



Nebraska
Department of Natural Resources

NEBRASKA'S WATER MANAGEMENT RESOURCE

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

Canal Recharge Opportunities and Successes

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Nebraska Department of Natural Resources

Outline

- Water Availability and Shortages
- Conjunctive Water Management
- Nebraska's Canal Recharge projects



WATER AVAILABILITY & WATER SHORTAGES

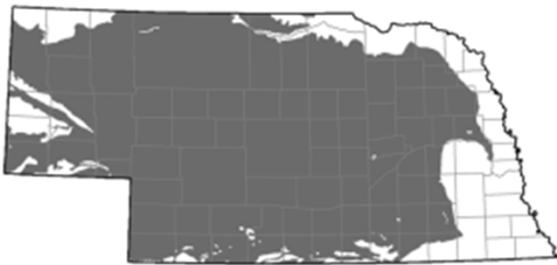
Water Availability & Water Shortages

Challenges

- Variable supplies
- Existing uses
- Compacts and agreements

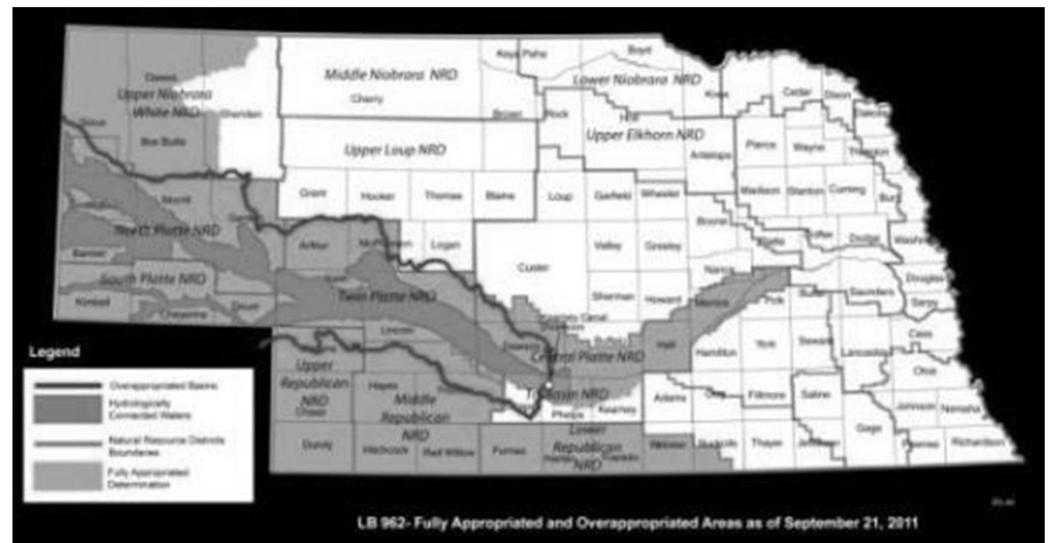
Opportunities

- Surface water and groundwater resources
- Infrastructure
- Planning framework



Platte River Basin in Nebraska

- Challenges
 - Interstate agreement
 - Fully and Overappropriated
 - Must offset depletions
- Opportunities
 - Comprehensive planning framework
 - Local management
 - Infrastructure





CONJUNCTIVE WATER MANAGEMENT

Surface water and groundwater resources are *hydrologically interconnected*, and decisions to improve the management of one cannot be made properly without *considering* the other.

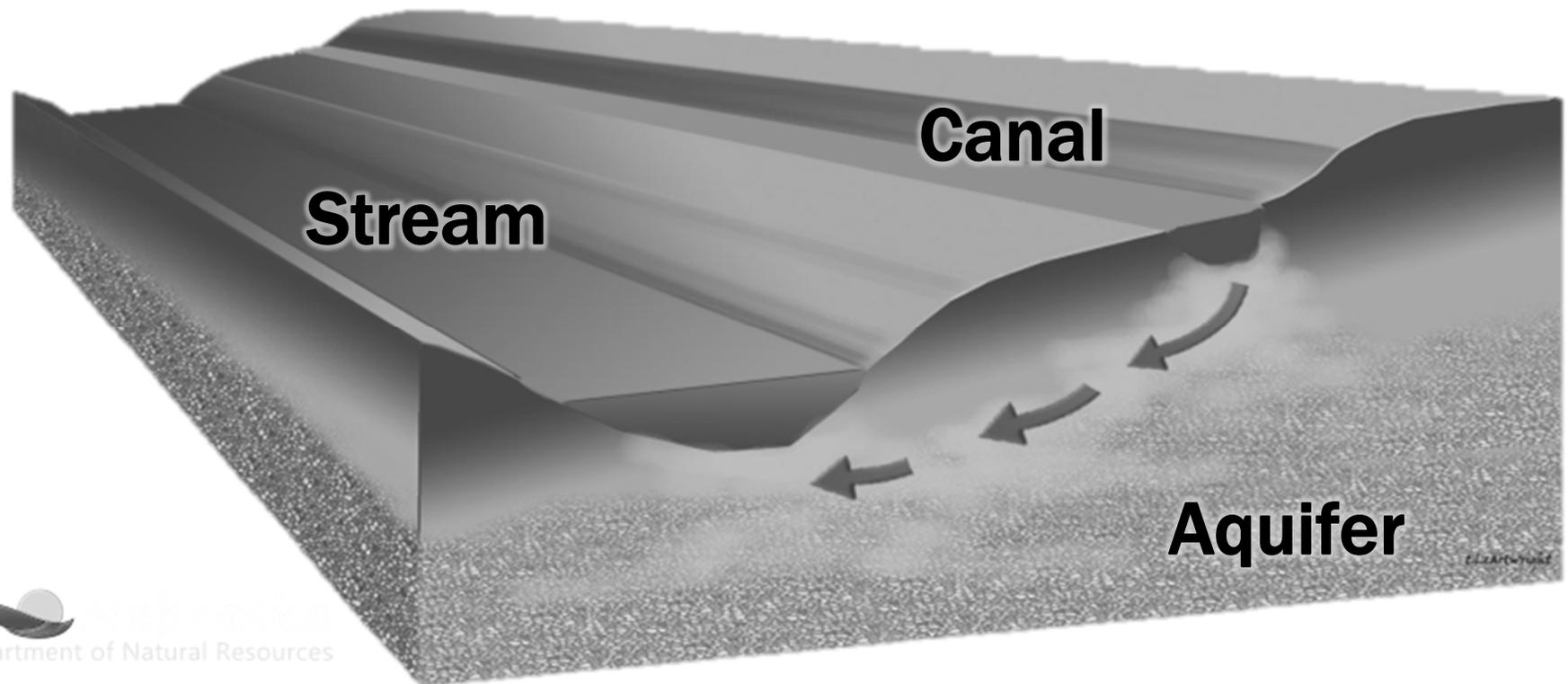
Conjunctive Water Management is an *adaptive process* that utilizes the *connection* between surface water and groundwater to *maximize water use*, while *minimizing impacts* to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the reliability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



CANAL RECHARGE PROJECTS

Canal Systems

- As part of normal operations, unlined irrigation canals provide groundwater recharge resulting in streamflow accretions



Opportunities

- Divert excess flow during non-irrigation season into canals
- Study indicated frequent excesses
- Provide additional recharge and accretions
- Mitigate flood impacts



2011 Pilot Project

- High flows in spring prior to irrigation season
- DNR coordinated with NRDs, Irrigation Districts/Canal Companies to divert excesses
- Established framework for process



General process

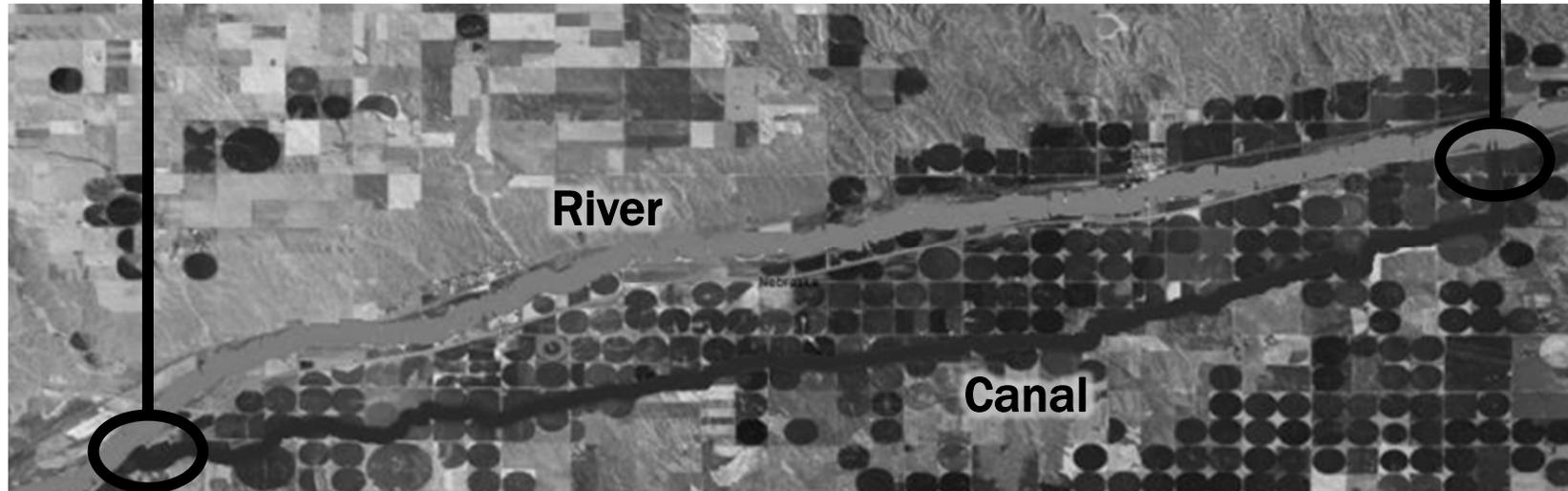
- Monitoring for opportunities
 - Upstream flows, snowpack, predictions
- Estimate timing of peak
- Irrigation District apply for permit
 - All existing rights satisfied
- Contract for payment

General process

- Diversions measured at head gates
- Canal returns measured
- Continue to divert
 - As long as excess exists
 - Until irrigation starts
 - Until weather inhibits
- Estimate volume recharged

Diversion/Head Gate

Return/Spill

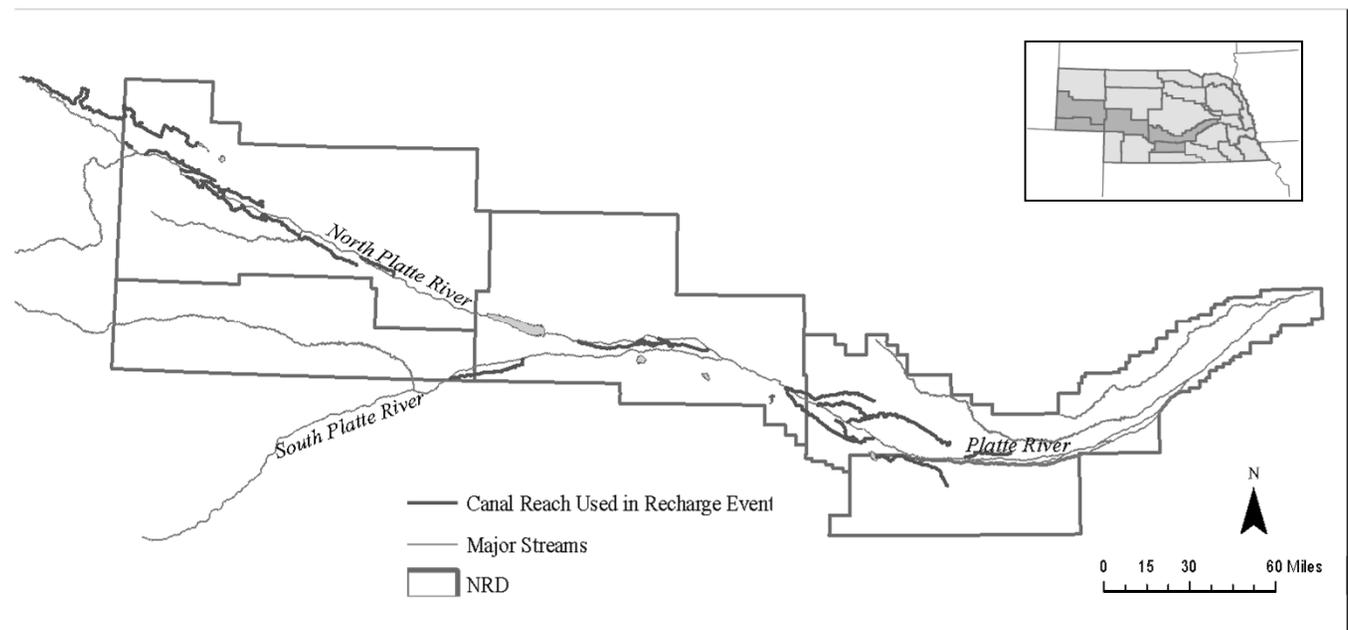


$$\textit{Recharge} = \textit{Diversion} - \textit{Return}$$

$$\textit{Recharge Percent} = \frac{\textit{Diversion} - \textit{Return}}{\textit{Diversion}} \times 100\%$$

2011 Pilot Project

- 23 Canals and 5 NRDs
 - Diversion Total 142,000 a-f
 - Recharge Total 64,000 a-f



2013 Flood Flows

Friday, September 20, 2013

Saturday, September 21, 2013

South Platte River Highway 83 Bridge, North Platte, NE

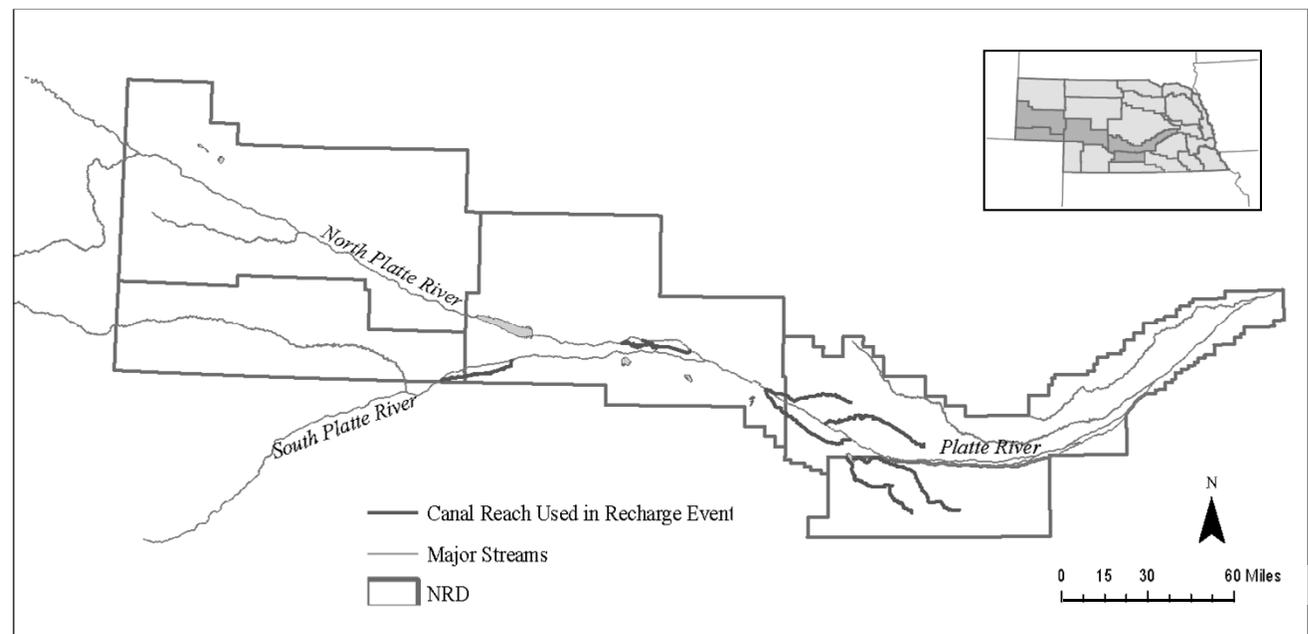


South Platte River Buffalo Bill Road Bridge, North Platte, NE



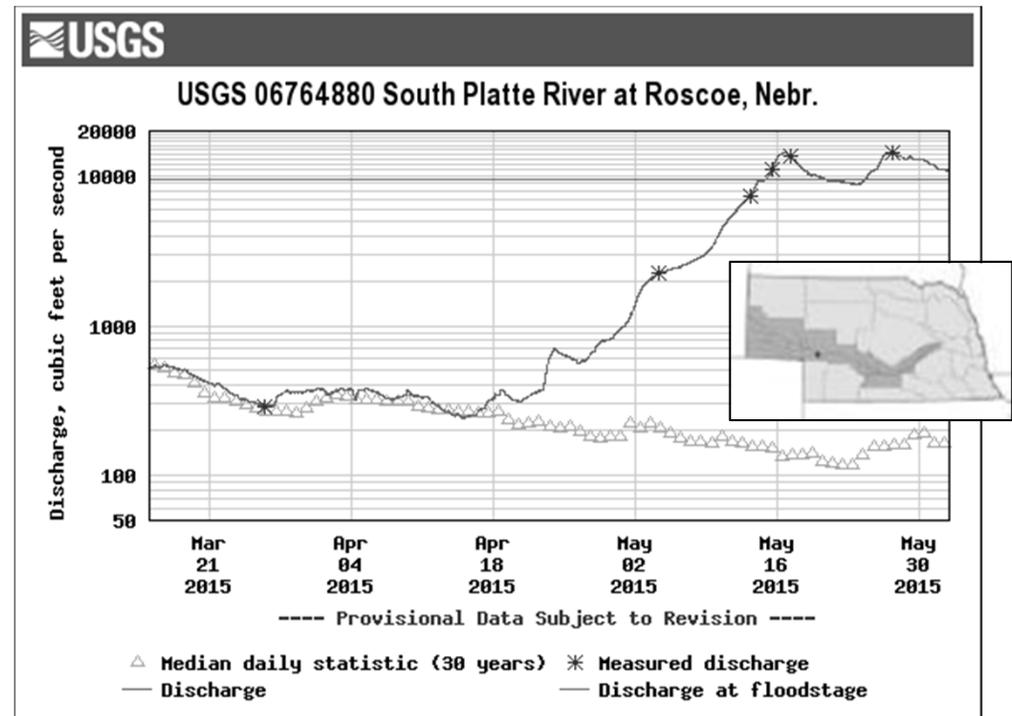
2013 Flood Flows

- 9 Canals and 4 NRDs
 - Diversion Total 44,000 a-f
 - Recharge Total 27,000 a-f
 - Total Cost \$707,748



2015 Flood Flows

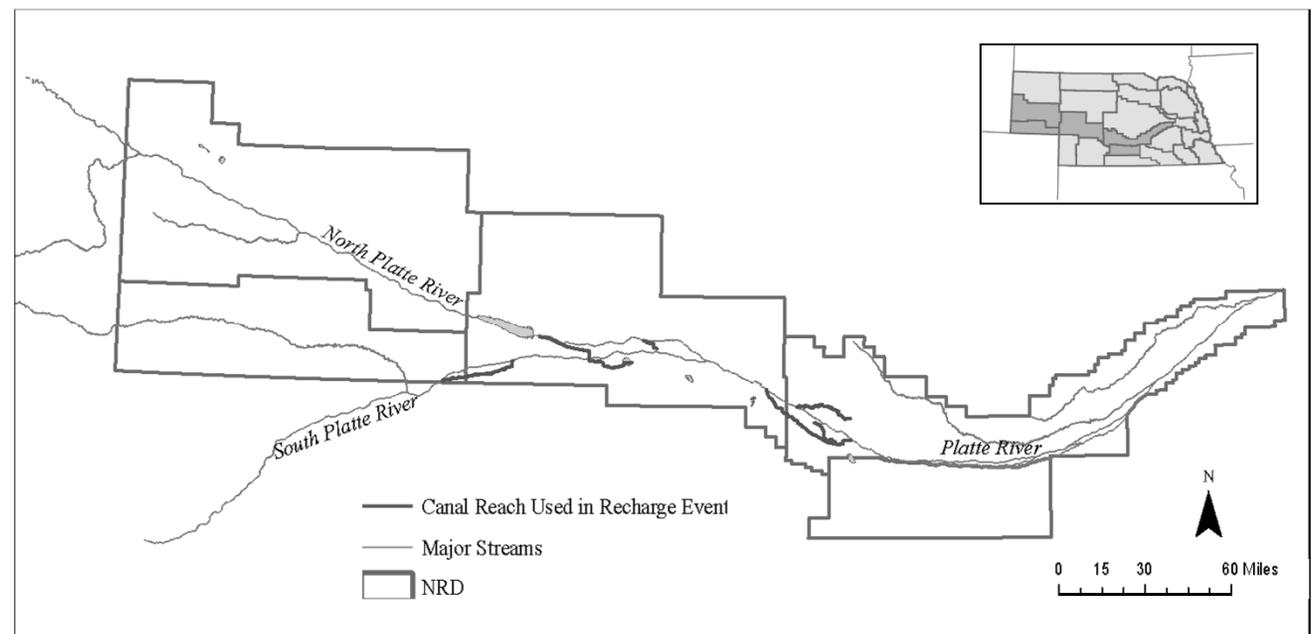
- Wet conditions during spring snowmelt
- Canals filled early
- Stored excess in lakes, reservoirs



2015 Flood Flows

➤ 7 Canals and 4 NRDs

- Diversion Total 17,700 a-f
- Preliminary Recharge Total 7,600 a-f



CWM Successes

- Other projects
 - Canal Rehabilitation
 - Recharge pits
 - Reservoir recharge
- Modeling how to use groundwater and surface water most effectively

Summary

- Nebraska faces many water challenges
- DNR and partners are using CWM to maximize water uses while minimizing negative impacts
- The 2011 Pilot Project laid the framework for successes in 2013 and 2015
- CWM will continue to be part of the way Nebraska successfully manages water

Next: Model analysis of resulting accretions



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THANK YOU

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