America's Hottest Species

Ten Endangered Wildlife, Fish & Plants
Impacted by Climate Change











ENDANGERED SPECIES COALITION

About the Report

This year, our *America's Hottest Species* report focuses on wildlife, fish, birds and plants on the U.S. list of threatened and endangered species that are particularly imperiled by global warming. The vast majority of these species were "listed" due to other causes. Only the polar bear and two corals have been listed as a result of the threat of global warming. However, scientists are increasingly seeing that climate change is like a bulldozer shoving species, already on the brink of extinction, perilously closer to the edge of existence.

A definitive list on the ten most impacted species is impossible, given the number of species feeling the heat from global warming. Therefore, the species included here are meant as ambassadors, representing the kinds of threats that many endangered species face across the nation. And listed species aren't the only ones in jeopardy. Climate change is dangerous to a host of other species. The Pacific walrus, the Pika, the Wolverine, the Boreal toad, Mason's skypilot, and the Bearded, Ringed and Spotted seals are all increasingly losing ground, quite literally, due to climate change. These species, and many others, are going to need significant help to survive.

This report presents a snapshot of the ways in which global warming is harming our treasured species. It was created in collaboration with our incredibly effective member groups. And numerous individuals in the scientific community guided us in selecting which species to highlight. In addition, thousands of our individual activists had the opportunity to get involved and vote for the species they were most concerned about. The Activist's Choice is presented at the end of the report.

Acknowledgments

This report has truly been a group effort. Outstanding profiles about the species and the work of member groups to protect them were contributed by Paige Bonaker and Josh Pollock from the Center for Native Ecosystems, Marydele Donnelly from the Caribbean Conservation Corporation, Noah Greenwald and Miyoko Sakashita from the Center for Biological Diversity, Anne Law and George Wallace from the American Bird Conservancy, Jonathan Proctor and David Gaillard from Defenders of Wildlife, Rob Roberts from Trout Unlimited, and Glen Spain from the Pacific Coast Federation of Fisherman's Associations. Greg Butcher from the National Audubon Society, Elizabeth Griffin from Oceana, Anders Rhodin from the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group, and Eric Goode and Peter Praschag from the Behler Chelonian Center all provided us with guidance and information on species and the impacts that they face.

Anne Law from the American Bird Conservancy and Gilly Lyons from Save Our Wild Salmon assisted us in securing beautiful photographs for the report. A number of photographers very kindly donated their striking images either directly or by making them available to the public domain, including Guillaume Feuillet, Brandon Cole, Jack Jeffrey, Michael Graziano, Dave Bickford, Terry Tollefsbol, Welby Smith, and Carmen Converse.

The report was expertly guided and created by our Policy Director, Jon Hunter. Our Executive Assistant, Greg Kuether, contributed superb species profiles. Our intern Sophie Mason pulled together some initial research. And Jan Randall, our Board Member and Professor Emeritus of Biology at San Francisco State University prepared materials for us on the threats from climate change to wildlife which we drew upon for our introduction.

This generous gift of time, expertise and work by dozens of committed individuals throughout the country heartens us and gives us hope that no matter what obstacles we face, together we'll be able to help buffer species from the worst impacts of climate change.

December 2009

Cover Credits: Akikiki: Jack Jeffrey; Elkhorn Coral: NOAA; Bull Trout: Dave Beckford; Canada Lynx: Colorado DOW; Pacific Salmon: Brandon Cole; Grizzly Bear: Terry Tollefsbol; Leatherback Sea Turtle: Guillaume Feuillet/ www.kwata.net; Bog Turtle: NC Wildlife Resources Commission; Western Prairie Fringed Orchid: Minnesota DNR; Flatwoods Salamander: Michael Graziano; Polar Bear: USFWS.

Leda Huta
Executive Director

Introduction

Global warming is not on its way. It is not making a pit stop at the trucker's outpost up the highway. It is not rounding the corner into the neighborhood. It isn't even knocking at the front door. It is here. It is in the living room, having a boiling pot of tea. And we need to decide just how much we're going to protect ourselves from getting scalded *today*.

While some of us are just beginning to feel the heat, others, such as low-lying communities, are already dangerously impacted. The same holds true for wildlife. For millions of years, species have adapted to each other and to the cycles of nature. Global warming introduces chaos into what has previously functioned like a finely tuned orchestra. It changes where species live, what is available for them to eat, and the makeup of their habitats. While all wildlife is experiencing the changes, some are particularly vulnerable. Endangered species, already on the brink of extinction, can scarcely afford another threat.

Spring is the most important time of renewal—when buds burst, plants bloom, insects wake from their dormancy, and animals pair off producing young. The timing and locations need to be just right for plants to be pollinated, seeds to be dispersed, and food to be available for animals waking from their hibernation or migrating from their wintering habitats or growing from their larval stages into adults. Yet, spring is arriving earlier in every ocean and on every major continent save one. Global warming is disrupting nature's timing and the life cycles of animals, birds, fish and plants suddenly do not synch.

Global warming is also causing species to shift further north or upslope. It spreads disease farther. It causes areas to become too wet or too dry. It increases the frequency of wildfires. And, it simply makes the world too hot. Global warming replaces nature's essential harmony and rhythms with a disastrous cacophony.

And the death toll is rising. Several populations of a small mountain rabbit, the Pika, appear to have gone extinct, in search of higher ground. Approximately 4,000 young walruses were recently trampled to death because, with less sea ice available to them, they were forced to mass together on land. More than 200 whales and dolphins beached themselves in Tasmania possibly because changing ocean currents are moving food sources closer to shore. Gray whales with bony shoulder blades and protruding ribs are starving to death as their food supplies crash. Hundreds of Magellanic (Patagonian) penguins recently showed up dead or dying on the shores of Brazil, probably in search of food that is likely no longer where it used to be. Hundreds of puffins starved to death in the North Sea as their food disappeared. Ancient forest trees—pines, firs, and hemlocks—across the West have died. And so the catastrophes have begun.

According to the Intergovernmental Panel on Climate Change (IPCC), 20 to 30 percent of the world's species will be at an increased risk of extinction if global temperature rises above 1.5 to 2.5° C above pre-industrial levels. Driving this many species to extinction will result in a planet that has lost its beautiful diversity and many of the benefits that nature provides. While some of us may throw our hands up in hopelessness at this news, there is a much better response—working for change. Our political leaders finally appear to be on the cusp of taking serious action to prevent the worst impacts of climate change. But, they won't succeed without an outpouring of support from Americans for strong climate change legislation and strong international agreements. Our policy recommendations at the end of this report describe the priority areas we are concerned about. Please make your own voice heard.

Kaua`i Creeper or `Akikiki

Oreomystis bairdi

At a Glance

Hawaiian honeycreepers are related to finches and entirely restricted to the Hawaiian Islands. At least 59 species originally occurred, but, with human settlement, first by Polynesians and later by Europeans, came multiple introductions of exotic species that have caused the extinction of most honeycreeper species. Only 17 types remain today.

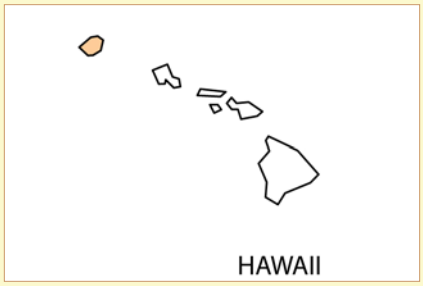
Range: Perhaps as little as 14 square miles mostly within the the Alaka`i Wilderness Preserve in northwestern Kaua`i.

Habitat Type: Mesic to wet montane forest.

Primary Diet: Insects, insect larvae, and other arthropods taken from bark, crevices, dead wood, and epiphytes by gleaning, probing, and rarely by excavation.

Estimated Population: Approximately 1,300 individuals.

States with Current Habitat



Partner Organization

AMERICAN BIRD CONSERVANCY

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The `Akikiki is a small honeycreeper endemic to the island of Kaua`i in the Hawaiian Islands where it is vulnerable to a wide range of threats. Like many birds that have evolved on isolated oceanic islands in the absence of mammalian predators, honeycreepers, including the `Akikiki, are highly vulnerable to rats and cats that prey on adults, chicks, and eggs. Exotic herbivores such as pigs, cattle, sheep, and goats degrade their natural habitat, and exotic plants out compete native plants resulting in additional habitat degradation and the loss of food plants and insects with which they co-evolved. In 1826, mosquitoes were introduced to the Hawaiian Islands, and multiple introductions of exotic bird species brought two serious avian diseases, avian pox virus and avian malaria, to which the `Akikiki and other Hawaiian honeycreepers have no natural resistance.

Threats related to Global Warming

Avian malaria is a serious threat to the `Akikiki, and global warming could exacerbate that threat by eliminating nearly all areas where malaria transmission is currently temperature limited. Where mean ambient temperatures are between 55-63°F, malaria transmission is constrained, and below 55°F the malaria parasite will not develop in birds. All forested areas on Kaua`i are warm enough for some level of malaria transmission. However, an increase in temperature of slightly less than 4°F, which is predicted by some models, would raise the 63°F theshold by nearly 1000 feet, resulting in an 85% decrease in the area where transmission is currently limited.

Long-term solutions to limiting the spread of malaria on Kaua`i and other Hawaiian Islands include reducing global temperature rise and controlling malaria-spreading mosquitoes. However, since both of these are long-term solutions and the `Akikiki is at risk of extinction now, aggressive efforts are needed to reduce habitat degradation that can provide breeding opportunities for mosquitoes. Feral pigs create wallows and eat holes in tree fern trunks where water can collect and mosquitoes can breed. Fencing large blocks of montane forest habitat and removing feral pigs and other ungulates is an effective method of maintaining the integrity and quality of Hawai`i's native forests and reducing the prevalence of malaria.

American Bird Conservancy and Hawaiian bird expert, Dr. Eric VanderWerf, petitioned the U.S. Fish and Wildlife Service to list the `Akikiki under the Endangered Species Act. In response, the Service has proposed listing the species along with `Akeke`e, another imperiled honeycreeper endemic to Kaua`i facing similar threats. Listing the `Akikiki would provide federal protection of the species and its habitat, and provide funding support for recovery actions such as habitat restoration and protection.

Elkhorn Coral *Acropora palmata*

National Oceanic and Atmospheric Administration

Once the most abundant and important reef-building corals in Florida and the Caribbean, elkhorn corals have declined by more than 90 percent in many areas, mainly as a result of disease and "bleaching. "

Threats related to Global Warming

The rising temperature of the ocean as a result of global warming is the single greatest threat to this coral species, as well as coral reefs more generally worldwide. When corals are stressed by warm ocean temperatures, they experience bleaching — which means they expel the colorful algae upon which they rely for energy and growth. Many corals die or succumb to disease after bleaching.

Mass bleaching events have become much more frequent and severe as ocean temperatures have risen in recent decades. Scientists predict that most of the world's corals will be subjected to mass bleaching events at deadly frequencies within 20 years on our current emissions path.

A related threat, ocean acidification, caused by the ocean's absorption of carbon dioxide, impairs the ability of corals to build their protective skeletons. Scientists have predicted that most of the world's coral reefs will disappear by mid-century due to global warming and ocean acidification unless carbon dioxide pollution is rapidly reduced.

The Center for Biological Diversity is working to conserve elkhorn and other corals by leveraging the power of the Endangered Species Act to ensure that these vulnerable and magnificent coral reef ecosystems are protected. In direct response to the Center's work in 2006, elkhorn and staghorn corals, became the first, and to date only, coral species protected under the Endangered Species Act--marking the first time the U.S. government acknowledged global warming as a primary threat to the survival of a species.

In October 2009, the Center launched an effort to gain endangered listing for 83 additional corals.

At a Glance

Elkhorn coral were once one of the dominant reef building corals in Florida and the Caribbean. In just three decades, these corals have declined by up to 90 percent. Elkhorn corals are found in Southern Florida and throughout the Caribbean. Elkhorn corals live on shallow reefs and require clear and clean water within a limited temperature range.

Range: The tropical western Atlantic, including the Gulf of Mexico, southern Florida, Bahamas, Haiti, Puerto Rico, Jamaica, Cuba, Lesser Antilles, Panama, Belize and Nicaragua.

Habitat Type: Marine, typically 1 to 5 meters deep.

Estimated Population: 1000 - 2500 individuals.

States with Current Habitat

Partner Organization

CENTER for BIOLOGICAL DIVERSITY

Because life is good.

Bull Trout *Salvelinus confluentus*

At a Glance

Bull trout are members of the salmonidae family, but they are not true trout. Instead, they are char – a group which includes brook trout, lake trout and dolly varden. Bull trout exhibit two distinct life histories, or patterns of behavior. Migratory bull trout are larger fish that spend part of the year feeding in lakes and big rivers and then reproduce in smaller streams. Resident bull trout are smaller fish that spend their entire lives in the same stream or river where they were born.

Range: Northern Rockies, Northwest and Western Canada.

Habitat Type: Cold, clear water in mountains and larger coastal rivers.

Primary Diet: Mainly piscivorous (fish eating).

Estimated Population: Less than 500,000 remaining, mostly in isolated groups of less than 1,000 individuals.

States with Current Habitat

Partner Organization

TROUT UNLIMITED

© Dave Bickford

Bull trout require the coldest water of all species native to the Rocky Mountains (summer temps less than 58 degrees F and spawning temps less than 48 degrees) and are therefore a leading indicator species for aquatic ecosystem health within the Rocky Mountain region. They spawn in the fall and often migrate long distances to lay their eggs in loose, silt-free gravels. Both juveniles and adults are often found in or near deep pools and overhead cover such as logjams, boulders or undercut banks, where they find protection from predators in cool water temperatures.

Because of their dependency on cold, clean water and pristine habitat, bull trout have been largely extirpated from much of their historic range. The best bull trout habitat occurs within large watersheds that have cold, clean water. Especially important are unrestricted well-vegetated floodplains, meaning that stream channels have room to move and create new pools, side channels and other habitat features. Therefore, current bull trout strongholds are often within or downstream from protected wilderness and roadless areas, where dams, road building, grazing, logging and other landscape impacts are limited or nonexistent.

Threats related to Global Warming

As late summer flows are affected by global warming, fewer rivers will be able to provide ample cold water for bull trout. Bull trout distribution is also related to air temperature, so the heightened ambient air temperatures of the bull trout's habitat caused by global warming are reducing their survivable habitat. The warming climate also affects precipitation and timing in the Rockies, which is predominately driven by snowfall and snowmelt. The timing and duration of spring runoff could dramatically affect stream temperatures, habitat creation, and therefore the spawning activities of the bull trout.

Trout Unlimited is working to conserve, protect and restore bull trout habitat throughout their historic range. TU partners with state and federal agencies and private landowners on projects that include installing large trees and rootwads for overhead cover, fencing riparian corridors in agricultural areas to reduce sedimentation, removing fish passage barriers such as undersized or perched culverts, mine reclamation and improving irrigation practices to increase streamflows.

Canada Lynx *Lynx canadensis*

USFWS/Maine DIFW

Canada lynx numbers have declined throughout most of their range in the lower 48 states due to overtrapping as well as habitat loss and fragmentation from logging, fire suppression, road construction, recreational developments and urbanization. Other factors that have affected lynx numbers in the contiguous United States include highway mortalities, snow compaction from recreation, and genetic isolation from populations in Canada.

Today, lynx are listed as Threatened in all of the lower 48 states where they are known to occur. Their populations are especially vulnerable in Maine, Minnesota, Washington, and in Colorado, where they were recently reintroduced.

Threats related to Global Warming

Canada lynx are especially vulnerable to global warming. In order to maintain a competitive advantage over other predators, this species depends on high elevation habitat with cold, snowy winters. As temperatures rise with global warming, the snowpack and forests that lynx rely on are predicted to move upward in altitude and northward in latitude. As their habitat shifts upward in elevation, current lynx populations will likely become more isolated. Thus, protecting habitat at higher elevations as well as important corridors linking those areas is just as critical as protecting current Canada lynx habitat in order to ensure the long-term survival of the species.

Center for Native Ecosystems has long been a champion for lynx in the Southern Rockies region. The organization helped build public support for lynx reintroduction in the region, challenges high-impact development projects in lynx habitat that would irreversibly fragment or damage the habitat, and works to press the responsible state and federal agencies to adequately protect lynx habitat, especially in light of global warming.

Defenders of Wildlife has worked to restore the lynx throughout its range in the lower-48 states, by leading the efforts to list them as a Threatened species under the Endangered Species Act in 2000, and to secure the designation of more than 25 million acres of Critical Habitat for lynx from Maine to Washington state in 2009.

At a Glance

Canada lynx have large feet covered with thick fur that creates a natural snowshoe, allowing the cat to walk on top of deep, fluffy snow. This gives them an advantage over other predators, such as bobcats and coyotes, when hunting their main prey, the snowshoe hare.

Range: Northern Cascades, Northern and Southern Rockies, Greater Yellowstone Area, Northern Great Lakes, Northern New England, Alaska and Canada.

Habitat Type: High elevation spruce-fir forests with cold, snowy winters.

Primary Diet: Snowshoe hares and other small mammals.

Estimated Population: Unknown, but probably only about 1,000 lynx remain in the lower 48 states.

States with Current Habitat

Partner Organizations

Center for Native Ecosystems

DEFENDERS OF WILDLIFE

Pacific Salmon *Oncorhynchus*

At a Glance

This is actually a complex of seven (7) closely related species in the genus Oncorhynchus, including chinook or king salmon, coho or silver salmon, coastal sea-run cutthroat, steelhead, chum salmon, pink salmon, and sockeye salmon, collectively often referred to as "salmonids."

Range: Today they occupy the North American west coast only as far south as central to southern California, depending on the species, and have lost access to much of their historic habitat.

Habitat Type: Coastal waters, rivers and streams.

Primary Diet: Primarily aquatic insects as juveniles, but also smaller fish as maturing adults.

Estimated Population: Populations of these species are at less than 10% their historic abundance, and several sub-species are down to 1-2%.

States with Current Habitat

Partner Organization

institute for fisheries resources

PACIFIC COAST FEDERATION OF FISHERMEN'S ASSOCIATIONS
PCFFA
STEWARDS OF THE FISHERIES

© Brandon Cole

Salmon and steelhead are an important part of the food chains of at least 150 other species, including humans. As the healthy stream habitat for these species has been destroyed by human development or been blocked by dams, tens of thousands of fishing-dependent jobs have been lost, and subsistence fishing-dependent Native American communities have been threatened. Restoring these stocks not only makes good biological sense, but it would provide billions of dollars in economic benefits to these struggling coastal communities.

Each of these salmonid species is "anadromous," which means they lay their eggs in freshwater, their young (then called "smolts") gradually move downstream as they grow over several weeks to months where they adapt to salt water conditions in an estuary, and then they spend between 2-5 years in the oceans before returning upstream to lay their eggs in precisely the same river reach as they were hatched in. These fish can migrate many thousands of miles, against many obstacles, as they grow in the ocean to maturity and then migrate back to their natal streams to lay eggs and die. Each species has developed genetically and behaviorally distinct sub-species comprising different "runs," each evolved for the specific freshwater conditions in their natal streams, with different runs often returning at staggered times each year to take advantage of multiple habitat niches.

In 1992, the American Fisheries Society (AFS) identified 106 distinct Northwest salmonid runs as extinct, with another 214 runs in Northern California and the Pacific Northwest at varying degrees of risk of extinction in the near future.

Threats related to Global Warming

Salmonids are cold water fish which typically die when exposed for very long to freshwater temperatures above about 20º C. (72º F.) Global warming has pushed the average summer temperatures of many west coast river systems above that mortality threshold, killing many fish. Global climate change is also diminishing total river flows throughout the northwest and California, as well as changing the basic hydrology that these fish evolved with. In many areas their already limited range is likely to contract. Depleted genetic diversity as well as accelerated habitat loss due to human development has reduced their ability to respond to these stresses. Changing ocean conditions, including ocean acidification, are causing additional stresses to these populations from global warming.

The Institute for Fisheries Resources (IFR) and its sister organization, the Pacific Coast Federation of Fishermen's Associations (PCFFA), are both dedicated to protecting and restoring anadromous and marine resources and their native habitats.

Leatherback Sea Turtle

Dermochelys coriacea

© Guillaume Feuillet/ www.kwata.net

Leatherbacks nest in the tropics but range widely in the world's oceans, moving into colder, higher latitude waters during summer months. Climate change is expected to significantly disrupt the marine and terrestrial environments on which they depend.

Threats related to Global Warming

Climate change is altering the oceans physically and chemically as warmer waters expand, ice covers recede, circulation patterns change, and the pH of the oceans declines. Leatherbacks (and all six other species of marine turtles) will be affected by freshwater from melting glaciers, changes in salinity and oxygen, and altered ocean chemistry as shifts occur in currents, key habitats, and the range and abundance of prey species.

Changing ocean conditions are especially threatening in the Pacific where leatherback nesting populations are declining dramatically. Warmer-than-usual waters of El Nino years significantly reduce oceanic productivity by inhibiting the mixing of surface water with deeper, cold waters, resulting in less available food near the surface and reducing the reproductive potential of leatherbacks and other marine species.

Global climate change threatens reproduction on nesting beaches throughout the leatherback's range. The sex of a developing leatherback embryo is dependent on the temperature of incubation in the nest, with warmer temperatures producing females and cooler temperatures producing males. Warmer beaches initially will produce more female offspring, to the detriment of the production of males; hot beaches ultimately will be lethal to embryos. Seasonal variation in rainfall and drought will alter incubation conditions and increase embryo losses. Other effects of climate change include increased numbers of hurricanes and severe storms, associated beach erosion, nest loss and the destruction of nesting habitat.

Changing marine temperatures are expected to continue to alter the range of leatherbacks. In the last 17 years, leatherbacks have expanded their range in the North Atlantic by about 250 miles.

Caribbean Conservation Corporation conducts research, education, and advocacy to reduce threats to leatherbacks and support the recovery of endangered populations. Our programs protect nesting habitat in Florida and Central America, and we work to reduce incidental leatherback capture and mortality in numerous fisheries.

At a Glance

The leatherback is the world's most widely dispersed reptile and the largest of the living turtles. Its 59-71 inch carapace is not a hard shell but instead is made of tough connective tissue with seven prominent ridges. Below the carapace is a continuous layer of small dermal bones. Leatherbacks weigh up to 1100 lbs.

Range: Atlantic, Indian and Pacific Oceans.

Habitat Type: Coastal waters, open ocean, and tropical beaches.

Primary Diet: Jellyfish, salps and other gelatinous organisms.

Estimated Population: Global nesting population is 26,000 to 43,000 adult females.

States with Current Habitat

Partner Organization

CARIBBEAN CONSERVATION CORPORATION

Grizzly Bear *Ursus arctos*

At a Glance

The grizzly bear has a distinctive hump on its shoulders, a concave face and long claws. Their coloration is usually darkish brown with white tips on their backs and shoulders that give them a "grizzled" appearance. They live solitary lives except during breeding, cub rearing, and in areas with a super-abundant food supply such as salmon streams. Grizzly bears hibernate during the winter for 5-8 months.

Range: 5 recovery areas: Yellowstone, Northern Continental Divide, Cabinet-Yaak, Selkirks and North Cascades. This represents less than 2% of historic range in the lower 48 states.

Habitat Type: Varied, from dense forests to open grasslands.

Primary Diet: Omnivorous; grasses, sedges, roots, berries, seeds, insects, fish, mammals and carrion.

Estimated Population: 1,200 to 1,400.

States with Current Habitat

Partner Organization

Grizzly bears reproduce slowly. Females may not have their first litter until they are 6 years of age. Therefore, recovery depends greatly on minimizing female mortality. This requires keeping them safely away from humans, our trash and our livestock because human-caused mortality is the number one threat to grizzly bears. This is why they survived modern human encroachment in the contiguous U.S. only in the most remote and rugged mountainous areas, though they once were common across much of the western mountains and plains.

Threats related to global warming

Global warming appears to be exacerbating human-caused grizzly bear mortalities. Grizzly bears are denning later in the fall due to global warming. This keeps them at risk from human-caused mortality for additional weeks during a time of year when grizzlies and hunters overlap. Grizzly deaths due to human self-defense often result.

Global warming is also causing some natural grizzly bear food resources to decline, forcing grizzlies to seek alternative foods. For example, Whitebark pine (Pinus albicaulis) seeds are a food resource for grizzly bears in some areas, including Yellowstone. Global warming has led to an increase in whitebark pine blister rust as well as an increase in competing species such as Douglas fir in higher elevations. As whitebark pine and other natural grizzly food resources decline due to global warming, grizzlies may shift from remote high elevation areas to lower elevation human-populated areas, looking for alternative foods. Here, they often encounter humans and our garbage, food and livestock. This causes bears to become conditioned to humans; these human-conditioned bears are often removed or killed by wildlife managers due to safety concerns.

Defenders of Wildlife works with people who live, work and recreate in grizzly habitat to reduce the causes of grizzly-human conflicts and thereby minimize grizzly bear mortalities. Through Defenders' Grizzly Proactive Fund, they help purchase bear-resistant garbage containers and fence community dumps; build electric fencing for calving and sheep bedding grounds and bee yards; and install food lockers and food hanging poles in campsites. Also, through Defenders' Grizzly Compensation Trust, they reimburse livestock owners for economic losses due to grizzly bear depredations. This helps to build local tolerance for grizzly bears, especially as they continue to expand into new territories. Defenders is also working with Congress and the Obama administration to enact federal legislation that will result in the development and implementation of a national strategy to assist wildlife, including grizzly bears, adapt to the impacts of global warming, and provide dedicated funding from cap-and-trade revenues for implementing the wildlife adaptation strategy.

Bog Turtle *Glyptemys muhlenbergii*

N.C. Wildlife Resources Commission

Bog turtles are one of the most rare turtles found in the United States. Laws banning the collection of the turtles for sale have done little to stop the practice with bog turtles being a prized species in many animal black markets.

Invasive plants such as the purple loosestrife can dry out large areas of suitable habitat. Purple loosestrife grows in large, compact clumps that are impenetrable to the turtle, restricting its movement.

Bog turtle populations are divided into two distinct populations separated by a 250-mile distance. The northern populations found in Connecticut, Massachusetts, New York, Pennsylvania, New Jersey, Delaware, and Maryland are listed as threatened. The southern populations found in Georgia, North Carolina, South Carolina, Tennessee, and Virginia are listed as threatened due to similarity of appearance.

Threats related to Global Warming

Bog turtles are extremely sensitive to the effects of global warming. The turtle's survival is closely tied to its delicate habitat. Erratic weather patterns resulting from global warming will disrupt the fragile balance key to the turtle's survival. By altering hydrological cycles, global warming will either dry out or flood the turtle's habitat.

In addition to bog turtles needing a very specific habitat, much of the remaining habitat in the Northeast has been fragmented apart by roads and development. As the changing climate alters the availability of the turtle's current habitat, they will have very limited ability to migrate to places that could be more suitable.

At a Glance

The bog turtle is the smallest turtle found in the United States. The largest bog turtle ever found measured only 4.5 inches. Bog turtles are easily identified by the patches of orange found along the side of their heads.

Range: Northeast United States, Southern Appalachian region.

Habitat Type: Open canopy wetlands with little standing water, bogs, fens and murky soils.

Primary Diet: Small insects, invertebrates, various plant vegetation.

Estimated Population: Unknown, but estimates range from 2,500 to 10,000.

States with Current Habitat

Western Prairie Fringed Orchid

Platanthera praeclara

At a Glance

The Western Prairie Fringed Orchid is one half of a unique symbiotic relationship occurring in the tall, grass meadows of the Midwestern United States. Releasing its fragrance only in the evening the orchid relies on Hawkmoths for pollination.

Range: Midwestern United States, into Canada.

Habitat Type: Moist, native, tall grass meadows.

Estimated Population: 172 known populations, of which only 4 have numbers greater than 1,000 plants. May be extirpated in Oklahoma and South Dakota.

States with Current Habitat

© Minnesota DNR - Welby Smith & Carmen Converse

The decline of the Western Prairie Fringed Orchid is yet another victim of the continued development of untouched, native lands. Past and present farming practices have cleared vast areas of native tallgrass prairie, fragmenting the populations of orchids into smaller and smaller patches of suitable habitat. This has decreased the ability of the hawkmoth to provide the necessary pollination needed for the orchids survival.

Herbicide and pesticide use in farming can also lead to a downfall in orchid populations. Other factors contributing to the decline of the orchid include overgrazing, collecting, fire and hay mowing.

The orchid is considered threatened in all states with known populations.

Threats related to Global Warming

Prairie potholes are the depressions that remained when glaciers receded from the Midwest 10,000 years ago. These potholes make up part of the seasonal wetlands of the Great Plains. In order to thrive, the Western Prairie Fringed Orchid relies on regular rainfall to maintain these distinctive wetlands.

Global warming may threaten this balance by significantly altering the hydrological cycles of the Midwest. Unlike many other parts of the country, climate models indicate that the upper Great Plains may experience an increase in the total amount of preciptation each year. However, while the overall amount may be higher it is predicted that this will be experienced with significant increases in Spring rain, but also increased drought in late Summer. Both the possible Spring flooding and Summer drought could harm the orchid.

The drought of the 1980's significantly reduced flower production and pollination when many of the perennial plants failed to regenerate. As these wetlands begin to dry, invasive plants such as the leafy spurge will crowd the region and eliminate the conditions required for the orchid's survival.

Flatwoods Salamander

Ambystoma cingulatum and bishopi

© Michael Graziano

The Flatwoods Salamander was listed as a threatened species in 1999 primarily because of loss and degradation of both the ponds where the salamanders breed and the upland habitats of Longleaf Pine Flatwoods, where the salamanders live primarily underground during the non-breeding season. The causes of loss of habitat include logging, urban and agricultural sprawl, invasive plants, and drought.

Threats related to Global Warming

These two salamanders are at risk of losing habitat to rising sea levels, as well as being at risk from drought, which is predicted to become more common because of climate change, and habitat destruction.

Drought is particularly problematic for the salamanders because remaining populations are typically limited to single ponds, where consecutive years of drought and drying of the pond can lead to loss of the population. With droughts predicted to become more frequent and intense due to climate change, the Frosted and Reticulated Salamanders are in serious peril.

The species separation of the Reticulated and Frosted Flatwoods Salamanders has been found to date back millions of years to a time when the climate was warmer, sea levels were higher and the Apalachicola was an ocean bay rather than a river. This unique history highlights a further vulnerability for the two salamander species—much of their last remaining habitat is likely at risk of being submerged by rising seal levels caused by our warming planet.

In response to a lawsuit from the Center for Biological Diversity, Florida Biodiversity Project and Wild South, the U.S. Fish and Wildlife Service recognized earlier this year that the Flatwoods Salamander was actually two species separated by the Apalachicola River drainage, with the Reticulated to the west and the Frosted to the east, and designated just over 27,000 acres of protected critical habitat for the two species.

At a Glance

Until this year, the Frosted and Reticulated Flatwoods Salamanders were listed as one species—simply the Flatwoods Salamander. After the U.S. Fish and Wildlife Service obtained information indicating the Flatwoods Salamander was actually two species, they listed the Frosted as threatened and the Reticulated as endangered.

Range: Northern Florida, Georgia, South Carolina and Alabama.

Habitat Type: Longleaf Pine Flatwoods.

Primary Diet: A variety of small invertebrates.

Estimated Population: Surveys indicate there are roughly 20 populations of Reticulated Flatwoods Salamander and 25 populations of the Frosted Flatwoods Salamander, many of these based on observation of just one individual.

States with Current Habitat

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Activists' Choice

Polar Bear *Ursus maritimus*

At a Glance

The polar bear is considered a sea mammal with its scientific name literally translated as "Sea Bear." It is thought that the polar bear is a descendent of the Grizzly Bear. The bear's fur is not actually white, but clear, hollow strands that collect and store heat from the sun.

Range: Circumpolar arctic regions. Bering/Chukchi and Beaufort seas in the United States.

Habitat Type: Sea ice and snow pack.

Primary Diet: Ringed seals with the occasional bearded seal or walrus. Whale remains on some islands.

Estimated Population: Global population is 20,000 to 25,000. In the U.S., there are approximately 1,500 near the Beaufort Sea and at least 2,000 in the Chukchi Sea population - though data is incomplete.

States with Current Habitat

Activists' Choice

In an online vote earlier this year, the polar bear was chosen by the Endangered Species Coalition's activists and supporters as *America's Hottest Species*.

U.S. Fish and Wildlife Service

Globally polar bear populations continue to decline. The United States is home to two distinct populations, of which, both are in decline. The Beaufort Sea population decline from an estimated 1,800 individuals in the 1980's and 1990's to 1,500 individuals in 2006. Population numbers for the Chukchi Sea area are incomplete.

Persistent Organic Pollutants (POPs) such as PCB's and mercury negatively influence the health of polar bears. POP's are contaminants that are slow to degrade in the environment and bond to the fatty tissue that is key to polar bear survival. As the bears utilize their fats stores over the winter this releases the contaminants into their systems causing disruptions in reproduction, thyroid function, and immune systems. They reach the polar bears via the food chain (from plants into fish into seals into bears).

Threats related to Global Warming

The possible demise of the polar bear is tied directly to the effects of global warming. Sea ice is the key habitat for the polar bear providing dens, hunting grounds, and means of travel.

Global warming has an increased effect in the arctic, with water temperatures increasing faster than other areas of the globe. The sea ice acts as a natural reflector to solar radiation. However, warmer temperatures are causing the ice to melt, exposing the darker colored water. The darker water absorbs the solar energy increasing the temperature of the water, thus speeding up the melting of the ice.

The loss of summer sea ice will result in the decline of suitable hunting grounds for the polar bear, forcing them to travel greater distances to hunt. Declines in polar bear fat storage have already been seen resulting in stress to the bears and sometimes death.

As the sea ice continues to decline this may also push bears inland to human populated areas.

The polar bear was the first mammal to be listed as Threatened due primarily to global warming.

Safeguarding Species
in a Warming World

As this report details, there are numerous ways that global warming is compounding the stresses that Endangered and Threatened species in the United States are already under. Globally, according to the Intergovernmental Panel on Climate Change (IPCC), 20 to 30 percent of the world's species will be at an increased risk of extinction if global temperature increases exceed 1.5 to 2.5° C (3 to 5° F) above pre-industrial levels. We must take action now if we are to protect endangered species both today and in the future.

Congressional Action

The United States Congress needs to pass comprehensive climate change legislation that both significantly reduces the sources of global warming pollution and also addresses the impacts of global warming we are already seeing today.

Currently, the U.S. Congress is considering climate change legislation. To truly protect wildlife, legislation needs the following three policies: 1) planning and funding to help wildlife adapt to climate change, 2) CO_2 emissions targets based on what the best available science indicates is needed to avoid the worst impacts of global warming, and 3) protection of existing environmental laws, such as the Clean Air Act and Endangered Species Act.

In the summer of 2009, the U.S. House of Representatives passed global warming legislation. The bill contains important provisions instructing federal and state agencies to create adaptation plans to benefit our nation's natural resources and lessen the impacts of global warming. It also allocates some money to implement these plans. As the U.S. Senate debates legislation, it is important these provisions be kept and the funding expanded and clearly dedicated to meet this need. Currently, natural resources safeguarding language is included in the Senate's primary climate change legislation sponsored by Senators Kerry and Boxer.

Senators Baucus, Bingaman, T. Udall and Whitehouse have also introduced separate legislation to protect wildlife and wild places from climate change. The Natural Resources Climate Adaptation Act addresses the impacts of climate change on natural resources such as forests, coastlines and wildlife habitats, and on the people and economies that depend on those resources.

Working to lessen the impacts of climate change alone will not be enough to protect wildlife, fish and plants from the increased risk of extinction brought by global warming. The emissions of heat-trapping gases like CO_2 must be dramatically and quickly reduced. Emission reduction targets in global warming legislation must be based on what the best available science indicates is needed to avoid the worst impacts of global warming to humans and wildlife alike. For even a fifty percent chance of limiting the rise in global temperatures to 2° C from pre-industrial levels, the IPCC states a need to reduce emissions from 1990 levels 25 to 40 percent by 2020. More recent recommendations go further and state that we should stabilize global CO_2 levels to 350 ppm, which is below our present day level of 389. In addition to setting the strongest 2020 target possible, global warming legislation should contain provisions to respond to emerging climate science and any identified need to set deeper and more accelerated emission reduction targets.

As new legislative measures are developed to combat global warming, they should not preempt or curtail existing laws, such as the Clean Air Act and Endangered Species Act, but rather supplement them in a mutually reinforcing manner. By exempting the Clean Air Act, the House-passed legislation eliminates the Environmental Protection Agency's (EPA's) ability to crack down on global warming pollution from new sources and from the nation's oldest, dirty power plants and other existing industrial sources. Any final legislation must not include these types of exemptions to environmental laws.

Executive Action

The United States clearly needs to demonstrate leadership on climate change. Negotiating an effective and binding international agreement is essential. Furthermore, the Department of the Interior and the National Oceans and Atmospheric Administration (NOAA) have crucial roles to play in helping our nation's wildlife, fish and plants survive the global warming impacts we have begun experiencing. Global warming must be factored into all endangered species related decisions now made in order to help prevent species from disappearing forever. The Interior Department's Fish and Wildlife Service has taken an important initial step by drafting a global warming plan for their areas of work. This is good progress and it should be complimented by similar efforts in all the other land, water and wildlife agencies of the U.S. Government.

To learn more about these issues, please visit www.StopExtinction.org, where you can also join ESC's Activist Network to receive updates and announcements about how you can help protect and restore America's wildlife, fish and plants.

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