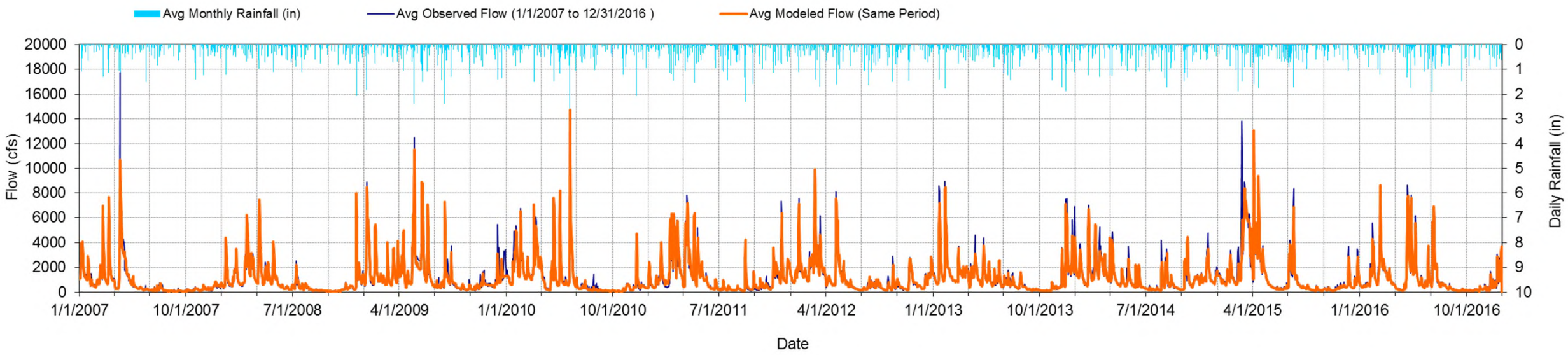
Group E3 TMDL
Upper Guyandotte River Watershed
Draft Model Hydrology Calibration
October 5, 2017

Model Outlet 2001 vs. USGS 03203600 Guyandotte River at Logan, WV

Mean Daily Flow



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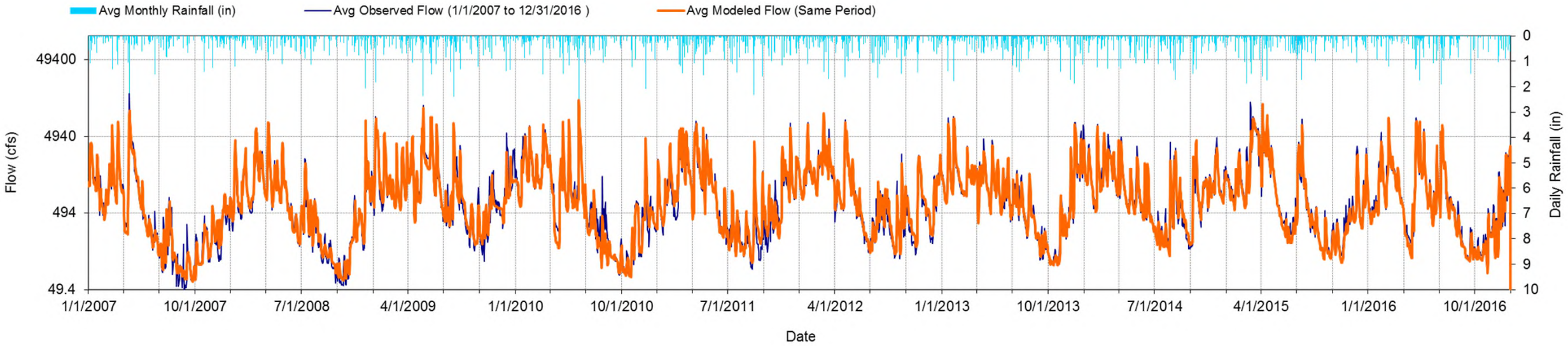
Mean Daily Flow Log Scale



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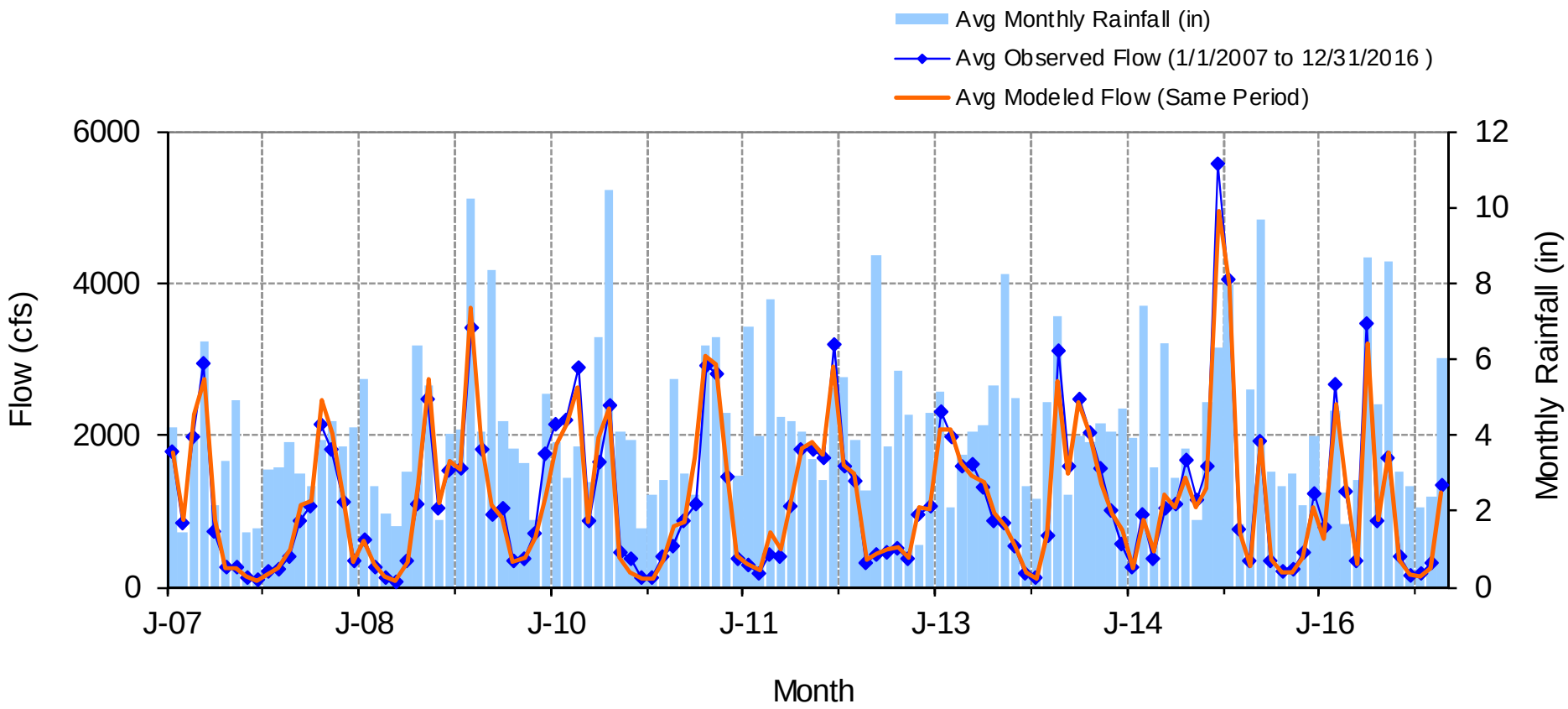
Mean Monthly Flow



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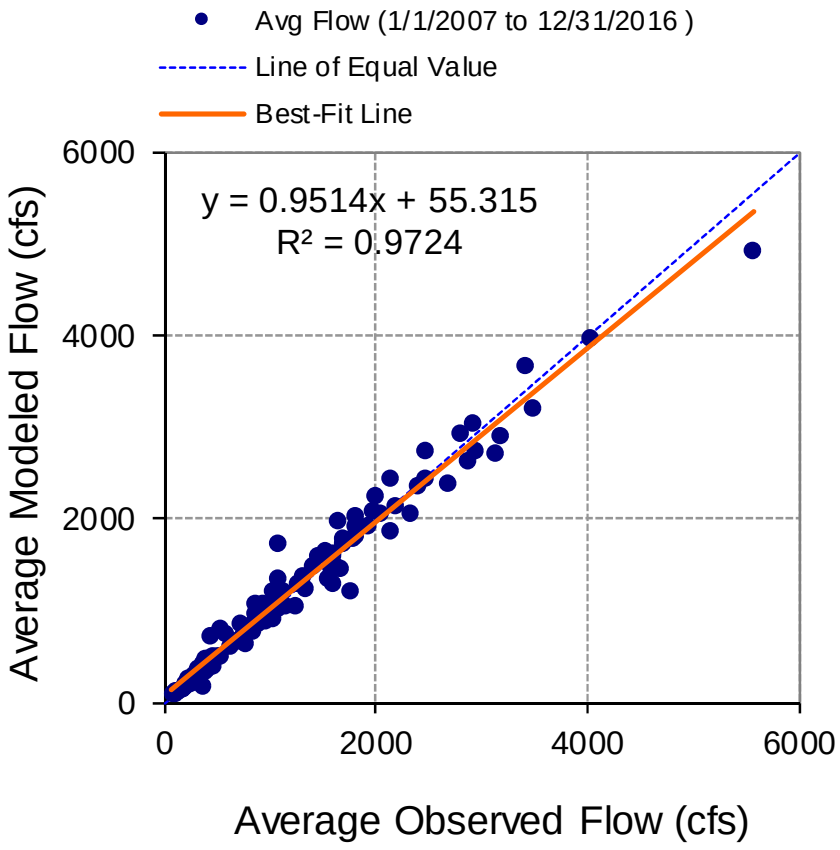
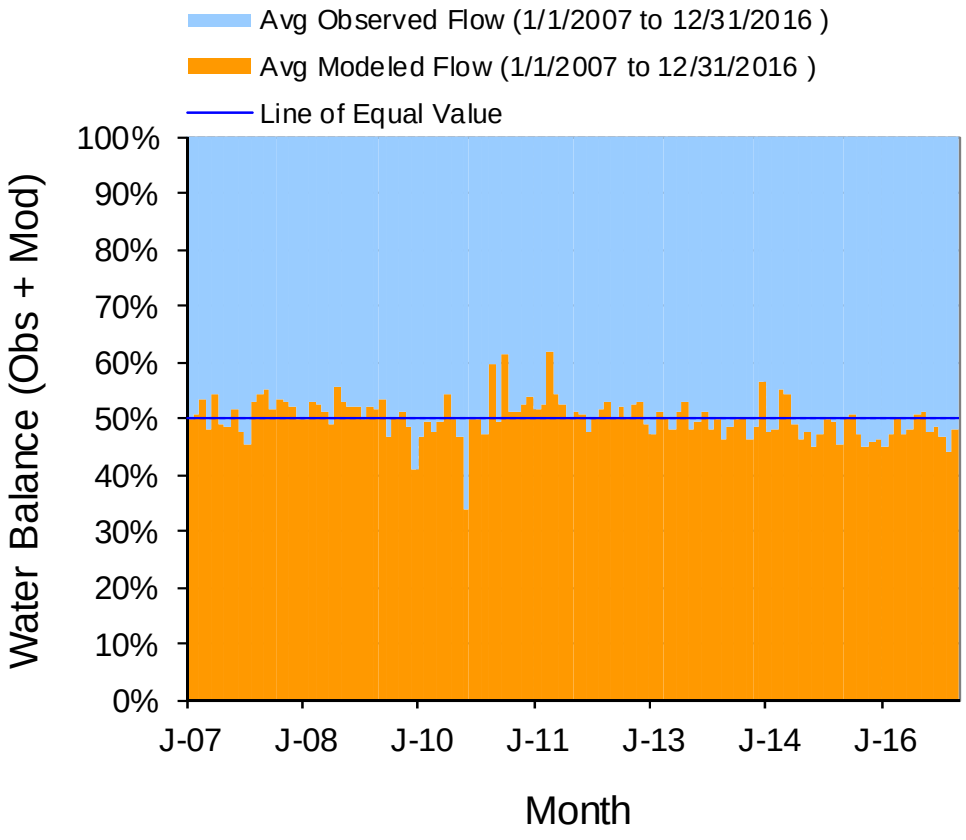
Monthly Regression and Temporal Variation





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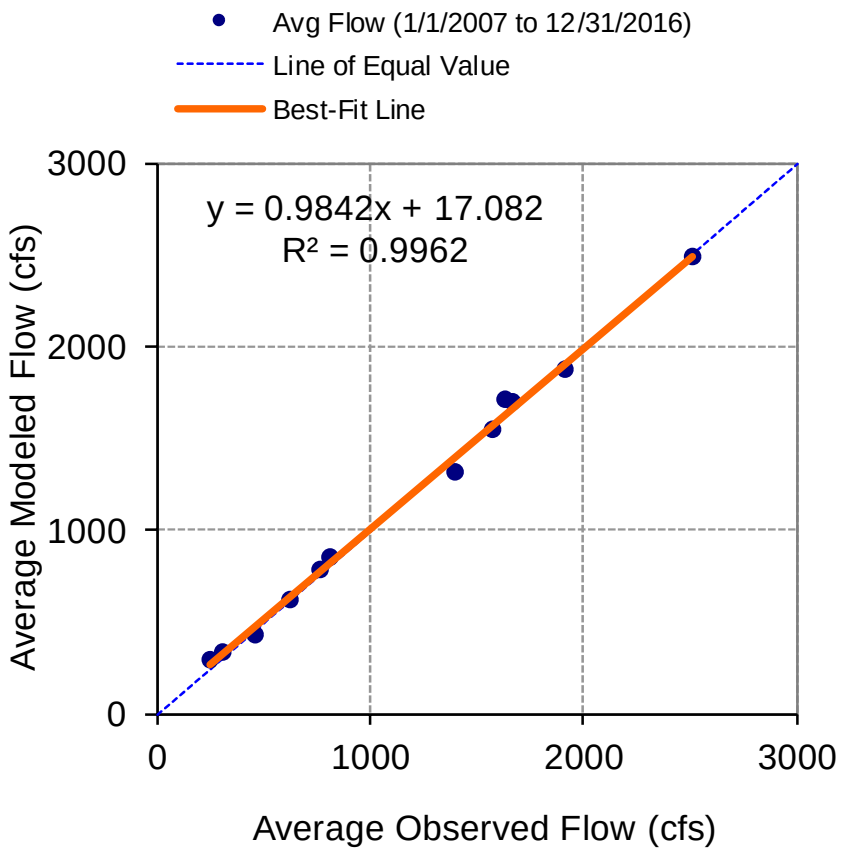
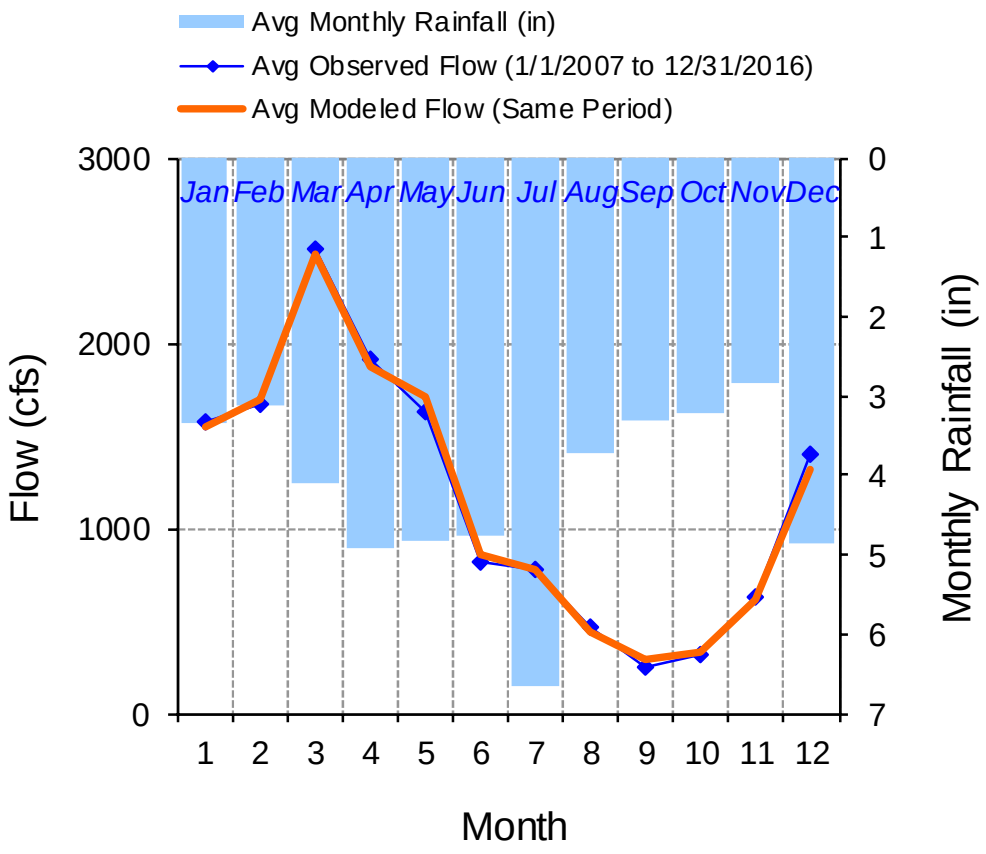
Seasonal Regression and Temporal Aggregate





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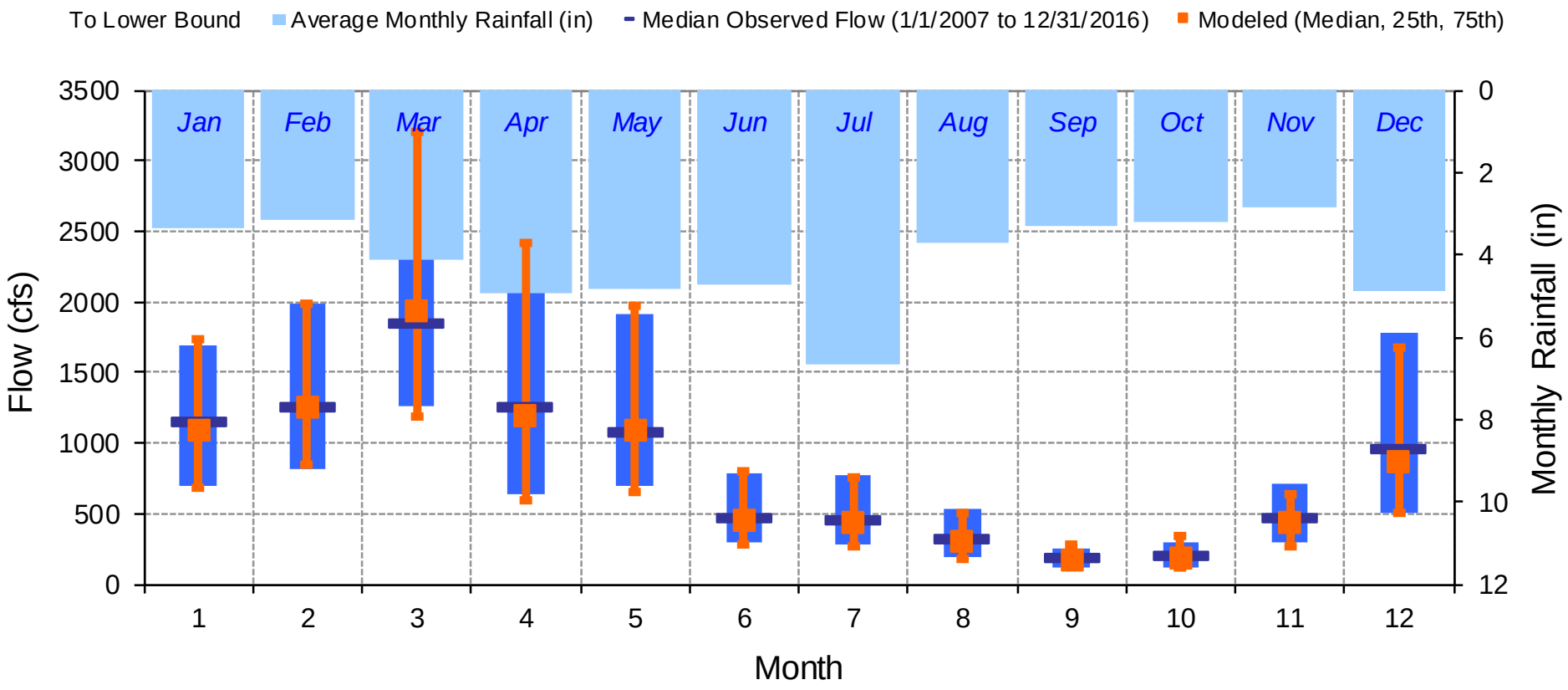
Seasonal Medians and Ranges



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Seasonal Summary

MONTH	OBSERVED FLOW (CFS)				MODELED FLOW (CFS)			
	MEAN	MEDIAN	25TH	75TH	MEAN	MEDIAN	25TH	75TH
Jan	1578.75	1135.00	696.25	1697.50	1546.75	1096.91	684.08	1728.28
Feb	1664.60	1240.00	811.50	1980.00	1692.89	1253.10	838.13	1990.79
Mar	2510.73	1835.00	1260.00	3042.50	2484.29	1928.82	1193.32	3210.38
Apr	1914.67	1240.00	641.25	2372.50	1878.01	1189.48	596.52	2415.95
May	1633.92	1065.00	700.25	1910.00	1708.92	1087.97	654.29	1978.73
Jun	815.36	447.00	302.25	790.25	856.84	445.51	280.05	798.95
Jul	772.36	433.50	286.25	770.00	782.73	441.52	271.23	751.58
Aug	467.05	304.50	191.75	535.25	434.11	305.99	180.38	508.55
Sep	256.66	170.50	126.00	253.25	291.16	169.92	128.36	277.02
Oct	311.26	188.50	121.50	300.50	331.87	187.11	112.98	346.30
Nov	624.58	459.50	302.25	713.25	618.12	438.28	266.59	641.68
Dec	1403.75	939.50	509.50	1777.50	1312.04	868.42	500.87	1668.97

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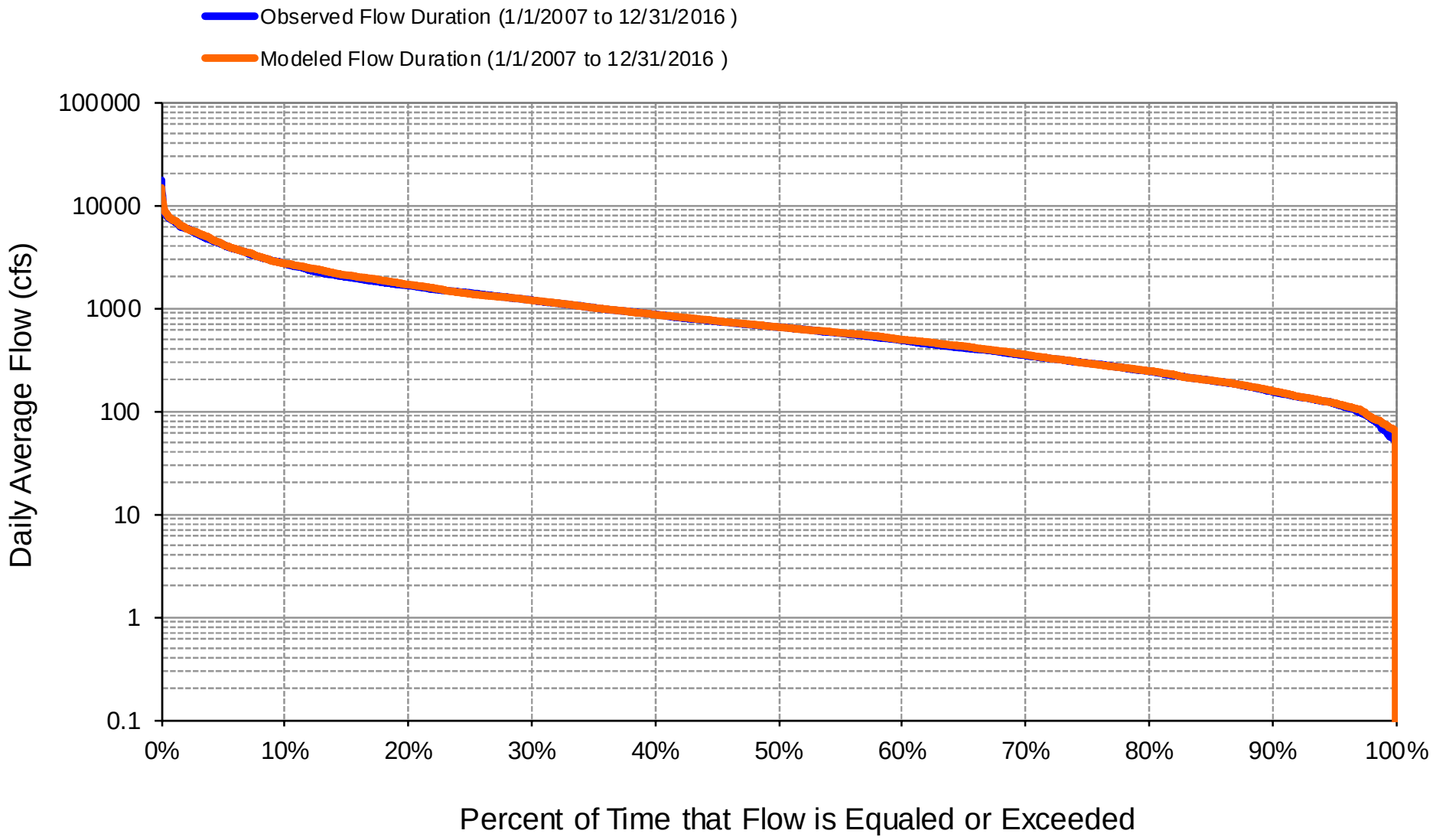
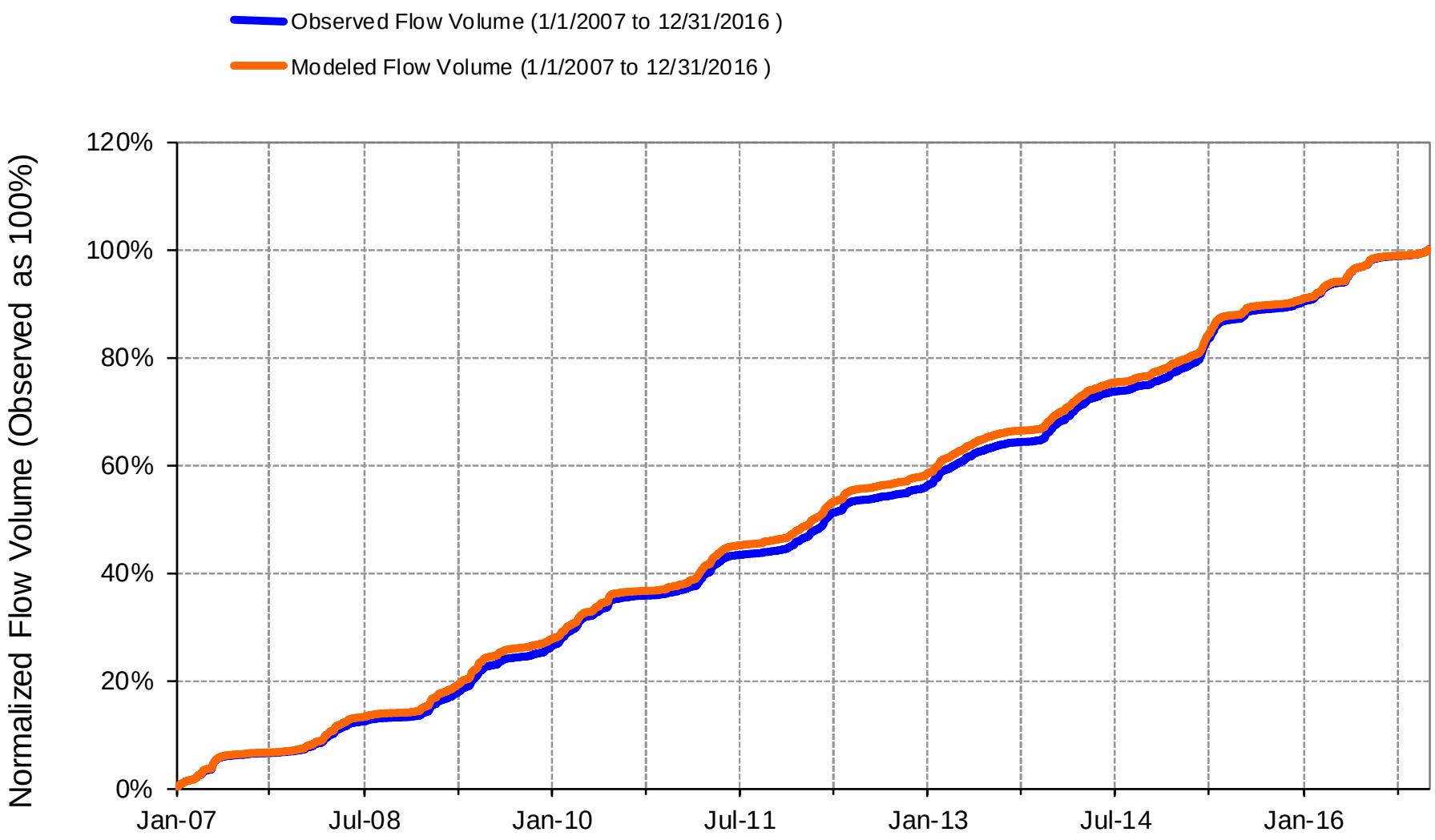

Observed Flow Duration (1/1/2007 to 12/31/2016)
Modeled Flow Duration (1/1/2007 to 12/31/2016)
Daily Average Flow (cfs)
100000
10000
1000
100
10
1
0.1
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time that Flow is Equaled or Exceeded


Observed Flow Volume (1/1/2007 to 12/31/2016)
Modeled Flow Volume (1/1/2007 to 12/31/2016)
Normalized Flow Volume (Observed as 100%)
120%
100%
80%
60%
40%
20%
0%
Jan-07
Jul-08
Jan-10
Jul-11
Jan-13
Jul-14
Jan-16

LSPC Simulated Flow		Observed Flow Gage	
REACH OUTFLOW FROM SUBBASIN 2001		USGS 03203600 GUYANDOTTE RIVER AT LOGAN, WV	
10-Year Analysis Period: 1/1/2007 - 12/31/2016 Flow volumes are (inches/year) for upstream drainage area		Hydrologic Unit Code: 5070101 Latitude: 37.84232616 Longitude: -81.9759574 Drainage Area (sq-mi): 833	
Total Simulated In-stream Flow:	**18.92**	Total Observed In-stream Flow:	**18.95**
Total of simulated highest 10% flows:	**7.65**	Total of Observed highest 10% flows:	**7.68**
Total of Simulated lowest 50% flows:	**2.62**	Total of Observed Lowest 50% flows:	**2.63**
Simulated Summer Flow Volume (months 7-9):	**2.07**	Observed Summer Flow Volume (7-9):	**2.06**
Simulated Fall Flow Volume (months 10-12):	**3.10**	Observed Fall Flow Volume (10-12):	**3.21**
Simulated Winter Flow Volume (months 1-3):	**7.72**	Observed Winter Flow Volume (1-3):	**7.76**
Simulated Spring Flow Volume (months 4-6):	**6.03**	Observed Spring Flow Volume (4-6):	**5.92**
Total Simulated Storm Volume:	**7.74**	Total Observed Storm Volume:	**7.67**
Simulated Summer Storm Volume (7-9):	**0.84**	Observed Summer Storm Volume (7-9):	**0.90**

Errors (Simulated-Observed)	*Error Statistics*	*Recommended Criteria*	*last run*	
Error in total volume:	-0.14	10		
Error in 50% lowest flows:	-0.31	10		
Error in 10% highest flows:	-0.32	15		
Seasonal volume error - Summer:	0.73	30		
Seasonal volume error - Fall:	-3.34	30		
Seasonal volume error - Winter:	-0.58	30		
Seasonal volume error - Spring:	1.86	30		
Error in storm volumes:	0.88	20		
Error in summer storm volumes:	-7.13	50		
Nash-Sutcliffe Coefficient of Efficiency, E:	0.852	Model accuracy increases		
Baseline adjusted coefficient (Garrick), E':	0.752	as E or E' approaches 1.0		