# 2022 Fire Season Outlook Using the Spring Snowpack Index

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The Spring Snowpack Index (SSPI) is a unique product developed by Weather Research and Consulting Services, LLC that has proven to be an effective predictor of wildland fire season severity. The SSPI combines Snow Water Equivalent (SWE) values and snowmelt rates from National Resources Conservation Service (NRCS) SNOTEL data resulting in a number that integrates both winter and spring weather (i.e. temperature, precipitation and evaporation). Our research indicates that it is a much better predictor of fire season severity than SWE alone because it is a measure of snowmelt date, fire season length, soil moisture and both live fuel and large dead fuel moisture. SSPI values have a wide range extending from -100 to 300 or higher. In general, the lower the SSPI value, the higher the probability of an active fire season.

A number of refinements were recently made to improve the predictive capabilities of the SSPI.
1) additional years of NRCS snowpack and fire data were added to the database
2) new algorithms were developed that predict national acres burned and the number of National Preparedness Level 4 and 5 days
3) algorithms were developed to predict acres burned for each of the eleven western states and Alaska, and
4) an SSPI climatology was implemented to determine the mean and median values for each of the eleven western states and Alaska.

The graphic to the right displays this year's SSPI calculated for river basins in the Western United States using NRCS SNOTEL data. The lowest SSPI values, less than minus 50, are located in Arizona, New Mexico, southern Utah and southern Nevada. Warm, dry and windy April weather produced rapid snowmelt across the Southwestern States. Unseasonably cool and wet weather significantly delayed snowmelt throughout the Pacific Northwest and Northern Rockies. The highest SSPI values, 150 or greater, are located in Washington, Oregon, Idaho and Montana.

2022
Spring Snowpack Index
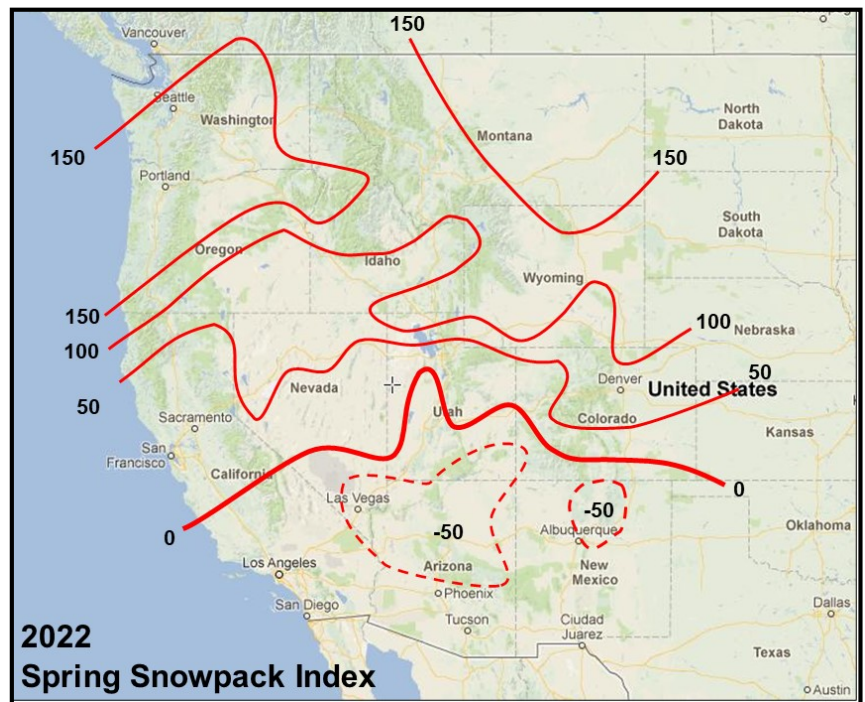
Using updated algorithms that predict acres burned for each of the western states, the southern half of the region can expect another very active fire season. This includes the states of Arizona, New Mexico California, Utah and Colorado. Meanwhile, the northern states of Washington, Oregon, Idaho, Montana and Wyoming will likely experience an average fire season due to the cool, wet spring and delayed snowmelt.

2022
Projected Fire Season Severity
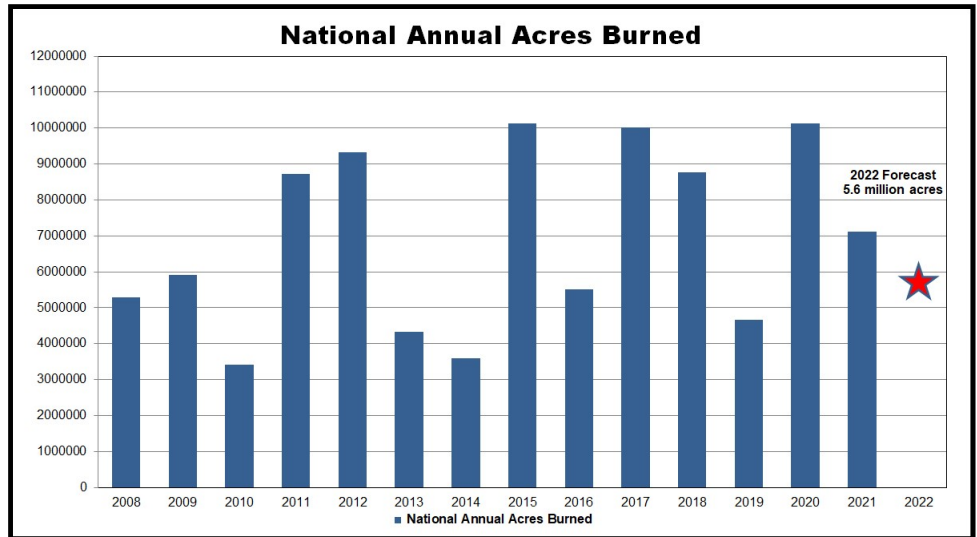**Based on the Spring Snowpack Index (SSPI)**

The table below lists the statewide SSPI averages for the past nine years. Figures in red indicate negative values with Arizona and New Mexico reporting the most. All states are showing higher SSPI values this year compared to last year indicating the winter snowpack was better and/or a below normal spring snowmelt rate. However, the improvement was negligeable in Colorado, Utah, Arizona and New Mexico.

State	2022	2021	2020	2019	2018	2017	2016	2015	2014
MONTANA	125	91	101	109	154	151	67	56	166
WASHINGTON	149	104	86	73	140	146	48	24	125
WYOMING	103	92	91	83	116	155	125	49	145
IDAHO	123	28	61	112	78	200	55	9	113
CALIFORNIA	73	-6	23	165	36	317	73	4	9
COLORADO	53	43	68	122	34	94	117	49	94
OREGON	144	4	7	87	34	200	8	4	62
NEVADA	63	8	-23	132	4	192	92	-9	57
UTAH	20	12	47	152	-6	115	89	1	53
ARIZONA	-27	-77	-14	49	-7	4	-6	0	-9
NEW MEXICO	-18	-28	-12	97	-13	40	48	15	15
AVG	73	25	40	106	52	147	65	18	75

Data developed by Weather Research and Consulting Services, LLC

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The SSPI is also a good predictor of annual acres burned throughout the United States. The algorithm was developed by correlating the average SSPI value for the eleven western states with national annual acres burned as reported by the National Interagency Fire Center in Boise, Idaho. The average SSPI this year is 73 compared to 25 last year and 40 in 2020 (table previous page). The algorithm output is 5.6 million acres burned this year (graphic to the right), plus or minus a million acres. Thus, the number of national acres burned this year could vary between 4.6 million and 6.6 million acres. This suggests a less active fire season than last year due primarily to the cool, wet spring and delayed snowmelt across the Pacific Northwest and northern Rockies. Most of the acreage burned will likely occur across the southern tier of states from California, Nevada and Colorado into Arizona and New Mexico.
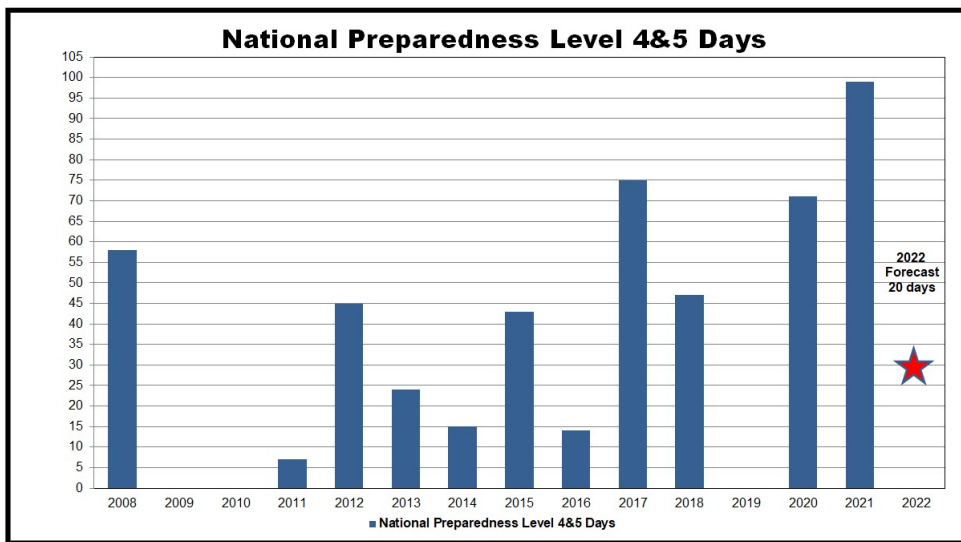
In addition to national acres burned, an algorithm was added to predict the number of National Preparedness Level (NPL) 4 and 5 days during the fire season. This was done to provide insight into the severity of the fire season and also the level of fire management necessary to meet objectives. The forecast is for a near to below normal 20 NPL days this year compared to 99 days in 2021. The graphic to the left illustrates how this forecast compares to previous years.

In summary, an analysis of this year's Spring Snowpack Index indicates a near normal 2022 fire season with 4.6 to 6.6 million acres burned nationally. However, the early fire season will be very active in Arizona, New Mexico, Utah and Colorado. California will also have an active fire season that will last well into the fall and early winter. A high demand for firefighting resources is likely across the Southwest, Rocky Mountain and Great Basin Geographic Areas and the state of California.

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