

ON THIN ICE

Warming Winters Put America's Hunting and Fishing Heritage at Risk

NATIONAL WILDLIFE FEDERATION 2012



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PROTECTING AND RESTORING HABITAT

Report

Introduction



Millions of Americans who hunt and fish eagerly anticipate the onset of shorter days and colder weather each year. The changing of the seasons signals the approach of a special time, rich in history and tradition, and filled with friends and family. Guns are cleaned, ammunition purchased, ice auger blades sharpened, lures organized and shanties shored up in preparation for winter adventures.

But in many places, hunting and ice fishing opportunities never materialized in the winter of 2011-2012. Record warm temperatures across the country left lakes, ponds and bays ice-free; found mountains, fields and woods without snow; kept elk and deer high in the mountains; and allowed ducks and geese to linger on their northern breeding grounds.

Television news producers dubbed the bizarre season “Winter Gone Mild” or “The Winter That Wasn’t.” For the contiguous United States, the period from December through February was the fourth-warmest on record, with an average temperature 3.9 degrees F above normal.¹ More than 3,110 daily high temperature records were broken or tied in January alone.²

The winter of 2011-2012 was odd, but it wasn’t a complete anomaly. Since the 1970s, winter temperatures have been increasing across the northern United States, from 1 to 2 degrees F in the Pacific Northwest to about 4 degrees F in the Northeast.³ The season is also getting shorter, with spring now arriving as much as two weeks earlier than it did just two decades ago.⁴ And winter is becoming less white: The extent of snow cover across the Northern Hemisphere has decreased by approximately 3 to 9 percent since 1978, with especially rapid declines

in the western United States.⁵ Climatologists expect these trends to continue, and they project that by the end of the century, parts of the Northeast will lose as many as half of their snow-covered days each year.⁶ In a recent piece reviewing these trends, a *Time* magazine writer wondered whether “winter as we know it could one day be a season of the past.”⁷

The decline of winter has major implications for all forms of outdoor recreation—including the popular sports of skiing and snowmobiling—and the businesses that depend on them. As America’s first and foremost conservationists, hunters and anglers worry not only about the future of their sports, but the nation’s wildlife heritage. “I’m concerned not so much for myself but for the wildlife,” said Ed Zygmunt, a sportsman from Pennsylvania. “When the quality of the outdoor experience declines, for youngsters, that experience sets the stage for long-term interest. If they don’t learn about wildlife and care about wildlife, what is going to happen to wildlife in the future?”⁸

Americans remember well that the winters of 2009-2010 and 2010-2011 were unusually snowy and cold across large parts of the country, and some of us might be puzzled about such wide swings from one year to the next. Part of the explanation for extremes in winter weather is related to carbon pollution: As ice in the Arctic melts, it affects air circulation patterns, causing the jet stream to dip south persistently in some locations, bringing cold air to those places. Also, the overall increase in temperatures allows the air to hold more moisture, so when it does snow, we get heavier snowfalls. The two previous winters don’t disprove the damage caused by carbon pollution, nor do they change the decades-long trend of shorter, warmer and less snowy winters.



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Ice Fishing

Ed Zygmont drove to a Cabela's store in the fall to stock up on new ice fishing equipment, hoping for a winter full of angling for bluegill, perch, bass and pickerel. He waited for the lakes in northeastern Pennsylvania to freeze over. And waited. The ice fishing equipment spent the winter untouched—still in its packaging—in his basement, a cruel reminder of a missed opportunity.

"We usually get together with friends and relatives to ice fish," he said. "It's sort of an annual ritual. It's not just catching fish, it's getting together and cooking soup, grilling

venison burgers, telling stories and having a good time—and getting the grandkids out on the ice, too. We didn't have that opportunity this year because of the warmer temperatures."⁹

Across the northern tier of the country this year, winter conditions could best be described as balmy. A total of 27 states from Montana to Maine had December-to-February temperatures ranking among their 10 warmest. The mercury in Minot, North Dakota, for example, soared to 61 degrees on January 5th.¹⁰ While some rejoiced in the warm weather, ice fishers despaired—and the businesses that rely on them suffered.

One place where ice fishing is woven into the local culture is Black Lake, near the northern tip of Michigan's Lower Peninsula. "Typically at this time of year there would be a lot of ice shanties out on the lake, but there's not this year, because the ice isn't safe," Black Lake resident Brenda Archanbo reported in mid-February. Many communities were forced to cancel their winter ice festivals and events due to lack of snow and ice. Archanbo remembers longer and colder winters back in the 1960s, when thousands of people would flock to the Black Lake Shivarree. "They'd have a big tent on the ice, a band, food, crafts, snowmobile races, ice fishing, cross country skiing, kids' activities," she recalled. "We hope to bring it back next year, but we'll have to develop a Plan B if we can't hold it on the ice."¹¹

In many other Michigan communities, the story was much the same. Ice fishers on Baldwin Lake in Greenville were warned in mid-January to stay off the ice for their own safety—and that of potential rescuers.¹² The annual winter festival in Onekama in January was cancelled for lack of snow and ice. Local business owners who depend on ice fishers and snowmobilers for income said that winter business was off as much as 50 percent.¹³ Kensington also



flickr: TomGill (apstrake)

cancelled its "Winter Bliss Festival,"¹⁴ and Mackinaw City called off its 23rd annual sled dog race—the Mackinaw Mush—because there wasn't sufficient snow.¹⁵

In mid-January, Houghton Lake in Michigan's northern Lower Peninsula still hadn't frozen all the way across yet, and local officials were worried. "Ice and snow are a real boon for our local businesses," Linda Tuck, director of the Houghton Lake Chamber of Commerce, told *The Great Lakes Echo*. "We have one of the most popular fishing lakes in the state, in the summer and winter, and this winter we're seeing a real downturn." Added Lyman Foster, owner of a bait and tackle shop in Houghton Lake: "We've had about 50 percent less business than what we usually have this time of year. It's starting to hurt."¹⁶

The warm weather also devastated ice fishing in New Hampshire, said retired wildlife biologist and sportsman Eric Orff. For the first time in recorded history, Great Bay—a large tidal inlet between New Hampshire and Maine popular with winter smelt anglers—didn't freeze over. "There's practically no safe ice to fish on in southern New Hampshire, which is totally unbelievable," Orff reported in late February. "The sport shops that depend on ice fishermen for business such as live bait and ice fishing equipment have been dealt a terrible blow."¹⁷



flickr: tqhh

In addition to these direct impacts on sporting traditions and local economies, the changes in winter conditions are leading to ecological changes that have equal or greater impacts on the resources hunters and anglers cherish. One focus of concern is the Great Lakes, where ice coverage has declined an average of 71 percent in the past four decades.¹⁸ Winter ice helps curb the impact of waves and currents, protecting the eggs of whitefish and other important fish species, and reducing shoreline erosion.¹⁹ It also diminishes evaporation. With only about 5 percent of the Great Lakes' surface frozen this winter, lake levels could drop two inches or more by the summer, according to the Army Corps of Engineers.²⁰ Equally important, the lack of ice cover allows the lakes to absorb more heat from the sun, leading to warmer water temperatures in the summer. This, in turn, could make the lakes less hospitable to certain fish, promote the incursion of aquatic invasive species, and set the stage for hazardous algal blooms—worrisome outcomes for both recreational and commercial fisheries on the Great Lakes.²¹

Sportswoman in Focus:

BRENDA ARCHAMBO

Ice fishing runs in Brenda Archambo's blood. Archambo, 50, lives on a lake near Cheboygan, Michigan. She has fond memories of spending hours out in a shanty on the frozen lake fishing for perch, walleye, muskie and pike with her grandparents, father, uncles and brother—and, more recently, with her grandchildren. "Up here in northern Michigan, it's part of our outdoor heritage—it's part of who we are."

In normal winters, she would log 100 hours or more on the ice. But winters aren't normal anymore, and this year she only got about 25 hours of ice-time. "The seasons are shorter, and the ice conditions are not the same."

She worries how this change will affect her grandchildren and generations to come. "It's incumbent on us to instill a stewardship ethic in the next generation, and the best way to do that is to get them out on the water and in the wilderness and let them learn to appreciate nature." Without memorable experiences like ice fishing, "there's not going to be anyone there to defend nature later on."

And, it's not just the impact on her family that concerns Archambo. As chair of the Cheboygan County Economic Development Authority, she worries about the economic impacts. "A lot of communities here in Northern Michigan host winter ice carnivals—ice fishing contests, dog sled races, snowmobile races, things like that—to bring commerce to our areas in winter. A lot of these events have been cancelled because there's no snow or the ice isn't safe. So it's really impacting the communities that rely on cold weather."

The solutions seem obvious to her—reduce carbon pollution through conservation, efficiency and cleaner energy sources. "For Michiganders who hunt and fish, it's important to our \$5 billion annual recreational tourism economy, but it's also a wise investment in our economic future and our outdoor heritage," she said. "As sportsmen and sportswomen, we need to speak up, and speak up soon. We need to get out in front of the train before it runs us over."





Moose Hunting

The warm winter also bodes ill for the moose, one of the most iconic game species in the northern states of Maine, New Hampshire and Minnesota. These half-ton, antlered animals are already in trouble, and the lack of cold weather this year is certain to exacerbate their perilous condition. One culprit is the winter tick—an insect about the diameter of a pencil eraser. The blood-feeding ticks cause 41 percent of all moose deaths in New Hampshire, according to a recent study.²²

How do the diminutive insects fell these large beasts? It's a matter of numbers: Moose start out at a disadvantage because they don't have as much success with removing ticks by grooming as other species do. In a normal year, a moose may carry 30,000 ticks. But in years such as this,

with warm winters and late snowfalls, that number can explode to 160,000 ticks per moose.²³ The insects take their final meal at the end of winter, when moose are at their weakest. This stresses even healthy adults by reducing their blood volume, causing a thinner coat due to scratching, and distracting them from foraging and resting. In their compromised state, many succumb to malnutrition or infections. For calves, the ticks are a virtual death sentence, because the insects can suck away the young animal's entire blood supply in a matter of months.

Carbon pollution contributes to this grim toll because as winters get warmer and less snowy across northern states, more ticks survive and breed. "There's almost no question that warming trends are

going to be good for ticks, which in turn will be bad for moose," said Kristine Rines, moose project leader for the New Hampshire Fish and Game Department.²⁴

In large part because of the toll of ticks, New Hampshire's moose population has declined from about 5,500 to around 4,000 over the past several years, says New Hampshire Fish and Game Commission member Eric Orff. Because of the depleted population, the board has decided to reduce the number of moose hunting permits in the state from 350 to 198 for the next two hunting seasons. "We're looking at a winter this year that's even more mild—so we can expect another surge in moose tick numbers" and further reductions in moose-hunting permits in years to come, he added.²⁵

In neighboring Maine, which has a larger moose population, many outdoorsmen, taxidermists and big-game butchers say the tick problem is the worst they've ever seen. In 2011, a group of outdoorsmen reported finding 142 dead moose in northern and western portions of the state, with many of the carcasses still swarming with ticks. "I've never seen a year like this, and I've been doing this for 27 years," Dick Sprague, a deer- and moose-meat processor and taxidermist from Minot, Maine, told *The Bangor Daily News*. "Skinning these heads, you're crawling with ticks after you get done. It's definitely a crazy season."²⁶



Sportsman in Focus:

ERIC ORFF

"This is the warmest winter I've ever seen, and I've lived here since 1963," said Eric Orff, a retired wildlife biologist for the state of New Hampshire who lives in Epsom. "It's kind of bizarre." Orff, who now serves on New Hampshire's Fish and Game Commission, has a personal interest in wildlife as well: He comes from a long line of New England hunters and anglers.

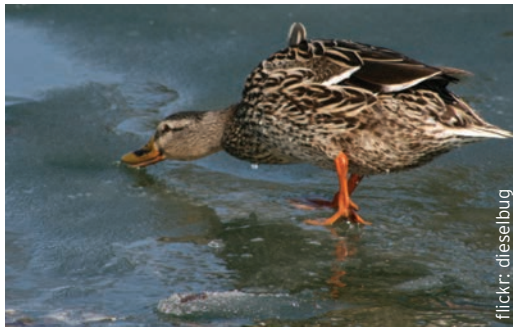
The most obvious impact of what he calls "a winter without a winter" is the lack of ice cover on rivers, ponds, lakes and bays in much of the state. In mid-February, he drove around Great Bay—a large tidal basin on the border between New Hampshire and Maine. For the first time in history, the bay didn't freeze over. "I've never seen such a thing—no snow on the coast, no ice anywhere."

The warm weather kept waterfowl from migrating to the bay, resulting in a poor hunting season. It also devastated ice fishing in the Granite State—bad news for smelt-loving anglers like Orff, and terrible news for the businesses that depend on these outdoor recreationists. When you add this to the challenging conditions for both skiers and snowmobilers in New Hampshire, "it has severe economic impacts to the state," said Orff. Among those impacts: The Fish and Game Commission's income is off nearly \$1 million because of a decline in snowmobile registrations, Orff said.

"One winter doesn't make a trend, but if you look back on the last decade, we've had more mild winters than we ever had," he said. "Some claim it's a natural occurrence, but they're ignoring the fact that atmospheric carbon dioxide levels are higher than at any time in the past 800,000 years. After this winter, the alarm should be sent out."

New Hampshire's outdoor traditions are being threatened by climate change, Orff believes. "I spent three decades restoring fish and wildlife to New Hampshire, and I don't want to see the progress we made reversed. Climate change is a subject I'm passionate about—and I'm trying to get hunters on board."





Waterfowl Hunting

There was no shortage of waterfowl in North America this fall and winter; the latest annual survey by the U.S. Fish and Wildlife Service estimated the breeding duck population at 45.6 million, well above its long-term average.²⁷ The problem for many duck and geese hunters this year was that the unusually warm temperatures kept many flocks from migrating until late in the season—or not at all.

In central Illinois, for example, more than 450,000 ducks were counted in an early January survey—nearly three times the average at that time of year. Officials noted that the mild winter weather led many ducks to remain in the state all winter, rather than flying south. Conversely, Canada goose migration to this area was paltry, peaking at only 5,050 on February 2, nearly 90 percent below the average for the period—and by far the lowest on record.²⁸

In Colorado, frustrated waterfowl hunters waited in vain for birds to fly into their decoy spreads. "There are two main things that the weather has hurt us on," Jim Gammonly, waterfowl biologist for Colorado Parks and Wildlife, told *The Denver Post* in late January. "One is that even as late as a couple of weeks ago, there were still tens of thousands of Canada geese and ducks—mainly mallards—well north of us. The other is the weather here. We haven't had a lot of cold weather, so even if we had a lot of birds around, they'd be harder to get to because there are so many places

for them to get away from the gun."²⁹

For North Carolina duck hunter Richard Mode, it was a season of frustration. The long-time sportsman normally heads out on the Catawba River in his canoe more than a dozen times a year to hunt local wood ducks and migratory mallards, but with the warm weather this winter, the mallards just weren't there. A planned trip to a friend's hunting cabin in Maryland in February might have made up for the disappointing harvest in his home state, but the trip was called off. "In the second week of February, he called and said, 'Don't come, there's no birds—they're still doing the backstroke in Canada,'" Mode recalled.³⁰

New Hampshire sportsman Eric Orff also reported a poor waterfowl hunting season in his area. In a normal year, cold weather freezes over lakes and ponds in Canada and New England, driving birds to the New Hampshire coast. But this year, the freeze-over didn't happen, and the mallards, black ducks and Canada geese stayed put. "The waterfowl season didn't materialize because the ducks didn't come as they normally do," he said.³¹

It wasn't the first bad season for waterfowl hunters, nor will it be the last. Researchers say there are noticeable changes occurring in migratory behavior as winters become shorter and warmer. EBird, a joint

project of the Cornell Laboratory of Ornithology and the National Audubon Society, uses information provided by bird watchers worldwide to understand changes in avian populations and movements. "One trend we are noticing... is that waterfowl seem to be wintering farther and farther north," Marshall Iliiff, the project's leader, told *The Syracuse Post-Standard* in January.³²

One of many states likely to see reduced duck hunting opportunities as a result of these trends is Arkansas. Seven years ago, when James Bednarz first read of such a possibility in a newspaper, he was skeptical, so Bednarz, a professor of wildlife ecology at Arkansas State University in Jonesboro, decided to study it. He and his colleagues examined 50 years' worth of waterfowl survey data, bird counts, crop production figures, weather statistics and duck hunting success figures. After thoroughly analyzing the data, Bednarz is certain that climate change is causing fewer ducks to migrate south for the winter.

"The analysis definitely demonstrates that change is happening right now," Bednarz said. "If [climate change] continues, waterfowl hunting in places where we've traditionally done it will seriously diminish. I think it will be a big cost to our heritage and our wildlife."³³



Sportsman in Focus:

G. RICHARD MODE

In a normal winter, Richard Mode would be out on North Carolina's Catawba River with his son a dozen or more times duck hunting, and he'd bring back 30 or more birds. This year he got two, both local wood ducks. "We didn't hunt much—the birds just weren't there," said Mode, 63, who lives near the upper stretches of the river in Morganton. "It was frustrating—not because we didn't harvest the birds, but because we didn't see them."



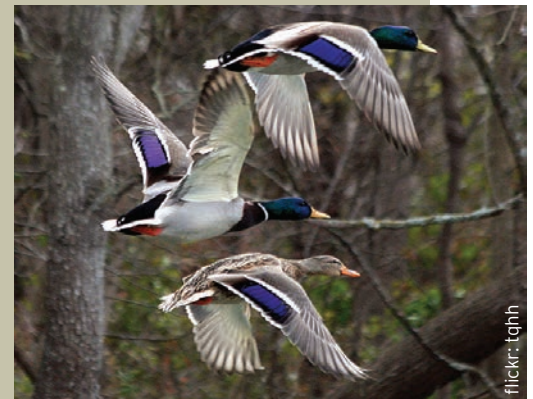
Mode has float-hunted on the Catawba River for four decades, and few things bring him greater enjoyment. "I love to be on the river, I love to see the ducks and all the other river birds and wildlife that comes with a float trip. This year was quite a disappointment."

Mode said this winter's mild weather isn't simply an anomaly, it's part of a trend. "Winters have definitely gotten warmer, and that has impacted waterfowl migration. Even though I enjoy the lower heating bill, I know these changes in migratory bird patterns mean there are less opportunities for sportsmen."

The scarcity of ducks and the warm weather have allowed Mode to get out trout fishing every month, but he's been unable to take too much pleasure in that fact. He knows the trout he and other North Carolinians prize rely on cold water to thrive. "We see stream temperatures warming—it doesn't bode well for our trout fisheries."

Mode has two young granddaughters, and another grandchild on the way, and he wonders what the future holds for them. "North Carolina has wonderful outdoor resources and traditions, and I'd like to share those with my granddaughters—but I don't think they'll have the same opportunities that I've had. I hope I'm wrong."

To Mode, both the culprit and the solution are clear. "I believe that a major cause of climate change is carbon pollution. We need a new energy policy that changes the way we produce and use energy in this country to reduce the amount of carbon we're putting in the atmosphere, to save wildlife and habitats from the consequences of climate change."



flickr: tqjhh

Snowshoe Hare Hunting

For game species that don't migrate with the seasons, the challenges posed by climate change are very different. Animals that depend on consistent snow cover during the winter for camouflage, for example, are being left dangerously exposed by milder, less snowy years. Among these creatures are snowshoe hares.

These reclusive animals, named for the large feet that help them navigate deep snow, hide from their predators in part by matching their surroundings. In warm months, their coat is a rusty brown color, allowing them to blend in with the undergrowth and dirt in their forest and swamp habitats. When the days get shorter, the hares grow a coat of white guard hairs so that they're tough to spot in the snow.

The problem for hares in recent years is that the snows are coming later and melting sooner. With their white coats against a dark background, they are glaringly exposed to lynx, coyotes, foxes, eagles, owls and other predators. This may be leading to higher mortality

and could pose a threat to some hare populations. Research by University of Montana researcher Scott Mills indicates that spring and fall are the deadliest seasons for hares. "I'm speculating that the reason they are dying more in the spring and fall is because of the mismatch of colors," Mills said.³⁴

Fewer hares mean fewer opportunities for hare hunters. In Pennsylvania, where hares are found mostly in isolated forests and shrubby swamps in northern parts of the state, officials have listed the snowshoe hare as a species of special concern. A 2005 study for the state's game commission noted that climate change "...could have significant effects on the viability of snowshoe hares in Pennsylvania." "Global warming has already reduced winter severity in Pennsylvania (e.g., currently lakes are ice-covered for about 2 weeks less each winter)," the study said. "With milder winters will come less snow cover, which puts snowshoe hares at greater risk of predation because of their white pelage in winter."³⁵



The study noted another troublesome impact of climate change: warmer weather and less severe winters are aiding the spread of pest insects. One of these pests, the hemlock woolly adelgid, "...could result in the total loss of the primary species providing conifer cover in Pennsylvania, and has potential consequences for snowshoe hares because they are associated with mixed conifer-deciduous forests," according to the study. "Especially in the Poconos, loss of hemlocks could result in degradation of existing habitats used by snowshoe hares."³⁶

Pennsylvania's hare harvest has been declining for years, along with the number of hare hunters. Ed Zygmunt is one of those who has given up hunting the fleet-footed animals. "When I first started hunting—even in the lower elevations of Pennsylvania—snowshoe hares were fairly abundant. You could go out during the hunting season confident you would see one or two or three," Zygmunt said. "In those same areas today, you won't even find a snowshoe track. They just don't exist in those areas. To me, that's the glaring example of the impact of climate change on wildlife."³⁷

Although hare populations farther north are not currently in jeopardy, hunters should be concerned about the possibility that the animal's numbers might drop if winters continue to be shorter and less snowy. "Hares are important because they are prey for almost everything in the forest that eats meat," Mills said. "Without hares, the ecosystem unravels."³⁸



Sportsman in Focus:

ED ZYGMUNT

Ed Zygmunt is the son and grandson of avid sportsmen, and the 59-year-old resident of Laceyville, Pennsylvania has hunted and fished “since I was knee-high to a grasshopper,” he said. One of his most treasured winter rituals is ice fishing with family and friends—a ritual that warm weather interrupted this year.

Another winter ritual that Zygmunt keenly misses is snowshoe hare hunting. In more than four decades of hunting, Zygmunt estimates he bagged more than 100 of the fleet-footed animals—both with the help of beagles and by stalking the hares through swampy underbrush on his own. But as the winters passed, he noticed a troubling trend. “When I first started hunting, snowshoe hare were fairly abundant—even in the lower elevations of Pennsylvania. You could go out during the hunting season confident you would see one or two or three. In those same areas today, you won’t even find a snowshoe hare track. They just don’t exist.”

Snowshoe hare populations in Pennsylvania have declined to the point that the animal is now listed as a species of special concern in the state. One of the key reasons for that decline is climate change. “It’s like the straw that breaks the camel’s back,” Zygmunt said. “Loss of habitat, change in the habitat, an increase in the predator population—all those come into play. When you throw in climate change—then you have a collapse in the population. That’s what I’ve witnessed in my lifetime.”

Although Pennsylvania still allows hare hunting, Zygmunt said he gave up this cherished winter tradition a few years ago. “I just don’t feel right shooting hare, knowing that the populations are hurting. I just can’t do it anymore.”

Zygmunt is concerned about how diminished hunting and fishing opportunities will affect his grandchildren and generations beyond. “If they don’t see wildlife, can’t catch fish—they’re not going to be as passionate as I was when I was younger. If young people don’t care about wildlife, they’ll be less motivated to protect wildlife and the environment. It’s critical we keep those traditions going so they can take up the cause when old-timers like me are gone.”





flickr: Ashlie Dove

Trout Fishing

Less snow equals more problems for another group of creatures prized by American sportsmen and sportswomen: trout. A healthy winter snowpack is vital because as it melts it provides a steady source of water for rivers and streams during warm months, and it also helps to keep water temperatures from getting too high for the cold-water-adapted fish.

Through the end of February, snow cover across the contiguous United States was 237,000 square miles below average—the third smallest coverage in the past 46 years.³⁹ Snowpacks were particularly low in the Sierra Nevadas, the Great Basin and parts of the Southern Rockies—places where the chilly runoff from snow is especially crucial for trout in warmer months.

In Colorado, the weather was so warm in February that fly fishermen were out casting on the Colorado River. But, with the snowpack in the Colorado River basin at only about 60 percent of its normal level, they worried what the summer would bring. “If warm weather prevails, Colorado could be looking at another year similar to 2002, when severe drought and a lack of moisture created warm water and high stress for the river’s fish ecology,” reporter Tom Boyd wrote in *The Denver Post*.⁴⁰

When fish are stressed by warm water, they are more susceptible to disease, explained Todd Malmsbury, a former biologist with the Colorado Division of Wildlife. To avoid further jeopardizing the fish in such

conditions, the state in past years has temporarily shut down trout fishing in some areas.⁴¹

In neighboring New Mexico, anglers are concerned about the status of the native Rio Grande cutthroat trout. The fish is currently a candidate for listing under the Endangered Species Act, and its numbers are declining. The cutthroat need clear, cold water, and in the past they were found only at elevations of between 7,500 feet and 8,000 feet. But as winter snowpacks melt earlier, the fish have been forced to shift their habitat upstream to between 8,250 feet and 10,750 feet, where pools are shallower and subject to freezing.

A long-term drought, wildfires, non-native species and other threats are pushing the cutthroat and other New Mexican trout species to the brink. “If we have a poor snowpack, it has a direct impact on the fish,” said Garrett VeneKlasen, an angler, fishing guide and field coordinator for Trout Unlimited. “If we have another year like last year, we would lose a lot of our Rio Grande cutthroat. We’re very concerned about the future of our native fish because of climate change.”⁴³

In Montana’s Bitterroot Mountains, the winter snowpack was about average this year, reported Missoula angler and biologist Bill Geer—leaving him hopeful that he’ll have a good season fly fishing for trout on his favorite trout stream, Lolo Creek. But

based on his knowledge of fish and his analysis of stream flow, temperature and weather data, he figures the good times won’t last. “I know in my heart it’s not going to be a long-term thing,” he said.⁴⁴

Several scientific studies have confirmed this dim prognosis and clearly linked it to carbon pollution. A 2008 study using 50 years of data found that mountains in the West are getting less snow, that snowpacks are melting faster, and that more rivers are drying up in the summer. The researchers looked at several possible causes of this trend and concluded that climate change was the best explanation.⁴⁵ In a paper published last year, scientists used tree rings to reconstruct 800 years of western snowpack history and found that the past 50 years of decline are both unusual and due largely to global warming.⁴⁶

The implications for anglers are grim. A consortium of outdoor sporting groups predicted that as much as 42 percent of current trout and salmon habitat in the United States will be lost before the end of the century, with the South, Southwest and Northeast experiencing especially severe reductions. In some regions, trout and salmon populations could be slashed by 50 percent or more.⁴⁷ Another study projects that trout habitat in New Mexico could disappear as river water temperatures increase.⁴⁸



flickr: CircumerrroStock

Sportsman in Focus:

BILL GEER



Four kinds of trout live in the clear, cool waters of Lolo Creek, which flows out of the Bitterroot Mountains near Missoula, Montana. Bill Geer and his wife live less than half a mile from the creek, and he takes every opportunity he can to fish there.

Geer, a wildlife biologist, has been fishing the creek regularly since he first came to Missoula as a college student in 1970. In the past decade, though, he's noticed a disturbing trend: With warmer temperatures and shorter, less snowy winters, he's catching fewer fish. "A good snowpack means there's enough water for the trout. But now there's not enough snow," he said. "My little fishing stream isn't such a Shangri-La anymore—it's breaking my heart."

Geer points out that this is happening elsewhere in the West. On the Yellowstone River in southern Montana, on the White River in Colorado, and elsewhere, stream flows are declining as winter snowpacks are decreasing. "When flow trends go downhill, that doesn't signal a good future for trout. It's getting too warm for them."

As sad as this makes him, he's more worried about the impacts on his six grandchildren, several of whom also hunt and fish. "It concerns me that they're going to be losing some of the great outdoor opportunities that I had."

It's not just fishing opportunities that Geer sees going downhill. He goes elk hunting every fall with a friend, and they've noticed that their success is declining. Traditionally, elk migrate out of their high-altitude habitat in the fall, when cold weather and snow drive the animals to lower elevations. "Now with winter coming later, and being warmer, the elk are staying higher longer. They aren't coming down until the end of the hunting season, or after the season has ended. For a hunter, you're not happy about that."

Geer, who directs climate change initiatives for the Theodore Roosevelt Conservation Partnership, said there's no question that carbon pollution is behind these trends. For people who doubt whether climate change is real, he suggests paying less attention to public polls on the issue and more attention to wildlife. "If you want to know what's happening, look at what's happening to the critters. Look at Colorado's elk or Yellowstone's cutthroat. They're telling us a story."

Conclusion

The 2011-2012 “winter that wasn’t” in North America is an indication of our future. As we continue to spew carbon pollution into the atmosphere, we are exacerbating global warming and ensuring that cold, snowy winters will become less frequent.

For those who care about time-honored traditions of hunting and angling, the decline of winter should be a subject of deep concern. The loss of ice fishing, waterfowl hunting, moose and snowshoe hare hunting and fly fishing would diminish the outdoor recreational opportunities of Americans. In addition, it would be a major blow to the local and regional economies that depend on these activities. America’s 1.3 million waterfowl hunters, for example, spent a total of \$900 million on their sport in 2006 (the latest year for which data are available), helping support more than 27,000 jobs and generating nearly \$154 million in state tax revenue.⁴⁹ For their part, ice fishers spent more than \$100 million on equipment alone in 2006.⁵⁰



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Fortunately, there are things that sportsmen and sportswomen can do to help protect these culturally and economically crucial traditions. Most immediately, they can speak up in support of the Environmental Protection Agency’s proposed rules to establish new limits on carbon pollution from power plants.

New rules will use the Clean Air Act to tackle the nation’s biggest source of air pollution that causes climate change: coal-burning power plants. Currently, our nation’s power plants can belch carbon dioxide pollution into

our air without any limits. They collectively spew a staggering 2.4 billion tons of carbon dioxide into the air each year. Taken together, the emissions from coal-fired electricity-generating facilities are the largest single industrial source of carbon pollution in the United States.⁵¹

Hunters and anglers who care about preserving outdoor recreational opportunities in the winter—and all seasons—for future generations of Americans need to add their voices to those of other conservationists in support of setting strong air pollution standards that reduce carbon pollution.

Reducing carbon pollution will not only help safeguard wildlife and habitats from the harmful impacts of global warming, but it will protect the health of millions of Americans and preserve the thousands of jobs that depend, directly and indirectly, on hunting and angling.

The extremely mild weather this winter is sending us a message that we can’t afford to ignore.

To learn more about the issue and find out how to get involved, please visit WWW.NWF.ORG/CLEANAIR



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Endnotes

- ¹ NOAA National Climatic Data Center, 2012. State of the Climate: U.S. Climate Report for February and Winter, available at <http://www.ncdc.noaa.gov/sotc/> (accessed March 11, 2012).
- ² NOAA National Climatic Data Center, 2012. State of the Climate: National Overview for January 2012, available at <http://www.ncdc.noaa.gov/sotc/national/2012/1> (accessed February 24, 2011).
- ³ Goddard Institute for Space Studies, 2010. GISS Surface Temperature Analysis, available at <http://data.giss.nasa.gov/gistemp/maps/> (accessed March 10, 2012).
- ⁴ U.S. Global Change Research Program, 2009. Global Climate Change Impacts in the United States, T.R. Karl, J.M. Melillo, and T.C. Peterson, (eds.). Cambridge University Press, 191 pp.
- ⁵ The National Snow and Ice Data Center, 2010. Northern Hemisphere Snow: State of the Cryosphere, available at http://nsidc.org/sotc/snow_extent.html (accessed March 4, 2012).
- ⁶ Frumhoff, P.C., et al., 2007. *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions. Synthesis Report of the Northeast Climate Impacts Assessment* (Cambridge, Mass: Union of Concerned Scientists).
- ⁷ Walsh, B., January 9, 2012. "The Year that Winter Forgot: Is it Climate Change?" *Time*, available at www.time.com/time/health/article/0,8599,2104040,00.html (accessed February 25, 2012).
- ⁸ Ed Zygumt, personal communication, February 24, 2012.
- ⁹ Ibid.
- ¹⁰ NOAA National Climatic Data Center, 2012. State of the Climate: U.S. Climate Report for February and Winter.
- ¹¹ Brenda Archambo, personal communication, February 17, 2012.
- ¹² Smith, C., January 12, 2012. "Michigan Ice Fishing 'Just Not Safe'." *The Daily News* (Greenville, Mich.), available at <http://thedailynews.cc/2012/01/12/slideshow-michigan-ice-fishing-%E2%80%98just-not-safe%E2%80%99/> (accessed February 20, 2012).
- ¹³ WWTV/WWUP-TV 9&10 News. "Onekama Winterfest Cancelled." Available at <http://www.9and10news.com/video?clipId=6622936&autostart=true> (accessed February 20, 2012).
- ¹⁴ Hometownlife.com, January 23, 2012. "Kensington's Winter Bliss Festival Cancelled." Available at <http://www.hometownlife.com/article/20120123/NEWS11/120123009/Kensington-s-Winter-Bliss-Festival-cancelled> (accessed February 17, 2012).
- ¹⁵ The Mackinaw Mush, 2012. "2012 Mackinaw Mush Annual Sled Dog Race." Available at <http://www.mackinawmush.com/> (accessed February 18, 2012).
- ¹⁶ Bienkowski, B., January 10, 2012. "No Snow, No Ice Means No Business for Some." *The Great Lakes Echo*, available at <http://greatlakesecho.org/2012/01/10/no-snow-no-ice-means-no-business-for-some/> (accessed February 19, 2012).
- ¹⁷ Eric Orff, personal communication, February 22, 2012.
- ¹⁸ Msnbc.com, March 10, 2012. "Great Lakes Ice Coverage Falls 71 Percent Over 40 Years, Researcher Says." Available at http://usnews.msnbc.msn.com/_news/2012/03/10/10636825-great-lakes-ice-coverage-falls-71-percent-over-40-years-researcher-says (accessed March 12, 2012).
- ¹⁹ Yauck, J., January 3, 2010. "Great Lakes Ice Rhythms." *The Bay View Compass* (Milwaukee, Wisc.), available at <http://bayviewcompass.com/archives/2708> (accessed February 20, 2012).
- ²⁰ McIntosh, D., January 18, 2012. "Lack of Ice Could Mean Drop in Lake Levels." *The Harbor Light* (Harbor Springs, Mich.), available at <http://www.harborlightnews.com/atf.php?sid=13893> (accessed February 20, 2012).
- ²¹ Hall, N.D. and Stuntz, B.B., November 2007. *Climate Change and Great Lakes Water Resources*. National Wildlife Federation.
- ²² Wolff, F., June 17, 2012. "New Hampshire: Shorter Winters Mean More Ticks, Pose Big Threat to Moose." U.S. Fish and Wildlife Service *Open Spaces* blog, available at <http://www.fws.gov/news/blog/index.cfm/2011/6/17/New-Hampshire-Shorter-Winters-Mean-More-Ticks-Pose-Big-Threat-to-Moose> (accessed February 29, 2012).
- ²³ Ibid.
- ²⁴ Ibid.
- ²⁵ Eric Orff, personal communication.
- ²⁶ Karkos, T., December 2, 2011. "Woodsmen, Butchers Say Maine Moose, Deer Crawling with Ticks." *The Bangor Daily News*, available at <http://bangordailynews.com/2011/12/02/outdoors/woodsmen-butchers-say-maine-moose-deer-crawling-with-ticks/> (accessed February 28, 2012).
- ²⁷ Flyways.us, 2011. 2011 Breeding Duck Population Estimates. Available at <http://www.flyways.us/status-of-waterfowl/population-estimates/2011-breeding-duck-population-estimates> (accessed March 3, 2012).
- ²⁸ Armstrong, J., March 1, 2012. "IDNR Waterfowl Biologist Discusses Warm Winter's Effect on Wildlife." *The State Journal-Register* (Springfield, Ill.), available at <http://www.sj-r.com/blogs/community/sangamoweather/x1413596636/Does-the-Warm-Winter-Weather-Affect-Wildlife-Answers-from-IDNRs-State-Waterfowl-Biologist> (accessed March 3, 2012).
- ²⁹ Willoughby, S., January 25, 2012. "Warm Winter has Colorado Hunters Frustrated by Scarcity of Ducks and Geese." *The Denver Post*, available at http://www.denverpost.com/huntnfish/ci_19814927#ixzz1o128WU00 (accessed on March 1, 2012).
- ³⁰ G. Richard Mode, personal communication, February 28, 2012.
- ³¹ Eric Orff, personal communication.
- ³² Figura, D., February 3, 2012. "Where are the Birds? Unseasonably Warm Winter Impacts Local Bird Watching Scene." *The Post-Standard* (Syracuse, N.Y.), available at <http://blog.syracuse.com/outdoors//print.html> (accessed on February 28, 2012).
- ³³ Shelton, S., June 23, 2011. "Arkansas: Warming Trends Changing the Hunt for Waterfowl." U.S. Fish and Wildlife Service *Open Spaces* blog, available at <http://www.fws.gov/news/blog/index.cfm/2011/6/23/Arkansas-Warming-Trends-Changing-the-Hunt-for-Waterfowl> (accessed February 27, 2012).
- ³⁴ Science Daily, February 24, 2009. "Climate Change Hurting Hares: White Snowshoe Hares Can't Hide On Brown Earth." Available at <http://www.sciencedaily.com/releases/2009/02/090224220347.htm> (accessed February 25, 2012).
- ³⁵ Diefenbach, D.R., et al., 2005. *Distribution and Coarse-Scale Habitat Association of Snowshoe Hares in Pennsylvania* (Harrisburg, Penn.: Pennsylvania Game Commission). Available at <http://sfr.psu.edu/research/pacfwru/reports/snowshoe-hares> (accessed February 24, 2012).
- ³⁶ Ibid.
- ³⁷ Ed Zygumt, personal communication.
- ³⁸ Science Daily, 2009.
- ³⁹ NOAA National Climatic Data Center, 2012. State of the Climate: U.S. Climate Report for February and Winter.
- ⁴⁰ Boyd, T., February 29, 2012. "February's Midsummer Feel Hooks Fly-Fishermen." *The Denver Post*, available at http://www.denverpost.com/outdoors/ci_20064392#ixzz1oCtuzhnd (accessed March 2, 2012).
- ⁴¹ Todd Malmbsbury, personal communication, March 2, 2012.
- ⁴² Gay, J., 2009. "Rio Grande Cutthroat Especially Threatened by Climate Change." New Mexico Wildlife Federation's *Outdoor Reporter*, available at www.nmwildlife.org/images/uploads/NMWF_Winter2009.pdf (accessed March 3, 2012).
- ⁴³ Garrett VeneKlasen, personal communication, March 5, 2012.
- ⁴⁴ Bill Geer, personal communication, March 5, 2012.
- ⁴⁵ Kaufman, M., February 1, 2008. "Decline in Snowpack Is Blamed on Warming." *The Washington Post*, available at <http://www.washingtonpost.com/wp-dyn/content/article/2008/01/31/AR2008013101868.html> (accessed March 3, 2012).
- ⁴⁶ Columbia Basin Fish and Wildlife News Bulletin, June 10, 2011. "Study: Unprecedented Snowpack Losses In West Last 50 Years May Signal Fundamental Shift." Available at <http://www.cbbulletin.com/409744.aspx> (accessed March 3, 2012).
- ⁴⁷ Bipartisan Policy Center. "Freshwater Fish: The Issue in Brief," in *Season's End: Global Warming's Threat to Hunting and Fishing*, available at http://www.seasonsends.org/freshwater_fish.shtml (accessed March 3, 2012).
- ⁴⁸ Staudt, A., 2009. "New Mexico Getting Drier, Warmer as Climate Changes." New Mexico Wildlife Federation's *Outdoor Reporter*, available at www.nmwildlife.org/images/uploads/NMWF_Winter2009.pdf (accessed March 3, 2012).
- ⁴⁹ Carver, E., November 2008. *Economic Impact of Waterfowl Hunting in the United States: Addendum to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation*, U.S. Fish and Wildlife Service.
- ⁵⁰ Staudt, A., et al., 2010. *Odd-ball Winter Weather: Global Warming's Wake-Up Call for the Northern United States*, National Wildlife Federation.
- ⁵¹ Nordhaus, W.D., October 27, 2010. "Energy: Friend or Enemy?" *The New York Review of Books*, available at <http://www.nybooks.com/articles/archives/2011/oct/27/energy-friend-or-enemy/> (accessed March 2, 2012).



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