



WIND CAVE NATIONAL PARK 2012 RESOURCE BRIEF



Above: A forest monitoring plot in Wind Cave NP with a large number of ponderosa pine saplings and seedlings.

Right: Many riparian areas of the park show impacts of intense wildlife use.

PLANT COMMUNITY MONITORING

Overview: The Northern Great Plains Inventory and Monitoring (I&M) Network staff completed the second year of plant community monitoring at Wind Cave National Park (NP) in 2012. This was a much drier year than 2011 throughout the region, resulting in less vegetation cover, shorter plant height, and a thicker litter layer.

Compared to 2011, vegetative cover in Wind Cave NP decreased by 38%, and average height of the herbaceous layer decreased 47%. On average, there were 9 native plant species per square meter plot. Kentucky bluegrass (*Poa pratensis*) was the most common exotic species found in the park.

Highlights: An intensive forest health survey was completed in 2012. It revealed only 8 tree and tall shrub species in the park, half of which only appeared in 1 or 2 (out of 90) plots within the park, and even then no larger

than saplings. The overwhelming majority of mature trees was composed of ponderosa pine (*Pinus ponderosa*) and Rocky Mountain juniper (*Juniperus scopulorum*), with only one plot recording mature trees of another species (*Ulmus americana*).

I&M staff also assisted Wind Cave NP staff in 2012 with an on-going study of the riparian areas of the park. Data from this effort will be useful in assessing the impacts of wildlife on stream conditions.



Condition Indicator	Current Status/Trend	Rationale for Resource Condition
Plant Community		
Upland Plant Community Structure and Composition	●	Overall species diversity and herbaceous cover was good, and the diversity of native plants falls within the natural range of variation for mixed-grass prairie.
Exotic Plant Early Detection and Management	●	Monitoring efforts showed low cover of exotic species in many areas of the park.
Air Quality		
Ozone Exceedance Days	●	Ground-level ozone was considered unhealthy for sensitive groups on 1 day in the summer of 2012.
Note: Table based on State of the Parks Reports - see annual report for more details. Green indicates "good condition", yellow indicates "caution", and red indicates "significant concern". Line thickness indicates confidence with dashed lines indicating "low confidence" and thick solid lines indicating "high confidence".		

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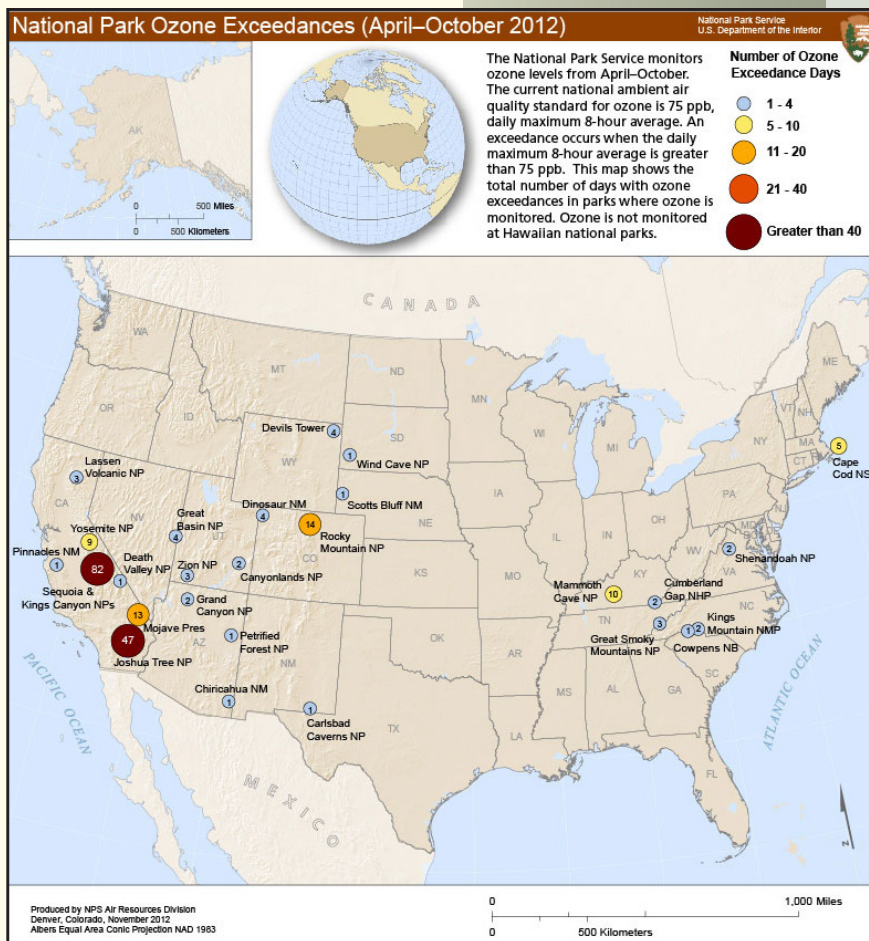


AIR QUALITY MONITORING

Overview: Ground-level ozone is one of the most widespread pollutants affecting vegetation and public health in the U.S. In humans, exposure to ozone can cause respiratory problems and impairment of the body's immune system.

Several plant species that occur at Wind Cave NP are known to be sensitive to ozone, including ponderosa pine. Summer ozone levels have been monitored in Wind Cave NP since 1995. To protect human health and vegetation, the US Environmental Protection Agency (EPA) has set a national standard for ozone of 75 parts per billion (ppb) averaged over an 8-hour period.

Highlights: During the summer of 2012, Wind Cave NP exceeded the EPA standard on 1 day in June. At the time of this exceedance, the air quality in the park was considered moderate at which times unusually sensitive people should consider limiting prolonged outdoor exertion. Since monitoring began, there have only been two other years with recorded exceedances: 2005 and 2006.



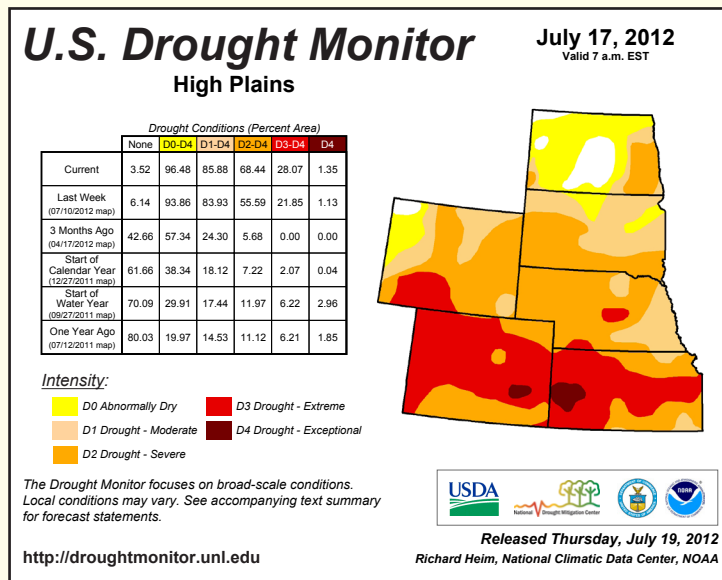
WEATHER AND CLIMATE MONITORING

Overview: Weather is a fundamental driver of ecosystems in the northern Great Plains. Trends in temperature and precipitation may help explain trends seen in other resources such as plant communities.

Top: Map of National Park Ozone Exceedances 2012. Courtesy of NPS Air Resources Division.

Bottom: Drought conditions at Wind Cave NP during July when NGPN surveyed vegetation.

Highlights: Wind Cave NP experienced severe drought condition in July 2012 when vegetation monitoring took place. The drought worsened throughout the summer and fall. By the end of 2012, the area was experiencing an extreme drought.



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