UPPER PLATTE RIVER BASIN-WIDE PLAN DEVELOPMENT

SPG Meeting # 9 – January 2018

ESTABLISHED MAY 2017

Water Management Planning Values

- ☑ Generational Stewardship
- ☑ Maintaining the good life
- ☑ There is a space for all; willingness and interest in working together; shared burden
- ☑ Looking beyond our own fences
- ☑ Others can make good use of the water we save
- ☑ We are making a difference!
- ☑ We have a long culture of adapting and changing with the times
- ☑ "Putting water back to the river without causing economic harm"

This is an Open Meeting

Notices Were Placed in:

The Grand Island Independent

Kearney Hub

The North Platte Telegraph

Scottsbluff Star-Herald.com

Sidney Sun-Telegraph
SERVING SIDNEY & CHEYENNE COUNTY SINCE 1873

SPG Decision-Making Process

- ☑ The first goal is consensus
- ☑ A majority vote is the determining factor for all sections of the plan
- ☑ If the group cannot reach a majority, the NeDNR and the NRDs will work together to resolve the disputed issues
- ☑ If the SPG is unable to come to consensus by June 2018, the NeDNR and the NRDs will work together to resolve the disputed issues and create a final plan by August 2018

September Meeting Recap

Key Discussion Highlights

Follow-Up Items

- ☑ Glossary of Terms
- ☑ Parking Lot
- ☑ Annotated First Increment

Key Discussion Highlights

SEPTEMBER SPG MEETING

- Statute 46-715 interpretation, discussion, and related to planning process
  - Identifying FA/OA Distinctions
  - Finding a Water Use & Supply Balance
  - Considerations for establishing a target goal (consumptive use vs. reusable use)
- First Increment robust review will show the benefits of first increment activities
  - There will be different realities for the second increment
- Continued work on definitions for: Social & Environmental Health; Safety; and Welfare of the Basin
- Prioritized topics for future meetings (economic data; drought; conjunctive management; storage)

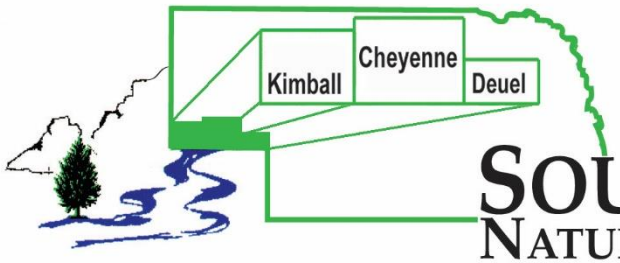
Roadmap Through January 2018

JANUARY 17, 2018

- First Increment Activities Costs & Benefits
- Identification of Second Increment Intent
- Set roadmap for March, May, July 2018

MARCH 21, 2018

- Conjunctive Management
- Drought
- Economic Analysis / Indicators



SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Lodgepole Creek Subbasin

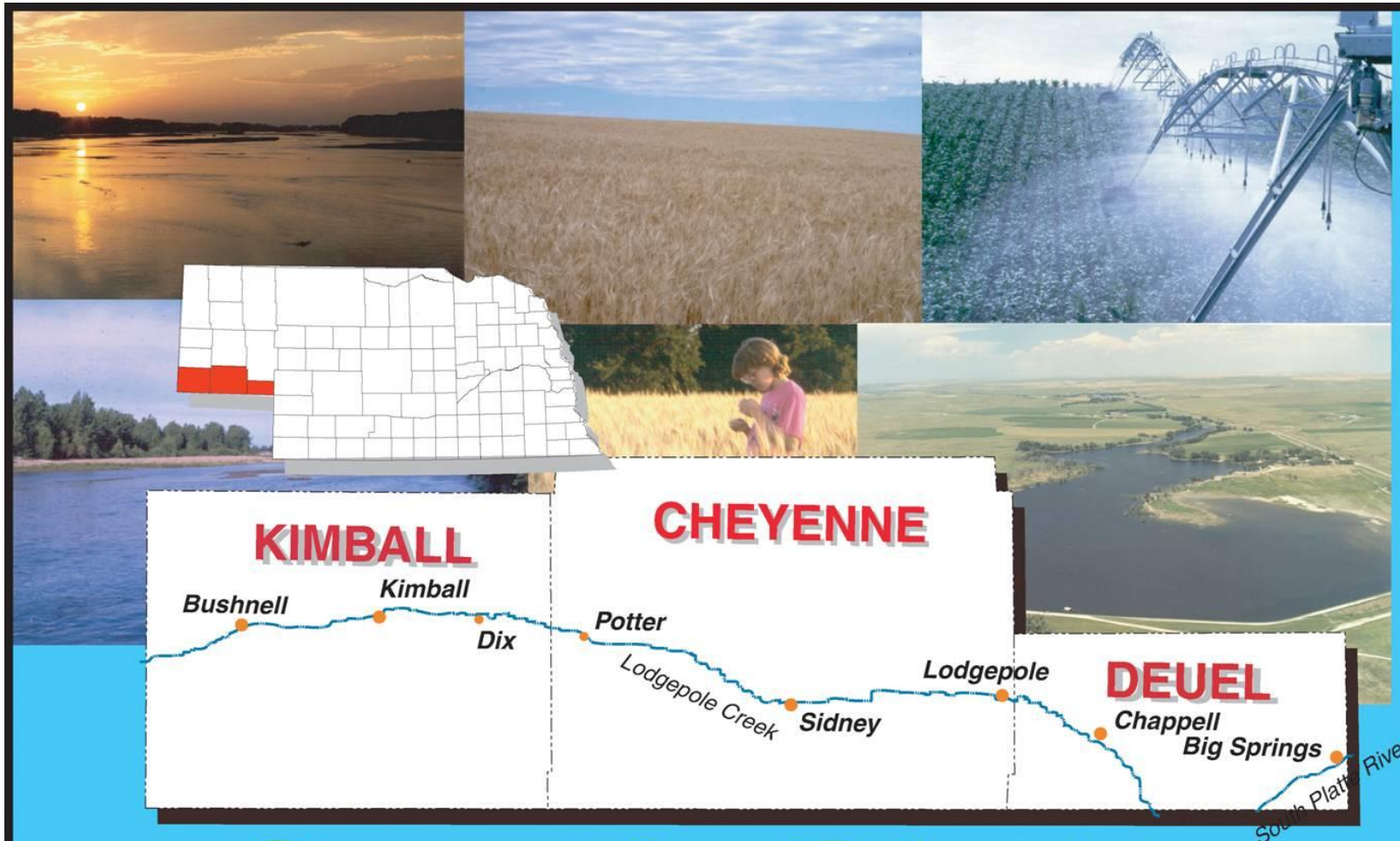
Upper Platte River Basin Water Management Plan - Single Planning Group Meeting

January 17, 2018

North Platte, Nebraska

Proposal

To treat the Lodgepole Creek Subbasin within the SPNRD differently from the rest of the Platte River Overappropriated Basin

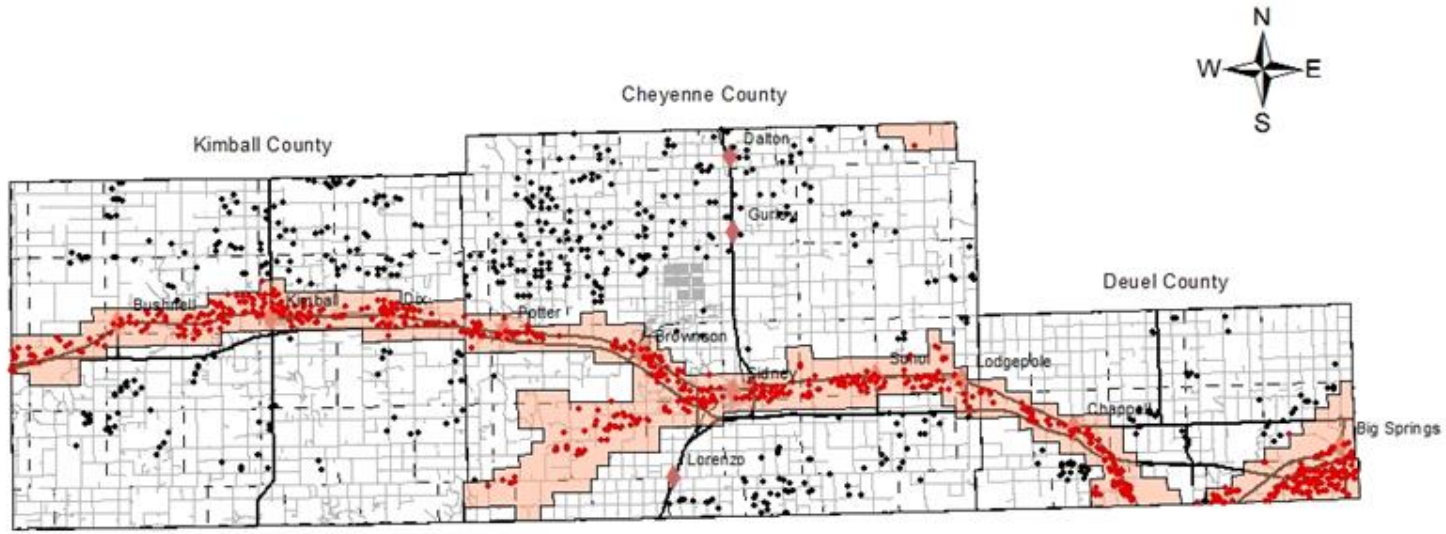


South Platte
Natural Resources District

Our Mission:

Formulate and instigate forward-looking plans and programs through a cooperative process that will provide for the long-term protection and enhancement of the district's natural resources while ensuring that major economic and social impacts are fully considered.

South Platte NRD
Irrigation Wells in
Fully and Over Appropriated Areas

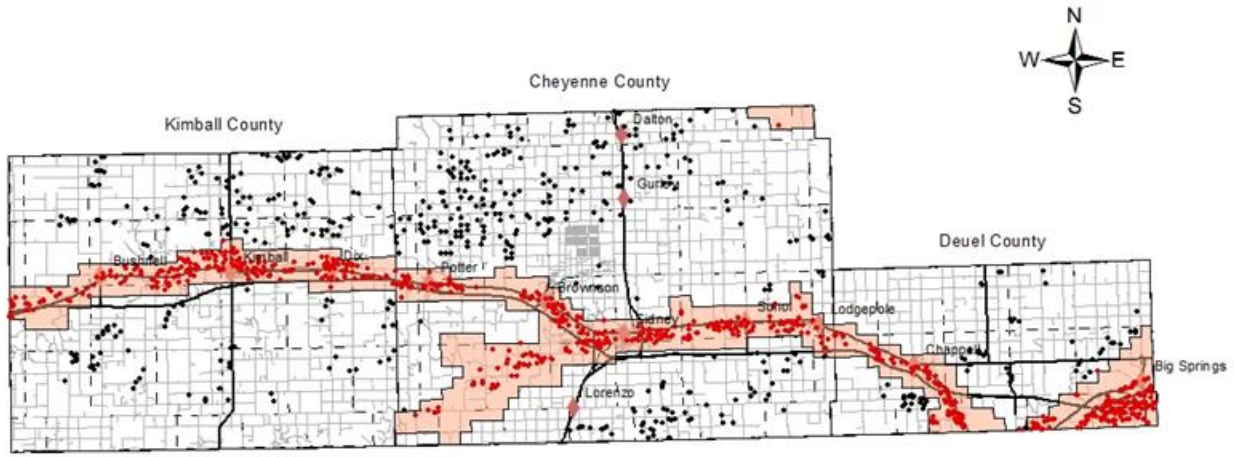


Legend

- 522 Irrigation wells in Fully Appropriated Area
- 725 Irrigation wells in Overappropriated Area
- Overappropriated Areas
- Fully Appropriated Areas

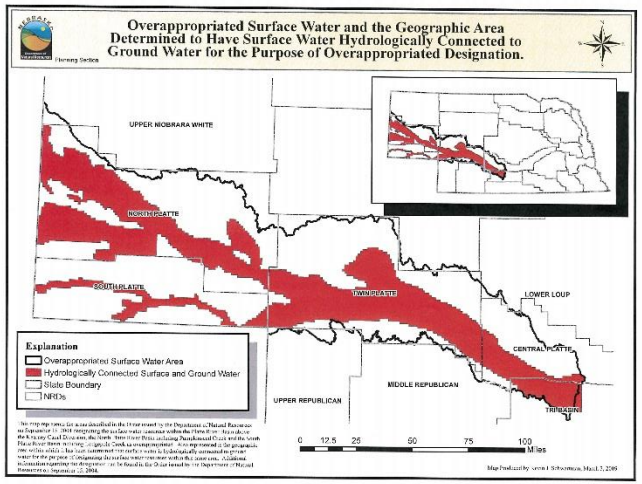
0 5 10 20 Miles

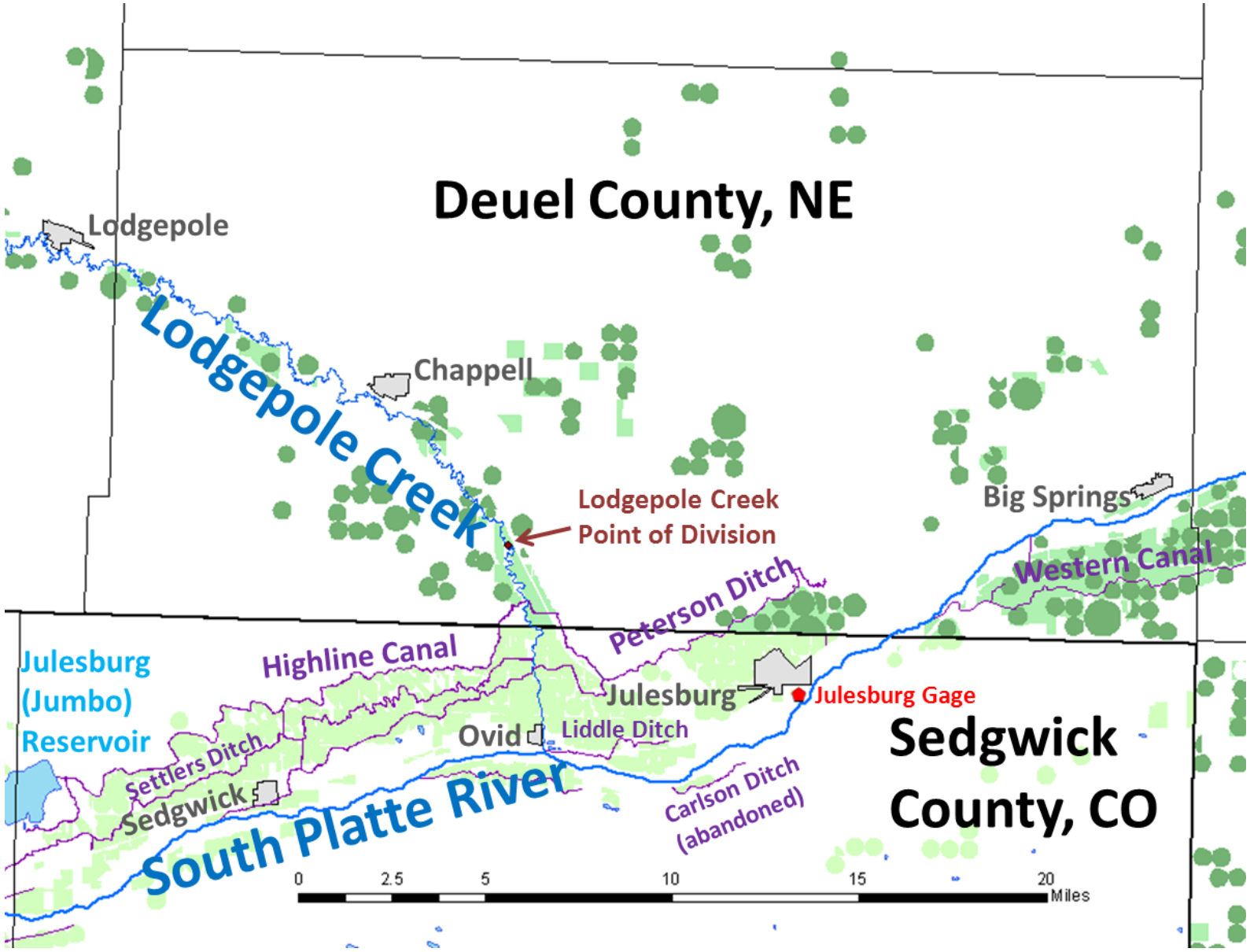
South Platte NRD
Irrigation Wells in
Fully and Over Appropriated Areas



Legend

- 522 Irrigation wells in Fully Appropriated Area
- 725 Irrigation wells in Overappropriated Area
- Overappropriated Areas
- Fully Appropriated Areas





Overview of Lower Lodgepole Creek Region (2005 Irrigated Acres from CALMIT and Colorado DWR)

Questions?
Comments

Rod L. Horn, General Manager

South Platte Natural Resources District

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Cell # 308-249-5671

Office # 308-254-2377

Protecting Lives, Protecting Property, Protecting the Future

SOUTH PLATTE

Kimball Cheyenne Deuel

NATURAL RESOURCES DISTRICT

Draft Post ‘97 Analysis

Jesse Bradley, NeDNR

NEBRASKA
DEPT. OF NATURAL RESOURCES

Preliminary Robust Review Goals

- Provide updated preliminary estimates of post-1997 depletion targets for SPG (required to be addressed in the second increment)

- Provide for more informed discussion of second increment objectives with the SPG (total depletions resulting from groundwater irrigated acres)

Preliminary Robust Review Model Simulation Setup

WWUMM Area Assumptions

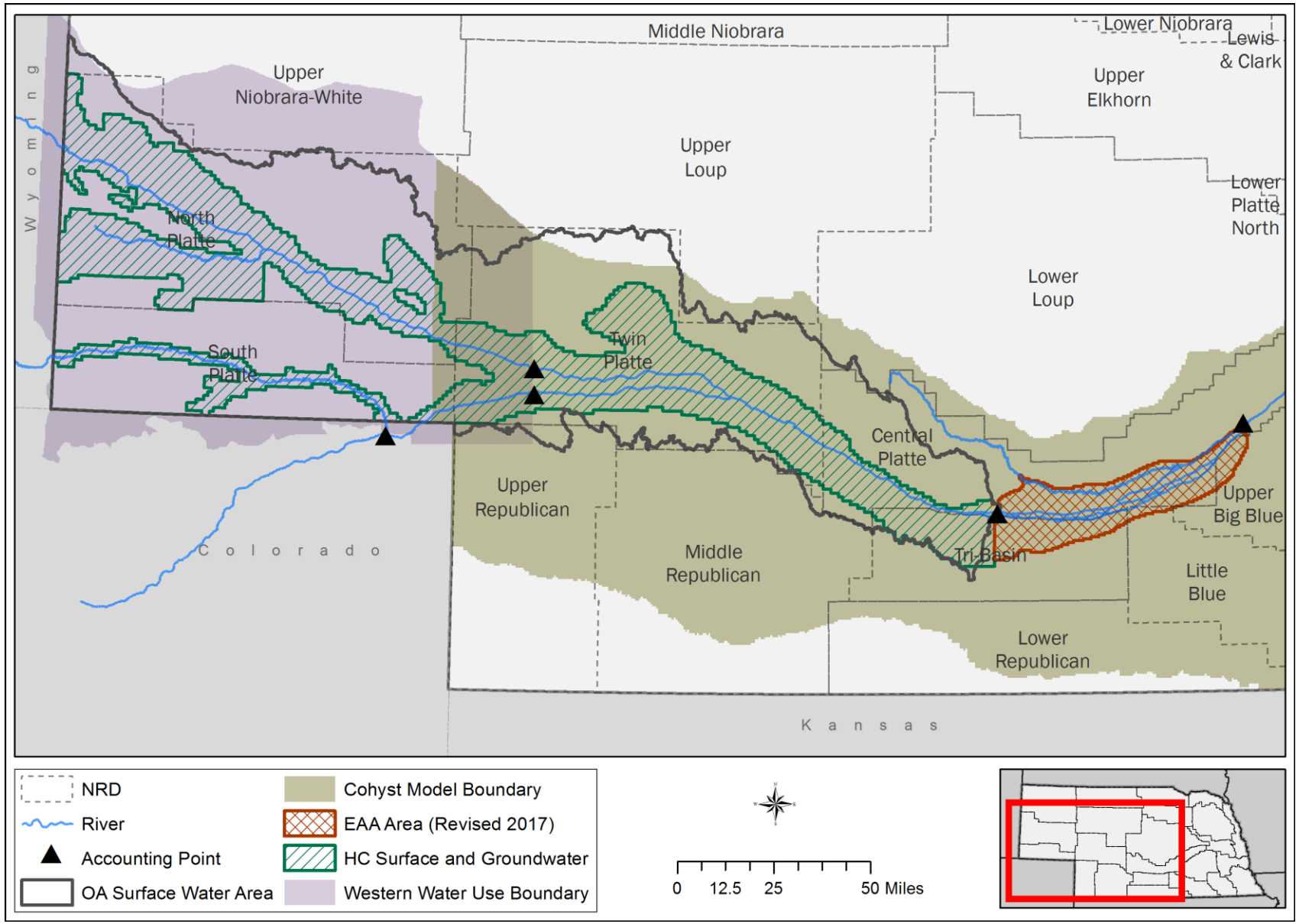
- Used historical calibrated version of the groundwater and watershed models (Run 028/LU004/NIR set 2 for GW only lands)
- Model is simulated from 1953 – 2063
- Climate repeats 1989-2013 twice for 2014-2063
- Landuse data repeats after 2013 in the baseline simulation and 1997 acres and crop types in the "1997" simulation
- Surface water and commingled acres remain constant in the baseline and 1997 simulations to cancel out commingled effects
- Results are summarized for three areas: 1) North Platte River; 2) South Platte River; and 3) Lodgepole Creek

Preliminary Robust Review Model Simulation Setup

COHYST Area Assumptions

- Used version 28 of groundwater and watershed models
- Models are simulated from 1950 – 2063
- Climate repeats 1989-2013 twice for 2014-2063
- Landuse data repeats after 2010 in the baseline simulation and 1997 acres and crop types in the "1997" simulation
- Surface water and commingled acres remain constant in the baseline and 1997 simulations to cancel out commingled effects
- Results are summarized for two areas: 1) Upstream of Elm Creek and 2) Elm Creek to Chapman

Model Areas


Middle Niobrara
Lower Niobrara
Lewis & Clark
Upper Niobrara-White
Upper Elkhorn
Upper Loup
Lower Platte North
Lower Loup
North Platte
South Platte
Twin Platte
Central Platte
Upper Republican
Upper Big Blue
Middle Republican
Tri-Basin
Little Blue
Lower Republican
Wyoming
Colorado
Kansas
NRD
River
Accounting Point
OA Surface Water Area
Cohyst Model Boundary
EAA Area (Revised 2017)
HC Surface and Groundwater
Western Water Use Boundary
0 12.5 25 50 Miles

Land Use Changes District-Wide

Change in Groundwater Only Irrigated Acres within each NRD

NRD	Updated Modeling Analysis
North Platte	-3,400
South Platte	15,300
Twin Platte	57,000
Central Platte	79,000
Tri-Basin	53,000
Total	**200,900**

NPNRD and SPNRD values are changes between 1997 and 2013. All other NRDs are 1997 and 2010.

Land Use Changes OA Areas

Change in Groundwater Only Irrigated Acres within HC/OA and EAA Area

NRD	Updated Modeling Analysis
North Platte	-5,400
South Platte	-1,100
Twin Platte	26,500
Central Platte	13,500
Tri-Basin	12,500
Total	**46,000**

NPNRD and SPNRD values are changes between 1997 and 2013. All other NRDs are 1997 and 2010.

Updated Results of Post-1997 Depletions Analysis

NPNRD Results

NPNRD Results

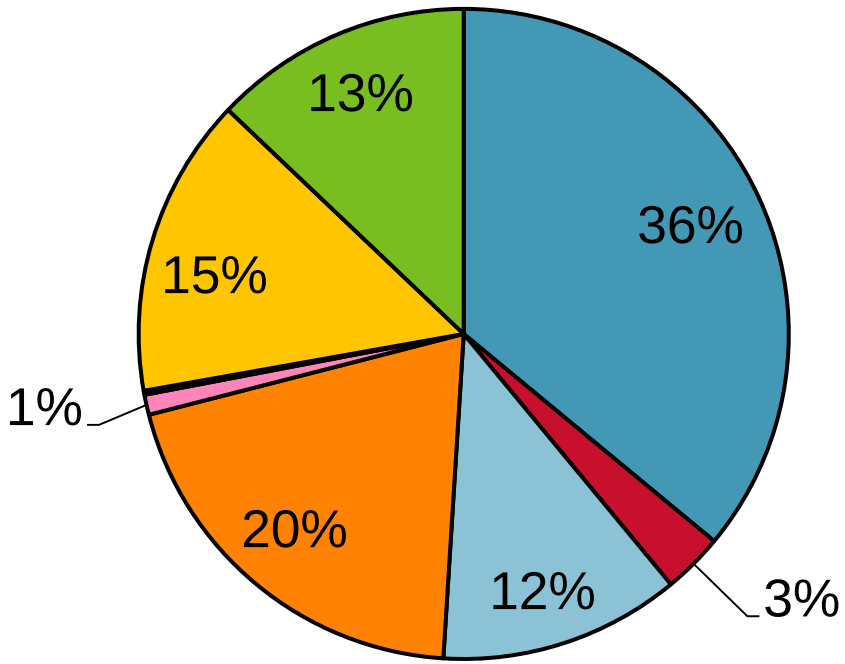
Acres Changes

NPNRD	Change 1997 to 2013
District-Wide	-3,400
OA Area	-5,400

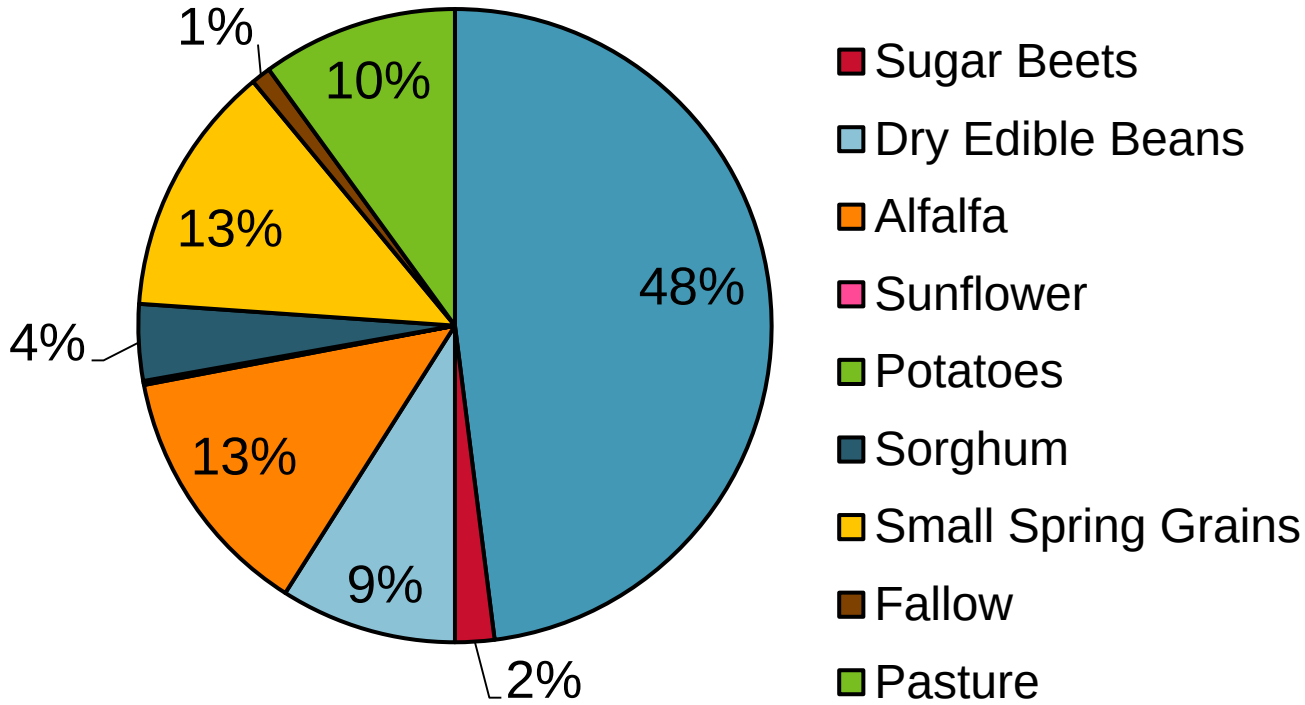
NPNRD Results

Crop Type Changes

1997
134,500 GW only irrigated acres



2013
131,100 GW only irrigated acres

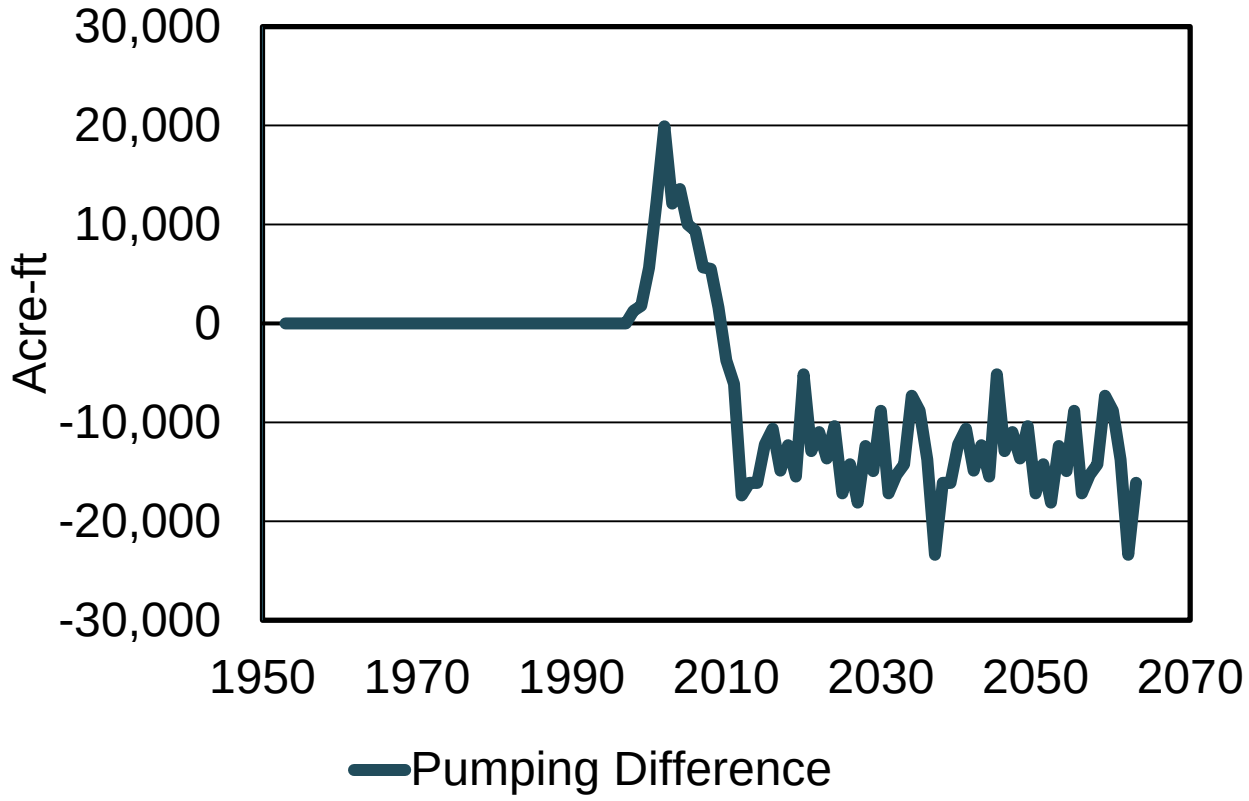


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

NPNRD Results - Pumping Changes

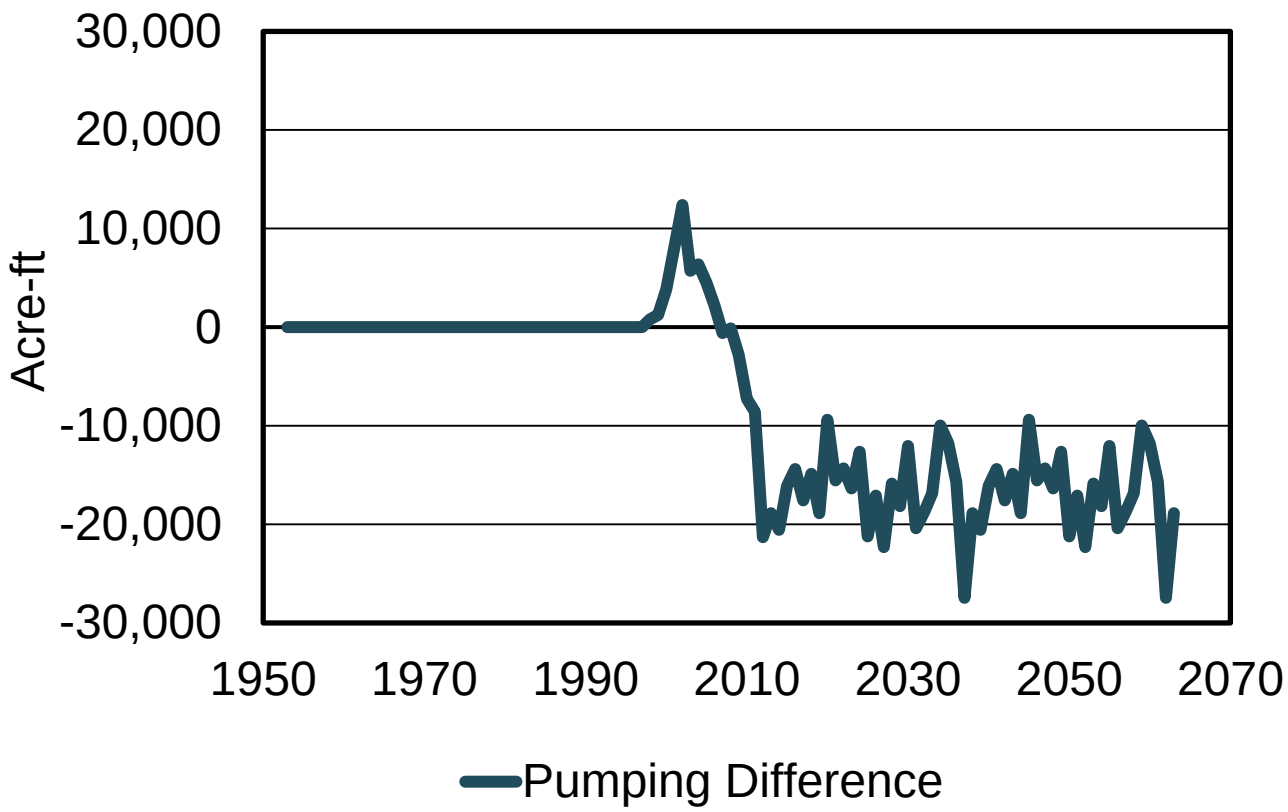
District-Wide

3,400 acre decrease in GW only irrigated acres



Overappropriated Area

5,400 acre decrease in GW only irrigated acres

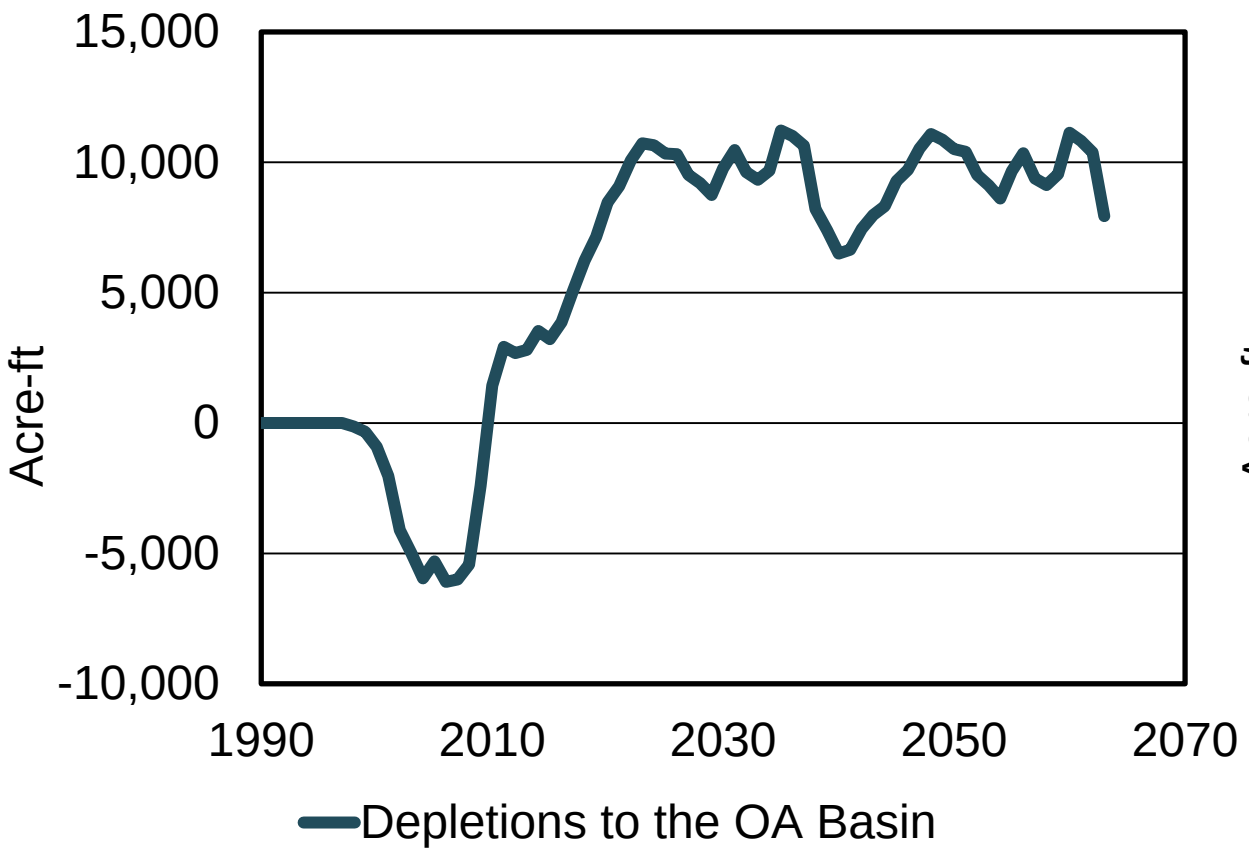


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

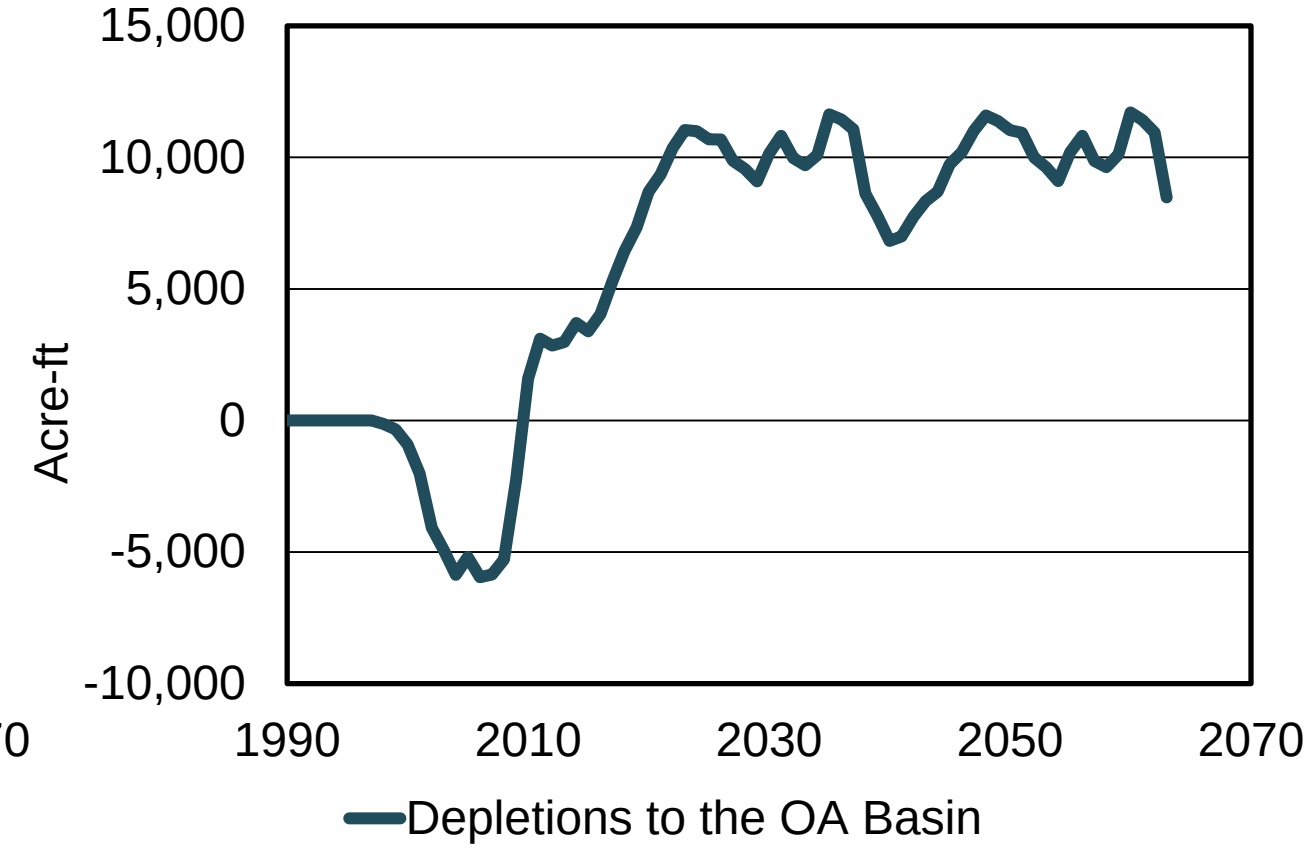
NPNRD Results - Stream Depletions

Depletions to streams in the Overappropriated Basin due to changes in GW pumping

Pumping District-Wide

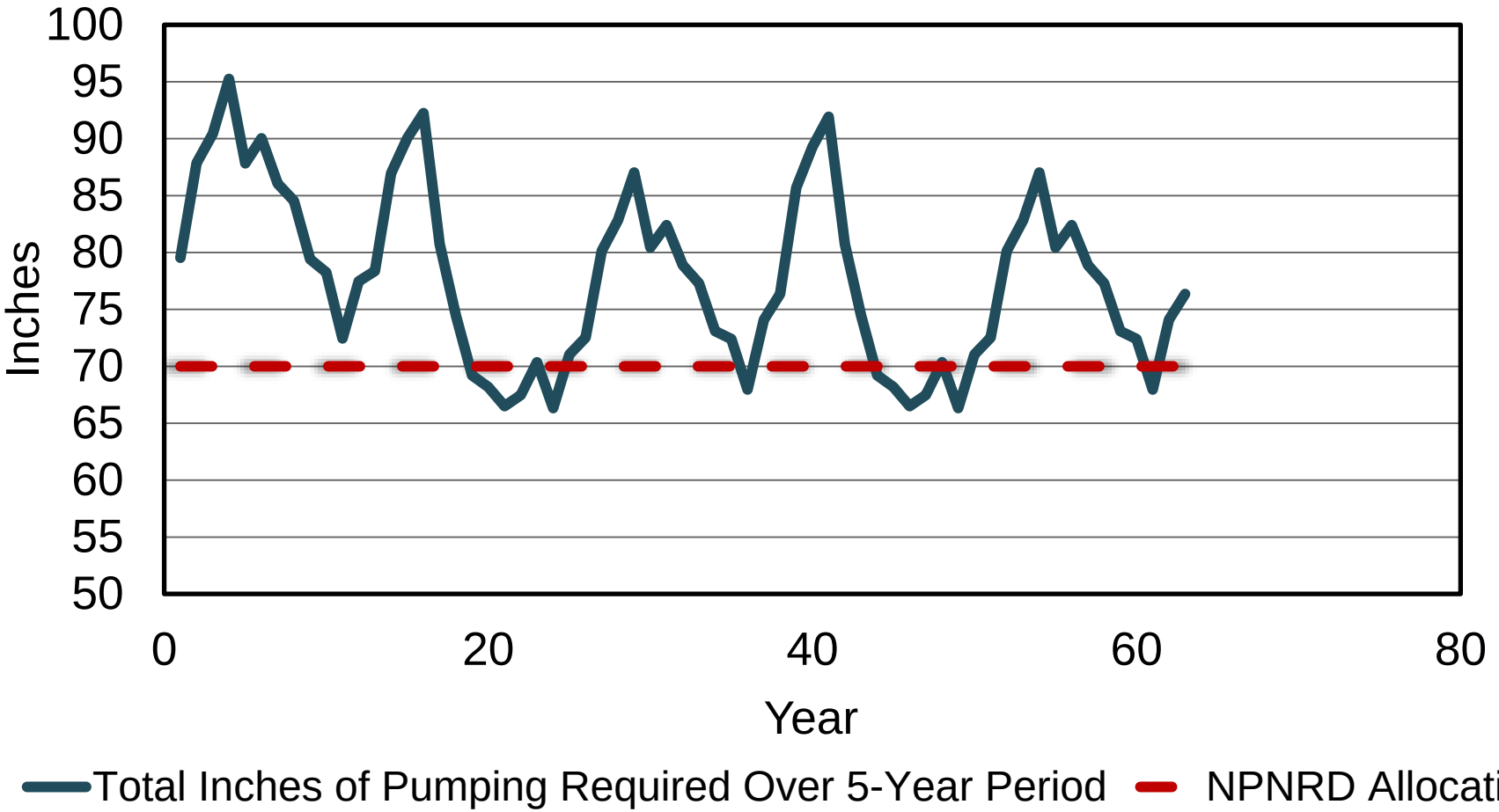


Pumping in Overappropriated Area



NPNRD Allocation Analysis

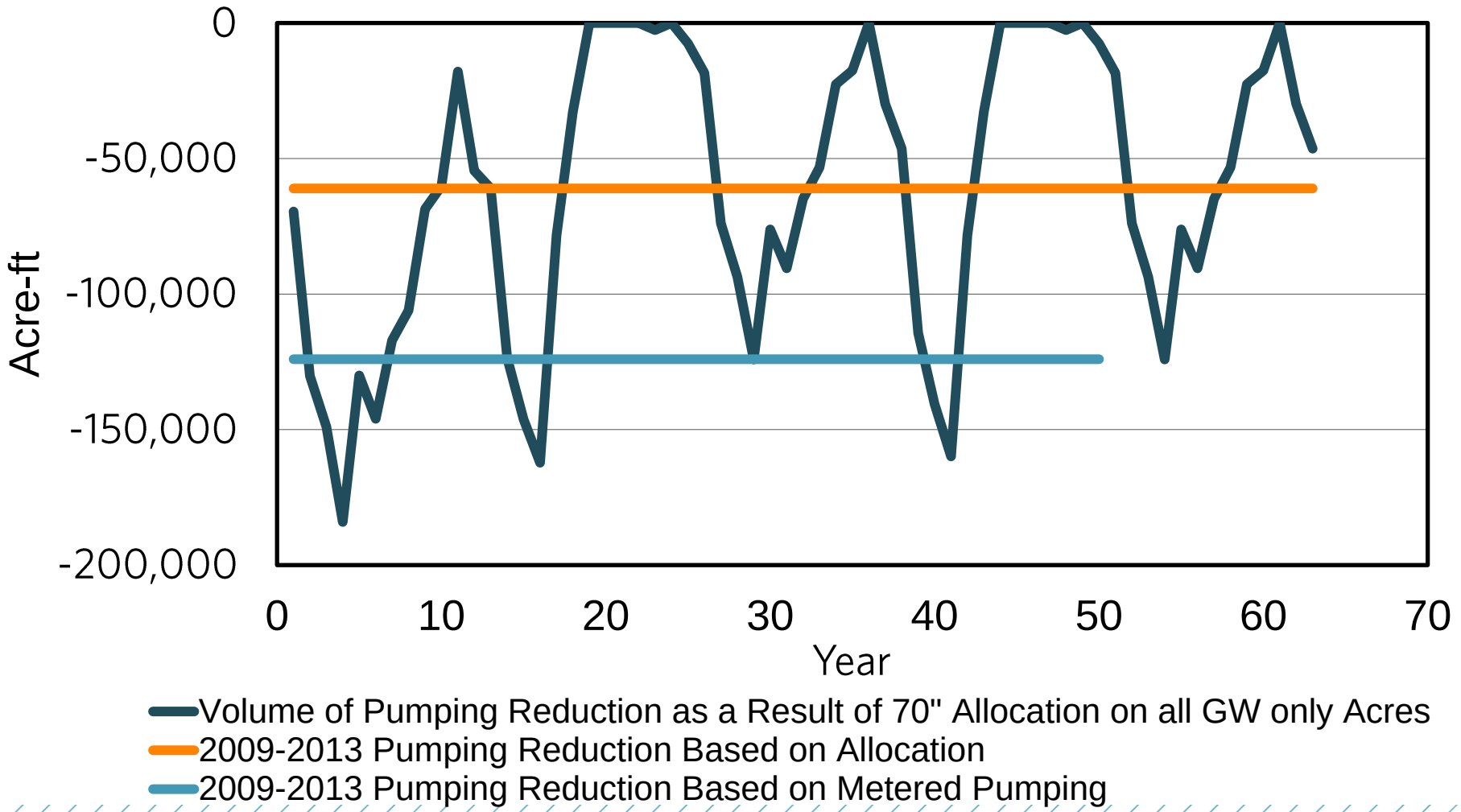
Estimated Inches Necessary to Meet Full Crop Demand



- Estimated pumping requirements over a five-year period based on simulated pumping
  - Review of five-year allocation period NIR demands relative to NPNRD allocation (70"/5-years)
  - Average pumping requirement is 15.6" per year in the OA Area or ~78" over a five-year allocation period

NPNRD Allocation Analysis

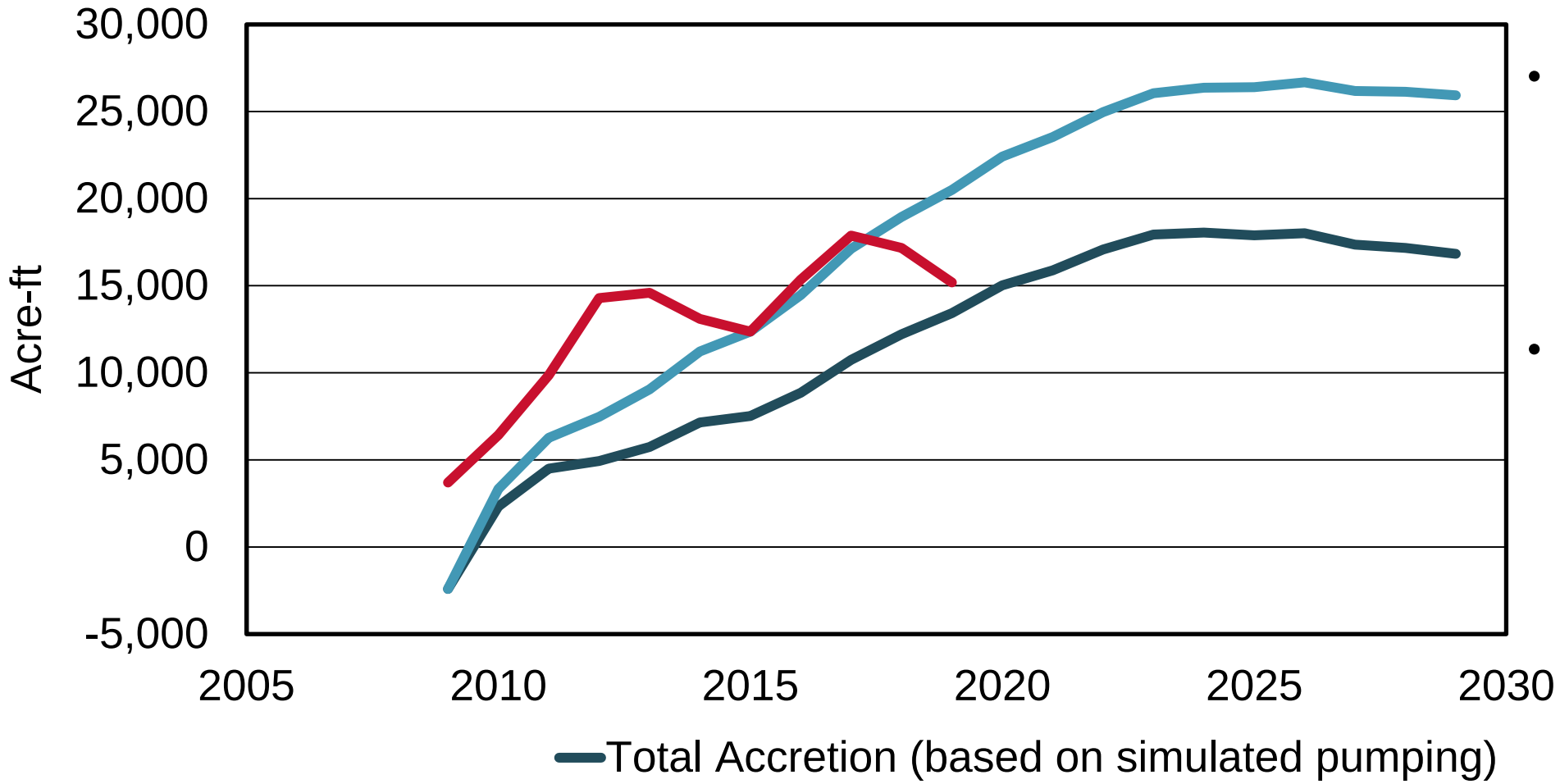
Estimated Pumping Reductions



- Estimated reduction in groundwater pumping resulting from allocation on OA acres (~87,500 acres)
- 2009-2013 near average reduction in groundwater pumping based on NIR of ~60,000 AF
- 2009-2013 meter data indicate an additional ~65,000 AF on reduction in groundwater pumping (total of 125,000 AF)

NPNRD Allocation Analysis

Estimated accretions resulting from allocations and acre reductions in the NPNRD



- The blue lines are based on the sum of the post-1997 analysis and allocation response curves
- The red line is based on NPNRD reported management actions through 2019 (email correspondence for SPG data).

SPNRD Results

SPNRD Results

Acres Changes

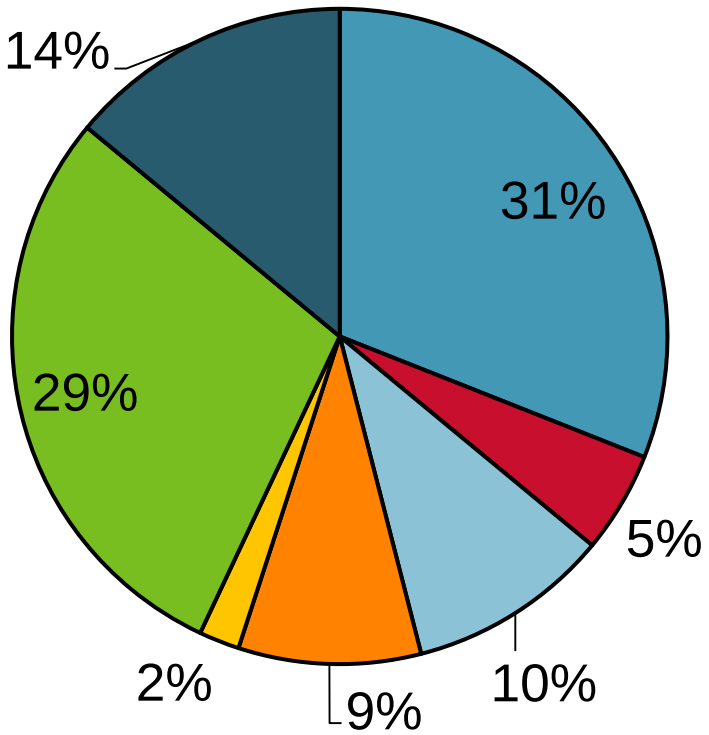
SPNRD	Change 1997 to 2013
District-Wide	15,300
OA Area	-1,100

SPNRD Results

Crop Type Changes

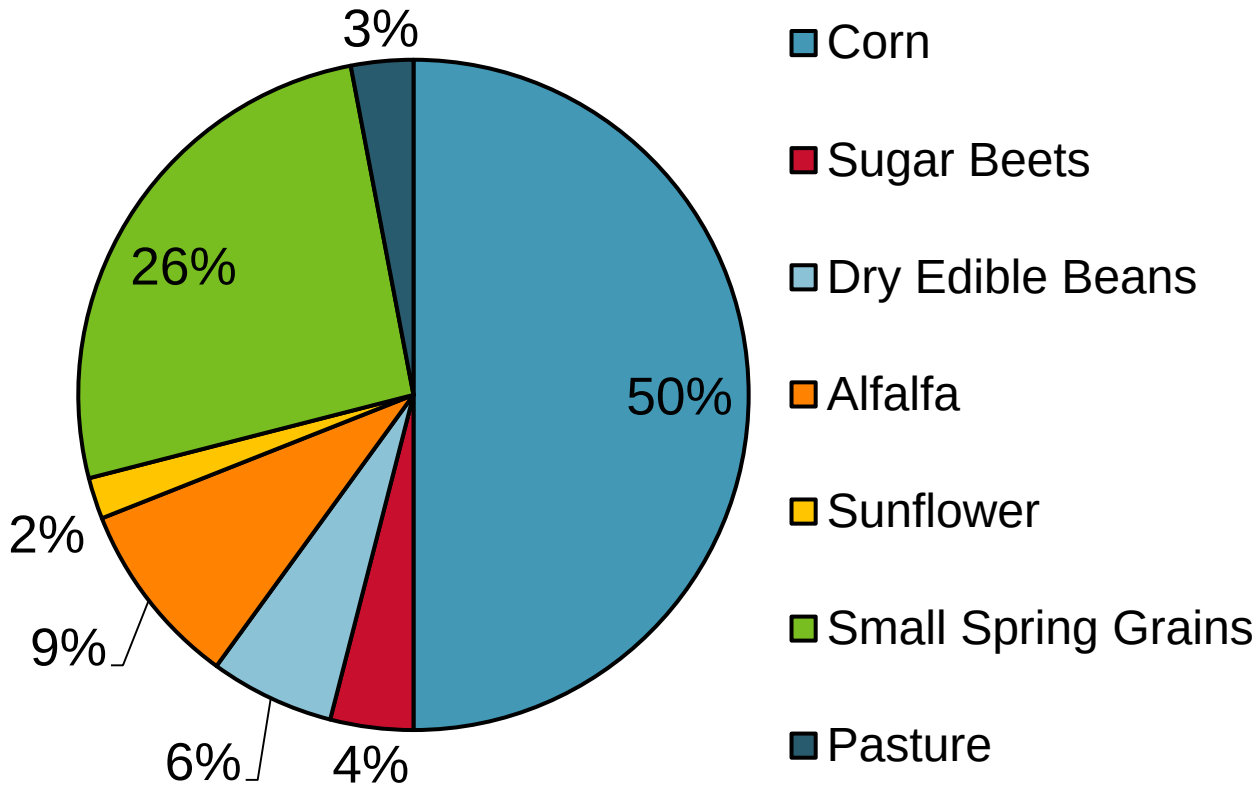
1997

103,700 GW only irrigated acres



2013

119,000 GW only irrigated acres

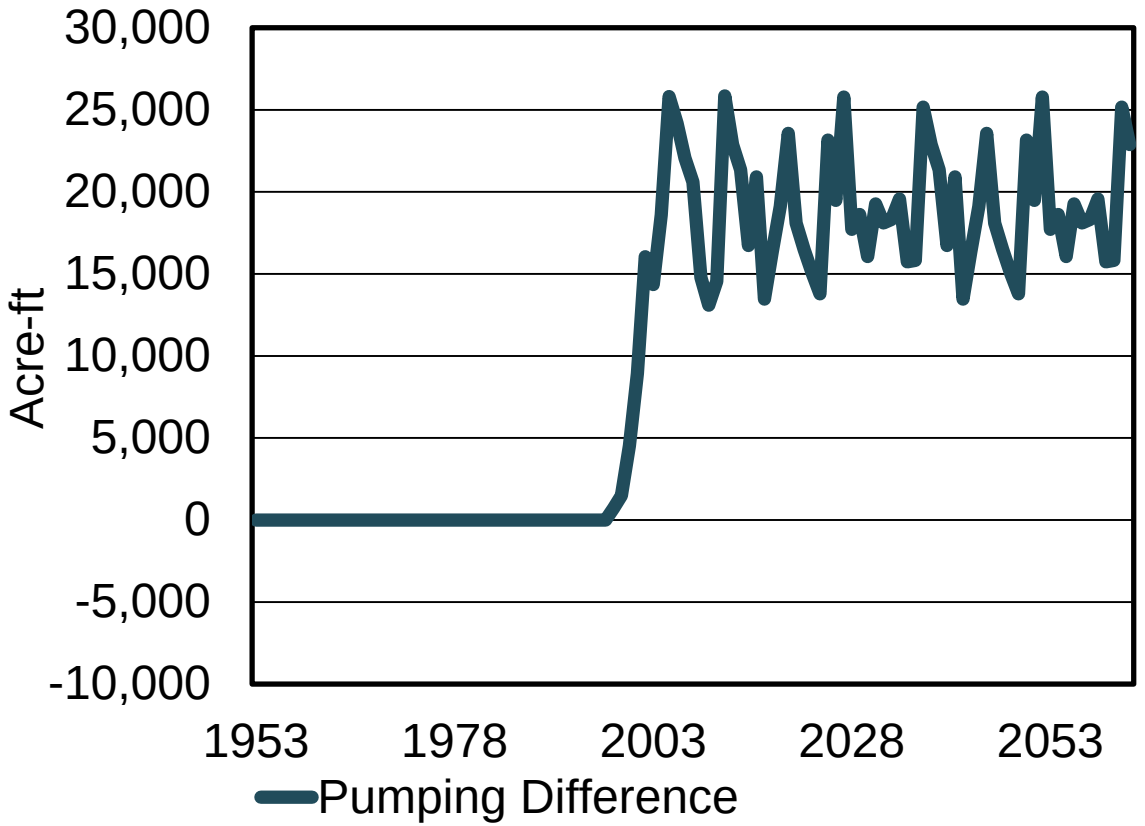


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

SPNRD Results - Pumping Changes

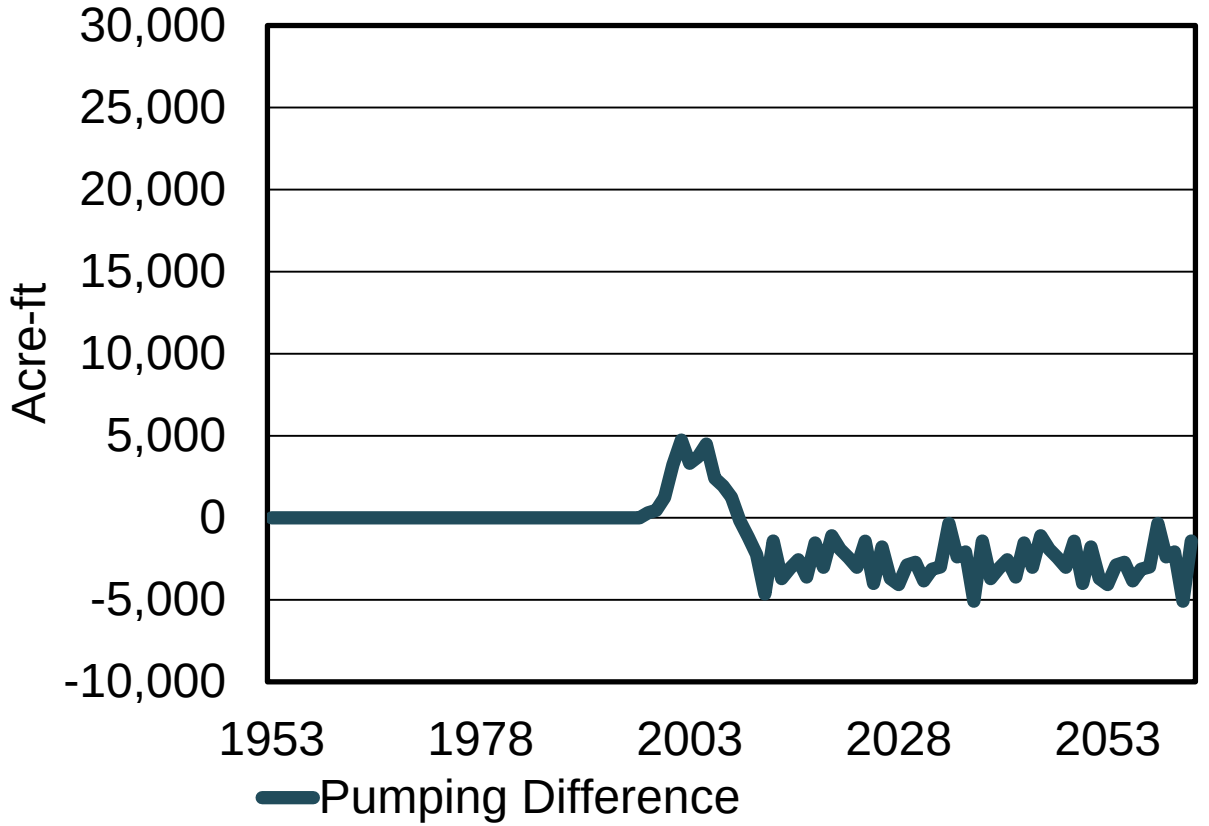
District-Wide

15,300 acre increase in GW only irrigated acres



Overappropriated Area

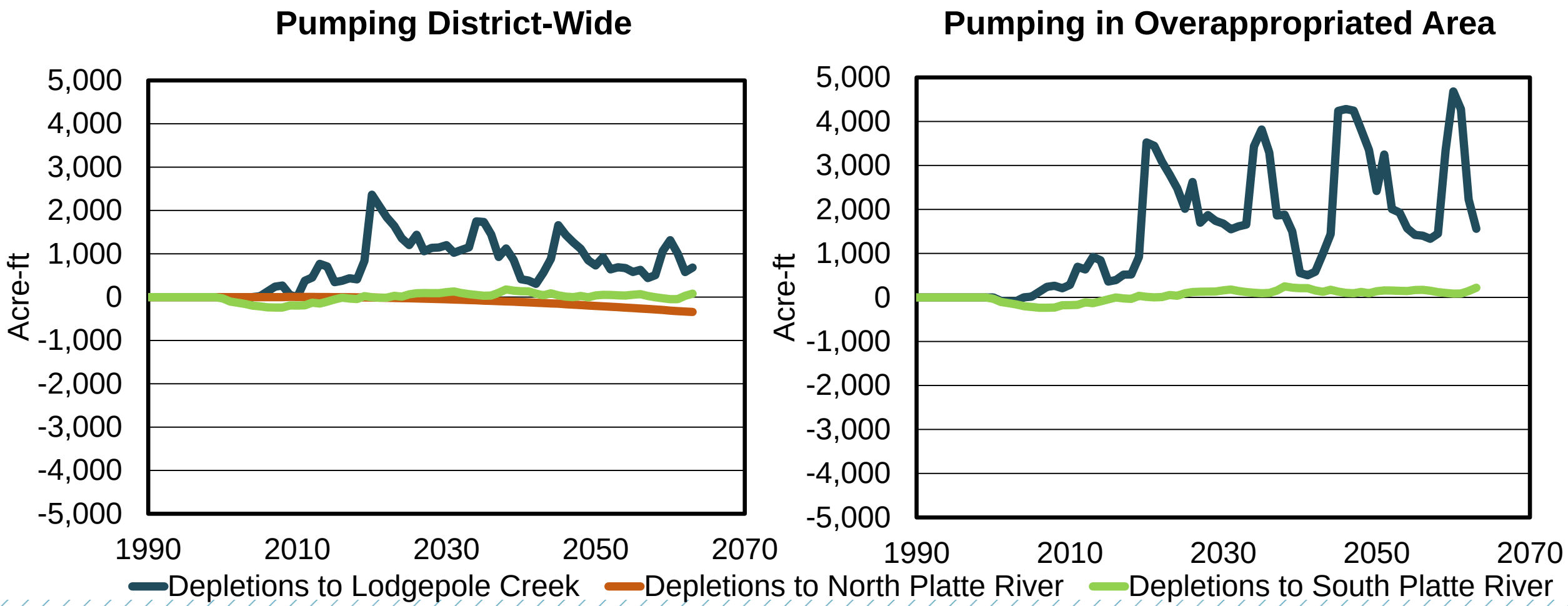
1,100 acre decrease in GW only irrigated acres



- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

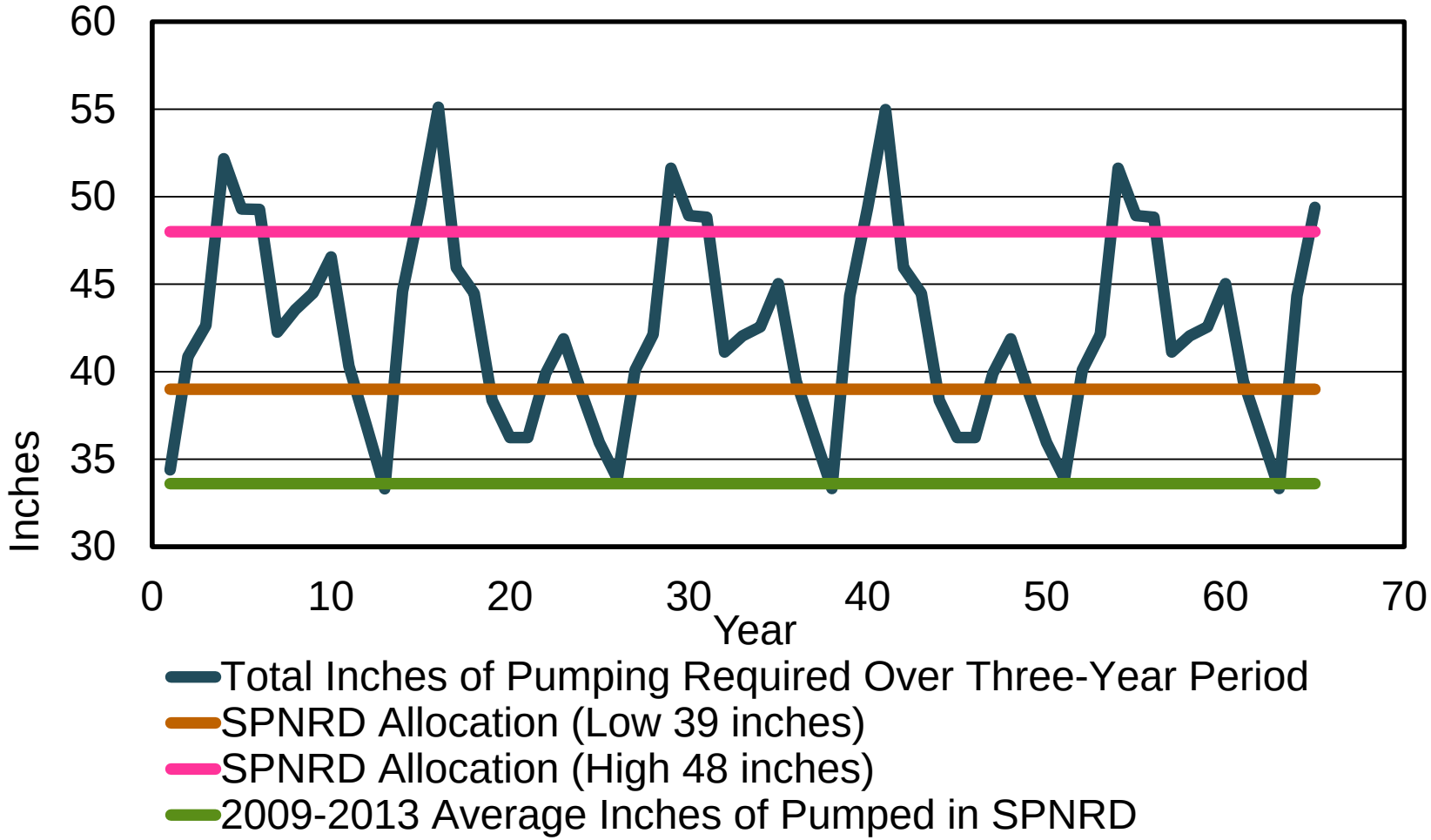
SPNRD Results - Stream Depletions

Depletions to streams due to changes in GW pumping



SPNRD Allocation Analysis

Estimated Inches Necessary to Meet Full Crop Demand



25-year average NIR pumping requirement translates to 12.5" per year in the South Platte River OA Area or 37.5" over three-year allocation period

2009-2013 NIR pumping requirements averaged 15.5" per year

2009-2013 metered pumping average 15" or ~1000 AF less for the 5-year period with most of the reduction occurring in 2012

TPNRD Results

TPNRD Results

Acres Changes

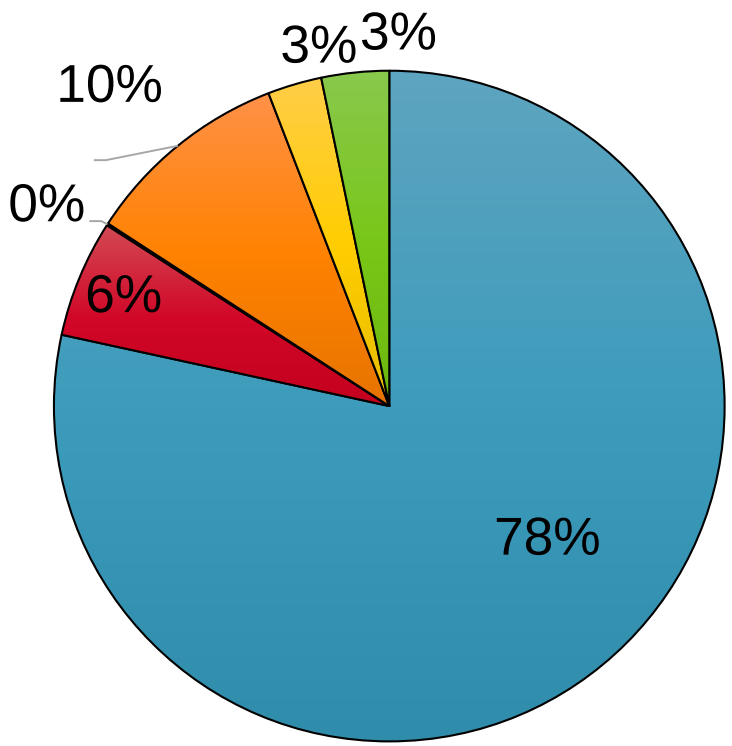
TPNRD	Total change (1997 to 2010)
District-Wide	57,000
OA Area	26,500

TPNRD Results

Crop Type Changes

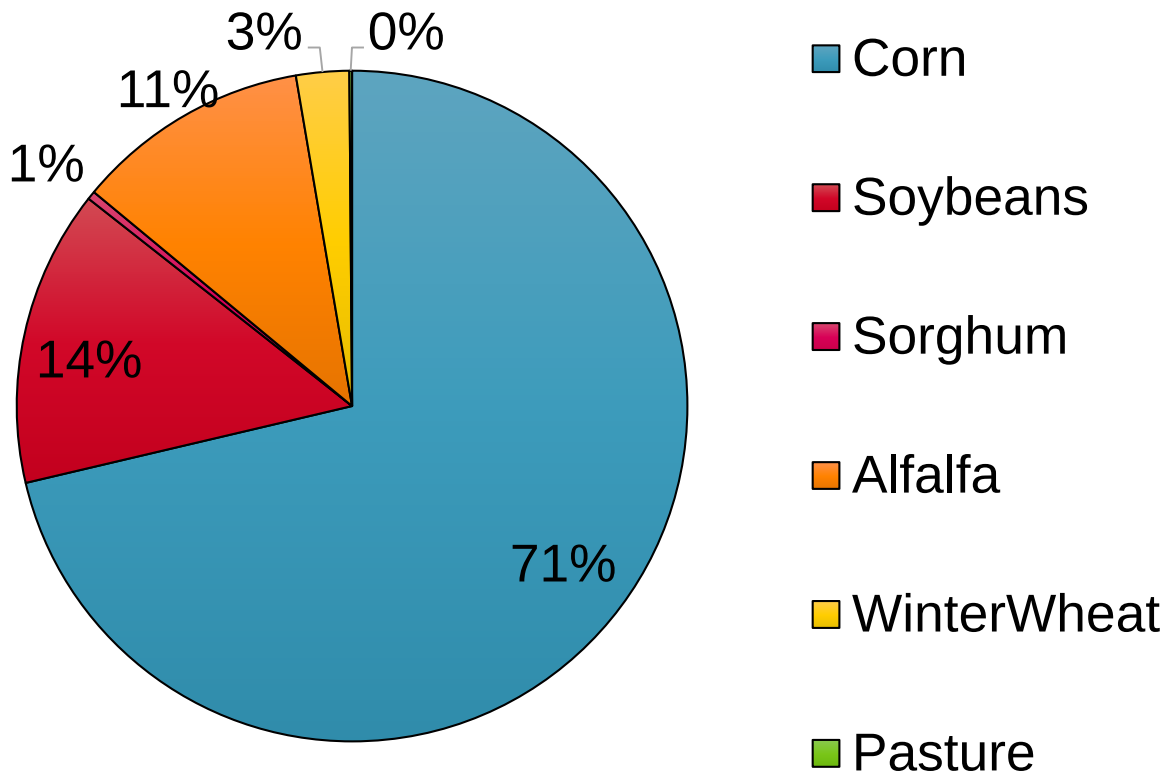
1997

206,000 GW only irrigated acres



2010

263,000 GW only irrigated acres

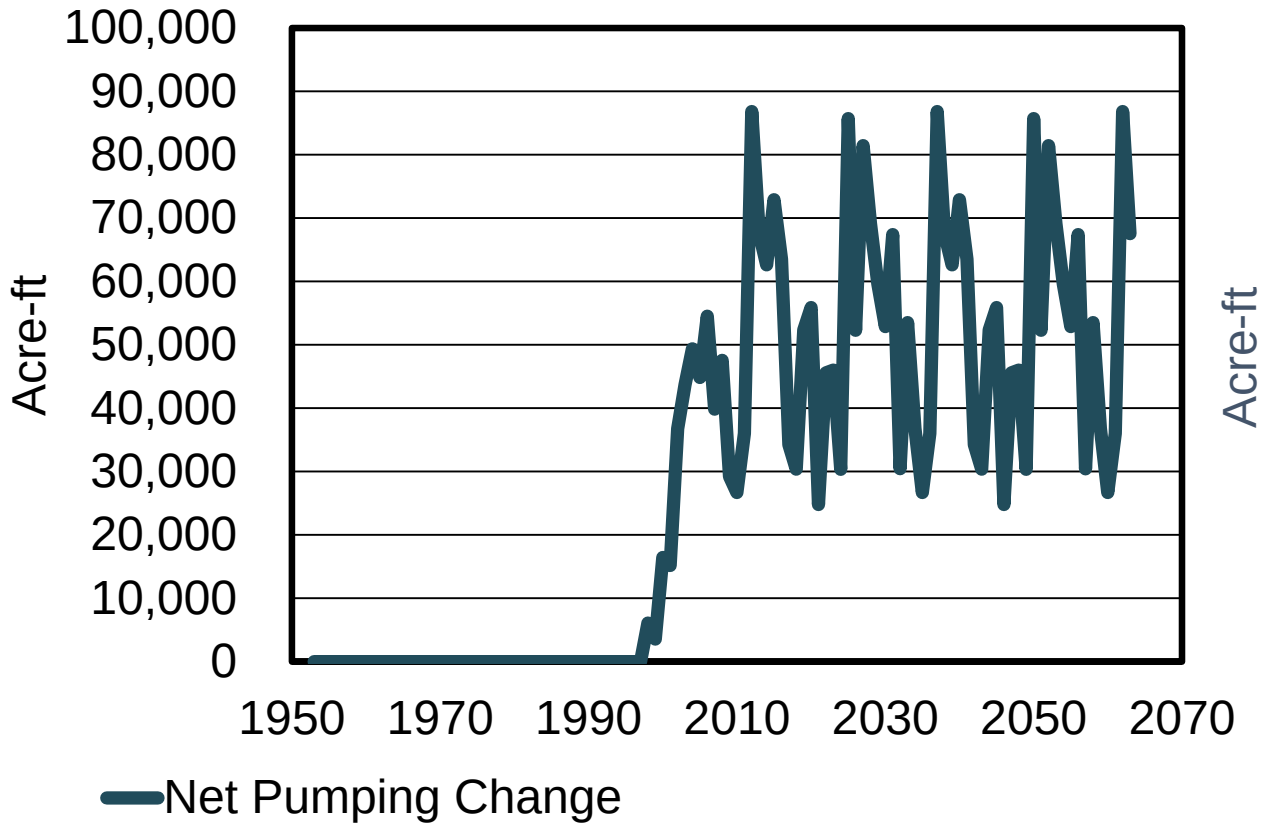


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

TPNRD Results - Pumping Changes

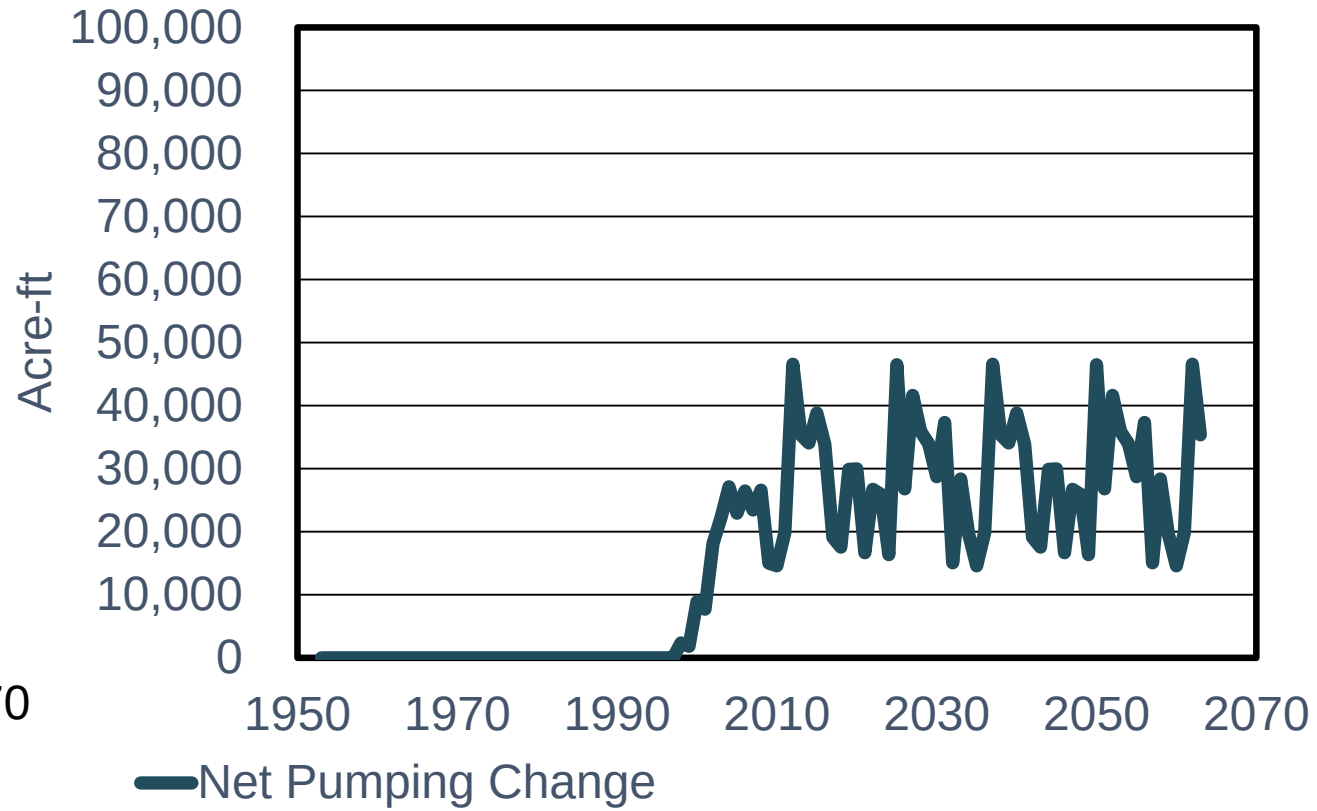
District-Wide

57,000 acre increase in GW only irrigated acres



Overappropriated Area and EAA

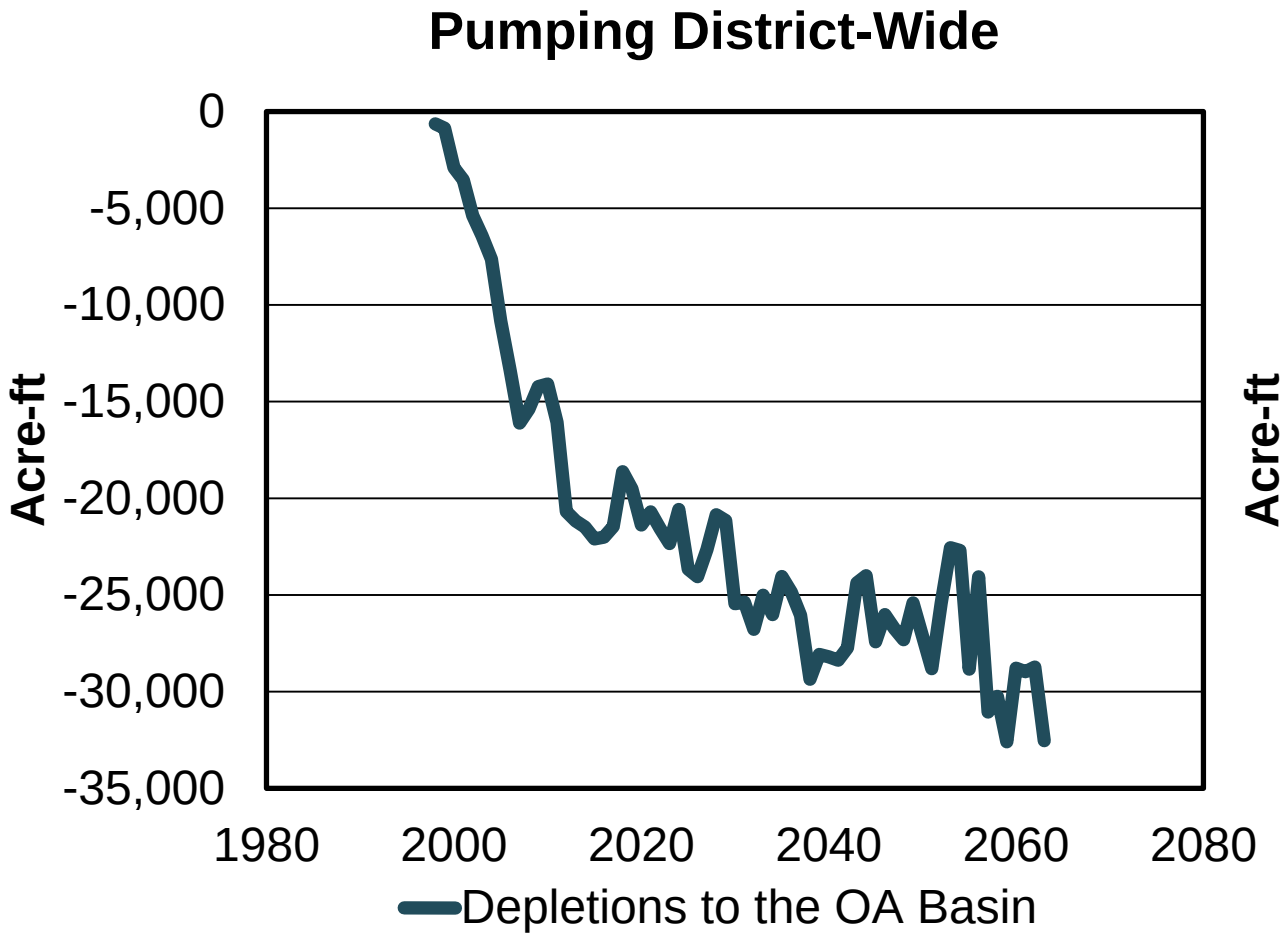
26,500 acre increase in GW only irrigated acres

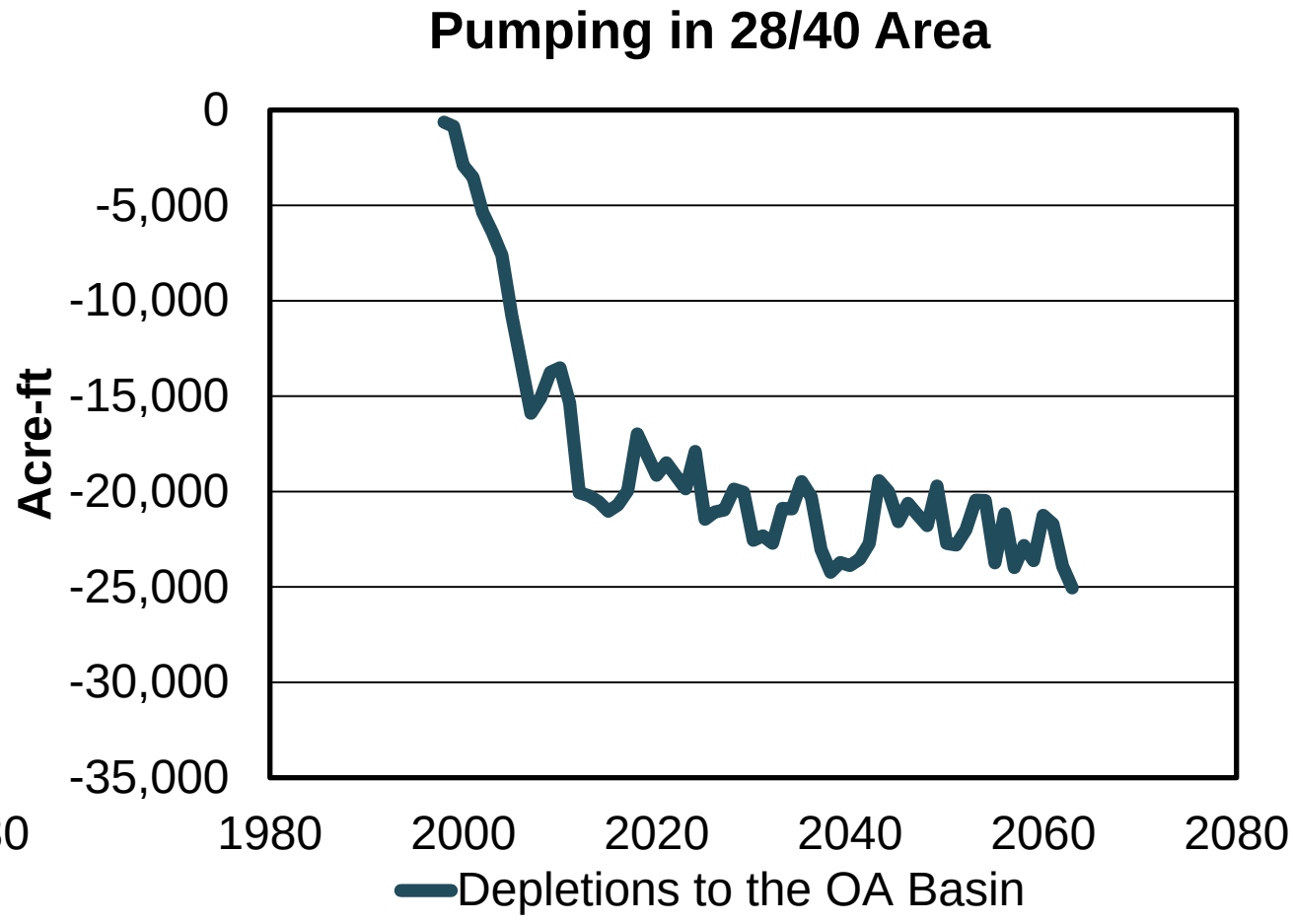


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

TPNRD Results - Stream Depletions

Depletions to streams in the Overappropriated Basin due to changes in GW pumping





CPNRD Results

CPNRD Results

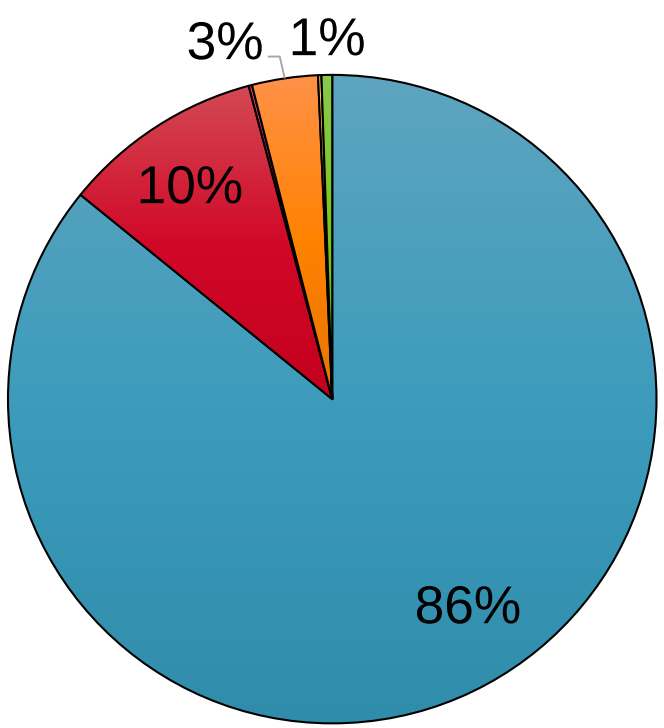
Acres Changes

CPNRD	Total change (1997 to 2010)
District-Wide	79,000
OA Area	13,000
EAA Area	500

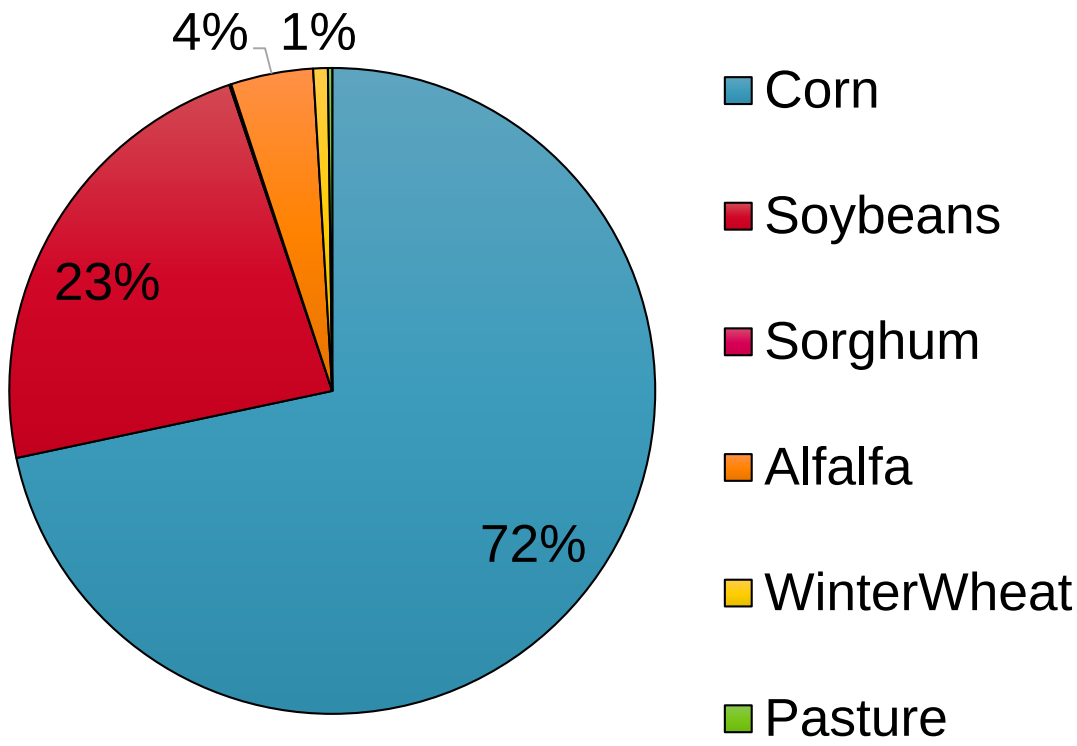
CPNRD Results

Crop Type Changes

1997
818,000 GW only irrigated acres



2010
897,000 GW only irrigated acres

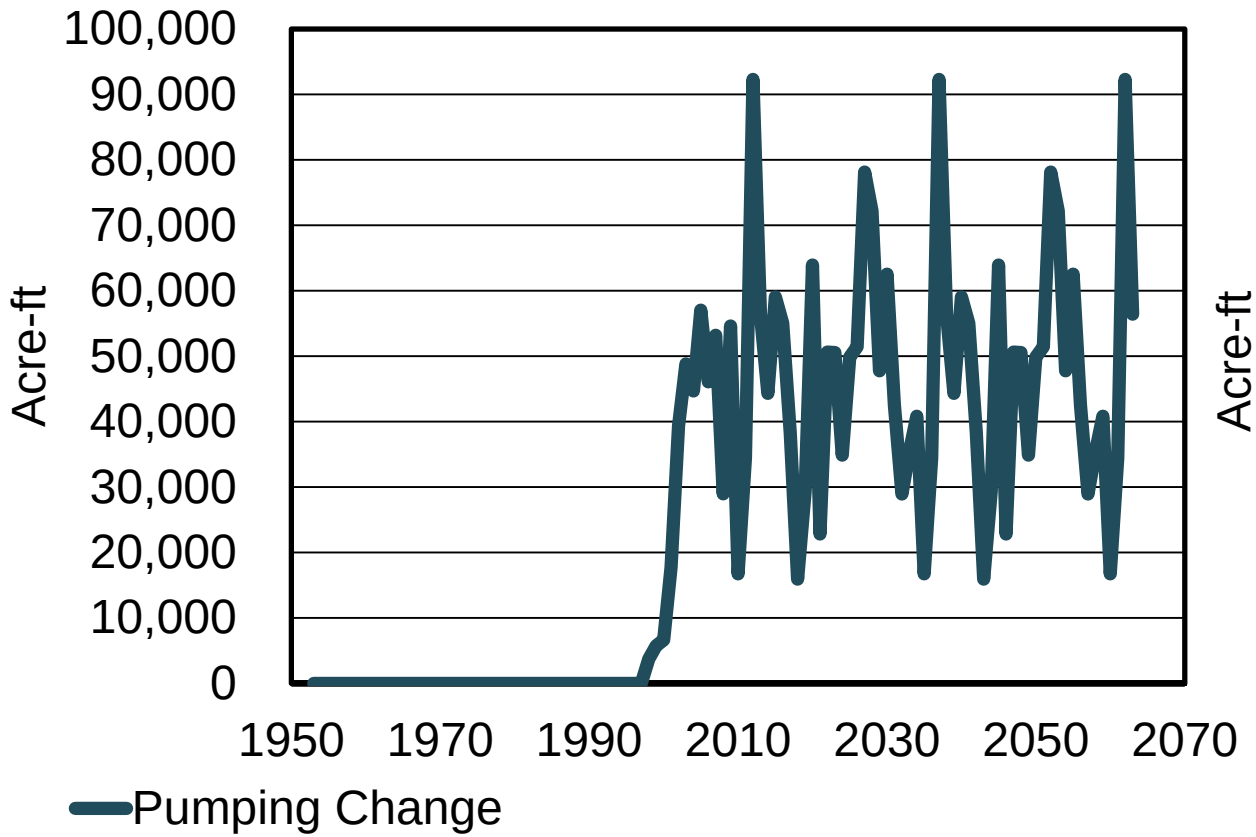


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

CPNRD Results - Pumping Changes

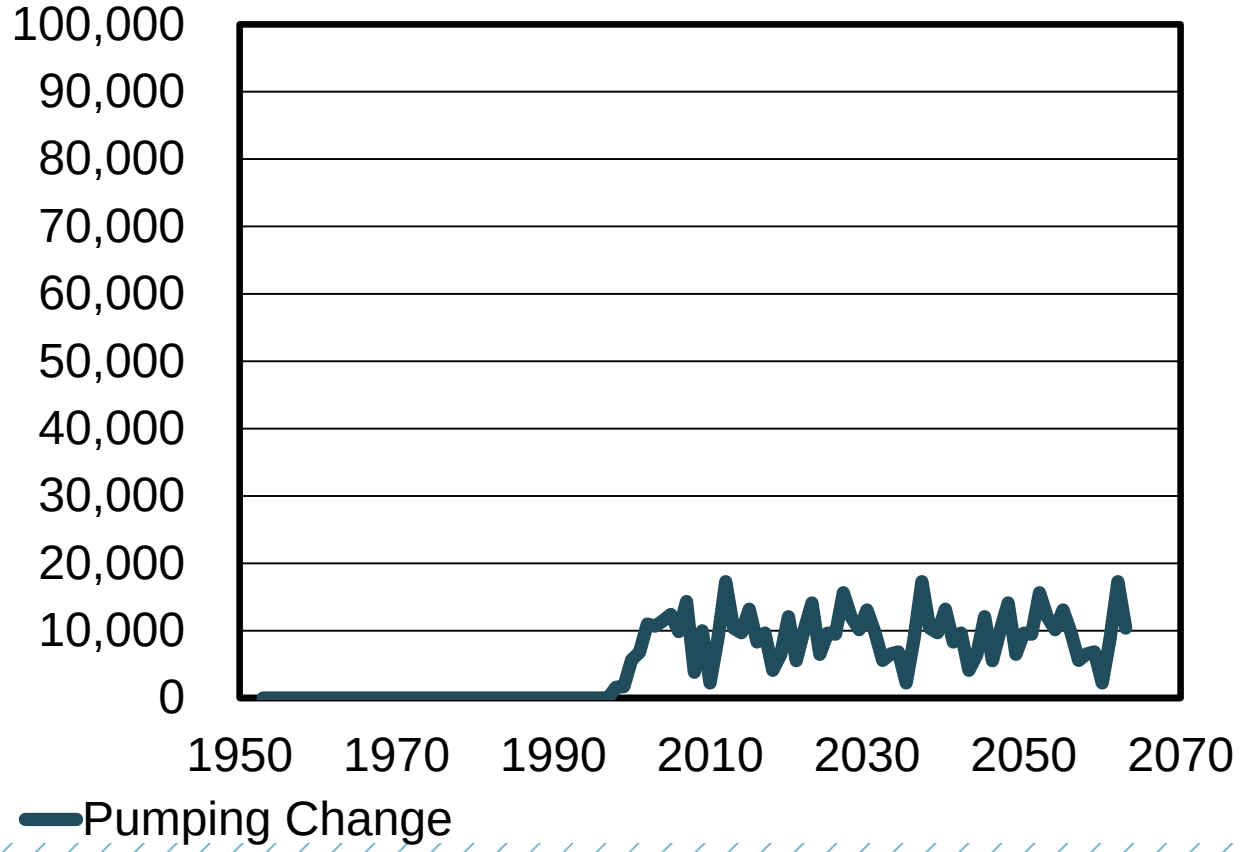
District-Wide

79,000 acre increase in GW only irrigated acres



Overappropriated Area

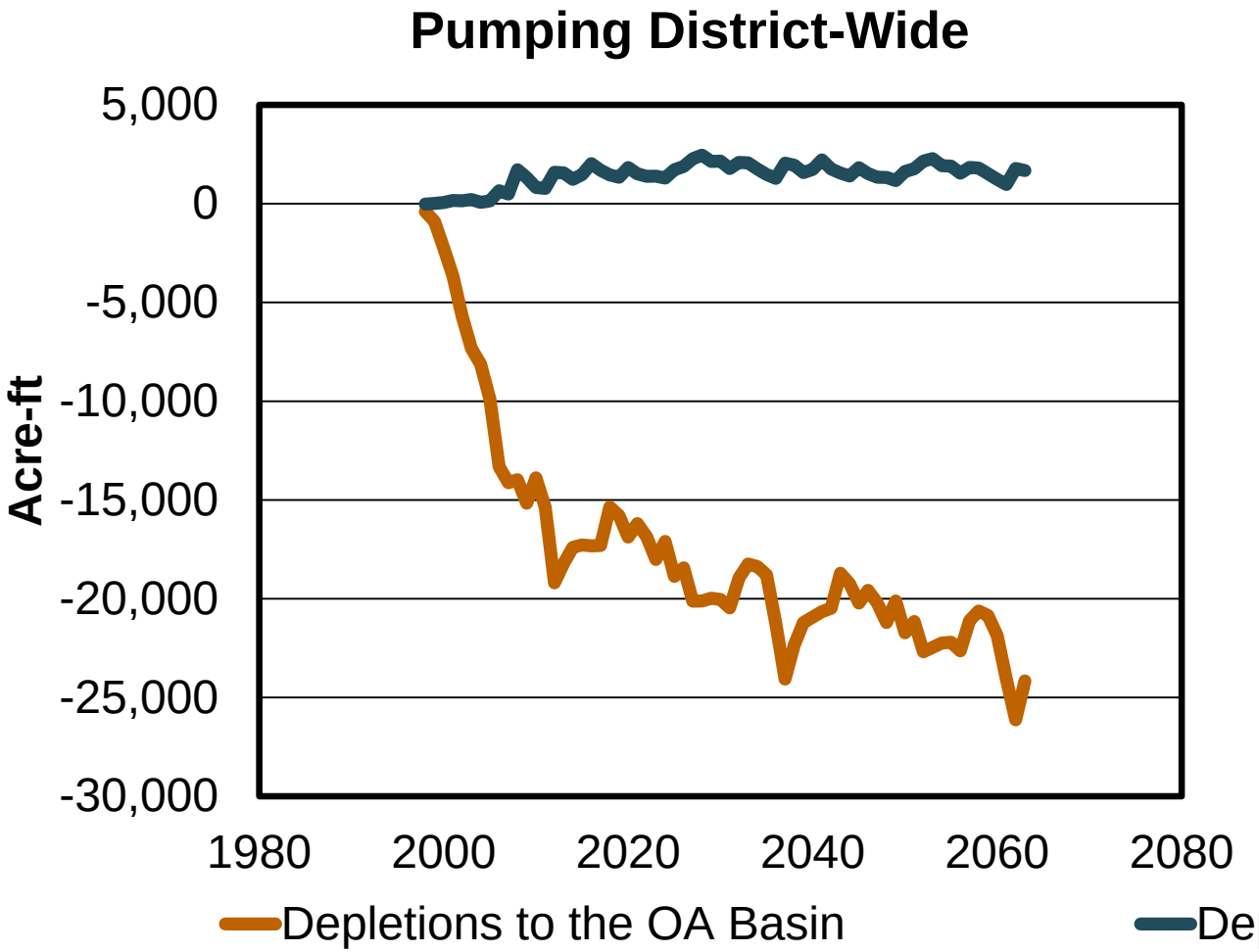
13,000 acre increase in GW only irrigated acres

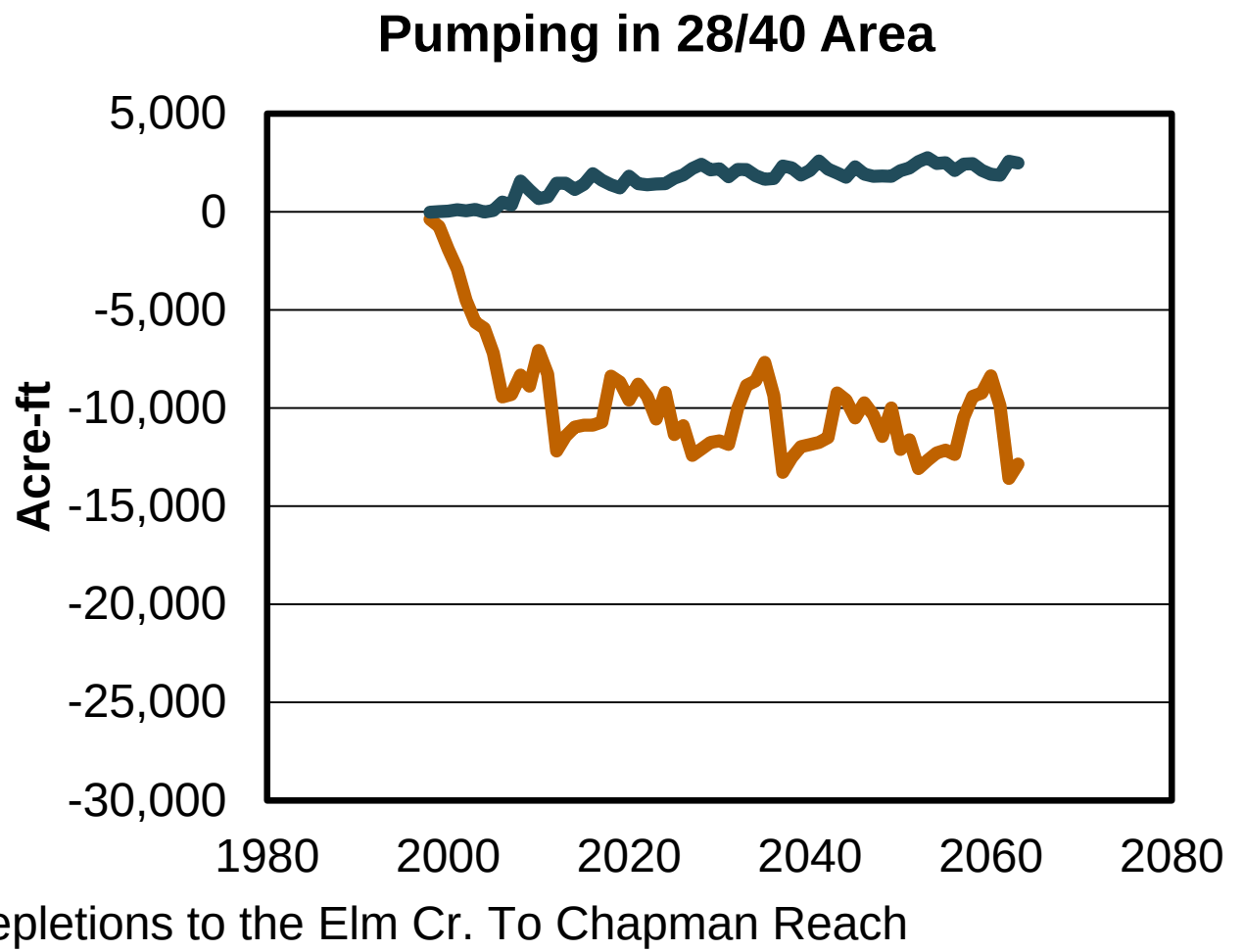


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

CPNRD Results – Stream Depletions

Depletions to streams due to changes in GW pumping





TBNRD Results

TBNRD Results

Acres Changes

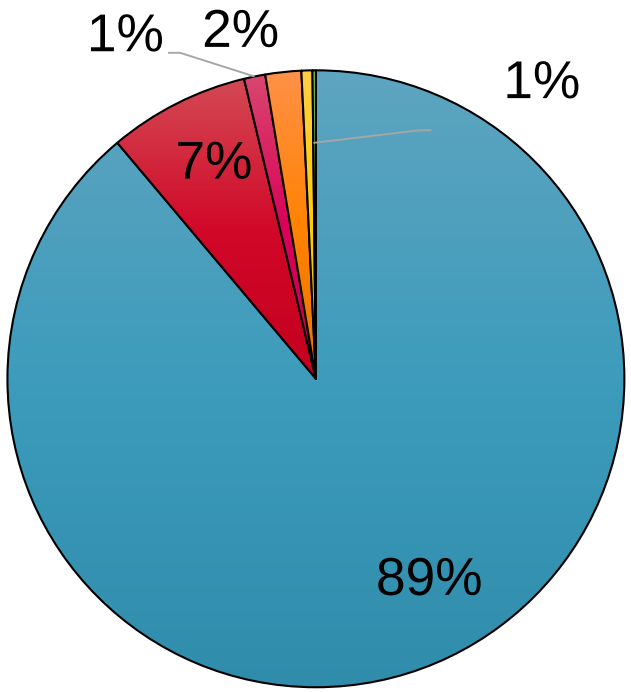
TBNRD	Total change (1997 to 2010)
District-Wide	53,000
OA Area	12,500

TBNRD Results

Crop Type Changes

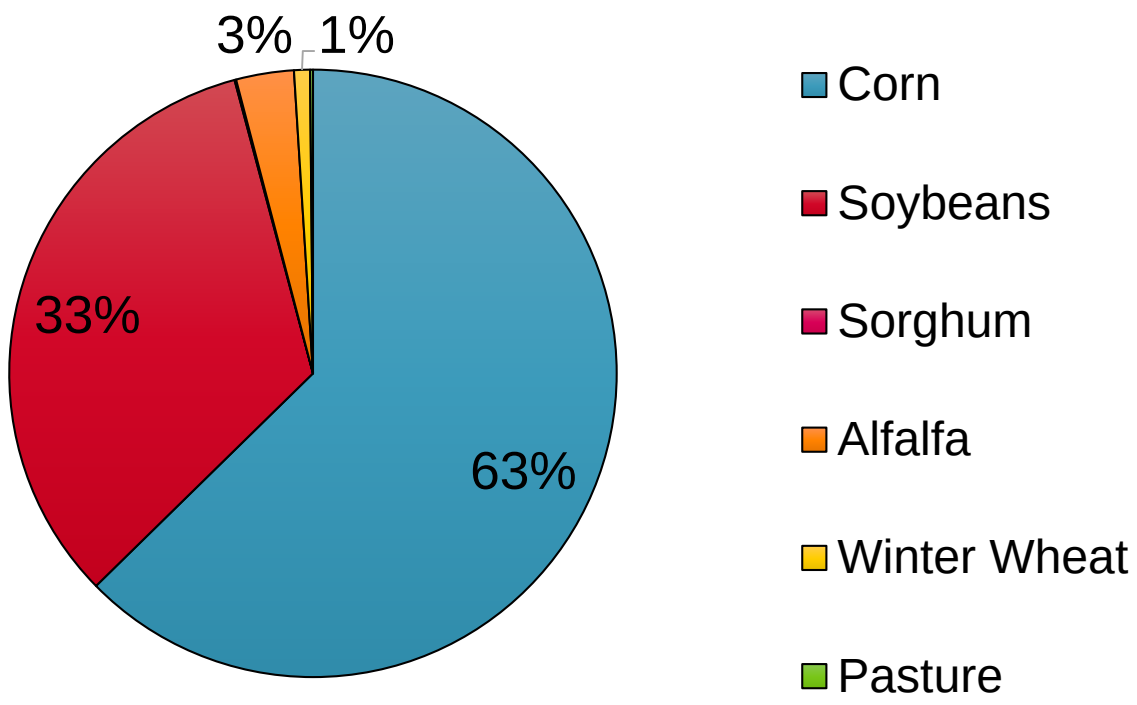
1997

407,000 GW only irrigated acres



2013

460,000 GW only irrigated acres

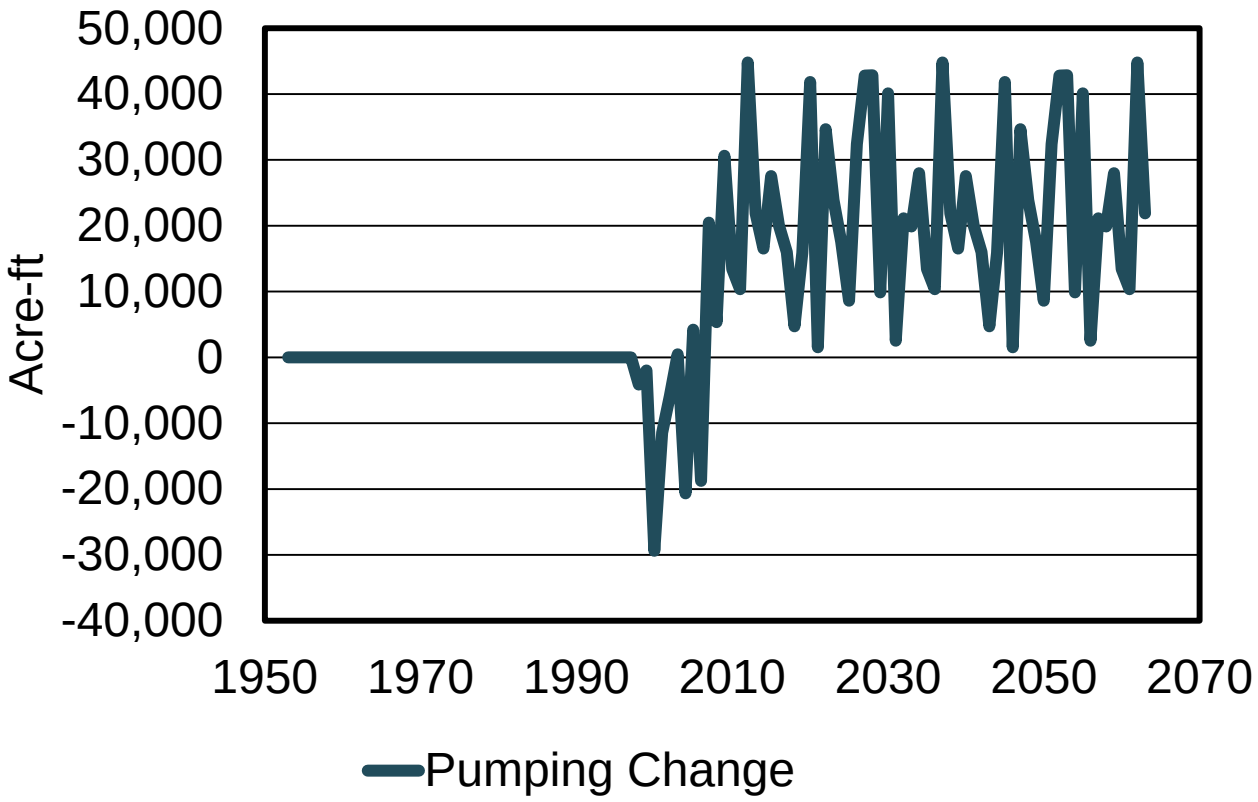


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

TBNRD Results - Pumping Changes

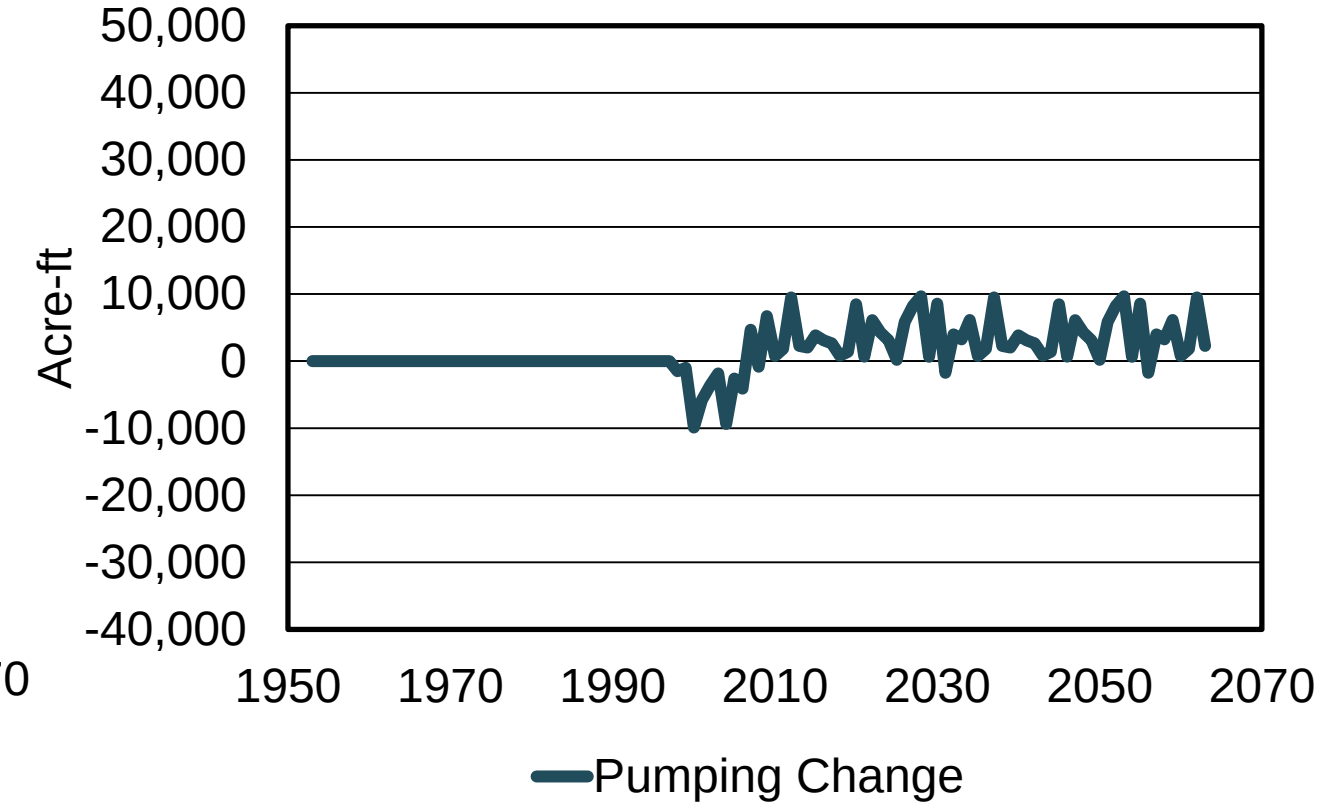
District-Wide

53,000 acre increase in GW only irrigated acres



Overappropriated Area and EAA

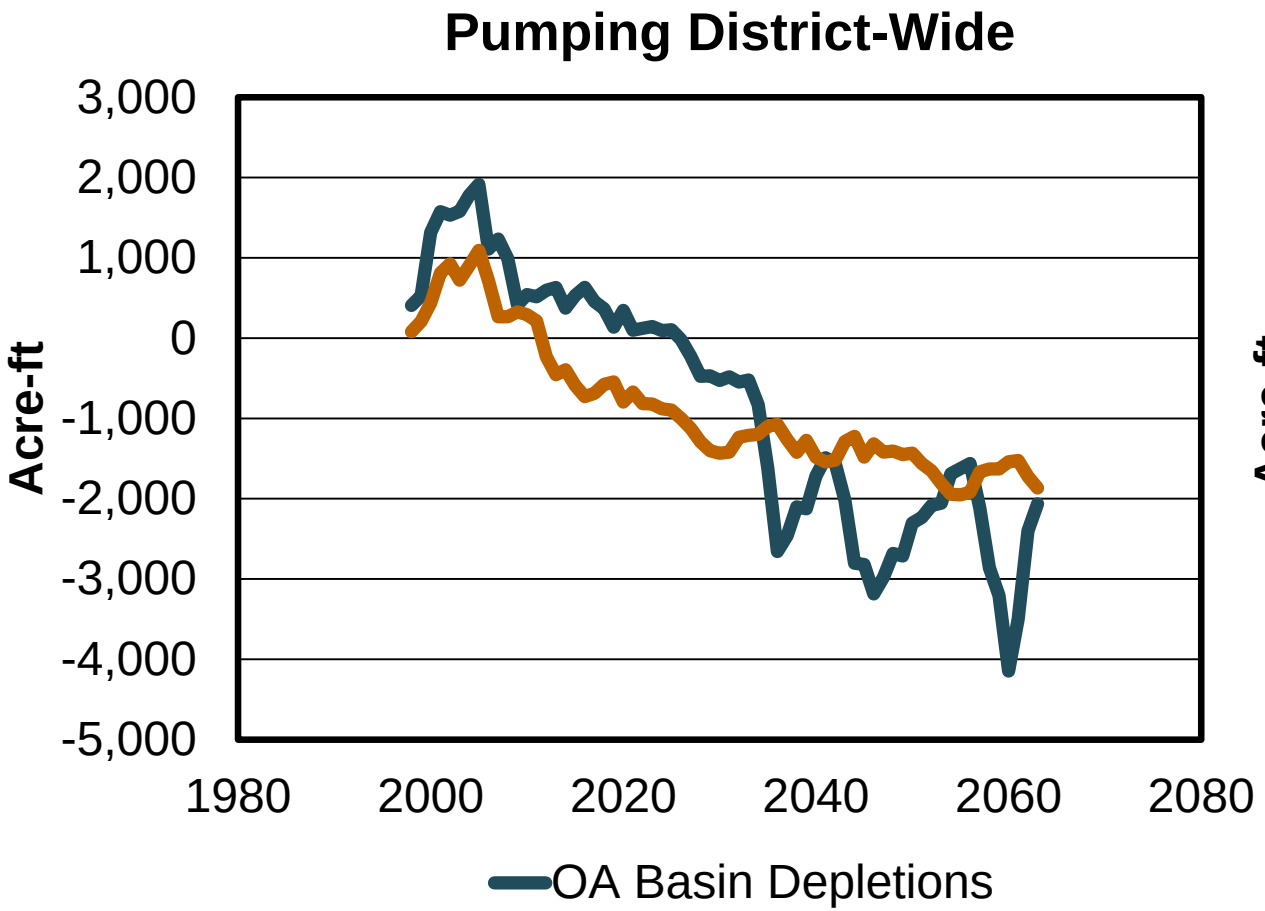
12,500 acre increase in GW only irrigated acres

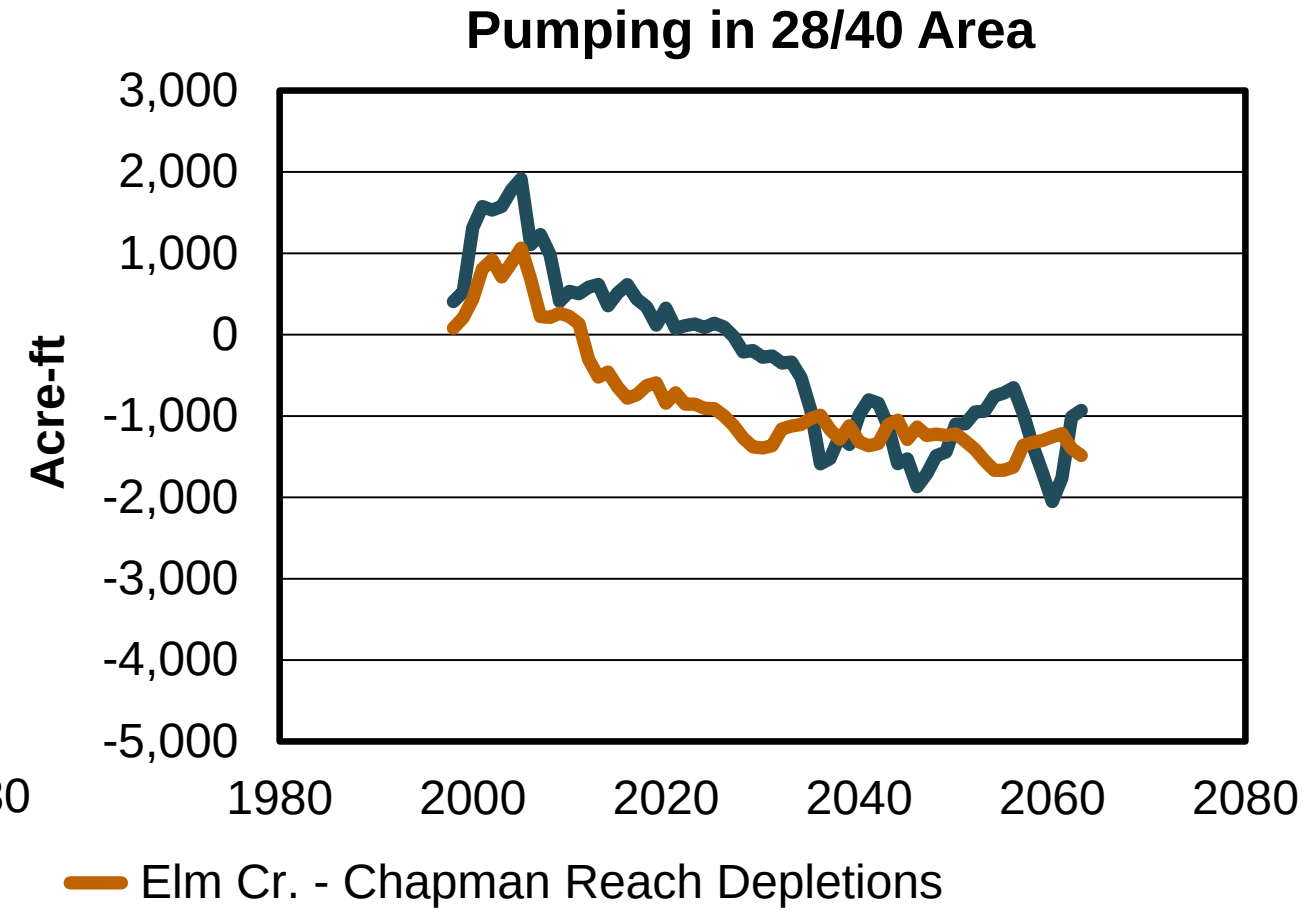


- Positive Values Indicate Increased Pumping
- Negative Values Indicate Decreased Pumping

TBNRD Results - Stream Depletions

Depletions to streams due to changes in GW pumping





Summary

Change in Post-1997 Depletions Estimates Through 2029

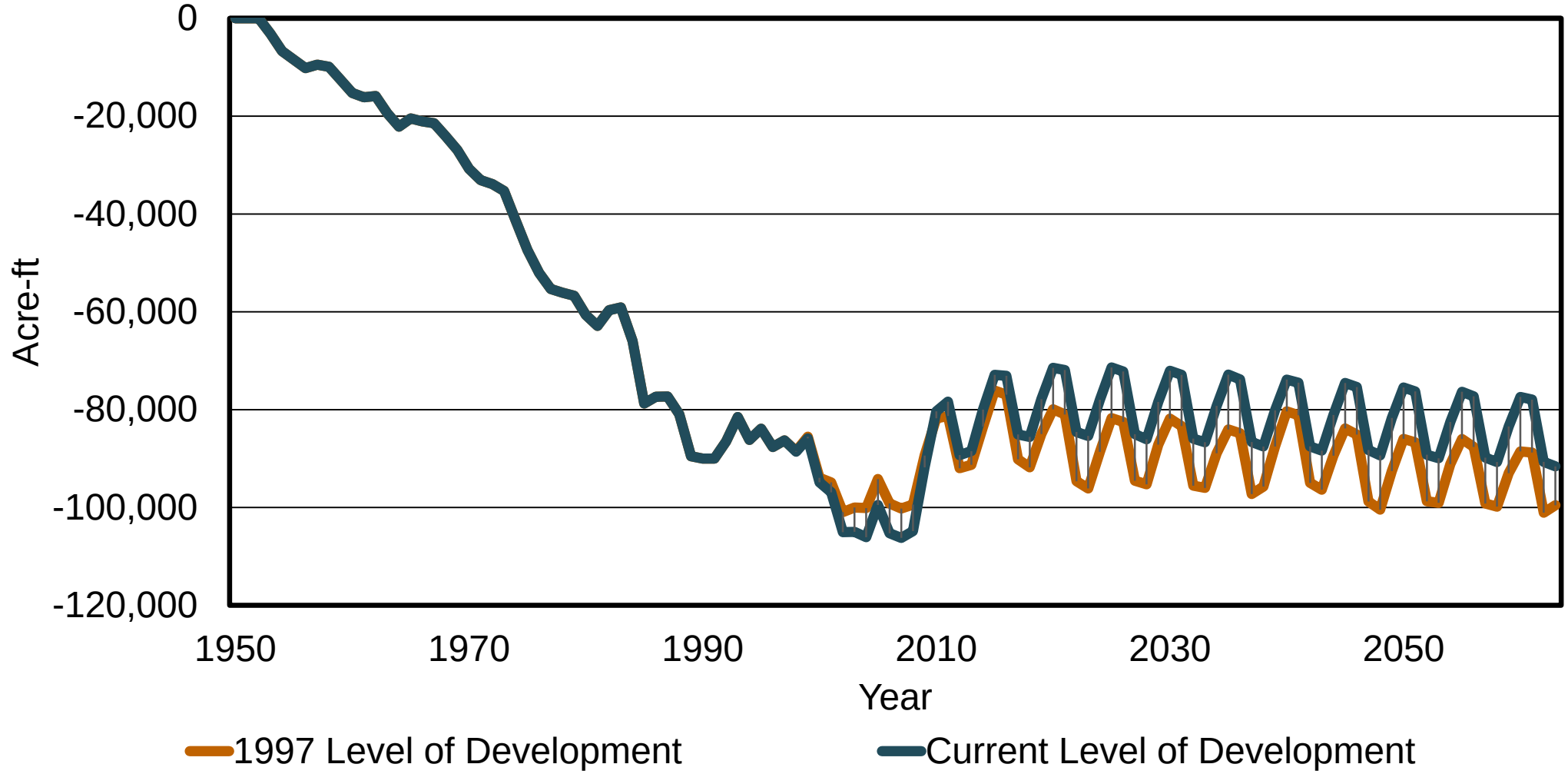
NRD	District-Wide (2019)	District-Wide (2029)	OA and EAA (2019)	OA and EAA (2029)
North Platte	-7,100	-10,000	-7,300	-10,000
South Platte	-900	-1,200	-1,000	-1,900
Twin Platte	21,000	25,000	19,000	22,500
Central Platte	16,500	18,000	8,500	10,000
Tri-Basin	800	2,000	800	1,700
Total	**30,300**	**33,800**	**20,000**	**22,300**

***Retirements, acreage changes, and transfers are the only management actions included.**
****All values in AF/year**

Updated Results on Total Depletions Analysis

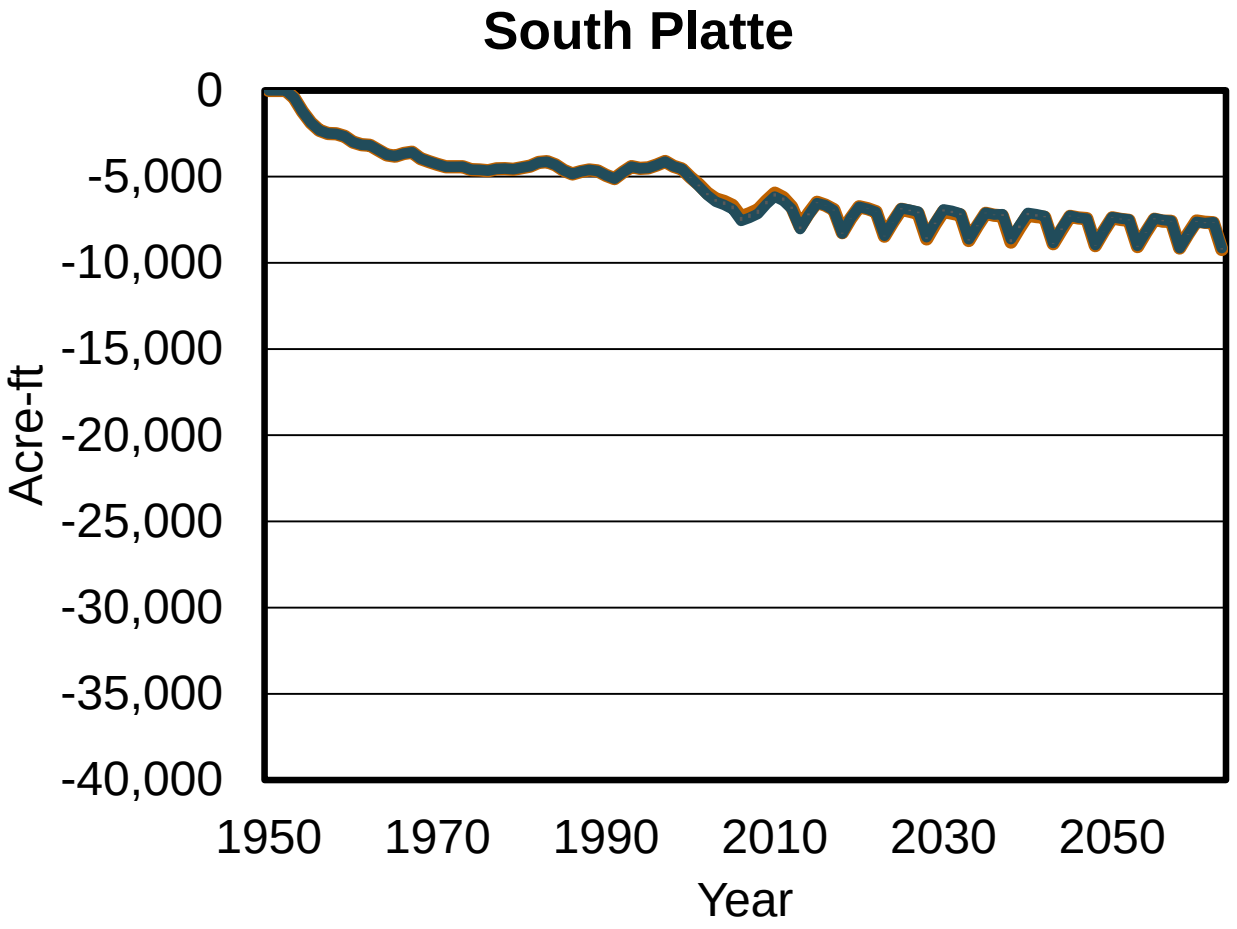
NPNRD Total Depletions

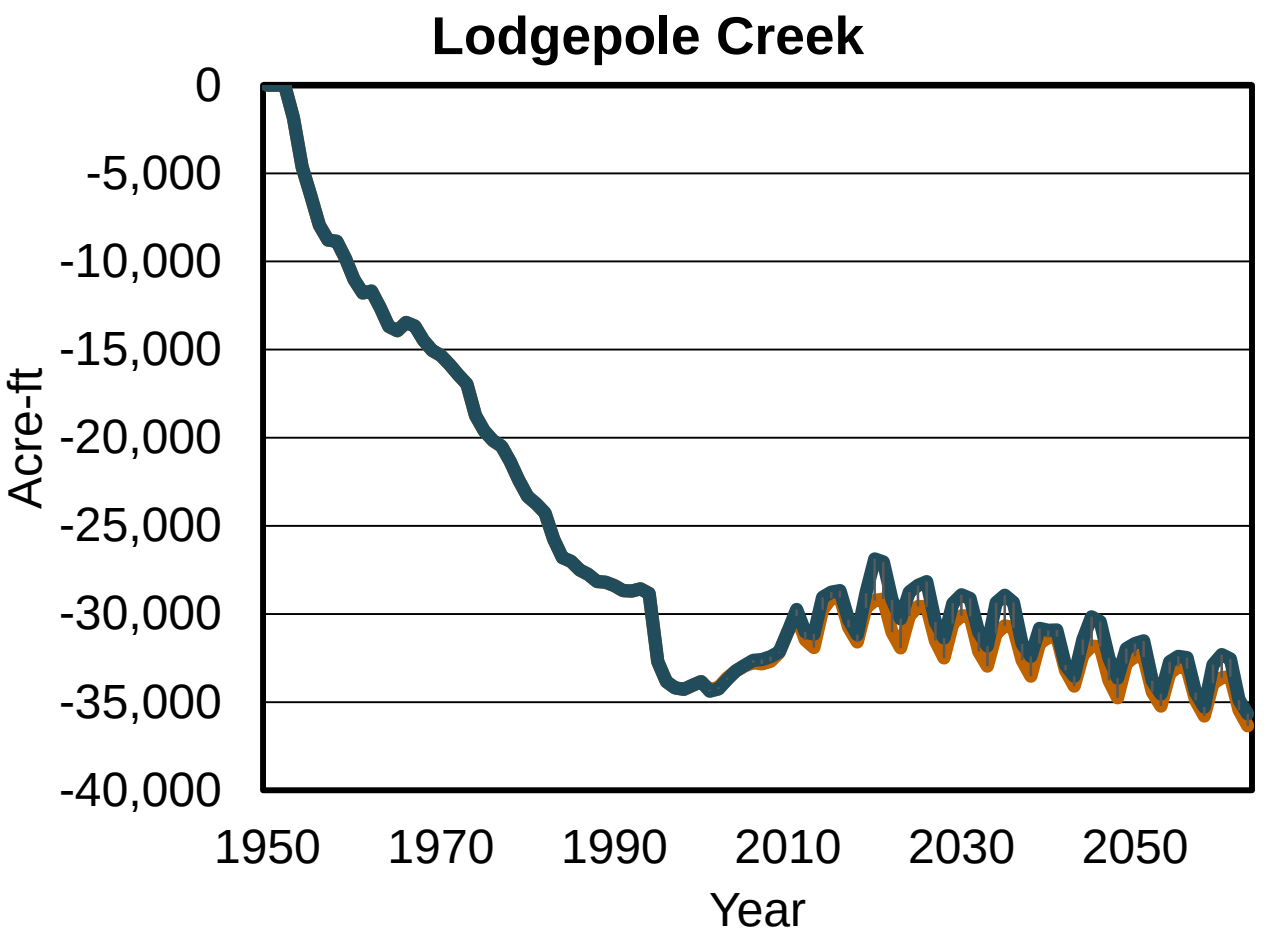
Groundwater Depletions Resulting from GW Only Wells



SPNRD Total Depletions

Groundwater Depletions Resulting from GW Only Wells



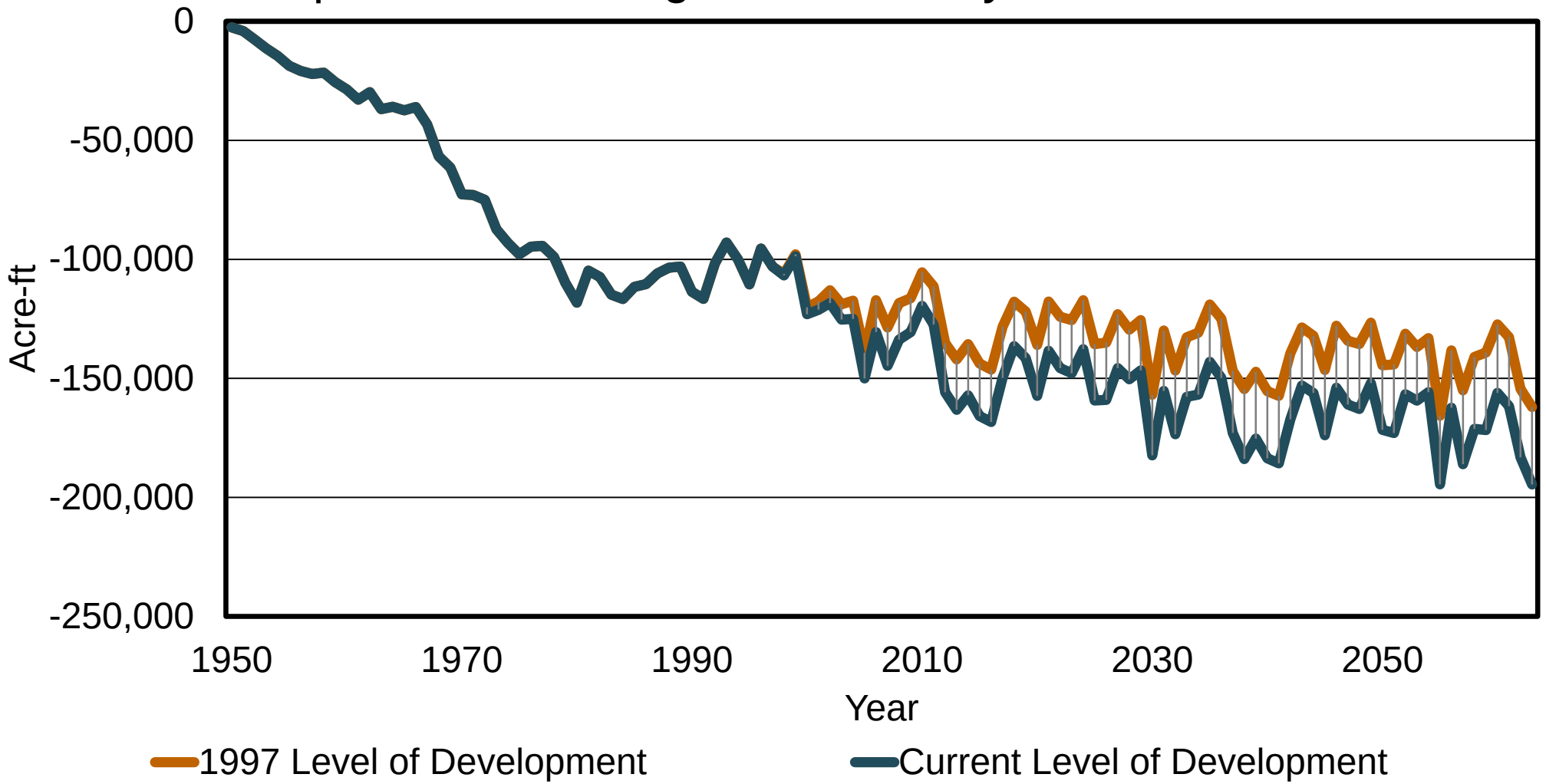


1997 Level of Development

Current Level of Development

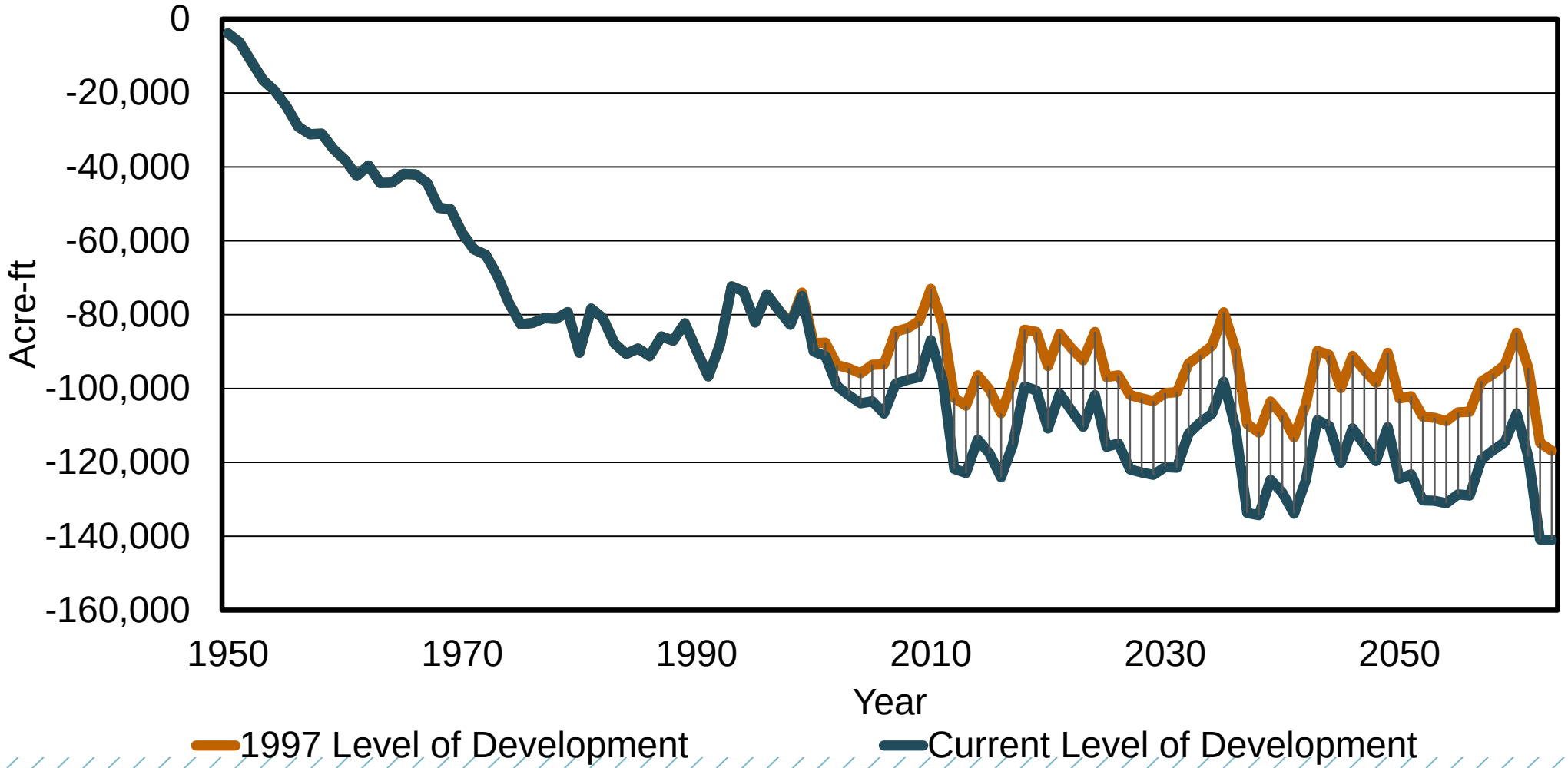
TPNRD Total Depletions

Groundwater Depletions Resulting from GW Only Wells



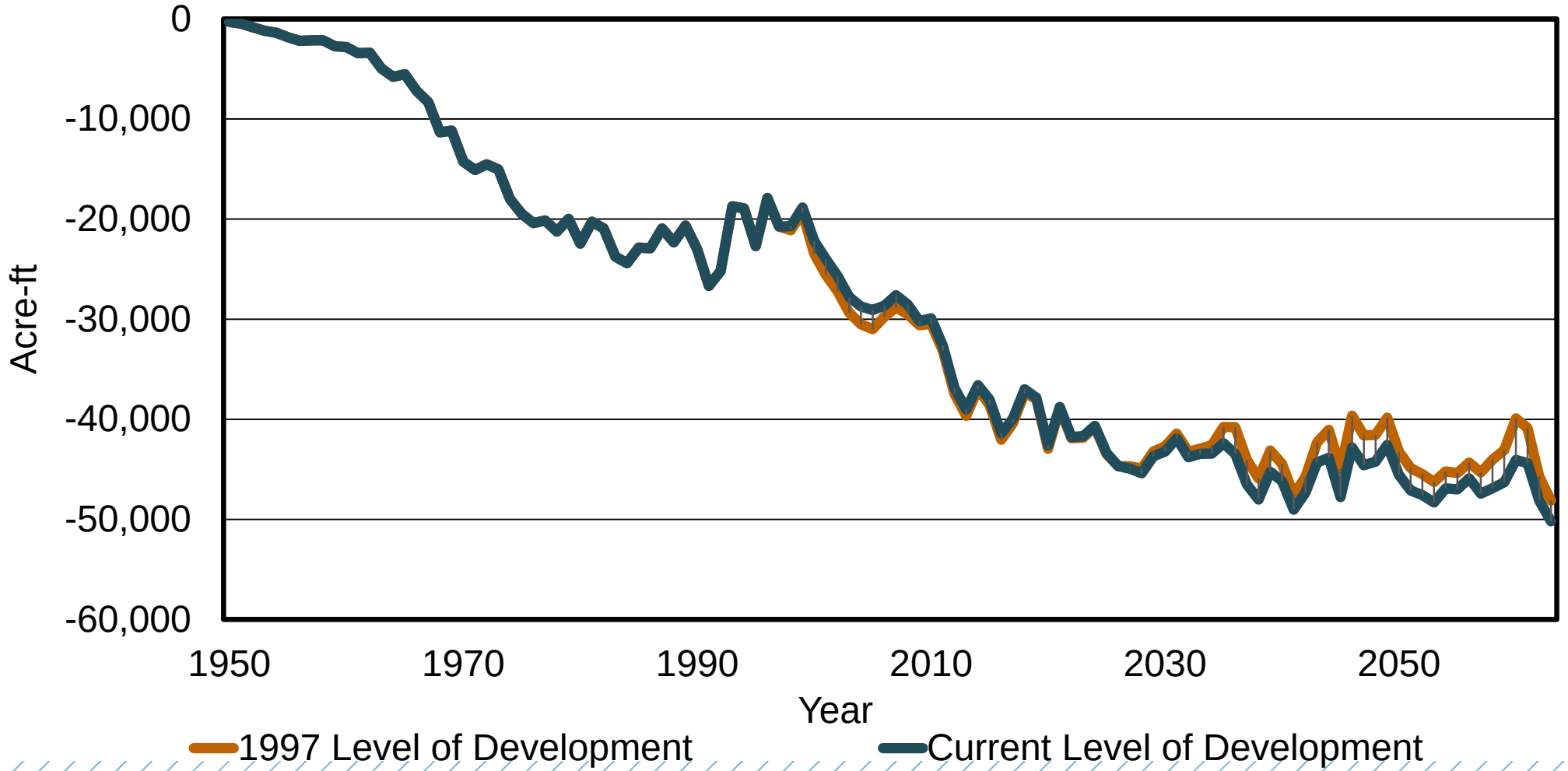
CPNRD Total Depletions

Groundwater Depletions Resulting from GW Only Wells



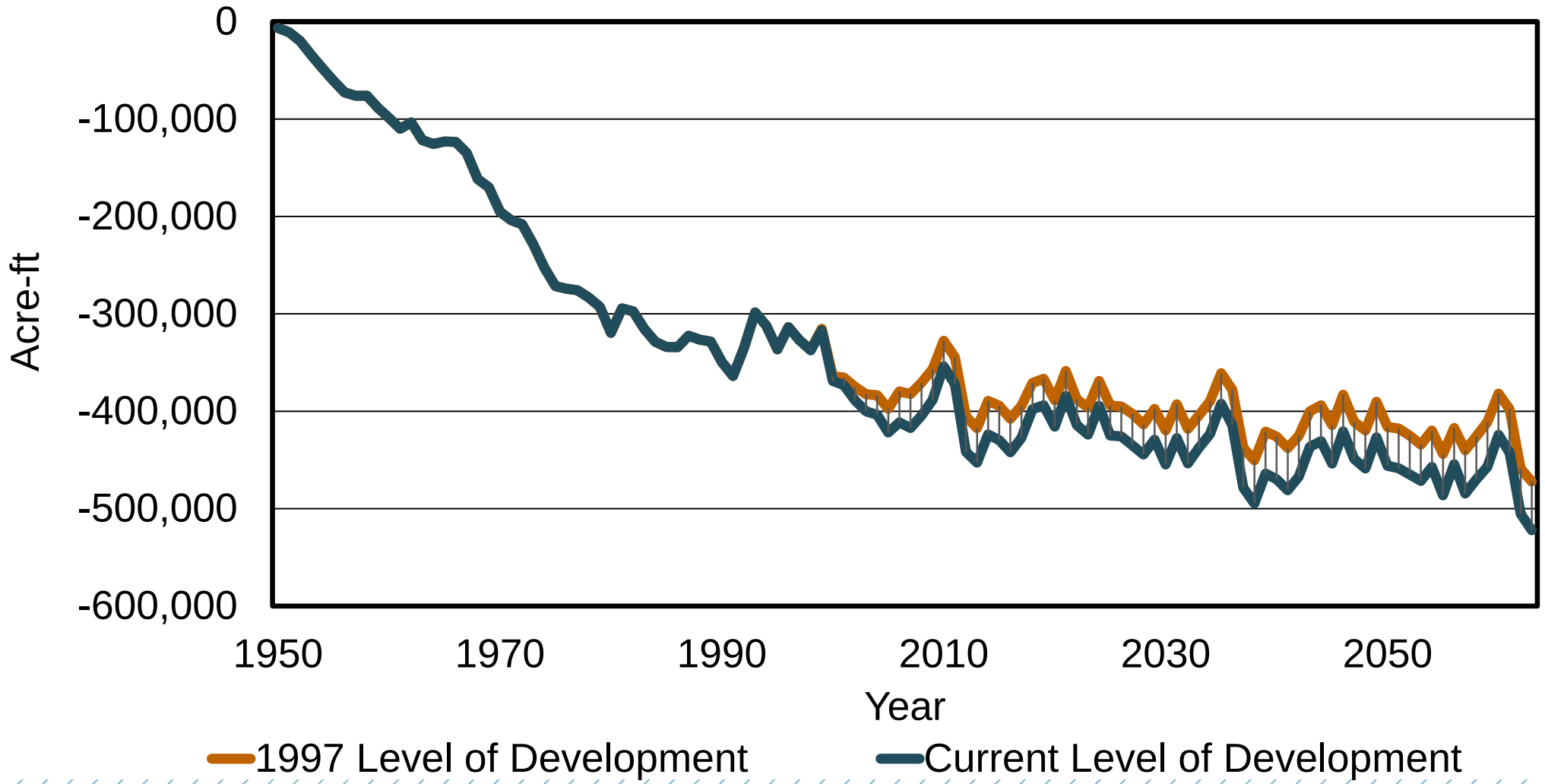
TBNRD Total Depletions

Groundwater Depletions Resulting from GW Only Wells



Total Depletions Basin-Wide Upstream of Elm Creek

Groundwater Depletions Resulting from GW Only Wells



WHY DID THE RESULTS CHANGE?

- Updates to land use data and crop type information through 2010 – changes in pumping requirements
- More robust water balance (comprehensive watershed model) – changes in recharge distribution
- Correction of model configuration (mainly eastern model unit area) – simulates connection of the Platte River

ADDITIONAL EFFORTS MOVING FORWARD

- Continue to review and finalize acres data with NRDs
- Incorporate M&I Pumping changes
- Incorporate other management actions (i.e., allocations, recharge, surface water leases, etc.)
- Finalize Robust Review

Costs Incurred for 1st Increment Activities

	PROJECTS	RETIREMENTS	STUDIES	ADMINISTRATION*	TOTAL
NRD COSTS	$34.8M	$8.5M	$4.1M	$10.0M ($1.25M Annual)	**$57.4M**
NeDNR COSTS	$43.8M	$5.0M	$0.9M	-	**$49.7M**
TOTAL COSTS	**$78.6M**	**$13.5M**	**$5.0M**	**$10.0M**	**$107.1M**

*NRD costs for regulation included in administration costs.
*Costs to producers and third party economic impacts due to regulation not monetized in this table

Costs Continuing to 2nd Increment for 1st Increment Activities

	PROJECTS	RETIREMENTS	STUDIES	ADMINISTRATION	TOTAL
NRD COSTS	$2.3M	$0.6M	-	$1.2M	**$4.1M**
NeDNR COSTS					
TOTAL COSTS	**$2.3M**	**$0.6M**	**-**	**$1.2M**	**$4.1M**

*NRD costs for regulation included in administration costs.
*Costs to producers and third party economic impacts due to regulation not monetized in this table

Cost of Regulation in Terms of Production

Additional costs are incurred beyond NRD/NeDNR direct costs:

- Flow meters
- Cropping changes
- Deficit irrigation
- Ag economy impacts beyond producer

Benefits of First Increment Activities

- Change in Groundwater Only Irrigated Acres within each NRD

NRD	Updated Modeling Analysis
North Platte	-3,400
South Platte	15,300
Twin Platte	57,000
Central Platte	79,000
Tri-Basin	53,000
Total	**200,900**

NPNRD and SPNRD values are changes between 1997 and 2013. All other NRDs are 1997 and 2010.

Land Use Changes OA Areas

- Change in Groundwater Only Irrigated Acres within HC/OA and EAA Area

NRD	Updated Modeling Analysis
North Platte	-5,400
South Platte	-1,100
Twin Platte	26,500
Central Platte	13,500
Tri-Basin	12,500
Total	**46,000**

NPNRD and SPNRD values are changes between 1997 and 2013. All other NRDs are 1997 and 2010.

III. FIRST INCREMENT ACTIVITIES COSTS & BENEFITS

Estimated Annual Accretion Range (AF) of 1st Increment Projects During 2nd Increment	Low (AF)	High (AF)
North Dry Creek Aug. Project	700	1,300
Retirement of Water	5,200	8,370
Excess Flow / GW Recharge	5,000	16,000
Reduce GW Withdrawals NPNRD	15,000	20,000
Transfer to Instream Flow	10,000	16,500
NCORPE	7,700	24,000
Credits from PRRIP Projects	0	10,000
Estimate of PRRIP Projects	0	30,000
TOTAL	**43,600**	**126,170**

Summary

2ND INCREMENT DEPLETION GROWTH

- Post-1997 new uses: 3,500 AF
- All uses: 44,700 AF

1ST INCREMENT ACTIVITY BENEFITS

- 200,900 HCA acres remained in production (46,000 acres within OA/EAA area)
- Mitigation offset (estimated): 43,600 – 126,200 AF

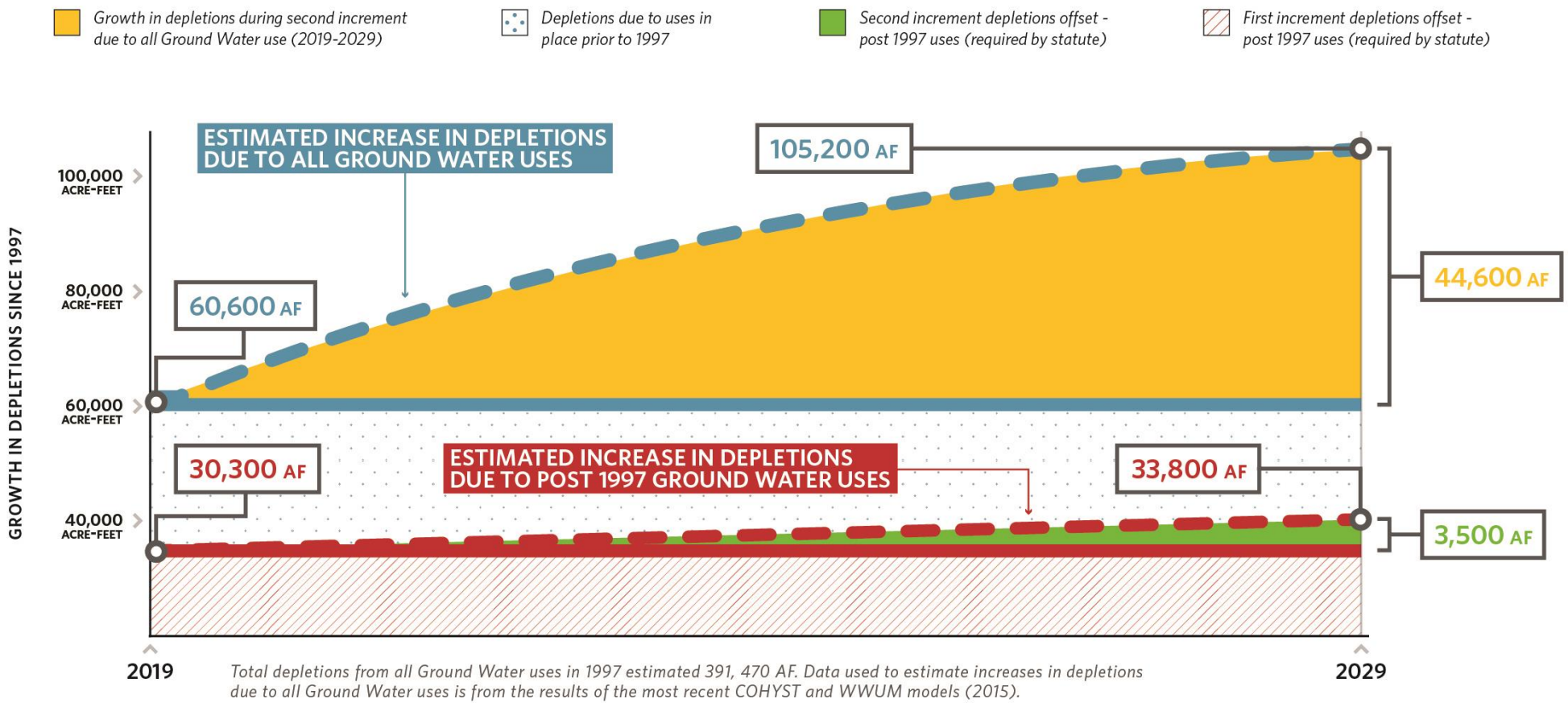
COSTS INCURRED IN 1ST INCREMENT:

- $107.1M

COSTS REMAINING IN 2ND INCREMENT FOR 1ST INCREMENT ACTIVITIES

- Estimated Annual Costs: $4.1M ($41M cumulative during 2nd Increment)

Second Increment Intent



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Total	**30,300**	**33,800**	**20,000**	**22,300**

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****All values in acre-ft/year**

Second Increment Intent

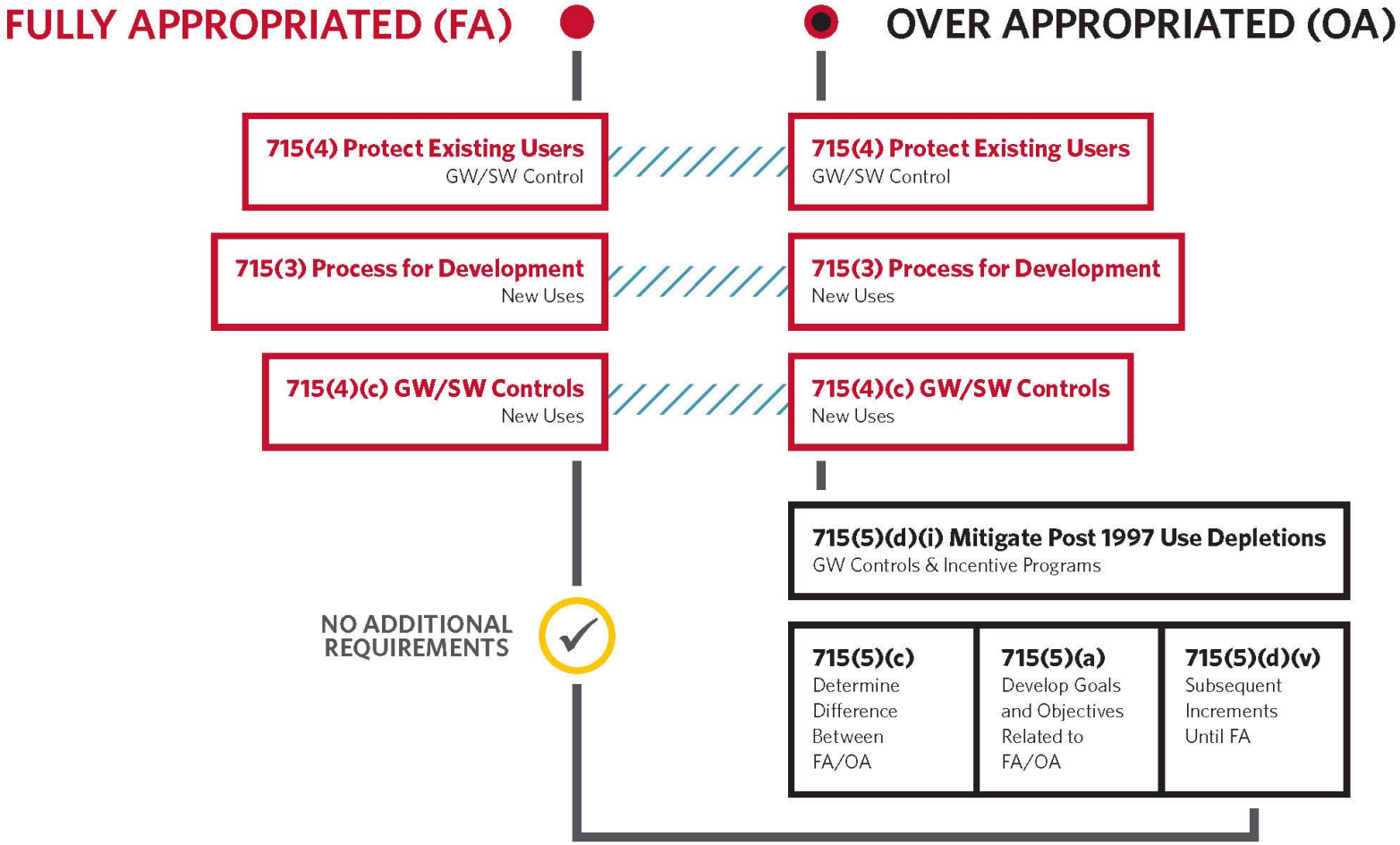
- New Modeling Results for Post 97 Depletions
- Range of Estimated Benefits
- Costs of the First Increment
- Second Increment Costs for 1st Increment Activities

Public Comment

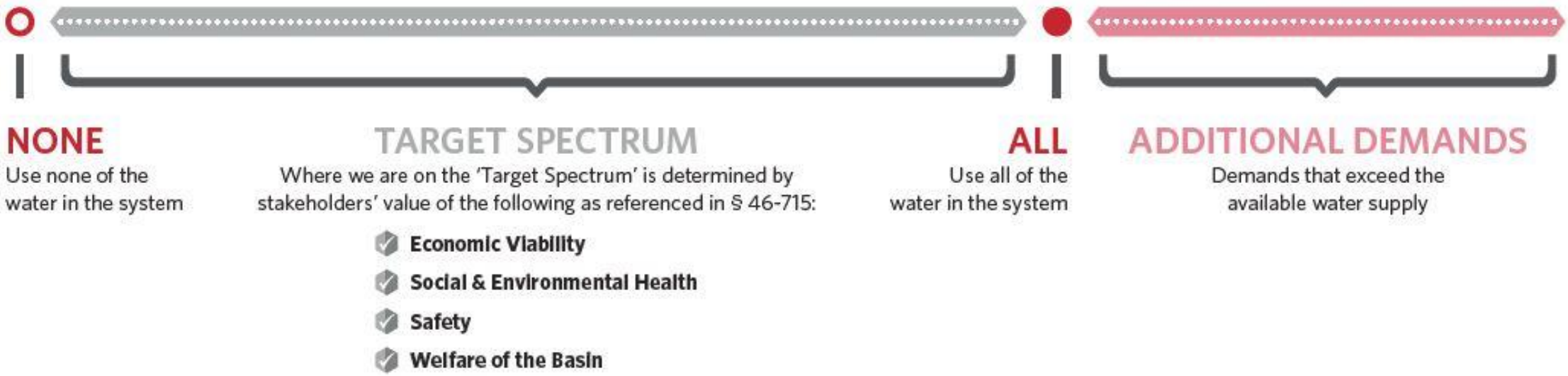
Next Meeting – March 21, 2018

Holiday Inn Express | North Platte, NE

FA/OA Determination



Water Use & Supply Balance



Water Use & Supply Balance

Water Use & Supply Balance

NONE
Use none of the water in the system

TARGET SPECTRUM
Where we are on the 'Target Spectrum' is determined by stakeholders' value of the following as referenced in § 46-715:

- **Economic Viability**
- **Social & Environmental Health**
- **Safety**
- **Welfare of the Basin**

ALL
Use all of the water in the system

Costs Continuing to 2nd Increment

Cost of maintaining the status quo:

- O&M costs to for projects built in the 1st increment
- Administration
- Study continuation
- Leases

Benefits of 1st Increment Activities