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# Niobrara Basin Conjunctive Water Management Model

**UNWNRD Water Issues Meeting, Alliance, NE**

**February 8, 2011**

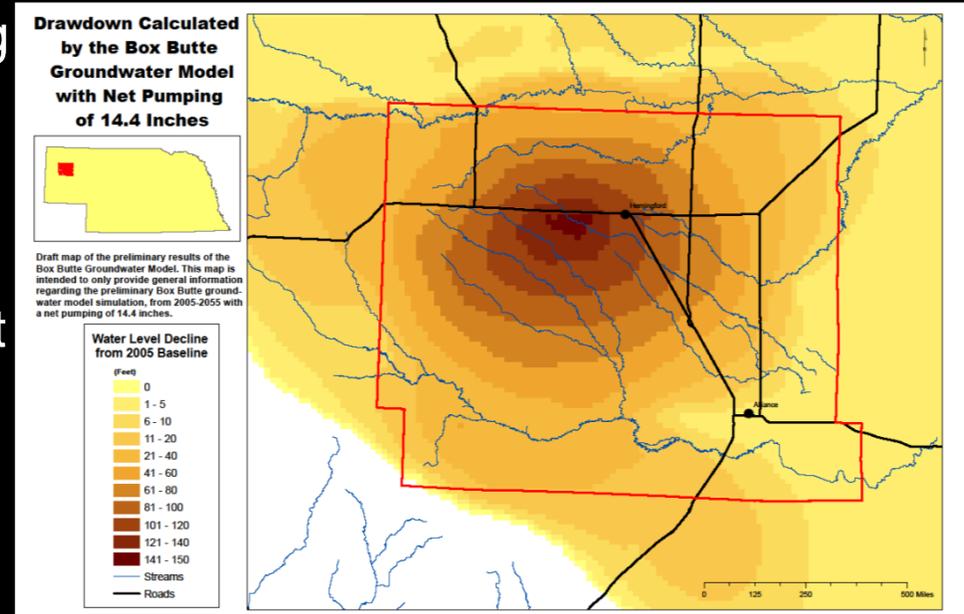
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# Previous Efforts

- Box Butte Model
  - Groundwater model to evaluate effects of pumping
- IMP
  - Passed 2009
  - IMP Annual Meeting
  - Current water management options
  - Continue to develop data and tools
- IWMPP
  - Develop water management tools



# What is the Niobrara Conjunctive Management Model?

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- Model groundwater, surface water, and landuse interactions
- Combines IWMPPF & WaterSMART grants
- Two Geographic Regions: Upper Basin (UNWNRD Region) & Lower Basin

# Purpose

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- Model the hydrologic surface-groundwater interactions and economic effects of various water management strategies in order to develop water management tools



# Goals & Objectives

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- Develop Tools for Water Managers
- IMP Data Development
- Water Use Optimization
- Evaluate Effects of a Variable Water Supply
- Evaluation of Management Options

# What is the Basin Studies Program?

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- Bureau of Reclamation program
- 17 western states eligible
- Contributed \$350,000 (in-kind) to the Niobrara Basin Conjunctive Water Management Model



# Stakeholder Input

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- Multiple stakeholder meetings in the basin
- Education and discussion forum
- Development of possible management options
- Stakeholder input on further refinements and goals

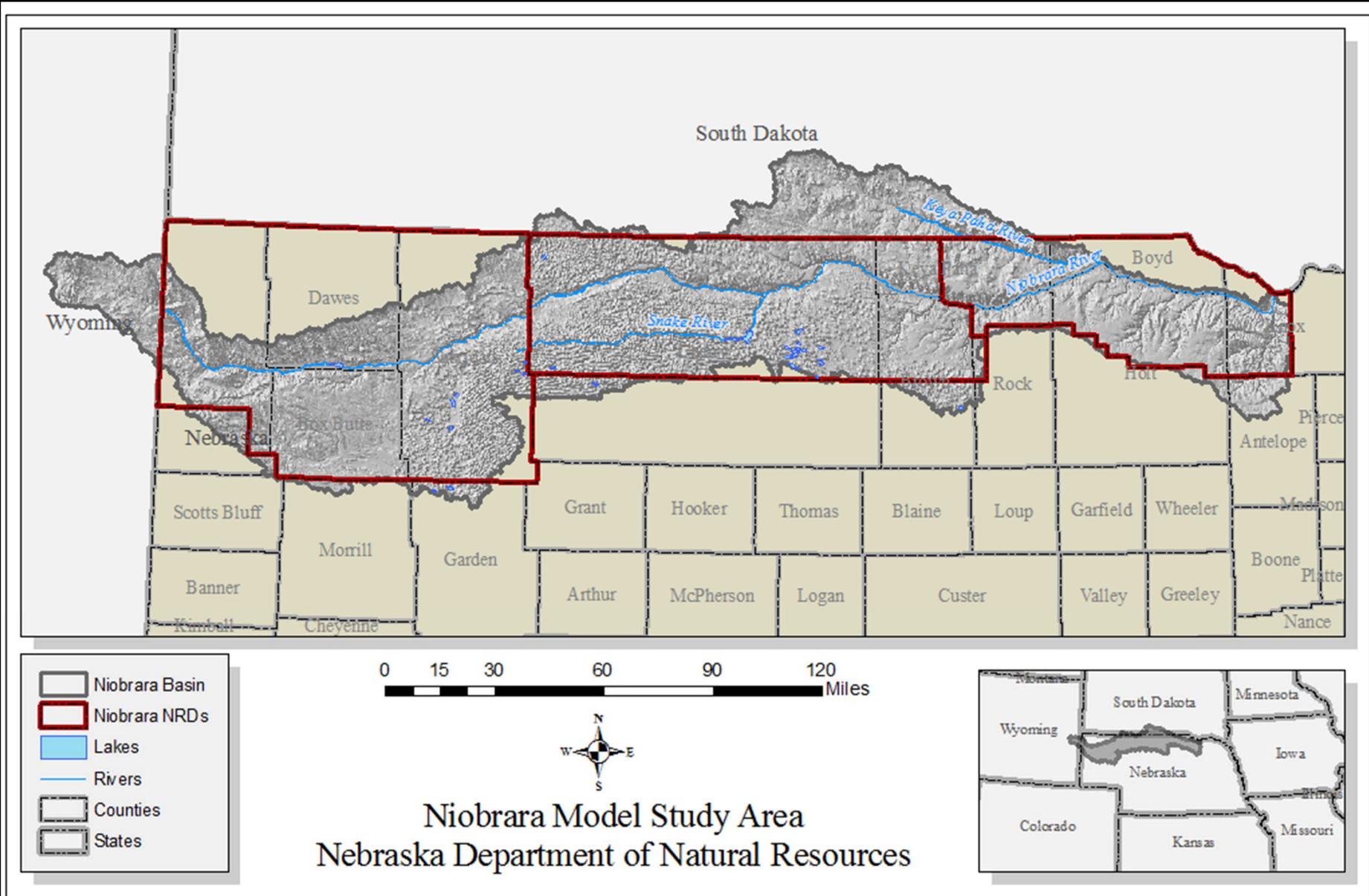
# How will the Basin Studies grant effect the goals of the IWMPP grant?

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- Will add economic analysis and variable water supply components
- Include Lower Basin portion (second phase of the project)



# Model Study Area



# Project Components

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- Integrated water model
- Economic tool development and analyses
- Effects of variable water supply



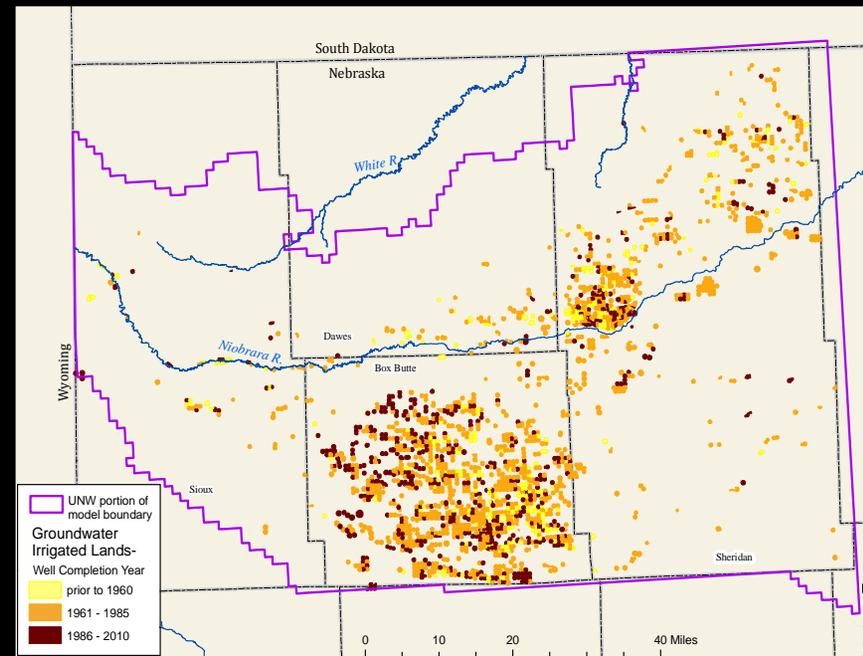
# Integrated Water Model

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- Combines a groundwater model, surface water operations model, and a land use model
- Three models will interact to determine how changes in one portion of the system effect other portions of the system (i.e. effects to SW operations on GW recharge)

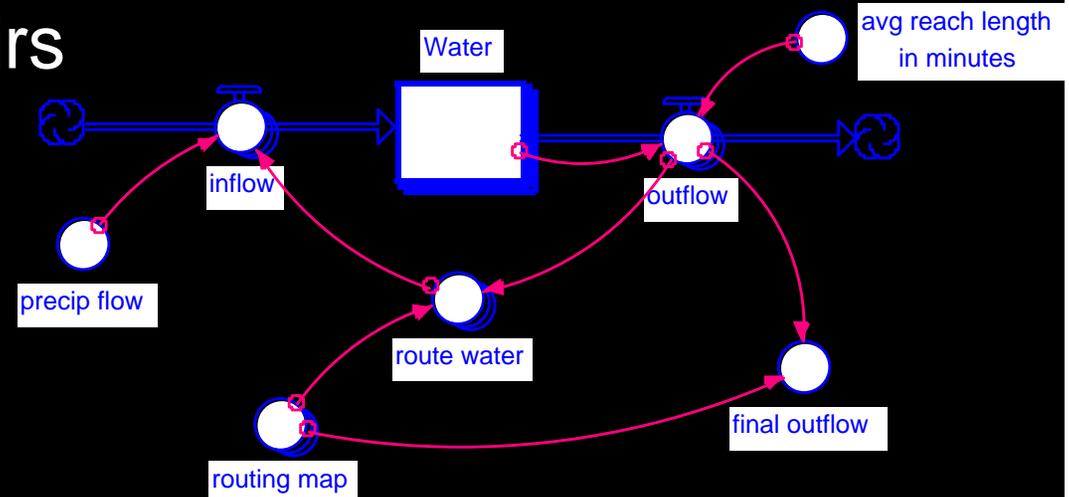
# Groundwater Model

- Currently in development
- Uses UNWNRD Certified Acres Data
- Estimates groundwater pumping for each field
- Meter Data



# Surface Water Model

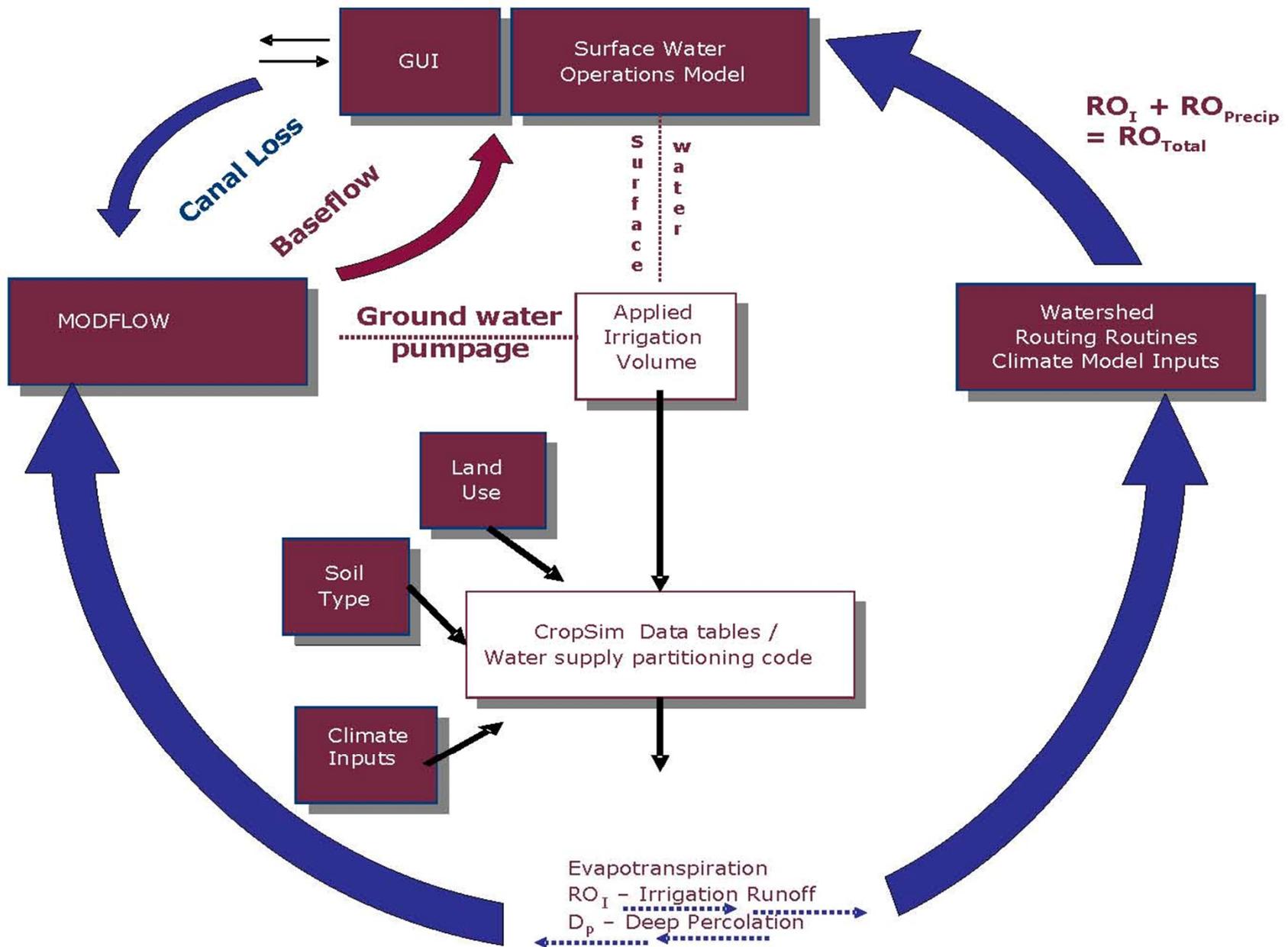
- Accounts for river operations
  - Dams & Reservoirs
  - Major Canals
- Relies upon water partition from CROPSIM
- Iteratively interacts with the groundwater model



# Land-Use Model - CROPSIM

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- Based upon
  - Soil Type
  - Crop Type
  - Precipitation
- Estimates ET based upon crop type
- Provides inputs for groundwater and surface water operations model



# Economic Component

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- Bureau of Reclamation economists will evaluate each management option in terms of its potential economic impacts
- Cost-benefit analyses, economic impact analyses, etc



# Climate Component/Variable Water Supply

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- Bureau will develop different potential future climate scenarios
- Will provide method to 'bracket' the extent of potential changes to the water supply due to climate
- Evaluate management options during wet, normal, and drought conditions

# Development of Management Tools

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- Project designed to develop tools (hydrologic & economic) to aid in water management decisions
- Based upon stakeholder input
- Must be consistent with the IMP

# Timeline

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- Entire Project: 2 Years
- Upper Basin completed first

**Thank You!**

