

# NATIONAL PARKS IN PERIL

## THE THREATS OF CLIMATE DISRUPTION

### State Fact Sheet: Indiana

Human disruption of the climate is the greatest threat ever to our national parks.

At risk are nearly every resource and value that make our national parks so special. In *National Parks in Peril*, the Rocky Mountain Climate Organization and the Natural Resources Defense Council identify 25 national parks as having the greatest vulnerabilities to human-caused climate change. In Indiana, Indiana Dunes National Lakeshore is among the 25 parks most at risk. Indiana Dunes is vulnerable to a loss of ice and snow, a loss of water, more downpours and floods, a loss of plant communities, a loss of wildlife, more crowding, a loss of fishing, and more air pollution.

Many of these impacts are already happening, as human activities—the emission of heat-trapping gases—are now changing the climate. To preserve our national parks for ourselves and future generations, we need to both stop changing the climate and take actions to preserve the resources and values that make our parks special. For detailed recommendations, see the full report, *National Parks in Peril*.

#### Loss of Ice and Snow

As the climate gets hotter, national parks in the North are losing snow and ice—one of the most obvious effects of a changed climate on our national parks. Global warming very likely will decrease opportunities for snow-dependent outdoor winter recreation in national parks, including Indiana Dunes, where the snowshoeing and cross-country skiing season is already getting shorter, in the face of the almost 4°F increase in average temperatures in the Upper Great Lakes region in the 20<sup>th</sup> century.

#### Loss of Water

In the upper Midwest, the water level of the Great Lakes is likely to fall. While water levels are rising in the world's oceans, the opposite is happening in the Great Lakes. With higher temperatures, lake levels have dropped and are expected to drop farther, because of less winter ice and more summer evaporation. In 2007, visitors to Indiana Dunes got a glimpse of this future. That year, high temperatures and below-average precipitation dropped Lake Superior 21 inches below its 1918-2006 average (a record low) and Lake Michigan 23 inches below its average. Scientists project that Great Lake levels could fall by as much as several feet by 2090. In the Great Lakes parks, fixed docks and boat ramps could be too high, deeper-draft boats could lose access to docks and anchorages, and drying wetlands on lake edges could affect habitat and food for fish and birds. The lakes also are projected to be ice-free for more of the year.

#### More Downpours and Floods

With a changed climate, more precipitation now comes in downpours. The amount of rain falling in heavy storms increased by 20 percent over the past century, while there has been little change in the amount from light and moderate storms. In its recent report, the U.S. Global Change Research Program says there is at least a 90 percent likelihood that heavy downpours



To read the full report on the impacts of global warming on national parks, visit [www.nrdc.org/policy](http://www.nrdc.org/policy) or [www.rockymountainclimate.org](http://www.rockymountainclimate.org)

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will become even more frequent and intense. With an increase in downpours, flooding also is likely to increase. Virtually all national parks in Indiana and elsewhere are at risk, as the forecast is for more downpours everywhere. An extreme downpour in Mount Rainier National Park in 2006 illustrates the risk—it caused so much flooding that the entire park was closed for a full six months.

### **Loss of Plant Communities**

An altered climate can lead to fundamental changes in the natural plant communities of parks. Indiana Dunes has an astonishing diversity of plants, with more than 1,100 flowering plants. The park is already struggling with invasive plant species that threaten the local ecosystems, a problem which could be worsened by an altered climate.

### **Loss of Wildlife**

For many Americans, the highlight of a trip to a national park is the wildlife they see. But a changed climate could mean less of the wildlife species now in the parks. Some species may go completely extinct, and, local populations in particular parks may be eliminated or decline sharply.

At Indiana Dunes, numbers of Karner blue butterflies, an endangered species, have declined in years of low snow cover, thought to be from a loss of the protection that snow provides for over-wintering eggs.

An altered climate is likely to reduce inland populations of cold-water fish species, including trout and salmon. At Indiana Dunes fishing for Chinook and coho salmon and trout could be affected if, as projected, warmer temperatures lead to the creation of deep, oxygen-depleted layers of water in the lakes, reducing salmon and trout populations.

### **More Overcrowding**

As temperatures soar with a changed climate, to escape oppressive heat enough people may flock to cooler northern parks and to national lakeshores to overcrowd them. In these parks, the impacts of additional visitation could include less visitor enjoyment and damage to park resources. Overcrowding could be a significant problem particularly for those parks that offer a break from heat and are close to major population centers, including Indiana Dunes, with beaches just a few miles from Gary and about 2 million visits each year.

### **Loss of Fishing**

Anglers have long enjoyed fishing amid the natural settings of our national parks. But now a changed climate threatens to reduce fish populations and recreational fishing opportunities in the parks. At Indiana Dunes fishing for Chinook and coho salmon and trout could be affected if, as projected, warmer temperatures reduce salmon and trout populations.

### **More Air Pollution**

A hotter climate is projected to worsen concentrations of ground-level ozone, a component of smog created when pollutants mix in sunlight. Ground-level ozone has been firmly established to harm people's health, and the U.S. Environmental Protection Agency has set air quality standards at the levels necessary to prevent adverse health effects. Based on monitoring with portable equipment, monitoring sites near the park, and other methods, the NPS thinks that Indiana Dunes in 2005-2007 violated the ozone standard. Because future climate-change driven increases in ozone levels are

expected to be greatest where ozone levels already are high, the lakeshore is at risk of continued, perhaps worsened, levels of unhealthful air.

For documentation of the sources used for this fact sheet, please see the full report, *National Parks in Peril: The Threats of Climate Disruption*, at [www.rockymountainclimate.org](http://www.rockymountainclimate.org).