IDWR State Water Supply Meeting

January 15, 2016

Measuring Mores Creek Summit
Dec 30, 2015
150% of Median

USDA United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report
January 1, 2016

To better understand what is driving our weather in Idaho, check out the article below which explains this year's dominant weather pattern with quotes from our USDA Meteorologist.

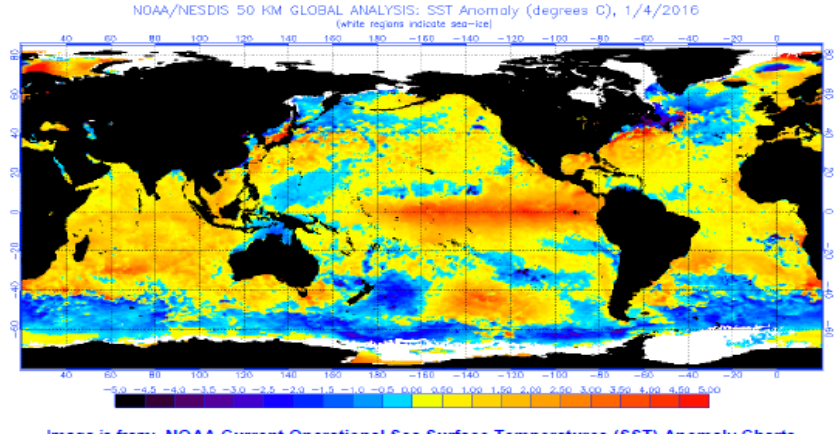
January 4, 2016 News Headlines: ENSO summary from PBS NewsHour Science page

"Think El Niño is weird now? Just wait for this summer"

See link for full article:
http://www.pbs.org/newshour/updates/think-el-nino-is-weird-now-just-wait-for-this-summer/

The El Niño Southern Oscillation (ENSO) is a patch of warmer-than-normal water in the eastern and central Pacific Ocean that develops around the equator. Picture it as a spoon stirring a cup of coffee, said Brad Rippey, a meteorologist with the U.S. Department of Agriculture.

The heat acts like the spoon bowl, pushing huge currents around the Pacific. But then some of this warmth seeps upward from the moving water, like an invisible spoon handle, and begins stirring the air. "Eventually everything is moving in tandem," Rippey said, and that's when things get weird for the planet's weather.

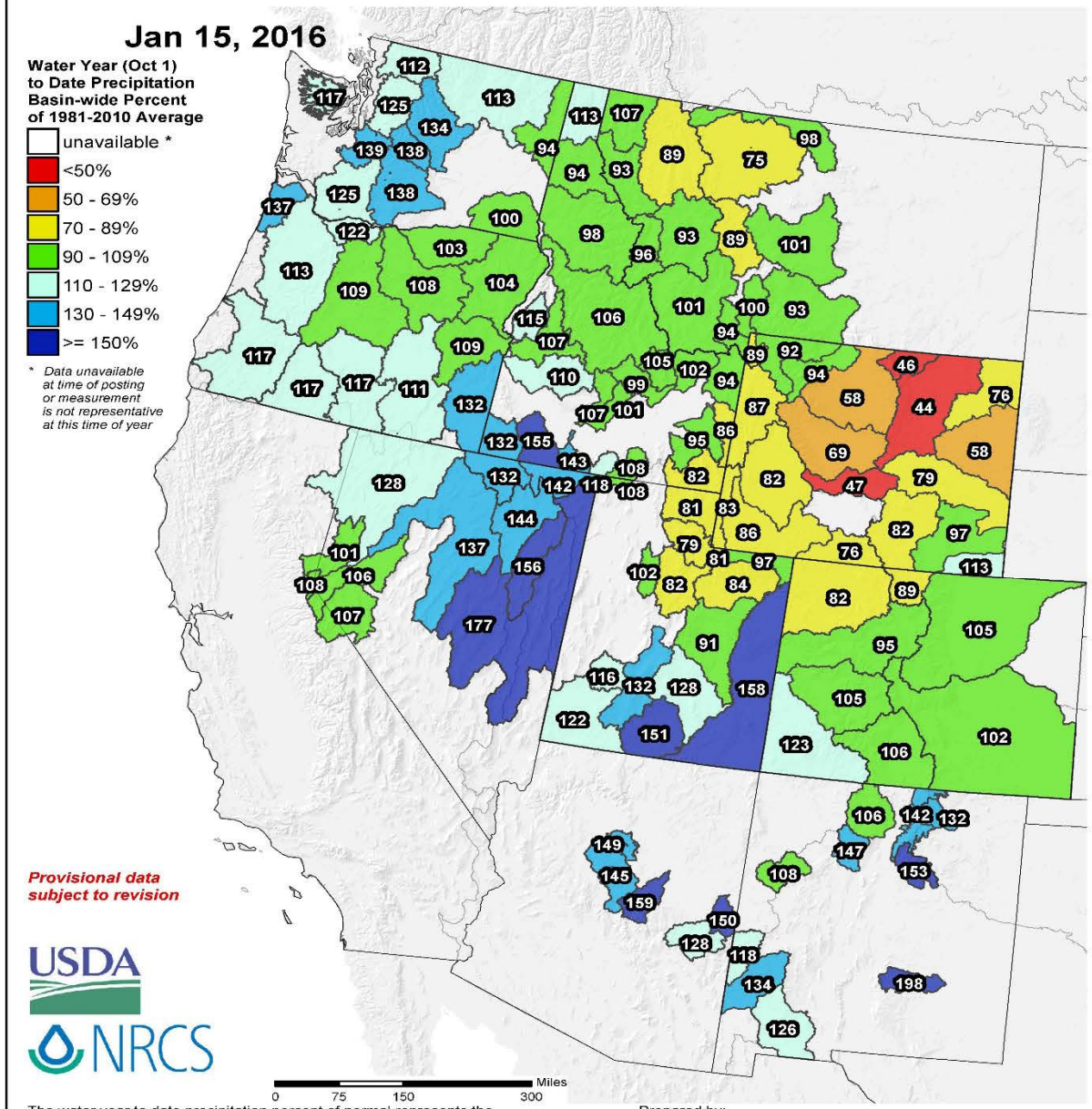


Ron Abramovich
Water Supply Specialist
Snow Survey
Boise, Idaho

USDA

NRCS Natural Resources Conservation Service

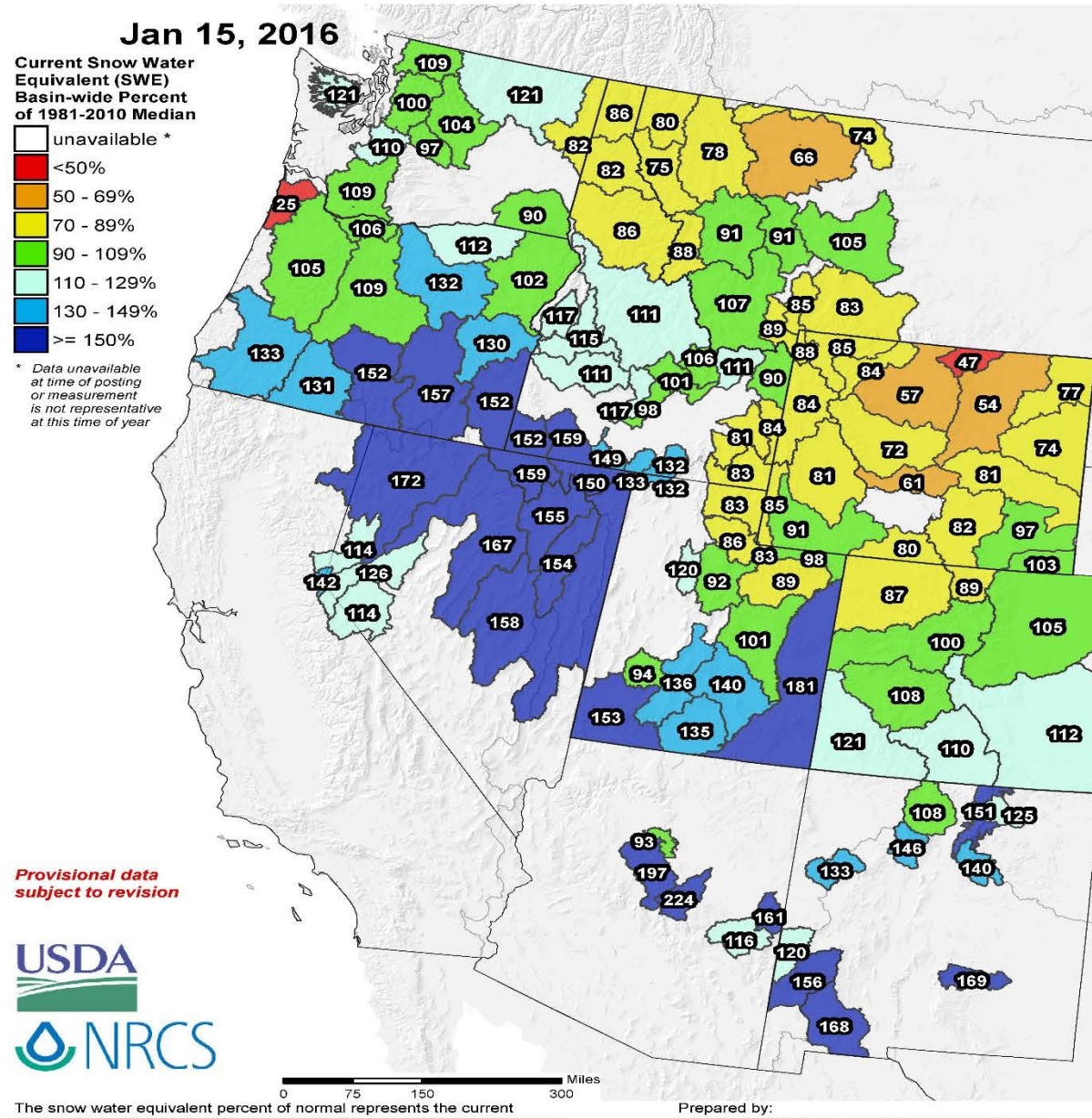
Westwide SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal



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:
USDA/NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

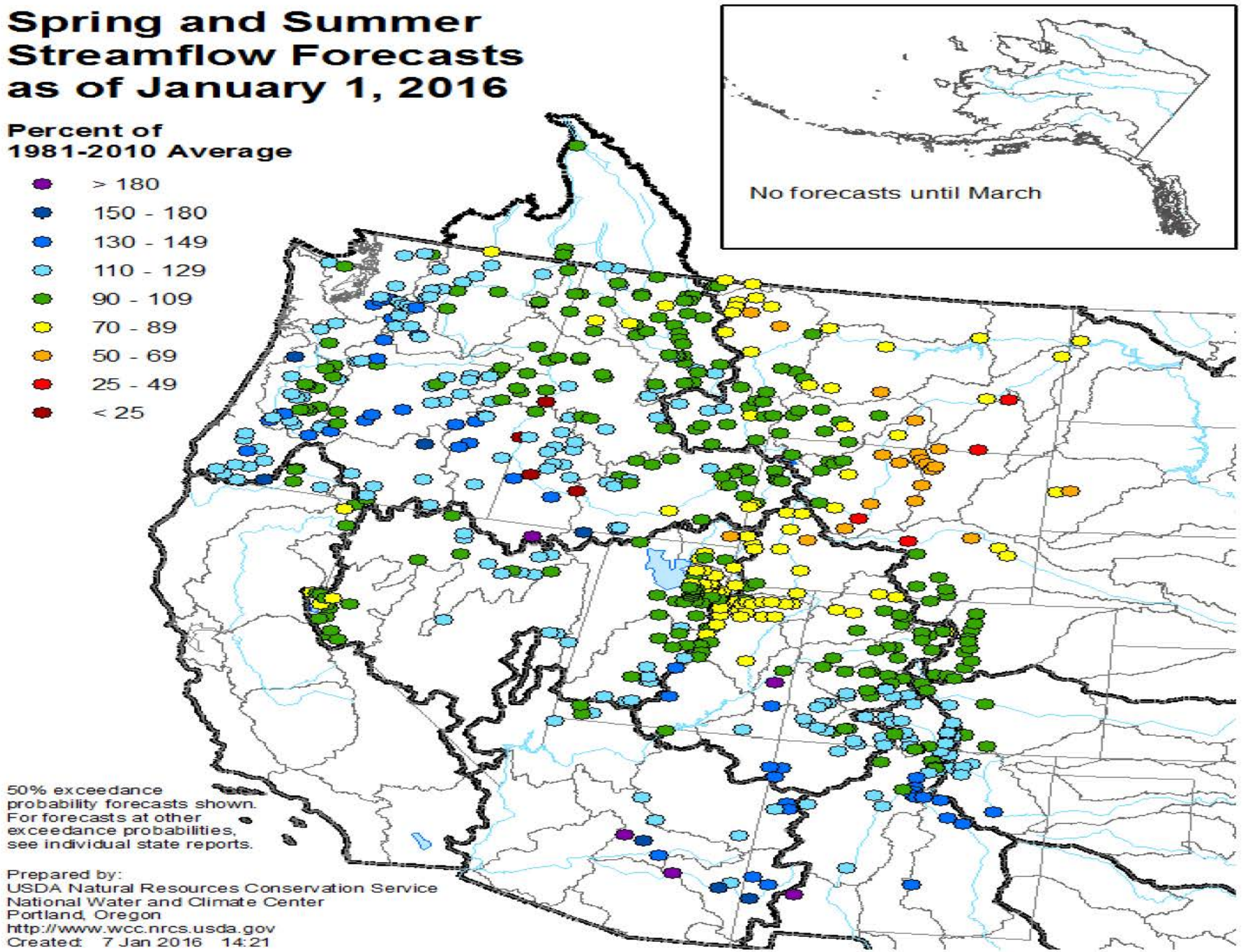
Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Norm

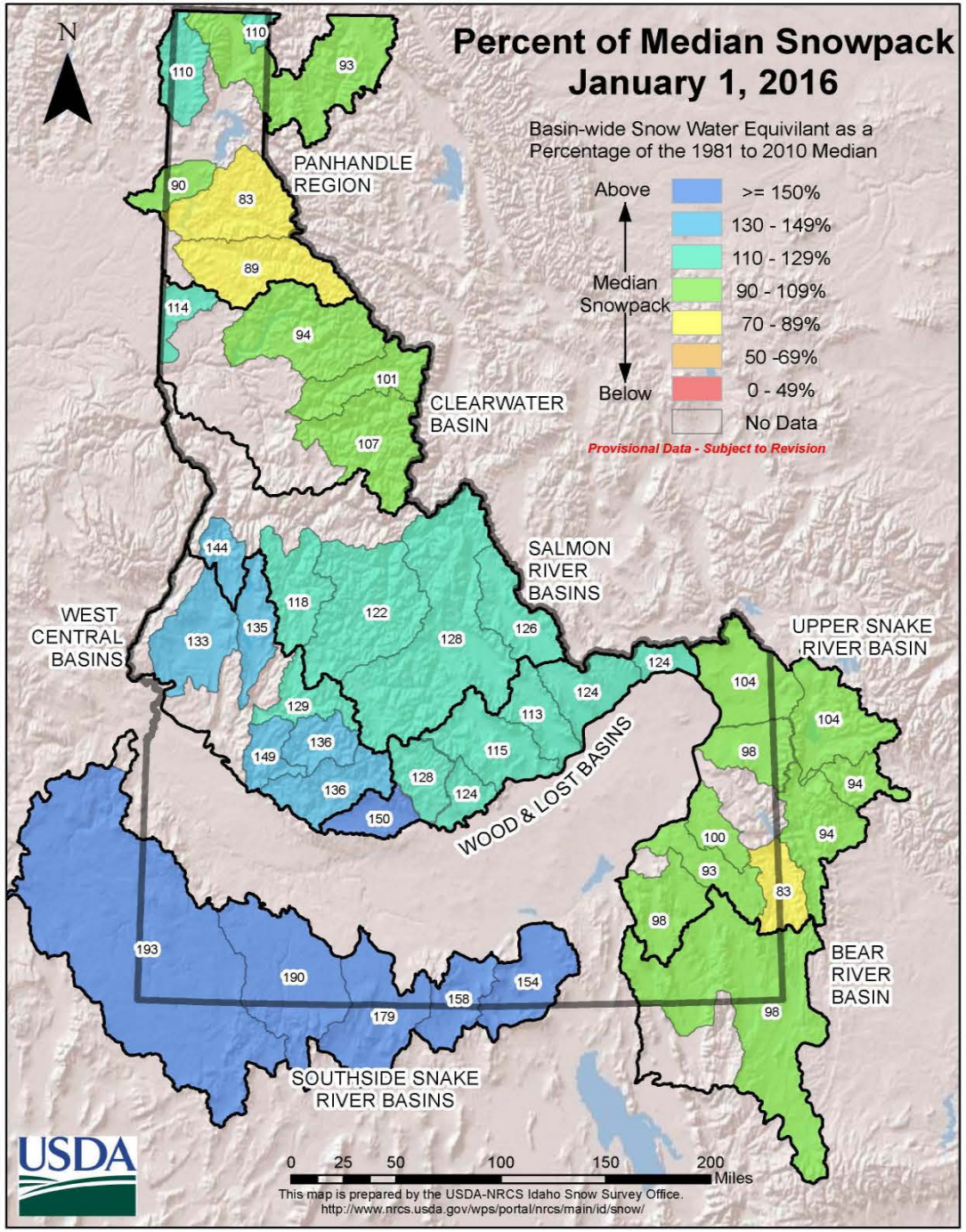


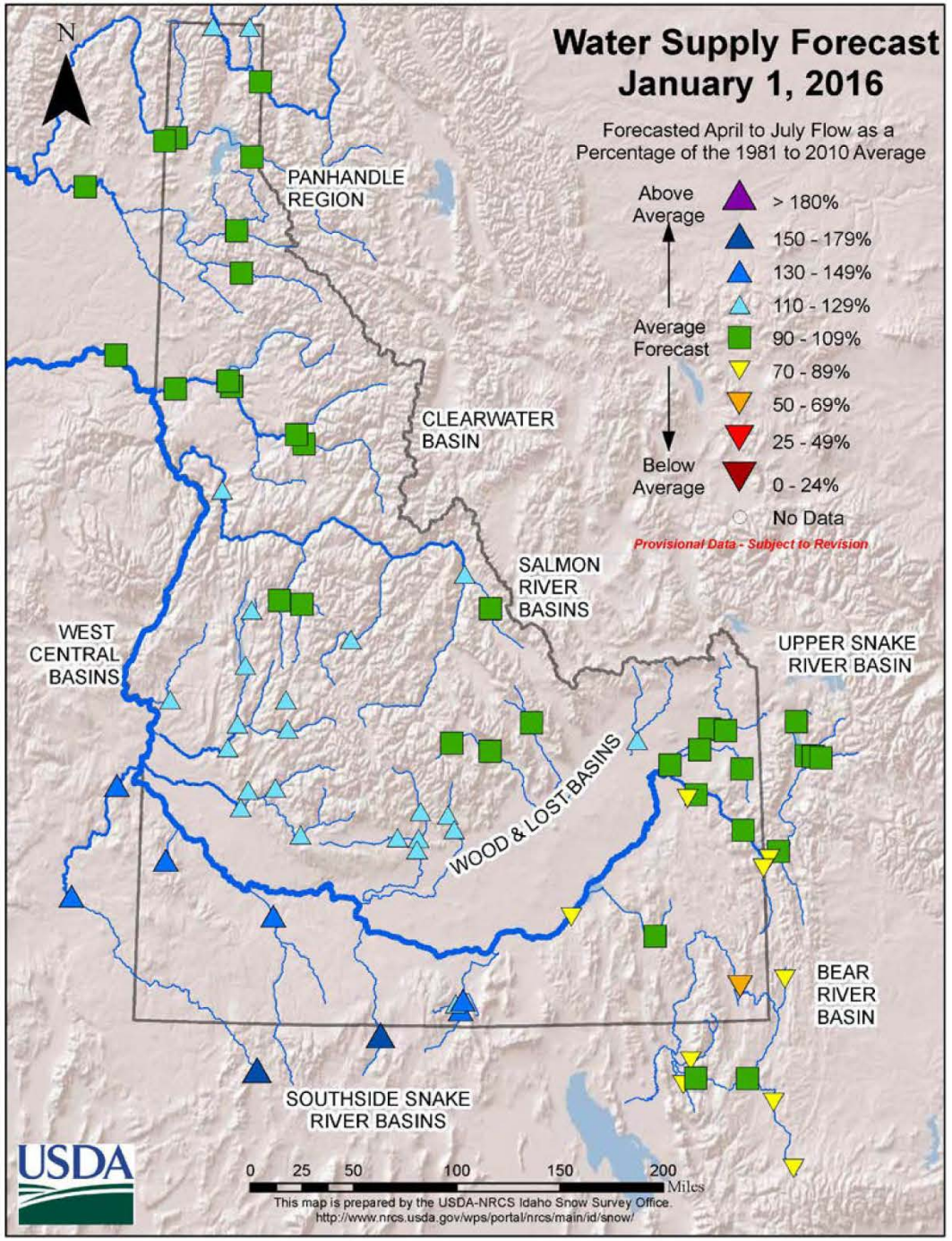
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

Spring and Summer Streamflow Forecasts as of January 1, 2016

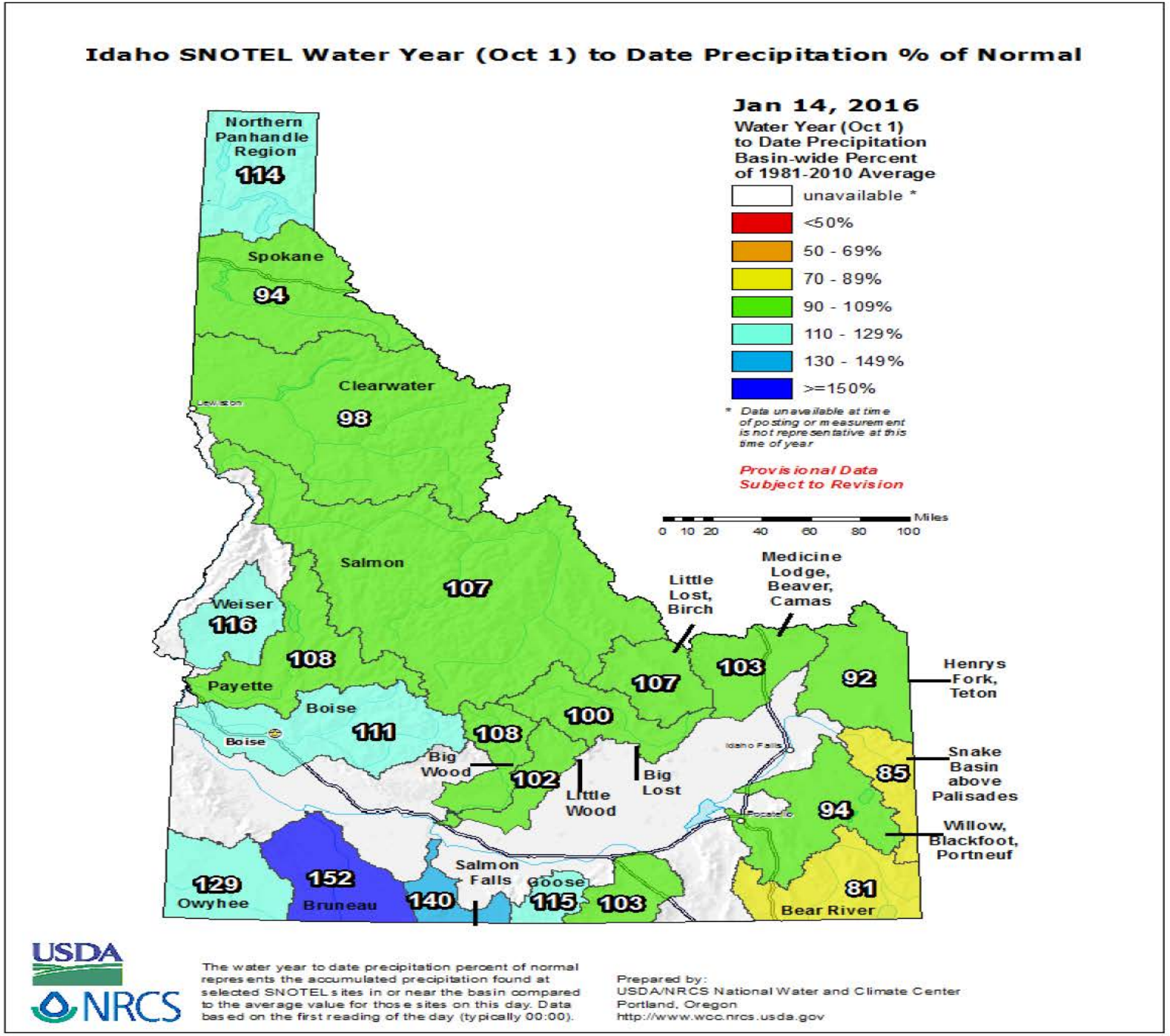



N
Percent of Median Snowpack
January 1, 2016
Basin-wide Snow Water Equivilant as a
Percentage of the 1981 to 2010 Median
Above
Median Snowpack
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
110
110
93
90
83
89
114
94
101
107
144
118
122
135
133
128
126
124
124
104
104
129
113
136
115
98
94
149
128
124
136
150
100
94
93
83
98
193
190
154
158
179
98
USDA
0 25 50 100 150 200
Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/


N
Water Supply Forecast
January 1, 2016
Forecasted April to July Flow as a
Percentage of the 1981 to 2010 Average
Above Average
Average Forecast
Below Average
> 180%
150 - 179%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 - 69%
25 - 49%
0 - 24%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
USDA
0 25 50 100 150 200
Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/

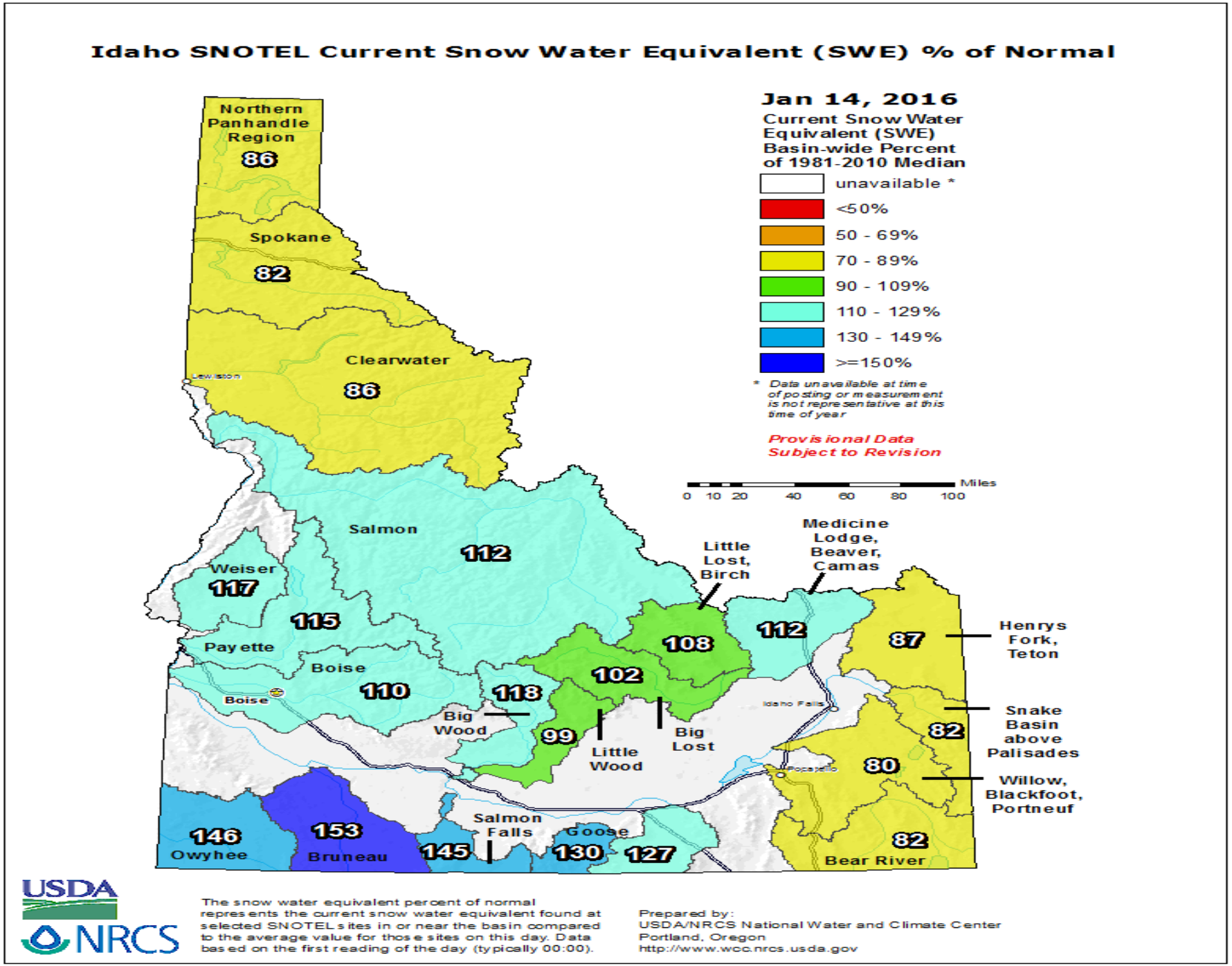
January 1-15 SNOTEL Precipitation is only 18 -30% of the normal January totals with half of January still to come...

But storms are starting to move in…



With minimal precipitation, the 1st half of January, snowpack %'s were dropping 1-2 percentage points a day.

Today's snowpacks are 40 – 80% of their seasonal peaks that occur in early April.



IDAHO SURFACE WATER SUPPLY INDEX (SWSI) January 1, 2016

The Surface Water Supply Index (SWSI) is a predictive indicator of surface water availability within a watershed for the spring and summer water use season. The index is calculated by combining pre-runoff reservoir storage (carryover) with forecasts of spring and summer streamflow. SWSI values are scaled from +4.0 (abundant supply) to -4.0 (extremely dry), with a value of zero indicating a median water supply as compared to historical occurrences. The SWSI analysis period is from 1981 to present.

SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for some basins to indicate the potential for agricultural irrigation water shortages.

BASIN or REGION	*SWSI Value*	*Most Recent Year With Similar SWSI Value*	*Agricultural Water Supply Shortage May Occur When SWSI is Less Than*
Spokane	-0.3	2013	NA
Clearwater	0.8	2006	NA
Salmon	0.6	2010	NA
Weiser	1.5	2010	NA
Payette	1.0	2008	NA
Boise	1.5	2012	-1.4
Big Wood	0.8	2012	0.7
Little Wood	1.3	2012	-1.2
Big Lost	0.8	2010	0.7
Little Lost	0.8	2006	1.3
Teton	0.3	2010	-3.9
Henrys Fork	-0.3	2012	-3.5
Snake (Heise)	-0.3	2010	-1.6
Oakley	1.3	2005	0.7
Salmon Falls	1.7	1993	-0.5
Bruneau	3.1	2006	NA
Owyhee	1.0	2005	-3.0
Bear River	-0.8	2015	-3.7

Updated Jan 11, 2016 to verify projected storage levels

Summary Table: Amount of streamflow needed in 2016 for adequate surface irrigation supplies.

Fall reservoir carryover storage are used to project spring storage levels. Then, by knowing the adequate irrigation water supply needed in your basin, spring reservoir volumes are subtracted from the adequate irrigation supply to determine the volume of streamflow to marginally meet adequate surface irrigation supplies in 2016.

Column 2 - Column 3 = Column 4 Col4/Col6 X 100=Col 5

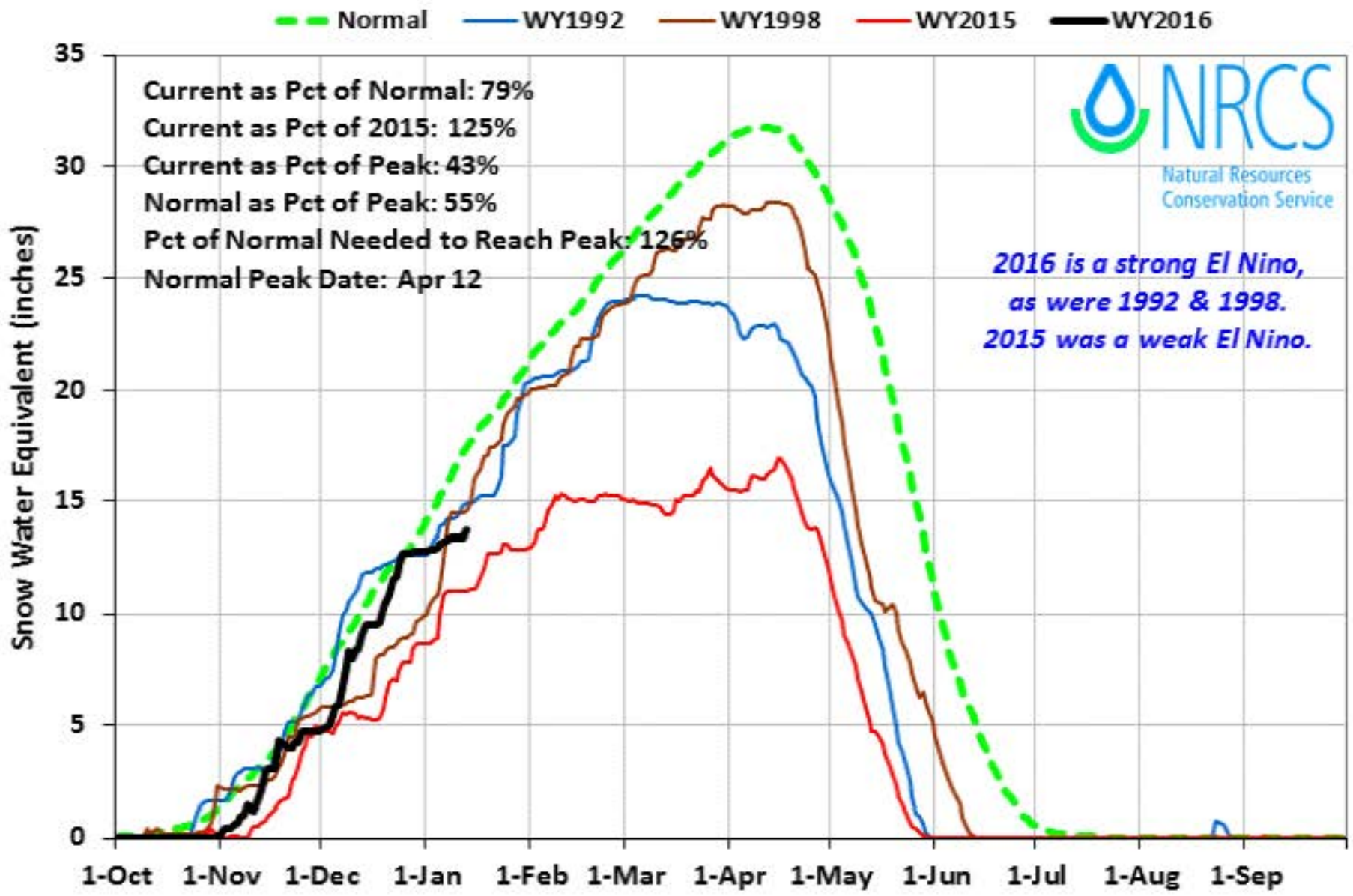
1 Basin	2 Adequate irrigation water supply KAF	3 Projected end of Mar, Feb, or Jan reservoir storage KAF	4 2016 Streamflow volume needed for adequate water supply KAF	5 % of average streamflow needed to meet an adequate irrigation supply in 2016 KAF	6 1981-2010 Streamflow average KAF	7 Streamflow period used in alanysis	9 2015 Streamflow % of average	
							KAF	%
Boise	1500	625	875	64%	1360	apr-sep	750	55%
Big Wood	275	70	205	77%	265	apr-sep	80	30%
Little Wood	60	17	43	47%	92	mar-sep	31	33%
Big Lost	180	33	147	98%	150	apr-sep	88	59%
Little Lost	40	—	40	118%	34	apr-sep	24	71%
Teton	85	—	85	44%	193	apr-sep	160	83%
Snake (Heise)	4,400	1450	2950	78%	3,780	apr-sep	3200	85%
Oakley	50	17	33	106%	31	mar-sep	13	51%
Salmon Falls	110	25	85	100%	85	mar-sep	42	49%
Owyhee	450	110	340	51%	665	feb-sep	180	27%
Bear River	280	500	0	0%	205	apr-sep	89	42%

Projected change in reservoir storage from Fall 2015 to target levels in Spring 2016 when the streamflow forecast and runoff period starts.

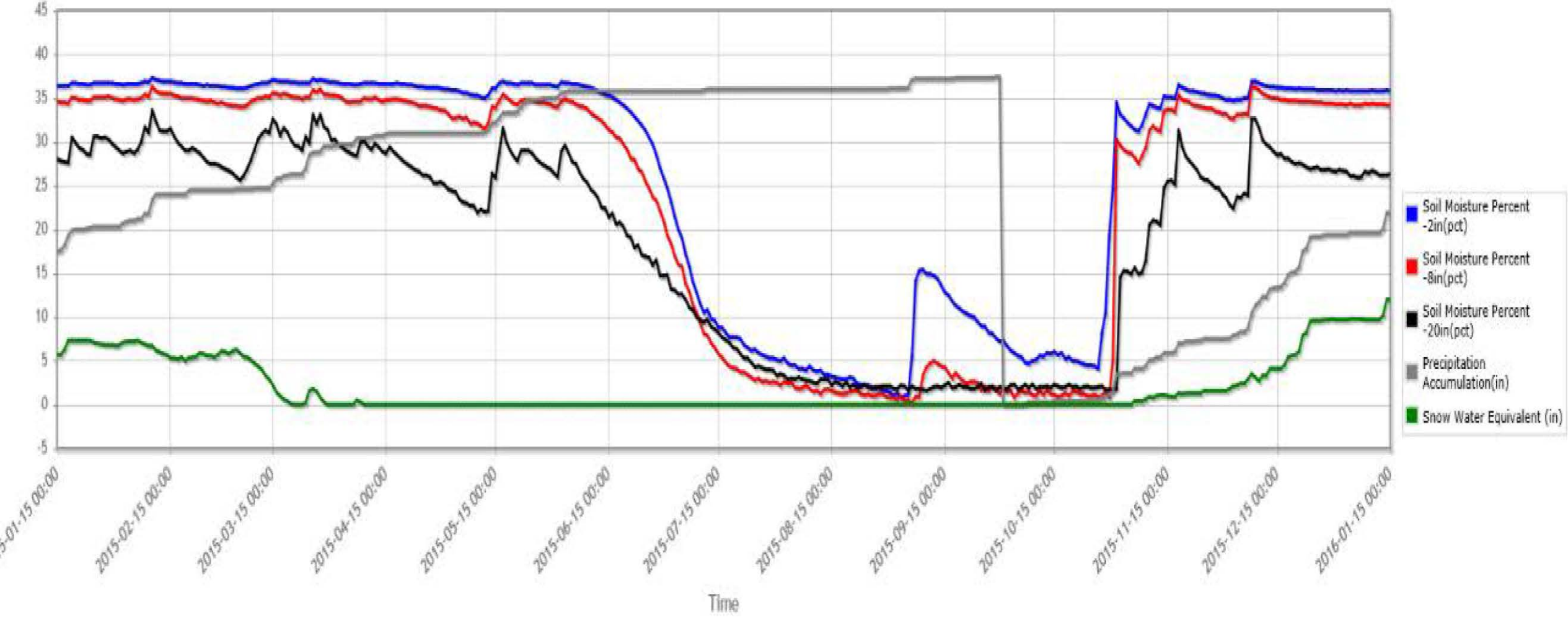
	Oct 31 Storage (KAF)	Nov 30 Storage (KAF)	Dec 31 Storage (KAF)	Jan 31 Storage (KAF)	Feb 28 Storage (KAF)	Projected Mar 31 (KAF)	Estimated Change in Storage (KAF)
Boise Reservoir System	396.2	423.8	470.9	not est	not est	625	201
Magic Reservoir	19.1	25.8	29.8	not est	not est	70	44
Little Wood Reservoir	4.2	6.5	9	not est	17	not est	10
Mackay Reservoir	9.0	17.2	23.3	not est	not est	33	16
Jackson & Palisades	1046.8	1158.0	1260	not est	not est	1450	292
Oakley Reservoir	7.9	10.1	11.9	not est	17	not est	7
Salmon Falls Reservoir	11.2	13.4	16.2	not est	25	not est	12
Lake Owyhee	26.4	43.1	69.5	110	not est	not est	67
Bear Lake	467.7	453.3	460.4	not est	not est	500	47

Northern Panhandle Region 2016 Snowpack Comparison Graph (8 sites)

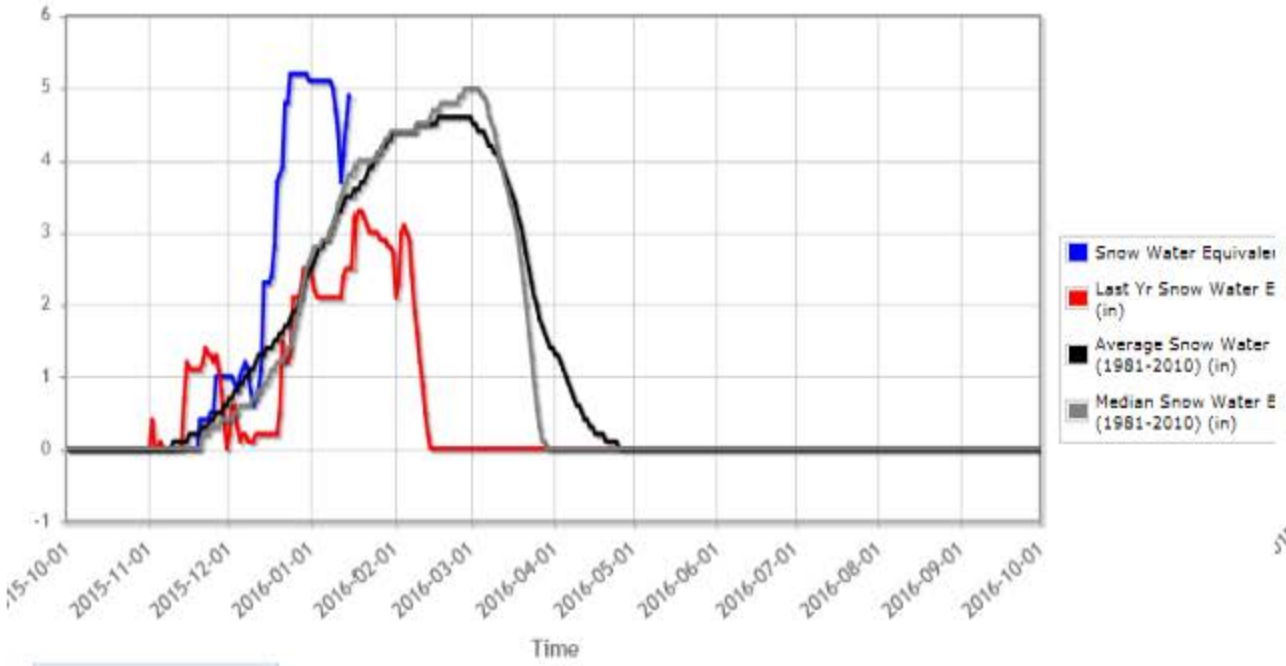
Based on Provisional SNOTEL data as of Jan 13, 2016



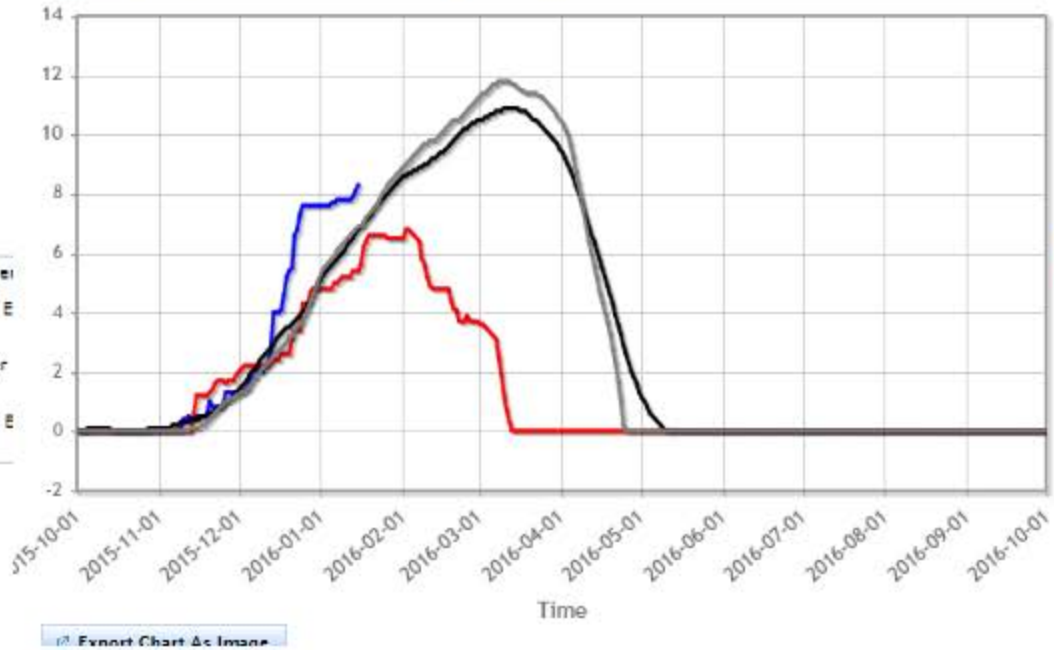
Moscow Mountain (989) Idaho SNOTEL Site - 4700 ft



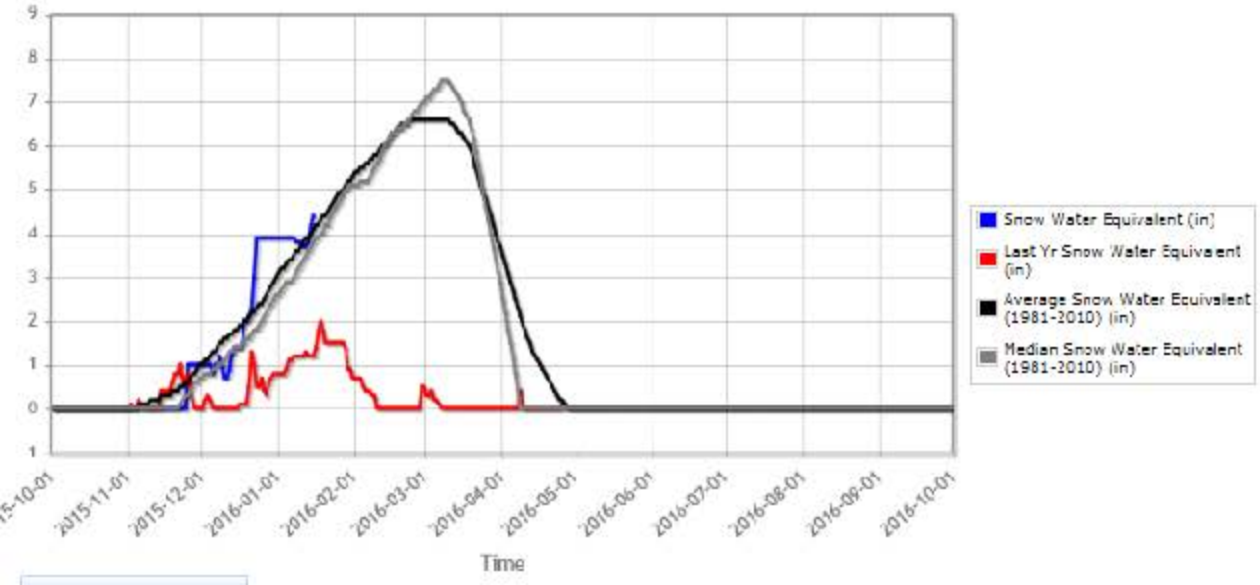
Prairie (704) Idaho SNOTEL Site - 4800 ft



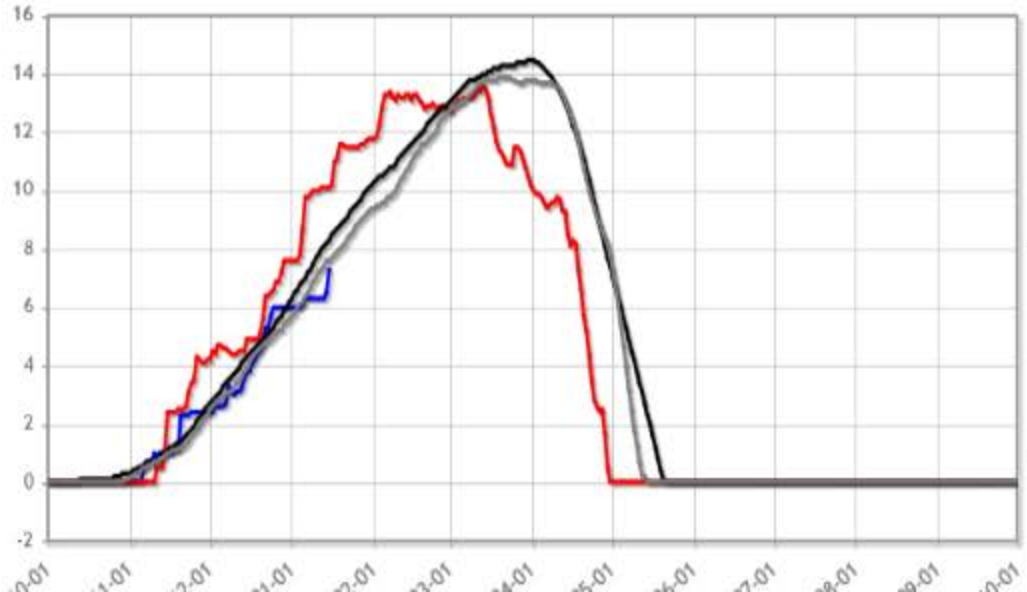
Camas Creek Divide (382) Idaho SNOTEL Site - 5710 ft



Mud Flat (654) Idaho SNOTEL Site - 5730 ft

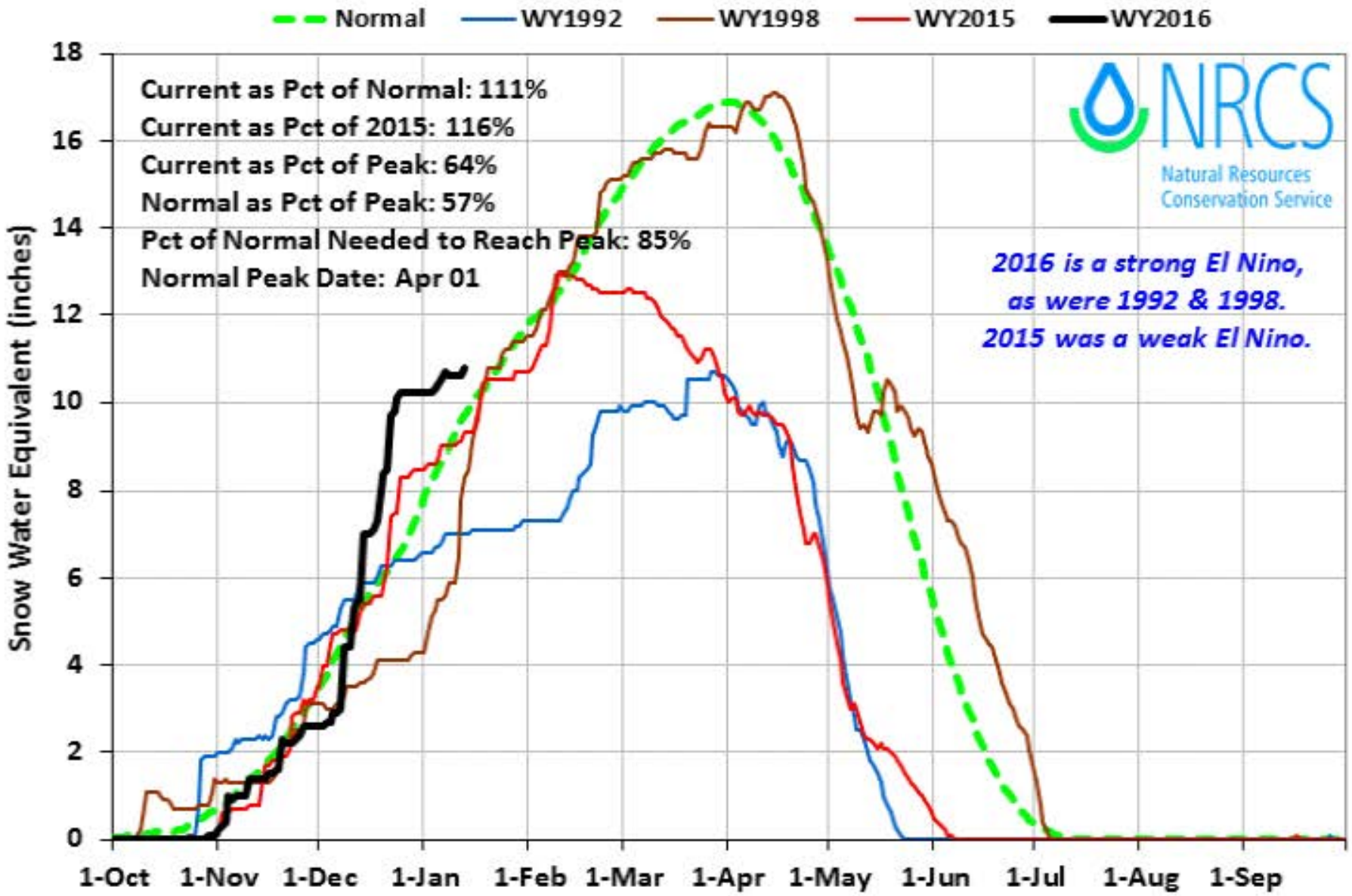


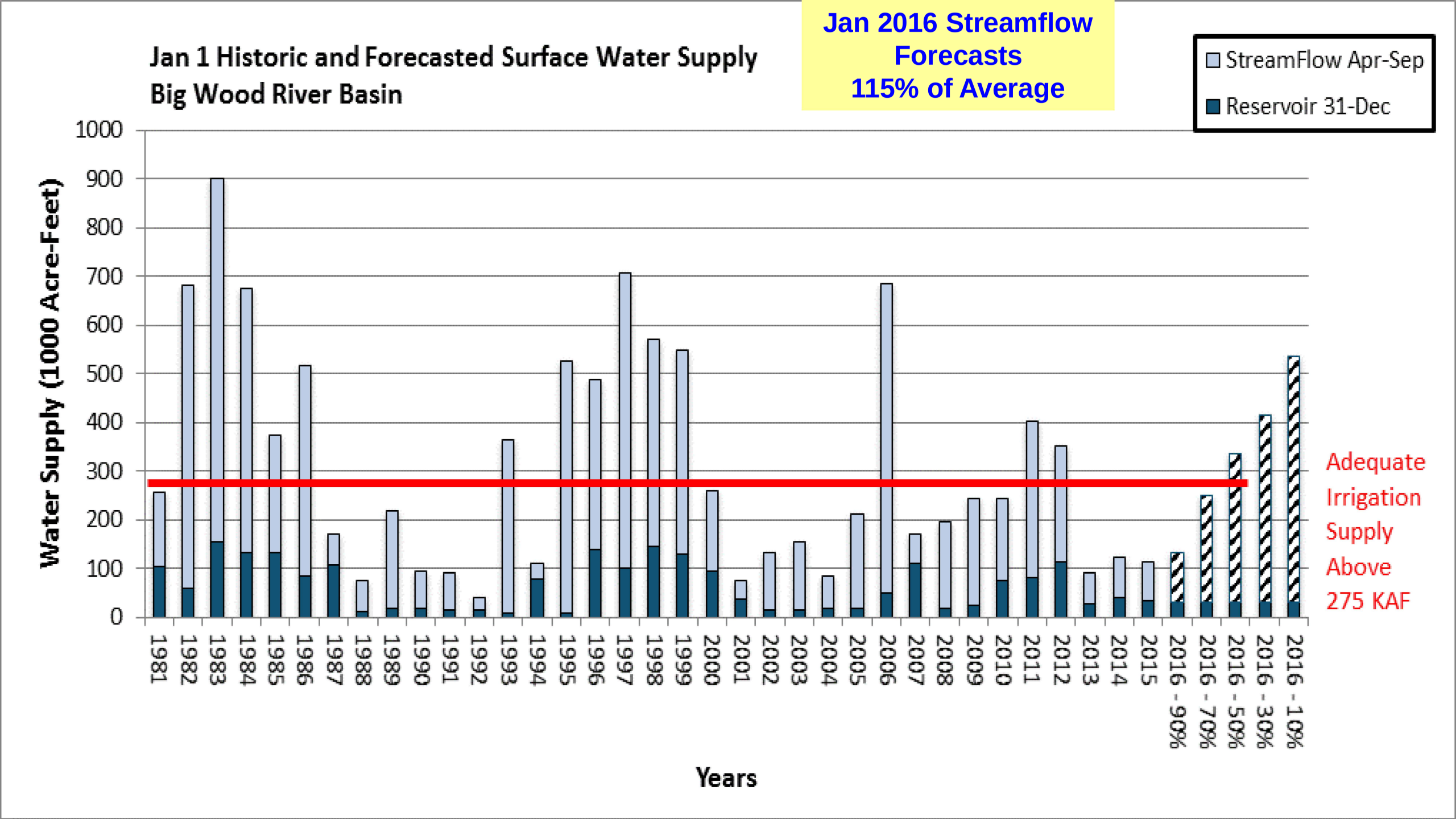
Pine Creek Pass (695) Idaho SNOTEL Site - 6720 ft



Big Wood Basin 2016 Snowpack Comparison Graph (9 sites)

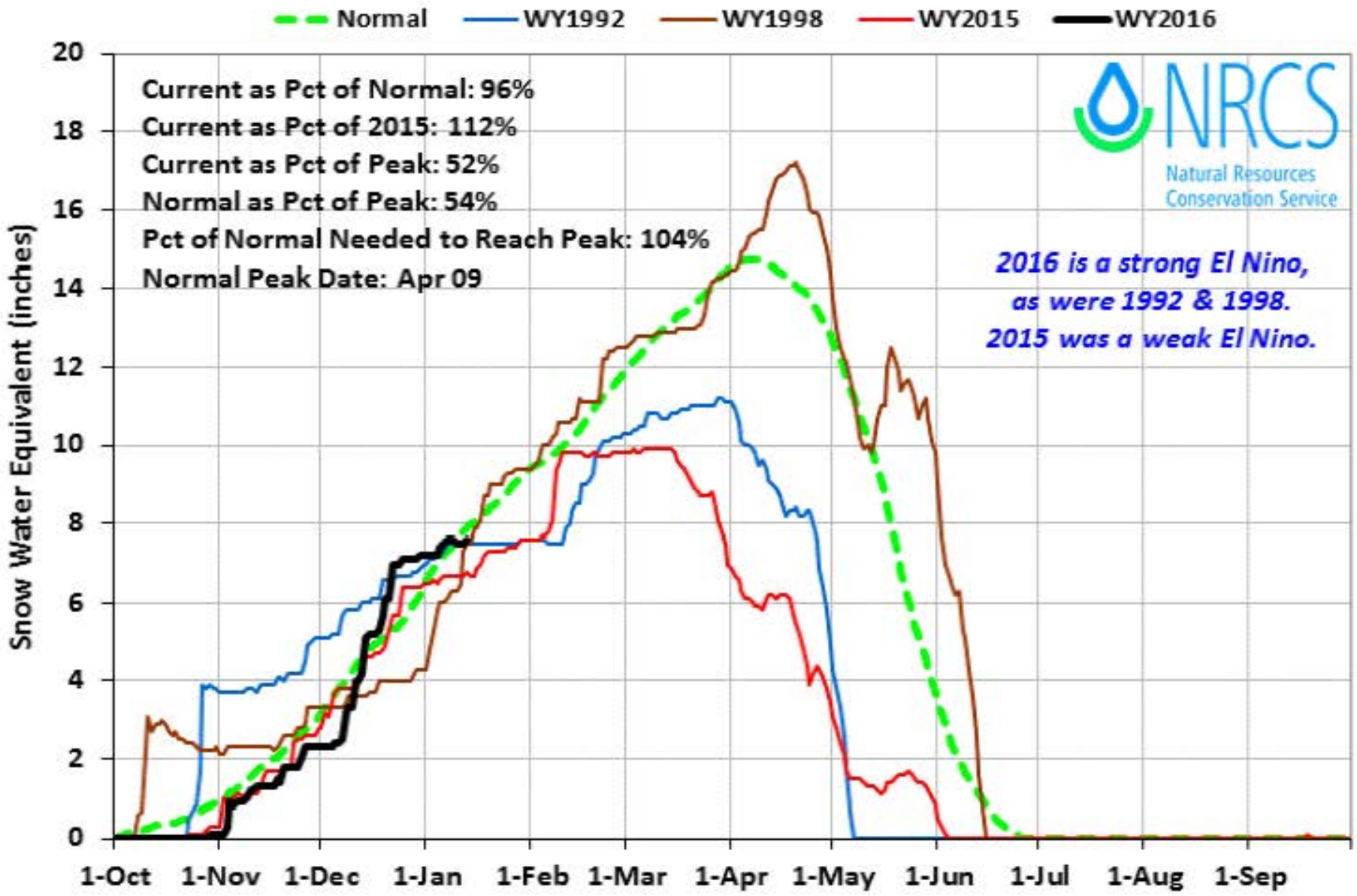
Based on Provisional SNOTEL data as of Jan 13, 2016

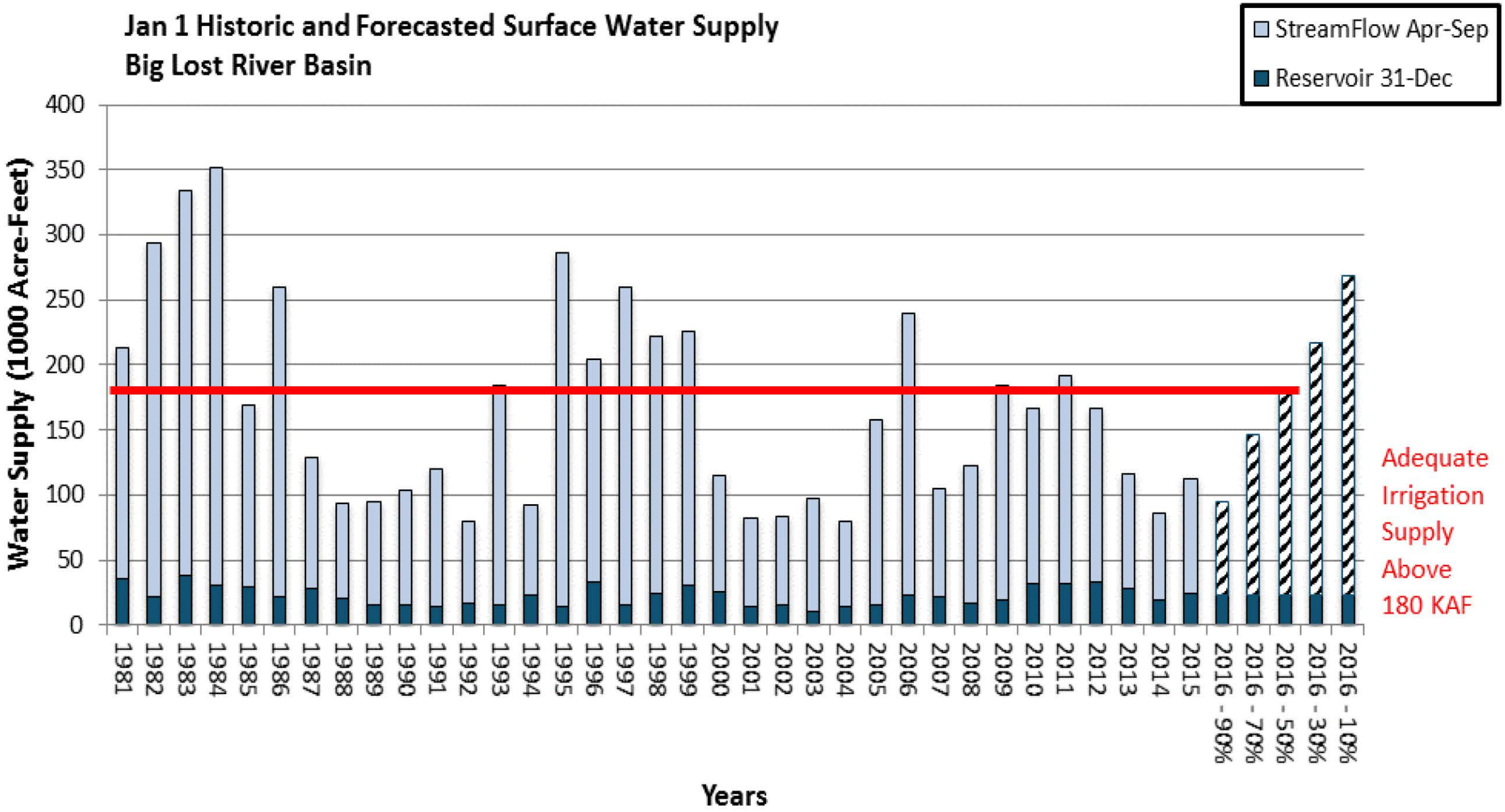


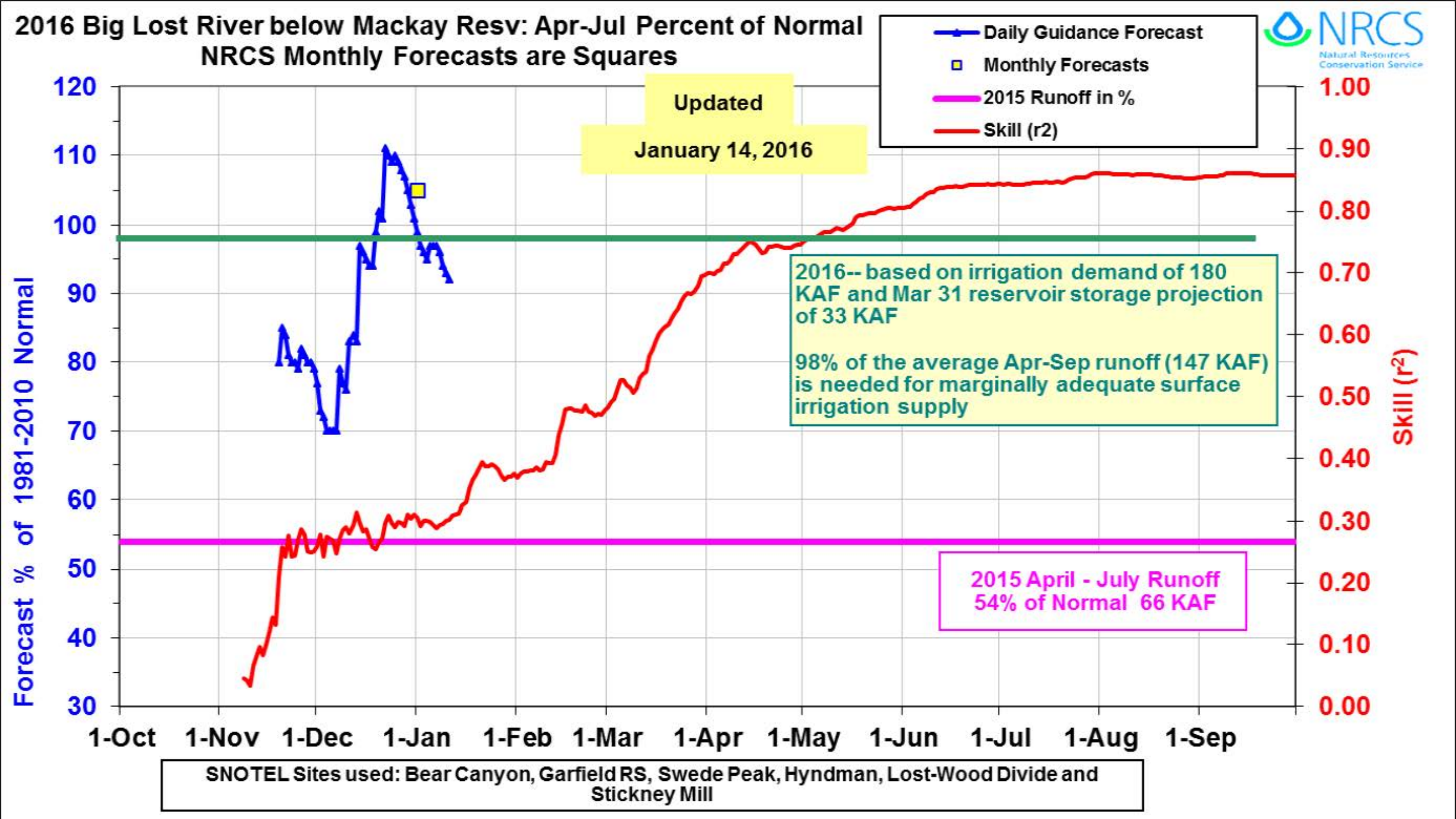

Jan 1 Historic and Forecasted Surface Water Supply
Big Wood River Basin
Jan 2016 Streamflow Forecasts
115% of Average
StreamFlow Apr-Sep
Reservoir 31-Dec
Water Supply (1000 Acre-Feet)
1000
900
800
700
600
500
400
300
200
100
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016 - 90%
2016 - 70%
2016 - 50%
2016 - 30%
2016 - 10%
Years
Adequate Irrigation Supply Above 275 KAF

Big Lost Basin 2016 Snowpack Comparison Graph (5 sites)

Based on Provisional SNOTEL data as of Jan 13, 2016

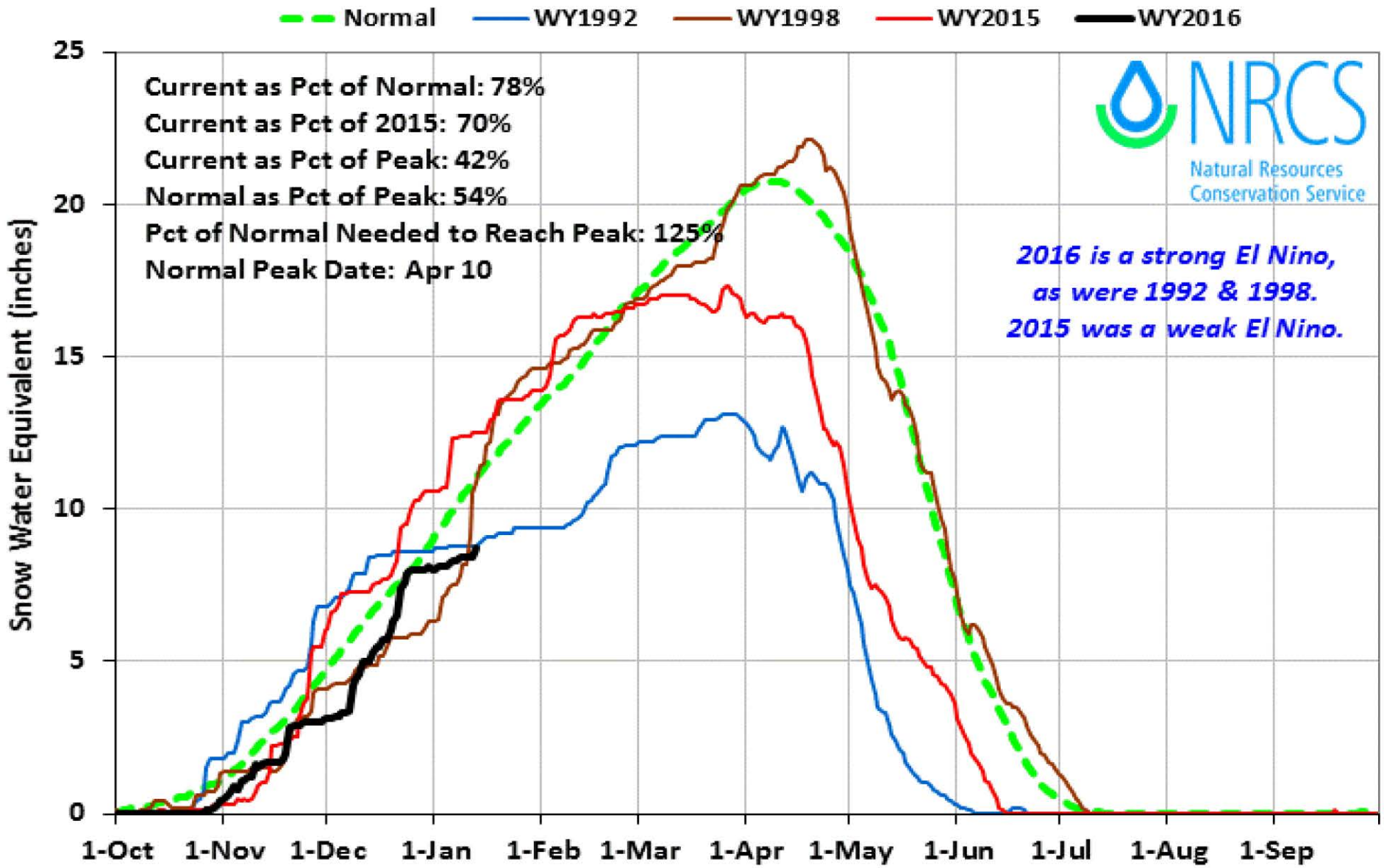


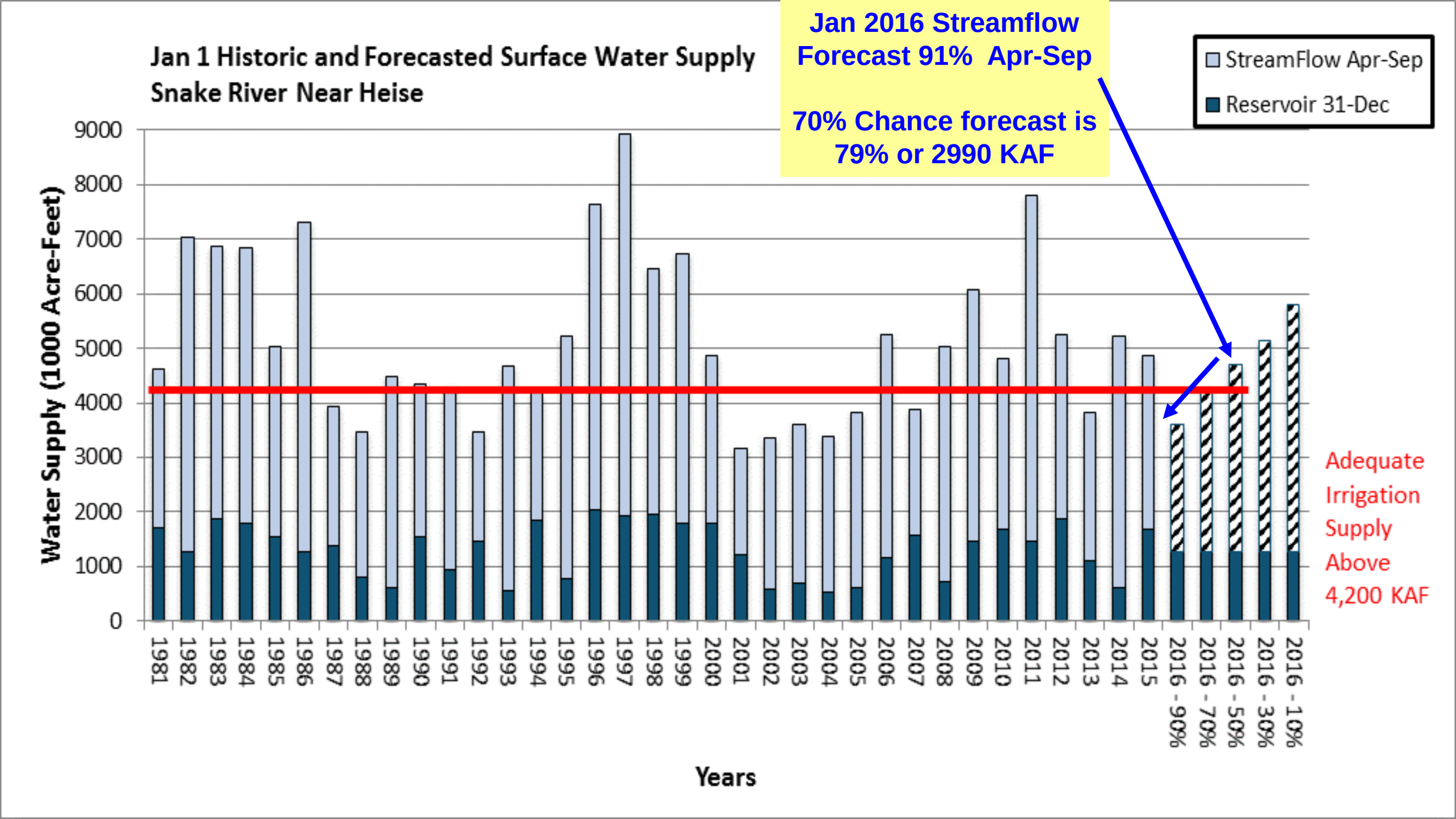

Jan 1 Historic and Forecasted Surface Water Supply
Big Lost River Basin
StreamFlow Apr-Sep
Reservoir 31-Dec
Water Supply (1000 Acre-Feet)
400
350
300
250
200
150
100
50
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016 - 90%
2016 - 70%
2016 - 50%
2016 - 30%
2016 - 10%
Years
Adequate Irrigation Supply Above 180 KAF

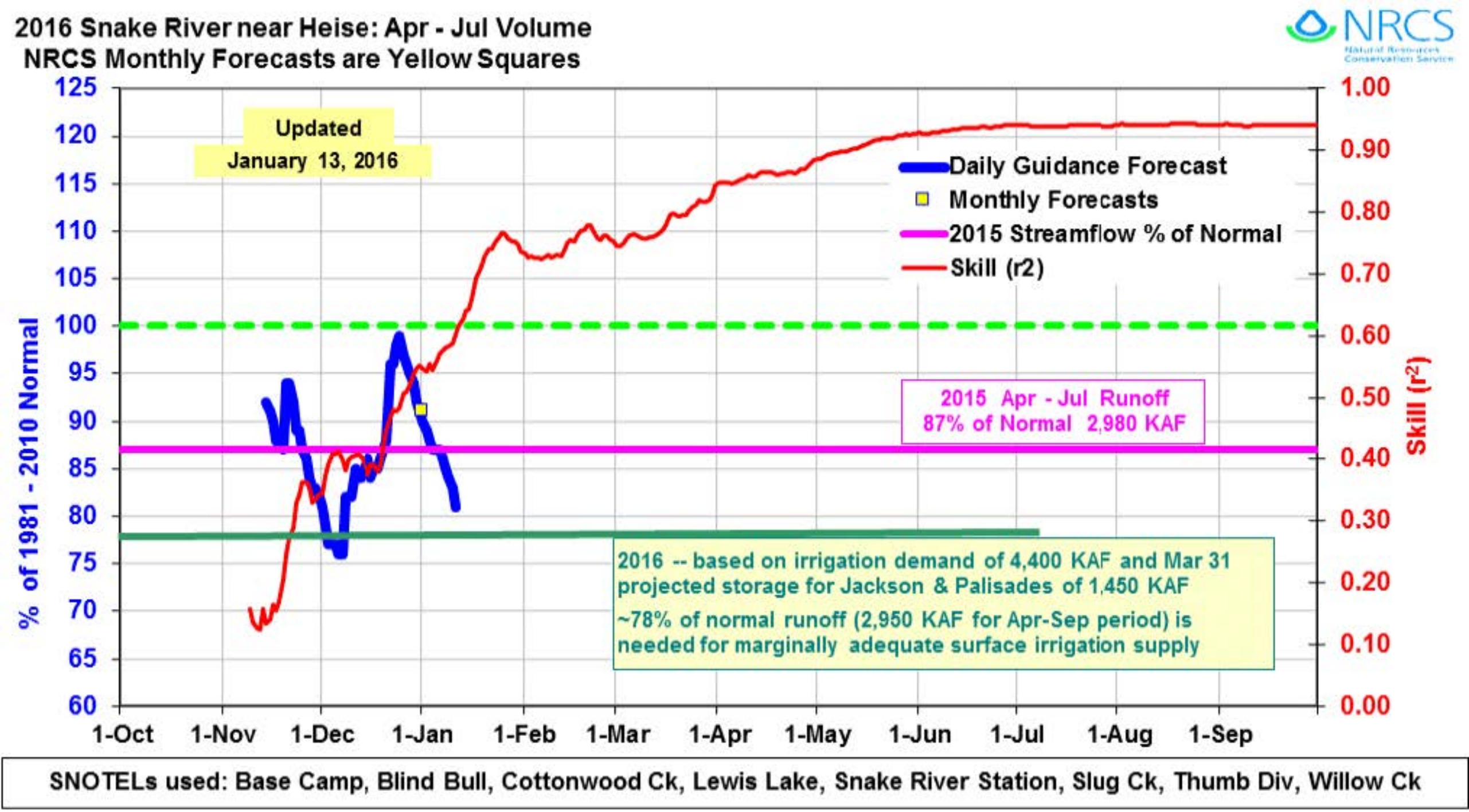

2016 Big Lost River below Mackay Resv: Apr-Jul Percent of Normal
NRCS Monthly Forecasts are Squares
Daily Guidance Forecast
Monthly Forecasts
2015 Runoff in %
Skill (r2)
NRCS
Natural Resources Conservation Service
Updated
January 14, 2016
2016-- based on irrigation demand of 180 KAF and Mar 31 reservoir storage projection of 33 KAF
98% of the average Apr-Sep runoff (147 KAF) is needed for marginally adequate surface irrigation supply
2015 April - July Runoff
54% of Normal 66 KAF
Forecast % of 1981-2010 Normal
Skill (r²)
120
110
100
90
80
70
60
50
40
30
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
SNOTEL Sites used: Bear Canyon, Garfield RS, Swede Peak, Hyndman, Lost-Wood Divide and Stickney Mill

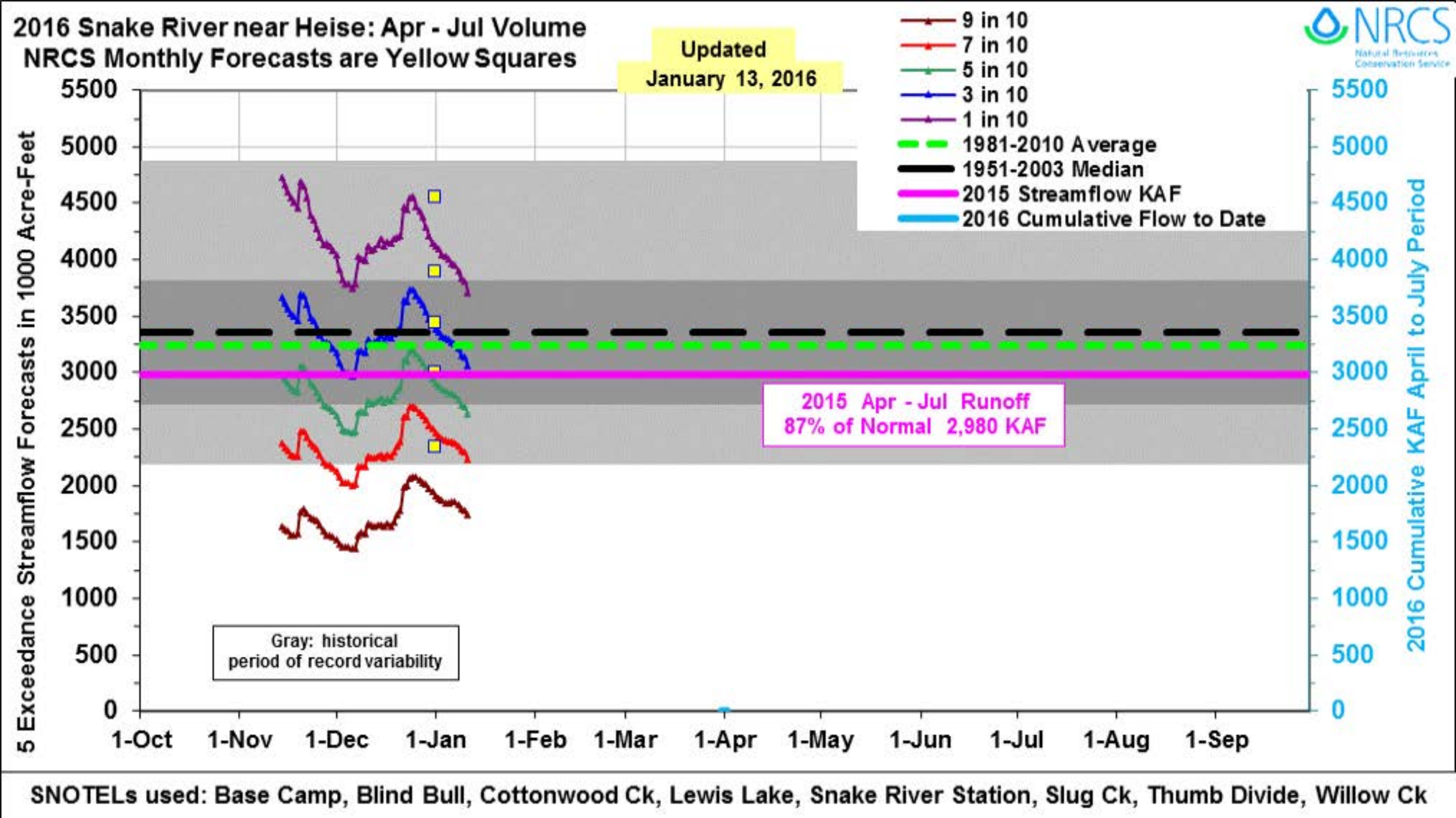
Snake Basin above Palisades 2016 Snowpack Comparison Graph (18 sites)

Based on Provisional SNOTEL data as of Jan 13, 2016

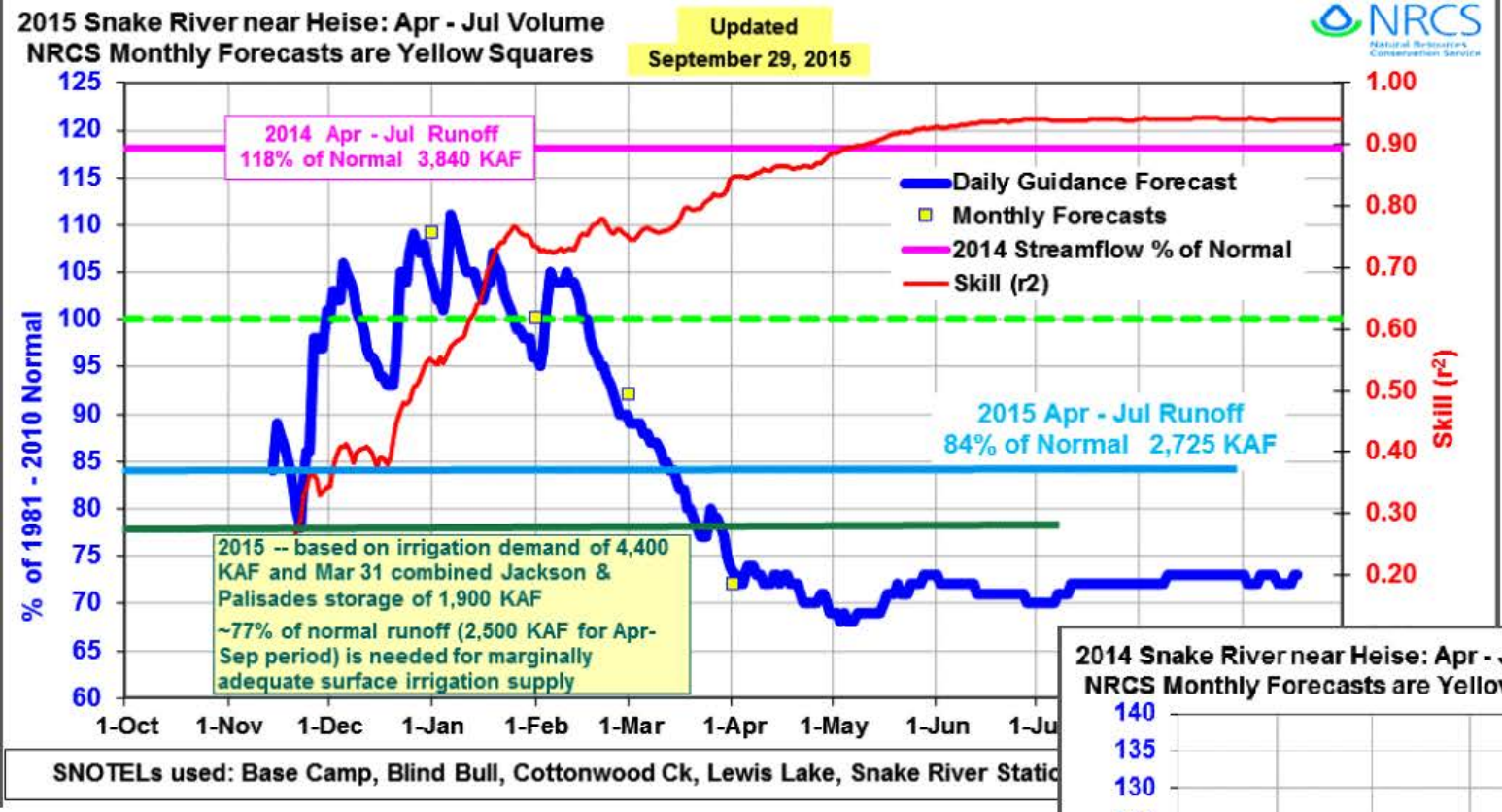


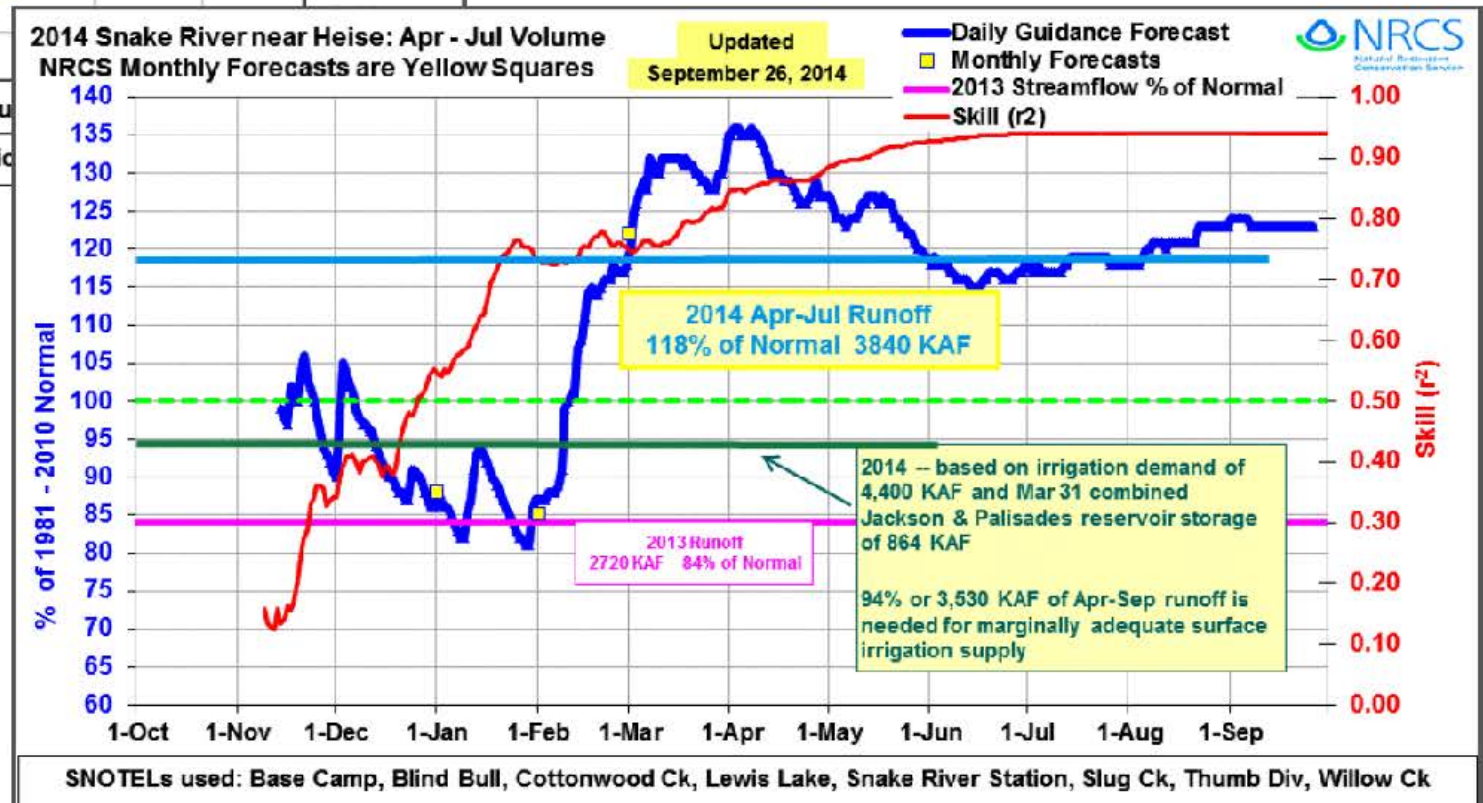

Jan 1 Historic and Forecasted Surface Water Supply
Snake River Near Heise
Jan 2016 Streamflow Forecast 91% Apr-Sep
70% Chance forecast is 79% or 2990 KAF
StreamFlow Apr-Sep
Reservoir 31-Dec
Water Supply (1000 Acre-Feet)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016 - 90%
2016 - 70%
2016 - 50%
2016 - 30%
2016 - 10%
Years
Adequate Irrigation Supply Above 4,200 KAF


2016 Snake River near Heise: Apr - Jul Volume
NRCS Monthly Forecasts are Yellow Squares
NRCS
Natural Resources Conservation Service
Updated
January 13, 2016
Daily Guidance Forecast
Monthly Forecasts
2015 Streamflow % of Normal
Skill (r2)
2015 Apr - Jul Runoff
87% of Normal 2,980 KAF
2016 -- based on irrigation demand of 4,400 KAF and Mar 31 projected storage for Jackson & Palisades of 1,450 KAF
~78% of normal runoff (2,950 KAF for Apr-Sep period) is needed for marginally adequate surface irrigation supply
% of 1981 - 2010 Normal
Skill (r²)
125
120
115
110
105
100
95
90
85
80
75
70
65
60
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
SNOTELs used: Base Camp, Blind Bull, Cottonwood Ck, Lewis Lake, Snake River Station, Slug Ck, Thumb Div, Willow Ck



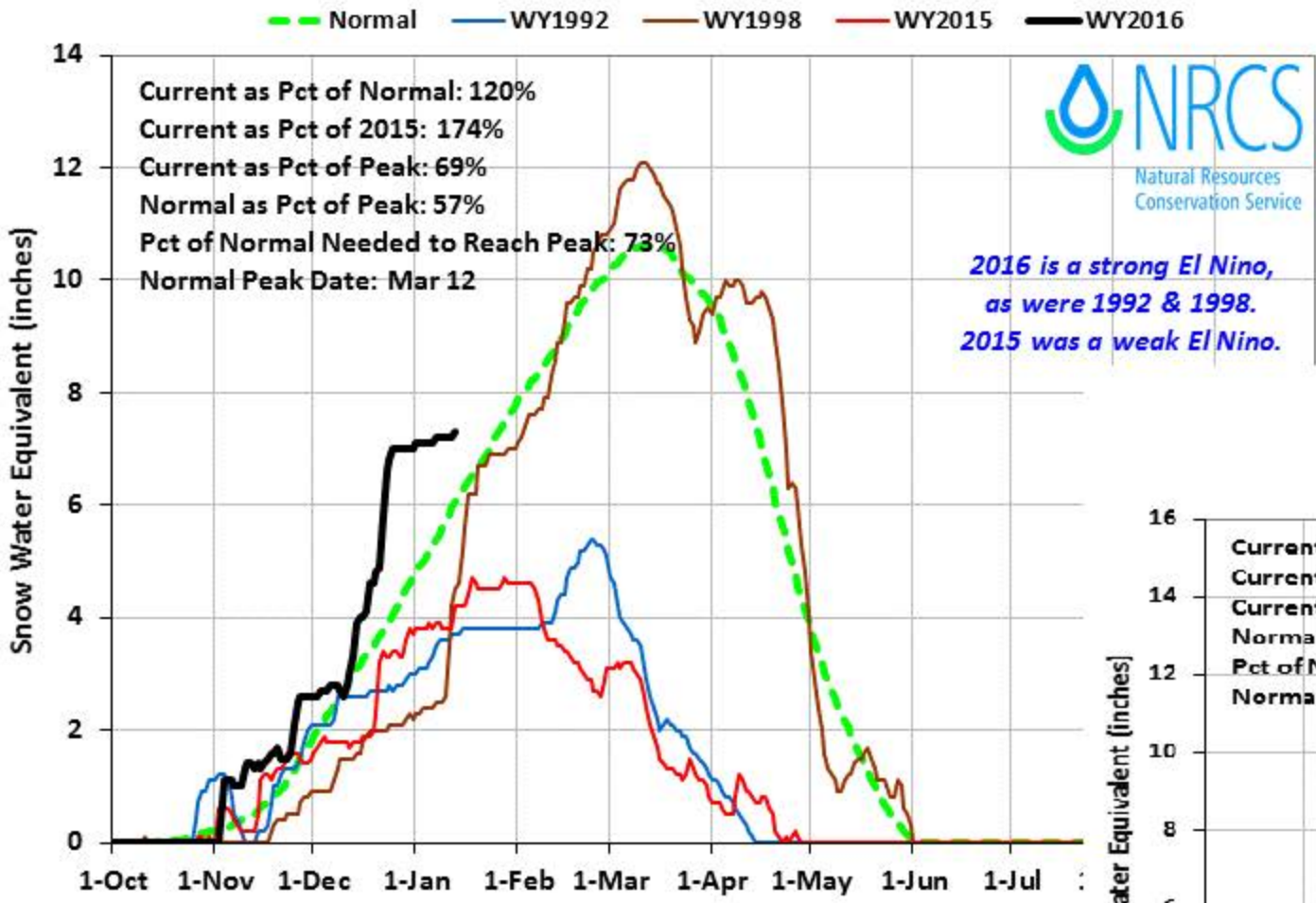
SNOTELs used: Base Camp, Blind Bull, Cottonwood Ck, Lewis Lake, Snake River Station, Slug Ck, Thumb Divide, Willow Ck


2015 Snake River near Heise: Apr - Jul Volume
NRCS Monthly Forecasts are Yellow Squares
Updated
September 29, 2015
NRCS
2014 Apr - Jul Runoff
118% of Normal 3,840 KAF
Daily Guidance Forecast
Monthly Forecasts
2014 Streamflow % of Normal
Skill (r2)
2015 Apr - Jul Runoff
84% of Normal 2,725 KAF
2015 -- based on irrigation demand of 4,400 KAF and Mar 31 combined Jackson & Palisades storage of 1,900 KAF
~77% of normal runoff (2,500 KAF for Apr-Sep period) is needed for marginally adequate surface irrigation supply
% of 1981 - 2010 Normal
Skill (r²)
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
SNOTELs used: Base Camp, Blind Bull, Cottonwood Ck, Lewis Lake, Snake River Statio


2014 Snake River near Heise: Apr - Jul Volume
NRCS Monthly Forecasts are Yellow Squares
Updated
September 26, 2014
NRCS
Daily Guidance Forecast
Monthly Forecasts
2013 Streamflow % of Normal
Skill (r2)
2014 Apr-Jul Runoff
118% of Normal 3840 KAF
2013 Runoff
2720 KAF 84% of Normal
2014 -- based on irrigation demand of 4,400 KAF and Mar 31 combined Jackson & Palisades reservoir storage of 864 KAF
94% or 3,530 KAF of Apr-Sep runoff is needed for marginally adequate surface irrigation supply
% of 1981 - 2010 Normal
Skill (r²)
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
SNOTELs used: Base Camp, Blind Bull, Cottonwood Ck, Lewis Lake, Snake River Station, Slug Ck, Thumb Div, Willow Ck

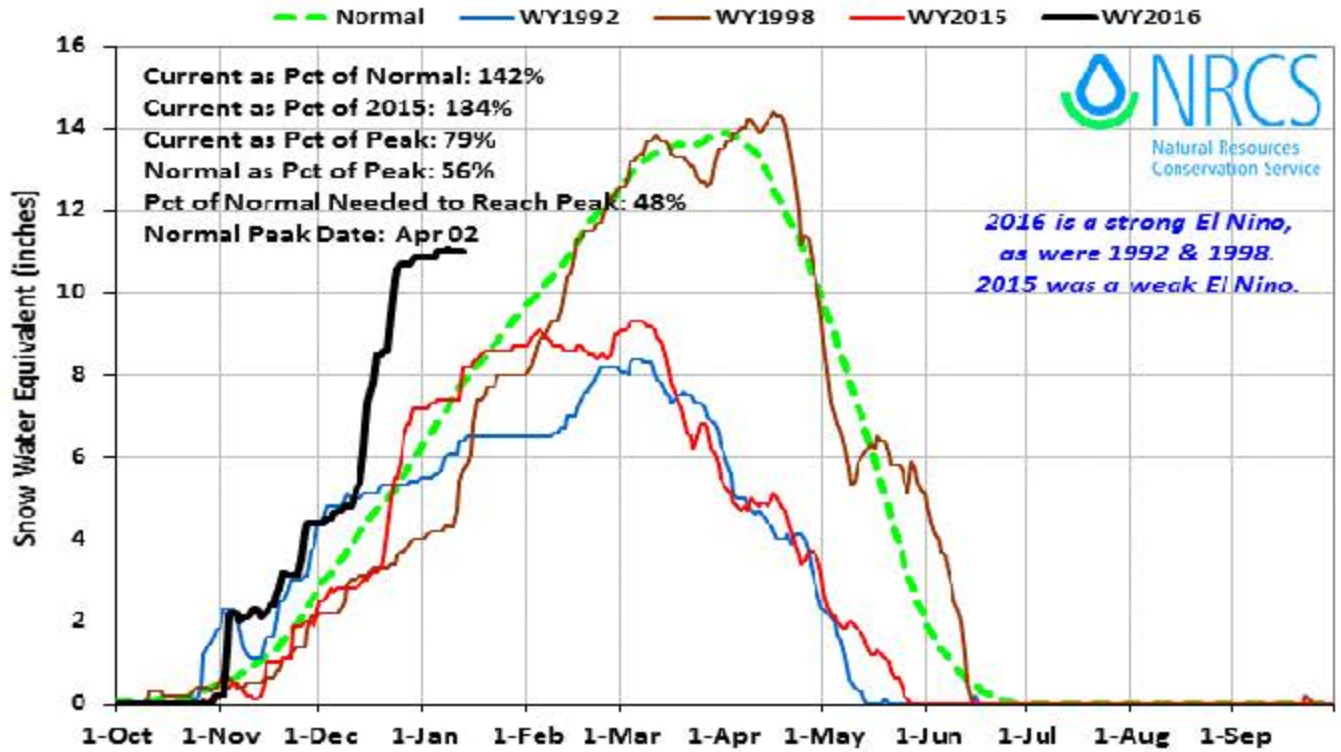
Owyhee Basin 2016 Snowpack Comparison Graph (7 sites)

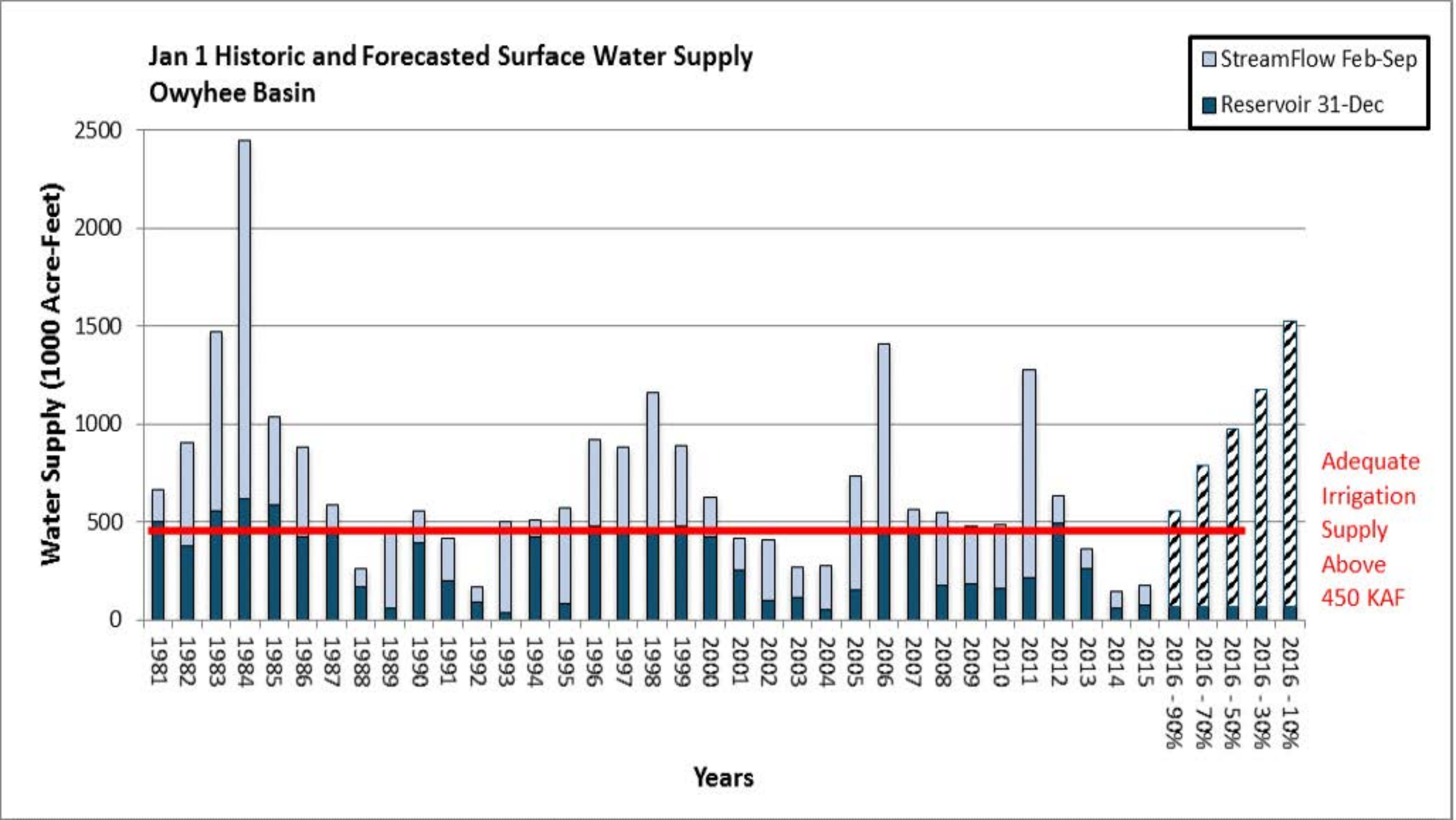
Based on Provisional SNOTEL data as of Jan 13, 2016



Bruneau Basin 2016 Snowpack Comparison Graph (5 sites)

Based on Provisional SNOTEL data as of Jan 13, 2016




Jan 1 Historic and Forecasted Surface Water Supply
Owyhee Basin
StreamFlow Feb-Sep
Reservoir 31-Dec
Water Supply (1000 Acre-Feet)
2500
2000
1500
1000
500
0
Adequate Irrigation Supply Above 450 KAF
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016 - 90%
2016 - 70%
2016 - 50%
2016 - 30%
2016 - 10%
Years


Think Snow!!