



Climate Change Impacts on the Lummi Nation



Lummi Natural Resources Department (LNR) – Water Resources Division (LWRD)

Introduction

Climate change is occurring now. Given that the current and potential future impacts of climate change on the Lummi Nation are significant and diverse, building a climate resilient community in the face of these impacts requires coordinated and comprehensive climate preparedness planning. The Lummi Nation is preparing by taking action to reduce the causes of climate change (i.e., climate mitigation), as well as by taking action to adapt to climate change impacts that have already occurred or that will unavoidably occur in the future (i.e., climate adaptation). Planning for the future will benefit the present and build upon existing programs designed to protect human health, environmental and cultural resources, and infrastructure.

Cause of Climate Change

Anthropogenic (human-caused) emissions of long-lived, heat-trapping gases, called greenhouse gases (GHGs), into the atmosphere since the industrial era (mid-17th century) are the cause of observed changes in the Earth's climate over the past 150 years. Examples of GHGs include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and chlorofluorocarbons (CFCs). Fossil fuel burning, land use change (e.g., biomass burning from deforestation), and industrial processes (e.g., cement and fertilizer production) are a few of the many sources of human-generated GHG emissions. Increasing atmospheric concentrations of GHGs since the industrial era has enhanced the greenhouse effect, the process that mediates the Earth's energy budget. Greenhouse gases serve as the Earth's blanket, without which the Earth would be too cold to be habitable by humans. Increasing the concentration of GHGs in the atmosphere is like using a thicker blanket; the greenhouse effect is enhanced and additional warming occurs.

The positive correlation between increasing atmospheric GHG concentrations, specifically CO₂, and increasing surface temperatures over the period of the instrumental record is depicted in Figure 1.

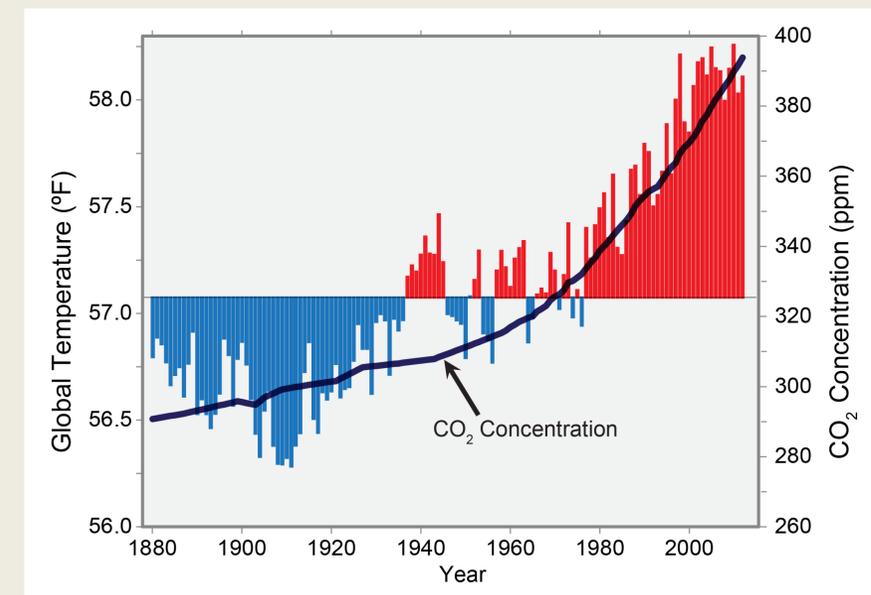
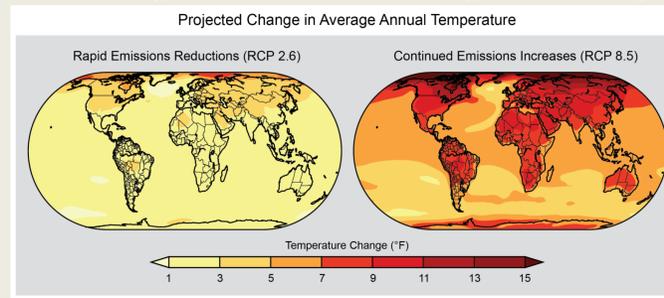


Figure 1. Global Annual Average Temperature and Atmospheric Carbon Dioxide Concentration (National Climate Assessment 2014)

Climate Change Impacts in the Pacific Northwest

Changes in climate affect not only air temperatures (a.k.a., global warming), but also sea surface temperatures, precipitation patterns, sea level, storm events, ocean acidification, and other physical systems. Although climate change is occurring globally, the impacts of climate change will vary regionally. The best available science indicates that current and future climate change impacts in the region of the Lummi Indian Reservation are likely to include the following:

Increasing air temperatures – a.k.a. global warming



Changes in precipitation – wetter winters, drier summers



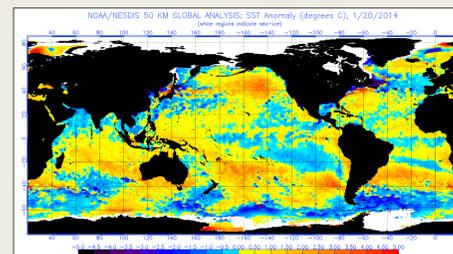
Changes in streamflow – higher winter flows, earlier spring snowmelt, lower summer flows



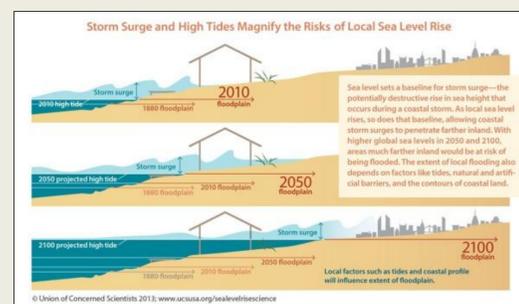
Increasing extent, frequency, and/or intensity of extreme weather events – e.g., droughts, wildfires, floods



Increasing sea surface temperatures



Accelerated sea level rise



Ocean acidification



Climate Mitigation Strategies

Although the Reservation makes only a relatively minor contribution to global carbon emissions, achieving emissions reduction goals globally will require universal support and participation. Table 1 lists some of the climate mitigation recommendations that have been adopted by the Lummi Indian Business Council (LIBC), the governing body of the Lummi Nation.

Table 1. Climate Mitigation Recommendations (LWRD 2016)

Target Area	Mitigation Strategy
Transportation Alternatives	Walk, bike, or carpool to a destination
	Provide and promote utilization of public transportation
	Invest in pedestrian-friendly infrastructure
	Drive an electric, hybrid, or high fuel economy vehicle
Building-Related Energy Efficiency	Use fuel efficient driving habits
	Conduct energy audits
	Perform energy efficiency retrofitting and weatherization
Behavior-Related Energy Efficiency	Mandate green building standards for new construction
	Provide recycling services, promote reuse of materials, and reduce consumption
	Encourage building occupants to perform energy saving measures
Renewable Energy	Promote water conservation
	Continue installation of photovoltaic (solar) arrays for electricity production
Carbon Storage	Continue installation of geothermal heat pumps in new construction
	Continue forest and wetland conservation and restoration

Selected Lummi Nation Climate Mitigation Actions to Date:

- Lummi Nation Strategic Energy Plan: 2016-2026
- Lummi Indian Reservation Wind Energy Development Feasibility Assessment
- Residential Energy Efficiency Pilot Program
- Energy Audits through the Community Energy Challenge
- Tribal Administration Building geothermal heat pump

Climate Adaptation Strategies

Coincident with actions to ensure climate mitigation, the Lummi Nation is also committed to undertake climate adaptation – the primary purpose of which is to make the Lummi Nation resilient to climate change. This will require taking proactive steps to prepare for future impacts, a planning process that will be dynamic and ongoing. Some preparedness actions are already underway on the Reservation; others will need to be developed.

Selected Lummi Nation Climate Mitigation Actions to Date:

- Lummi Nation Climate Change Mitigation and Adaptation Plan: 2016-2026
- Coastal Flood Study (RiskMAP) Partnership Agreement
- Climate change research (e.g., linking physical processes and models to changes in habitat and biological outcomes in the estuary and nearshore marine environment)

Additional Information

If you have questions please contact Jeremy Freimund, LNR Water Resources Manager (360-312-2314, jeremyf@lummi-nsn.gov) or visit our website (<http://lnnr.lummi-nsn.gov/LummiWebsite/Website.php?PageID=95>). Detailed information is available in the Lummi Nation Climate Mitigation and Adaption Plan: 2016-2026 and the Lummi Nation Strategic Energy Plan 2016-2026 (please see website provided above to access plans).