Amount of Runoff Needed in 2018 for Adequate Irrigation Supply

Summary Table: Amount of streamflow needed in 2018 for adequate surface irrigation supplies.

For complete summary see: Surface Water Supply Index (SWSI)
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/id/snow/waterproducts/?cid=stelprdb1240689

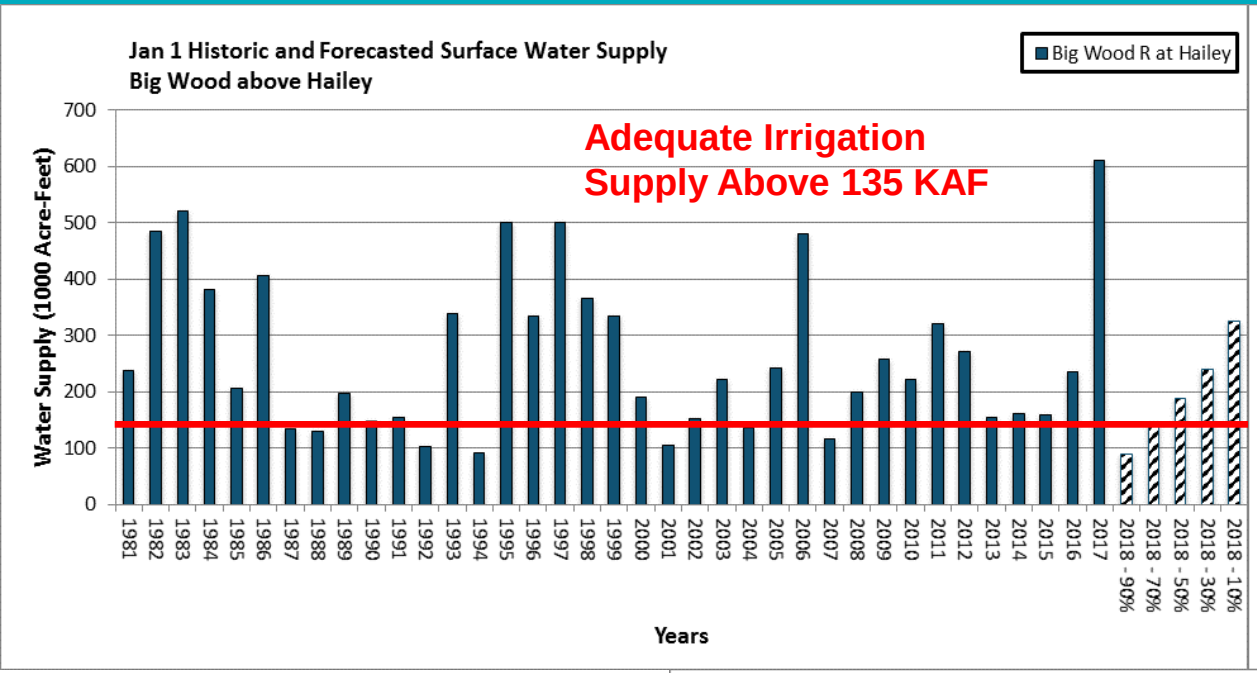
Created: October 30, 2017
Updated: December 1, 2017

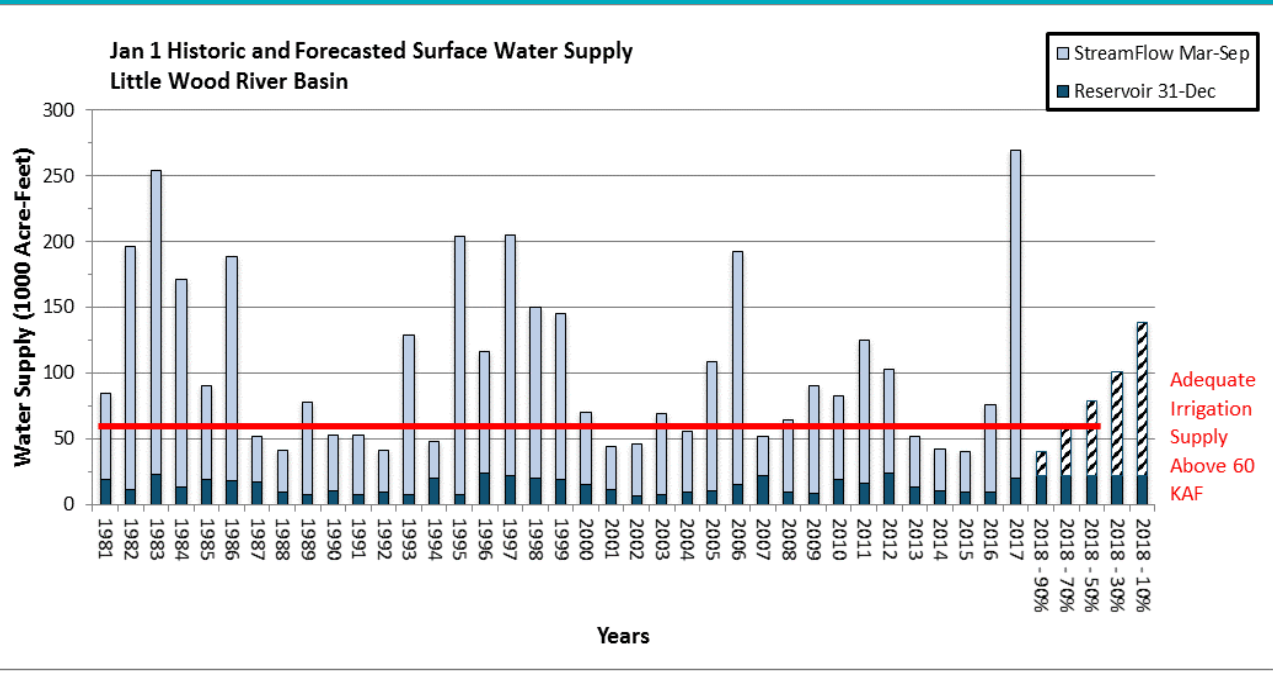
Fall reservoir carryover storage is used to project spring reservoir storage levels based on current conditions and recent trends. Then, by knowing the adequate irrigation water supply needed in your basin, the projected spring reservoir volumes are subtracted from the adequate irrigation supply to determine the volume of streamflow to marginally meet adequate surface irrigation supplies in 2018.

	Column 2 -	Column 3 =	Column 4	Col4/Col6 X 100=		
Column 1	2	3	4	5	9	
Basin	Amount needed for adequate irrigation water supply KAF	Projected end of month reservoir storage (Jan, Feb or Mar) KAF	2018 streamflow volume needed for adequate water supply KAF	% of average streamflow to meet adequate irrigation supply in 2018 KAF	2018 Apr - Sep Streamflow Runoff KAF	% of average
Boise	1500	800	700	51%	1220	90%
Big Wood	275	160	115	43%	204	77%
Little Wood	60	22	38	41%	89	97%
Big Lost	180	20	160	107%	204	136%
Little Lost	40	---	40	118%	43	126%
Teton	85	---	85	44%	234	121%
Snake (Heise)	4,400	1900	2500	66%	4792	127%
Oakley	50	38	12	39%	14	44%
Salmon Falls	110	97	13	15%	38	45%
Owyhee	575	480	95	14%	225	34%
* Bear River	280	1000	35	17%	90	44%

* Based on **Bear River** reservoir allocation: only 245 KAF in storage can be used in 2018 and remaining 35 KAF supply is from runoff.

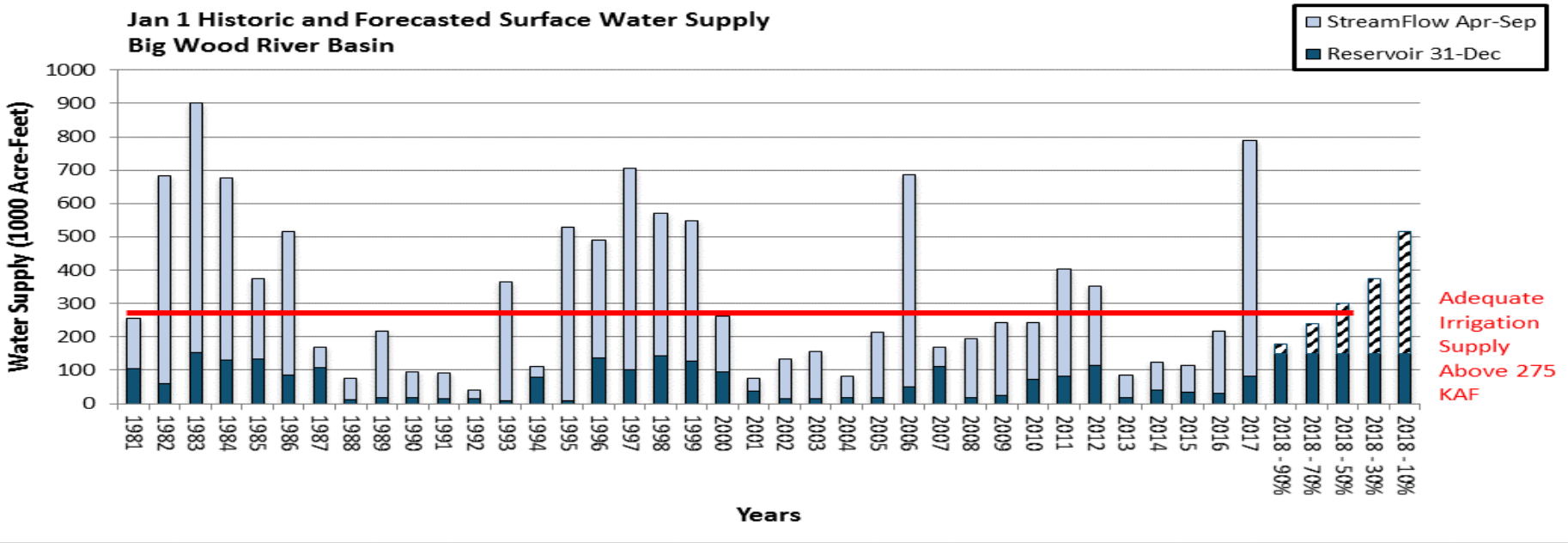
2018 January 1 Owyhee, Big Wood & Boise Basin January 1 SWSI with Adequate Irrigation Supply



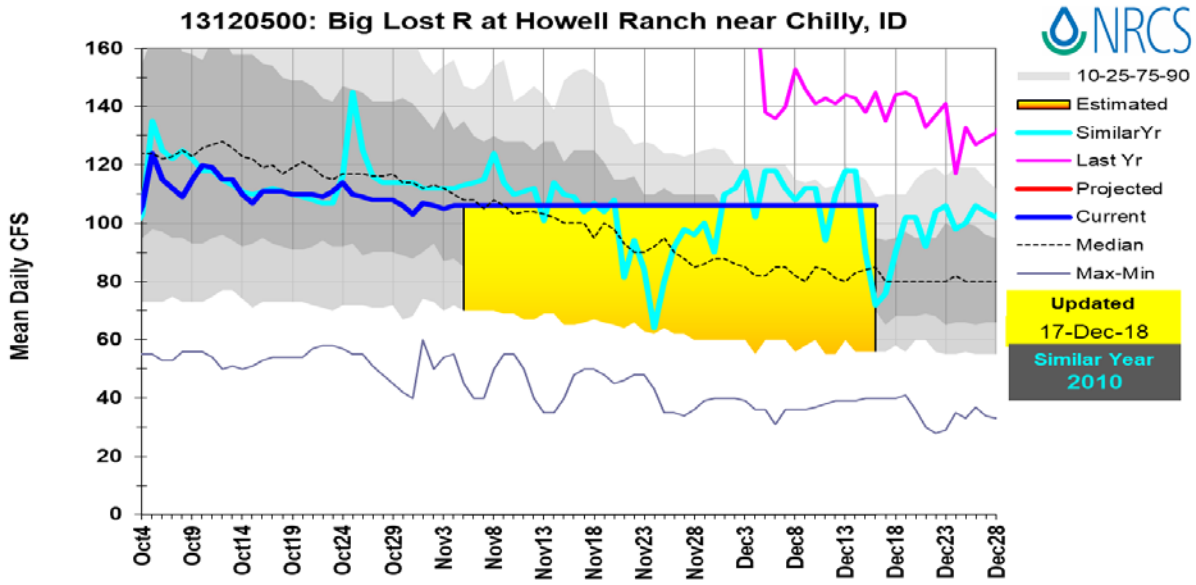


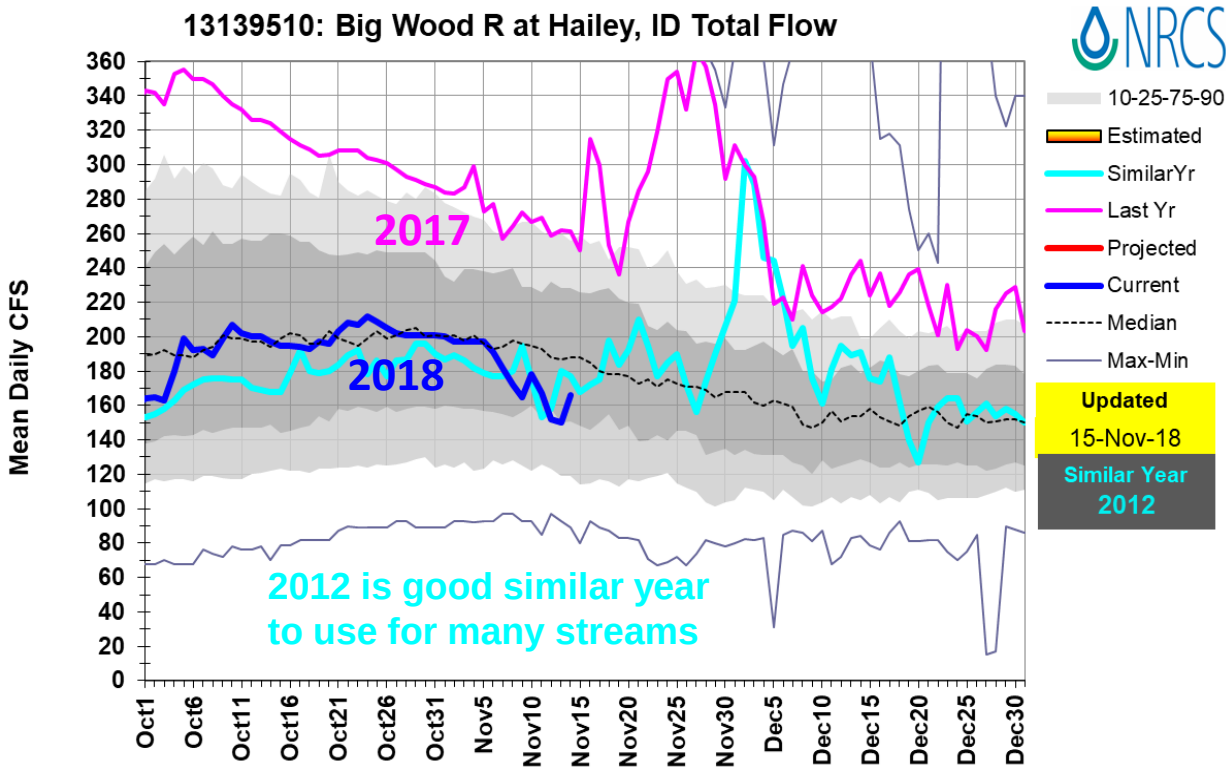
As of Jan 1, 2018 each basin was showing 50-70% Chance of Adequate Supplies

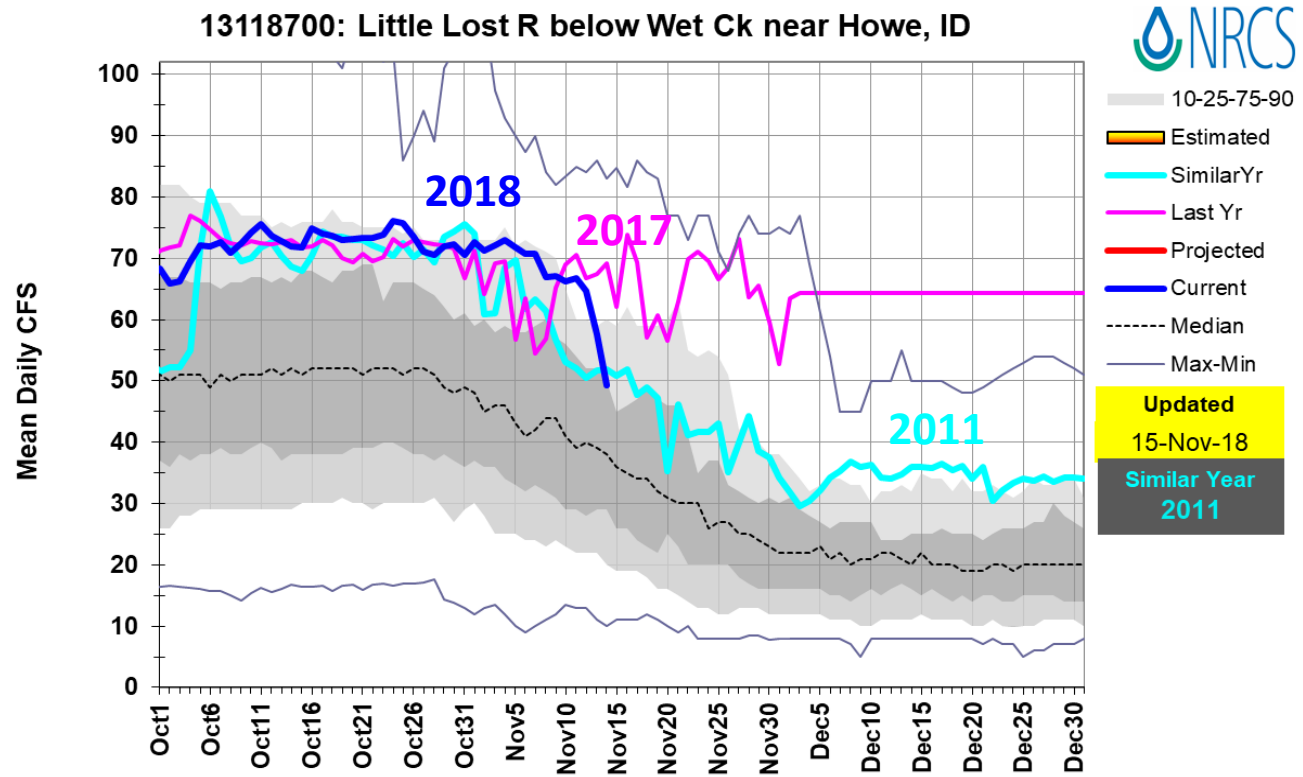
Decisions in 2019 will not be as easy because of less reservoir carryover.



Fall Streamflow Conditions







Reservoir Storage Projection for Spring 2019

As of November 1, 2018, projected change in reservoir storage from Fall 2018 to start of runoff season in Spring 2019.

Created: November 6, 2018

Updated: December 10, 2018

	Sep 30 storage KAF	Observed Oct 31 storage KAF	Observed Nov 30 storage KAF	Observed Dec 31 storage KAF	Projected Jan 31 Storage KAF	Projected Feb 28 storage KAF	Projected Mar 31 storage KAF	Projected change in storage KAF
Boise Reservoir System	446.4	437.5	465.4				630	193
Magic Reservoir	61.1	69.0	76.7				120	51
Little Wood Reservoir	11.1	12.9	15.6			23		10
Mackay Reservoir	24.8	24.8	26.8				40	15
Jackson & Palisades Reservoir System	1476.7	1462.5	1582.4				1800	338
Oakley Reservoir	12.1	13.5	14.4			23		10
Salmon Falls Reservoir	31.9	33.1	34.8			41		8
Lake Owyhee	220.5	222.7	237.0		280			57
Bear Lake	802.3	798.2	796.8				850	52

Other basins, Spokane, Clearwater, Salmon, Weiser, Payette and Bruneau basins, the surface agricultural irrigation demand is not known or relevant.

Amount of Runoff Needed in 2019 for Adequate Irrigation Supply

Summary Table: Amount of streamflow needed in 2019 for adequate surface irrigation supplies.

For complete summary see: Surface Water Supply Index (SWSI)
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/id/snow/waterproducts/?cid=stelprdb1240689

Created: November 6, 2018
Updated:

Fall reservoir carryover storage is used to project spring reservoir storage levels based on current conditions and current flow trends. Then, by knowing the adequate irrigation water supply needed in your basin, the projected spring reservoir volumes are subtracted from the adequate irrigation supply to determine the volume of streamflow to marginally meet adequate surface irrigation supplies in 2019.

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

Column 1 Basin	2 Amount needed for adequate irrigation water supply KAF	3 Projected end of month reservoir storage (Jan, Feb or Mar) KAF	4 2019 streamflow volume needed for adequate water supply KAF	5 % of average streamflow needed for adequate 2019 irrigation supply KAF	6 1981-2010 Apr - Sep average streamflow KAF	7 Streamflow period used in analysis	9 2018 Apr - Sep Streamflow Runoff KAF | % of average	
Boise	1500	630	870	64%	1360	Apr-Sep	1220	90%
Big Wood above Hailey	135	---	135	51%	263	Apr-Sep	257	98%
Big Wood	275	120	155	58%	265	Apr-Sep	204	77%
Little Wood	60	23	37	40%	92	Mar-Sep	89	97%
Big Lost	180	40	140	93%	150	Apr-Sep	204	136%
Little Lost	40	---	40	118%	34	Apr-Sep	43	126%
Teton	85	---	85	44%	193	Apr-Sep	234	121%
Snake (Heise)	4,400	1800	2600	69%	3,780	Apr-Sep	4792	127%
Oakley	50	23	27	87%	31	Mar-Sep	14	44%
Salmon Falls	110	41	69	81%	85	Mar-Sep	38	45%
Owyhee	575	280	295	44%	665	Feb-Sep	225	34%
* Bear River	280	850	35	17%	205	Apr-Sep	90	44%

*** Based on Bear River reservoir allocation: only 245 KAF in storage can be used in 2019, remaining 35 KAF to meet adequate irrigation supply is from runoff.**

Apr 1 2018 Surface Water Supply Index
Big Wood above Hailey

Big Wood above Hailey SWSI — Adequate Water Supply Not Available or Known

Station ID	Station Name	Period	Data Type	Years	# of Years	
13139510	Big Wood R at Hailey	Apr-Sep	strm	1981-2017	37	Units KAF

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

Rank	Year	Enso	Stream Flow Apr-Sep	Reservoir 31-Mar	Streamflow + Reservoir Sum	Non-Exceedance Probability	SWSI
1	2017	LN	611	0	611	97%	3.9
2	1983	SE	521	0	521	95%	3.7
3	1995	SE	501	0	501	92%	3.5
4	1997	N	500	0	500	89%	3.3
5	1982	N	485	0	485	87%	3.1
6	2006	N	480	0	480	84%	2.9
7	1986	N	406	0	406	82%	2.6
8	1984	N	381	0	381	79%	2.4
9	1998	SE	366	0	366	76%	2.2
10	1993	EN	338	0	338	74%	2.0
11	1999	SL	335	0	335	71%	1.8
12	1996	N	334	0	334	68%	1.5
13	2011	SL	321	0	321	66%	1.3
2018 10% Chance Exceedance Forcast		LN	285	0	285	64%	1.2
14	2012	LN	272	0	272	63%	1.1
15	2009	N	259	0	259	61%	0.9
2018 30% Chance Exceedance Forcast		LN	245	0	245	59%	0.8
16	2005	EN	242	0	242	58%	0.7
17	1981	N	237	0	237	55%	0.4
18	2016	SE	236	0	236	53%	0.2
2018 50% Chance Exceedance Forcast		LN	225	0	225	51%	0.1
19	2010	EN	221	0	221	50%	0.0
20	2003	EN	221	0	221	47%	-0.2
21	1985	N	205	0	205	45%	-0.4
22	2008	N	199	0	199	42%	-0.7
2018 70% Chance Exceedance Forcast		LN	199	0	199	41%	-0.8
23	1989	SL	198	0	198	39%	-0.9
24	2000	N	190	0	190	37%	-1.1
2018 90% Chance Exceedance Forcast		LN	164	0	164	36%	-1.2
25	2014	N	162	0	162	34%	-1.3
26	2015	EN	159	0	159	32%	-1.5
27	2013	N	154	0	154	29%	-1.8
28	1991	N	153	0	153	26%	-2.0
29	2002	N	153	0	153	24%	-2.2
30	1990	N	147	0	147	21%	-2.4
31	2004	N	136	0	136	18%	-2.6
32	1987	N	134	0	134	16%	-2.9
33	1988	SE	130	0	130	13%	-3.1
34	2007	EN	117	0	117	11%	-3.3
35	2001	LN	104	0	104	8%	-3.5
36	1992	EN	103	0	103	5%	-3.7
37	1994	SE	91	0	91	3%	-3.9

2017

2018 Observed Runoff 257 KAF

Adequate Supplies 135 KAF

Shortages Likely

Big Wood River Basin SWSI

Adequate Water Supply Greater than 0.1 SWSI or 275 KAF

Station ID	Station Name	Period	Data Type	Years	# of Years	
13142500	Big Wood R blw Magic Reservoir	Apr-Sep	strm	1981-2018	38	Units KAF
13142000	Magic Reservoir	31-Mar	resv	1981-2018	38	Units KAF

ENSO Classification

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

Rank	Year	Enso	Stream Flow Apr-Sep	Reservoir 31-Mar	Streamflow + Reservoir Sum	Non-Exceedance Probability	SWSI
1	2017	LN	710	186	896	97%	4.0
2	1983	SE	747	114	861	95%	3.7
3	1982	N	622	108	729	92%	3.5
4	1997	N	605	118	724	90%	3.3
5	2006	N	636	78	714	87%	3.1
6	1984	N	545	149	694	85%	2.9
7	1986	N	432	186	619	82%	2.7
8	1998	SE	427	170	597	79%	2.5
9	1995	SE	518	77	595	77%	2.2
10	1999	SL	420	102	522	74%	2.0
11	1996	N	351	161	512	72%	1.8
12	2011	SL	322	107	429	69%	1.6
13	2012	LN	238	185	423	67%	1.4
14	1993	EN	355	38	393	64%	1.2
15	2018	LN	204	185	388	62%	1.0
16	1985	N	242	144	385	59%	0.7
17	1981	N	153	146	299	56%	0.5
18	2000	N	165	132	298	54%	0.3
2019 Amount Needed		EN	155	120	275	51%	0.1
19	2016	SE	187	88	275	51%	0.1
20	2009	N	219	42	261	49%	-0.1
21	2010	EN	167	92	259	46%	-0.3
22	1989	SL	200	42	242	44%	-0.5
23	2005	EN	194	36	230	41%	-0.7
24	2007	EN	60	151	211	38%	-1.0
25	1987	N	61	145	206	36%	-1.2
26	2008	N	178	28	206	33%	-1.4
27	2003	EN	140	36	176	31%	-1.6
28	2015	EN	79	80	159	28%	-1.8
29	2014	N	84	73	157	26%	-2.0
30	2002	N	120	26	146	23%	-2.2
31	1990	N	79	51	130	21%	-2.5
32	1994	SE	31	94	125	18%	-2.7
33	2004	N	66	45	110	15%	-2.9
34	2013	N	66	40	106	13%	-3.1
35	2001	LN	38	65	104	10%	-3.3
36	1988	SE	64	40	104	8%	-3.5
37	1991	N	76	27	103	5%	-3.7
38	1992	EN	24	34	58	3%	-4.0

Adequate Supplies

2018

Shortages Likely

To estimate amount needed for next year	KAF	
Current Year Oct 31 end of month storage	69	
Projected Storage Change Oct 31 to Mar 31	51	
Projected Mar 31 storage	120	
Streamflow needed to reach combined reservoir and streamflow total of 275 KAF	155	59% of average flow needed for Apr-Sep period
Adequate Irrigation Needs	275	
1981-2010 Apr-Sep average streamflow	265	

Surface Water Supply Index (SWSI)

A **Surface Water Supply Index (SWSI)** is a predictive indicator of the surface water available in a basin compared to historic supply. The SWSI is **calculated** by summing the two major sources of irrigation water supply; reservoir carryover and spring and summer streamflow runoff. These two sources are analyzed together when determining the total surface water supply available for the season.

Monthly SWSI Products

Statewide Summary Table: Select month

Individual Basin Tables:

Select Month January **Select Basin** Bear River

Retrieve Table

1981 to Present Streamflow and Reservoir Graphs:

Select Month January **Select Basin** Bear River

Retrieve Graph

Period of Record Streamflow and Reservoir Graphs:

Select Month January **Select Basin** Bear River

Retrieve Graph

Flow Trend Graphs

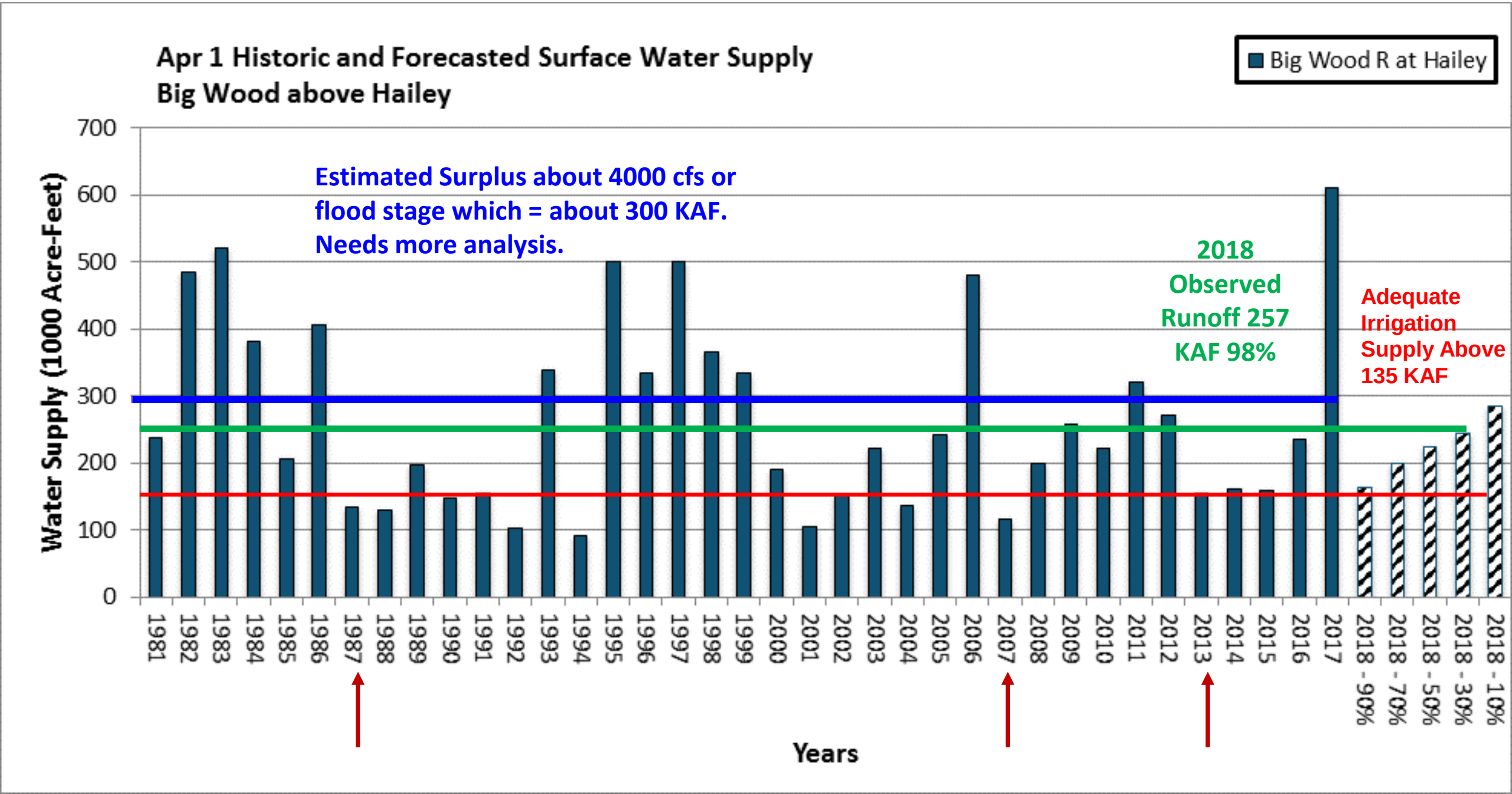
Individual Flow Trend Graphs: Select Basin

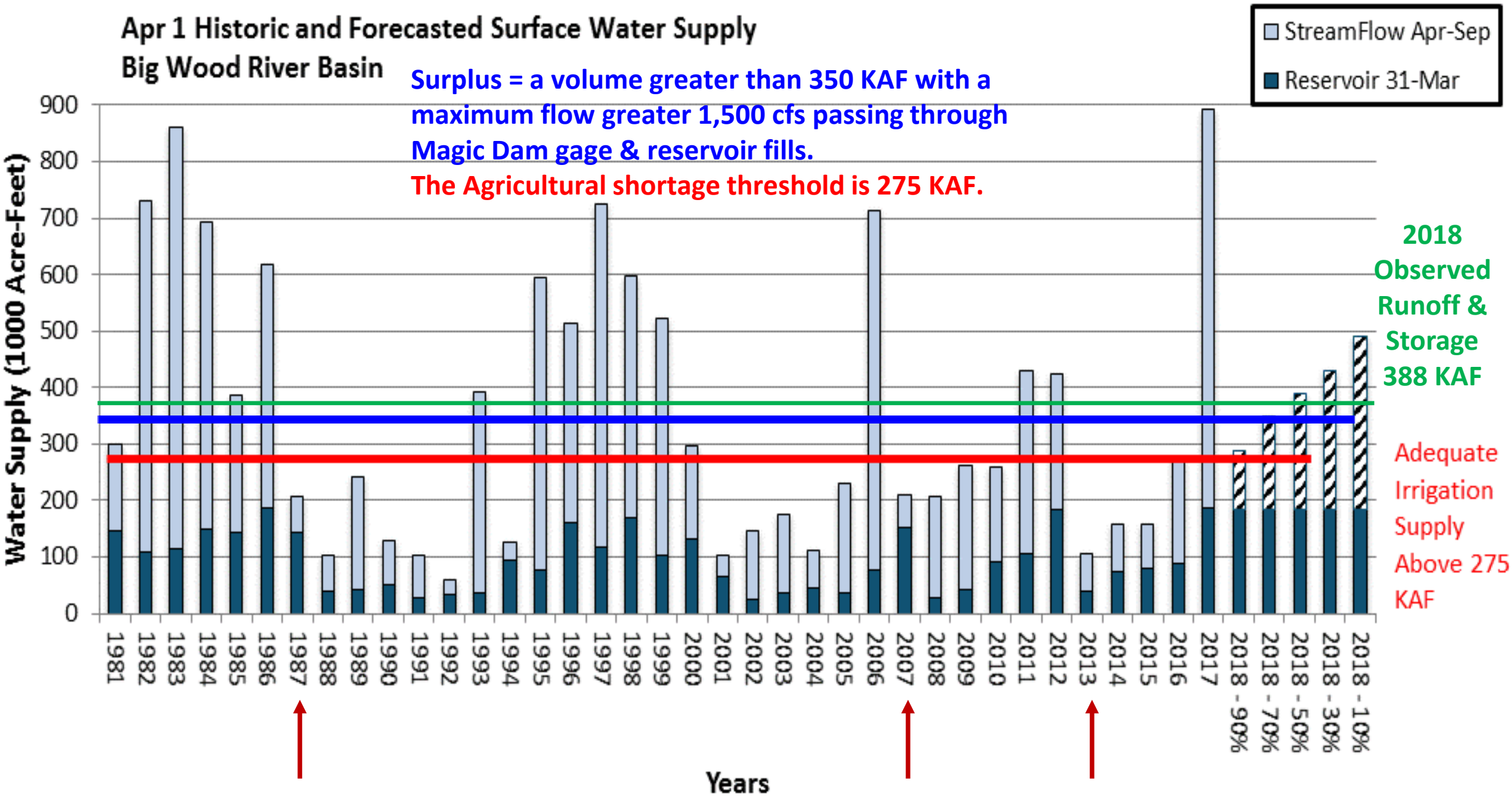
These reports are available here

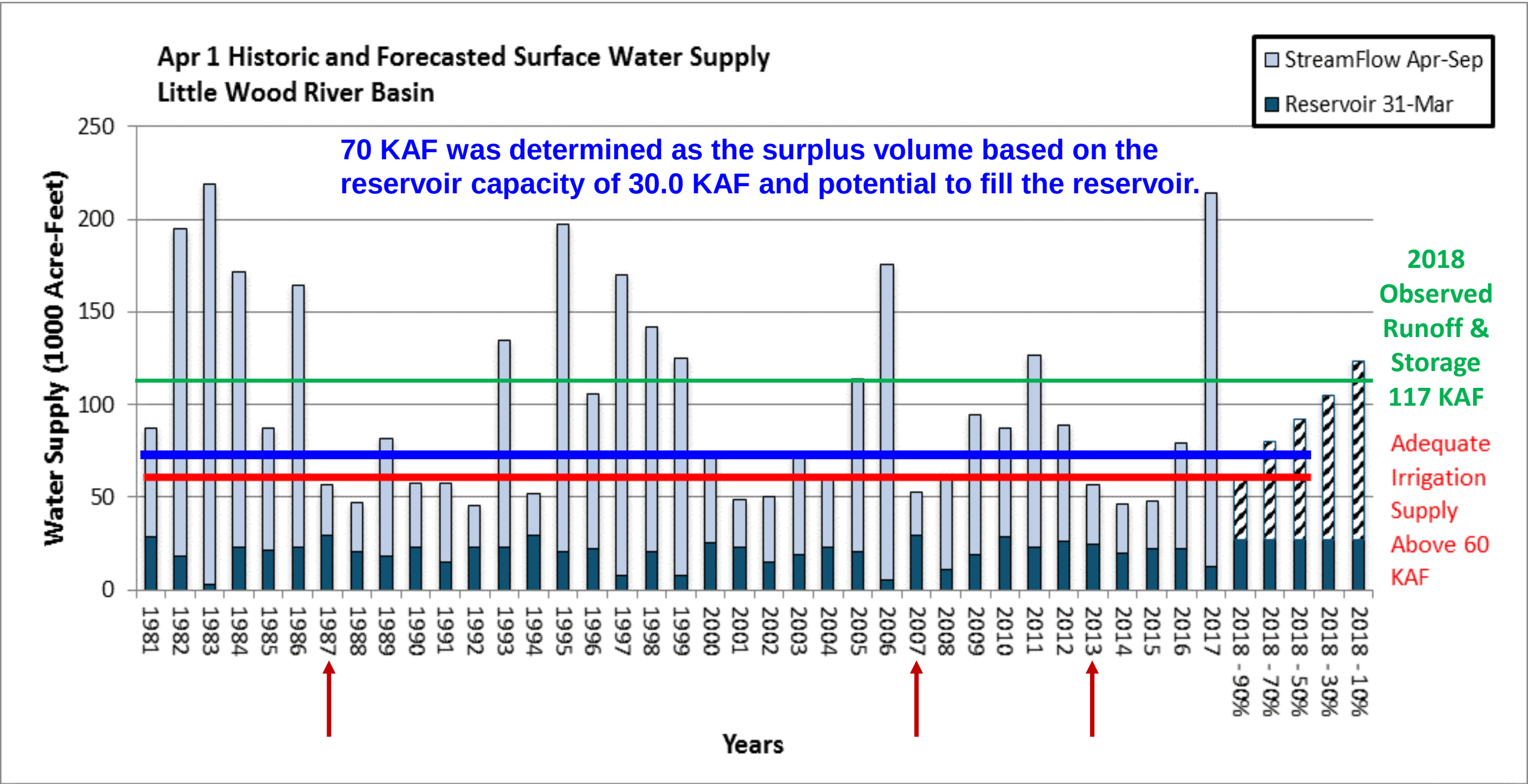
Surface Water Irrigation Outlook

> 2019 Streamflow Needed for Adequate Irrigation Supply

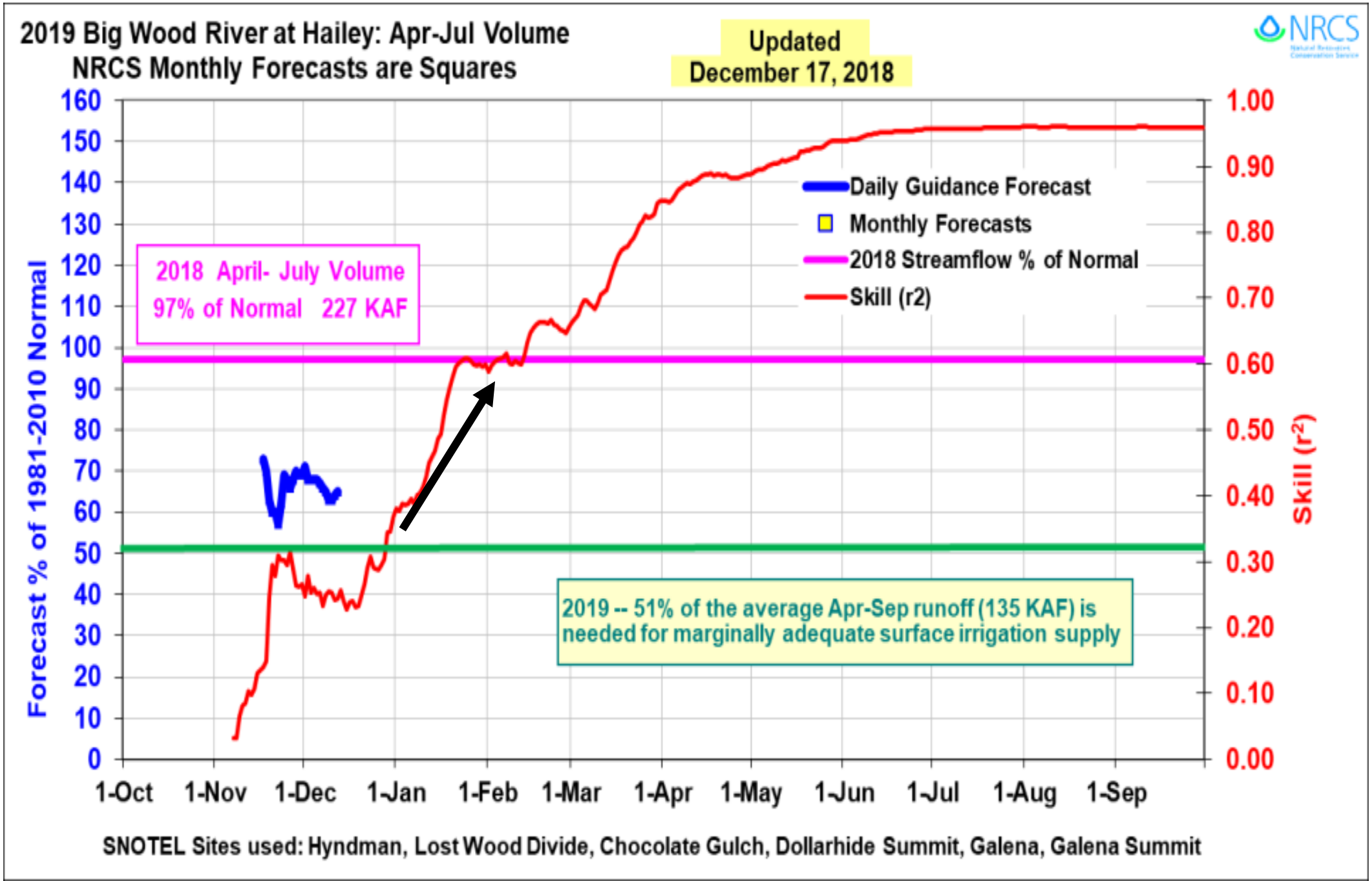
> 2018 Salmon Falls Reservoir Storage Allotment: Jan | Feb | Mar | Apr | May


Apr 1 Historic and Forecasted Surface Water Supply
Big Wood above Hailey
Big Wood R at Hailey
Estimated Surplus about 4000 cfs or
flood stage which = about 300 KAF.
Needs more analysis.
2018
Observed
Runoff 257
KAF 98%
Adequate
Irrigation
Supply Above
135 KAF
Water Supply (1000 Acre-Feet)
0
100
200
300
400
500
600
700
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
2017
2018 - 90%
2018 - 70%
2018 - 50%
2018 - 30%
2018 - 10%
Years

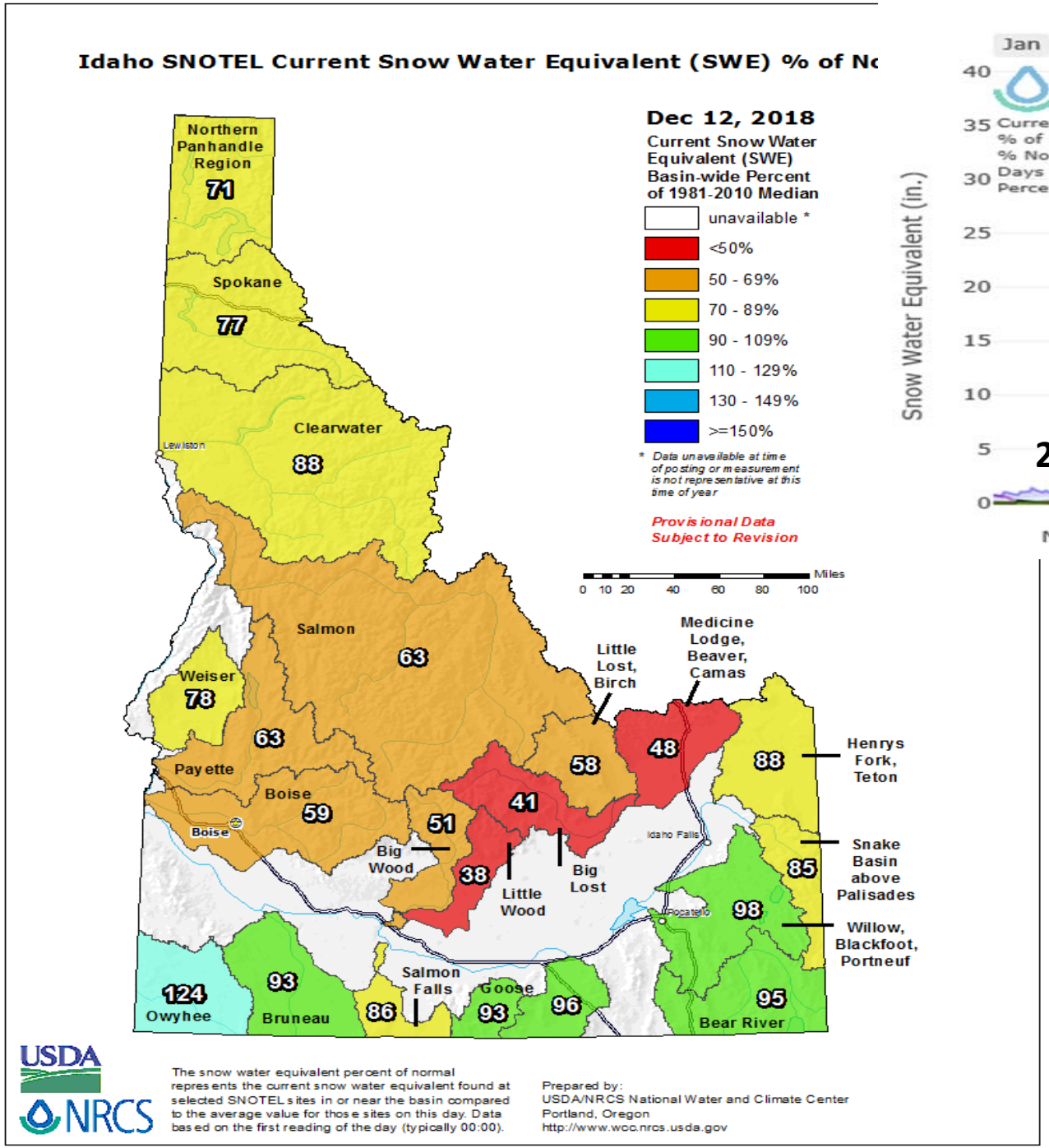

Apr 1 Historic and Forecasted Surface Water Supply
Big Wood River Basin
Surplus = a volume greater than 350 KAF with a maximum flow greater 1,500 cfs passing through Magic Dam gage & reservoir fills.
The Agricultural shortage threshold is 275 KAF.
StreamFlow Apr-Sep
Reservoir 31-Mar
Water Supply (1000 Acre-Feet)
0
100
200
300
400
500
600
700
800
900
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
2017
2018 - 90%
2018 - 70%
2018 - 50%
2018 - 30%
2018 - 10%
Years
2018 Observed Runoff & Storage 388 KAF
Adequate Irrigation Supply Above 275 KAF

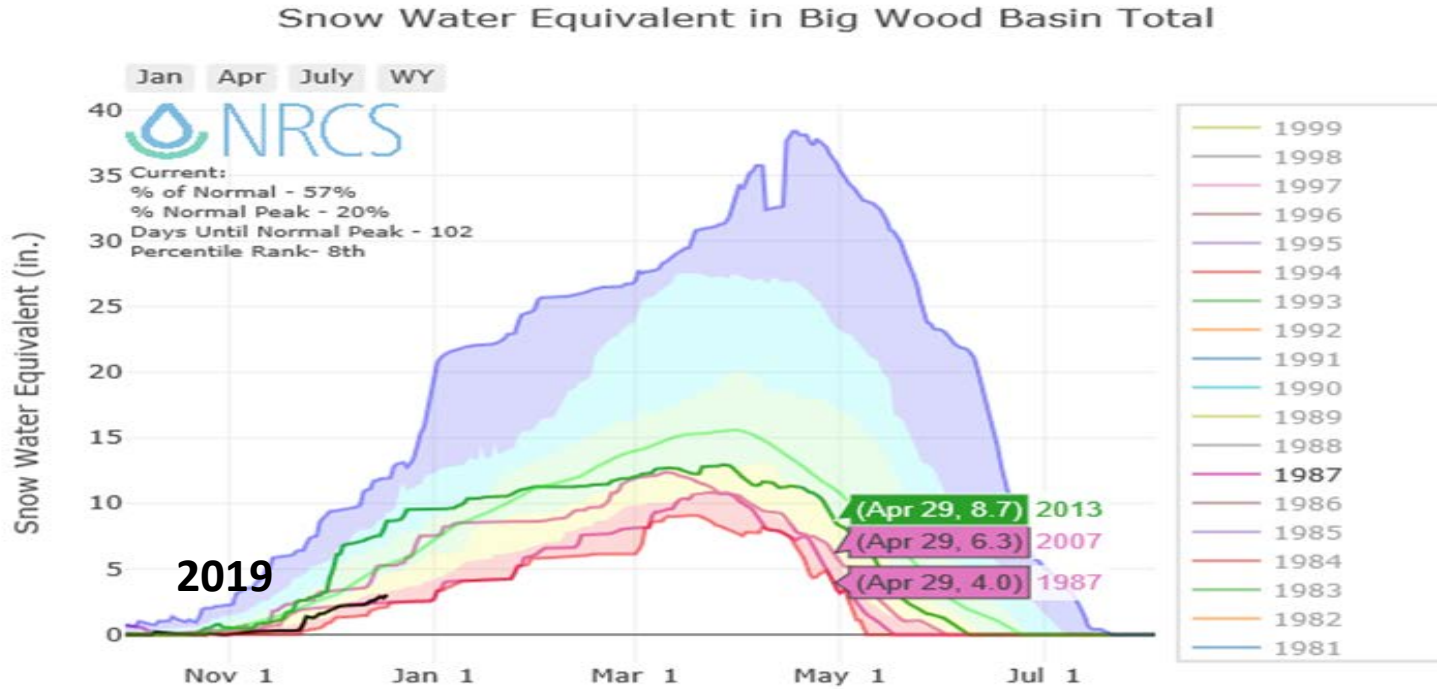

Apr 1 Historic and Forecasted Surface Water Supply
Little Wood River Basin
StreamFlow Apr-Sep
Reservoir 31-Mar
70 KAF was determined as the surplus volume based on the reservoir capacity of 30.0 KAF and potential to fill the reservoir.
2018 Observed Runoff & Storage 117 KAF
Adequate Irrigation Supply Above 60 KAF
Water Supply (1000 Acre-Feet)
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
2017
2018 - 90%
2018 - 70%
2018 - 50%
2018 - 30%
2018 - 10%
Years

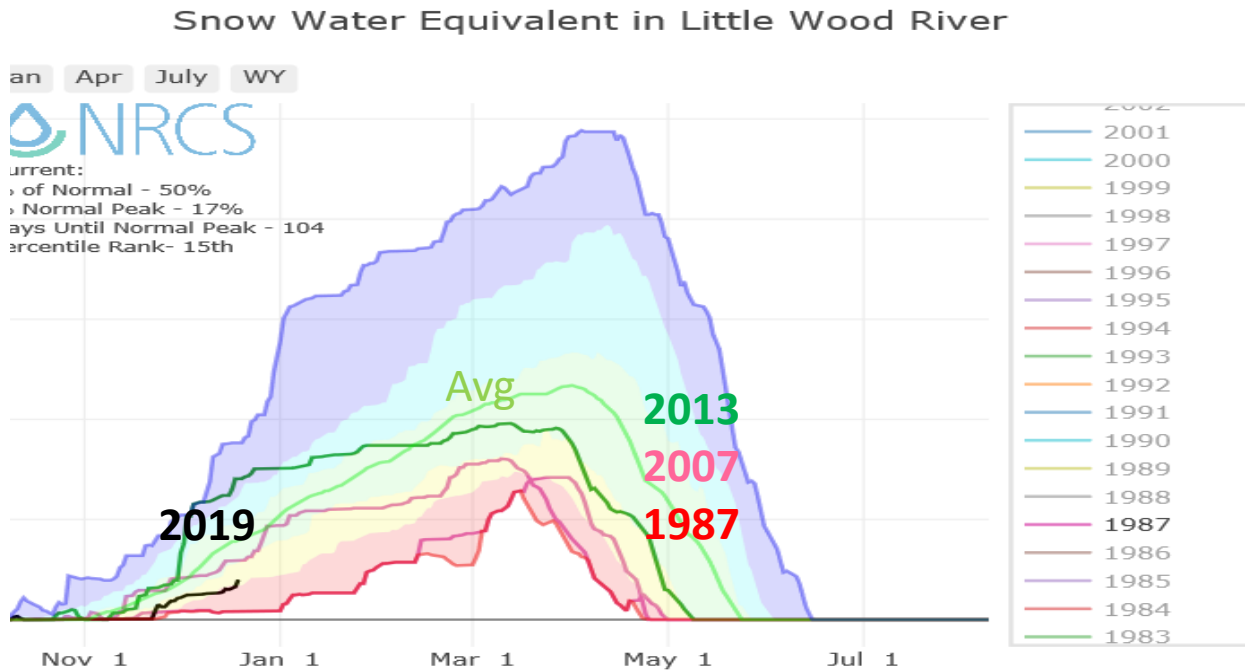
2019 Big Wood River at Hailey Daily Water Supply Forecast



Note increase in forecast skill level during January as we progress from being 40% of the way thru winter on Jan 1 to 60% on Feb 1.


Idaho SNOTEL Current Snow Water Equivalent (SWE) % of Nc
Dec 12, 2018
Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median
unavailable *
<50%
50 - 69%
70 - 89%
90 - 109%
110 - 129%
130 - 149%
>=150%
* Data unavailable at time of posting or measurement is not representative at this time of year
Provisional Data Subject to Revision
Miles
0 10 20 40 60 80 100
Northern Panhandle Region
71
Spokane
77
Clearwater
88
Lewiston
Salmon
63
Weiser
78
63
Payette
Boise
59
Boise
Big Wood
51
38
Little Wood
Big Lost
Little Lost, Birch
Medicine Lodge, Beaver, Camas
48
58
41
Idaho Falls
Pocatello
88
Henrys Fork, Teton
85
Snake Basin above Palisades
98
Willow, Blackfoot, Portneuf
95
Bear River
124
Owyhee
93
Bruneau
86
Salmon Falls
93
Goose
96
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:
USDA/NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov


Snow Water Equivalent in Big Wood Basin Total
Jan Apr July WY
NRCS
Current:
% of Normal - 57%
% Normal Peak - 20%
Days Until Normal Peak - 102
Percentile Rank- 8th
Snow Water Equivalent (in.)
40
35
30
25
20
15
10
5
0
2019
(Apr 29, 8.7) 2013
(Apr 29, 6.3) 2007
(Apr 29, 4.0) 1987
Nov 1
Jan 1
Mar 1
May 1
Jul 1
1999
1998
1997
1996
1995
1994
1993
1992
1991
1990
1989
1988
1987
1986
1985
1984
1983
1982
1981


Snow Water Equivalent in Little Wood River
an Apr July WY
NRCS
urrent:
of Normal - 50%
Normal Peak - 17%
ays Until Normal Peak - 104
ercentile Rank- 15th
Avg
2013
2007
1987
2019
Nov 1
Jan 1
Mar 1
May 1
Jul 1
2001
2000
1999
1998
1997
1996
1995
1994
1993
1992
1991
1990
1989
1988
1987
1986
1985
1984
1983

Forecast Overview

Seasonal Climate Forecast
Dec 2018 – Feb 2019
Issued: November 20, 2018

ODF Meteorologist Pete Parsons

Analog years 1987 2007 2013

- **Current tropical Pacific SSTs (above average) prompted the removal of the 1996-97 analog year, which was replaced with 1986-87. The 2006-07 and 2012-13 analogs remain from last month. 1986-87 and 2006-07 had moderate and weak El Niño winters respectively, while 2012-13 had an ENSO-neutral winter.**

Note: Analog years are selected based on past behavior of ENSO indices and not future predictions.

- ***A classic "split-flow" jet stream pattern*, typical of El Niño events, is expected for this winter.** Stretches of mild and damp weather should alternate with cool (but not excessively cold) and dry periods. Extreme and/or prolonged cold spells are unlikely, and the chances for valley snow/ice are below average. However, a brief burst of cold weather, with valley snow/ice, can't be ruled out during El Niño events.

- The temperature forecast is tricky, because low-level inversions can lead to cool valley readings, while higher elevation sites are relatively mild. Overall, rainfall and mountain snowpacks should be below average, but expect lots of damp days.

IMPORTANT NOTE: This forecast is based on past and current weather data and is not associated with CPC predictions (see "Forecasting Methods…" at: https://oda.direct/Weather) nor the official CPC "Three-Month Outlooks," which are available here: http://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1

LITTLE WOOD RIVER NR CAREY

ELEVATION DISTRIBUTION

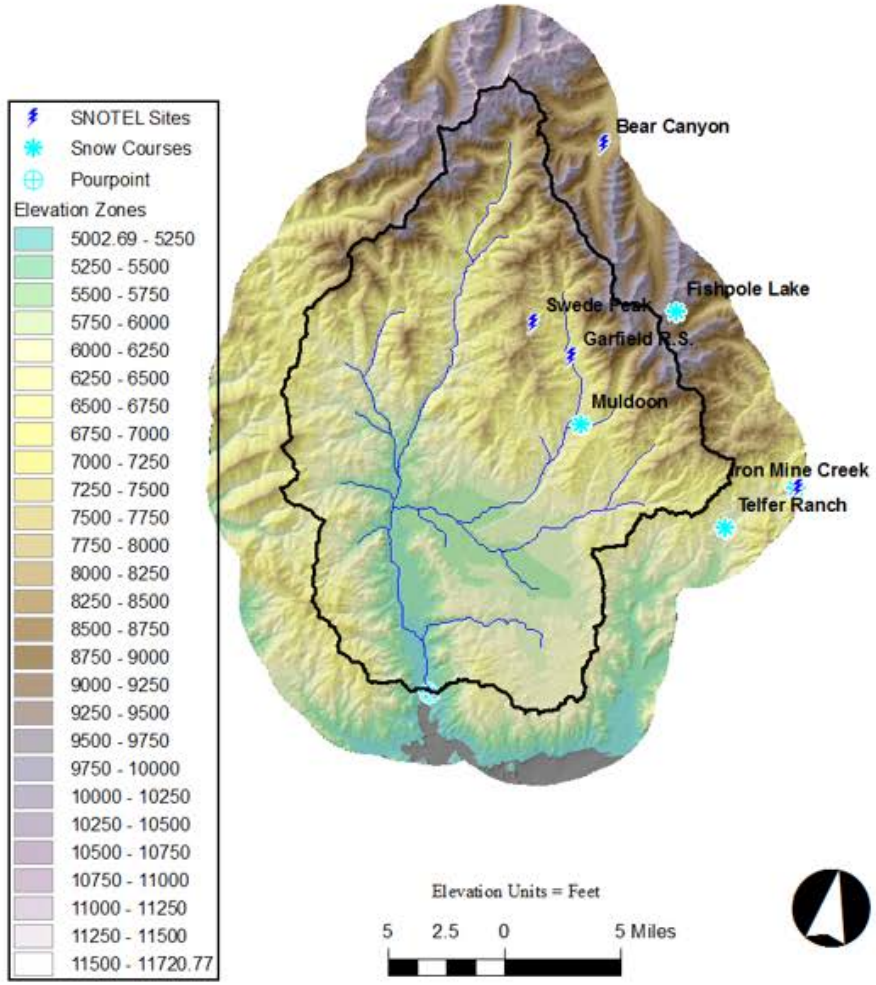


Figure 1. Map of the Little Wood river basin, including 3.1 mile buffer, delineated from the Little Wood River near Carey streamgage station, showing elevation distribution, SNOTEL and snow course site locations.

LITTLE WOOD RIVER NR CAREY

PRECIPITATION DISTRIBUTION

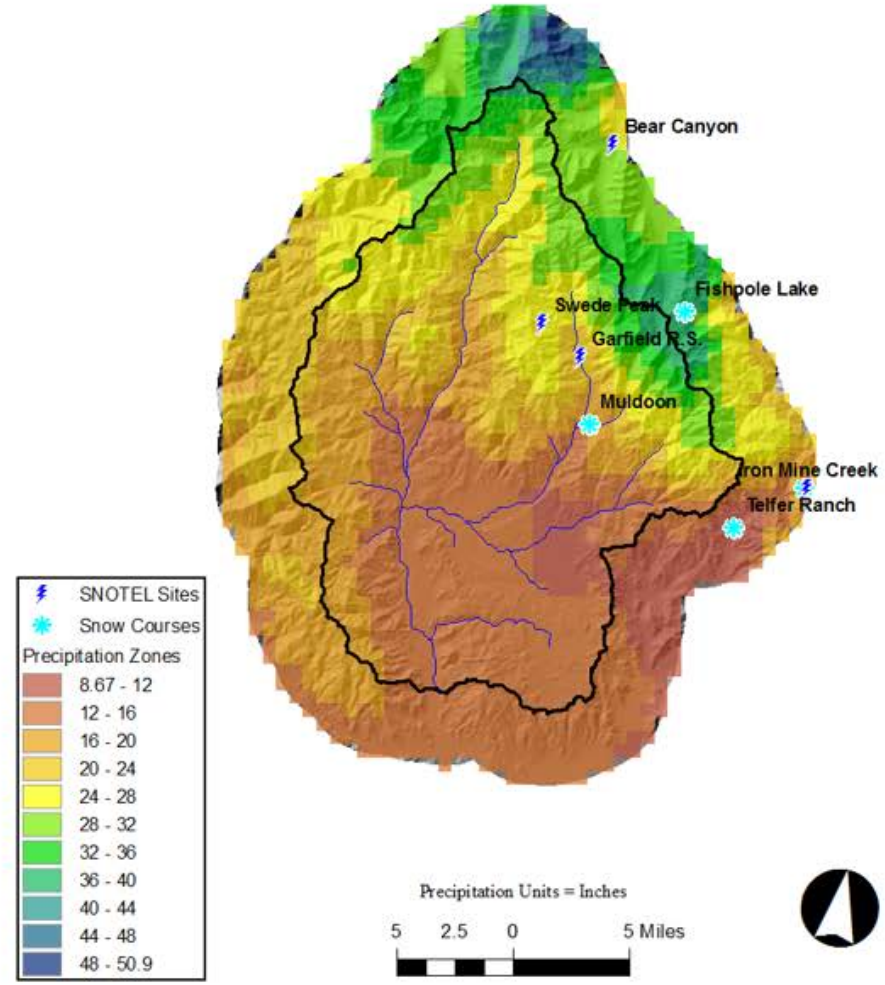


Figure 2. PRISM 30-year (1981-2010) annual precipitation distribution for the Little Wood River basin.