PRRIP Water Portfolio Review

Water Advisory Committee
October 2, 2018

PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

Overview

- Review Program water projects
  - Three initial state projects
  - Water Action Plan projects
- Reference for committee members
  - March 2018 GC Water Workshop
  - Water Project Fact Sheets
- Project accounting
- Future plans
- Project scoring

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First Increment Water Objective

- Reduce deficits to target flows by 130-150 KAF
- 80 KAF from 3 initial state projects
- Milestone #4: 50-70 KAF from WAP
- First Increment Extension: get to 120 KAF, determine cost/value of next 10 KAF

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Score vs. Operations

- Score
  - OPSTUDY hydrology, 1947-1994
  - Annual hydrologic condition
- Operational Deficit Reductions
  - Actual hydrology, 2007-2017
  - Real-time hydrologic condition
- Both evaluated at Grand Island, but should not expect matching results

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Three Sources of Water

- New/Leased water
- Retimed water
- Conserved water

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Project	Score, Approved or Estimated [AF]	Period of Operation During First Increment	Project Type
Three Initial State Projects			
Pathfinder Modification EA (WY)	70,000	2012-2017	New Water/Lease
Lake McConaughy EA (NE)		2007-2017	New Water/Lease
Tamarack I (CO)	10,000	2007-2017	Retiming
SUBTOTAL =	**80,000**		
WAP Operational Projects WITH Approved Scores			
Pathfinder Municipal Account Lease	6,350	2012-2017	New Water/Lease
Phelps County Canal Groundwater Recharge	2,700	2011-2017	Retiming
Cook Recapture Well	160	2015-2017	Retiming
No-Cost NCCW	260	2007-2017	New Water/Lease
SUBTOTAL =	**9,470**		
WAP Operational Projects WITHOUT Approved Scores			
Elwood Reservoir Recharge	2,800	2015-2017	Retiming
CPNRD groundwater recharge	600	2013-2017	Retiming
CPNRD surface water transfer	12,000	2015-2017	New Water/Lease
NPPD Groundwater Recharge	1,800	2015-2017	Retiming
CNPPID Irrigator Lease	1,935	2016-2017	New Water/Lease
SUBTOTAL =	**19,135**		
TOTAL =	**108,600**		

Three State Projects

- Lake McConaughy EA (NE)
  - 200 KAF max capacity
  - SNI = 10% non-irrigation season inflows
- Pathfinder EA (WY)
  - Part of Pathfinder Modification Project
  - Capacity = 33,493 AF
  - Water moved to Lake Mac EA at end of irrigation season
- Tamarack I (CO)
  - Groundwater recharge in northeastern CO
  - Scored at CO-NE state line

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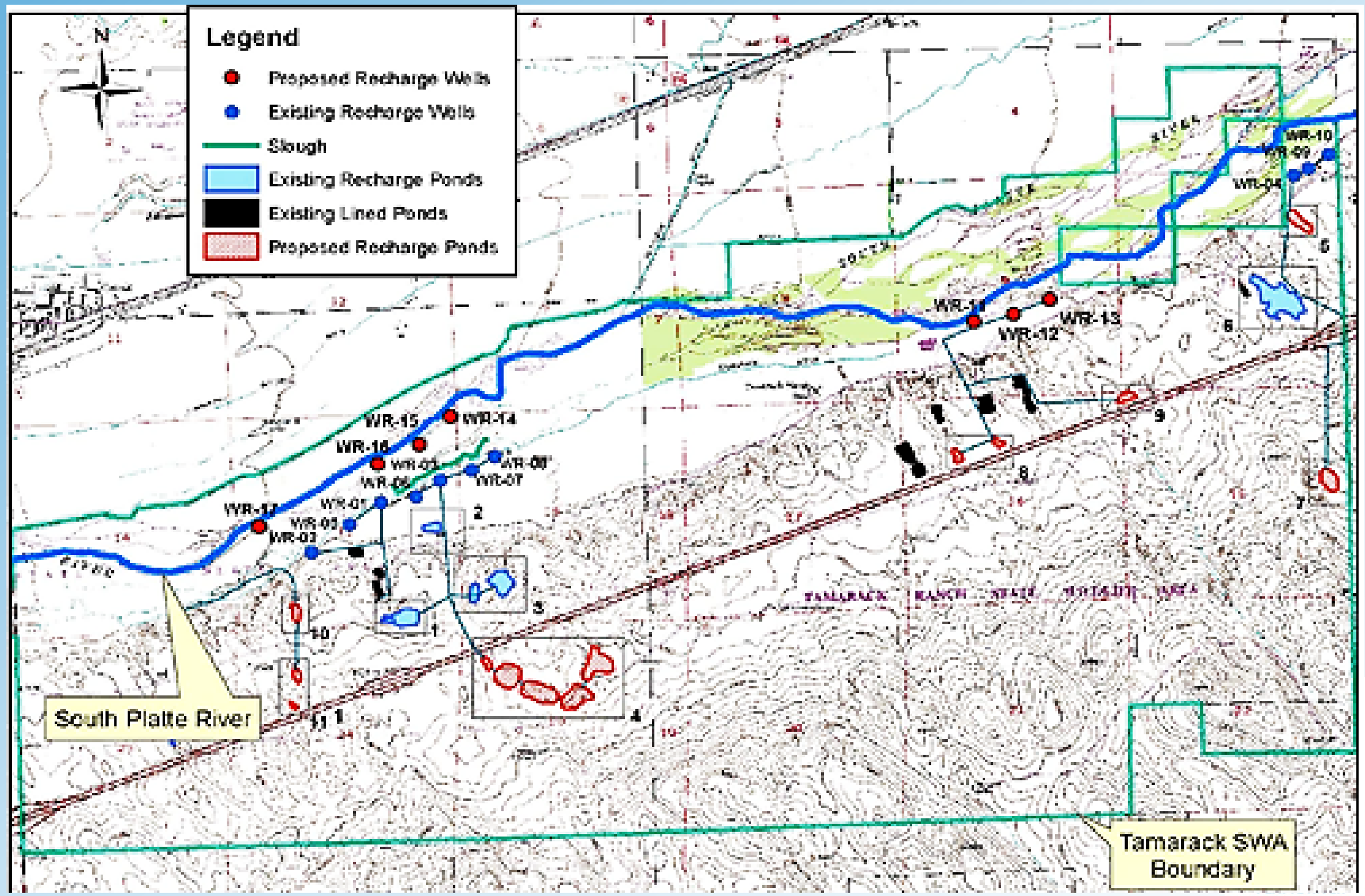
Tamarack Projects



Tamarack Projects

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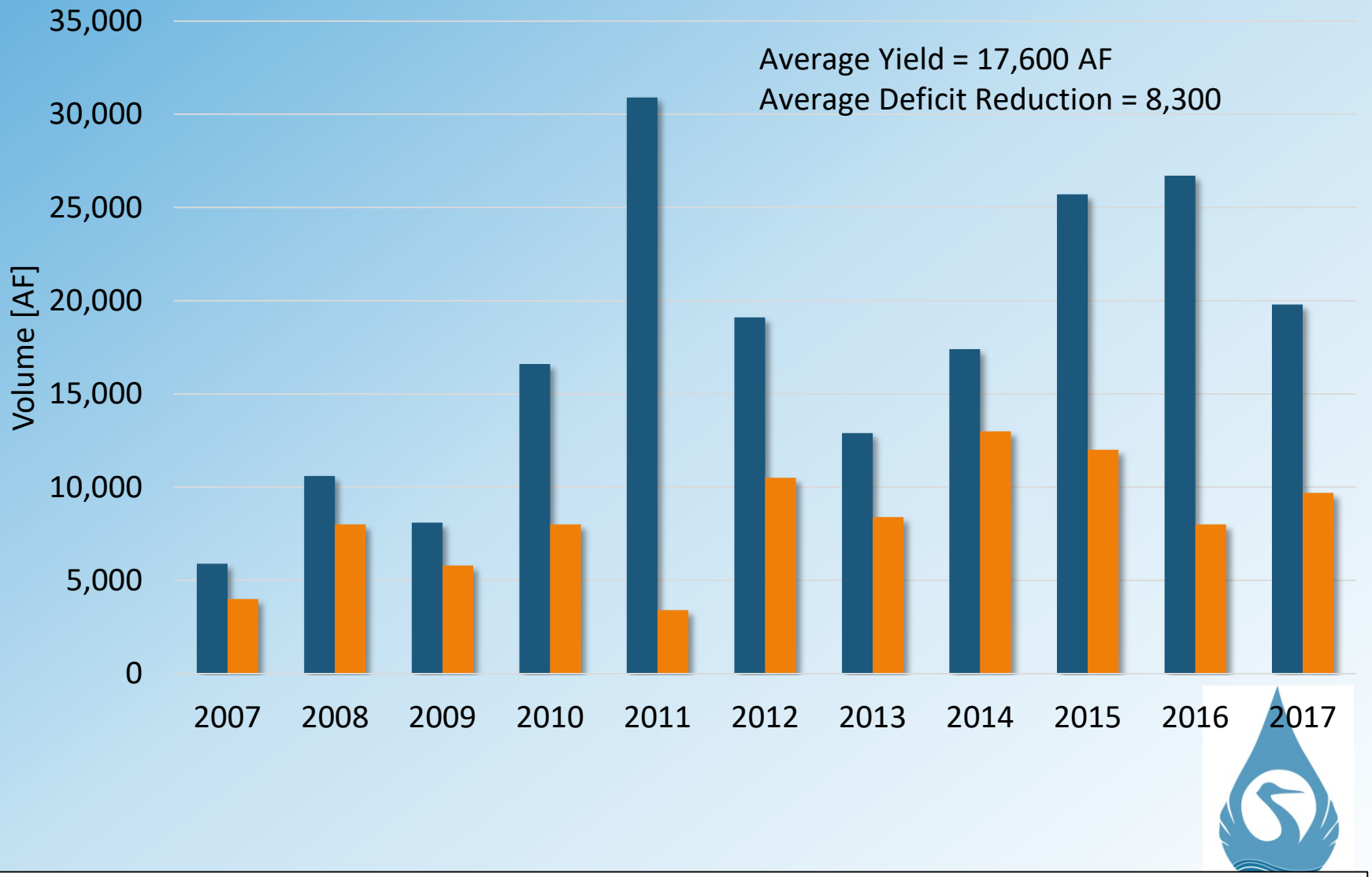
Tamarack 1 Yield and Deficit Reductions at CO-NE State Line, 2007-2017



Pathfinder and McConaughy

9% loss between Pathfinder & McConaughy

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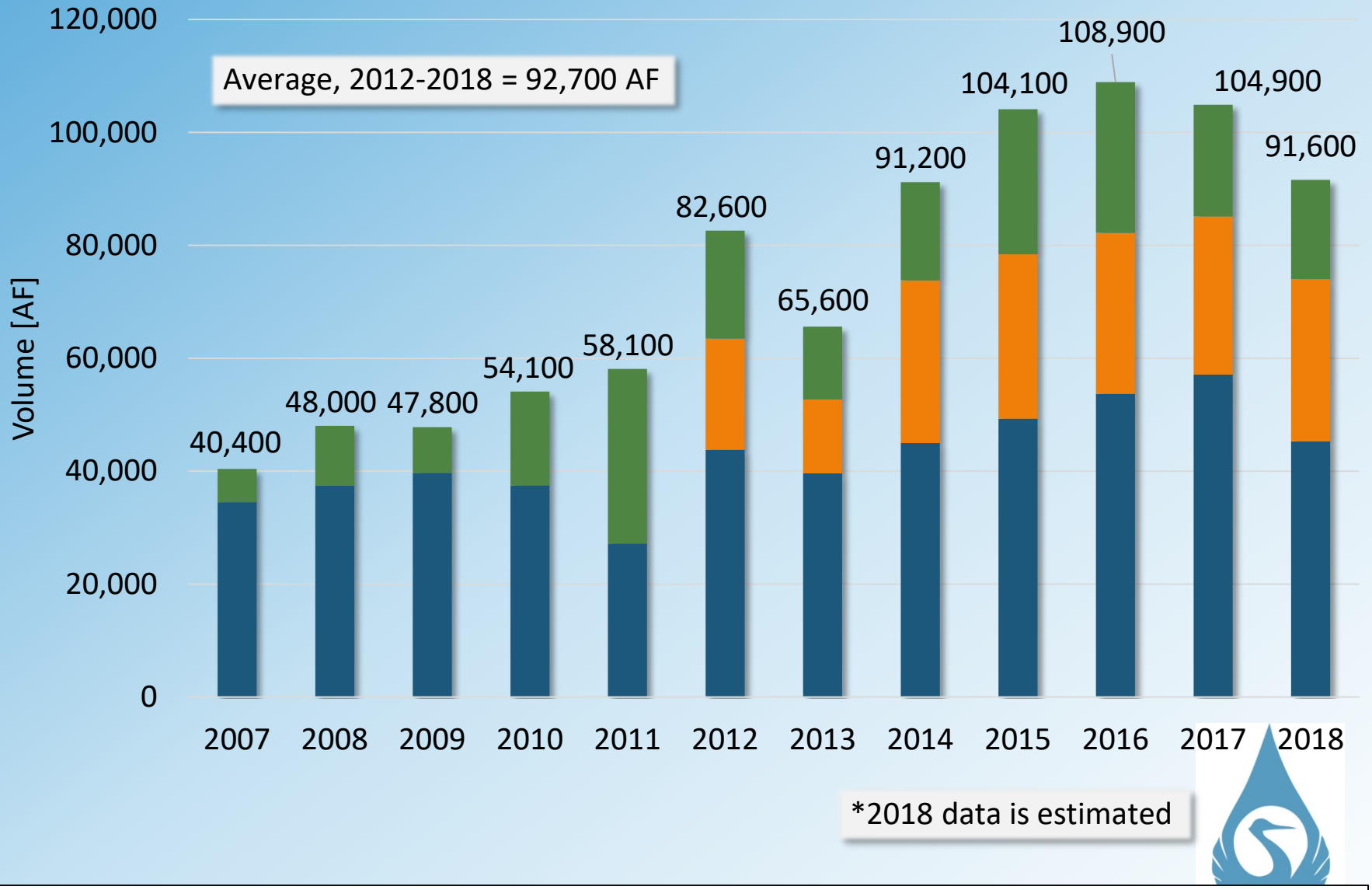
Water Accruals to Three State Projects, 2007-2018



All Environmental Account Water

- Lake McConaughy
  - Storable Natural Inflows (SNI)
- Pathfinder Modification Project
  - Pathfinder EA
  - Pathfinder Municipal Account Lease
- CNPPID irrigation system
  - No-Cost NCCW
  - CNPPID Irrigator Lease
- CPNRD Surface Water Transfer*

*Pilot Program in 2018

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Pathfinder Municipal Account Lease

- Wyoming Account aka Municipal Account = 20,000 AF
- Lease agreement between Program and WWDO in 2011
  - 38,400 AF x $51/AF = $1,958,400 prepaid
  - 4,800 AF base releases, 2012-2019
  - Additional water available in some years (up to 4,800 AF for 9,600 AF total)
  - Last water under original lease delivered in 2017
- Program purchasing water at $65/AF through end of First Increment

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Pathfinder Municipal Account Lease

Year	Releases Measured at Pathfinder Dam (AF)	Deliveries to Lake McConaughy (AF)	Transit Losses (%)
2012	4,800	4,400	8%
2013	4,800	4,400	8%
2014	9,600	8,500	11%
2015	9,600	9,200	4%
2016	4,800	4,100	15%
2017	9,600	8,900	7%
Total	43,200	39,500	N/A
Average	7,200	6,600	9%

2016: additional 4,800 AF available, but declined

2018: releases = 8,100 AF

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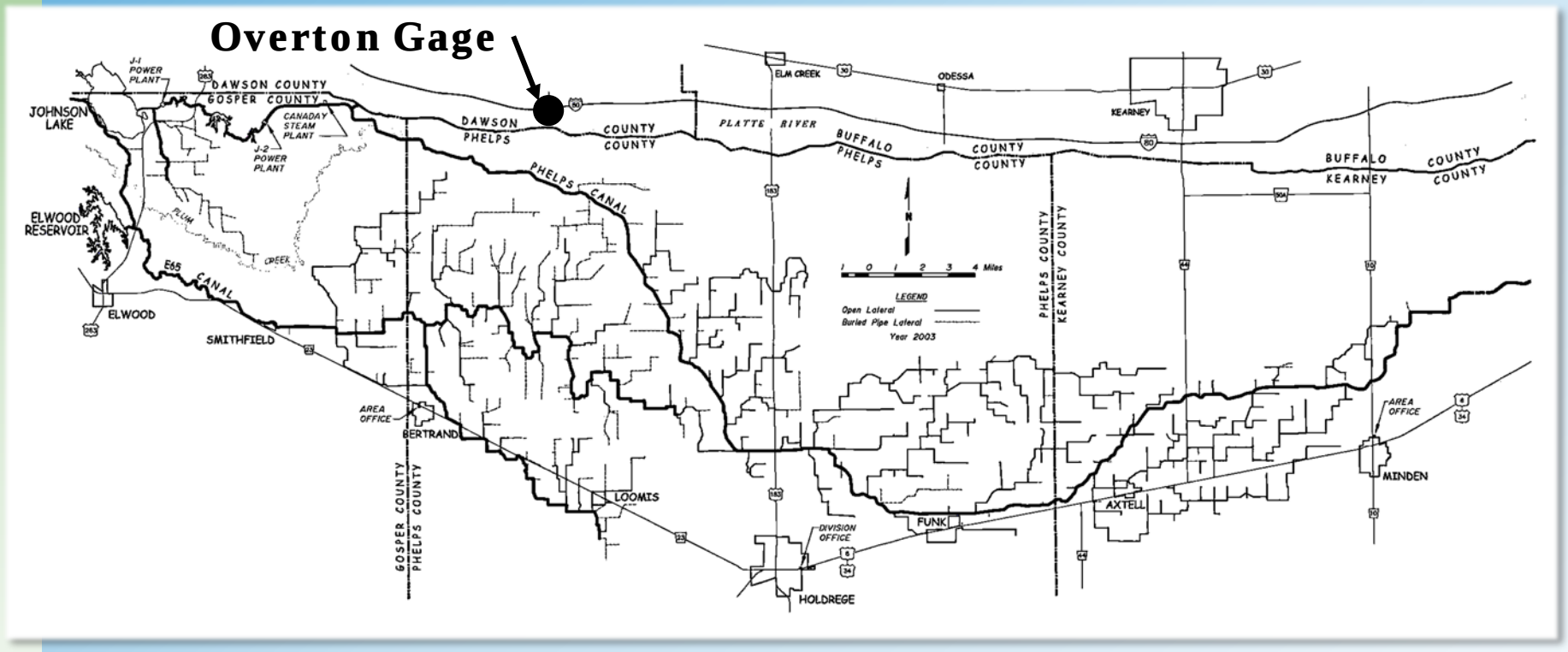
CNPPID Irrigation System



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No-Cost NCCW

- NCCW = Net Controllable Conserved Water
- CNPPID irrigation system improvements
  - 1992 agreement with NWF
  - Funding contributions from USBR
- 314 AF added to EA annually at no cost to Program
- Past discussions of purchasing additional NCCW, but never reached agreement

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CNPPID Irrigator Lease

- Program leases water from individual irrigators, CNPPID administers
  - Full allocation years only
  - Enroll in fall for next irrigation season
  - Originally capped at 2,000 acres
  - Parcels must go dryland (generally pivot corners, odd-shaped, difficult to irrigate)
  - 9” per acre added to Lake McConaughy EA
  - $220/acre ($293/AF)
- Pilot Program
  - 2016 = 1,037 acres (778 AF)
  - 2017 = 1,275 acres (956 AF)
  - 2018 = 2,055 acres (1,541 AF)

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CNPPID Irrigator Lease

- Program and CNPPID agreed to 5-year extension
  - Approved by GC in September 2018
  - Extends through 2023 irrigation season
  - Cap increased to 3,000 acres (max 2,250 AF)
  - $220/acre, but can revisit annually

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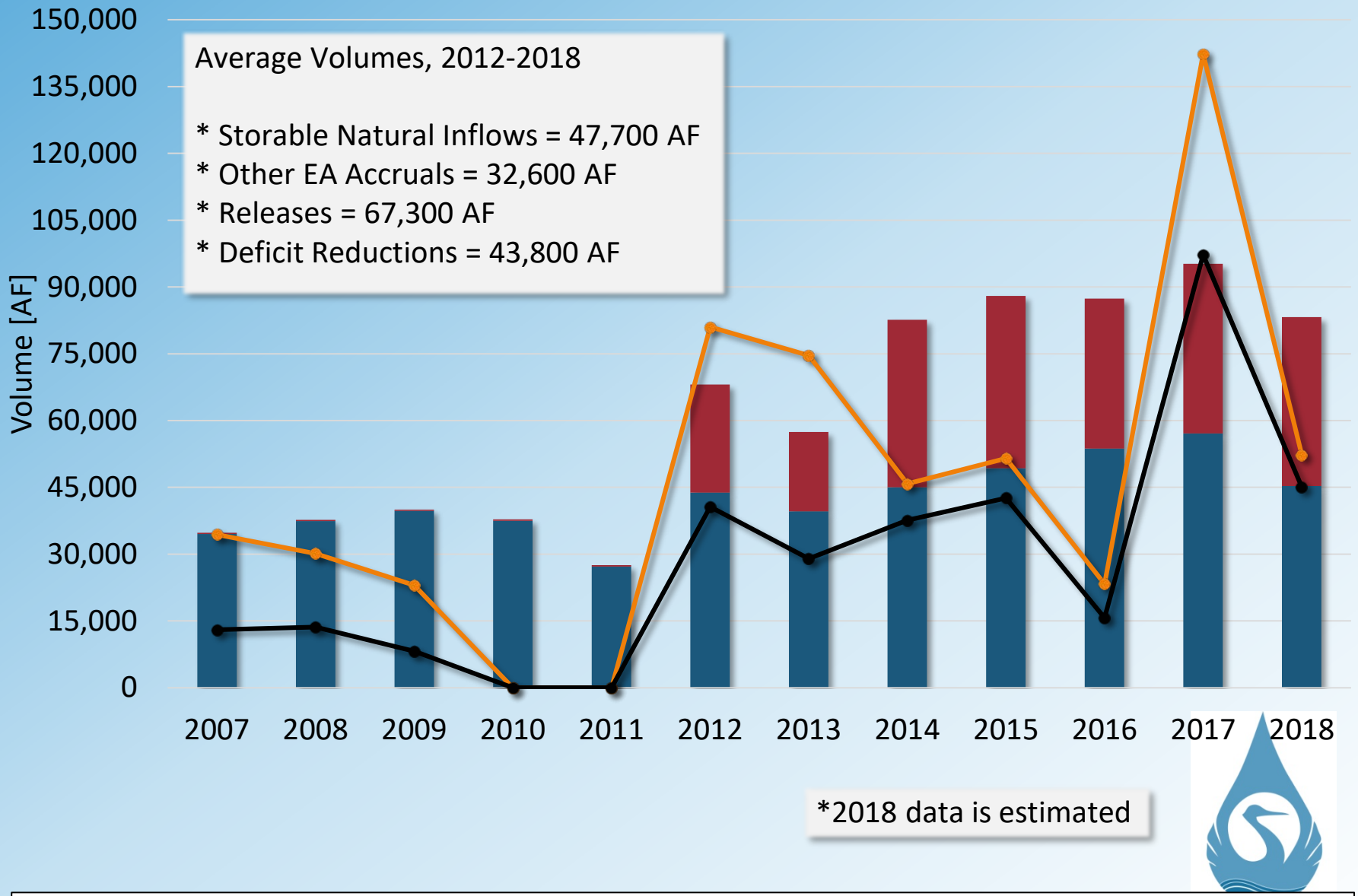
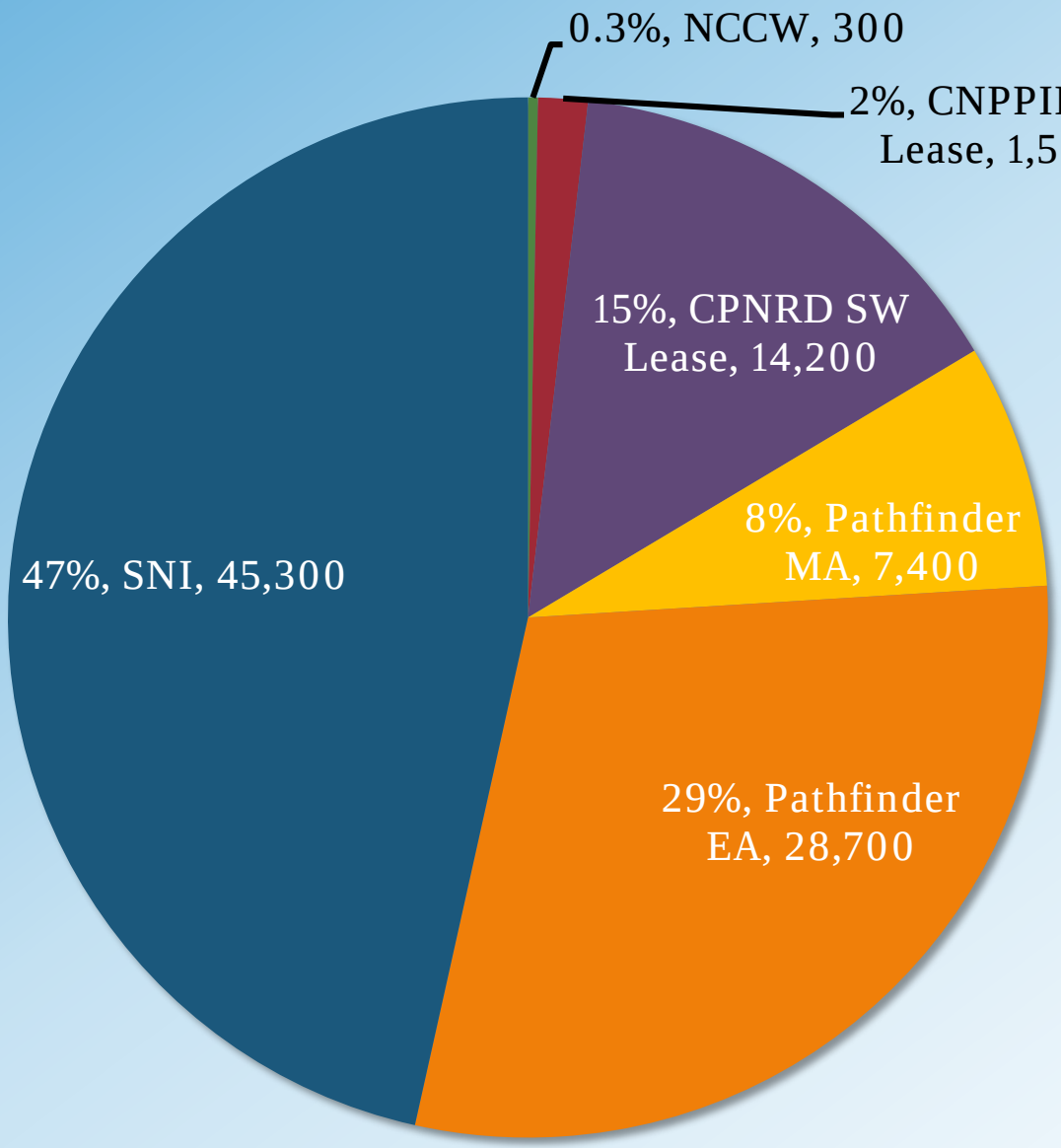
Lake McConaughy EA Performance, 2007-2018



2018 EA Accruals (estimated, in AF)



Total Accruals: 97,400AF

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Other Leasing/Recharge Projects

- Leases
  - CPNRD surface water transfer
- Recharge Projects
  - Phelps County Canal
  - Elwood Reservoir
  - CPNRD canals
  - NPPD canals
- Most operating under temporary permits from NDNR
- Program has WSAs with CNPPID, CPNRD, NPPD through 12/31/2019
- Costs increase 3% annually

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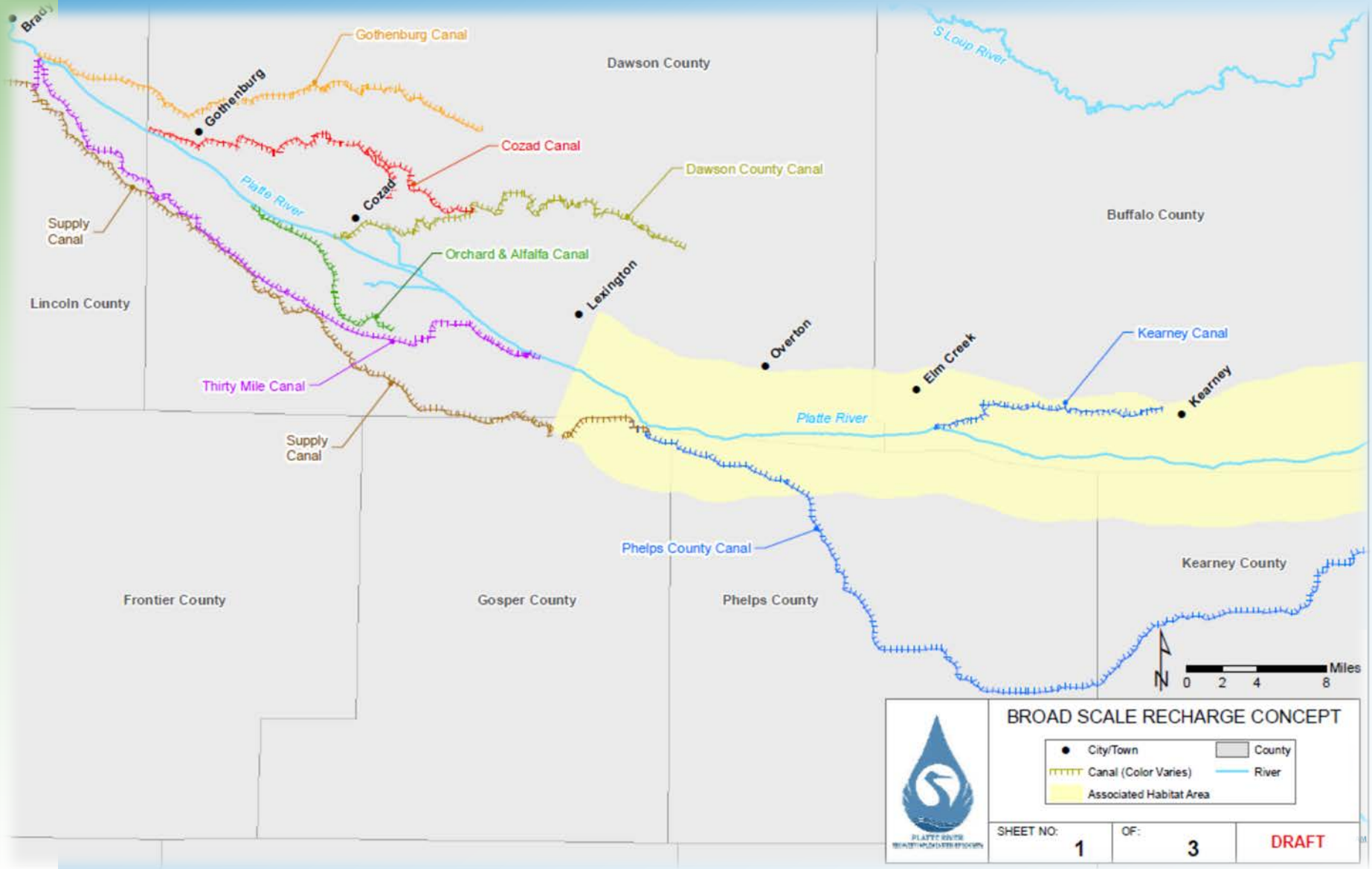
Other Leasing/Recharge Projects



CPNRD Surface Water Transfer

- Thirty Mile, Cozad, Orchard-Alfalfa Canals
  - Surface water relinquished, irrigators switched to groundwater
  - Transfer consumptive use, adjusted for pumping depletions
- 2015-2017: water returned at canal headgates
  - Average = 15,100 AF
  - Comparatively little “counted” (wetter years, fewer deficits)
- 2018: Pilot program to transfer water to EA
  - Capped at 14,200 AF

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CPNRD Surface Water Transfer

Above: Cozad Canal

Left: Orchard-Alfalfa Canal

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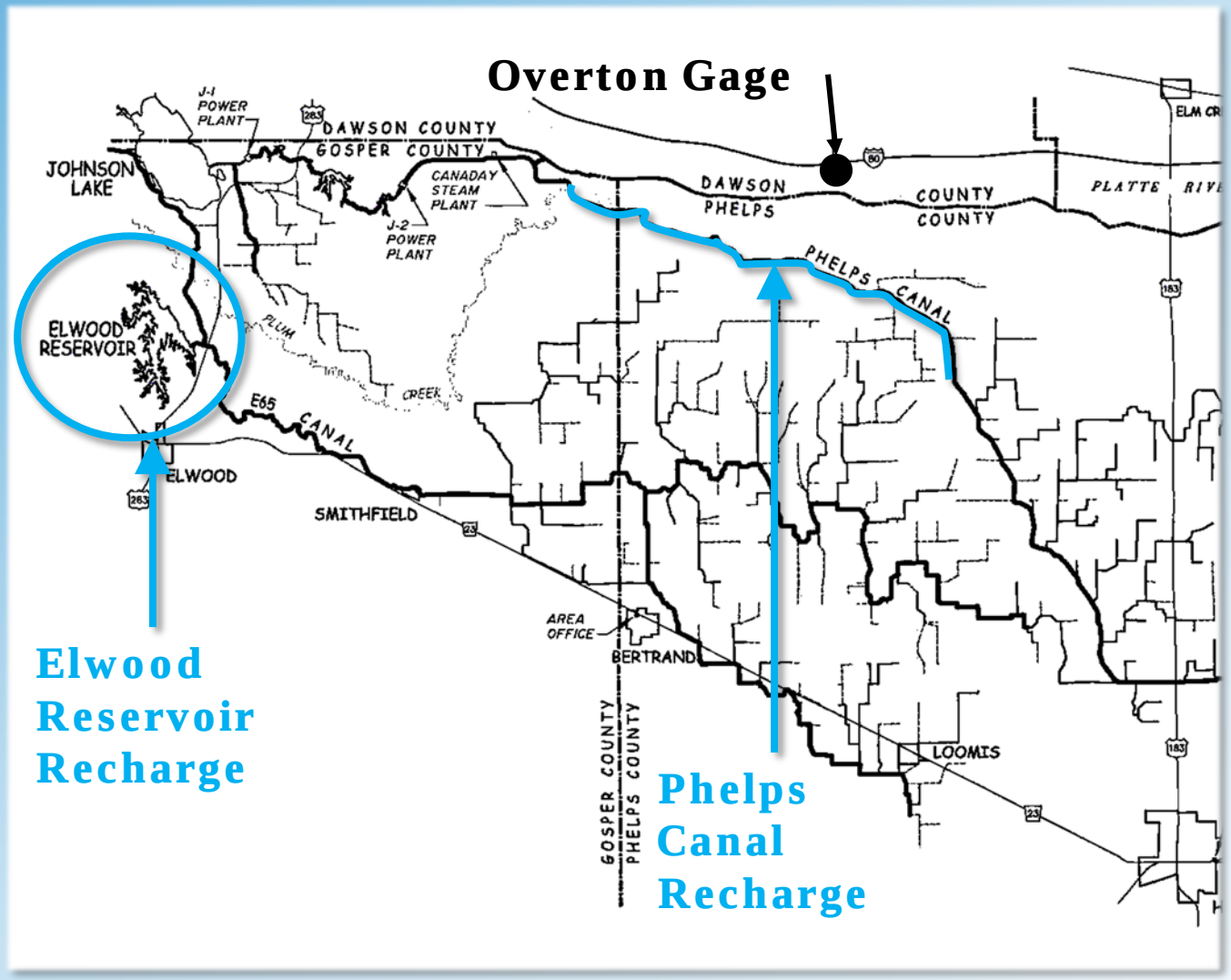
Phelps Canal and Elwood Recharge



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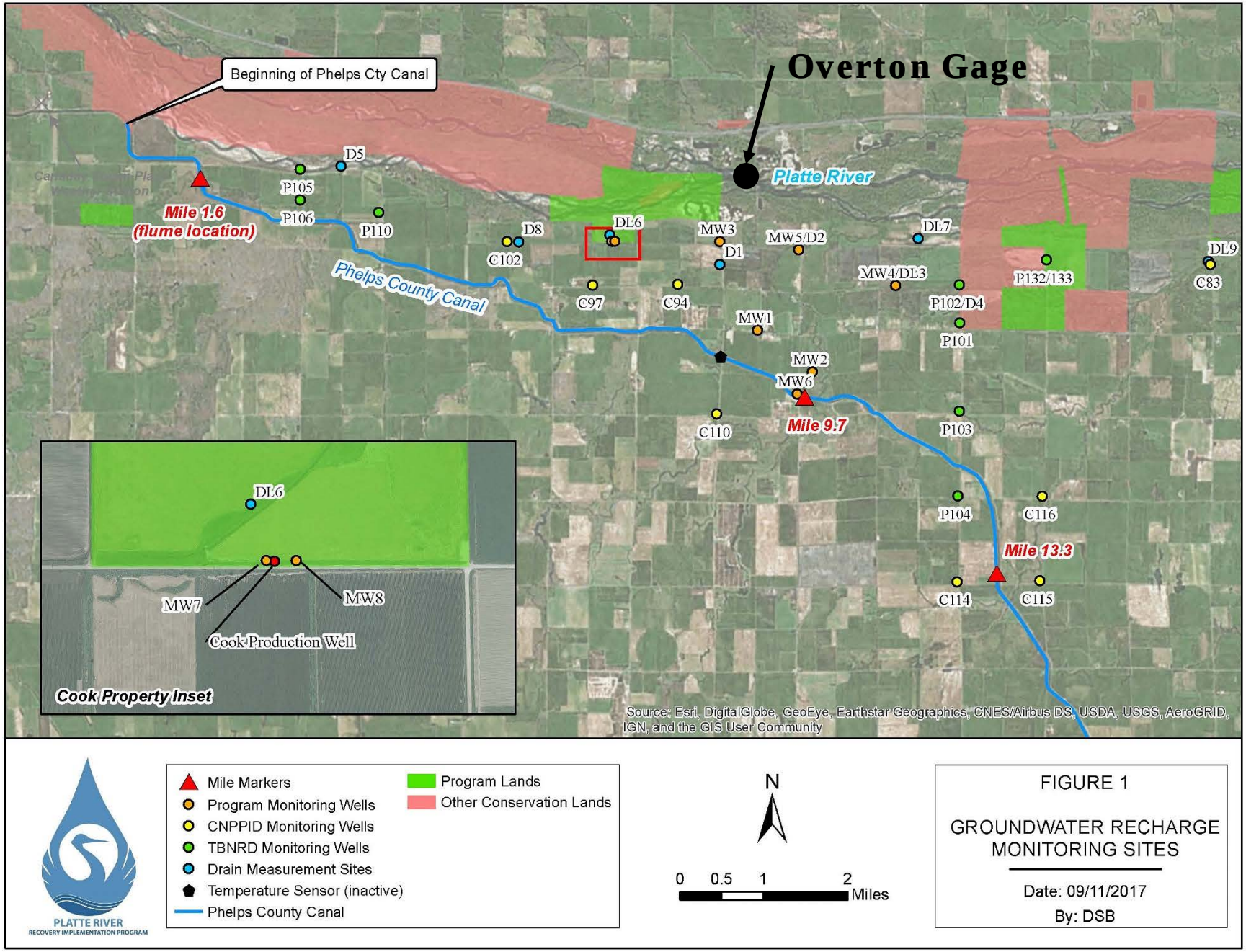
Beginning of Phelps Cty Canal
Overton Gage
Platte River
Mile 1.6
(flume location)
Phelps County Canal
D5
P105
P106
P110
D8
C102
DL6
MW3
D1
MW5/D2
DL7
DL9
C83
MW4/DL3
P132/133
C97
C94
P102/D4
MW1
P101
MW2
MW6
Mile 9.7
C110
P103
P104
C116
Mile 13.3
C114
C115
DL6
MW7
MW8
Cook Production Well
Cook Property Inset
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Mile Markers
Program Monitoring Wells
CNPPID Monitoring Wells
TBNRD Monitoring Wells
Drain Measurement Sites
Temperature Sensor (inactive)
Phelps County Canal
Program Lands
Other Conservation Lands
N
0 0.5 1 2
Miles
FIGURE 1
GROUNDWATER RECHARGE MONITORING SITES
Date: 09/11/2017
By: DSB

Phelps County Canal Recharge

	Recharged water (AF)	Cook Pumping (AF)	Lagged accretions (AF)	Yield at GI (AF)	Reductions to deficits (AF)	% Reduction
2011	3,045	0	676	589	0	0%
2012	1,909	0	1,794	1,369	917	67%
2013	4,982	0	3,425	2,608	1,829	70%
2014	1,332	0	2,104	1,759	1,258	72%
2015	4,098	0	2,615	2,340	940	40%
2016	5,933	120	4,206	3,754	1,206	32%
2017	4,115	198	4,312	3,549	1,808	51%
2018 (to date)	1,496	41	2,662	2,423	1,663	69%
Total:	26,910	359	21,795	18,391	9,623	
Average:	3,409	51	3,017	2,543	1,375	57%

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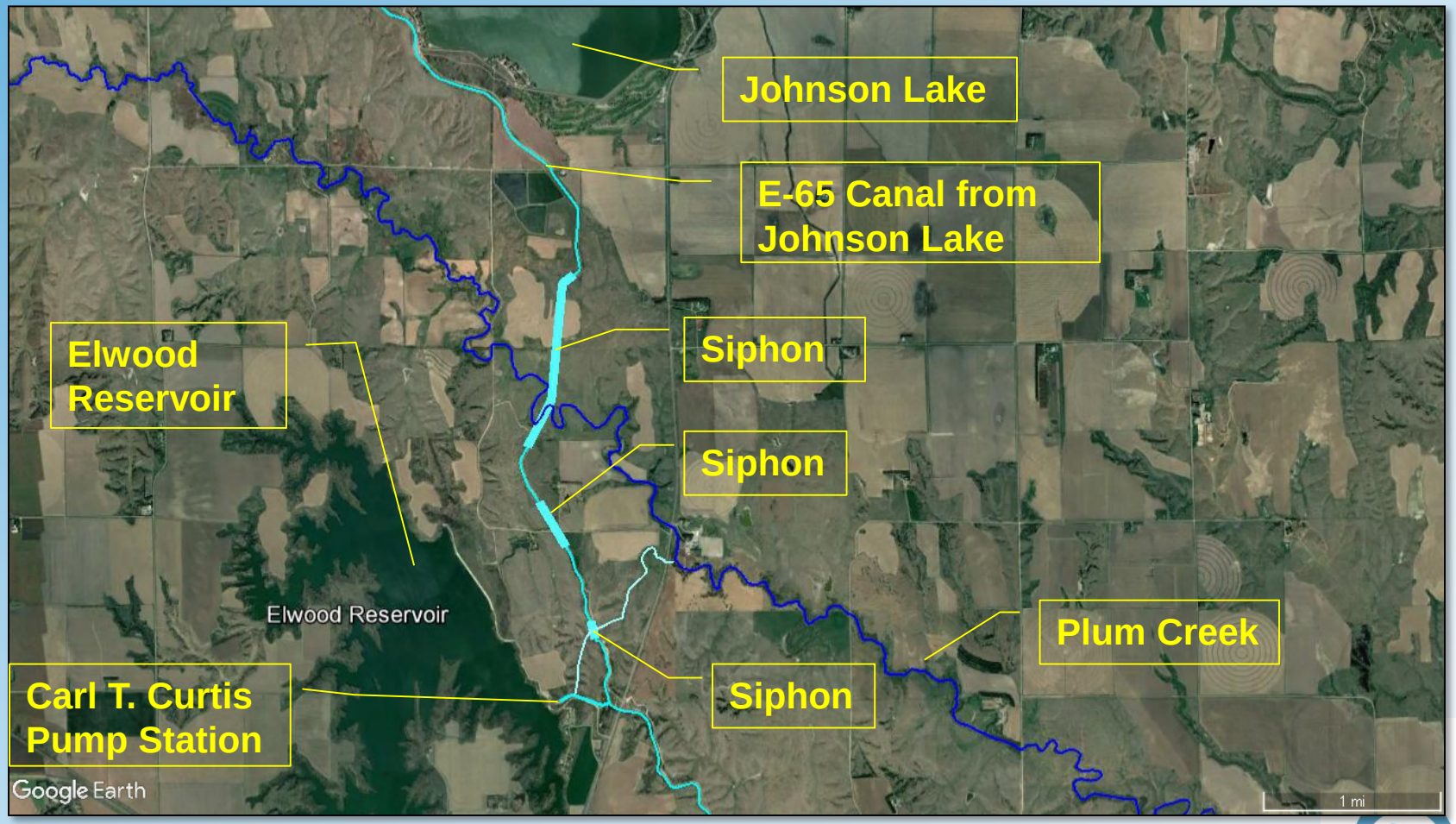
Elwood Reservoir Recharge



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Elwood Reservoir Recharge

	Recharged water (AF)	Lagged accretions (AF)	Yield at GI (AF)	Reductions to deficits (AF)	% Reduction
2015	3,733	15	13	1	4%
2016	5,779	756	658	217	33%
2017	7,016	1,458	1,150	610	53%
2018 (to date)	6,421	1,245	1,115	749	71%
Total:	22,948	3,473	2,936	1,621	
Average:	5,737	868	734	405	55%

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CPNRD Canal Recharge

- Thirty Mile, Cozad, Orchard-Alfalfa Canals
  - Divert excess flows during non-irrigation season
  - Started 2011, consistent since 2015
  - Permanent recharge permits granted by NDNR in 2015
  - Program pays for calculated net accretions at the river (based on old COHYST)
- Average diversions, 2015-2017 = 13,200 AF
- Average recharge, 2015-2017 = 7,700 AF

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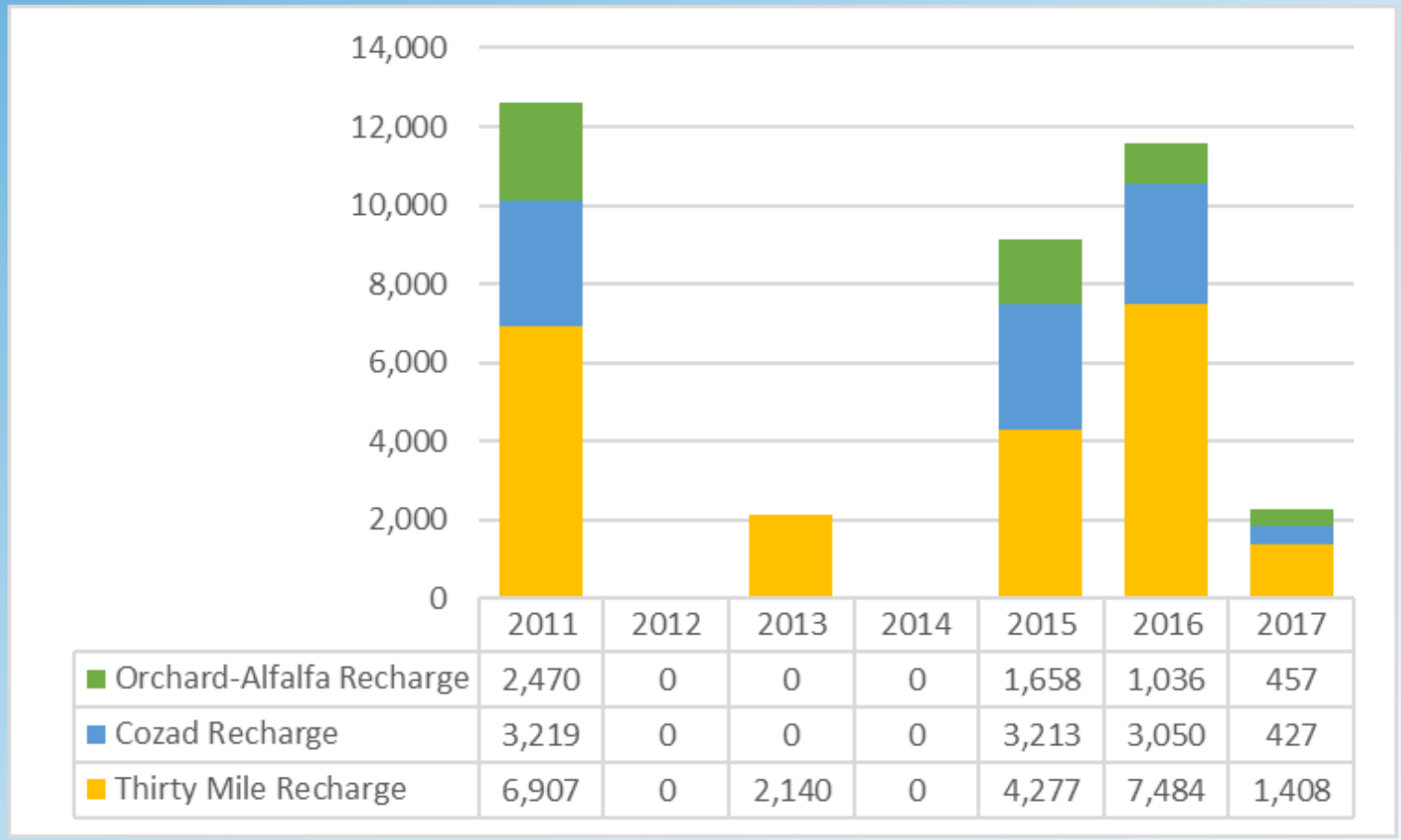
CPNRD Canal Recharge



	2011	2012	2013	2014	2015	2016	2017
Orchard-Alfalfa Recharge	2,470	0	0	0	1,658	1,036	457
Cozad Recharge	3,219	0	0	0	3,213	3,050	427
Thirty Mile Recharge	6,907	0	2,140	0	4,277	7,484	1,408

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NPPD Canal Recharge

- Gothenburg and Dawson County Canals
  - Divert excess flows during non-irrigation season
  - Started 2015
  - Program initially paid for headgate diversions (2015-2016), then net recharge (2017)
  - Will need to use COHYST to develop scoring model

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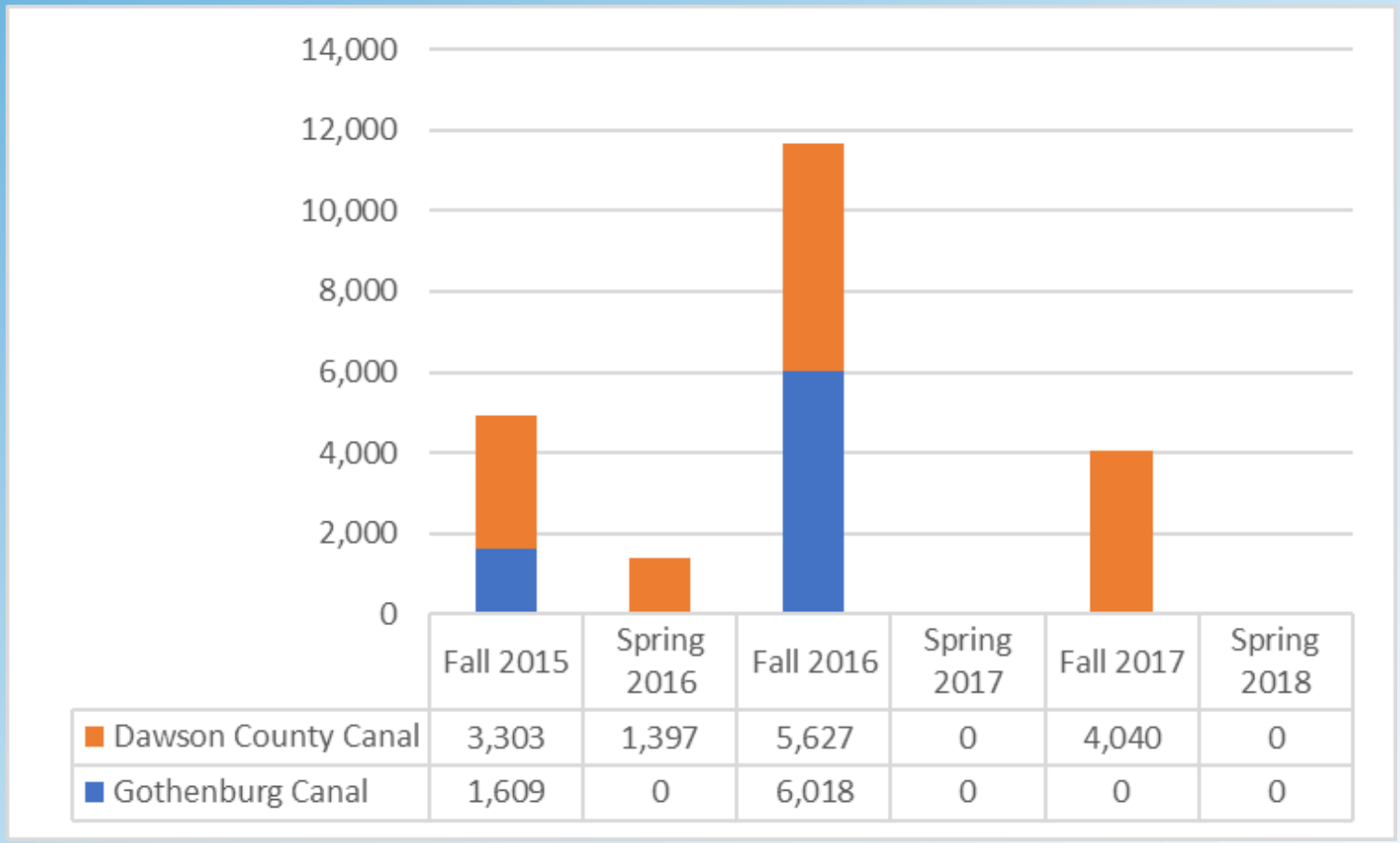
NPPD Canal Diversions for Recharge



	Fall 2015	Spring 2016	Fall 2016	Spring 2017	Fall 2017	Spring 2018
Dawson County Canal	3,303	1,397	5,627	0	4,040	0
Gothenburg Canal	1,609	0	6,018	0	0	0

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Future WAP Projects

- Retiming Projects
  - Broad-Scale Recharge
  - Slurry Wall Gravel Pits
- Recapture Projects
  - Cottonwood Ranch
  - Phelps & Elwood
- Leases
  - North Platte canals
  - NPPD surface water

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WAP Future Projects	Score Estimate [AF]	Cumulative Score [AF]	Anticipated Start of Operations	Project Type
Active projects with approved scores	89,500	89,500	2007-present	
Active projects without approved scores	19,135	108,635	2013-present	
Cottonwood Ranch Broad-Scale Recharge	4,000	112,635	2019	Retiming
Lakeside Slurry Wall Gravel Pit	2,800	115,435	Late 2019	Retiming
Cottonwood Ranch Recapture	4,000	119,435	2020	Retiming
Elwood & Phelps Recapture	6,000	125,435	2020	Retiming
NPPD surface water lease	600	126,035	???	New Water/Lease
CNPPID NCCW Lease	2,800	128,835	???	New Water/Lease
North Platte Irrigator Lease(s)	2,500	131,335	???	New Water/Lease
SUBTOTAL, Future Projects	**22,700**			
TOTAL, All Active and Future Projects	**131,300**			

Broad-Scale Recharge

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Broad-Scale Recharge

Physical Characteristics

- Recharge (Storage) Area:
  - 416 acres
- Recharge Area (≤ 12 in.):
  - 224 acres
- Recharge Area (> 12 in.):
  - 192 acres
- Recharge (Storage) Volume:
  - 459 acre-feet

Others

- Estimated Yield (Score):
  - 4,000 AFY
  - Assuming no recapture component… about 40% efficiency
- Cost:
  - $4,275,972
  - Myers Construction

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Broad-Scale Recharge

- Timeline:
  - October 2018: Begin Construction
  - December 2018: Complete Pipeline
  - May 2019: Complete Construction
  - Summer 2019: Begin Recharge
  - Late 2019/2020: Begin Recapture

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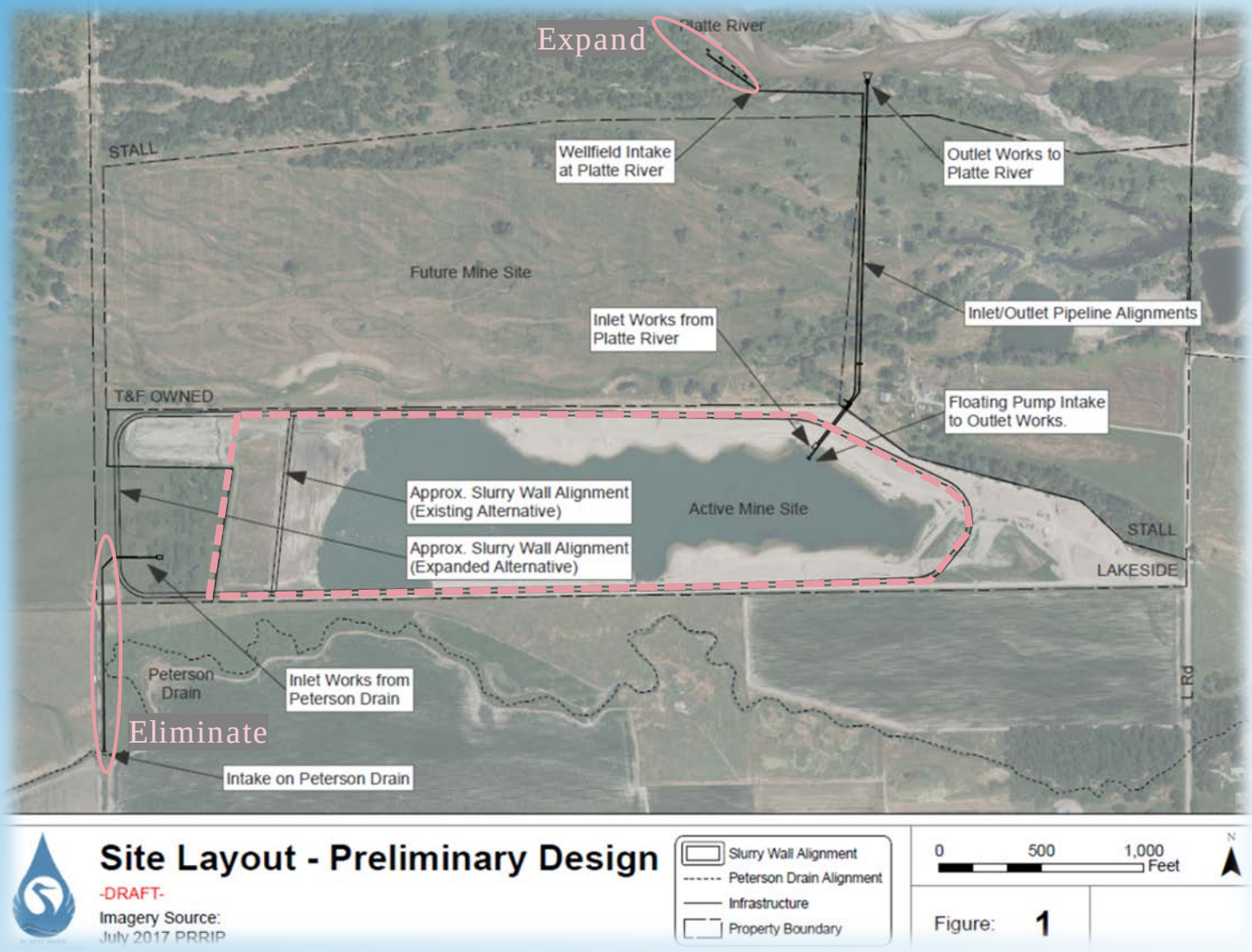
Lakeside Slurry Wall



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Lakeside Slurry Wall

- Estimated Yield (Score): 2,500 – 3,000
- Estimated OPPC: $8.6 million

- Timeline:
  - December 2018: Final Design (90-95%)
  - Early/Mid 2019: Permitting
  - Late 2019: Construction
  - Late 2020/2021: Begin Storage

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Recapture Projects

- Recapture Well Network
  - Water recharged through Phelps/Elwood
  - Wells south of river, within TBNRD
  - Estimated score up to 6,000 AF
- Cottonwood Ranch
  - Wells north and east of property
  - Estimated score up to 3,000 AF
- Planning/Design/Permitting in 2019
- Start construction in 2020

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Potential Lease Projects

- NPPD surface water
- North Platte Canals
  - Glendo contractors
  - Non-federal irrigation districts

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Project Scoring

- Elwood Recharge
- CNPPID Irrigator Lease
- Cottonwood Ranch Broad-Scale Recharge
- NPPD Canal Recharge
- CPNRD Canal Recharge

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Questions???

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