Climate & Public Lands 101 Talking Points

CLIMATE CHANGE ESSENTIAL KNOWLEDGE

CLIMATE CHANGE TRENDS

Evidence of climate change can be seen in long-term changes, such as:

- Precipitation patterns
- Sea level rise
- Shifting ecosystems
- The number/frequency of extreme weather events

Data for these trends is collected from multiple sources, such as:

- Weather instruments and records
- Tree rings
- Ice cores
- Satellite images
- Sedimentary layers
- And other observations

WHAT ARE GREENHOUSE GASES?

- Greenhouse gases absorb and trap heat radiating from the Earth's surface, acting like a blanket that surrounds the Earth, keeping our planet at a comfortable, livable temperature.
- When fossil fuels like coal and natural gas are burned for energy, more and more carbon dioxide, methane, and other greenhouse gases are added to this "blanket" in the atmosphere, thickening the blanket. This thicker blanket traps more heat underneath it, increasing the globe's temperature and disrupting the climate.
- Until the late 1800s, carbon dioxide levels in the atmosphere were stable at about 280 parts per million (ppm). This concentration of greenhouse gases has kept our atmosphere's blanket comfortably warm.
- In 2018, carbon dioxide concentrations climbed to 407.4 ppm, a 45 percent increase from pre-industrial levels.[1] As these numbers keep climbing, the atmosphere blanket keeps getting warmer.
- Today, carbon dioxide levels are higher than at any point in the past 800,000 years!

1) Climate Change: Atmospheric Carbon Dioxide: Noaa Climate.gov https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide

WHAT DOES "ANTHROPOGENIC" MEAN?

- Anthropogenic simply means human-caused.
- 97% of scientists agree that present day climate change is anthropogenic because people are responsible for the sharp increase in greenhouse gases in the atmosphere and destruction of carbon sinks through deforestation.

GLOBAL WARMING OR CLIMATE CHANGE?

- Global warming is the rising of average global temperatures due to the rapid increase in greenhouse gases being released into the atmosphere through energy production, transportation, agriculture, and other human activities.
- Over the past 100 years, the average surface temperature on Earth has increased by 2.05°F above the 20th century average.[2]
- Temperature increases are not the same everywhere because the world is composed of diverse climates. Some areas—like the planet's poles—are warming much faster than other regions. While the Earth's average temperature is 2° higher, temperatures in the Arctic were up to **68° F higher than average** in 2018.
- Warming global temperatures are extremely difficult to reverse. When our planet's temperature loses balance, so do natural systems.
- Climate change is the cumulative impact of global warming, causing dramatic changes in global weather patterns that impact entire ecosystems. Average global warming beyond 4°F causes impacts that go from bad to outright catastrophic.

CLIMATE TRENDS & IMPACTS IN THE NORTHWEST

WATER

- The region's winter precipitation is expected to increase over the long term, but with greater year-to-year variability. This shift means years of extended drought, along with more extreme weather events, such as damaging heavy rainfall.
- Severe rain events cause flooding, debris flows, and landslides that alter habitats, harm aquatic species, and threaten communities.

2) NOAA National Centers for Environmental Information, State of the Climate: Global Climate Report for January 2020, published online February 2020, retrieved on March 26, 2020 from https://www.ncdc.noaa.gov/sotc/global/202001.

- Winter precipitation is also expected to shift from snow to rain in the mountains. More winter precipitation falling as rain at higher elevations compromises the snowpack, which normally acts as a summer water "piggy bank" for humans and ecosystems downstream. Spring snowpack in the Northwest has declined by about 30% on average from 1955 to 2016.
- In the past 18 years, glaciers throughout the West have lost about 117 gigatons of ice — enough that if this lost ice were melted all at once and spread across the state of Washington it would come up our knees.[3]
- Reduced snowpack leads to greatly reduced summer streamflow rates. The combination of higher summer air temperatures and lower streamflow will raise river temperatures.
- Habitat suitable for cold-water species, such as salmon, is estimated to decline nationally by approximately 62% through 2100 under current emissions trends. However, if climate emissions are stabilized, only a 12% reduction is projected.[4]

COASTS & OCEANS

- Sea level rise due to global warming impacts shorelines, ecosystems, and coastal communities.
- Over the last 100 years, 50% of coastal wetlands have been destroyed due to sea level rise, land use changes, and extreme weather events.
- The worst-case sea level rise projection, 4.3 feet by the end of the century, would heavily damage vital infrastructure throughout the Northwest, including low-lying urban areas of Puget Sound and Portland. This rise would also harm and displace vulnerable coastal communities, including Indigenous groups.
- Commercial fishing and razor clamming are being affected by the cumulative impacts of ocean acidification, harmful algal blooms, higher temperatures, and habitat degradation.
- Worsening algal blooms also pose a public health concern due to associated toxins in shellfish.

FORESTS & WILDLIFE

- Plants and animals living at the edge of suitable habitat may find the changing climate inhospitable. Some animal species could migrate, while others may decline and become endangered.

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3) https://www.seattletimes.com/seattle-news/environment/decade-of-heavy-storms-has-helped-northwest-glaciers-but-dont-expect-trend-to-last-studies-show/

4) Climate Change in the United States: Benefits Of Global Action, United States Environmental Protection Agency, Office Of Atmospheric Programs - 2015

- As seasonal events such as spring blooms and snowmelt shift, some species are following cues and behaviors that are out of sync with the changing ecosystem.
- Snow-dependent wildlife and threatened or endangered species are particularly vulnerable to climate impacts. This includes species that change fur color from brown in the summer to white in the winter (weasels, snowshoe hare, and jackrabbits). Their genetic traits may be unable to keep pace with rapid seasonal shifts.
- Forests are getting drier across the American West. Less precipitation means that trees are becoming stressed by lower water availability. More hot, dry, and windy days make for ripe wildfire conditions.
- In the Pacific Northwest, the size, duration, and number of wildfires are increasing. It is estimated climate change contributed to an additional 4.2 million acres of forest fires during 1984–2015 (doubling the expected area).
- If greenhouse gas emissions continue at even a moderate rate, the average area burned each year in the Pacific Northwest is expected to more than triple by the 2040s, relative to 1916–2006. Climate-driven wildfires pose a unique challenge to communities as there are now over 40-million homes in fire-prone landscapes across the West.

PUBLIC LAND & CLIMATE DEFENSE

- Intact natural landscapes can provide nearly a third of the carbon mitigation needed to keep climate change under 2 degrees Celsius. Reforestation, maintaining forest protections, and habitat restoration projects are essential climate mitigation approaches that allow natural climate sinks to lock up carbon.
- Compared to technological approaches to capture carbon, natural carbon sinks are far lower cost, longer lasting, and have multiple synergistic benefits.
- Some of the best natural carbon sinks are old growth forests and coastal wetlands.
- Despite covering less than 1% of the world's land area, coastal wetlands lock up carbon for thousands of years, making them one of the longest-lived tools for climate mitigations. Coastal habitats and wetlands absorb over 10x as much carbon per land base as forests. Yet many coastal wetlands are threatened by human impacts or in need of restoration.
- For more on carbon sinks, see our **Forests & Climate Talking Points.**
- Beyond absorbing carbon, public lands buffer species and human communities from worsening climate impacts.

- Intact ecosystems enhance communities' climate resilience by stabilizing soils and slowing storm runoff, lessening flooding events and erosion and dramatically reducing the costs of extreme weather events. For example, natural water filtration by native vegetation in King County, Washington, is estimated to offer storm water benefits amounting to 5.9 billion dollars.[5]
- Forests in the United States provide drinking water to more than 180 million people. As climate impacts intensify, public lands ensure the stability of these resources. Rivers that are shaded by native species not only ensure clean drinking water for communities downstream, they also protect endangered aquatic species from rising temperatures, lessen evaporation, and slow runoff, allowing depleted water tables to recharge.
- These functions taking place on public lands directly benefit neighboring communities in the forms of clean water and air.
- Public lands provide opportunities for employment and generate billions of dollars from tourism, which helps to diversify local economies and increase their capacity to address change.
- While some cities in the Pacific Northwest have taken steps to preserve upstream landscapes, other communities are adjacent to unprotected public lands that may not always function as a source of natural climate defense if logged or fragmented.
- Built infrastructure, like dams, storm sewers, and water treatment plants require maintenance and depreciate over time. Intact or restored ecosystems are self-maintaining and appreciate in value.
- Public lands are also valuable in a changing climate because they can provide space and means for species to adapt. Many species are already responding to climate change by shifting their ranges to track suitable climatic conditions. However, habitat loss and fragmentation make it difficult for species to keep pace with these changes.
- Ecosystems that are relatively intact have a better chance of maintaining biodiversity because they are not under as much stress as ecosystems fragmented by human development

INDUSTRIALIZED PUBLIC LANDS & CLIMATE CHANGE

- As of 2013, 4.5 times more carbon is introduced to the atmosphere from drilling on public lands than these same landscapes can absorb. These emissions make up 20% of the country's total emissions.[6]

5) Exchange, A. P. E. (2005). Ecosystem Services Enhanced by Salmon Habitat Conservation in the Green/Duwamish and Central Puget Sound Watershed.

6) Goad, J., & Lee-Ashley, M. (2014, April 4). The Clogged Carbon Sink: U.S. Public Lands Are the Source of 4.5 Times More Carbon Pollution

- In the last three years, leases offered to private companies to develop new oil and gas operations on public could result in lifecycle emissions between **1 billion and 5.95 billion metric tons of CO2e**.[7]

GETTING INVOLVED

- Become involved in public land stewardship—replanting native species, removing invasive species, and conducting routine monitoring of land, air, and water conditions.
- Get to know local land agencies (local, state, and federal) and ask about the policies that are affecting the region's public lands' natural climate defense.
- Get involved in the planning process that shapes these landscapes.
- Join your local **Broadband** to continue learning about climate connections and participating in restoration and repair projects on public lands.

Than They Can Absorb. Retrieved from https://www.americanprogress.org/issues/green/news/2013/12/05/80277/the-clogged

7 The Wilderness Society. (n.d.). The Climate Report 2020: Greenhouse Gas Emissions from Public Lands.