Update on NeDNR Modeling and Technical Activities

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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

- 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

![Interactive Map Usage by Month](image)

**Maps**
- Benchmark
- Dams Inventory
- Floodplain
- Water Planning
- Nebraska Interactive Map
- Registered Groundwater Wells
- Streamgaging
- Surface Water Appropriations

**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

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

- 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

CNEB  UNW

Baseline Name File

Scenario Output Dir

Browse

Browse

Land use change  Canal recharge change  Climate Scenario
Model Application Tool
Model Application Tool
Model Application Tool

[Image of a software tool interface with options for land use change and customizable zones.]
Model Application Tool

![Image of a software interface for model application tool]

- Baseline Name File: C:s-gou\Dropbox\FortranCode\NEWS-UMW\NEWS_1960_2010\forDNR\name-unw.txt
- Scenario Name File: C:s-gou\Dropbox\FortranCode\NEWS-UMW\NEWS_1960_2010\forDNR\name-unwG.txt

Variables:
- Precipitation
- Groundwater pumping
- Surface Delivery
- Streamflow
- Recharge
- ET

Zones:
- CHERRY
- Not_Nebraska
- SCOTT'S BLUFF
- BOX BUTTE
- SHERIDAN
- DAWES

Crops:
- Corn
- SugarBeets
- EdibleBeans
- Alfalfa
- WinterWheat
- Potatoes

Irrigation:
- Dry
- GW
- SW
- CO

Graph showing flow (acre-feet per year) from 1998 to 2007.
Model Application Tool

Model

- CNEB
- UNW

Baseline Name File

Scenario Output Dir

Land use change

Canal recharge change

Climate Scenario

Browse
Model Application Tool
Model Application Tool
## Model Application Tool

**Canal Recharge Change**

### Table: Canal Recharge Schedule

<table>
<thead>
<tr>
<th></th>
<th>Canal</th>
<th>Start</th>
<th>End</th>
<th>Month</th>
<th>Rate</th>
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<tbody>
<tr>
<td>1</td>
<td>Customized</td>
<td>1980-09-25</td>
<td>2017-09-25</td>
<td>1,2,3,4,5,6,7,8,9,10,11</td>
<td>-1000</td>
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<td>2000-09-25</td>
<td>4,5</td>
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</tbody>
</table>

**Controls:**
- **Add**: Add a new record.
- **Delete**: Delete selected record(s).
- **Save**: Save changes.
- **Run**: Run the application.

**Fields:**
- **Canal**: Select from Canal1, Canal2, Canal3, or Customized.
- **Customized Canal File**: Enter file path.
- **Start**: Start date (9/25/1995).
- **To**: End date (9/25/2000).
- **Change of rate**: +500.
Model Application Tool
Model Application Tool
- 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
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