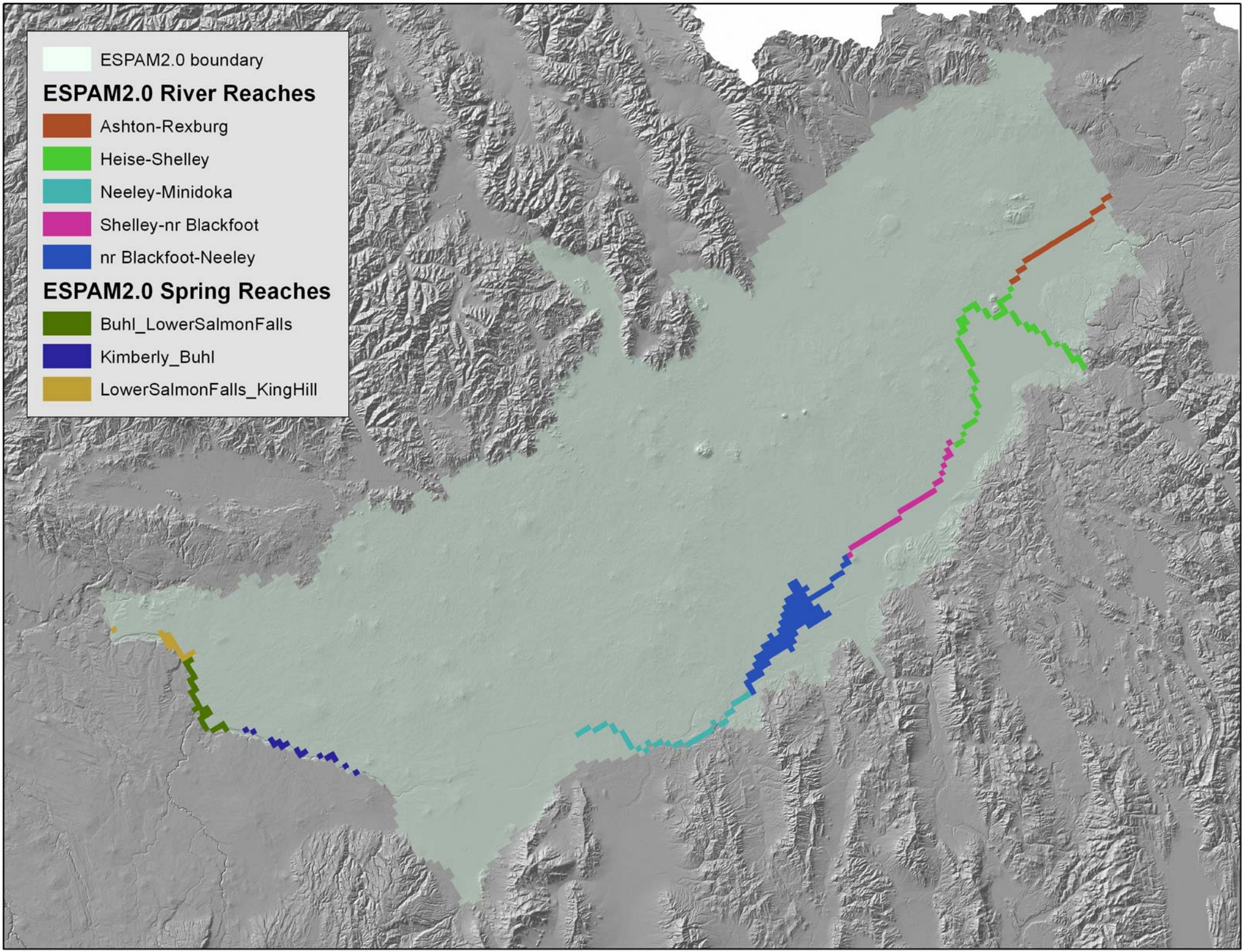
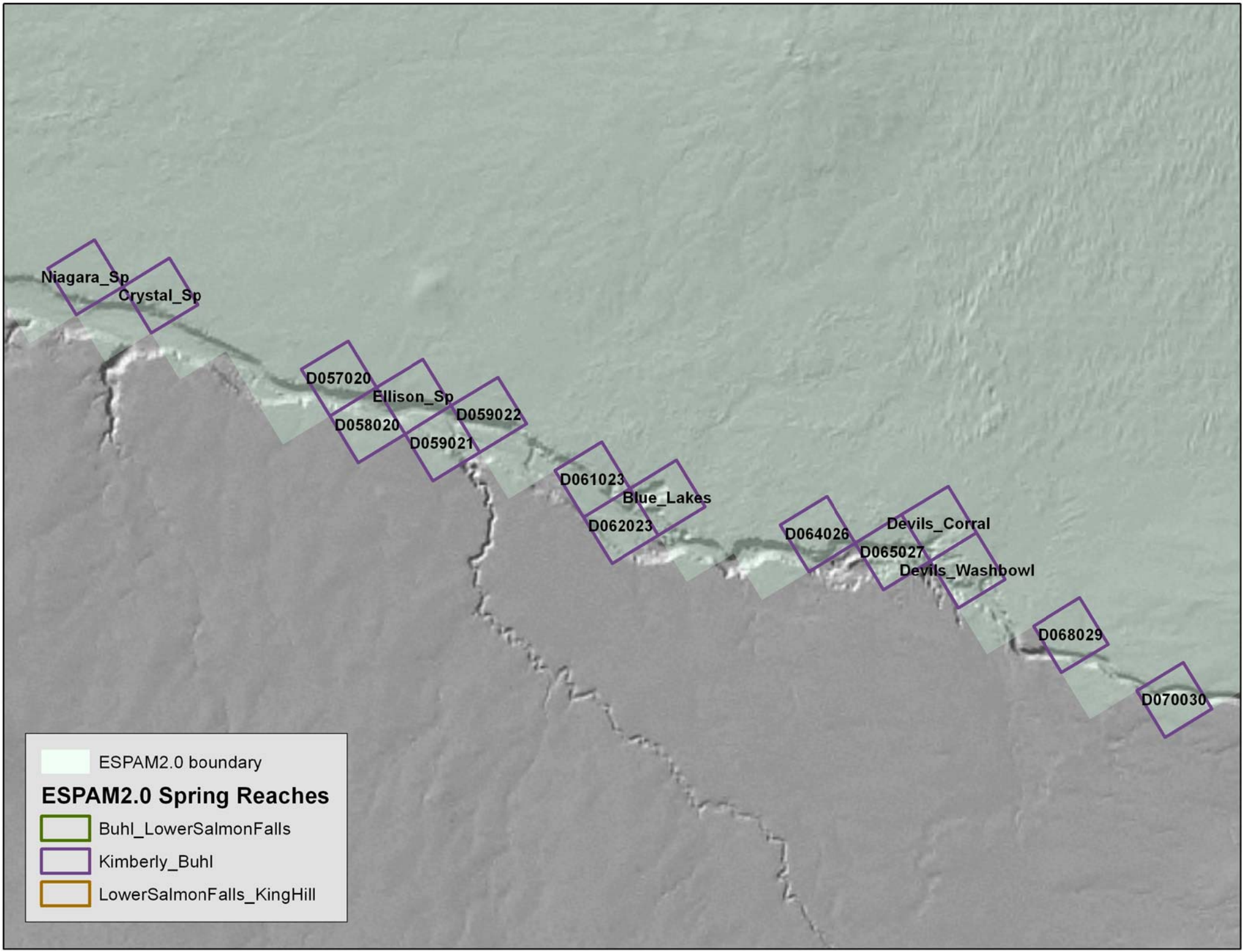
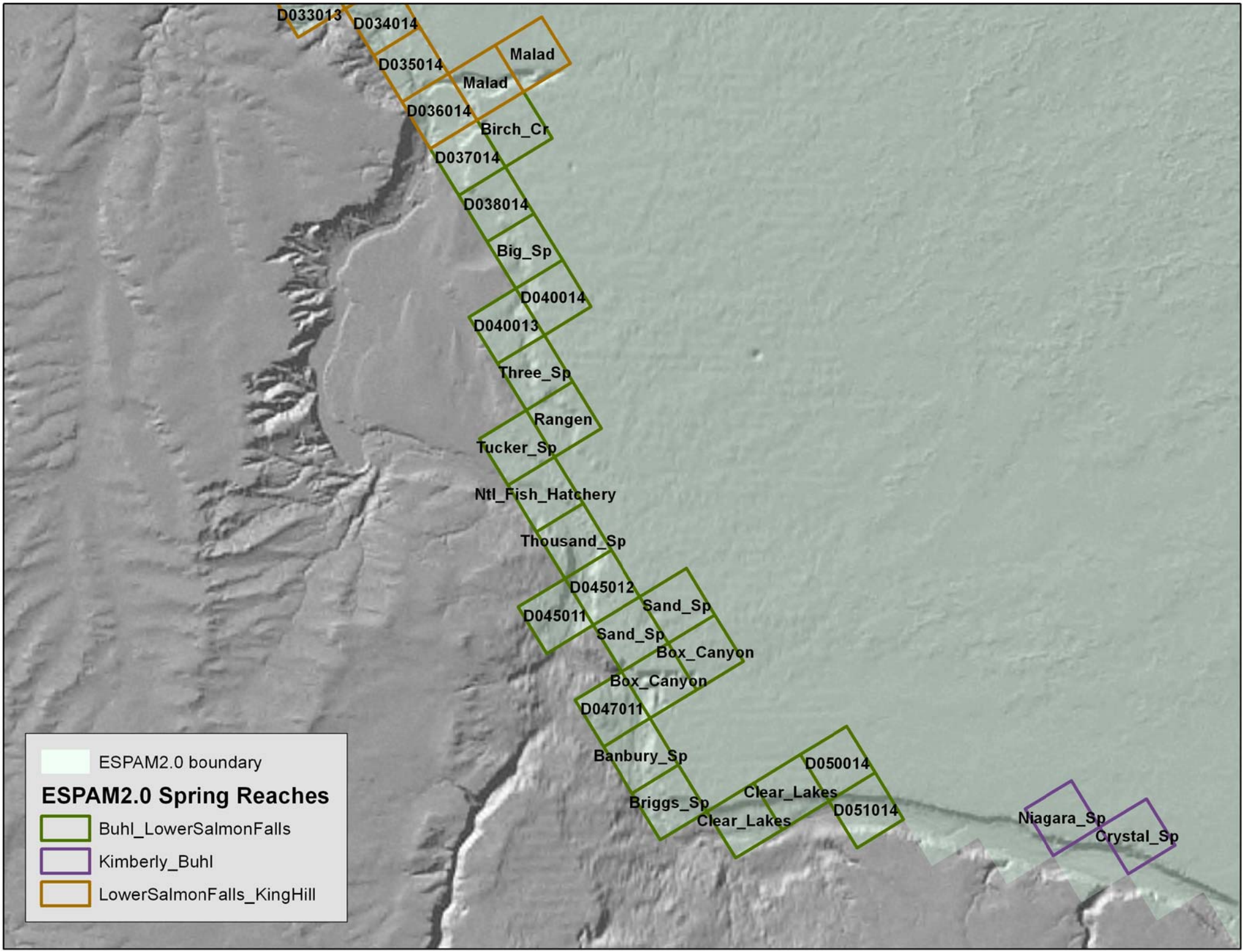
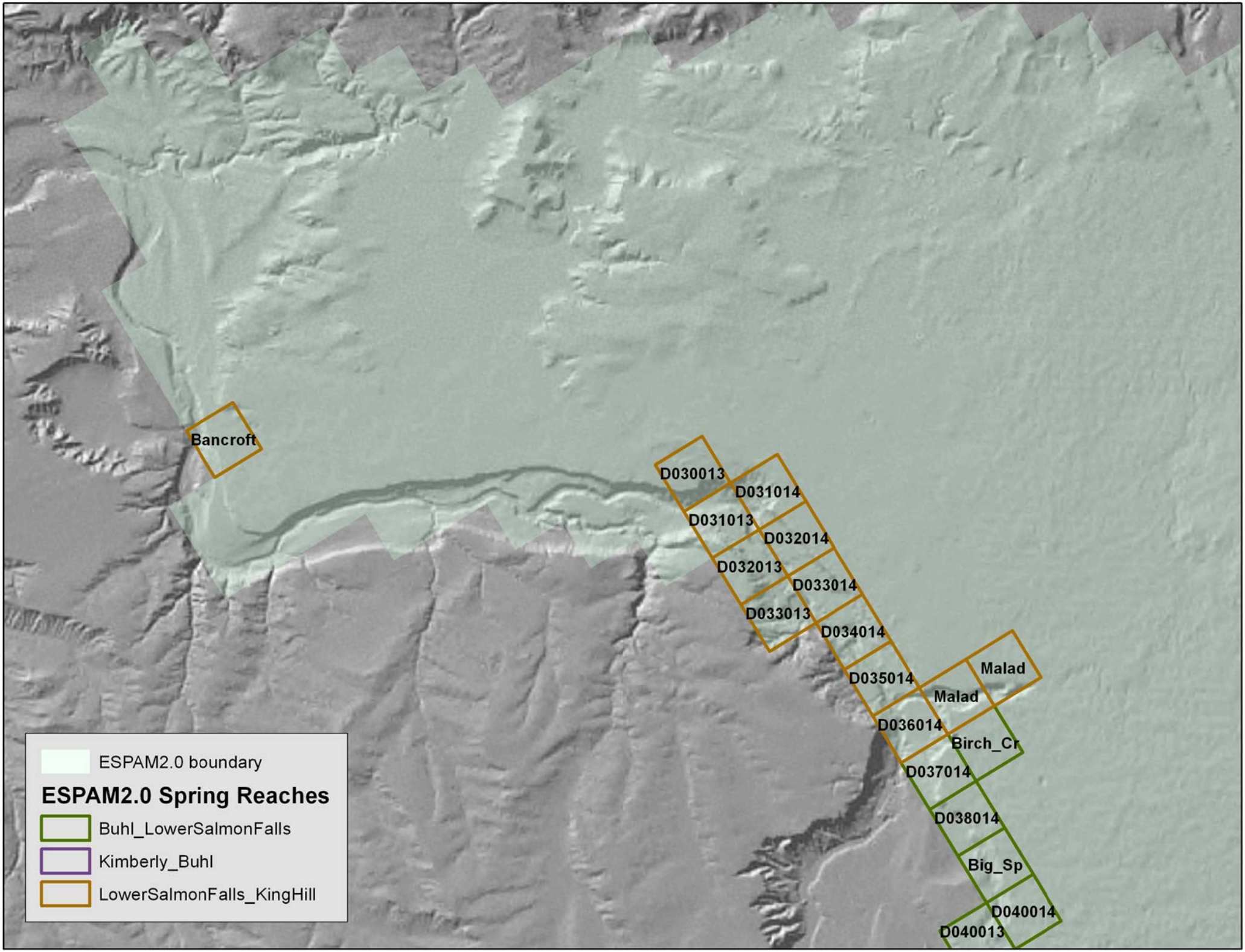
APPENDIX A.

RIVER AND SPRING REACH LOCATION MAPS


ESPAM2.0 boundary
ESPAM2.0 River Reaches
Ashton-Rexburg
Heise-Shelley
Neeley-Minidoka
Shelley-nr Blackfoot
nr Blackfoot-Neeley
ESPAM2.0 Spring Reaches
Buhl_LowerSalmonFalls
Kimberly_Buhl
LowerSalmonFalls_KingHill


Niagara_Sp
Crystal_Sp
D057020
Ellison_Sp
D058020
D059022
D059021
D061023
Blue_Lakes
D062023
D064026
Devils_Corral
D065027
Devils_Washbowl
D068029
D070030
ESPAM2.0 boundary
ESPAM2.0 Spring Reaches
Buhl_LowerSalmonFalls
Kimberly_Buhl
LowerSalmonFalls_KingHill


D033013
D034014
D035014
Malad
Malad
D036014
Birch_Cr
D037014
D038014
Big_Sp
D040014
D040013
Three_Sp
Rangen
Tucker_Sp
Ntl_Fish_Hatchery
Thousand_Sp
D045012
D045011
Sand_Sp
Sand_Sp
Box_Canyon
Box_Canyon
D047011
Banbury_Sp
Briggs_Sp
Clear_Lakes
Clear_Lakes
D050014
D051014
Niagara_Sp
Crystal_Sp
ESPAM2.0 boundary
ESPAM2.0 Spring Reaches
Buhl_LowerSalmonFalls
Kimberly_Buhl
LowerSalmonFalls_KingHill


Bancroft
D030013
D031014
D031013
D032014
D032013
D033014
D033013
D034014
D035014
Malad
Malad
D036014
Birch_Cr
D037014
D038014
Big_Sp
D040014
D040013
ESPAM2.0 boundary
ESPAM2.0 Spring Reaches
Buhl_LowerSalmonFalls
Kimberly_Buhl
LowerSalmonFalls_KingHill

APPENDIX B.

STEADY STATE SIMULATION RESULTS

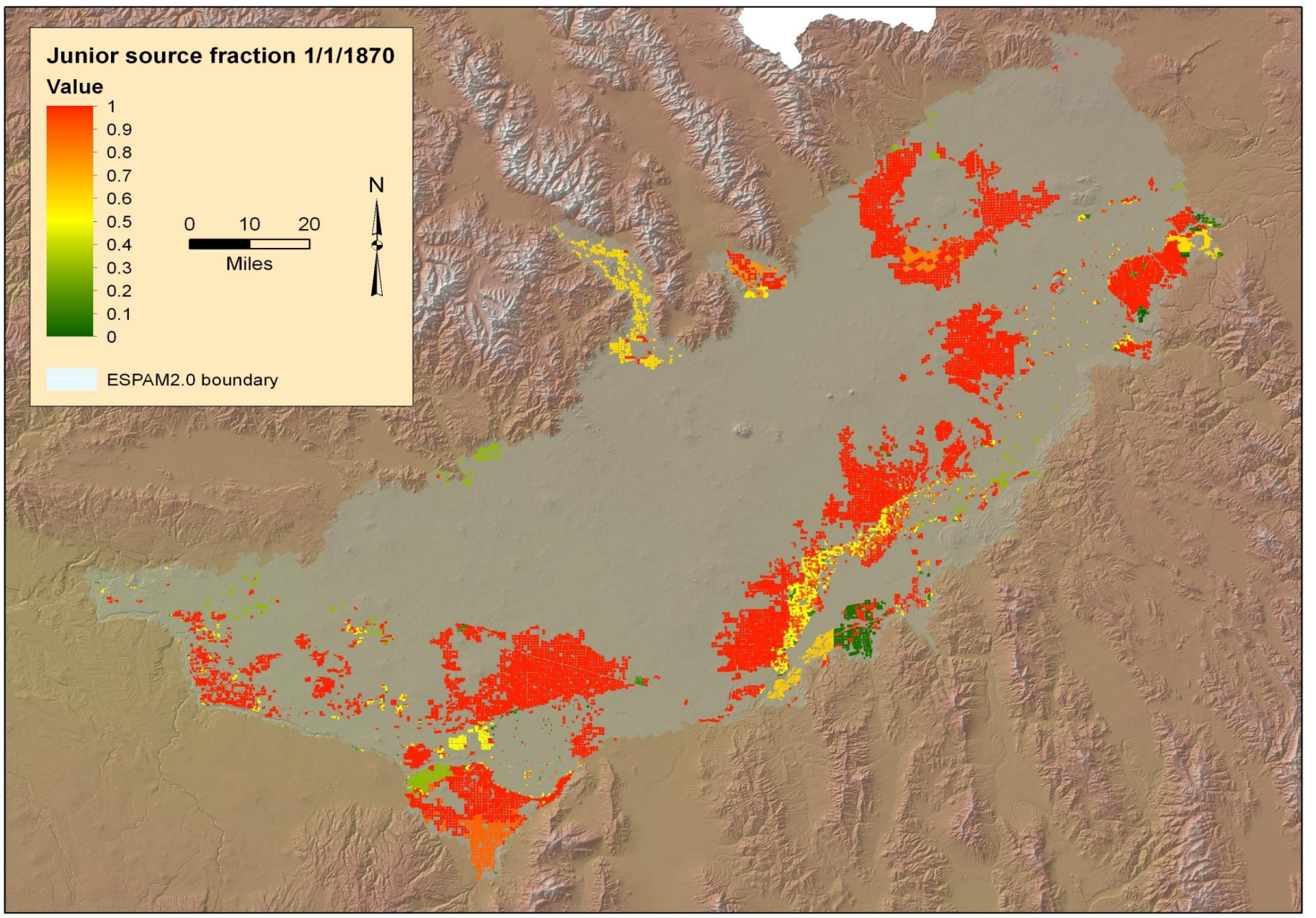
Notes:
Reaches representing springs downstream of Milner may contain multiple springs, and may contain springs not included in the reach name.
Reaches calibrated to transient (time series) targets (river reaches, group A & B springs) are highlighted in green.
Reaches calibrated to steady state (average) targets (group C springs, spring reach baseflow) are highlighted in pink.
Baseflow represents water that discharges from the ESPA to the Snake River below Milner without daylighting as surficial spring flow.

Reach Name		ESPAM2.0 prediction of steady state accrual in response to curtailment (cfs)				
		Junior to January 1, 1870	Junior to January 1, 1949	Junior to January 1, 1961	Junior to January 1, 1973	Junior to January 1, 1985
Ashton to Rexburg		247	218	167	98	16
Heise to Shelley		371	329	234	133	25
Shelley to Near Blackfoot		440	385	255	142	28
Near Blackfoot to Neeley		1319	1153	755	421	88
Neeley to Minidoka		69	60	40	25	6
Kimberly to Buhl springs	D070030	0	0	0	0	0
	D069029	0	0	0	0	0
	D068029	0	0	0	0	0
	Devil's Washbowl	14	12	7	4	1
	Devil's Corral	18	15	9	5	1
	D065027	2	2	1	1	0
	D064026	1	1	1	0	0
	Blue Lakes	44	37	23	12	3
	D062023	0	0	0	0	0
	D061023	0	0	0	0	0
	D059022	0	0	0	0	0
	D059021	0	0	0	0	0
	Ellison	0	0	0	0	0
	D058020	0	0	0	0	0
	D057020	0	0	0	0	0
	Crystal	100	87	56	31	6
	Niagara	65	57	37	21	4
Buhl to Lower Salmon Falls springs	D051014	0	0	0	0	0
	D050014	0	0	0	0	0
	Clear Lakes	77	67	44	25	5
	Briggs	4	3	2	1	0
	Banbury	9	8	5	3	1
	D047011	0	0	0	0	0
	Box	132	115	76	43	8
	Sand	39	34	22	13	2
	D045011	0	0	0	0	0
	D045012	0	0	0	0	0
	Thousand	92	80	54	31	6
	NFH	23	20	13	8	1
	Tucker	2	2	1	1	0
	Rangen	35	31	21	12	2
	Three	25	22	15	9	2
	D040013	0	0	0	0	0
	D040014	1	1	1	0	0
	Big	13	12	8	5	1
	D038014	2	2	1	1	0
	D037014	0	0	0	0	0
	Birch	0	0	0	0	0

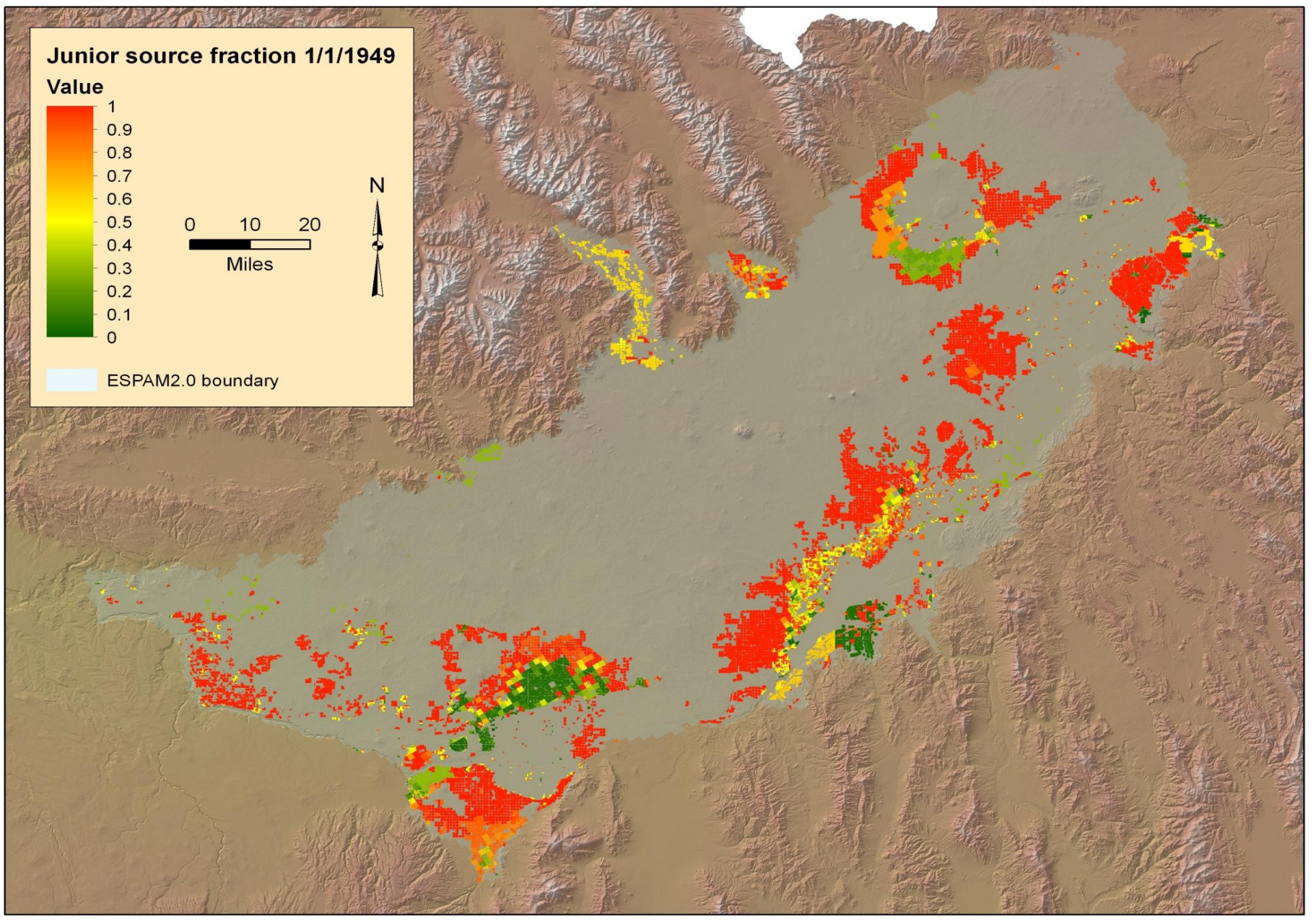
Notes:
Reaches representing springs downstream of Milner may contain multiple springs, and may contain springs not included in the reach name.
Reaches calibrated to transient (time series) targets (river reaches, group A & B springs) are highlighted in green.
Reaches calibrated to steady state (average) targets (group C springs, spring reach baseflow) are highlighted in pink.
Baseflow represents water that discharges from the ESPA to the Snake River below Milner without daylighting as surficial spring flow.

Reach Name		ESPAM2.0 prediction of steady state accrual in response to curtailment (cfs)				
		Junior to January 1, 1870	Junior to January 1, 1949	Junior to January 1, 1961	Junior to January 1, 1973	Junior to January 1, 1985
Lower Salmon Falls to King Hill springs	D036014	0	0	0	0	0
	Malad	81	72	51	33	6
	D035014	0	0	0	0	0
	D034014	2	2	1	1	0
	D033013	0	0	0	0	0
	D033014	1	1	1	0	0
	D032013	0	0	0	0	0
	D032014	1	1	0	0	0
	D031013	0	0	0	0	0
	D031014	0	0	0	0	0
	D030013	0	0	0	0	0
	Bancroft	1	1	1	1	0
Kimberly to Buhl springs		246	212	135	75	15
Buhl to LSF springs		456	398	264	153	29
LSF to King Hill springs		87	77	55	35	7
Kimberly to Buhl baseflow		20	17	10	5	1
Buhl to LSF baseflow		13	11	7	4	1
LSF to King Hill baseflow		7	6	5	3	1
Kimberly to Buhl reach gain		266	229	145	80	17
Buhl to LSF reach gain		469	409	272	157	30
LSF to King Hill reach gain		94	84	60	39	7
Kimberly to King Hill reach gain		830	722	476	275	54
Total response		3276	2868	1927	1095	218

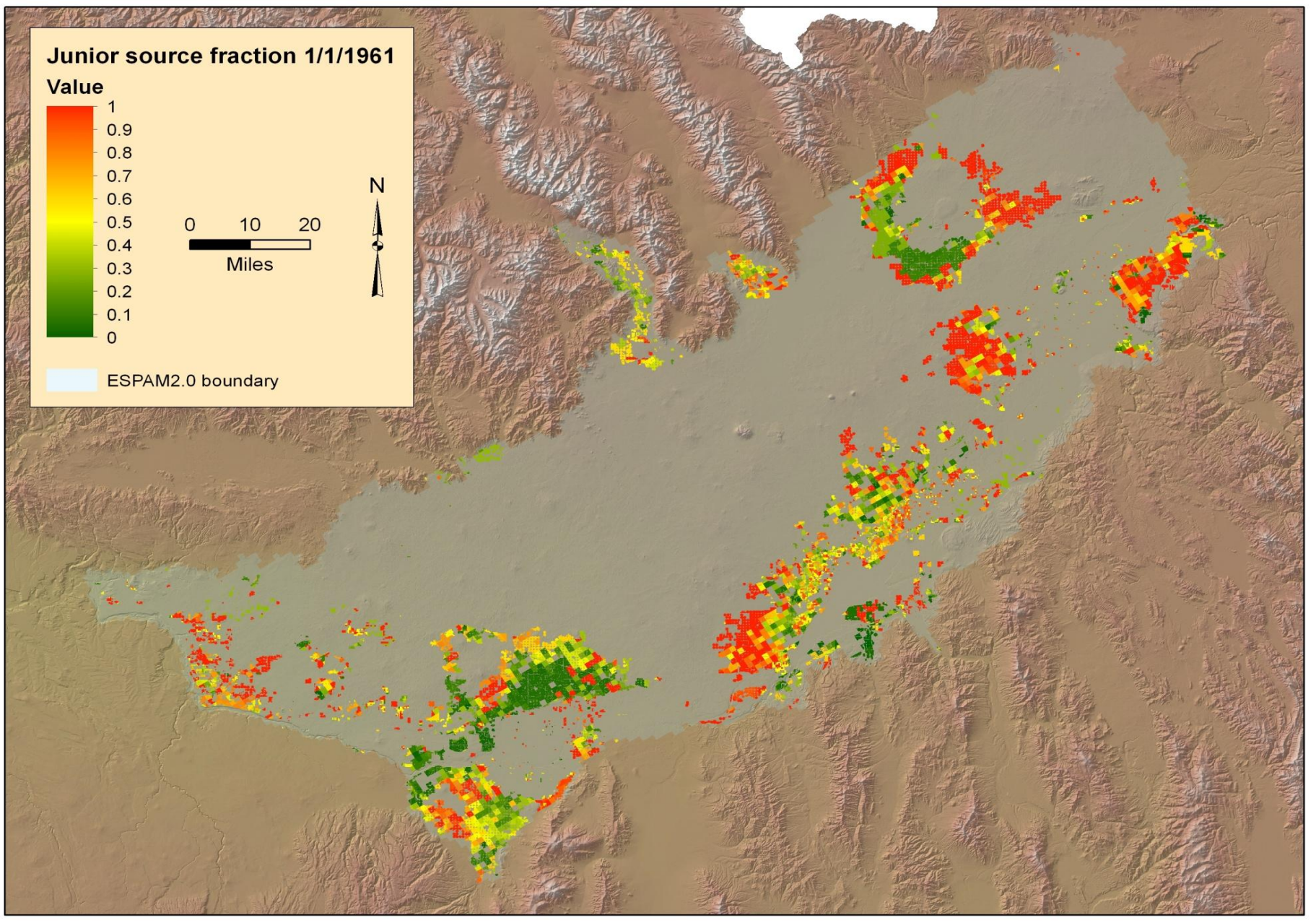
Reach Name	Curtailment junior to 1/1/1870					
	Response to ESPAM2.0 well file	Response to ESPAM1.1 well file (cfs)		Net change (ESPAM2.0 from ESPAM1.1)	Change attributed to model structure and parameters	Change attributed to irrigated lands and CIR data
	ESPAM2.0	ESPAM2.0	ESPAM1.1			
Ashton to Rexburg	247	210	316	-22%	-33%	18%
Heise to Shelley	371	313	211	76%	49%	19%
Sum above Shelley	**618**	**523**	**526**	18%	-1%	18%
Shelley to Near Blackfoot	440	367	406	8%	-10%	20%
Near Blackfoot to Neeley	1319	1104	1035	27%	7%	19%
Neeley to Minidoka	69	57	158	-56%	-64%	21%
Sum Shelley to Milner	**1828**	**1528**	**1598**	14%	-4%	20%
Devil's Washbowl to Buhl	**246**	**205**	**298**	-17%	-31%	20%
Buhl to Thousand Springs	262	219	137	91%	60%	20%
Thousand Springs	117	97	89	31%	9%	20%
Thousand Springs to Malad	78	65	10	666%	535%	20%
Sum Buhl to Lower Salmon Falls	**457**	**381**	**236**	93%	61%	20%
Malad	81	67	77	6%	-13%	22%
Malad to Bancroft	5	4	6	-8%	-31%	33%
Sum Lower Salmon Falls to King Hill	**87**	**71**	**83**	5%	-14%	22%
Sum of Springs below Milner	**790**	**657**	**617**	28%	7%	20%
Kimberly to Buhl baseflow	20	17	--	--	--	--
Buhl to LSF baseflow	13	11	--	--	--	--
LSF to King Hill baseflow	7	5	--	--	--	--
Sum of baseflow below Milner	**40**	**33**	--	--	--	--
Total (cfs)	**3276**	**2741**	**2741**	19%	0%	19%
Acres curtailed	1,058,575	970,074	970,094	9%	0%	9%
Curtailed consumptive use (AF/yr)	2,373,054	1,984,510	1,984,659	20%	0%	20%
Average consumptive use (ft/yr)	2.24	2.05	2.05	10%	0%	10%



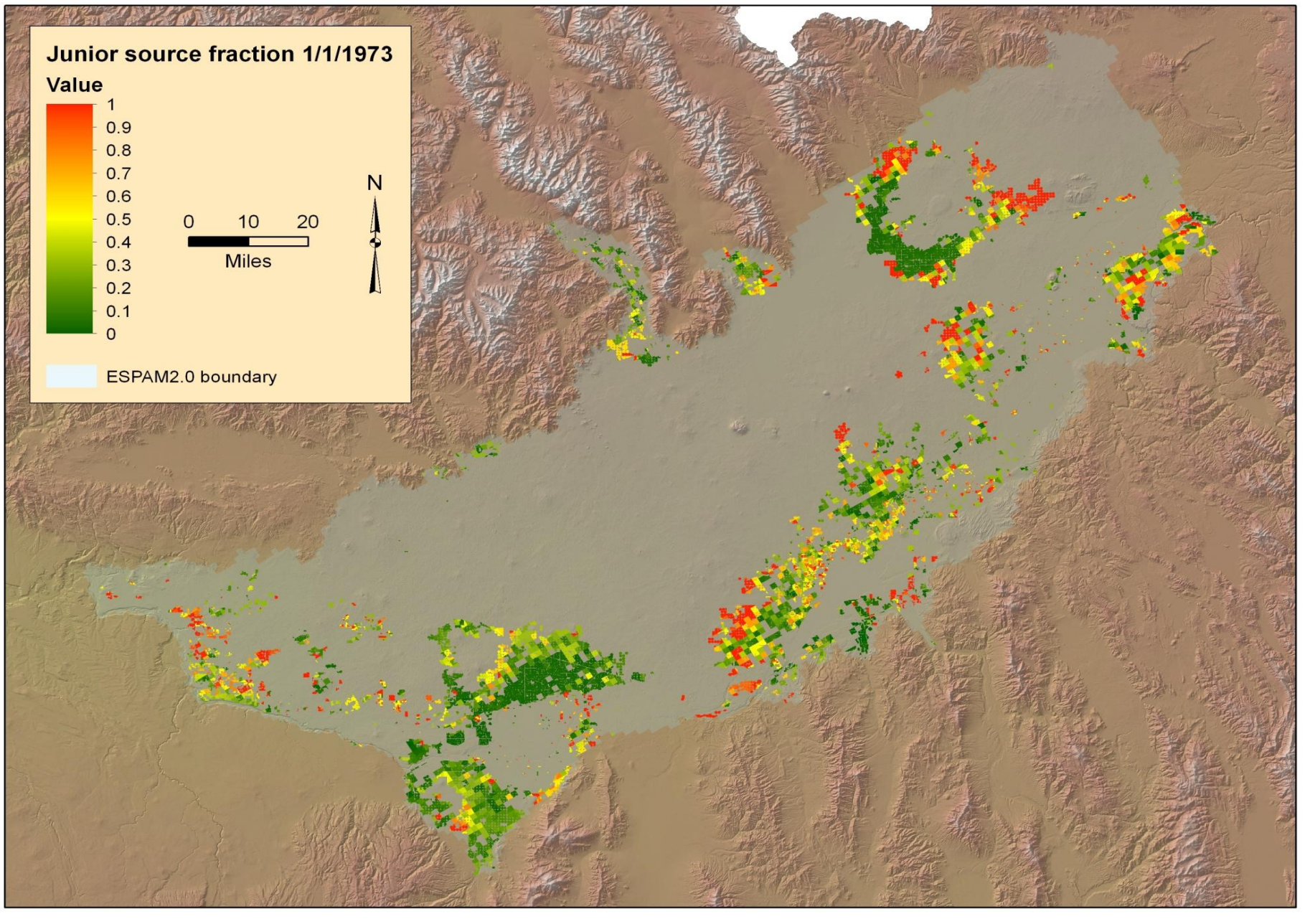
Reach Name	Curtailment junior to 1/1/1949					
	Response to ESPAM2.0 well file	Response to ESPAM1.1 well file (cfs)		Net change (ESPAM2.0 from ESPAM1.1)	Change attributed to model structure and parameters	Change attributed to irrigated lands and CIR data
	ESPAM2.0	ESPAM2.0	ESPAM1.1			
Ashton to Rexburg	218	193	290	-25%	-34%	13%
Heise to Shelley	329	286	195	69%	47%	15%
Sum above Shelley	**547**	**479**	**484**	13%	-1%	14%
Shelley to Near Blackfoot	385	329	368	5%	-11%	17%
Near Blackfoot to Neeley	1153	986	925	25%	7%	17%
Neeley to Minidoka	60	50	134	-55%	-63%	20%
Sum Shelley to Milner	**1598**	**1364**	**1427**	12%	-4%	17%
Devil's Washbowl to Buhl	**212**	**180**	**257**	-17%	-30%	18%
Buhl to Thousand Springs	228	193	122	87%	58%	18%
Thousand Springs	102	86	79	29%	9%	18%
Thousand Springs to Malad	69	58	9	662%	540%	19%
Sum Buhl to Lower Salmon Falls	**398**	**337**	**210**	90%	61%	18%
Malad	72	60	68	6%	-12%	21%
Malad to Bancroft	5	4	5	-7%	-31%	35%
Sum Lower Salmon Falls to King Hill	**77**	**63**	**73**	5%	-14%	22%
Sum of Springs below Milner	**688**	**580**	**540**	27%	7%	18%
Kimberly to Buhl baseflow	17	15	--	--	--	--
Buhl to LSF baseflow	11	9	--	--	--	--
LSF to King Hill baseflow	6	5	--	--	--	--
Sum of baseflow below Milner	**35**	**29**	--	--	--	--
Total (cfs)	**2868**	**2452**	**2452**	17%	0%	17%
Acres curtailed	934,579	871,177	871,197	7%	0%	7%
Curtailed consumptive use (AF/yr)	2,077,491	1,775,493	1,775,637	17%	0%	17%
Average consumptive use (AF/ac/yr)	2.22	2.04	2.04	9%	0%	9%



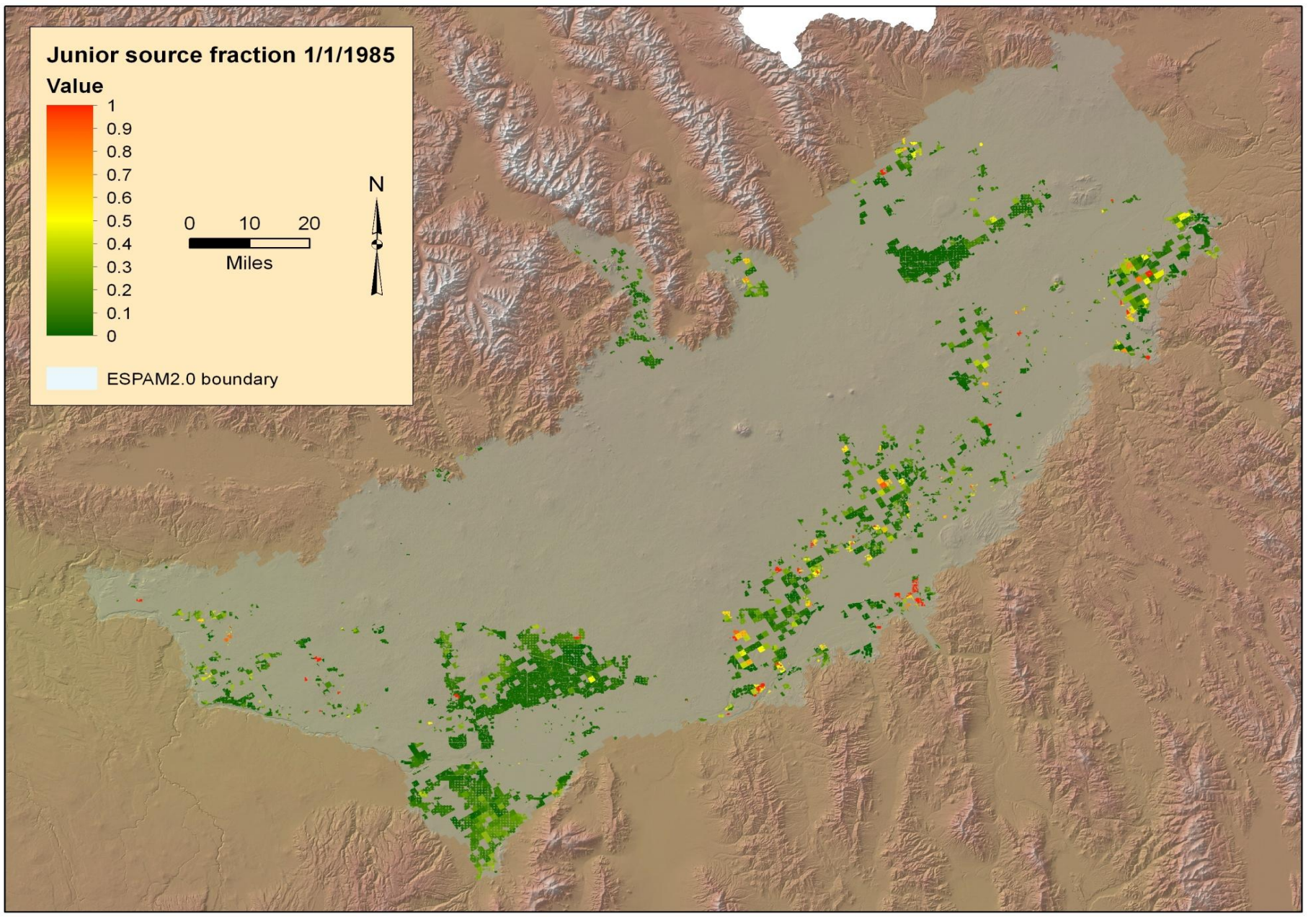
Reach Name	Curtailment junior to 1/1/1961					
	Response to ESPAM2.0 well file	Response to ESPAM1.1 well file (cfs)		Net change (ESPAM2.0 from ESPAM1.1)	Change attributed to model structure and parameters	Change attributed to irrigated lands and CIR data
	ESPAM2.0	ESPAM2.0	ESPAM1.1			
Ashton to Rexburg	167	147	222	-25%	-34%	14%
Heise to Shelley	234	202	141	66%	43%	16%
Sum above Shelley	**401**	**349**	**363**	10%	-4%	15%
Shelley to Near Blackfoot	255	215	240	6%	-10%	18%
Near Blackfoot to Neeley	755	640	593	27%	8%	18%
Neeley to Minidoka	40	32	84	-52%	-61%	25%
Sum Shelley to Milner	**1050**	**888**	**917**	15%	-3%	18%
Devil's Washbowl to Buhl	**135**	**113**	**160**	-16%	-30%	20%
Buhl to Thousand Springs	150	126	81	85%	55%	19%
Thousand Springs	68	57	54	26%	6%	19%
Thousand Springs to Malad	47	38	6.4	628%	501%	21%
Sum Buhl to Lower Salmon Falls	**265**	**221**	**141**	87%	57%	19%
Malad	51	41	47	9%	-13%	25%
Malad to Bancroft	4	3	4	-4%	-34%	44%
Sum Lower Salmon Falls to King Hill	**55**	**44**	**51**	8%	-14%	26%
Sum of Springs below Milner	**454**	**378**	**352**	29%	7%	20%
Kimberly to Buhl baseflow	10	9	--	--	--	--
Buhl to LSF baseflow	7	6	--	--	--	--
LSF to King Hill baseflow	5	3	--	--	--	--
Sum of baseflow below Milner	**22**	**18**	--	--	--	--
Total (cfs)	**1927**	**1633**	**1633**	18%	0%	18%
Acres curtailed	635,927	584,799	584,819	9%	0%	9%
Curtailed consumptive use (AF/yr)	1,396,226	1,181,973	1,182,086	18%	0%	18%
Average consumptive use (AF/ac/yr)	2.20	2.02	2.02	9%	0%	9%



Reach Name	Curtailment junior to 1/1/1973					
	Response to ESPAM2.0 well file	Response to ESPAM1.1 well file (cfs)		Net change (ESPAM2.0 from ESPAM1.1)	Change attributed to model structure and parameters	Change attributed to irrigated lands and CIR data
	ESPAM2.0	ESPAM2.0	ESPAM1.1			
Ashton to Rexburg	98	84	128	-23%	-34%	17%
Heise to Shelley	133	112	78	70%	44%	19%
Sum above Shelley	**231**	**196**	**206**	12%	-5%	18%
Shelley to Near Blackfoot	142	120	132	7%	-9%	18%
Near Blackfoot to Neeley	421	356	331	27%	7%	18%
Neeley to Minidoka	25	19	46	-46%	-59%	31%
Sum Shelley to Milner	**588**	**494**	**509**	15%	-3%	19%
Devil's Washbowl to Buhl	**75**	**62**	**88**	-15%	-29%	20%
Buhl to Thousand Springs	85	71	47	82%	52%	20%
Thousand Springs	40	33	31	28%	6%	21%
Thousand Springs to Malad	28	22	3.7	644%	501%	24%
Sum Buhl to Lower Salmon Falls	**153**	**127**	**82**	87%	55%	21%
Malad	33	25	29	12%	-14%	30%
Malad to Bancroft	3	2	2	6%	-35%	63%
Sum Lower Salmon Falls to King Hill	**35**	**27**	**31**	12%	-15%	32%
Sum of Springs below Milner	**262**	**215**	**201**	30%	7%	22%
Kimberly to Buhl baseflow	5	5	--	--	--	--
Buhl to LSF baseflow	4	4	--	--	--	--
LSF to King Hill baseflow	3	2	--	--	--	--
Sum of baseflow below Milner	**13**	**10**	--	--	--	--
Total (cfs)	**1095**	**916**	**916**	20%	0%	19%
Acres curtailed	359,944	327,535	327,555	10%	0%	10%
Curtailed consumptive use (AF/yr)	793,051	663,272	663,362	20%	0%	20%
Average consumptive use (AF/ac/yr)	2.20	2.03	2.03	9%	0%	9%

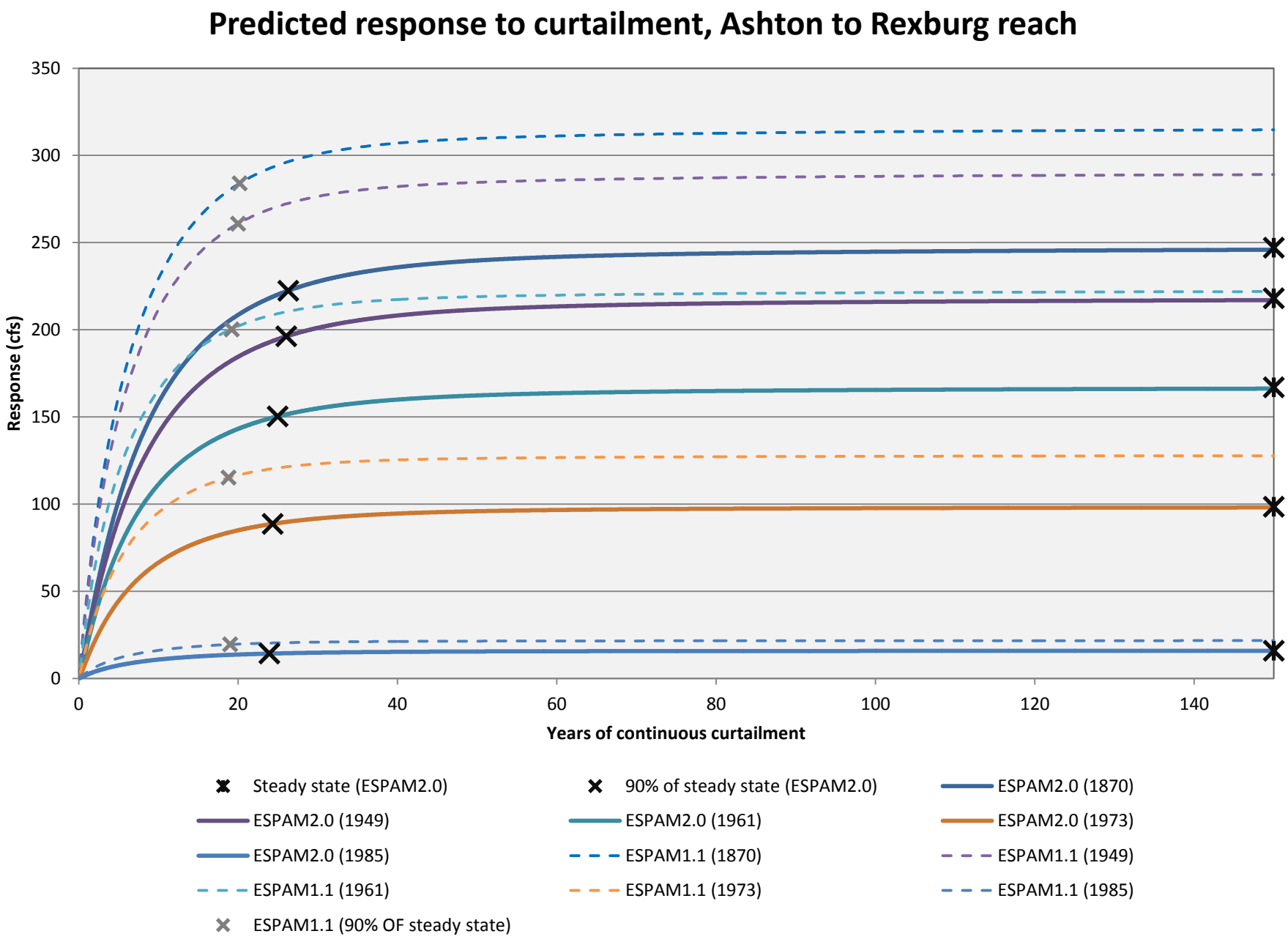


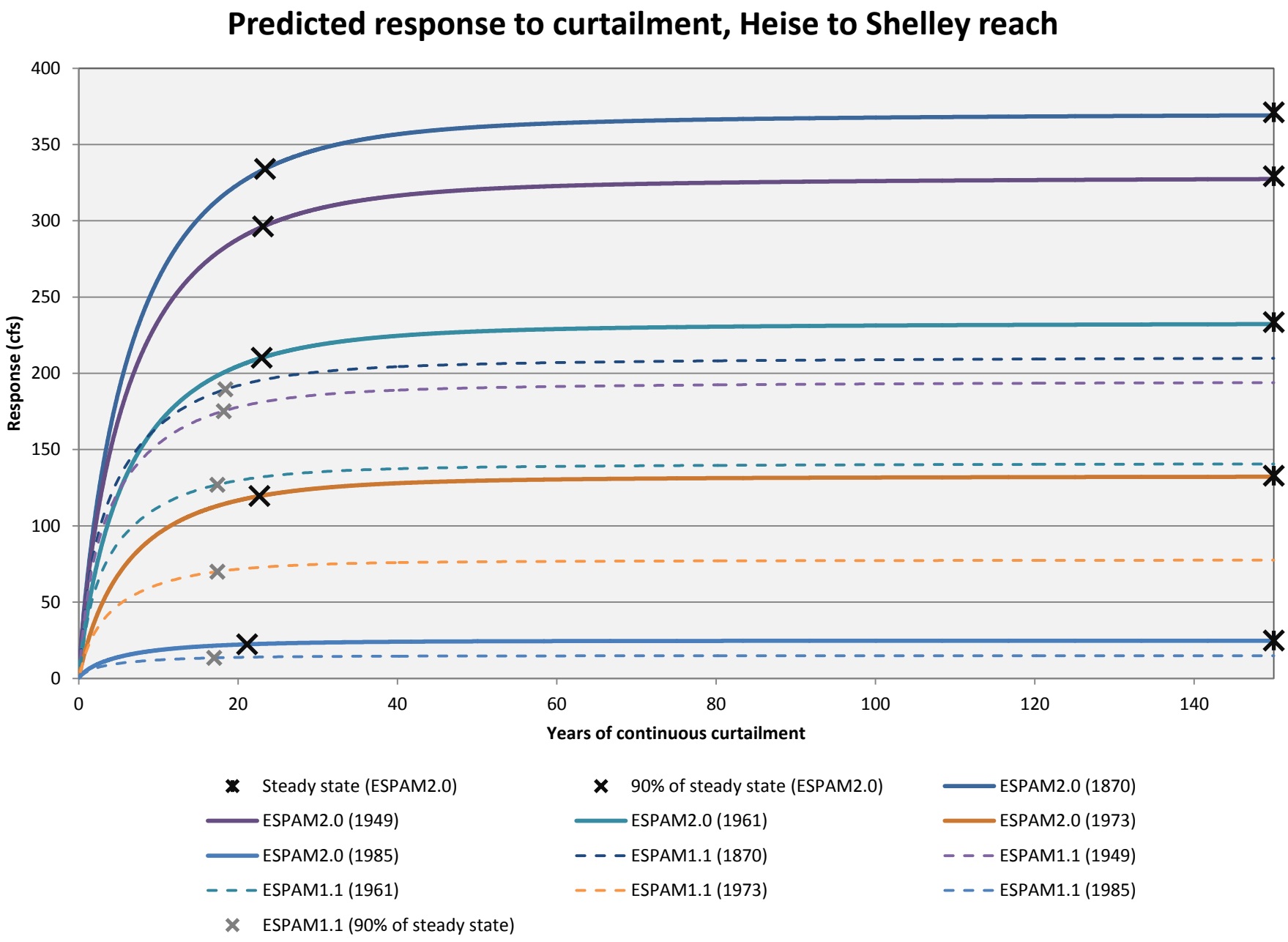
Reach Name	Curtailment junior to 1/1/1985					
	Response to ESPAM2.0 well file	Response to ESPAM1.1 well file (cfs)		Net change (ESPAM2.0 from ESPAM1.1)	Change attributed to model structure and parameters	Change attributed to irrigated lands and CIR data
	ESPAM2.0	ESPAM2.0	ESPAM1.1			
Ashton to Rexburg	16	15	22	-28%	-31%	4%
Heise to Shelley	25	21	15	66%	38%	20%
Sum above Shelley	**41**	**36**	**37**	10%	-3%	13%
Shelley to Near Blackfoot	28	24	26	9%	-9%	20%
Near Blackfoot to Neeley	88	73	69	28%	6%	21%
Neeley to Minidoka	6	4	10	-42%	-59%	42%
Sum Shelley to Milner	**123**	**101**	**105**	17%	-4%	22%
Devil's Washbowl to Buhl	**15**	**12**	**18**	-14%	-31%	25%
Buhl to Thousand Springs	17	13	8	107%	66%	24%
Thousand Springs	8	6	5.6	37%	11%	23%
Thousand Springs to Malad	5	4	0.74	607%	484%	21%
Sum Buhl to Lower Salmon Falls	**29**	**24**	**14**	105%	66%	23%
Malad	6	5	5.5	12%	-10%	25%
Malad to Bancroft	0	0	1	-27%	-45%	32%
Sum Lower Salmon Falls to King Hill	**7**	**5**	**6**	8%	-14%	25%
Sum of Springs below Milner	**51**	**41**	**38**	34%	8%	24%
Kimberly to Buhl baseflow	1	1	--	--	--	--
Buhl to LSF baseflow	1	1	--	--	--	--
LSF to King Hill baseflow	1	0	--	--	--	--
Sum of baseflow below Milner	**3**	**2**	--	--	--	--
Total (cfs)	**218**	**180**	**180**	21%	0%	21%
Acres curtailed	72,316	65,273	65,282	11%	0%	11%
Curtailed consumptive use (AF/yr)	157,652	130,470	130,506	21%	0%	21%
Average consumptive use (AF/ac/yr)	2.18	2.00	2.00	9%	0%	9%

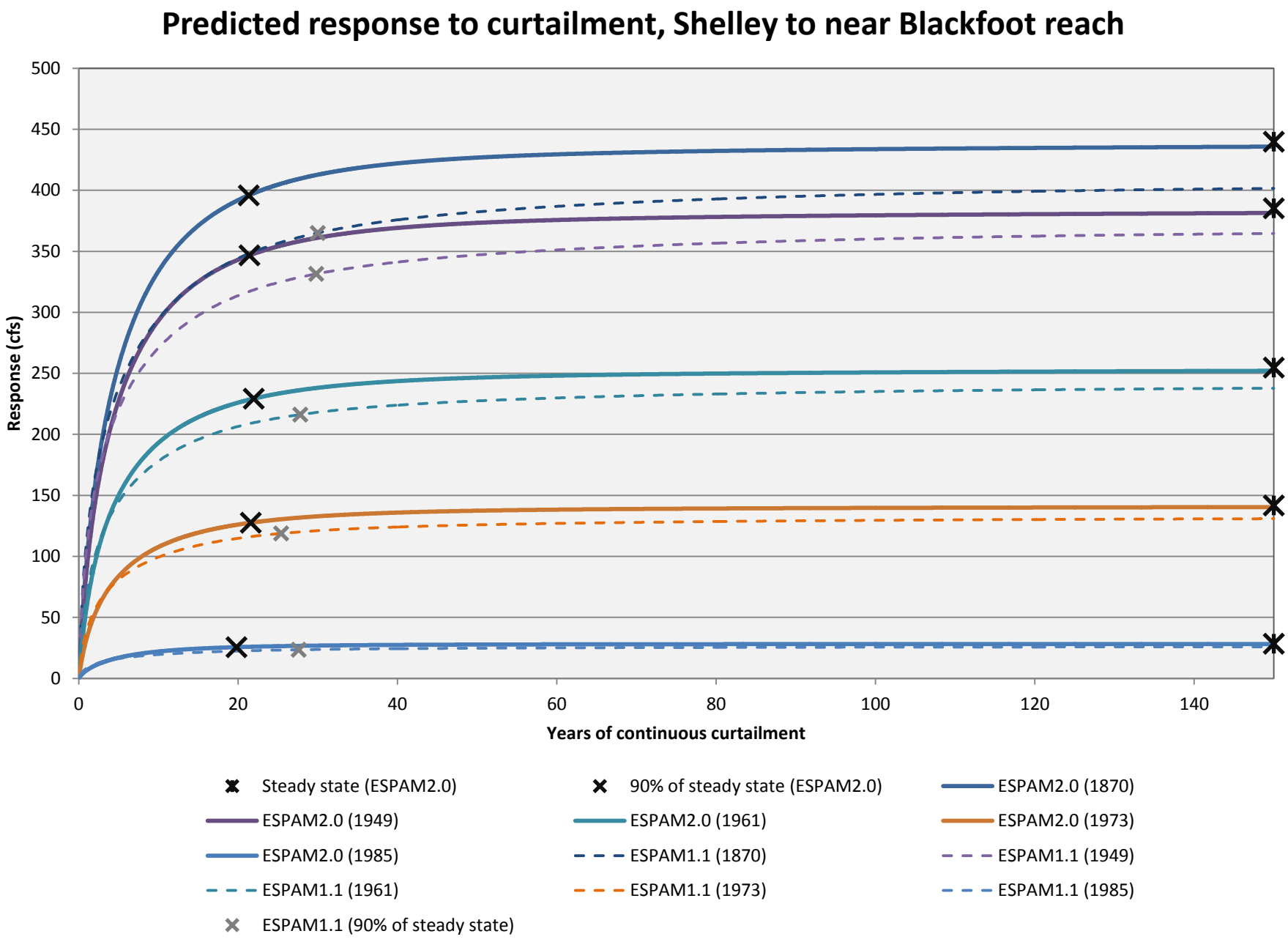


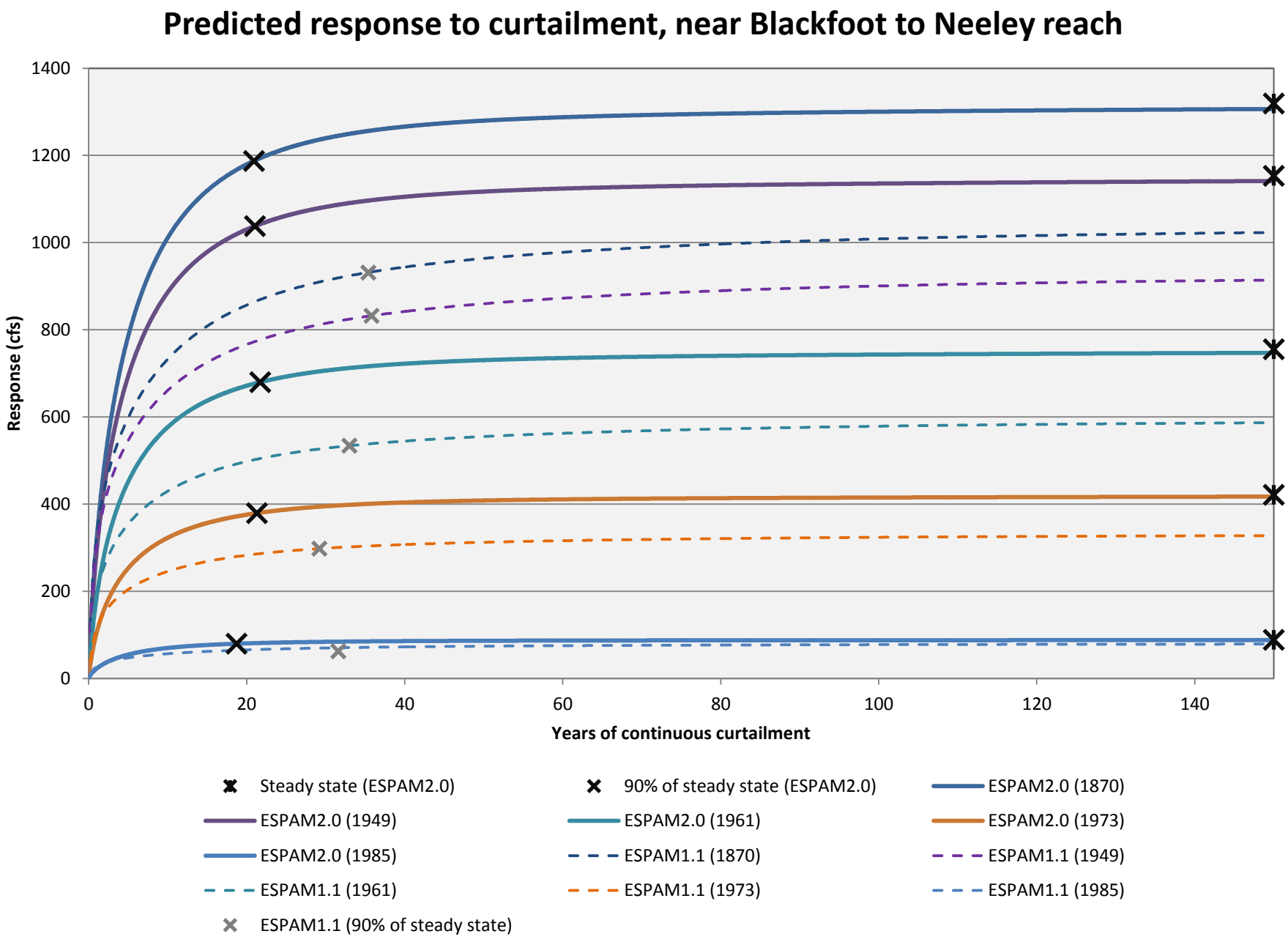
APPENDIX C.

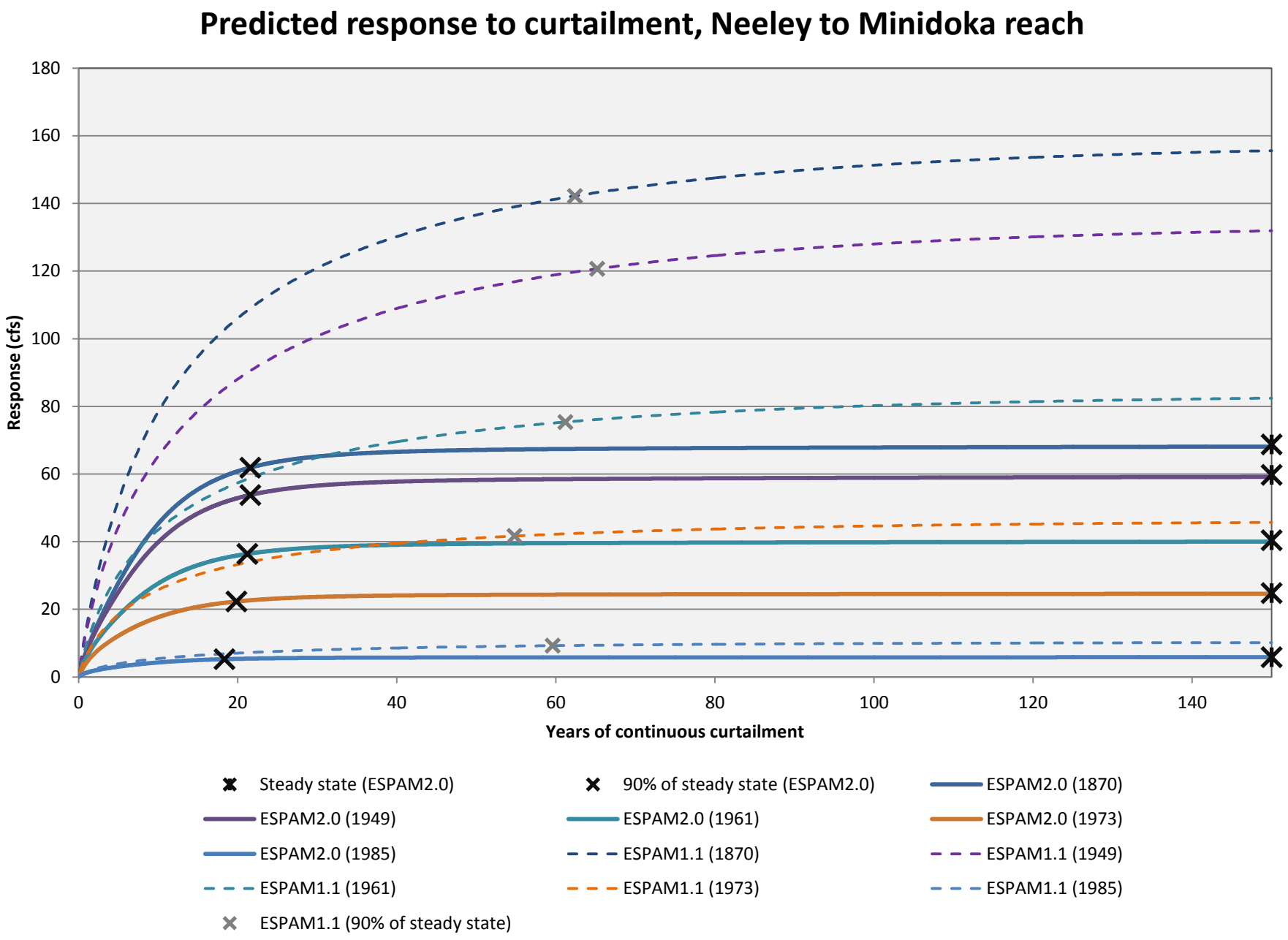
LONG TERM TRANSIENT SIMULATIONS WITH ESPAM2.0 STRESS FILES

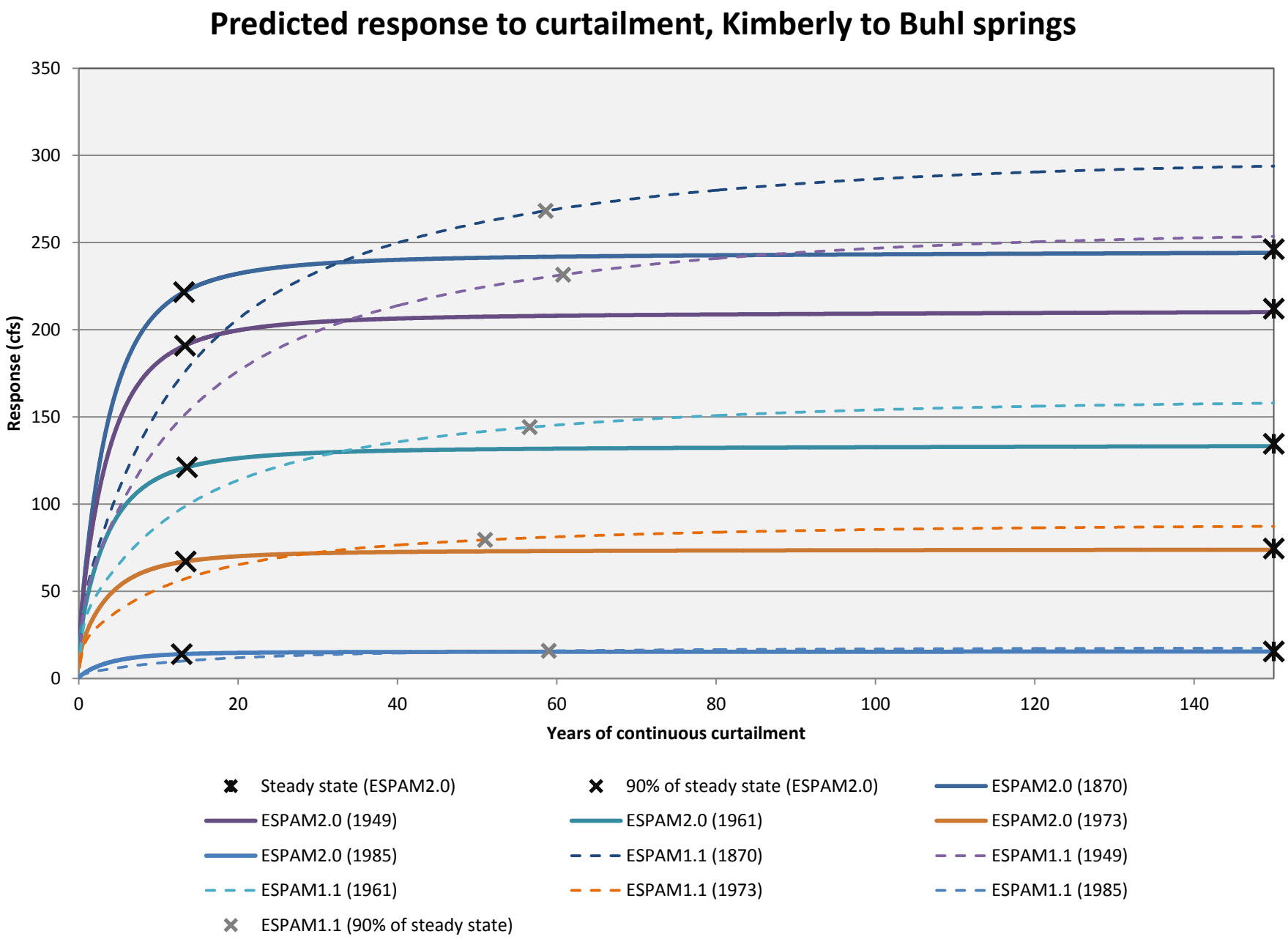

Predicted response to curtailment, Ashton to Rexburg reach
Response (cfs)
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% OF steady state)

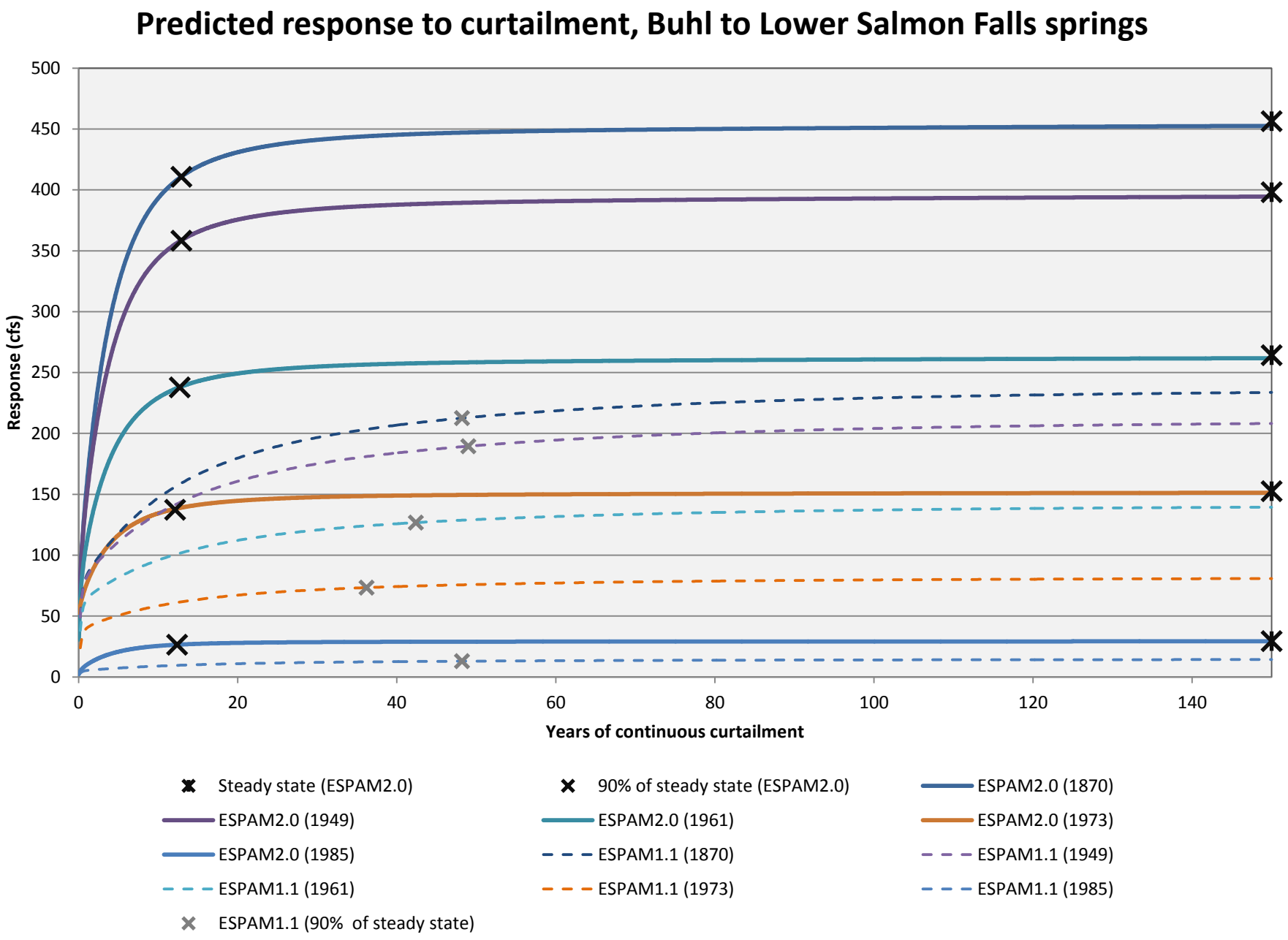

Predicted response to curtailment, Heise to Shelley reach
Response (cfs)
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

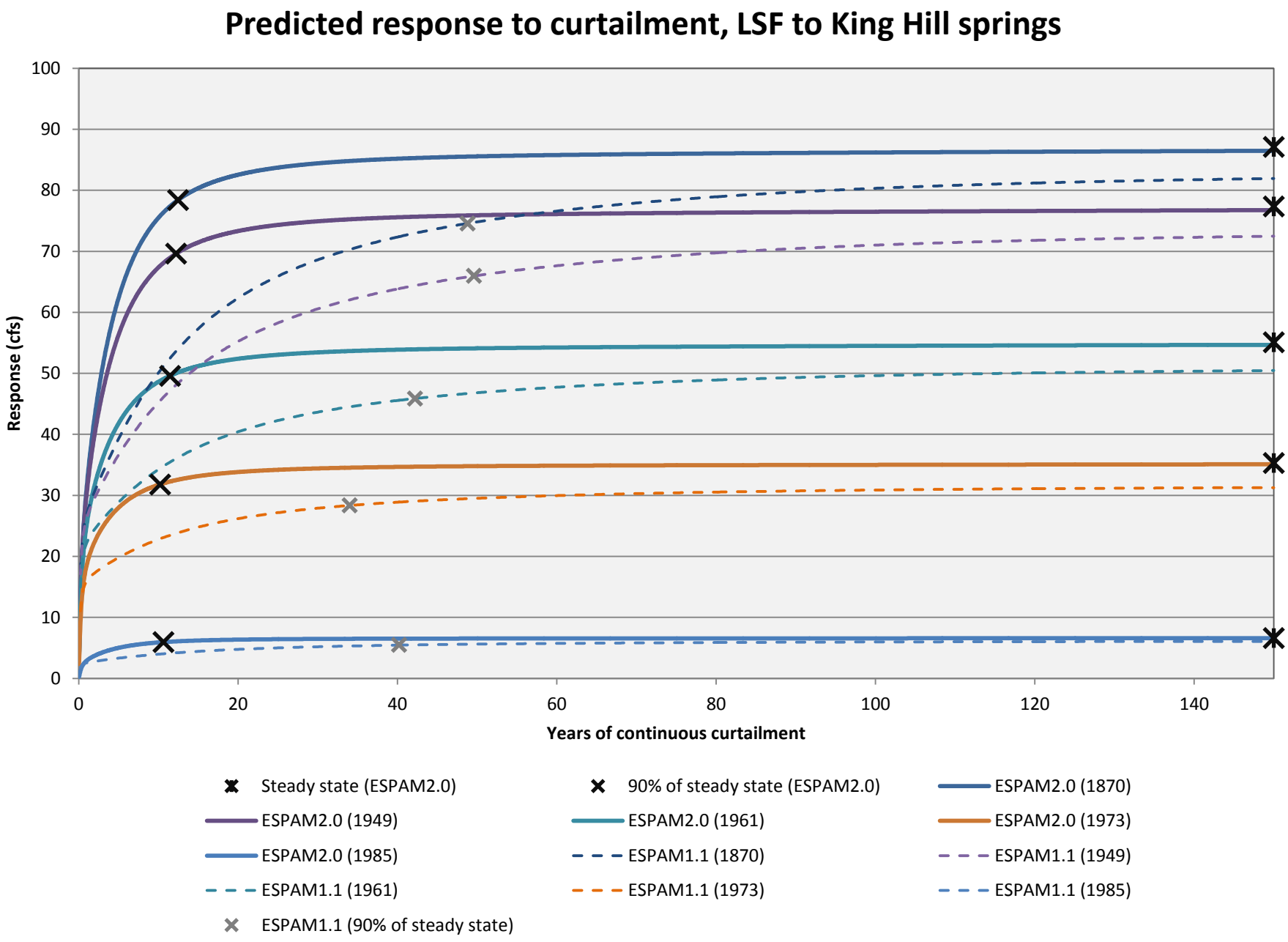

Predicted response to curtailment, Shelley to near Blackfoot reach
Response (cfs)
500
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)


Predicted response to curtailment, near Blackfoot to Neeley reach
Response (cfs)
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)


Predicted response to curtailment, Neeley to Minidoka reach
Response (cfs)
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)


Predicted response to curtailment, Kimberly to Buhl springs
Response (cfs)
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

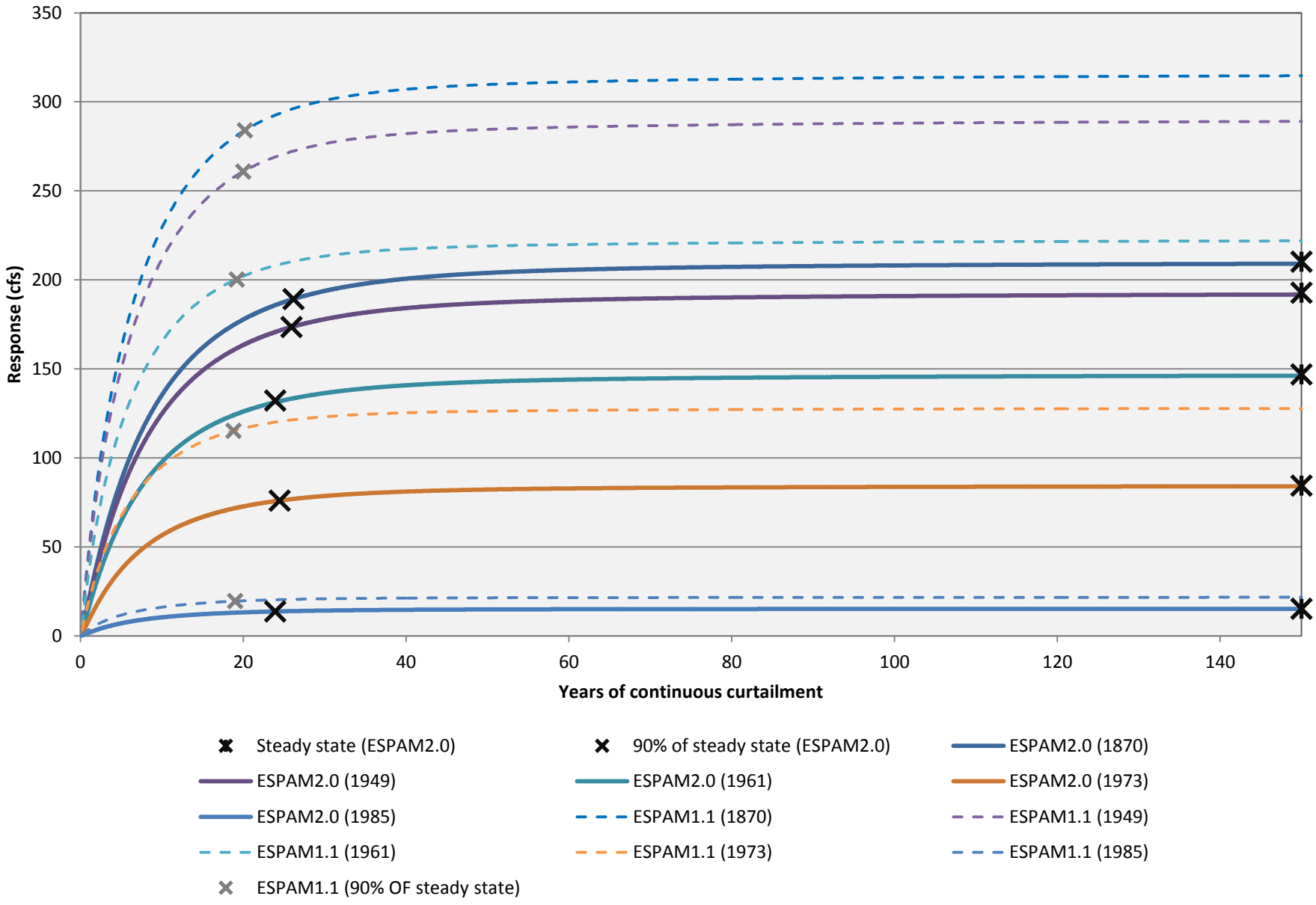

Predicted response to curtailment, Buhl to Lower Salmon Falls springs
Response (cfs)
500
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

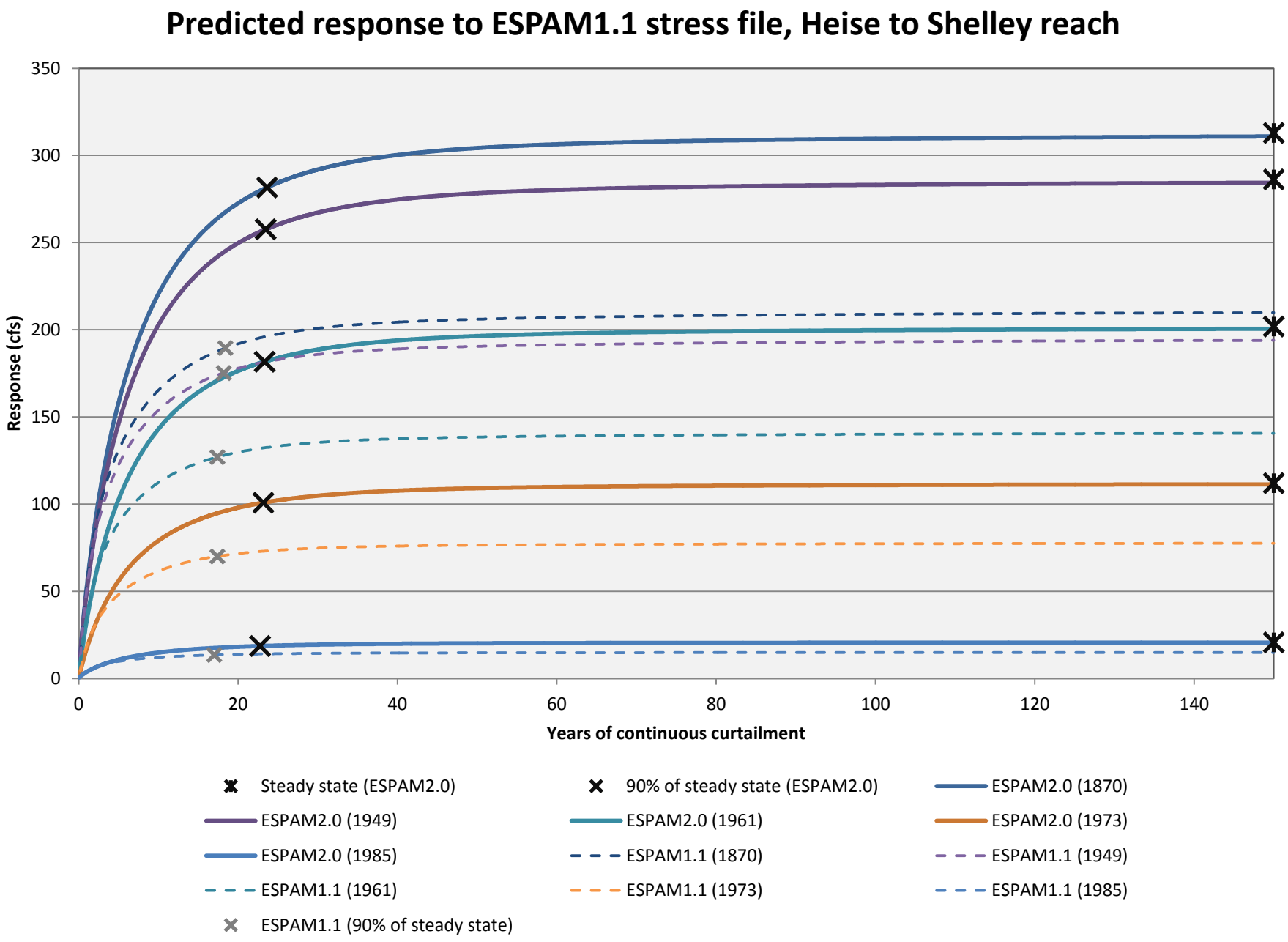

Predicted response to curtailment, LSF to King Hill springs
Response (cfs)
Years of continuous curtailment
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100
120
140
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

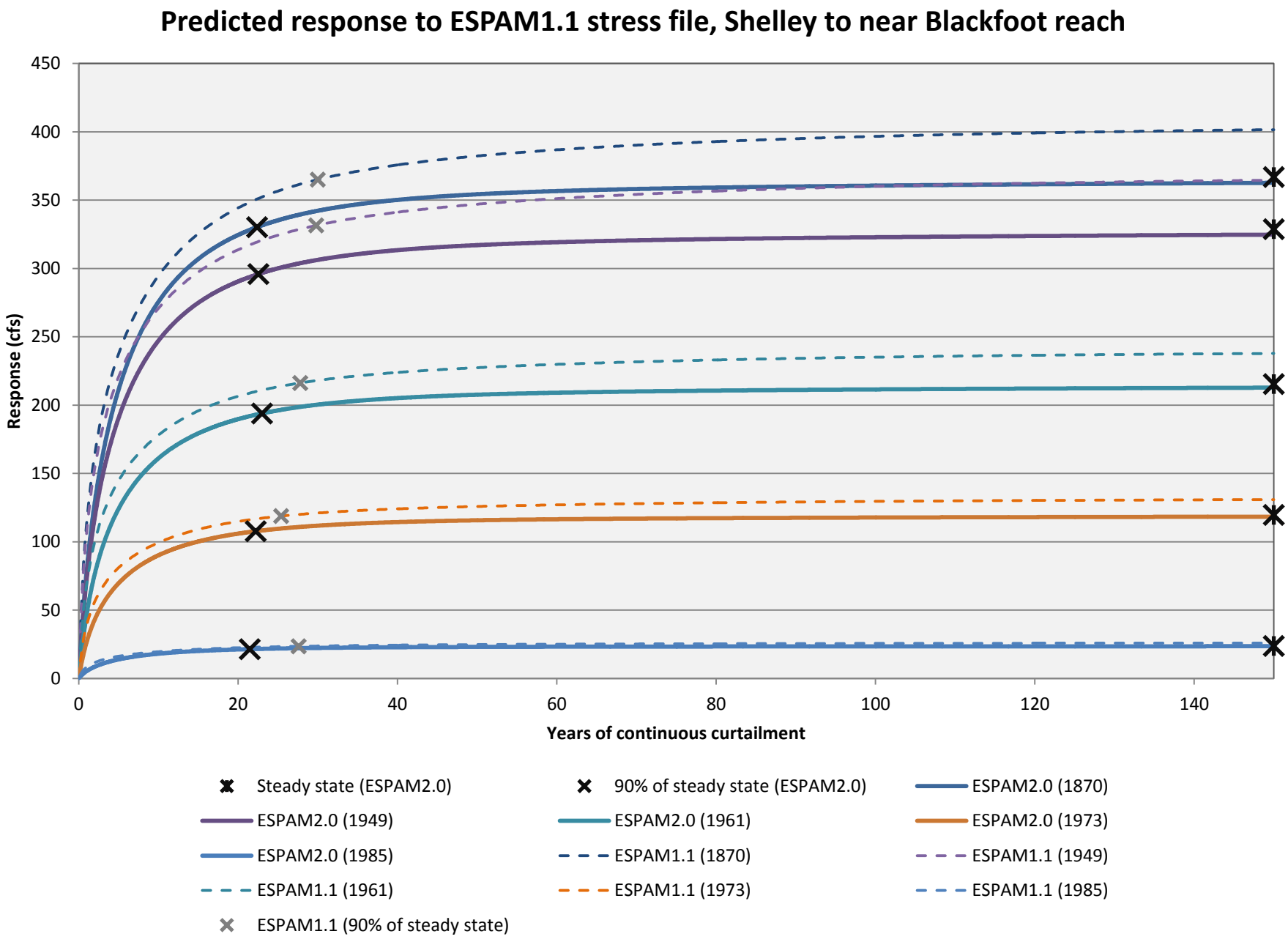
APPENDIX D.

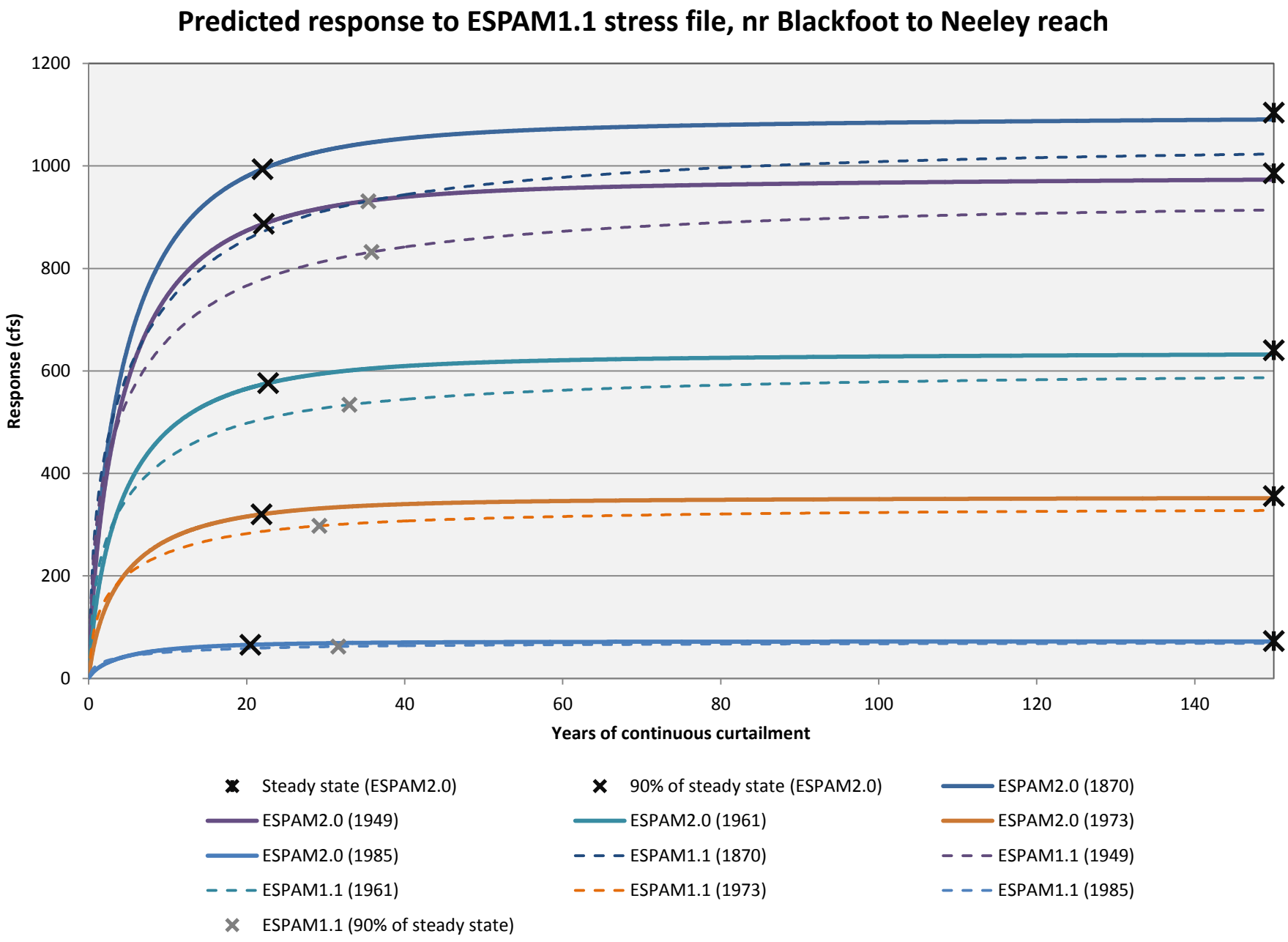
LONG TERM TRANSIENT SIMULATIONS WITH ESPAM1.1 STRESS FILES

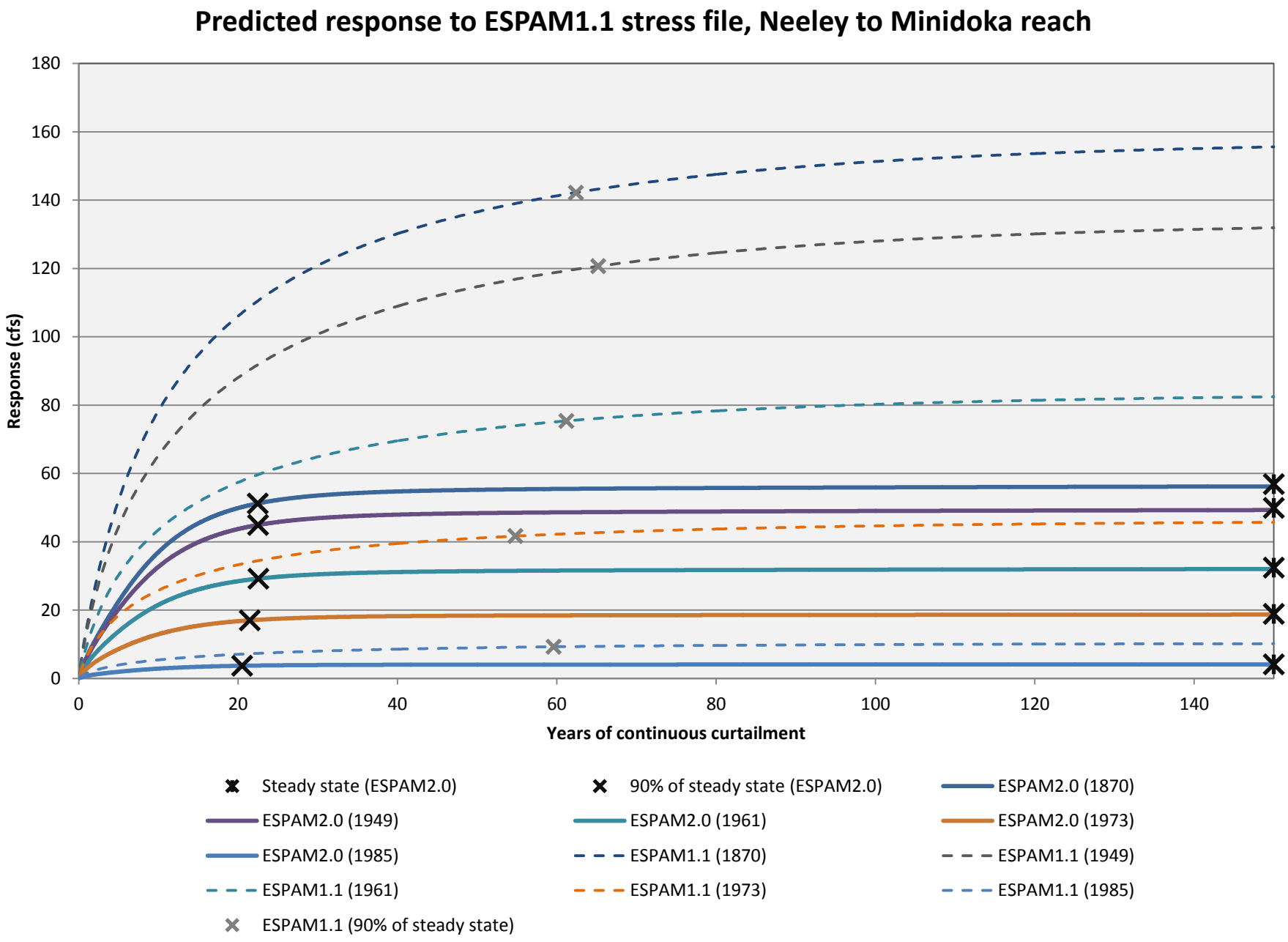
Predicted response to ESPAM1.1 stress file, Ashton to Rexburg reach

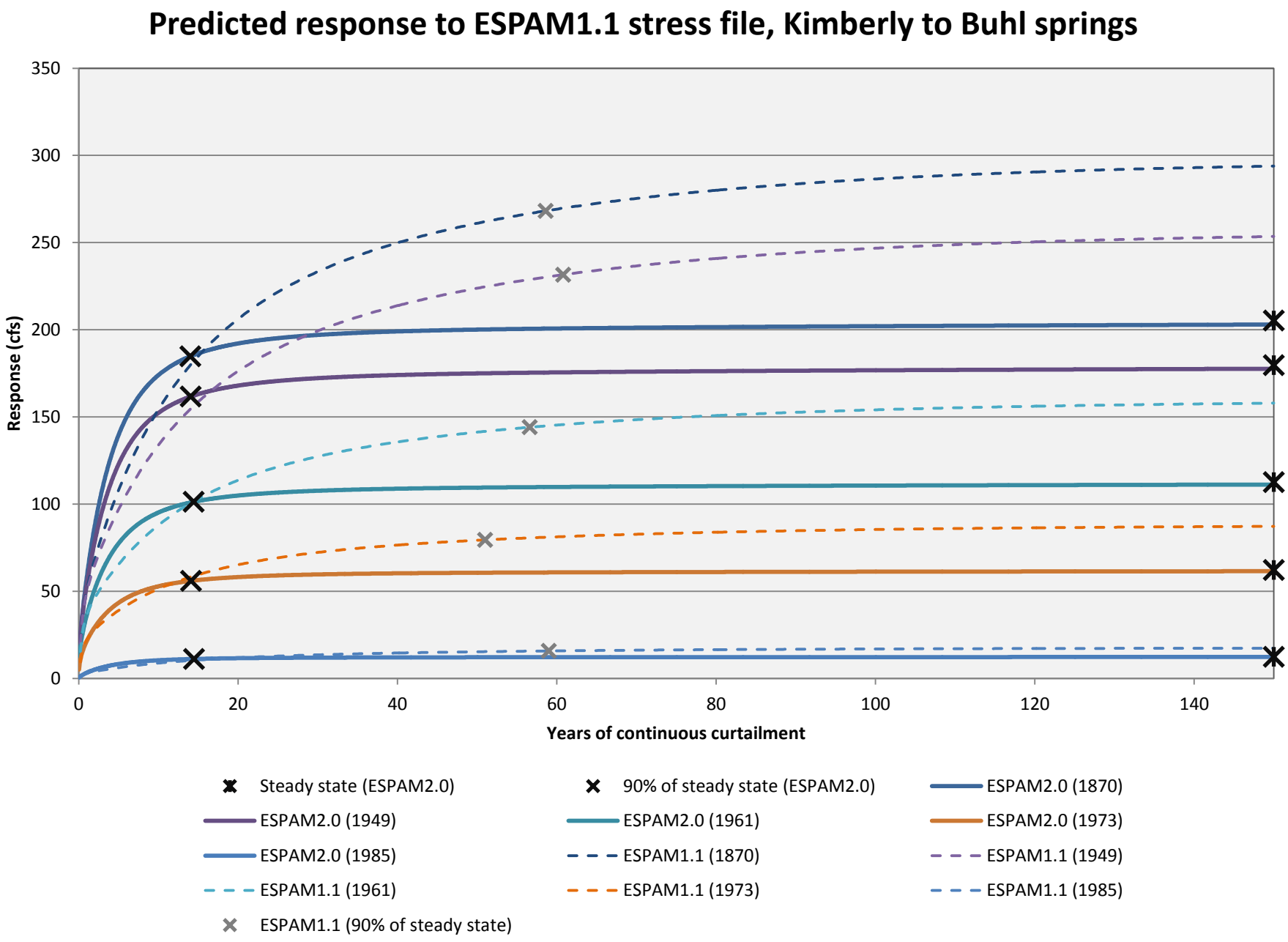


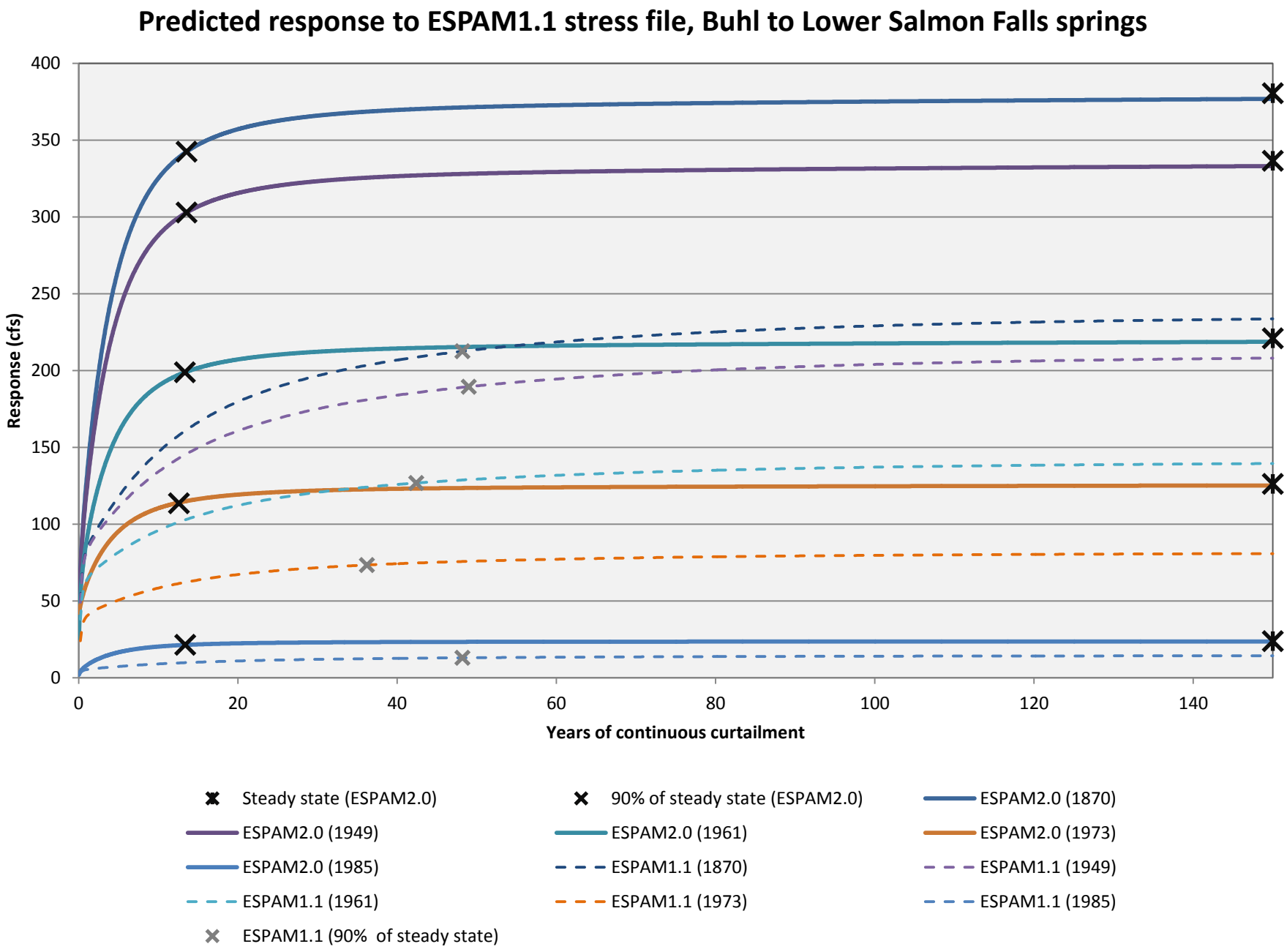

Predicted response to ESPAM1.1 stress file, Heise to Shelley reach
Response (cfs)
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

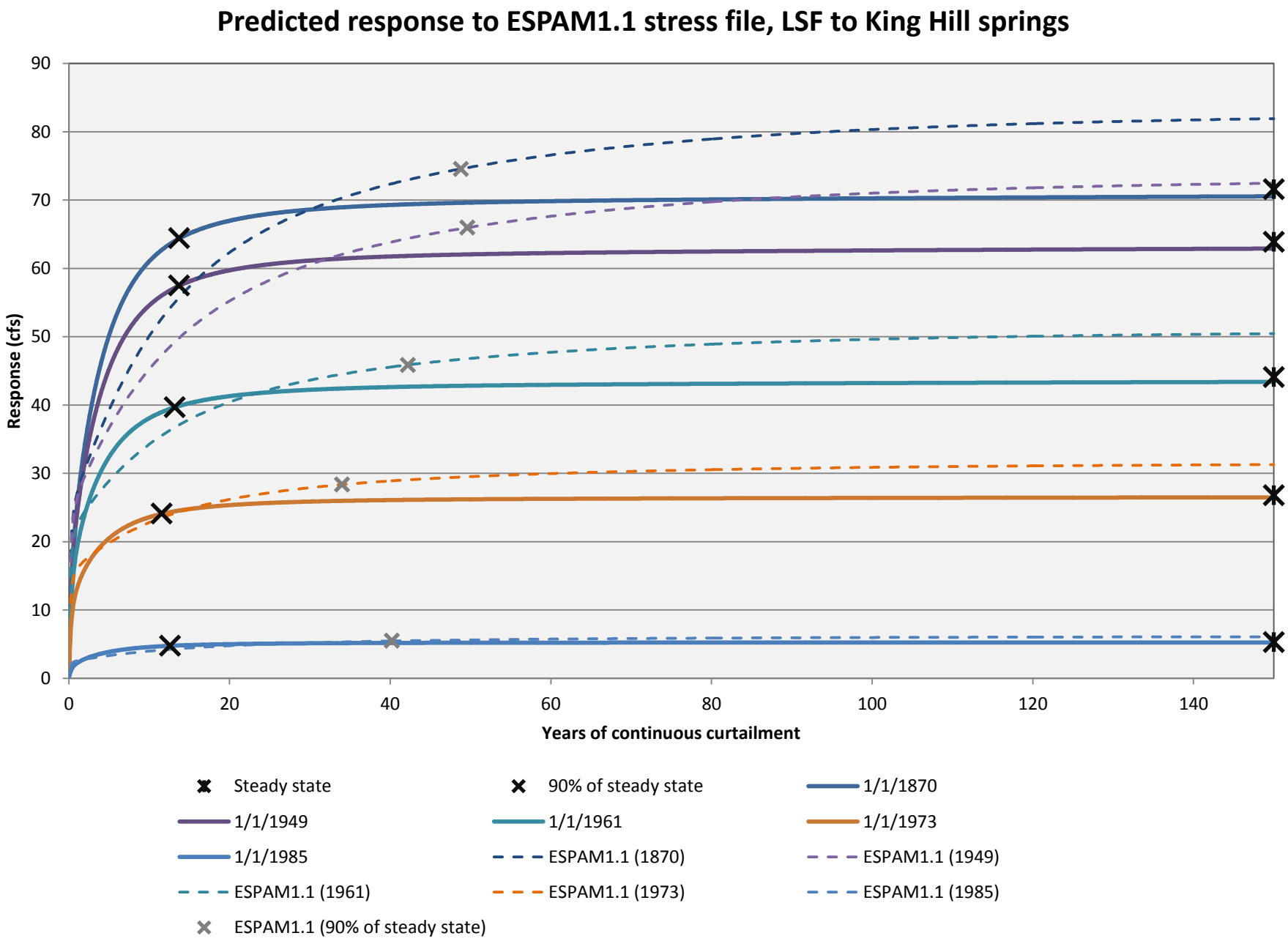

Predicted response to ESPAM1.1 stress file, Shelley to near Blackfoot reach
Response (cfs)
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)


Predicted response to ESPAM1.1 stress file, nr Blackfoot to Neeley reach
Response (cfs)
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)


Predicted response to ESPAM1.1 stress file, Neeley to Minidoka reach
Response (cfs)
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

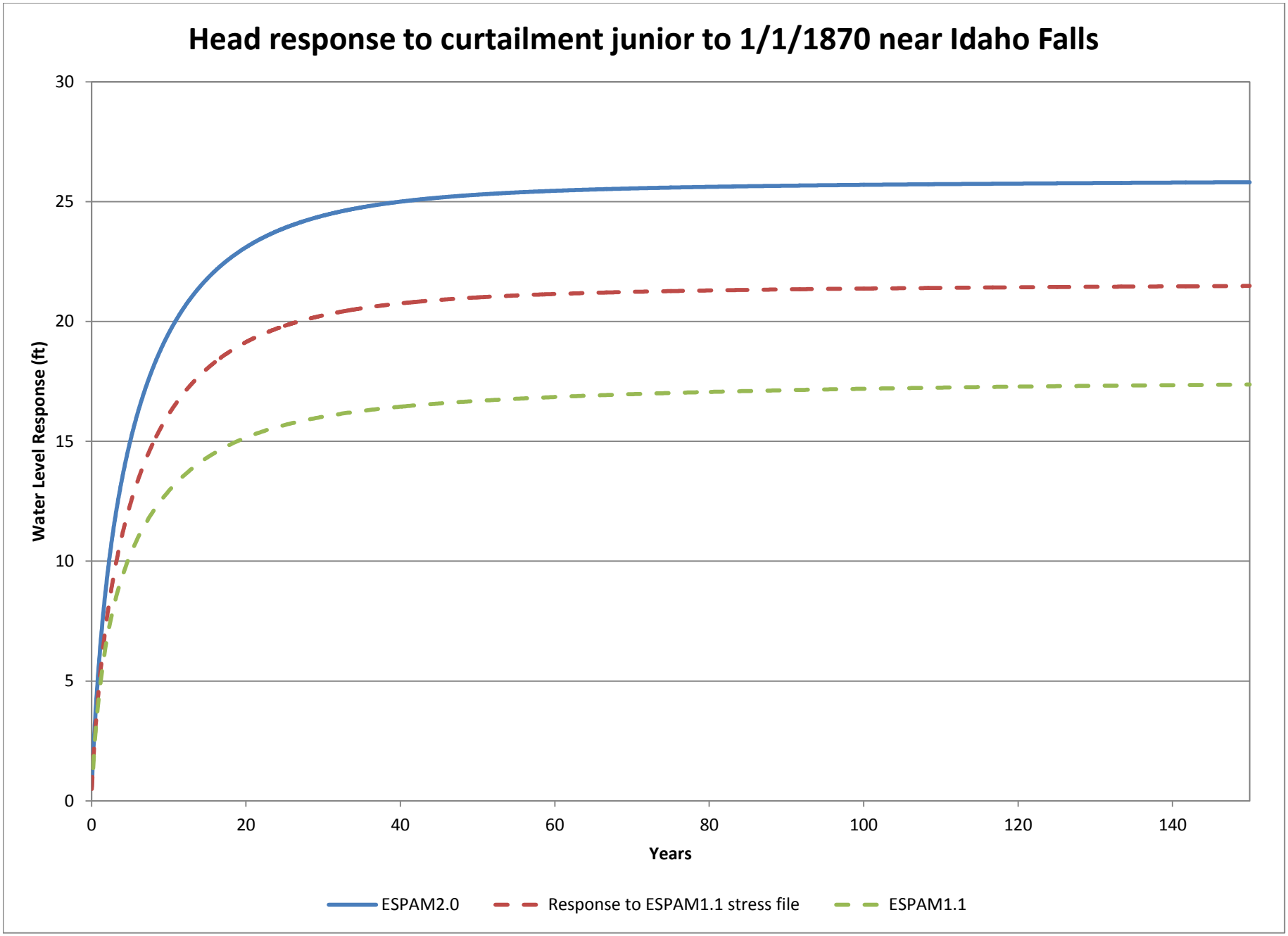

Predicted response to ESPAM1.1 stress file, Kimberly to Buhl springs
Response (cfs)
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

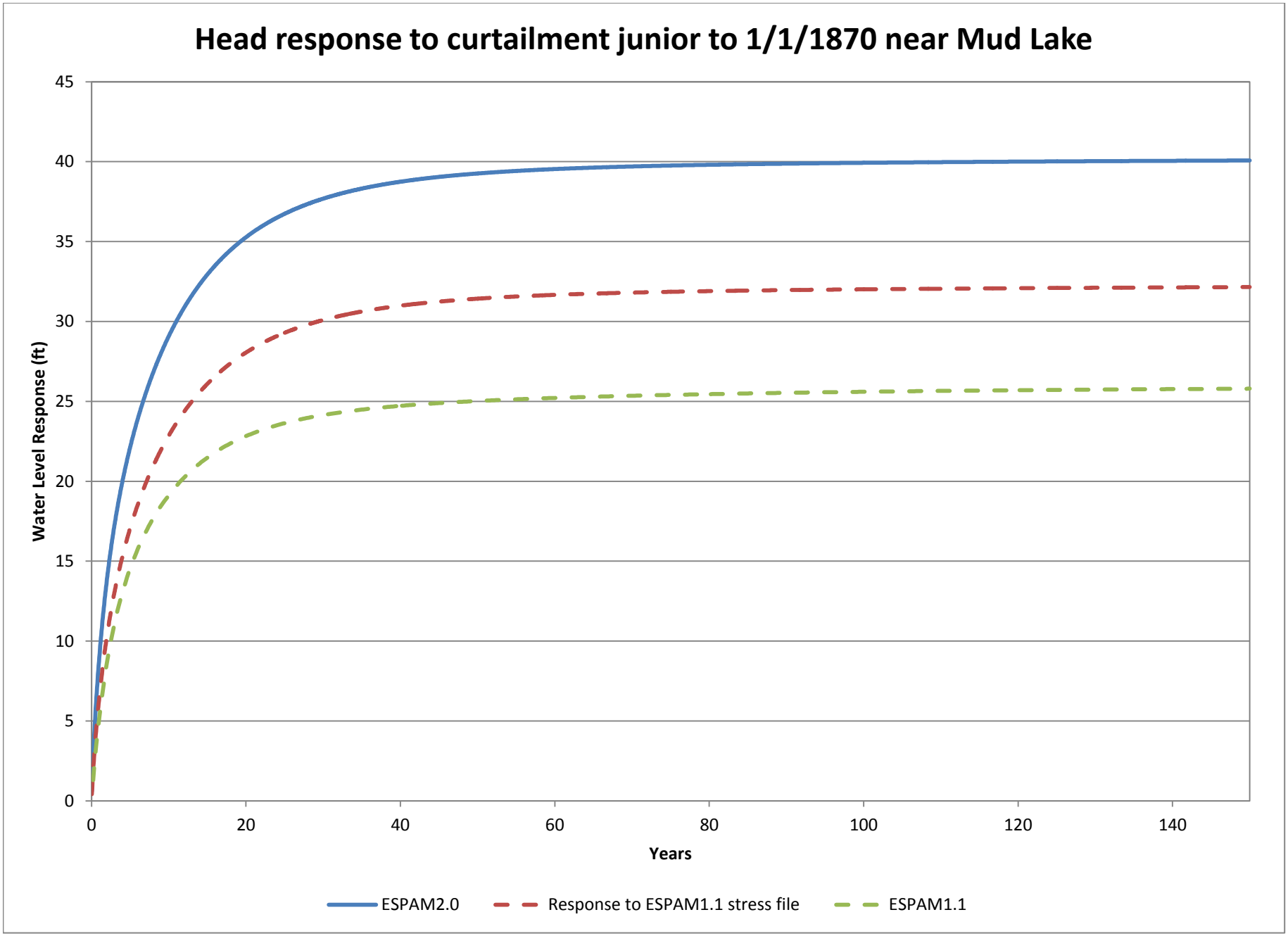

Predicted response to ESPAM1.1 stress file, Buhl to Lower Salmon Falls springs
Response (cfs)
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state (ESPAM2.0)
90% of steady state (ESPAM2.0)
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

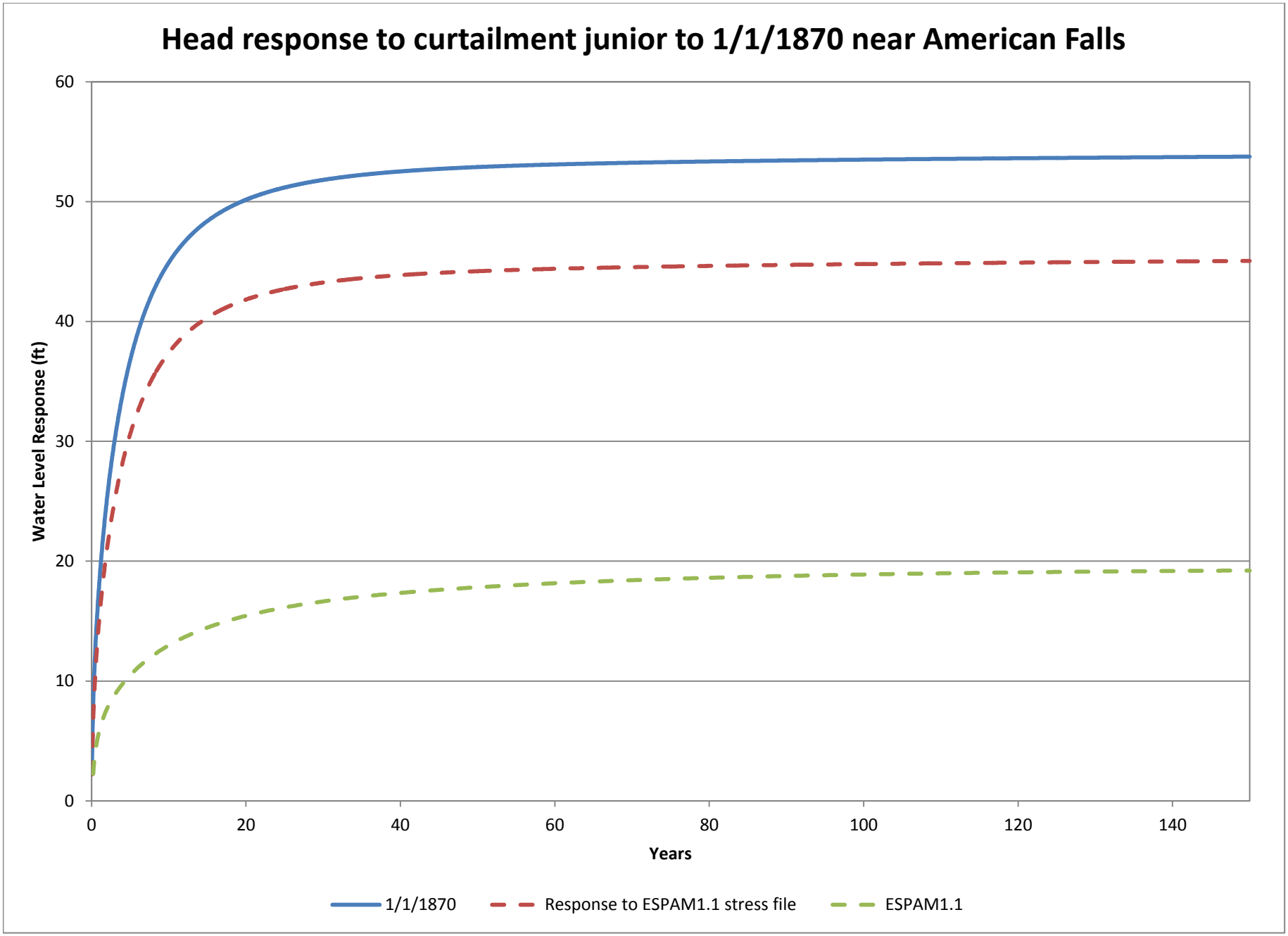

Predicted response to ESPAM1.1 stress file, LSF to King Hill springs
Response (cfs)
0
10
20
30
40
50
60
70
80
90
0
20
40
60
80
100
120
140
Years of continuous curtailment
Steady state
90% of steady state
1/1/1870
1/1/1949
1/1/1961
1/1/1973
1/1/1985
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)
ESPAM1.1 (90% of steady state)

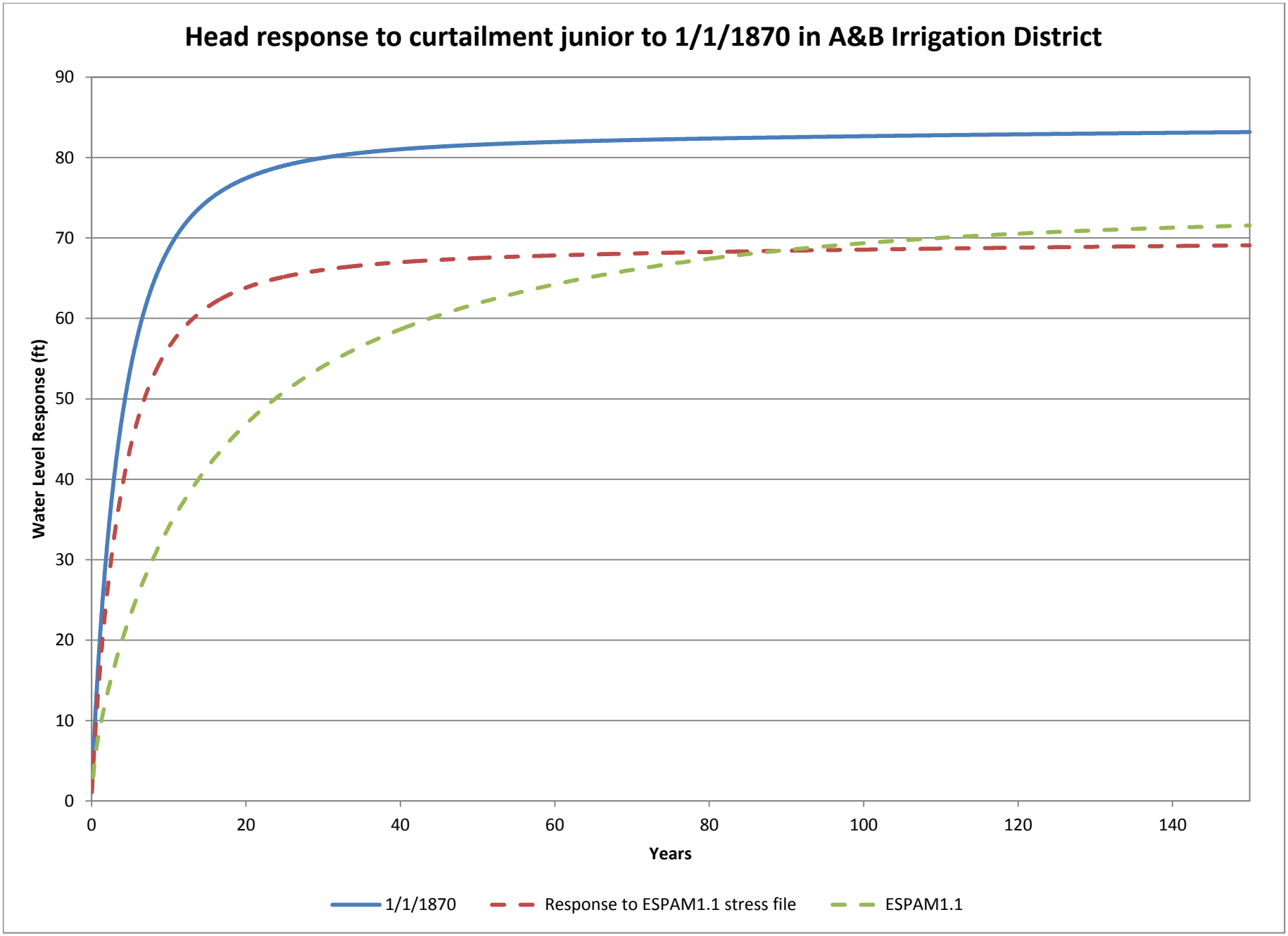
APPENDIX E.

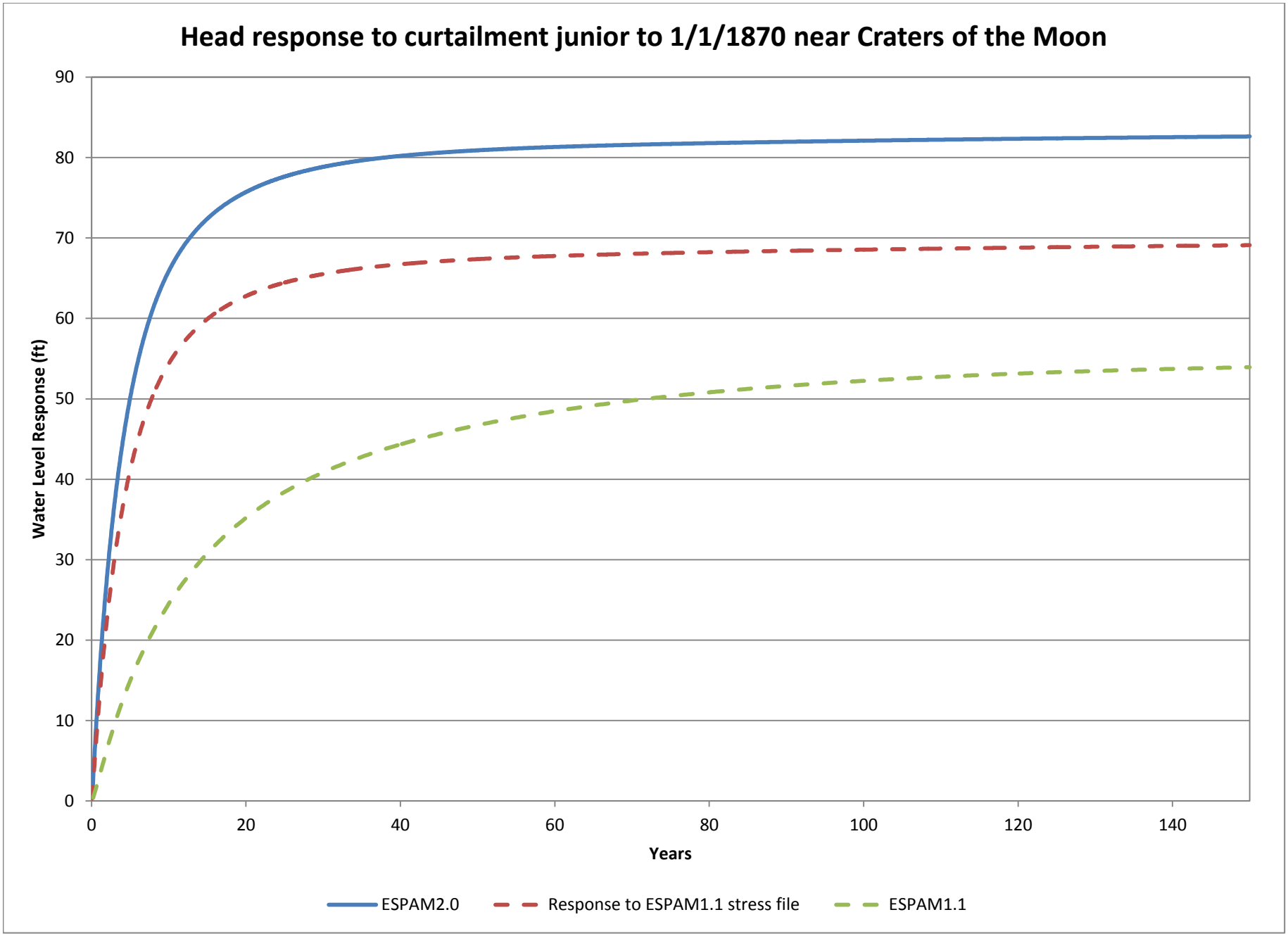
PREDICTED LONG TERM TRANSIENT HEAD RESPONSE

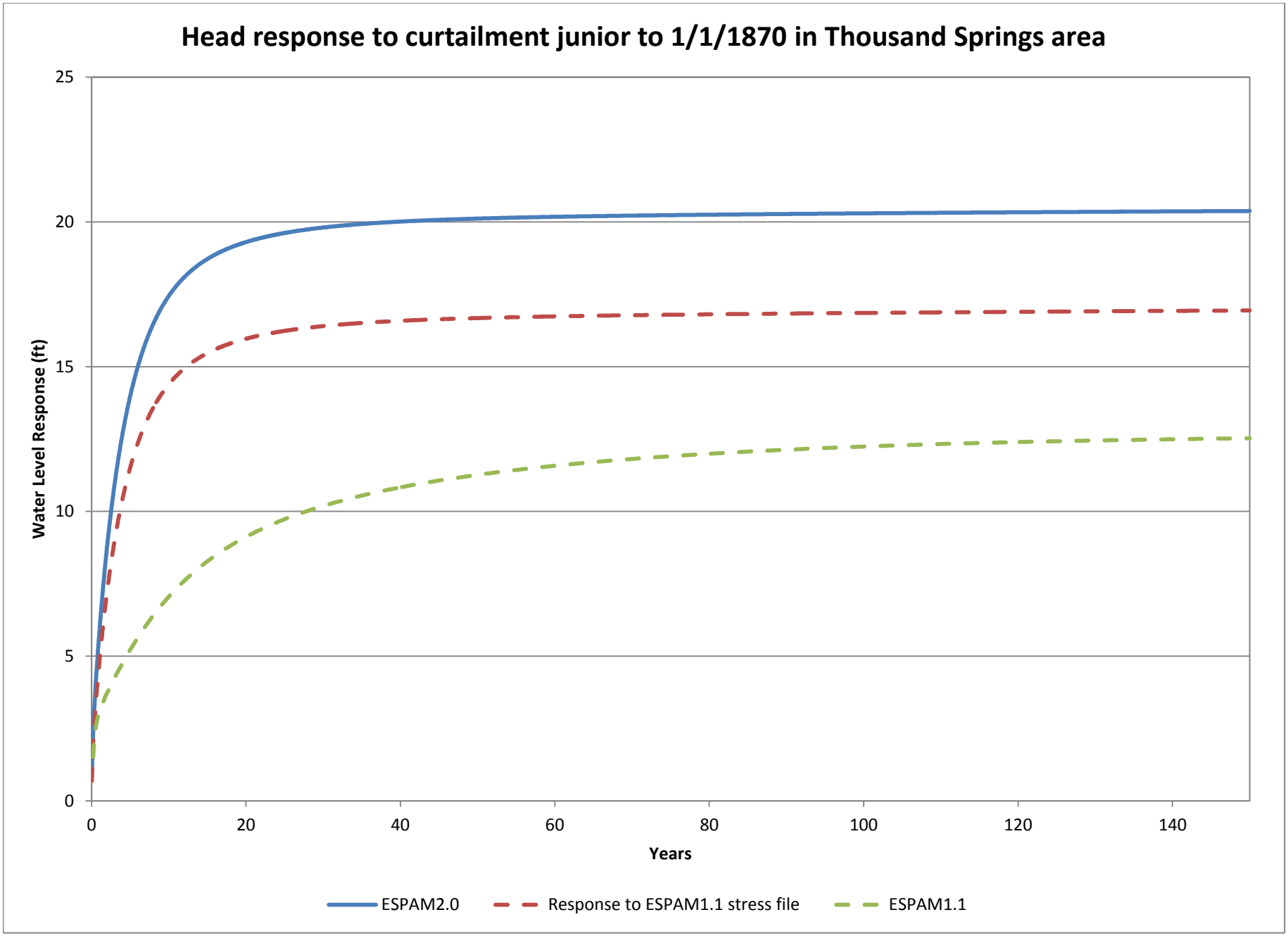

Head response to curtailment junior to 1/1/1870 near Idaho Falls
Water Level Response (ft)
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
Years
ESPAM2.0
Response to ESPAM1.1 stress file
ESPAM1.1


Head response to curtailment junior to 1/1/1870 near Mud Lake
Water Level Response (ft)
45
40
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140
Years
ESPAM2.0
Response to ESPAM1.1 stress file
ESPAM1.1


Head response to curtailment junior to 1/1/1870 near American Falls
Water Level Response (ft)
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
Years
1/1/1870
Response to ESPAM1.1 stress file
ESPAM1.1

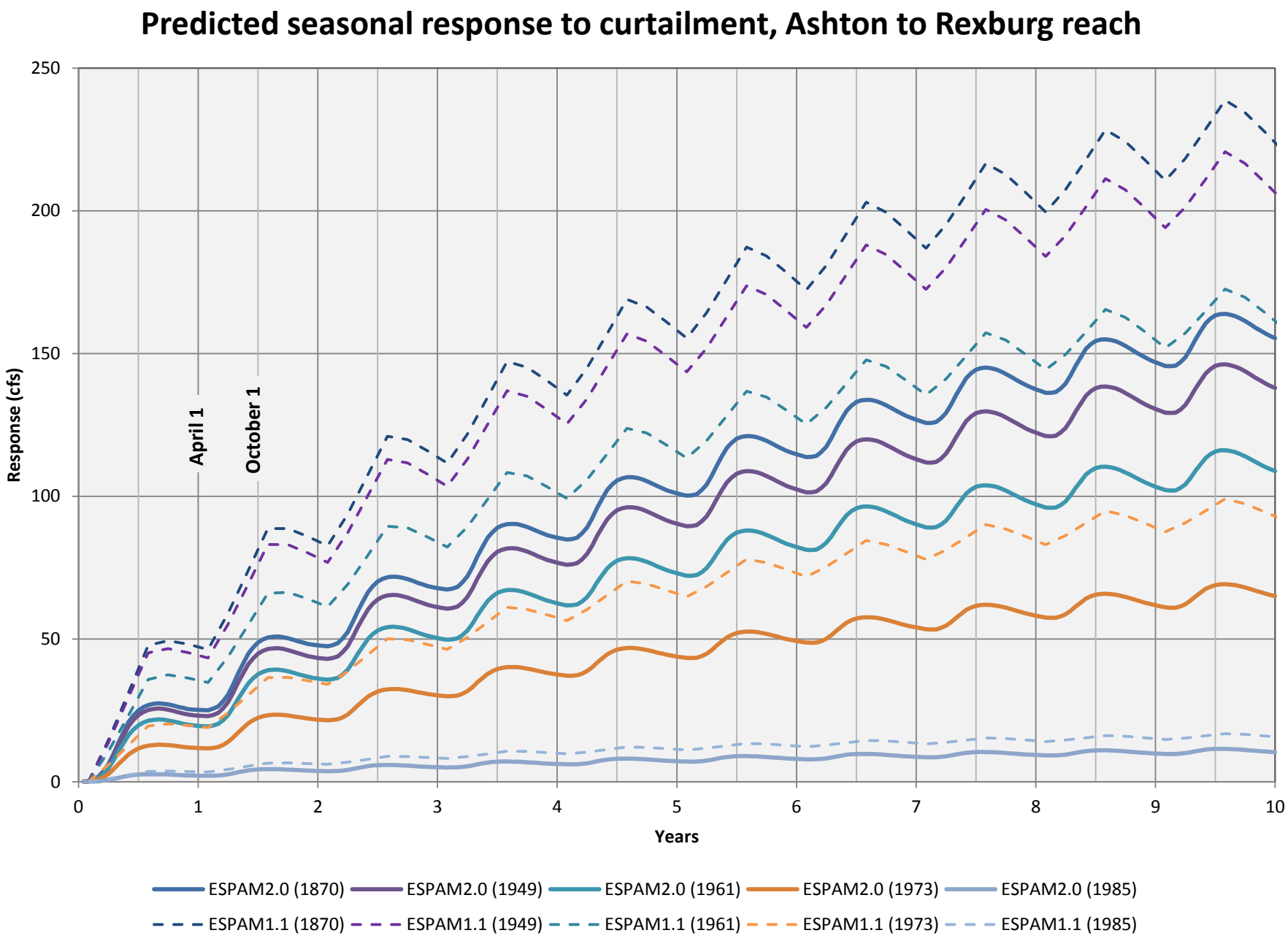

Head response to curtailment junior to 1/1/1870 in A&B Irrigation District
Water Level Response (ft)
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
Years
1/1/1870
Response to ESPAM1.1 stress file
ESPAM1.1

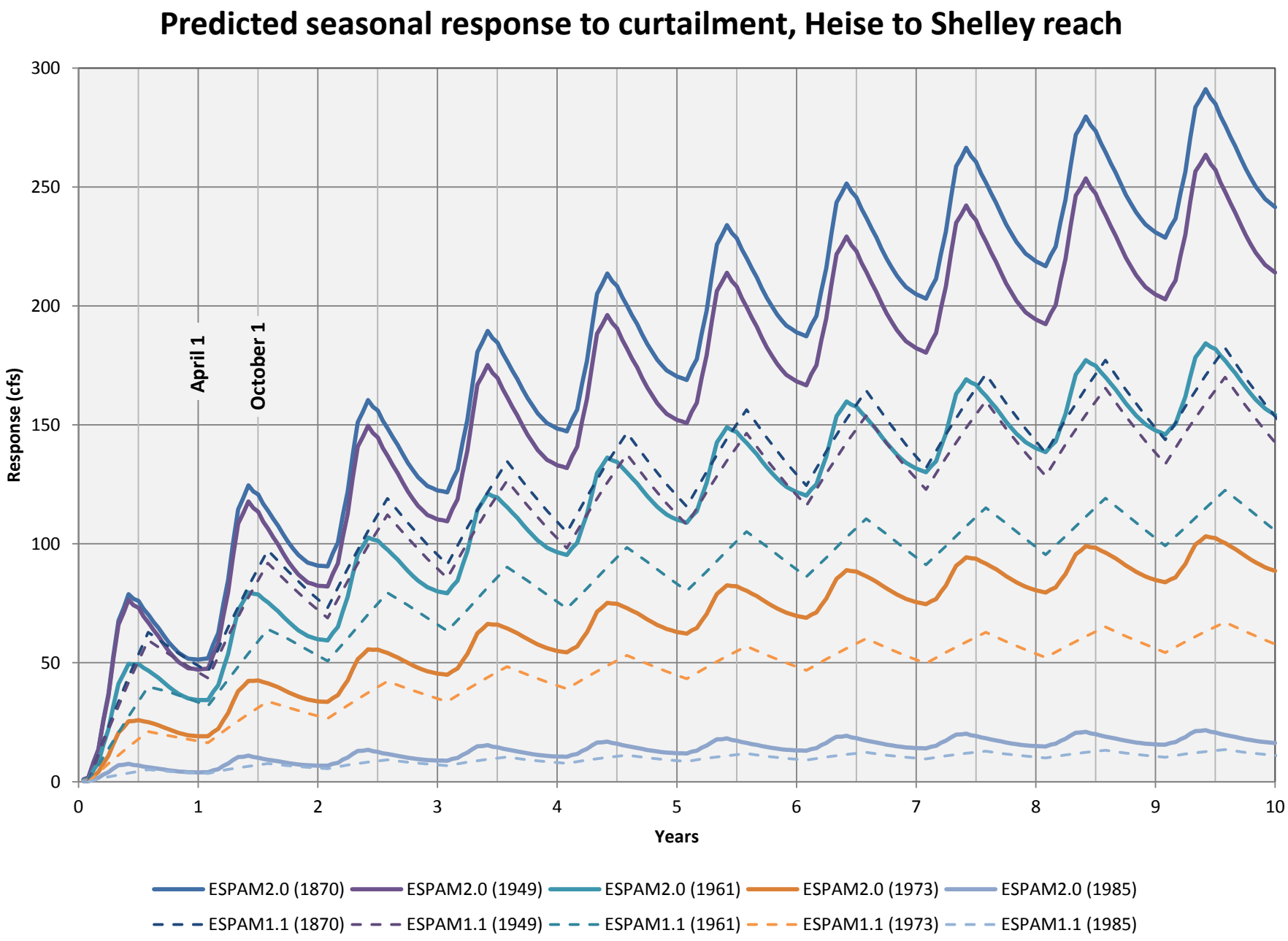

Head response to curtailment junior to 1/1/1870 near Craters of the Moon
Water Level Response (ft)
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
Years
ESPAM2.0
Response to ESPAM1.1 stress file
ESPAM1.1

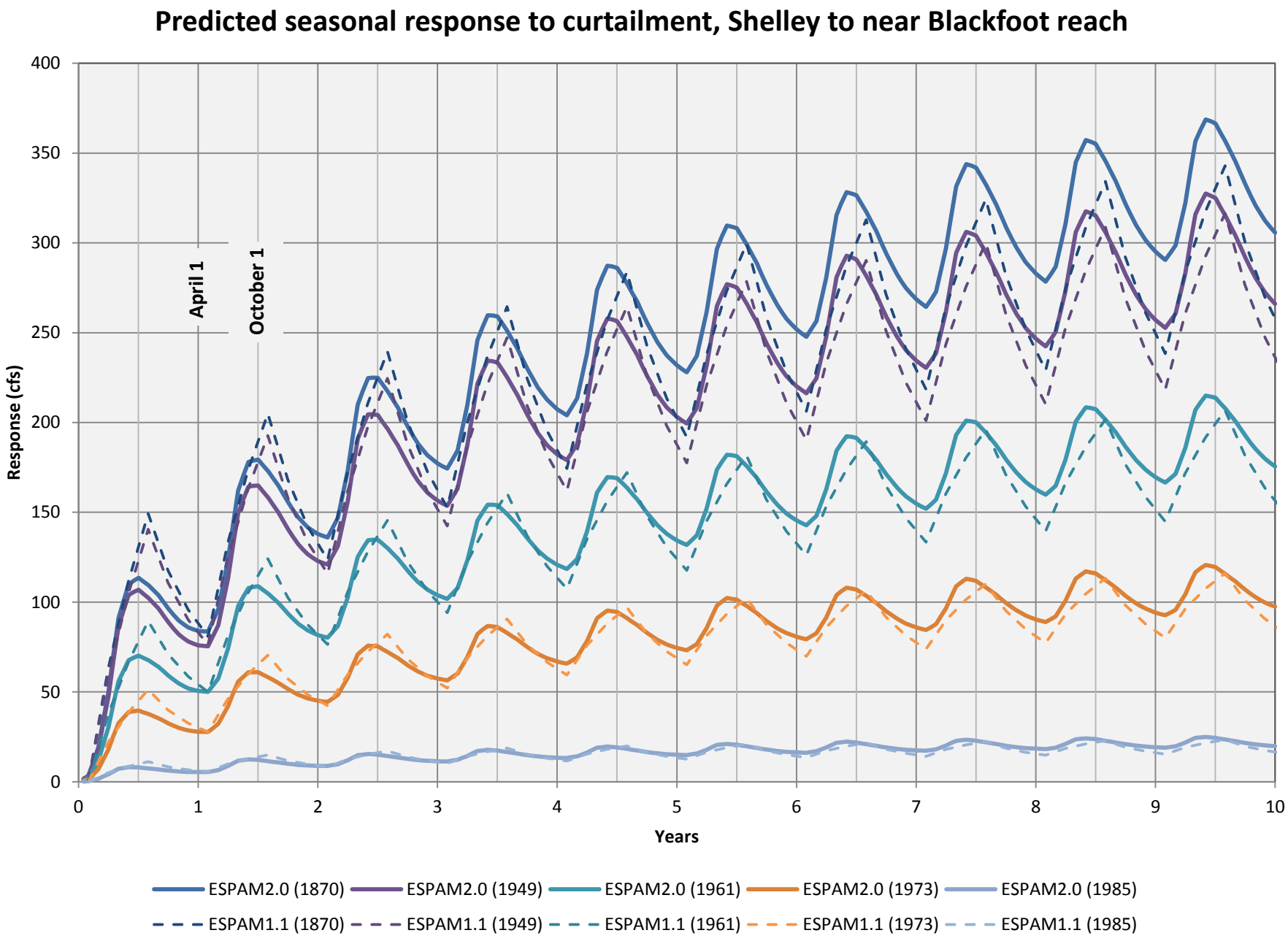

Head response to curtailment junior to 1/1/1870 in Thousand Springs area
Water Level Response (ft)
25
20
15
10
5
0
0
20
40
60
80
100
120
140
Years
ESPAM2.0
Response to ESPAM1.1 stress file
ESPAM1.1

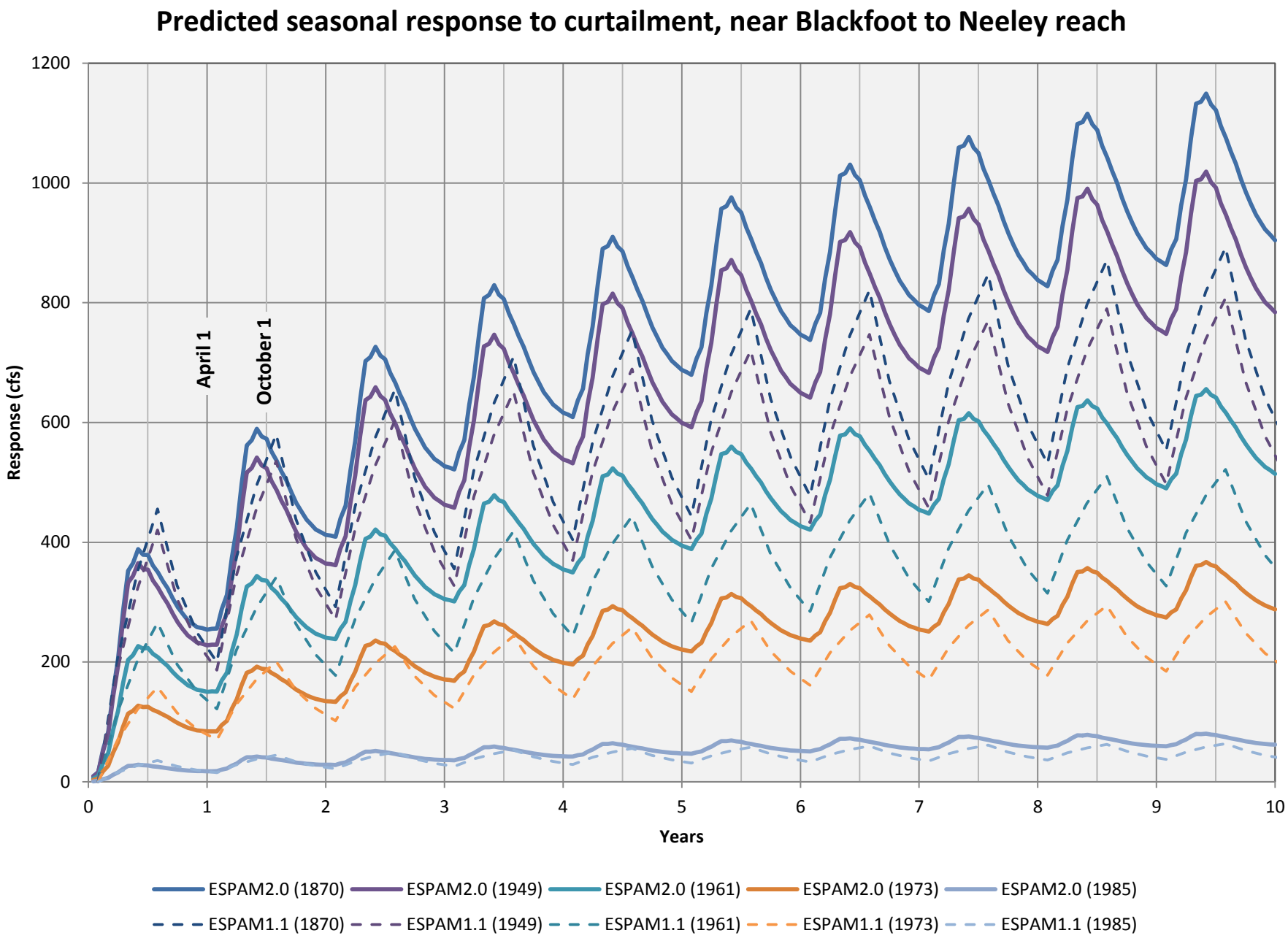
APPENDIX F.

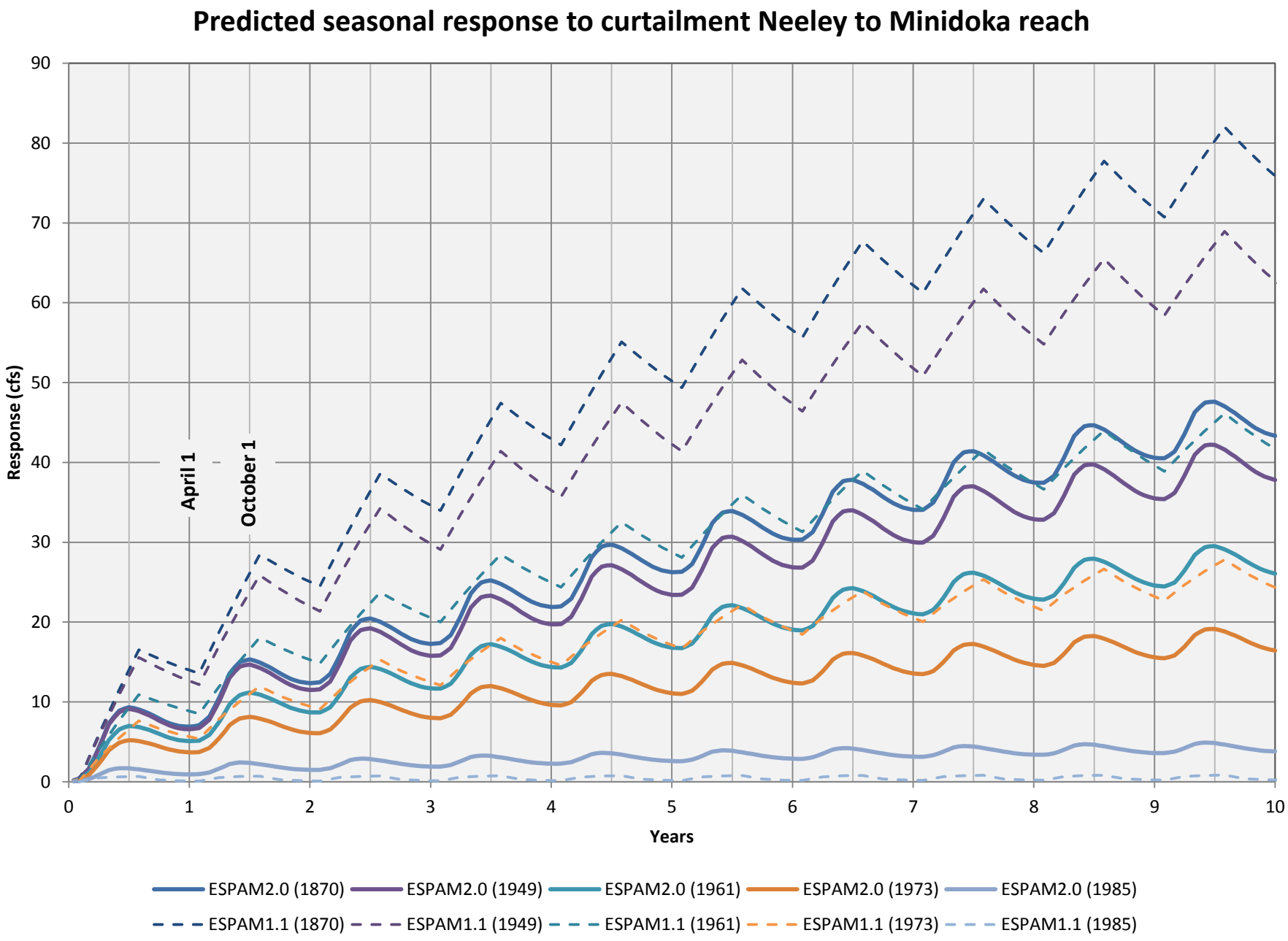
SHORT TERM SEASONAL TRANSIENT SIMULATIONS

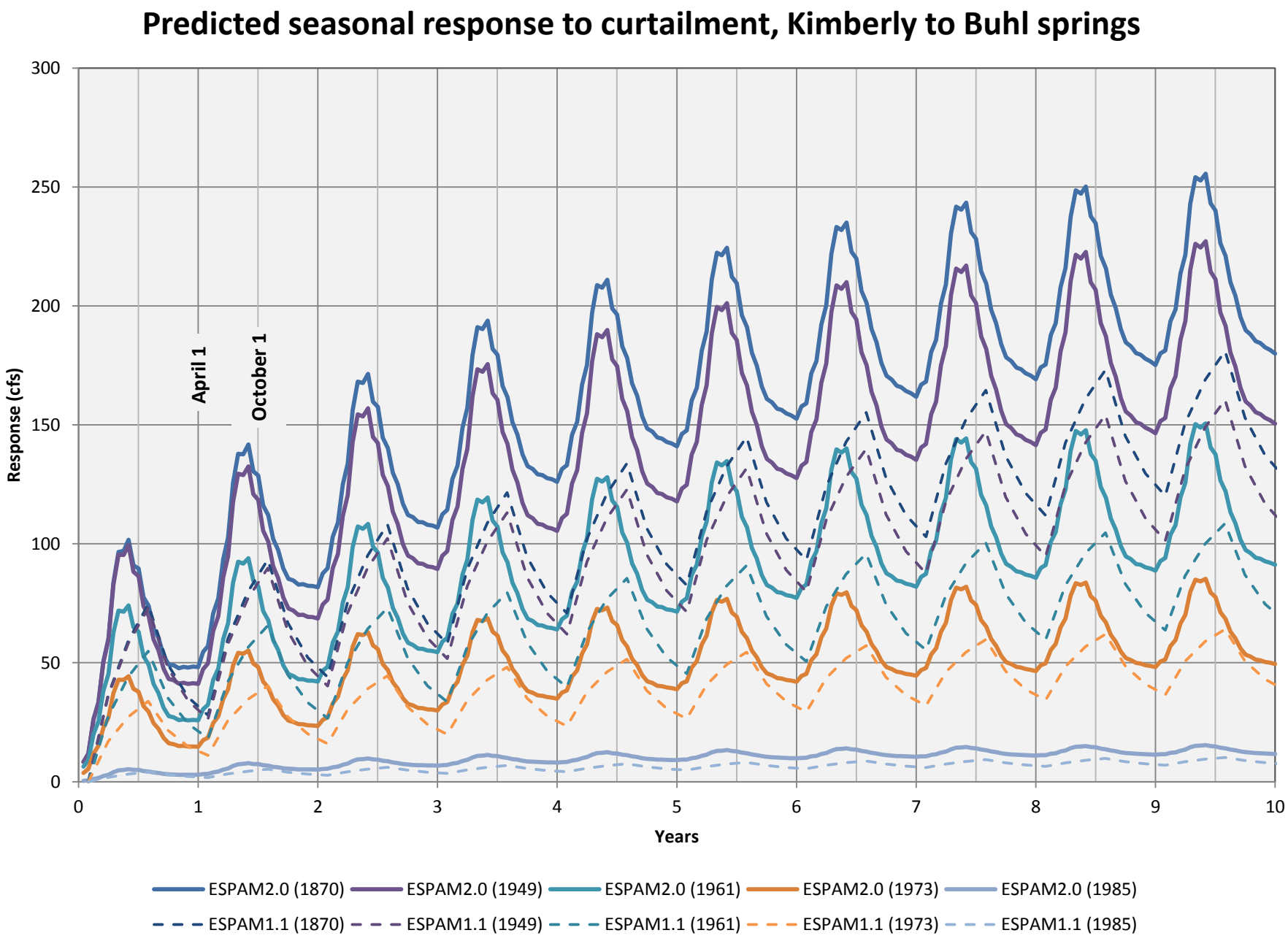

Predicted seasonal response to curtailment, Ashton to Rexburg reach
Response (cfs)
250
200
150
100
50
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)

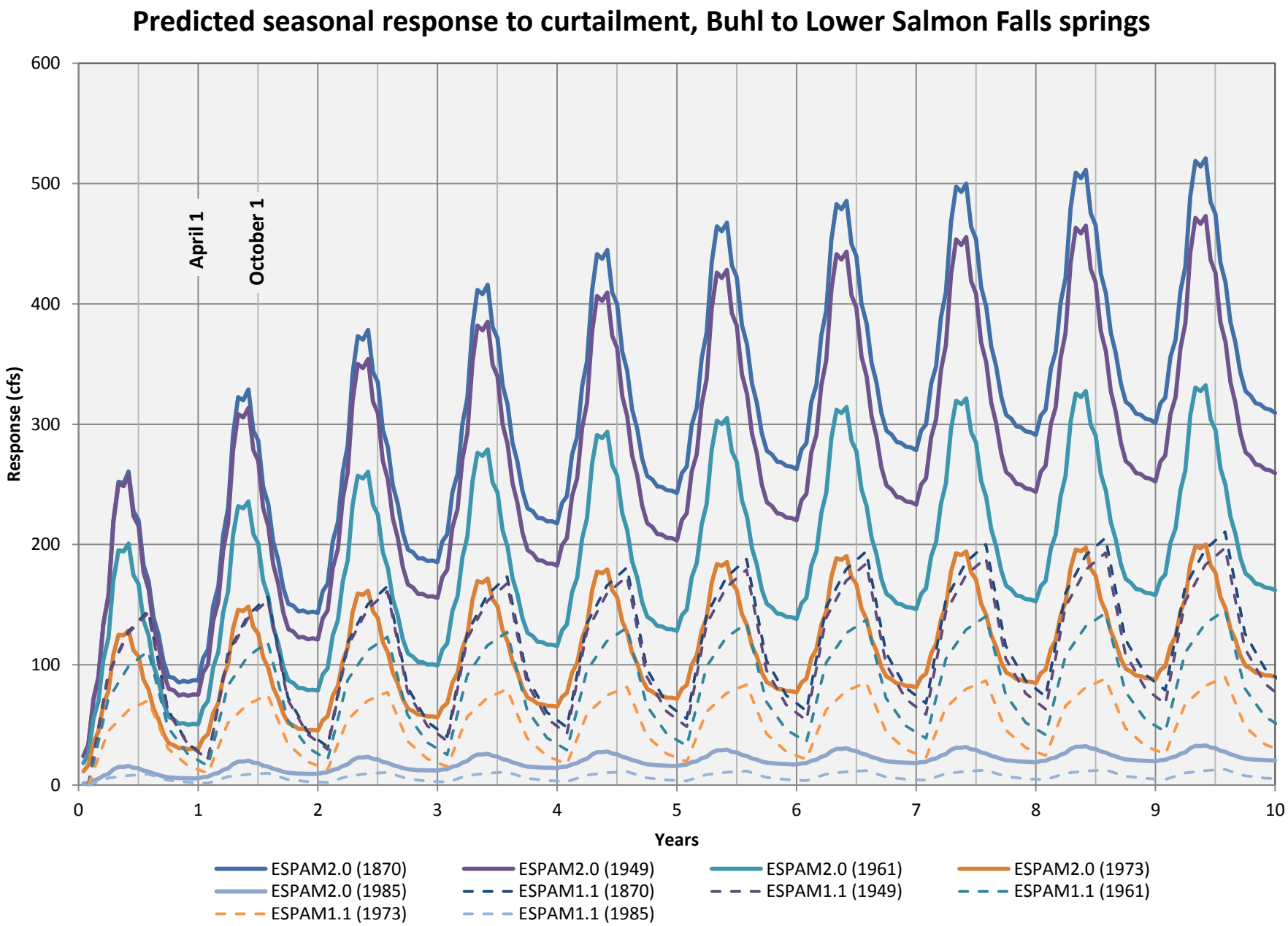

Predicted seasonal response to curtailment, Heise to Shelley reach
Response (cfs)
300
250
200
150
100
50
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)

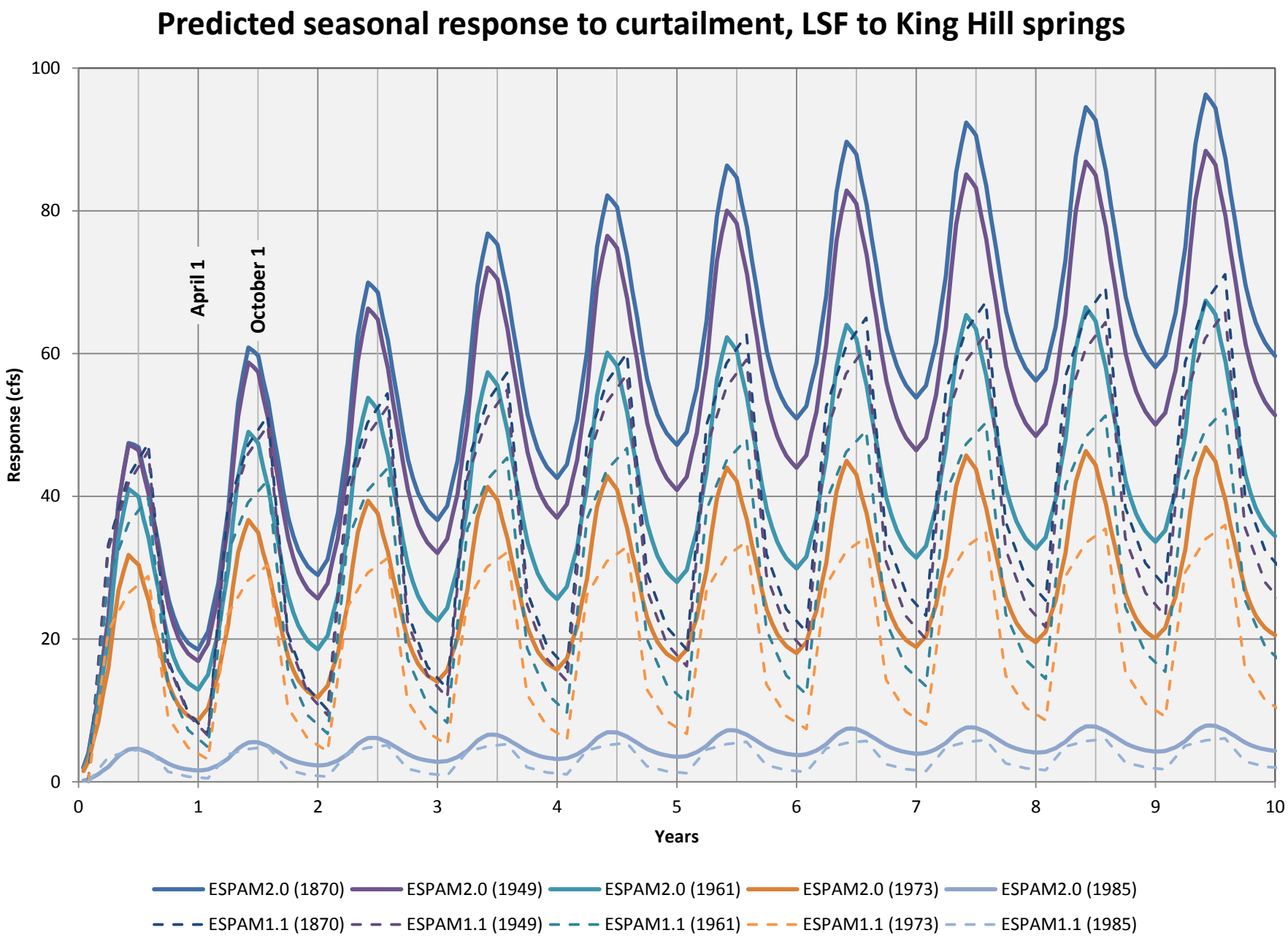

Predicted seasonal response to curtailment, Shelley to near Blackfoot reach
Response (cfs)
Years
April 1
October 1
0
50
100
150
200
250
300
350
400
0
1
2
3
4
5
6
7
8
9
10
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)


Predicted seasonal response to curtailment, near Blackfoot to Neeley reach
Response (cfs)
1200
1000
800
600
400
200
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)


Predicted seasonal response to curtailment Neeley to Minidoka reach
Response (cfs)
Years
April 1
October 1
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4
5
6
7
8
9
10
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)


Predicted seasonal response to curtailment, Kimberly to Buhl springs
Response (cfs)
300
250
200
150
100
50
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)


Predicted seasonal response to curtailment, Buhl to Lower Salmon Falls springs
Response (cfs)
600
500
400
300
200
100
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)


Predicted seasonal response to curtailment, LSF to King Hill springs
Response (cfs)
100
80
60
40
20
0
April 1
October 1
0
1
2
3
4
5
6
7
8
9
10
Years
ESPAM2.0 (1870)
ESPAM2.0 (1949)
ESPAM2.0 (1961)
ESPAM2.0 (1973)
ESPAM2.0 (1985)
ESPAM1.1 (1870)
ESPAM1.1 (1949)
ESPAM1.1 (1961)
ESPAM1.1 (1973)
ESPAM1.1 (1985)