Conjunctive Water Management in Nebraska

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Recharging Aquifers through Excess Surface Water Diversions

- Water Management in Nebraska
- Theory of Conjunctive Water Management
- Application in Nebraska
  - Upper Platte River Basin
- Results and future work

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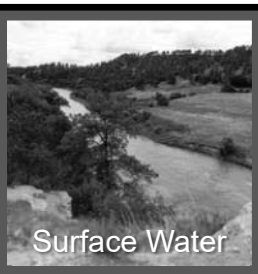
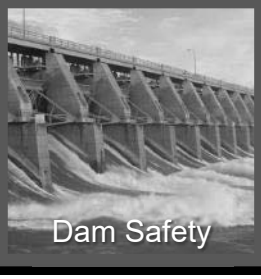
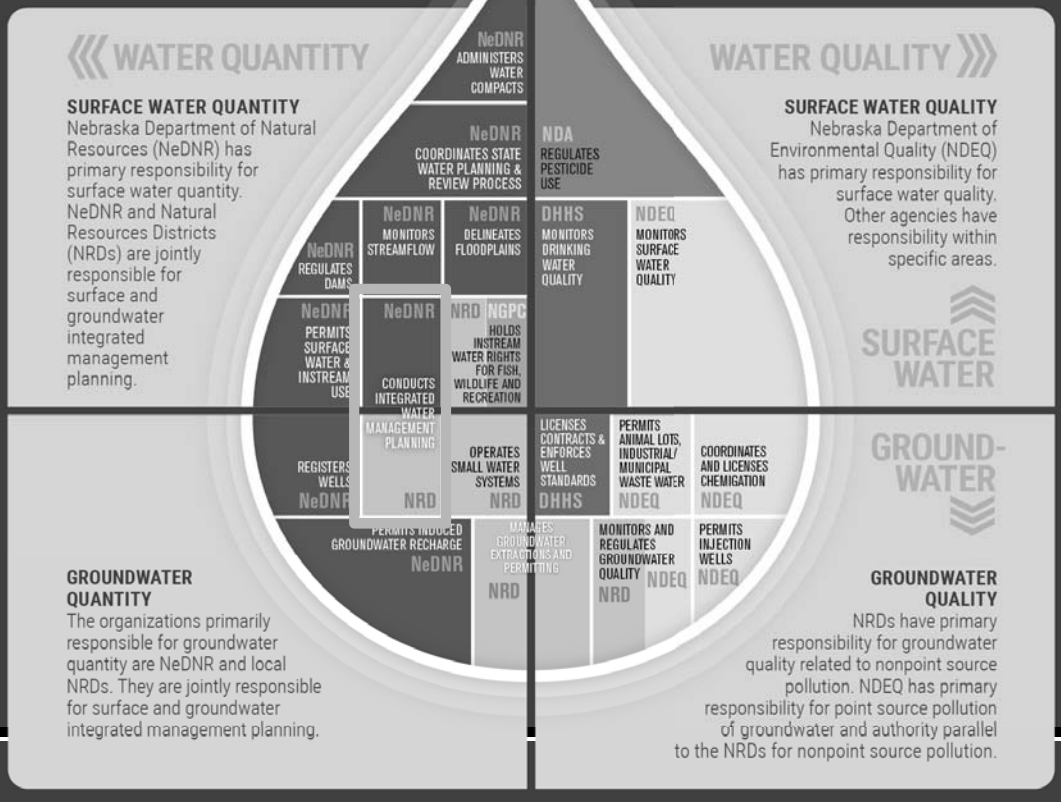
Providing the sound science and support for managing Nebraska's most precious resource.







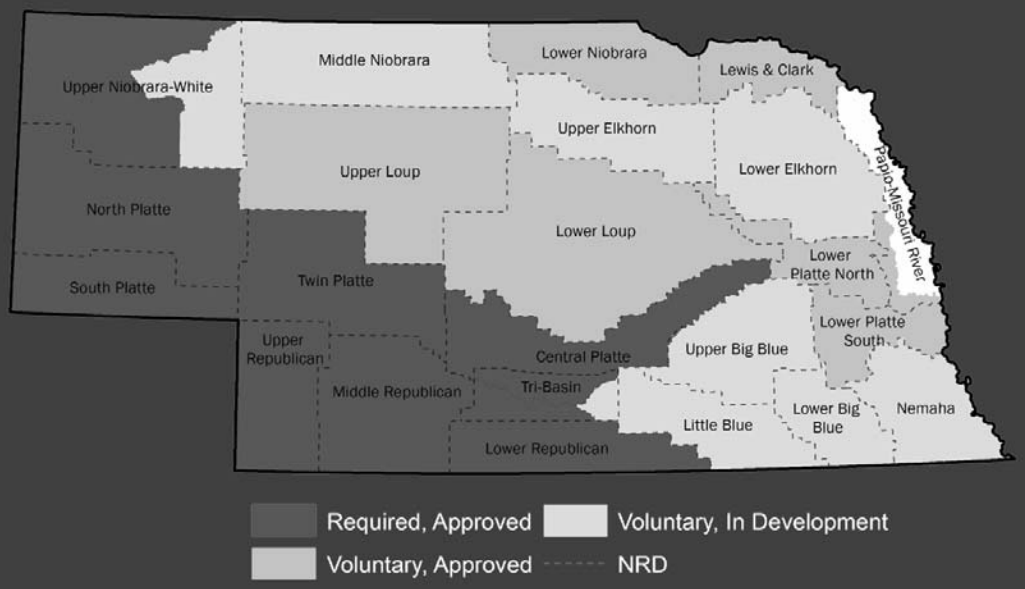
SURFACE WATER QUANTITY
Nebraska Department of Natural Resources (NeDNR) has primary responsibility for surface water quantity. NeDNR and Natural Resources Districts (NRDs) are jointly responsible for surface and groundwater integrated management planning.

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

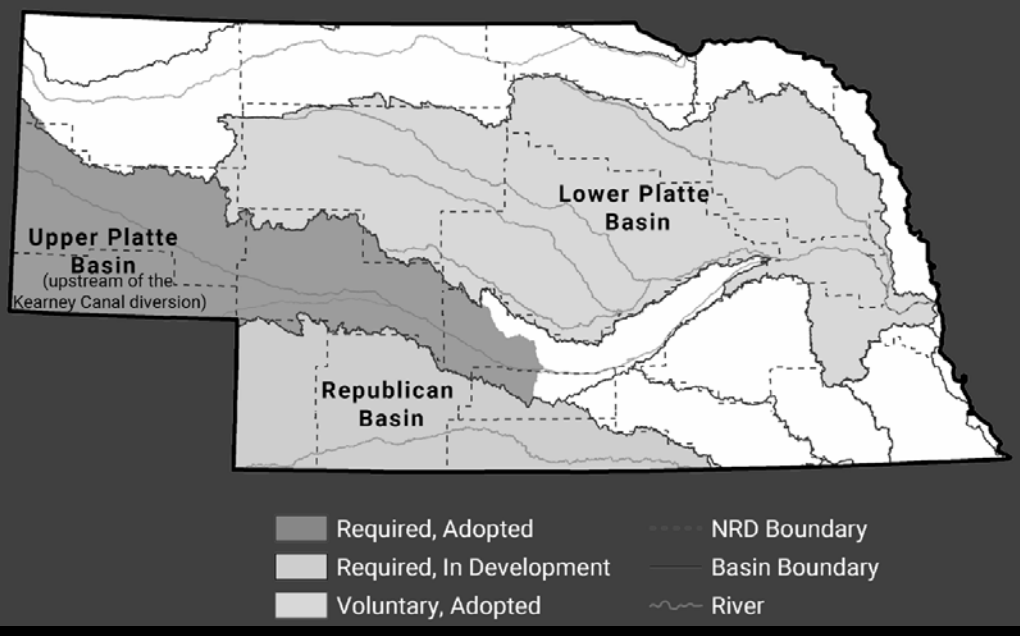
GROUNDWATER QUANTITY
The organizations primarily responsible for groundwater quantity are NeDNR and local NRDs. They are jointly responsible for surface and groundwater integrated management planning.

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.

Integrated Management Plans (IMPs)



Basin-Wide Plans



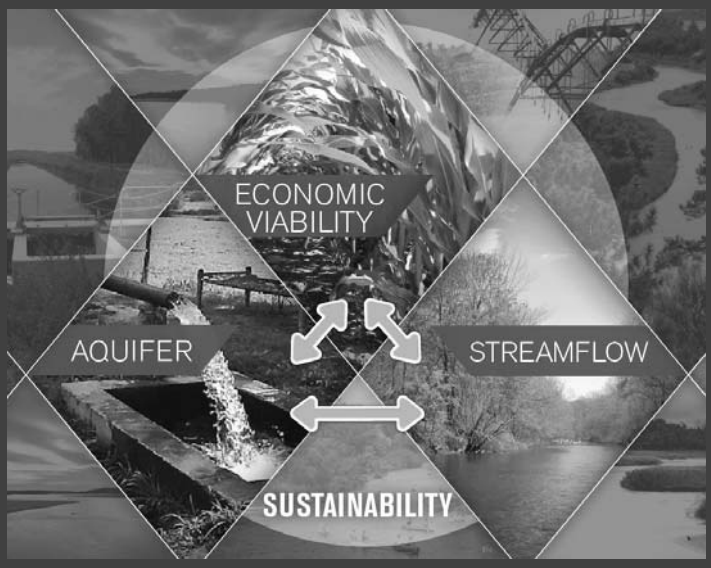
Purpose

…An integrated management plan shall include… Clear goals and objectives with a purpose of **sustaining a balance between water uses and water supplies**

so that **the economic viability, social and environmental health, safety, and welfare** of the river basin, subbasin, or reach

can be **achieved and maintained for both the near term and the long term…**

from *Neb. Rev. Stat.* § 46-715 (2)

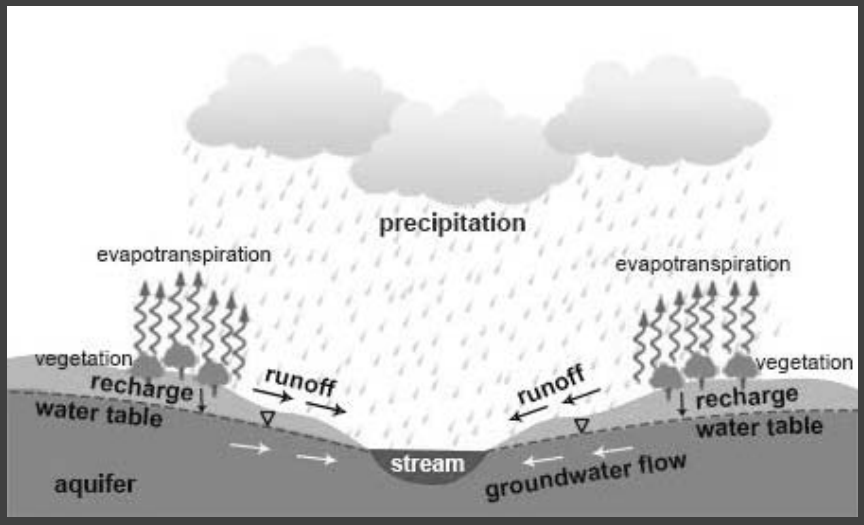


Conjunctive Water Management

is an ***adaptive process*** that utilizes the ***connection*** between surface water and groundwater to ***maximize water use***, while ***minimizing impacts*** to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the ***reliability of that supply***.

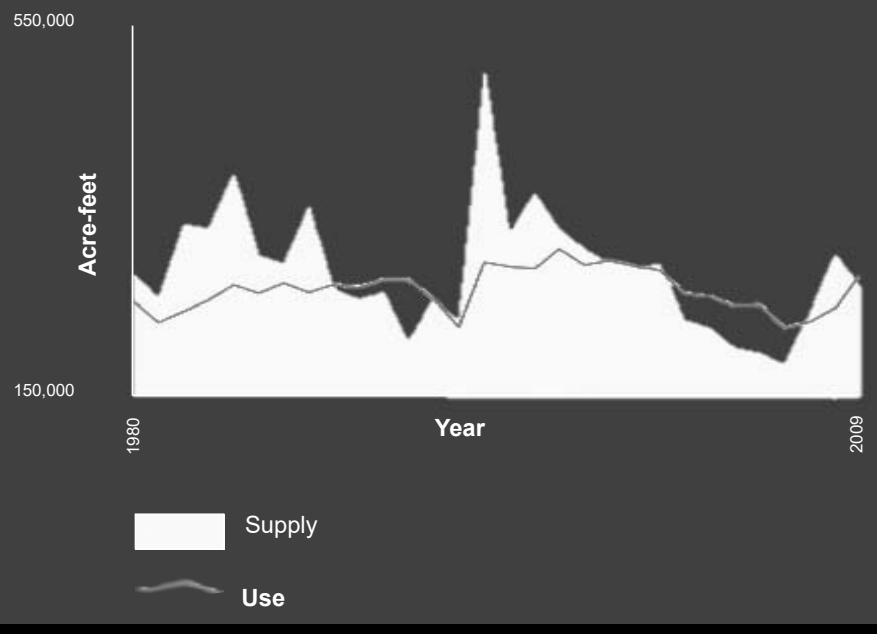
UNDERLYING CONCEPTS

- Surface and groundwater resources are interconnected
- Decisions for management of one cannot be made properly without considering the other



HOW IS CWM ACCOMPLISHED?

- Typically, by:
  - Using or storing additional surface water when it is plentiful
  - Relying more heavily on groundwater during dry periods
- Can change the timing and location of water for more efficient use
- Program for monitoring and evaluation

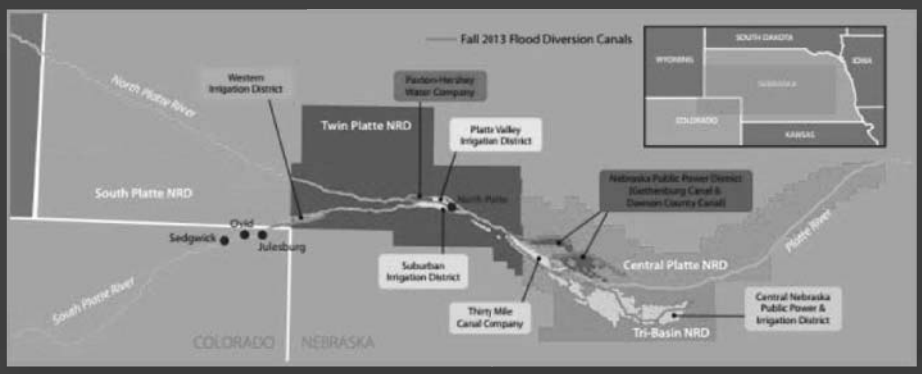


BENEFITS OF CWM

- Maximize available water supplies
- Leverage existing infrastructure
- Use existing planning framework
- Minimize the need for regulatory actions
- Customize to local opportunities or needs
- Maintain viability of existing uses

EXAMPLES OF CWM PROJECTS

- Augmentation projects
- Water leasing arrangements
- Canal rehabilitation
- Capturing excess flows
- Broad scale recharge
- Slurry wall reservoirs

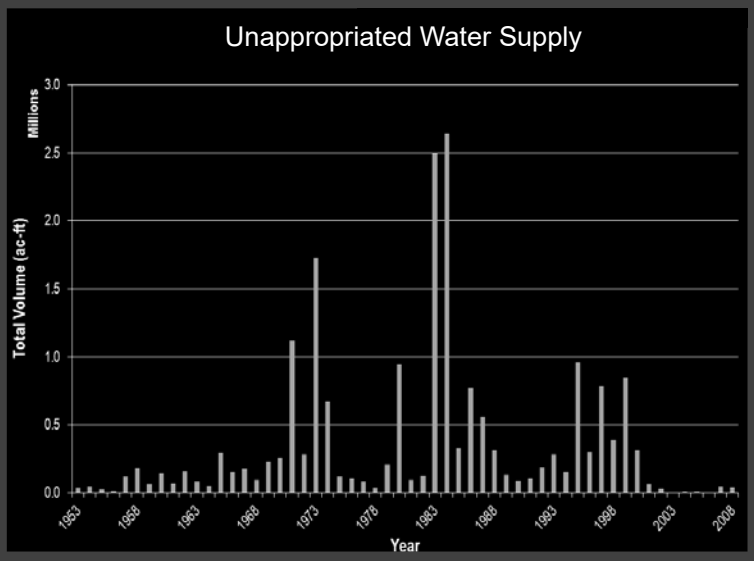


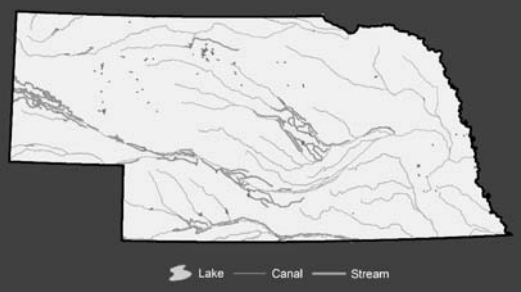
APPLYING CONJUNCTIVE MANAGEMENT

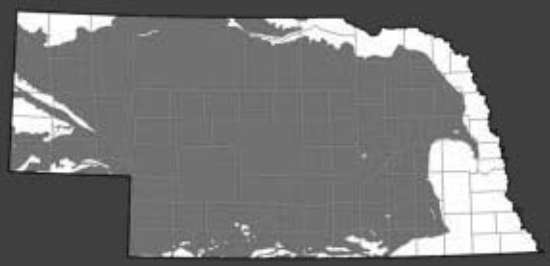
IN THE UPPER PLATTE RIVER BASIN

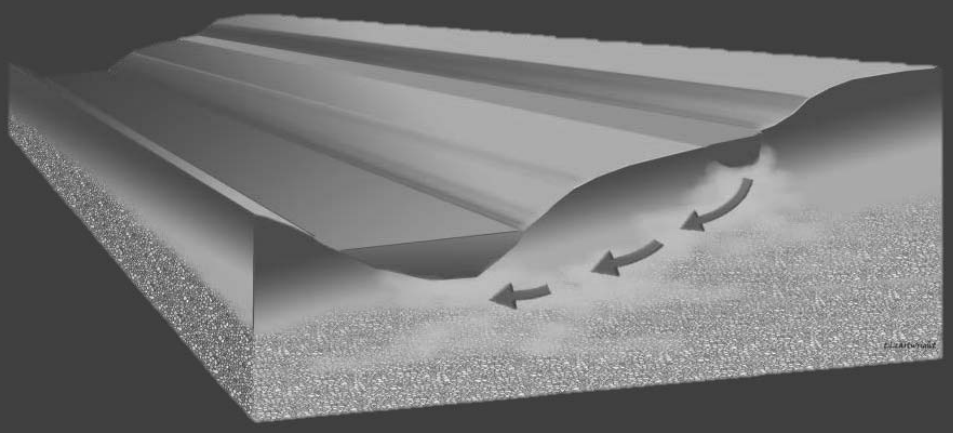
UPPER PLATTE RIVER

- Annually 1 million af inflows from WY
- More variable inflows from CO
- Water is generally fully allocated
- Offset depletions since 1997, offset any new use
- Instream flow needs for wildlife
- Unappropriated water occasionally available
- Extensive canal infrastructure
- Underlain by Ogallala Aquifer




Lake
Canal
Stream





2011 PILOT PROJECT

- High flows in spring through fall
  - North Platte, South Platte, Platte
- NeDNR coordinated with NRDs, Irrigation Districts/Canal Companies to divert excesses
- Process
  - Acquisition of permits
  - Contracts
  - Monitor

2011 PILOT PROJECT

23 Canals and 5 NRDs

Diversion Total 145,500 acre-ft
Recharge Total 96,120 acre-ft

Also helped mitigate flooding impacts in the basin

PROCESS DEVELOPED

- NeDNR, NRDs contract with irrigation districts
  - Canal must have recharge permit – temporary 1 year
- Field staff monitors flows
- When flows are in excess of targets/all appropriations met, notifies canal operator can divert and notifies DNR main office
- Field office tracks when canal starts and stops diverting excess
- Water Planning division models recharge impacts to streamflows, measure progress toward IMP goals and objectives

Fall 2013 FLOOD FLOWS

South Platte River at North Platte, NE

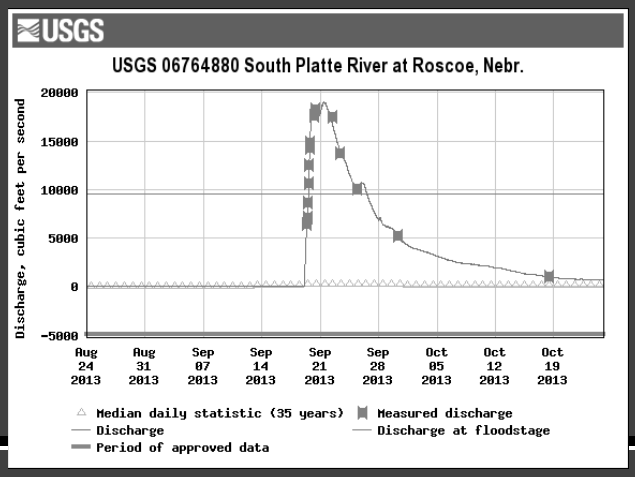
24 hours

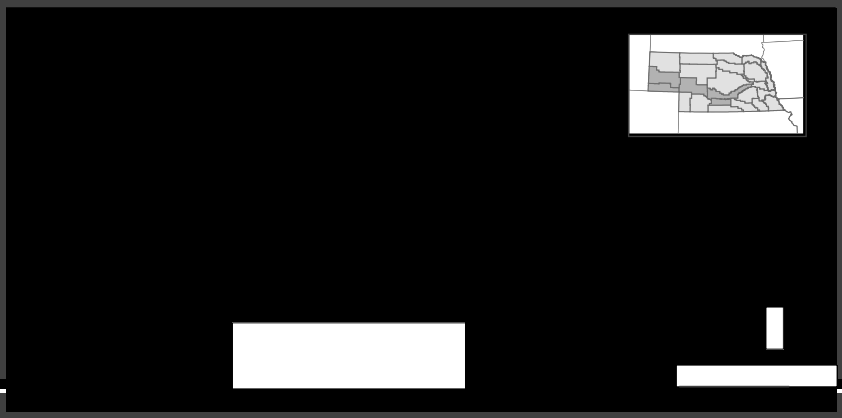
Fall 2013 FLOOD FLOWS

9 Canals and 4 NRDs

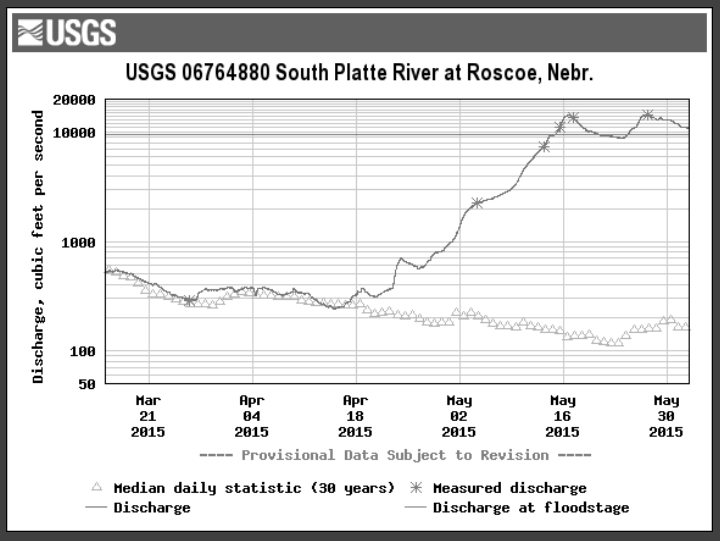
Diversion Total **27,300 acre-ft**

Recharge Total **21,800 acre-ft**





Spring 2015 FLOOD FLOWS

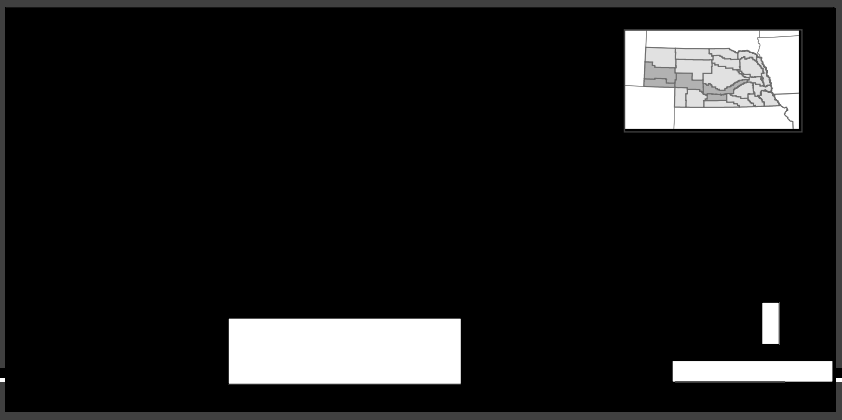


Spring 2015 FLOOD FLOWS

7 Canals and 4 NRDs

Diversion Total 17,600 acre-ft

Recharge Total 11,100 acre-ft



SUMMARY OF EXCESS FLOW DIVERSIONS

- Over **260,000** af diverted since 2011
- Recharge in excess of **176,000** af
- Accretions will benefit Platte River flows for many years into the future
- Process in place for future successes
- Reduces the need for additional regulations
- Creates greater resiliency in future periods

CWM FUTURE ACTIVITIES

- Expand implementation of CWM projects
- Enhance adaptation strategies based on management goals
- Support continued investment in maintaining and enhancing infrastructure
- Ensure that sound science and monitoring are available to support management decisions

Lessons Learned

- Conjunctive Water Management can be effectively applied in Nebraska
- Lead to a more reliable water supply and supports economic viability
- Local partners are key
- Monitoring and tracking is an important part of implementation

Questions?

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