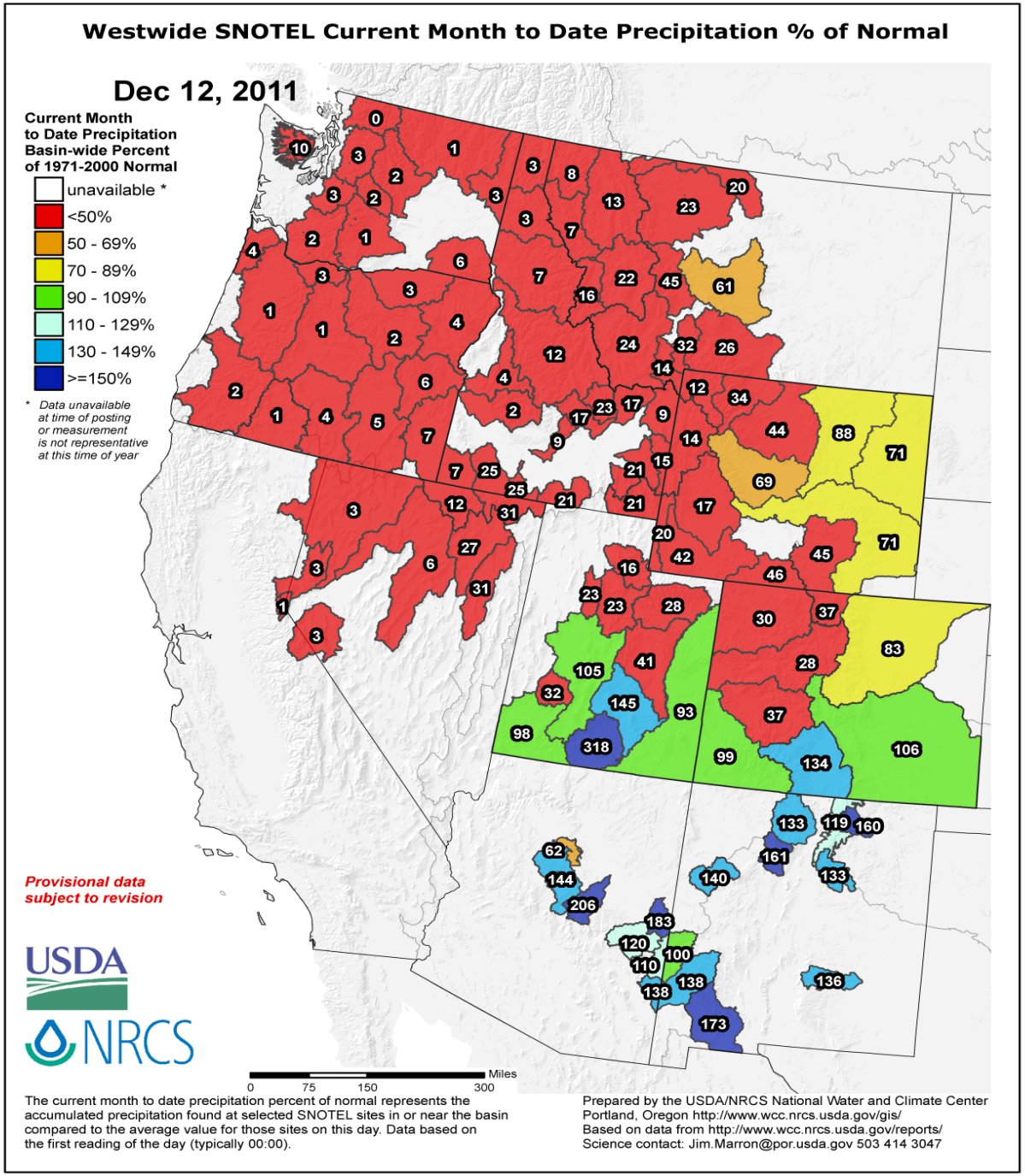


IDWR Water Supply Meeting
December 13, 2011

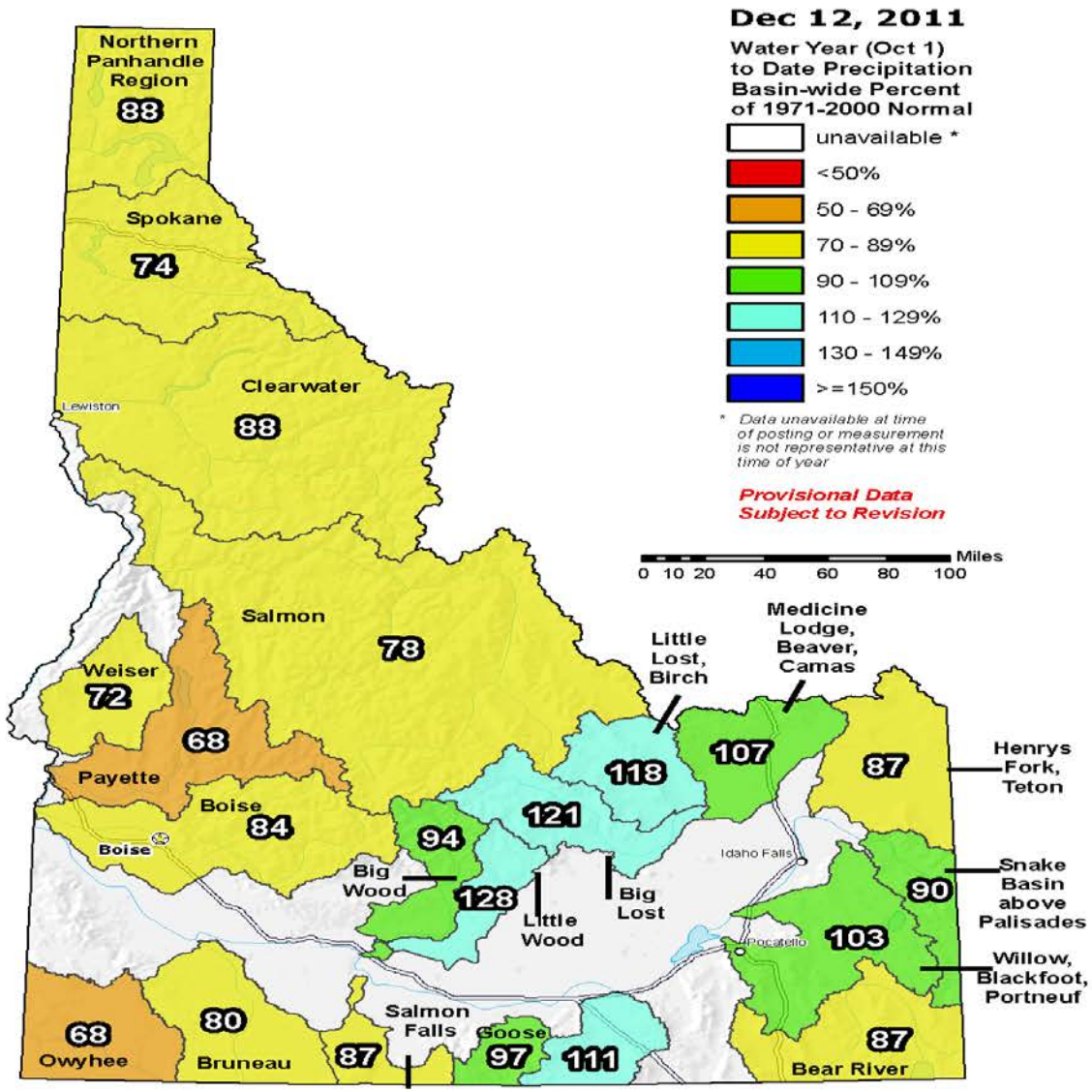
Idaho NRCS Snow Survey

Question of the:
Day
Week
Month

When will it snow?

NRCS

Idaho SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal



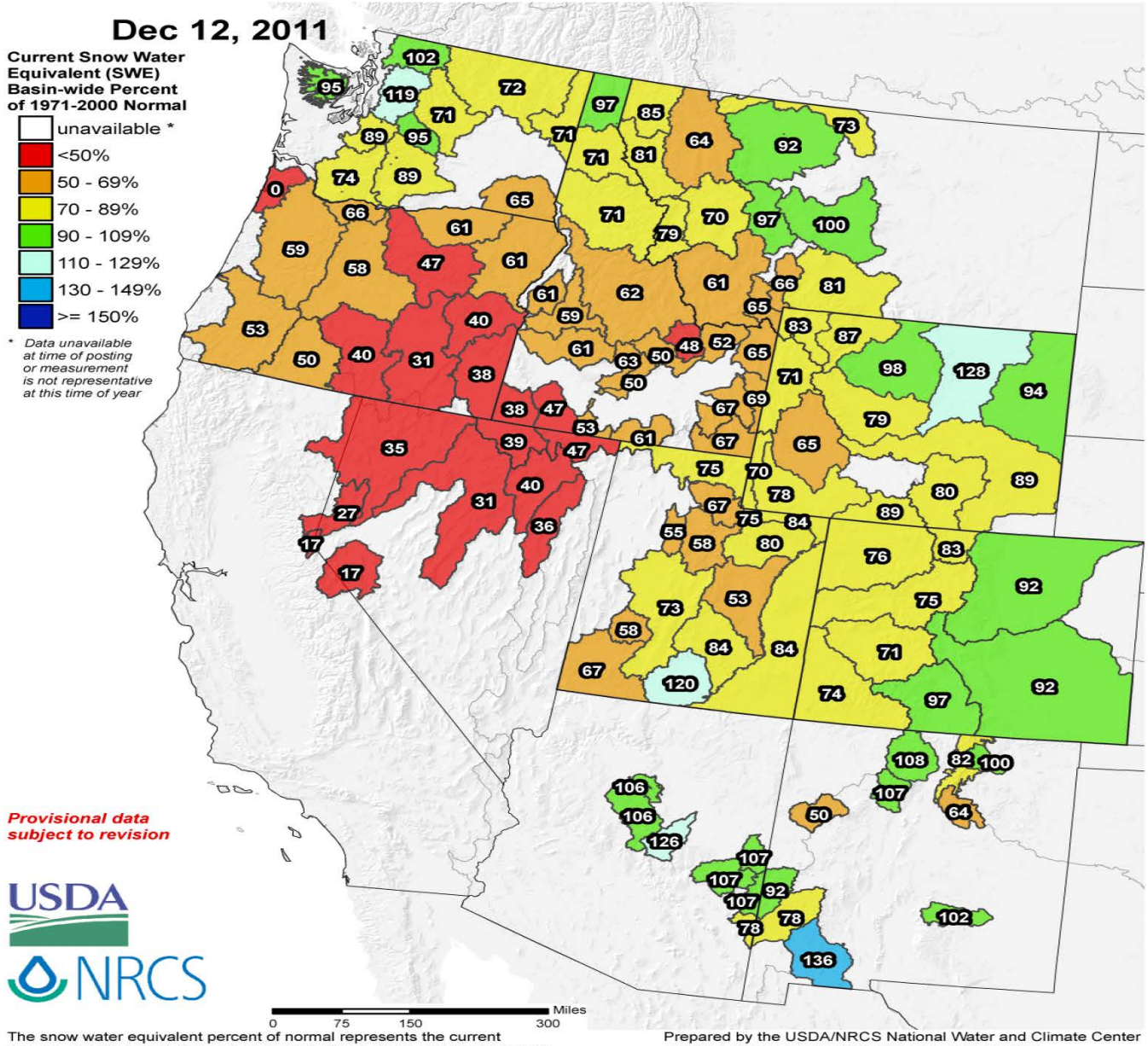
USDA NRCS

The water year to date precipitation percent of normal represents the accumulated precipitation found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

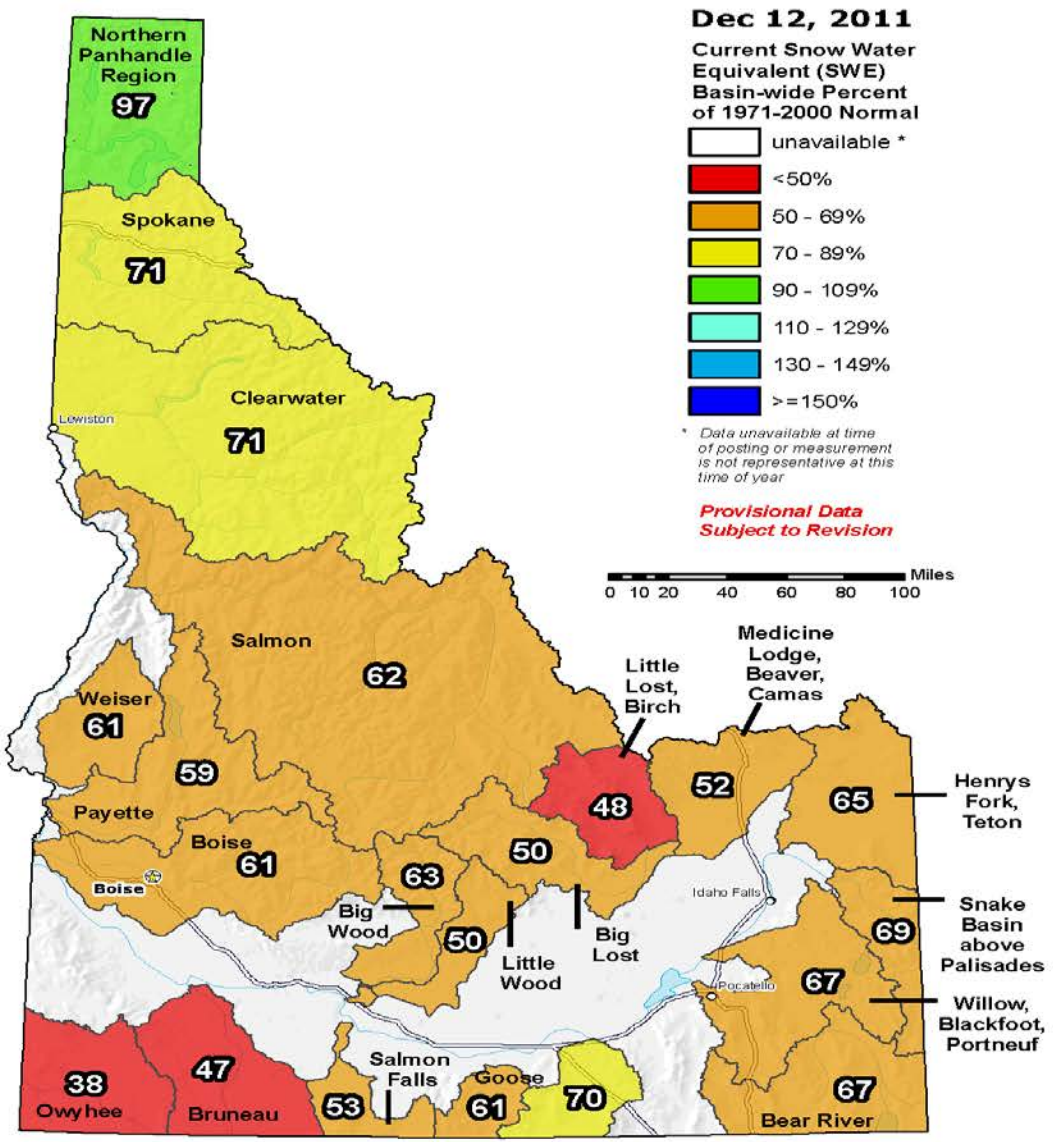
Dec 12, 2011



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Idaho SNOTEL Current Snow Water Equivalent (SWE) % of Normal



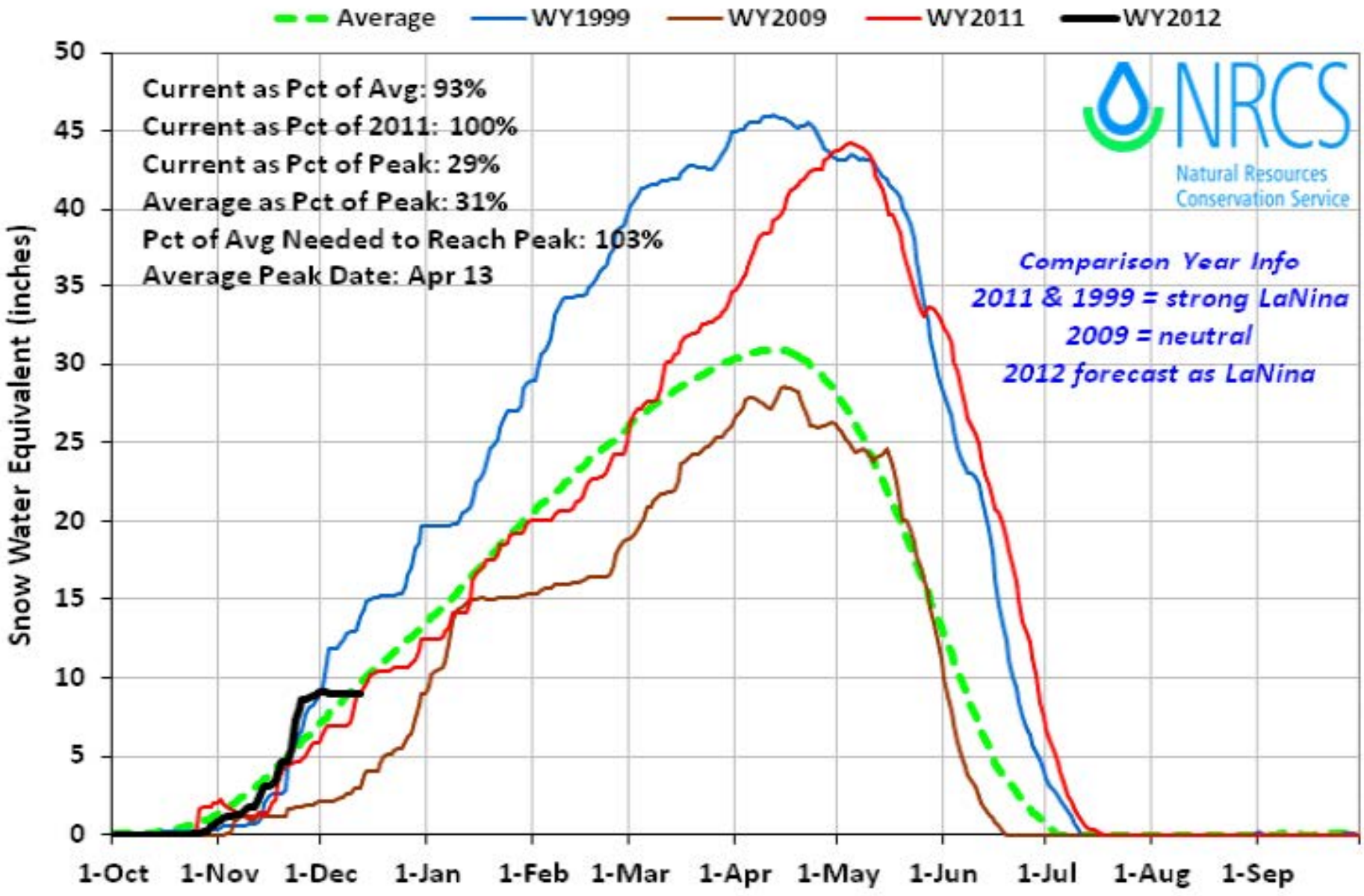
USDA NRCS

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

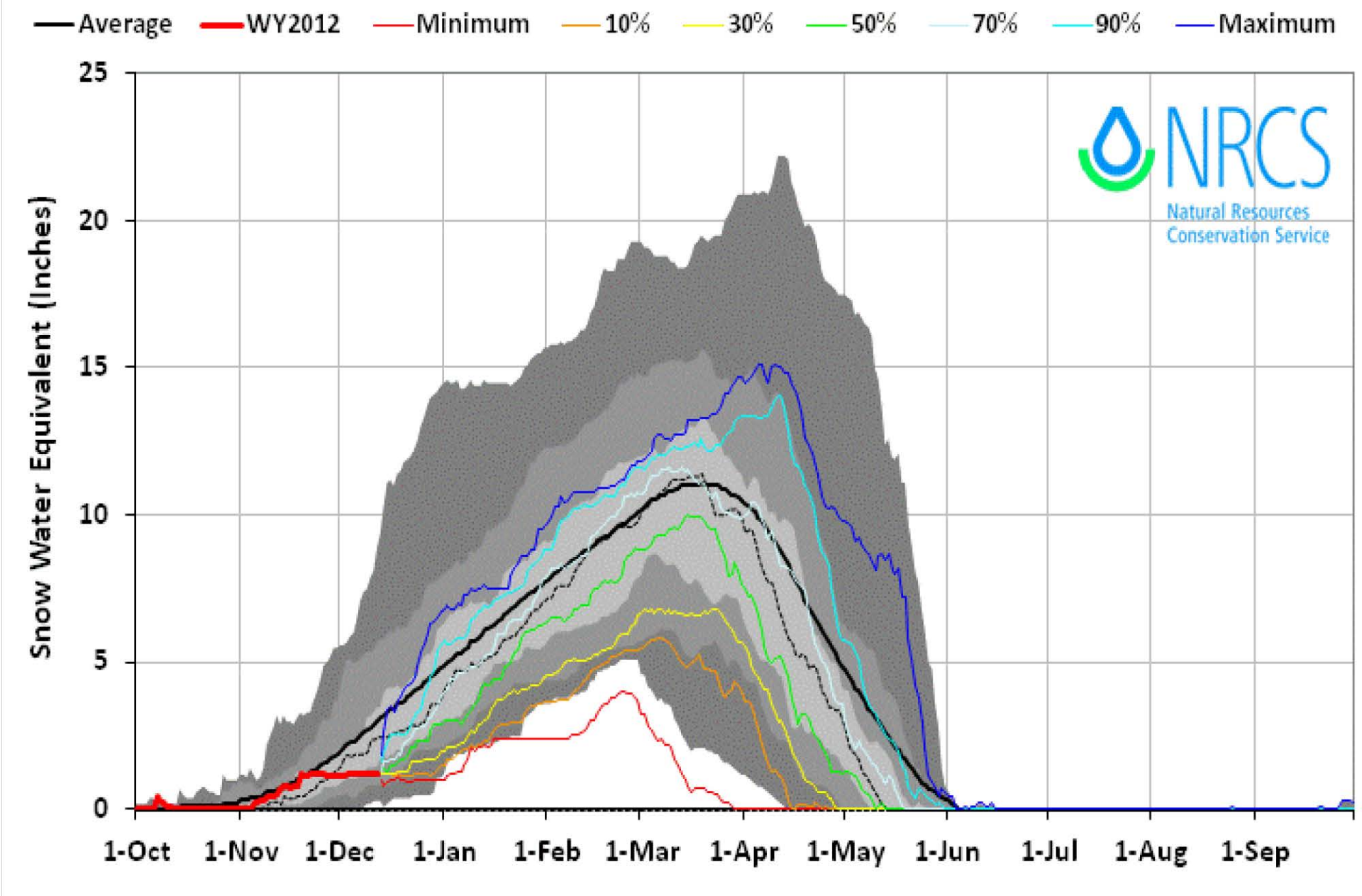
Northern Panhandle Region 2012 Snowpack Comparison Graph (6 sites)

Based on Provisional SNOTEL data as of Dec 12, 2011



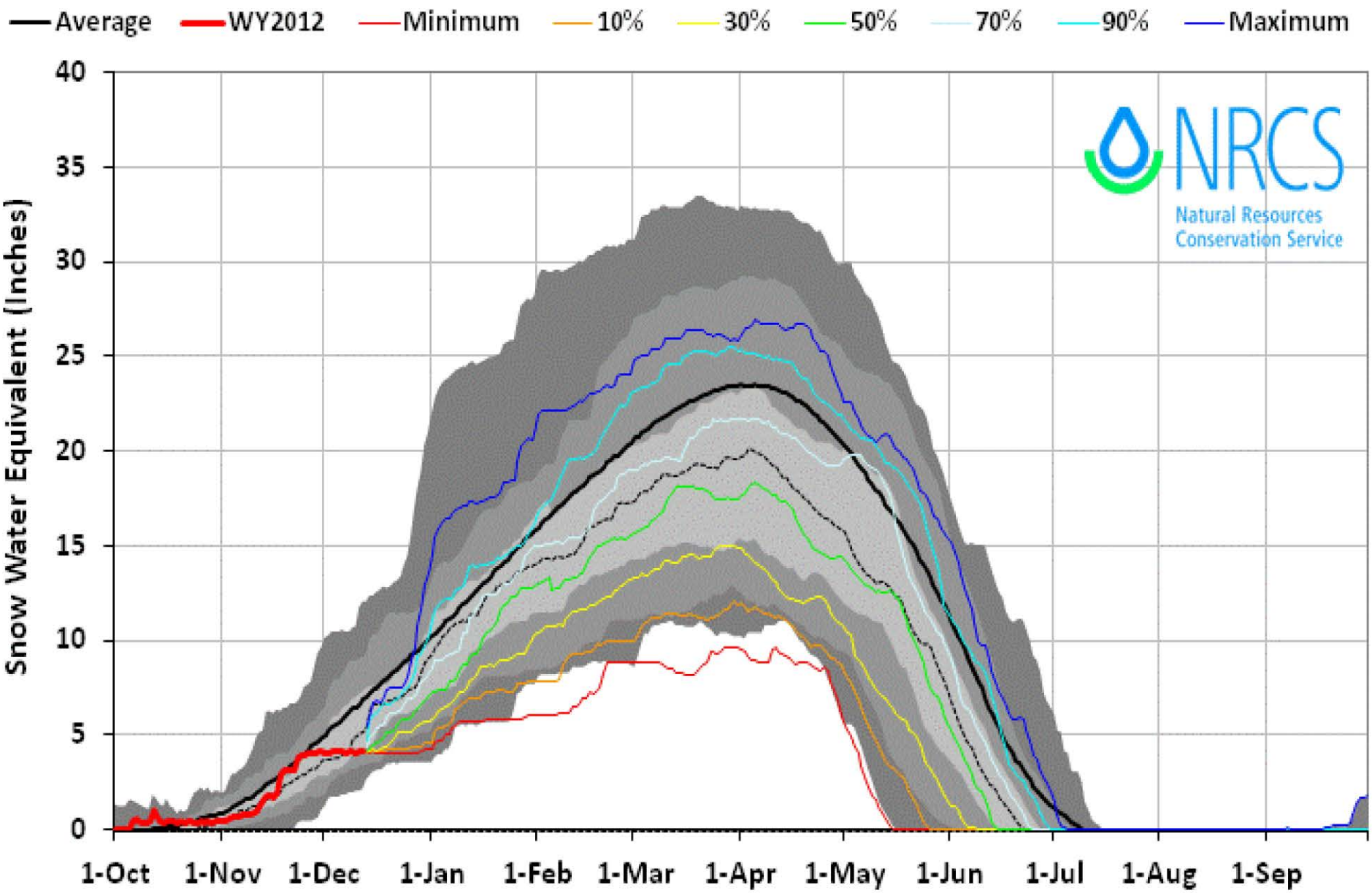
Owyhee Basin 2012 Snow Water with Non-Exceedence Projections (7 sites)

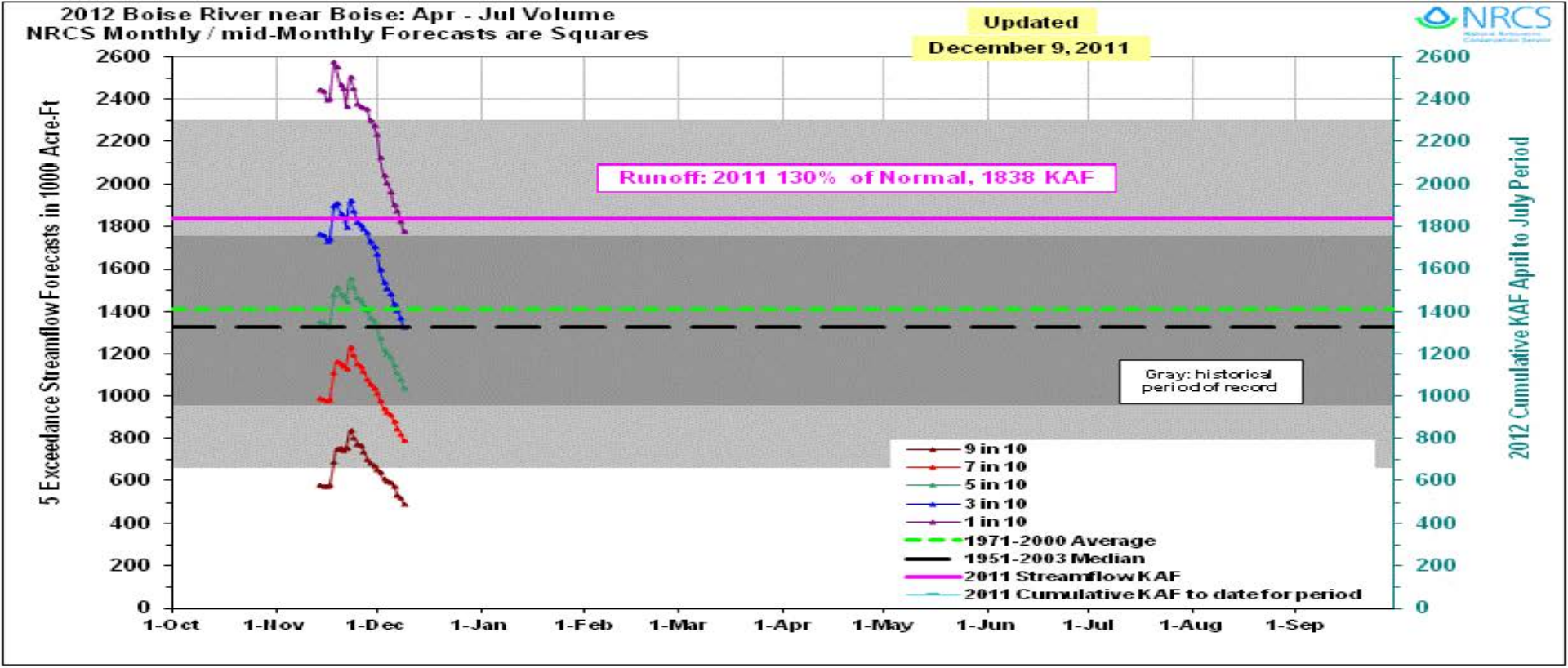
Based on Provisional SNOTEL data as of Dec 12, 2011



Boise Basin 2012 Snow Water with Non-Exceedence Projections (10 sites)

Based on Provisional SNOTEL data as of Dec 12, 2011





USDA NRCS Idaho Snow Survey, November 11, 2011

2012 Snowpack and Streamflow Needed for Adequate Agricultural Irrigation Supply in 2012

Boise Basin

Basin / Reservoir	Reservoir Storage Sep 30 2011 (KAF)	Projected Reservoir Storage (KAF on March 31, 2012)	Streamflow Needed For Adequate Irrigation Water Supply KAF (% of avg) Period	April 1 Snowpack Percent of Average that has Always Produced the Volume Needed in the Previous Column	Example Years April 1 Snow & Apr-Sep flow as % of Average for other similar Climatic Indexes: La Nina, SOI & Pacific Decadal Oscillation (PDO)
Boise 3 Reservoirs	618	750	> 750 KAF (49% of avg) Apr-Sep Adequate Water Supply 1,500 KAF	> 73% of average	1971 154 172 1974 162 162 1989 106 87 1999 119 120 2008 96 91 2011 97 129

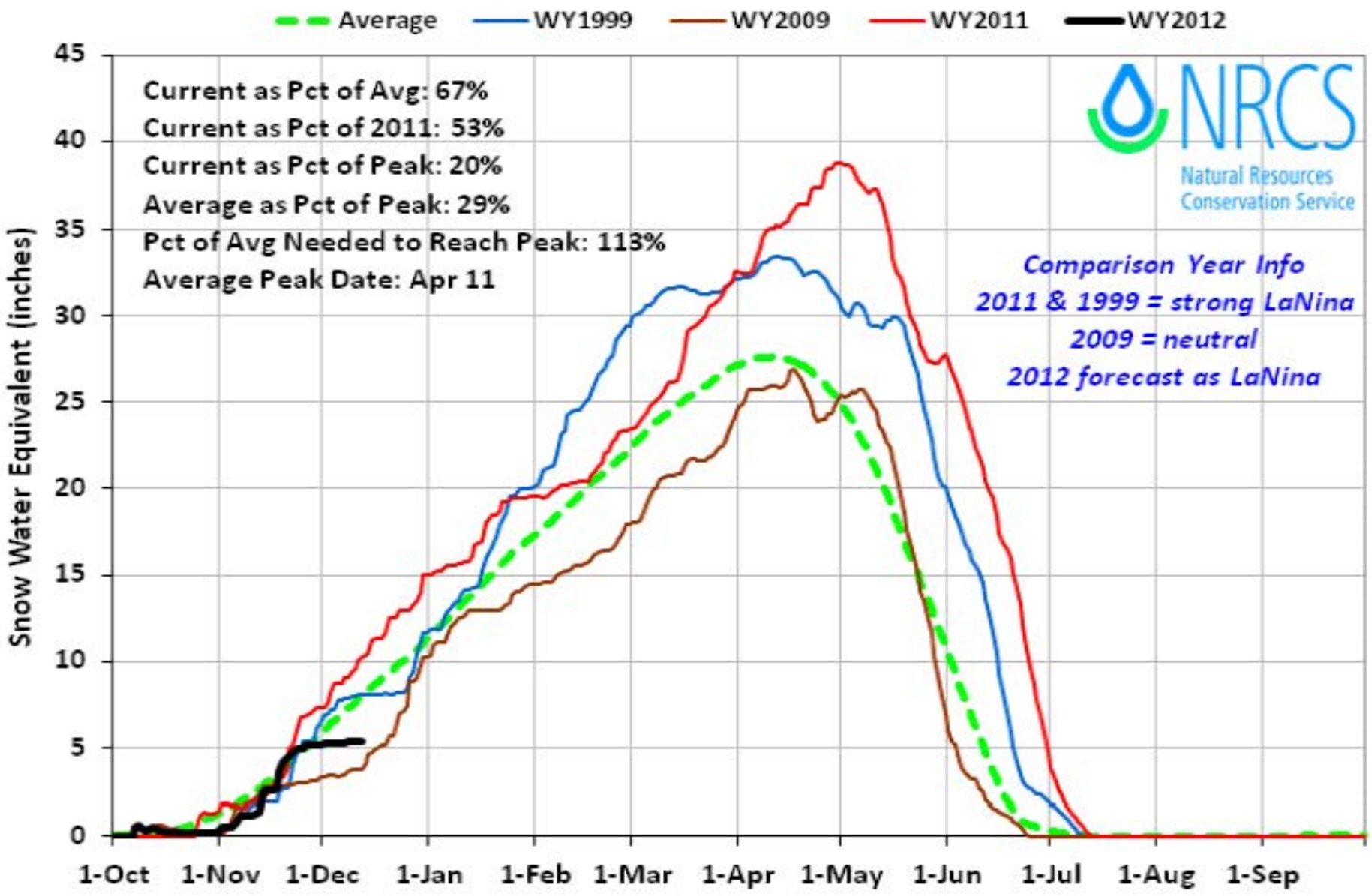
April 1 snowpack of 72% of average in 1988 produced streamflow of 49% of average.
April 1 snowpack greater than 120% of average has always produced flow greater than 120% of average.

2012 Snowpack and Streamflow Needed for Adequate Agricultural Irrigation Supply in 2012					
Basin / Reservoir	Reservoir Storage Sep 30 2011 (KAF)	Projected Reservoir Storage (KAF on March 31, 2012)	Streamflow Needed For Adequate Irrigation Water Supply KAF (% of avg) Period	April 1 Snowpack Percent of Average that has Always Produced the Volume Needed in the Previous Column	Example Years April 1 Snow & Apr-Sep flow as % of Average for other similar Climatic Indexes: La Nina, SOI & Pacific Decadal Oscillation (PDO)
Little Wood Basin					
Little Wood	12.4	25	>35 KAF (37% of avg) Apr-Sep Adequate Water Supply 55-60 KAF	>64% of average	1971 167 189 1974 156 132 1989 111 68 1999 119 124 2008 95 55 2011 107 119
April 1 snowpack of 63% of average in 1991 produced streamflow of 45% of average. April 1 snowpack greater than 120% of average has always produced flow greater than 130% of average.					
Big Lost Basin					
Big Lost Mackay	30	40	>140 KAF (81% of avg) Apr-Sep Adequate Water Supply 180 KAF	>110% of average	1971 156 140 1974 165 150 1989 107 46 1999 119 114 2008 92 61 2011 101 97
April 1 snowpack of 109% of average in 1962 produced streamflow of 76% of average. April 1 snowpack greater than 110% of average has always produced flow greater than 103% of average.					

NRCS Natural Resources Conservation Service

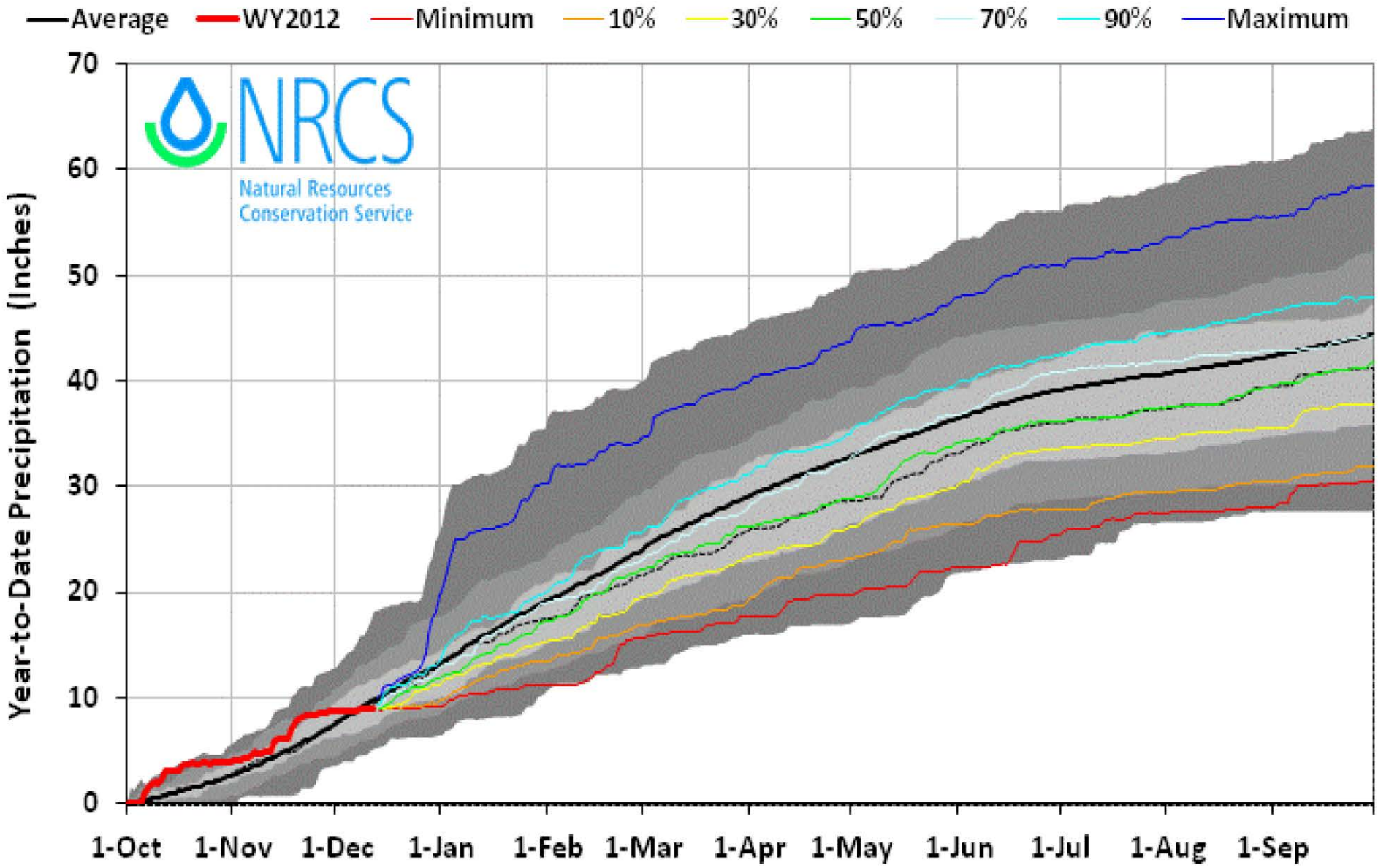
Snake Basin above Palisades 2012 Snowpack Comparison Graph (9 sites)

Based on Provisional SNOTEL data as of Dec 12, 2011

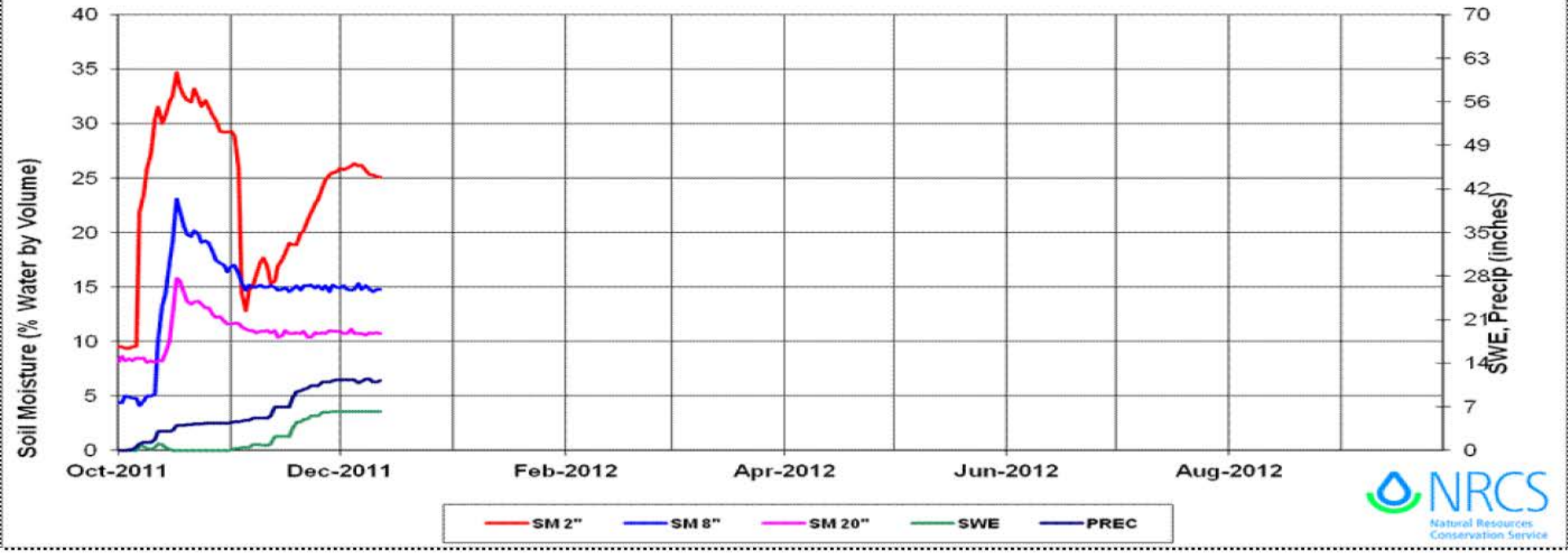


Snake Basin above Palisades 2012 Precipitation with Non-Exceedence Projections (9 sites)

Based on Provisional SNOTEL data as of Dec 12, 2011

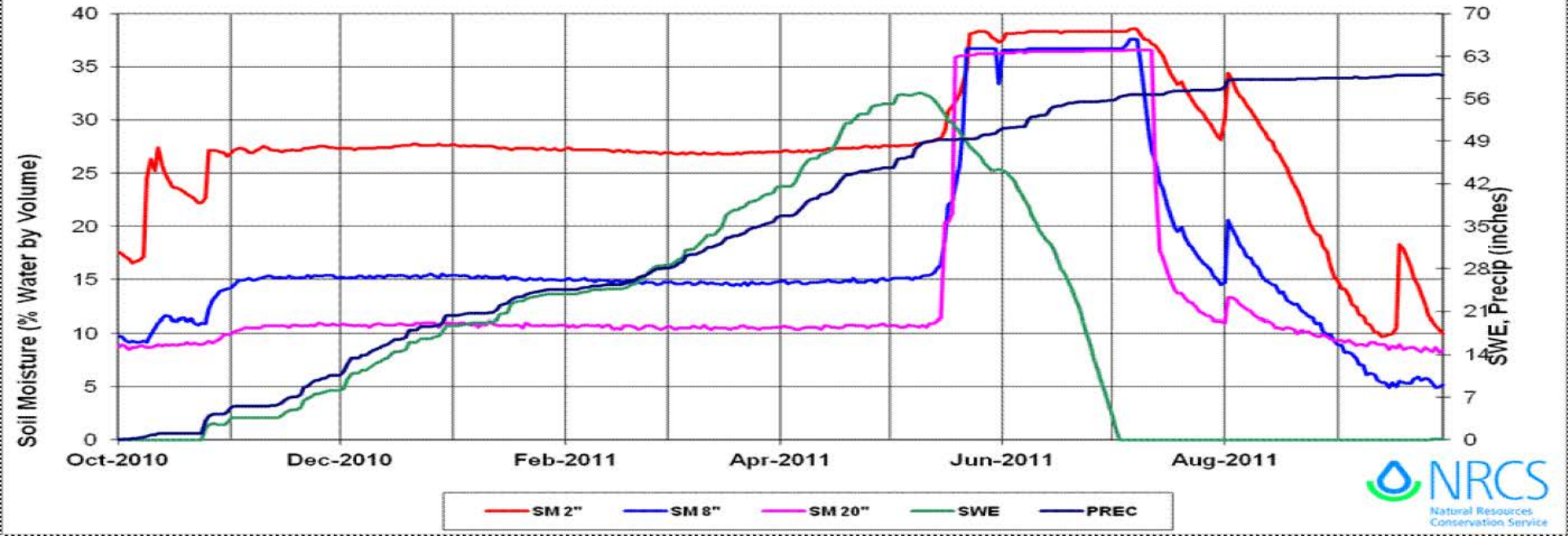


Lewis Lake Divide Soil Moisture - Water Year 2012

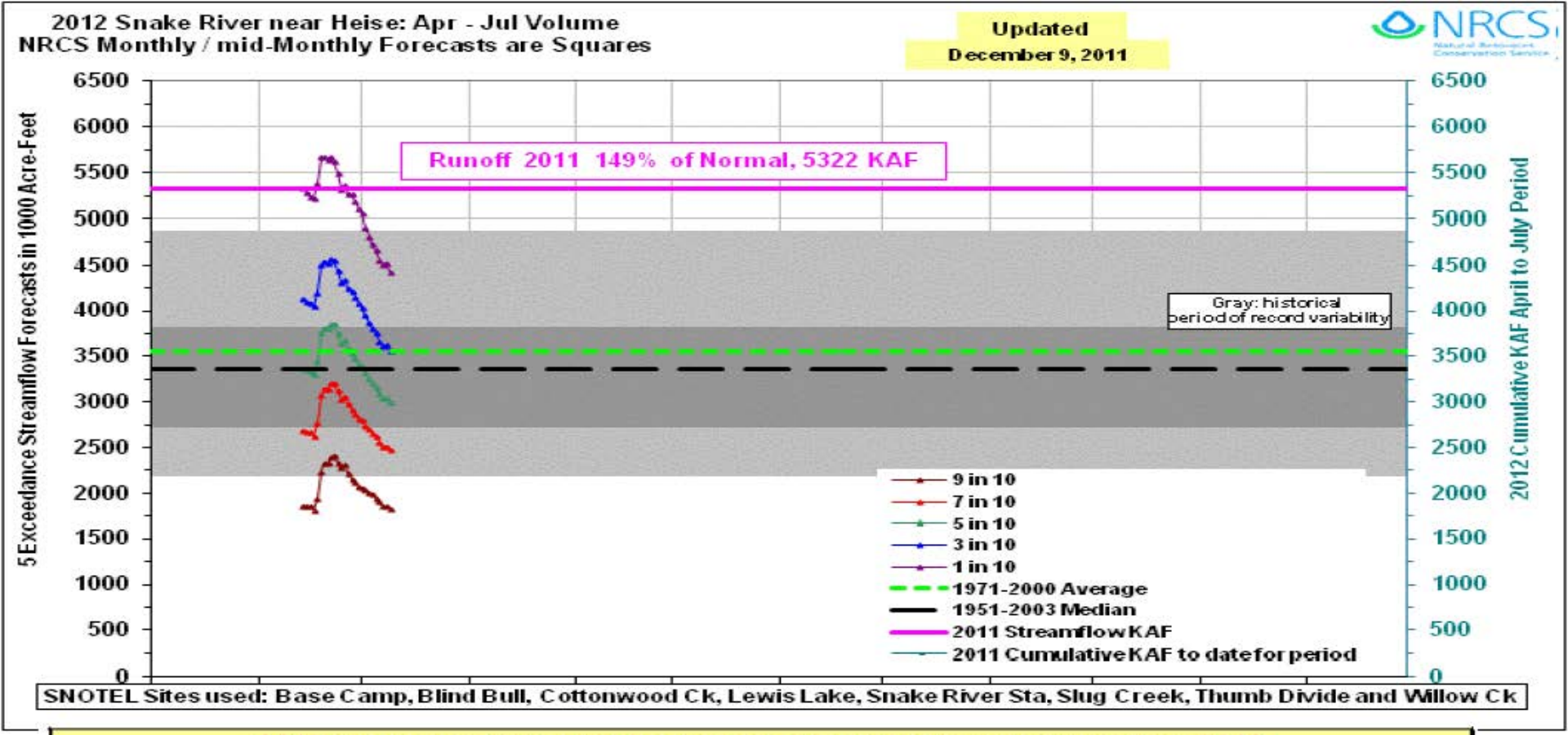


NRCS Natural Resources Conservation Service

Lewis Lake Divide Soil Moisture - Water Year 2011



NRCS Natural Resources Conservation Service



2012 Snowpack and Streamflow Needed for Adequate Agricultural Irrigation Supply in 2012

Basin / Reservoir	Reservoir Storage Sep 30 2011 (KAF)	Projected Reservoir Storage (KAF on March 31, 2012)	Streamflow Needed For Adequate Irrigation Water Supply KAF (% of avg) Period	April 1 Snowpack Percent of Average that has Always Produced the Volume Needed in the Previous Column	Example Years April 1 Snow & Apr-Sep flow as % of Average for other similar Climatic Indexes: La Nina, SOI & Pacific Decadal Oscillation (PDO)
Upper Snake Basin					
Snake above Heise Palisades Resv & Jackson Lake	1869	1700 Mar 31 2011	>2,800 KAF (67% of avg) Apr-Sep Adequate Water Supply 4,500 KAF	>80% of average	1971 152 148 1974 135 134 1989 111 93 1999 114 119 2008 105 103 2011 119 151

April 1 snowpack of 79% of average in 2002 produced streamflow of 67% of average.
April 1 snowpack greater than 125% of average has always produced flow greater than 120% of average.

2012 Snowpack and Streamflow Needed for Adequate Agricultural Irrigation Supply for 2012

Basin / Reservoir	Reservoir Storage Sep 30 2011 (KAF)	Projected Reservoir Storage (KAF on March 31, 2012)	Streamflow Needed For Adequate Irrigation Water Supply KAF (% of avg) Period	April 1 Snowpack Percent of Average that has Always Produced the Volume Needed in the Previous Column	Example Years April 1 Snow & Apr-Sep flow as % of Average for other similar Climatic Indexes: La Nina, SOI & Pacific Decadal Oscillation (PDO)
Salmon Falls Basin					
Salmon Falls	84.3	105	>10 KAF (10% of avg) Apr-Sep Adequate Water Supply 110 KAF	Minimal amount of flow needed.	1971 131 173 1974 122 98 1989 121 88 1999 90 95 2008 99 66 2011 111 175
Minimum April 1 snowpack of 42% of average in 1992 produced streamflow of 37% of average. April 1 snowpack greater than 122% of average has always produced flow greater than 114% of average.					
Bear River Basin					
Bear, Bear Lake	1162	1070	>0 KAF (minimal amount needed) Apr-Sep Adequate Water Supply 500 KAF	Minimal amount of flow needed.	1971 150 178 1974 113 111 1989 103 20 1999 93 151 2008 98 50 2011 135 256
Minimum April 1 snowpack of 45% of average in 1992 produced streamflow of 9% of average. April 1 snowpack greater than 133% of average has always produced flow greater than 142% of average.					

NRCS Natural Resources Conservation Service

2012 Snowpack and Streamflow Needed for Adequate Agricultural Irrigation Supply in 2012					
Basin / Reservoir	Reservoir Storage Sep 30 2011 (KAF)	Projected Reservoir Storage (KAF on March 31, 2012)	Streamflow Needed For Adequate Irrigation Water Supply KAF (% of avg) Period	April 1 Snowpack Percent of Average that has Always Produced the Volume Needed in the Previous Column	Example Years April 1 Snow & Apr-Sep flow as % of Average for other similar Climatic Indexes: La Nina, SOI & Pacific Decadal Oscillation (PDO)
Oakley Basin					
Goose Oakley	27.9	42	>8 KAF (25% of avg) Apr-Sep Adequate Water Supply 50 KAF	Minimal amount of flow needed.	1971 128 154 1974 145 134 1989 115 68 1999 97 109 2008 106 60 2011 115 149
Minimum April 1 snowpack of 31% of average in 1977 produced streamflow of 42% of average. April 1 snowpack greater than 118% of average has always produced flow greater than 111% of average.					

NRCS Natural Resources Conservation Service

NRCS Natural Resources Conservation Service

Bear SWSI

Adequate Water Supply Greater than -3.1 to -3.4 SWSI or 480 - 500 KAF

		Period	Data Type	Years	# of Years	
10046500	Bear River at Stewart Dam	Apr-Sep	strm	1981-2011	31	Units KAF
10055500	Bear Lake	31-Mar	resv	1981-2011	31	Units KAF

ENSO Classification

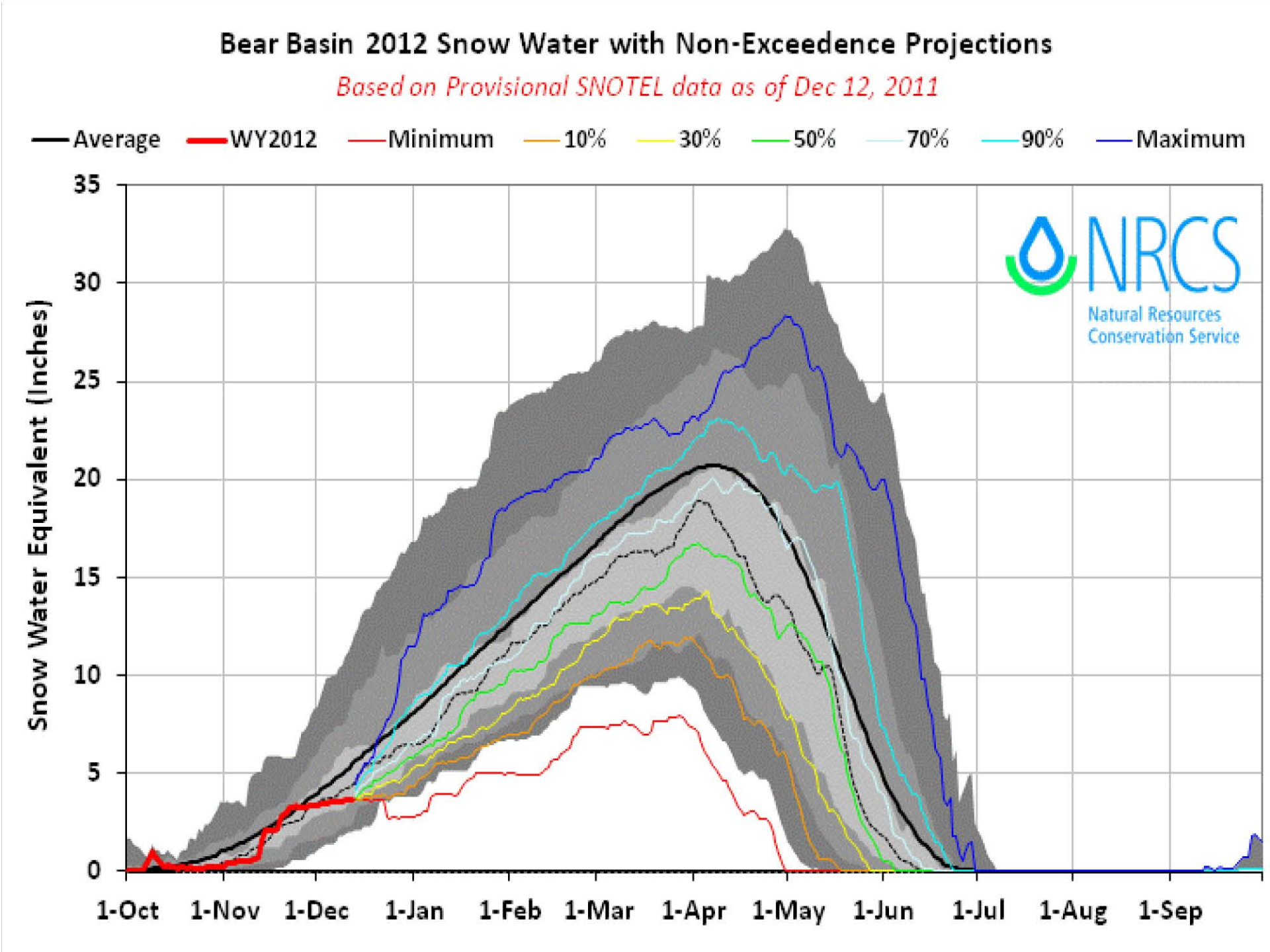
SE Strong El Nino - EN Mild El Nino - N Neutral - LN Mild La Nina - SL Strong La Nina

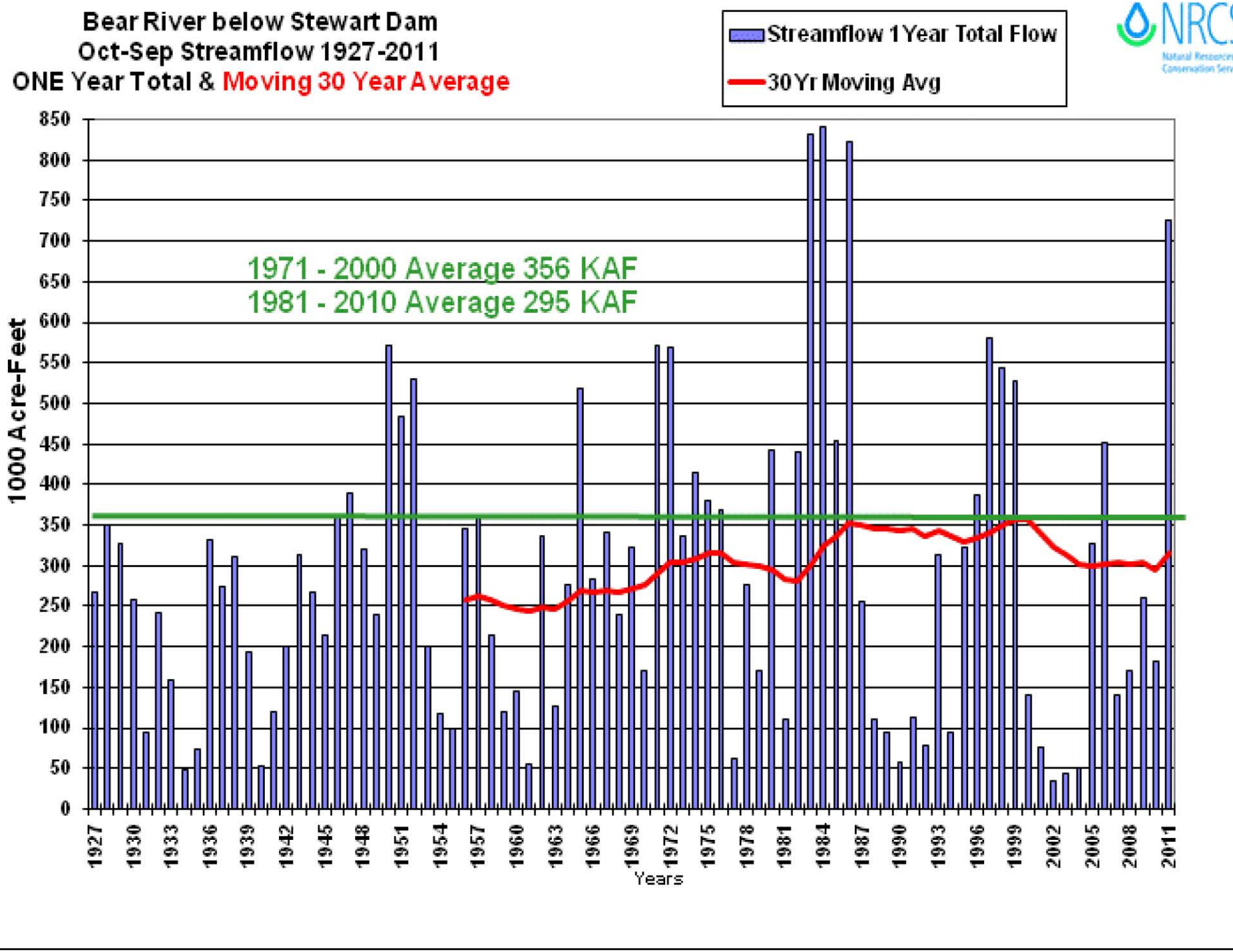
2010 & 2011 Provisional Data

Historic Rank	Year	ENSO	Streamflow Apr-Sep	Reservoir 31-Mar	Streamflow + Reservoir Sum	Non-Exceedance Probability	SWSI	Current Year Rank
1	1986	N	667	1124	1791	0.97	3.9	
2	1983	SE	625	1102	1727	0.94	3.6	
3	1984	N	650	1056	1706	0.91	3.4	
4	1999	SL	396	1095	1491	0.88	3.1	
5	1998	SE	402	1079	1481	0.84	2.9	
6	1997	N	484	945	1429	0.81	2.6	
7	1985	N	293	1047	1340	0.78	2.3	
8	1982	N	371	958	1329	0.75	2.1	
9	**2011**	SL	671	577	1248	0.72	1.8	
10	1987	N	108	1086	1194	0.69	1.6	
11	2000	N	54	1111	1165	0.66	1.3	
12	1988	SE	55	1065	1120	0.63	1.0	
13	1981	N	45	1067	1112	0.59	0.8	
14	1996	N	286	659	945	0.56	0.5	
15	2001	LN	19	911	930	0.53	0.3	
16	1989	SL	53	869	922	0.50	0.0	
17	2006	N	323	444	768	0.47	-0.3	
18	1990	N	18	747	765	0.44	-0.5	
19	**2010**	EN	117	568	685	0.41	-0.8	
20	2007	EN	39	609	649	0.38	-1.0	
21	1995	SE	238	385	623	0.34	-1.3	
22	**2009**	N	210	413	622	0.31	-1.6	
23	2002	N	11	607	617	0.28	-1.8	
24	1991	N	81	518	599	0.25	-2.1	
25	1994	SE	24	566	590	0.22	-2.3	
26	1993	EN	276	272	548	0.19	-2.6	
27	**2008**	N	132	397	529	0.16	-2.9	
28	1992	EN	22	506	528	0.13	-3.1	
29	2005	EN	285	156	441	0.09	-3.4	
30	2003	EN	11	389	400	0.06	-3.6	
31	2004	N	22	181	203	0.03	-3.9	
	2012 10% Chance Exceedance Forecast	**LN**			**0**	**0.42**	**-0.7**	**19**
	2012 30% Chance Exceedance Forecast	**LN**			**0**	**0.33**	**-1.4**	**22**
	2012 50% Chance Exceedance Forecast	**LN**			**0**	**0.30**	**-1.6**	**22**
	2012 70% Chance Exceedance Forecast	**LN**			**0**	**0.29**	**-1.8**	**23**
	2012 90% Chance Exceedance Forecast	**LN**			**0**	**0.20**	**-2.5**	**26**

Bear Basin 2012 Snow Water with Non-Exceedence Projections

Based on Provisional SNOTEL data as of Dec 12, 2011




Bear River below Stewart Dam
Oct-Sep Streamflow 1927-2011
ONE Year Total & Moving 30 Year Average
Streamflow 1Year Total Flow
30Yr Moving Avg
NRCS
Natural Resources Conservation Service
1971 - 2000 Average 356 KAF
1981 - 2010 Average 295 KAF
1000 Acre-Feet
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1927
1930
1933
1936
1939
1942
1945
1948
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1990
1993
1996
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2005
2008
2011
Years

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BOISE STATE UNIVERSITY

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

Melvin (Mel) L. Kunkel

WY 2012 STREAMFLOW FORECAST

The Upper Boise River Basin 2012 water year looks to be an interesting one from the water management point of view. Last year was a wet year with the natural flow into Lucky Peak being~24% higher than the 50 year average flow, **this year will follow suit with flows being ~17% higher than normal.**

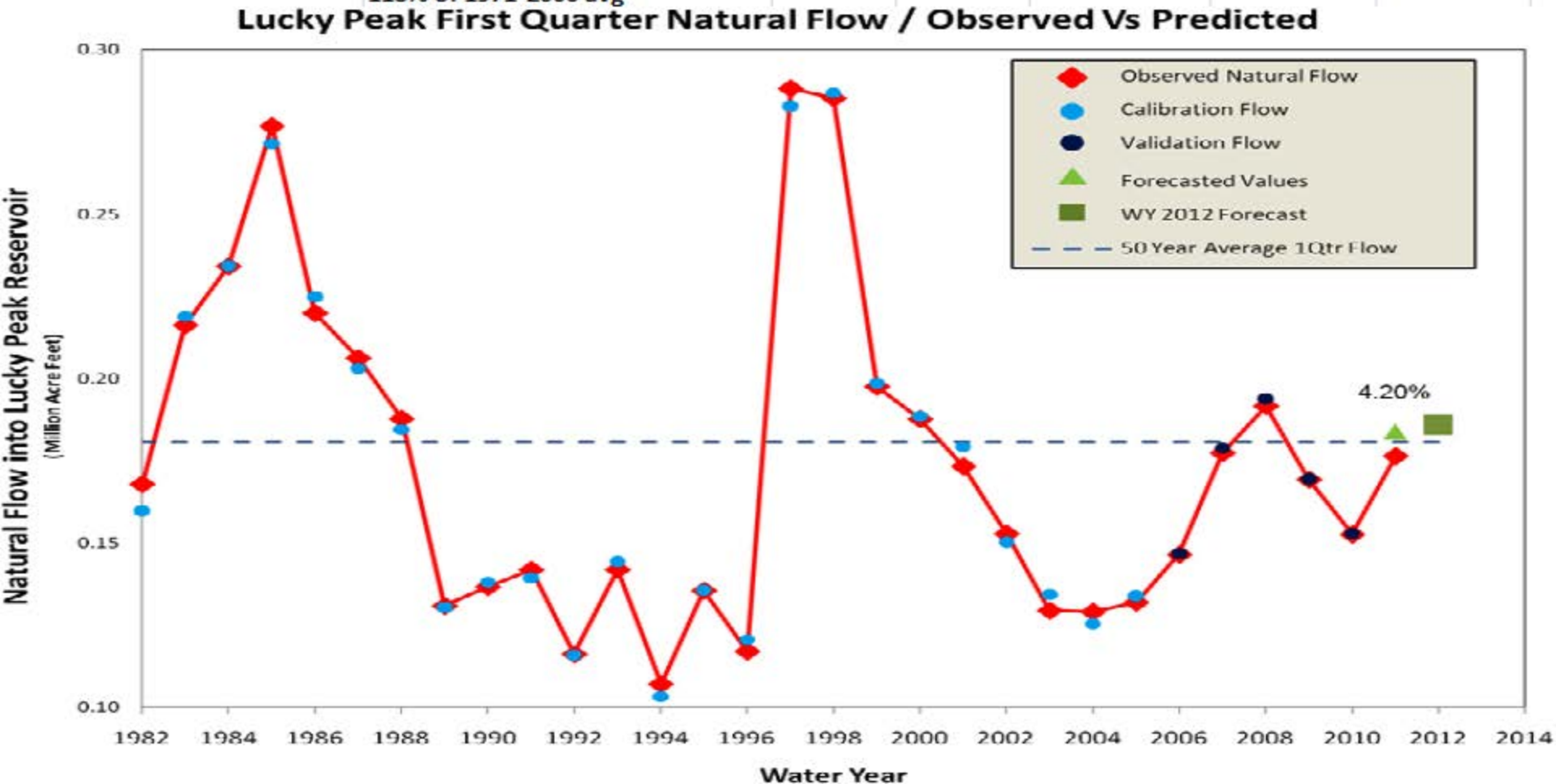
The model results indicate that we will have a slightly wetter first quarter than last year followed by a second quarter that is **significantly** wetter than last year's above average flow. After two quarters of strong flows, the third and fourth quarters drop slightly compared to last year's flows. The predicted annual flow from the summed Quarters predictions and the Annual prediction falls short of the WY 2011 flows, but not by much.

The **Forecasted flows are (posted 16 Oct 2011):**

1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Summed Qtrs	Annual Fcst
186,000 AF	396,000 AF	1.27 MAF	373,000 AF	**2.22 MAF**	**2.31 MAF**

** One note: This years modeling included the September PDO values. Normally I use the PDO values from the University of Washington; however this year, the September values were not available in time to do the forecast. In place of the UW data I used the September PDO value presented by the Climate Prediction Center, NCEP/NOAA, in its October 11, 2011 briefing titled "Global Ocean Monitoring: Recent Evolution, Current Status, and Predictions" available at http://www.cpc.ncep.noaa.gov/products/GODAS/. The forecast may be revised as the University of Washington PDO index is available.

BSU Boise River 2012 Forecast by Quarters	2011 Flow KAF	2012 Runoff KAF	2012 Forecast KAF	1962-2011 Average KAF	Forecast as % of 1962-2011 Average	Forecast as % of 1971-2000 Average	1971-2000 Average KAF
1st Quarter Oct-Dec	176.5	122.9(Oct-Nov)	186	180.6	103	100	186.4
2nd Quarter Jan-Mar	298.8		396	327.9	121	109	364.2
3rd Quarter Apr-Jun	1562.5		1270	1213.3	105	101	1258.4
4th Quarter Jul-Sep	402.9		373	253.5	147	139	267.5
Full Year Oct-Sep	2440.6		2310	1975.3	117	111	2076.5
	124% of 1961-2011 avg						
	118% of 1971-2000 avg						



Let It Snow !
Rock Store near Magic Mountain Ski Resort in 2003

Questions

NRCS Natural Resources Conservation Service