

Colorado's Tamarack Plan of Managed Groundwater Recharge

Colorado's Water Contribution to 3-States ESA PRRIP

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Jon Altenhofen, PE
South Platte Projects Manager
(Projects: ARA, PRRIP, ADI)



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Platte River Recovery Implementation Program (PRRIP) Update

PRRIP Background



- Program began July 1, 2007
- Incremental agreement between CO, WY, NE, DOI, Env. NGOs and Water Users
- First increment lasts for 13 years
- Provides compliance with Sec. 7 of the ESA
- Recovery of 4 threatened and endangered species

PRRIP – Benefits for Us



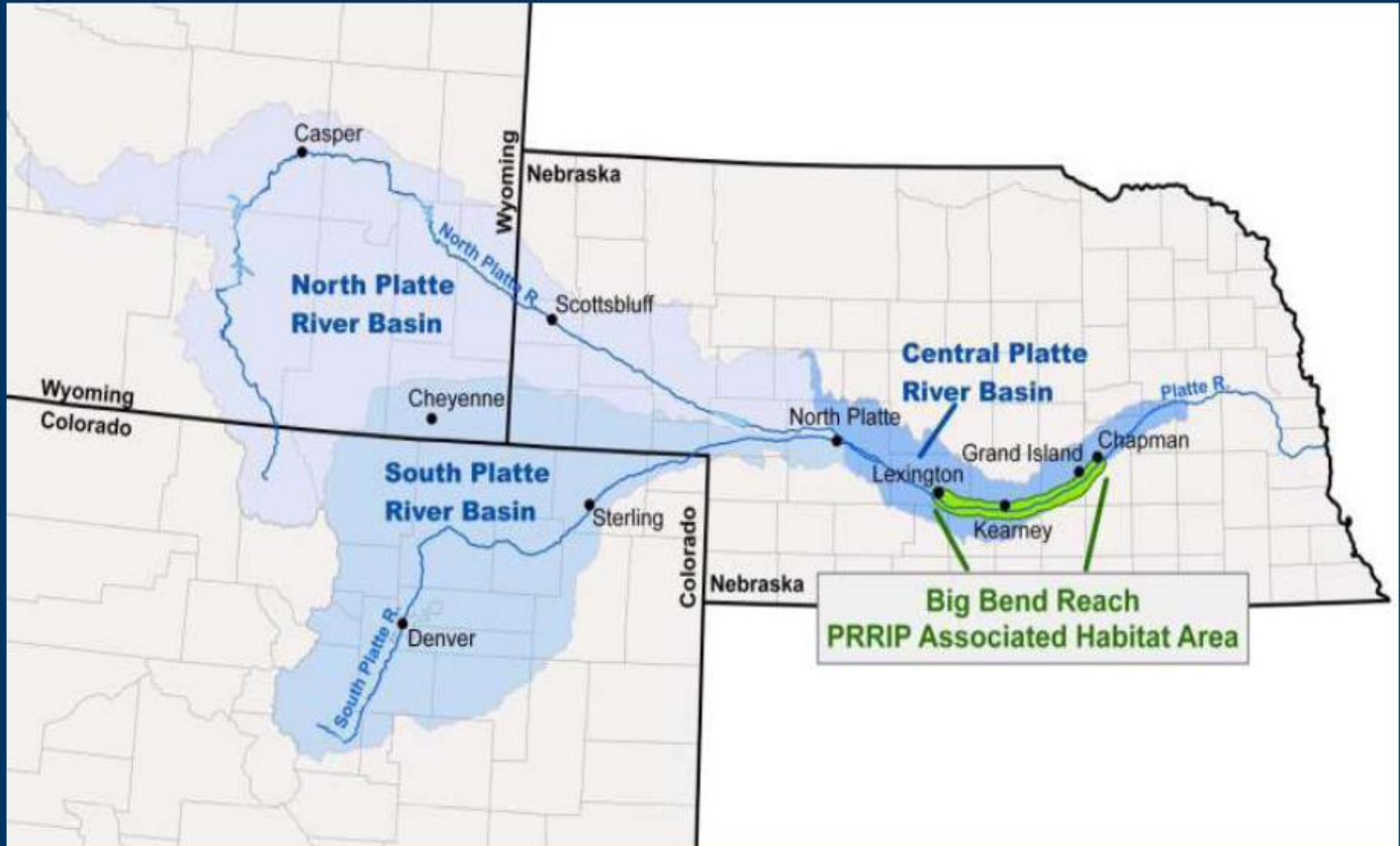
- Streamlined Section 7 consultation process
- FWS has provided 96 (71% in CO) consultations since 2007
- No litigation
- Allows continued water use and development

PRRIP Background



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PRRIP Background



PRRIP – Financial Resources

	Obligation*	Funds to Date**
Federal Agencies	\$157 Million	\$24.8 Million
Colorado	\$24 Million	\$25.5 Million
Wyoming	\$6 Million	\$6 Million

*financial obligation is in 2005 (or 2008, depending on the context) dollars

**payments must be adjusted for inflation

PRRIP – Land

- To date, the Program:
 - Obtained 8,600 of the 10,000 acres required
 - Sub-leases up to 1880 acres for agricultural use
 - Conducts land management activities (predator fencing, tree removal, demolition, seeding)



PRRIP – Adaptive Management

Recent Implementation Projects :

- hydraulic/sediment transport modeling
- off-channel sand and water (“OCSW”) habitat construction
- habitat rehabilitation
- sediment augmentation pilot project
- pulse flow events
- natural high flows
- flow consolidation





PRRIP – Adaptive Management

tern & plover off-channel sand & water habitat

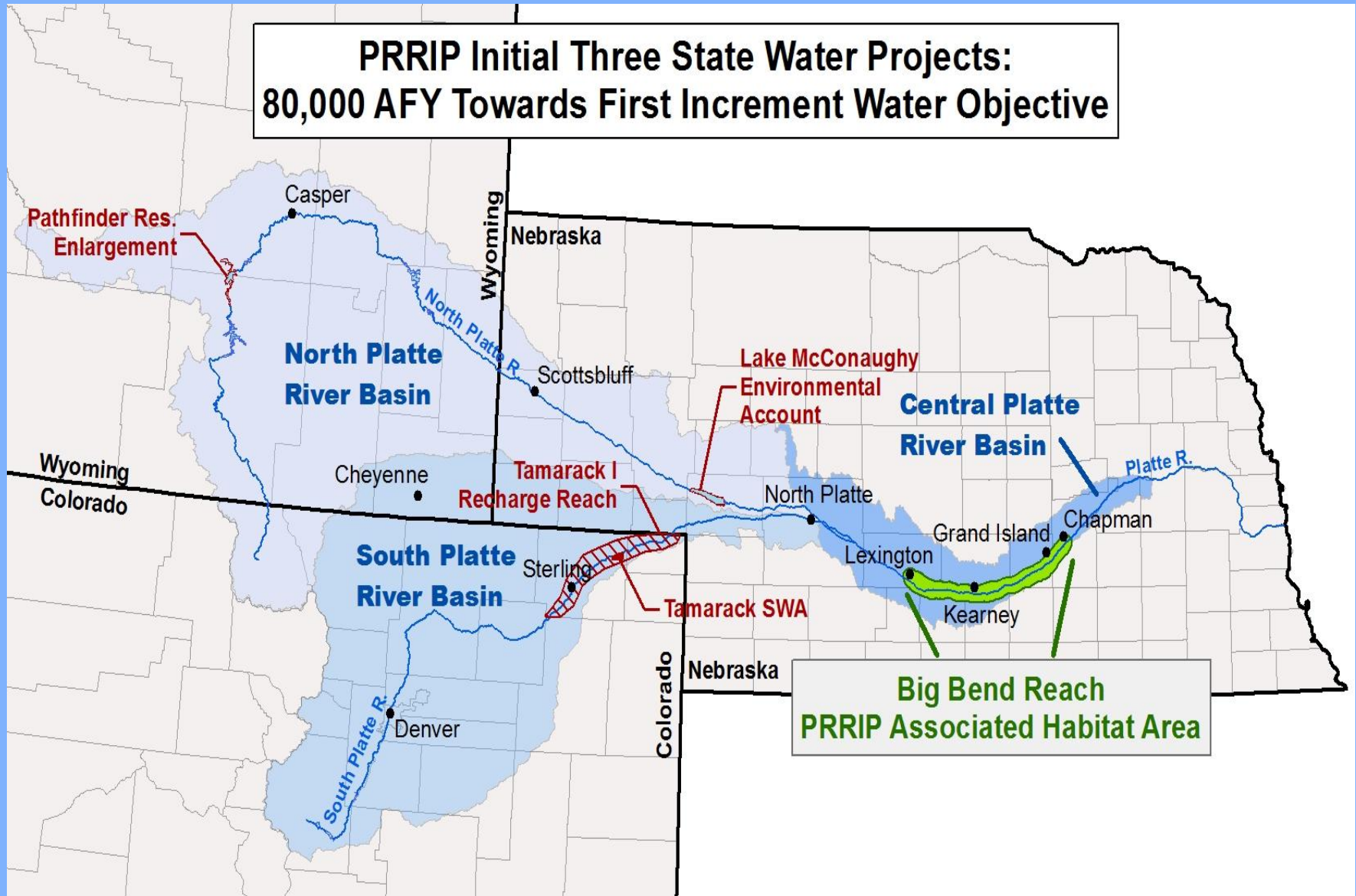


PRRIP Water

Water Obligations

	Existing Activities	Future Activities
Program	50 K - 70 K acre-ft	
Colorado	80 K (CO - 10K) acre-ft 	Post -97 depletions
Wyoming		Post -97 depletions
Nebraska		Post -97 depletions
Federal Agencies		Post -97 depletions

PRRIP Initial Three State Water Projects: 80,000 AFY Towards First Increment Water Objective



PRRIP-Water; States Water Contributions

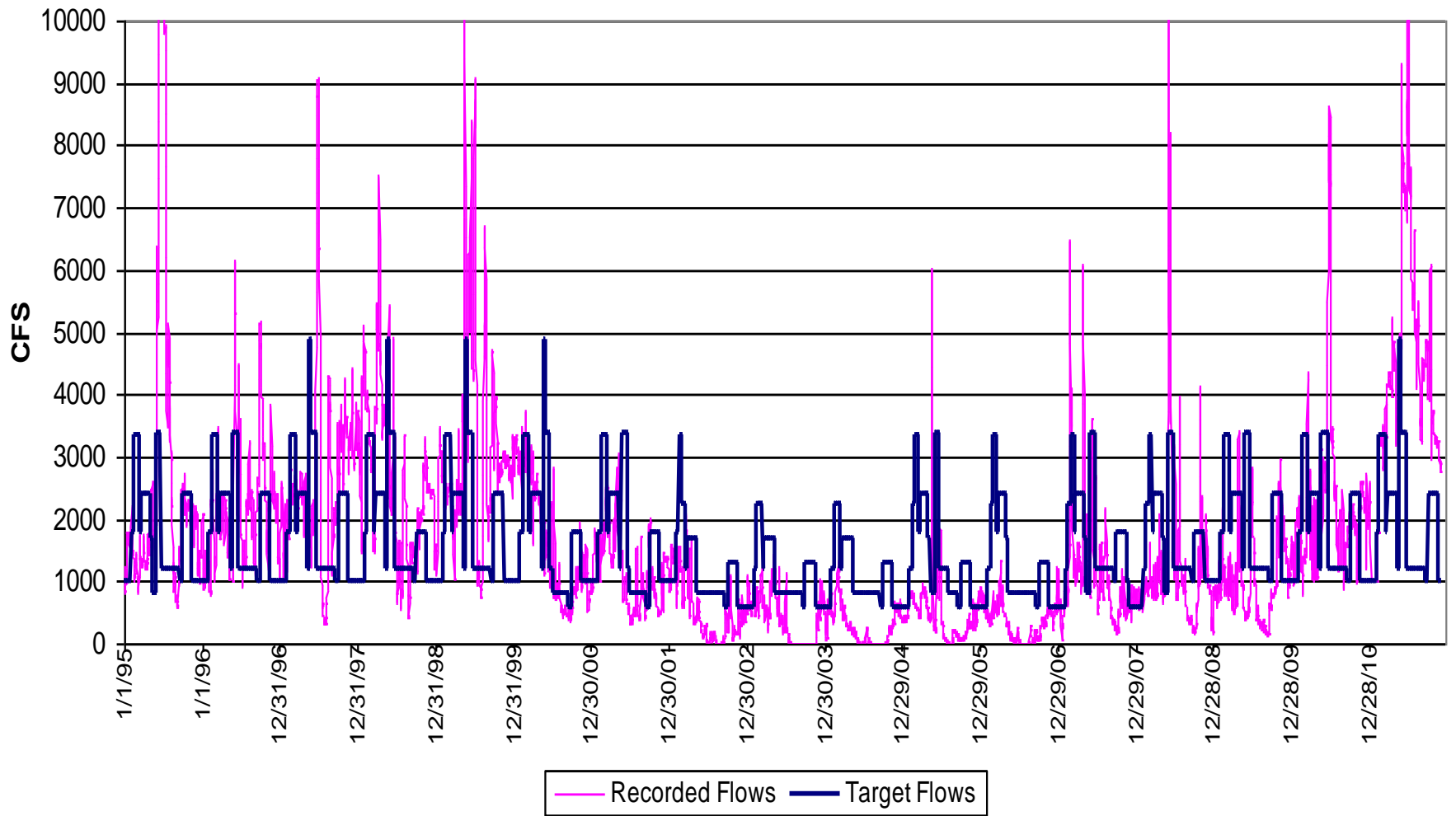
**(Nebraska, CNPPID-EA Acct. Lake McConaughy-50kaf yield
Wyoming Pathfinder Res. Enlargement-20kaf yield)**



USFWS Targets at Grand Island, NE USGS gage (cfs)					
<u>Julian Day Beg</u>	<u>Julian Day End</u>	<u>Wet</u>	<u>Normal</u>	<u>Dry</u>	<u>Dates</u>
1	31	1000	1000	600	Jan 1-31
32	45	1800	1800	1200	Feb 1-14
46	74	3350	3350	2250	Feb 15-Mar 15
75	81	1800	1800	1200	Mar 16-22
82	130	2400	2400	1700	Mar 23-May 10
131	139	1200	1200	800	May 11-19
140	146	4900	3400	800	May 20-26
147	171	3400	3400	800	May 27-Jun 20
172	258	1200	1200	800	Jun 21-Sept 15
259	273	1000	1000	600	Sep 16-Sep 30
274	319	2400	1800	1300	Oct 1-Nov 15
320	365	1000	1000	600	Nov 16-Dec 31

For 1947-1994 Hydrology; Annual Avg----417 kaf of shortages to targets and 477 kaf of excess to targets; Program negotiated water requirement for 130-150 kaf of shortage reduction annually

Grand Is Gage -- Daily Flows vs. Targets



PRRIP Water

- Entered agreement to obtain 4,800 ac-ft from Pathfinder Dam in WY
- Moving forward with J-2 Return Reregulating reservoir
 - Nebraska Water Management Incentives and Leasing (Net positive river effects)
- Conducting ground water recharge pilot study





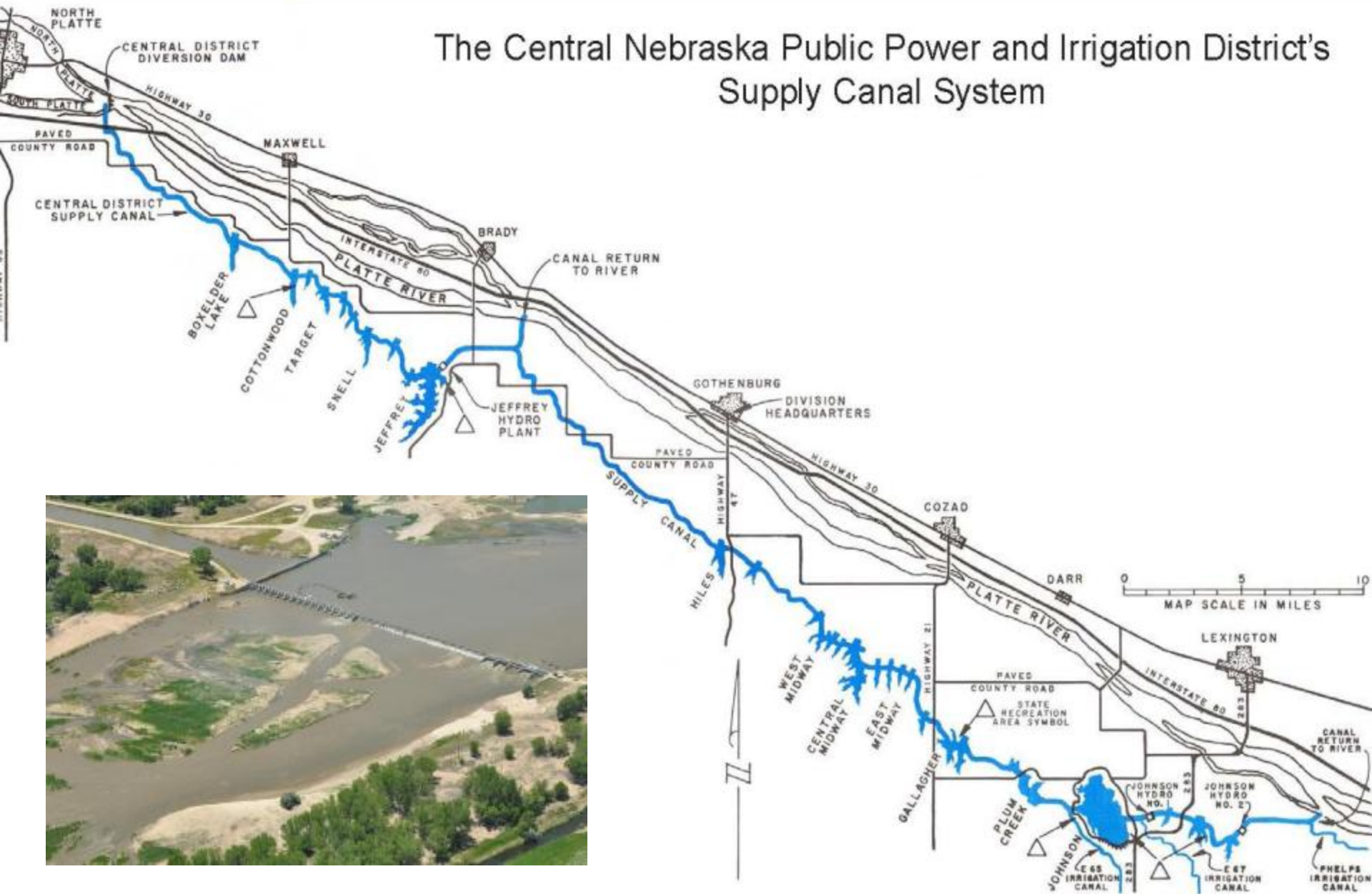
Option	Area 1 Beneficial Storage	Area 2 Beneficial Storage	Total Beneficial Storage	Phelps Canal Capacity	Program & NDNR Score *
Option 5	10,473 AF	3,486 AF	13,959 AF	1,675 cfs	40,800 AF



Capital Cost (000)	50-Yr Life Cycle Cost per AF based on EDO Score
\$44,391	\$31.22

J2 Rereg. Reservoir

The Central Nebraska Public Power and Irrigation District's Supply Canal System



PRRIP Water

- Performed Choke Point Modeling and Analysis at North Platte
 - High sustained flows ($> 4,000$ cfs) at North Platte this summer
 - Potential Reevaluation of Flood Stage
- Participated in efforts to eradicate phragmites



PRRIP Water - Colorado

- Tamarack I Ground Water Recharge:
 - Retimes up to 10 K acre-feet of water
 - Covers CO's "existing" water activities
 - Pumps in priority & at times of surplus at the habitat (often Dec & Jan)
 - Accretions occur at times of deficit at the habitat (February - June)



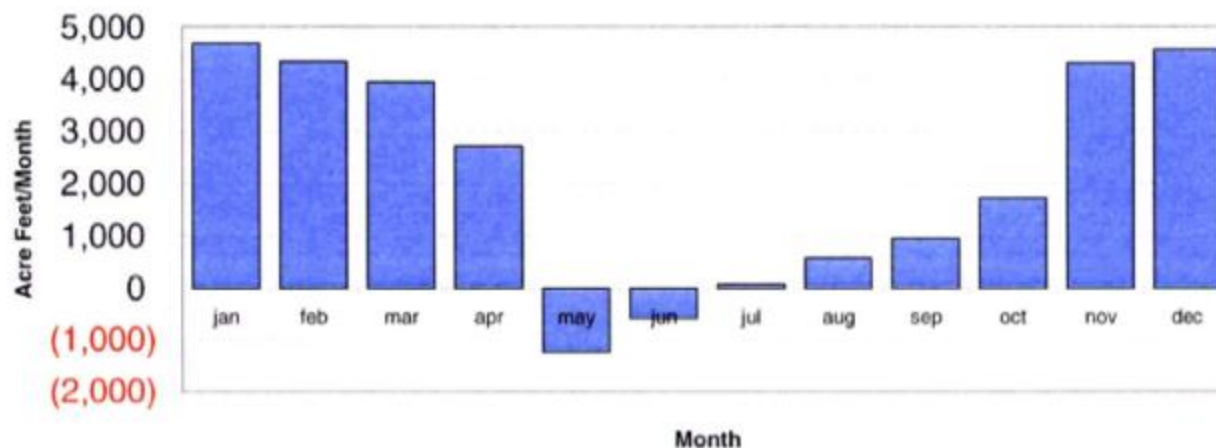
PRRIP Water - Colorado



- Tamarack II Ground Water Recharge:
 - Retimes water from CO's post-1997 population growth
 - Pumps in priority & during surplus in CO (Jul - Apr)
 - Accretions occur during net deficit (May - June)
 - Mitigated 1,800 ac-ft of depletions in 2010

FIGURE 1Based on **Population Increase** from July 1, 1997 to:**July 1, 2010**Based on GPCD (ac-ft/person/year): **0.2504****836,293**Based on **REVISED average % water supply sources** (see table below)

Based on original Transit Loss Assumptions, Paragraph C of CPFD

Cumulative Accretions/Depletions Effects at Julesburg

(Acre--Feet Per Month); Negative values in ()

Seasonal Accretions/Depletions	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	total
"New" Transbasin Imports	2863	2691	2361	1941	1195	880	682	841	703	1029	2423	2560	20,168
Nontributary Groundwater	912	908	910	1205	993	564	471	475	377	618	1124	1136	9,694
In-basin Agricultural Conversion	47	47	45	102	205	113	83	83	83	45	41	47	939
Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Reuse	(41)	(41)	(84)	(475)	(1519)	(603)	(1095)	(985)	(411)	(256)	(36)	(41)	(5,584)
Native South Platte Flow Development	918	740	717	(56)	(2102)	(1532)	(70)	170	203	279	762	874	901
Total Accretions/Depletions	4,699	4,345	3,949	2,717	(1,228)	(579)	71	583	956	1,714	4,314	4,577	26,118
Total Accretion/Depletion, cfs	76	78	64	46	(20)	(10)	1	9	16	28	73	74	

(1,807)
May+Jun
Total26,315
Oct-Apr
Total**Regional % Water Supply "Mix" REVISED**

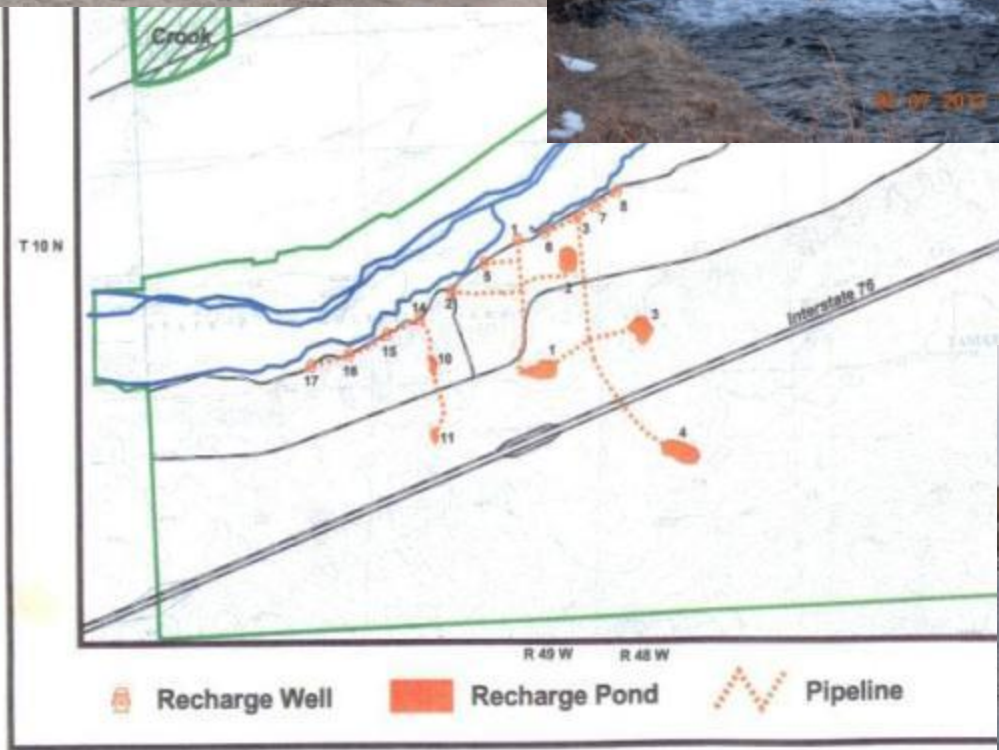
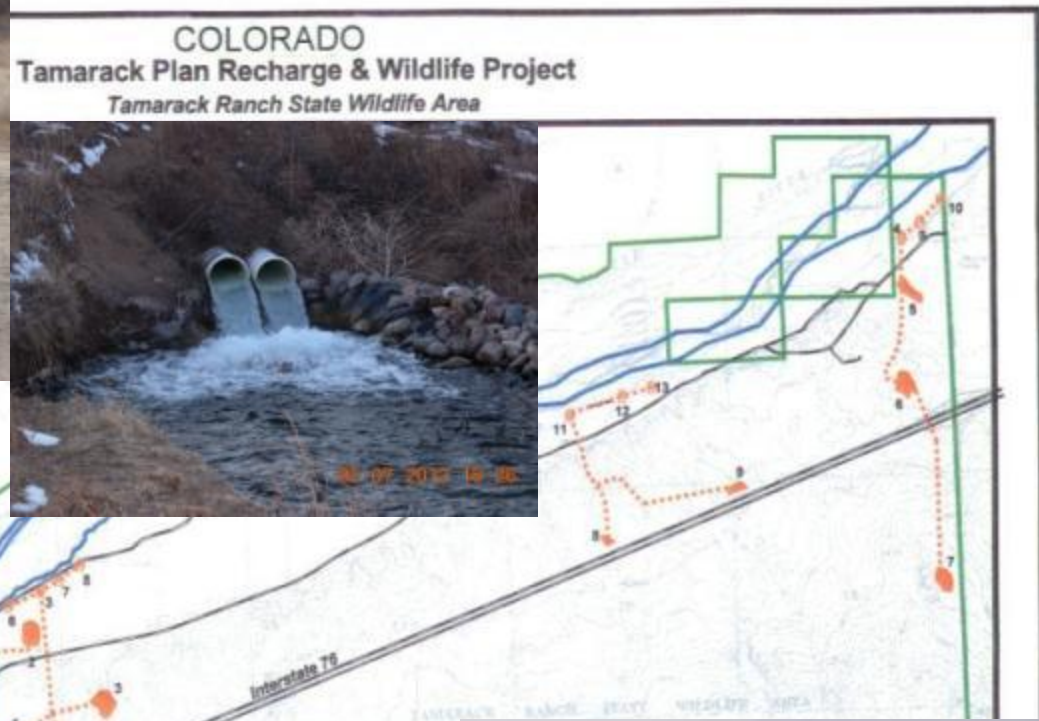
Northern	Central	Southern	
31.9%	23.3%	21.0%	"New" Transbasin Imports
0%	9.8%	40.7%	Nontrib. Groundwater
33.4%	3.9%	0%	In-basin Agric. Conversion
18.9%	29.4%	18.8%	Conservation
11.1%	28.7%	13.7%	Water Reuse
4.6%	5.0%	5.6%	Native S. Platte Flow Develop.
100.0%	100.0%	100.0%	Total

PRRIP Water - Colorado

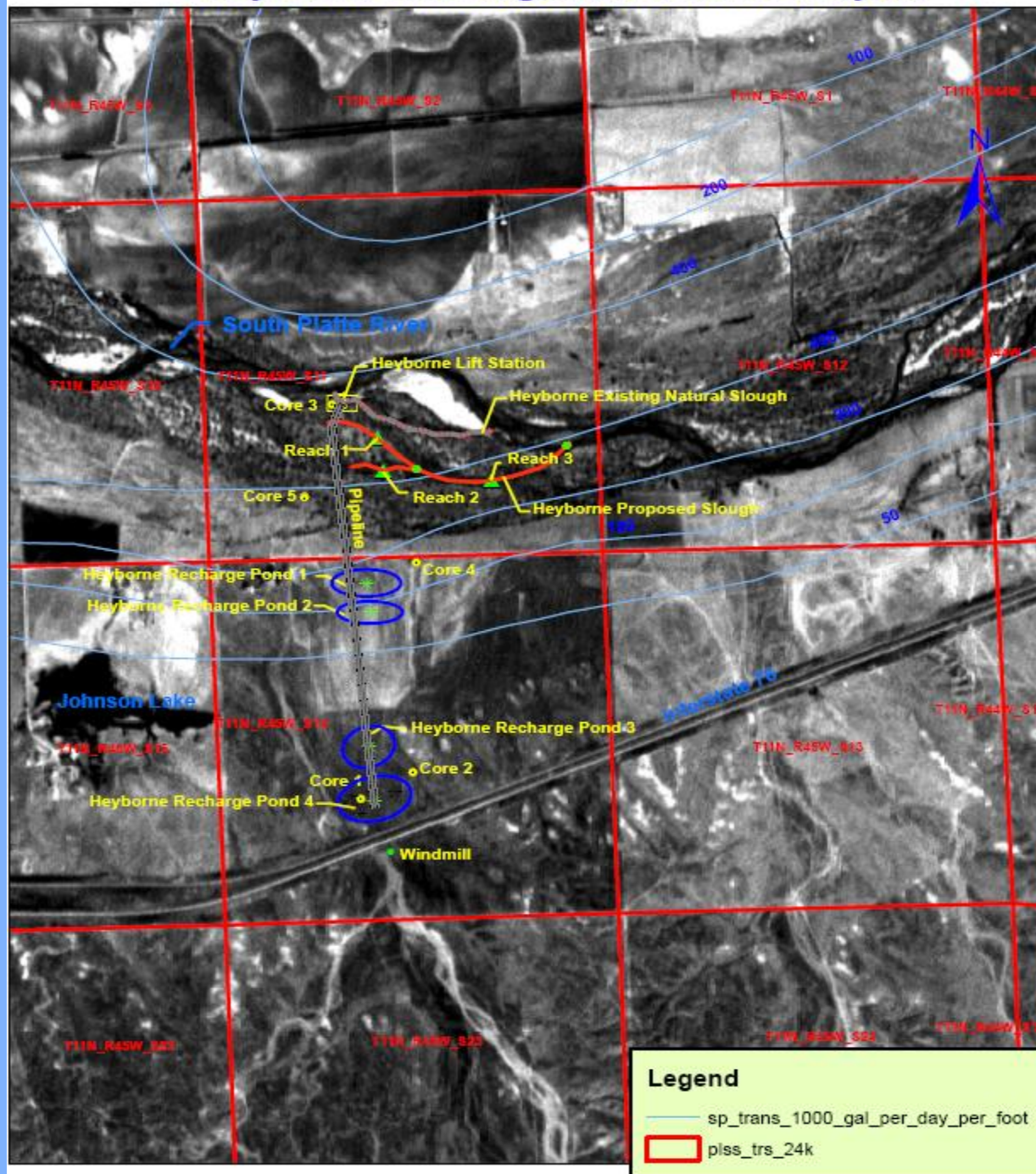
- Tamarack I & II Groundwater Recharge Project includes: CDOW Tamarack Ranch SWA near Crook
 - 10 exiting wells & 4 existing recharge ponds
 - Future build-out: add'l 6 wells & 3 recharge ponds
 - Recharge credits from Ducks Unlimited (DU) projects
 - Leasing of recharge credits from other CO projects



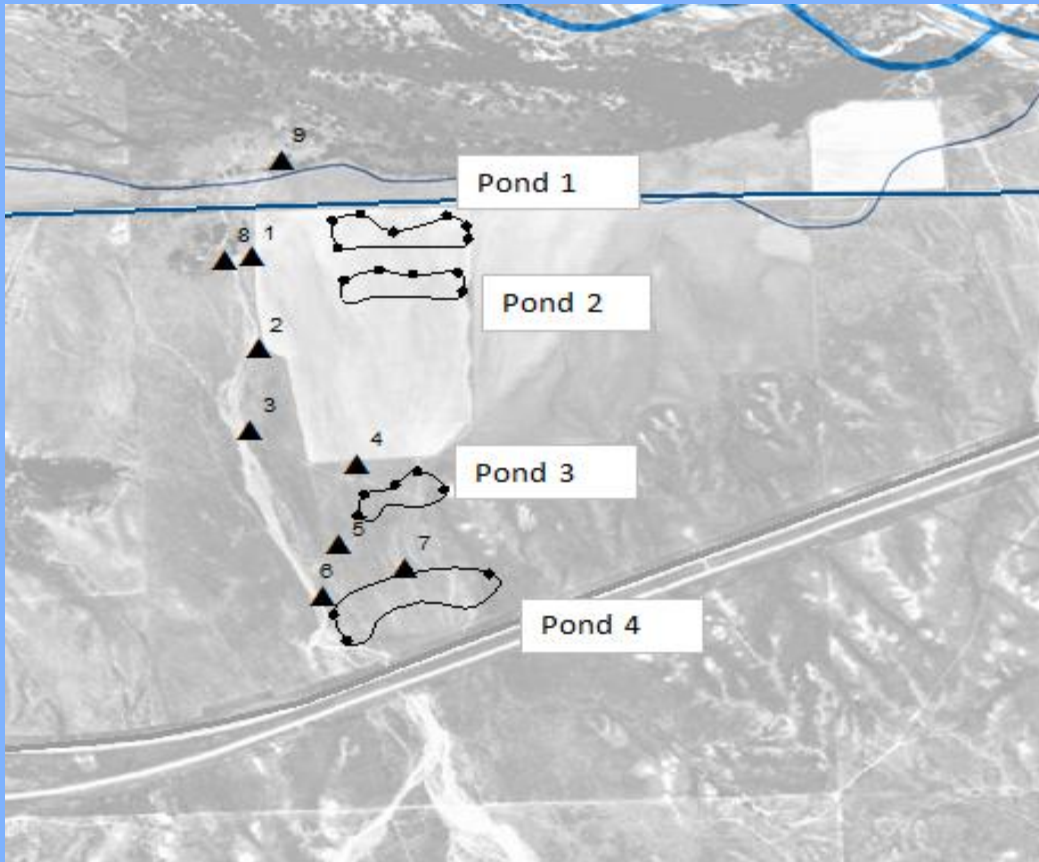
Tamarack
East
Ponds
from I-76



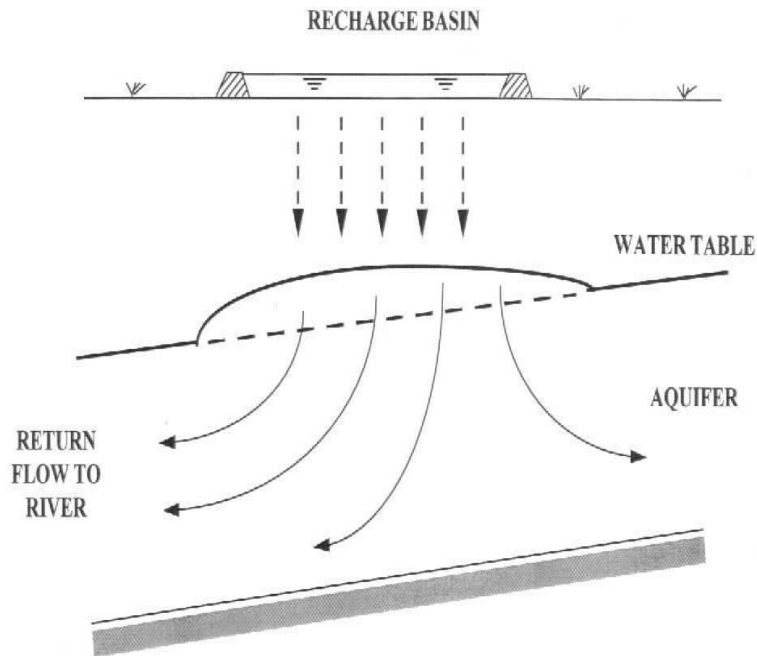
Heyborne Recharge and Wildlife Project



Heyborne Recharge and Wildlife Project—South Platte River Ranch



Managed Groundwater Recharge (LSPWCD)



Effects of Groundwater Recharge
(both managed and unmanaged)

Managed Groundwater Recharge Site

**Typical recharge well near SP river
and recharge ponds seen from I-76**



Recharge Ponds as Habitat



Snow Geese over Bill Condon's Recharge Ponds (near Crook, CO)

Recharge at Sunset on the Overland Trail Ranch



PRRIP Water - Colorado

- State of CO's Role in CO Water Program:
 - funding the \$24 Million
 - funding 1 operator for Tamarack project
 - to fund \$1 Million for Tamarack build-out
 - contributed to 2 DU recharge projects
 - provided Tamarack SWA for project site
 - obtaining recharge water rights
 - represents CO with PRRIP



PRRIP Water - Colorado

- South Platte Water Related Activities Program's (SPWRAP) Role:
 - providing remainder of CO's water obligations
 - funding O&M of Tamarack project
 - fulfills CO's accounting and reporting requirements
 - members covered by CO's depletion plan
 - represents CO water users with PRRIP

2012 fees

\$0.90/tap

\$.015/ac



QUESTIONS/ COMMENTS

www.platteriverprogram.org
www.spwrap.org

THANK YOU

jaltenhofen@ncwcd.org

970-622-2236