

**UPPER MISSISSIPPI RIVER PHASE II  
FLOOD RISK MANAGEMENT  
EXISTING CONDITIONS HYDRAULIC MODEL  
DOCUMENTATION REPORT**

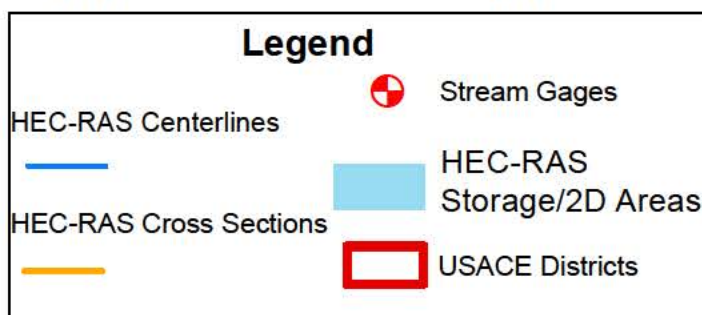
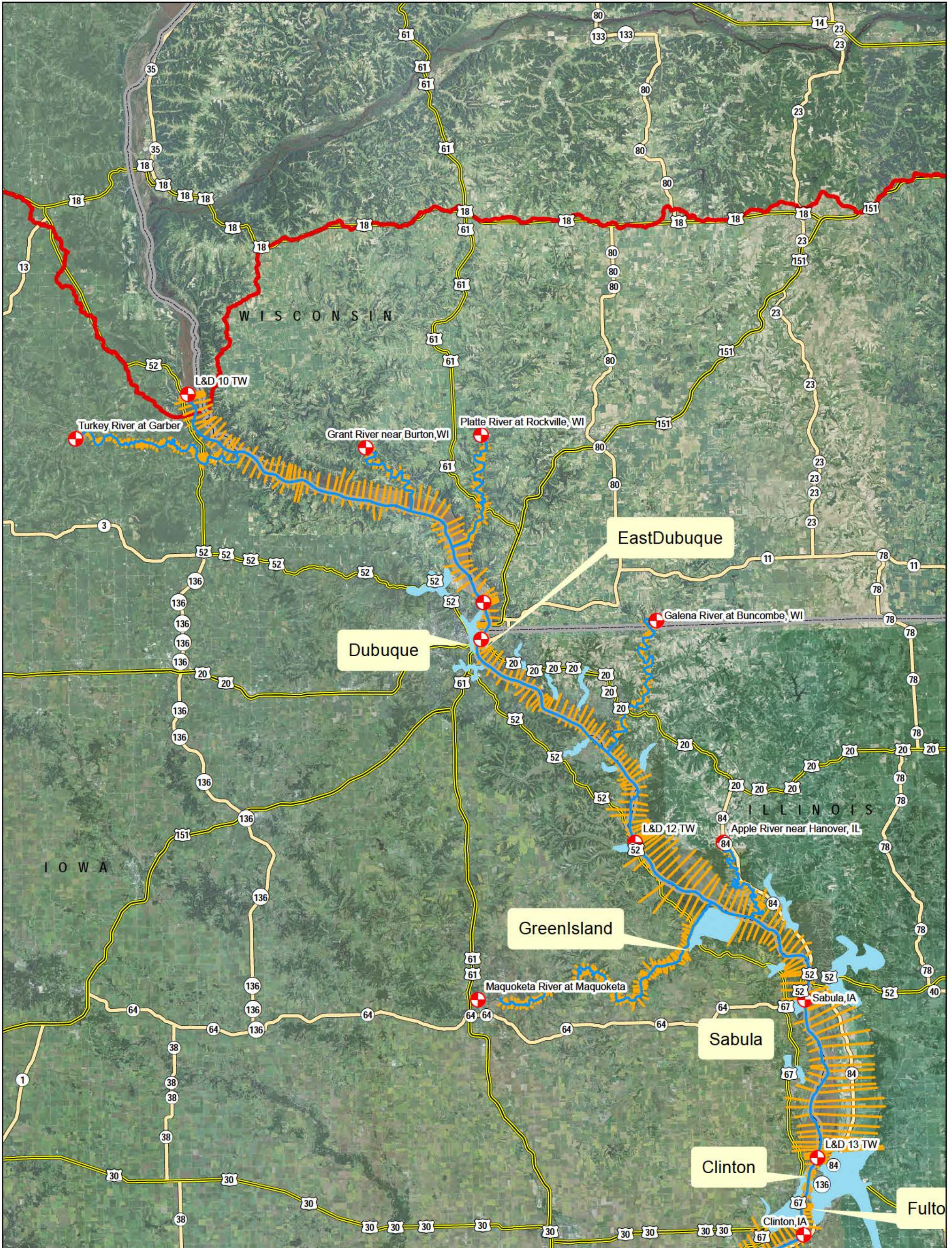
**APPENDICES**



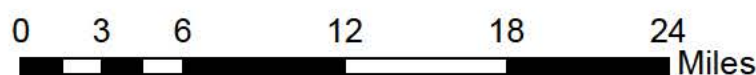
**US Army Corps  
of Engineers®**

**APPENDIX A-1**  
**MODEL EXTENT MAP**

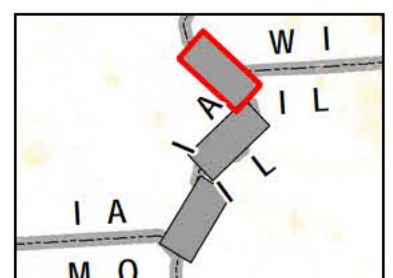
# Upper Mississippi River Hydraulic Model Phase II Geometry



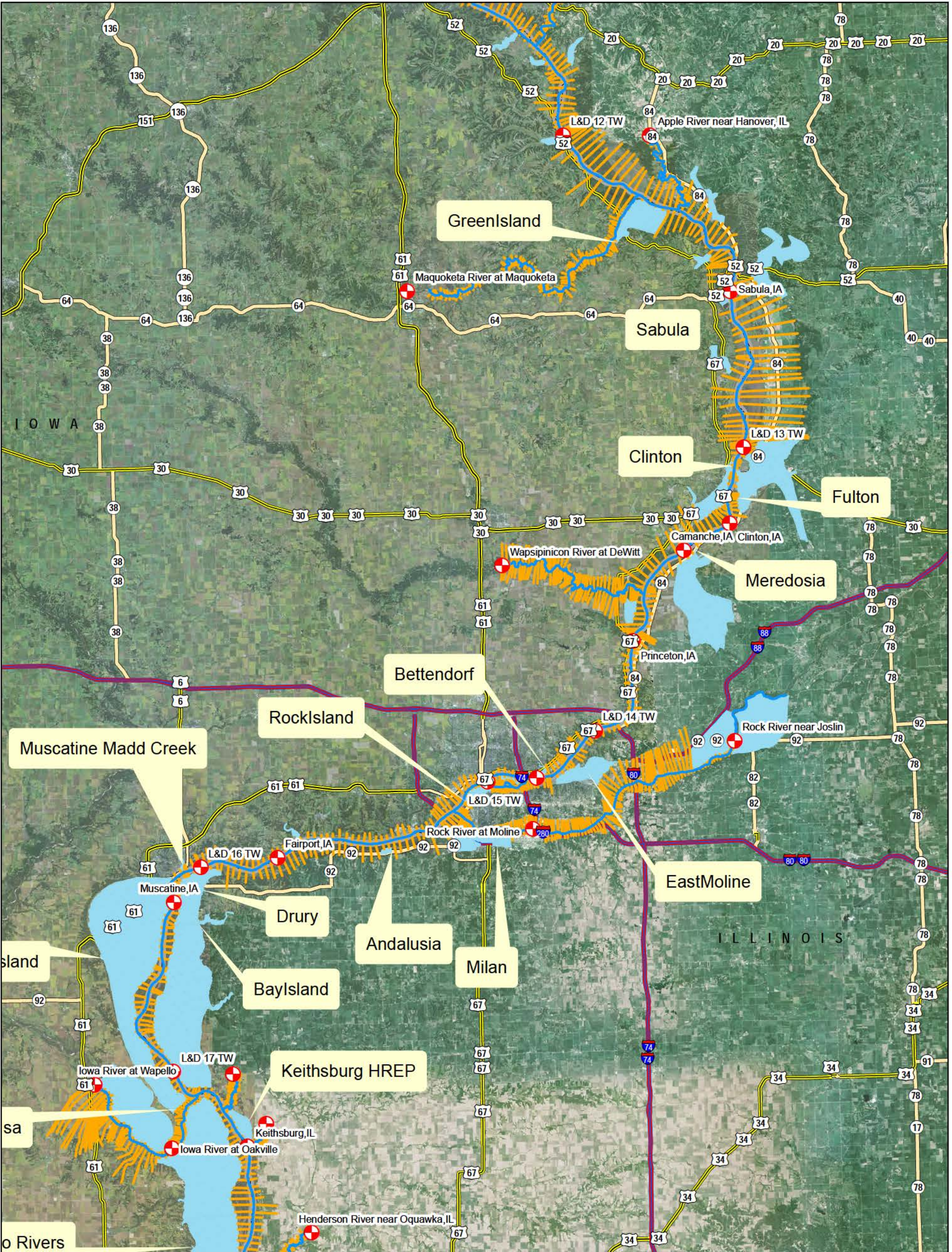
1 inch = 7 miles



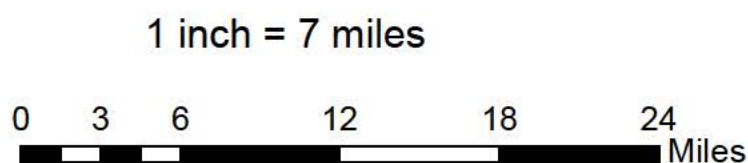
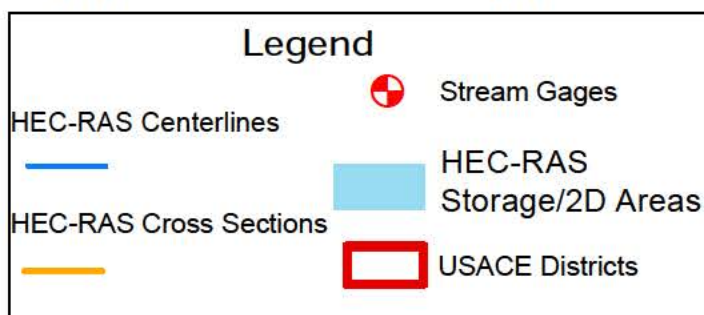
Date: 5/27/2020



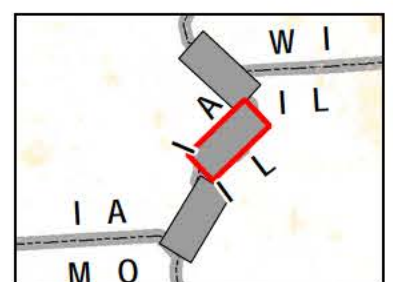
# Upper Mississippi River Hydraulic Model Phase II Geometry



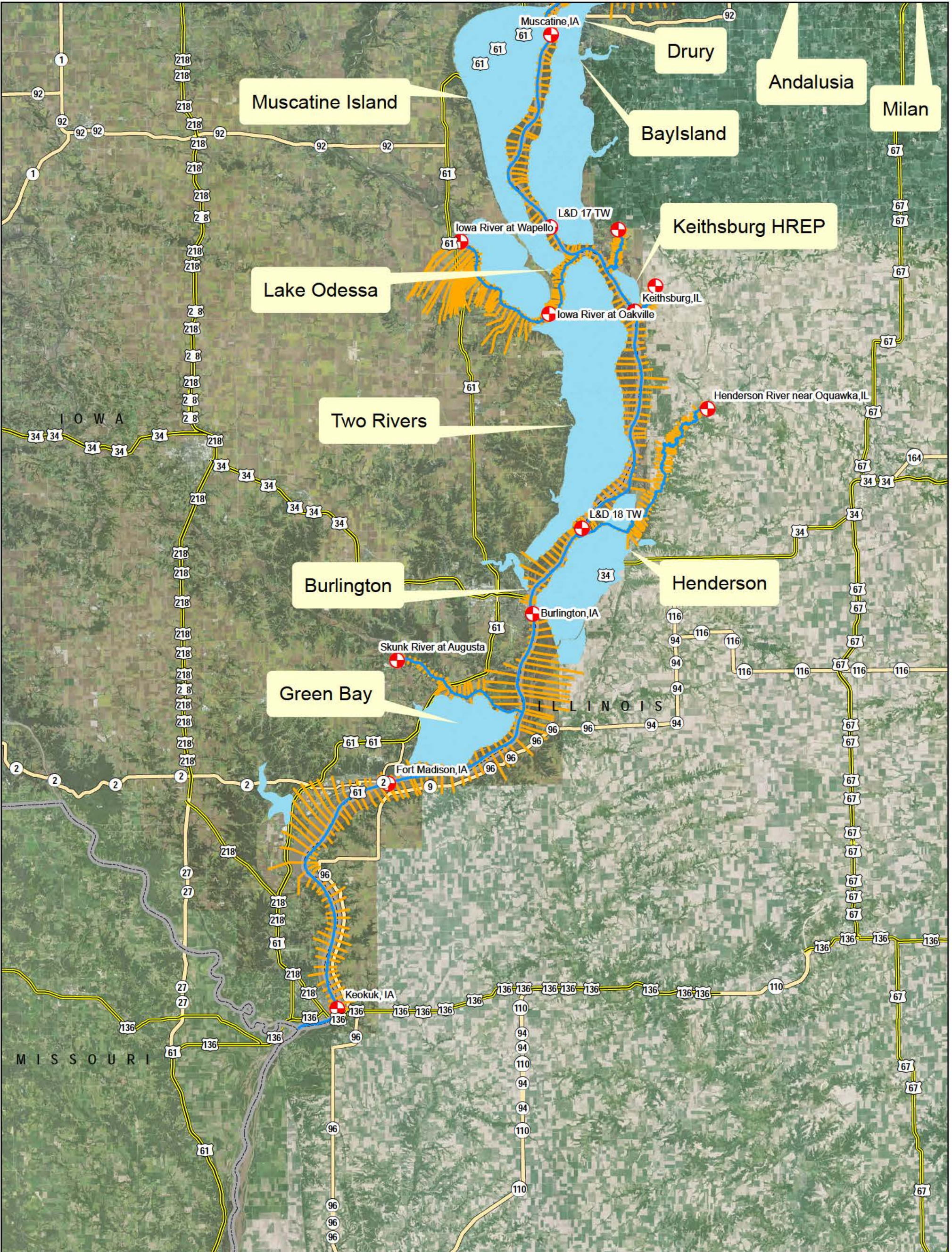
# Upper Mississippi River Hydraulic Model Phase II Geometry



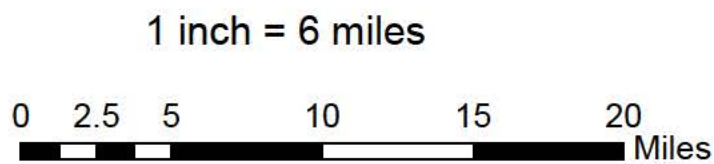
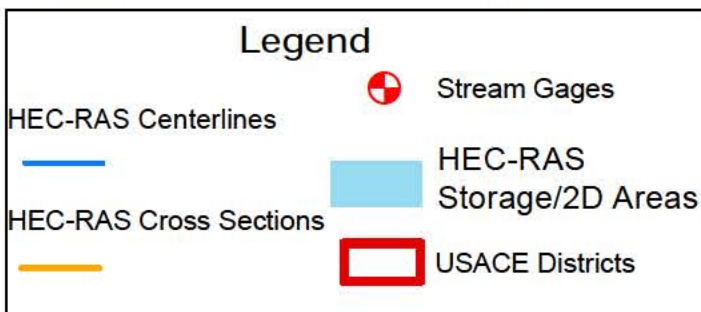
Date: 5/27/2020



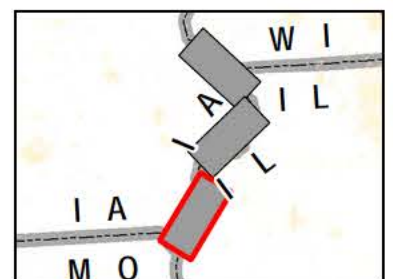
# Upper Mississippi River Hydraulic Model Phase II Geometry



# Upper Mississippi River Hydraulic Model Phase II Geometry



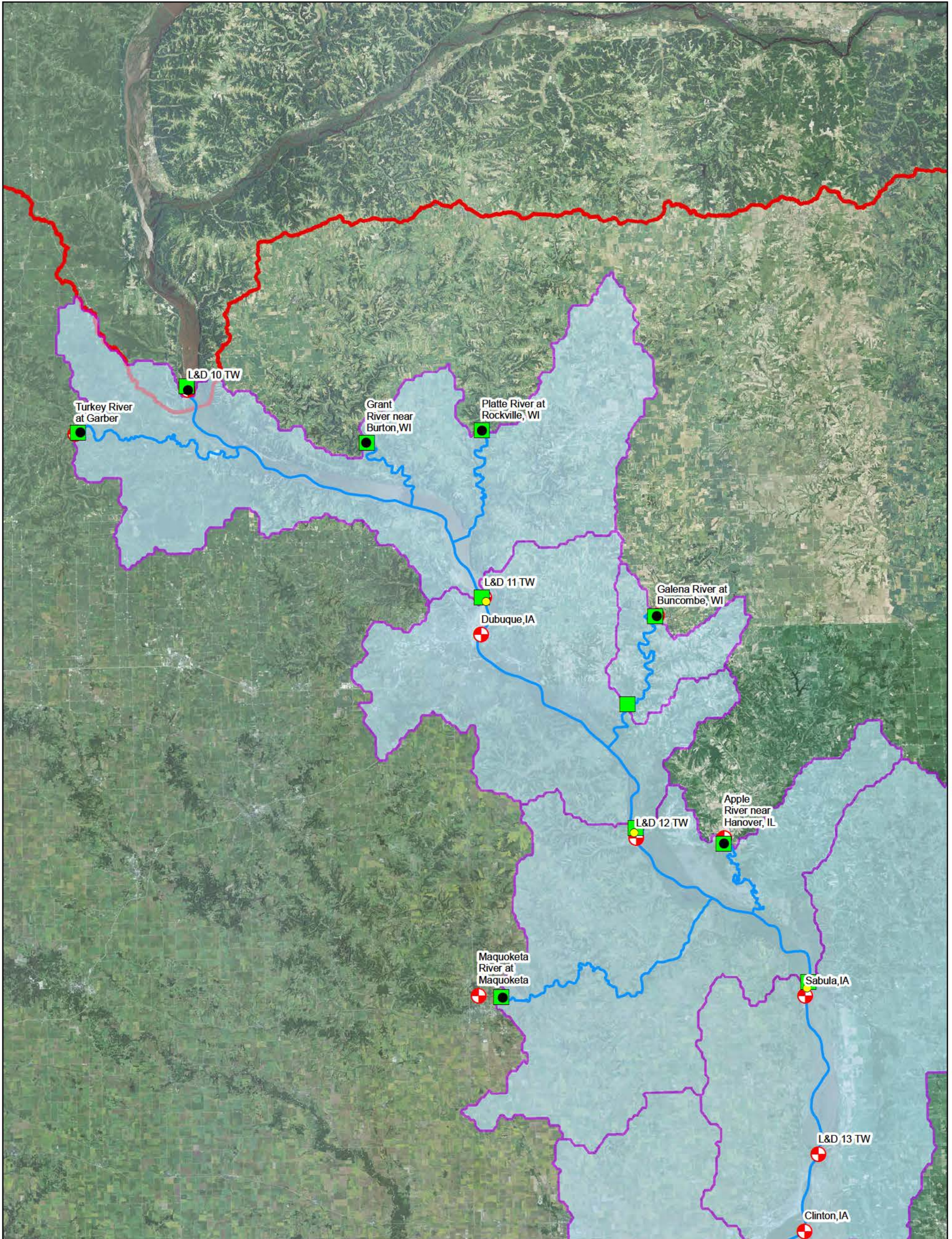
Date: 5/27/2020



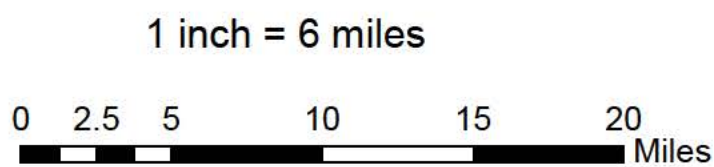
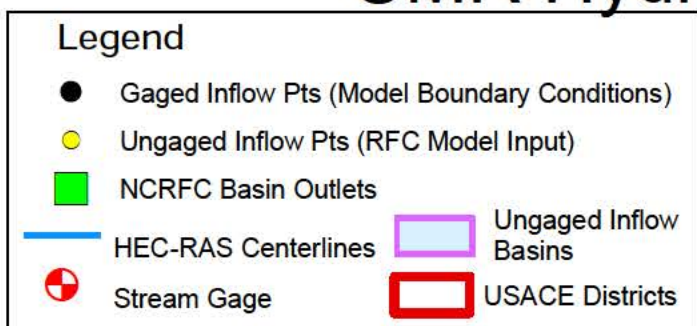
**APPENDIX A-2**

**MODEL MAP WITH INFLOWS**

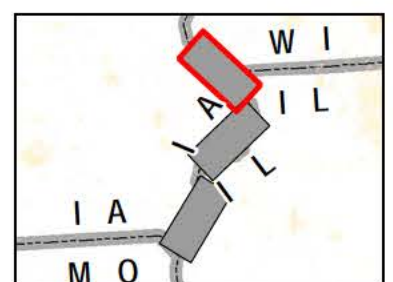
# UMR Hydraulic Model Phase II Inflows



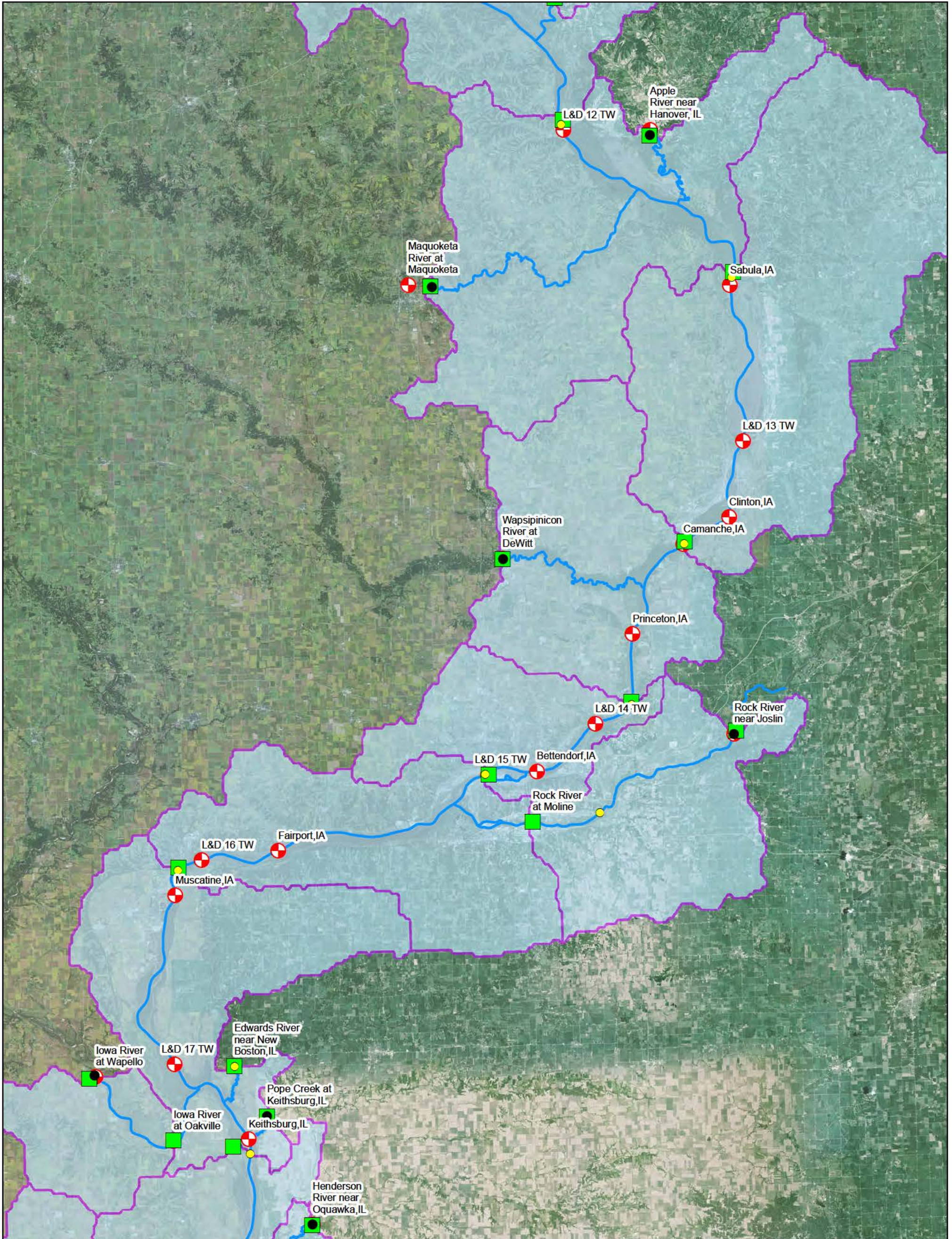
## UMR Hydraulic Model Phase II Inflows



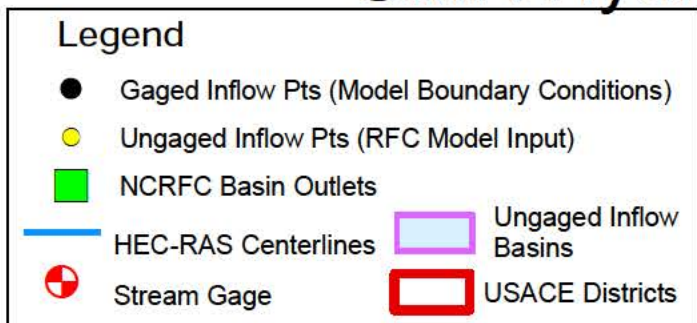
Date: 6/26/2020



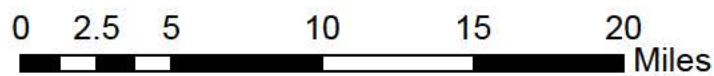
# UMR Hydraulic Model Phase II Inflows



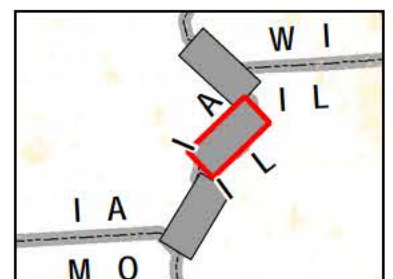
# UMR Hydraulic Model Phase II Inflows



1 inch = 6 miles

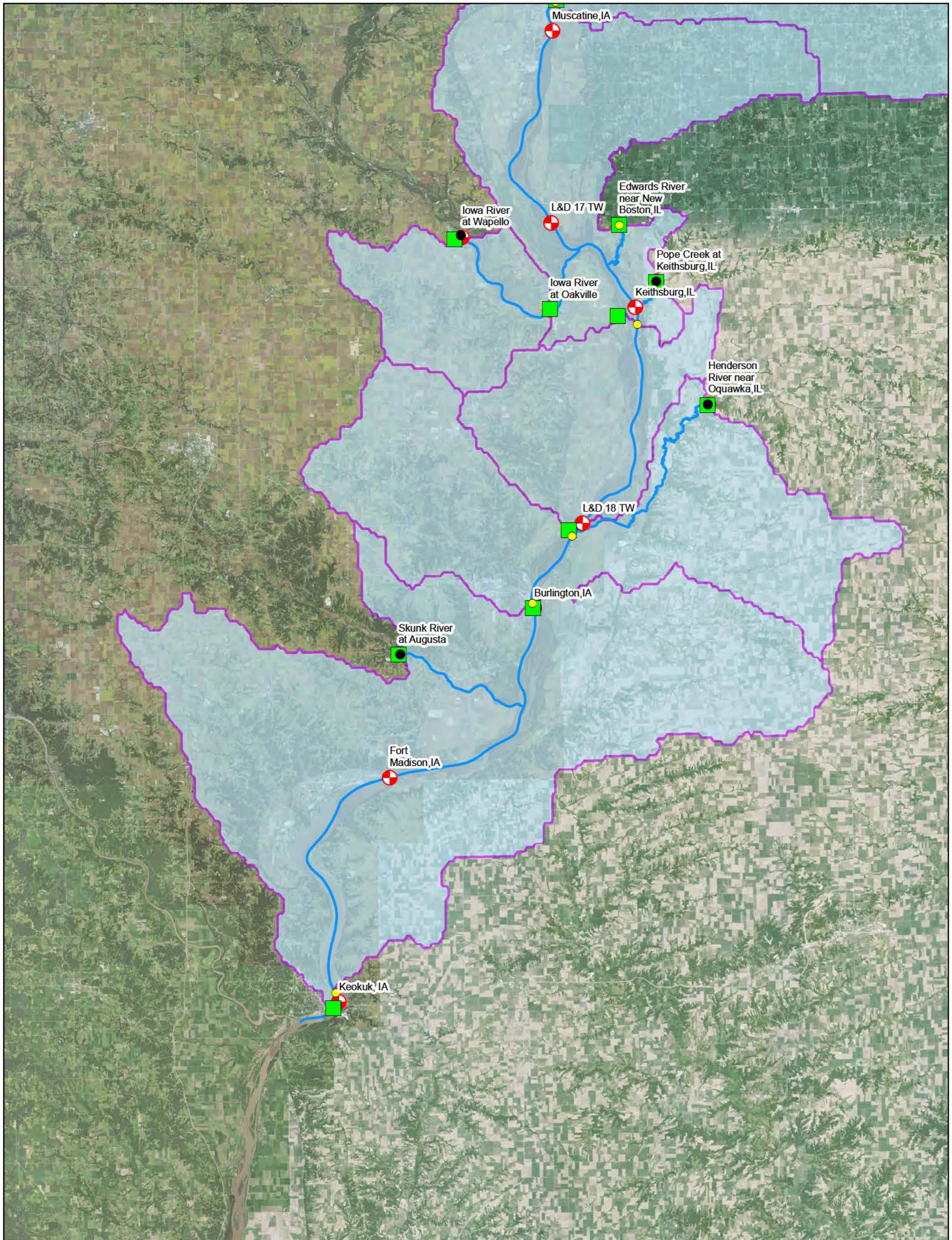


Date: 6/26/2020





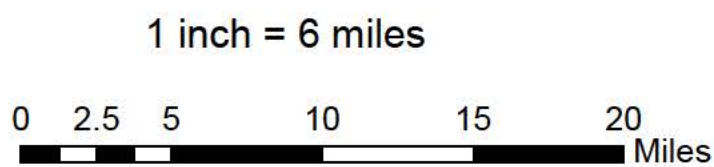
# UMR Hydraulic Model Phase II Inflows



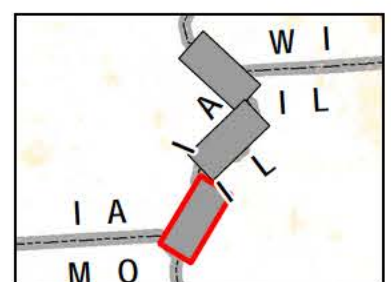
# UMR Hydraulic Model Phase II Inflows

**Legend**

- Gaged Inflow Pts (Model Boundary Conditions)
- Ungaged Inflow Pts (RFC Model Input)
- NCRFC Basin Outlets
- HEC-RAS Centerlines
- ⊕ Stream Gage
- Ungaged Inflow Basins
- USACE Districts



Date: 6/26/2020



## **APPENDIX B**

### **DATUM CONVERSIONS**

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
614.90	-0.154	-0.634
614.70	-0.154	-0.634
614.50	-0.154	-0.634
614.00	-0.154	-0.634
613.60	-0.154	-0.634
613.00	-0.157	-0.637
612.50	-0.157	-0.637
612.00	-0.157	-0.637
611.20	-0.161	-0.641
610.60	-0.164	-0.644
610.00	-0.167	-0.657
609.50	-0.161	-0.651
609.00	-0.157	-0.647
608.60	-0.157	-0.647
608.00	-0.154	-0.644
607.50	-0.151	-0.641
607.00	-0.154	-0.644
606.10	-0.164	-0.654
605.50	-0.171	-0.661
604.90	-0.174	-0.664
604.40	-0.174	-0.664
604.00	-0.177	-0.667
603.50	-0.177	-0.667
603.10	-0.174	-0.664
602.70	-0.174	-0.664
602.30	-0.171	-0.661
602.00	-0.171	-0.661
601.50	-0.167	-0.657
600.80	-0.161	-0.661
599.90	-0.161	-0.661
599.30	-0.161	-0.661
599.00	-0.161	-0.661
598.50	-0.161	-0.661
598.00	-0.161	-0.661
597.60	-0.164	-0.664
597.00	-0.167	-0.667
596.20	-0.171	-0.671
596.00	-0.174	-0.674
595.40	-0.177	-0.677
595.00	-0.18	-0.68
594.40	-0.18	-0.68
594.00	-0.18	-0.68
593.60	-0.18	-0.68
593.00	-0.18	-0.68
592.50	-0.18	-0.68
592.00	-0.18	-0.68
591.60	-0.184	-0.694
591.10	-0.184	-0.694
590.60	-0.184	-0.694
590.00	-0.18	-0.69

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
589.50	-0.18	-0.69
589.00	-0.177	-0.687
588.50	-0.171	-0.681
588.00	-0.167	-0.677
587.50	-0.164	-0.674
586.70	-0.157	-0.667
586.30	-0.154	-0.664
585.70	-0.148	-0.658
585.00	-0.144	-0.654
584.10	-0.138	-0.648
583.60	-0.135	-0.645
583.20	-0.135	-0.645
582.80	-0.135	-0.655
582.60	-0.135	-0.655
582.20	-0.135	-0.655
581.80	-0.135	-0.655
581.20	-0.135	-0.655
580.90	-0.135	-0.655
580.50	-0.138	-0.658
580.00	-0.141	-0.661
579.70	-0.141	-0.661
579.40	-0.144	-0.664
579.10	-0.144	-0.664
578.60	-0.151	-0.671
578.20	-0.154	-0.674
577.10	-0.157	-0.677
576.60	-0.161	-0.681
576.00	-0.167	-0.687
575.40	-0.171	-0.691
574.90	-0.171	-0.691
574.70	-0.171	-0.691
574.00	-0.164	-0.684
573.50	-0.164	-0.694
573.00	-0.161	-0.691
572.30	-0.154	-0.684
572.00	-0.151	-0.681
571.60	-0.148	-0.678
571.20	-0.148	-0.678
570.60	-0.151	-0.681
570.00	-0.157	-0.687
569.40	-0.161	-0.691
569.00	-0.167	-0.697
568.40	-0.171	-0.701
568.00	-0.167	-0.697
567.70	-0.164	-0.694
567.30	-0.164	-0.694
566.70	-0.164	-0.694
566.00	-0.164	-0.694
565.40	-0.164	-0.694
565.00	-0.164	-0.694

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
564.60	-0.167	-0.697
564.30	-0.171	-0.711
563.80	-0.167	-0.707
563.30	-0.167	-0.707
562.80	-0.161	-0.701
562.40	-0.157	-0.697
562.10	-0.157	-0.697
561.50	-0.154	-0.694
561.20	-0.151	-0.691
560.70	-0.148	-0.688
560.00	-0.144	-0.684
559.40	-0.141	-0.681
559.00	-0.141	-0.681
558.50	-0.138	-0.678
557.90	-0.138	-0.678
557.60	-0.135	-0.675
557.20	-0.135	-0.675
557.00	-0.135	-0.675
556.80	-0.135	-0.675
556.70	-0.135	-0.675
556.60	-0.135	-0.675
556.20	-0.135	-0.675
555.70	-0.135	-0.685
555.20	-0.135	-0.685
554.50	-0.131	-0.681
554.00	-0.128	-0.678
553.30	-0.125	-0.675
552.80	-0.125	-0.675
552.00	-0.125	-0.675
551.00	-0.125	-0.675
550.40	-0.125	-0.675
549.70	-0.125	-0.675
549.10	-0.125	-0.675
548.10	-0.125	-0.675
547.50	-0.121	-0.681
547.00	-0.121	-0.681
546.40	-0.118	-0.678
546.00	-0.118	-0.678
545.40	-0.118	-0.678
544.80	-0.118	-0.678
544.30	-0.115	-0.675
543.70	-0.115	-0.675
543.30	-0.115	-0.675
542.60	-0.115	-0.675
541.80	-0.112	-0.672
541.20	-0.112	-0.672
540.60	-0.108	-0.668
539.90	-0.102	-0.662
539.10	-0.102	-0.662
538.50	-0.102	-0.662

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
538.10	-0.102	-0.662
537.70	-0.105	-0.665
537.10	-0.105	-0.665
536.40	-0.105	-0.655
535.90	-0.105	-0.655
535.70	-0.105	-0.655
535.50	-0.105	-0.655
535.10	-0.108	-0.658
534.10	-0.108	-0.658
533.50	-0.108	-0.658
532.80	-0.112	-0.662
532.30	-0.112	-0.662
531.70	-0.112	-0.662
530.90	-0.108	-0.658
530.00	-0.105	-0.655
529.70	-0.105	-0.655
529.00	-0.105	-0.645
528.50	-0.105	-0.645
528.00	-0.105	-0.645
527.00	-0.098	-0.638
526.60	-0.098	-0.638
526.00	-0.095	-0.635
525.00	-0.098	-0.638
524.50	-0.095	-0.635
524.00	-0.095	-0.635
523.60	-0.092	-0.632
523.10	-0.089	-0.629
522.80	-0.089	-0.629
522.60	-0.085	-0.625
522.50	-0.085	-0.625
522.20	-0.082	-0.622
521.70	-0.079	-0.619
521.20	-0.075	-0.615
521.00	-0.072	-0.612
520.60	-0.069	-0.609
520.40	-0.069	-0.609
520.00	-0.066	-0.606
519.95	-0.066	-0.606
519.90	-0.066	-0.606
519.60	-0.066	-0.606
519.10	-0.059	-0.599
518.40	-0.056	-0.586
518.15	-0.052	-0.582
518.10	-0.052	-0.582
518.05	-0.052	-0.582
518.00	-0.052	-0.582
517.95	-0.052	-0.582
517.70	-0.049	-0.579
517.00	-0.046	-0.576
516.60	-0.046	-0.576

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
516.00	-0.043	-0.573
515.50	-0.039	-0.569
515.00	-0.036	-0.566
514.40	-0.039	-0.569
514.00	-0.043	-0.573
513.00	-0.049	-0.579
512.70	-0.052	-0.582
512.00	-0.056	-0.586
511.60	-0.059	-0.589
511.00	-0.062	-0.592
510.10	-0.066	-0.596
509.30	-0.069	-0.599
509.00	-0.072	-0.602
508.60	-0.072	-0.602
507.90	-0.079	-0.609
507.40	-0.079	-0.609
506.90	-0.082	-0.602
506.00	-0.085	-0.605
505.50	-0.085	-0.605
505.00	-0.085	-0.605
504.00	-0.092	-0.612
503.30	-0.098	-0.618
502.90	-0.102	-0.622
502.50	-0.108	-0.628
502.00	-0.112	-0.632
501.50	-0.118	-0.638
501.00	-0.121	-0.641
500.50	-0.128	-0.648
500.00	-0.135	-0.655
499.50	-0.141	-0.661
499.00	-0.144	-0.664
498.50	-0.151	-0.671
498.00	-0.157	-0.677
497.10	-0.167	-0.687
496.50	-0.177	-0.697
496.00	-0.184	-0.704
495.30	-0.187	-0.707
495.00	-0.187	-0.707
494.60	-0.19	-0.71
494.00	-0.19	-0.71
493.40	-0.194	-0.714
493.20	-0.197	-0.717
493.00	-0.197	-0.717
492.50	-0.2	-0.71
492.00	-0.207	-0.717
491.30	-0.217	-0.727
491.00	-0.22	-0.73
490.60	-0.223	-0.733
490.00	-0.226	-0.736
489.50	-0.23	-0.74

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
489.00	-0.233	-0.743
488.60	-0.23	-0.74
488.00	-0.23	-0.74
487.80	-0.23	-0.74
487.60	-0.226	-0.736
487.00	-0.223	-0.733
486.00	-0.217	-0.727
485.80	-0.217	-0.727
485.40	-0.21	-0.72
485.00	-0.207	-0.717
484.40	-0.2	-0.71
484.00	-0.197	-0.707
483.60	-0.197	-0.707
483.00	-0.203	-0.713
482.90	-0.203	-0.713
482.70	-0.203	-0.713
482.30	-0.203	-0.713
482.10	-0.207	-0.717
482.00	-0.207	-0.717
481.50	-0.207	-0.717
481.00	-0.21	-0.72
480.70	-0.21	-0.72
480.10	-0.21	-0.72
480.00	-0.21	-0.72
479.00	-0.21	-0.72
478.60	-0.207	-0.717
478.30	-0.207	-0.717
478.25	-0.207	-0.717
478.20	-0.207	-0.717
477.90	-0.207	-0.717
477.60	-0.207	-0.717
477.00	-0.21	-0.71
476.50	-0.21	-0.71
476.00	-0.207	-0.707
475.00	-0.207	-0.707
474.50	-0.207	-0.707
474.00	-0.207	-0.707
473.50	-0.207	-0.707
473.00	-0.207	-0.707
472.60	-0.207	-0.707
472.00	-0.207	-0.707
471.50	-0.207	-0.707
471.00	-0.207	-0.707
470.60	-0.207	-0.707
470.00	-0.207	-0.707
469.50	-0.207	-0.707
469.00	-0.203	-0.703
468.00	-0.207	-0.707
467.60	-0.207	-0.707
467.00	-0.207	-0.707



<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
466.50	-0.21	-0.71
466.00	-0.21	-0.71
465.50	-0.21	-0.71
465.00	-0.21	-0.71
464.50	-0.207	-0.707
464.00	-0.207	-0.707
463.60	-0.203	-0.703
463.00	-0.203	-0.703
462.50	-0.207	-0.707
462.00	-0.207	-0.707
461.50	-0.207	-0.707
461.00	-0.21	-0.7
460.50	-0.21	-0.7
460.00	-0.21	-0.7
459.50	-0.213	-0.703
459.00	-0.213	-0.703
458.60	-0.213	-0.703
458.00	-0.217	-0.707
457.60	-0.217	-0.707
457.20	-0.22	-0.71
457.00	-0.22	-0.71
456.60	-0.22	-0.71
456.00	-0.223	-0.713
455.90	-0.226	-0.716
455.60	-0.226	-0.716
455.00	-0.233	-0.723
454.70	-0.233	-0.723
454.30	-0.236	-0.726
454.00	-0.236	-0.726
453.60	-0.24	-0.73
453.00	-0.24	-0.73
452.50	-0.24	-0.73
452.00	-0.24	-0.73
451.50	-0.24	-0.73
451.00	-0.24	-0.73
450.50	-0.236	-0.726
450.00	-0.236	-0.726
449.40	-0.236	-0.726
449.00	-0.236	-0.726
448.00	-0.236	-0.726
447.20	-0.233	-0.723
447.00	-0.233	-0.723
446.40	-0.233	-0.713
446.00	-0.233	-0.713
445.30	-0.23	-0.71
445.00	-0.23	-0.71
444.40	-0.23	-0.71
444.00	-0.23	-0.71
443.50	-0.23	-0.71
443.00	-0.226	-0.706

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
442.40	-0.223	-0.703
442.00	-0.223	-0.703
441.50	-0.223	-0.703
441.00	-0.223	-0.703
440.30	-0.226	-0.706
440.00	-0.226	-0.706
439.50	-0.223	-0.703
439.00	-0.226	-0.706
438.40	-0.226	-0.706
438.00	-0.226	-0.706
437.50	-0.226	-0.706
437.10	-0.226	-0.706
437.00	-0.226	-0.706
436.50	-0.226	-0.706
436.00	-0.226	-0.706
435.60	-0.226	-0.706
435.00	-0.223	-0.703
434.40	-0.223	-0.703
434.00	-0.226	-0.706
433.40	-0.226	-0.696
433.00	-0.226	-0.696
432.50	-0.226	-0.696
432.00	-0.226	-0.696
431.50	-0.226	-0.696
431.00	-0.226	-0.696
430.50	-0.226	-0.696
430.00	-0.226	-0.696
429.50	-0.226	-0.696
429.00	-0.226	-0.696
428.70	-0.226	-0.696
428.05	-0.23	-0.7
428.00	-0.23	-0.7
427.95	-0.23	-0.7
427.60	-0.23	-0.7
427.00	-0.23	-0.7
426.00	-0.233	-0.703
425.50	-0.233	-0.703
425.00	-0.233	-0.703
424.40	-0.236	-0.706
424.00	-0.236	-0.706
423.50	-0.236	-0.706
423.00	-0.24	-0.71
422.40	-0.24	-0.71
422.00	-0.243	-0.713
421.50	-0.243	-0.713
421.00	-0.246	-0.716
420.50	-0.246	-0.706
420.00	-0.249	-0.709
419.40	-0.253	-0.713
419.00	-0.253	-0.713

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
418.60	-0.256	-0.716
418.00	-0.259	-0.719
417.40	-0.262	-0.722
417.00	-0.262	-0.722
416.60	-0.262	-0.722
416.00	-0.256	-0.716
415.70	-0.256	-0.716
415.00	-0.253	-0.713
414.40	-0.249	-0.709
414.00	-0.246	-0.706
413.50	-0.246	-0.706
413.00	-0.246	-0.706
412.40	-0.243	-0.703
412.00	-0.24	-0.7
411.40	-0.236	-0.696
411.00	-0.233	-0.693
410.60	-0.233	-0.693
410.30	-0.23	-0.69
410.00	-0.23	-0.69
409.70	-0.226	-0.686
409.20	-0.226	-0.686
408.90	-0.223	-0.673
408.50	-0.223	-0.673
408.00	-0.22	-0.67
407.50	-0.217	-0.667
407.00	-0.213	-0.663
406.40	-0.21	-0.66
406.00	-0.207	-0.657
405.50	-0.203	-0.653
405.00	-0.2	-0.65
404.30	-0.194	-0.644
404.11	-0.194	-0.644
404.10	-0.194	-0.644
404.09	-0.194	-0.644
404.00	-0.19	-0.64
403.50	-0.187	-0.637
403.25	-0.187	-0.637
403.20	-0.187	-0.637
403.15	-0.187	-0.637
403.00	-0.187	-0.637
402.50	-0.19	-0.64
402.00	-0.19	-0.64
401.50	-0.187	-0.637
401.00	-0.187	-0.637
400.50	-0.187	-0.637
400.00	-0.187	-0.637
399.50	-0.187	-0.637
399.00	-0.187	-0.637
398.50	-0.187	-0.637
398.00	-0.184	-0.634

<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
397.50	-0.184	-0.624
397.00	-0.184	-0.624
396.60	-0.184	-0.624
395.90	-0.18	-0.62
395.00	-0.177	-0.617
394.70	-0.174	-0.614
394.10	-0.171	-0.611
393.50	-0.171	-0.611
393.10	-0.167	-0.607
392.10	-0.167	-0.607
390.90	-0.171	-0.611
390.00	-0.171	-0.611
389.50	-0.171	-0.611
388.80	-0.177	-0.617
388.00	-0.187	-0.627
386.90	-0.197	-0.637
385.80	-0.19	-0.62
385.60	-0.184	-0.614
384.90	-0.174	-0.604
384.50	-0.167	-0.597
383.90	-0.157	-0.587
383.80	-0.157	-0.587
383.75	-0.157	-0.587
383.40	-0.154	-0.584
382.90	-0.151	-0.581
382.40	-0.148	-0.578
381.90	-0.144	-0.574
381.40	-0.141	-0.571
381.00	-0.138	-0.568
380.50	-0.138	-0.568
380.00	-0.135	-0.565
379.50	-0.131	-0.561
379.00	-0.131	-0.561
378.60	-0.128	-0.558
378.00	-0.125	-0.555
377.30	-0.121	-0.551
377.00	-0.121	-0.551
376.40	-0.118	-0.548
376.00	-0.118	-0.548
375.60	-0.115	-0.545
375.00	-0.115	-0.535
374.50	-0.115	-0.535
374.00	-0.115	-0.535
373.50	-0.115	-0.535
373.00	-0.118	-0.538
372.50	-0.118	-0.538
372.00	-0.121	-0.541
371.50	-0.125	-0.545
371.00	-0.125	-0.545
370.50	-0.128	-0.548

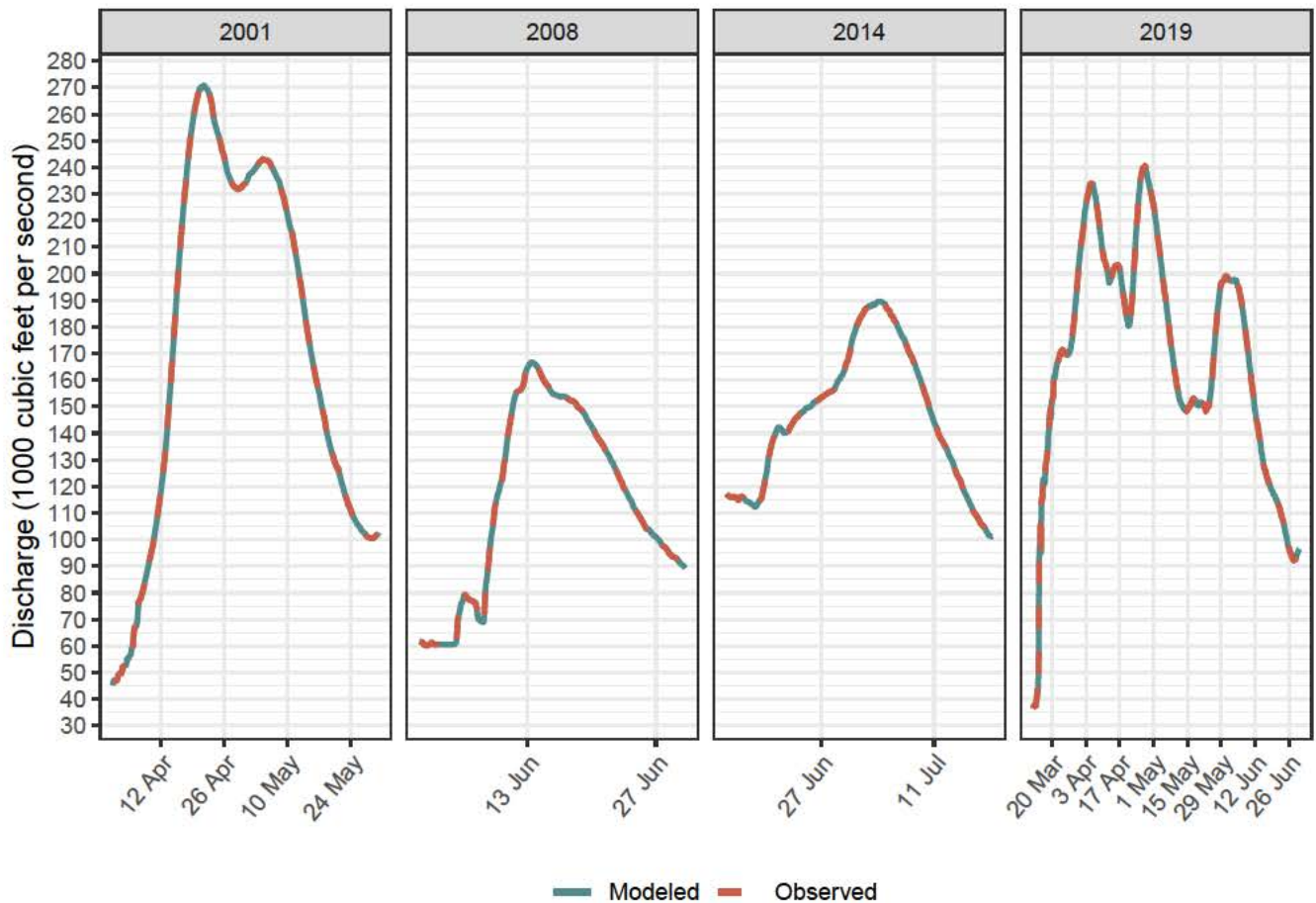
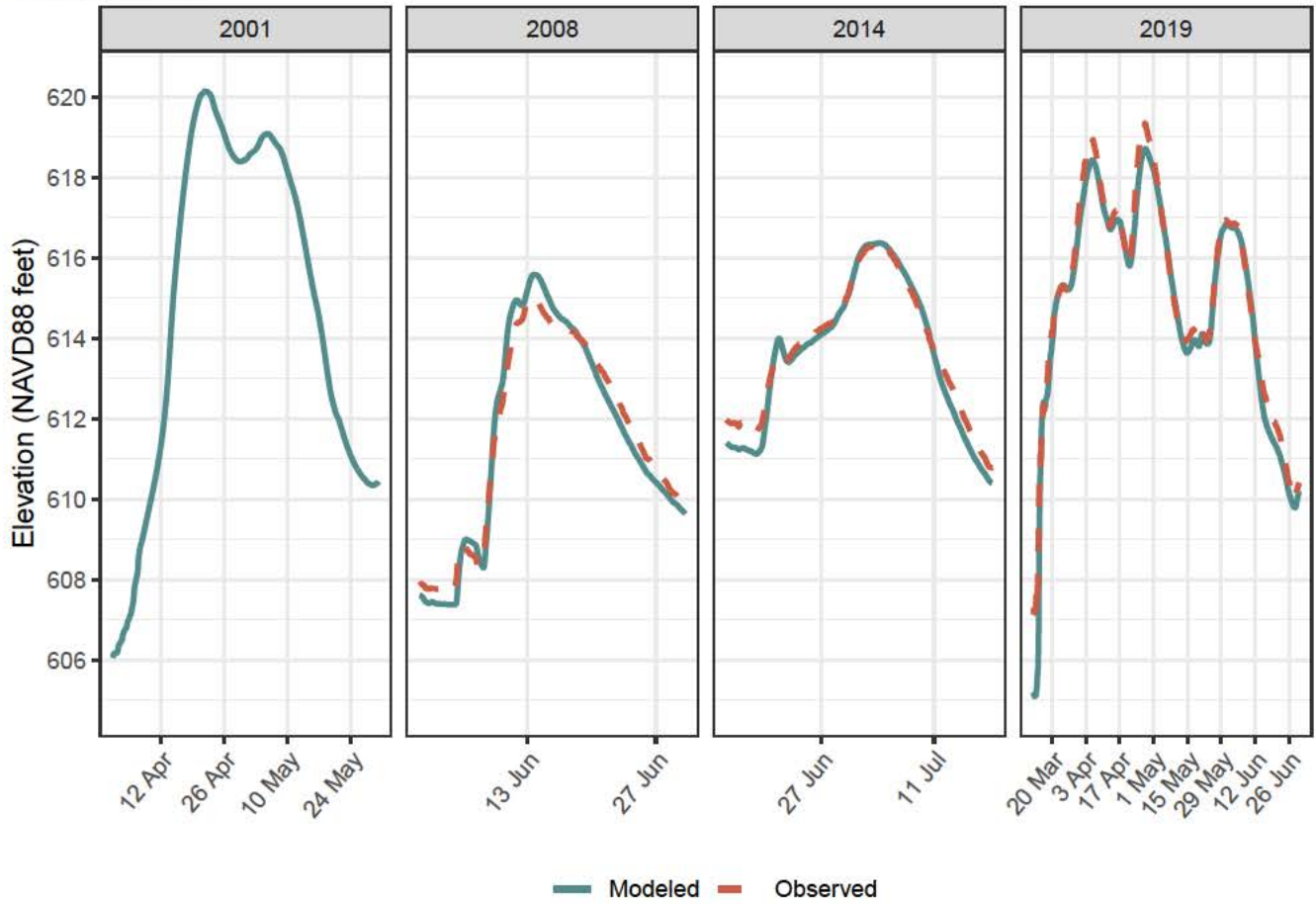
<b>River Mile</b>	<b>Convert elevations in NGVD 1929 to NAVD 1988 (feet)</b>	<b>Convert elevations in MSL 1912 to NAVD 1988 (feet)</b>
370.00	-0.128	-0.548
369.50	-0.131	-0.551
369.00	-0.131	-0.551
368.50	-0.135	-0.555
368.00	-0.138	-0.558
367.50	-0.141	-0.561
367.00	-0.141	-0.561
366.50	-0.144	-0.564
366.00	-0.148	-0.568
365.50	-0.151	-0.571
365.00	-0.151	-0.571
364.70	-0.154	-0.574
364.50	-0.154	-0.574
364.40	-0.154	-0.564
364.30	-0.154	-0.564
364.20	-0.154	-0.564

## **APPENDIX C-1**

### **MODEL CALIBRATION HYDROGRAPHS**

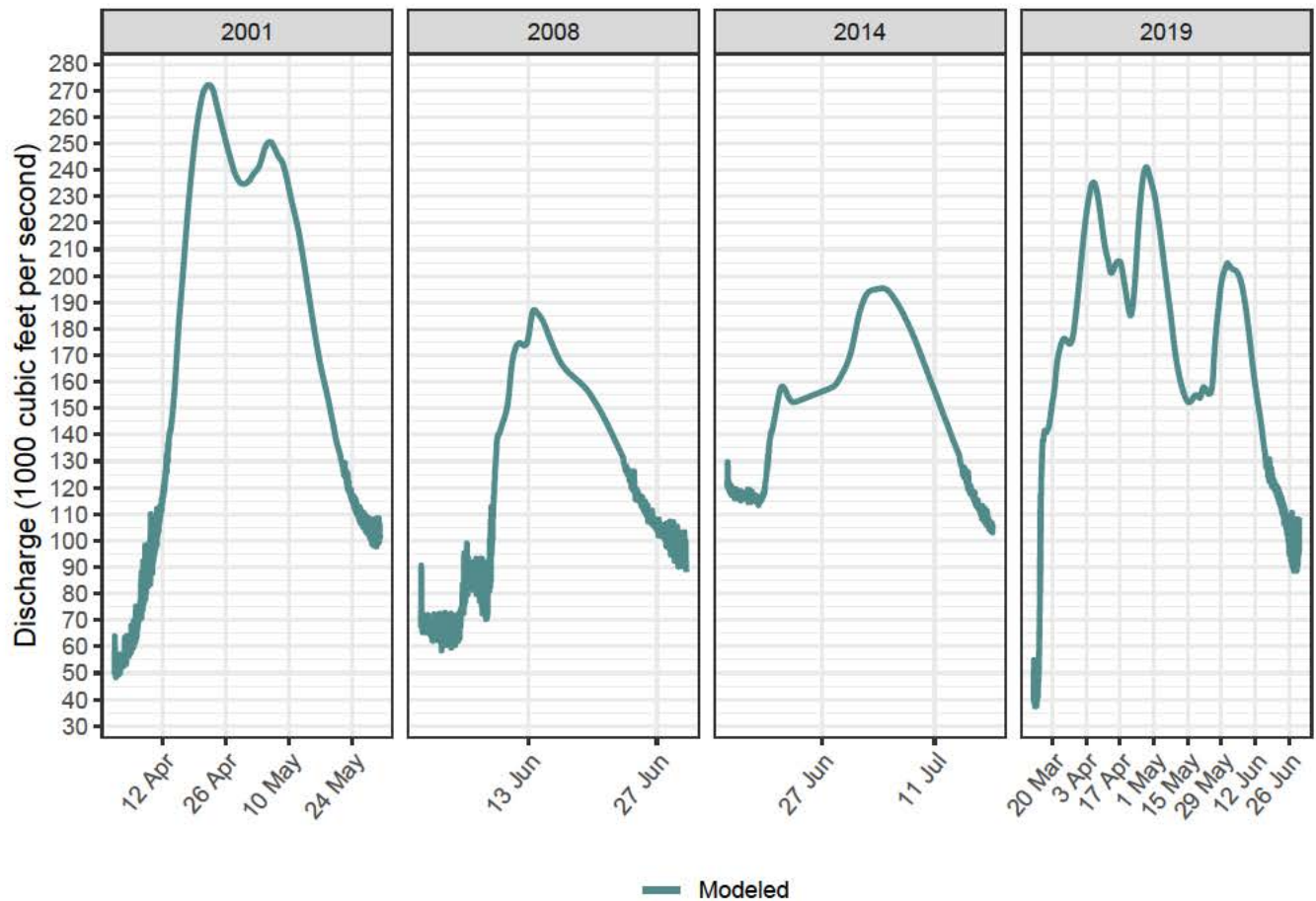
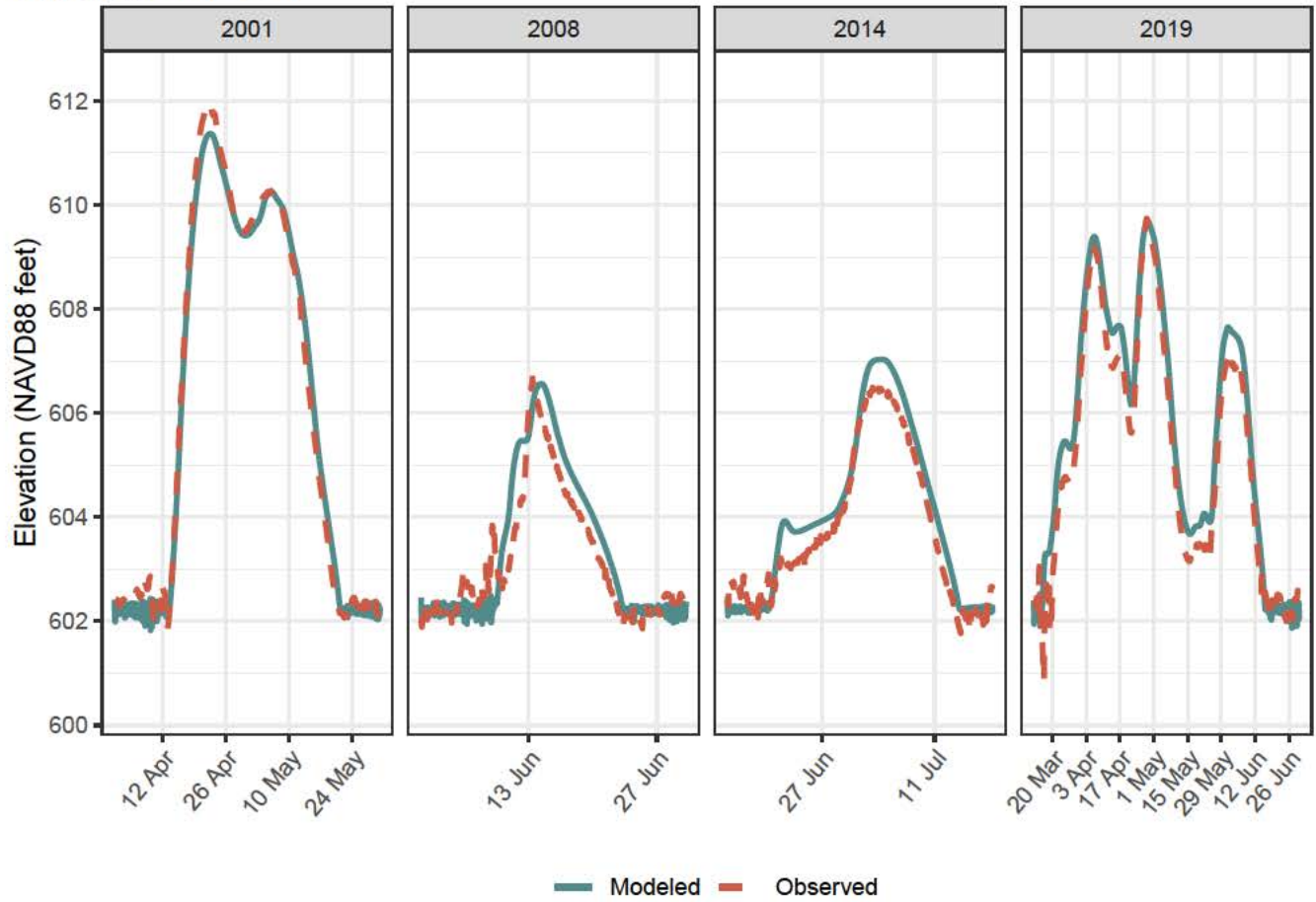
Mississippi River, LD10\_Turkey Reach, River Mile 615.1

Gage L&D 10



Mississippi River, Platte\_Galena Reach, River Mile 583.19

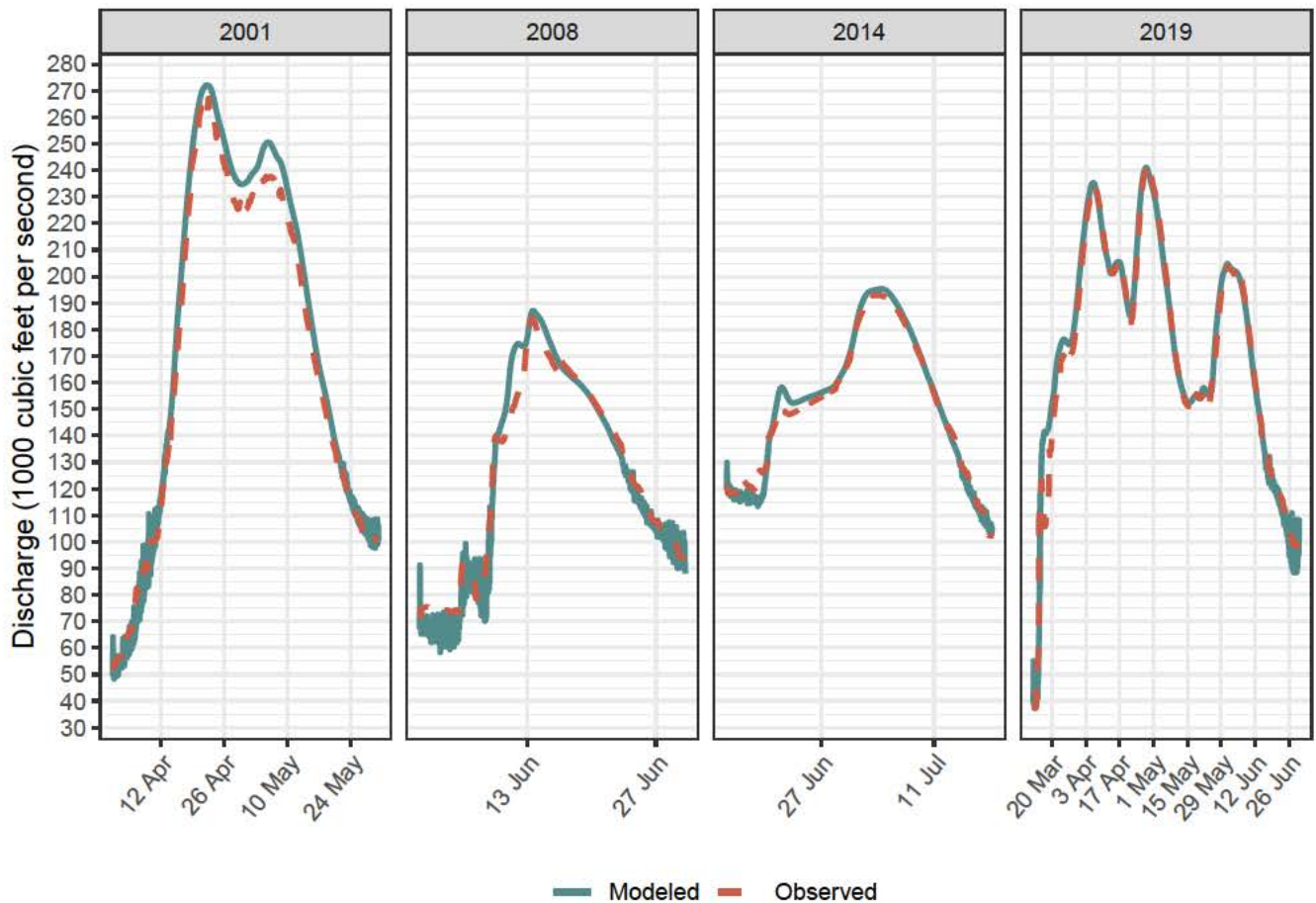
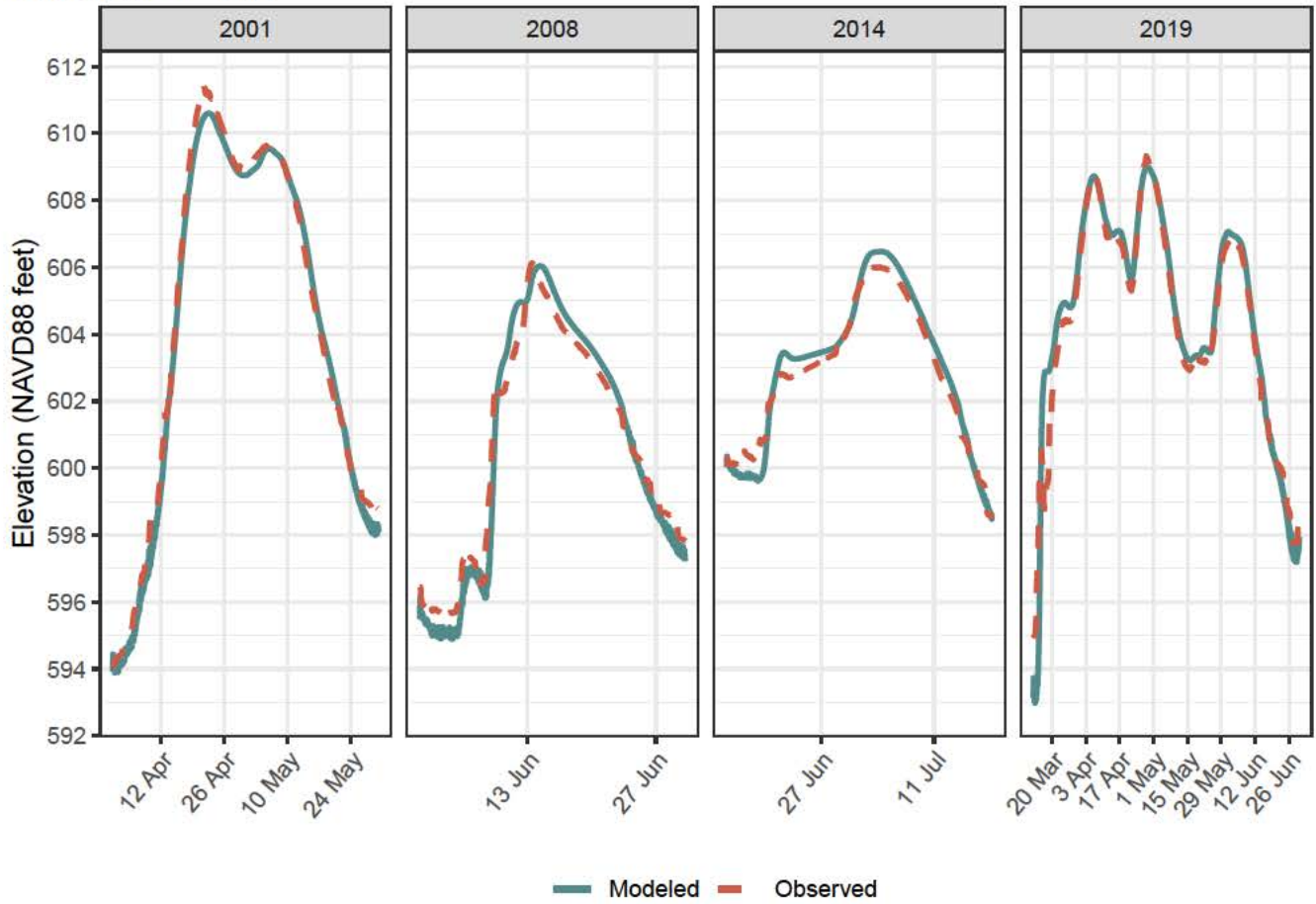
Gage L&D 11 POOL





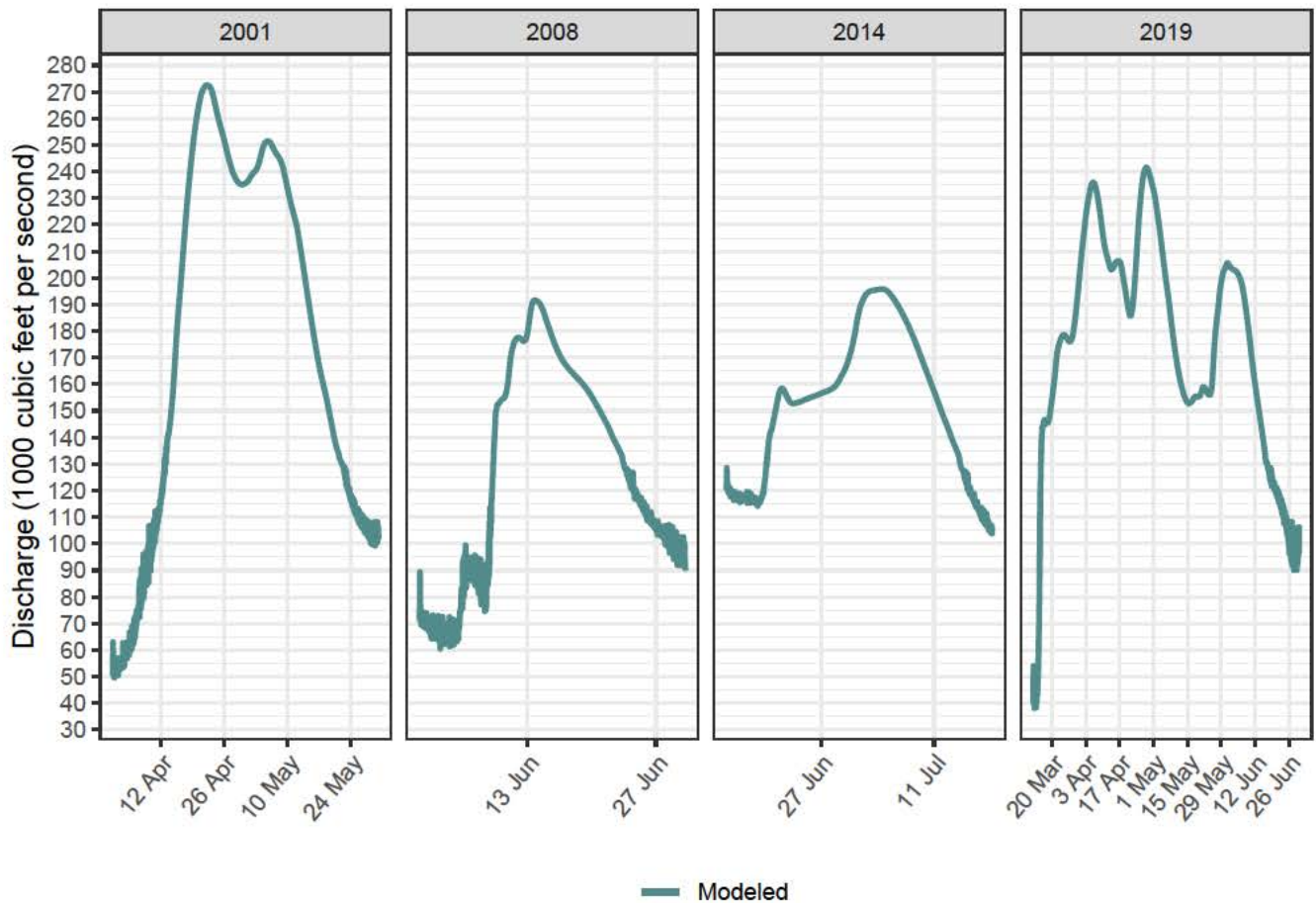
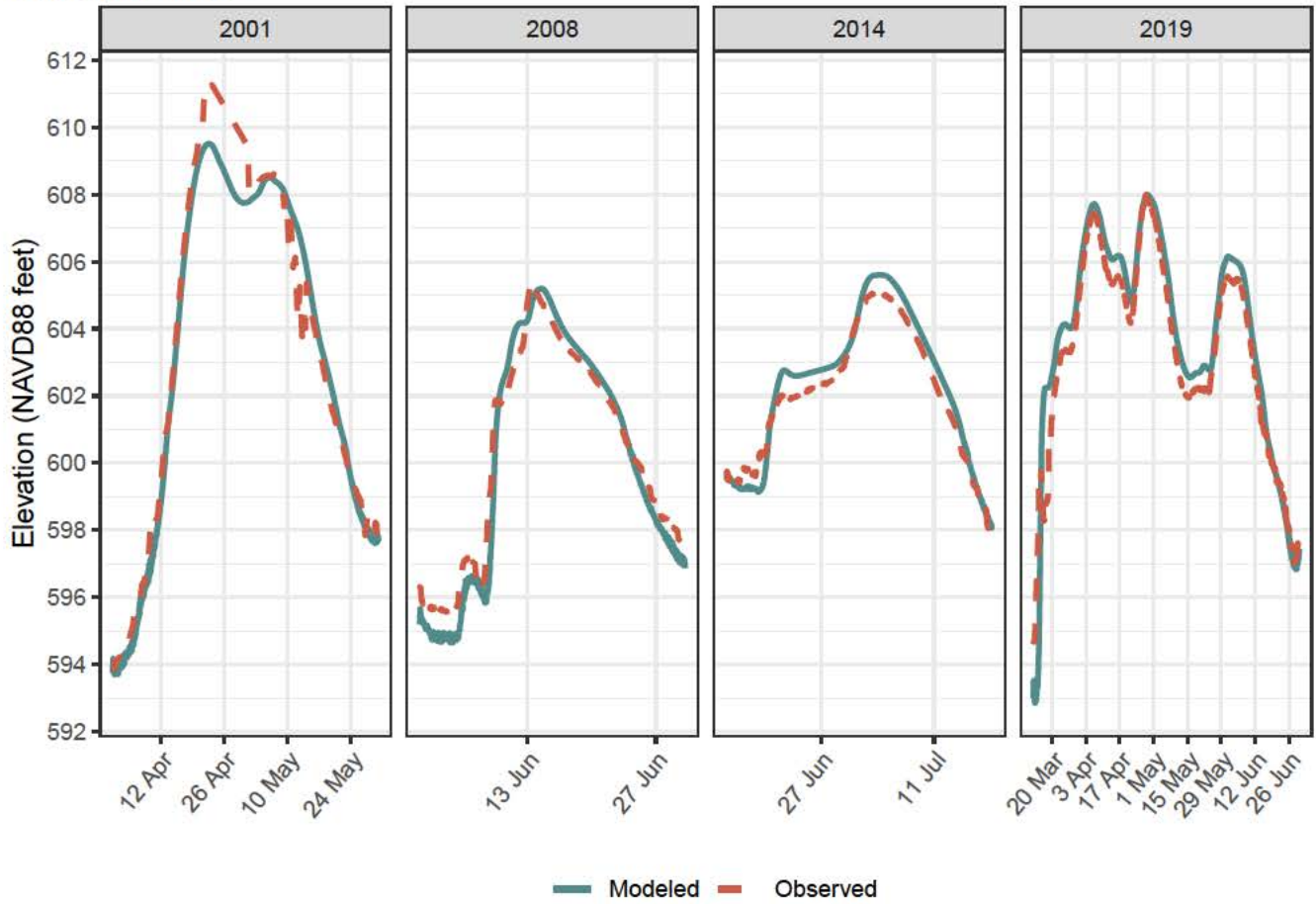
Mississippi River, Platte\_Galena Reach, River Mile 582.99

Gage L&D 11 TAIL



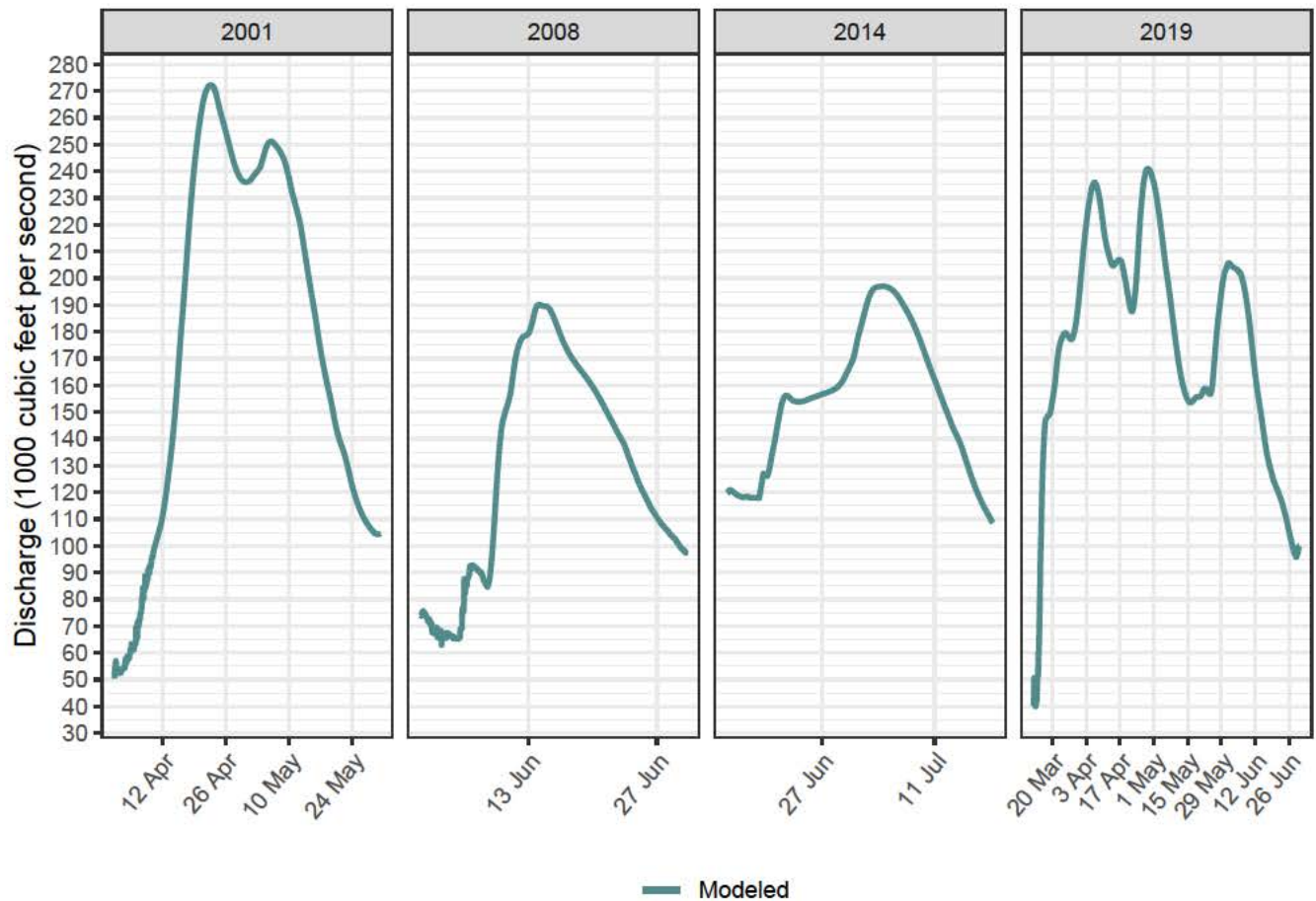
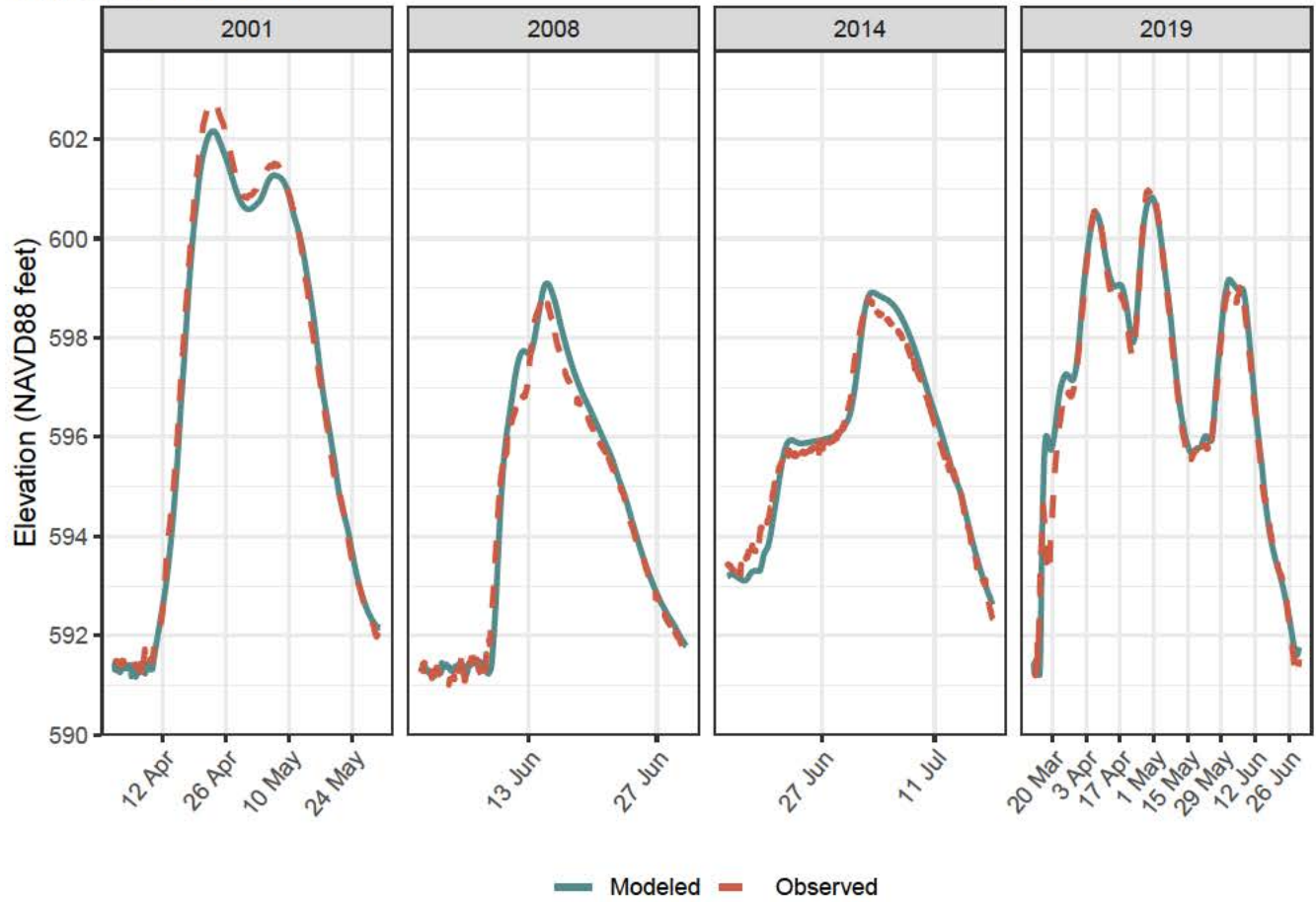
Mississippi River, Platte\_Galena Reach, River Mile 579.91

Gage DUBUQUE



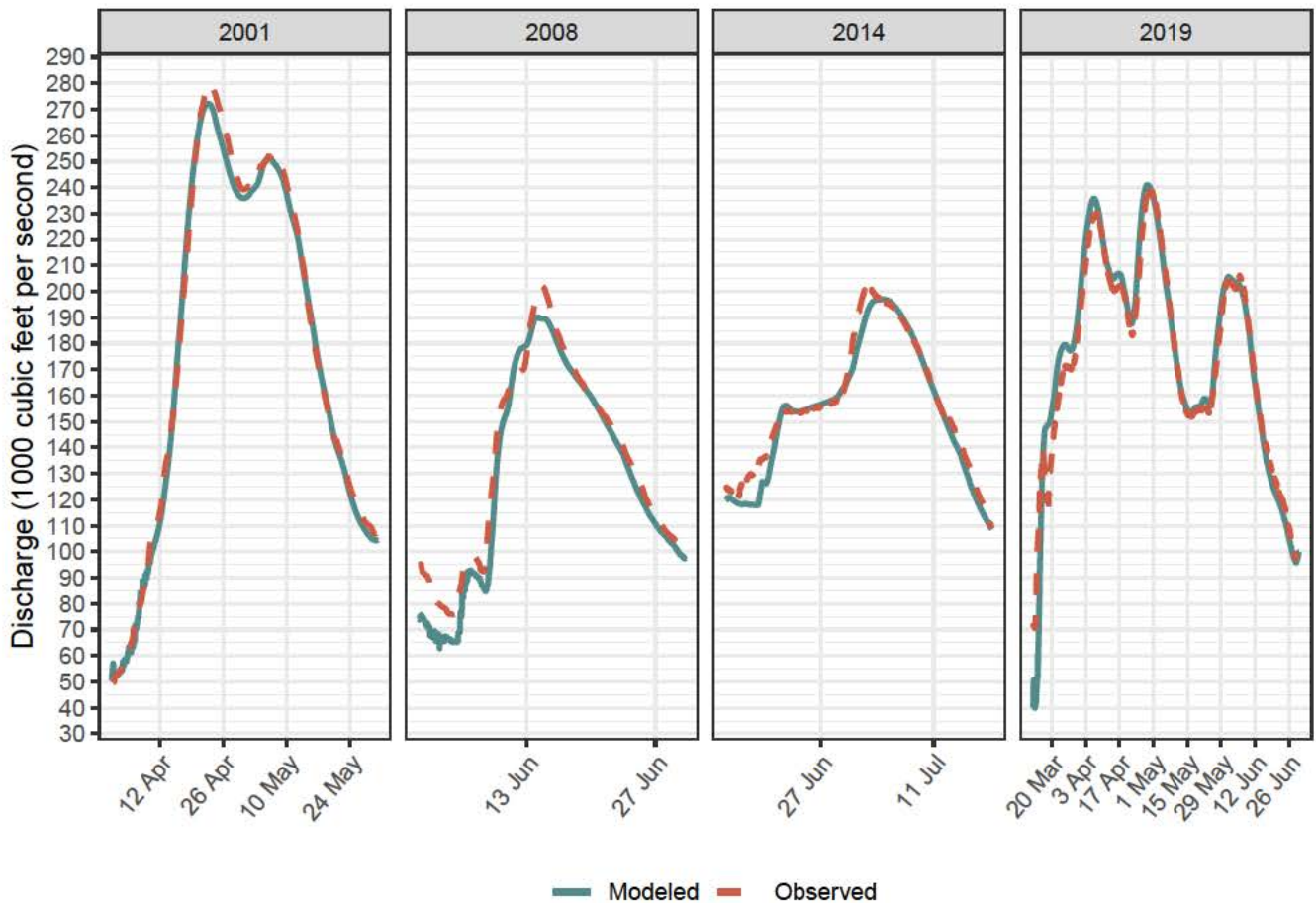
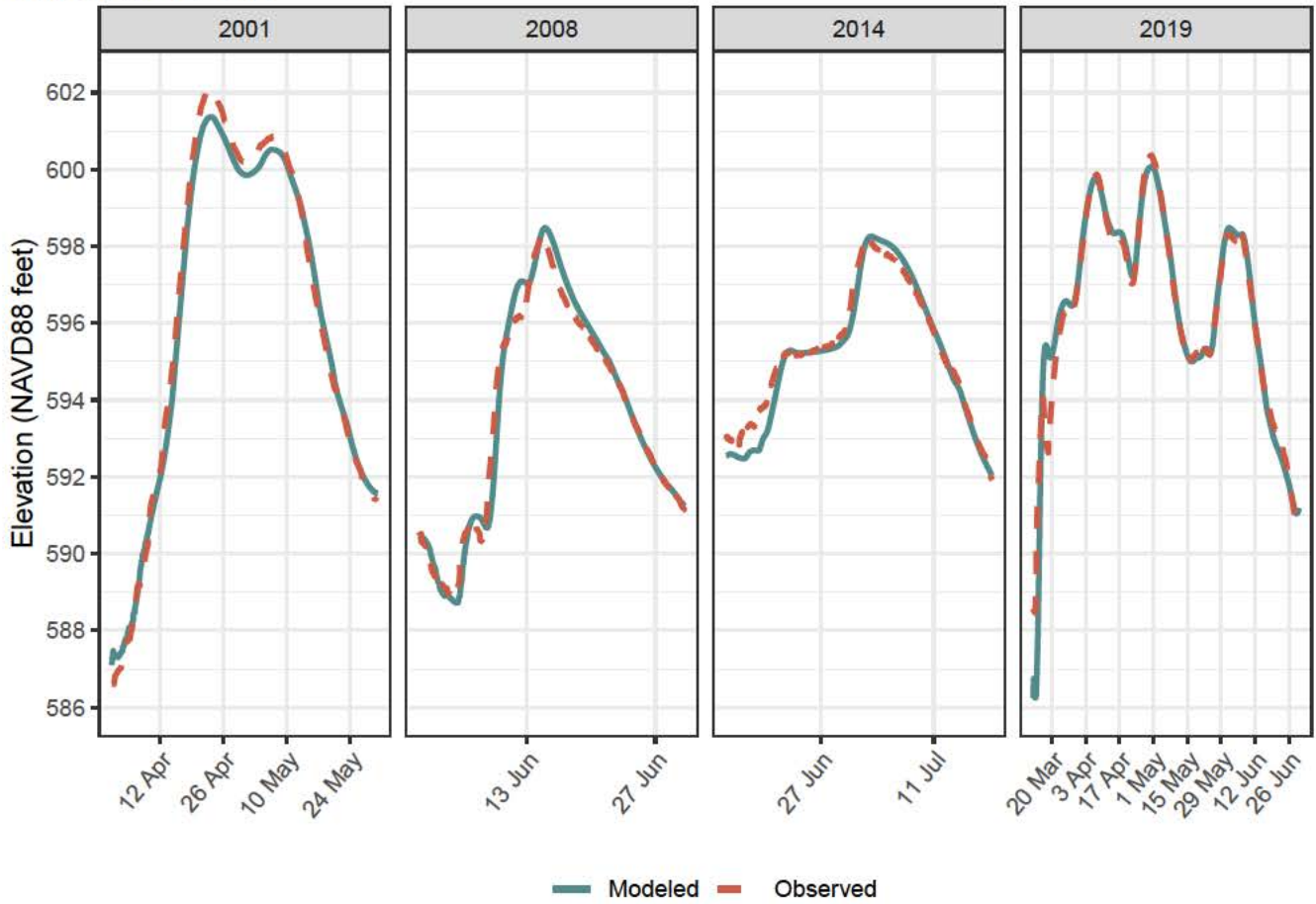
Mississippi River, Galena\_Maquoketa Reach, River Mile 556.75

Gage L&D 12 POOL



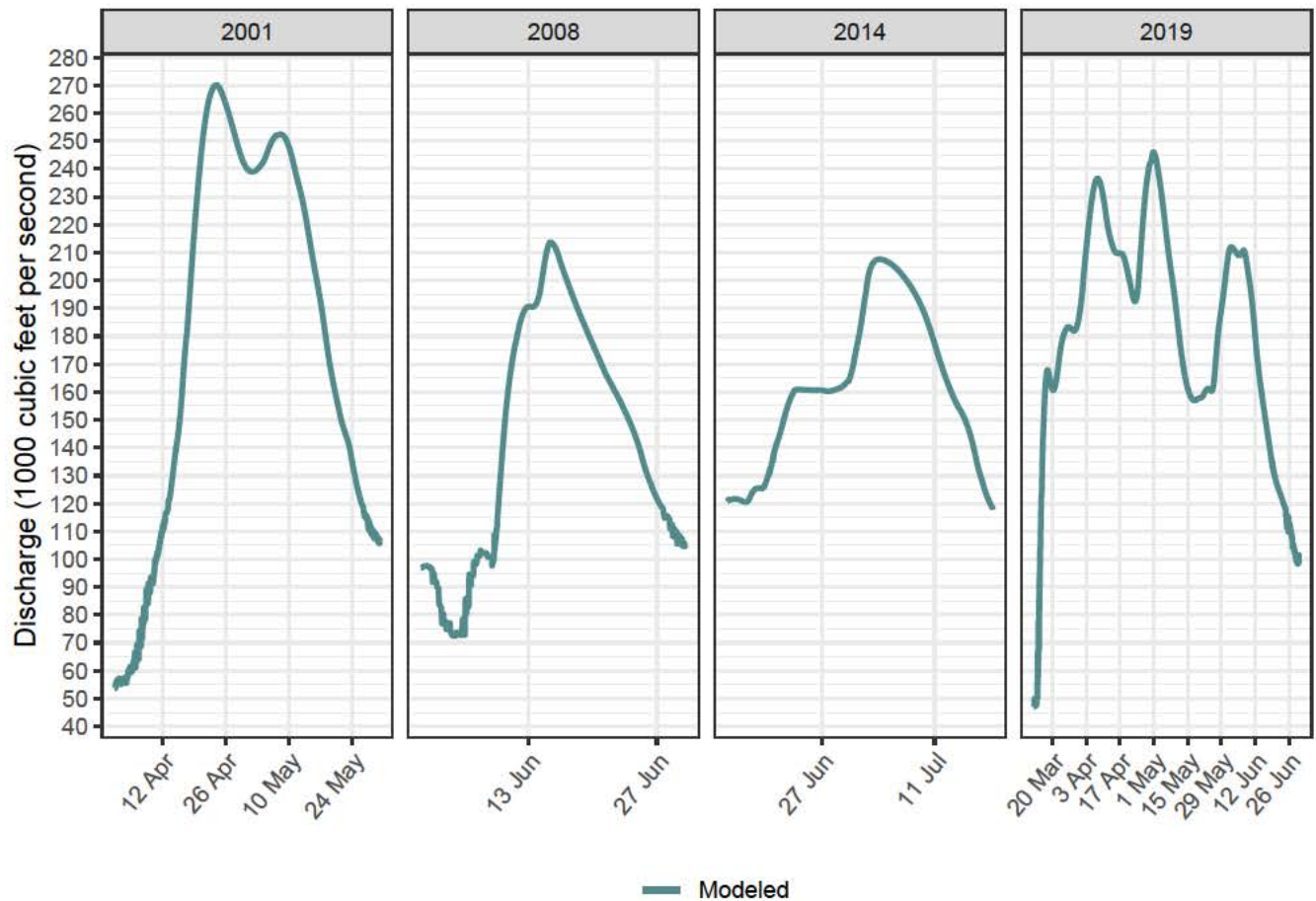
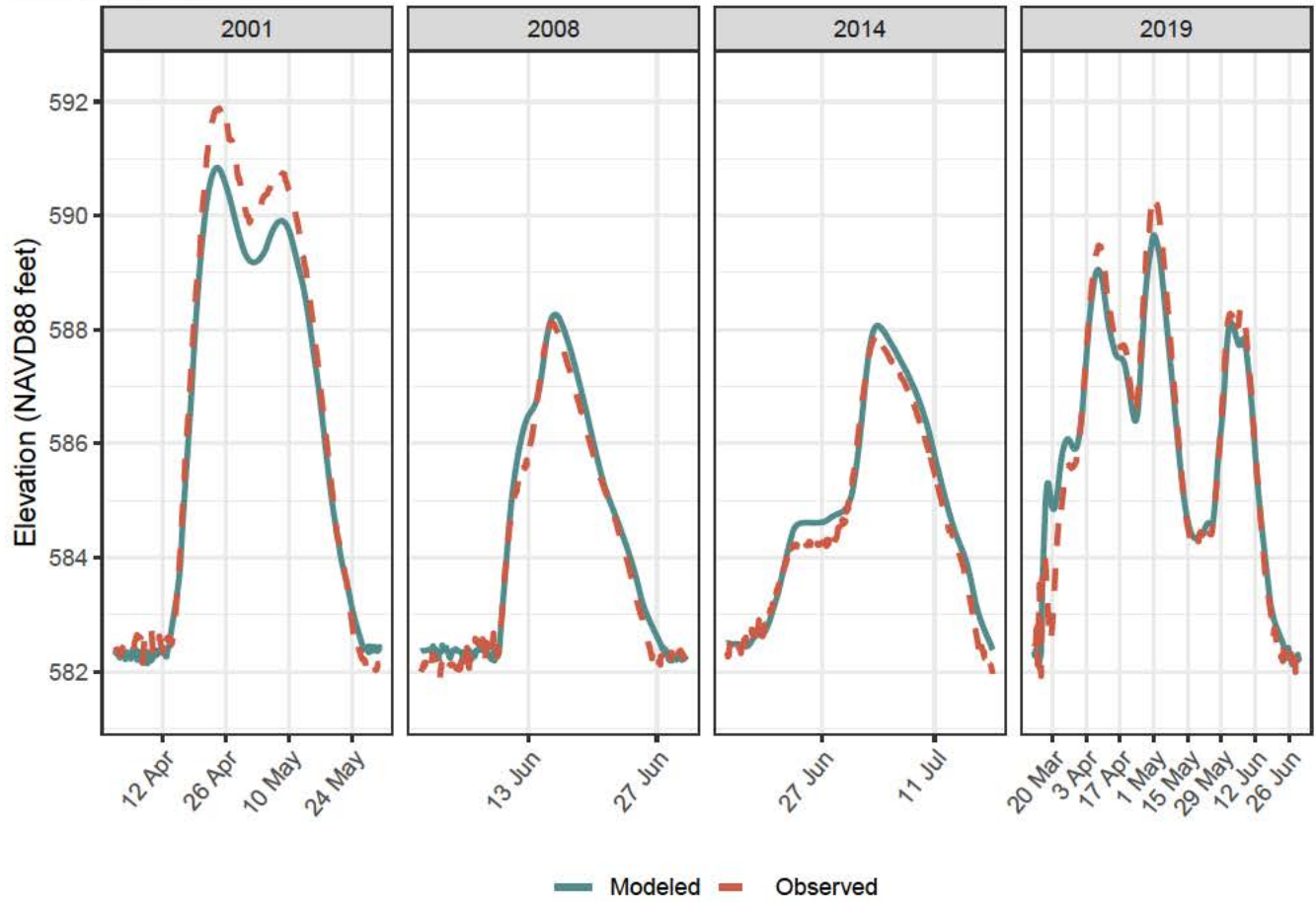
Mississippi River, Galena\_Maquoketa Reach, River Mile 556.61

Gage L&D 12 TAIL



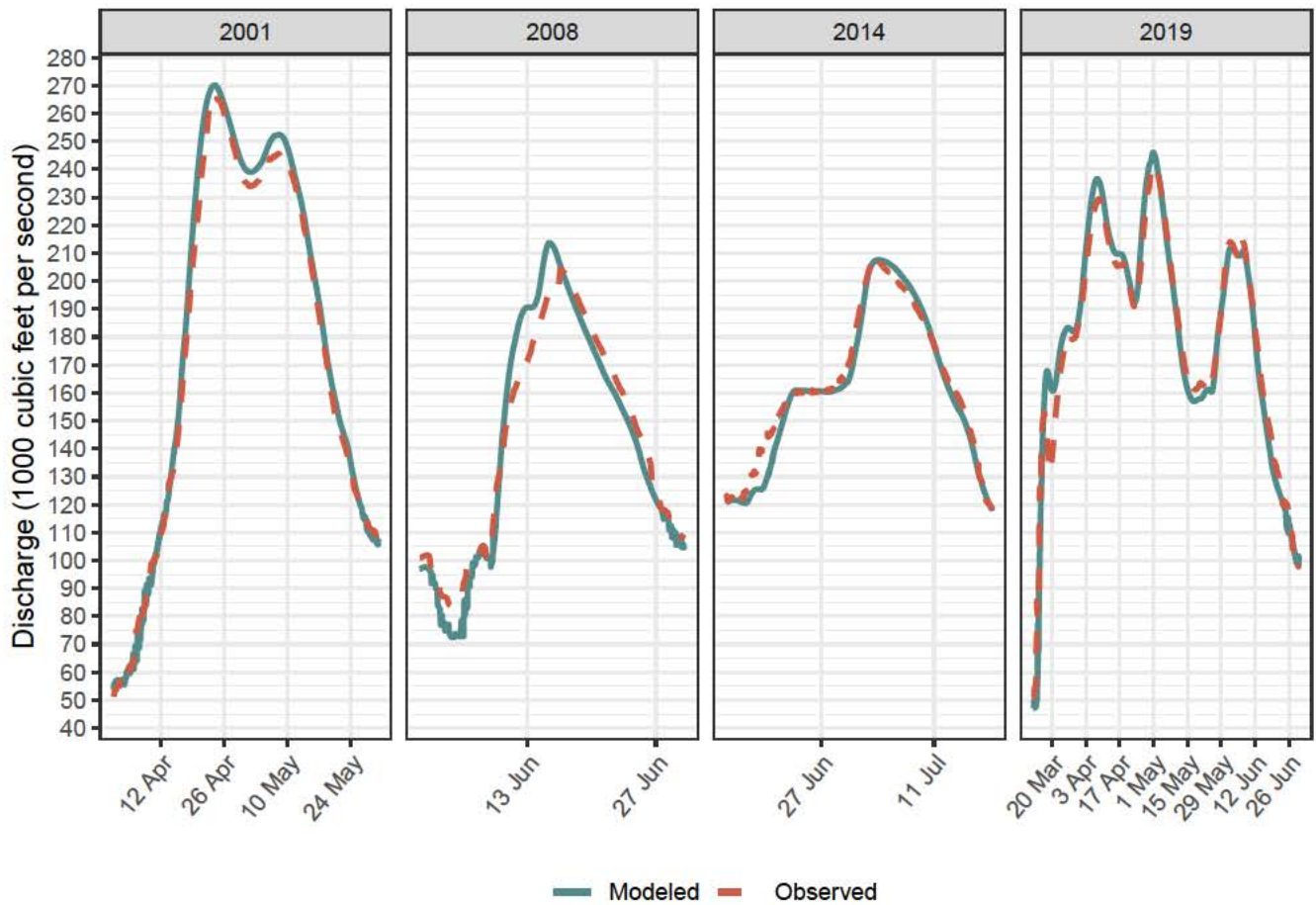
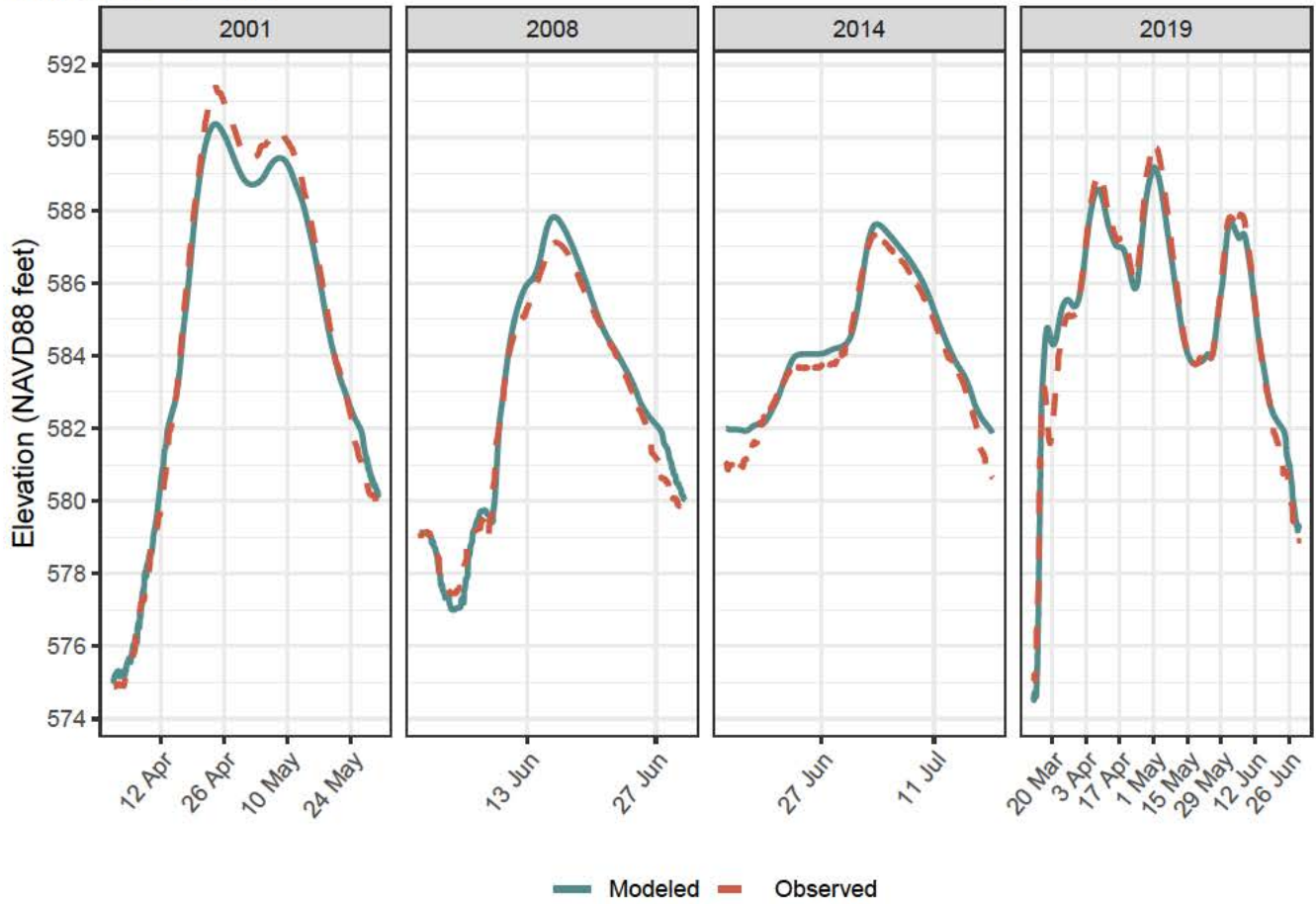
Mississippi River, Apple\_Wapsi Reach, River Mile 522.59

Gage L&D 13 POOL



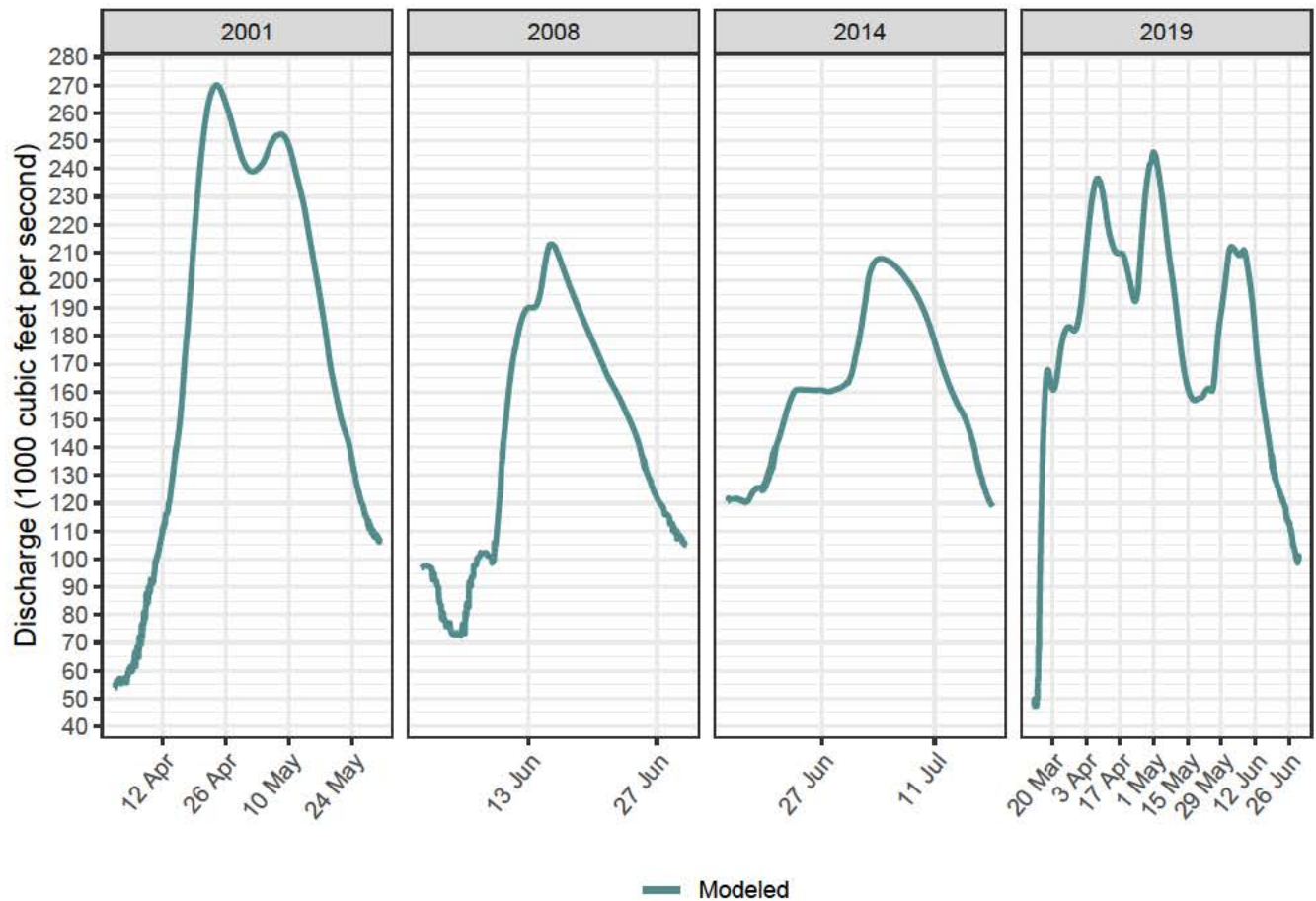
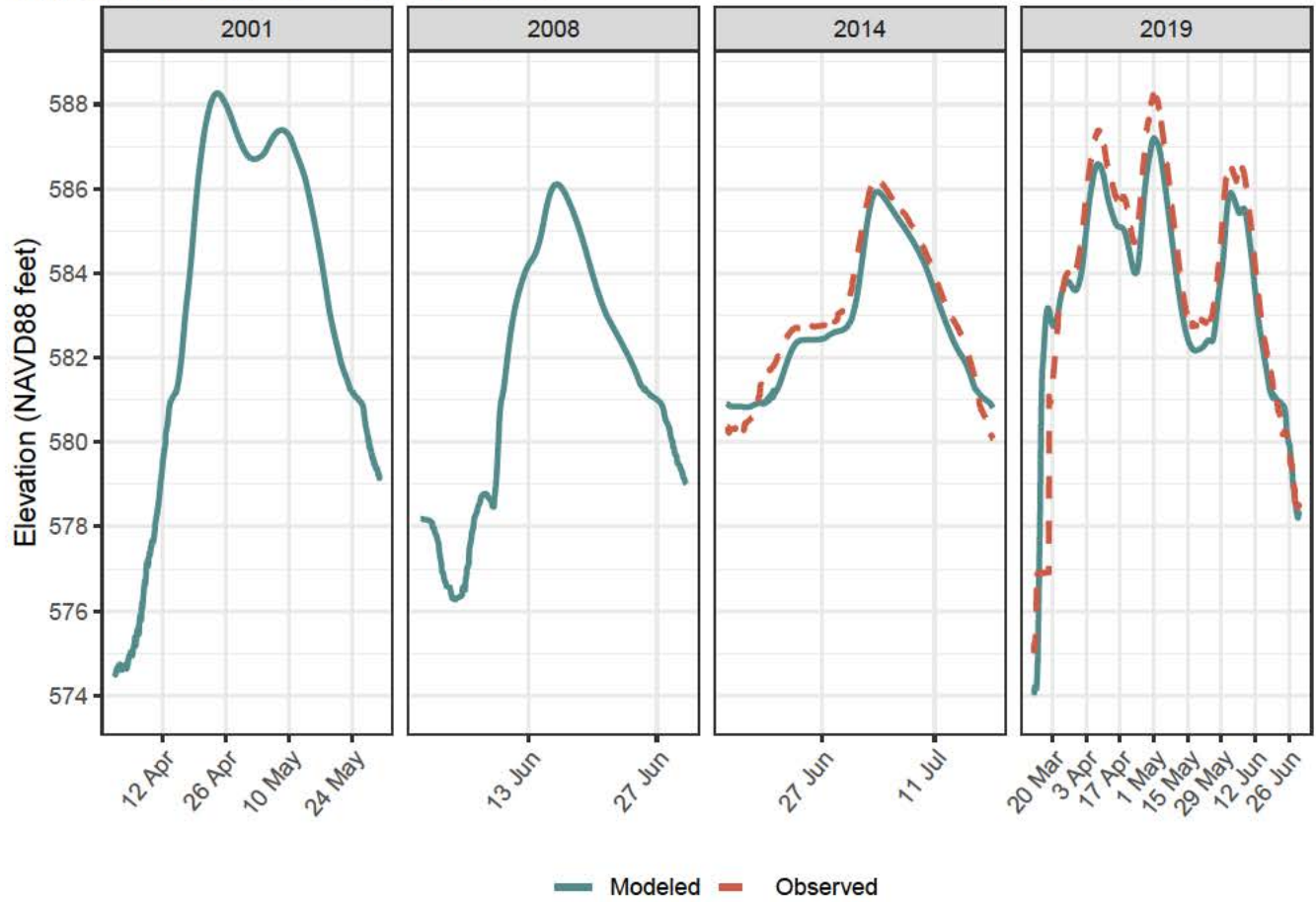
Mississippi River, Apple\_Wapsi Reach, River Mile 522.47

Gage L&D 13 TAIL



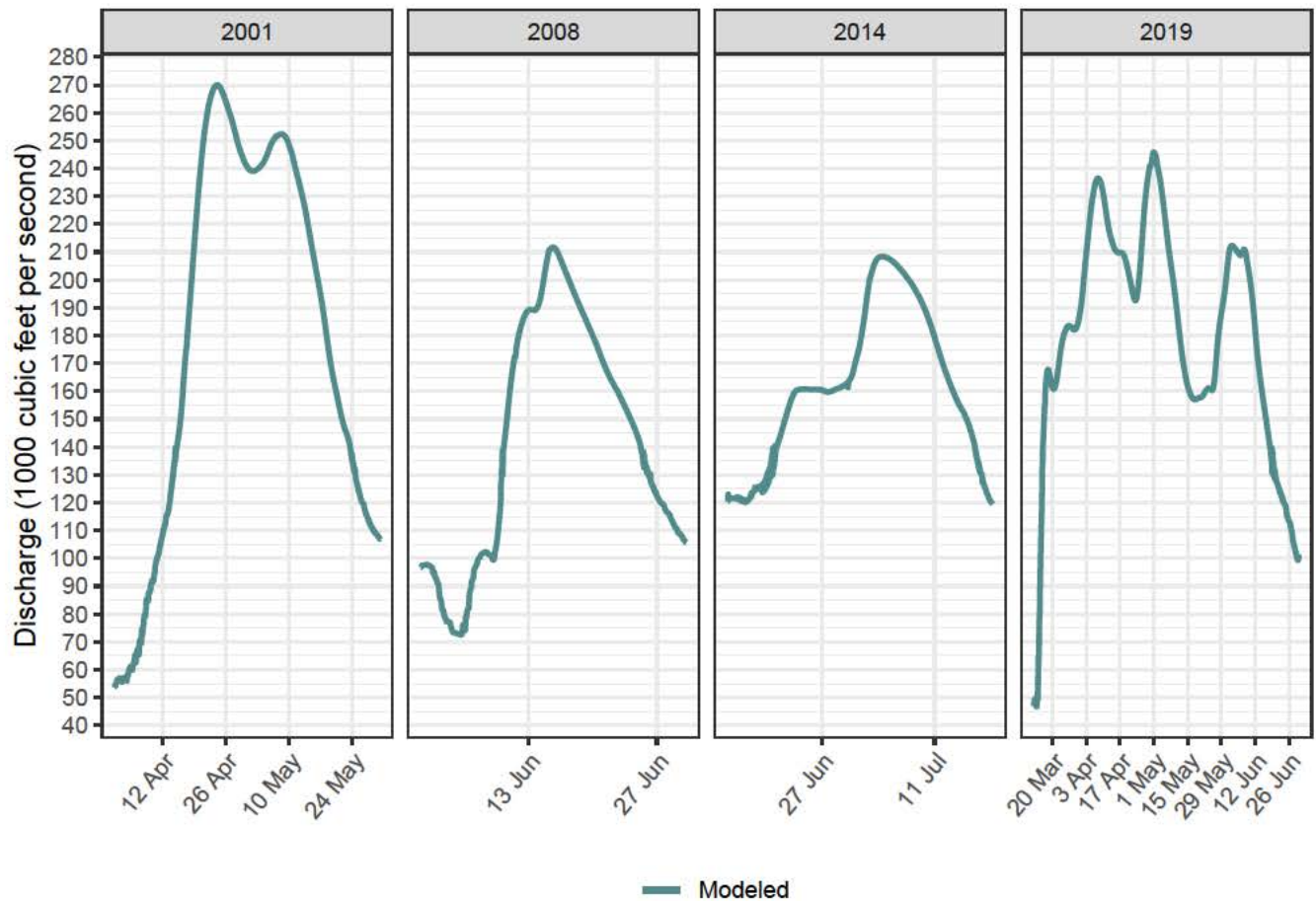
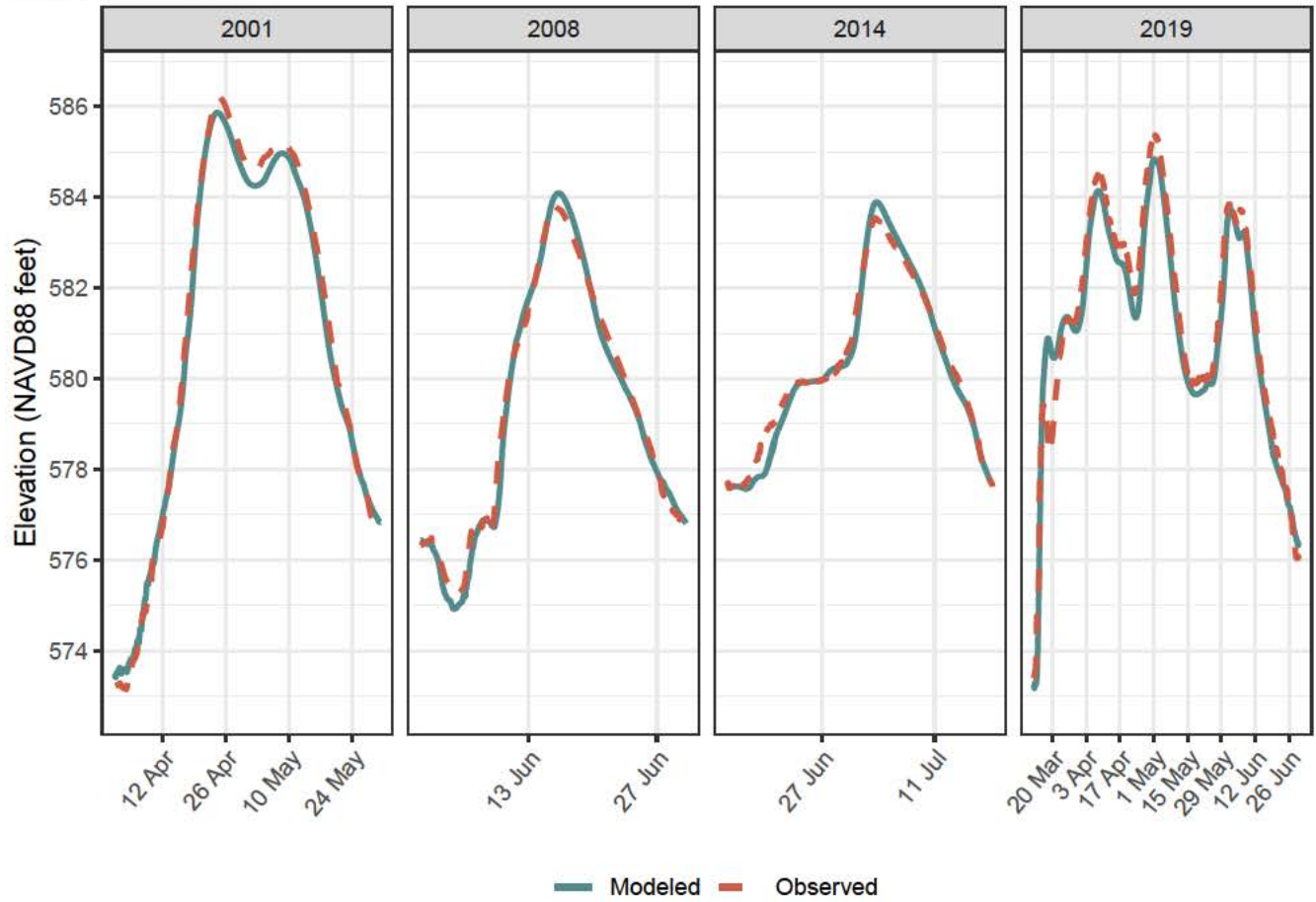
# Mississippi River, Apple\_Wapsi Reach, River Mile 517.25

## Gage BEAVER SLOUGH AT CLINTON



Mississippi River, Apple\_Wapsi Reach, River Mile 512.02

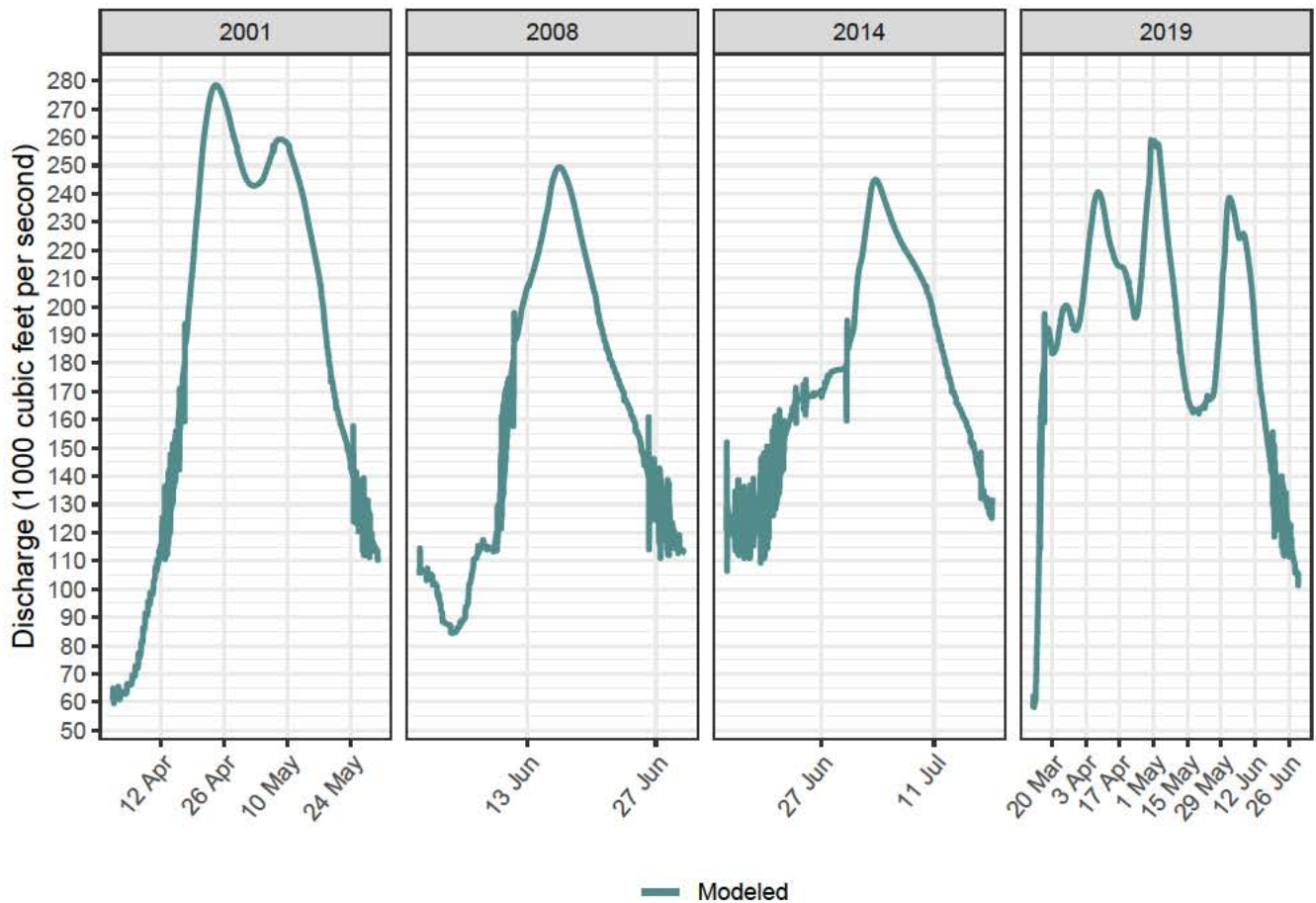
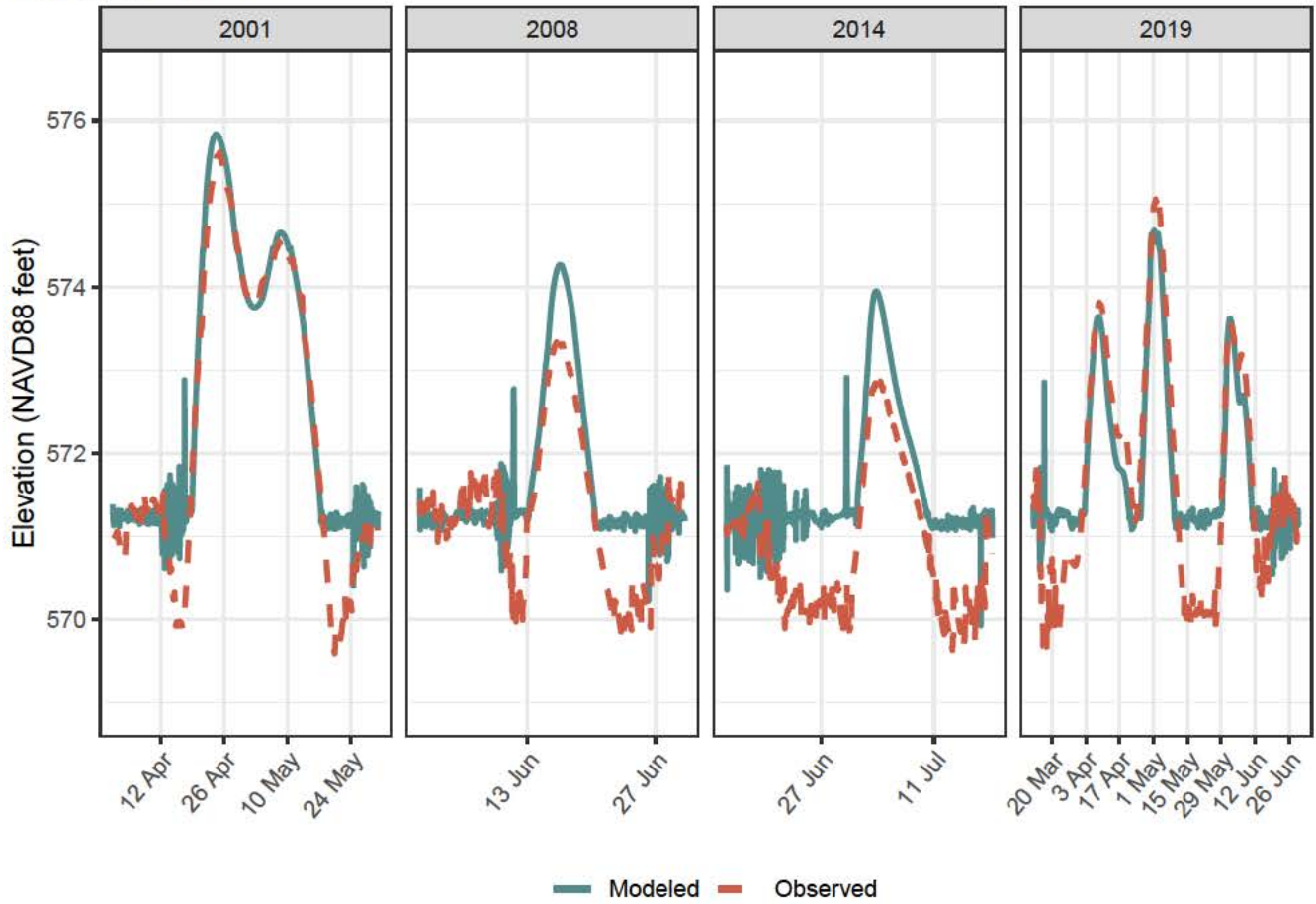
Gage CAMANCHE





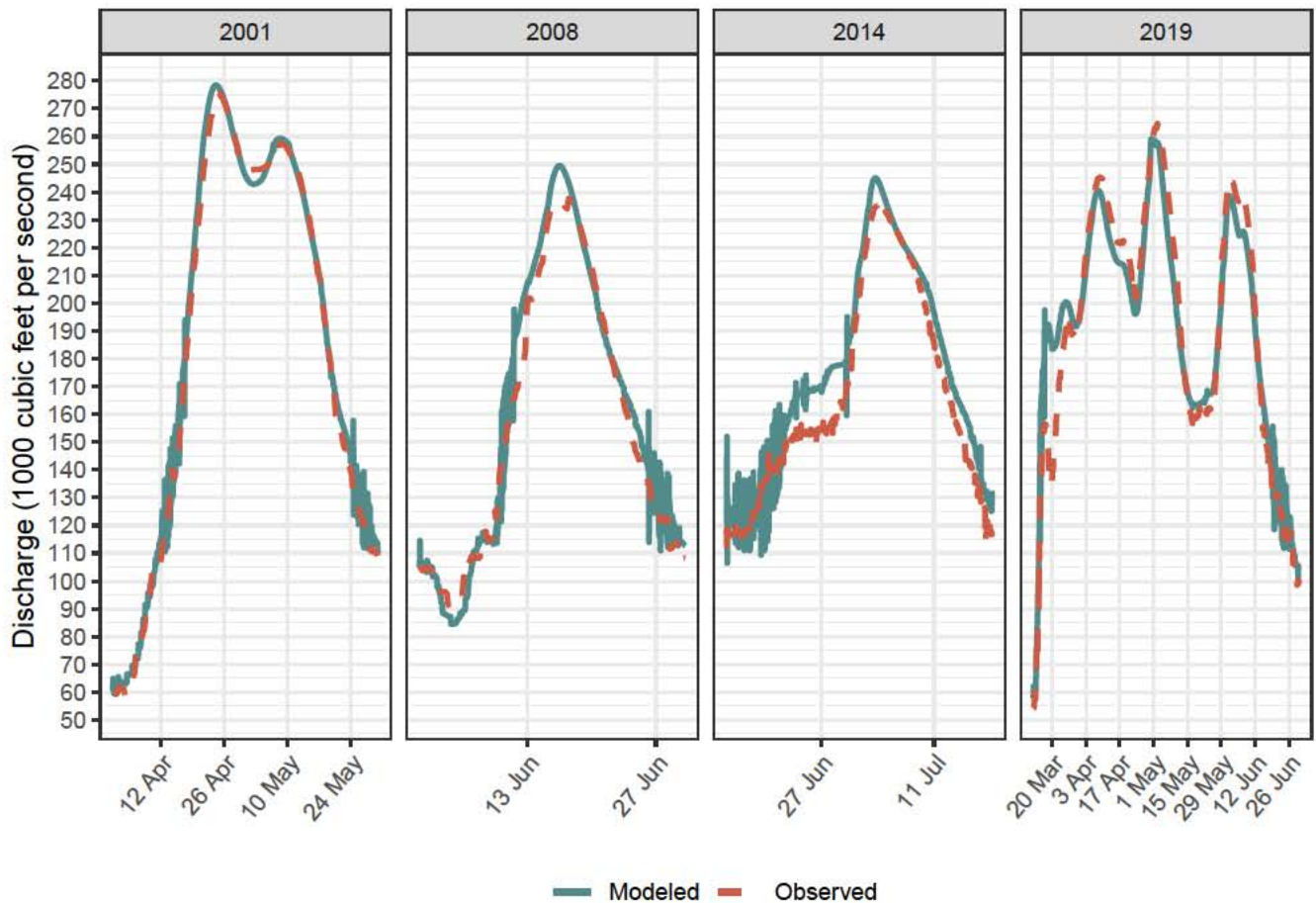
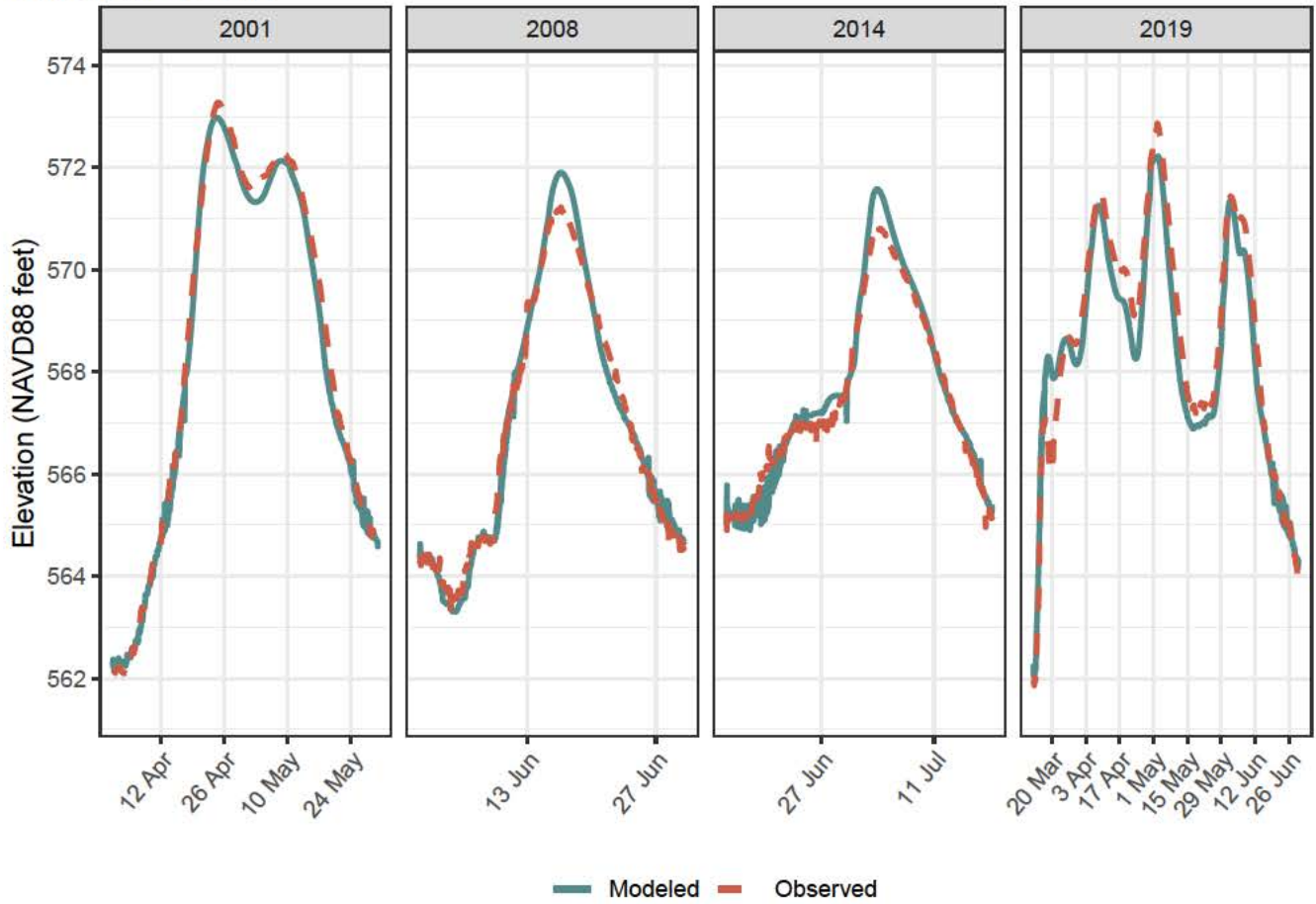
Mississippi River, Wapsi\_Sylvan Reach, River Mile 493.43

Gage L&D 14 POOL



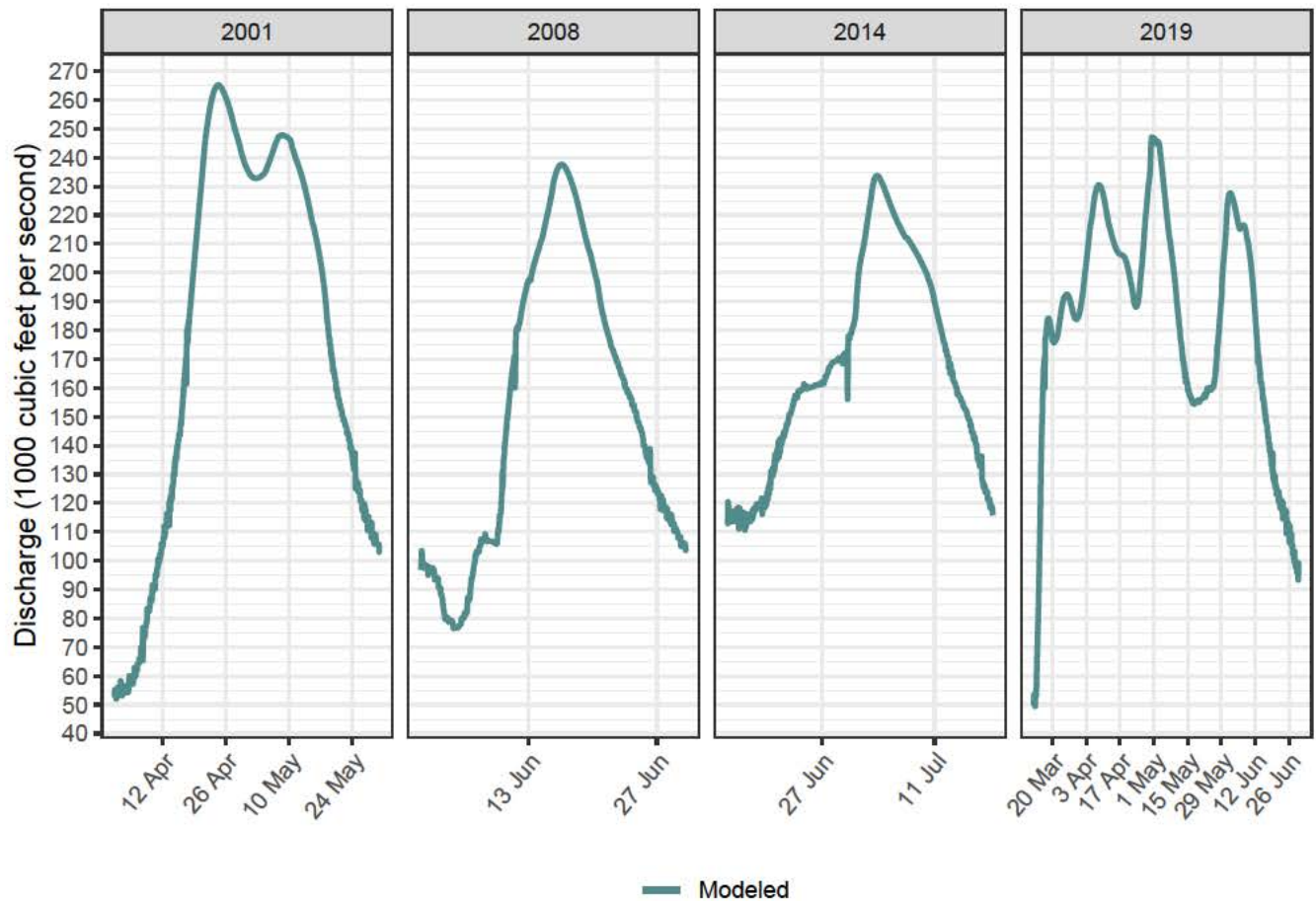
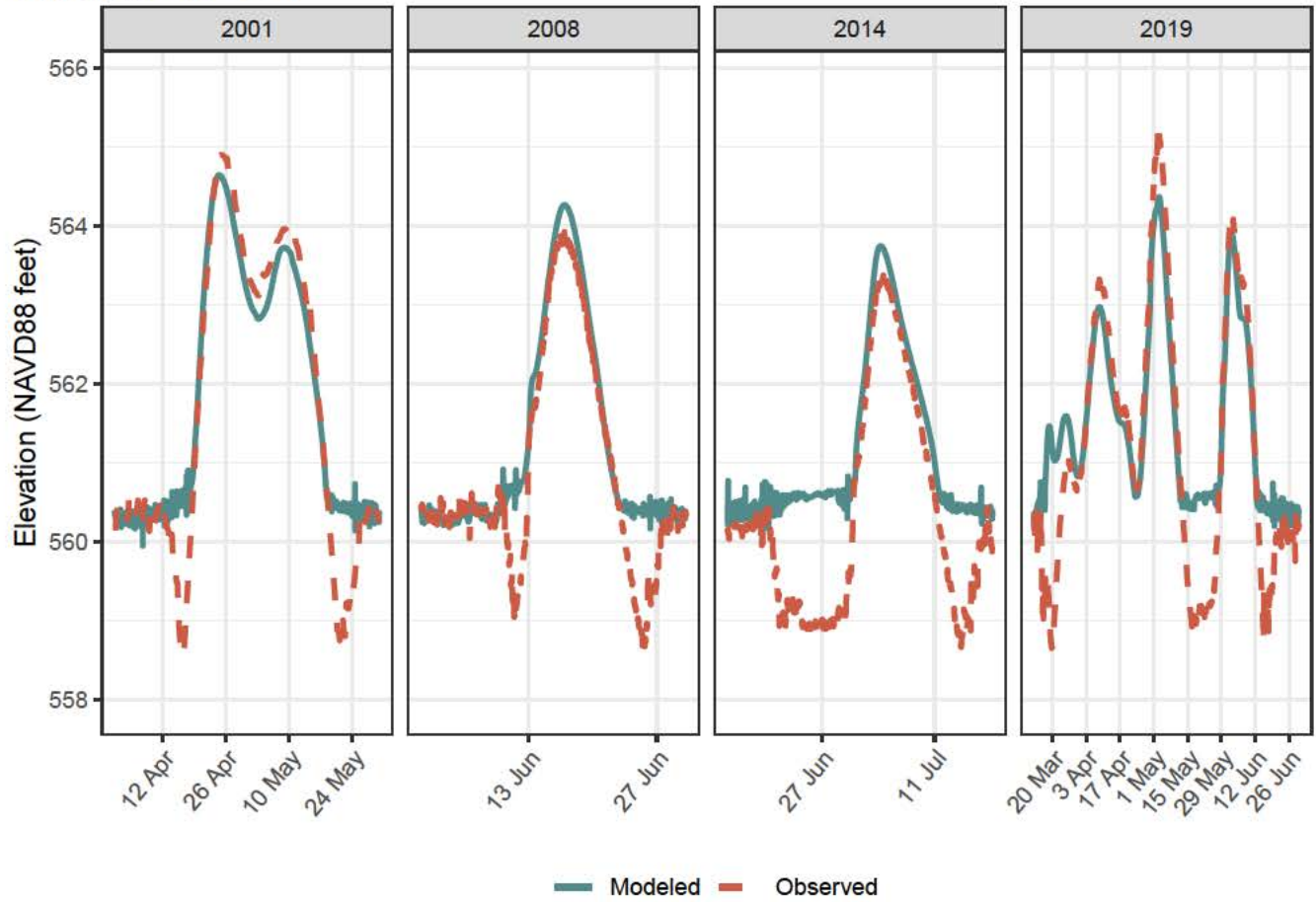
Mississippi River, Wapsi\_Sylvan Reach, River Mile 493.31

Gage L&D 14 TAIL



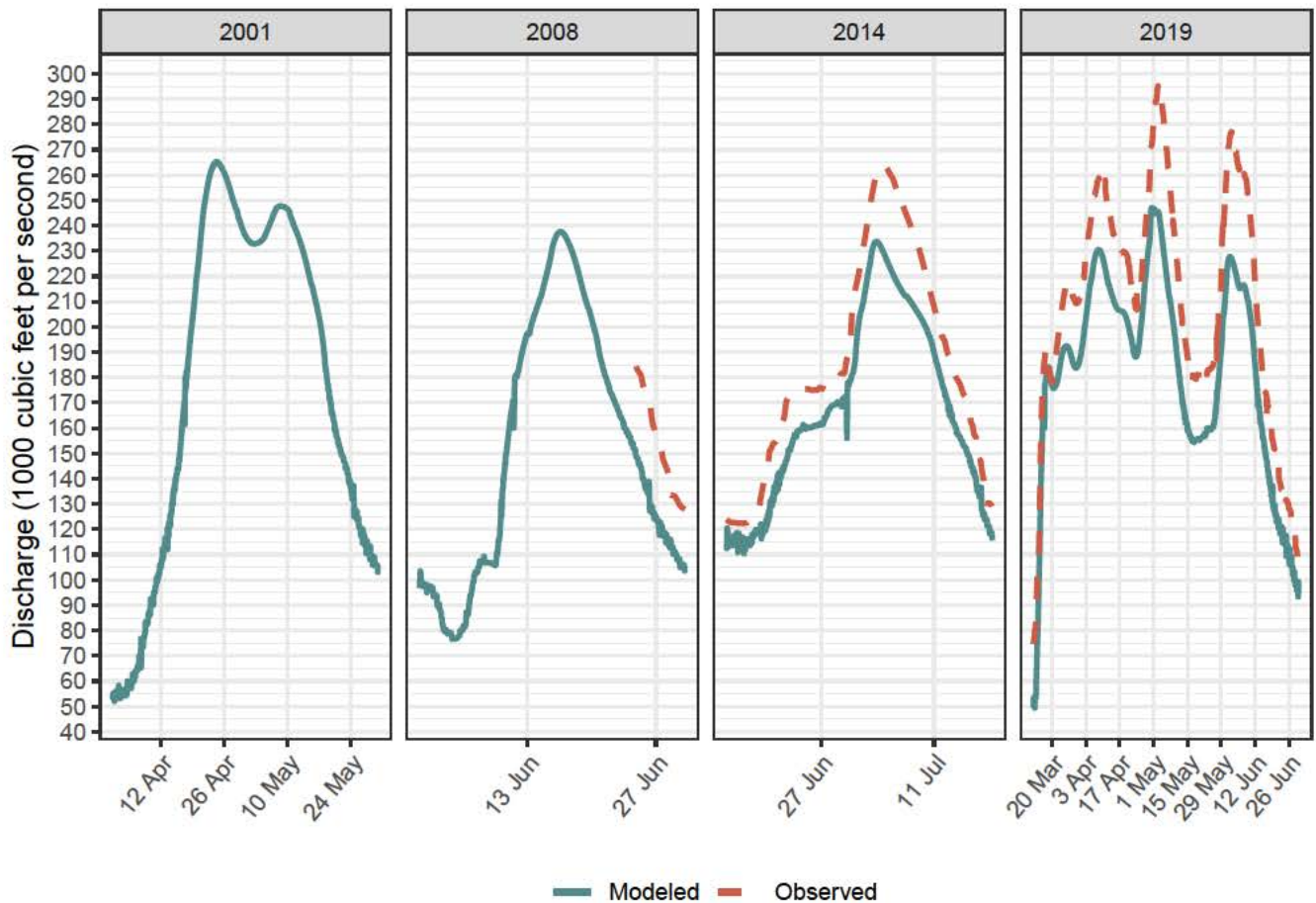
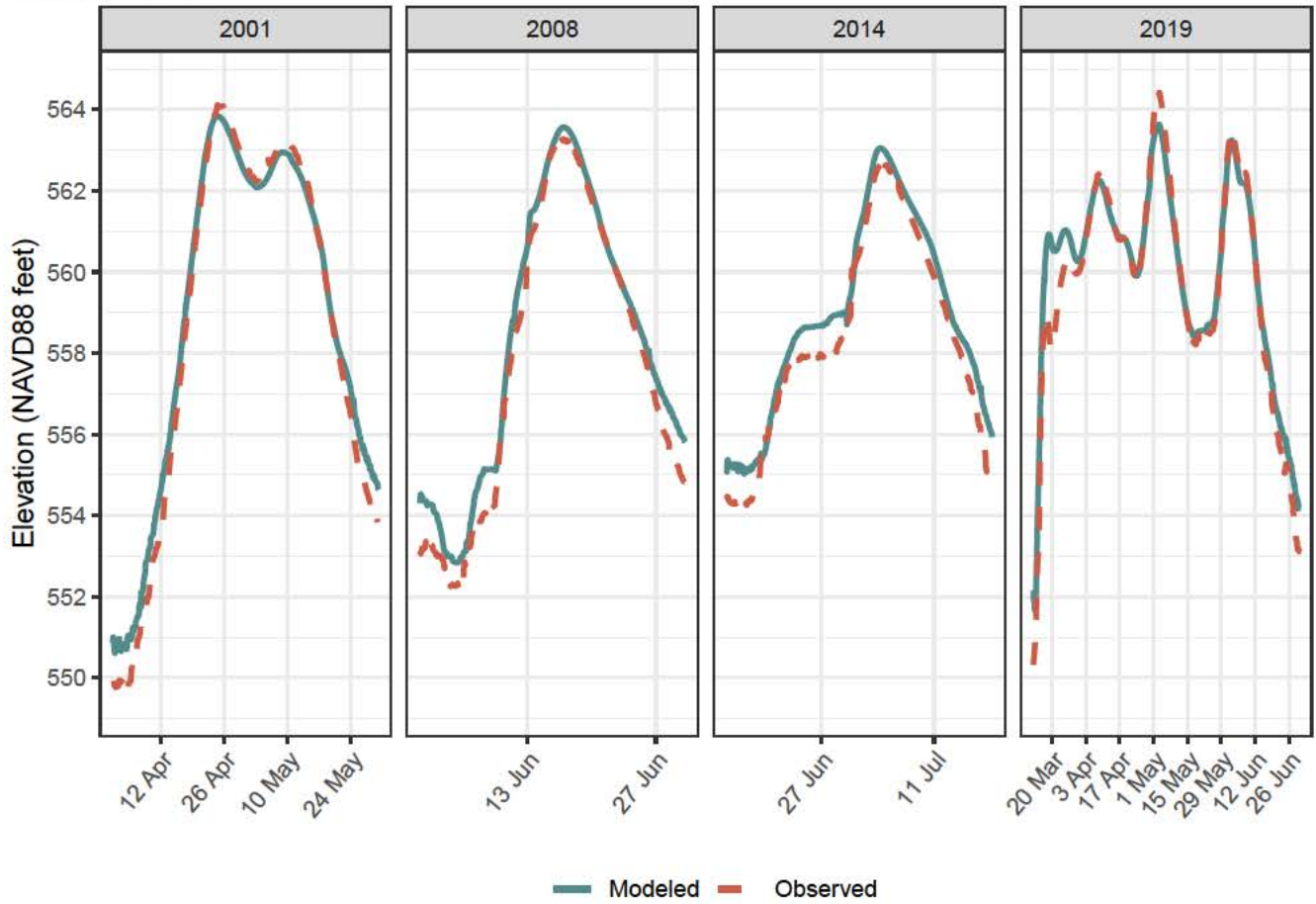
Mississippi River, ArsenallowaSide Reach, River Mile 483.12

Gage L&D 15 POOL



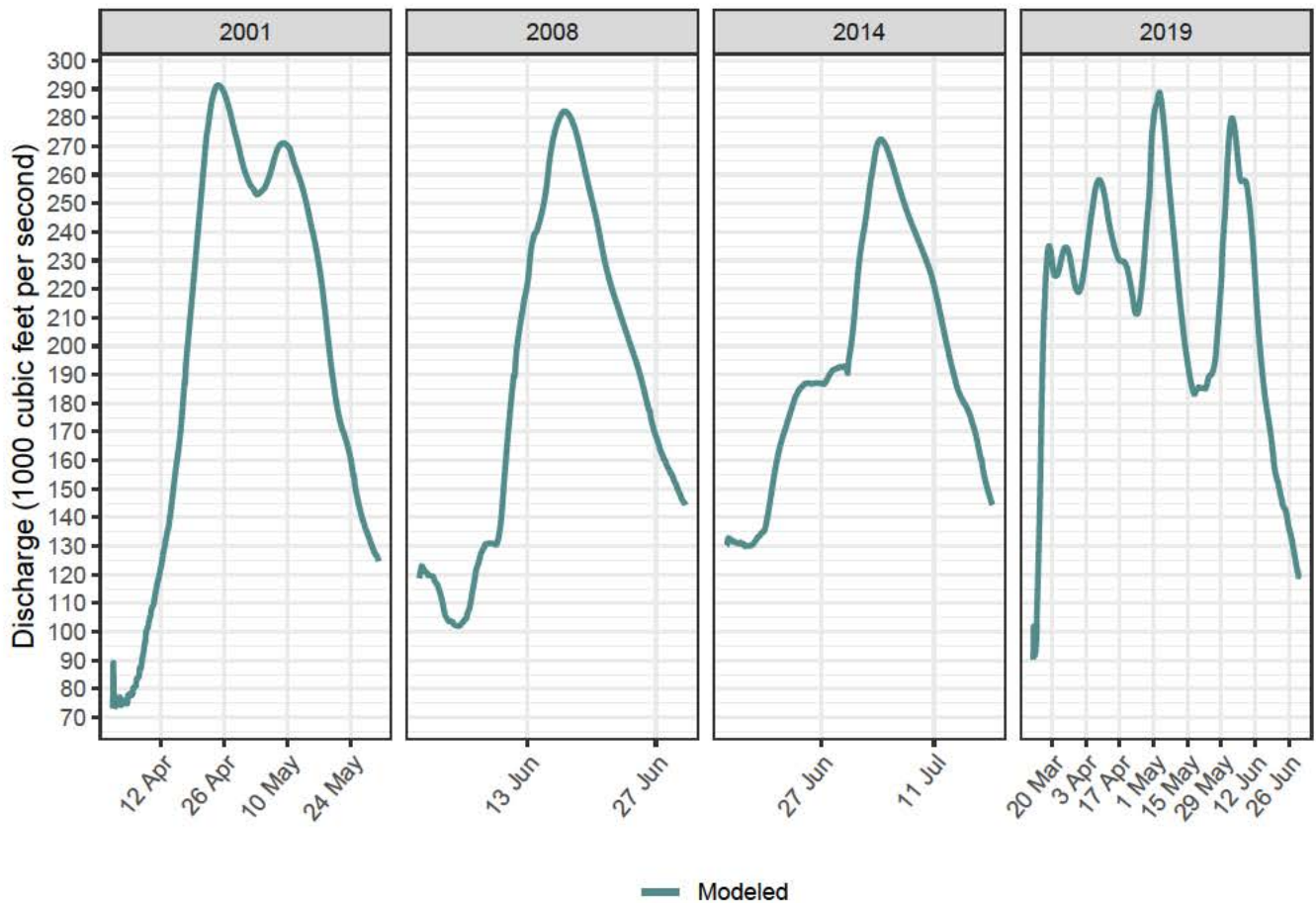
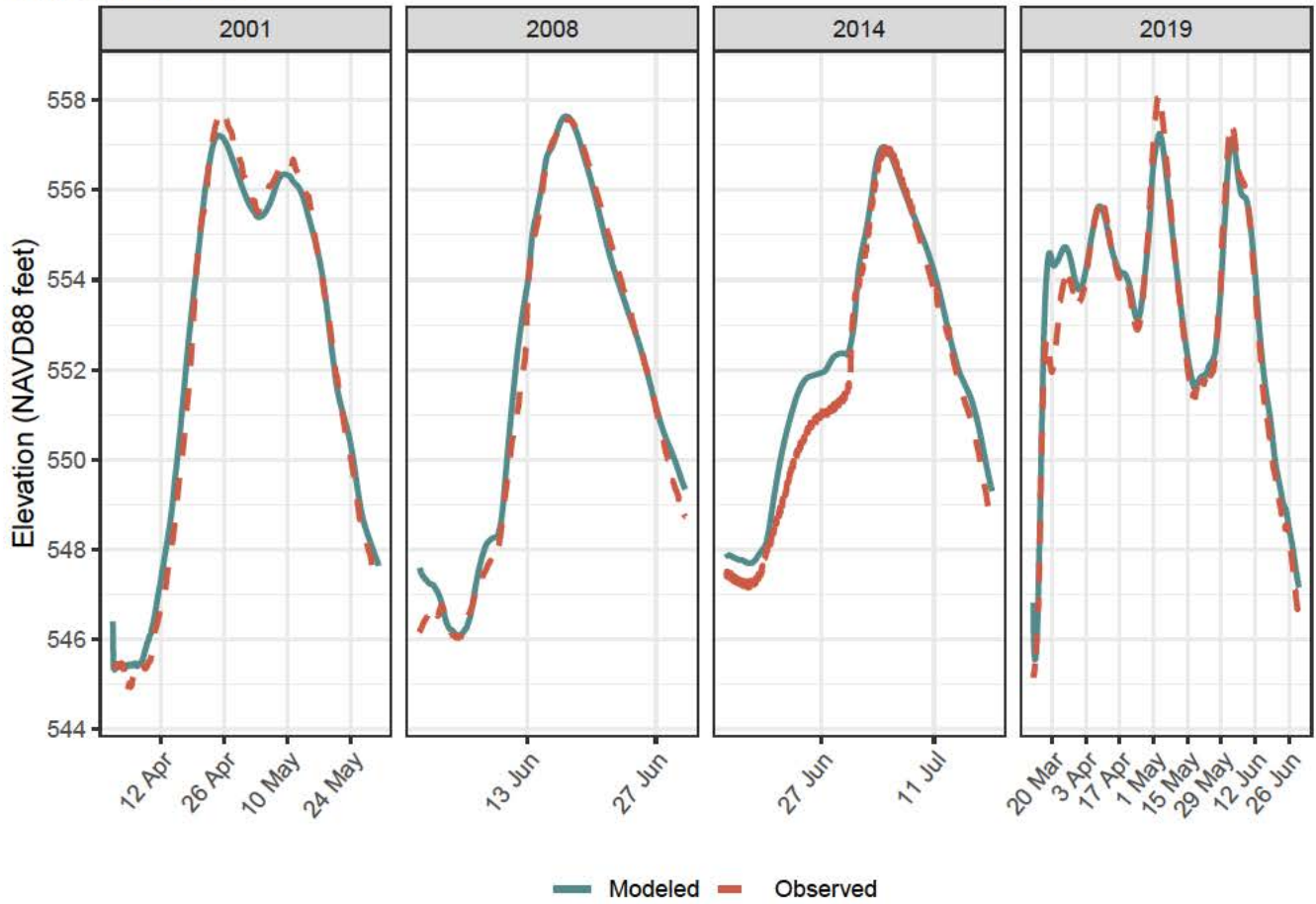
Mississippi River, ArsenallowaSide Reach, River Mile 482.74

Gage L&D 15 TAIL



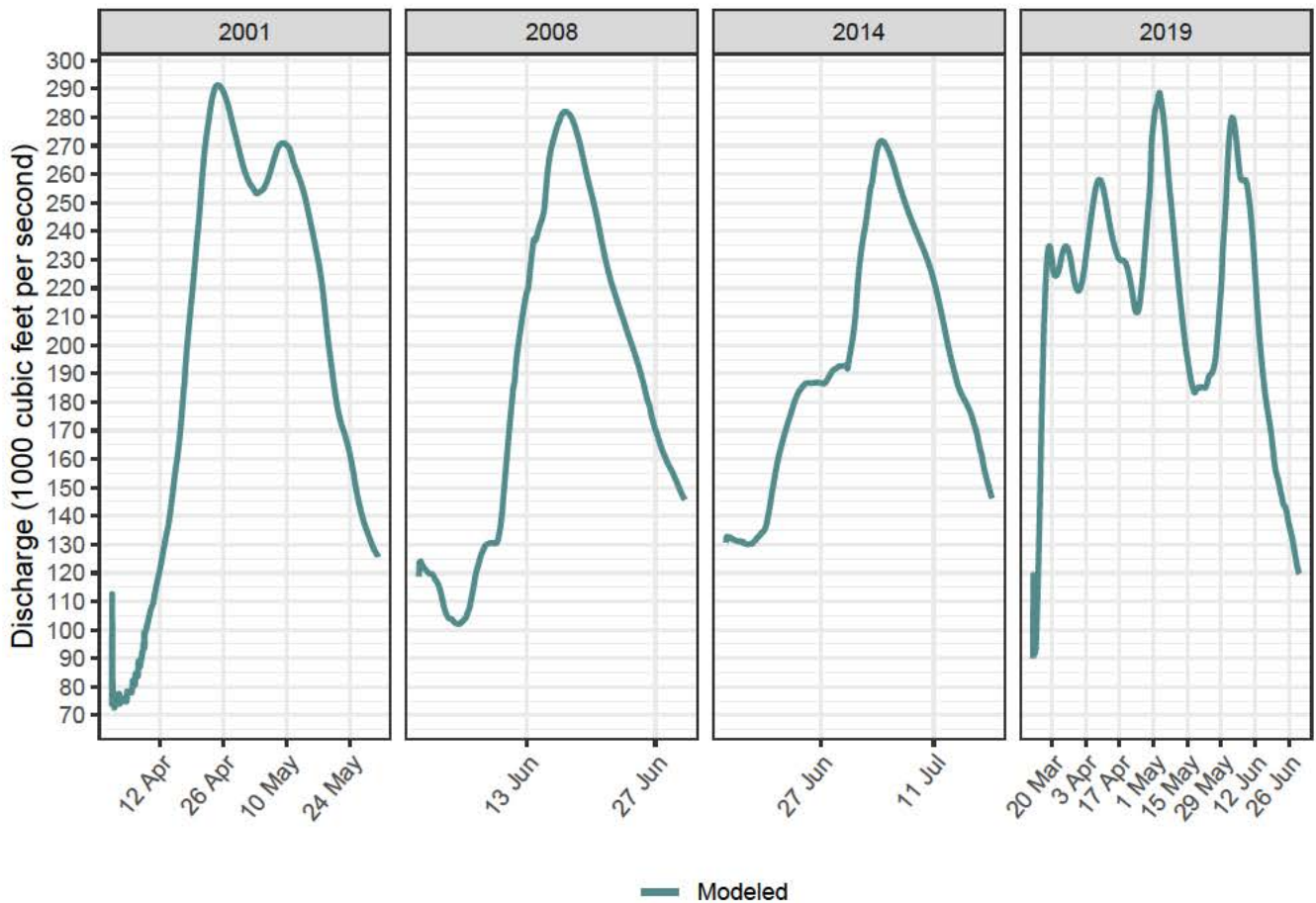
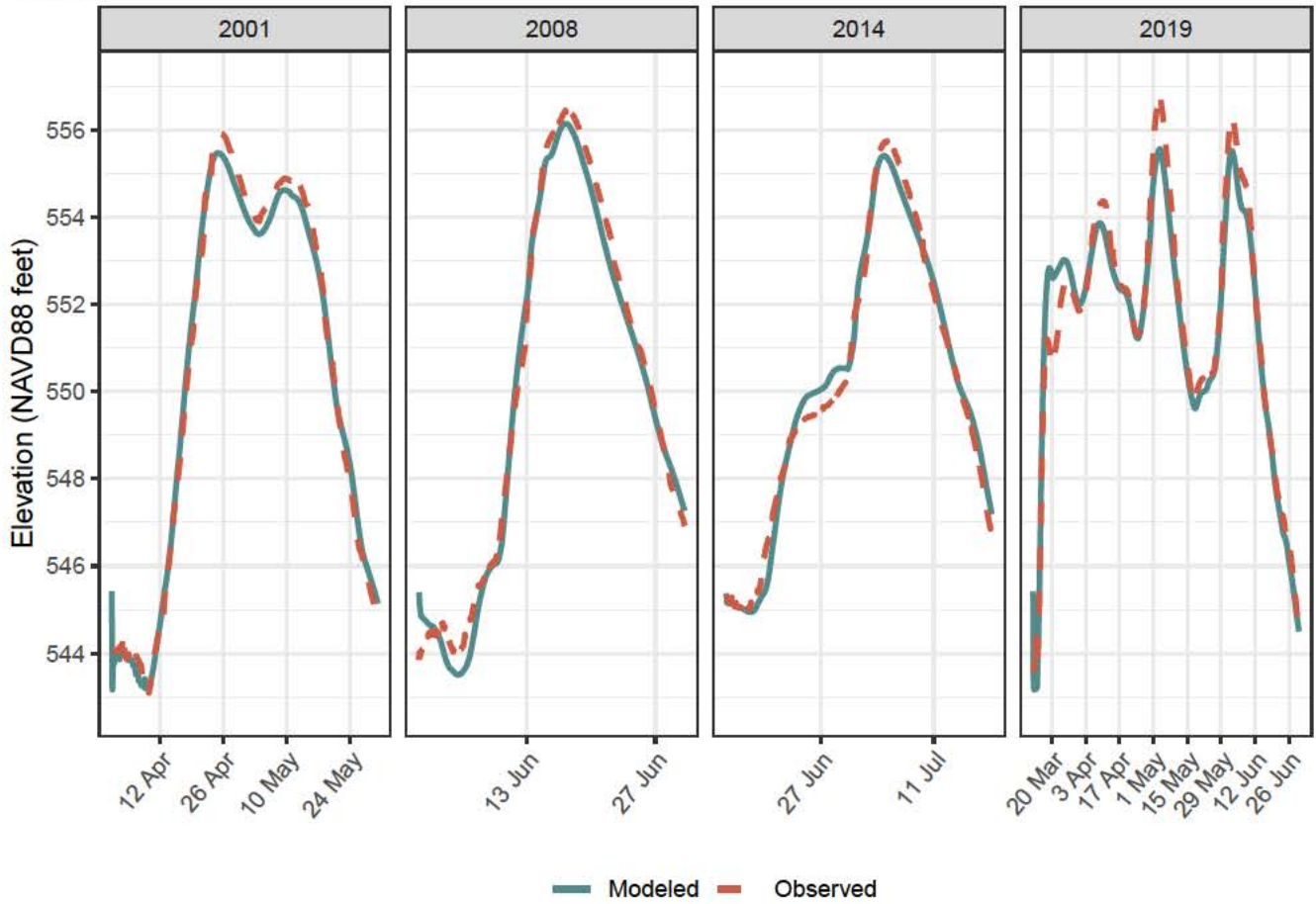
Mississippi River, Rock\_Iowa Reach, River Mile 463.59

Gage FAIRPORT



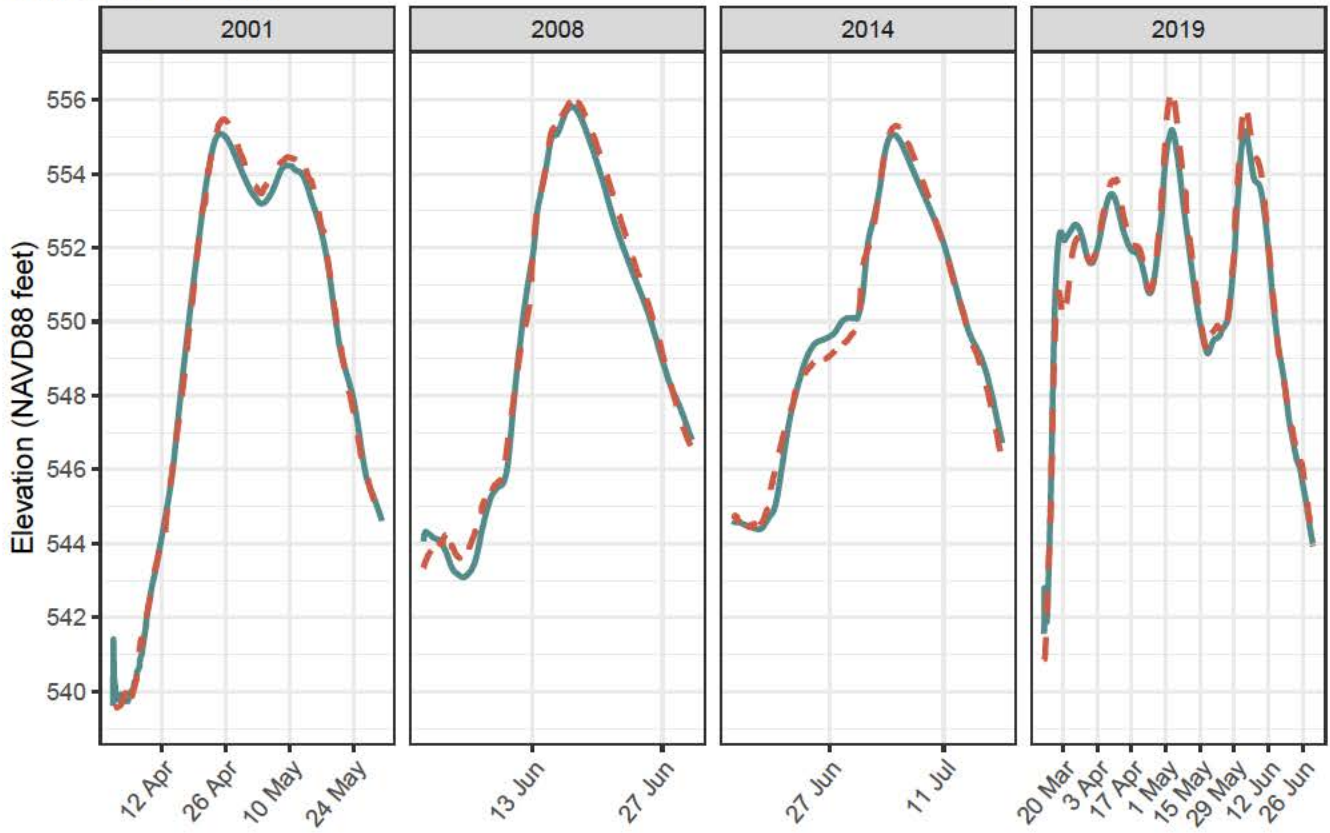
# Mississippi River, Rock\_Iowa Reach, River Mile 457.22

## Gage L&D 16 POOL

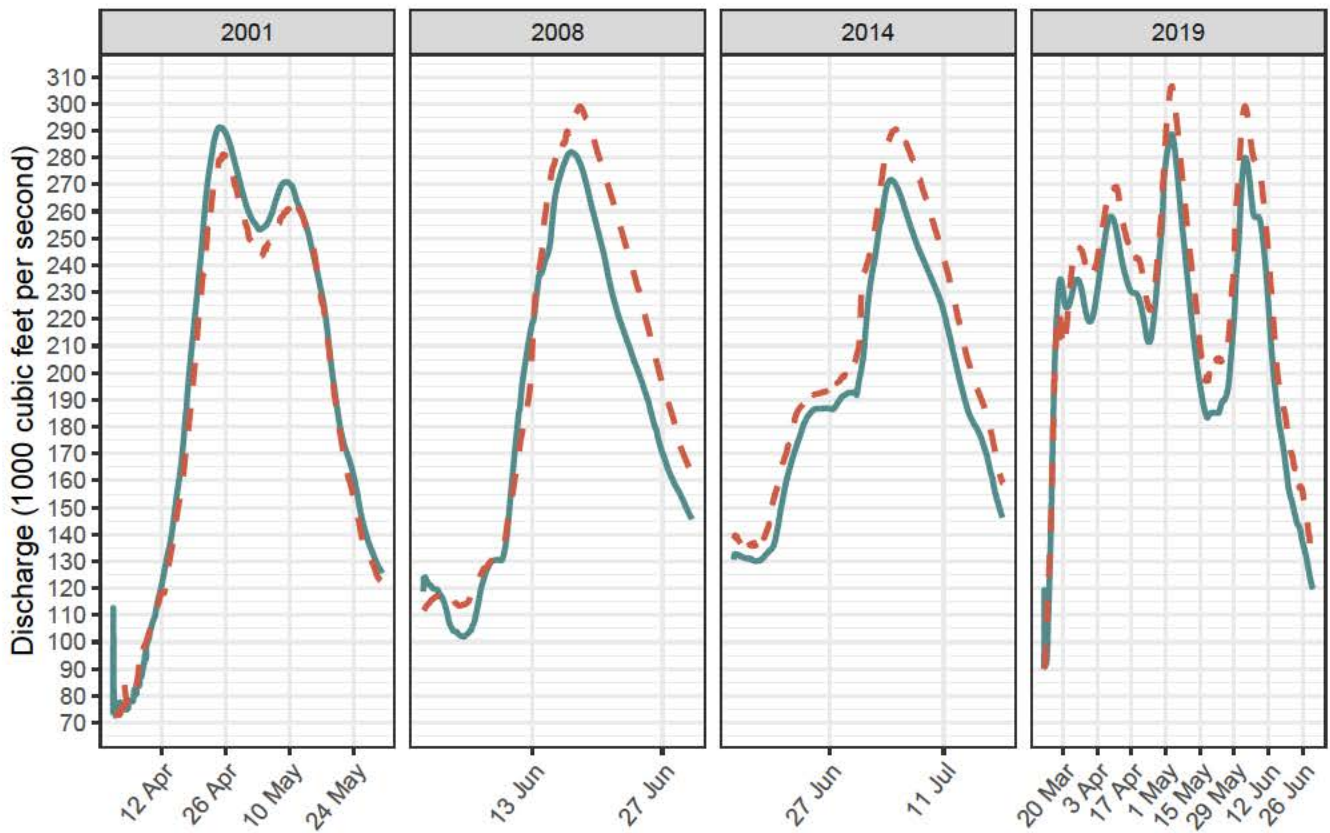


# Mississippi River, Rock\_Iowa Reach, River Mile 457.11

## Gage L&D 16 TAIL



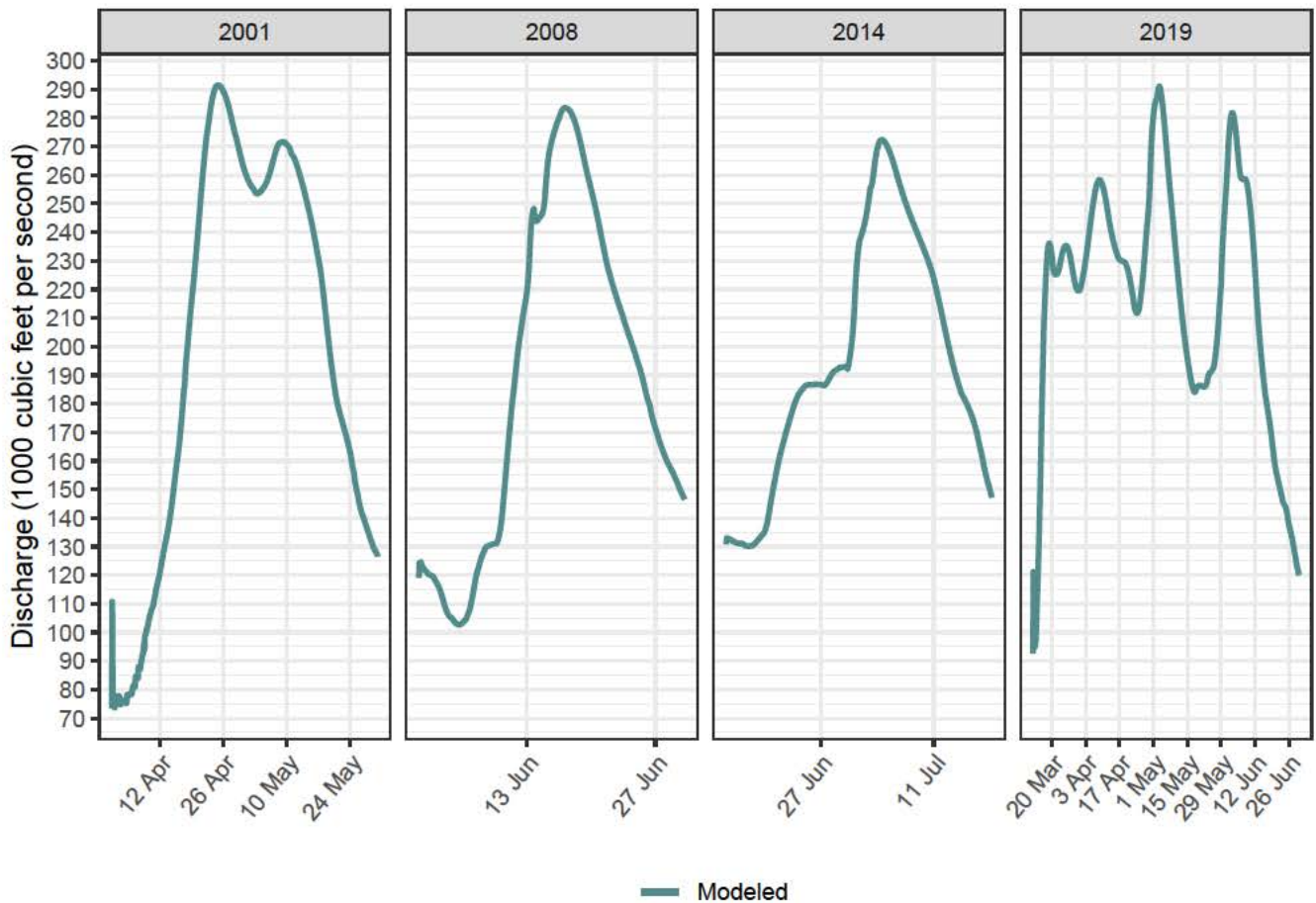
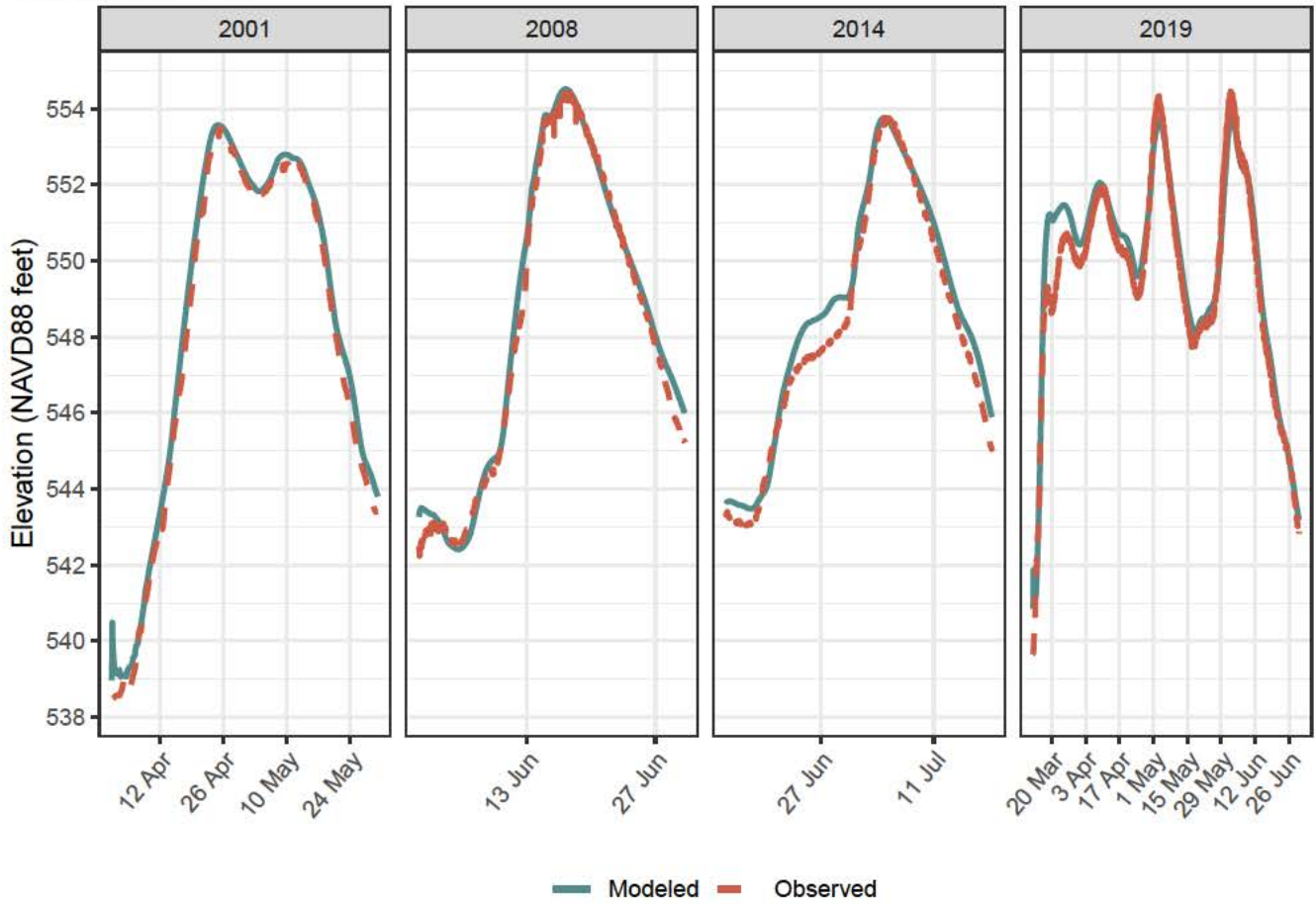
— Modeled - - Observed



— Modeled - - Observed

Mississippi River, Rock\_Iowa Reach, River Mile 453.15

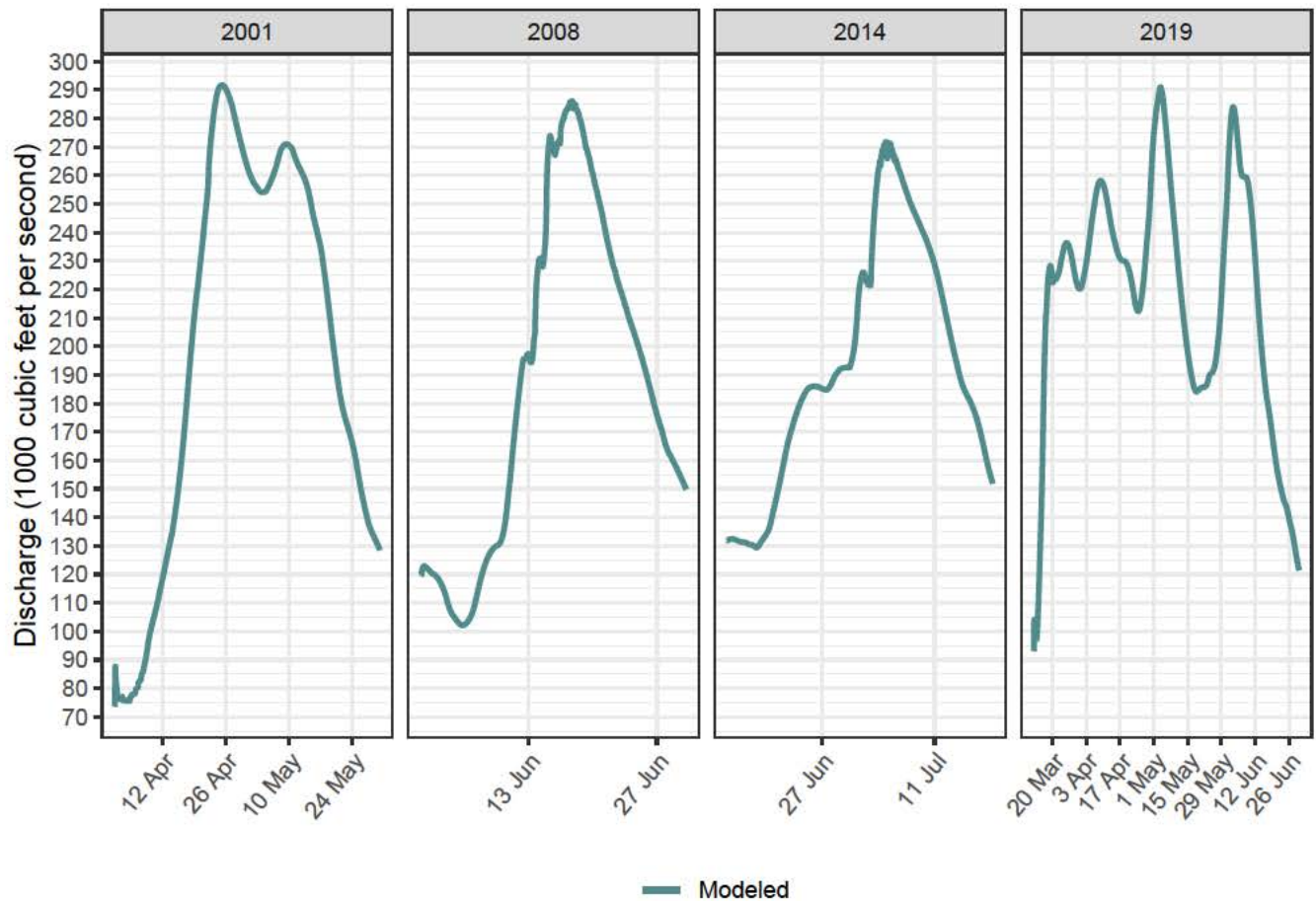
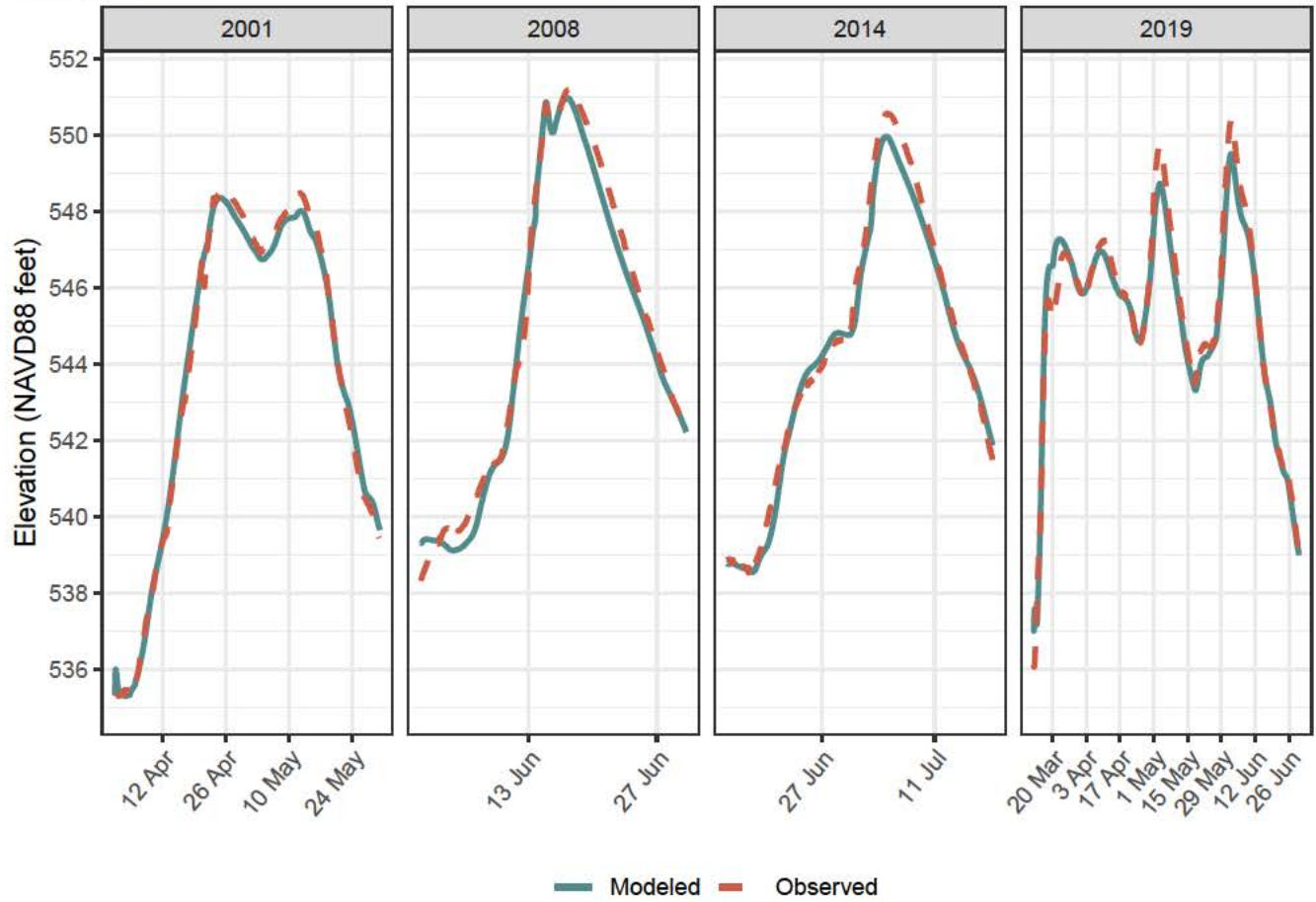
Gage MUSCATINE





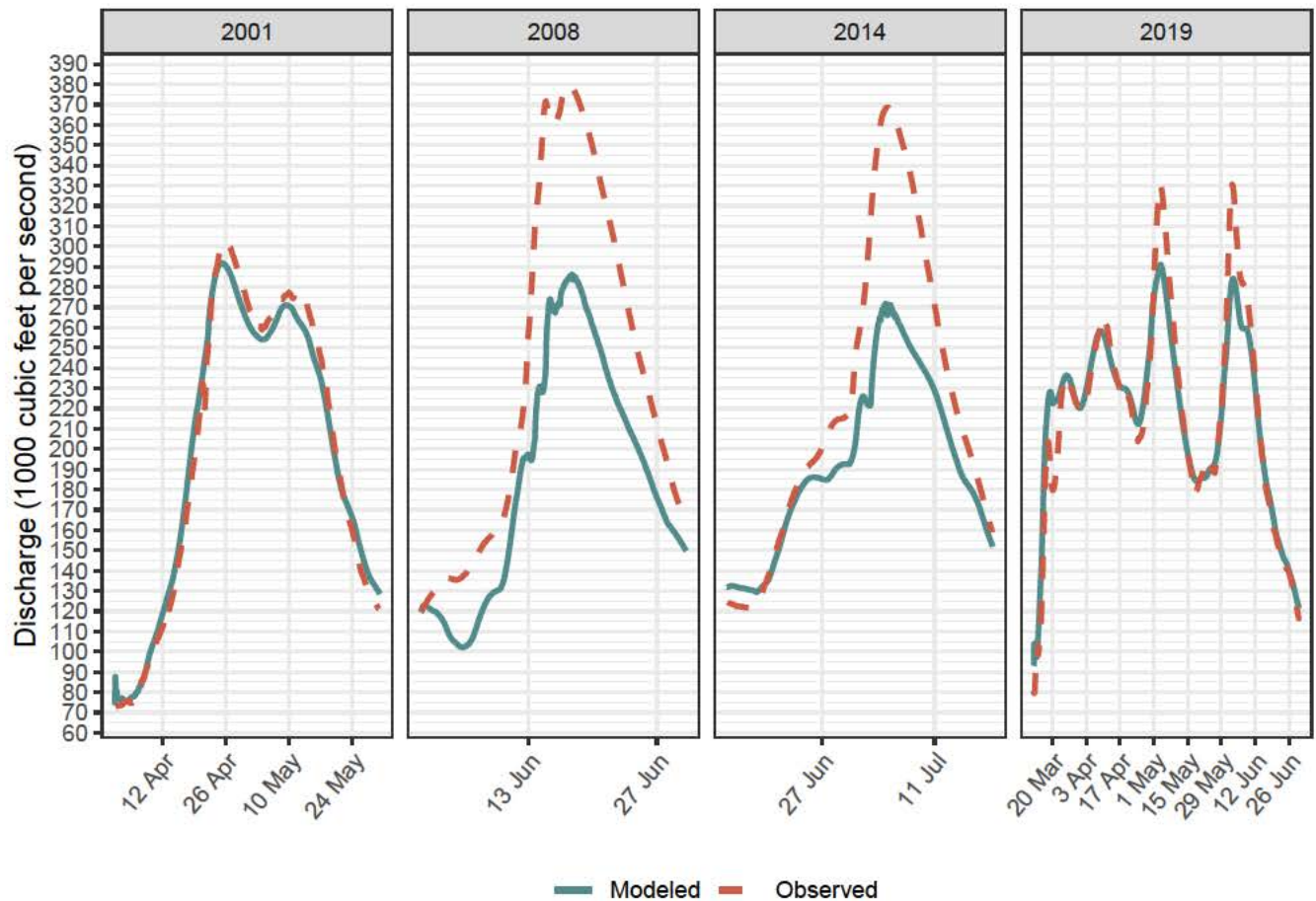
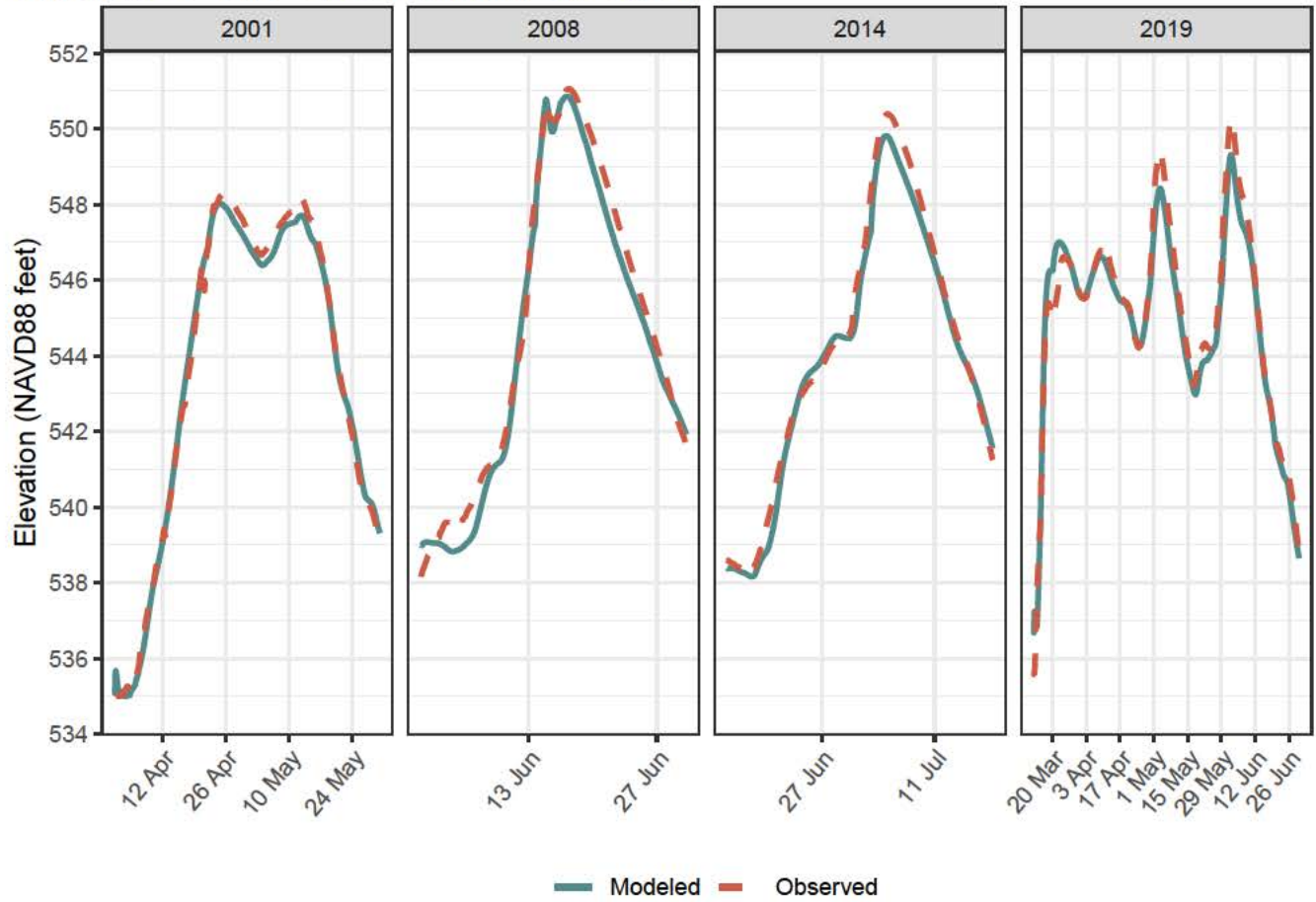
# Mississippi River, Rock\_Iowa Reach, River Mile 437.18

## Gage L&D 17 POOL + 2D Connection Lake Odessa



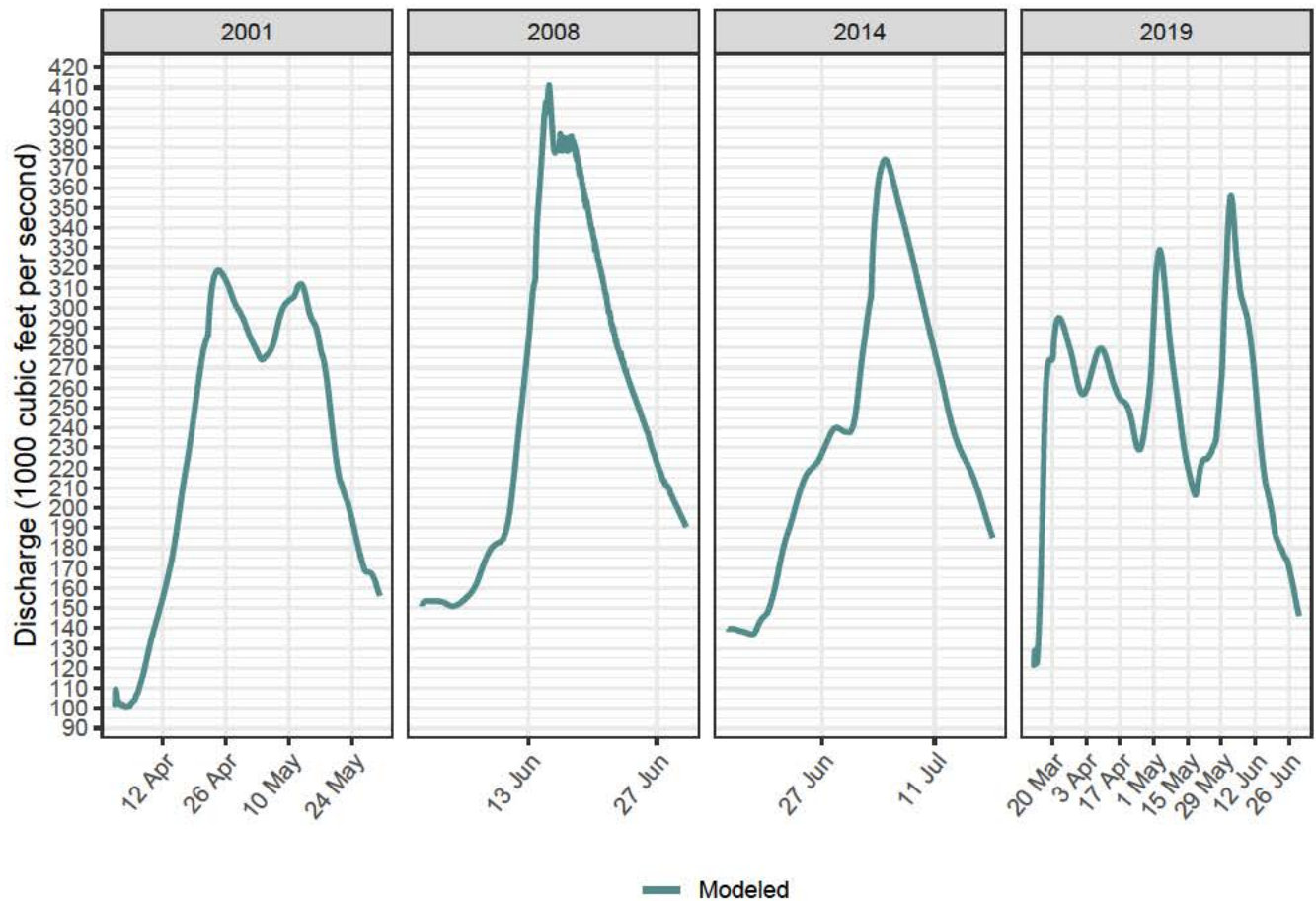
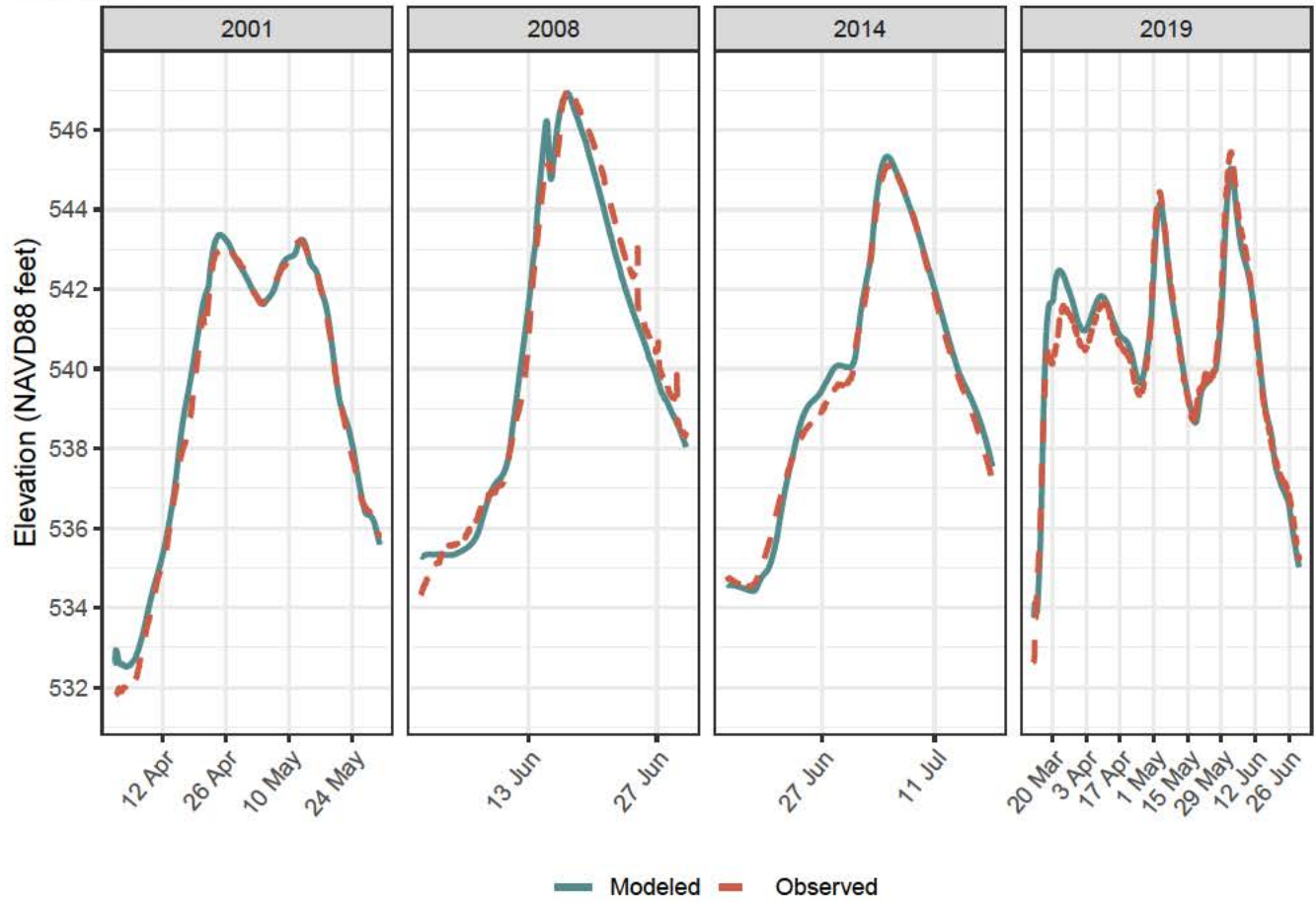
# Mississippi River, Rock\_Iowa Reach, River Mile 437.08

## Gage L&D 17 TAIL + 2D Connection Lake Odessa



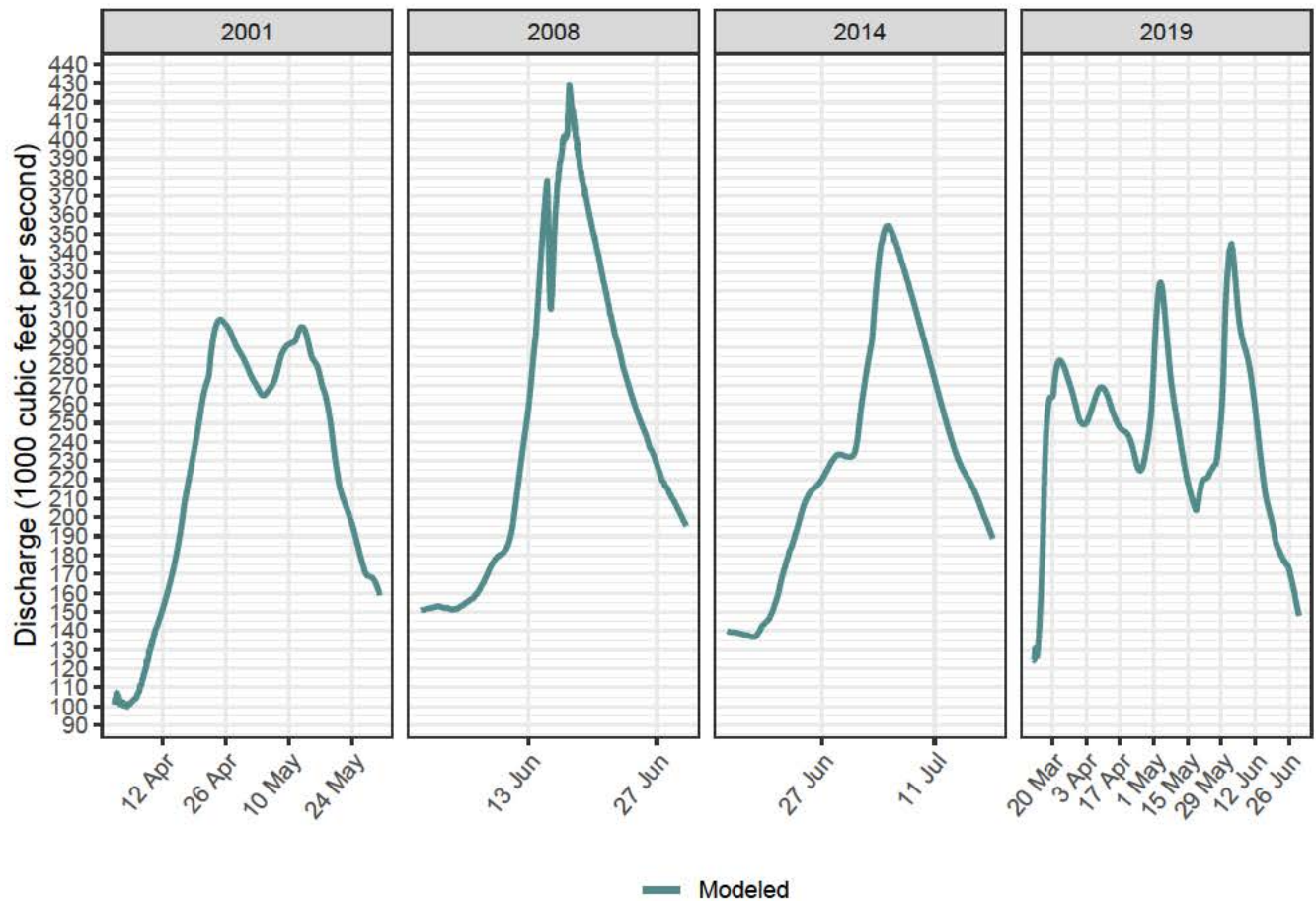
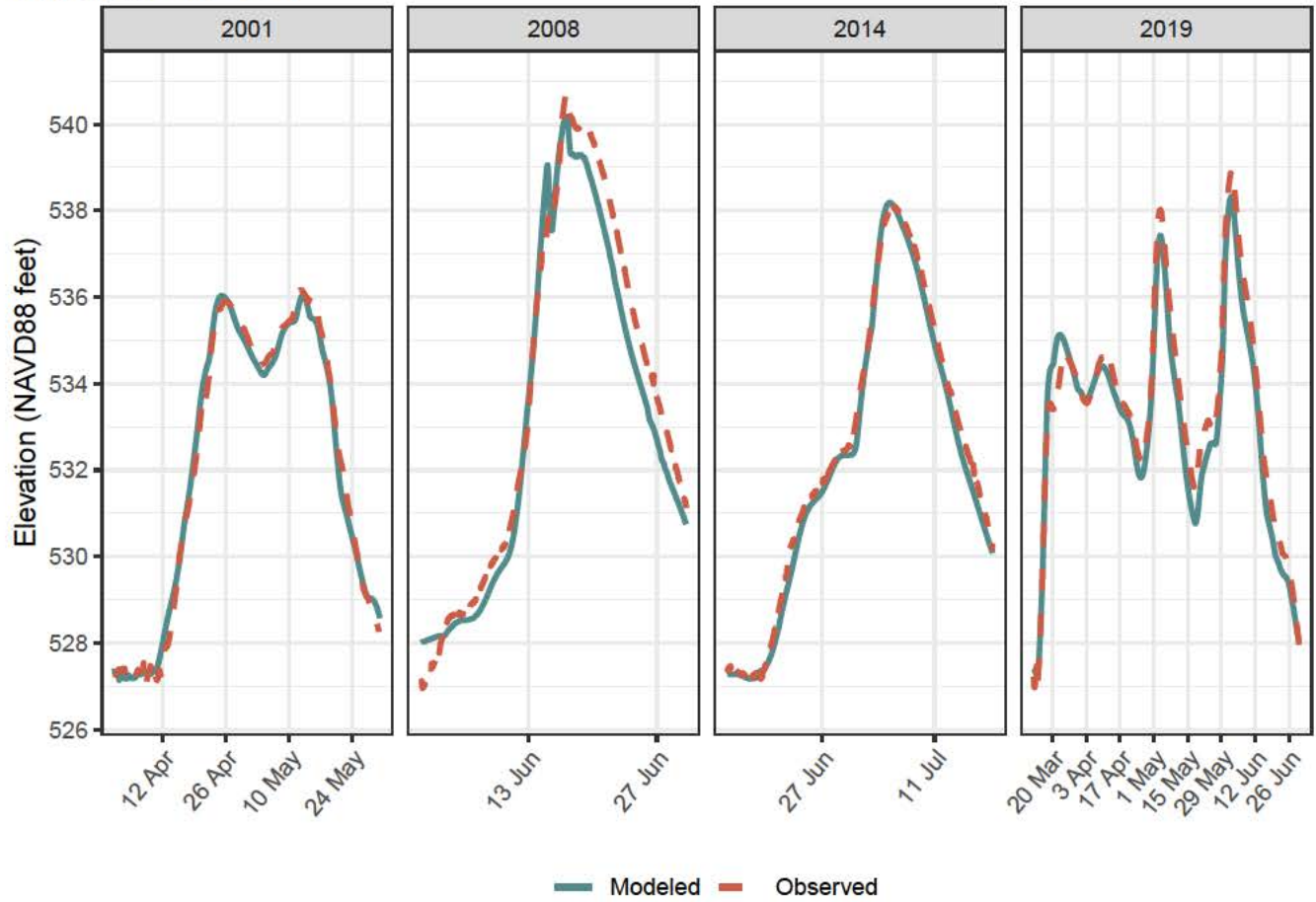
Mississippi River, Pope\_Henderson Reach, River Mile 427.61

Gage KEITHSBURG



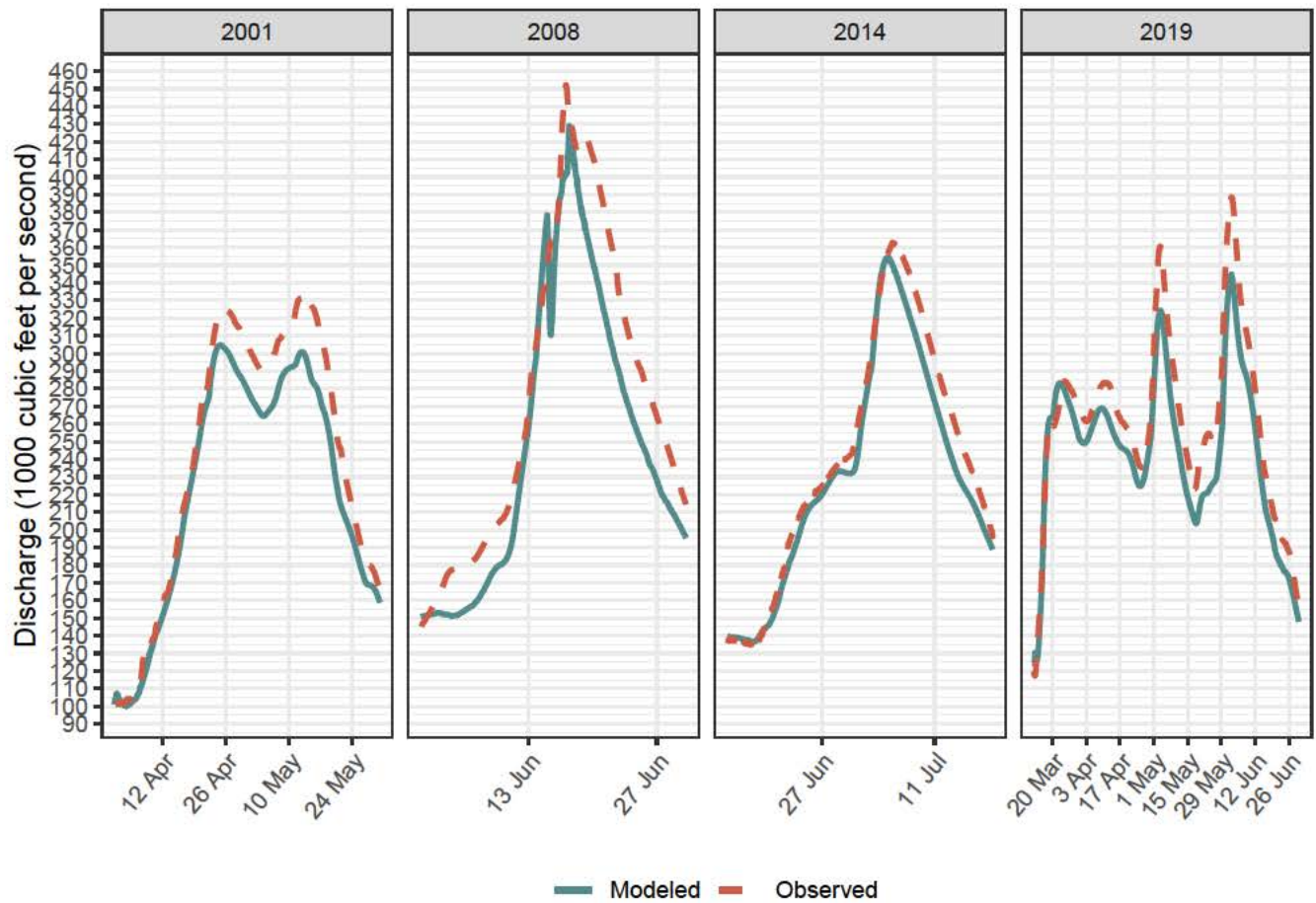
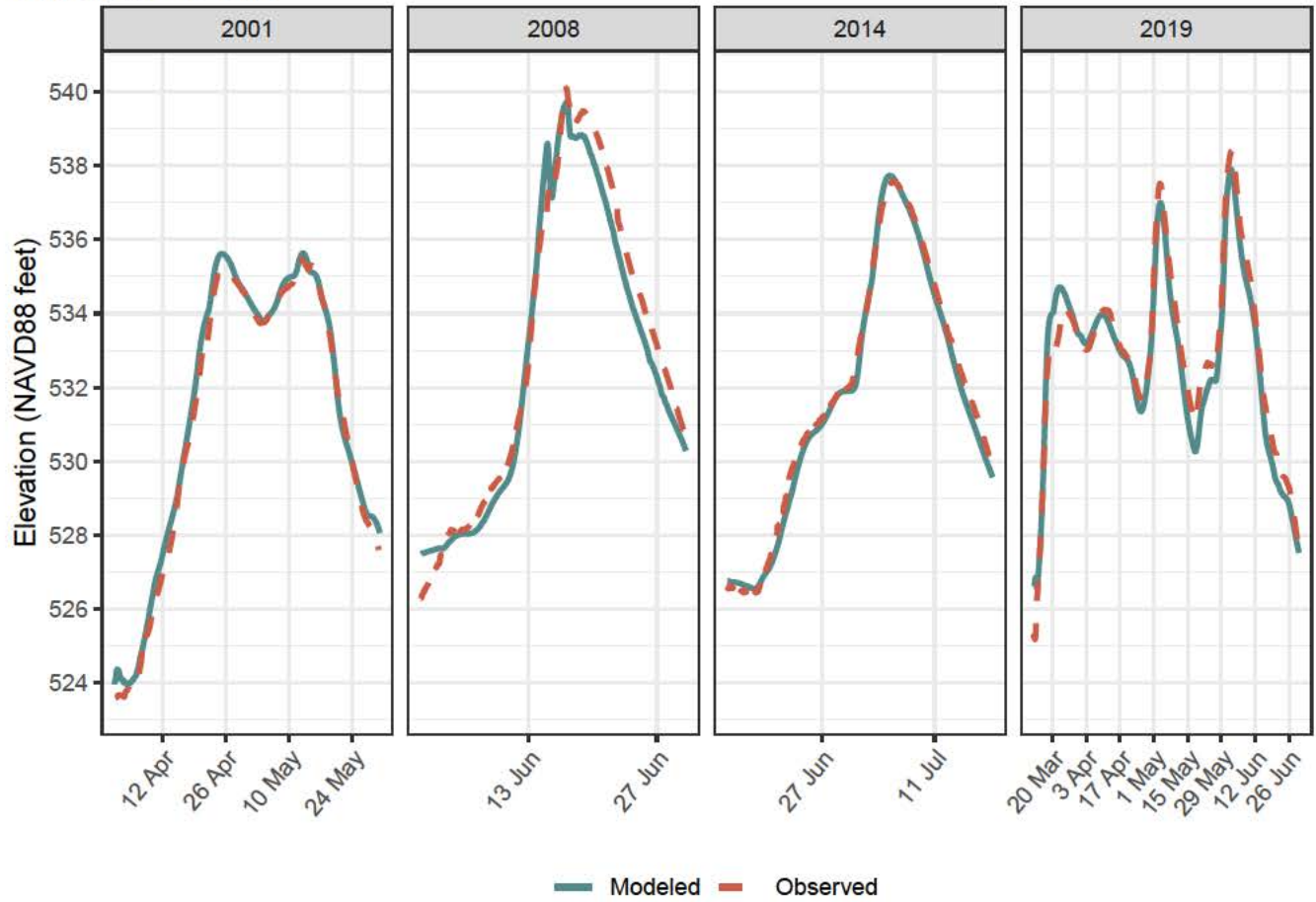
# Mississippi River, Pope\_Henderson Reach, River Mile 410.46

## Gage L&D 18 POOL



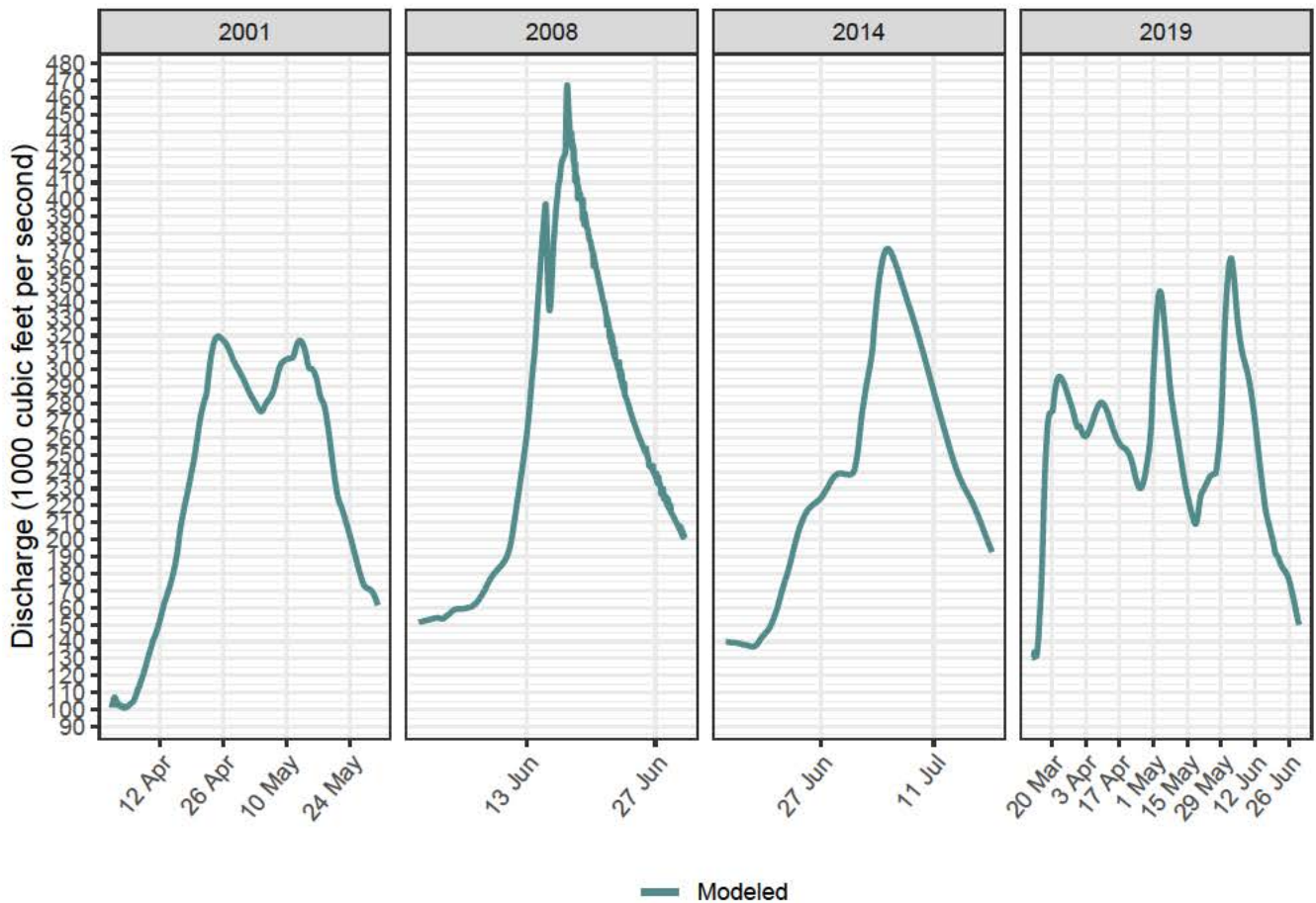
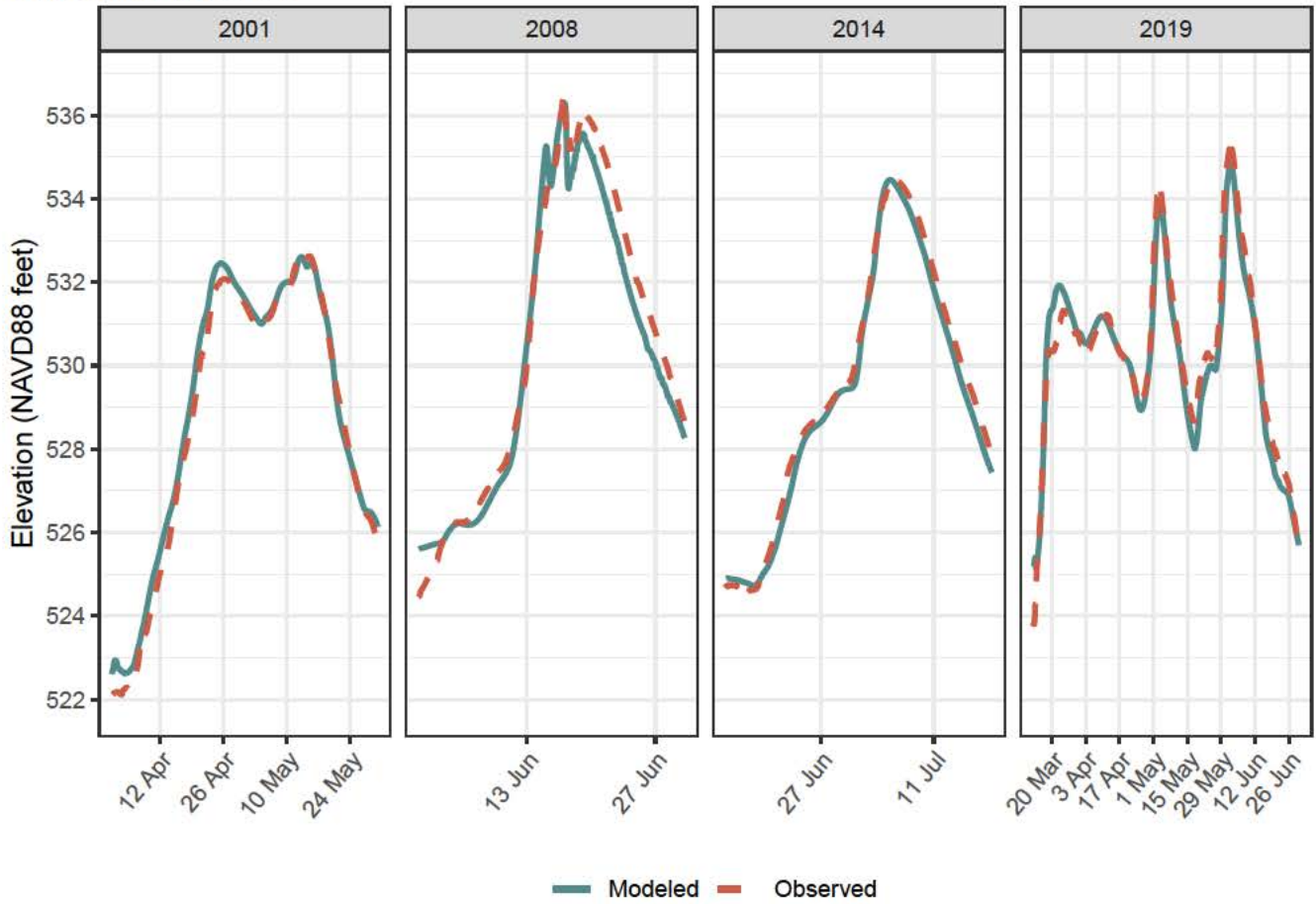
Mississippi River, Pope\_Henderson Reach, River Mile 410.39

Gage L&D 18 TAIL



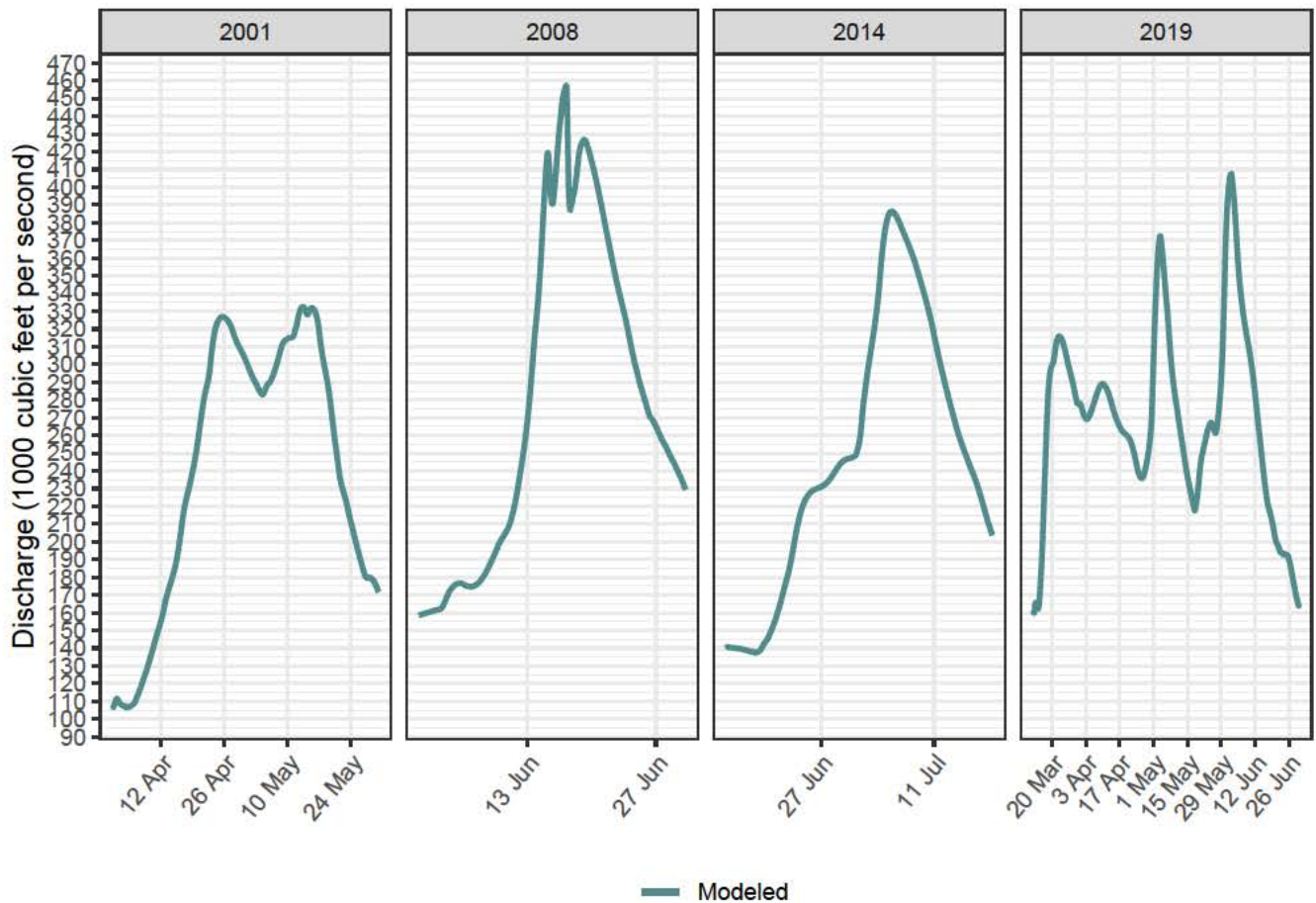
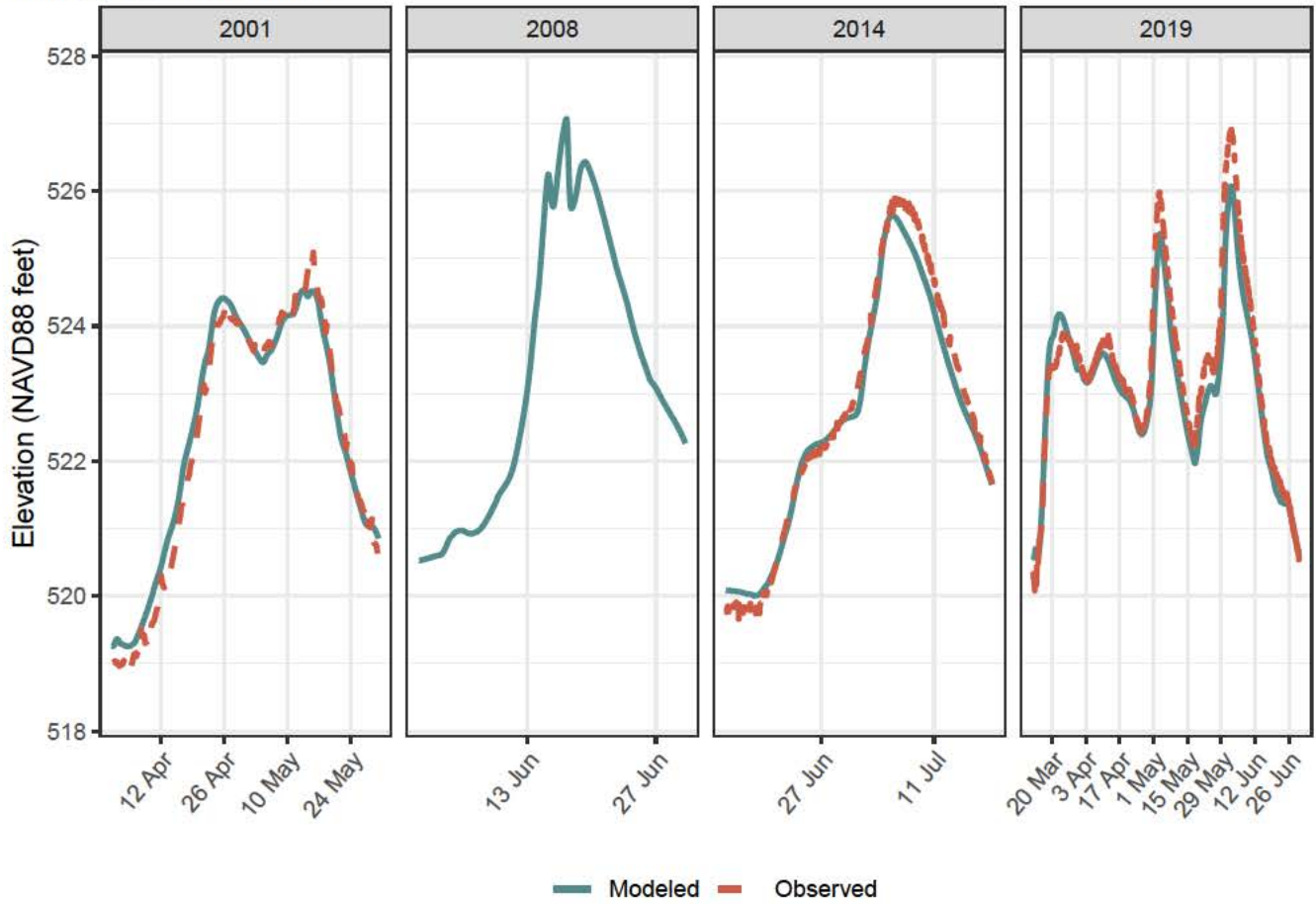
Mississippi River, Henderson\_Skunk Reach, River Mile 403.18

Gage BURLINGTON



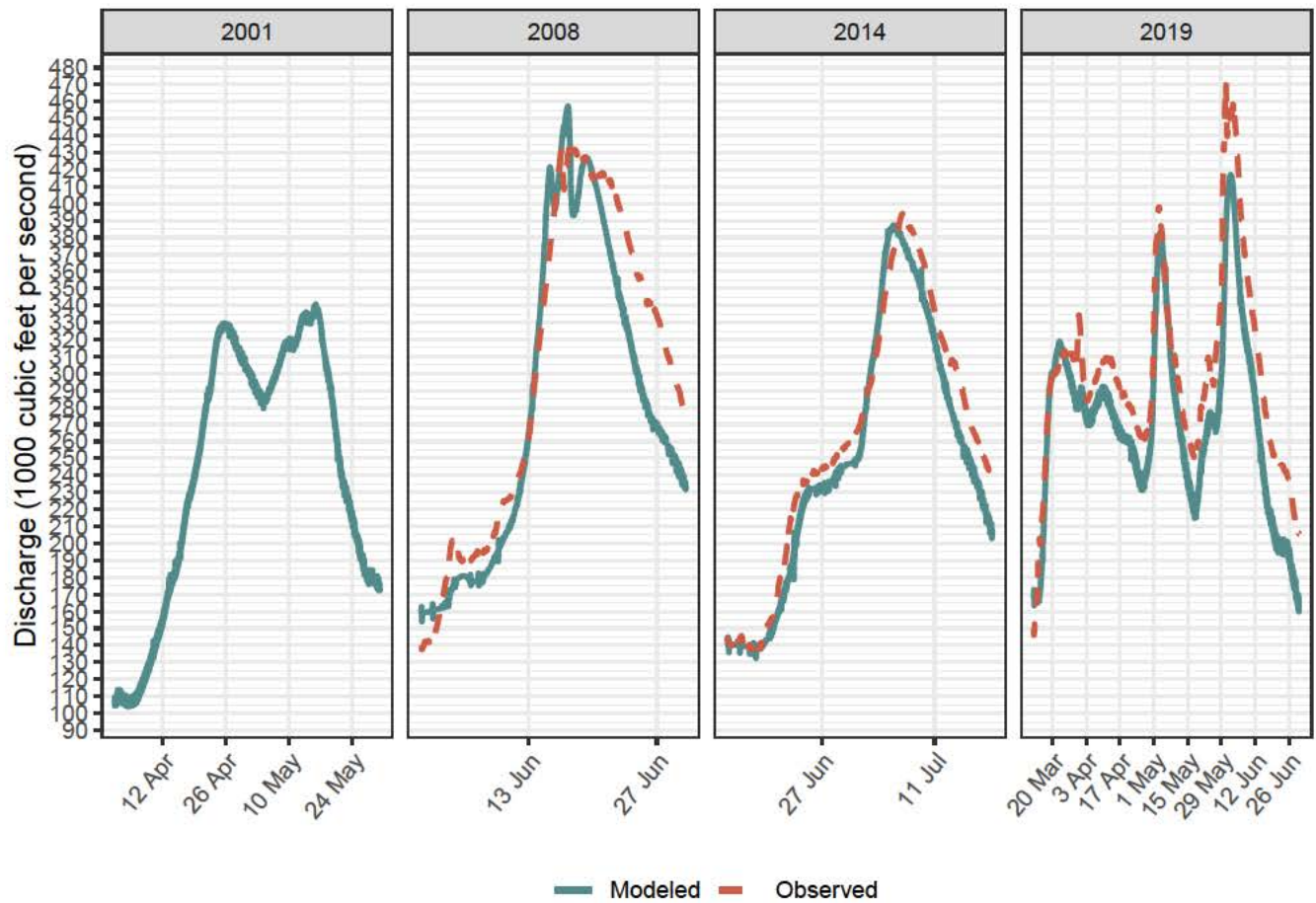
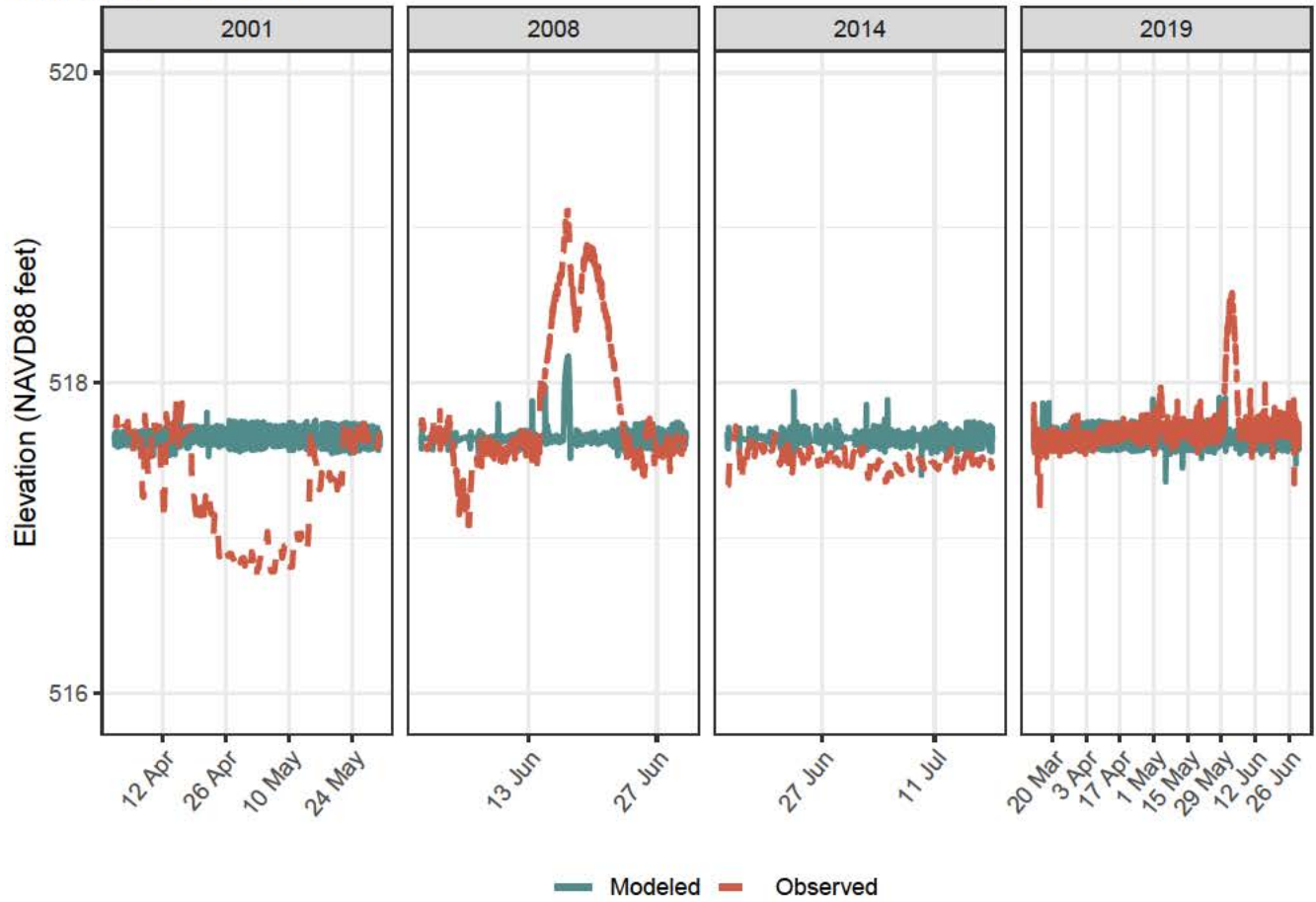
Mississippi River, Skunk\_DesMoines Reach, River Mile 383.99

Gage FORT MADISON



Mississippi River, Skunk\_DesMoines Reach, River Mile 364.74

Gage L&D 19 POOL

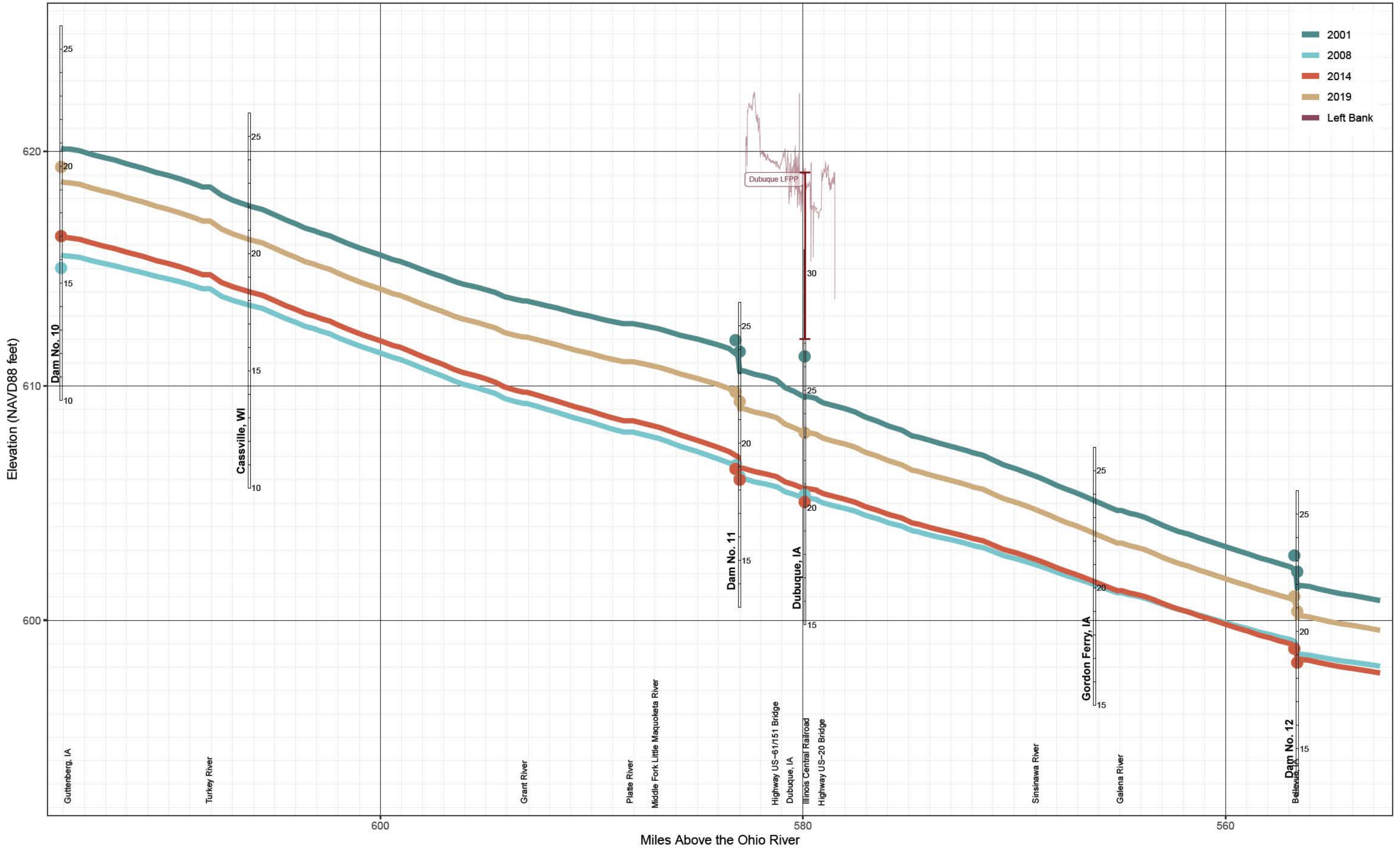




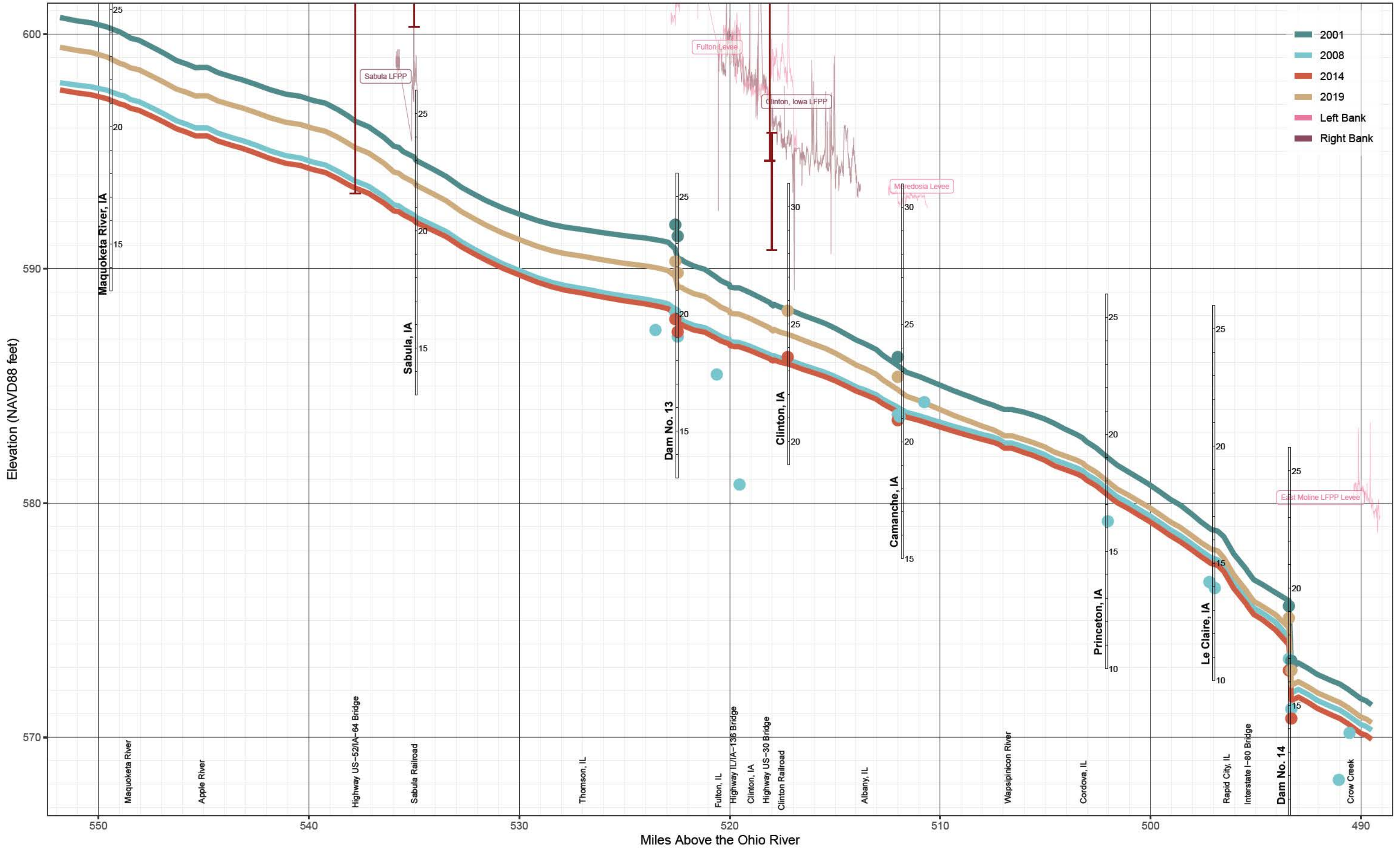
## **APPENDIX C-2**

### **MODEL CALIBRATION PROFILE PLOTS**

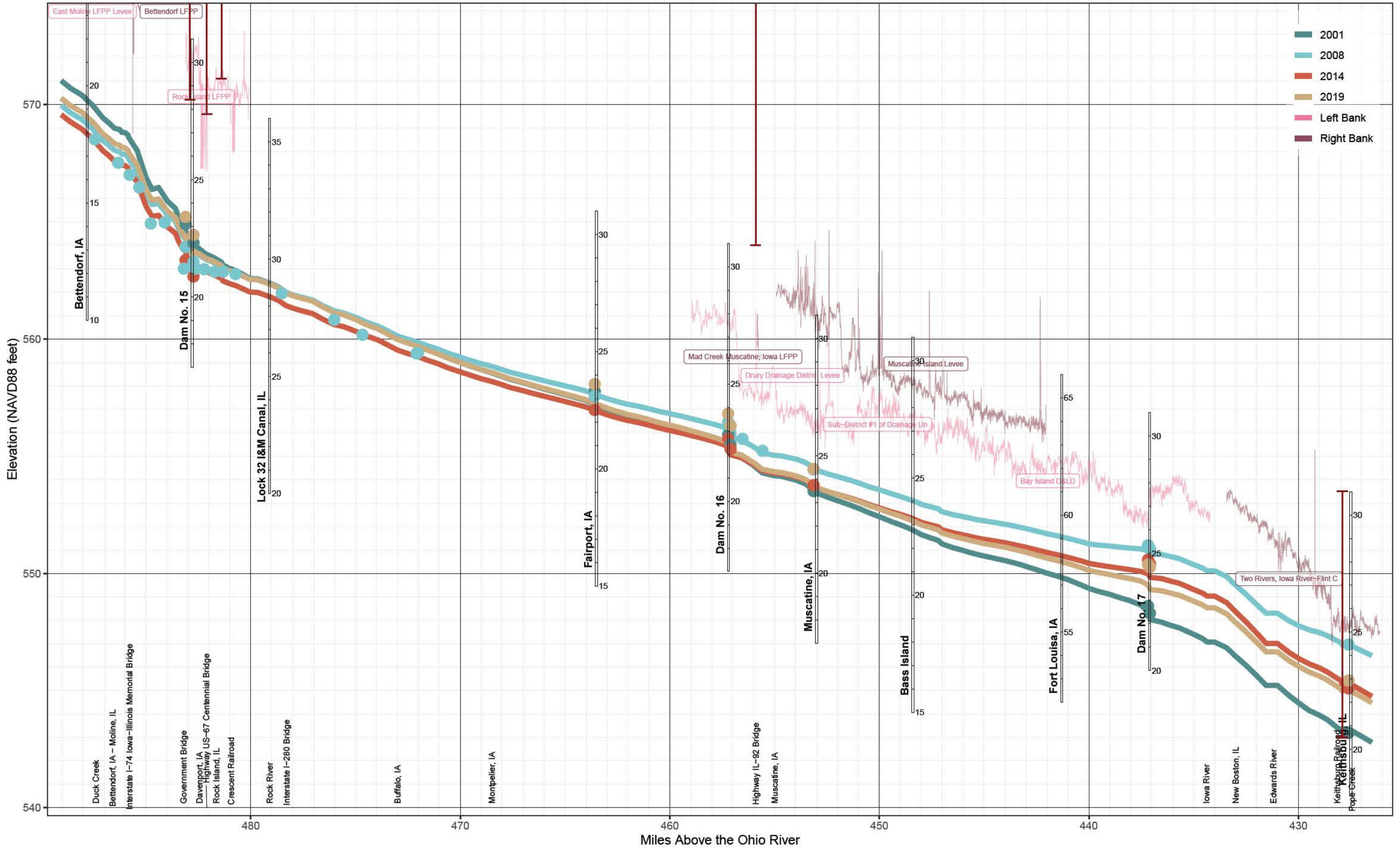
Upper Mississippi River Hydraulic Model – Guttenberg to Keokuk



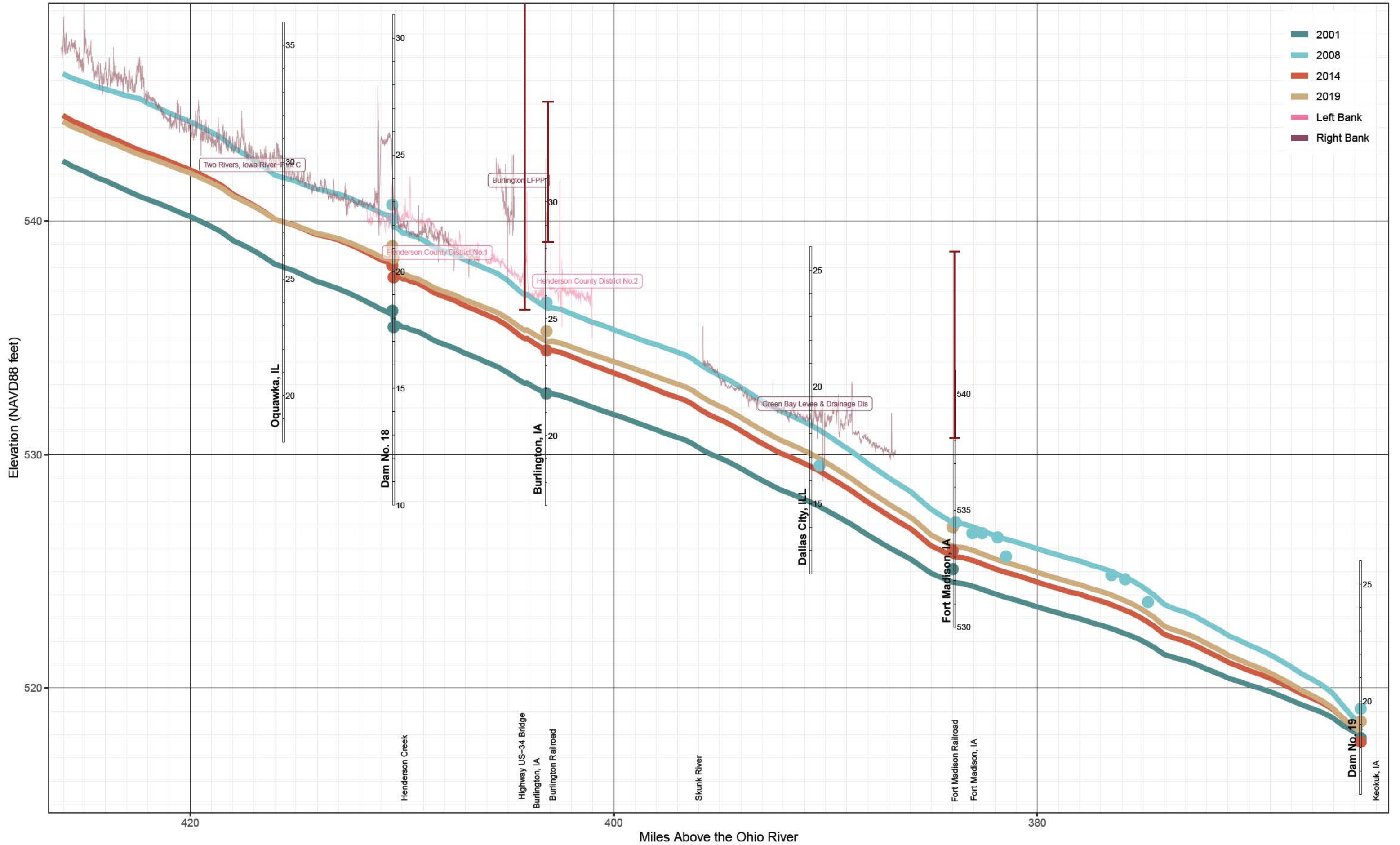
# Upper Mississippi River Hydraulic Model – Guttenberg to Keokuk



# Upper Mississippi River Hydraulic Model – Guttenberg to Keokuk



Upper Mississippi River Hydraulic Model – Guttenberg to Keokuk



## **APPENDIX C-3**

### **FLOW-ROUGHNESS FACTORS**

Flow-Roughness Factors

	<b>L&amp;D 10 Tail to L&amp;D 11 Pool</b>	<b>L&amp;D 11 Tail to Dubuque, IA</b>	<b>Dubuque, IA to L&amp;D 12 Pool</b>	<b>L&amp;D 12 Tail to L&amp;D 13 Pool</b>	<b>L&amp;D 13 Tail to Clinton (Beaver)</b>	<b>Clinton (Beaver) to Camanche, IA</b>	<b>Camanche, IA to L&amp;D 14 Pool</b>	<b>L&amp;D 14 Tail to L&amp;D 15 Pool</b>	<b>L&amp;D 15 Tail to Fairport, IA</b>
	<b>RS 615.1 to RS 583.07</b>	<b>RS 582.99 to RS 579.91</b>	<b>RS 579.88 to RS 556.66</b>	<b>RS 556.61 to RS 522.59</b>	<b>RS 522.47 to RS 517.61</b>	<b>RS 517.25 to RS 512.02</b>	<b>RS 511.61 to RS 493.43</b>	<b>RS 493.31 to RS 482.86</b>	<b>RS 482.74 to RS 463.59</b>
Flow	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor
0	1	0.9	0.9	1	1	1	0.9	0.9	1
20000	1	0.9	0.9	1	1	1	0.9	0.9	1
40000	1	0.9	0.9	1	1	1	0.9	0.9	1
60000	1	0.9	0.9	1	1	1	0.9	0.9	1
80000	1	0.9	0.9	1	1	1.05	0.95	0.9	1
100000	1	0.9	0.9	1	1	1.1	0.95	0.9	1
120000	1	1	1	1	1.05	1.5	0.95	0.9	1
140000	1	1.1	1.1	1	1.1	1.2	0.95	0.9	1
160000	1.1	1.1	1.1	1.05	1.1	1.2	0.95	0.9	1
180000	1.1	1.15	1.1	1.05	1.1	1.2	0.95	0.9	1
200000	1.1	1.2	1.15	1.1	1.1	1.2	0.95	0.9	1
220000	1.1	1.2	1.15	1.1	1.1	1.2	1	0.95	1
240000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
260000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
280000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
300000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
320000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
340000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
360000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
380000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
400000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
420000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
440000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
460000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
480000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
500000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
520000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
540000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
560000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1
580000	1.1	1.2	1.15	1.1	1.1	1.2	1	1	1

Flow-Roughness Factors

	<b>Fairport, IA to L&amp;D 16 Pool</b>	<b>L&amp;D 16 Tail to Muscatine, IA</b>	<b>Muscatine, IA to L&amp;D 17 Pool</b>	<b>L&amp;D 17 Tail to Keithsburg, IL</b>	<b>Keithsburg, IL to L&amp;D 18 Pool</b>	<b>L&amp;D 18 Tail to Burlington, IA</b>	<b>Burlington, IA to Fort Madison, IA</b>	<b>Fort Madison, IA to L&amp;D 19 Pool</b>	
	<b>RS 463.06 to RS 457.22</b>	<b>RS 457.11 to RS 453.15</b>	<b>RS 452.88 to RS 437.18</b>	<b>RS 437.08 to RS 427.92</b>	<b>RS 427.63 to RS 410.46</b>	<b>RS 410.39 to RS 403.18</b>	<b>RS 403.12 to RS 383.99</b>	<b>RS 383.88 to RS 364.74</b>	
Flow	Factor	Factor	Factor	Factor	Factor	Factor	Factor	Factor	
0	1	1	1	1	1	0.9	0.9	0.8	
20000	1	1	1	1	1	0.9	0.9	0.8	
40000	1	1	1	1	1	0.9	0.9	0.8	
60000	1	1	1	1	1	0.9	0.9	0.8	
80000	1	1	1	1	1	0.9	0.9	0.8	
100000	1	1	1	1	1	0.9	0.9	0.8	
120000	1	1	1	1.05	1	0.95	0.95	0.8	
140000	1	1	1	1.1	1	1	1	0.8	
160000	1	1.05	1.05	1.1	1	1	1	0.8	
180000	1	1.1	1.05	1.15	1.05	1	1	0.8	
200000	1	1.1	1.05	1.15	1.1	1	1	0.8	
220000	1	1.1	1.05	1.15	1.1	1	1	0.8	
240000	1	1.1	1.05	1.15	1.1	1.05	1.05	0.8	
260000	1	1.15	1.05	1.15	1.1	1.1	1.1	0.8	
280000	1	1.15	1.05	1.15	1.1	1.1	1.1	0.8	
300000	1	1.15	1.05	1.15	1.1	1.1	1.1	0.8	
320000	1	1.15	1.05	1.15	1.1	1.15	1.1	0.8	
340000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
360000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
380000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
400000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
420000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
440000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
460000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
480000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
500000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
520000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
540000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
560000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	
580000	1	1.15	1.05	1.15	1.1	1.15	1.15	0.8	



## **APPENDIX D**

### **HIGH WATER DATA CORRESPONDENCE**



DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS, ROCK ISLAND DISTRICT  
CLOCK TOWER BUILDING - PO BOX 2004  
ROCK ISLAND, ILLINOIS 61204-2004

January 9, 2020

Programs and Project  
Management Division

TO: Partners Adjacent to the Upper Mississippi River from Anoka, MN, to Keokuk, IA

Dear Sir or Madam:

The U.S. Army Corps of Engineers, Rock Island District (District), in partnership with state and Federal agencies, initiated a new hydraulic model for the main-stem Upper Mississippi River from Anoka, MN, to Keokuk, IA. The numerical hydraulic model will be calibrated using observed flow and stage data at gauge locations. In order to assist with the calibration process, we are seeking high water mark (HWM) information.

HWM elevation information is a valuable part of the modeling effort. To assure that the best available information is used in developing the hydraulic model, the District requests that you provide high quality and well-documented HWM elevation information for the following flood events: April/May 2001, June/July 2014, and March/April/May/June 2019.

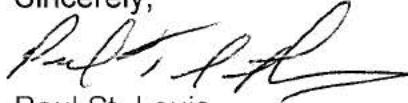
The District defines high quality and well-documented HWMs as having been collected and documented by a professional land surveyor (P.L.S.) or under the supervision of a P.L.S. The HWM data should contain the event dates, horizontal coordinates, vertical and horizontal elevation datum, and nature of data acquisition, i.e. field measurement during event, water's edge, debris line, etc. We are requesting the data in text file format and, if available, any supporting photographs.

Due to the study's timeline, we are asking for a response to this request by March 15, 2020; otherwise, we will assume that you do not have HWM information to be used for model calibration purposes.

I have sent a copy of this letter to the Upper Mississippi River Basin Association, the Upper Mississippi, Illinois, and Missouri Rivers Association, and the Iowa, Illinois, Wisconsin, and Minnesota counties bordering the Mississippi River.

Please email HWM information to [REDACTED] If you need additional time or have any questions, you may reach me via my email address or at [REDACTED]

Sincerely,

A handwritten signature in black ink, appearing to read "Paul St. Louis", with a stylized flourish extending to the right.

Paul St. Louis  
Program Manager