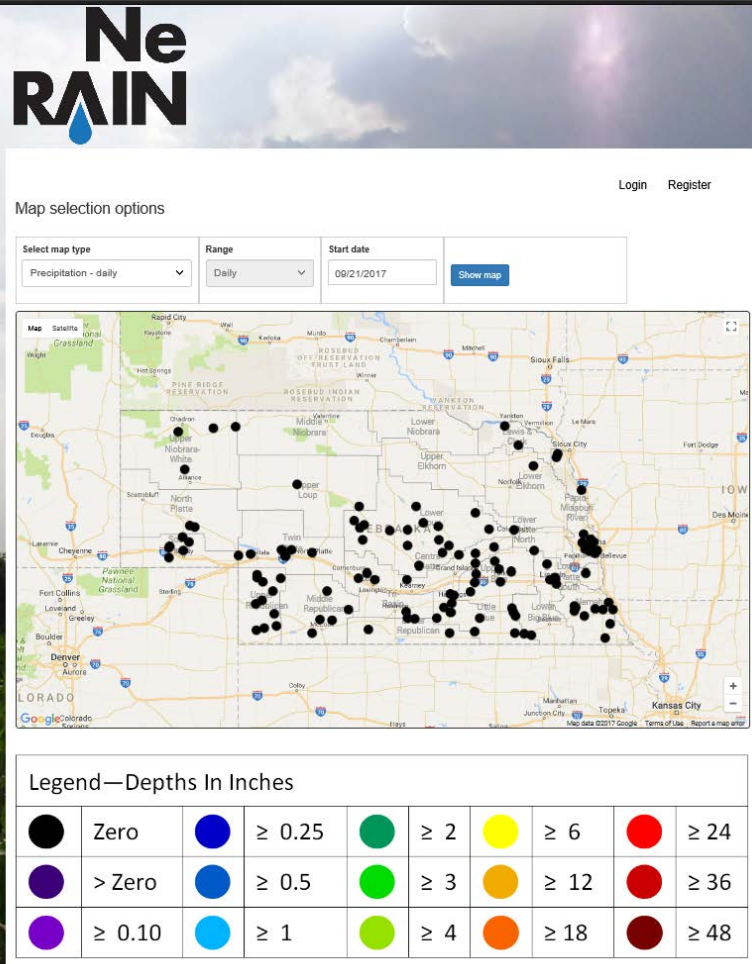
Approved IMPs

Publications and Data

Basin-wide planning efforts



NeRain



Needed to update programming language, for current servers and operating system

Updated look

New logo, working to be tablet and mobile-friendly

Zooming maps—using a Google map base

Database changes: “Many to many” relationship between accounts and gauges

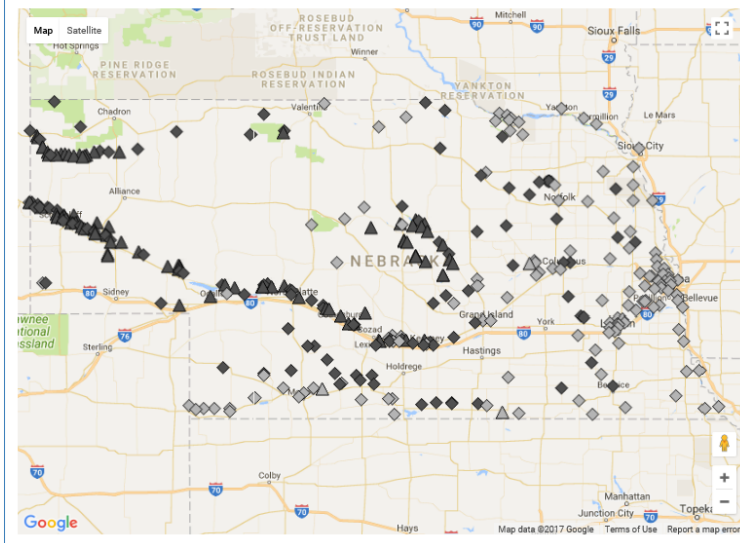
Yet to come during next month: tying volunteer gauges to *normal* rainfall, new graphs

Stream Gage Data

Nebraska Government Website



Nebraska Interactive Streamgage Map



Streamgaging

The Department of Natural Resources is authorized to measure and monitor the water flowing in Nebraska's streams, rivers, and canals. For this purpose, the Department has established a Streamgaging Program. Through this program, the Department operates and maintains a streamgaging network comprised of more than 250 gaging sites. The network includes continuous stream and reservoir gages, partial year gages, canal gages, canal return flow gages, and miscellaneous spot measurements. The core network consists of approximately 110 continuous streamgages and 120 canal gages.

Gage List

***Unless otherwise marked, all data is provisional and subject to revision**

Legend

- ◆ - NeDNR Stream
- ◇ - USGS/Other Stream
- ▲ - NeDNR Canal
- △ - USGS/Other Canals
- - NeDNR Reservoir
- - Other Reservoir

Interactive map

NeDNR and other gages available

Real-time data

Daily data

Hydrographic reports

Rating curves

These webpages work best with [Google Chrome](#). To install, please click on the browser name to download the most recent version. If headers, graphs, and other page elements do not appear to display properly, we suggest deleting the browser history. If you have questions please contact the Department at (402) 471-2363.

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Version: 1.3 8/18/2017

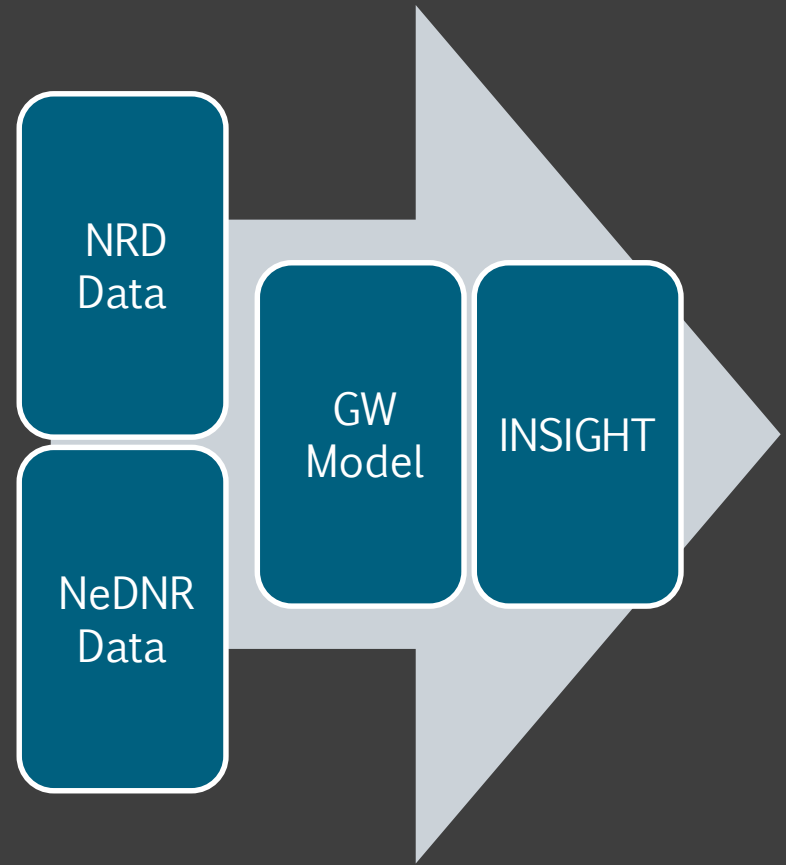
Future Efforts: Data Exchange Platforms

Focus is on ensure
best available data
supports models and
INSIGHT

Ease IMP reporting
efforts

Reduce data
translation errors

USGS Water Smart
Grant



Future Efforts: Data Exchange Platforms

Consumptive Use and Stream Depletion Calculator

Would you like to:

Find CIR for particular location

Calculate CU change for a land use change

Calculate CU change for a transfer

Enter data for IMP reporting

Upload files for IMP reporting

<https://nednr.nebraska.gov/CIR/Home/Index>

Present Conditions

Section	Township	Range	Crop	Acres
10	9	17	Irrigated Corn	140

Future Conditions

Section	Township	Range	Crop	Acres
10	9	17	Dryland Corn	140

Submit Clear

Computed CIR Offsets





Section	Township	Range	Crop(ID)	Acres	CIR(IN)	Recharge(IN)	GW withdrawal(AF)	Stream depletion (Percent)	Estimated net depletion (AF)
Present Conditions									
10	9	17	Irrigated Corn (icm)	140	8.95	6.6	27.42	21	5.76
Total Present Conditions				140			27.42		6
Future Conditions									
9	17	10	Dryland Corn (dcm)	140	0	1.6	-18.67	21	-3.82
Total Future Conditions				140			-18.67		-4
Net Value (AF)									-10

Print Results Return to Main Menu

Annual Report of Water Use
Activities in the Twin Platte NRD

For the 2017 Platte Basin
Meeting North Platte NE -
July 19, 2017 Holiday Inn
Express - 2:00 pm

2016

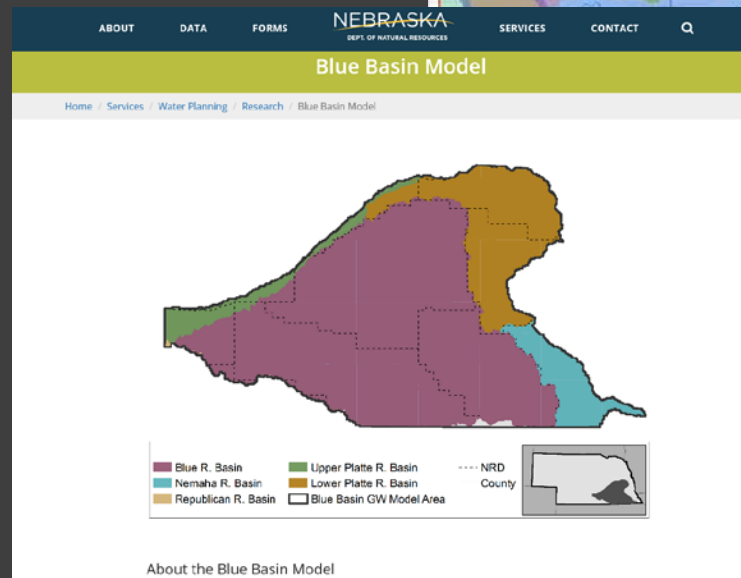
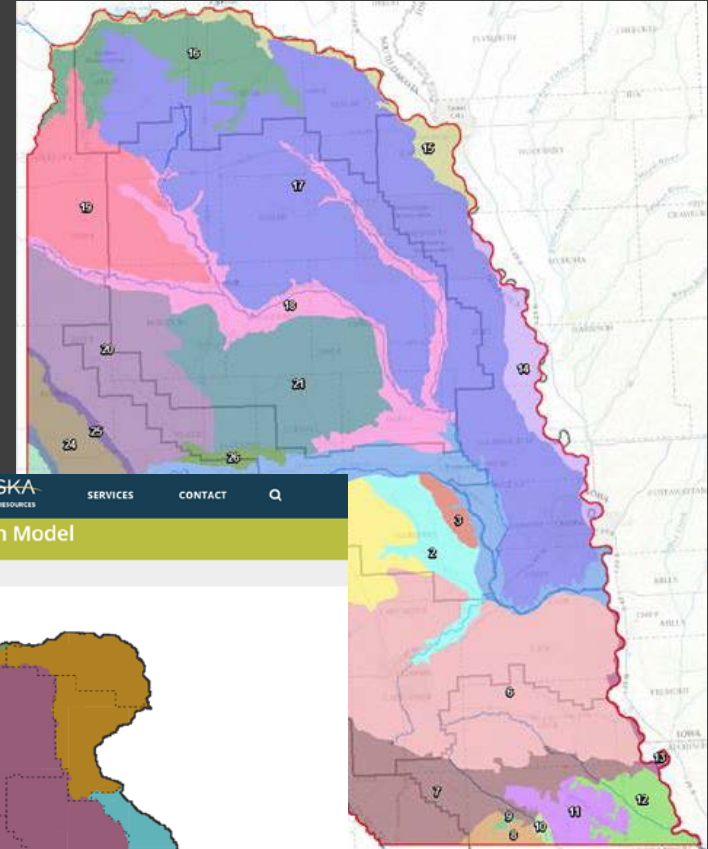





Future Efforts: Completion of Groundwater Models

Finalize Lower Platte
Missouri Tribs Model

Complete Nemaha
Model

Collaborate with
Blue basin NRDs in
developing a new
Blue Basin Model



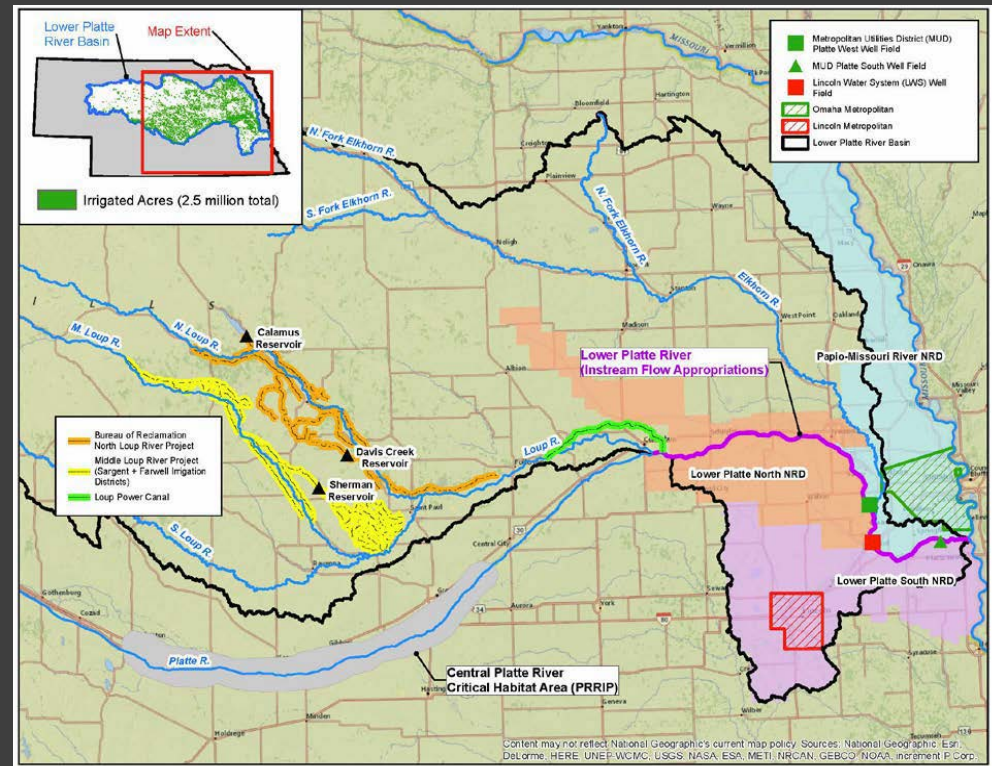
Future Efforts: IMP Related Analyses

Upper Platte “robust review” efforts toward addressing post-1997 depletions

Conjunctive management analyses

Lower Platte Drought Contingency Plan analyses

Republican River conjunctive management study (NBID system)



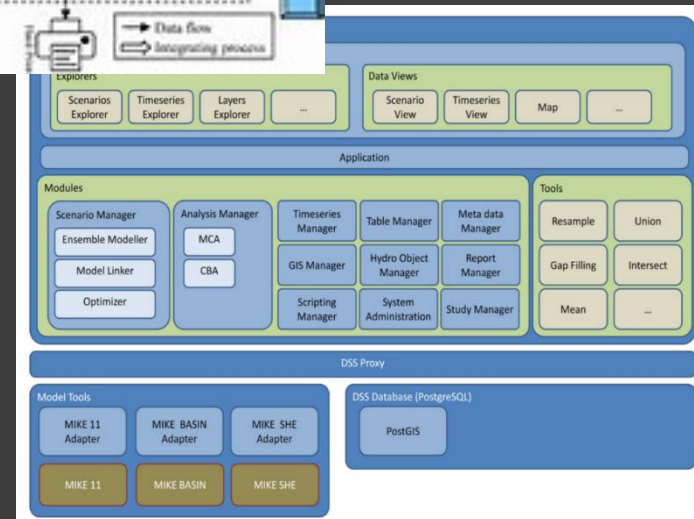
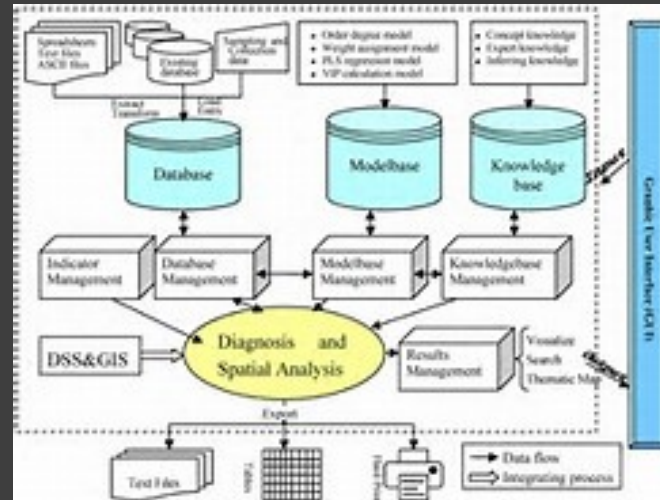
Future Efforts: Decision Support Tools

Evaluate effects associated with NeDNR permitting (excess flows, transfers, etc.)

Connect existing models and data in the Platte Basin

Goal to identify most optimal outcomes

Currently finalizing work plan and scope

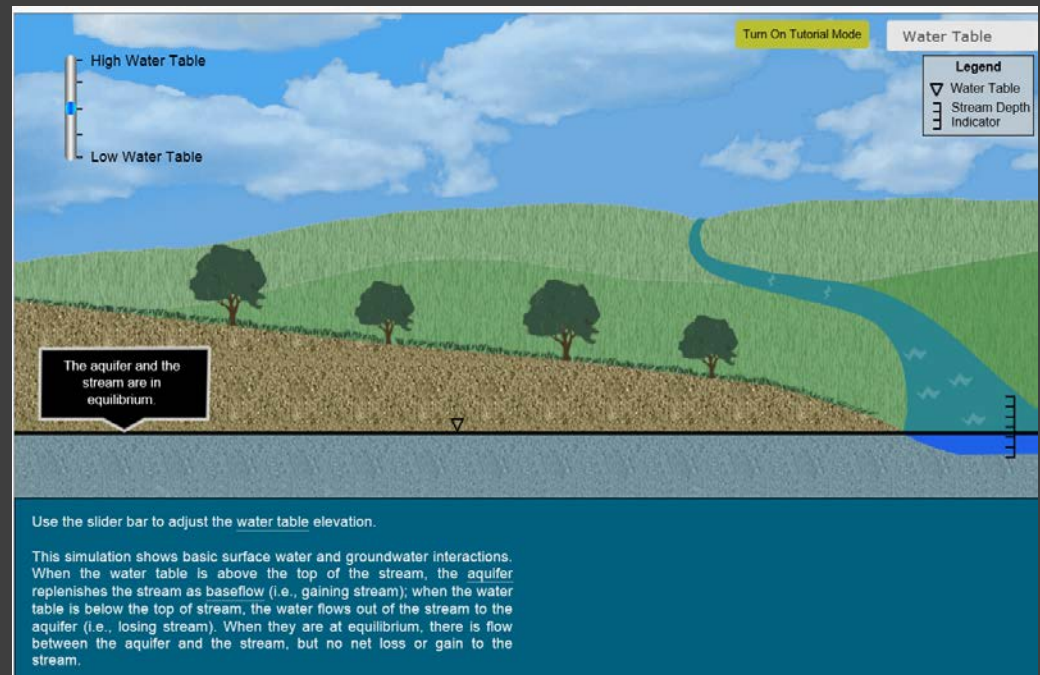


Future Efforts: Education and Outreach

Tools to describe groundwater depletions

Tools to create greater transparency on surface water data

INSIGHT overview

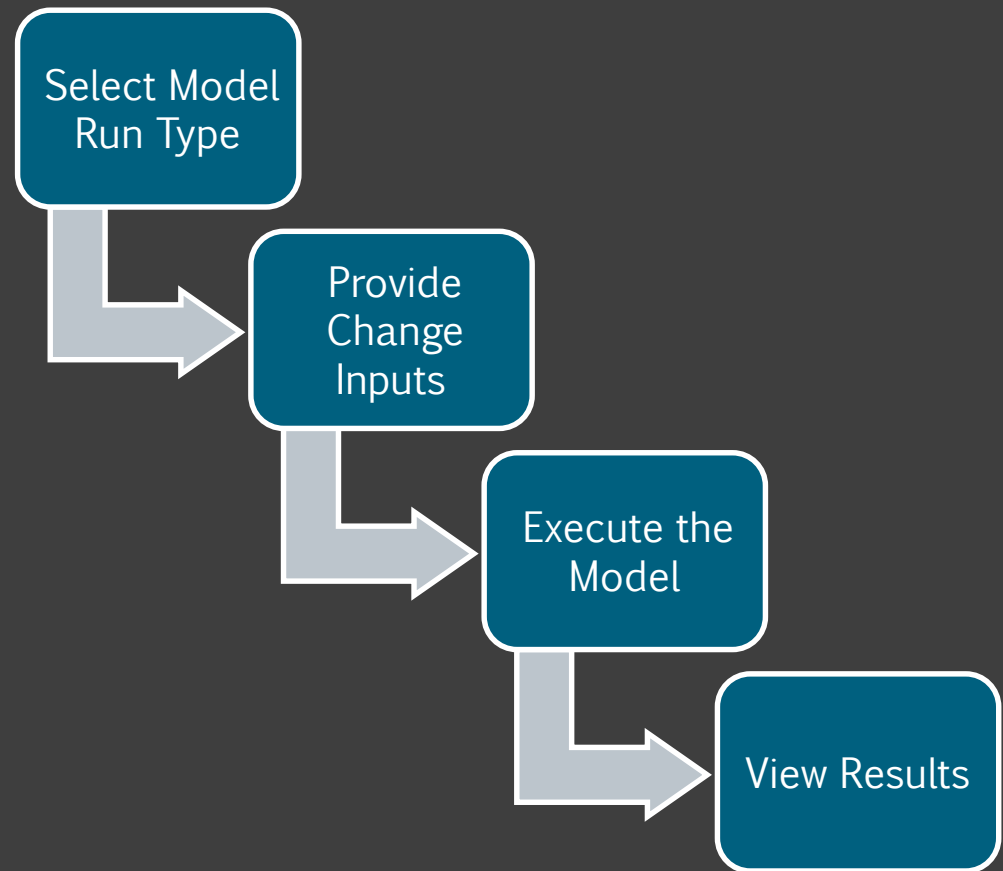


Future Efforts: Tools to Utilize Existing Groundwater Models

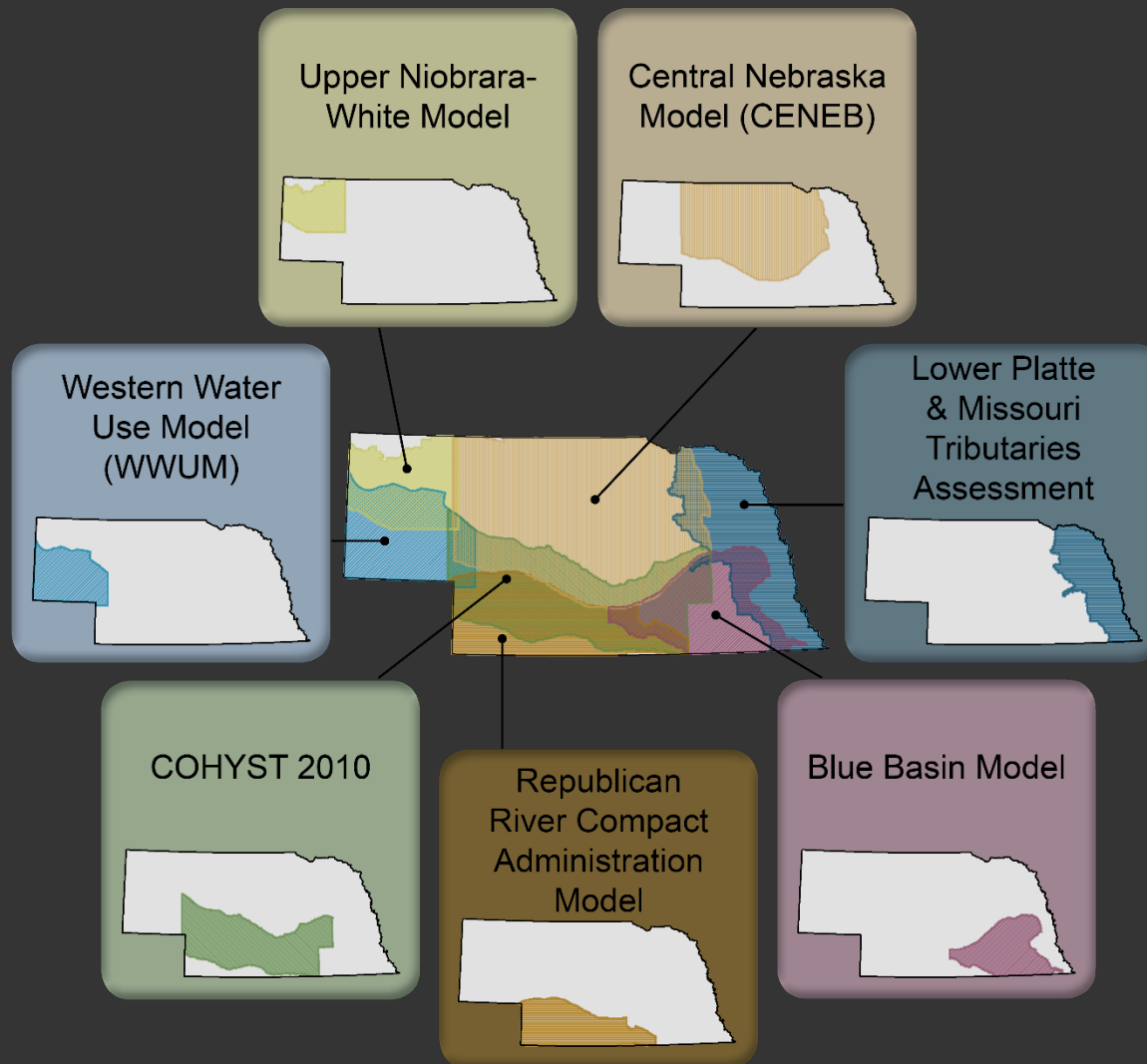
GUI for model analysis (land use change, recharge, pumping)

Improve access to watershed model results

View results at the county, NRD, or watershed level



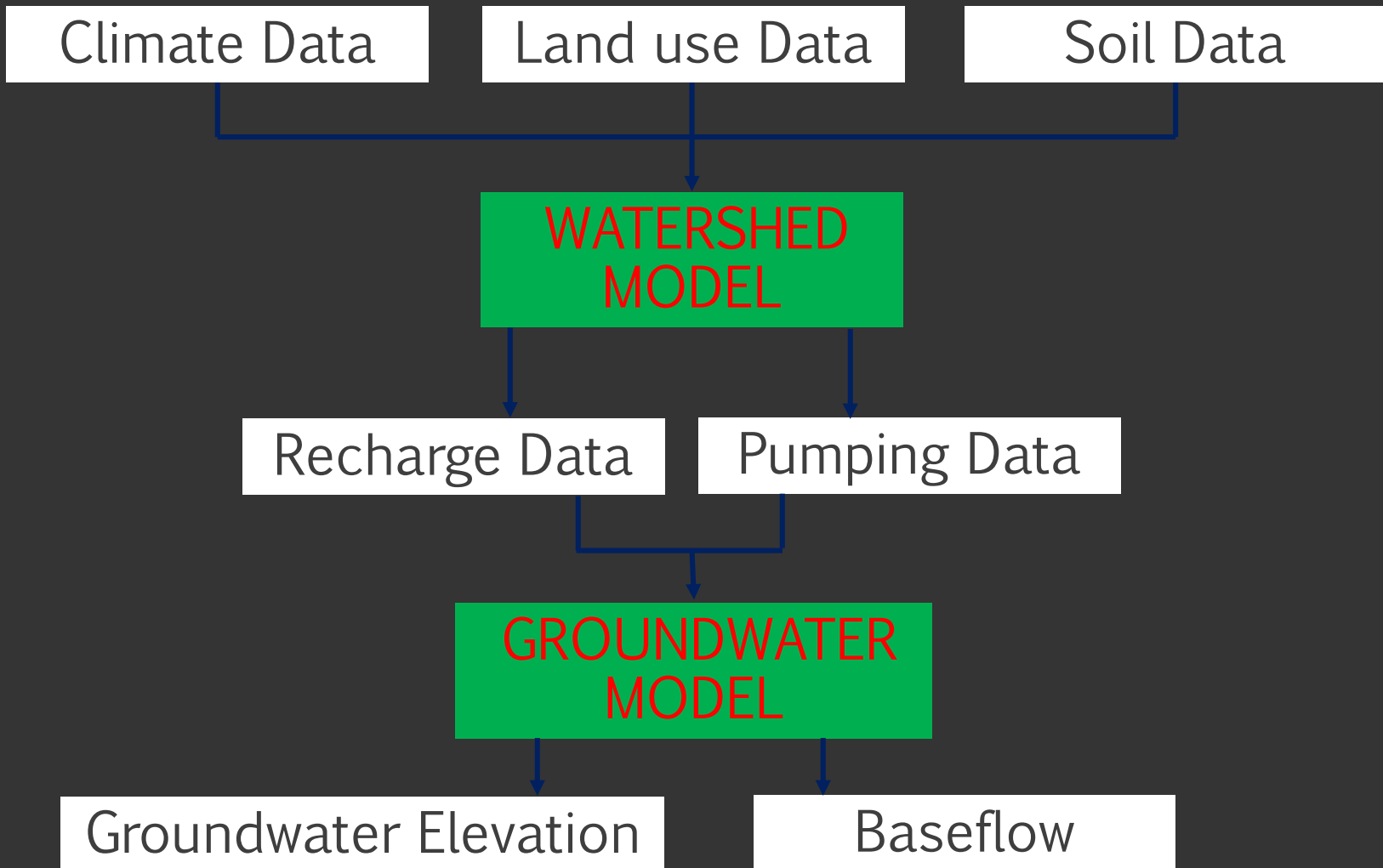
Model Application Tool



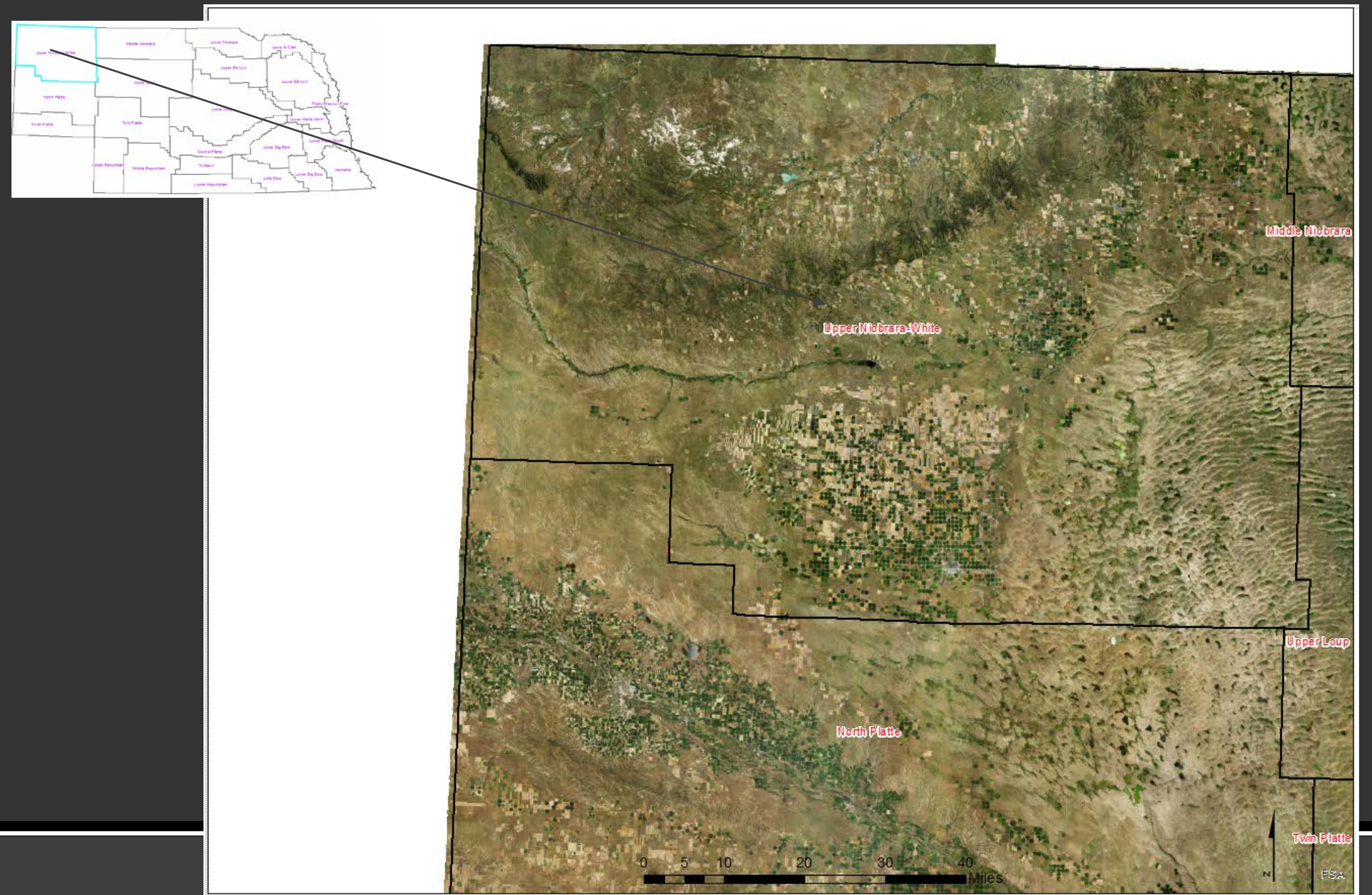
Model Application Tool

- Hydrologic models have been constructed and calibrated
- Examples of current model uses :
 - Hydrologically Connected Area Analysis
 - Fully Appropriated Basin Analysis
 - Water Supply and Demand Calculation
- Existing models can be a helpful tool to NRDs
 - Land use, and Irrigation type change analysis
 - Canal recharge analysis
 - Drought scenario analysis
- Need for tools supporting model analysis in a robust manner
- The Department's effort - Model Application Tool

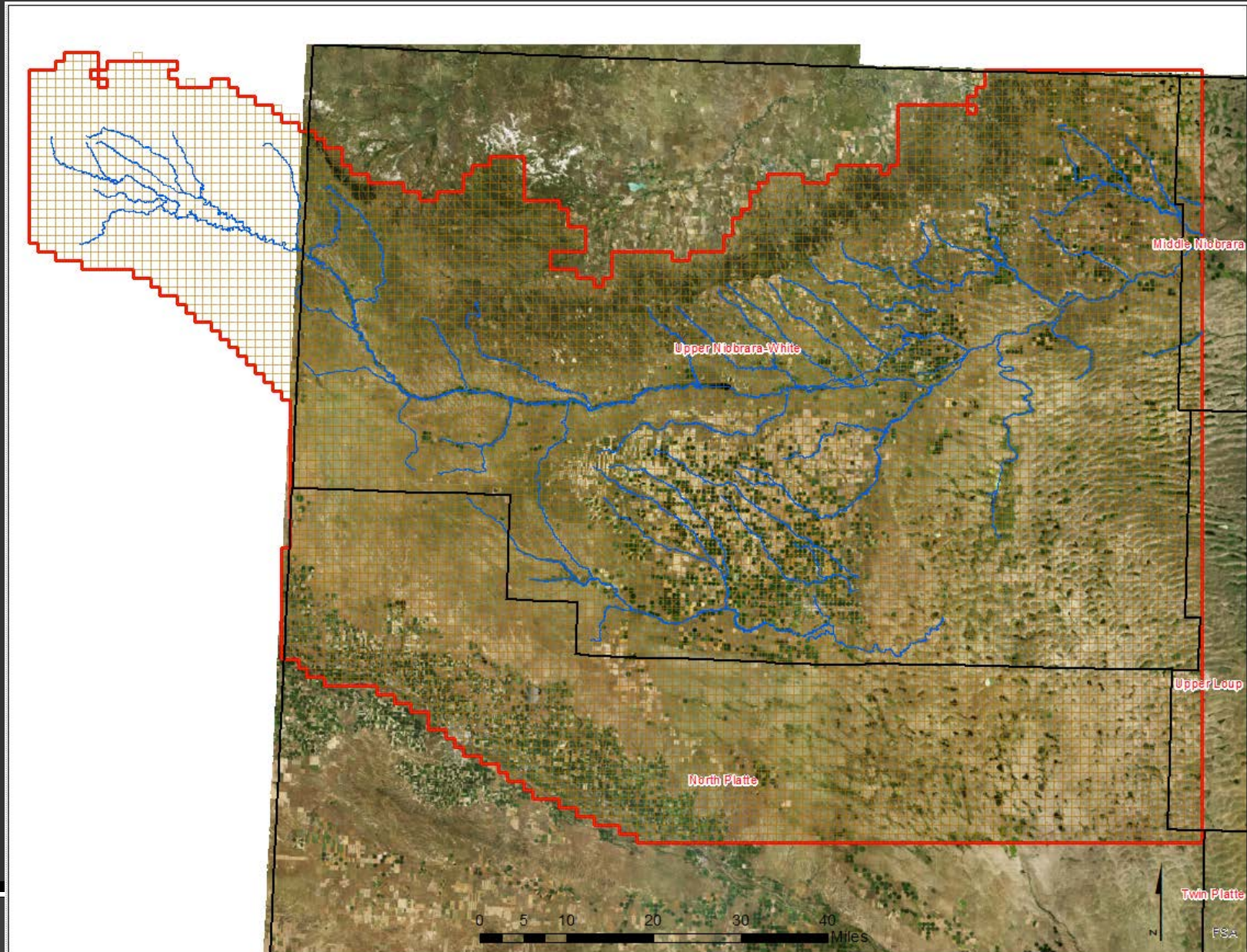
Model Application Tool



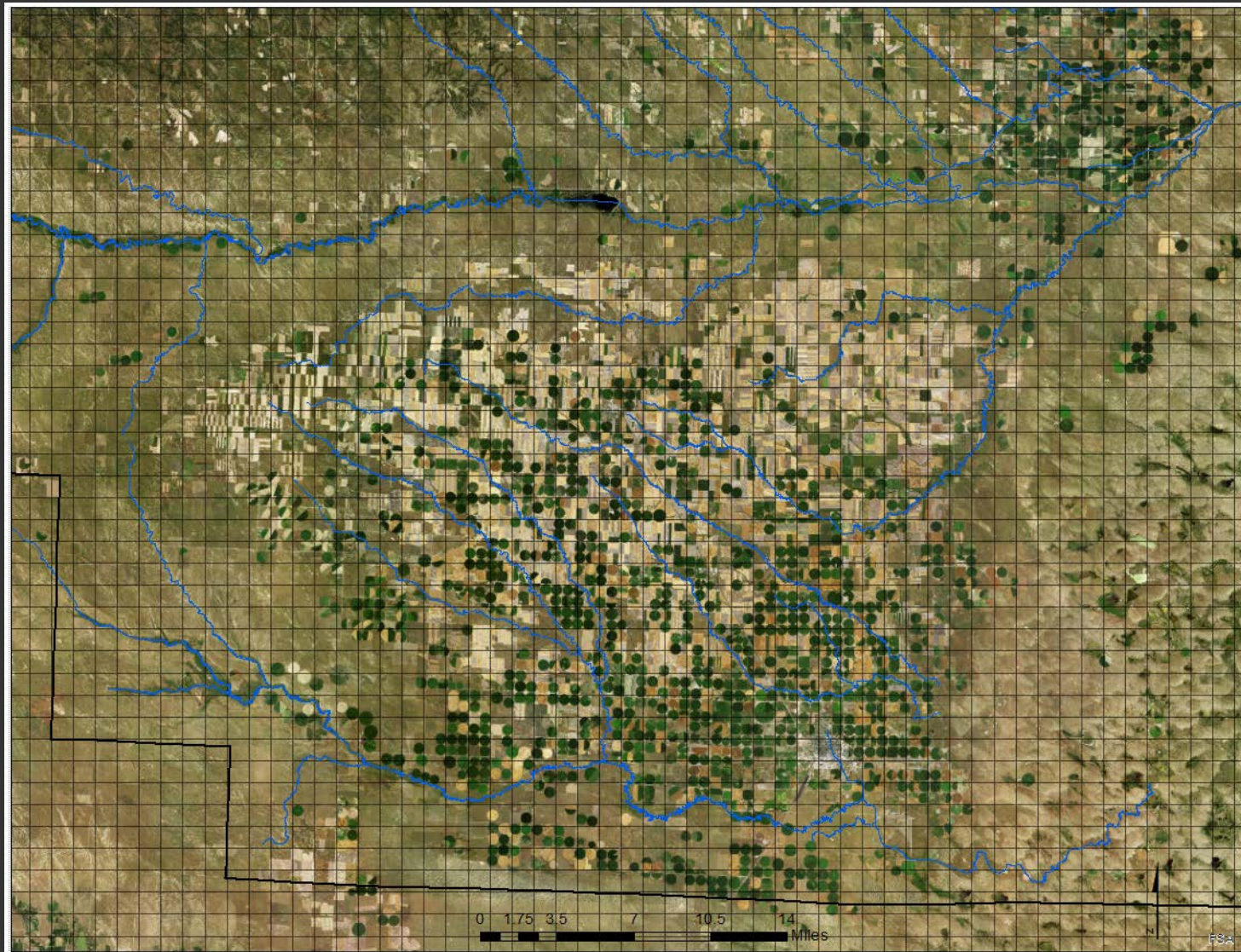
Model Application Tool



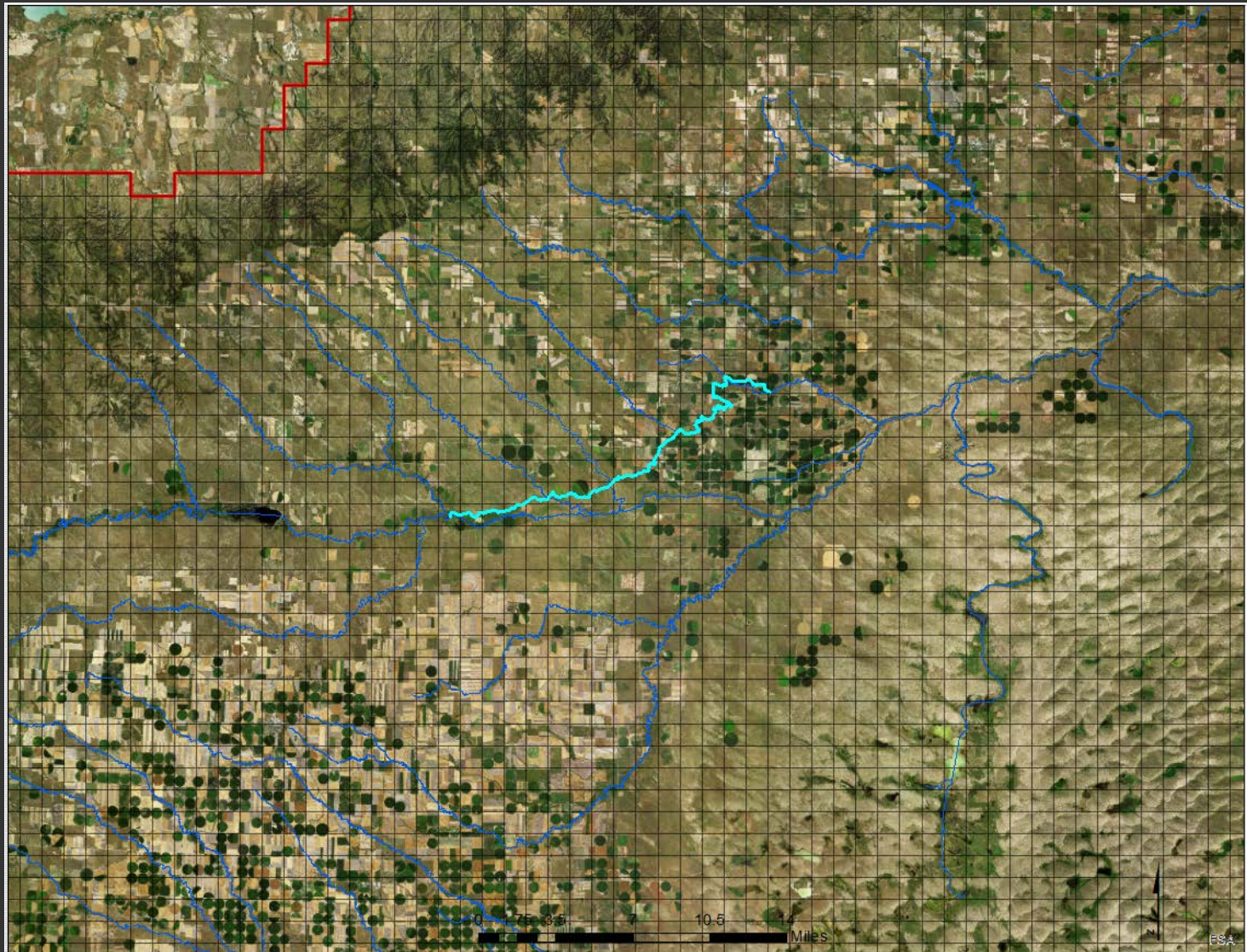
Model Application Tool



Model Application Tool



Model Application Tool



Model Application Tool

Model Application Tool

Model

CNEB UNW

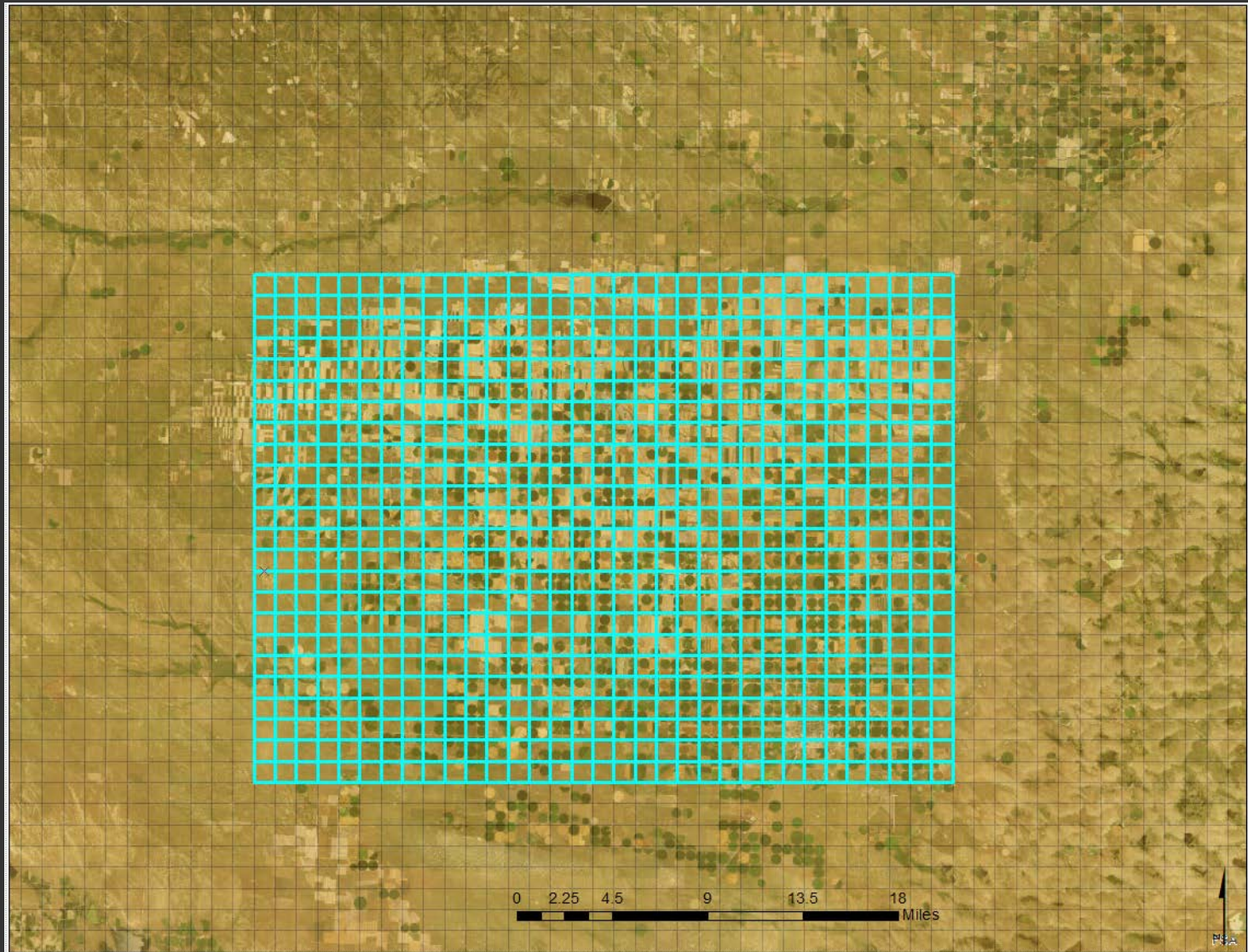
Baseline Name File

Scenario Output Dir

Model Application Tool



Model Application Tool



Model Application Tool

Land use change

Add
 Delete
 Save
 Run

Zone

County
 NRD
 Subbasin
 WBDHU10
 Customized

Customized Zone File

	In	From	To
1	Central Platte	GW;Corn	Dry;Corn
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Lower Big Blue
 Nemaha
 Middle Republican
 Upper Republican
 Lower Platte South
 Upper Big Blue
 Central Platte

From

Corn
 SugarBeets
 EdibleBeans
 Alfalfa
 WinterWheat
 Potatoes
 Milo
 Sunflower

To

Corn
 SugarBeets
 EdibleBeans
 Alfalfa
 WinterWheat
 Potatoes
 Milo
 Sunflower

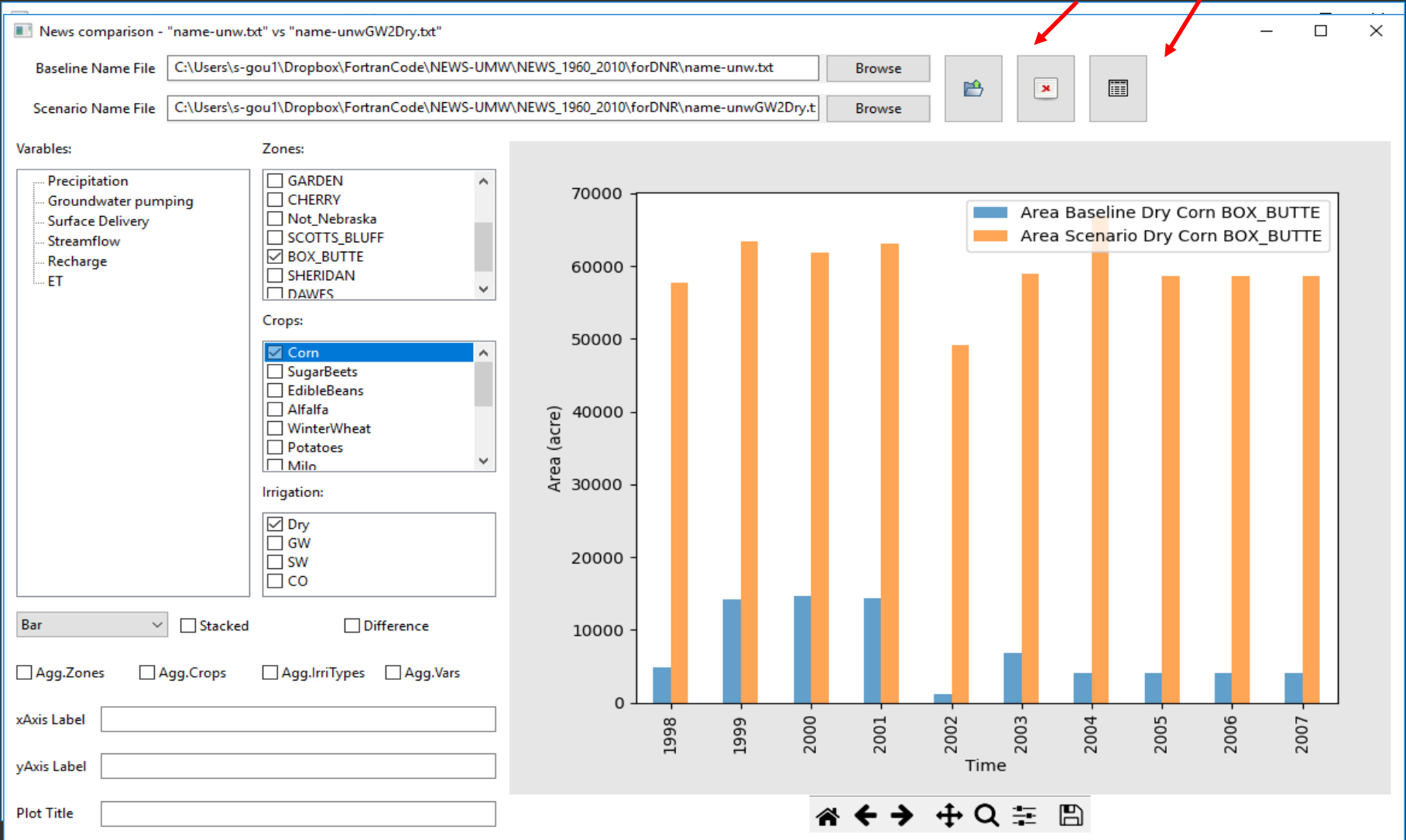
Dry
 GW
 SW
 CO
 Dry

Dry
 GW
 SW
 CO
 Dry

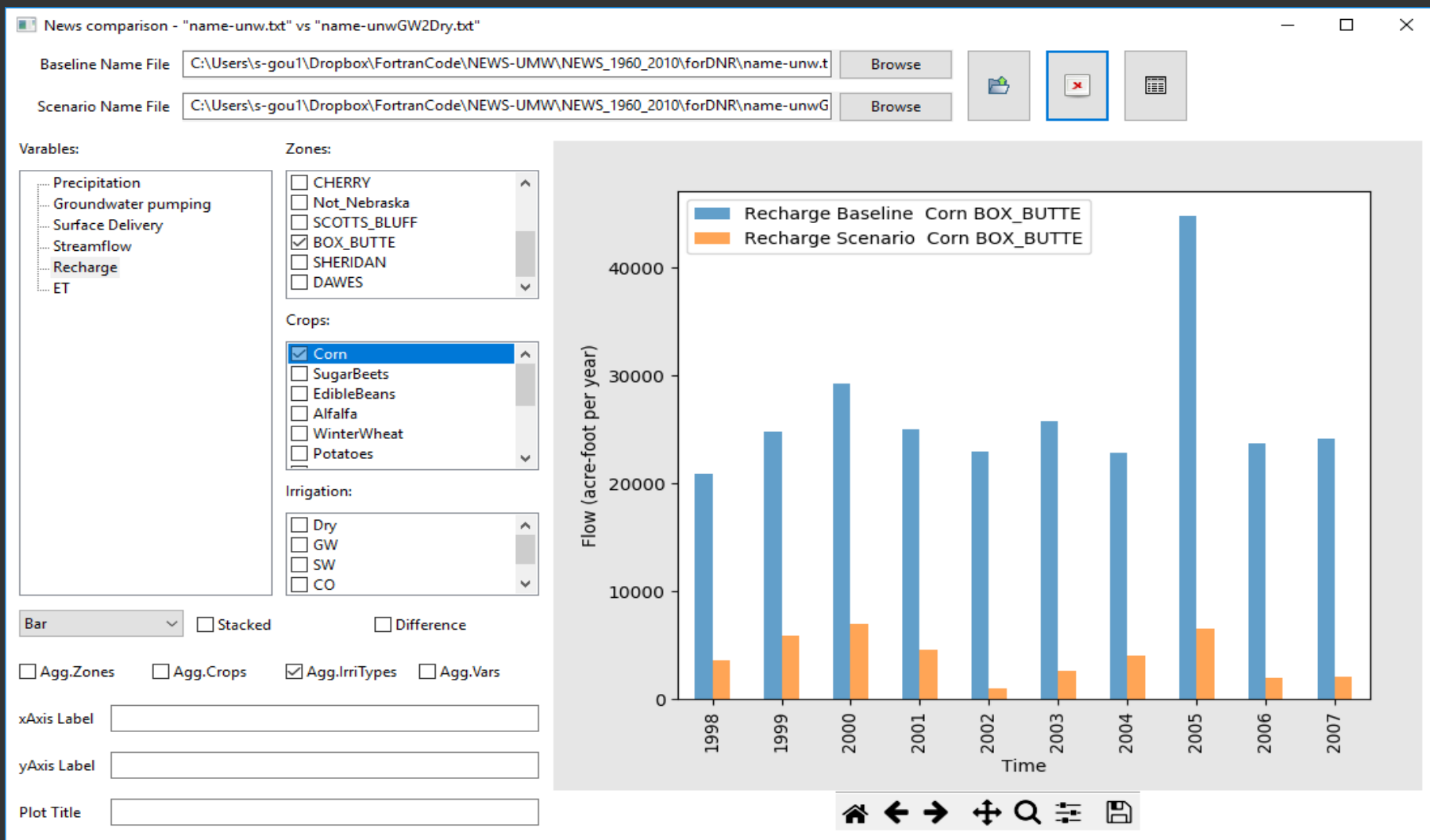
Model Application Tool

Plot data

Export data



Model Application Tool



Model Application Tool

Model Application Tool

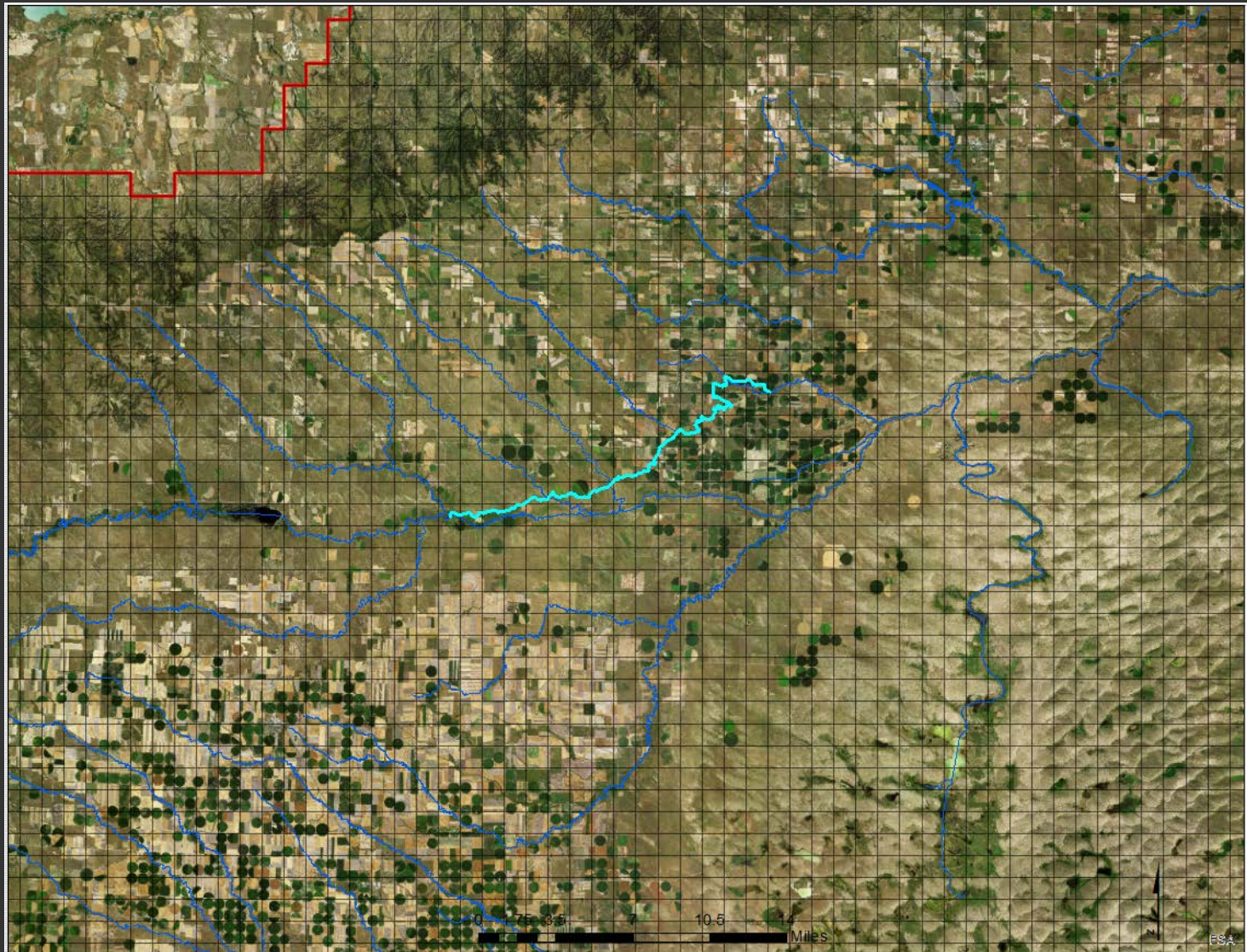
Model

CNEB UNW

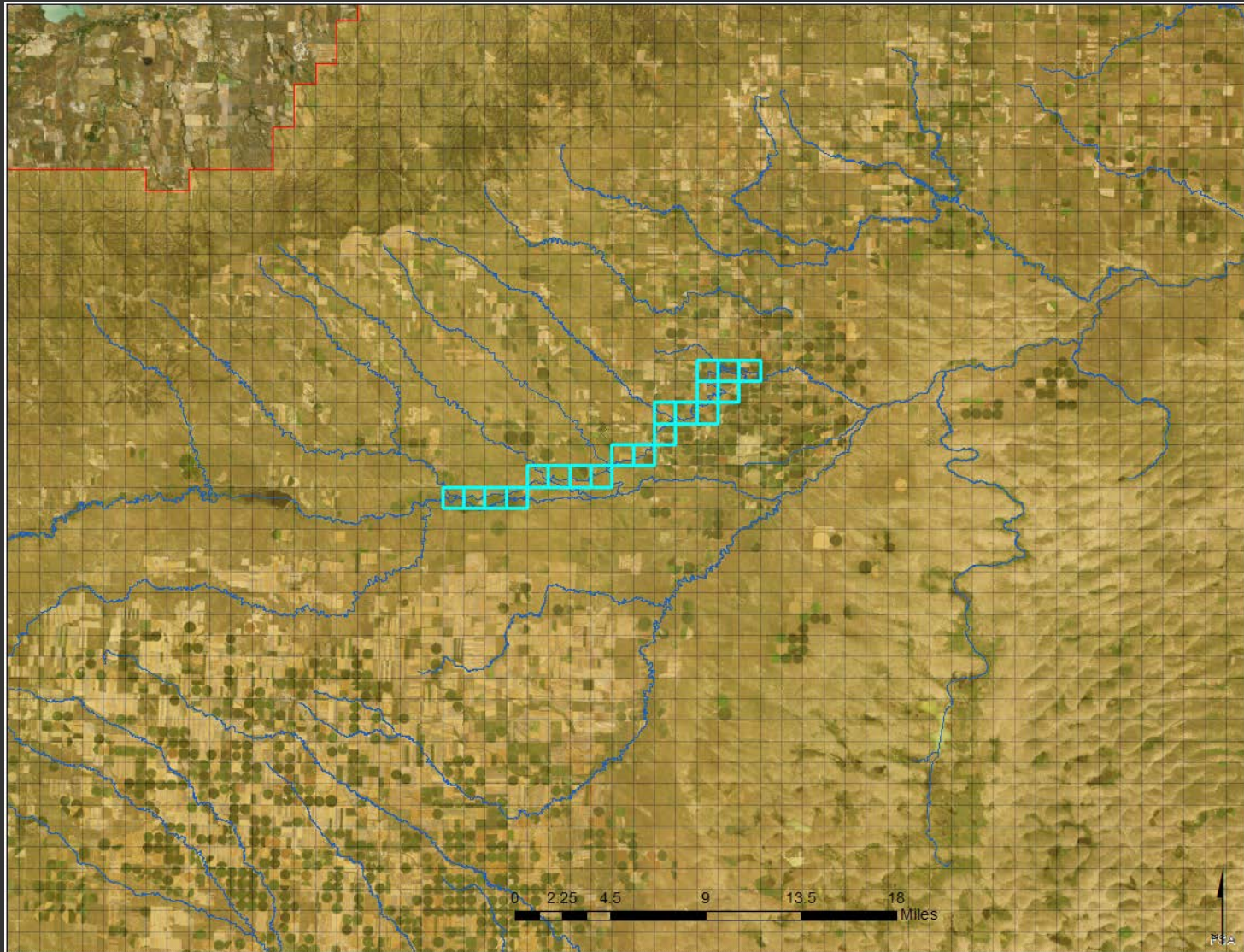
Baseline Name File

Scenario Output Dir

Model Application Tool



Model Application Tool



Model Application Tool

Canal Recharge Change

+ Add x Delete Save Run

Canal

Canal1 Canal2 Canal3 Customized

Customized Canal File

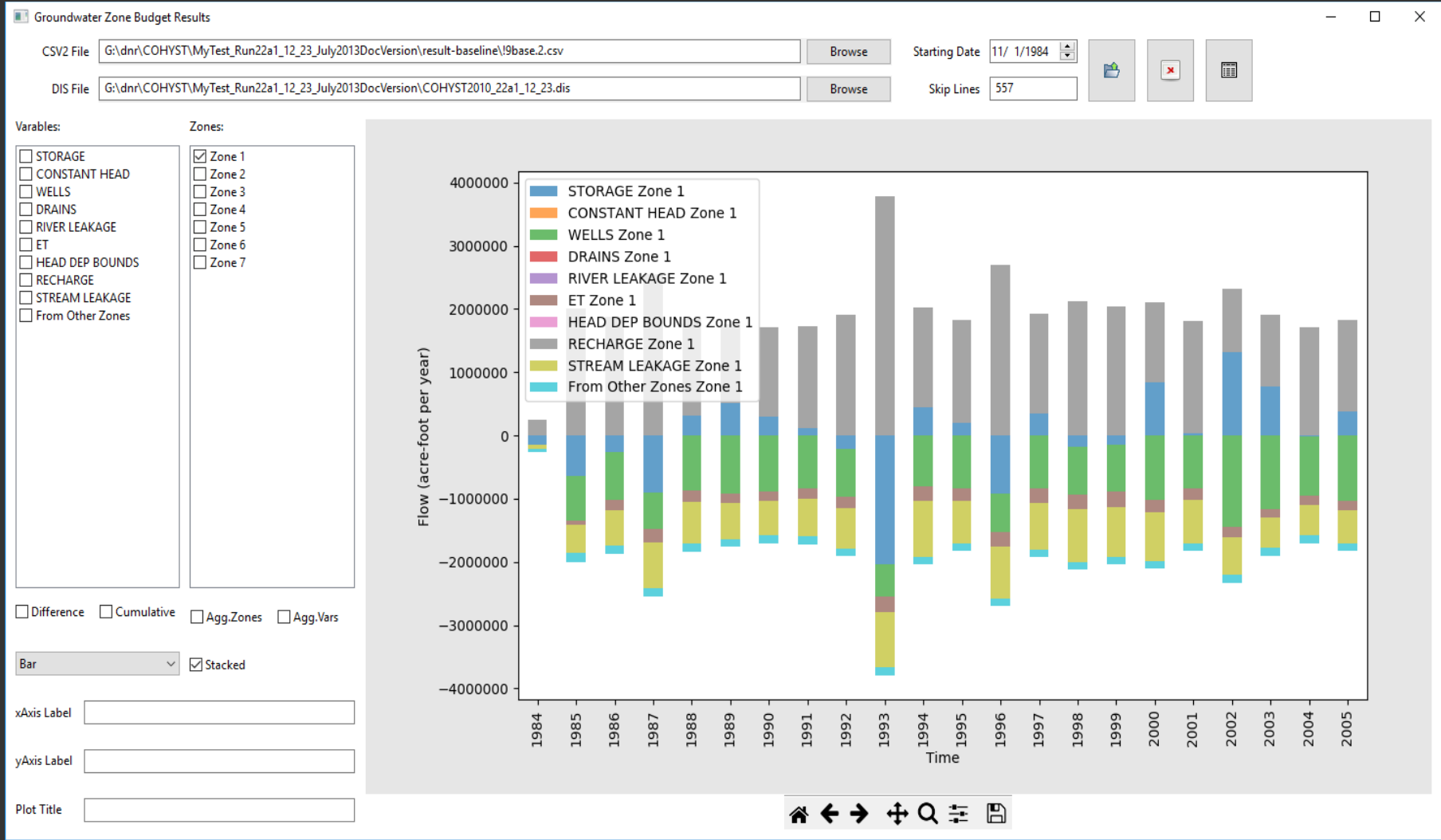
Start To

Change of rate

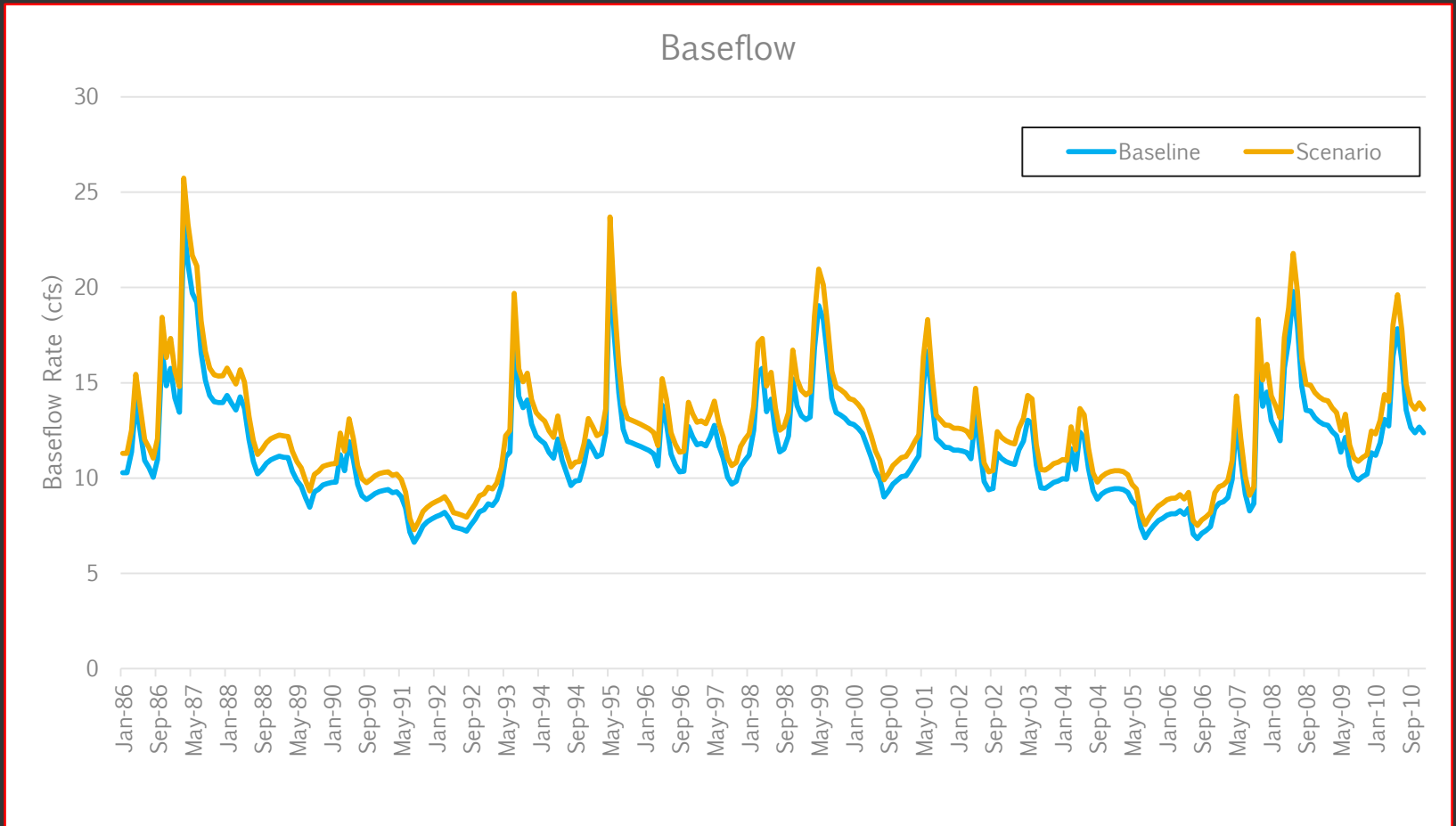
January
 Feburay
 March
 April
 May
 June
 July
 August
 September
 October
 November
 December

	Canal	Start	End	Month	Rate
1	Customized	1980-09-25	2017-09-25	1,2,3,4,5,6,7,8,9,10,11	-1000
2	Canal2	1995-09-25	2000-09-25	4,5	+500
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

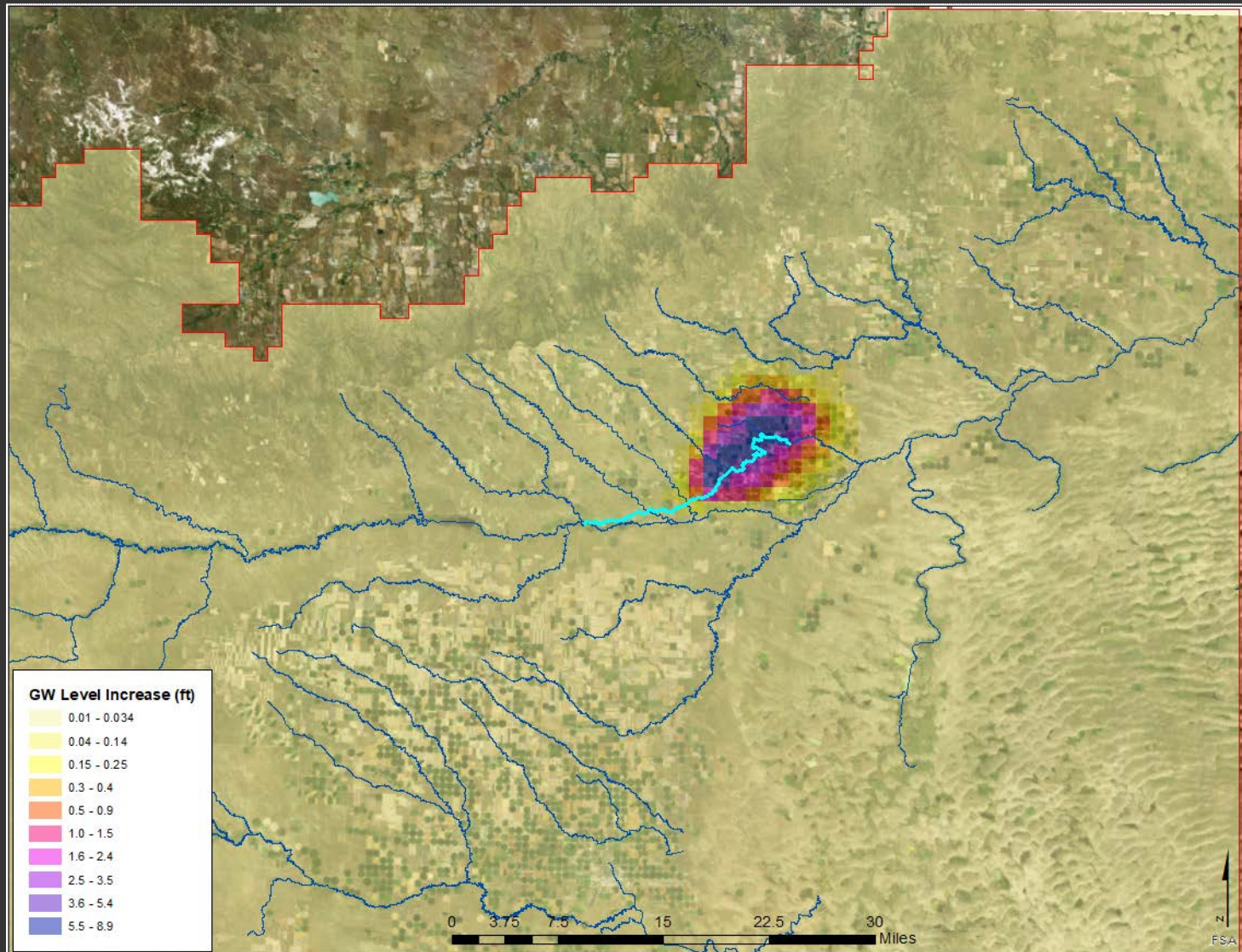
Model Application Tool



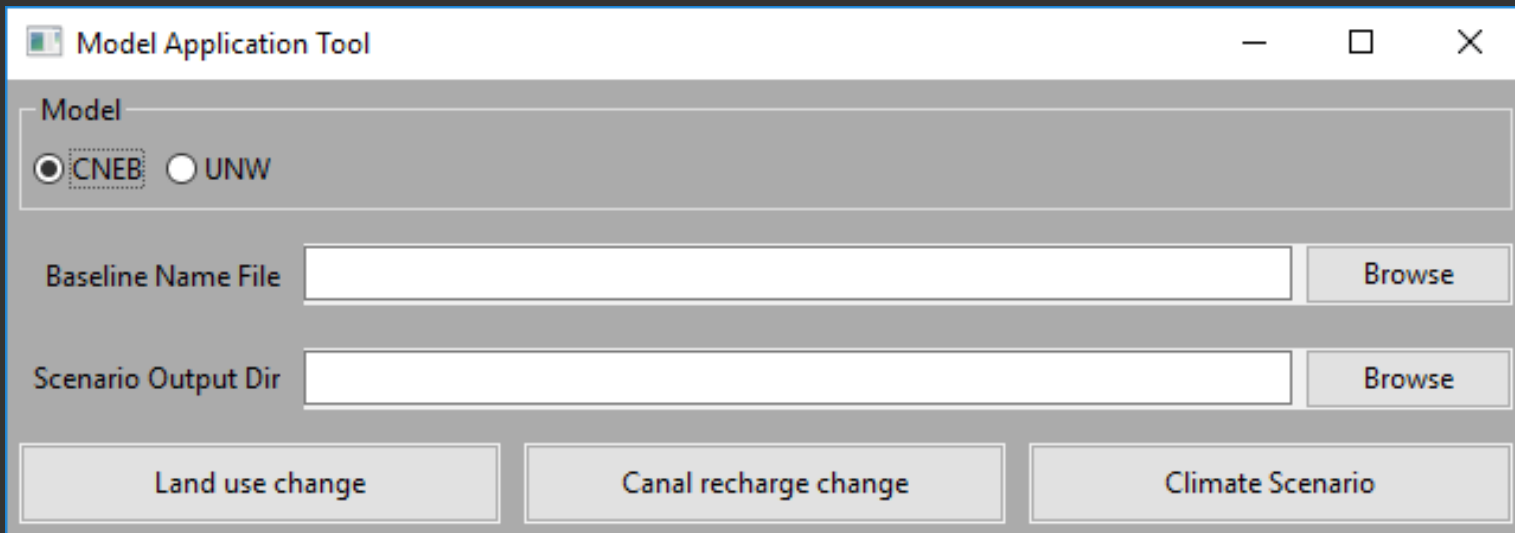
Model Application Tool



Model Application Tool



Model Application Tool



The screenshot shows a software window titled "Model Application Tool". Inside the window, there is a "Model" section with two radio buttons: "CNEB" (which is selected) and "UNW". Below this, there are two input fields: "Baseline Name File" and "Scenario Output Dir", each followed by a "Browse" button. At the bottom of the window, there are three buttons: "Land use change", "Canal recharge change", and "Climate Scenario".

- Model Application Tool developed as per need of the Department and NRDs
- Model Application Tool will be shared to NRDs for their use
- Tool can be customized based on NRD's needs
- Please let us know any suggestions we could incorporate in Model Application Tool

NEBRASKA

A thick yellow swoosh graphic that starts under the 'N', goes under the 'B', 'R', 'A', 'S', and 'K', and ends under the 'A'.

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

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