

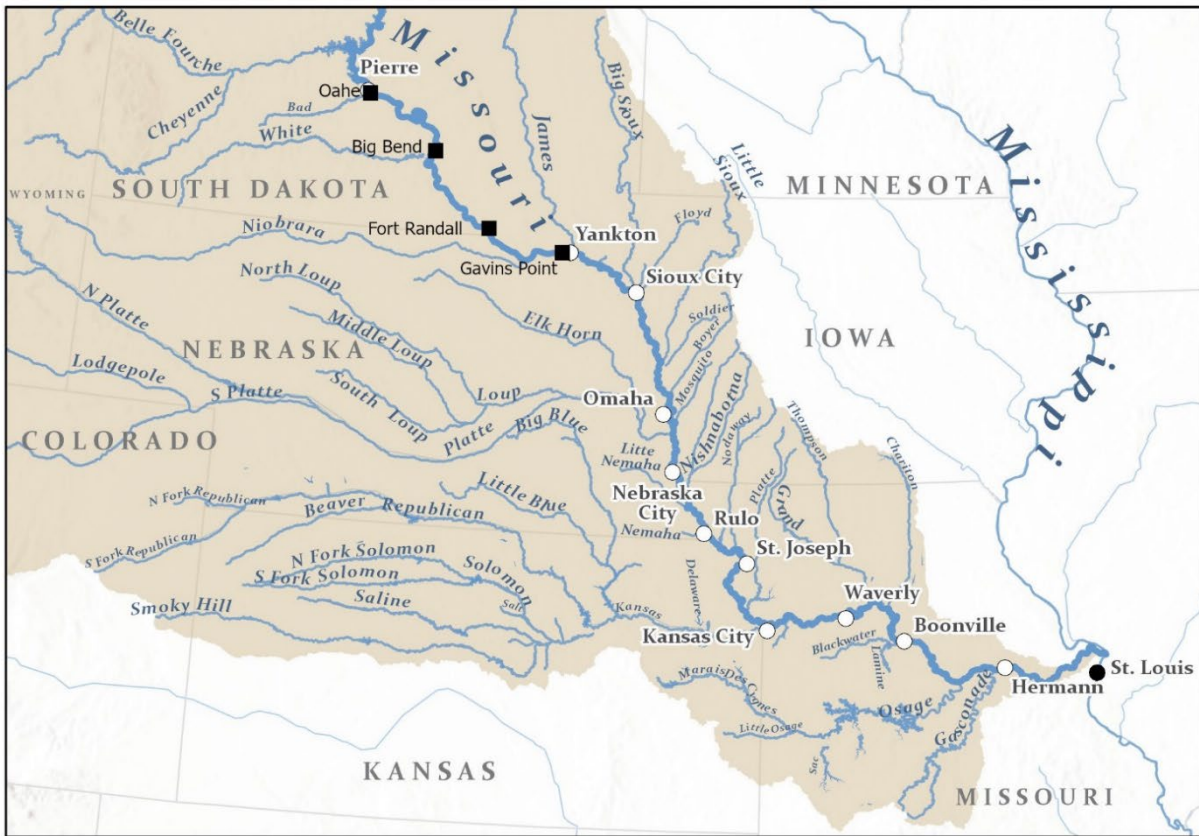


US Army Corps  
of Engineers ®

# Missouri River Flow Frequency Study

## Yankton, South Dakota to Hermann, Missouri

### Appendix F: HEC-RAS Ungaged Basins



U.S. Army Corps of Engineers  
Northwestern Division  
Omaha District, Kansas City District, and  
Missouri River Basin Water Management

June 2023

**Gavins to Sioux City**

River	Reach	RS	Lower RS	%	Contributing Area	Lag Time (hrs)	Flow (opt.)		DSS B part (opt.)
							Max	Min	
Missouri River	Gavins to James	810.68	801.64	10	472	28		-500	Gav to Jam Ung
Missouri River	James to Vermill	799.79	772.2	19	908	18		-500	Jam to Ver Ung
Missouri River	James to Vermill	787.64		10	462	21		-500	Bow Creek Ung
Missouri River	Verm to BigSux	771.2	734.98	28	1334	10		-500	Ver to Big S Ung
Missouri River	Verm to BigSux	770.76		7	344	14		-500	Verm Ung
Missouri River	Verm to BigSux	745.52		5	222	5		-500	Aowa Creek Ung
Missouri River	Verm to BigSux	737.48		3	131	3		-500	Elk Creek Ung
Missouri River	BigSux to LilSux	733.39		20	965	2		-500	Big Sioux Ung

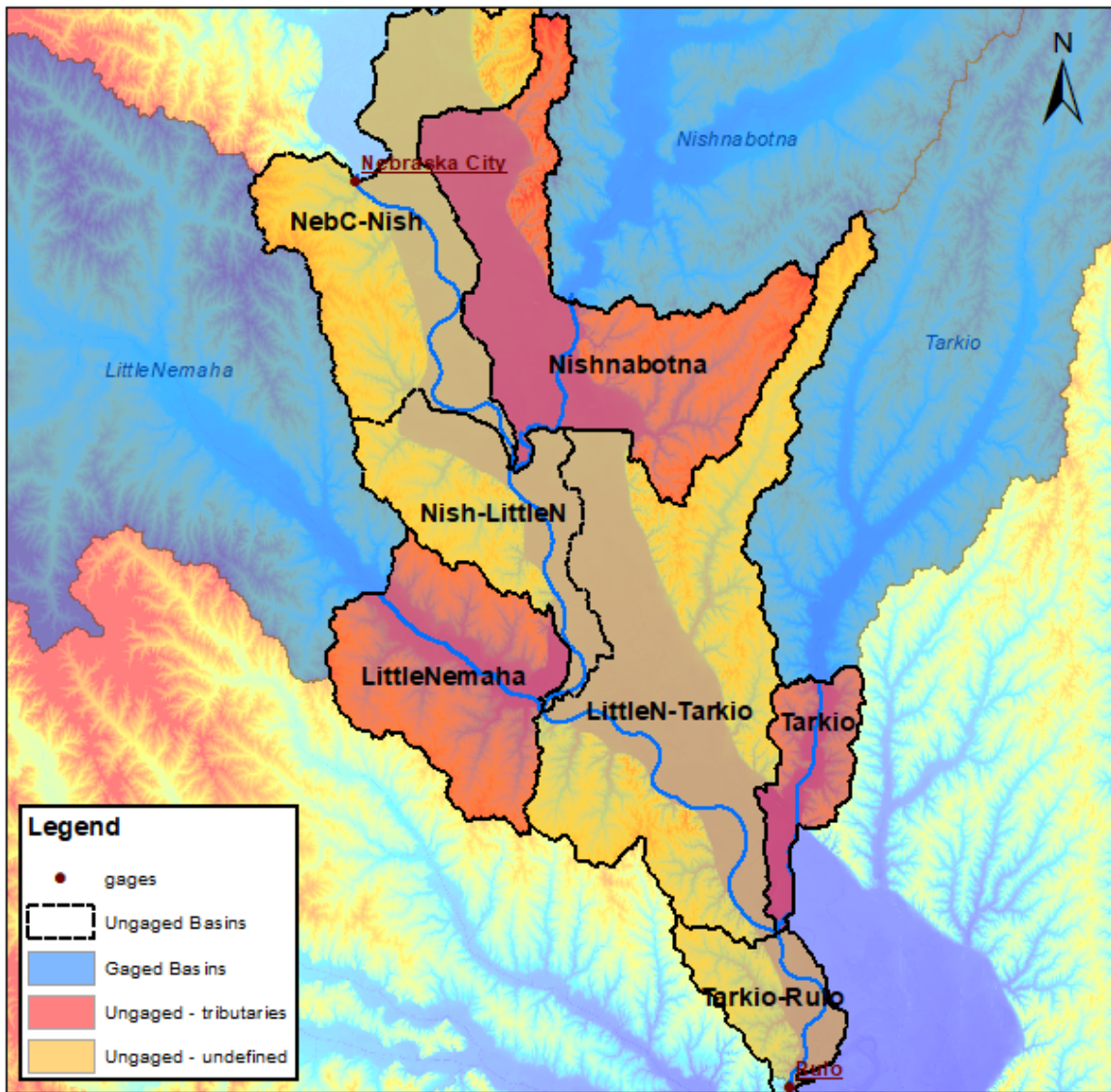
**Sioux City to Omaha**

River	Reach	RS	Lower RS	%	Contributing Area	Lag Time (hrs)	Flow (opt.)		DSS B part (opt.)
							Max	Min	
Missouri River	BigSux to LilSux	733.9	669.82	25	356	31		-500	Big Sux to Lsux Ung
Missouri River	BigSux to LilSux	732.17		5	65	42		-500	Perry Cr Ung
Missouri River	BigSux to LilSux	720.45		5	72	38		-500	Pigeon Cr Ung
Missouri River	BigSux to LilSux	697.8		7	102	30		-500	Blackbird Ung
Missouri River	BigSux to LilSux	670.25		5	66	20		-500	Mon Har Ung
Missouri River	LSux to Soldier	664.94		9	124	12		-500	Tek Div Ung
Missouri River	Soldier to Boyer	663.35	635.88	12	172	14		-500	LS to Boy Ung
Missouri River	Soldier to Boyer	649.58		7	100	12		-500	Old Sold Riv Ung
Missouri River	Soldier to Boyer	647.17		9	124	8		-500	Fish Creek Ung
Missouri River	Boyer to Platte	634.61	161.45	7	98	6		-500	Boy to Oma Ung
Missouri River	Boyer to Platte	622.14		11	164	6		-500	Pigeon Cr Oma Ung

**Omaha to Nebraska City**

<b>Ungaged Reach</b>	<b>Drainage Area</b>	<b>%</b>	<b>Ratio</b>	<b>RS</b>	<b>Lower RS</b>	<b>Mid Point/Point for Lag (RM)</b>	<b>Distance for Lag (mi)</b>	<b>Lag (hr)</b>
Omaha to Platte	310	20	0.20	615.66	595.64	605.7	42.9	15
Mosquito Creek	238	15	0.15	605.06		605.06	42.3	15
Big Papillion Creek	384	24	0.24	596.48		596.48	33.7	12
Platte to Weeping Water	383	24	0.24	594.4	569.24	581.8	19.1	7
Watkins Ditch	185	12	0.12	587.85		587.85	25.1	9
Weeping Water to Nebraska City	89	6	0.06	568	563.5	565.8	3.0	1

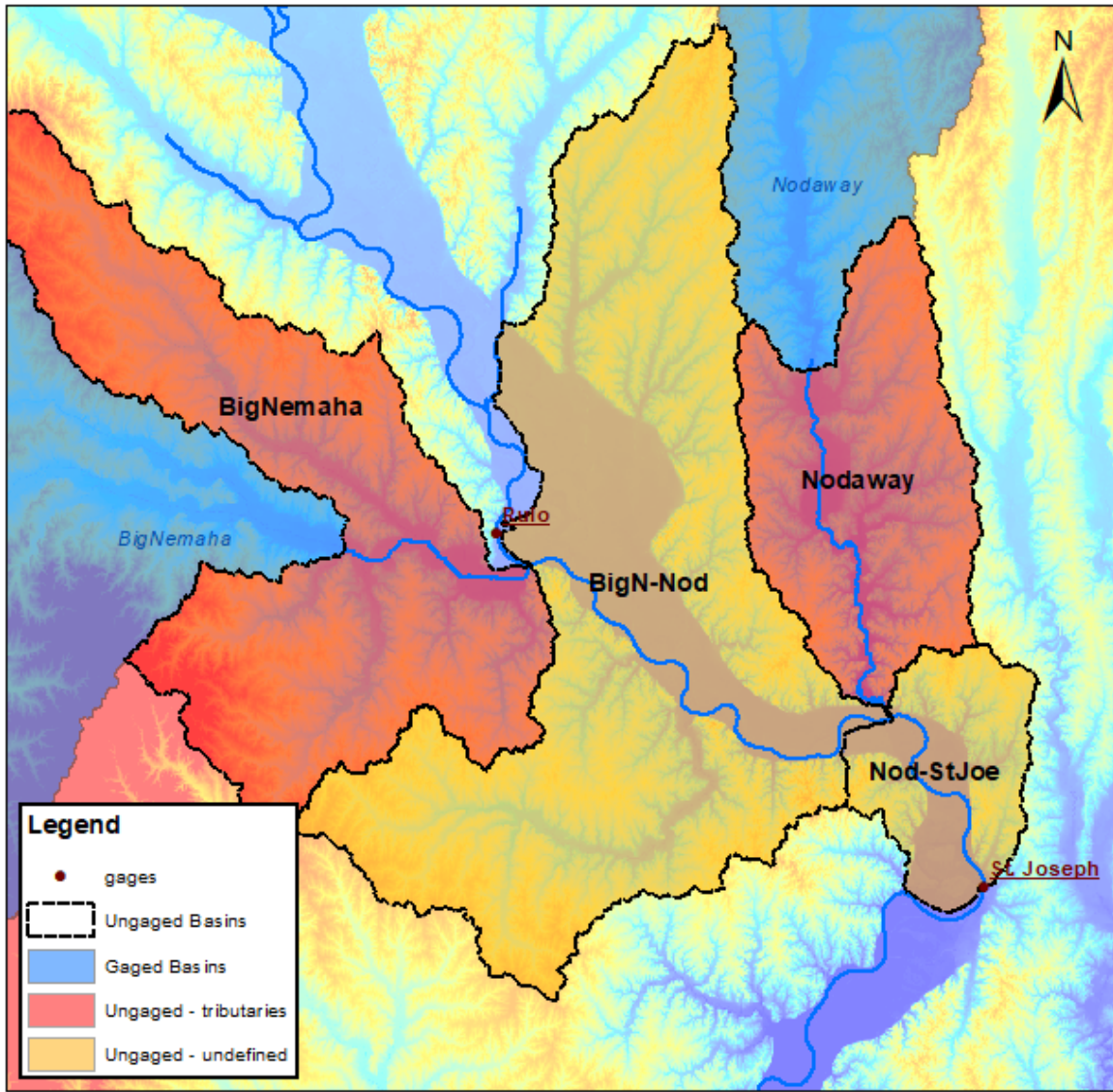
**Nebraska City to Rulo**



Ungaged Reach	Drainage Area	%	Ratio	RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
NebC-Nish	145	18	0.18	563	542	553	54	13
Nishnabotna	157	20	0.20	542		542	44	11
Nish-LittleN	78	10	0.10	542	527	535	36	9
LittleNemaha	100	13	0.13	527		527	29	7
LittleN-Tarkio	231	29	0.29	527	507	517	19	5
Tarkio	35	4	0.04	507		507	9	2
Tarkio-Rulo	41	5	0.05	507	495	501	3	1

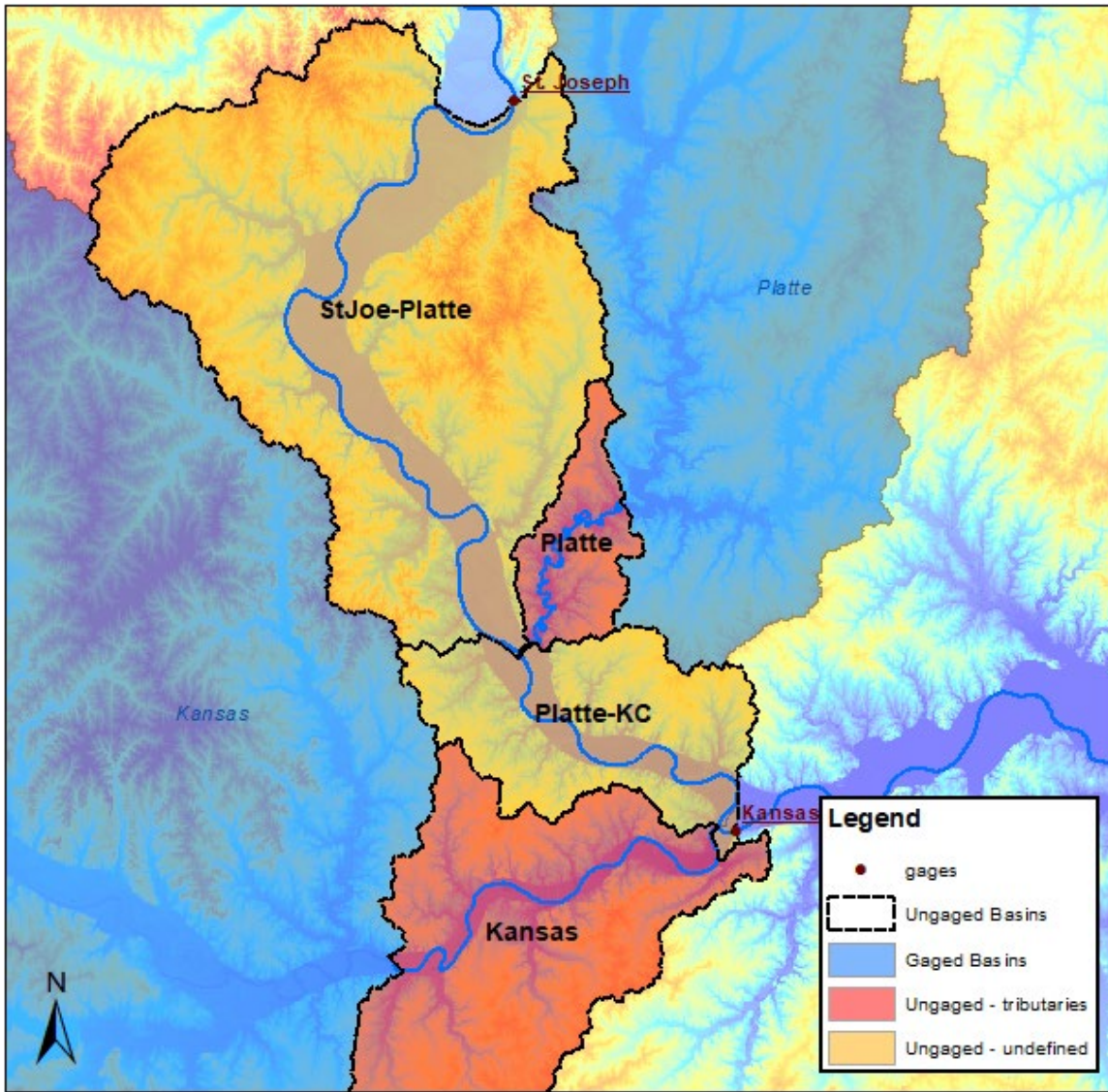
\*The two HEC-RAS models overlap from Nebraska City to St. Joseph, basin parameters and ungaged input locations varied slightly between the two models. Basin parameters in this Appendix are from the Kansas City district model.

**Rulo to St. Joseph**



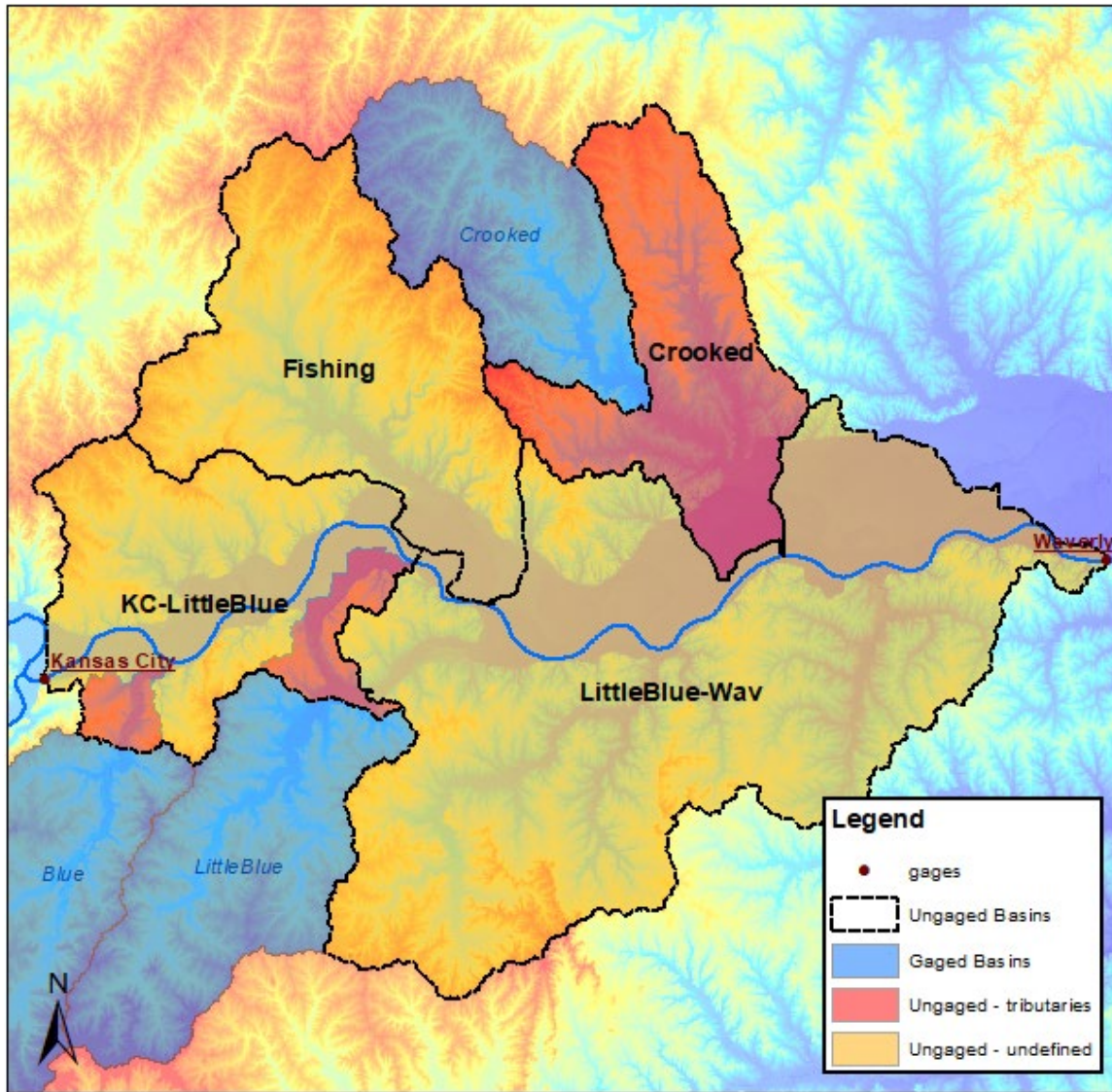
Ungaged Reach	Drainage Area	%	Ratio	RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
BigNemaha	580	32%	0.32	495		495	47	11
BigN-Nod	837	46%	0.46	495	463	479	31	8
Nodaway	278	15%	0.15	463		463	15	4
Nod-StJoe	128	7%	0.07	463	448	456	7	2

**St. Joseph to Kansas City**



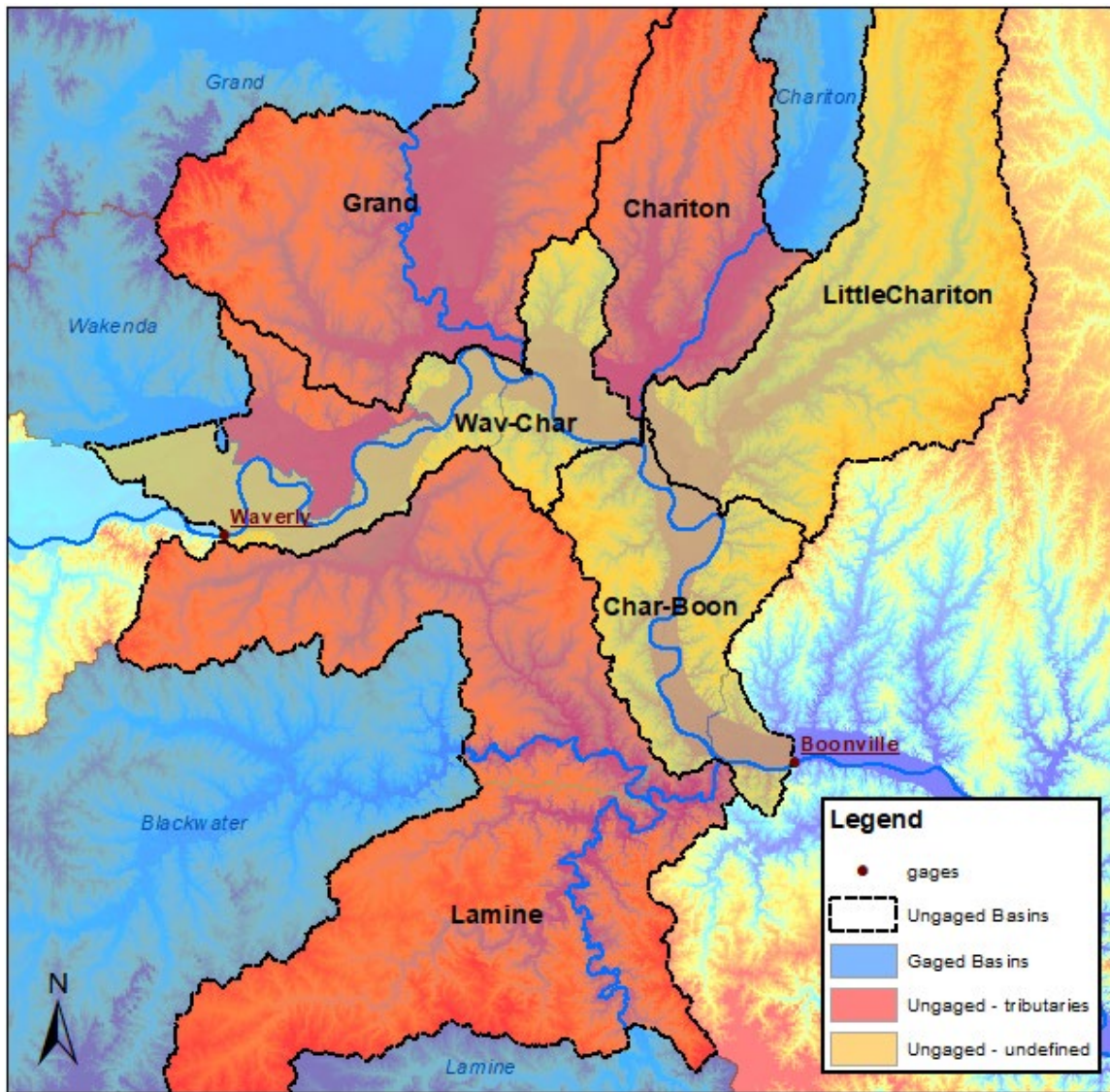
Ungaged Reach	Drainage Area	%	Ratio	RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
StJoe-Platte	730		0.55	448	391	420	53	13
Platte	69		0.05	391		391	25	6
Platte-KC	187		0.14	391	367	379	13	3
Kansas	350		0.26	367		367	1	0

**Kansas City to Waverly**



Ungaged Reach	Drainage Area	%	Ratio	Upper RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
KC-LittleBlue	244	17%	0.17	366	339	353	59	14
Fishing	282	20%	0.20	334		334	41	10
LittleBlue-Wav	693	49%	0.49	339	293	316	23	6
Crooked	191	14%	0.14	314		314	21	5

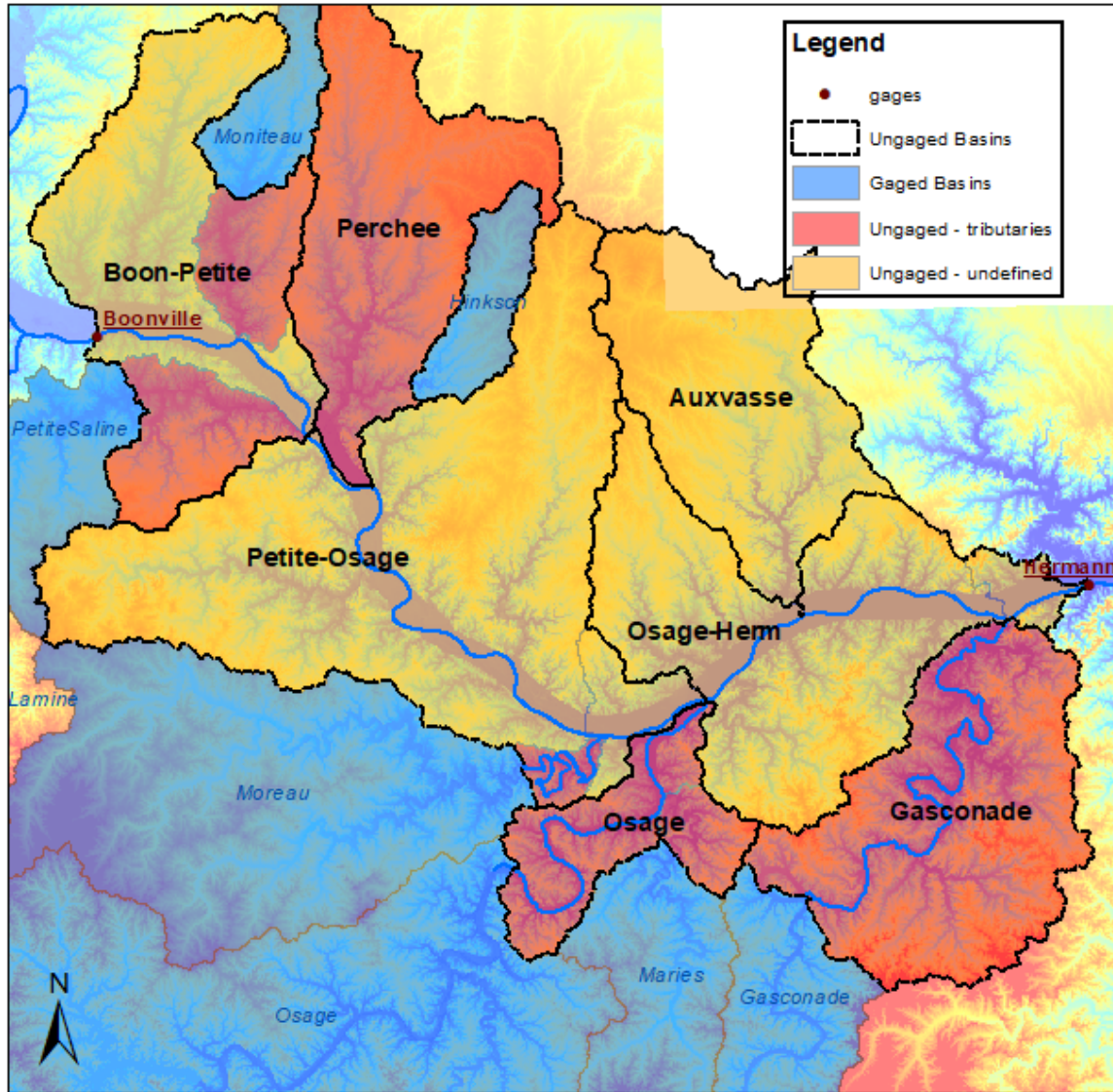
**Waverly to Boonville**



Ungaged Reach	Drainage Area	%	Ratio	Upper RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
Wav-Char	367	10%	0.10	293	239	263	67	16
Grand	960	26%	0.26	250		250	53	13
Chariton	481	13%	0.13	250	239	245	48	12
LittleChariton	698	19%	0.19	227		227	30	7
Char-Boon	268	7%	0.07	239	196	218	21	5
Lamine	990	26%	0.26	202		202	5	1



**Boonville to Hermann**



Ungaged Reach	Drainage Area	%	Ratio	Upper RS	Lower RS	Mid Point/Point for Lag (RM)	Distance for Lag (mi)	Lag (hr)
Boon-Petite	442	15%	0.15	196	177	187	89	22
Perchee	331	11%	0.11	170		170	72	18
Petite-Osage	815	28%	0.28	177	130	149	51	12
Osage	145	5%	0.05	130		130	32	8
Osage-Herm	460	16%	0.16	130	98	114	16	4
Auxvasse	313	11%	0.11	121		121	23	6
Gasconade	385	13%	0.13	104		104	6	1