

City of Columbia Council Worksession

Hinkson TMDL

February 16, 2011

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Table 11. Hinkson Creek and Reference Streams Used in TMDL Reduction Analysis

Stream	Watershed Size* (mi ²)	USGS Gauging Station No.	Flow Analysis Period
Hinkson Creek	69.8	06910230	Oct 2007-Sept 2010
Big Creek	414	06921720	Oct 1965 - Sept 2010
Middle Fork Salt River	313	05506350	Oct 1999 - Sept 2010
North River	354	05501000	Oct 1960 - Sept 2010
S. Fabius River	620	05500000	Oct 1960 - Sept 2010

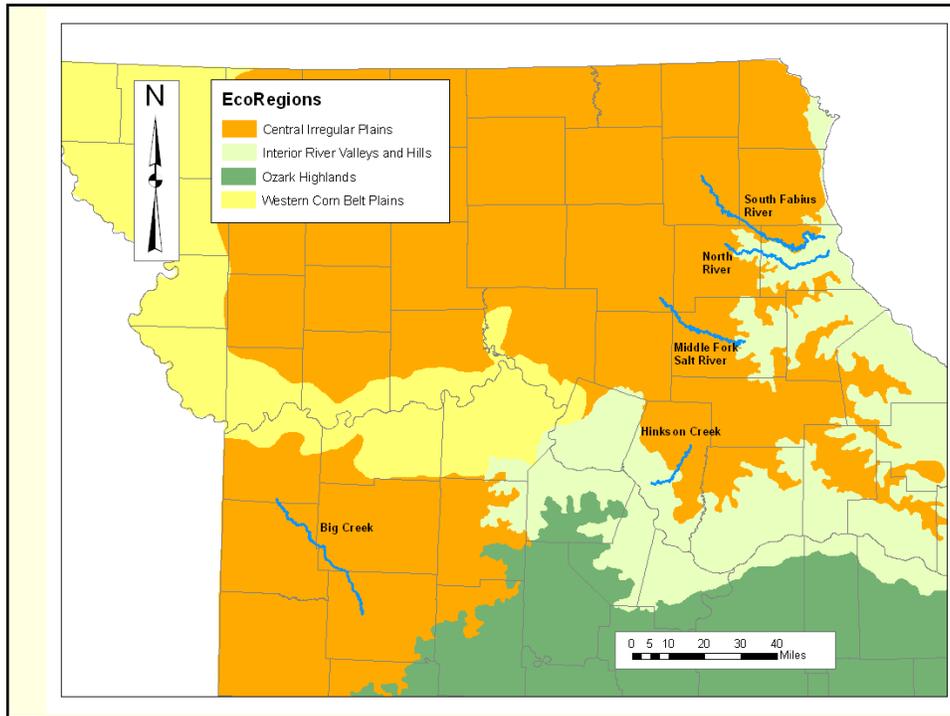


Figure 9. Annualized Flow Duration Curves based on water year data for Hinkson Creek and Reference Streams at USGS Hinkson Gaging Station

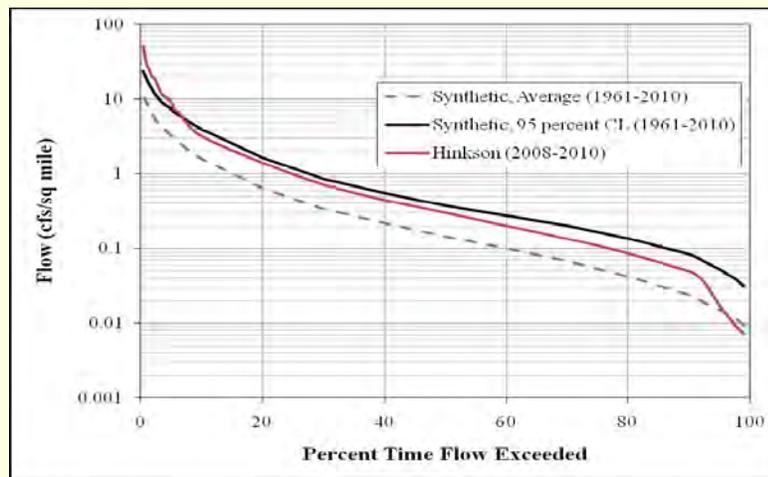


Table 13. Flows for Hinkson Creek and Reference Streams with Target Changes at USGS Hinkson Creek Gaging Station

Flow Duration (percent)	Current Hinkson (cfs/sq mile)	TMDL (Synthetic Flow, 95th percent CL, cfs/sq mile)	Difference (percent)
1	29.95	18.83	37.1
3	14.45	10.31	28.7
5	8.93	7.31	18.1
7	5.56	5.56	0
10	3.15	3.96	-
30	0.72	0.86	-
50	0.3	0.38	-
70	0.2	0.13	-
90	0.05	0.08	-

Table 14. Estimated Runoff Coefficients Based on the Percent of Imperviousness

Land Use (2005 Data)	Area (sq miles)	Percent Imperviousness	Rv	Rv* Area	Weighted Rv	Percent Runoff
<i>WLA (Columbia)</i>	33.12				0.31	64
Impervious	3.11	100	0.95	2.95		
High Intensity Urban	1.85	45	0.46	0.85		
Low Intensity Urban	10.01	30	0.32	3.2		
Cropland	1.48	2	0.07	0.1		
Grassland	8.57	2	0.07	0.6		
Sub-total	25.02			7.68		
<i>Rest of Watershed/LA</i>	56.63				0.11	36
Impervious	1.15	100	0.95	1.09		
High Intensity Urban	0.1	45	0.46	0.05		
Low Intensity Urban	2.38	30	0.32	0.76		
Cropland	8.76	2	0.07	0.61		
Grassland	25.97	2	0.07	1.82		
Sub-total	38.35			4.26		
<i>Total Watershed</i>	89.75					

Table 15. Storm Water TMDL and its Allocation at the Outlet of Hinkson Creek Watershed

Percent Flow Exceedance	3	5	10	30	50	70	90
Synthetic Flow/TMDL (cfs)	925.3	656.1	355.4	77.2	34.1	18.0	7.2
Hinkson Creek Flow (cfs)	1296.9	801.5	282.7	64.6	26.9	11.7	4.5
Difference in Flow (cfs)	371.6	145.4	-72.7	-12.6	-7.2	-6.3	-2.7
Target Percent Increase (+)/Decrease(-)	28.7	18.1	-25.7	-19.4	-26.7	-53.8	-60.0
Portion Attributable to WLA (Columbia) (cfs)	239.1	93.5	-	-	-	-	-
Portion Attributable to LA (cfs)	132.5	51.8	-	-	-	-	-
WLA Percent Reduction	39.6	26.5	-	-	-	-	-
LA Percent Reduction	19.1	11.5	-	-	-	-	-

Results of Macroinvertebrate Studies by DNR from 2001-2006

Table 8. Stream Condition Index Scores for Hinkson Creek (MDNR 2002)

Site No.	Site	Fall 2001	Spring 2002	Fall 2003	Spring 2004	Spring 2005	Fall 2005	Spring 2006
8	Rogers Rd.	12	16					
7	Hinkson Creek Rd.	12	18	18	18	18	18	
6.5	Hwy 63 Connector				17*			
6	Walnut Street	12	12	16	14	18	16	
5.5	Broadway St.			16	16	16	12	
5	Capen Park	16	12					
4	Rock Quarry Rd.	17*	14					
3.5	Recreation Dr.					14	14	
3	Forum Blvd.	18	14					16
2	Twin Lakes	16	14					12
1	Scott Rd.	14	14					16

* represents the mean of two duplicate samples

Note: Some SCI scores in this table (italics) may vary from what is reported in the four surveys. This is due to the data being rescored based on more recent sampling of reference streams in the ecoregion.

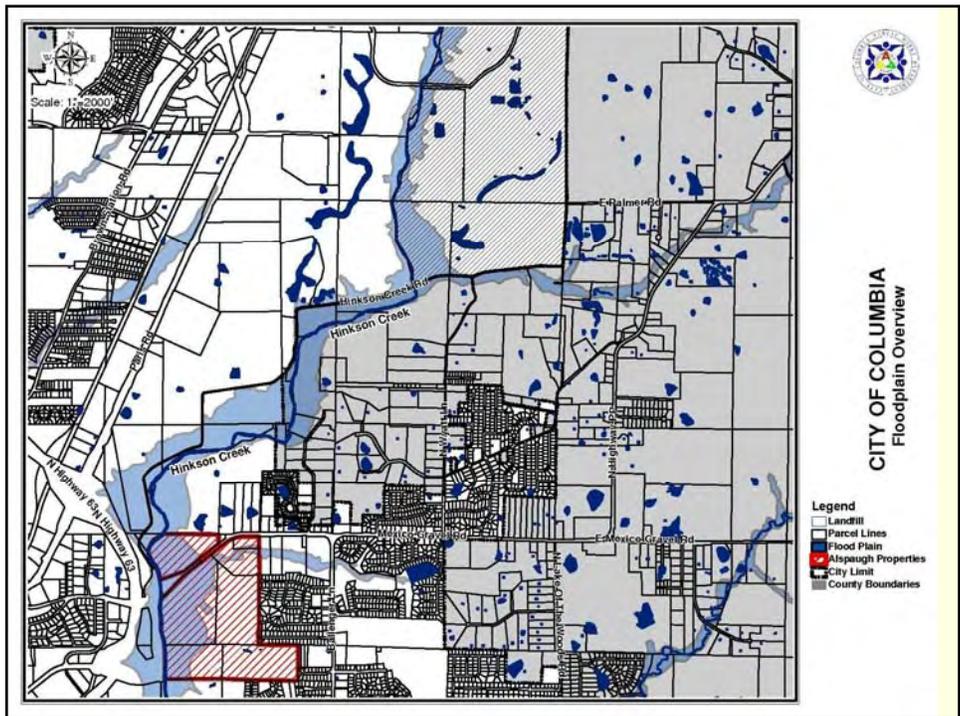
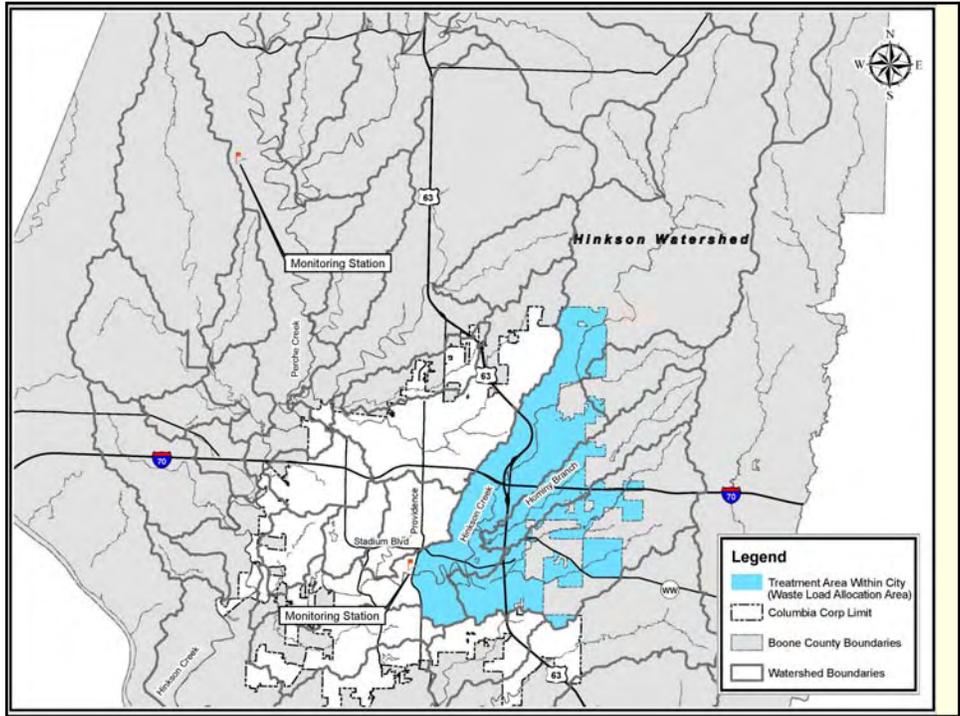
Secondary Target

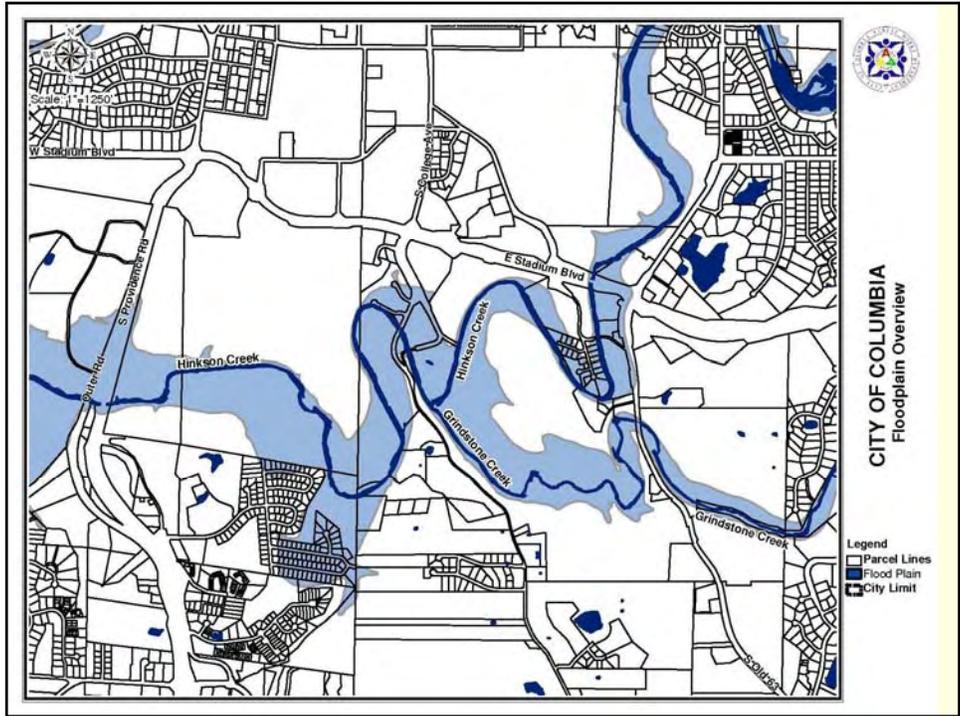
- ...secondary target for determining whether Hinkson Creek is attaining WQS is for the water body to receive a **fully supporting biological rating for all sites surveyed**.

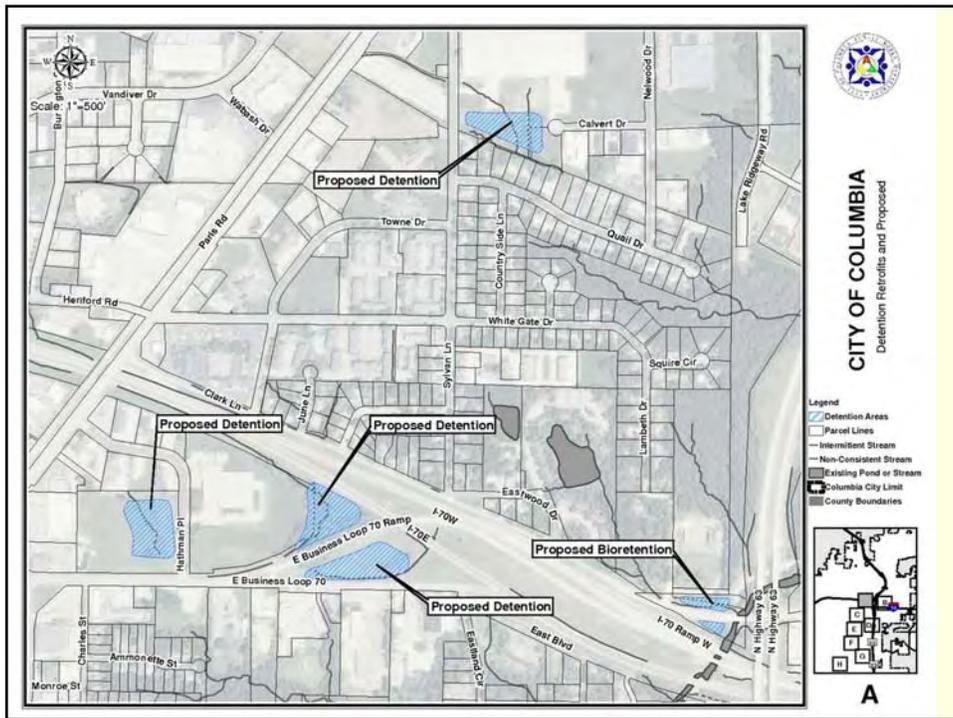
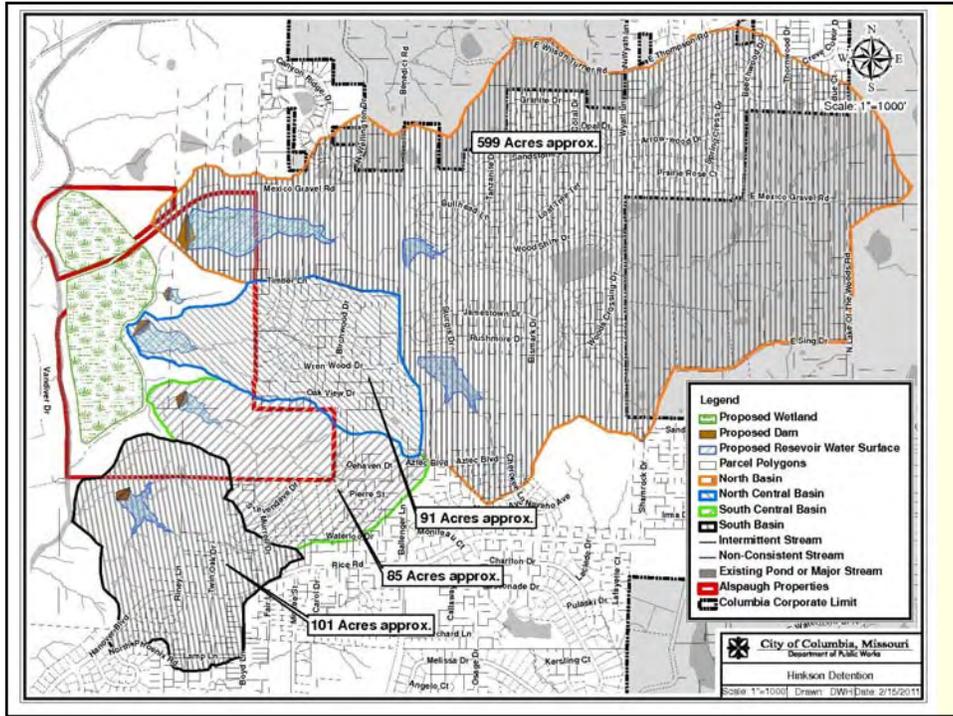
Table 8 indicates that across all four of the water quality studies downstream of Interstate 70 (site 6.5 through site 1), 13 of 26 sampling events or 50 percent, were rated as fully supporting the aquatic life designated use. In contrast, **93 percent** of all invertebrate samples collected in the reference streams for Hinkson Creek's ecoregion show normal, fully supporting invertebrate communities. The secondary target of **100 percent** of all sites surveyed receiving a fully supporting rating can be accomplished through actions and BMPs used to reduce storm water runoff.

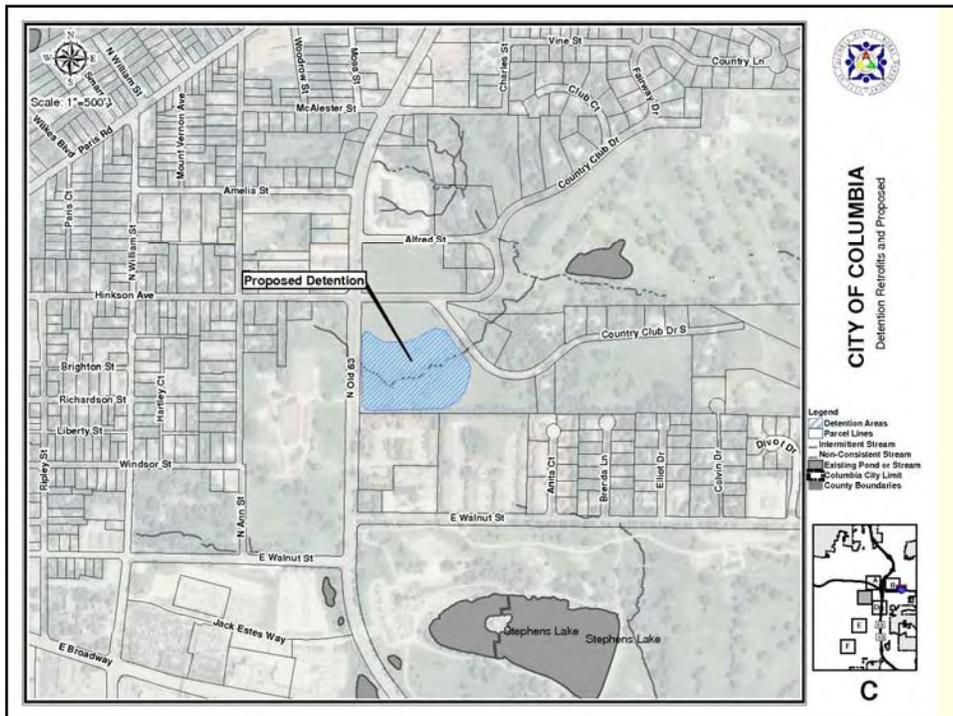
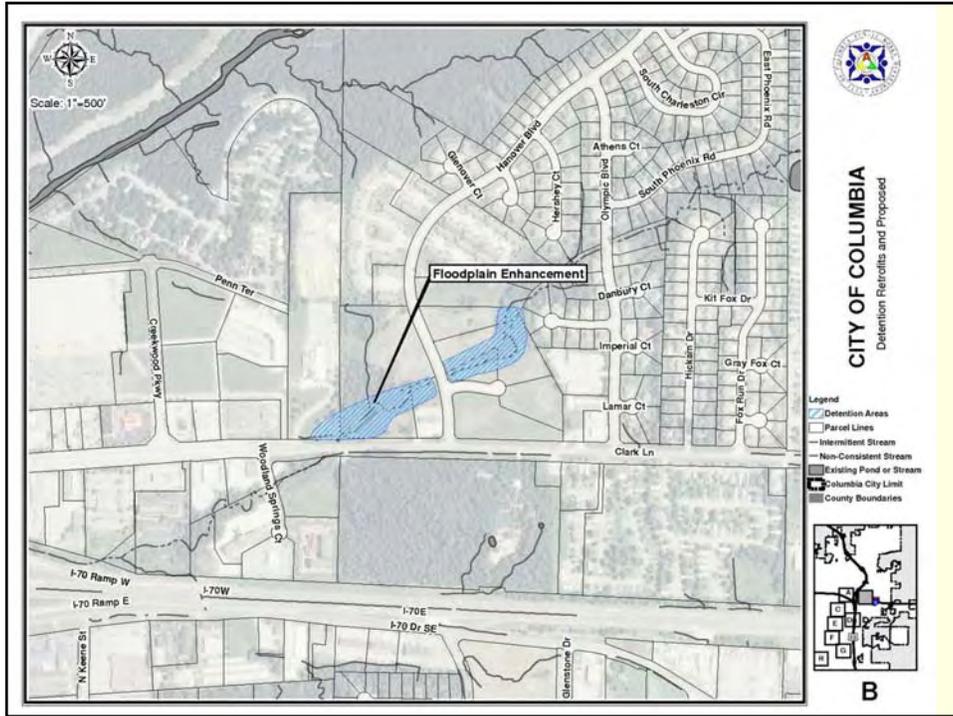
10. Monitoring Plans (pg 43)

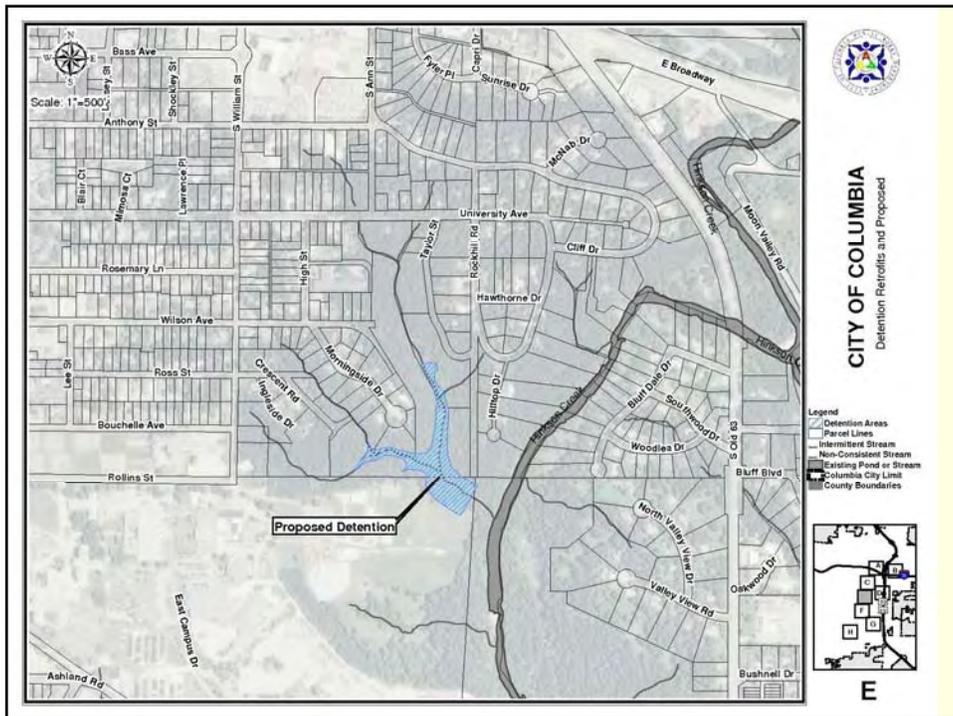
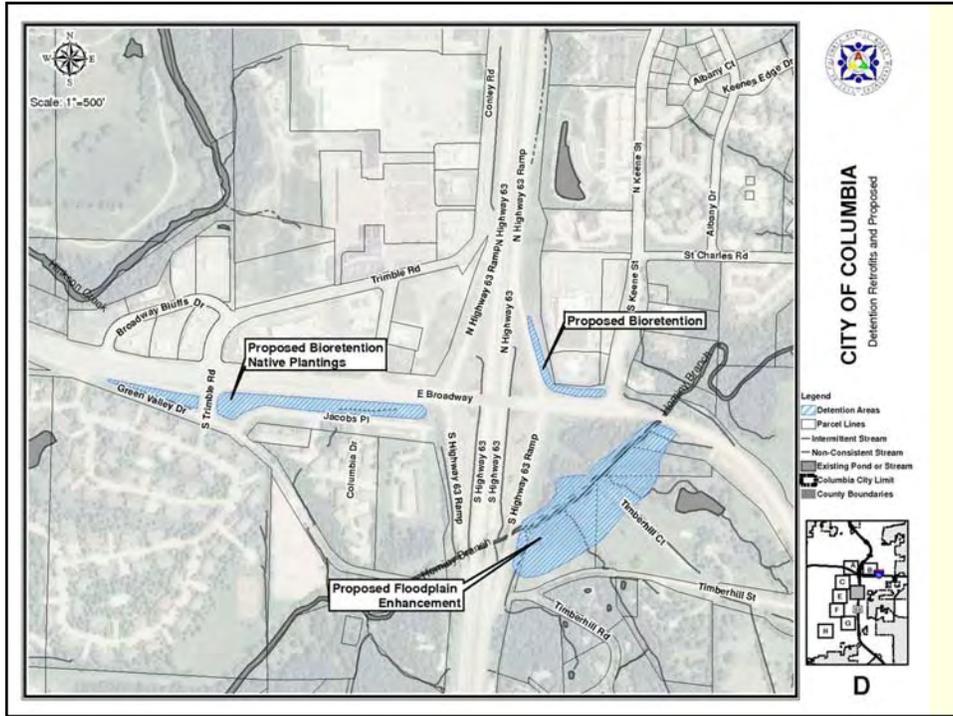
- In the first phase of implementation of the TMDL, EPA recommends assessment of the biocommunity to be conducted. In addition, MDNR intends to conduct a follow-up bioassessment of Hinkson Creek, including collection of water quality data, once substantial implementation of the TMDL has occurred, **typically three to five years**. Chloride data will also continue to be collected by volunteer water quality monitors to determine trends in chloride concentrations in Hinkson Creek.

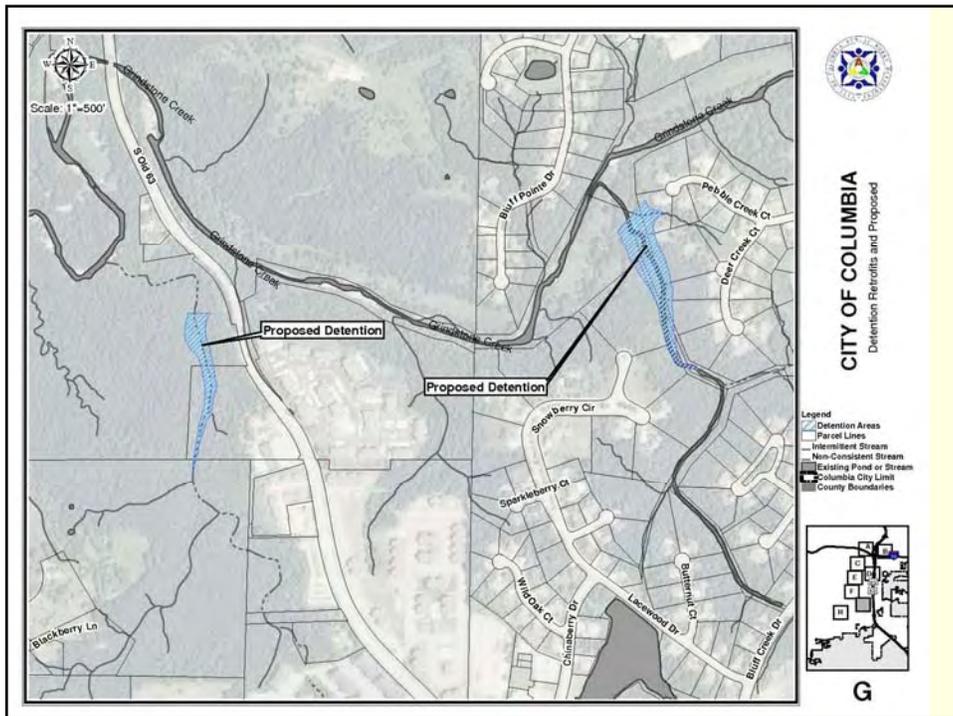
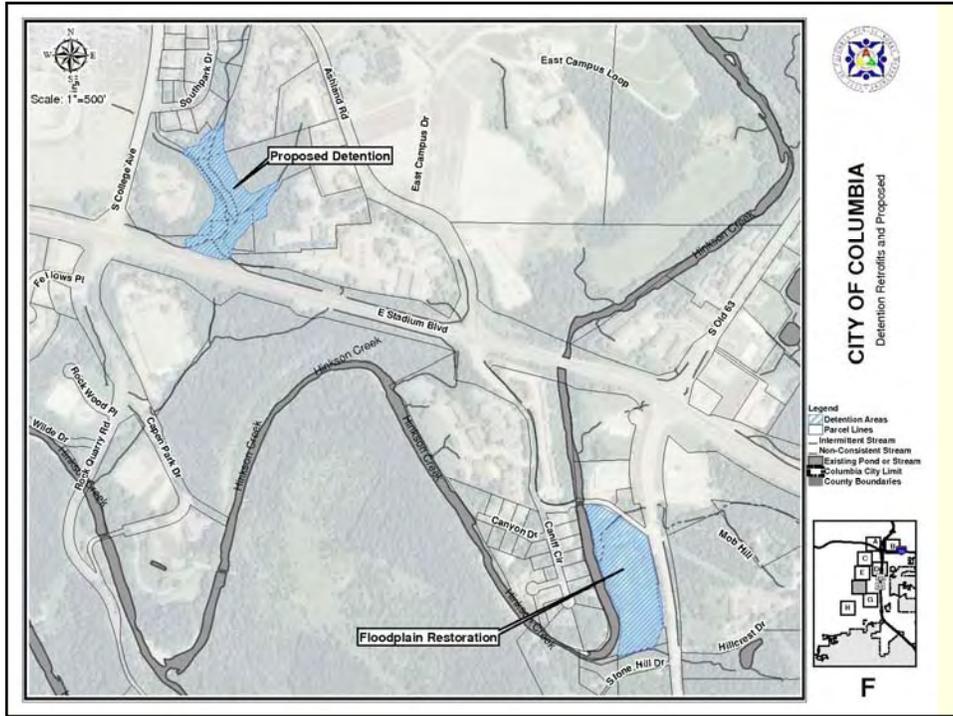


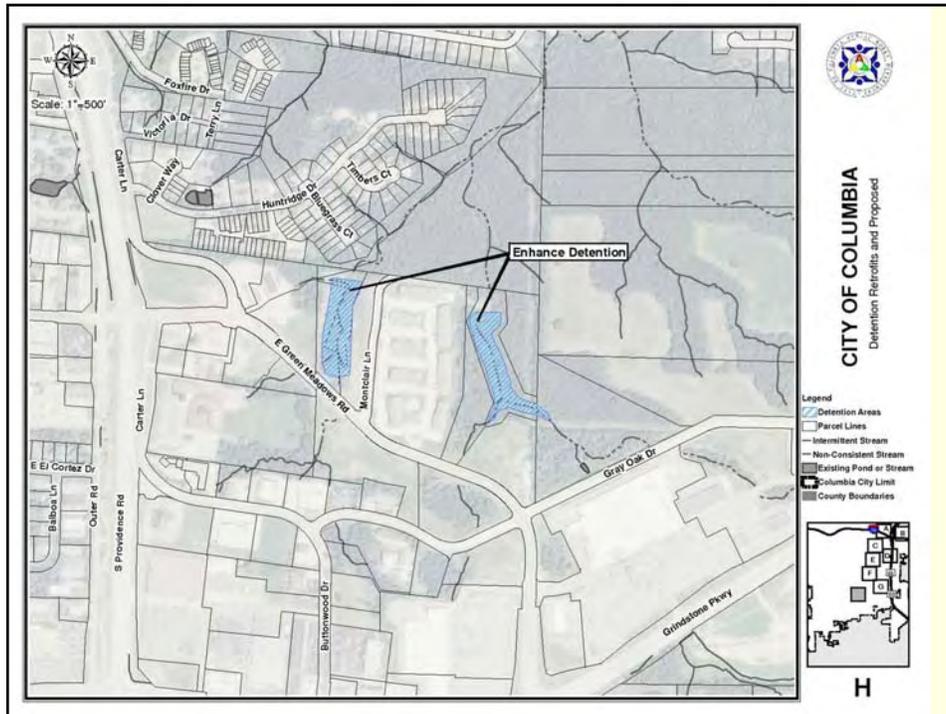








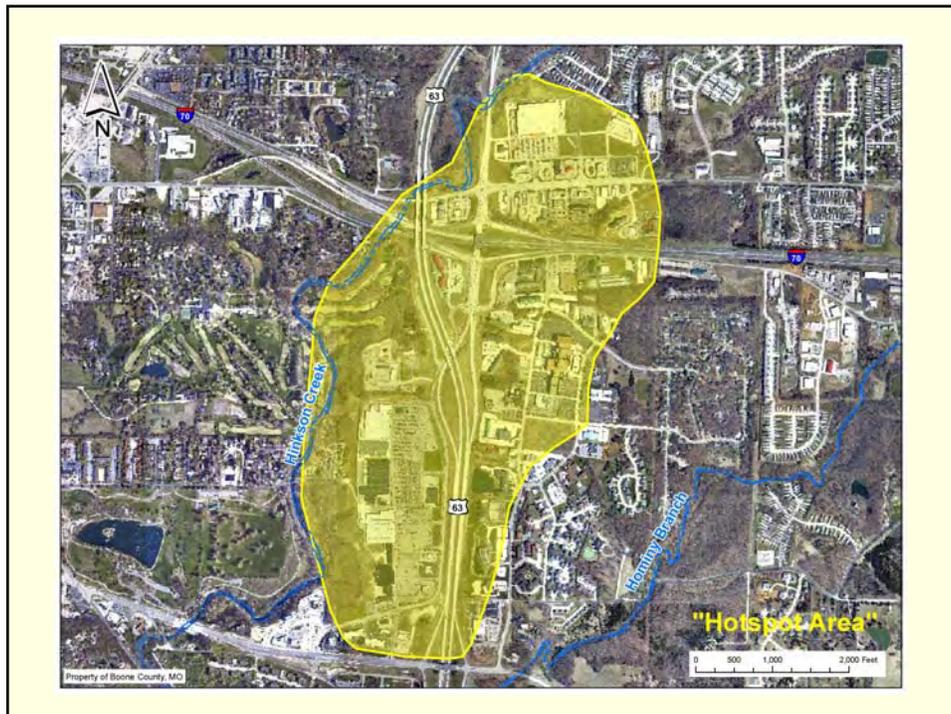




Staff Proposed Next Steps

- Appeal the 100% supporting 100% of the time and the 3 to 5 year schedule
- Negotiate Implementation Schedule with MDNR
- Start Macroinvertebrate Monitoring Program this year (Need to Identify funding)
- Demonstration Projects (Need to Identify funding)
- Place Storm Water utility rate increase on August election. (Council needs to approve by May)

Boone County
Hinkson Creek Watershed
Restoration Project Phase 2
319 Grant
Hot-Spot Analysis





Hotspot Area

- Delineated by Missouri DNR and the Hinkson Grant
 - Based on early results of Hinkson studies showing problems between I-70 and Broadway
- Approx. 355 acres (1.7% of TMDL WLA area)
- 20 Potential Sites Identified by Study
- Treatments focus on 1/2" to 1" rain events
- By Consultant's Estimate (A Civil Group):
 - Reduction in 1yr flow leaving Hot Spot Area: 40%
 - Total cost for all sites: \$1.1 Million (Does not include Right-of Way)



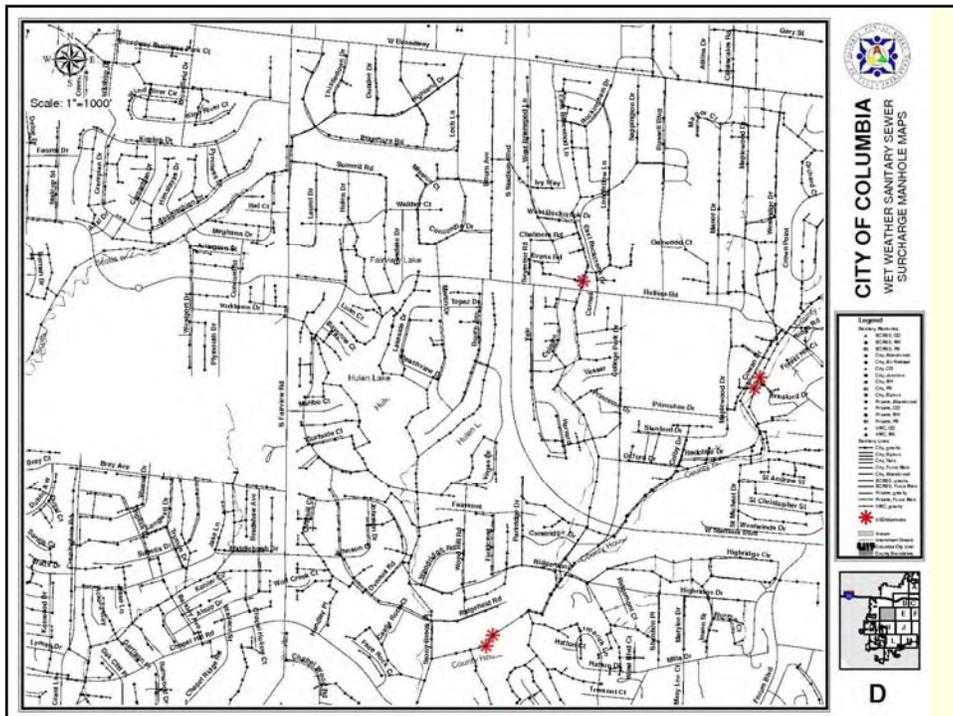




Sanitary Sewer Overflows and Inflow & Infiltration (I&I) Reduction Program

Wet Weather SSO & WIB Summary

FY Year	Precipitation Inches	WIB	SSO	FY Year	Precipitation Inches	WIB	SSO
2010	53	31	117	1992	62	2	0
2009	52	17	30	1991	34	0	0
2008	60	12	38	1990	35	30	1
2007	38	0	0	1989	54	0	0
2006	30	0	0	1988	35	1	0
2005	40	0	0	1987	31	2	0
2004	47	18	5	1986	34	25	1
2003	41	0	0	1985	42	9	0
2002	42	10	0	1984	55	16	0
2001	44	6	5	1983	51	10	0
2000	41	3	2	1982	46	5	0
1999	40	1	3	1981	48	13	4
1998	30	1	0	1980	49	0	0
1997	45	1	1	1979	24	14	0
1996	37	0	2	1978	32	2	0
1995	40	11	1	1977	38	5	4
1993	38	12	1	1976	37	3	0



Reimbursement Program Eligibility

- Single Family Residence
- Constructed prior to 1996
- Property is in a target study area
- Private I&I Sources shown in Table #1

I&I Reduction Program Table #1

Private I&I Source	Maximum City Reimbursement
Sump Pump (disconnect existing pump from sewer and permanently discharge outside residence)	\$1,000
Downspout (up to 4)	\$500
Uncapped Cleanout (s)	\$75 each
Lateral Connection	\$2,500