Winter Outlook 2022/2023

For Aspen/Snowmass



Verification of Last Winter's Forecast

The valid period was Oct 1 2021 to May 1 2022

- Snowmass: Prediction 360"...What occurred...370.4"
- Highlands: Prediction 350"...What occurred 380.1"
- Aspen Mtn: Prediction 320"...What occurred 324.3"
- Town: Prediction 166"...What occurred 173.25"

We have to start with Current Sea Surface Temps (SST's)



Canadian Model SST Fcst for Dec/Jan/Feb



European Model SST Fcst for Dec/Jan/Feb



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The NMME is an average of the Canadian and European SST's...Implied Jet Location

NMME Forecast of SST Anom IC=202209 for Lead 3 2022DJF



European Model Dec/Jan/Feb Precip Anomaly



Max: 5.03 • Min: -1.39

Canadian Model Dec/Jan/Feb Precip Anomaly



NMME Dec/Jan/Feb Precip Anomaly



NOAA Nov/Dec/Jan Precip Outlook



NOAA Dec/Jan/Feb Precip Outlook



NOAA Jan/Feb/Mar Precip Outlook



Quick Stats using the Water Plant

• Let's do the last 50 years shall we....

- Only 8 Winters out of the last 50 have had 15% or more below normal snow.
- This means 84% of the time over the last 50 years we have been OK.

 Please use the Water Plant when you want snowfall data. Google 'Aspen Water Dept'. Then click 'About Aspen Water', then click 'Weather Reports on the Left', then click "Aspen Snowfall Data'.

This is what you get...It's Fantastic!!!!

57-58	0.00	0.00	0.00	20.00	21.00	31.00	19.00	11.00	0.00	0.00	102.0
58-59	0.00	т	16.00	19.00	33.50	20.00	•	•	•	0.00	88.50
59-60	10.00	23.00	13.00	10.20	21.20	35.50	24.00	1.00	4.00	0.00	141.9
60-61	0.00	8.00	13.00	21.00	5.00	26.00	23.00	21.00	14.00	0.00	131.0
61-62	27.00	16.00	26.50	29.50	25.00	39.00	16.00	19.50	2.50	т	201.0
62-63	0.00	т	11.00	10.50	22.50	16.00	27.00	4.00	0.00	0.00	91.00
63-64	0.00	5.00	12.50	14.50	22.50	18.00	38.00	10.50	5.00	1.00	127.0
64-65	0.00	5.00	37.50	47.00	21.50	19.50	76.50	10.00	2.00	0.00	219.0
65-66	7.00	Т	22.50	15.70	32.00	15.50	7.20	23.00	5.50	0.00	128.4
66-67	0.00	11.50	16.50	30.10	11.00	31.20	9.00	11.00	2.30	0.00	122.6
67-68	0.00	6.00	19.50	34.20	14.80	26.10	14.50	31.10	8.30	0.00	154.5
68-69	0.00	5.60	24.90	18.00	19.10	10.40	13.20	6.50	0.00	2.30	100.0
69-70	0.00	35.60	9.80	23.70	43.00	11.80	28.10	36.00	2.50	0.00	190.5
70-71	8 10	20.10	15.30	22.70	18.20	28.60	30.90	17.00	3.40	0.00	164.3
71-72	6.80	10.40	23 70	38.10	10.20	14.00	19.30	10.00	0.00	0.00	132.6
72-73	8 70	14.50	36.30	10.40	12.00	26.70	24.60	4.20	3.50	0.00	140.0
72-73	0.00	9.50	20.30	32.00	6.50	21.90	24.00	15.00	1.50	0.00	121.0
74 75	U.UU	7.50	17.90	32.00	25.90	21.00	26.30	14.00	7.00	1.20	170.1
74-75	0.00	7.50	17.60	27.70	35.60	21.60	36.40	14.90	7.00	1.30	170.4
/3-/6	0.00	13.00	12.00	20.50	15.20	24.50	24.70	7.50	0.00	4.50	121.3
/6-//	0.00	-	9.00	6.00	13.00	19.50	24.00	12.20	2.00	0.00	85.7
//-/8	0.00		26.00	45.00	34.00	25.50	34.00	6.50	15.00	0.00	186.0
78-79	1.00	T	14.00	53.00	41.50	26.00	19.50	7.50	2.00	14.50	179.0
79-80	0.00	1.50	26.00	10.00	41.60	31.00	26.00	10.00	2.00	0.00	148.
80-81	0.00	11.80	9.50	12.50	9.90	9.00	36.50	16.90	6.00	0.00	112.1
81-82	0.00	14.60	19.50	57.50	48.50	14.50	30.50	12.50	8.50	0.00	206.1
82-83	2.50	12.60	31.20	11.50	12.80	31.50	45.00	28.00	41.00	0.00	216.1
83-84	0.00	8.00	55.00	72.00	10.50	28.00	47.50	28.50	13.00	15.50	278.0
84-85	2.50	41.45	15.00	36.00	21.00	18.50	44.50	25.00	7.00	0.50	211.4
85-86	4.00	7.50	48.75	12.40	9.25	37.90	14.30	18.80	8.00	0.00	160.9
86-87	4.50	16.00	22.50	10.50	18.50	33.50	23.00	6.00	0.00	0.00	134.
87-88	0.00	0.00	20.50	35.00	40.50	13.50	26.50	6.00	9.00	0.00	151.0
88-89	0.00	0.00	31.00	22.00	21.00	40.00	35.00	28.00	3.00	0.00	180.0
89-90	0.00	6.50	24.00	18.00	13.50	20.00	19.75	24.00	4.00	1.00	130.7
90-91	0.00	17.50	31.75	25.75	20.50	17.50	42.00	35.00	1.00	0.00	191.0
91-92	0.00	27.30	23.60	8.75	21.50	14.00	30.00	8.30	0.00	0.00	133.4
92-93	0.00	1.52	52.00	21.70	23.50	50.00	32.00	28.00	2.30	1.00	212.0
93-94	0.00	13.00	26.40	21.00	16.00	44.10	20.00	26.80	0.00	0.00	167.3
94-95	0.00	6.36	43.00	18.90	24.30	46.30	58.50	27.80	13.50	0.70	239.3
95-96	0.40	12.80	17.30	17.10	38.10	45.30	27.10	24.30	0.00	0.00	182.4
96-97	0.15	22.40	37.30	43.60	44.75	23.70	22.90	21.90	0.00	0.00	216.
97-98	0.00	27.70	16.70	15.67	27.40	34.67	33.07	32.20	0.85	0.00	188.3
98-99	0.00	8.60	26.00	17.40	32.39	24.80	13.10	16.20	21.75	0.00	160.3
99-00	0.00	3.50	7.10	17.43	29.25	27.30	29.16	1.24	2.05	0.00	117.
00-01	4.00	0.00	36.20	16.00	13.70	18.30	17.80	24.40	16.80	3.50	150.
01-02	0.00	2.80	22.40	23.25	25.80	15.50	26.60	5.50	0.00	0.00	121
02-03	0.75	13.00	25.20	16.25	7.75	23.75	30.95	24.45	14.50	0.00	156.
03-04	0.00	0.00	30.40	30.10	25 70	34.25	11.60	11.00	5 50	0.00	148
04-05	1.20	9.30	26.05	13.77	39.60	23.50	20.25	13.70	5.50	0.75	153.6
05-06	0.00	6.40	29.00	36.40	39.70	14.30	24.48	8.25	0.00	0.00	158
06-07	9.50	15.85	32.25	15 75	29.55	27.70	10.80	7 70	13.40	0.00	162
07-08	0.30	13.05	7.00	63.14	51 20	38.96	30.30	23.60	12 70	0.00	250
08.00	0.00	1.02	21.02	50.43	42.00	13 70	33.35	27.00	2.50	0.00	201
00-03	U.UU	6.99	10.00	25.90	42.00	25.60	35.70	27.00	10.90	0.00	172
10-11	0.00	9.75	33.05	16.73	22.00	33.00	20.00	55.00	12.41	0.00	224
11.12	0.00	0.70	17.00	10.73	23.12	33.10	57.10	13.50	13.41	0.00	221.
12 12	0.00	6.90	6.00	24.00	49.00	23.31	25.43	12.00	0.5	0.00	102
12-13	0.00	5.37	0.00	34.60	10.30	25.94	23.43	30.40	9	0.00	103.
13-14	1.50	19.40	20.10	27.50	40.50	26.00	37.15	17.50	4.8	0.00	200.4
14-15	0.00	2.30	32.30	42.63	5.26	18.82	24.90	14.70	8.7	0.00	149.6
15-16	0.00	0.30	21.58	34.58	34.90	26.10	33.00	24.70	0.8	0.00	175.9
16-17	0.00	7.00	13.60	32.32	45.40	17.30	16.00	17.03	9.00	0.00	157.0
17-18	0.00	15.30	6.80	13.00	19.30	41.70	12.70	15.30	3.00	0.00	127.
18-19	0.00	10.50	24.80	22.60	31.40	31.80	63.12	5.90	20.1	0.00	210.
19-20	0.00	26.70	23.50	34.50	27.40	38.30	21.70	24.80	0	4.80	201.1
20-21	3.00	9.30	14.00	27.20	9.40	39.80	38.75	13.50	1.2	0.00	156.1
21-22	0.00	4.30	18.70	46.70	19.35	30.45	31.96	22.1	11.85	0.00	185.4
HIGH	27.00	41.45	55.00	72.00	71.50	79.00	76.50	55.90	41.00	15.50	278.0
LOW	0.00	0.00	0.00	6.00	5.00	2.00	6.09	0.00	0.00	0.00	59.1
AVE.	1.37	9.14	21.77	25.42	25.82	26.09	27.18	16.55	5.23	0.76	156.4

To get this Fcst right, one must make a decision. I've made the critical decision. I will use 2010-2011 as my analog Winter. Let's look at 2010-2011 and see what happened:

- 1. The Water Plant got 221" of snow. That's a ton at 8148ft. The Ski areas had 400" or so.
- 2. However, that year brought the 'Snowiest April' ever in Aspen with 55.9" of snow. April still counts but that's a ridiculous total, it also didn't occur in the 'Heart of Winter'.

• Why did I pick 2010-2011 as my analog Winter...Pure Research

- 1. Hints of a EPO (Negative Eastern Pacific Oscillation).
- 2. The QBO (Quasi-biennial oscillation) will be Westerly.
- 3. The IOD (Indian Ocean Dipole) will be Negative.
- 4. The Pacific Typhoon season is dead again. The last 3 years have been dead. Similar things happened in 2010-2011.
- 5. What's important about this Pacific stuff is it helps us with good phases of the MJO.

Let's take a closer look at 2010-2011 5th Snowiest since 1934

	S	0	Ν	D	J	F	Μ	А	Μ		
07-08	0.30	13.95	7.00	63.14	51.20	38.96	39.39	23.60	12.70	0.00	250.24
08-09	0.00	1.02	21.92	59.43	42.00	13.70	33.70	27.00	2.50	0.00	201.27
09-10	Т	5.88	19.00	25.80	12.80	35.60	26.50	36.35	10.80	0.00	172.73
10-11	0.00	8.75	33.05	16.73	23.12	33.10	37.10	55.90	13.41	0.00	221.16
11-12	0.00	8.96	17.68	10.60	31.60	23.51	6.09	12.68	0.5	0.00	111.62
12-13	0.00	5.37	6.00	34.80	18.30	25.94	25.43	38.48	9	0.00	163.32
13-14	1.50	19.40	26.10	27.50	40.50	26.00	37.15	17.50	4.8	0.00	200.45
14-15	0.00	2.30	32.30	42.63	5.26	18.82	24.90	14.70	8.7	0.00	149.61
15-16	0.00	0.30	21.58	34.58	34.90	26.10	33.00	24.70	0.8	0.00	175.96
16-17	0.00	7.00	13.60	32.32	45.40	17.30	16.00	17.03	9.00	0.00	157.65
17-18	0.00	15.30	6.80	13.00	19.30	41.70	12.70	15.30	3.00	0.00	127.10
18-19	0.00	10.50	24.80	22.60	31.40	31.80	63.12	5.90	20.1	0.00	210.22
19-20	0.00	26.70	23.50	34.50	27.40	38.30	21.70	24.80	0	4.80	201.70
20-21	3.00	9.30	14.00	27.20	9.40	39.80	38.75	13.50	1.2	0.00	156.15
21-22	0.00	4.30	18.70	46.70	19.35	30.45	31.96	22.1	11.85	0.00	185.41
HIGH	27.00	41.45	55.00	72.00	71.50	79.00	76.50	55.90	41.00	15.50	278.00
LOW	0.00	0.00	0.00	6.00	5.00	2.00	6.09	0.00	0.00	0.00	59.10
AVE.	1.37	9.14	21.77	25.42	25.82	26.09	27.18	16.55	5.23	0.76	156.48

Very Important subtle things will determine our Winter. We want the subtle things to be Negative.

1. We want to see a – EPO (Negative Eastern Pacific Oscillation).

2. We want to see a –PNA (Negative Pacific North American Teleconnection).

3. We want to see a –AO (Negative Arctic Oscillation).

4. We want the MJO (Madden Julian Oscillation) to be in Phases 8,1,2,3,5 a lot of the time.

-EPO (Negative Eastern Pacific Oscillation)



-PNA (Negative Pacific North American Teleconnection)



-AO (Negative Arctic Oscillation)



What have we done this evening

- 1. We started off by looking at the large-scale...That was the Northern Hemisphere Sea Surface Temps
- 2. Then we looked at the model Sea Surface Temp Fcsts to see if they made sense with a La Nina Winter
- 3. Then we made a drawing of where the jet should be located based on Sea Surface Temp Fcsts
- 4. Next, we looked at what the models thought about Precipitation this Winter. Were the model fcsts consistent based on where I thought the jet would be located
- 5. Then I picked an analog year (2010-2011) based on Hemispheric Trends (IOD, QBO) and Sea Surface Temps that have occurred in the past
- 6. Then we examined the subtle trends (-EPO, -PNA, -AO) that truly have a huge impact on what kind of Winter happens
- 7. Then I gave y'all the Snowfall Totals...This is a process one must follow to be correct

Normal snow at the ski areas from Oct 1st until May 1st

- Snowmass: 318"
- Highlands (Northwoods Sensor): 320 to 325"
- Aspen Mtn: 282 to 292"
- In Town: 146 to 156"

Numbers for this Winter...Oct 1 to May 1

- Snowmass 350". Normal 318".
- Highlands 360". Normal 320 to 325".
- Aspen Mtn 315". Normal 282 to 292".
- In Town (Aspen) 170". Normal 146 to 156".
- These forecast values are 10% above normal.