

Thinking Regionally!

Acting locally!

*Creating Safe and Healthy Waterways for the Enjoyment of
Generations to Come!*

FOUNTAIN CREEK FLOOD CONTROL STUDY

Water Rights Protection Task

October 14, 2015

Larry Small

Executive Director

AGENDA

- Introductions
- Brief background on study
- Review final report
 - Comments
- Next steps



Water Rights Protection Task

- Formation of a technical group
 - Provide Technical Input
 - Designee's for water rights holders
 - Division 2 Staff, USGS
 - Identify Water Rights potentially impacted
 - Develop Guidelines for operation
 - Identify Fatal Flaws



Funding Partners

- Fountain Creek Watershed, Flood Control and Greenway District
- Colorado Springs Utilities
- City of Fountain Utilities
- Pueblo Board of Water Works
- Southeastern Colorado Water Conservancy District
- Pueblo West
- Security Water & Sanitation District

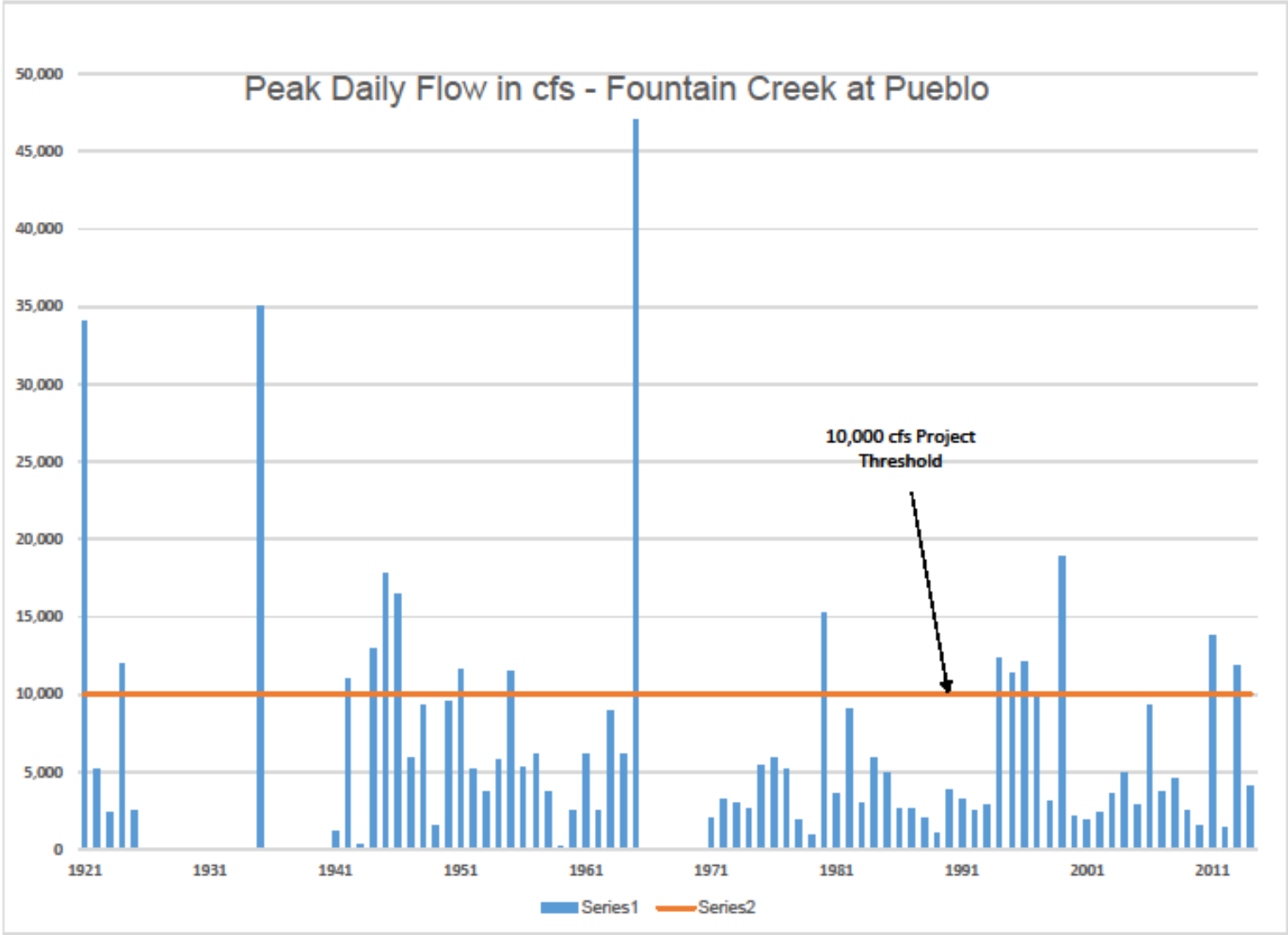
Resulted in \$26,000 for engineering

With additional \$25,000 of in-kind service from Colorado Springs Utilities

Established Guidelines

- Looked at flood frequency
- What actually works within the call regime

- Review assumptions
 - Flow is over 10,000 cfs
 - Release rate is 500 cfs or greater
 - Release as the hydrograph falls



Fountain Creek Flood Remediation Project

- Reductions in peak flow and sediment transport
 - Store flows that may cause at the Fountain Creek gaging station at Pueblo to exceed **10,000 cfs**.
- Temporarily store and then released back to Fountain Creek as soon as practical
 - Once the flows at the gaging station have dropped below 10,000 cfs
- Concerns that the operation of the Project will change the “ownership” of these peak flows
 - Increase the losses that occur
 - Reduce the available water

Report

- Analysis based on historic events with flow over 10,000 cfs at the Pueblo Gauge
- Water temporarily stored on Fountain Creek and released as the hydrograph falls
 - Full volume stored will be released to the Arkansas
 - Evaporation and additional transit loss would be replaced
- Allocated to downstream users based on priority using a modified TLAP model
 - Treated as a release from Pueblo with timing determined by model

Comments

- Received comments from 5 groups
- Many comments were outside the scope of this task
- Most of the editorial comments will be incorporated in the final report
- SEO suggested that TLAP may require improvements for ease of administration
- BBA had numerous comments
- Volume differences vs USGS Report
 - Differ because of 10,000 cfs threshold

WATER RIGHTS AFFECTED

Primary rights that may be affected

4/15/1884-Fort Lyon Canal;

12/3/1884–Catlin and Las Animas

Consolidated Canals;

2/21/1887–Amity Canal;

3/1/1887–Fort Lyon Canal;

9/25/1889–Holbrook Canal;

6/9/1890–Colorado Canal;

4/1/1893–Amity Canal;

8/31/1893–Fort Lyon Canal;

8/31/1896–Great Plains Reservoir

System;

1/25/1906–Fort Lyon Storage.

SUMMARY OF CALLS ON THE ARKANSAS RIVER		
DURING FOUNTAIN CREEK FLOOD EVENTS DURING 1999, 2011, AND 2013		
Date	From Water Districts 14 and 17	From Water District 67
	Priority and Structure	Priority and Structure
April 28, 1999	3/1/1887 Fort Lyon	--
April 29, 1999	8/01/1896 Great Plains Reservoirs	--
April 30, 1999	12/14/1948 John Martin Reservoir	--
May 1, 1999	12/14/1948 John Martin Reservoir	--
May 2, 1999	12/14/1948 John Martin Reservoir	--
May 3, 1999	6/25/1962 Pueblo Reservoir/ Free River	--
September 14, 2011	4/15/1884 Fort Lyon	1/29/1885 Buffalo
September 15, 2011	12/3/1884 Catlin	4/1/1886 Fort Bent
	5/1/1887 Bessemer/Excelsior	
September 16, 2011	6/9/1890 Colorado Canal	2/21/1887 Amity
September 17, 2011	3/11/1886 Rocky Ford Highline	4/1/1893 Amity
September 18, 2011	4/15/1884 Fort Lyon	1/29/1885 Buffalo
September 13, 2013	4/15/1884 Fort Lyon	1/29/1885 Buffalo
September 14, 2013	4/15/1884 Fort Lyon	1/29/1885 Buffalo
September 15, 2013	3/13/1888 Las Animas Consolidated	2/21/1887 Amity
	6/9/1890 Colorado Canal	7/22/1889 X-Y
	3/2/1892 Holbrook	
September 16, 2013	6/9/1890 Colorado Canal	2/21/1887 Amity
	8/01/1896 Great Plains Reservoirs	7/22/1889 X-Y
	1/25/1906 Fort Lyon Storage	
September 17, 2013	3/13/1888 Las Animas Consolidated	2/21/1887 Amity
	6/9/1890 Colorado Canal	7/22/1889 X-Y
	3/2/1892 Holbrook	
September 18, 2013	6/9/1890 Colorado Canal	7/22/1889 X-Y
	8/01/1896 Great Plains Reservoirs	4/1/183 Amity
	1/25/1906 Fort Lyon Storage	

METHODOLGY FOR APPORTIONING WATER TEMPORARILY STORED IN PROJECT FACILITIES

HANDOUTS

Tables 7, 8 and 9

HANDOUTS

**TABLE 7
ADDITIONAL FLOW IN THE ARKANSAS RIVER ABOVE KEY DIVERSION POINTS
FROM THE ADDITIONAL FLOOD INCREMENT IN THE 2013 COMPOSITE FLOOD
FLOW VALUES IN CFS**

Date	Time	Release from Pueblo Reservoir	Colo-rado Canal	Rooky Ford High-line	Catlin	Hol-brook	Fort Lyon Storage	Fort Lyon	Lac Animas Consolidated	John Martin Reservoir
9/13/2013	0000									
9/13/2013	0400									
9/13/2013	0800	1113	7.2	3.0						
9/13/2013	1200		53.5	26.3						
9/13/2013	1600		164.7	97.6	2.1					
9/13/2013	2000		277.5	205.0	12.8	3.5	2.6			
9/14/2013	0000		284.5	272.2	47.1	16.3	12.5			
9/14/2013	0400		188.3	241.6	113.3	50.8	40.4	1.1		
9/14/2013	0800		84.2	148.9	189.7	111.4	92.9	5.8		
9/14/2013	1200		27.8	66.4	229.4	178.5	157.3	20.6		
9/14/2013	1600		8.9	23.6	205.6	214.4	201.9	53.4	2.6	
9/14/2013	2000		4.1	8.5	140.3	197.0	200.5	104.0	10.3	
9/15/2013	0000		2.8	4.3	75.8	141.6	157.5	156.4	29.6	2.7
9/15/2013	0400		2.2	3.0	35.0	82.3	100.5	186.0	64.9	9.2
9/15/2013	0800		1.8	2.3	16.1	41.2	54.5	178.3	111.4	24.4
9/15/2013	1200		1.5	1.9	8.7	20.0	27.3	140.7	153.1	51.7
9/15/2013	1600		1.3	1.7	5.8	10.9	14.2	93.9	171.8	88.9
9/15/2013	2000		1.2	1.5	4.4	7.1	8.6	55.2	160.2	126.4
9/16/2013	0000		1.1	1.3	3.6	5.3	6.0	30.6	126.6	150.9
9/16/2013	0400			1.2	3.0	4.2	4.7	17.4	87.1	153.3
9/16/2013	0800			1.1	2.6	3.5	3.9	11.0	54.3	134.4
9/16/2013	1200			1.0	2.3	3.0	3.3	7.8	32.5	103.7
9/16/2013	1600				2.1	2.7	2.9	6.1	20.0	72.0
9/16/2013	2000				1.9	2.4	2.5	5.0	13.3	46.7
9/17/2013	0000				1.7	2.1	2.3	4.3	9.7	29.7
9/17/2013	0400				1.6	2.0	2.1	3.7	7.6	19.4
9/17/2013	0800				1.5	1.8	1.9	3.3	6.2	13.5
9/17/2013	1200				1.4	1.7	1.8	2.9	5.3	10.2
9/17/2013	1600				1.3	1.5	1.6	2.7	4.6	8.1
9/17/2013	2000				1.2	1.4	1.5	2.4	4.0	6.7

**TABLE 7
ADDITIONAL FLOW IN THE ARKANSAS RIVER ABOVE KEY DIVERSION POINTS
FROM THE ADDITIONAL FLOOD INCREMENT IN THE 2013 COMPOSITE FLOOD
FLOW VALUES IN CFS**

Date	Time	Release from Pueblo Reservoir	Colo-rado Canal	Rooky Ford High-line	Catlin	Hol-brook	Fort Lyon Storage	Fort Lyon	Lac Animas Consolidated	John Martin Reservoir
9/18/2013	0000				1.1	1.3	1.4	2.2	3.6	5.8
9/18/2013	0400				1.0	1.3	1.3	2.1	3.2	5.0
9/18/2013	0800					1.2	1.2	1.9	3.0	4.5
9/18/2013	1200					1.1	1.2	1.8	2.7	4.0
9/18/2013	1600					1.1	1.1	1.7	2.5	3.6
9/18/2013	2000						1.0	1.6	2.3	3.3
9/19/2013	0000							1.5	2.2	3.0
9/19/2013	0400							1.4	2.0	2.8
9/19/2013	0800							1.3	1.9	2.6
9/19/2013	1200							1.2	1.8	2.4
9/19/2013	1600							1.2	1.7	2.3
9/19/2013	2000							1.1	1.6	2.1
9/20/2013	0000							1.1	1.5	2.0
9/20/2013	0400								1.4	1.9
9/20/2013	0800								1.3	1.8
9/20/2013	1200								1.3	1.7
9/20/2013	1600								1.2	1.6
9/20/2013	2000								1.1	1.5
9/21/2013	0000								1.1	1.4
9/21/2013	0400									1.4
9/21/2013	0800									1.3
9/21/2013	1200									1.2
9/21/2013	1600									1.2
9/21/2013	2000									1.1
9/22/2013	0000									1.1
9/22/2013	0400									
9/22/2013	0800									
9/22/2013	1200									
9/22/2013	1600									
9/22/2013	2000									
Sum			1112.5	1112.5	1112.5	1112.5	1112.5	1112.5	1112.5	1112.5

Note: The values in this table were calculated from the corresponding values in Table 6 with an upward adjustment to remove the effects of the TLAP transit losses.

TABLE 8
 SUMMARY OF DAILY ARKANSAS RIVER CALLS, 4-HOUR DIVERSION RATES, WATER RIGHTS UNDER WHICH WATER WAS DIVERTED
 SELECTED STRUCTURES DURING SEPTEMBER 13 THROUGH 22, 2013

Date	Time	River call(s) above JMD	River call(s) WD 57	Colo Canal 4-hr avg div	RFHL Canal 4-hr avg div	Cattin 4 hr avg div	Holbrook 4-hr avg div	FL Stor Canal 4-hr avg	Fort Lyon 4 hr avg div	LACC 4 hr avg div	Amity 4-hr avg div	Junior water right in structure under which water was diverted during period								
												Colo Canal	RFHL Canal	Cattin Canal	Holbrook Canal	FL Stor Canal	Fort Lyon Canal	Great Plains Reevs	LACC	Amity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
9/13/2013	0:00			0.0	91.9	0.0	48.3	0.0	131.4	18.3	0.0		8/30/1885				4/15/1884		12/3/1884	
9/13/2013	4:00			0.0	94.6	14.5	48.7	0.0	129.0	27.6	0.0		3/7/1884	12/3/1884			4/15/1884		12/3/1884	
9/13/2013	8:00	4/15/1884	1/29/1885	183.6	172.0	181.3	47.3	0.0	127.3	33.6	0.0	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	
9/13/2013	12:00			760.3	432.6	285.1	48.1	0.0	123.5	44.2	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	
9/13/2013	16:00			755.6	465.6	249.3	48.7	0.0	118.9	43.2	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	
9/13/2013	20:00			742.0	465.8	248.6	48.9	0.0	127.2	37.1	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	
9/14/2013	0:00			731.8	465.9	248.8	48.7	0.0	125.3	20.1	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	
9/14/2013	4:00	4/15/1884	1/29/1885	696.4	463.4	271.5	43.1	0.0	252.3	25.2	285.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/14/2013	8:00			704.0	462.9	300.7	121.4	0.0	187.1	23.8	218.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/14/2013	12:00			843.0	464.1	293.6	158.9	0.0	304.3	22.9	108.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/14/2013	16:00			863.0	459.8	307.3	157.8	0.0	636.7	20.4	19.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/14/2013	20:00			725.6	461.6	303.3	406.1	0.0	780.9	70.0	0.6	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	0:00			755.3	463.9	298.3	578.5	0.0	780.2	72.8	0.1	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	4:00			723.8	462.8	315.4	577.3	0.0	780.0	89.6	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	8:00	3/13/1888, 6/9/1890, 3/2/1992	2/21/1887, 7/22/1889	714.5	461.4	311.6	578.4	0.0	780.3	130.1	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	12:00			722.2	460.3	312.4	577.2	0.0	780.1	132.5	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	16:00			781.6	436.1	313.8	578.6	0.0	757.8	132.3	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/15/2013	20:00			732.0	430.8	313.5	578.1	0.0	758.1	132.0	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	0:00			67.1	368.8	315.4	577.3	0.0	759.3	131.6	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	4:00			4.8	330.9	315.2	577.4	0.0	759.3	130.3	0.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	8:00	6/8/1890, 8/1/1896, 1/25/1906	7/22/1889, 4/1/1893	205.3	217.5	309.0	578.5	29.3	761.4	125.5	23.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	12:00			755.2	188.4	285.2	558.3	463.3	903.3	122.1	27.1	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	16:00			755.3	194.8	277.3	572.7	548.1	932.2	116.4	348.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/16/2013	20:00			710.5	188.9	275.5	576.1	548.9	923.6	125.4	403.7	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	0:00			847.8	187.2	269.1	575.7	522.2	934.4	125.2	404.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	4:00			481.4	198.1	289.2	571.6	498.3	920.3	125.7	403.4	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	8:00	3/13/1888, 6/9/1890, 3/2/1992	7/22/1889, 4/1/1893	0.0	351.7	288.9	580.2	470.2	917.9	126.7	400.3	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	12:00			0.5	350.3	291.7	577.4	212.3	922.7	126.3	407.7	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	16:00			0.0	318.4	293.5	578.1	11.1	929.3	129.1	407.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/17/2013	20:00			0.0	131.5	294.4	573.4	0.0	925.6	131.3	407.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	0:00			0.0	101.9	295.8	554.3	0.0	923.6	133.5	408.3	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	4:00			0.0	94.6	295.3	525.2	0.0	928.3	134.2	403.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	8:00	6/9/1890, 8/1/1896, 1/25/1906	7/22/1889, 4/1/1893	0.0	96.0	295.8	215.9	0.0	793.1	129.4	405.7	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	12:00			0.0	94.6	295.0	181.3	0.0	780.1	128.5	411.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	16:00			0.0	94.6	296.2	159.6	0.0	761.7	130.2	497.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/18/2013	20:00			0.0	83.8	297.6	157.3	0.0	783.3	129.2	502.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	0:00			0.0	90.0	295.4	157.1	0.0	782.1	127.9	508.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	4:00			0.0	90.8	294.3	156.8	0.0	782.9	126.4	506.5	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	8:00	3/13/1888, 6/9/1890, 3/2/1992	7/22/1889, 4/1/1893	0.0	88.9	293.0	157.3	0.0	780.9	127.4	528.5	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	12:00			0.0	93.3	292.2	157.3	0.0	782.0	126.8	544.8	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	16:00			0.0	93.4	292.0	158.8	0.0	780.9	126.7	552.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/19/2013	20:00			0.0	93.2	292.5	157.5	0.0	781.8	126.3	555.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/20/2013	0:00			0.0	93.2	296.1	157.0	0.0	783.3	125.3	553.9	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/20/2013	4:00			0.0	92.7	295.0	104.3	0.0	783.0	124.5	553.0	6/09/1890	1/6/1890	1/1/4/1887			4/15/1884		12/3/1884	2/2/1887
9/20/2013	8:00	3/13/1888, 6/9/1890, 3/2/1992	7/22/1889, 4/1/1893	0.0	91.9	290.0	0.0	0.0	782.4	126.4	553.6	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/20/2013	12:00			0.0	91.8	245.4	0.0	0.0	788.4	126.8	553.8	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/20/2013	16:00			0.0	91.5	245.1	0.0	0.0	783.8	133.1	540.2	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/20/2013	20:00			0.0	91.4	246.6	0.0	0.0	782.3	130.7	497.1	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/21/2013	0:00			0.0	91.5	245.2	0.0	0.0	781.4	140.3	371.0	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/21/2013	4:00			0.0	91.0	244.0	0.0	0.0	700.8	140.3	357.3	6/09/1890	1/6/1890	12/3/1884			4/15/1884		12/3/1884	2/2/1887
9/21/2013	8:00	3/11/																		

TABLE 9
APPORTIONMENT OF THE ADDITIONAL WATER IN THE 2013 COMPOSITE FLOOD
SEPTEMBER 13 THROUGH 22, 2013

Date	Time	River call and maximum diversion rate	Additional water at the Colo Canal	Historical diversion into Colo. Canal	Additional diversion into Colo. Canal	Additional water at the Holbrook	Historical diversion into Holbrook Canal	Additional diversion into Holbrook Canal	Add water at FL Storage Canal	Historical diversion into FL Storage	Additional diversion into FL Stor	Additional water at JMR for Amity	Historical diversion into Amity	Additional water at JMR for amity
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
9/13/2013	0:00	9/25/1899-Holbrook Canal-155 cfs		0.0			46.3			0.0			0.0	
9/13/2013	4:00	9/25/1899-Holbrook Canal-155 cfs		0.0			46.7			0.0			0.0	
9/13/2013	8:00	6/09/1890-Colorado Canal -756.26 cfs	7.2	183.6	7.2		47.3			0.0			0.0	
9/13/2013	12:00	6/09/1890-Colorado Canal -756.26 cfs	53.5	760.3	0.0		48.1			0.0			0.0	
9/13/2013	16:00	6/09/1890-Colorado Canal -756.26 cfs	164.7	755.6	0.7		48.7			0.0			0.0	
9/13/2013	20:00	6/09/1890-Colorado Canal -756.26 cfs	277.5	742.0	14.2	3.0	46.9	3.0	0.0	0.0			0.0	
9/14/2013	0:00	6/09/1890-Colorado Canal -756.26 cfs	284.5	731.8	24.5	14.0	46.7	14.0	0.0	0.0			0.0	
9/14/2013	4:00	6/09/1890-Colorado Canal -756.26 cfs	186.3	696.4	59.9	43.5	43.1	43.5	0.0	0.0			285.8	
9/14/2013	8:00	6/09/1890-Colorado Canal -756.26 cfs	84.2	704.0	52.3	95.5	121.4	95.5	0.0	0.0			216.8	
9/14/2013	12:00	3/2/1892-Holbrook Reservoir-600 cfs	27.8	643.0		153.1	158.9	153.1	0.0	0.0			106.9	
9/14/2013	16:00	3/2/1892-Holbrook Reservoir-600 cfs	8.9	663.0		163.8	157.8	163.8	0.0	0.0			19.0	
9/14/2013	20:00	3/2/1892-Holbrook Reservoir-600 cfs	4.1	725.6		168.9	409.1	168.9	0.0	0.0			0.6	
9/15/2013	0:00	3/2/1892-Holbrook Reservoir-600 cfs	2.8	755.3		121.4	578.5	21.5	72.3	0.0			0.1	
9/15/2013	4:00	3/2/1892-Holbrook Reservoir-600 cfs	2.2	723.8		70.6	577.3	22.7	46.1	0.0			0.0	
9/15/2013	8:00	3/2/1892-Holbrook Reservoir-600 cfs	1.8	714.5		35.4	578.4	21.6	25.0	0.0			0.0	
9/15/2013	12:00	3/2/1892-Holbrook Reservoir-600 cfs	1.5	722.2		17.1	577.2	17.1	12.5	0.0			0.0	
9/15/2013	16:00	3/2/1892-Holbrook Reservoir-600 cfs	1.3	761.6		9.3	578.8	9.3	6.5	0.0			0.0	
9/15/2013	20:00	3/2/1892-Holbrook Reservoir-600 cfs	1.2	732.0		6.1	576.1	6.1	3.9	0.0			0.0	
9/16/2013	0:00	3/2/1892-Holbrook Reservoir-600 cfs	1.1	67.1		4.5	577.3	4.5	2.8	0.0			0.0	
9/16/2013	4:00	3/2/1892-Holbrook Reservoir-600 cfs		4.6		3.6	577.4	3.6	2.2	0.0			0.0	
9/16/2013	8:00	1/25/1906-Fort Lyon Storage-1,375 cfs		205.3		3.0	578.5		1.8	26.3	1.8		23.9	
9/16/2013	12:00	1/25/1906-Fort Lyon Storage-1,375 cfs		755.2		2.6	558.3		1.5	463.3	1.5		27.1	
9/16/2013	16:00	1/25/1906-Fort Lyon Storage-1,375 cfs		755.3		2.3	572.7		1.3	546.1	1.3		348.9	
9/16/2013	20:00	1/25/1906-Fort Lyon Storage-1,375 cfs		710.5		2.0	576.1		1.2	548.9	1.2	30.8	403.7	30.8
9/17/2013	0:00	1/25/1906-Fort Lyon Storage-1,375 cfs		647.8		1.8	575.7		1.0	502.2	1.0	28.9	404.8	28.9
9/17/2013	4:00	1/25/1906-Fort Lyon Storage-1,375 cfs		481.4		1.7	571.6		1.0	466.3	1.0	18.9	403.4	18.9
9/17/2013	8:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.5	580.2		0.9	470.2	0.9	13.2	400.3	13.2
9/17/2013	12:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.5		1.4	577.4		0.8	212.3	0.8	9.9	407.7	9.9
9/17/2013	16:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.3	578.1		0.7	11.1	0.7	7.9	407.0	7.9
9/17/2013	20:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.2	573.4		0.7	0.0		6.6	407.8	6.6
9/18/2013	0:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.2	554.3		0.6	0.0		5.6	406.3	5.6
9/18/2013	4:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.1	523.2		0.6	0.0		4.9	403.0	4.9
9/18/2013	8:00	1/25/1906-Fort Lyon Storage-1,375 cfs		0.0		1.0	215.9		0.6	0.0		4.3	405.7	4.3
9/18/2013	12:00	4/01/1893-Amity-783.5 cfs		0.0		0.9	161.3		0.5	0.0		3.9	411.0	3.9
9/18/2013	16:00	4/01/1893-Amity-783.5 cfs		0.0		0.9	159.6		0.5	0.0		3.5	407.0	3.5
9/18/2013	20:00	4/01/1893-Amity-783.5 cfs		0.0			157.3		0.5	0.0		3.2	502.8	3.2
9/19/2013	0:00	4/01/1893-Amity-783.5 cfs		0.0			157.1			0.0		3.0	506.9	3.0
9/19/2013	4:00	4/01/1893-Amity-783.5 cfs		0.0			156.8			0.0		2.7	506.5	2.7
9/19/2013	8:00	4/01/1893-Amity-783.5 cfs		0.0			157.3			0.0		2.5	526.5	2.5
9/19/2013	12:00	4/01/1893-Amity-783.5 cfs		0.0			157.3			0.0		2.4	544.8	2.4
9/19/2013	16:00	4/01/1893-Amity-783.5 cfs		0.0			158.8			0.0		2.2	552.9	2.2
9/19/2013	20:00	4/01/1893-Amity-783.5 cfs		0.0			157.5			0.0		2.1	555.0	2.1
9/20/2013	0:00	4/01/1893-Amity-783.5 cfs		0.0			157.0			0.0		1.9	553.9	1.9
9/20/2013	4:00	4/01/1893-Amity-783.5 cfs		0.0			104.3			0.0		1.8	553.0	1.8
9/20/2013	8:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.7	553.6	1.7
9/20/2013	12:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.6	553.8	1.6
9/20/2013	16:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.6	540.2	1.6
9/20/2013	20:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.5	407.1	1.5
9/21/2013	0:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.4	371.0	1.4
9/21/2013	4:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.3	357.3	1.3
9/21/2013	8:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.3	297.5	1.3
9/21/2013	12:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.2	301.1	1.2
9/21/2013	16:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.2	381.5	1.2
9/21/2013	20:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.1	422.2	1.1
9/22/2013	0:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0		1.1	422.9	1.1
9/22/2013	4:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0			425.2	
9/22/2013	8:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0			488.4	
9/22/2013	12:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0			517.1	
9/22/2013	16:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0			548.1	
9/22/2013	20:00	4/01/1893-Amity-783.5 cfs		0.0			0.0			0.0			551.7	
		Sum - 4hr cfs	1112.5	n/a	158.8	953.7	n/a	768.1	186.6	n/a	10.2	175.4	n/a	175.4
		Ac-ft	368	n/a	52	315	n/a	254	61	n/a	3	58	n/a	58

Summary

- Methodology works for allocating water temporarily stored
 - Higher flow rates would reduce the number of flood events stored
 - Lower flow rates would increase the number of flood events stored
 - For the purpose of allocating water it is recommended that the flow rate not be lower than the 10,000 cfs evaluated here.
- Storage of peak flows greater than 10,000 cfs results in relatively small volumes of water being stored
- TLAP is reasonable for allocating water down the Arkansas River

Questions or Comments

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