



Hydrology Comments Meeting Minutes

Van Bibber Creek Major Drainageway Plan

Thursday, April 30, 2020

11:00 am Virtual Meeting on Microsoft Teams

Attendees:

Name	Company	E-mail
John Conn	Jefferson County	jconn@co.jefferson.co.us
Jacob Beedle	Arvada	jbeedle@arvada.org
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Amy Gabor	Olsson	agabor@olsson.com
Deb Ohlinger	Olsson	dohlinger@olsson.com
Madison Stewart	Olsson	mstewart@olsson.com

Discussion Items:

The main purpose of the meeting was to discuss if and how to calibrate peak flows for the Van Bibber Creek watershed. Specifically, to discuss the high peak flows coming from the foothills as a result of discretizing individual subbasins in the foothills for use in CUHP. While this summary is not intended to represent a comprehensive account of the meeting, it is intended to reflect the key points raised and issues for further consideration and to identify the action items resulting from the discussions. The non-bold items comprised the meeting agenda. The bold items resulted from the discussions.

- 1) Introductions
- 2) Peak flow comparisons

Table 1: Calculated 100-Year Peak Flows

Study	Location	Date	Tributary Area (ac)	Tributary Area (sm)	100-Year Peak Flow (cfs)	Unit Discharge (cfs/acre)
Draft 2020 MDP (Future Conditions)	DP 100 @ confluence with Ralston (Total/Downstream of DP157T)	2020	11154	17.43	7618	0.7
			5836	9.12	5739	1.0
Draft 2020 MDP (Future Conditions)	DP134 @ confluence w/ Ramstetter (Total/Downstream of DP157T)	2020	8761	13.69	6884	0.8
			3443	5.38	4028	1.2
Draft 2020 MDP (Existing/Future Conditions)	DP157T @ Hwy 93	2020	5318	8.31	5,216	1.0
One Basin Draft 2020 MDP (Existing/Future Conditions)	DP157T @ Hwy 93	2020	5318	8.31	2,198	0.4
StreamStats (Existing Conditions - Average)	DP157T @ Hwy 93	2020	6016	9.4	523	0.1

Results from the Draft 2020 MDP are not completely unexpected because of the limitations and intended use of CUHP. MHFD expected flows from the foothills to realistically look more like the One Basin Draft 2020 MDP results (see above). CUHP was not calibrated for areas like the foothills, where much more runoff infiltrates. Streamstats should not be considered when calibrating flows originating from the foothills because there is not enough historical data backing it.

Table 2: 100-Year Peak Flow Comparison

Stream	Design Point	Tributary Area (sm)	100-Year Peak Flow (cfs)	Unit Discharge (cfs/acre)
Van Bibber Creek	157T	8.31	5216	1.0
Dutch Creek	D-1	2.3	1210	0.8
Massey Draw	123	5	2070	0.6
Mt Vernon Creek	Mouth	10	4395	0.7
Tucker Gulch	Mouth	11	2800	0.4
Ralston Creek	Upstream reservoir	48	7228	0.2
Coal Creek	3260	15	3370	0.4
Bear Canyon Creek	401	2.84	1063	0.6

Some of the studies in Table 2 are older studies and used much larger subbasins. The calculated one basin peak flows on Van Bibber Creek matches closely with similar watersheds.

Table 3: Measured Peak Flows

Study	Location	Date	Tributary Area (ac)	Tributary Area (sm)	Peak Flow (cfs)	Unit Discharge (cfs/acre)
Ralston Creek Flood Warning Plan	DP 157T @ Hwy 93 (Station 330)	7/22/1991	5318	8.31	560	0.11
Ralston Creek Flood Warning Plan	DP 105T @ Sports Complex (Station 320)	5/18/1995	10871	16.99	440	0.04
Jarrett	DP 169	2013	4262	6.66	580	0.14
September 11-13, 2013 Arvada Flood Event	Van Bibber Creek at Gage 333 Hwy 93	2013	5318	8.31	750	0.14
September 11-13, 2013 Arvada Flood Event	Van Bibber Creek at Gage 323 Sports Complex	2013	10871	16.99	426	0.04

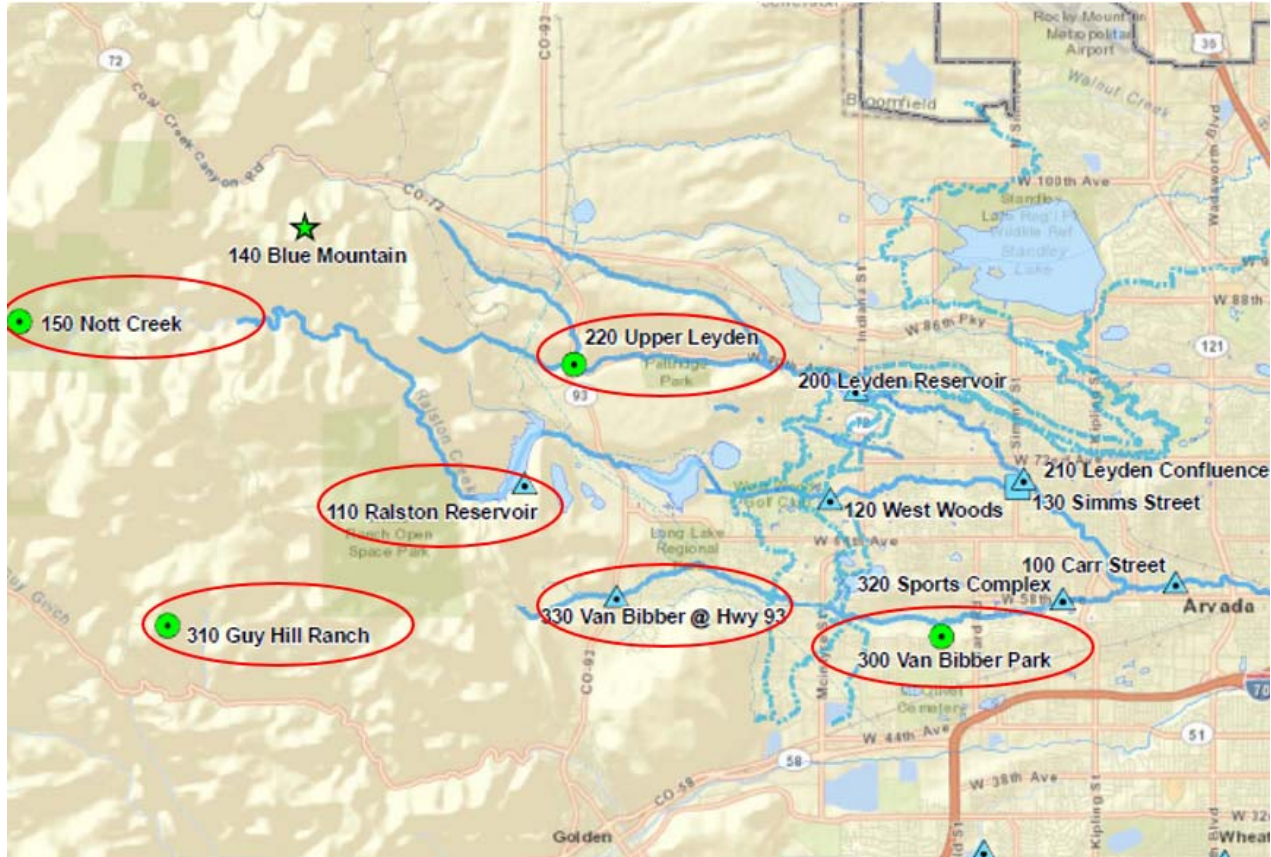
The September 2013 flood event was a less intense, long duration storm. CUHP models a short duration, intense storm event.

Table 4. Historic Annual Peak Flows on Van Bibber Creek.

Year	Van Bibber Creek at Gage 333 Highway 93		Van Bibber Creek at Gage 323 Sports Complex	
	Peak Stage (ft)	Peak Discharge (cfs)	Peak Stage (ft)	Peak Discharge (cfs)
2013	2.58	750	3.64	426
2012	2.54	396	3.07	353
2011	2.25	349	3.53	404
2010	2.68	417	3.00	350
2009	2.46	383	3.1	352
2008	--	--	2.53	296
2007	2.60	402	2.92	337
2006	--	--	1.70	--
2005	--	--	2.40	157
2004	2.50	387	3.30	375
2003	4.30	665	2.66	309
2002	2.60	402	2.86	331
2001	--	--	3.40	387
2000	--	--	3.50	406
1999	4.21	652	3.34	382
1998	--	--	2.94	339
1997	3.67	571	2.81	325
1996	--	--	2.72	315
1995	3.60	560	2.80	324
1994	2.75	428	2.50	292
1993	2.84	442	2.80	324
1992	2.75	428	2.80	324
1991	2.93	456	3.70	440
1990	--	--	2.50	292

Credit: September 11-13, 2013 Arvada Flood Event: Reconstruction and Documentation. Water & Earth Technologies. March 2014.

Kevin mentioned that not all of the peak flows listed in Table 4 are accurate. The 2013 flood event has been studied in depth and will be used to help calibrate flows.

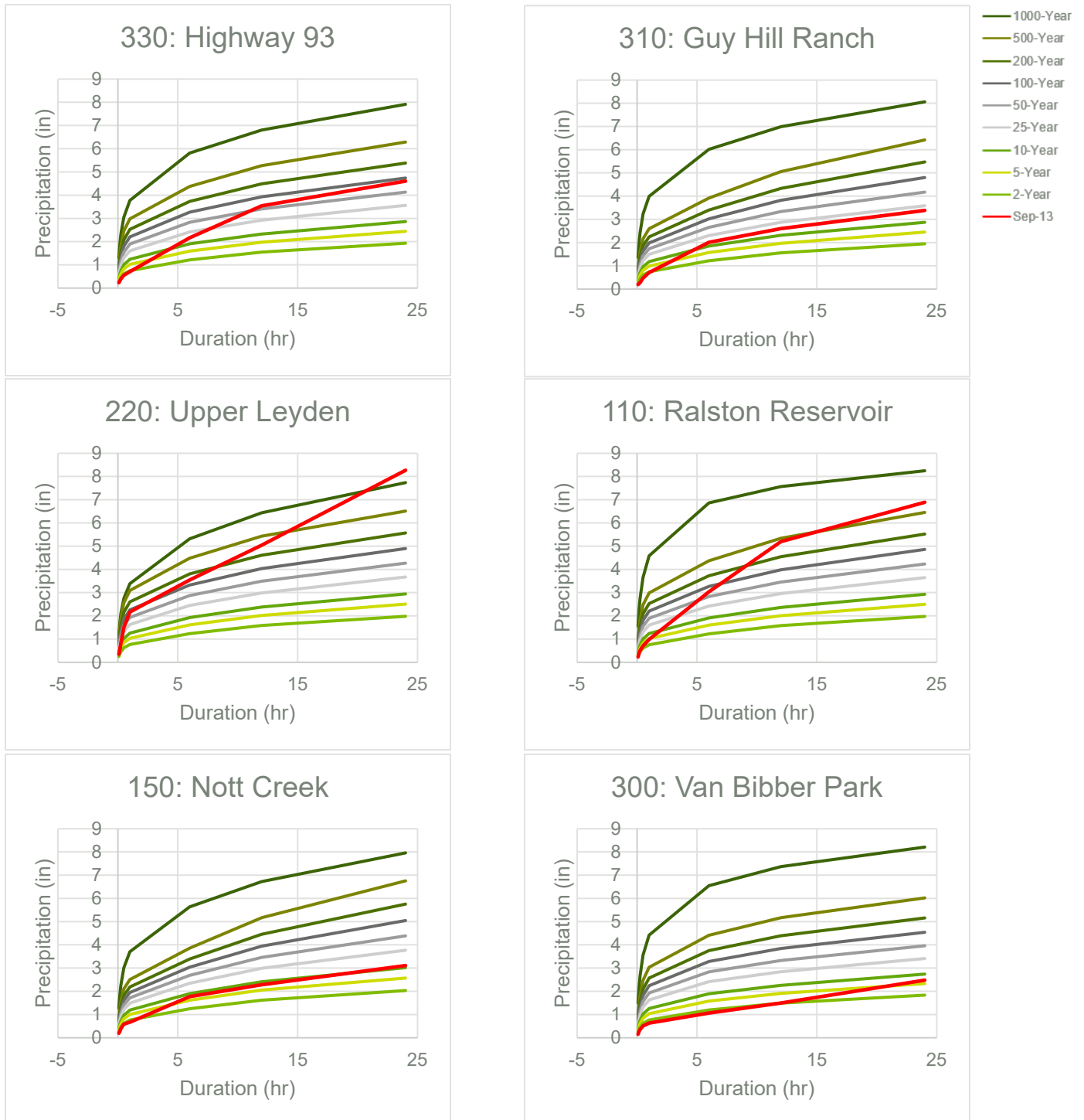


Credit: September 11-13, 2013 Arvada Flood Event: Reconstruction and Documentation. Water & Earth Technologies. March 2014.

Inconsistencies in peak flows from Draft 2020 MDP and previous studies may result from the large catchment areas used in old studies. MHFD suggested that if justification cannot be made for higher flows due to changes in percent impervious, changes in rainfall, and how canals were studied previously, etc., then calibration should be done. Arvada is concerned that if higher flows are justified then other projects have been under designed, new or current projects would need increased design, and remapping would be needed.

Olsson will use GARR data and the September 2013 flood data to calibrate the upper watershed on Van Bibber Creek. Following the meeting, Olsson discussed with MHFD and it was decided to start the calibration using the single basin upstream of Highway 93 CUHP model. Olsson will then evaluate the lower watershed peak flows to determine whether the increases are justified, or if additional calibration is needed.

NOAA Atlas 14 IDF Curve and September 2013 Flood Event Data from Alert5:



Action Items:

Olsson

- **Calibrate upper watershed flows using GARR data and September 2013 flood data.**
- **Review lower watershed results after upper watershed is calibrated and determine whether additional calibration is needed.**

MHFD

- **Send Water and Earth Tech post 2013 event study (completed)**
- **Send hydrology calculations on Ward Road Dam design project (completed)**

Please contact Olsson at 303-237-2072 with changes or questions regarding these meeting minutes. These minutes will be considered final unless comments are received within seven days of distribution. Although comments will be incorporated, as appropriate, only major revisions will be redistributed.

Minutes prepared by: Madison Stewart

cc: Attendees, File