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NEBRASKA'S WATER MANAGEMENT RESOURCE

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

Canal Recharge Opportunities and Successes

JESSIE WIETJES, Integrated Water Management Analyst
Nebraska Department of Natural Resources

Outline

- Background
- 2011 Pilot Project
- 2013 South Platte Flooding
- 2015 Platte Flooding

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WATER AVAILABILITY & WATER SHORTAGES

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Water Availability & Water Shortages: Challenges

- Variable water supplies
- Existing groundwater and surface water uses within Nebraska
- External factors – Compacts and Agreements

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Water Availability & Water Shortages: Surface Water

Average Annual Precipitation

86,000,000 acre-feet

Quantity of river discharge indicated by line width

Average Annual Streamflow

Total Flow In = 1,000,000 acre-feet

Total Flowing Out = 7,100,000 acre-feet

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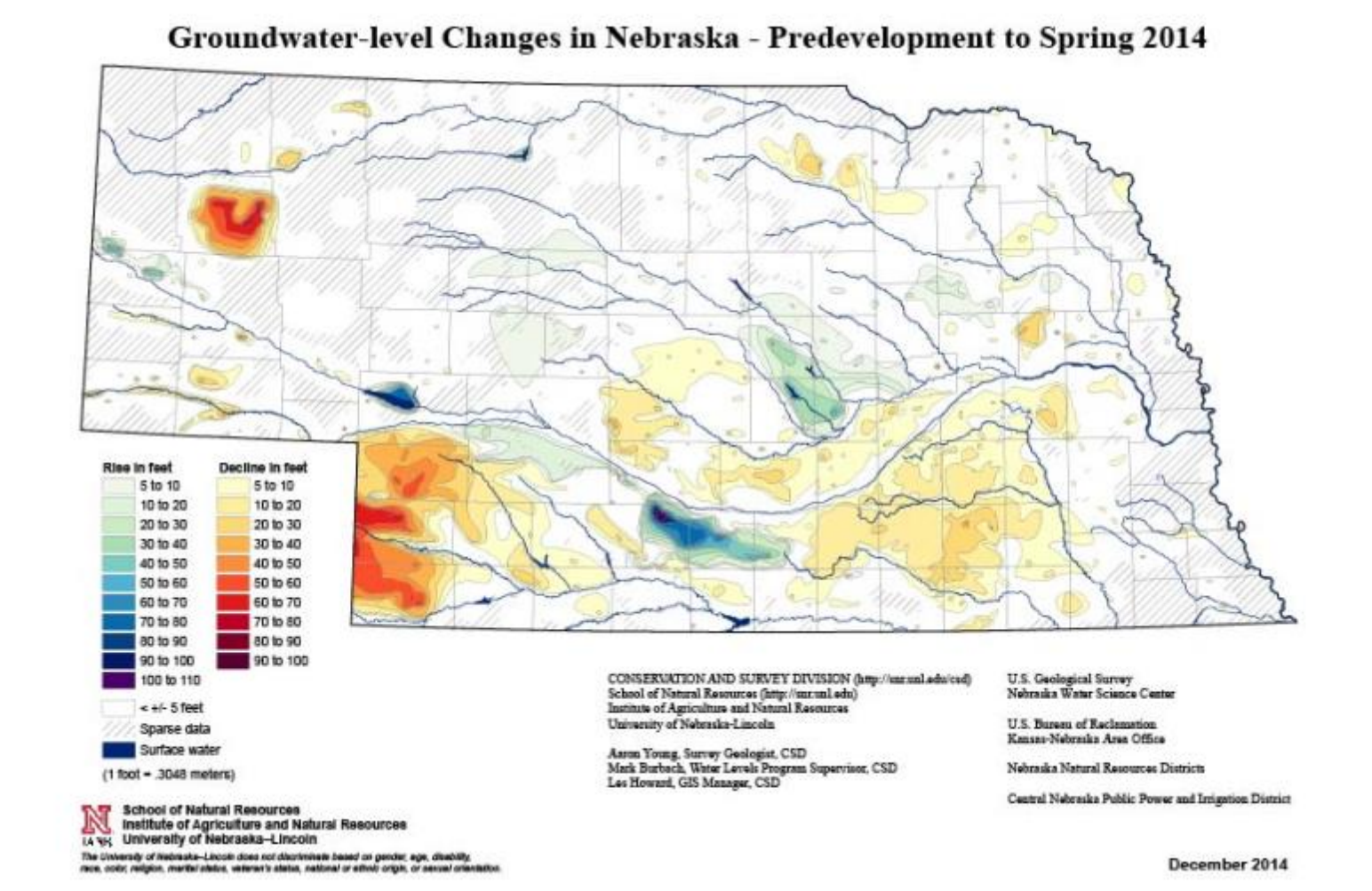
Water Availability & Water Shortages: Groundwater



CONJUNCTIVE MANAGEMENT

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What are the benefits of CWM?

- Maximize the available water supplies
- Leverage existing infrastructure
- Utilize existing planning framework
- Minimize the need for regulatory actions

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CANAL RECHARGE PROJECTS

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Pilot Project

- High flows in spring of 2011 prior to irrigation season
- Work with NRDs, Irrigation Districts/Canal Companies to arrange Permitting
- Diversions of Excess Flows
- Diversion and return measuring and monitoring

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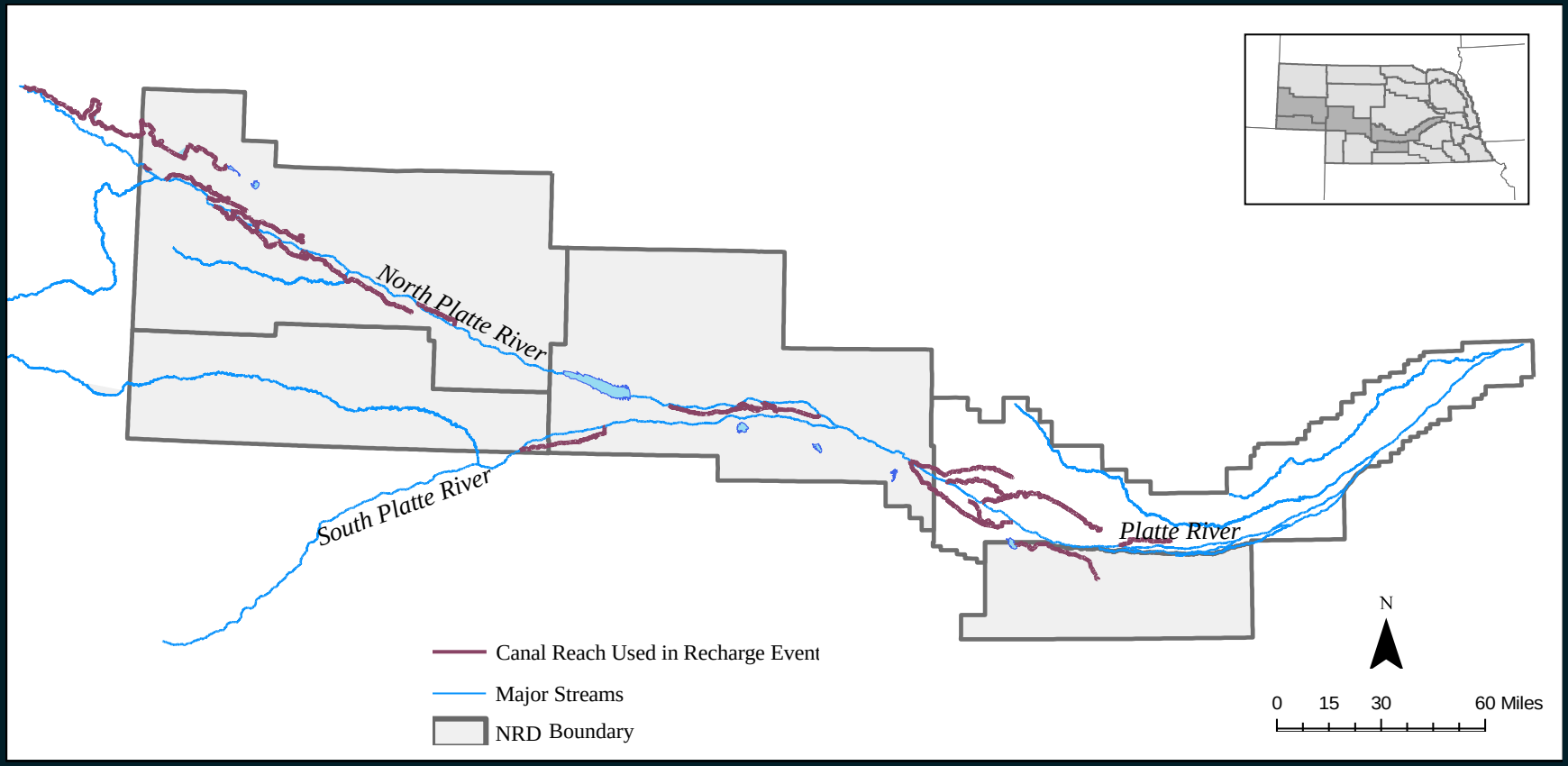
2011 Canals



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2011 Demonstration Project

- For groundwater recharge and flood reduction
- Partners
  - 23 Canals
  - DNR
  - South Platte
  - Tri-Basin
  - Twin Platte
  - Central Platte
  - North Platte
- Results:
  - Diversion Total 142,000 a-f
  - Recharge Total 64,000 a-f
  - 2011-2019 Accretion Total 15,000 a-f

  Average annual accretion ~1,500 a-f/yr

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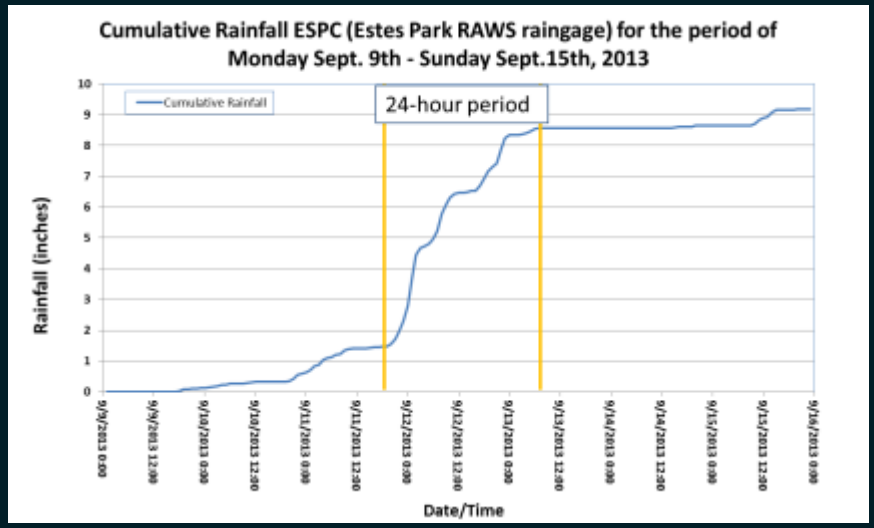
2013 Flood Flow Project

- Flooding in Eastern Colorado due to extreme rainfall September 2013
- Peak period of rainfall (6 PM Tuesday – 6 PM Wednesday)
- Cumulative Rainfall at Estes Park raingage



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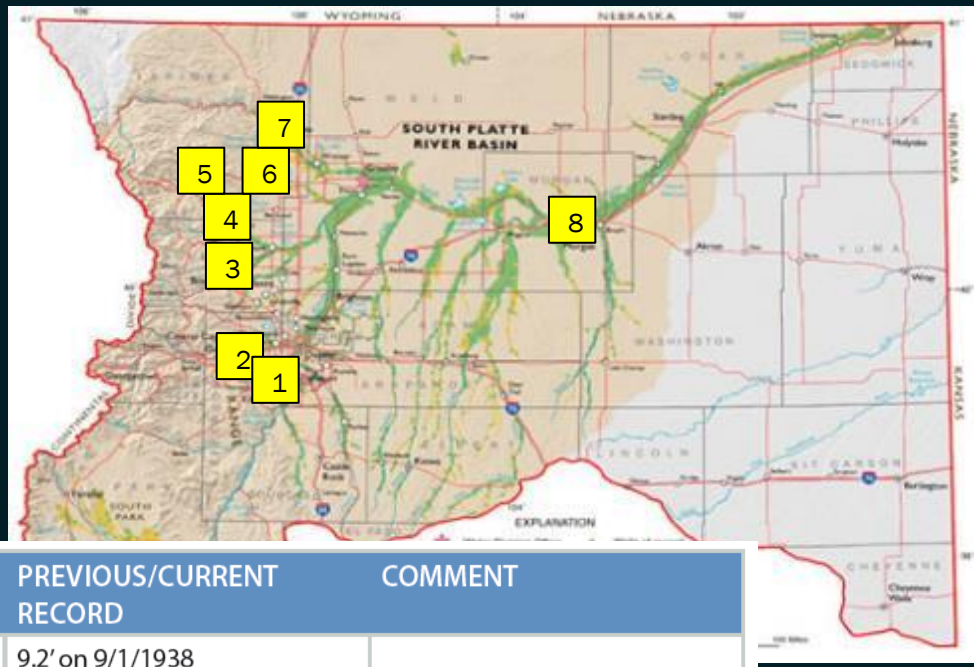
2013 Flood Flow Project

- Preliminary estimated peak flows at various points in the South Platte River Basin



	GAGE	2013 PEAK (preliminary)	NEW RECORD	PREVIOUS/CURRENT RECORD	COMMENT
1	Bear Creek at Morrison	9.1′	No?	9.2′ on 9/1/1938	
2	Clear Creek at Golden	6.8′; 1550 cfs	No	2370 cfs on 7/10/1983	
3	Boulder Creek at Boulder	8.2′; 5,000 cfs	No	~11,000 cfs on 5/30/1894	1894 estimated
4	St. Vrain Creek at Lyons	>8.8′	Yes?	8.1′; 10,500 cfs on 6/22/1941	Gage destroyed 2013
5	N. Fork Big Thompson R., Drake	10.2′	Yes	9.3′ on 7/31/1976	
6	Big Thompson, Canyon Mouth	>8.2′	Maybe	~19.9′, ~31,000 cfs on 7/31/76	Gage destroyed 2013 and 1976
7	Poudre R. at Ft. Collins	10.8′; 8420 cfs	Yes?	10.5′, 7,710 cfs on 4/30/1999	Gaged since 1975
8	S. Platte R. near Fort Morgan	24.7′; 50,600 cfs	No	83,700 cfs on 5/31/1935	

Preliminary flood peaks from selected gages on Front Range drainages affected by flooding, September 2013, compared with previous flood peaks. (Data: USGS, Colorado DWR, UDFCD)

2013 Flood Flow Project

- South Platte flows peaked at stateline gage on September 18th, 2013 (21,000 cfs)

South Platte River Bridge, Highway 83,
North Platte, NE
Friday, September 20,2013 at 8:45 a.m.

South Platte River Bridge, Highway 83,
North Platte, NE
Friday, September 21,2013 at 11:30 a.m.

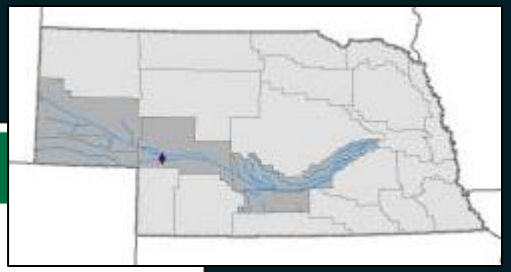
2013 Excess Flow Project

- Diversion projects were quickly coordinated by DNR, NRDs, and irrigation districts

South Platte River Bridge, Buffalo Bill Road,
North Platte, NE
Friday, September 20,2013 at 8:30 a.m.

South Platte River Bridge, Buffalo Bill Road,
North Platte, NE
Saturday, September 21,2013 at 9:00 a.m.

2013 Flood Flow Project



USGS

USGS 06764880 South Platte River at Roscoe, Nebr.

Discharge, cubic feet per second

20000
15000
10000
5000
0
-5000

Sep 07 2013
Sep 14 2013
Sep 21 2013
Sep 28 2013
Oct 05 2013
Oct 12 2013

△ Median daily statistic (30 years)
Measured discharge
Discharge
Discharge at floodstage
Period of approved data

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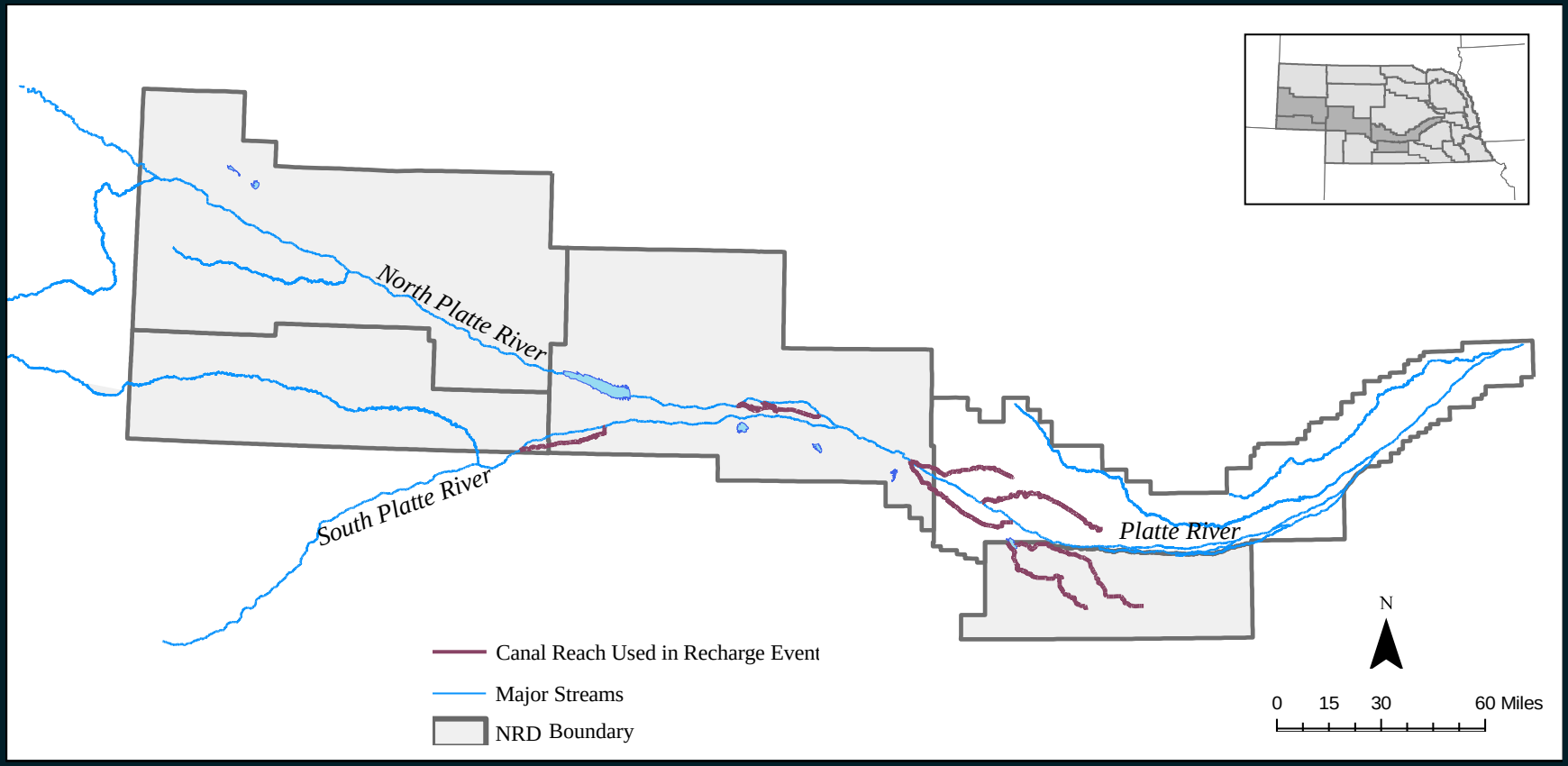
2013 Canals



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2013 Demonstration Project

- For groundwater recharge and flood reduction
- Partners
  - 9 Canals
  - DNR
  - South Platte
  - Tri-Basin
  - Twin Platte
  - Central Platte
- Results:
  - Diversion Total 44,000 a-f
  - Recharge Total 27,000 a-f
  - 2011-2019 Accretion Total 5,600 a-f

Total Cost $707,748

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2015 Flood Flow Project

- Above average snowmelt and precipitation in spring 2015 in Colorado
- Monitored streamflows, work with irrigation districts and NRDs to get permits in place and prepare
- Divert into canals until irrigation season
- Store excess flows in ponds, pits, lakes, and reservoirs

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2015 Flood Flow Project

- Expecting high flows into mid-summer
- Potential for higher flows in North Platte River as well
- Will continue to divert as long as excess exist (target flows are met) and storage available

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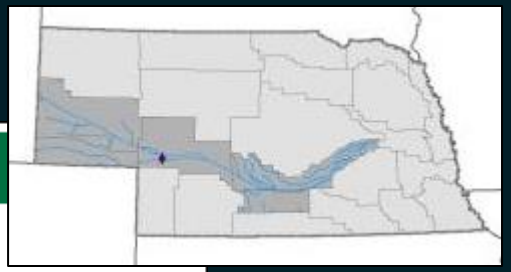
2015 Flood Flow Project



USGS

USGS 06764880 South Platte River at Roscoe, Nebr.

Discharge, cubic feet per second

20000
10000
1000
100
50

Mar 21 2015
Apr 04 2015
Apr 18 2015
May 02 2015
May 16 2015
May 30 2015

---- Provisional Data Subject to Revision ----

△ Median daily statistic (30 years)
✳ Measured discharge
— Discharge
— Discharge at floodstage

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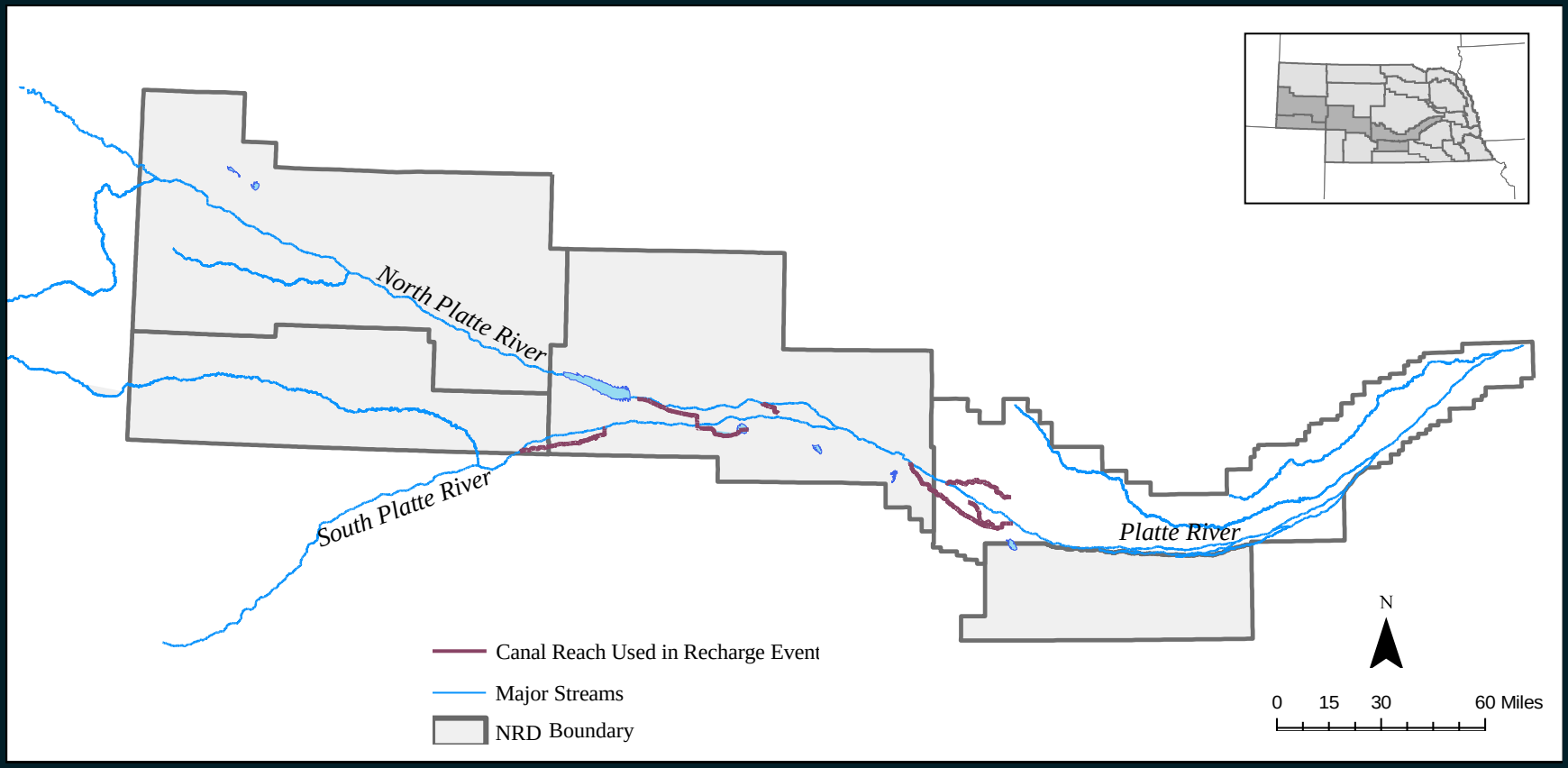
2015 Canals



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Summary

- DNR and partners are using CWM to maximize benefits to water users while minimizing negative impacts on streamflow and groundwater levels
  - The 2013 Flood Flow Project demonstrated that DNR and partners are able to quickly coordinate CWM projects
- Benefits of current CWM projects will continue to emerge in the future

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Nebraska's most precious resource.

THANK YOU

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