



Watershed Protection Department

MEMORANDUM

TO: Mapi Vigil, P.E

FROM: Reem Zoun, P.E.; Kevin Smith, GISP.

DATE: July 31, 2014

SUBJECT: Numbers of At-Risk Structures and Roadways in the City of Austin Floodplain

The following memo documents the number of structures located in the City of Austin (COA) 100yr floodplain and at risk of flooding during various storm events identified by the Creek Flood Hazard Mitigation (CFHM) Masterplan process and the Floodplain Management Office (FPO) where CFHM scoring is not yet available. The memo also identifies the number of roadways at-risk of flooding based on CFHM Masterplan and the City's Flood Early Warning System (FEWS) Program where CFHM scoring is not yet available.

It is notable that the structure and roadway counts are available for the watersheds which have an effective hydraulic model; most but not all watersheds in the City's Full Purpose Jurisdiction currently have an effective model.

Summary

A total of 5,799 structures in 46 watersheds are located in the 100yr floodplain in the City of Austin Full Purpose Jurisdiction.

The CFHM Masterplan has identified 5,118 structures in the 100yr floodplain located in 25 watersheds in the City's Full Purpose Jurisdiction. Out of the 5,118 structures in the 100yr floodplain, 2,561 are inundated during a 100yr flood; 1,152 during a 25yr flood, 539 during a 10yr flood and 48 are inundated during a 2yr flood. The FPO identifies 681 structures in 100yr floodplain in 21 additional watersheds.

A total of 393 roadways in 26 watersheds are at risk of inundation during a 100yr flood in the City of Austin Full Purpose Jurisdiction.

Structures in Floodplain and at Risk of Flooding in the City of Austin

A total of 5,799 structures in 46 watersheds are located in the 100yr floodplain in the City of Austin Full Purpose Jurisdiction where a hydraulic model is available. This number accounts for structures identified by the CFHM Masterplan process and additional structures located by FPO in watersheds that have not yet been scored by CFHM Masterplan.

The CFHM Masterplan has identified 5,118 structures in the 100yr floodplain located in 25 watersheds in the City's Full Purpose Jurisdiction. The FPO identifies structures in additional watersheds that have not yet been scored by CFHM. There are 681 structures in 100yr floodplain in 21 additional watersheds identified by the FPO.

The following counts were generated for the 25 watersheds in the CFHM 2013 Masterplan:

- Number of structures in the 100-yr floodplain in the Full Purpose City limits ¹ = 5,118
- Number of structures at risk for flooding in the 100-yr floodplain ^{2,3,4} = 2,561
- Number of structures at risk for flooding in the 25-yr floodplain ^{2,3,4} = 1,152
- Number of structures at risk for flooding in the 100-yr floodplain ^{2,3,4} = 539
- Number of structures at risk for flooding in the 100-yr floodplain ^{2,3,4} = 48

The counts generated by the 2013 CFHM Masterplan are based on following conditions:

1. Only structures over 400 ft² were evaluated. Structures were identified based on the SDE 2006 building polygon layer. Garage apartments, sheds, and other secondary structures over 400 ft² identified from a visual review were also removed from this count.
2. At-risk structures for different storm events include all structures with estimated flooding depths of > 0 during the respective storm event.
3. Finished Flood Elevations (FFE) for structures are estimated to be 0.5ft higher than 2012 LiDAR data. Elevations Certificates and survey data for FFE were available for few structures.
4. All structure counts listed above only includes structures in the City's Full Purpose Jurisdiction.

Table 1 presents the numbers of structures in 100yr floodplain and counts of structures at risk of inundation in each watershed based on CFHM Masterplan. The same information is presented in graphical form in **Figure 1**.

A list of 66 watersheds in the City of Austin area and number of structures in 100yr floodplain in full purpose jurisdiction in each of these watersheds where available is included in **Table 3** in *Appendix A*.

Table 1 Structures in Floodplain and at Risk of Flooding based on CFHM Masterplan

	Watershed	Structures in 100yr Floodplain	Inundated in 100yr Flood	Inundated in 25yr Flood	Inundated in 10yr Flood	Inundated in 2yr Flood	Jurisdiction
1	Barton Creek ¹	42	19	8	3	1	Full Purpose
2	Blunn Creek	12	1	0	0	0	Full Purpose
3	Boggy Creek	142	69	48	22	1	Full Purpose
4	Bull Creek ²	56	22	11	1	1	Full Purpose
5	Carson Creek	126	91	73	55	21	Full Purpose
6	Country Club East	12	1	0	0	0	Full Purpose
7	Country Club West	45	9	5	4	0	Full Purpose
8	Dry Creek East	1	0	0	0	0	Full Purpose
9	Dry Creek North	19	2	2	1	1	Full Purpose
10	East Bouldin Creek	67	16	6	0	0	Full Purpose
11	Fort Branch	305	135	43	13	1	Full Purpose
12	Harris Branch	1	1	0	0	0	Full Purpose
13	Johnson Creek	56	8	5	2	0	Full Purpose
14	Little Walnut Creek ³	427	197	67	21	0	Full Purpose
15	Onion Creek	876	829	406	203	0	Full Purpose
16	Rinard Creek	1	0	0	0	0	Full Purpose
17	Shoal Creek	672	281	134	74	6	Full Purpose
18	Slaughter Creek	52	16	0	0	0	Full Purpose
19	South Boggy Creek	52	18	13	2	0	Full Purpose
20	Tannehill Branch	369	109	10	1	0	Full Purpose
21	Waller Creek	368	122	44	21	1	Full Purpose
22	Walnut Creek	249	83	46	24	6	Full Purpose
23	West Bouldin Creek	128	52	27	21	6	Full Purpose
24	West Bull Creek	1	0	0	0	0	Full Purpose
25	Williamson Creek	1039	480	204	71	3	Full Purpose
	Total	5118	2561	1152	539	48	

¹ Barton Creek count includes only structures along Gaines Tributary.

² Bull Creek includes structures in West Bull Creek watershed

³ Little Walnut Creek count includes structures in Buttermilk Branch.

Structure Flooding by Watershed based on CFHM Masterplan

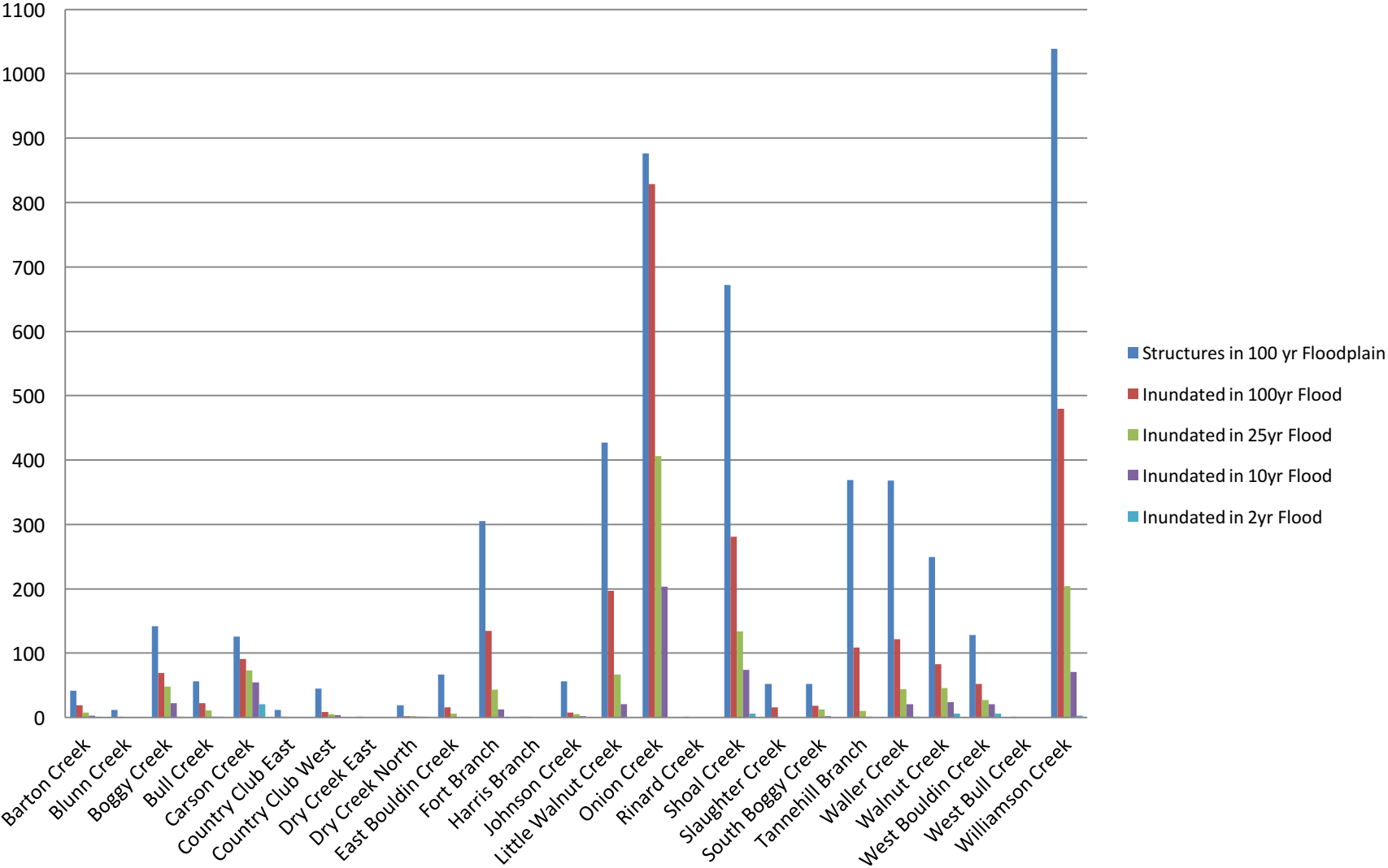


Figure 1 Structures in Floodplain and at Risk of Inundation by Watershed based on CFHM Masterplan

Roadways in at Risk of Flooding in the City of Austin

A total of 393 roadways in 26 watersheds are at-risk of inundation during a 100yr flood in the City of Austin Full Purpose Jurisdiction. This number accounts for 392 roadways identified by the CFHM Masterplan process and 1 additional roadway located by FEWS in the Cuernavaca Creek watershed. The roadways counts from CFHM Master Plan are based on COA 100yr future conditions model.

The following counts were generated from the 25 watersheds in the CFHM 2013 Masterplan:

- Number of roadway crossings in the 100-yr floodplain in the full purpose City limits = 580
- Number of at-risk roadways during a 100-yr storm in the Full Purpose City limits = 392
- Number of at-risk roadways during a 25-yr storm in the Full Purpose City limits = 309
- Number of at-risk roadways during a 10-yr storm in the Full Purpose City limits = 236
- Number of at-risk roadways during a 2-yr storm in the Full Purpose City limits = 95
- Number of roadway crossings in the 100-yr floodplain in all jurisdictions = 733
- Number of roadway crossings at risk for flooding during a 100-yr storm in all jurisdictions = 499

At-risk roadways for different storm events are computed based on > 0ft of water depth at the upstream face of the roadways during a storm event.

Table 2 presents counts of roadways in floodplain and at-risk of flooding by watershed based on CFHM Masterplan. **Figure 2** shows the total counts of roadways at-risk of inundation in each watershed.

Appendix A includes **Table 4** which presents a list of 26 watersheds in the City of Austin area and number of roadways at-risk of inundation in a 100yr storm in Full Purpose Jurisdiction in each of these watersheds.

Table 2 Roadways in Floodplain and at Risk of Flooding based on CFHM Masterplan

	Watershed	Roadways in 100yr Floodplain	Inundated in 100yr Flood	Inundated in 25yr Flood	Inundated in 10yr Flood	Inundated in 2yr Flood	Jurisdiction
1	Barton Creek ¹	7	7	5	5	5	Full Purpose
2	Blunn Creek	9	7	6	1	0	Full Purpose
3	Boggy Creek	25	13	11	8	1	Full Purpose
4	Bull Creek ²	45	26	17	10	5	Full Purpose
5	Carson Creek	16	15	12	12	5	Full Purpose
6	Country Club East	10	6	3	2	2	Full Purpose
7	Country Club West	22	12	11	7	5	Full Purpose
8	Decker Creek	7	2	2	1	1	Full Purpose
9	Dry Creek North	15	13	9	7	4	Full Purpose
10	East Bouldin Creek	16	14	13	11	2	Full Purpose
11	Fort Branch	23	21	21	19	6	Full Purpose
12	Gilleland Creek	3	1	1	0	0	Full Purpose
13	Harris Branch	8	2	2	2	2	Full Purpose
14	Johnson Creek	21	12	8	7	3	Full Purpose
15	Little Walnut Creek ³	35	23	15	13	2	Full Purpose
16	Marble Creek	2	1	1	1	1	Full Purpose
17	Onion Creek	7	3	3	3	1	Full Purpose
18	Shoal Creek	54	46	41	35	11	Full Purpose
19	Slaughter Creek	22	4	3	3	3	Full Purpose
20	South Boggy Creek	13	11	8	1	1	Full Purpose
21	Tannehill	25	19	13	11	2	Full Purpose
22	Waller Creek	49	45	38	31	14	Full Purpose
23	Walnut Creek	58	28	18	13	8	Full Purpose
24	West Bouldin Creek	13	12	9	6	1	Full Purpose
25	Williamson Creek	75	49	39	27	10	Full Purpose
		580	392	309	236	95	

¹ Barton Creek count includes only roadways along Gaines Tributary.

² Bull Creek includes roadways in West Bull Creek watershed

³ Little Walnut Creek includes roadways in Buttermilk Branch.

Roadway Flooding by Watershed based on CFHM Masterplan

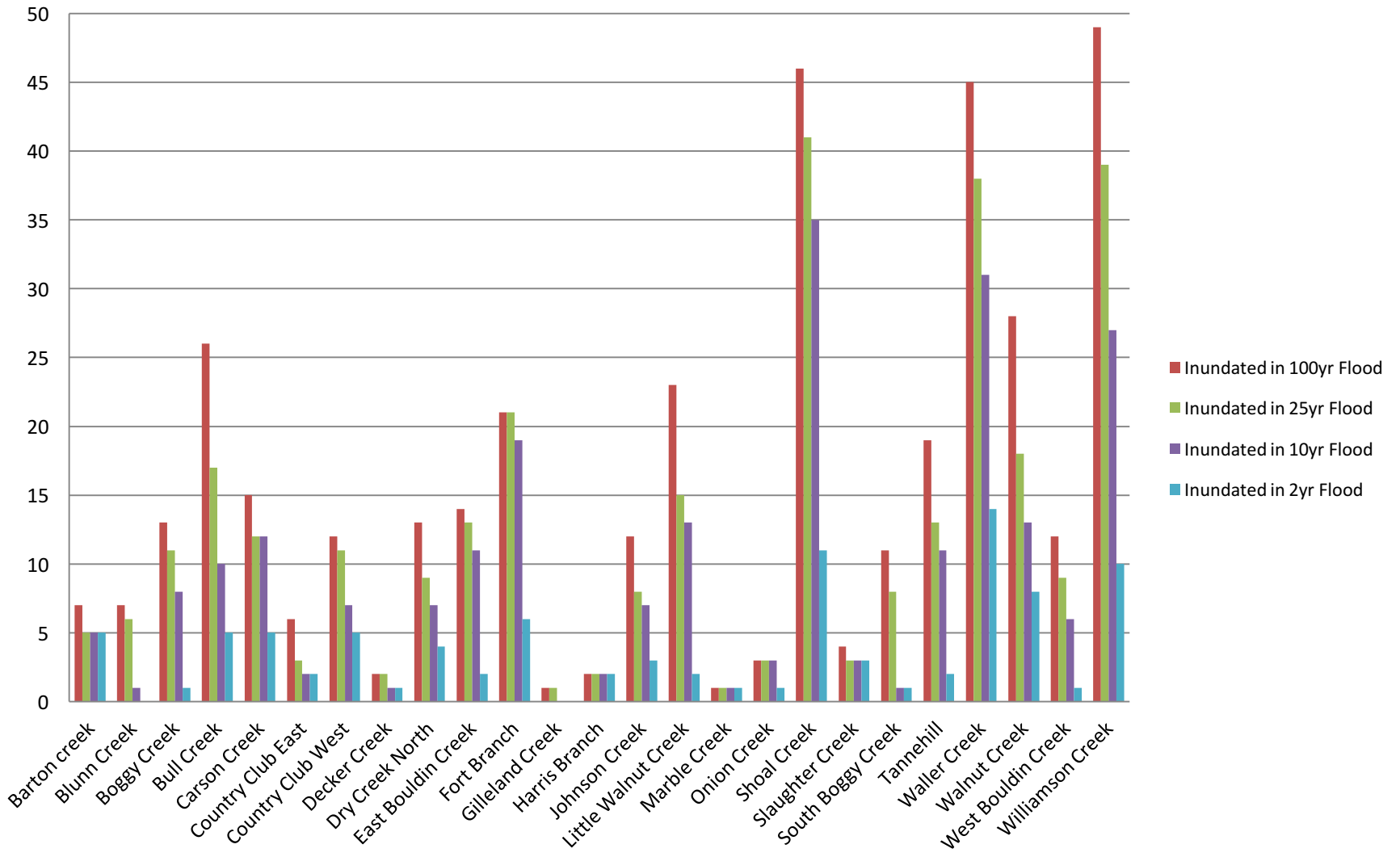


Figure 2 Roadways at Risk of Inundation by Watershed in COA Full Purpose Jurisdiction

APPENDIX A

Table 3 Number of Structures in 100yr Floodplain in the City of Austin watersheds

	Watershed Name	Structures in 100yr Floodplain (CFHM)	Structures in 100yr Floodplain (FPO)	Comments
1	Barton Creek	42		
2	Bear Creek		0	Mostly suburban watershed with new development conforming to current ordinances
3	Bear Creek West		0	No mapped floodplain, current floodplain is backwater from Lake Austin
4	Bee Creek		0	Majority of watershed is outside jurisdiction, with the exception of next to Lake Austin steep terrain prevents building in Floodplain
5	Blunn Creek	12		
6	Boggy Creek	142		CFHM Master plan rescoring in 2013
7	Bohls Hollow		0	Outside COA ETJ, majority is Barton Creek Parks (BCP) lands
8	Bull Creek	56		CFHM Master plan scoring in 2013
9	Buttercup Creek			Outside COA ETJ
10	Carson Creek	126		CFHM Master plan rescoring in 2013/2014
11	Cedar Hollow		0	Outside COA ETJ, almost entirely BCP lands
12	Coldwater Creek		4	Majority of watershed is outside jurisdiction and in BCP lands, with the exception of next to Lake Austin
13	Colorado River		27	
14	Commons Ford Creek			Majority of watershed is outside jurisdiction, with the exception of next to Lake Austin steep terrain prevents building in Floodplain
15	Connors Creek		0	Most of watershed is BCP Lands
16	Cottonmouth Creek			Outside COA Full Purpose
17	Country Club East	12		
18	Country Club West	45		
19	Cuernavaca Creek		2	Majority of watershed is outside jurisdiction, with the exception of next to Lake Austin steep terrain prevents building in Floodplain

	Watershed Name	Structures in 100yr Floodplain (CFHM)	Structures in 100yr Floodplain (FPO)	Comments
20	Decker Creek		0	Majority of watershed is outside jurisdiction
21	Dry Creek East	1		Majority of watershed is outside jurisdiction
22	Dry Creek North	19		
23	Eanes Creek		4	
24	East Bouldin Creek	67		
25	Elm Creek		0	Majority of watershed is outside jurisdiction
26	Fort Branch	305		
27	Gilleland Creek			Majority of watershed is outside jurisdiction
28	Harpers Branch		0	No mapped floodplain
29	Harris Branch	1		
30	Harrison Hollow		0	Majority of watershed is outside jurisdiction and in BCP lands, with the exception of next to Lake Austin
31	Hog Pen Creek		0	No mapped floodplain with exception of backwater from Lake Austin, half of watershed is in BCP lands
32	Honey Creek		0	Majority of watershed is outside jurisdiction and in BCP lands, with the exception of next to Lake Austin
33	Huck's Slough		0	No mapped floodplain
34	Johnson Creek	56		
35	Lake Austin		178	
36	Lake Creek		14	
37	Lake Travis		0	
38	Little Barton Creek		0	Outside COA ETJ
39	Little Bear Creek		0	
40	Little Bee Creek		0	
41	Little Walnut Creek	427		
42	Maha Creek		0	Outside COA Full Purpose
43	Marble Creek		32	Majority of watershed is outside of jurisdiction
44	North Fork Dry Creek		0	Outside COA Full Purpose
45	Onion Creek	876	3	
46	Panther Hollow		0	Half of watershed is BCP lands, steep terrain prevents building in floodplain

	Watershed Name	Structures in 100yr Floodplain (CFHM)	Structures in 100yr Floodplain (FPO)	Comments
47	Rattan Creek		1	Email from Kevin S. on 2014/06/30. Floodplain from Upper Brushy creek study.
48	Rinard Creek	1		Majority of watershed is outside jurisdiction
49	Running Deer Creek		0	Majority of watershed is outside jurisdiction, with the exception of next to Lake Austin
50	Shoal Creek	672		CFHM Master plan rescoring in 2013/2014
51	Slaughter Creek	52		
52	South Boggy Creek	52		
53	South Brushy Creek		0	Majority of watershed is outside jurisdiction, with new development conforming to current ordinances
54	South Fork Dry Creek		0	Outside COA Full Purpose
55	St. Stephens Creek		11	
56	Steiner Creek		0	Majority of watershed is outside jurisdiction, with the exception of next to Lake Austin
57	Tannehill Branch	369		CFHM Master plan scoring in 2013
58	Taylor Slough North		0	No mapped floodplain, current floodplain is backwater from Lake Austin
59	Taylor Slough South		1	No mapped floodplain, current floodplain is backwater from Lake Austin
60	Ladybird Lake		25	
61	Turkey Creek		25	Half of watershed is BCP lands, steep terrain prevents building in floodplain
62	Waller Creek	368		
63	Walnut Creek	249		
64	West Bouldin Creek	128		
65	West Bull Creek	1		
66	Williamson Creek	1039		

	Subtotal	5118	681	
--	----------	------	-----	--

	Total		5799	
--	-------	--	------	--

** Structures in Buttermilk Branch are included in the count for Little Walnut Creek

Table 4 Number of Roadways at Risk of Flooding During a 100yr Flood in the City of Austin Full Purpose Jurisdiction

	Watershed	Roadways at Risk of Inundation in a 100yr Storm (CFHM)	Roadways at Risk of Inundation in a 100yr Storm (FEWS)	Comments
1	Barton creek	7		Only includes roadways along Gaines Tributary.
2	Blunn Creek	7		
3	Boggy Creek	13		CFHM Master plan rescoring in 2013.
4	Bull Creek	26		CFHM Master plan scoring in 2013. Includes roadways in West Bull.
5	Carson Creek	15		CFHM Master plan rescoring in 2013.
6	Country Club East	6		
7	Country Club West	12		
8	Cuernavaca Creek		1	LWC on River Hills Road.
9	Decker Creek	2		
10	Dry Creek North	13		
11	East Bouldin Creek	14		
12	Fort Branch	21		CFHM Master plan rescoring in 2013.
13	Gilleland Creek	1		
14	Harris Branch	2		
15	Johnson Creek	12		
16	Little Walnut Creek	23		Includes roadways in Buttermilk Branch.
17	Marble Creek	1		
18	Onion Creek	3		
19	Shoal Creek	46		CFHM Master plan rescoring in 2013.
20	Slaughter Creek	4		
21	South Boggy Creek	11		
22	Tannehill	19		CFHM Master plan scoring in 2013.
23	Waller Creek	45		
24	Walnut Creek	28		
25	West Bouldin Creek	12		
26	Williamson Creek	49		
	Subtotal	392	1	

	Total		393	
--	-------	--	------------	--

** Roadway counts are within the COA full purpose jurisdictions.