

Climate Change, Biodiversity, and Public Lands

Main Takeaways

Human activities over the past ~150 years are driving the rise of global temperatures, which in turn, negatively impact the planet's ecosystems and biodiversity.

We know from a variety of sources — Indigenous knowledge, scientific and agricultural data, as well as our current lived experiences — both climate change and biodiversity loss are happening.

Public lands offer a variety of solutions to the climate change and biodiversity crises, because with proper land management, public lands can simultaneously address the inequitable impacts, biodiversity loss, and climate change mitigation.

What are climate change and biodiversity loss, and how do we know this is happening?

Alex Sánchez, co-founder of the organization Voces Unidas de las Montañas, shared his story about how climate change is impacting his family and community as a part of the “Communities at the Heart of Climate Action” collection which highlights community members who are committed to protecting the people and places they call home.

Alex Sánchez grew up in a small town on the Mexican Pacific Coast called “El Colorado,” named after its bright red soil. Farming and ranching were at the heart of the community. Many families, including his own, produced corn, beans, and watermelon and raised livestock.

By the time Alex was nine, climate change combined with unfavorable agricultural trade policies made it almost impossible for the family business to remain productive. It became too hard to make ends meet. In search of better opportunities, the Sánchez family migrated north. By a twist of fate, they settled in another place called Colorado — this time in the United

States. They made El Jebel, a small town in the Roaring Fork Valley, their new home.

“Migration worldwide is tied to climate,” says Sánchez. “It’s tied to policies that are made by governments and institutions that create unintended consequences, and emigration is one of them.”

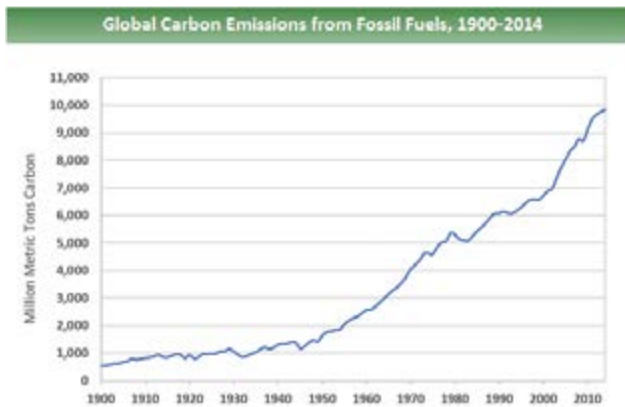
The experience had a lasting impact on Sánchez’s life. In Colorado, he became keenly aware of climate change and pollution around him. He noticed that communities of color were disproportionately burdened by the fossil fuel industry’s unchecked pollution and the resulting climate change impacts — including hotter days and smoke from nearby forest fires.

“On the Western slope in Colorado, it’s no secret where the pollution, bad water, and negative effects of industry ends up,” he says. “It’s next to communities that happen to be low income, that happen to be working families, that happen to be People of Color.”

Climate Change

Our planet’s climate has changed many times throughout its history. Over geologic time our planet has been both warmer and cooler than it is now. However, in the past 100 years, our

planet’s average temperature has more rapidly risen compared to all other times in history, dating back several millennia. These changes have caused major landscape and species fluctuations (ice ages, mass extinctions, etc), but typically these changes happened over thousands of years, not hundreds



Source: Boden, T.A. Marland, G., and Andres, R.J. (2017). Global, Regional, and National Fossil-Fuel CO₂Emissions. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A. doi 10.3334/CDIAC/00001_V2017.

of years as is happening now. We know this from many sources, but some of the strongest evidence is ice-core data that shows atmospheric gas composition including greenhouse gases, past air temperature variations, and glacial accumulation and melt rates. During the past 100 years, carbon emissions have rapidly increased and so have global temperatures. In this same 100 year period, history shows significant increase in extraction and burning of fossil fuels, major deforestation, and extraction of hard rock minerals, along with changes in global commerce. This has resulted in a recognition that these changes in human activities from 1900 to the present are driving climate change.

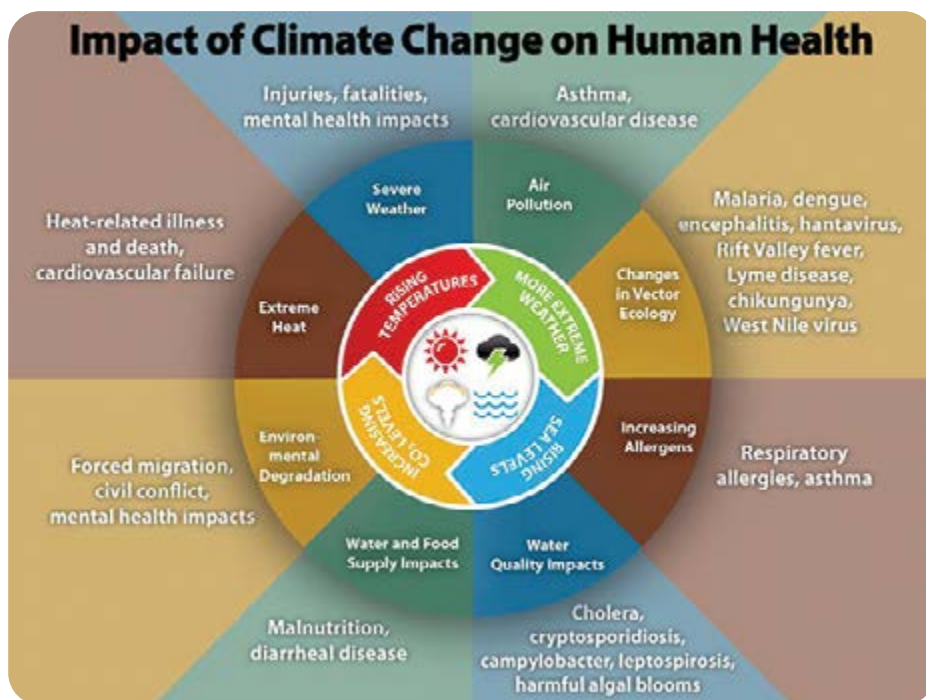
Carbon dioxide, methane, and nitrous oxide are called greenhouse gases because they trap heat from the sun in Earth's atmosphere, similar to how a greenhouse used for growing plants traps heat from the sun, or how a car gets hot on a sunny day. Although the greenhouse effect is a natural process, human activities including agriculture, carbon emissions, industrial processes, and deforestation are increasing greenhouse gas concentrations resulting in a rise of average temperatures at unnatural and unprecedented rates. This increase in global average temperature is called global warming, and it is the root cause of the climate change many communities are currently experiencing.

In addition to ice-core data and other Western measurements of climate change, there are other ways we know that climate change is happening. Indigenous peoples have been aware of and tracking climate change for many years. Many tribes and Indigenous groups have traditions related to ecosystems and specific plants and animals and as temperatures have warmed over the past 100 years, Native cultures are observing the shifting dates of traditional

ceremonies. For example, a 2016 USDA report describes how a spring Bread Dance ceremony is traditionally held by the Shawnee people when a particular tree's leaves become the size of squirrel ears. In recent years, Shawnee elders have noted this benchmark is happening earlier in the spring. Understanding of the world that is based on connectedness to land, ecology, and tradition is known as traditional ecological knowledge (TEK), and there are countless examples of tribal members using TEK to identify a changing climate. Other observations of the natural world also indicate a major shift in our climate. Farmers around the globe have reported hotter growing seasons, harsher winters, wetter monsoon seasons, and generally more challenging growing conditions for crops. In the past 10 years, firefighters have battled wildfires that are bigger, hotter, and spread faster than many can remember. While most of the narratives about climate change in the mainstream media focus on "Western" scientific data, it's important to acknowledge the many ways of experiencing and knowing our climate is changing.

The Intergovernmental Panel on Climate Change (IPCC), a large group of scientists convened by the United Nations, found atmospheric concentrations of CO₂, methane, and nitrous oxide are higher than any time in the last 800,000 years. Since the turn of the 20th century, the planet has warmed 1.8°F (1°C) and is on track to continue warming. Scientists point to human industrial activities as a cause for this change in atmospheric conditions and the related warming. In a special report released in 2018, the IPCC found global warming will soon exceed 2.7°F (1.5°C), "leading to irreversible loss of the most fragile ecosystems, and crisis after crisis." The effects of climate change are different in scope and severity for every community and can include:

- more frequent and severe weather events
- increased flooding and erosion, particularly along coastlines
- extreme heat, droughts, and wildfires



Source: cdc.gov

- reduced agricultural yields and food insecurity
- loss of outdoor tourism and recreation economies
- migration of peoples displaced by these effects

Climate change is an existential threat to all of us, but its effects are felt disproportionately among low-income communities and communities of color. A 2017 United Nations report identified three ways communities who experience social inequity, including low-income communities and Black, Indigenous, and People of Color, are bearing the brunt of the effects of climate change :

- Increased exposure to climate change's effects, i.e.; living outdoors, in flood-prone areas, or without air conditioning.
- Increased likelihood of being harmed by climate change's effects, i.e.; food insecurity, loss of livelihood, and health problems such as respiratory and cardiovascular diseases, injuries from severe weather events, heat related illnesses, mental health problems, as well as water and insect-borne diseases.
- Decreased ability to cope and recover from the damage suffered, i.e.; inequitable access to legal or medical assistance, inequitable distribution of relief funds after natural disaster, or loss of culturally significant subsistence practices.

It is important to recognize these disparate impacts are not by accident - they are the result of past and current unjust social and economic systems rooted in systemic racism. These inequities are often referred to as environmental racism, and strategies to rectify it are called environmental justice.

Biodiversity Loss

Biodiversity refers to the variety of life in an ecosystem, from simple cells and microbes to complex plants and animals. It also includes the ecological processes and services that sustain life in an ecosystem, such as nutrient recycling and pollination. Scientists have found the Earth has entered a sixth era of mass-extinction. Since 1900, a total of 198 species have gone extinct, and another 279 are possibly extinct. In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimated another one million animal and plant species could go extinct within the next few decades. In addition to species extinction, population sizes among monitored animal species are shrinking. Scientists have noted a 68% average reduction in population size among 4,392 monitored animal species between 1970 and 2016.

Similar to climate change, many Native communities have identified biodiversity loss through cultural, agricultural, and oral traditions. The Quileute Tribe in Washington state is unable to find smelt eggs to make "stinky-eggs" in time for Honoring Elders Day, and the Iñupiaq of Alaska connect sea

Brock's Story: "My Climate Story" Project

The Fraser Basin Council Youth Program created the "My Climate Story" platform in 2018 for youth from a diversity of backgrounds across British Columbia, Canada to share how climate change is affecting their communities, and what inspires them to take action on climate change and environmental issues.

This story from Brock, a member of the Métis people, highlights the impacts of climate change on the Fraser River run of sockeye salmon.

Born and raised along the shores of the Little Shuswap Lake, near the mouth of the Adams River, I have always had a great appreciation for the journey of the sockeye salmon who also share this home at the beginning and end of their lives. As a child I spent many crisp autumn afternoons walking along the banks of the frigid river as bright red swarms twisted and reshaped the flowing water. The smells so pungent, yet oddly magnetic and comforting, as the salmon melted back into the earth to be recycled and resuscitated into the web of re-creation, spun out again to continue on the cycle that started since time immemorial. I recall the words of local Secwepemc elders weaving images into our minds and hearts of the importance of *sqeltenuw i* (the sockeye), summoning stories of when the river ran so red you could walk across it without ever touching the water.

In August 2018, I joined a canoe full of young leaders and we journeyed down the Fraser River from the headwaters

near Mount Robson, through ten biogeoclimatic zones, to the Salish Sea. Along the way we were welcomed by Indigenous fishers, whose eyes gleamed of hope for a year of abundant and healthy salmon, mirroring their own perseverance of traditions and culture. With each stroke we took, we knew that the strength and rhythm of our paddles were a mere fraction of the power and stamina the sockeye expelled swimming against us. As water beads dripped down to our fingers, we reflected on how this precious resource, which carves its way through the heart of the province, is what the sockeye rely on to navigate home and bring life to a new generation. Every year, their route along the Fraser becomes more challenging, the water is more shallow, the temperature is warmer, and the banks are eroding.

That autumn, I returned home to Tsútswecw Provincial Park along the Adams River. To witness once again the splendor of this incredible phenomenon. Sadly, as I stared into the river, I only spotted speckles of red, a trend that is now all too common. These mighty warriors are becoming less and less. As they channel back to this place, something has begun. The vessel that carries their spirit can no longer cope with increasing pressures of such a task. Their decomposing bodies cast a glow that leaks into the pebbles that make the beds for the eggs, and for a moment they look like stars. Sparkling in the vast dark waters that once ran red.

ice loss and altered whale migration to less successful whale hunts. In southeast Alaska, Native people have seen shellfish unable to produce calcium carbonate shells due to ocean acidification. Toxic algae outbreaks have also become more common, threatening traditionally local species. The Amskapi Piikani/Blackfeet people identified that “sage, berries, sweetgrass, and willows are seen as declining in population... the trees are moving further up the mountain...there is an increase in the number of grizzly bears, mountain lions, and wolves within the Blackfeet Nation, and along with this increase ‘there’s a lot of predation.’”

In the ancestral homelands of the Ojibwe or Chippewa, now known as the states of Minnesota, Wisconsin, and Michigan, 11 Ojibwe tribes have formed an intertribal natural resource agency called the Great Lakes Indian Fish and Wildlife Commission (GLIFWC). In 2018, GLIFWC interviewed tribal elders, harvesters, and knowledge-holders to complete a Climate Change Vulnerability Assessment on 60 beings, or species of interest, across the Ceded Territories. The Ojibwe have reserved treaty rights to hunt, fish, and gather in the Ceded Territories as they have since time immemorial, so the biodiversity and ecological health of the region is critically important to their food security, livelihoods, and culture. Two species highlighted in the report as extremely vulnerable to increased warming were Waabooz (Snowshoe Hare) and Manoomin (Northern Wild Rice). Climate change not only threatens species vital to the biodiversity of ecosystems, but also to the traditional ways of people who have inhabited these and neighboring lands for thousands of years.

Maintaining biodiversity is beneficial for many reasons. When an ecosystem has diversity in its plant and animal populations, it is inherently more resilient to short term events like wildfires and flooding. Diversity in plant life increases soil fertilization, controls erosion which improves water quality, and helps with pollination. Biodiversity also refers to genetic diversity within species which is beneficial in preventing disease outbreaks. Biodiversity also provides numerous benefits to humans, including but not limited to:

- Food security — Agricultural production, hunting, fishing, and gathering are all dependent on biodiversity. Pollination, nutrient recycling, and pest regulation are all ecosystem services that enhance food production on both wild and working landscapes.
- Pollination — For many plants to fruit and reproduce, a pollinator is needed to transfer pollen between plants. Insects like bees and beetles, birds, and bats that feed on nectar are all pollinators. Many essential human food resources require pollination to produce.
- Nutrient recycling — Nutrient recycling is best visualized as a food web, with different species of plants and animals both consuming and contributing nutrients into the ecosystem.
- Pest regulation — Diverse ecosystems are more resistant to pests and have a healthier balance of predator and prey populations. This resilience to pests can reduce the impact of natural disasters like wildfires, floods, and hurricanes by preventing damage that would be exacerbated during these events.

- Medicines — Biodiversity is essential for both natural medicines and the development of pharmaceuticals. Plants, fungi, and even wildlife anatomy contribute to medicines and pharmaceuticals.

While there are many important cultural, ecological, and biological reasons that biodiversity is important, it is also important to recognize the financial value to biodiversity as well: IPBES estimated the value of biodiversity at around \$24 trillion per year, based on the economic value of each of the benefits biodiversity provides to humans.

How can public lands address the climate and biodiversity crises?



Public lands offer solutions to sustainably develop renewable energy, mitigate the effects of a warming globe and increased greenhouse gases, and protect critical habitat for preserving biodiversity. Additionally, public lands policy can rapidly start to address environmental justice issues, especially for communities most affected by climate change and biodiversity loss.

The Convention on Biological Diversity, which was originally established in 1992 and now has 196 member-countries, established an international goal of conserving 17% of each country’s terrestrial area and 10% of each country’s ocean waters, which scientists say is not enough to preserve Earth’s biosphere from irreparable harm. Several scientific and environmental organizations began calling for a new goal: placing 30% of Earth’s lands and waters into conservation status by 2030 (also known as ‘thirty by thirty’). The Convention included the 30x30 initiative as a target in the official Global Biodiversity Framework draft published in 2021. Independently, President Biden issued Executive Order 14008 in January 2021, establishing a national goal of conserving 30% of U.S. lands and waters by 2030. Federal agencies collaborated to release the Conserving and Restoring America the Beautiful report in 2021, which was the first step in developing a conservation plan reflecting the 30x30 vision in the United States. Ultimately, the goal of this movement is centered around preserving land, protecting ecosystems, and placing land in non-extractive statuses. Designations such as Wilderness, Wildlife Refuges, National Recreation Areas, Wilderness Study Areas, and National Parks/Monuments help reach this goal.

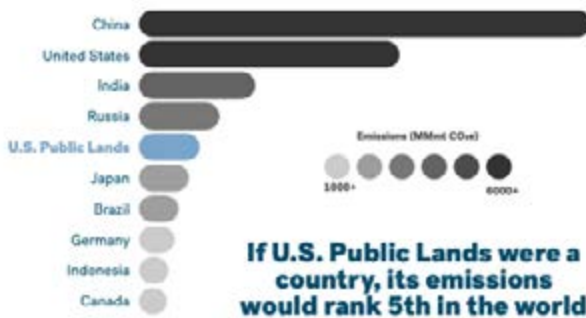
The 30x30 initiative is an important step forward in recognizing the self-determination of Indigenous peoples and the value of TEK. One of the core principles of the 30x30 initiative is “regular, meaningful, robust consultation with

Tribal Nations.” This represents a significant departure from the way tribes and Indigenous groups have been “consulted” on land management decisions in the past and ensures TEK will receive an important role in shaping future land management strategies. Findings from the 2019 IPBES report documents that tribes and Indigenous groups are effectively preserving biodiversity. Although Indigenous groups only own, occupy, or manage 25% of the world’s land, 80% of the world’s biodiversity is found on those lands.

The 30x30 goal is an ambitious and important goal, relying on the many benefits of public lands to address the effects of climate change and biodiversity loss. The following are specific ways that public lands can be a solution to these crises.

Renewable Energy on Public Lands

The federal government controls access to 2.4 billion acres of minerals (e.g., coal, oil, and natural gas) located under the surface of the United States. Scientists have reached consensus: in order to reduce average temperatures on Earth, we must cut down on greenhouse gas emissions caused by burning fossil fuels. Currently, the lifecycle emissions of fossil fuels produced on public lands account for nearly a quarter of greenhouse gas emissions in the United States. If federal public lands were a country, these lands would be the world’s fifth largest emitter of greenhouse gases. Although resource extraction on public lands is a big part of carbon emissions, most of these emissions can be eliminated with a shift in federal energy policy.



In 2019, there were 96 large-scale renewable energy projects on public lands generating more than 5,000 megawatts (5 gigawatts) and powering more than 2 million homes. Although these projects are substantial, they represent less than 5% of the total available capacity for renewable energy production in the United States. In 2020, Congress adopted a national goal of producing 25 gigawatts of solar, wind, and geothermal electricity by 2025, but that would still be less than 25% of the capacity for renewable energy.

In May of 2021, Congressman Mike Levin reintroduced the Public Lands Renewable Energy Development Act (PLREDA) in an attempt to ensure these projects are sited responsibly with minimal impacts to wildlife, and to create a Renewable Energy Resource Conservation Fund that supports expanding recreational access, conservation and restoration work, and other important stewardship activities.

The Bureau of Land Management (BLM) has already identified over 700,000 acres as Designated Leasing Areas (DLAs) for renewable energy development that meet three criteria:

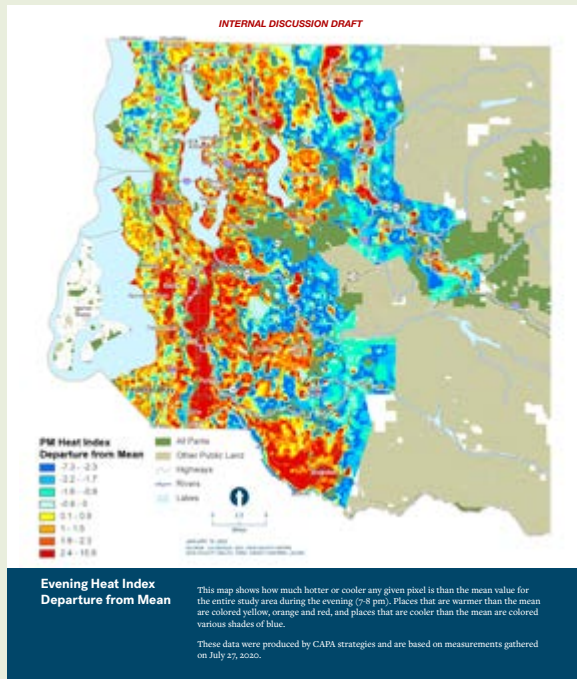
- excellent solar or wind resources
- proximity to existing or planned transmission and highway corridors
- lower environmental, social, cultural, and recreational impacts

By utilizing appropriate federal public lands for renewable energy development and decreasing fossil fuel extraction, the United States would significantly reduce emissions, construct sustainable energy infrastructure, and create lasting economic benefits for workers and communities. In terms of climate change and biodiversity, this policy change would represent a major shift towards a sustainable future, resulting in lower global average temperatures and more resilient ecological communities.

Heat Equity — Urban Parks and Green Space

The 1995 Chicago heat wave killed over 700 people in the course of five days of record temperatures. Most of the victims were Black, elderly, and low-income Chicagoans. The disaster sparked increased public scrutiny of what the EPA now calls “heat islands” and “heat equity.” Intra-urban heat islands are areas of a city dominated by concrete and steel hardscaping which exacerbate the effects of sun and heat. The Trust for Public Land’s (TPL) 2020 report revealed additional data supporting green space as a solution to the heat island and climate crisis. According to the report, areas within a 10-minute walk of a park are up to 6 degrees cooler than areas farther away. Increasing access to local parks has great potential to reduce heat-related illness as well as promote physical activity and social cohesion. Parks and green space mitigate the effects of hot weather, but racially discriminatory urban planning practices such as redlining and interstate highway development have forced low-income communities and People of Color into higher density and industrial neighborhoods. Those same discriminatory urban planning practices have ensured wealthier neighborhoods have parks and green space that mitigate heat.

As climate change exacerbates the effects of heat islands, communities are looking for ways to protect both environmental and human health. The city of Albuquerque, New Mexico is seeking to reduce the effects of heat islands and promote climate resiliency by planting 100,000 trees in 10 years. A report by The Nature Conservancy found the city’s tree canopy is being degraded by extreme heat and drought caused by climate change, limited capacity for proper tree care, and poor species and site selection. In response, experts evaluated and scored 136 tree species on a total of 15 criteria, including but not limited to: temperature and drought tolerance, urban compaction tolerance, pest and disease resistance, and whether the species supports wildlife. Without the thoughtful and concerted effort of the “Let’s Plant ABQ” campaign, Albuquerque’s urban forests would be vulnerable to dramatic dieback, and residents would suffer dramatic health impacts in turn.



King County and City of Seattle Heat Island Mitigation Strategy

King County and City of Seattle applied for a FEMA hazard mitigation grant in 2021 that would help fund the development of a countywide urban heat island mitigation strategy. This grant would provide funding for urban and street tree planting, increased public access to greenspace, incentives for energy efficiency retrofits and green roofs, increased access to cooling centers, and increased outreach and education about managing heat impacts on health. Reducing heat impacts is one of many priority actions in King County's updated Strategic Climate Action Plan, which provides strategies to cut countywide greenhouse gas emissions in half by the end of this decade, prepare for the impacts of climate change, and build more sustainable and resilient frontline communities.

Public lands can be a potential solution to heat islands. Local city planning efforts can ensure parks and green space are included in development and all communities have equitable access to these important places. These planning processes are often open to public comment and grassroots campaigns led by citizens and community groups can impact planning decision-making. The City of Seattle and King County in western Washington state undertook a heat-mapping project in the summer of 2021. King County's Strategic Climate Action Plan includes reducing heat impacts as a priority action to prepare for climate change and build resilient communities.

Carbon Sequestration

An important way land conservation can mitigate climate change is by capturing and storing carbon dioxide, a greenhouse gas that causes an increase in global temperature. Through photosynthesis and the carbon cycle, plants capture carbon and store it in vegetation and the soil. Because of these natural processes, many public lands are carbon sinks - places that absorb more carbon than they release. Maintaining carbon sinks is essential to slowing and mitigating climate change.

Forests are critically important carbon sinks, storing carbon in woody vegetation and the soil. The United States Forest Service (USFS) manages over 190 million acres in 154 National Forests. The 16.8 million acre Tongass National Forest is a rainforest in southeast Alaska - the largest temperate rainforest on the planet. According to a 2021 study, the Tongass accounts for 44% of the carbon capture in the whole United States National Forest system.

Wetlands, like those in Everglades National Park, the National Wildlife Refuge System, and Waterfowl Production Areas (WPAs), trap organic matter and slow decomposition, storing carbon in the soil. Wetland soils are capable of holding 40% soil carbon, compared to the .5%- 2% soil carbon in most agricultural soils. A 2016 study published in Nature found that despite accounting for only 5%-8% of the planet's surface, wetlands hold 20%-30% of global soil carbon. When wetlands are drained, dredged, or filled, that stored carbon enters the atmosphere, speeding up the greenhouse effect.

Preserving and Protecting Intact Ecosystems

In addition to slowing climate change and mitigating its effects, conserving public lands will be instrumental in slowing the rate of biodiversity loss and protecting intact ecosystems. Preserving habitat, migration corridors, and breeding/calving grounds are three ways to preserve biodiversity through land protection.

Habitat

In 2019, the IPBES found that 75% of Earth's land surface and 66% of marine environments have been altered by humans. Forests have been cleared for agriculture and timber, wetlands have been polluted, and grasslands over-grazed. These changes have reduced habitat spaces for many species; wildlife and native flora need habitat for food and population security. Some species can adapt to vastly different conditions, while others can only survive in very specific habitats. By protecting the most ecologically sensitive areas, which often have the richest biodiversity, we can sustain healthy populations of wildlife whether they are endangered, threatened, or common.



Wildlife Crossing at Liberty Canyon

Migration corridors

Animals migrate to find food, better habitat, breed and rear their young, and to expand their range. Migrations can be seasonal or spontaneous and include individual animals or millions at a time. Roads and human activity present significant barriers to animal movement. Even fences around pastures and rangelands can present a significant barrier to some species like the pronghorn antelope, which rarely jumps fences because they are a plains animal that did not evolve to jump over obstacles. Pronghorn have been observed walking for miles down a fence line until they can go under the fence on their bellies.

In the Northern Rocky Mountains, ensuring natural connectivity between distinct grizzly bear populations is crucial for viability of the species. Bears in the Greater Yellowstone Ecosystem (GYE) are isolated from other populations of bears, namely the Northern Continental Divide Ecosystem (NCDE) population in and around Glacier National Park. This isolation has been identified as a long-term threat to the genetic viability of the GYE bears. Human development in the Missoula and Bitterroot Valleys of Montana is preventing grizzly migration between the two recovery zones. In 2018, an NCDE bear made its way south into the Bitterroot Valley, but was relocated after digging holes on a golf course. The bear was released in the Seeley Lake area to the northeast, but had to be euthanized a year later due to conflicts with humans.

Wildlife crossings connecting public lands dissected by roads are becoming a valuable tool for land managers in the United States. Several states, such as Washington and Montana, have already built wildlife crossings over major roads like I-90 and Highway 200 that were once a major barrier and source of mortality for migrating wildlife. In the Pigeon River Gorge between Great Smoky Mountains National Park and Cherokee National Forest, Interstate 40 divides Tennessee and North Carolina. The 28-mile stretch of highway has been identified as a “death trap” due to increased high-speed traffic and a lack

of wildlife-friendly infrastructure. The Safe Passage project is studying wildlife movements and seeking to build wildlife crossings over and under I-40 to mitigate the increased mortality resulting from traffic through the gorge. Plans to build a wildlife crossing in Los Angeles are expected to break ground in 2022. This crossing over the 101 freeway at Liberty Canyon in Agoura Hills will provide a vital link in the chain connecting the Santa Monica Mountains, Simi Hills, and the Santa Susana Mountains allowing all animals to move freely between these open spaces.

Breeding/Calving/Spawning Grounds

Many animals require a particular habitat to breed and raise their young. Spotted owls require old growth forest for nesting, waterfowl need the prairie potholes of the North Central United States and Central Canada, and salmon need clean, cool water in their natal streams.

The coastal plain east of Prudhoe Bay, Alaska, known as the “1002 Area” of Arctic National Wildlife Refuge, is the calving grounds for the Porcupine Caribou Herd. The Refuge, which is home to 42 fish species, 37 land mammals, 8 marine mammals, and more than 200 migratory and resident bird species, also includes the country’s largest Wilderness area. The 1.5 million acre coastal plain, the calving grounds of the Porcupine herd and biological heart of the Refuge, was not included in the Wilderness designation. Oil and gas companies have lobbied to open the 1002 area to drilling for decades. For the Gwich’in people, who have hunted, fished, and trapped in the region since time immemorial, the Porcupine herd provides a central part of their diet and culture. Gwich’in leaders, scientists, and conservation groups agree that allowing drilling, road building, and other extractive industrial activity in the 1002 area would have a devastating effect on the area’s biodiversity and the Gwich’in way of life. Permanent protection of the coastal plain is imperative to preserving the caribou calving grounds and this important ecosystem on which the Gwich’in depend.

Appalachian Landscape Conservation Cooperative (Appalachian LCC)



The Appalachian LCC is a science and management partnership between various public and private organizations working to protect the biodiversity of the Appalachian region and create a coordinated landscape-level conservation effort. The LCC contains the most significant biodiversity “hot spot” east of the Rocky Mountains and is the largest contiguous biodiversity hot spot area in the nation. The Central and Southern Appalachians are unrivaled in the United States for aquatic species diversity and comparable only to China for forest diversity. Approximately 198 species are federally listed as threatened or endangered. Of these, 108 or 54% are aquatic species (primarily mussels and fish). Additionally, the LLC supports the 30x30 initiative of supporting landscape conservation.

What actions can you take to help?

As an individual, the challenges brought up in this module can feel overwhelming; it’s easy to get discouraged and feel helpless. While these are natural and normal feelings, it is important to remember the collective actions of many individuals can have major impacts when it comes to climate change and biodiversity loss. There is plenty of information online about steps you can take to reduce your own impact on climate change — simple things like changing incandescent light bulbs to LEDs, turning off lights at home when you’re not using them, reducing heating and cooling system loads in the home by 1-2 degrees, and reducing food waste. These strategies make a difference when undertaken by millions of people over many years, although they also sometimes feel very small in comparison to the scale of the biodiversity/climate crises today. Below are some additionally impactful ways you can influence the climate change and biodiversity conversations in today’s world.

- Plant habitat gardens. Urban pollinator gardens can be as small as a few feet square, and in more suburban/rural areas, planting wildflower meadows encourages native species of pollinators. Additionally, you can help native species like mason bees by building bee houses, put out hummingbird feeders during migration season, and plant food sources like milkweed that are vital to various insects and animals.

- Engage in a restoration project as a volunteer. This might be a half-day event identifying and removing invasive species of plants, a day of cleaning up a dump-site and removing garbage from public lands, or a bigger project like stabilizing and rerouting a stream to help with habitat.
- Support climate friendly legislation. This can be in the voting booth, at campaign rallies, or in public local government forums/meetings. The more people who are advocating for climate-responsible governance, the more likely our elected officials will support it.
- Learn about and educate others on the benefits of biodiverse, natural ecosystems and landscapes. After wolves were reintroduced in Yellowstone National Park, many species including elk and deer populations benefited; yet, there exists a strong anti-wolf movement in the Greater Yellowstone Ecosystem. Similarly, beavers provide vital habitat to many species of native fish, migratory birds, and plant species; yet, in many parts of the country beavers are seen as nuisance animals. By learning about the ecological benefits of these species and sharing knowledge with others, you can encourage environmentally responsible land management practices.
- Encourage traditional land management strategies when possible. For example, in much of the western states, Indigenous peoples set small-scale burns in the forestlands to maintain a healthy forest ecosystem with little disease, few invasive insects, and low large-scale wildfire risk. As traditional land management practices decreased or were outlawed, forests became overgrown and larger, destructive fires have become common. Today many land managers are working to thin forests and to manage with “prescribed burns,” returning to practices closer to traditional management strategies of these areas. Publicly supporting this type of work is vital to its long-term success and to the ecological restoration that is important in these areas.
- Support community-based organizations fighting for climate equity issues. This could be directly donating time, money, or other resources to these efforts; it might be canvassing a neighborhood and advocating for a policy, protesting, donating money to support a specific campaign, or offering to speak publicly about a climate-related inequity you’ve seen or experienced.
- Spend time on public lands. Go for a hike, explore a nearby nature center, or stop for a few minutes at a public park. By engaging with public lands, you are validating their existence. Document your visit on social media-share it as widely as you’re comfortable to make others aware of these resources.
- Make climate change/biodiversity loss visible. If you’re an artist, content creator, or have a social media profile, create, share, and encourage climate/biodiversity focused art projects. There are many artist-activists today focusing on climate change and biodiversity with the goal of making these issues visible and important to a broader audience. By joining this movement or sharing this work, you can amplify these efforts.



Community Members organizing an Earth Day planting event.

- Write opinion pieces or letters to the editor about public lands in your community.

These strategies will not change the world on their own, however they will make a direct appeal to land managers, policy makers, and elected officials who create local and global policies that impact these issues on a broader scale. These strategies can also elevate the pressing need for change in the eyes of elected officials and voters. Since many potential large-scale solutions to these challenges can

be addressed through public land management and policy, there is a real opportunity to influence elected officials through public support and visibility. On a larger scale, public support of these issues can influence leaders globally, through trans-national agreements and summits. The climate and biodiversity crises did not emerge overnight, and will not disappear rapidly either. With many people taking small steps toward non-extractive, ecologically-responsible practices, we can begin to address them.

