Appendix D

Sensitivity Analysis Selected Hydrographs, Tables and Maps

Table SA.1 Head Difference Statistics (Sensitivity Run Head - Calibrated with Subsidance Head) At the end of the simulation, SP 88, TS 10. 2009

			Model Wide				Layer 1				Layer 2				Layer 3				EAST SALT RIVER VALLEY				ELOY				MARICOPA-STANFIELD			
Sim	**Change Factor**	**Multiplier**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**
Simulation Without Subsidance	Subsidance Removed	NA	-12.38	13.25	11.18	18.14	-7.21	6.43	5.88	9.66	-10.93	13.23	9.89	17.15	-17.88	15.20	17.76	23.47	-2.66	1.44	2.52	3.02	-17.03	13.51	15.80	21.74	-8.45	11.98	7.18	14.66
Simulation Using Non-Lagged Recharge	Recharge Not Lagged	NA	-1.32	8.29	5.06	8.40	-5.13	5.75	4.58	7.70	-3.66	5.17	4.27	6.33	3.93	9.59	6.34	10.37	-2.21	1.99	2.20	2.97	-2.99	6.07	4.64	6.77	2.19	11.88	6.96	12.08
Vertical Hydraulic Conductivity (Kz)	-95%	0.05	-41.68	123.05	73.84	129.92	48.49	51.60	41.83	70.81	-27.09	83.95	51.50	88.21	-129.92	134.97	128.17	187.33	-18.19	35.85	22.75	40.20	-47.46	89.67	67.01	101.45	-42.29	186.59	106.37	191.30
	-90%	0.10	-33.10	98.81	59.07	104.20	37.02	40.65	32.23	54.97	-17.47	68.18	40.74	70.37	-105.50	107.90	104.25	150.90	-13.38	25.84	16.70	29.09	-38.91	73.95	53.82	83.56	-31.79	148.05	85.39	151.41
	-80%	0.20	-23.49	72.40	42.99	76.12	26.09	30.71	22.89	40.30	-8.29	48.69	28.59	49.39	-78.41	78.56	77.49	110.99	-8.55	15.52	10.38	17.72	-28.79	54.88	39.00	61.97	-20.81	107.90	63.12	109.88
	-50%	0.50	-10.06	30.64	17.99	32.24	9.72	13.86	8.85	16.93	-2.25	20.61	11.95	20.73	-33.46	33.13	33.17	47.09	-3.37	4.86	3.58	5.91	-13.06	24.39	16.43	27.66	-7.70	44.41	26.54	45.06
	-20%	0.80	-3.29	9.65	5.62	10.19	2.83	4.40	2.64	5.23	-0.74	6.43	3.67	6.47	-10.65	10.49	10.56	14.94	-1.09	1.37	1.08	1.75	-4.23	8.01	5.25	9.06	-2.59	13.63	8.13	13.87
	+10%	1.10	1.46	4.20	2.42	4.44	-1.04	1.94	1.08	2.20	0.37	3.17	1.72	3.19	4.49	4.52	4.47	6.37	0.44	0.52	0.43	0.68	1.99	3.81	2.39	4.30	0.96	5.52	3.31	5.60
	+20%	1.20	2.62	7.55	4.36	7.99	-1.97	3.57	1.97	4.08	0.63	5.44	3.01	5.48	8.16	8.17	8.10	11.54	0.87	1.01	0.84	1.33	3.45	6.62	4.18	7.47	1.91	10.26	6.13	10.44
	+50%	1.50	5.02	15.02	8.65	15.84	-3.86	7.63	3.96	8.55	1.47	11.89	6.45	11.98	15.38	15.96	15.55	22.16	1.73	1.98	1.66	2.63	6.52	12.12	7.85	13.77	3.78	21.64	12.86	21.97
	+100%	2.00	8.63	24.64	14.05	26.11	-6.48	11.42	6.10	13.13	2.42	19.19	10.00	19.34	26.25	25.97	26.05	36.93	2.55	3.08	2.43	3.99	11.42	21.17	13.45	24.05	6.33	34.14	19.88	34.72
	+400%	5.00	16.88	45.40	25.01	48.43	-10.39	19.63	9.78	22.21	4.83	33.95	16.92	34.29	48.38	49.57	48.34	69.26	5.23	5.72	5.00	7.75	19.70	39.61	23.81	44.24	17.32	63.07	35.29	65.40
	+900%	10.00	21.09	54.11	29.44	58.07	-11.41	23.52	10.99	26.14	6.46	39.20	19.42	39.73	58.06	59.80	57.90	83.34	6.16	6.62	5.88	9.04	23.71	47.48	28.14	53.07	23.67	75.13	41.34	78.76
	+1900%	20.00	25.43	60.48	31.84	65.61	-10.36	31.97	10.33	33.60	8.97	40.52	20.15	41.50	65.26	67.55	65.05	93.92	6.84	7.35	6.53	10.03	26.32	54.41	30.98	60.44	33.74	82.55	43.76	89.17
Recharge	-20%	0.8	-18.63	16.08	16.72	24.61	-12.27	8.23	9.78	14.77	-15.60	10.56	14.08	18.84	-26.45	21.05	26.29	33.81	-7.91	4.23	7.47	8.97	-20.71	9.71	19.10	22.88	-19.96	24.77	16.68	31.81
	-10%	0.9	-19.00	10.99	17.02	21.95	-17.03	9.95	13.55	19.73	-17.81	9.40	15.99	20.13	-21.66	12.48	21.53	25.00	-14.14	8.10	13.37	16.30	-21.03	8.45	19.44	22.66	-17.66	14.72	14.63	22.99
	+10%	1.1	18.25	10.39	16.52	21.00	16.40	9.33	13.34	18.87	16.97	9.00	15.43	19.20	20.94	11.75	20.80	24.01	9.04	4.83	8.58	10.25	21.01	7.78	19.72	22.40	17.57	13.41	14.61	22.11
	+20%	1.2	25.52	59.31	31.76	64.57	31.84	18.02	25.87	36.58	33.13	17.31	30.03	37.38	40.18	22.49	39.85	46.04	6.84	7.35	6.53	10.03	26.49	52.11	30.83	58.46	33.74	82.55	43.76	89.17
	+30%	1.3	51.03	28.94	46.10	58.66	46.23	25.77	37.57	52.93	47.96	24.76	43.46	53.98	47.36	33.86	46.12	58.22	18.89	10.68	17.94	21.70	59.20	19.36	55.48	62.28	51.26	37.66	42.47	63.61
Specific Yield (Sy)	-50%	0.50	-37.51	21.23	33.02	43.11	-33.19	19.25	25.43	38.37	-35.40	18.09	31.27	39.76	-42.75	24.03	42.34	49.04	-28.64	16.63	26.87	33.12	-41.48	16.51	37.60	44.64	-34.66	27.97	28.17	44.53
	-25%	0.75	-12.92	14.67	12.16	19.54	-6.33	7.83	6.07	10.07	-9.62	9.97	9.15	13.85	-21.10	18.17	21.25	27.84	-3.71	2.22	3.50	4.32	-16.03	11.12	15.23	19.50	-11.64	20.64	10.71	23.70
	+25%	1.25	12.47	11.02	11.35	16.64	7.84	6.16	6.46	9.97	10.51	8.58	9.63	13.56	18.06	13.45	17.98	22.52	2.73	1.75	2.59	3.24	15.57	8.24	14.68	17.61	11.38	14.57	9.54	18.49
	+35%	1.35	17.12	15.17	15.56	22.87	10.76	8.32	8.82	13.60	14.40	11.63	13.17	18.51	24.83	18.68	24.70	31.07	3.66	2.32	3.48	4.33	21.35	11.48	20.11	24.24	15.71	19.92	13.14	25.37
	+50%	1.50	23.18	20.49	21.03	30.94	14.64	11.35	12.03	18.53	19.49	15.47	17.76	24.88	33.54	25.39	33.32	42.06	4.69	2.99	4.45	5.56	28.93	15.86	27.23	33.00	21.32	26.43	17.76	33.96
Pumpage	-20%	0.80	56.82	42.92	51.34	71.20	39.65	24.04	32.24	46.37	48.56	29.11	44.01	56.61	63.88	56.75	62.20	85.44	14.97	8.79	14.21	17.36	65.78	27.39	61.64	71.26	60.17	60.88	49.89	85.59
	-15%	0.85	43.03	33.23	38.89	54.37	29.73	18.60	24.19	35.07	36.49	22.93	33.10	43.10	49.04	43.64	47.76	65.65	12.32	7.00	11.70	14.17	50.20	21.54	47.05	54.62	44.42	47.36	36.84	64.93
	-10%	0.9	28.58	21.94	25.84	36.03	19.86	12.46	16.14	23.44	24.48	15.67	22.22	29.07	39.48	27.71	39.17	48.23	9.33	5.09	8.86	10.63	33.42	14.09	31.32	36.27	28.82	31.66	23.94	42.81
	-5%	0.95	14.22	11.21	12.88	18.10	9.69	6.23	7.88	11.52	12.03	7.88	10.96	14.38	19.93	14.18	19.80	24.46	5.25	2.83	4.99	5.97	16.50	7.45	15.49	18.11	14.27	16.23	11.89	21.61
	+5%	1.05	-13.94	11.60	12.59	18.13	-9.14	6.39	7.40	11.15	-11.55	7.59	10.49	13.82	-19.99	14.82	19.89	24.89	-6.43	3.42	6.09	7.28	-15.78	7.22	14.66	17.35	-14.16	17.67	11.93	22.64
	+10%	1.1	-27.70	23.29	24.71	36.19	-17.76	12.33	14.02	21.62	-23.27	15.68	20.83	28.06	-39.62	29.71	39.28	49.52	-12.58	6.74	11.88	14.27	-31.59	15.00	28.99	34.97	-27.88	35.06	23.07	44.79
	+15%	1.15	-39.91	34.89	35.10	53.01	-24.32	17.47	18.69	29.95	-32.84	23.01	29.10	40.10	-49.23	43.87	47.59	65.94	-19.24	10.37	18.12	21.86	-45.25	22.57	40.92	50.57	-40.22	52.83	32.69	66.40
	+20%	1.2	-49.04	44.52	42.58	66.23	-29.37	21.67	21.87	36.50	-40.20	28.77	35.34	49.43	-60.24	55.58	57.98	81.96	-24.71	13.37	23.18	28.09	-54.41	27.93	48.46	61.16	-51.24	68.61	41.09	85.62
Both Recharge and Pumpage	-20%	0.8	20.71	30.03	20.31	36.48	6.25	10.13	7.30	11.91	14.25	19.70	14.69	24.31	38.42	38.75	38.95	54.57	-0.98	3.94	3.08	4.06	24.84	23.85	23.74	34.44	23.36	40.99	21.84	47.18
	-10%	0.9	9.78	14.91	9.79	17.83	2.53	4.78	3.34	5.41	6.65	10.22	7.12	12.19	18.58	19.08	18.90	26.63	-0.56	2.00	1.58	2.07	11.81	11.96	11.35	16.81	10.94	20.35	10.63	23.10
	+10%	1.1	-8.91	14.99	9.23	17.44	-1.35	4.50	2.91	4.69	-5.54	9.44	6.29	10.94	-18.16	19.31	18.49	26.50	0.38	1.75	1.35	1.79	-10.57	11.44	10.28	15.57	-10.30	21.38	10.79	23.73
	+20%	1.2	-17.32	30.58	18.04	35.14	-1.79	8.29	5.31	8.48	-10.35	18.98	12.05	21.62	-36.19	39.53	36.78	53.59	0.69	3.71	2.89	3.77	-20.17	23.35	19.75	30.86	-20.72	43.78	21.55	48.43
Both Pumpage and Specific Yield	-20%	0.8	51.57	38.60	46.55	64.42	37.11	22.55	30.10	43.42	44.19	26.24	40.03	51.39	70.14	49.59	69.53	85.90	14.82	8.73	14.08	17.20	17.80	22.99	20.96	62.71	56.61	56.49	46.83	79.97
	-10%	0.9	24.56	18.87	22.21	30.97	17.33	11.04	14.07	20.55	20.98	13.28	19.05	24.83	33.76	23.92	33.50	41.38	8.83	4.83	8.39	10.07	28.13	12.20	26.36	30.66	25.49	27.48	21.17	37.48
	+10%	1.1	-21.57	17.51	19.42	27.78	-14.65	10.27	11.79	17.89	-18.30	11.98	16.52	21.87	-30.13	22.25	29.96	37.46	-11.04	5.98	10.46	12.56	-24.12	11.41	22.37	26.68	-21.94	26.38	18.35	34.31

Table SA.2 Residual Statistics (Observed Head - Model Computed Head)[1]

			Model Wide				Layer 1				Layer 2				Layer 3				EAST SALT RIVER VALLEY				ELOY				MARICOPA-STANFIELD			
Sim	**Change Factor Percent**	**Multiplier**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**
Calibrated Simulation With Subsidence (SWT)	**Unchanged**	**1**	**-3.07**	**40.82**	**29.34**	**40.93**	**-3.83**	**29.02**	**21.95**	**29.27**	**-5.12**	**42.42**	**32.13**	**42.72**	**0.83**	**52.83**	**37.51**	**52.83**	**-13.61**	**24.10**	**22.17**	**27.63**	**-6.87**	**37.12**	**28.43**	**37.75**	**5.89**	**47.46**	**31.92**	**47.81**
Simulation Without Subsidence	Subsidence Removed	NA	14.00	45.72	33.85	47.81	6.44	32.36	24.41	32.99	14.91	48.11	36.23	50.36	24.89	57.07	45.87	62.25	-10.37	24.79	20.31	26.82	10.76	41.76	31.04	43.12	23.09	52.88	41.02	57.69
Simulation Using Non-Lagged Recharge	Recharge Not Lagged	NA	-12.00	42.51	33.33	44.17	-8.47	31.70	25.06	32.81	-11.95	45.21	35.92	46.75	-17.70	52.26	43.18	55.16	-17.66	24.48	25.01	30.15	-12.78	39.71	31.83	41.72	-9.81	48.94	37.26	49.91
Vertical Hydraulic Conductivity (Kz)	-95%	0.05	37.11	119.77	73.77	125.38	-24.45	41.99	34.41	48.58	28.16	79.68	56.96	84.50	147.36	163.17	158.77	219.84	-0.86	62.62	30.44	62.50	12.97	70.06	46.85	71.24	91.26	175.53	134.24	197.81
	-20%	0.8	-0.03	43.29	31.17	43.29	-5.13	29.29	22.37	29.73	-4.53	43.48	32.77	43.70	14.00	56.71	43.16	58.40	-12.87	25.81	22.51	28.79	-5.35	37.04	28.18	37.42	12.33	53.05	38.24	54.45
	+20%	1.2	-5.46	40.20	29.38	40.56	-2.88	29.05	21.84	29.18	-5.59	41.89	31.77	42.25	-9.41	51.44	38.33	52.28	-14.22	22.87	21.92	26.89	-8.22	37.61	28.88	38.49	1.17	45.55	31.14	45.56
	+1900%	20	-22.53	70.74	49.56	74.24	5.38	35.27	25.73	35.68	-2.11	56.56	41.16	56.59	-93.91	80.63	98.70	123.77	-17.40	17.48	20.57	24.63	-17.11	52.94	36.42	55.63	-34.36	99.30	79.82	105.06
Recharge	-20%	0.8	26.92	58.79	42.01	64.66	22.20	39.95	33.80	45.70	22.93	49.03	41.43	54.12	39.69	87.15	55.91	95.75	6.43	26.93	17.85	27.63	22.46	45.33	38.60	50.59	38.21	80.27	51.44	88.88
	-10%	0.9	11.59	43.97	33.28	45.47	9.14	33.65	26.14	34.86	8.97	45.30	35.19	46.17	18.92	54.67	42.21	57.84	-3.61	24.67	16.68	24.88	7.75	40.42	31.42	41.16	21.06	50.43	38.74	54.64
	+10%	1.1	-17.79	39.97	32.42	43.75	-16.67	27.22	24.39	31.91	-19.55	40.76	33.44	45.20	-17.26	53.68	43.95	56.37	-22.63	24.64	29.05	33.41	-21.73	35.76	31.64	41.84	-9.07	47.44	34.38	48.29
	+20%	1.2	-32.18	41.18	41.25	52.26	-29.16	28.26	33.12	40.60	-33.42	40.58	40.39	52.56	-35.38	56.32	55.40	66.50	-30.58	26.06	35.51	40.14	-36.08	36.37	41.06	51.23	-24.16	49.77	42.21	55.32
Specific Yield (Sy)	-25%	0.75	22.56	60.75	39.20	64.80	12.58	32.83	25.70	35.15	17.20	46.76	36.33	49.81	45.54	95.49	64.56	105.78	-5.86	24.85	17.33	25.48	14.62	41.30	31.82	43.81	41.88	86.94	56.73	96.49
	+25%	1.25	-21.58	41.61	35.04	46.88	-15.40	29.97	25.41	33.69	-23.02	44.53	36.80	50.12	-29.61	51.11	48.16	59.05	-19.53	24.53	26.21	31.32	-23.07	39.20	33.85	45.48	-18.66	47.28	38.36	50.82
	+50%	1.5	-35.32	46.03	43.67	58.02	-23.93	32.33	30.53	40.22	-35.72	48.06	44.18	59.88	-53.03	55.38	64.03	76.67	-23.90	25.45	29.31	34.88	-34.77	42.95	41.32	55.26	-37.56	53.05	49.95	64.99
Pumpage	-20%	0.8	-61.61	55.39	64.59	82.85	-41.71	33.60	44.60	53.56	-57.17	46.69	59.00	73.81	-99.27	72.51	103.90	122.93	-33.19	24.46	35.62	41.20	-57.53	45.32	59.68	73.23	-72.86	72.04	77.64	102.45
	-10%	0.9	-32.55	42.71	40.69	53.70	-22.95	28.69	28.73	36.74	-32.03	42.51	38.99	53.22	-48.58	55.20	62.06	73.52	-24.12	23.54	29.27	33.66	-32.91	38.68	38.39	50.78	-32.59	51.24	46.58	60.72
	-5%	0.95	-17.69	40.18	32.62	43.90	-13.39	27.96	23.32	30.99	-18.67	41.69	33.63	45.67	-23.28	52.22	46.19	57.16	-18.90	23.55	25.53	30.16	-19.96	36.99	31.26	42.03	-12.82	46.88	36.16	48.59
	+5%	1.05	11.38	45.31	33.59	46.72	5.63	31.84	24.02	32.33	7.92	44.65	34.02	45.34	25.12	59.49	48.37	64.57	-8.19	25.01	19.01	26.26	5.82	39.07	29.55	39.50	24.88	54.85	43.43	60.22
	+10%	1.1	26.70	61.88	42.13	67.39	15.90	35.84	28.84	39.21	21.00	48.51	39.19	52.85	51.45	94.84	67.24	107.88	-2.99	26.29	16.80	26.41	19.15	42.92	34.62	47.00	45.34	87.97	60.25	98.95
	+20%	1.2	52.68	79.24	61.76	95.15	32.50	45.73	40.17	56.10	43.54	58.95	54.57	73.28	96.91	118.06	105.73	152.72	7.16	29.84	17.17	30.63	41.19	53.39	49.51	67.43	81.03	112.67	91.65	138.77
Both Recharge and Pumpage	-20%	0.8	-32.41	49.62	42.84	59.26	-16.54	31.31	26.71	35.41	-29.88	47.43	40.47	56.05	-61.11	62.28	71.76	87.25	-15.91	21.72	22.06	26.89	-29.26	44.33	38.39	53.11	-40.58	59.82	54.15	72.28
	-10%	0.9	-18.10	41.95	33.85	45.69	-10.20	29.27	23.35	30.99	-18.28	43.78	34.59	47.44	-30.53	52.42	49.68	60.65	-14.53	22.64	21.92	26.86	-18.58	39.54	32.03	43.69	-17.43	47.83	38.79	50.90
	+10%	1.1	11.47	57.96	35.00	59.08	1.97	29.80	22.30	29.86	6.54	44.73	33.39	45.20	33.14	91.92	57.43	97.69	-12.15	25.76	22.07	28.43	3.68	38.42	28.36	38.59	30.03	83.88	50.13	89.07
	+20%	1.2	26.23	69.74	44.91	74.50	8.65	33.73	25.43	34.81	18.70	51.98	39.39	55.23	64.22	107.92	83.33	125.55	-11.61	27.79	22.59	30.06	15.08	44.76	33.44	47.22	53.16	100.60	71.06	113.76
Both Pumpage and Specific Yield	-10%	0.9	-25.49	41.18	36.38	48.43	-18.58	27.44	25.54	33.14	-25.59	40.95	35.19	48.28	-36.40	55.11	55.29	66.03	-21.67	23.10	27.41	31.64	-27.05	37.23	34.33	46.02	-22.58	49.41	41.52	54.31
	+10%	1.1	15.76	47.60	36.18	50.13	8.74	33.39	25.82	34.51	11.58	46.21	35.90	47.63	32.44	62.45	53.14	70.36	-5.67	25.91	18.24	26.47	9.87	40.54	31.35	41.72	30.10	58.30	48.00	65.60

Change in Residual (Calibrated Simulation with Subsidence -Sensitivity Simulation)[2]

			Model Wide Change				Layer 1 Change				Layer 2 Change				Layer 3 Change				EAST SALT RIVER VALLEY Change				ELOY Change				MARICOPA-STANFIELD Change			
Sim	**Change Factor**	**Multiplier**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**	**Mean**	**StDev**	**MAE**	**RMSE**
Simulation Without Subsidence	Subsidence Removed	NA	-17.07	-4.90	-4.52	-6.88	-10.27	-3.34	-2.45	-3.72	-20.03	-5.69	-4.10	-7.64	-24.06	-4.24	-8.36	-9.42	-3.23	-0.69	1.86	0.81	-17.63	-4.63	-2.61	-5.36	-17.20	-5.42	-9.10	-9.88
Simulation Using Non-Lagged Recharge	Recharge Not Lagged	NA	8.93	-1.69	-3.99	-3.24	4.64	-2.68	-3.11	-3.54	6.83	-2.79	-3.79	-4.03	18.53	0.57	-5.67	-2.34	4.05	-0.38	-2.84	-2.51	5.91	-2.59	-3.40	-3.96	15.71	-1.48	-5.34	-2.09
Vertical Hydraulic Conductivity (Kz)	-95%	0.05	-40.18	-78.95	-44.43	-84.44	20.62	-12.97	-12.45	-19.32	-33.28	-37.26	-24.83	-41.78	-146.53	-110.34	-121.25	-167.01	-12.74	-38.52	-8.27	-34.86	-19.84	-32.94	-18.42	-33.49	-85.37	-128.08	-102.32	-150.00
	-20%	0.8	-3.04	-2.47	-1.83	-2.35	1.30	-0.27	-0.42	-0.46	-0.59	-1.06	-0.64	-0.98	-13.18	-3.88	-5.65	-5.58	-0.74	-1.71	-0.34	-1.16	-1.52	0.09	0.25	0.33	-6.43	-5.59	-6.33	-6.64
	+20%	1.2	2.39	0.62	-0.04	0.37	-0.95	-0.03	0.11	0.08	0.47	0.53	0.36	0.47	10.24	1.40	-0.82	0.55	0.61	1.23	0.25	0.75	1.35	-0.48	-0.45	-0.74	4.72	1.91	0.77	2.26
	+1900%	20	19.46	-29.92	-20.22	-33.31	-9.21	-6.25	-3.78	-6.41	-3.01	-14.14	-9.03	-13.87	94.74	-27.80	-61.19	-70.94	3.79	6.62	1.60	3.00	10.24	-15.81	-7.99	-17.88	40.25	-51.84	-47.90	-57.25
Recharge	-20%	0.8	-29.99	-17.97	-12.67	-23.73	-26.03	-10.93	-11.85	-16.43	-28.06	-6.61	-9.30	-11.40	-38.86	-34.32	-18.39	-42.92	-20.03	-2.82	4.32	0.01	-29.33	-8.21	-10.17	-12.83	-32.32	-32.81	-19.52	-41.07
	-10%	0.9	-14.66	-3.15	-3.94	-4.53	-12.97	-4.63	-4.18	-5.60	-14.10	-2.88	-3.06	-3.45	-18.09	-1.84	-4.70	-5.02	-10.00	-0.57	5.48	2.75	-14.63	-3.30	-2.99	-3.41	-15.17	-2.98	-6.82	-6.83
	+10%	1.1	14.72	0.85	-3.08	-2.82	12.84	1.80	-2.44	-2.65	14.43	1.66	-1.31	-2.48	18.09	-0.85	-6.44	-3.55	9.02	-0.54	-6.88	-5.78	14.86	1.37	-3.21	-4.09	14.96	0.02	-2.46	-0.47
	+20%	1.2	29.11	-0.36	-11.91	-11.33	25.33	0.76	-11.17	-11.34	28.30	1.84	-8.26	-9.84	36.21	-3.48	-17.89	-13.67	16.97	-1.95	-13.34	-12.50	29.21	0.75	-12.63	-13.48	30.05	-2.31	-10.29	-7.50
Specific Yield (Sy)	-25%	0.75	-25.63	-19.93	-9.86	-23.87	-16.41	-3.81	-3.75	-5.88	-22.32	-4.34	-4.20	-7.09	-44.71	-42.66	-27.05	-52.95	-7.74	-0.75	4.84	2.15	-21.49	-4.18	-3.39	-6.05	-35.99	-39.48	-24.81	-48.68
	+25%	1.25	18.51	-0.80	-5.70	-5.94	11.57	-0.95	-3.46	-4.42	17.89	-2.11	-4.67	-7.40	30.44	1.73	-10.64	-6.23	5.92	-0.43	-4.04	-3.68	16.20	-2.07	-5.42	-7.73	24.55	0.17	-6.44	-3.01
	+50%	1.5	32.25	-5.21	-14.33	-17.09	20.10	-3.31	-8.58	-10.95	30.60	-5.64	-12.05	-17.16	53.86	-2.55	-26.52	-23.84	10.30	-1.35	-7.14	-7.25	27.90	-5.83	-12.89	-17.51	43.45	-5.59	-18.03	-17.18
Pumpage	-20%	0.8	58.54	-14.57	-35.26	-41.92	37.88	-4.58	-22.65	-24.29	52.05	-4.27	-26.87	-31.09	100.10	-19.68	-66.39	-70.10	19.58	-0.36	-13.45	-13.56	50.65	-8.19	-31.25	-35.48	78.75	-24.59	-45.72	-54.64
	-10%	0.9	29.48	-1.89	-11.35	-12.76	19.12	0.34	-6.77	-7.47	26.90	-0.09	-6.86	-10.50	49.41	-2.37	-24.54	-20.70	10.51	0.56	-7.10	-6.03	26.03	-1.56	-9.96	-13.03	38.48	-3.79	-14.66	-12.91
	-5%	0.95	14.62	0.64	-3.28	-2.97	9.56	1.06	-1.37	-1.73	13.55	0.73	-1.50	-2.95	24.11	0.61	-8.67	-4.34	5.29	0.55	-3.36	-2.53	13.09	0.13	-2.82	-4.28	18.71	0.58	-4.24	-0.78
	+5%	1.05	-14.45	-4.49	-4.25	-5.78	-9.46	-2.82	-2.07	-3.06	-13.05	-2.23	-1.89	-2.62	-24.30	-6.66	-10.85	-11.74	-5.42	-0.91	3.16	1.37	-12.70	-1.95	-1.12	-1.75	-18.99	-7.40	-11.52	-12.41
	+10%	1.1	-29.77	-21.06	-12.79	-26.46	-19.73	-6.82	-6.89	-9.94	-26.12	-6.09	-7.07	-10.13	-50.63	-42.01	-29.73	-55.06	-10.62	-2.19	5.37	1.22	-26.02	-5.80	-6.19	-9.24	-39.45	-40.51	-28.34	-51.14
	+20%	1.2	-55.75	-38.42	-32.43	-54.22	-36.33	-16.71	-18.22	-26.83	-48.66	-16.53	-22.44	-30.56	-96.08	-65.23	-68.22	-99.89	-20.76	-5.74	5.00	-3.00	-48.07	-16.27	-21.08	-29.68	-75.14	-65.21	-59.73	-90.95
Both Recharge and Pumpage	-20%	0.8	29.34	-8.80	-13.51	-18.33	12.71	-2.29	-4.76	-6.14	24.76	-5.01	-8.34	-13.33	61.94	-9.45	-34.25	-34.42	2.30	2.38	0.11	0.74	22.39	-7.21	-9.95	-15.36	46.47	-12.37	-22.23	-24.46
	-10%	0.9	15.03	-1.13	-4.51	-4.76	6.37	-0.24	-1.40	-1.72	13.15	-1.37	-2.47	-4.72	31.36	0.41	-12.17	-7.82	0.92	1.46	0.25	0.77	11.71	-2.42	-3.60	-5.94	23.32	-0.38	-6.87	-3.09
	+10%	1.1	-14.54	-17.14	-5.66	-18.15	-5.80	-0.78	-0.35	-0.59	-11.66	-2.31	-1.26	-2.48	-32.31	-39.08	-19.92	-44.86	-1.45	-1.66	0.09	-0.80	-10.56	-1.30	0.07	-0.84	-24.14	-36.42	-18.21	-41.26
	+20%	1.2	-29.30	-28.92	-15.58	-33.57	-12.48	-4.70	-3.48	-5.54	-23.82	-9.56	-7.26	-12.51	-63.39	-55.08	-45.82	-72.73	-2.00	-3.69	-0.42	-2.43	-21.95	-7.63	-5.01	-9.47	-47.27	-53.14	-39.14	-65.95
Both Pumpage and Specific Yield	-10%	0.9	22.41	-0.37	-7.04	-7.50	14.75	1.58	-3.59	-3.87	20.47	1.47	-3.06	-5.56	37.23	-2.28	-17.78	-13.21	8.06	1.00	-5.24	-4.00	20.17	-0.11	-5.90	-8.27	28.47	-1.95	-9.61	-6.50
	+10%	1.1	-18.83	-6.78	-6.84	-9.20	-12.57	-4.37	-3.86	-5.24	-16.70	-3.79	-3.77	-4.91	-31.61	-9.62	-15.63	-17.53	-7.94	-1.81	3.92	1.16	-16.75	-3.41	-2.92	-3.97	-24.21	-10.84	-16.08	-17.79

1. Residuals calculated based on targets in Groundwater Vistas. Observed Head - Model Computed Head. Negative Numbers represent overstimulated heads and Positive errors represent under simulated heads.
2. In order to get a change in residual that could be compared to the head difference at the end of SP 88, the difference had to be calculated as the results of the calibrated simulation - the results of the sensitivity simulation to obtain the correct sign. In this part of the table, a negative number indicates the sensitivity heads are lower elevation than the calibrated and simulated heads. A positive number indicates they are higher elevations.

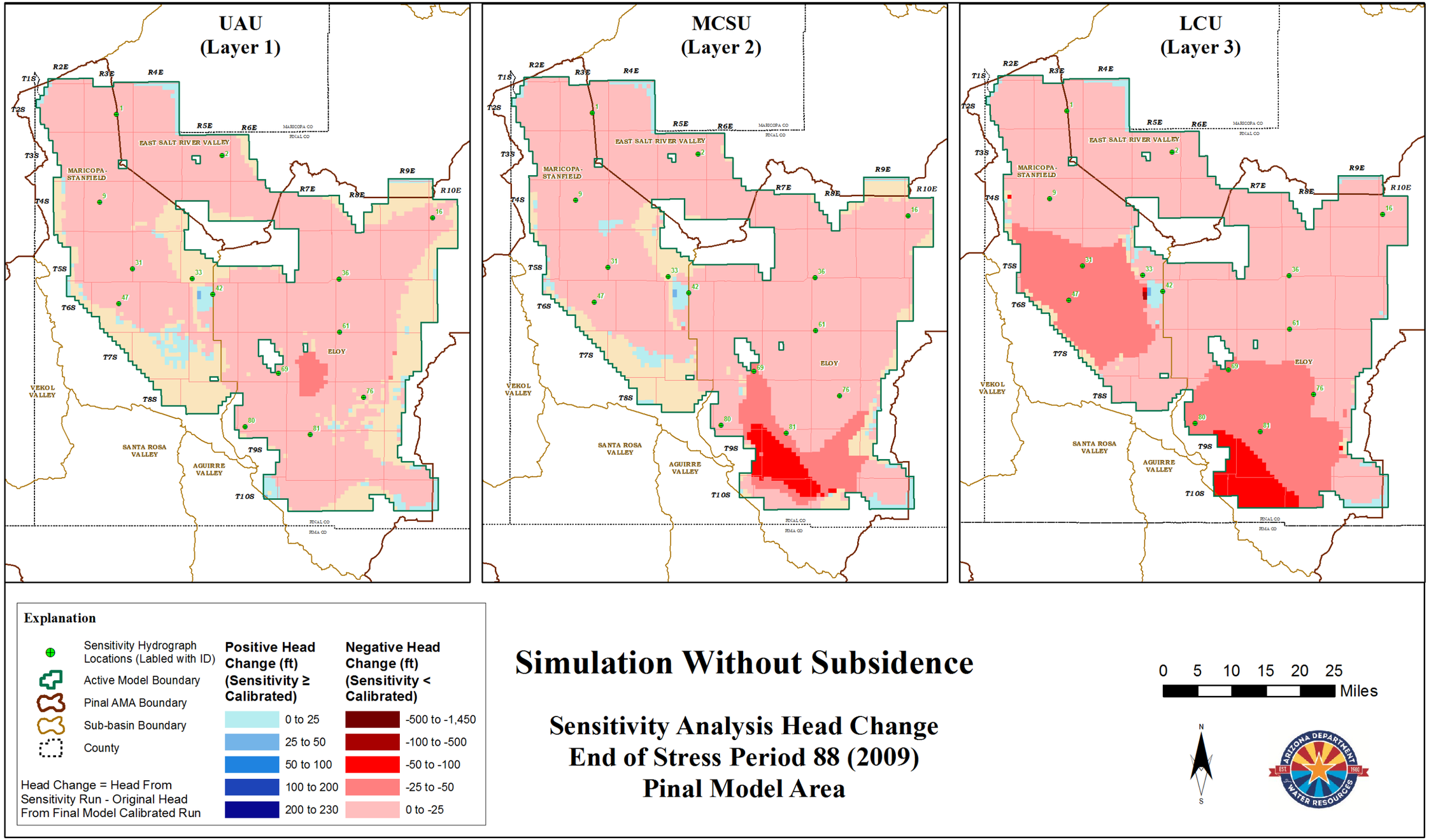


Figure 1 Simulation Without Subsidence

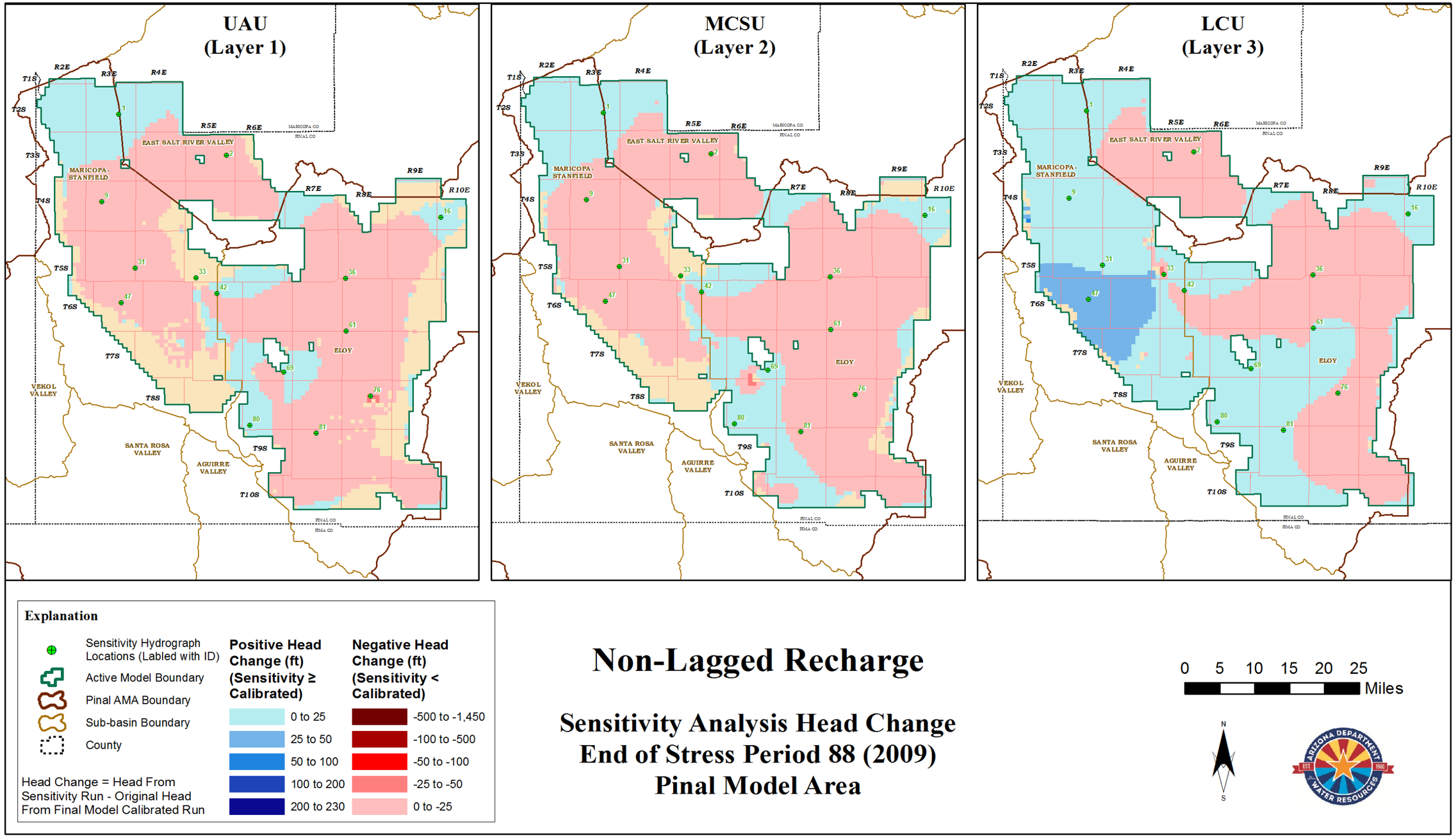


Figure 2 Non-Lagged Recharge

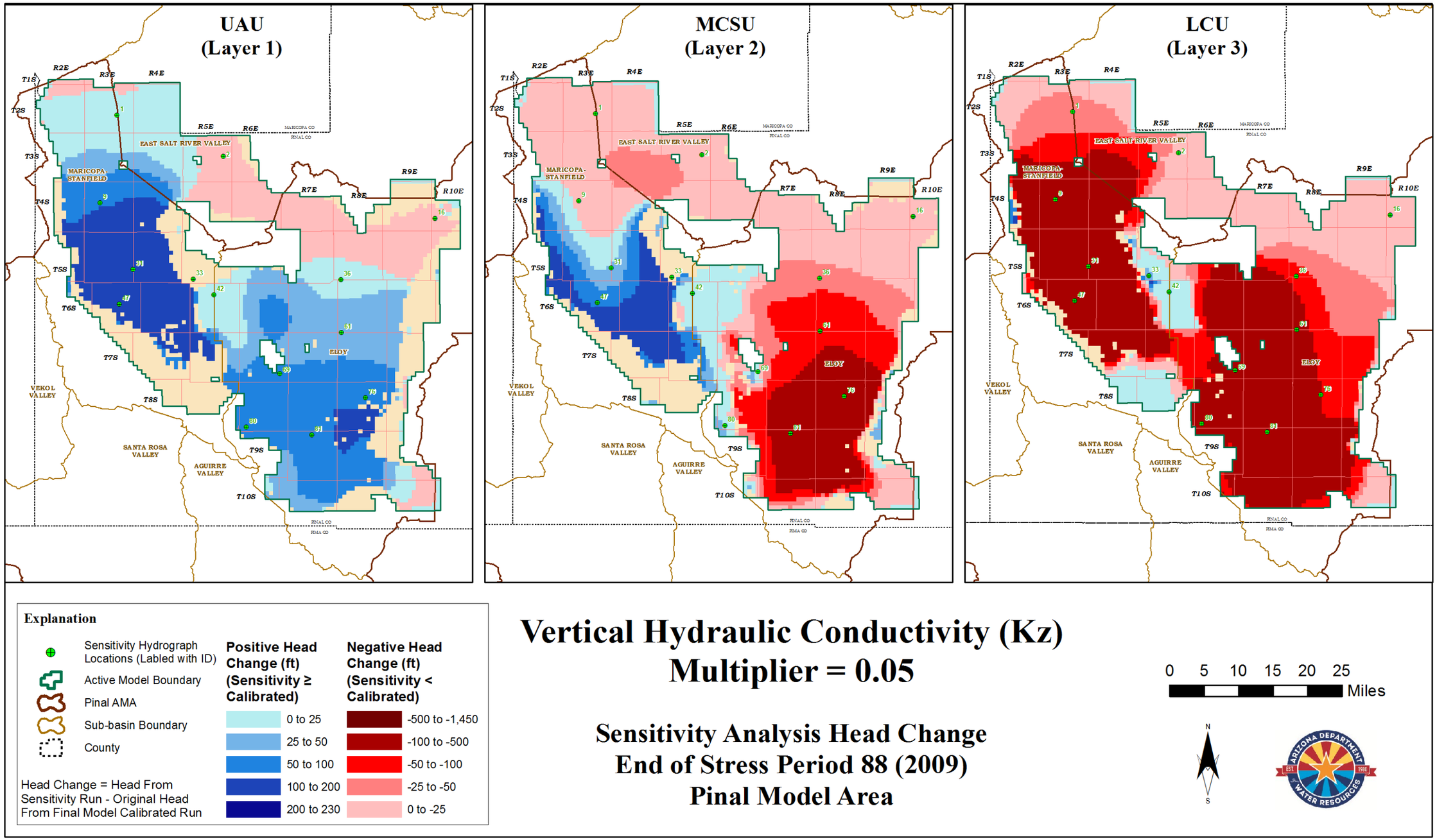


Figure 3 Kz Multiplier 0.05

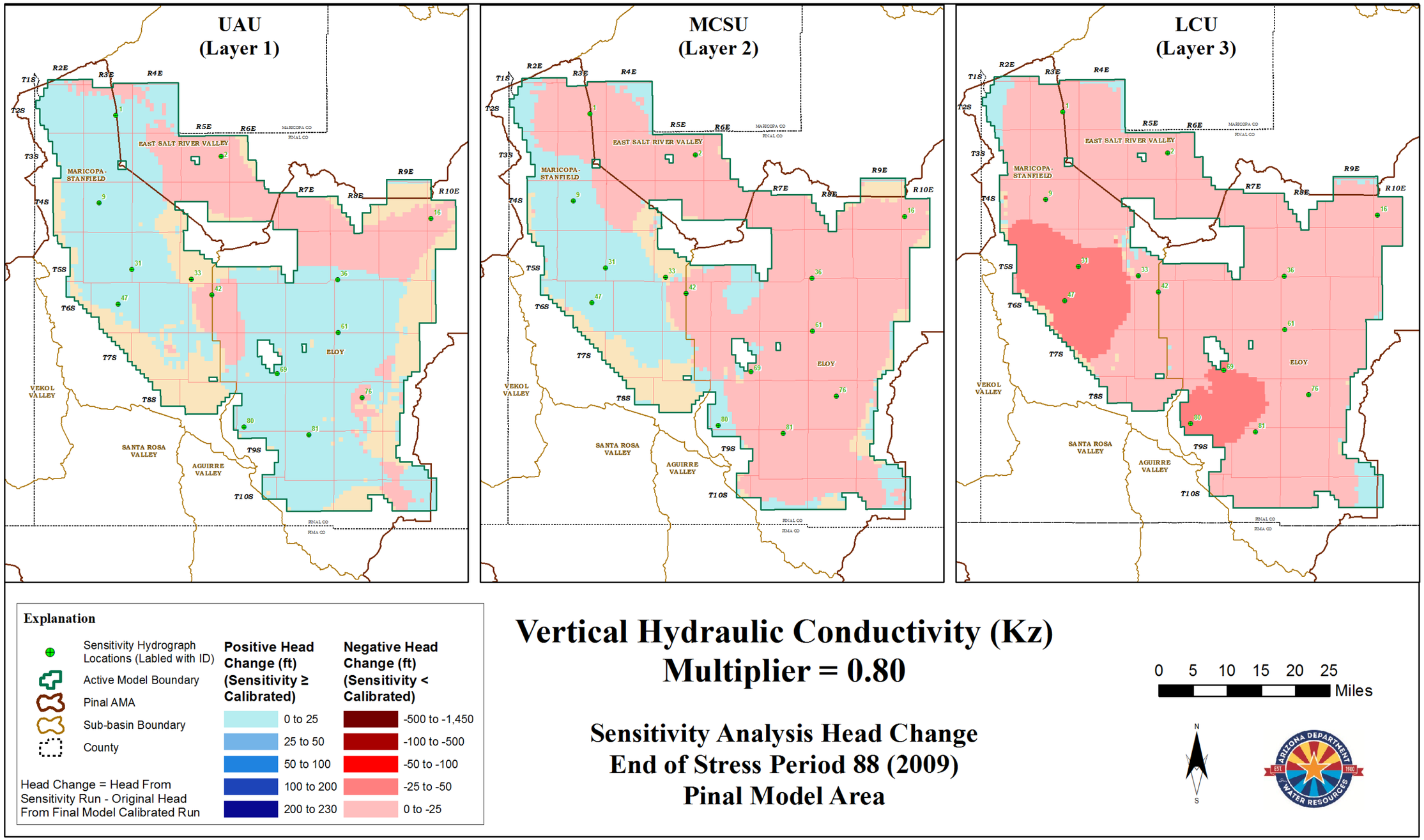


Figure 4 Kz Multiplier 0.80

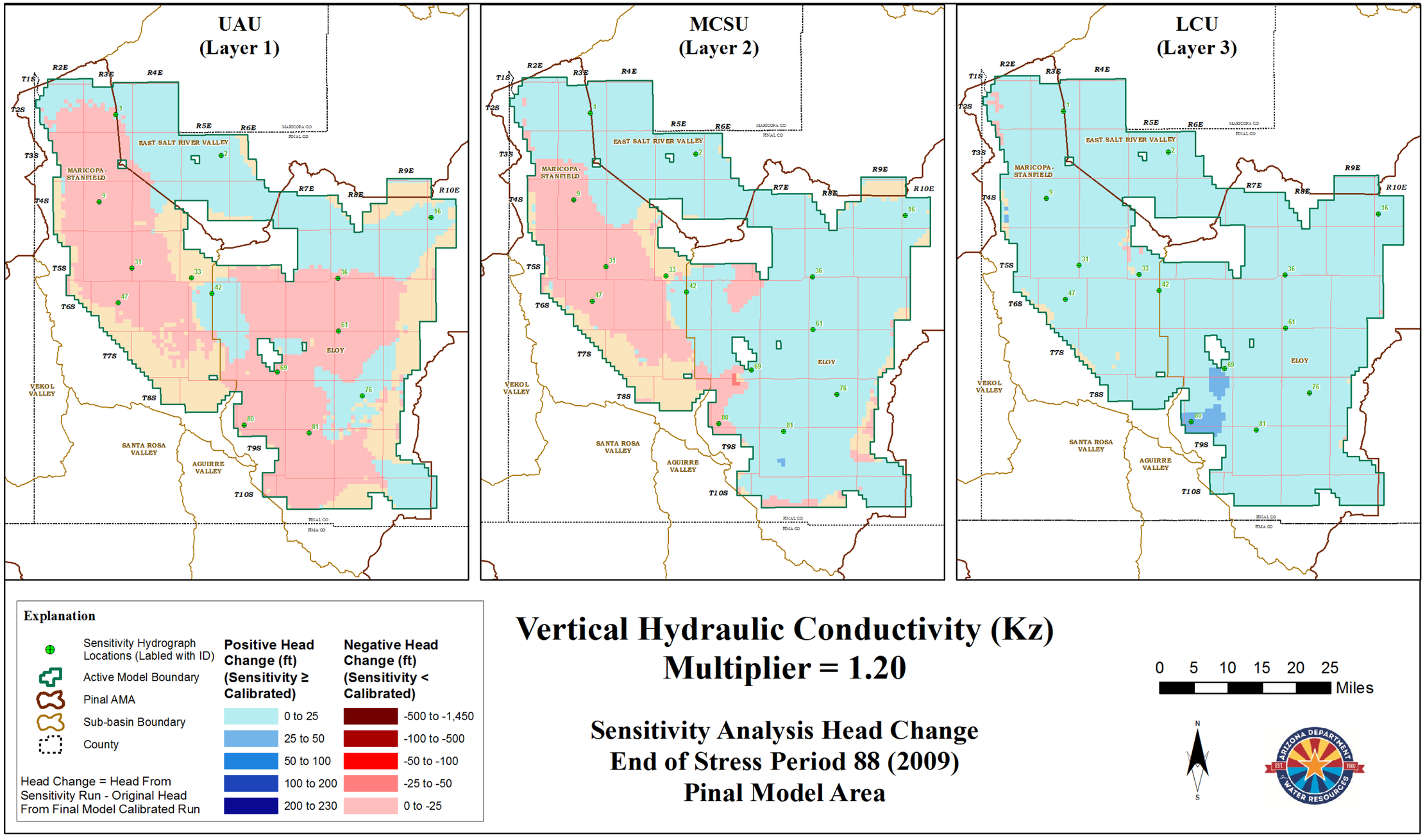


Figure 5 Kz Multiplier 1.20

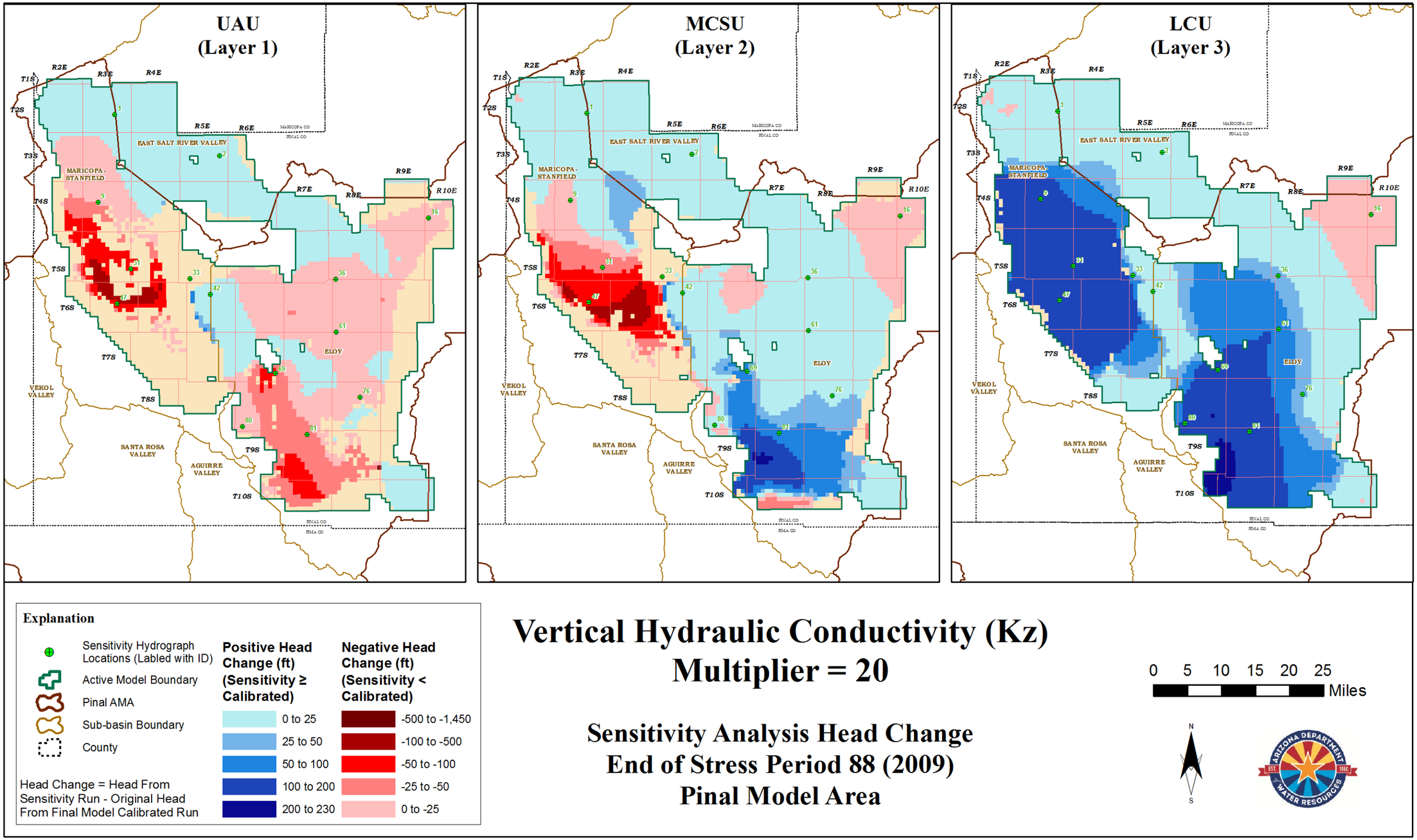


Figure 6 Kz Multiplier 20

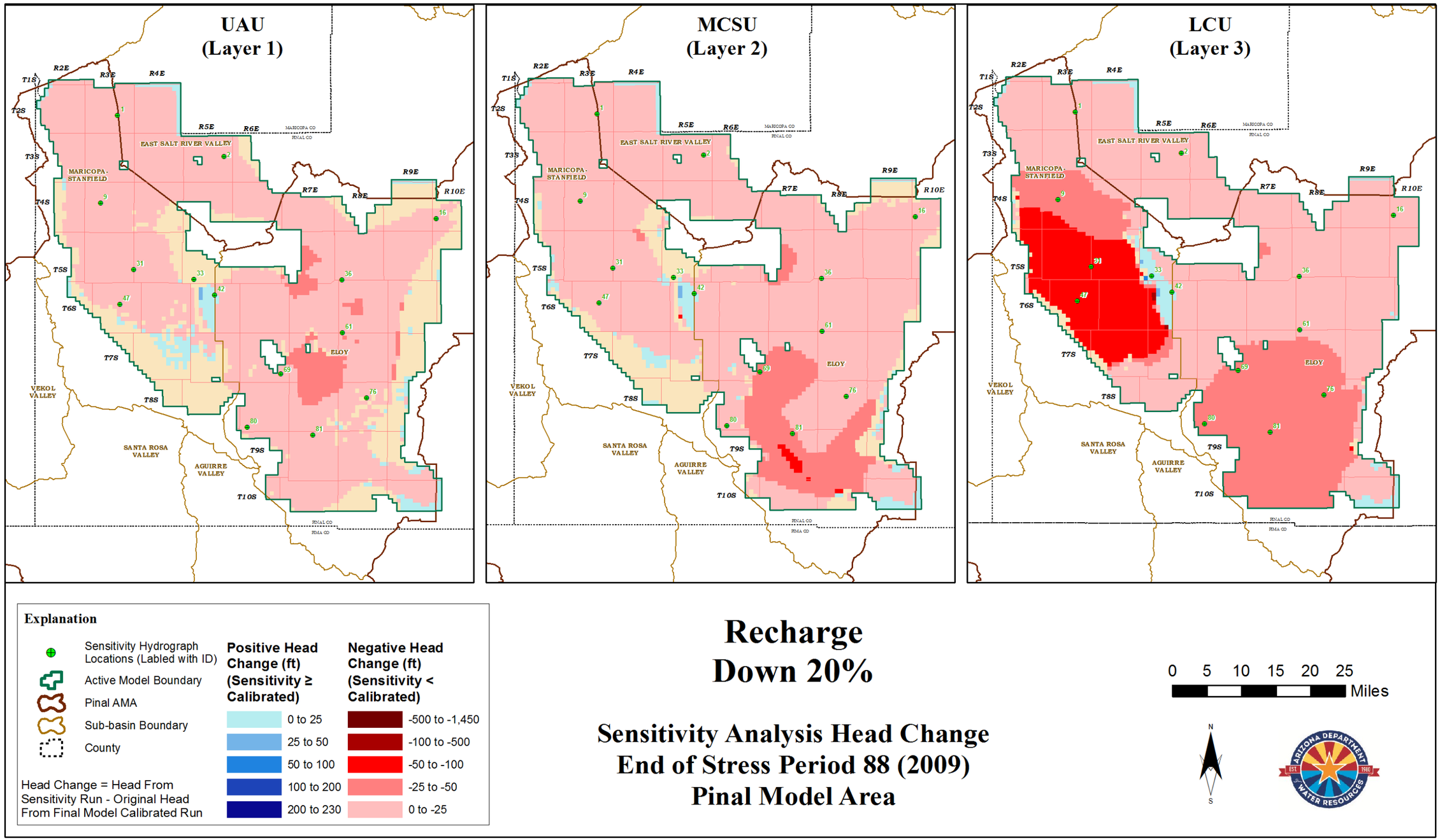


Figure 7 Recharge Down 20%

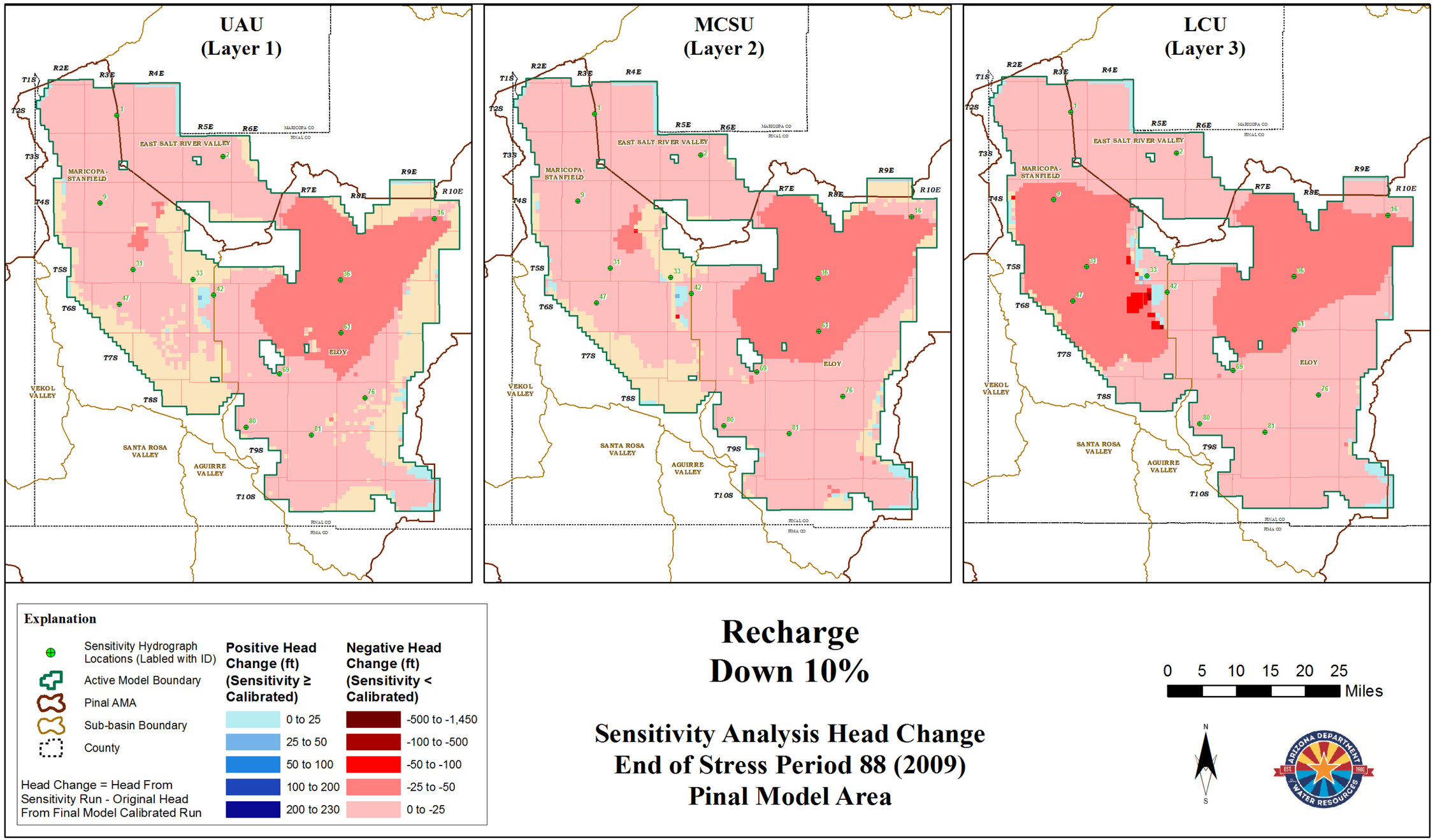


Figure 8 Recharge Down 10%

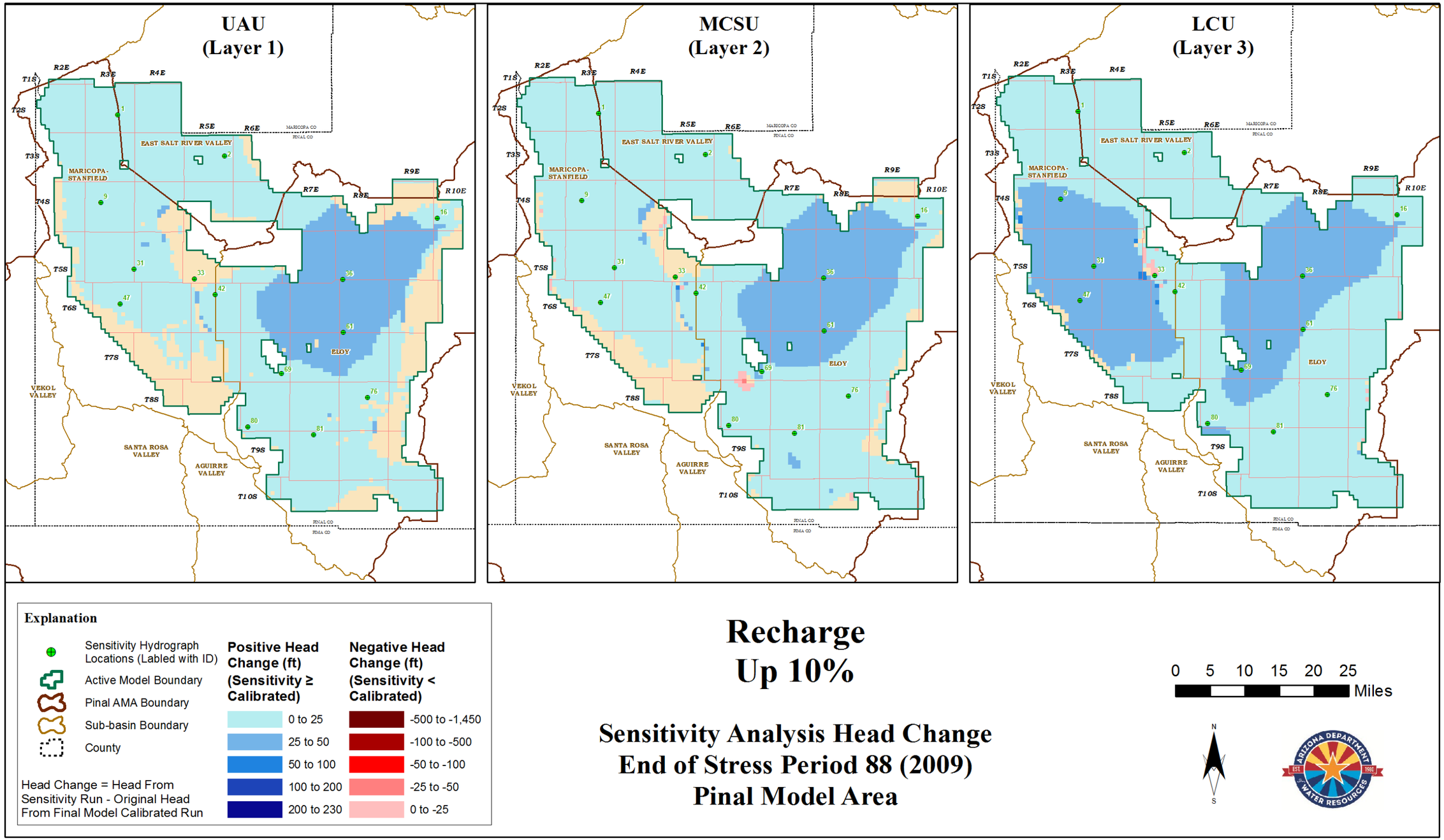


Figure 9 Recharge Up 10%

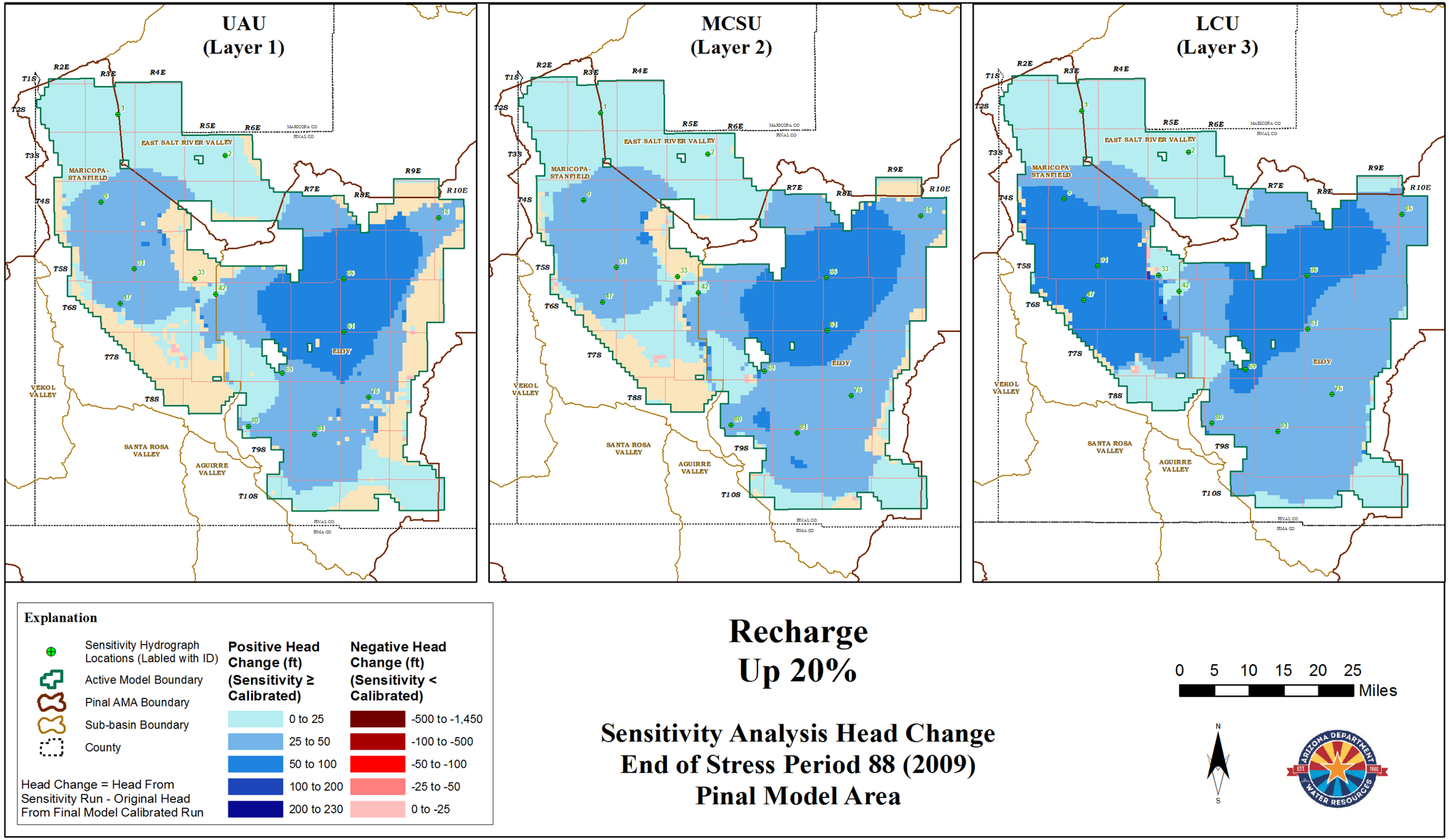


Figure 10 Recharge Up 20%

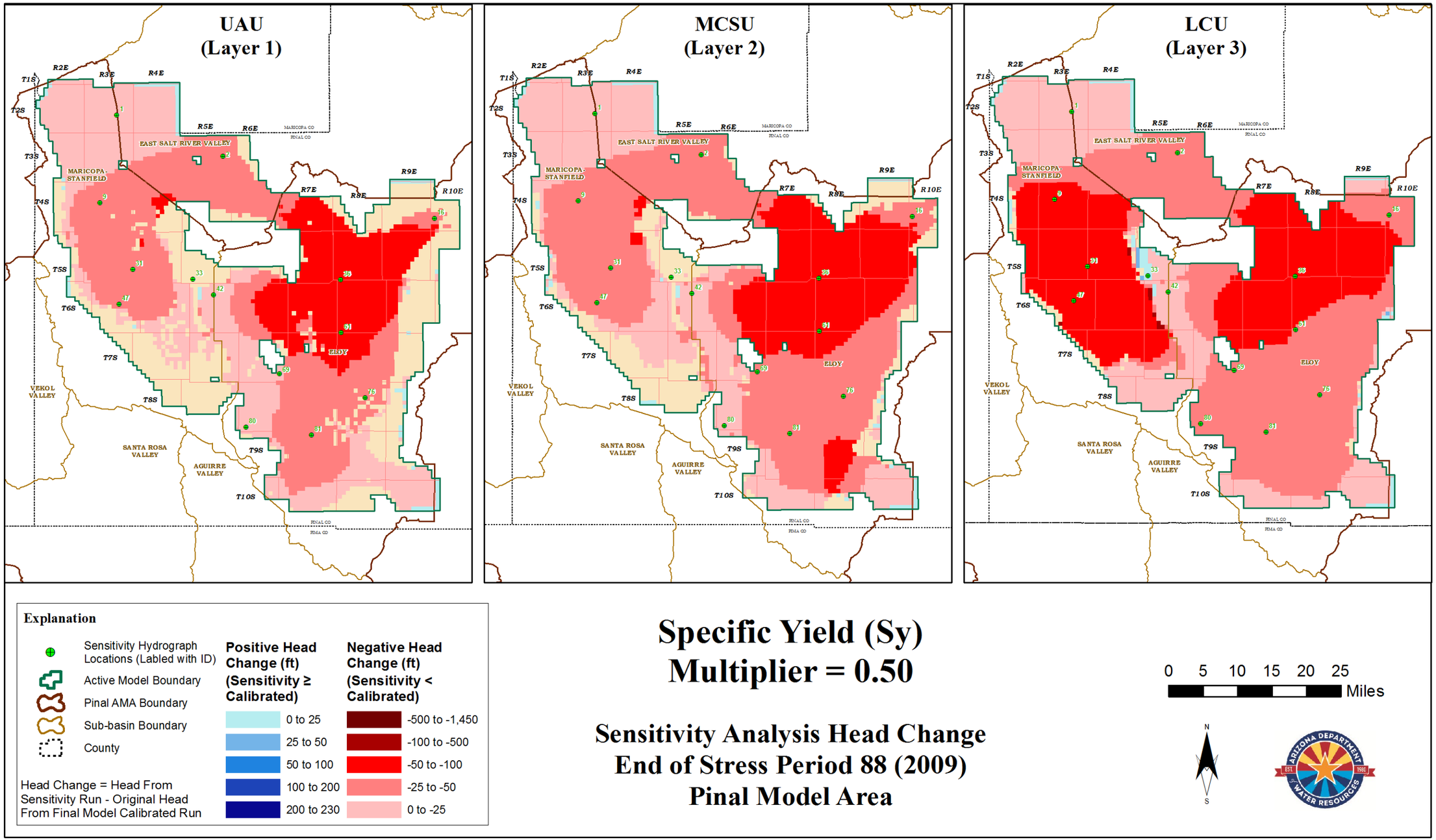


Figure 11 Sy Multiplier 0.50

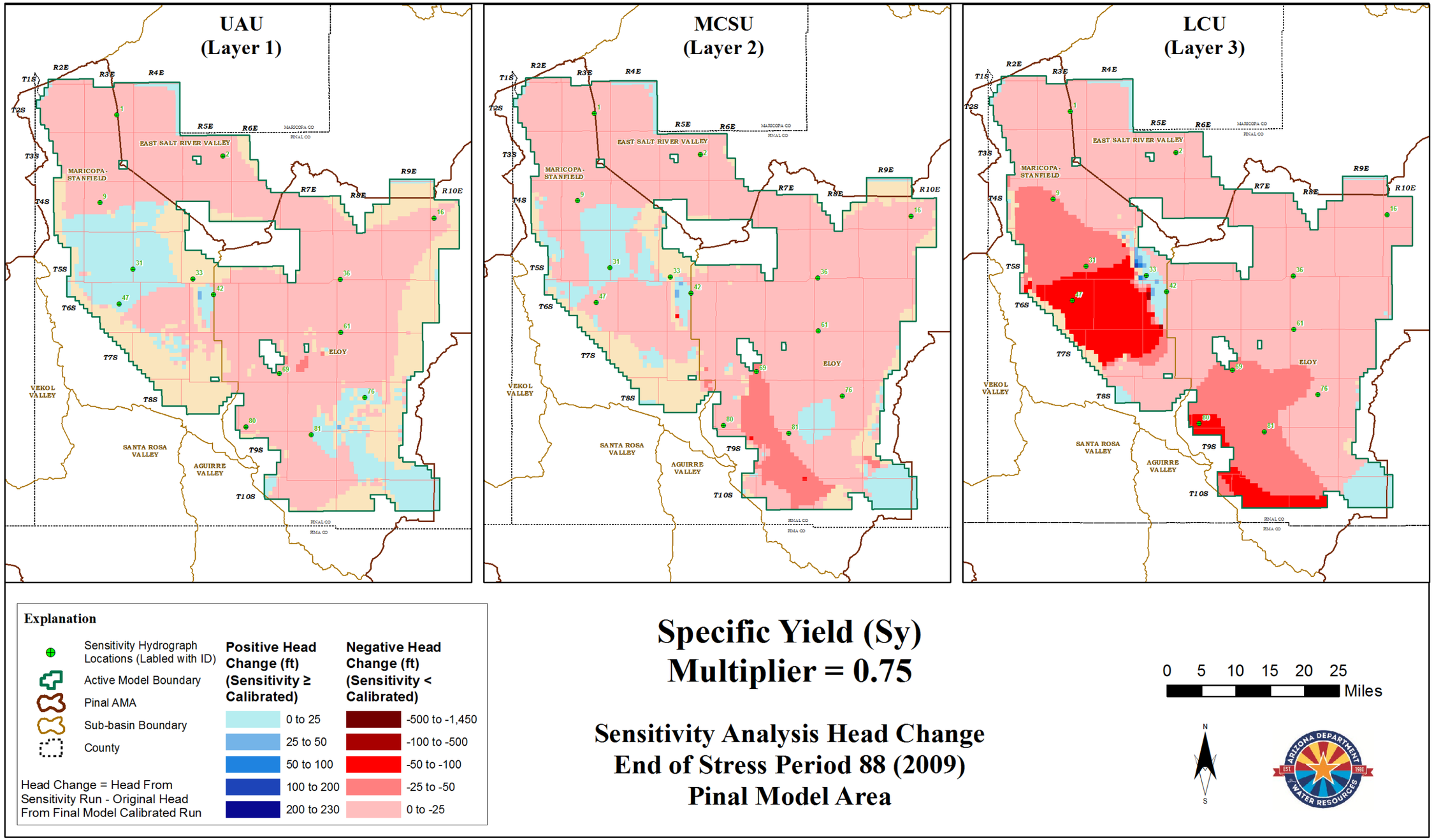


Figure 12 Sy Multiplier 0.75

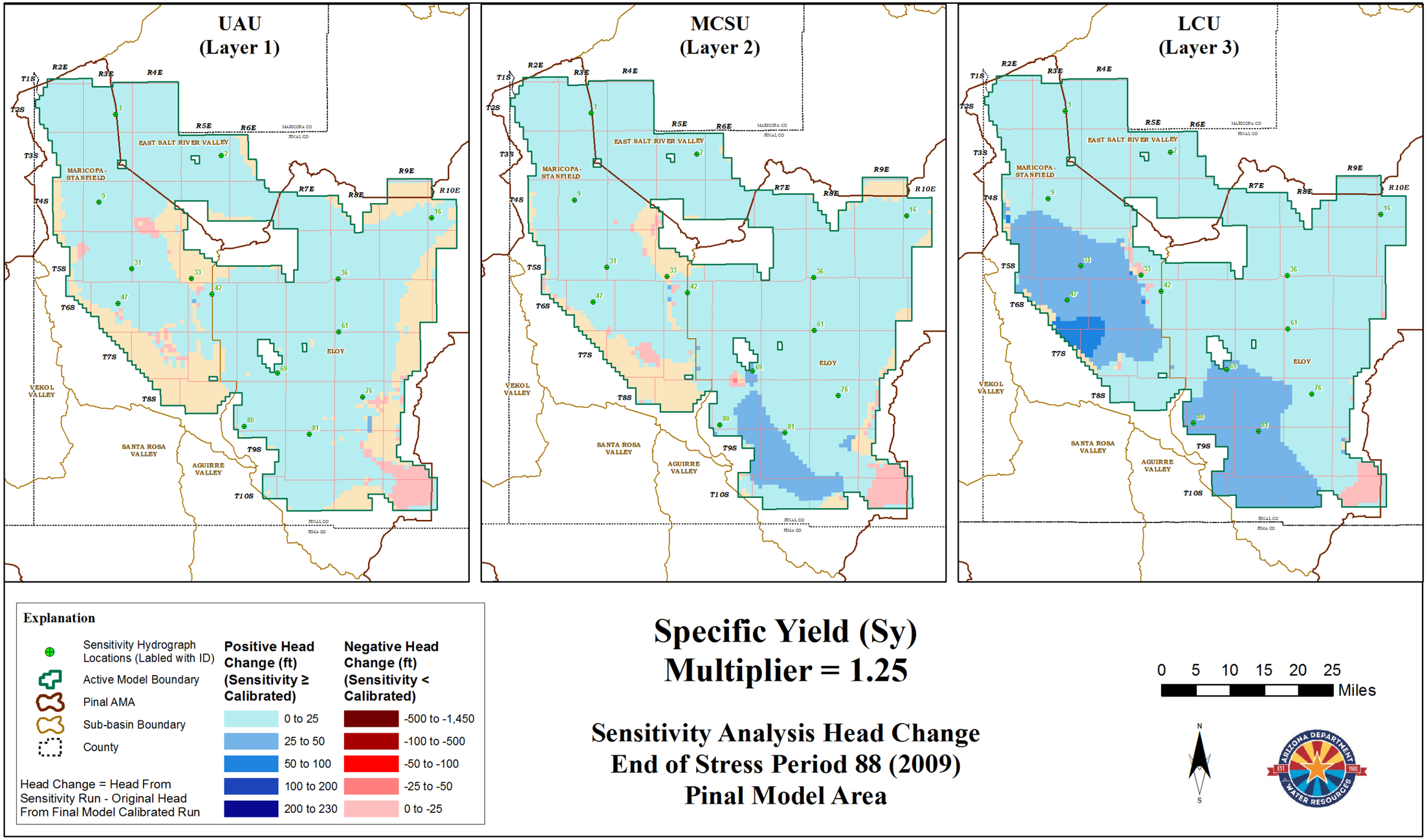


Figure 13 Sy Multiplier 1.25

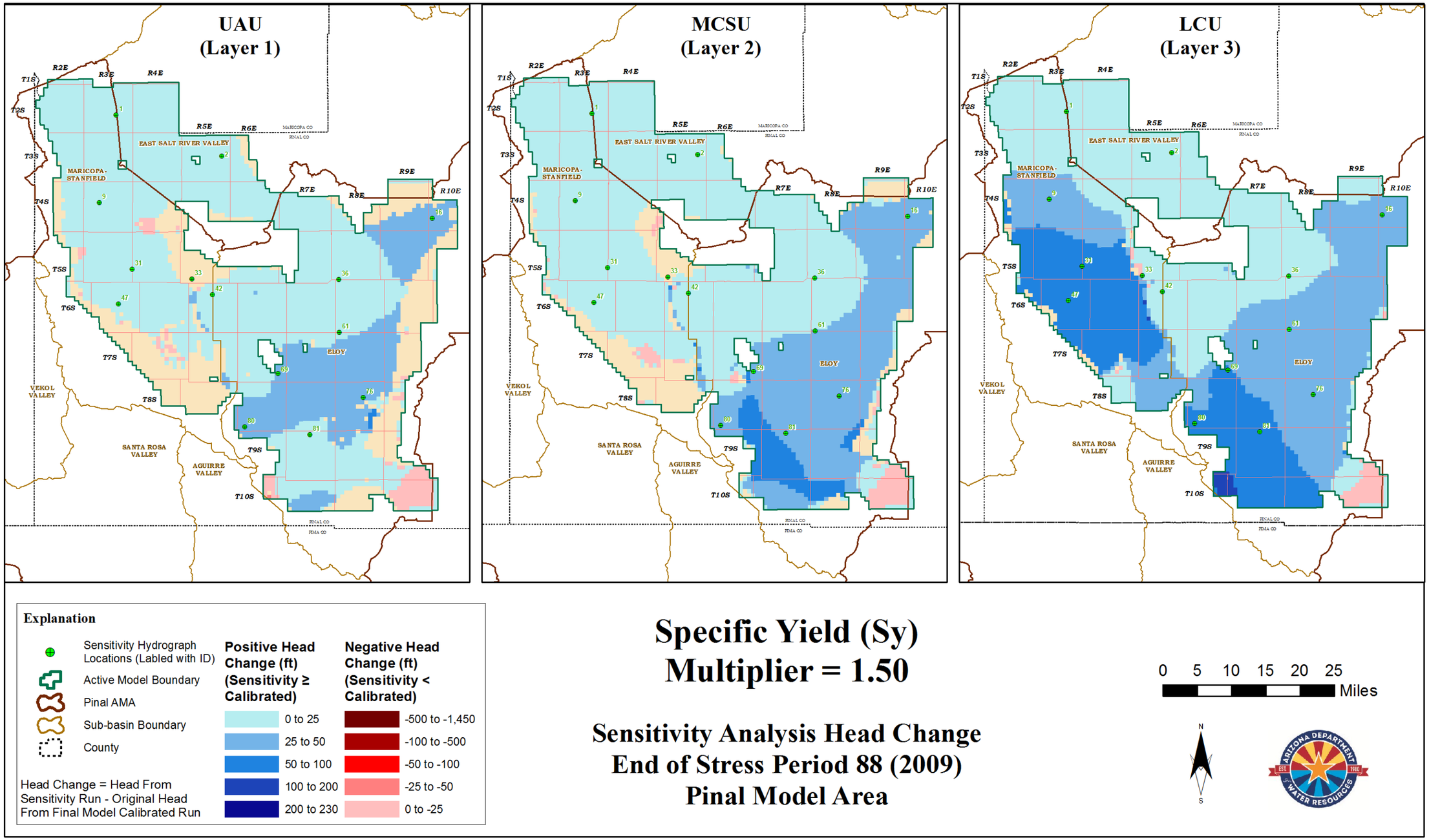


Figure 14 Sy Multiplier 1.50

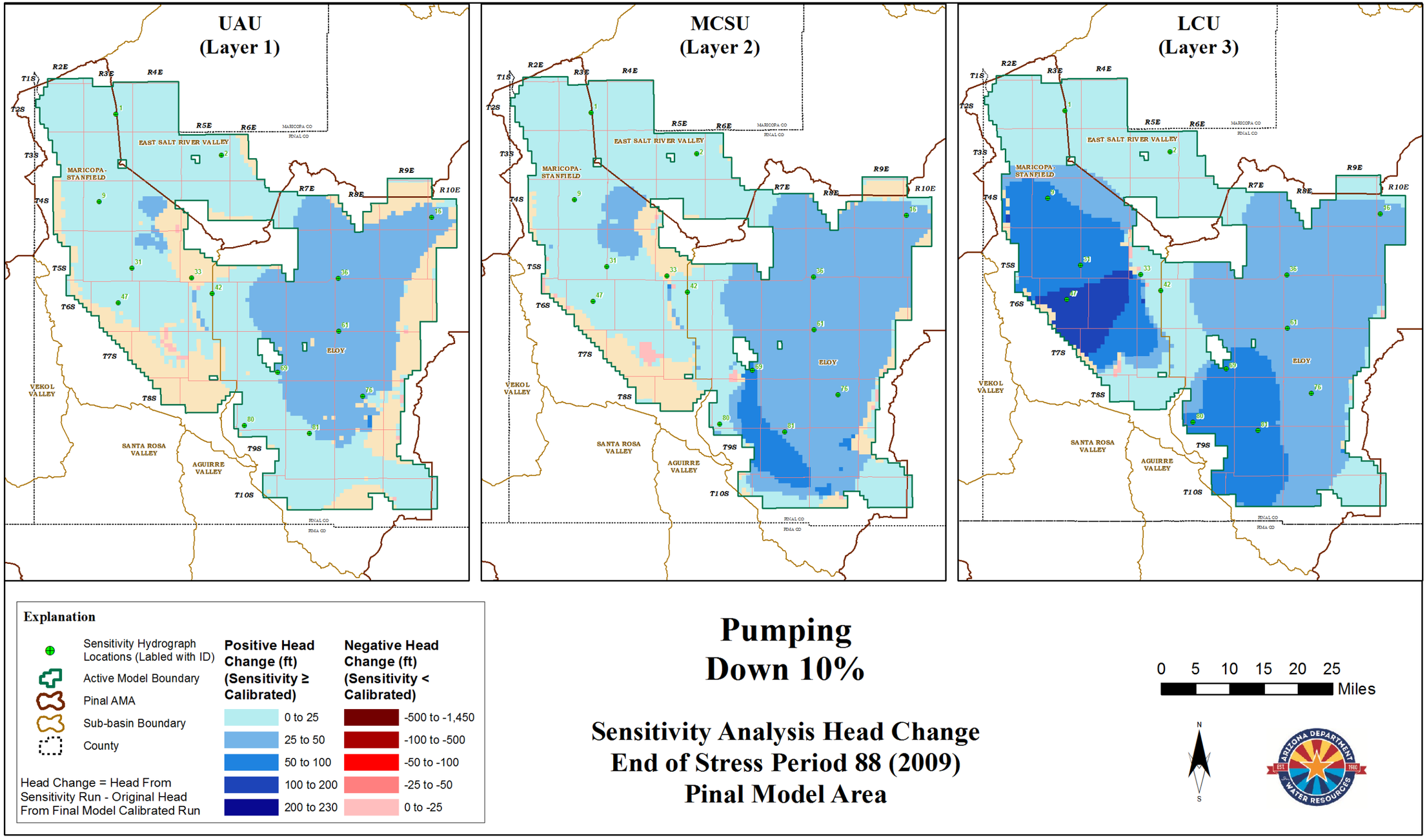


Figure 15 Pumping Down 10%

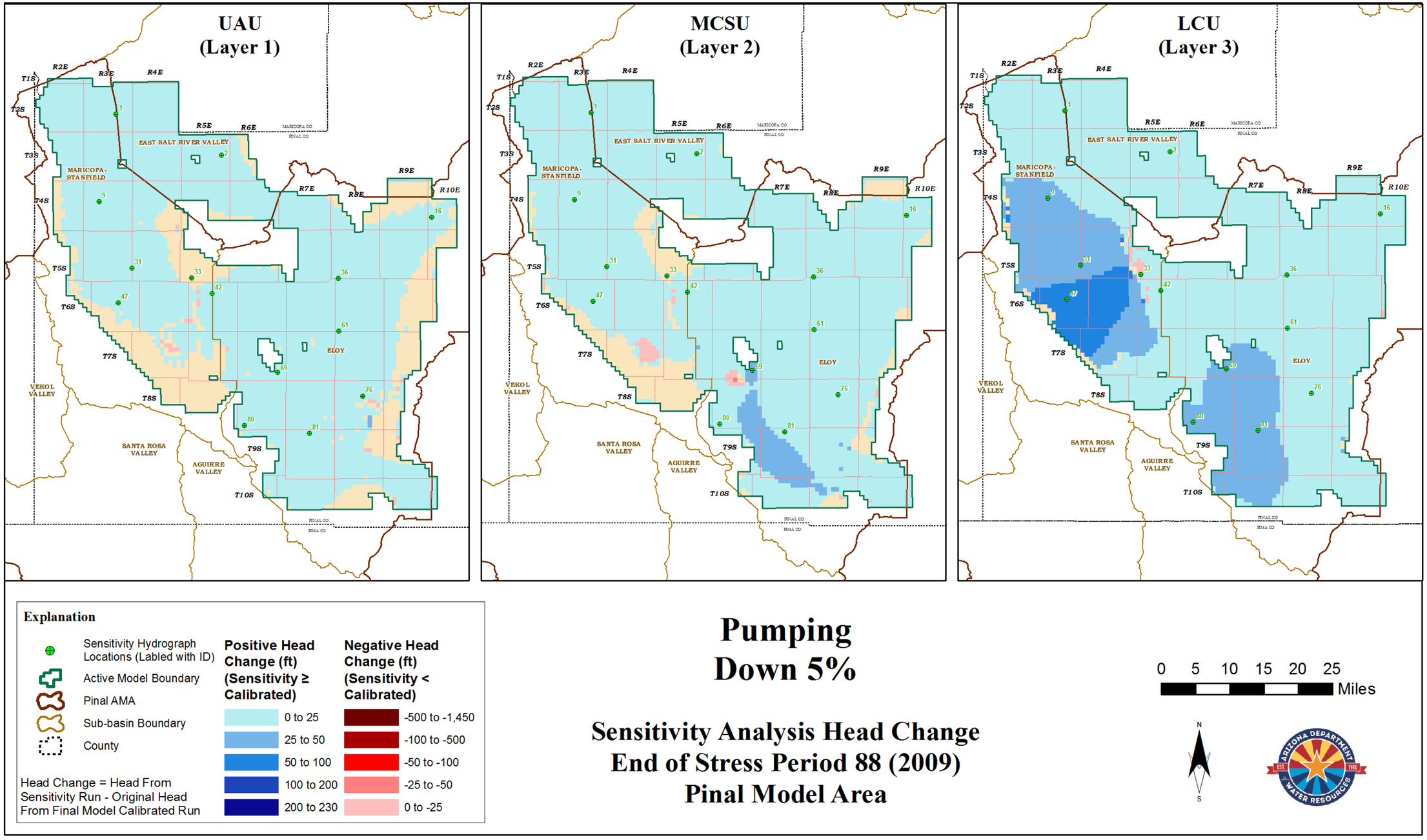


Figure 16 Pumping Down 5%

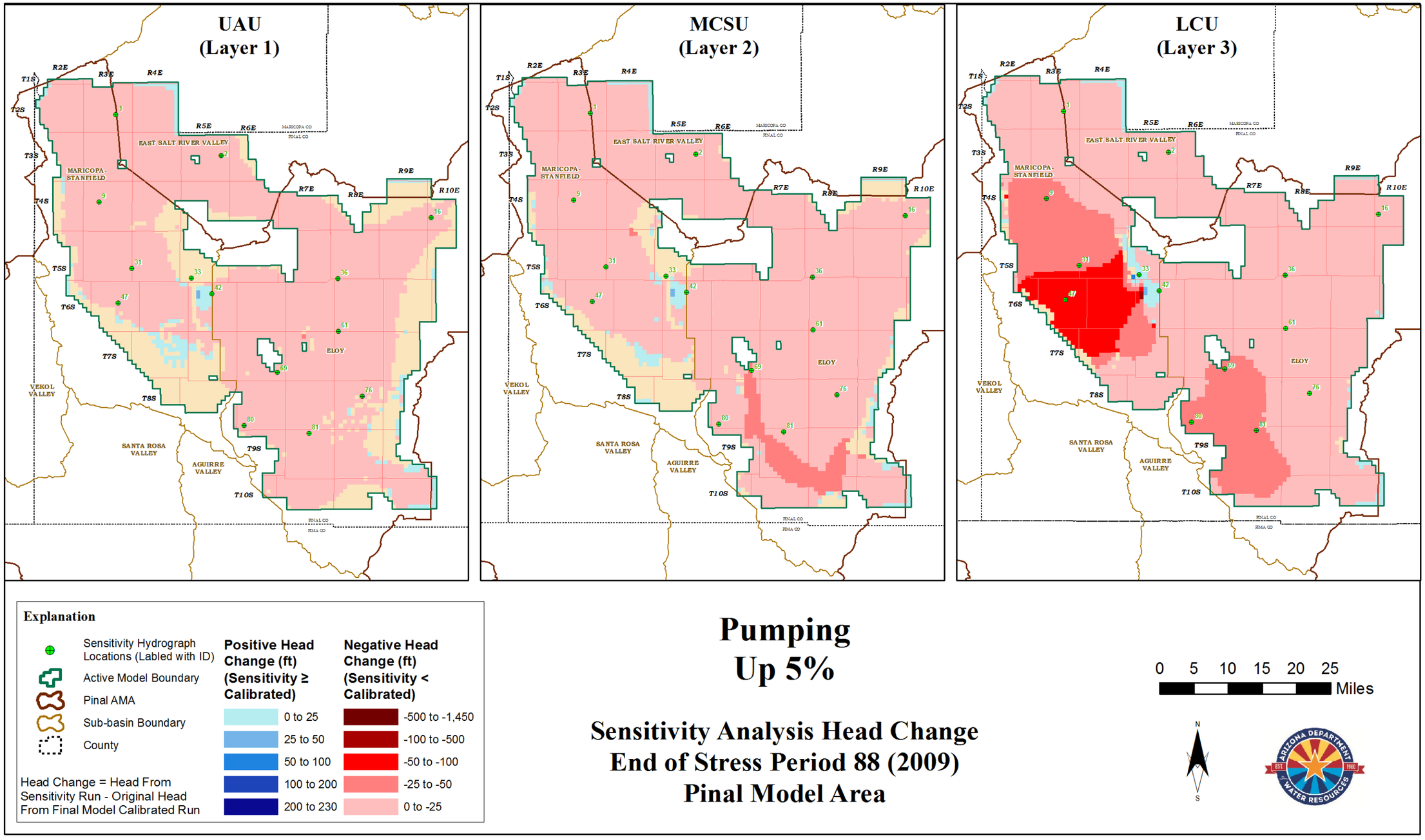


Figure 17 Pumping Up 5%

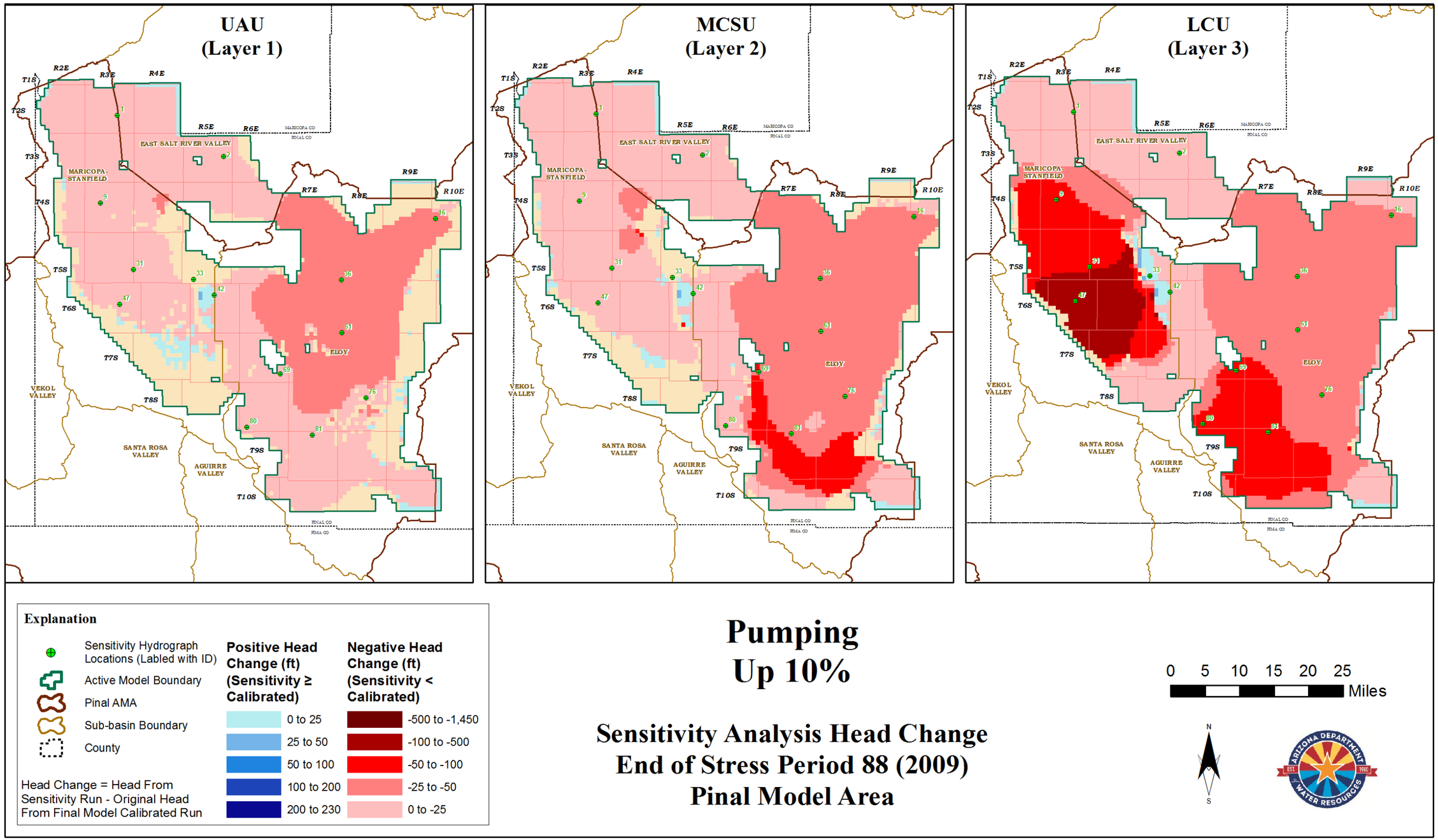


Figure 18 Pumping Up 10%

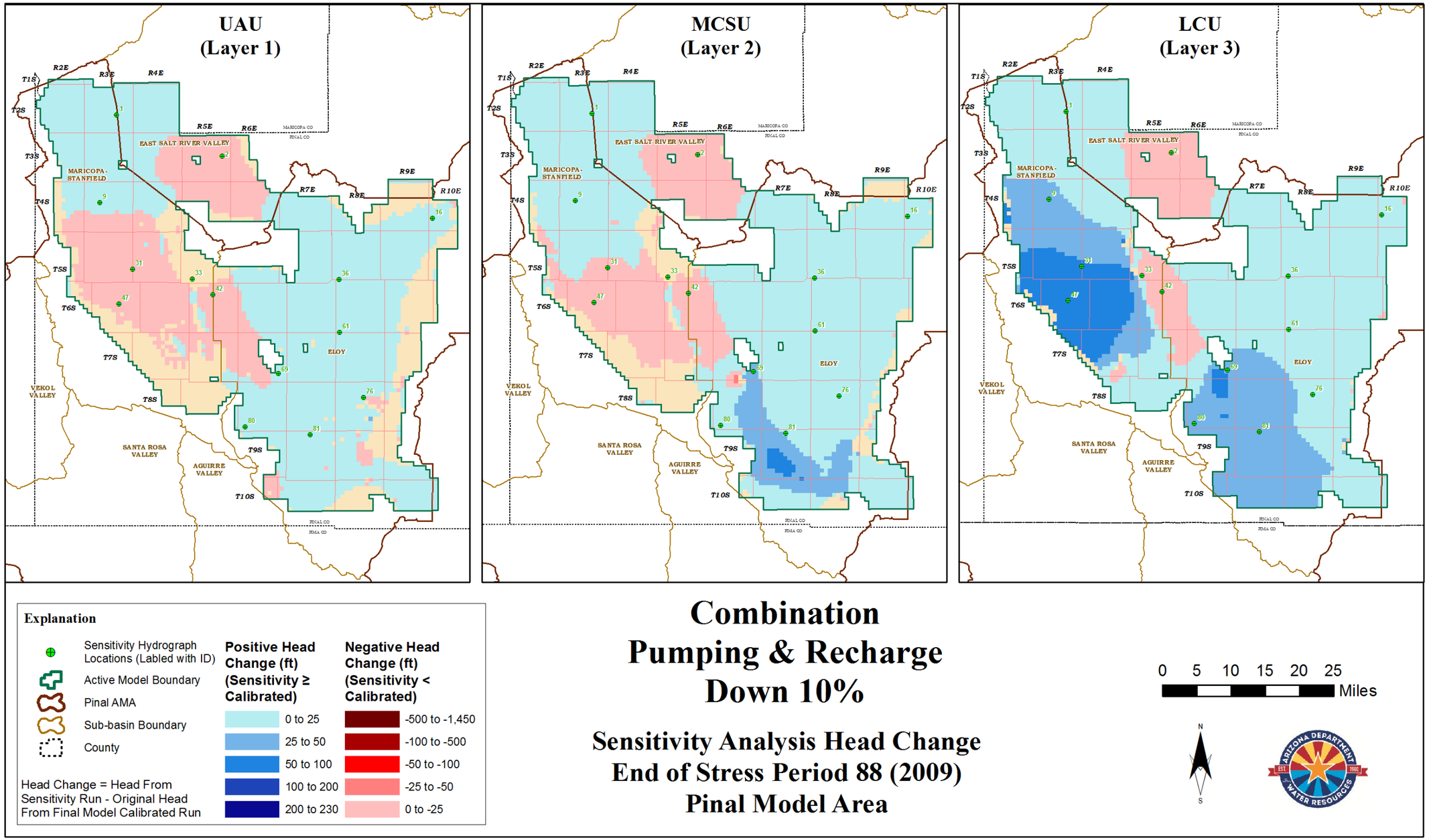


Figure 19 Combination Pumping and Recharge Down 10%

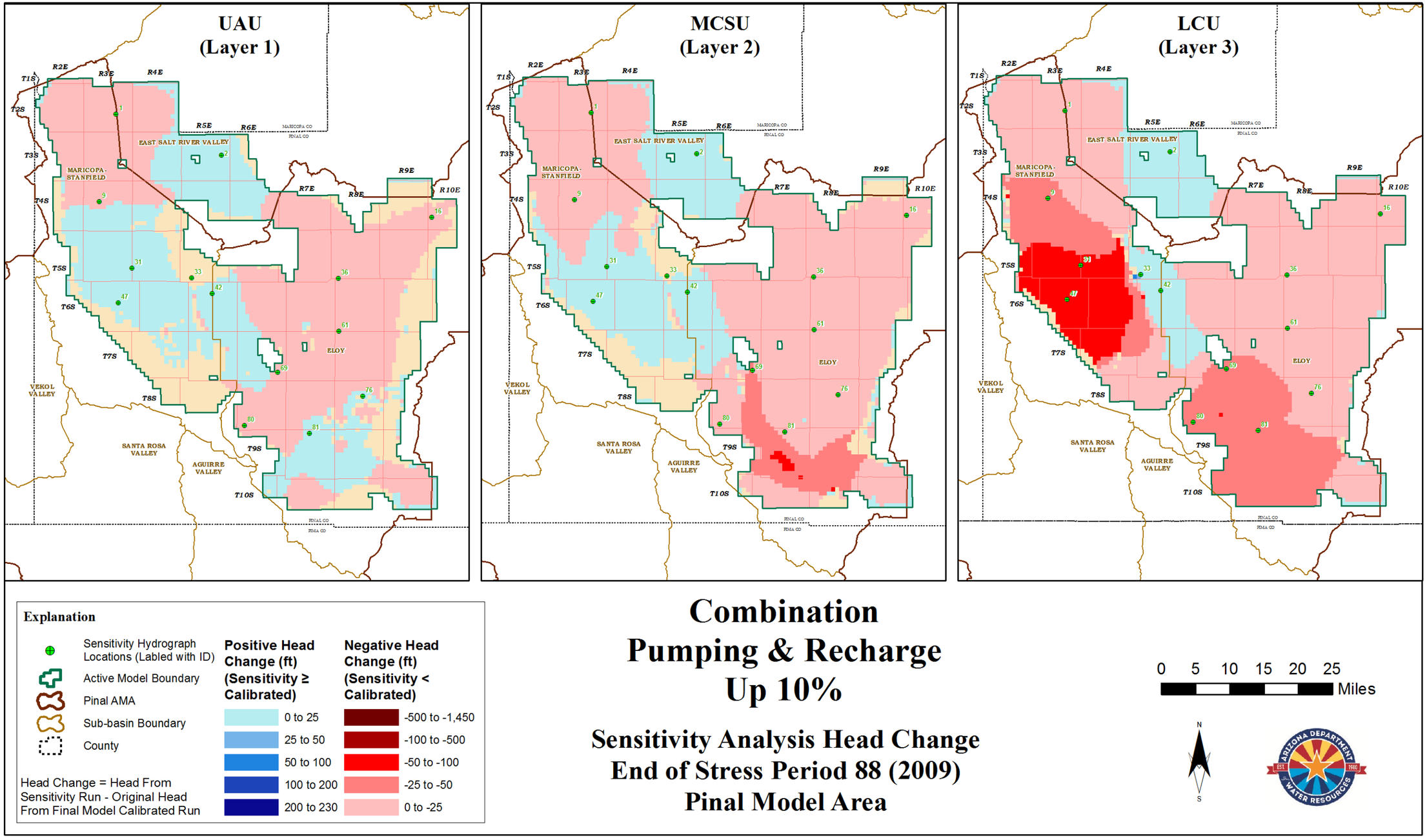


Figure 20 Combination Pumping and Recharge Up 10%

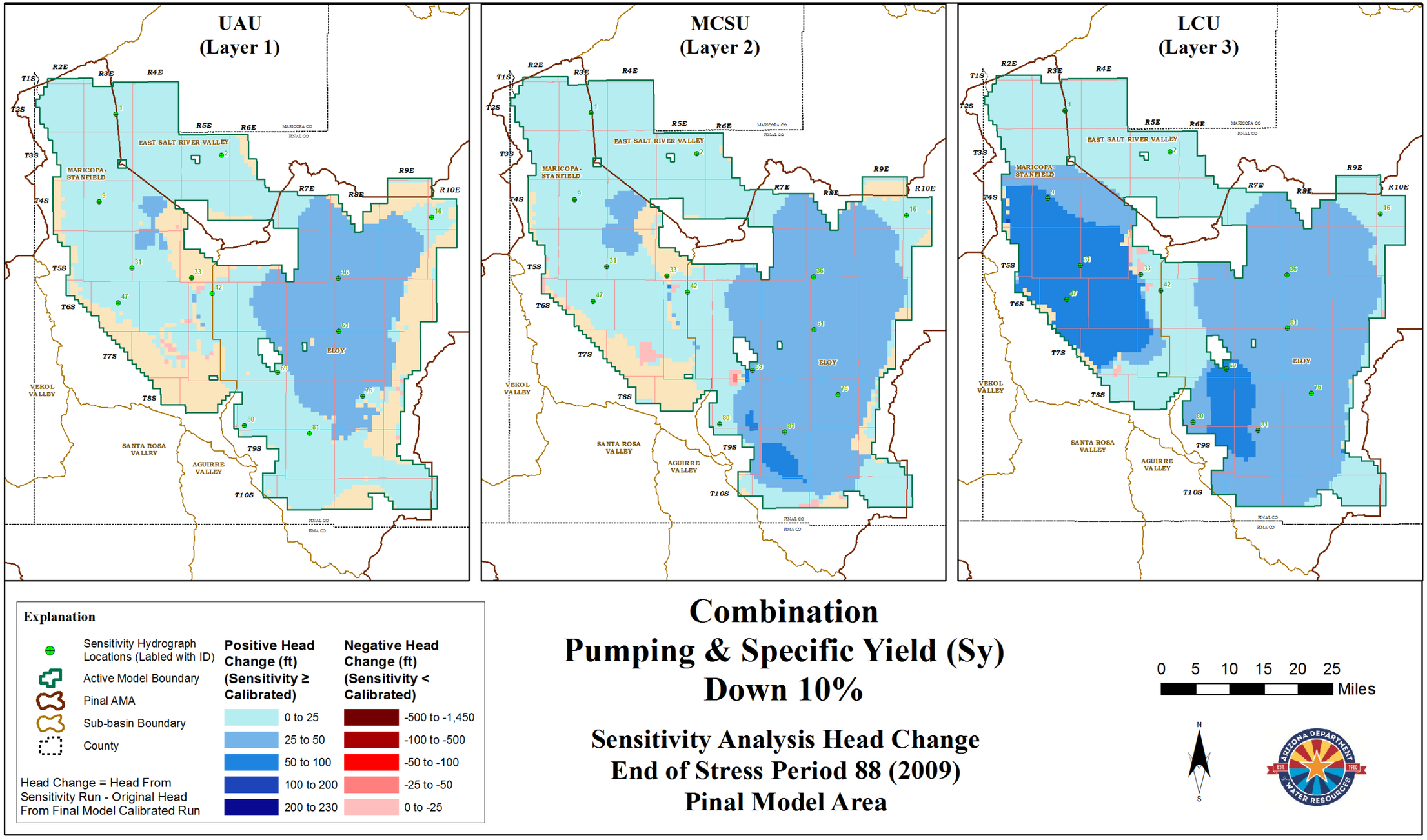


Figure 21 Combination Pumping and Sy Down 10%

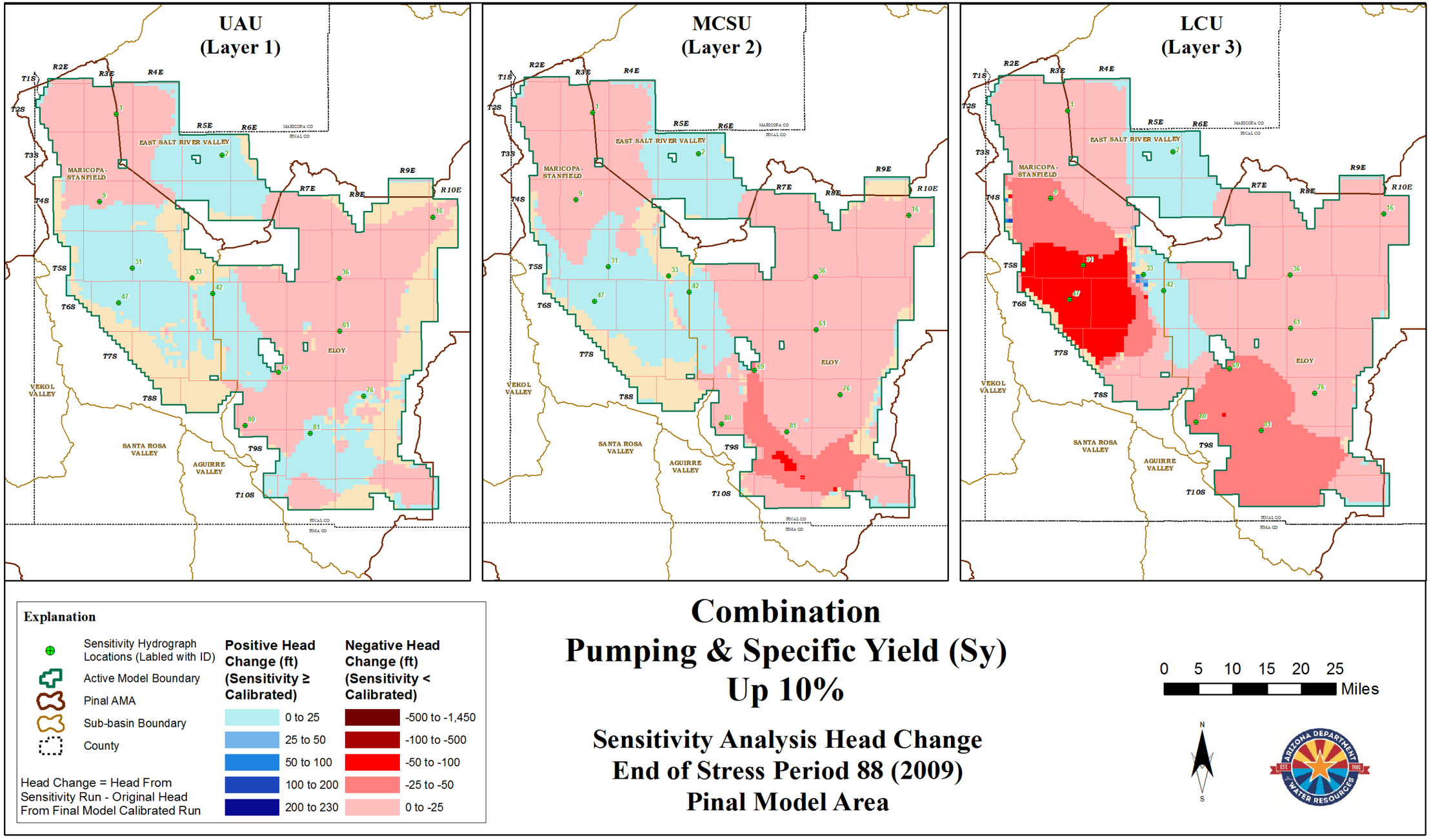
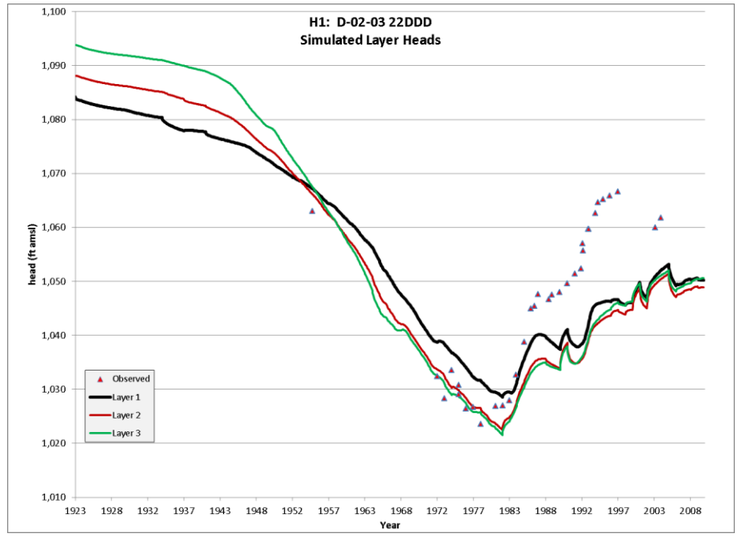
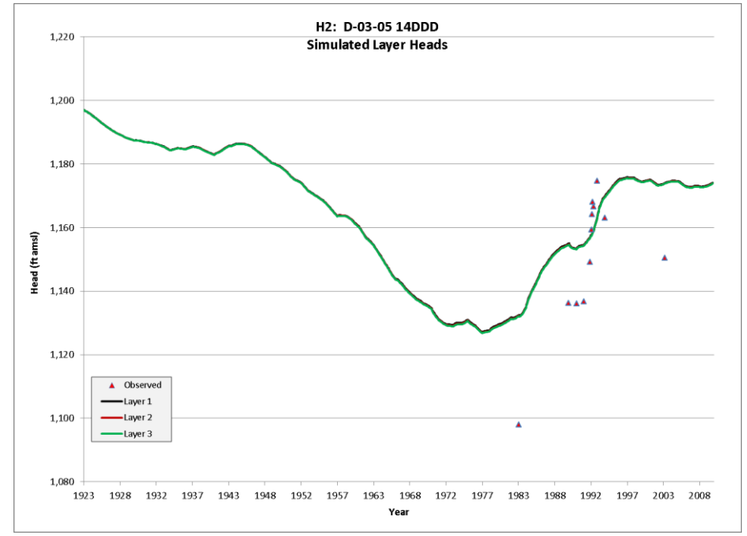
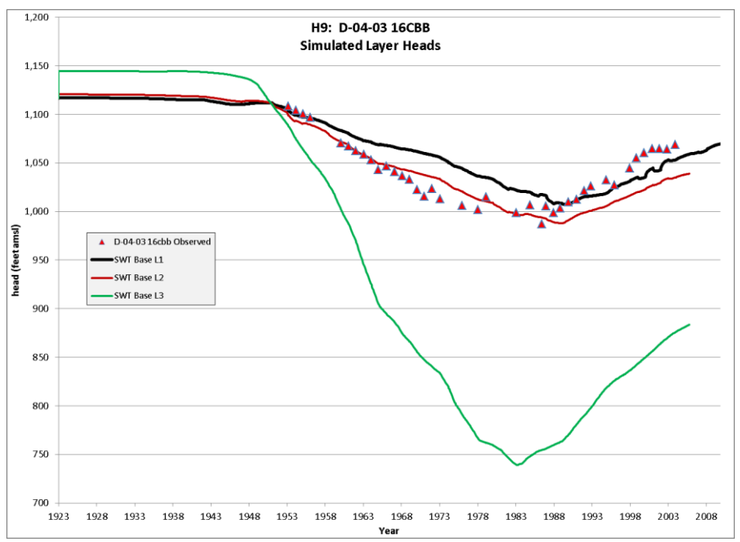


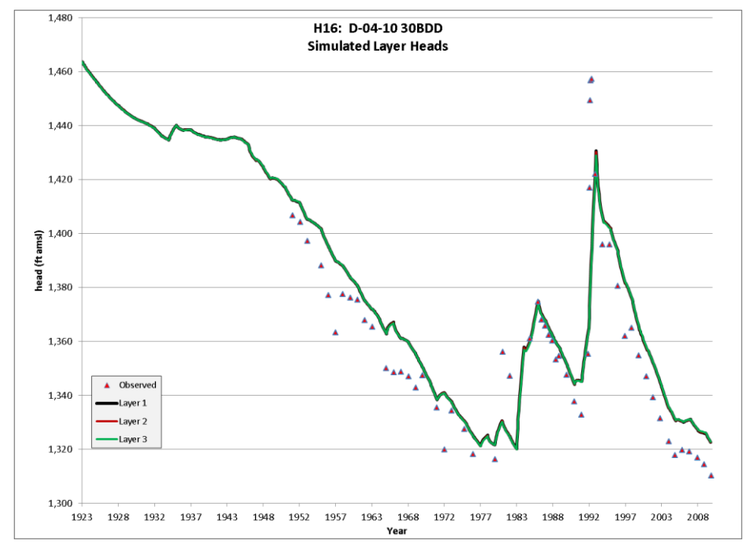
Figure 22 Combination Pumping and Sy Up 10%

Simulated Layer Head Hydrographs

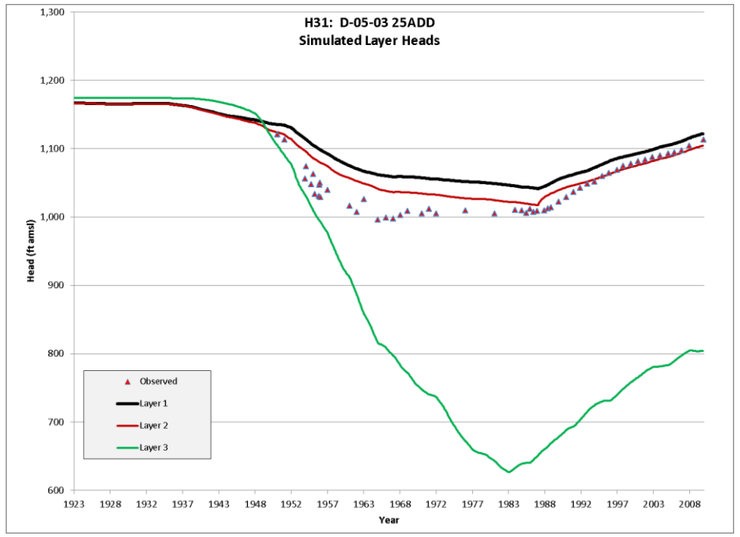


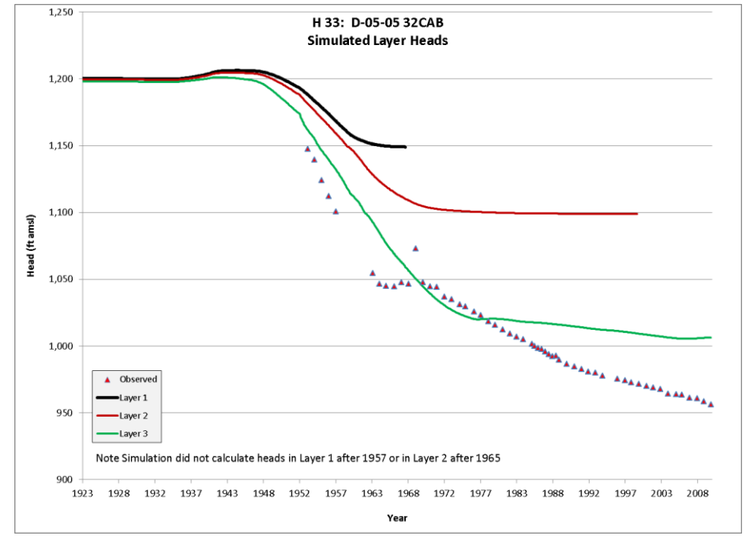


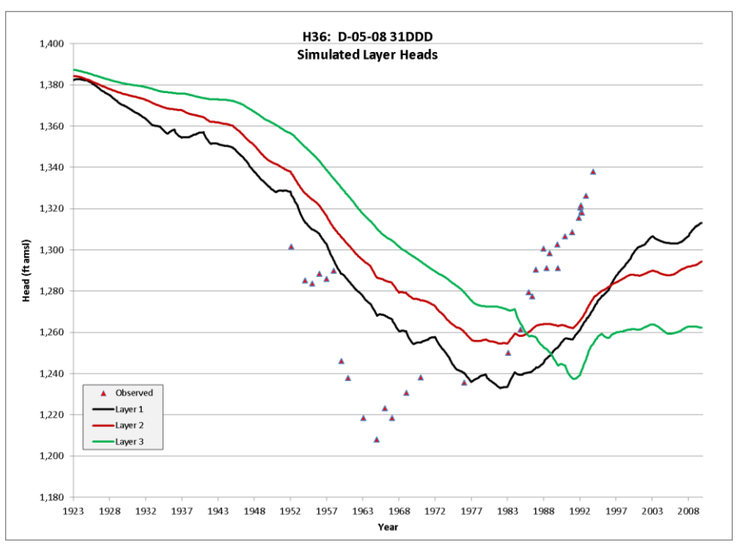


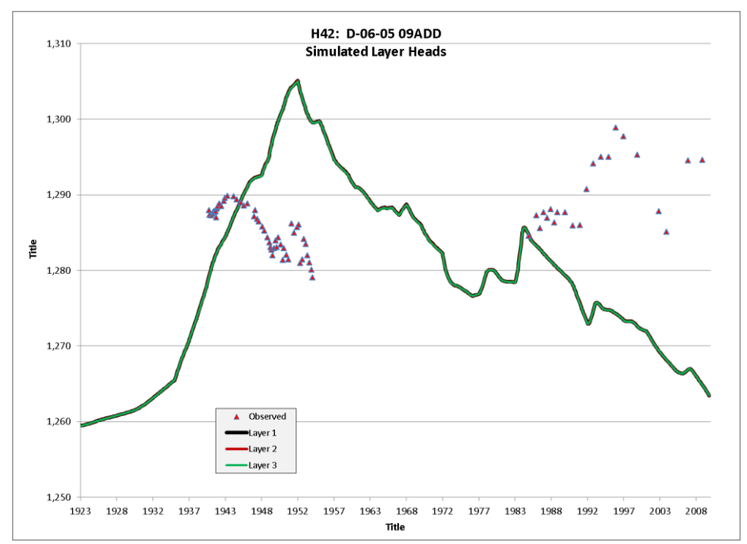


Simulated Layer Head Hydrographs

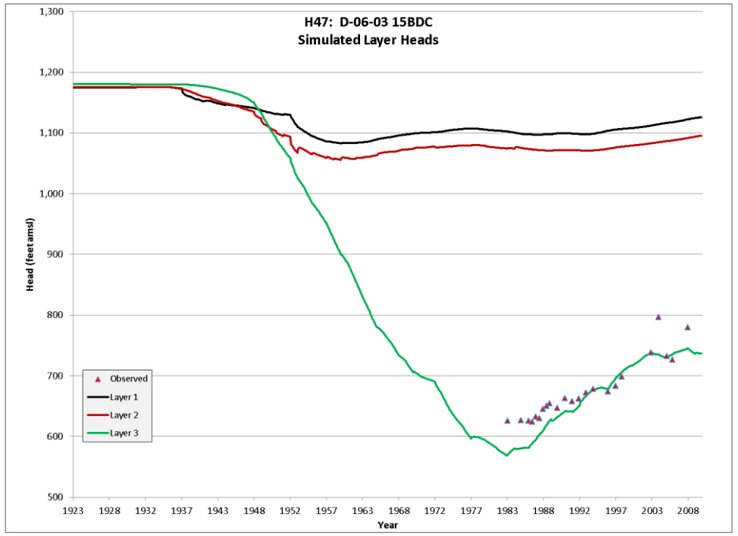


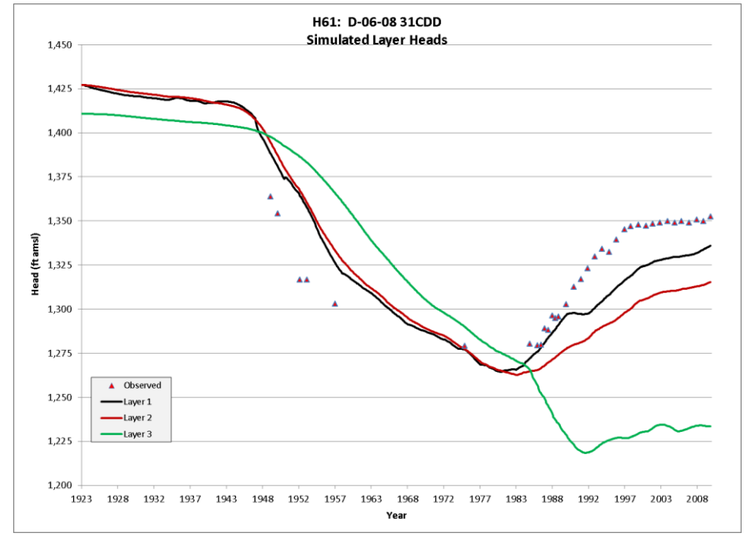


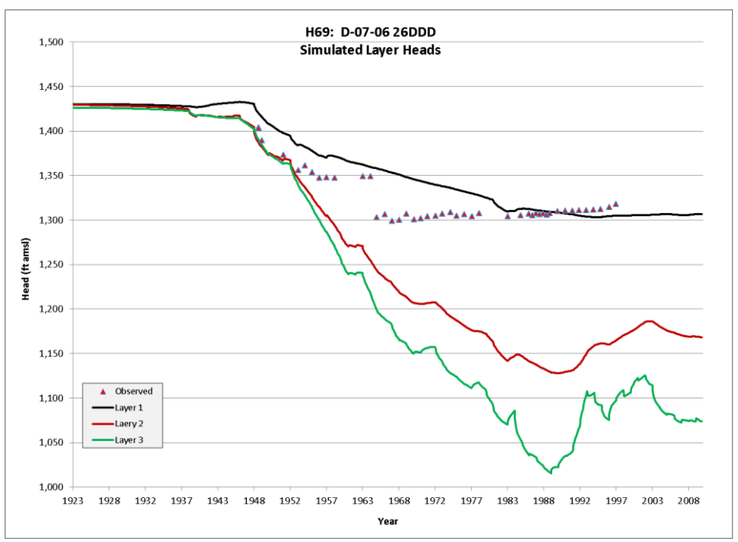


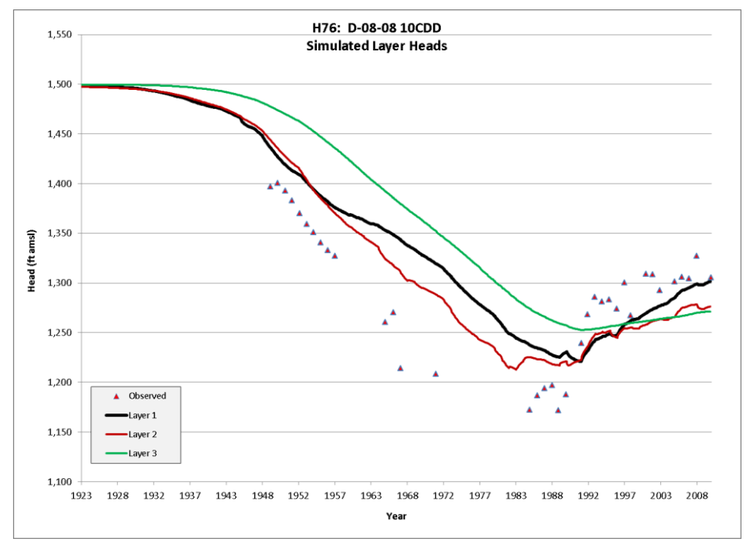


Simulated Layer Head Hydrographs

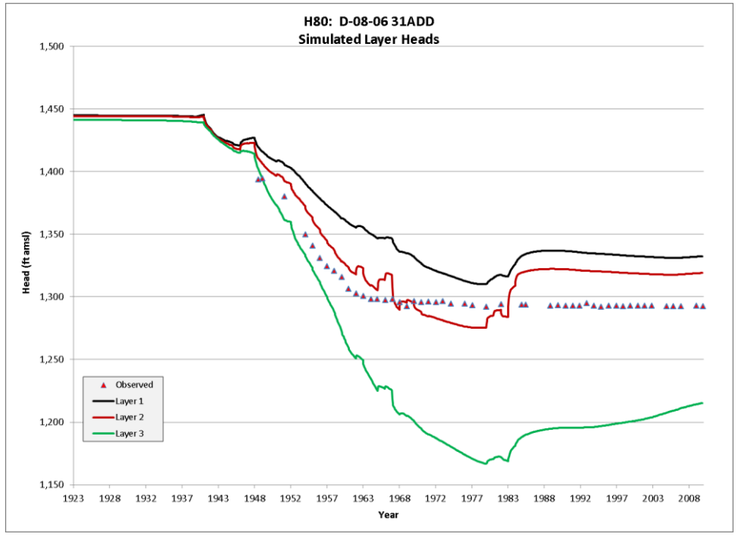


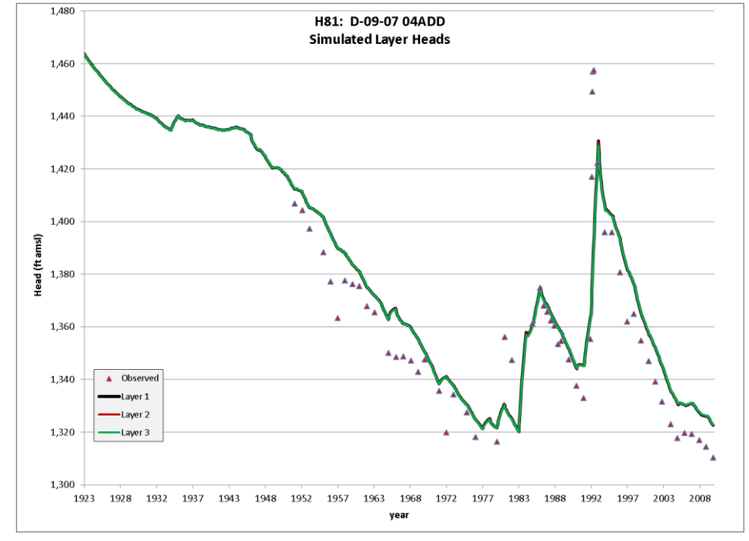




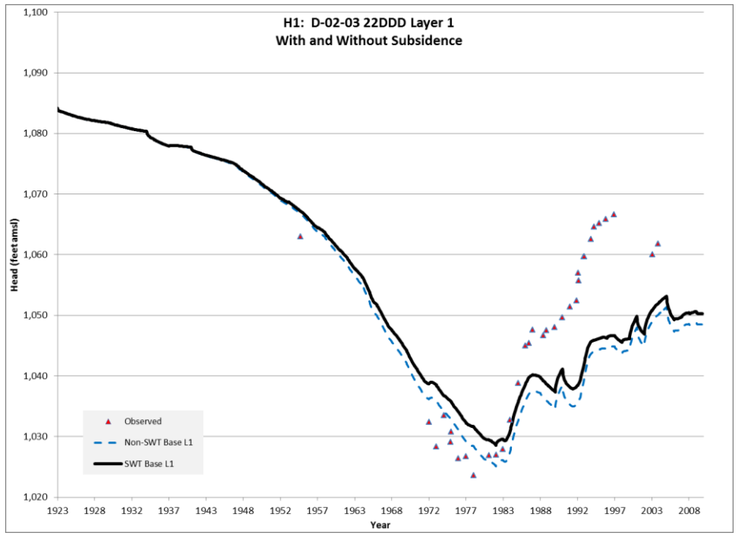


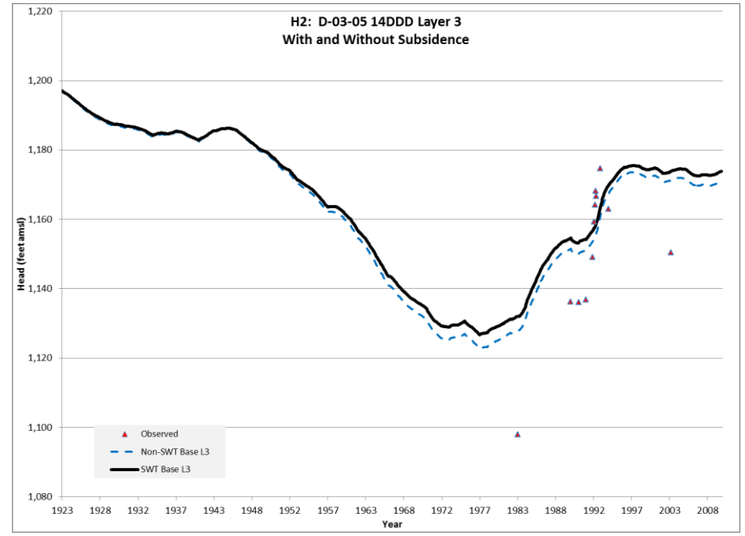
Simulated Layer Head Hydrographs

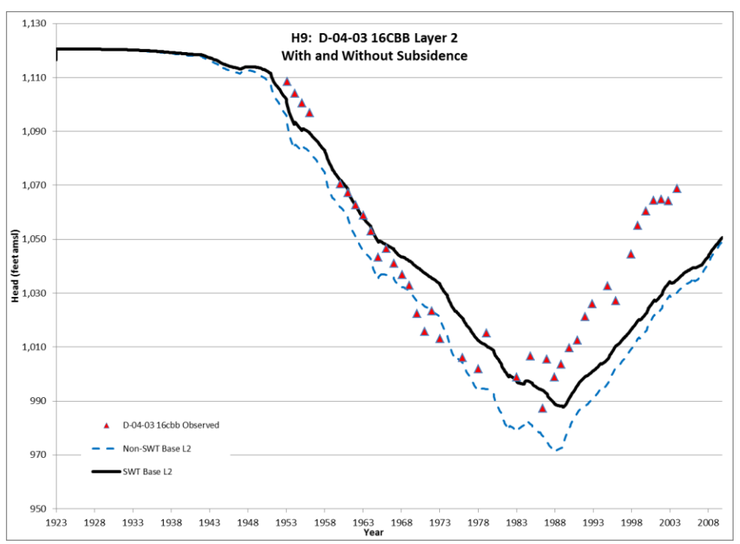


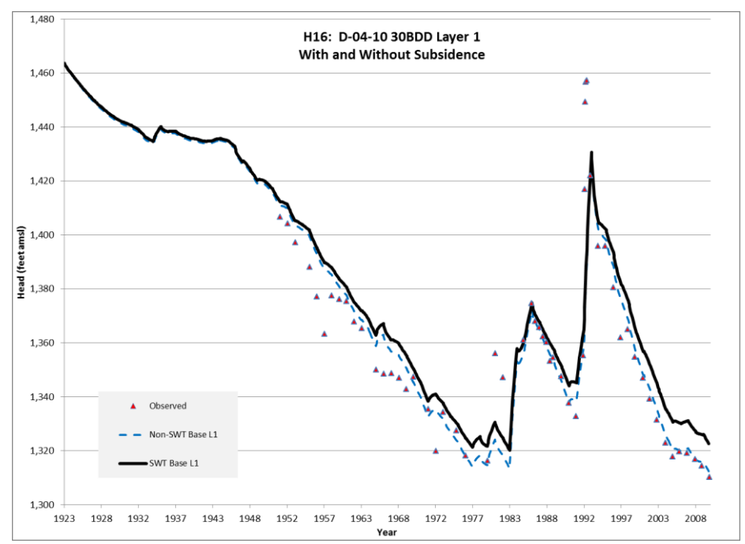


Hydrographs With and Without Subsidence

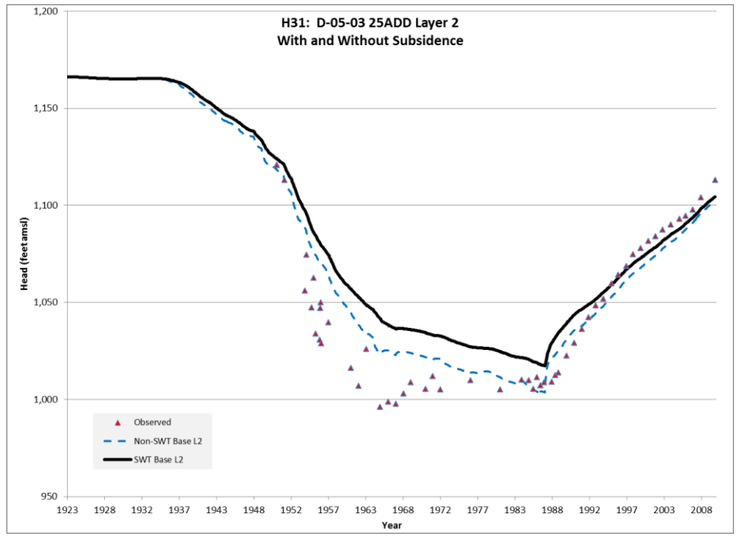


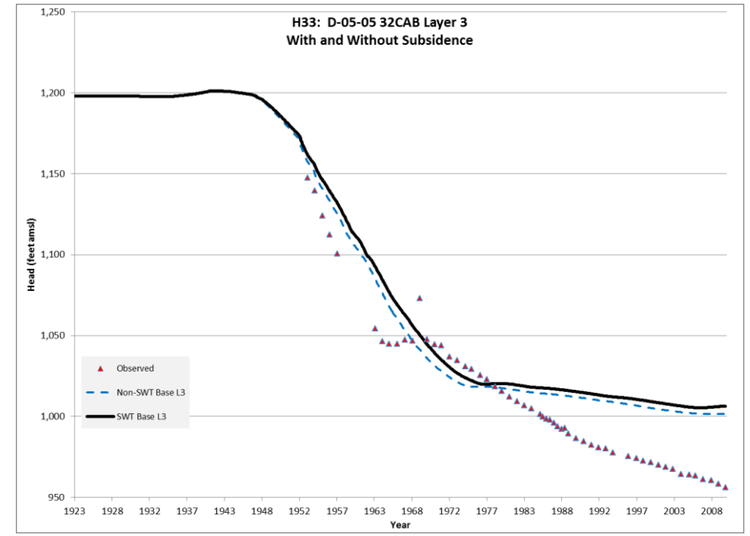


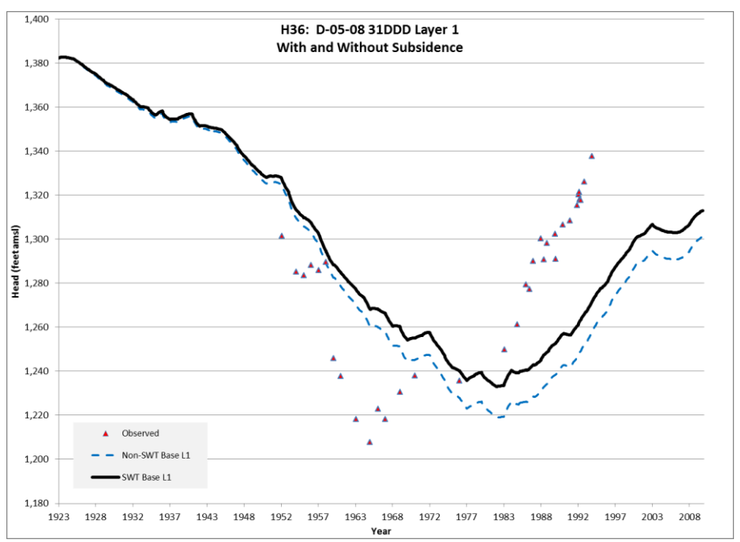


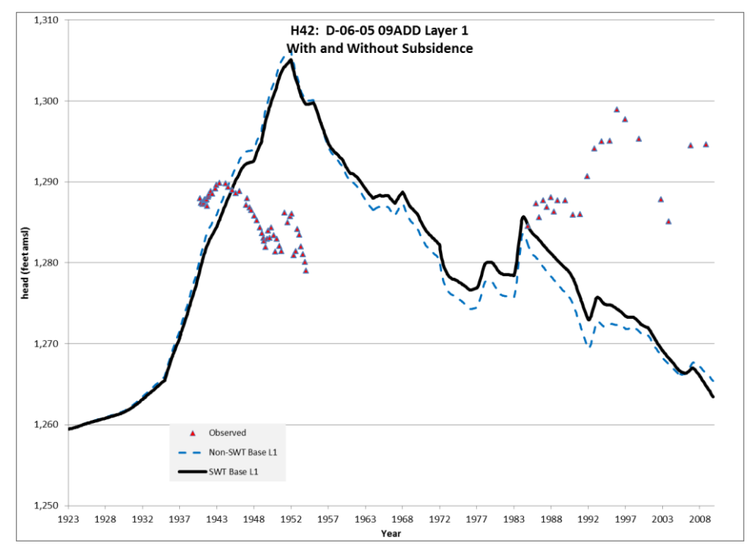


Hydrographs With and Without Subsidence

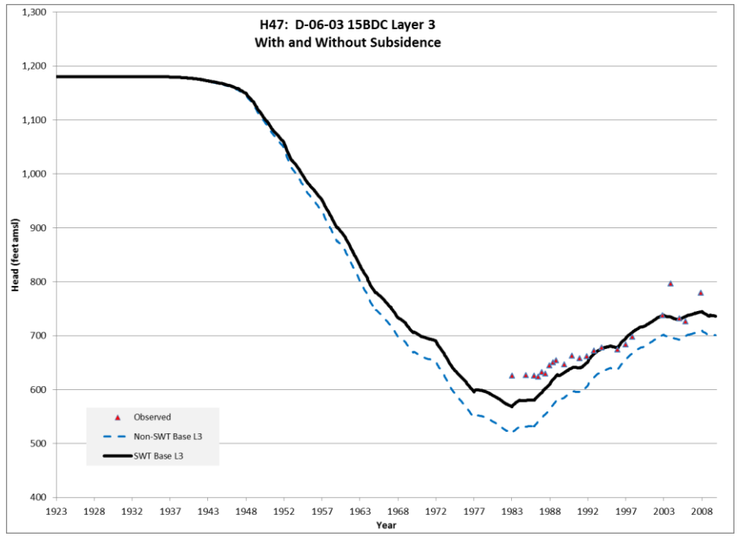


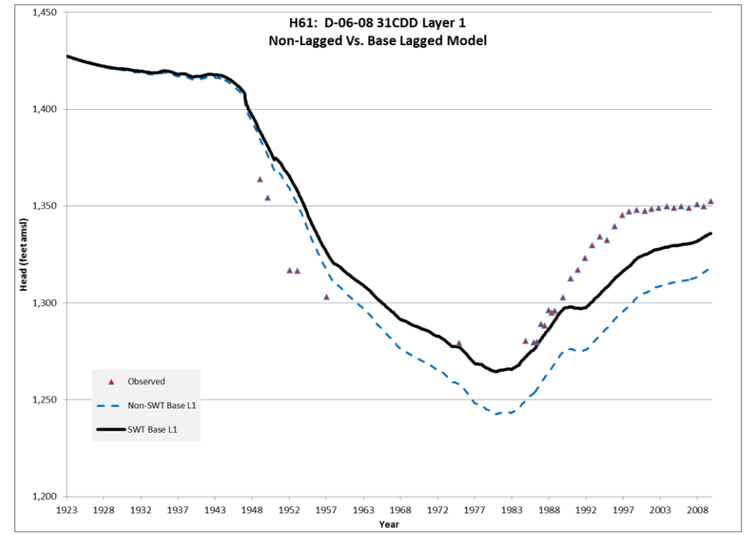


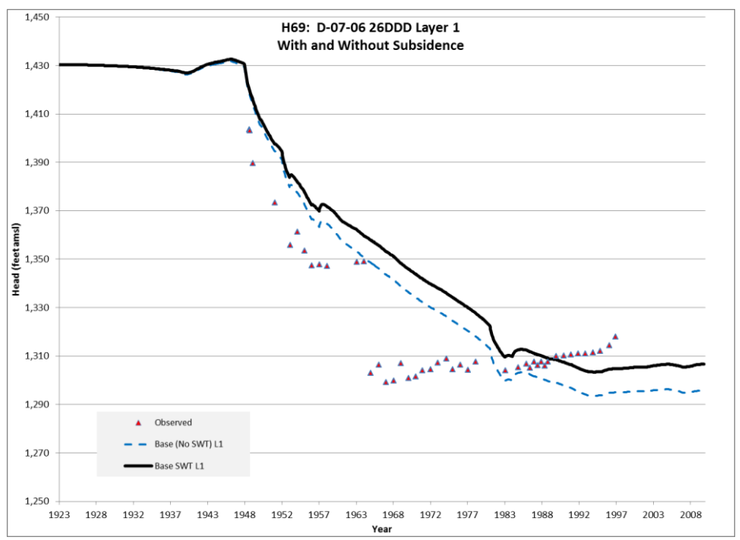


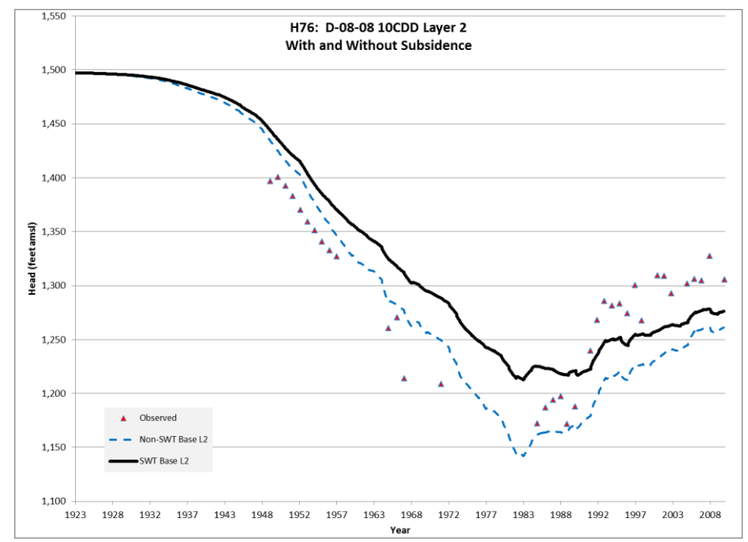


Hydrographs With and Without Subsidence

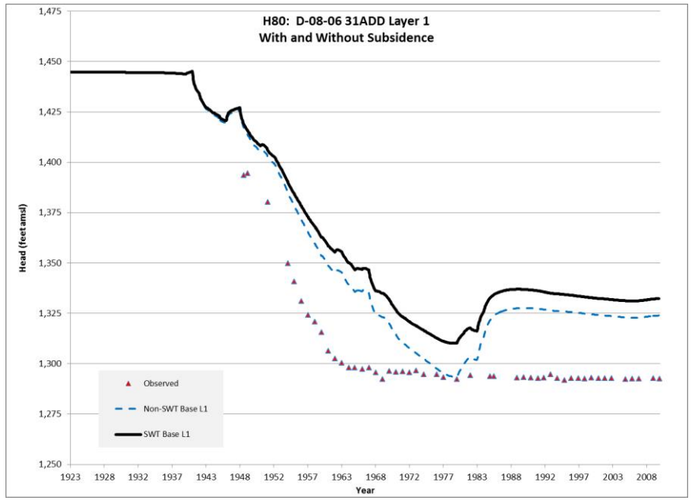


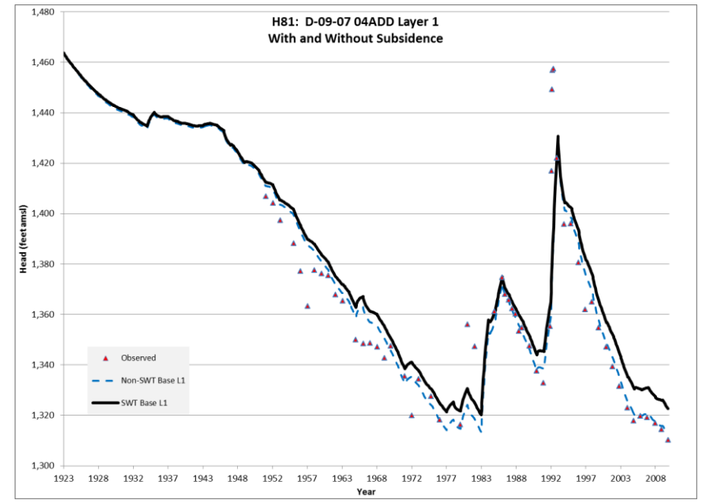




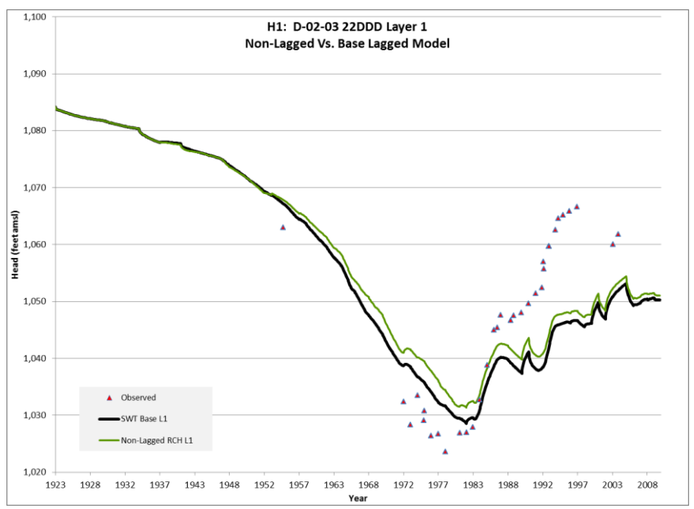


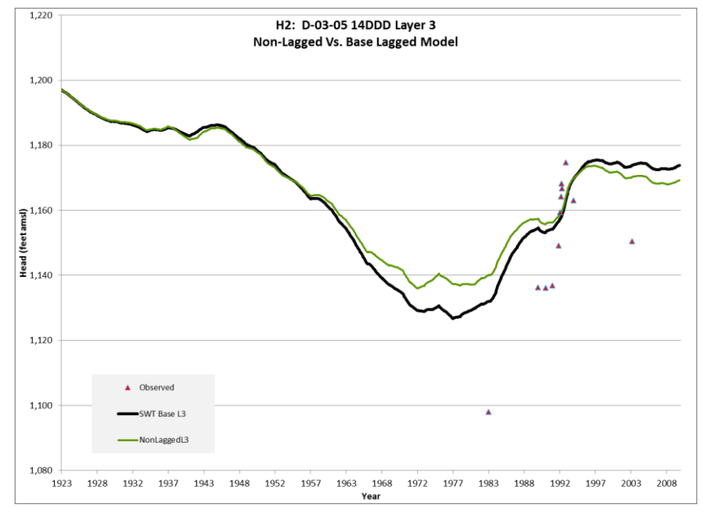
Hydrographs With and Without Subsidence



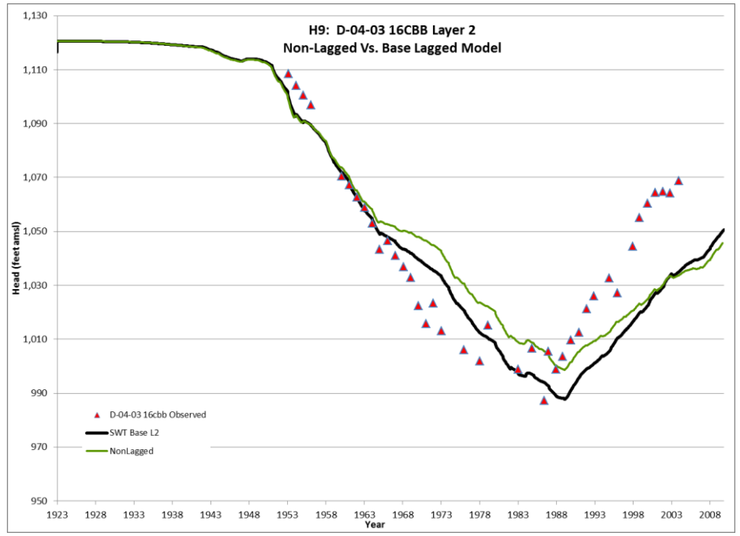


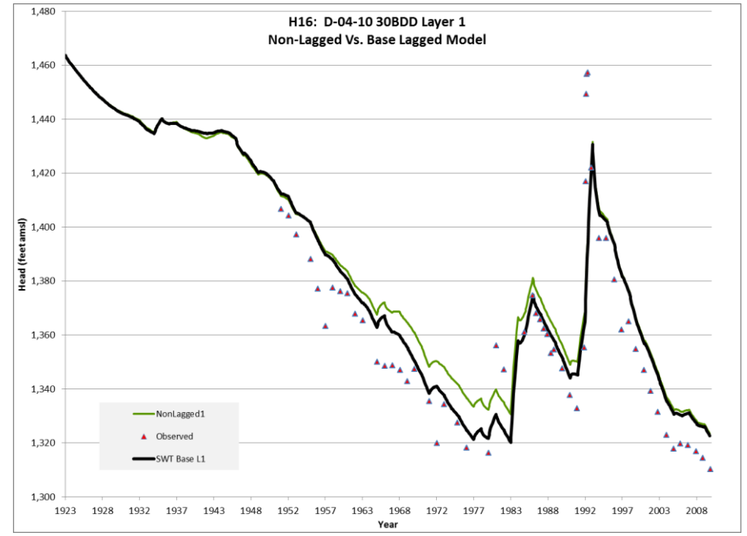
Hydrographs With and Without Lagged Agricultural Recharge

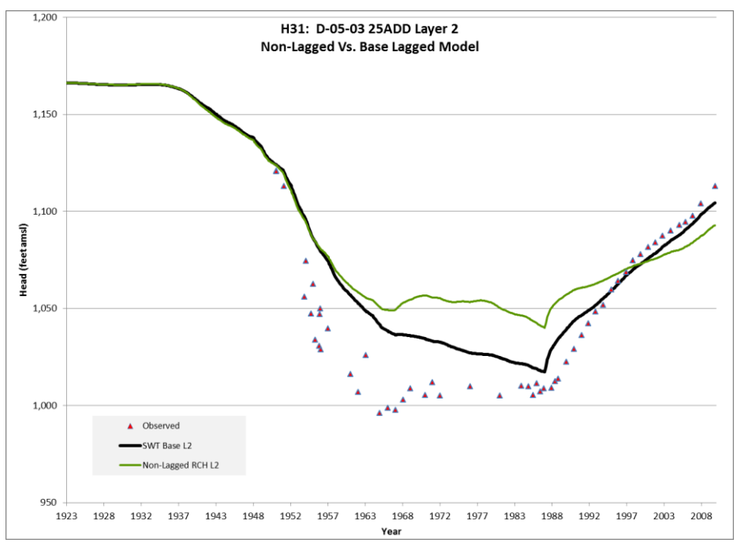


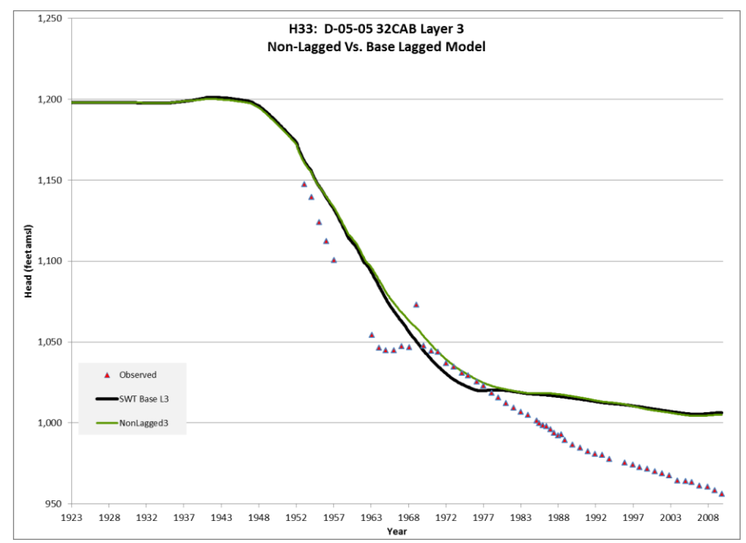


Hydrographs With and Without Lagged Agricultural Recharge

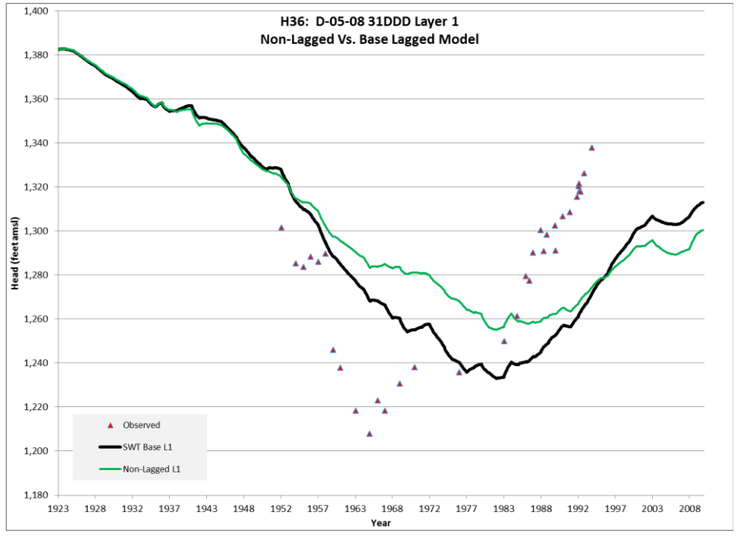


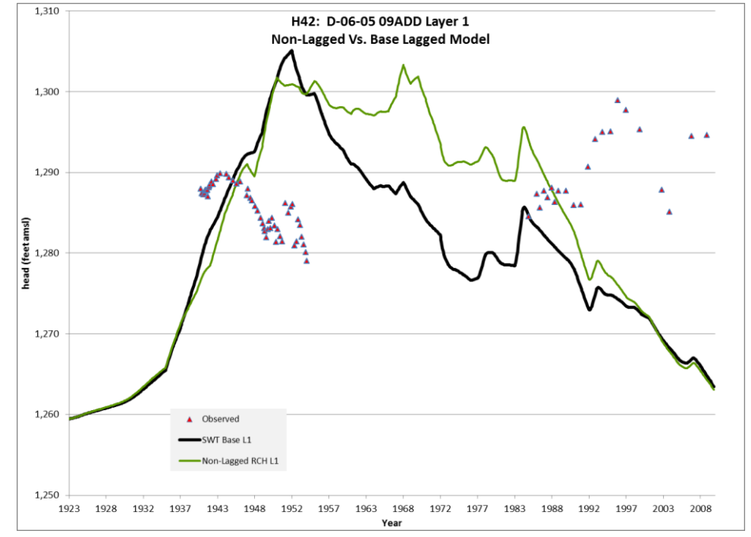


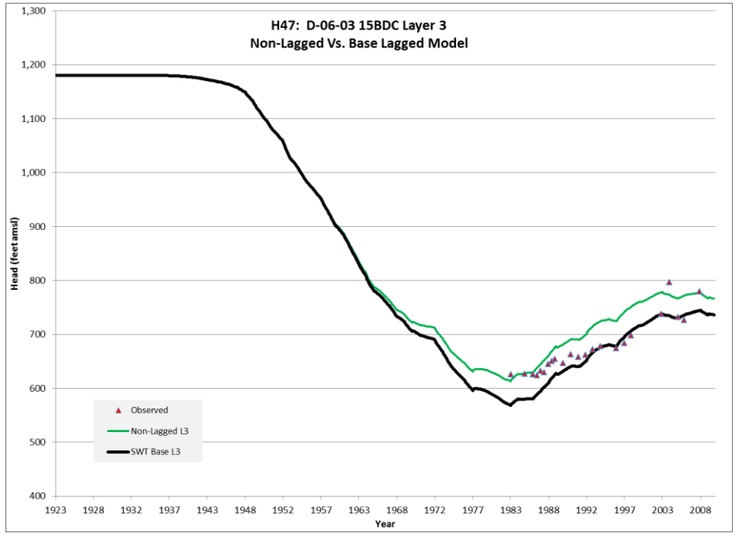


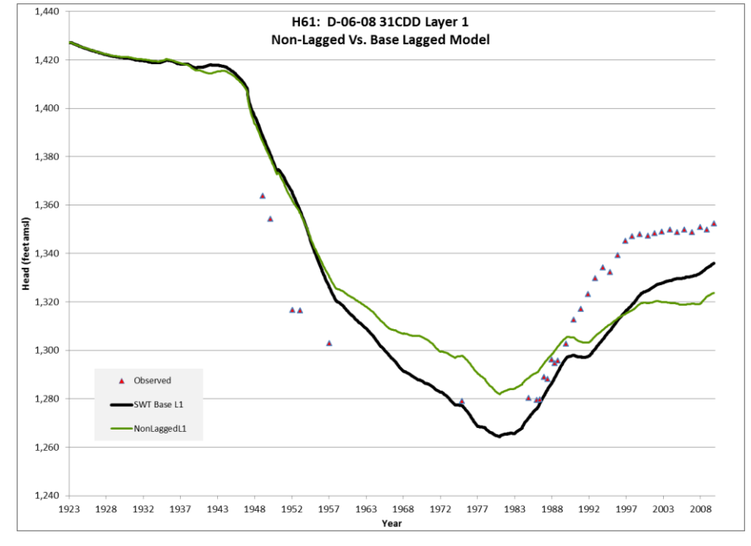


Hydrographs With and Without Lagged Agricultural Recharge

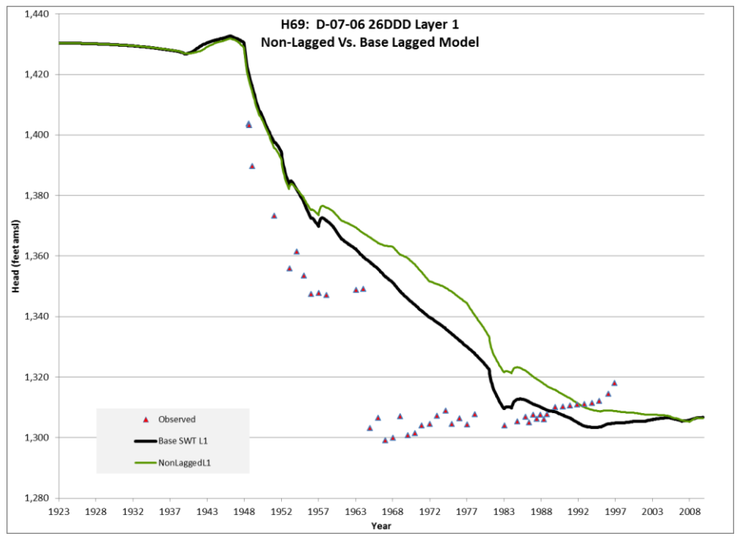


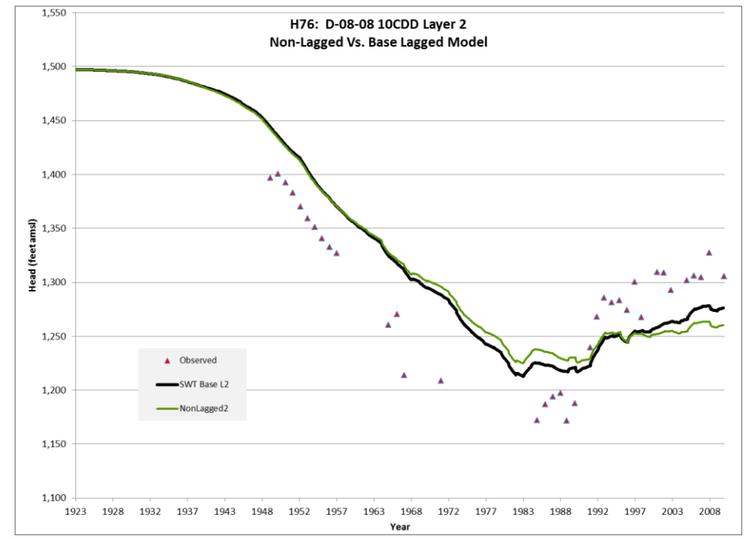


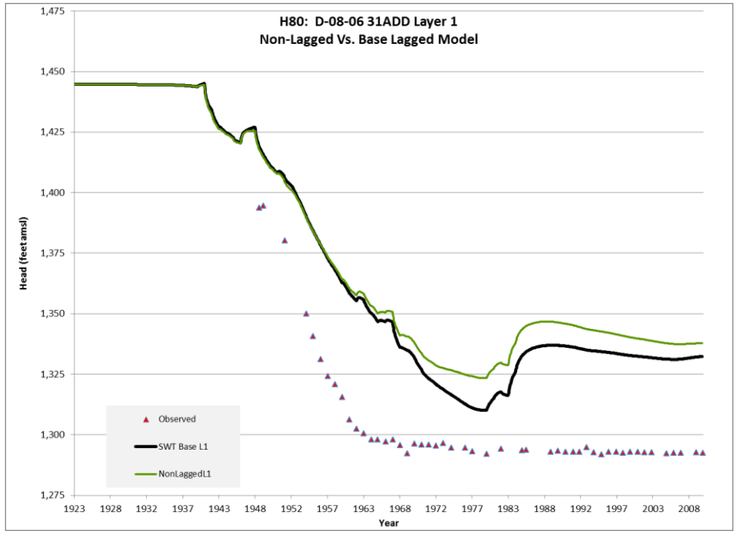


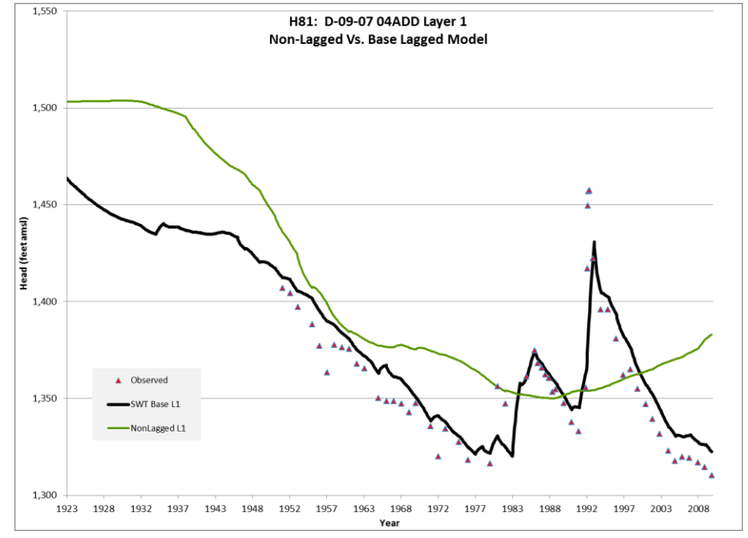


Hydrographs With and Without Lagged Agricultural Recharge

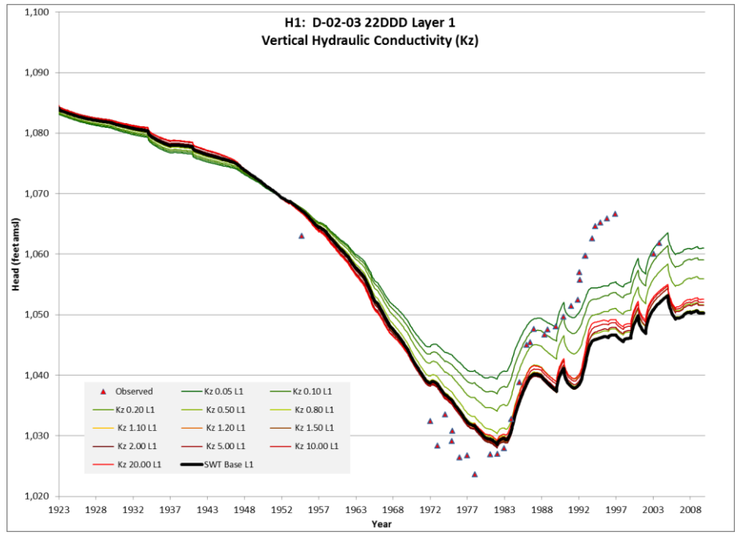


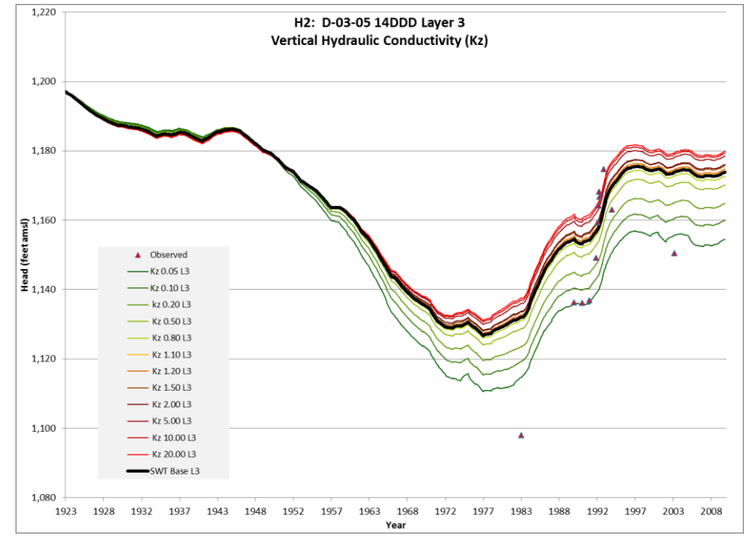


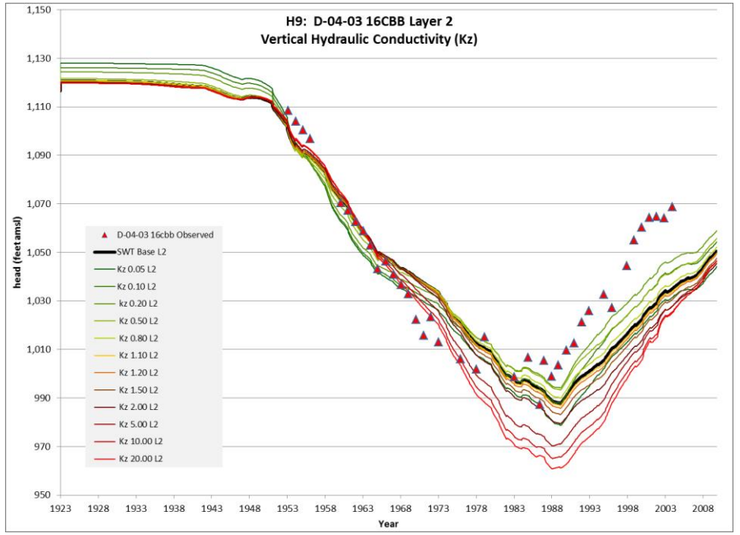


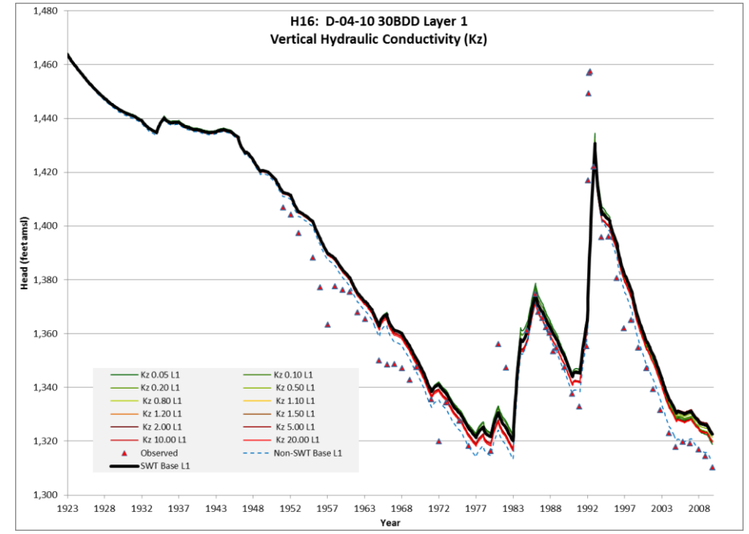


Vertical Hydraulic Conductivity (Kz) Sensitivity Hydrographs

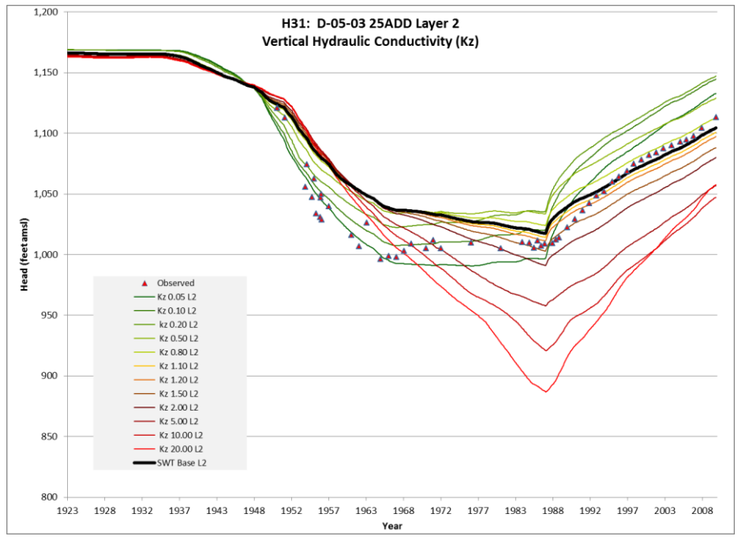


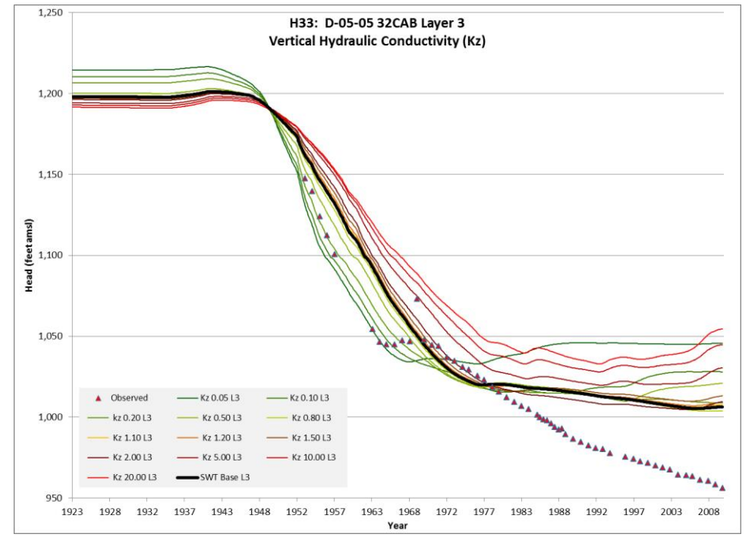


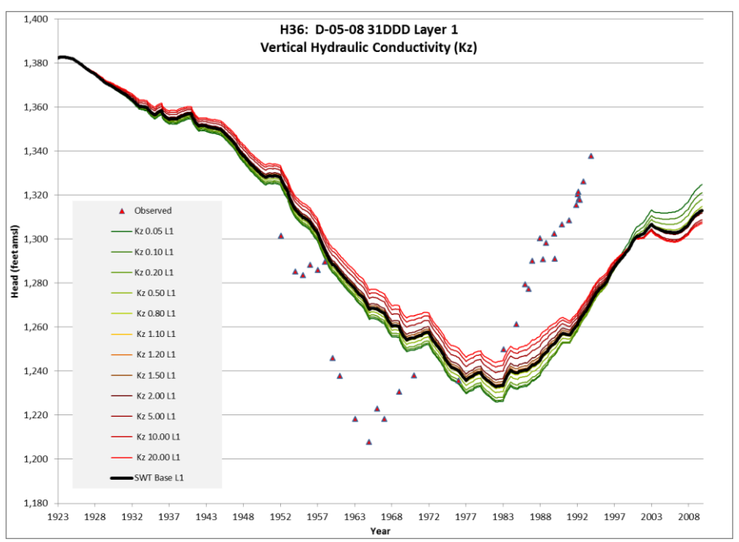


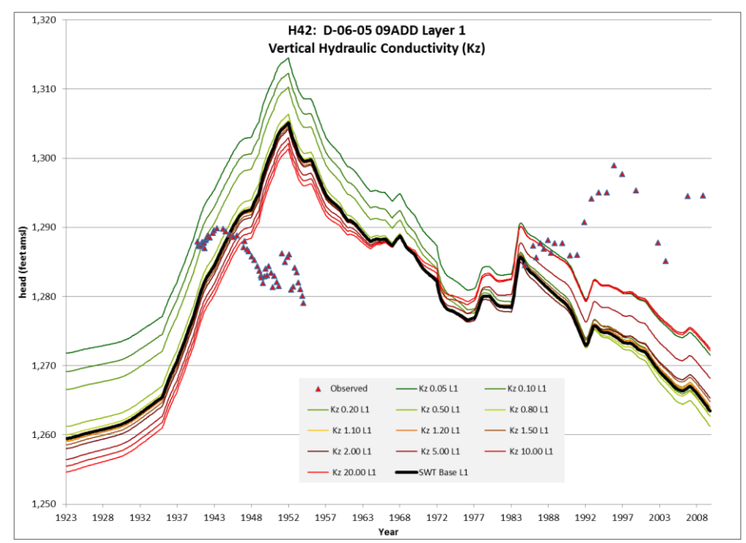


Vertical Hydraulic Conductivity (Kz) Sensitivity Hydrographs

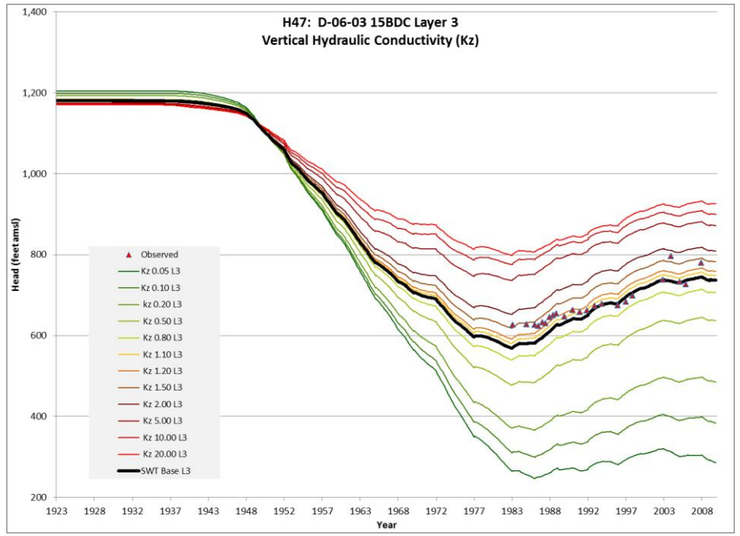


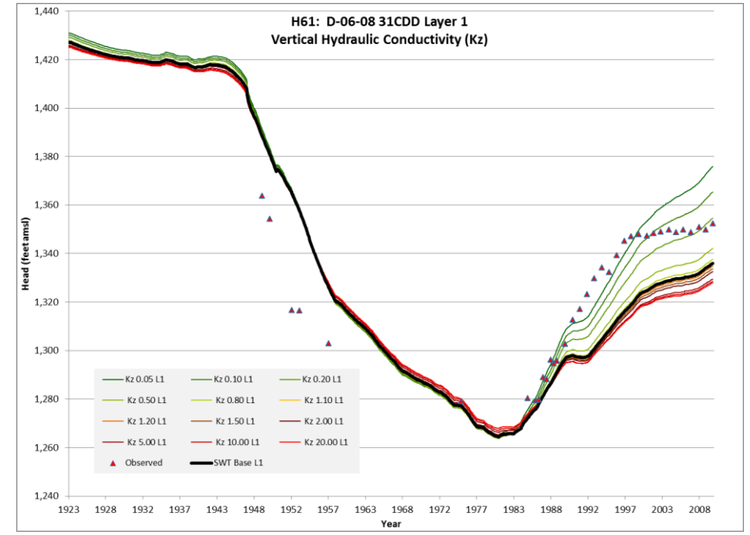


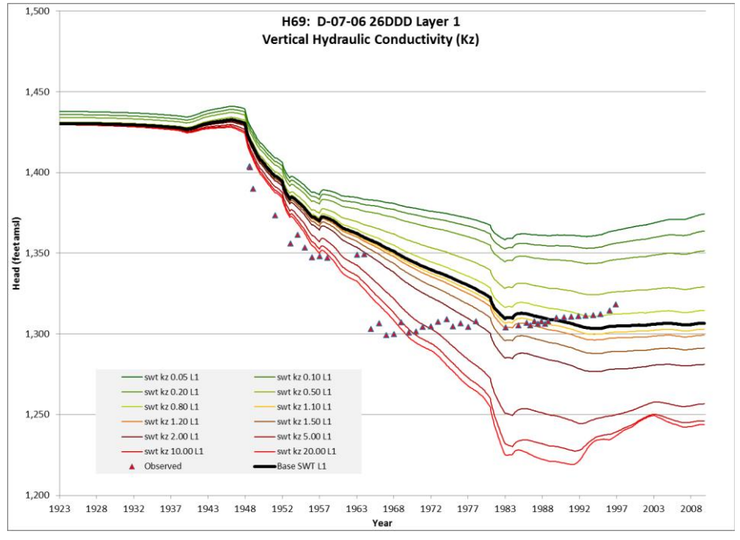


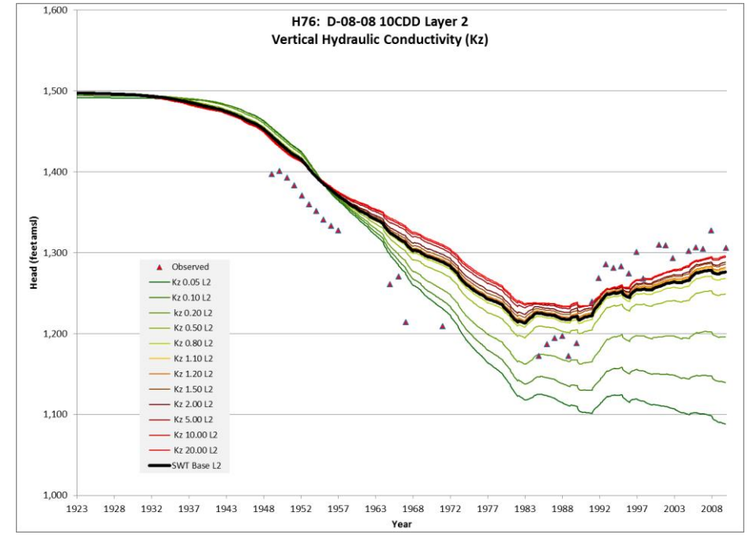


Vertical Hydraulic Conductivity (Kz) Sensitivity Hydrographs

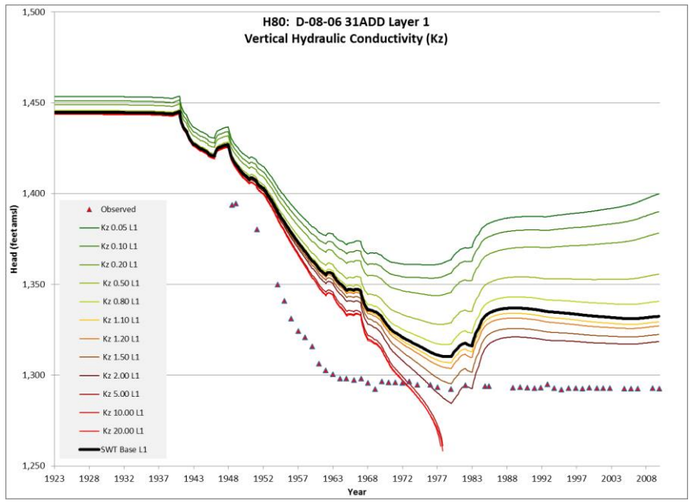


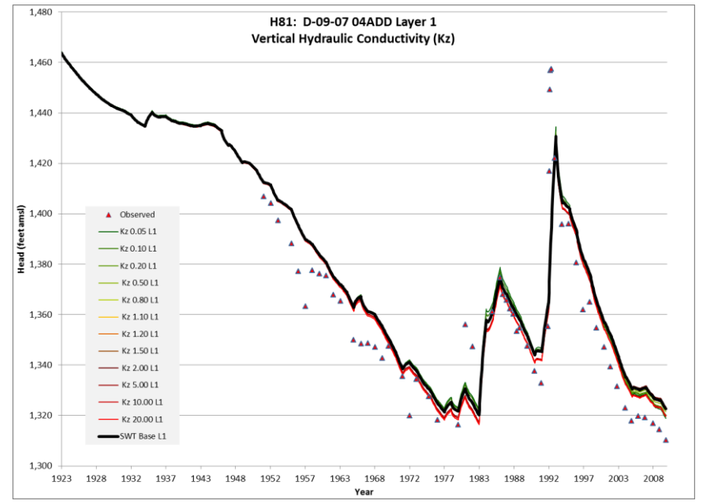




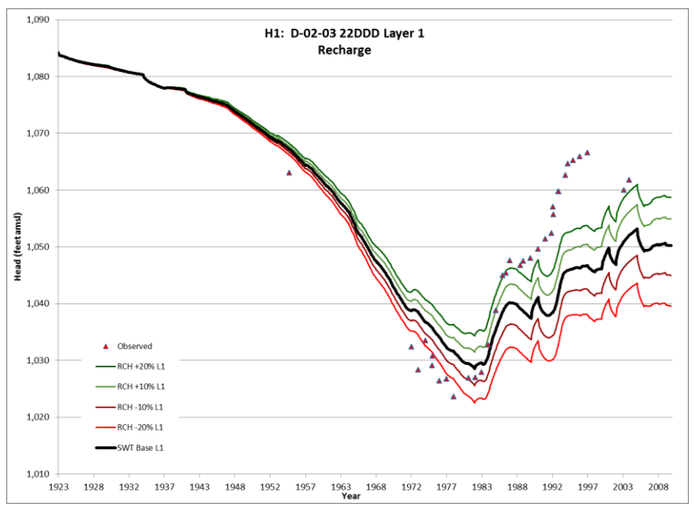


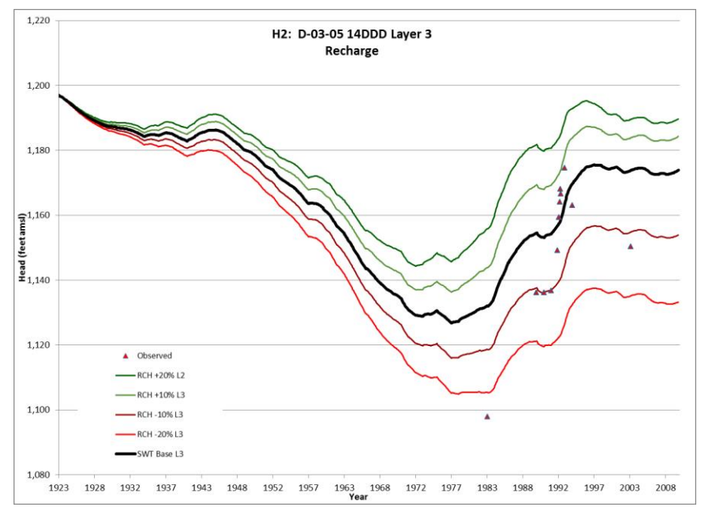
Vertical Hydraulic Conductivity (Kz) Sensitivity Hydrographs



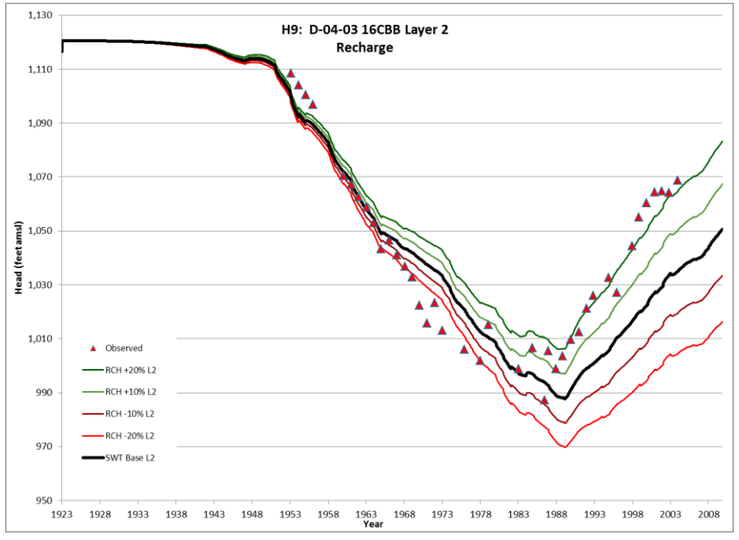


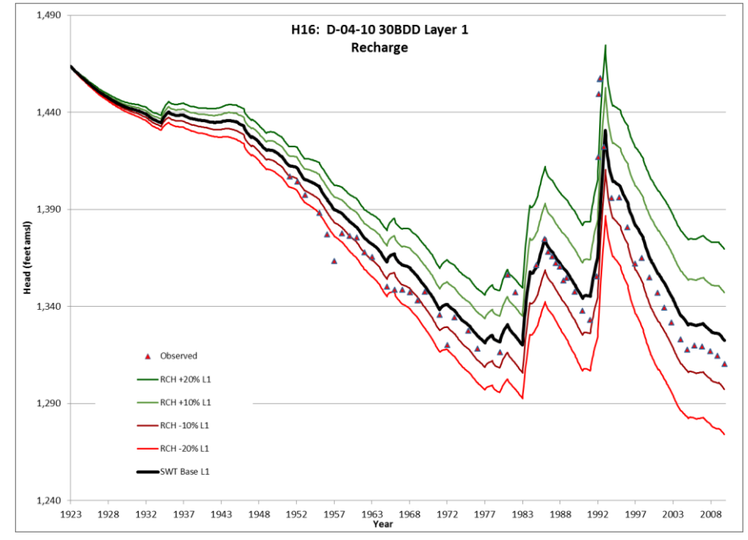
Recharge Sensitivity Hydrographs

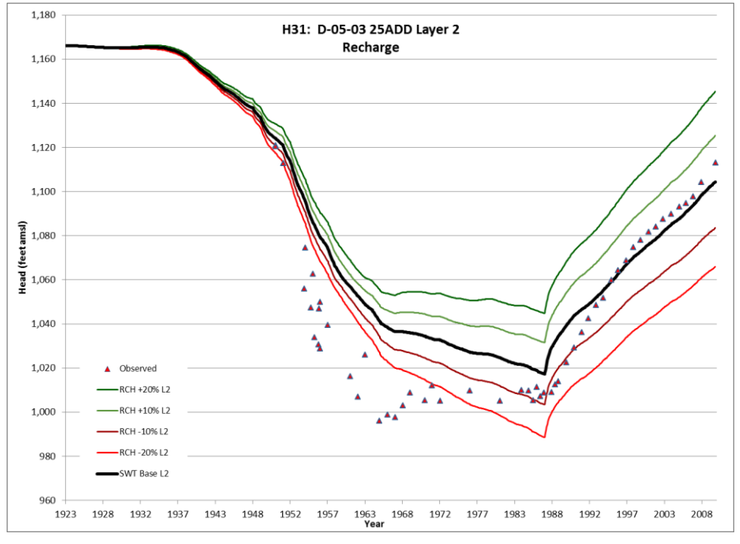


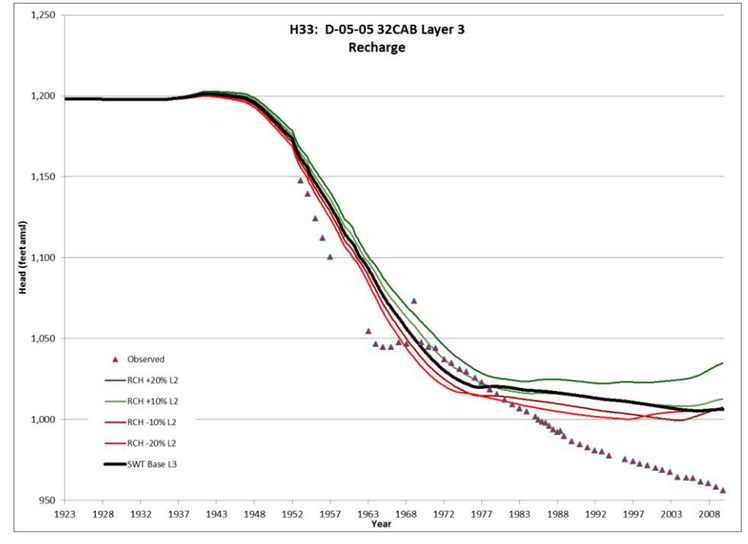


Recharge Sensitivity Hydrographs

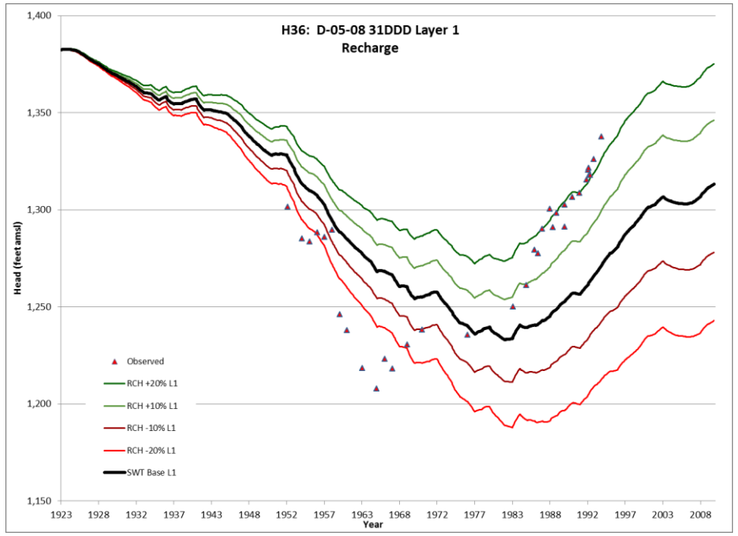


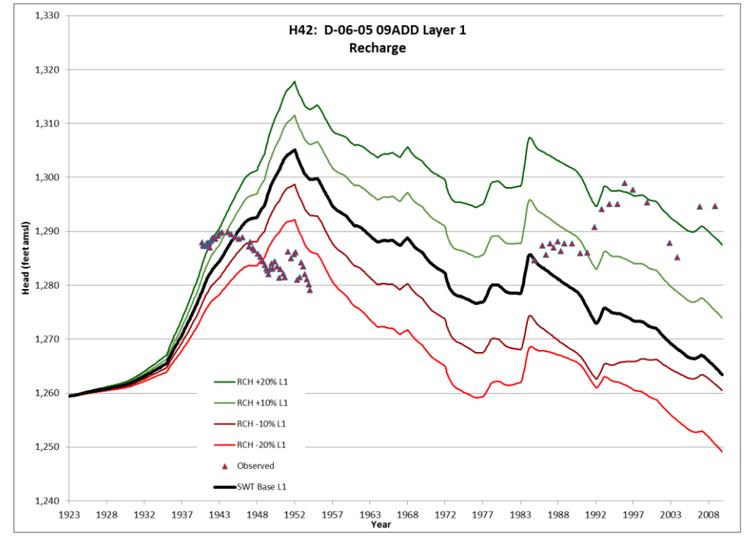


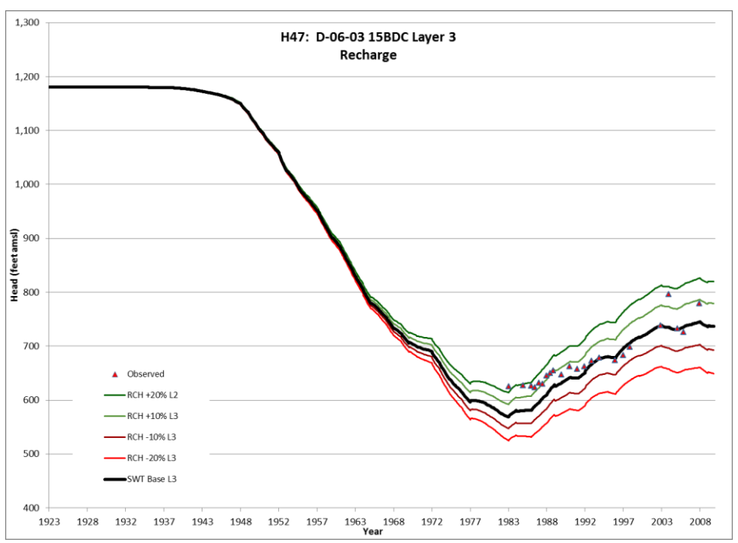


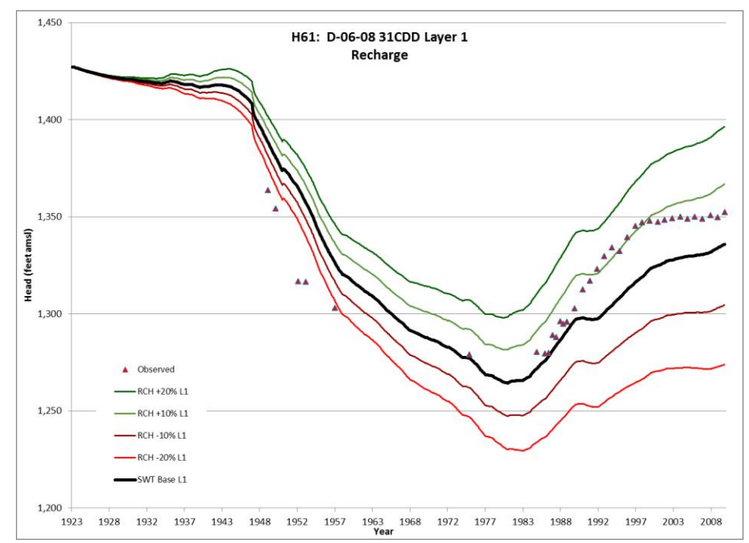


Recharge Sensitivity Hydrographs

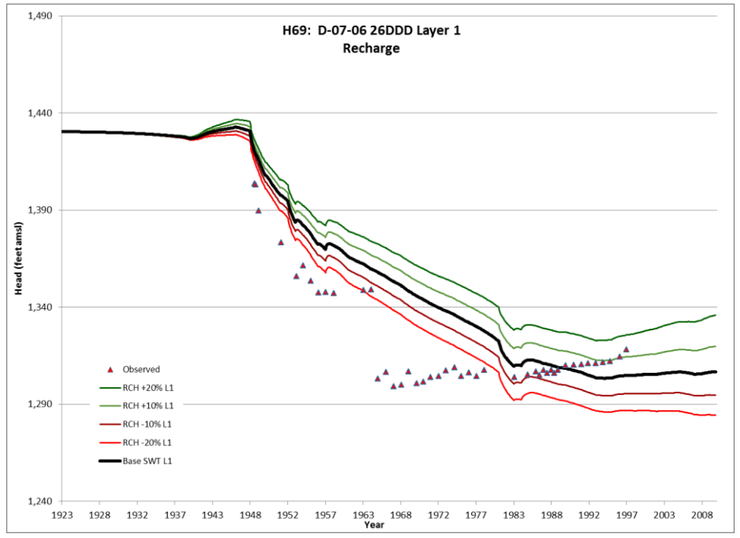


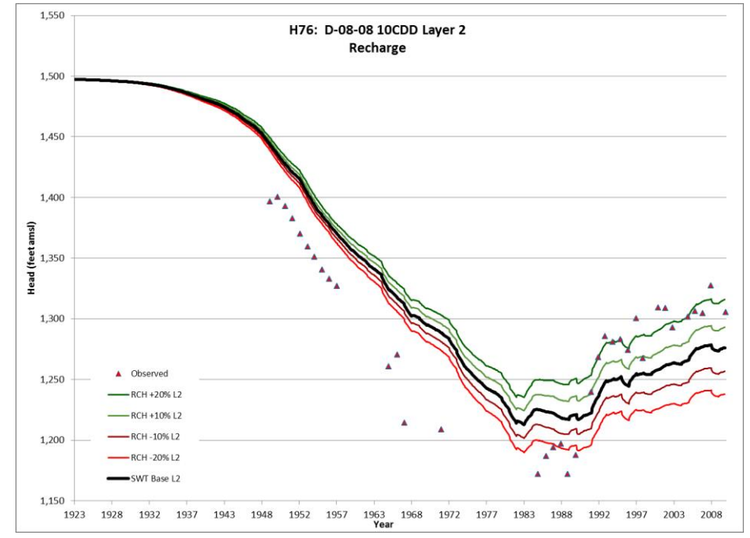


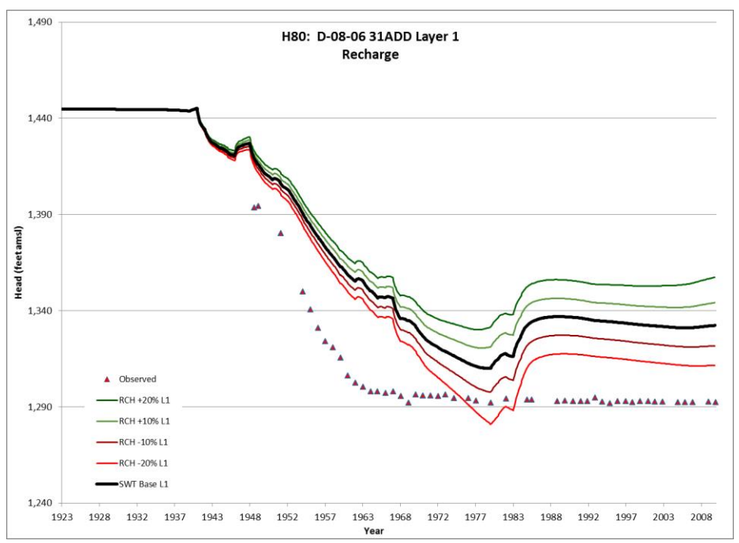


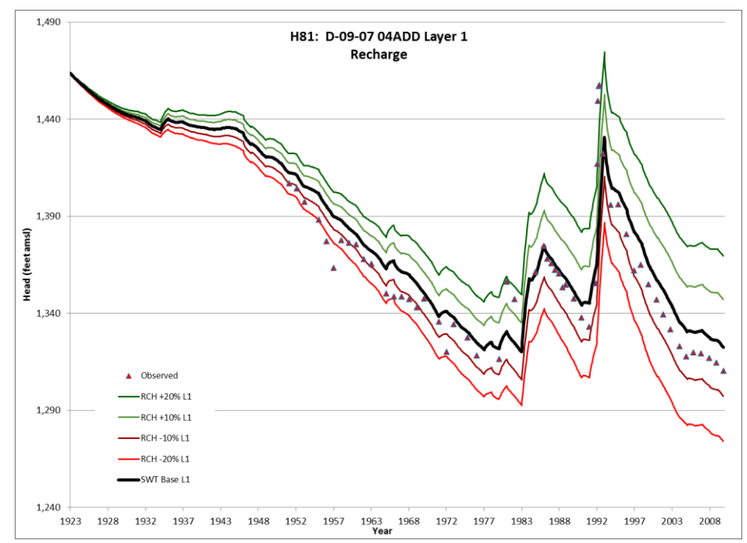


Recharge Sensitivity Hydrographs

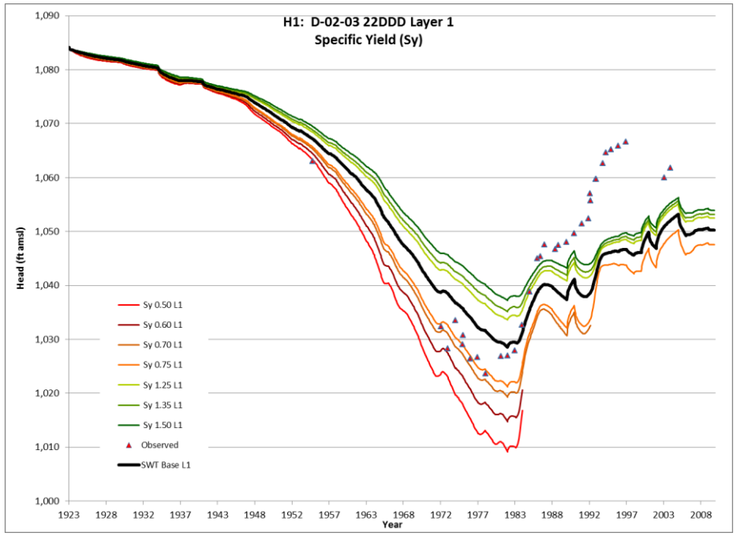


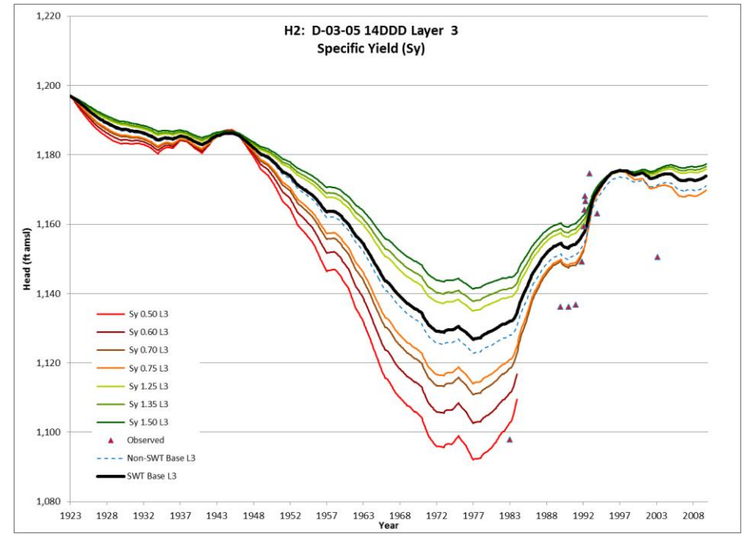


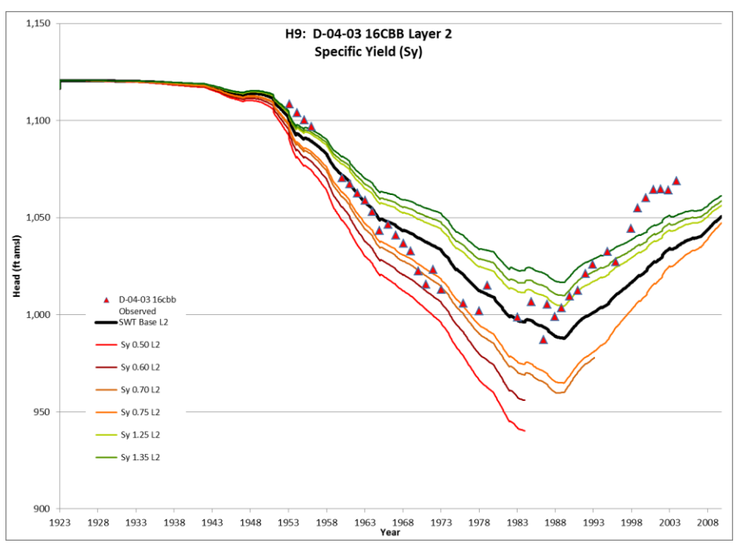


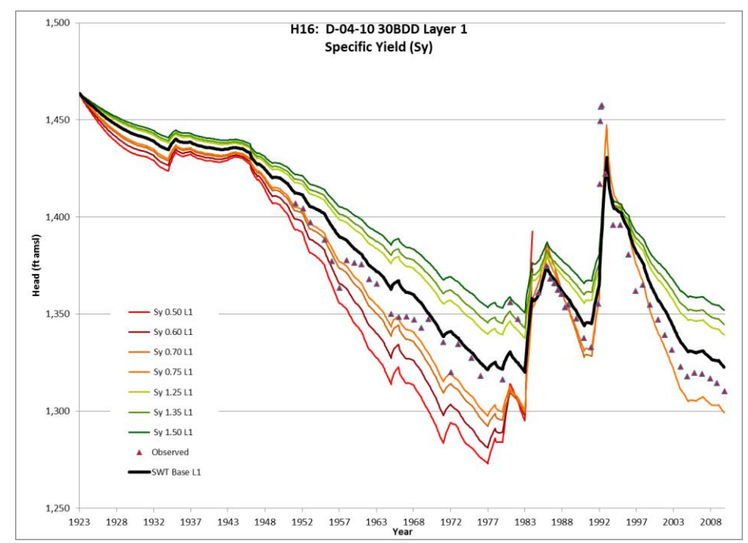


Specific Yield (Sy) Sensitivity Hydrographs

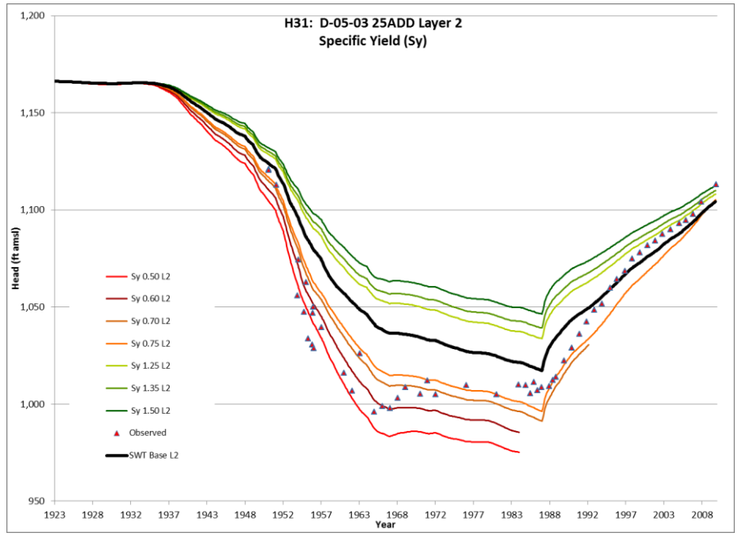


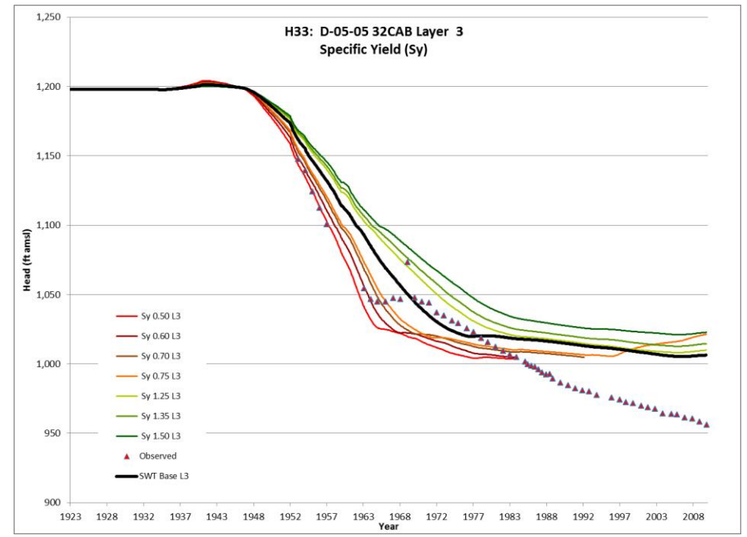


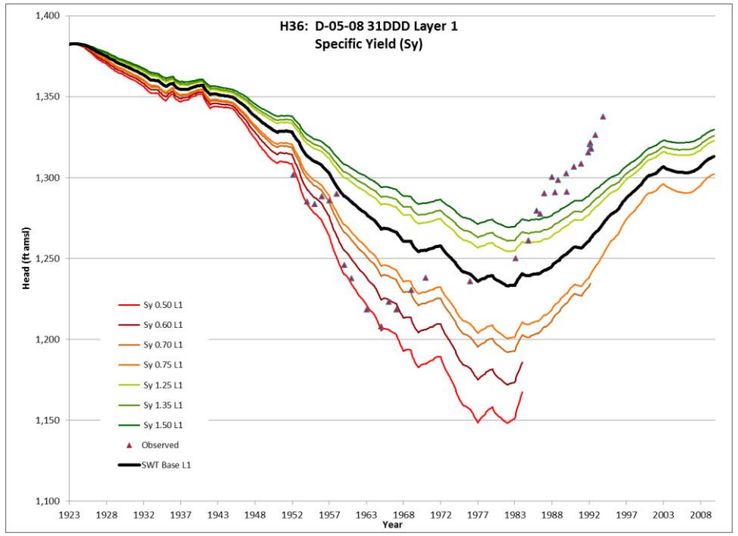


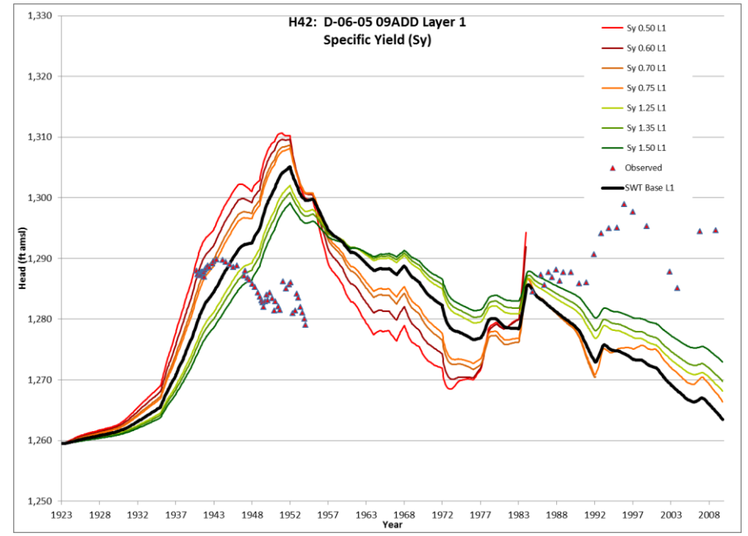


Specific Yield (Sy) Sensitivity Hydrographs

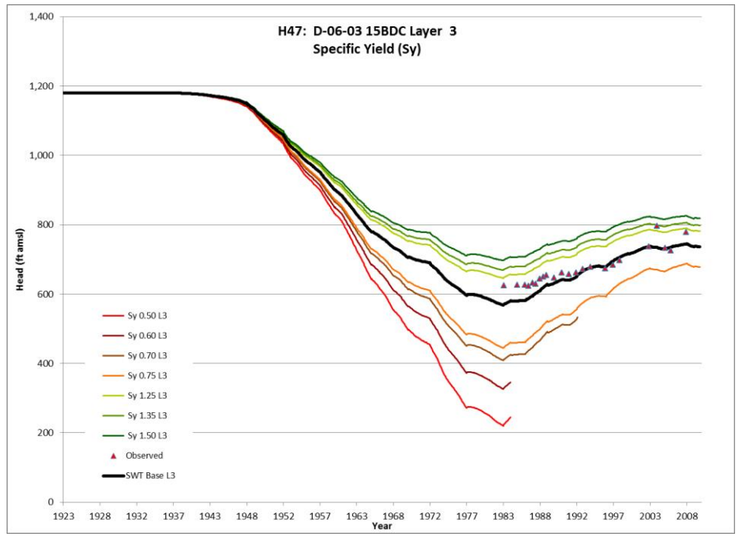


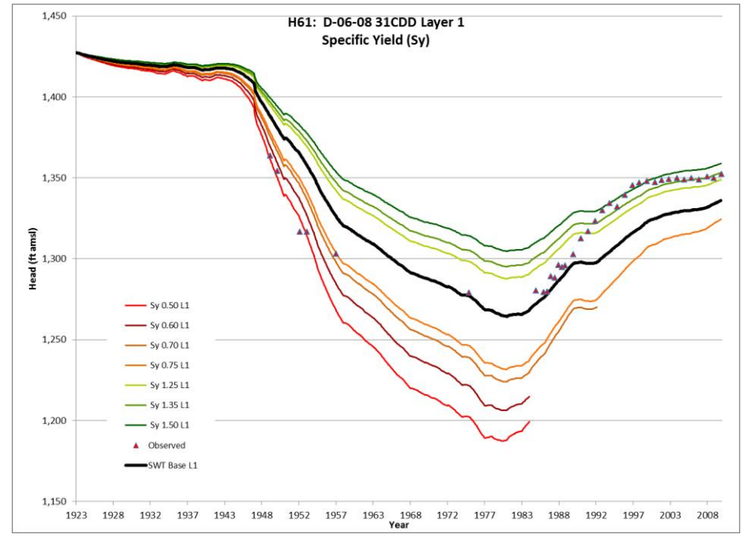


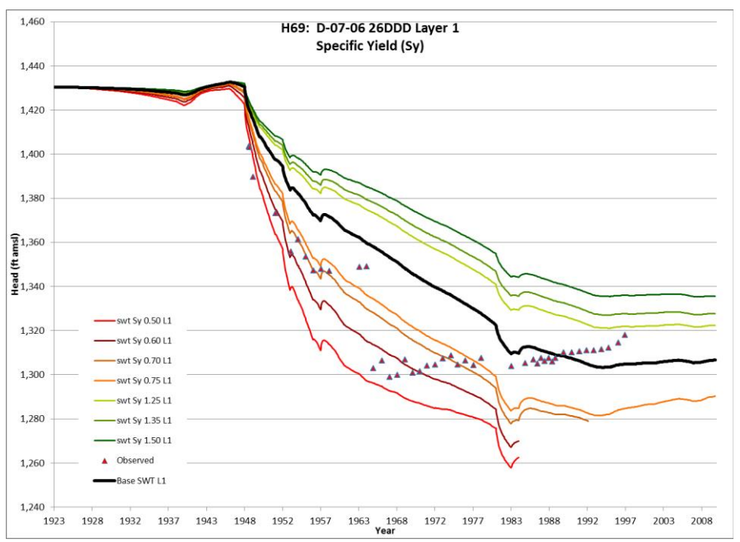


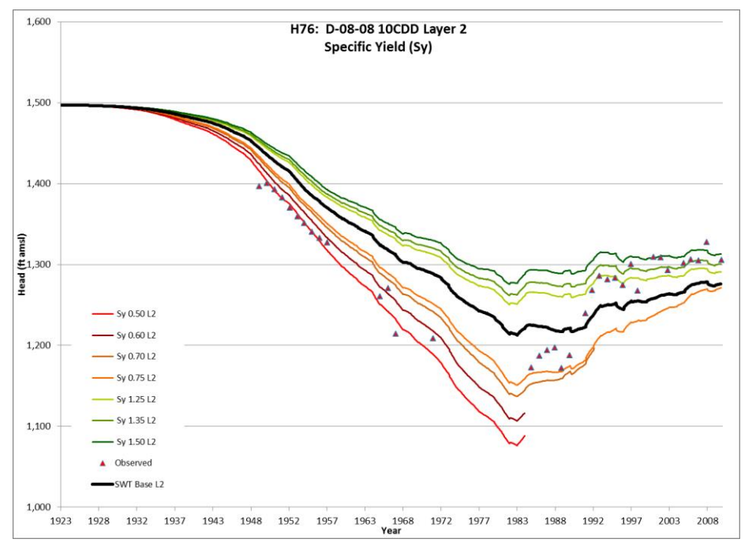


Specific Yield (Sy) Sensitivity Hydrographs

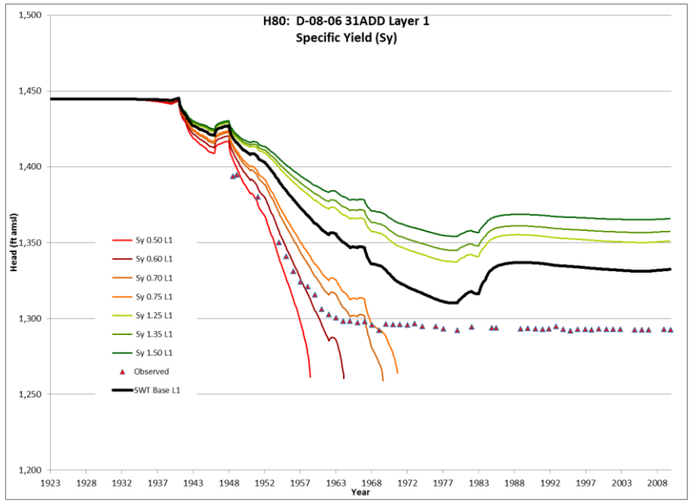


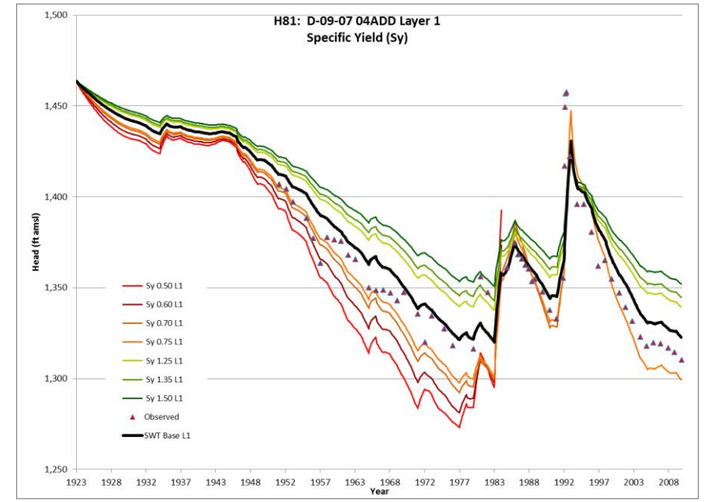




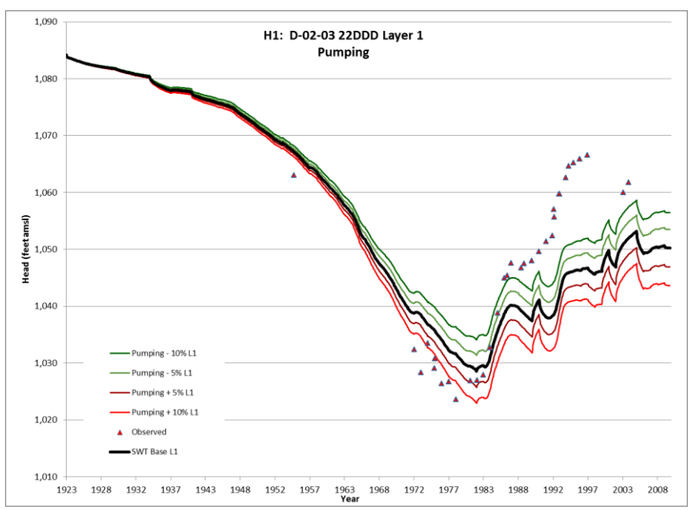


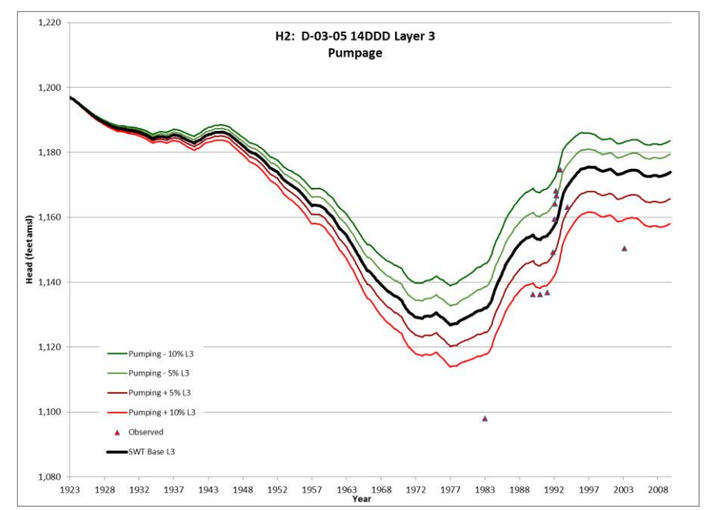
Specific Yield (Sy) Sensitivity Hydrographs



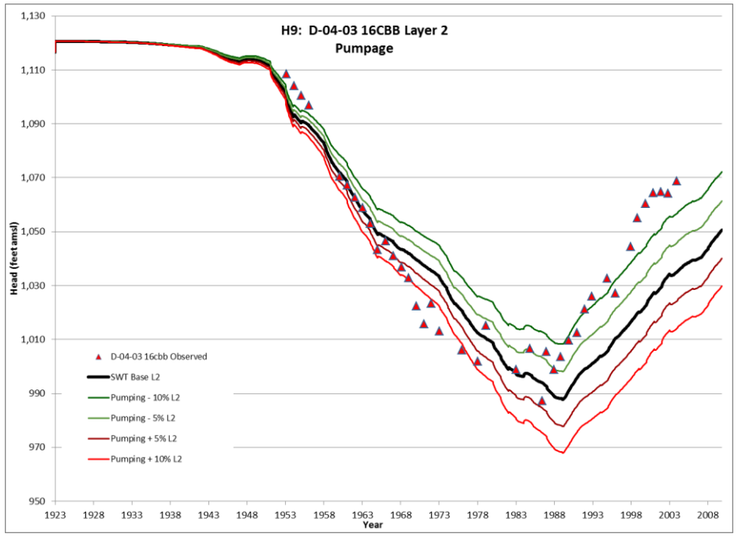


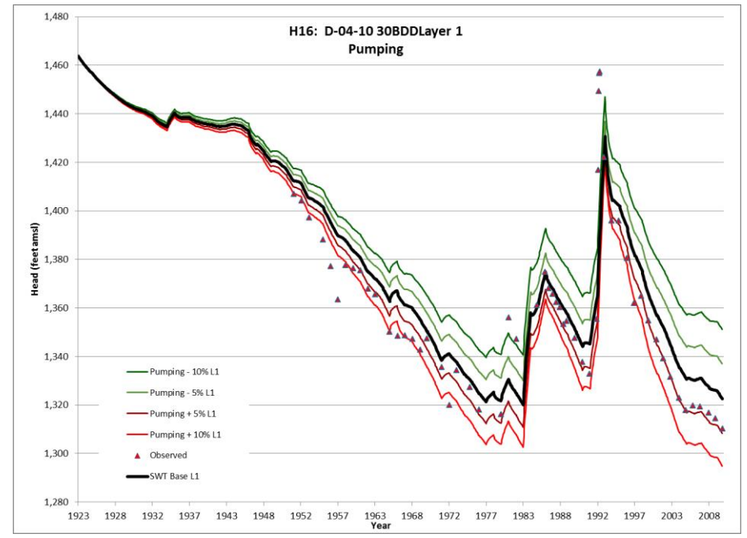
Pumping Sensitivity Hydrographs

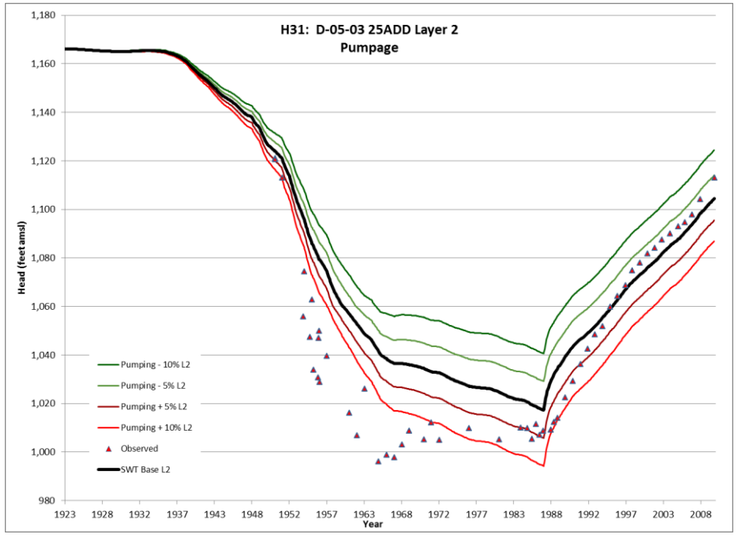


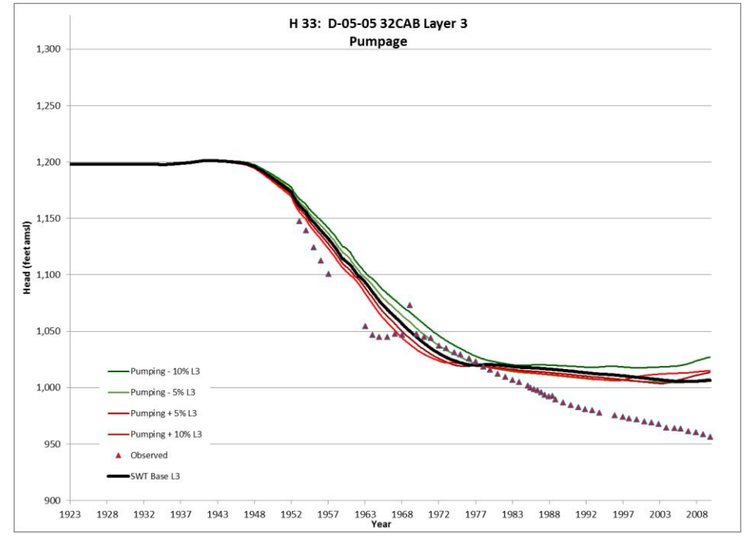


Pumping Sensitivity Hydrographs

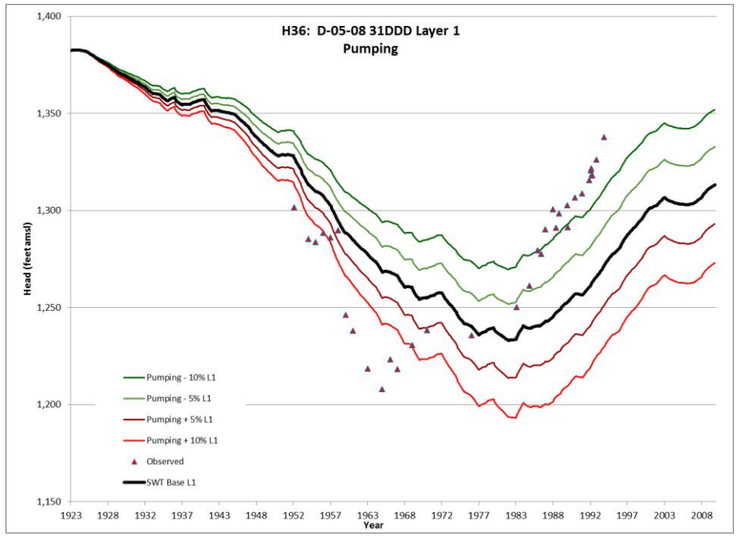


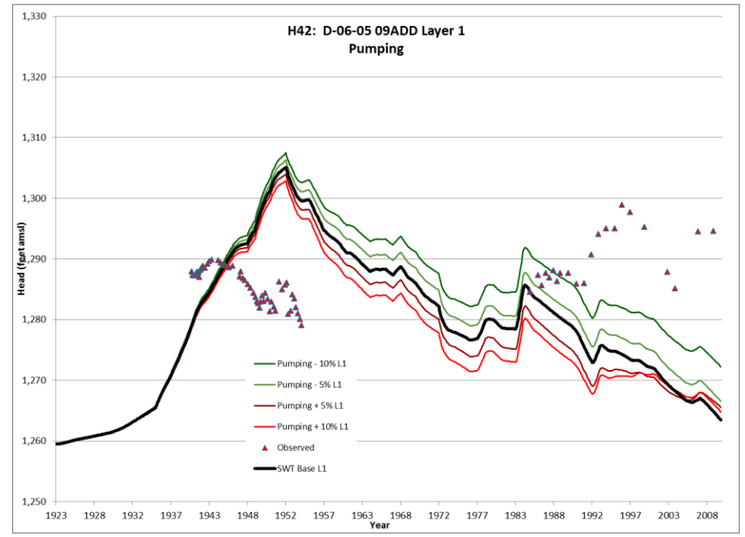


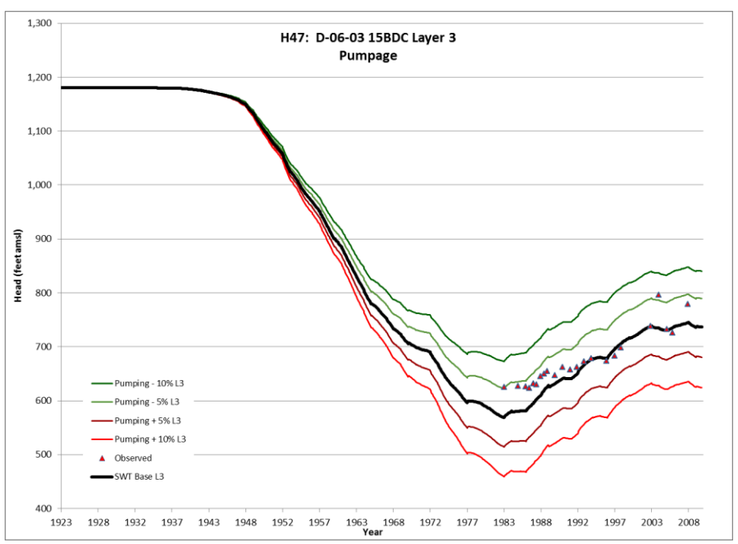


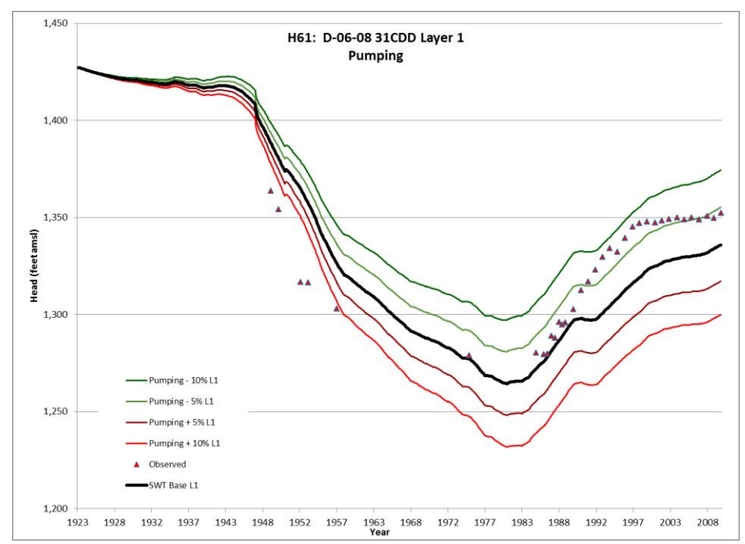
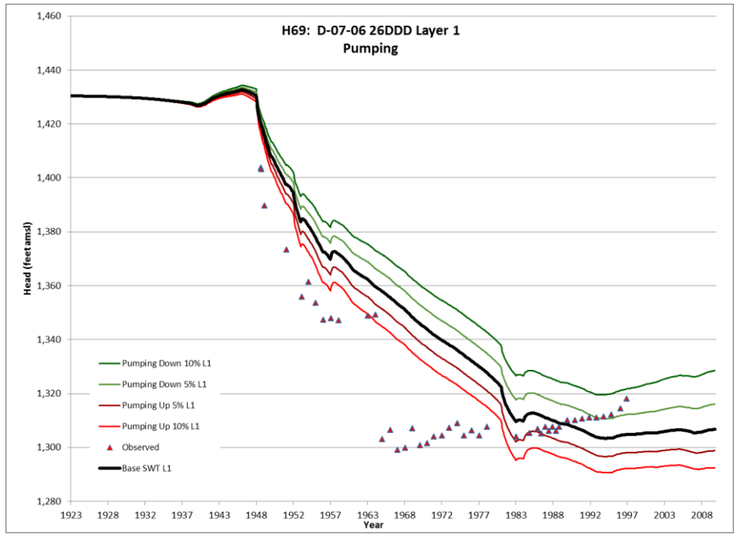
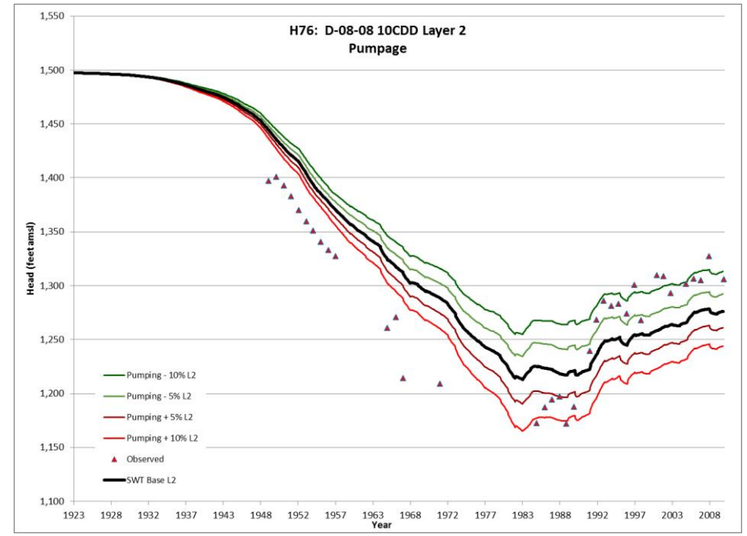
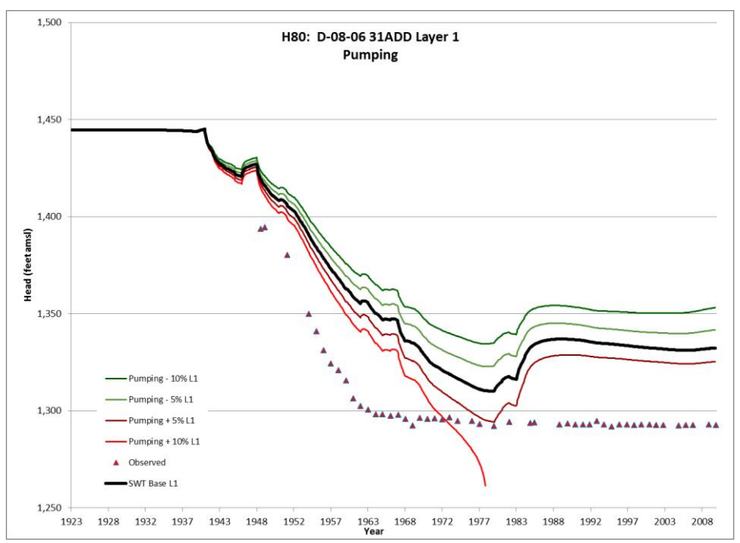
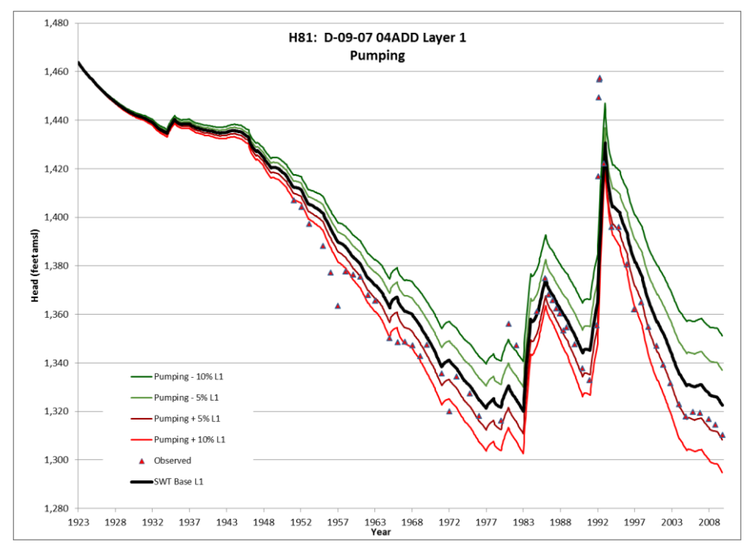


Pumping Sensitivity Hydrographs









Pumping Sensitivity Hydrographs