



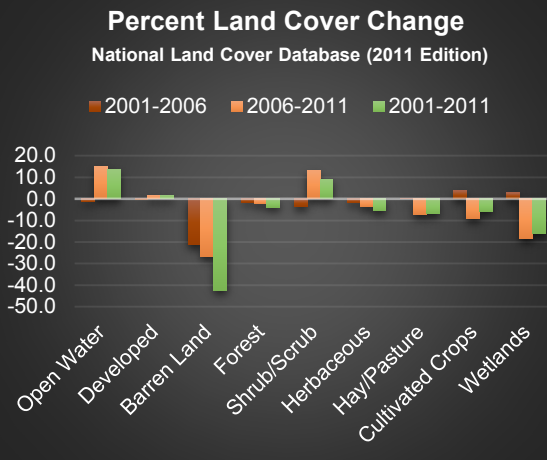
MISSOURI NATIONAL RECREATIONAL RIVER 2013 RESOURCE BRIEF

LAND USE CHANGE

Overview: National Land Cover Database 2011 (NLCD 2011) was released on April 4, 2014. This release was remarkable since it provided, for the first time, the capability to assess spatially explicit national land cover changes in the United States from 2001 to 2011. The 16-class (30-meter spatial resolution) land cover classification scheme based on Landsat satellite data is available for 2001, 2006, and 2011.

Highlights: Missouri National Recreational River (Missouri NRR) straddles the border of southeast South Dakota and north-east Nebraska and is the most easterly park in the Northern Great Plains Network. Based on NLCD 2011, open water (51%) and wetlands (23%) are the predominant land covers. Combined, planted/cultivated crops, forest, and grassland/herbaceous land covers were equally proportioned with total park coverage of almost 25%.

Overall rates of land cover conversion from 2001 to 2011 were relatively low, with approxi-



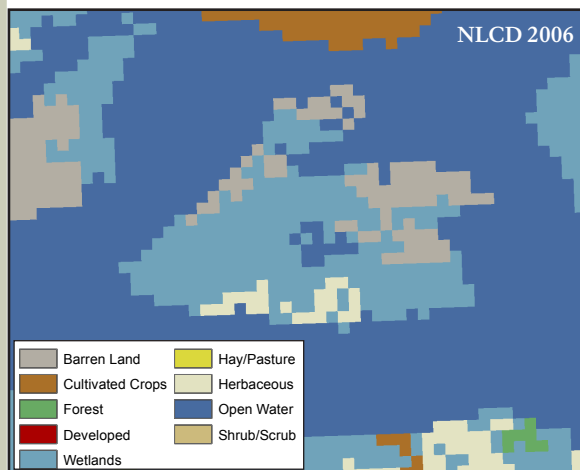
mately 96% of the park remaining in the same land cover class from 2001 to 2006 and almost 89% of the park remaining static over the entire ten year period. Of the land cover classes that changed from 2001 to 2011, a combined 6.5% shifted into the open water category. This change is easily explained by the 2011 Missouri River flood that inundated thousands of acres of varying land cover classes throughout the river corridor. The figure above represents this snapshot impact very well. If NLCD was available for 2012, many of these percent changes would noticeably differ since river levels had returned to normal.

Above: In 2011 the Missouri River flooded its banks, shifting land cover classes to open water.

Above right: Percent land cover change across various years using the National Land Cover Database.

Right: Data from the National Land Cover Database show changes in land use (loss of wetland and barren land to open water) between 2006 and 2011 at Missouri NRR near the confluence of the James River and Missouri River.

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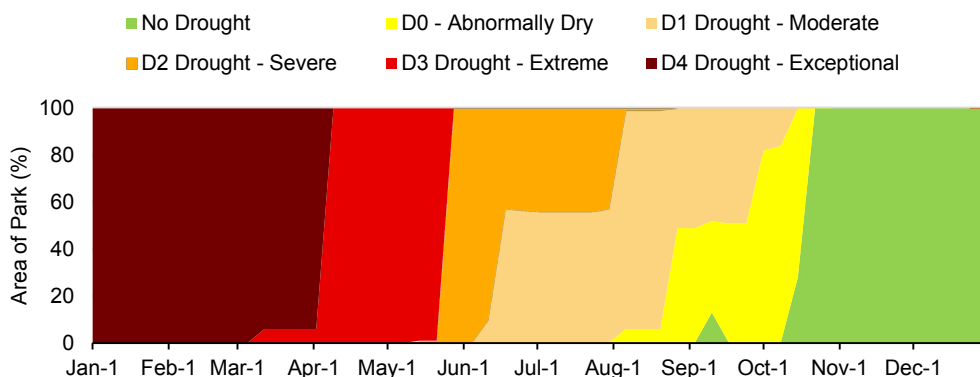


WEATHER AND CLIMATE MONITORING

Overview: Weather is a fundamental driver of ecosystems in the Great Plains and may help explain trends seen in other natural resources. Drought categories are based on local reports and drought indicators including: Palmer Drought index, CPC Soil Moisture, USGS Streamflow, Standardized Precipitation Index, and Objective Short- and Long-term Drought Indicator Blends.

Highlights: Similar to other NPS units in South Dakota in 2013, Missouri NRR experienced a reverse in drought impacts observed in 2012. Drought conditions gradually improved throughout 2013 and by early October precipitation levels reverted to normal trends.

Missouri National Recreational River Drought Monitor Classes (2013)



Data Source: The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration.

Left: Percent area of Missouri NRR under drought conditions in 2013. Colors represent different drought classes.

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WATER QUALITY MONITORING

Overview: The Northern Great Plains Network is embarking on its second full season of water quality monitoring at select Parks. The focus in 2014 is on the Niobrara River system with sites at Agate Fossil Beds NM, Niobrara NSR, and Missouri NRR. Continuous water temperature, specific conductance, pH, and dissolved oxygen will be collected by the USGS Nebraska Water Science Center during the 2014 ice-free season.

Highlights: Continuous water quality monitoring was initiated at the USGS Niobrara River near Verdel, NE station on March 24, 2014. Real-time data are available at http://waterdata.usgs.gov/nwis/uv?site_no=06465500.



Left: Staff from USGS deploy water quality monitoring equipment on the Niobrara River at Missouri NRR.

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Network Parks: Agate Fossil Beds NM • Badlands NP • Devils Tower NM • Fort Laramie NHS • Fort Union Trading Post NHS • Jewel Cave NM • Knife River Indian Villages NHS • Missouri NRR • Mount Rushmore NMEM • Niobrara NSR • Scotts Bluff NM • Theodore Roosevelt NP • Wind Cave NP