

Keetch-Byram Drought Index (KBDI)

The Oklahoma Fire Danger (OKFD) model also calculates a drought index which is used to increase the amount of dead fuel available for consumption. This index, the Keetch-Byram Drought Index (KBDI), was included in the 1988 revisions to the national system (NFDRS). A statewide color-coded map of KBDI is updated once daily at 4 p.m. CST.

Drought, as defined by KBDI, is a condition of dryness in the litter, duff, and upper soil layers that progresses from saturation to an absence of available moisture. The KBDI is based on an arbitrary 8 inches of water in the litter/duff/soil column. When the column is completely saturated, KBDI = 0. As water is removed from the column by evapotranspiration, the KBDI increases in value. When KBDI reaches 800 (its max), all the water has been removed. In the NFDRS and OKFD model, as KBDI increases above a value of 100, increasing amounts of dead fuel are provided for burning. During combustion some of this fuel contributes directly to fireline intensity (BI), but most increases total heat release (ERC) and contributes to burn severity through smoldering combustion.

In Oklahoma, the KBDI has shown itself to be more useful during the growing season than during the dormant season. Also, as it was developed mainly for forested landscapes, its usefulness for grassy landscapes is somewhat questionable. The interpretations below are based on experience within forested areas in the southeastern United States.

<u>KBDI Value</u>	<u>Interpretations</u>
0-200	Nearly all soil organic matter, duff and litter are left intact after a burn. Once the fire passes, remaining embers extinguish quickly and within a few minutes, the area is extinguished and smoke free.
200-400	Litter and duff layers begin to contribute to fire intensity. Heavier fuel classes can become involved. Soil exposure is minimal. Smoke management can become a real hazard, especially if there are larger fuels available. Smoldering with resulting smoke can continue into the night.
400-600	These levels represent the upper range at which most understory type burning should be conducted. Most of the duff and organic layers will ignite and actively burn. Considerable soil exposure occurs. The intensity can be expected to increase almost exponentially from the lower to upper ends of this range. Complete consumption of all but the largest dead fuels can be expected, and larger fuels not consumed may smolder for several days, leading to smoke and possible fire control problems.
600-800	These levels represent the most severe drought conditions, and many states issue burn bans at these levels. Prescribed fires should not be conducted at levels over 700. Fires that do occur will be intense and deep-burning. Live understory vegetation (2-3" range) should be considered part of the fuel complex due to its low fuel moisture. Most subsurface soil organic matter will be consumed, and great soil exposure will occur with great future erosion potential. Smoldering may occur for many days, with smoke and fire control problems.