Updated POD and irrigated lands files

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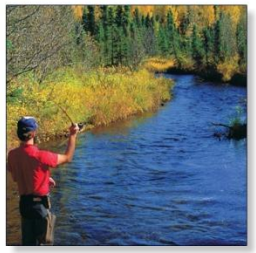
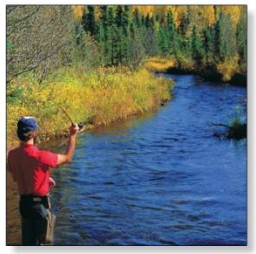
Outline

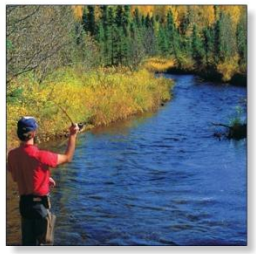


- What is POD file
- Why update files
- Changes in POD file
- Changes in irrigated lands file
- Effect of new files
  - Compare model simulation results using 2014 POD with 2008 irrigated lands & 2015 POD with 2010 irrigated lands



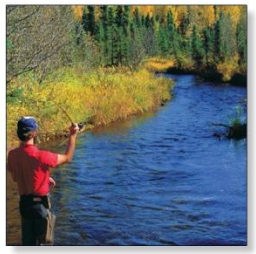
What is POD file

- Point of diversion (POD) file
  - GIS file of irrigation wells with water right priority dates and maximum irrigation diversion rates
  - Used in curtailment scenarios to calculate number of curtailed acres in each model cell
  - Used with irrigated lands file



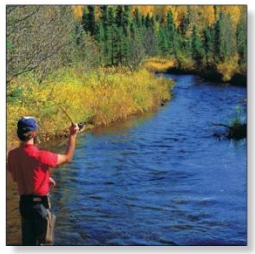
Why update files

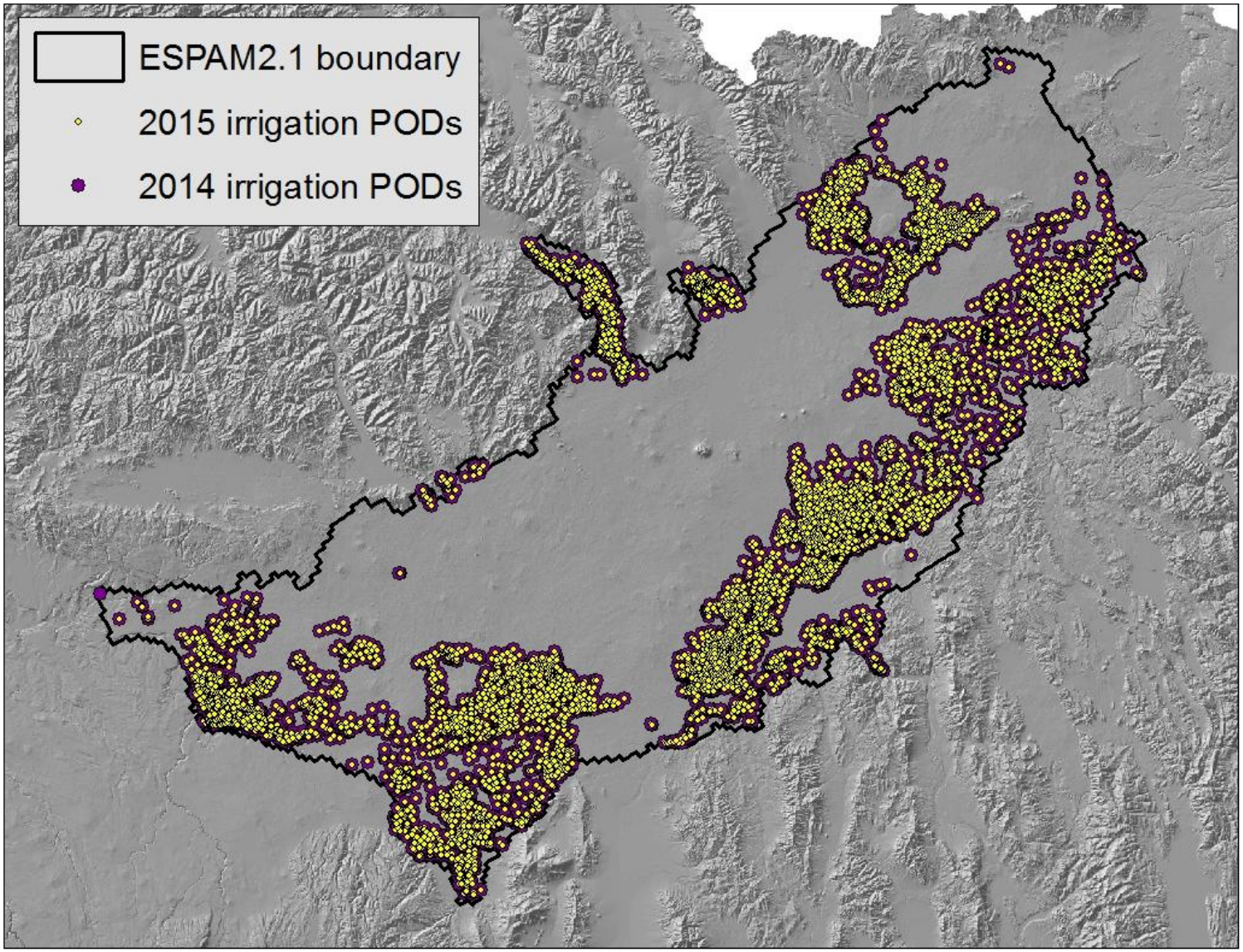
- Point of diversion (POD) file
  - IDWR water right database is continually updated
    - Snake River Basin Adjudication
    - Water right transfers
    - Licensing of permits/lapsed permits
    - Ownership changes and splits
    - Other changes to water right records
- Irrigated lands file
  - Changes in land use evaluated in conjunction with development of METRIC ET
  - 2010 is most recent year available

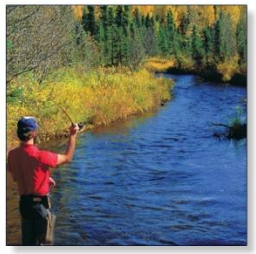


Changes in POD file

- 2006 POD file – 18,567 irr points of diversion within ESPAM1 boundary
- 2007 POD file – 18,524 irr points of diversion
- 2008 POD file – 18,936 irr points of diversion
- 2009 POD file – 18,909 irr points of diversion
- 2010 POD file – 20,095 irr points of diversion
- 2011 POD file – 20,841 irr points of diversion
- 2012 POD file – 21,314 irr points of diversion
- 2013 POD file – 22,041 irr points of diversion within ESPAM2 boundary
- 2014 POD file – 22,091 irr points of diversion
- 2015 POD file – 22,381 irr points of diversion

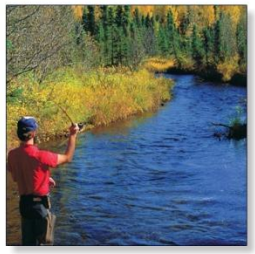


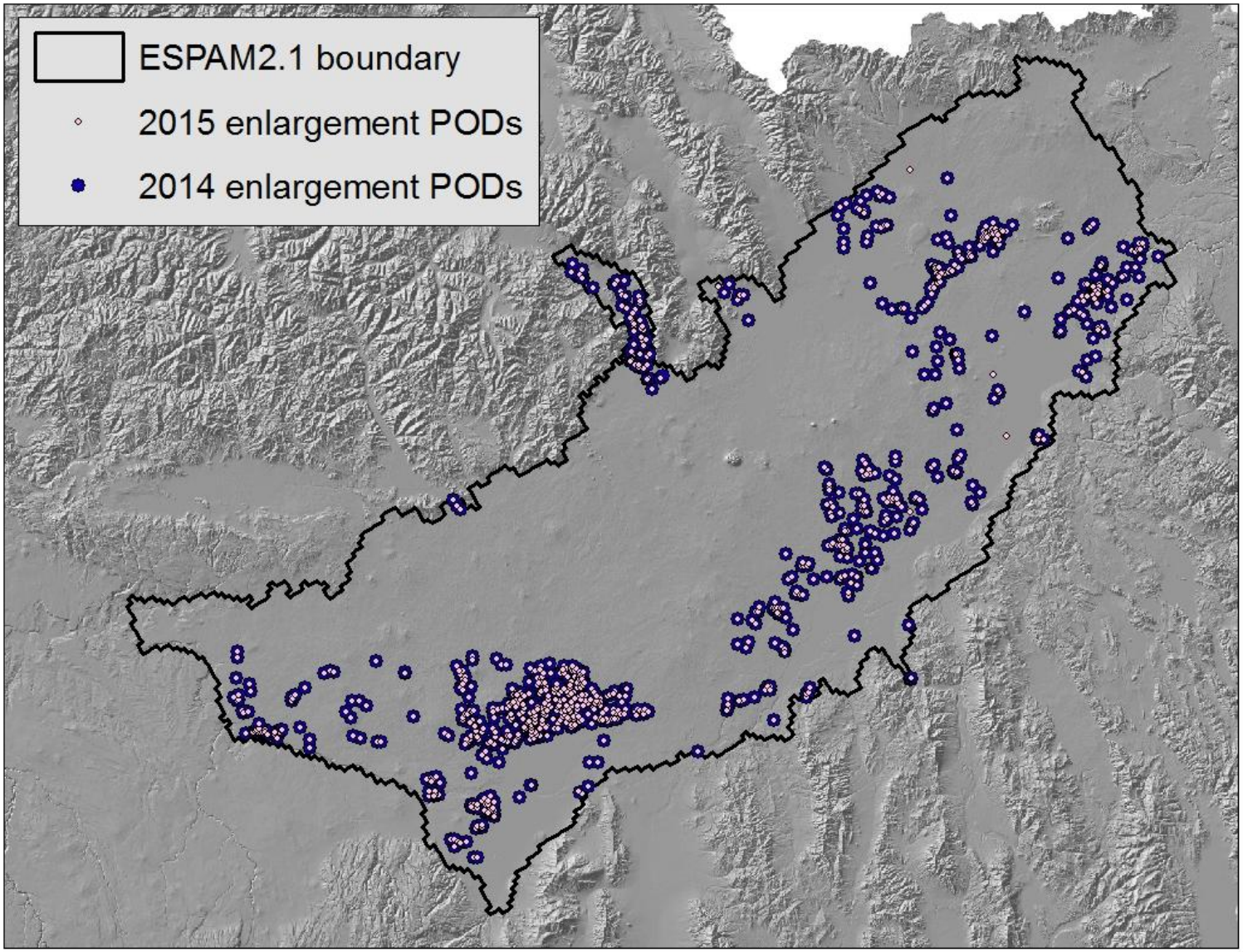

ESPAM2.1 boundary
2015 irrigation PODs
2014 irrigation PODs



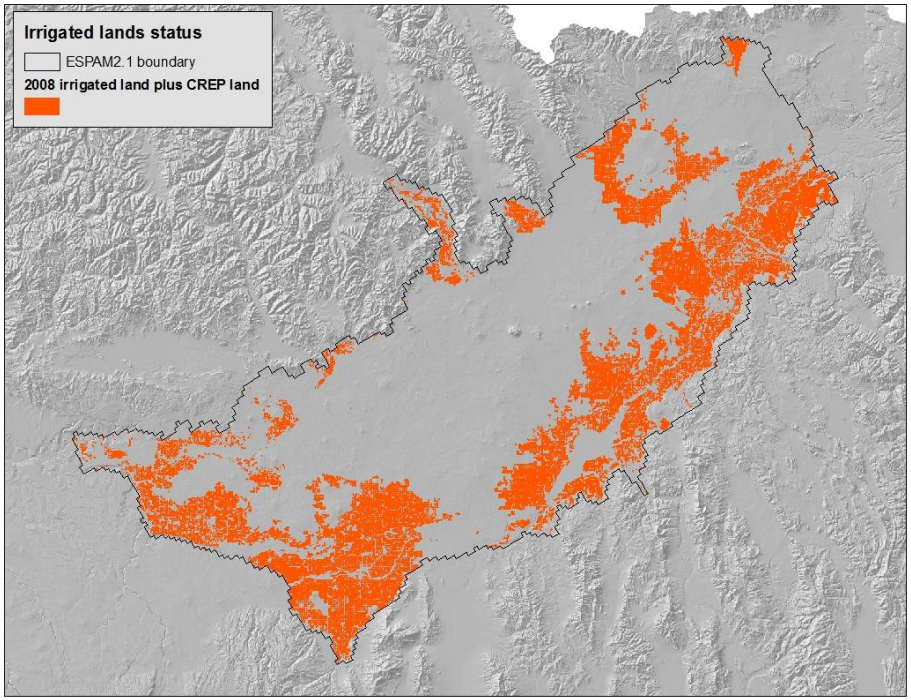
Changes in POD file

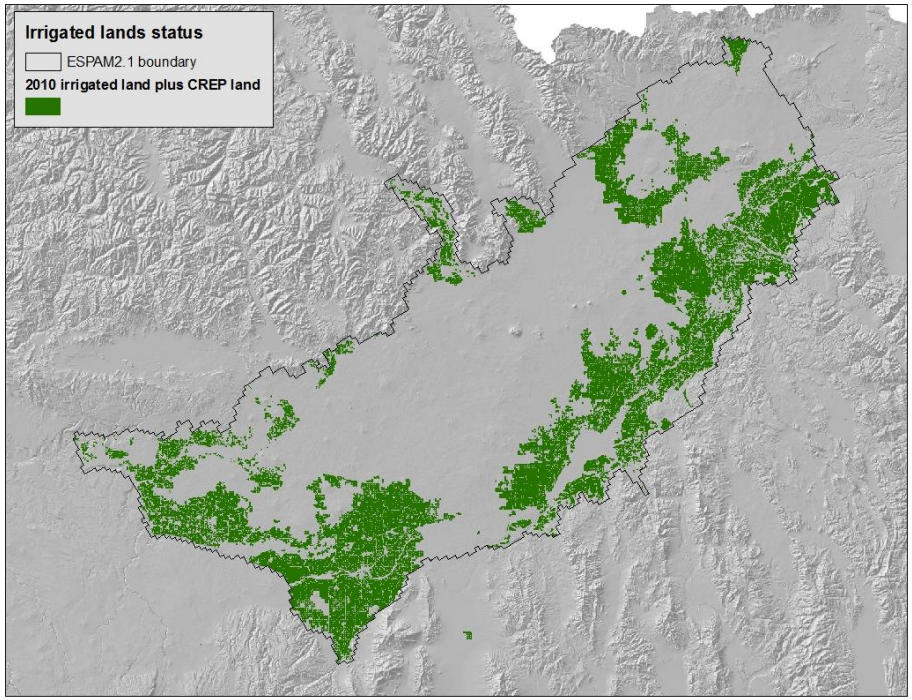
- 2006 POD file – 544 enlargements within ESPAM1 boundary
- 2007 POD file – 623 enlargements
- 2008 POD file – 743 enlargements
- 2009 POD file – 790 enlargements
- 2010 POD file – 1,934 enlargements
- 2011 POD file – 1,981 enlargements
- 2012 POD file – 1,998 enlargements
- 2013 POD file – 2,022 enlargements within ESPAM2 boundary
- 2014 POD file – 1,986 enlargements
- 2015 POD file – 2,006 enlargements



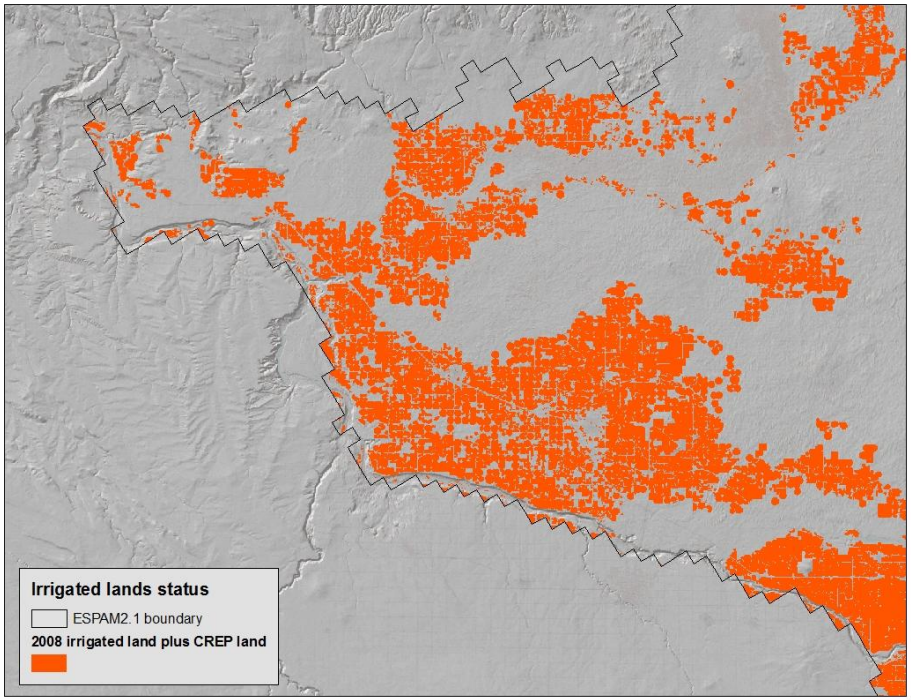

ESPAM2.1 boundary
2015 enlargement PODs
2014 enlargement PODs

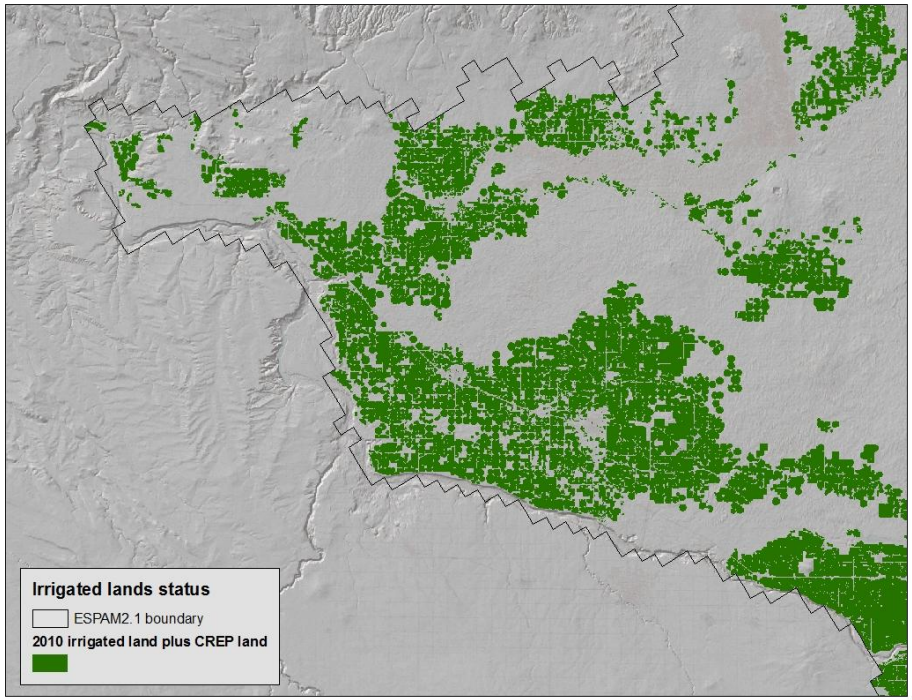
Changes in irrigated lands file

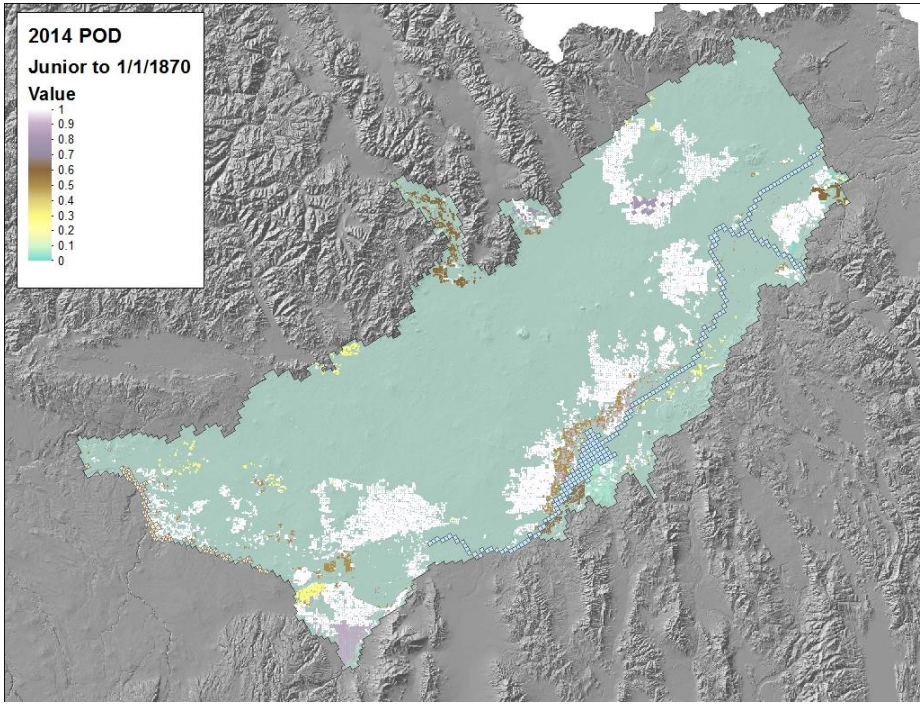


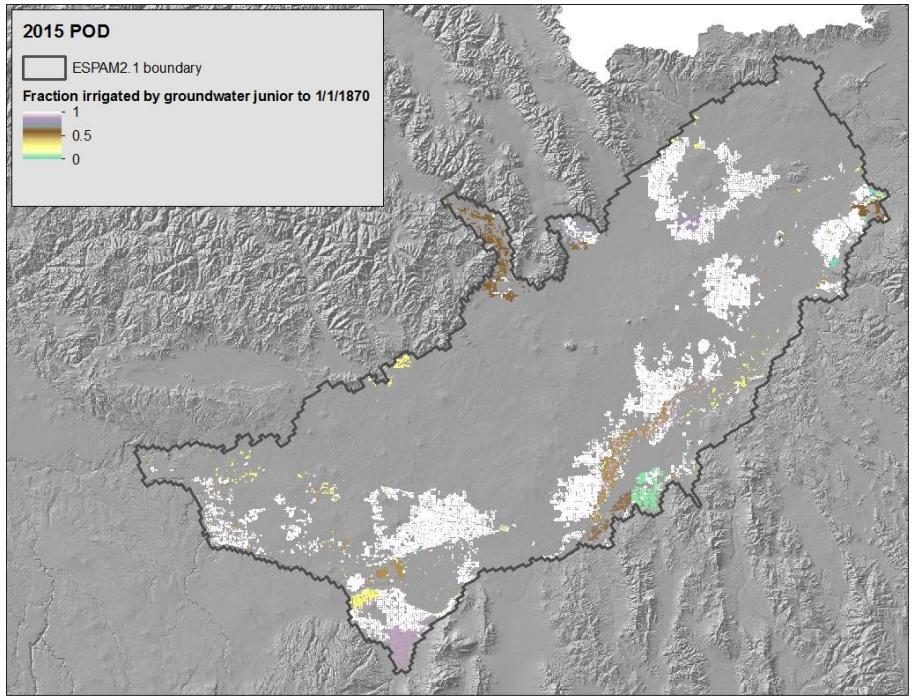


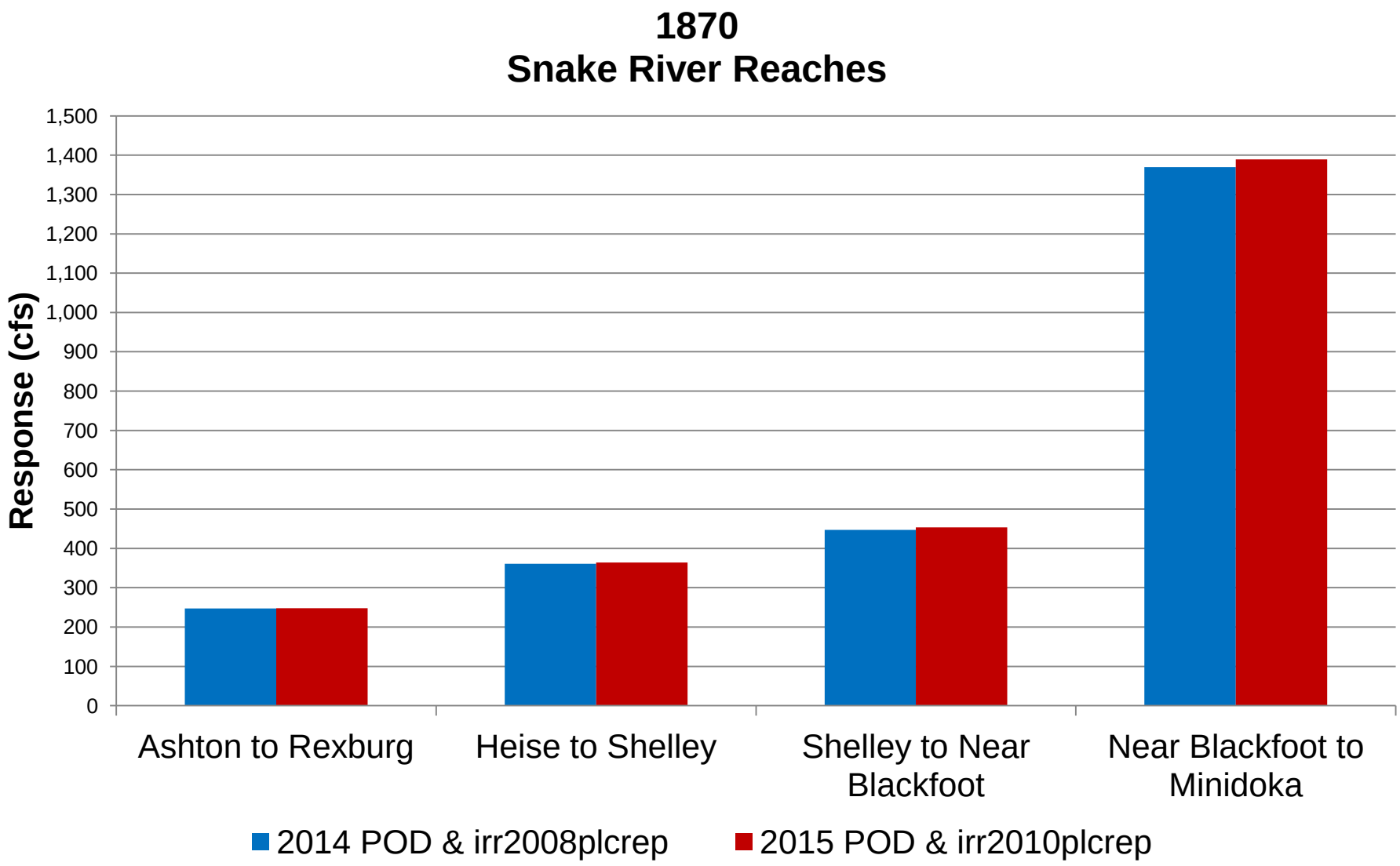
Changes in irrigated lands file

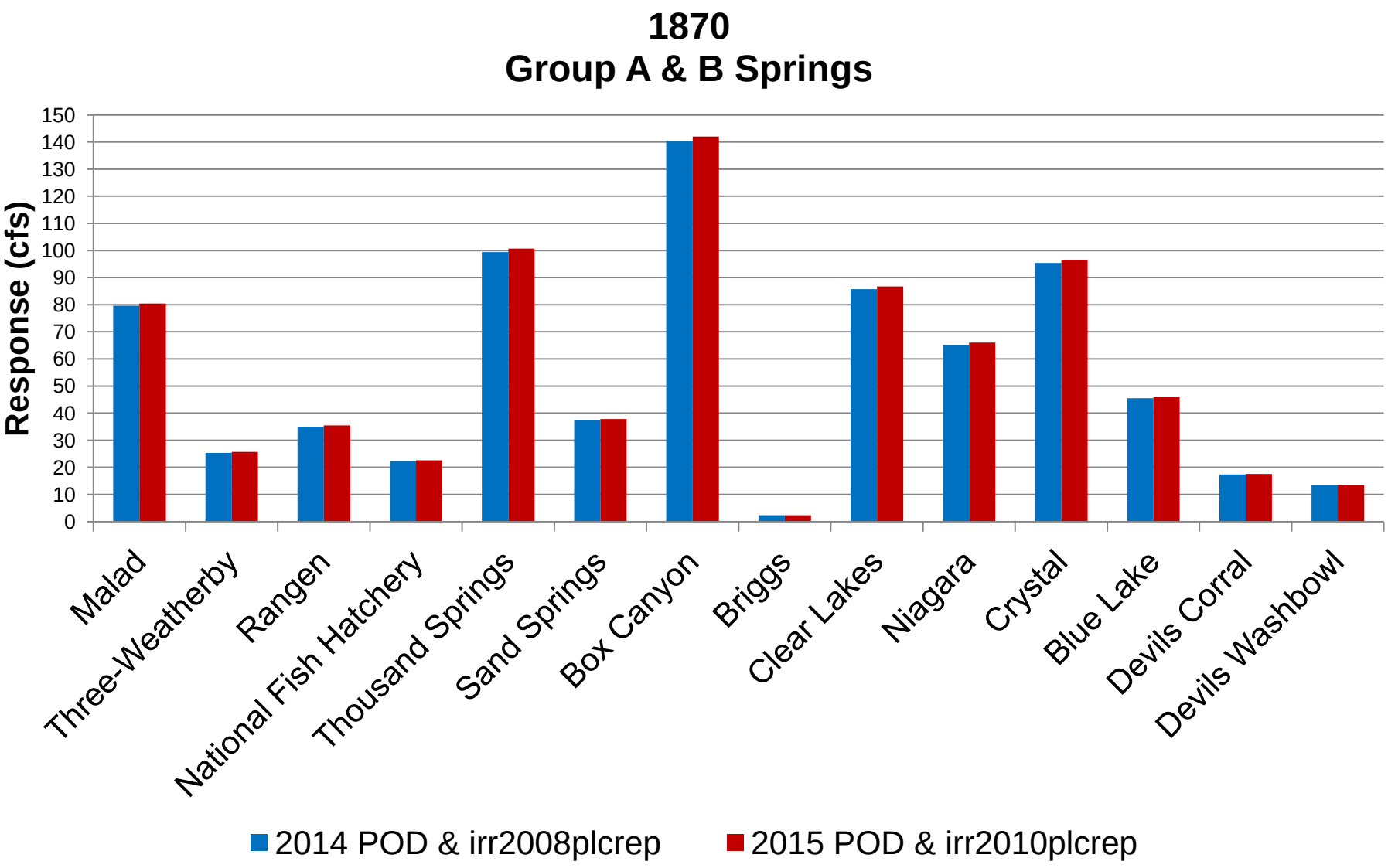





2014 POD
Junior to 1/1/1870
Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

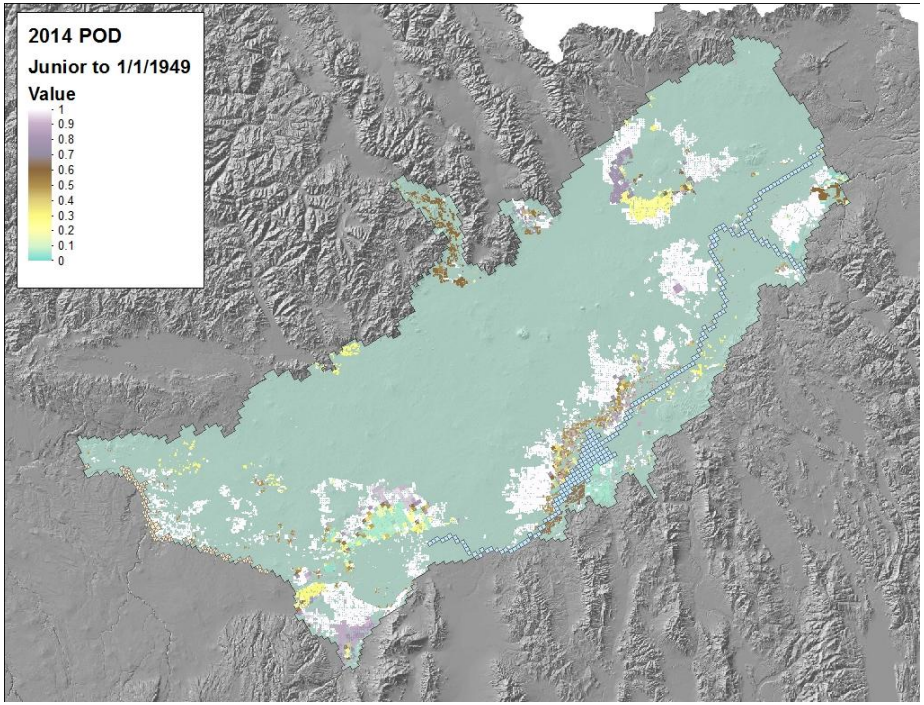

2015 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1870
1
0.5
0

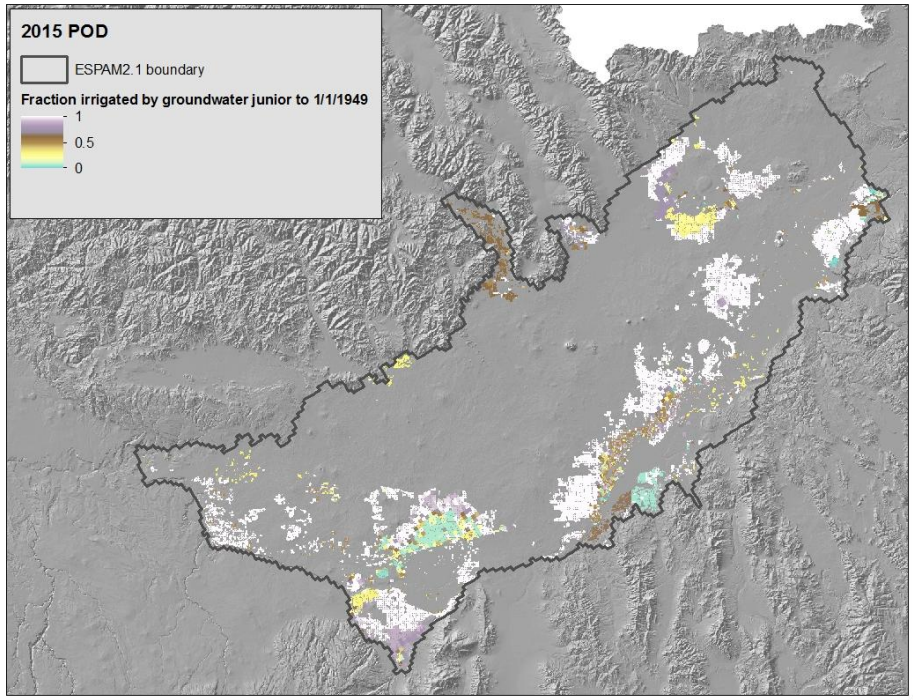

1870
Snake River Reaches
Response (cfs)
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0
Ashton to Rexburg
Heise to Shelley
Shelley to Near Blackfoot
Near Blackfoot to Minidoka
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

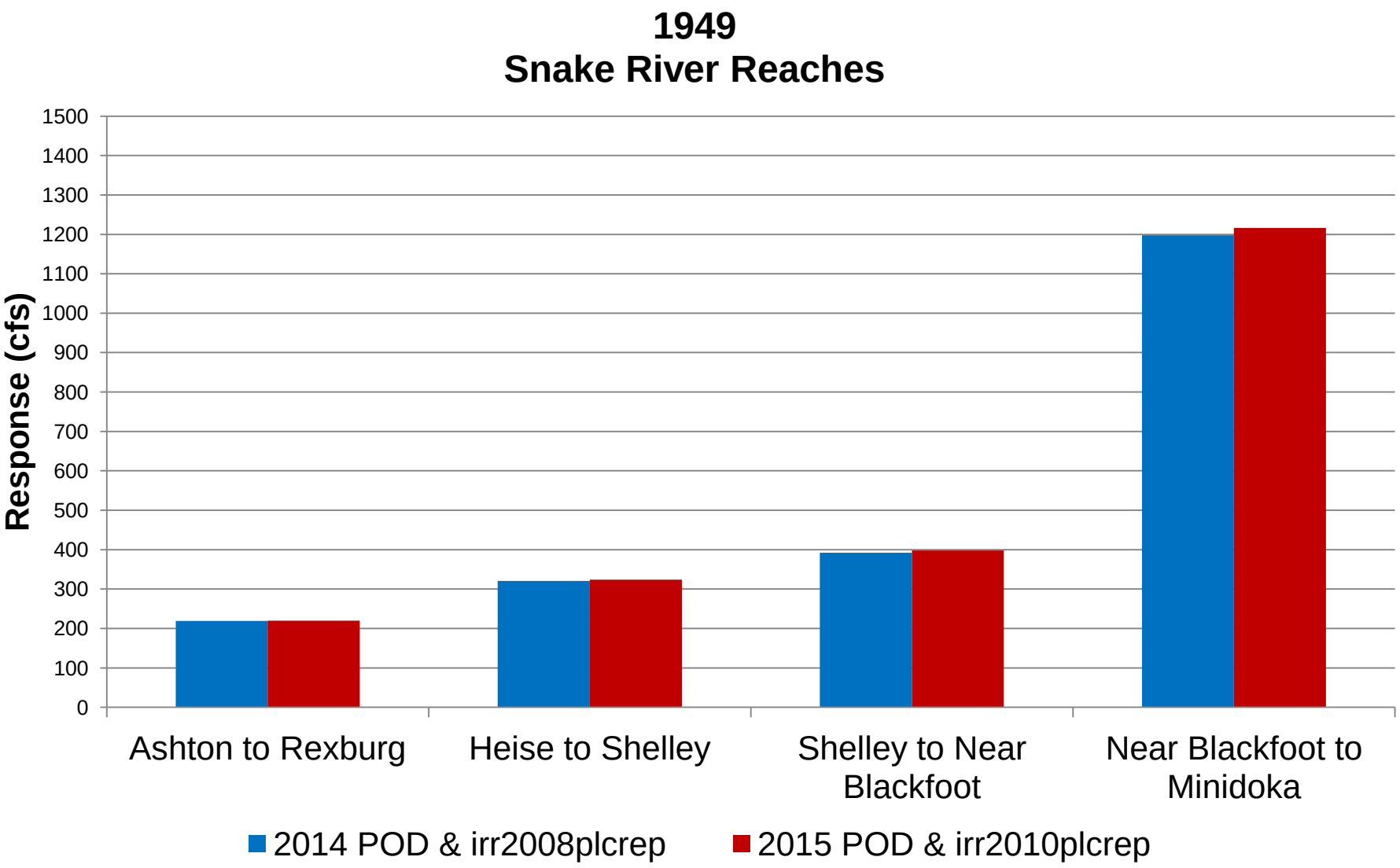

1870
Group A & B Springs
Response (cfs)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Malad
Three-Weatherby
Rangen
National Fish Hatchery
Thousand Springs
Sand Springs
Box Canyon
Briggs
Clear Lakes
Niagara
Crystal
Blue Lake
Devils Corral
Devils Washbowl
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

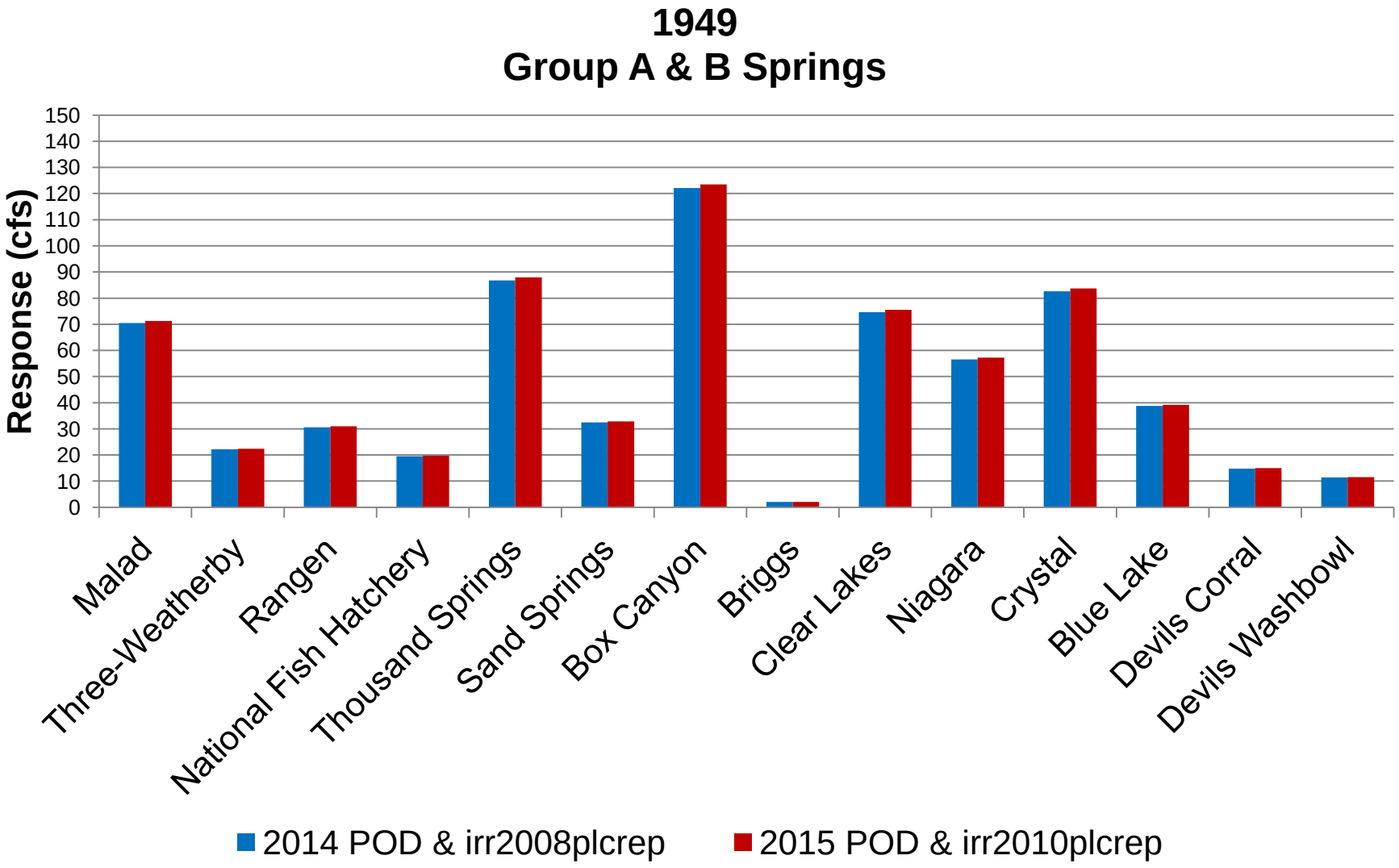
Reach Name		ESPAM2.1 prediction of steady state accrual in response to curtailment (cfs)		
		POD 2014 & irr2008plcrep January 1, 1870	POD 2015 & irr2010plcrep January 1, 1870	2015/2014
Ashton to Rexburg		246.97	248.03	100.43%
Heise to Shelley		360.67	363.86	100.89%
Shelley to Near Blackfoot		446.83	453.14	101.41%
Near Blackfoot to Minidoka		1369.42	1389.35	101.46%
Kimberly to Buhl springs	D070030	0.11	0.11	100.94%
	D069029	0.12	0.12	100.94%
	D068029	0.08	0.08	100.94%
	Devil's Washbowl	13.37	13.50	100.94%
	Devil's Corral	17.39	17.55	100.94%
	D065027	1.21	1.23	100.94%
	D064026	1.17	1.18	100.93%
	Blue Lakes	45.54	45.98	100.97%
	D062023	0.10	0.10	101.00%
	D061023	0.38	0.39	101.01%
	D059022	0.04	0.04	101.00%
	D059021	0.00	0.00	100.91%
	Ellison	0.26	0.26	101.01%
	D058020	0.04	0.04	101.02%
	D057020	0.13	0.13	101.04%
	Crystal	95.39	96.63	101.30%
	Niagara	65.15	65.99	101.28%
Buhl to Lower Salmon Falls springs	D051014	0.01	0.01	101.14%
	D050014	0.00	0.00	101.14%
	Clear Lakes	85.75	86.71	101.12%
	Briggs	2.31	2.34	101.12%
	Banbury	6.71	6.78	101.09%
	D047011	0.23	0.23	101.09%
	Box	140.38	142.00	101.15%
	Sand	37.36	37.79	101.16%
	D045011	0.00	0.00	101.21%
	D045012	0.07	0.07	101.21%
	Thousand	99.43	100.73	101.31%
	NFH	22.31	22.59	101.26%
	Tucker	2.21	2.24	101.24%
	Rangen	35.00	35.43	101.24%
	Three	25.37	25.68	101.23%
	D040013	0.17	0.17	101.23%
	D040014	1.58	1.60	101.23%
	Big	13.74	13.91	101.22%
	D038014	1.88	1.90	101.20%
	D037014	0.29	0.29	101.14%
	Birch	0.13	0.13	101.17%
Lower Salmon Falls to King Hill springs	D036014	0.39	0.40	101.05%
	Malad	79.58	80.42	101.05%
	D035014	0.34	0.35	100.95%
	D034014	2.65	2.67	100.91%
	D033013	0.00	0.00	100.90%
	D033014	0.96	0.97	100.90%
	D032013	0.03	0.03	100.89%
	D032014	0.56	0.57	100.90%
	D031013	0.15	0.15	100.88%
	D031014	0.17	0.17	100.89%
	D030013	0.06	0.06	100.83%
	Bancroft	0.92	0.92	99.89%

Kimberly to Buhl springs	240.48	243.32	101.18%
Buhl to LSF springs	474.92	480.61	101.20%
LSF to King Hill springs	85.81	86.70	101.03%
Kimberly to Buhl baseflow	21.64	21.85	100.96%
Buhl to LSF baseflow	12.36	12.51	101.20%
LSF to King Hill baseflow	6.94	6.99	100.77%
Kimberly to Buhl reach gain	262.12	265.17	101.16%
Buhl to LSF reach gain	487.28	493.12	101.20%
LSF to King Hill reach gain	92.75	93.69	101.01%
Kimberly to King Hill reach gain	842.15	851.97	101.17%
Total response	3266.04	3306.35	101.23%
Total Acres Curtailed	1,058,445	1,070,690	101.16%


2014 POD
Junior to 1/1/1949
Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0

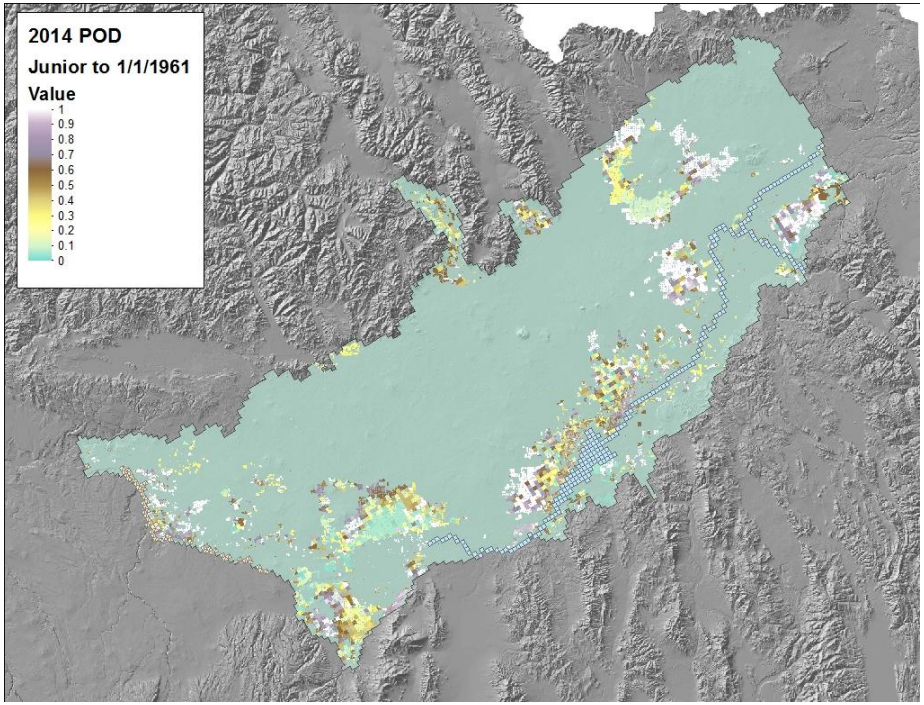

2015 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1949
1
0.5
0

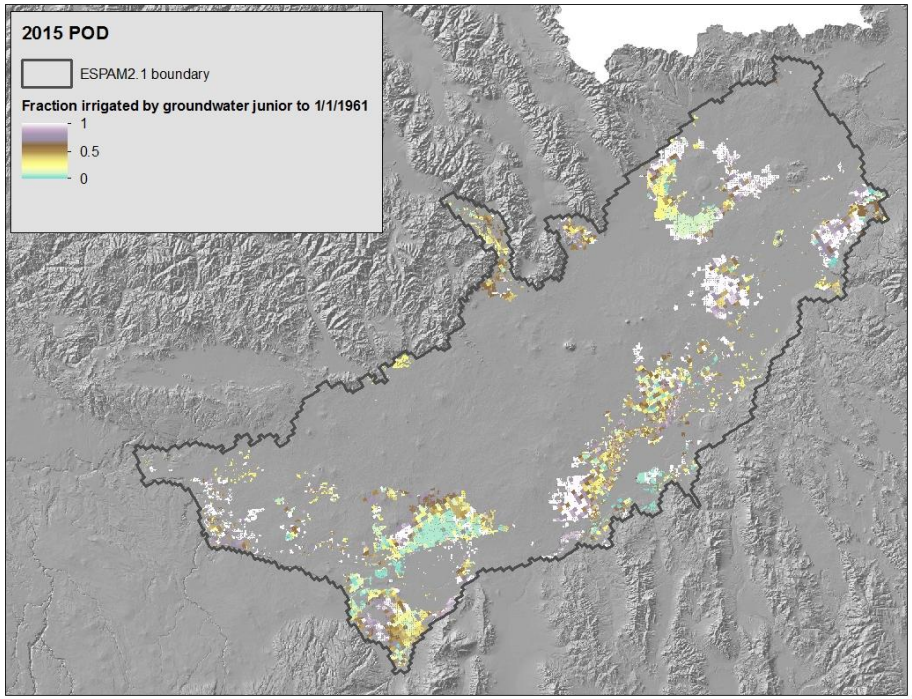

1949
Snake River Reaches
Response (cfs)
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Ashton to Rexburg
Heise to Shelley
Shelley to Near Blackfoot
Near Blackfoot to Minidoka
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

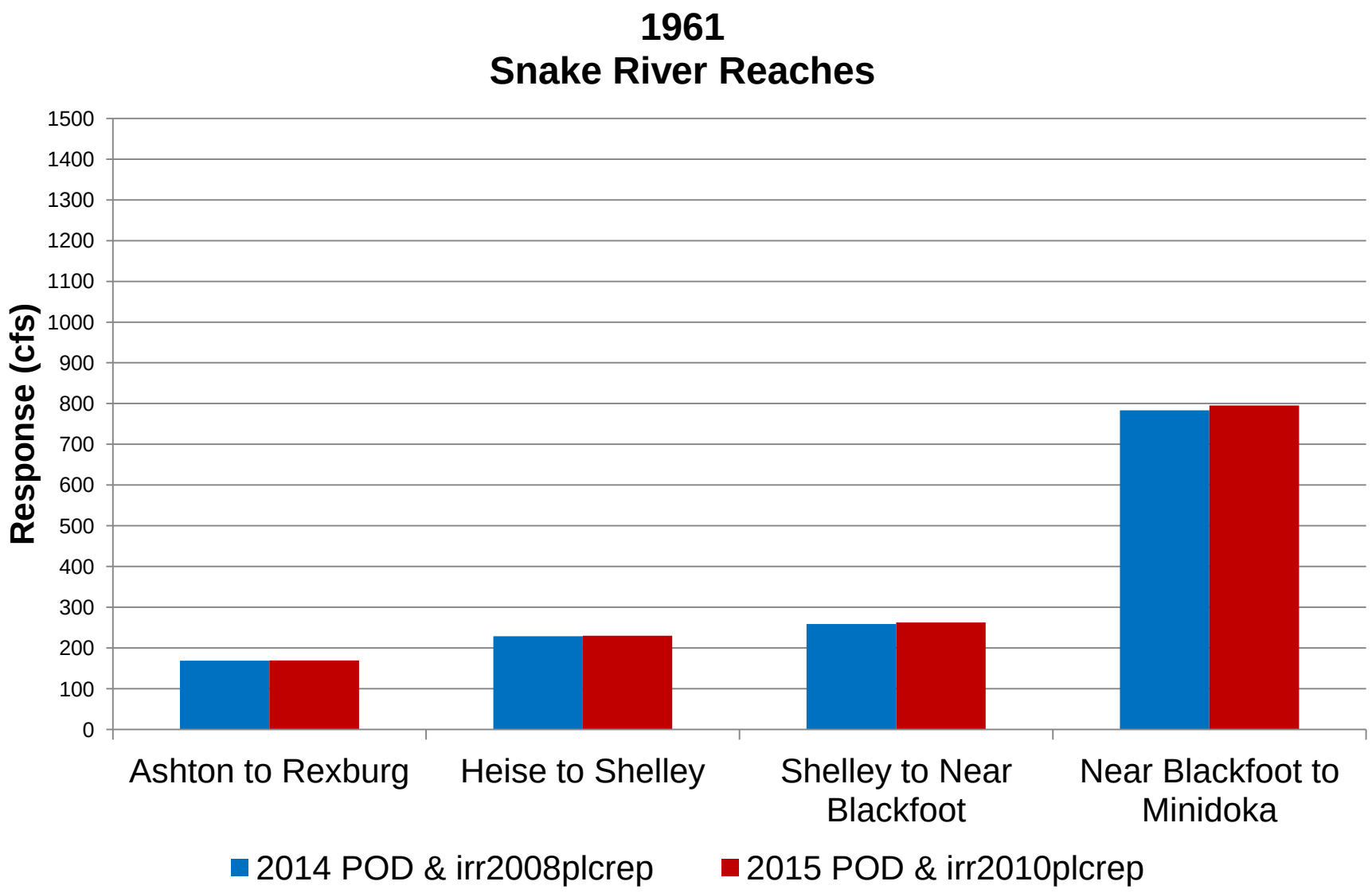

1949
Group A & B Springs
Response (cfs)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Malad
Three-Weatherby
Rangen
National Fish Hatchery
Thousand Springs
Sand Springs
Box Canyon
Briggs
Clear Lakes
Niagara
Crystal
Blue Lake
Devils Corral
Devils Washbowl
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

Reach Name		ESPAM2.1 prediction of steady state accrual in response to curtailment (cfs)		
		POD 2014 & irr2008plcrep January 1, 1949	POD 2015 & irr2010plcrep January 1, 1949	2015/2014
Ashton to Rexburg		218.94	219.89	100.43%
Heise to Shelley		320.63	323.69	100.96%
Shelley to Near Blackfoot		391.87	397.81	101.52%
Near Blackfoot to Minidoka		1197.53	1216.31	101.57%
Kimberly to Buhl springs	D070030	0.09	0.09	100.89%
	D069029	0.10	0.10	100.89%
	D068029	0.07	0.07	100.89%
	Devil's Washbowl	11.38	11.49	100.89%
	Devil's Corral	14.80	14.94	100.89%
	D065027	1.03	1.04	100.89%
	D064026	0.99	1.00	100.88%
	Blue Lakes	38.80	39.16	100.93%
	D062023	0.08	0.08	100.97%
	D061023	0.33	0.33	100.98%
	D059022	0.04	0.04	100.97%
	D059021	0.00	0.00	100.87%
	Ellison	0.22	0.22	100.98%
	D058020	0.03	0.03	101.00%
	D057020	0.11	0.11	101.02%
	Crystal	82.65	83.73	101.32%
	Niagara	56.54	57.28	101.30%
Buhl to Lower Salmon Falls springs	D051014	0.00	0.00	101.14%
	D050014	0.00	0.00	101.14%
	Clear Lakes	74.64	75.47	101.11%
	Briggs	2.01	2.04	101.11%
	Banbury	5.84	5.91	101.08%
	D047011	0.20	0.20	101.08%
	Box	122.08	123.48	101.15%
	Sand	32.49	32.86	101.16%
	D045011	0.00	0.00	101.22%
	D045012	0.06	0.06	101.22%
	Thousand	86.79	87.95	101.34%
	NFH	19.49	19.74	101.27%
	Tucker	1.93	1.95	101.25%
	Rangen	30.56	30.95	101.26%
	Three	22.16	22.43	101.25%
	D040013	0.14	0.15	101.24%
	D040014	1.38	1.40	101.24%
	Big	12.01	12.15	101.23%
	D038014	1.64	1.66	101.21%
	D037014	0.25	0.25	101.14%
	Birch	0.11	0.11	101.17%
Lower Salmon Falls to King Hill springs	D036014	0.35	0.35	101.04%
	Malad	70.48	71.22	101.05%
	D035014	0.31	0.31	100.94%
	D034014	2.36	2.38	100.90%
	D033013	0.00	0.00	100.89%
	D033014	0.86	0.86	100.89%
	D032013	0.02	0.02	100.88%
	D032014	0.50	0.51	100.89%
	D031013	0.13	0.14	100.87%
	D031014	0.15	0.15	100.87%
	D030013	0.05	0.05	100.81%
	Bancroft	0.87	0.87	99.83%

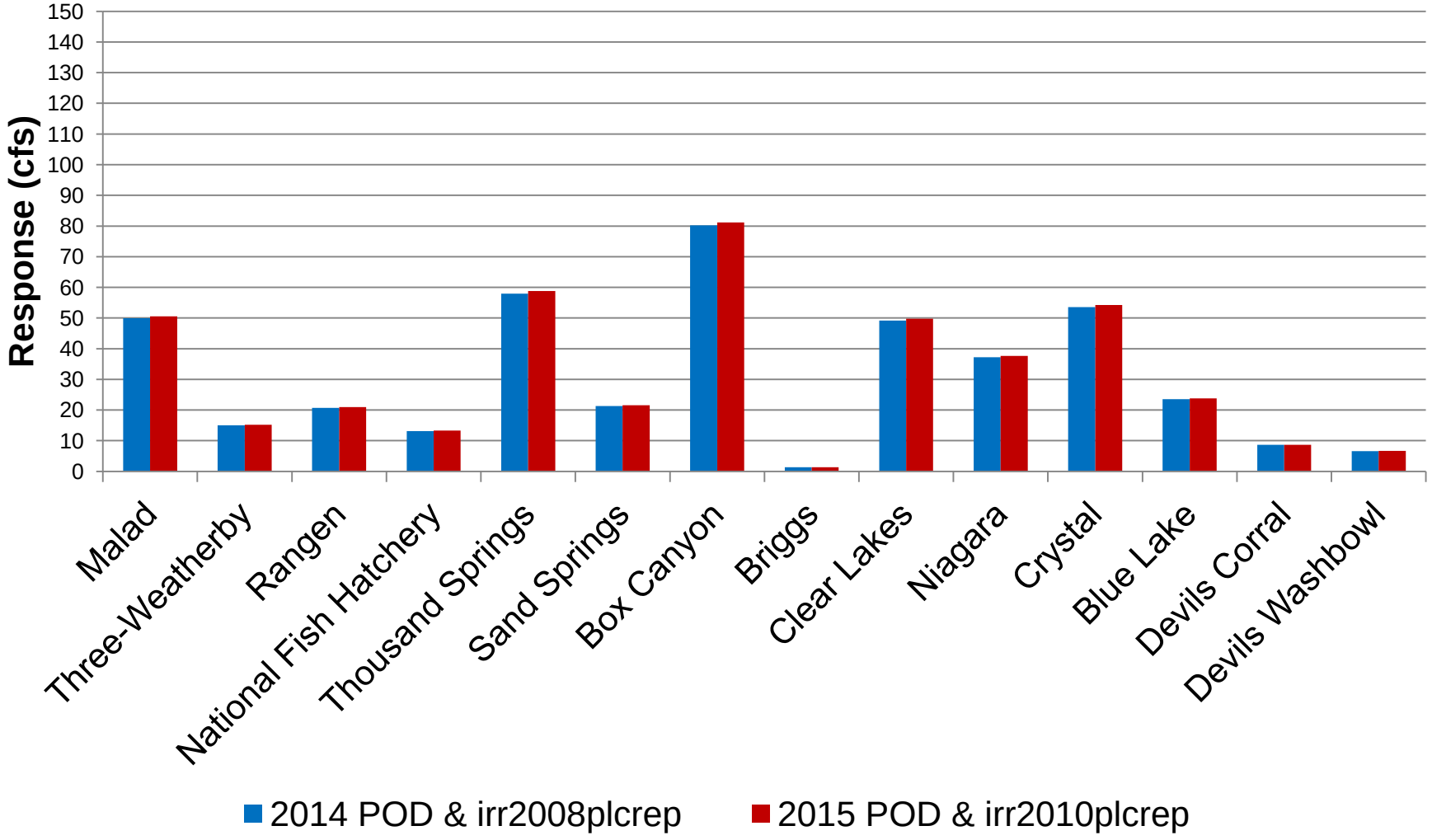
Kimberly to Buhl springs	207.28	209.72	101.18%
Buhl to LSF springs	413.79	418.77	101.20%
LSF to King Hill springs	76.09	76.87	101.03%
Kimberly to Buhl baseflow	18.45	18.62	100.91%
Buhl to LSF baseflow	10.78	10.91	101.21%
LSF to King Hill baseflow	6.24	6.28	100.74%
Kimberly to Buhl reach gain	225.73	228.34	101.16%
Buhl to LSF reach gain	424.57	429.69	101.20%
LSF to King Hill reach gain	82.32	83.15	101.01%
Kimberly to King Hill reach gain	732.62	741.18	101.17%
Total response	2861.58	2898.87	101.30%
Total Acres Curtailed	935,833	947,185	101.21%


2014 POD
Junior to 1/1/1961
Value
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0


2015 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1961
1
0.5
0

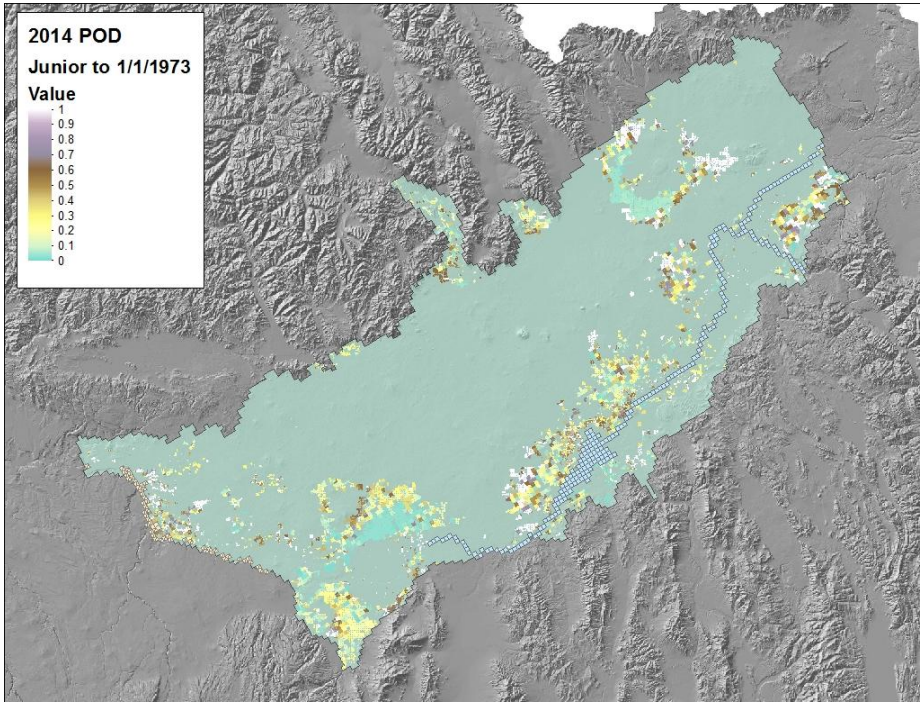

1961
Snake River Reaches
Response (cfs)
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Ashton to Rexburg
Heise to Shelley
Shelley to Near Blackfoot
Near Blackfoot to Minidoka
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

1961
Group A & B Springs



Reach Name		ESPAM2.1 prediction of steady state accrual in response to curtailment (cfs)		
		POD 2014 & irr2008plcrep January 1, 1961	POD 2015 & irr2010plcrep January 1, 1961	2015/2014
Ashton to Rexburg		168.97	169.75	100.46%
Heise to Shelley		228.67	229.91	100.54%
Shelley to Near Blackfoot		259.08	262.69	101.40%
Near Blackfoot to Minidoka		783.63	795.12	101.47%
Kimberly to Buhl springs	D070030	0.05	0.05	100.79%
	D069029	0.06	0.06	100.79%
	D068029	0.04	0.04	100.80%
	Devil's Washbowl	6.62	6.67	100.80%
	Devil's Corral	8.63	8.70	100.80%
	D065027	0.60	0.61	100.80%
	D064026	0.59	0.59	100.81%
	Blue Lakes	23.56	23.77	100.90%
	D062023	0.05	0.05	100.95%
	D061023	0.20	0.20	100.97%
	D059022	0.02	0.02	100.96%
	D059021	0.00	0.00	100.80%
	Ellison	0.14	0.14	100.99%
	D058020	0.02	0.02	101.03%
	D057020	0.07	0.07	101.06%
	Crystal	53.54	54.27	101.36%
	Niagara	37.18	37.67	101.32%
Buhl to Lower Salmon Falls springs	D051014	0.00	0.00	101.17%
	D050014	0.00	0.00	101.17%
	Clear Lakes	49.19	49.75	101.14%
	Briggs	1.33	1.35	101.14%
	Banbury	3.86	3.90	101.11%
	D047011	0.13	0.13	101.11%
	Box	80.25	81.20	101.19%
	Sand	21.30	21.56	101.20%
	D045011	0.00	0.00	101.30%
	D045012	0.04	0.04	101.30%
	Thousand	57.92	58.78	101.48%
	NFH	13.16	13.35	101.39%
	Tucker	1.31	1.32	101.36%
	Rangen	20.67	20.96	101.37%
	Three	15.03	15.23	101.35%
	D040013	0.10	0.10	101.35%
	D040014	0.94	0.95	101.35%
	Big	8.16	8.27	101.34%
	D038014	1.12	1.13	101.32%
	D037014	0.17	0.18	101.25%
	Birch	0.08	0.08	101.27%
Lower Salmon Falls to King Hill springs	D036014	0.24	0.25	101.07%
	Malad	49.98	50.51	101.06%
	D035014	0.22	0.22	100.90%
	D034014	1.70	1.72	100.84%
	D033013	0.00	0.00	100.82%
	D033014	0.62	0.62	100.83%
	D032013	0.02	0.02	100.82%
	D032014	0.36	0.37	100.82%
	D031013	0.10	0.10	100.80%
	D031014	0.11	0.11	100.81%
	D030013	0.04	0.04	100.73%
	Bancroft	0.77	0.76	99.66%

Kimberly to Buhl springs	131.38	132.95	101.19%
Buhl to LSF springs	274.76	278.28	101.28%
LSF to King Hill springs	54.15	54.71	101.03%
Kimberly to Buhl baseflow	10.94	11.03	100.84%
Buhl to LSF baseflow	7.24	7.33	101.30%
LSF to King Hill baseflow	4.64	4.67	100.64%
Kimberly to Buhl reach gain	142.32	143.98	101.17%
Buhl to LSF reach gain	282.00	285.61	101.28%
LSF to King Hill reach gain	58.79	59.38	101.00%
Kimberly to King Hill reach gain	483.11	488.97	101.21%
Total response	1923.47	1946.45	101.19%
Total Acres Curtailed	636,744	643,713	101.09%
AF/acre	2.19	2.19	100.10%


2014 POD
Junior to 1/1/1973
Value
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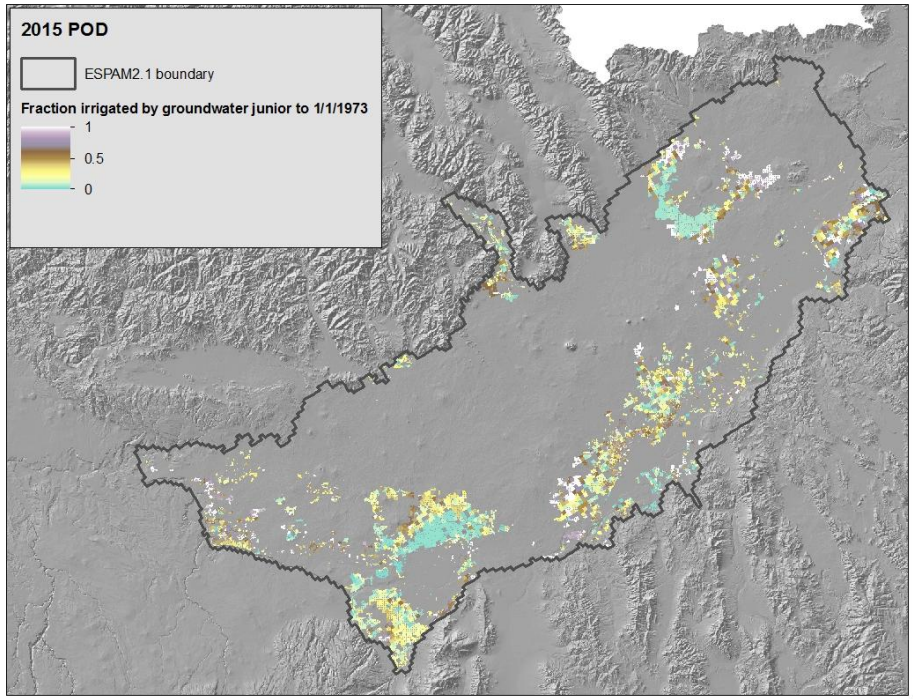
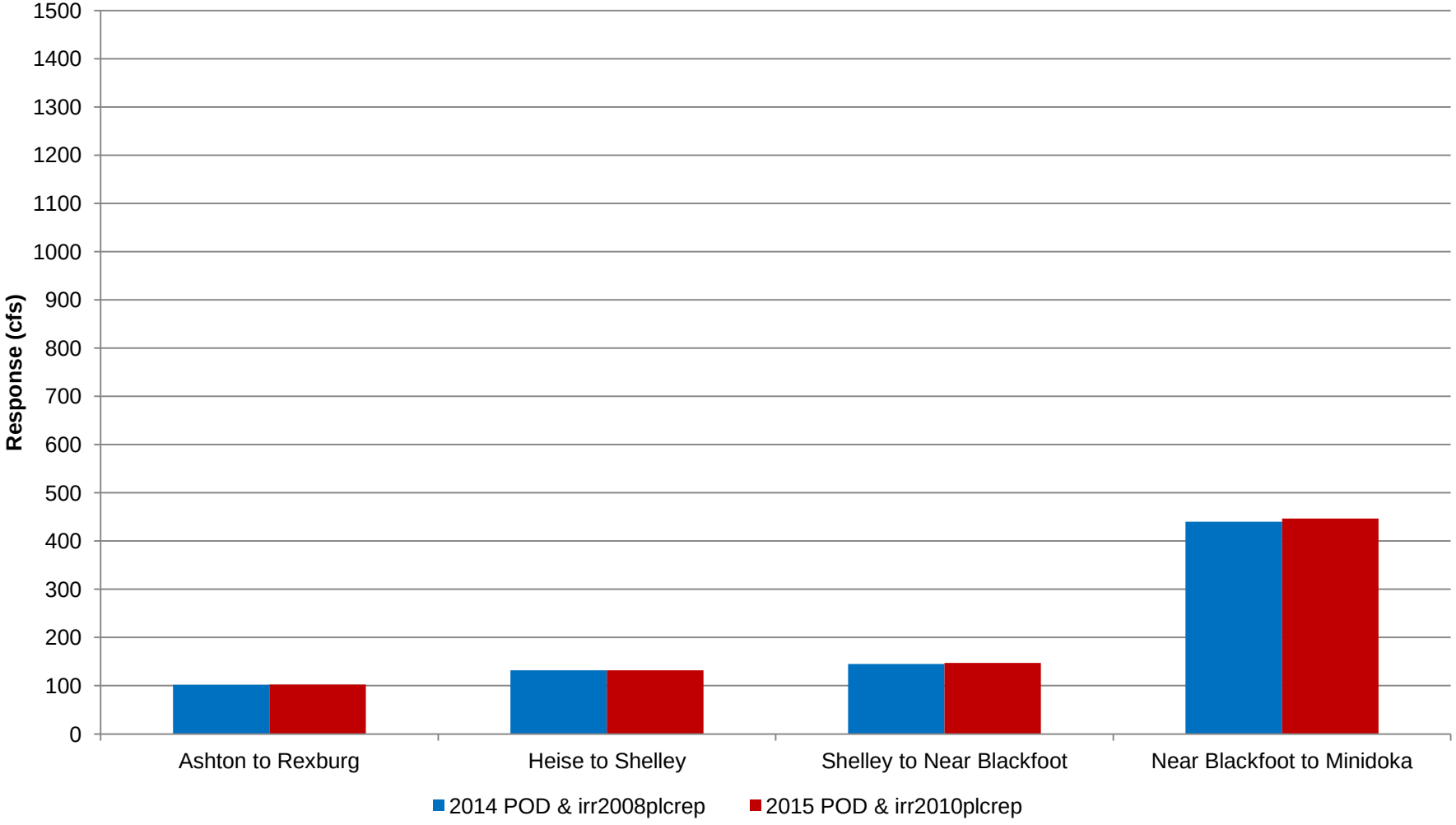
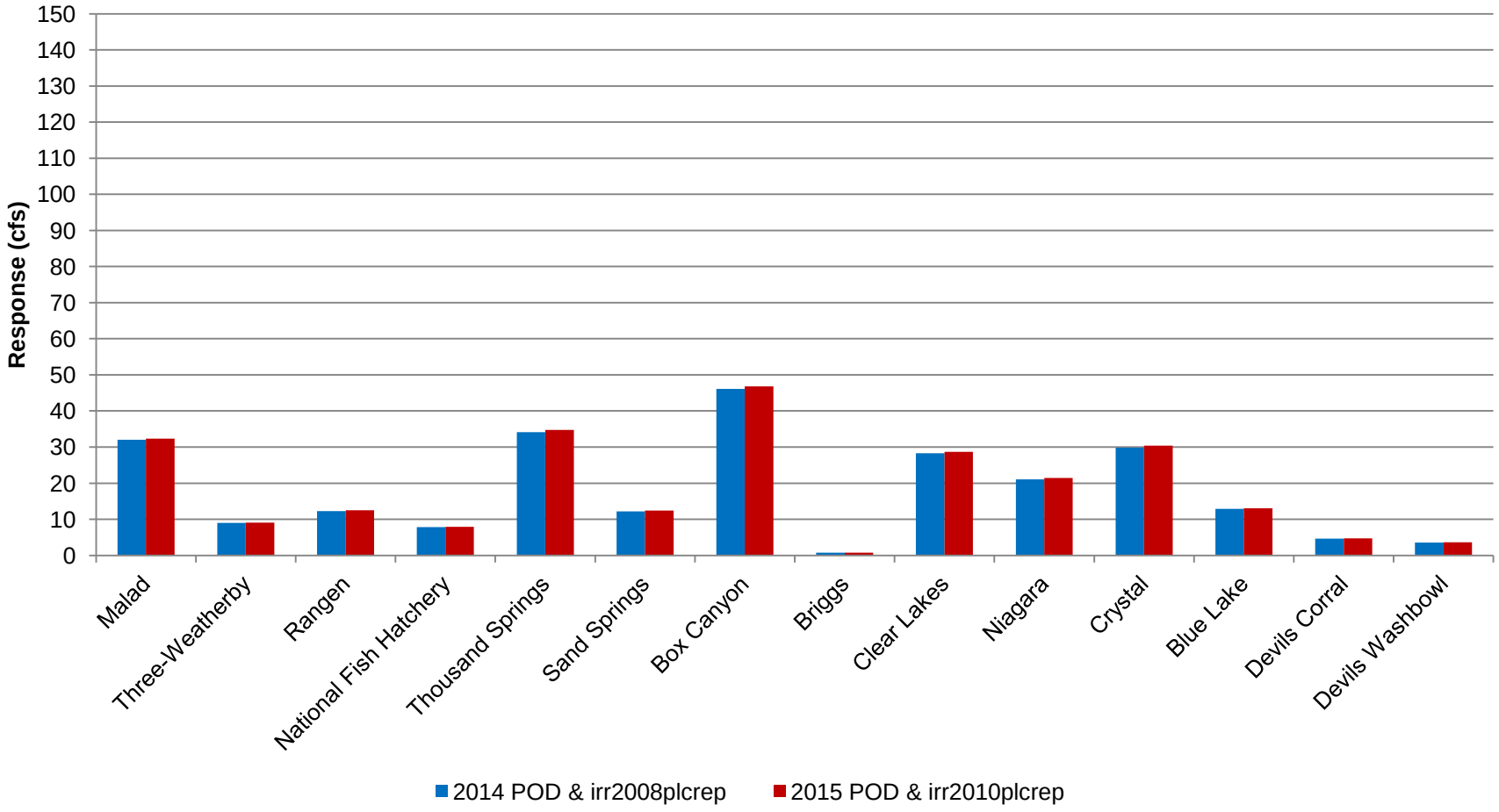
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0


2015 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1973
1
0.5
0

1973
Snake River Reaches

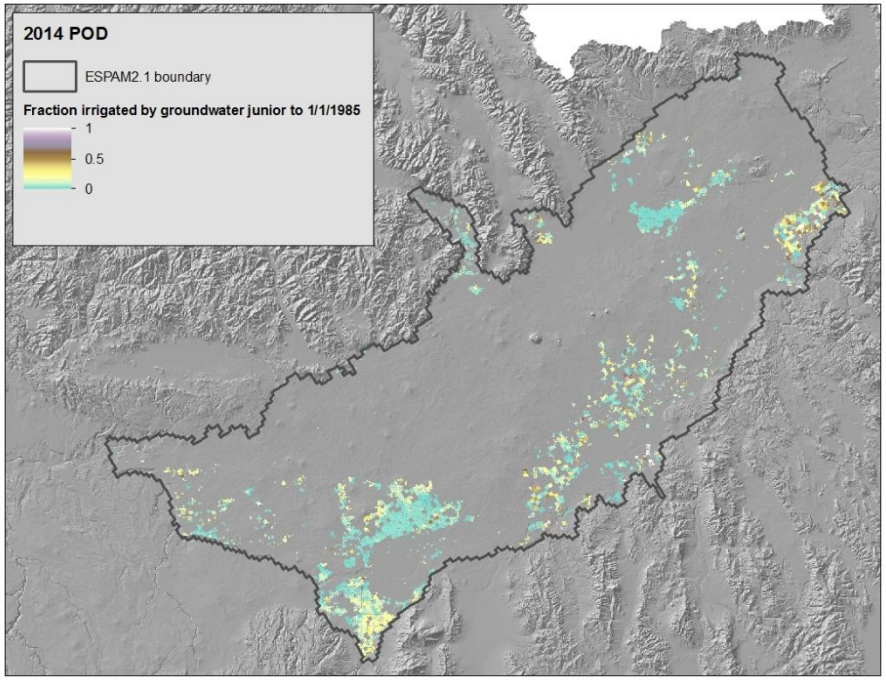


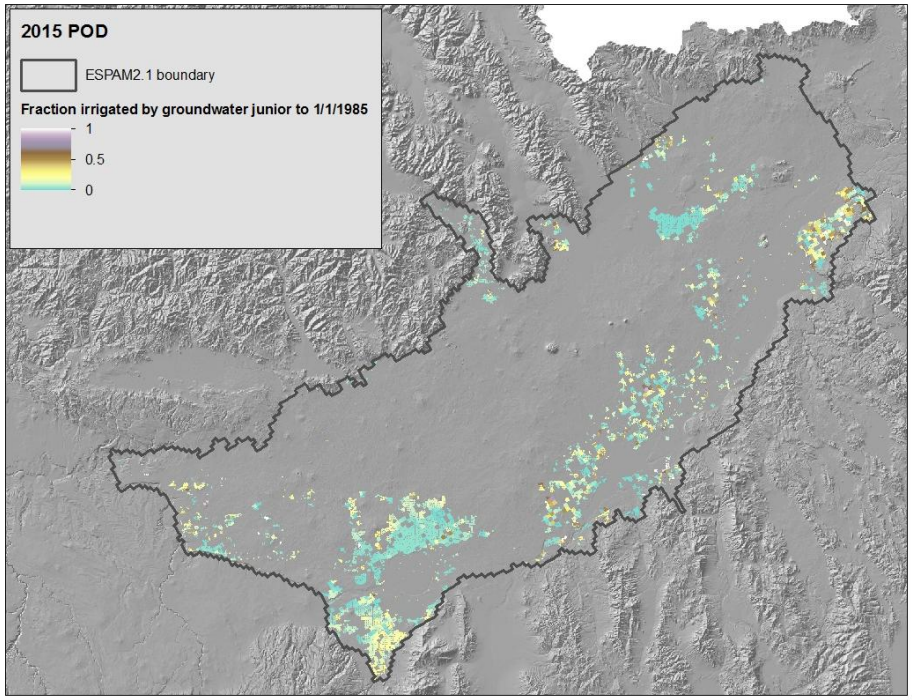
1973
Group A & B Springs

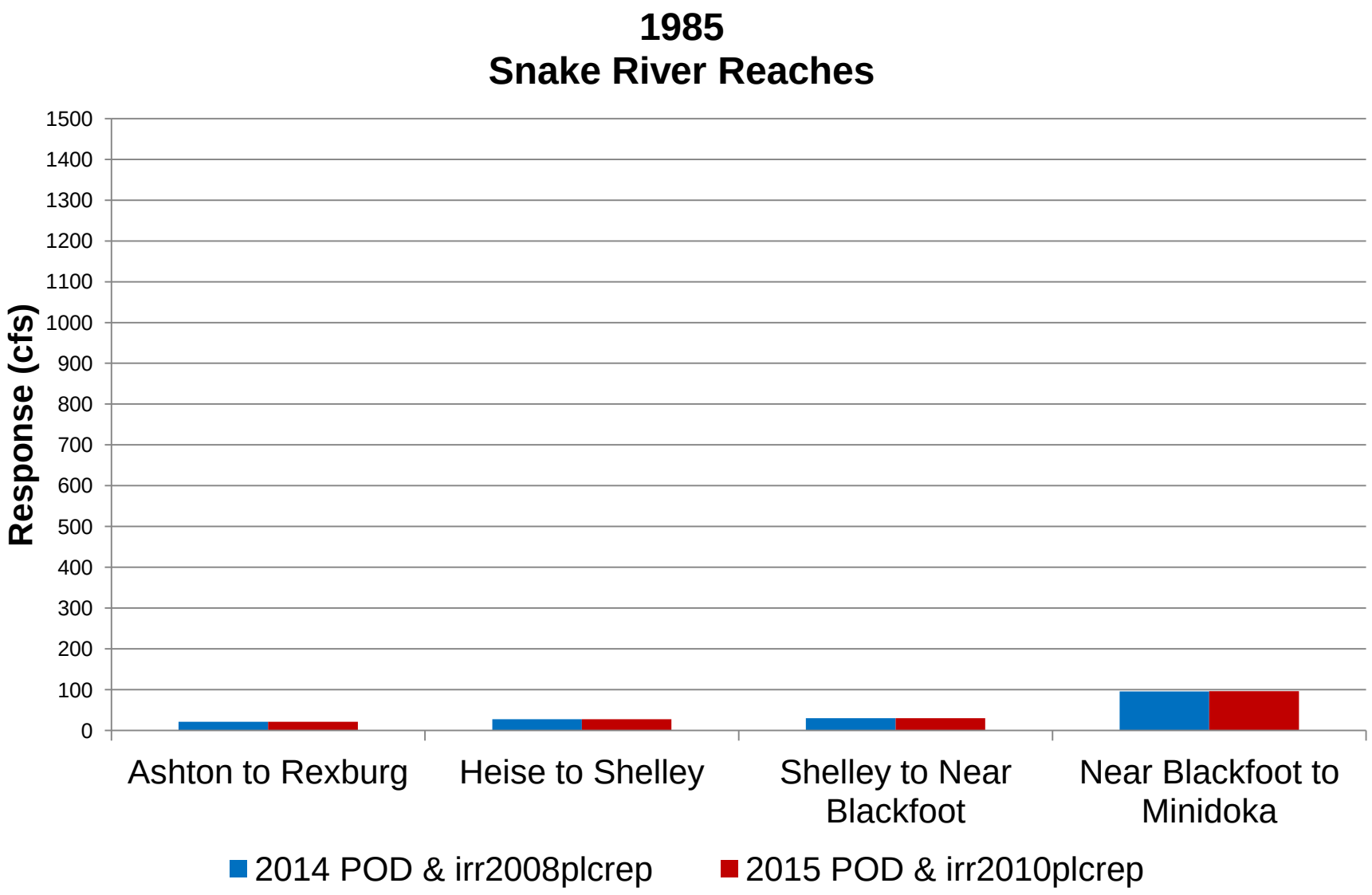


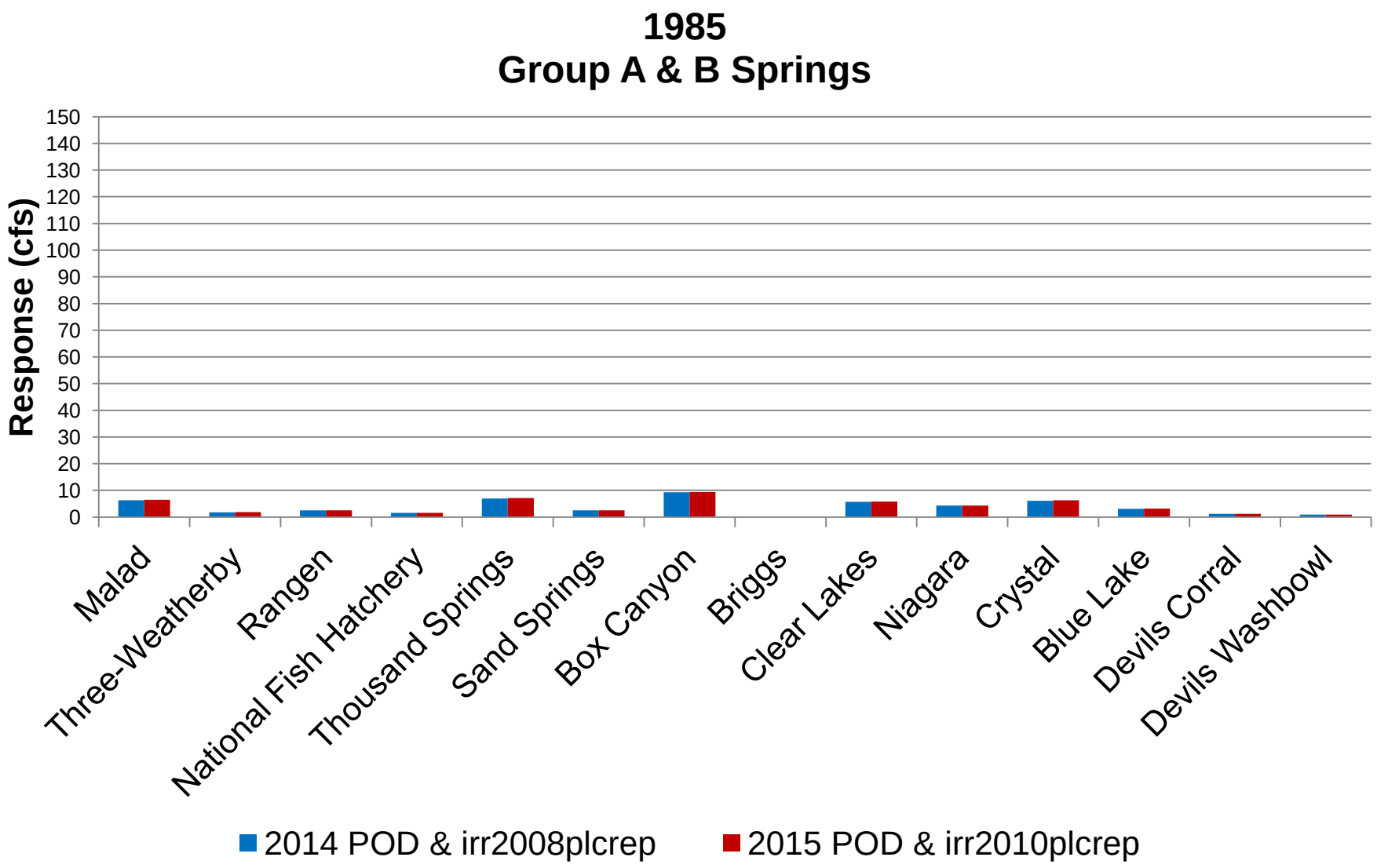
Reach Name		ESPAM2.1 prediction of steady state accrual in response to curtailment (cfs)		
		POD 2014 & irr2008plcrep January 1, 1973	POD 2015 & irr2010plcrep January 1, 1973	2015/2014
Ashton to Rexburg		102.00	102.17	100.16%
Heise to Shelley		131.92	132.14	100.16%
Shelley to Near Blackfoot		145.25	147.19	101.34%
Near Blackfoot to Minidoka		439.93	446.36	101.46%
Kimberly to Buhl springs	D070030	0.03	0.03	101.18%
	D069029	0.03	0.03	101.18%
	D068029	0.02	0.02	101.18%
	Devil's Washbowl	3.56	3.60	101.19%
	Devil's Corral	4.65	4.70	101.20%
	D065027	0.33	0.33	101.20%
	D064026	0.32	0.32	101.22%
	Blue Lakes	12.88	13.05	101.31%
	D062023	0.03	0.03	101.36%
	D061023	0.11	0.11	101.38%
	D059022	0.01	0.01	101.40%
	D059021	0.00	0.00	101.31%
	Ellison	0.08	0.08	101.44%
	D058020	0.01	0.01	101.48%
	D057020	0.04	0.04	101.51%
	Crystal	29.88	30.40	101.76%
	Niagara	21.09	21.41	101.53%
Buhl to Lower Salmon Falls springs	D051014	0.00	0.00	101.41%
	D050014	0.00	0.00	101.40%
	Clear Lakes	28.25	28.64	101.39%
	Briggs	0.77	0.78	101.40%
	Banbury	2.22	2.25	101.38%
	D047011	0.07	0.08	101.39%
	Box	46.12	46.80	101.47%
	Sand	12.21	12.39	101.54%
	D045011	0.00	0.00	101.62%
	D045012	0.02	0.02	101.62%
	Thousand	34.16	34.78	101.80%
	NFH	7.81	7.94	101.64%
	Tucker	0.78	0.79	101.61%
	Rangen	12.28	12.48	101.61%
	Three	8.96	9.10	101.57%
	D040013	0.06	0.06	101.55%
	D040014	0.56	0.57	101.55%
	Big	4.89	4.96	101.53%
	D038014	0.67	0.68	101.51%
	D037014	0.11	0.11	101.42%
	Birch	0.05	0.05	101.45%
Lower Salmon Falls to King Hill springs	D036014	0.15	0.15	101.20%
	Malad	31.99	32.37	101.17%
	D035014	0.14	0.14	101.00%
	D034014	1.12	1.13	100.93%
	D033013	0.00	0.00	100.92%
	D033014	0.41	0.41	100.92%
	D032013	0.01	0.01	100.91%
	D032014	0.24	0.24	100.92%
	D031013	0.06	0.06	100.90%
	D031014	0.07	0.07	100.90%
	D030013	0.02	0.02	100.84%
	Bancroft	0.64	0.66	102.44%

Kimberly to Buhl springs	73.06	74.18	101.54%
Buhl to LSF springs	159.97	162.46	101.56%
LSF to King Hill springs	34.87	35.28	101.18%
Kimberly to Buhl baseflow	5.90	5.97	101.25%
Buhl to LSF baseflow	4.27	4.34	101.54%
LSF to King Hill baseflow	3.18	3.22	101.28%
Kimberly to Buhl reach gain	78.95	80.15	101.52%
Buhl to LSF reach gain	164.24	166.80	101.56%
LSF to King Hill reach gain	38.05	38.50	101.19%
Kimberly to King Hill reach gain	281.24	285.45	101.50%
Total response	1100.34	1113.31	101.18%
Total Acres Curtailed	364,010	367,974	101.09%
AF/acre	2.19	2.19	100.09%


2014 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1985
1
0.5
0

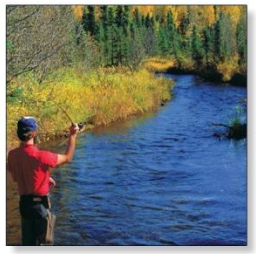

2015 POD
ESPAM2.1 boundary
Fraction irrigated by groundwater junior to 1/1/1985
1
0.5
0


1985
Snake River Reaches
Response (cfs)
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Ashton to Rexburg
Heise to Shelley
Shelley to Near Blackfoot
Near Blackfoot to Minidoka
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep


1985
Group A & B Springs
Response (cfs)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Malad
Three-Weatherby
Rangen
National Fish Hatchery
Thousand Springs
Sand Springs
Box Canyon
Briggs
Clear Lakes
Niagara
Crystal
Blue Lake
Devils Corral
Devils Washbowl
2014 POD & irr2008plcrep
2015 POD & irr2010plcrep

Reach Name		ESPAM2.1 prediction of steady state accrual in response to curtailment (cfs)		
		POD 2014 & irr2008plcrep January 1, 1985	POD 2015 & irr2010plcrep January 1, 1985	2015/2014
Ashton to Rexburg		21.49	21.63	100.64%
Heise to Shelley		27.95	27.74	99.26%
Shelley to Near Blackfoot		30.27	30.45	100.60%
Near Blackfoot to Minidoka		95.86	96.50	100.68%
Kimberly to Buhl springs	D070030	0.01	0.01	100.61%
	D069029	0.01	0.01	100.61%
	D068029	0.01	0.01	100.61%
	Devil's Washbowl	0.90	0.91	100.61%
	Devil's Corral	1.18	1.18	100.63%
	D065027	0.08	0.08	100.64%
	D064026	0.08	0.08	100.70%
	Blue Lakes	3.09	3.13	101.18%
	D062023	0.01	0.01	101.57%
	D061023	0.03	0.03	101.70%
	D059022	0.00	0.00	101.31%
	D059021	0.00	0.00	100.83%
	Ellison	0.02	0.02	101.04%
	D058020	0.00	0.00	101.04%
	D057020	0.01	0.01	101.05%
	Crystal	6.11	6.25	102.34%
	Niagara	4.26	4.33	101.65%
Buhl to Lower Salmon Falls springs	D051014	0.00	0.00	101.60%
	D050014	0.00	0.00	101.61%
	Clear Lakes	5.69	5.78	101.60%
	Briggs	0.15	0.16	101.68%
	Banbury	0.44	0.45	101.67%
	D047011	0.01	0.02	101.67%
	Box	9.26	9.41	101.67%
	Sand	2.50	2.54	101.69%
	D045011	0.00	0.00	101.79%
	D045012	0.00	0.00	101.79%
	Thousand	6.95	7.10	102.15%
	NFH	1.57	1.61	102.19%
	Tucker	0.16	0.16	102.20%
	Rangen	2.48	2.53	102.20%
	Three	1.80	1.84	102.23%
	D040013	0.01	0.01	102.25%
	D040014	0.11	0.12	102.26%
	Big	0.98	1.00	102.28%
	D038014	0.13	0.14	102.32%
	D037014	0.02	0.02	102.47%
	Birch	0.01	0.01	102.44%
Lower Salmon Falls to King Hill springs	D036014	0.03	0.03	102.83%
	Malad	6.28	6.49	103.30%
	D035014	0.03	0.03	103.15%
	D034014	0.23	0.24	103.23%
	D033013	0.00	0.00	103.24%
	D033014	0.08	0.09	103.24%
	D032013	0.00	0.00	103.24%
	D032014	0.05	0.05	103.24%
	D031013	0.01	0.01	103.22%
	D031014	0.01	0.02	103.23%
	D030013	0.01	0.01	103.14%
	Bancroft	0.05	0.05	102.04%

Kimberly to Buhl springs	15.79	16.05	101.68%
Buhl to LSF springs	32.29	32.90	101.89%
LSF to King Hill springs	6.79	7.01	103.28%
Kimberly to Buhl baseflow	1.46	1.47	100.74%
Buhl to LSF baseflow	0.86	0.88	102.07%
LSF to King Hill baseflow	0.56	0.58	103.04%
Kimberly to Buhl reach gain	17.25	17.52	101.60%
Buhl to LSF reach gain	33.15	33.77	101.89%
LSF to King Hill reach gain	7.34	7.58	103.26%
Kimberly to King Hill reach gain	57.74	58.88	101.98%
Total response	233.30	235.20	100.82%
Total Acres Curtailed	80,246	80,827	100.72%
AF/acre	2.11	2.11	100.09%



End