

Multi-scaled Data Exchange to Support Integrated Water Resources Management

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Resources

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Agenda

- Who we are
- What we do
- How local data support our work at multiple scales
 - Interstate
 - Intrastate
 - Local

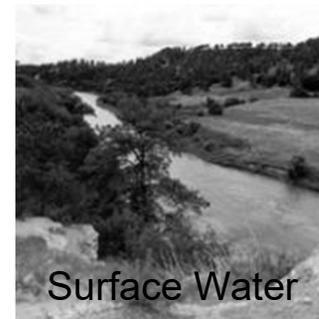




Providing the sound science and support for managing Nebraska's most precious resource



Water Planning and Integrated Management



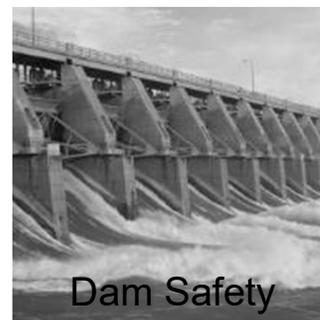
Surface Water



Groundwater



Floodplain Management

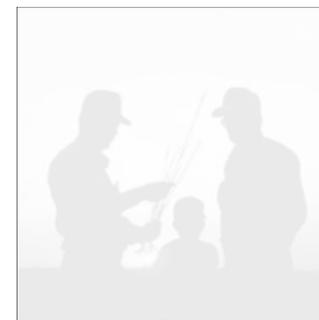


Dam Safety





Providing the sound science and support for managing Nebraska's most precious resource



IMPLEMENTATION

Water Management
Projects

Strategic Planning Actions

PLANNING AND PUBLIC PARTICIPATION

Goals and Objectives
for Water Planning

Stakeholder Involvement

Water Availability and
Water Shortages

Water Supplies and Water Uses

SCIENCE

Hydrologic Models, Data, and Analyses

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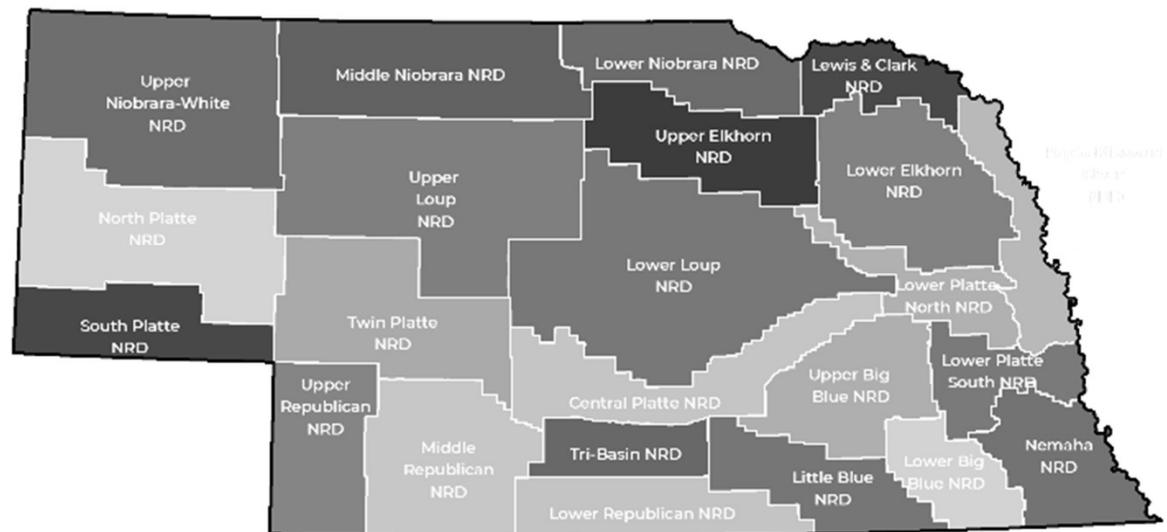
Water Supplies and Water Uses

SCIENCE

Hydrologic Models, Data, and Analyses

Nebraska's Natural Resources Districts

- Natural Resources District system created by act of legislature in 1969 (districts in place since 1972)
- Boundaries based on major river basins
- Created to solve flood control, soil erosion, irrigation runoff, and groundwater quality and quantify issues, among other responsibilities



WATER QUANTITY

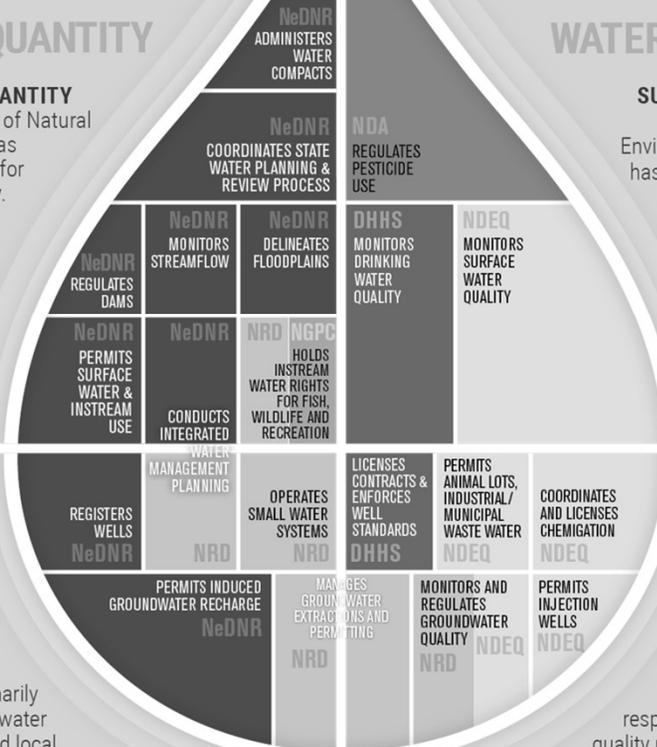
SURFACE WATER QUANTITY

Nebraska Department of Natural Resources (NeDNR) has primary responsibility for surface water quantity. NeDNR and Natural Resources Districts (NRDs) are jointly responsible for surface and groundwater integrated management planning.

WATER QUALITY

SURFACE WATER QUALITY

Nebraska Department of Environmental Quality (NDEQ) has primary responsibility for surface water quality. Other agencies have responsibility within specific areas.



SURFACE WATER

GROUNDWATER

GROUNDWATER QUANTITY

The organizations primarily responsible for groundwater quantity are NeDNR and local NRDs. They are jointly responsible for surface and groundwater integrated management planning.

GROUNDWATER QUALITY

NRDs have primary responsibility for groundwater quality related to nonpoint source pollution. NDEQ has primary responsibility for point source pollution of groundwater and authority parallel to the NRDs for nonpoint source pollution.

Interstate Data Exchange

Compact Compliance: Republican River Compact Administration (RRCA)

- Compact signed by three states and ratified by Congress in 1943
- Divides “virgin water supply” of the Republican River between Colorado, Kansas, and Nebraska
 - Virgin water supply = water supply undepleted by the activities of man
- 11% to Colorado, 40% to Kansas, 49% to Nebraska
- Long legal history between Kansas and Nebraska
 - Kansas filed suit in 1998 with major points of contention being proliferation of well development (depleting streamflow) in Nebraska and chronic overuse by Nebraska in several subbasins
 - Settlement laid out accounting procedures
- Annual data exchange



RRCA Data Exchanged

NeDNR Data

- Non-federal surface water uses
 - Location, diversion amount, acres
- Water administration
 - Dates and curtailment information
- Streamflow records
- New wells
 - Physical information, intended use
- Crop irrigation requirements*
- Non-federal reservoirs**
 - Surface area, capacity, evaporation

*Combines NASS and HPRCC data

**Calculations based on dam inventory, field office notes, and USBR data

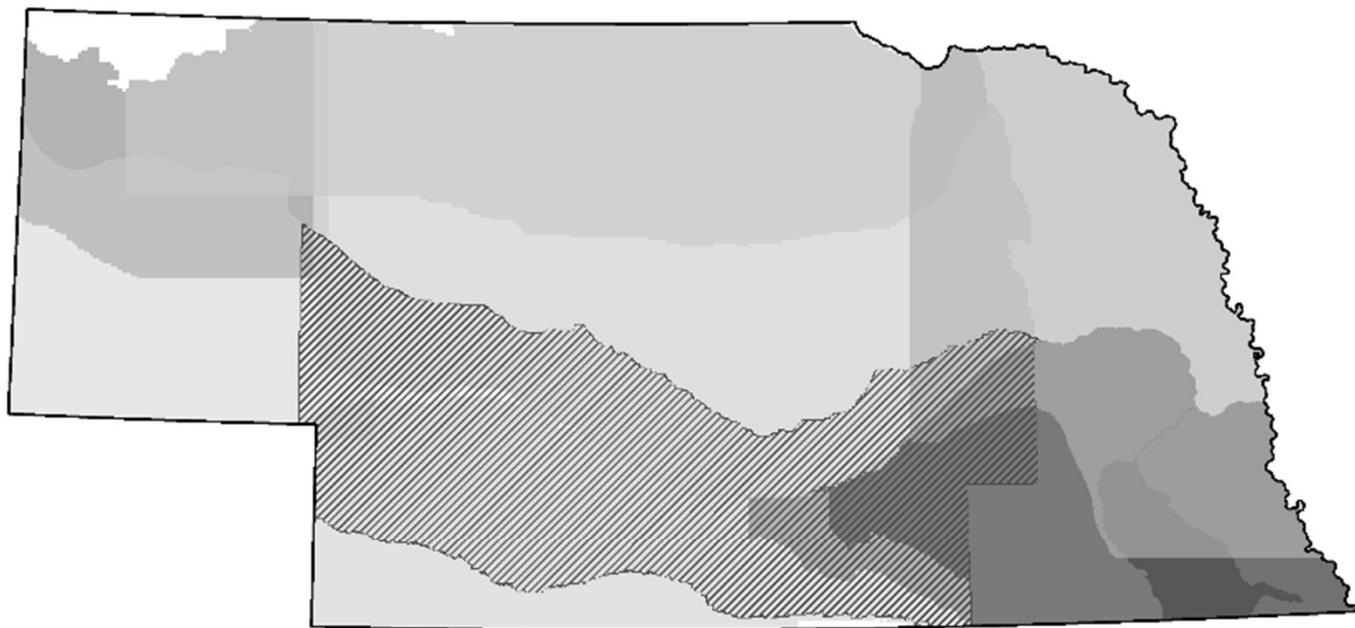
Data from Other Local Partners

- Platte River reservoirs (irrigation districts)
 - Inflow, outflow, net evaporation
- Augmentation projects (Natural Resources Districts)
 - Physical information, daily pumping data
- Groundwater pumping (Natural Resources Districts, irrigation districts)
 - Pumping amount (from power or meter records), system type, acres irrigated



Intrastate Data Exchange

Hydrologic Modeling Efforts Across Nebraska



- | | |
|-----------------------------|---------------------------------|
| Upper Missouri Waters | Upper North Platte Waters Model |
| Upper North Platte Waters | Missouri Model |
| Western North Platte Waters | North Platte Waters |
| Republican Basin Model | G. N. D. Model |
| Upper North Platte Waters | |



Data Used in Hydrologic Modeling

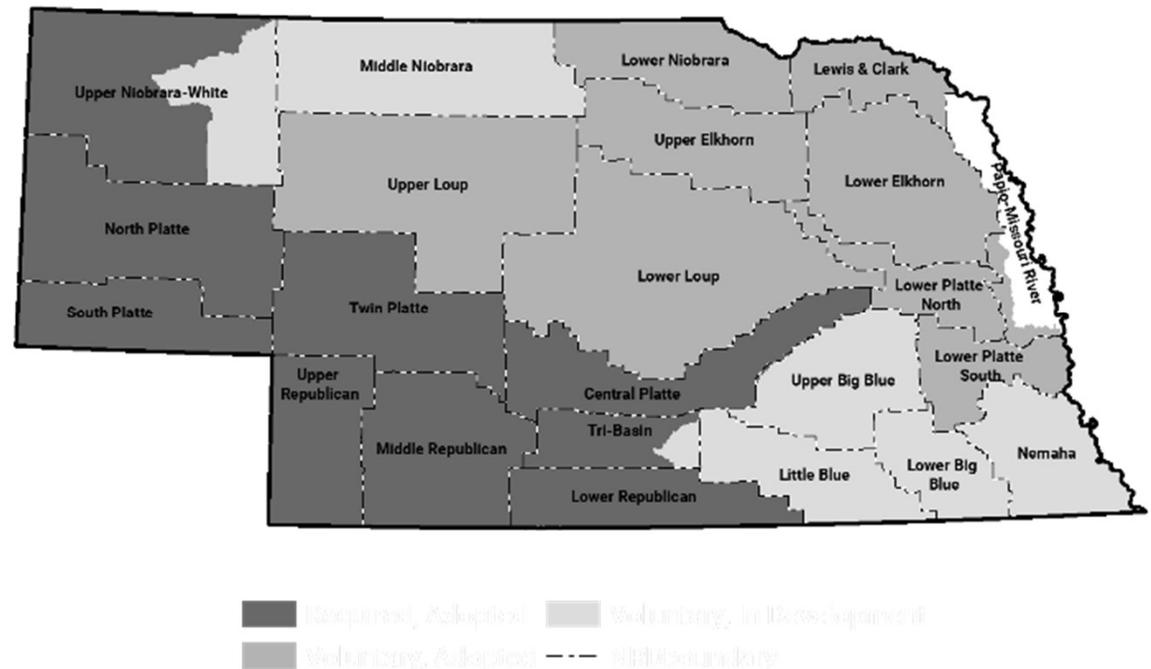
- Climate
- Soils
- Land Use
 - Natural Resources District certified irrigated acres
- Groundwater pumping
 - Natural Resources District metered data – irrigation
 - Municipal and industrial pumping
- Geology
 - University Conservation and Survey Division test holes
 - NeDNR registered wells
 - Airborne electromagnetic survey data
- Surface water
 - NeDNR stream gage data
 - Headwaters seepage/springs locations
 - Local operations data



Local Data Exchange

Nebraska's Integrated Management Planning (IMP) Process

- 2004: LB962 required IMPs in fully and over-appropriated basins
- 2010: LB764 allowed for voluntary IMPs
- 2014: LB1098 Water Sustainability Fund
 - Several goals, including to promote goals and objectives of approved IMPs
- 2018: All Natural Resources Districts in the state participating in IMPs



Data Exchanged for IMP Annual Reports

Natural Resources District data

- Static groundwater levels
- Certified acres/changes
- Municipal/industrial uses
- Metered data (irrigation)
- Stream gage measurements
- Well construction permits issued/denied
- Variances granted
- Transfer permits granted
- Depletions to streamflows resulting from new, retired, or other changes to uses

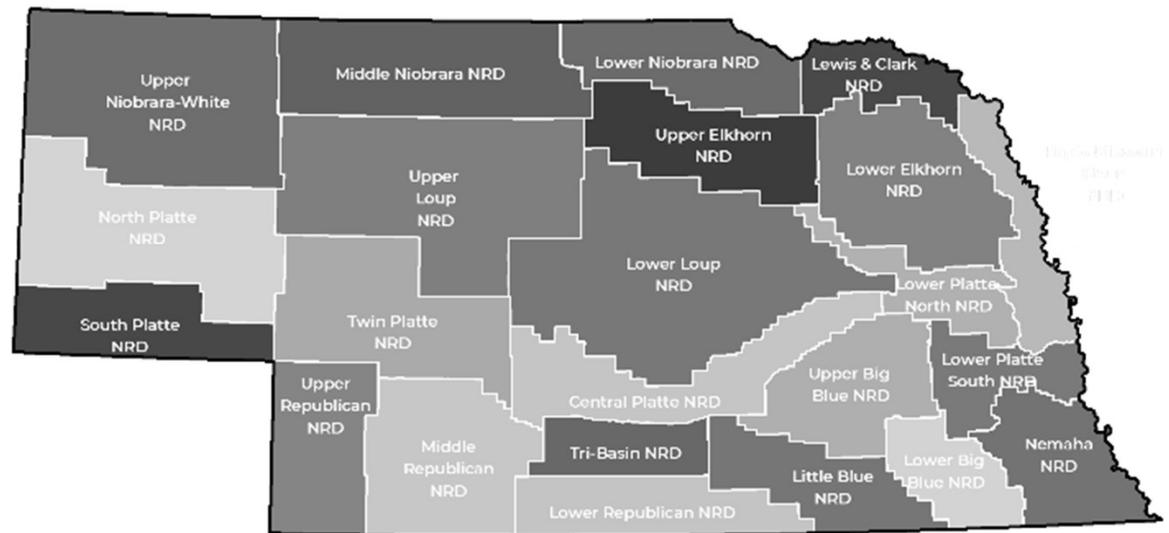
NeDNR data

- Irrigation use
- Municipal/industrial use
- New appropriations granted
- New groundwater permits issued
- Stream gage measurements
- Transfers/cancellations of appropriations
- Administrative actions taken
- New depletions accounting
- New data collected or model/study results



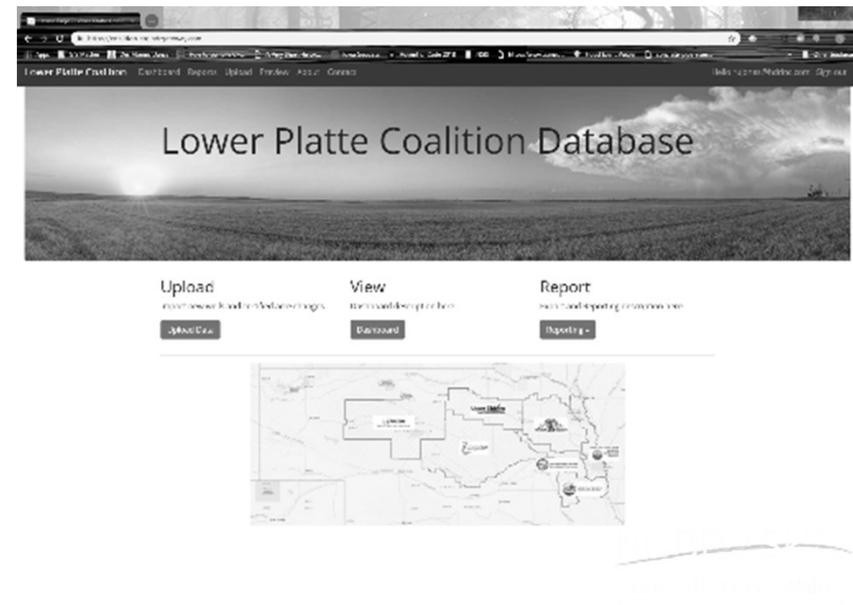
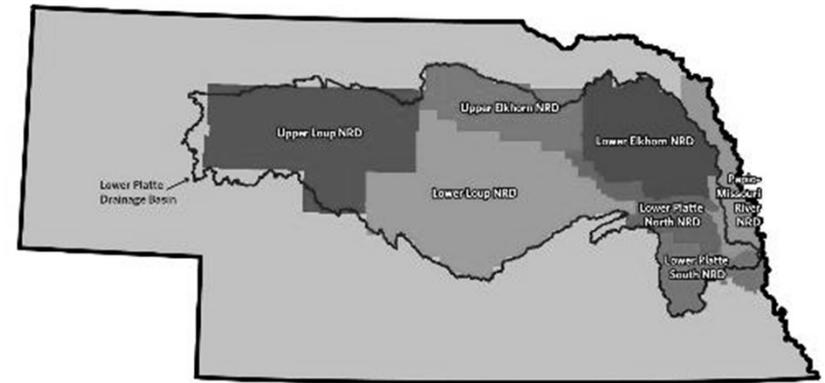
Data Exchange Challenges

- NeDNR has 23 partners in effort
- Challenges
 - Data types/Level of detail vary
 - Technology/experience
 - Formats
 - Nomenclature, units, etc.
- Critical to the fundamental IMP feedback loop



Database development

- Lower Platte Basin Coalition – 2018 Basin Plan
- Opportunity to establish consistency in data collection and storage
- Coincident effort with USGS WUDR statewide database development for non-agricultural uses
- Two purposes:
 - Importing, storage, and reporting for IMP and basin plan annual reporting
 - Data record for plan monitoring, future modeling efforts



Importing and Storing Data

- Standardized format – template files
- Compatibility with existing databases – not creating work!
- Robust validation

Import Preview

Showing 10 of 10 records

MED	NDC	JFC	DKS	Dose	Unit	NDC Approval Date	Status	Form Capabilities	Approximate Weight
UK	10011	10011.1	010011	100 mg	1	11/04/2011	A	100	10
UK	10012	10012.2	010012	100 mg	1	12/14/2011	A	100	10
UK	10013	10013.3	010013	100 mg	1	10/17/2011	A	100	10
UK	10014	10014.4	010014	100 mg	1	01/02/2012	A	100	10
UK	10015	10015.5	010015	100 mg	1	08/05/2011	A	100	10
UK	10016	10016.6	010016	100 mg	1	02/02/2012	A	100	10
UK	10017	10017.7	010017	100 mg	1	02/02/2012	A	100	10
UK	10018	10018.8	010018	100 mg	1	08/05/2011	A	100	10
UK	10019	10019.9	010019	100 mg	1	02/02/2012	A	100	10
UK	10020	10020.0	010020	100 mg	1	08/05/2011	A	100	10

Import Preview

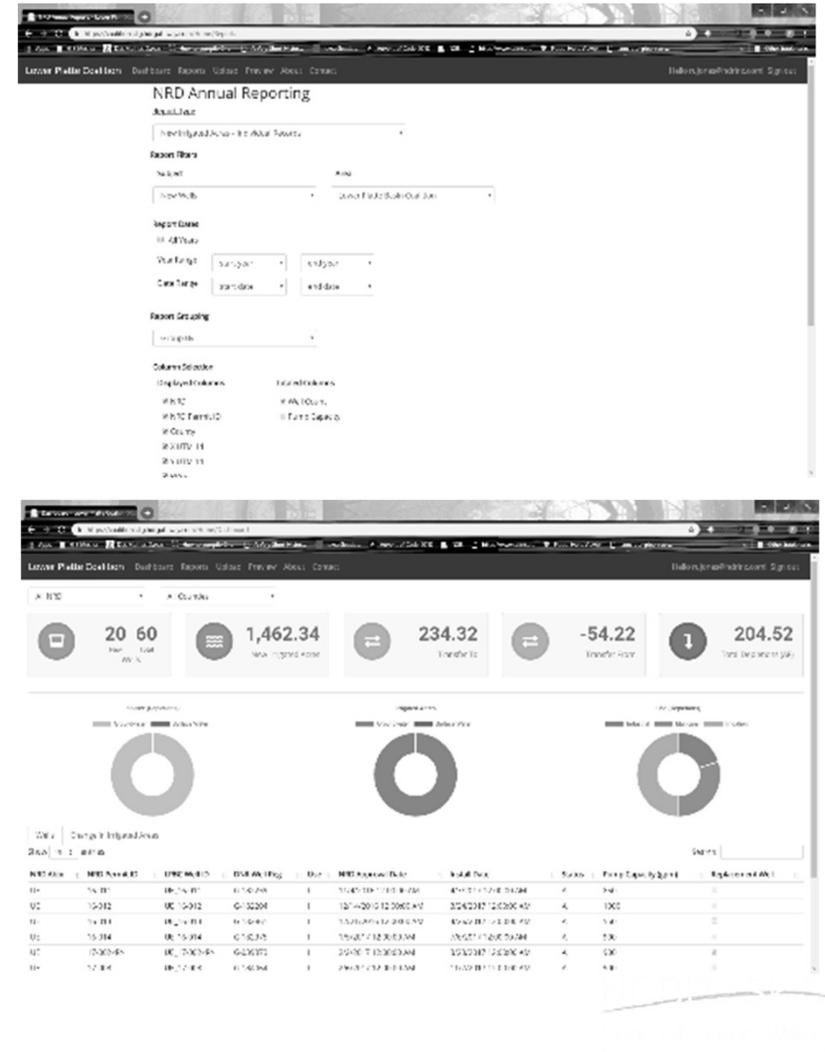
Showing 10 of 10 records

MED	NDC	JFC	PFC	Change Type	Approval Date	Status	Stock Decision Rule	MED Act 2
UK	20101	10011.1	1	New	5	5	5	45
UK	20102	10012.2	1	New	5	5	5	45
UK	20103	10013.3	1	New	5	5	5	45
UK	20104	10014.4	1	New	5	5	5	45
UK	20105	10015.5	1	New	5	5	5	45
UK	20106	10016.6	1	New	5	5	5	45
UK	20107	10017.7	1	New	5	5	5	45
UK	20108	10018.8	1	New	5	5	5	45
UK	20109	10019.9	1	New	5	5	5	45
UK	20110	10020.0	1	New	5	5	5	45

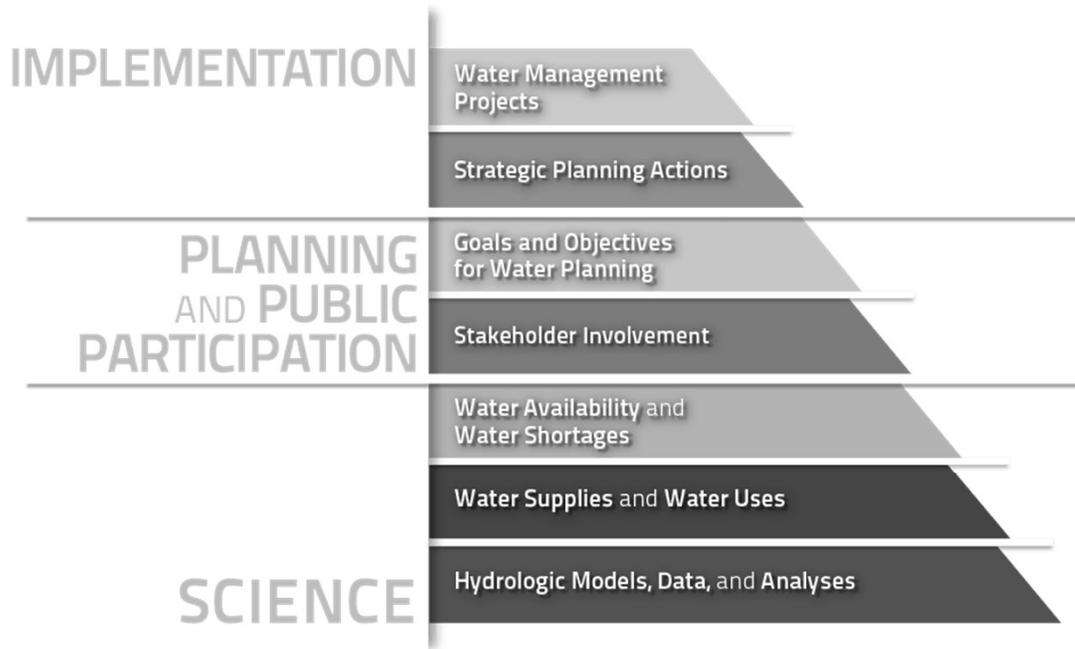


Reporting

- Multiple database queries:
 - Spatial
 - Temporal
 - Type (use, transfer, retirements, etc.)
- Standardized reporting tables and graphics
- Timing and location record of new uses stored for monitoring and modeling updates



Data Exchanged Annually Informs Adaptive Management





THANK YOU

dnr.nebraska.gov  