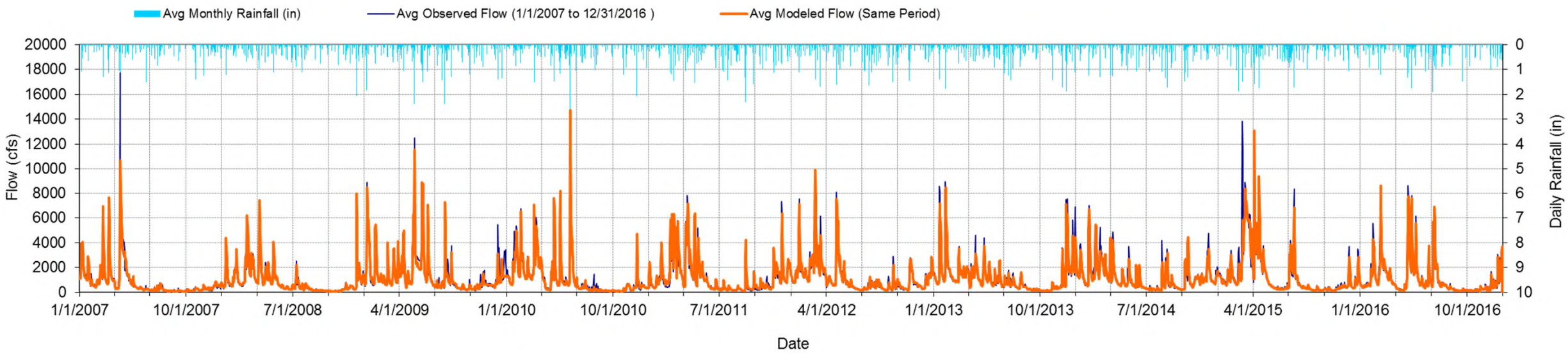
Group E3 TMDL
Upper Guyandotte River Watershed
Draft Model Hydrology Calibration
October 5, 2017

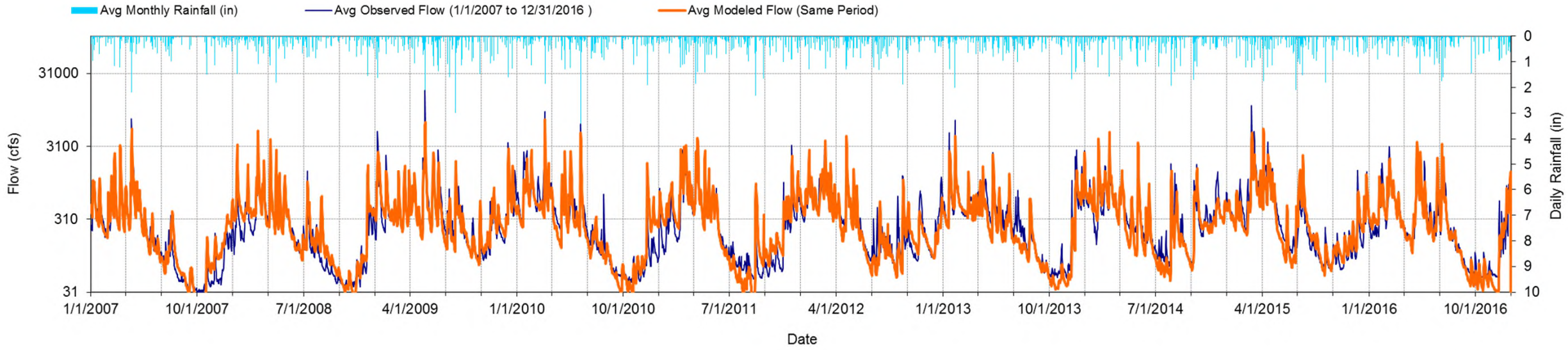
Model Outlet 4041 vs. USGS 03202400 Guyandotte River near Baileysville, WV

Mean Daily Flow



Model Outlet 4041 vs. USGS 03202400 Guyandotte River near Baileysville, WV

Mean Daily Flow Log Scale



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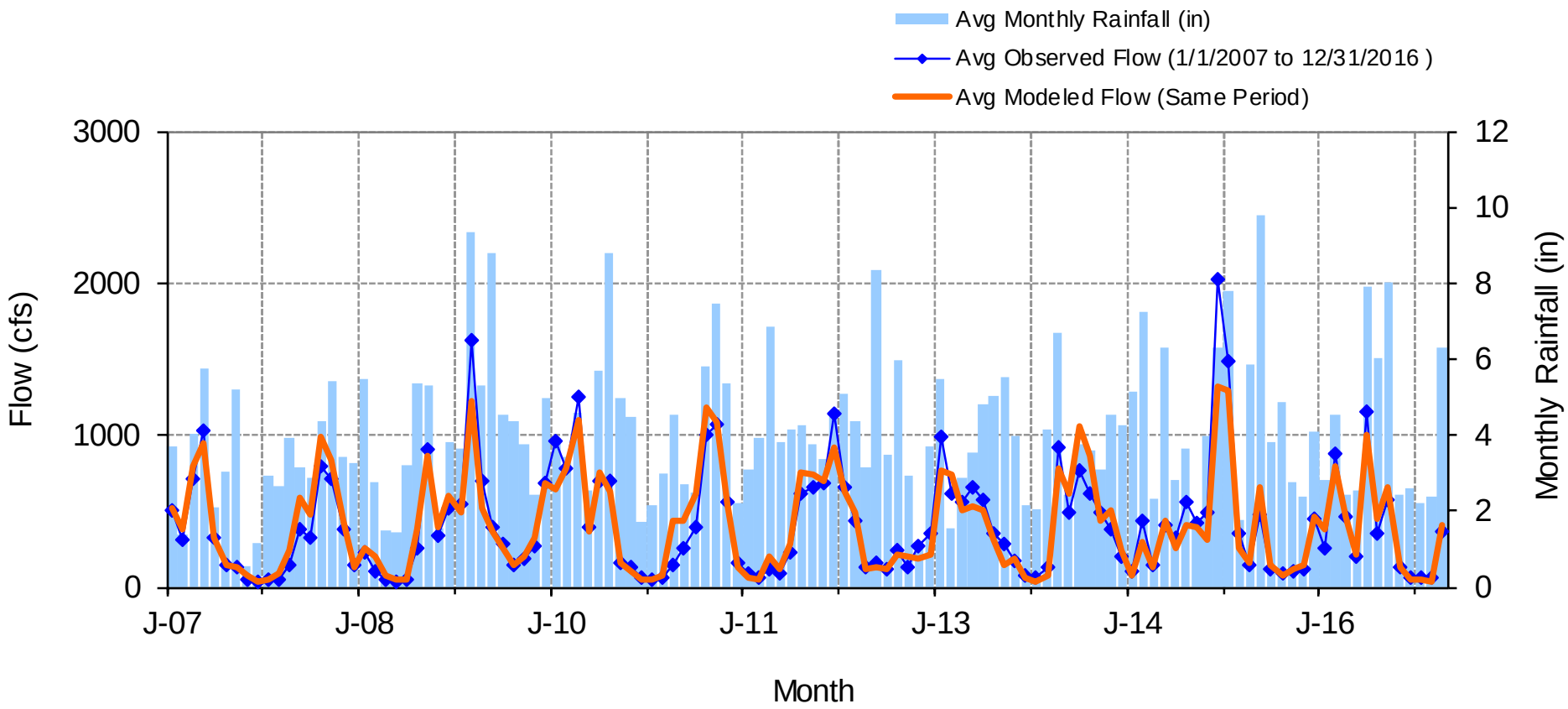
Mean Monthly Flow



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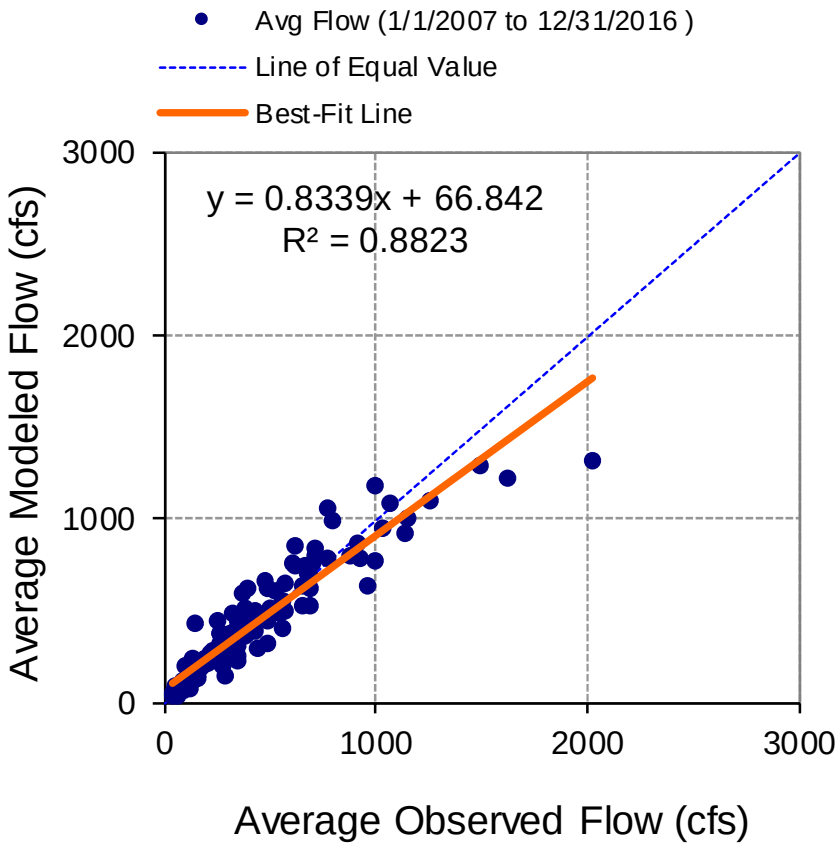
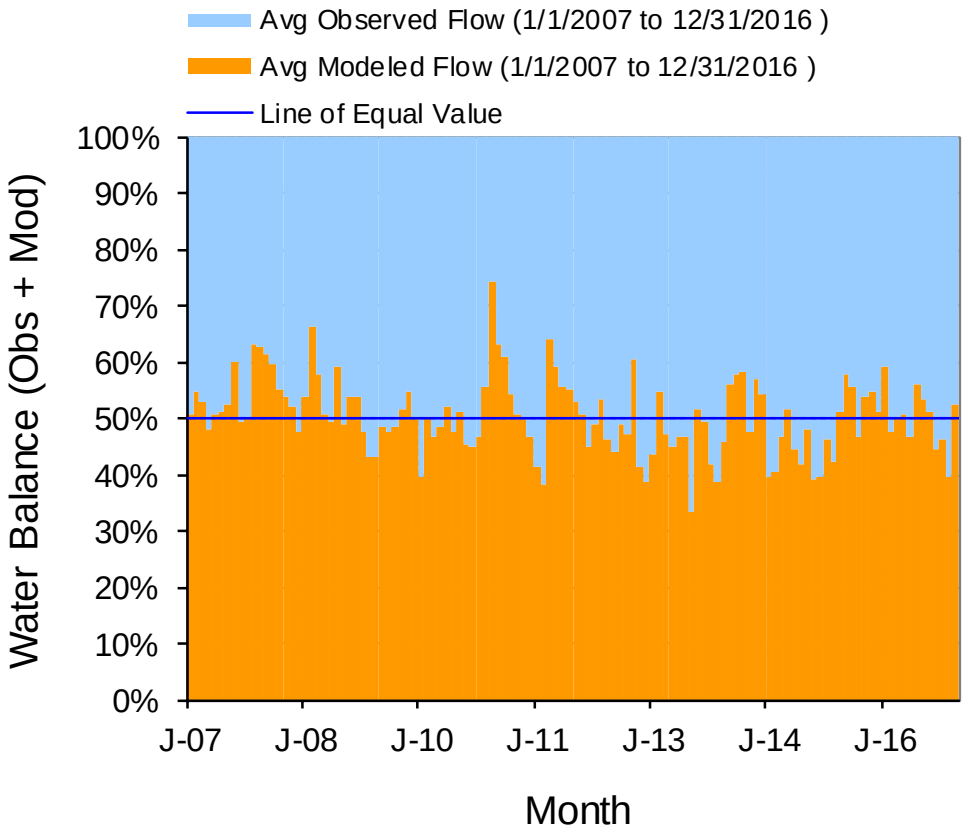
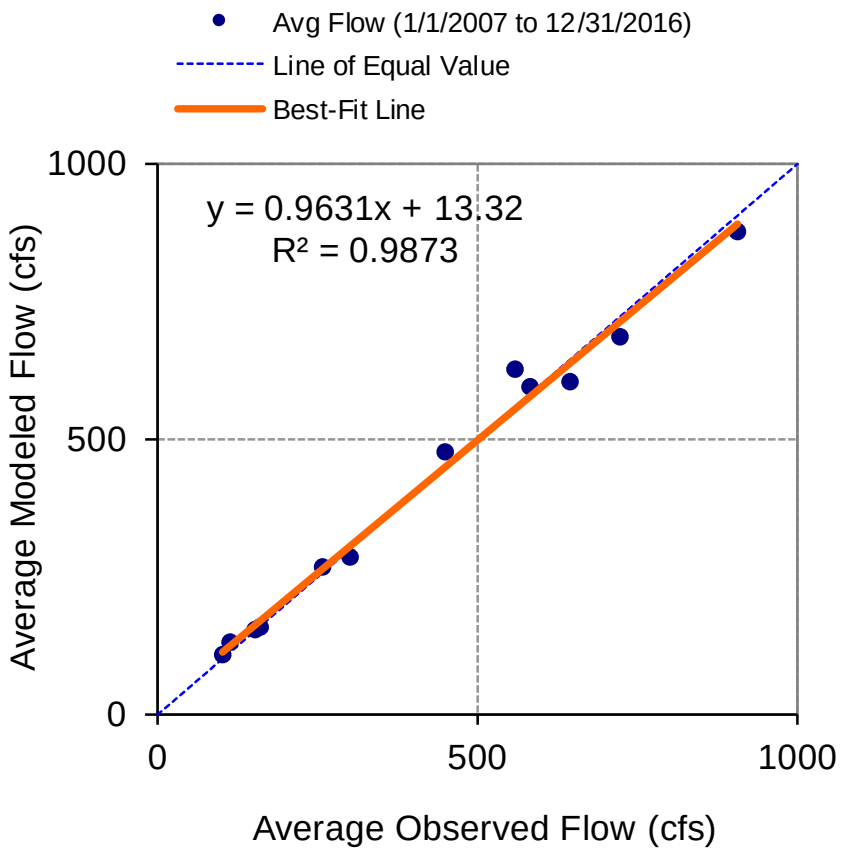
Monthly Regression and Temporal Variation

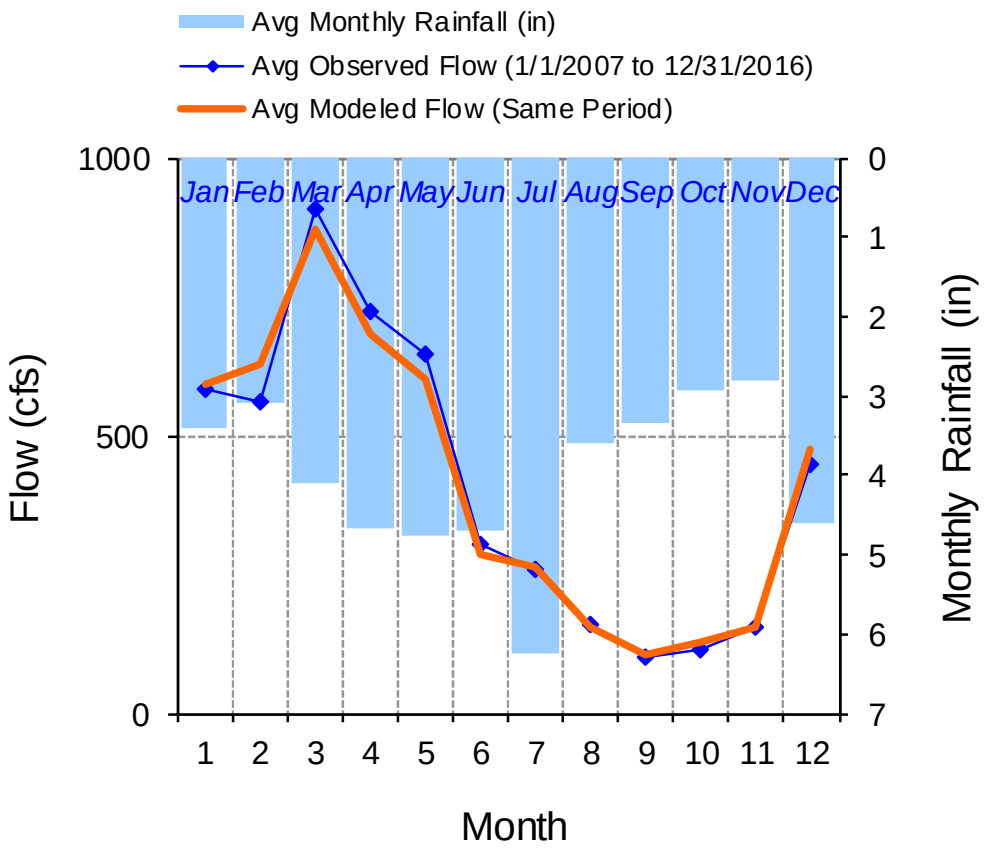




Model Outlet 4041 vs. USGS 03202400 Guyandotte River near Baileysville, WV

Seasonal Regression and Temporal Aggregate





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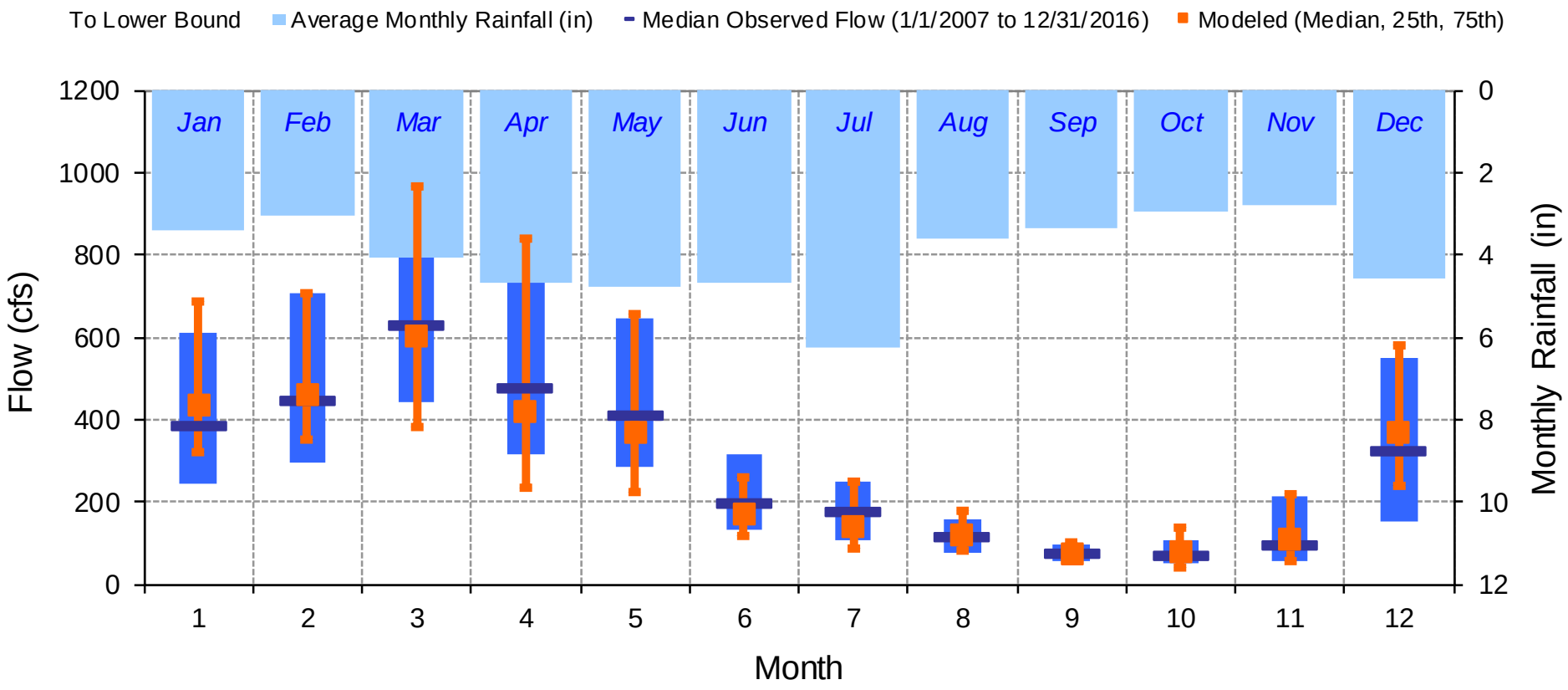
Seasonal Medians and Ranges



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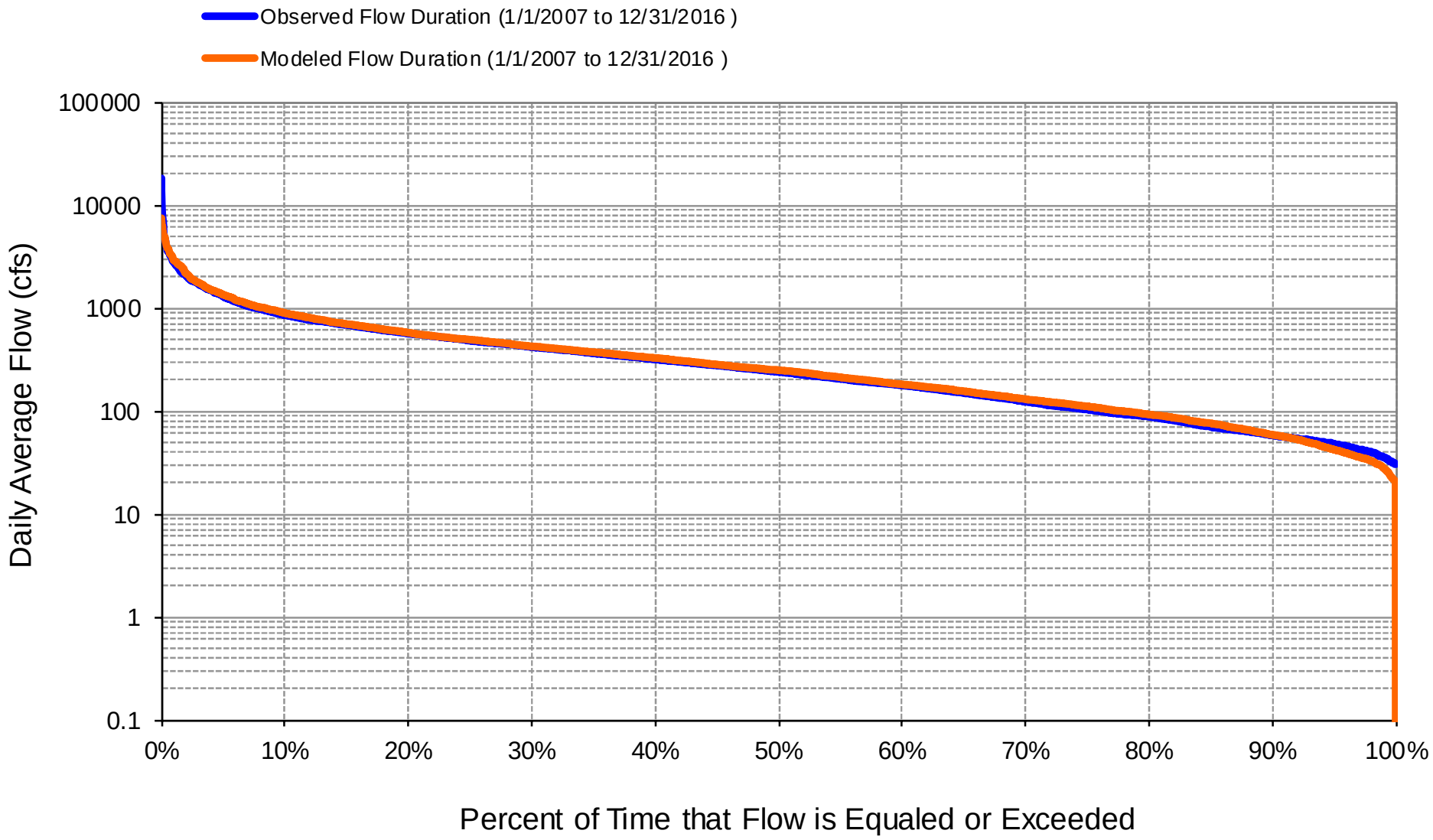
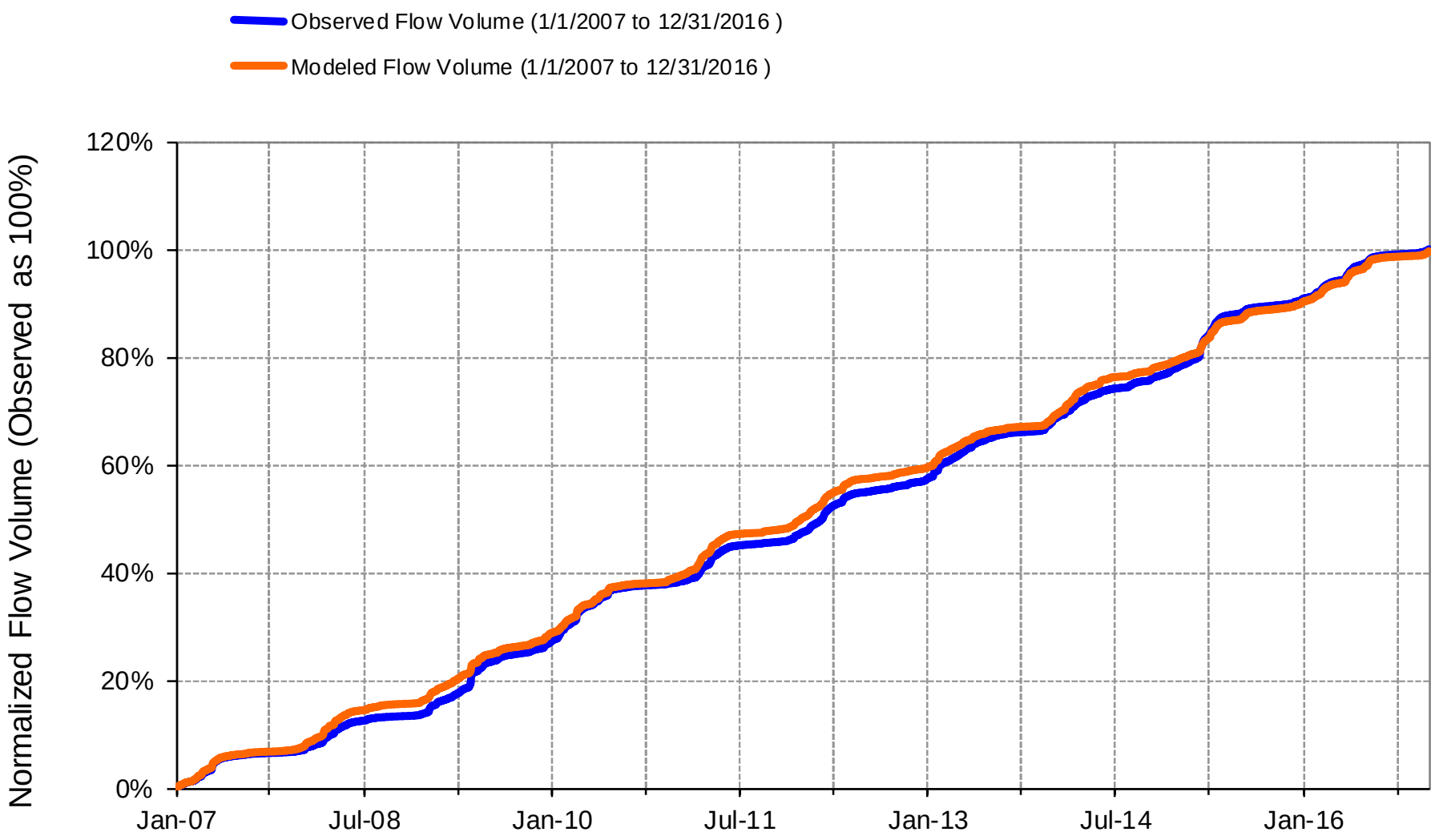
Seasonal Summary

MONTH	OBSERVED FLOW (CFS)				MODELED FLOW (CFS)			
	MEAN	MEDIAN	25TH	75TH	MEAN	MEDIAN	25TH	75TH
Jan	583.65	380.00	243.25	610.75	593.91	436.55	320.75	688.83
Feb	560.61	439.00	294.00	707.00	626.84	461.03	349.94	705.24
Mar	908.57	623.00	443.50	926.00	872.79	601.24	379.73	963.65
Apr	724.34	471.50	316.50	808.00	682.99	419.63	235.06	839.58
May	646.52	406.00	283.25	645.75	602.90	370.99	222.75	655.27
Jun	302.21	190.00	130.50	315.50	283.91	168.57	114.42	258.24
Jul	259.51	170.50	108.00	250.00	264.55	142.01	86.10	247.64
Aug	160.63	108.00	75.25	157.00	155.19	117.79	81.19	178.54
Sep	103.38	68.00	56.00	97.50	105.17	72.46	54.51	101.32
Oct	116.15	66.00	50.00	107.50	129.19	77.56	40.06	139.31
Nov	156.24	87.00	54.00	213.25	153.96	110.78	58.09	219.14
Dec	449.30	317.00	151.50	546.75	476.05	366.15	239.44	579.43

Model Outlet 4041 vs. USGS 03202400 Guyandotte River near Baileysville, WV


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 4041		USGS 03202400 GUYANDOTTE RIVER NEAR BAILEYSVILLE, 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: 37.60400034 Longitude: -81.6451096 Drainage Area (sq-mi): 306	
Total Simulated In-stream Flow:	**18.28**	Total Observed In-stream Flow:	**18.39**
Total of simulated highest 10% flows:	**7.53**	Total of Observed highest 10% flows:	**7.66**
Total of Simulated lowest 50% flows:	**2.62**	Total of Observed Lowest 50% flows:	**2.60**
Simulated Summer Flow Volume (months 7-9):	**1.96**	Observed Summer Flow Volume (7-9):	**1.96**
Simulated Fall Flow Volume (months 10-12):	**2.84**	Observed Fall Flow Volume (10-12):	**2.70**
Simulated Winter Flow Volume (months 1-3):	**7.68**	Observed Winter Flow Volume (1-3):	**7.55**
Simulated Spring Flow Volume (months 4-6):	**5.80**	Observed Spring Flow Volume (4-6):	**6.18**
Total Simulated Storm Volume:	**7.73**	Total Observed Storm Volume:	**7.23**
Simulated Summer Storm Volume (7-9):	**0.71**	Observed Summer Storm Volume (7-9):	**0.70**

Errors (Simulated-Observed)	*Error Statistics*	*Recommended Criteria*	*last run*	
Error in total volume:	-0.56	10		
Error in 50% lowest flows:	0.78	10		
Error in 10% highest flows:	-1.64	15		
Seasonal volume error - Summer:	0.26	30		
Seasonal volume error - Fall:	5.24	30		
Seasonal volume error - Winter:	1.74	30		
Seasonal volume error - Spring:	-6.18	30		
Error in storm volumes:	6.91	20		
Error in summer storm volumes:	1.40	50		
Nash-Sutcliffe Coefficient of Efficiency, E:	0.613	Model accuracy increases		
Baseline adjusted coefficient (Garrick), E':	0.554	as E or E' approaches 1.0		