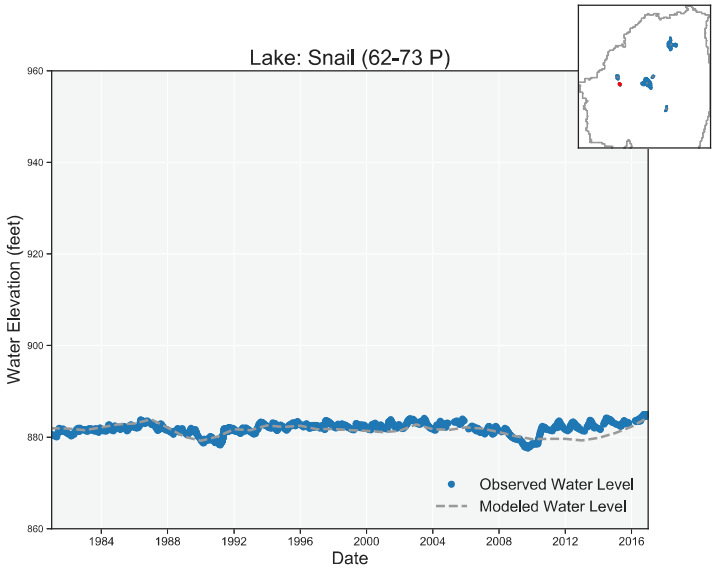
APPENDIX B

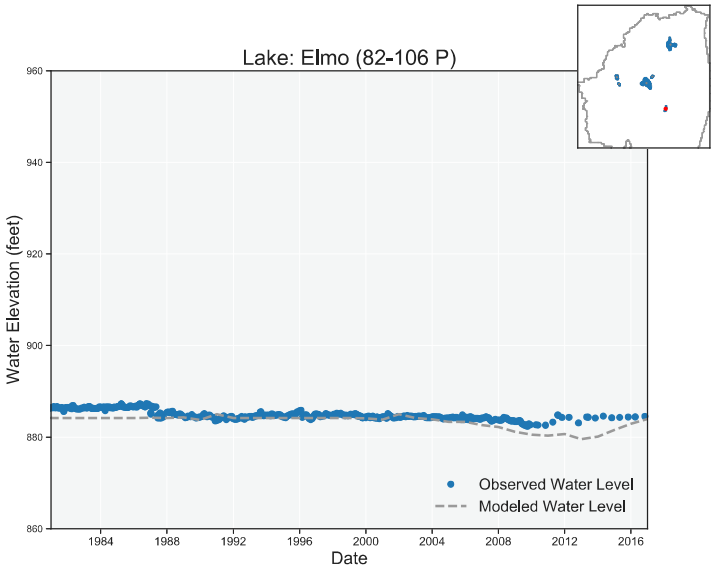
Appendix B

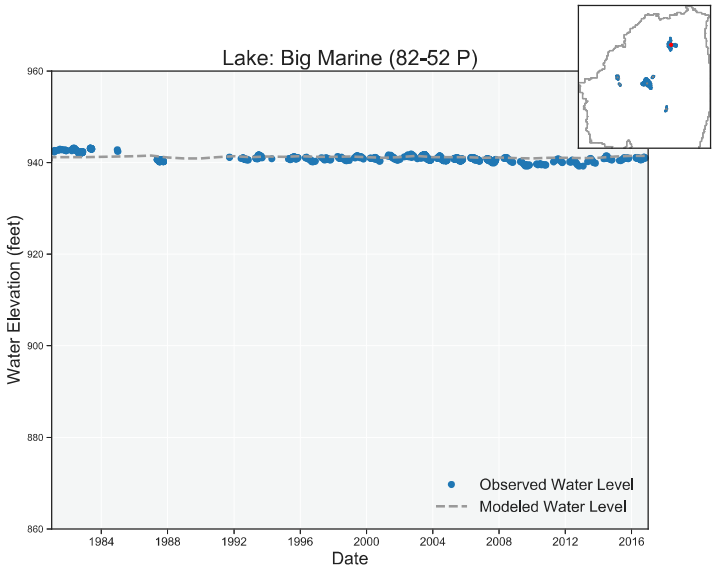
Comprehensive Calibration Plots and Statistics

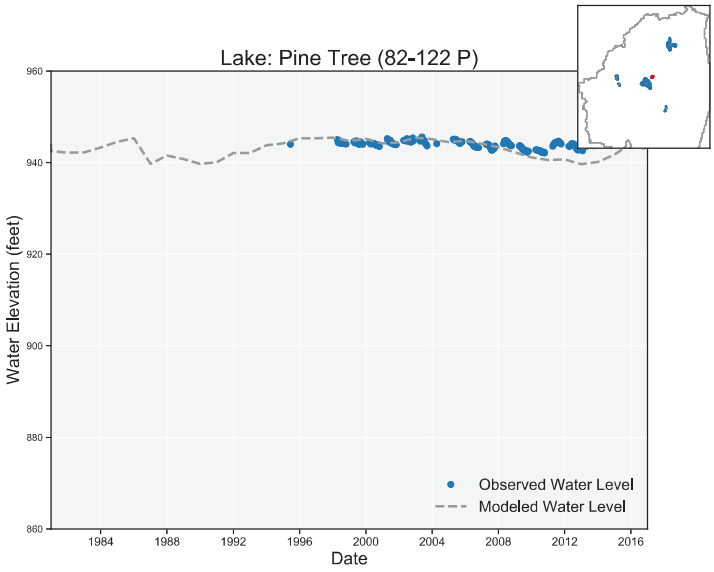
Appendix B-1

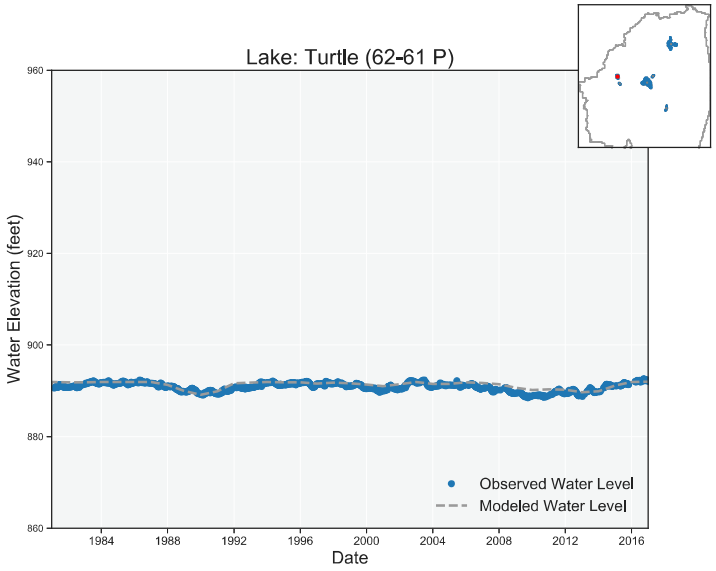
Fixed Scale Plots for the Annual Stress Period Model

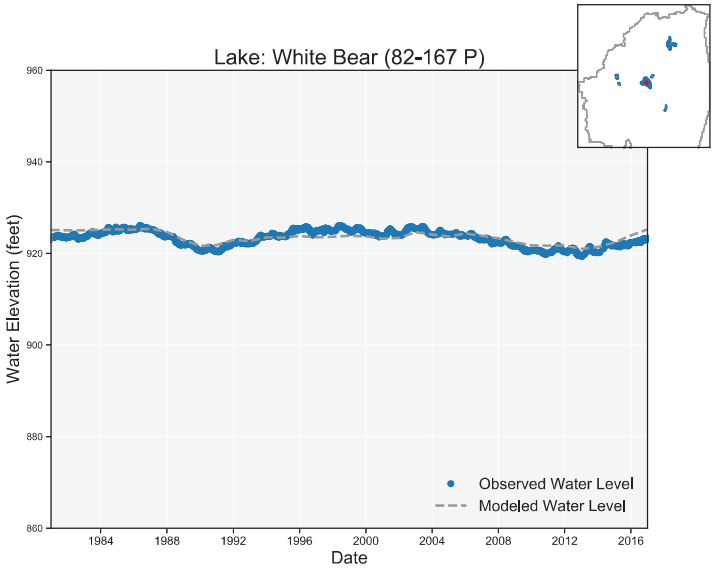

Lake: Snail (62-73 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Elmo (82-106 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

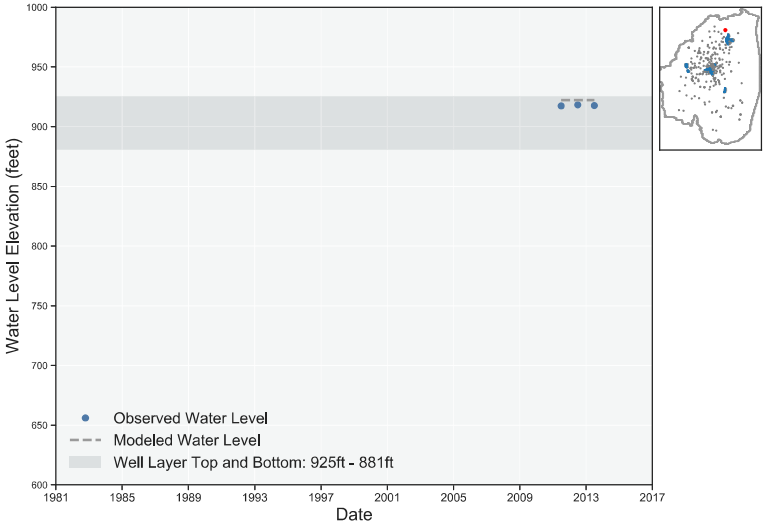

Lake: Big Marine (82-52 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Pine Tree (82-122 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

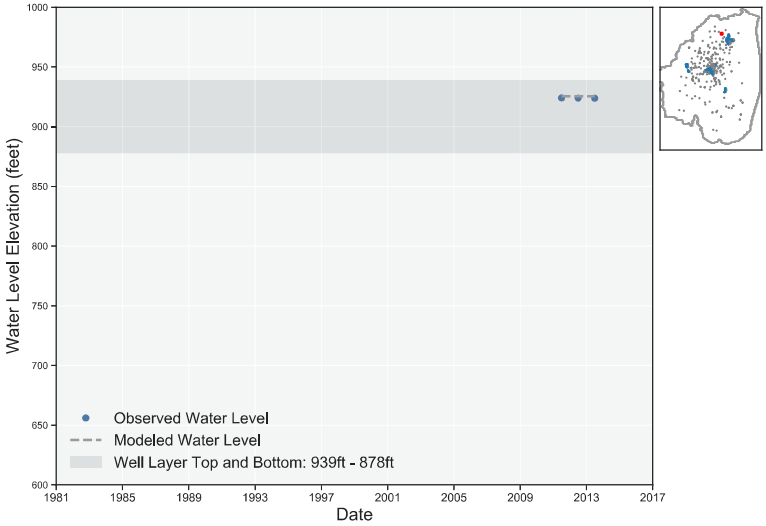

Lake: Turtle (62-61 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: White Bear (82-167 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

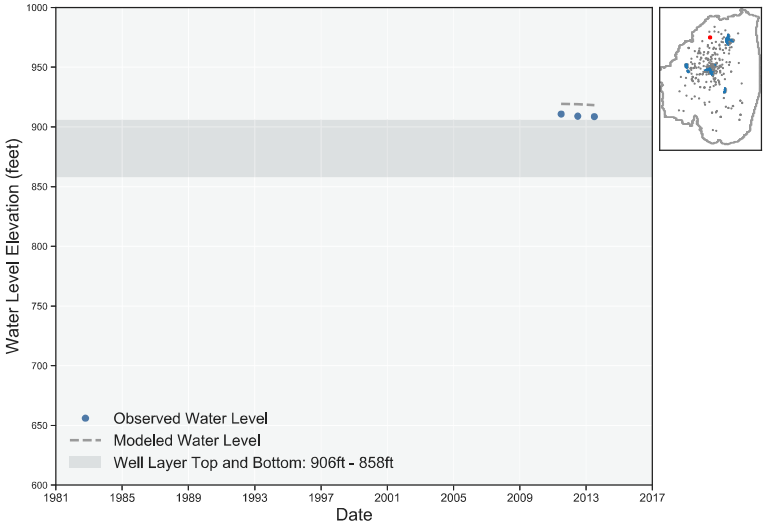
Well 138275 - Aq: QBAA Layers: 4 - 4



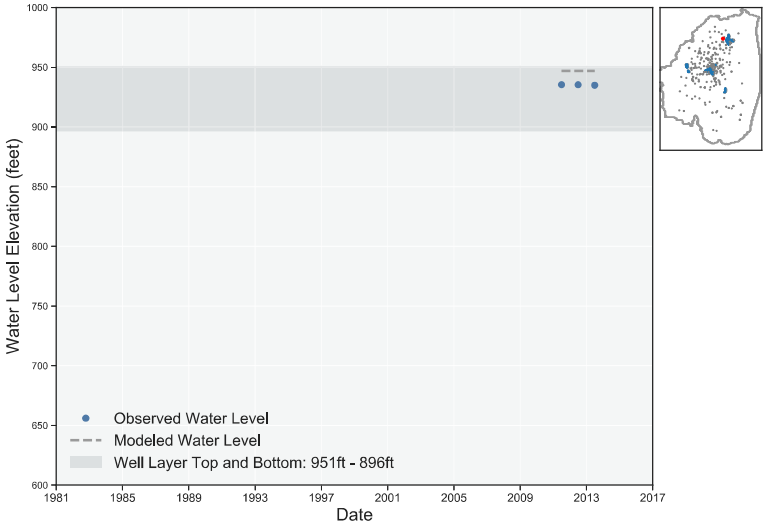
Well 446292 - Aq: QBAA Layers: 4 - 4



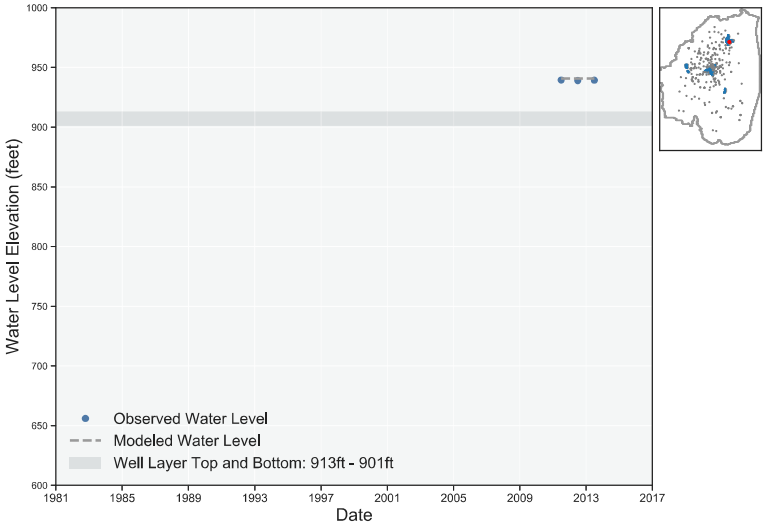
Well 404644 - Aq: QBAA Layers: 4 - 4



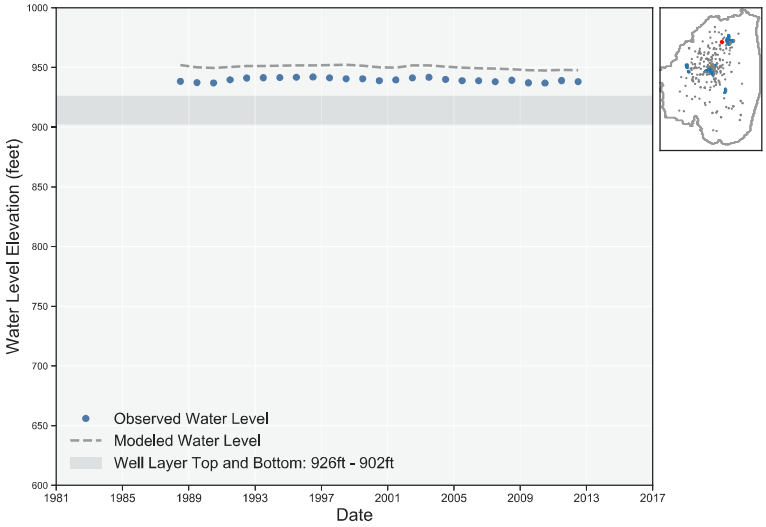
Well 112422 - Aq: QBAA Layers: 4 - 4



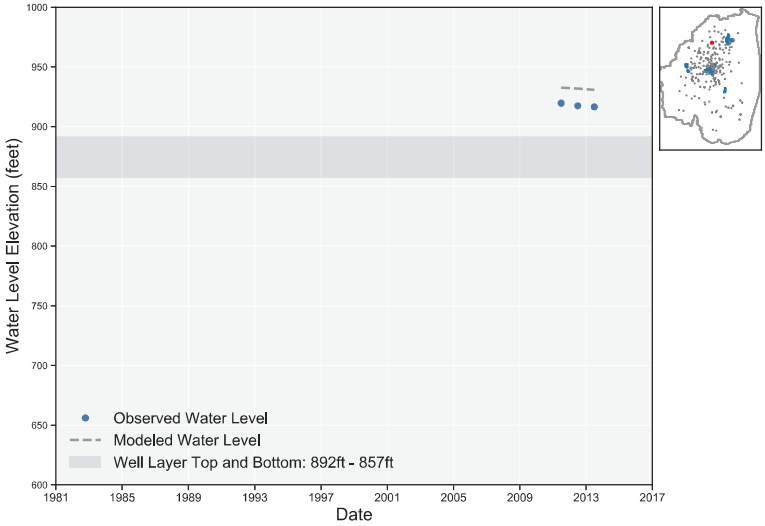
Well 139010 - Aq: QBAA Layers: 4 - 4



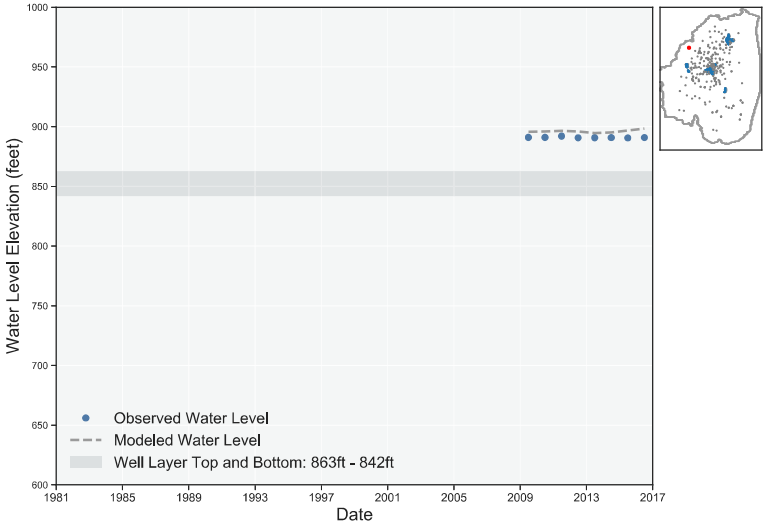
Well 82036 - Aq: QWTA Layers: 4 - 4



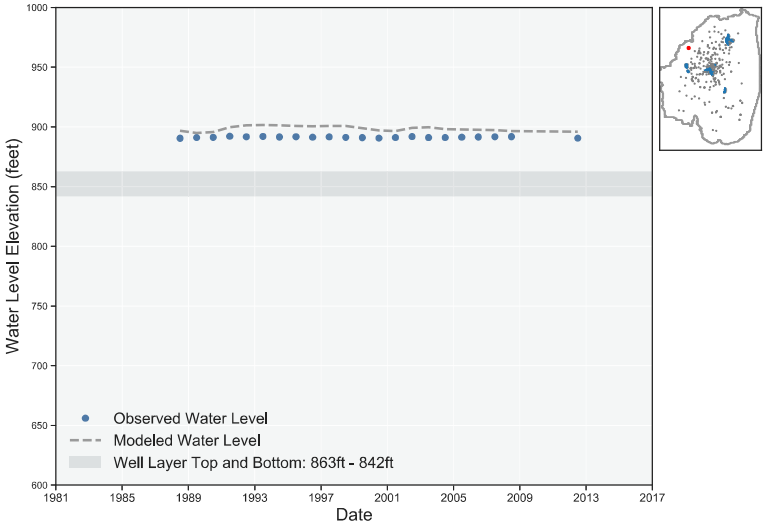
Well 136144 - Aq: QBAA Layers: 4 - 4



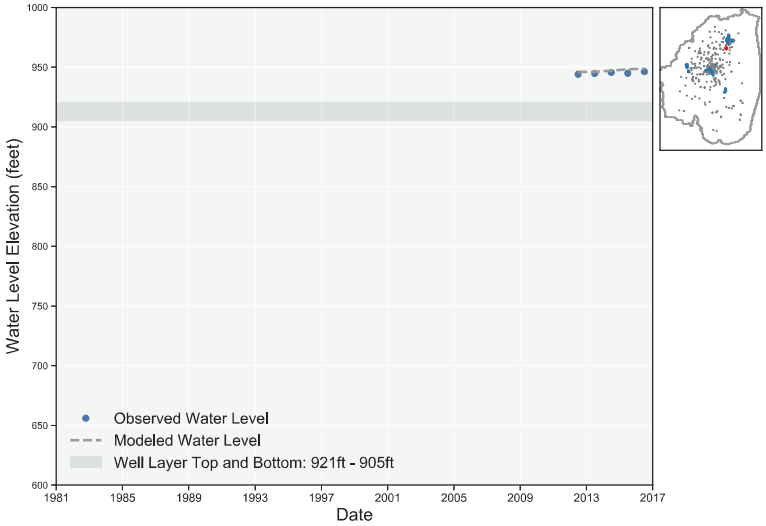
Well 2030 - Aq: QWTA Layers: 4 - 4



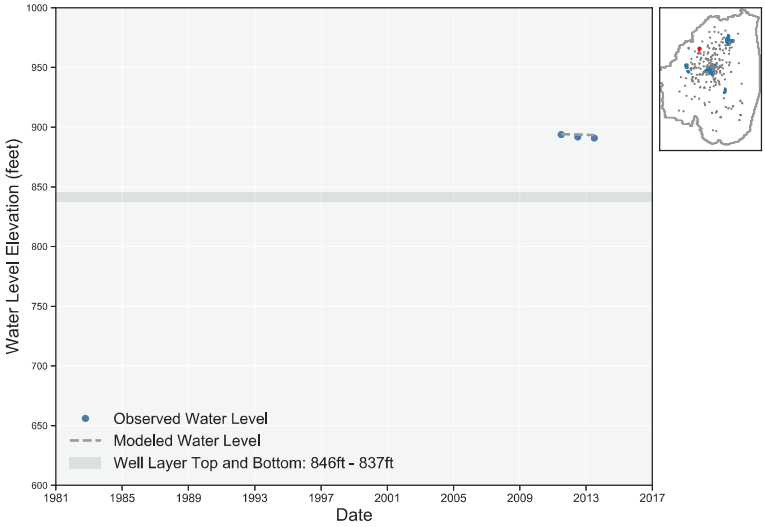
Well 2010 - Aq: QWTA Layers: 4 - 4



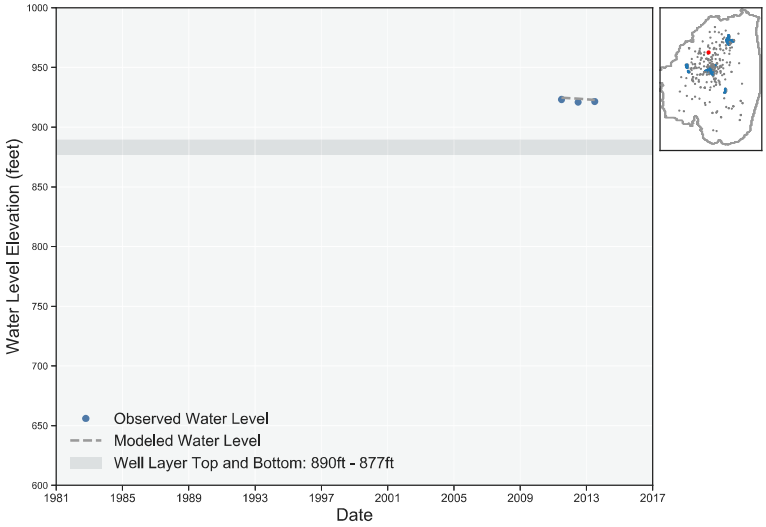
Well 82055 - Aq: QBAA Layers: 4 - 4



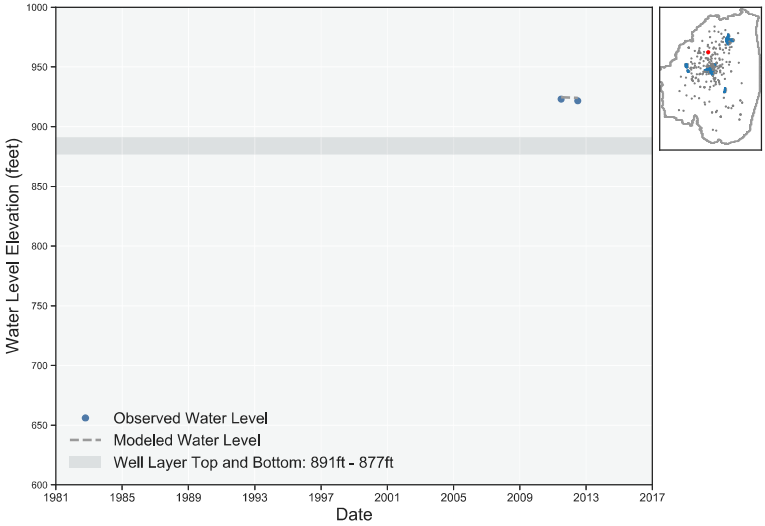
Well 169252 - Aq: QBAA Layers: 4 - 4



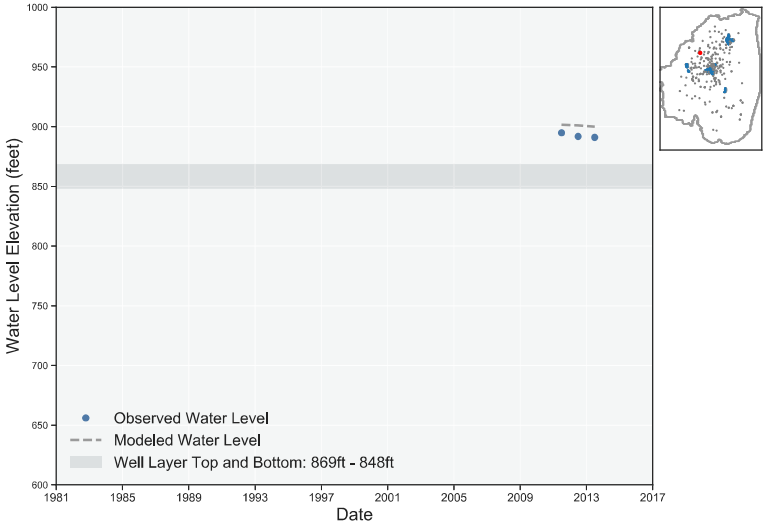
Well 620717 - Aq: QWTA Layers: 4 - 4



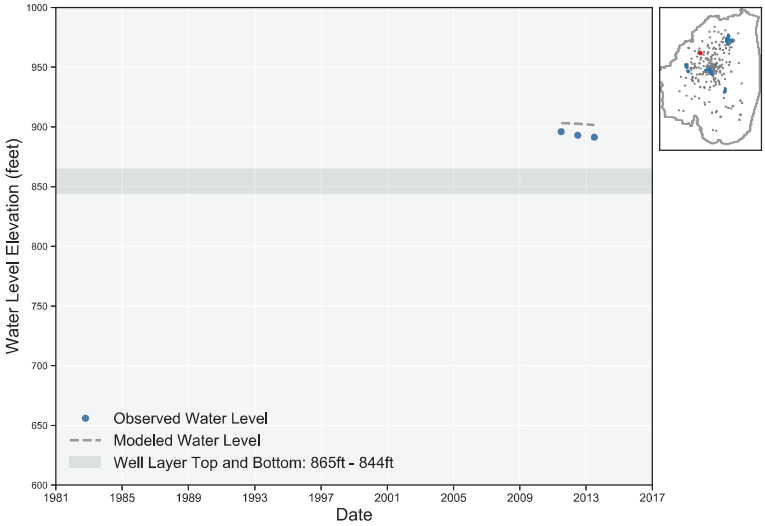
Well 620718 - Aq: QWTA Layers: 4 - 4



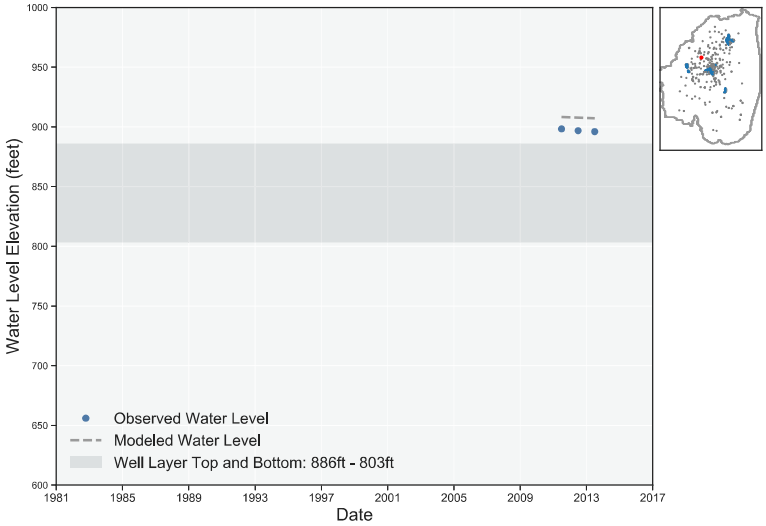
Well 435278 - Aq: QBAA Layers: 4 - 4



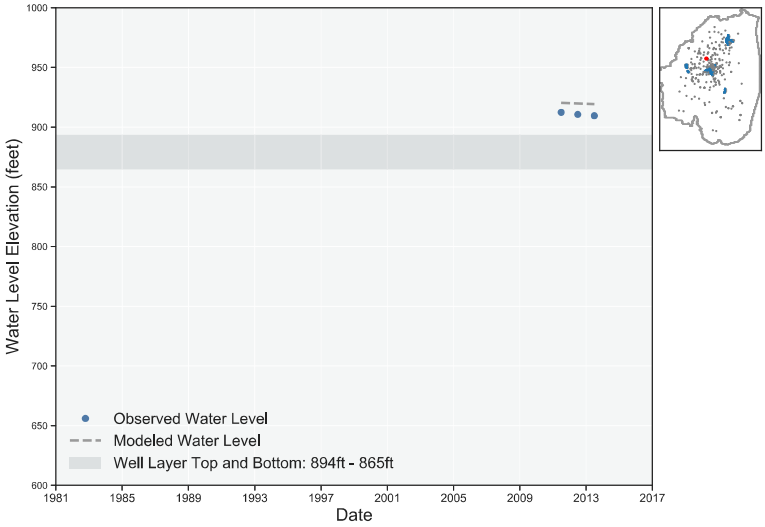
Well 435308 - Aq: QBAA Layers: 4 - 4



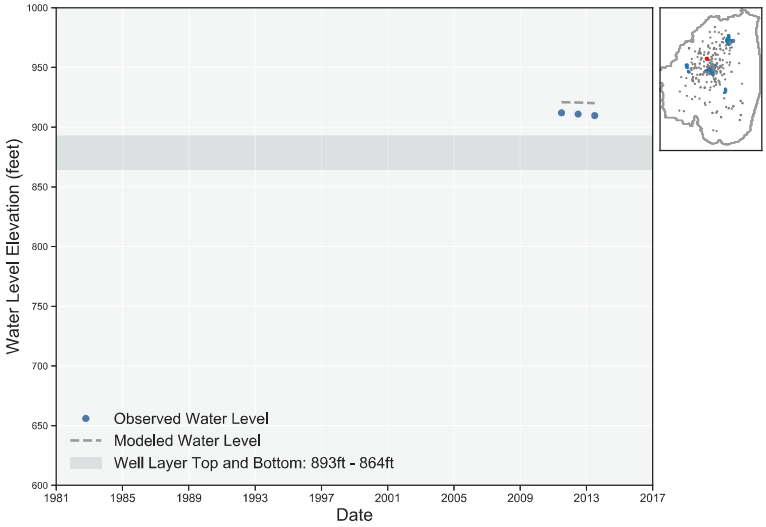
Well 126870 - Aq: QBAA Layers: 4 - 4



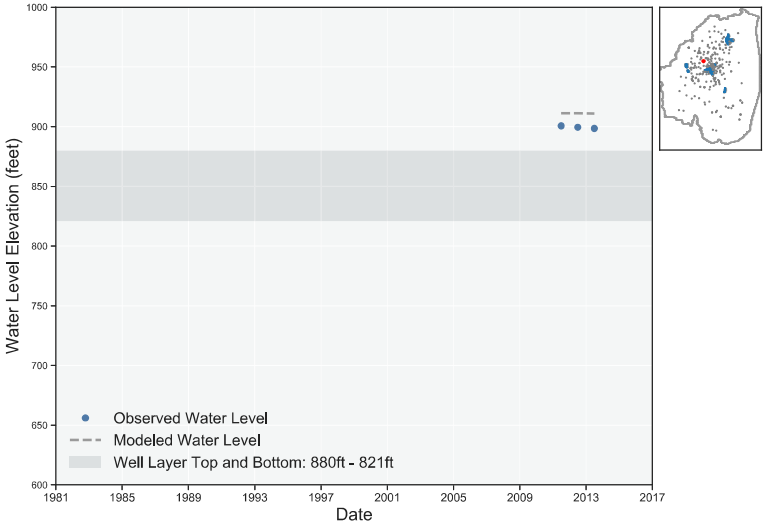
Well 465951 - Aq: QBAA Layers: 4 - 4



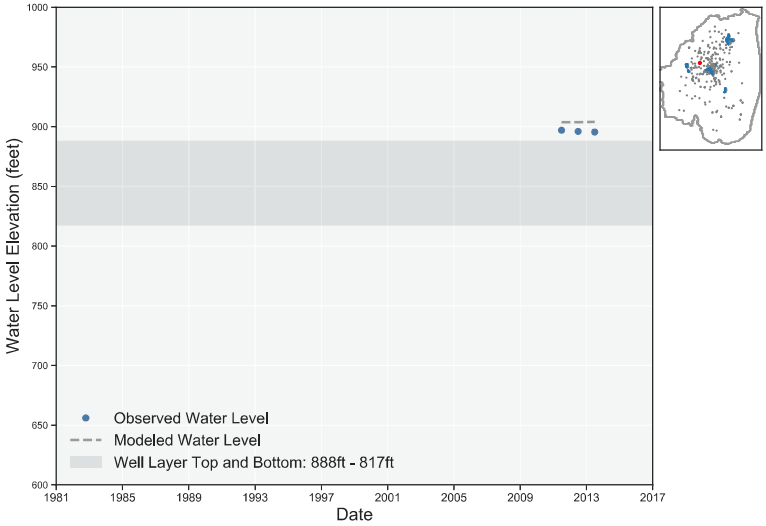
Well 496784 - Aq: QBAA Layers: 4 - 4



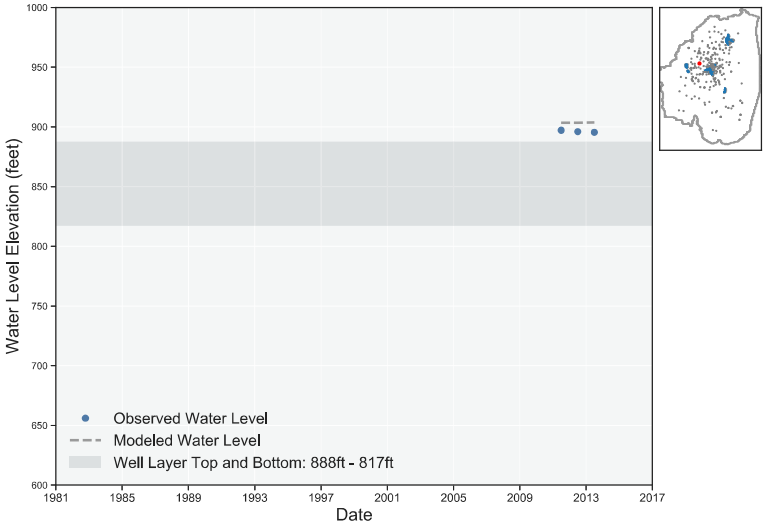
Well 112442 - Aq: QBAA Layers: 4 - 4



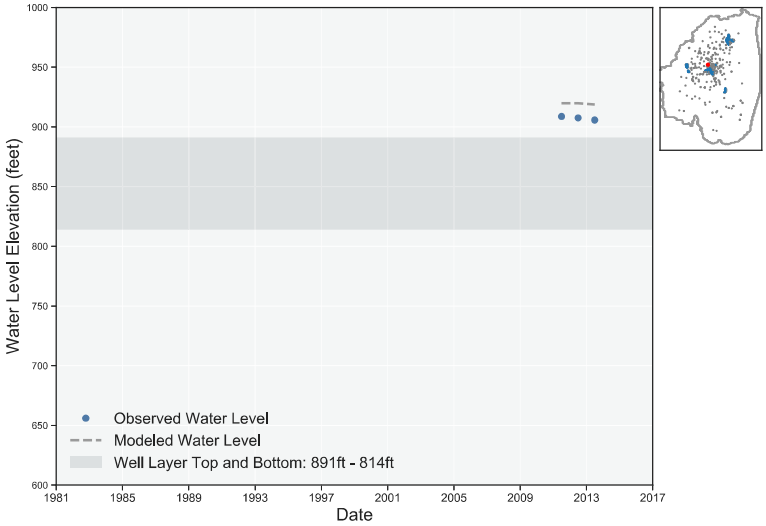
Well 430506 - Aq: QBAA Layers: 4 - 4



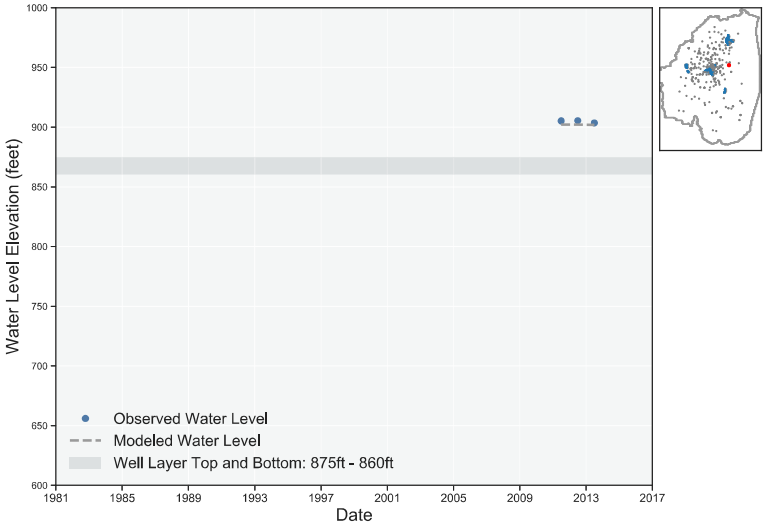
Well 130810 - Aq: QBAA Layers: 4 - 4



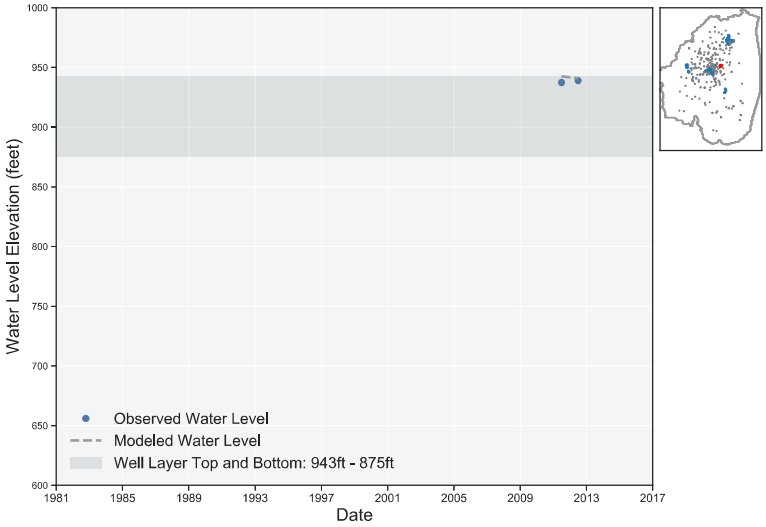
Well 141728 - Aq: Q Layers: 4 - 4



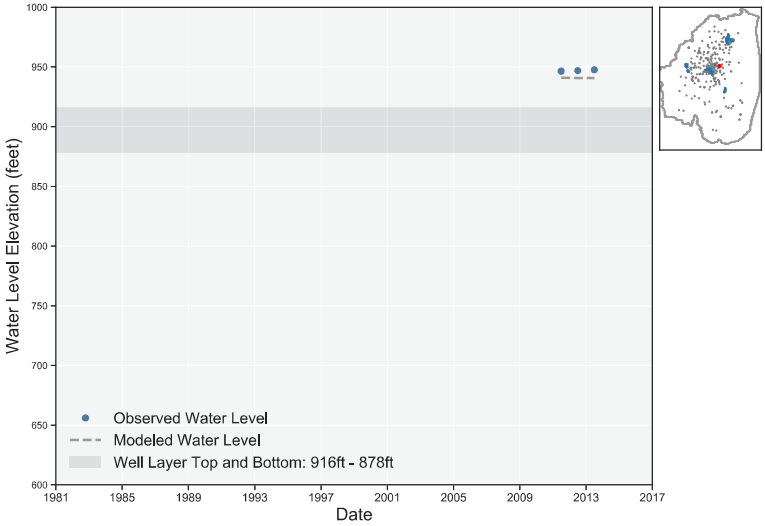
Well 153500 - Aq: QWTA Layers: 4 - 4



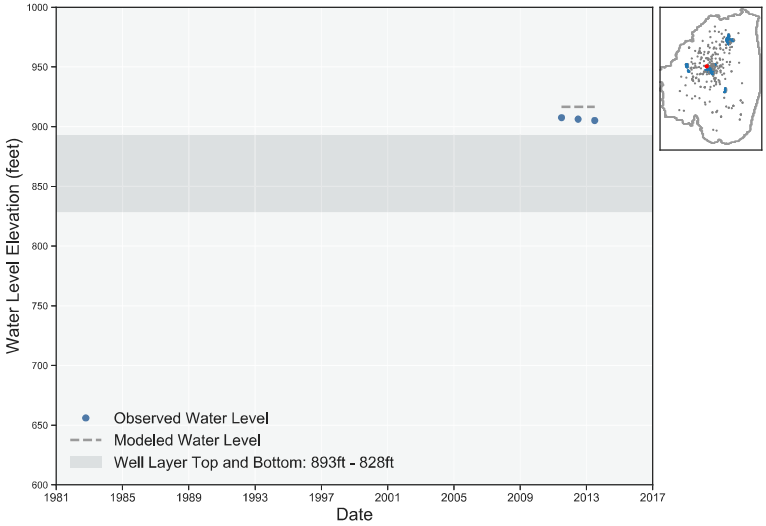
Well 418799 - Aq: QBAA Layers: 4 - 4



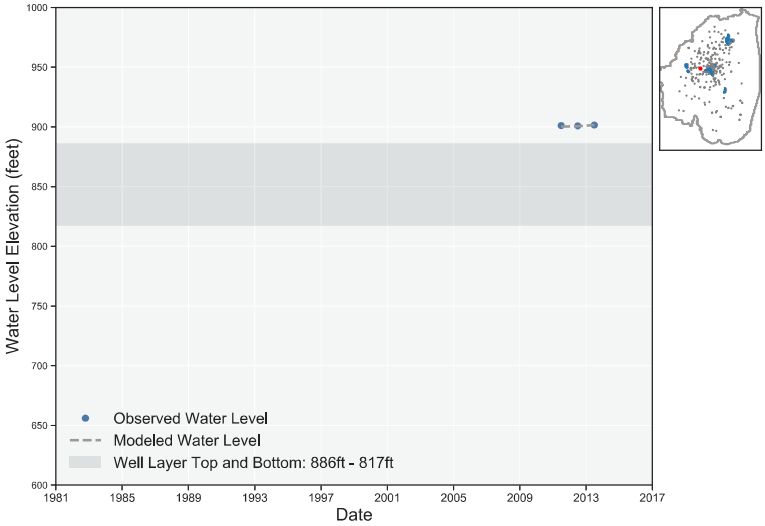
Well 404277 - Aq: QWTA Layers: 4 - 4



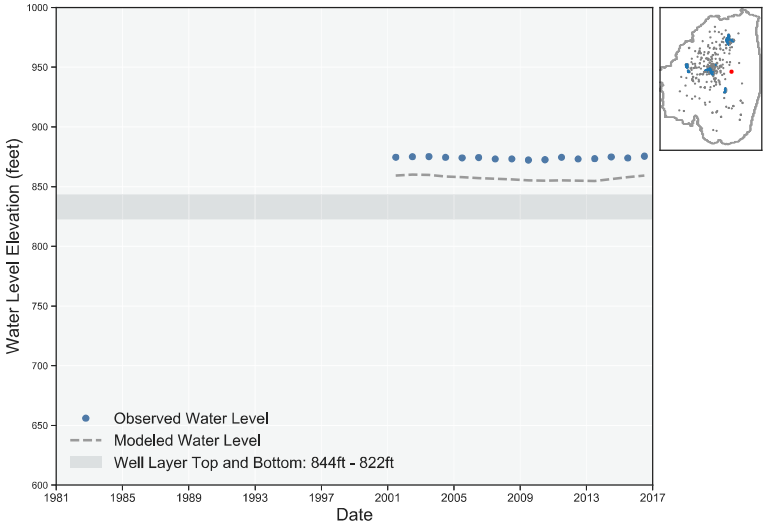
Well 186956 - Aq: Q Layers: 4 - 4



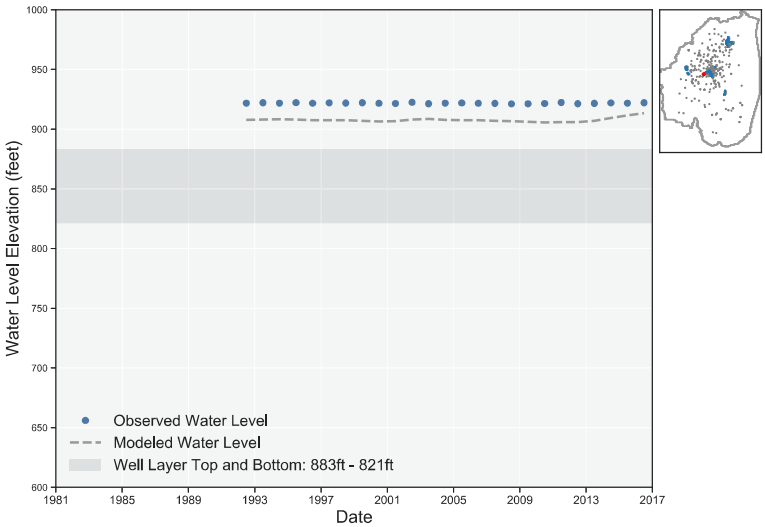
Well 173943 - Aq: QBAA Layers: 4 - 4



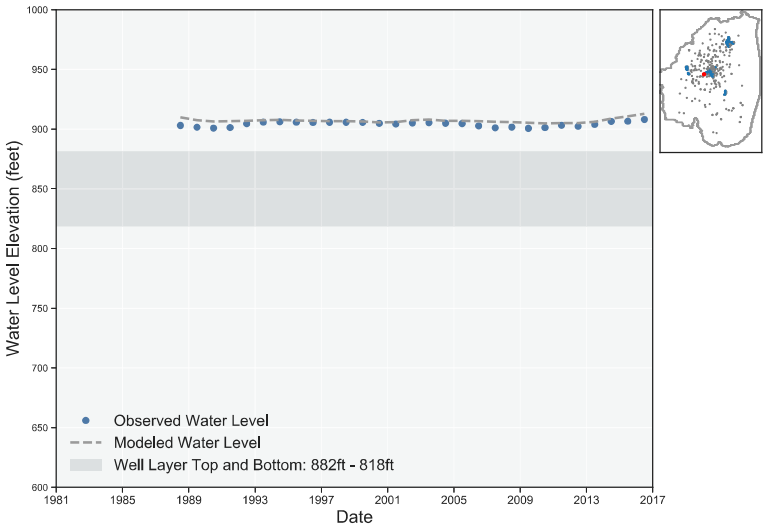
Well 82048 - Aq: QBAA Layers: 4 - 4



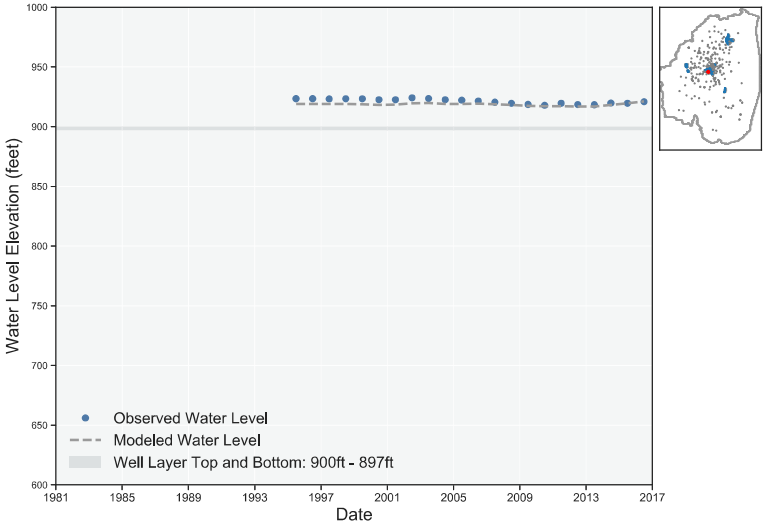
Well 62039 - Aq: QWTA Layers: 4 - 4



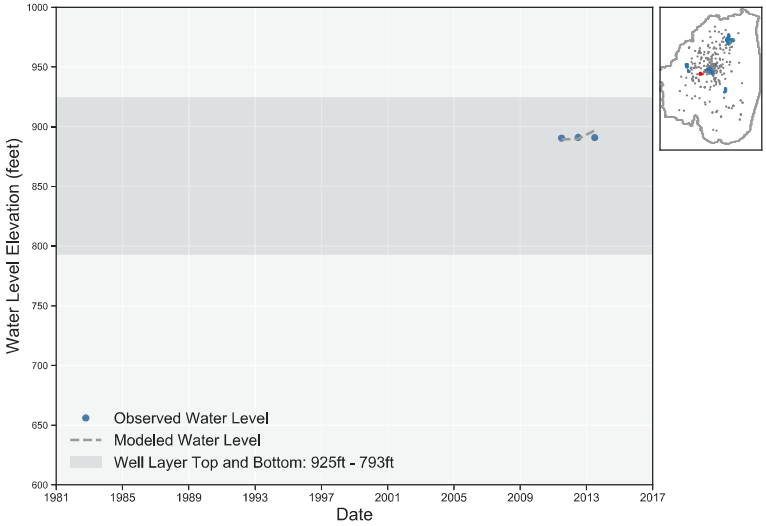
Well 62033 - Aq: QBAA Layers: 4 - 4



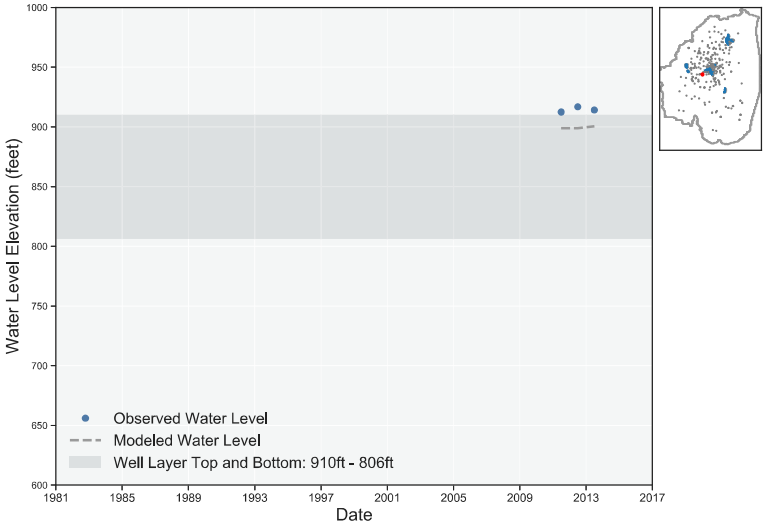
Well 62045 - Aq: QBAA Layers: 4 - 4



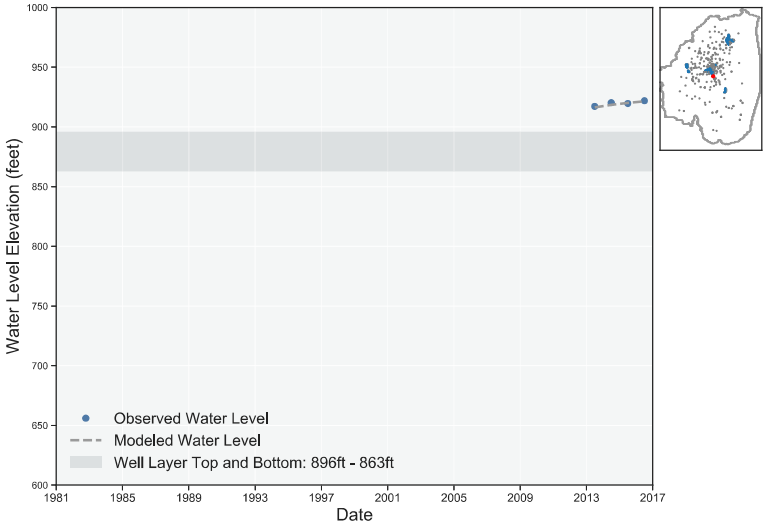
Well 151732 - Aq: Q Layers: 4 - 4



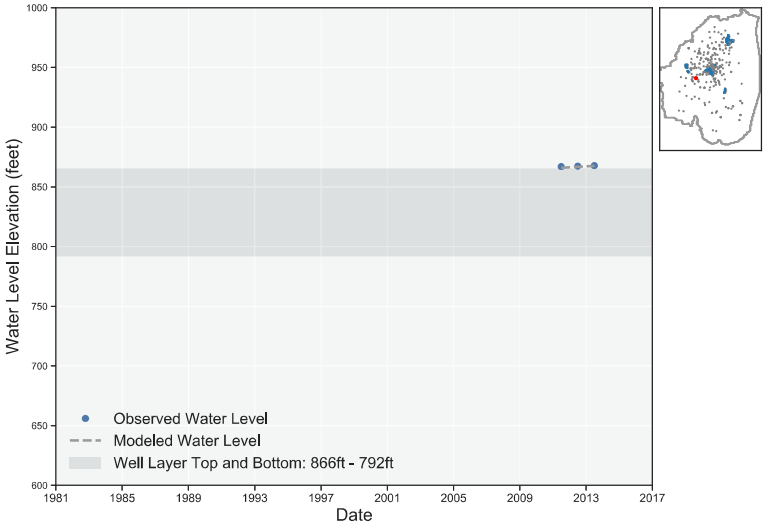
Well 401598 - Aq: QBUA Layers: 4 - 4



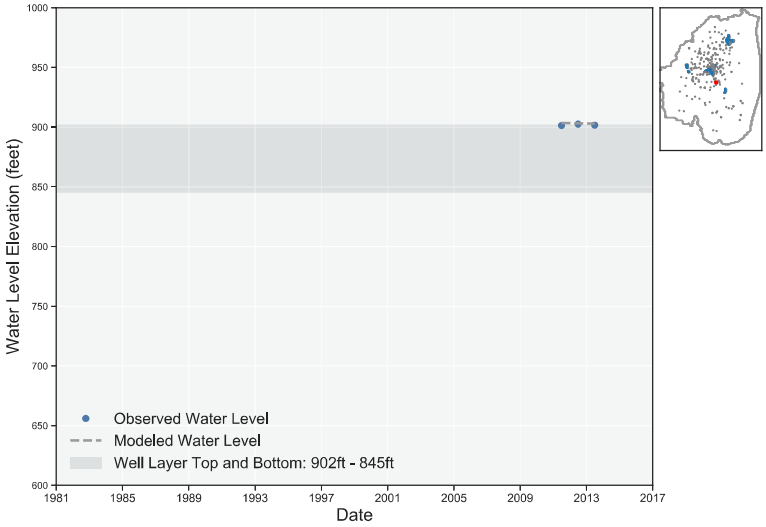
Well 82057 - Aq: QWTA Layers: 4 - 4



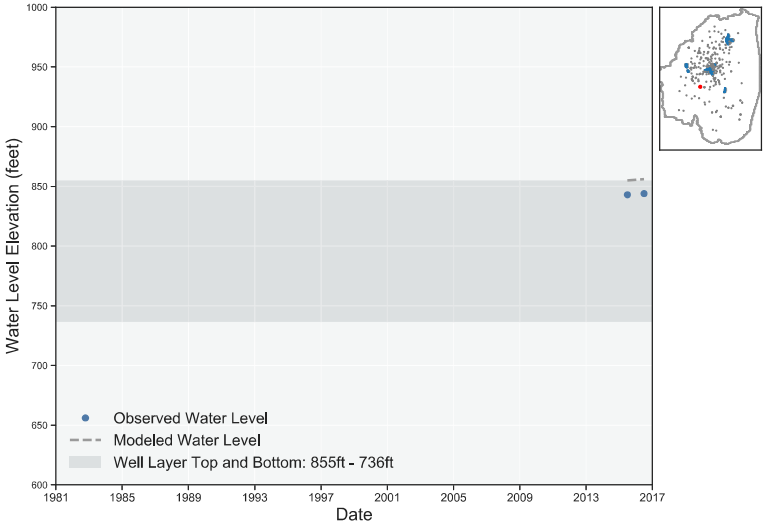
Well 107006 - Aq: QBAA Layers: 4 - 4



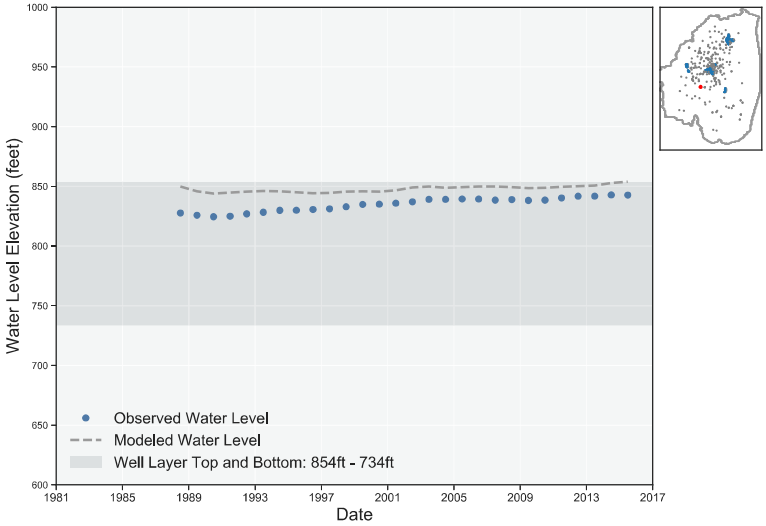
Well 436676 - Aq: QBAA Layers: 4 - 4



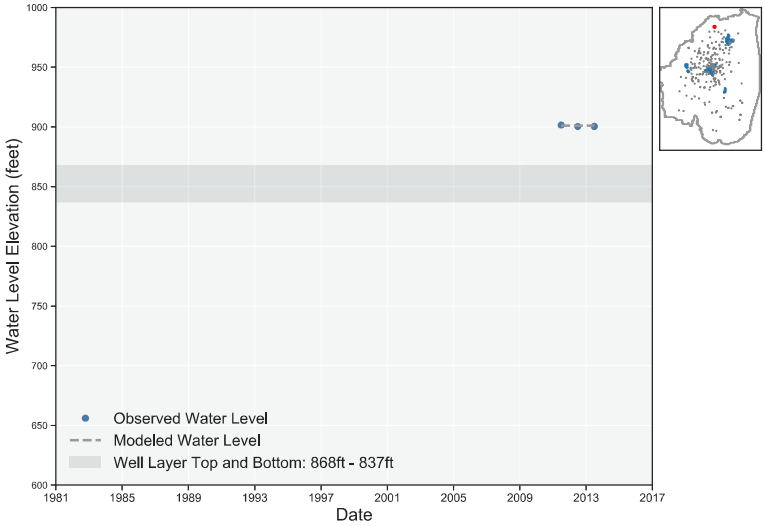
Well 62055 - Aq: QWTA Layers: 4 - 4



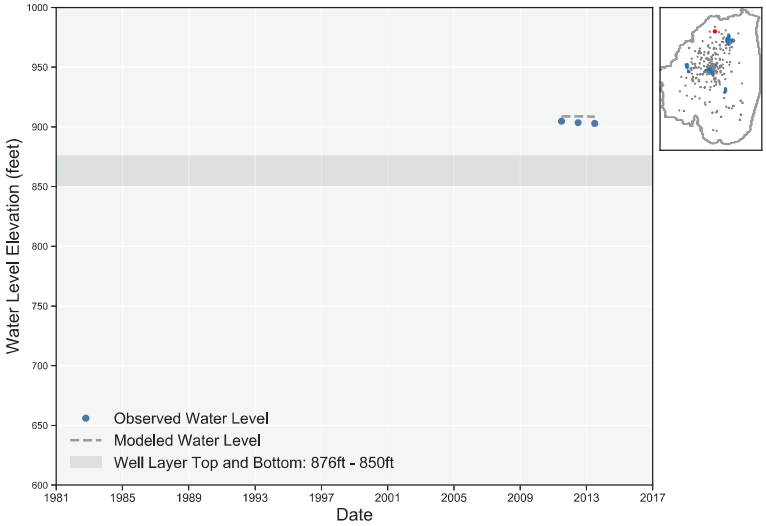
Well 62008 - Aq: QBAA Layers: 4 - 4



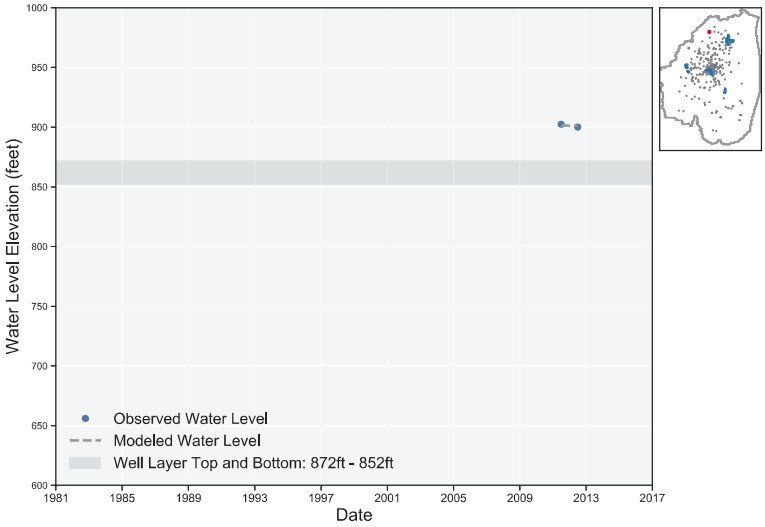
Well 178258 - Aq: QBAA Layers: 5 - 5



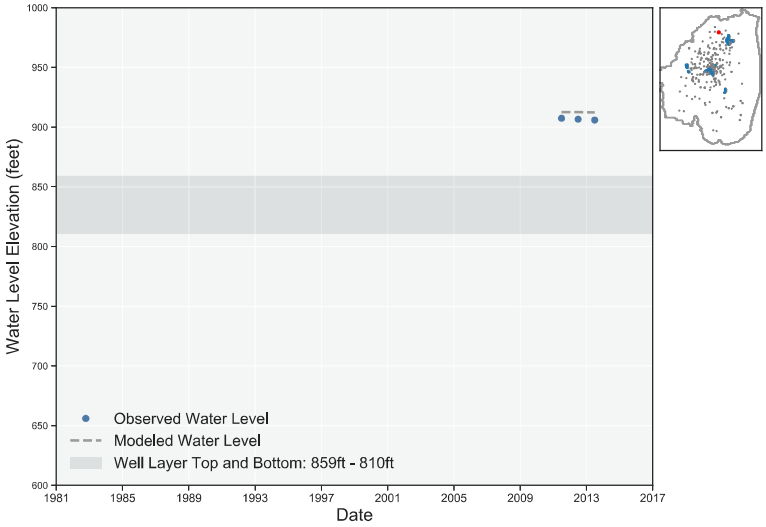
Well 428561 - Aq: QBAA Layers: 5 - 5



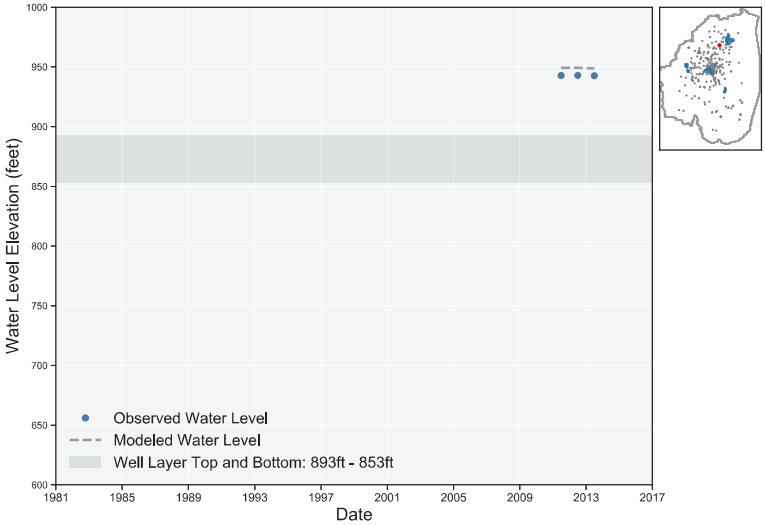
Well 150944 - Aq: QBAA Layers: 5 - 5



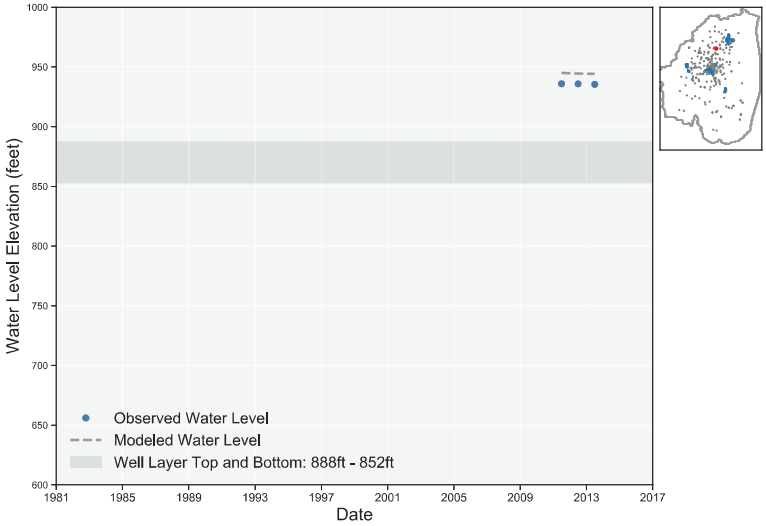
Well 420316 - Aq: QBAA Layers: 5 - 5



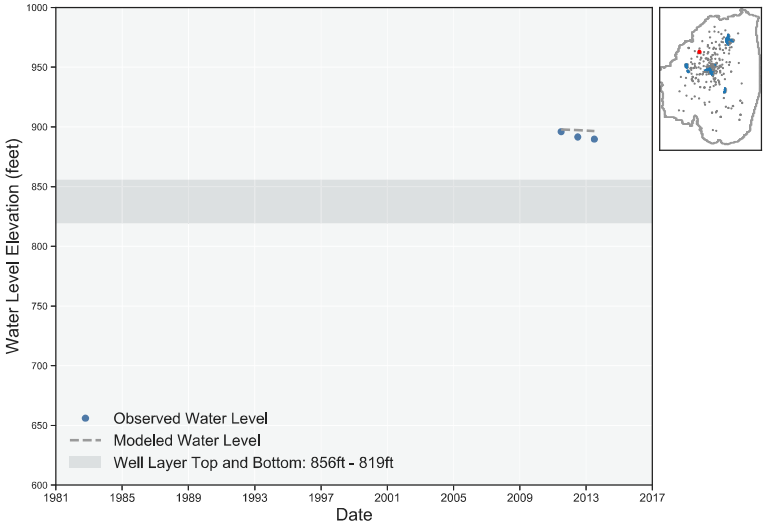
Well 112661 - Aq: QBAA Layers: 5 - 5



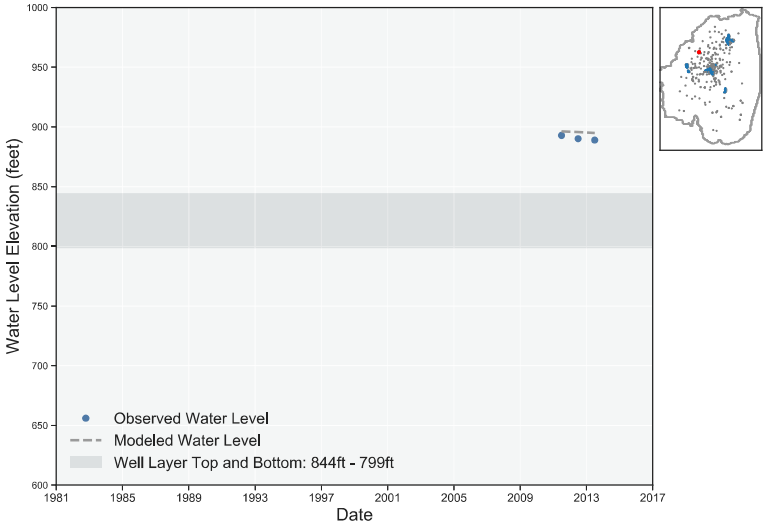
Well 485406 - Aq: OSTP Layers: 5 - 5



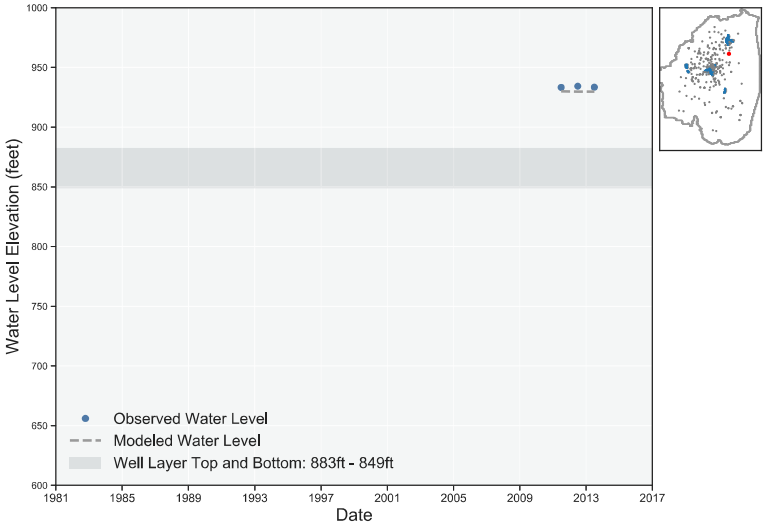
Well 439244 - Aq: OSTP Layers: 5 - 5



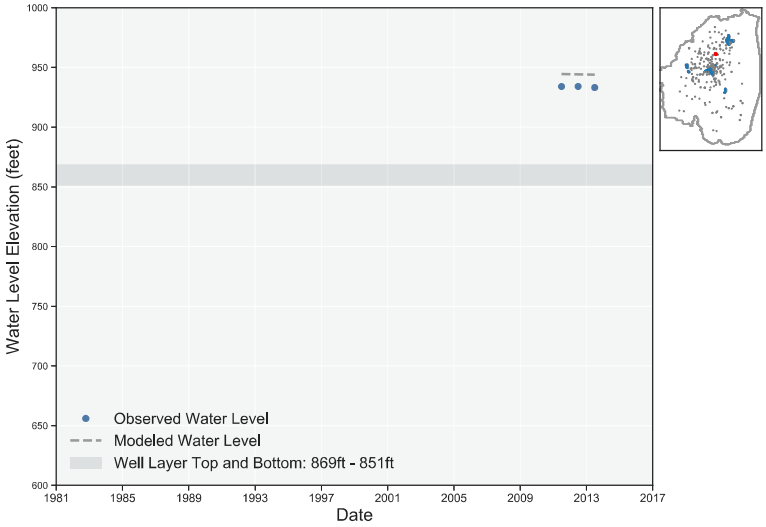
Well 439246 - Aq: OSTP Layers: 5 - 5



Well 411608 - Aq: QBAA Layers: 5 - 5



Well 410174 - Aq: OSTP Layers: 5 - 5



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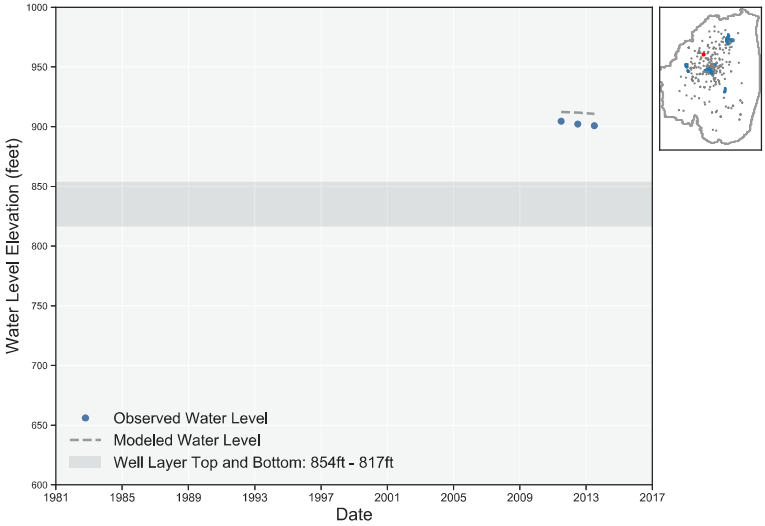
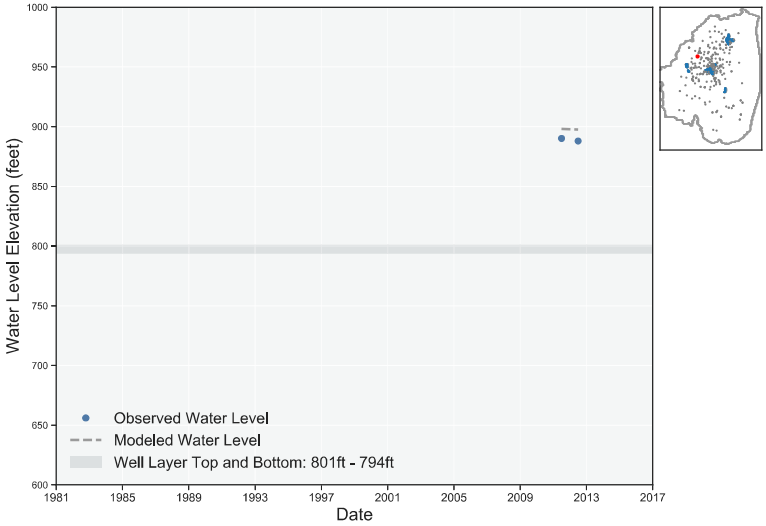


Well 164776 - Aq: OSTP Layers: 5 - 5



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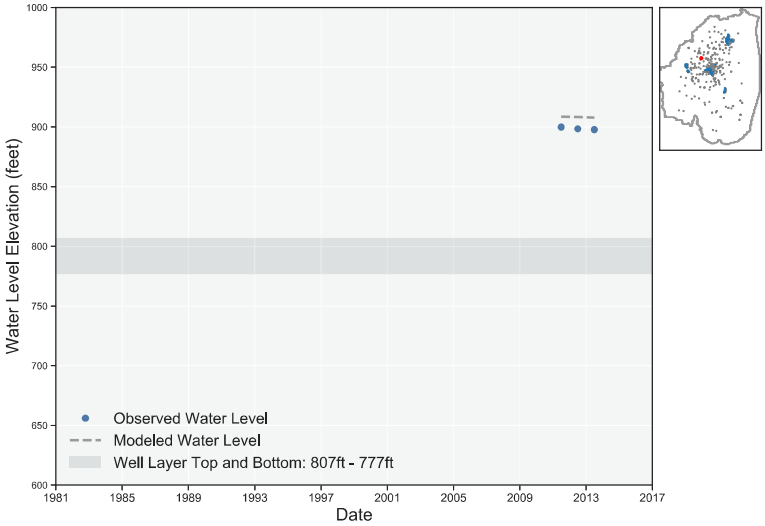

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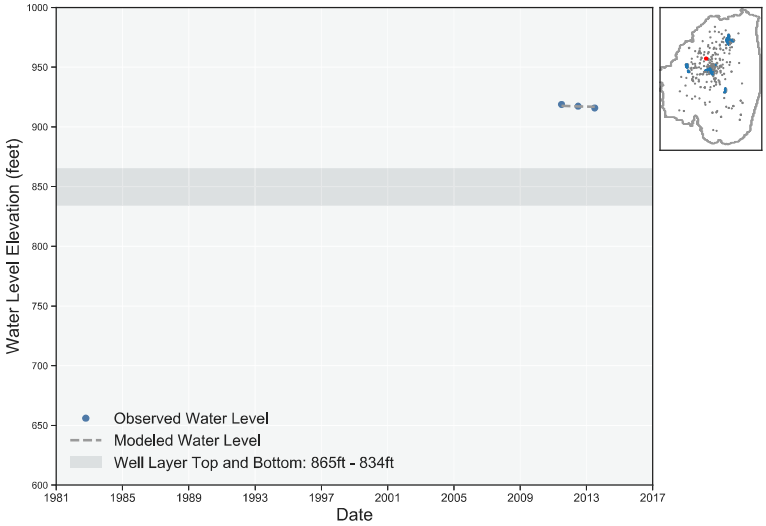
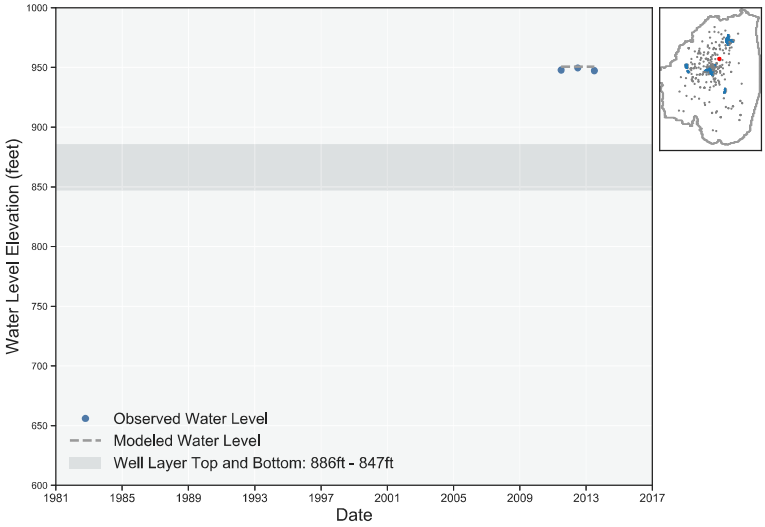
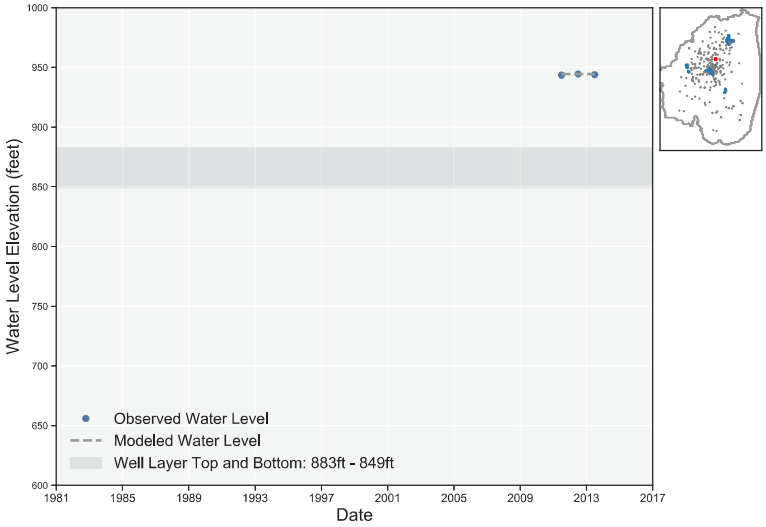


Well 429100 - Aq: OSTP Layers: 5 - 5



Well 138268 - Aq: OSTP Layers: 5 - 5



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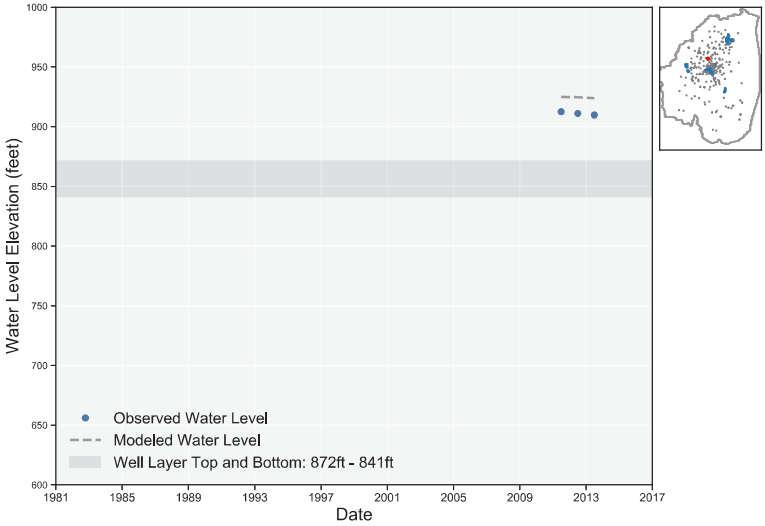
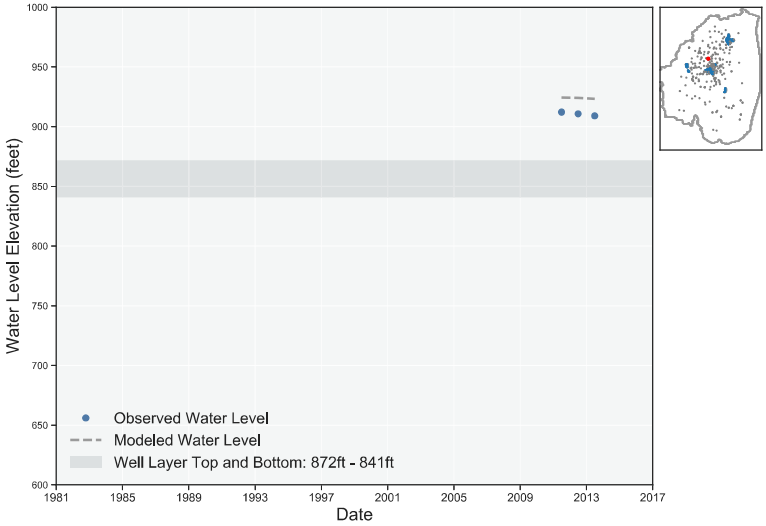
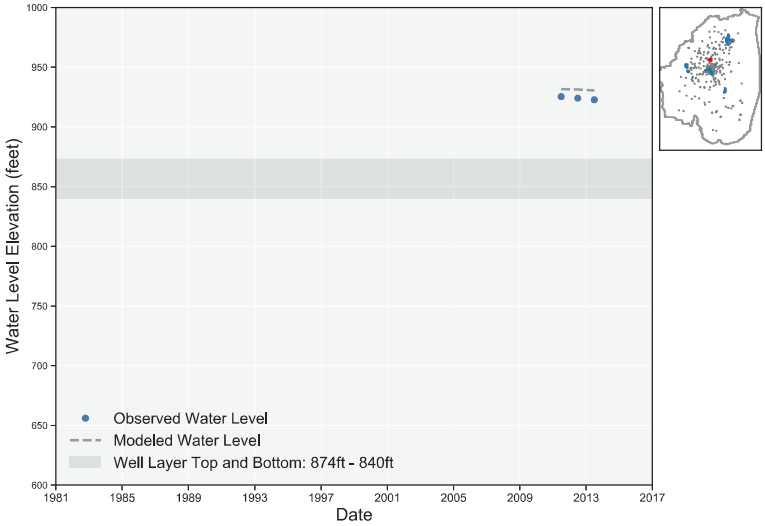


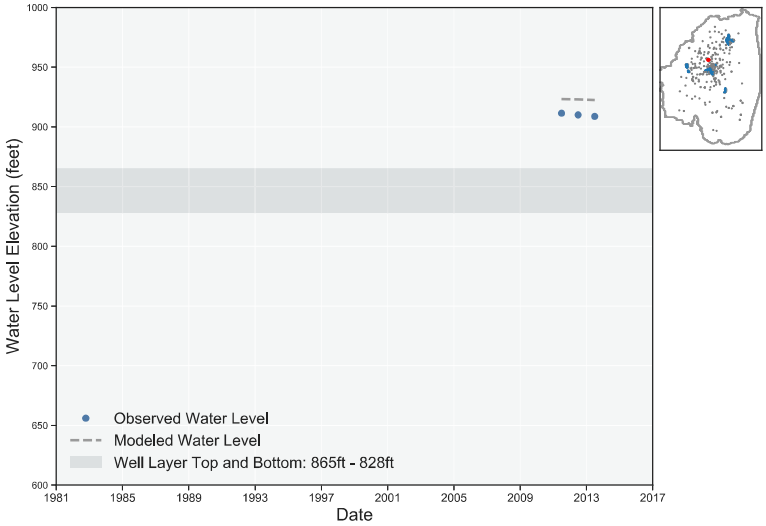
Well 163708 - Aq: QBAA Layers: 5 - 5



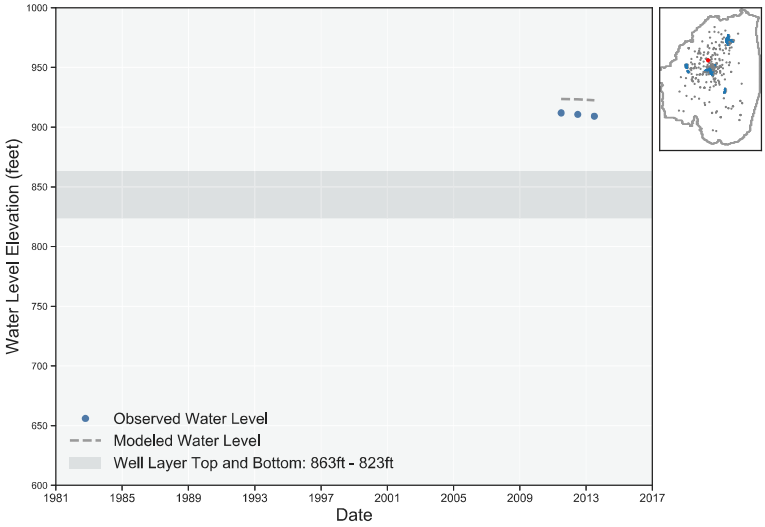
Well 153490 - Aq: OSTP Layers: 5 - 5



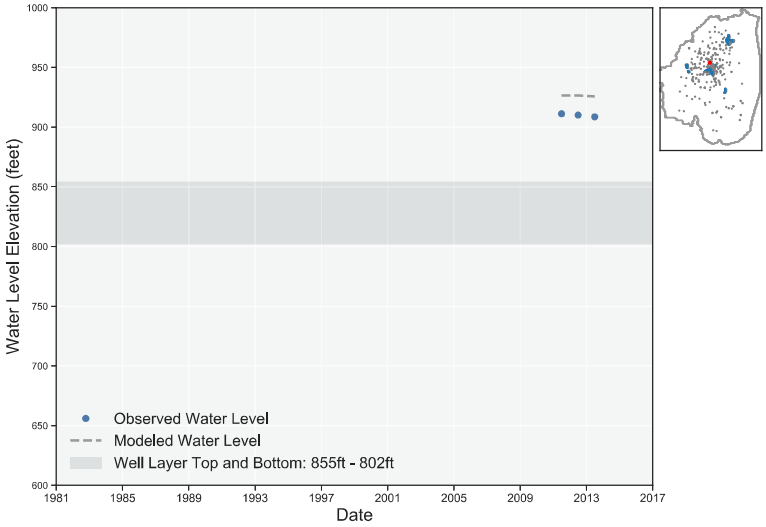
Well 435108 - Aq: OSTP Layers: 5 - 5



Well 450417 - Aq: OSTP Layers: 5 - 5



Well 432954 - Aq: QBAA Layers: 5 - 5



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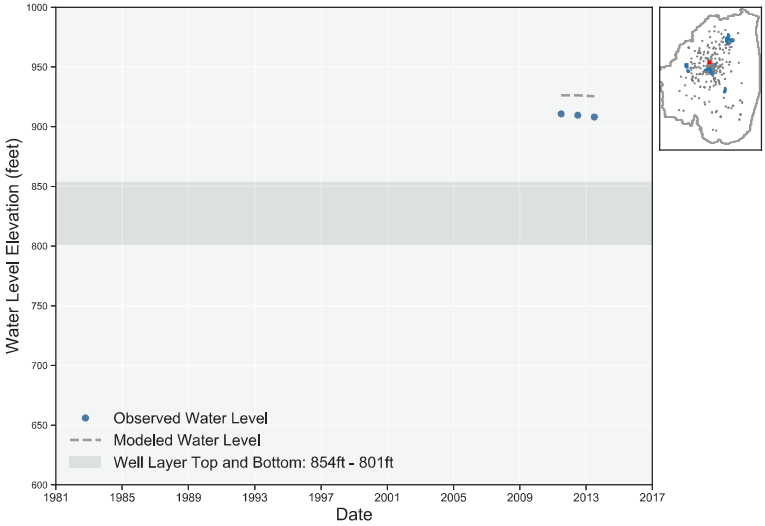

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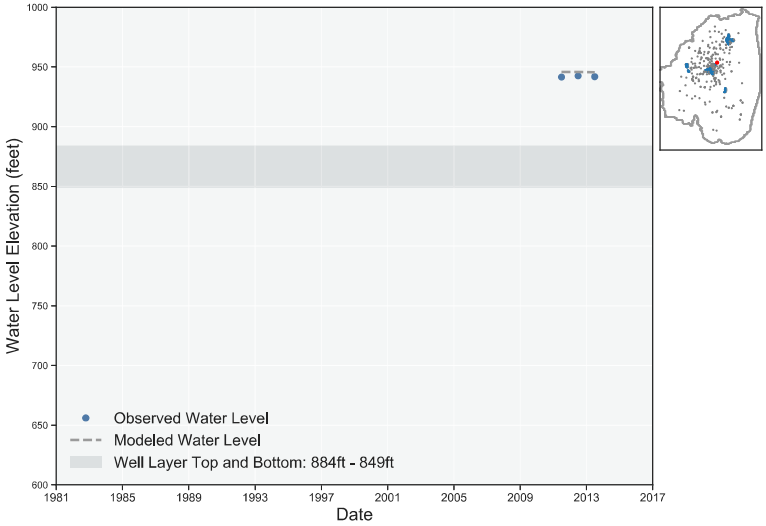
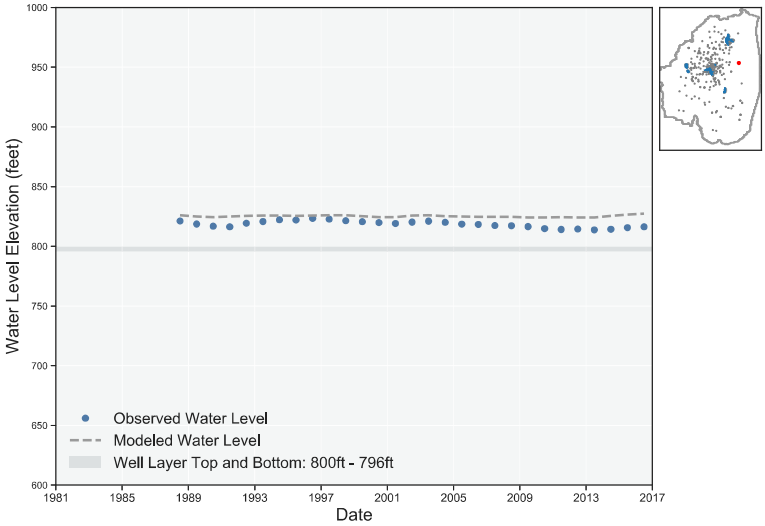


Well 82024 - Aq: QBAA Layers: 5 - 5



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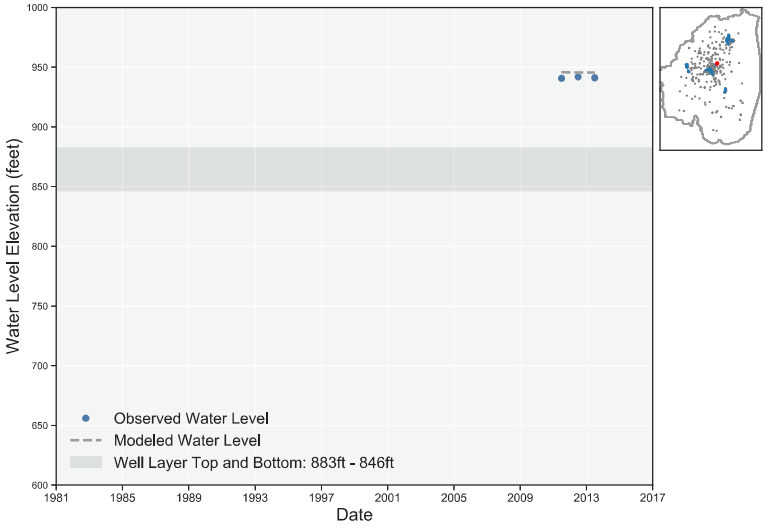

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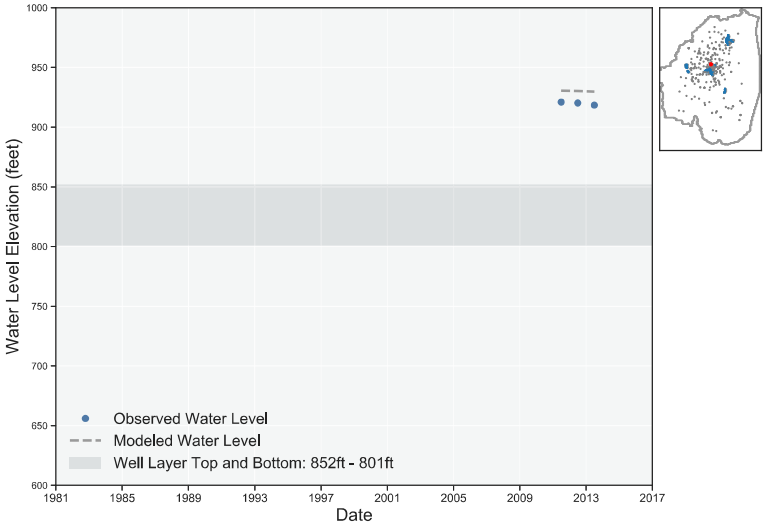
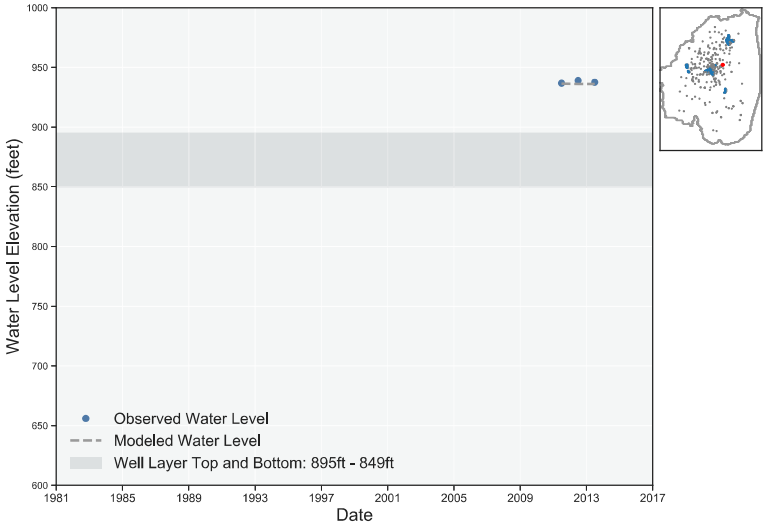


Well 437320 - Aq: OPDC Layers: 5 - 5



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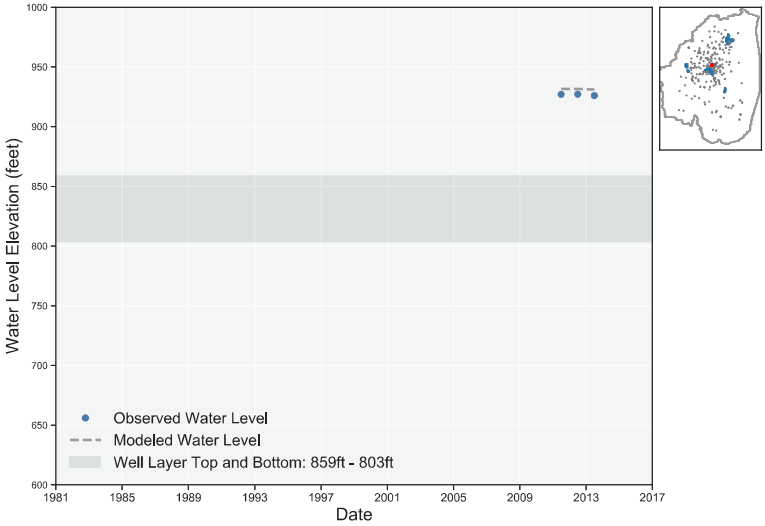

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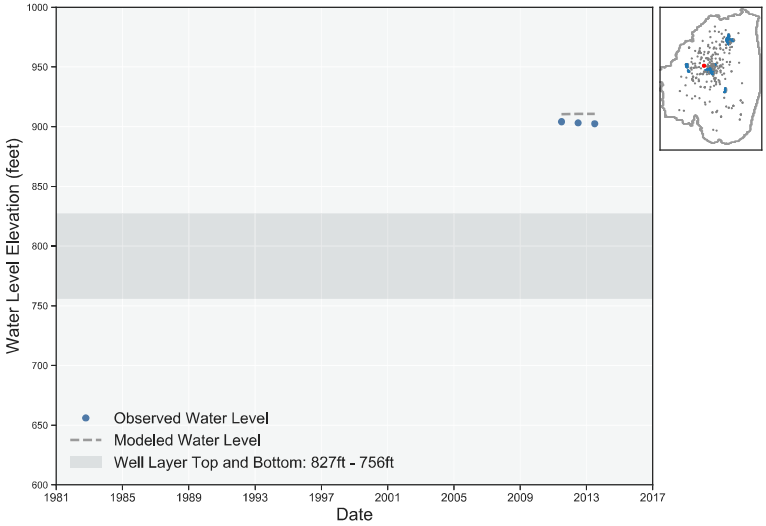

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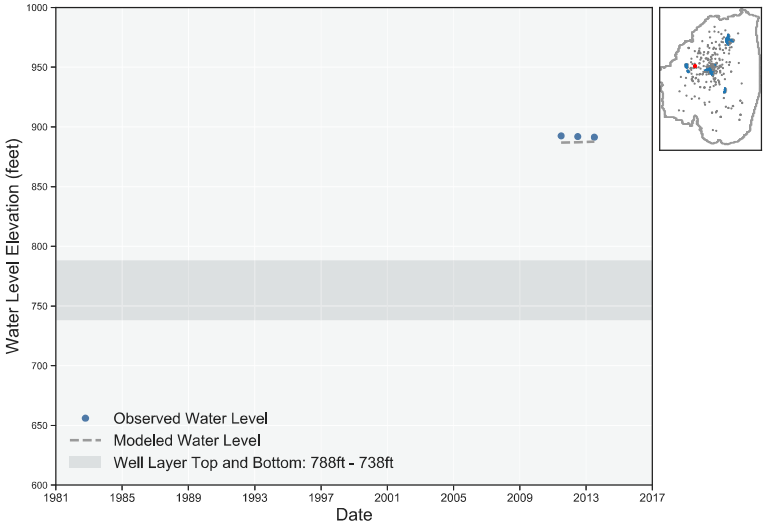

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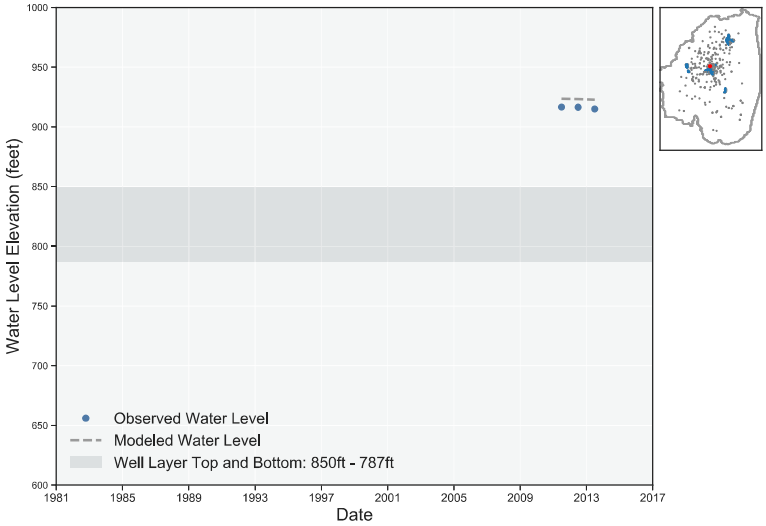

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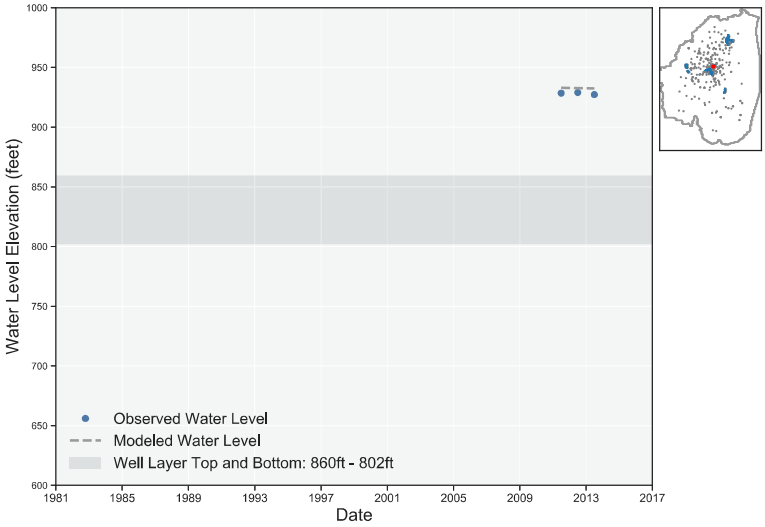

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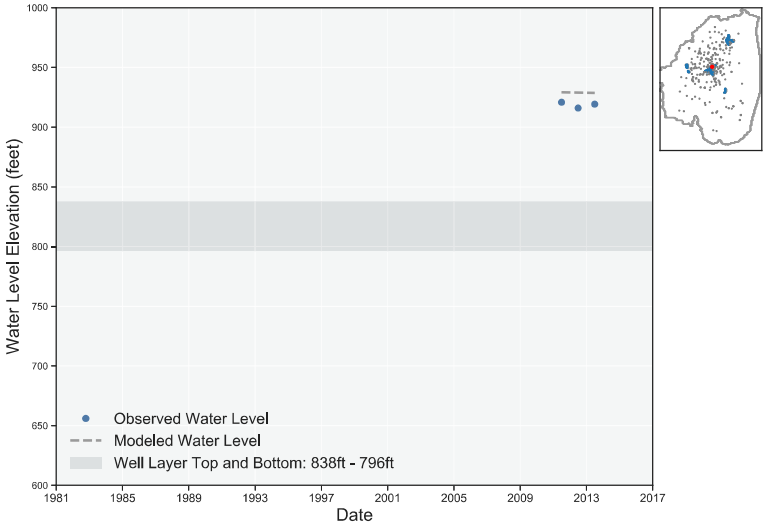
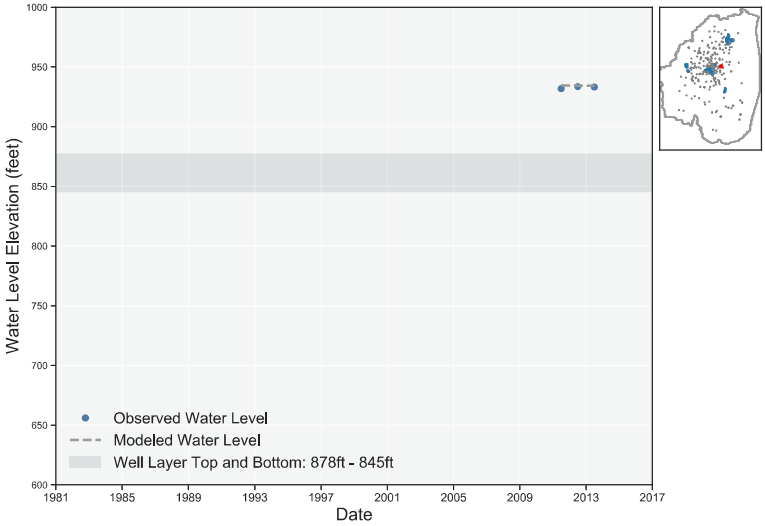


Well 163703 - Aq: OSTP Layers: 5 - 5



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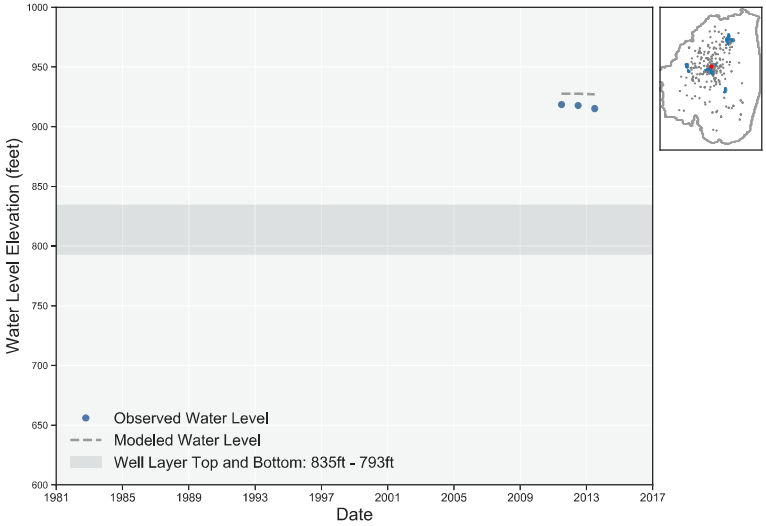

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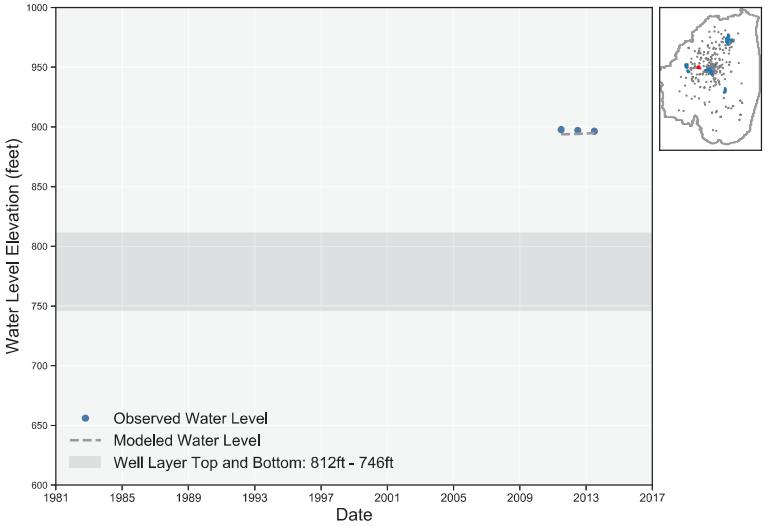
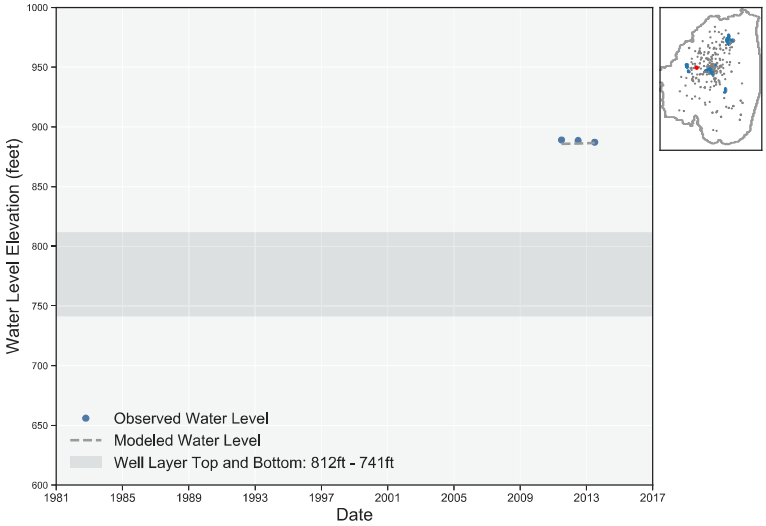


Well 205720 - Aq: OSTP Layers: 5 - 5



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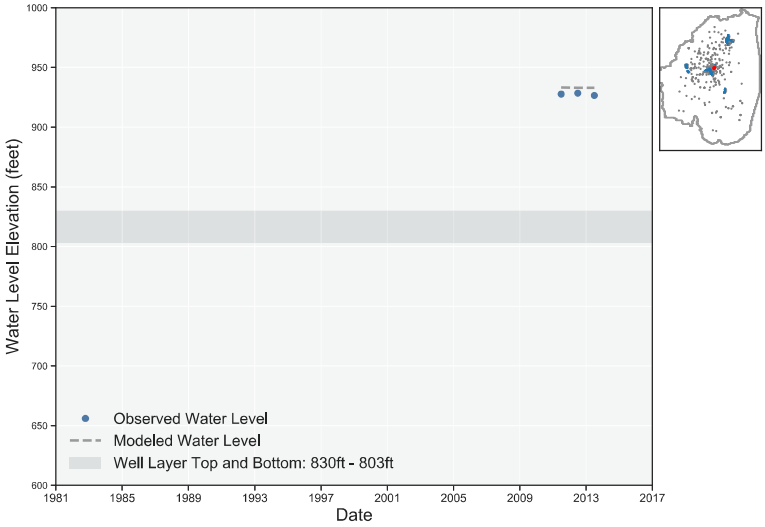

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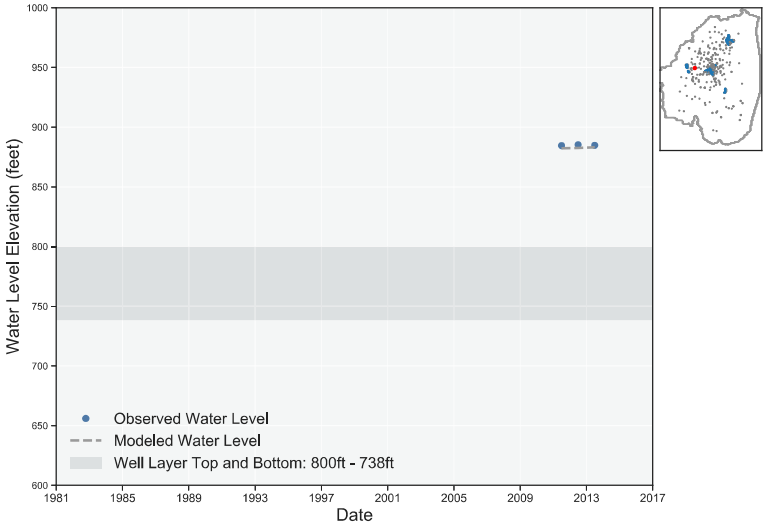

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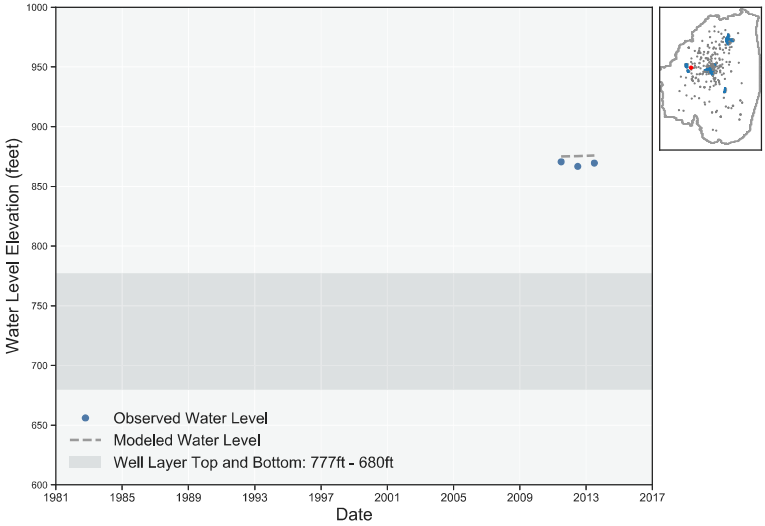

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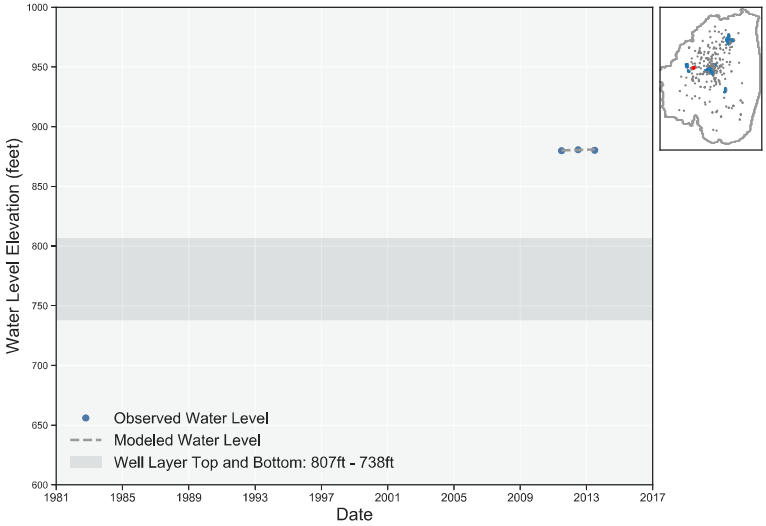

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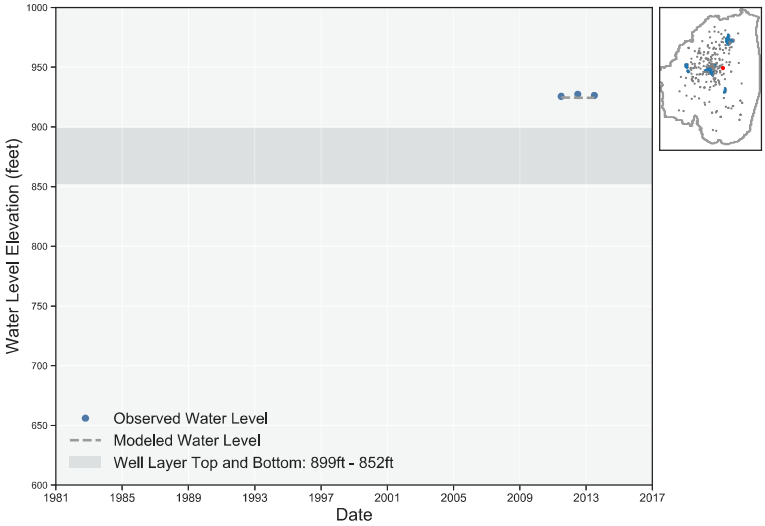
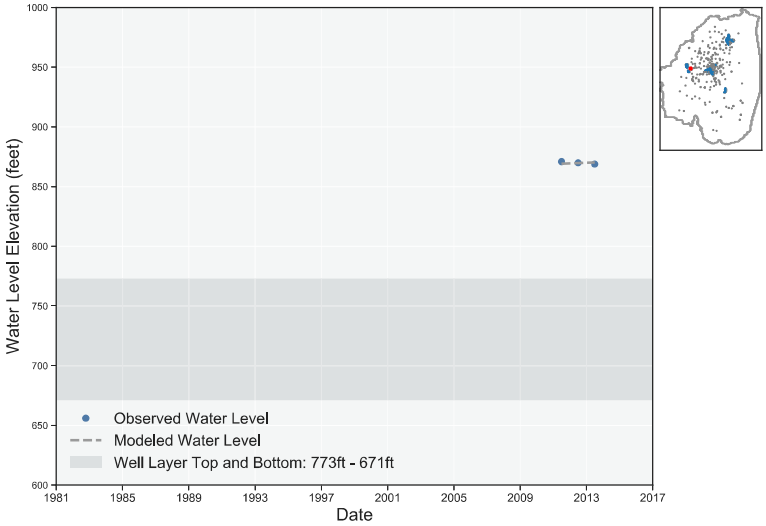


Well 436585 - Aq: QBAA Layers: 5 - 5



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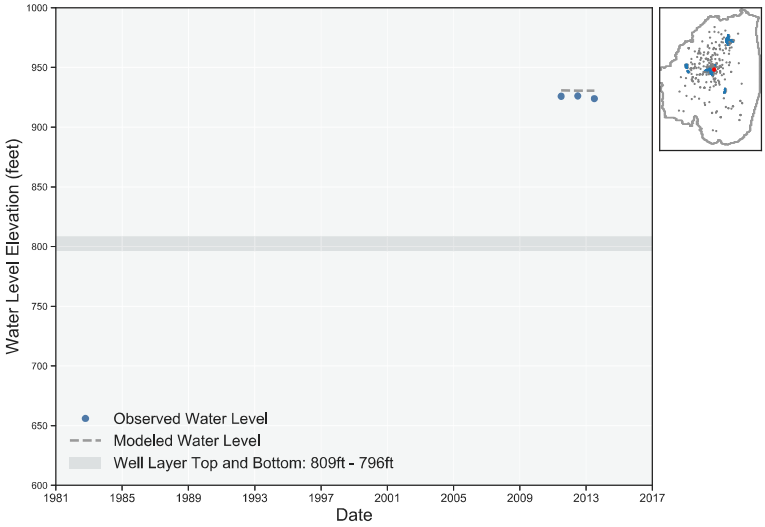

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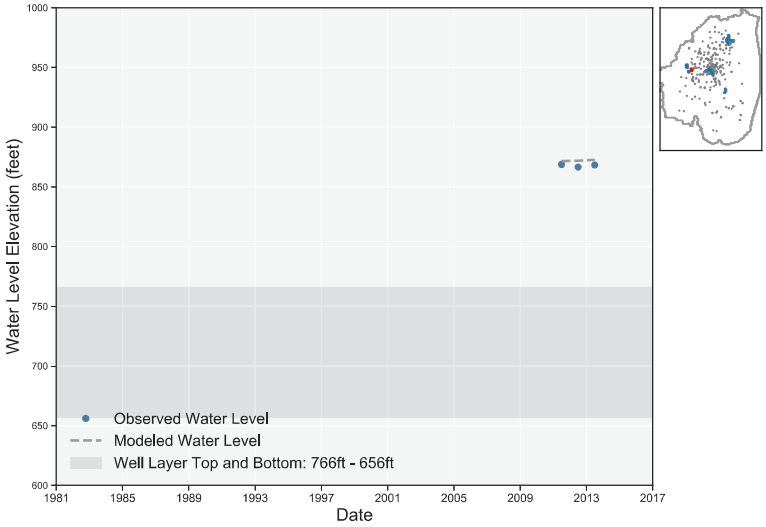

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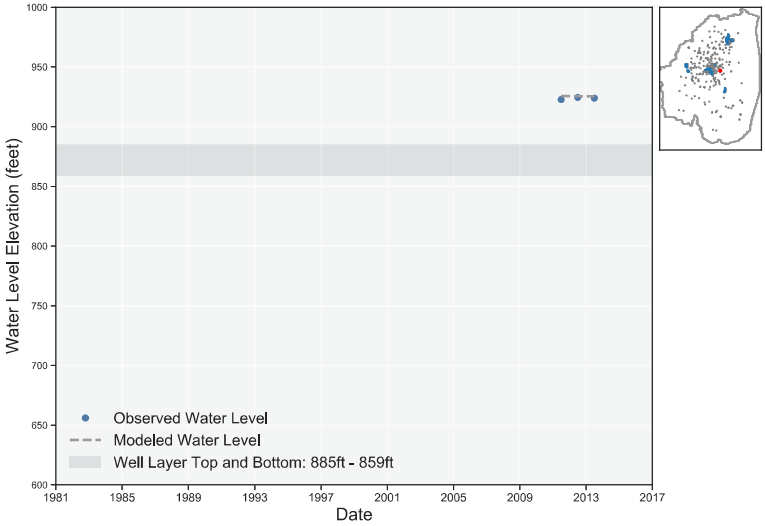

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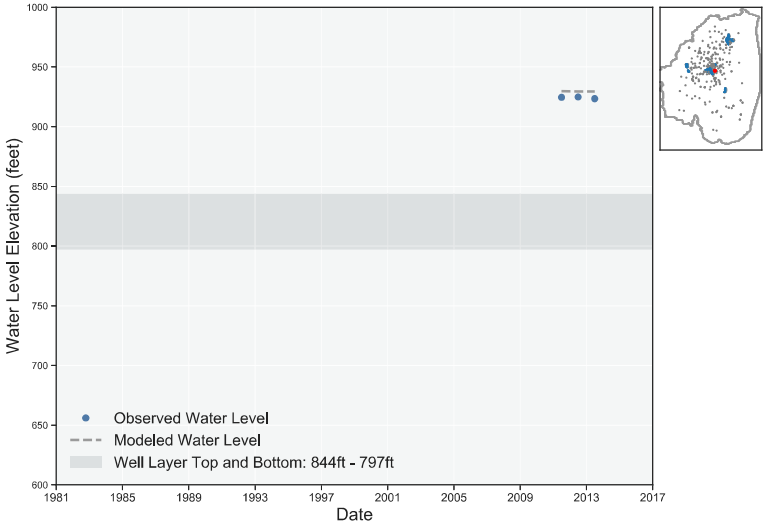

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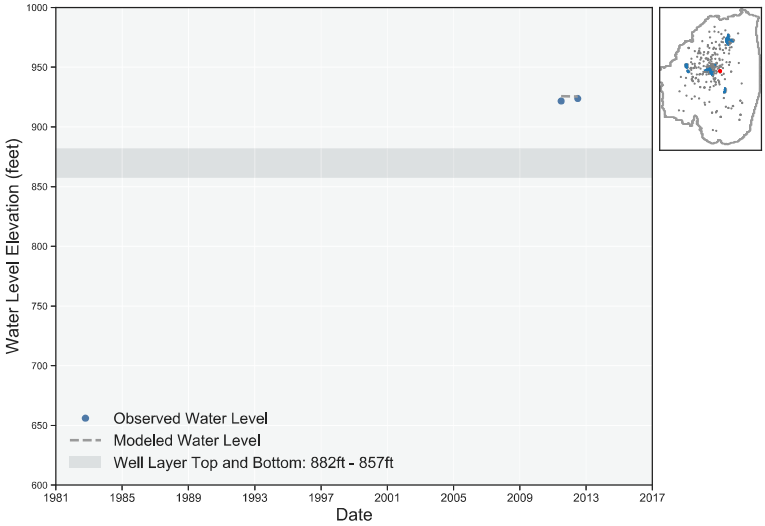

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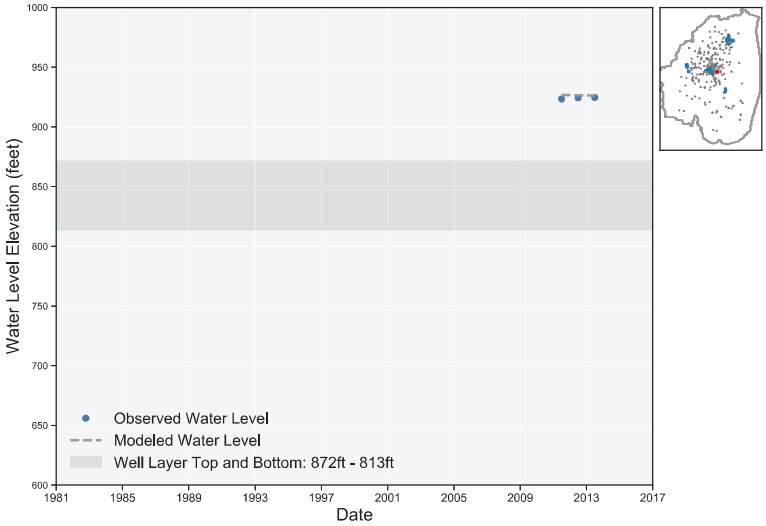

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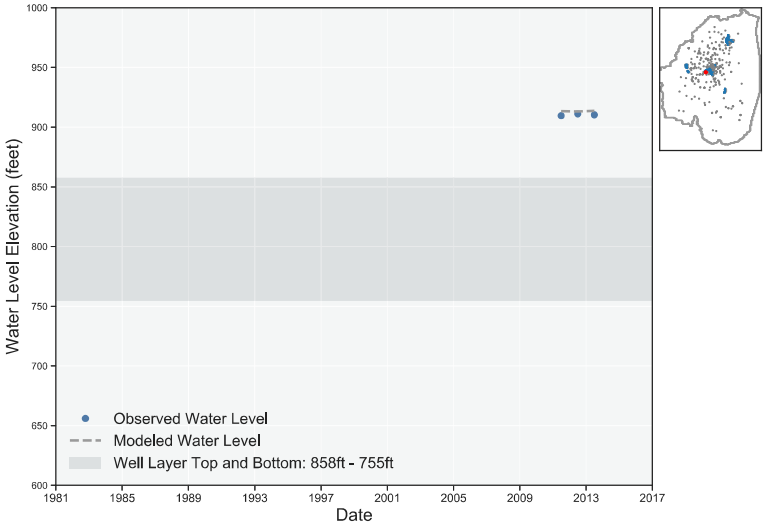

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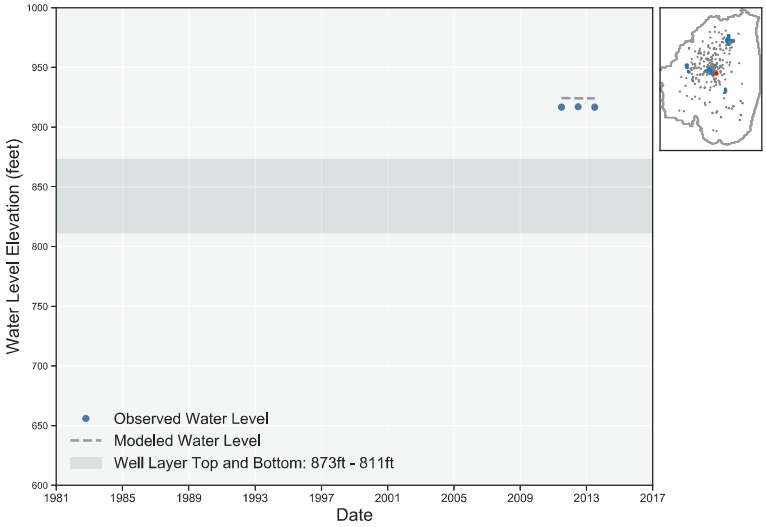

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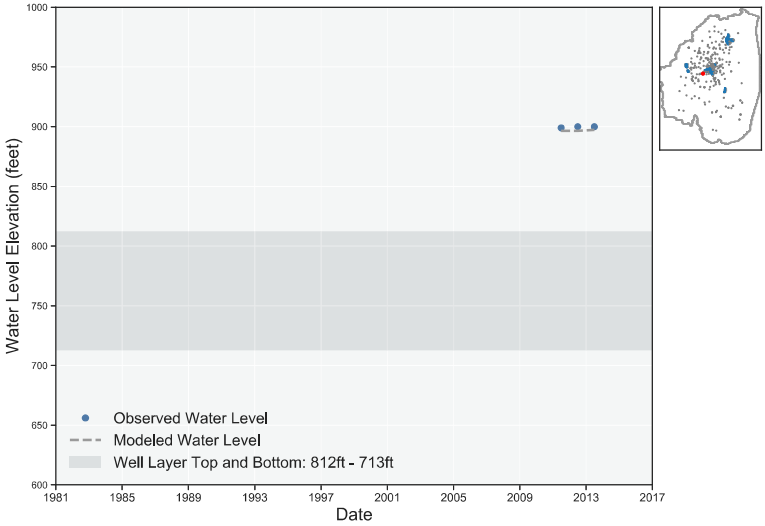

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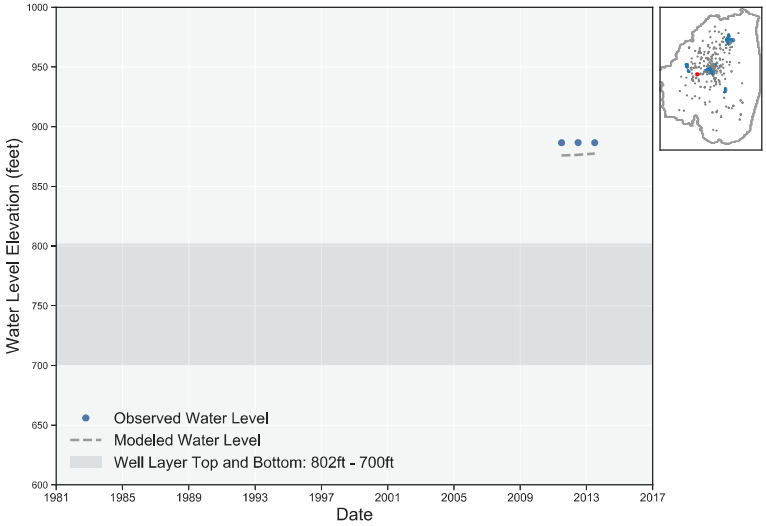
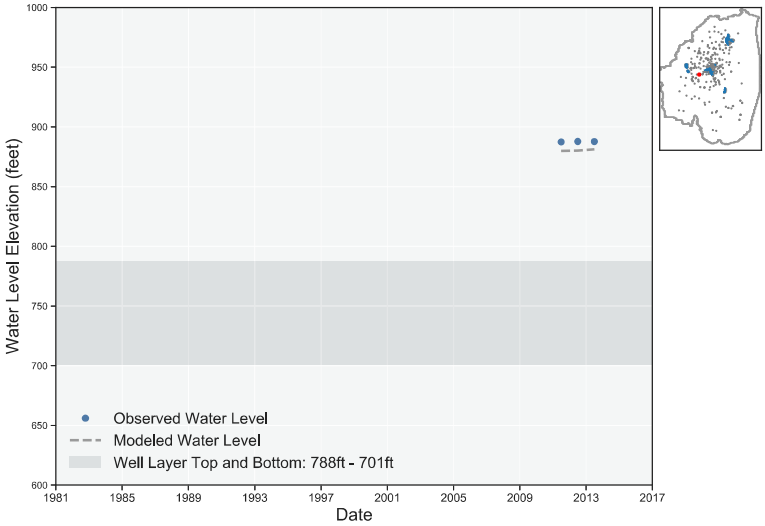
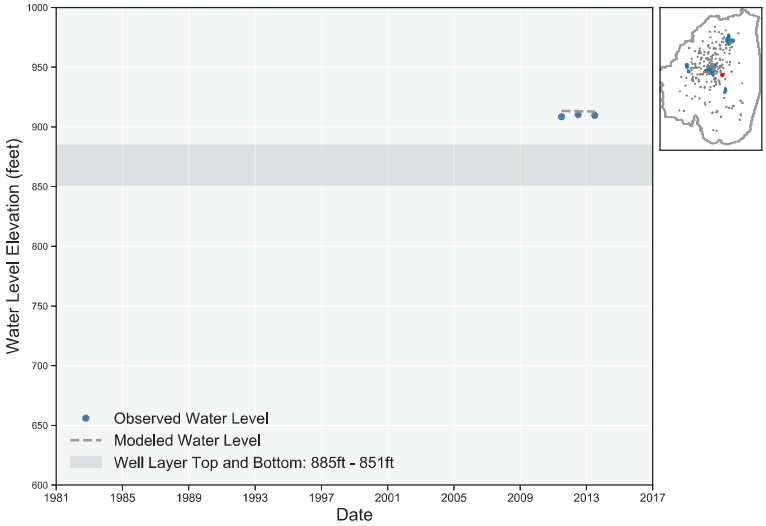


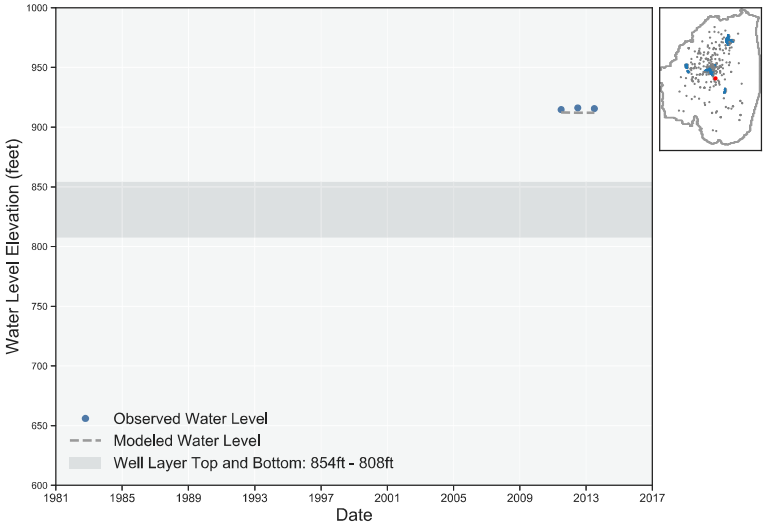
Well 448228 - Aq: QBAA Layers: 5 - 5



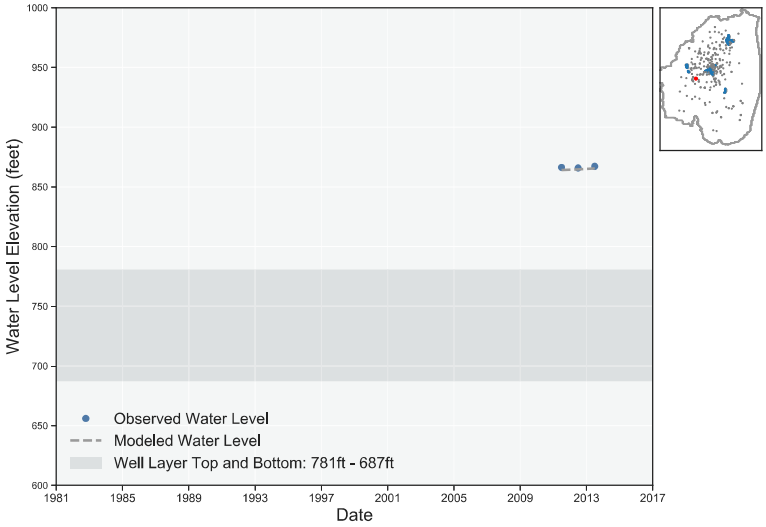
Well 130876 - Aq: OSTP Layers: 5 - 5



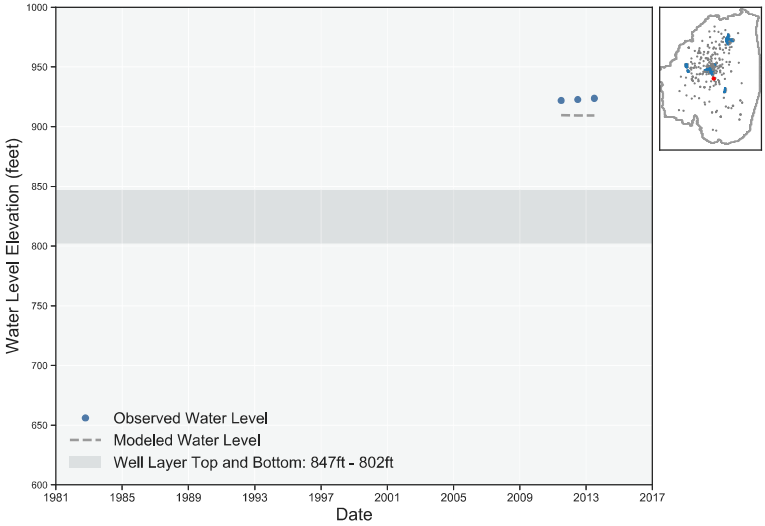
Well 175041 - Aq: OSTP Layers: 5 - 5



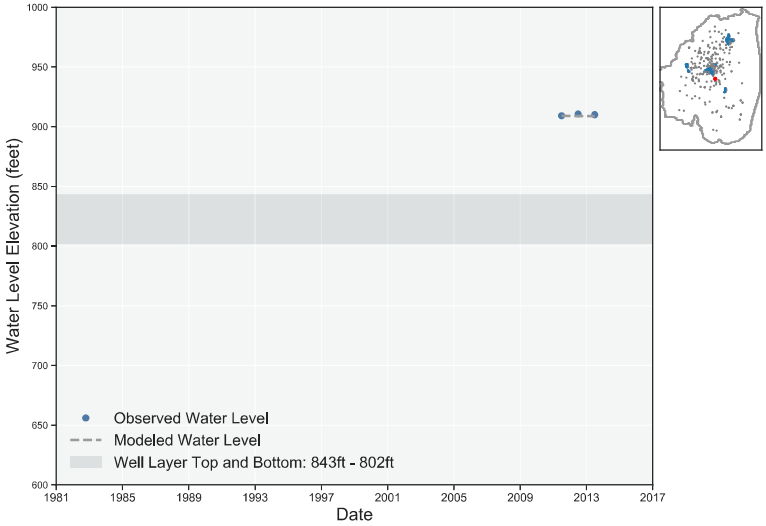
Well 138190 - Aq: OSTP Layers: 5 - 5



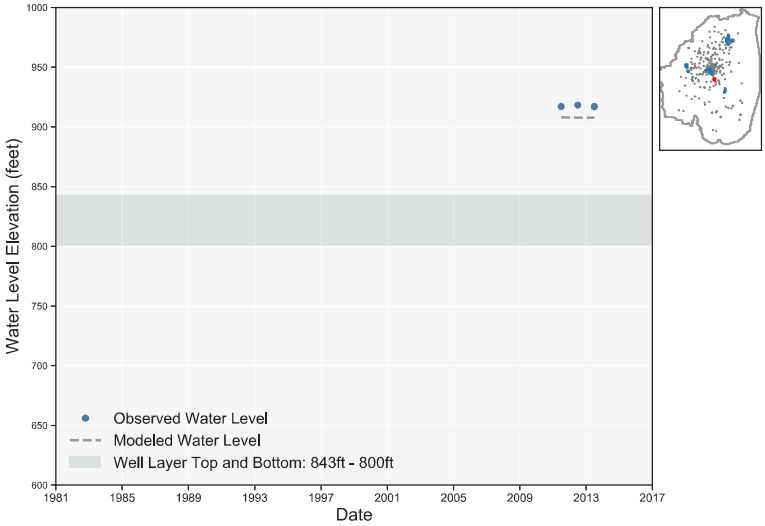
Well 138727 - Aq: OSTP Layers: 5 - 5



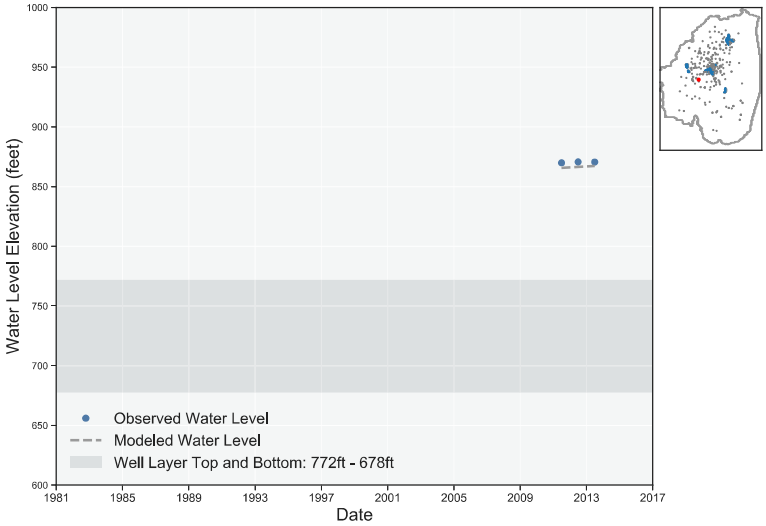
Well 418556 - Aq: OSTP Layers: 5 - 5



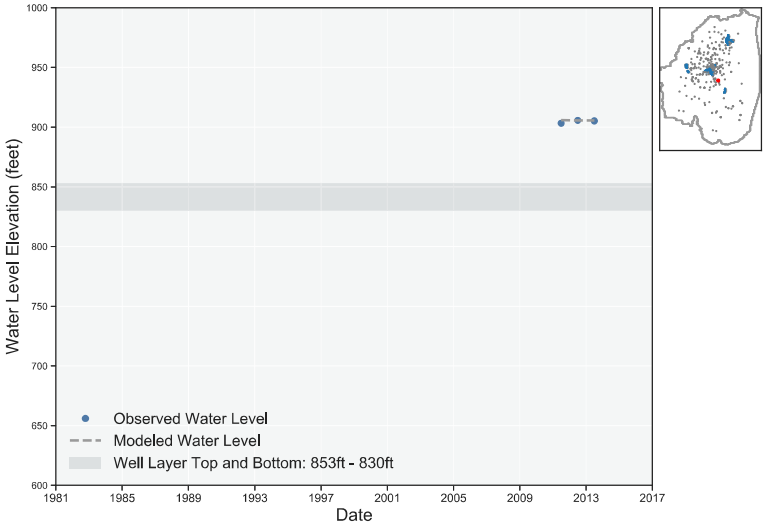
Well 127569 - Aq: OSTP Layers: 5 - 5



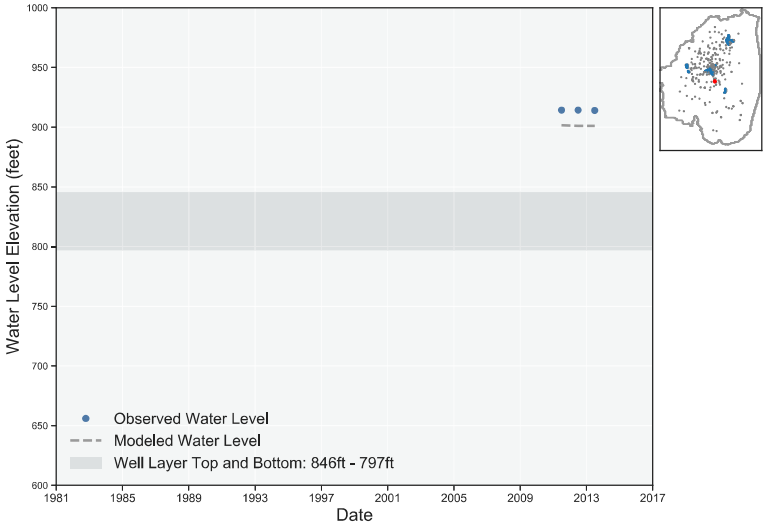
Well 130905 - Aq: OSTP Layers: 5 - 5



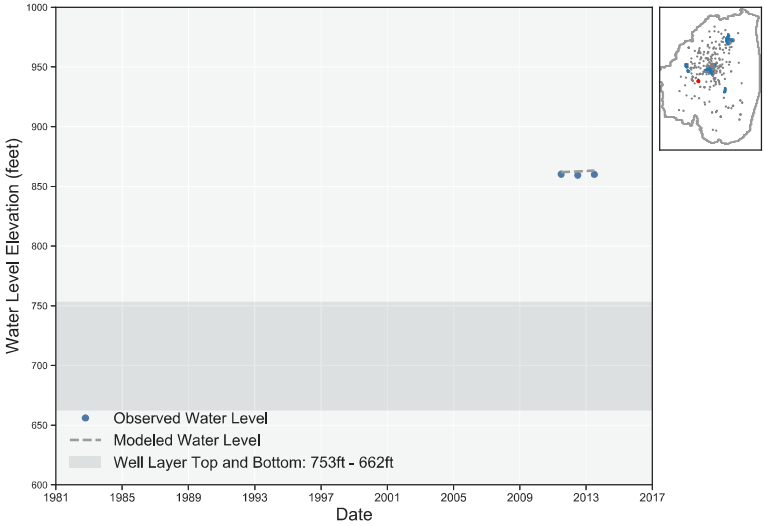
Well 410169 - Aq: OSTP Layers: 5 - 5



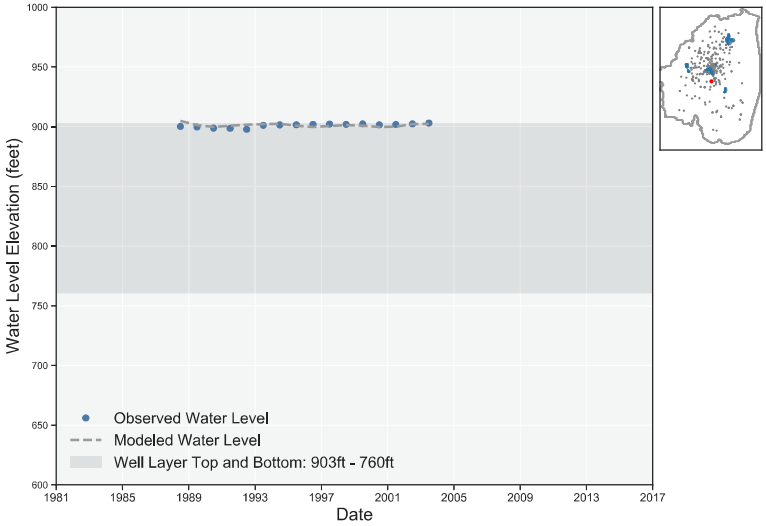
Well 153486 - Aq: QBAA Layers: 5 - 5



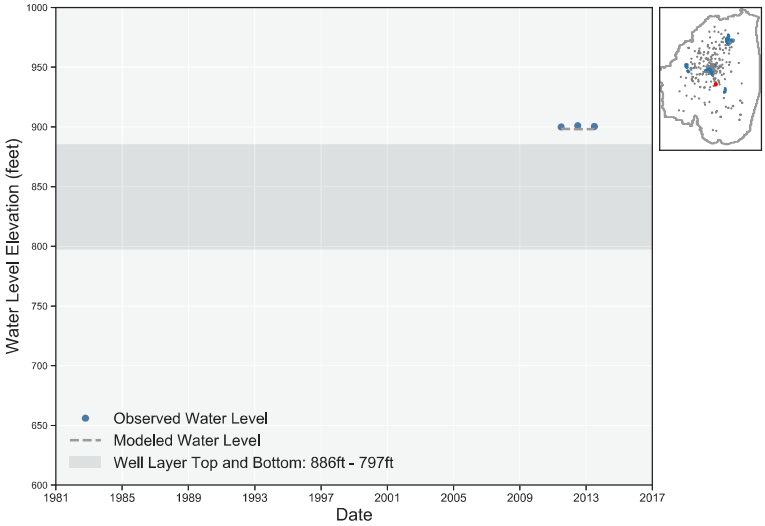
Well 112571 - Aq: OSTP Layers: 5 - 5



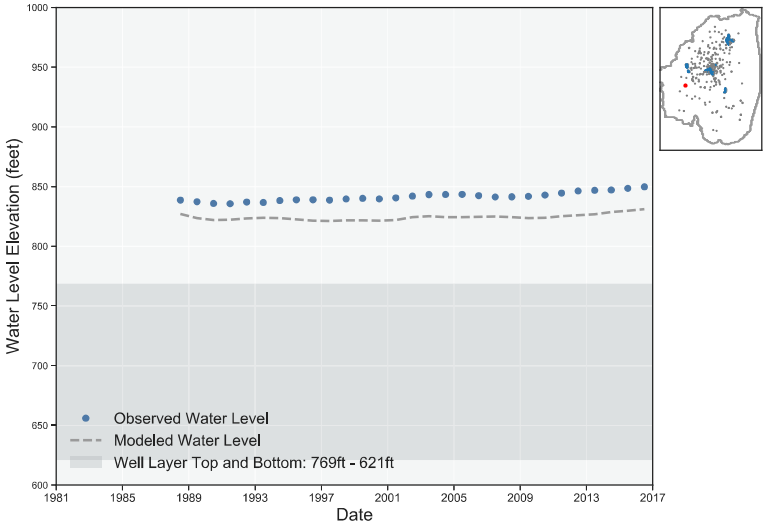
Well 82005 - Aq: OSTP Layers: 5 - 5



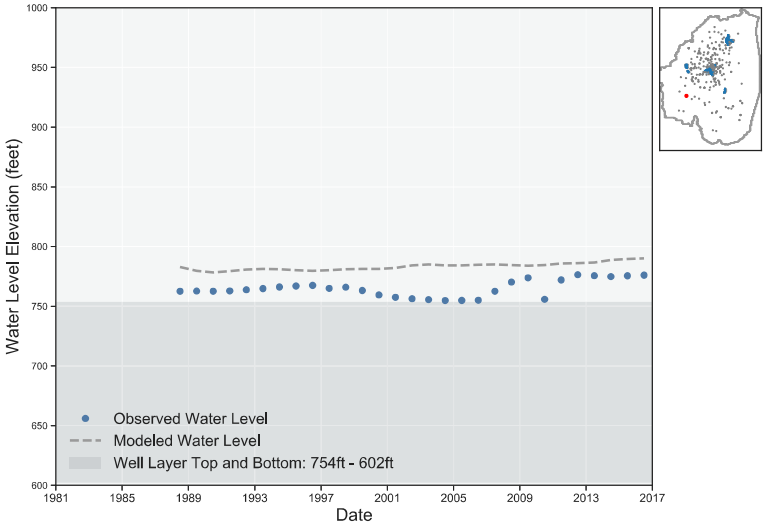
Well 421213 - Aq: OSTP Layers: 5 - 5



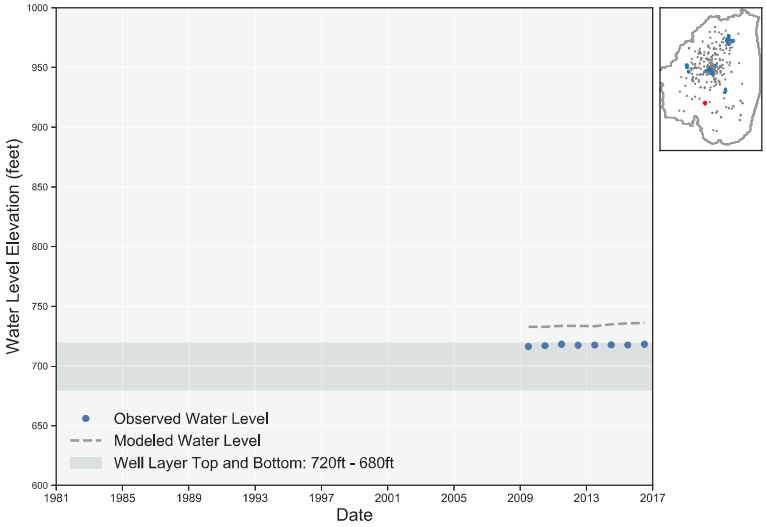
Well 62002 - Aq: OSTP Layers: 5 - 5



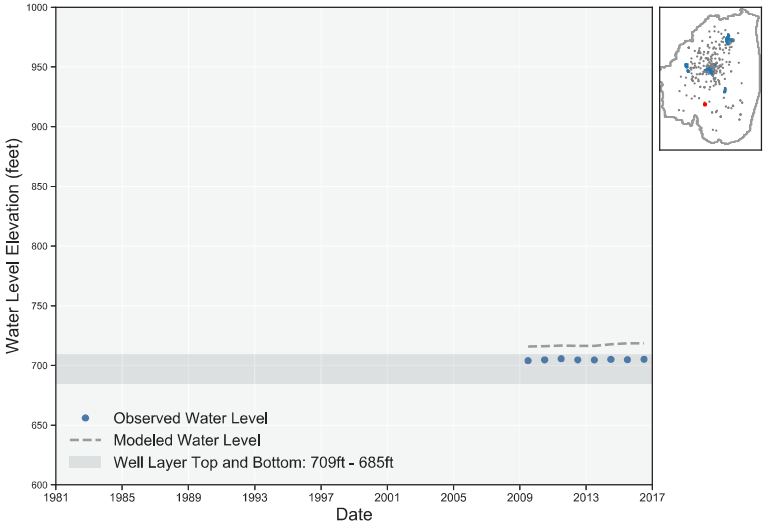
Well 62034 - Aq: OSTP Layers: 5 - 5



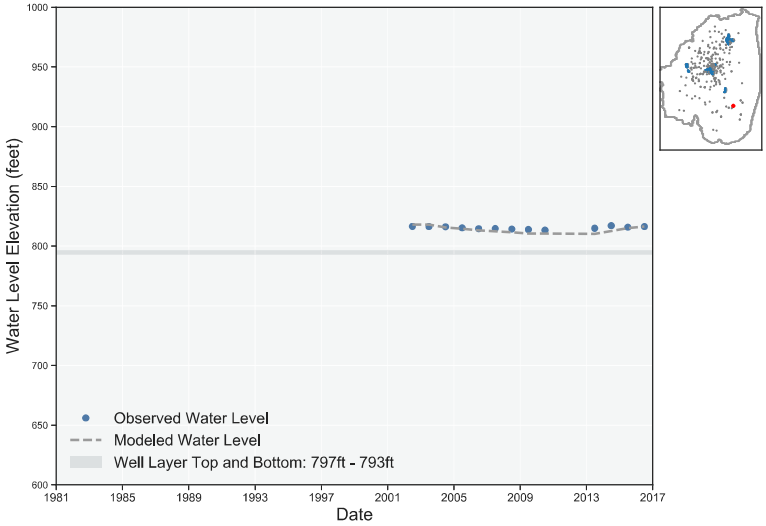
Well 62050 - Aq: OSTP Layers: 5 - 5



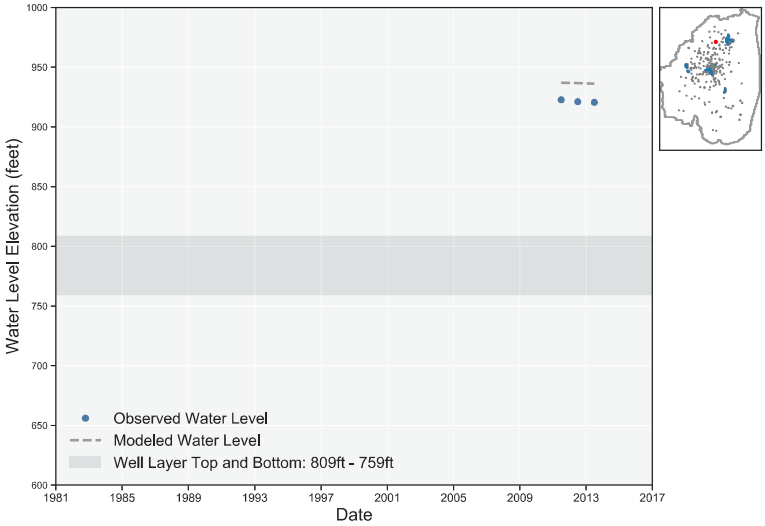
Well 62051 - Aq: OSTP Layers: 5 - 5



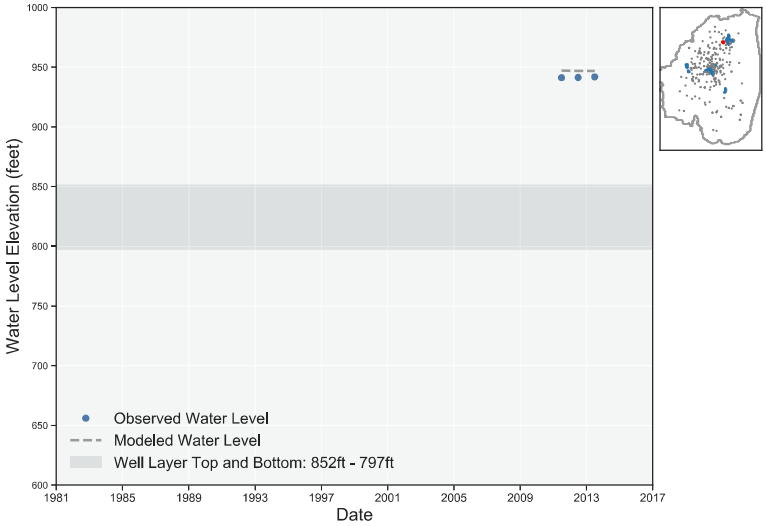
Well 675586 - Aq: QWTA Layers: 5 - 5



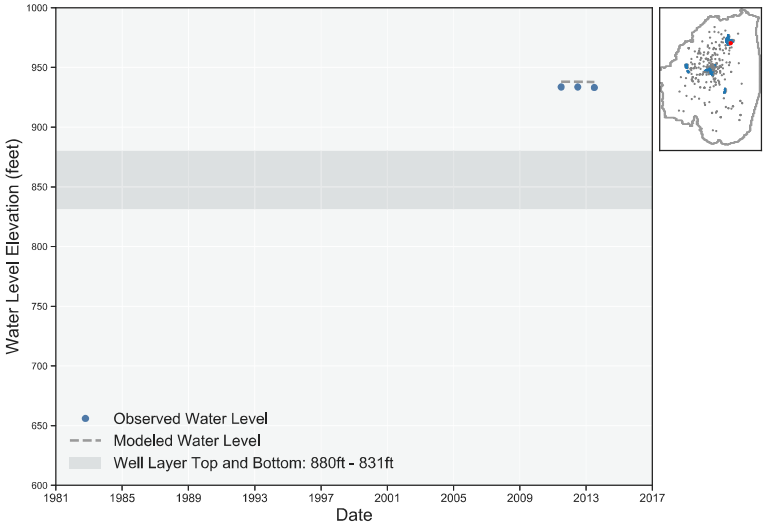
Well 419114 - Aq: OPDC Layers: 6 - 6



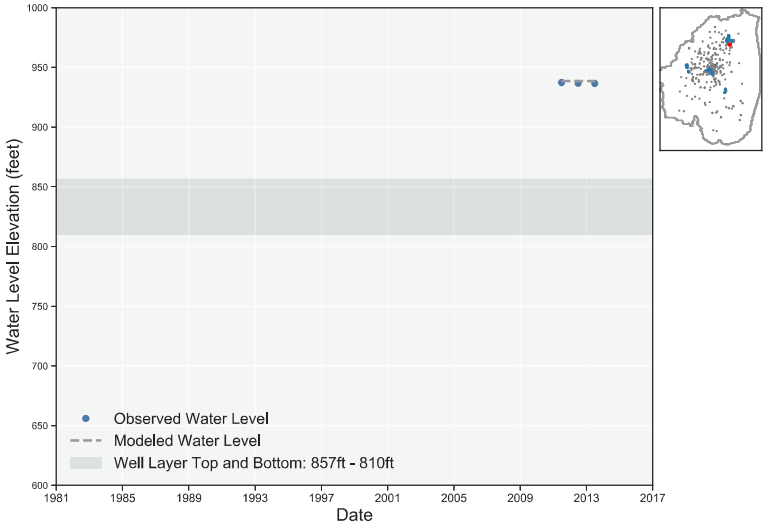
Well 411647 - Aq: OPDC Layers: 6 - 6



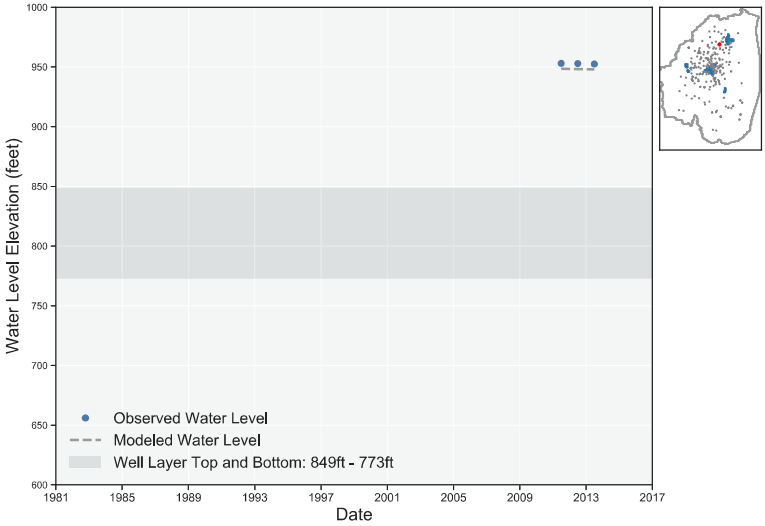
Well 153473 - Aq: OPDC Layers: 6 - 6



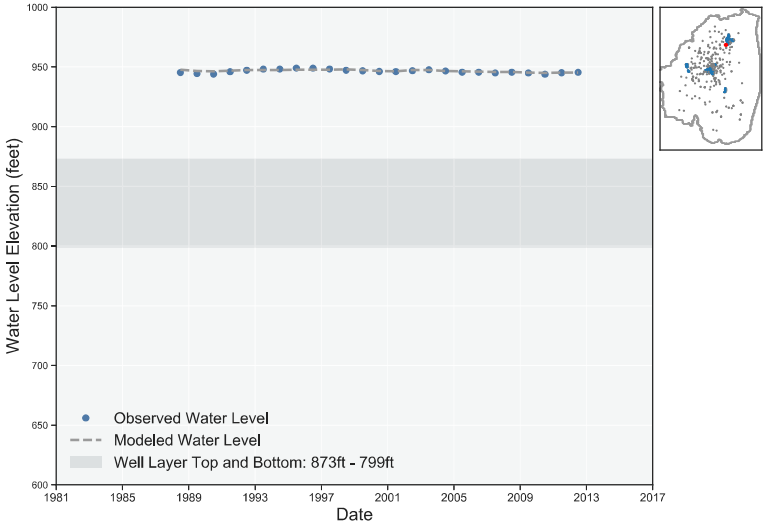
Well 435109 - Aq: OPDC Layers: 6 - 6



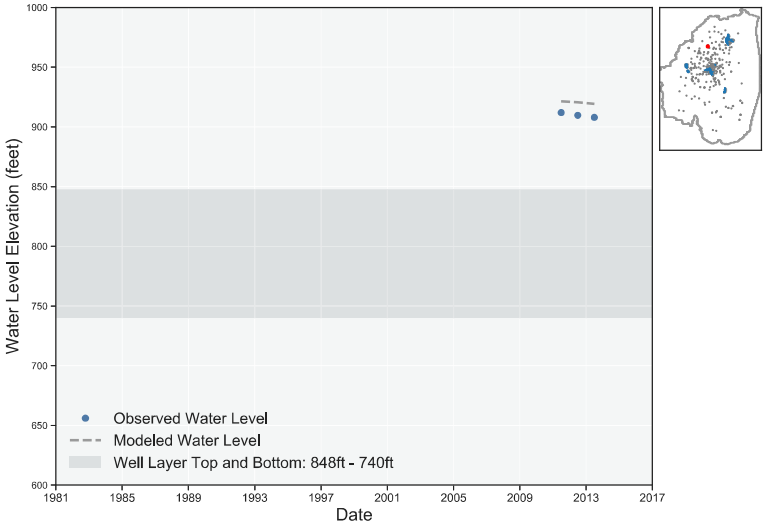
Well 450385 - Aq: OPDC Layers: 6 - 6



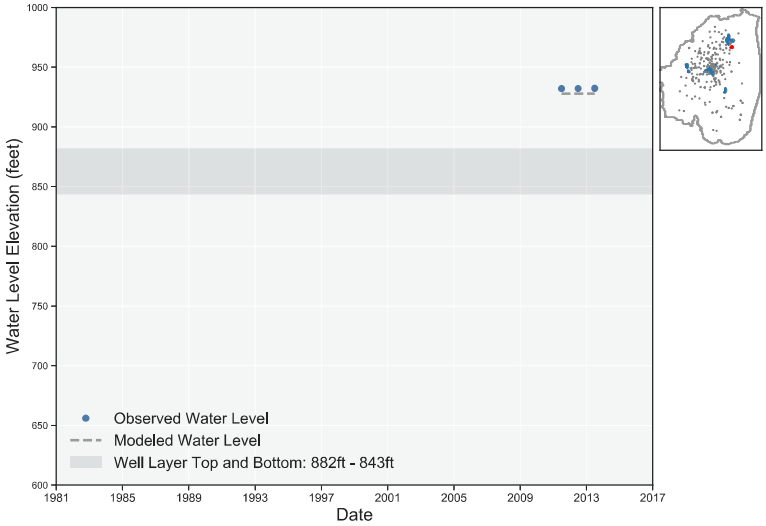
Well 82035 - Aq: OPDC Layers: 6 - 6



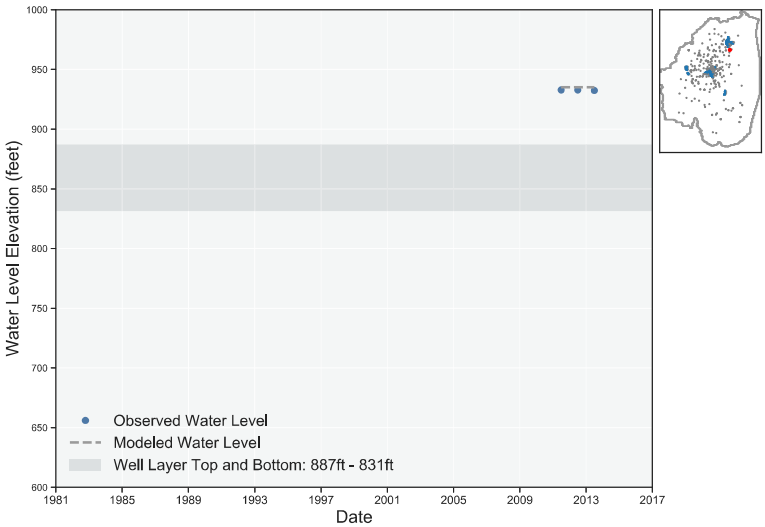
Well 430927 - Aq: OPDC Layers: 6 - 6



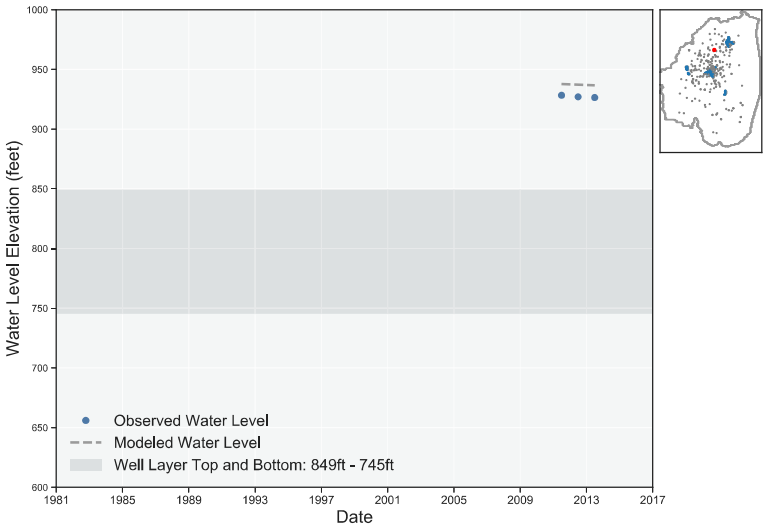
Well 435046 - Aq: OPDC Layers: 6 - 6



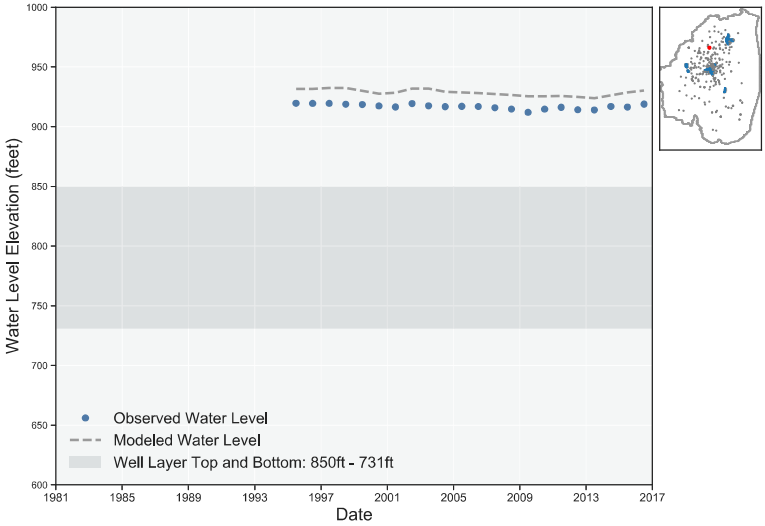
Well 422349 - Aq: OPDC Layers: 6 - 6



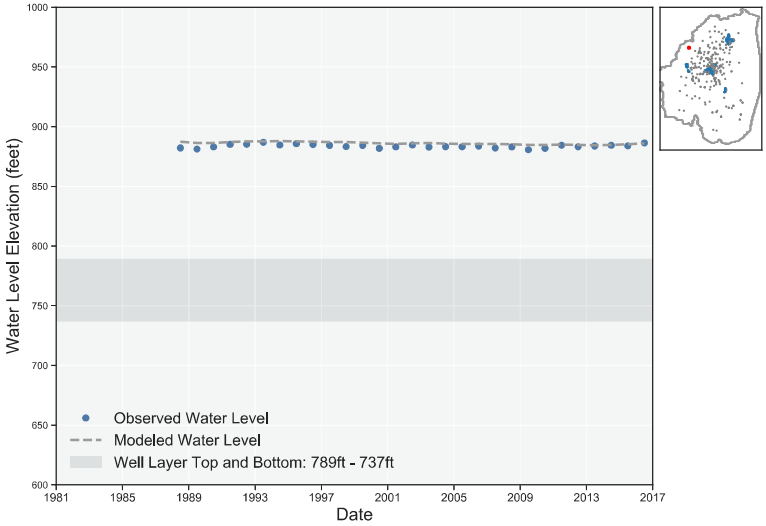
Well 513467 - Aq: OPDC Layers: 6 - 6



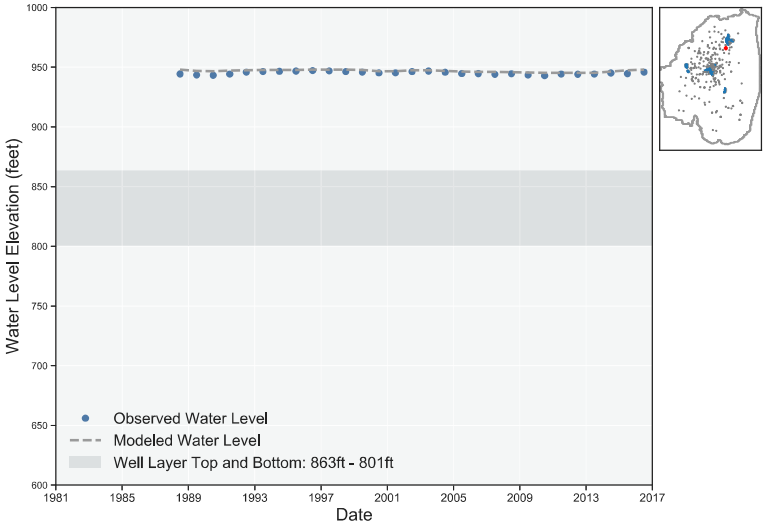
Well 82040 - Aq: OPDC Layers: 6 - 6



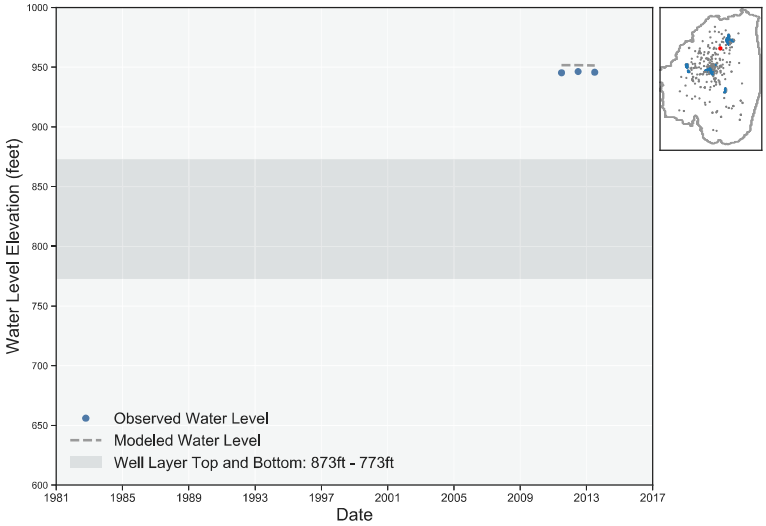
Well 2009 - Aq: QBAA Layers: 6 - 6



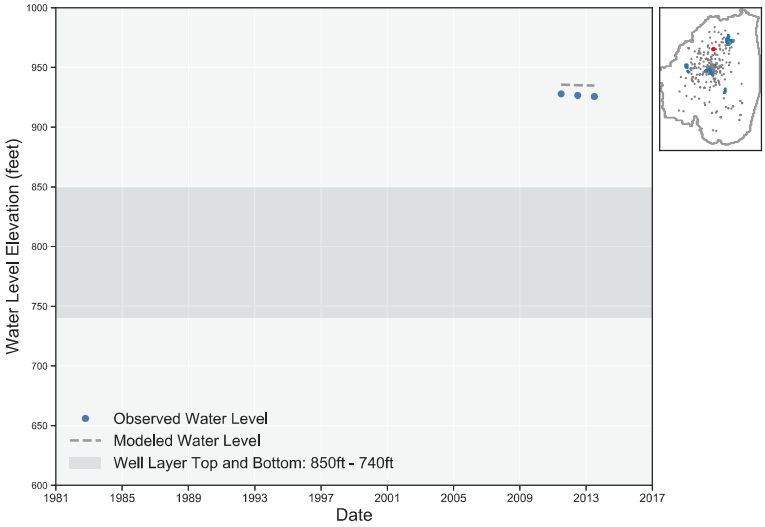
Well 82033 - Aq: OPDC Layers: 6 - 6



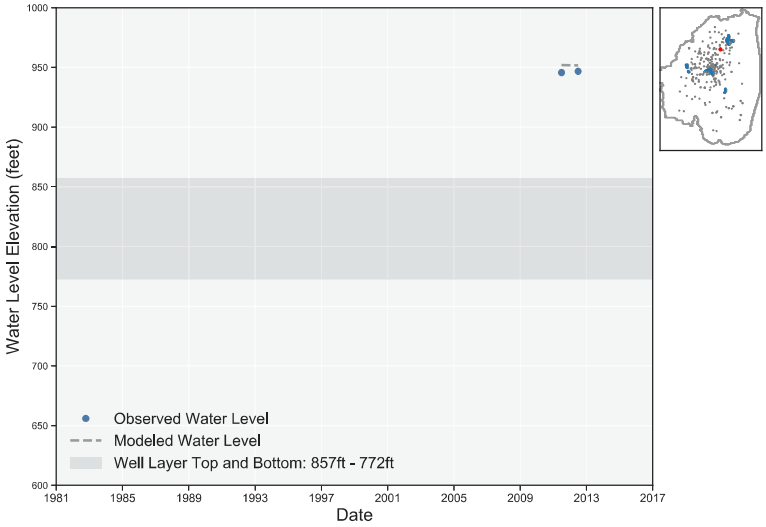
Well 196935 - Aq: OPDC Layers: 6 - 6



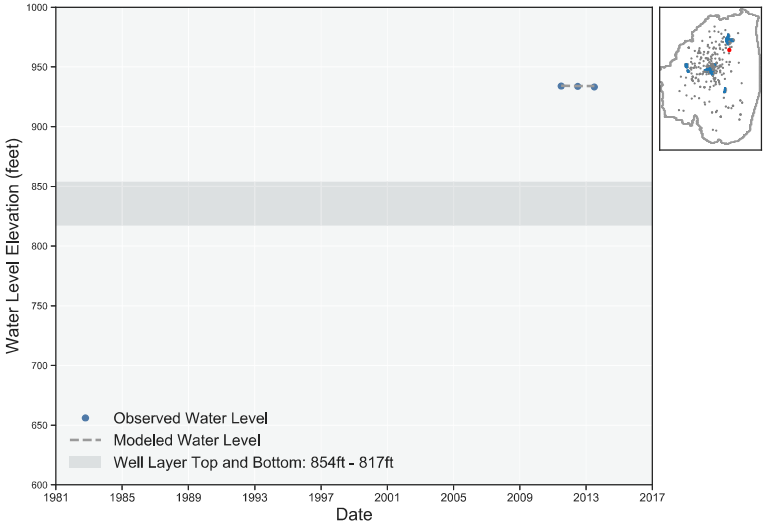
Well 110526 - Aq: OPDC Layers: 6 - 6



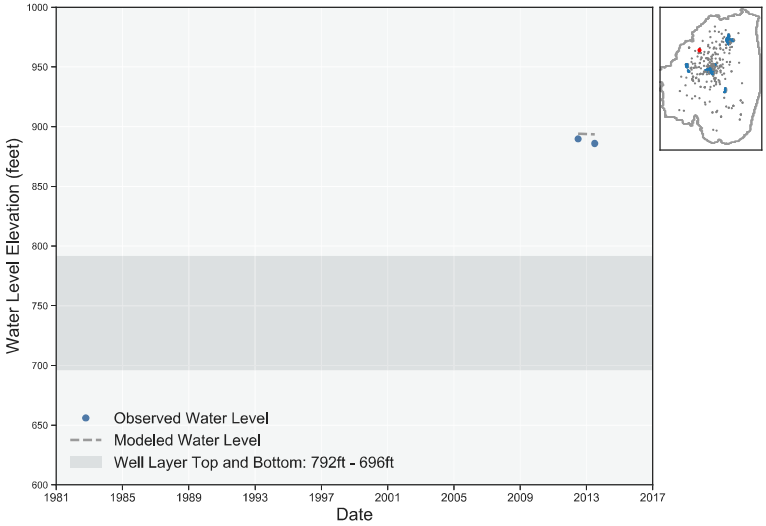
Well 418593 - Aq: OPDC Layers: 6 - 6



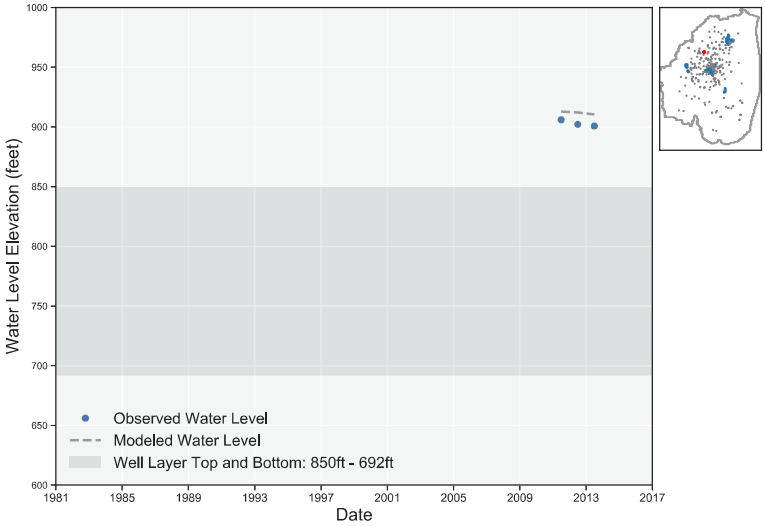
Well 430399 - Aq: OPDC Layers: 6 - 6



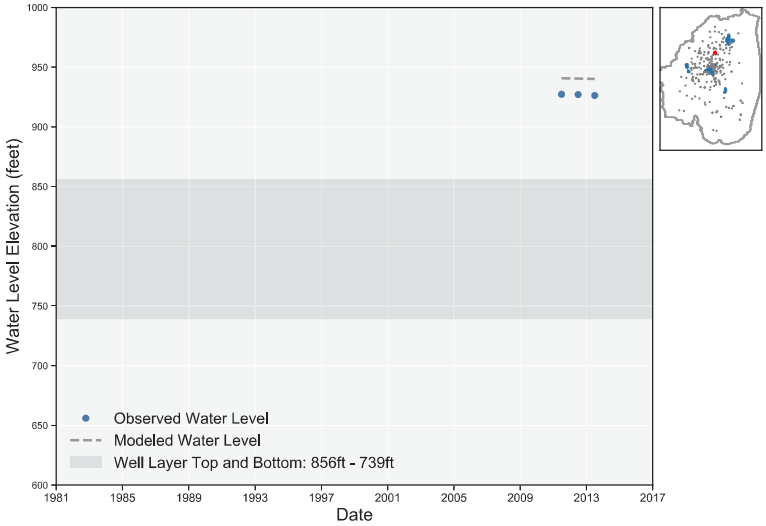
Well 188272 - Aq: OPDC Layers: 6 - 6



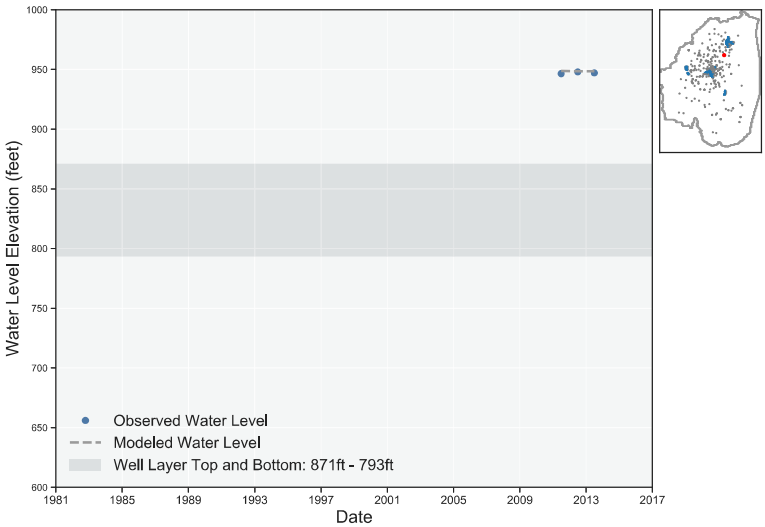
Well 524745 - Aq: OPDC Layers: 6 - 6



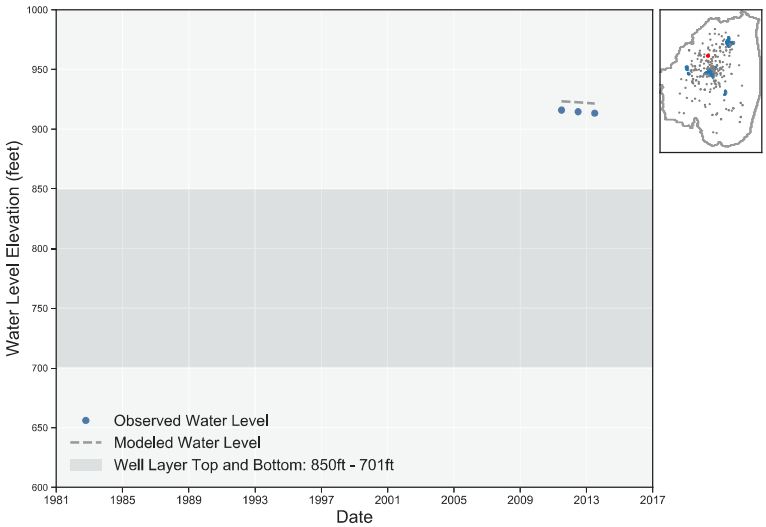
Well 558224 - Aq: OPDC Layers: 6 - 6



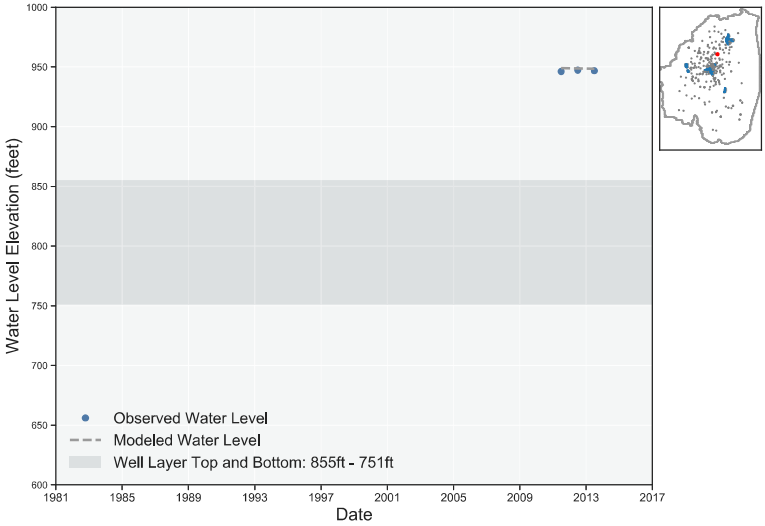
Well 420630 - Aq: OPDC Layers: 6 - 6



Well 427681 - Aq: OPDC Layers: 6 - 6

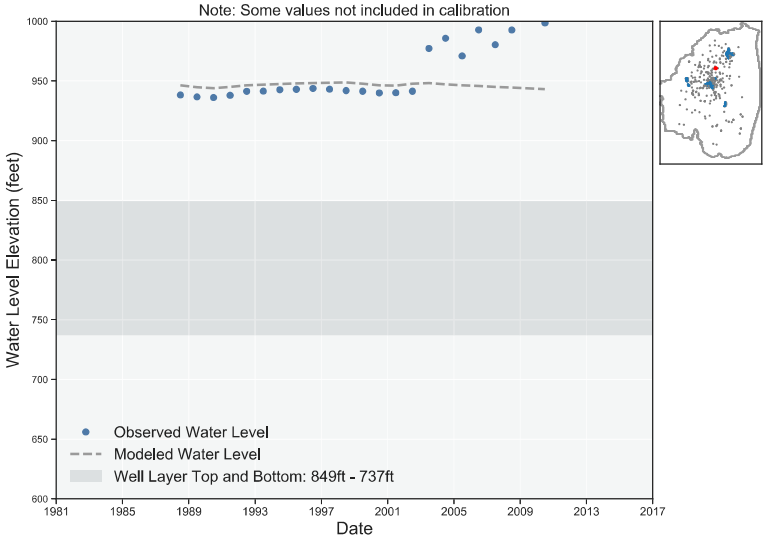


Well 430550 - Aq: OPDC Layers: 6 - 6

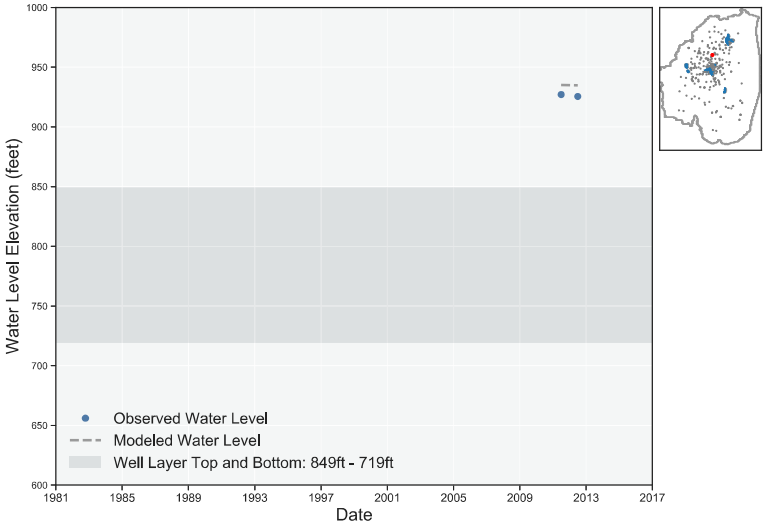


Well 82032 - Aq: OPDC Layers: 6 - 6

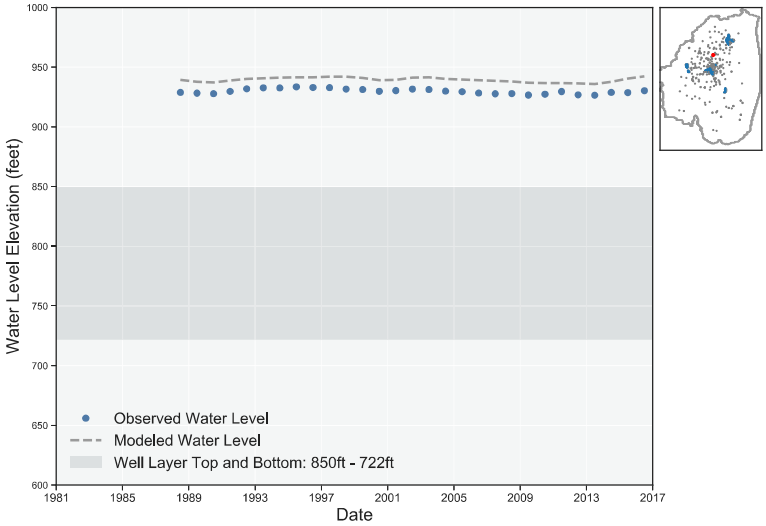
Note: Some values not included in calibration



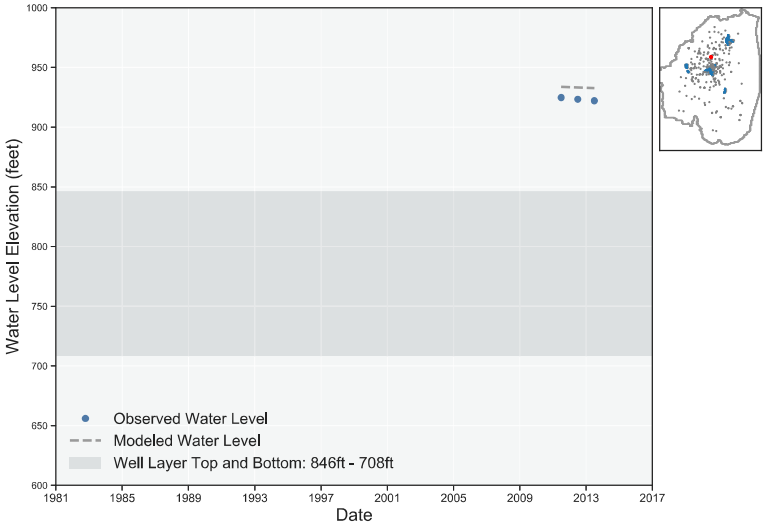
Well 713255 - Aq: OPDC Layers: 6 - 6



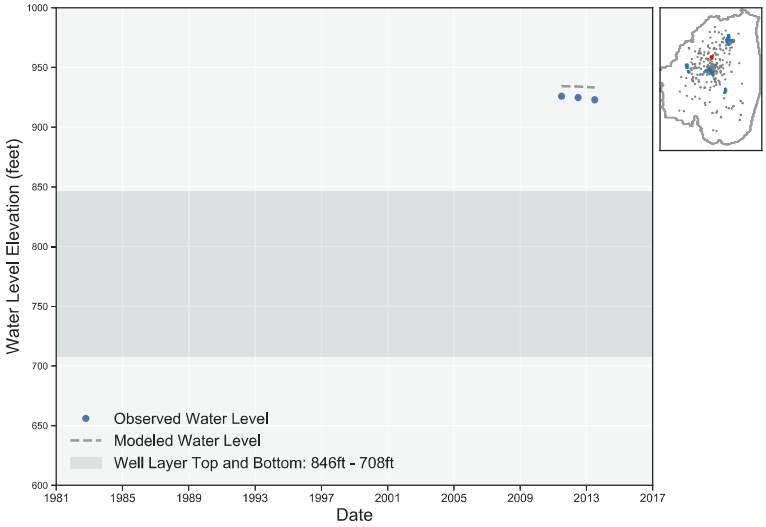
Well 82029 - Aq: OPDC Layers: 6 - 6



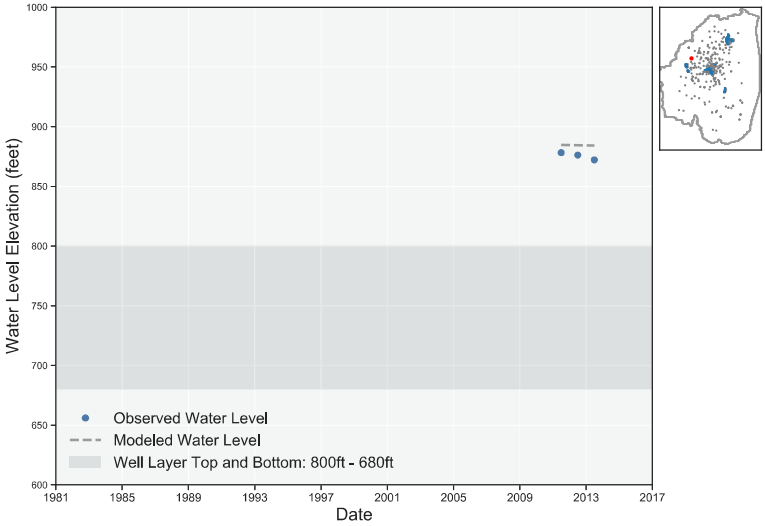
Well 141730 - Aq: OPDC Layers: 6 - 6



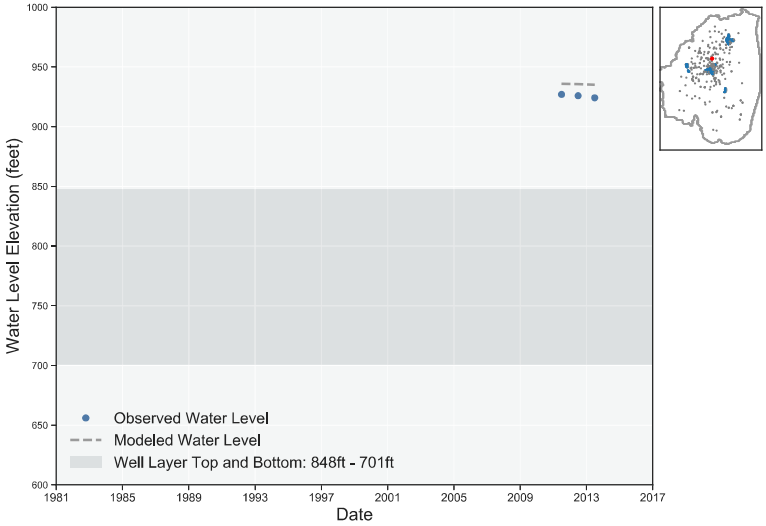
Well 138120 - Aq: OPDC Layers: 6 - 6



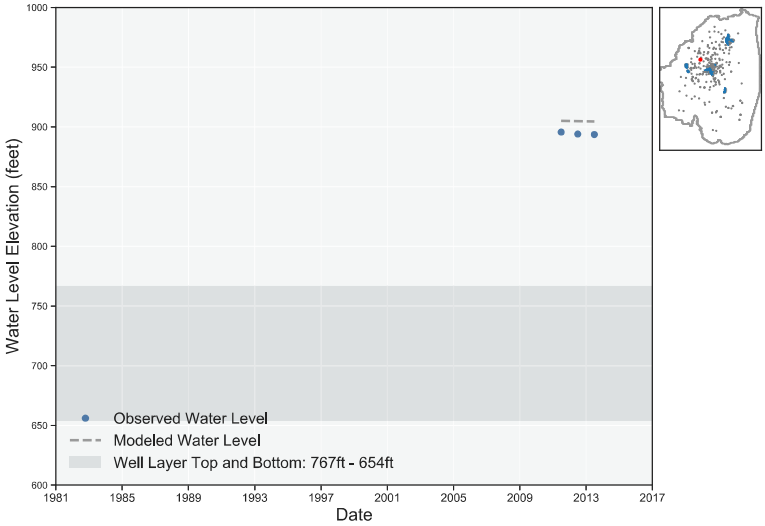
Well 170633 - Aq: OPDC Layers: 6 - 6



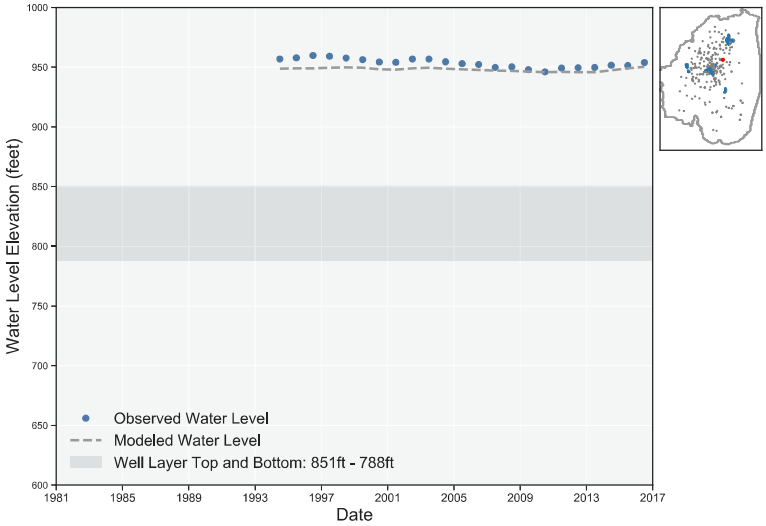
Well 439243 - Aq: OPDC Layers: 6 - 6



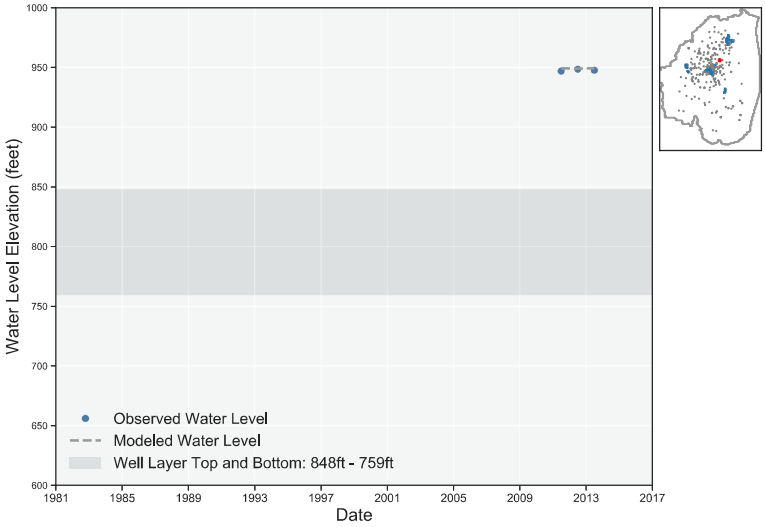
Well 138399 - Aq: OPDC Layers: 6 - 6



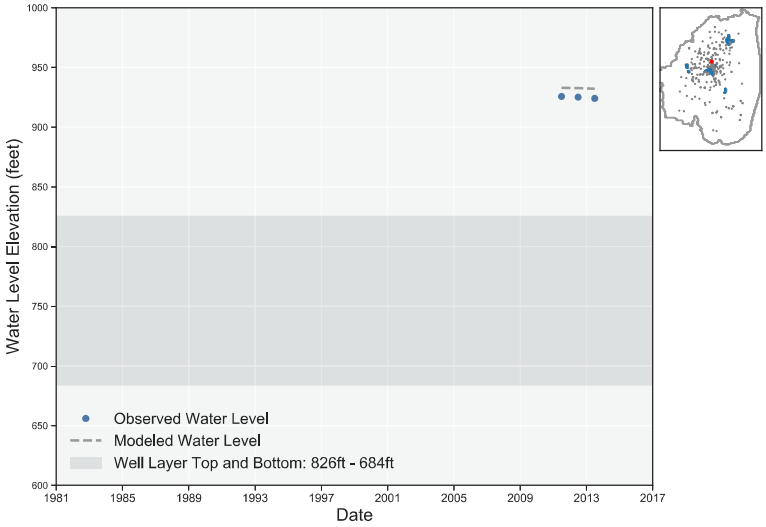
Well 82039 - Aq: OPDC Layers: 6 - 6



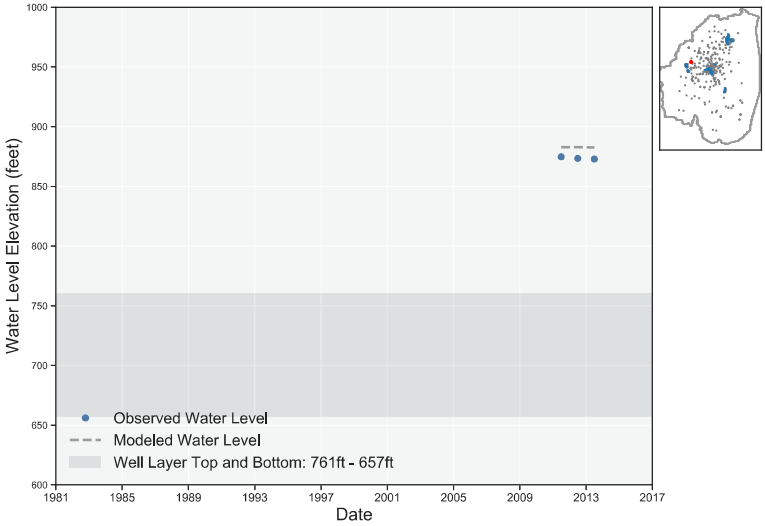
Well 413669 - Aq: OPDC Layers: 6 - 6



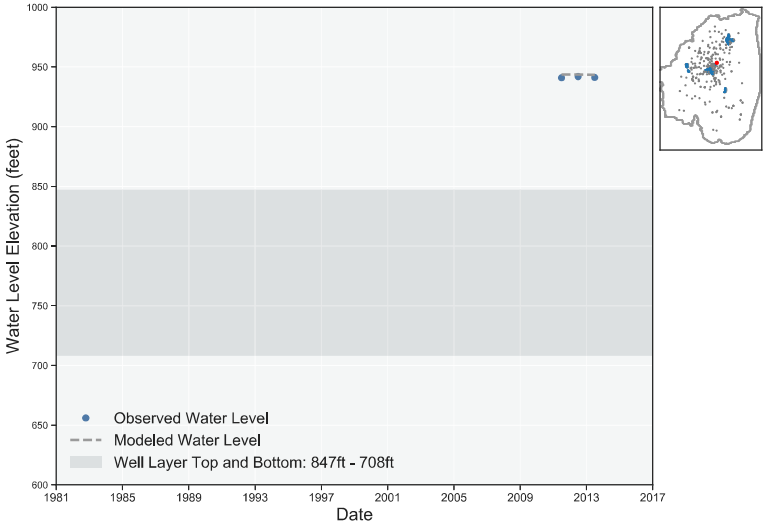
Well 546305 - Aq: OPDC Layers: 6 - 6



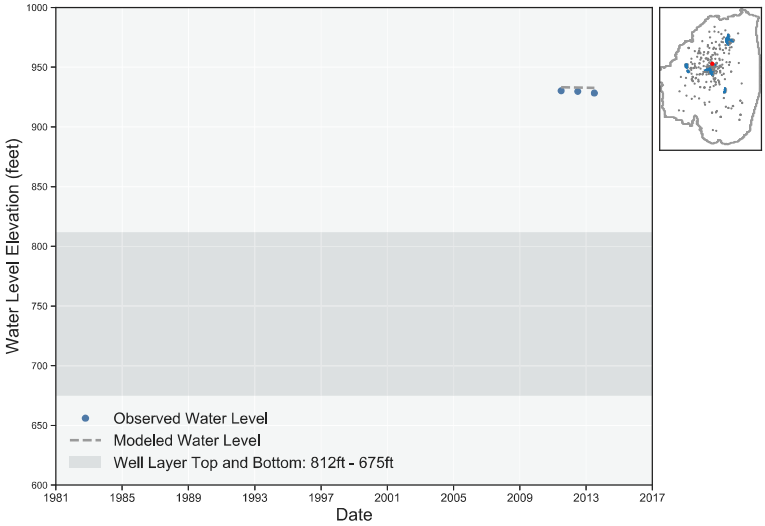
Well 512346 - Aq: OPDC Layers: 6 - 6



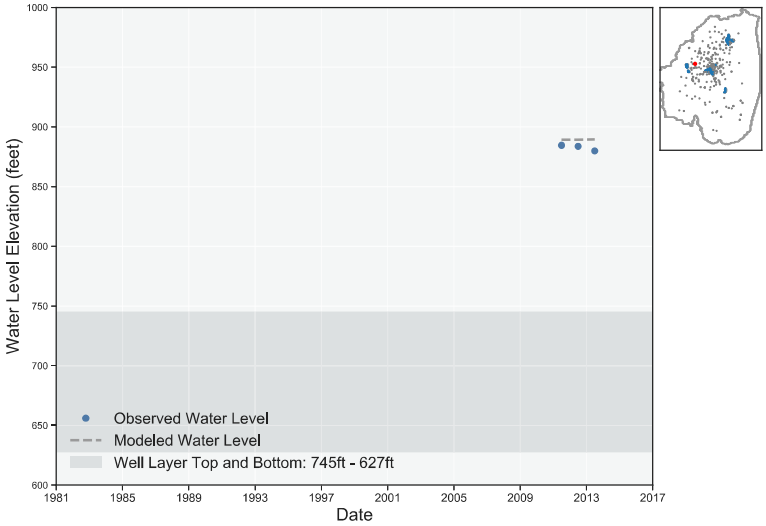
Well 139277 - Aq: OPDC Layers: 6 - 6



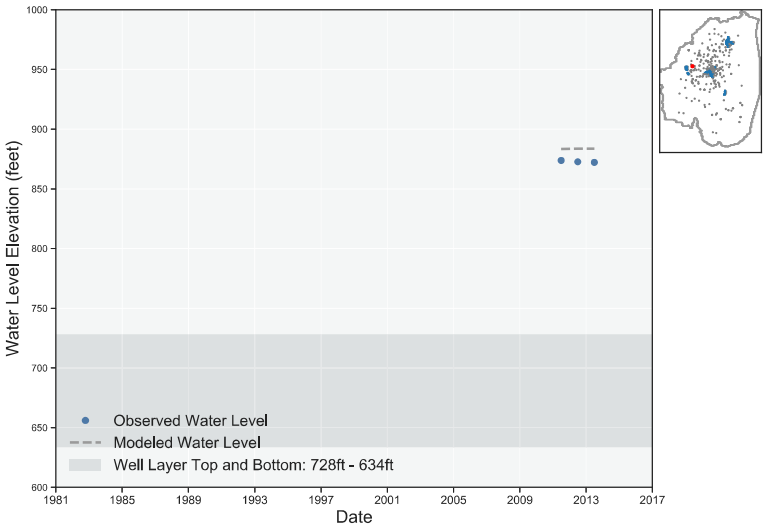
Well 436559 - Aq: OPDC Layers: 6 - 6



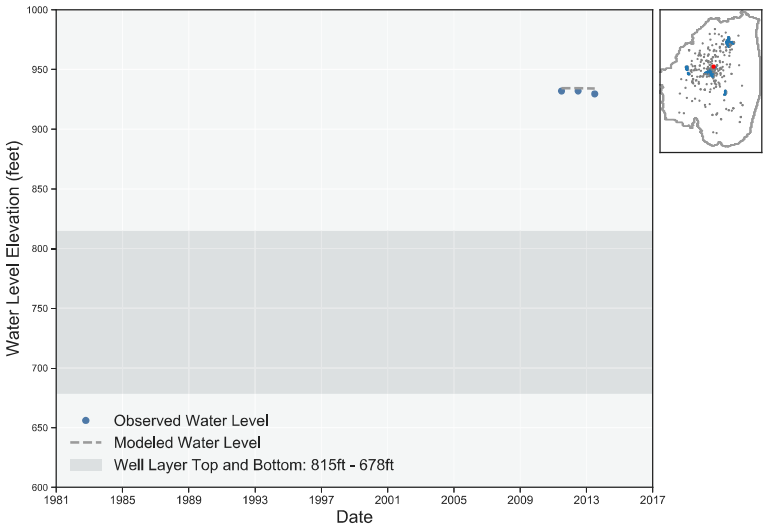
Well 205700 - Aq: OPDC Layers: 6 - 6



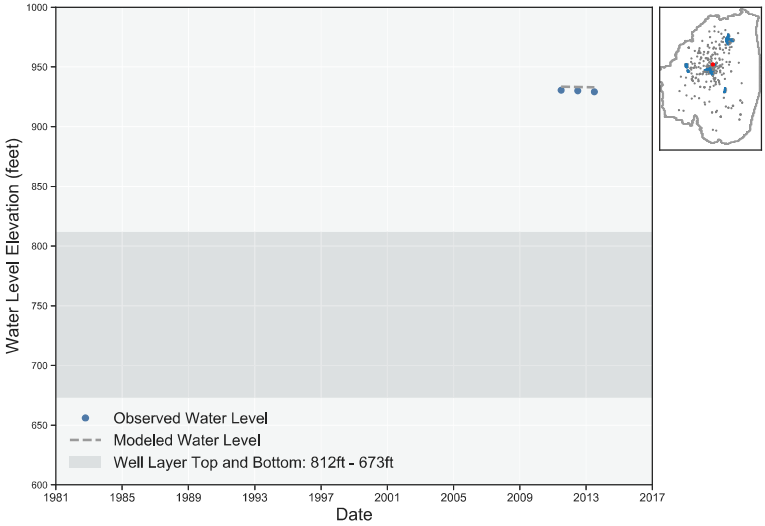
Well 521812 - Aq: OPDC Layers: 6 - 6



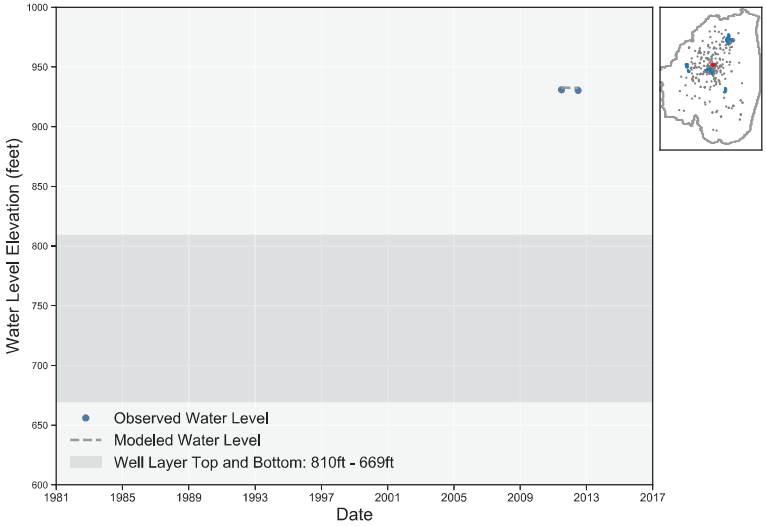
Well 418562 - Aq: OPDC Layers: 6 - 6



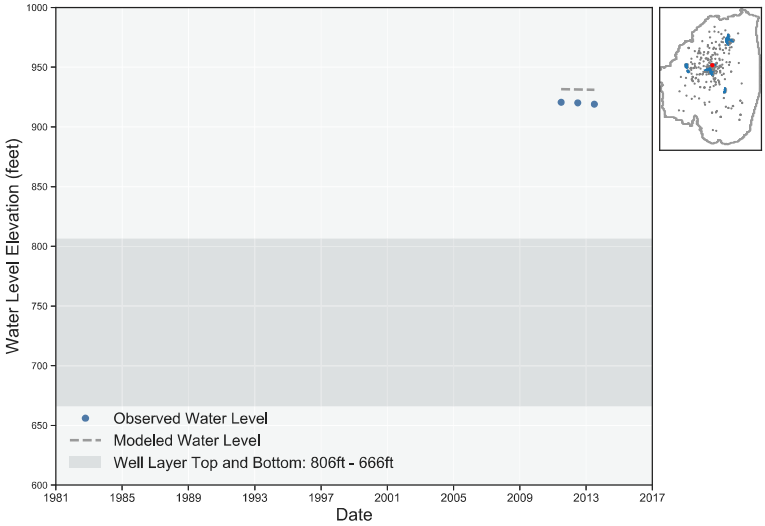
Well 421207 - Aq: OPDC Layers: 6 - 6



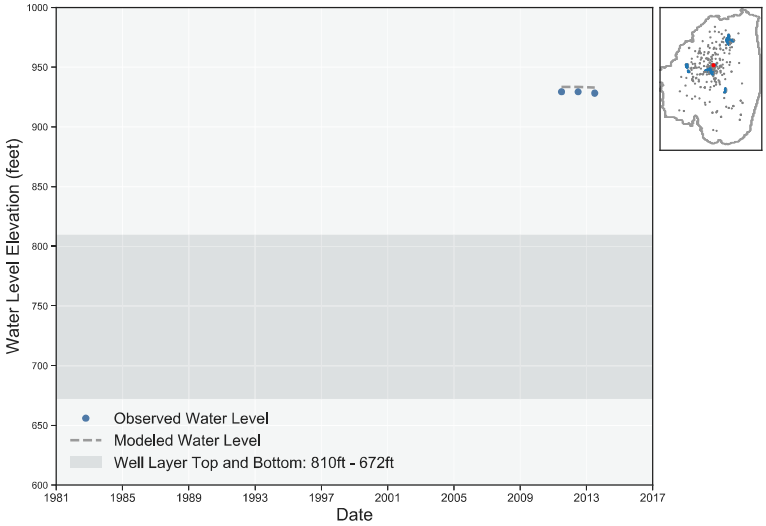
Well 450530 - Aq: OPDC Layers: 6 - 6



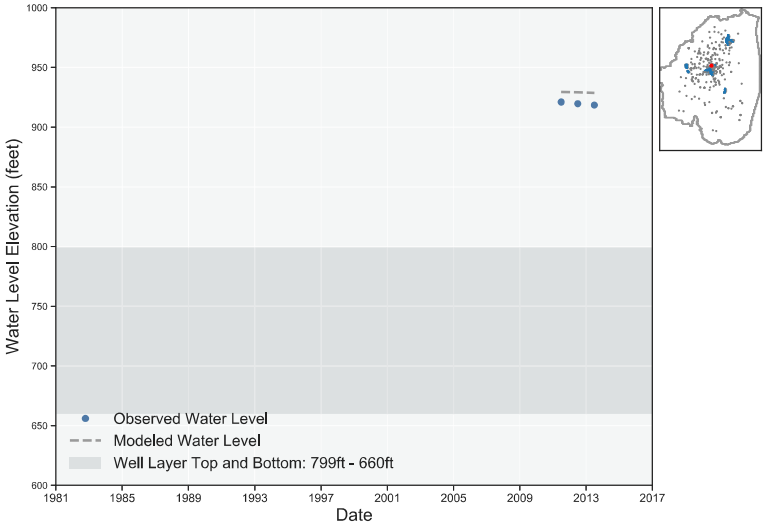
Well 427888 - Aq: OPDC Layers: 6 - 6



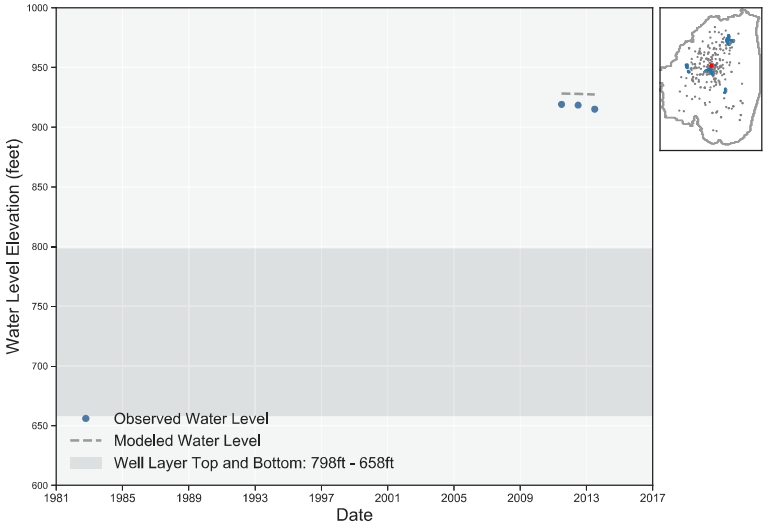
Well 182909 - Aq: OPDC Layers: 6 - 6



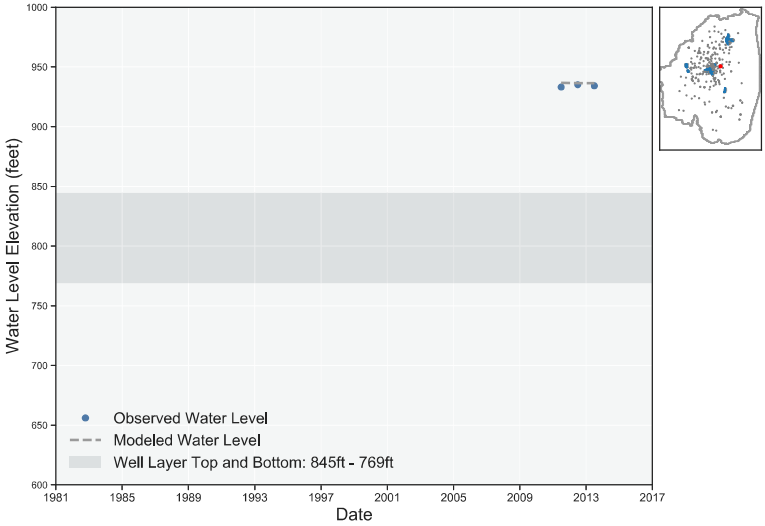
Well 208473 - Aq: OPDC Layers: 6 - 6



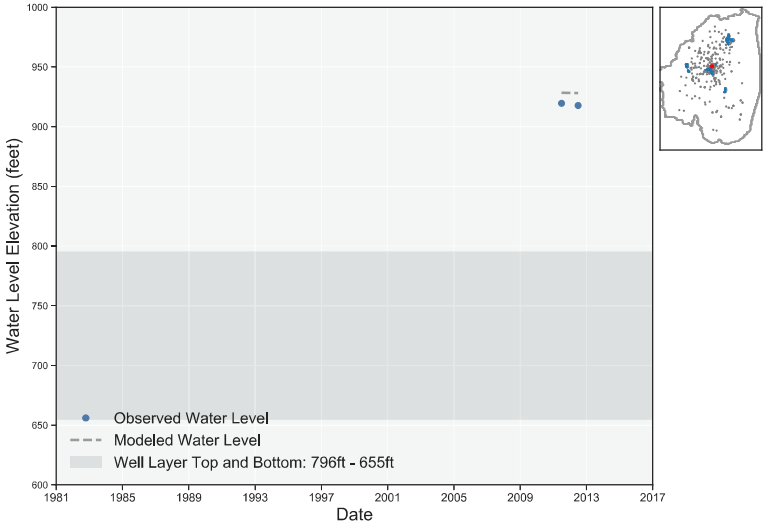
Well 450573 - Aq: OPDC Layers: 6 - 6



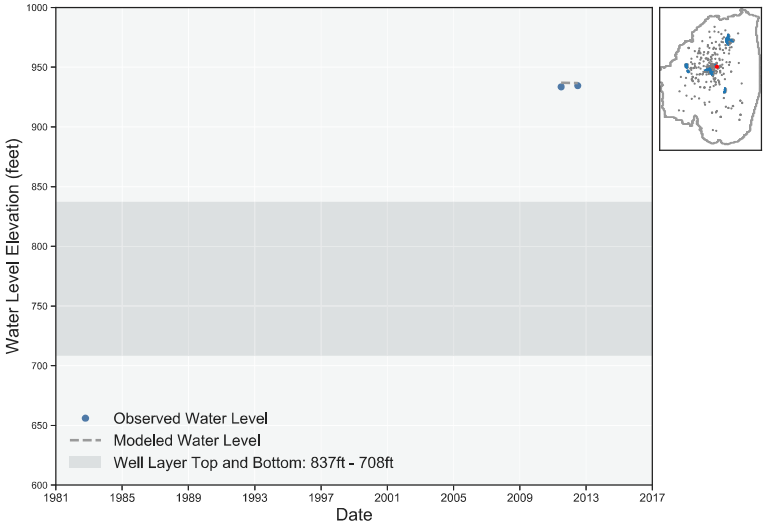
Well 182782 - Aq: OPDC Layers: 6 - 6



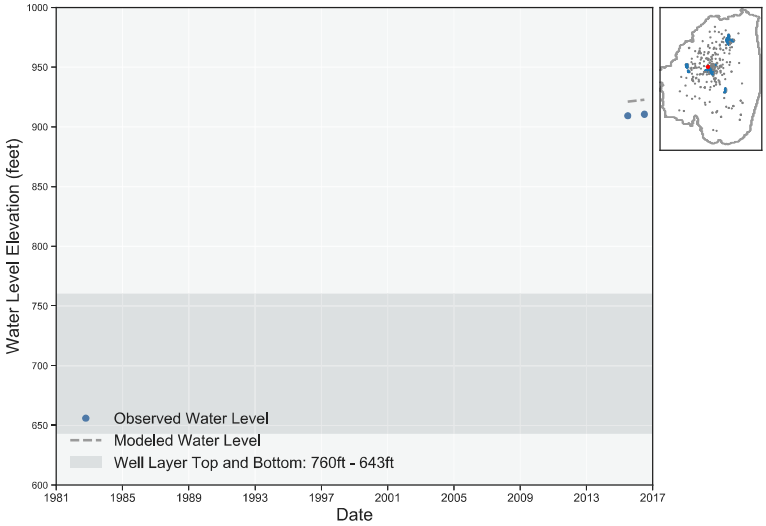
Well 182763 - Aq: OPDC Layers: 6 - 6



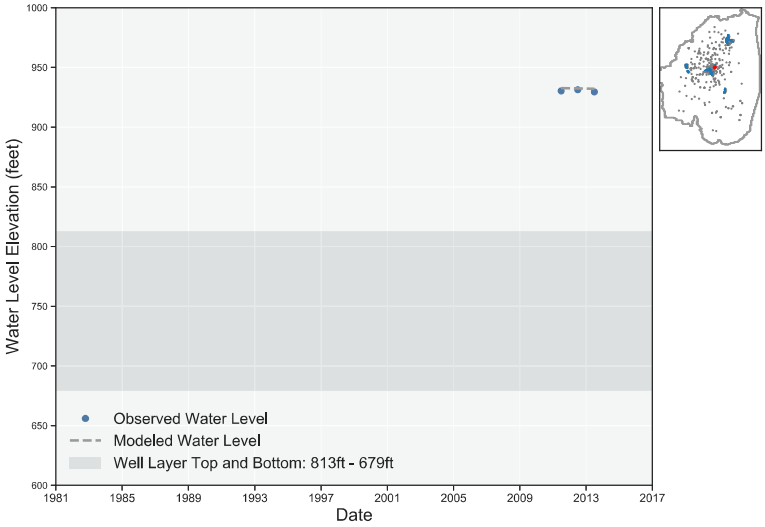
Well 430520 - Aq: OPDC Layers: 6 - 6



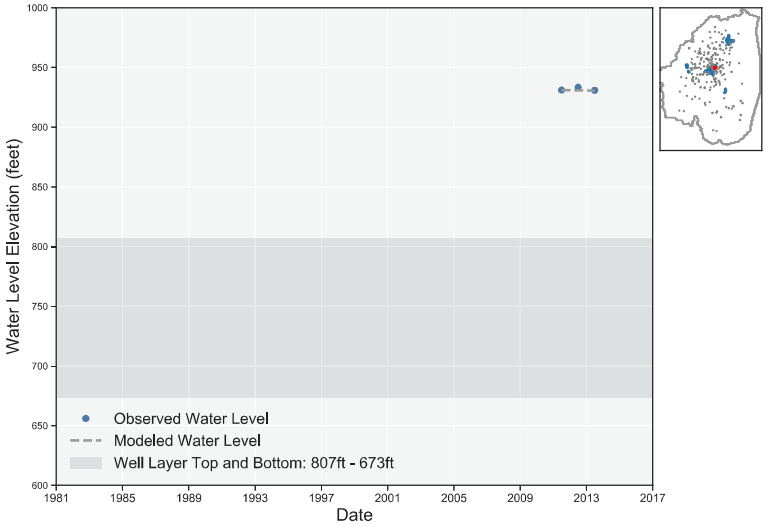
Well 62053 - Aq: CJDN Layers: 6 - 6



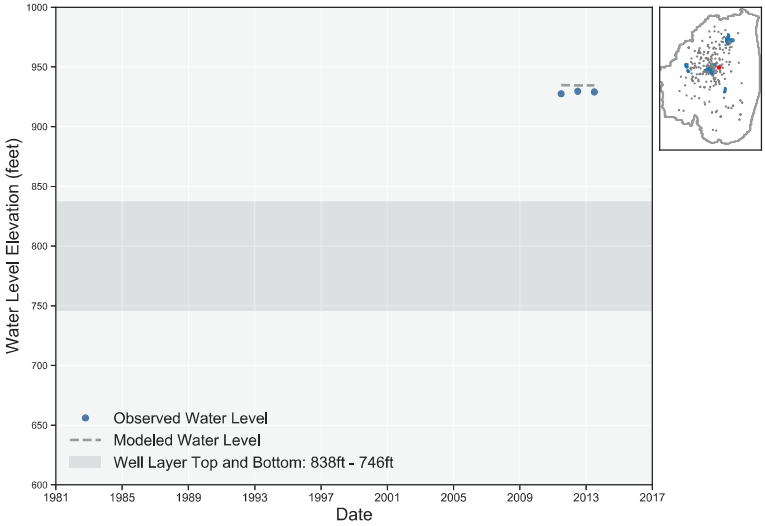
Well 195679 - Aq: OPDC Layers: 6 - 6



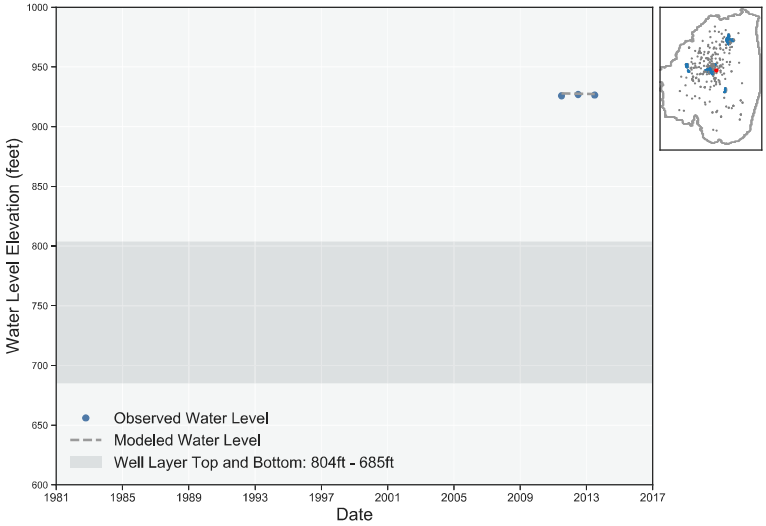
Well 207398 - Aq: OPDC Layers: 6 - 6



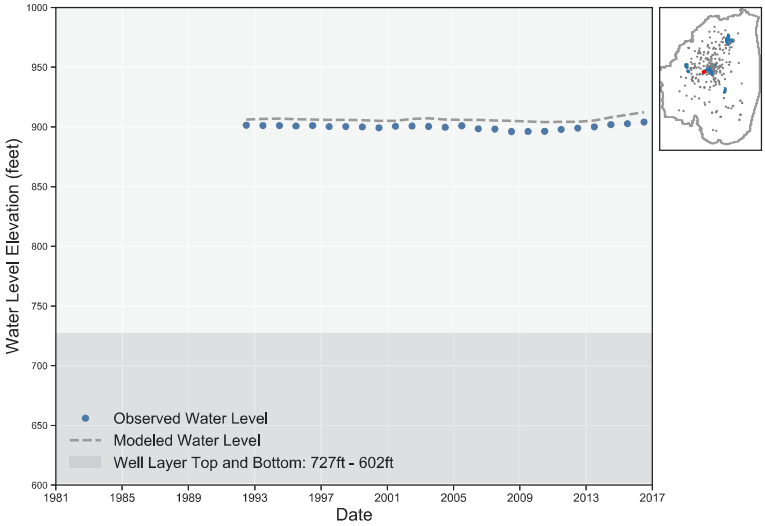
Well 404147 - Aq: OPDC Layers: 6 - 6



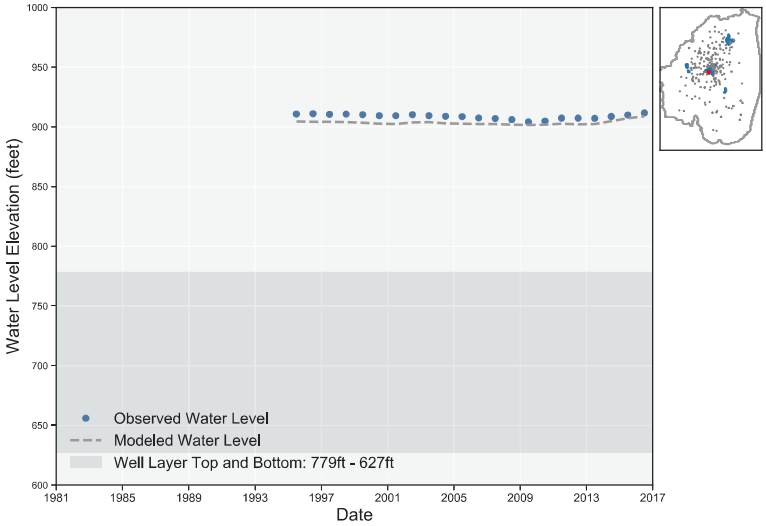
Well 420312 - Aq: OPDC Layers: 6 - 6



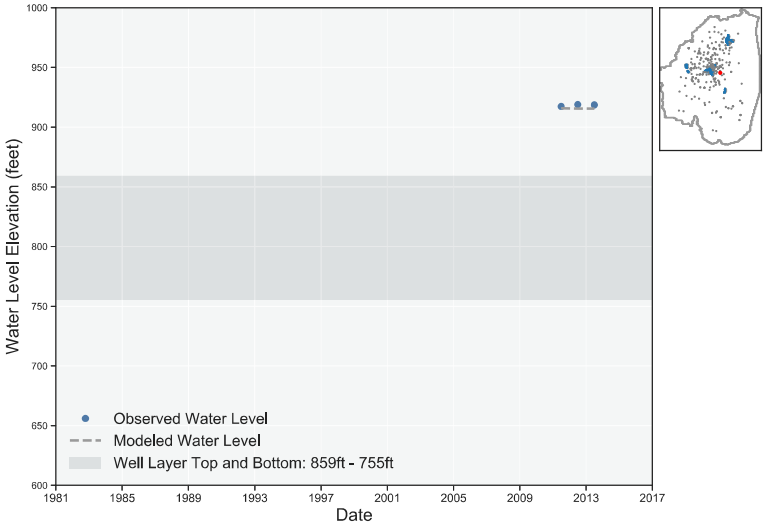
Well 62038 - Aq: OPDCCJDN Layers: 6 - 6



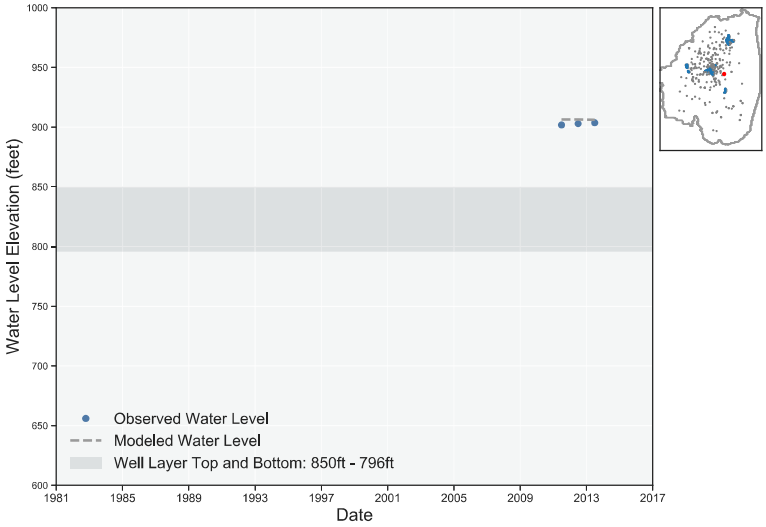
Well 62044 - Aq: OPDC Layers: 6 - 6



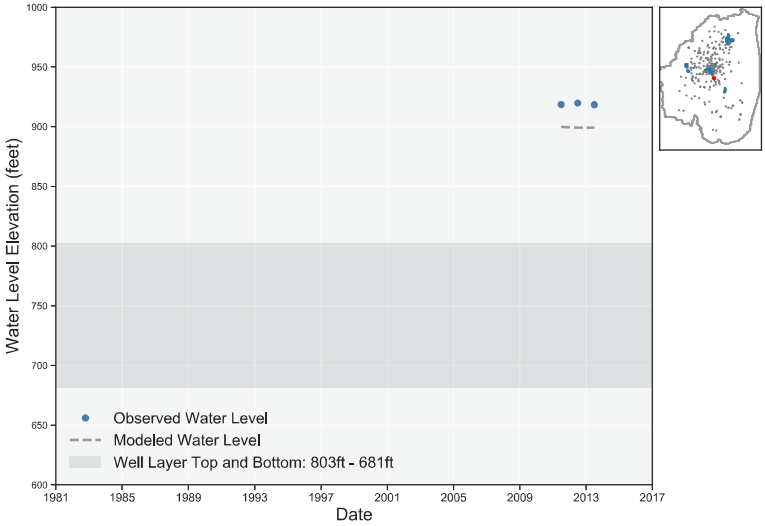
Well 435121 - Aq: OPDC Layers: 6 - 6



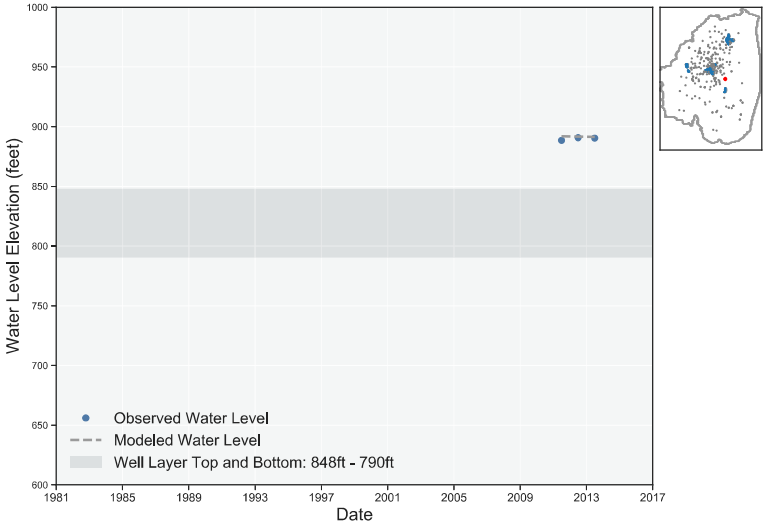
Well 762107 - Aq: OSTP Layers: 6 - 6



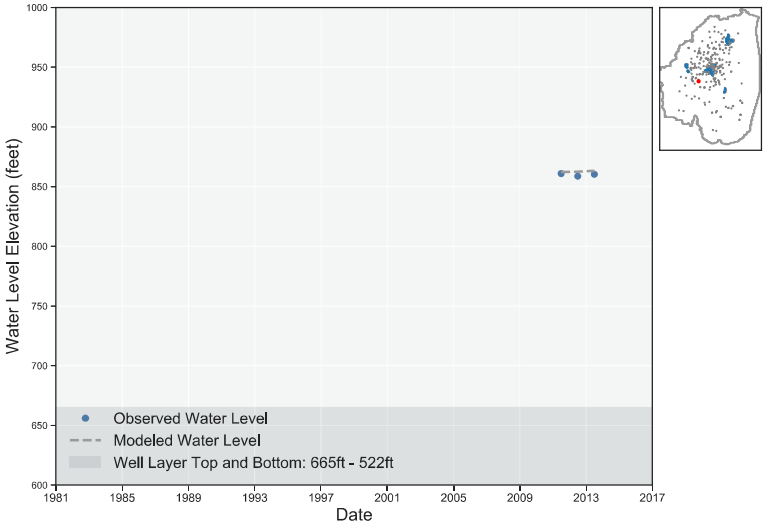
Well 138719 - Aq: OPDC Layers: 6 - 6



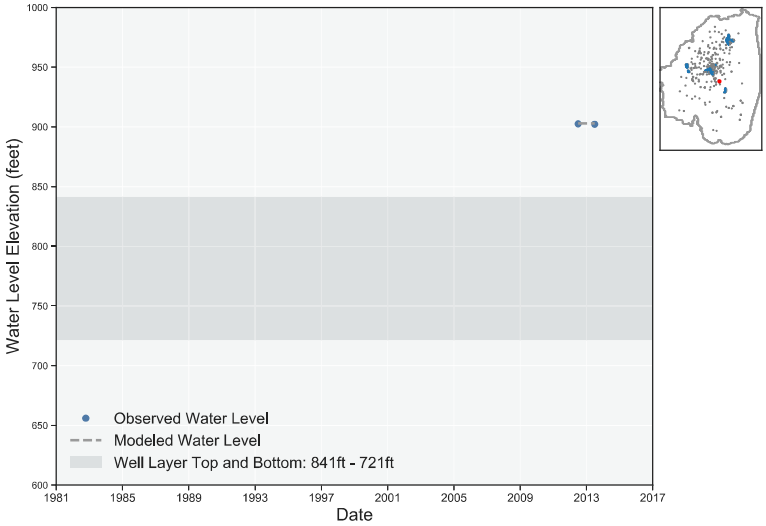
Well 242357 - Aq: OPDC Layers: 6 - 6



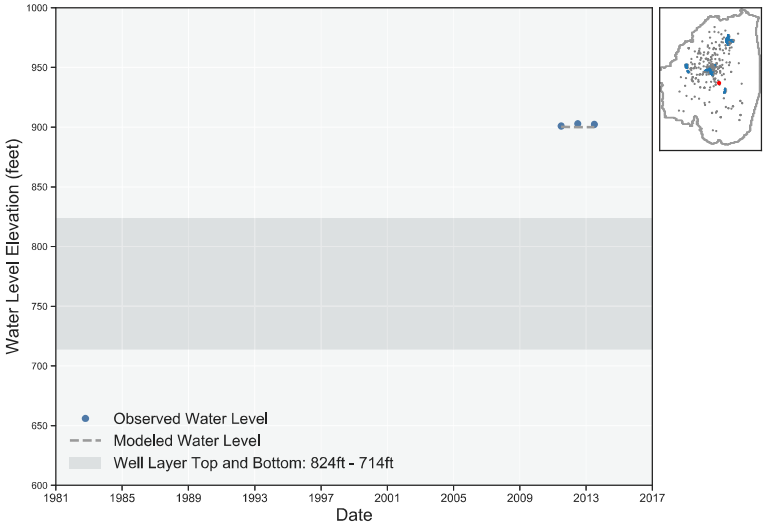
Well 430379 - Aq: OPDC Layers: 6 - 6



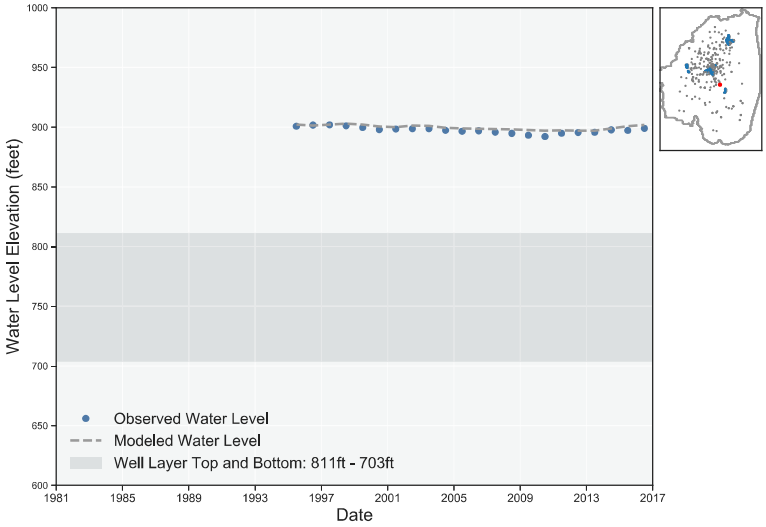
Well 421245 - Aq: OPDC Layers: 6 - 6



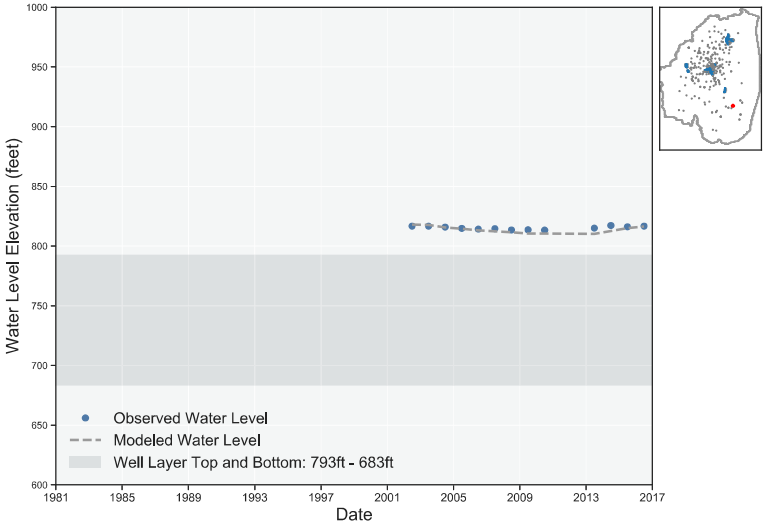
Well 440010 - Aq: OSTP Layers: 6 - 6



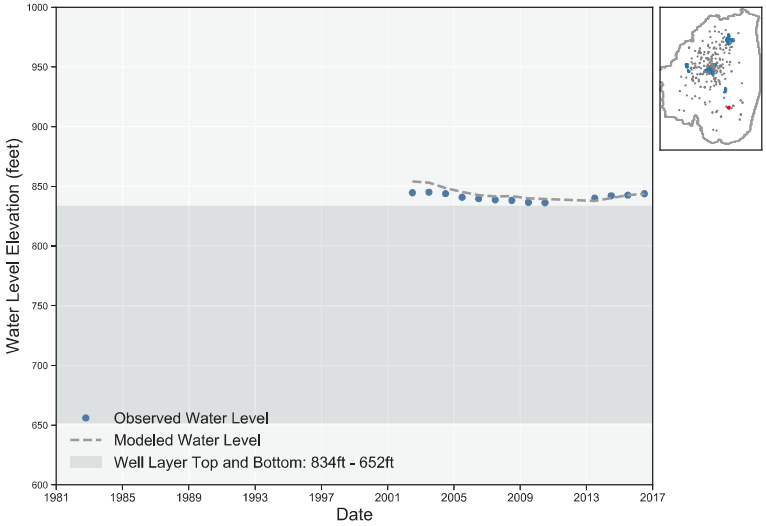
Well 82041 - Aq: OPDC Layers: 6 - 6



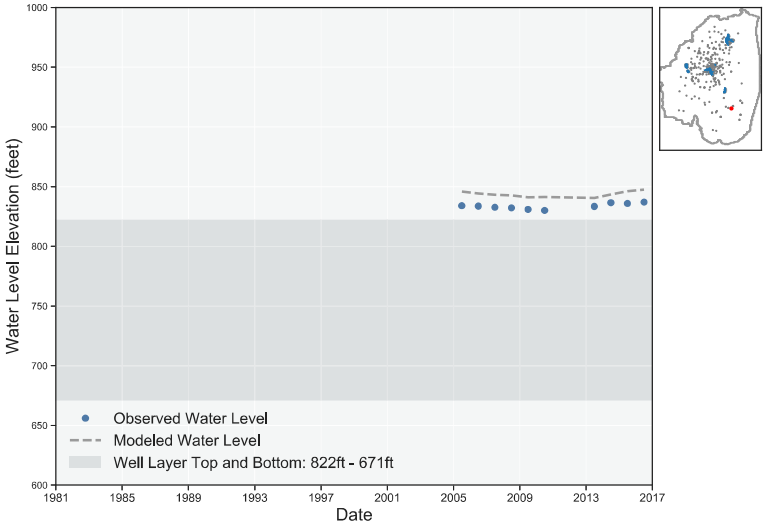
Well 675585 - Aq: OPDC Layers: 6 - 6



Well 675582 - Aq: OPDC Layers: 6 - 6

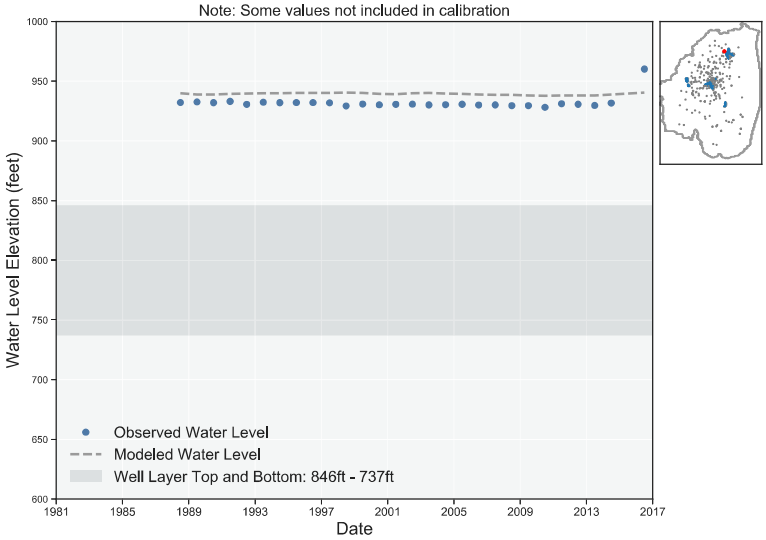


Well 727706 - Aq: OPDC Layers: 6 - 6

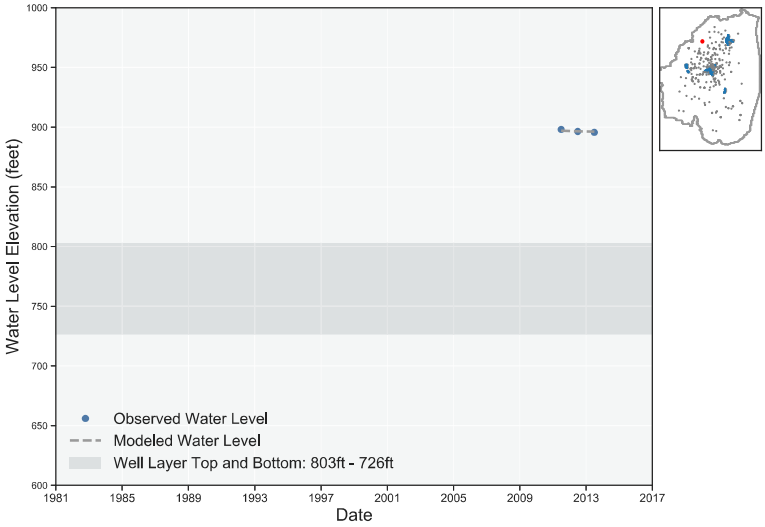


Well 82030 - Aq: OPDCCJDN Layers: 6 - 7

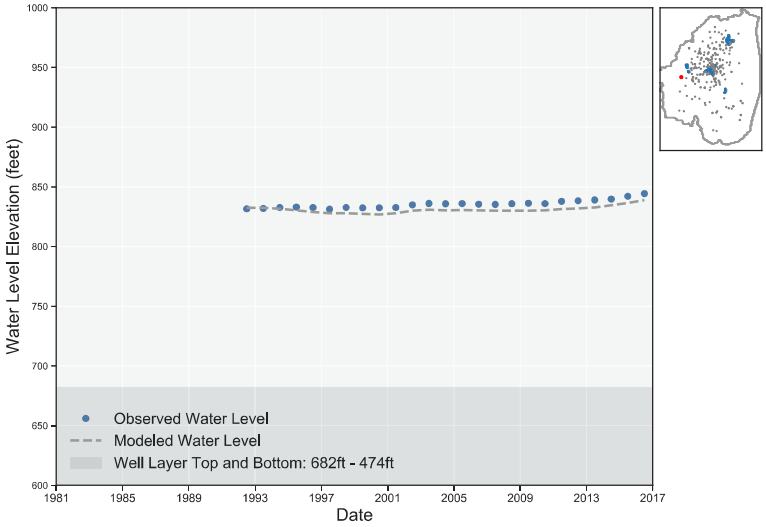
Note: Some values not included in calibration



Well 136792 - Aq: OPCJ Layers: 6 - 7

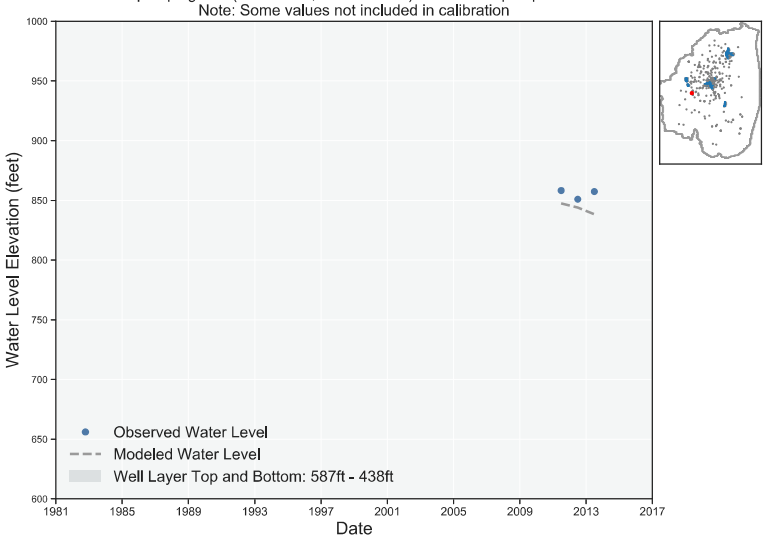


Well 62037 - Aq: OPDCCJDN Layers: 6 - 7



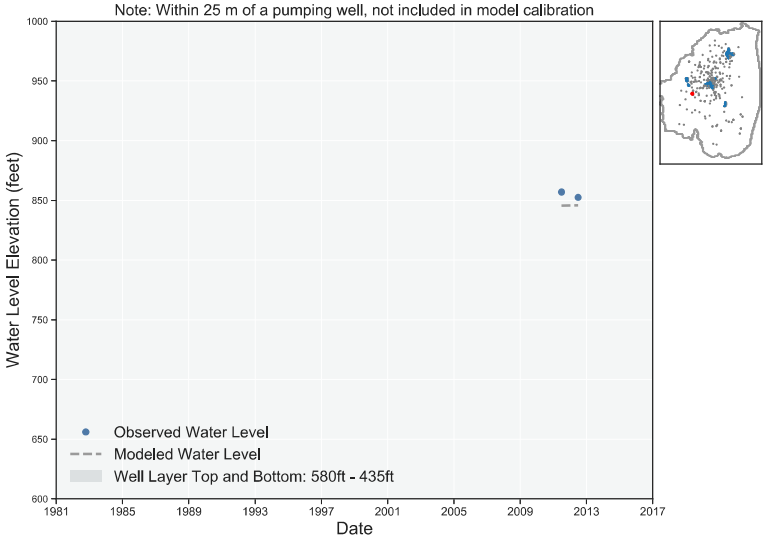
Well 151579 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation E) but was not pumped in 2011 or 2012.
Note: Some values not included in calibration

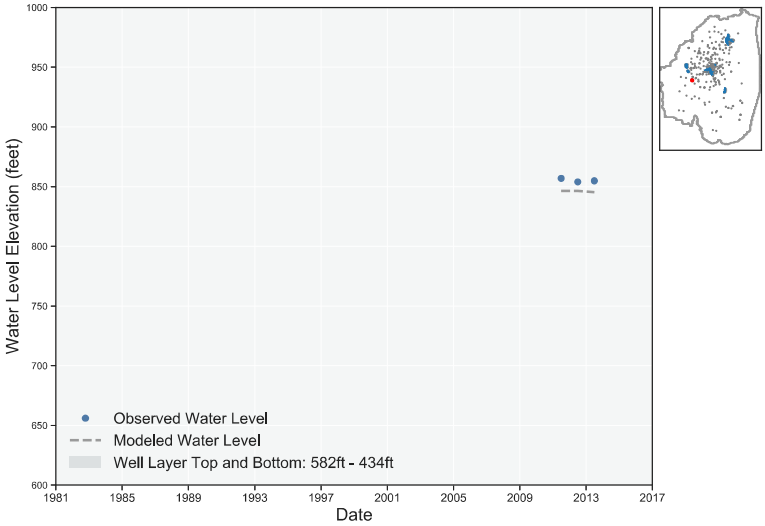


Well 706802 - Aq: OPCJ Layers: 6 - 7

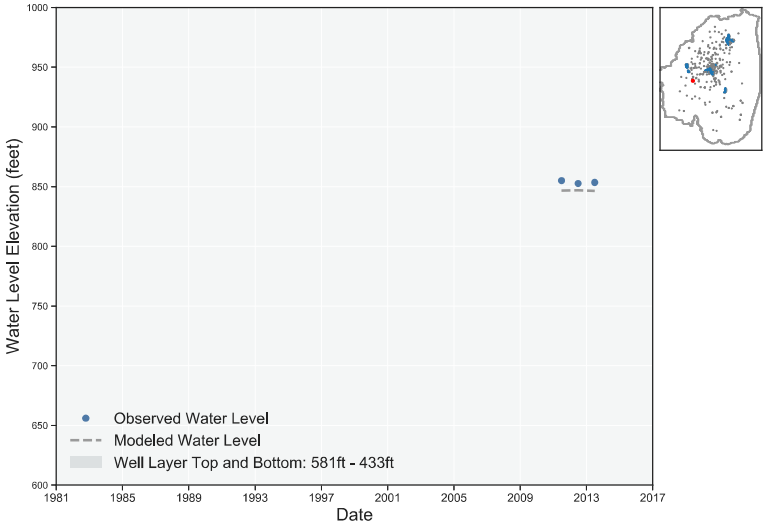
Note: Within 25 m of a pumping well, not included in model calibration



Well 753666 - Aq: OPCJ Layers: 6 - 7

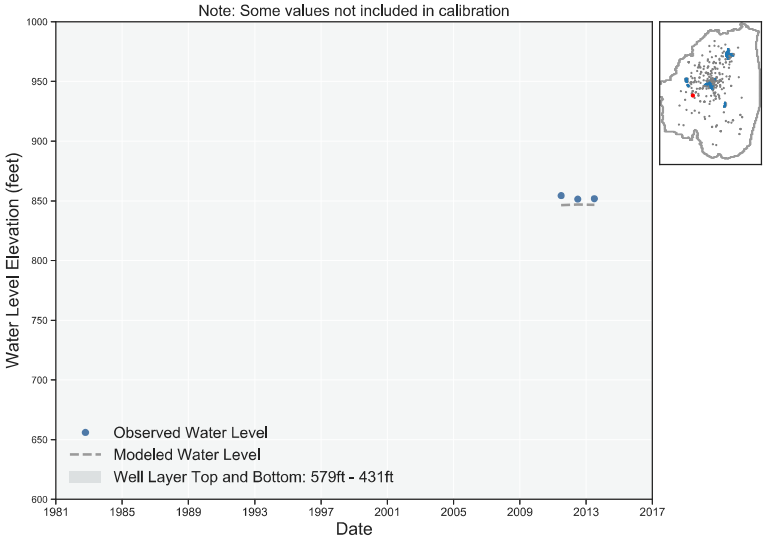


Well 753667 - Aq: OPCJ Layers: 6 - 7



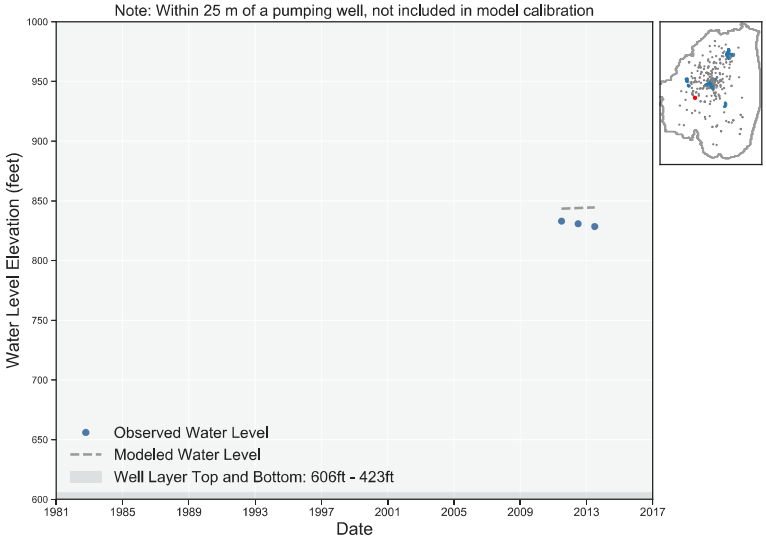
Well 759568 - Aq: OPCJ Layers: 6 - 7

Note: Some values not included in calibration

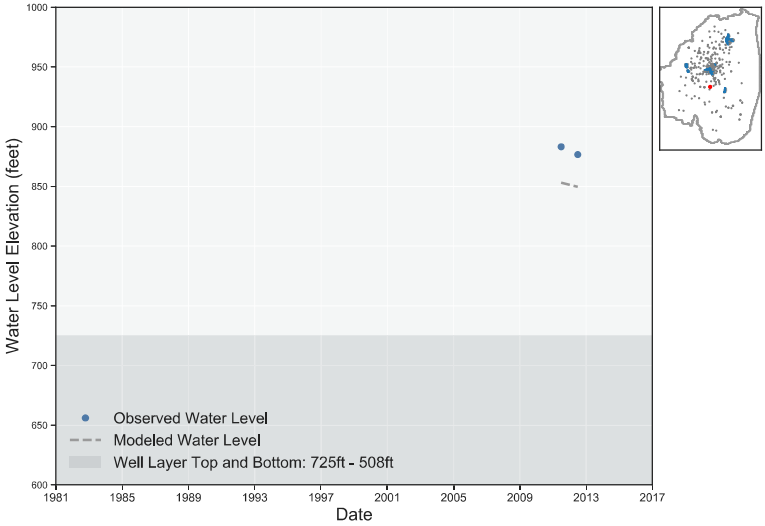


Well 759569 - Aq: OPCJ Layers: 6 - 7

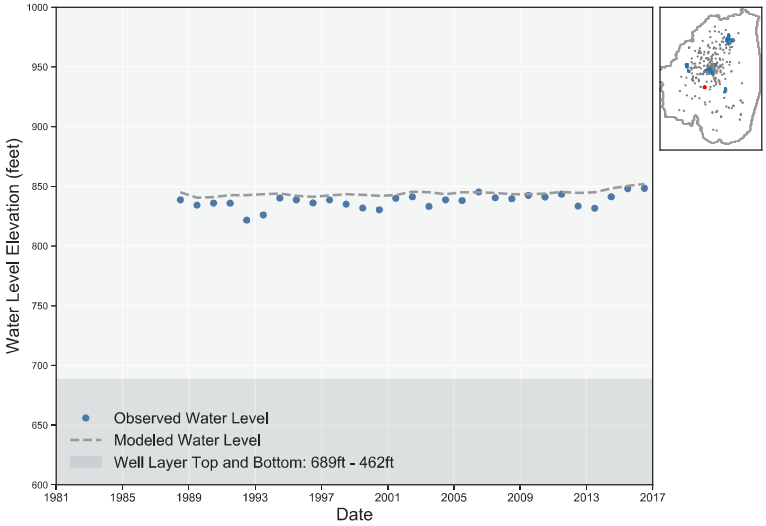
Note: Within 25 m of a pumping well, not included in model calibration



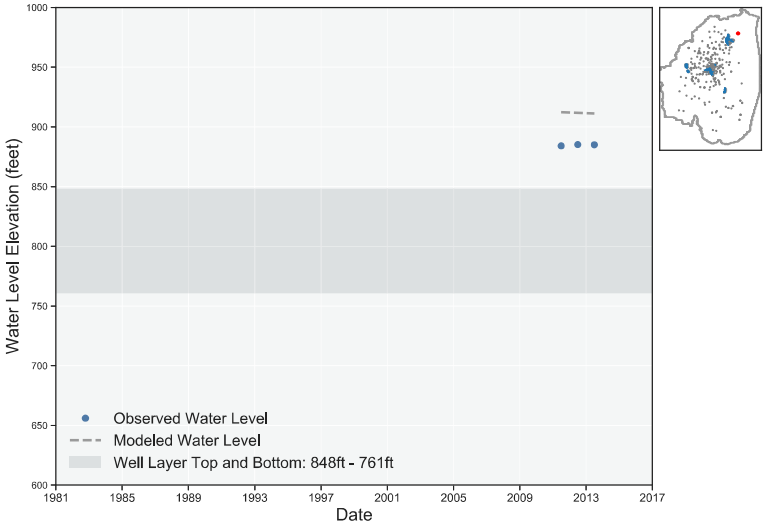
Well 686293 - Aq: OPCJ Layers: 6 - 7



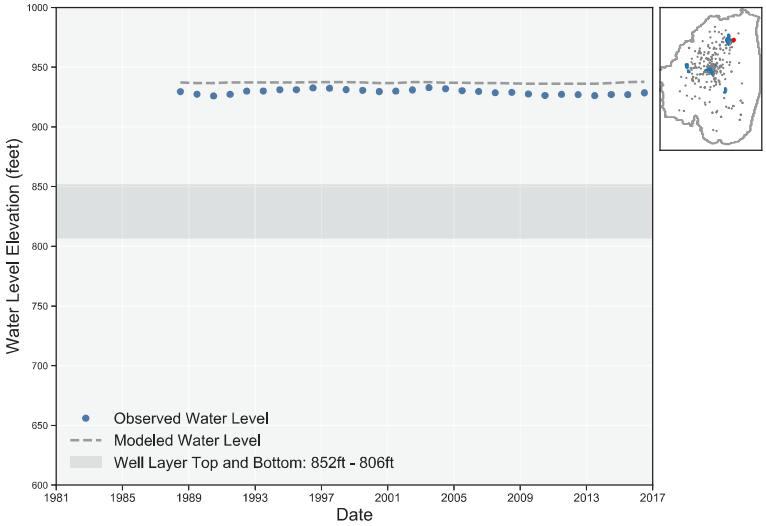
Well 62009 - Aq: OPDCCJDN Layers: 6 - 7



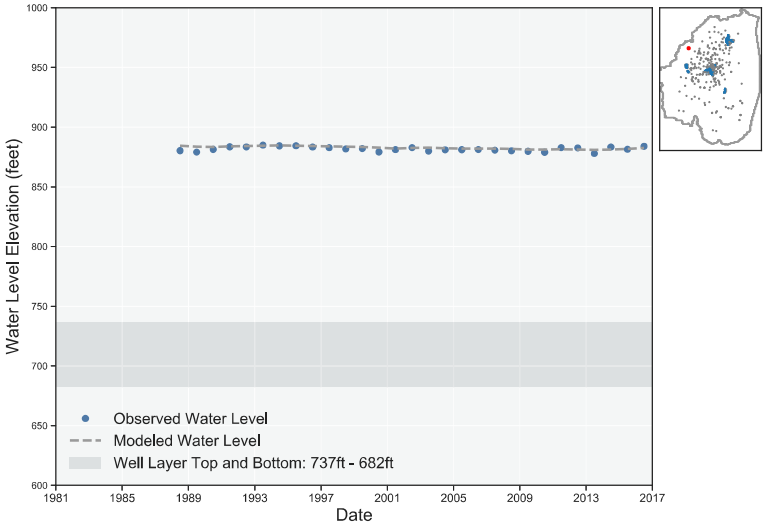
Well 517015 - Aq: OPCJ Layers: 7 - 7



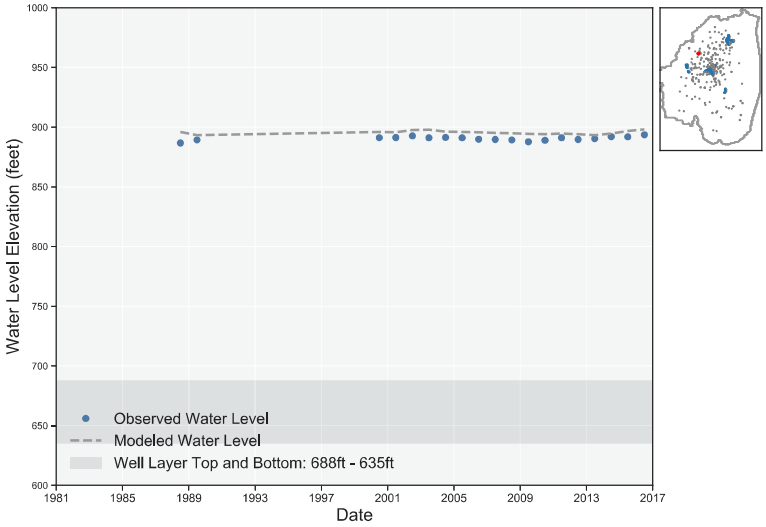
Well 82031 - Aq: CJDN Layers: 7 - 7



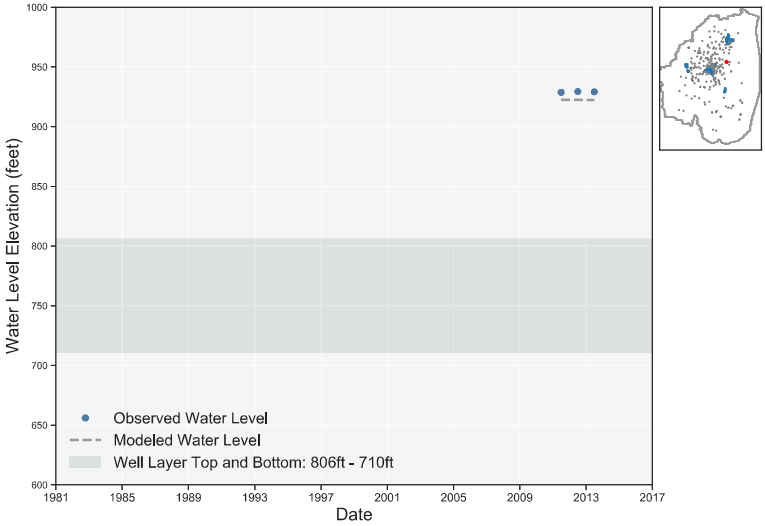
Well 2008 - Aq: QBAA Layers: 7 - 7



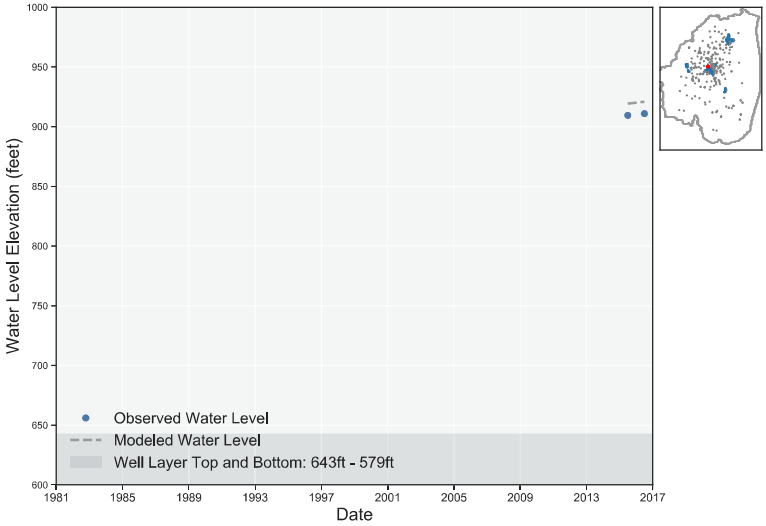
Well 2012 - Aq: CJDN Layers: 7 - 7



Well 409004 - Aq: OSTP Layers: 7 - 7



Well 62054 - Aq: OPDC Layers: 7 - 7

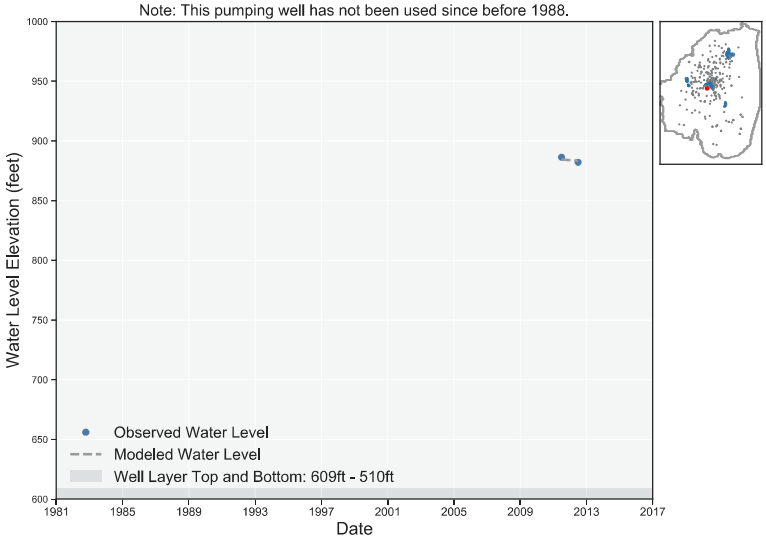


Well 208506 - Aq: CJDN Layers: 7 - 7

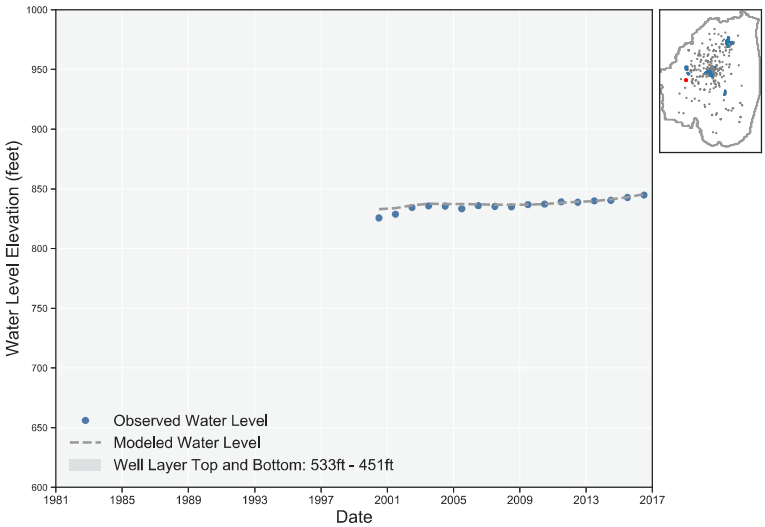
Note: This pumping well has not been used since before 1988.

Well 226567 - Aq: CJSL Layers: 7 - 7

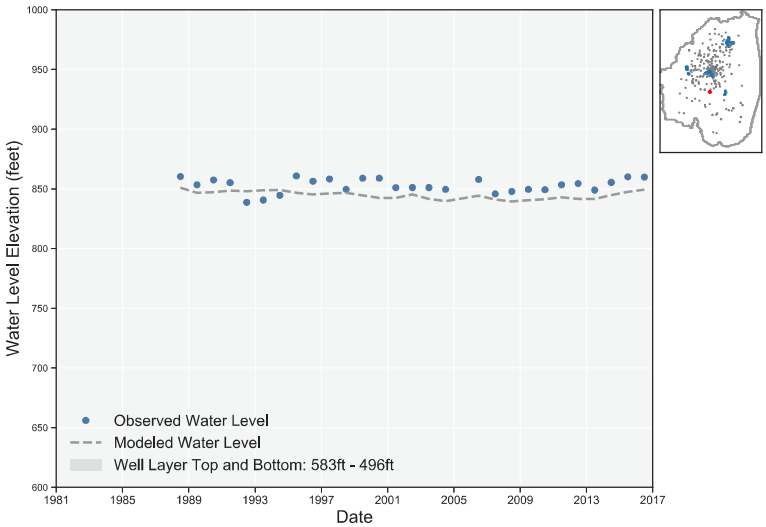
Note: This pumping well has not been used since before 1988.



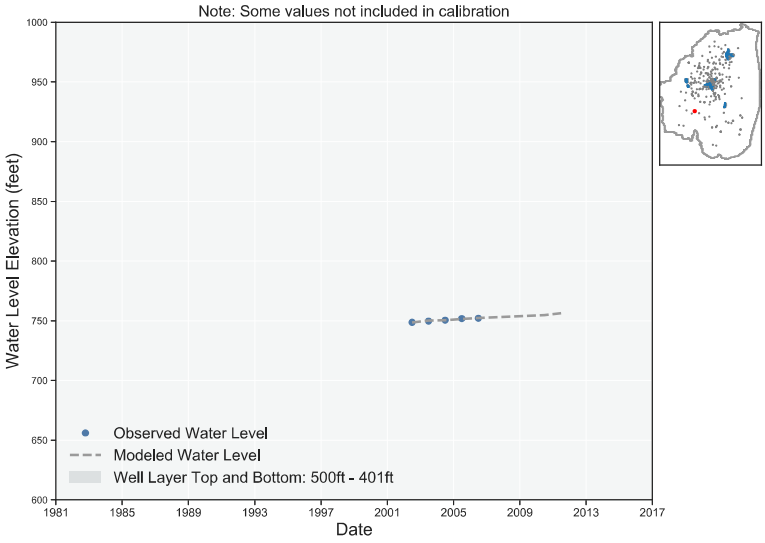
Well 62030 - Aq: CJDN Layers: 7 - 7



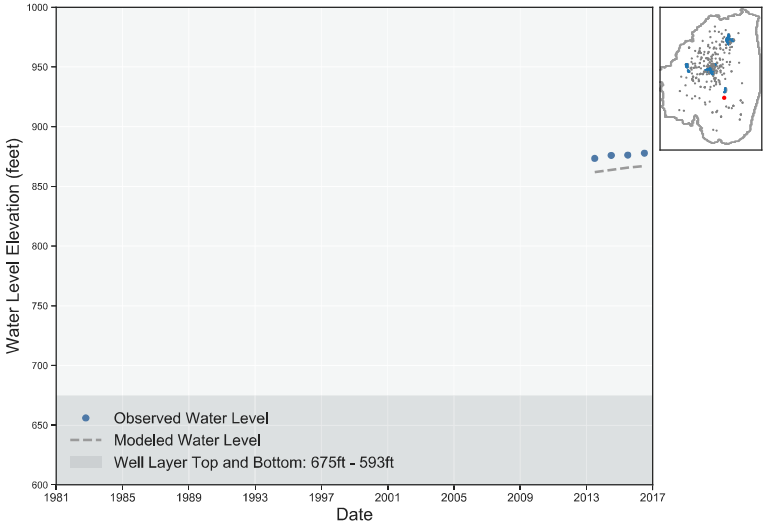
Well 62001 - Aq: CJDN Layers: 7 - 7



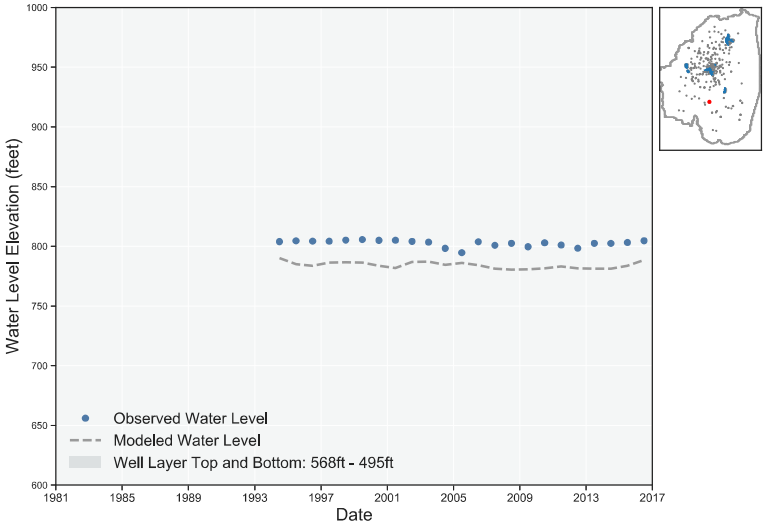
Well 62049 - Aq: CJDN Layers: 7 - 7



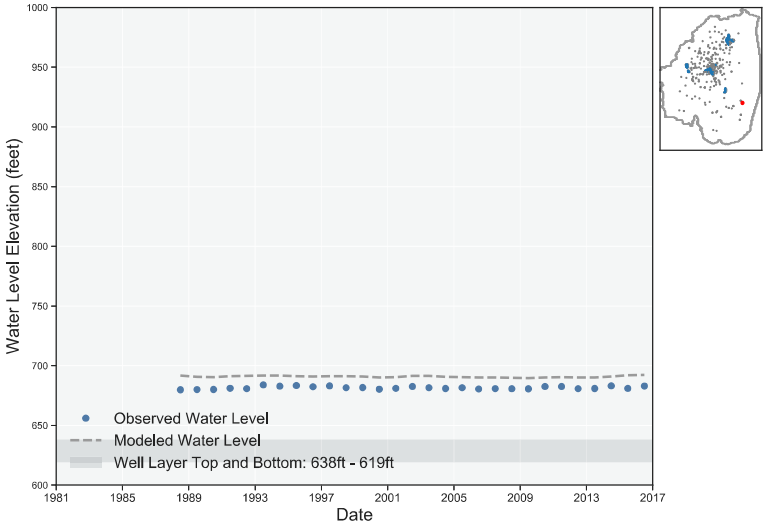
Well 82058 - Aq: QBAA Layers: 7 - 7



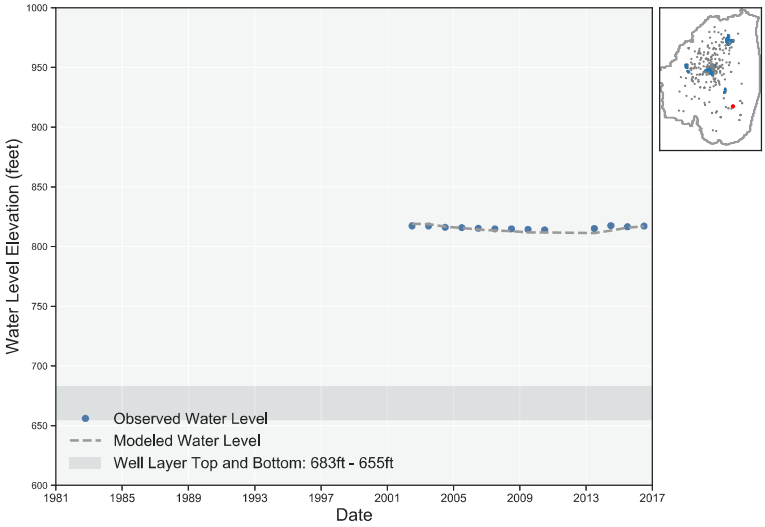
Well 62040 - Aq: CJDN Layers: 7 - 7



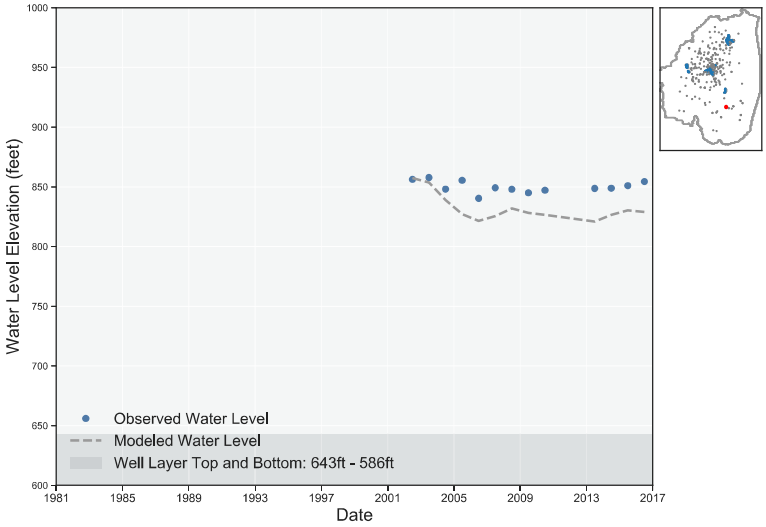
Well 82011 - Aq: CECR Layers: 7 - 7



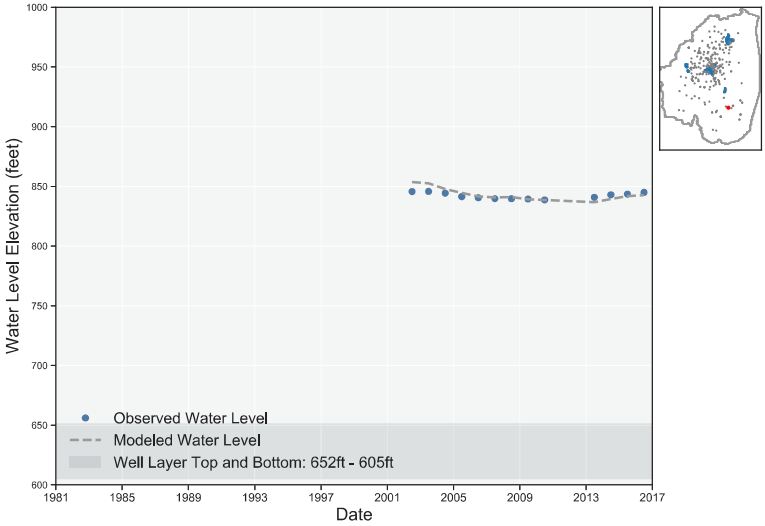
Well 675584 - Aq: CJDN Layers: 7 - 7



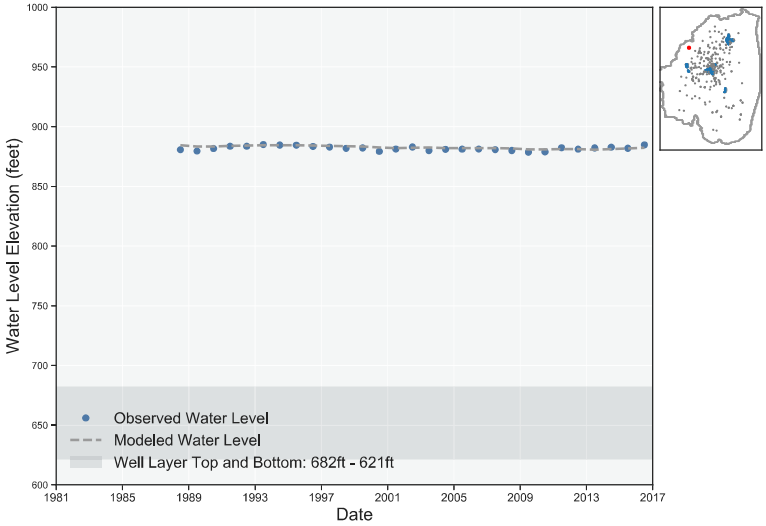
Well 675580 - Aq: CJDN Layers: 7 - 7



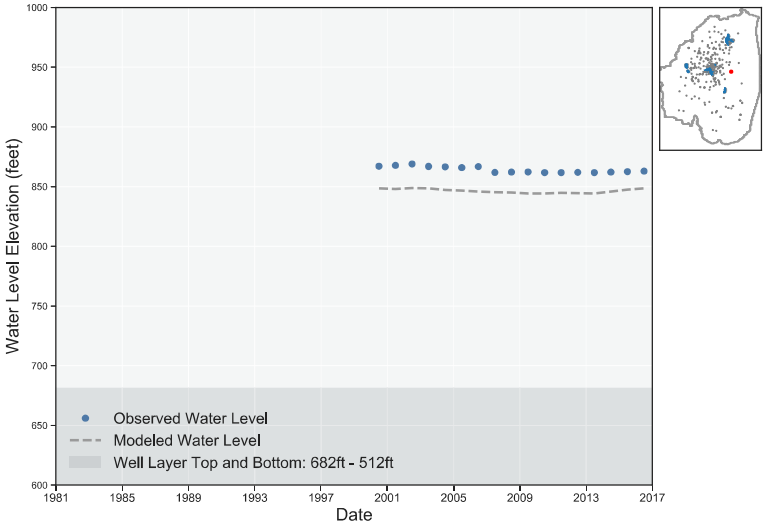
Well 675583 - Aq: CJDN Layers: 7 - 7



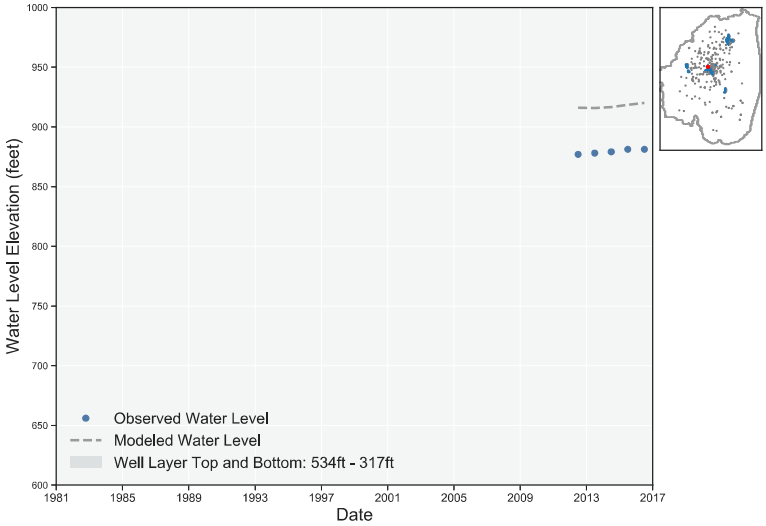
Well 2007 - Aq: QBAA Layers: 8 - 8



Well 82047 - Aq: CTCG Layers: 9 - 9

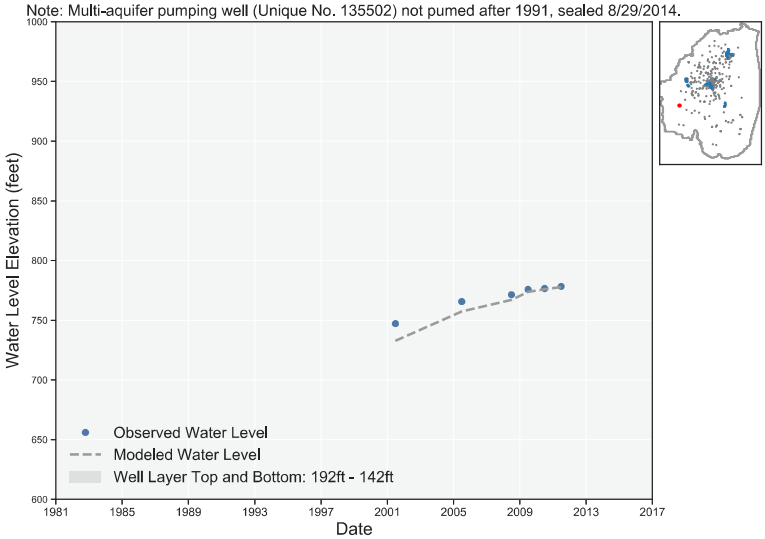


Well 62052 - Aq: CTCW Layers: 9 - 10



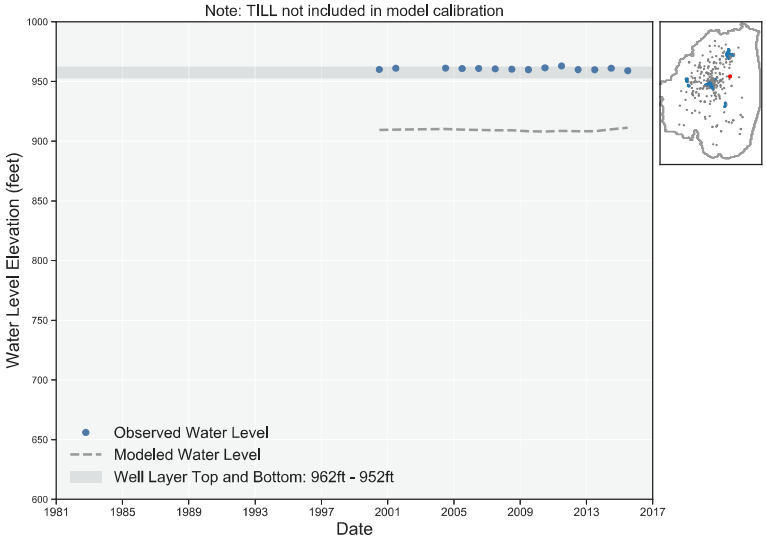
Well 62041 - Aq: CIGL Layers: 10 - 10

Note: Multi-aquifer pumping well (Unique No. 135502) not pumed after 1991, sealed 8/29/2014.

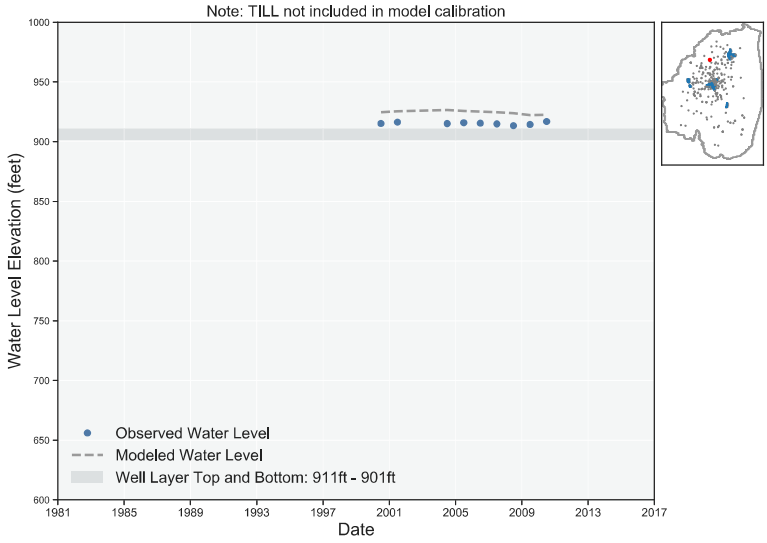


Well 82043 - Aq: TILL Layers: 1 - 1

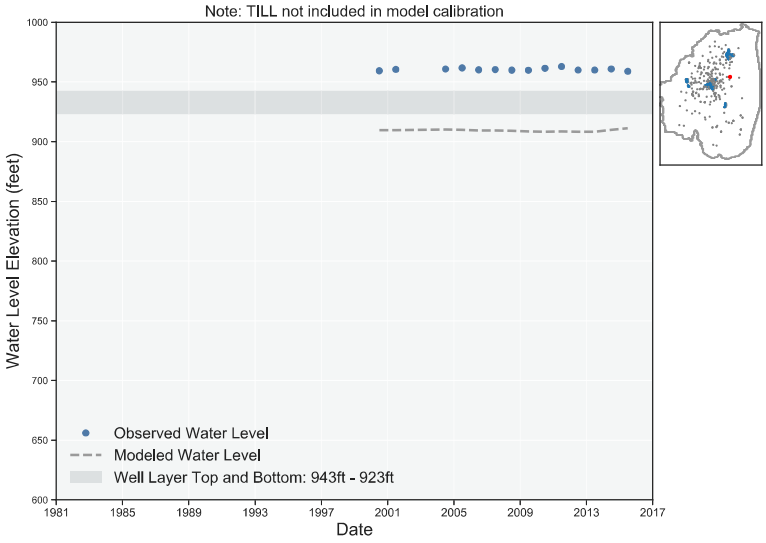
Note: TILL not included in model calibration



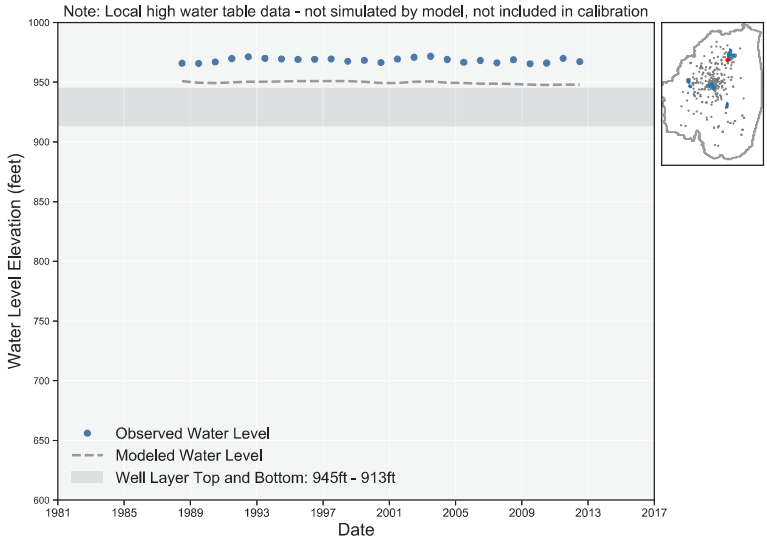
Well 82044 - Aq: TILL Layers: 2 - 2



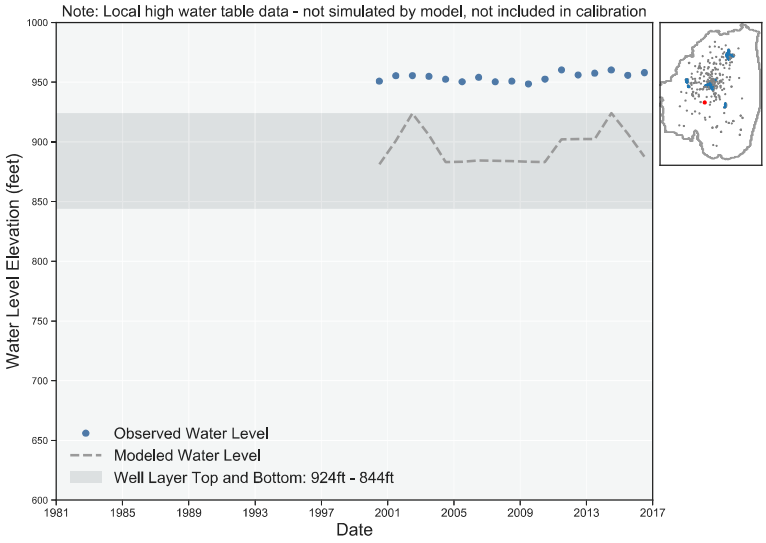
Well 82042 - Aq: TILL Layers: 3 - 3



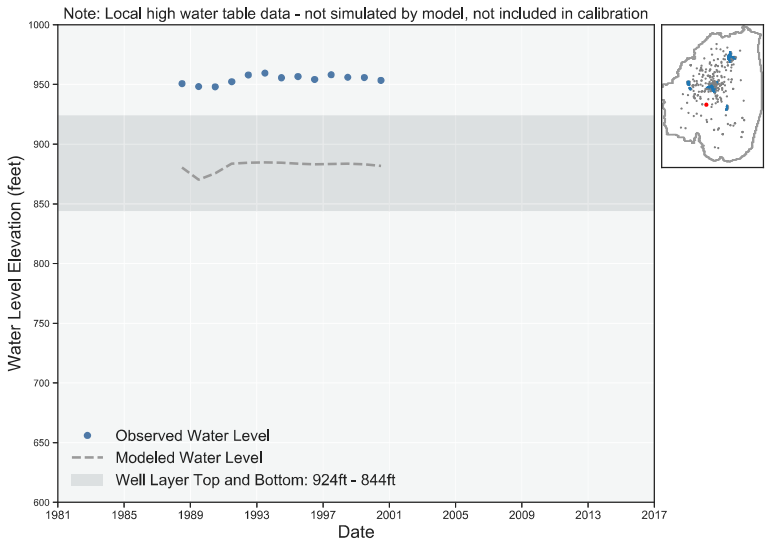
Well 82037 - Aq: QWTA Layers: 4 - 4



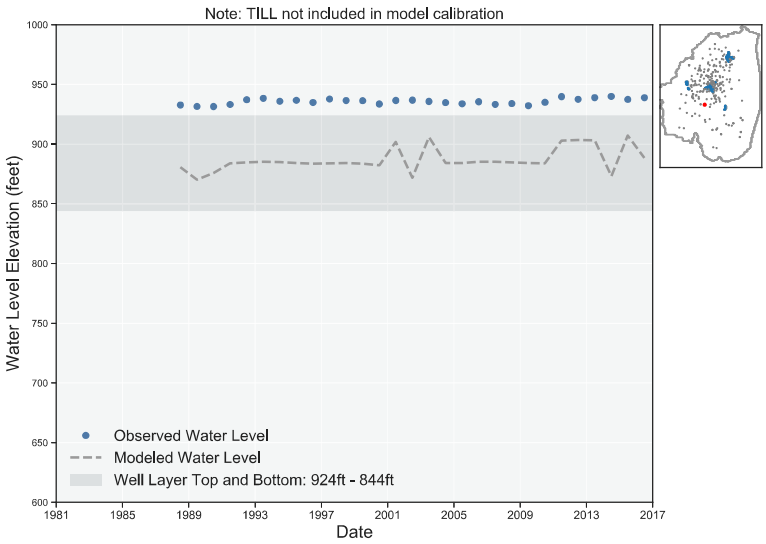
Well 62048 - Aq: QWTA Layers: 4 - 4



Well 62011 - Aq: QBAA Layers: 4 - 4

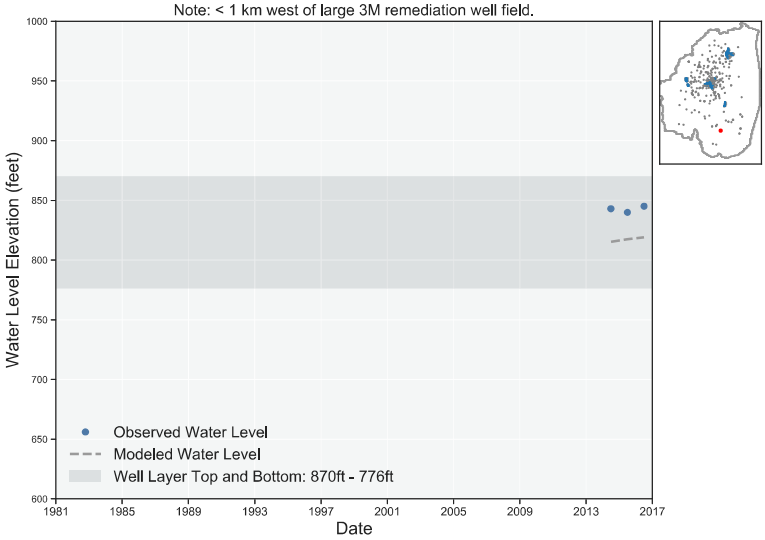


Well 62010 - Aq: TILL Layers: 4 - 4



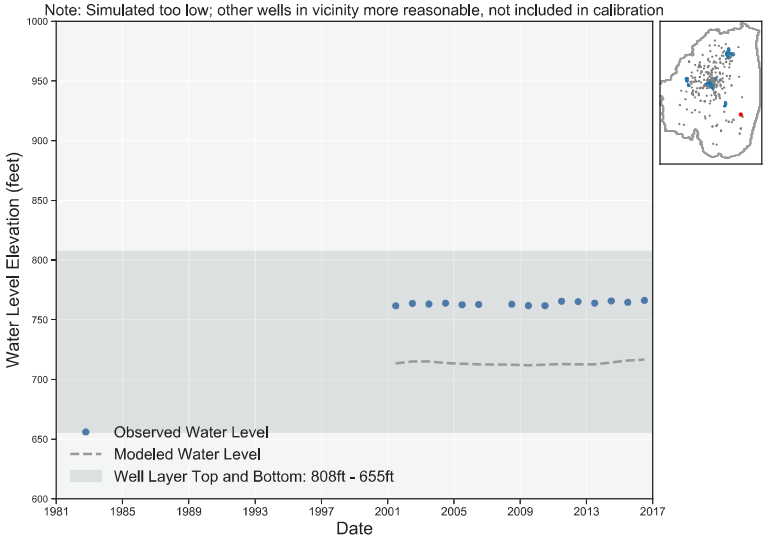
Well 82062 - Aq: QWTA Layers: 4 - 4

Note: < 1 km west of large 3M remediation well field.



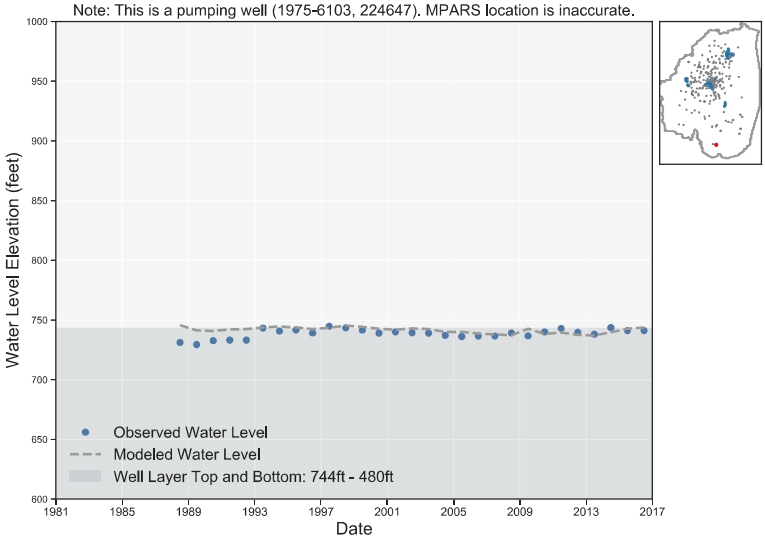
Well 82045 - Aq: CFRNCIGL Layers: 4 - 6

Note: Simulated too low; other wells in vicinity more reasonable, not included in calibration



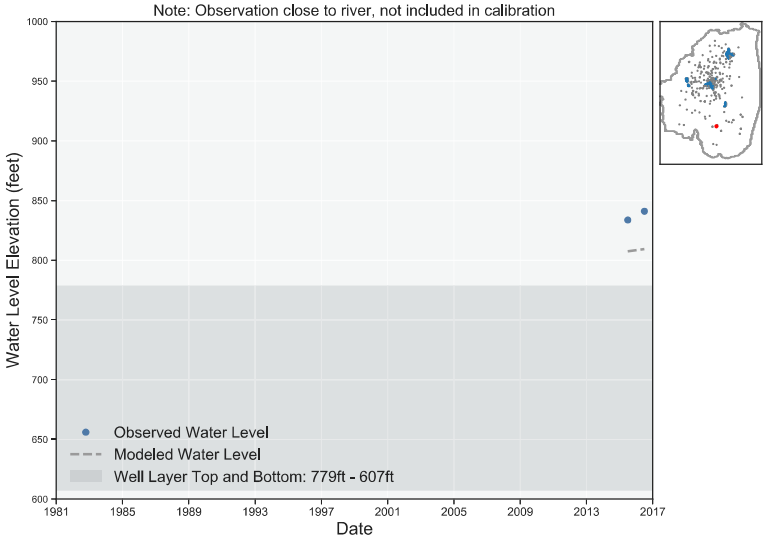
Well 82016 - Aq: OPDCCJDN Layers: 5 - 8

Note: This is a pumping well (1975-6103, 224647). MPARS location is inaccurate.



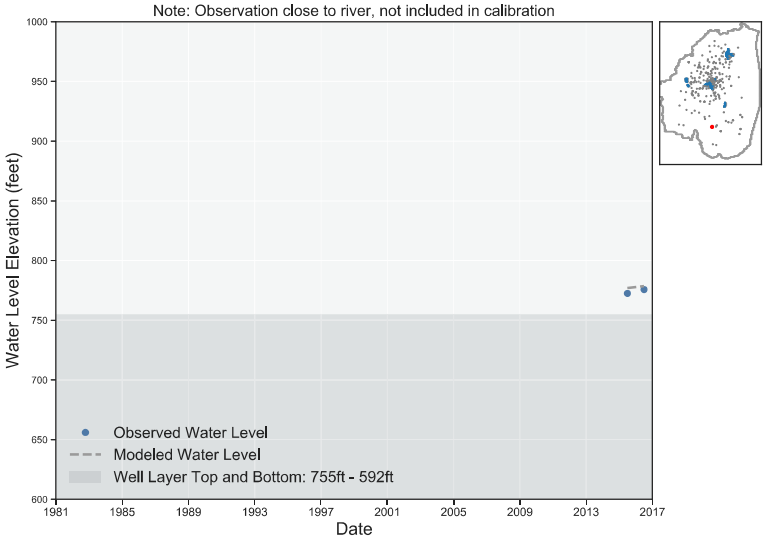
Well 767883 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



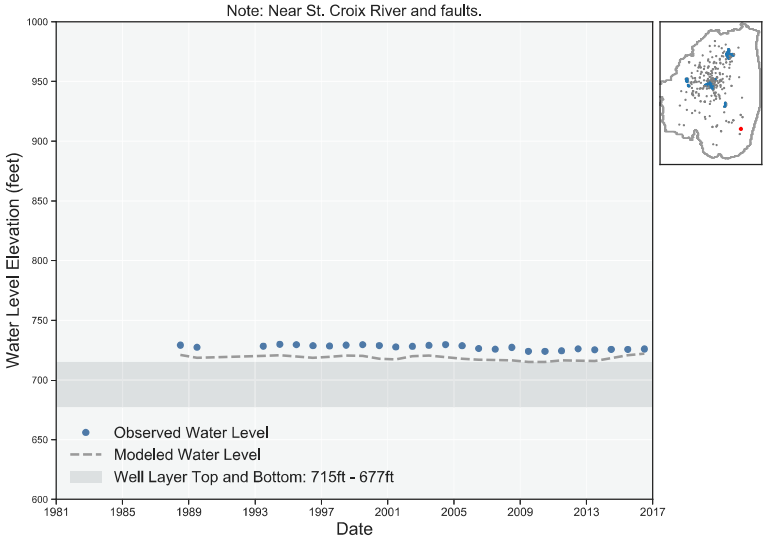
Well 767882 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



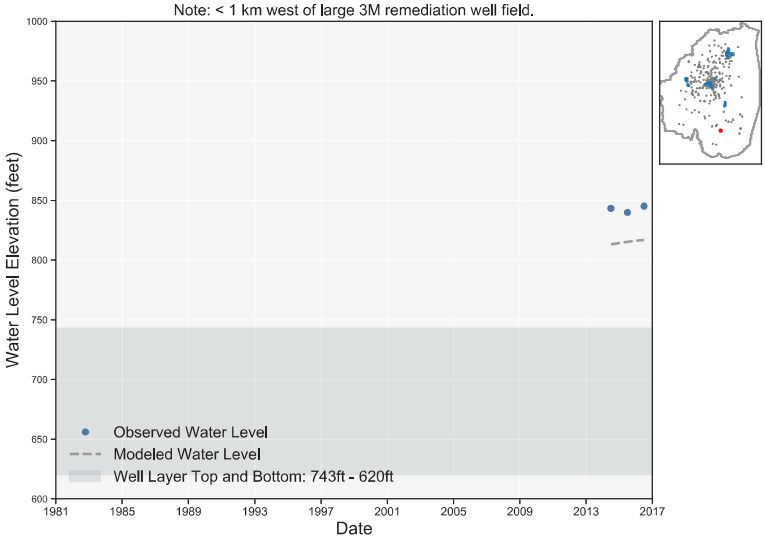
Well 82012 - Aq: CSTL Layers: 6 - 6

Note: Near St. Croix River and faults.



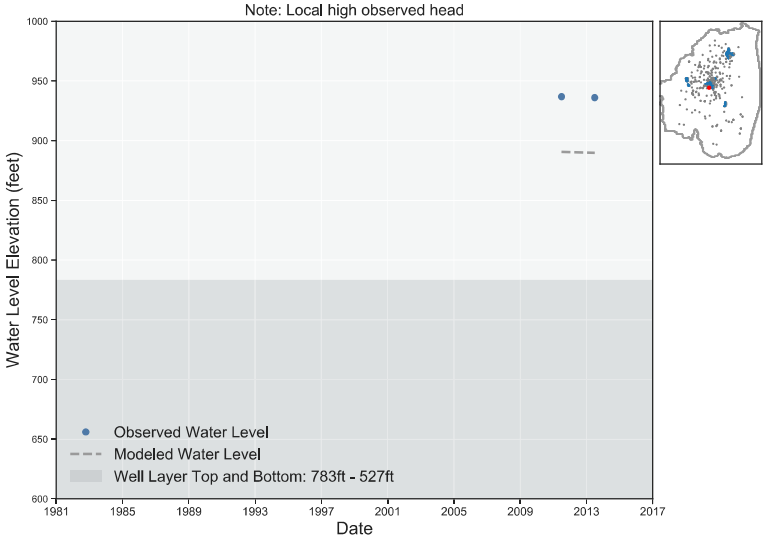
Well 82061 - Aq: OPDC Layers: 6 - 6

Note: < 1 km west of large 3M remediation well field.



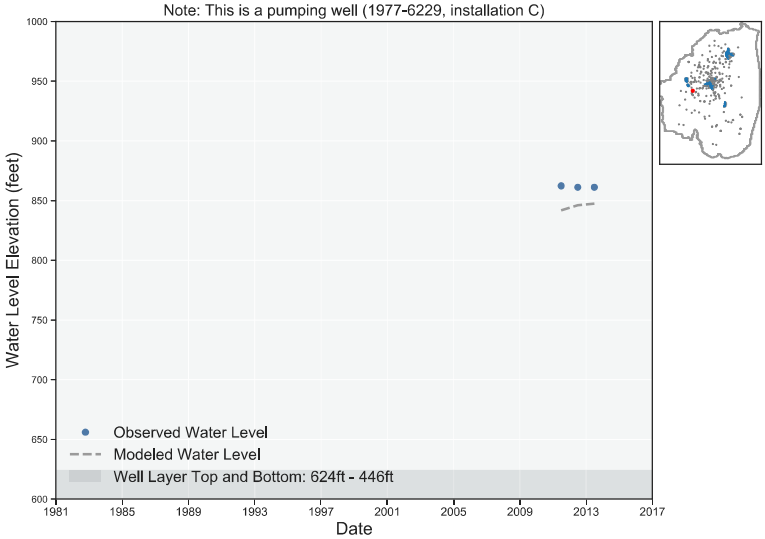
Well 226572 - Aq: OPCJ Layers: 6 - 7

Note: Local high observed head



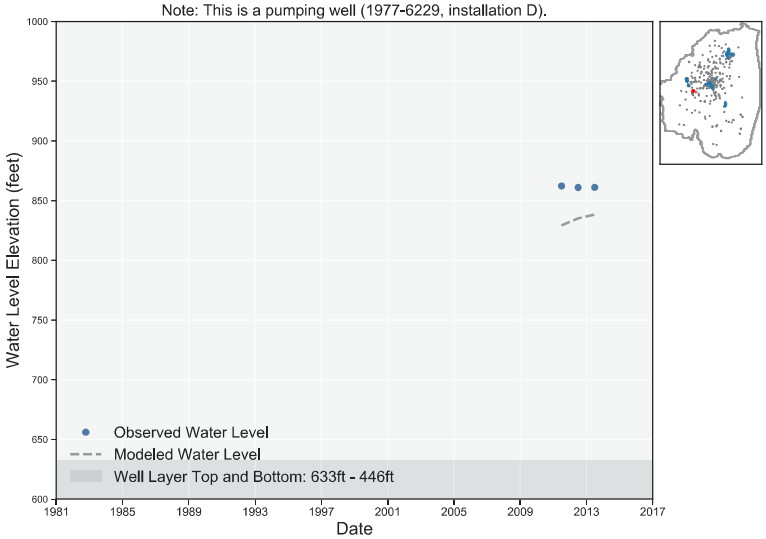
Well 127292 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation C)



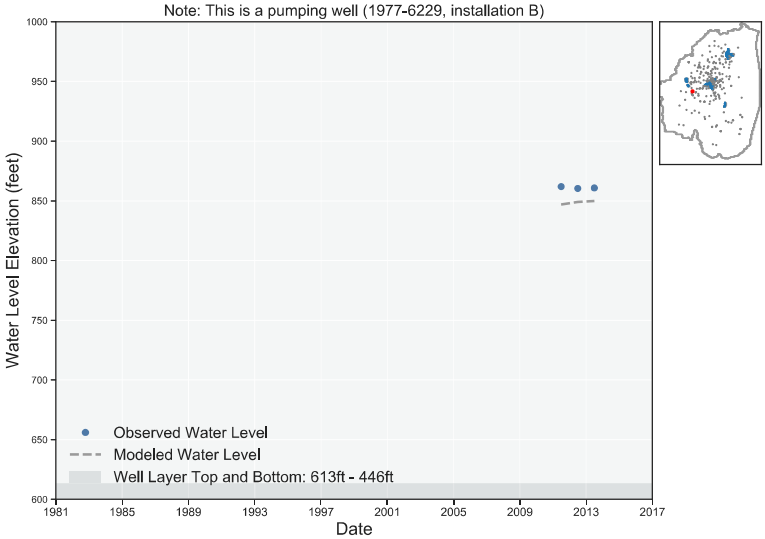
Well 151583 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation D).



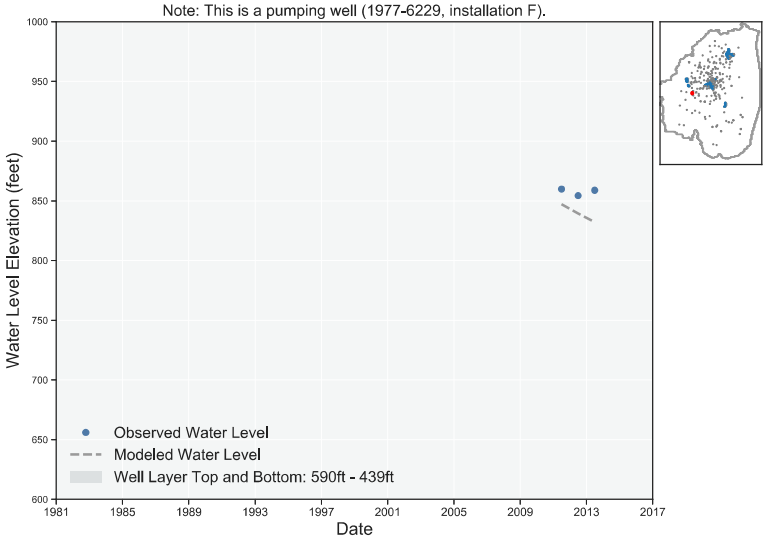
Well 133312 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation B)



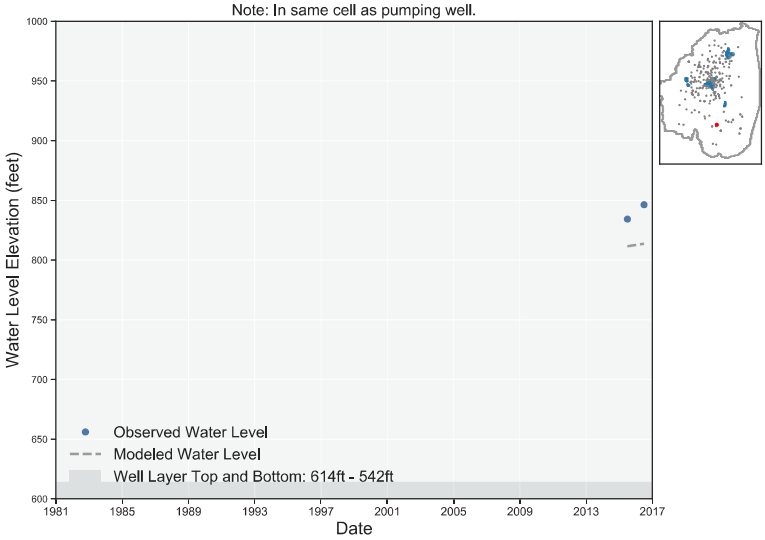
Well 706803 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation F).



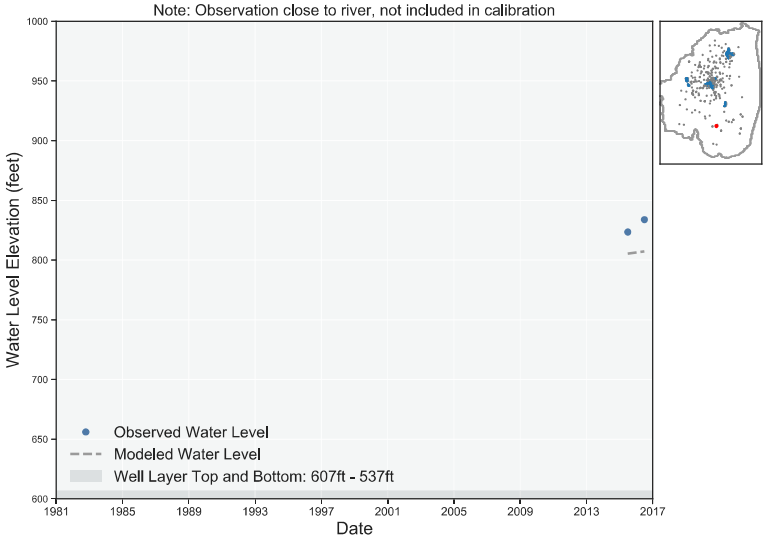
Well 763366 - Aq: CJDN Layers: 7 - 7

Note: In same cell as pumping well.



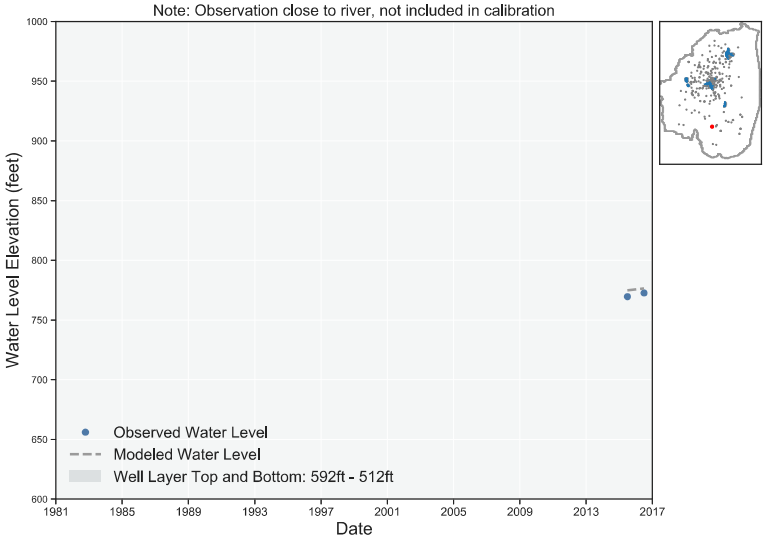
Well 767884 - Aq: CJDN Layers: 7 - 7

Note: Observation close to river, not included in calibration



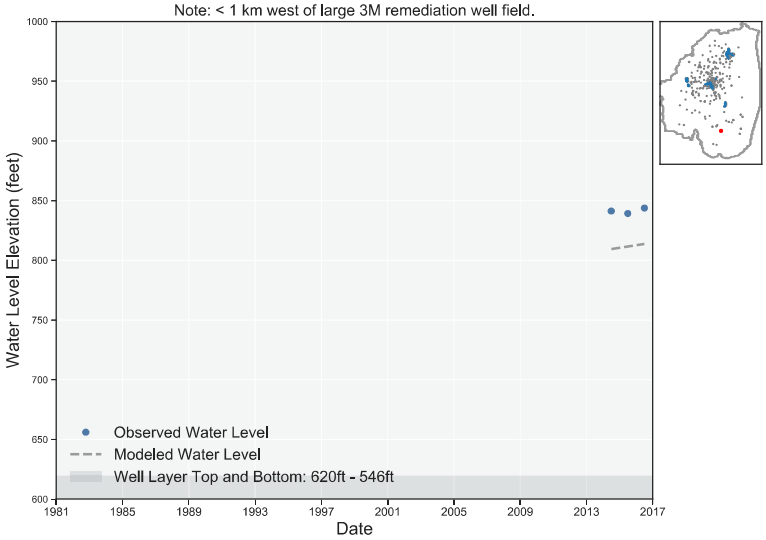
Well 767885 - Aq: CJDN Layers: 7 - 7

Note: Observation close to river, not included in calibration



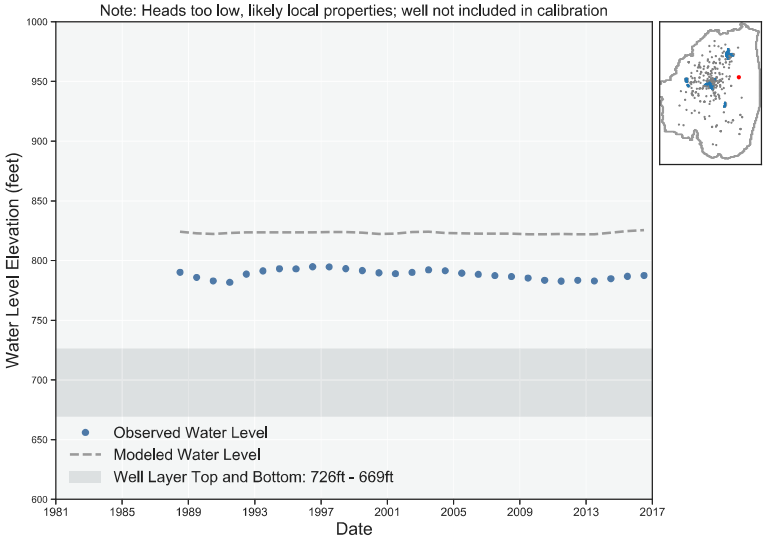
Well 82060 - Aq: CJDN Layers: 7 - 7

Note: < 1 km west of large 3M remediation well field.



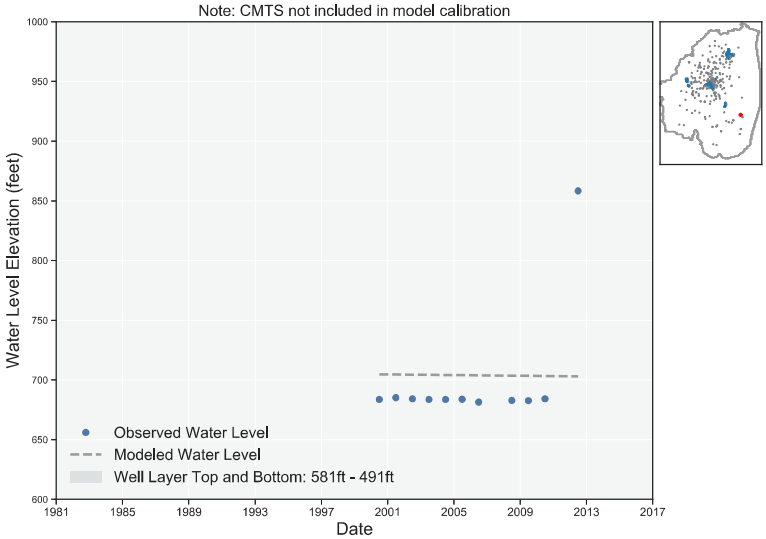
Well 82023 - Aq: QBAA Layers: 8 - 8

Note: Heads too low, likely local properties; well not included in calibration

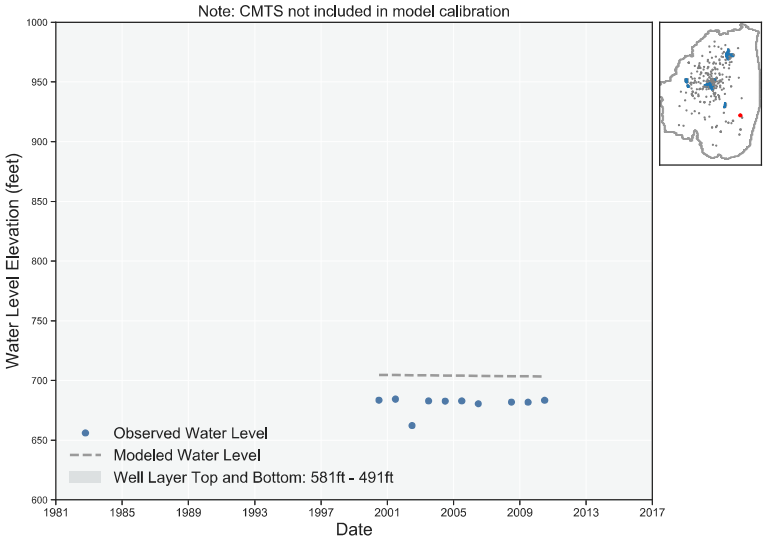


Well 82046 - Aq: CMTS Layers: 9 - 9

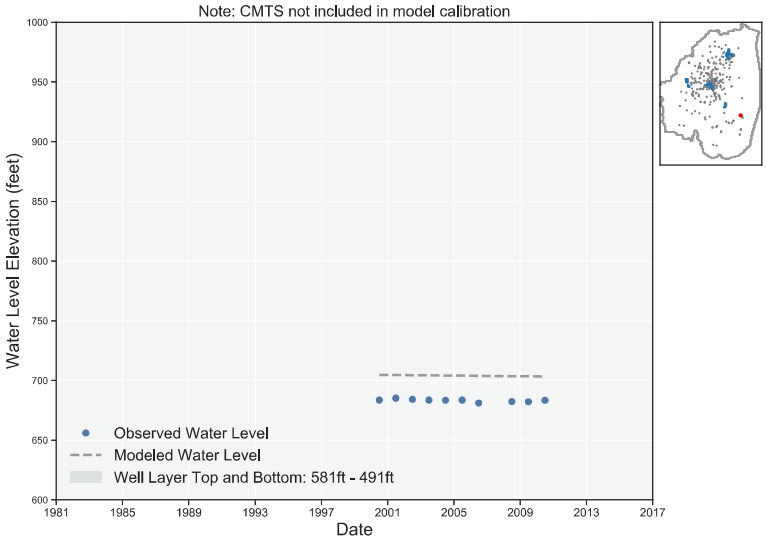
Note: CMTS not included in model calibration



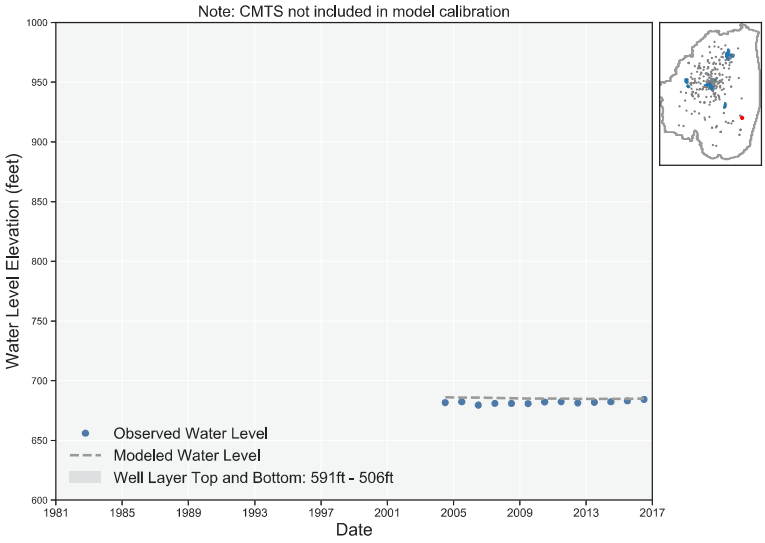
Well 82049 - Aq: CMTS Layers: 9 - 9



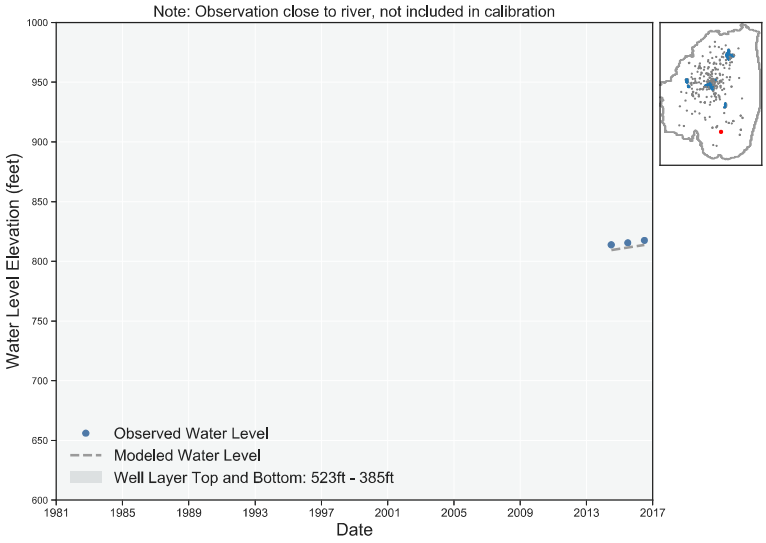
Well 82050 - Aq: CMTS Layers: 9 - 9



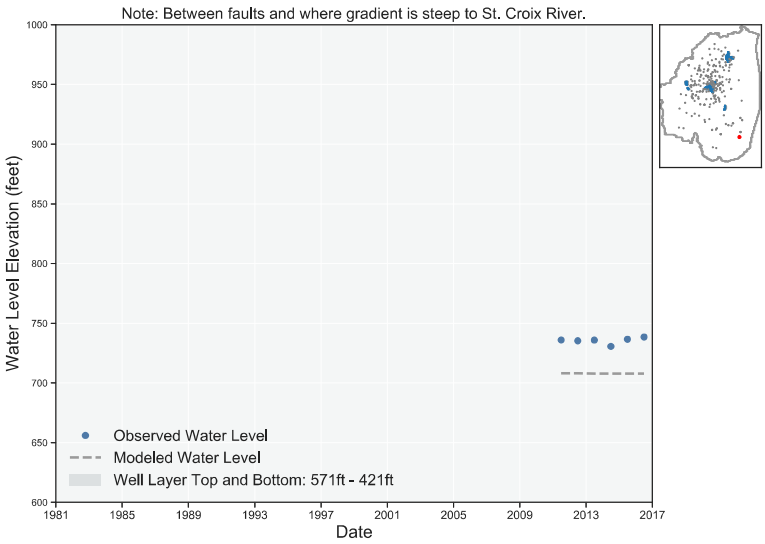
Well 82051 - Aq: CECRCMTS Layers: 9 - 9



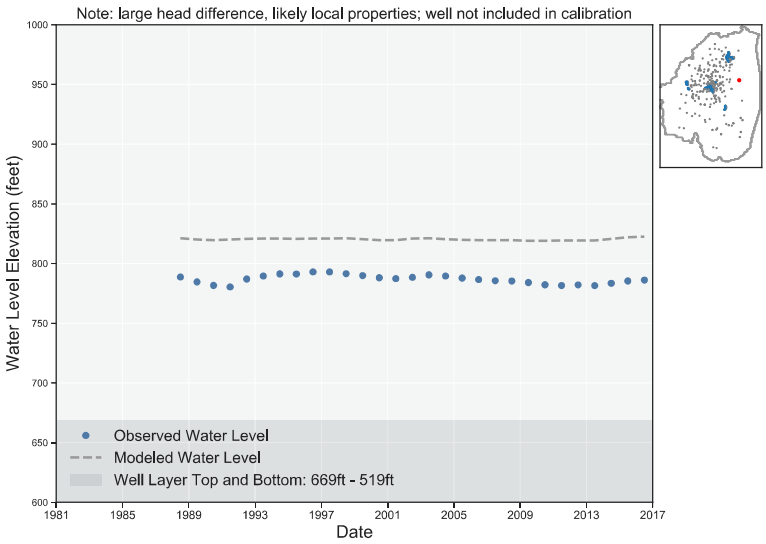
Well 82059 - Aq: CTCG Layers: 9 - 9



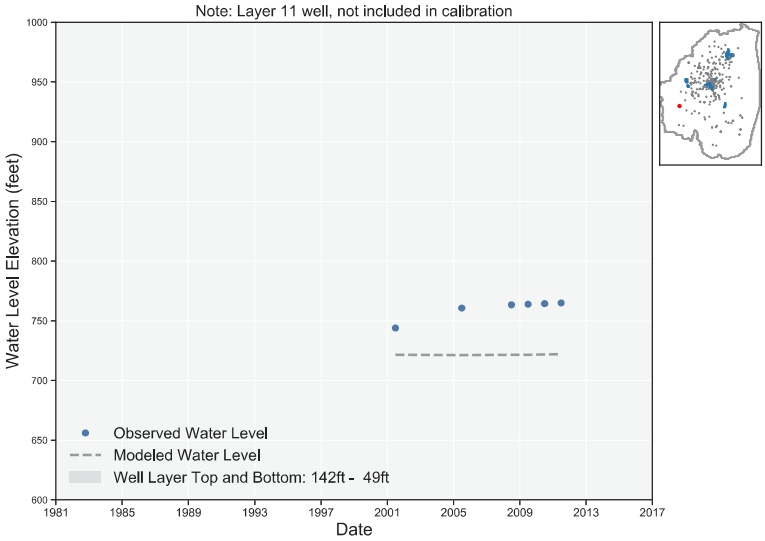
Well 82054 - Aq: CFIG Layers: 9 - 9



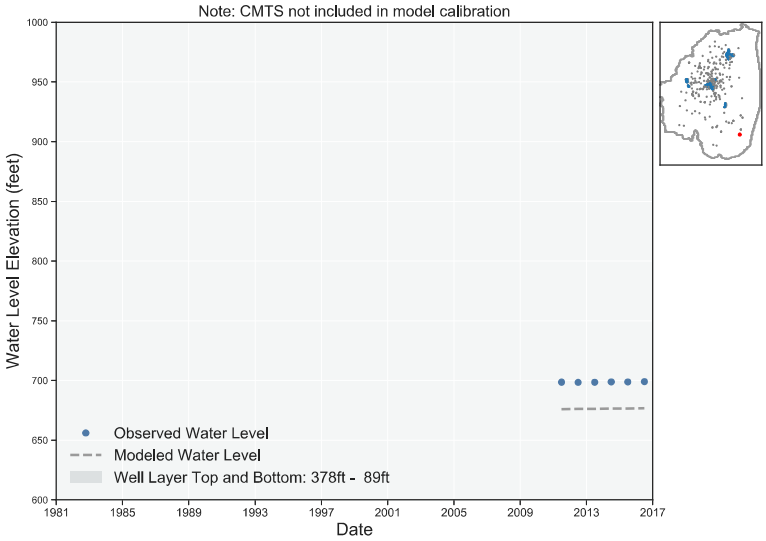
Well 82022 - Aq: CFRNCIGL Layers: 9 - 10



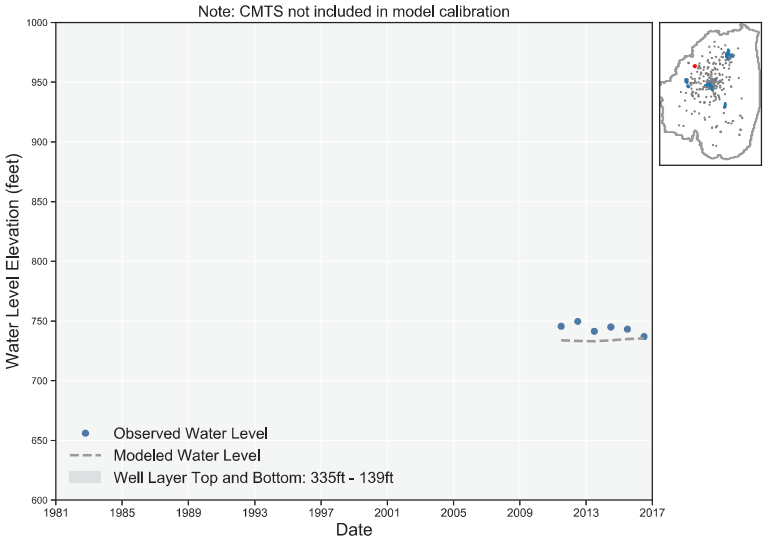
Well 62042 - Aq: CECR Layers: 11 - 11



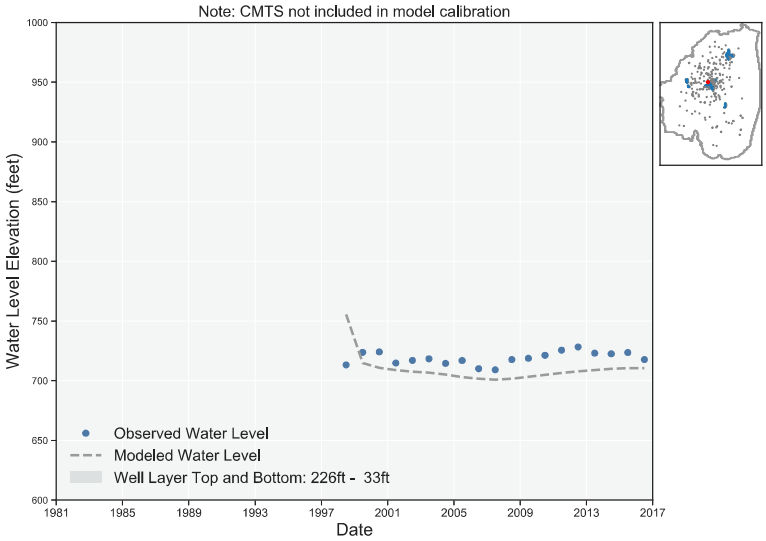
Well 82053 - Aq: CMTS Layers: 11 - 12



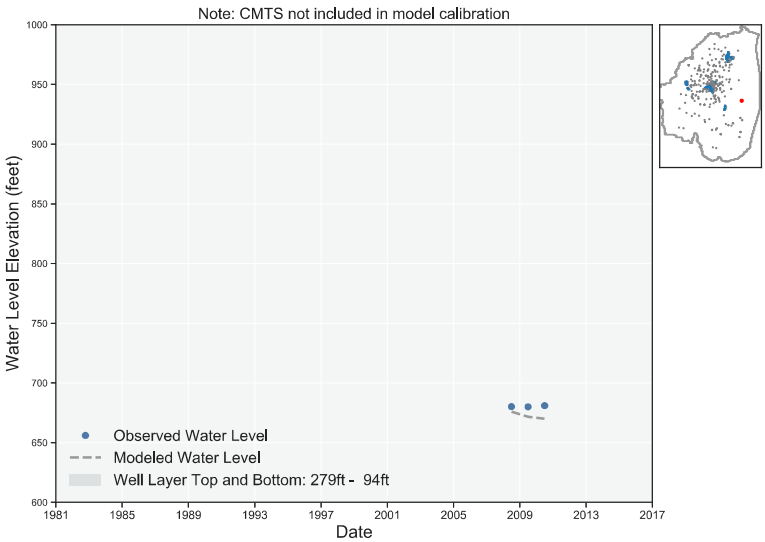
Well 2038 - Aq: CMTS Layers: 12 - 12



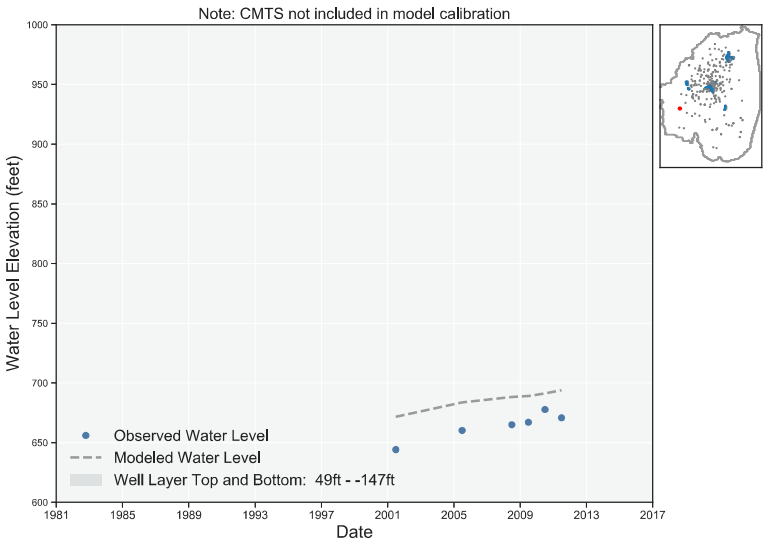
Well 62046 - Aq: CMTS Layers: 12 - 12



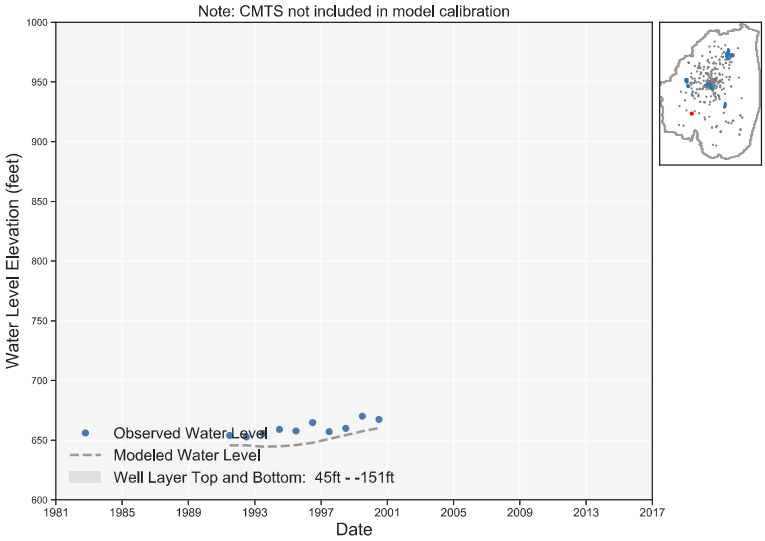
Well 82052 - Aq: CMTS Layers: 12 - 12



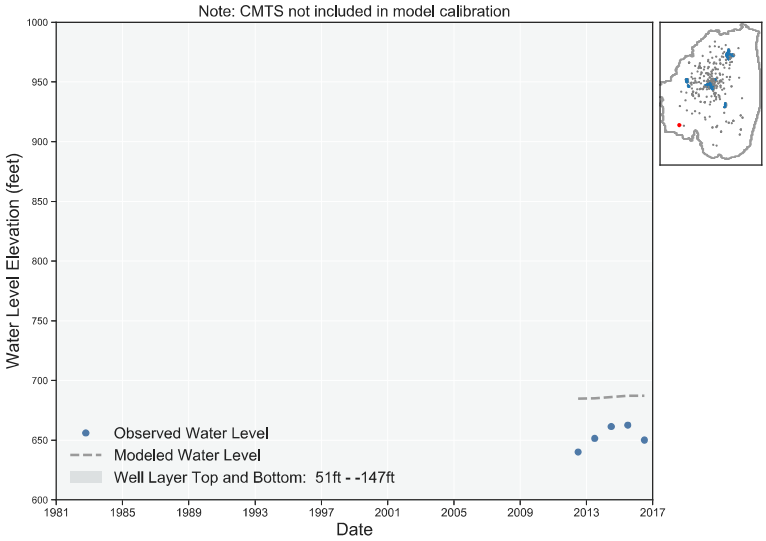
Well 62043 - Aq: CMTS Layers: 12 - 12



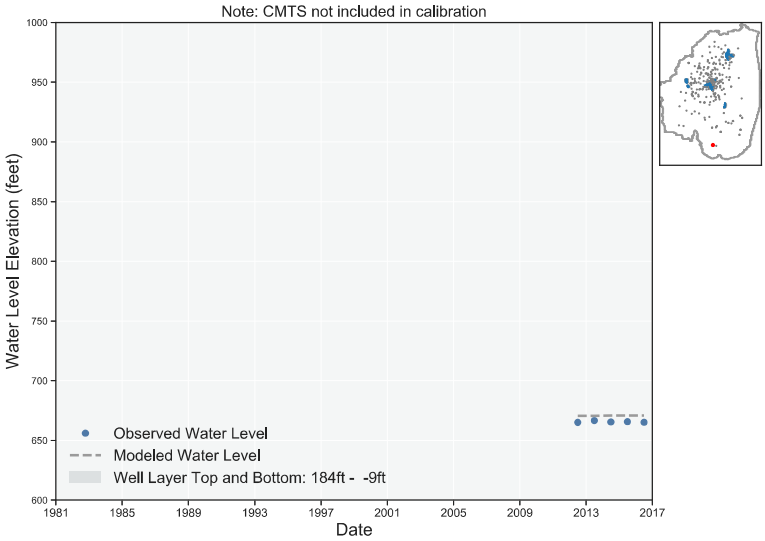
Well 62036 - Aq: CMTS Layers: 12 - 12



Well 27069 - Aq: CMTS Layers: 12 - 12

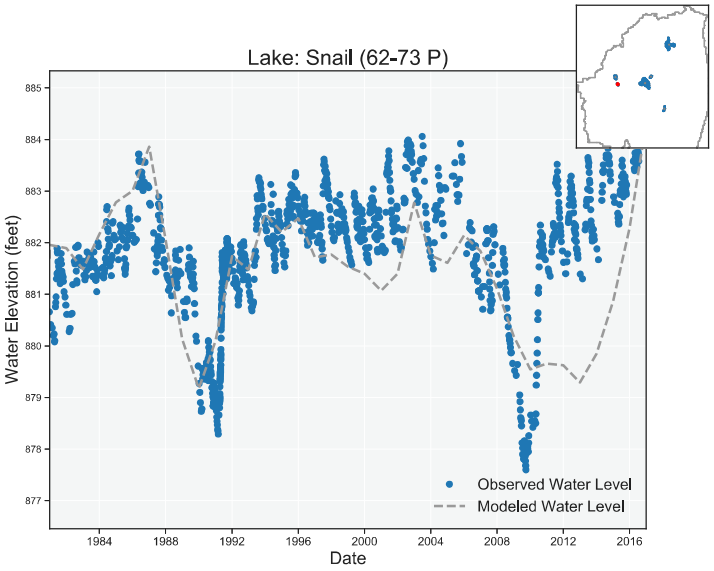


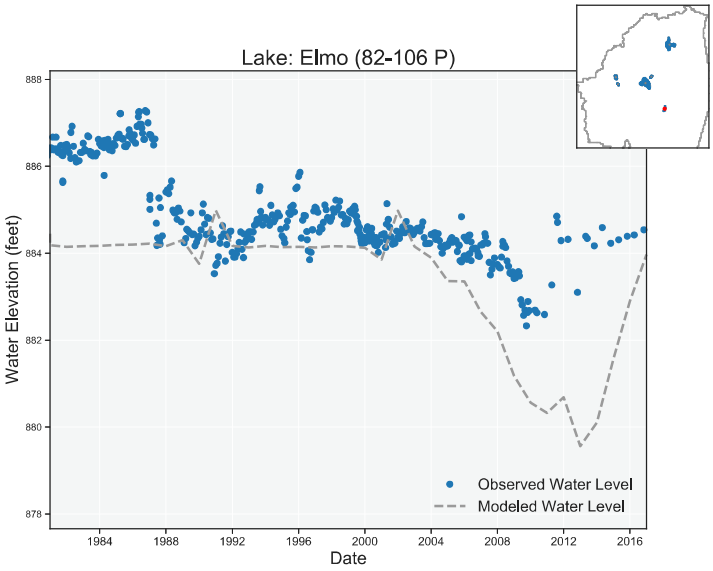
Well 82056 - Aq: CMTS Layers: 12 - 12

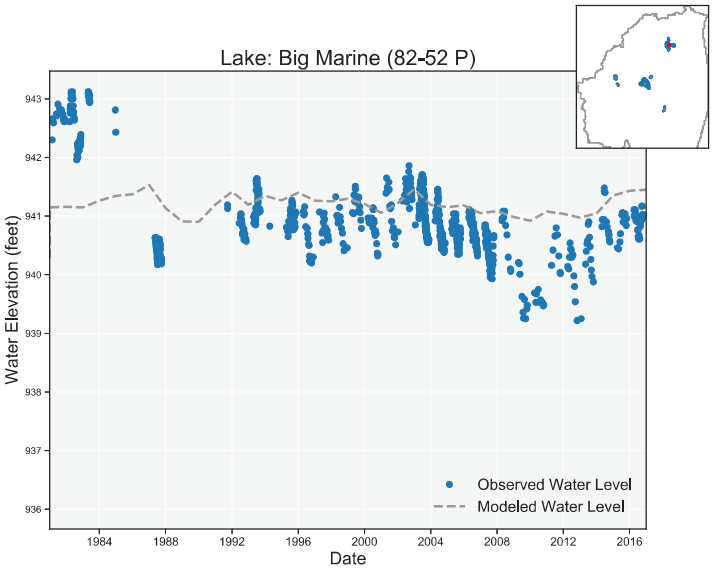


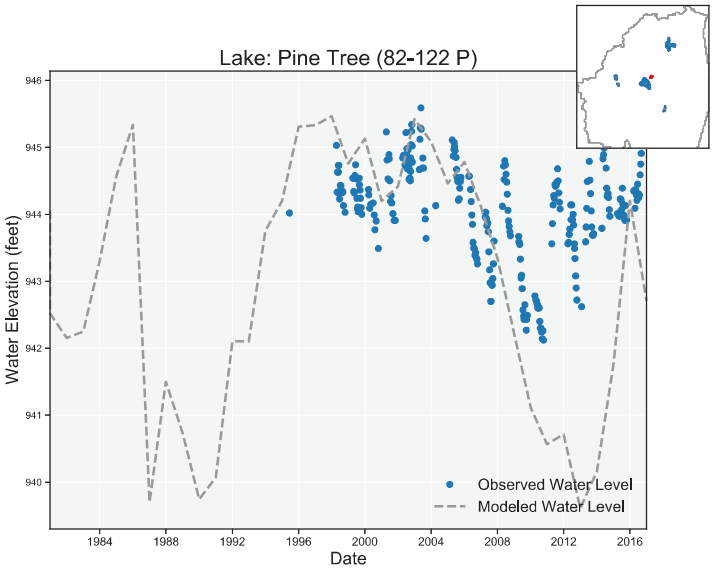
Appendix B-2

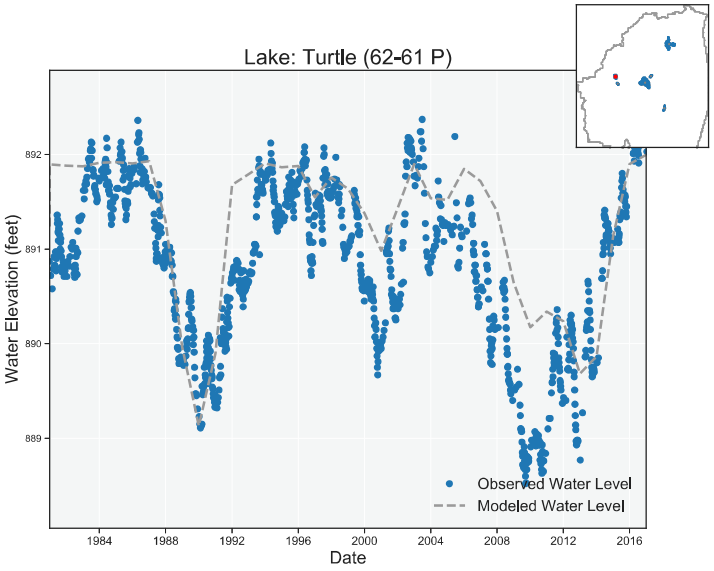
Auto-scaled Plots for the Annual Stress Period Model

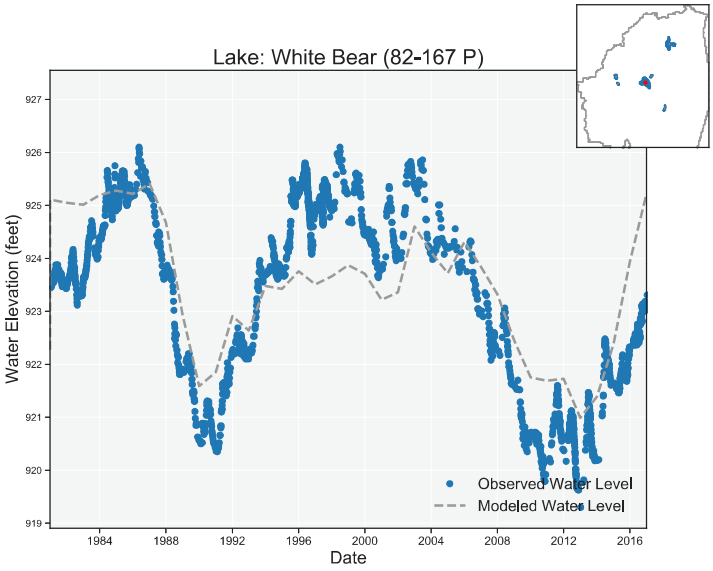

Lake: Snail (62-73 P)
Water Elevation (feet)
885
884
883
882
881
880
879
878
877
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Elmo (82-106 P)
Water Elevation (feet)
888
886
884
882
880
878
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

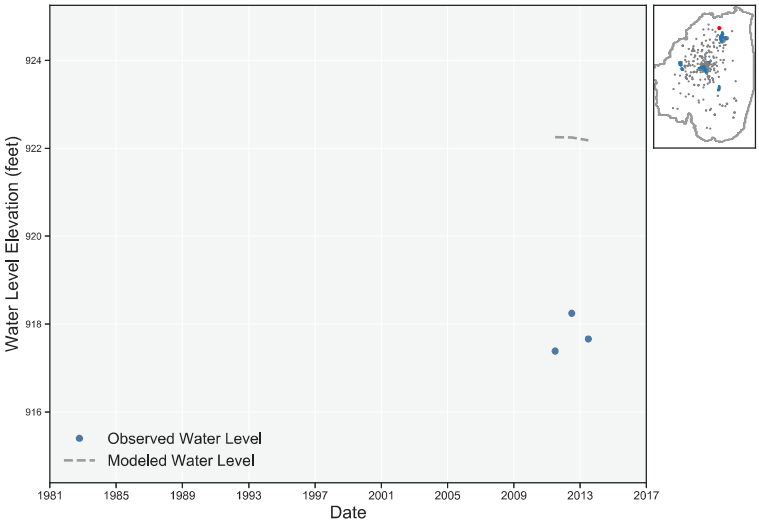

Lake: Big Marine (82-52 P)
Water Elevation (feet)
943
942
941
940
939
938
937
936
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Pine Tree (82-122 P)
Water Elevation (feet)
946
945
944
943
942
941
940
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

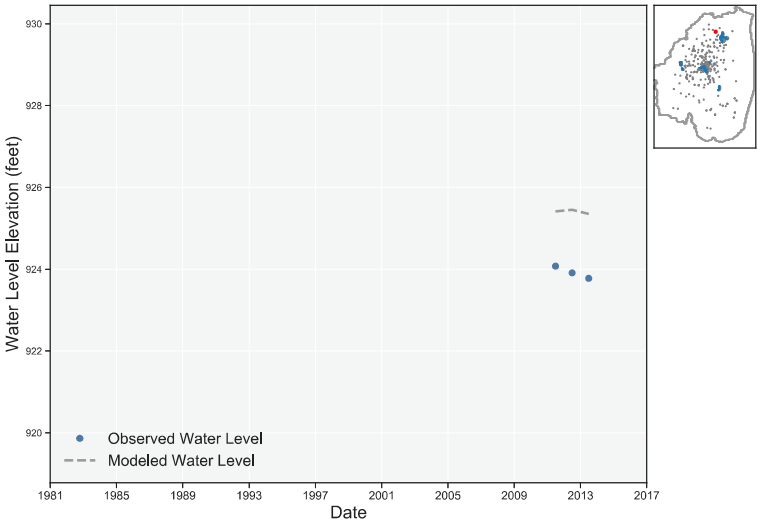

Lake: Turtle (62-61 P)
Water Elevation (feet)
892
891
890
889
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: White Bear (82-167 P)
Water Elevation (feet)
927
926
925
924
923
922
921
920
919
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

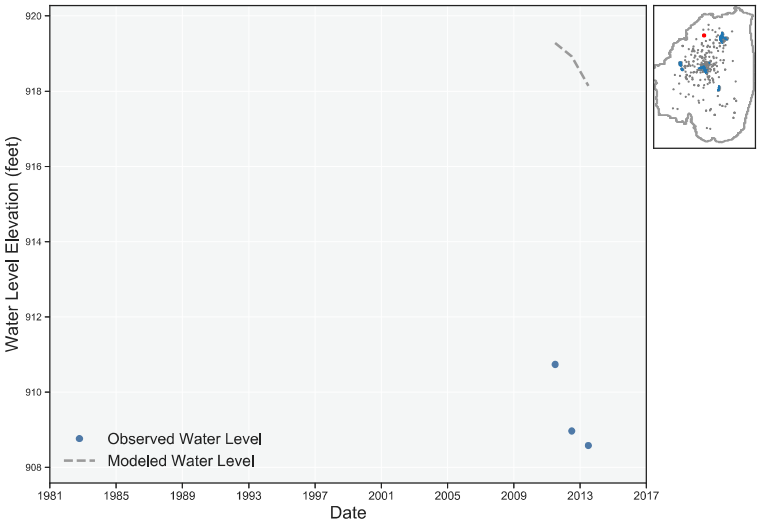
Well 138275 - Aq: QBAA Layers: 4 - 4



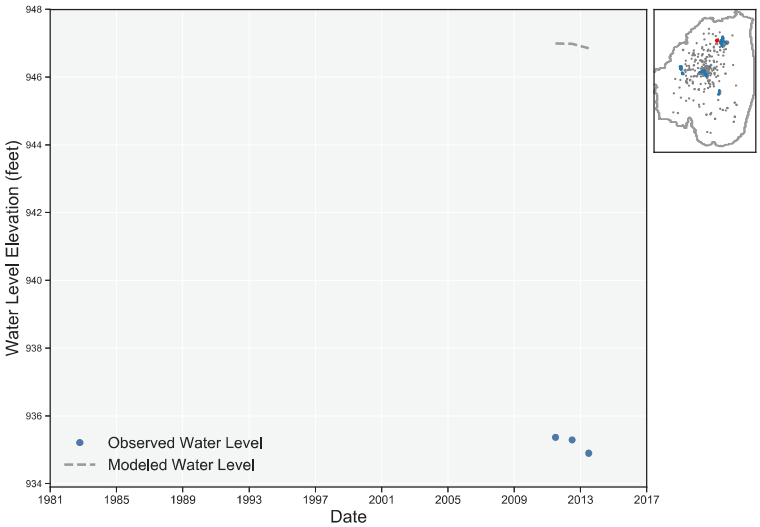
Well 446292 - Aq: QBAA Layers: 4 - 4



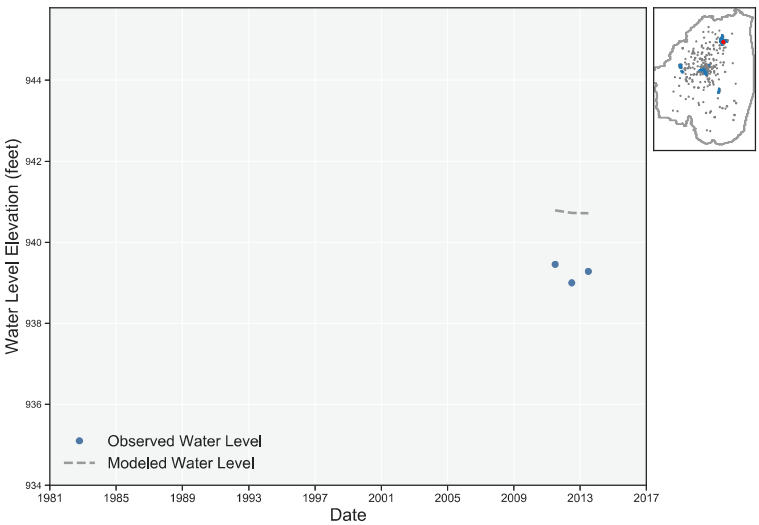
Well 404644 - Aq: QBAA Layers: 4 - 4



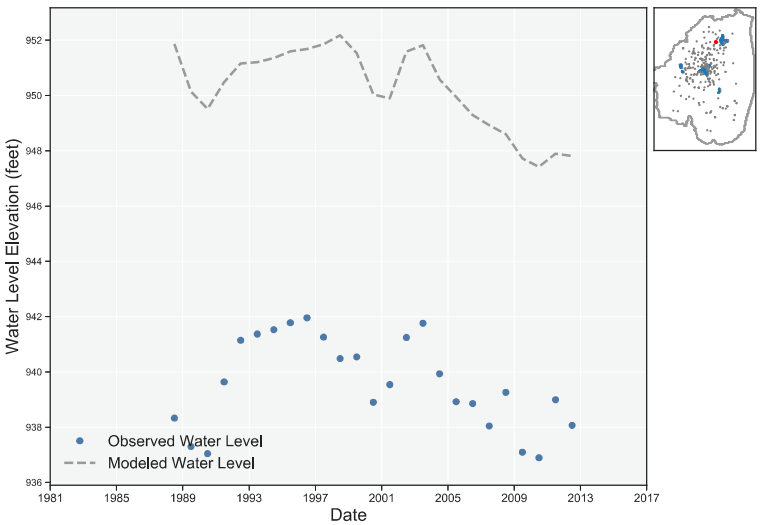
Well 112422 - Aq: QBAA Layers: 4 - 4



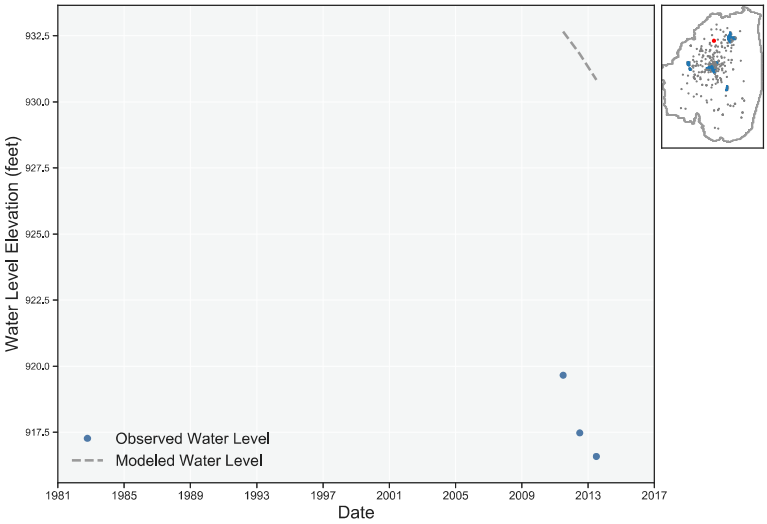
Well 139010 - Aq: QBAA Layers: 4 - 4



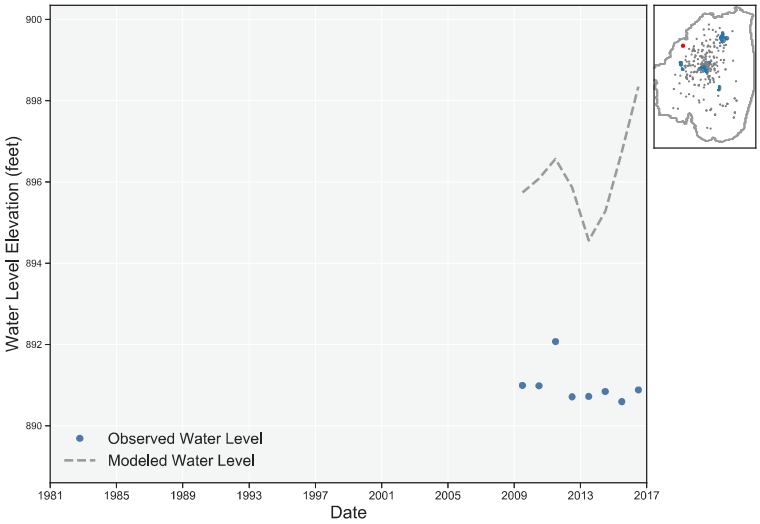
Well 82036 - Aq: QWTA Layers: 4 - 4



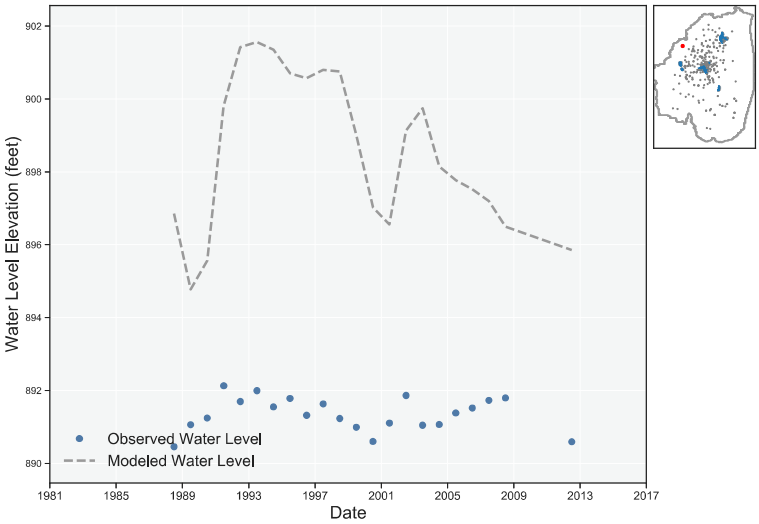
Well 136144 - Aq: QBAA Layers: 4 - 4



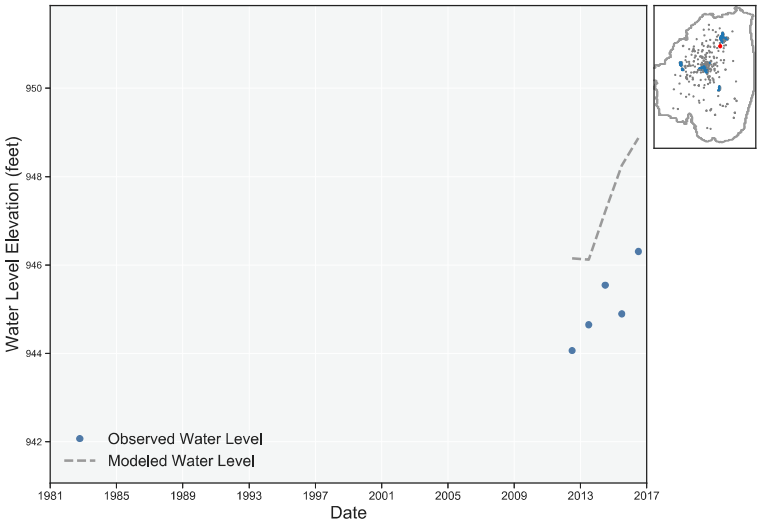
Well 2030 - Aq: QWTA Layers: 4 - 4



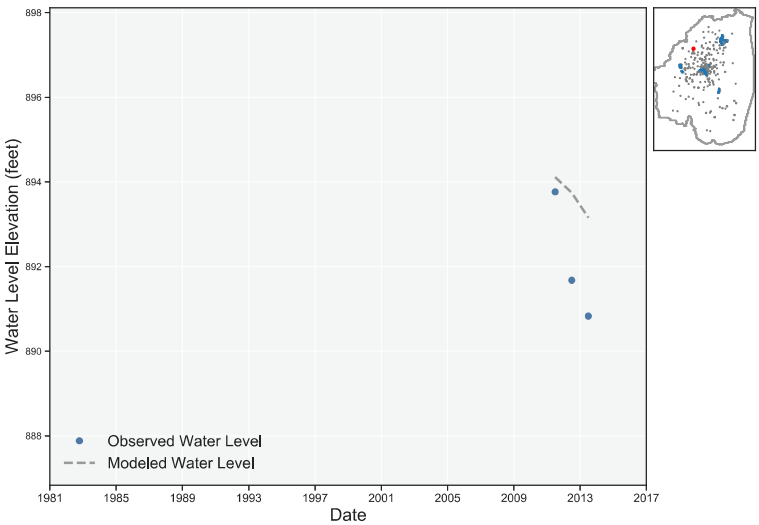
Well 2010 - Aq: QWTA Layers: 4 - 4



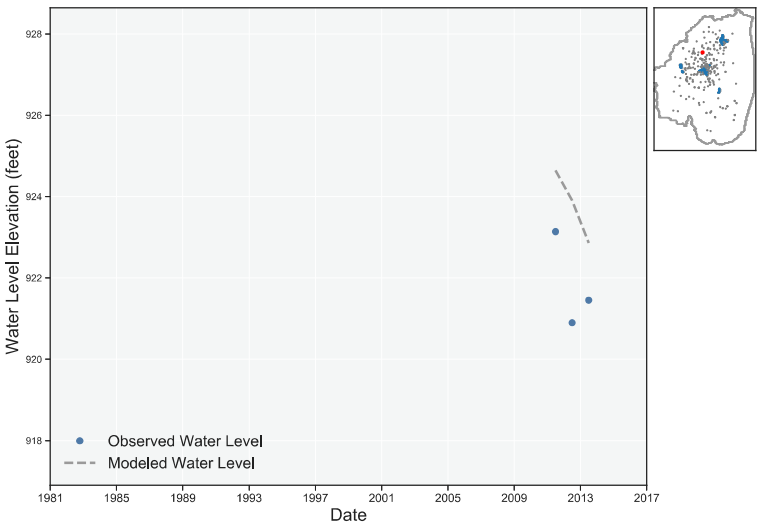
Well 82055 - Aq: QBAA Layers: 4 - 4



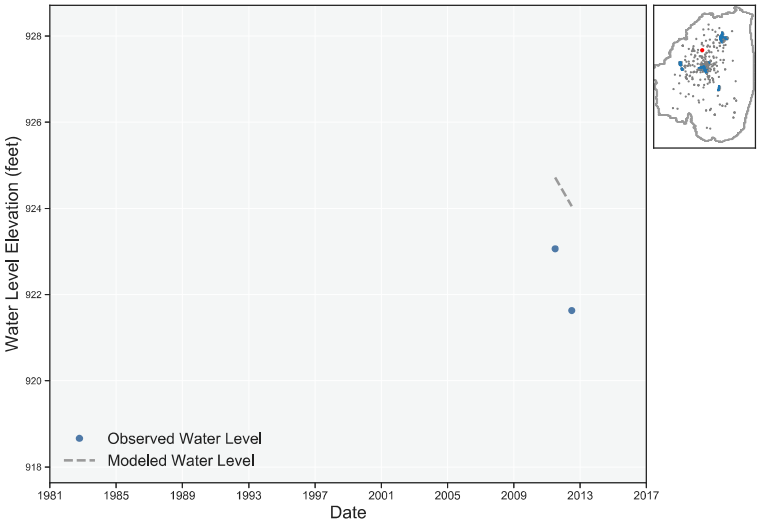
Well 169252 - Aq: QBAA Layers: 4 - 4



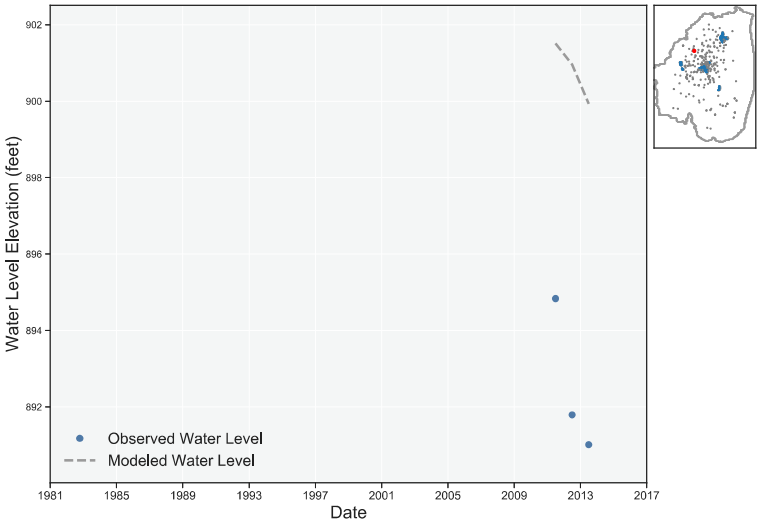
Well 620717 - Aq: QWTA Layers: 4 - 4



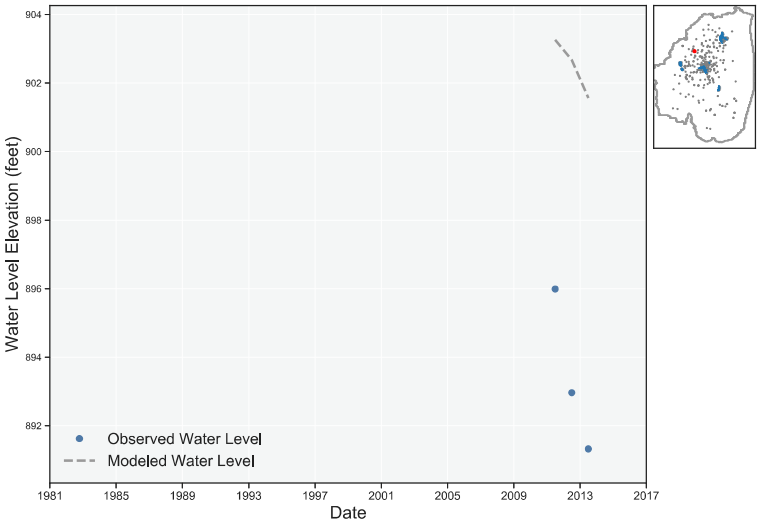
Well 620718 - Aq: QWTA Layers: 4 - 4



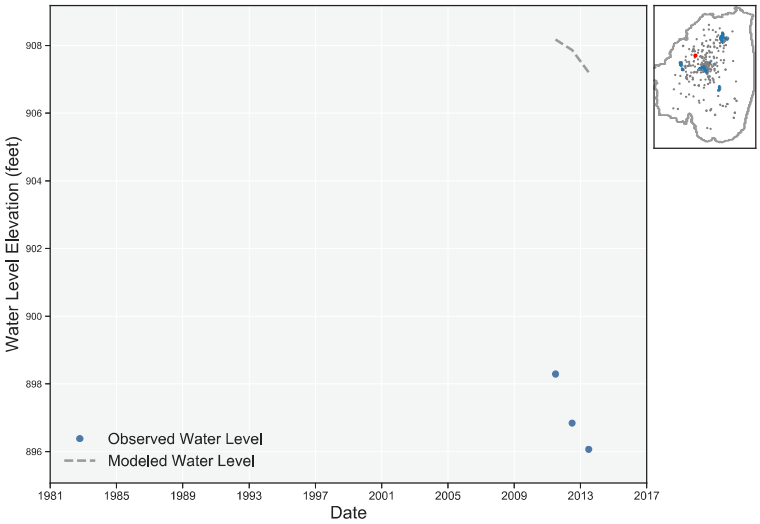
Well 435278 - Aq: QBAA Layers: 4 - 4



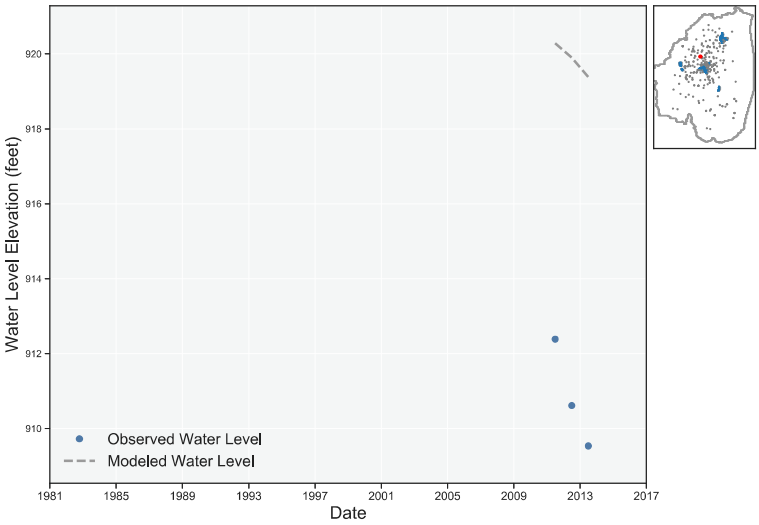
Well 435308 - Aq: QBAA Layers: 4 - 4



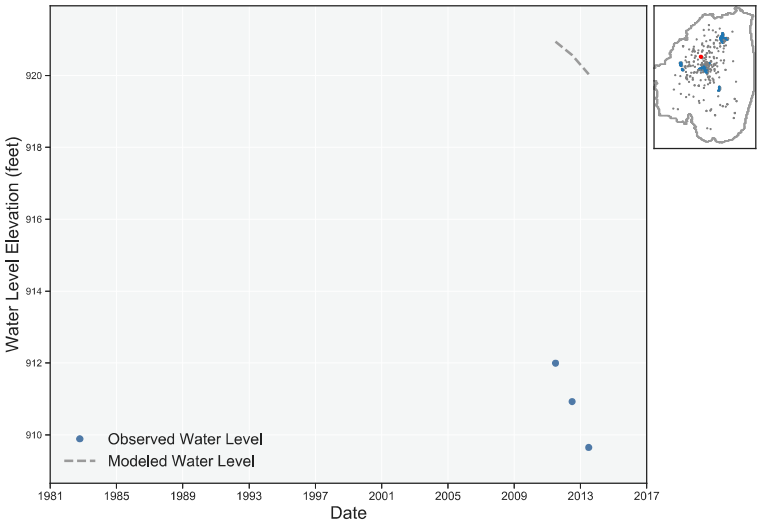
Well 126870 - Aq: QBAA Layers: 4 - 4



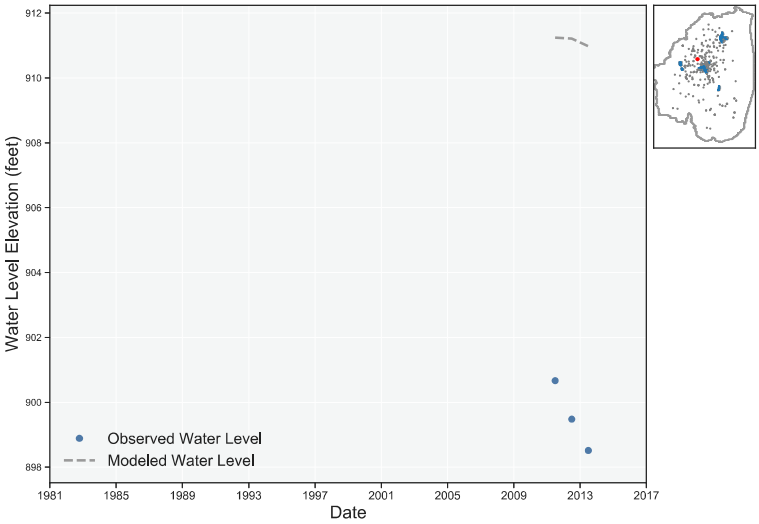
Well 465951 - Aq: QBAA Layers: 4 - 4



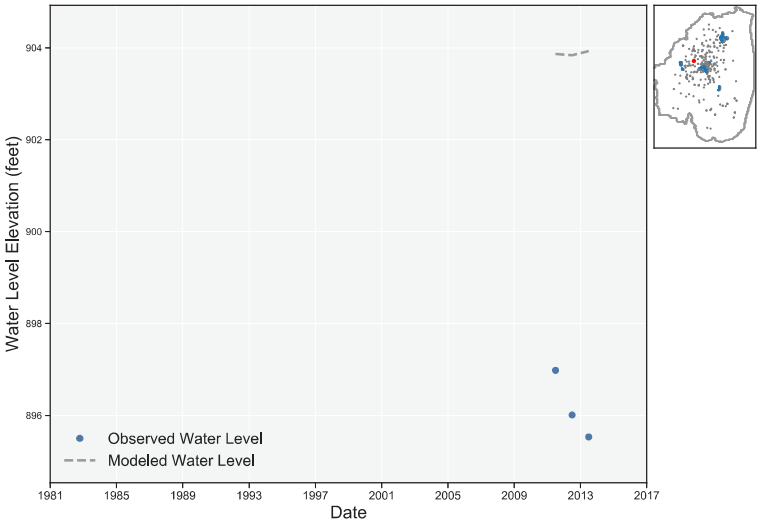
Well 496784 - Aq: QBAA Layers: 4 - 4



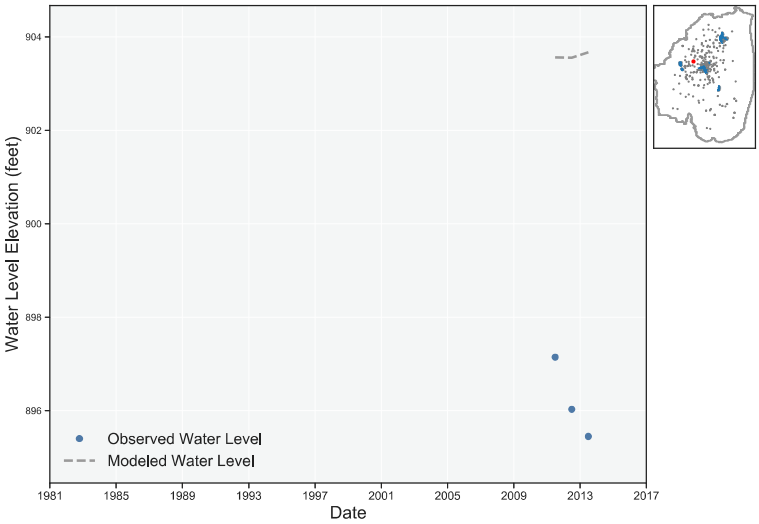
Well 112442 - Aq: QBAA Layers: 4 - 4



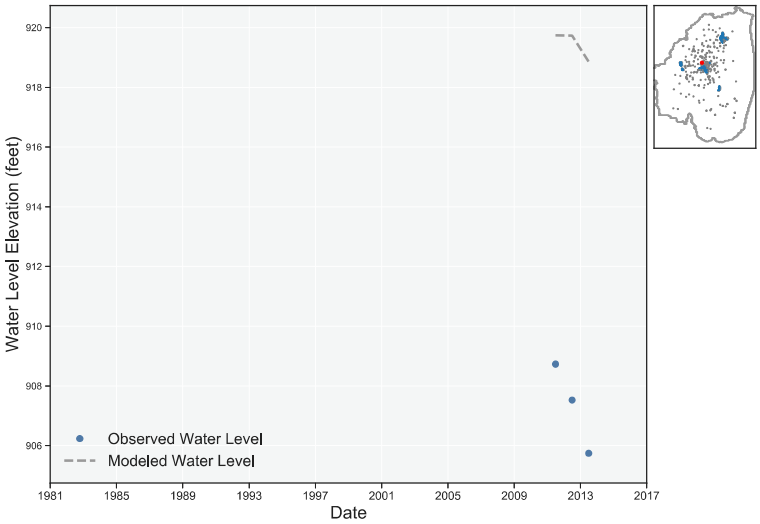
Well 430506 - Aq: QBAA Layers: 4 - 4



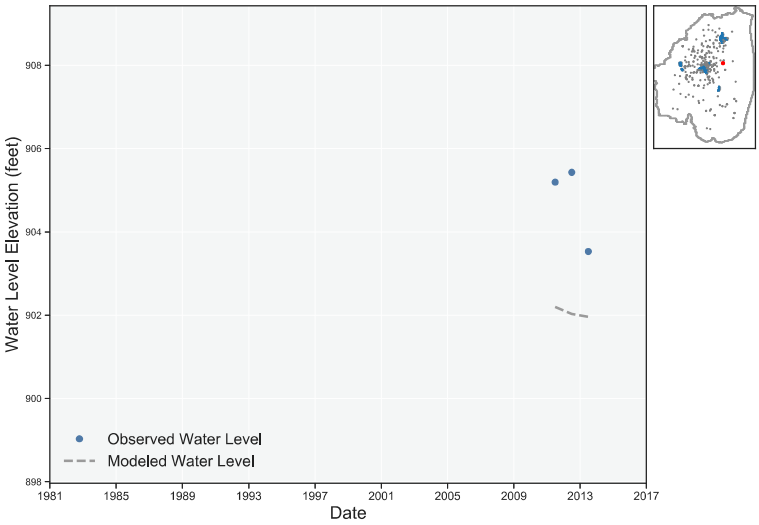
Well 130810 - Aq: QBAA Layers: 4 - 4



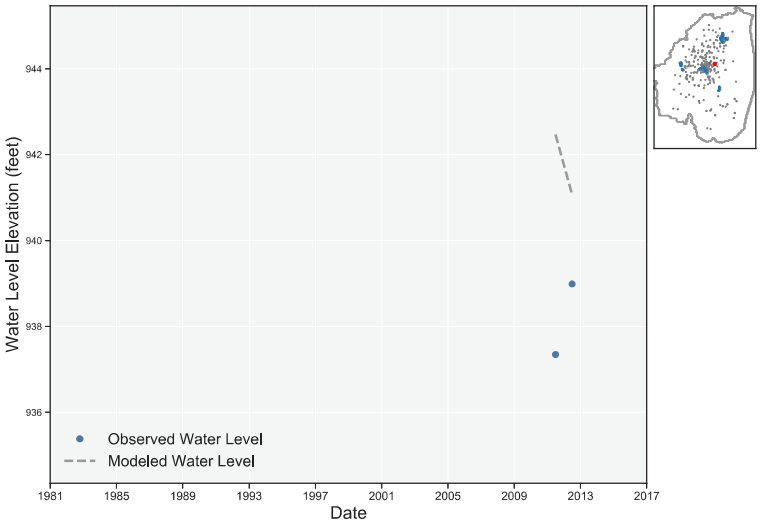
Well 141728 - Aq: Q Layers: 4 - 4



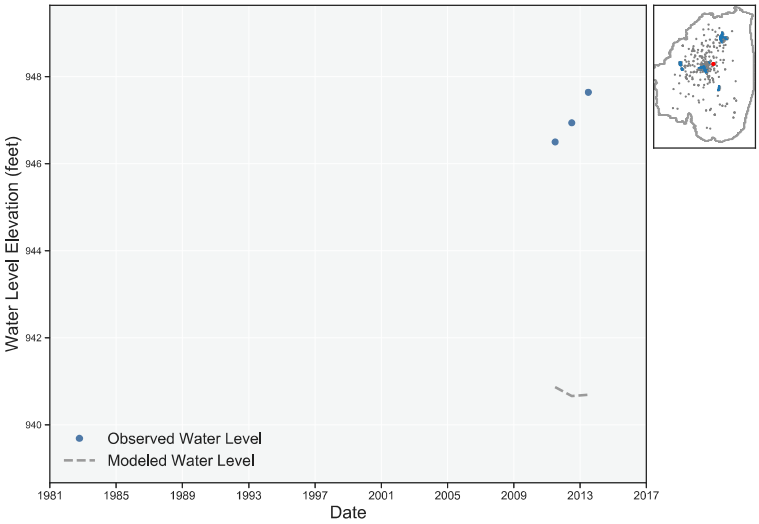
Well 153500 - Aq: QWTA Layers: 4 - 4



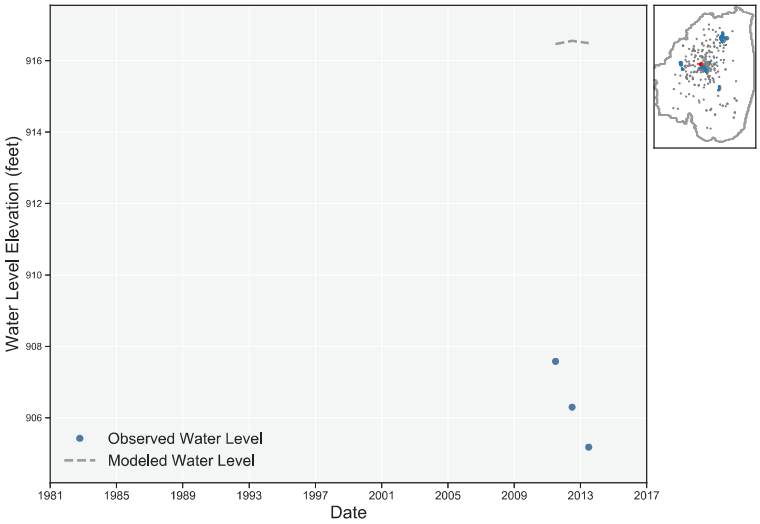
Well 418799 - Aq: QBAA Layers: 4 - 4



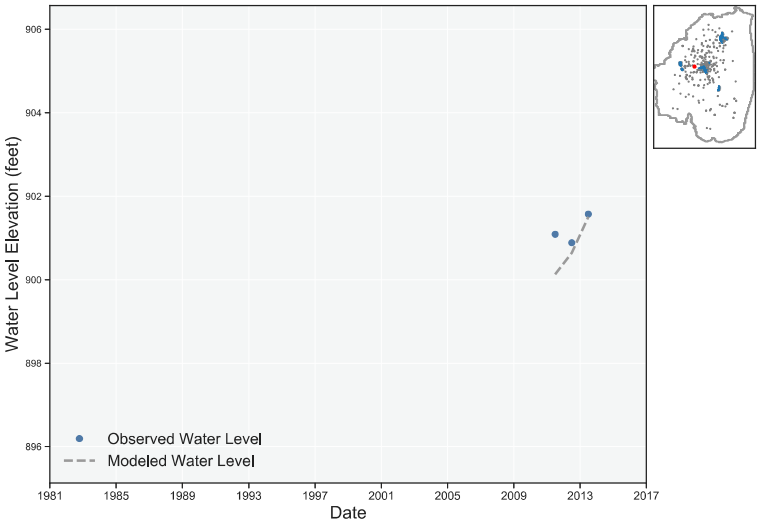
Well 404277 - Aq: QWTA Layers: 4 - 4



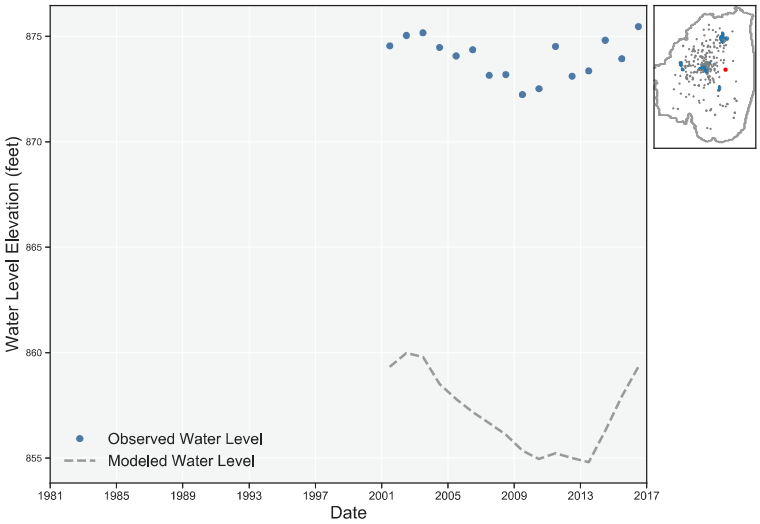
Well 186956 - Aq: Q Layers: 4 - 4



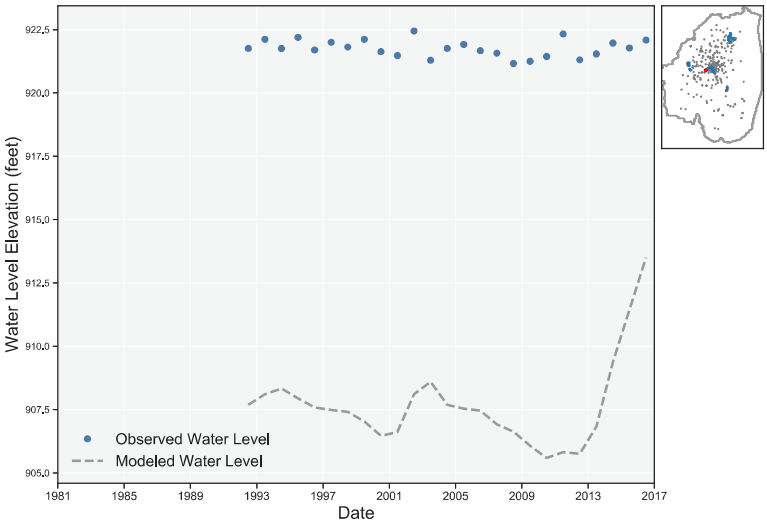
Well 173943 - Aq: QBAA Layers: 4 - 4



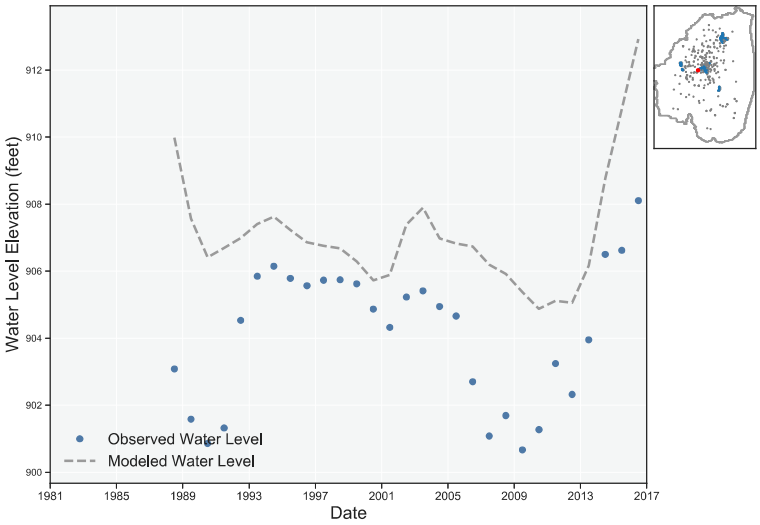
Well 82048 - Aq: QBAA Layers: 4 - 4



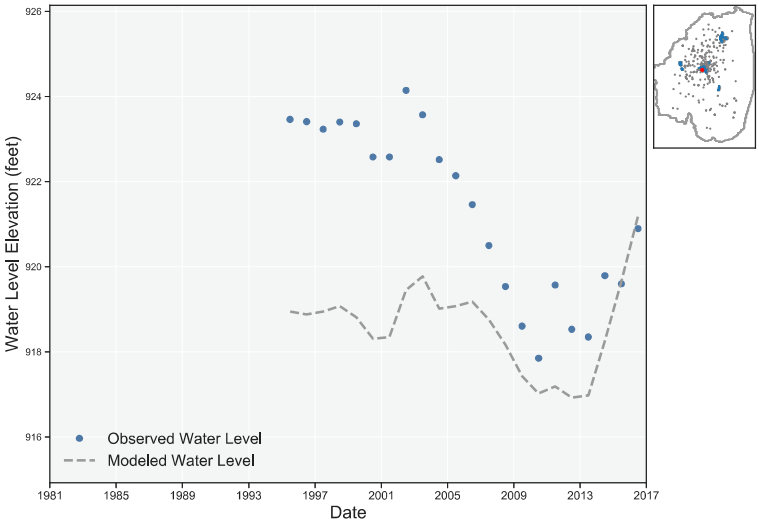
Well 62039 - Aq: QWTA Layers: 4 - 4



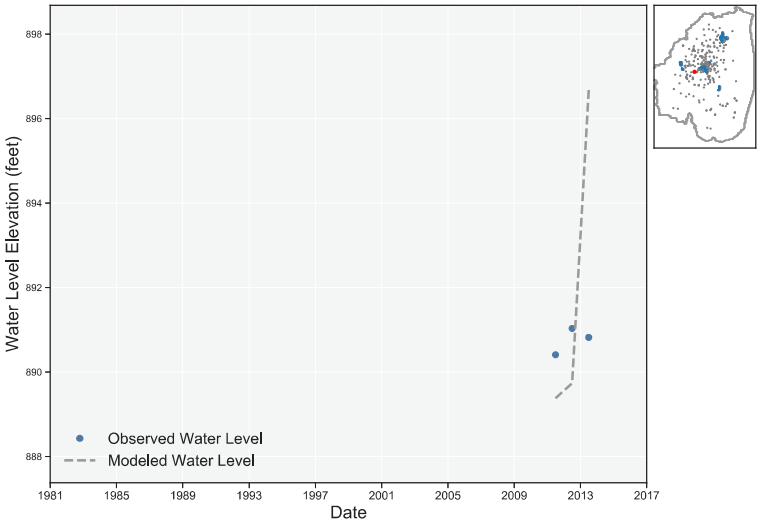
Well 62033 - Aq: QBAA Layers: 4 - 4



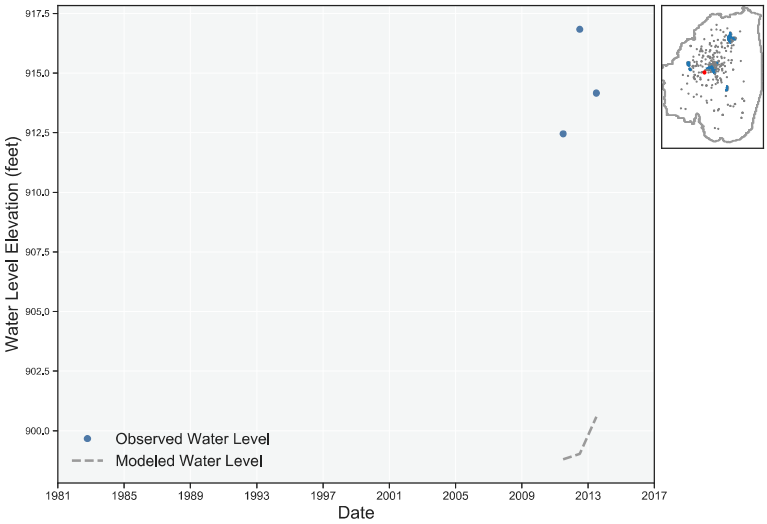
Well 62045 - Aq: QBAA Layers: 4 - 4



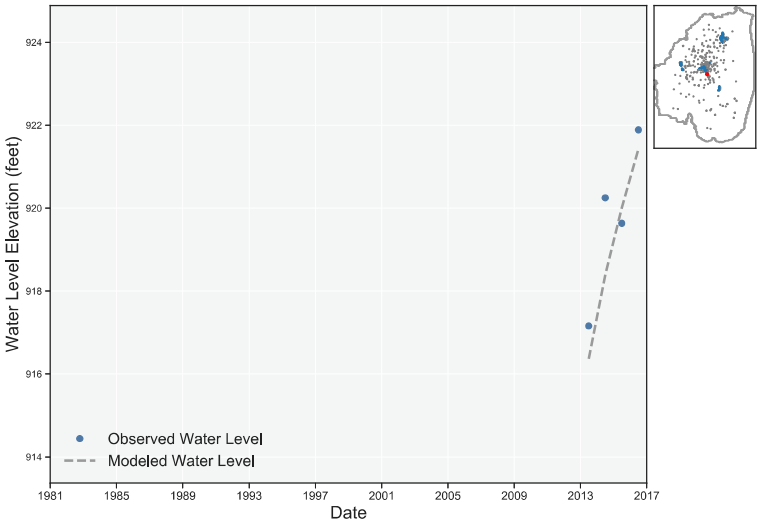
Well 151732 - Aq: Q Layers: 4 - 4



Well 401598 - Aq: QBUA Layers: 4 - 4



Well 82057 - Aq: QWTA Layers: 4 - 4



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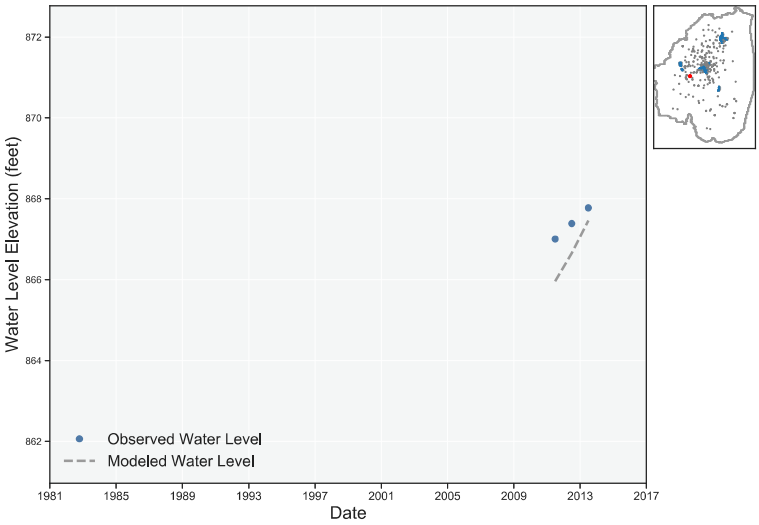
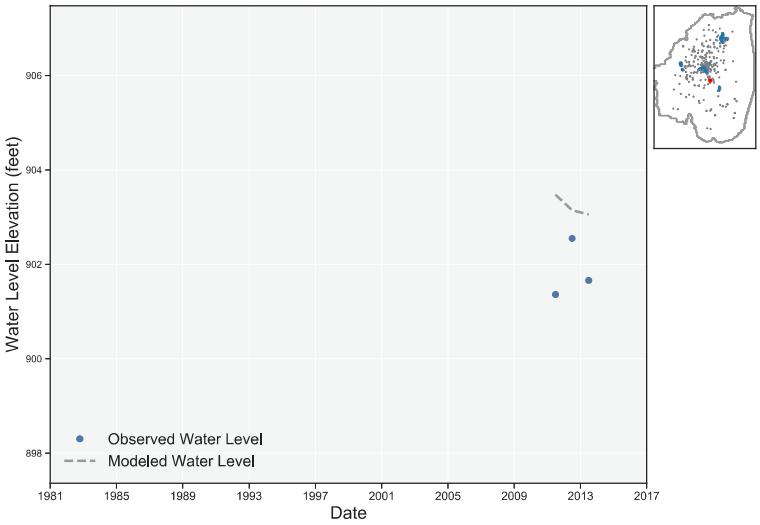


Well 436676 - Aq: QBAA Layers: 4 - 4



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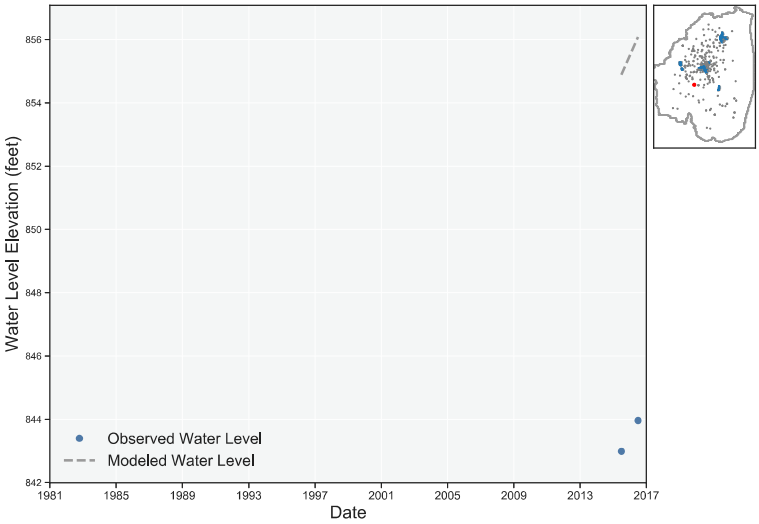

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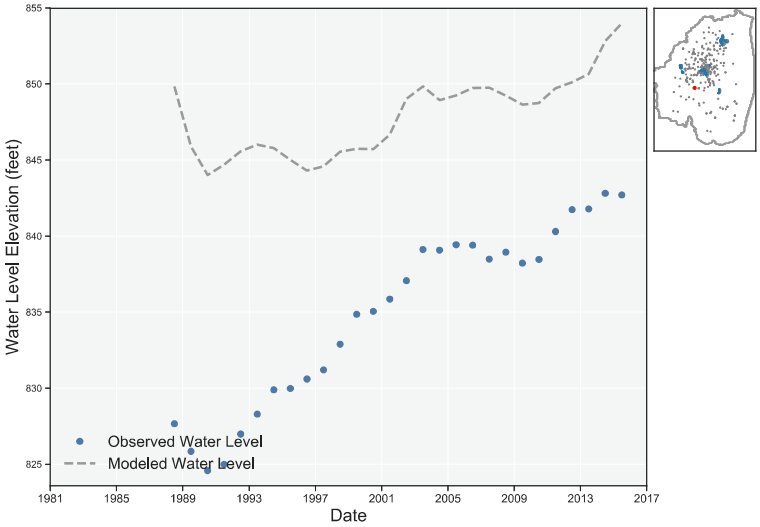
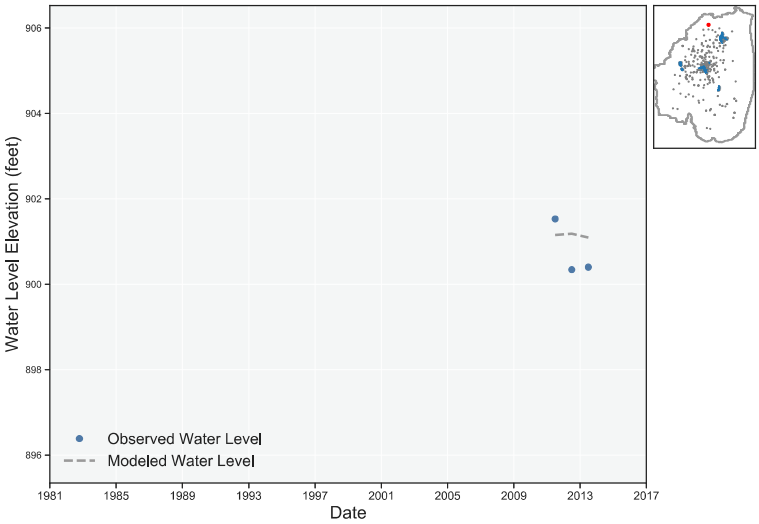
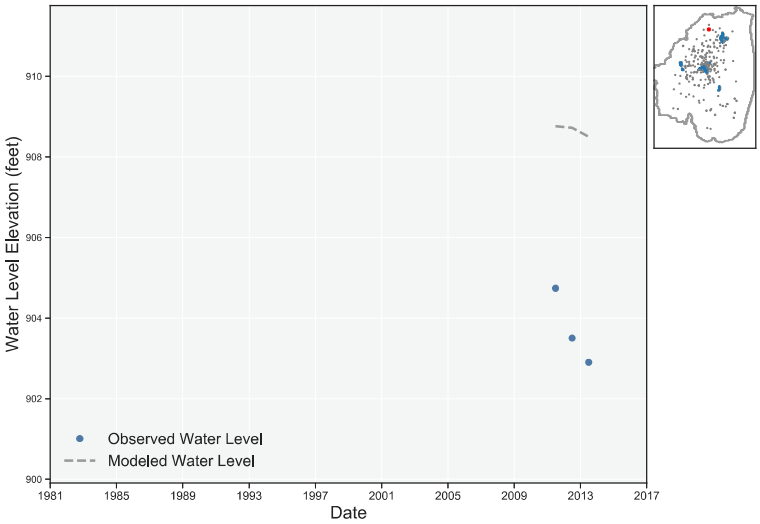


Well 178258 - Aq: QBAA Layers: 5 - 5



Well 428561 - Aq: QBAA Layers: 5 - 5



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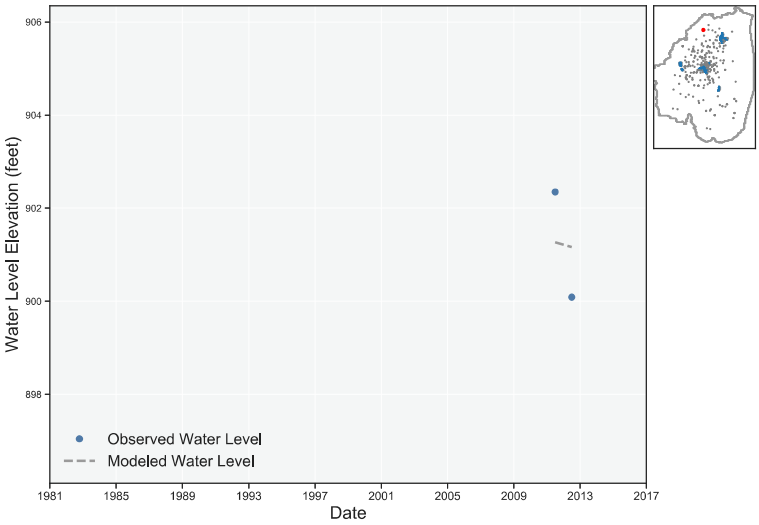

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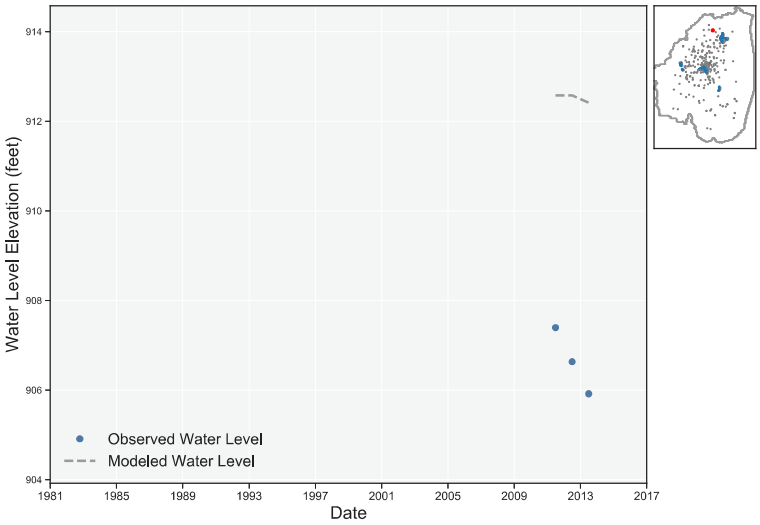
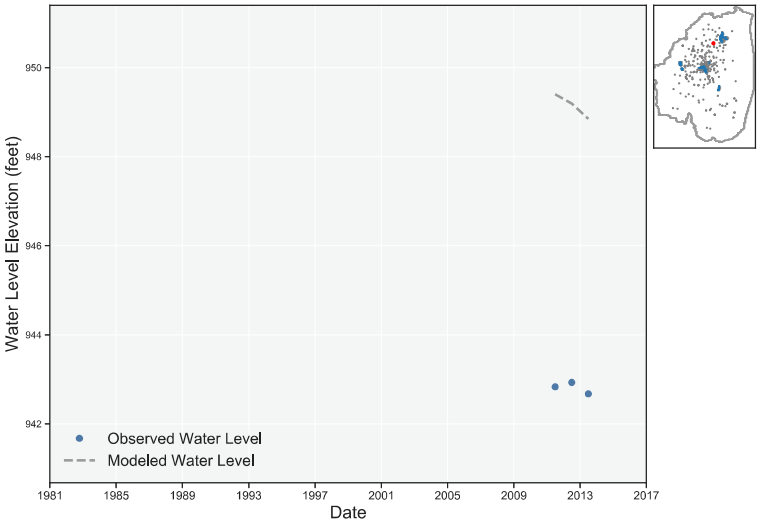
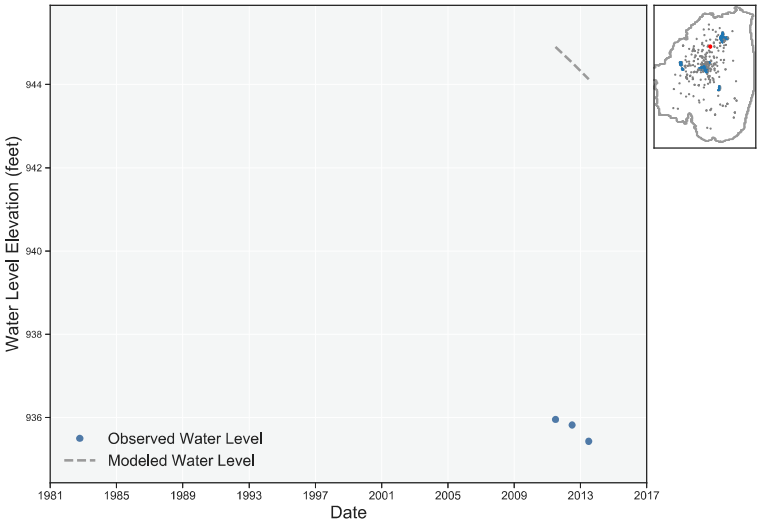


Well 112661 - Aq: QBAA Layers: 5 - 5



Well 485406 - Aq: OSTP Layers: 5 - 5



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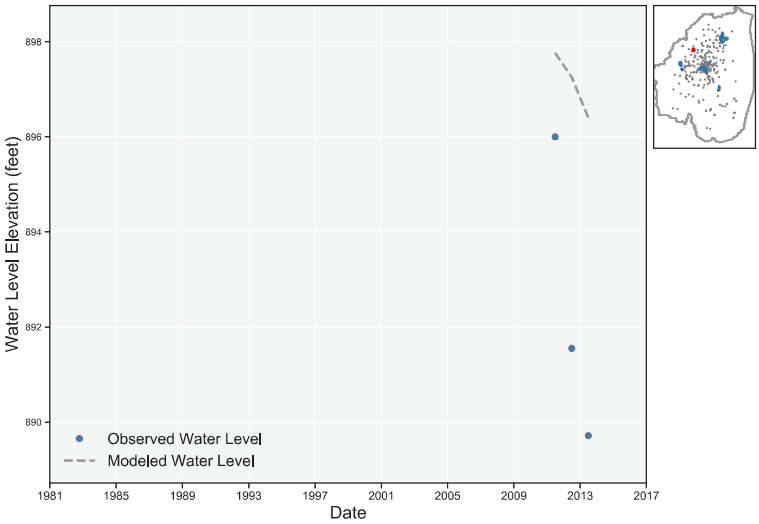
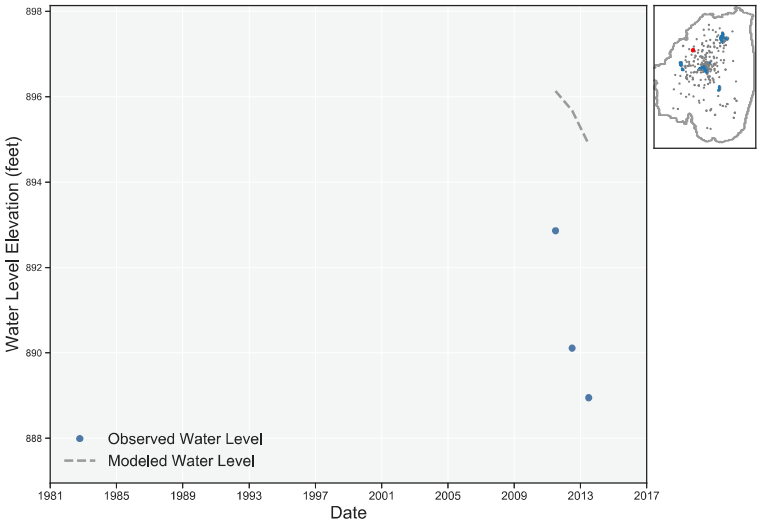
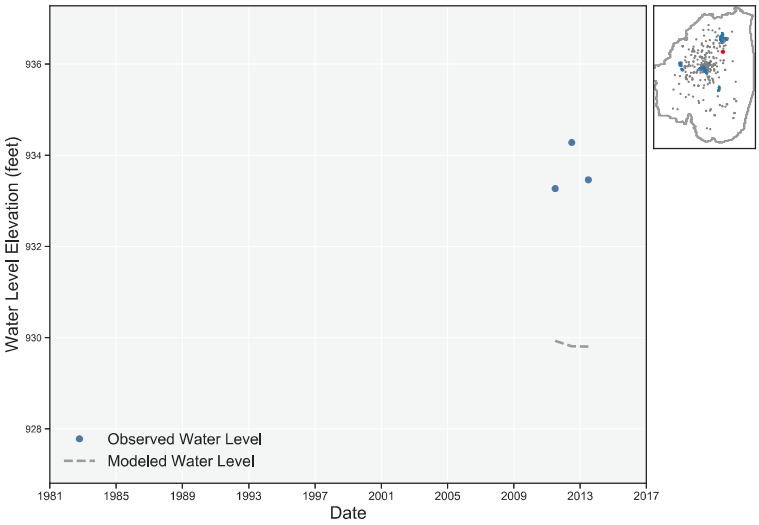


Well 439246 - Aq: OSTP Layers: 5 - 5



Well 411608 - Aq: QBAA Layers: 5 - 5



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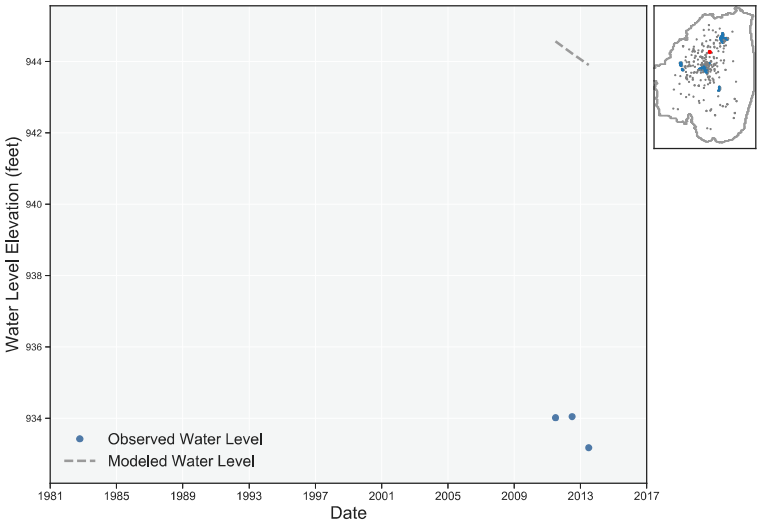
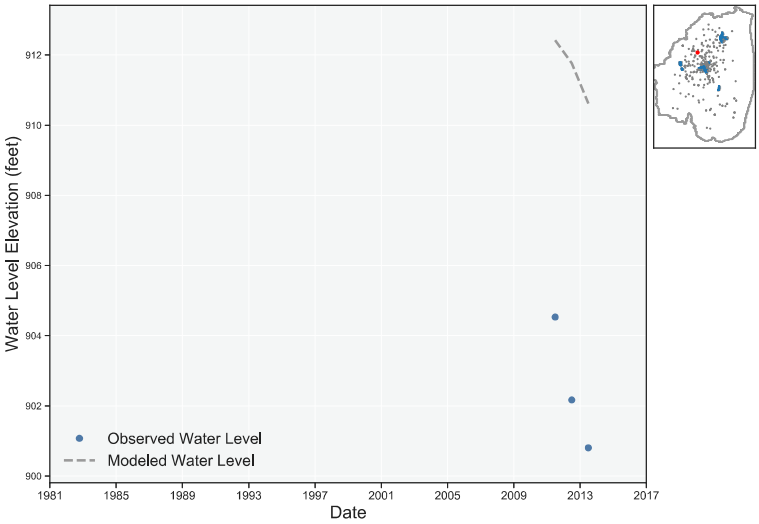
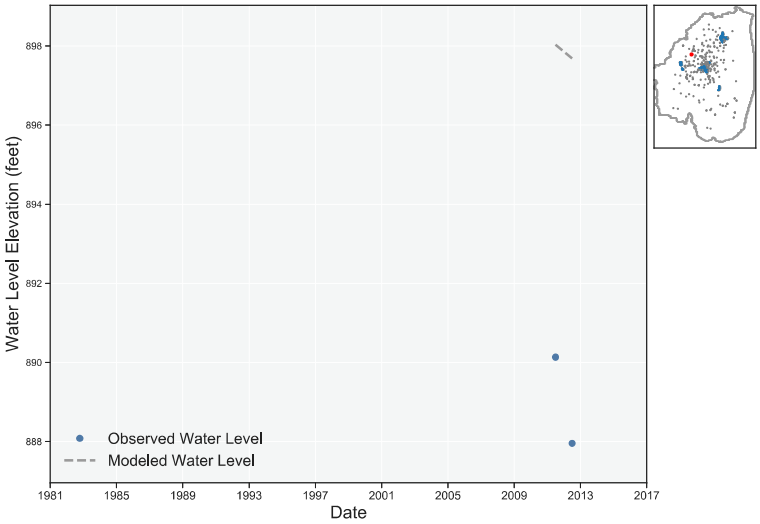


Well 162295 - Aq: OSTP Layers: 5 - 5



Well 164776 - Aq: OSTP Layers: 5 - 5



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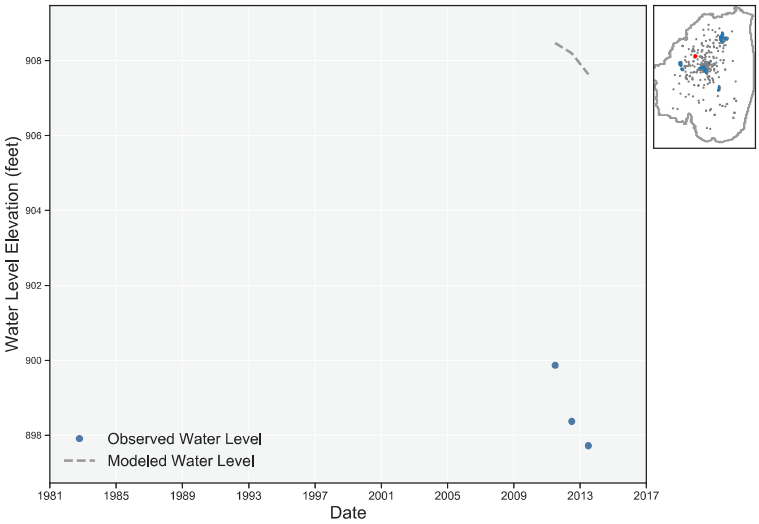
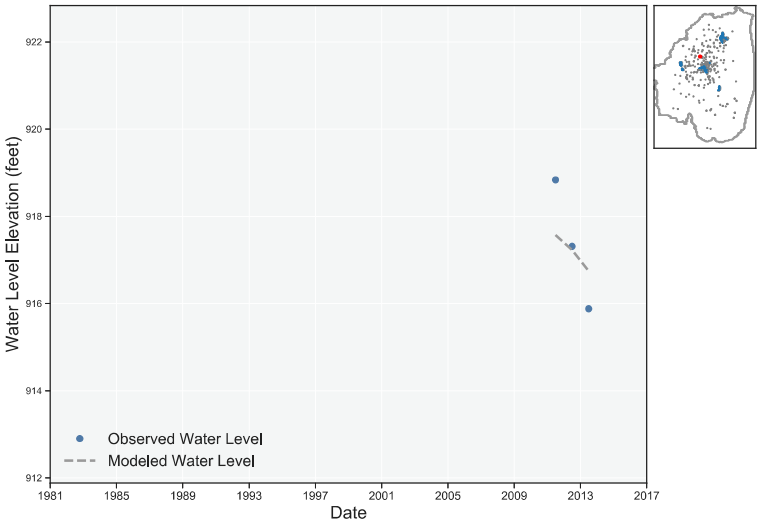
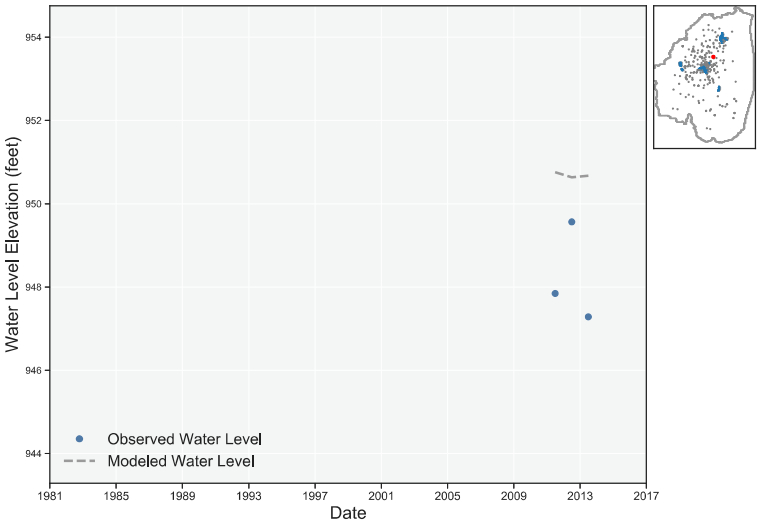


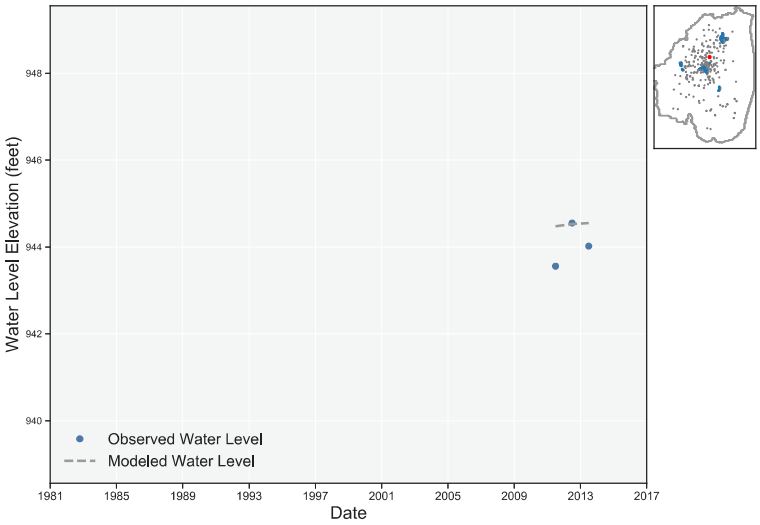
Well 653756 - Aq: QBAA Layers: 5 - 5



Well 429100 - Aq: OSTP Layers: 5 - 5



Well 138268 - Aq: OSTP Layers: 5 - 5



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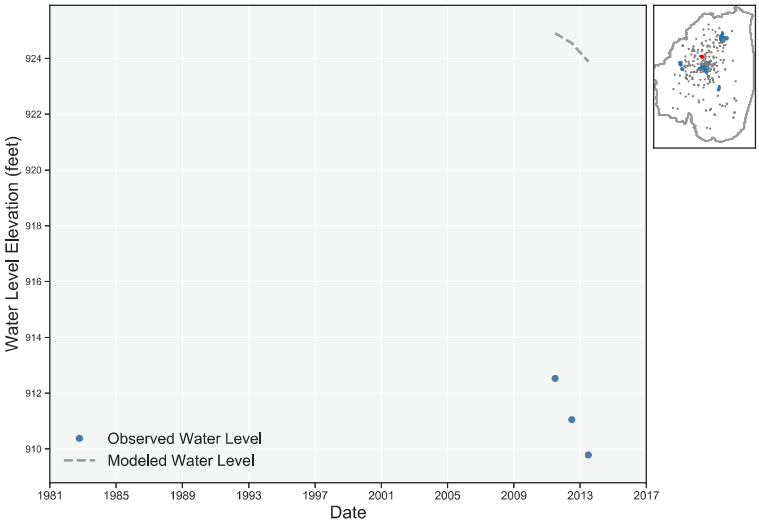

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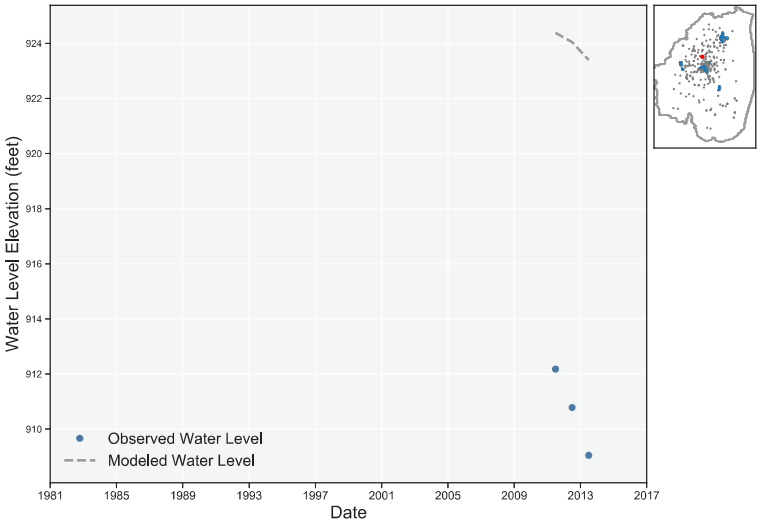
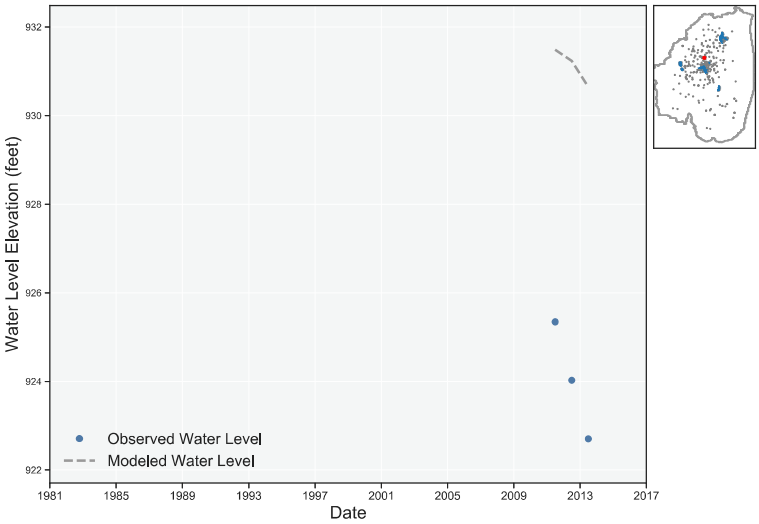


Well 153490 - Aq: OSTP Layers: 5 - 5



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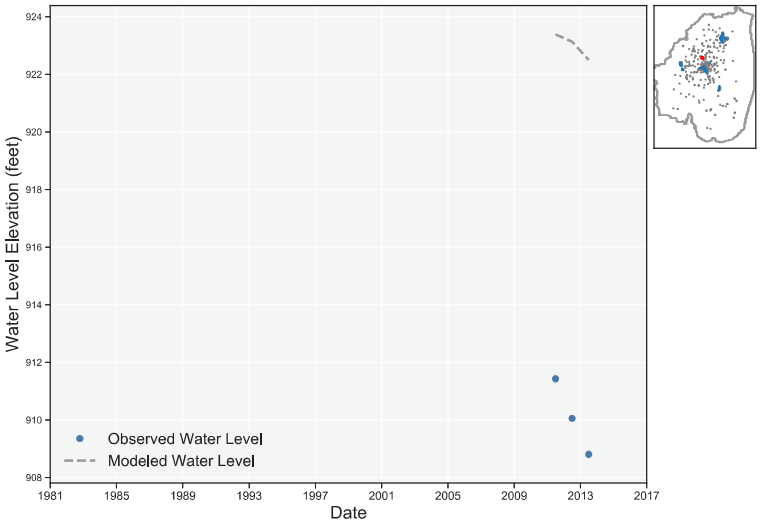

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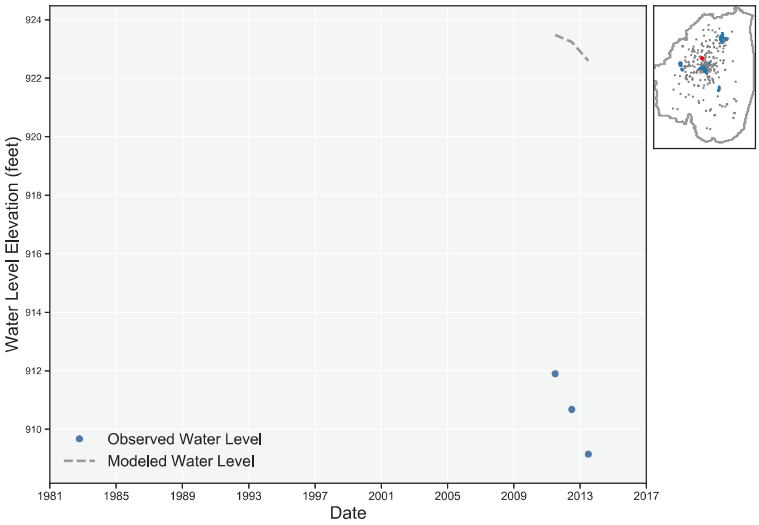

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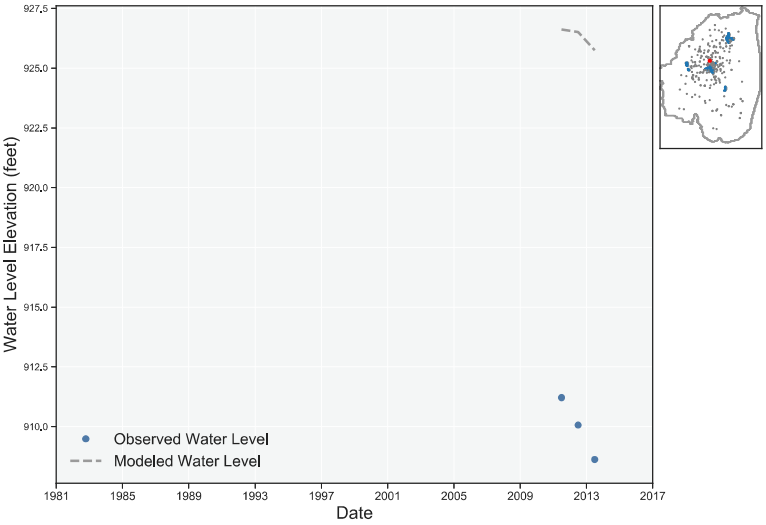

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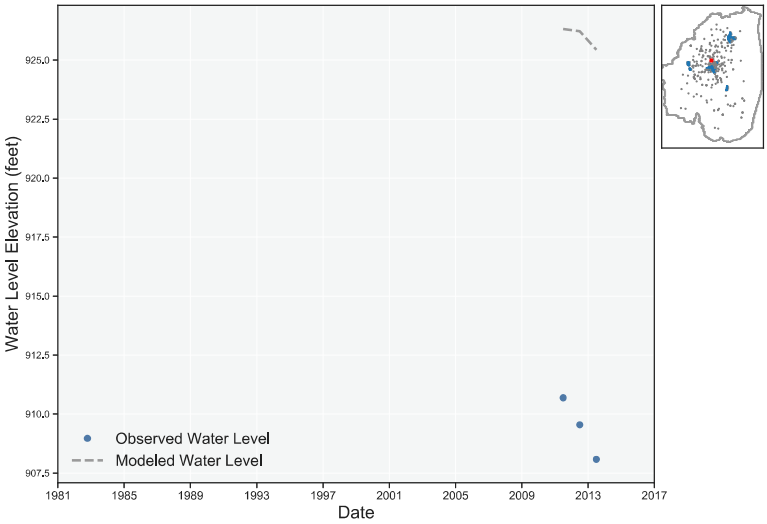

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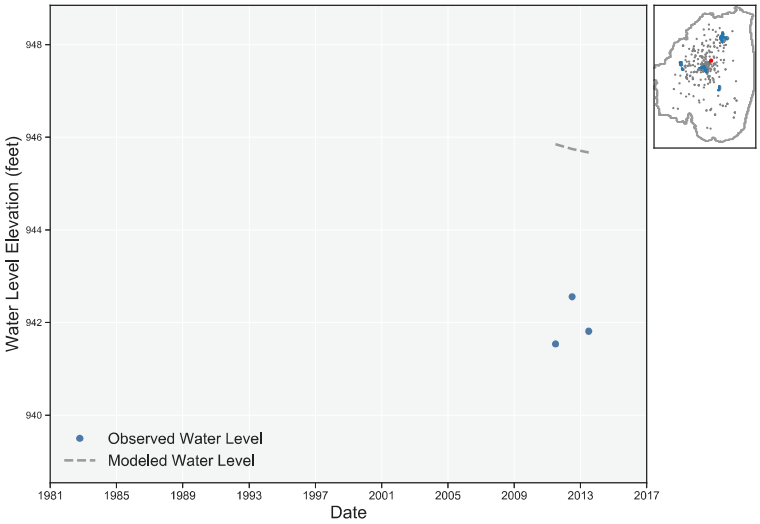
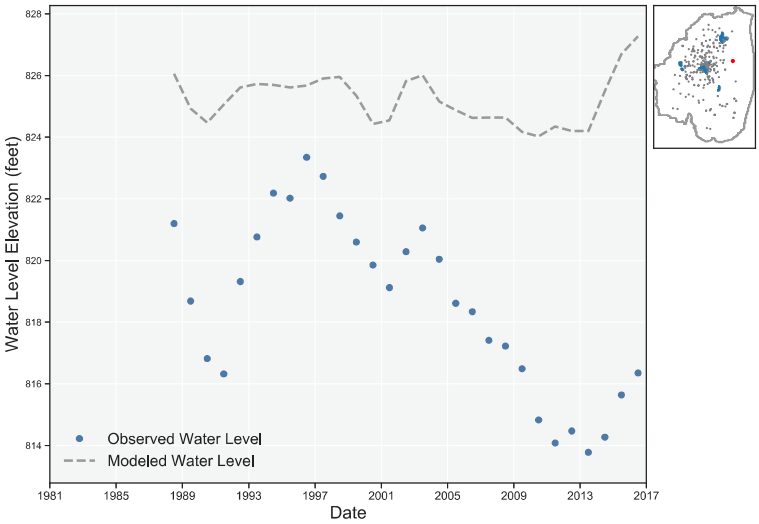


Well 82024 - Aq: QBAA Layers: 5 - 5



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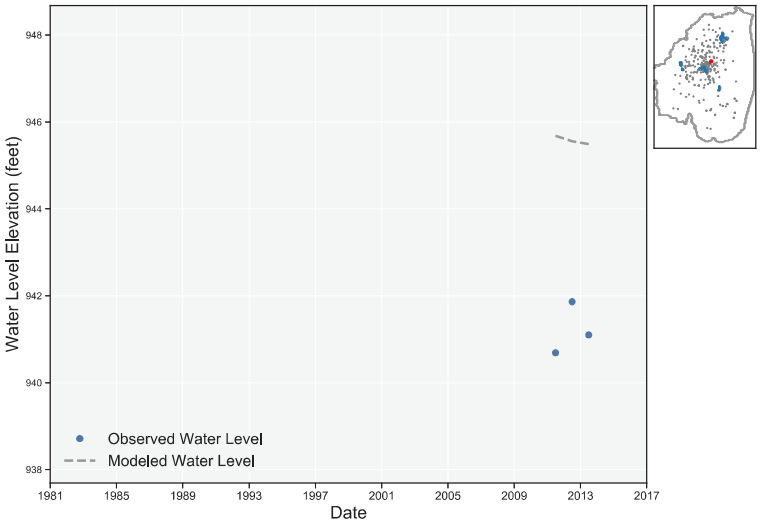

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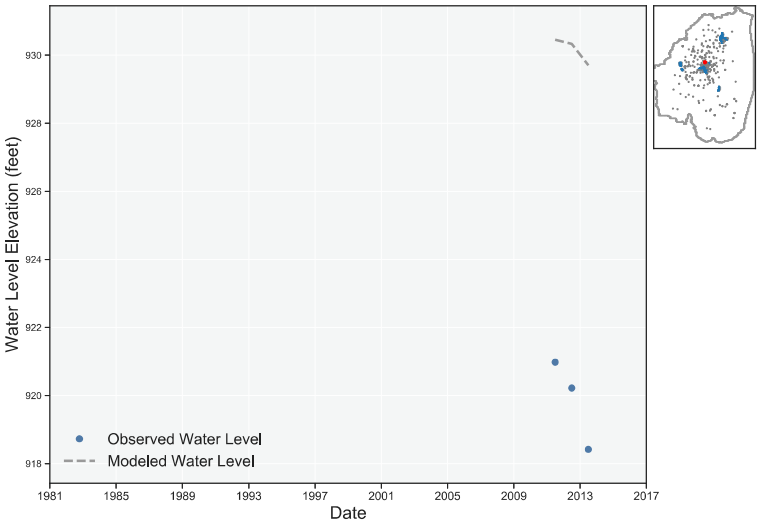

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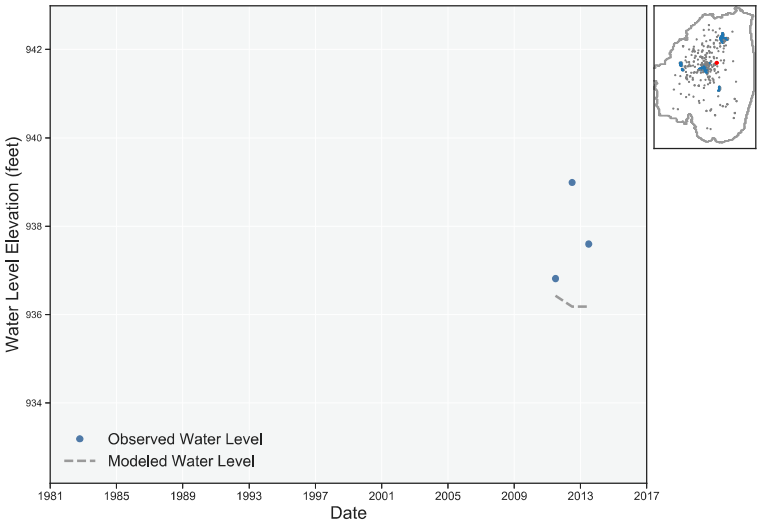

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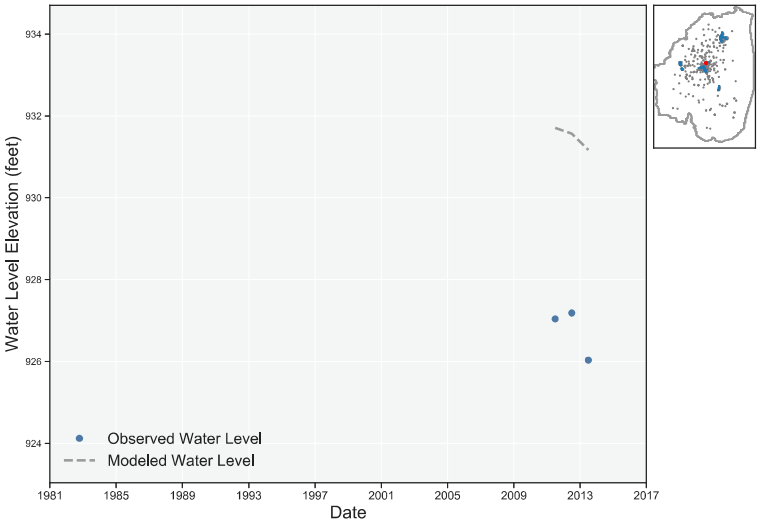

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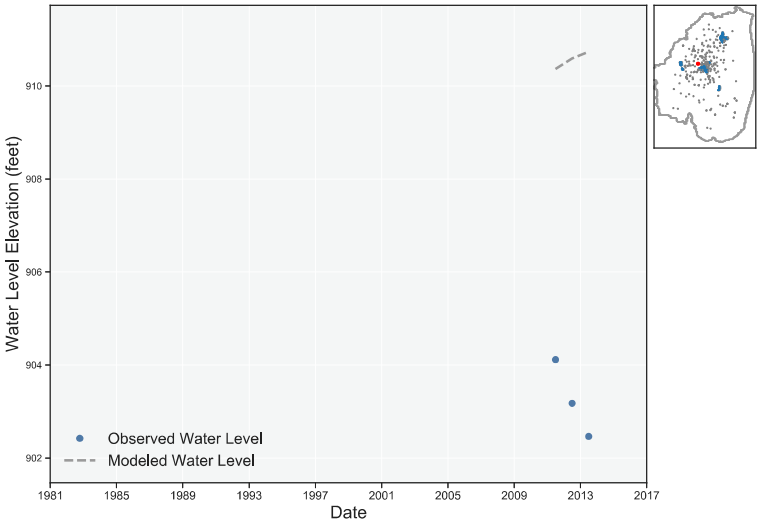

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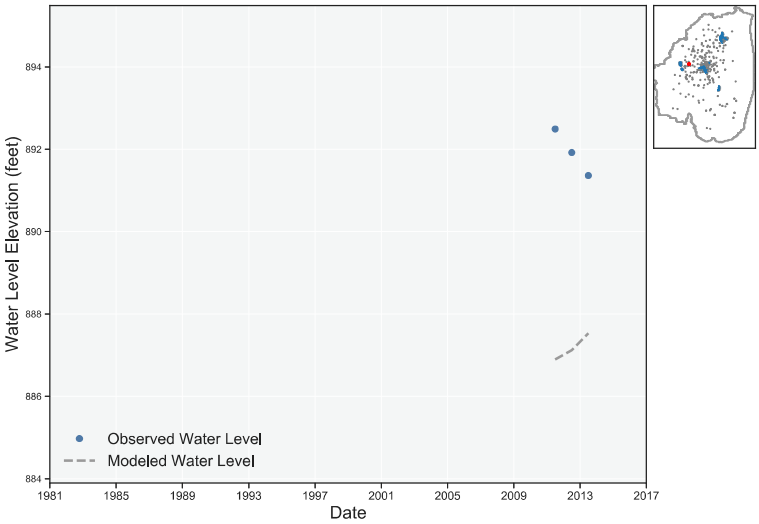

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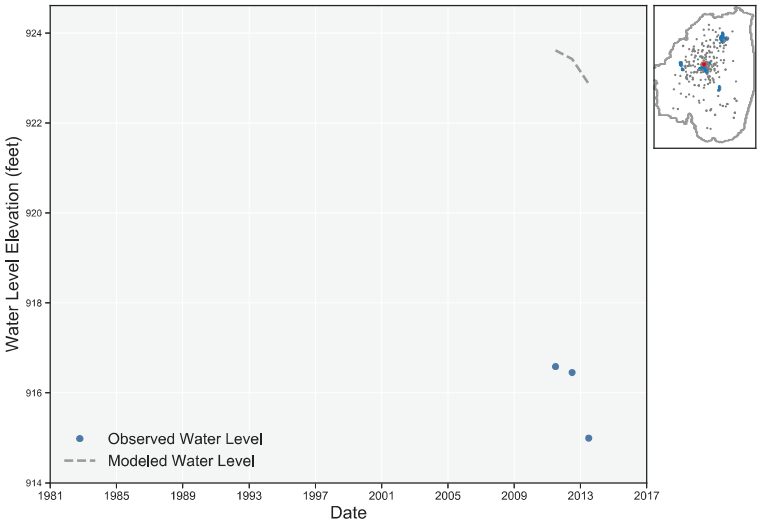
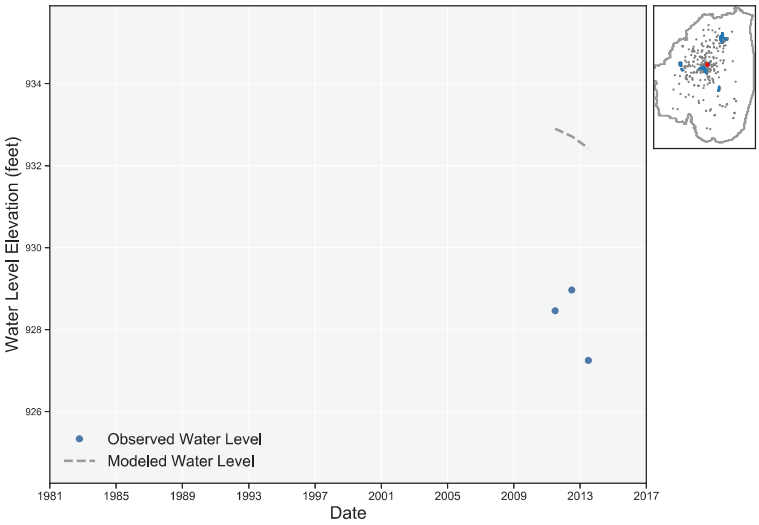


Well 208479 - Aq: QBAA Layers: 5 - 5



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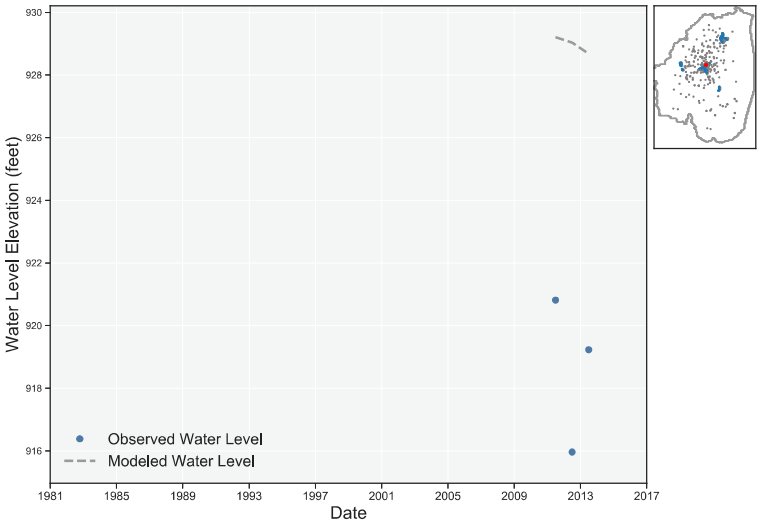

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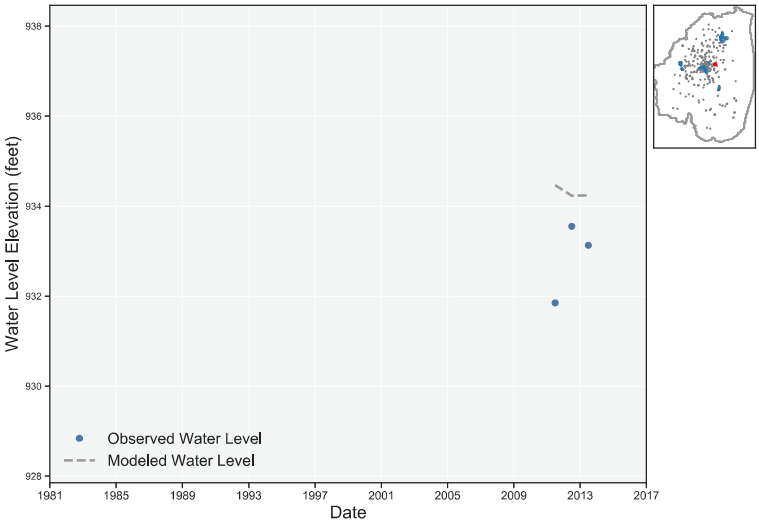

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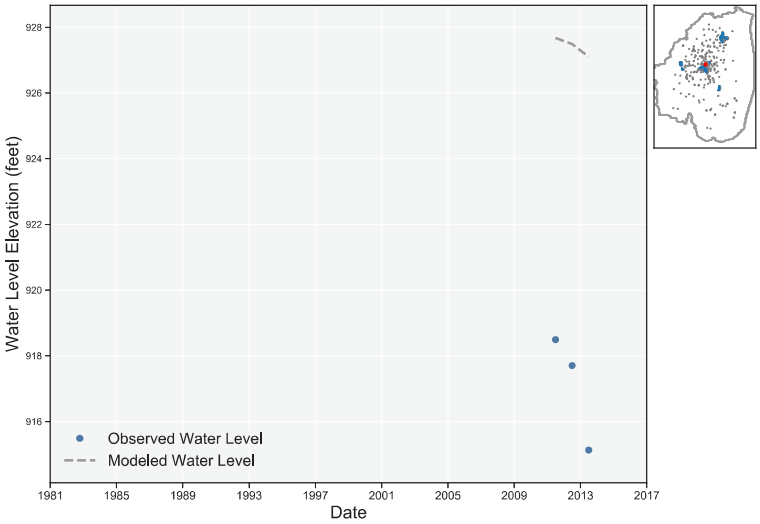

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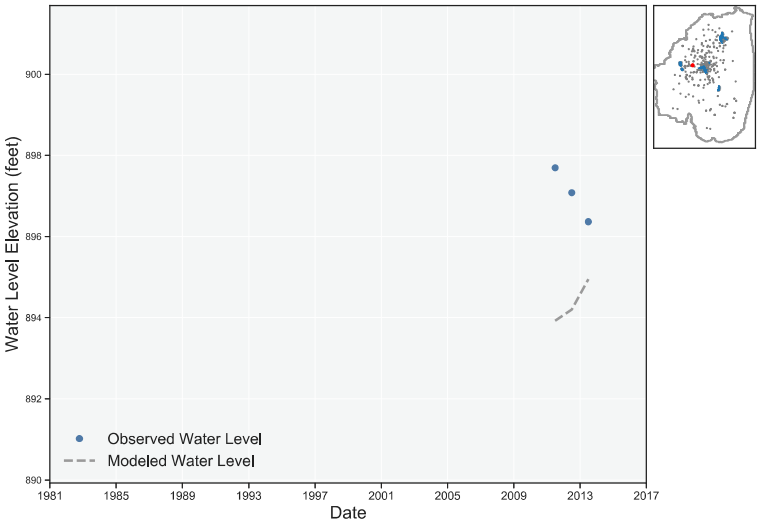
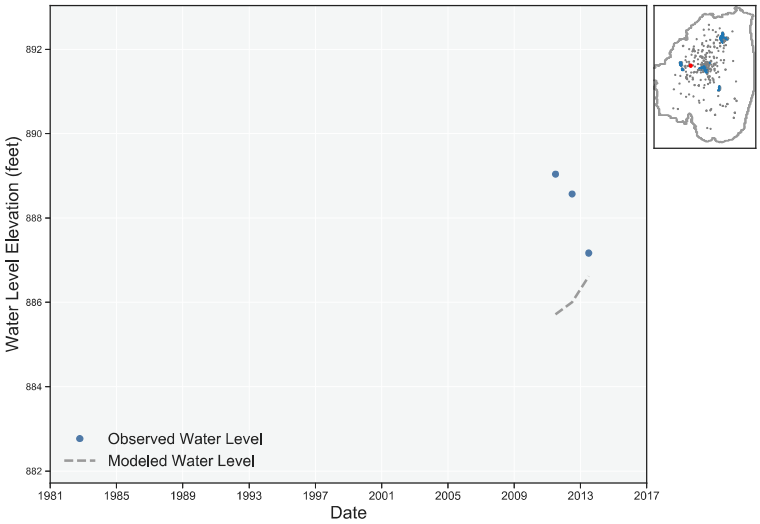


Well 205720 - Aq: OSTP Layers: 5 - 5



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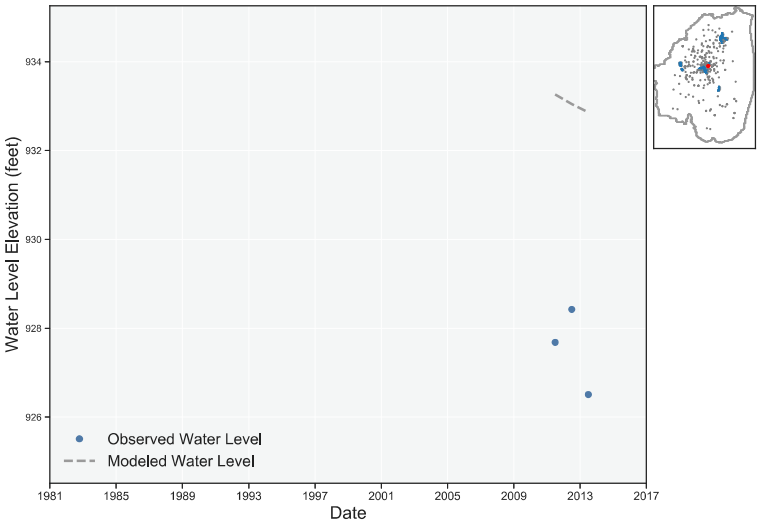

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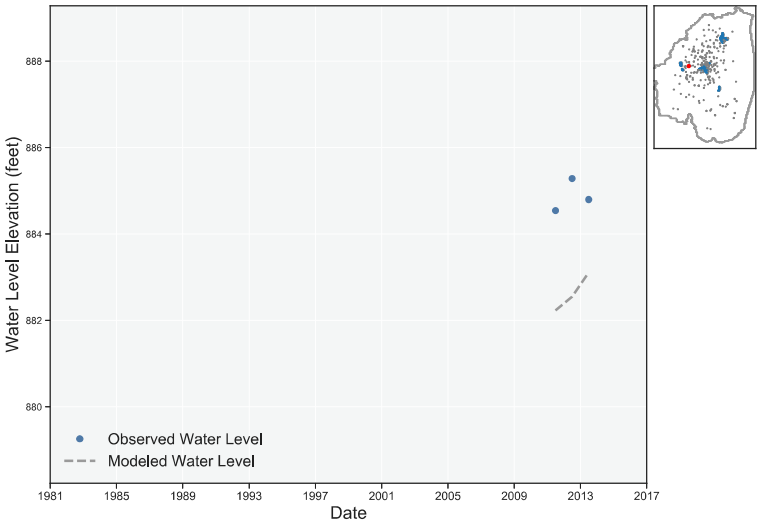

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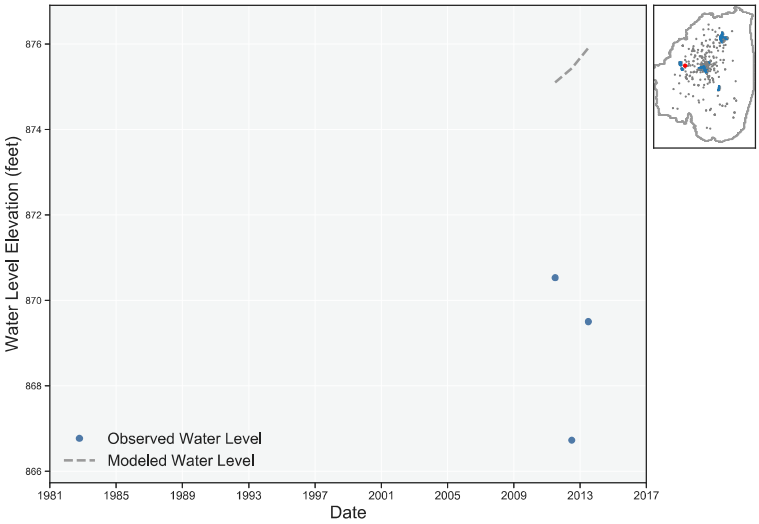
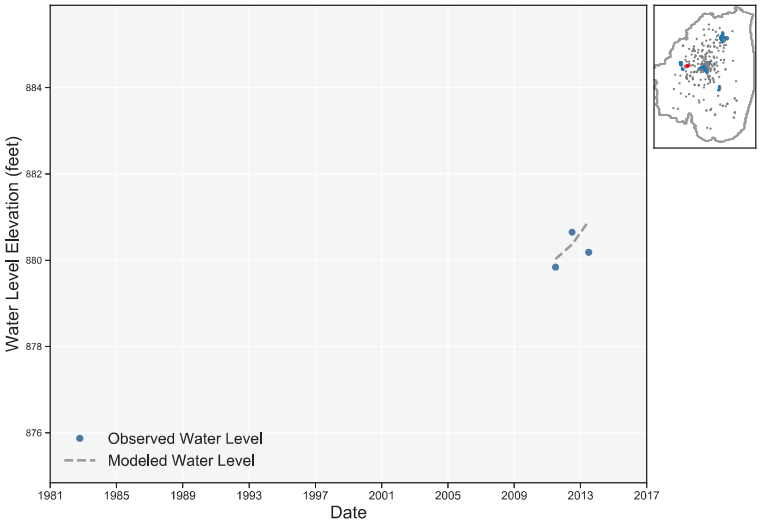


Well 504153 - Aq: OSTP Layers: 5 - 5



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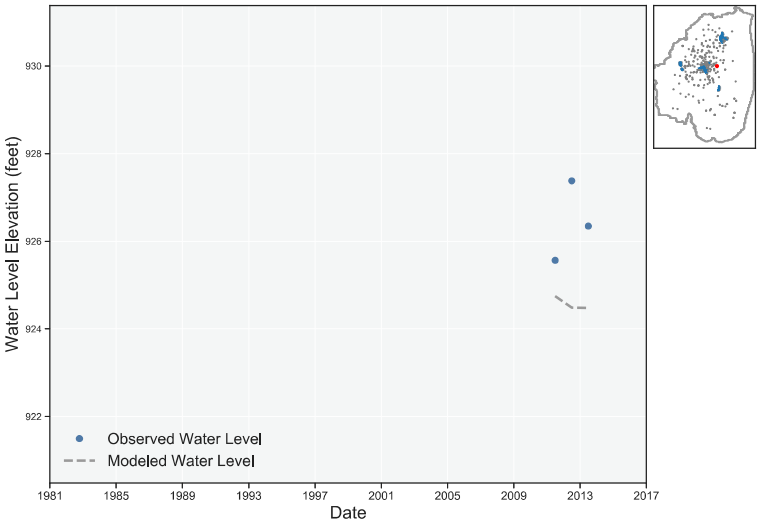

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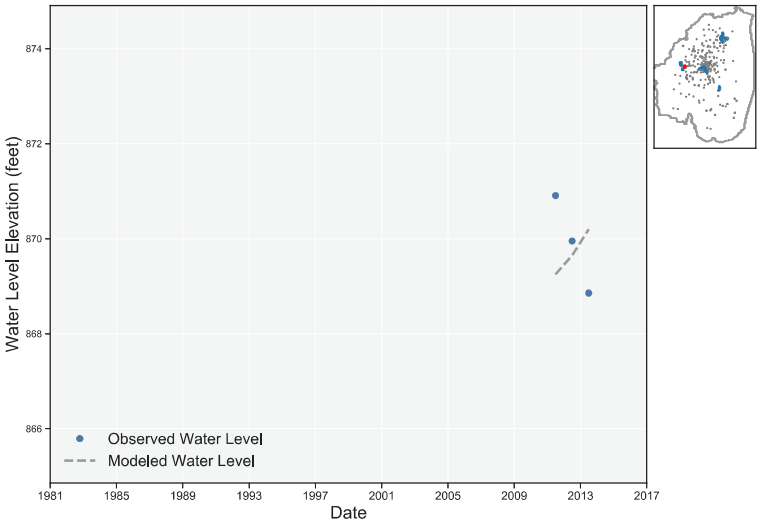
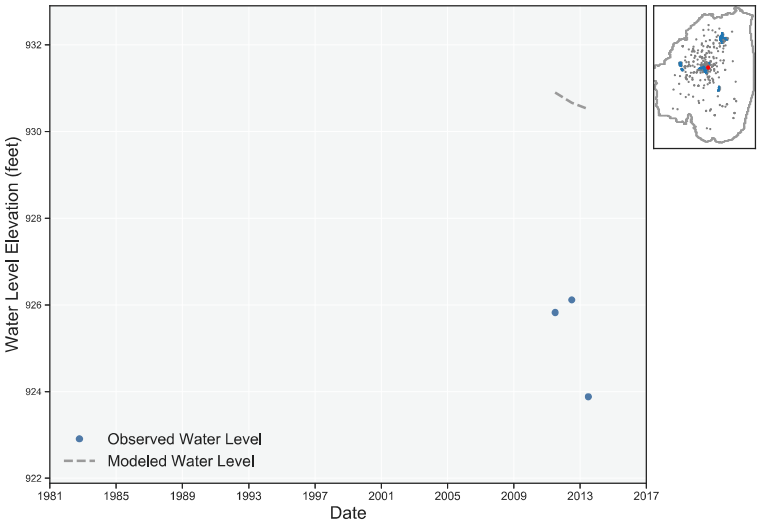
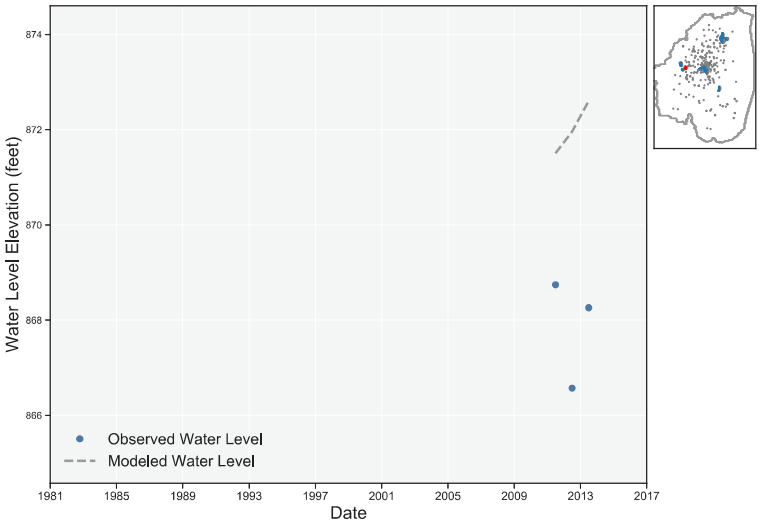


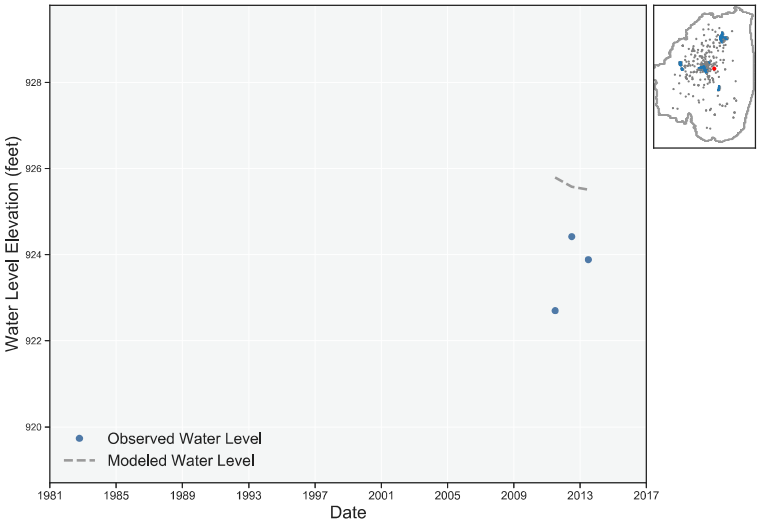
Well 112342 - Aq: OSTP Layers: 5 - 5



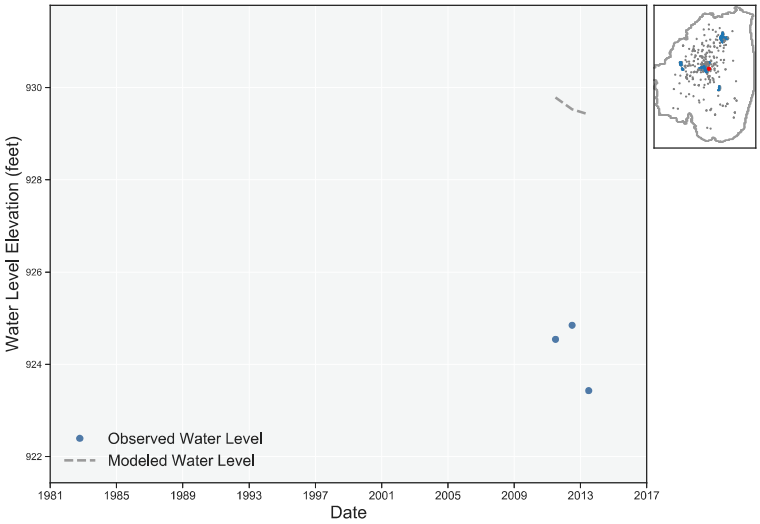
Well 404132 - Aq: QBAA Layers: 5 - 5



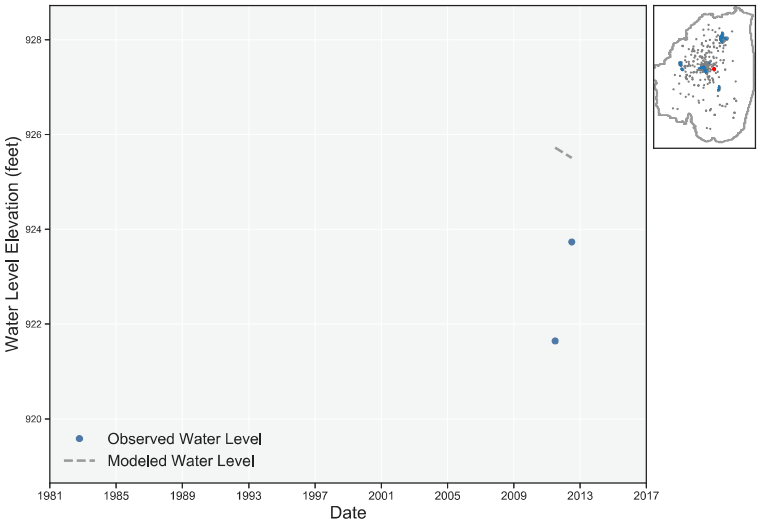
Well 505390 - Aq: OPDC Layers: 5 - 5



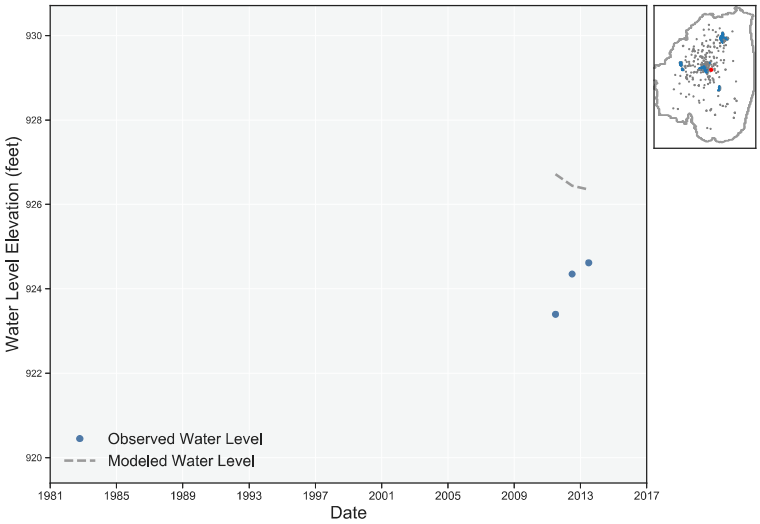
Well 153493 - Aq: OSTP Layers: 5 - 5



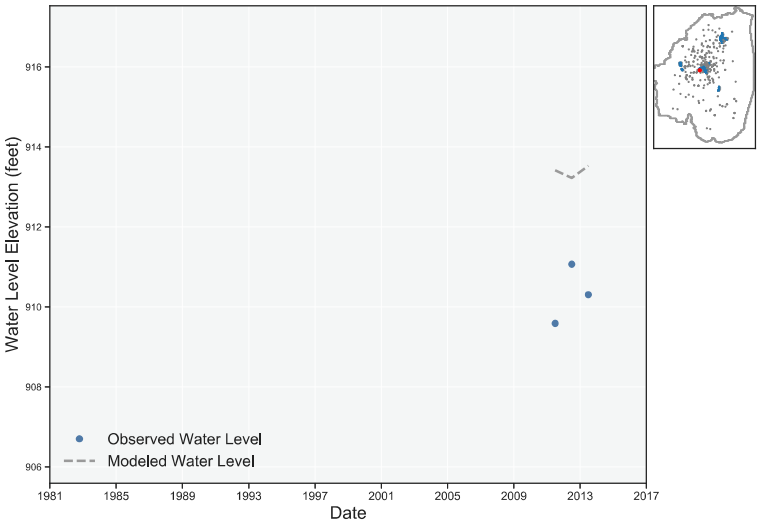
Well 413586 - Aq: OSTP Layers: 5 - 5



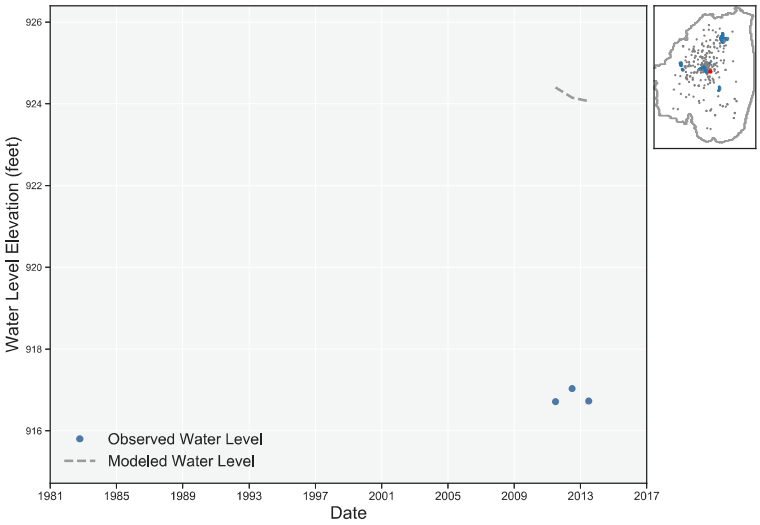
Well 182961 - Aq: OSTP Layers: 5 - 5



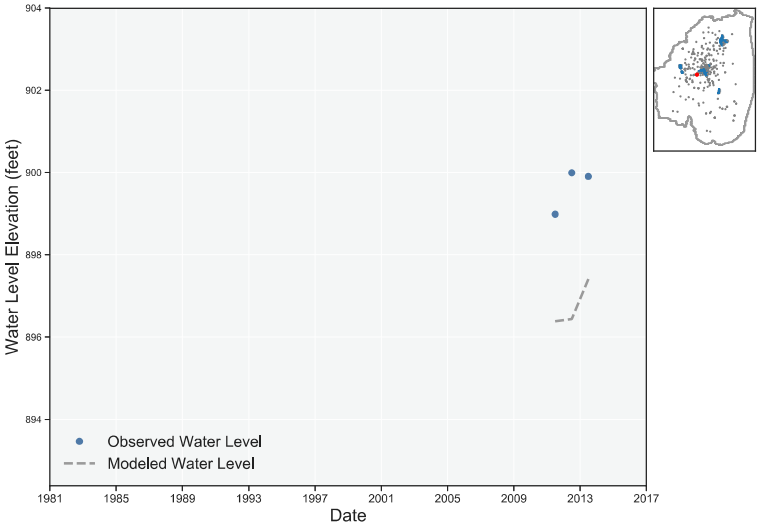
Well 504197 - Aq: OSTP Layers: 5 - 5



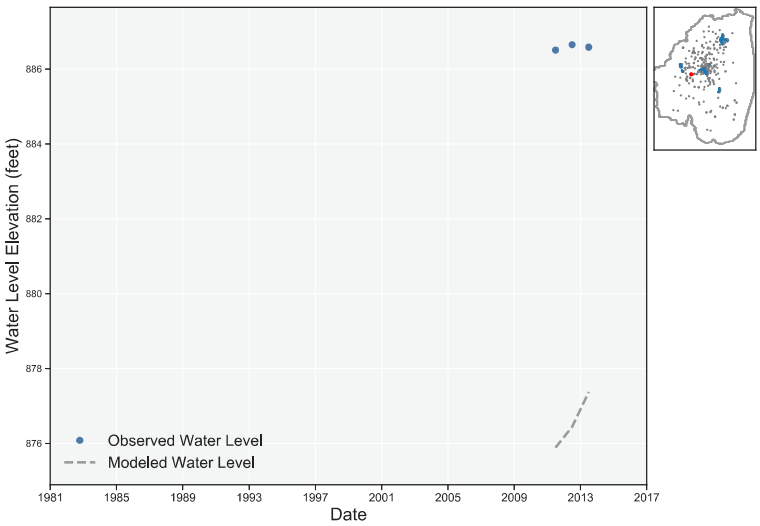
Well 136122 - Aq: OSTP Layers: 5 - 5



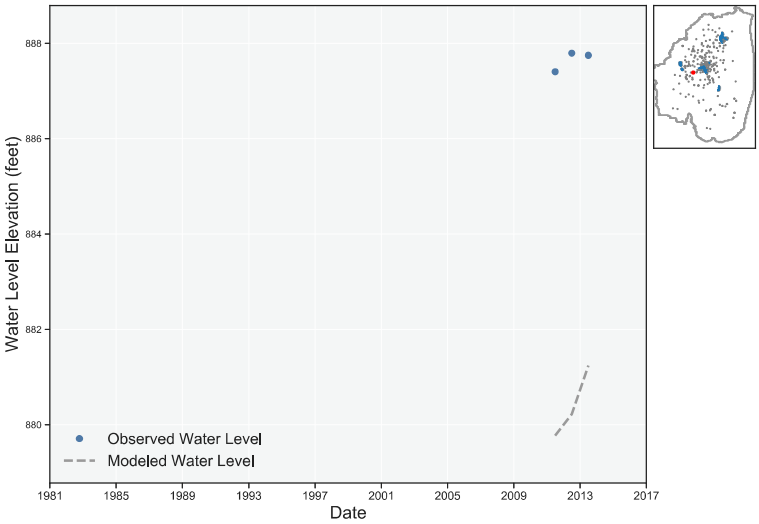
Well 112625 - Aq: OSTP Layers: 5 - 5



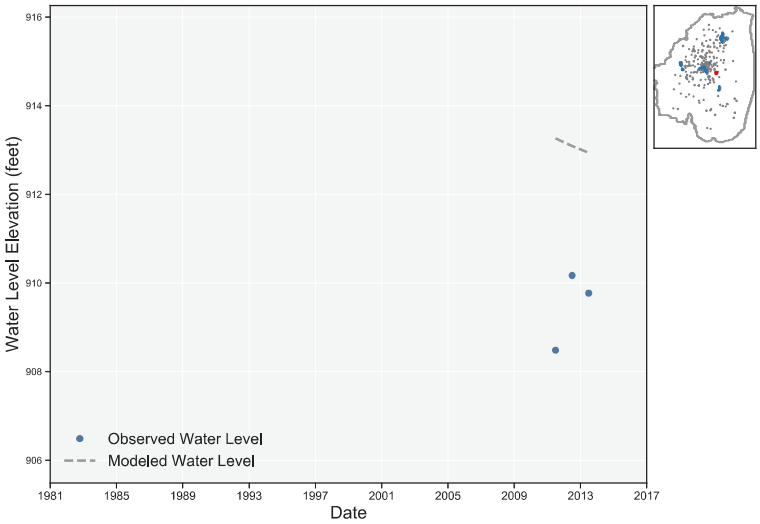
Well 145732 - Aq: OSTP Layers: 5 - 5



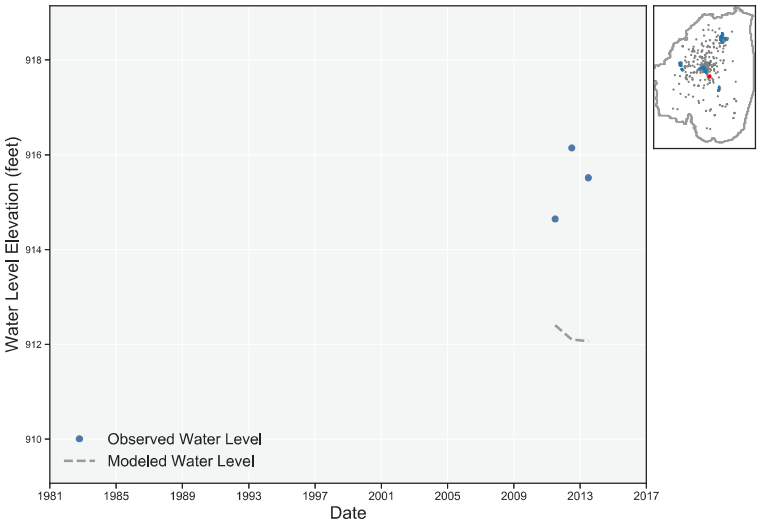
Well 448228 - Aq: QBAA Layers: 5 - 5



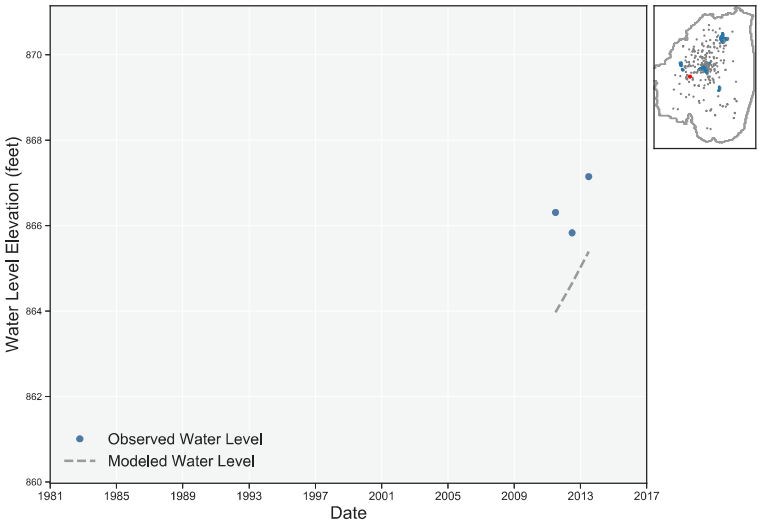
Well 130876 - Aq: OSTP Layers: 5 - 5



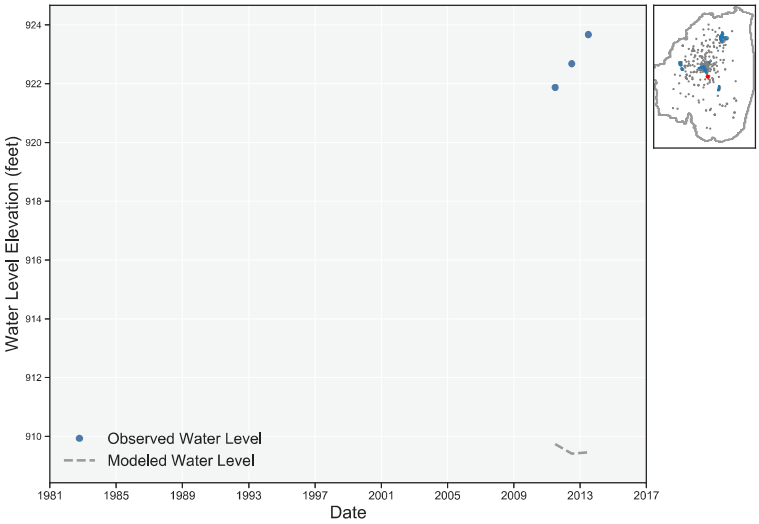
Well 175041 - Aq: OSTP Layers: 5 - 5



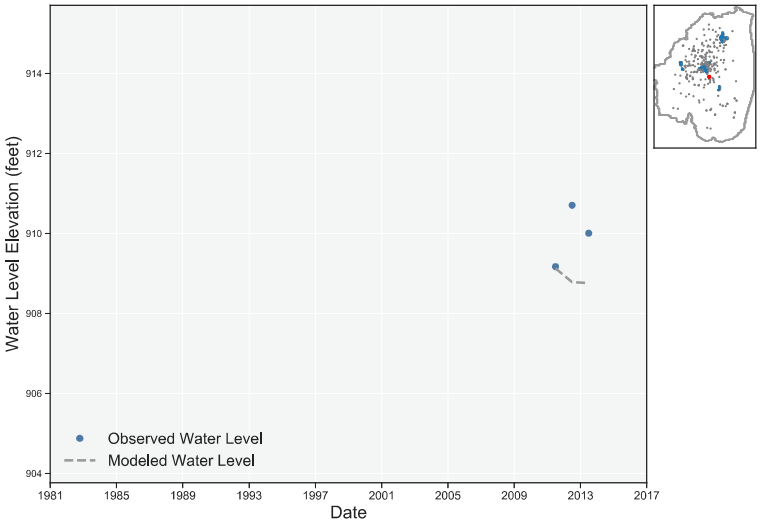
Well 138190 - Aq: OSTP Layers: 5 - 5



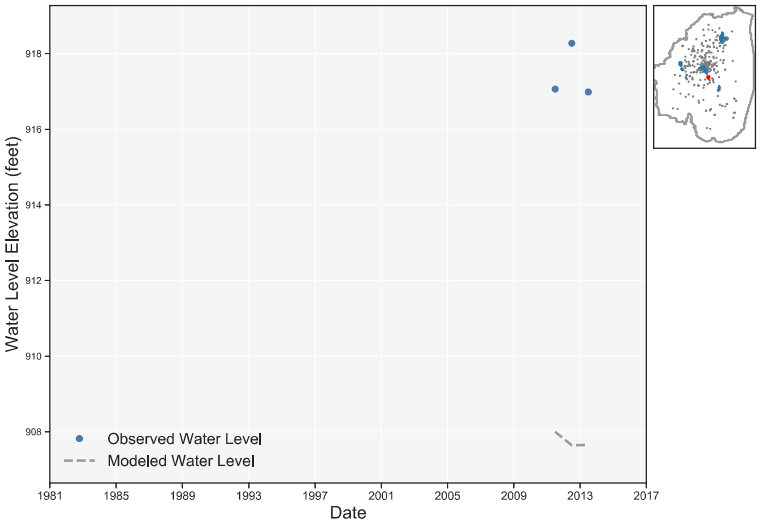
Well 138727 - Aq: OSTP Layers: 5 - 5



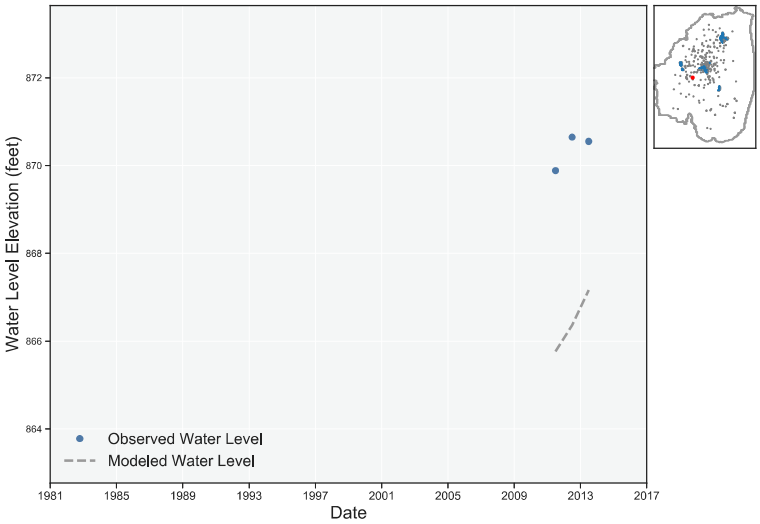
Well 418556 - Aq: OSTP Layers: 5 - 5



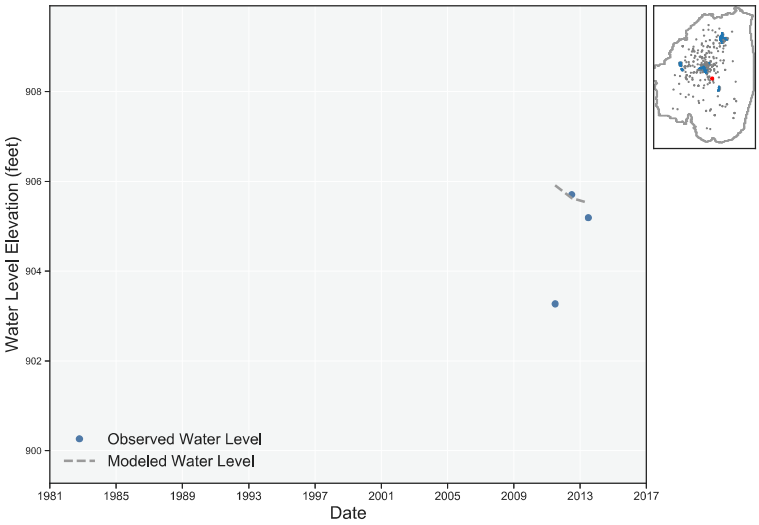
Well 127569 - Aq: OSTP Layers: 5 - 5



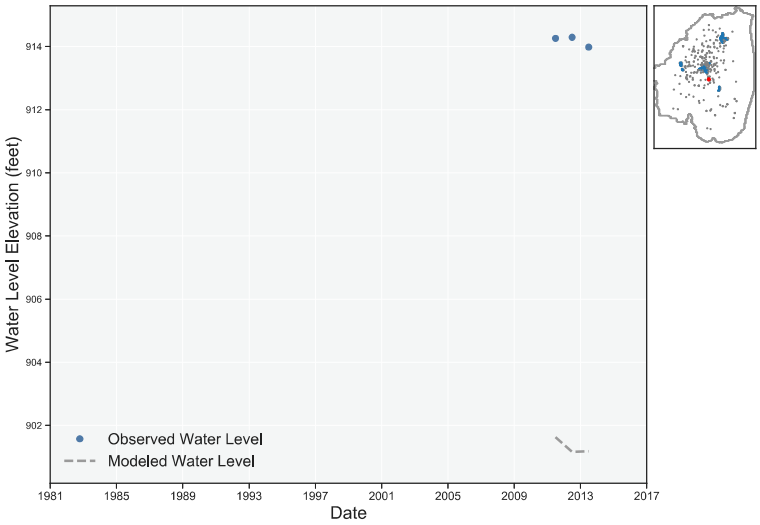
Well 130905 - Aq: OSTP Layers: 5 - 5



Well 410169 - Aq: OSTP Layers: 5 - 5



Well 153486 - Aq: QBAA Layers: 5 - 5



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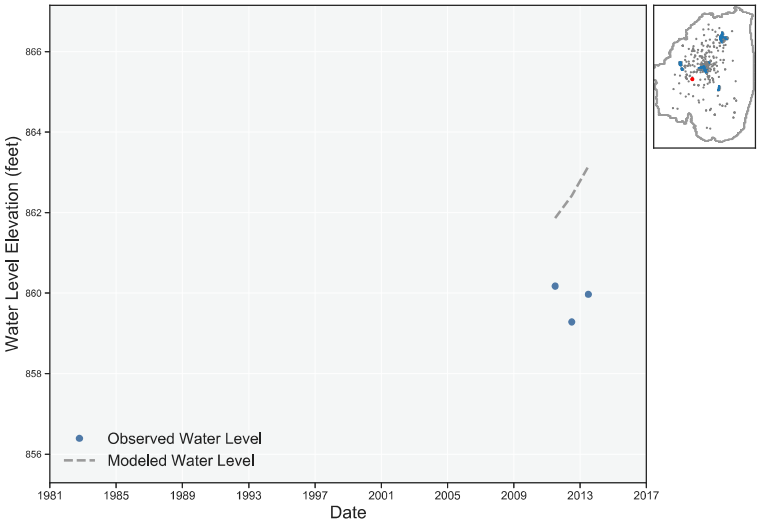
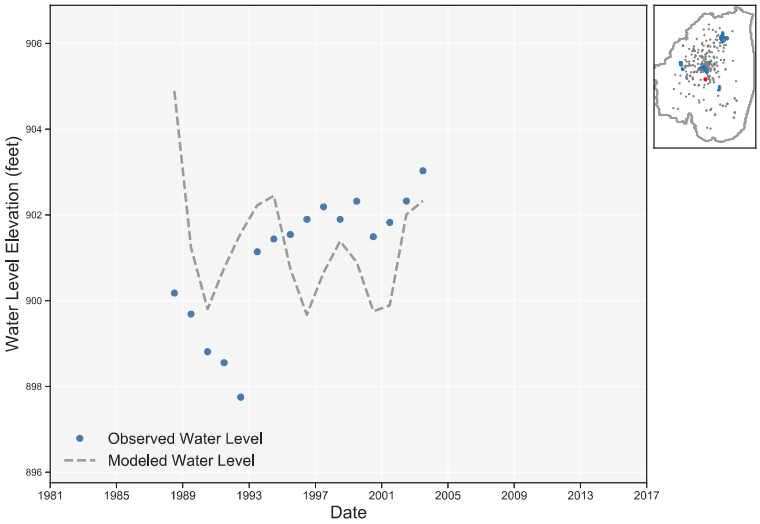


Well 82005 - Aq: OSTP Layers: 5 - 5



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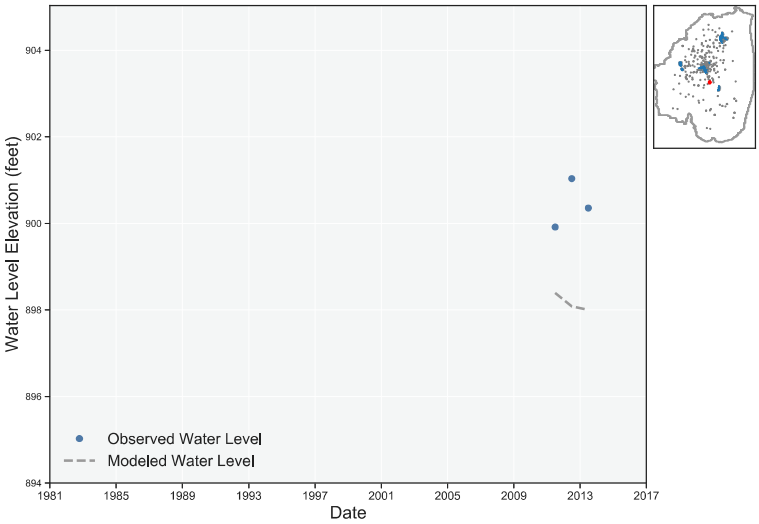
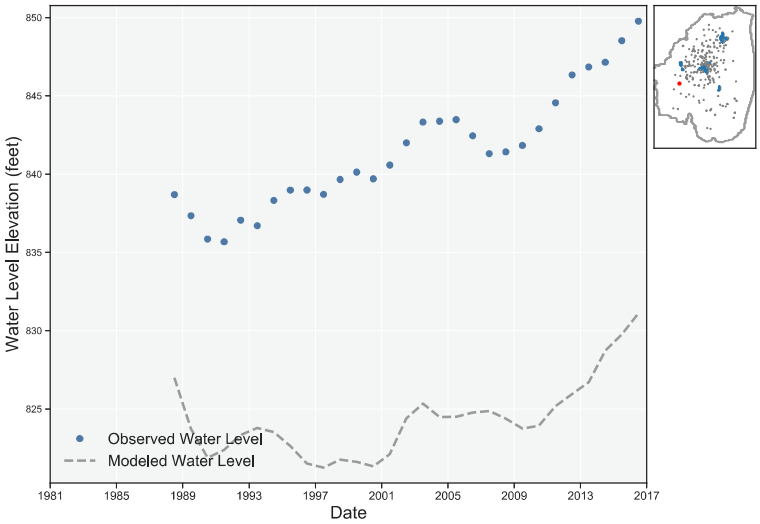
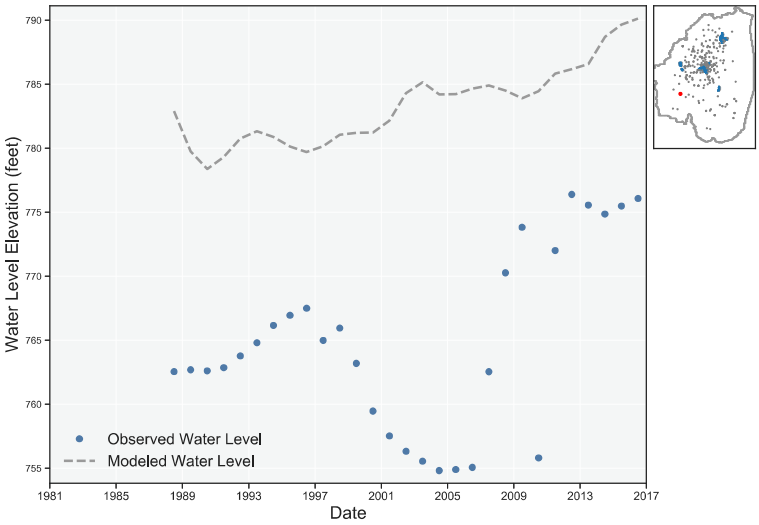


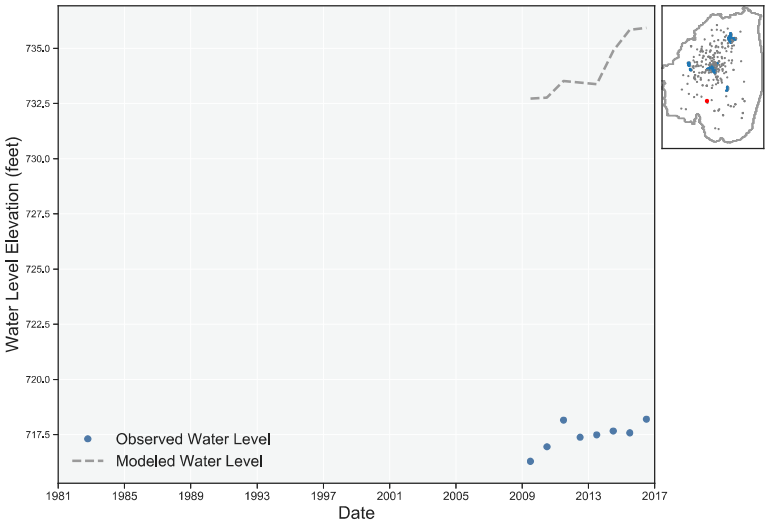
Well 62002 - Aq: OSTP Layers: 5 - 5



Well 62034 - Aq: OSTP Layers: 5 - 5



Well 62050 - Aq: OSTP Layers: 5 - 5



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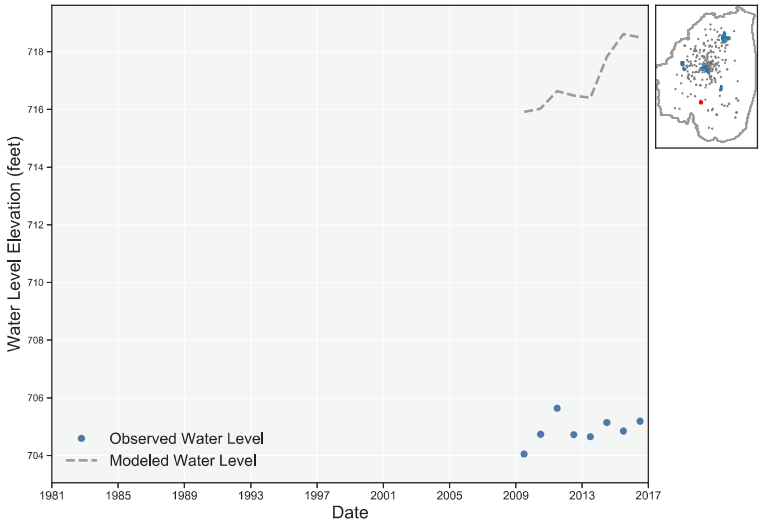
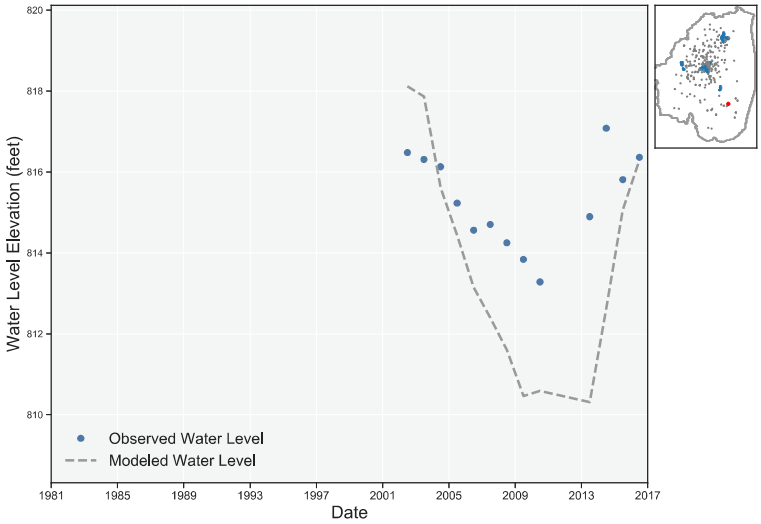
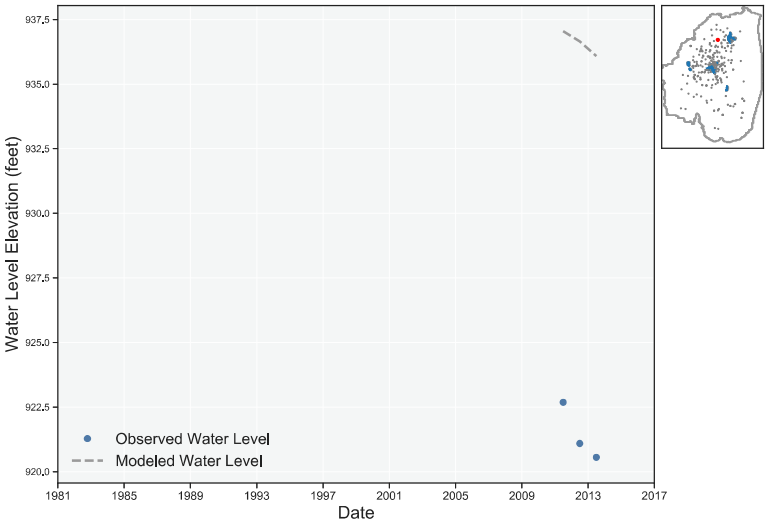


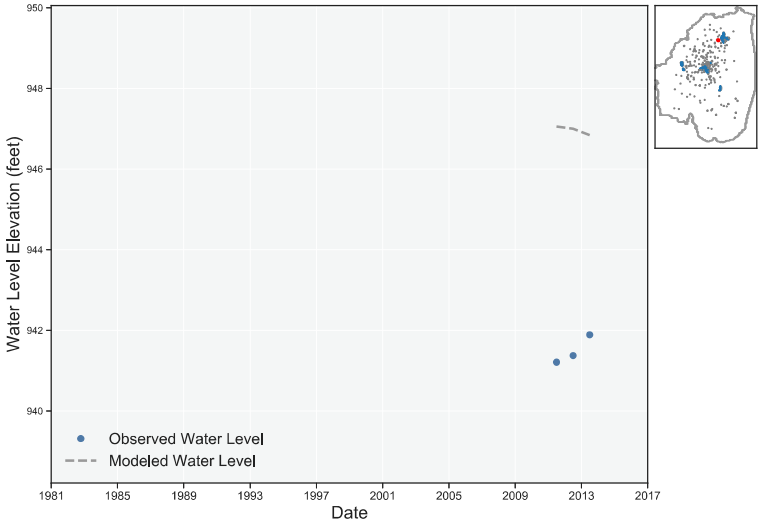
Well 675586 - Aq: QWTA Layers: 5 - 5



Well 419114 - Aq: OPDC Layers: 6 - 6



Well 411647 - Aq: OPDC Layers: 6 - 6



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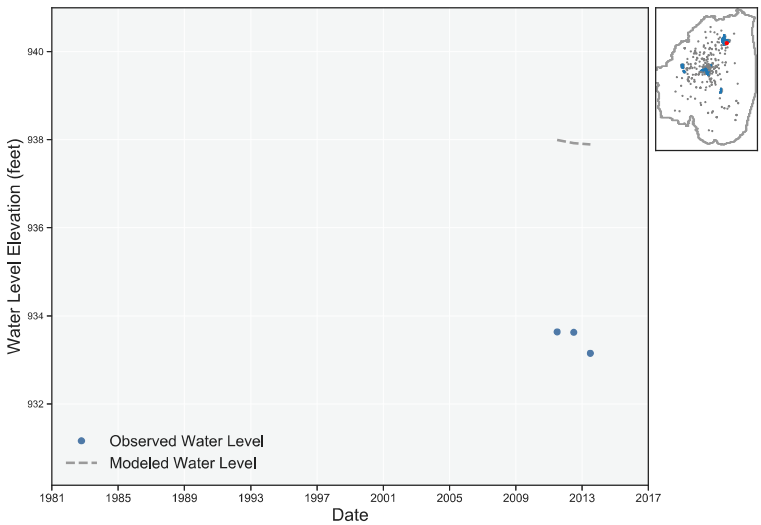

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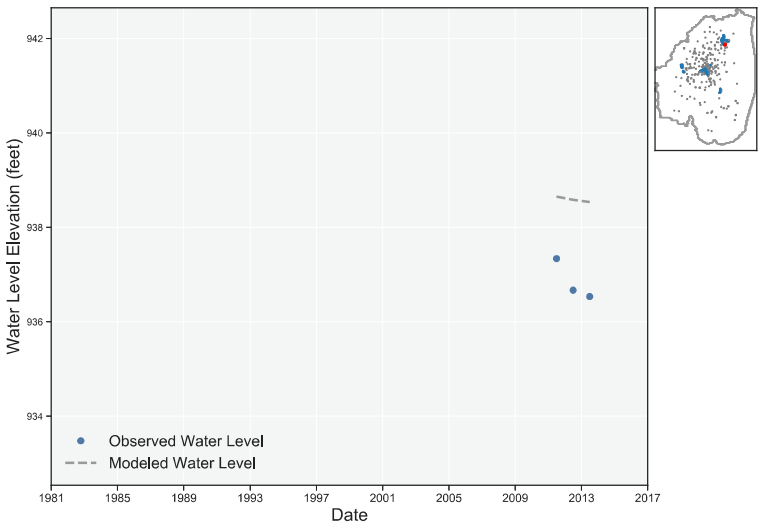

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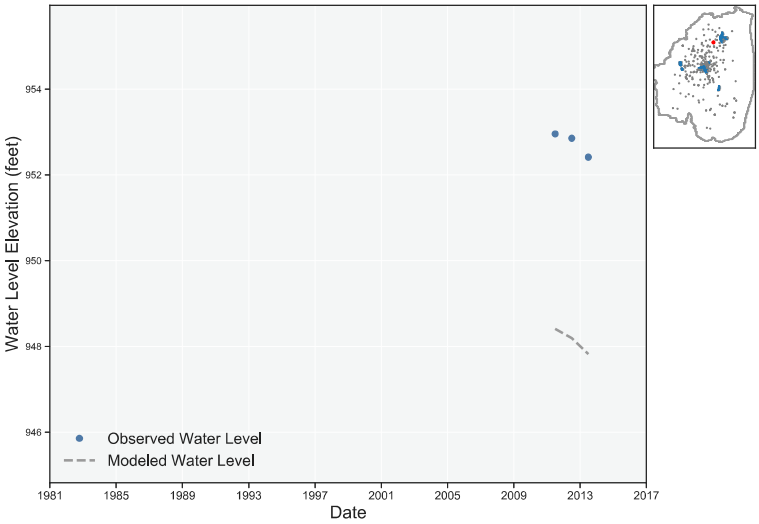
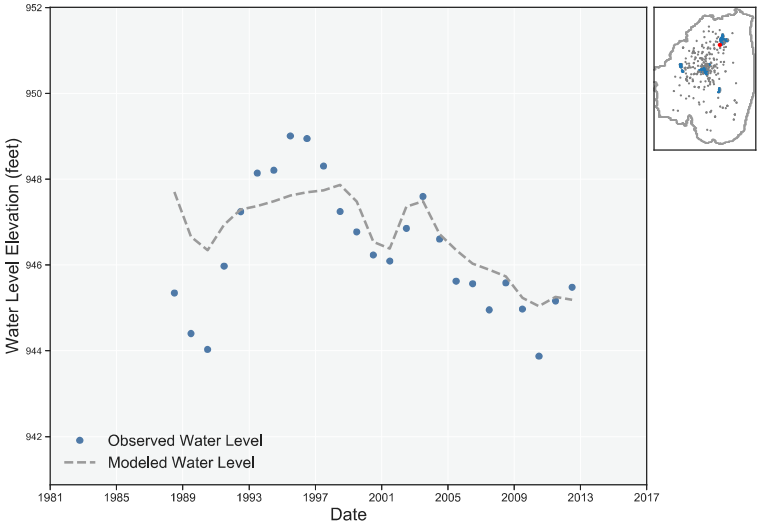
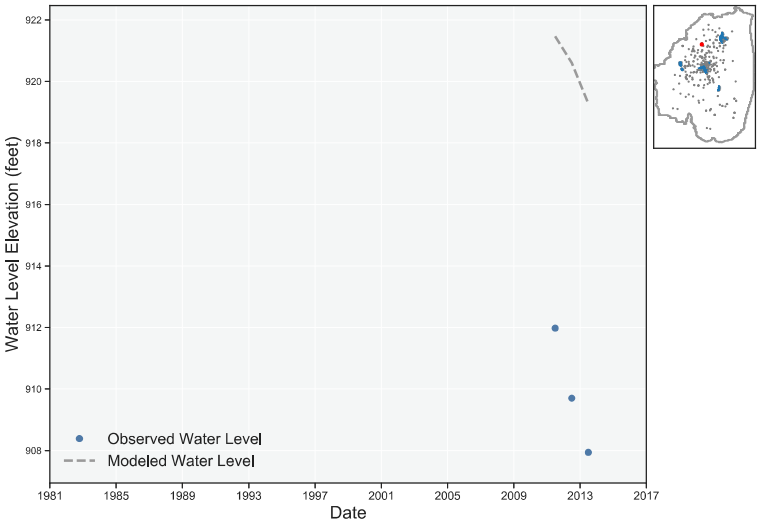


Well 82035 - Aq: OPDC Layers: 6 - 6



Well 430927 - Aq: OPDC Layers: 6 - 6



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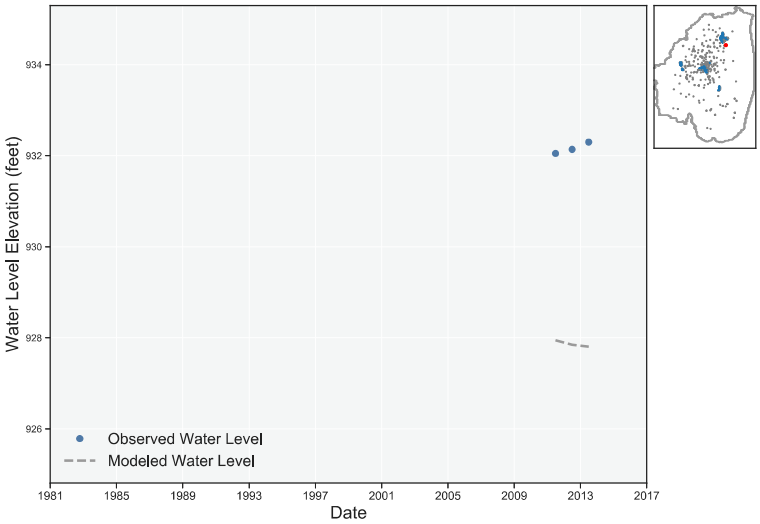

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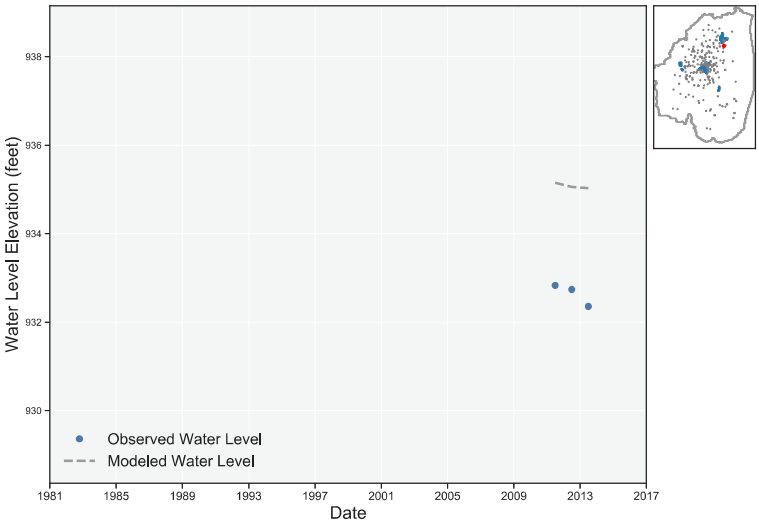

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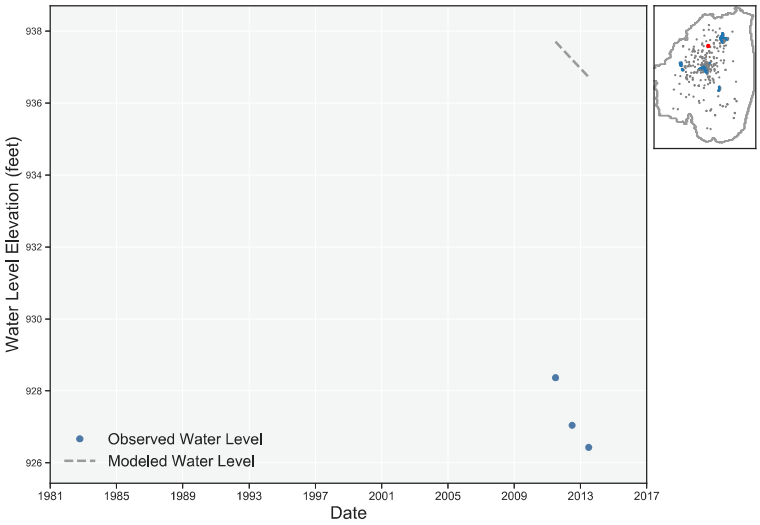

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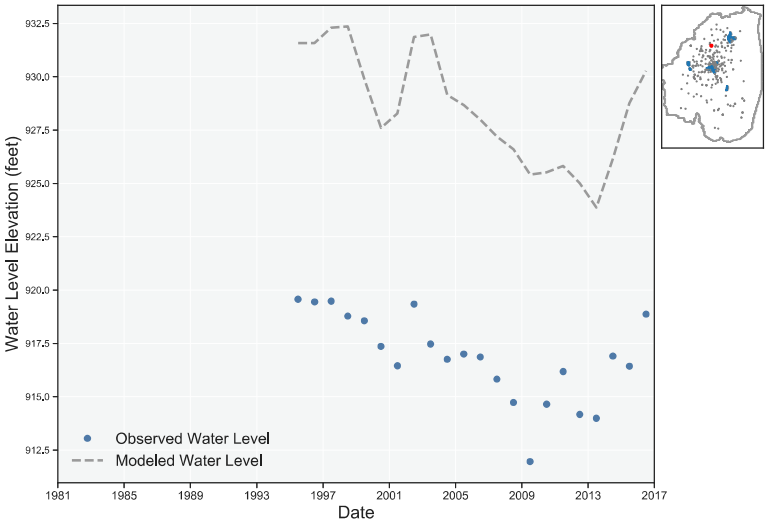
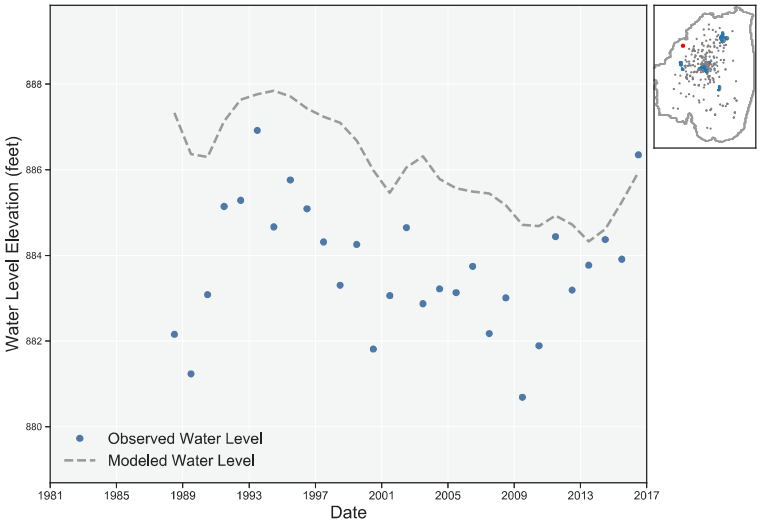


Well 2009 - Aq: QBAA Layers: 6 - 6



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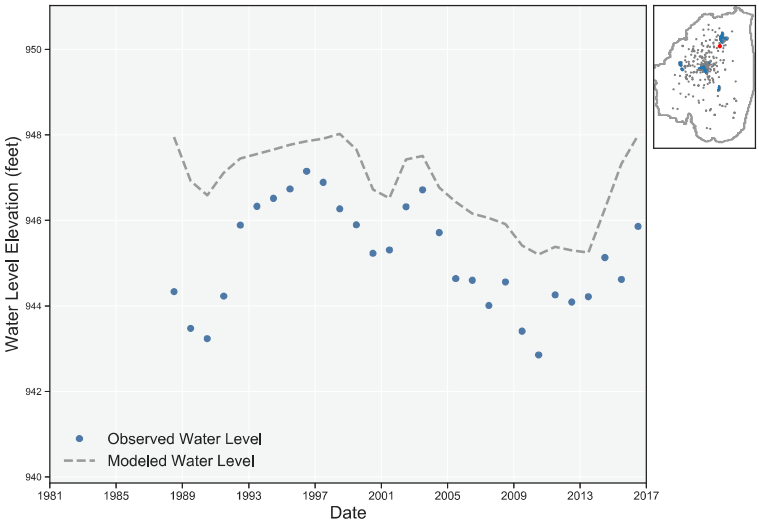
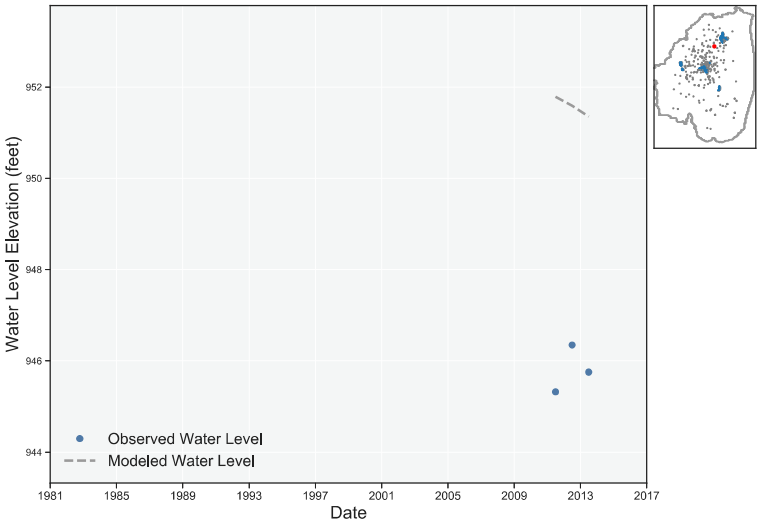
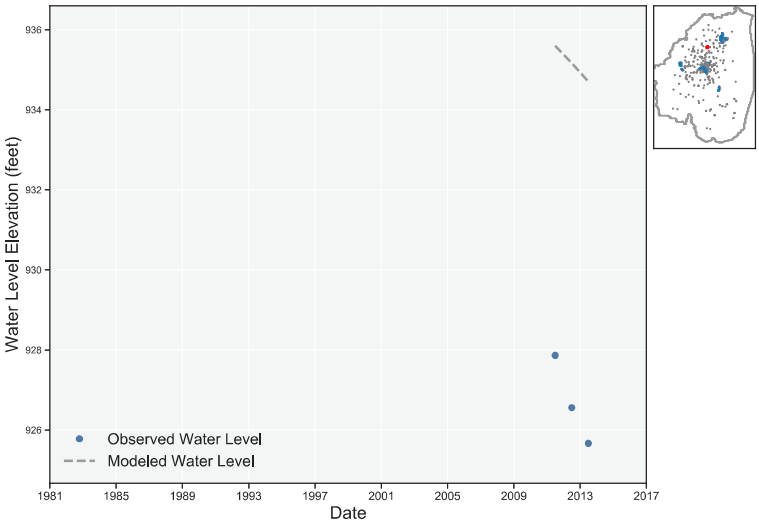


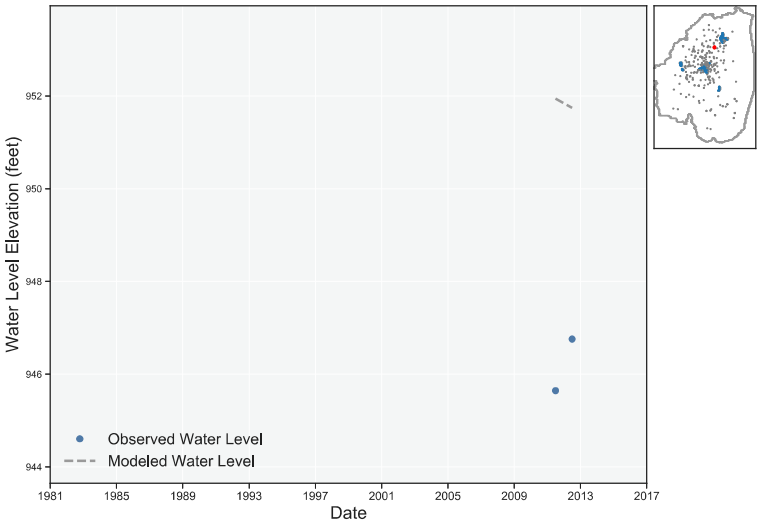
Well 196935 - Aq: OPDC Layers: 6 - 6



Well 110526 - Aq: OPDC Layers: 6 - 6



Well 418593 - Aq: OPDC Layers: 6 - 6



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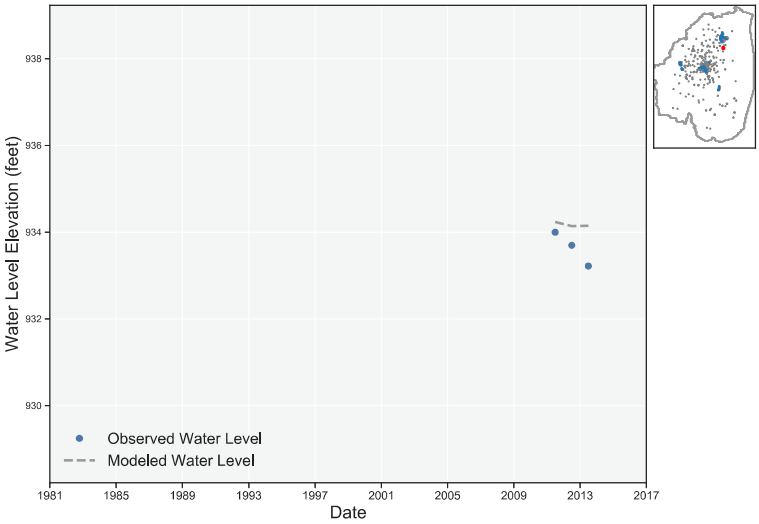
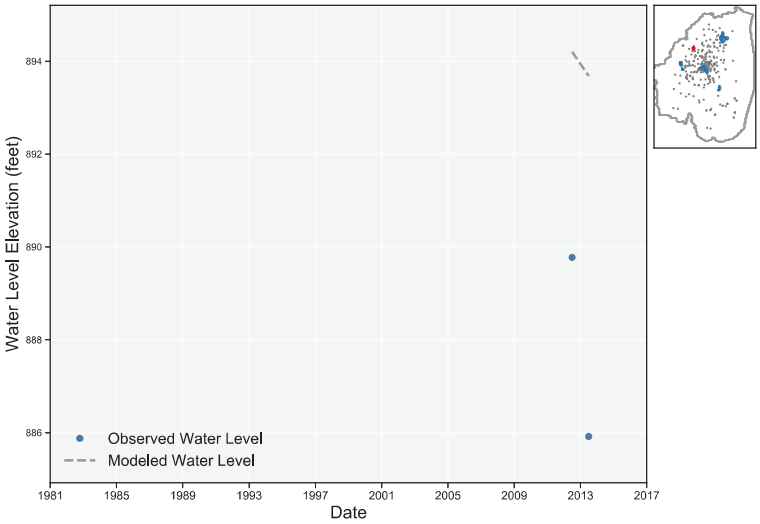


Well 188272 - Aq: OPDC Layers: 6 - 6



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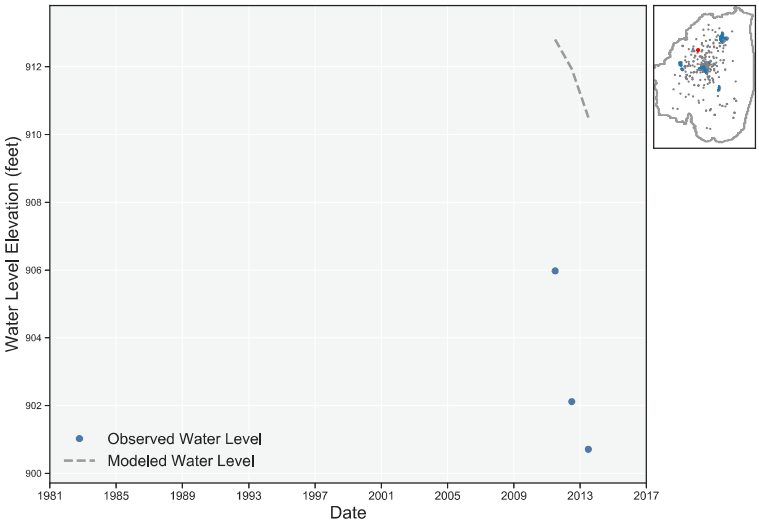
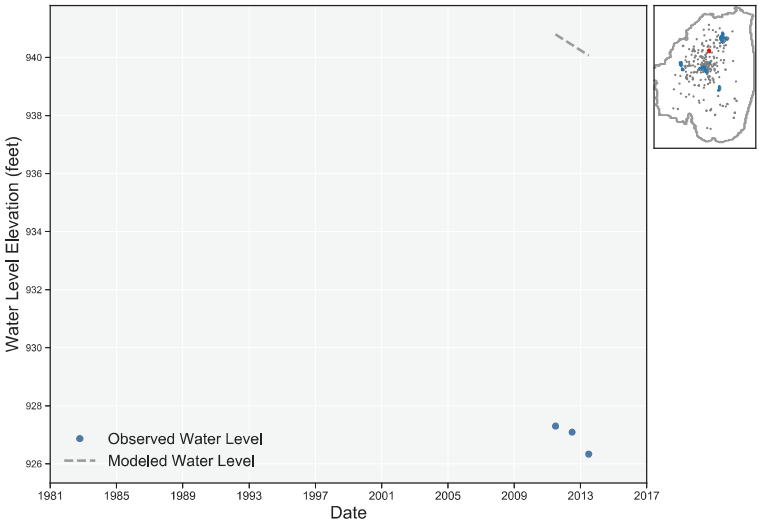
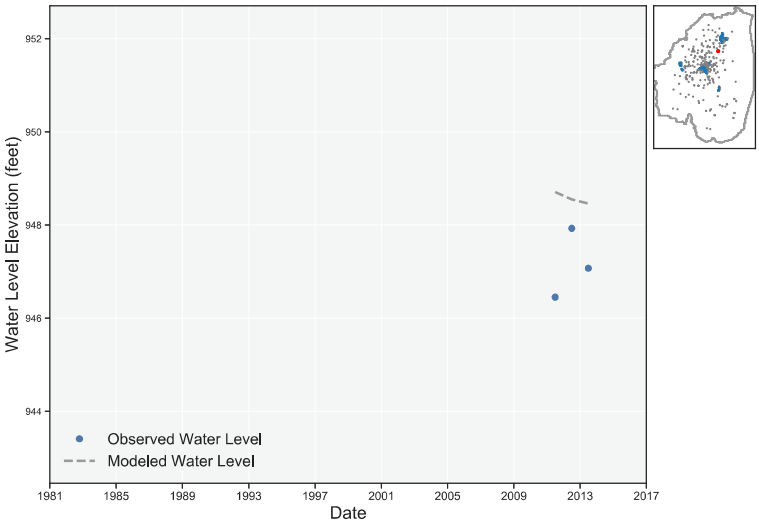


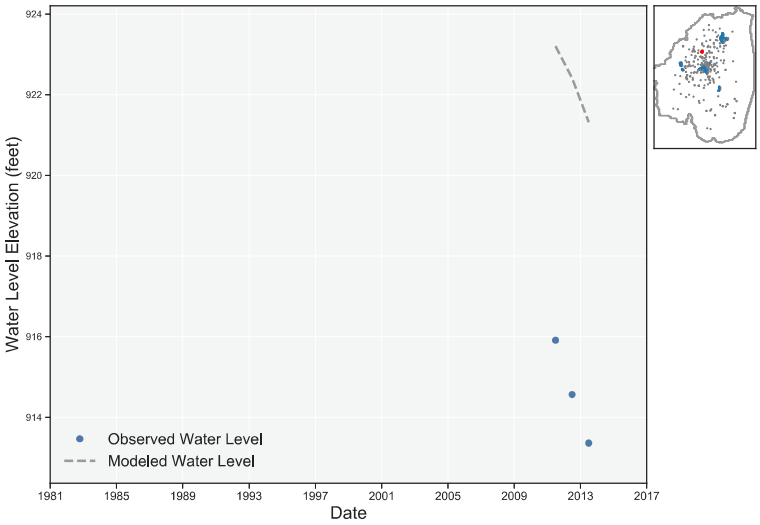
Well 558224 - Aq: OPDC Layers: 6 - 6



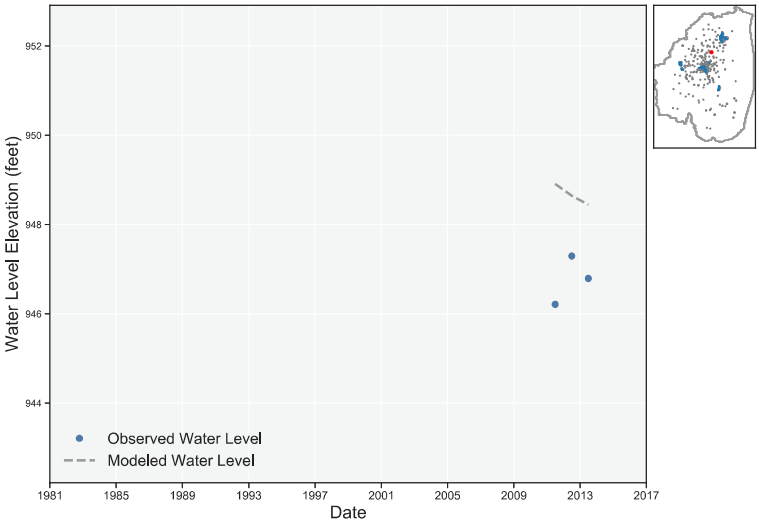
Well 420630 - Aq: OPDC Layers: 6 - 6



Well 427681 - Aq: OPDC Layers: 6 - 6

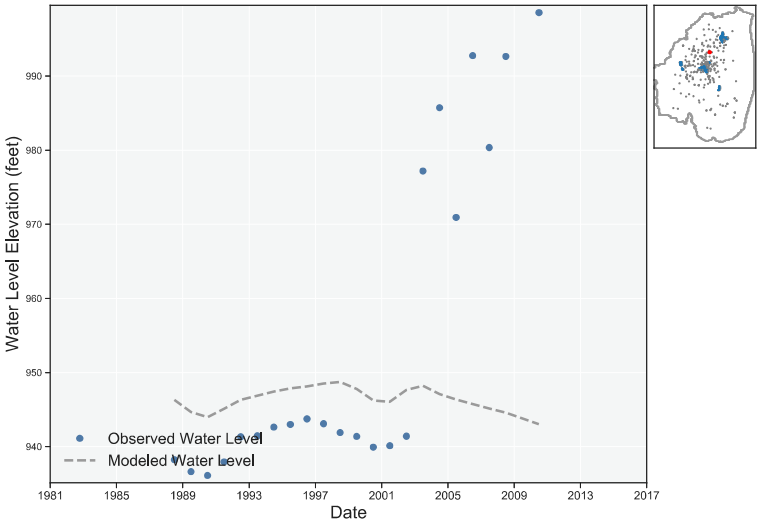


Well 430550 - Aq: OPDC Layers: 6 - 6

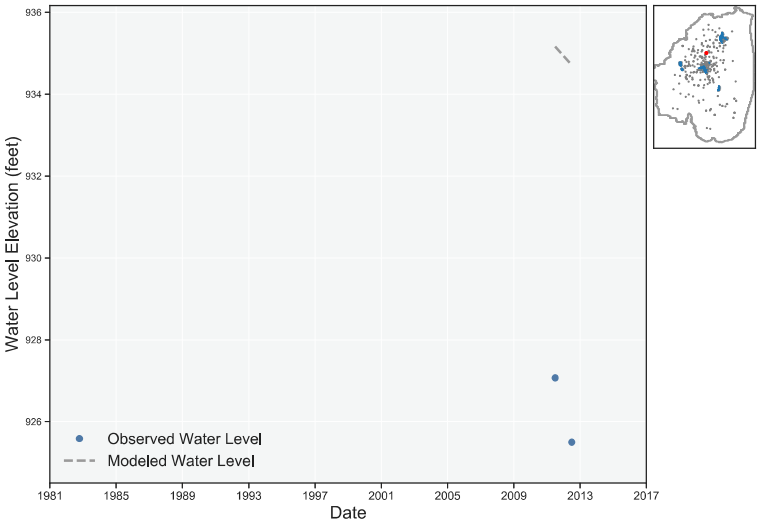


Well 82032 - Aq: OPDC Layers: 6 - 6

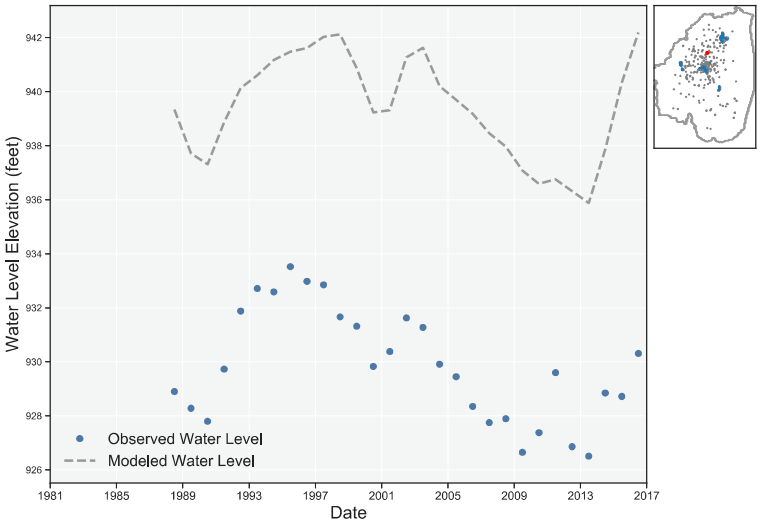
Note: Some values not included in calibration



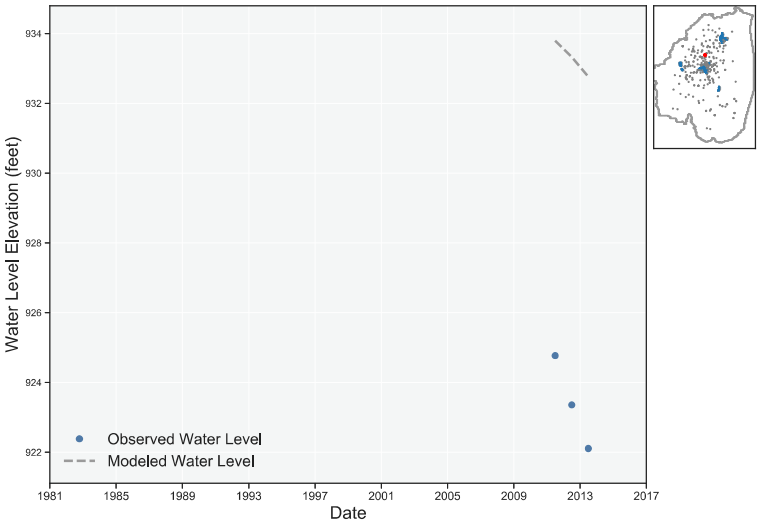
Well 713255 - Aq: OPDC Layers: 6 - 6



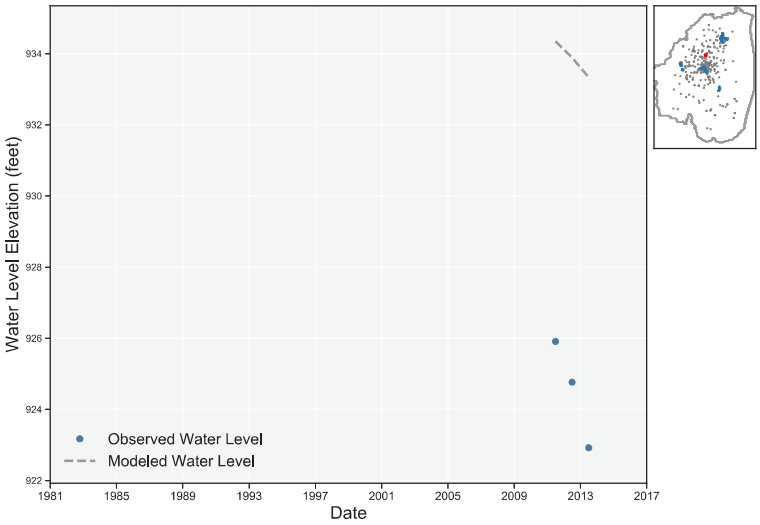
Well 82029 - Aq: OPDC Layers: 6 - 6



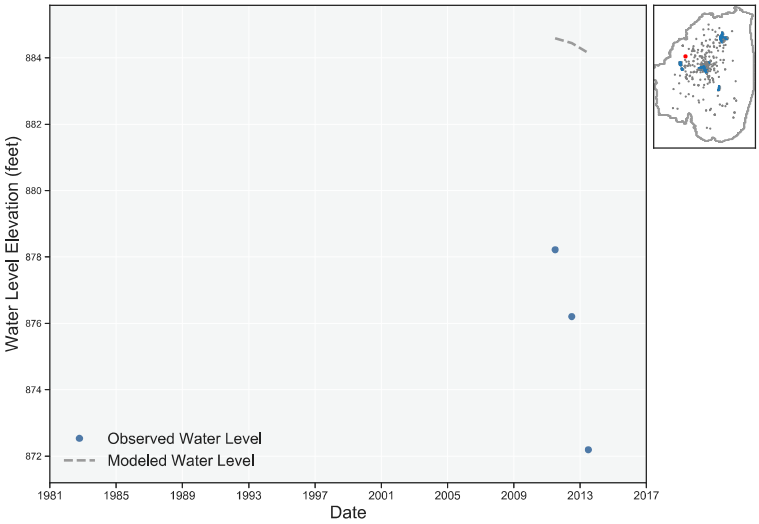
Well 141730 - Aq: OPDC Layers: 6 - 6



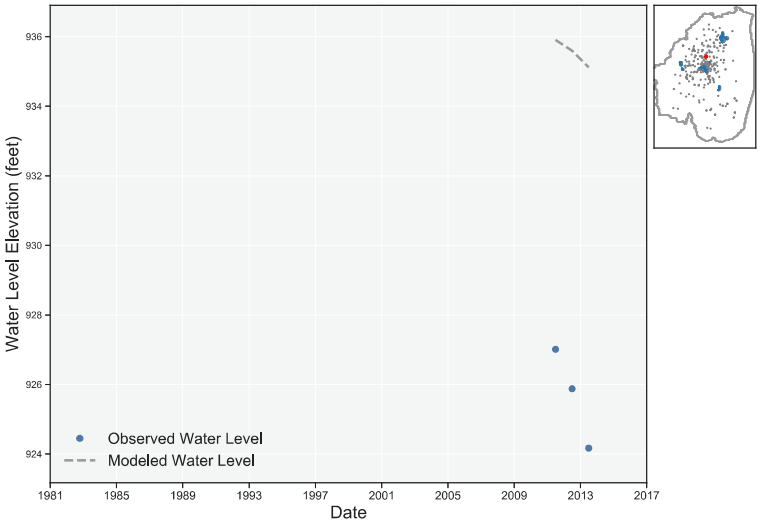
Well 138120 - Aq: OPDC Layers: 6 - 6



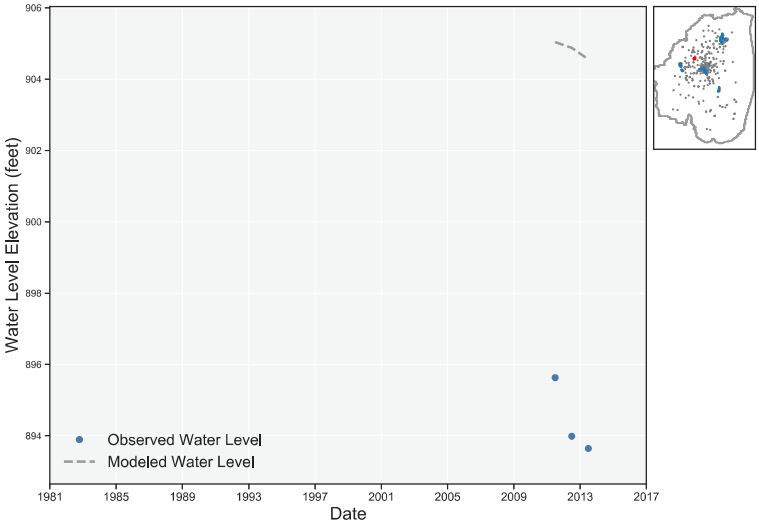
Well 170633 - Aq: OPDC Layers: 6 - 6



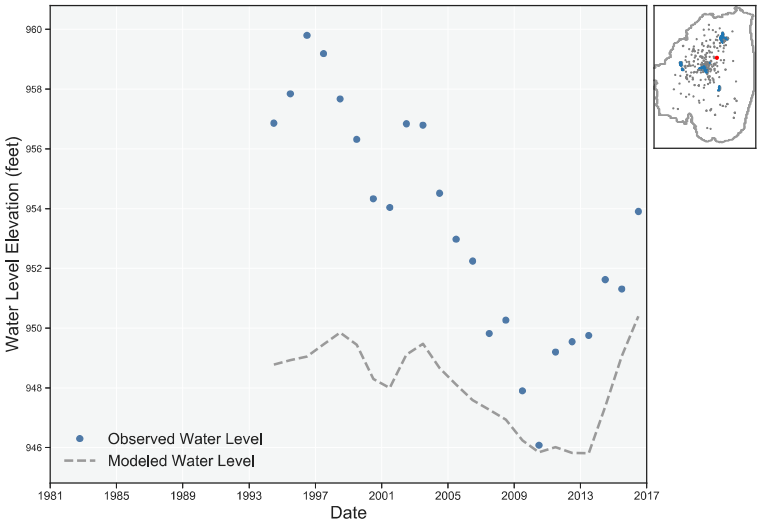
Well 439243 - Aq: OPDC Layers: 6 - 6



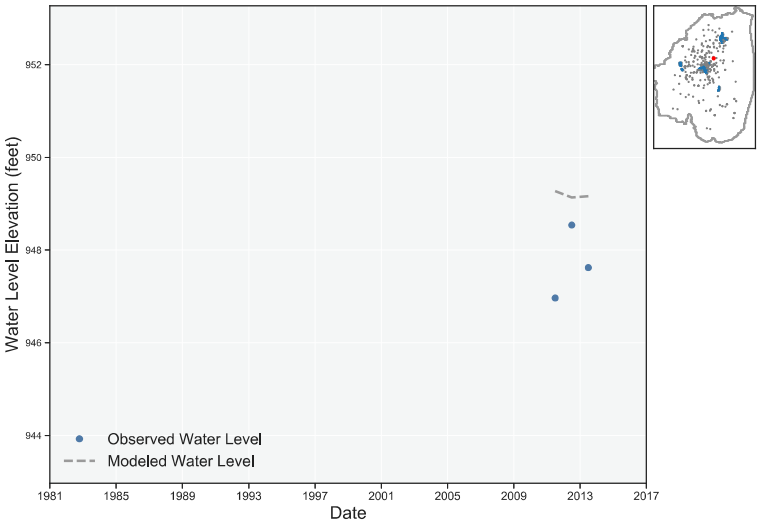
Well 138399 - Aq: OPDC Layers: 6 - 6



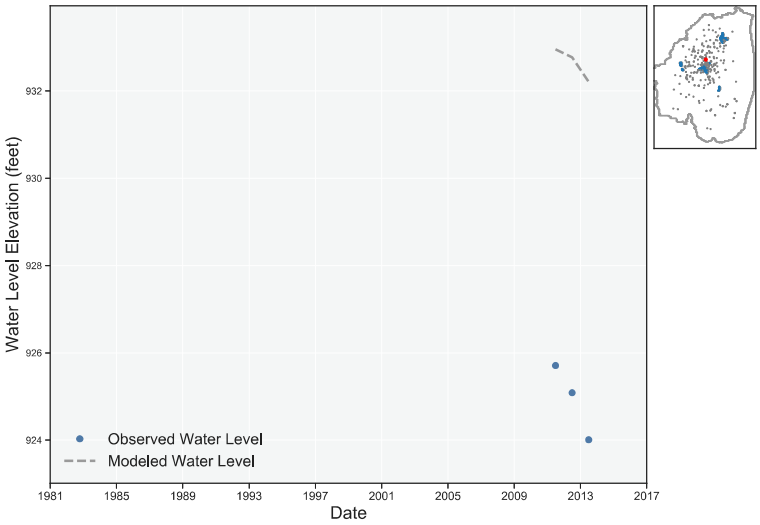
Well 82039 - Aq: OPDC Layers: 6 - 6



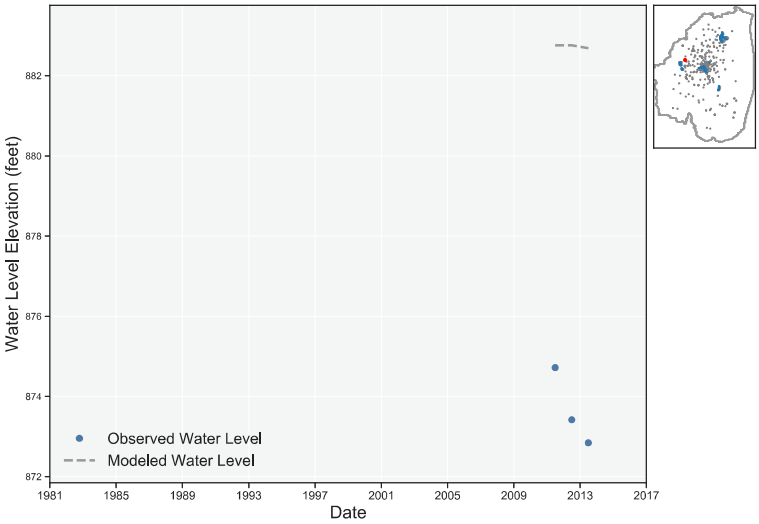
Well 413669 - Aq: OPDC Layers: 6 - 6



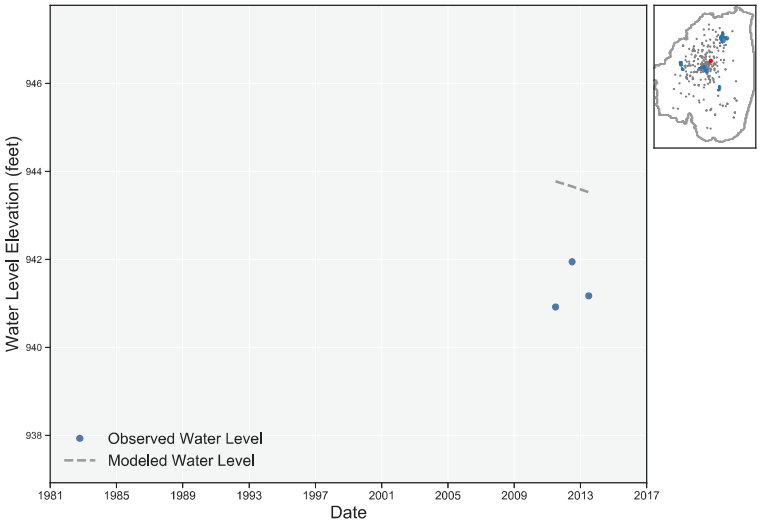
Well 546305 - Aq: OPDC Layers: 6 - 6



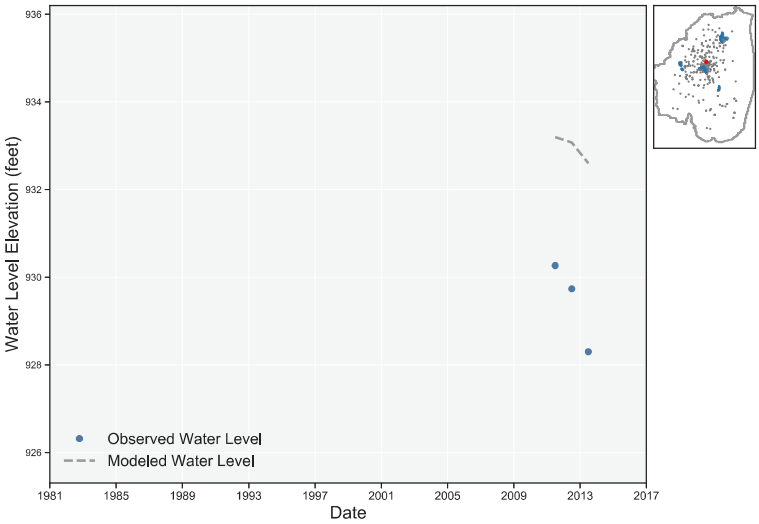
Well 512346 - Aq: OPDC Layers: 6 - 6



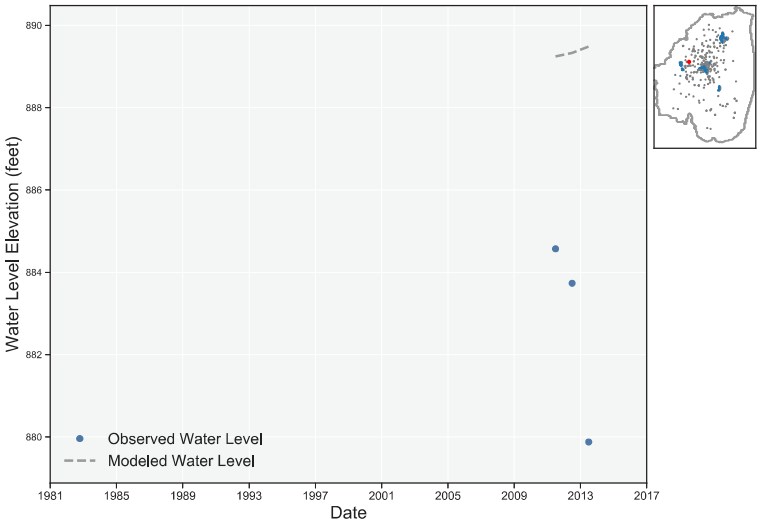
Well 139277 - Aq: OPDC Layers: 6 - 6



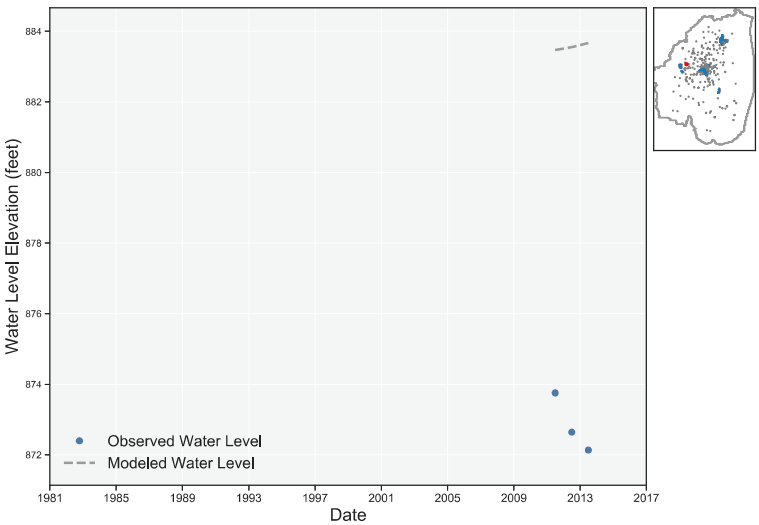
Well 436559 - Aq: OPDC Layers: 6 - 6



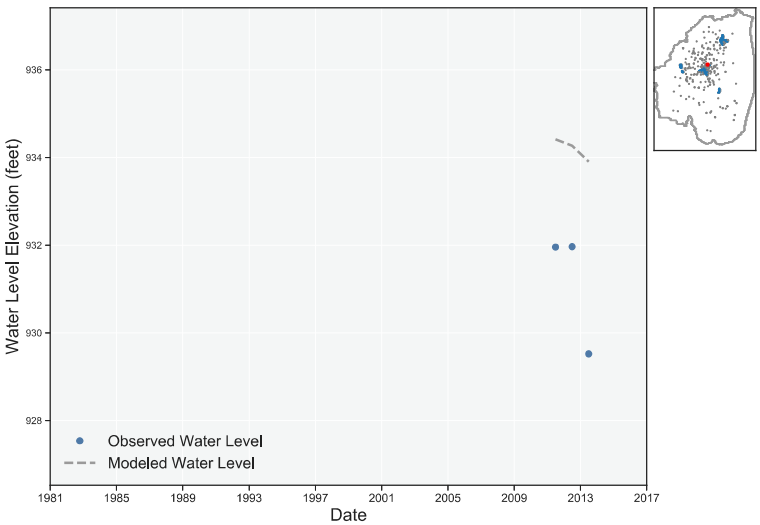
Well 205700 - Aq: OPDC Layers: 6 - 6



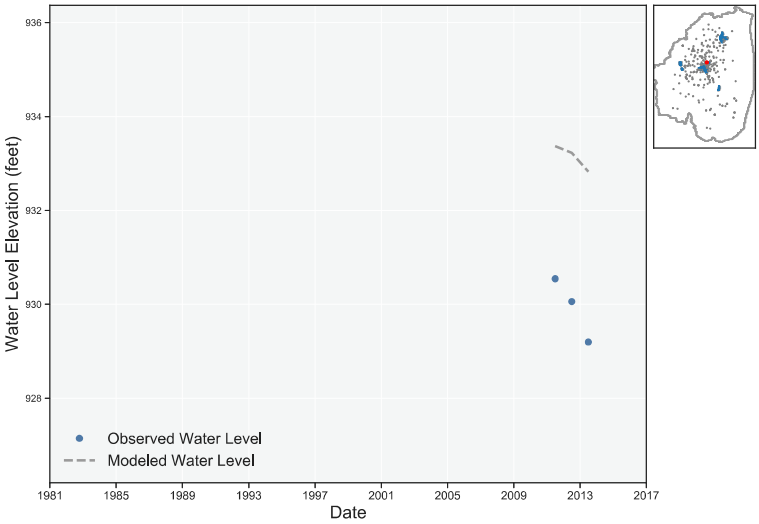
Well 521812 - Aq: OPDC Layers: 6 - 6



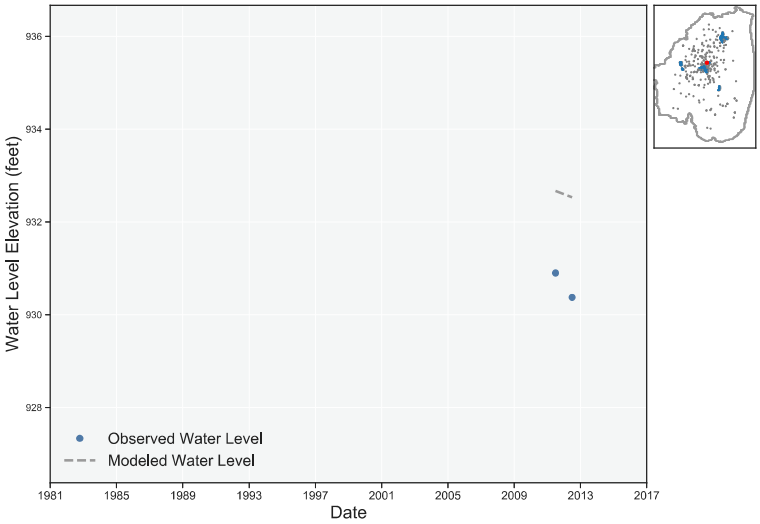
Well 418562 - Aq: OPDC Layers: 6 - 6



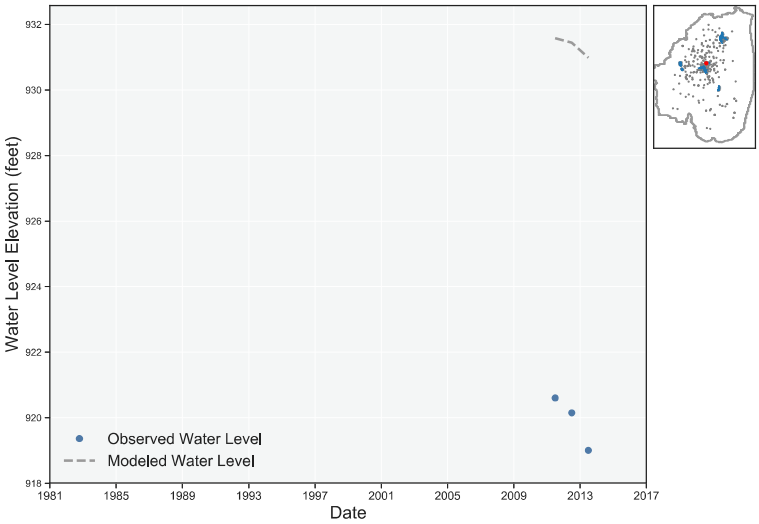
Well 421207 - Aq: OPDC Layers: 6 - 6



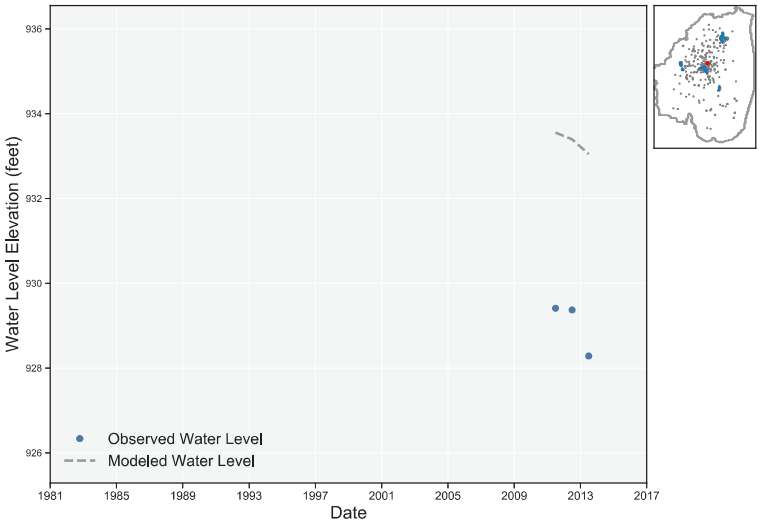
Well 450530 - Aq: OPDC Layers: 6 - 6



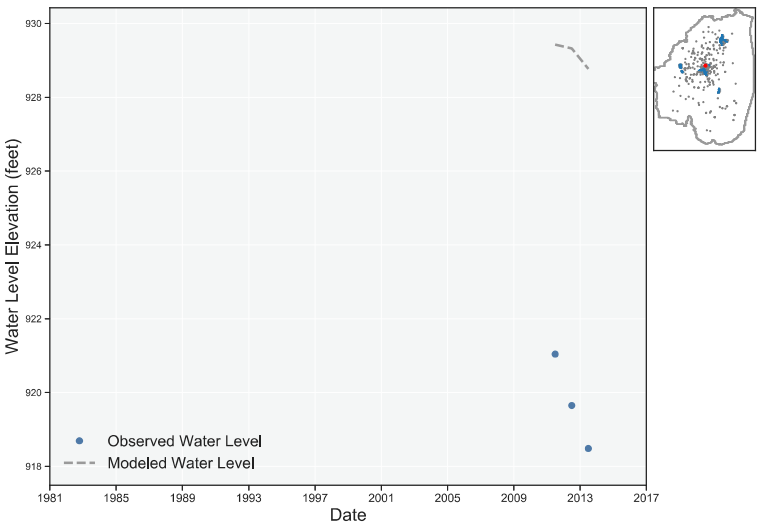
Well 427888 - Aq: OPDC Layers: 6 - 6



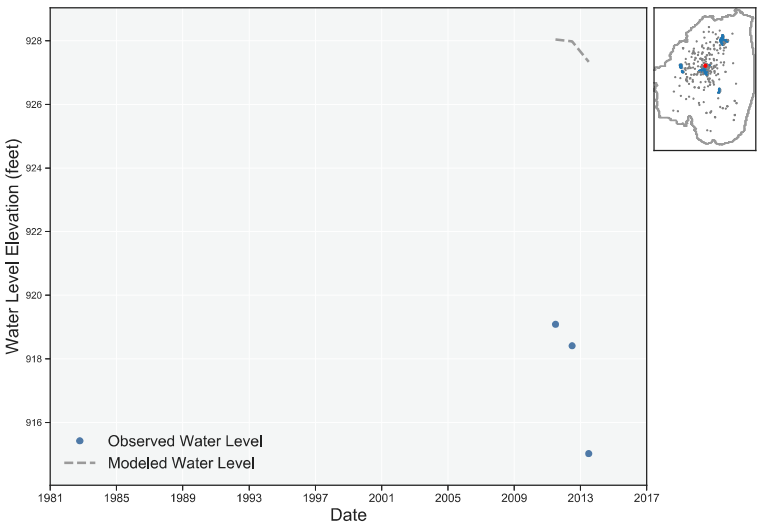
Well 182909 - Aq: OPDC Layers: 6 - 6



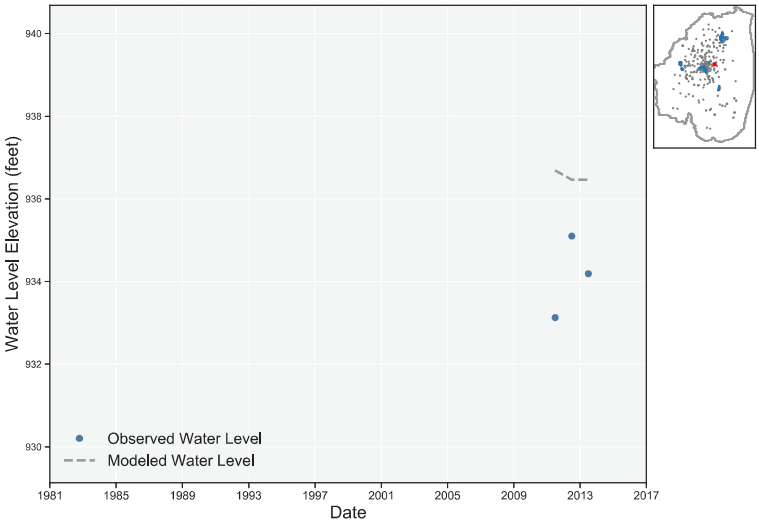
Well 208473 - Aq: OPDC Layers: 6 - 6



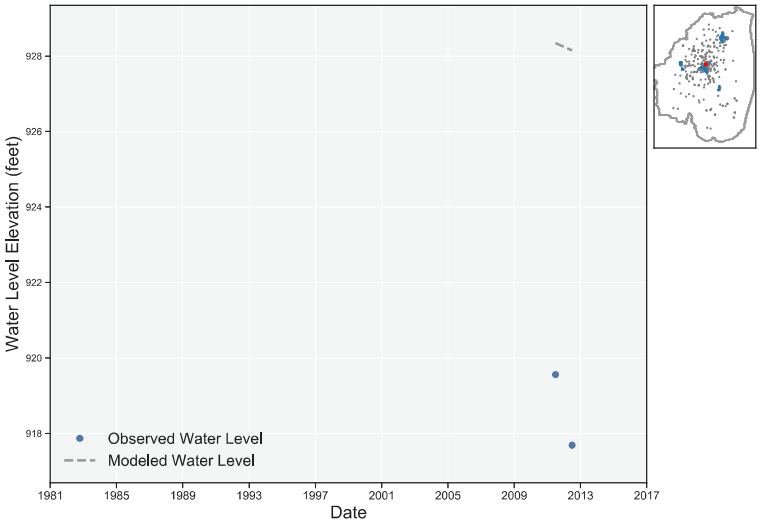
Well 450573 - Aq: OPDC Layers: 6 - 6



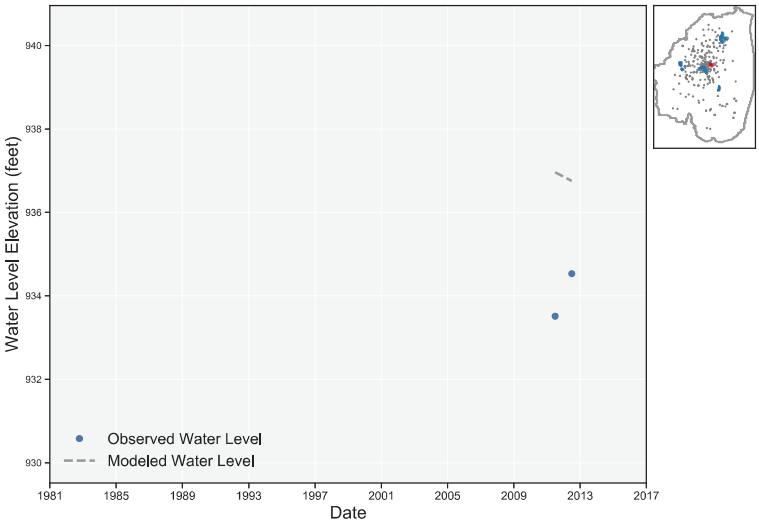
Well 182782 - Aq: OPDC Layers: 6 - 6



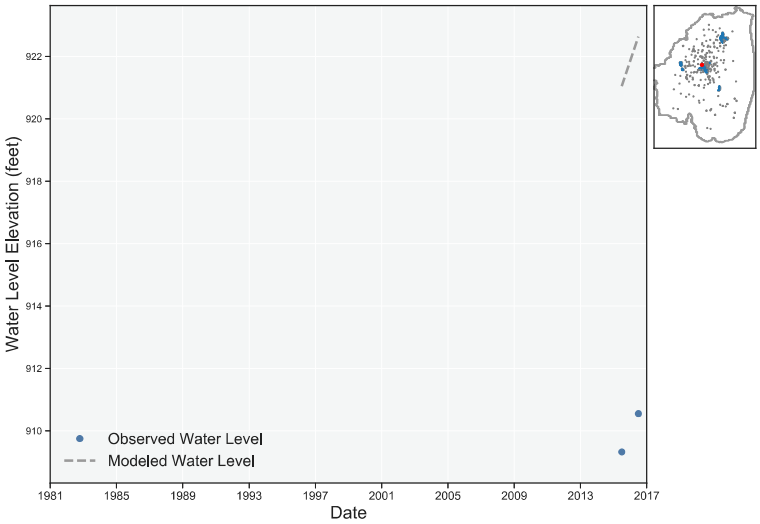
Well 182763 - Aq: OPDC Layers: 6 - 6



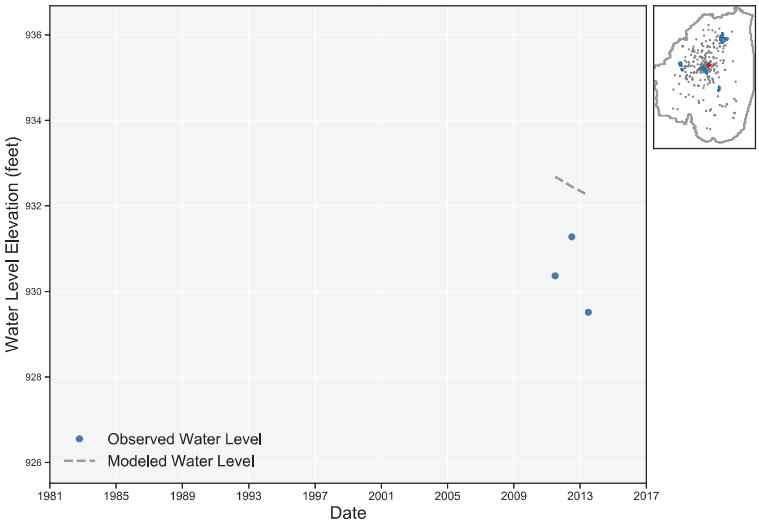
Well 430520 - Aq: OPDC Layers: 6 - 6



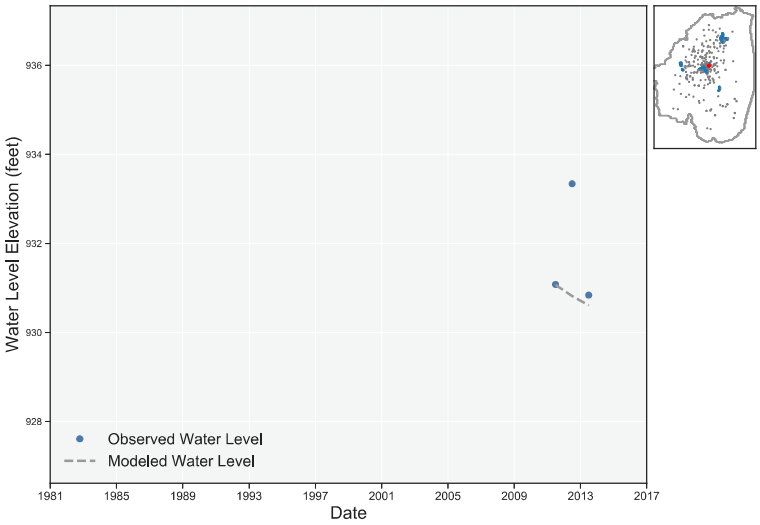
Well 62053 - Aq: CJDN Layers: 6 - 6



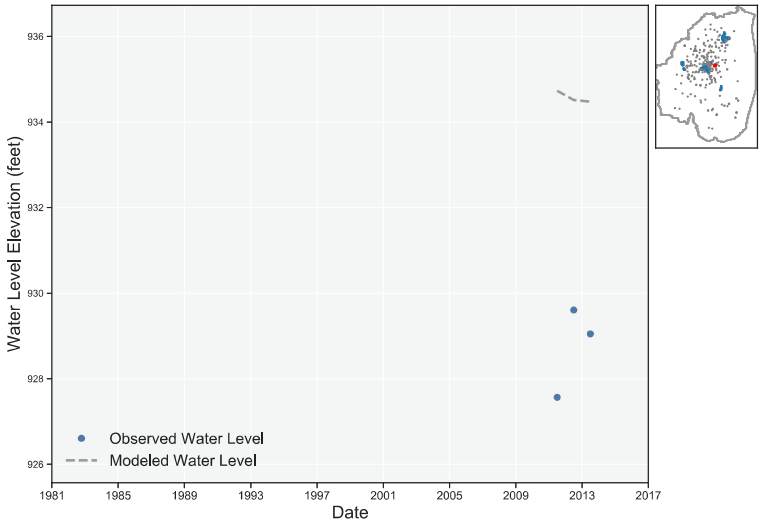
Well 195679 - Aq: OPDC Layers: 6 - 6



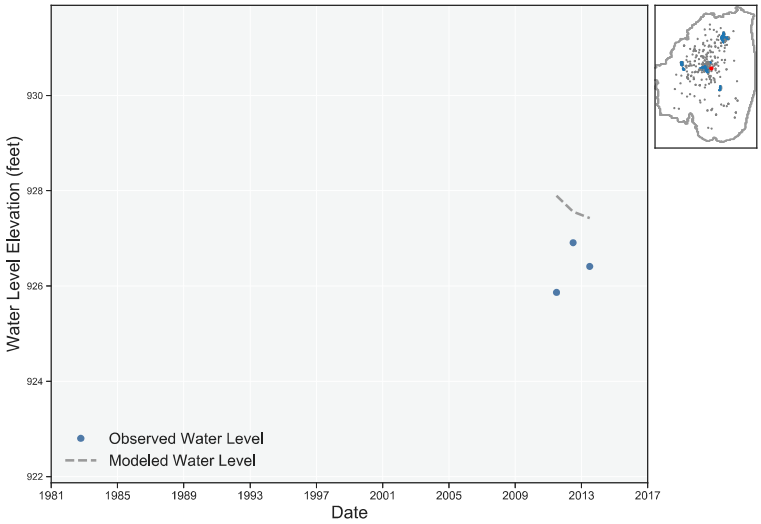
Well 207398 - Aq: OPDC Layers: 6 - 6



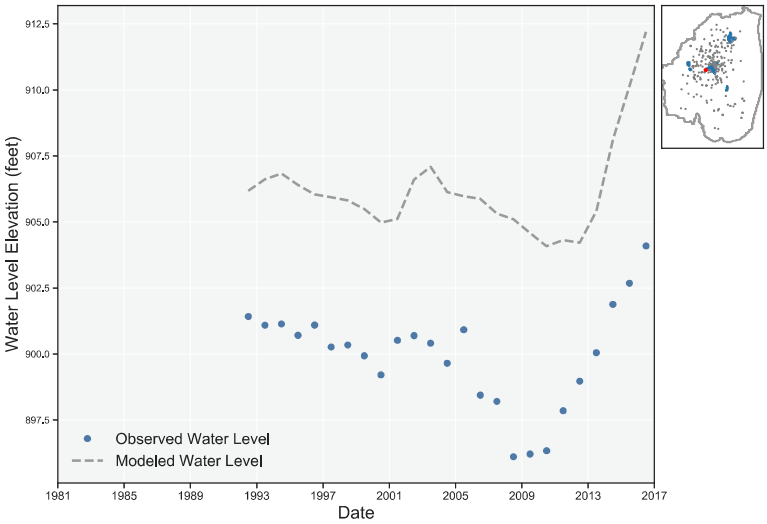
Well 404147 - Aq: OPDC Layers: 6 - 6



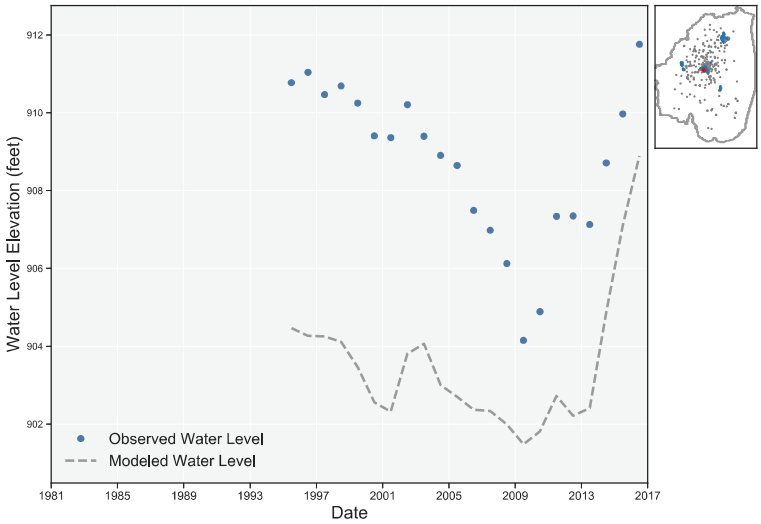
Well 420312 - Aq: OPDC Layers: 6 - 6



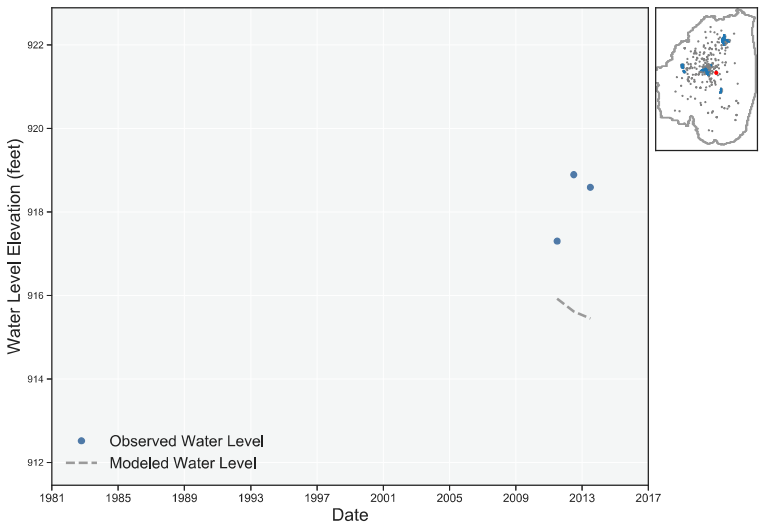
Well 62038 - Aq: OPDCCJDN Layers: 6 - 6



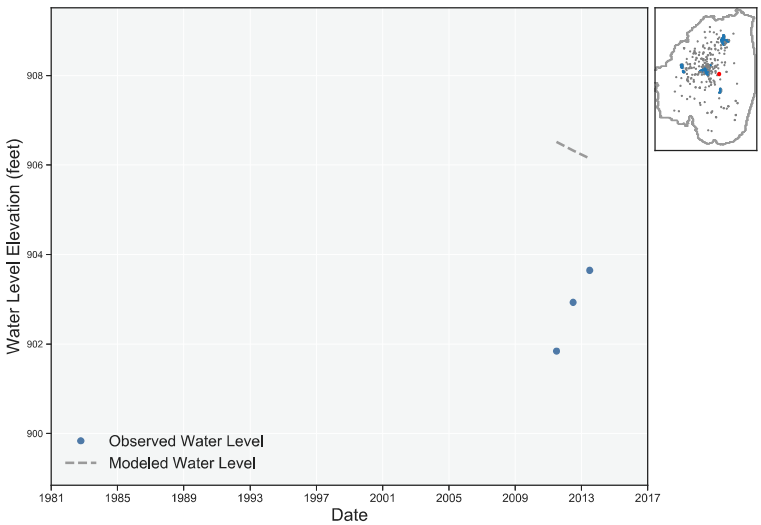
Well 62044 - Aq: OPDC Layers: 6 - 6



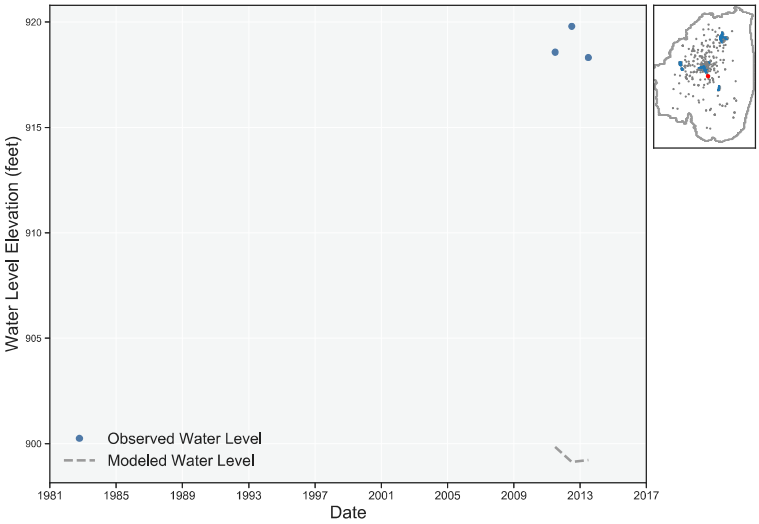
Well 435121 - Aq: OPDC Layers: 6 - 6



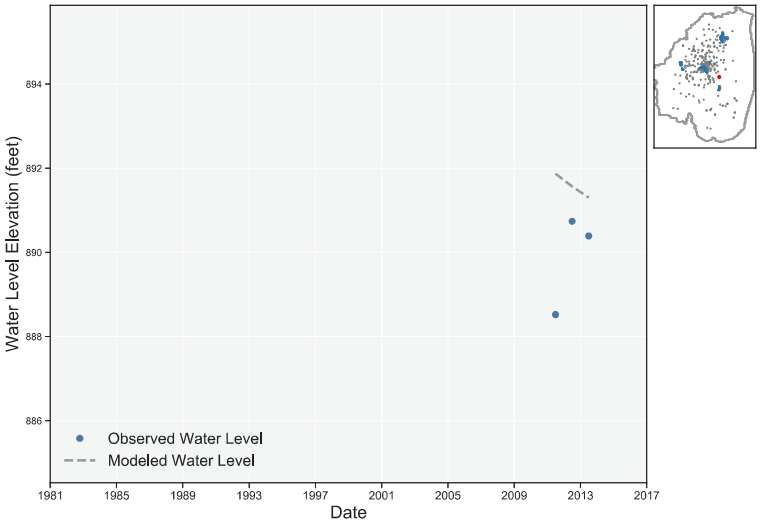
Well 762107 - Aq: OSTP Layers: 6 - 6



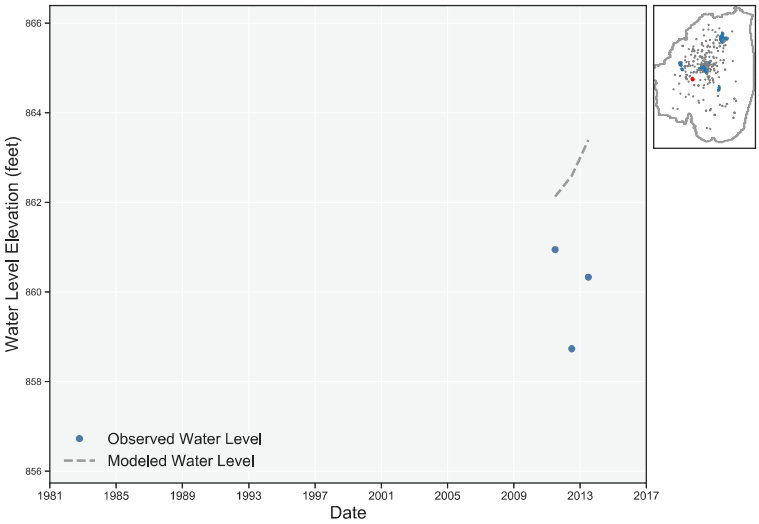
Well 138719 - Aq: OPDC Layers: 6 - 6



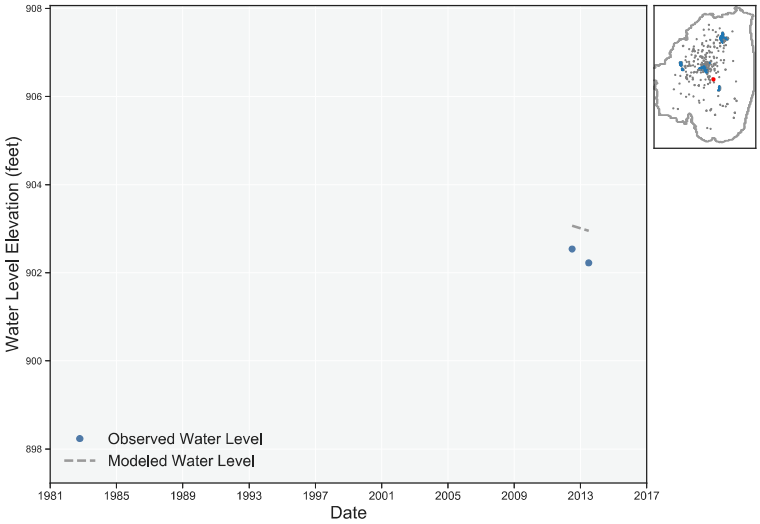
Well 242357 - Aq: OPDC Layers: 6 - 6



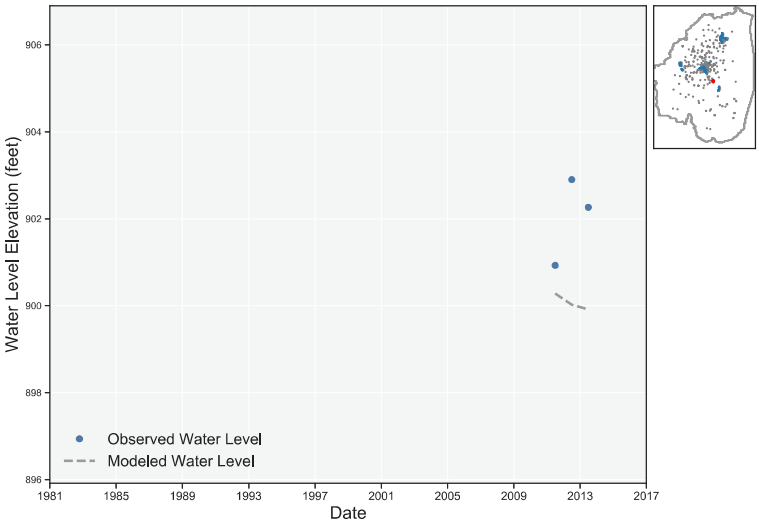
Well 430379 - Aq: OPDC Layers: 6 - 6



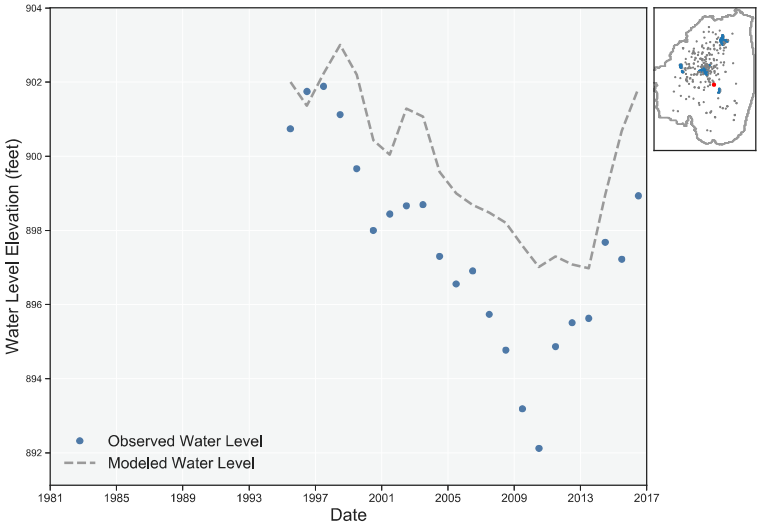
Well 421245 - Aq: OPDC Layers: 6 - 6



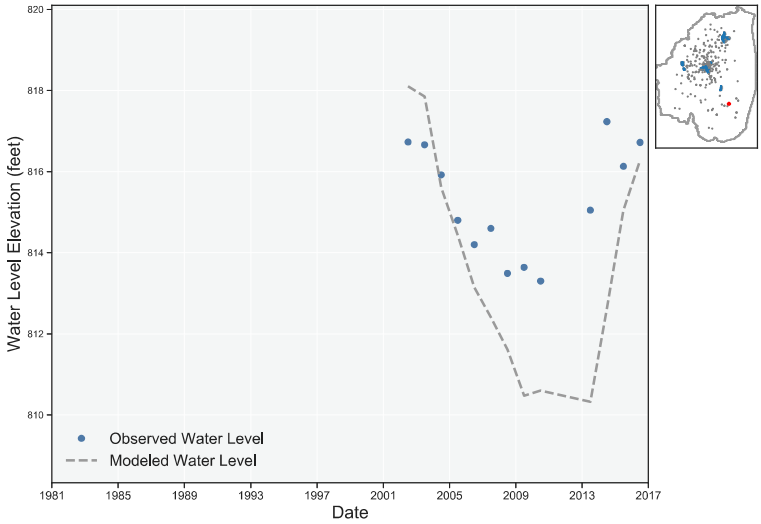
Well 440010 - Aq: OSTP Layers: 6 - 6



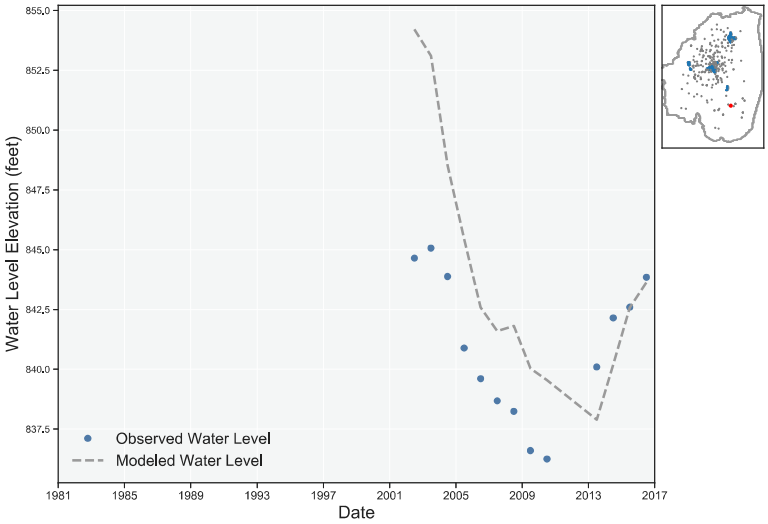
Well 82041 - Aq: OPDC Layers: 6 - 6



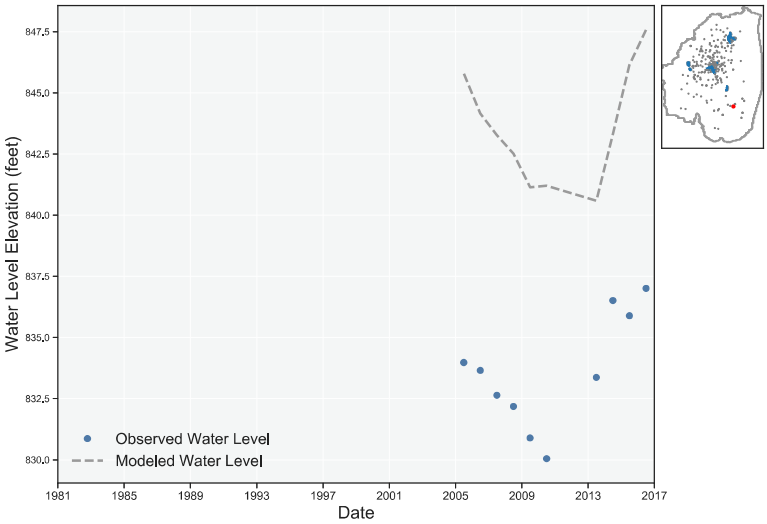
Well 675585 - Aq: OPDC Layers: 6 - 6



Well 675582 - Aq: OPDC Layers: 6 - 6

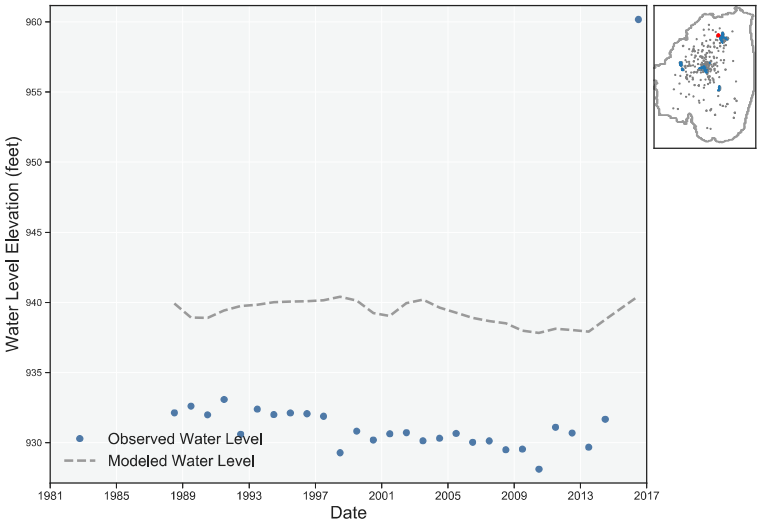


Well 727706 - Aq: OPDC Layers: 6 - 6

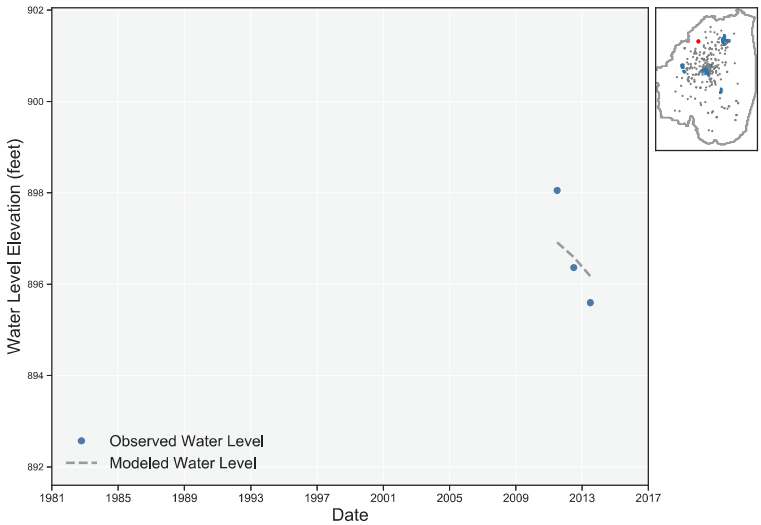


Well 82030 - Aq: OPDCCJDN Layers: 6 - 7

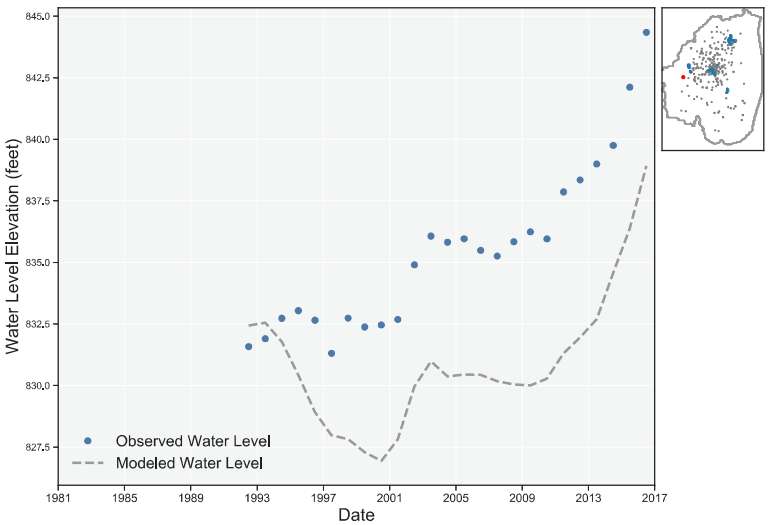
Note: Some values not included in calibration



Well 136792 - Aq: OPCJ Layers: 6 - 7

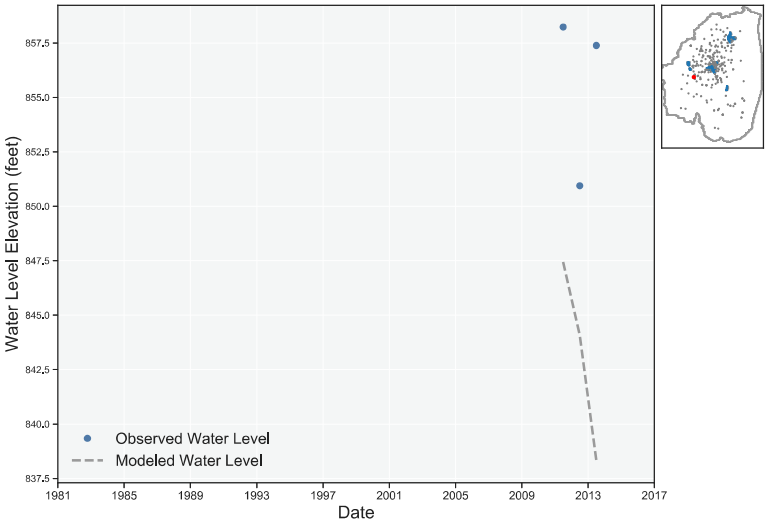


Well 62037 - Aq: OPDCCJDN Layers: 6 - 7



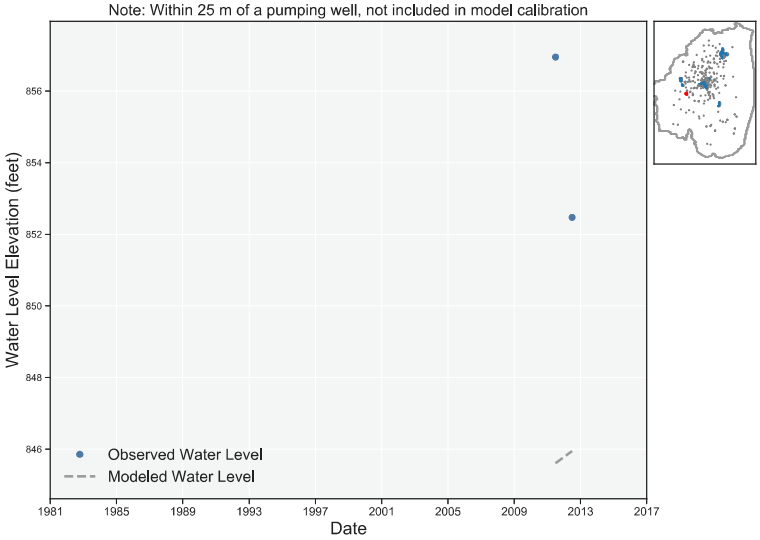
Well 151579 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation E) but was not pumped in 2011 or 2012.
Note: Some values not included in calibration

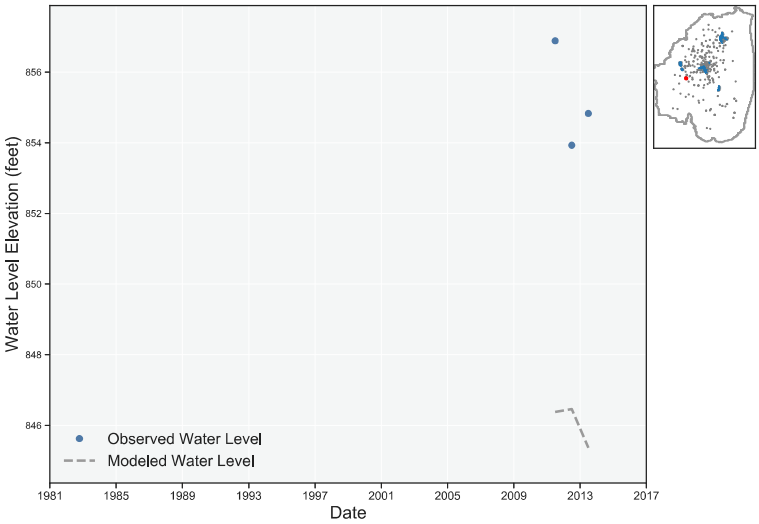


Well 706802 - Aq: OPCJ Layers: 6 - 7

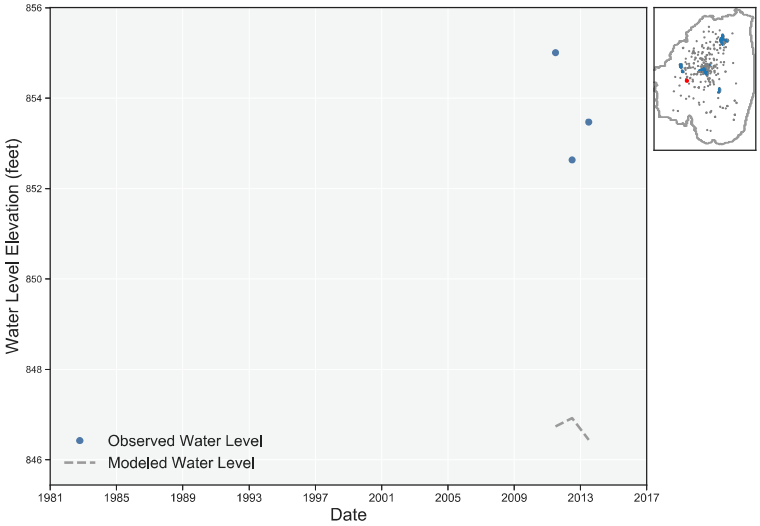
Note: Within 25 m of a pumping well, not included in model calibration



Well 753666 - Aq: OPCJ Layers: 6 - 7

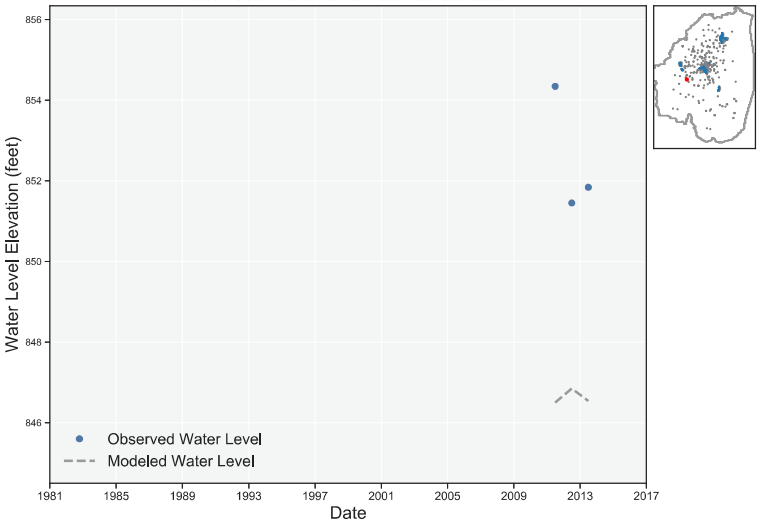


Well 753667 - Aq: OPCJ Layers: 6 - 7



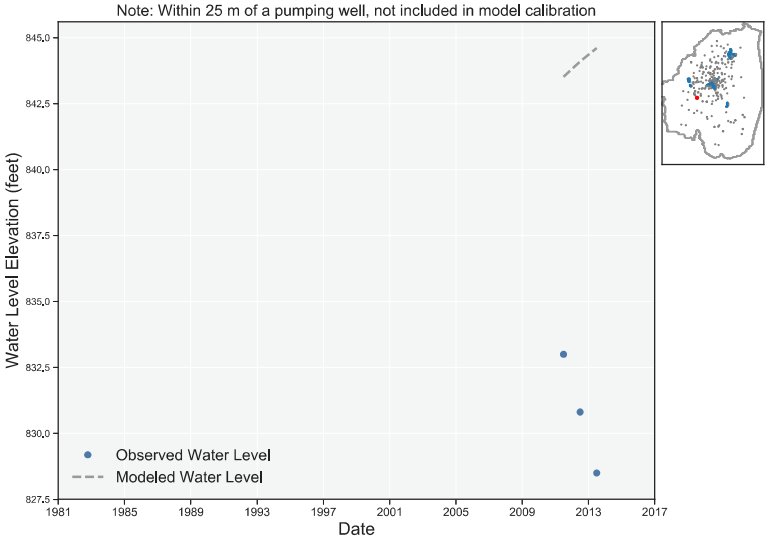
Well 759568 - Aq: OPCJ Layers: 6 - 7

Note: Some values not included in calibration

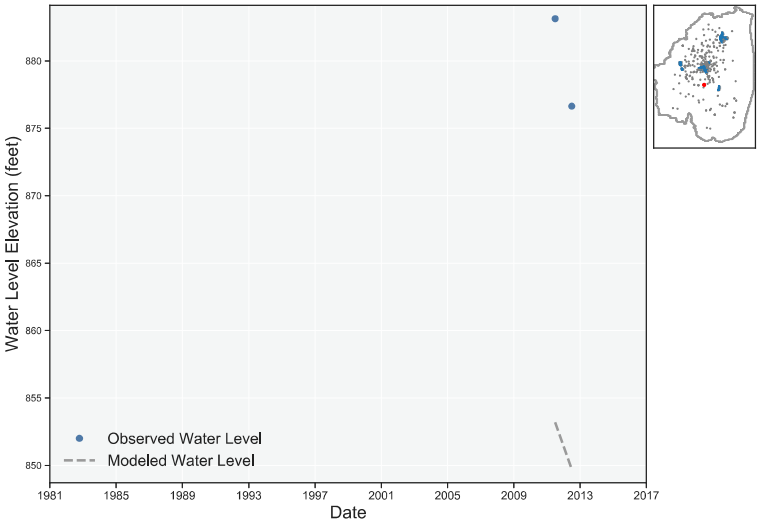


Well 759569 - Aq: OPCJ Layers: 6 - 7

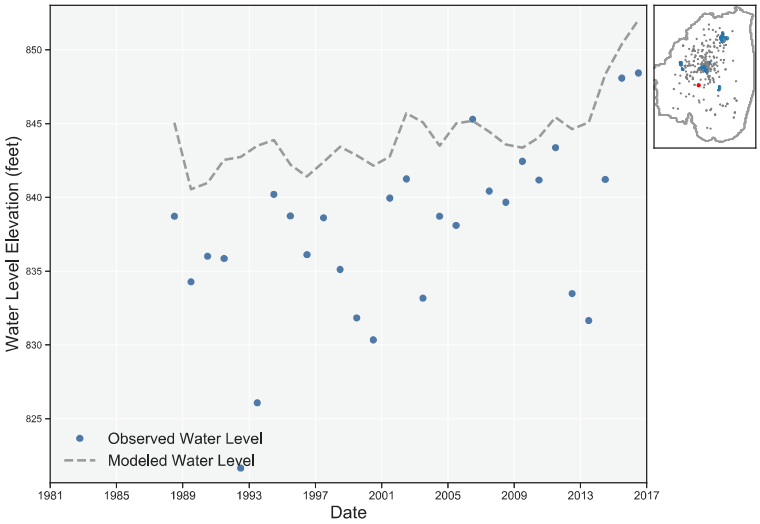
Note: Within 25 m of a pumping well, not included in model calibration



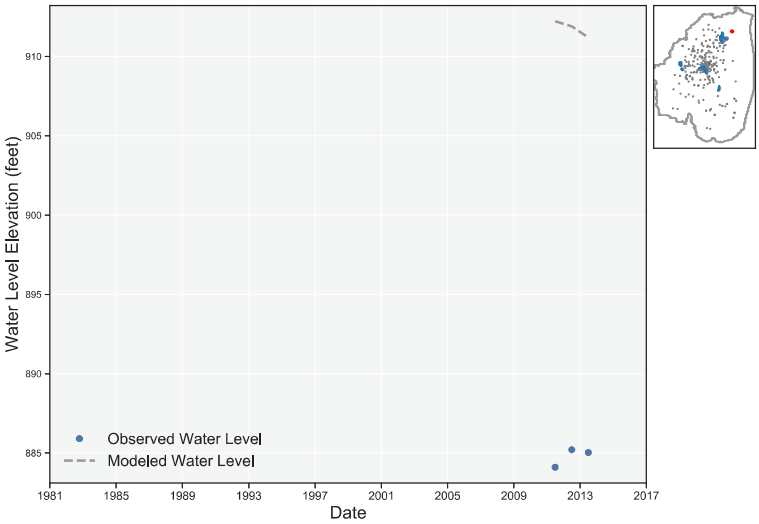
Well 686293 - Aq: OPCJ Layers: 6 - 7



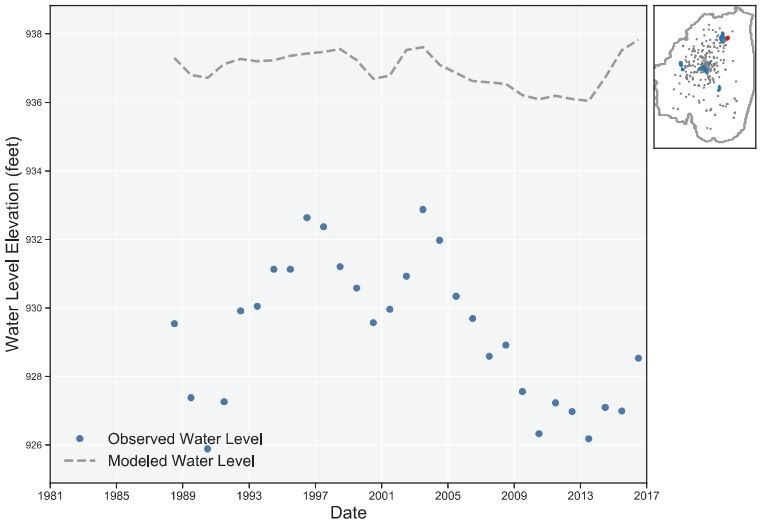
Well 62009 - Aq: OPDCCJDN Layers: 6 - 7



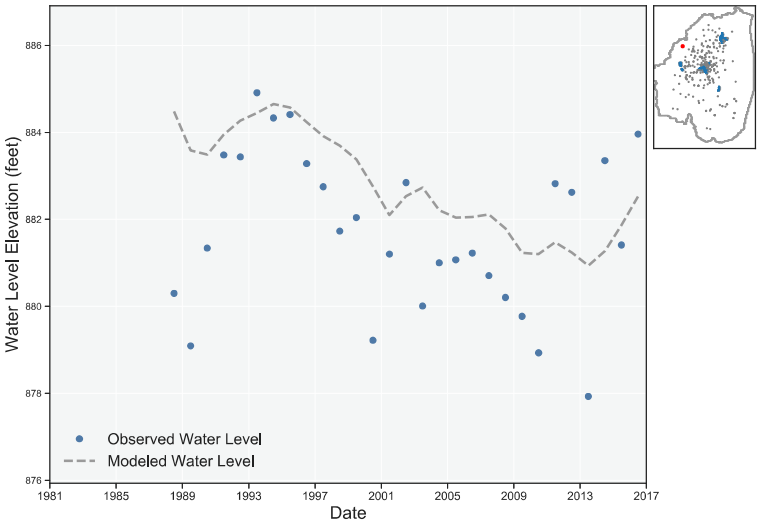
Well 517015 - Aq: OPCJ Layers: 7 - 7



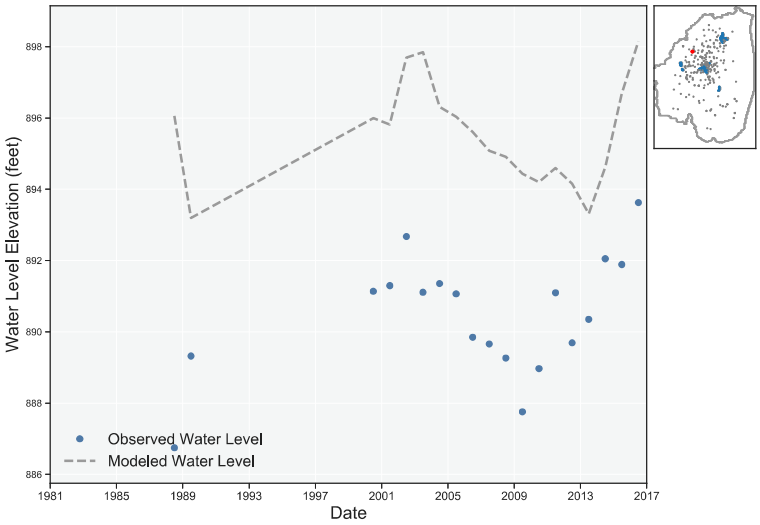
Well 82031 - Aq: CJDN Layers: 7 - 7



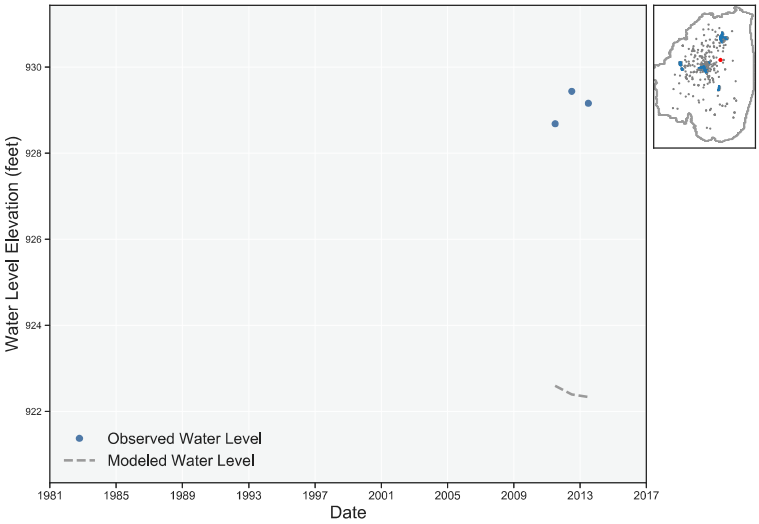
Well 2008 - Aq: QBAA Layers: 7 - 7



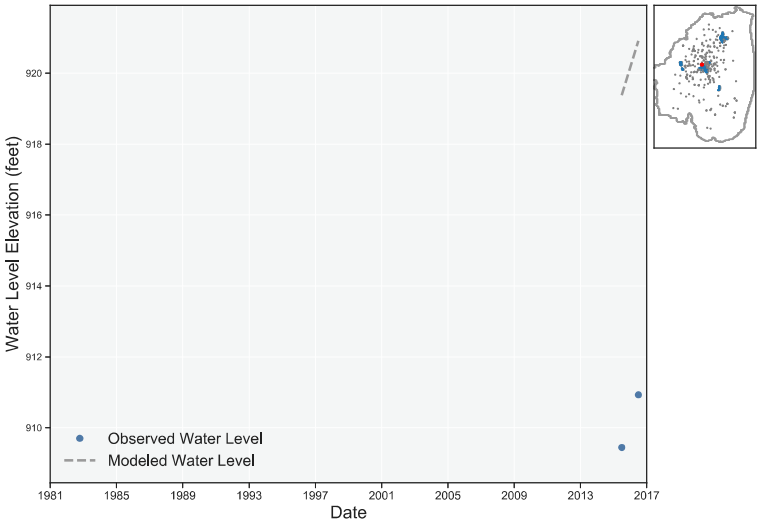
Well 2012 - Aq: CJDN Layers: 7 - 7



Well 409004 - Aq: OSTP Layers: 7 - 7

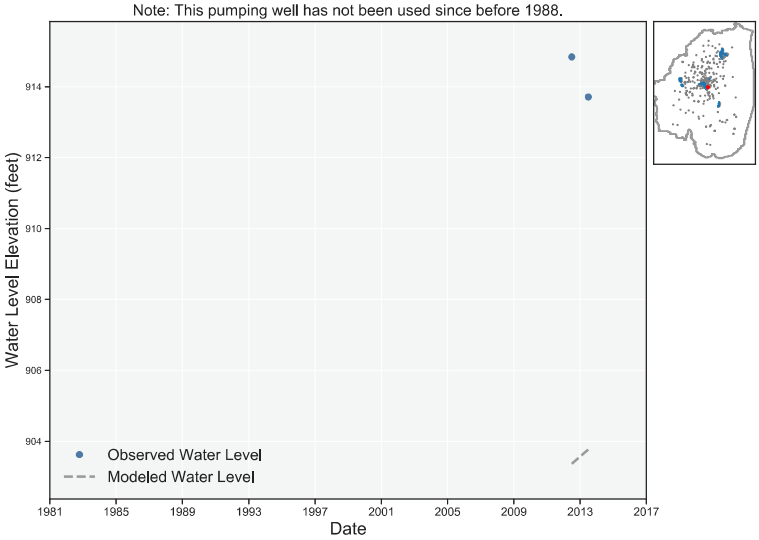


Well 62054 - Aq: OPDC Layers: 7 - 7



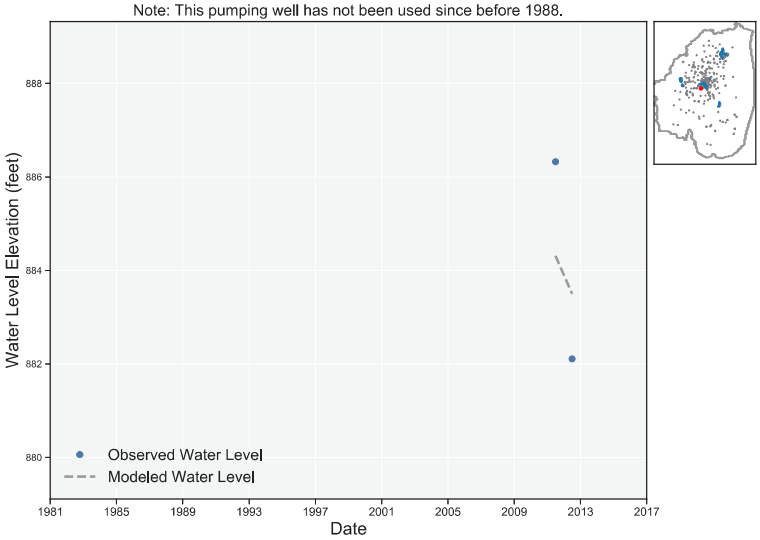
Well 208506 - Aq: CJDN Layers: 7 - 7

Note: This pumping well has not been used since before 1988.

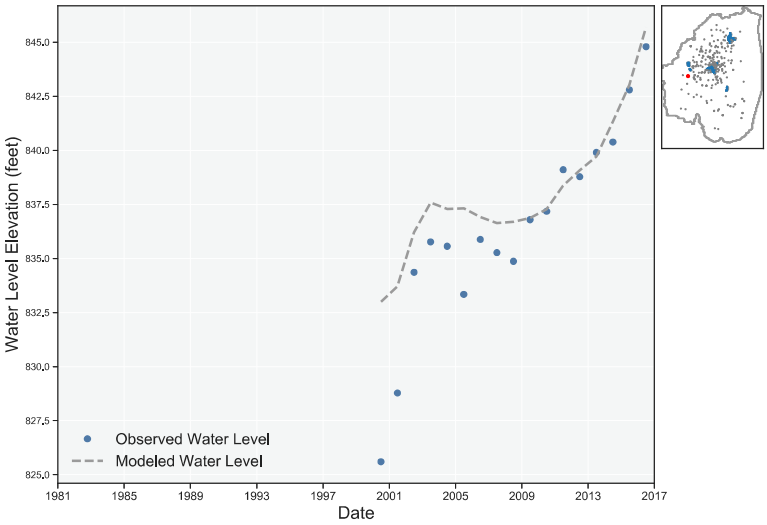


Well 226567 - Aq: CJSL Layers: 7 - 7

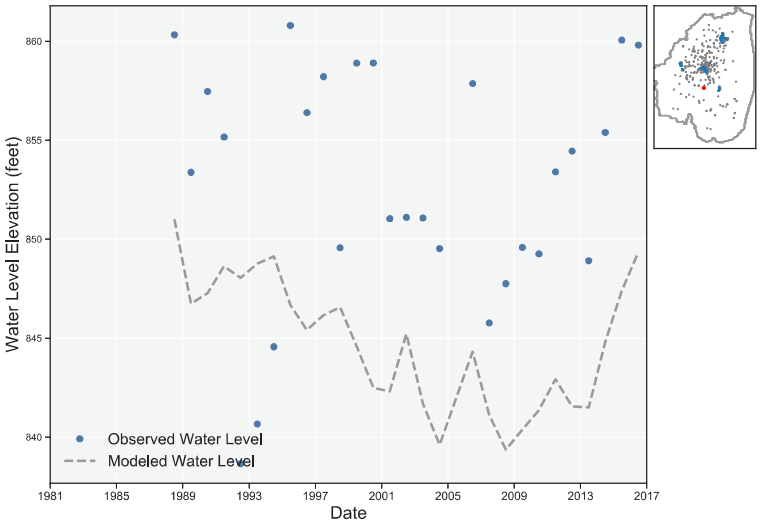
Note: This pumping well has not been used since before 1988.



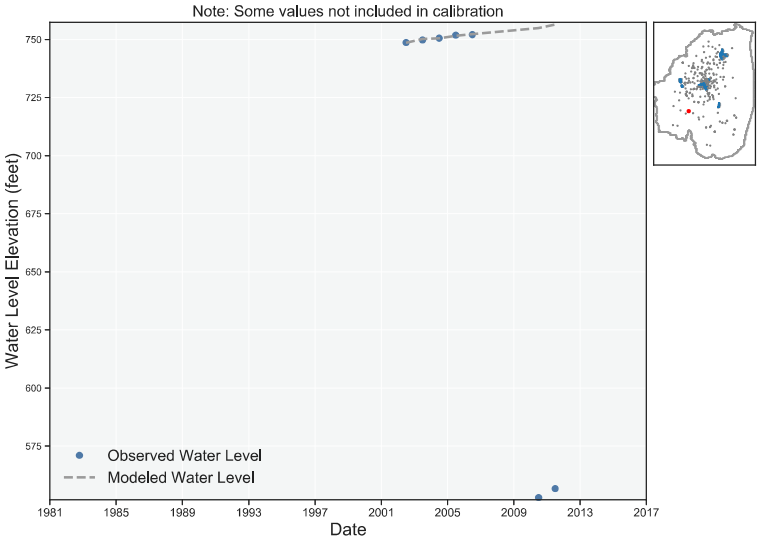
Well 62030 - Aq: CJDN Layers: 7 - 7



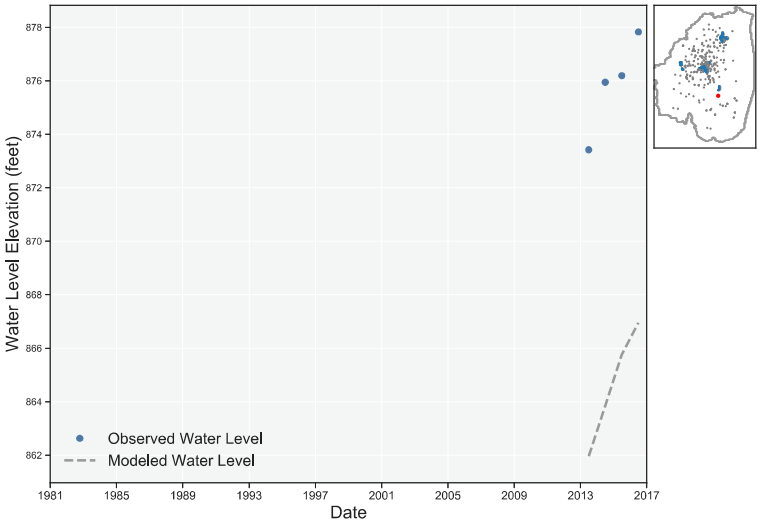
Well 62001 - Aq: CJDN Layers: 7 - 7



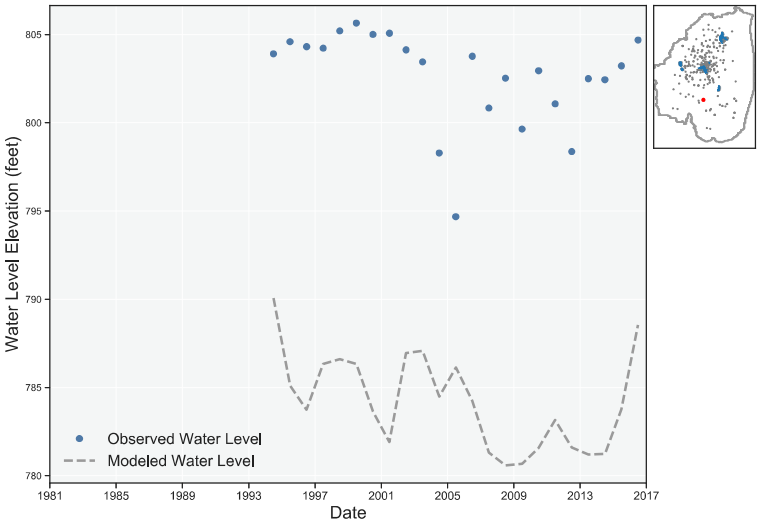
Well 62049 - Aq: CJDN Layers: 7 - 7



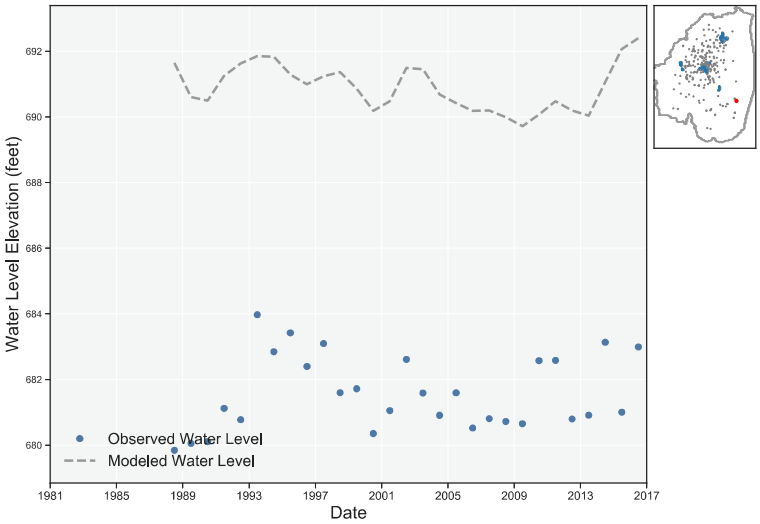
Well 82058 - Aq: QBAA Layers: 7 - 7



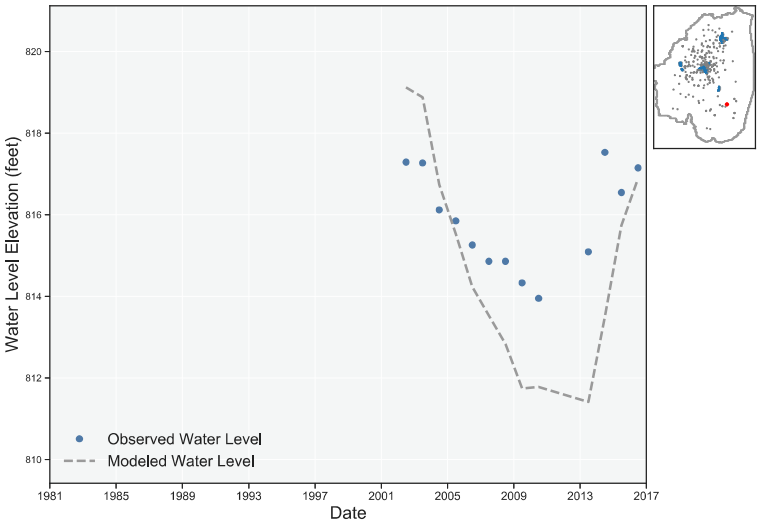
Well 62040 - Aq: CJDN Layers: 7 - 7



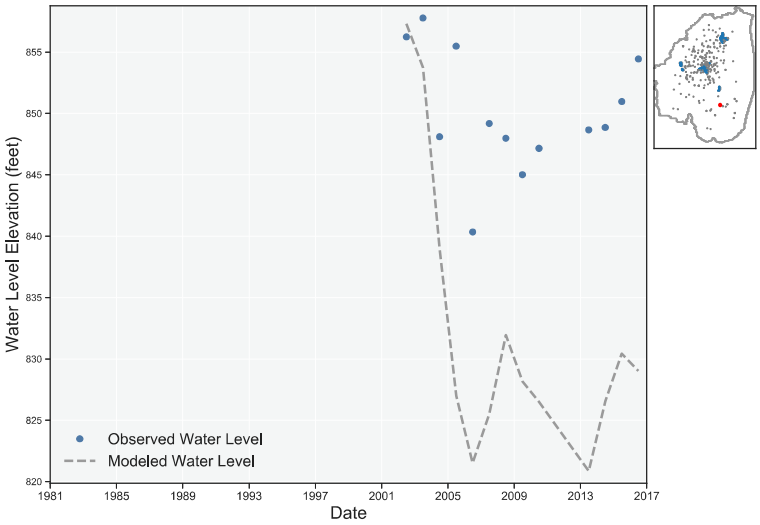
Well 82011 - Aq: CECR Layers: 7 - 7



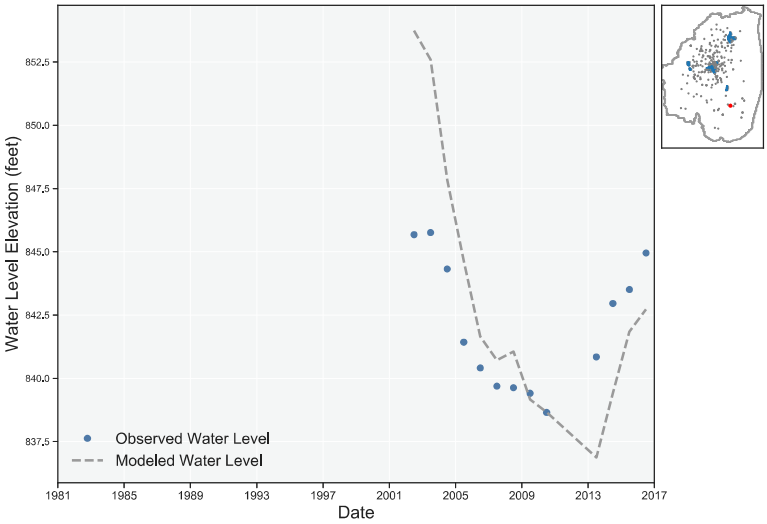
Well 675584 - Aq: CJDN Layers: 7 - 7



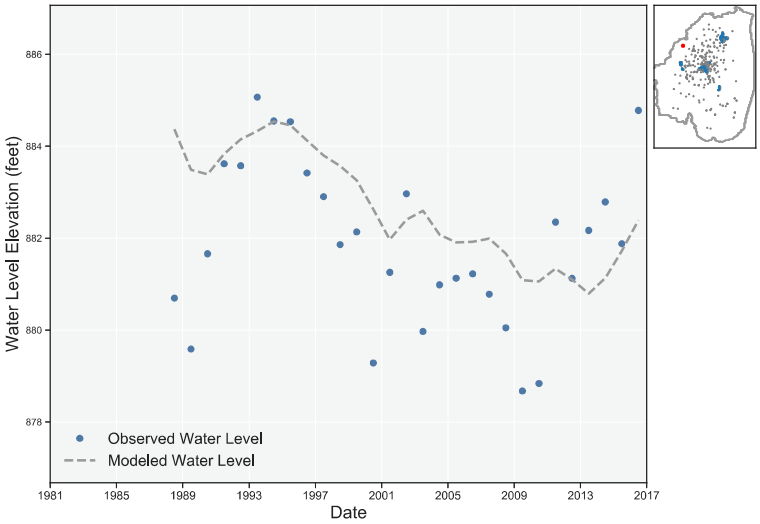
Well 675580 - Aq: CJDN Layers: 7 - 7



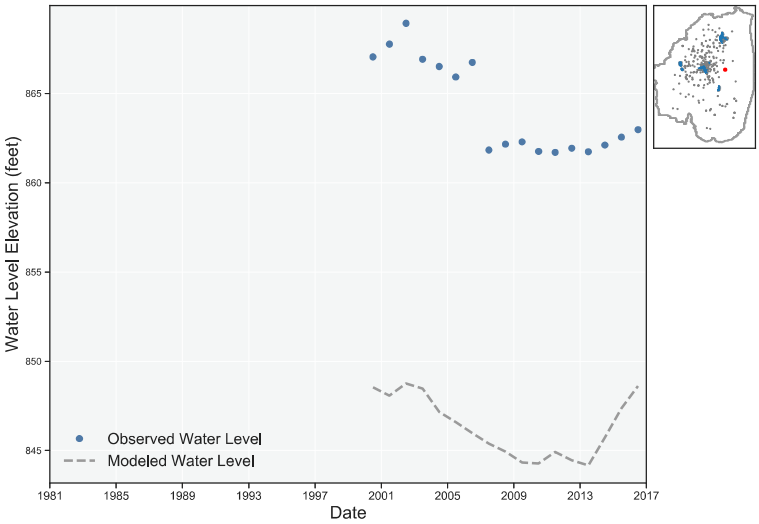
Well 675583 - Aq: CJDN Layers: 7 - 7



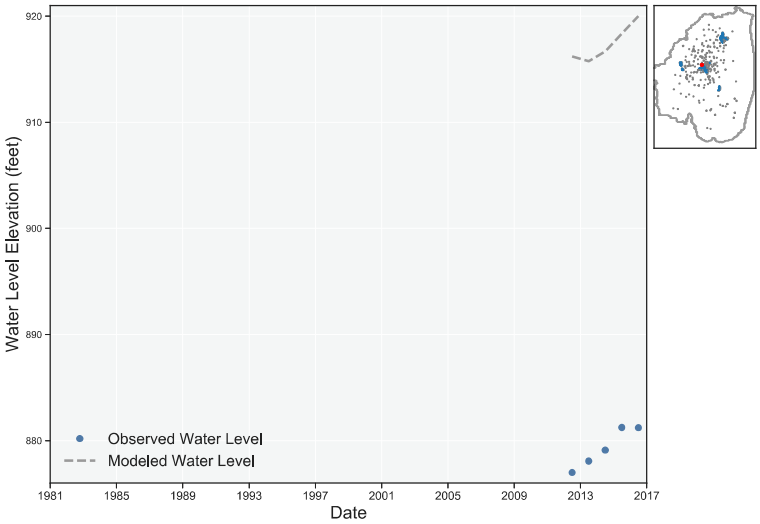
Well 2007 - Aq: QBAA Layers: 8 - 8



Well 82047 - Aq: CTCG Layers: 9 - 9

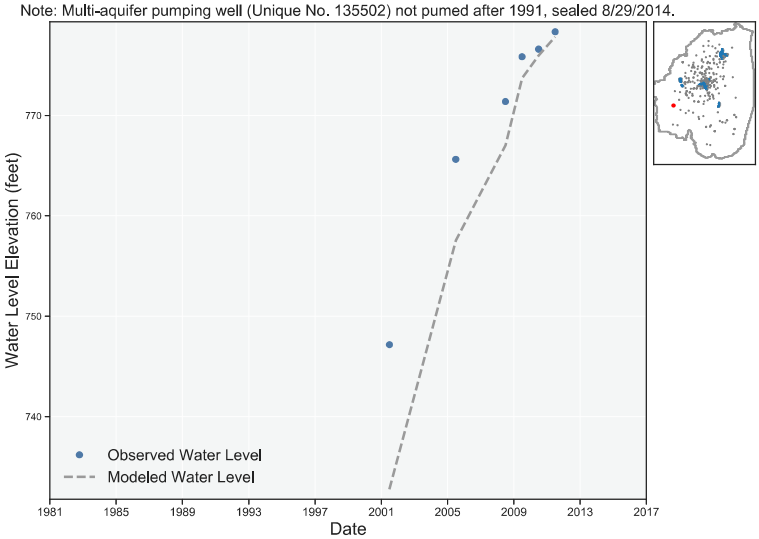


Well 62052 - Aq: CTCW Layers: 9 - 10



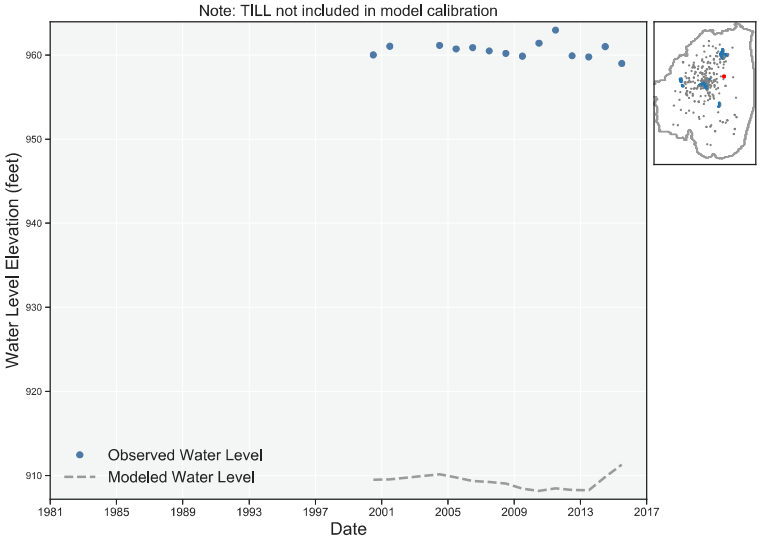
Well 62041 - Aq: CIGL Layers: 10 - 10

Note: Multi-aquifer pumping well (Unique No. 135502) not pumed after 1991, sealed 8/29/2014.

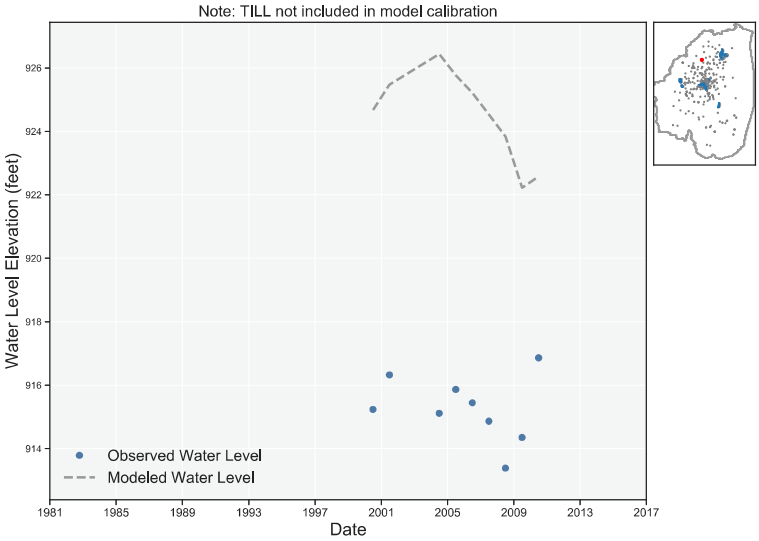


Well 82043 - Aq: TILL Layers: 1 - 1

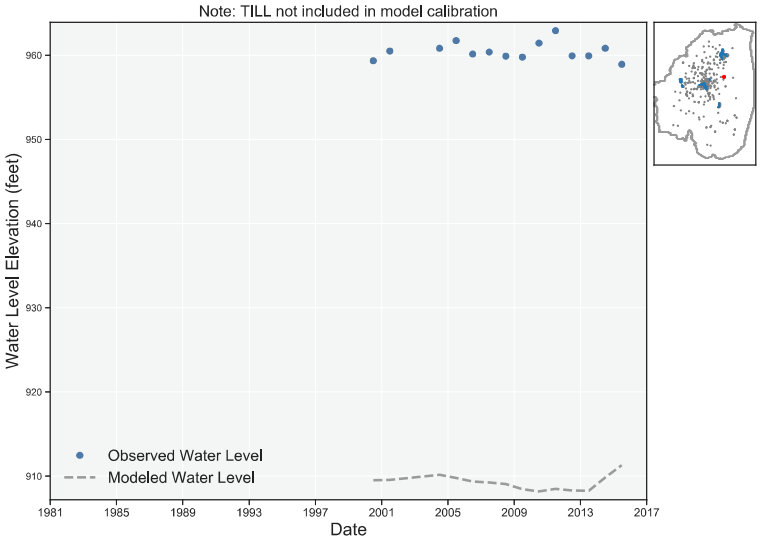
Note: TILL not included in model calibration



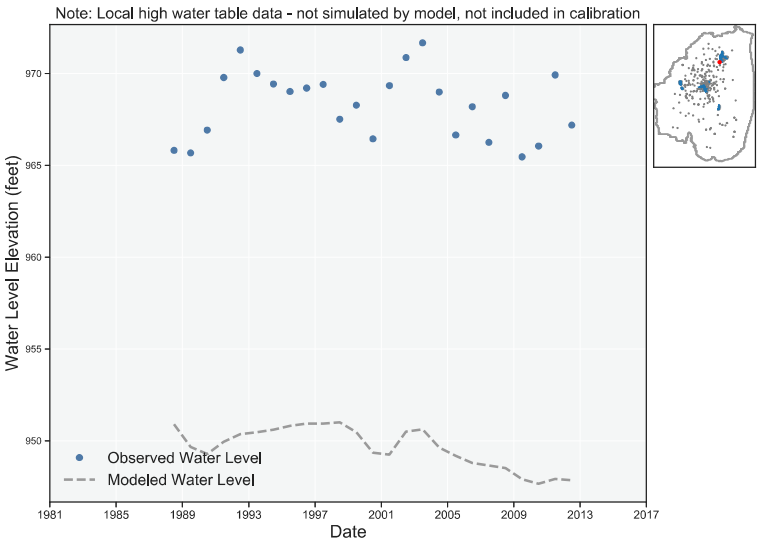
Well 82044 - Aq: TILL Layers: 2 - 2



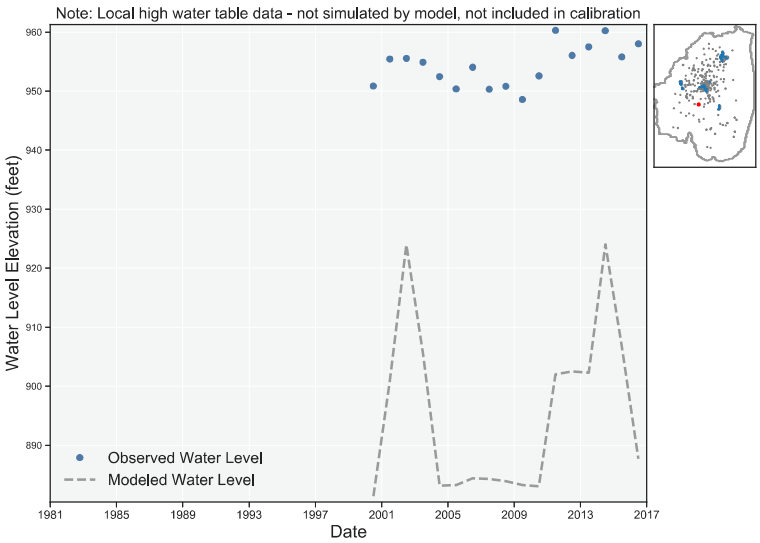
Well 82042 - Aq: TILL Layers: 3 - 3



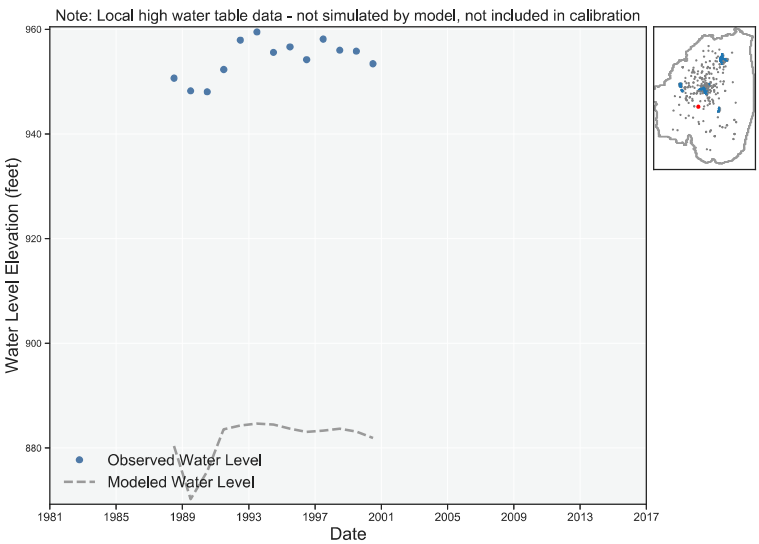
Well 82037 - Aq: QWTA Layers: 4 - 4



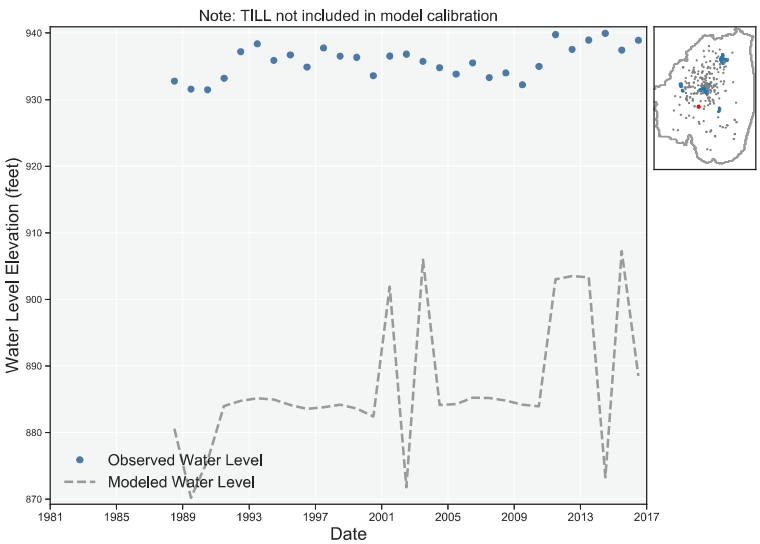
Well 62048 - Aq: QWTA Layers: 4 - 4



Well 62011 - Aq: QBAA Layers: 4 - 4

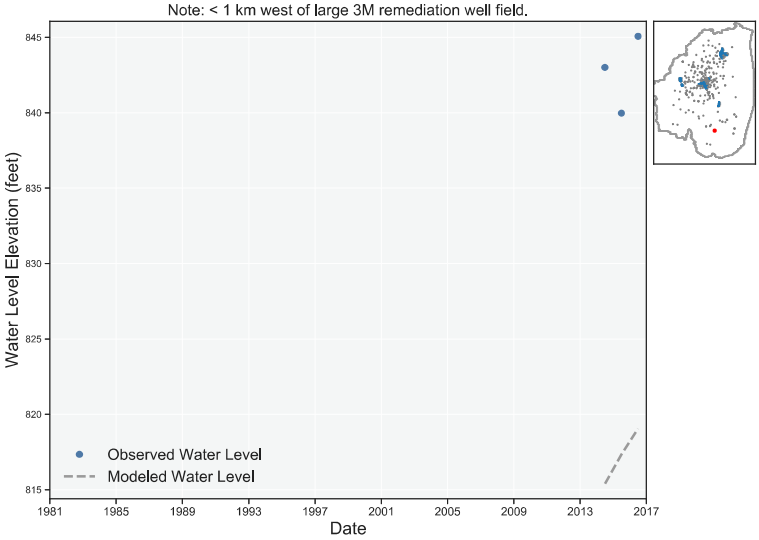


Well 62010 - Aq: TILL Layers: 4 - 4



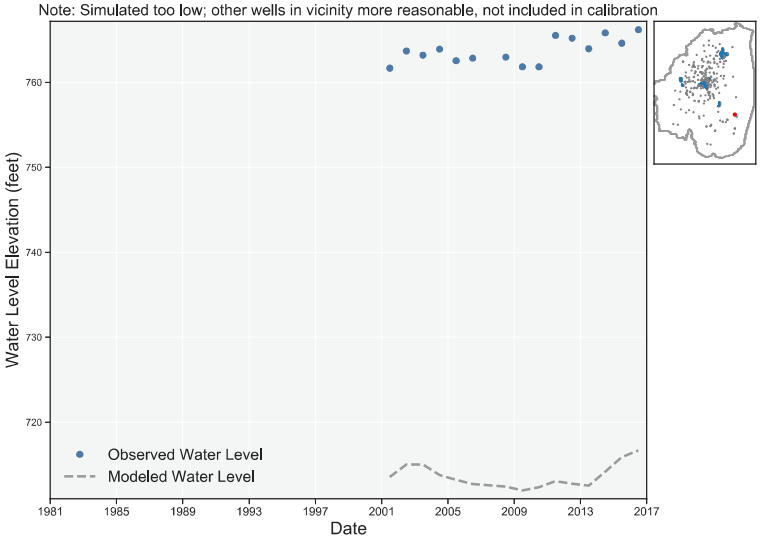
Well 82062 - Aq: QWTA Layers: 4 - 4

Note: < 1 km west of large 3M remediation well field.



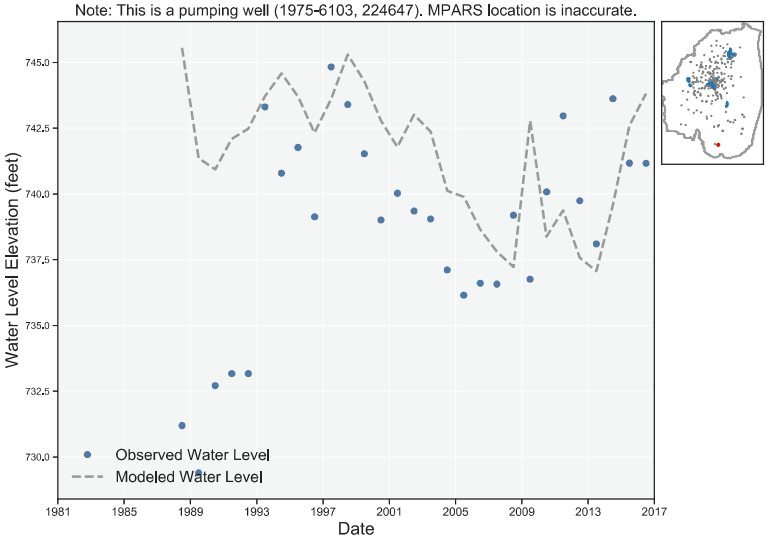
Well 82045 - Aq: CFRNCIGL Layers: 4 - 6

Note: Simulated too low; other wells in vicinity more reasonable, not included in calibration



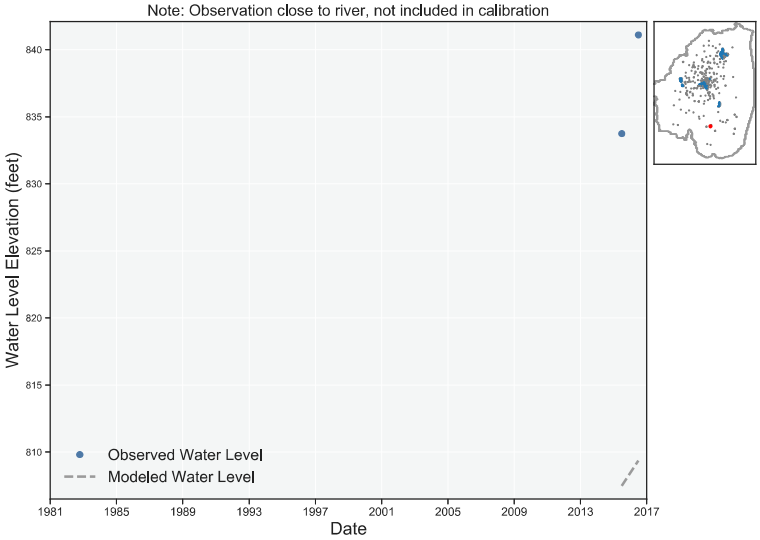
Well 82016 - Aq: OPDCCJDN Layers: 5 - 8

Note: This is a pumping well (1975-6103, 224647). MPARS location is inaccurate.



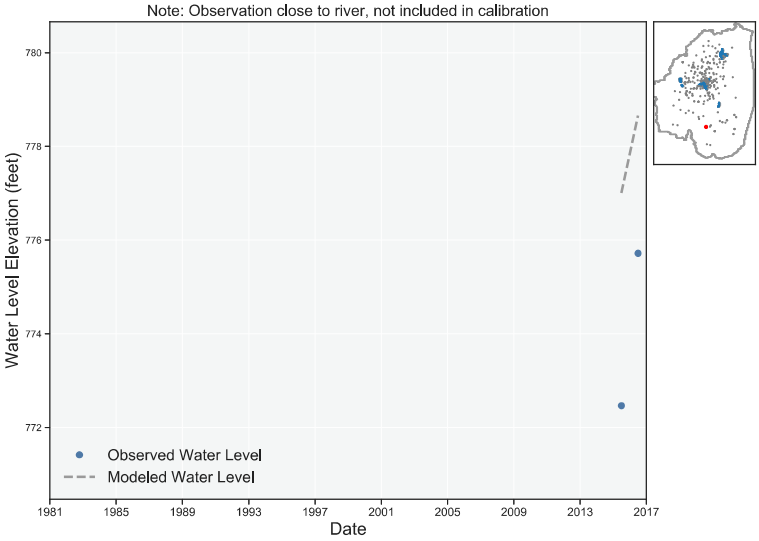
Well 767883 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



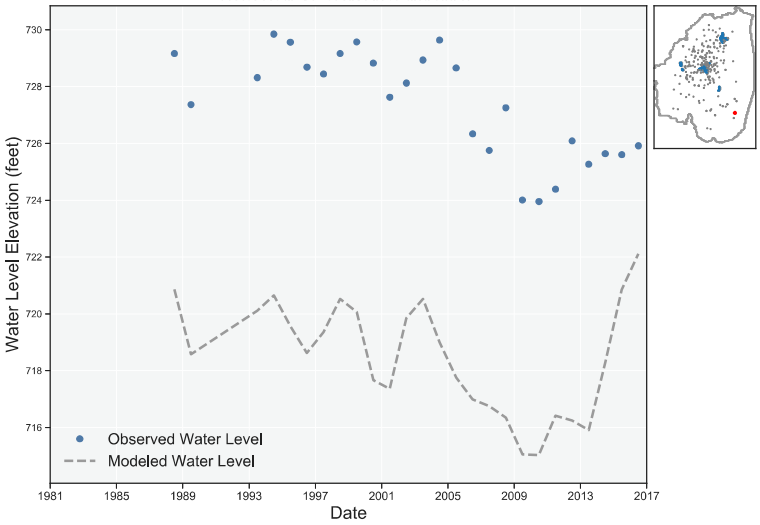
Well 767882 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration

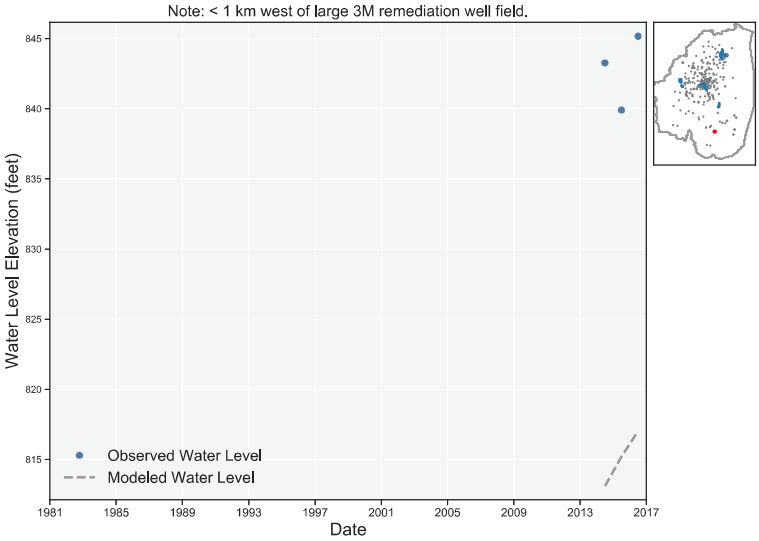


Well 82012 - Aq: CSTL Layers: 6 - 6

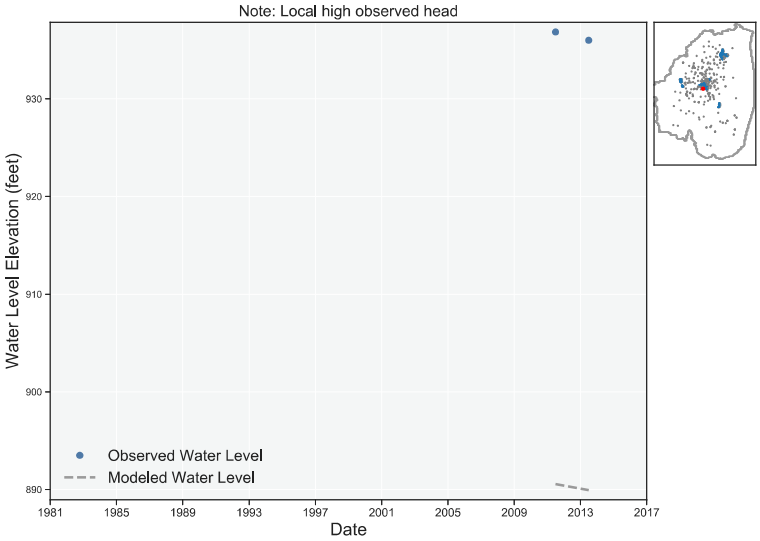
Note: Near St. Croix River and faults.



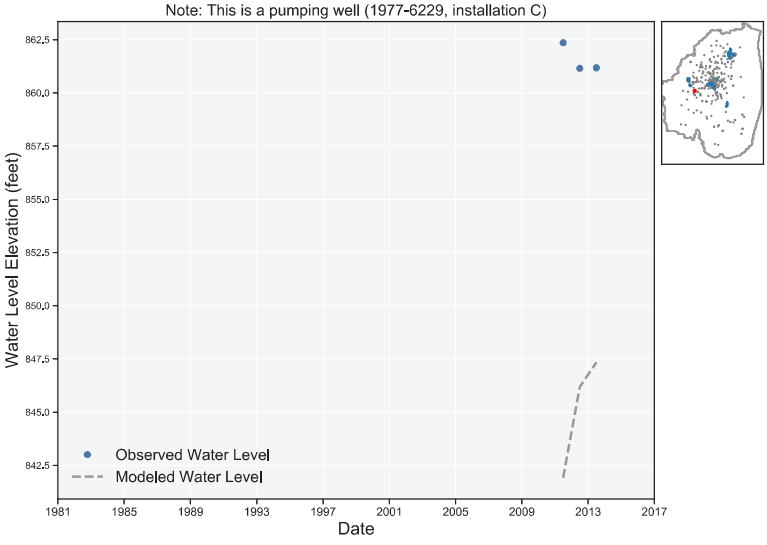
Well 82061 - Aq: OPDC Layers: 6 - 6



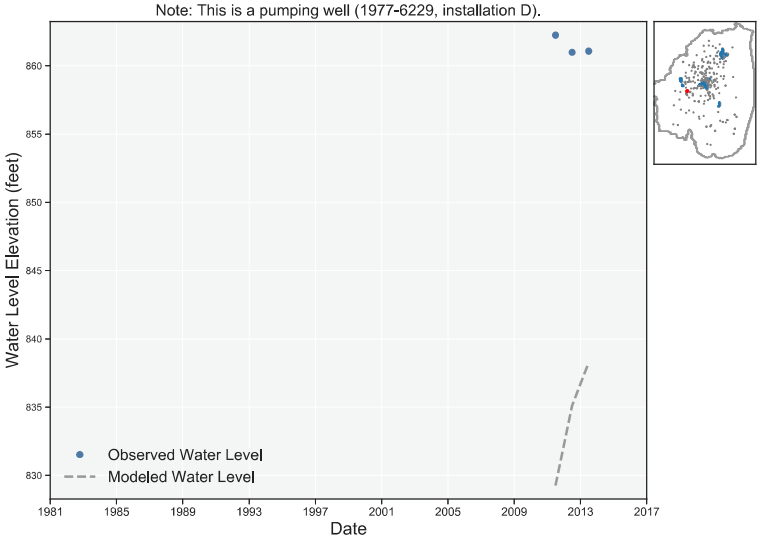
Well 226572 - Aq: OPCJ Layers: 6 - 7



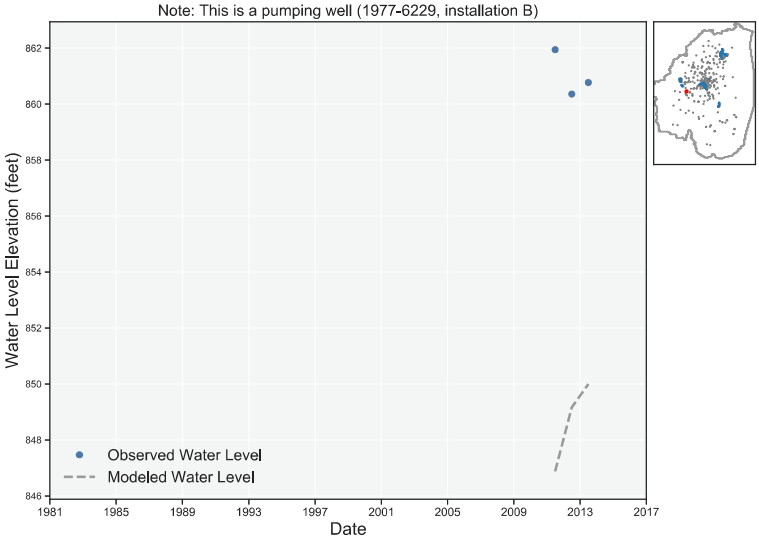
Well 127292 - Aq: OPCJ Layers: 6 - 7



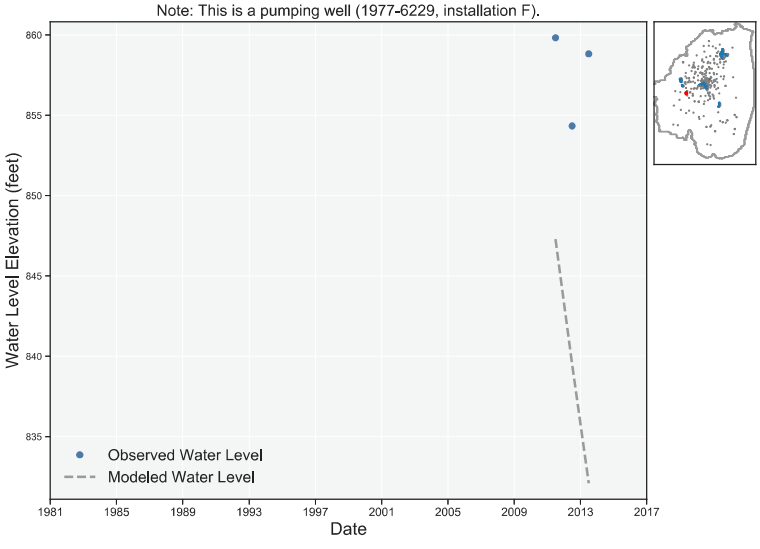
Well 151583 - Aq: OPCJ Layers: 6 - 7



Well 133312 - Aq: OPCJ Layers: 6 - 7

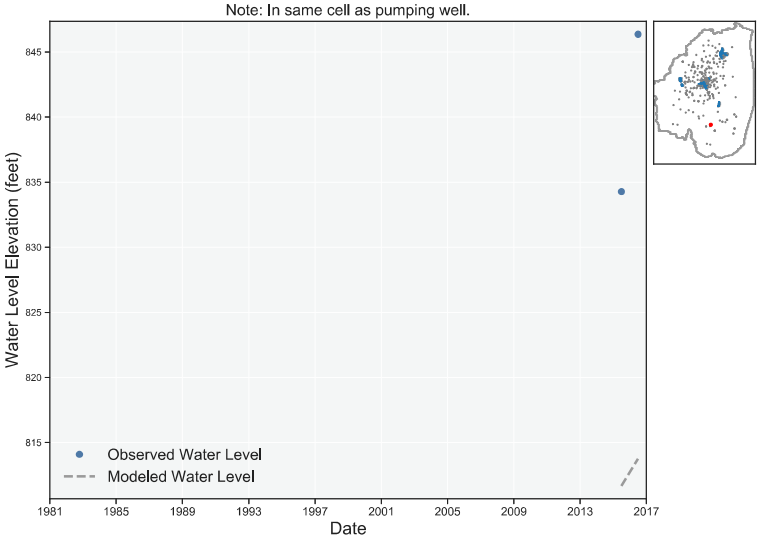


Well 706803 - Aq: OPCJ Layers: 6 - 7



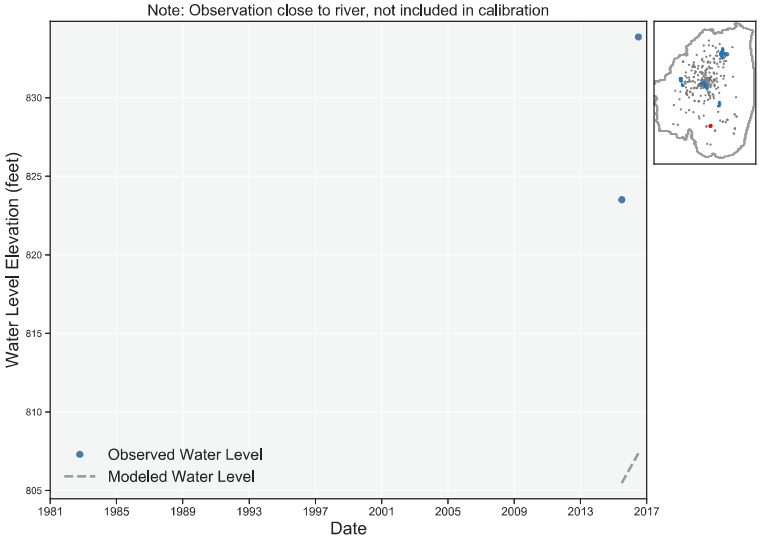
Well 763366 - Aq: CJDN Layers: 7 - 7

Note: In same cell as pumping well.



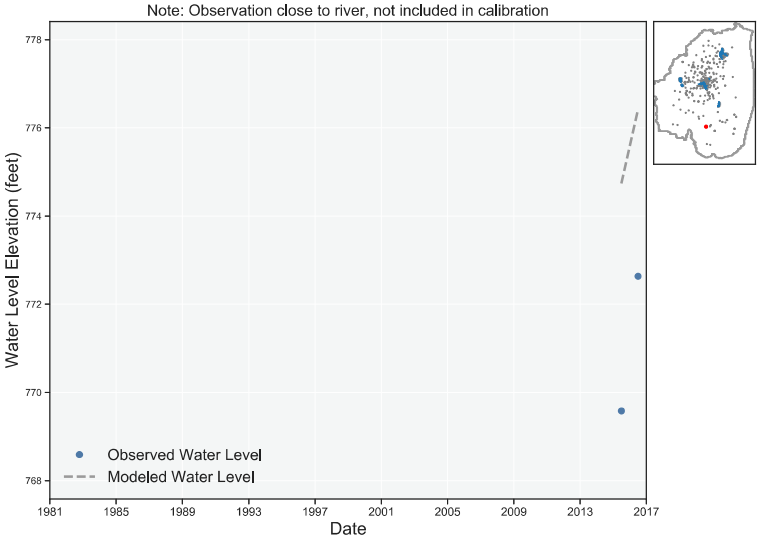
Well 767884 - Aq: CJDN Layers: 7 - 7

Note: Observation close to river, not included in calibration



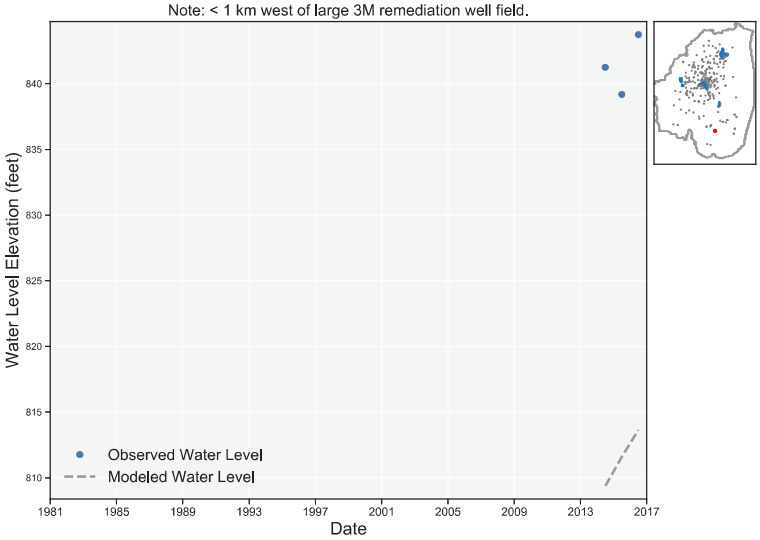
Well 767885 - Aq: CJDN Layers: 7 - 7

Note: Observation close to river, not included in calibration



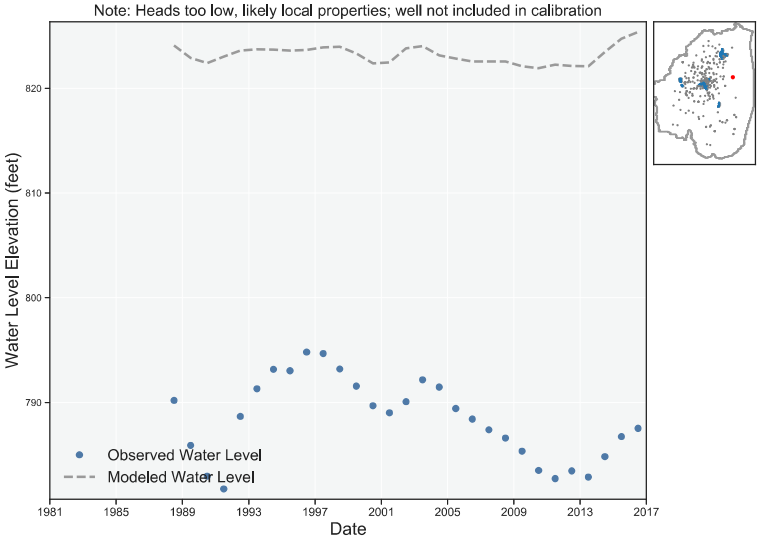
Well 82060 - Aq: CJDN Layers: 7 - 7

Note: < 1 km west of large 3M remediation well field.



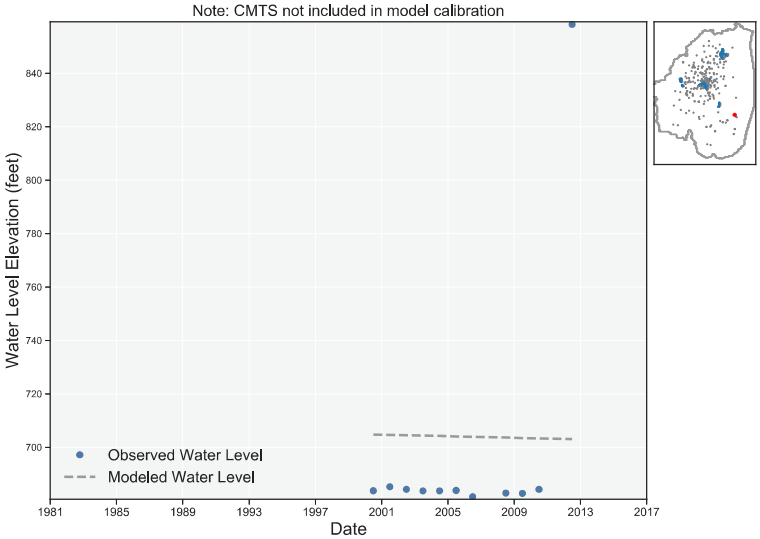
Well 82023 - Aq: QBAA Layers: 8 - 8

Note: Heads too low, likely local properties; well not included in calibration

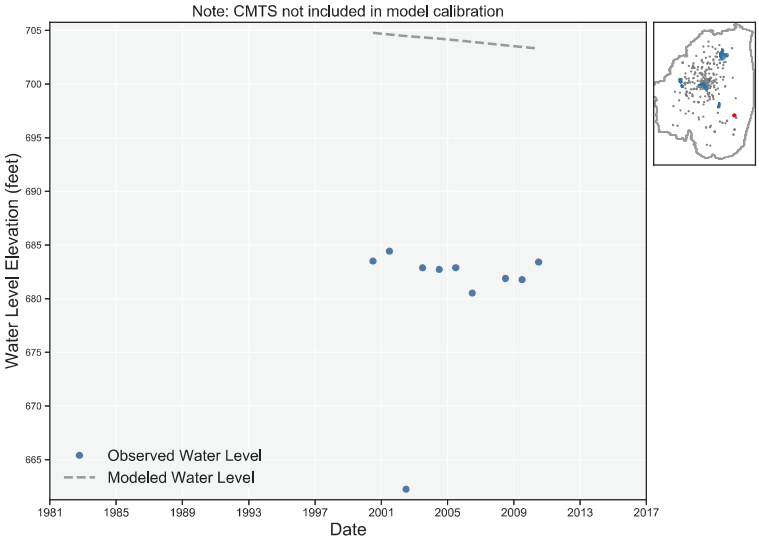


Well 82046 - Aq: CMTS Layers: 9 - 9

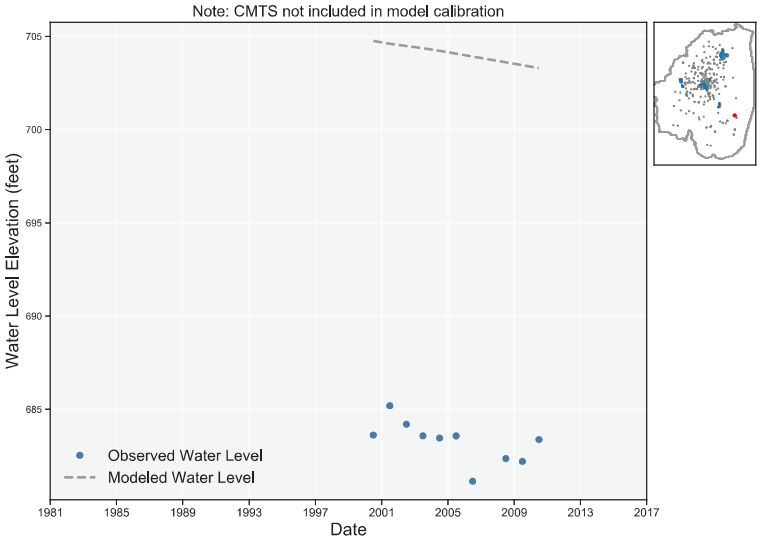
Note: CMTS not included in model calibration



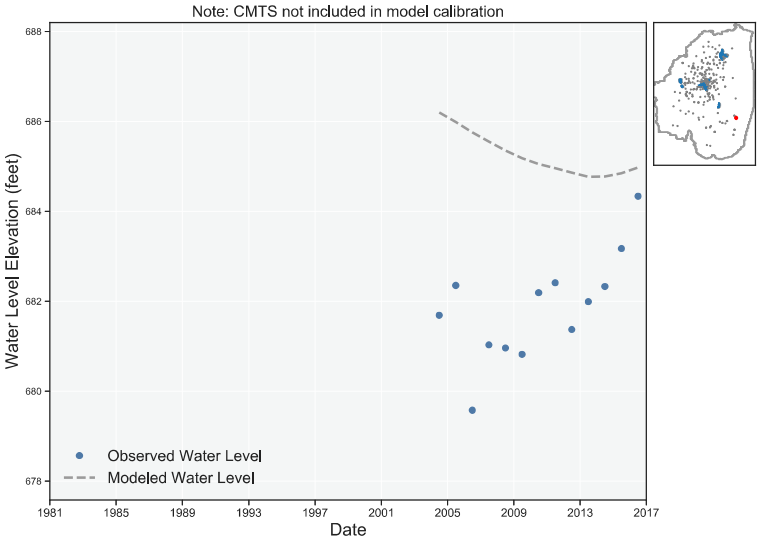
Well 82049 - Aq: CMTS Layers: 9 - 9



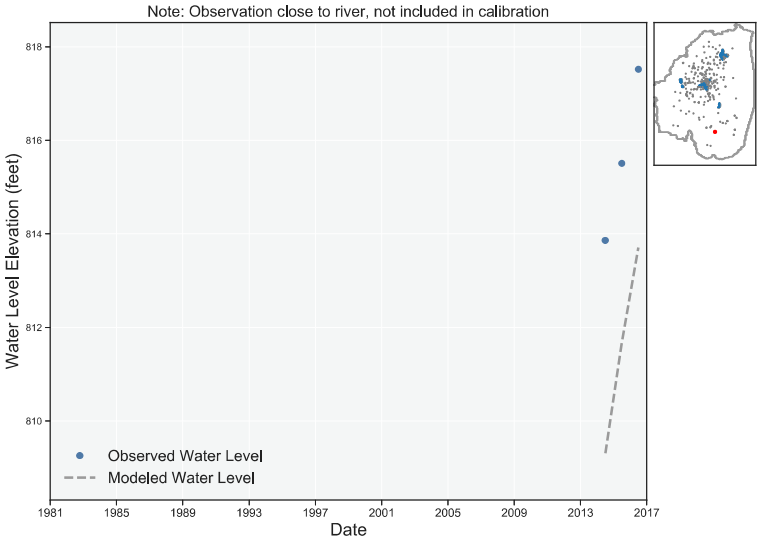
Well 82050 - Aq: CMTS Layers: 9 - 9



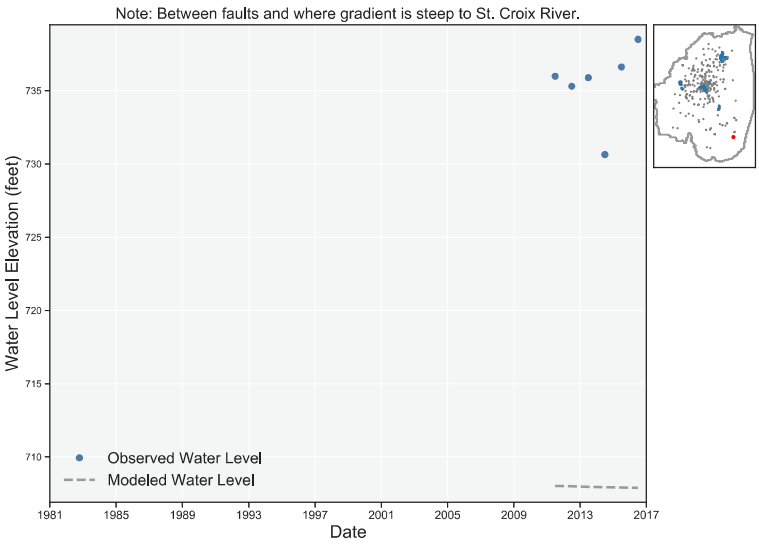
Well 82051 - Aq: CECRCMTS Layers: 9 - 9



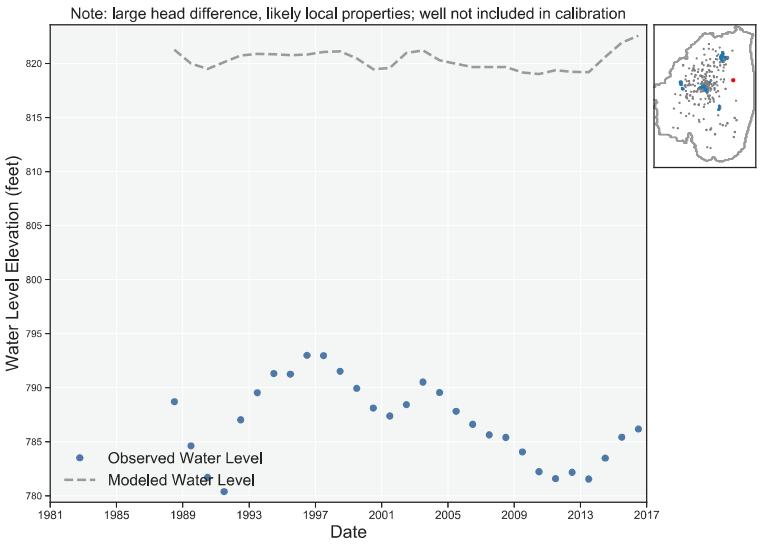
Well 82059 - Aq: CTCG Layers: 9 - 9



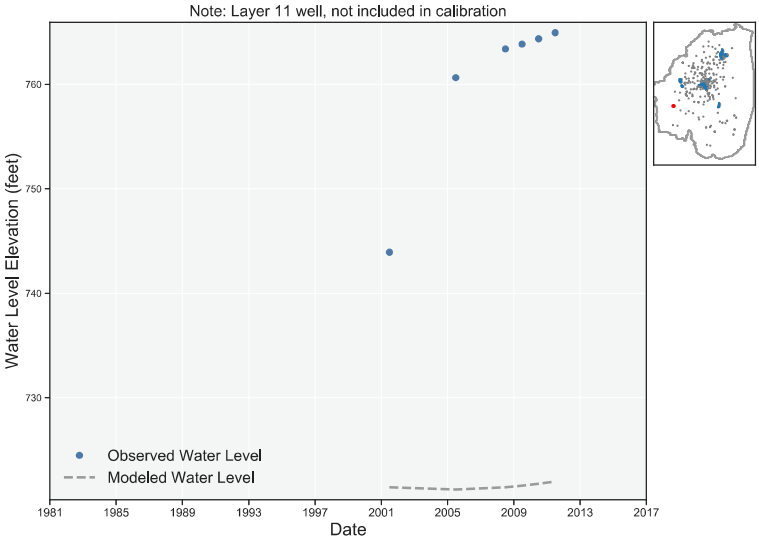
Well 82054 - Aq: CFIG Layers: 9 - 9



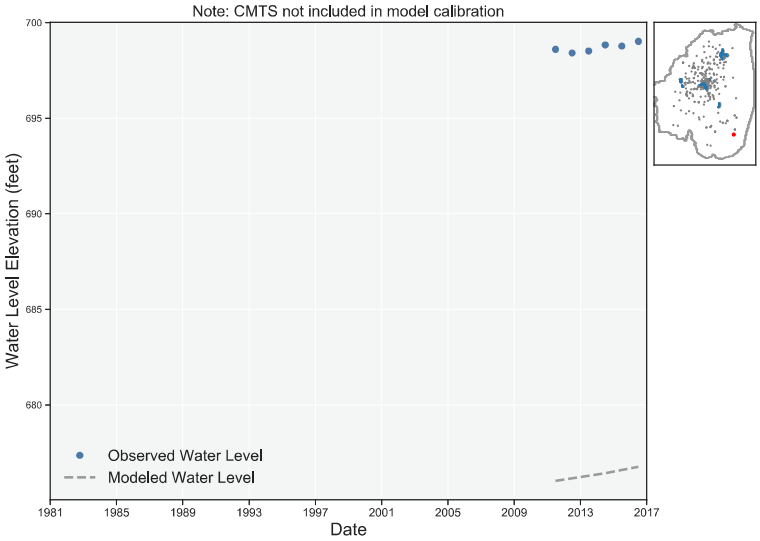
Well 82022 - Aq: CFRNCIGL Layers: 9 - 10



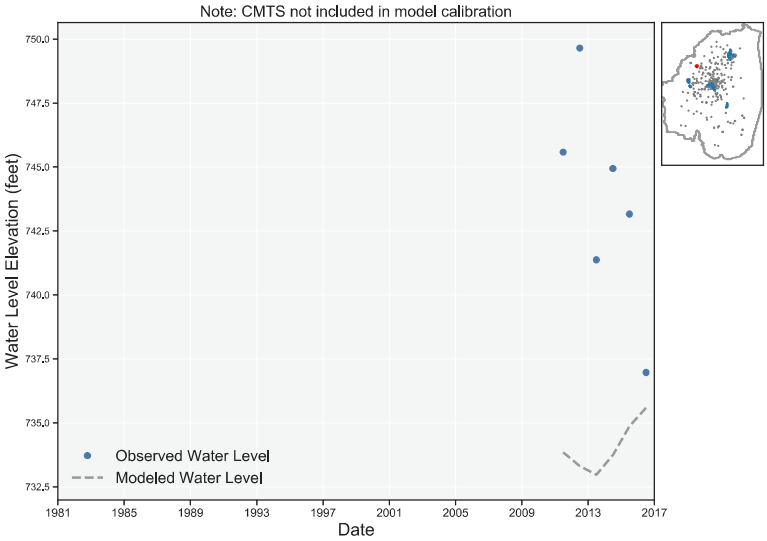
Well 62042 - Aq: CECR Layers: 11 - 11



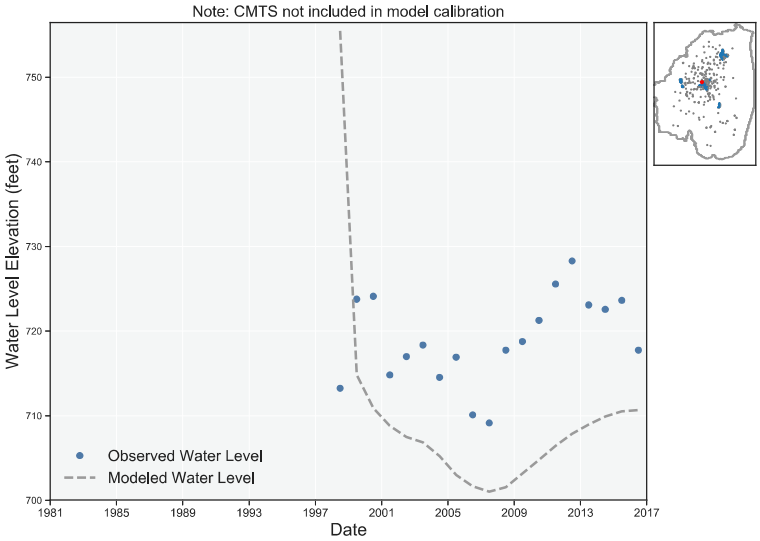
Well 82053 - Aq: CMTS Layers: 11 - 12



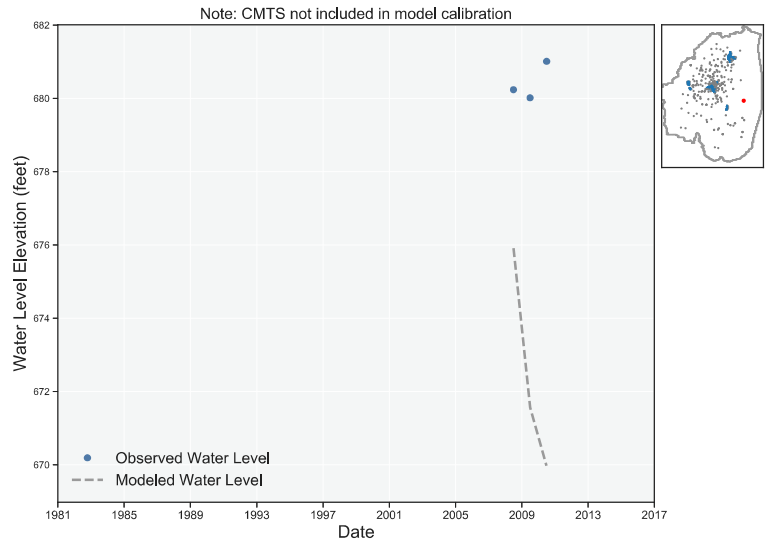
Well 2038 - Aq: CMTS Layers: 12 - 12



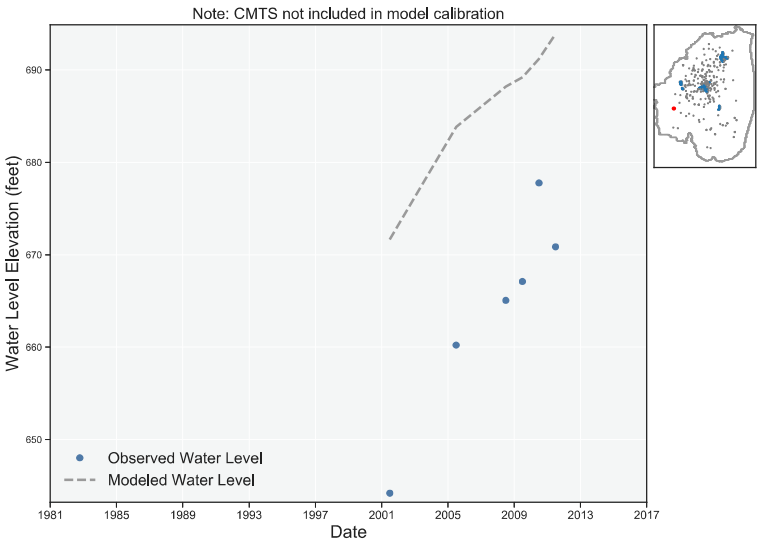
Well 62046 - Aq: CMTS Layers: 12 - 12



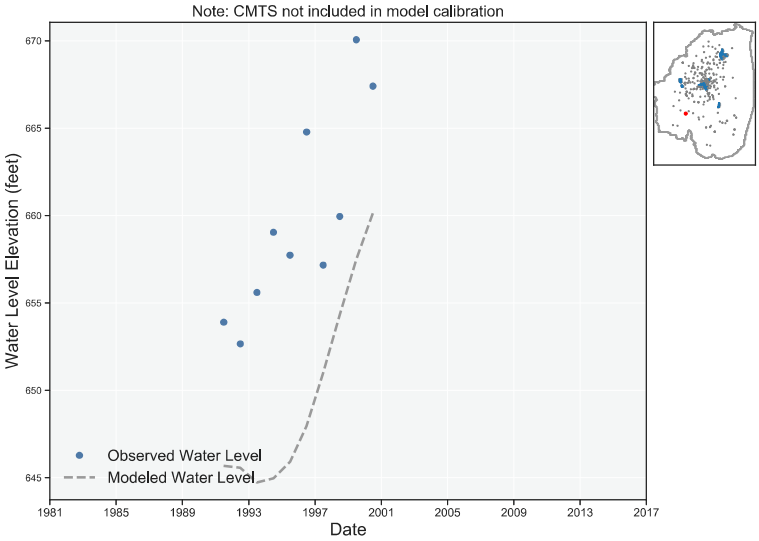
Well 82052 - Aq: CMTS Layers: 12 - 12



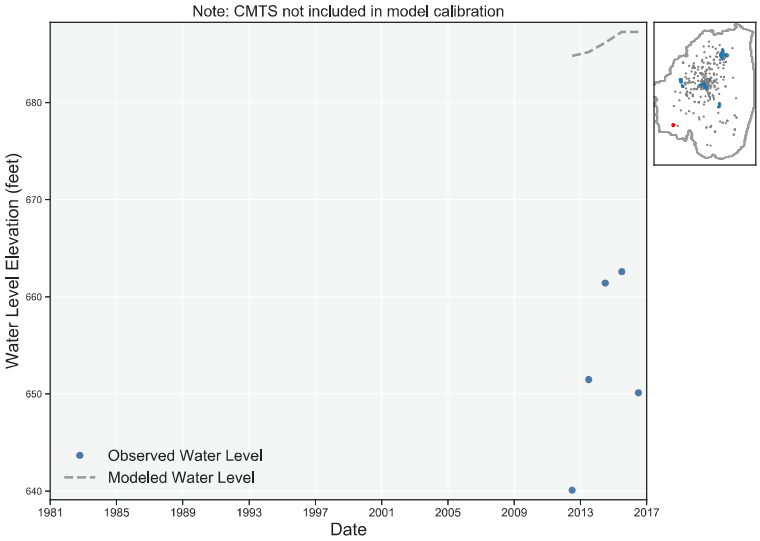
Well 62043 - Aq: CMTS Layers: 12 - 12



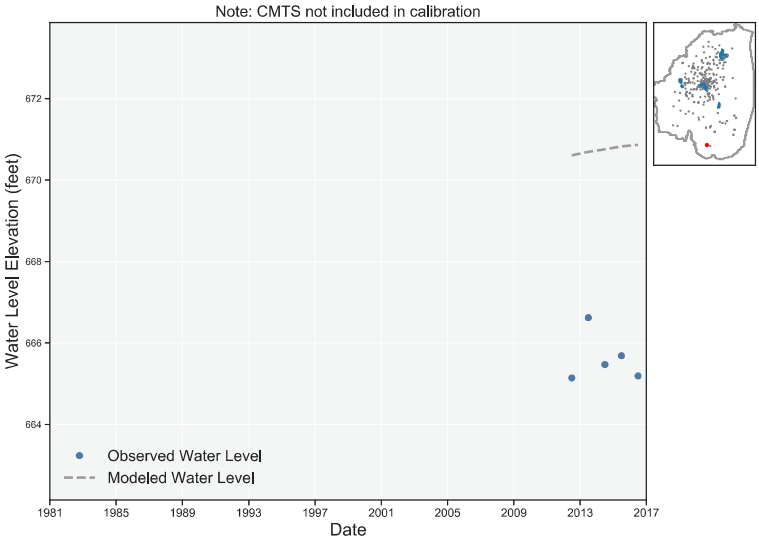
Well 62036 - Aq: CMTS Layers: 12 - 12



Well 27069 - Aq: CMTS Layers: 12 - 12

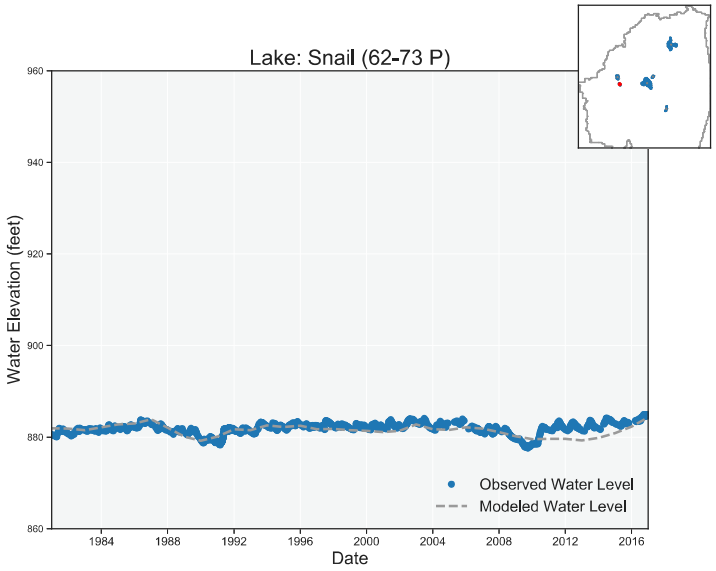


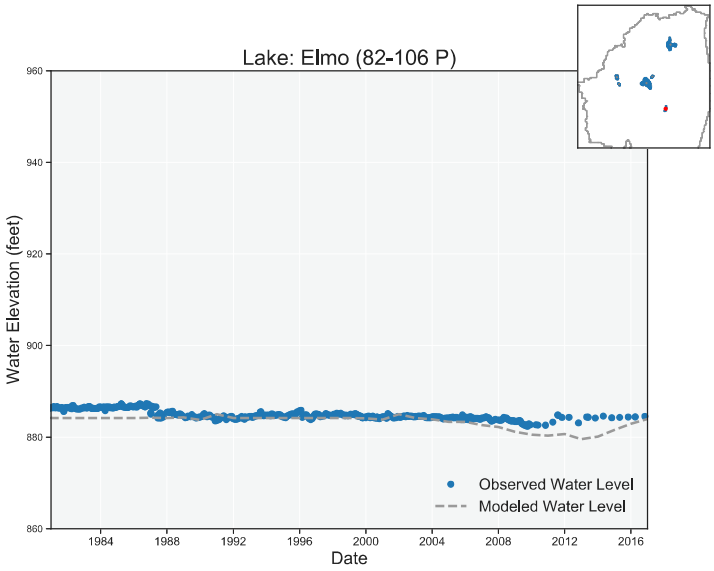
Well 82056 - Aq: CMTS Layers: 12 - 12

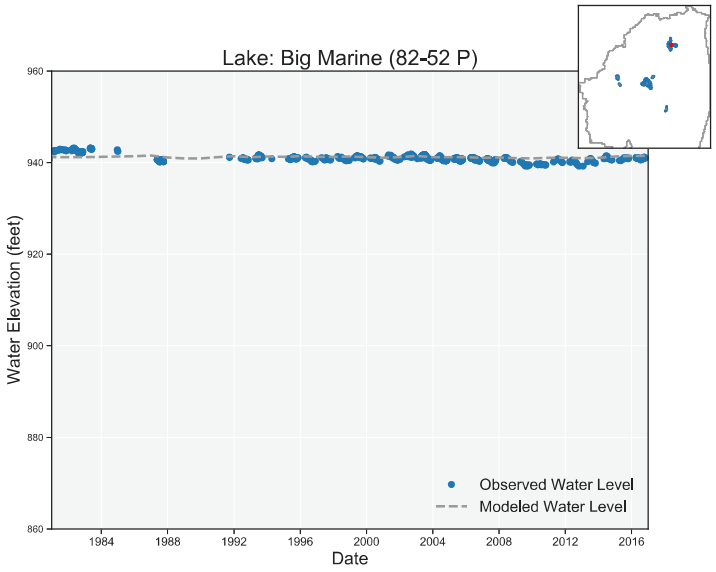


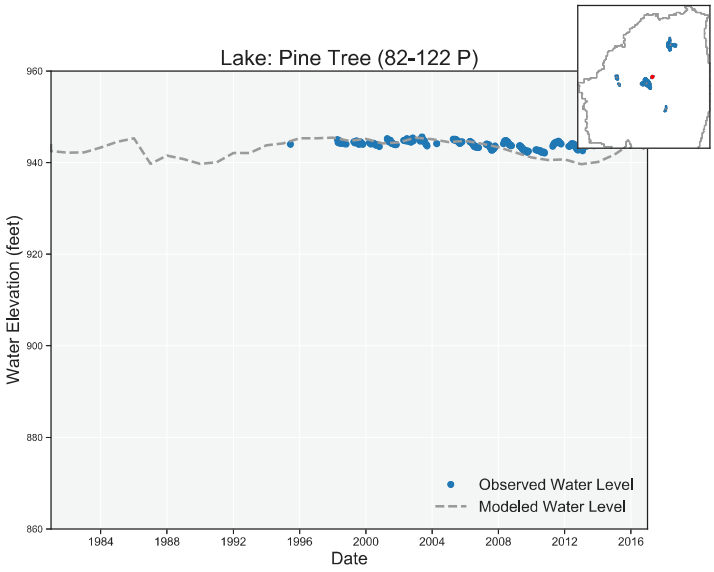
Appendix B-3

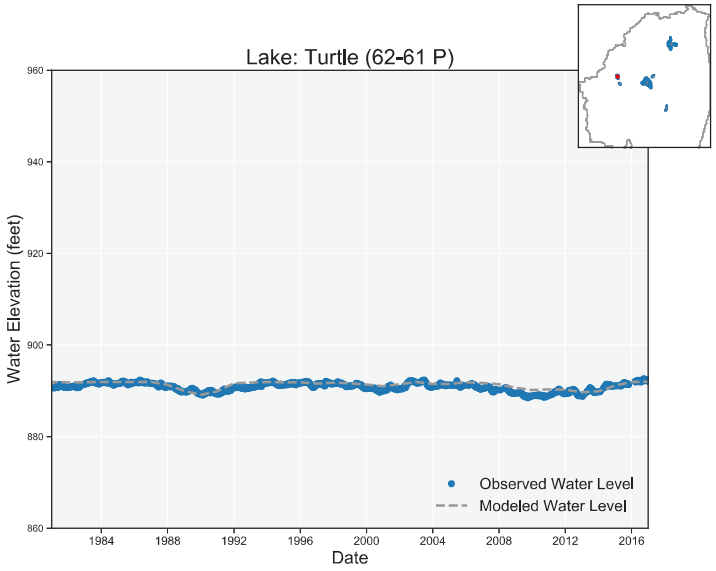
Fixed Scale Plots for the Triannual Stress Period Model

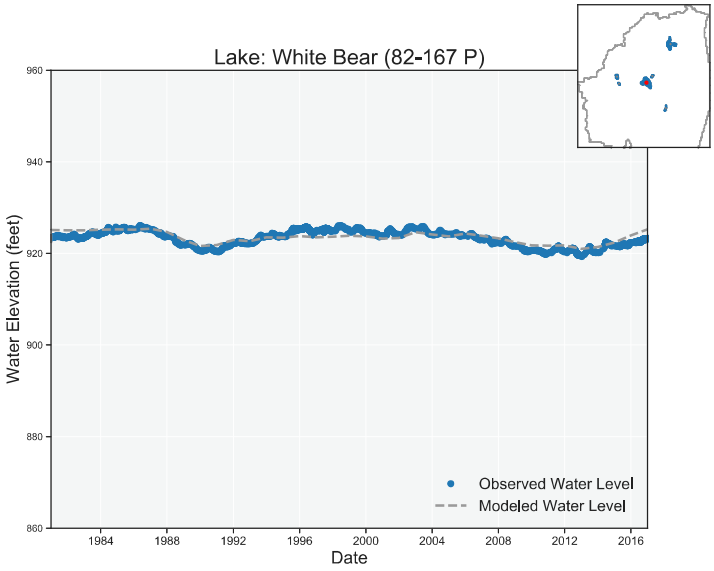

Lake: Snail (62-73 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Elmo (82-106 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

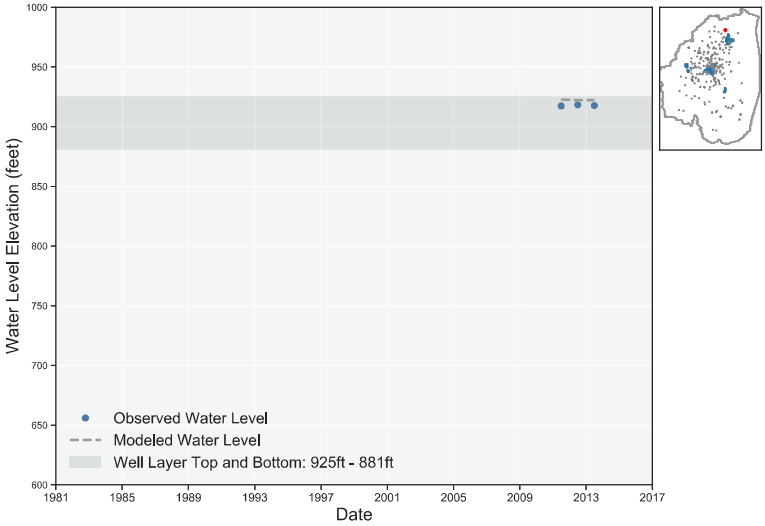

Lake: Big Marine (82-52 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Pine Tree (82-122 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

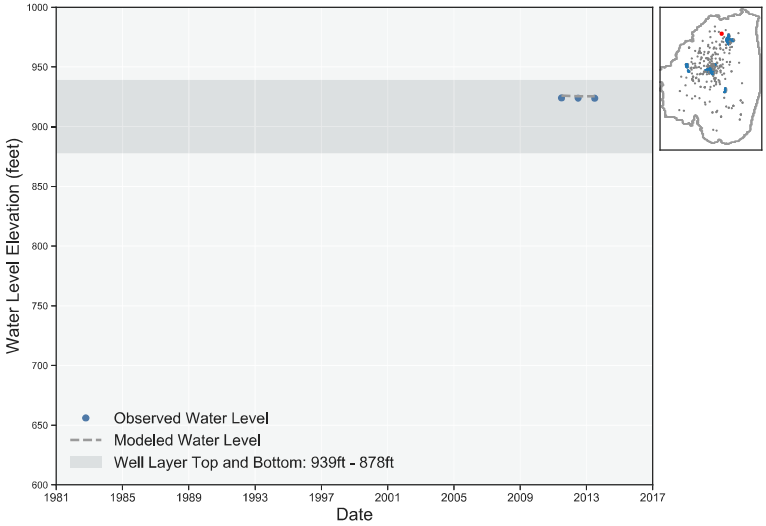

Lake: Turtle (62-61 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: White Bear (82-167 P)
Water Elevation (feet)
960
940
920
900
880
860
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

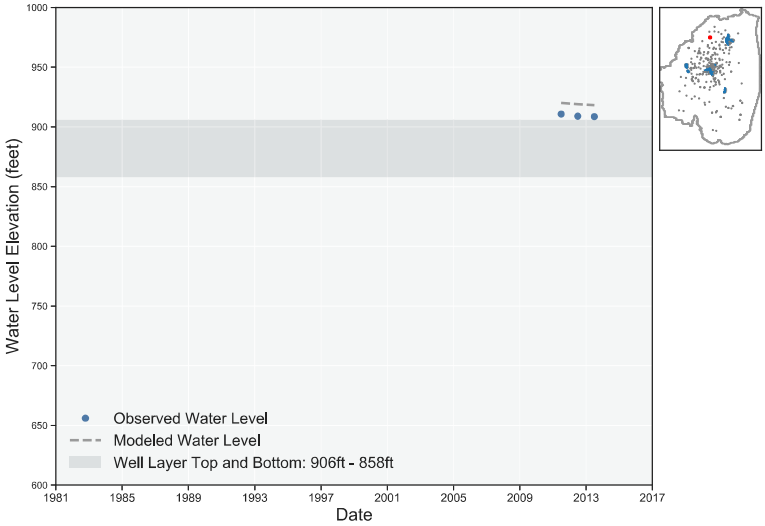
Well 138275 - Aq: QBAA Layers: 4 - 4



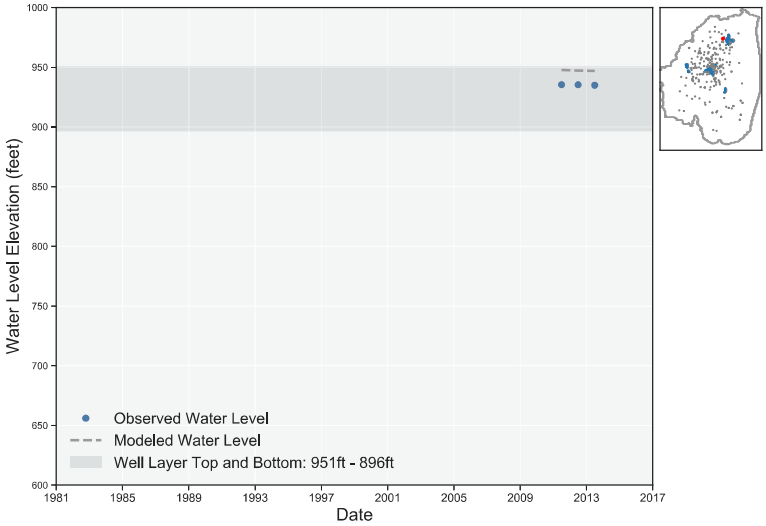
Well 446292 - Aq: QBAA Layers: 4 - 4



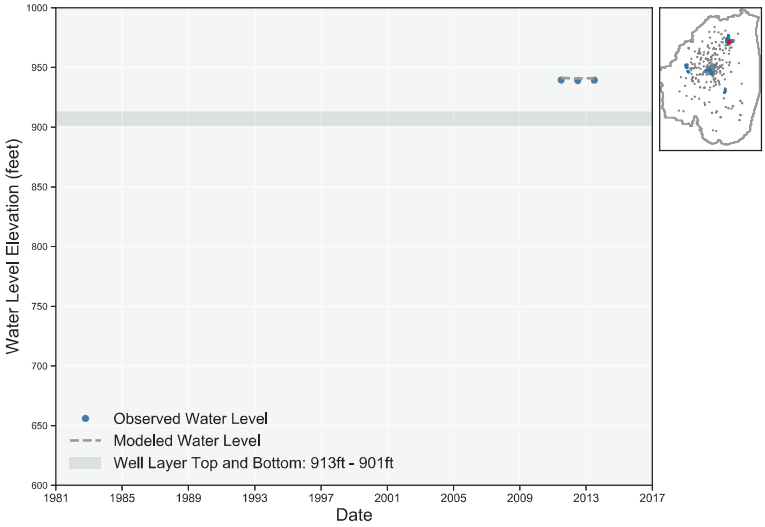
Well 404644 - Aq: QBAA Layers: 4 - 4



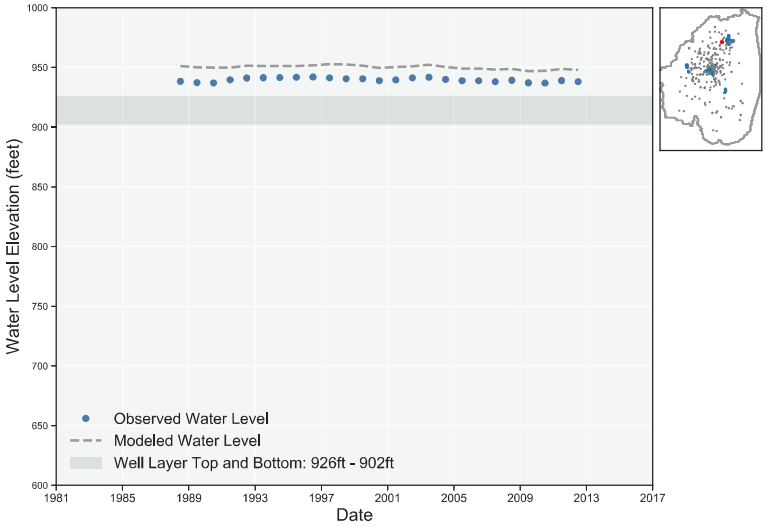
Well 112422 - Aq: QBAA Layers: 4 - 4



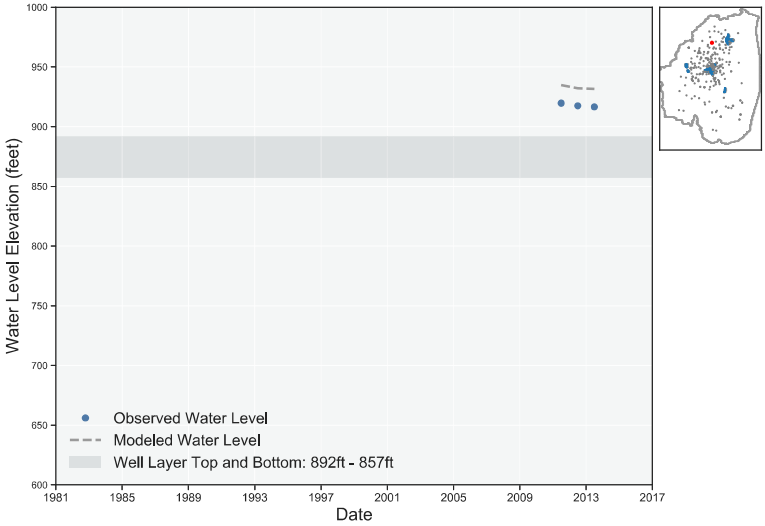
Well 139010 - Aq: QBAA Layers: 4 - 4



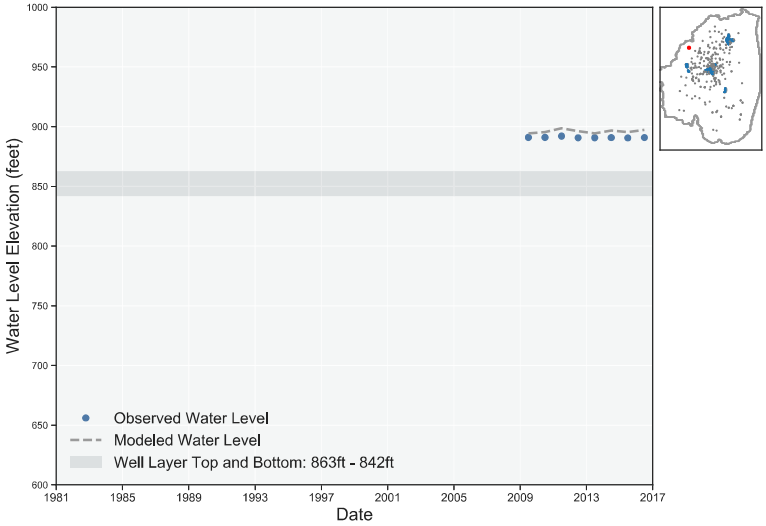
Well 82036 - Aq: QWTA Layers: 4 - 4



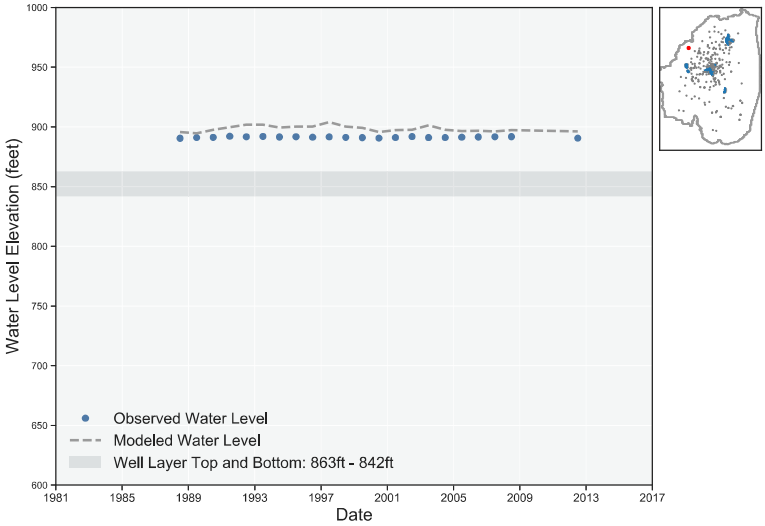
Well 136144 - Aq: QBAA Layers: 4 - 4



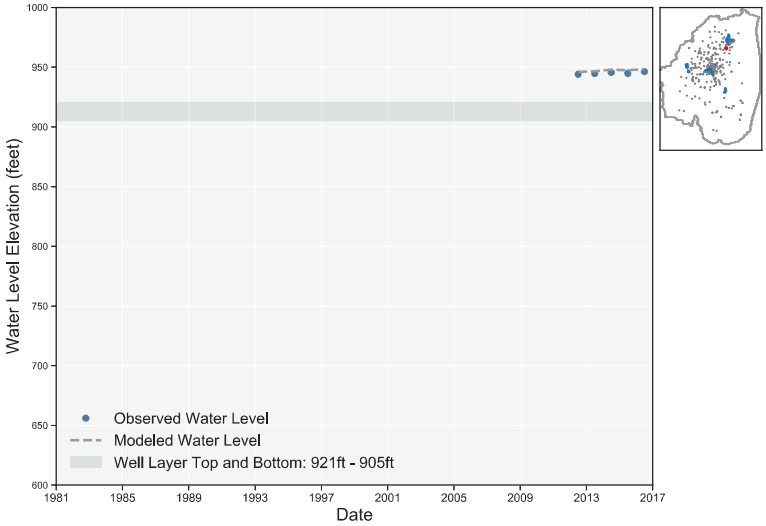
Well 2030 - Aq: QWTA Layers: 4 - 4



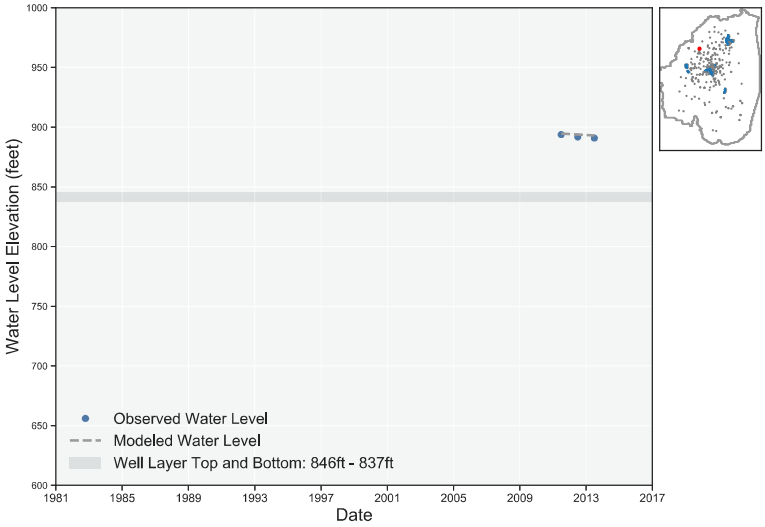
Well 2010 - Aq: QWTA Layers: 4 - 4



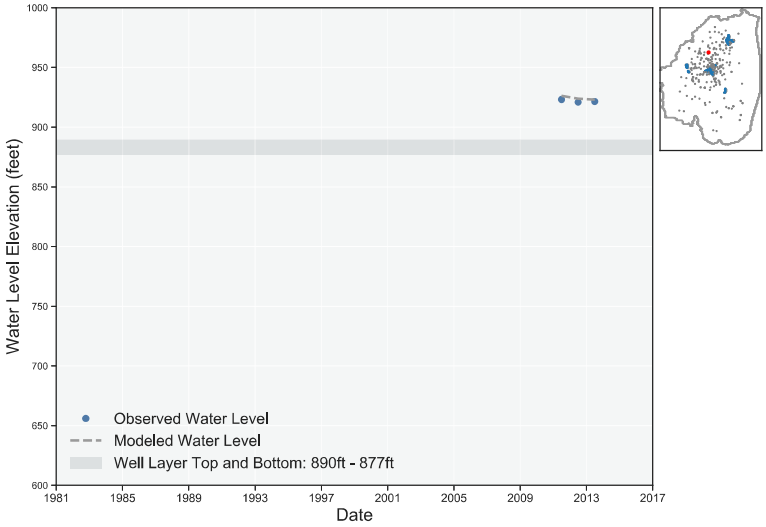
Well 82055 - Aq: QBAA Layers: 4 - 4



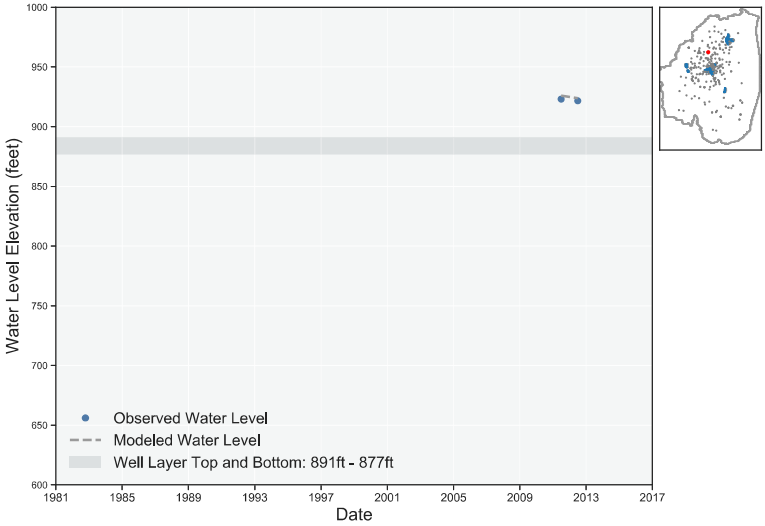
Well 169252 - Aq: QBAA Layers: 4 - 4



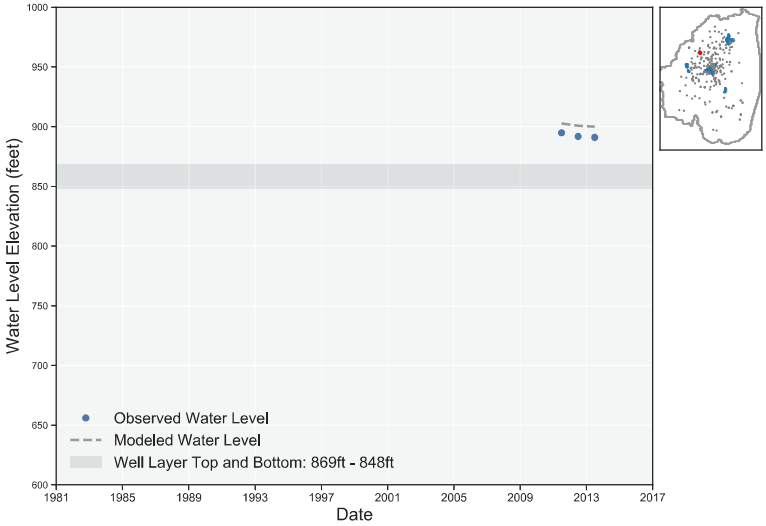
Well 620717 - Aq: QWTA Layers: 4 - 4



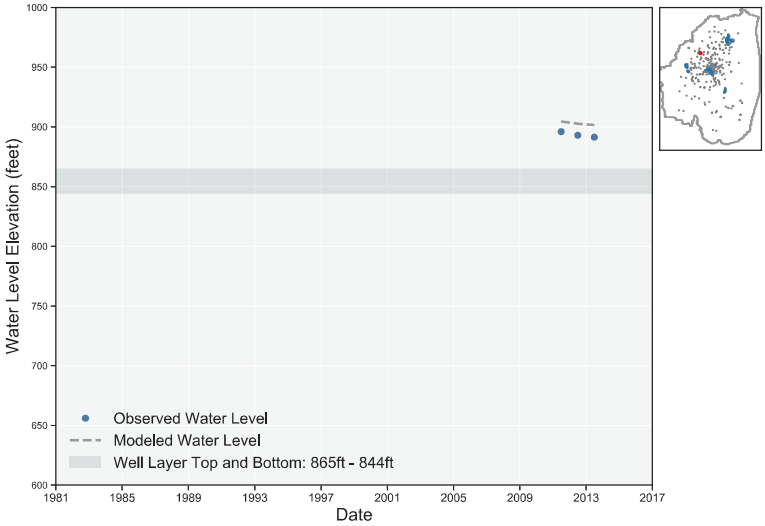
Well 620718 - Aq: QWTA Layers: 4 - 4



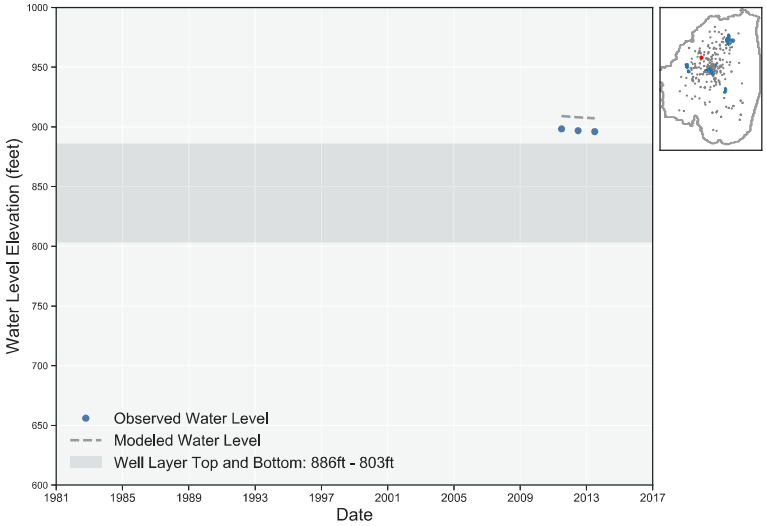
Well 435278 - Aq: QBAA Layers: 4 - 4



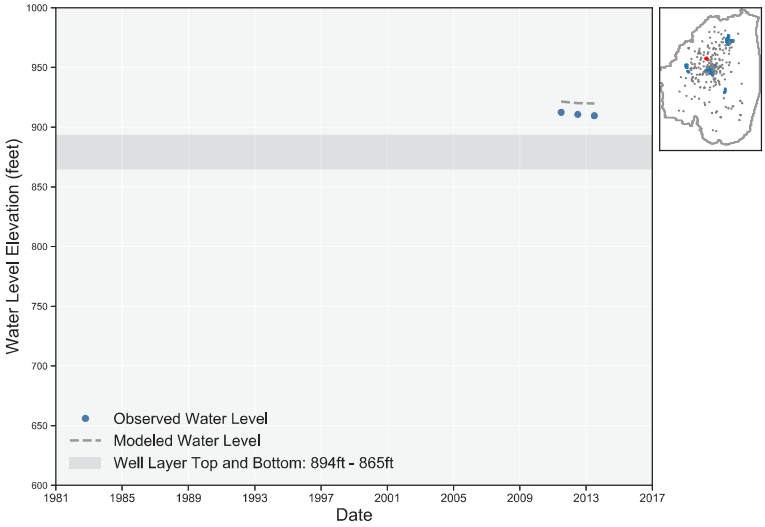
Well 435308 - Aq: QBAA Layers: 4 - 4



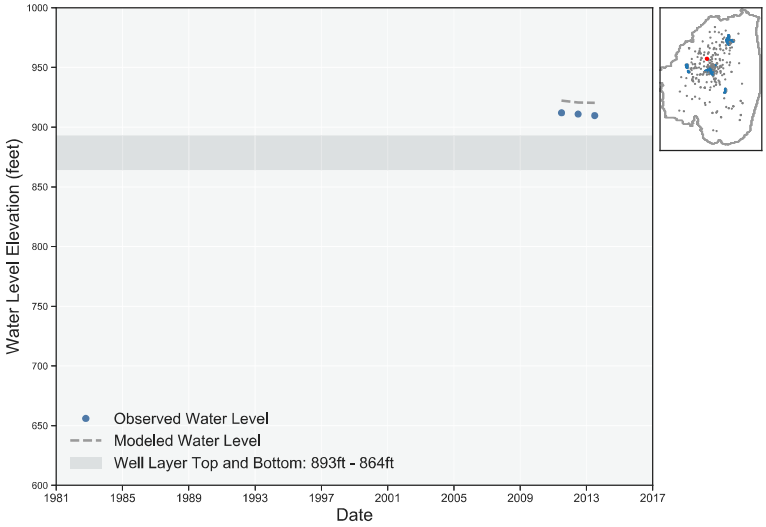
Well 126870 - Aq: QBAA Layers: 4 - 4



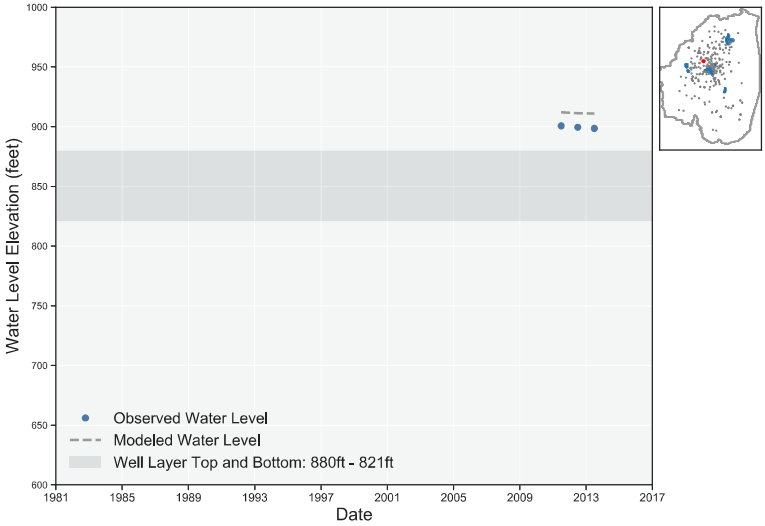
Well 465951 - Aq: QBAA Layers: 4 - 4



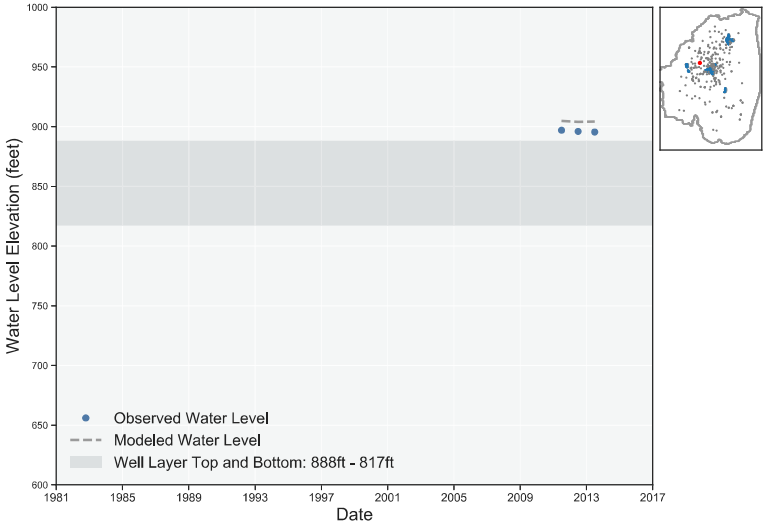
Well 496784 - Aq: QBAA Layers: 4 - 4



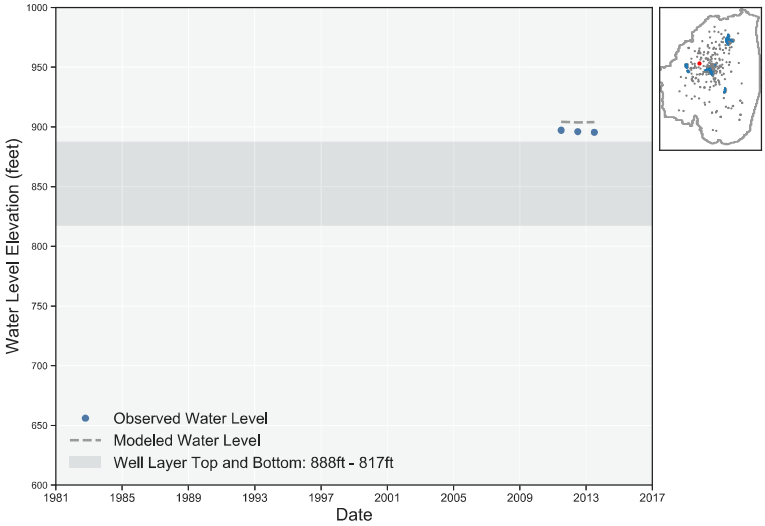
Well 112442 - Aq: QBAA Layers: 4 - 4



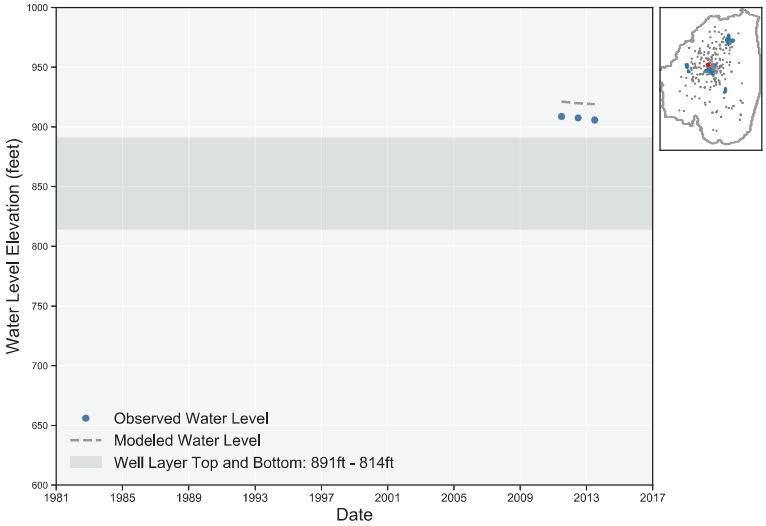
Well 430506 - Aq: QBAA Layers: 4 - 4



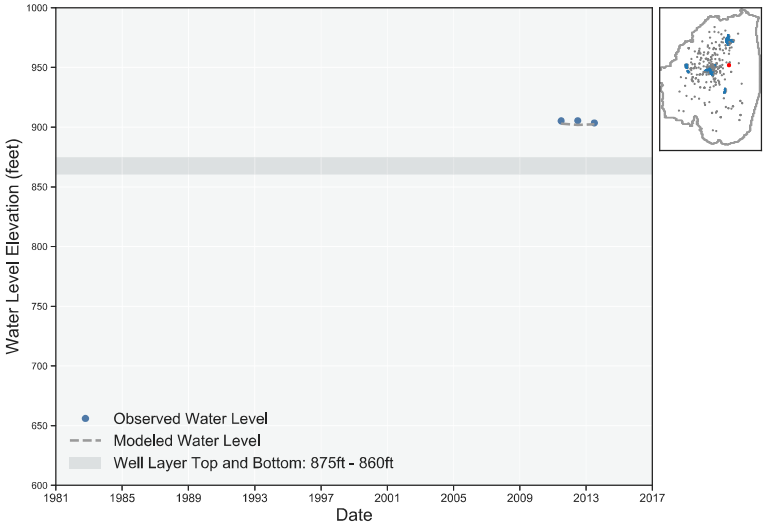
Well 130810 - Aq: QBAA Layers: 4 - 4



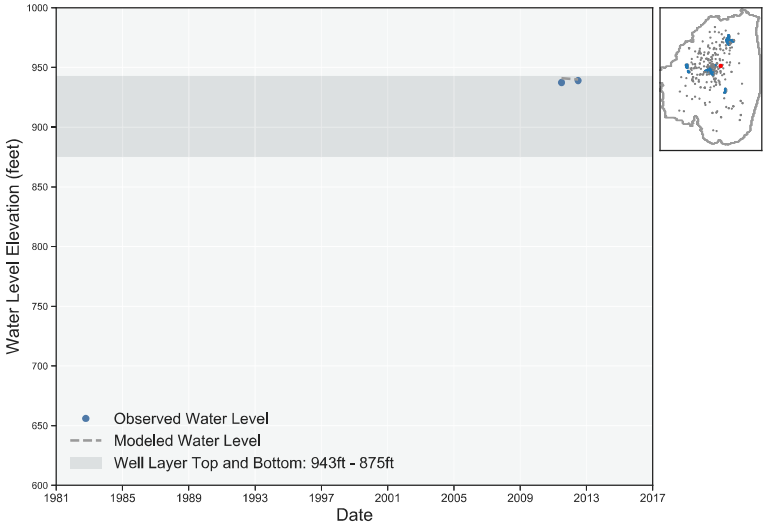
Well 141728 - Aq: Q Layers: 4 - 4



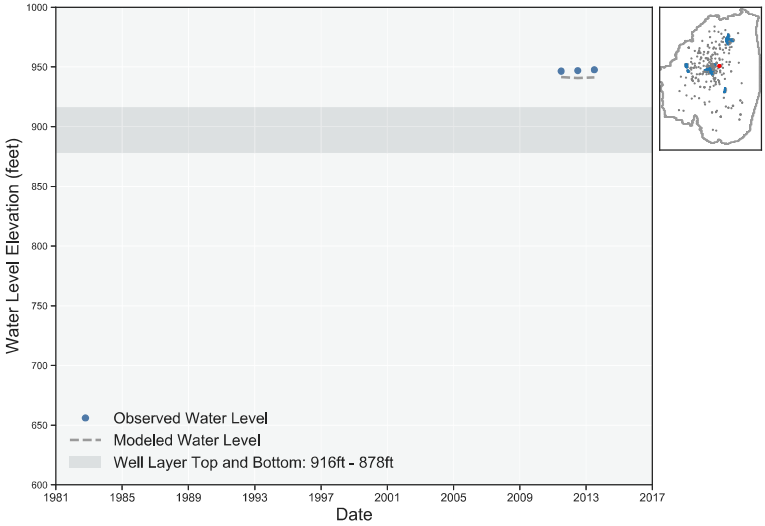
Well 153500 - Aq: QWTA Layers: 4 - 4



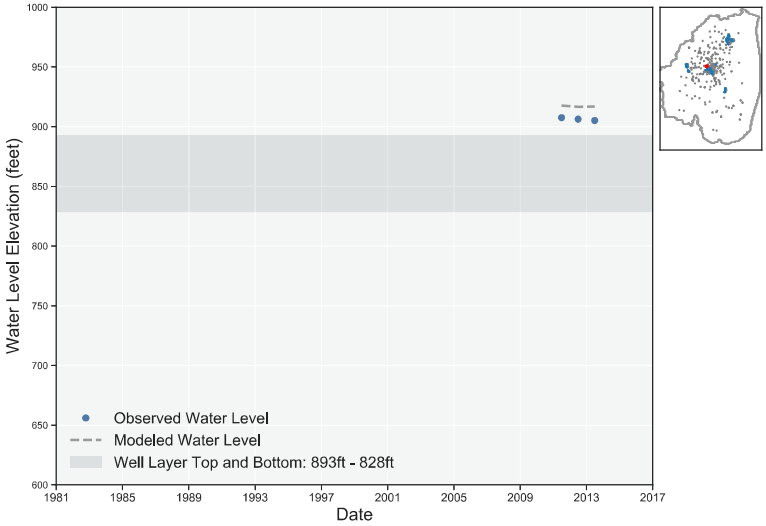
Well 418799 - Aq: QBAA Layers: 4 - 4



Well 404277 - Aq: QWTA Layers: 4 - 4



Well 186956 - Aq: Q Layers: 4 - 4



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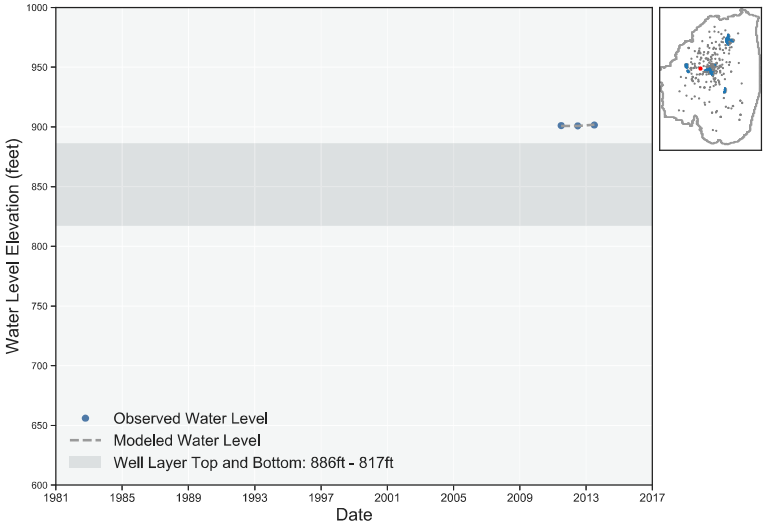
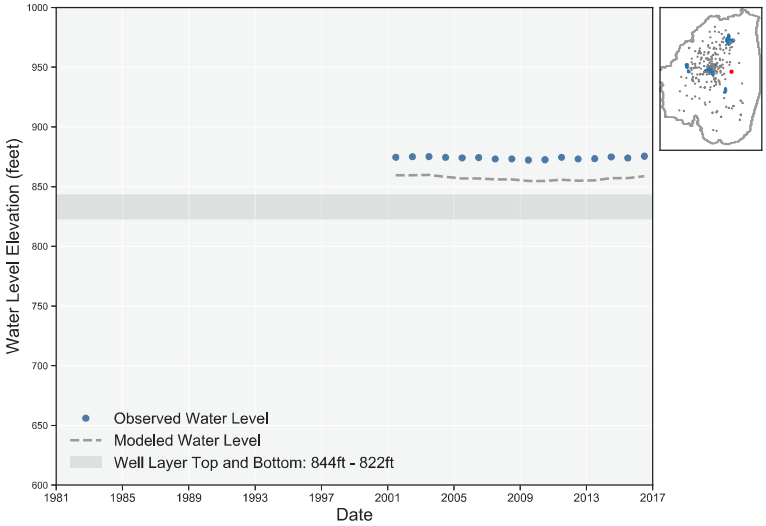
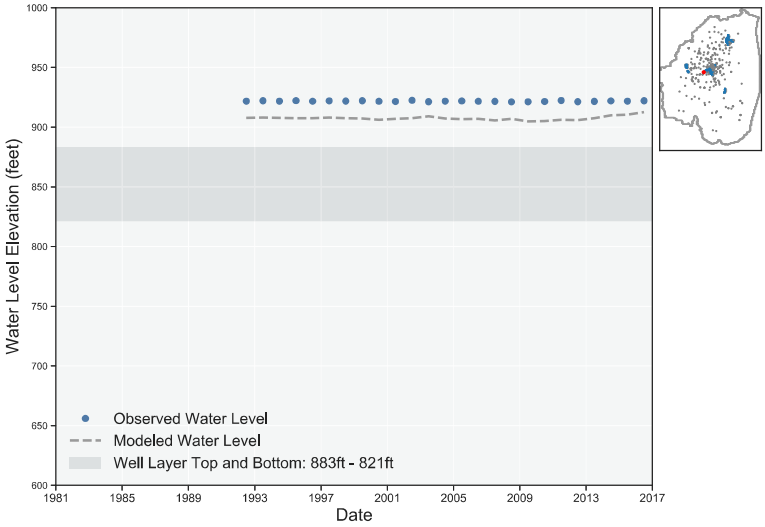


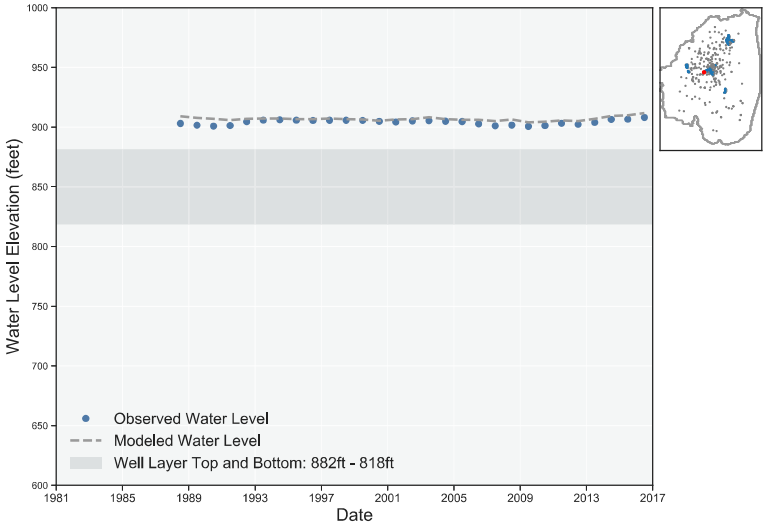
Well 82048 - Aq: QBAA Layers: 4 - 4



Well 62039 - Aq: QWTA Layers: 4 - 4



Well 62033 - Aq: QBAA Layers: 4 - 4



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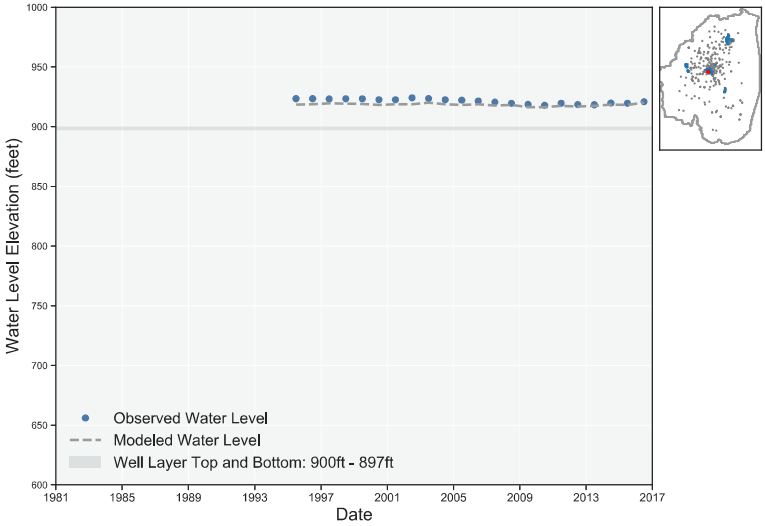

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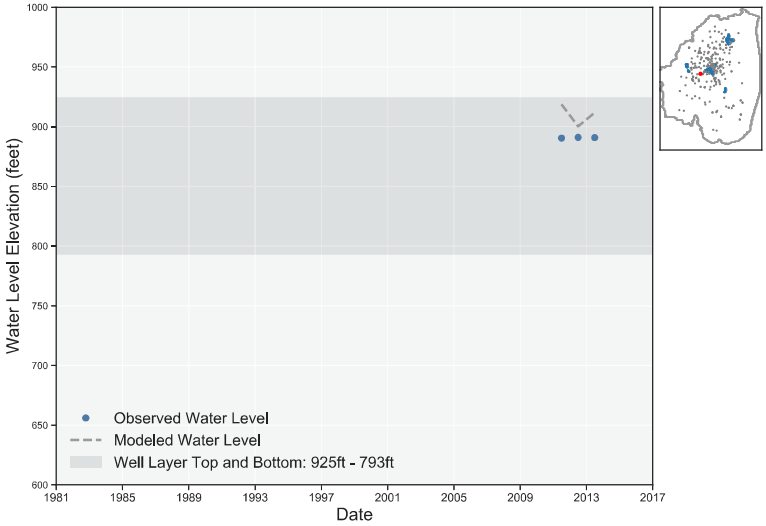

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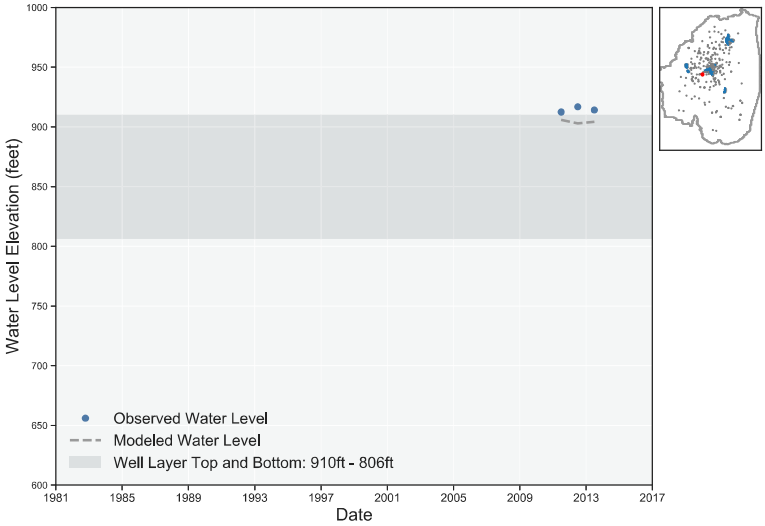

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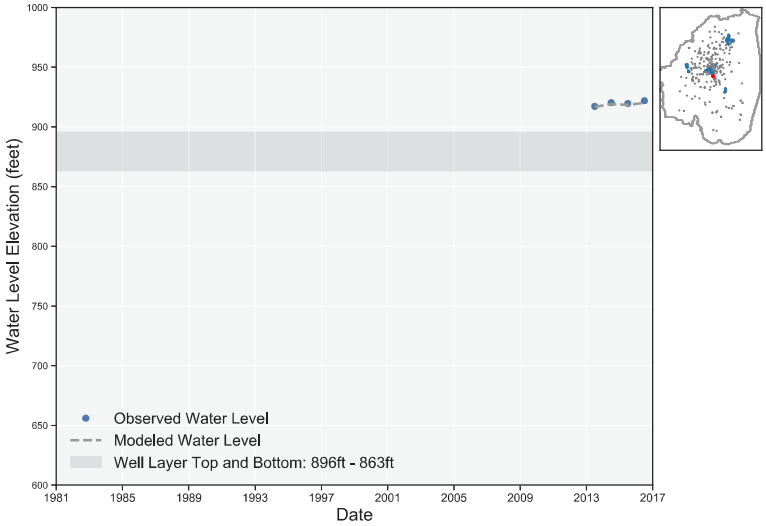

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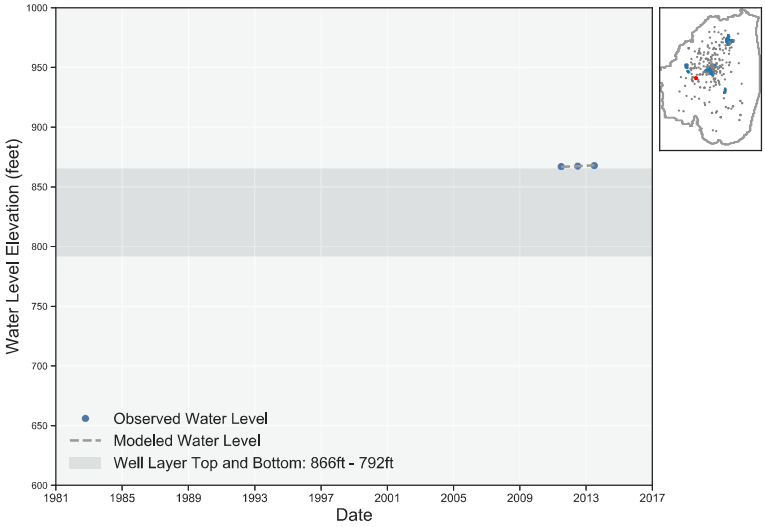
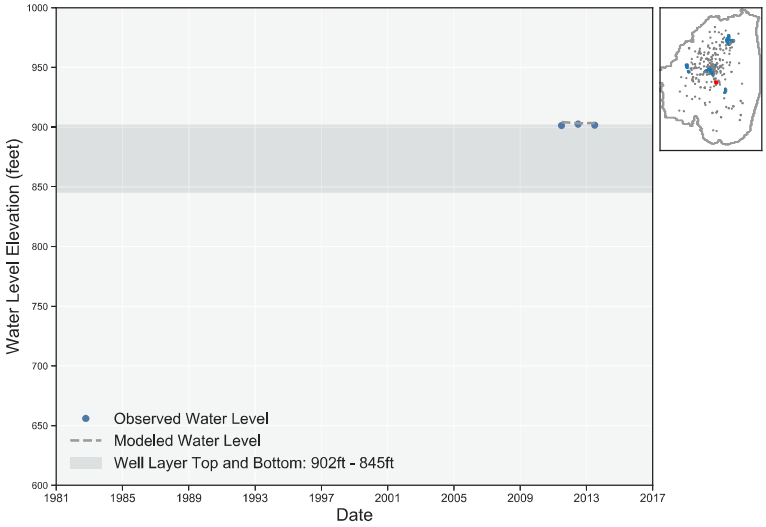


Well 436676 - Aq: QBAA Layers: 4 - 4



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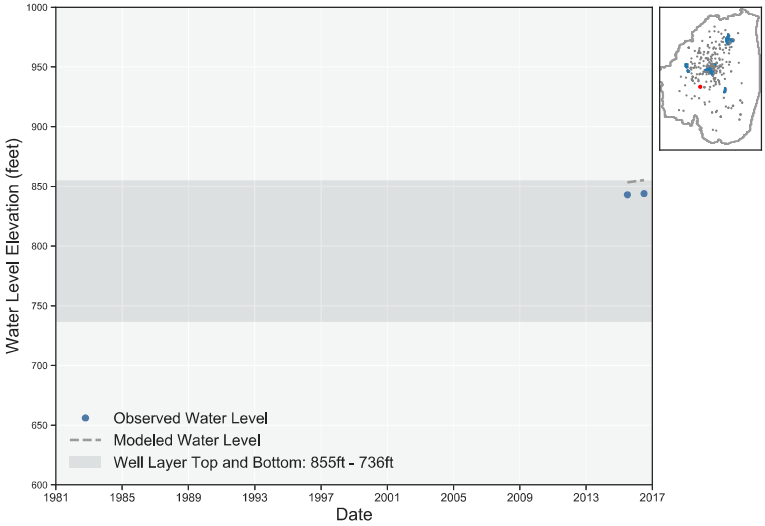
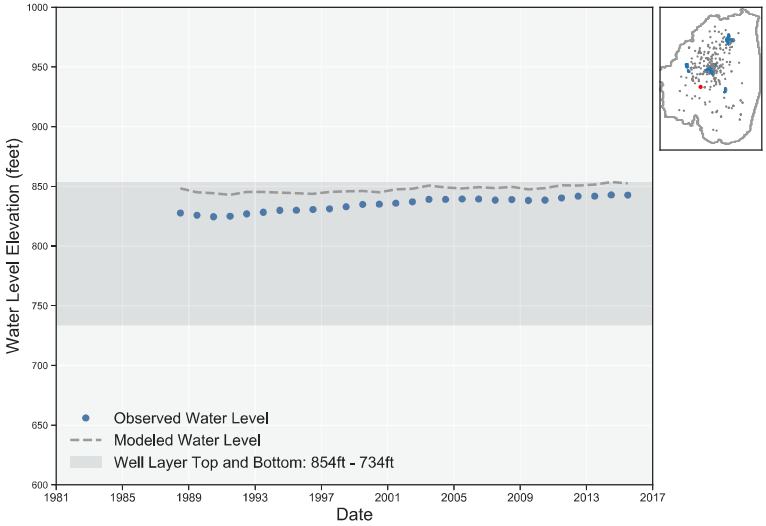
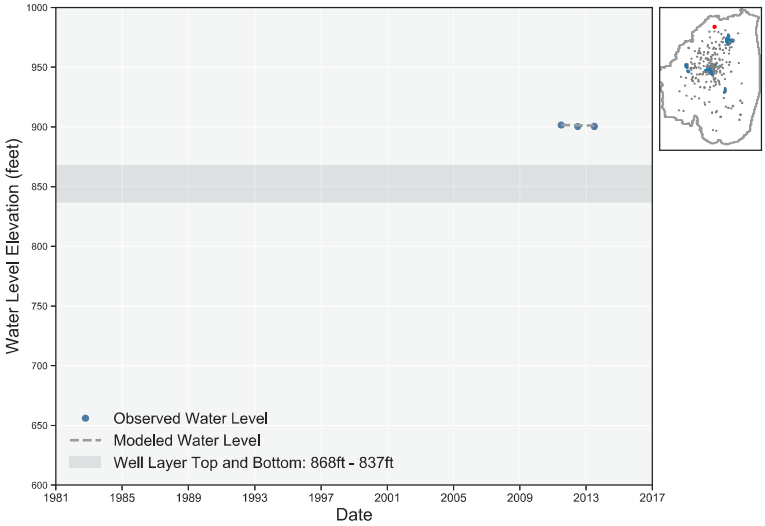


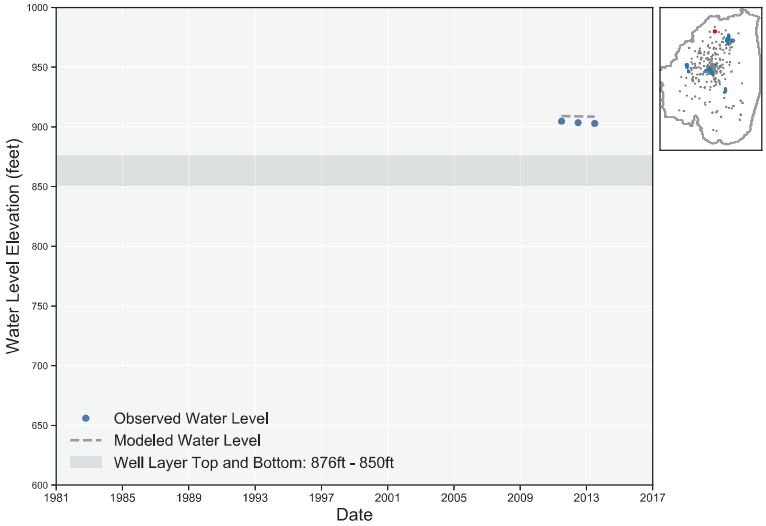
Well 62008 - Aq: QBAA Layers: 4 - 4



Well 178258 - Aq: QBAA Layers: 5 - 5



Well 428561 - Aq: QBAA Layers: 5 - 5



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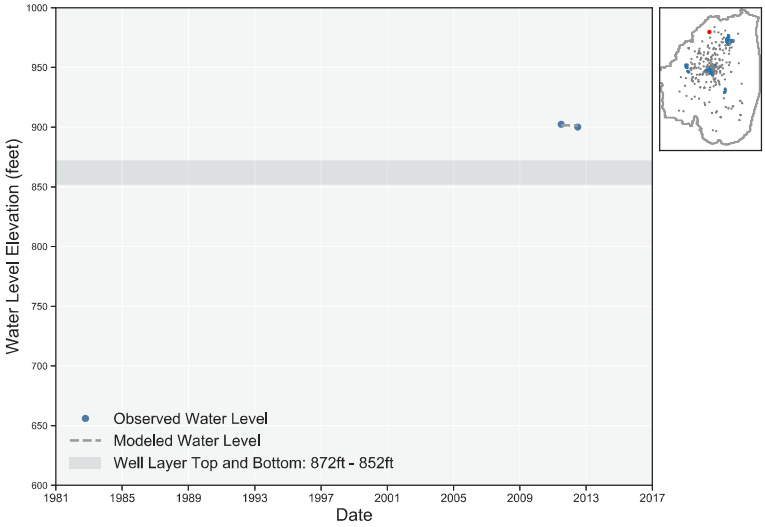
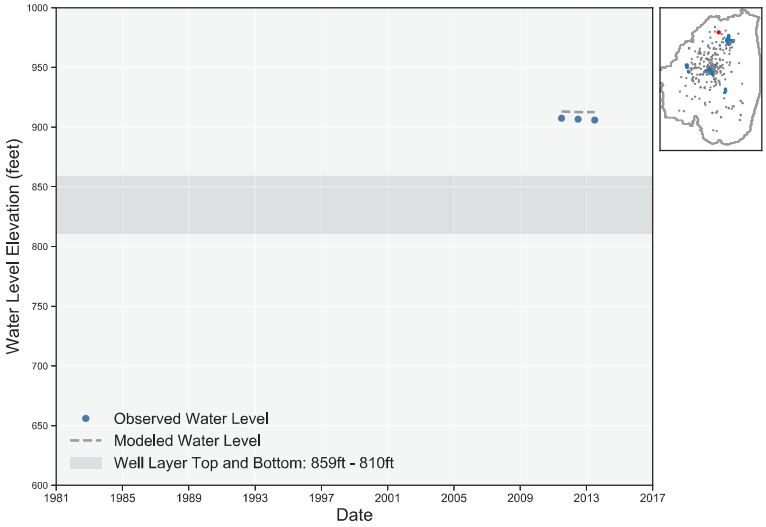
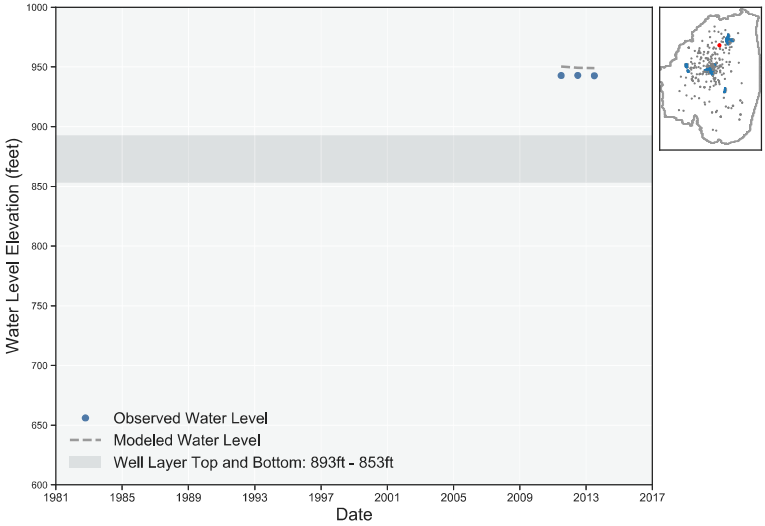


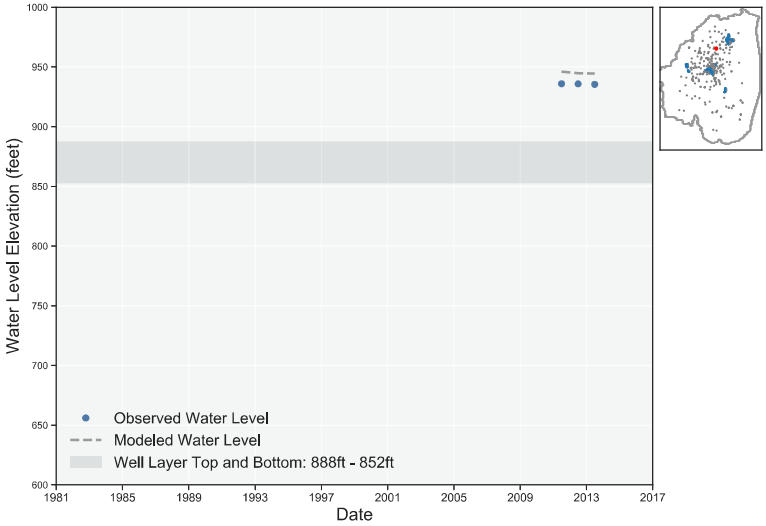
Well 420316 - Aq: QBAA Layers: 5 - 5



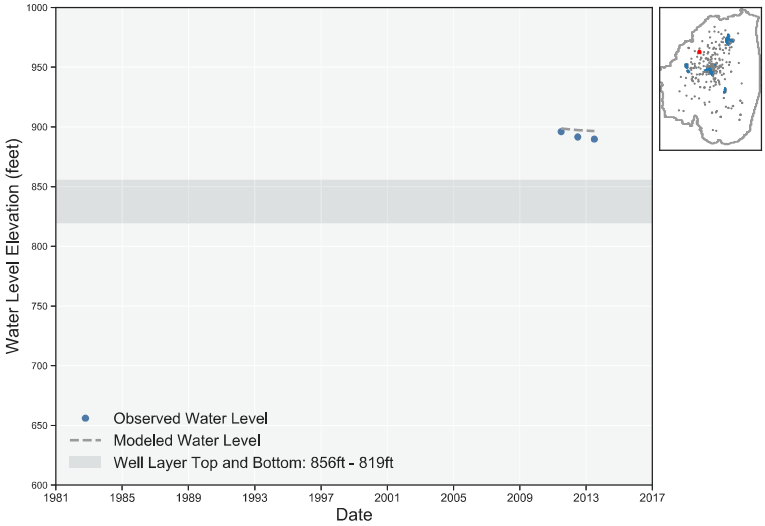
Well 112661 - Aq: QBAA Layers: 5 - 5



Well 485406 - Aq: OSTP Layers: 5 - 5



Well 439244 - Aq: OSTP Layers: 5 - 5



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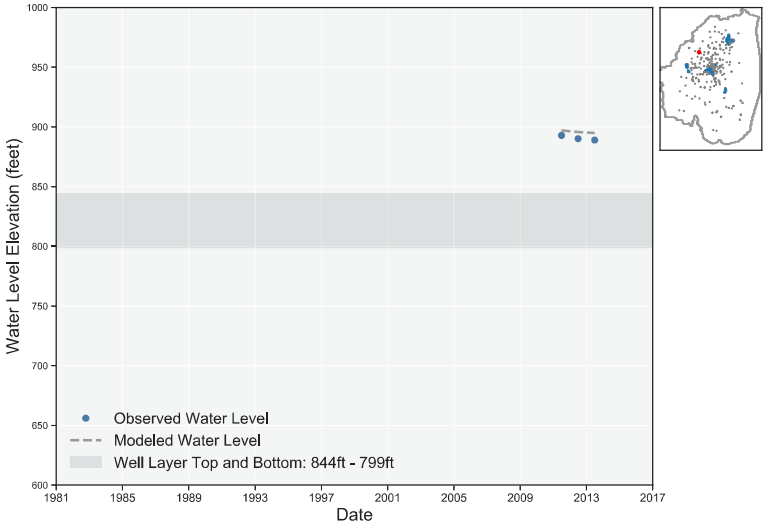

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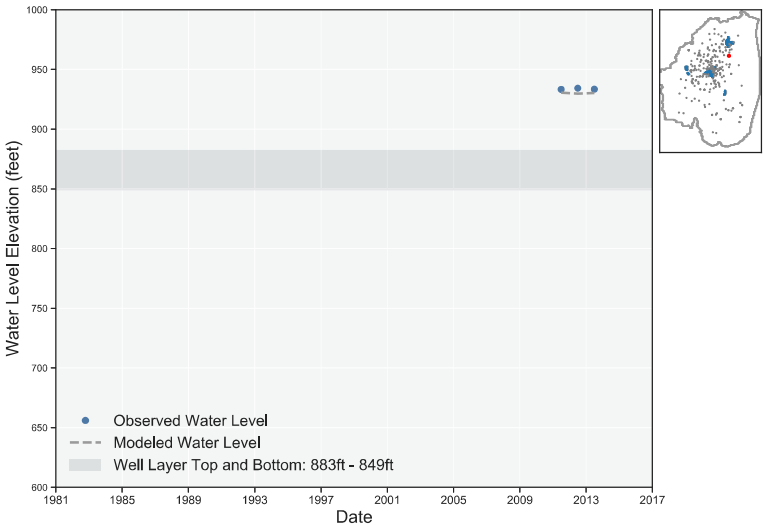

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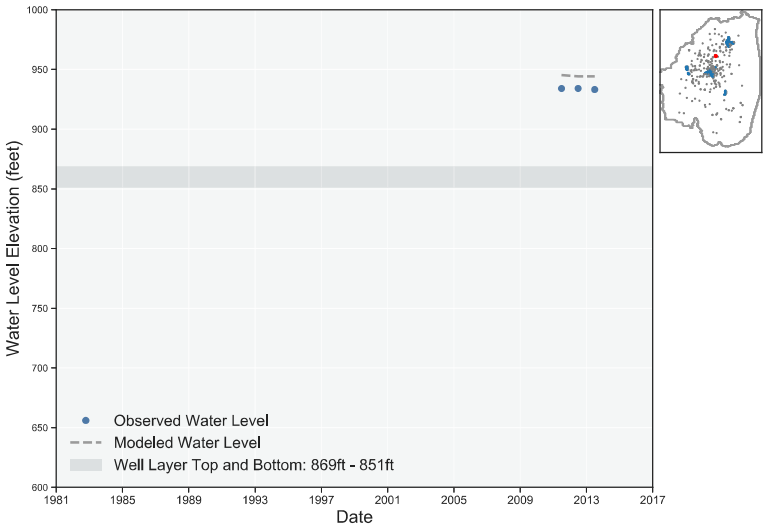

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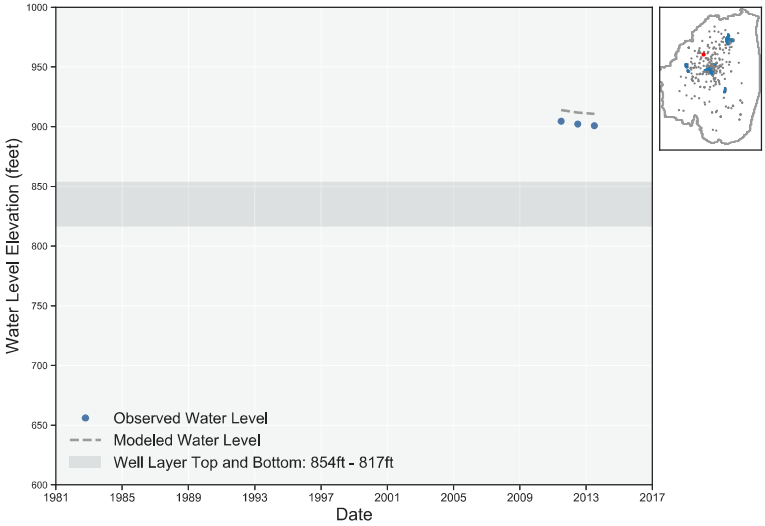

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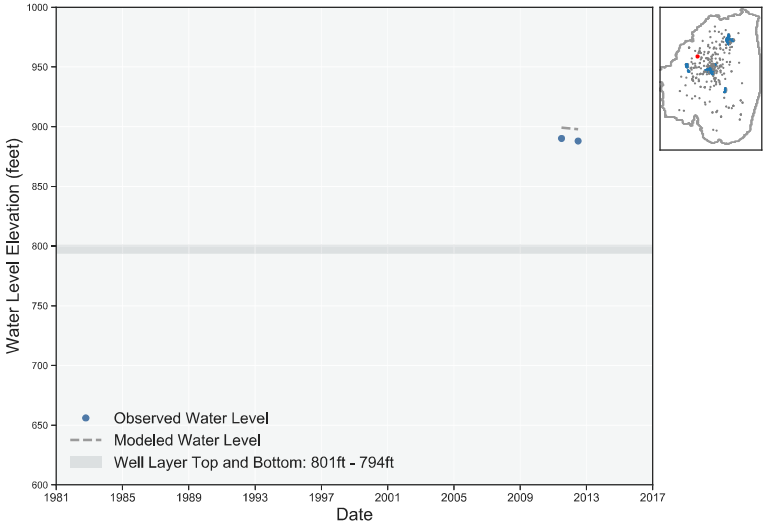

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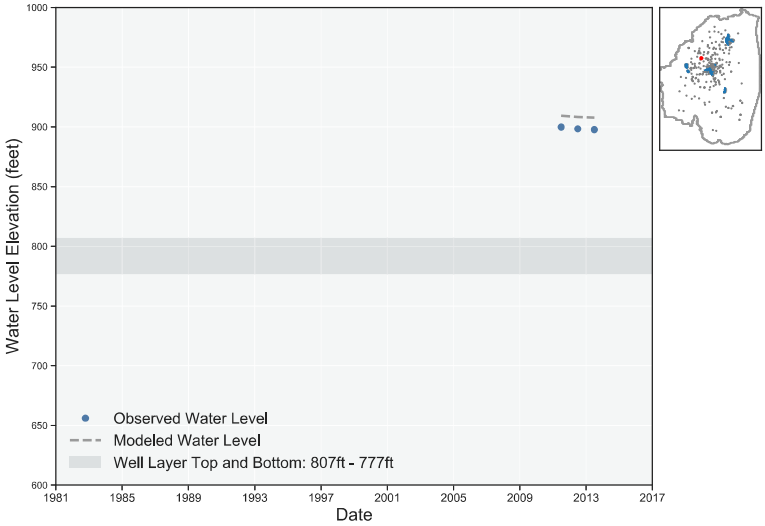
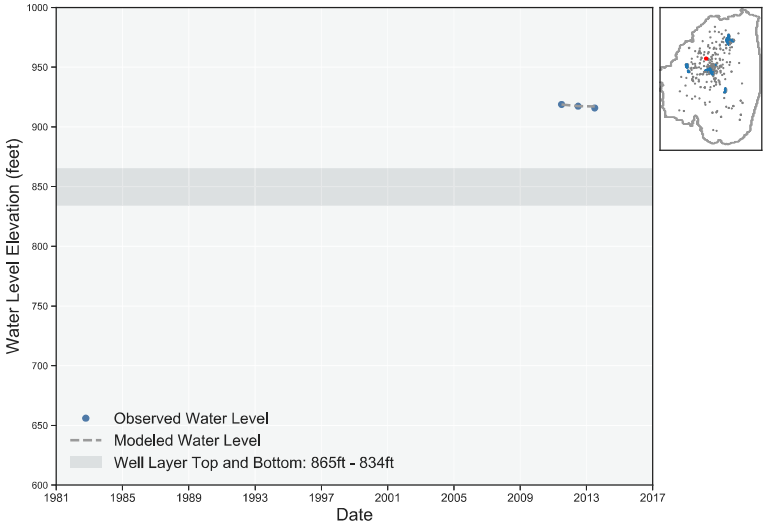


Well 653756 - Aq: QBAA Layers: 5 - 5



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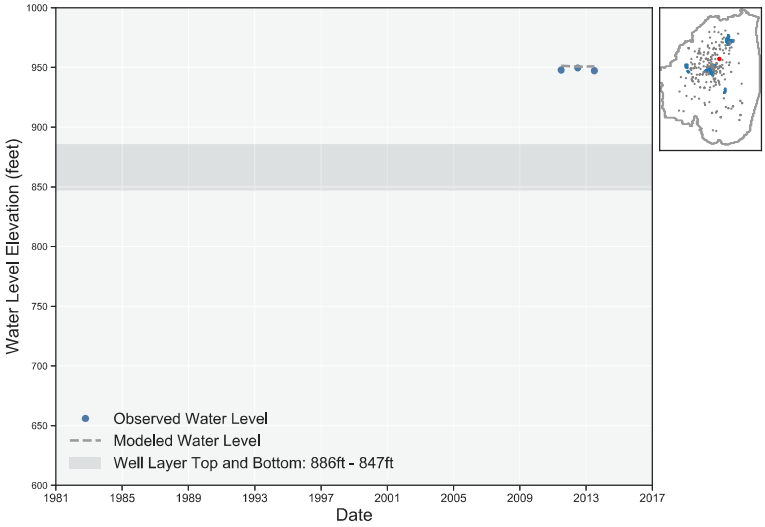

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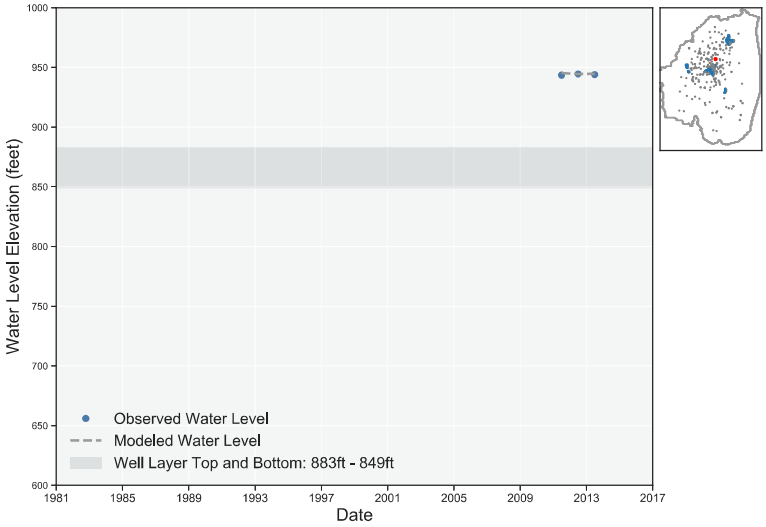
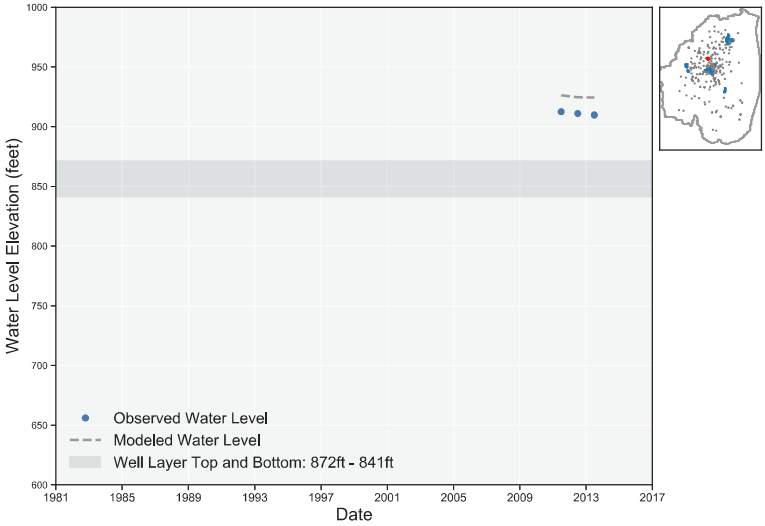


Well 469841 - Aq: QBAA Layers: 5 - 5



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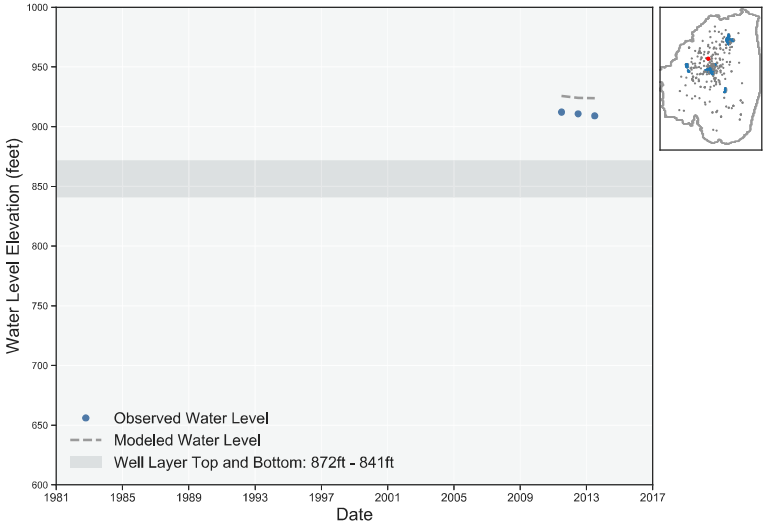

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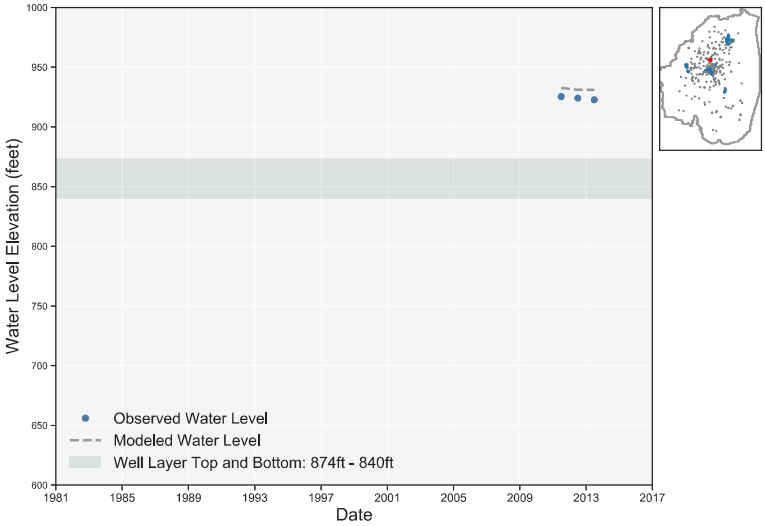

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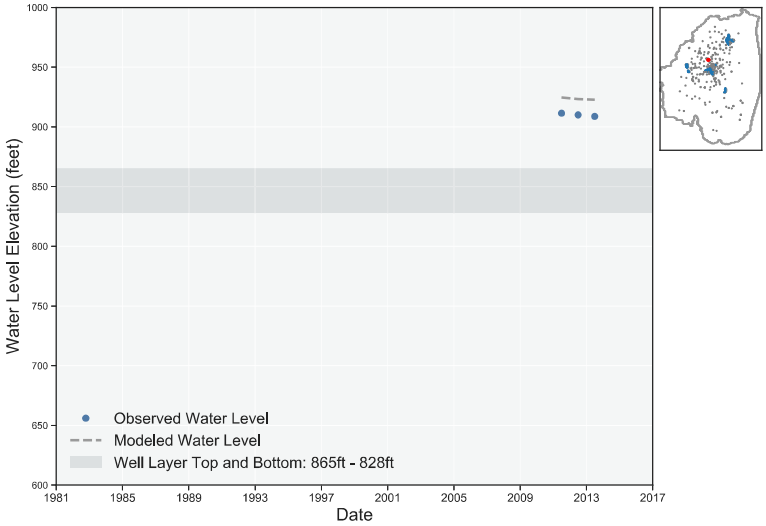

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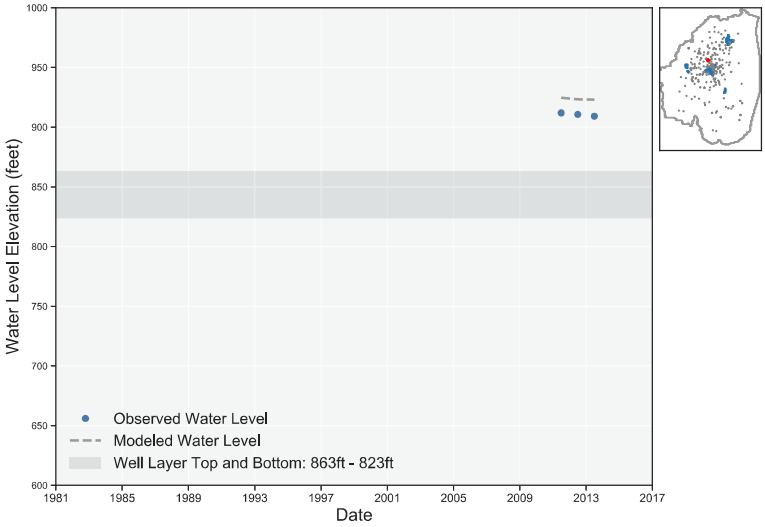

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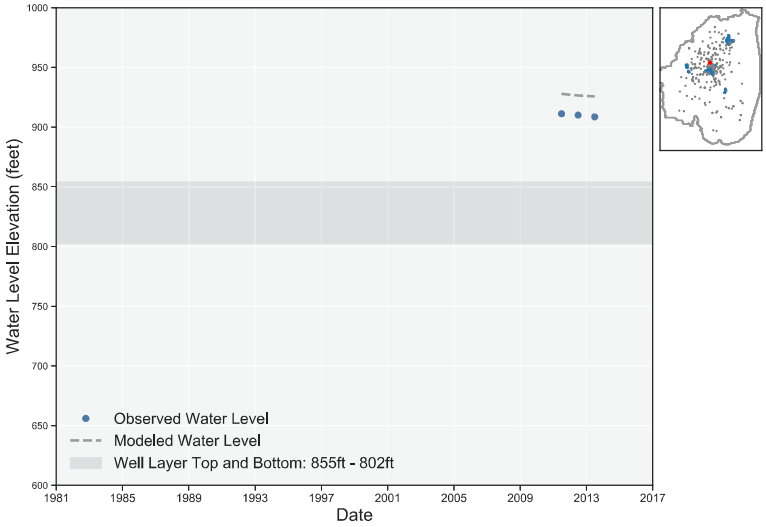

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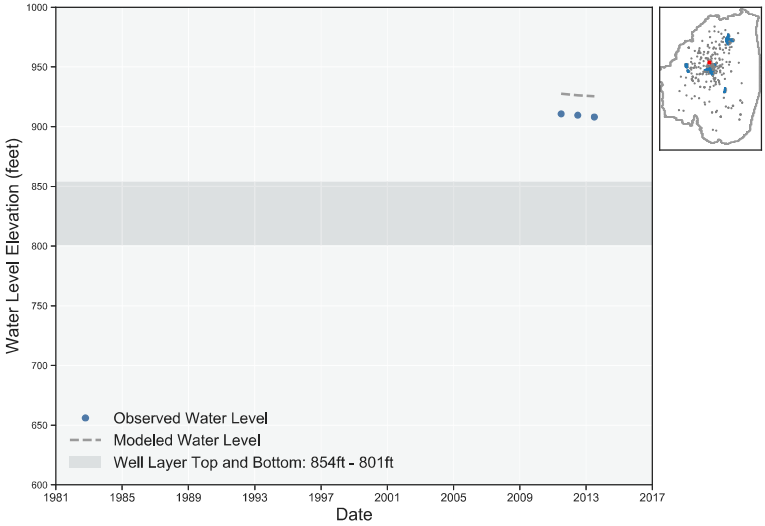

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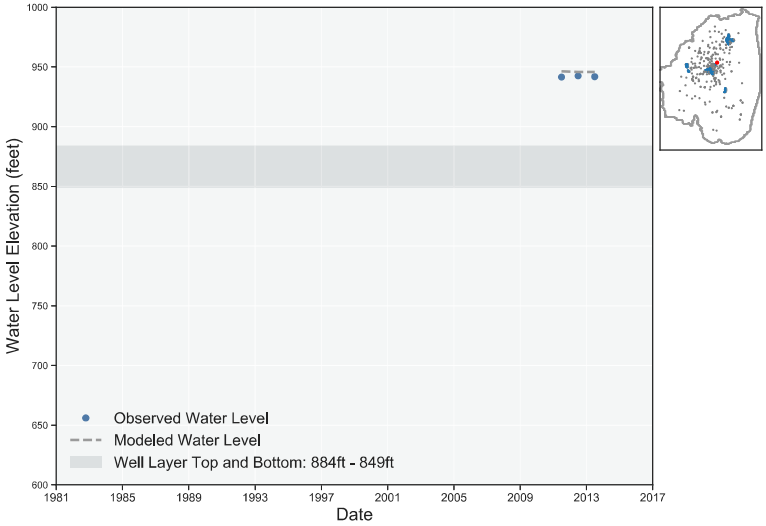
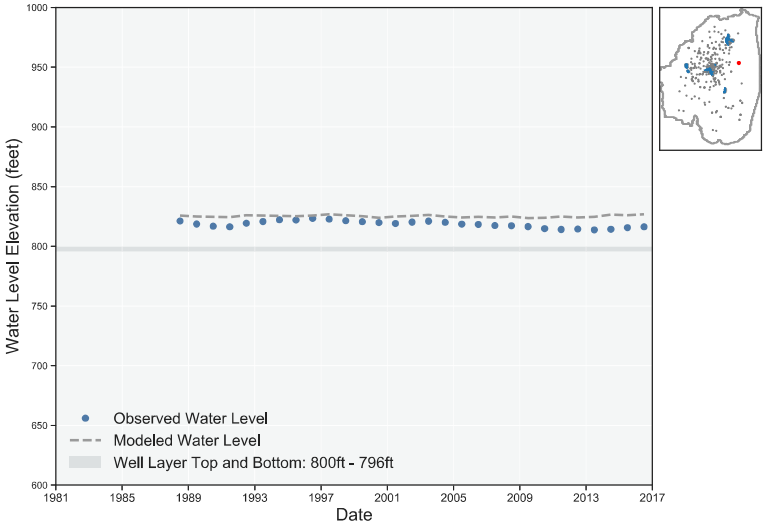


Well 82024 - Aq: QBAA Layers: 5 - 5



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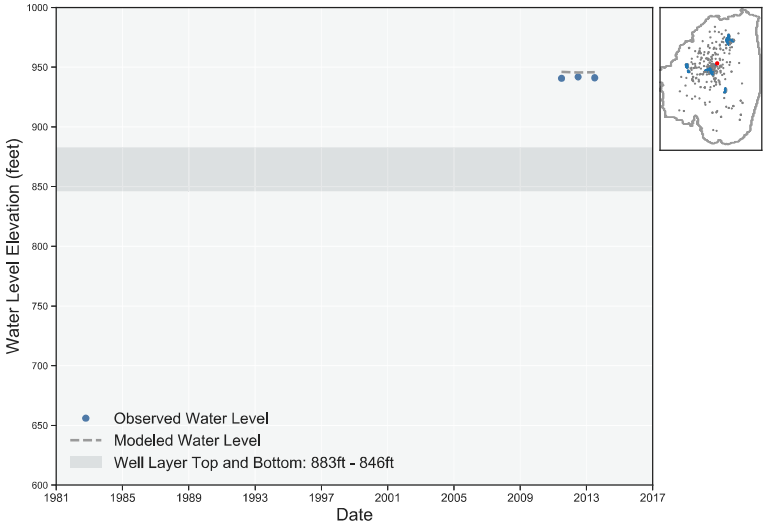

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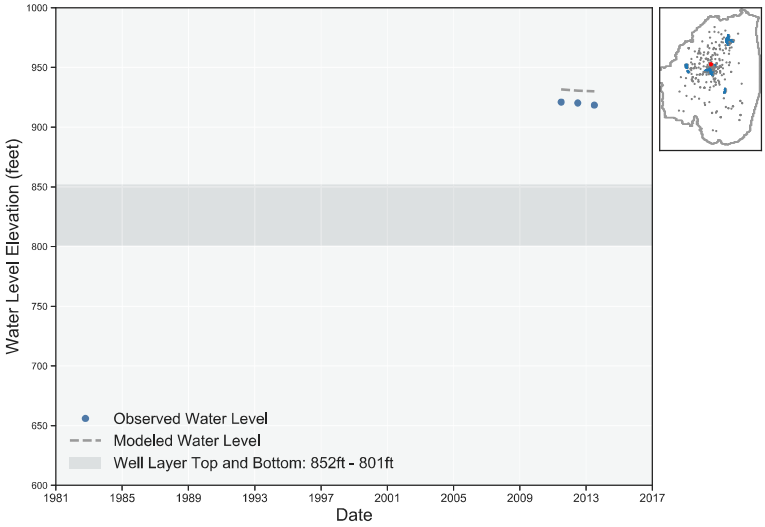

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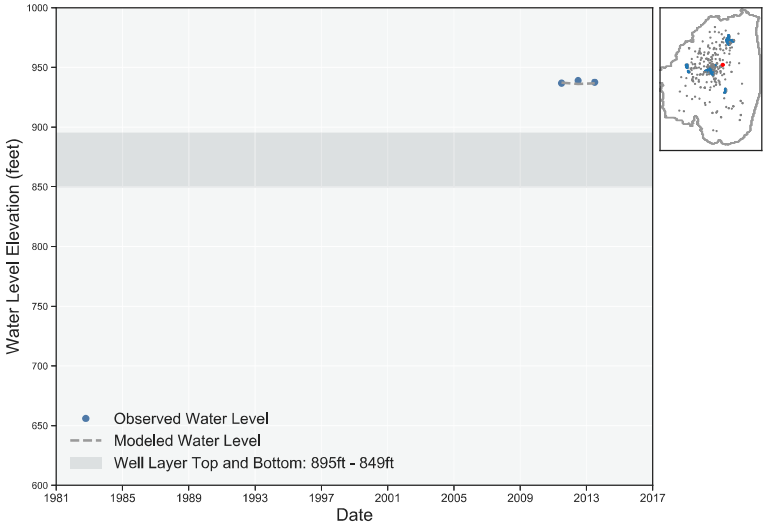

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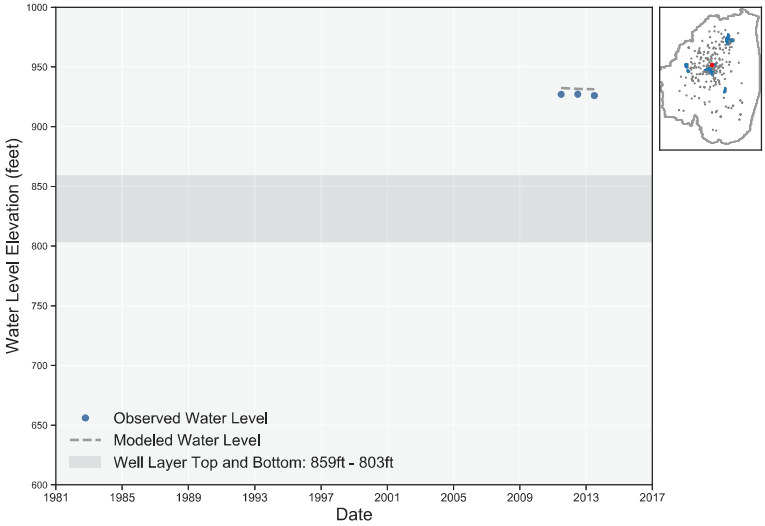

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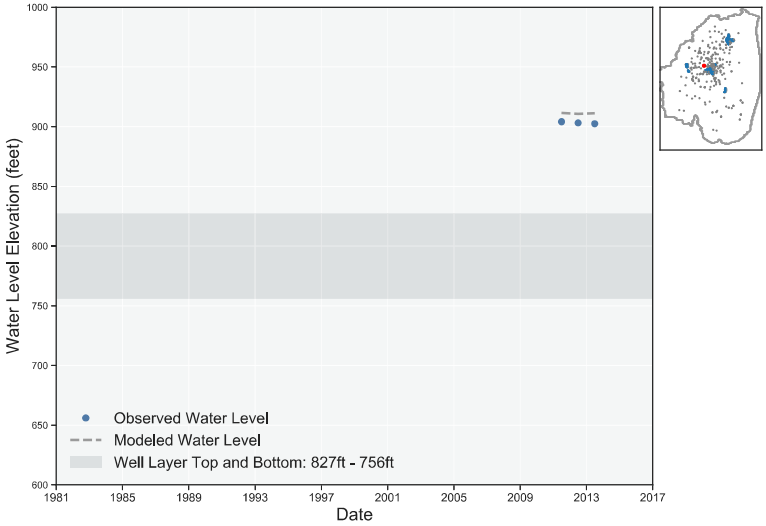

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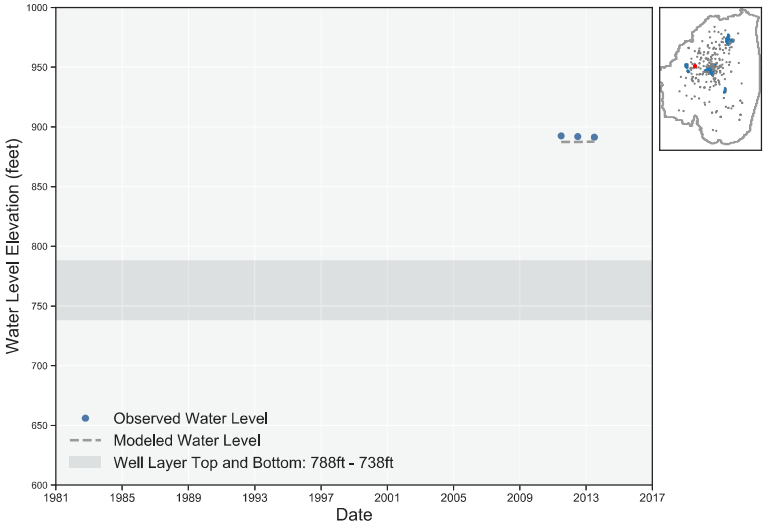

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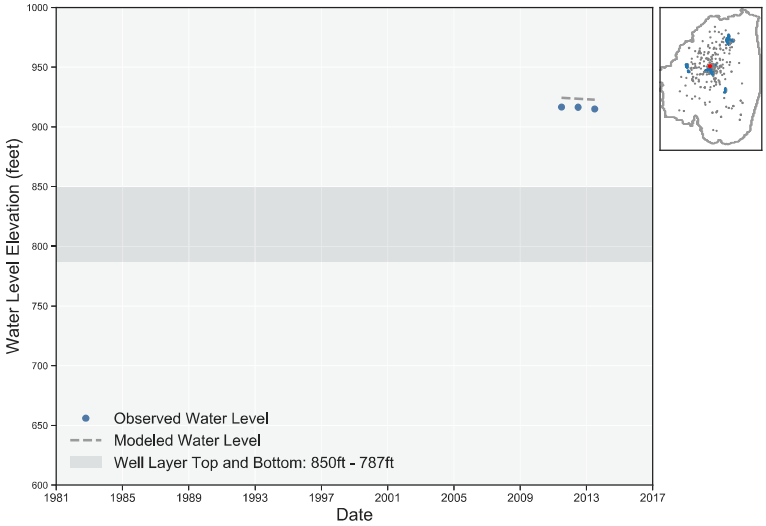

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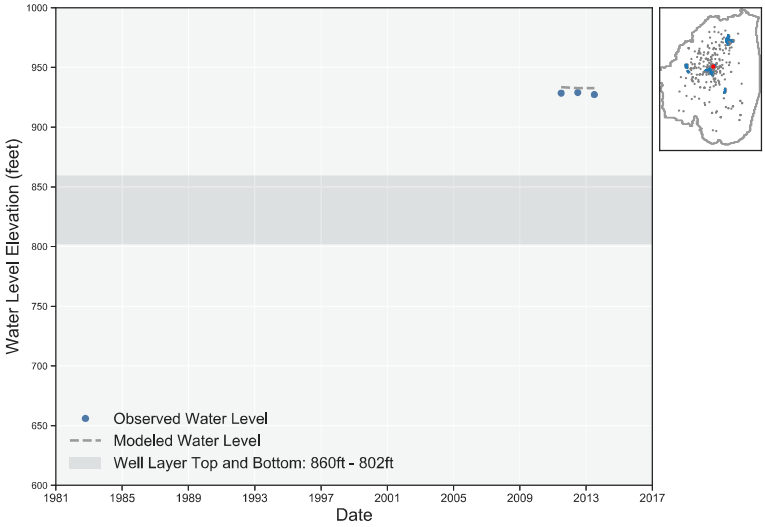

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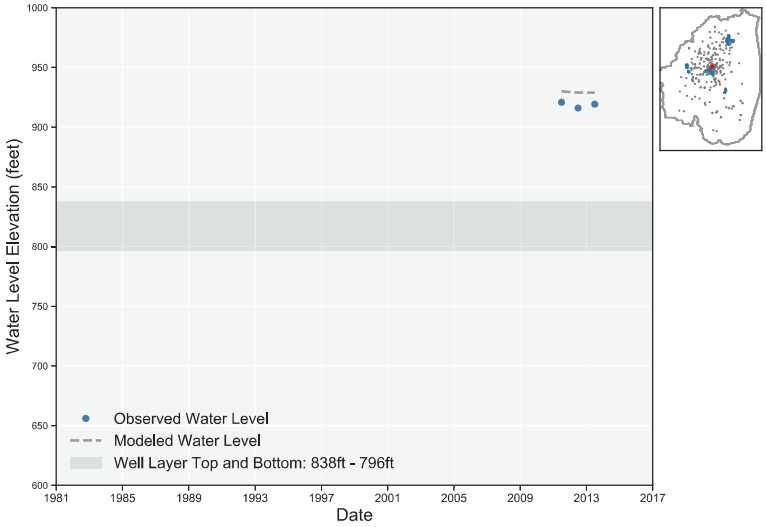

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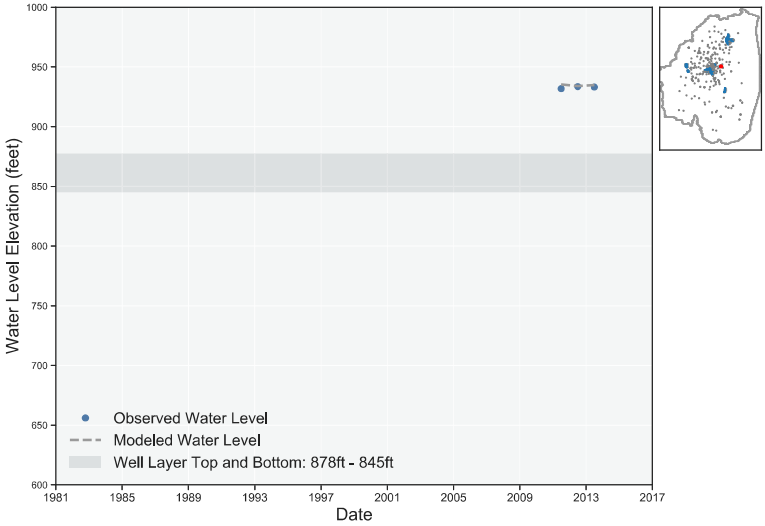
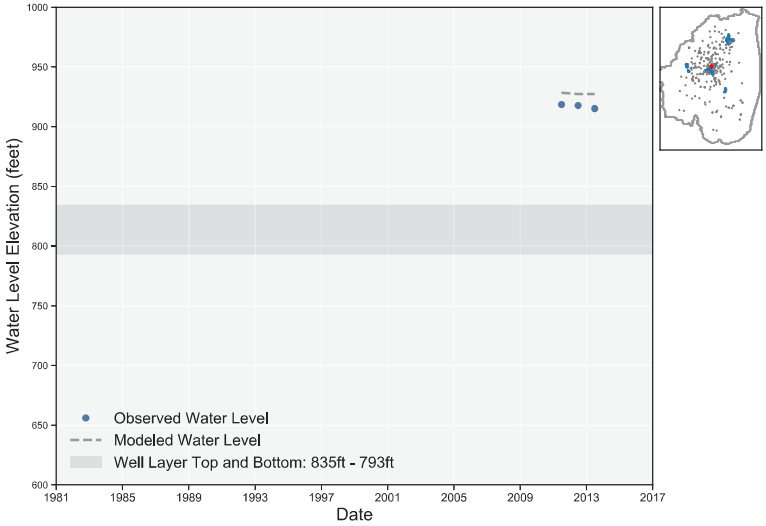


Well 130885 - Aq: OSTP Layers: 5 - 5



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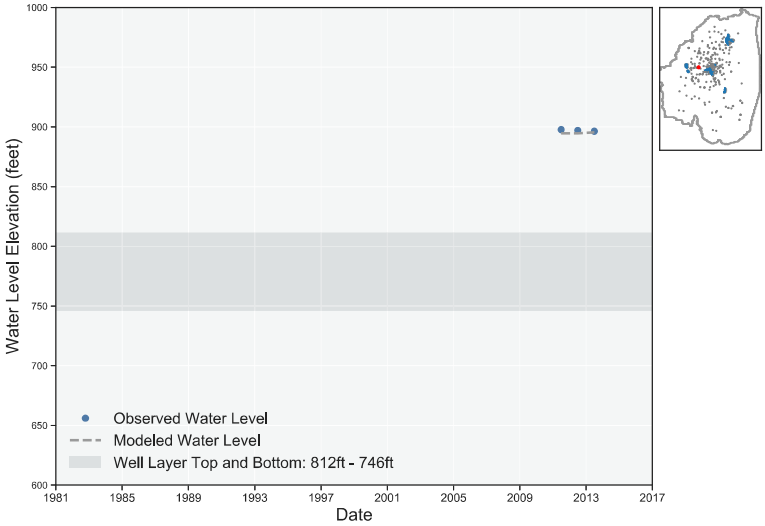
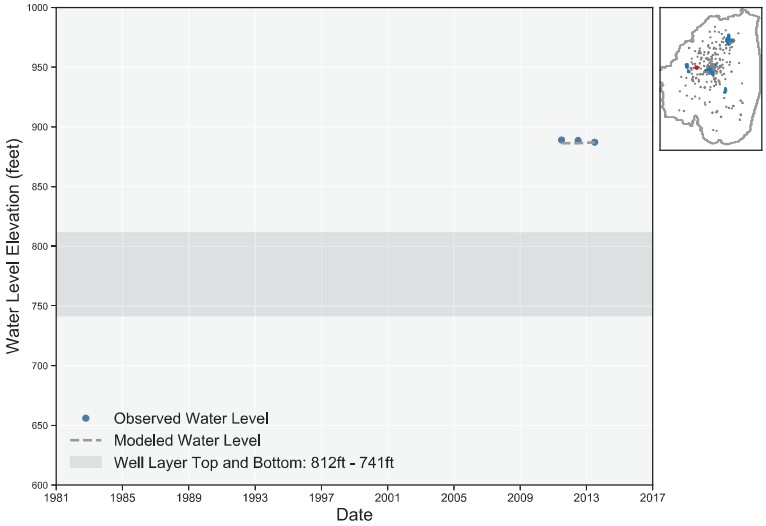
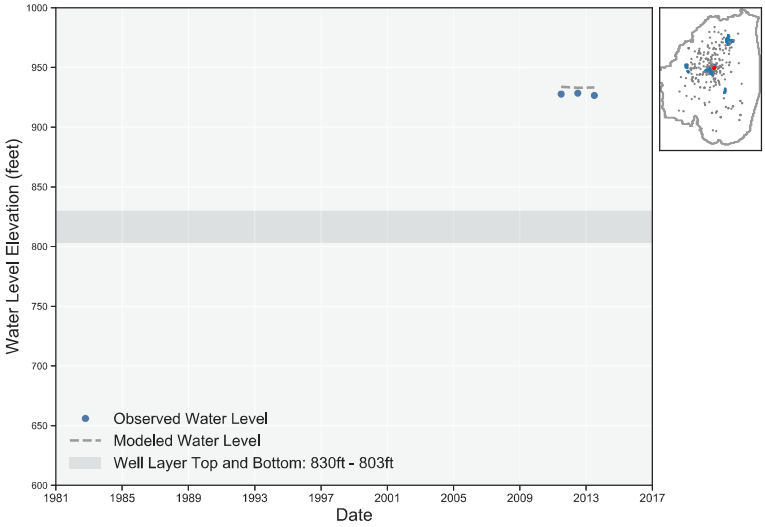


Well 205720 - Aq: OSTP Layers: 5 - 5



Well 112480 - Aq: OSTP Layers: 5 - 5



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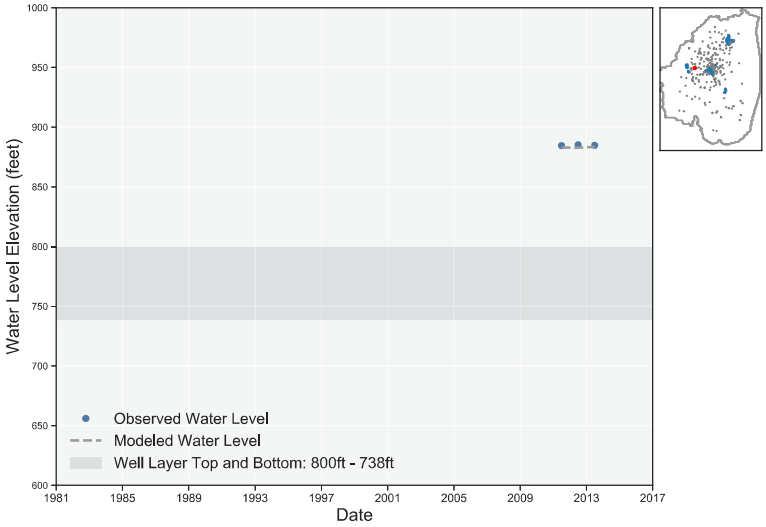
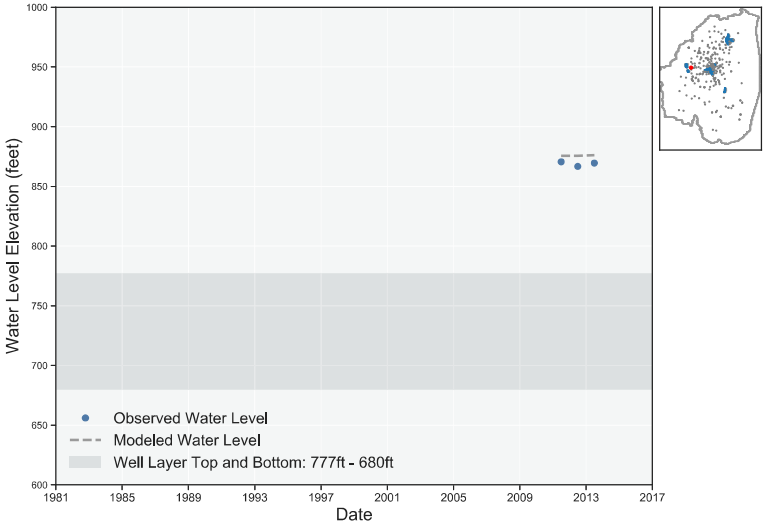
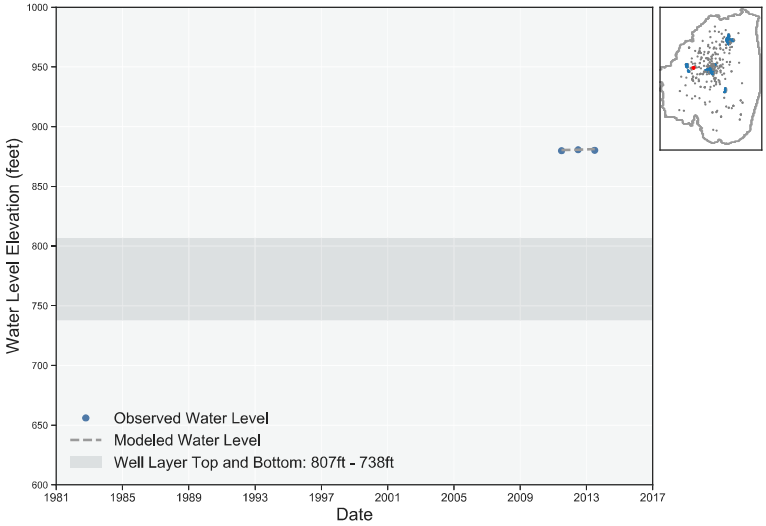


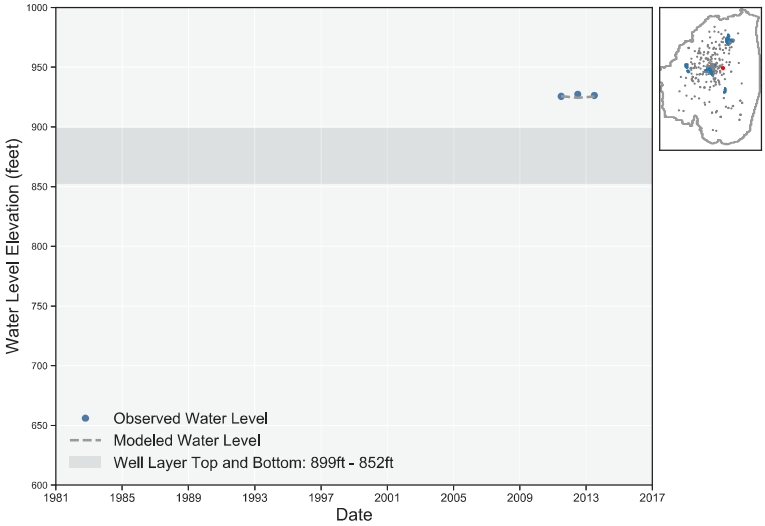
Well 405703 - Aq: OSTP Layers: 5 - 5



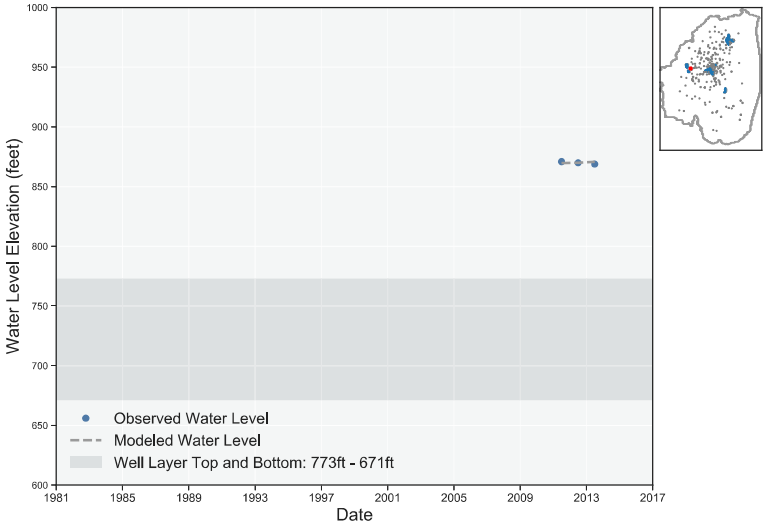
Well 504153 - Aq: OSTP Layers: 5 - 5



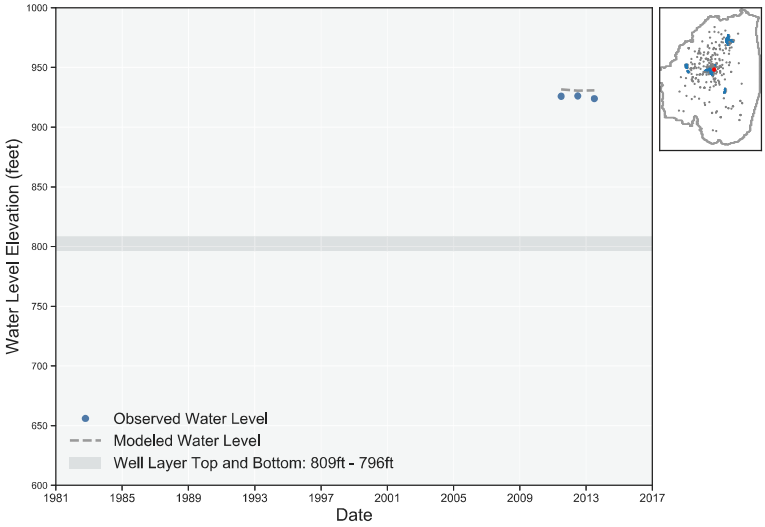
Well 136141 - Aq: OSTP Layers: 5 - 5



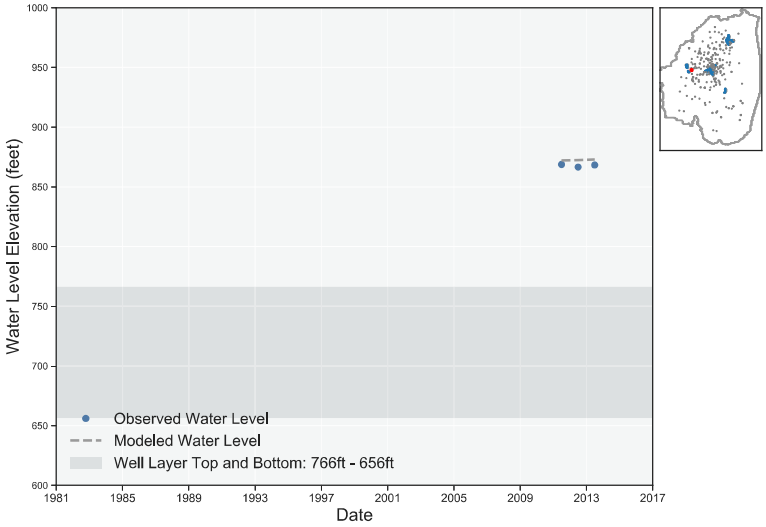
Well 436585 - Aq: QBAA Layers: 5 - 5



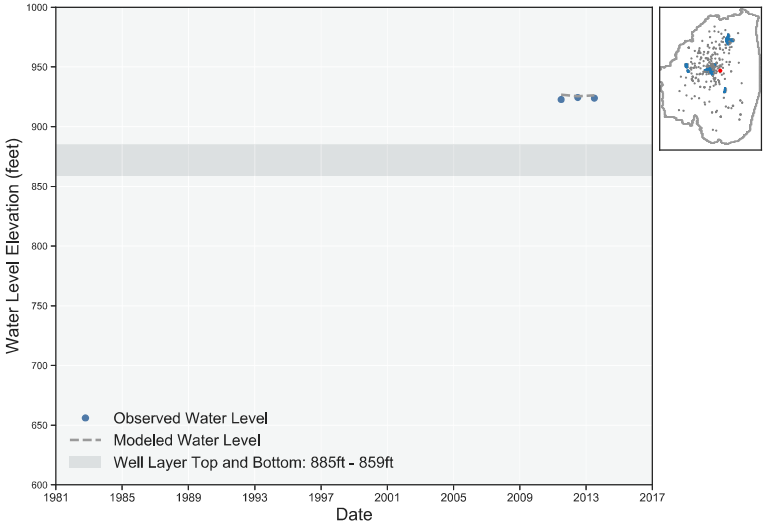
Well 112342 - Aq: OSTP Layers: 5 - 5



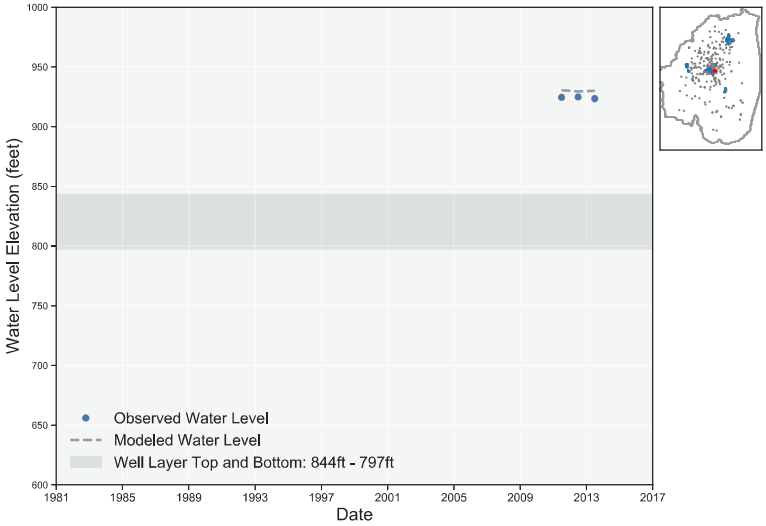
Well 404132 - Aq: QBAA Layers: 5 - 5



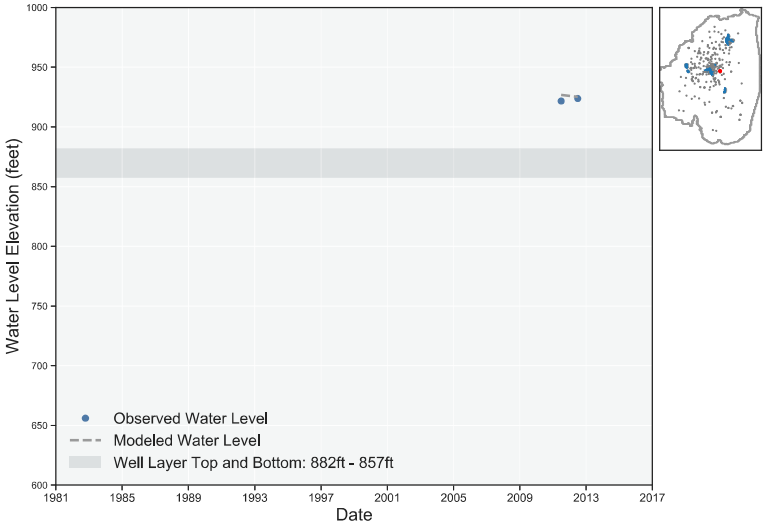
Well 505390 - Aq: OPDC Layers: 5 - 5



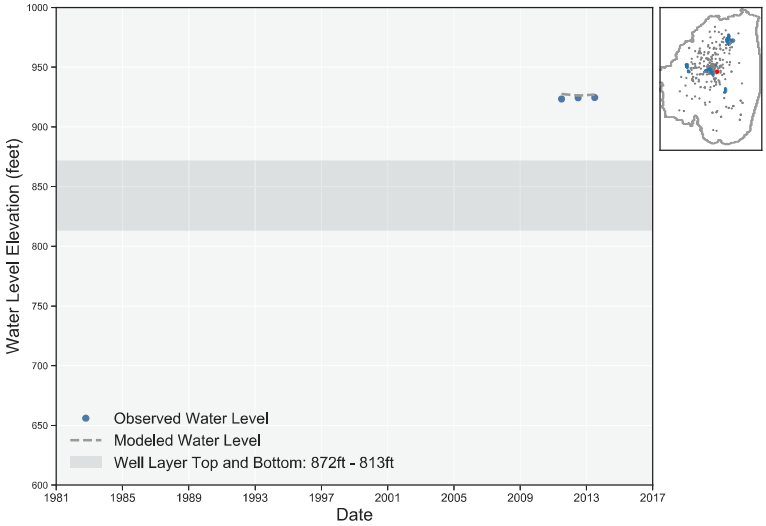
Well 153493 - Aq: OSTP Layers: 5 - 5



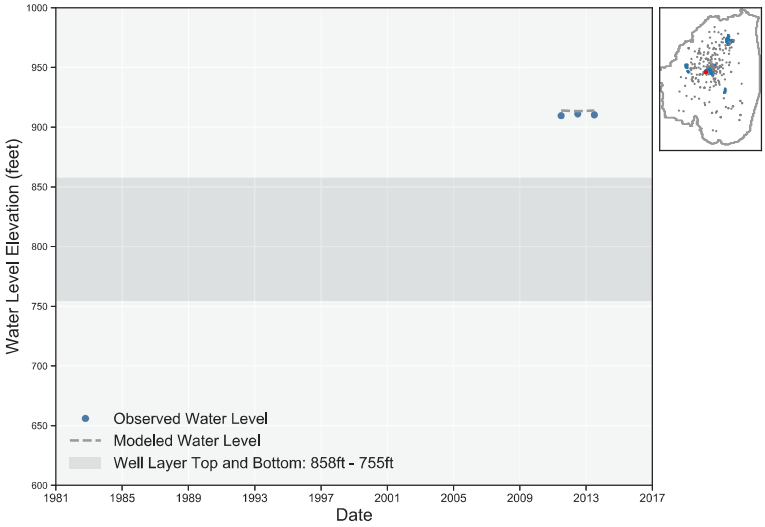
Well 413586 - Aq: OSTP Layers: 5 - 5



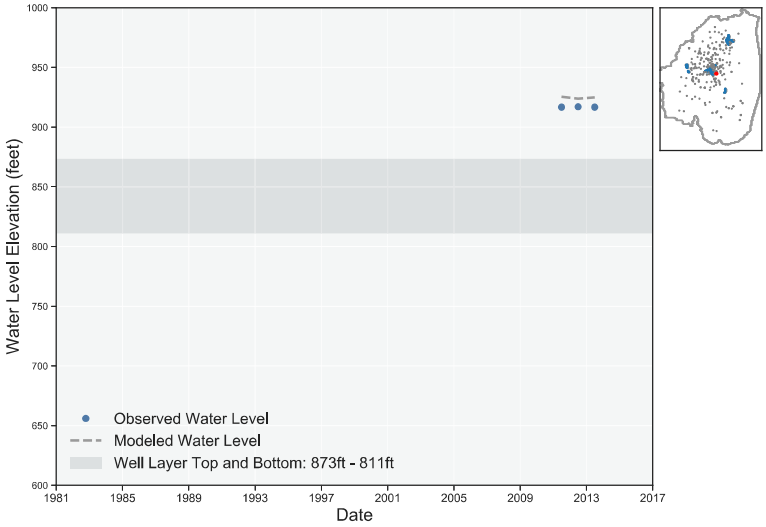
Well 182961 - Aq: OSTP Layers: 5 - 5



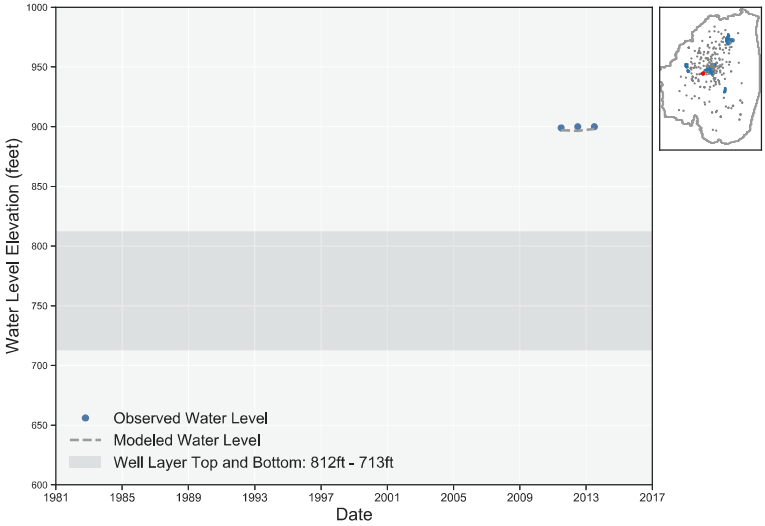
Well 504197 - Aq: OSTP Layers: 5 - 5



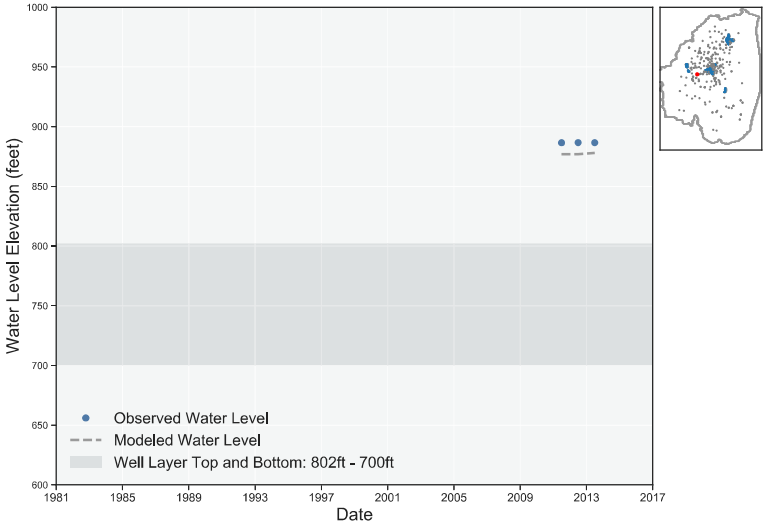
Well 136122 - Aq: OSTP Layers: 5 - 5



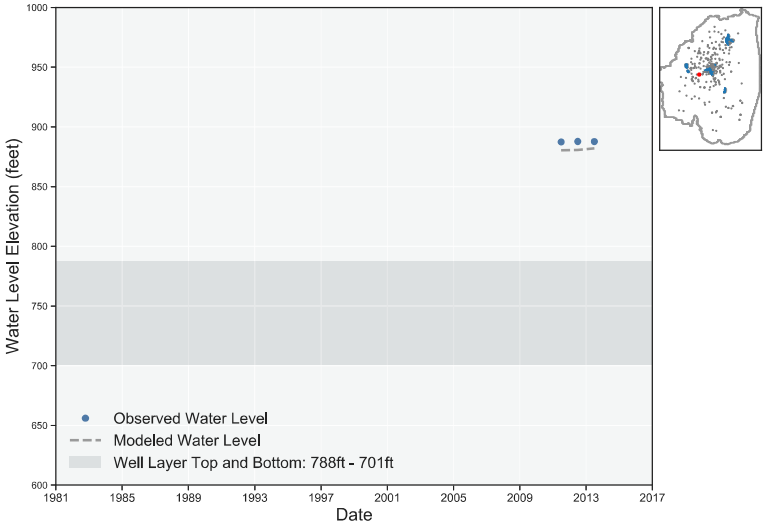
Well 112625 - Aq: OSTP Layers: 5 - 5



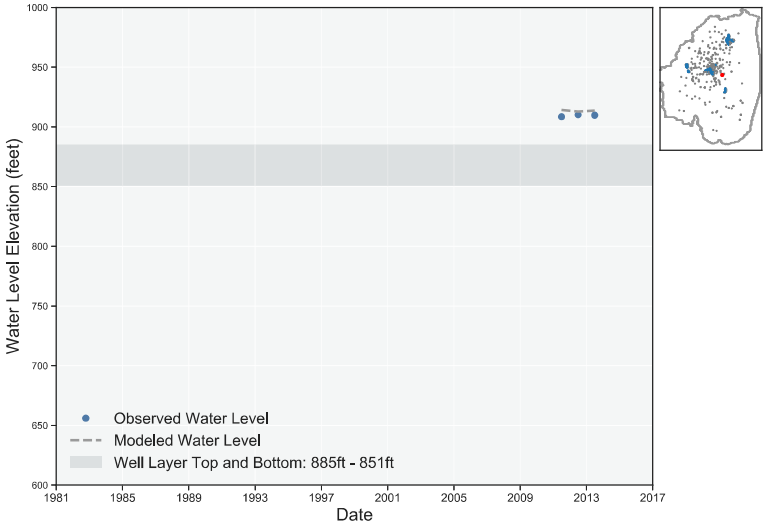
Well 145732 - Aq: OSTP Layers: 5 - 5



Well 448228 - Aq: QBAA Layers: 5 - 5



Well 130876 - Aq: OSTP Layers: 5 - 5



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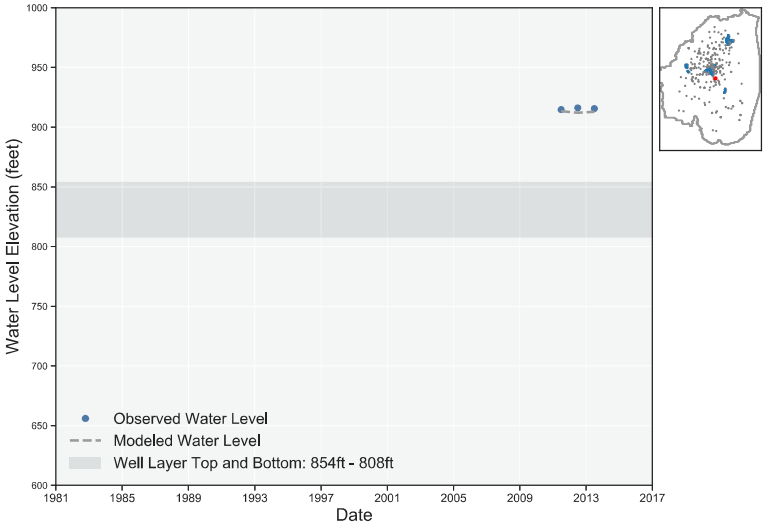
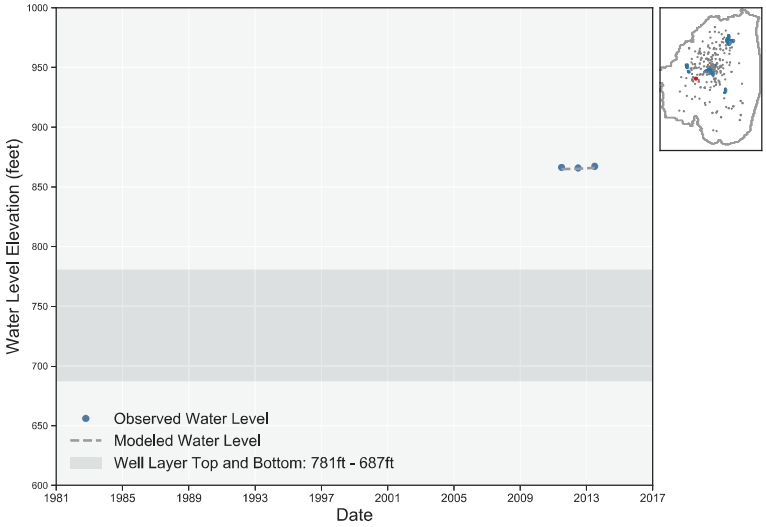


Well 138190 - Aq: OSTP Layers: 5 - 5



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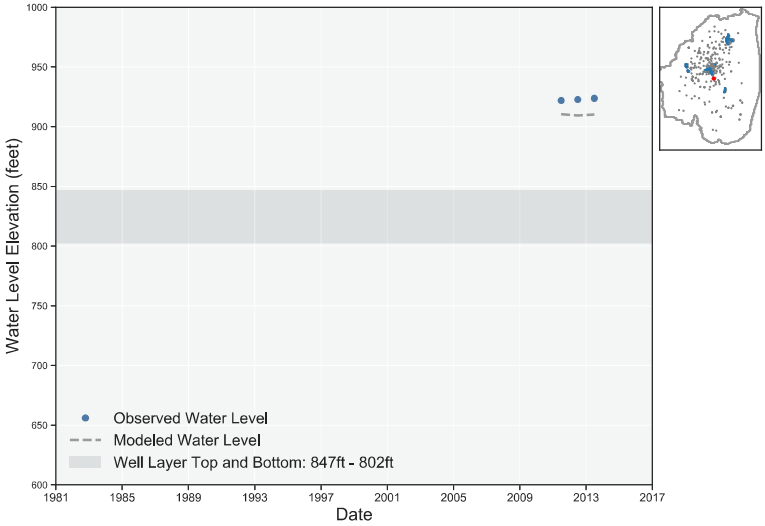
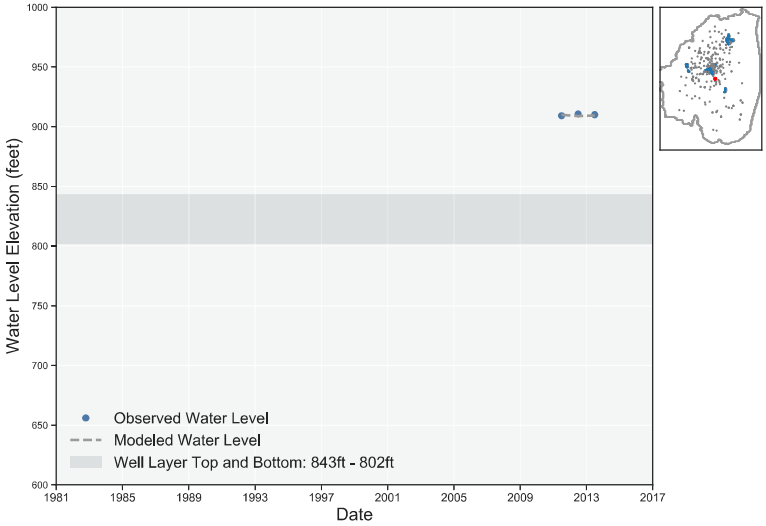
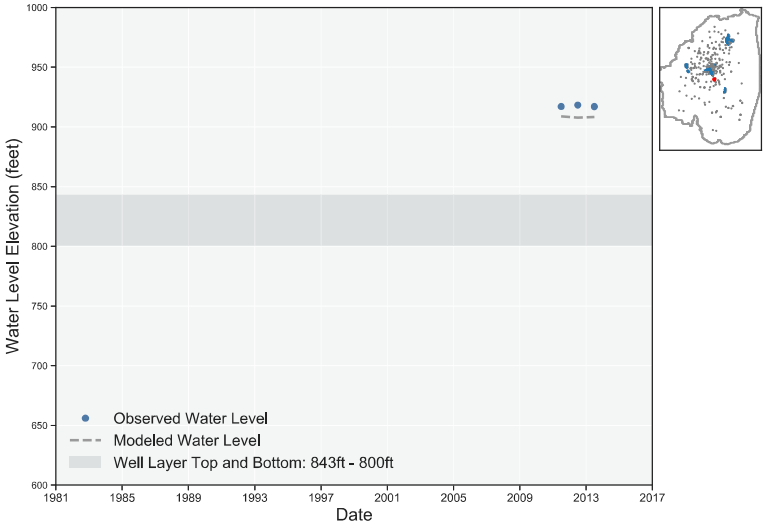


Well 418556 - Aq: OSTP Layers: 5 - 5



Well 127569 - Aq: OSTP Layers: 5 - 5



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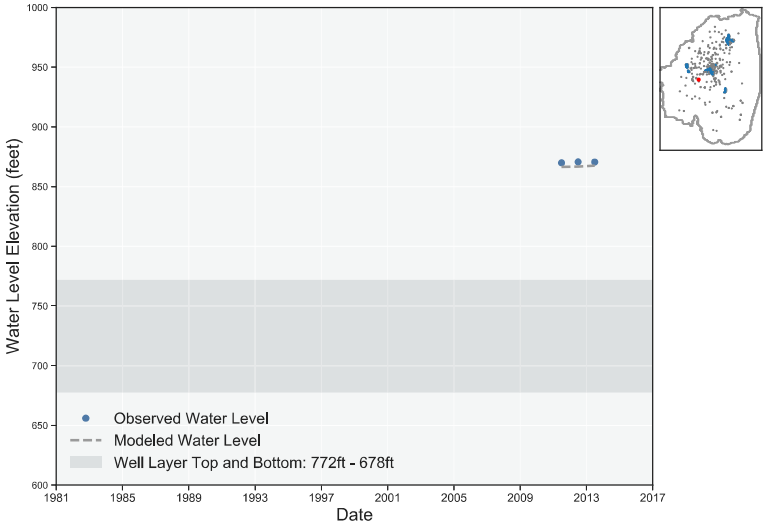

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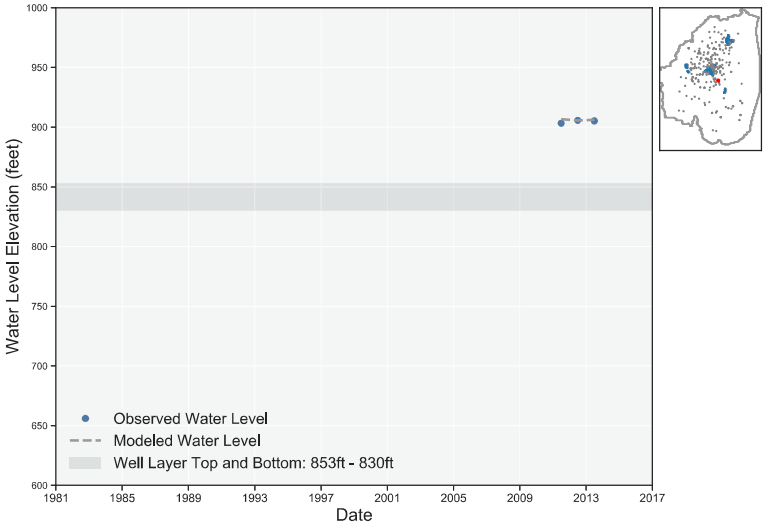

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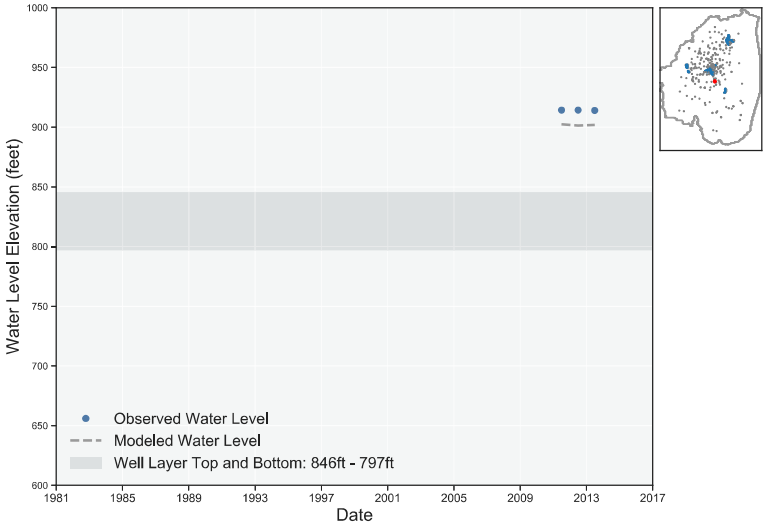

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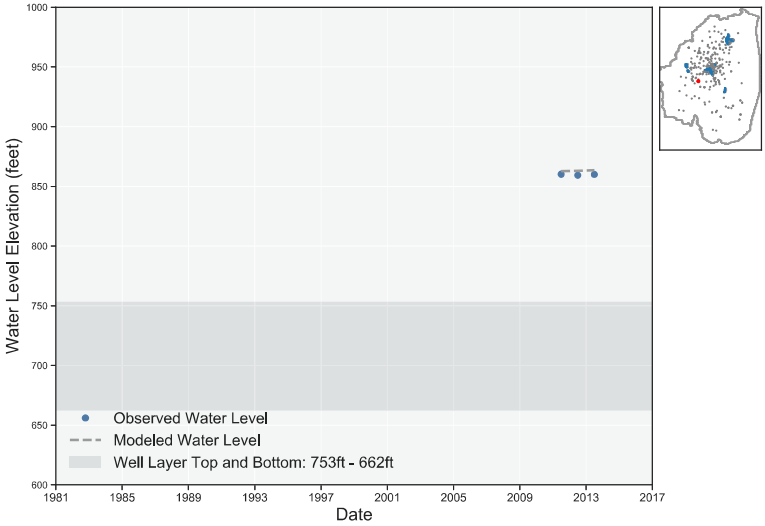
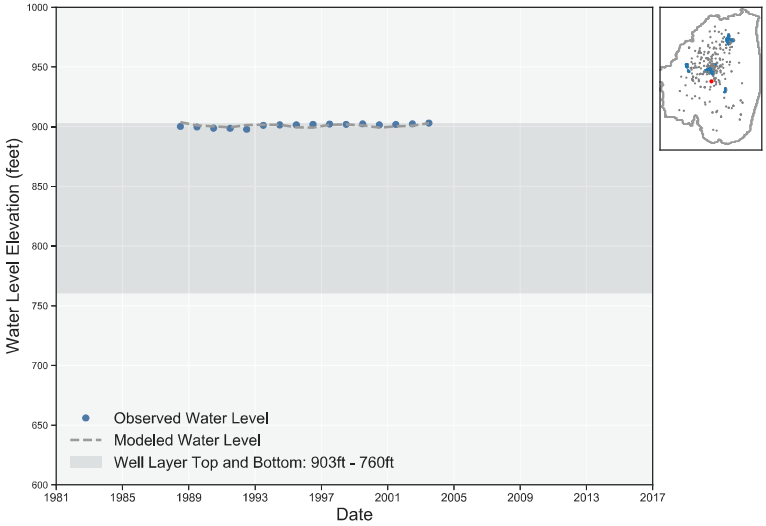


Well 82005 - Aq: OSTP Layers: 5 - 5



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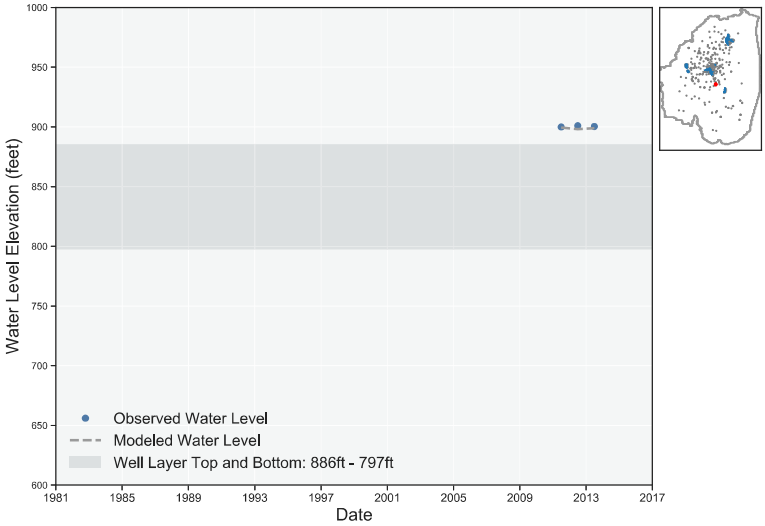
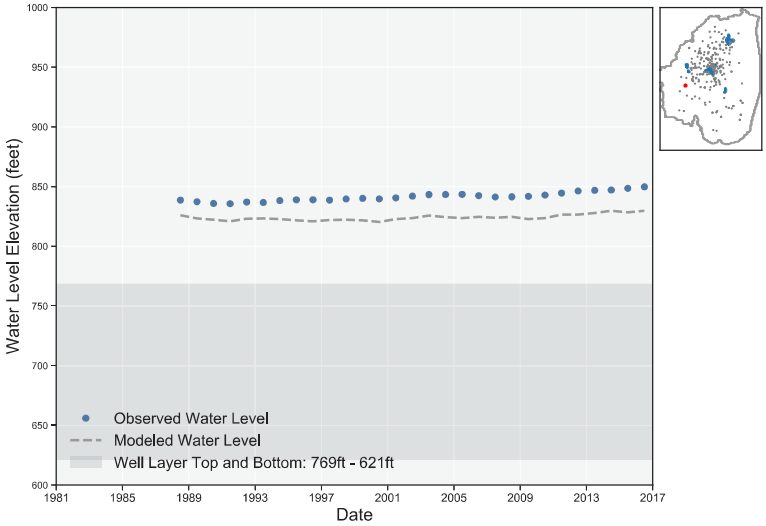
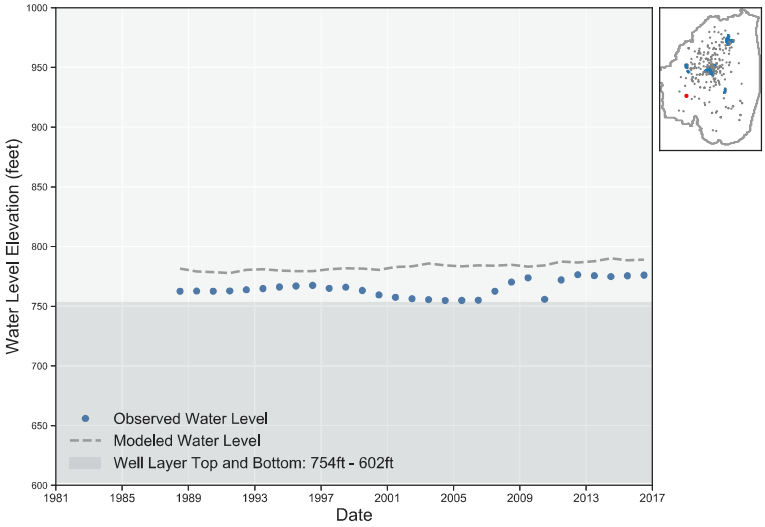


Well 62002 - Aq: OSTP Layers: 5 - 5



Well 62034 - Aq: OSTP Layers: 5 - 5



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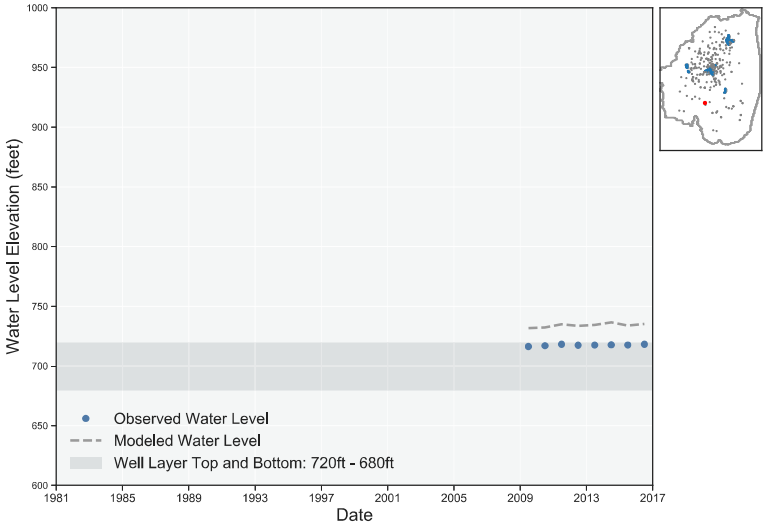

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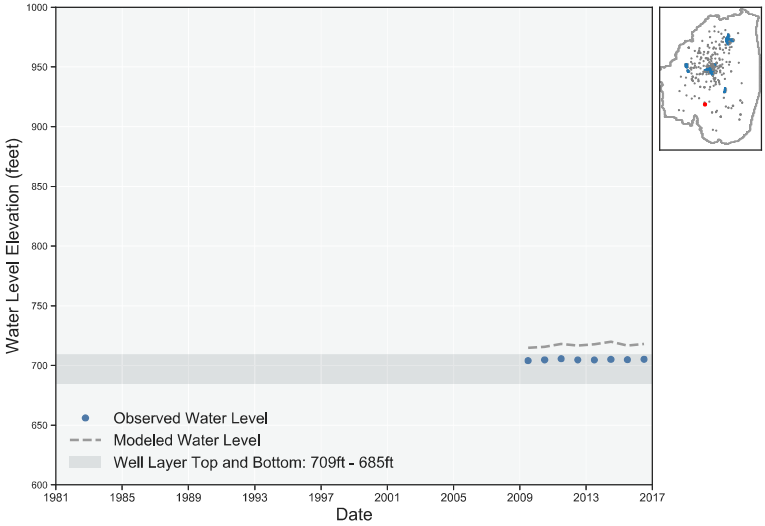
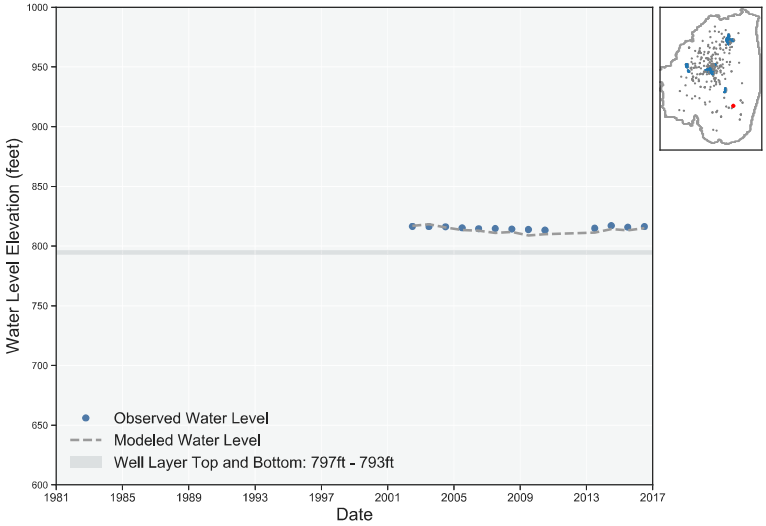
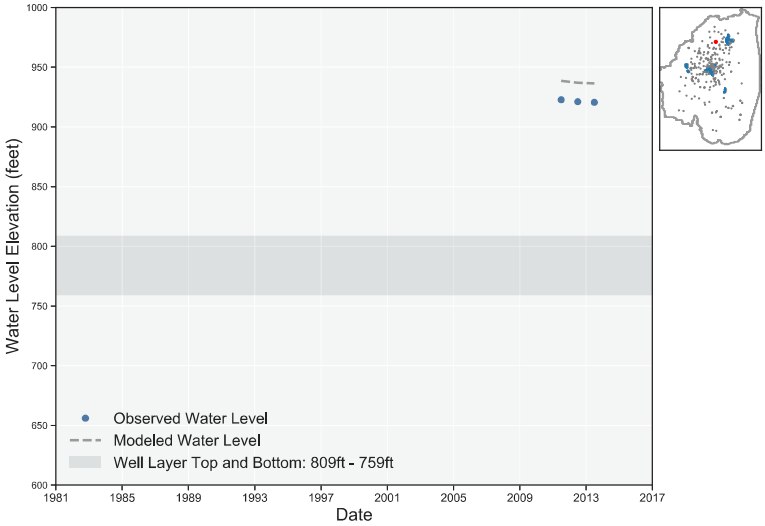


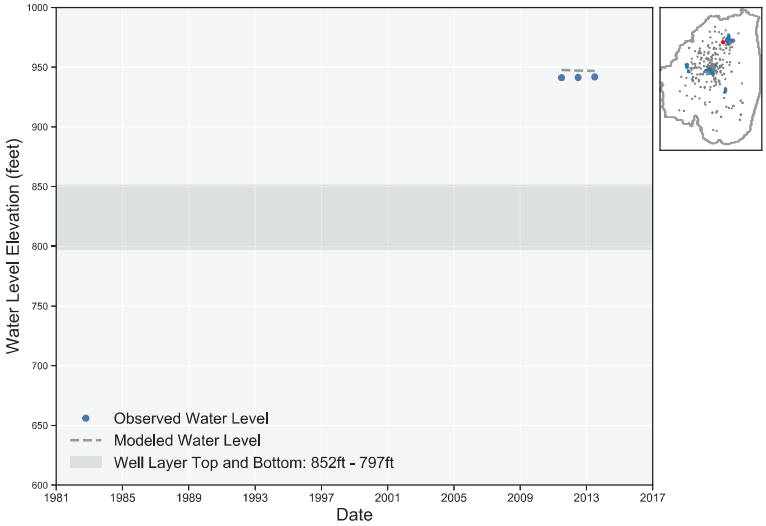
Well 675586 - Aq: QWTA Layers: 5 - 5



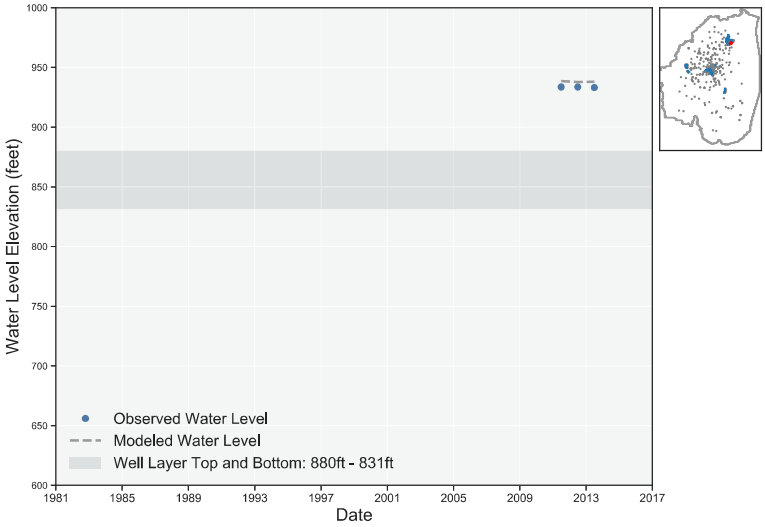
Well 419114 - Aq: OPDC Layers: 6 - 6



Well 411647 - Aq: OPDC Layers: 6 - 6



Well 153473 - Aq: OPDC Layers: 6 - 6



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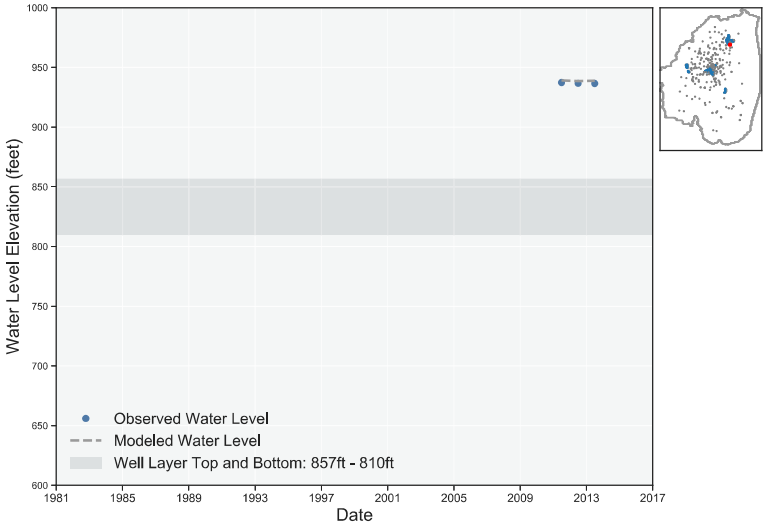
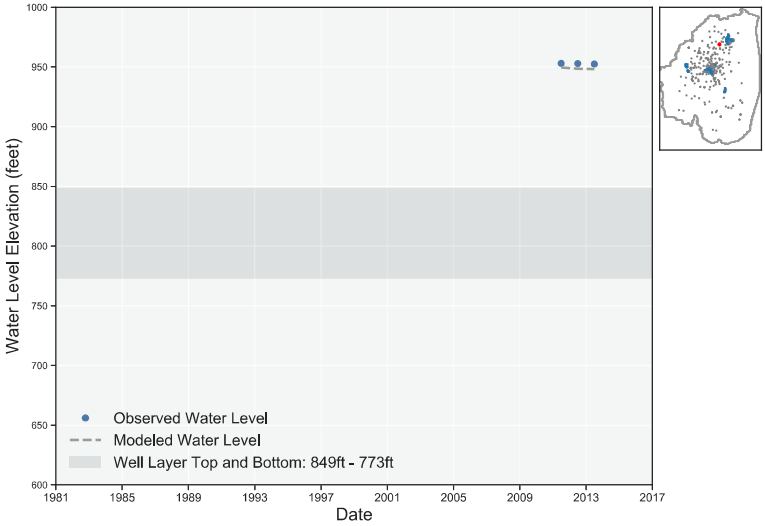
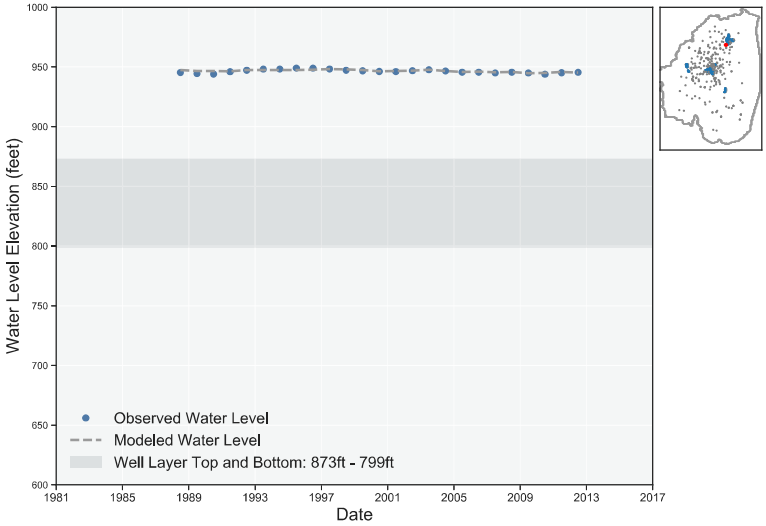


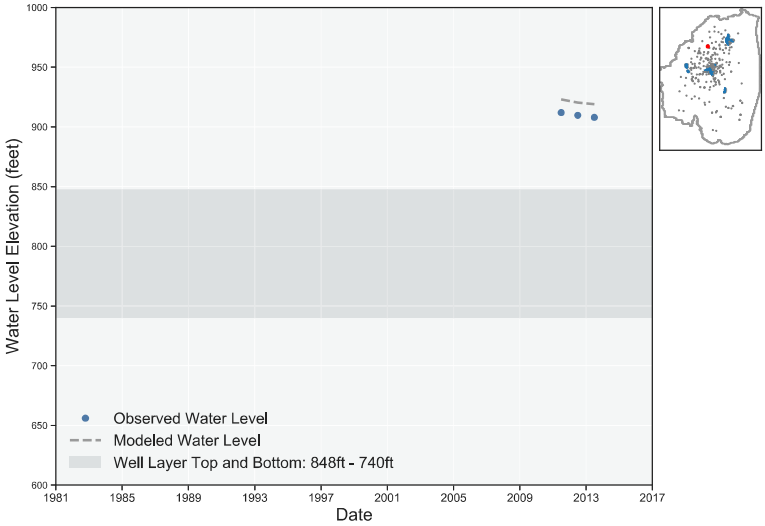
Well 450385 - Aq: OPDC Layers: 6 - 6



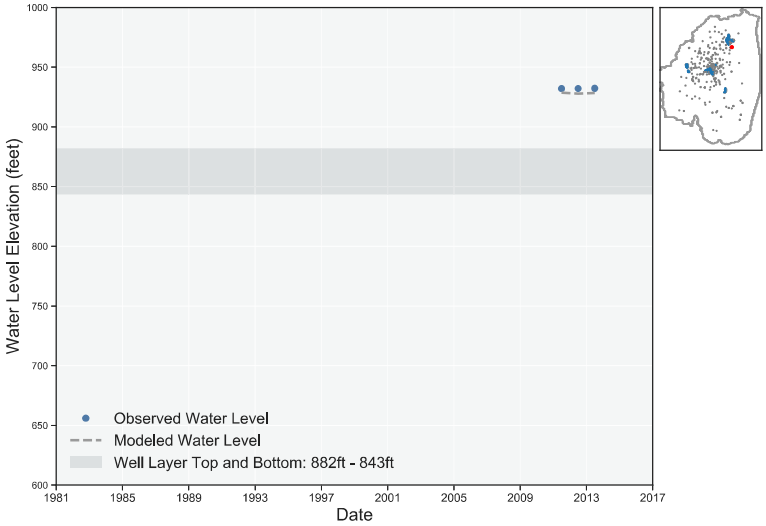
Well 82035 - Aq: OPDC Layers: 6 - 6



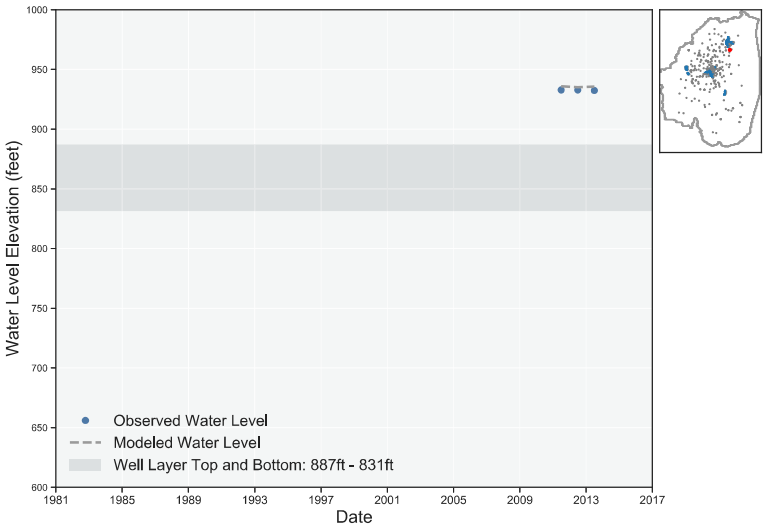
Well 430927 - Aq: OPDC Layers: 6 - 6



Well 435046 - Aq: OPDC Layers: 6 - 6



Well 422349 - Aq: OPDC Layers: 6 - 6



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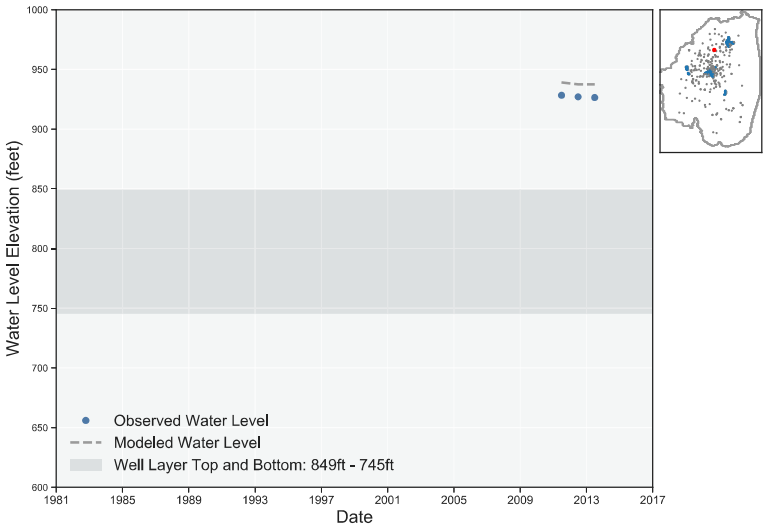
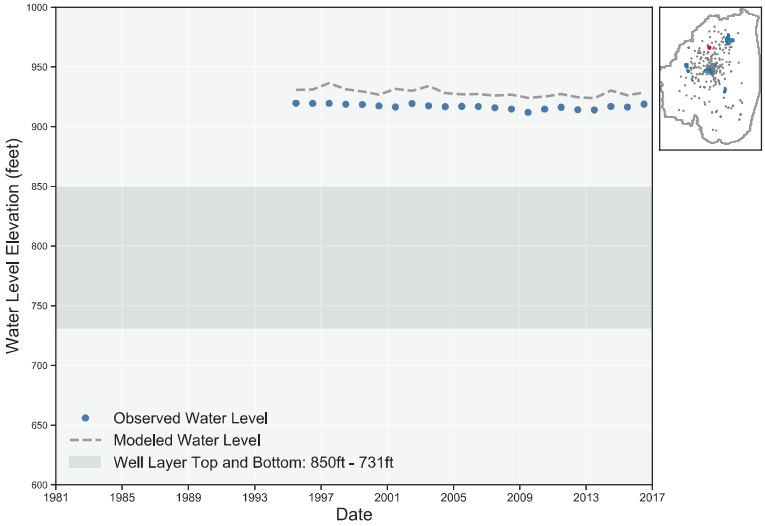
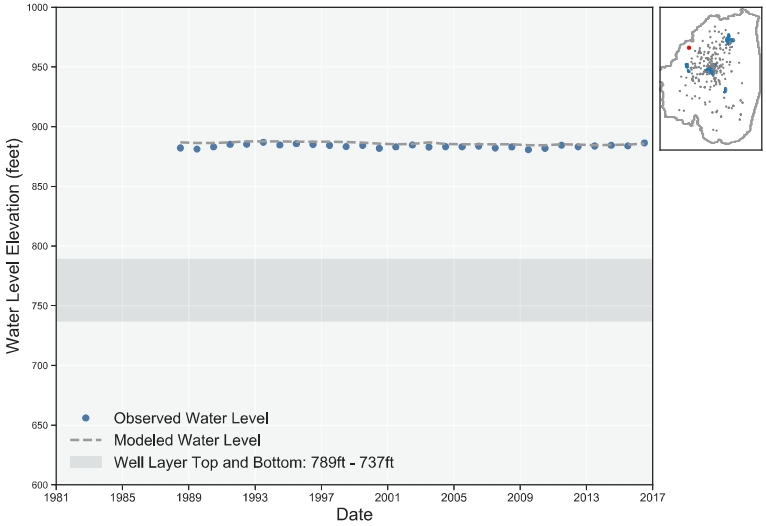


Well 82040 - Aq: OPDC Layers: 6 - 6



Well 2009 - Aq: QBAA Layers: 6 - 6



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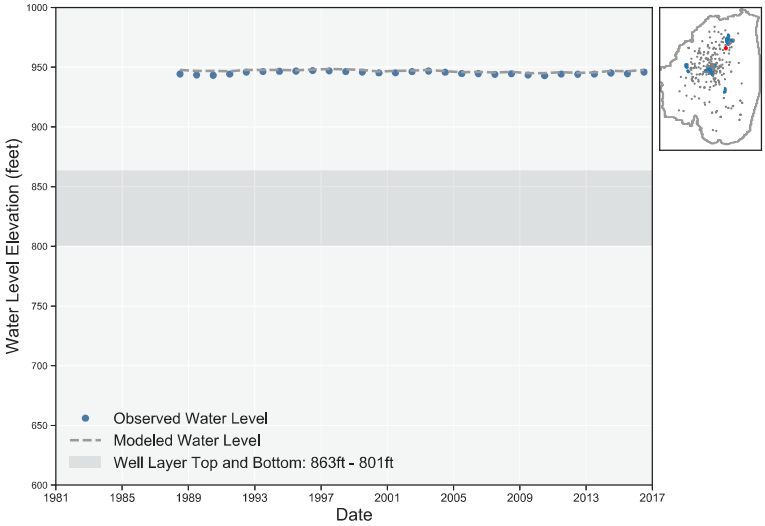
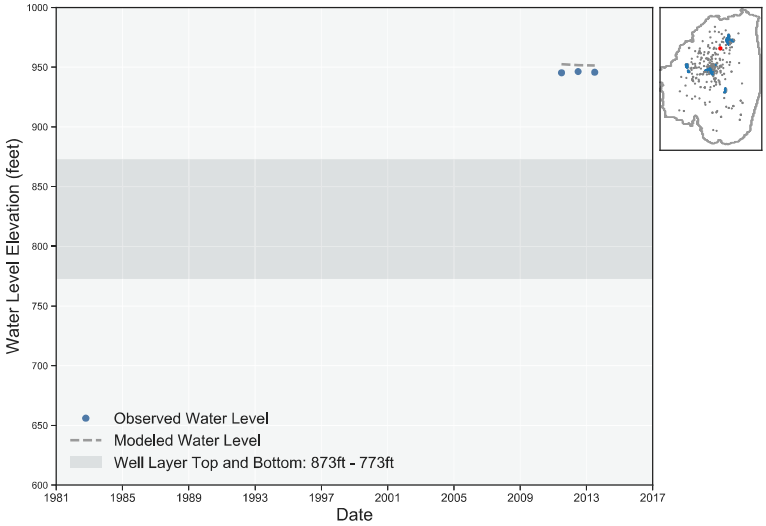
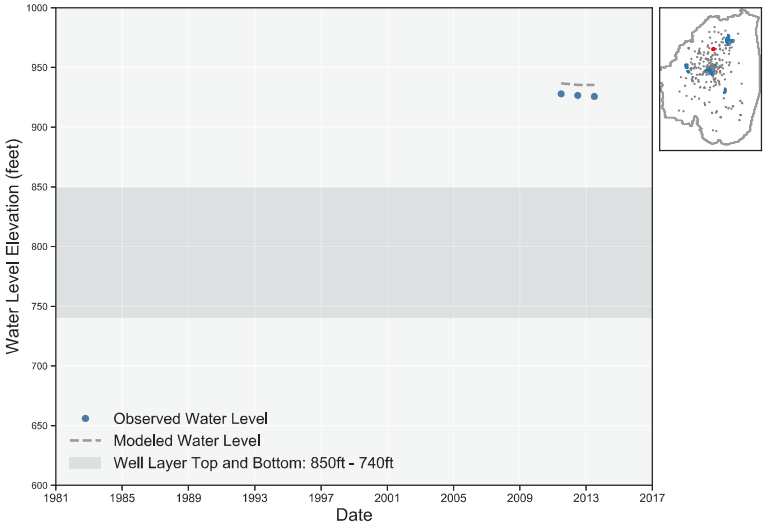


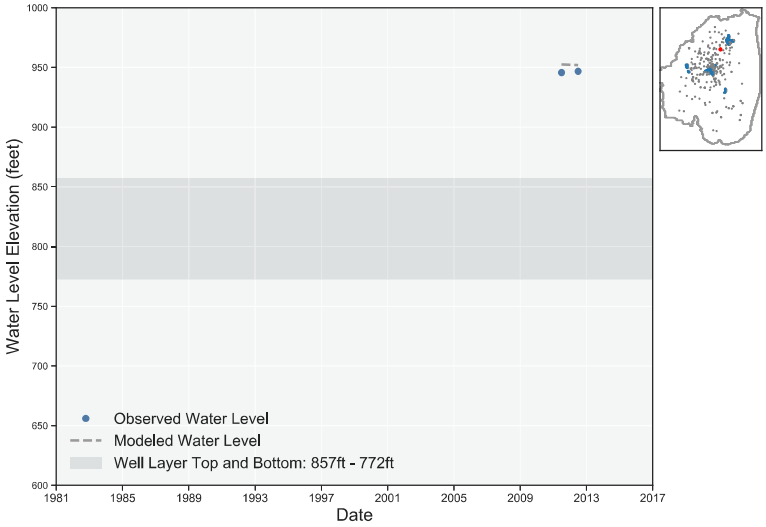
Well 196935 - Aq: OPDC Layers: 6 - 6



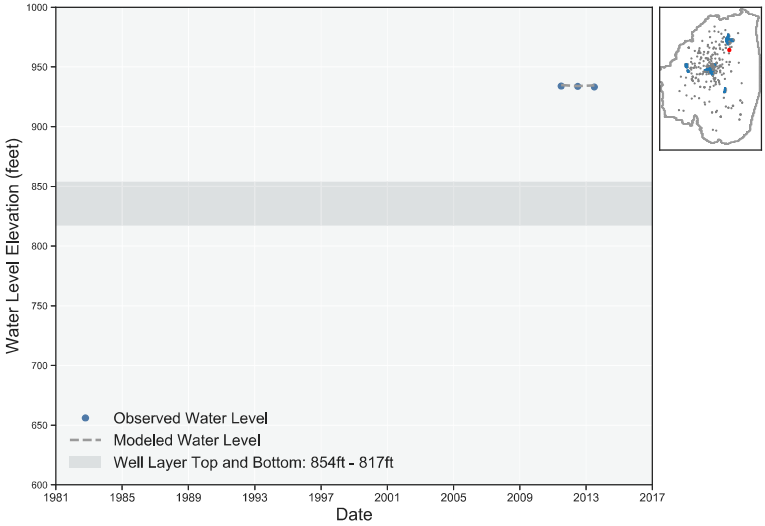
Well 110526 - Aq: OPDC Layers: 6 - 6



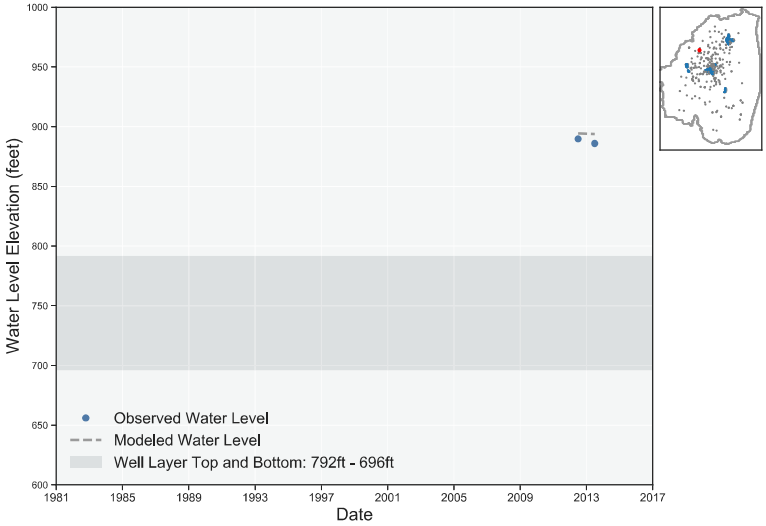
Well 418593 - Aq: OPDC Layers: 6 - 6



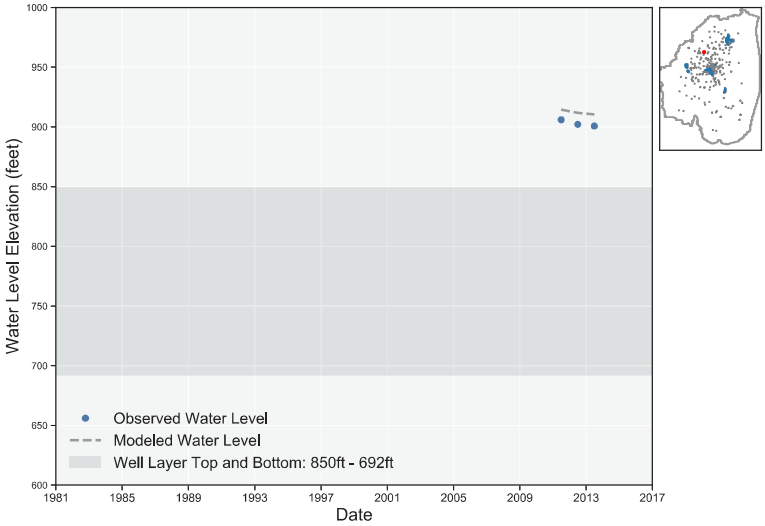
Well 430399 - Aq: OPDC Layers: 6 - 6



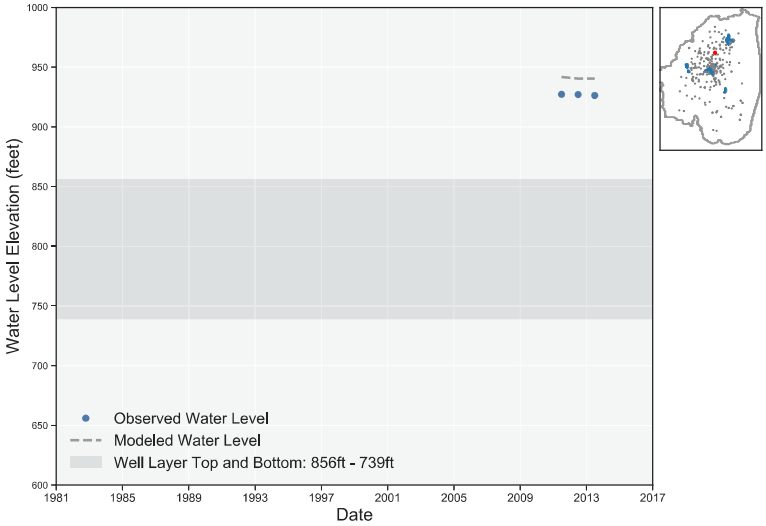
Well 188272 - Aq: OPDC Layers: 6 - 6



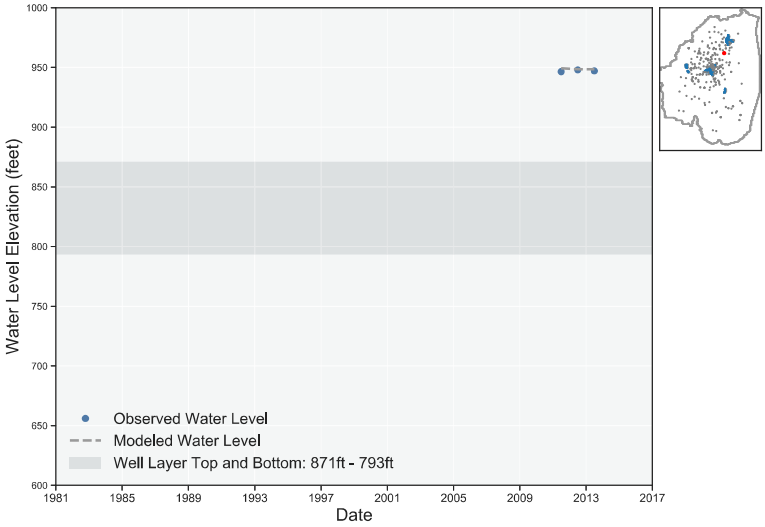
Well 524745 - Aq: OPDC Layers: 6 - 6



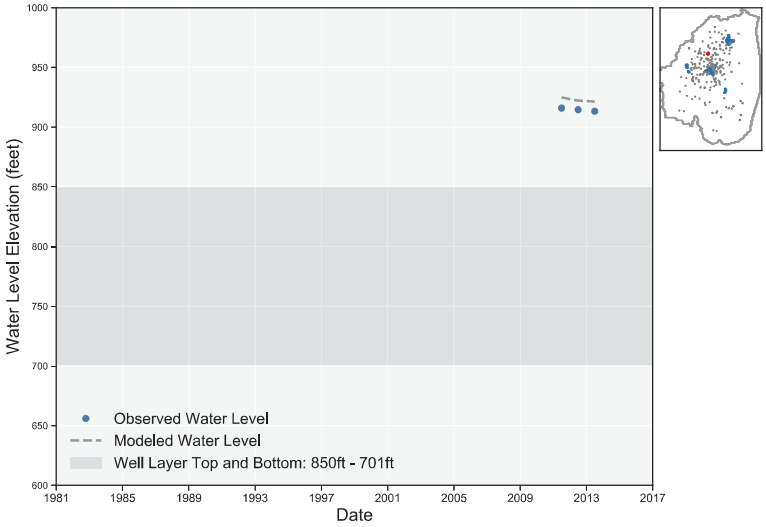
Well 558224 - Aq: OPDC Layers: 6 - 6



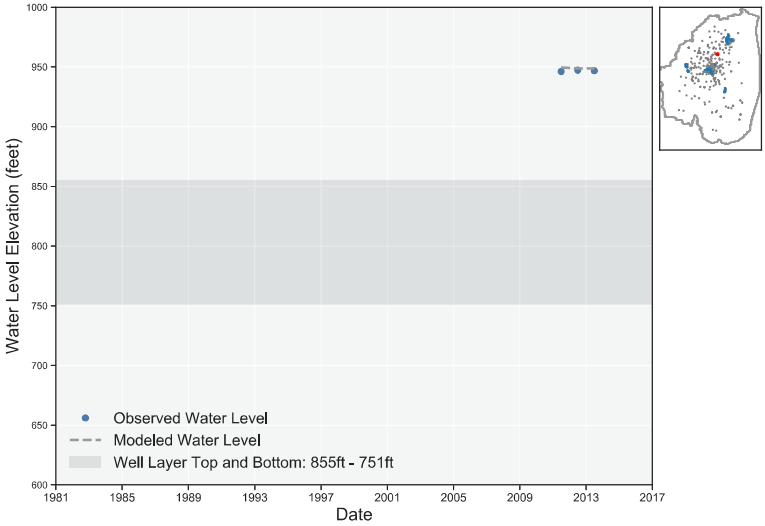
Well 420630 - Aq: OPDC Layers: 6 - 6



Well 427681 - Aq: OPDC Layers: 6 - 6

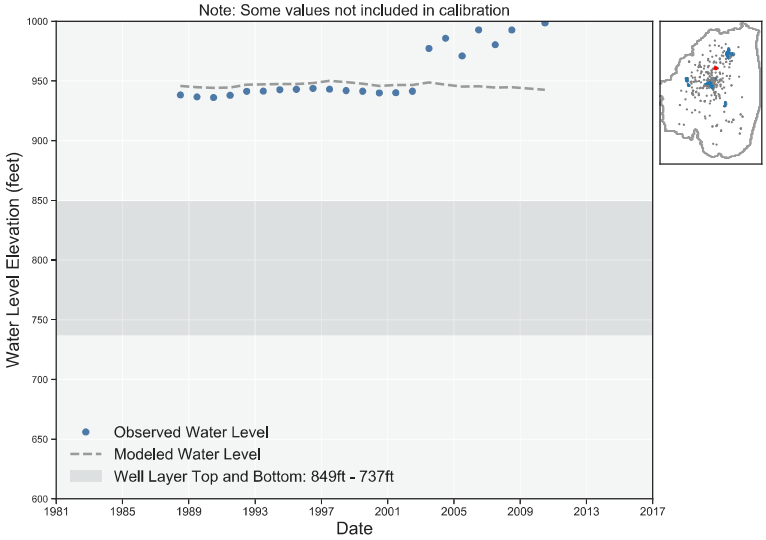


Well 430550 - Aq: OPDC Layers: 6 - 6

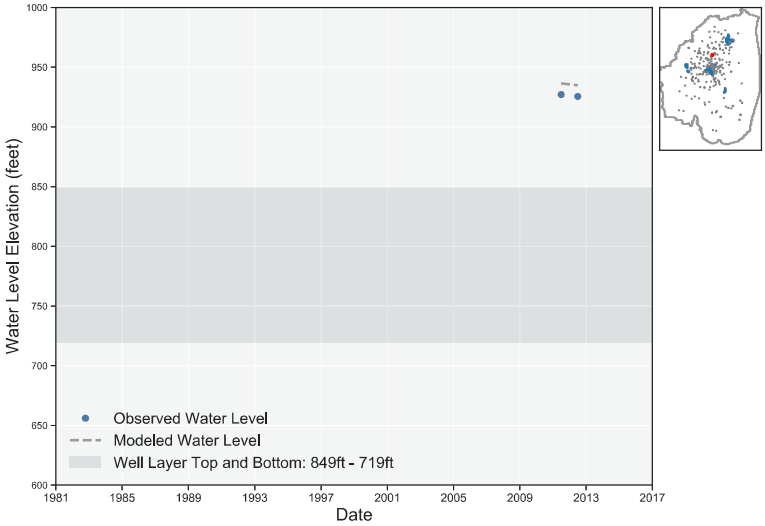


Well 82032 - Aq: OPDC Layers: 6 - 6

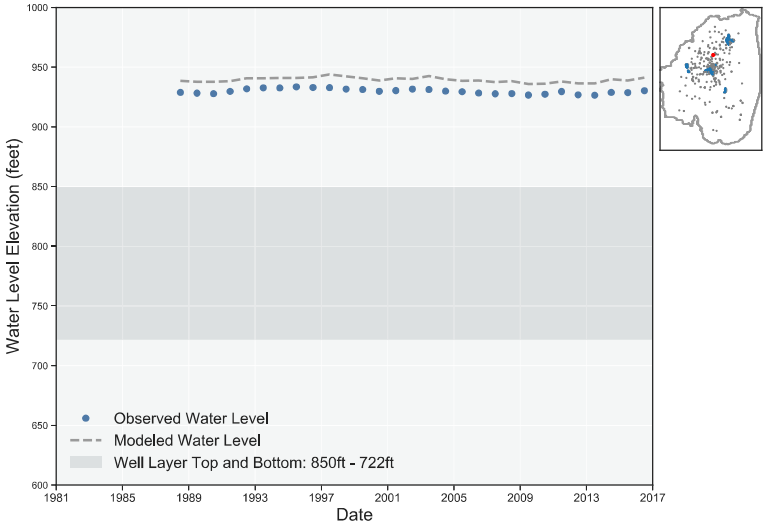
Note: Some values not included in calibration



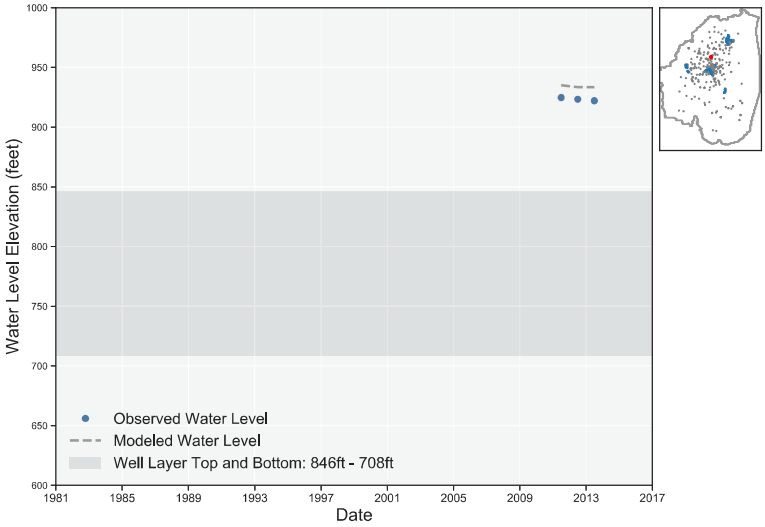
Well 713255 - Aq: OPDC Layers: 6 - 6



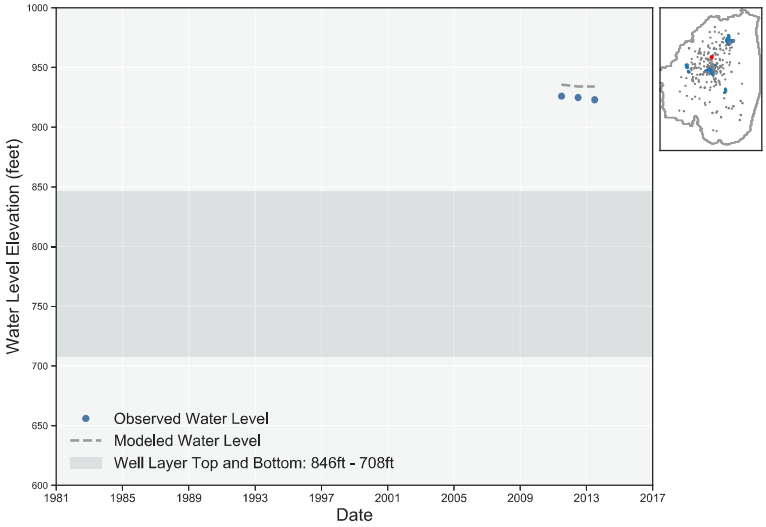
Well 82029 - Aq: OPDC Layers: 6 - 6



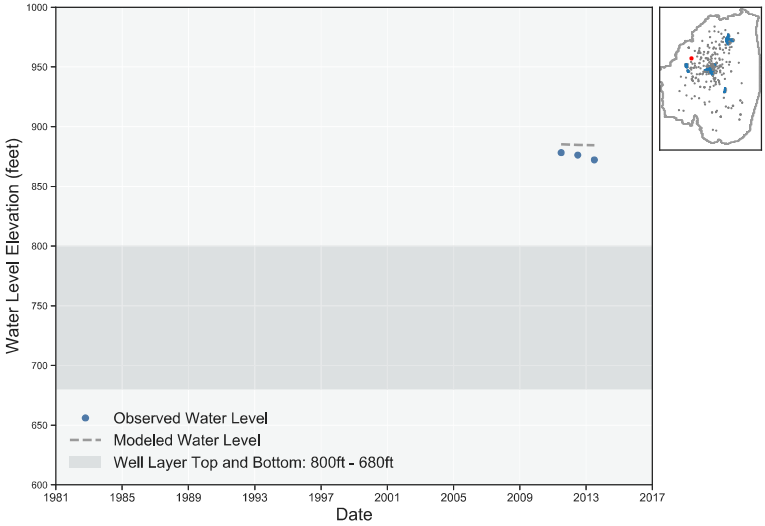
Well 141730 - Aq: OPDC Layers: 6 - 6



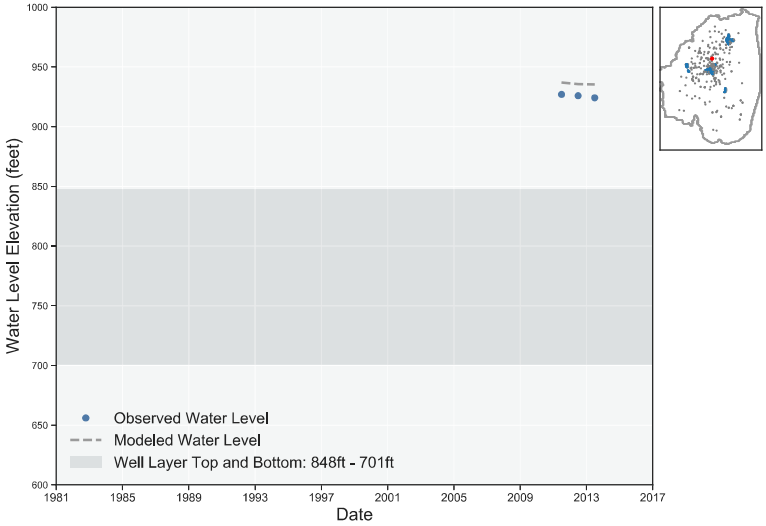
Well 138120 - Aq: OPDC Layers: 6 - 6



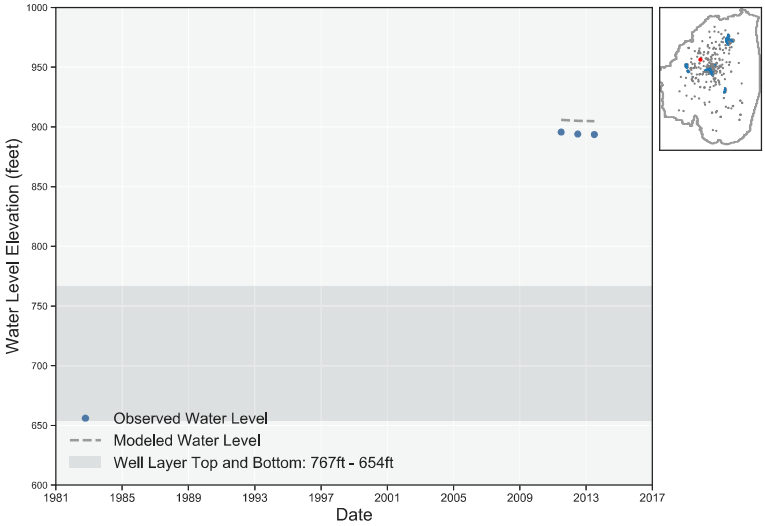
Well 170633 - Aq: OPDC Layers: 6 - 6



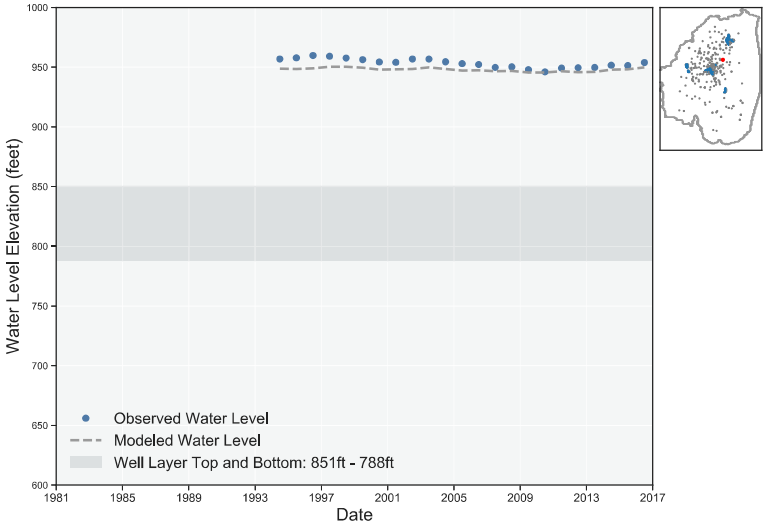
Well 439243 - Aq: OPDC Layers: 6 - 6



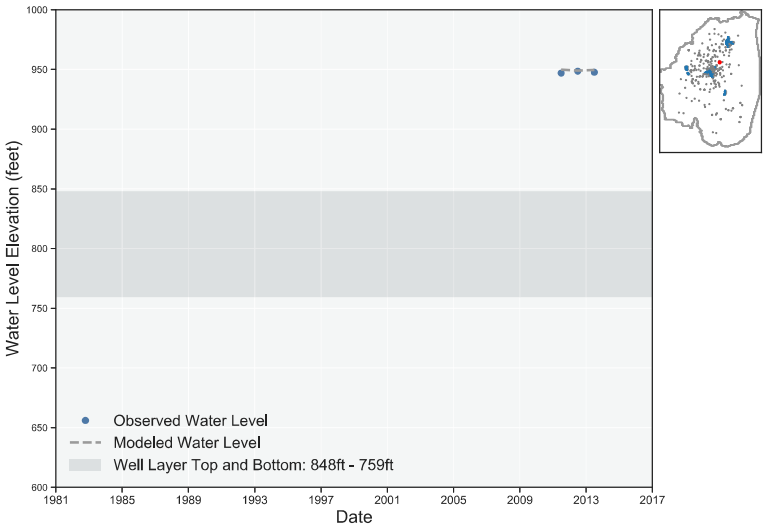
Well 138399 - Aq: OPDC Layers: 6 - 6



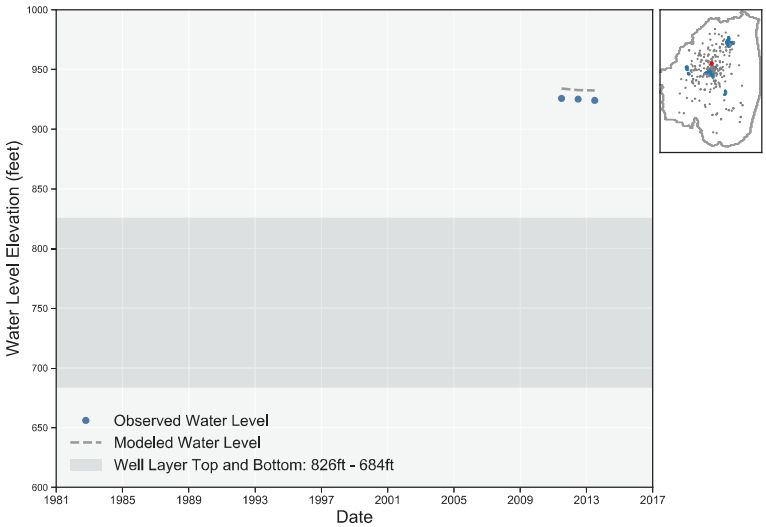
Well 82039 - Aq: OPDC Layers: 6 - 6



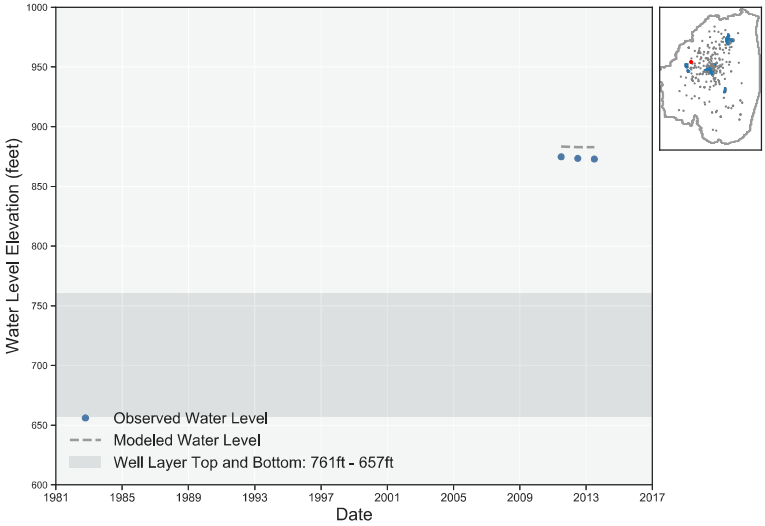
Well 413669 - Aq: OPDC Layers: 6 - 6



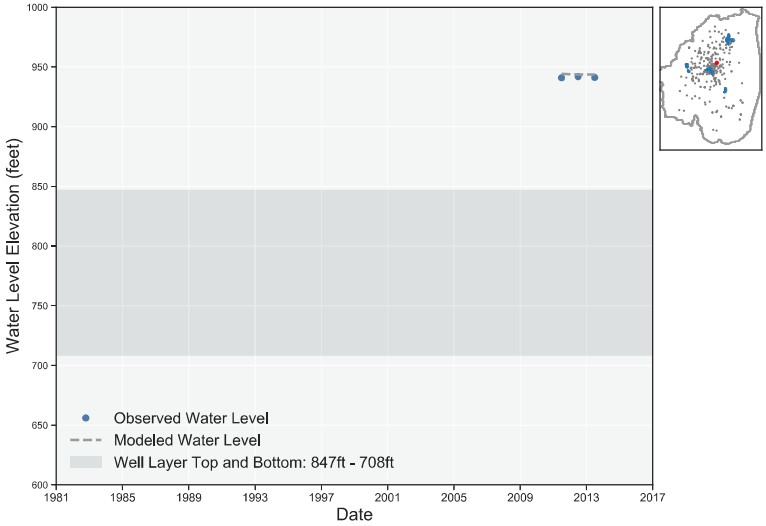
Well 546305 - Aq: OPDC Layers: 6 - 6



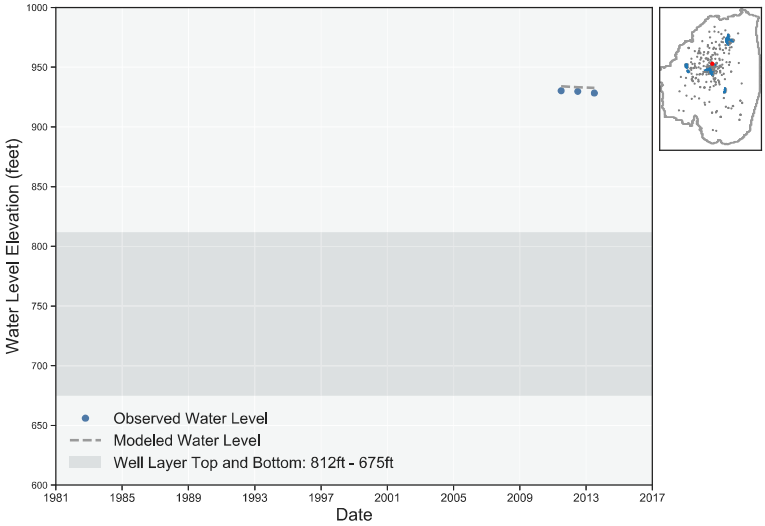
Well 512346 - Aq: OPDC Layers: 6 - 6



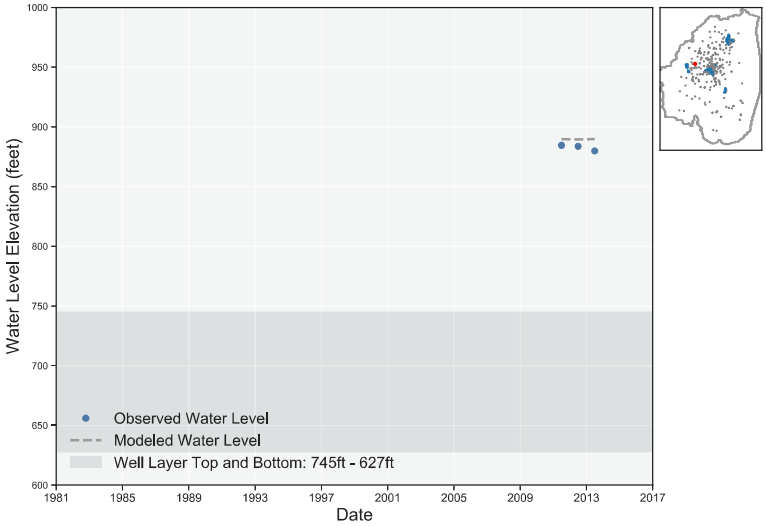
Well 139277 - Aq: OPDC Layers: 6 - 6



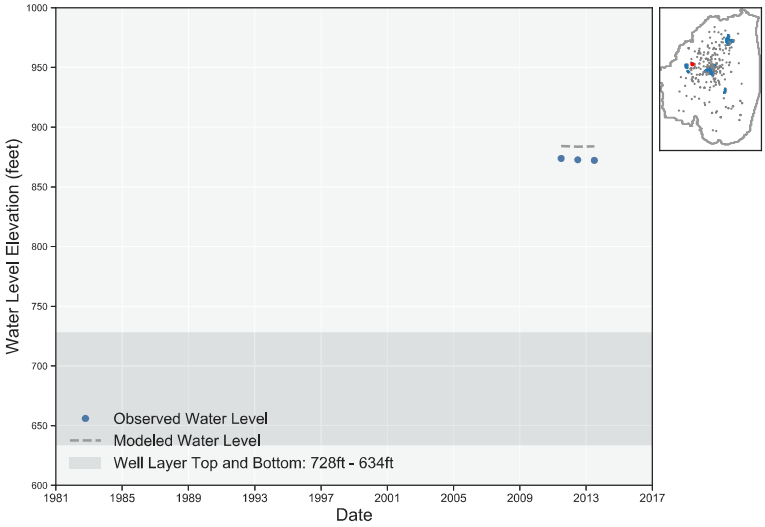
Well 436559 - Aq: OPDC Layers: 6 - 6



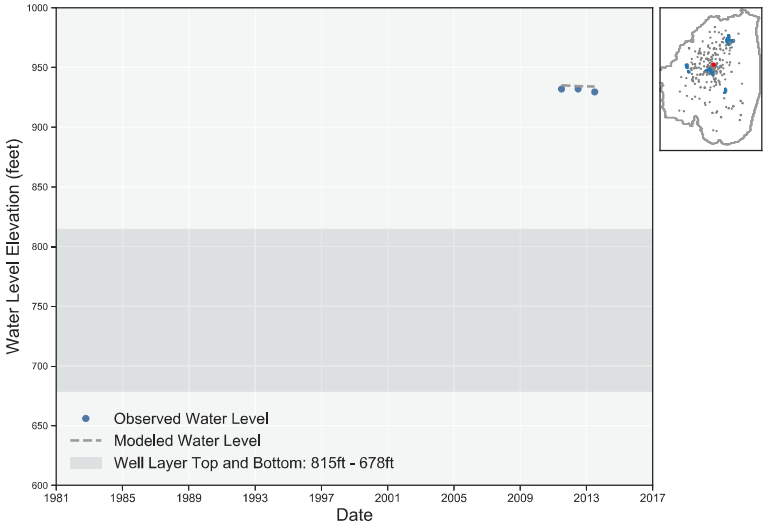
Well 205700 - Aq: OPDC Layers: 6 - 6



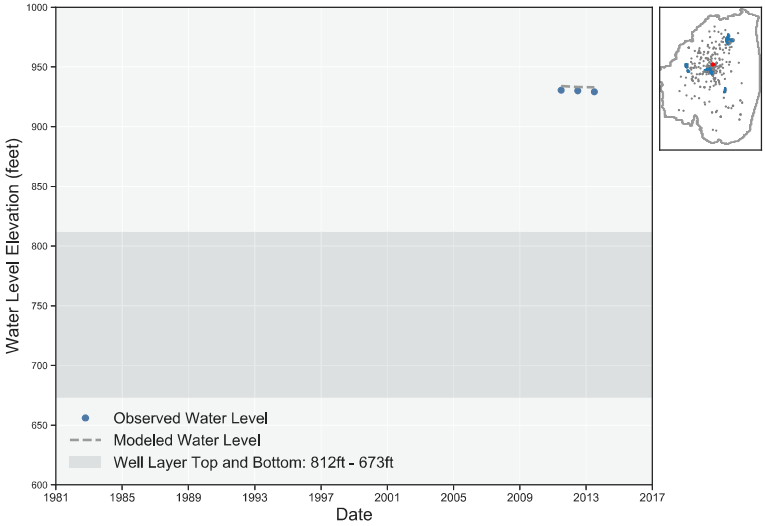
Well 521812 - Aq: OPDC Layers: 6 - 6



Well 418562 - Aq: OPDC Layers: 6 - 6



Well 421207 - Aq: OPDC Layers: 6 - 6



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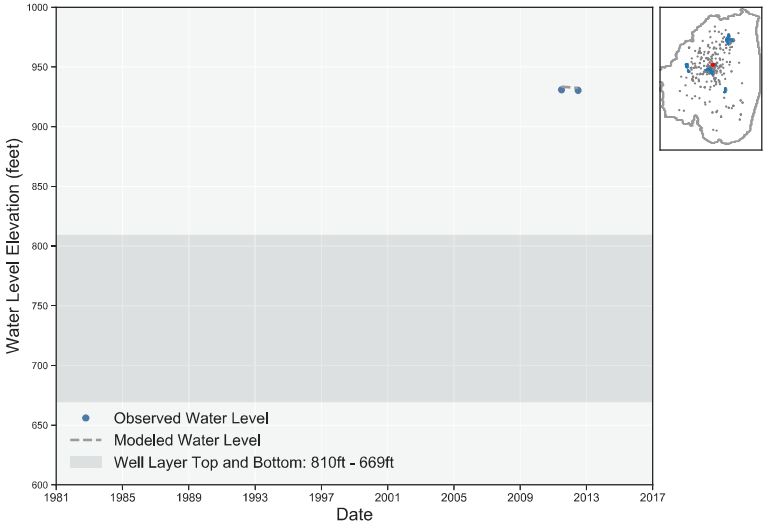
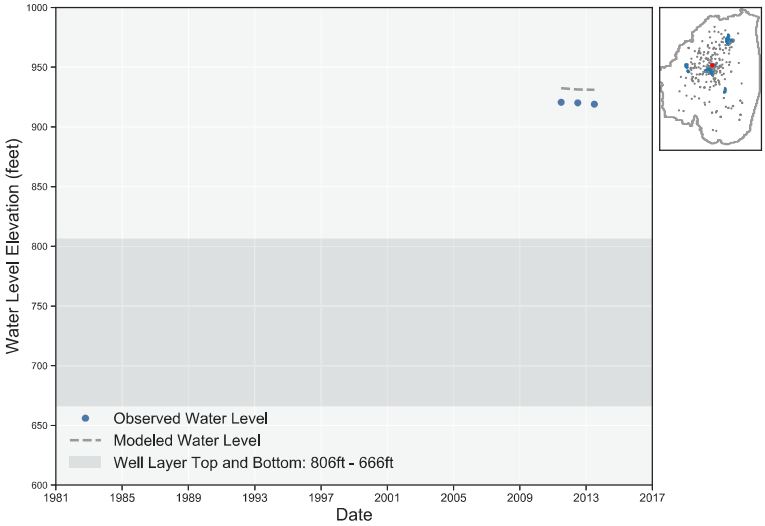


Well 427888 - Aq: OPDC Layers: 6 - 6



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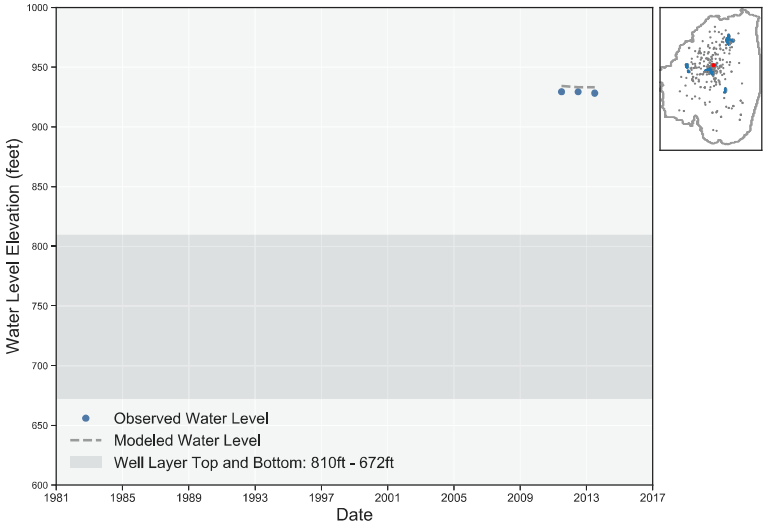
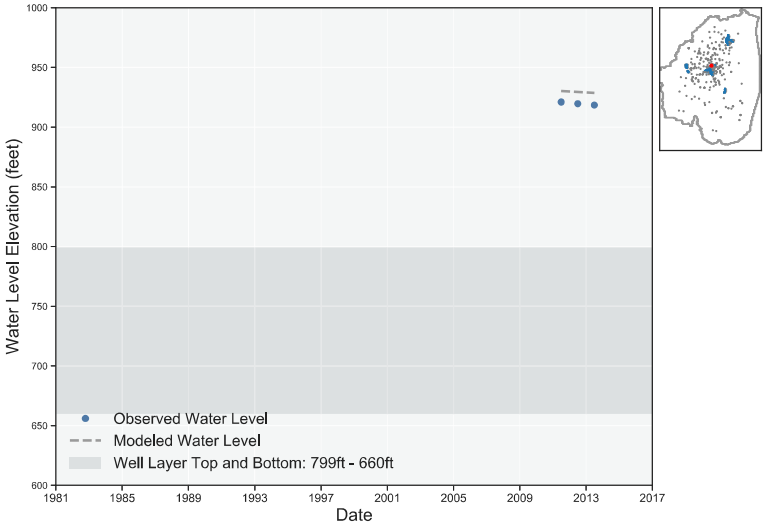
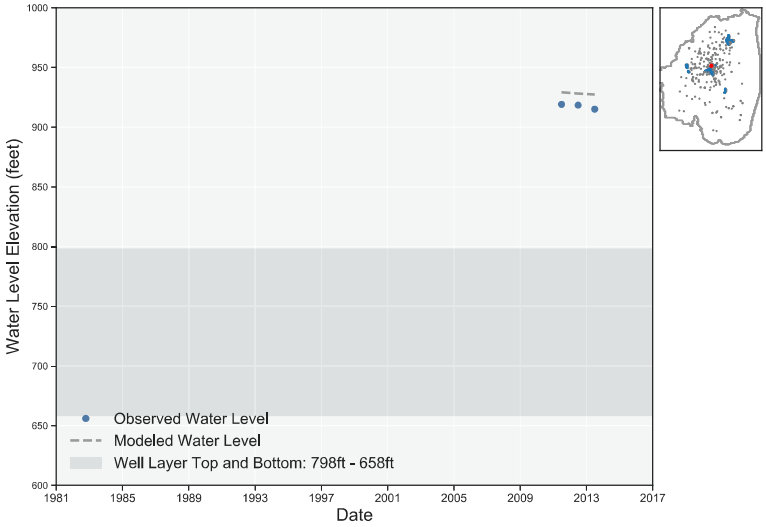


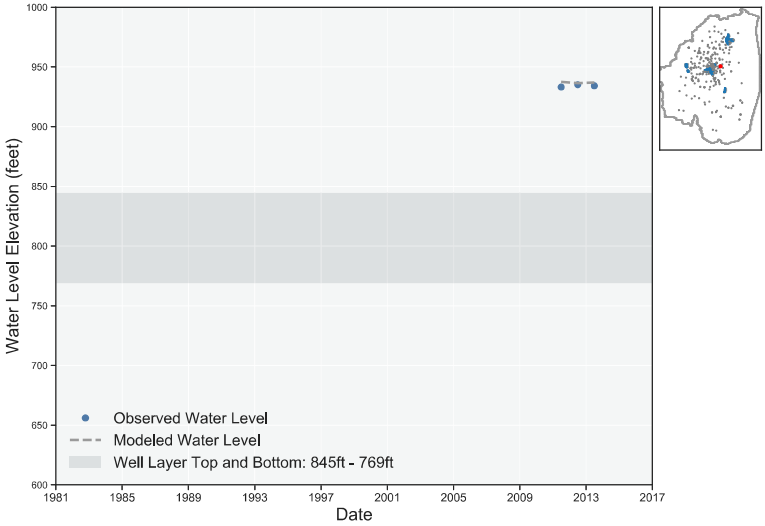
Well 208473 - Aq: OPDC Layers: 6 - 6



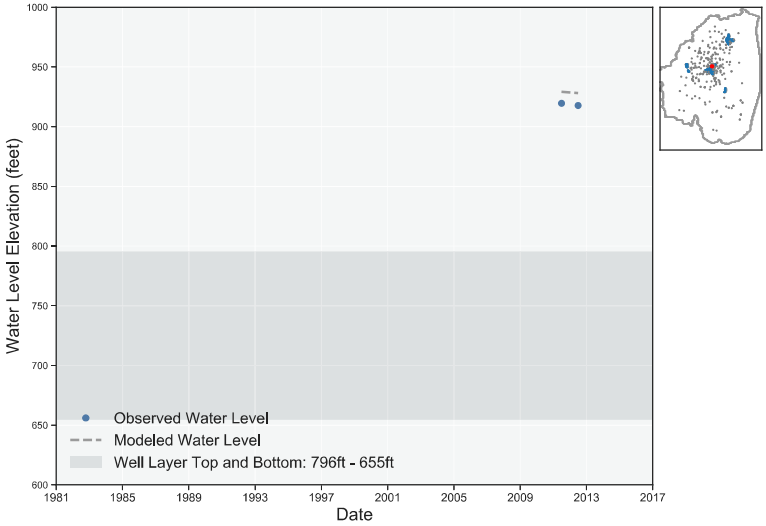
Well 450573 - Aq: OPDC Layers: 6 - 6



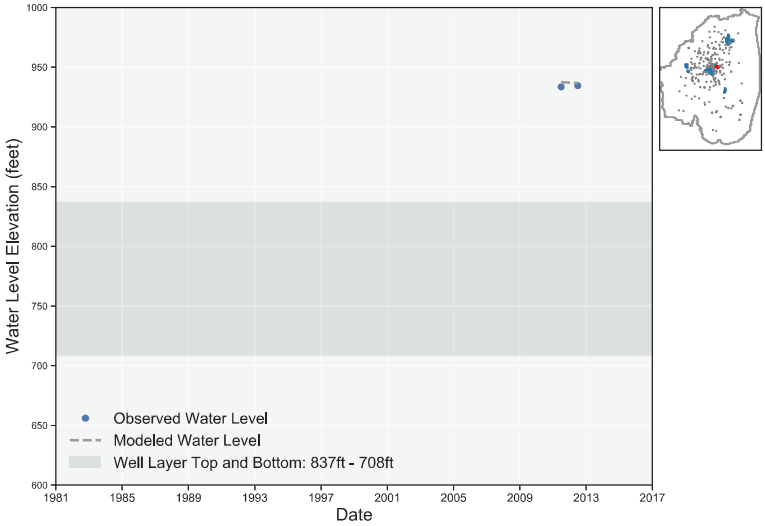
Well 182782 - Aq: OPDC Layers: 6 - 6



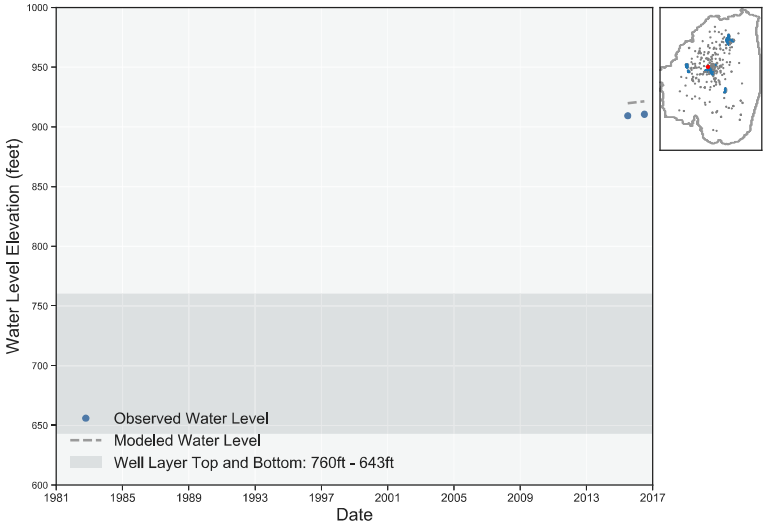
Well 182763 - Aq: OPDC Layers: 6 - 6



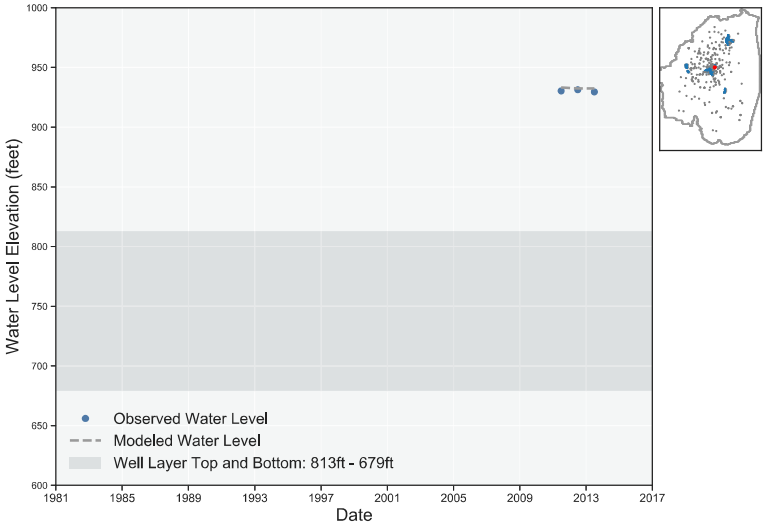
Well 430520 - Aq: OPDC Layers: 6 - 6



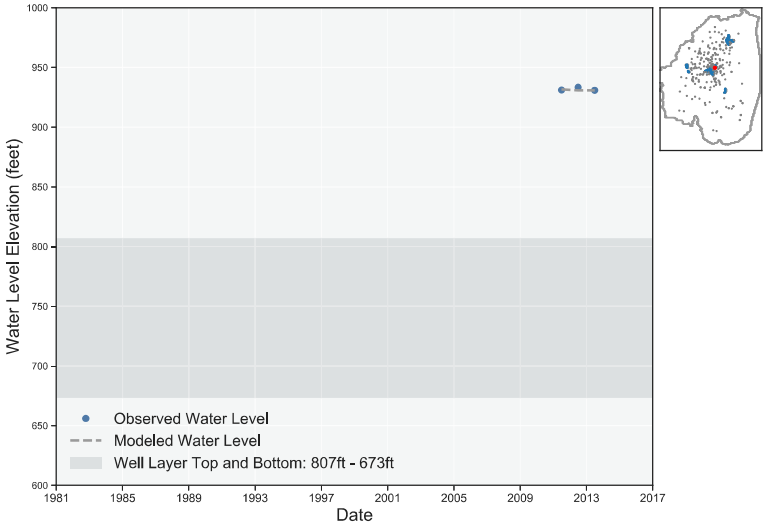
Well 62053 - Aq: CJDN Layers: 6 - 6



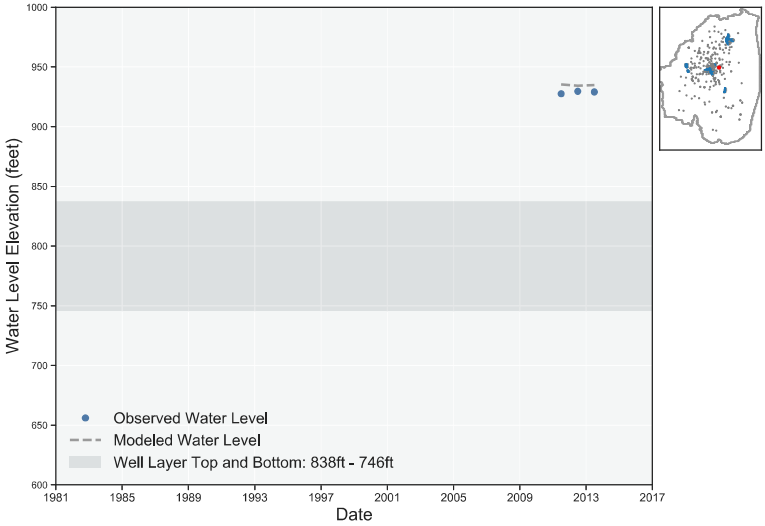
Well 195679 - Aq: OPDC Layers: 6 - 6



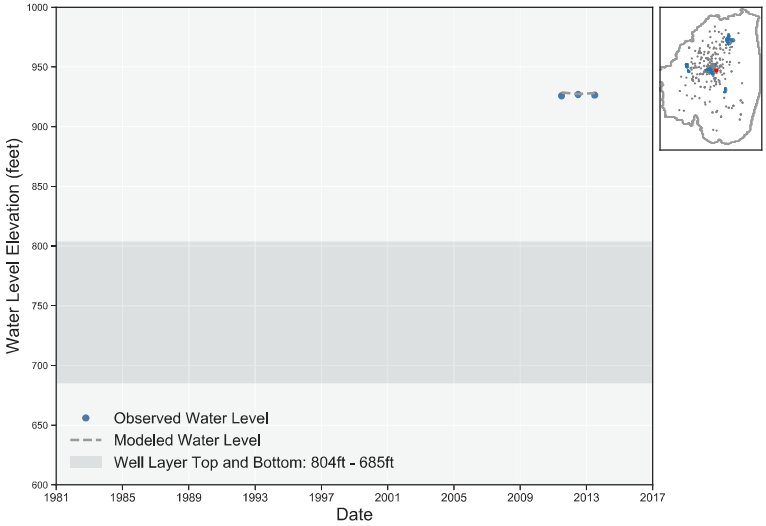
Well 207398 - Aq: OPDC Layers: 6 - 6



Well 404147 - Aq: OPDC Layers: 6 - 6



Well 420312 - Aq: OPDC Layers: 6 - 6



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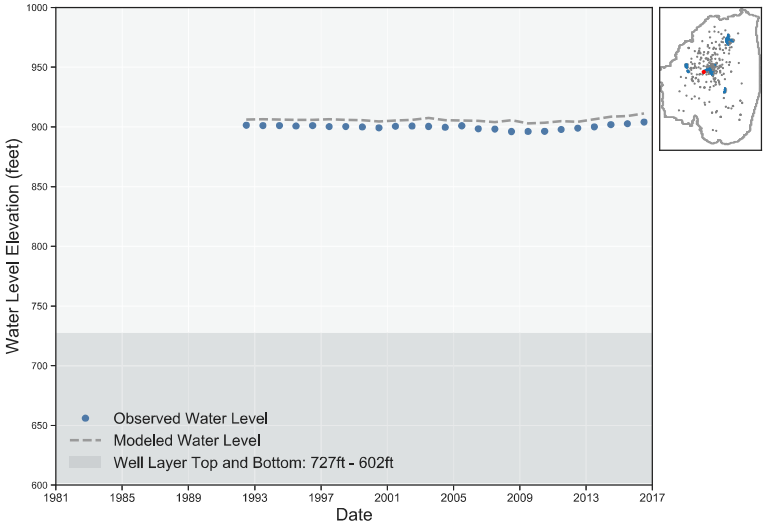
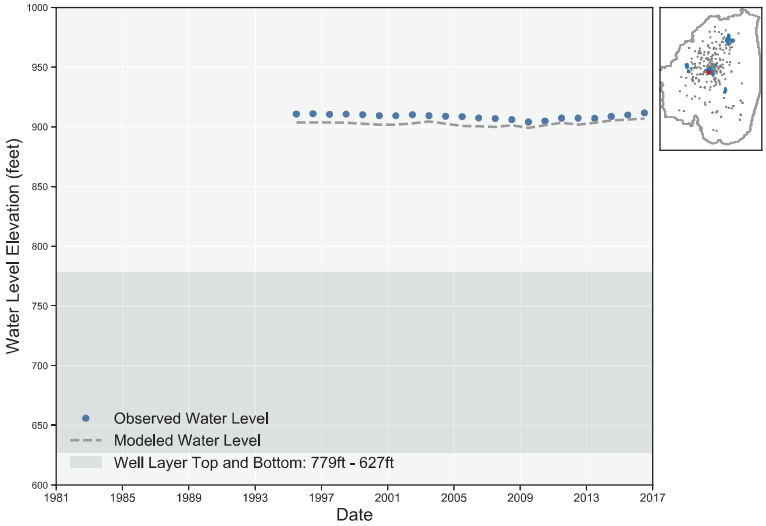
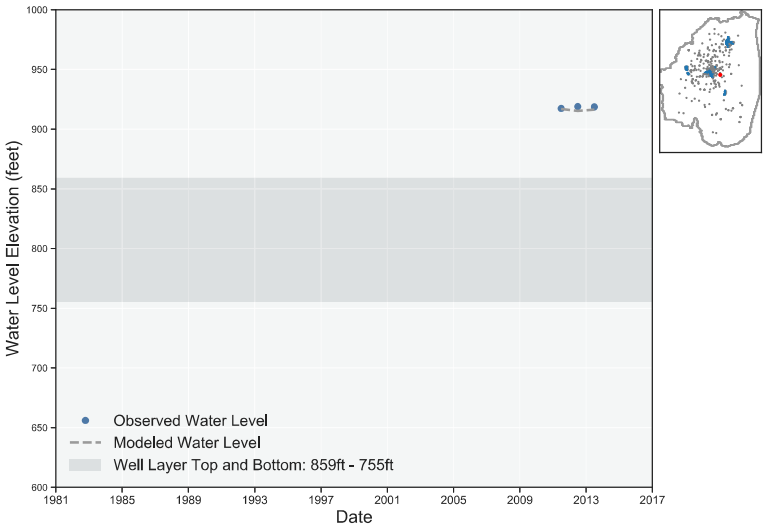


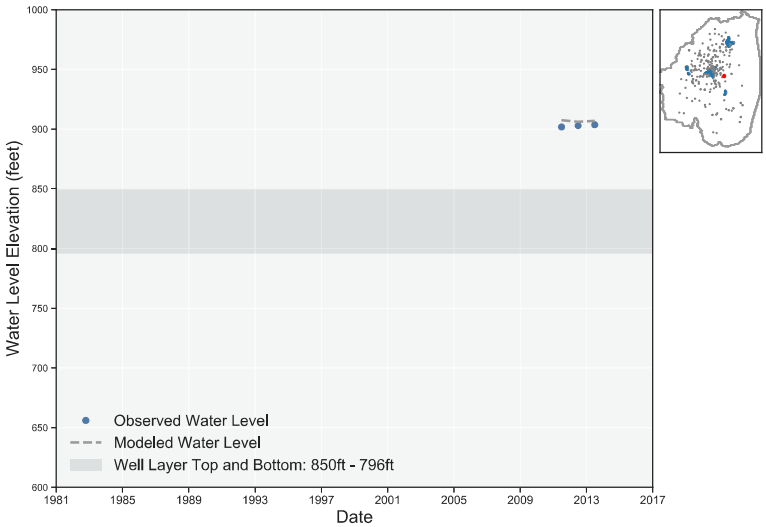
Well 62044 - Aq: OPDC Layers: 6 - 6



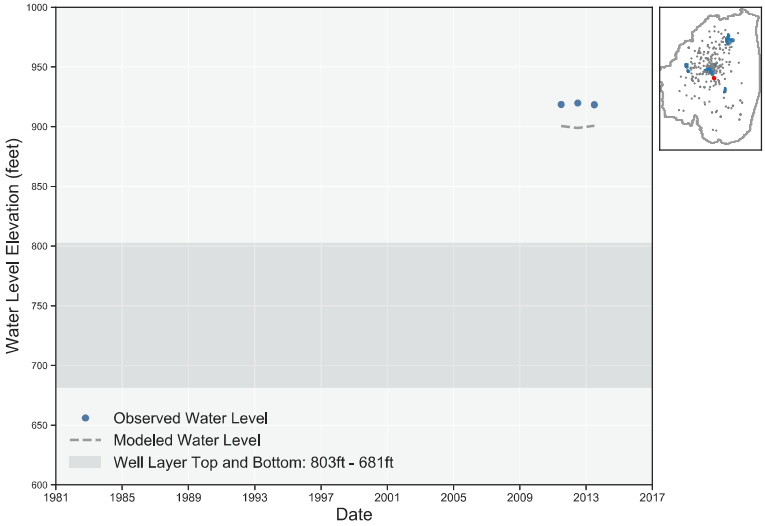
Well 435121 - Aq: OPDC Layers: 6 - 6



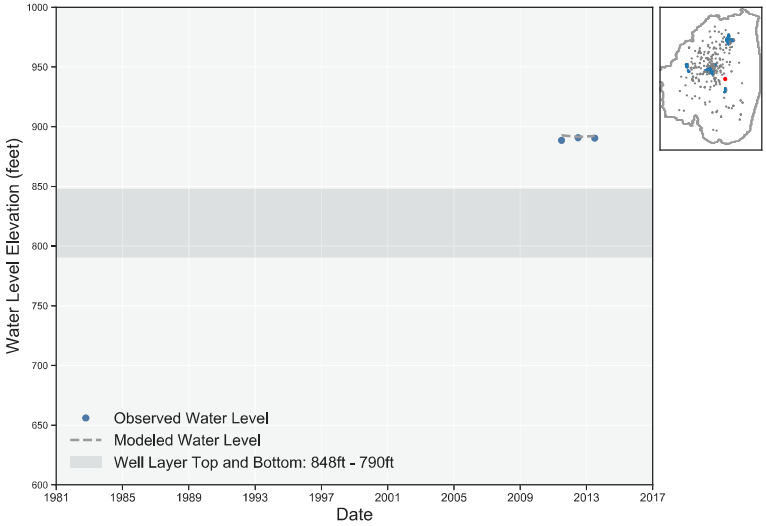
Well 762107 - Aq: OSTP Layers: 6 - 6



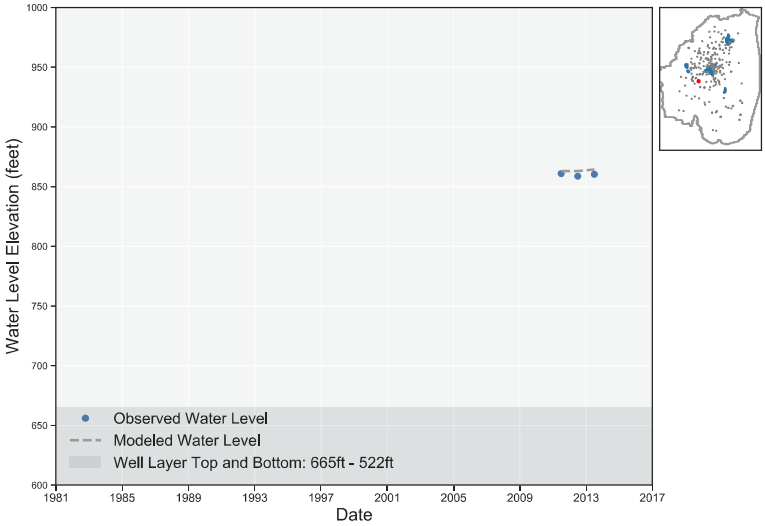
Well 138719 - Aq: OPDC Layers: 6 - 6



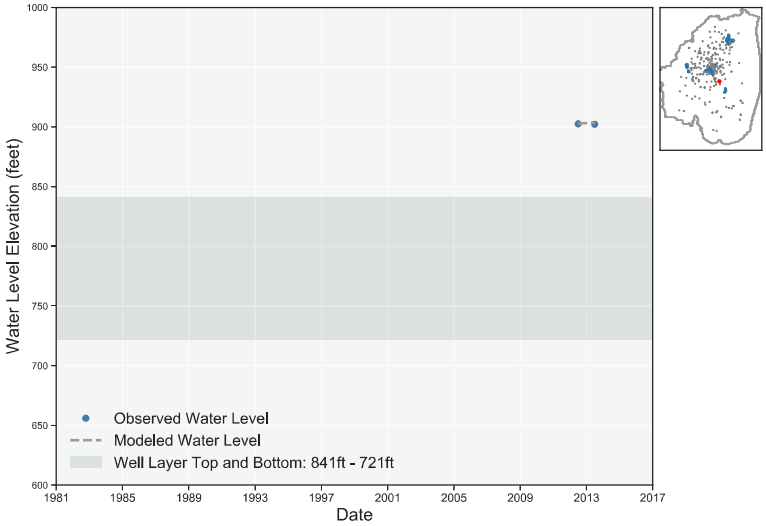
Well 242357 - Aq: OPDC Layers: 6 - 6



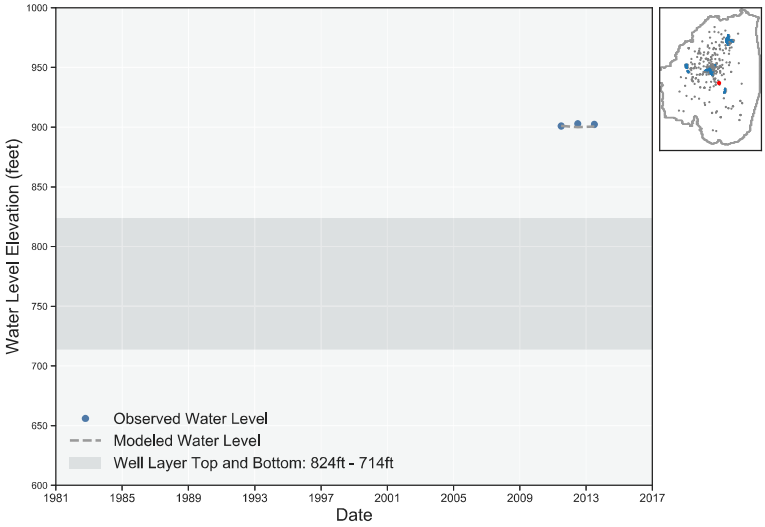
Well 430379 - Aq: OPDC Layers: 6 - 6



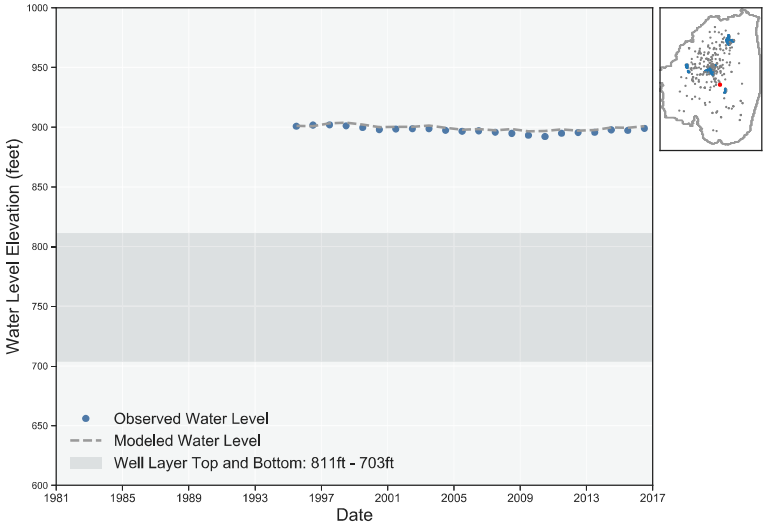
Well 421245 - Aq: OPDC Layers: 6 - 6



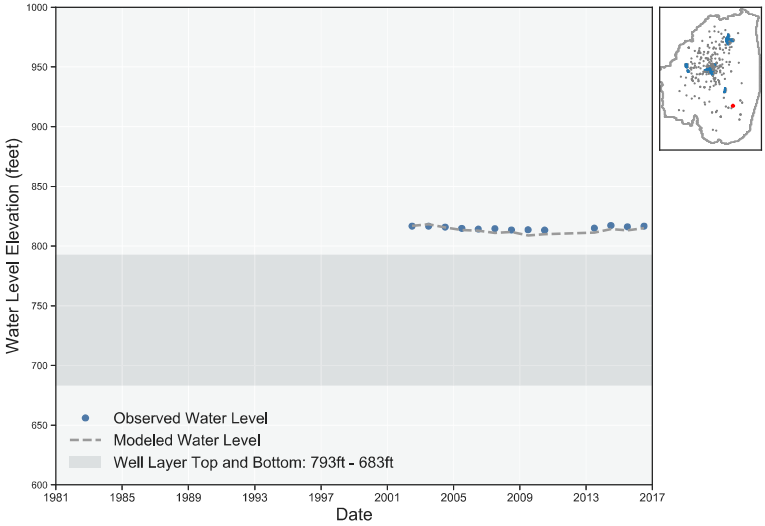
Well 440010 - Aq: OSTP Layers: 6 - 6



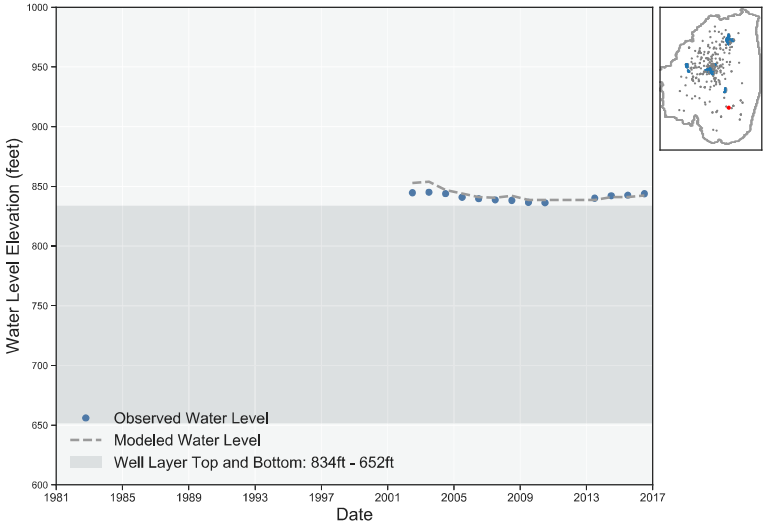
Well 82041 - Aq: OPDC Layers: 6 - 6



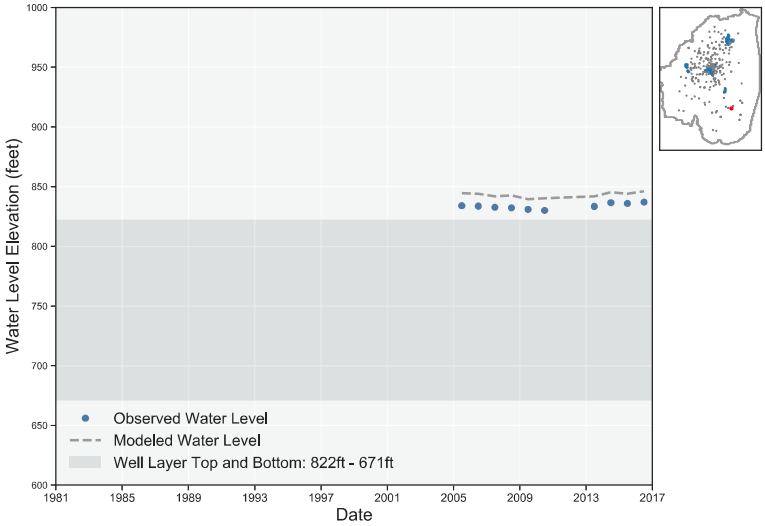
Well 675585 - Aq: OPDC Layers: 6 - 6



Well 675582 - Aq: OPDC Layers: 6 - 6

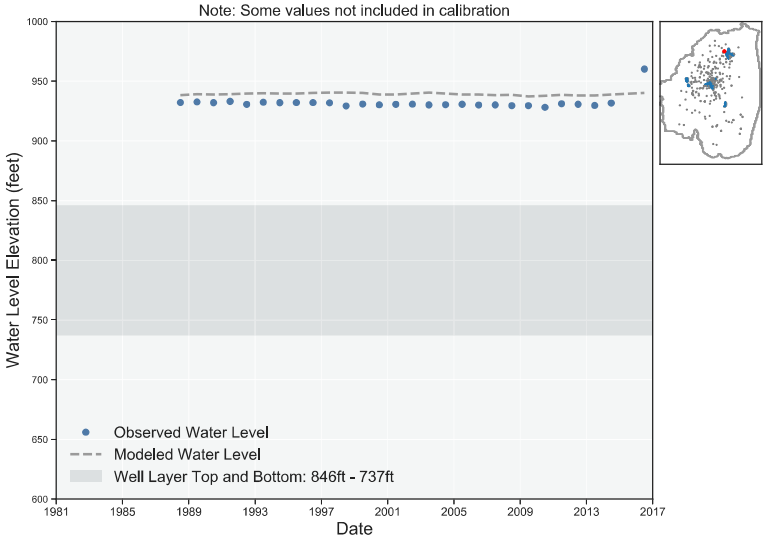


Well 727706 - Aq: OPDC Layers: 6 - 6

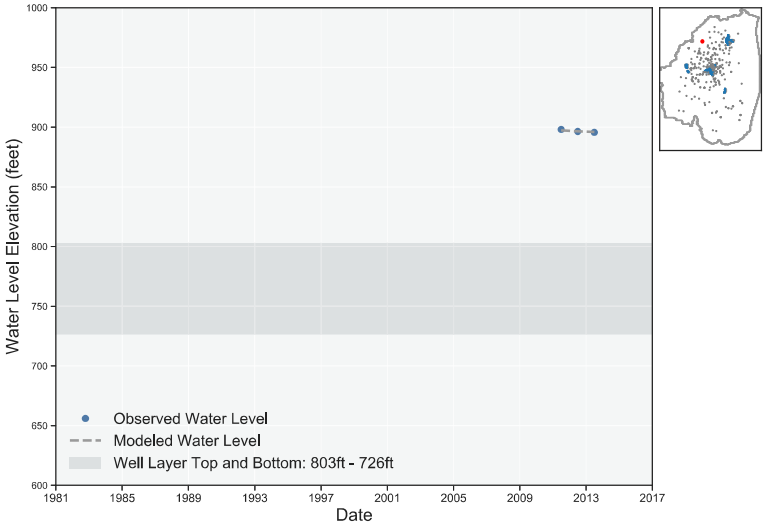


Well 82030 - Aq: OPDCCJDN Layers: 6 - 7

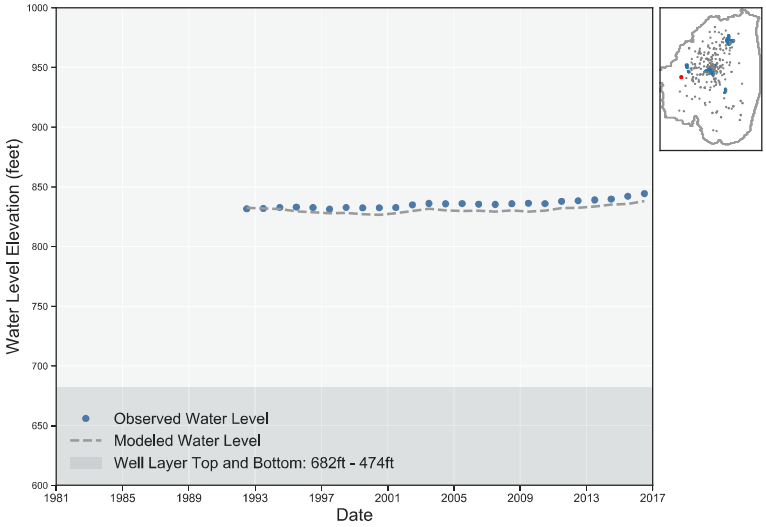
Note: Some values not included in calibration



Well 136792 - Aq: OPCJ Layers: 6 - 7

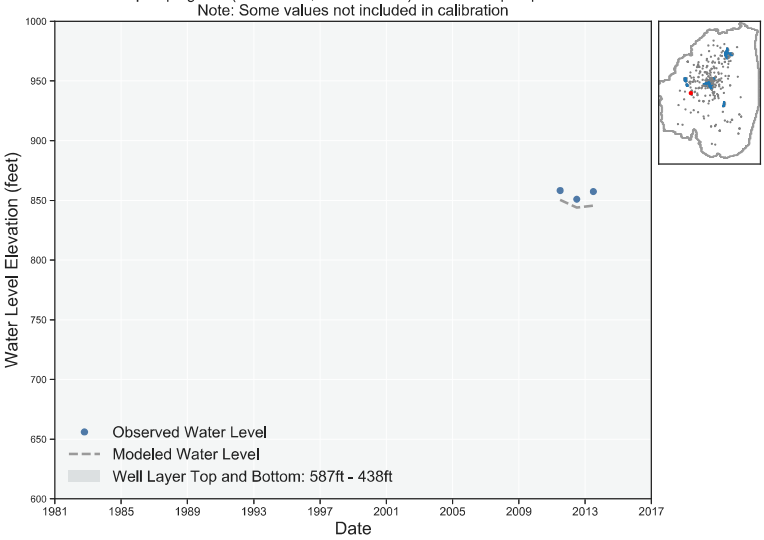


Well 62037 - Aq: OPDCCJDN Layers: 6 - 7



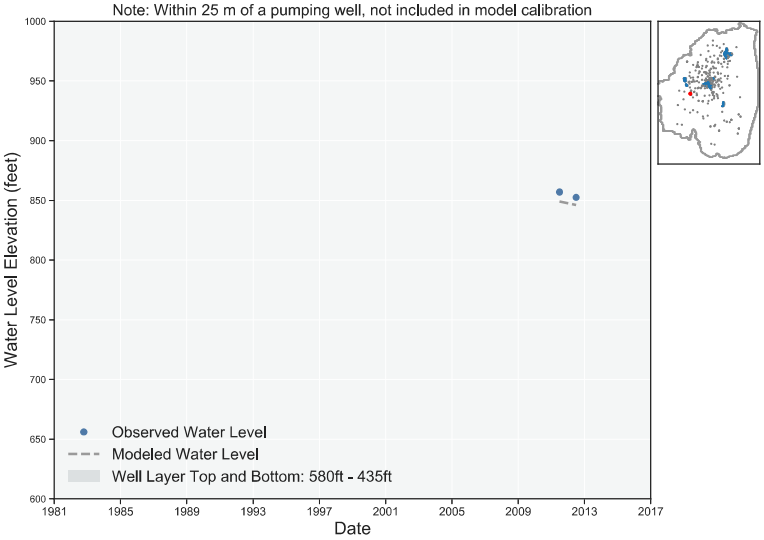
Well 151579 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation E) but was not pumped in 2011 or 2012.
Note: Some values not included in calibration

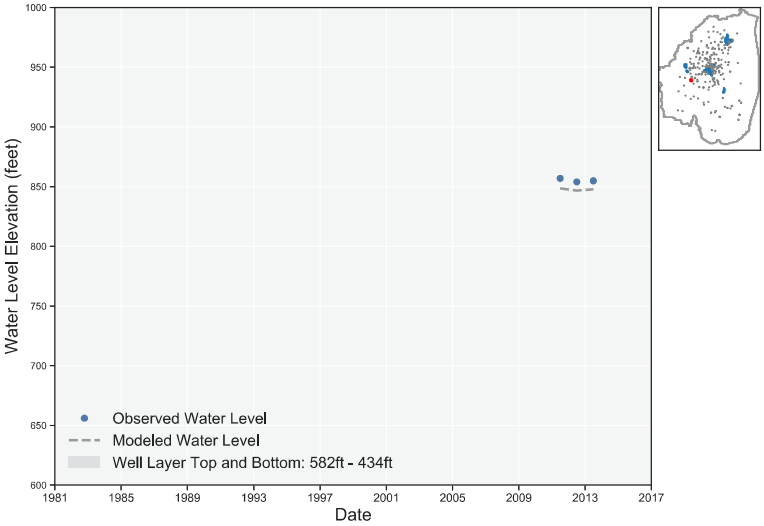


Well 706802 - Aq: OPCJ Layers: 6 - 7

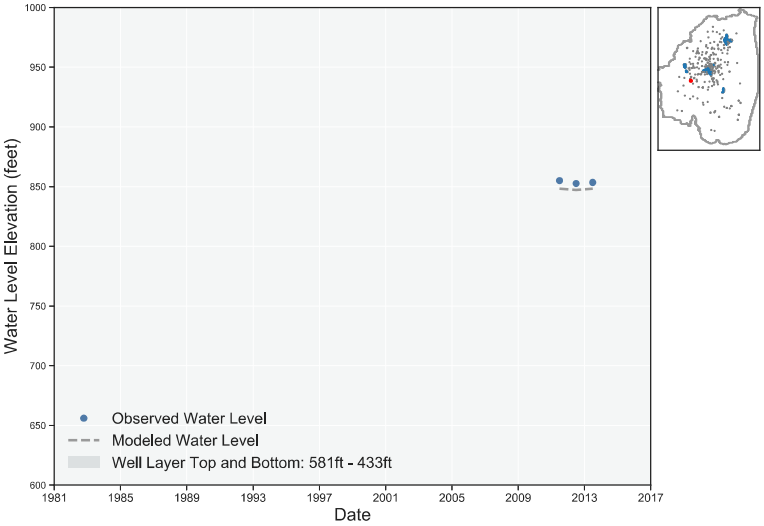
Note: Within 25 m of a pumping well, not included in model calibration



Well 753666 - Aq: OPCJ Layers: 6 - 7

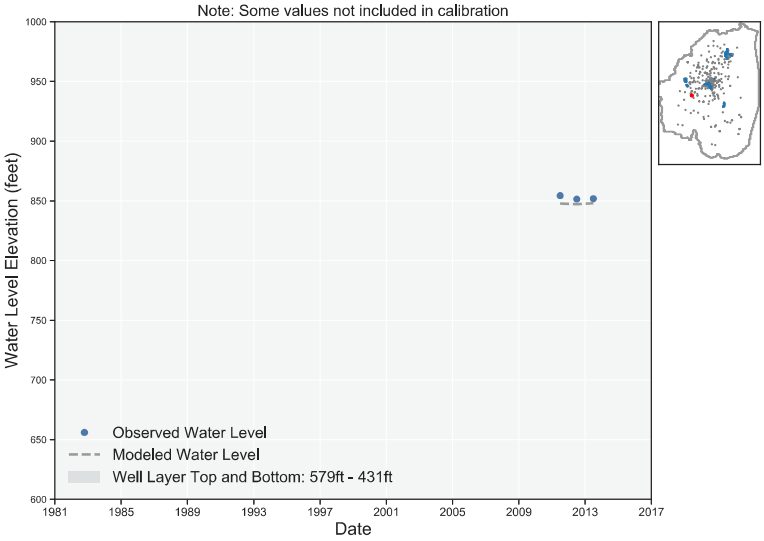


Well 753667 - Aq: OPCJ Layers: 6 - 7



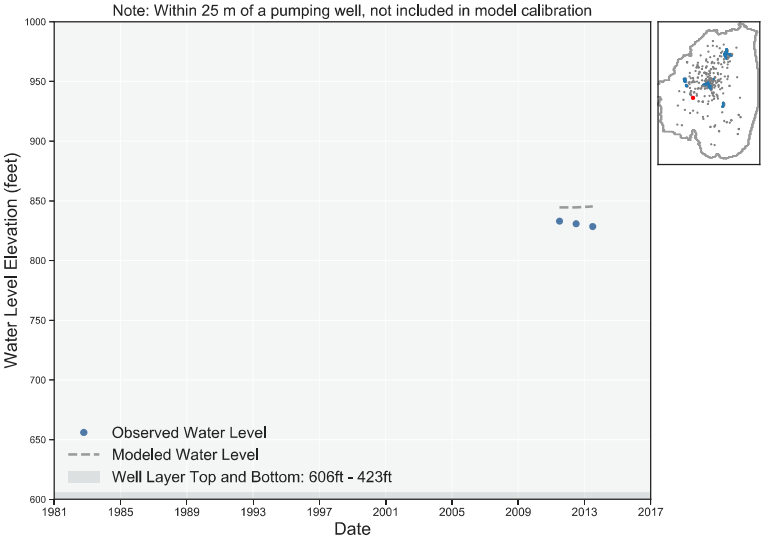
Well 759568 - Aq: OPCJ Layers: 6 - 7

Note: Some values not included in calibration

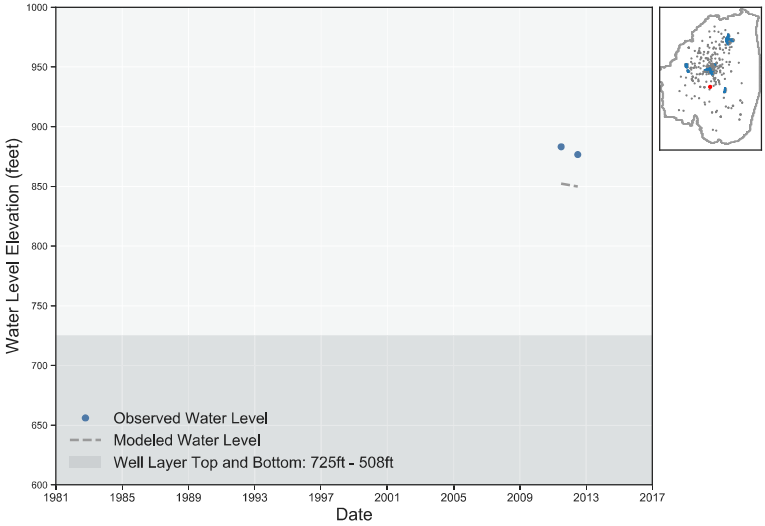


Well 759569 - Aq: OPCJ Layers: 6 - 7

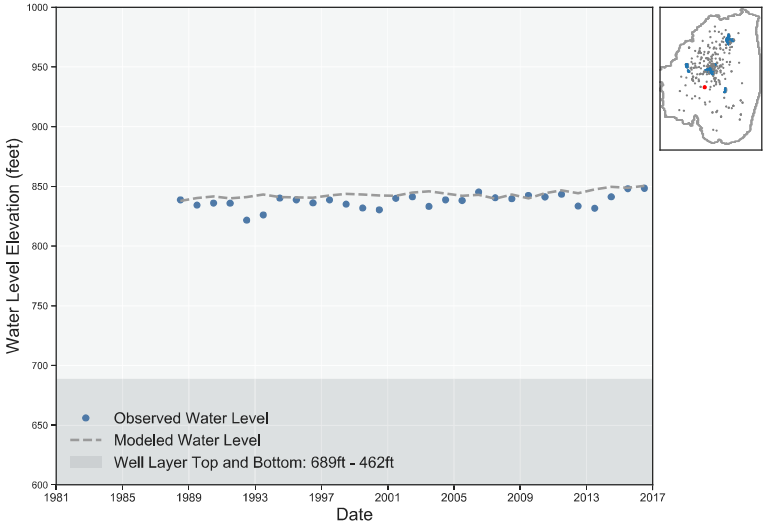
Note: Within 25 m of a pumping well, not included in model calibration



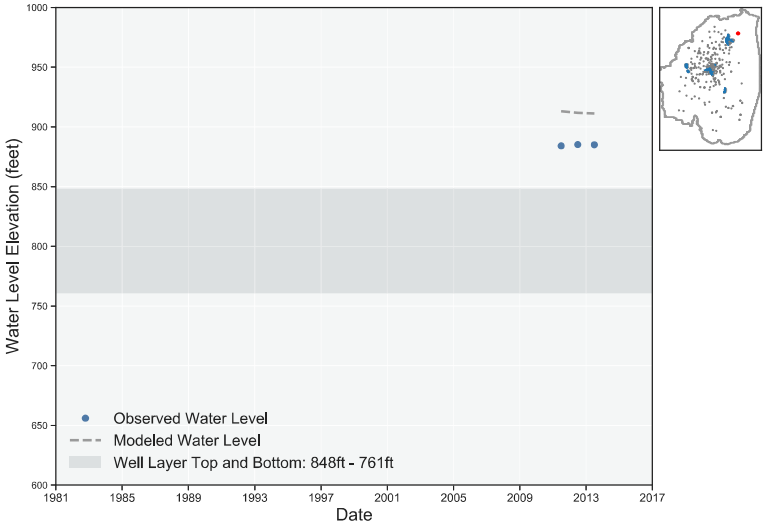
Well 686293 - Aq: OPCJ Layers: 6 - 7



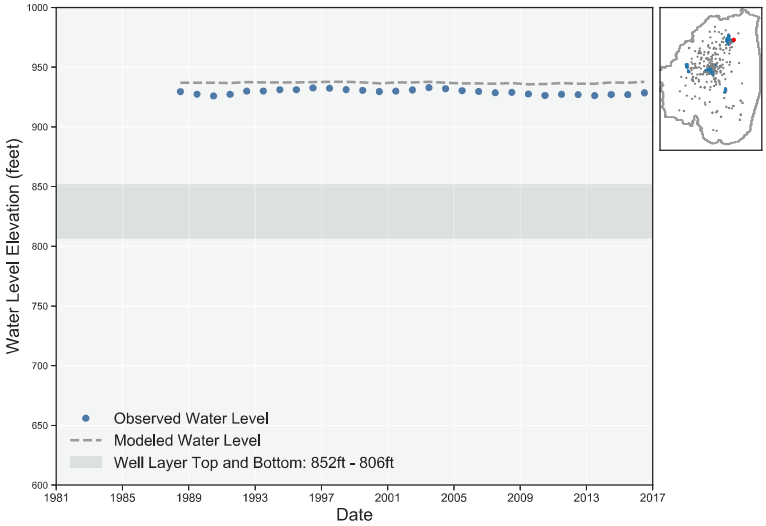
Well 62009 - Aq: OPDCCJDN Layers: 6 - 7



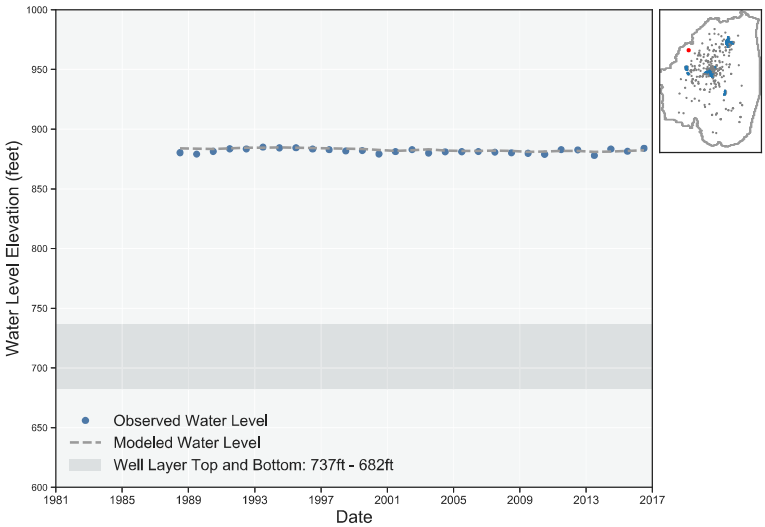
Well 517015 - Aq: OPCJ Layers: 7 - 7



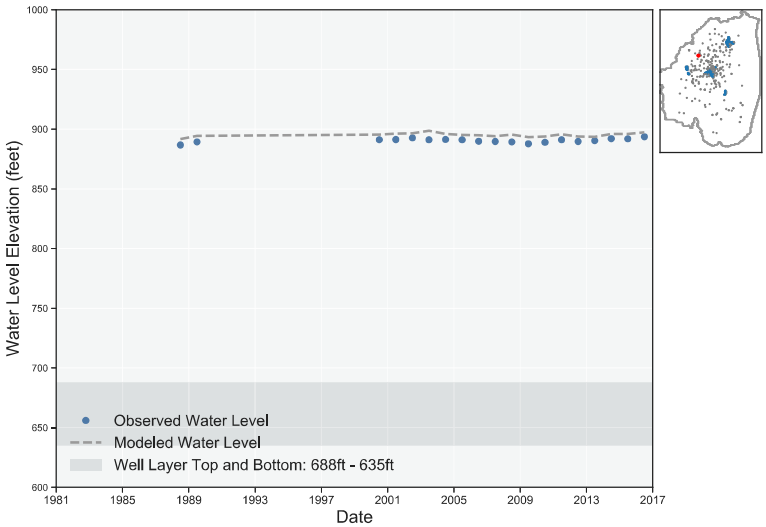
Well 82031 - Aq: CJDN Layers: 7 - 7



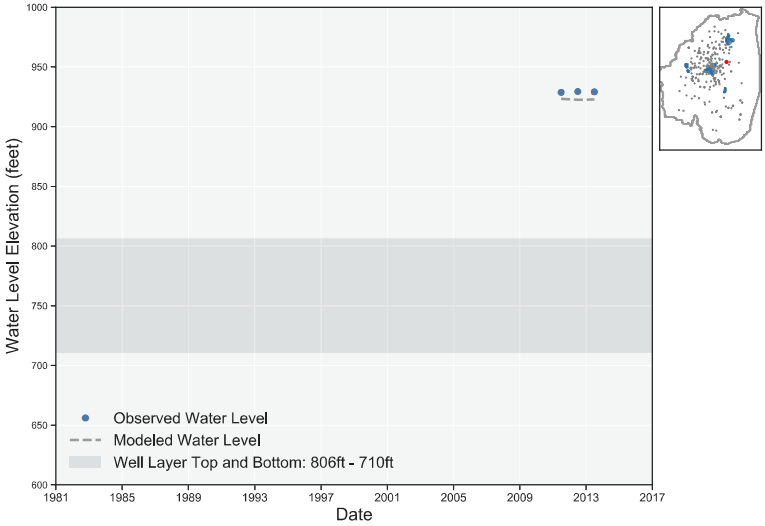
Well 2008 - Aq: QBAA Layers: 7 - 7



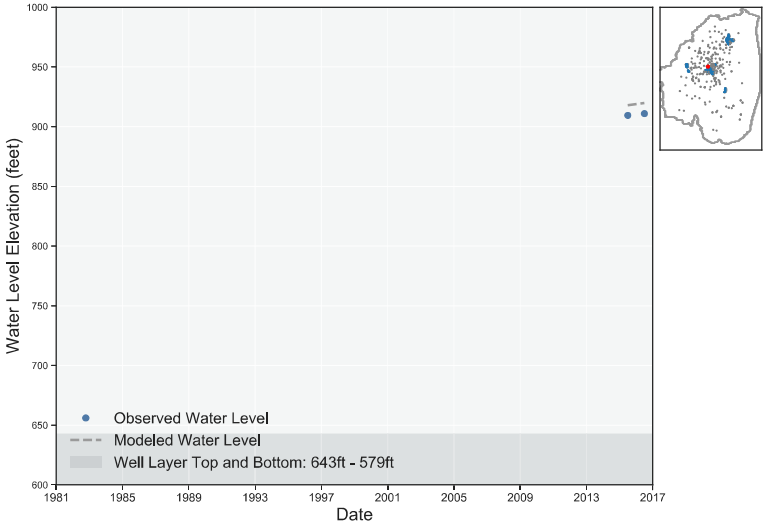
Well 2012 - Aq: CJDN Layers: 7 - 7



Well 409004 - Aq: OSTP Layers: 7 - 7



Well 62054 - Aq: OPDC Layers: 7 - 7

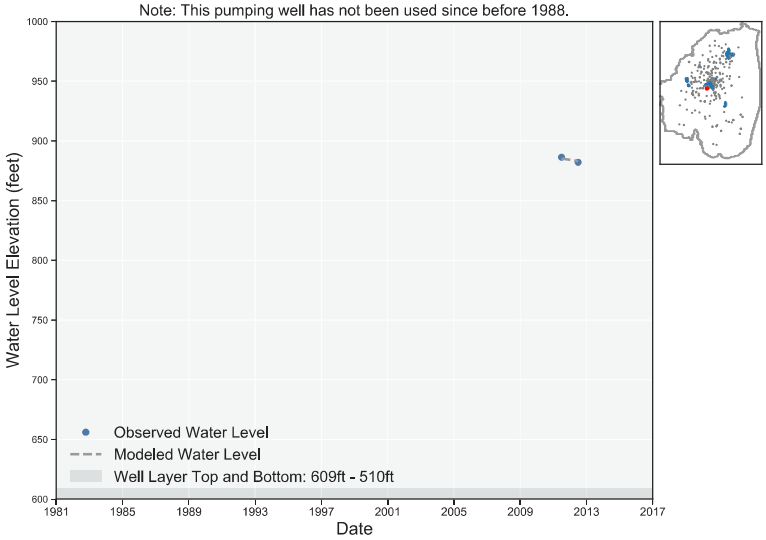


Well 208506 - Aq: CJDN Layers: 7 - 7

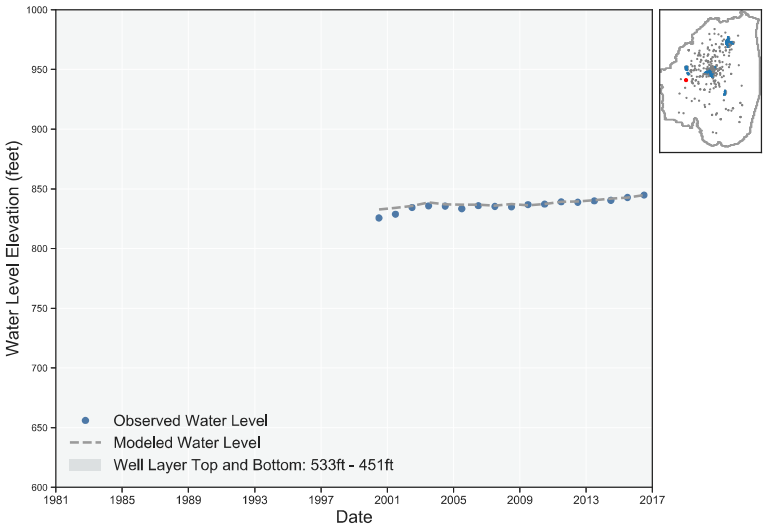
Note: This pumping well has not been used since before 1988.

Well 226567 - Aq: CJSL Layers: 7 - 7

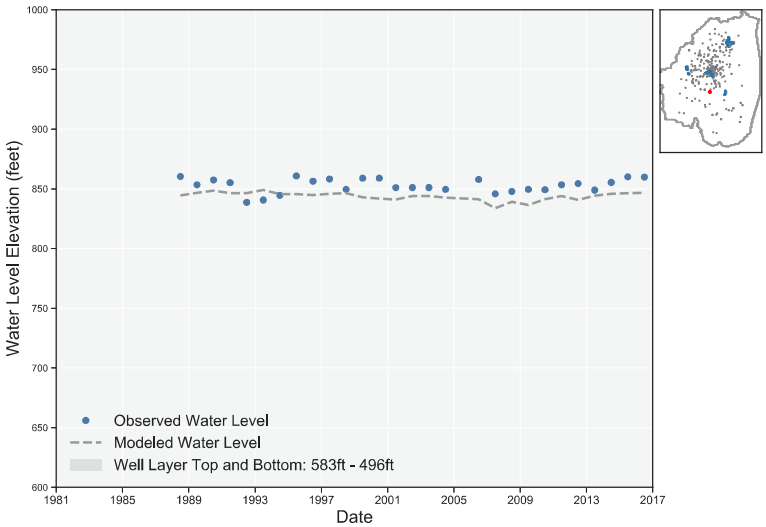
Note: This pumping well has not been used since before 1988.



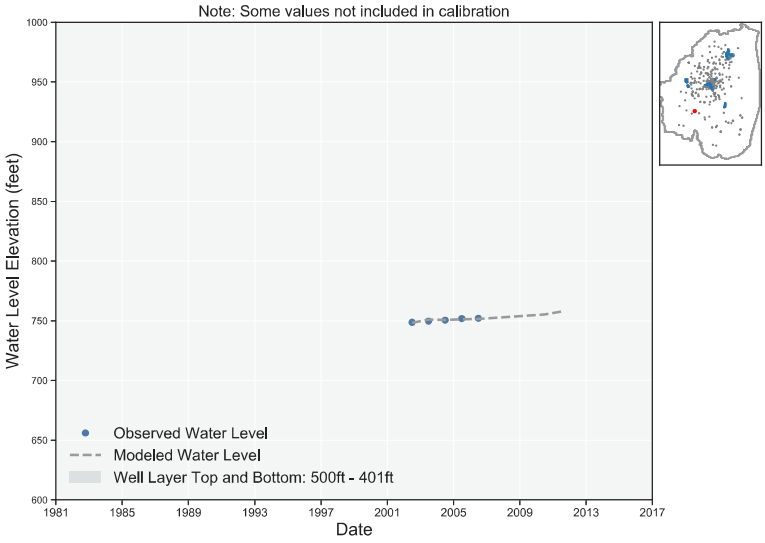
Well 62030 - Aq: CJDN Layers: 7 - 7



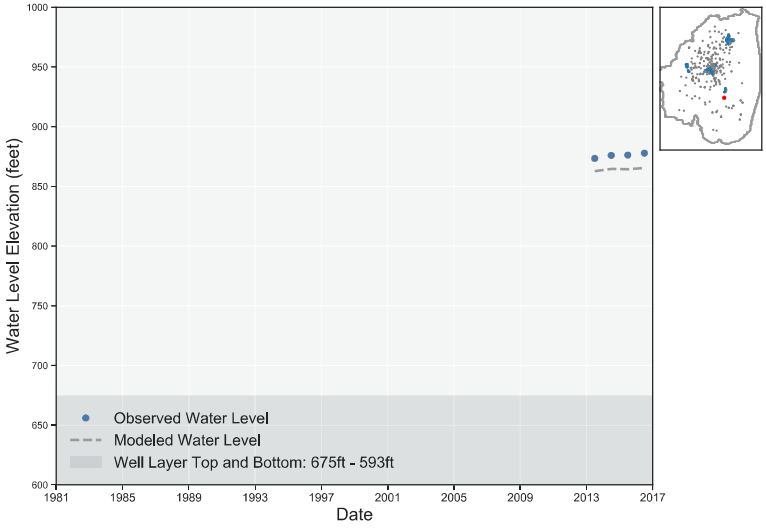
Well 62001 - Aq: CJDN Layers: 7 - 7



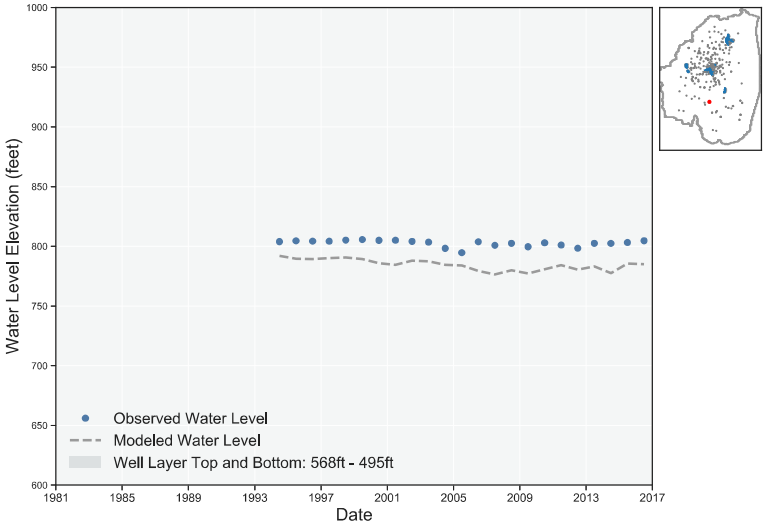
Well 62049 - Aq: CJDN Layers: 7 - 7



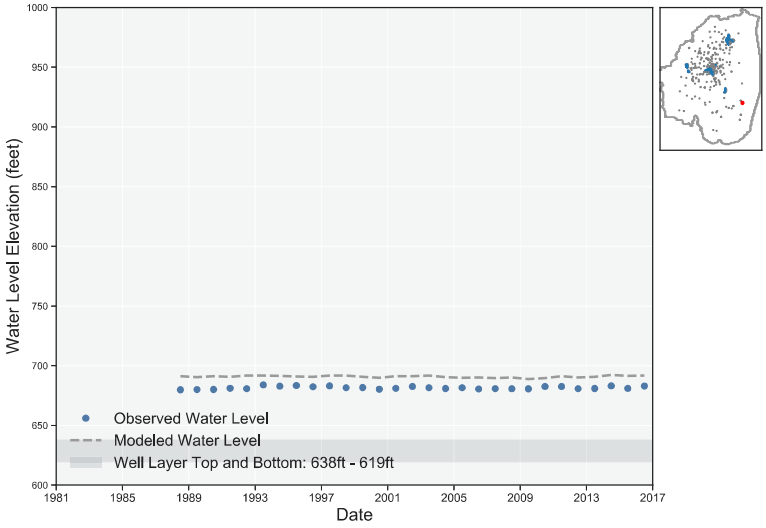
Well 82058 - Aq: QBAA Layers: 7 - 7



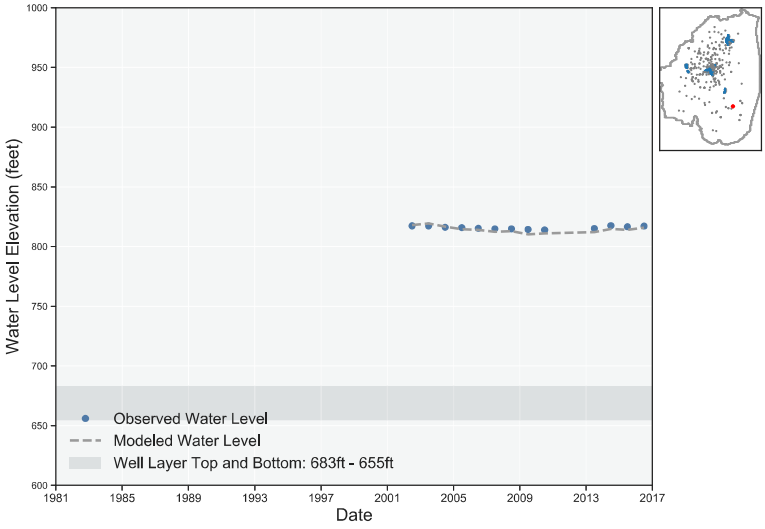
Well 62040 - Aq: CJDN Layers: 7 - 7



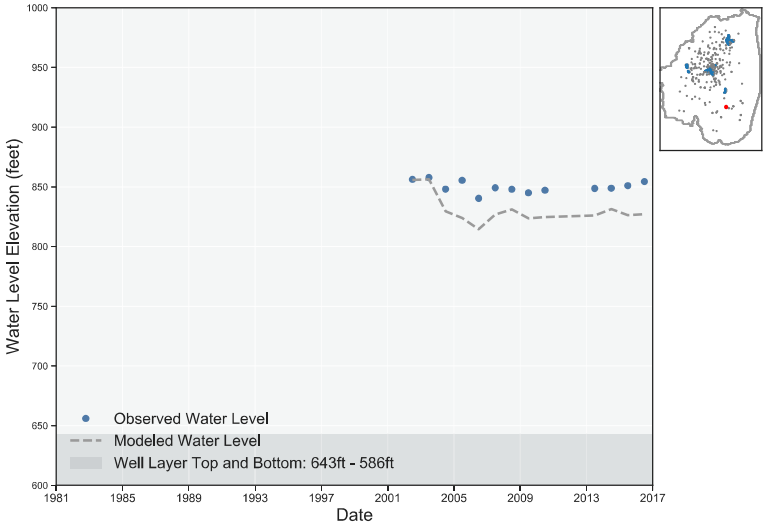
Well 82011 - Aq: CECR Layers: 7 - 7



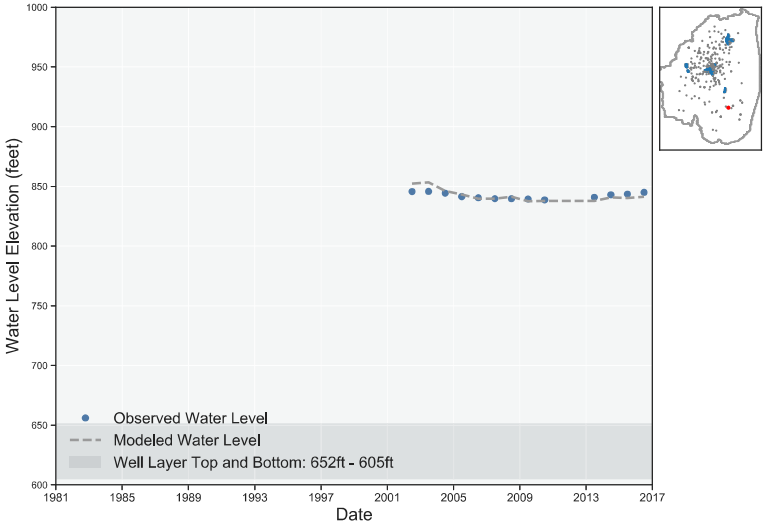
Well 675584 - Aq: CJDN Layers: 7 - 7



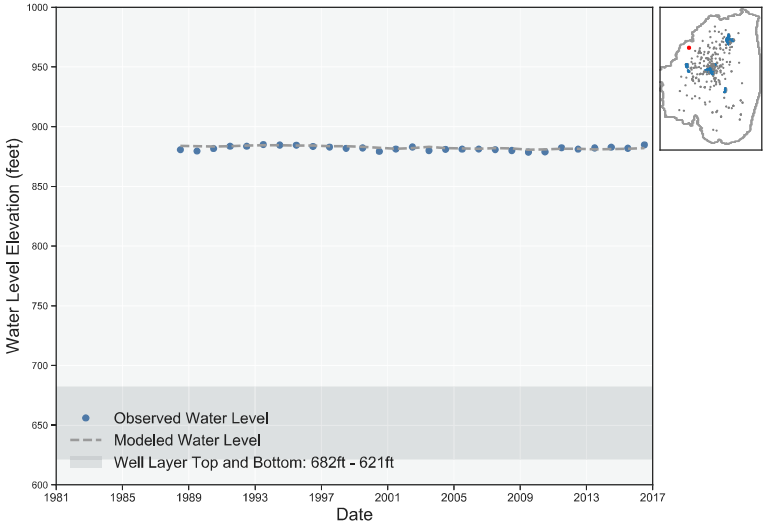
Well 675580 - Aq: CJDN Layers: 7 - 7



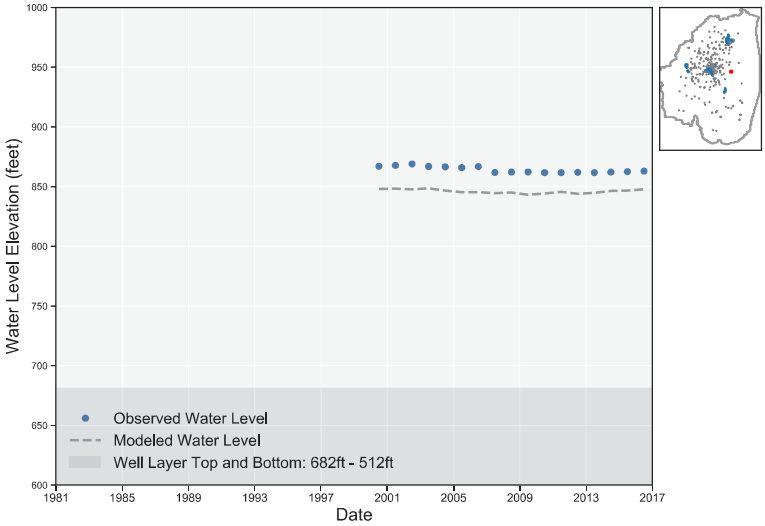
Well 675583 - Aq: CJDN Layers: 7 - 7



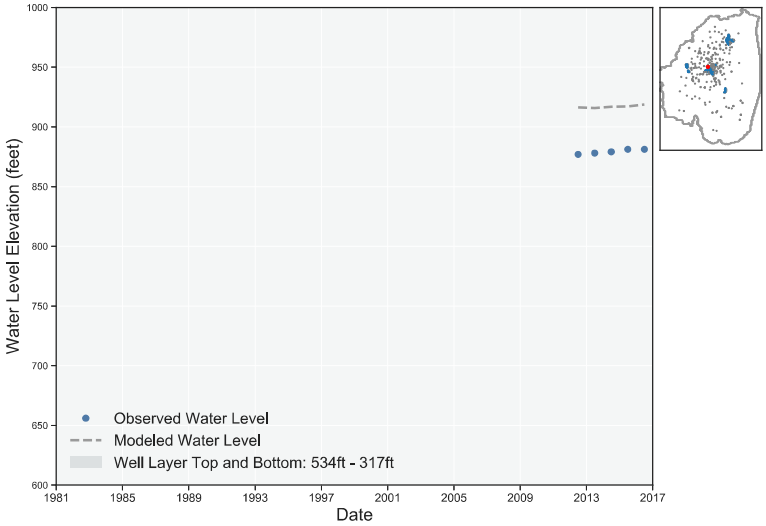
Well 2007 - Aq: QBAA Layers: 8 - 8



Well 82047 - Aq: CTCG Layers: 9 - 9

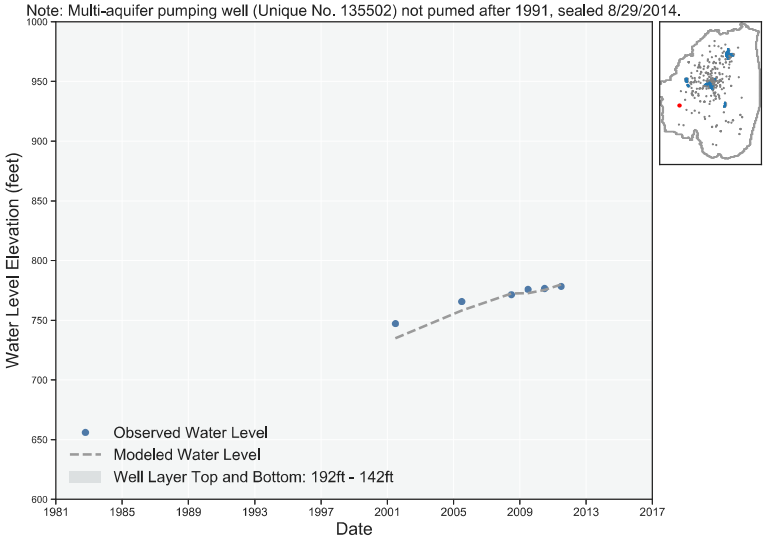


Well 62052 - Aq: CTCW Layers: 9 - 10



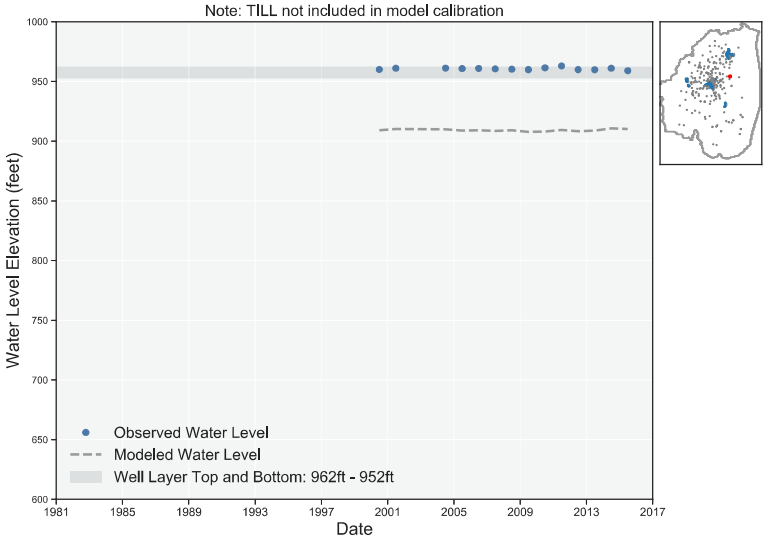
Well 62041 - Aq: CIGL Layers: 10 - 10

Note: Multi-aquifer pumping well (Unique No. 135502) not pumed after 1991, sealed 8/29/2014.

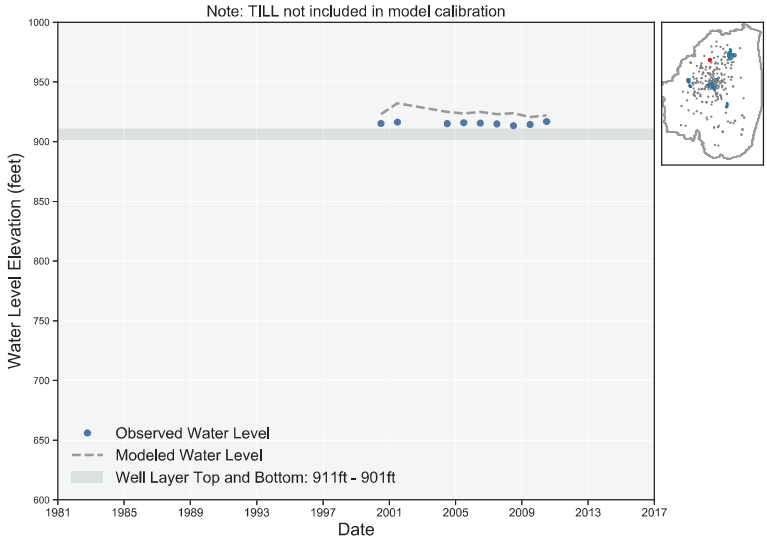


Well 82043 - Aq: TILL Layers: 1 - 1

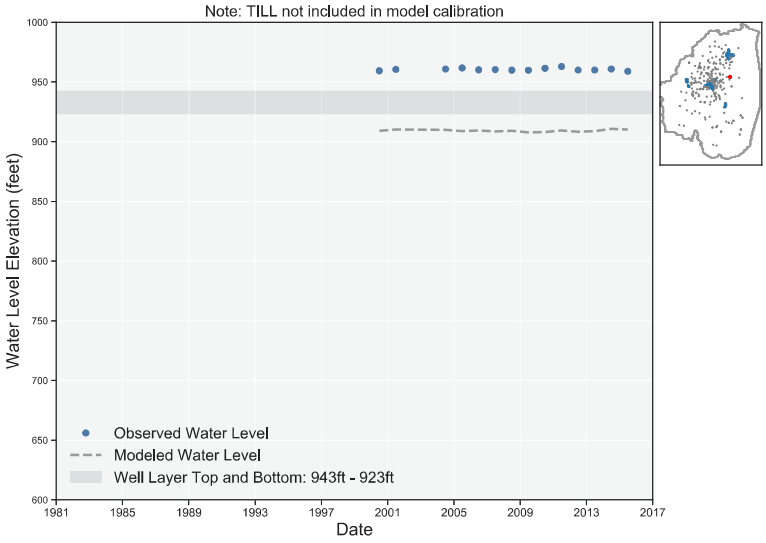
Note: TILL not included in model calibration



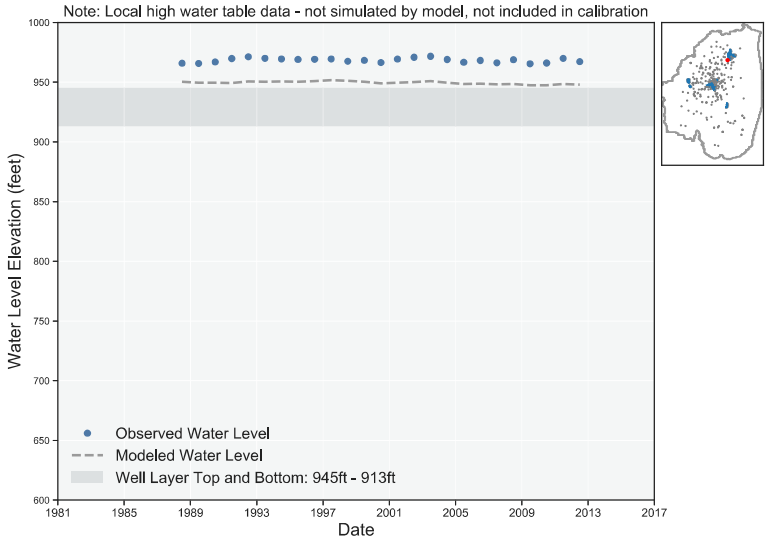
Well 82044 - Aq: TILL Layers: 2 - 2



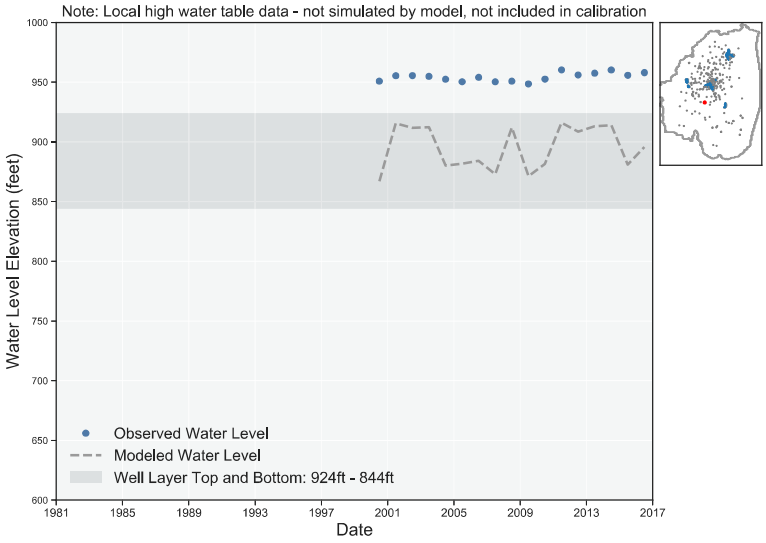
Well 82042 - Aq: TILL Layers: 3 - 3



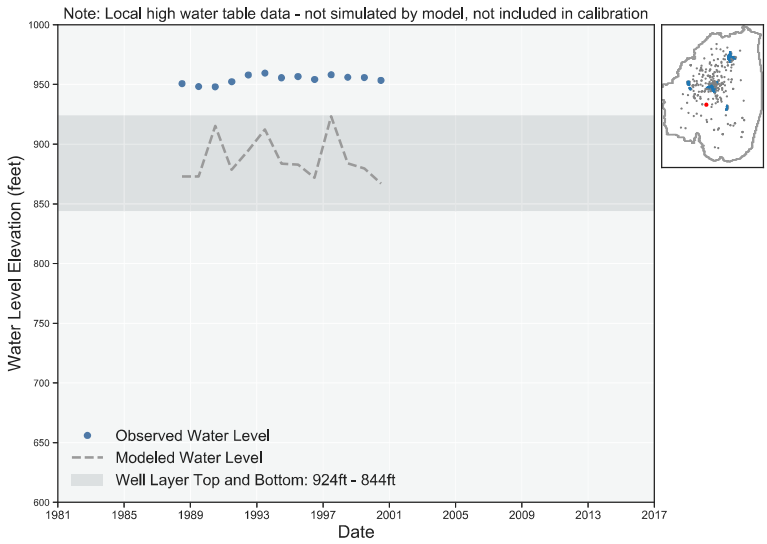
Well 82037 - Aq: QWTA Layers: 4 - 4



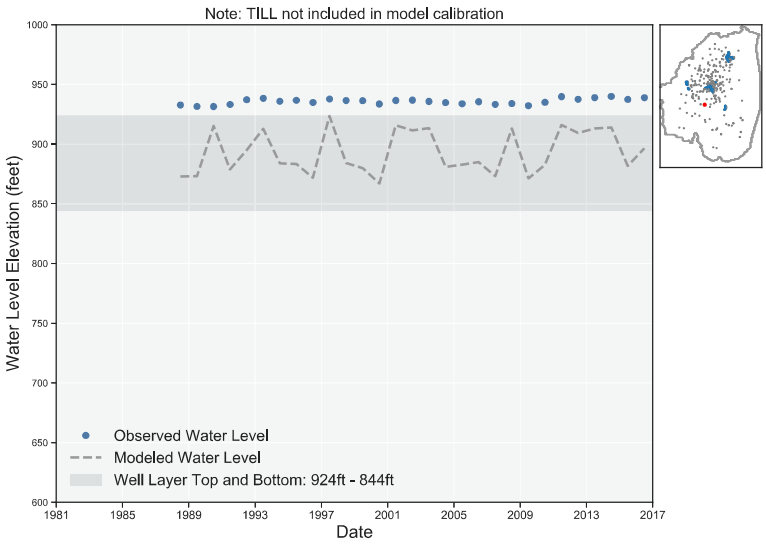
Well 62048 - Aq: QWTA Layers: 4 - 4



Well 62011 - Aq: QBAA Layers: 4 - 4

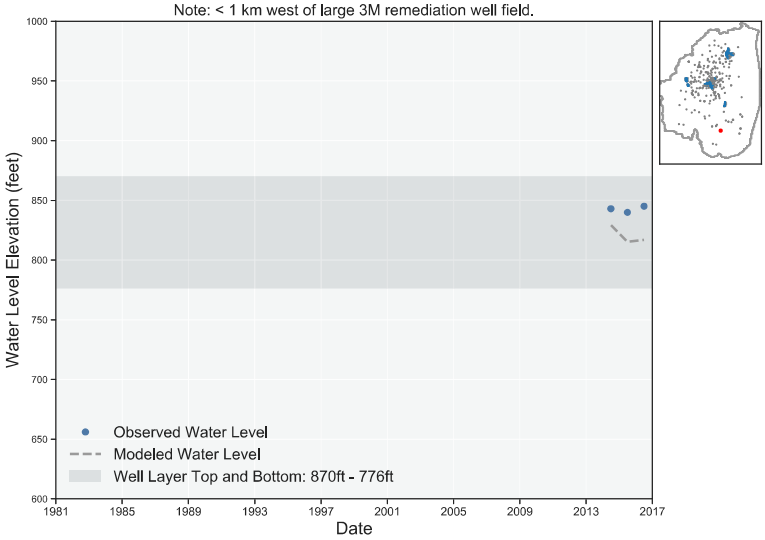


Well 62010 - Aq: TILL Layers: 4 - 4



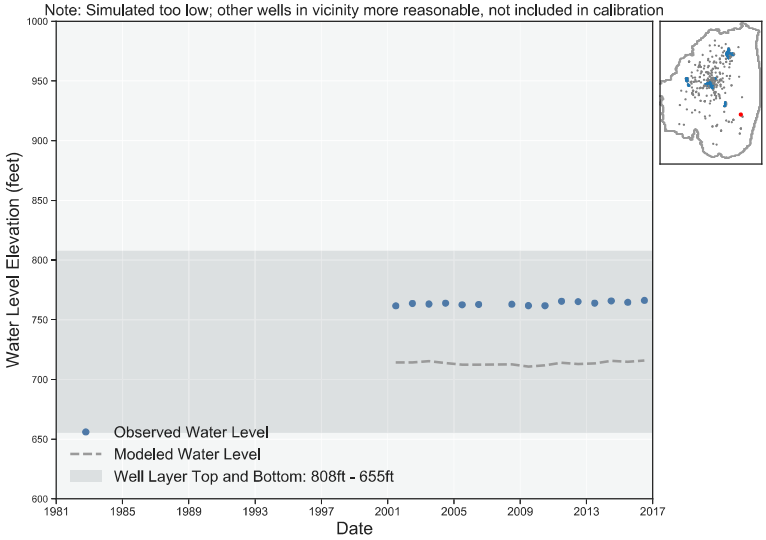
Well 82062 - Aq: QWTA Layers: 4 - 4

Note: < 1 km west of large 3M remediation well field.



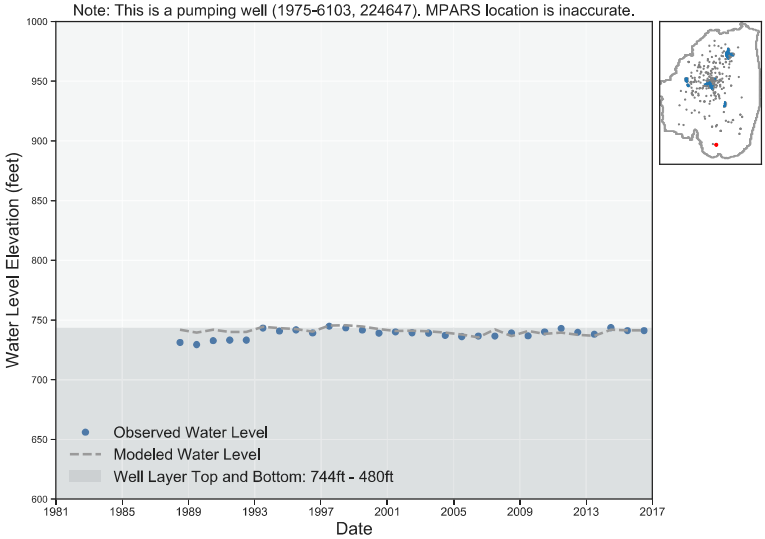
Well 82045 - Aq: CFRNCIGL Layers: 4 - 6

Note: Simulated too low; other wells in vicinity more reasonable, not included in calibration



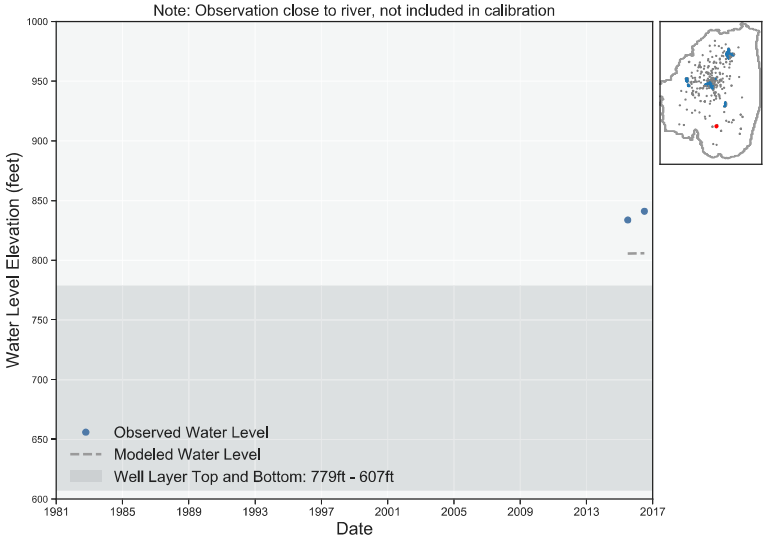
Well 82016 - Aq: OPDCCJDN Layers: 5 - 8

Note: This is a pumping well (1975-6103, 224647). MPARS location is inaccurate.



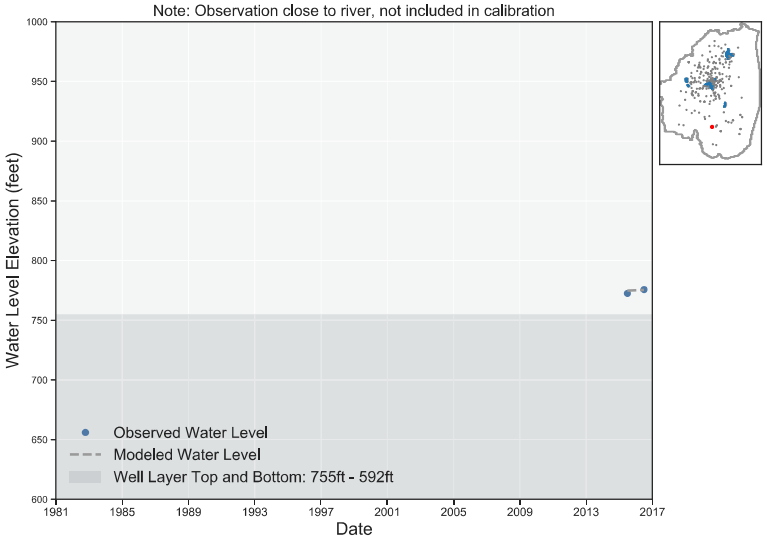
Well 767883 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



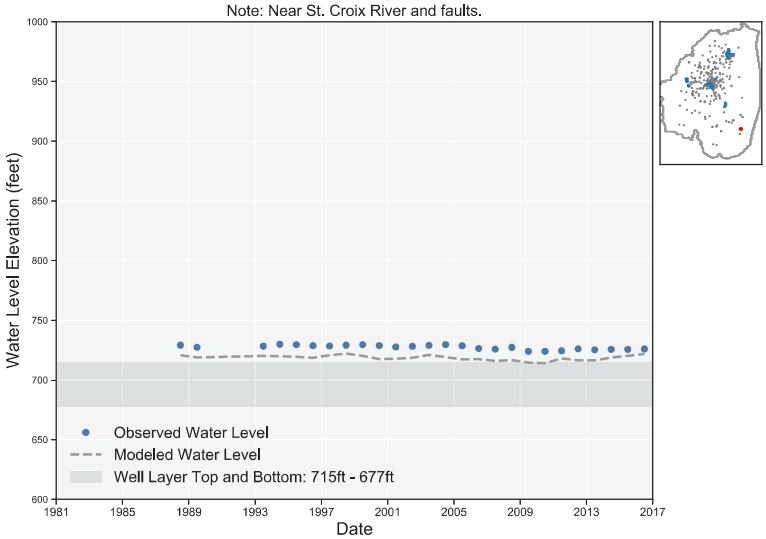
Well 767882 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



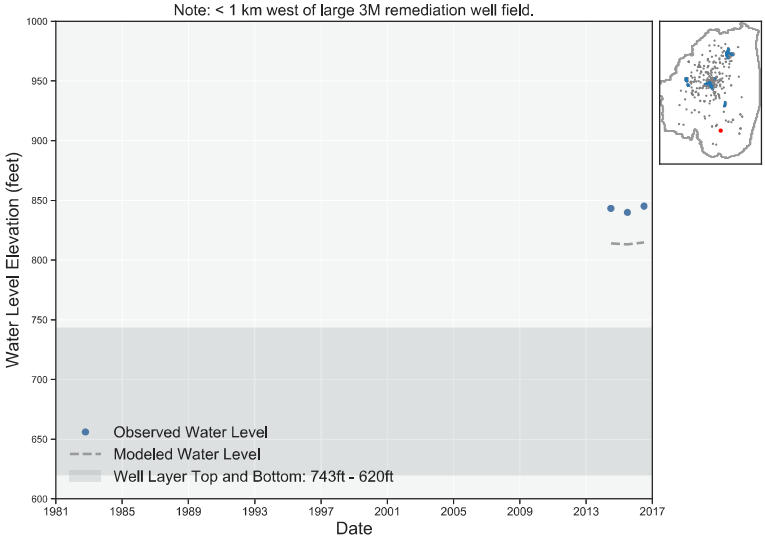
Well 82012 - Aq: CSTL Layers: 6 - 6

Note: Near St. Croix River and faults.



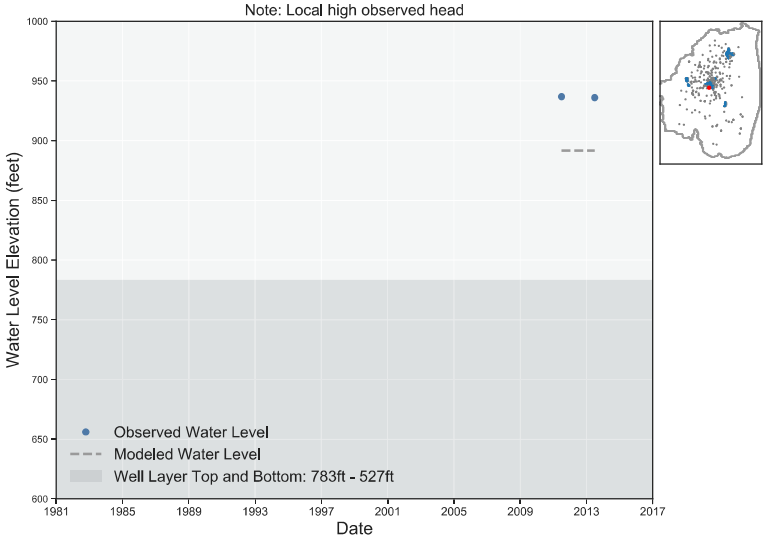
Well 82061 - Aq: OPDC Layers: 6 - 6

Note: < 1 km west of large 3M remediation well field.



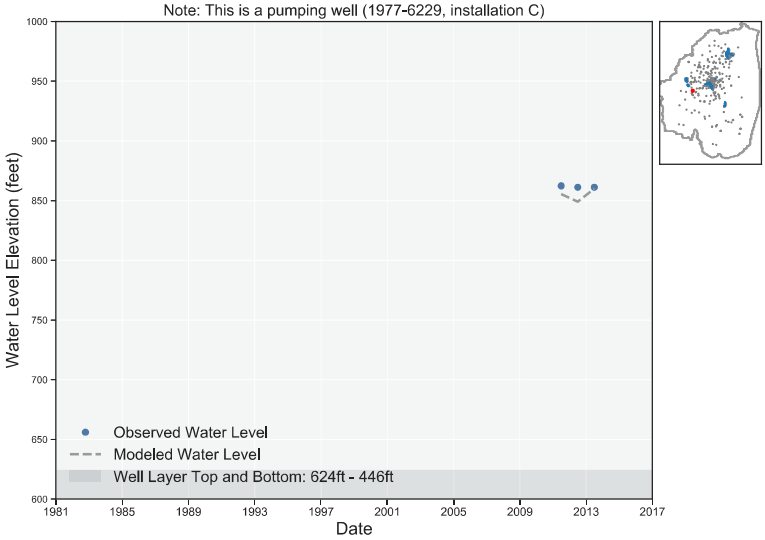
Well 226572 - Aq: OPCJ Layers: 6 - 7

Note: Local high observed head



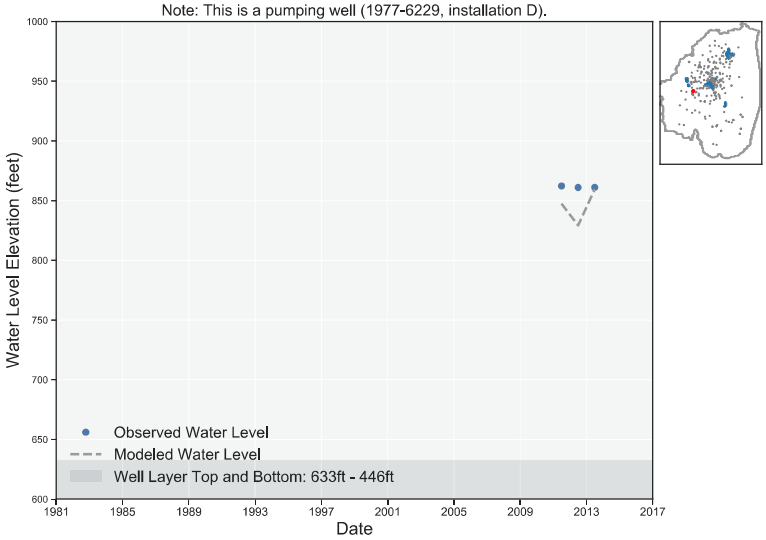
Well 127292 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation C)



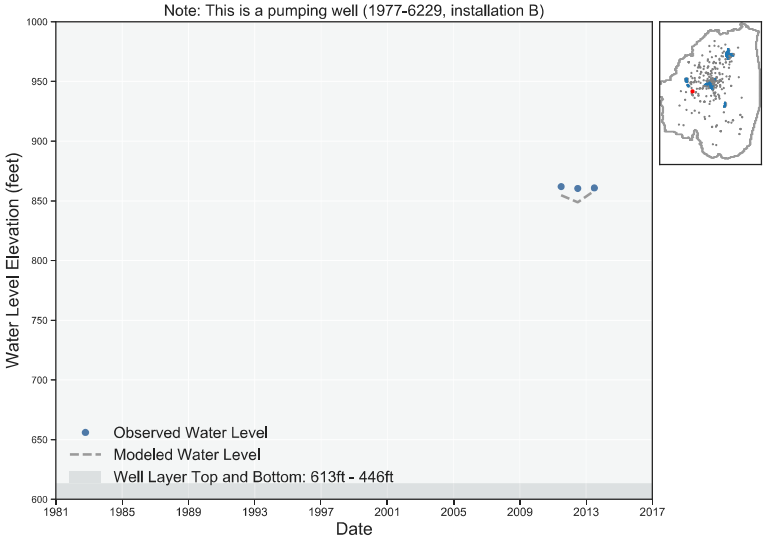
Well 151583 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation D).



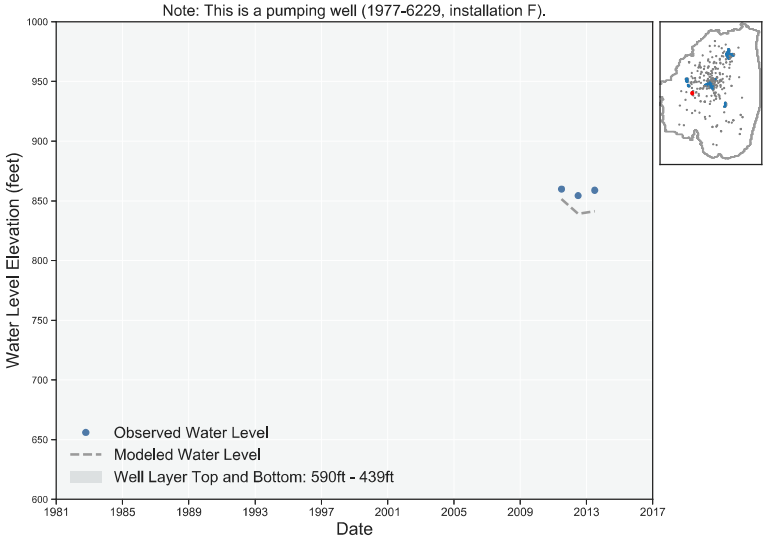
Well 133312 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation B)

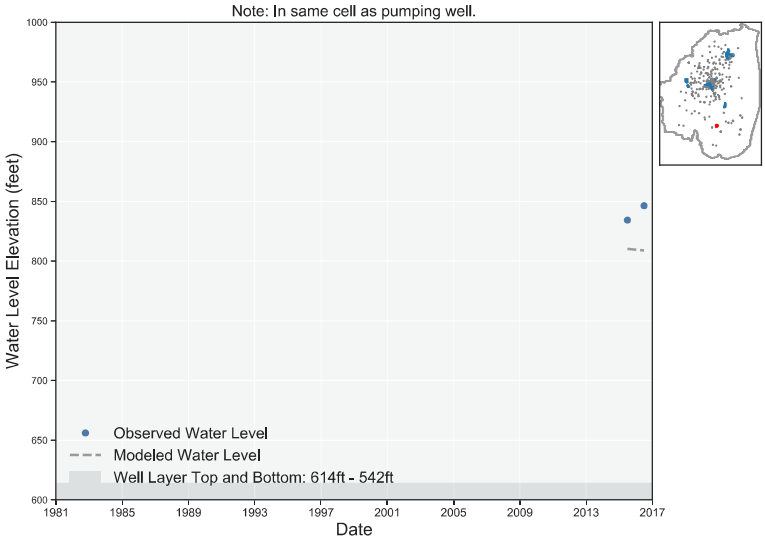


Well 706803 - Aq: OPCJ Layers: 6 - 7

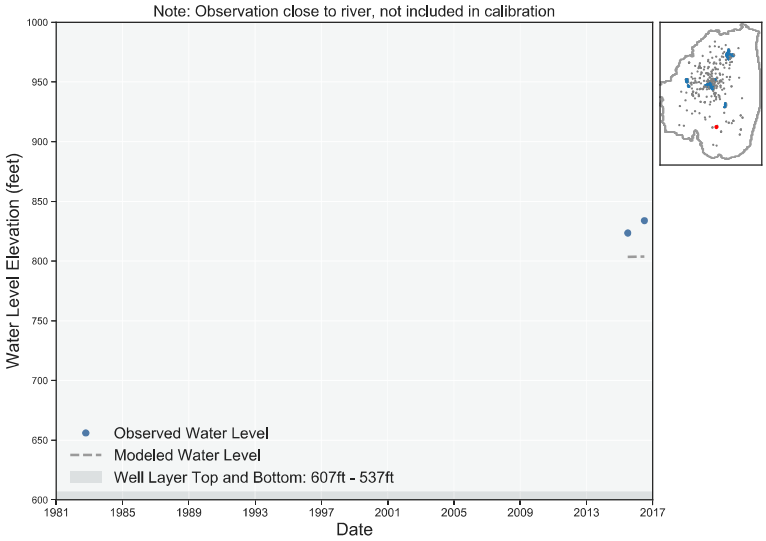
Note: This is a pumping well (1977-6229, installation F).



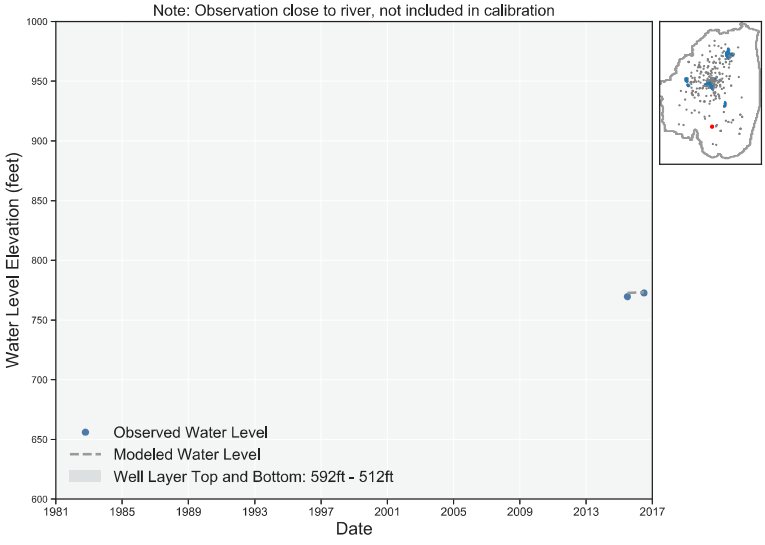
Well 763366 - Aq: CJDN Layers: 7 - 7



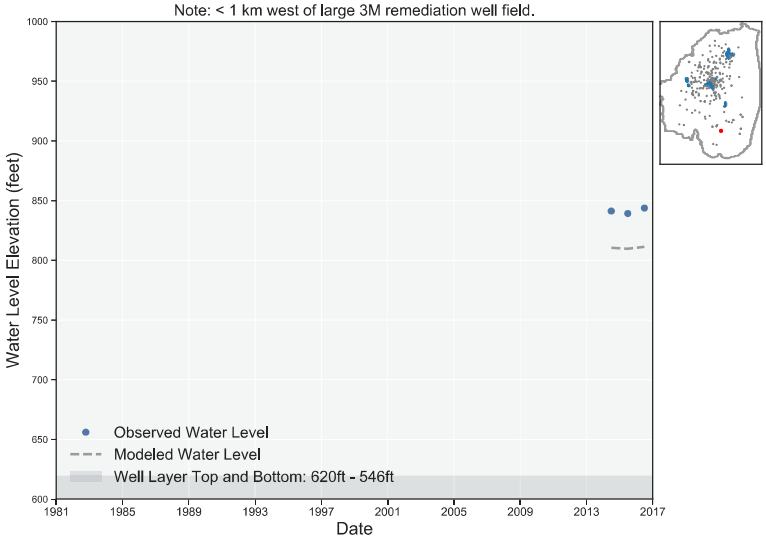
Well 767884 - Aq: CJDN Layers: 7 - 7



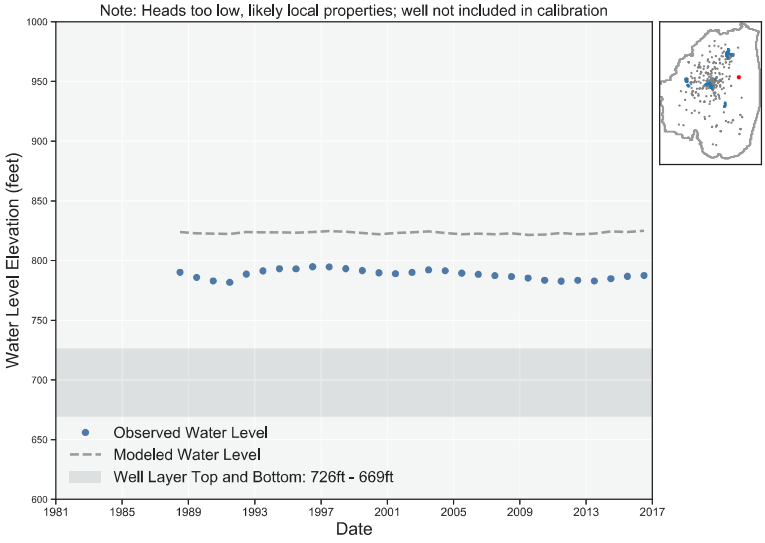
Well 767885 - Aq: CJDN Layers: 7 - 7



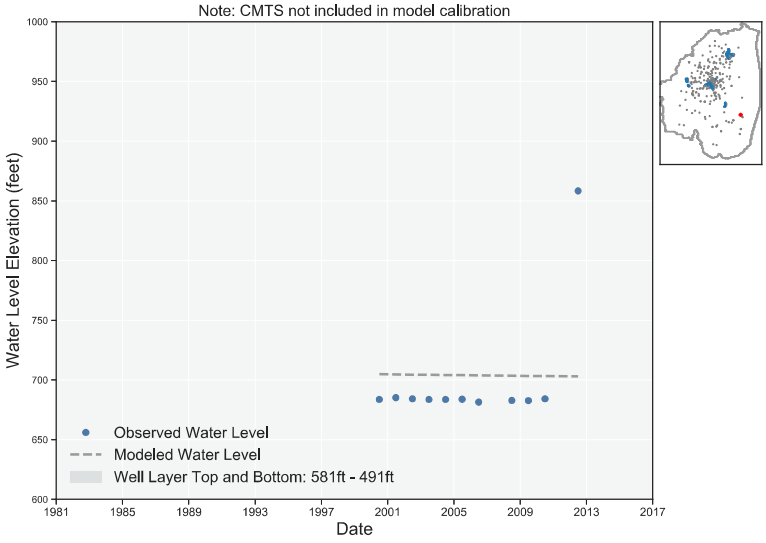
Well 82060 - Aq: CJDN Layers: 7 - 7



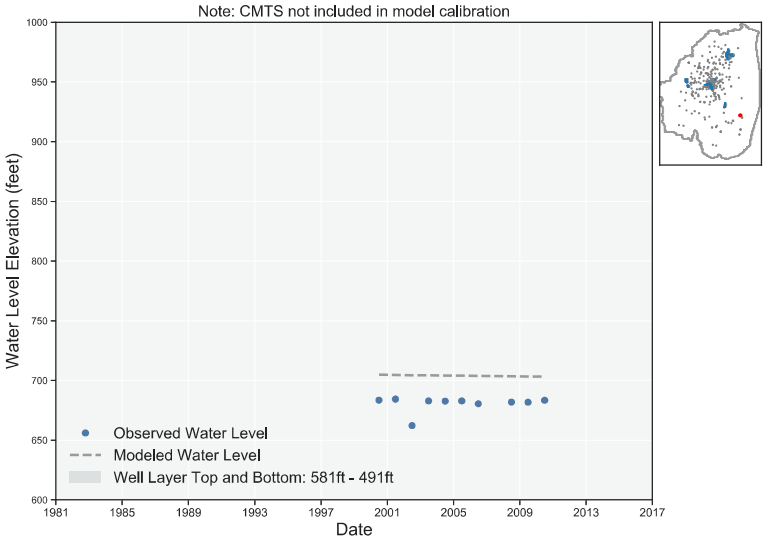
Well 82023 - Aq: QBAA Layers: 8 - 8



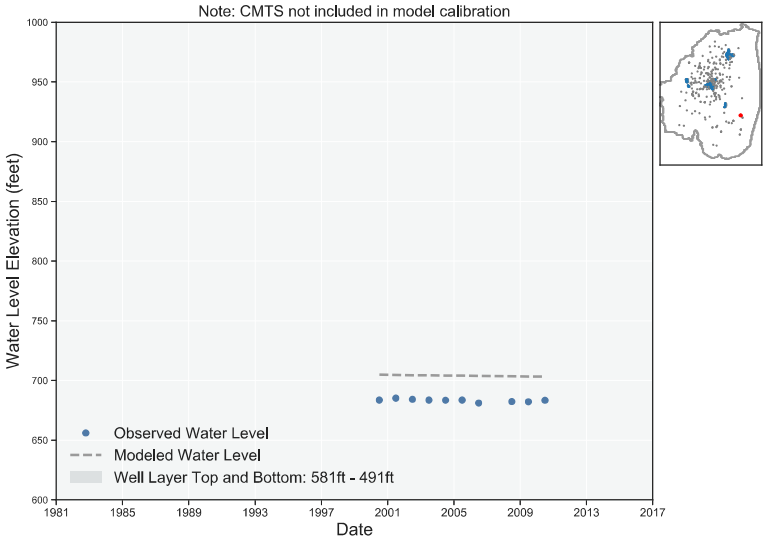
Well 82046 - Aq: CMTS Layers: 9 - 9



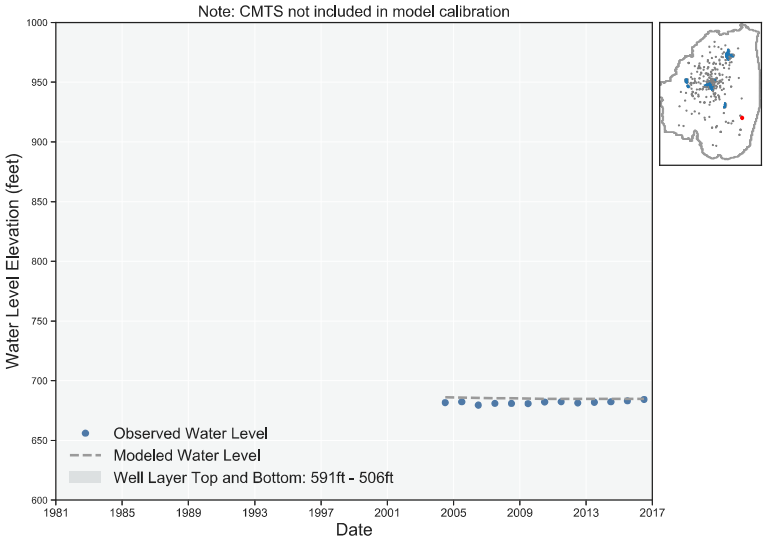
Well 82049 - Aq: CMTS Layers: 9 - 9



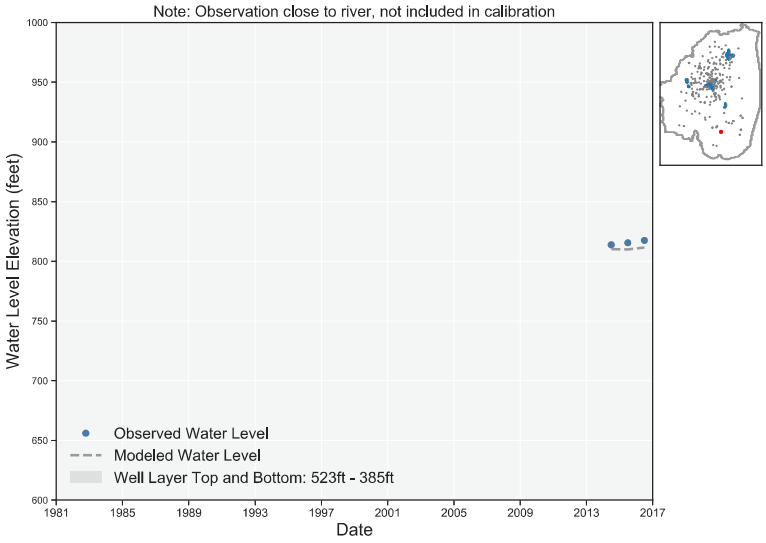
Well 82050 - Aq: CMTS Layers: 9 - 9



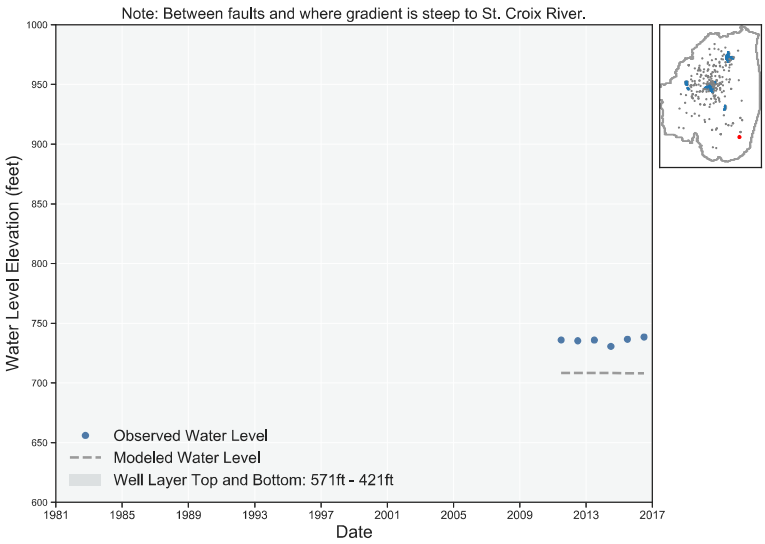
Well 82051 - Aq: CECRCMTS Layers: 9 - 9



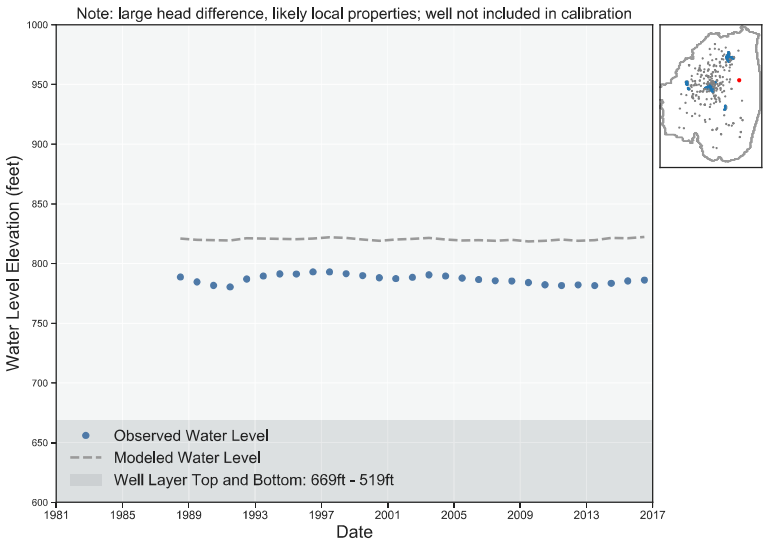
Well 82059 - Aq: CTCG Layers: 9 - 9



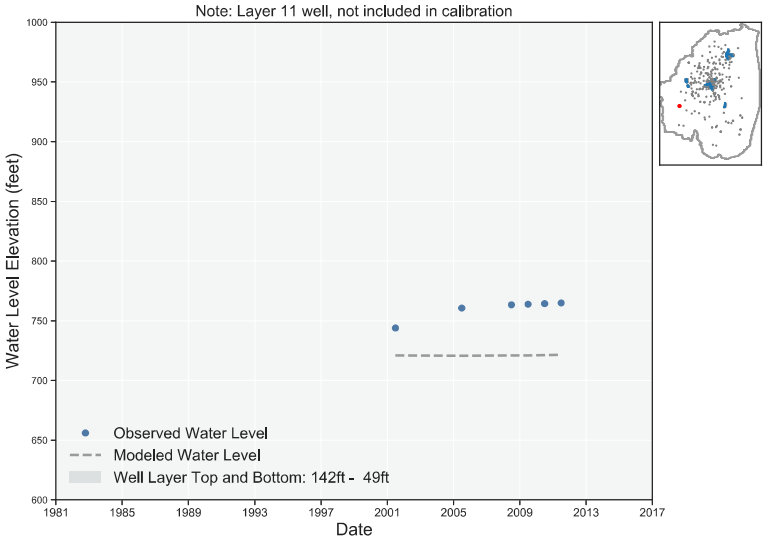
Well 82054 - Aq: CFIG Layers: 9 - 9



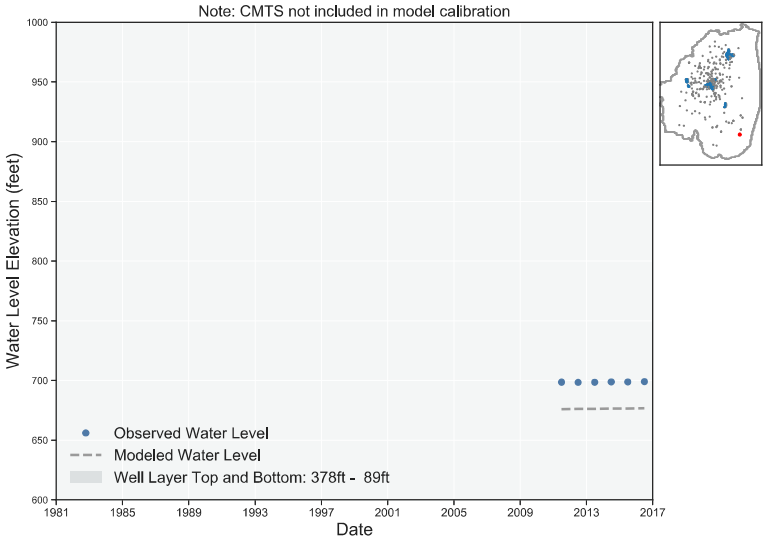
Well 82022 - Aq: CFRNCIGL Layers: 9 - 10



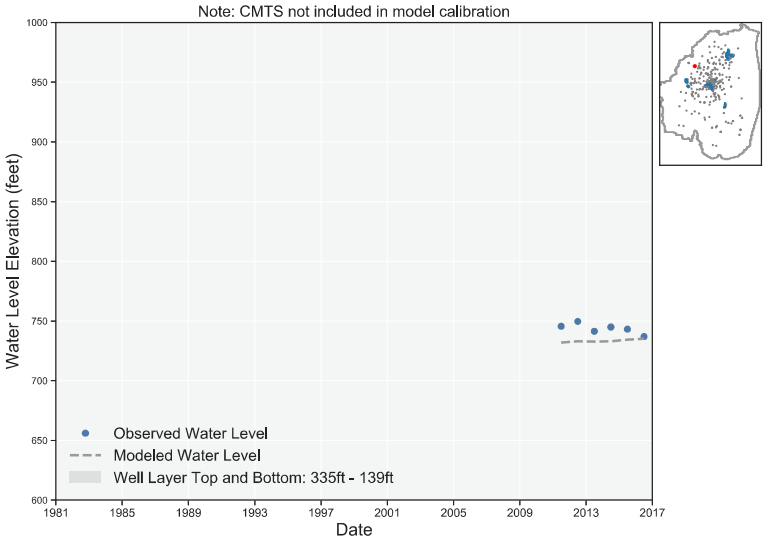
Well 62042 - Aq: CECR Layers: 11 - 11



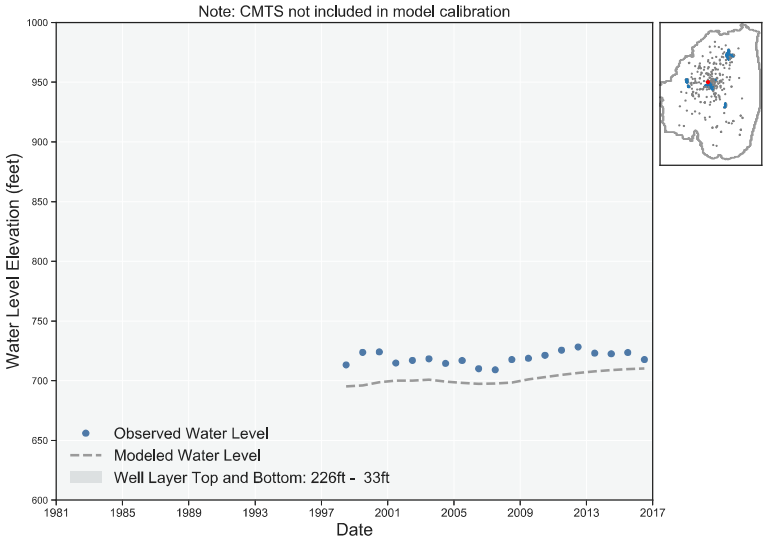
Well 82053 - Aq: CMTS Layers: 11 - 12



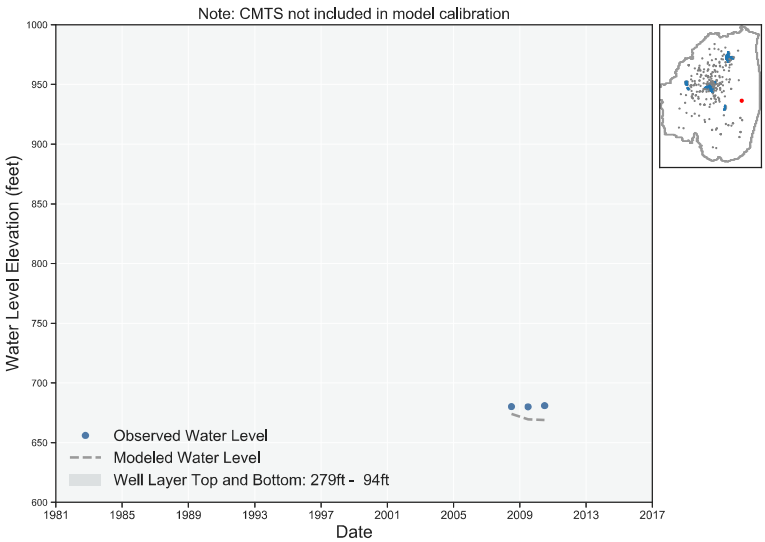
Well 2038 - Aq: CMTS Layers: 12 - 12



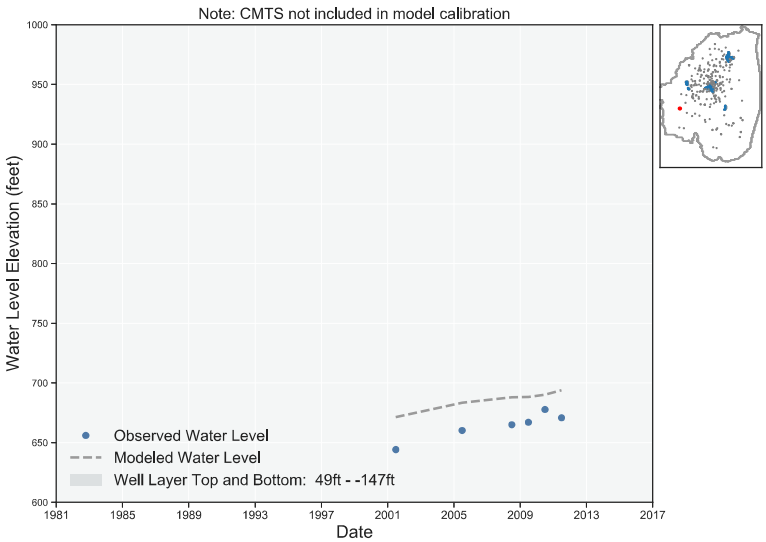
Well 62046 - Aq: CMTS Layers: 12 - 12



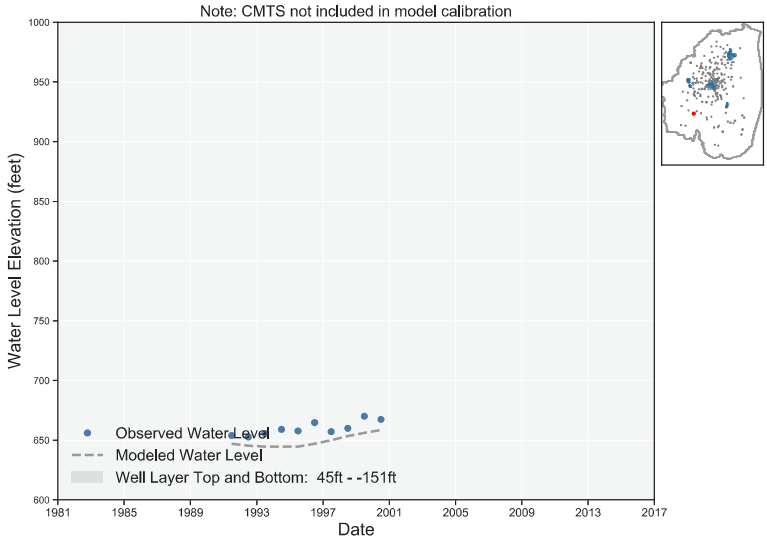
Well 82052 - Aq: CMTS Layers: 12 - 12



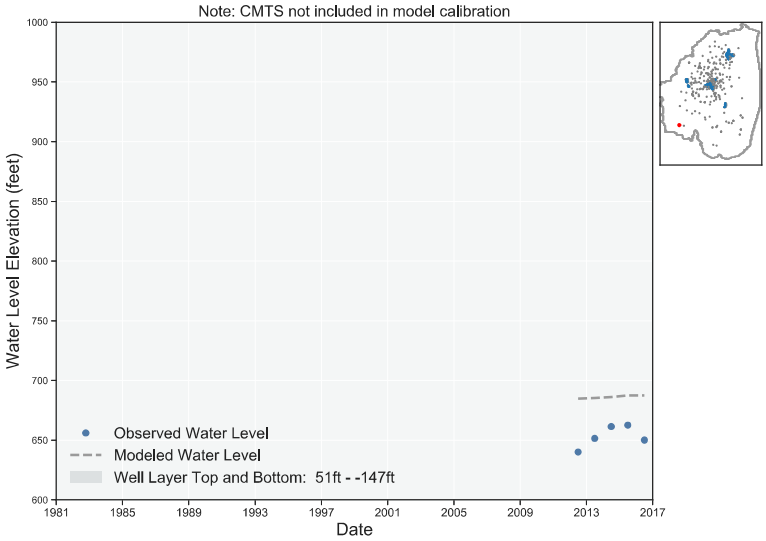
Well 62043 - Aq: CMTS Layers: 12 - 12



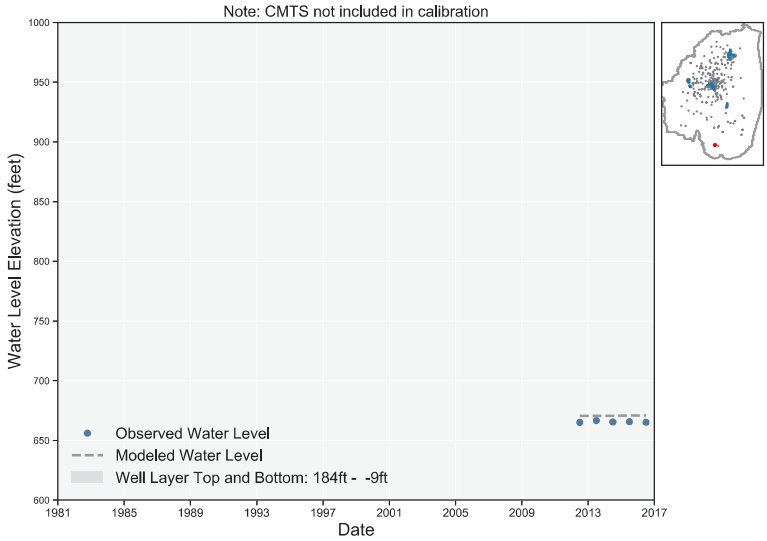
Well 62036 - Aq: CMTS Layers: 12 - 12



Well 27069 - Aq: CMTS Layers: 12 - 12

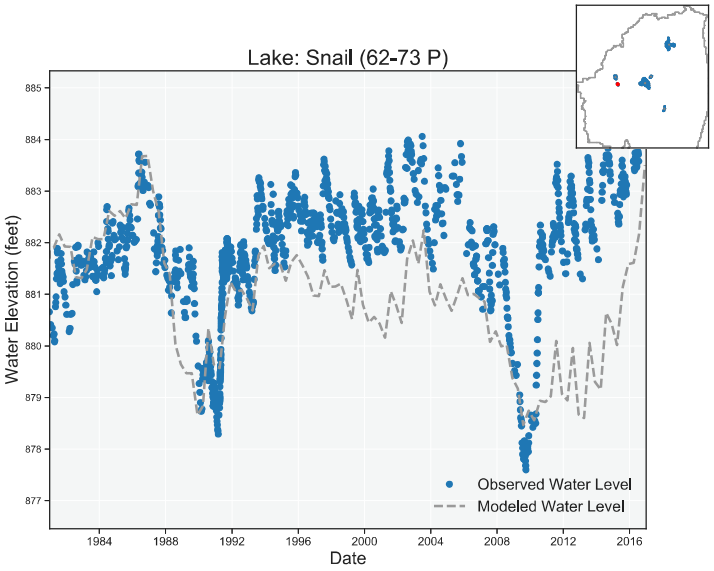


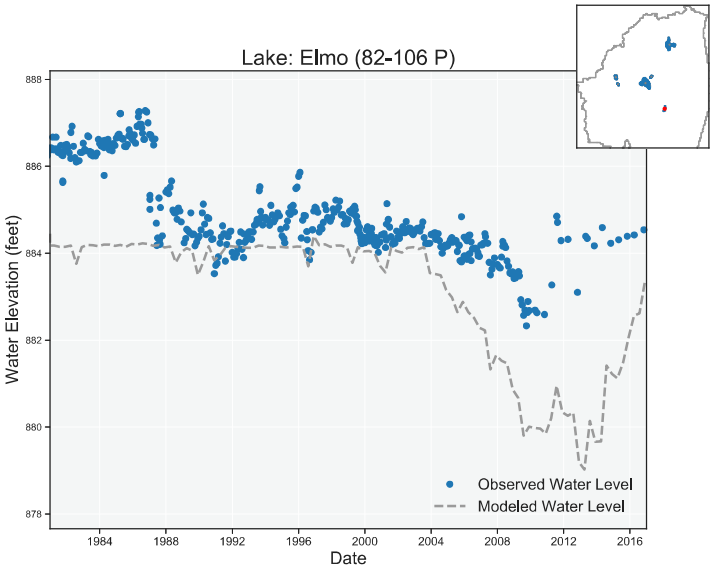
Well 82056 - Aq: CMTS Layers: 12 - 12

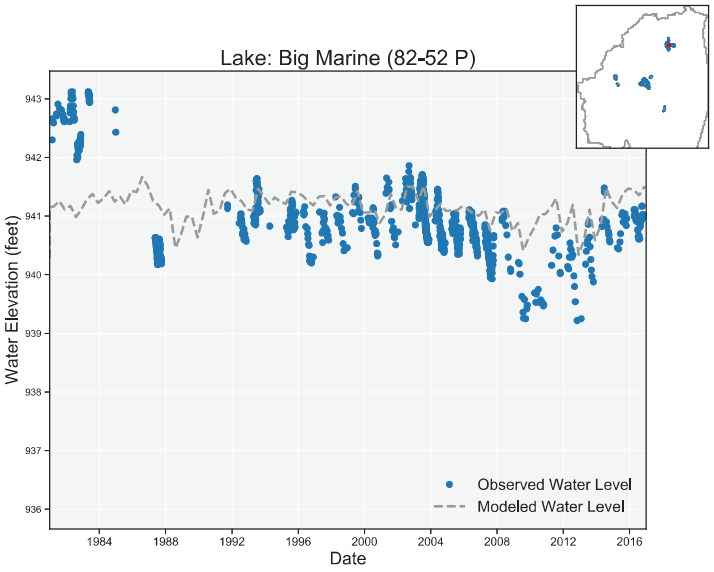


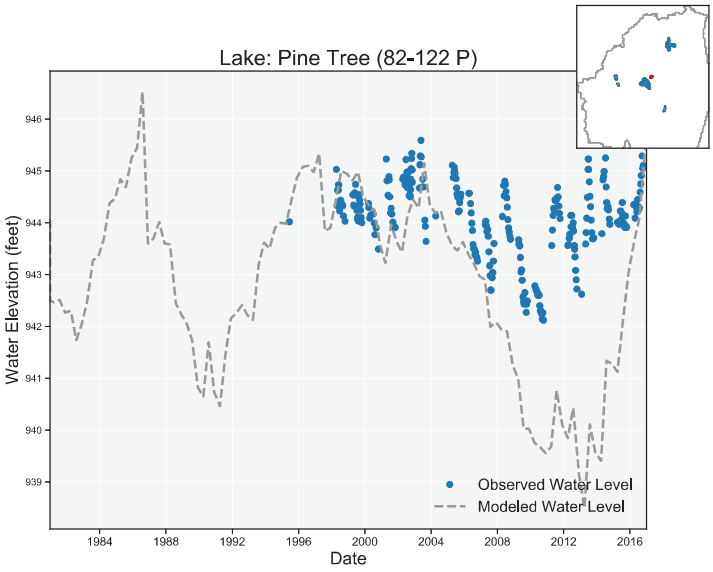
Appendix B-4

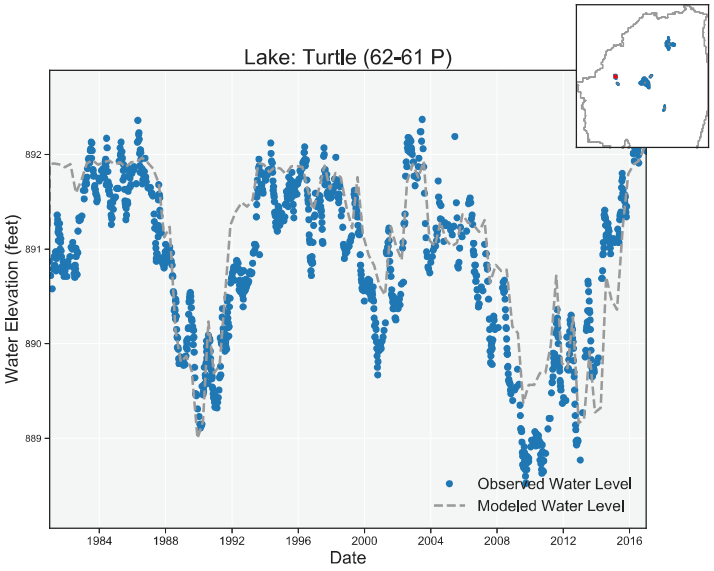
Auto-scaled Plots for the Triannual Stress Period Model

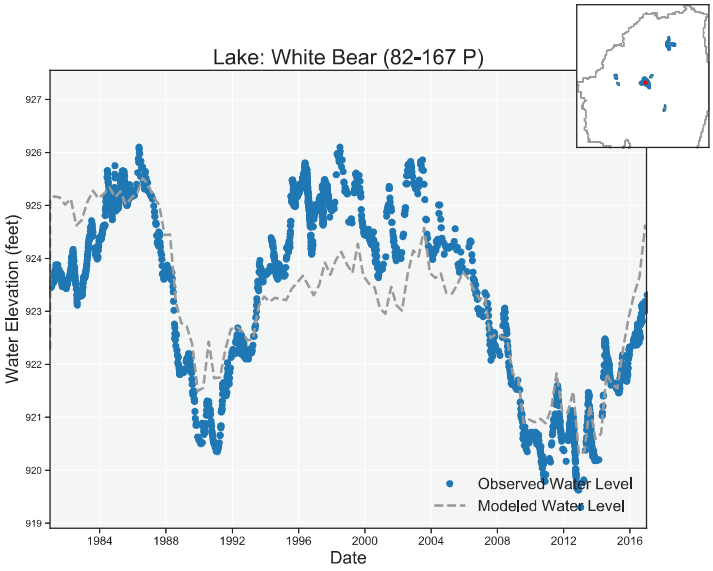

Lake: Snail (62-73 P)
Water Elevation (feet)
885
884
883
882
881
880
879
878
877
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Elmo (82-106 P)
Water Elevation (feet)
888
886
884
882
880
878
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

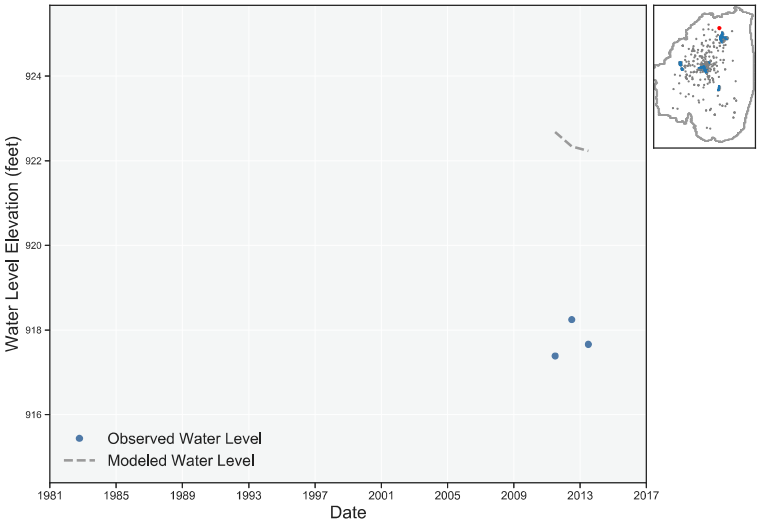

Lake: Big Marine (82-52 P)
Water Elevation (feet)
943
942
941
940
939
938
937
936
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: Pine Tree (82-122 P)
Water Elevation (feet)
946
945
944
943
942
941
940
939
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

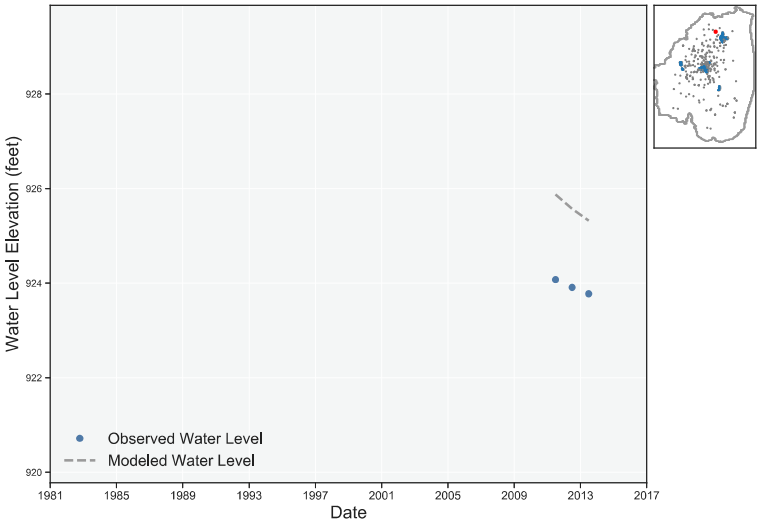

Lake: Turtle (62-61 P)
Water Elevation (feet)
892
891
890
889
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level


Lake: White Bear (82-167 P)
Water Elevation (feet)
927
926
925
924
923
922
921
920
919
1984
1988
1992
1996
2000
2004
2008
2012
2016
Date
Observed Water Level
Modeled Water Level

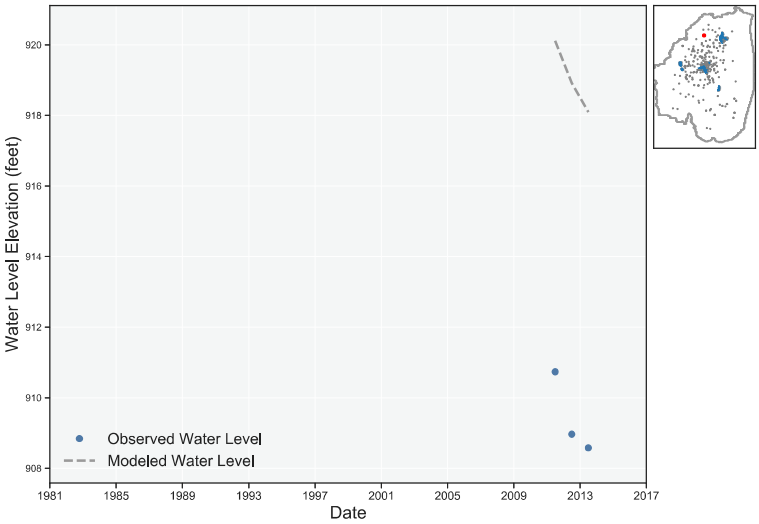
Well 138275 - Aq: QBAA Layers: 4 - 4



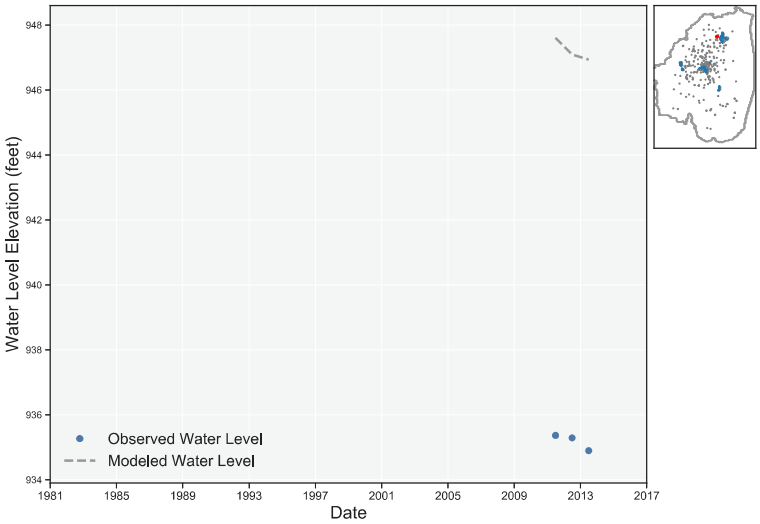
Well 446292 - Aq: QBAA Layers: 4 - 4



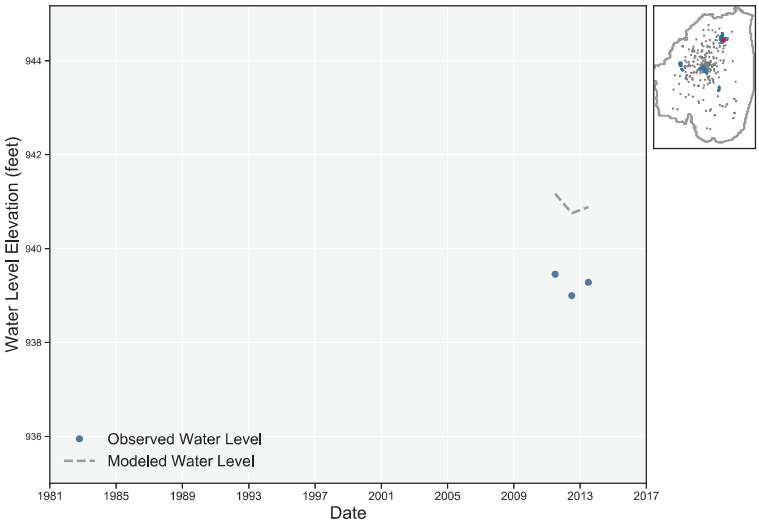
Well 404644 - Aq: QBAA Layers: 4 - 4



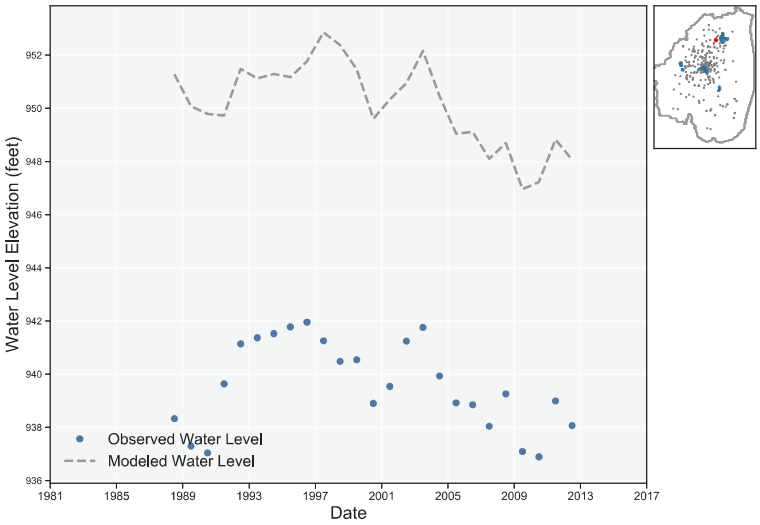
Well 112422 - Aq: QBAA Layers: 4 - 4



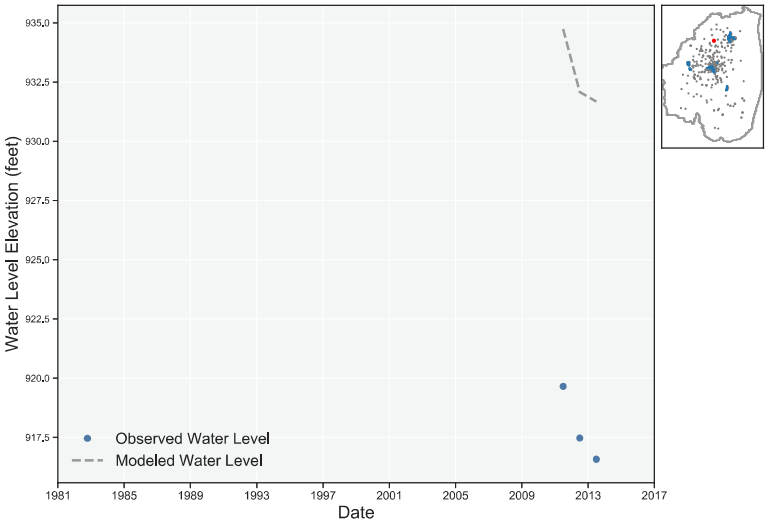
Well 139010 - Aq: QBAA Layers: 4 - 4



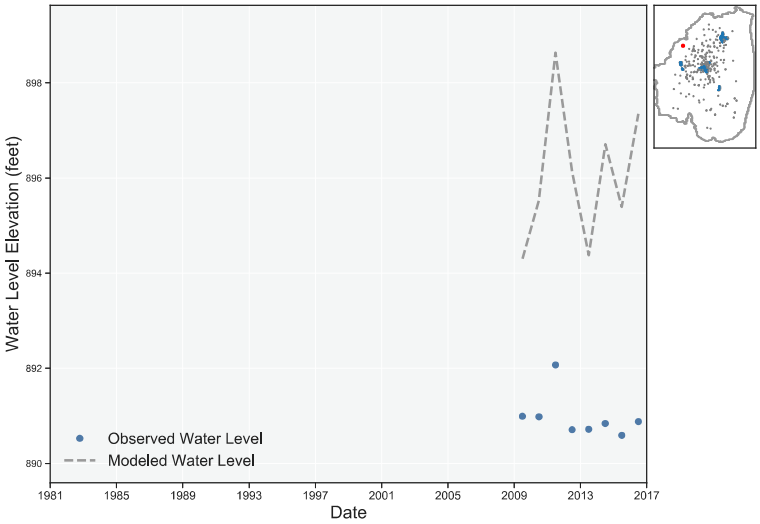
Well 82036 - Aq: QWTA Layers: 4 - 4



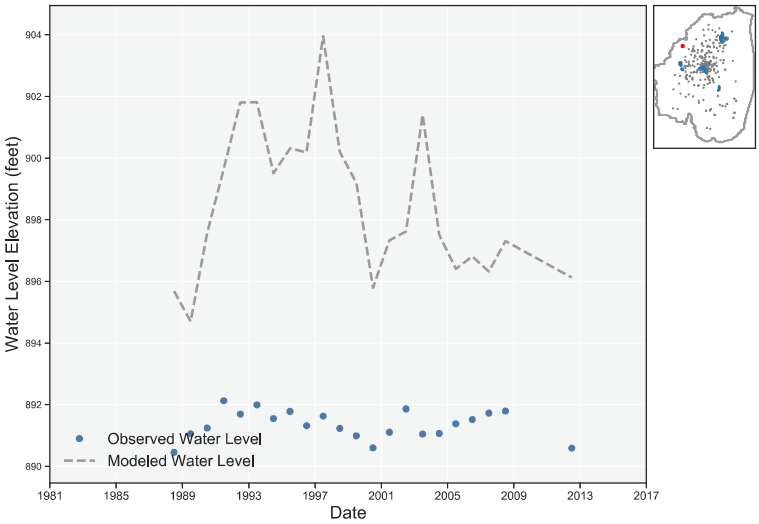
Well 136144 - Aq: QBAA Layers: 4 - 4



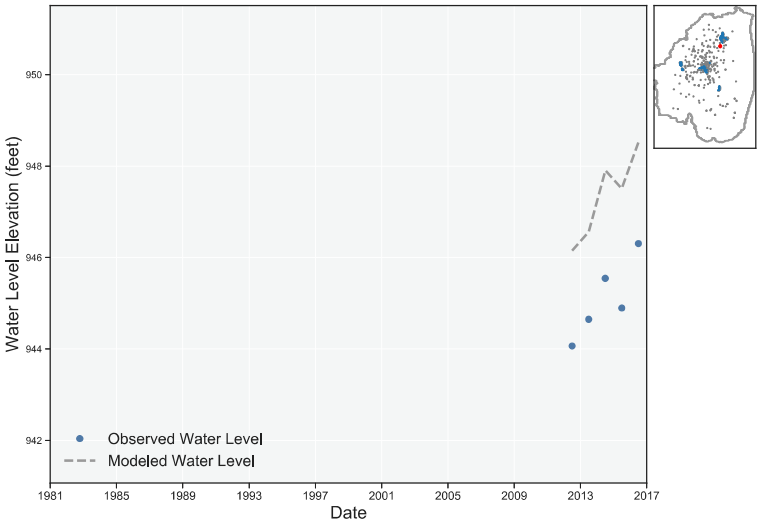
Well 2030 - Aq: QWTA Layers: 4 - 4



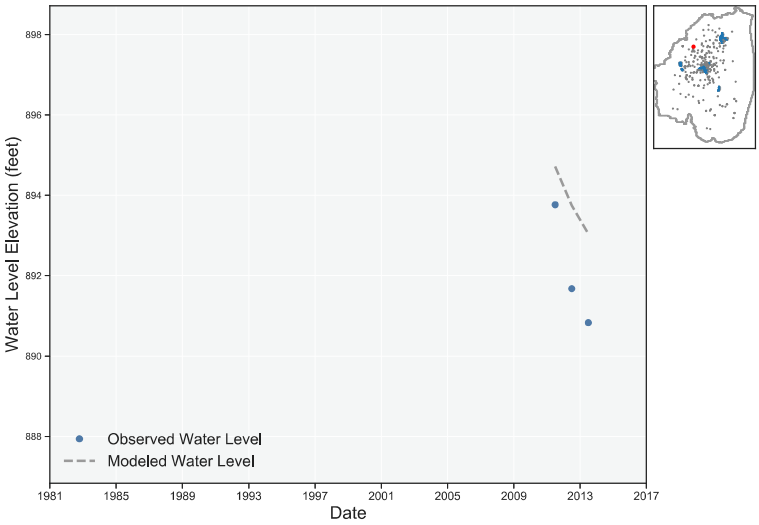
Well 2010 - Aq: QWTA Layers: 4 - 4



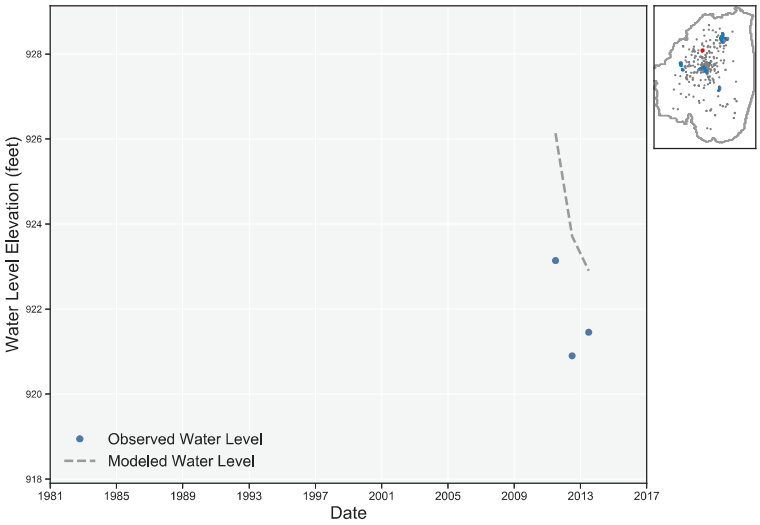
Well 82055 - Aq: QBAA Layers: 4 - 4



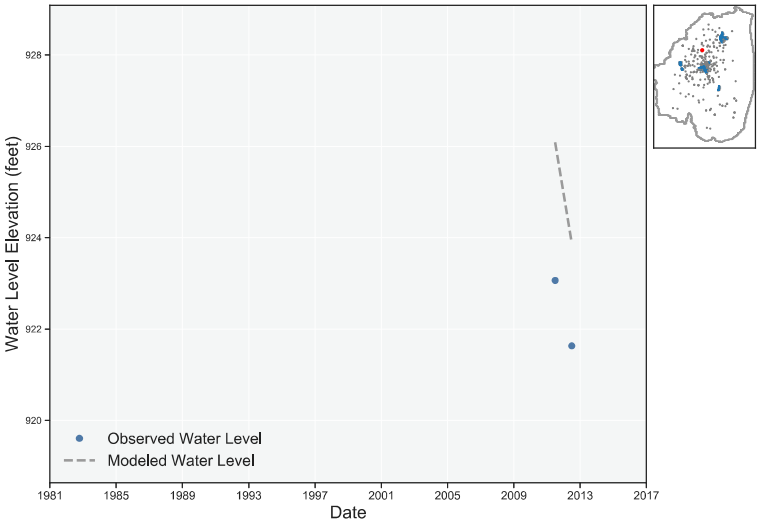
Well 169252 - Aq: QBAA Layers: 4 - 4



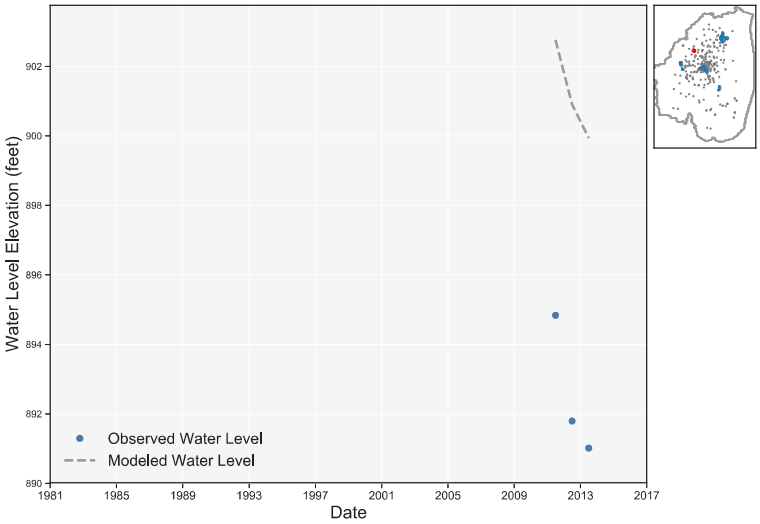
Well 620717 - Aq: QWTA Layers: 4 - 4



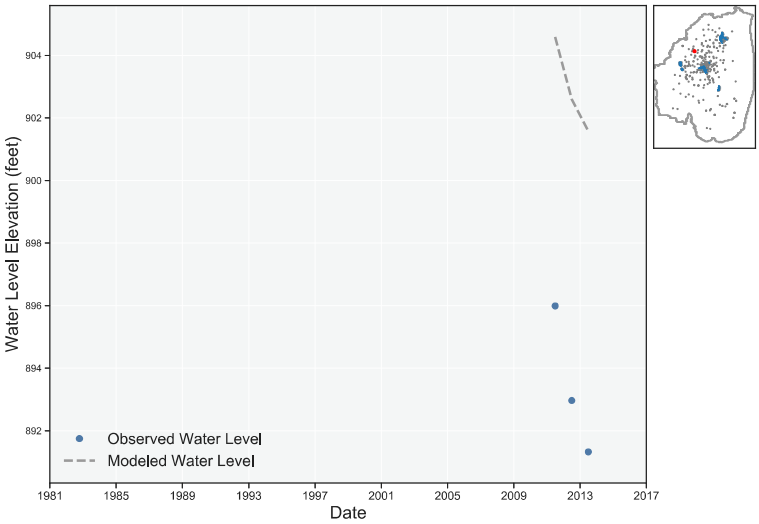
Well 620718 - Aq: QWTA Layers: 4 - 4



Well 435278 - Aq: QBAA Layers: 4 - 4



Well 435308 - Aq: QBAA Layers: 4 - 4



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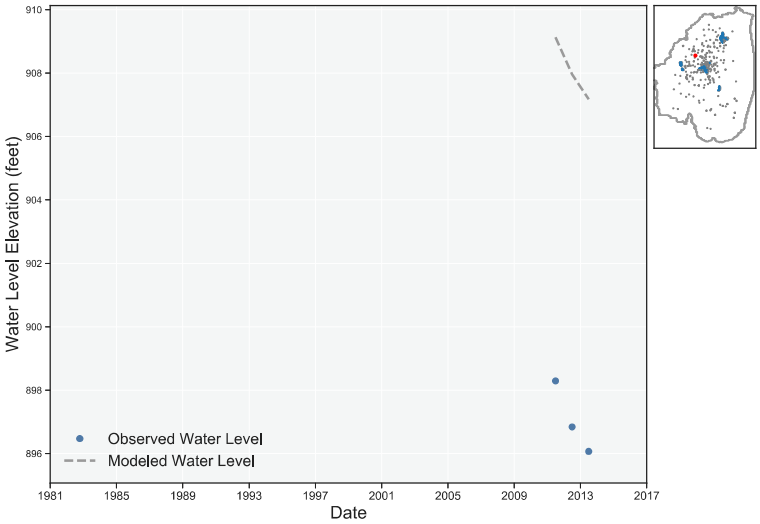

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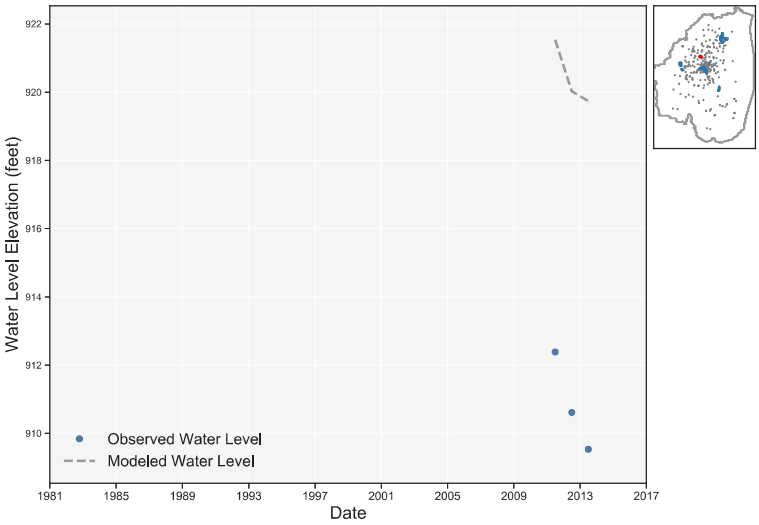

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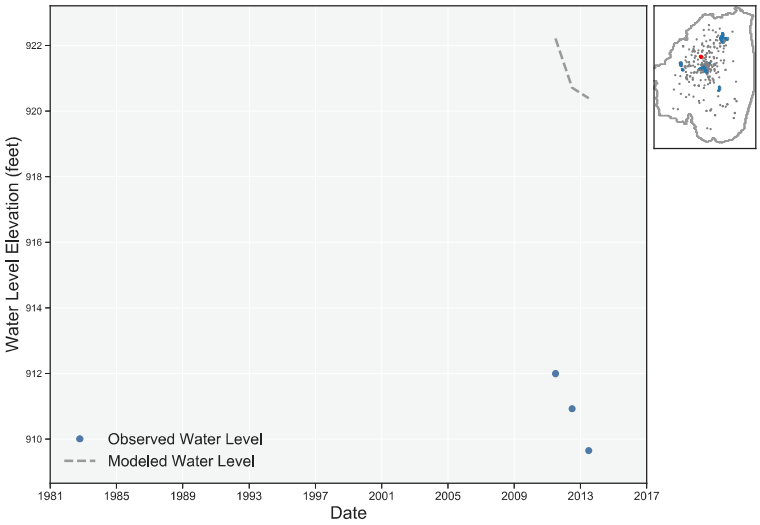

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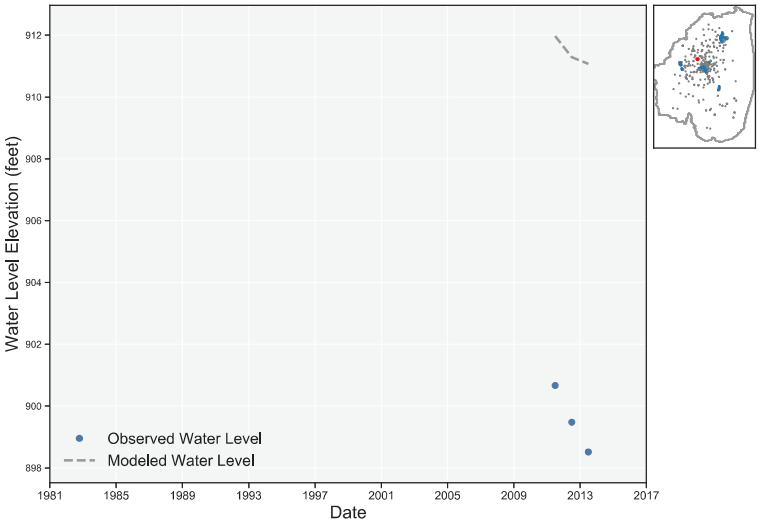

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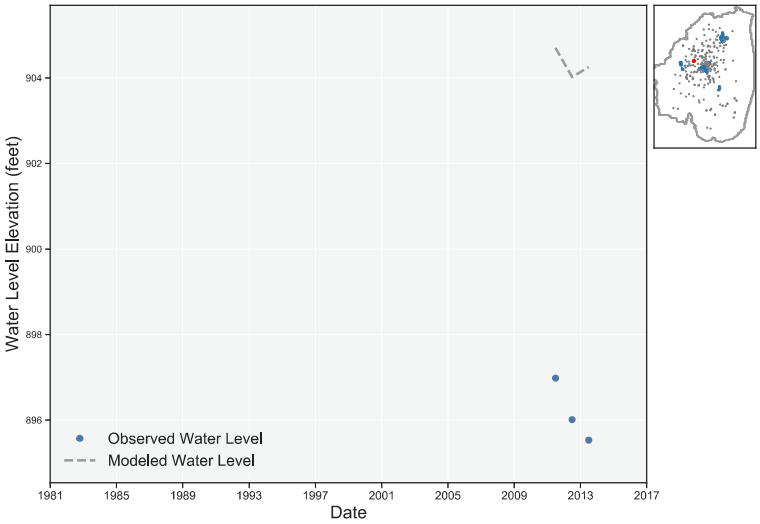
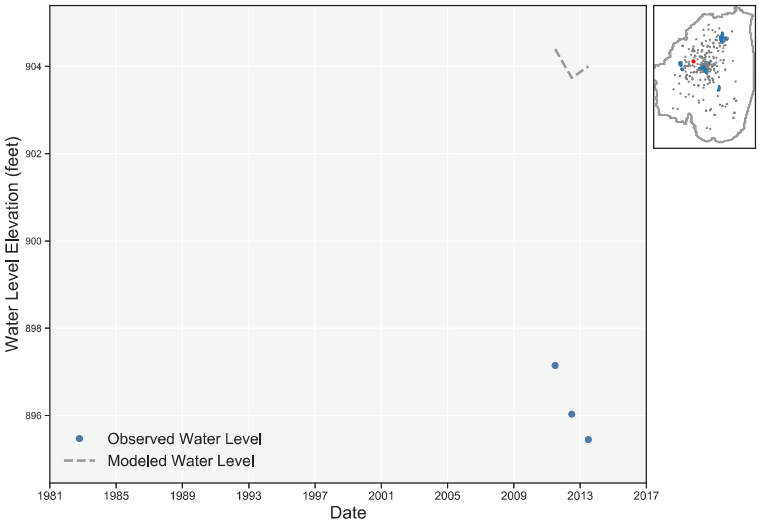


Well 130810 - Aq: QBAA Layers: 4 - 4



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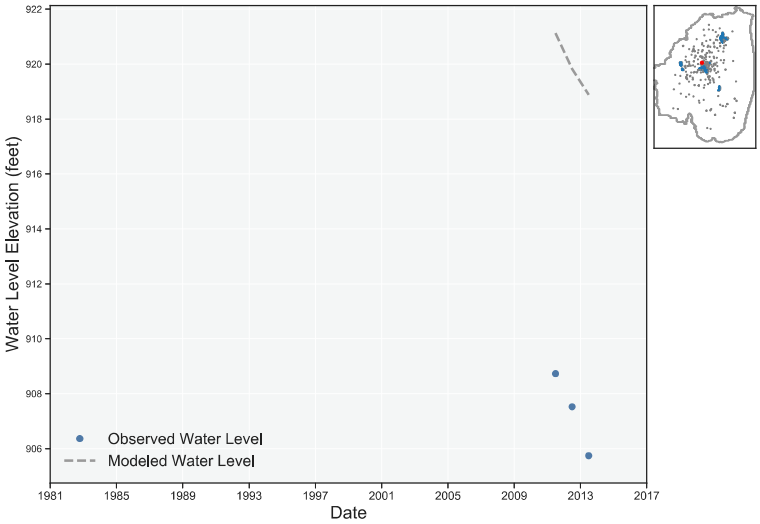

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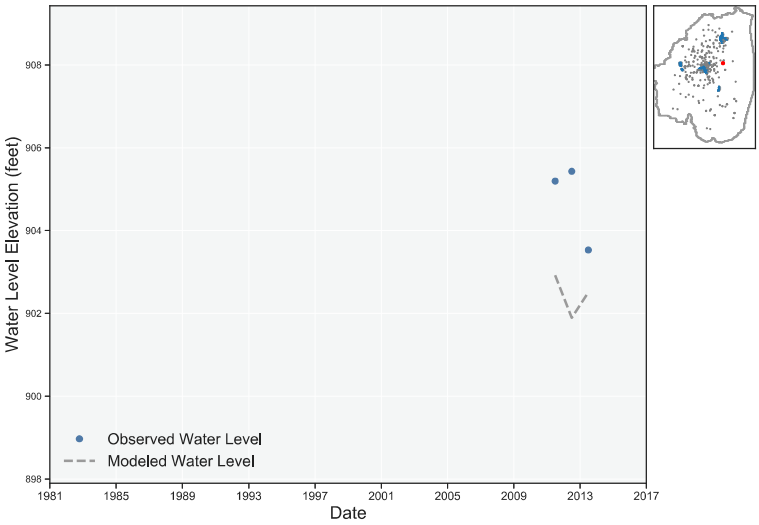

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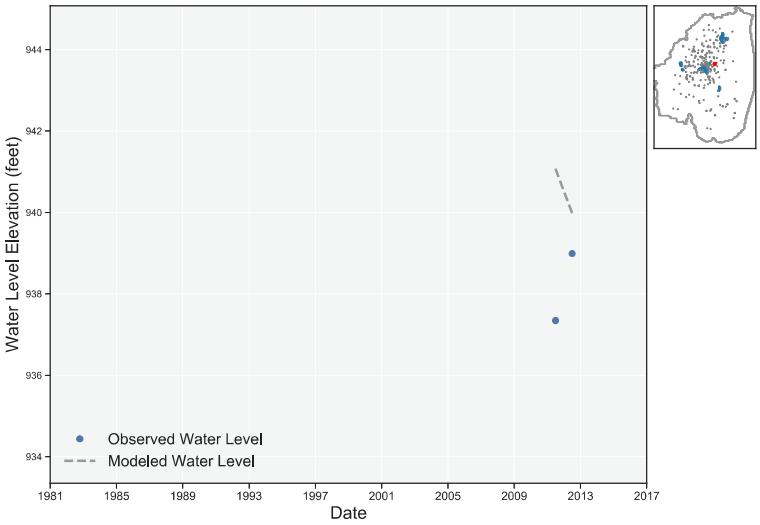

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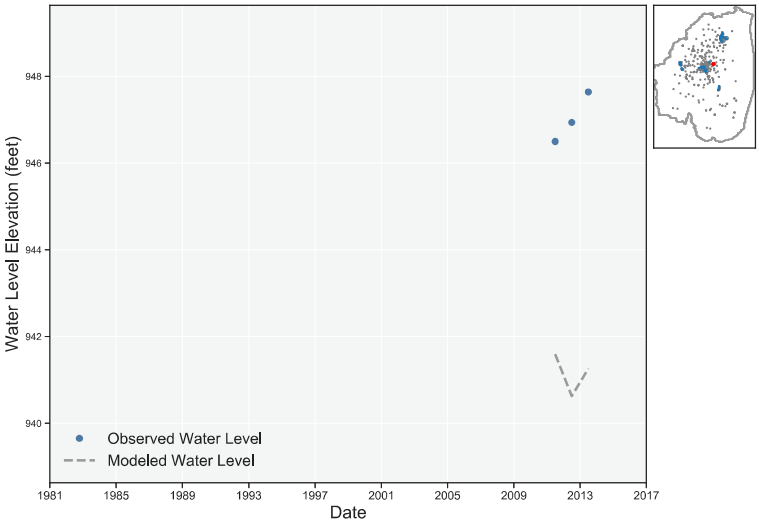

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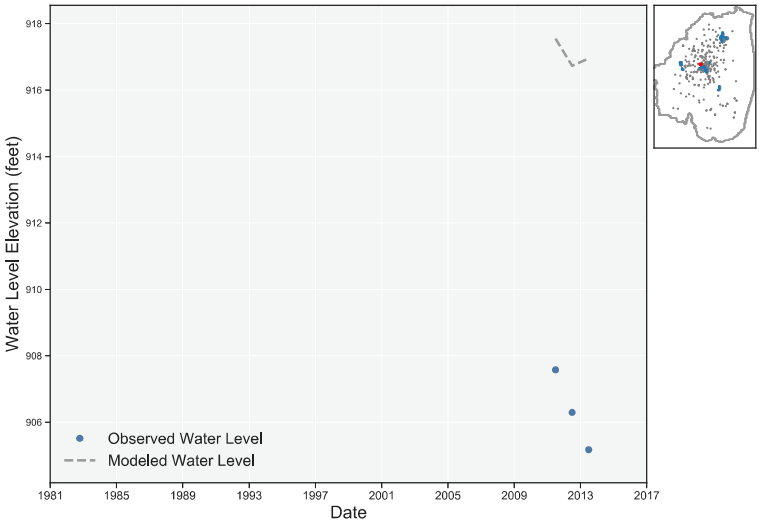

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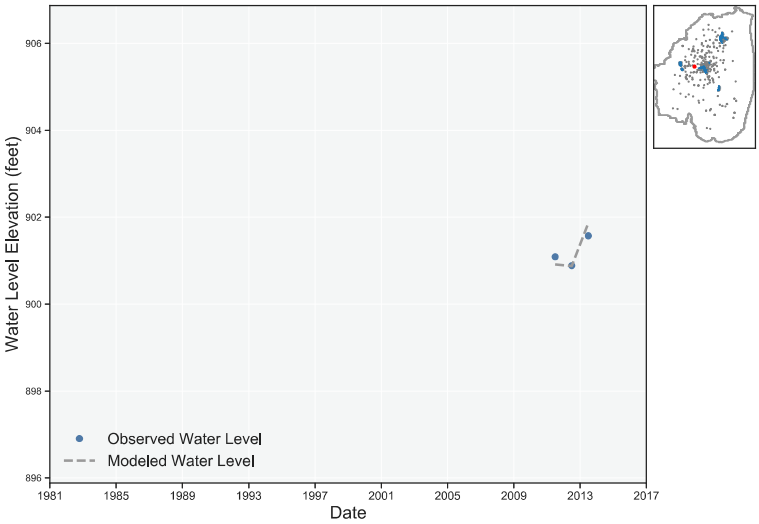
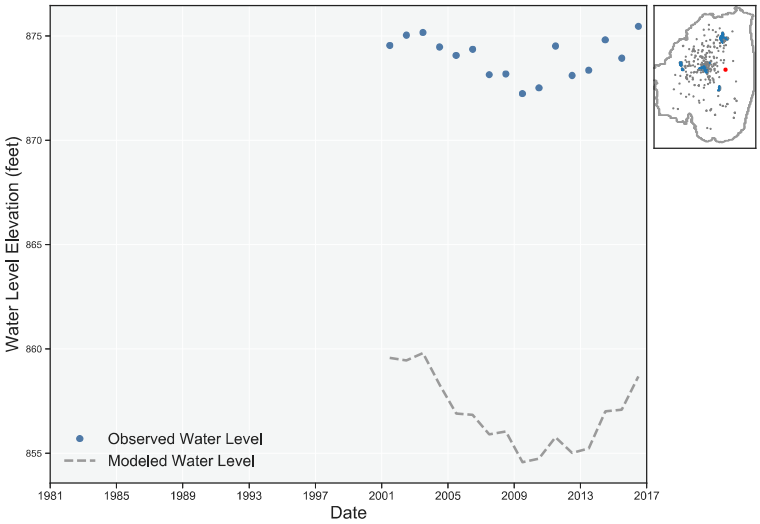


Well 82048 - Aq: QBAA Layers: 4 - 4



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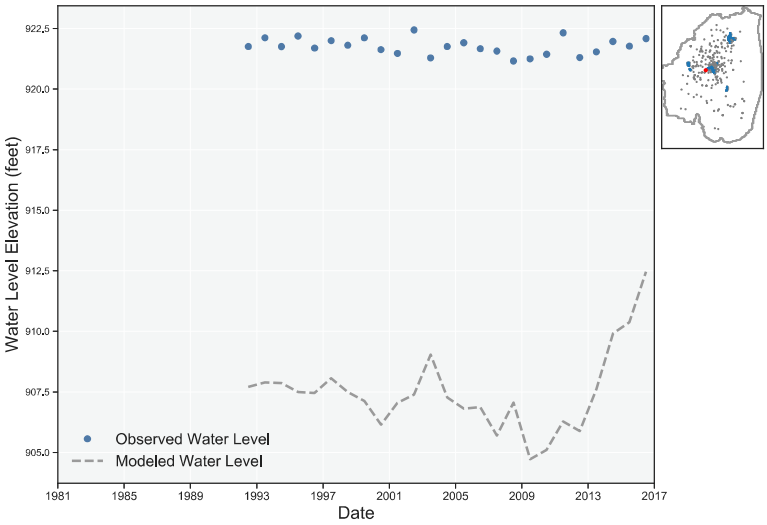

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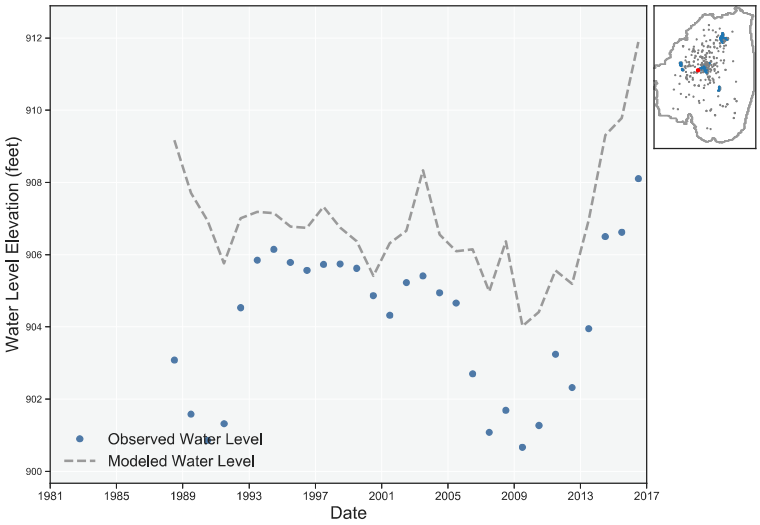

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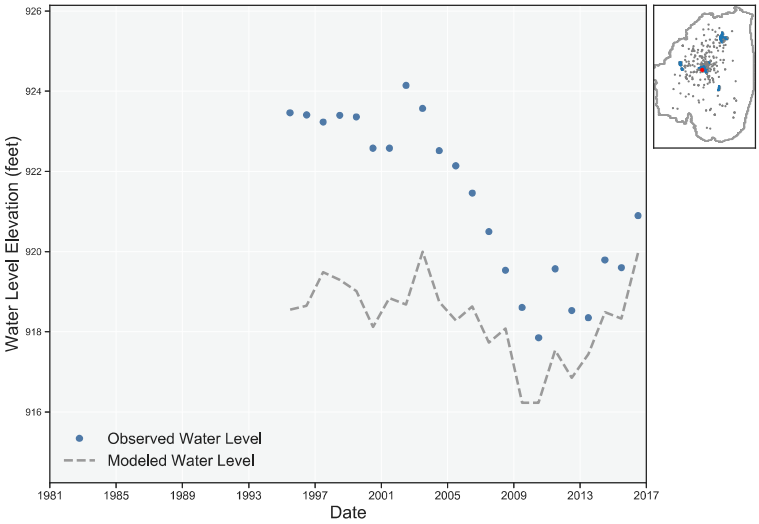

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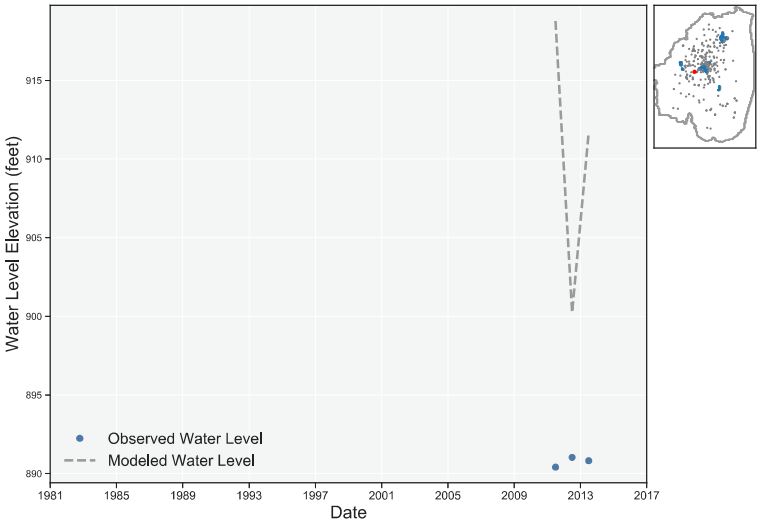

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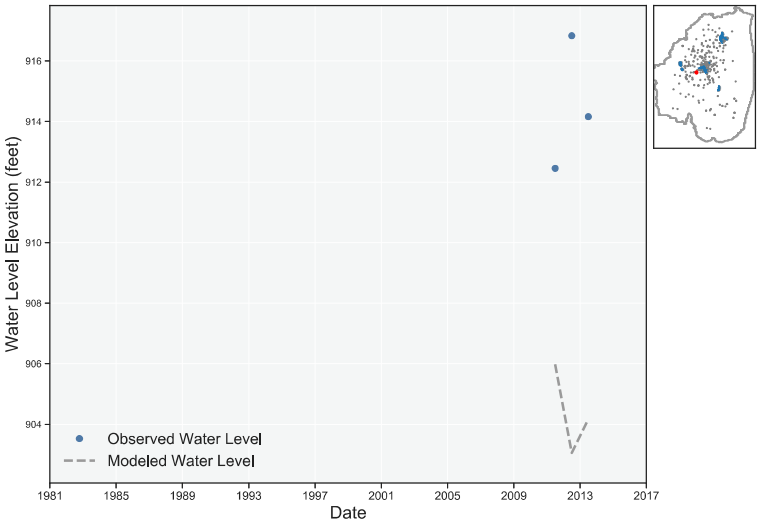

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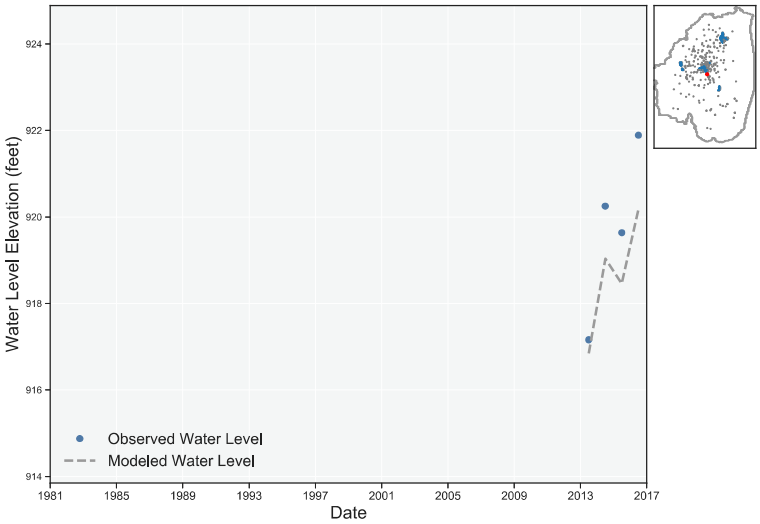
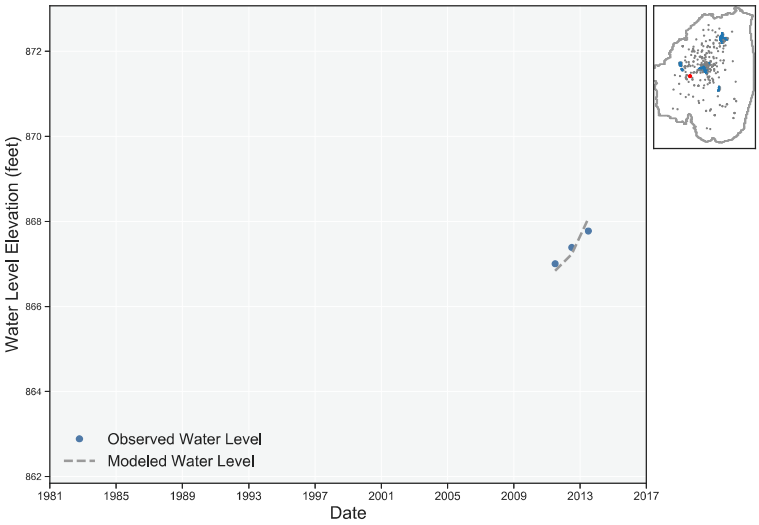


Well 107006 - Aq: QBAA Layers: 4 - 4



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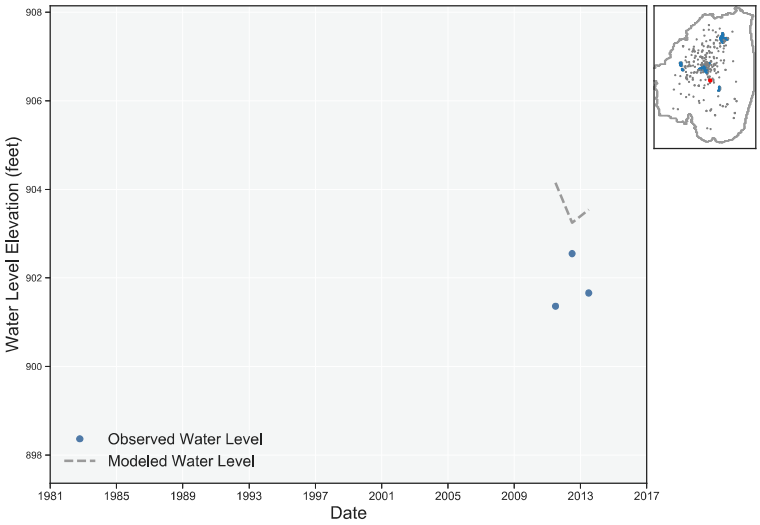

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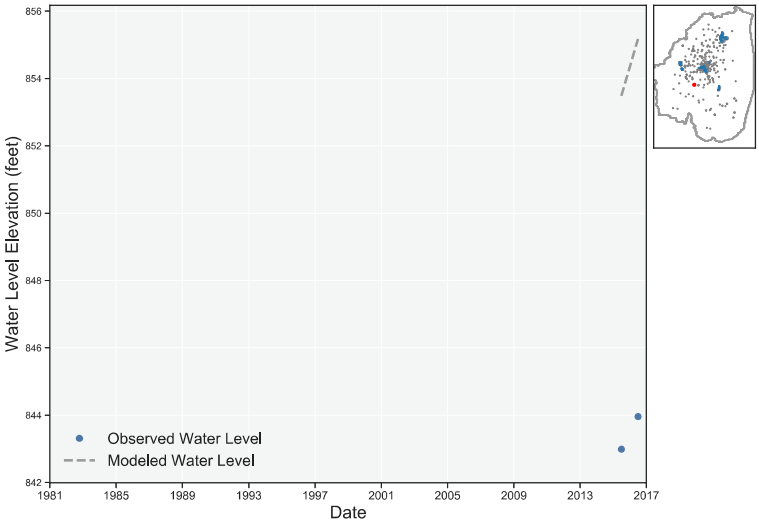

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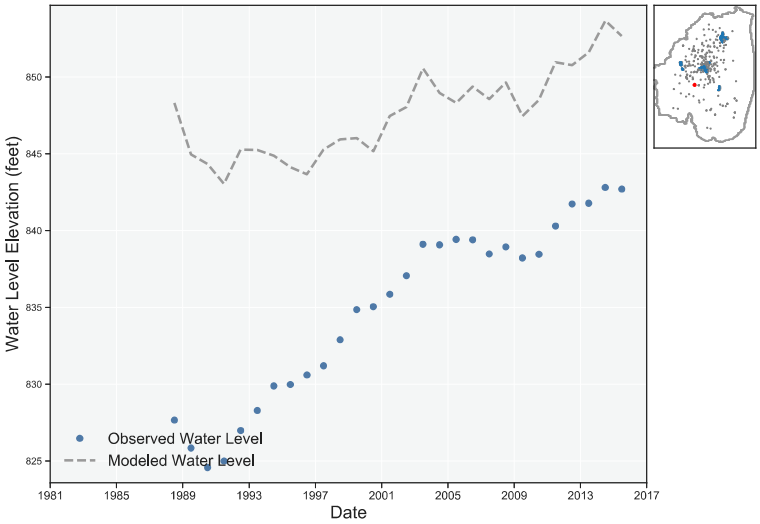
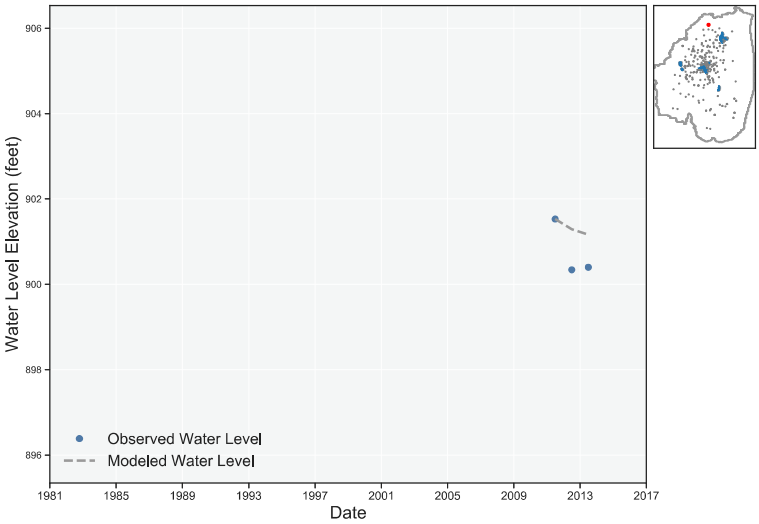


Well 178258 - Aq: QBAA Layers: 5 - 5



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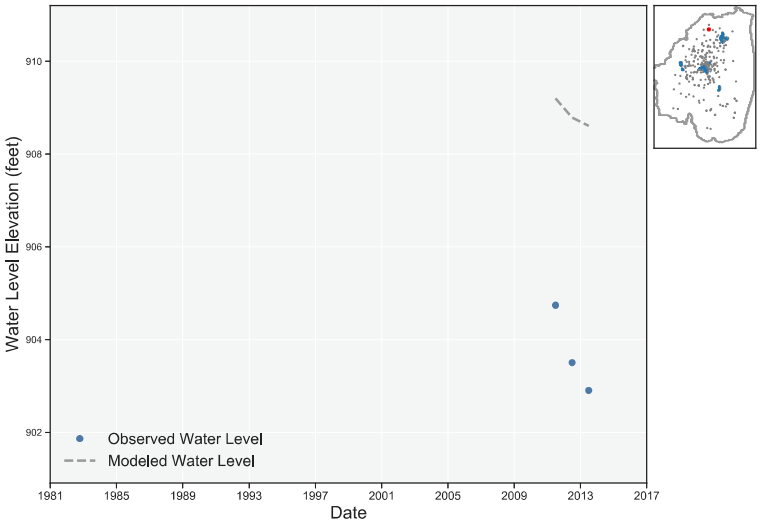

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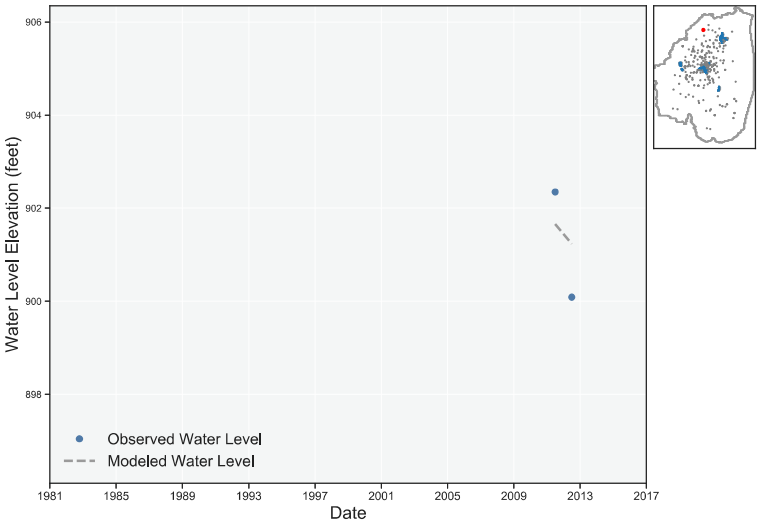

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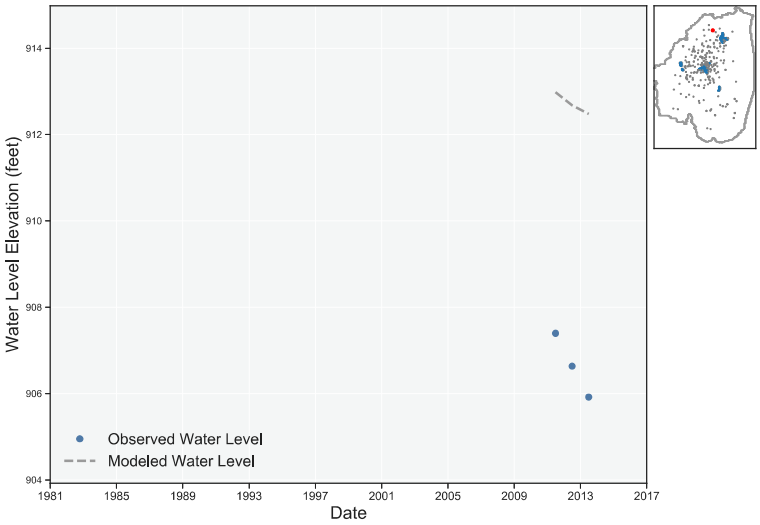

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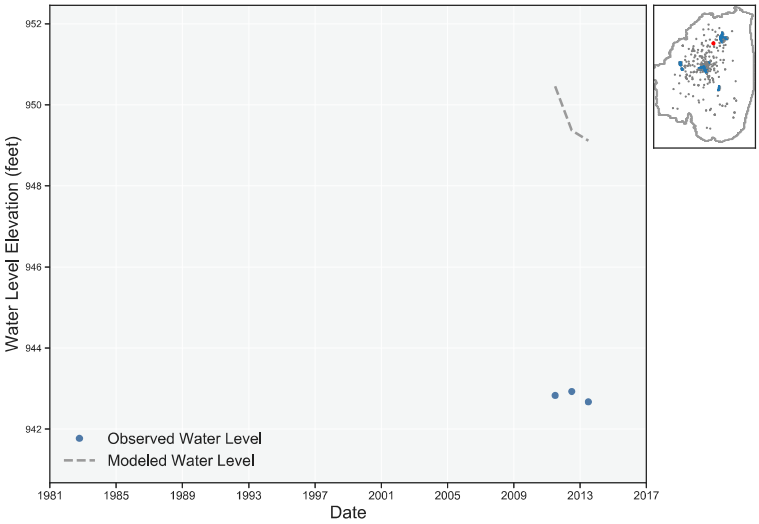

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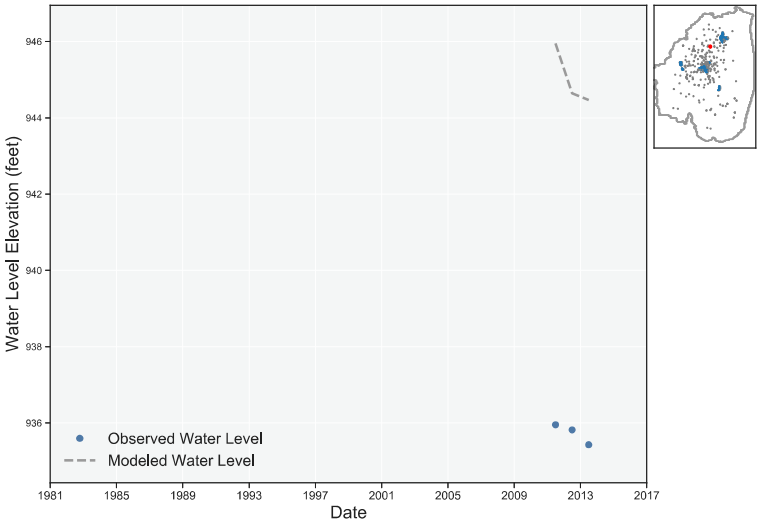

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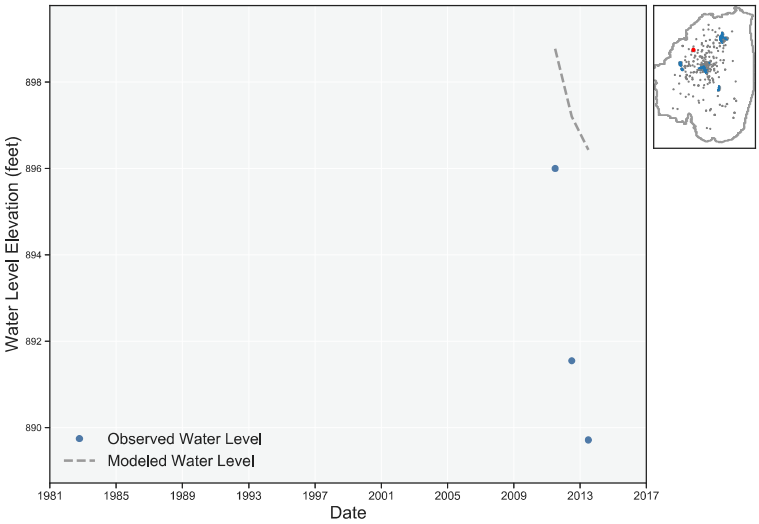

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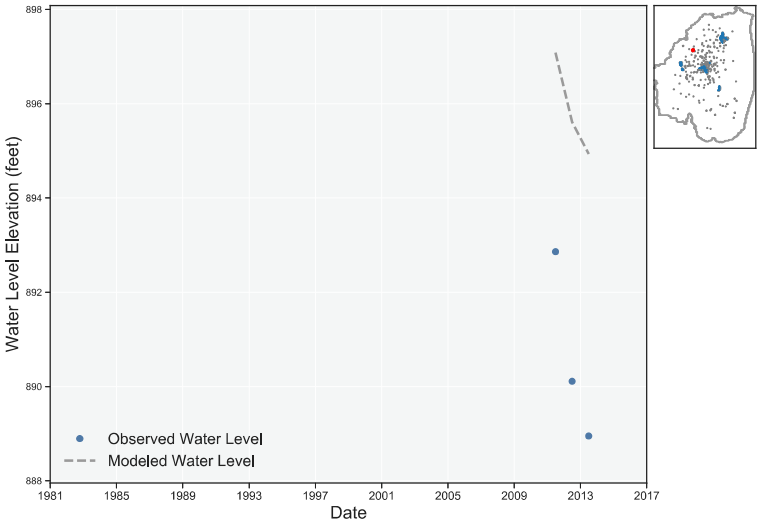

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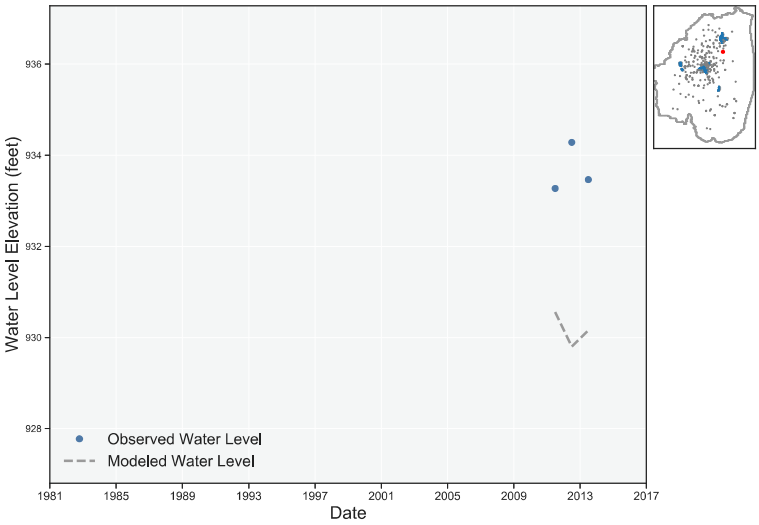

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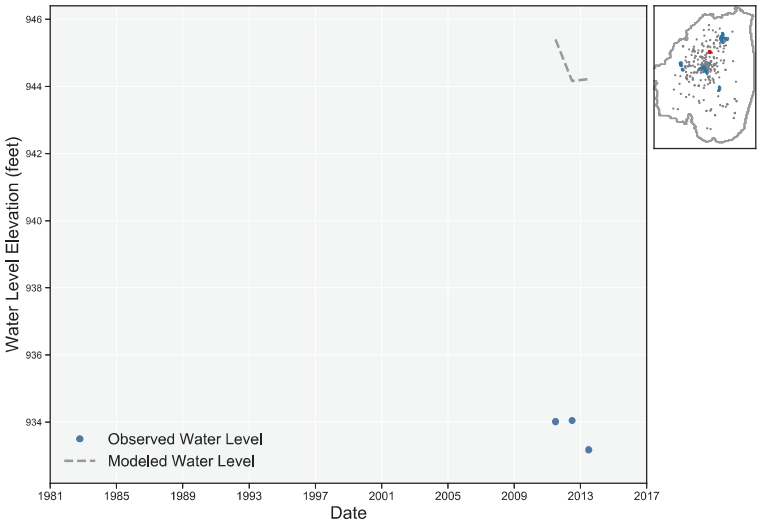

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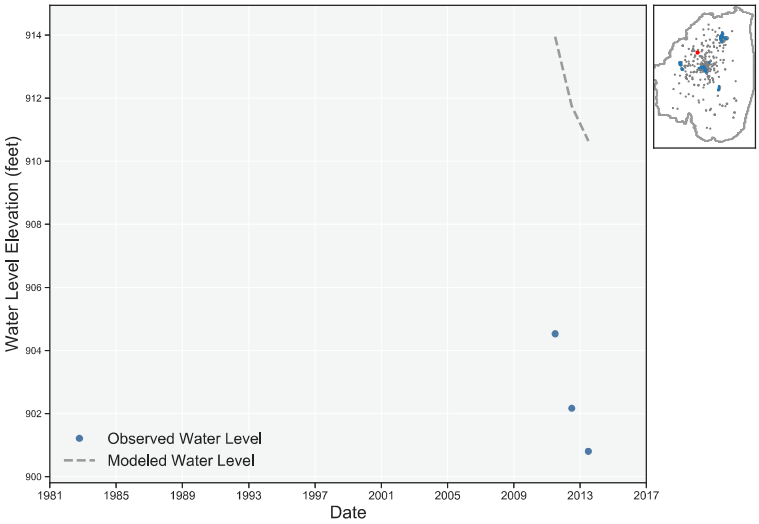

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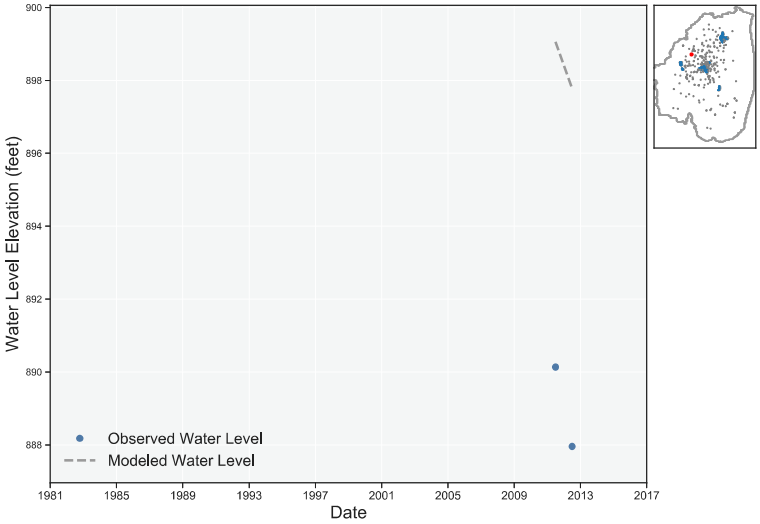

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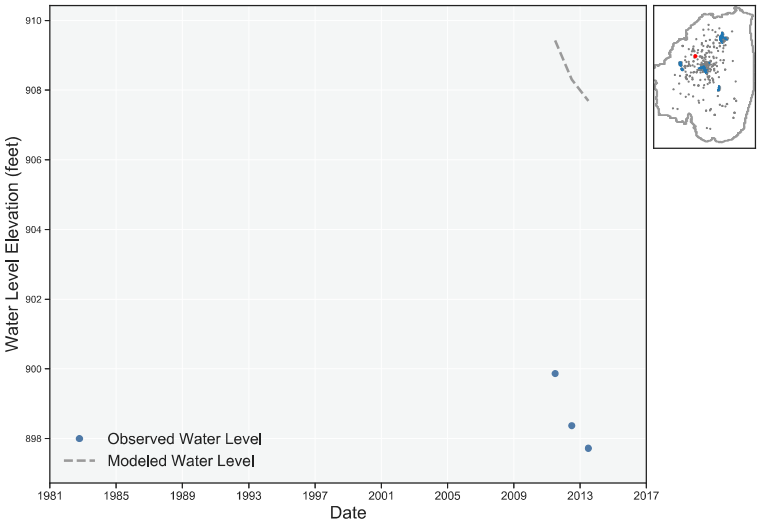

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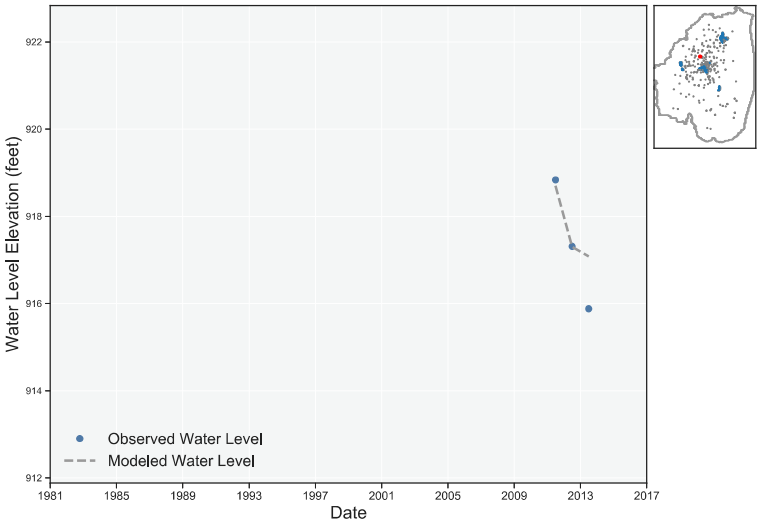

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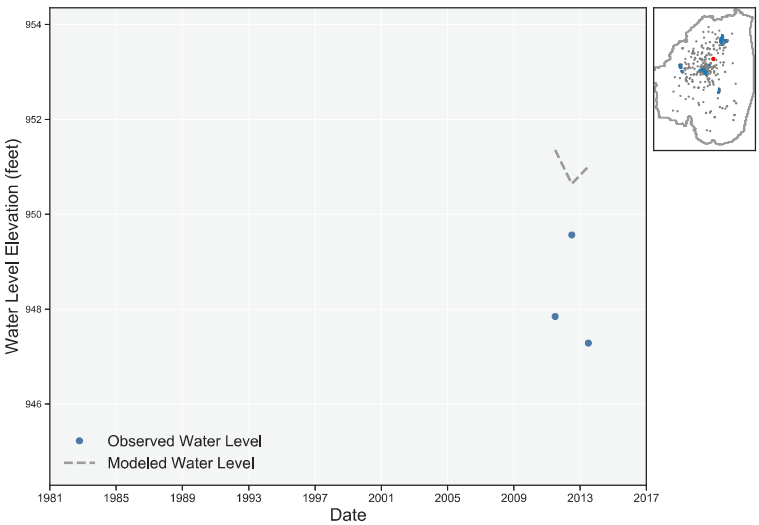

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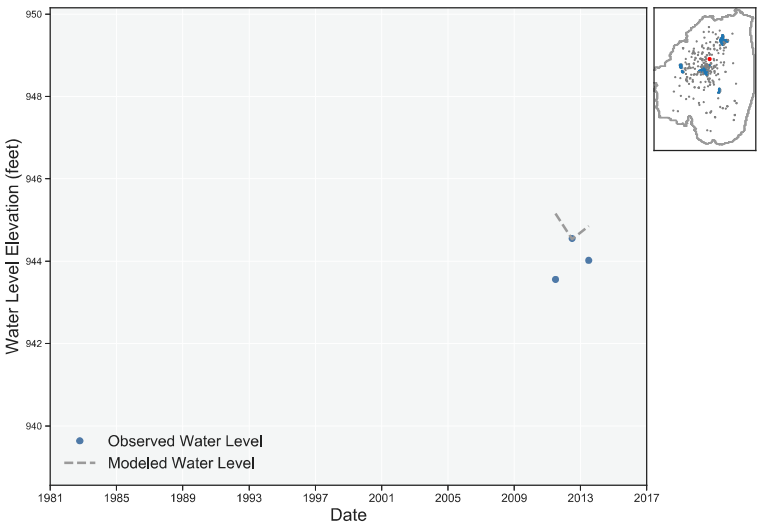

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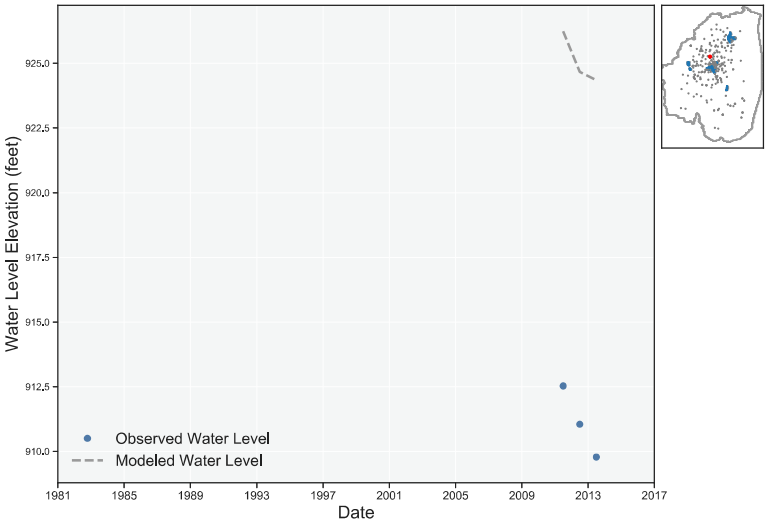

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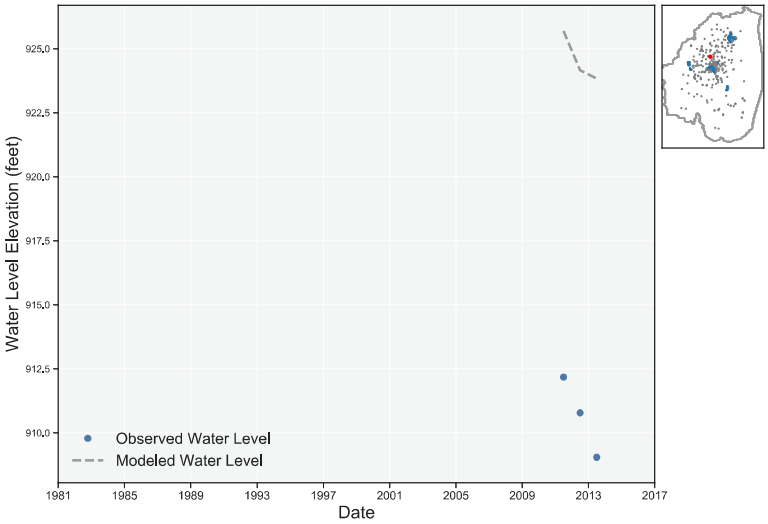

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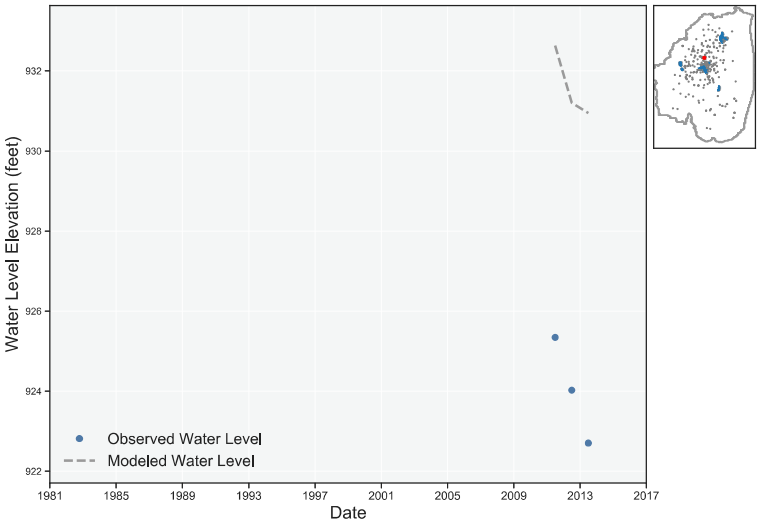

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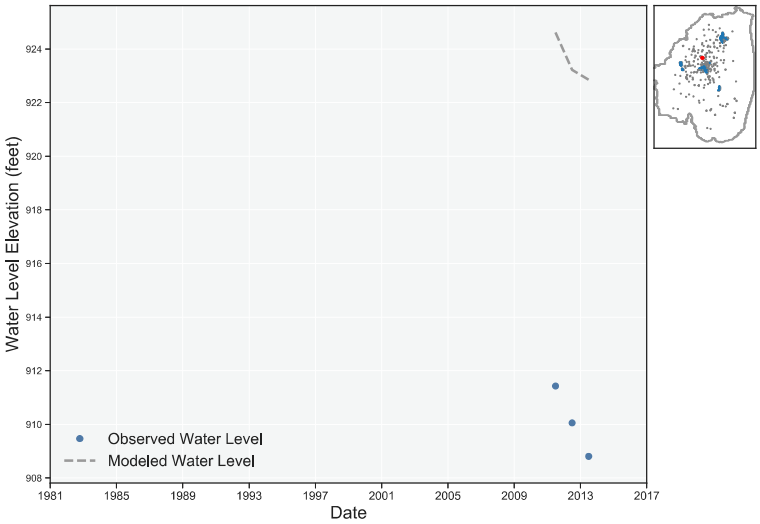

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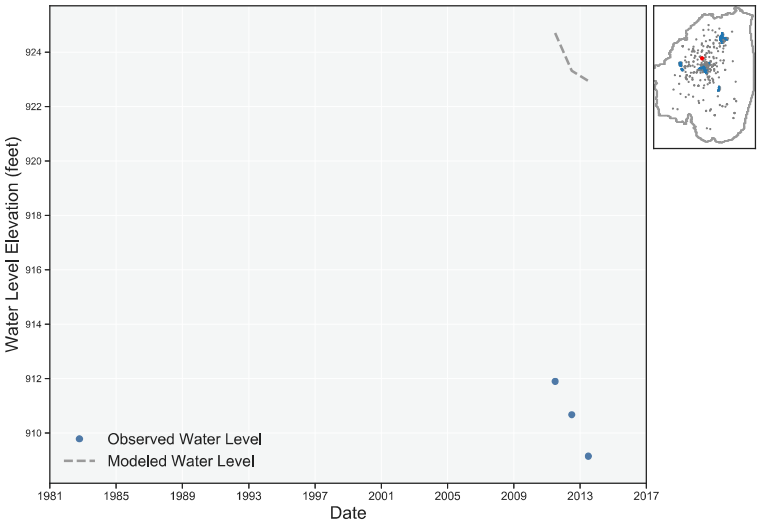

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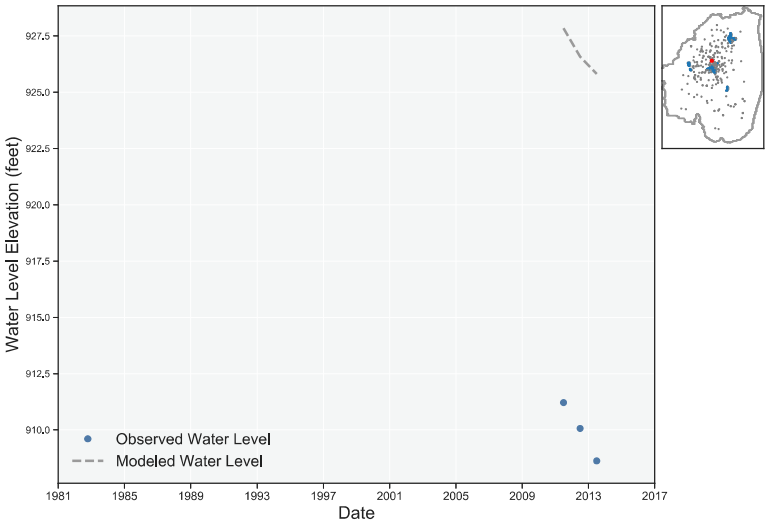

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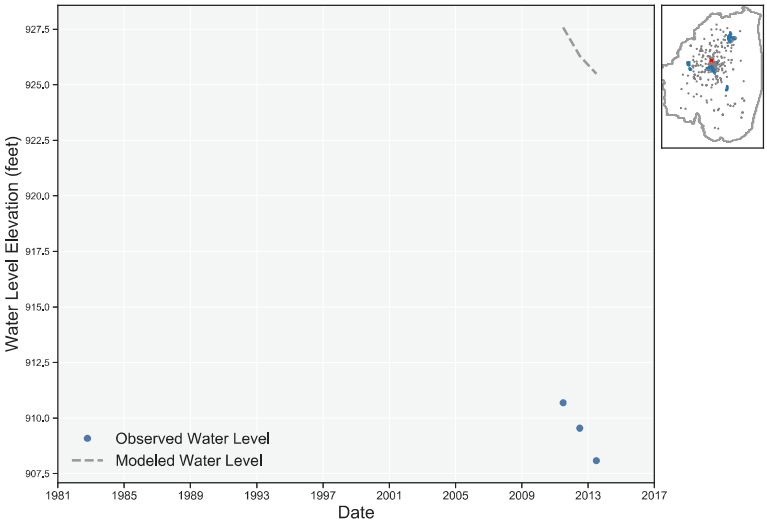

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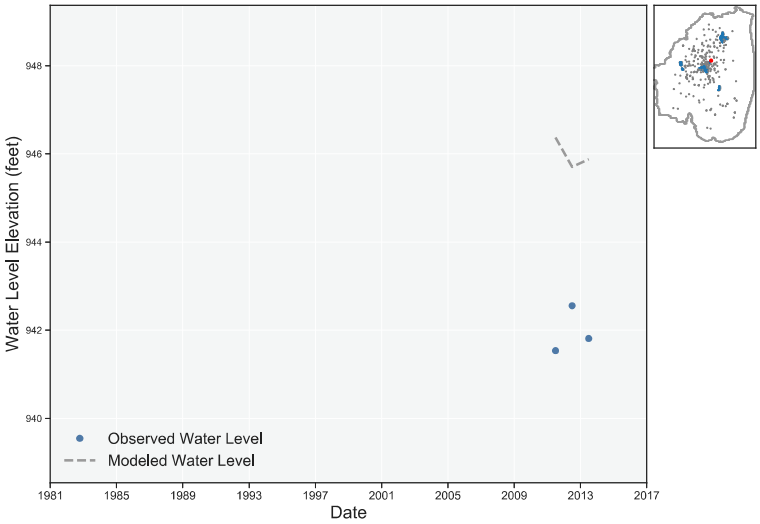

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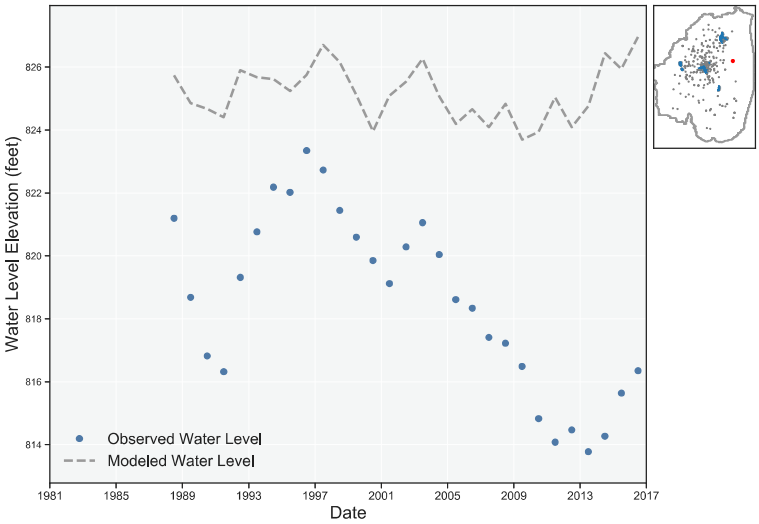

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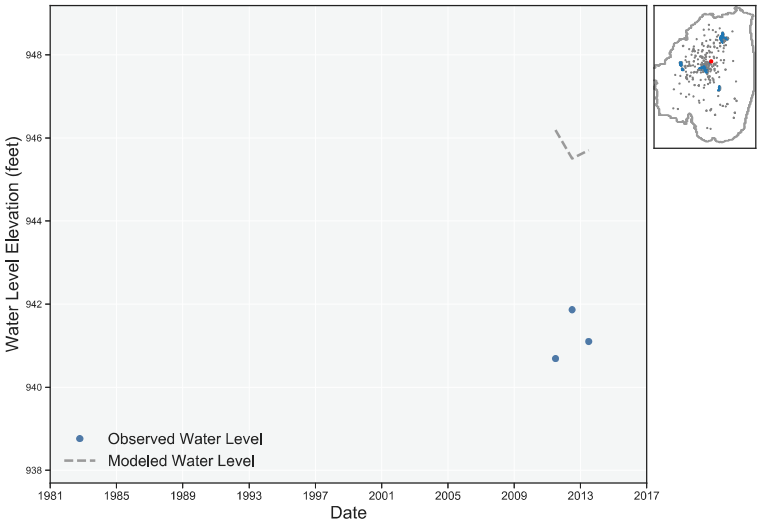
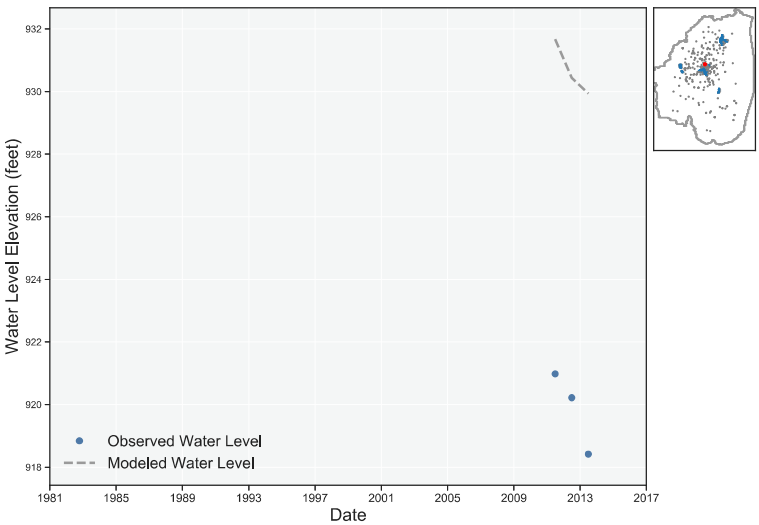
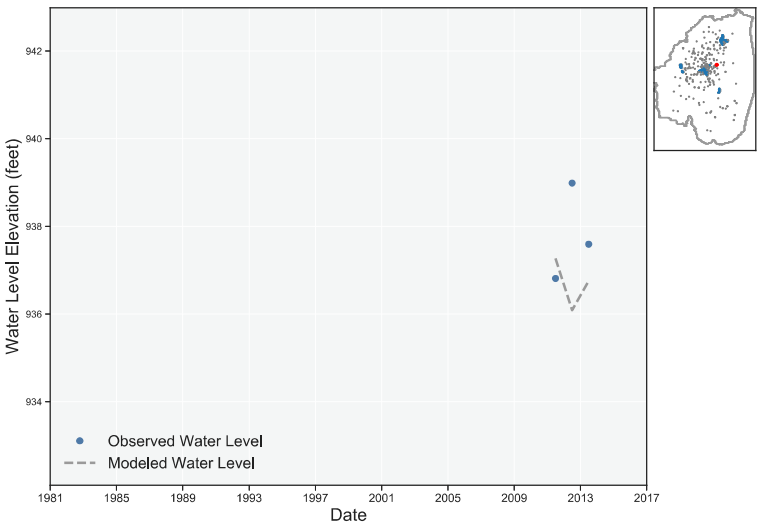


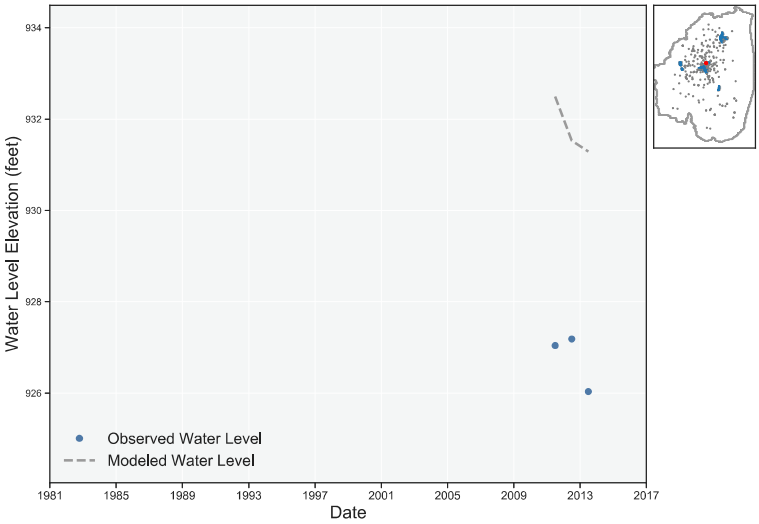
Well 182779 - Aq: MTPL Layers: 5 - 5



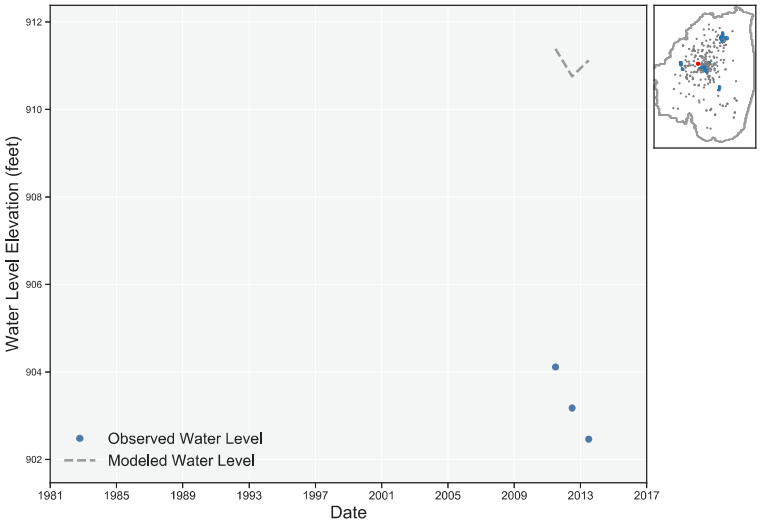
Well 437320 - Aq: OPDC Layers: 5 - 5



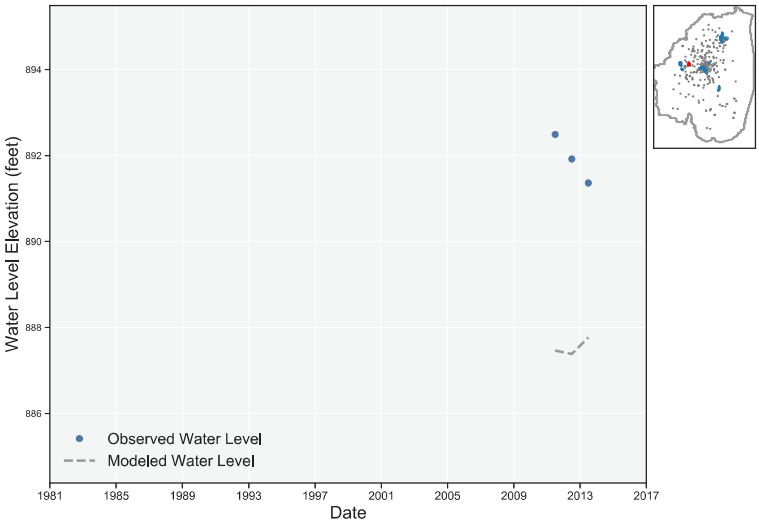
Well 176028 - Aq: OSTP Layers: 5 - 5



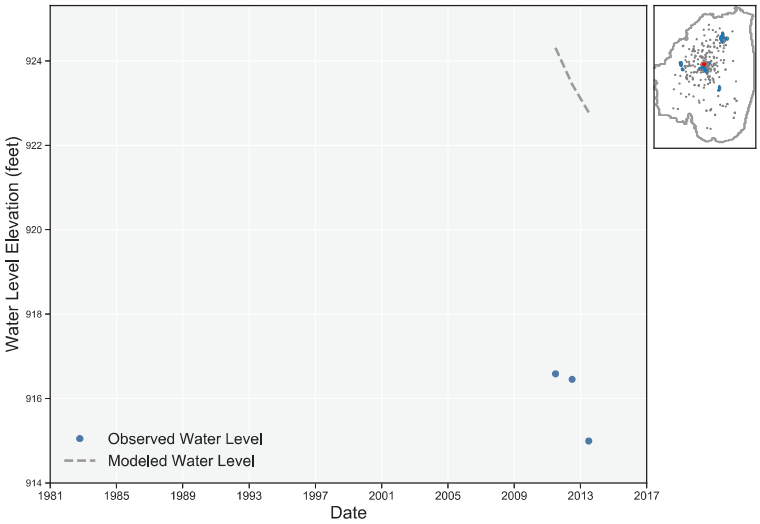
Well 410974 - Aq: OSTP Layers: 5 - 5



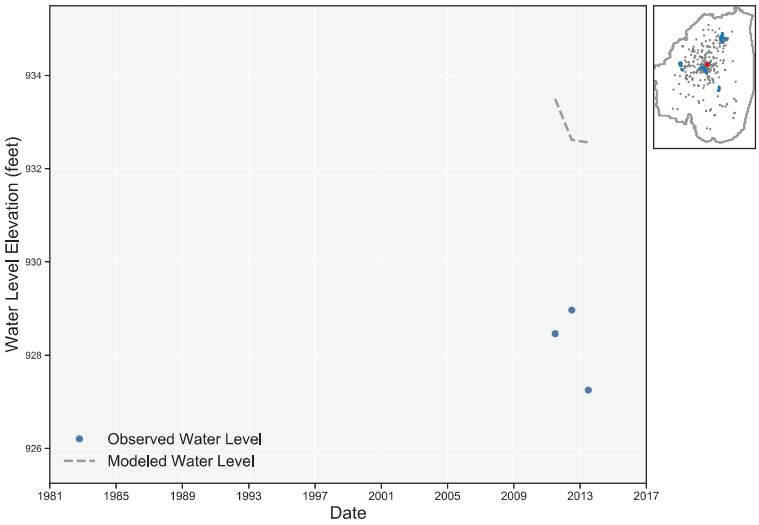
Well 205706 - Aq: OSTP Layers: 5 - 5



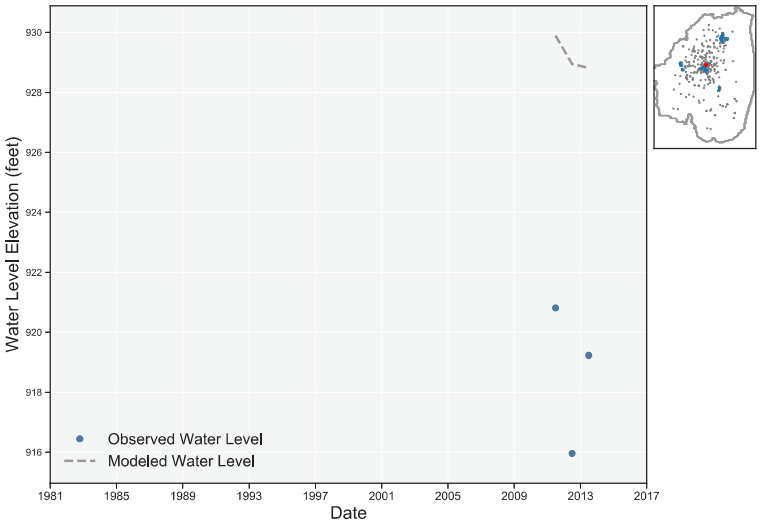
Well 130874 - Aq: OSTP Layers: 5 - 5



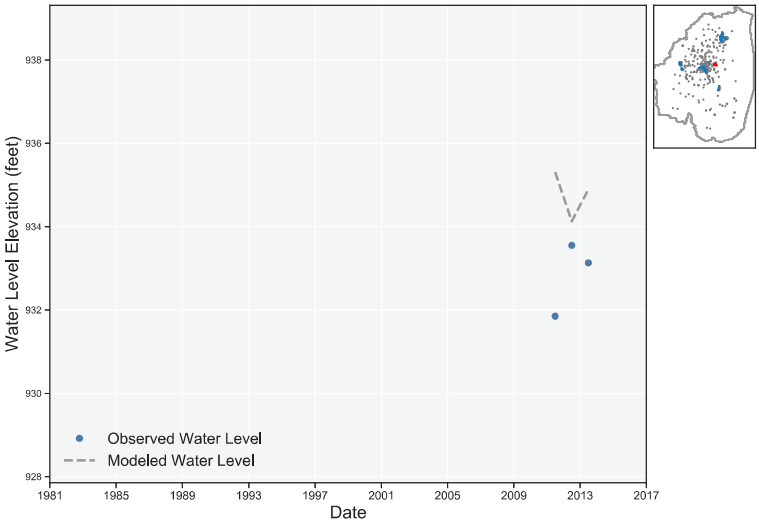
Well 208479 - Aq: QBAA Layers: 5 - 5



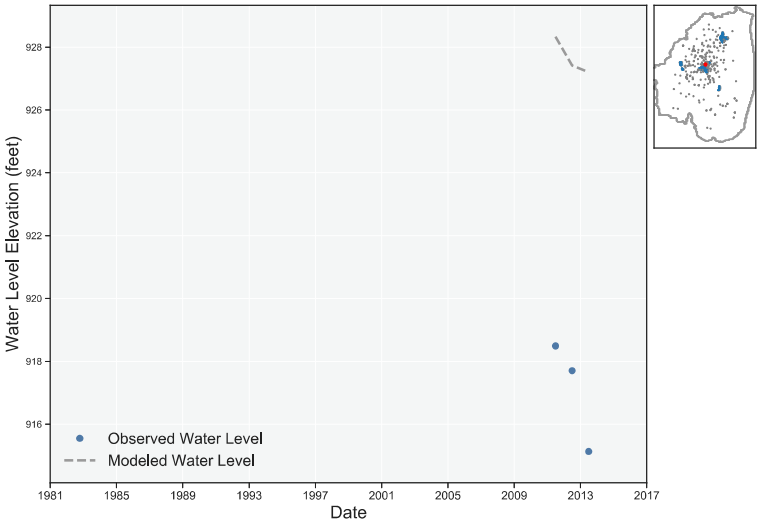
Well 178281 - Aq: OSTP Layers: 5 - 5



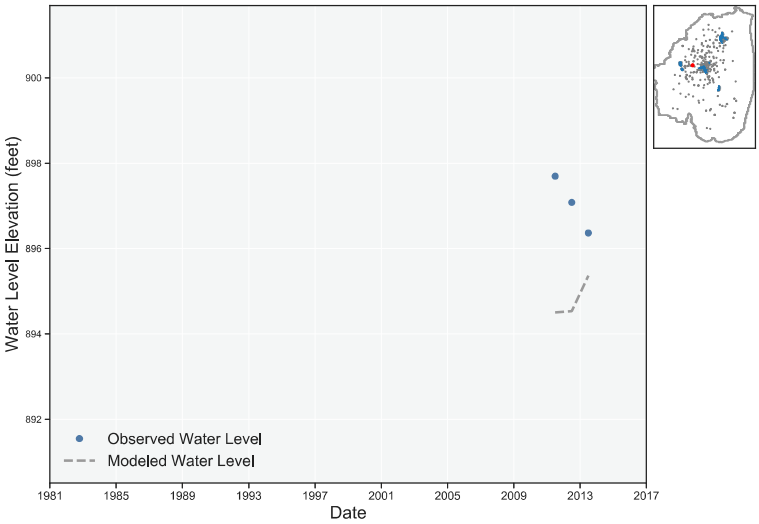
Well 163703 - Aq: OSTP Layers: 5 - 5



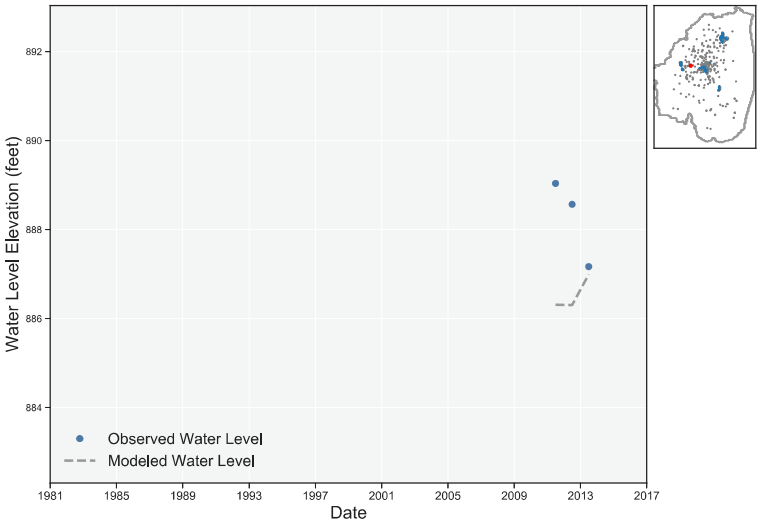
Well 130885 - Aq: OSTP Layers: 5 - 5



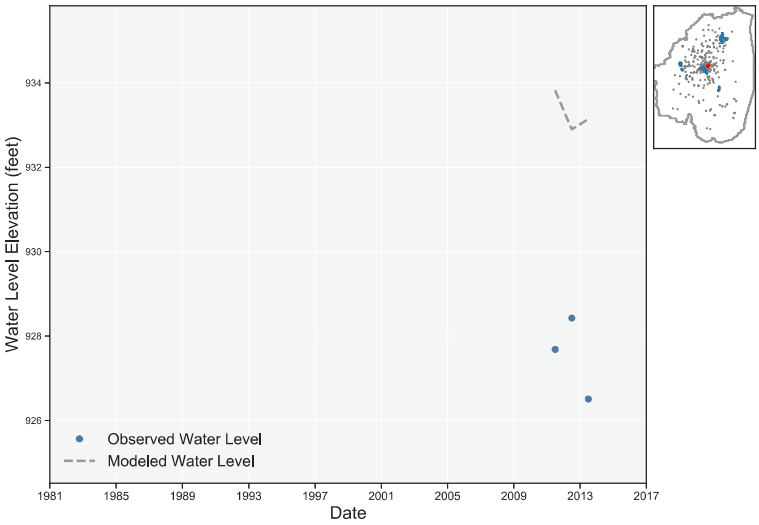
Well 154417 - Aq: OSTP Layers: 5 - 5



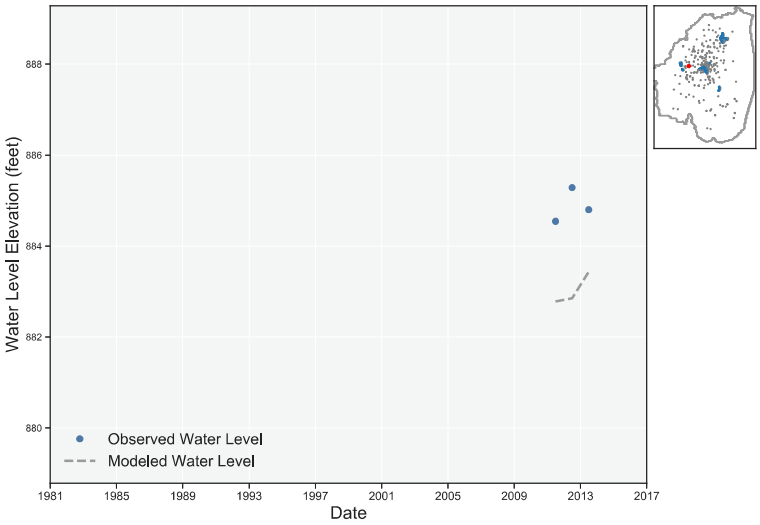
Well 205720 - Aq: OSTP Layers: 5 - 5



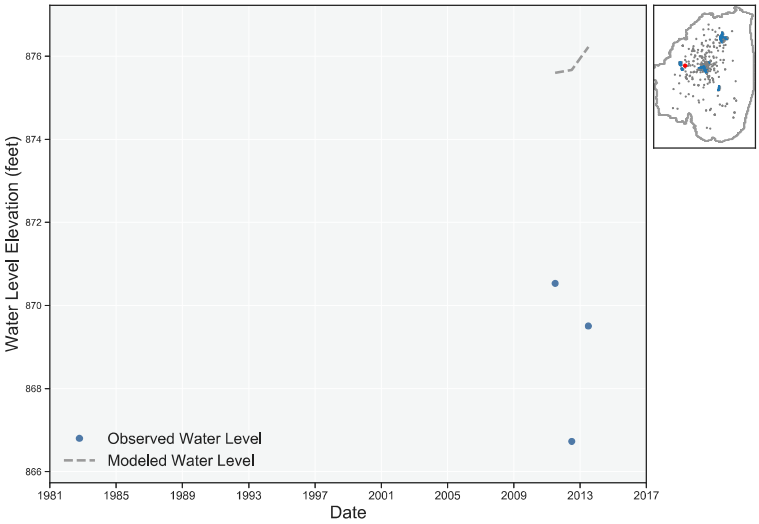
Well 112480 - Aq: OSTP Layers: 5 - 5



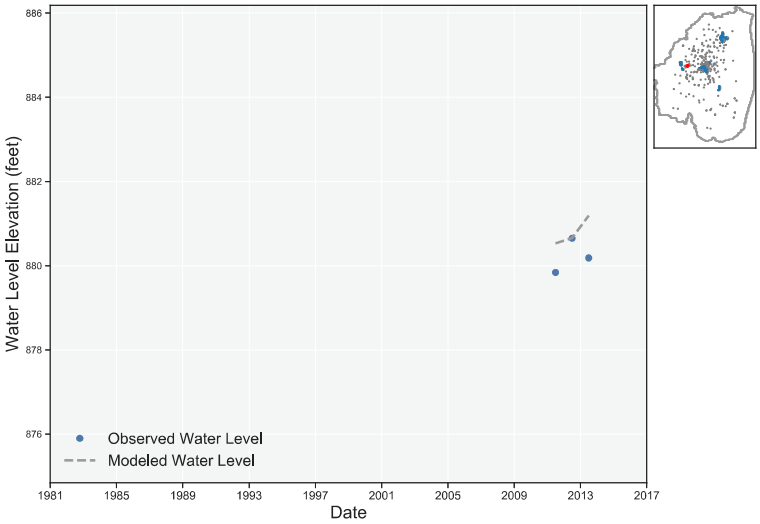
Well 430525 - Aq: OSTP Layers: 5 - 5



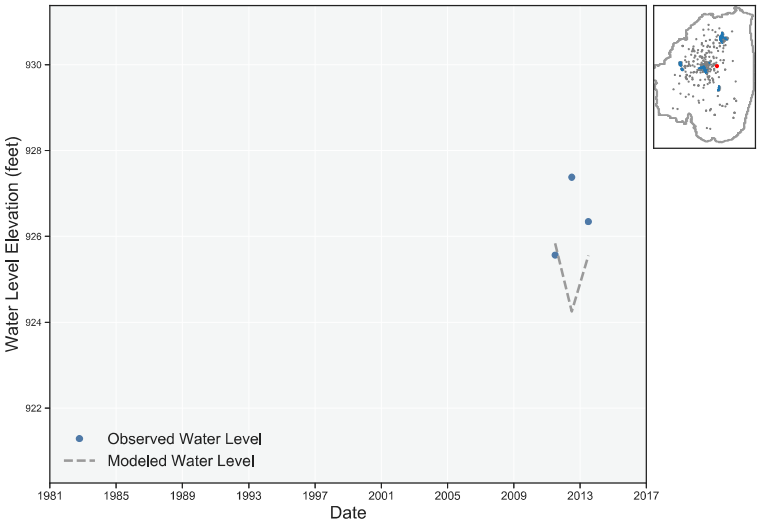
Well 405703 - Aq: OSTP Layers: 5 - 5



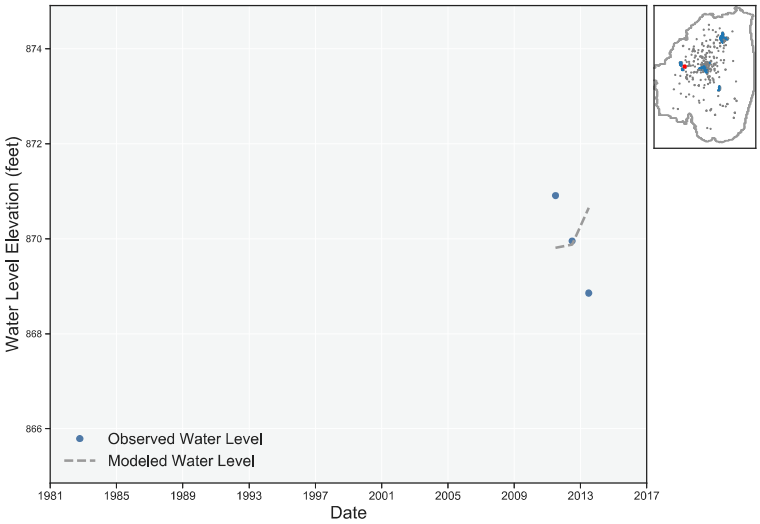
Well 504153 - Aq: OSTP Layers: 5 - 5



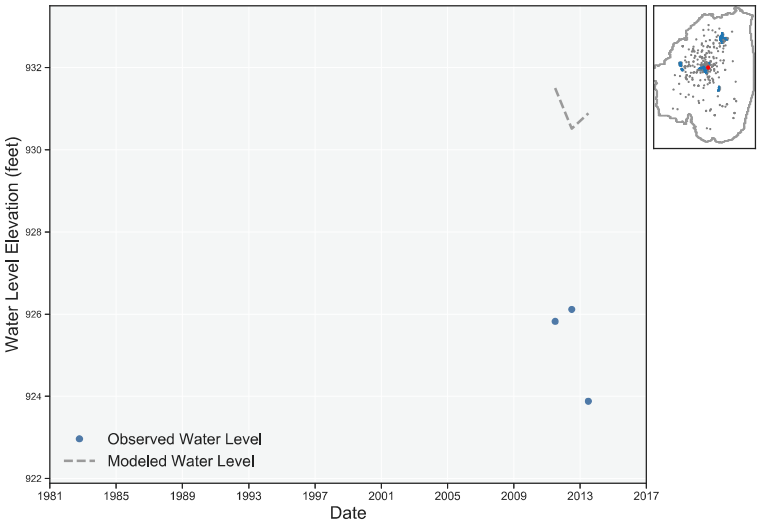
Well 136141 - Aq: OSTP Layers: 5 - 5



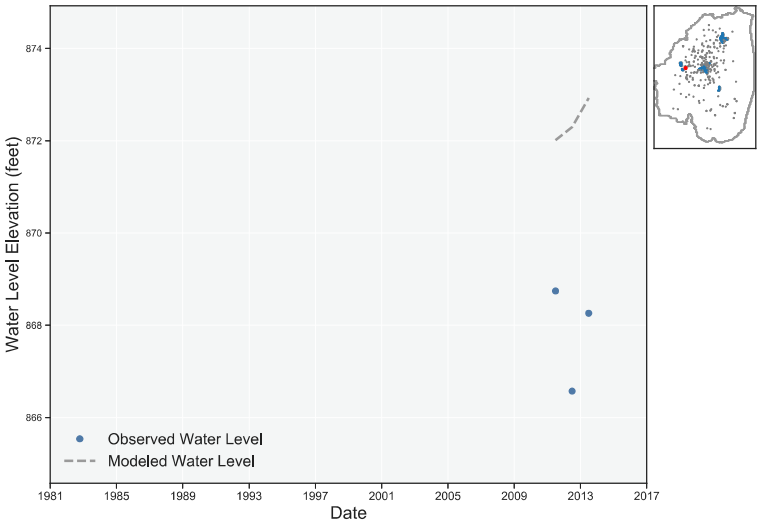
Well 436585 - Aq: QBAA Layers: 5 - 5



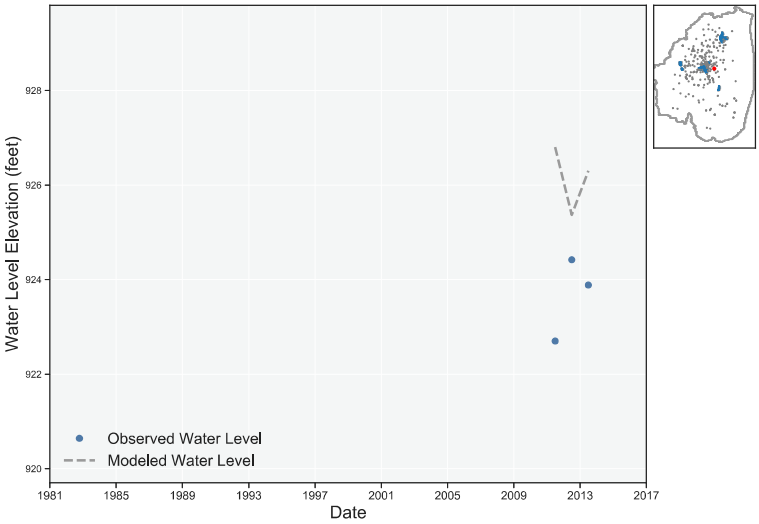
Well 112342 - Aq: OSTP Layers: 5 - 5



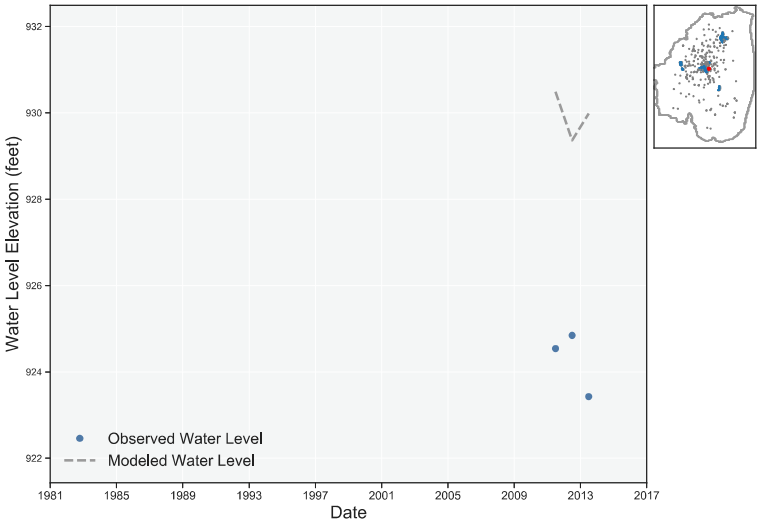
Well 404132 - Aq: QBAA Layers: 5 - 5



Well 505390 - Aq: OPDC Layers: 5 - 5



Well 153493 - Aq: OSTP Layers: 5 - 5



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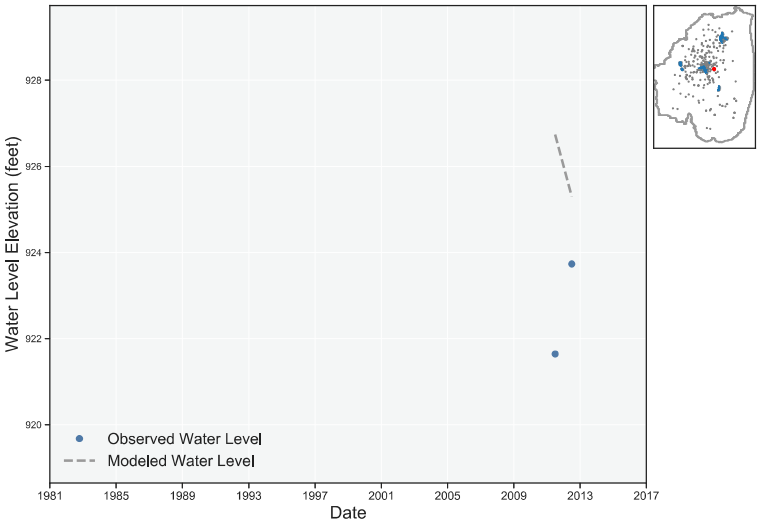
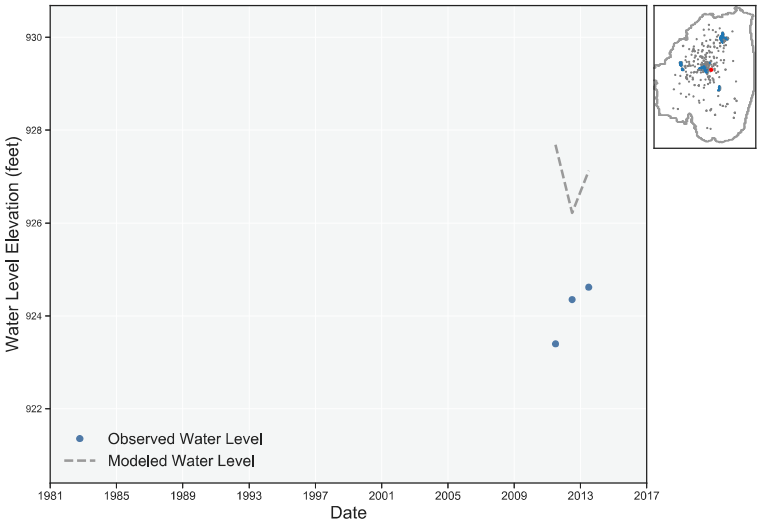


Well 182961 - Aq: OSTP Layers: 5 - 5



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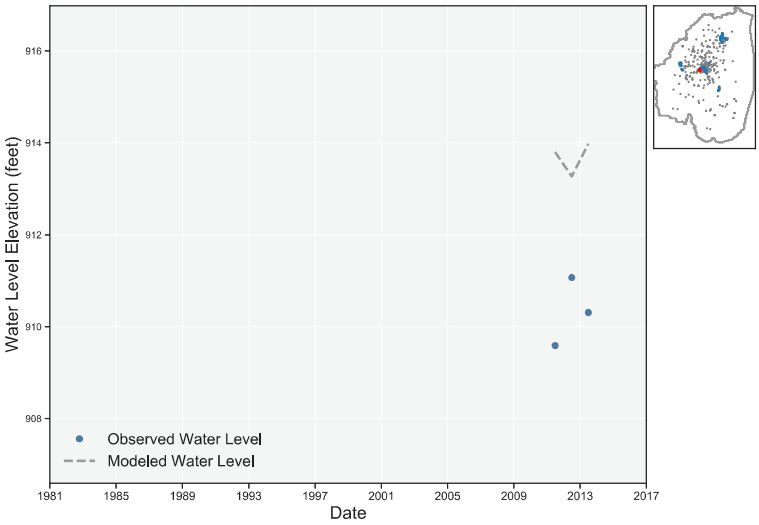

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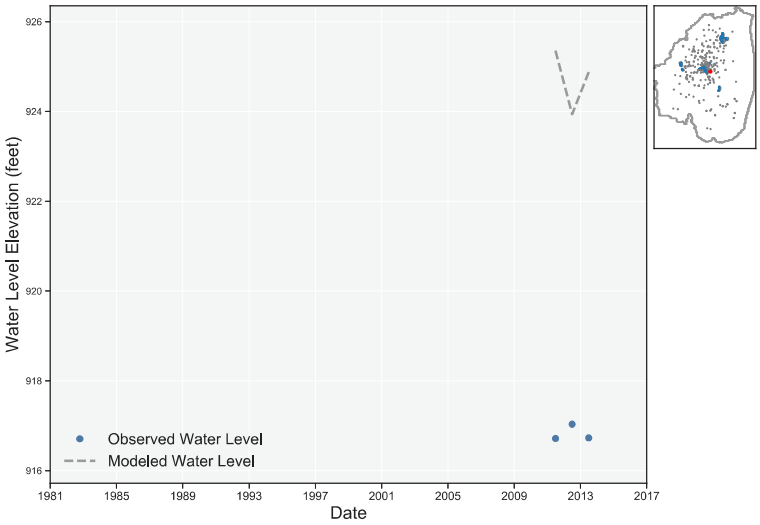

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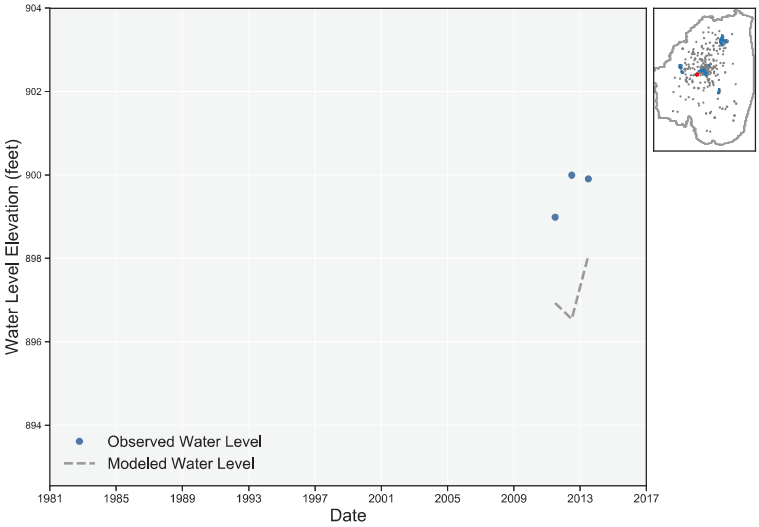
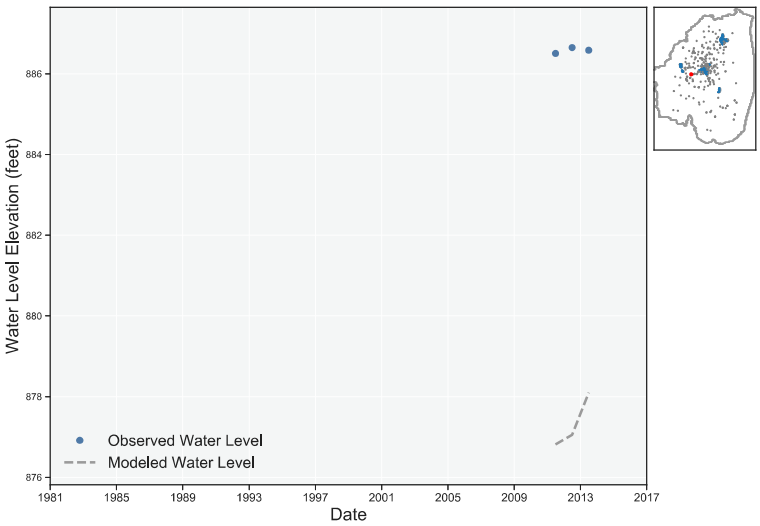
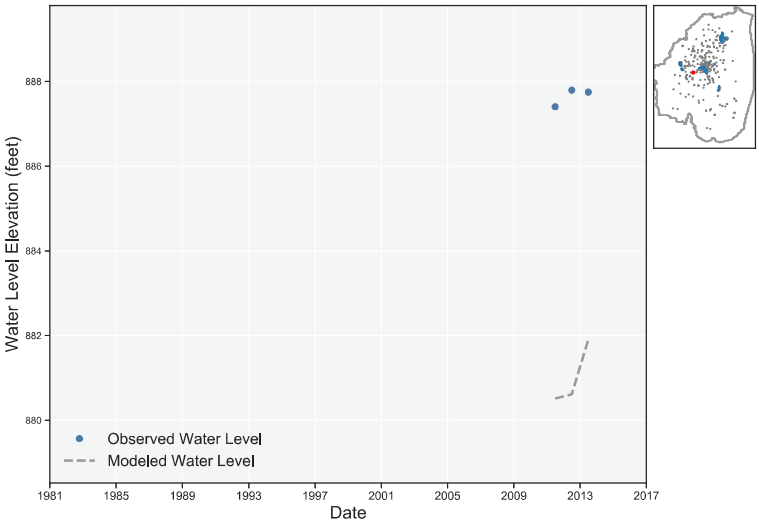


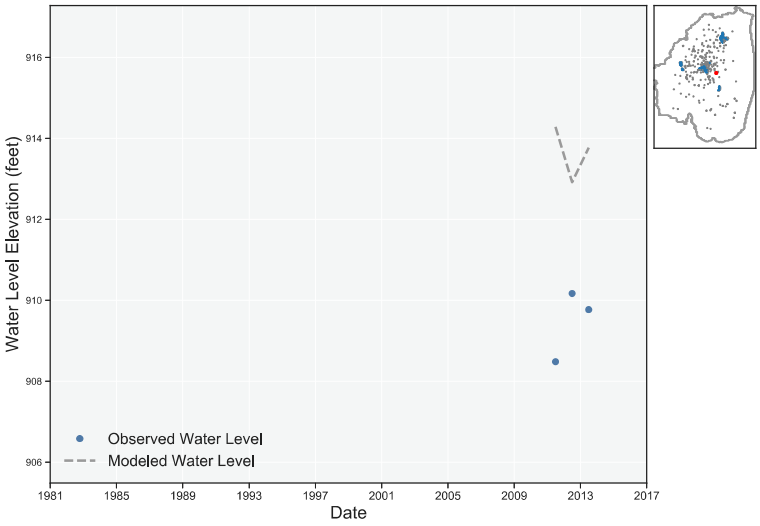
Well 145732 - Aq: OSTP Layers: 5 - 5



Well 448228 - Aq: QBAA Layers: 5 - 5



Well 130876 - Aq: OSTP Layers: 5 - 5



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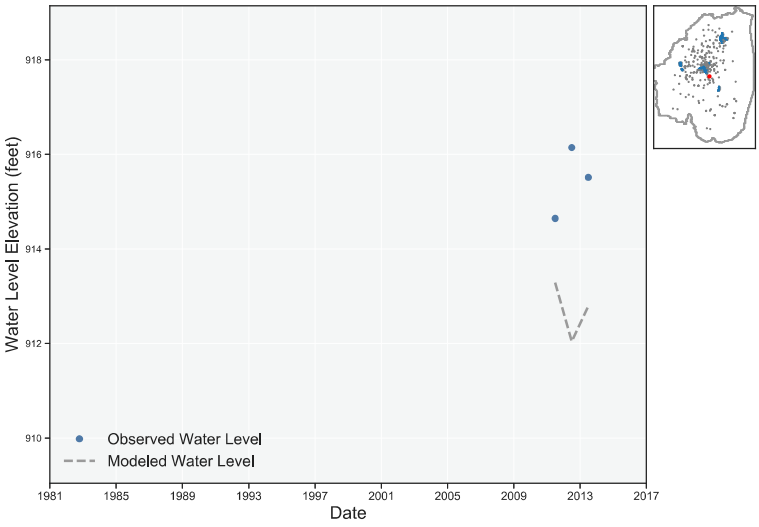
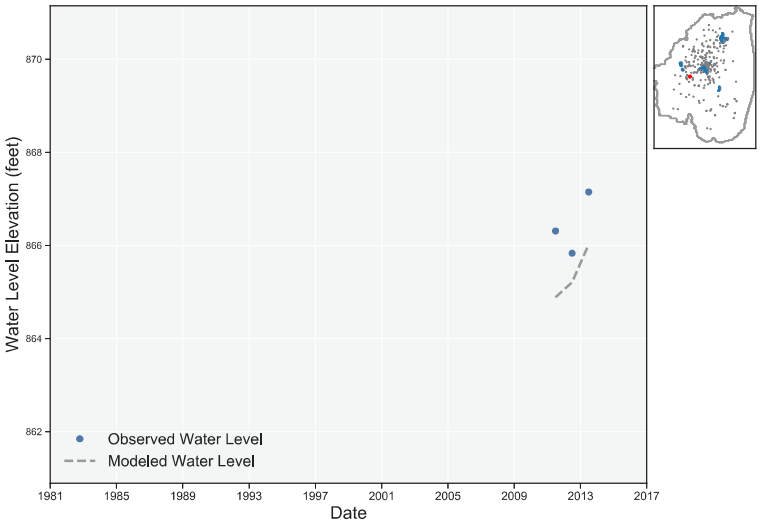


Well 138190 - Aq: OSTP Layers: 5 - 5



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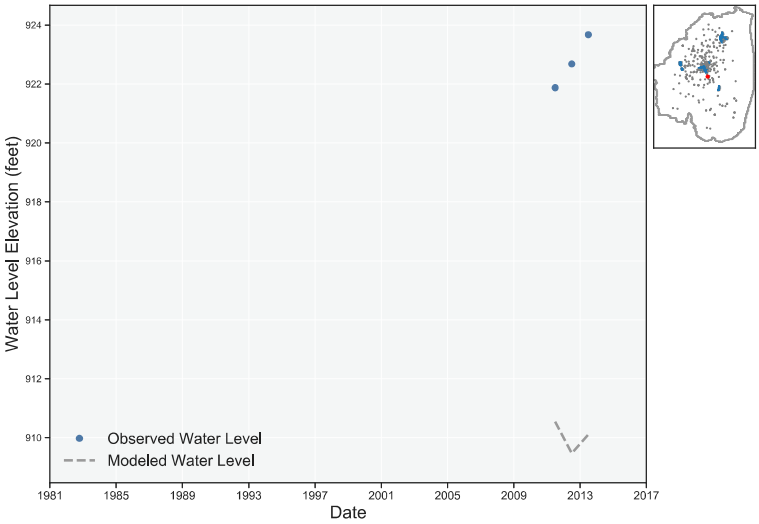
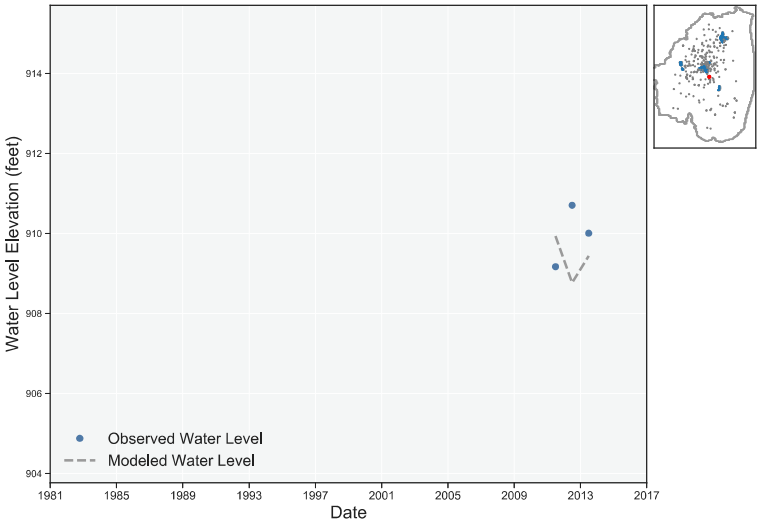
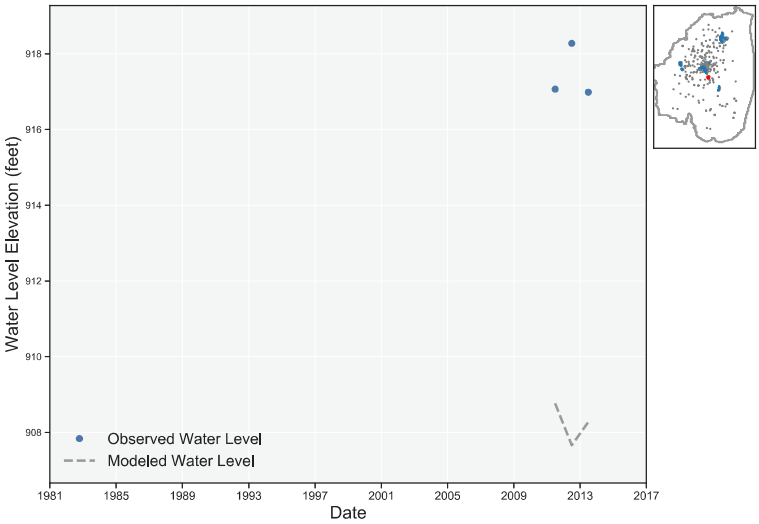


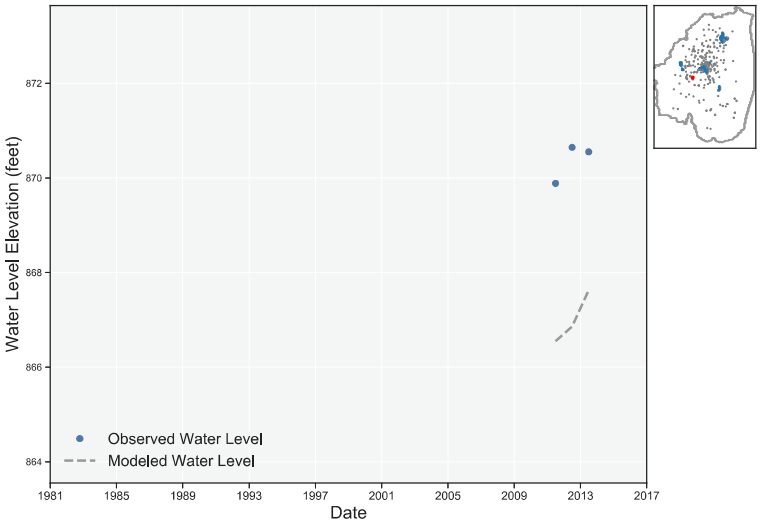
Well 418556 - Aq: OSTP Layers: 5 - 5



Well 127569 - Aq: OSTP Layers: 5 - 5



Well 130905 - Aq: OSTP Layers: 5 - 5



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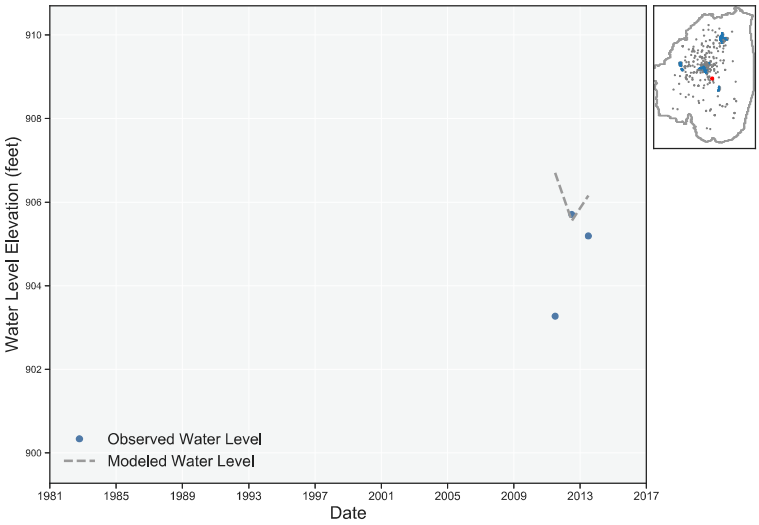
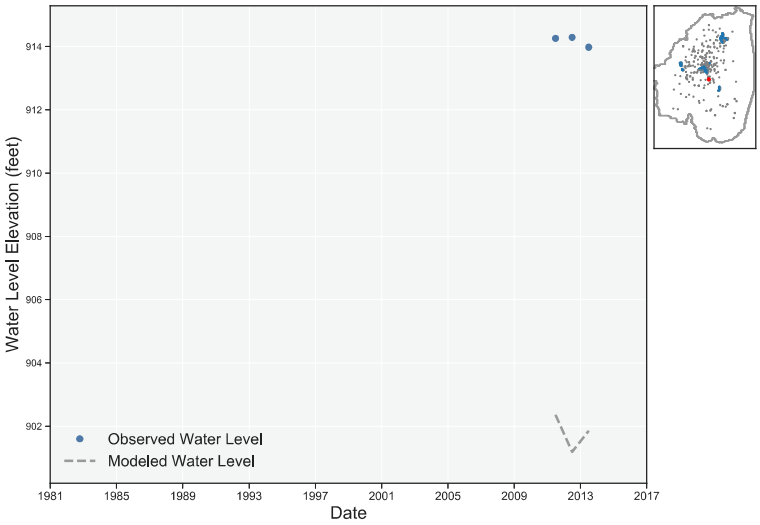


Well 153486 - Aq: QBAA Layers: 5 - 5



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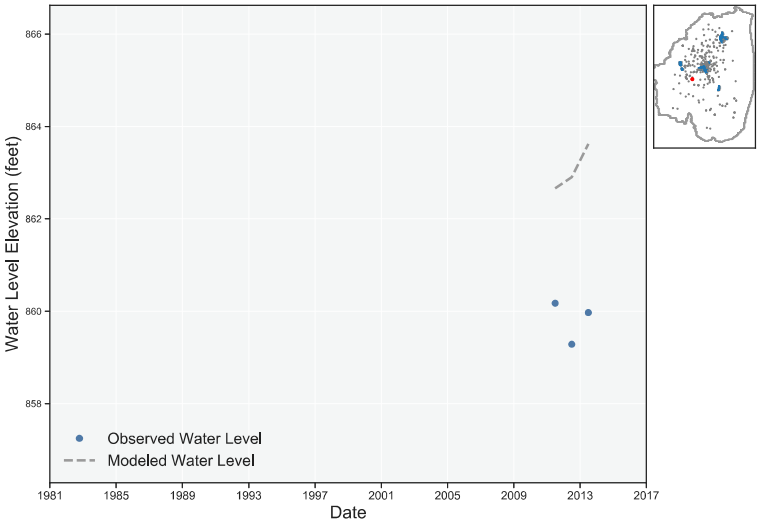

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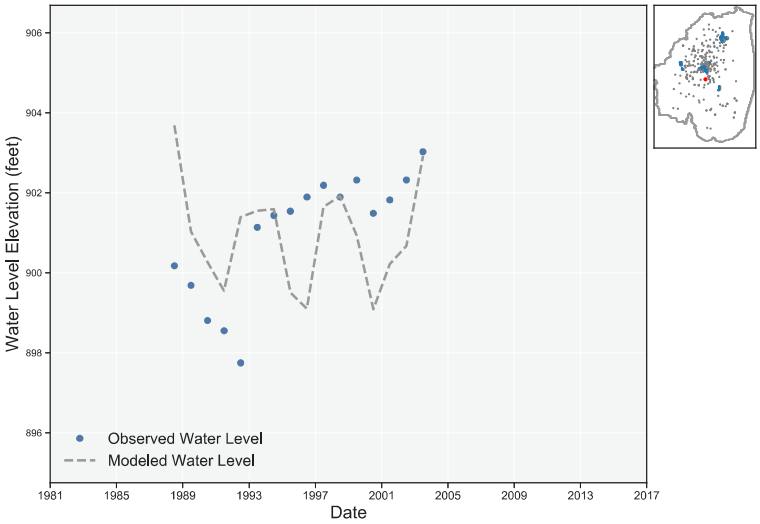
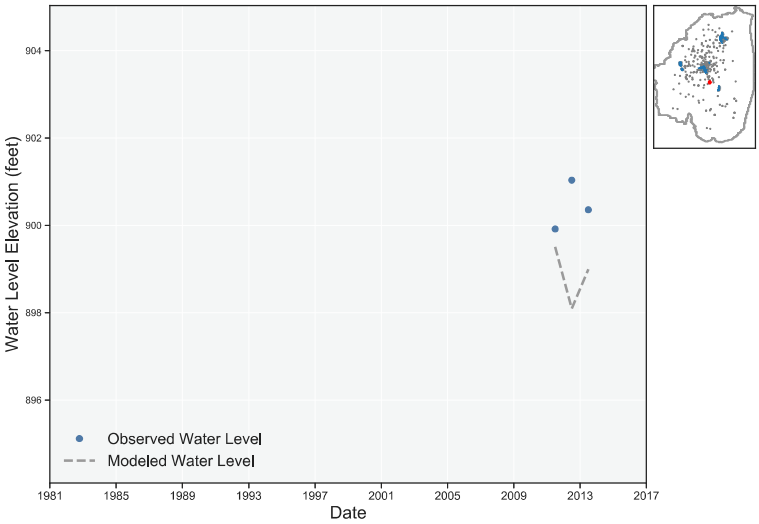


Well 421213 - Aq: OSTP Layers: 5 - 5



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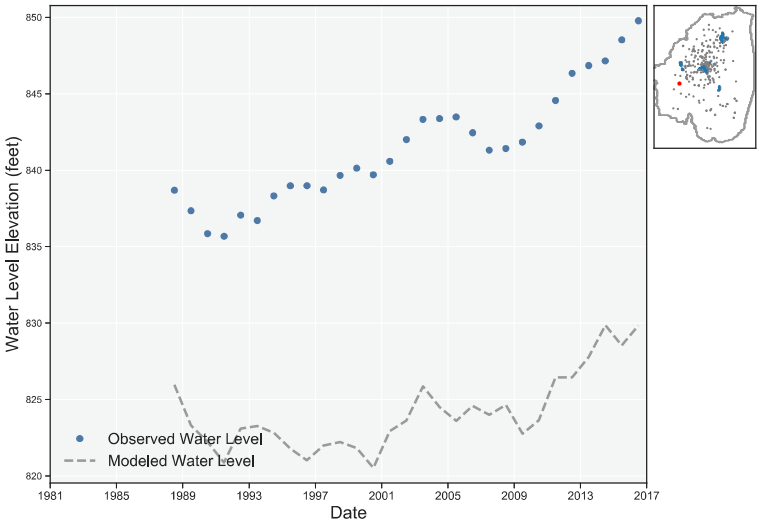
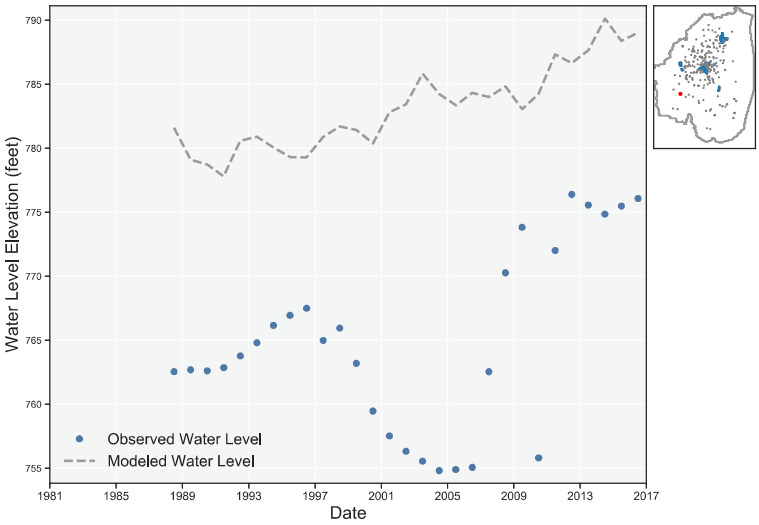
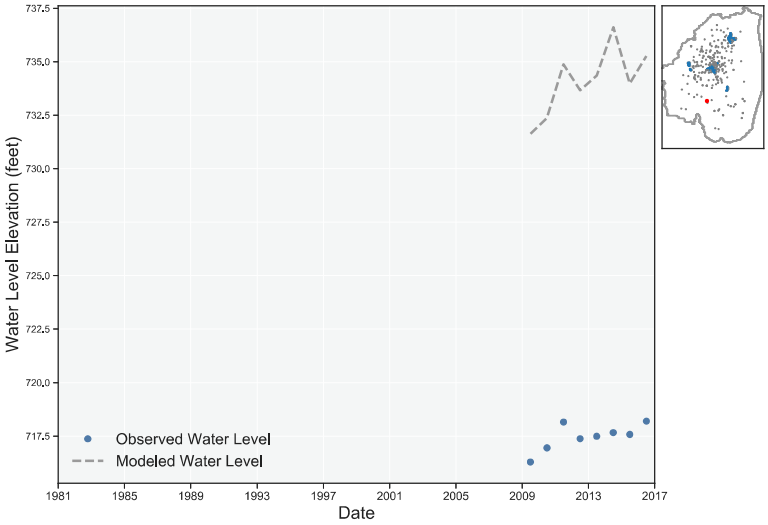


Well 62034 - Aq: OSTP Layers: 5 - 5



Well 62050 - Aq: OSTP Layers: 5 - 5



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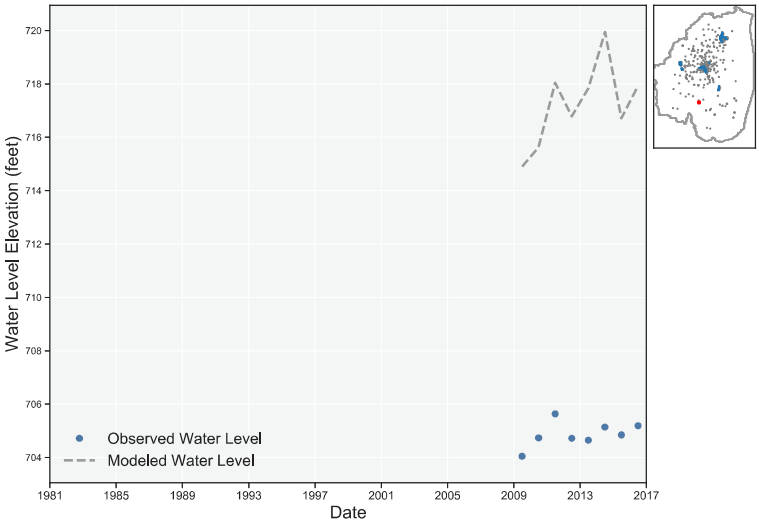
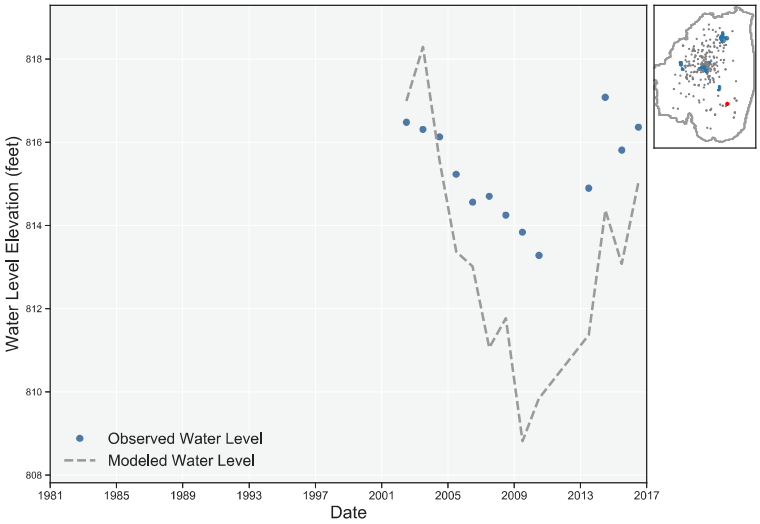
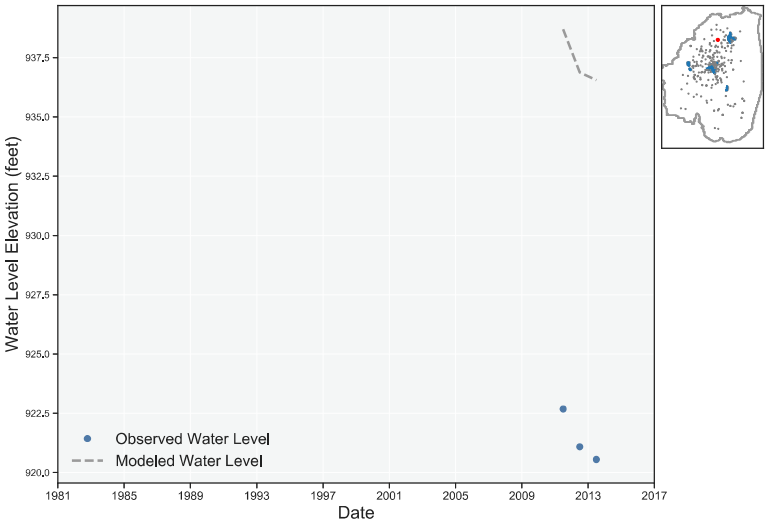


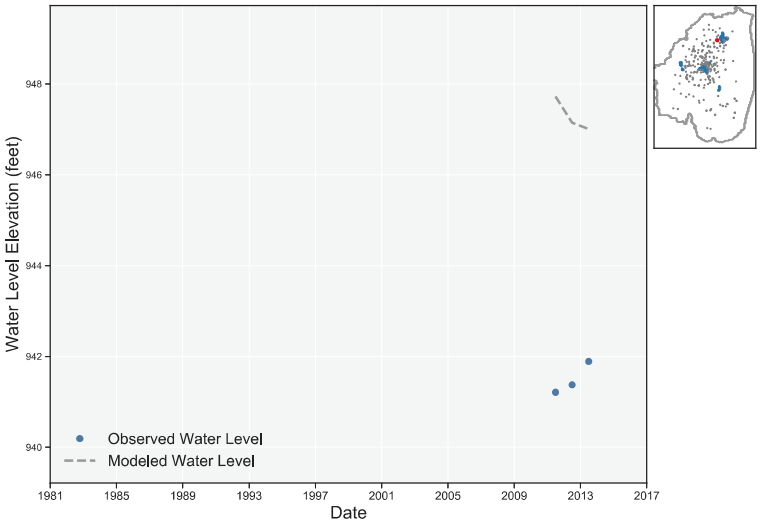
Well 675586 - Aq: QWTA Layers: 5 - 5



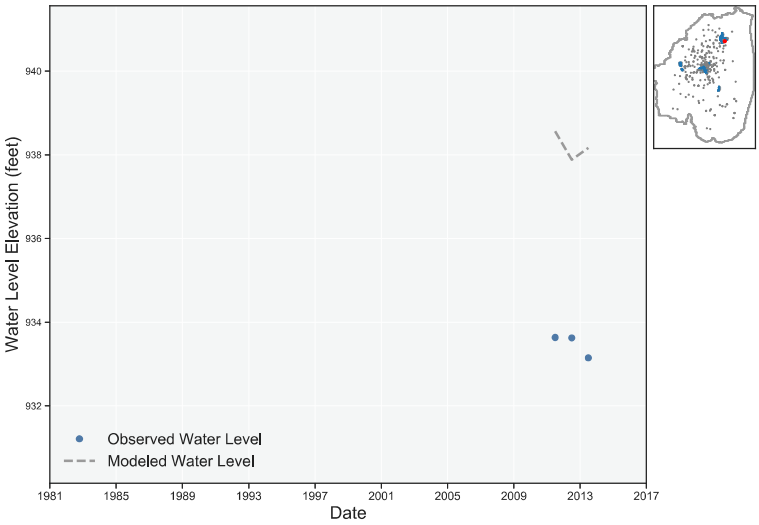
Well 419114 - Aq: OPDC Layers: 6 - 6



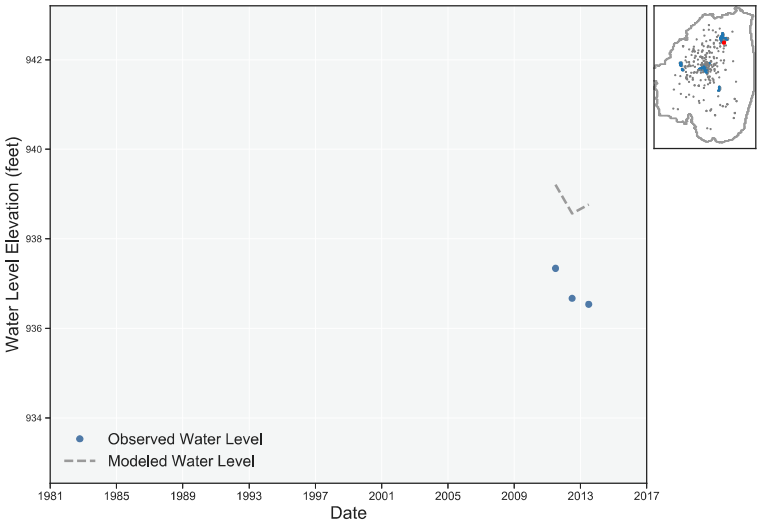
Well 411647 - Aq: OPDC Layers: 6 - 6



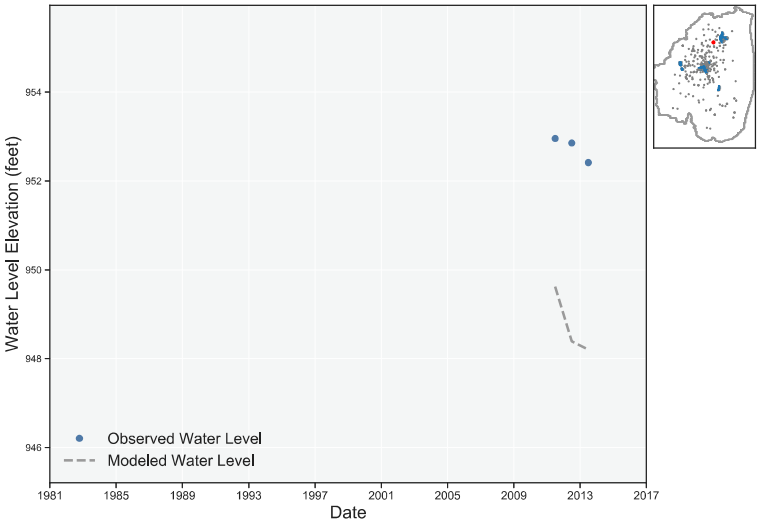
Well 153473 - Aq: OPDC Layers: 6 - 6



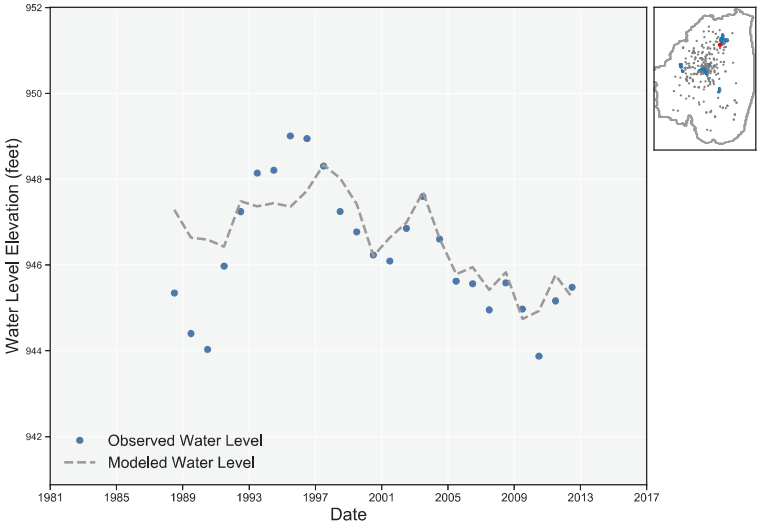
Well 435109 - Aq: OPDC Layers: 6 - 6



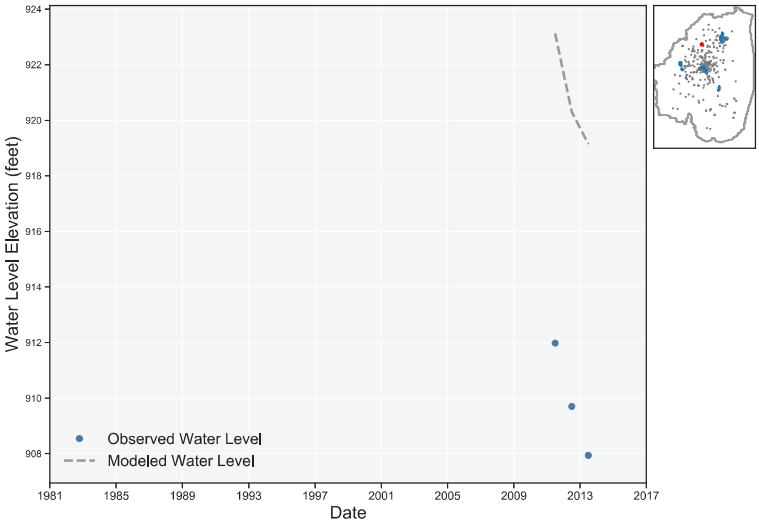
Well 450385 - Aq: OPDC Layers: 6 - 6



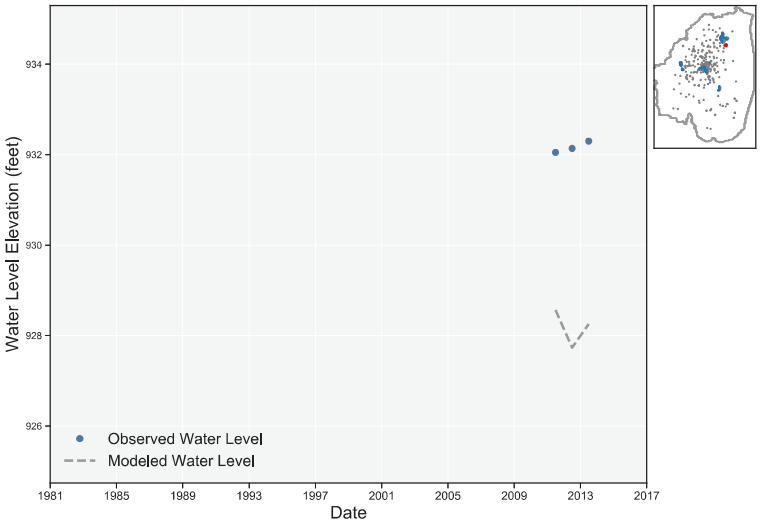
Well 82035 - Aq: OPDC Layers: 6 - 6



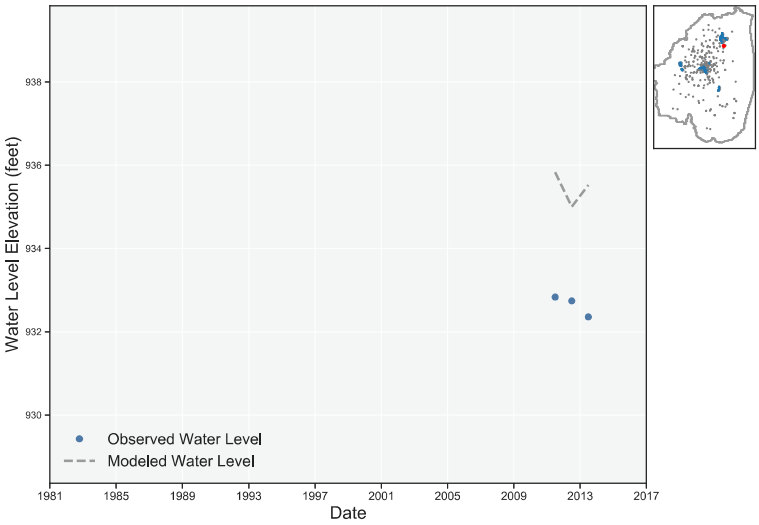
Well 430927 - Aq: OPDC Layers: 6 - 6



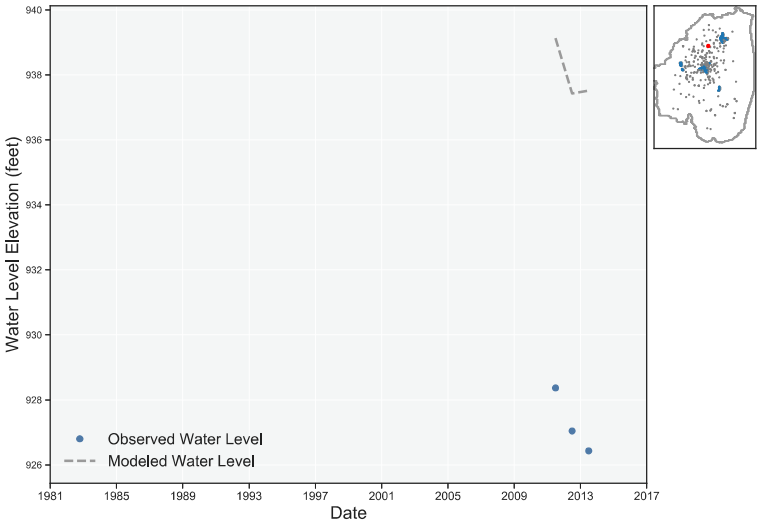
Well 435046 - Aq: OPDC Layers: 6 - 6



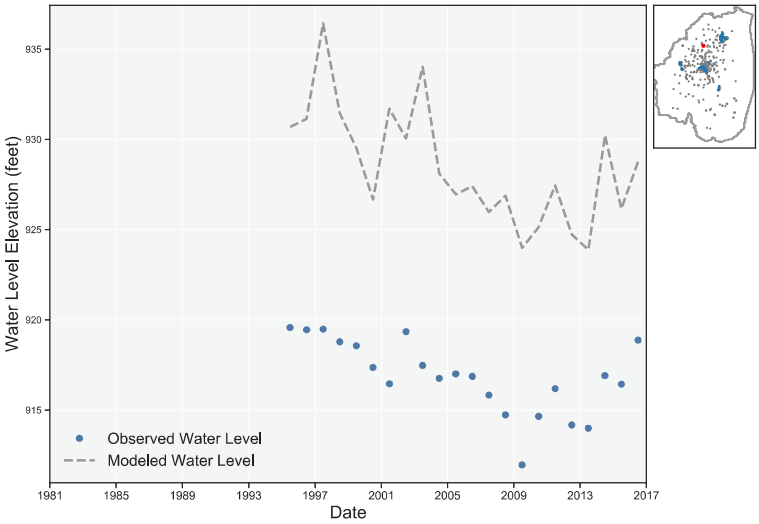
Well 422349 - Aq: OPDC Layers: 6 - 6



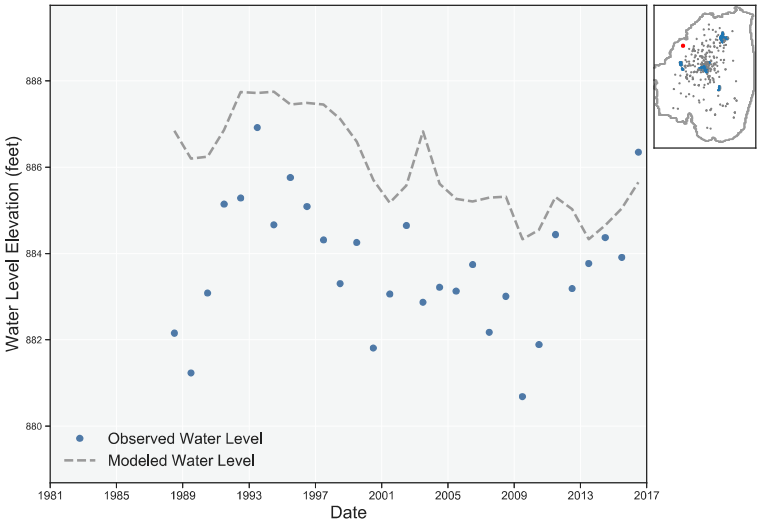
Well 513467 - Aq: OPDC Layers: 6 - 6



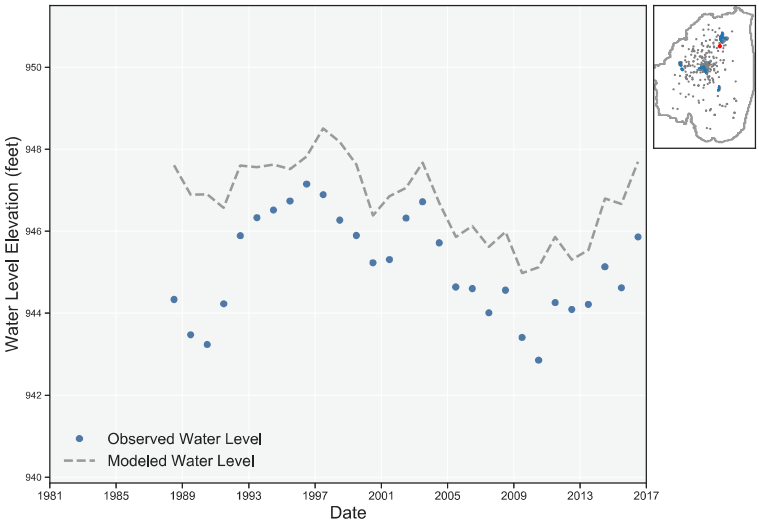
Well 82040 - Aq: OPDC Layers: 6 - 6



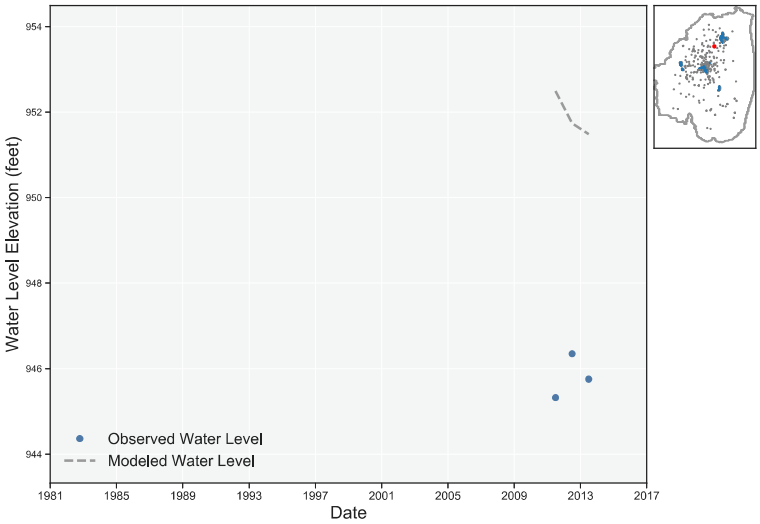
Well 2009 - Aq: QBAA Layers: 6 - 6



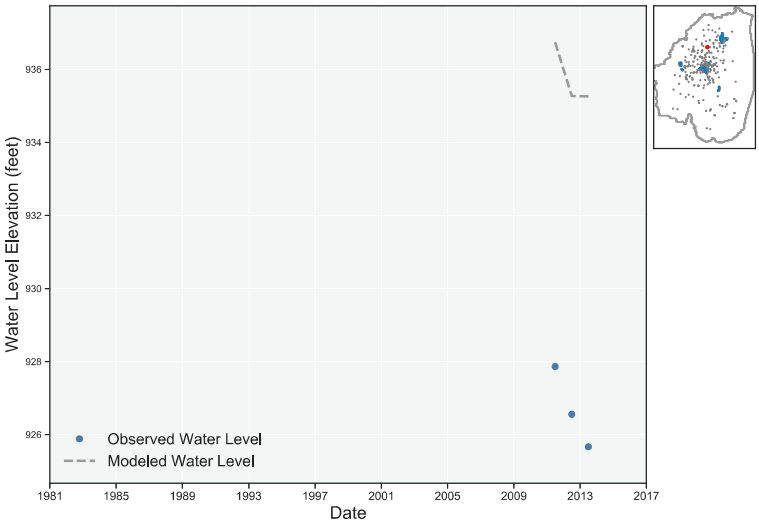
Well 82033 - Aq: OPDC Layers: 6 - 6



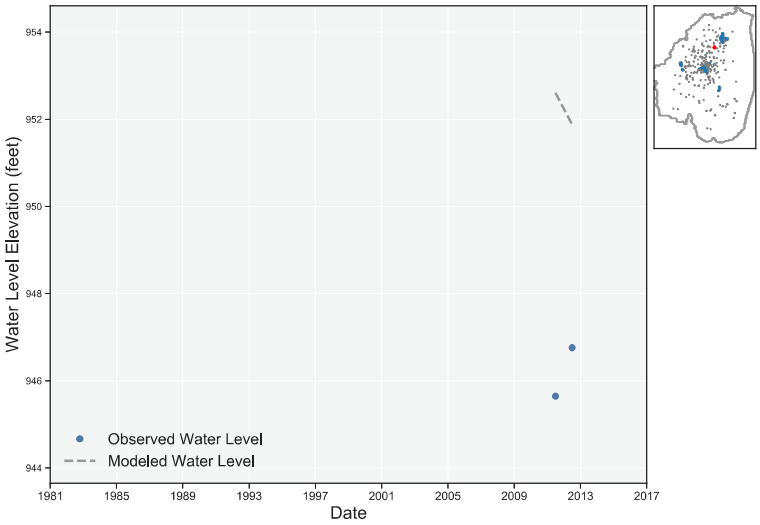
Well 196935 - Aq: OPDC Layers: 6 - 6



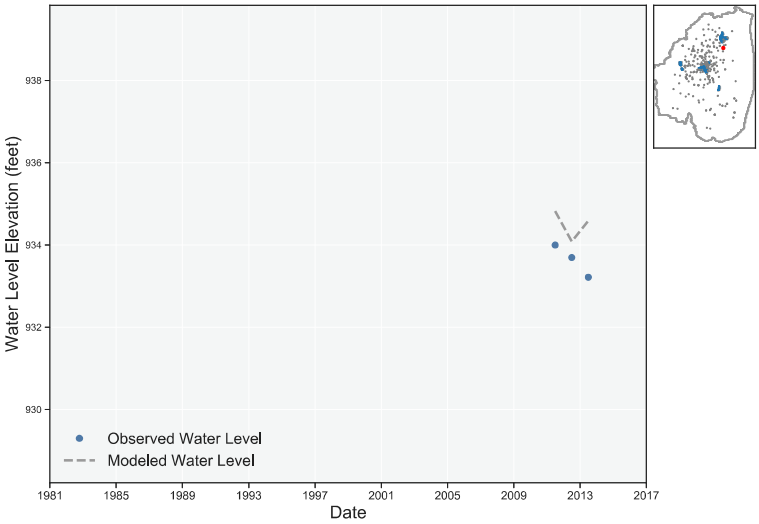
Well 110526 - Aq: OPDC Layers: 6 - 6



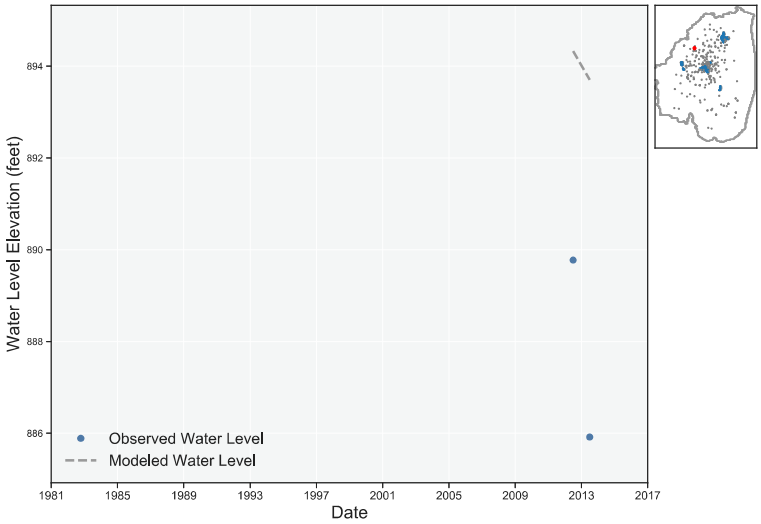
Well 418593 - Aq: OPDC Layers: 6 - 6



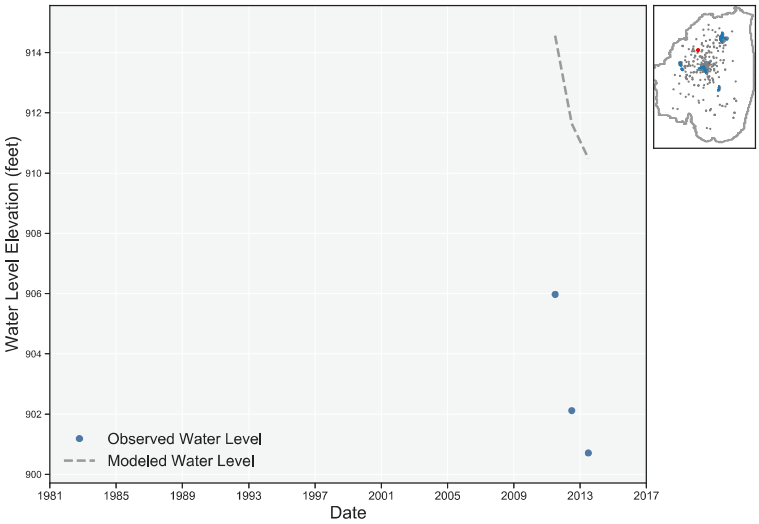
Well 430399 - Aq: OPDC Layers: 6 - 6



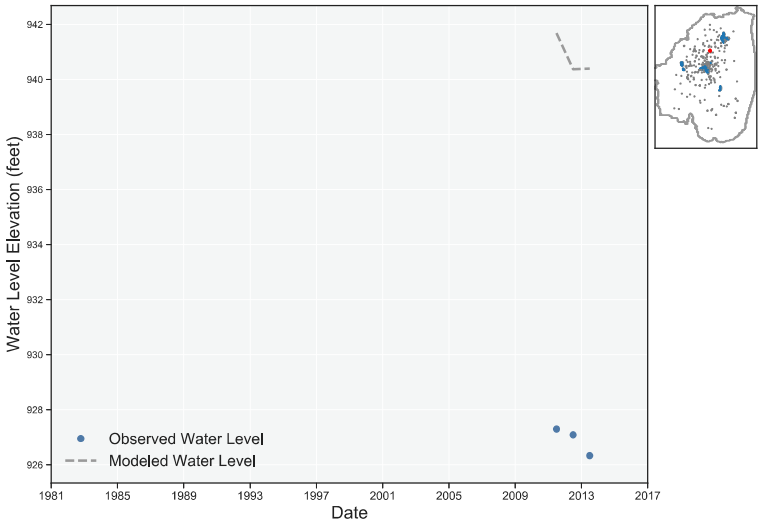
Well 188272 - Aq: OPDC Layers: 6 - 6



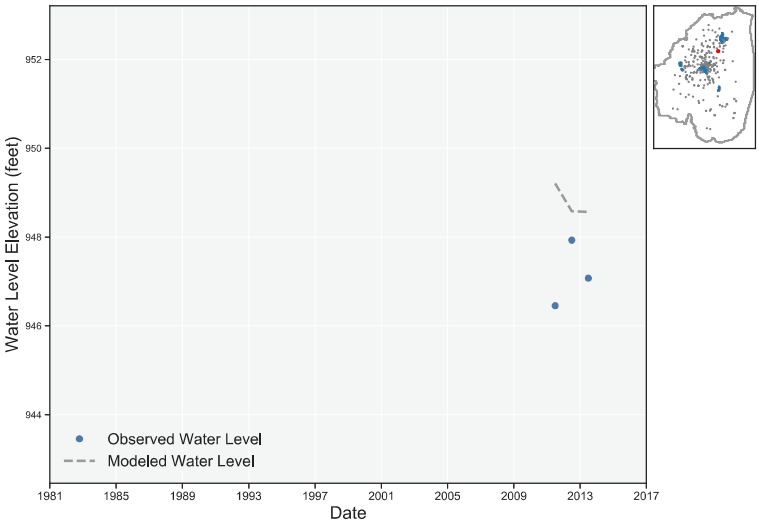
Well 524745 - Aq: OPDC Layers: 6 - 6



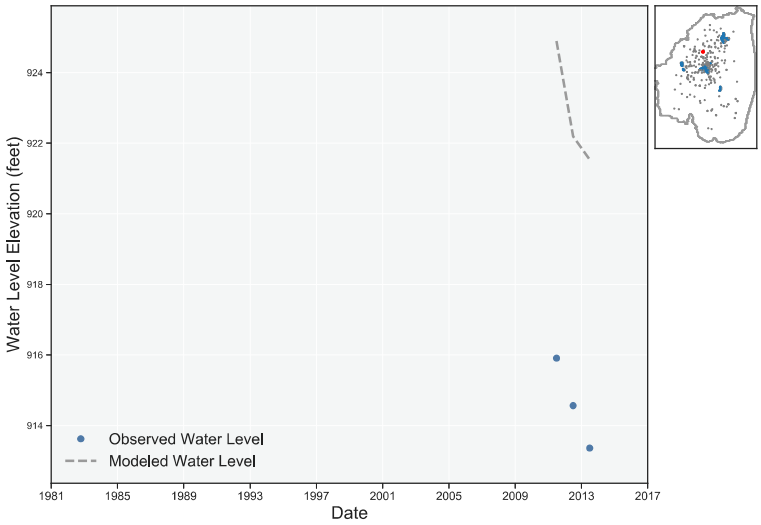
Well 558224 - Aq: OPDC Layers: 6 - 6



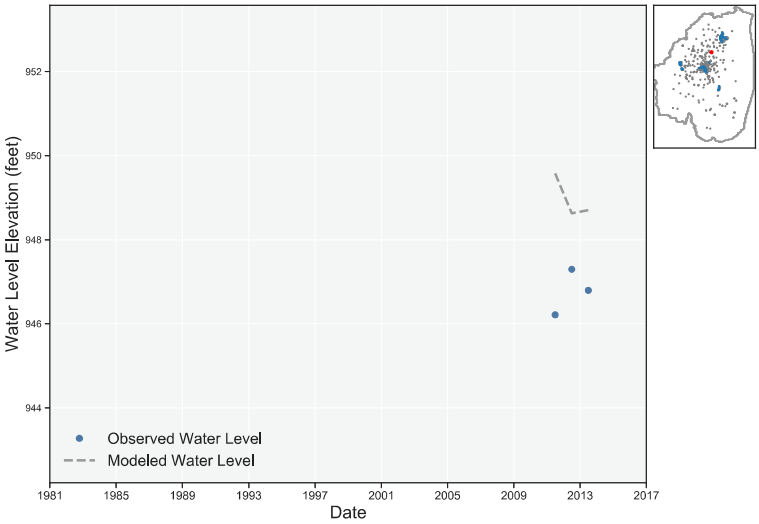
Well 420630 - Aq: OPDC Layers: 6 - 6



Well 427681 - Aq: OPDC Layers: 6 - 6

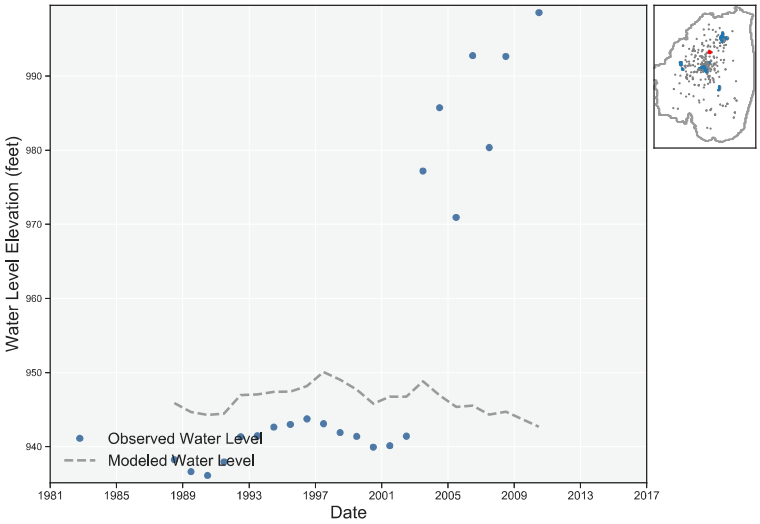


Well 430550 - Aq: OPDC Layers: 6 - 6

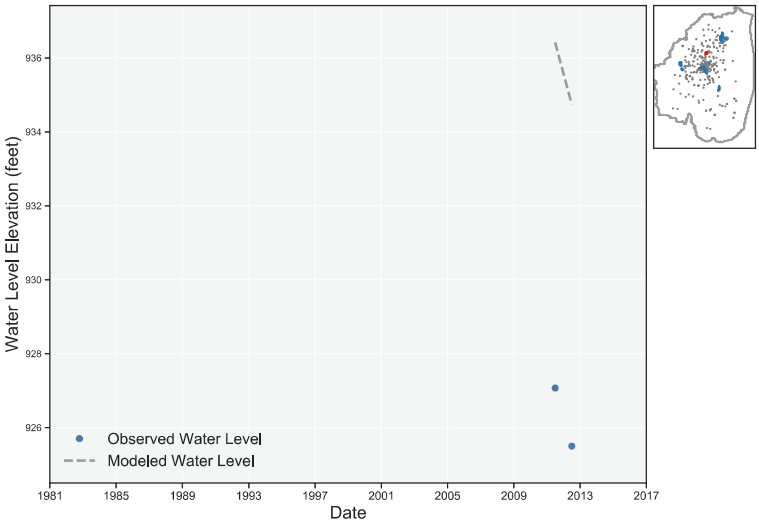


Well 82032 - Aq: OPDC Layers: 6 - 6

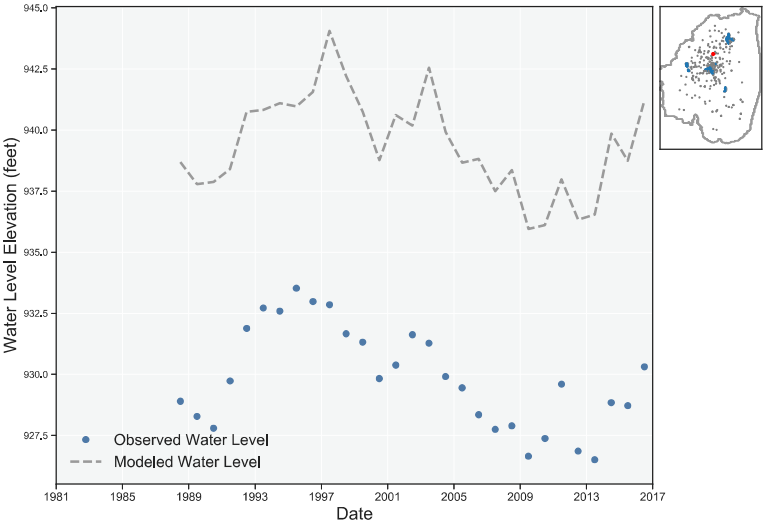
Note: Some values not included in calibration



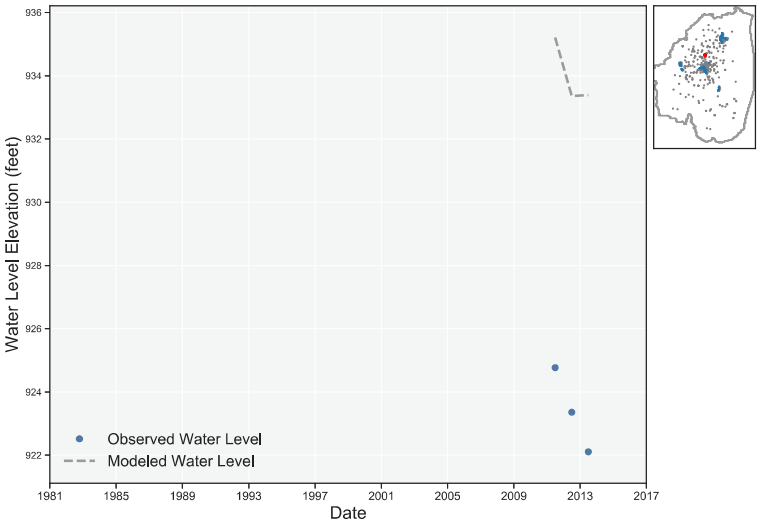
Well 713255 - Aq: OPDC Layers: 6 - 6



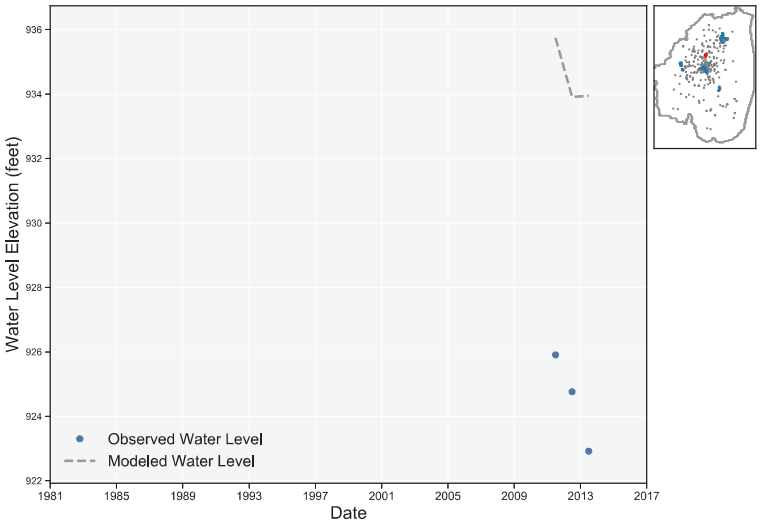
Well 82029 - Aq: OPDC Layers: 6 - 6



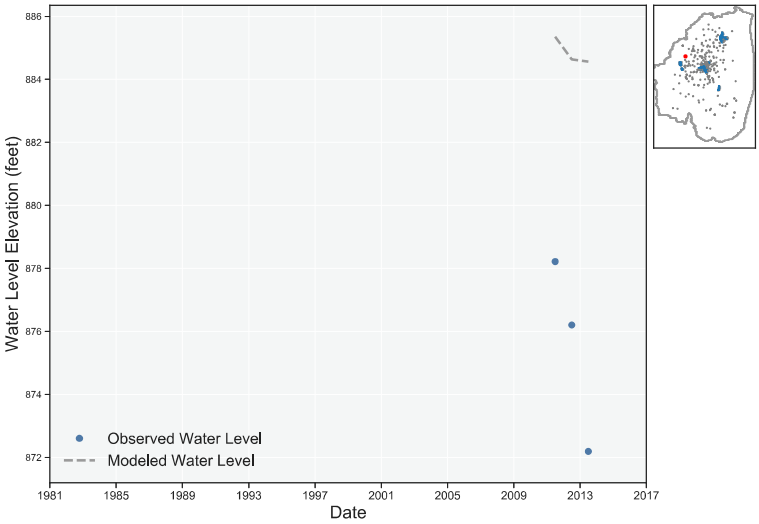
Well 141730 - Aq: OPDC Layers: 6 - 6



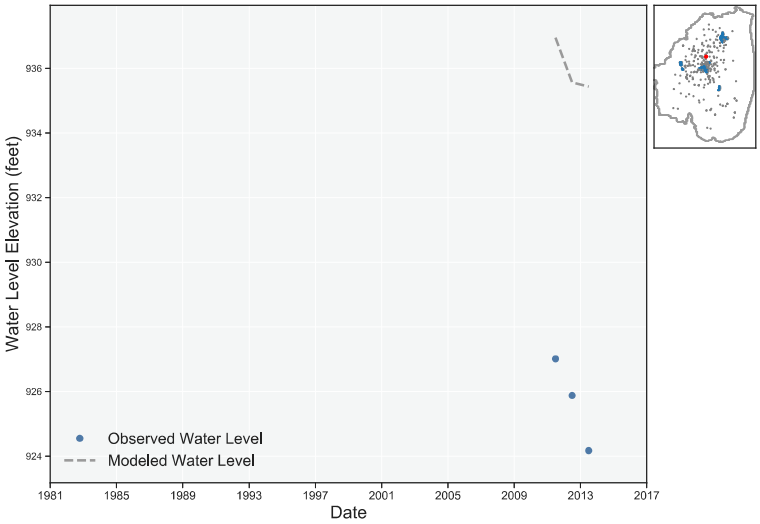
Well 138120 - Aq: OPDC Layers: 6 - 6



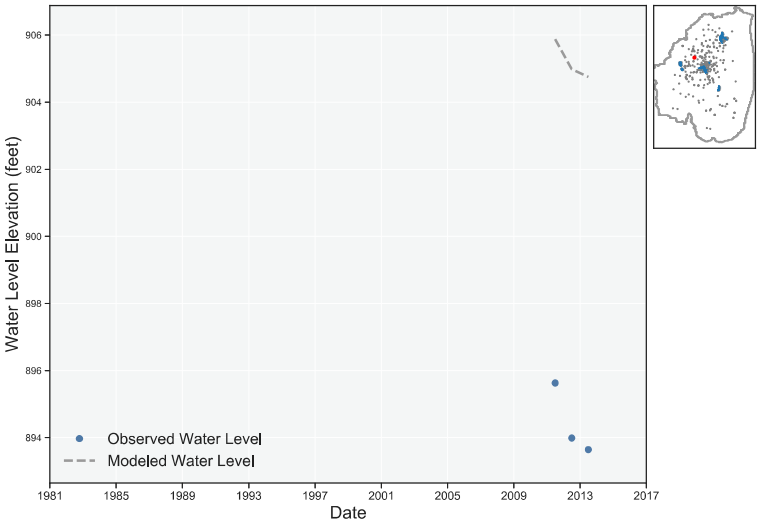
Well 170633 - Aq: OPDC Layers: 6 - 6



Well 439243 - Aq: OPDC Layers: 6 - 6



Well 138399 - Aq: OPDC Layers: 6 - 6



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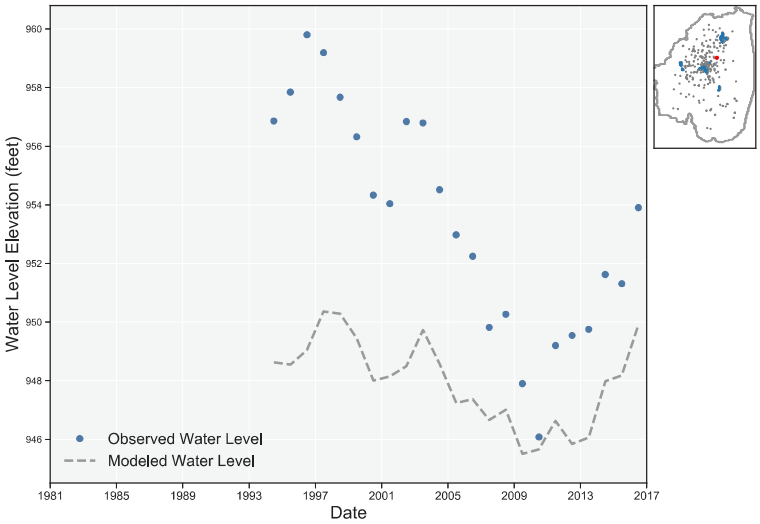
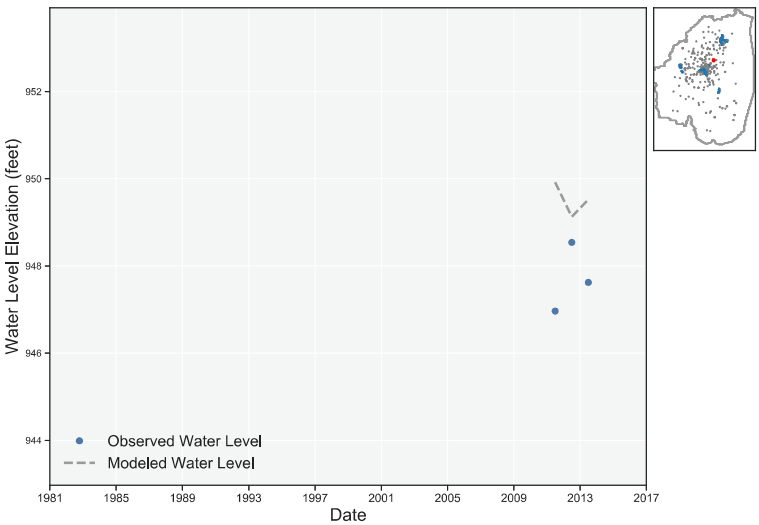
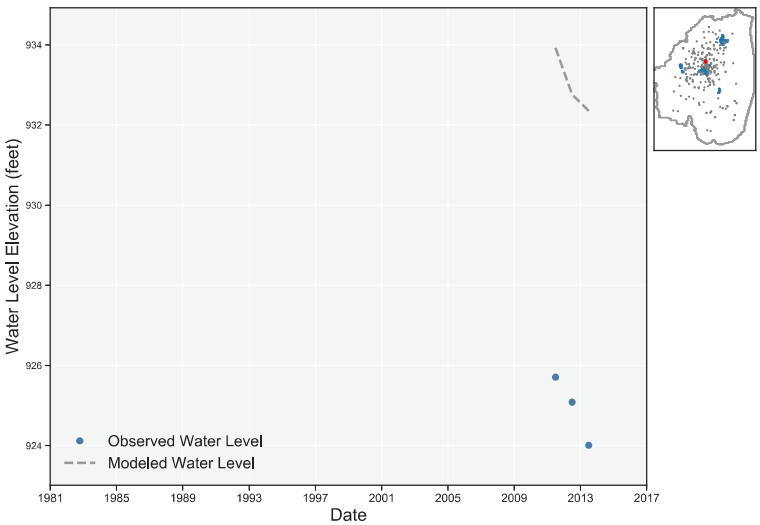


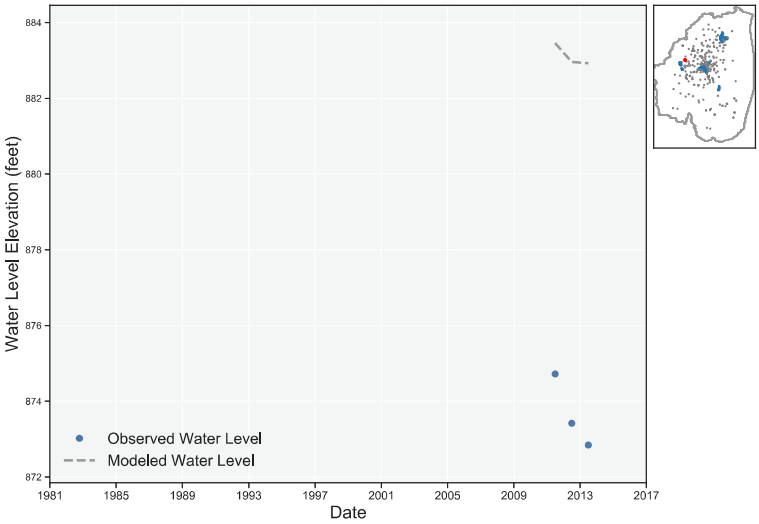
Well 413669 - Aq: OPDC Layers: 6 - 6



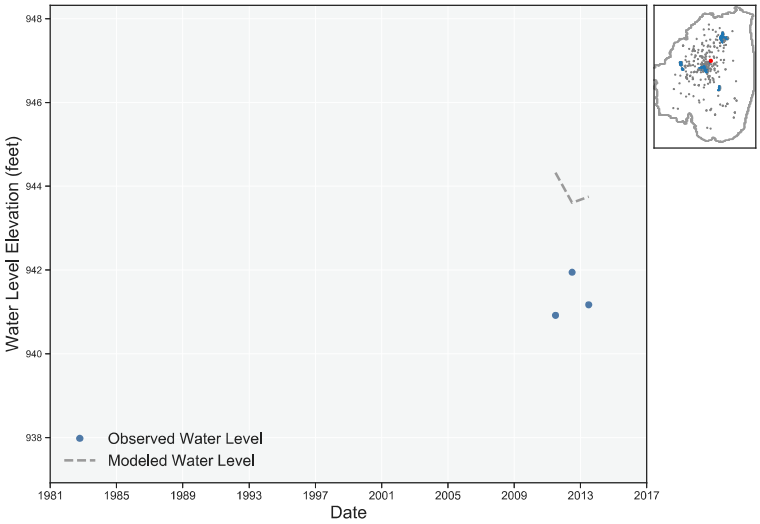
Well 546305 - Aq: OPDC Layers: 6 - 6



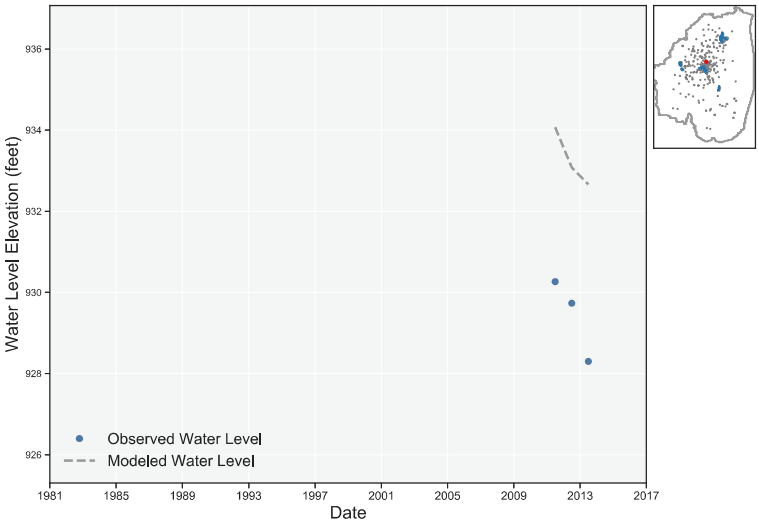
Well 512346 - Aq: OPDC Layers: 6 - 6



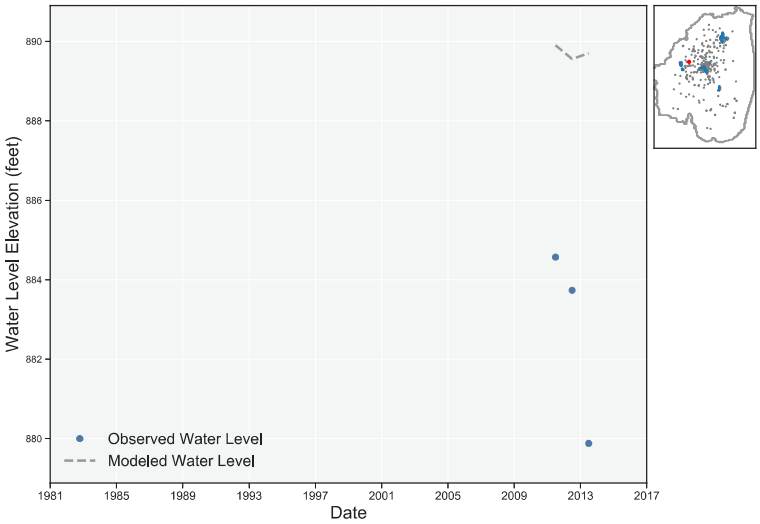
Well 139277 - Aq: OPDC Layers: 6 - 6



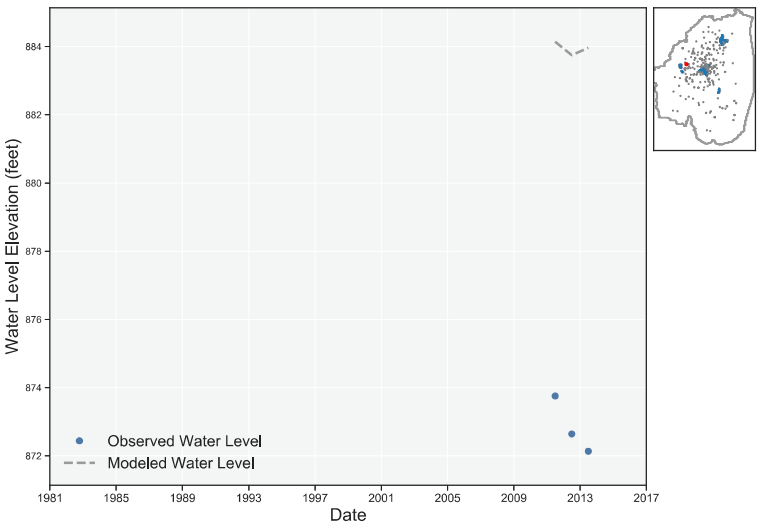
Well 436559 - Aq: OPDC Layers: 6 - 6



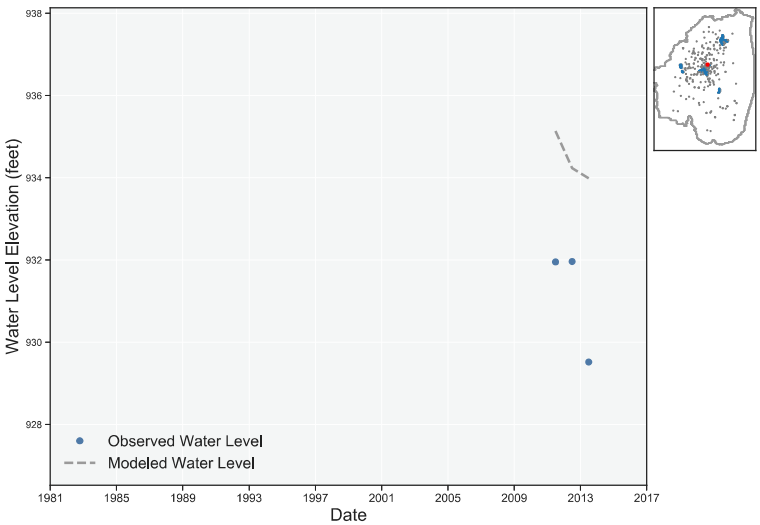
Well 205700 - Aq: OPDC Layers: 6 - 6



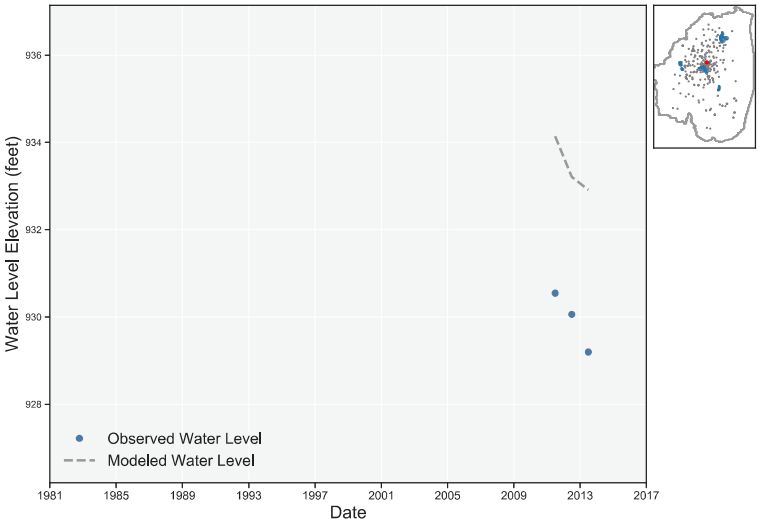
Well 521812 - Aq: OPDC Layers: 6 - 6



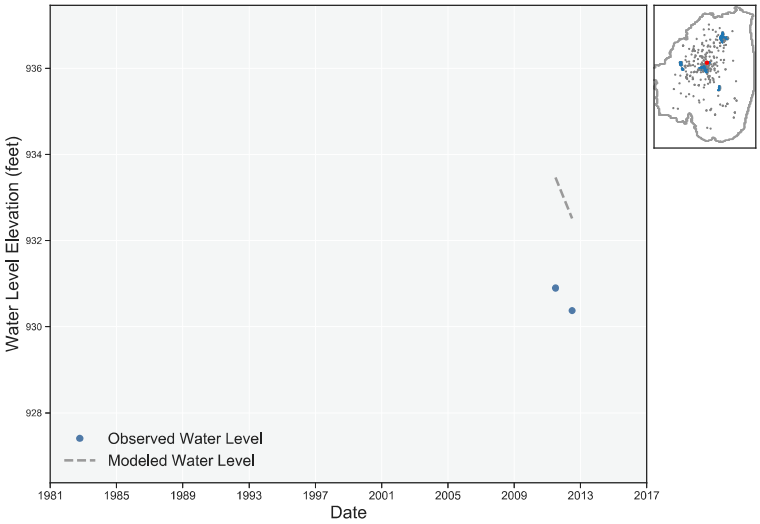
Well 418562 - Aq: OPDC Layers: 6 - 6



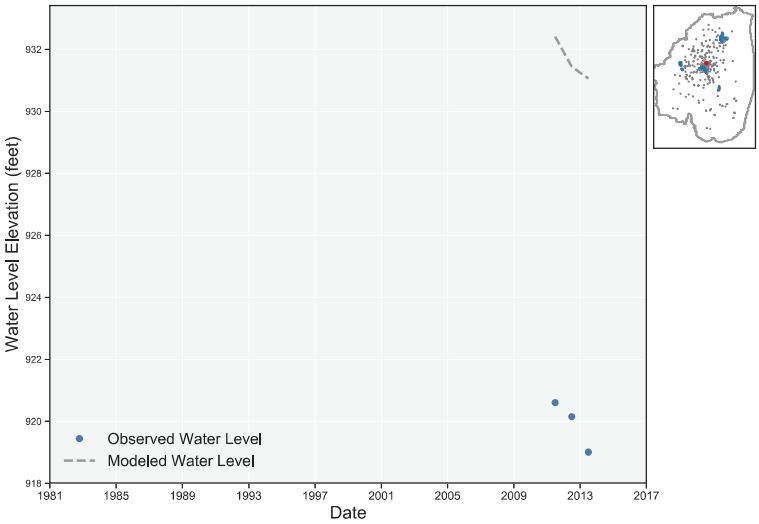
Well 421207 - Aq: OPDC Layers: 6 - 6



Well 450530 - Aq: OPDC Layers: 6 - 6



Well 427888 - Aq: OPDC Layers: 6 - 6



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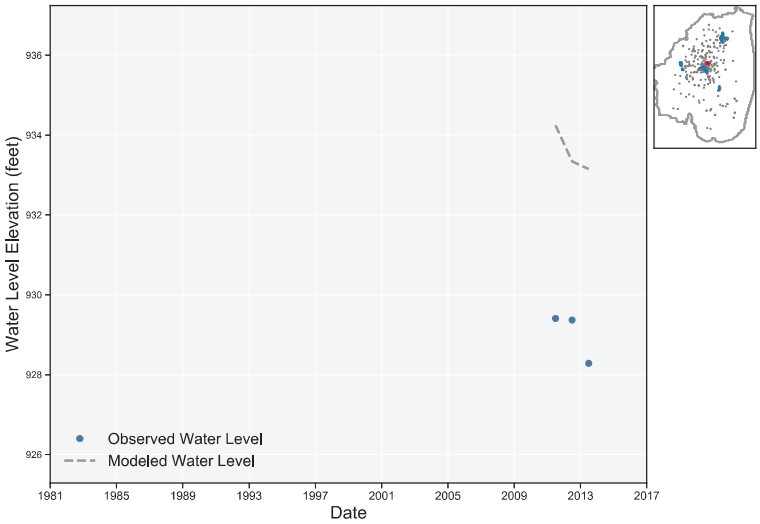
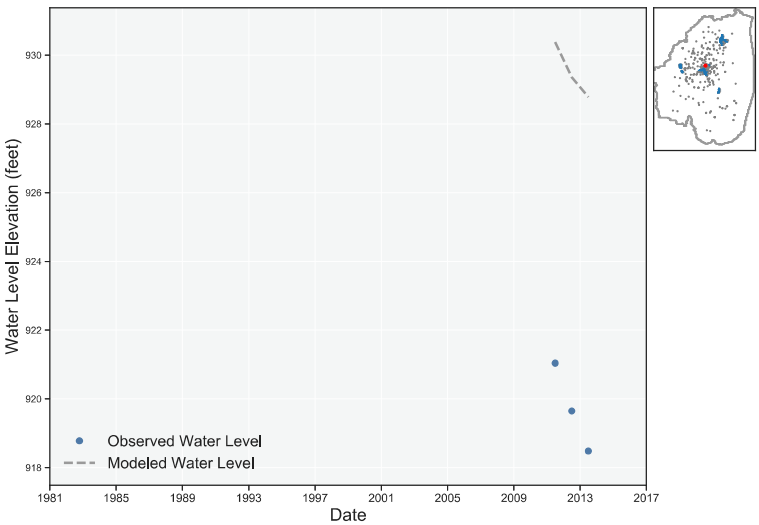
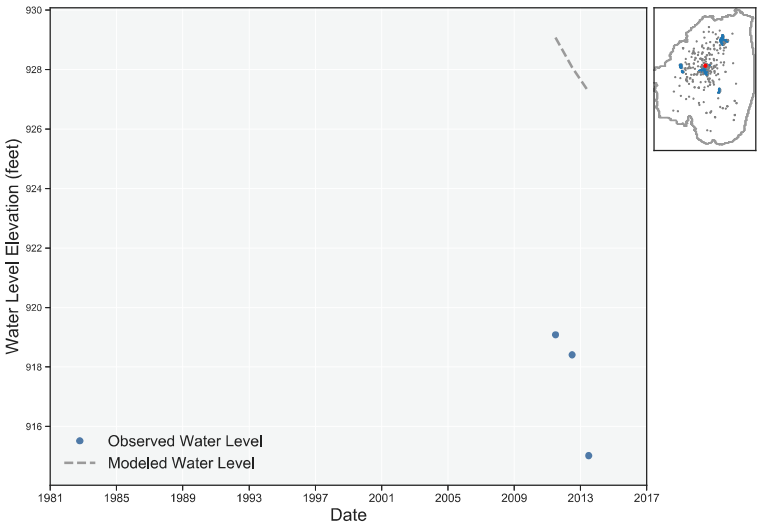


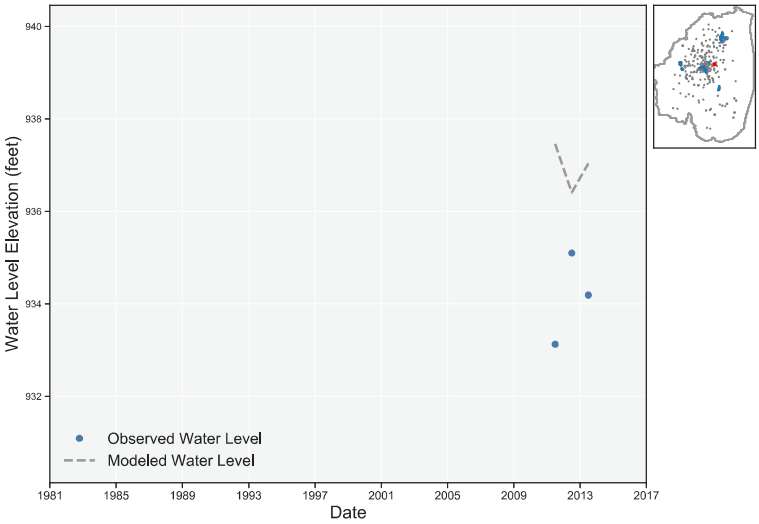
Well 208473 - Aq: OPDC Layers: 6 - 6



Well 450573 - Aq: OPDC Layers: 6 - 6



Well 182782 - Aq: OPDC Layers: 6 - 6



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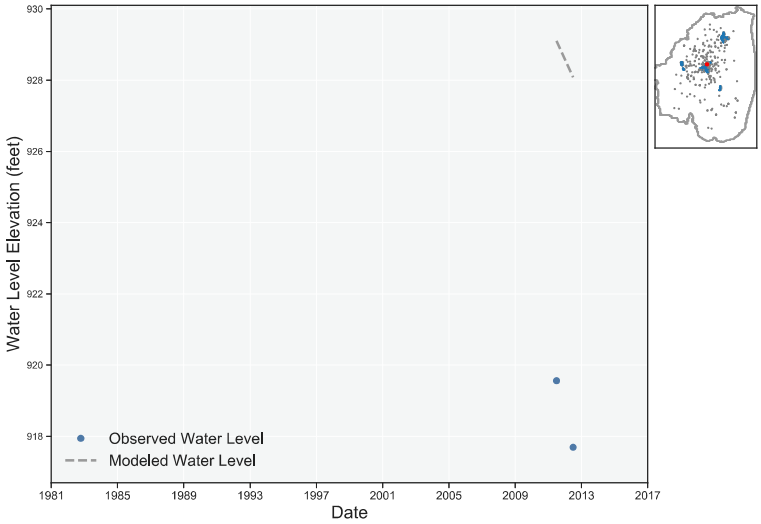
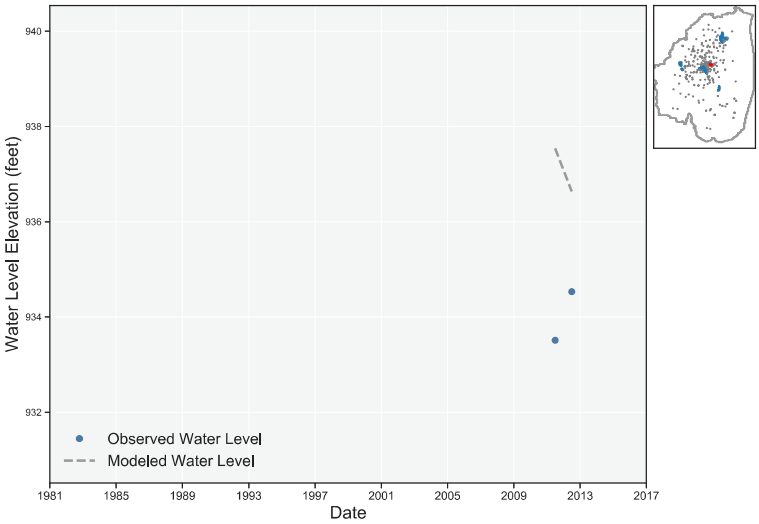
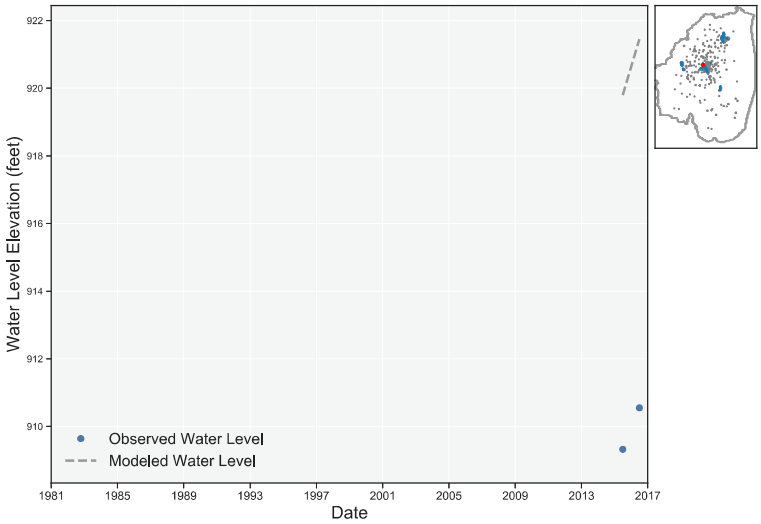


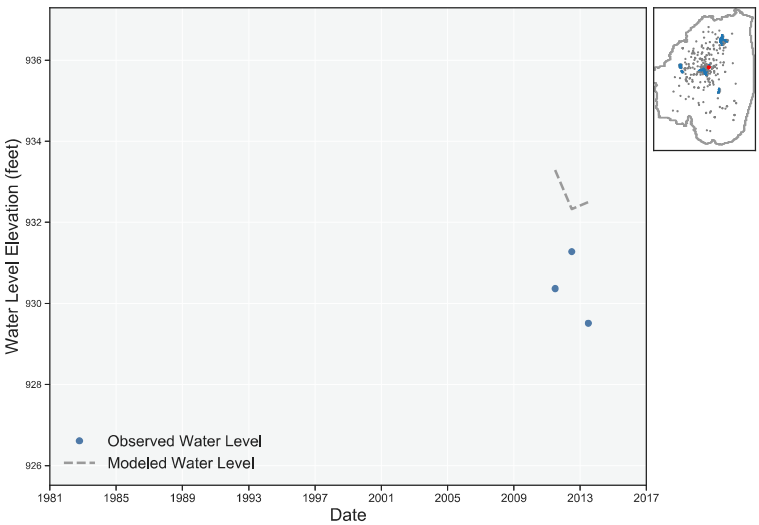
Well 430520 - Aq: OPDC Layers: 6 - 6



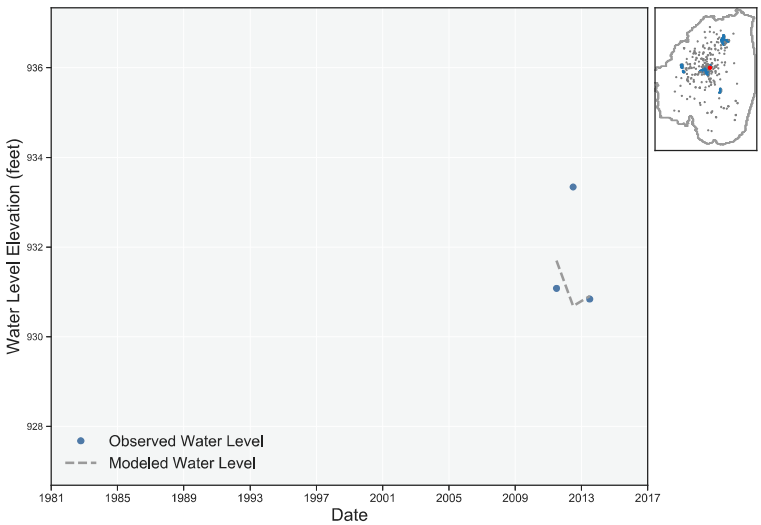
Well 62053 - Aq: CJDN Layers: 6 - 6



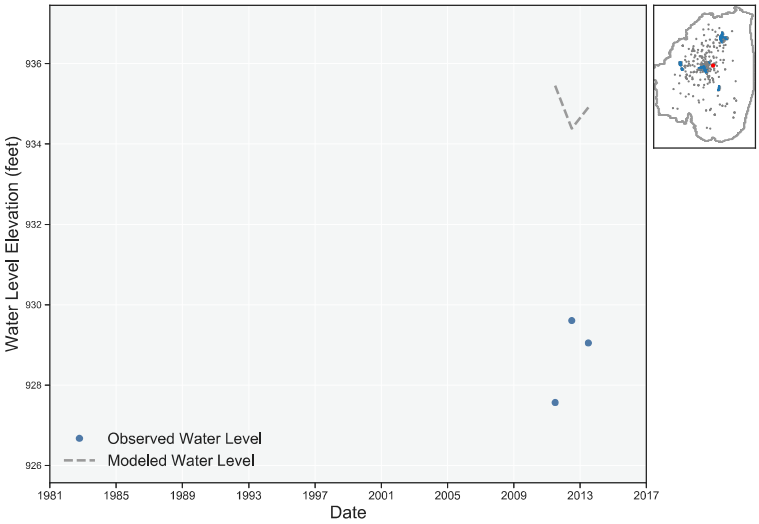
Well 195679 - Aq: OPDC Layers: 6 - 6



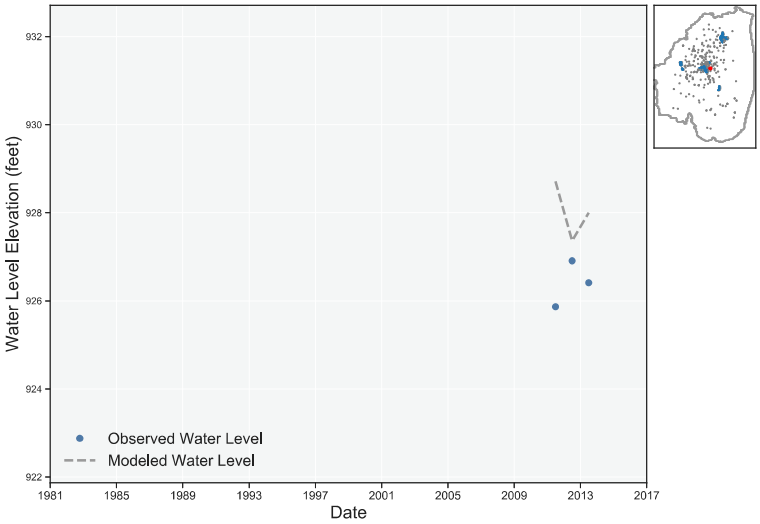
Well 207398 - Aq: OPDC Layers: 6 - 6



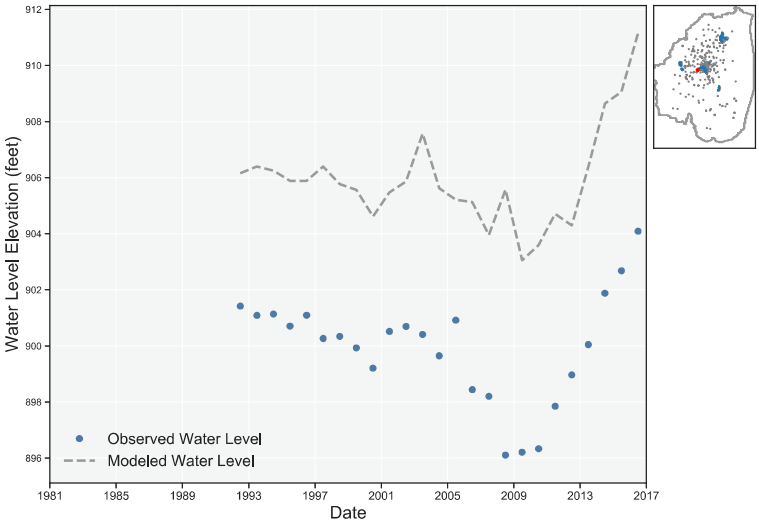
Well 404147 - Aq: OPDC Layers: 6 - 6



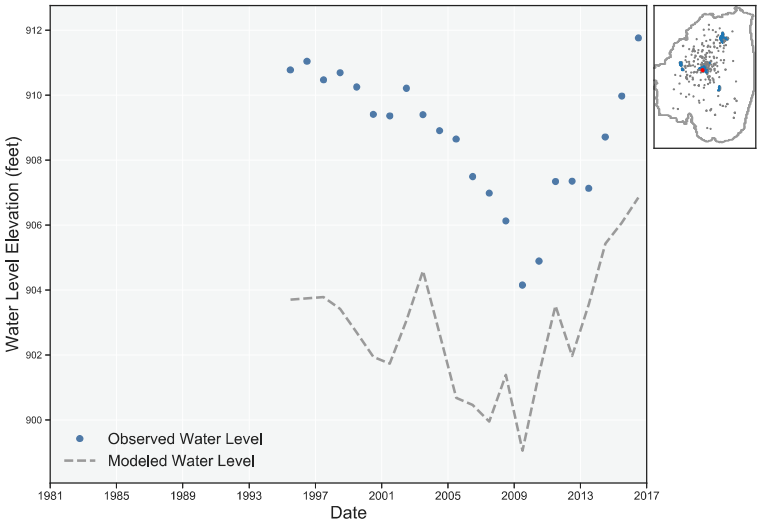
Well 420312 - Aq: OPDC Layers: 6 - 6



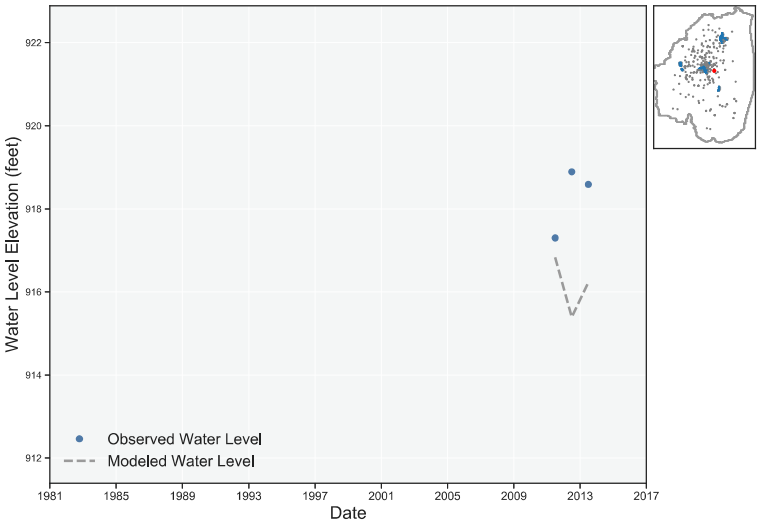
Well 62038 - Aq: OPDCCJDN Layers: 6 - 6



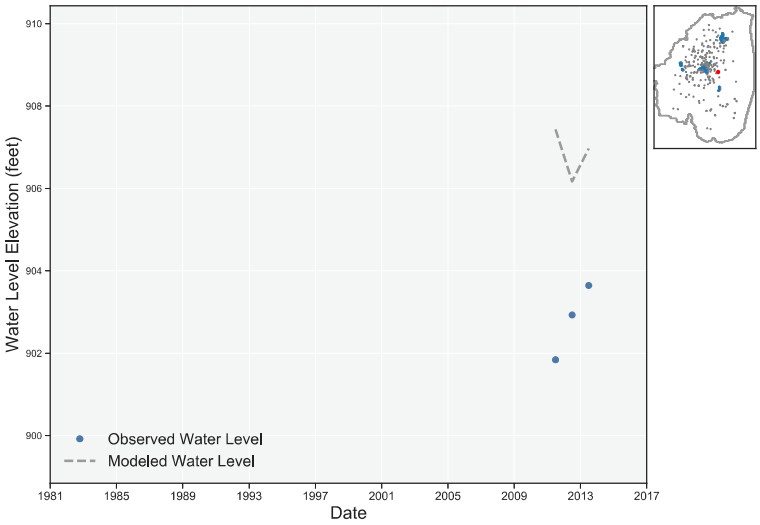
Well 62044 - Aq: OPDC Layers: 6 - 6



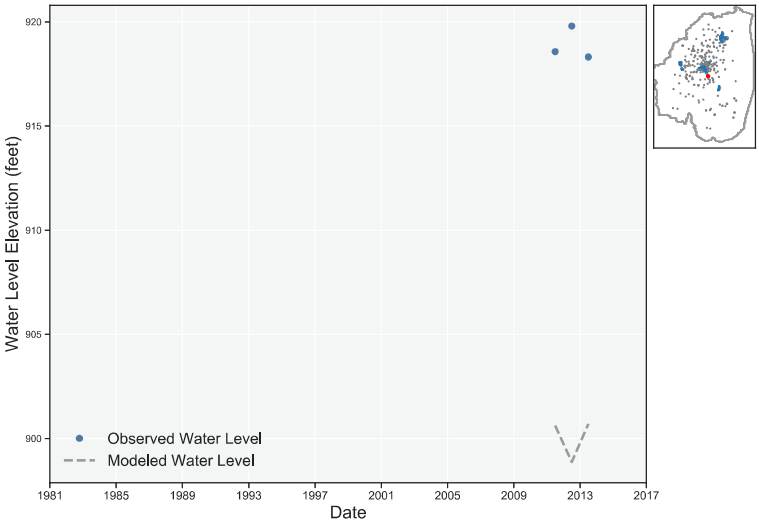
Well 435121 - Aq: OPDC Layers: 6 - 6



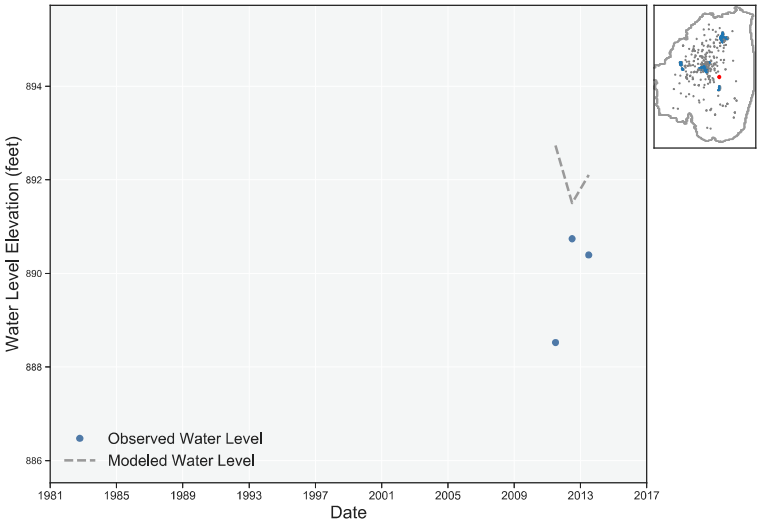
Well 762107 - Aq: OSTP Layers: 6 - 6



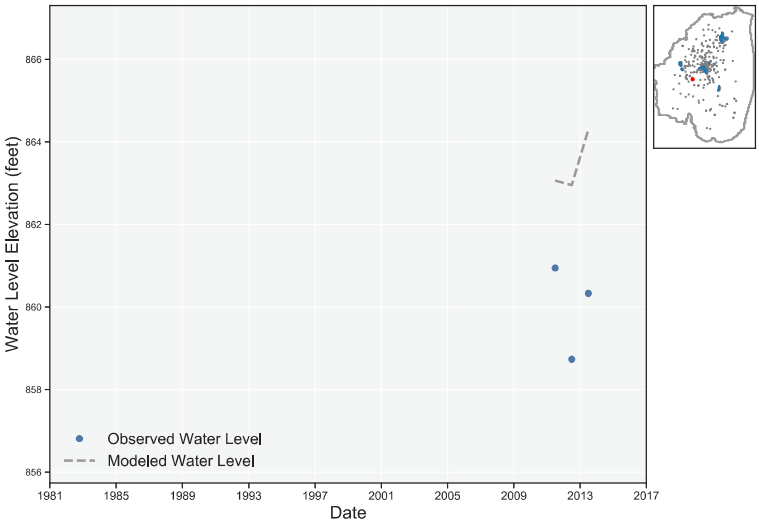
Well 138719 - Aq: OPDC Layers: 6 - 6



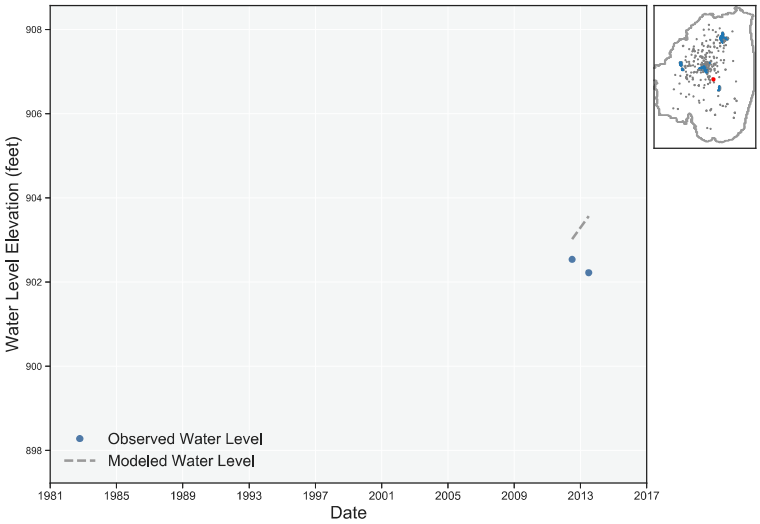
Well 242357 - Aq: OPDC Layers: 6 - 6



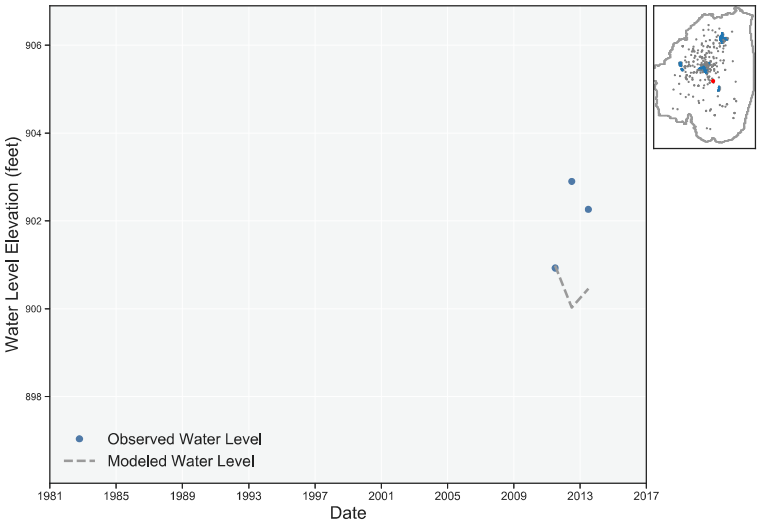
Well 430379 - Aq: OPDC Layers: 6 - 6



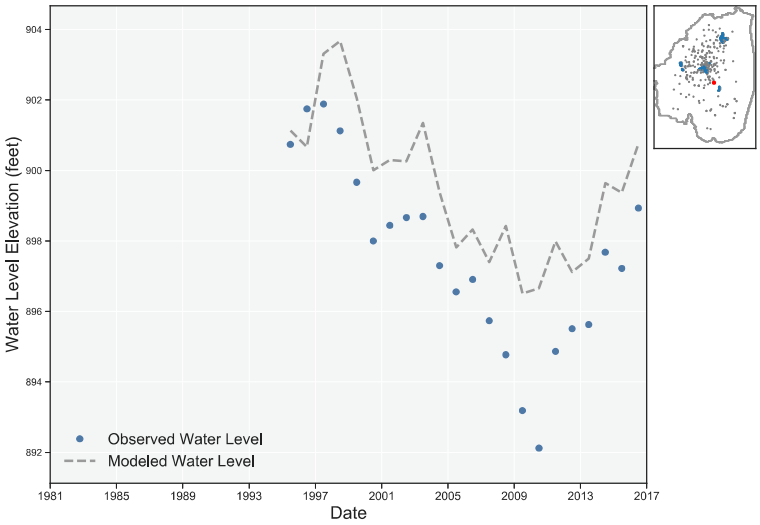
Well 421245 - Aq: OPDC Layers: 6 - 6



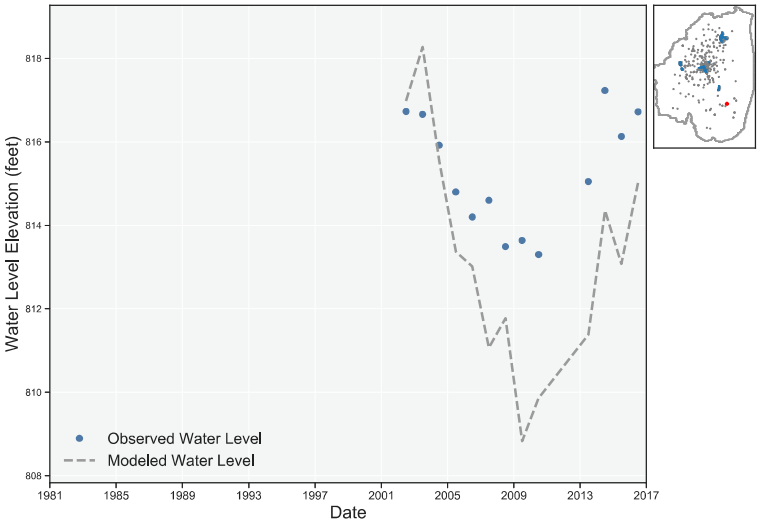
Well 440010 - Aq: OSTP Layers: 6 - 6



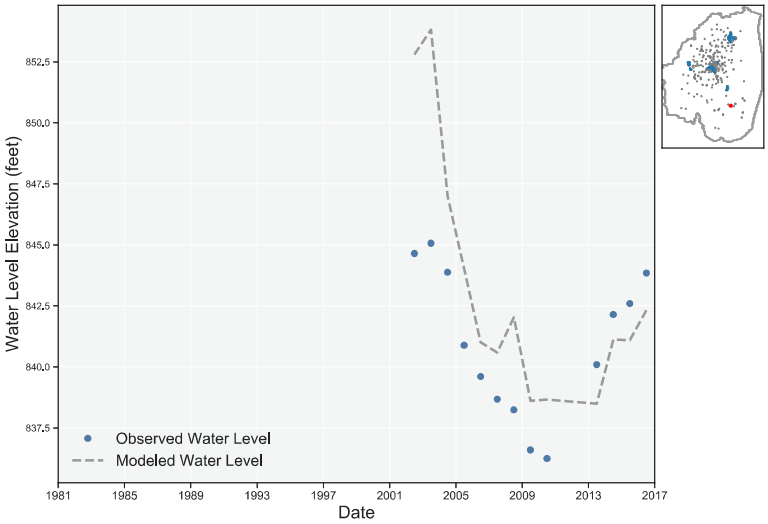
Well 82041 - Aq: OPDC Layers: 6 - 6



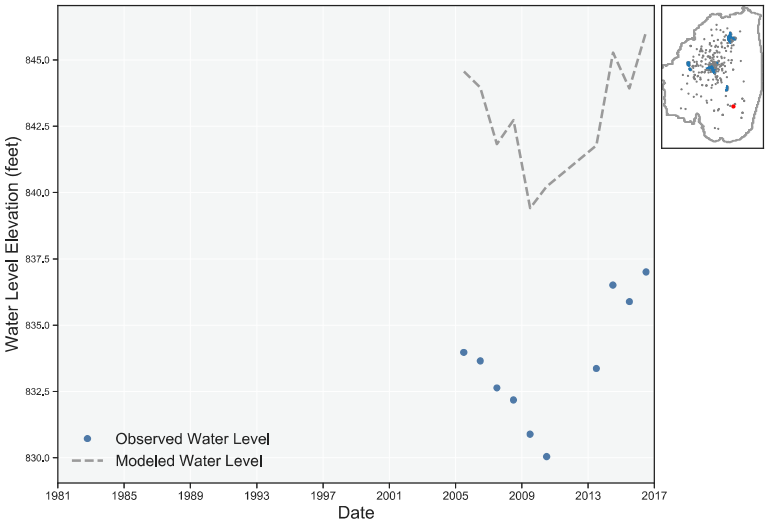
Well 675585 - Aq: OPDC Layers: 6 - 6



Well 675582 - Aq: OPDC Layers: 6 - 6

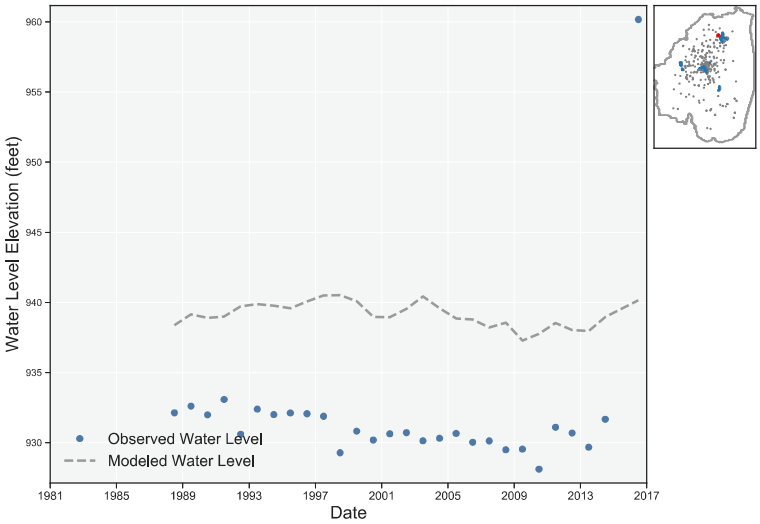


Well 727706 - Aq: OPDC Layers: 6 - 6

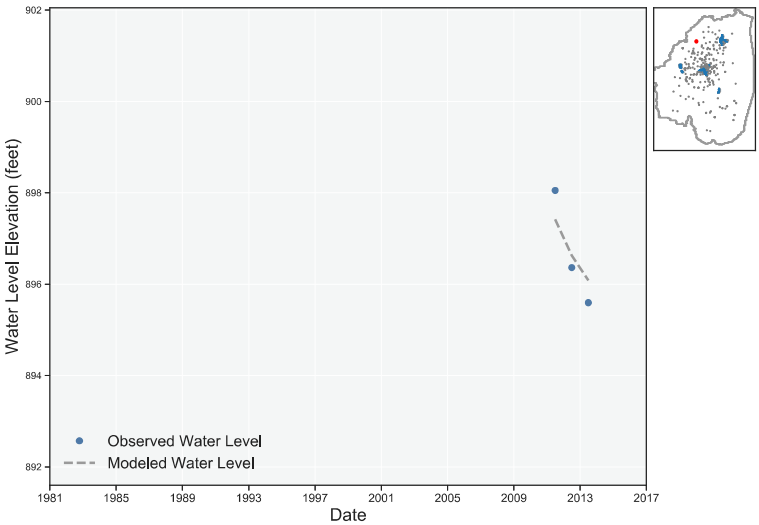


Well 82030 - Aq: OPDCCJDN Layers: 6 - 7

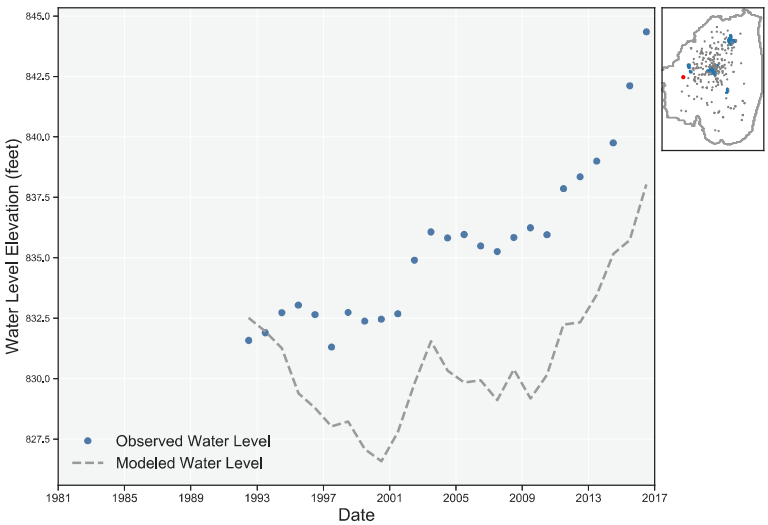
Note: Some values not included in calibration



Well 136792 - Aq: OPCJ Layers: 6 - 7

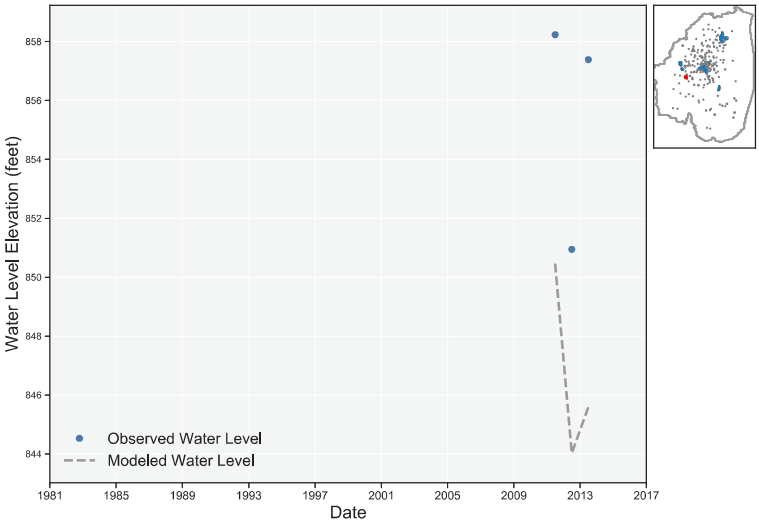


Well 62037 - Aq: OPDCCJDN Layers: 6 - 7



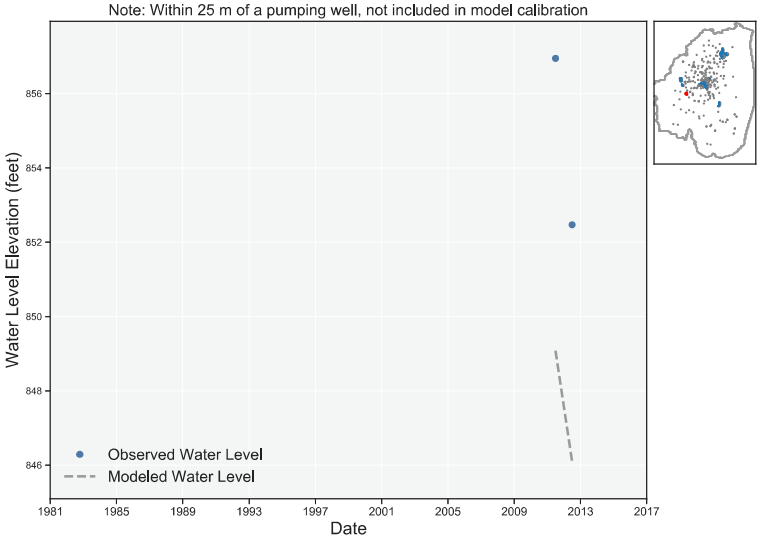
Well 151579 - Aq: OPCJ Layers: 6 - 7

Note: This is a pumping well (1977-6229, installation E) but was not pumped in 2011 or 2012.
Note: Some values not included in calibration

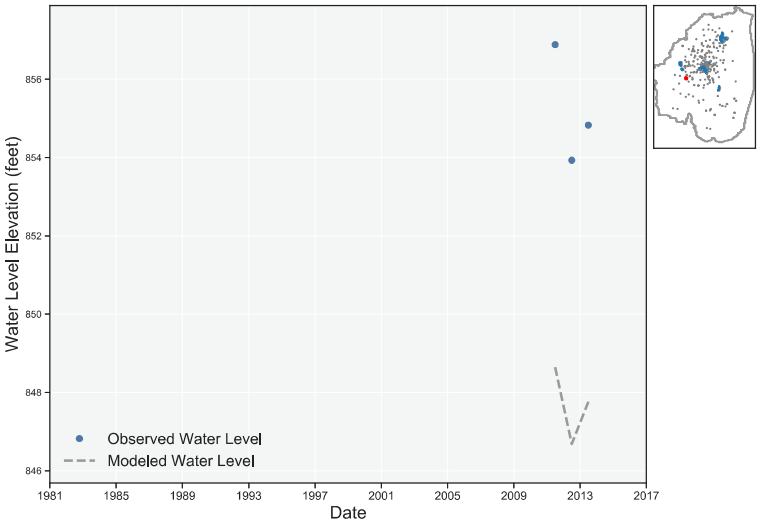


Well 706802 - Aq: OPCJ Layers: 6 - 7

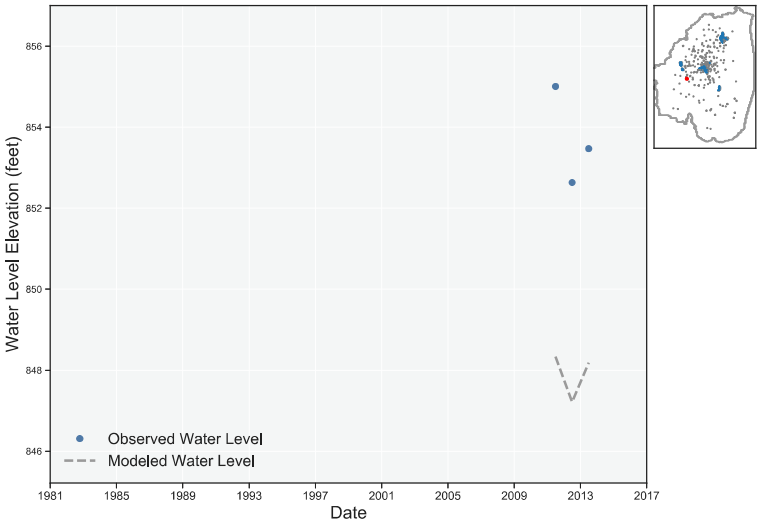
Note: Within 25 m of a pumping well, not included in model calibration



Well 753666 - Aq: OPCJ Layers: 6 - 7

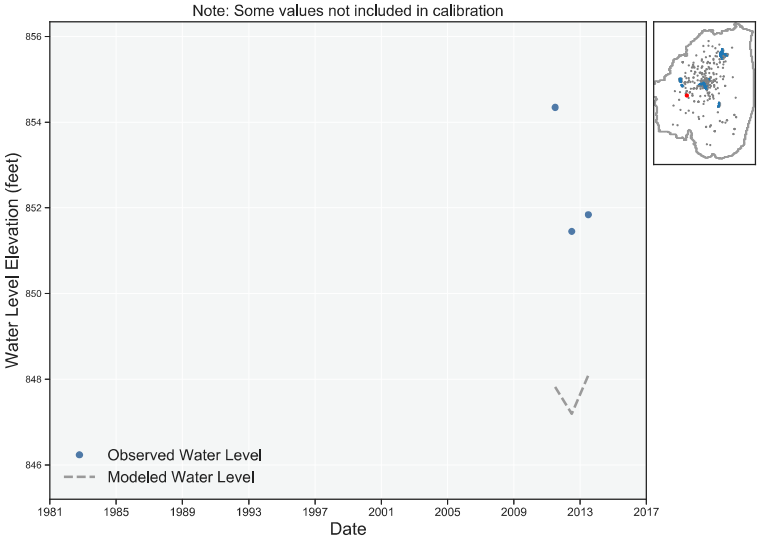


Well 753667 - Aq: OPCJ Layers: 6 - 7



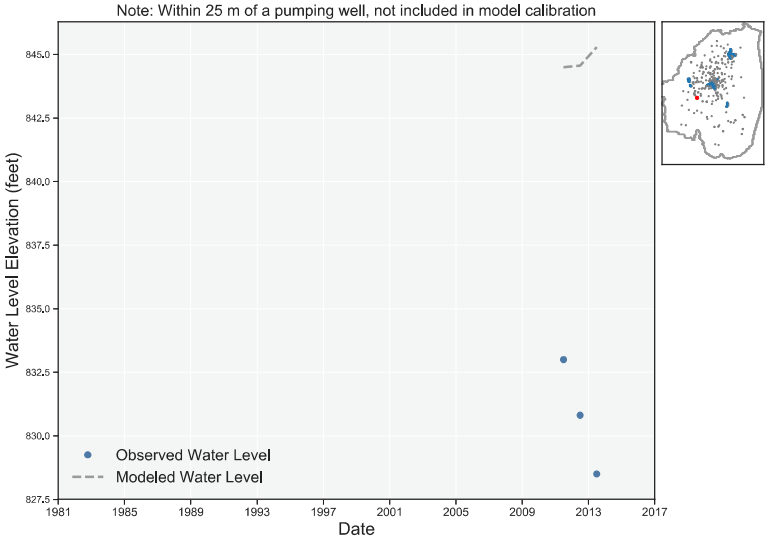
Well 759568 - Aq: OPCJ Layers: 6 - 7

Note: Some values not included in calibration

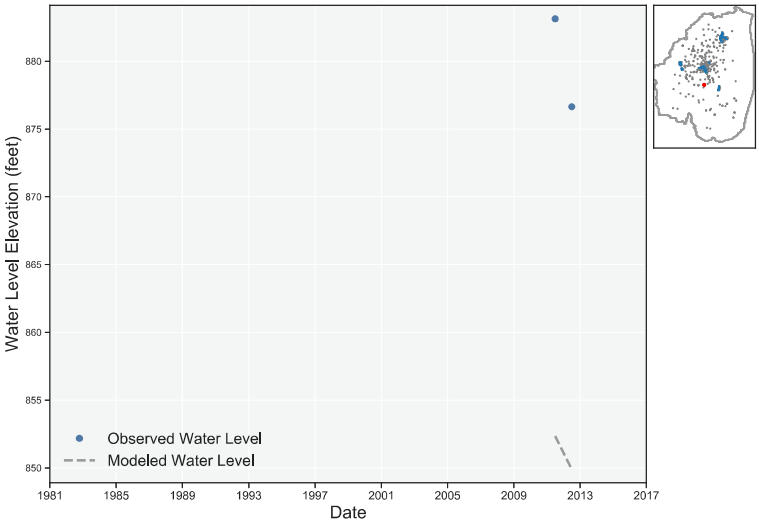


Well 759569 - Aq: OPCJ Layers: 6 - 7

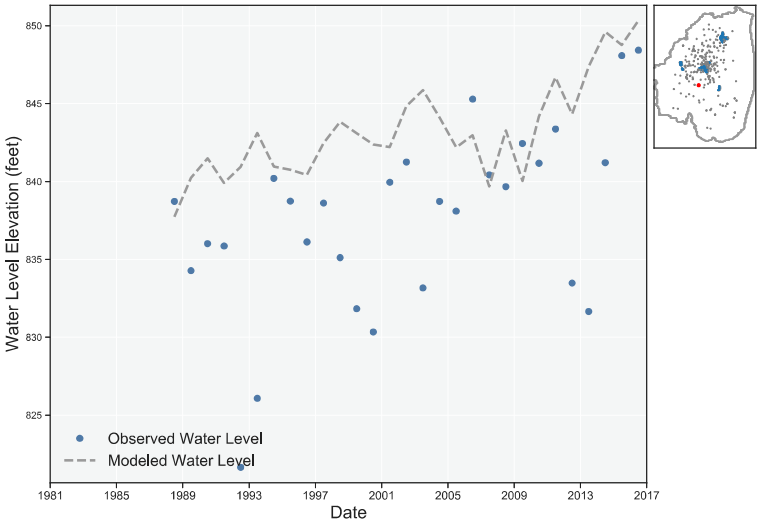
Note: Within 25 m of a pumping well, not included in model calibration



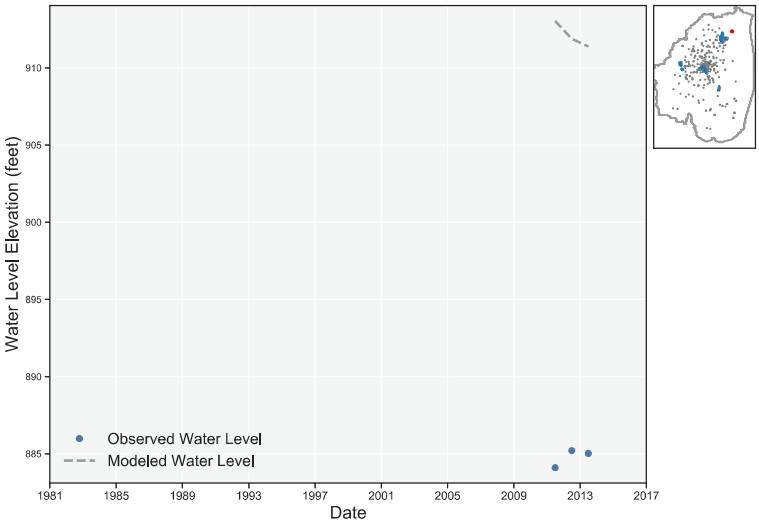
Well 686293 - Aq: OPCJ Layers: 6 - 7



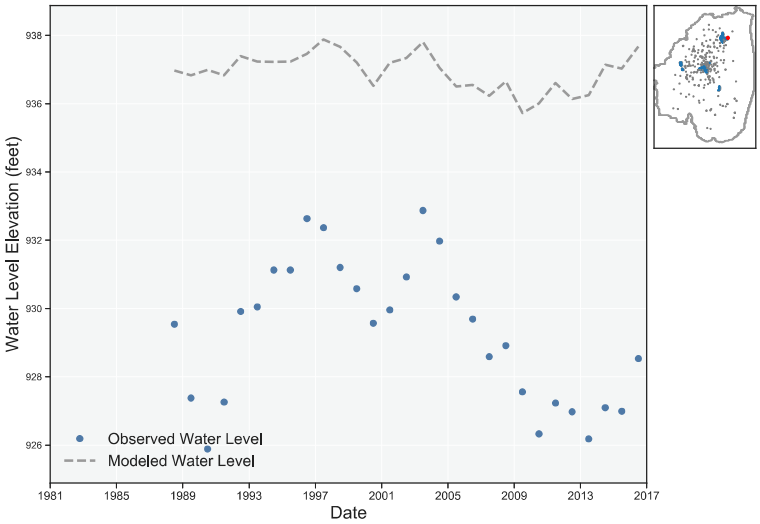
Well 62009 - Aq: OPDCCJDN Layers: 6 - 7



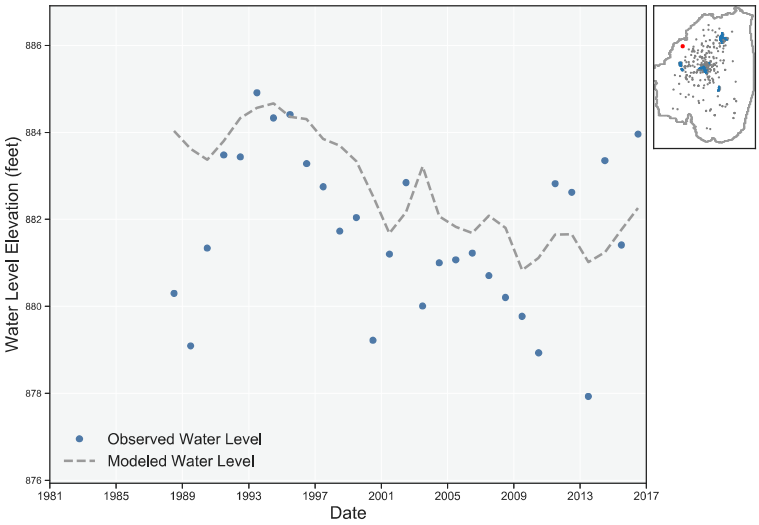
Well 517015 - Aq: OPCJ Layers: 7 - 7



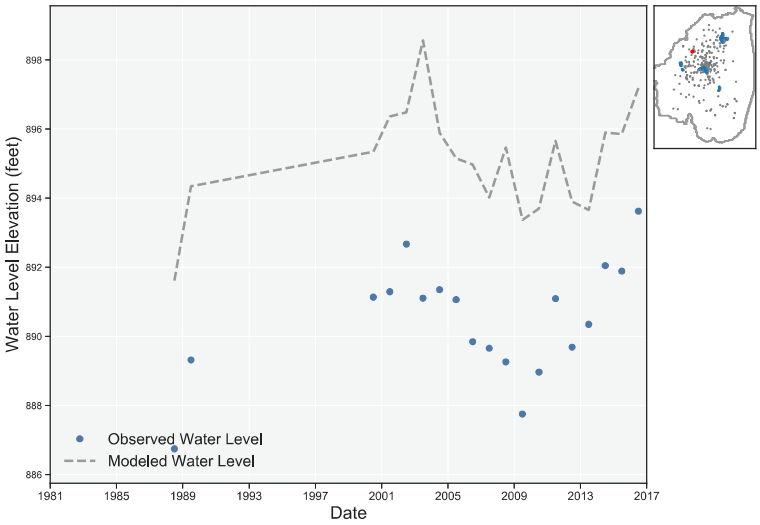
Well 82031 - Aq: CJDN Layers: 7 - 7



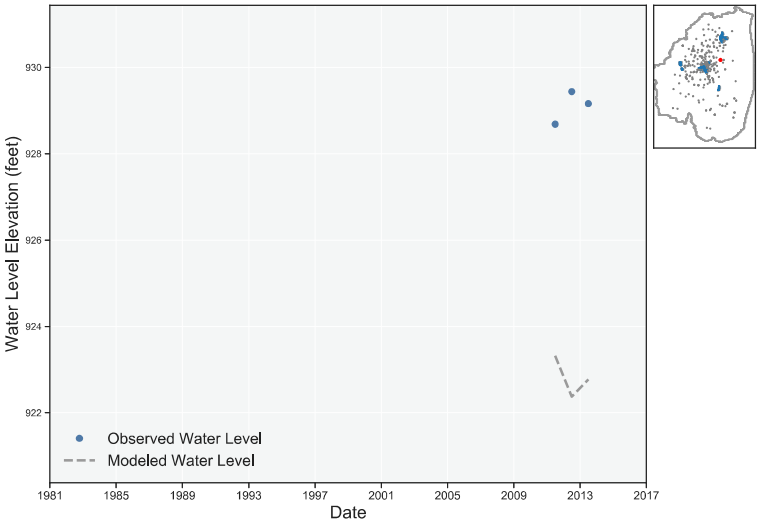
Well 2008 - Aq: QBAA Layers: 7 - 7



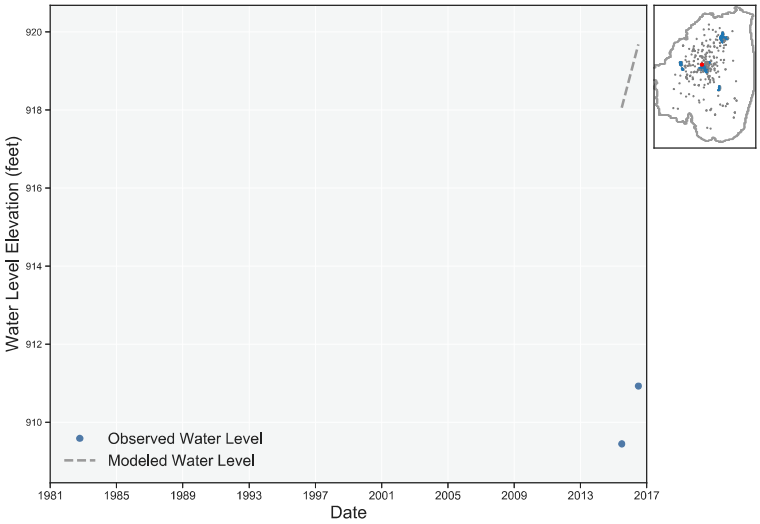
Well 2012 - Aq: CJDN Layers: 7 - 7



Well 409004 - Aq: OSTP Layers: 7 - 7

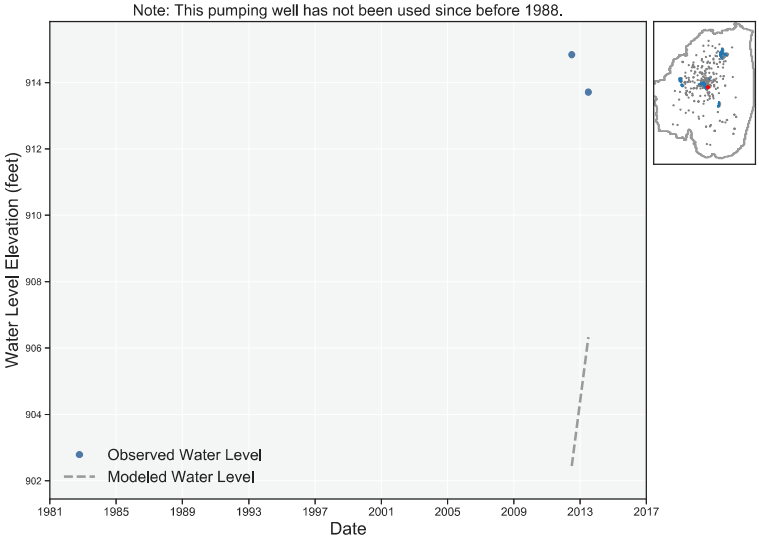


Well 62054 - Aq: OPDC Layers: 7 - 7



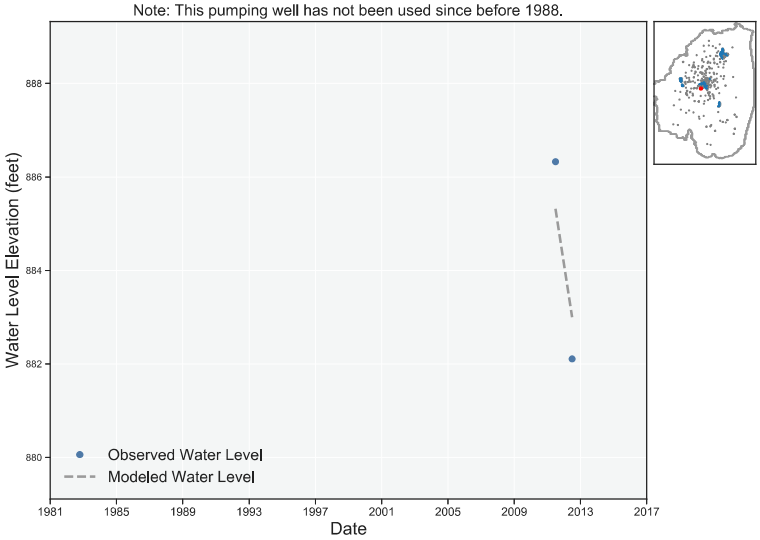
Well 208506 - Aq: CJDN Layers: 7 - 7

Note: This pumping well has not been used since before 1988.

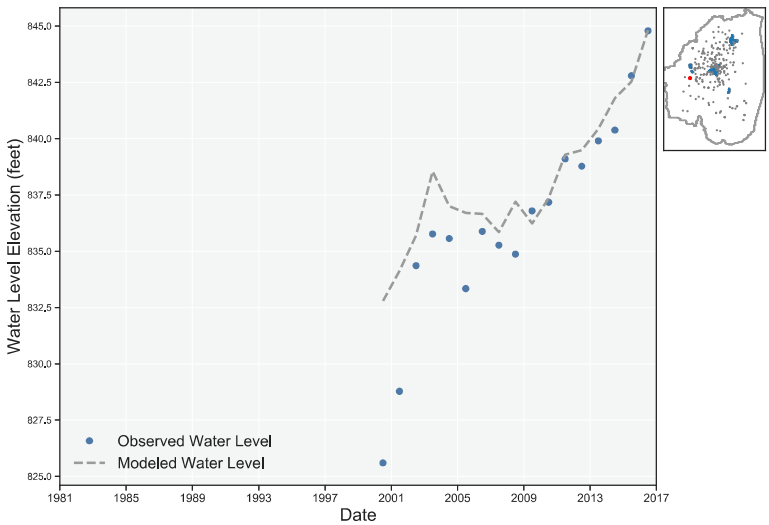


Well 226567 - Aq: CJSL Layers: 7 - 7

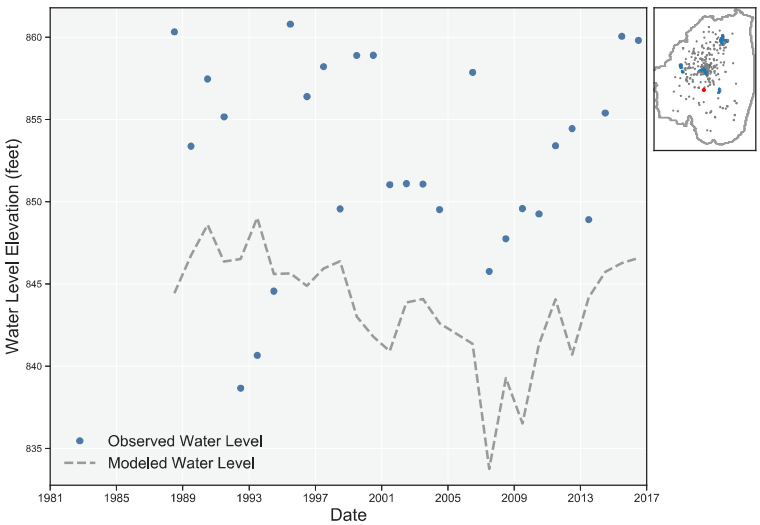
Note: This pumping well has not been used since before 1988.



Well 62030 - Aq: CJDN Layers: 7 - 7

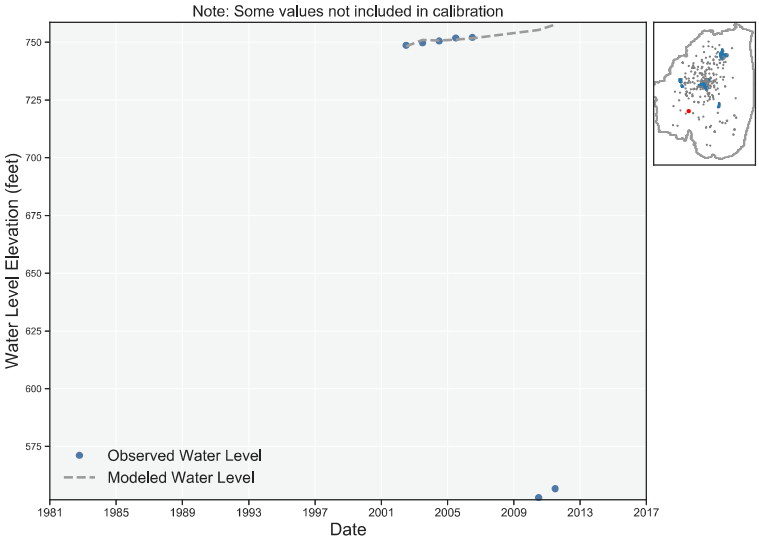


Well 62001 - Aq: CJDN Layers: 7 - 7

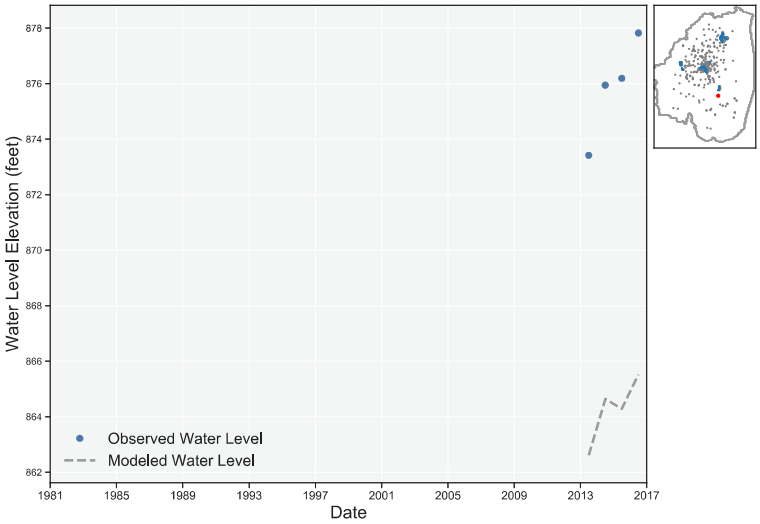


Well 62049 - Aq: CJDN Layers: 7 - 7

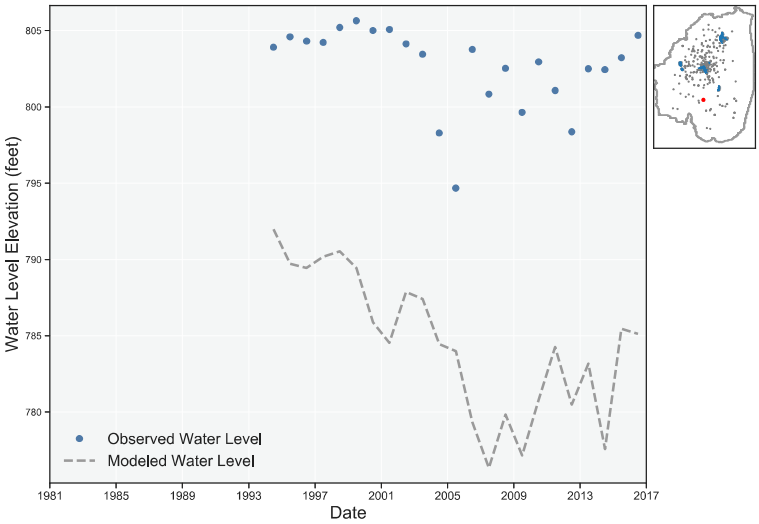
Note: Some values not included in calibration



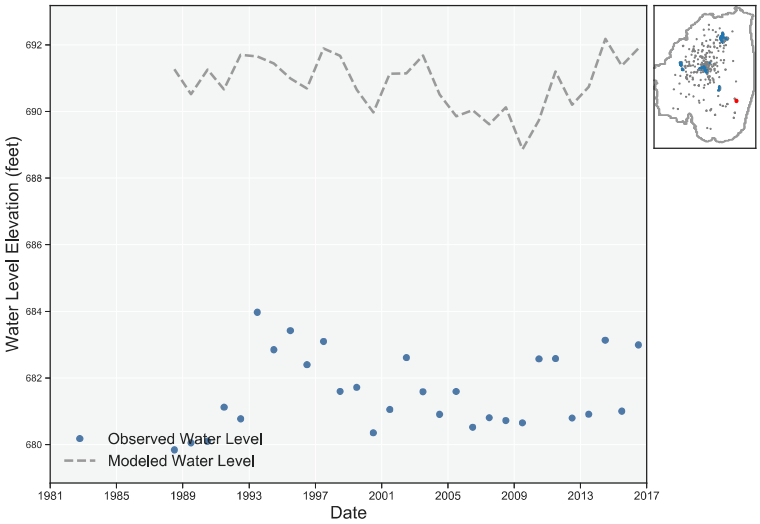
Well 82058 - Aq: QBAA Layers: 7 - 7



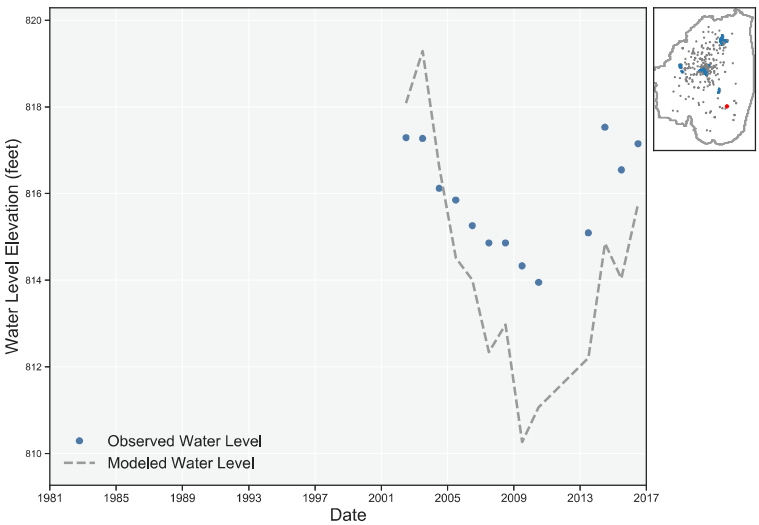
Well 62040 - Aq: CJDN Layers: 7 - 7



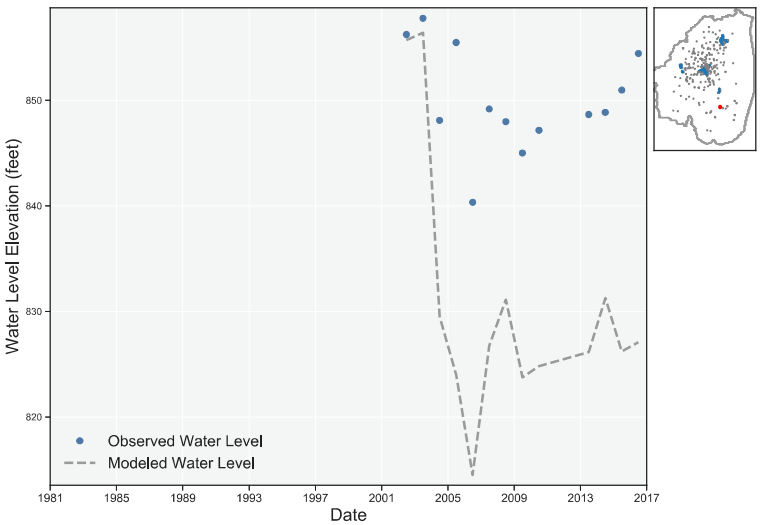
Well 82011 - Aq: CECR Layers: 7 - 7



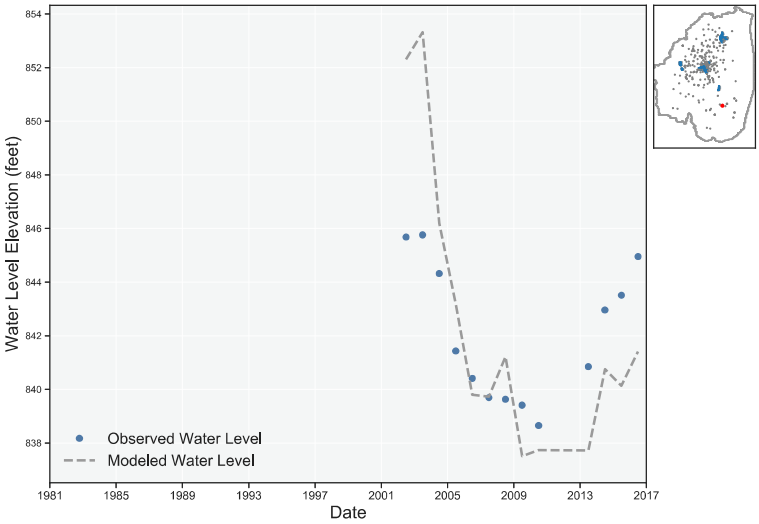
Well 675584 - Aq: CJDN Layers: 7 - 7



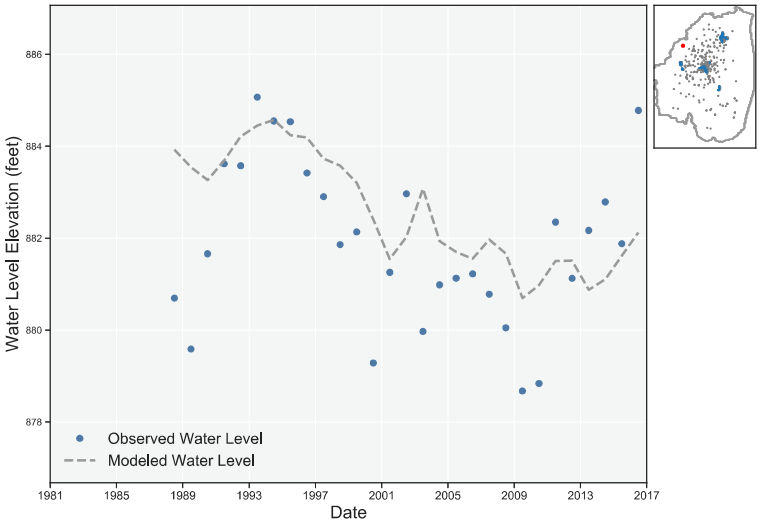
Well 675580 - Aq: CJDN Layers: 7 - 7



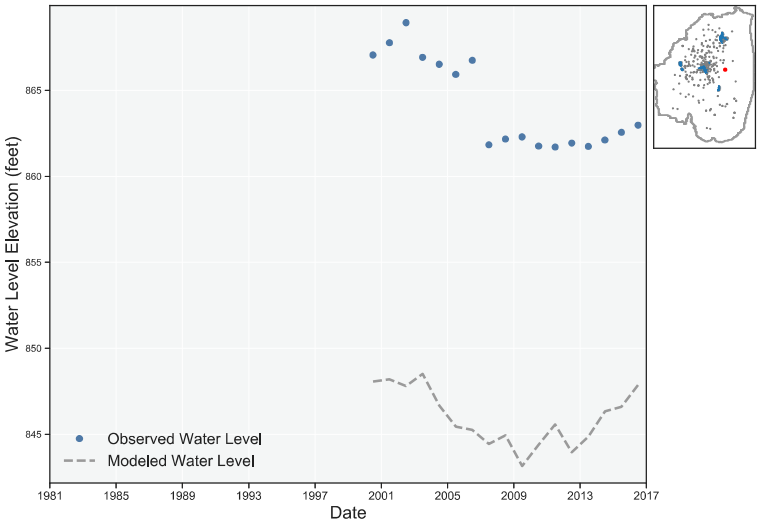
Well 675583 - Aq: CJDN Layers: 7 - 7



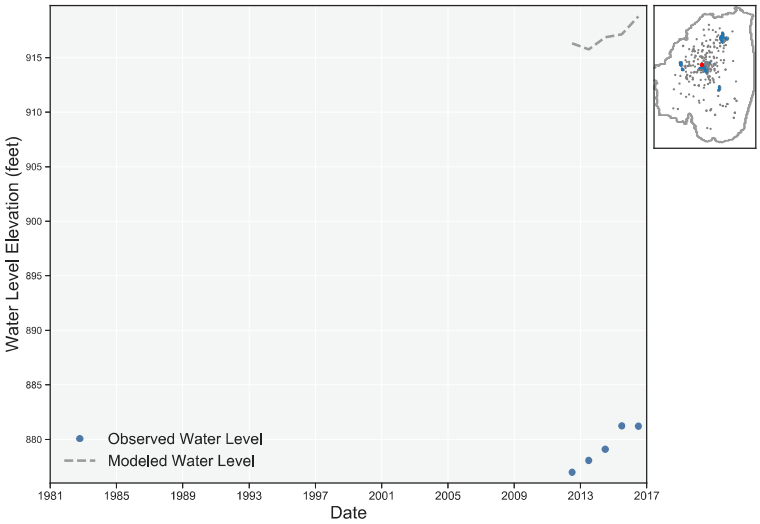
Well 2007 - Aq: QBAA Layers: 8 - 8



Well 82047 - Aq: CTCG Layers: 9 - 9

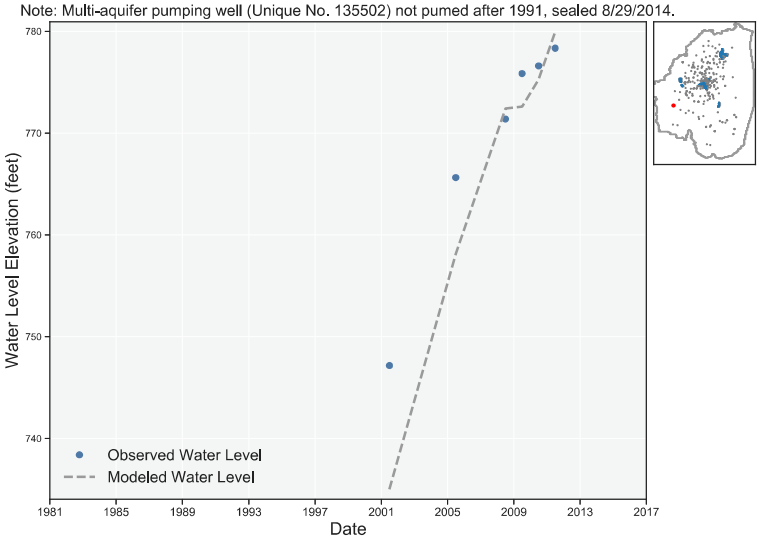


Well 62052 - Aq: CTCW Layers: 9 - 10



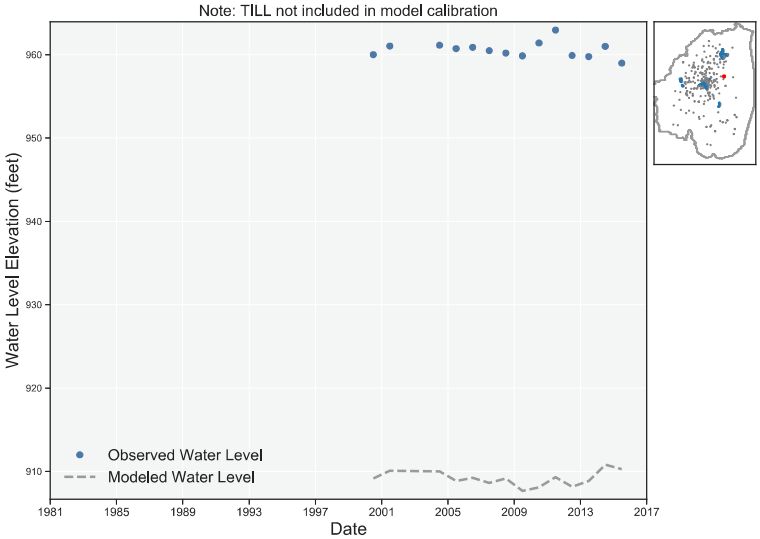
Well 62041 - Aq: CIGL Layers: 10 - 10

Note: Multi-aquifer pumping well (Unique No. 135502) not pumed after 1991, sealed 8/29/2014.

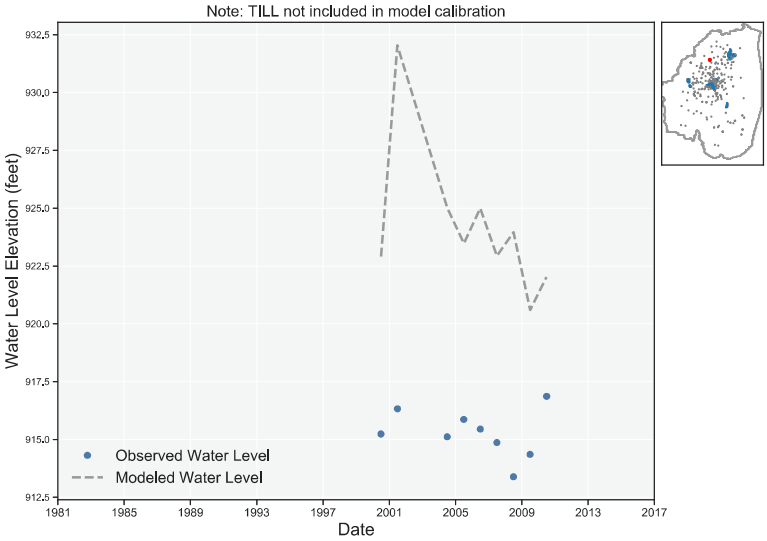


Well 82043 - Aq: TILL Layers: 1 - 1

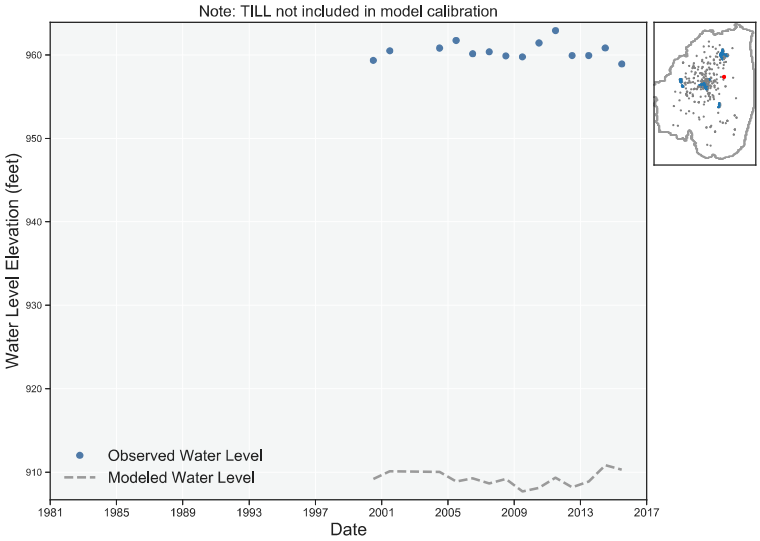
Note: TILL not included in model calibration



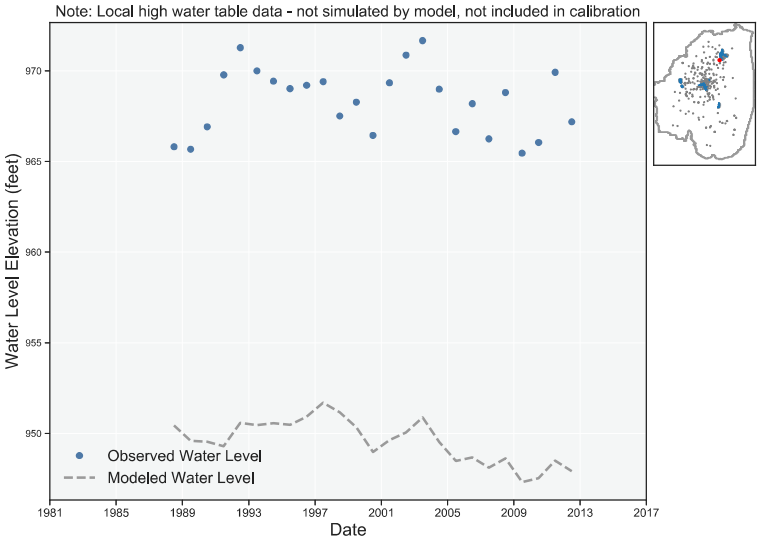
Well 82044 - Aq: TILL Layers: 2 - 2



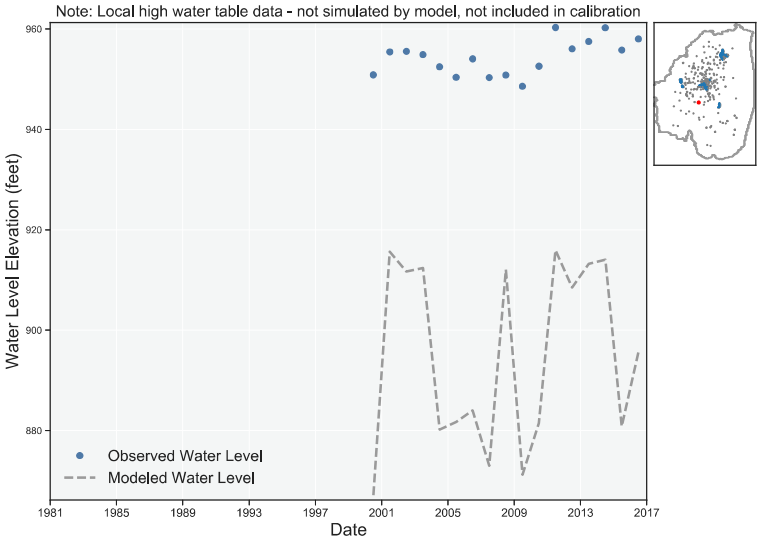
Well 82042 - Aq: TILL Layers: 3 - 3



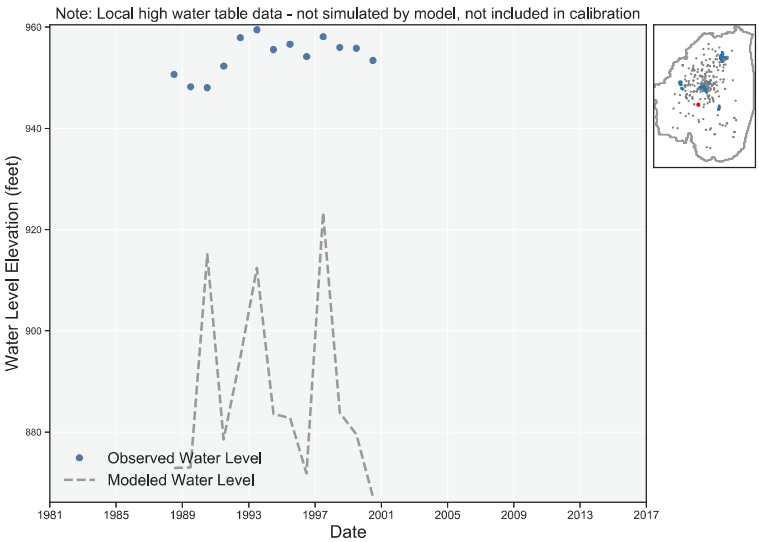
Well 82037 - Aq: QWTA Layers: 4 - 4



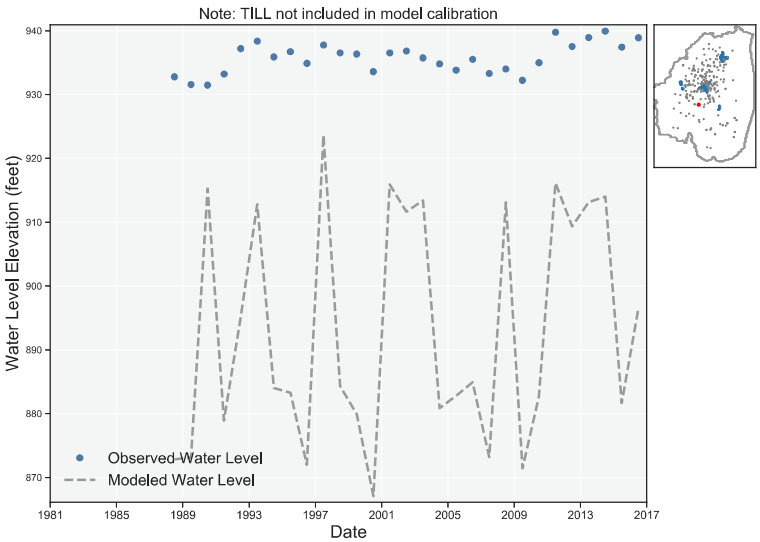
Well 62048 - Aq: QWTA Layers: 4 - 4



Well 62011 - Aq: QBAA Layers: 4 - 4

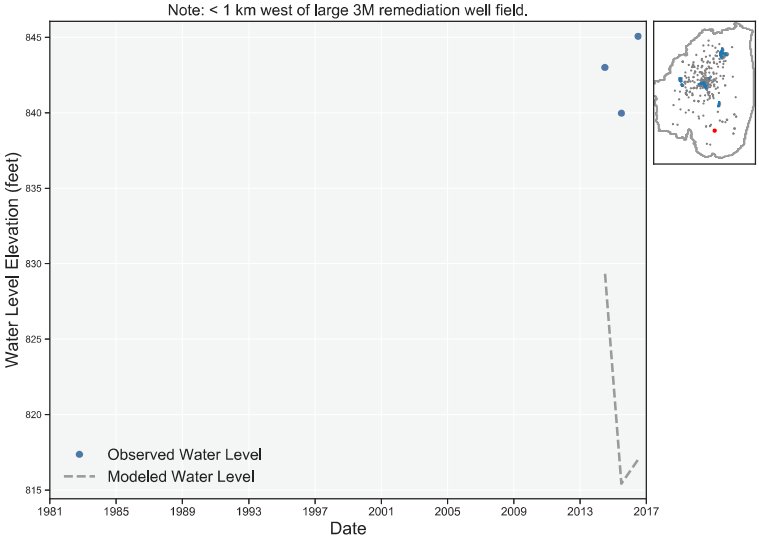


Well 62010 - Aq: TILL Layers: 4 - 4



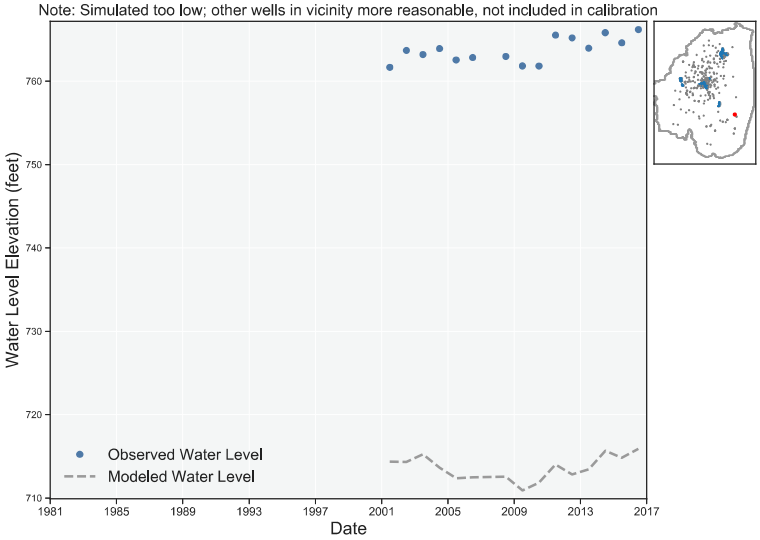
Well 82062 - Aq: QWTA Layers: 4 - 4

Note: < 1 km west of large 3M remediation well field.



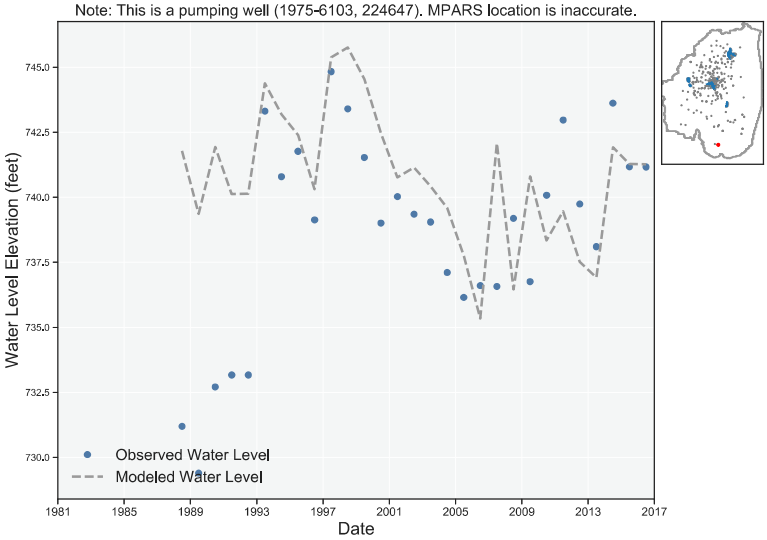
Well 82045 - Aq: CFRNCIGL Layers: 4 - 6

Note: Simulated too low; other wells in vicinity more reasonable, not included in calibration



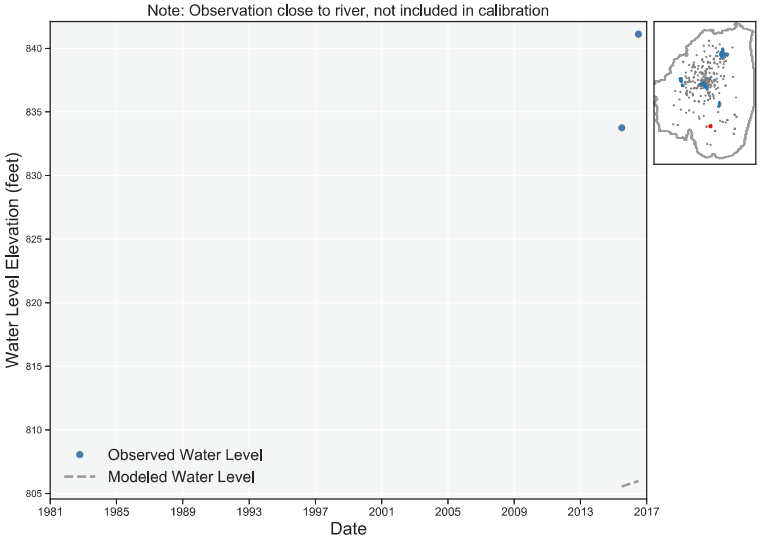
Well 82016 - Aq: OPDCCJDN Layers: 5 - 8

Note: This is a pumping well (1975-6103, 224647). MPARS location is inaccurate.



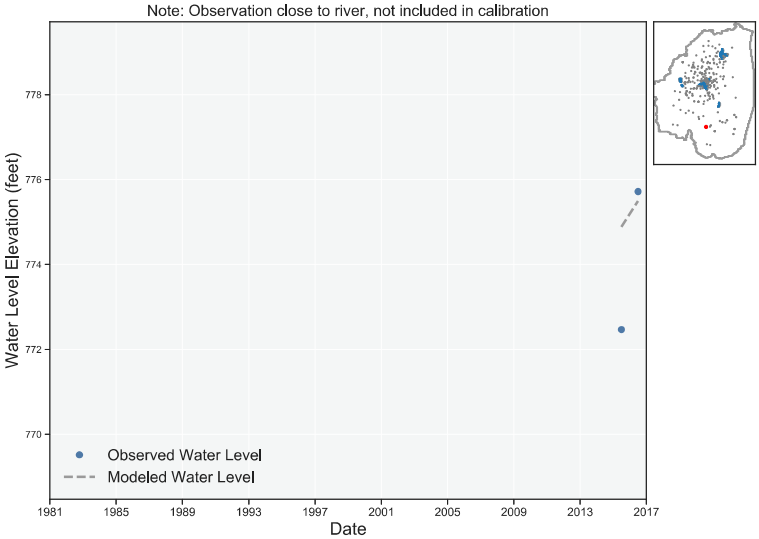
Well 767883 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration



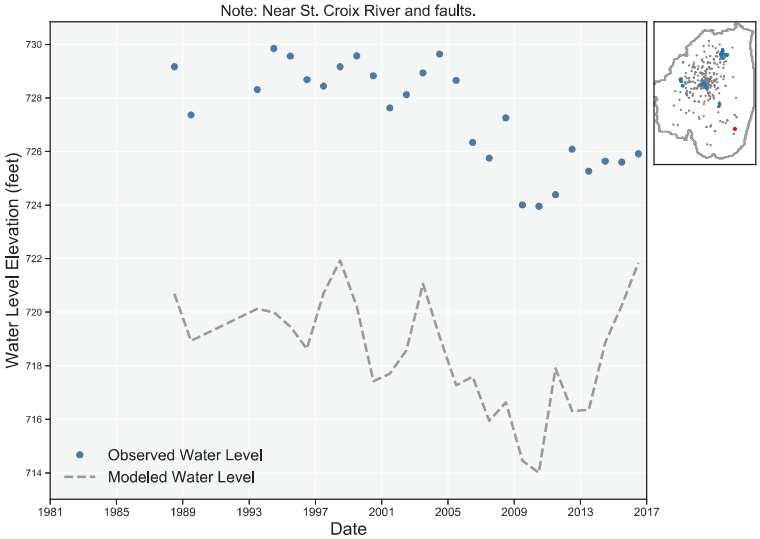
Well 767882 - Aq: OPDC Layers: 6 - 6

Note: Observation close to river, not included in calibration

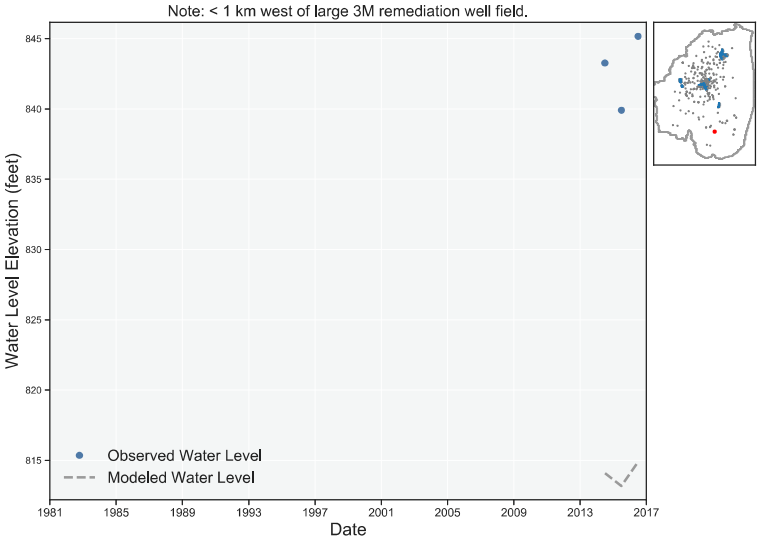


Well 82012 - Aq: CSTL Layers: 6 - 6

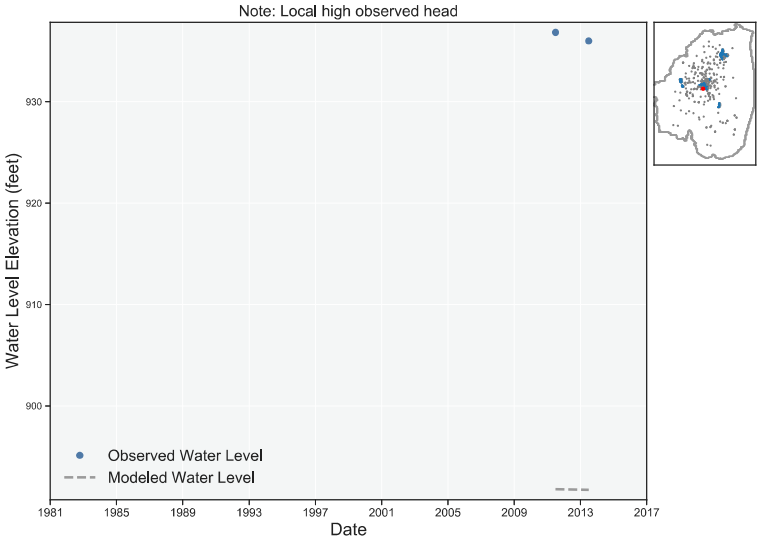
Note: Near St. Croix River and faults.



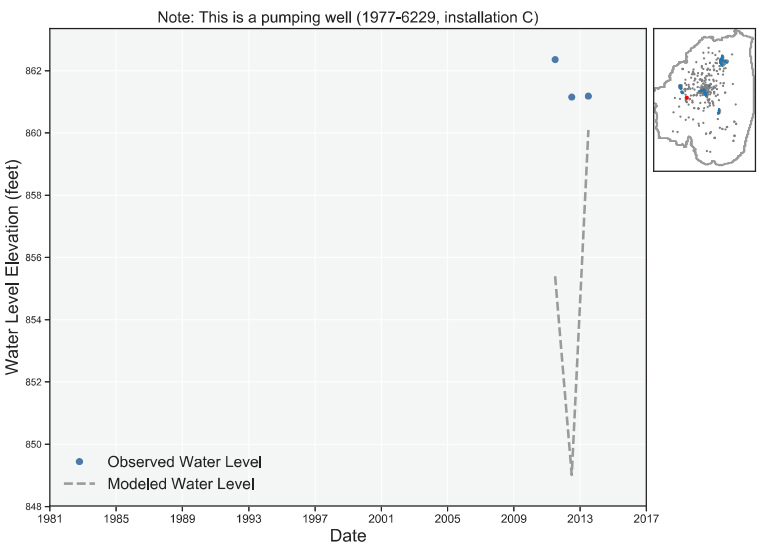
Well 82061 - Aq: OPDC Layers: 6 - 6



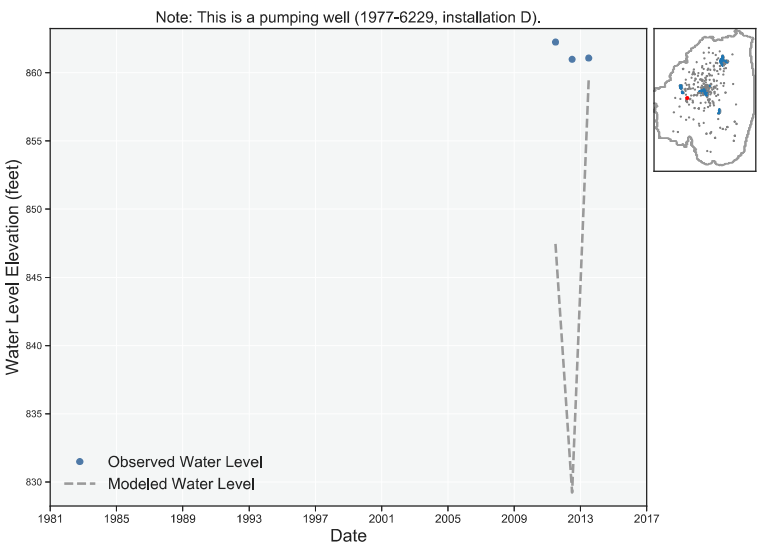
Well 226572 - Aq: OPCJ Layers: 6 - 7



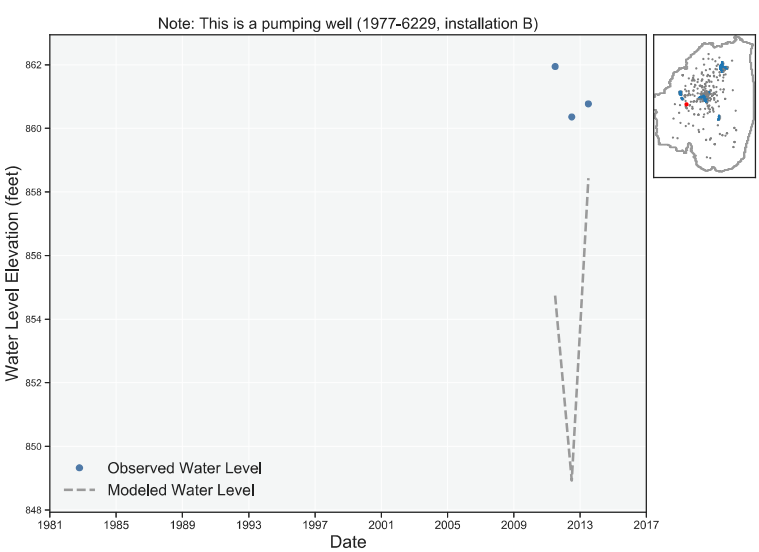
Well 127292 - Aq: OPCJ Layers: 6 - 7



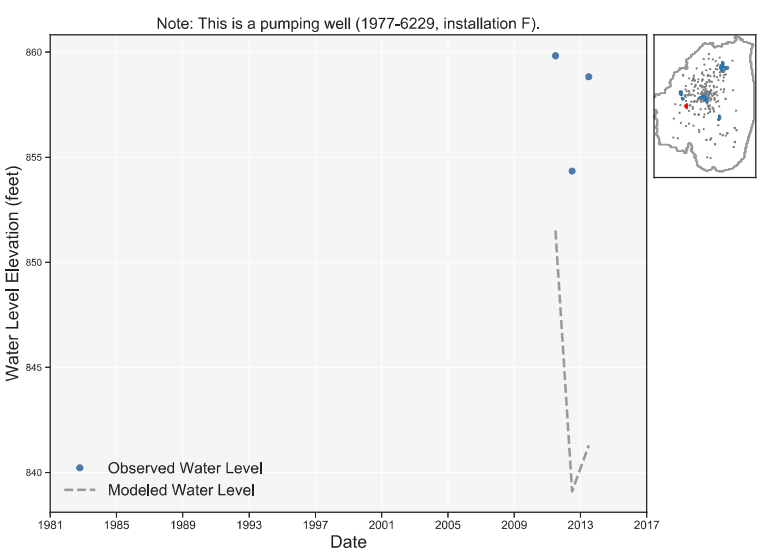
Well 151583 - Aq: OPCJ Layers: 6 - 7



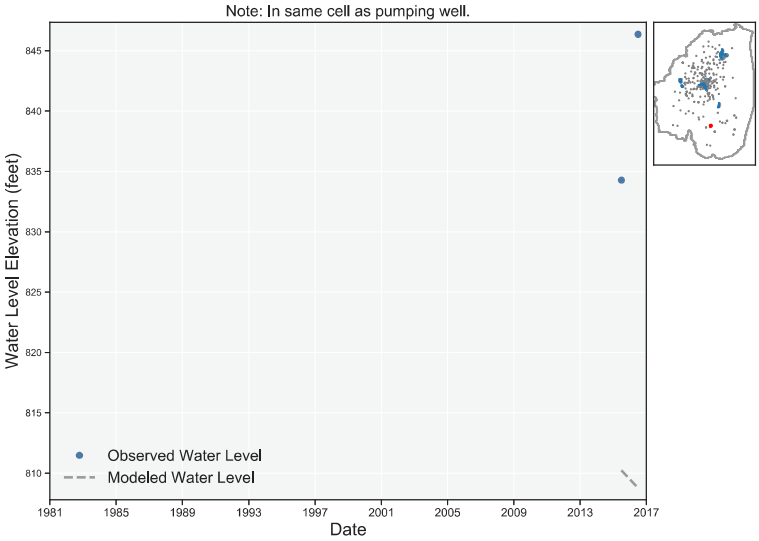
Well 133312 - Aq: OPCJ Layers: 6 - 7



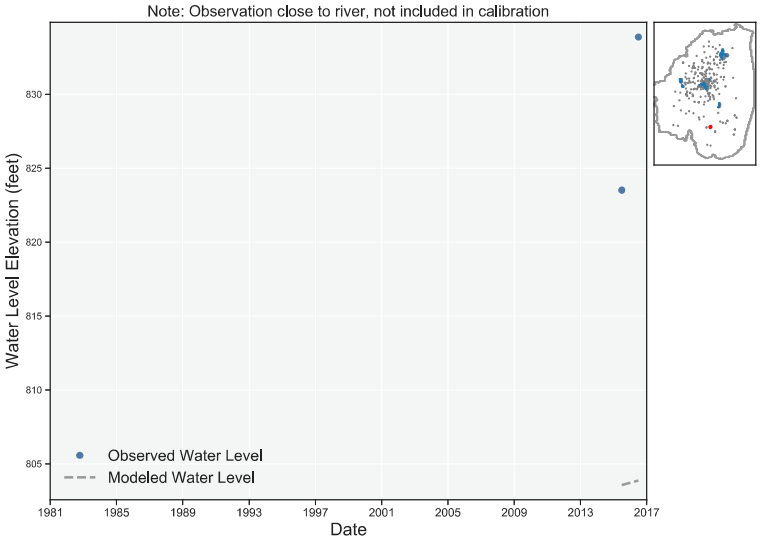
Well 706803 - Aq: OPCJ Layers: 6 - 7



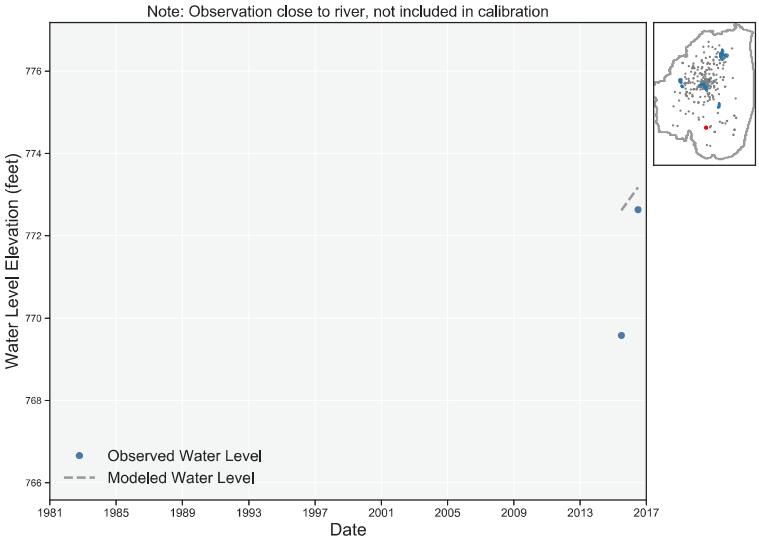
Well 763366 - Aq: CJDN Layers: 7 - 7



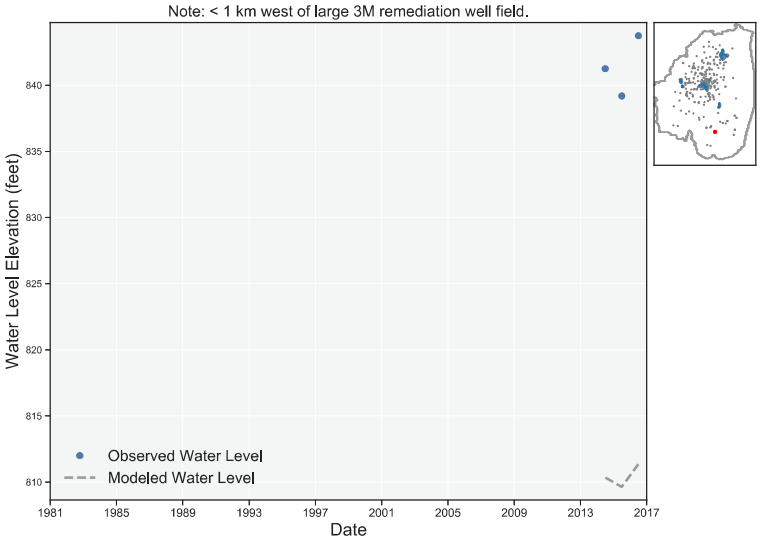
Well 767884 - Aq: CJDN Layers: 7 - 7



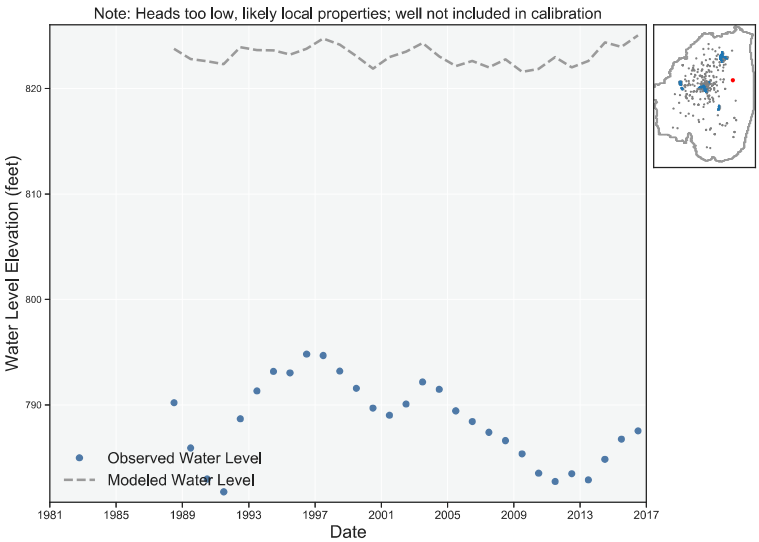
Well 767885 - Aq: CJDN Layers: 7 - 7



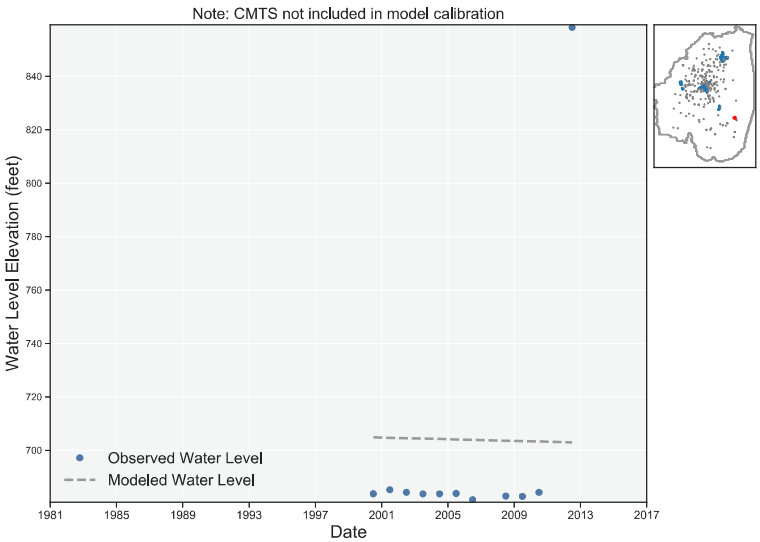
Well 82060 - Aq: CJDN Layers: 7 - 7



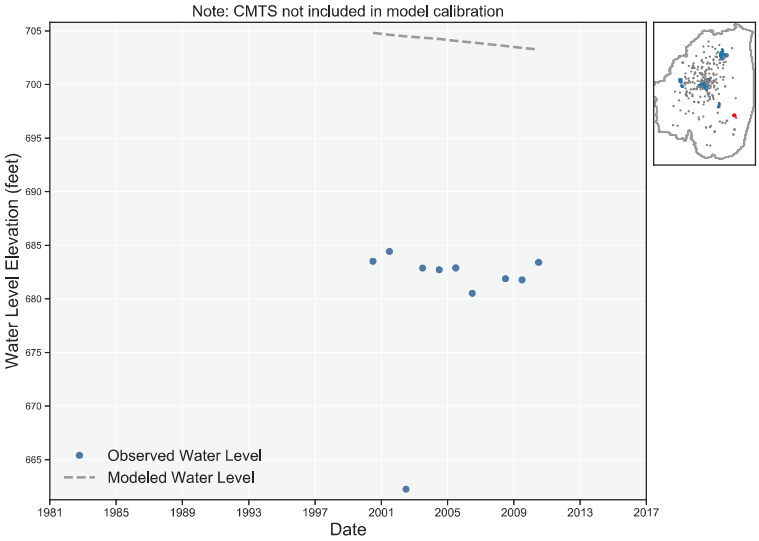
Well 82023 - Aq: QBAA Layers: 8 - 8



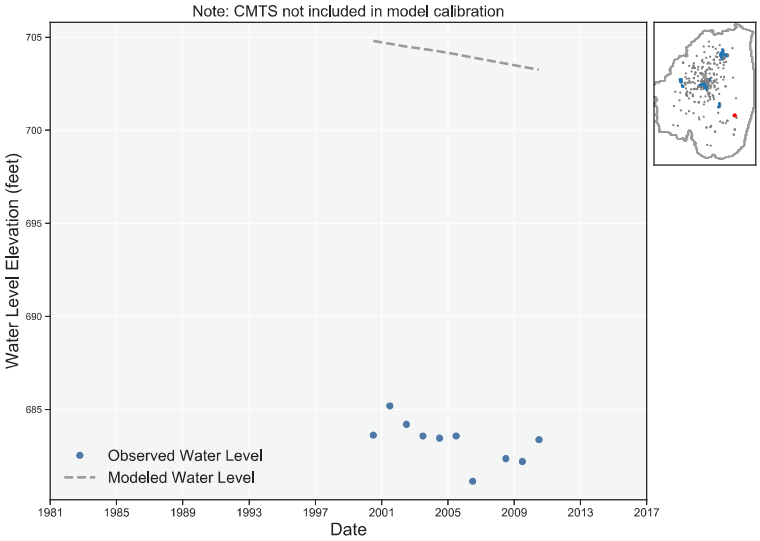
Well 82046 - Aq: CMTS Layers: 9 - 9



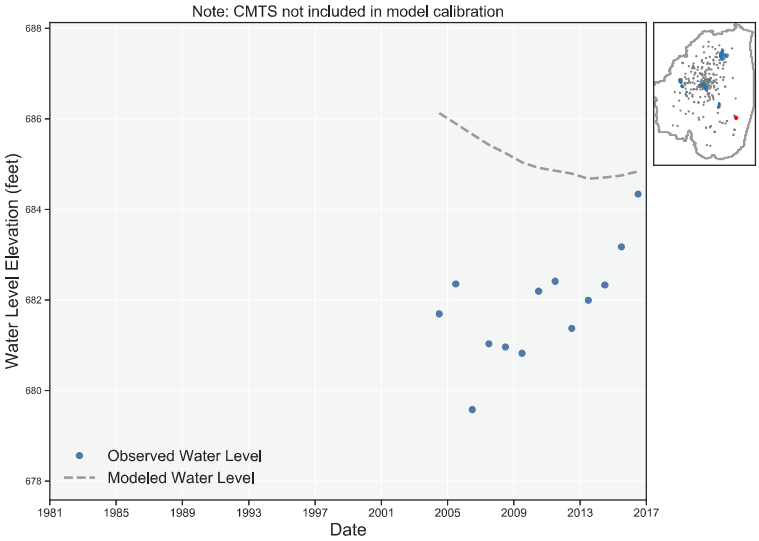
Well 82049 - Aq: CMTS Layers: 9 - 9



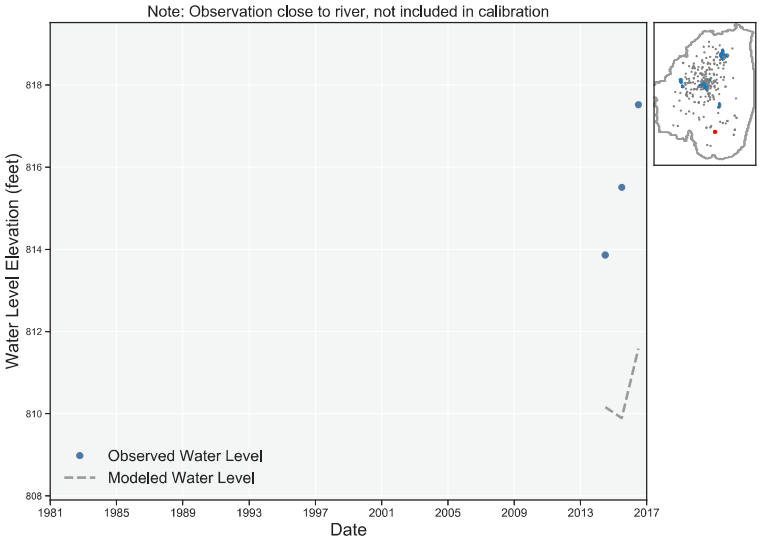
Well 82050 - Aq: CMTS Layers: 9 - 9



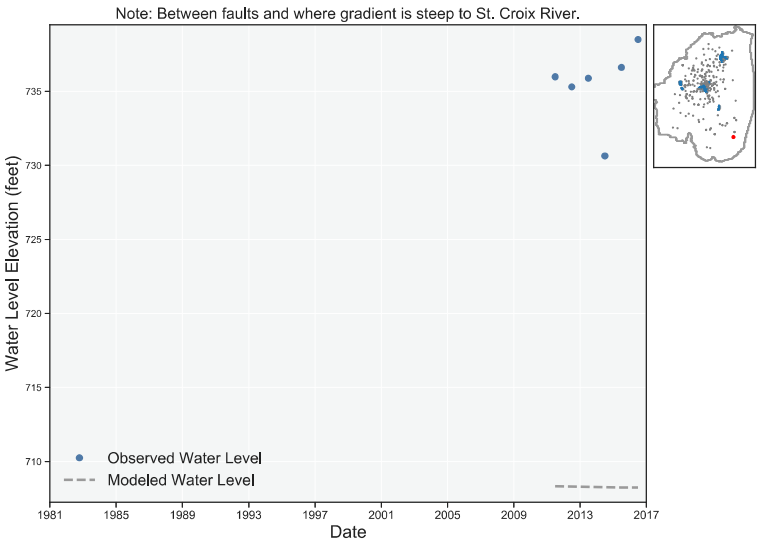
Well 82051 - Aq: CECRCMTS Layers: 9 - 9



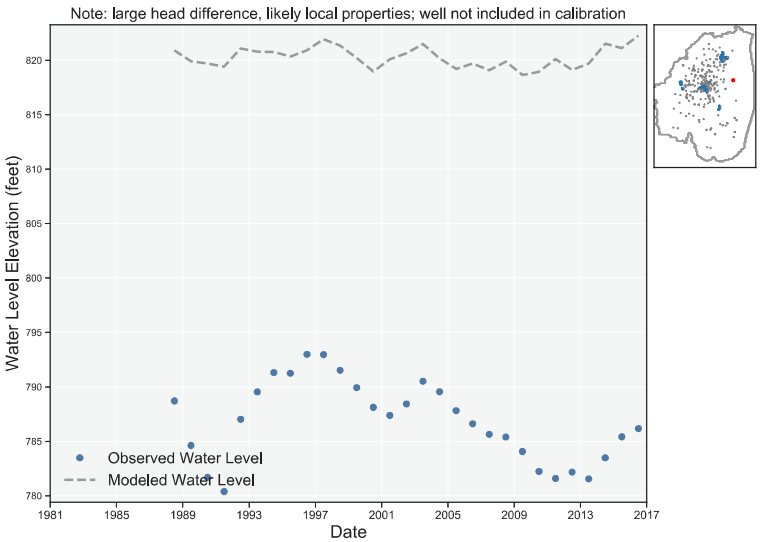
Well 82059 - Aq: CTCG Layers: 9 - 9



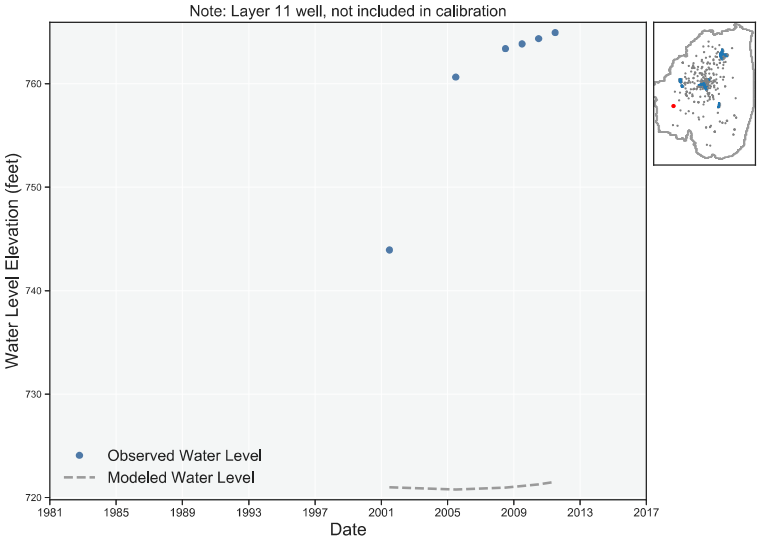
Well 82054 - Aq: CFIG Layers: 9 - 9



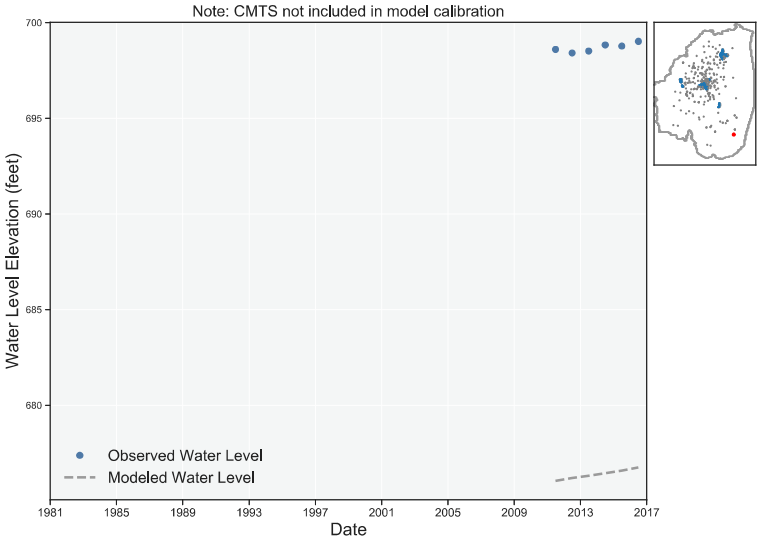
Well 82022 - Aq: CFRNCIGL Layers: 9 - 10



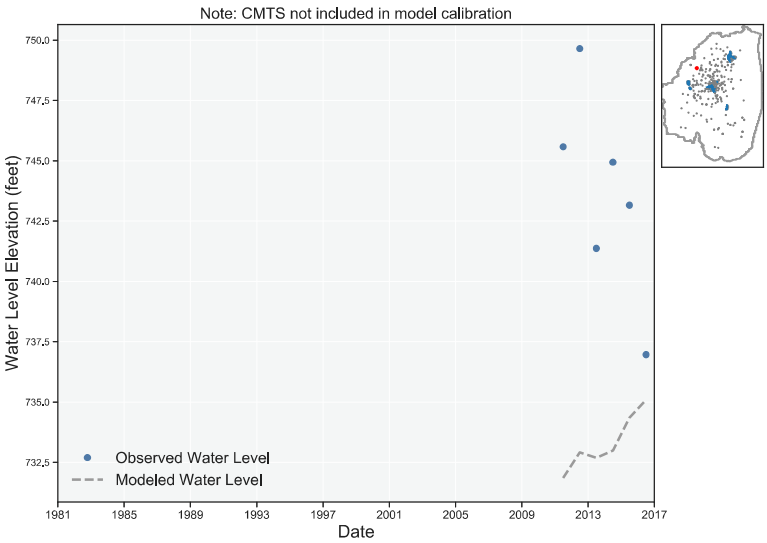
Well 62042 - Aq: CECR Layers: 11 - 11



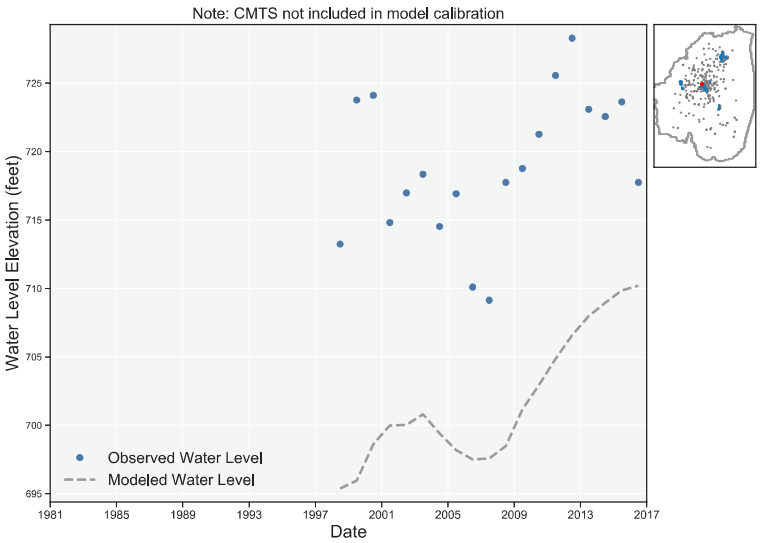
Well 82053 - Aq: CMTS Layers: 11 - 12



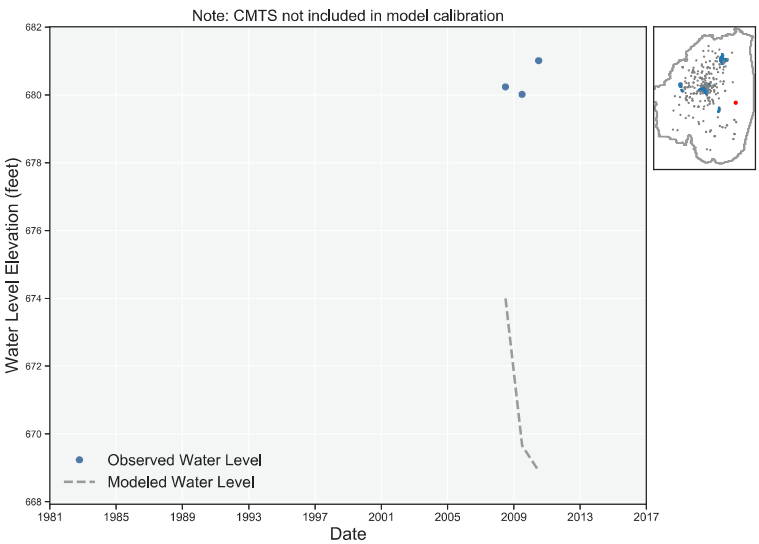
Well 2038 - Aq: CMTS Layers: 12 - 12



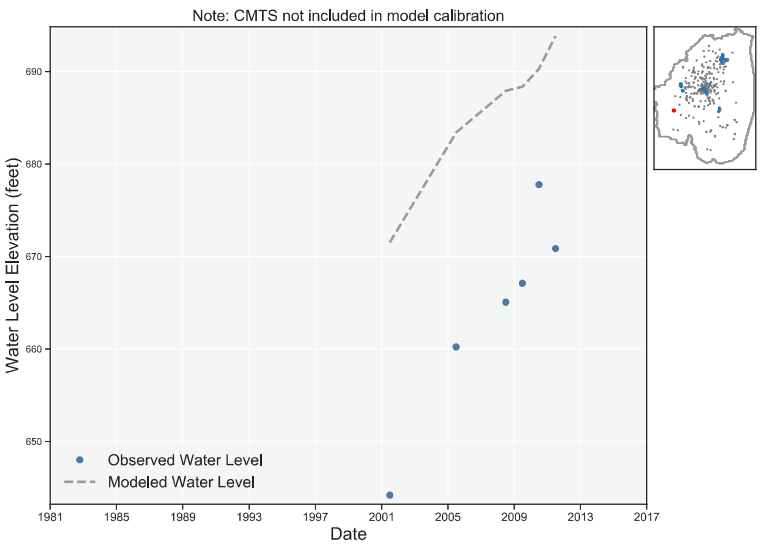
Well 62046 - Aq: CMTS Layers: 12 - 12



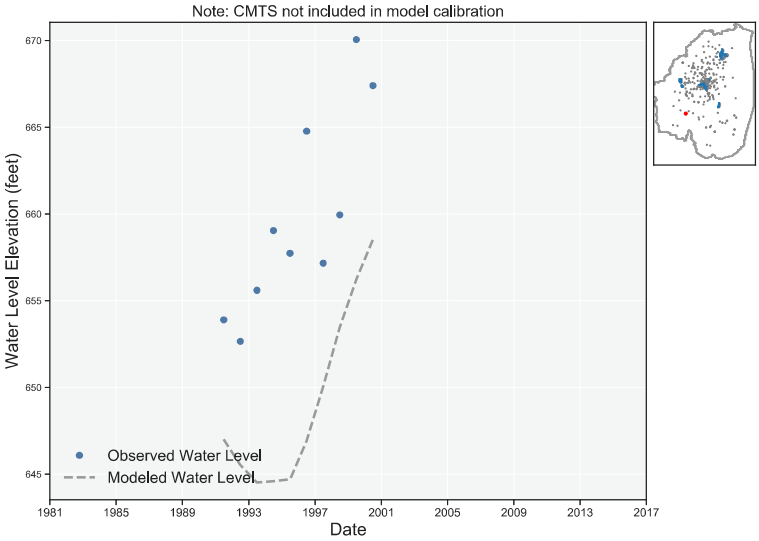
Well 82052 - Aq: CMTS Layers: 12 - 12



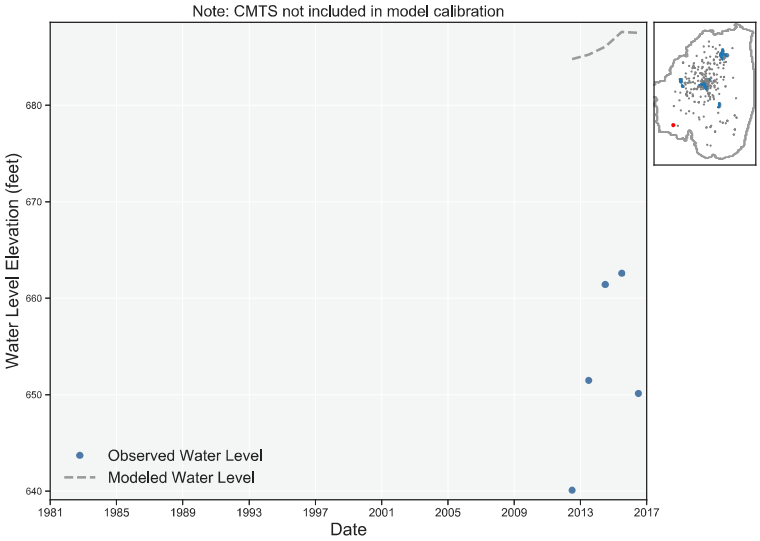
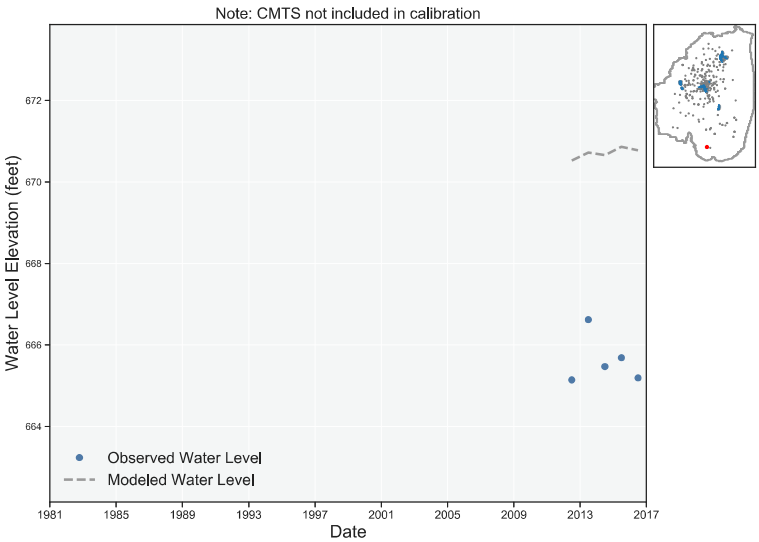
Well 62043 - Aq: CMTS Layers: 12 - 12



Well 62036 - Aq: CMTS Layers: 12 - 12



Well 27069 - Aq: CMTS Layers: 12 - 12



Well 82056 - Aq: CMTS Layers: 12 - 12