

# PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM -SUMMARY-

AND

# SOUTH PLATTE WATER RELATED ACTIVITIES PROGRAM -2014 ANNUAL REPORT-



Interior Least Tern



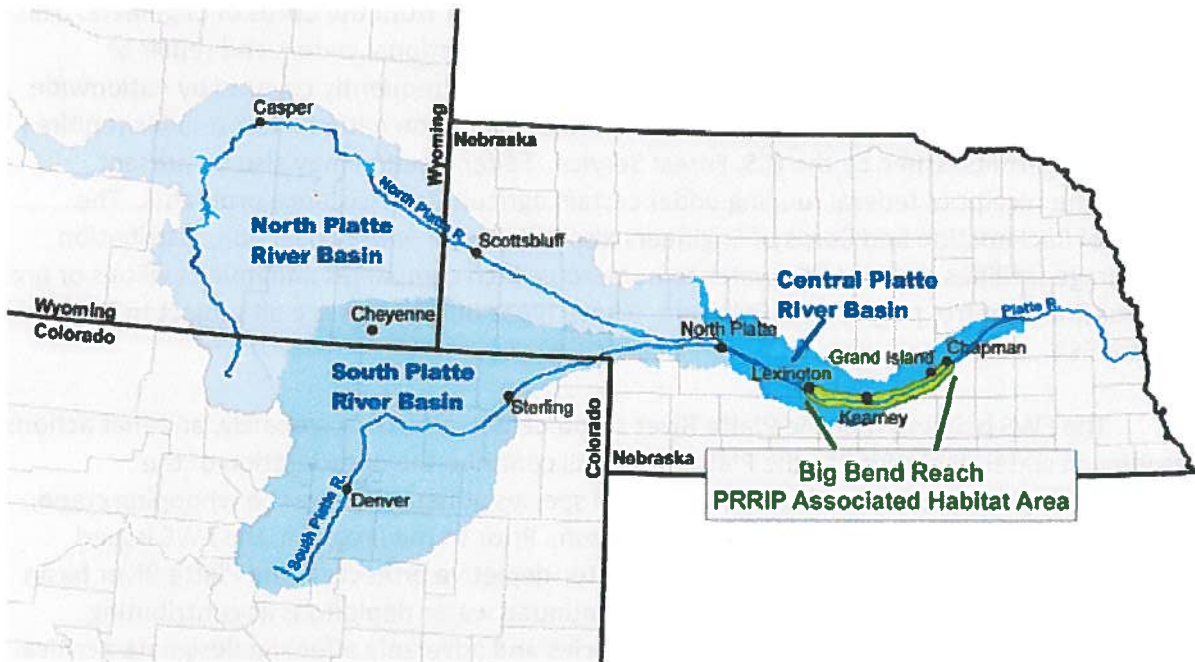
Whooping Crane



Piping Plover



Pallid Sturgeon



## **Why the Platte River Program is Needed by Colorado**

The Platte River Program is designed to resolve conflicts between water use and endangered species protection in the Platte River basin. Resolution of these conflicts is critical to the continued use and development of water supplies to meet the needs of Colorado's South Platte Basin.

### **The Conflict**

Water-related projects that are authorized, funded, or carried out by a federal agency may require consultation with the U.S. Fish and Wildlife Service (FWS) under the Endangered Species Act (ESA). Federal agencies are required by Section 7(a)(2) of the ESA to insure that those actions are not likely to jeopardize listed species or adversely modify their designated critical habitat. Construction, operation and maintenance of water projects in the Platte River basin routinely require a Clean Water Act Section 404 permit from the Corps of Engineers. This includes routine projects such as pipeline crossings of jurisdictional waters and repair or rehabilitation of conveyance structures, which activities are frequently covered by nationwide permits. Many water storage or conveyance facilities located on national forest lands require special use permits issued by the U.S. Forest Service. Federal action may also be present through the receipt of federal funding under certain agricultural assistance programs. The Bureau of Reclamation and Corps of Engineers also own major water collection, distribution and storage facilities that provide water to numerous ditch companies and municipalities or are used for flood control purposes in Colorado. These types of activities are all subject to Section 7 of the ESA.

The FWS believes that the Platte River resource is in a state of jeopardy, and that actions resulting in water depletions to the Platte River will continue the deterioration of the endangered species' habitat. The federally listed species at issue include the whooping crane, interior least tern, piping plover and pallid sturgeon. Prior to the Program, the FWS issued "jeopardy" biological opinions for virtually all water-depletive projects in the Platte River basin starting in the late 1970s, citing either new or continued water depletions as contributing factors in jeopardizing the existence of these species and adversely affecting designated critical habitat. Notable examples include the biological opinions issued in 1994 for the renewal of Forest Service special use authorizations for six existing agricultural and municipal water facilities along Colorado's Front Range. The 1994 opinions concluded that, absent offsetting measures, each of those existing water facilities would cause jeopardy to the listed species and adversely modify Platte River designated critical habitat in central Nebraska. The average annual depletions associated with one of those long-standing projects was 0.64 acre feet.

Under the jeopardy standard applied by the FWS, individual water projects undergoing ESA consultation must avoid or fully offset all project depletions to FWS instream flow

recommendations for the Platte River in the same amount, timing, duration and frequency in which they occur. Land acquisition and a sediment augmentation component may also be a required component of mitigation for federal authorizations that do not have the benefit of a recovery program. Fulfillment of these requirements may, for some projects, simply not be possible. For many others, these requirements have delayed permitting and compromised water yield and cost-effectiveness of the projects.

## **What the Program Does**

The States of Colorado, Nebraska and Wyoming and the U. S. Department of the Interior entered into the 13-year first increment of a comprehensive basin-wide Program effective January 1, 2007 to address habitat needs of the endangered species in the central and lower Platte River basin. This cooperative basin-wide approach is an equitable and effective means to resolve conflicts and provide greater certainty that the Platte River will continue as a reliable water source for both wildlife and the many people who reside and use water in the basin. The commitment of resources to the Program to preserve and enhance the habitat of the species allows water use and development activities in each of the three states to continue, in compliance with the ESA and in accordance with state water law and entitlements under interstate compacts and decrees.

The Program commits lands, water and management of those resources toward helping address the habitat needs of the species. As a water goal, the Program commits to reduce basin-wide shortages by an average of 130,000 to 150,000 acre feet per year in lieu of the FWS requirement to replace 417,000 acre feet of shortages to the FWS "target flows." The Program also has committed to obtain land, or interests in land, in an amount of 10,000 acres in the central Platte River. This water and land will be managed under the Program on behalf of the species and will constitute the mitigation needed to offset the impact of existing water projects on the Platte River species and habitat during the 13-year first increment of the Program. ESA compliance for future water related activities is afforded under the respective state plans to mitigate the effects of new water development. The operation of the Program past the first 13-year increment is not currently defined and, as provided in the first increment agreement, will be negotiated among the Program interests at the end of the first increment.

For Colorado, the Program is designed to provide regulatory compliance under the ESA for both existing and prospective new water uses within the South Platte River basin<sup>1</sup>. This compliance is needed for water providers to meet the water supply needs of the urban, agricultural, and industrial sectors of this rapidly changing and growing part of the state. The Program:

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<sup>1</sup> The Program is also designed to address ESA compliance for existing and new water uses occurring within defined consumptive use baseline allowances in the North Platte basin of Colorado

- Provides an alternative to the requirement that historic and future water related activities in Colorado replace individual depletions on a one-for-one basis in amount and in timing at the Colorado-Nebraska state line.
- Provides streamlined ESA Section 7 compliance procedures and regulatory predictability for existing and future water related activities in Colorado. Project owners and operators who choose to rely on the Program will know their requirements prior to ESA consultation.
- Avoids the potential for prohibited "take" of listed species under ESA Section 9 for water-related activities covered by the Program.
- Satisfies Colorado's water-related mitigation requirements through the Tamarack Plan, which utilizes managed groundwater recharge from existing and future recharge wells and ditches located in the lower reaches of the South Platte River in Colorado to re-time river flows from periods exceeding flow targets to periods short of target flows. The Tamarack Plan also obtains annually, by payment, recharge accretion credits not needed by local well augmentation plans during free-river periods. Water re-timing for the Tamarack Plan is limited to water that physically and legally exceeds existing and future water demands in Colorado (i.e. water that would normally flow out of the state) and is further limited to water that is in excess to target flows in the Program habitat in Nebraska. This water is first diverted for an initial beneficial use within Colorado; some of the unused return flows from this diverted water subsequently reach the river in times that benefit the Platte species.
- Provides potential benefits addressing two other issues important to the lower South Platte River in Colorado. The higher return flows produced in areas of the South Platte River as a result of the managed groundwater recharge for the Program also benefit Colorado's Minnow Species of Concern. Additionally, the Tamarack Plan puts water in the South Platte River at times when it is not needed or cannot be utilized to reduce target flow shortages. This "new" water supply enhances the effectiveness of augmentation plans and provides water for new uses within Colorado.
- Reduces pressure toward permanent dry up of agricultural lands along the lower South Platte for the benefit of federally listed species in Nebraska.
- Encourages development of improved science on the central Platte River through an adaptive management plan and integrated monitoring/research plan designed to test competing hypotheses of the Program's participants concerning species and habitat needs.

## Benefits of a Programmatic Approach

Individual water users will need to decide whether to rely on the Program for purposes of ESA compliance for their water-related projects in the Platte River basin. The circumstances surrounding each project will inform the decision whether to participate under the Program or pursue stand-alone ESA consultation and project-specific mitigation. The requirements in the vast majority of stand-alone Section 7 consultations conducted independent of a Program have, to date, entailed time intensive negotiations and mitigation requiring that water users replace individual project depletions on a one-for-one basis. In contrast, under the programmatic approach toward Platte ESA compliance: (1) individual projects are asked to contribute money, not water, to address their depletive impacts on the target species; (2) individual projects rely on the Program's offsetting measures as their means to avoid jeopardy to the species and adverse modification of critical habitat under Section 7; (3) programmatic offsetting measures serve to avoid any prohibited "take" of target species for all federal nexus and non-nexus individual water activities participating under the Program; and (4) individual projects can take advantage of streamlined procedures for documenting ESA compliance.

## Commitments and Costs under the Program

Colorado's responsibilities under the Program comprise 20% of the total Program budget in cash and cash-equivalent contributions. Colorado is contributing less water (10,000 to 27,000 acre feet out of the 130,000 to 150,000 annual acre foot shortage reduction) and more money (\$24 million), relative to the other states during the first increment of the Program. During the first increment of the Program, Colorado and its water users are required to:

1. Develop the capability under the Tamarack Plan to provide an average of 10,000 acre feet annually based on historic hydrology of shortage reduction to FWS target flows by the end of 2011. Colorado is on track to meet this requirement;
2. Re-time water in Colorado to avoid net increased shortages to target flows in the habitat pursuant to Colorado's Plan for Future Depletions. Colorado is in compliance with this requirement - attached is the Colorado Annual Review provided to and approved by the Program;
3. Participate in the business and operational activities of the Program; and
4. Provide \$24 million in cash or cash equivalent contributions to the Program (in 2005 dollars) to fund Program activities such as acquiring additional land and water, performing monitoring and research, and conducting Program operation and maintenance activities. To date, the Colorado Legislature has funded the full \$24 million toward satisfaction of this requirement.

## **Role of the South Platte Water Related Activities Program, Inc. (SPWRAP)**

The South Platte Water Related Activities Program, Inc. (SPWRAP), a Colorado nonprofit corporation, has been formed by Colorado water user participants under the Program to assist the State in fulfillment of various Program responsibilities including accounting and reporting requirements, obtaining interests in facilities, water rights and/or recharge credits, and assisting with the State's cash contributions to the Program, if necessary. In addition to the State of Colorado delegate, Colorado water users also have representation on the Program Governance Committee and advisory committees through membership in SPWRAP.

Membership in SPWRAP is the exclusive means by which individual Colorado water users may participate in the Platte River Program, and thereby be afforded the benefits and certainty of ESA compliance for their projects that are provided by the Program while avoiding stand-alone project mitigation requirements during Section 7 consultation under ESA. A certification of membership in SPWRAP is a prerequisite for water users to rely on the Program for purposes of ESA compliance. The river depletions about which FWS is concerned are both the depletions that have been occurring for decades, as well as the compounding effect of future depletions. Because of that and the fact that the costs of the Program began in 2007, fairness requires that all water users in the basin pay their fair share. As a result, water users who delay becoming members are required to pay assessments for all prior years, plus compounded interest, at the time they do join.

### **Websites**

South Platte Water Related Activities Program – <http://www.spwrap.org>

Platte River Recovery Implementation Program - <http://www.platteriverprogram.org>

## **SPWRAP 2014 Administration/Membership Report**

### 2014 Officers and Directors

Following are the officers and directors who have graciously offered their time and talents to SPWRAP during 2014.

Greg Dewey (Class M) – President

Jim Hall (Class M) – Vice President

Richard Belt (Class I) – Treasurer

Daniel Gallen (Class M) – Secretary

Kevin Urie (Class M) – Director, Executive Director

Wayland Anderson (Class M) - Director

Alan Berryman (Class W) - Director

Kim Hutton (Class M) – Director

Dennis Harmon (Class A) – Director

### Inquiries about SPWRAP

SPWRAP continues to field a variety of inquiries about membership in SPWRAP. Many of these inquiries are related to federal permitting requirements associated with U.S. Army Corps of Engineers Section 404 permits and how membership in SPWRAP supports ESA compliance under the larger basin-wide Platte River Recovery Implementation Program.

### Membership Certificates

SPWRAP is committed to providing Membership Certificates in a timely manner to members once we have received full payment for the assessed annual fee and any required back assessments. Some members require an invoice from SPWRAP in order to process their assessment fees within their organization. SPWRAP is glad to provide you with a separate invoice upon your request. SPWRAP will need you to complete and submit the appropriate member class Reporting Form & Assessment Invoice for us to determine the amount to include on the separate invoice.

In 2014, SPWRAP issued 45 Class M (Municipal); 23 Class A (Agricultural); 4 Class W (Water Conservancy & Water Conservation Districts); 9 Class I (Industrial); and 29 Class X (Miscellaneous) memberships for a total of 110 members. Municipal members continue to account for the majority of SPWRAP memberships and assessment amounts. Municipal members contributed 96% of the total SPWRAP assessments in 2014 followed by Industrial members at 3%.

### Funding

Funding through memberships in 2014 met our anticipated goals and we anticipate that our 2015 funding will be similar or slightly higher with additional members using the Program for ESA compliance.



### 2015 Assessments

The deadline for payment of 2015 assessments is **March 1, 2015**.

If annual membership is not renewed/paid by May 1<sup>st</sup> then your membership in SPWRAP will lapse. In order to re-join SPWRAP your entity will be required to pay all unpaid back assessments plus 4% interest (compounded annually).

Please complete and submit the appropriate member class Reporting Form & Assessment Invoice to:

SPWRAP  
% NCWCD  
220 Water Avenue  
Berthoud, CO 80513.

Entities that join SPWRAP for the first time in 2015, or in subsequent years, are required to pay back assessments to the beginning of 2007. Please contact Kevin Urie at [Kevin.urie@denverwater.org](mailto:Kevin.urie@denverwater.org) , or 303-628-5987, if you need help determining the back assessments or have other questions.

### Coordination with the U.S. Fish & Wildlife Service on SPWRAP Membership

It is SPWRAP's policy to not provide a formal list of membership to the USFWS. However, SPWRAP will confirm the current status of specific members who are relying on Program participation for ESA compliance if the USFWS requests such confirmation.

### 2015 SPWRAP Meeting Schedule

- 1) January 15<sup>th</sup>, 2015 (LSPWCD in Sterling)
- 1) April 16<sup>th</sup>, 2015
- 1) July 16<sup>th</sup>, 2015
- 1) September 17<sup>th</sup>, 2015
- 2) October 22<sup>nd</sup>, 2015 (anticipated)

- 1) All SPWRAP meetings will be at NCWCD in Berthoud at 9am unless otherwise noted or changed by the board of directors
- 2) SPWRAP traditionally holds its Annual meeting in October immediately following the South Platte Forum in Longmont



**Date:** April 28, 2014

**To:** Governance Committee (GC), Water Advisory Committee (WAC) and Executive Director's Office (EDO) of the Platte River Recovery Implementation Program (PRRIP)

**From:** Jon Altenhofen, Colorado Water User Member, WAC

**Memo Subject:** Colorado's Annual Depletion Report for 2013 in the South Platte River Basin

## **Colorado Plan for Future Depletions (CPFD)—Annual Review 2013**

**BASIS:** Mitigate the adverse impacts of new water related activities in Colorado on FWS Target Flows and on Program Water Projects by replacing monthly net depletions in river flow caused by population growth since July 1, 1997 on an average annual basis. Artificial groundwater recharge captures and retimes monthly net river accretions resulting from population growth into months of net river depletions (May and June) to offset such depletions.

**No changes in basic assumptions for 2013-2014 accounting.** 2014 is a 5 year check on assumptions and projections on % Water Source Mix in Colorado's Plan for Future Depletions and based on recent discussions in the winter of 2014 with the major municipal water users in each Region, the following assumptions have not changed and will be used for future years.

- (1) South Platte Basin in Colorado divided into North, Central, and South Regions based on counties.
- (2) Population Increase by Region since July 1, 1997 (baseline) via State Demographer (SDO) report. The current report provided to the WAC shows a population for January 1, 2013 in the South Platte River Basin of 3,617,033, an increase of about 2.1% per year since 1997. Based on the SDO report, the estimated population in 5 years on January 1, 2019 is 3,999,240.
- (3) GPCD--Gross Water Use ac-ft/person/year remains at 0.2504.
- (4) % Water Source Mix by Region of 6 sources; 5 measured divertible sources (transbasin imports, nontributary groundwater, agricultural conversion, reuse, and native post-1997 S. Platte flow development) plus water conservation as a source. Each source has a monthly accretive and/or depletive effect. See attached Figures for graphs of depletive and accretive effects for July 1, 2013 and estimated effects for July 1, 2019 in 5 years. The May + June depletive effect for 2019 is estimated at 3,068 ac-ft.
- (5) Monthly effects are routed to the Colorado-Nebraska Stateline using administrative routing loss factors.

### **CPFD Operations through 2013**

SPWRAP, Inc.--South Platte Water Related Activities Program is a non-profit group of mainly municipal Colorado water users collecting assessments (\$0.90 per tap in 2013) to pay for Colorado's water obligations for PRRIP in partnership with the State of Colorado where the State covers other Program costs. SPWRAP obtains creditable river accretions for use in Colorado's Plan for Future Depletions from

- (1) dedicated groundwater recharge projects collaboratively developed and operated by SPWRAP, Inc. and
- (2) by paying for creditable accretions not used by existing recharge plans.

May and June Depletions (acre-feet) at Stateline from population growth:

2007	1,410
2008	1,552
2009	1,679
2010	1,807
2011	1,949
2012	2,055
<u>2013</u>	<u>2,281</u>
Avg	1,819

Managed groundwater recharge retimed accretions (ac-ft) into May and June at Stateline for replacement supplies.

2007	3,277
2008	1,470
2009	4,220
2010	5,790
2011	6,545
2012	2,219
<u>2013</u>	<u>1,845</u>
Avg	3,624

On the average annual basis, adequate retimed accretions (3,624 ac-ft) available to replace depletions (1,819 ac-ft). Note that the average retimed accretions of 3,624 ac-ft also exceed the estimated May + June depletions in 2019 of 3,068 ac-ft. These retimed accretions will also increase due to more monthly net river accretions resulting from continued population growth.

As required each 5 years is also a report on changes in irrigated acres in the South Platte Basin of Colorado and that report from the State of Colorado is attached to this Memo. It shows the acres in 1997 of 920,114 and in 2013 of 835,517; a reduction of 84,597 acres mainly due to drought effects and reduced acres served by wells because of increased well augmentation requirements.

**FIGURE 1**

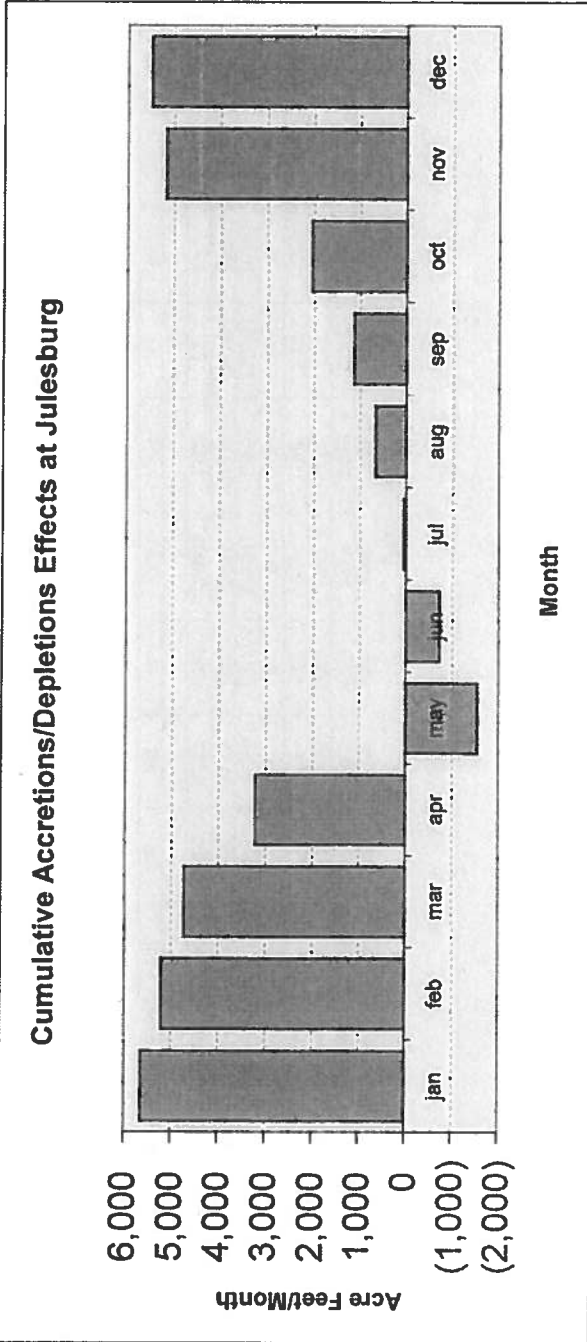
Based on Population Increase from July 1, 1997 to:  
1,011,276

July 1, 2013

Based on GPCD (ac-ft/person/year): 0.2504

Based on average % water supply sources (see table below)

Based on original Transit Loss Assumptions, Paragraph C of CPFD



Seasonal Accretions/Depletions	(Acre-Feet Per Month); Negative values in ( )												total
	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	
"New" Transbasin Imports	3468	3260	2860	2351	1448	1066	827	1019	852	1246	2936	3102	24,435
Nontributary Groundwater	1057	1051	1054	1395	1150	653	546	550	437	715	1302	1316	11,227
In-basin Agricultural Conversion	57	57	54	124	249	138	101	101	101	55	50	57	1,144
Conservation	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Reuse	(50)	(50)	(103)	(582)	(1862)	(739)	(1342)	(1208)	(503)	(314)	(44)	(50)	(6,847)
Native South Platte Flow Development	1107	892	864	(67)	(2536)	(1848)	(85)	205	245	337	919	1054	1,087
<b>Total Accretions/Depletions</b>	<b>5,839</b>	<b>5,211</b>	<b>4,731</b>	<b>3,222</b>	<b>(1,560)</b>	<b>(731)</b>	<b>48</b>	<b>667</b>	<b>1,131</b>	<b>2,039</b>	<b>5,162</b>	<b>5,479</b>	<b>31,046</b>
Total Accretion/Depletion, cfs	92	83	77	54	(25)	(12)	1	11	19	33	87	89	

(2,281)  
May+Jun  
Total

31,483  
Oct-Apr  
Total

**Regional % Water Supply "Mix"**

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

**FIGURE 2**

Based on Population Increase from July 1, 1997 to:

1,360,084

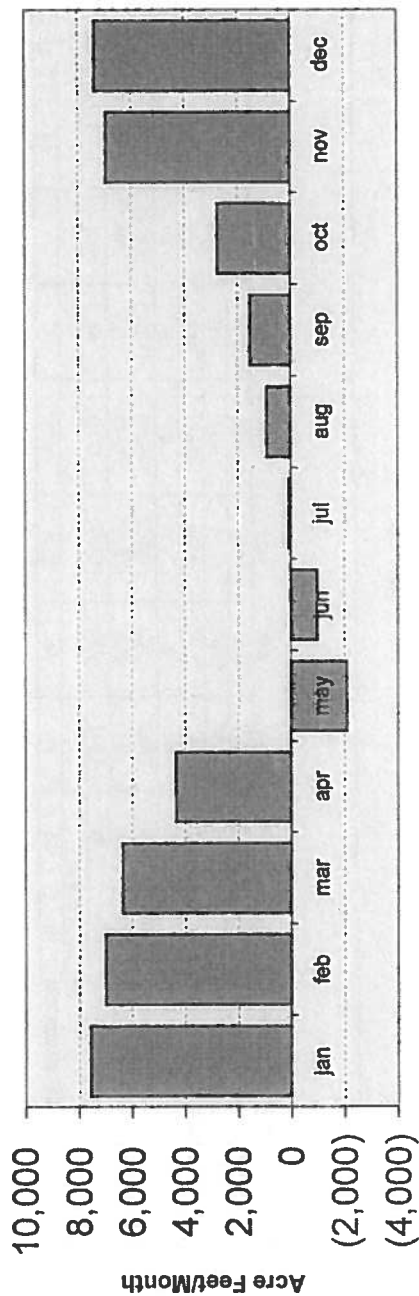
July 1, 2019

Based on GPCD (ac-ft/person/year): 0.2504

Based on average % water supply sources (see table below)

Based on original Transit Loss Assumptions, Paragraph C of CPFD

**Cumulative Accretions/Depletions Effects at Julesburg**



	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	total
Seasonal Accretions/Depletions	4864	4385	3847	3162	1947	1433	1112	1370	1146	1676	3948	4172	32,863
"New" Transbasin Imports	1421	1414	1418	1877	1547	878	734	740	588	962	1751	1770	15,100
Nontributary Groundwater	77	77	73	167	335	185	135	135	135	74	67	77	1,539
In-basin Agricultural Conversion	0	0	0	0	0	0	0	0	0	0	0	0	0
Conservation	(67)	(67)	(138)	(783)	(2504)	(985)	(1805)	(1625)	(677)	(422)	(59)	(67)	(9,209)
Water Reuse	1488	1200	1163	(90)	(3411)	(2485)	(114)	278	329	453	1236	1418	1,462
Native South Platte Flow Development	7,584	7,008	6,363	4,333	(2,065)	(983)	62	897	1,522	2,743	6,943	7,369	41,754
Total Accretions/Depletions	123	125	103	73	(34)	(17)	1	15	26	45	117	120	(3,068)
Total Accretion/Depletion, cfs													42,342
													Oct-Apr Total
													Total

**Regional % Water Supply "Mix"**

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

# STATE OF COLORADO

## Colorado Water Conservation Board

### Department of Natural Resources

1580 Logan Street, Suite 600  
Denver, Colorado 80203  
Phone: (303) 866-3441  
Fax: (303) 894-2578  
www.cwcb.state.co.us



TO: Suzanne Sellers, Program Manager

FROM: Carolyn Fritz, GIS Coordinator

DATE: February 27, 2014

SUBJECT: South Platte Irrigated Acreage

John W. Hickenlooper  
Governor

Mike King  
DNR Executive Director

James Eklund  
CWCB Director

The Platte River Recovery Implementation Program requires the State of Colorado to report on "net changes in irrigated agricultural acreage, using readily available data." This memo responds to your request for this information. For the years 1956-2010 (except 2008), this information is the result of the detailed delineation and analysis of irrigated acres within the South Platte River Basin associated with the South Platte Decision Support System (SPDSS).

For 2008 and 2013, the irrigated acreage estimate was not done at the same level of precision as past SPDSS snapshots. Since this request was for the total land irrigated within the South Platte, individual parcels were not delineated or crop typed. It also does not contain lands in districts 48 & 76 (Laramie River & tributaries).

Year	1956	1976	1987	1997	2001	2005	2008	2010	2013
Acreage	979,502	1,012,164	980,532	920,114	909,185	829,475	857,807	857,886	835,517
Changes	0	32,662	-31,632	-60,418	-10,929	-79,710	+28,332	+79	-22,369

Date: April 28, 2014

To: Governance Committee (GC), Water Advisory Committee (WAC) and Executive Director's Office (EDO) of the Platte River Recovery Implementation Program (PRRIP)

From: Jon Altenhofen, Colorado Water User Member, WAC

Memo Subject: Colorado's Annual Report for 2013 for Tamarack 1

## **Colorado's Initial Water Project (Tamarack 1)—Annual Review 2013**

The Colorado Tamarack 1 Project based on the historic study period of 1947-1994 developed an average annual yield of 10,000 acre-feet of target flow shortage reduction. This yield is the result of diversions to managed groundwater recharge sites during times when the river flows are in excess to target flows. The accretions returning to the river later from these diversions are credited to Tamarack 1 during times of shortage. As with the CPFDP (Colorado Plan for Future Depletions) operations, SPWRAP operates and pays electrical costs and maintains dedicated recharge projects (i.e., Tamarack Wildlife Area and Heyborne projects) and pays for Tamarack 1 creditable accretions not used by existing recharge plans. South Platte Water Related Activities Program (SPWRAP) is a non-profit group of mainly municipal Colorado water users collecting assessments (\$0.90 per tap in 2013) to pay for Colorado's water obligations for PRRIP in partnership with the State of Colorado where the State covers other Program costs. For 2007-2013, SPWRAP paid a total of about \$3,100,000 for CPFDP and Tamarack 1 creditable supplies. The table below shows the Tamarack 1 credits actually developed from all these operations since the start of the PRRIP in January 2007 with an average annual yield of 6,531 acre-feet for the years of full operations.

The 10,000 ac-ft goal has not yet been reached because the flow frequency for excess to targets has been less for the starting years of PRRIP as compared to the historic period. December through March are the months of greatest excess and for the historic period of 1947 through 1994, 59% of these months had excess flows above target flows. However for the first 7 years of the Program for December through March, only 37% of these months had excess flows, thus limiting the amount of water available for Tamarack 1 operations. An estimate of the Tamarack 1 credit achievable if actual flows similar to historic excesses had occurred for the beginning years of the Program can be estimated as follows: divide the actual 6,531 ac-ft average in table below by the water availability ratio of 0.63 (=37/59) which results in 10,360 ac-ft.

The Program document recognizes the possibility that reductions in actual yield might occur in paragraph IIIC of the Tamarack 1 description in PRRIP Attachment 5 Section 3 which states "...as long as Tamarack 1 is constructed and operated as described herein, the target flow shortage reduction credited to Tamarack 1 individually or to the three initial water projects collectively will not be reduced even if the real time frequency and magnitude of flows in excess to targets at Grand Island causes Tamarack 1 to produce an average annual yield that is less than that projected under historic flow conditions, regardless of the reasons for the change."

Colorado recognizes that with changing hydrologic conditions, additional capacity is required to meet the Tamarack 1 objectives and this is why the Tamarack Wildlife Area water right allows the addition of 7 more recharge wells. The drilling of 6 of these wells at a cost of about \$1.2M (paid for by SPWRAP and State of Colorado) started in April 2013 and completed in December 2013. Tamarack 1 project has an overall limit on average annual net diversions of 30,000 ac-feet and for the first 7 years of operations the actual diversions have annually average 18,000 ac-ft, so additional diversion capacity exists.

	Tamarack 1 Credits for Shortage Reduction; acre-feet (PRRIP start January 2007)												
	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	Total
2007			641	587	506	344	0	698	0	0	0	515	3290
2008	480	0	0	3038	1666	721	0	0	66	274	50	460	6754
2009	0	1024	932	951	699	680	278	377	346	441	436	430	6593
2010	0	0	0	2520	1255	1828	861	0	0	0	0	824	7288
2011	374	0	0	2365	0	0	0	0	0	0	0	0	2739
2012	0	0	0	2561	3129	2290	100	0	134	109	84	807	9215
2013	614	0	0	2542	1697	1295	0	0	0	0	452	0	6599
												<b>Avg 2008-2013</b>	<b>6531</b>



