

Update on NeDNR Modeling and Technical Activities

NEBRASKA

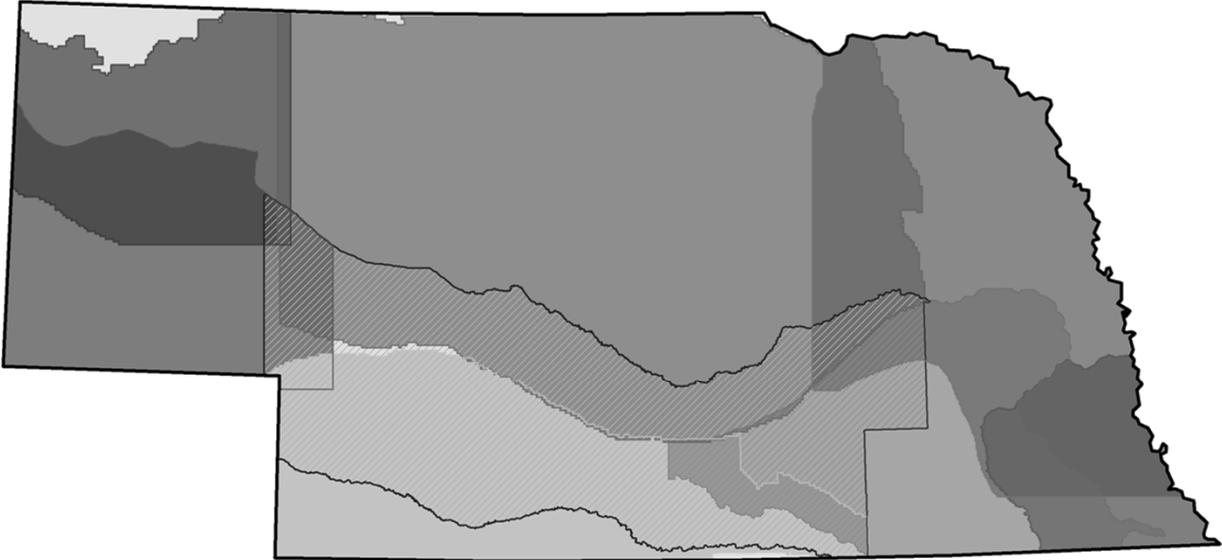
Jesse Bradley, Assistant Director

Mahesh Pun, Integrated Management Analyst

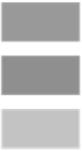
Outline

- Review current available tools, data, information
 - I. Groundwater models
 - II. INSIGHT and interactive maps
 - III. 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



Central
Groundwater
Model



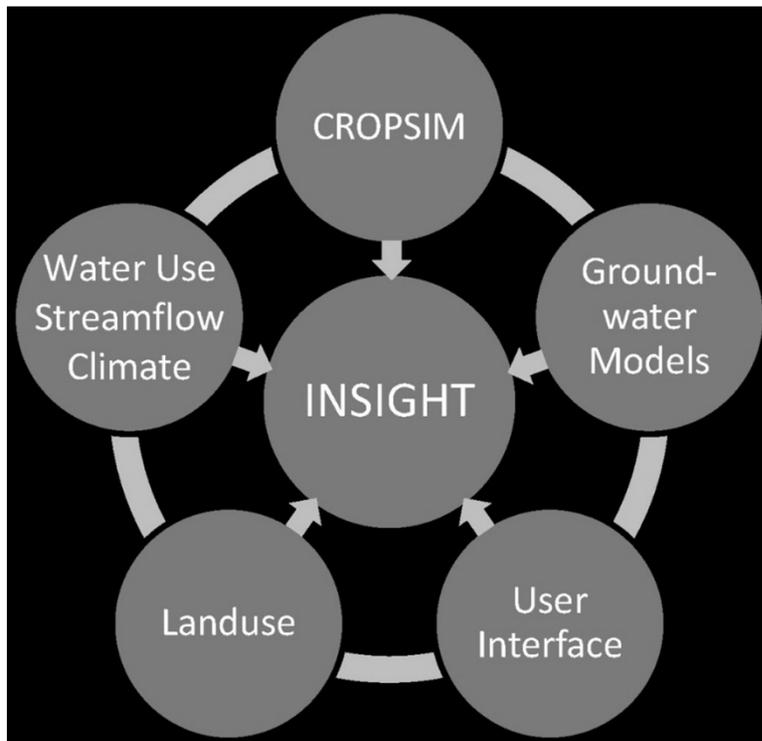
North
Groundwater
Model



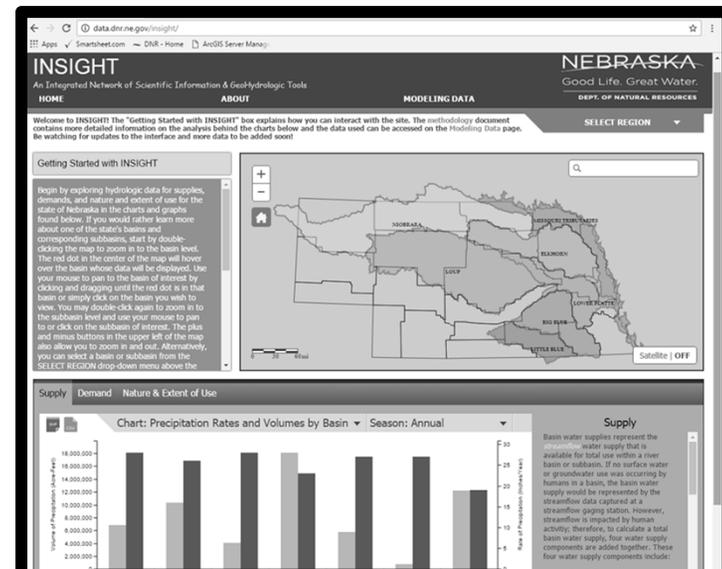
South
Groundwater
Model

- Goal is to have statewide groundwater modeling tools

INSIGHT



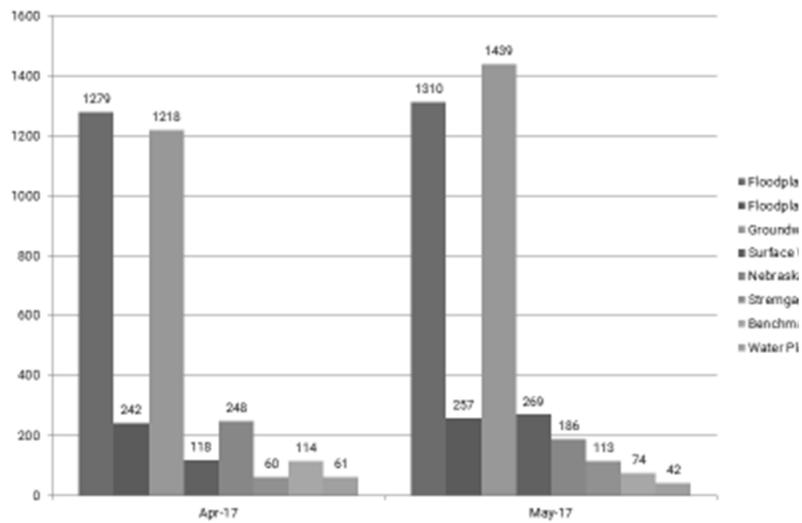
- Continued enhancements
 - Data exports
 - Expansion of area covered
 - Improved documentation and explanation of variables
 - Interface updates



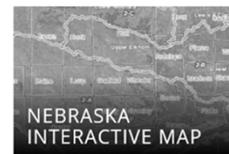
Interactive Maps

Department of Natural Resources Monthly Met
 Submitted June 15, 2017

NeDNR Interactive Map Usage by Month



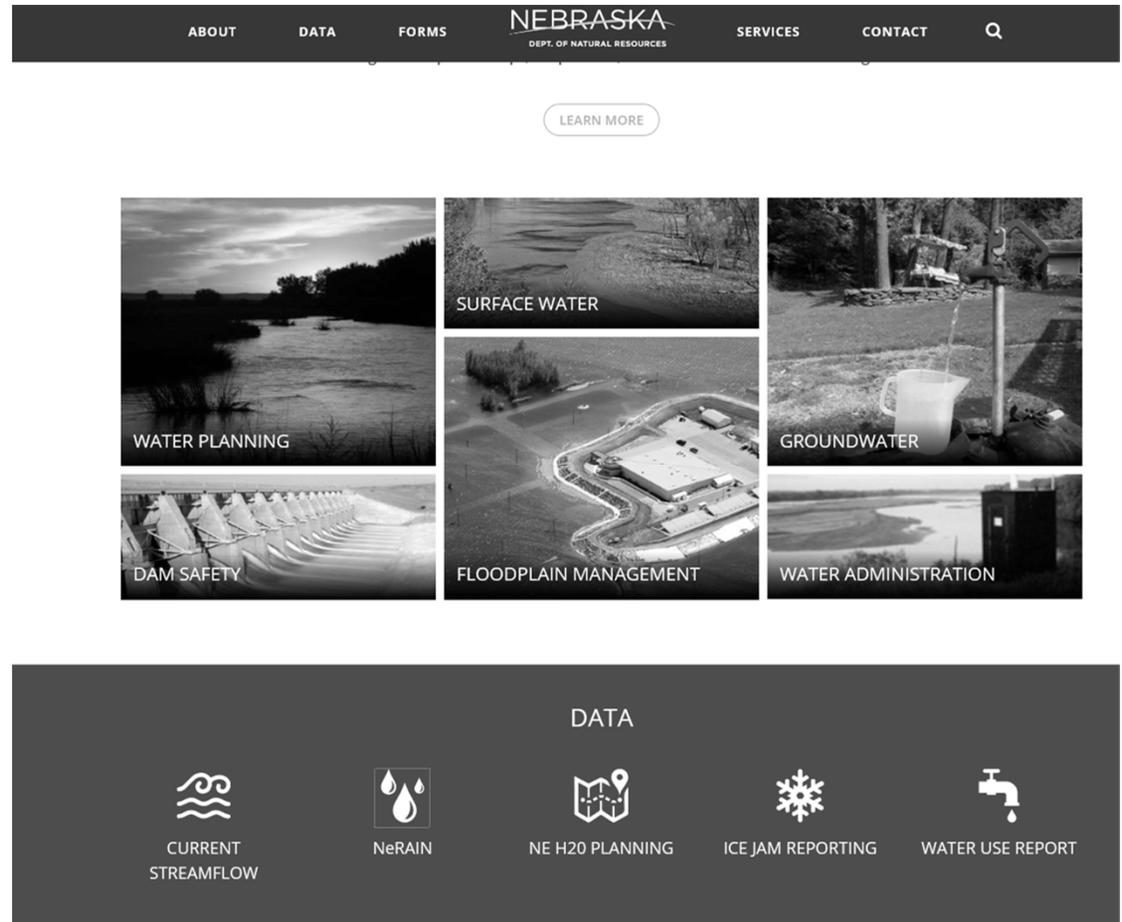
Maps



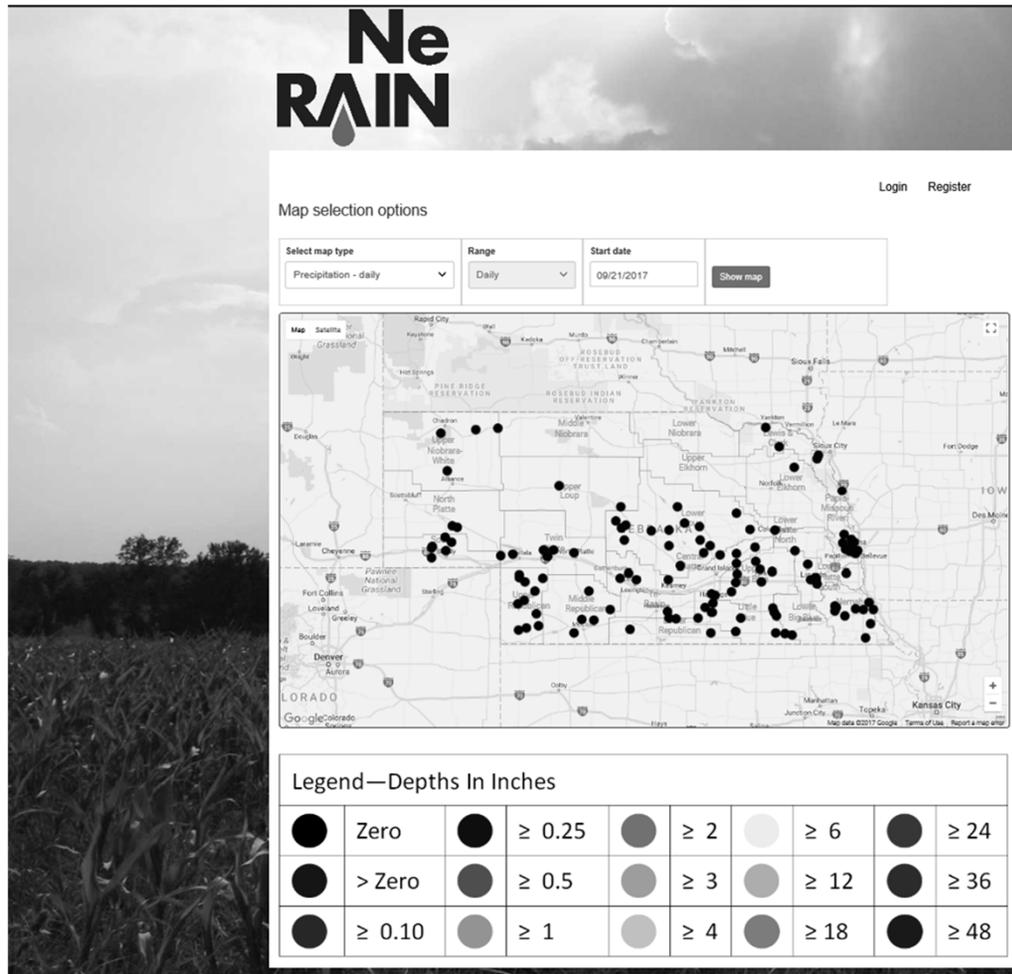
NOTE: If you need access to any of the older interactive maps, send an email using the feedback link.

Website

- New form and organization
- Approved IMPs
- Publications and Data
- Basin-wide planning efforts



NeRain

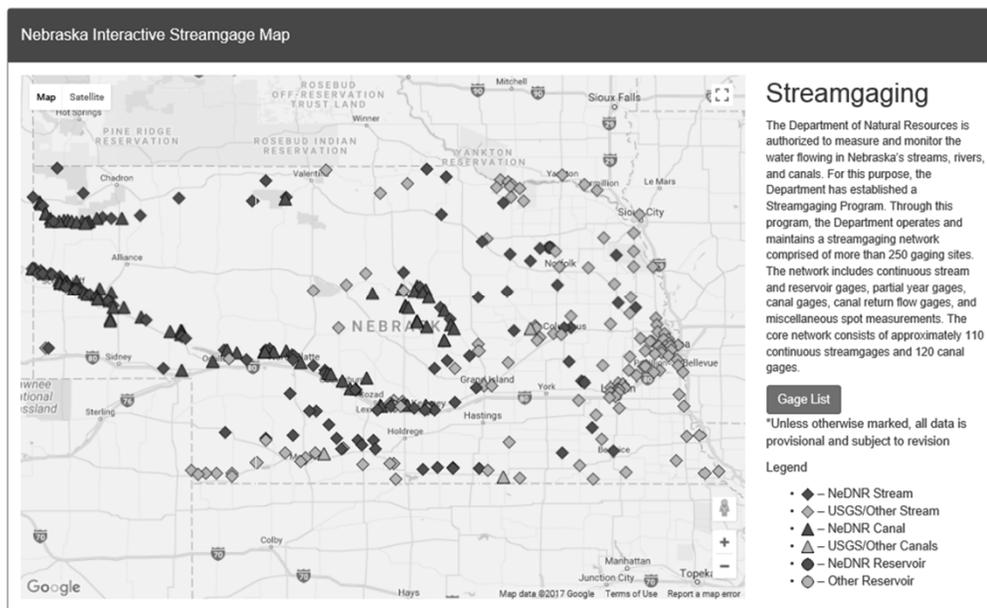


- Needed to update programming language, for current servers and operating system
- Updated look
 - New logo, working to be tablet and mobile-friendly
- Zooming maps—using a Google map base
- Database changes: “Many to many” relationship between accounts and gauges
- Yet to come during next month: tying volunteer gauges to *normal* rainfall, new graphs

Stream Gage Data

Nebraska Government Website

NEBRASKA
DEPT. OF NATURAL RESOURCES



- Interactive map
- NeDNR and other gages available
 - Real-time data
 - Daily data
 - Hydrographic reports
 - Rating curves

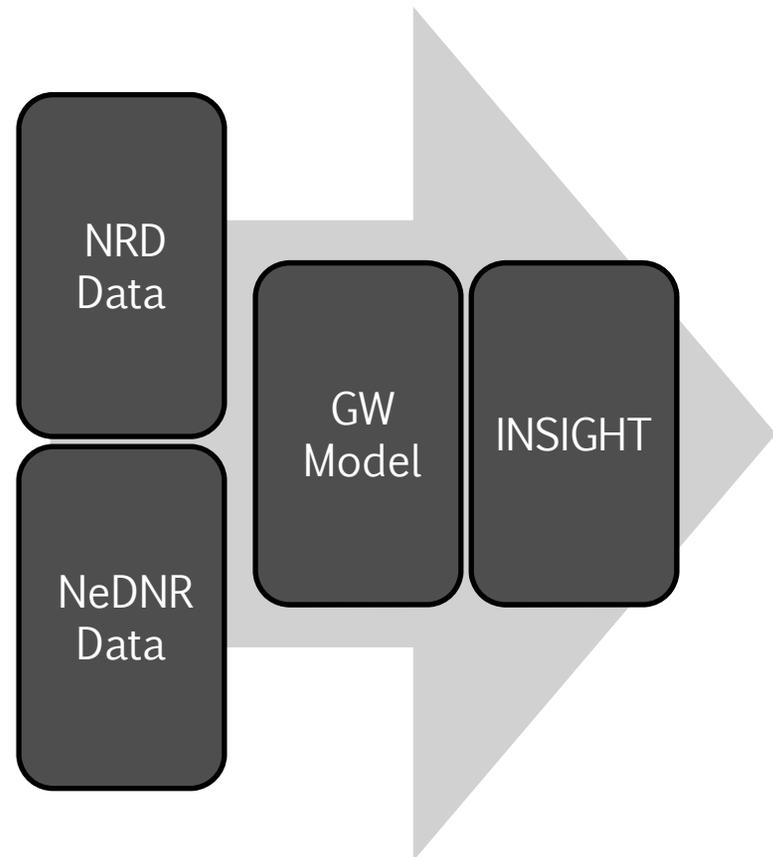
These webpages work best with Google Chrome. To install, please click on the browser name to download the most recent version. If headers, graphs, and other page elements do not appear to display properly, we suggest deleting the browser history. If you have questions please contact the Department at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

© 2017 - Nebraska Department of Natural Resources

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

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

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

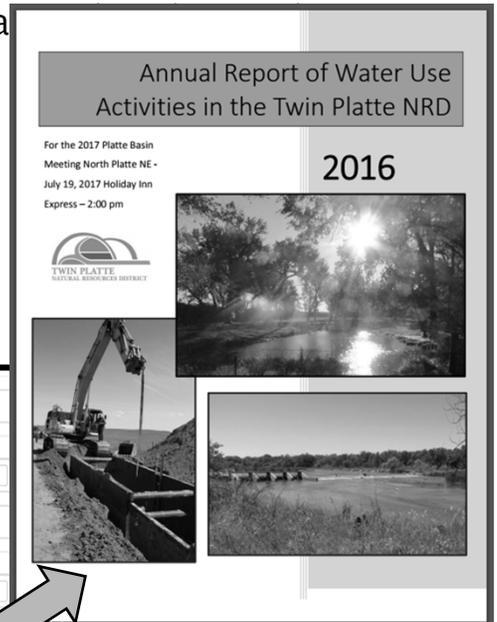
Section	Township	Range	Crop	Acres
10	9	17	Dryland Corn	140

Submit Clear

Computed CIR Offsets

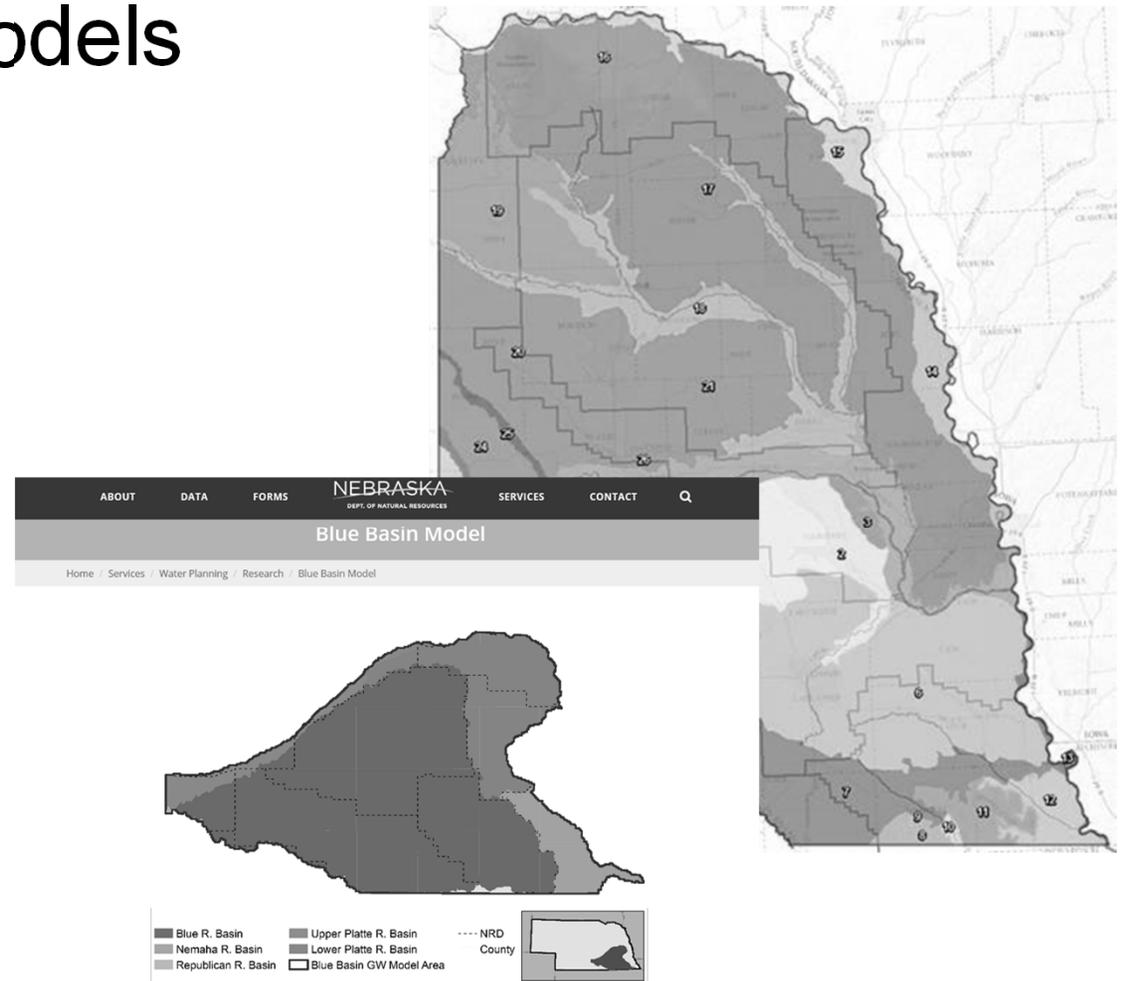
Section	Township	Range	Crop(ID)	Acres	CIR(IN)	Recharge(IN)	GW withdrawal(AF)	Stream depletion (Percent)	Estimated net depletion (AF)
Present Conditions									
10	9	17	Irrigated Corn (icm)	140	0.95	6.6	27.42	21	5.76
Total Present Conditions				140			27.42		6
Future Conditions									
9	17	10	Dryland Corn (dcm)	140	0	1.6	-18.67	21	-3.92
Total Future Conditions				140			-18.67		-4
Net Value (AF)									-10

Print Results Return to Main Menu



Future Efforts: Completion of Groundwater Models

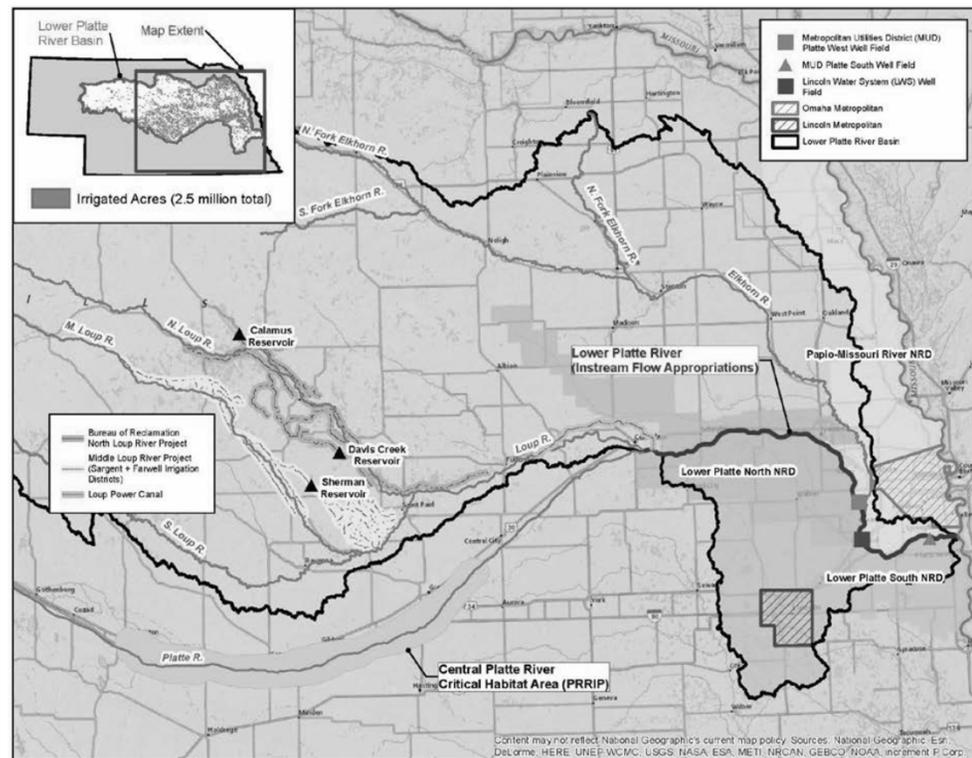
- Finalize Lower Platte Missouri Tribs Model
- Complete Nemaha Model
- Collaborate with Blue basin NRDs in developing a new Blue Basin Model



About the Blue Basin Model

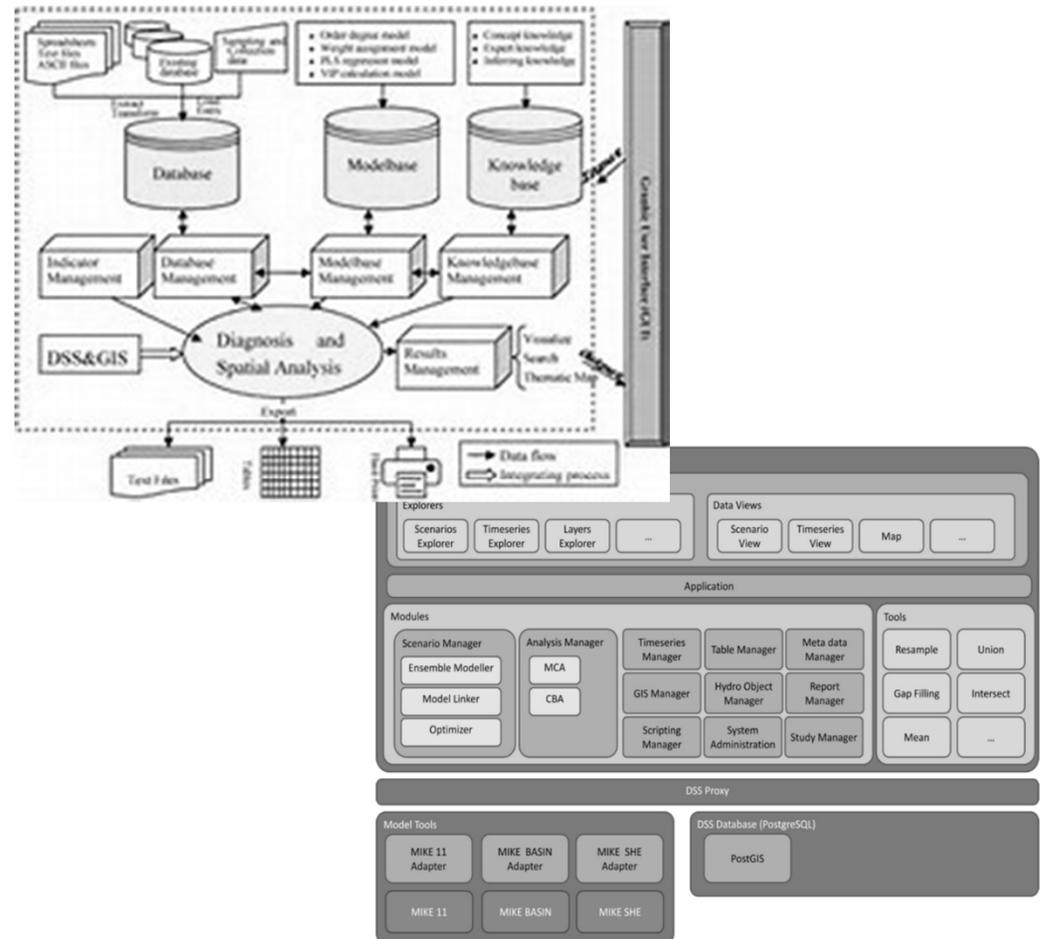
Future Efforts: IMP Related Analyses

- 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)



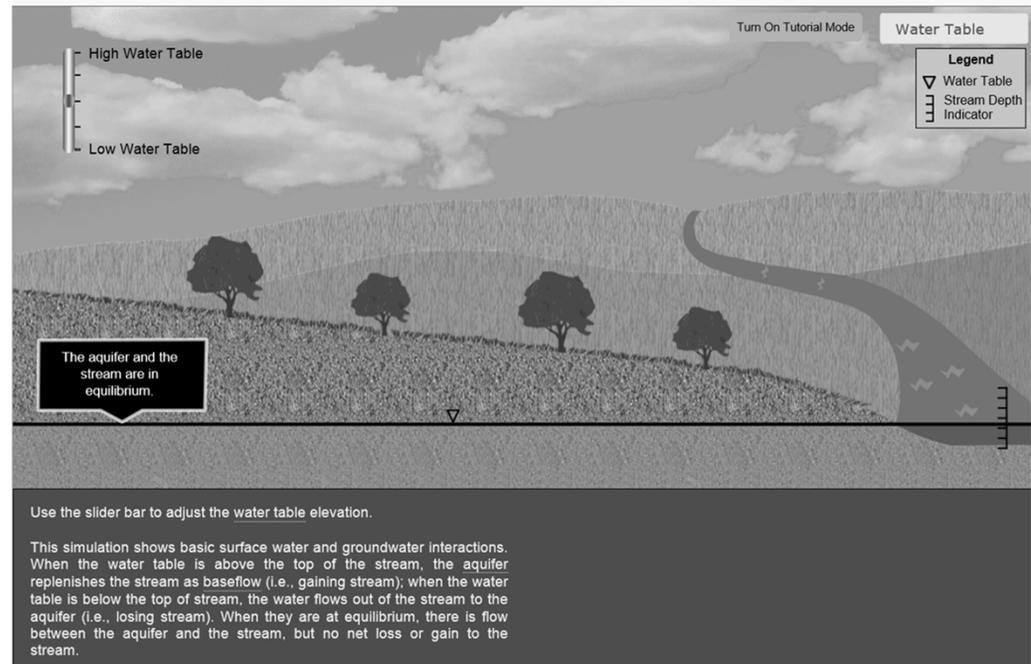
Future Efforts: Decision Support Tools

- 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



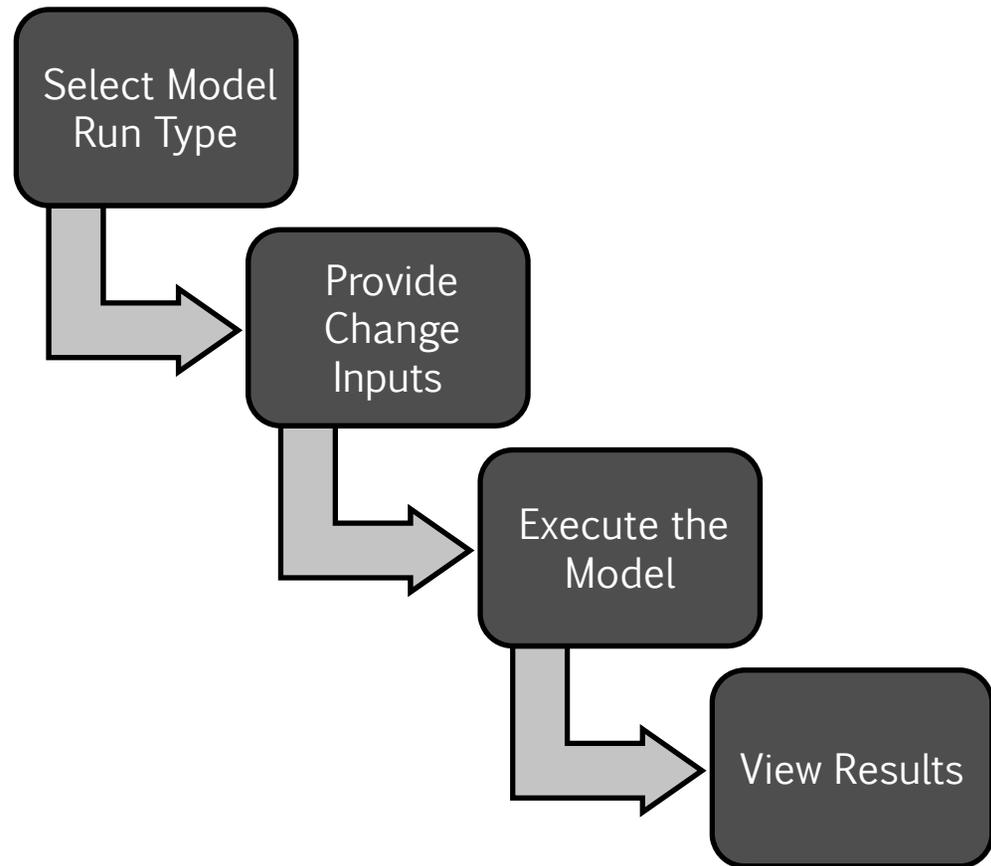
Future Efforts: Education and Outreach

- Tools to describe groundwater depletions
- Tools to create greater transparency on surface water data
- INSIGHT overview

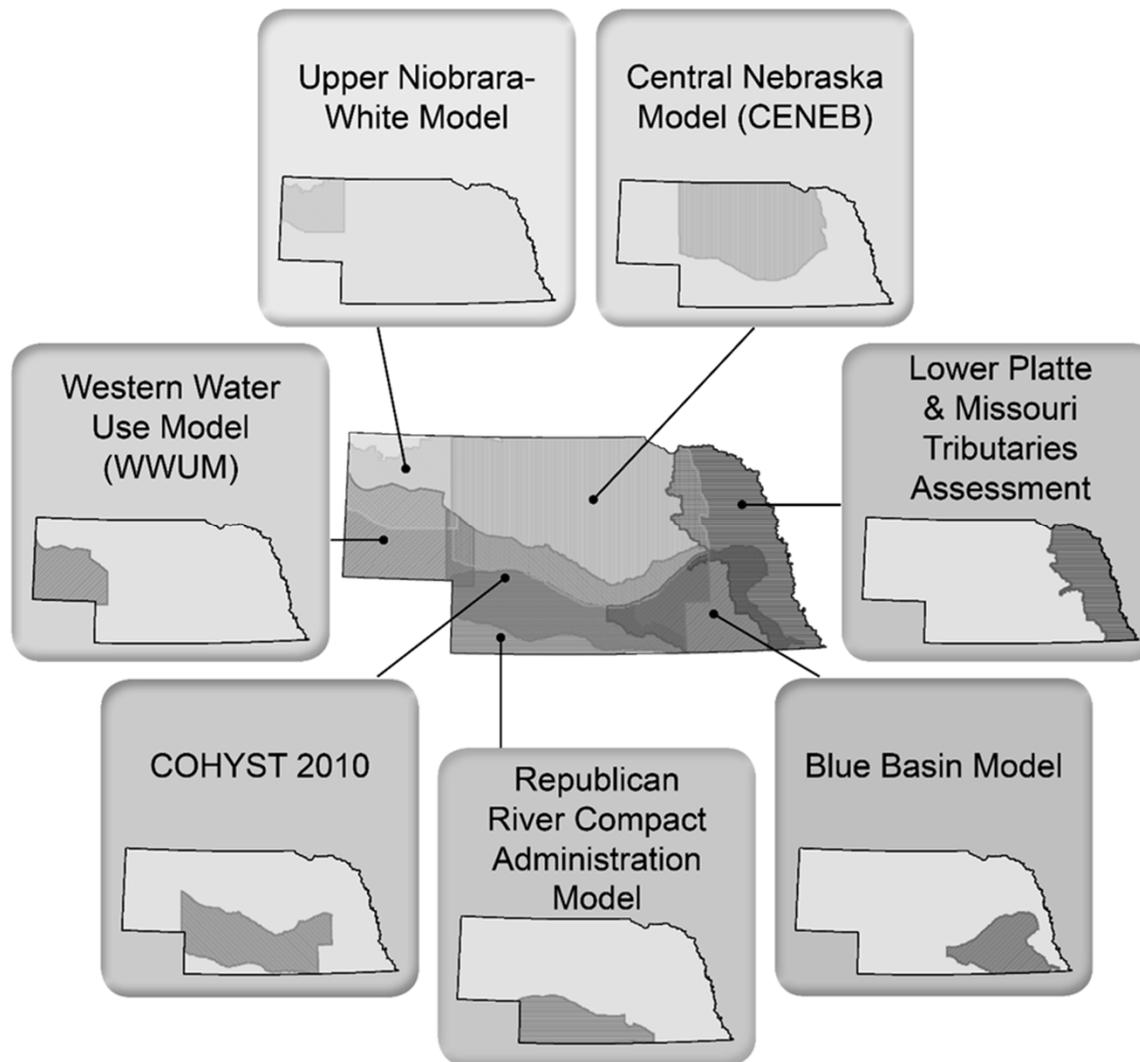


Future Efforts: Tools to Utilize Existing Groundwater Models

- GUI for model analysis (land use change, recharge, pumping)
- Improve access to watershed model results
- View results at the county, NRD, or watershed level



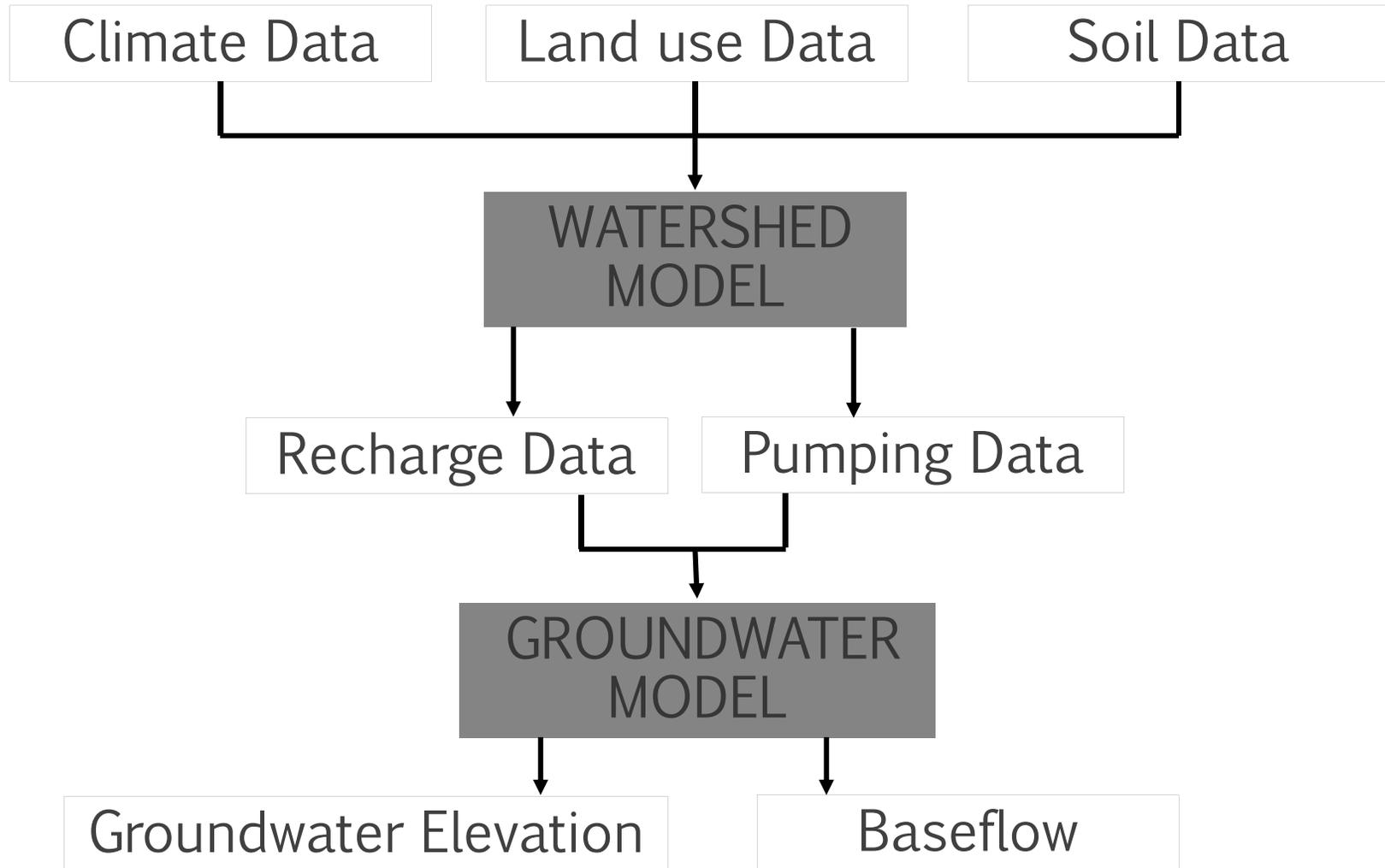
Model Application Tool



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

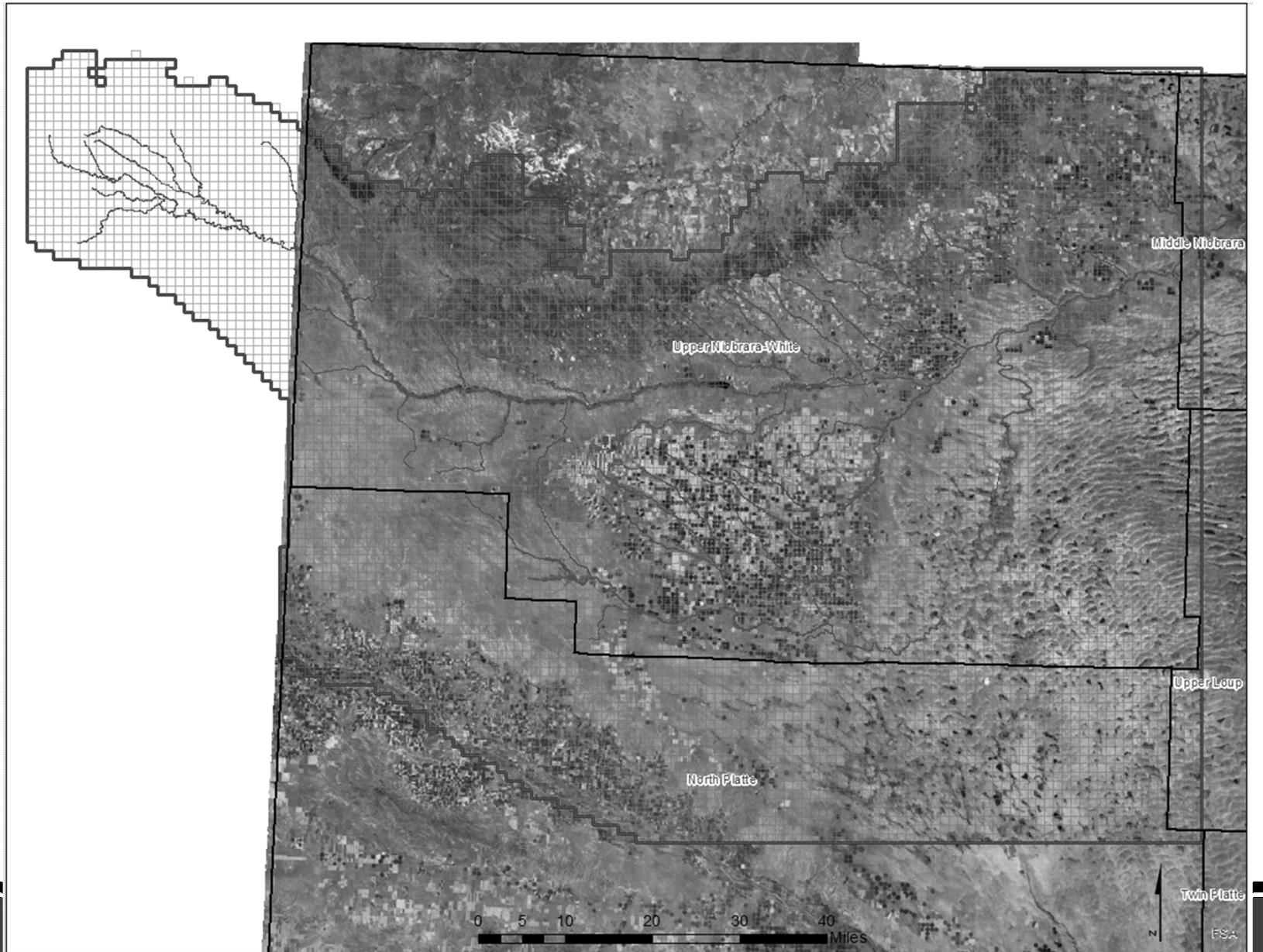
Model Application Tool



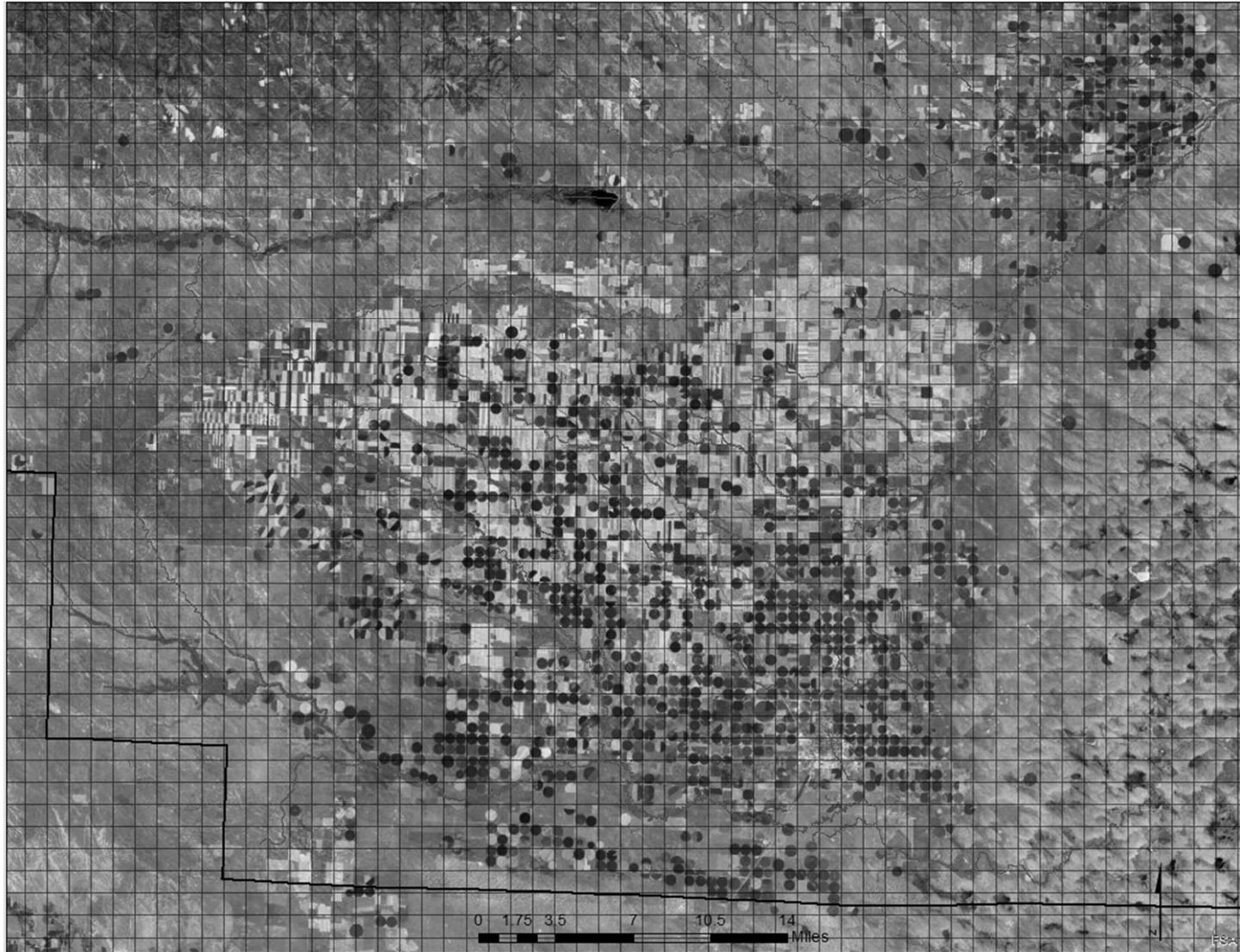
Model Application Tool



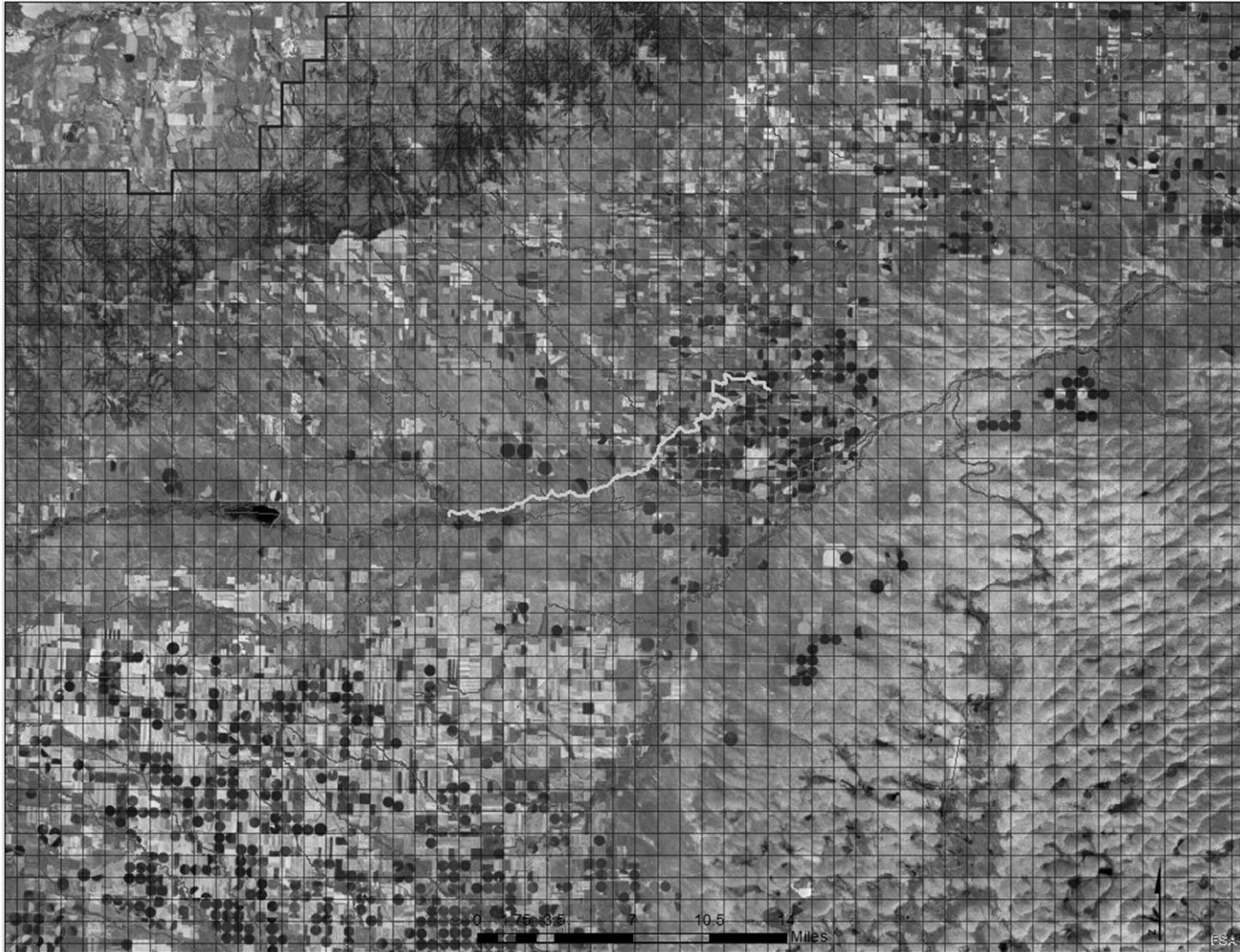
Model Application Tool



Model Application Tool



Model Application Tool



Model Application Tool

The screenshot shows a software window titled "Model Application Tool" with standard window controls (minimize, maximize, close). The interface includes a "Model" section with radio buttons for "CNEB" (selected) and "UNW". Below this are two input fields: "Baseline Name File" and "Scenario Output Dir", each with a "Browse" button. At the bottom, there are three buttons: "Land use change" (highlighted with a black border), "Canal recharge change", and "Climate Scenario".

Model Application Tool

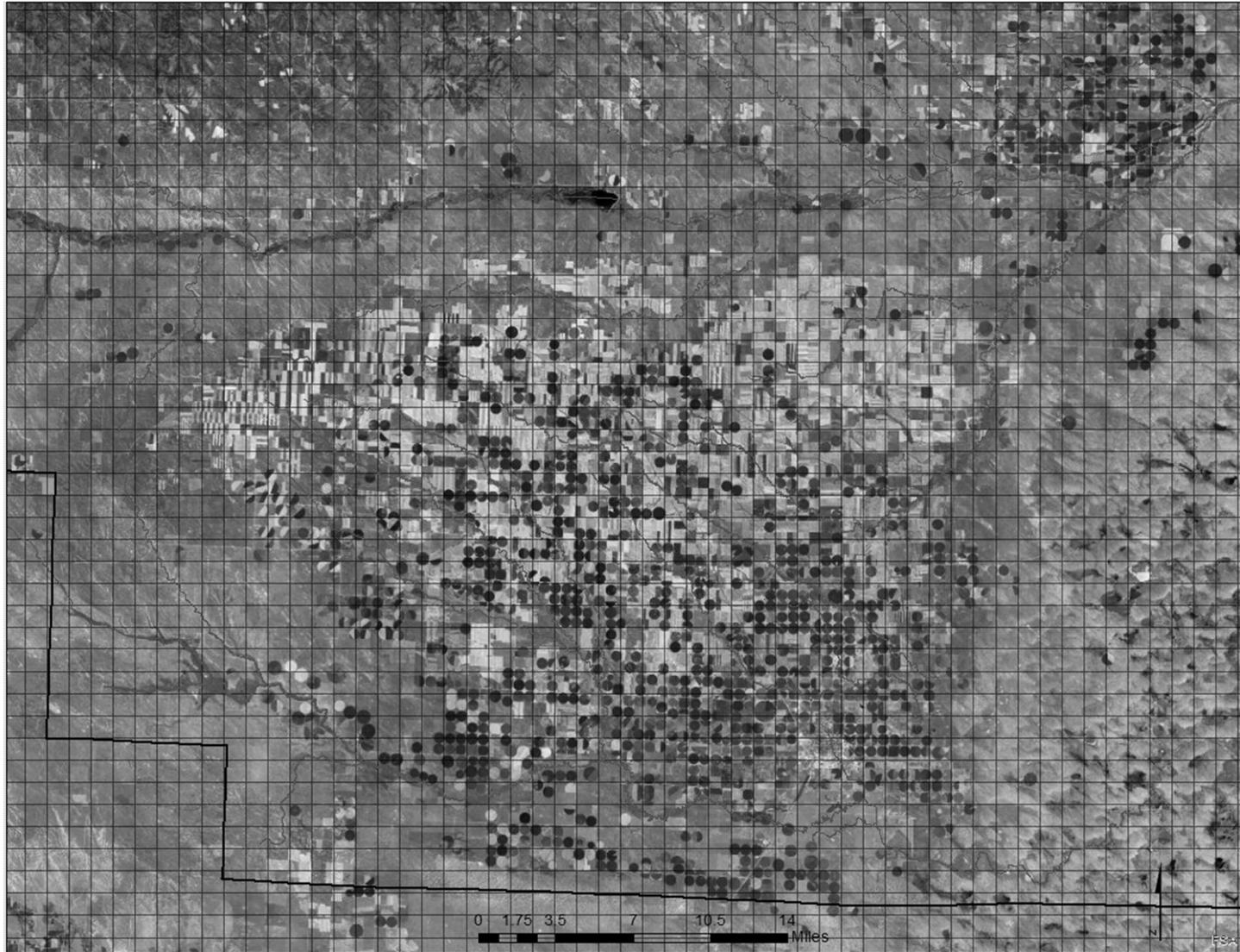
Model

CNEB UNW

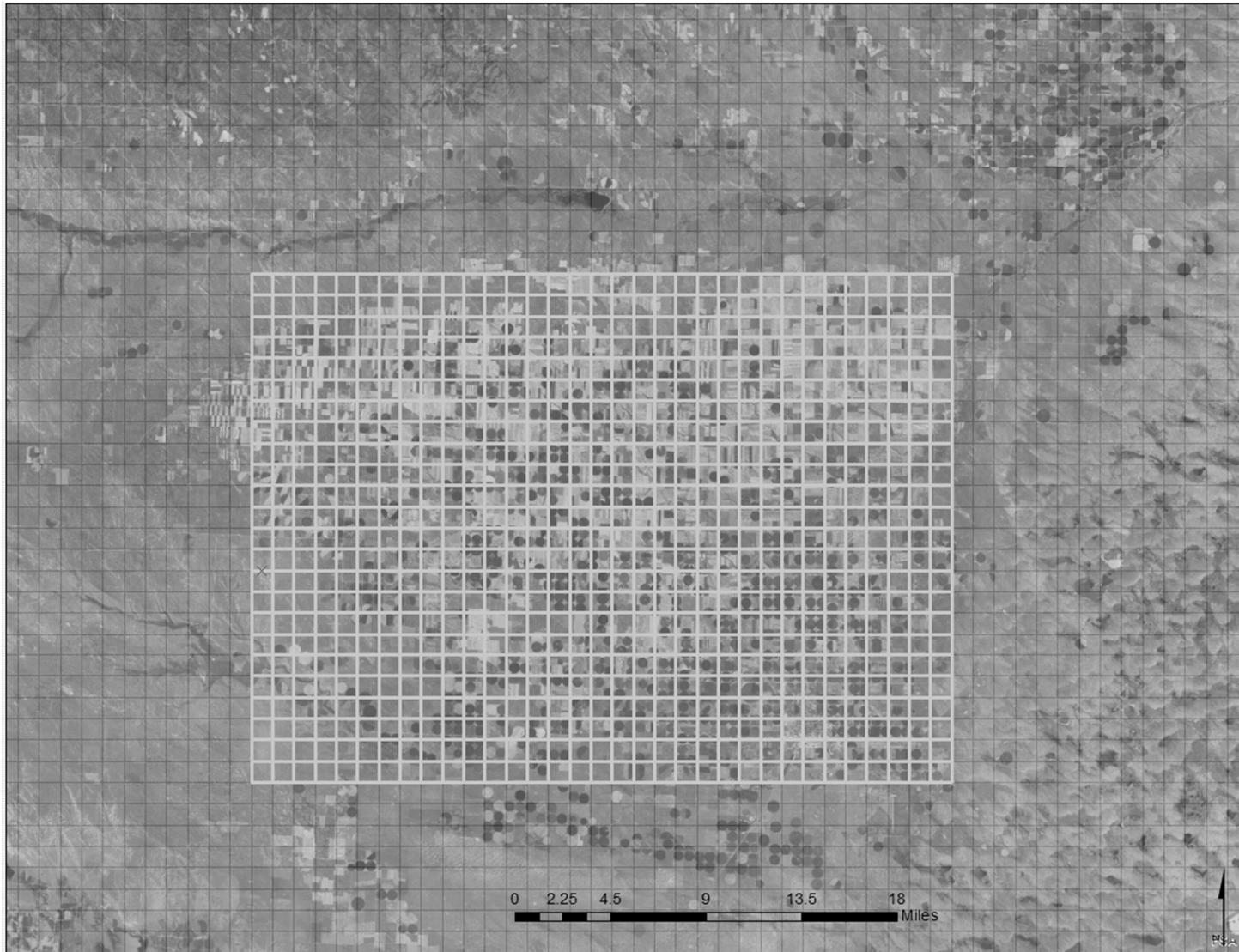
Baseline Name File

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

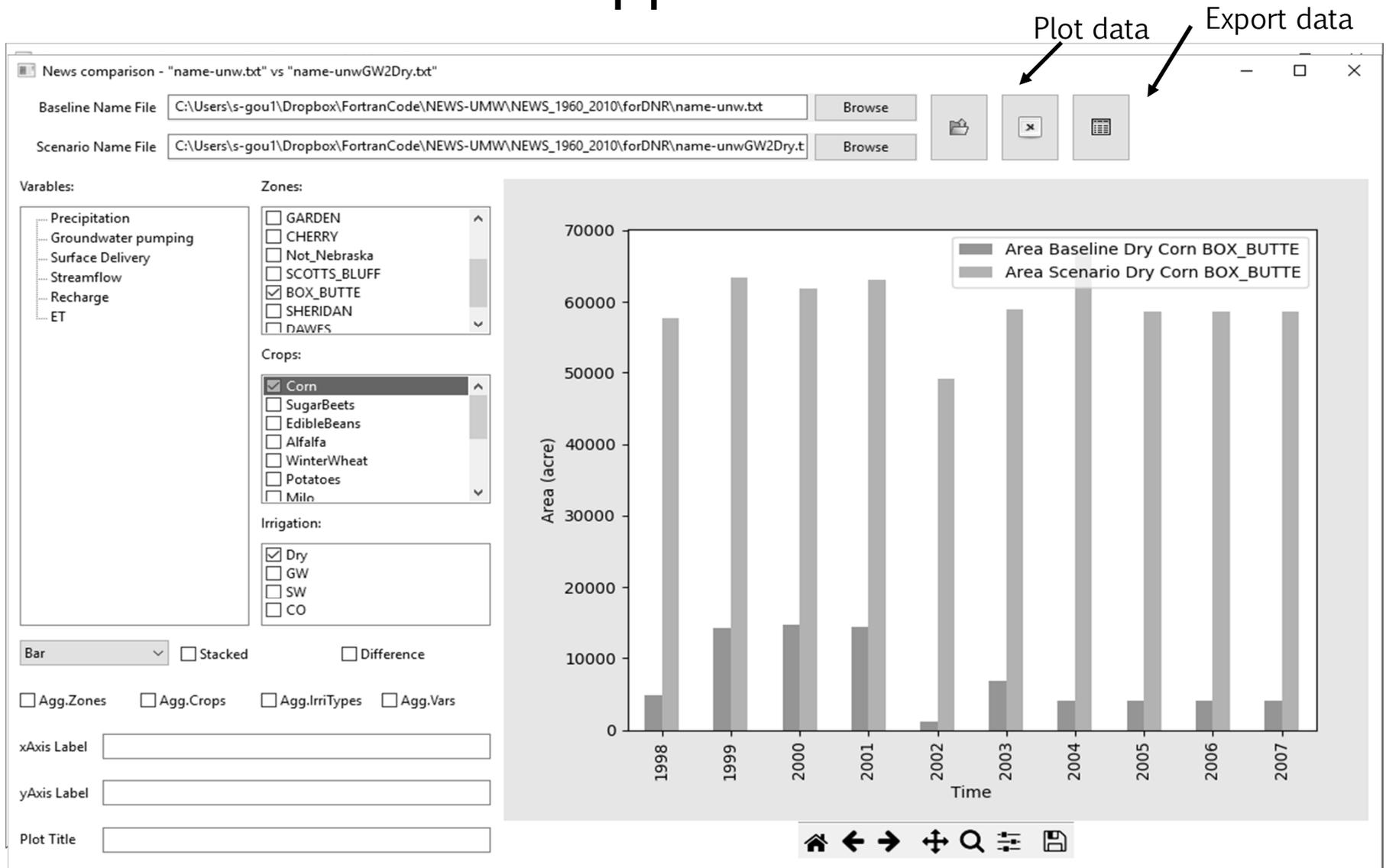
From
 Corn
 SugarBeets
 EdibleBeans
 Alfalfa
 WinterWheat
 Potatoes
 Milo
 Sunflower

To
 Corn
 SugarBeets
 EdibleBeans
 Alfalfa
 WinterWheat
 Potatoes
 Milo
 Sunflower

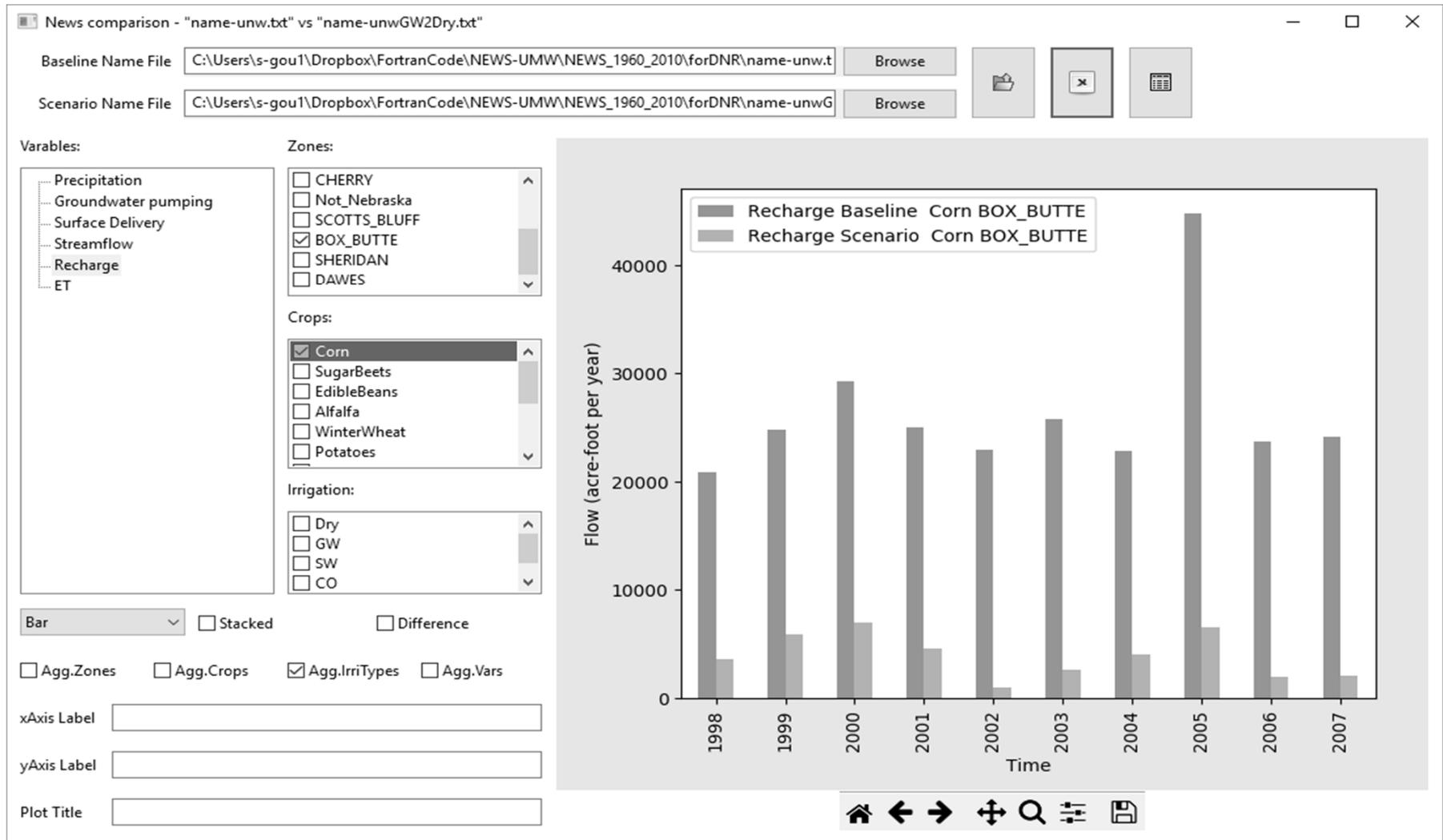
Dry
 GW
 SW
 CO
 Dry

Dry
 GW
 SW
 CO
 Dry

Model Application Tool



Model Application Tool

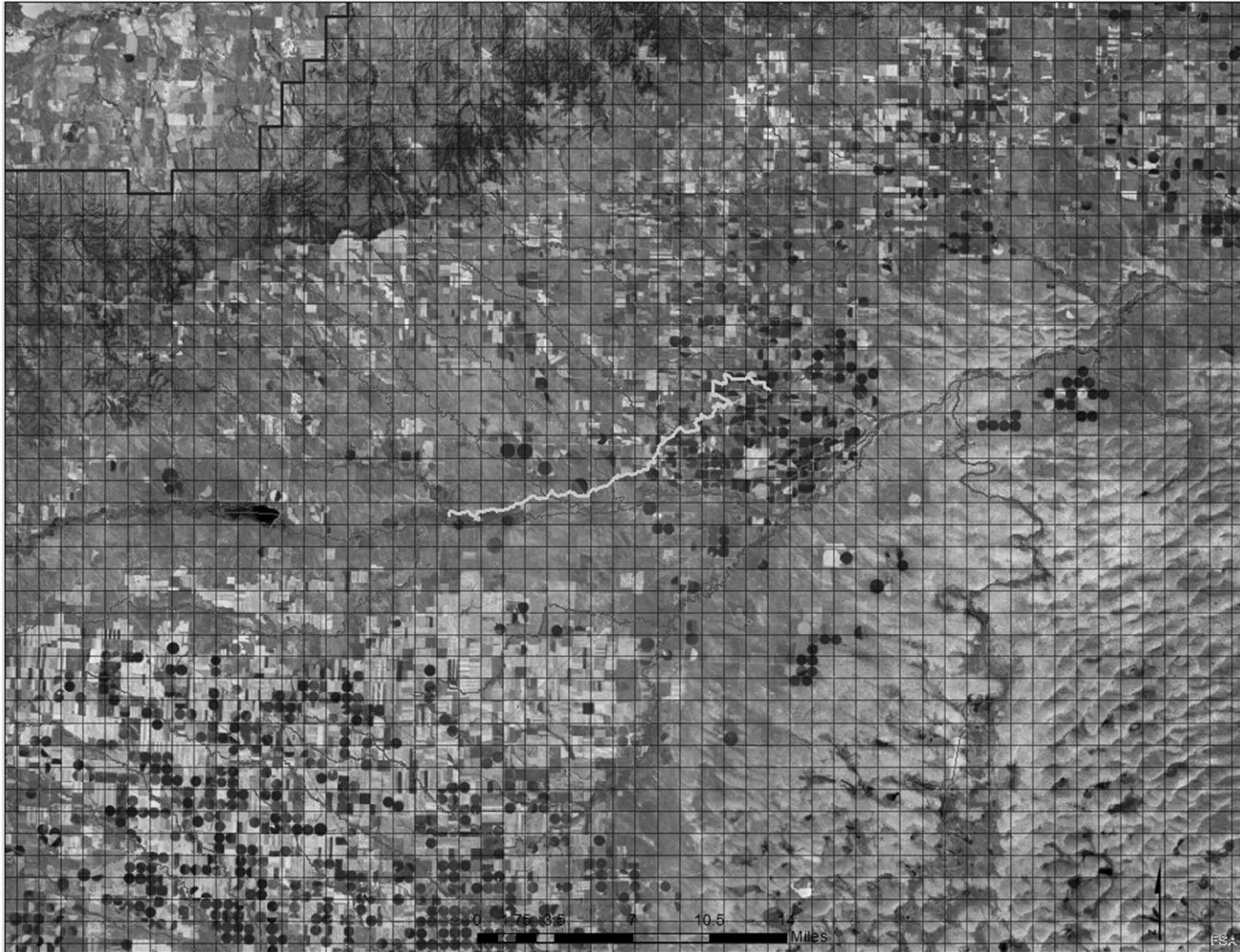


Model Application Tool

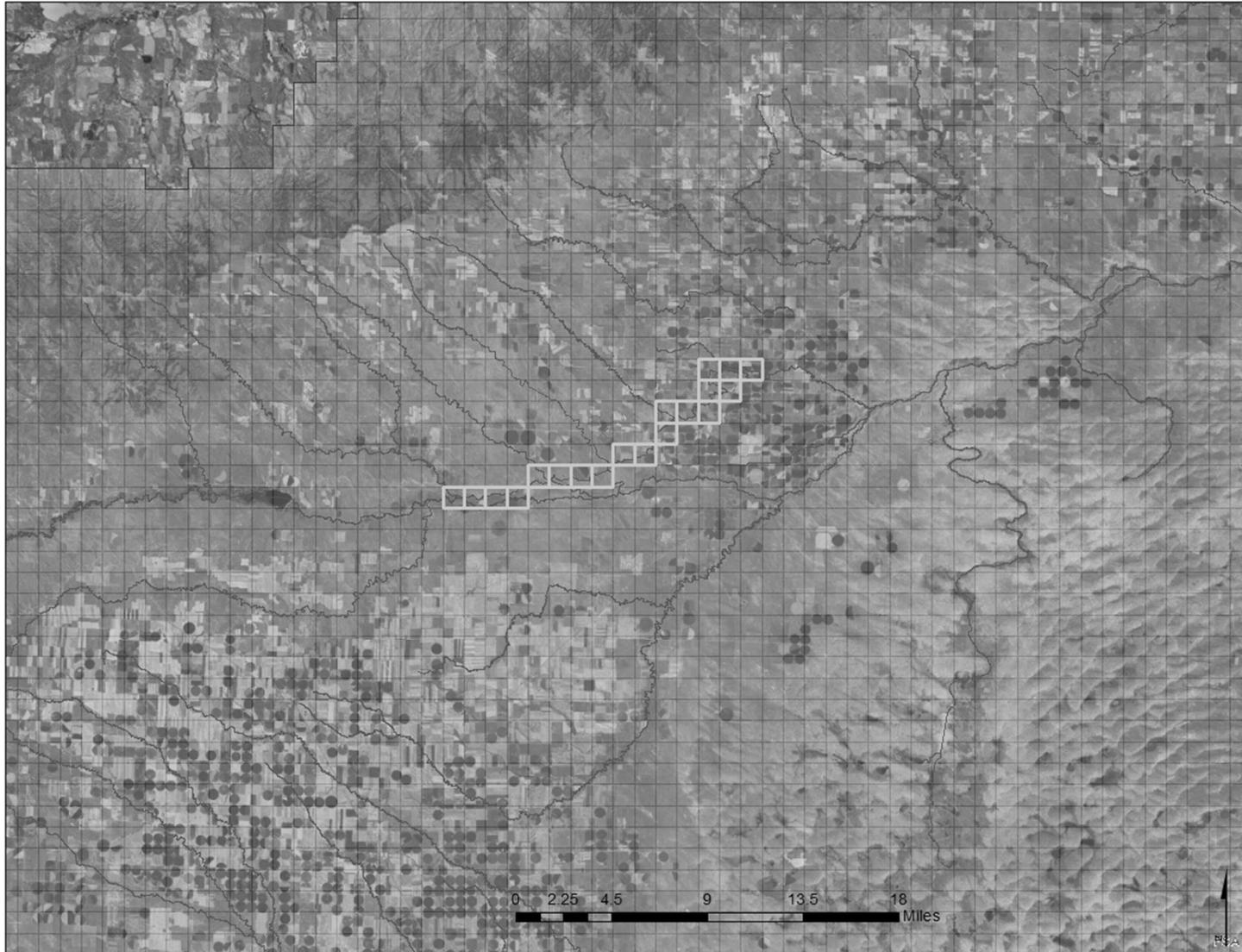
The screenshot shows a software window titled "Model Application Tool" with standard window controls (minimize, maximize, close). The interface is organized into several sections:

- Model Selection:** A section labeled "Model" containing two radio buttons: "CNEB" (which is selected) and "UNW".
- Baseline Name File:** A text input field followed by a "Browse" button.
- Scenario Output Dir:** A text input field followed by a "Browse" button.
- Scenario Selection:** Three buttons at the bottom: "Land use change", "Canal recharge change" (which is highlighted with a black border), and "Climate Scenario".

Model Application Tool



Model Application Tool



Model Application Tool

Canal Recharge Change

+ Add - Delete Save Run

Canal
 Canal1 Canal2 Canal3 Customized

Customized Canal File

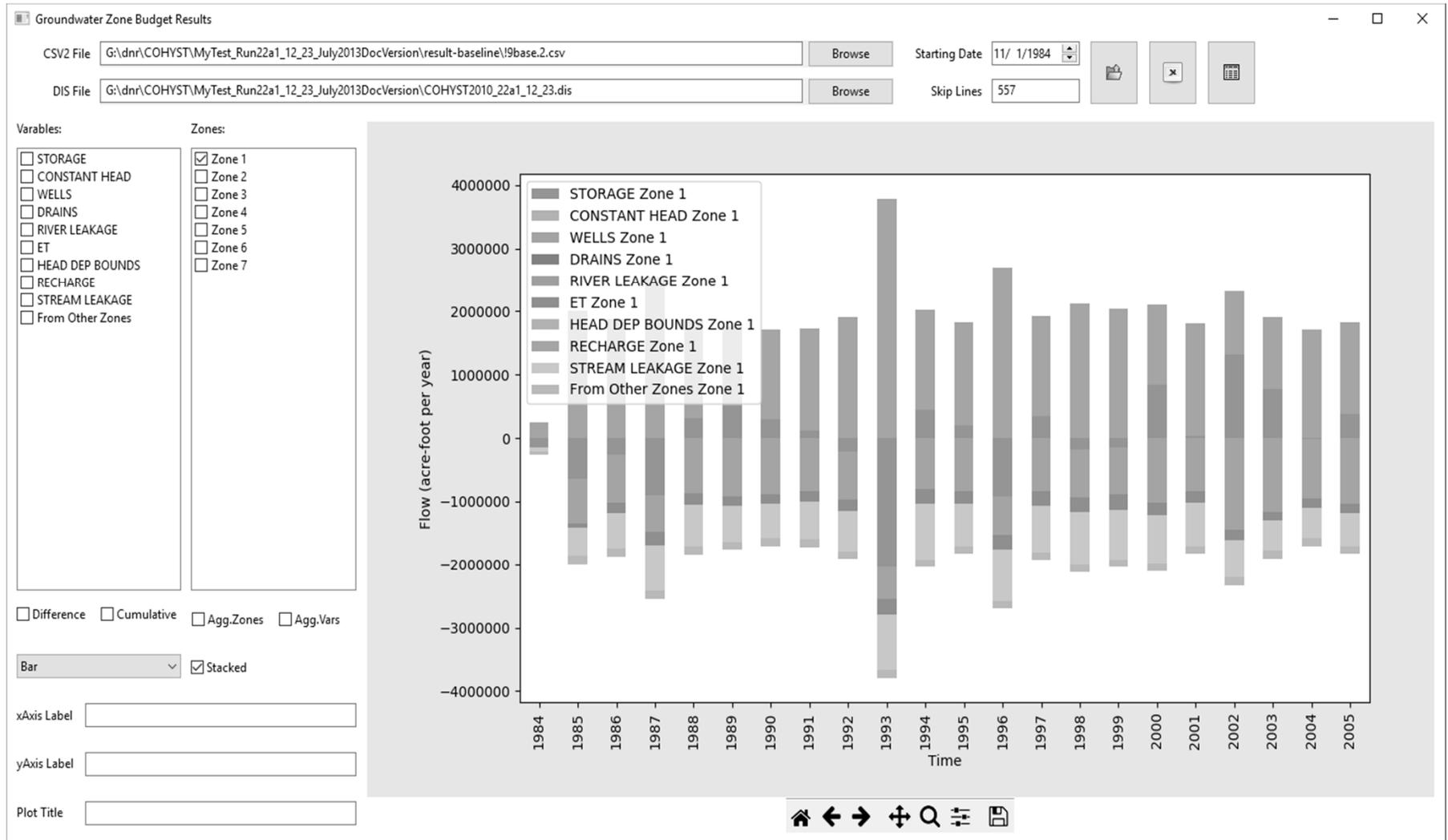
Start To

Change of rate

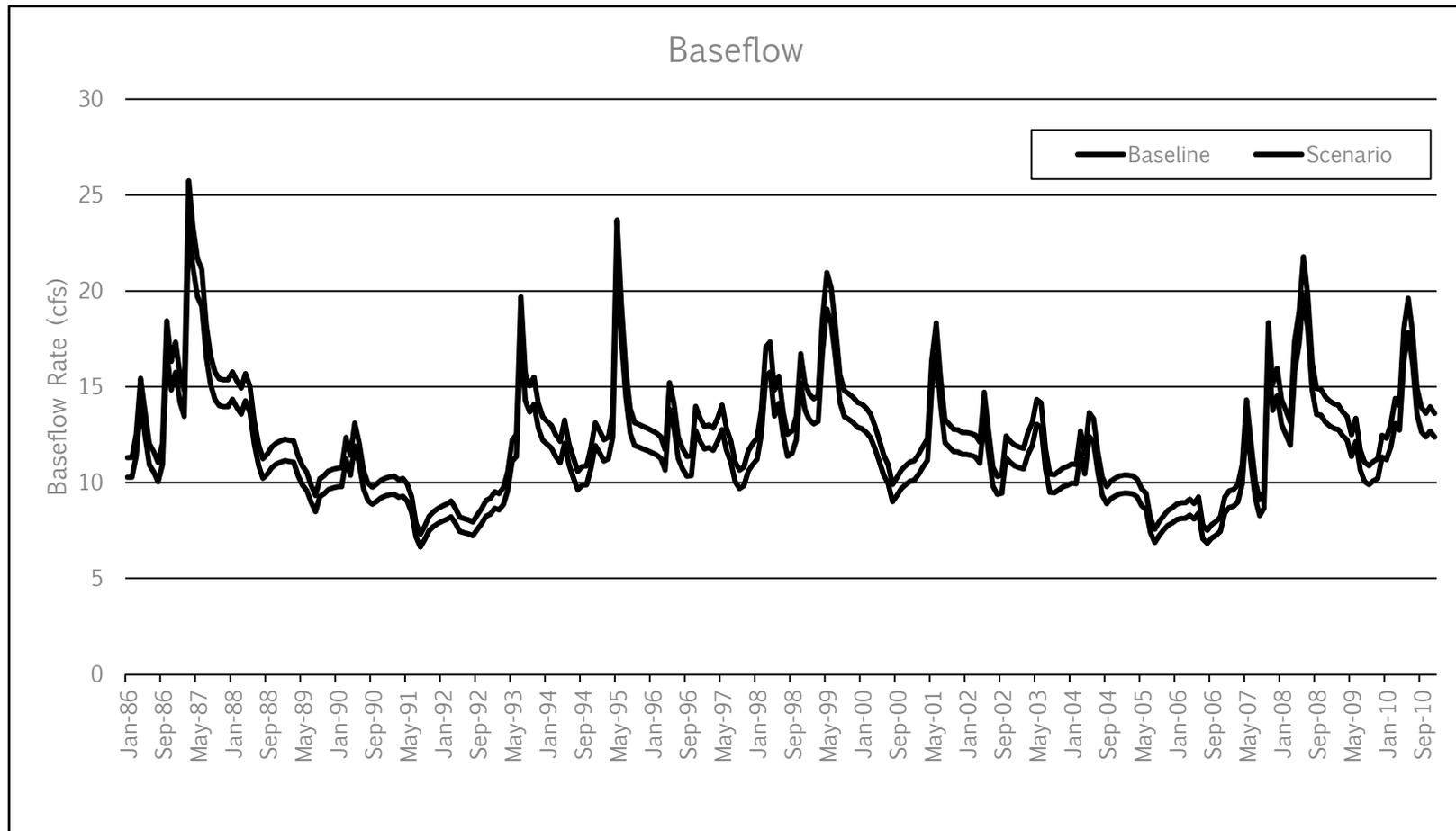
January
 Feburay
 March
 April
 May
 June
 July
 August
 September
 October
 November
 December

	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					

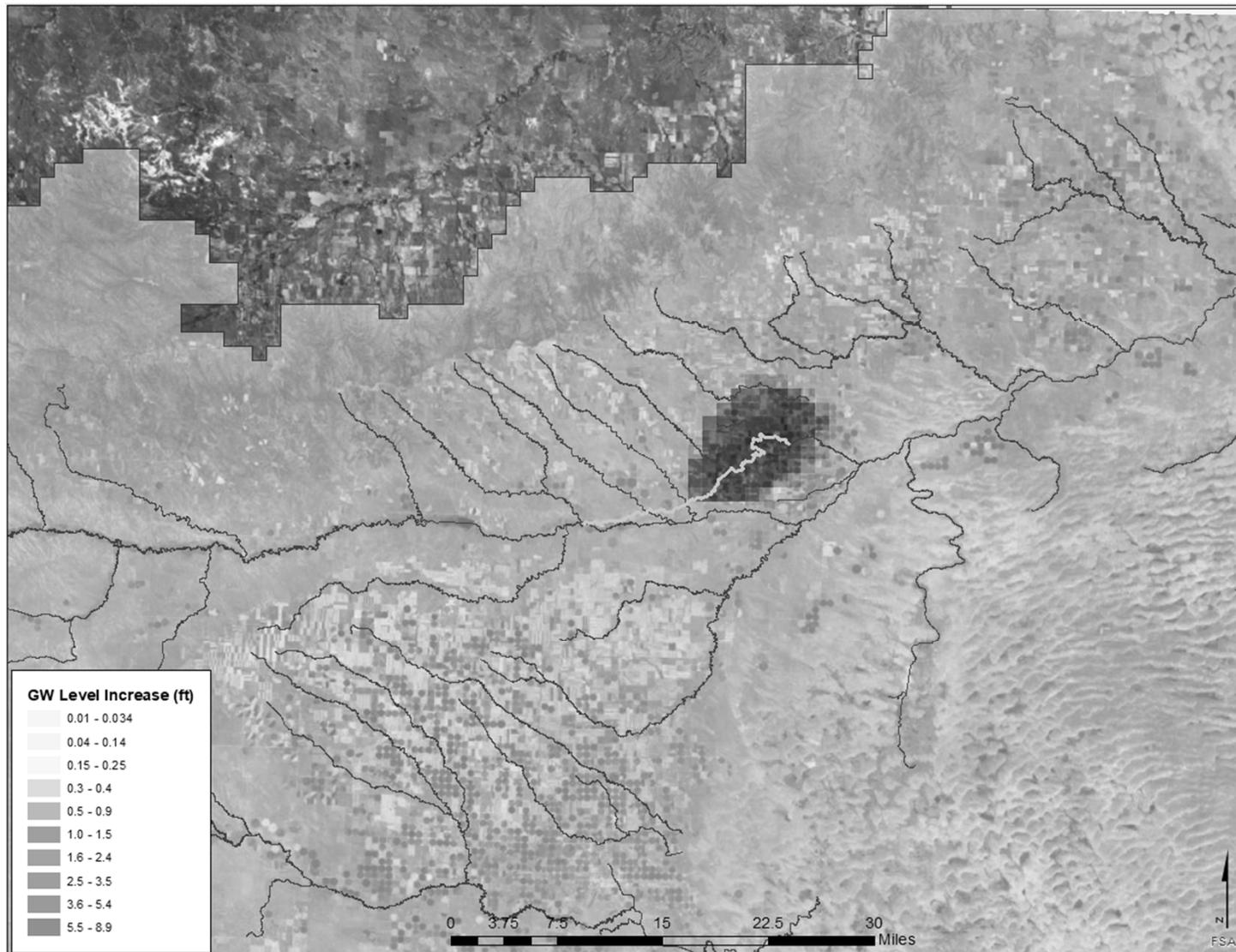
Model Application Tool



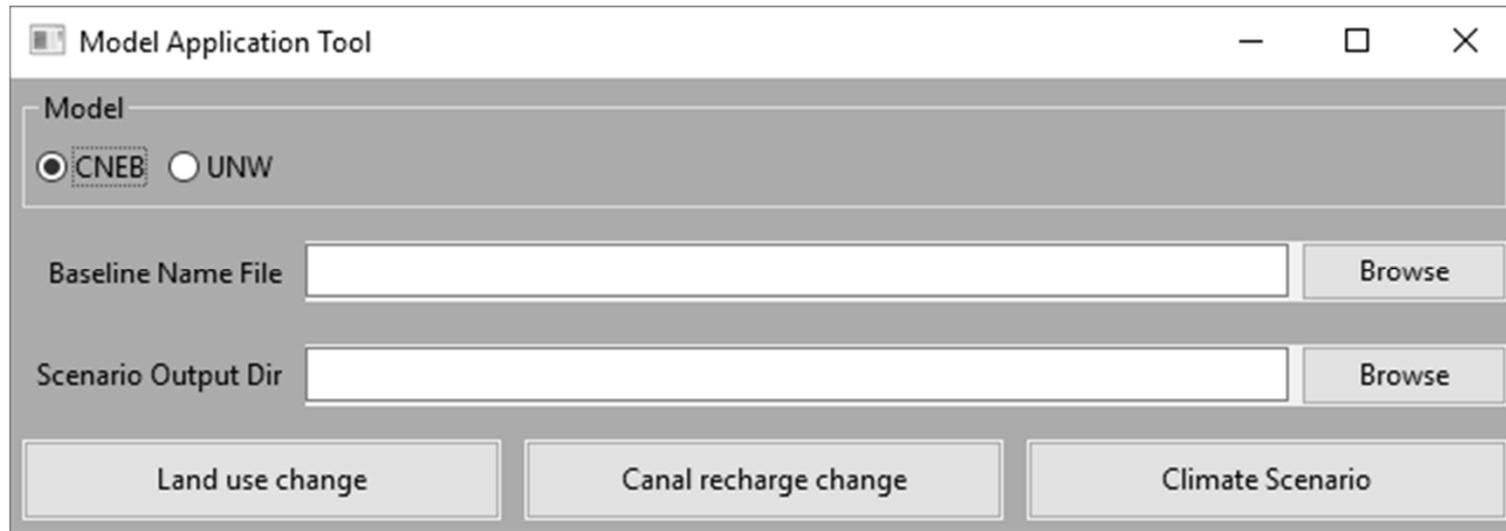
Model Application Tool



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



301 Centennial Mall South, 4th Floor
PO Box 94676
Lincoln, NE 68509-4676
402-471-2363
