

A WHOLE NEW GAME

The effects of climate change on hunting, fishing,
and outdoor recreation in South Dakota





Under most climate change projections the prairie pothole region (PPR) will experience increased drought and up to 90% of wetlands in the PPR may be lost.

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Written by:

Nancy Lange, Clean Air Program Coordinator
nlange@iwla.org
(651) 649-1446

Edited by:

Cindy Han, Gwen Steel, and Paul Lepisto

Layout by:

Jeremy Morris

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Contact:

Izaak Walton League of America, Midwest Office
1619 Dayton Avenue, Suite 202
St. Paul, Minnesota 55104
(651) 649-1446

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Mission statement:

To conserve, maintain, protect, and restore the soil, forest, water, and other natural resources of the United States and other lands; to promote means and opportunities for the education of the public with respect to such resources and their enjoyment and wholesome utilization.

Founded in 1922, the Izaak Walton League of America is dedicated to common-sense conservation that protects America's hunting, fishing, and outdoor heritage relying on solution-oriented conservation, education, and the promotion of outdoor recreation for the benefit of our citizens. The League has 40,000 members and supporters nationwide. Our headquarters are in Gaithersburg, Maryland, and we have a regional office in St. Paul, Minnesota



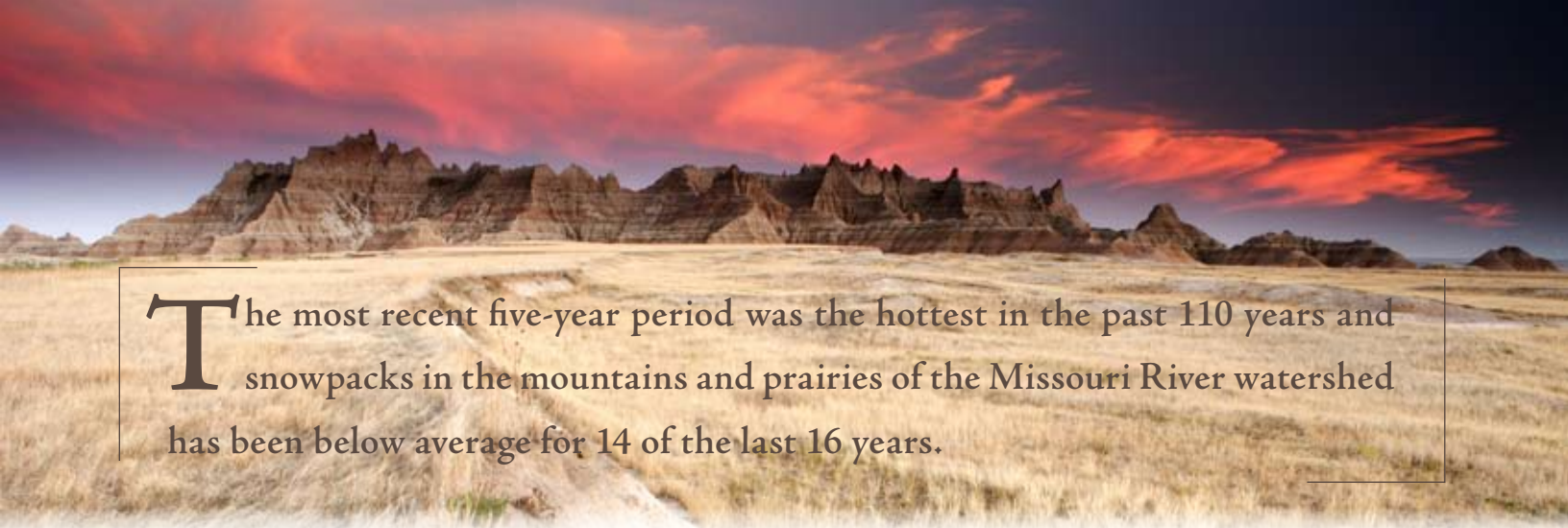
WE know that the earth has natural climate cycles. Some, like the advancing and receding of glaciers, take tens of thousands of years. Other more local events like the El Niño in the Pacific occur every few years. Plants, animals and people have proved very adaptable to such natural changes over the millennia. But the changes underway today are different. They are happening more rapidly and the long-term trend is in the same direction - getting warmer.

In 2007, the scientific community, represented through the Intergovernmental Panel on Climate Change, issued its most defining assessment that the warming of the climate system is unequivocal, and that human actions are responsible for most of the warming that has occurred in the last half century. Field observations from the deep oceans to high mountaintops are documenting changes in life cycles, ranges, and most surprisingly, in the genetic makeup of the world's plants and animals.

Treasured fish and wildlife and their required habitat are explicitly threatened by a warmer, more erratic climate. For sportsmen and sportswomen, this could mean lasting changes not only to their favorite recreational pastimes, but also in the very culture and traditions that many sporting families have known for generations.

“Those of us who hunt and fish are already experiencing the changes brought about by a warmer world. If we lose the vulnerable parts of our natural world, like moose and trout and pine forests, we’ve failed to be good stewards. Hunters’ and anglers’ voices should be among the loudest calling for action on global warming.”

— Bill Grant, Associate Executive Director,
Izaak Walton League of America



The most recent five-year period was the hottest in the past 110 years and snowpacks in the mountains and prairies of the Missouri River watershed has been below average for 14 of the last 16 years.

South Dakota's Rich Heritage

South Dakota contains a diversity of grassland and prairie ecosystems, with a mountainous region cropping up in the far west. South Dakota's most notable geographic features are the Missouri River, which bisects the state and the Black Hills, a miniature version of the Rocky Mountains that lies in the far western region of the state. Surrounding these signature landmarks are agriculture and range lands, prairies and grasslands, rivers and wetlands, supporting a diversity of wildlife and game species, including pheasants, duck, deer, elk, bighorn sheep, and mountain lions.

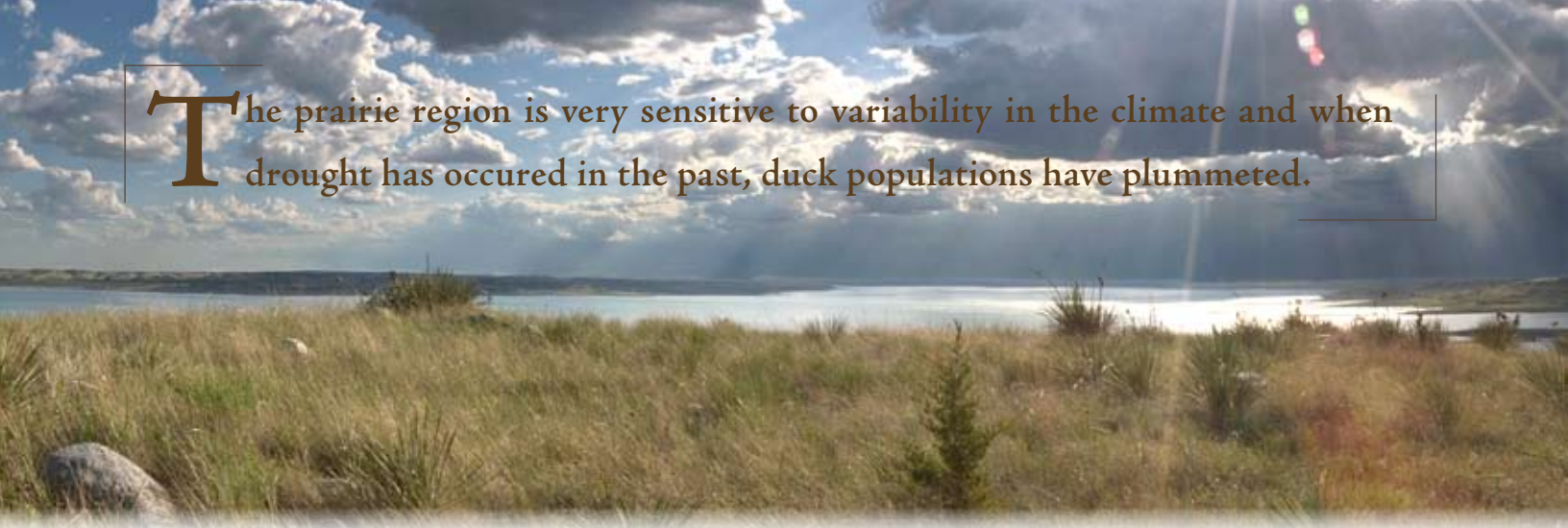
South Dakotans value their state's fish and wildlife, with 97 percent of citizens reporting that healthy fish and wildlife populations are important to the economy and well-being of the state.¹ Thousands of South Dakotans hunt and fish each year and many visitors are drawn by the state's populations of game species including upland birds like pheasants, grouse, and quail. South Dakota supports the highest pheasant population in the nation and tens of thousands of hunters visit the state each fall. The large reservoirs on the Missouri River experience over 8 million visitor days annually and offer anglers the chance to catch walleye, channel catfish, Chinook salmon, small mouth bass, and northern pike.

The state has a highly variable climate. Summertime temperatures routinely exceed 100

degrees Fahrenheit and wintertime lows may drop 20 degrees below zero Fahrenheit. It is considered a semi-arid state that experiences periodic droughts. As a mid-continent state, South Dakota is likely to experience greater overall warming than other parts of the United States, with the greatest warming expected to occur in the winter time—a continuation of a current trend. By 2100, spring and summer temperatures are projected to warm 1 to 6 degrees F and 2 to 7 degrees F in the winter.

Already warmer winter and springtime temperatures coupled with lack of rain and snow are producing effects in the Missouri River basin. The most recent five-year period was the hottest in the past 110 years for the basin and snowpack in the mountains and prairies of the Missouri River watershed has been below average 14 of the last 16 years. Reservoir levels are at historic low water levels.





The prairie region is very sensitive to variability in the climate and when drought has occurred in the past, duck populations have plummeted.

Prairie Potholes

Eastern South Dakota's wetland-rich grassland complex lies within a vast prairie pothole region, which stretches from northern Iowa to central Alberta. The prairie pothole region provides ideal waterfowl habitat and has been called America's duck factory, estimated to produce 50 percent of North America's ducks. But many other grassland and migrating birds

plummeted.² Scientists believe that under most climate change projections, the prairie pothole region will experience increased drought, along with milder winters, hotter summers, and longer growing seasons. Under these conditions, up to 90 percent of the wetlands in the prairie potholes may be lost, which in turn will reduce the abundance of breeding ducks by estimates as high as 69 percent.³

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—Carter Johnson, South Dakota State University

depend on South Dakota's prairies and wetlands. Shallow wetlands filled with aquatic and plant life and the surrounding grasslands provide vital habitat for shorebirds, wading birds, passerines, hawks, owls, as well as ducks.

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This pothole drought will shift duck breeding sites to smaller, less productive locations in the east where the drought may not be as severe. “The problem with that is that the loss of wetlands in the east provides no insurance for duck production that we’ve had in the past,” according to Carter Johnson, Professor of Ecology at South Dakota State University. “The water will be there. The basins won’t be there. In the west where we have the basins, we won’t have the water.”⁴

Johnson states his belief that the future of duck hunting rests on the fate of prairie wetlands. “We could expect to lose up to half of the ducks in the fall flight, which could mean an end to duck season.”⁵ “The message to us as managers and planners is that we’re going to need every wetland we can get to keep this kind of negative change to a minimum.”⁶

A person wearing a hat and waders is fishing in a stream. The background shows a rocky bank with some greenery.

TROUT need cold, highly oxygenated flowing water in order to survive. Brown trout numbers have fallen more than 90 percent in parts of Rapid Creek.

Black Hills Trout Streams

The Black Hills draws millions of visitors each year to see the presidential monument Mount Rushmore, Badlands National Park, and Custer State Park. But many also come to fish for trout in the 400 miles of streams and 14 lakes.

One of the region's largest trout streams, Rapid Creek, illustrates the impact that hotter temperatures and drought have already had on South Dakota's trout streams. Rapid Creek begins deep in the Black Hills and flows into and out of the Pactola Reservoir.

Trout need cold, highly oxygenated flowing water in order to survive. While persistent drought conditions have reduced stream levels and raised water temperatures, fisheries managers have also not been able to count on enough water flow from the reservoir to counteract the drought's effects in Rapid Creek. Stream biologists are investigating whether low, constant stream flows are contributing to the explosive growth of didymo, invasive algae that covers stream beds and knocks out the plant and insect growth necessary for healthy brown trout. Brown trout numbers have fallen by more than 90 percent in parts of the creek and the Department of Game, Fish and Parks (GFP) is undertaking an experimental program to restore nutrient levels sufficient to promote good stream plant growth.

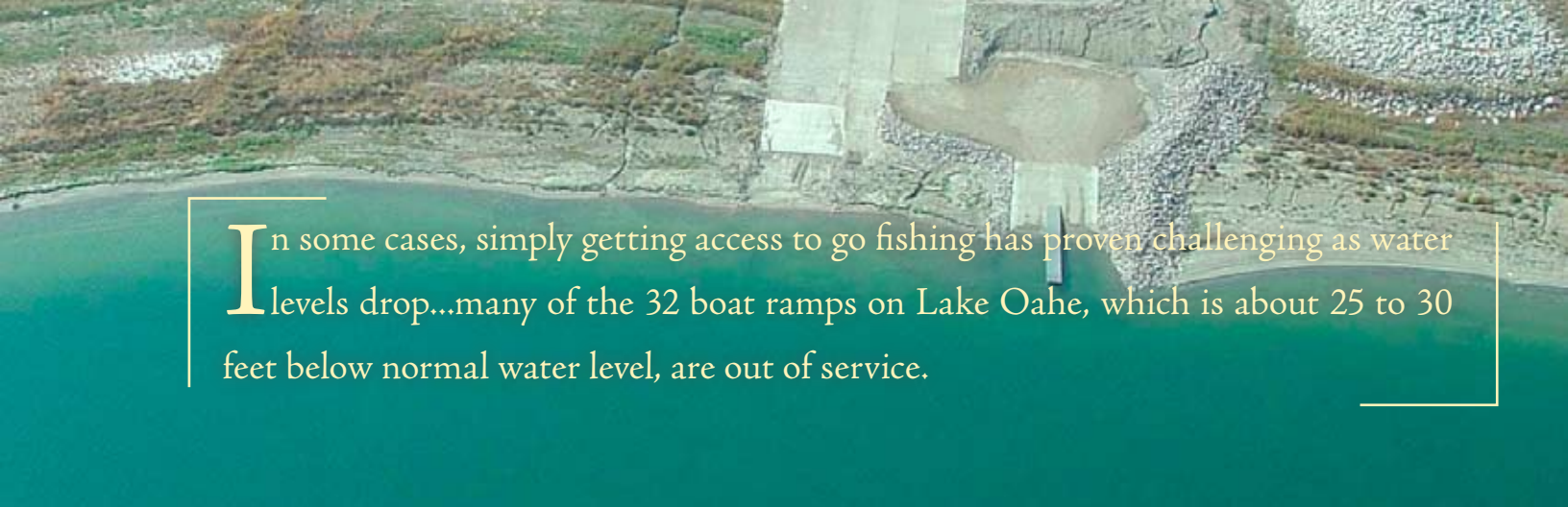


Brown trout

Rapid Creek's example illustrates the challenge of maintaining adequate water conditions in South Dakota's trout streams in the face of global warming. For anglers, the numbers and types of fish available is likely to change. Former GFP Fisheries Manager, Dennis Unkenholz, talked about these changes; "There very likely is going to be some trout where there's cold enough water. It may be just a remnant population, or it may be a population that doesn't support a whole lot of fishing use. But if the cold water goes away, you're going to see a species change and favor a cool or warm-water species."⁷



Didymo is an invasive algae that threatens the health of trout streams.



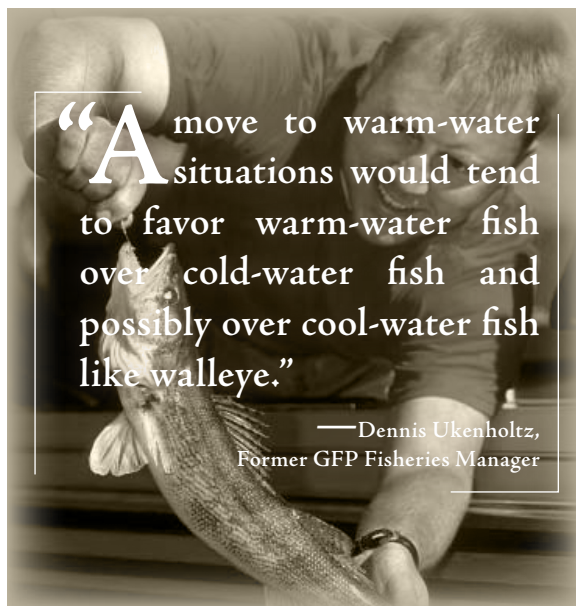
In some cases, simply getting access to go fishing has proven challenging as water levels drop...many of the 32 boat ramps on Lake Oahe, which is about 25 to 30 feet below normal water level, are out of service.

Fish in Hot Water

In the northeastern region of the state, a string of glacial lakes supports a vital sport fishery. Until quite recently, these lakes were small, shallow marshes, and some were dry enough to be farmed until wet periods in the 1990s filled the lakes to depths between 20 to 30 feet.


But the ability of South Dakota's glacial lakes to maintain the habitat necessary for healthy fish populations depends on future conditions. If drought and higher temperatures prevail, water levels may fall to the point that the present fishery cannot survive.⁸

Across the state, a warmer climate may alter habitat and water quality conditions enough to change the state's fisheries. According to former GFP Fisheries Manager Dennis Ukenholtz, "A move to warm-water situations would tend to favor warm-water fish over cold-water fish for sure and possibly over cool-water fish like walleye."⁹ So along with the fish, anglers may have to do some adapting of their own. Bluegills and bass, better suited for warmer temperatures, may replace walleye and trout in many South Dakota lakes and streams. In some cases, simply getting access to go fishing has proven challenging as water levels drop. Reservoirs along the Missouri River have suffered from the lack of rain and snow—and it shows. Many of the 32 boat ramps on Lake Oahe, which is about 25 to 30 feet below normal water level, are out of service. The state has had to build extensions on several ramps in order to make them usable.



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—Dennis Ukenholtz,
Former GFP Fisheries Manager



If climate changes trend toward warmer, drier conditions, game birds in the drier western regions of South Dakota will face increasingly harsh conditions and the primary pheasant range may shift further northward and eastward.

Upland birds


South Dakota is home to a number of upland game birds including sharp-tailed grouse, prairie chickens, and pheasants. The pheasant is not native to South Dakota, but since its introduction 100 years ago, it has flourished and become a vital part of the state's hunting economy and traditions.

If climate changes trend toward warmer, drier conditions, game birds in the drier western regions of South Dakota will face increasingly harsh conditions and the primary pheasant range may shift further northward and eastward to regions of greater precipitation.¹⁰ Wildlife managers in Minnesota have identified pheasants as one species that may do better in that state under warming conditions.

The breeding success of birds and the survival of their young is closely linked to temperature and moisture conditions. Wet, cold conditions can be lethal to newly hatched chicks while early summer heat is dangerous for young birds that are just leaving the nest to search for insects and water. In the case of pheasants, it has been demonstrated that chick survival is impaired when conditions become too hot and

dry. While 2006 pheasant population numbers did not decline significantly due to the state's ongoing drought, smaller broods were found, particularly in areas hit hardest by the drought. "Poor habitat conditions, created by the lack of precipitation and extreme hot conditions, resulted in limited cover and minimal insect production," according to Thomas Kirschenmann, Senior Wildlife Biologist for GFP. "The combination of these two factors was the most likely cause of the lower chick survival that we observed in 2006."¹¹

All upland birds are dependent on healthy grasslands for nesting, food supply, and protection from harsh weather. According to Tony Leif, Game Program Administrator for Game, Fish and Parks, "Weather conditions are bumps in the road— good one year and maybe bad the next—but healthy habitat is the vital component for upland birds."¹² Land conservation programs like the Soil Bank program from the 1960s and the Conservation Reserve Program have played a vital role in the success of South Dakota bird populations. The accelerated conversion of prairies and grasslands to cropland and the retirement of existing CRP acreage is a cause for significant concern among wildlife managers.



“I’ve got a pretty big carbon footprint, but I’m working to correct that. As hunters and anglers we need to recognize that our lifestyle is hurting our sport and resources. The sacrifices don’t have to be great but there is a lot of work to be done.” —Carter Johnson, South Dakota State University Professor

South Dakota’s ability to continue to produce large numbers of pheasants in drought conditions is due in a large part to the standing residual cover provided on CRP acres.¹³

Along with protecting the essential habitat needed for all of South Dakota’s wildlife, South Dakota State University Professor Carter Johnson identifies the other essential response to global warming: “On the other side, we need to reduce the chance of this happening by reducing the emission of greenhouse gases into the atmosphere.”¹⁴ Johnson recognizes that his own choices affect the resources he cares deeply about. “I’ve got a pretty big carbon footprint, but I’m working to correct that. As hunters and anglers, we need to recognize that our lifestyle is hurting our sport and our resources. The sacrifices don’t have to be great but there is a lot of work to be done.”¹⁵

Help wildlife weather the coming changes

When we work to restore wetlands and streams, maintain natural habitats, prevent the spread of invasive species and create wildlife buffers, our individual actions add up to help wildlife weather the coming changes. These actions also bolster the ability of wetlands, forests and other natural systems to absorb and store carbon.

State fish and wildlife agencies listen to their stakeholder groups. Encourage them to take proactive steps in protecting South Dakota’s fish and wildlife resources from global warming.



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A Call to Arms



Sportsmen and women have risen to the call for stewardship countless times in order to protect our natural heritage. The Izaak Walton League itself began when a group of fisherman banded together in 1922 to preserve the threatened ecosystem of the Upper Mississippi River.

Today, the call for stewardship has reached a volume that must be heeded. The solutions are at hand and we need to get to work.

Make your voice heard

Let city council members, the mayor, state representatives and your member of Congress know that we must enact strong policies to achieve the level of emission reductions scientists tell us is necessary – an 80 percent reduction in global warming pollution from current levels by mid-century.

Individual actions add up to global warming solutions

- ♦ Electricity contributes about one quarter of the global warming pollution in South Dakota;
 - Replace your standard light bulbs with compact fluorescent bulbs
 - Get an energy audit to reduce the heating and cooling demand in your home
 - Buy efficient appliances
- ♦ Vehicles release almost half of South Dakota's global warming emissions;
 - Drive less and drive smart with a well tuned vehicle.
 - Buy hybrid vehicles or vehicles that meet cleaner emissions standards
- ♦ Buy local products when possible.
- ♦ While using less energy is the first step, it also helps to use a renewable, sustainable fuel instead of a fossil fuel.

Check to see what green power purchase program your local electric utility offers. You can pay a little extra to make sure that the electricity you use is coming from a renewable source such as wind or solar.

Join the Ikes!

The Izaak Walton League of America has chapters all over the country, with members who work together to protect the soil, air, woods, and water in their region. The League's mission is to promote common-sense conservation through community-based efforts. Our members typically enjoy hunting, fishing, and outdoor recreation, and they appreciate the importance of protecting our natural resources for future generations.



For more information, visit www.iwla.org or call 1-800-IKELINE.