



# Lincoln County Climate Action Plan



Carbon neutral by 2035





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Earth's rapidly changing climate and rising global temperatures impact Lincoln County and the entire planet. We're already witnessing more extreme weather and climate events in our region— increase in ocean acidification, hotter summers, more summer drought conditions, more wildfires, increased flooding risk and more. Acting together early ensures that we are more empowered and prepared to preserve our health and quality of life for current and future generations.

Our Lincoln County climate action plan is the starting point to mitigate and adapt to the effects of climate change. We know that some of our descriptions and discussions will be woefully wrong in the years to come which is the reason why this document will be continually revised and updated. Co-created by the citizens of Lincoln County, the plan includes opportunities for people who live and work in Lincoln County to join together and address this challenge by becoming carbon neutral by 2035.

## How to read this Climate Action Plan

Chapters 1 – 3 of this plan describe the planning process, why we must act on climate change, and our climate action goals. Chapter 4 sets out topic-specific strategies for us all to take to reach those goals. Chapter 5 discusses the first steps of our goal to become carbon neutral goal by 2035. Throughout this document, we show pictures of public climate meetings in Lincoln County. Boxes in brown text describing the results of our 2019 climate survey.

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Guide our efforts to become climate neutral by 2035.

Plan infrastructure and land use projects

Prioritize actions and initiatives

Advocate for coordinated change with partners

Educate our community about the impact of our habits

Promote sustainable economic development

### Climate Survey Results

**88% of our respondents believe that human activity is contributing to climate change.**



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Climate action plans are typically developed by city and/or county governments. In this situation, Lincoln County citizens stepped forward to fill the void. Citizens Climate Lobby - Newport (CCL) group and 350 Oregon Central Coast (350 OCC) have been sponsoring public meetings throughout the county to educate the public about climate change for the past three years.

% 7 `ja UHY`WXUb[ Y`g fj Ym In August 2018, the two groups circulated a 10-question survey. In August 2019, the groups circulated a 31-question survey. Results of the surveys are displayed throughout this plan.

&" 7 ca a i b]mWfVcb`Zchdf]bh The Oregon Department of Environmental Quality generated an EPA computer model for us which projected that mobile and non-mobile emissions total approximately 507,000 metric tons of CO2. We used this model as our baseline to determine how much CO2 would need to be reduced or sequestered to achieve carbon neutrality by 2035.

**3. Climate Action Plan Committee (CAPC):** We formed a voluntary committee composed of Lincoln County citizens who wrote the key sections of this report. A list of the section writers and their biographies can be found on page 58 .

**4. Public engagement:** We sponsored a robust community involvement strategy, including a climate action fair, community town hall, focus group and two online surveys.

**5. Strategy and plan development:** 350 Oregon Central Coast and Citizens for a Better Lincoln County have created this plan to show how Lincoln County can become carbon neutral by the year 2035.



Representative Dave Gomberg speaking before a joint CCL/350 OCC presentation at the Newport Public Library in August 2019 about the 2019 legislative session including HB 2020, the proposed climate bill



Bill Kucha starting a Waldport climate meeting with a song in February 2020



Brian Ettling, volunteer for Citizens Climate Lobby - Portland, speaking about proposed national and state climate legislation in February 2020 at the Newport Public Library

# Public engagement UbX Wja UH'g fj Ym

OCC 350 and CCL sponsored numerous public engagement meetings and solicited feedback that was essential for the development of the climate action plan for the county. As part of the planning process, we sponsored climate survey questionnaire in 2018 and 2019. Our groups typically held one or two public engagement meetings per month in Waldport, Lincoln City, and Newport.



**What we learned from our survey: 73% of local survey respondents agree that climate change is a serious threat to the current generations while 8% believe that climate change is a mild threat. Only 6% believe that climate change is not a current threat.**

- Lincoln County is already experiencing the impacts of climate change—we need to make a change quickly.
- Lincoln County residents want to be leaders in this space, inspiring other communities to follow suit.
- Community members have ideas for translating strategies into meaningful action. They want to be a part of this community-wide effort.
- Our survey shows that people who live and work in Lincoln County need support to make these changes part of their daily routine. This support includes:
  - Education and awareness-raising
  - Accessible, easy to understand implementation resources
  - Demonstration projects and modeled behavior
  - Cost assistance

## Community engagement

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Public education meetings

%&

News articles and opinion pieces

+) )

2019 Earth Day Fair attendees

85

2020 Earth Day virtual attendees

%&)

Valid survey responses

**Climate Survey**  
**65% of our respondents believe that the Sixth Mass Extinction (ongoing extinction of other species by human activity) is happening now**

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## Greenhouse effect

Climate change is a continuous and evolving condition caused by air emissions that are created from combustion and from gases that escape into the atmosphere. When these emissions (called greenhouse gases or GHGs for short) enter the atmosphere, they act as a glass greenhouse reflecting heat back to the Earth, and which does not allow the warmth to release into space (see Figure 1). As the planet warms, climate conditions change around the world. In some areas the changes are and will be dire, making them ultimately uninhabitable due to heat or flooding from expanding warmer water and melting arctic ice.

While Figure 1 shows a large band around the planet reflecting heat back toward the Earth, the atmosphere actually is much thinner. It starts at the Earth's surface and only extends about seven miles high (Figure 2). This is roughly the height where commercial jets fly.

The average American family emits about 80 metric tonnes (2,200 lbs/tonne) of greenhouse gases each year from our cars, electricity, heat, air travel and the materials we buy. Figure 3 shows how much volume a metric tonne of greenhouse gases actually fills (this volume is averaged for all locations on Earth throughout all times of year as pressure and volume of gases varies by elevation and with the daily weather). With 126.22 million households in the United States alone, these emissions add up quickly to fill the atmosphere.

***“Owing to past neglect, in the face of the plainest warnings, we have now entered upon a period of danger...The era of procrastination, of half-measures, of soothing and baffling expedients, of delays, is coming to its close. In its place we are entering a period of consequences...We cannot avoid this period; we are in it now.”***

***Winston Churchill, in the British House of Commons, November 1936***  
*(This quote was included in the 2018 report to the Oregon State Legislature by the Oregon Global Warming Commission)*

Figure 1. Greenhouse gas effect - NOAA

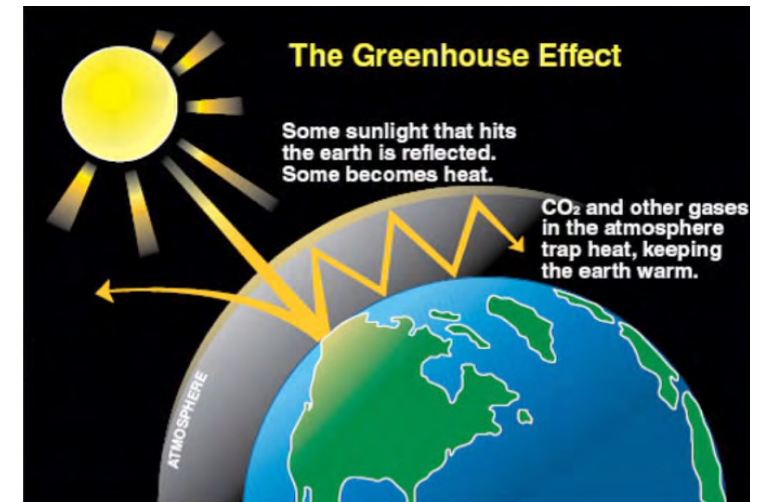


Figure 2. The Earth's atmosphere - NASA





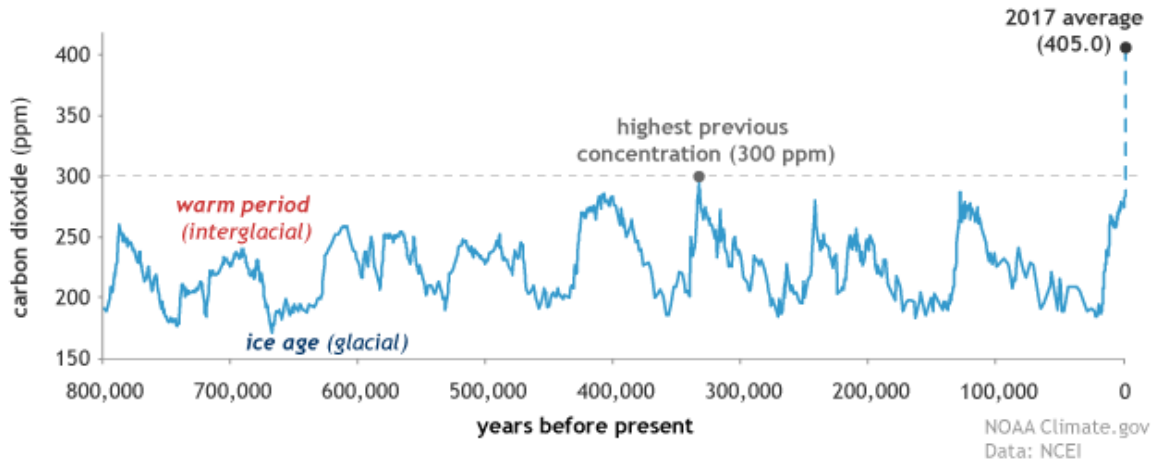
Figure 3. Volume of one metric ton of greenhouse gases - carbonvisuals.com



Figure 4 shows the increase atmospheric CO<sub>2</sub> concentrations over time. For 650,000 years, atmospheric CO<sub>2</sub> stayed of below 300 parts per million (ppm). As population began to skyrocket into the 20th century, the atmospheric CO<sub>2</sub> concentration increased exponentially. In May 2020, the average concentration was 414 ppm. If all greenhouse gases are considered, this number rises to about 490 ppm.

Figure 4. Increase in atmospheric CO<sub>2</sub> concentrations over time - (NOAA, 2018)

CO<sub>2</sub> during ice ages and warm periods for the past 800,000 years



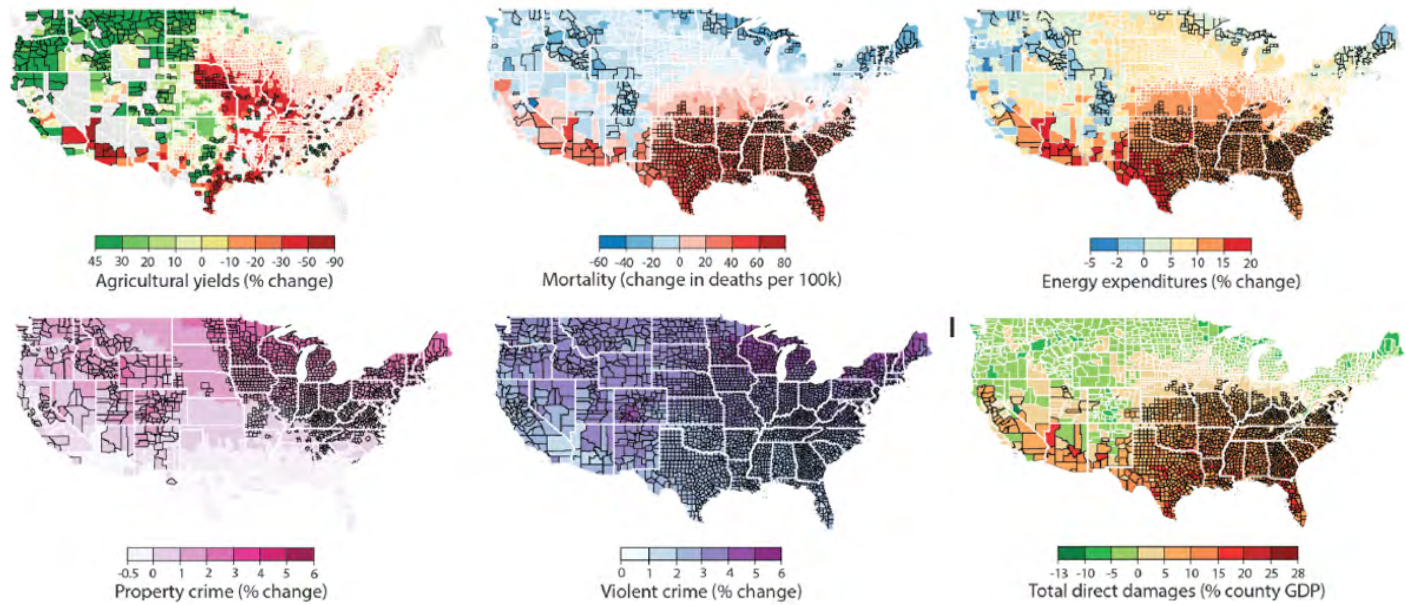
250 concerned citizens and elected state senators and representatives attend a rally in support of SB 1530 and to protest the walkout by the Republican House and Senate members at the State Capital in Salem on February 25, 2020.





# How will climate change affect the United States?

If climate change is not slowed or reversed very soon, the United States will experience many significantly increasing and irreversible impacts and cumulative effects throughout the current century. Coastal areas and tidal rivers will be affected the most due to rising sea levels as well as destabilizing effects to the fishing industry as a result of ocean acidification and hypoxia. Weather conditions will get hotter throughout the country, with already hot places becoming nearly uninhabitable. This pushes populations of plants and animals further north or to higher elevations or to extinction, as well as opening the door to expansion of invasive plant and animal populations. Crop shortages will send price shock waves through our population and will threaten the wellbeing of all, especially the poorest people. A 2017 study estimated economic benefits and damages county by county related to climate change by 2090, aggregating estimates from several other studies (Figure 5). Figure 6 shows southern states bearing much of the burden of climate change, while some trends like property and violent crime increase in the northern states (likely due to migration and population increase). Northern states are generally expected to experience economic growth while southern states experience economic damages. Figure 5. Economic damages from climate change in the United States - (Hsiang et al. 2017)



Data shown for counties without black lines around them have an 85% confidence rate, and data shown for counties with a black outline have a 95% confidence level.

<sup>1</sup> "Estimating economic damages from climate change in the United States" - Hsiang et al., Science 356, 1362–1369 (2017) 30 June 2017.

## Beyond weather changes: The "social cost" of carbon

Every metric tonne of greenhouse gases emitted damages society in many ways—from disruptions in agricultural productivity, to increased infrastructure expenses, to stress on public health. This cost to society is referred to as the "social cost of carbon." The United States National Academies of Science estimate the social cost of carbon to be \$42 per ton of greenhouse gases.



# How will climate change affect Lincoln County?

## Population shift

Due to Lincoln County's location and expected more moderate climate due to the Pacific Ocean, the county can expect continued population growth pressure as people migrate to places where water is less scarce and temperatures in the summer are more bearable. In particular, even more tourists are expected to flock to the central Oregon coast during the summer time, notwithstanding the current Covid 19 pandemic. The upper figure on the right shows the mean temperature of Northwest Oregon from 1971 to 2000. The bottom figure on the right shows the temperatures will be much warmer in the future from 2040 to 2069 under the Higher Emissions model (which is generally considered the business as usual model where people do not change their consumptive behaviors).

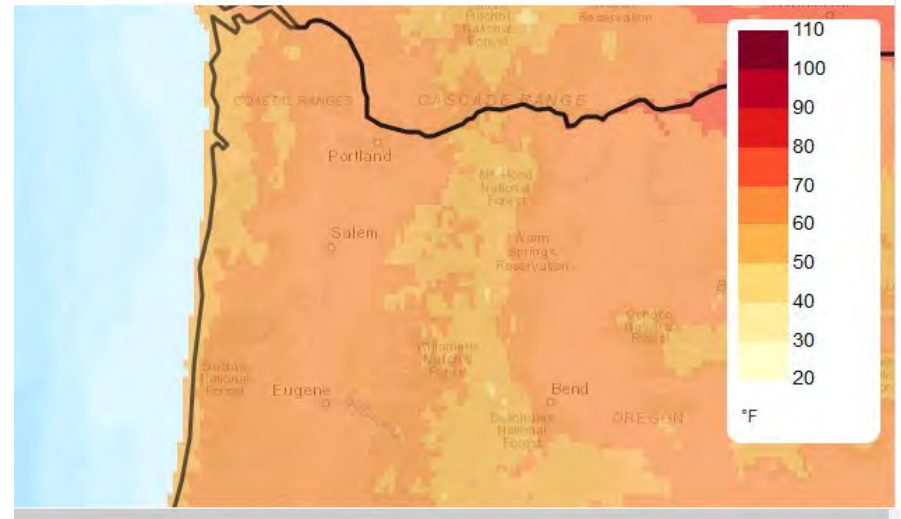
By 2100, the Portland metro area where the summer average temperature, currently 78°F, will be more like the average summer in cities just east of Los Angeles, California. In the coming years, the Willamette Valley will generally experience one day above 100°F annually, but by 2100, the Willamette Valley can expect 22 days that exceed triple digits. The high temperatures in the Willamette Valley and other parts of the U.S. will cause crowds to flood into the cooler coastal sections such as Lincoln County.

The Climate ToolBox, located at <https://climatetoolbox.org>, allows individuals to view past climate data and model likely future scenarios.

### Mean Temperature, Summer (Jun-July-Aug)

Historical simulation, 1971-2000 mean

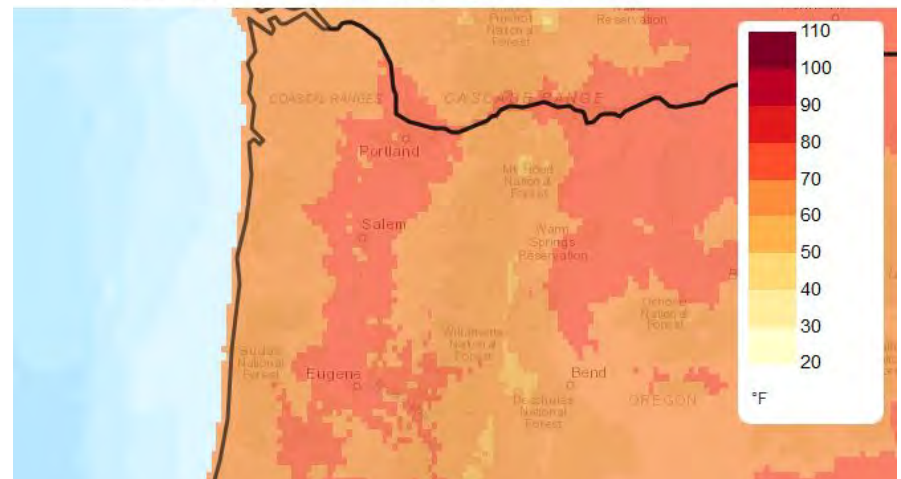
Multi-model mean derived from 20 downscaled CMIP5 models



### Mean Temperature, Summer (Jun-July-Aug)

Higher Emissions (RCP 8.5), 2040-2069 mean

Multi-model mean derived from 20 downscaled CMIP5 models

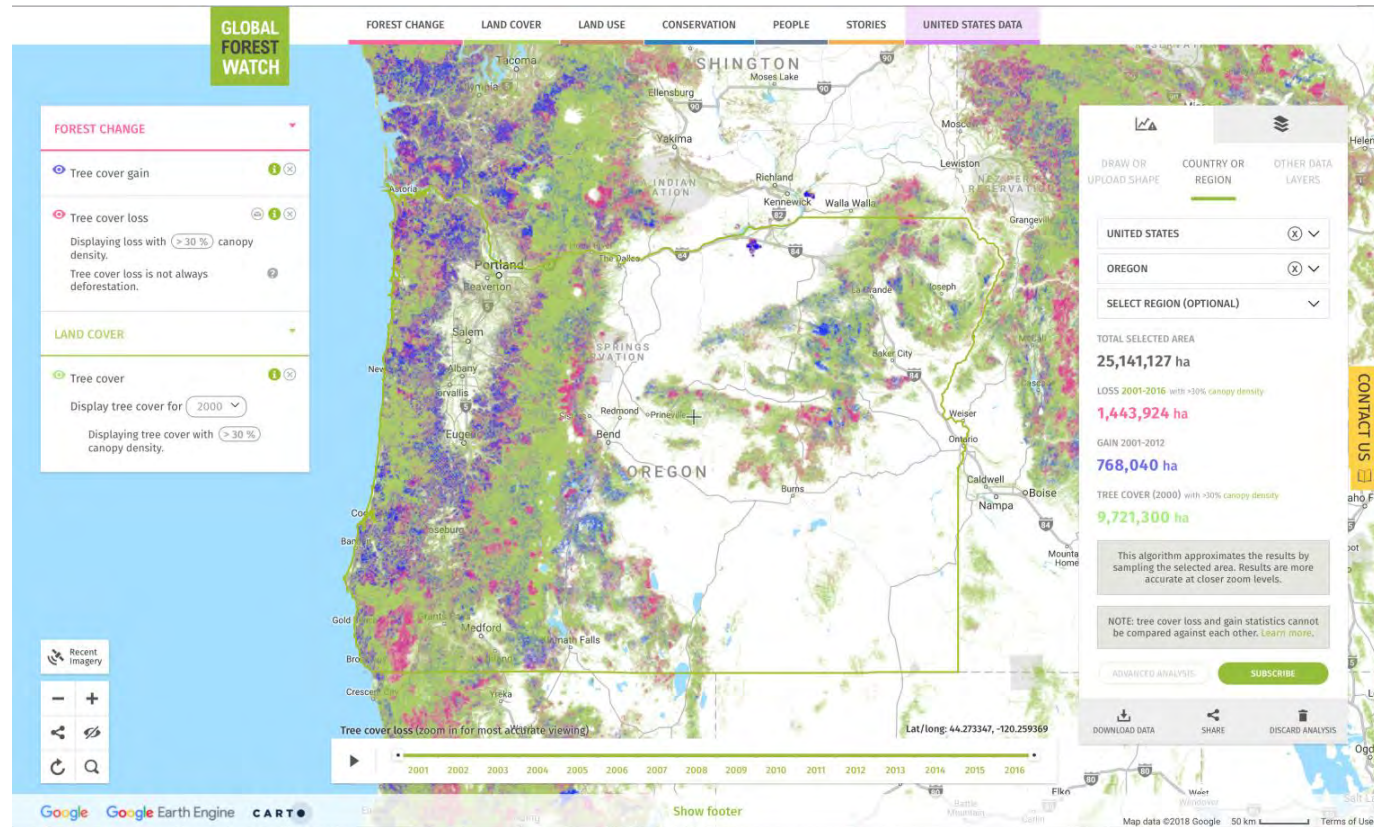




# Regional wildfire risk

According to Global Forest Watch, the state of Oregon has lost approximately 1.7 million acres of forest cover from the period of 2001 to 2017. Much of this forest cover loss is due to wildfires. For example, the Biscuit Fire beginning in July 2002 burned 500,000 acres. Much of the Kalmiopsis Wilderness was burned and tree cover has not returned, as can be seen in the southwest corner of the map.

Wildfires in Oregon have become more punishing and costly. Federal and state governments spent \$454 million and \$514 million on wildfire suppression costs in 2017 and 2018 respectively, according to data from Northwest Interagency Coordination Center. In 2017, more than 2,000 total fires burned 665,000 acres statewide. All totaled in 2018, Oregon had 1,880 fires that burned 846,411 acres or 1,322 square miles — an area larger than Rhode Island. The following forest fires table on the next page was provided by the Oregon Forest Resources Institute, based upon information from the Northwest Coordinating Center. While two intense fire years in a row does not necessarily mean a trend, climate scientists have been predicting for years that there will be an increase in the number of wildfire acreage burned throughout the West.



## Oil Companies: A Final Note

**We applaud the real progress Oregon has made in resetting our electric utilities toward a low-carbon future, and regret our failure to do the same in transportation. Much of this slow slog is due to the well-financed resistance from oil companies determined to extract the last dollar of profit out of a product that has no place in a decarbonized world. Upton Sinclair, the quotable muckraker from this country's first Gilded Age, said it best: "It is difficult to get a man to understand something when his salary depends upon his not understanding it."**

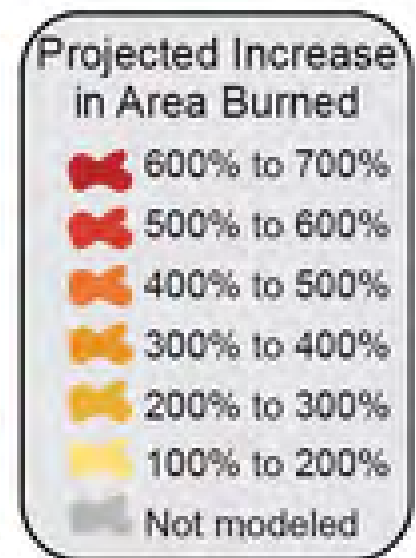
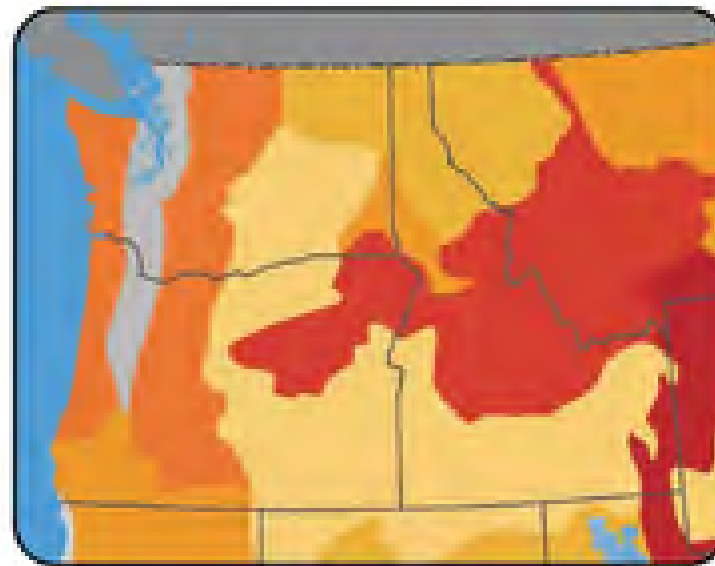
**Not Upton Sinclair, not Doonesbury, not even The Onion could imagine theater as absurd as this. I leave readers to draw their own conclusions.**

**Angus Duncan, Chair  
Chair's Letter to the 2018 Biennial Report to the Oregon State Legislature  
Oregon Global Warming Commission  
September 24, 2018**

**Forest fires and acres burned in Oregon - 2014-2018**

Year	ODF Protected			USFS Protected			Combined Total	
	Fires (number)	Size (acres)	Average (acres/fire)	Fires (number)	Size (acres)	Average (acres/fire)	Fires (number)	Size (acres)
<b>2018</b>	964	90,704	94	667	349,123	523	1,631	439,827
<b>2017</b>	1,090	47,165	43	718	470,718	656	1,808	517,883
<b>2016</b>	396	4,529	11	561	45,663	81	957	50,192
<b>2015</b>	1,139	72,439	64	1,104	256,835	233	2,243	329,274
<b>2014</b>	1,184	114,089	96	1,410	119,280	85	2,594	233,369
<b>Total</b>	<b>4,773</b>	<b>328,926</b>	<b>69</b>	<b>4,460</b>	<b>1,241,619</b>	<b>278</b>	<b>9,233</b>	<b>1,570,545</b>

Oregon State University's Oregon Climate Change Research Institute (OCCRI) analysis has projected the likely scenarios of increased burning in the Northwest. The figure to the right shows the projected increase in fire disturbance. By 2040, we can anticipate a 400% to 500% increase in the number of acres burned along the Oregon Central Coast.



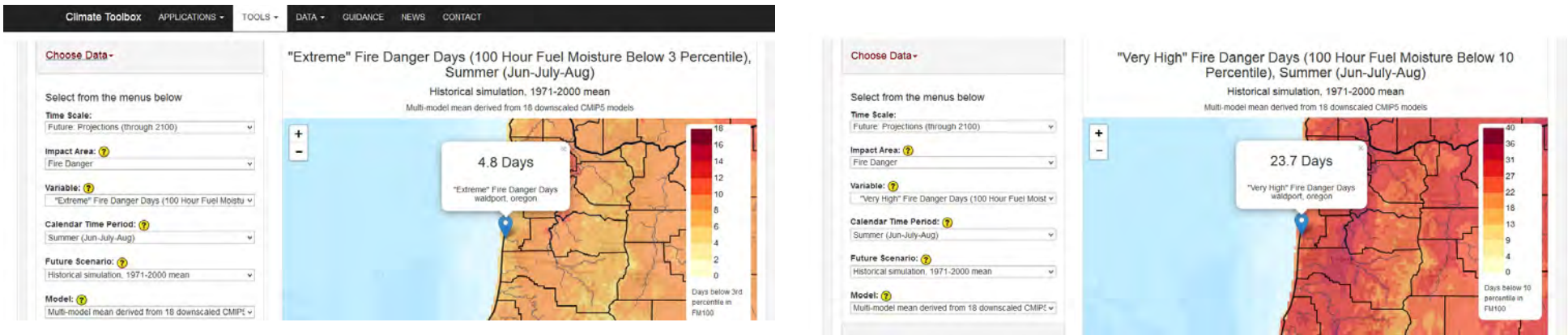
**Climate Survey Results**

**74.5% of our respondents agreed that climate change is reducing the amount of snowpack and summer rains which, in turn, are drying out the forests and making the forests more prone to wildfires.**

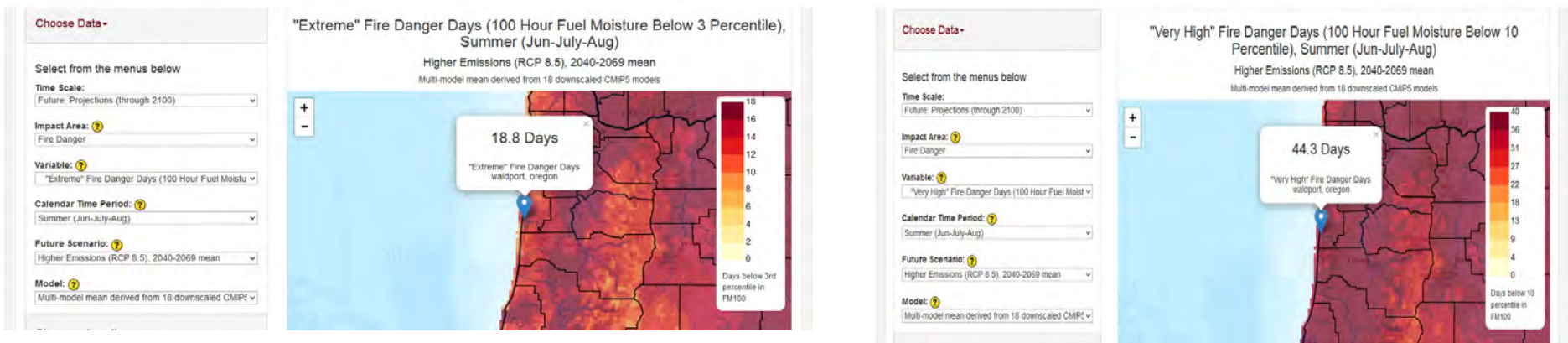


# Extreme fire risk in Lincoln County

The first figure on the left shows the historical average number of extreme fire danger days in western Oregon from 1978 to 2000 which amounts to less than five days in the summer. The figure to the immediate right below shows the historical average number of "very high" fire danger days in western Oregon from 1978 to 2000 which amounts to less than 24 days in the summer. (Source: Climate Toolbox)



Fast forward to the years 2040 to 2069 with a higher emissions model (RCP 8.5). The first figure on the bottom left shows that the number of "extreme" fire danger has quadrupled to 14 days in the summer. The second figure to the immediate right below shows that the number of "very high" fire danger days has nearly doubled to 44 days in the summer. (Source: Climate Toolbox)



The oceans cover 71 percent of the Earth's surface and contain 97 percent of the Earth's water... 99 percent of the living space on the planet.

Hawai'i Pacific University's Oceanic Institute



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The fishing and crabbing industry of Lincoln County's coastal communities will be hard hit by the changing chemical make-up of the ocean as well as the significant ocean warming. The impact of fossil fuels and resulting climate change to the world's oceans is occurring in three major ways:

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The oceans absorb roughly 25% of the carbon dioxide released from burning fossil fuels, causing cWU'UWX]WU]cb, which has profound ja dUWg on the ability of crustaceans to form their shells. Shellfish, shrimp, lobster, and coral reefs all depend on carbonate ion to form their shells. Acidification also impacts the ocean's ability to hold oxygen, thus further seriously disrupting marine life.

The U.S commercial fishing and seafood industry (including imports) generated \$144 billion in sales in 2015, a 6-percent decline from the previous year, and supported 1.2 million jobs, a 15-percent decline from 2014, although this is still above the five-year average. Factors such as the "warm blob", marine toxins, and El Nino affected the Pacific marine environment in 2015...

- NOAA, US Department of Interior

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The oceans have been absorbing approximately 90% of the heat from the greenhouse effect caused by excess CO<sub>2</sub> in the atmosphere and oceans are warming rapidly. Warming oceans cause the bleaching of coral reefs that serve as life support systems for phytoplankton, which produce between 50-70% of global oxygen. Coral reefs are the foundations of fisheries worldwide, supporting life systems for over 25% of aquatic life, serving as spawning grounds for massive numbers of fish species who breed in the reefs before releasing into the open seas. The globe has already lost roughly 25% of its coral reefs and if measures are not taken to curb these trends, scientists estimate 90% will be dead by 2050.

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Agricultural runoff from synthetic nitrogen fertilizer which is made with high volumes of natural gas is creating yet another hazard, algae blooms which are dramatically altering our waterways. In 2018, global use of synthetic nitrogen fertilizer reached an incredible 120 million tons. Some blooms are so tremendous in size they can be observed from outer space. The overall health threat to ocean life posed by algae blooms is dire as they strip oxygen from water, suffocating aquatic life and creating oceanic dead zones. Toxins released by these blooms also pose serious health risk to humans through contact with affected waterways and through consumption of contaminated fish.



***Our children, and theirs, will be living for decades with the worsening consequences of our failure to take timely action when we knew we should.***

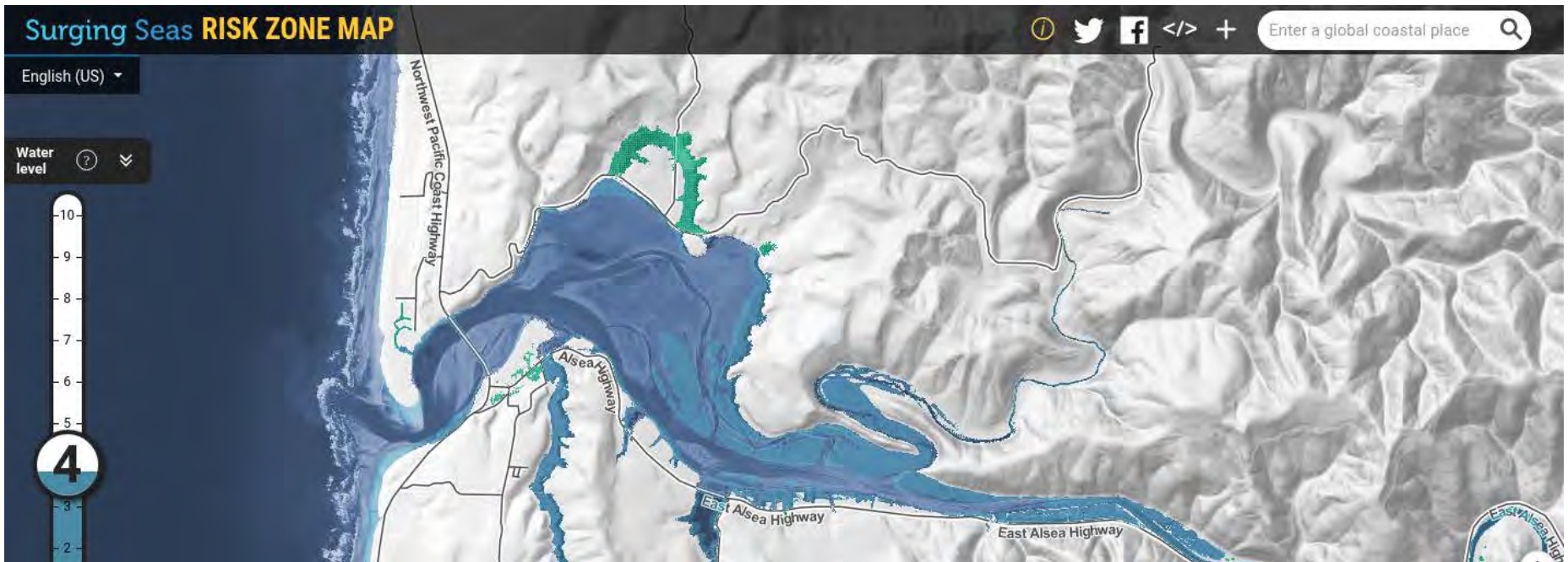


# Projections of future sea levels vary according to whether, when, and how much CO2 emissions are cut.

A draft of a US government report on climate change projects that even if emissions are cut to reach zero by 2080, we'll still see between one and four feet of sea level rise by 2100 in Lincoln County. Without the cuts, it suggests that an eight-foot rise can't be ruled out. Sea level rise at specific locations may be more or less than the global average due to local factors such as land subsidence from natural processes and withdrawal of groundwater, changes in regional ocean currents, and whether the land is still rebounding from the compressive weight of Ice Age glaciers.

The two major causes of global sea level rise are thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets. The oceans are absorbing more than 90 percent of the increased atmospheric heat associated with emissions from human activity

In 2009, as part of the international launch of 350.org, Vicki Osis, marine education specialist recently retired from Hatfield Marine Science Center, gave a presentation at the Waldport Library on projected sea level rise. In preparation for her presentation, the County Surveyor's office located elevation benchmarks in Old Town near the north end of Mill Street, the south end of the Asea Bridge on Highway 101, the north end of the sea wall along Highway 101 and the east end of the Lint Slough Bridge on Highway 34, indicating an average elevation in lower Waldport of 12.24 ft. The current mean high tide level was 7.5 ft., and the highest recorded storm tide in the area at that time was 12.28 ft.





## Why we must change

In urban settings, rising seas threaten infrastructure necessary for local jobs and regional industries. Roads, bridges, water supplies, sewage treatment plants, landfills—virtually all human infrastructure—is at risk from sea level rise. Most of Old Town, Waldport, was built on land fill.

Higher sea levels mean that deadly and destructive storm surges push farther inland than they once did, which also means more frequent nuisance flooding. Disruptive and expensive, nuisance flooding is estimated to be from 300 percent to 900 percent more frequent within U.S. coastal communities than it was just 50 years ago. Communities less than four feet above the mean high tide level are at risk for frequent flooding.

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*King tides on the Oregon coast are pushing further up estuaries due to sea level rise.*



*King tides flooding a parking lot in Waldport*

The population and homes exposed are just part of the story. Flooding to four feet would reach higher than a huge amount of dry land, covering some three million acres of roads, bridges, commercial buildings, agricultural lands, toxic waste dumps, schools, hospitals, and more. Coastal flooding made worse by global warming and rising seas promises to cause many billions of dollars of damage over the coming decades. Even a small increase can have devastating effects on coastal habitats farther inland, it can cause destructive erosion, wetland flooding, aquifer and agricultural soil contamination with salt, and lost habitat for fish, birds, and plants. And the prospect of higher coastal water levels threatens basic services such as Internet access, since much of the underlying communications infrastructure lies in the path of rising seas.

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As a result of these risks, many coastal cities are already planning adaptation measures to cope with the long-term prospects of higher sea levels, often at considerable cost. Examples include building seawalls, rethinking roads and considering ecosystem-based adaptation (natural resources) to absorb and sequester CO2 from the atmosphere. Scaling up ecosystem-based adaptation delivers greater climate resilience and additional benefits like biodiversity conservation and the creation of greener, more livable cities

A significant shift is under way, dividing the climate challenge into two related, but distinct, priorities: personal and local choices working to curb greenhouse gases to limit odds of worst-case outcomes later this century while boosting resilience to current and anticipated climatic and coastal hazards with just as much fervor. There's action from the top down, and—perhaps more significant in the long run—from the bottom up.

Federal funding to offset local costs of coastal communities in preparation for inevitable sea rise should come from the subsidies paid to fossil fuel corporations responsible for the crisis and from a drastic cut to our bloated military budget, since our military and its 800 bases worldwide are the biggest users of fossil fuels.



*A California gray whale cruising the Yaquina Head Outstanding Natural Area.*

## Climate Survey Results

**Would you support a modest increase in the tourist room tax charged in Newport, Lincoln City, and other towns in Lincoln County to pay for mitigation and sequestration costs of greenhouse gas emissions generated by tourists?**

<b>Yes</b>	<b>72%</b>
<b>No</b>	<b>20%</b>
<b>Not sure</b>	<b>8%</b>

## K Uter si dd`nřWčbgYfj Uĥcbž'UbX`fYgĵ]YbWm

Water resources in Oregon are experiencing increasing pressures because of overuse. Stream flow diversions for municipal water supply in Lincoln County are currently exceeding sustainable use of surface water resources, particularly during the summer and early fall low-flow months. As a result, future reliability of municipal water supplies and increasing impacts to stream ecosystems are at serious risk. In addition, two colliding factors - future growth and climate change - require action now to improve management of water resources into the foreseeable future to ensure water supply reliability and the resiliency of stream ecosystem services.

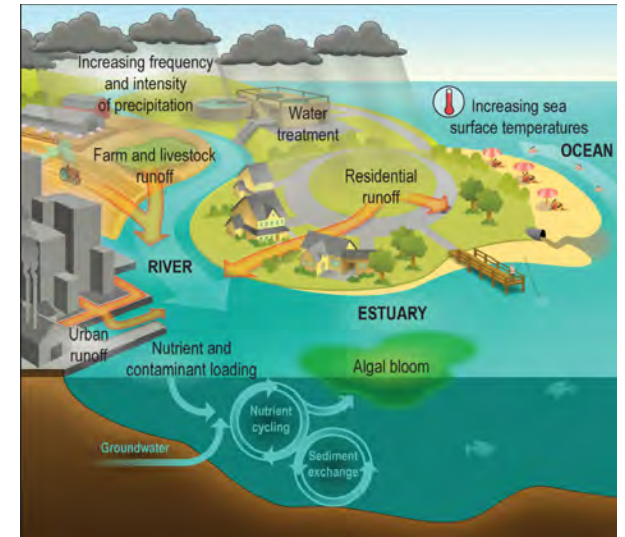
This section addresses water resource issues in Lincoln County, including the linkage between climate change and water resources, land and forest resources, wetlands and estuaries, and carbon sequestration. Identified approaches to water conservation herein are proposed to assist Lincoln County municipalities adapt to the effects of climate change in a manner that increases the reliability and sustainability of water resources, a foundational resource that must be effectively managed to ensure an enduring economic stability and quality of life for all.

This section is organized as follows: a brief discussion of water rights regarding "beneficial use" per Oregon Water Law, an initial statement, problem description, supporting data/information and examples, goal statement, recommended solutions and actions, coordination, and regulatory drivers.

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Each municipality that diverts water from a stream, for service to residents and businesses within its service area, must have a "water right" obtained from the Oregon Water Rights Department (OWRD). As described in Understanding Water Rights in Oregon – A Guide for Land Trusts (Coalition of Oregon Land Trusts, 2017), "All surface water and groundwater in Oregon is publicly owned, and its use is administered by the OWRD. Water rights, therefore, are rights to use water allocated by the state to users. In practice, any consumptive use of water—that is, a use that requires water to be diverted from the source, such as irrigation—must comply with state laws governing that use. Like other western states, Oregon follows the doctrine of prior appropriation, or "first in time, first in right": this means the first person to divert water and put it to beneficial use can acquire a right to the continued use of the water that is enforceable against subsequent diverters in times of shortage.

Precipitation and temperature changes affect water quantity and quality - Trtjani, J. et. al, 2016



**One of the basic legal principles that govern water use under prior appropriation, is "Beneficial Use"**

Beneficial Use is defined (Coalition of Oregon Land Trusts, 2017) as follows: water may be legally diverted from the source only if used for a beneficial purpose without waste.

- Beneficial uses include, but are not limited to, the following: irrigation, domestic, industrial, municipal, and instream.
- Water diversion that exceeds the quantity needed to fulfill the beneficial use constitutes waste and cannot form the basis of a water right.



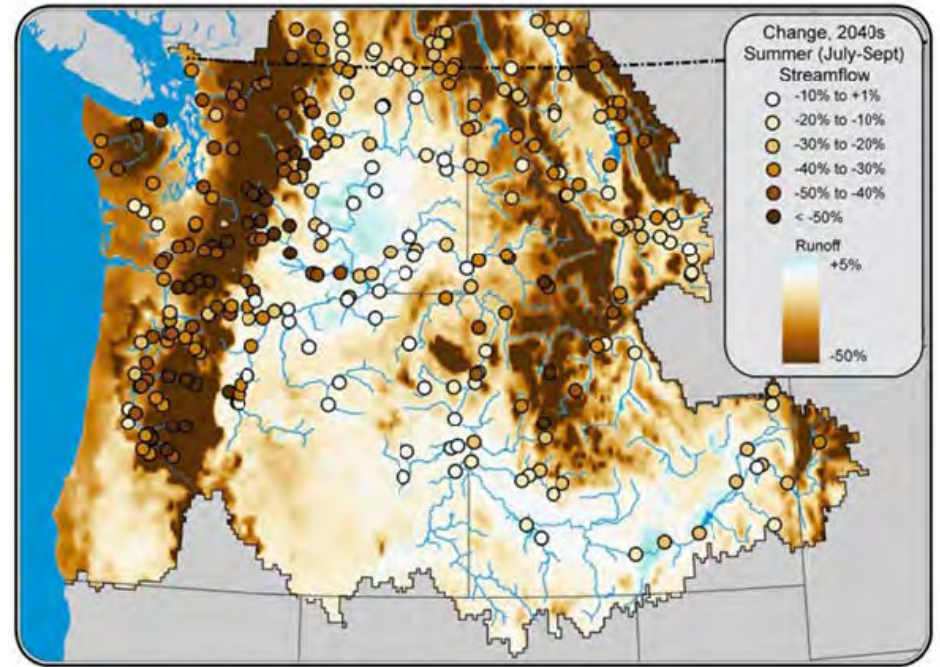
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As defined above, "waste" is a key provision under beneficial use. While it may be difficult to demonstrate examples of "waste" from a diverted source of water, this section will focus on areas of water use that are, at best, inefficient and subject to improved (conserved) use. The goal of water conservation herein is to reduce the rate and volume of water diverted at the stream source, thereby conserving water to remain instream to provide a multitude of ecological and aesthetic value, to reduce costs of potable water treatment as a result of lower demand, and to reduce the costs of wastewater treatment as a result of lower volumes used by residents and businesses. Ecosystem benefits include cooler water temperatures during low-flow months, healthy fisheries during all life phases, and improved stability of stream banks and riparian areas that collectively serve aquatic and terrestrial populations of plants and wildlife, as well as for the aesthetic enjoyment of healthy ecosystems which belong to the public trust.

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The issue is that water is a limited natural resource. Municipalities in Lincoln County draw their water supply from area streams. Demand on municipal water sources, such as the Siletz and Yachats rivers and other area streams, during low-flow summer and early fall periods often exceeds the minimum stream flow for maintaining healthy fish and aquatic ecosystems, wildlife, and water quality. In addition, the duration of the low-flow season is expected to increase due to climate change, and increased demand due to population growth will put further stress on these streams for municipal water supply.

In summary, the issue is that water is a limited resource that is already in a state of overuse in Lincoln County, leaving communities at risk of unreliable water supplies as well as deeper ecological impacts to our already strained stream ecosystems.



## Climate Survey Results

*How much would you be willing to pay for actual mitigation costs to reduce greenhouse gases and mitigate climate change?*

<b>1% of income</b>	12%
<b>2% of income</b>	9%
<b>3% of income</b>	11%
<b>4% of income</b>	2%
<b>5% of income</b>	26%
<b>Not willing to pay anything</b>	19%
<b>Other</b>	20%



## Problem description

### Municipalities will be forced to restrict further water use

As Lincoln County population continues to grow and industrial demand increases, municipalities will be forced to further restrict water use more than they currently do in several central coast towns. Early planning and preparation for these eventualities are the responsibility of the local/regional municipalities, whose primary role is to maintain the health and safety of community water resources. Municipalities must put more emphasis on technologies, practices and incentives that encourage water conservation and reuse. Water conservation measures identified herein can be used by municipalities to prioritize and to request funding from the state carbon fee and reinvestment fund for implementation.

Presently in-stream water quality requirements are either not established or not being met. All streams used for water supply by municipalities in Lincoln County from Lincoln City to Yachats fail to meet the Clean Water Act Section 303(d) water quality standards, with impaired uses that include fish and aquatic life; public and private domestic water supply; and water contact recreation. Causes of impaired use include temperature, dissolved oxygen, turbidity, and E. coli. For more information on the 303(d) listed streams in the Lincoln County region, refer to the map and 303(d) database prepared by Oregon Department of Environmental Quality (DEQ): <https://hdcgcx2.deq.state.or.us/HVR291/?viewer=wqsa>.

Summer demand on the Siletz and Yachats rivers and other municipal water sources have been a serious concern in recent years regarding overdraft of water supplies during the low-flow season and the corresponding impacts to stream ecosystem health, including for salmon and steelhead populations. During the summer of 2019, numerous articles appeared in local news media citing pleas by city officials in Newport, Lincoln City, Toledo, Siletz and Seal Rock for area residents and businesses to voluntarily conserve water to reduce demand in order to minimize impacts to the Siletz River related to low-flow and water quality issues. Unless effective measures to conserve water are developed and implemented in the near-term, mandatory water-use restrictions may be required for Lincoln County communities as this water supply condition worsens during periods of extended drought and coupled with future growth. According to area water district officials, "a sustainable water supply is vital to the health and safety of our communities" (Newport New Times, August 7, 2019).



*Earth Day Celebration - April 22, 2019 at the Newport Public Library. Newport Middle School students present their climate change information to a packed room sponsored by Citizens Climate Lobby - Newport and 350 Oregon Central Coast.*



On September 13, 2019, the Newport News Times reported “Low stream-flow is forecasted to continue for the Siletz River, a water source relied upon by the communities of Newport, Toledo, Siletz and Seal Rock. In addition to impacting drinking water supplies, low stream flow can have significant impacts on farm, forest, recreation and natural resources sectors. Officials say preparation and timely response to low stream flow conditions are vital to the health and safety of local communities.” The article cites requests by the cities of Newport, Toledo, Siletz and the Seal Rock Water District, asking their customers to conserve water by minimizing outdoor irrigation, refrain from washing cars and other non-essential uses of water for the remainder of the summer and early fall low-flow season.

Similarly, the City of Yachats curtailed water use in 2015, 2018, and 2019 due to low flows on the Yachats River. Access to water was shut off among farms with junior water rights and testing of fire hydrants and hoses was restricted during low stream-flow periods (Yachats News, September 4, 2019).

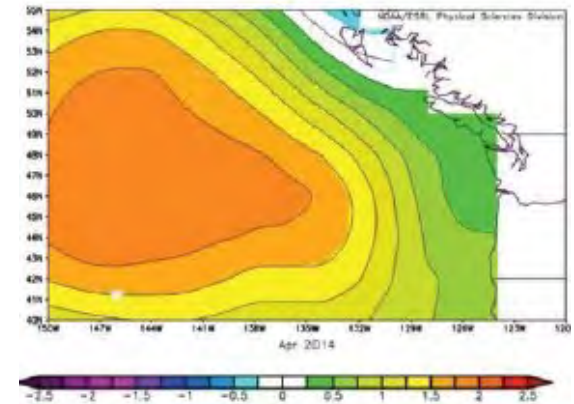
Other related news articles include a request by the Kernville-Gleneden Beach-Lincoln Beach Water District for voluntary water conservation by its customers (Newport News Times, August 30, 2019).

**Goal Statement**

The primary goal of water-supply resiliency measures is to identify and prioritize ways to reduce water use to a level of sustainable demand from limited water resources. Such measures would encourage municipalities, agriculture and other industries to reduce water demand through development of a focused, interrelated suite of water conservation measures, regulations, education and incentives.

Municipalities must be encouraged to manage water-supply resources and usage to maximize hydrologic stability, ecosystem health and storage capacity of its source watersheds (i.e., retention of rainfall by surrounding lands and forests, resulting in reduced storm runoff and erosion, and increased groundwater recharge to enhance stream baseflow during summer months when rainfall is scarce) and ensure that all in-stream water quality requirements are met in order to remove rivers and streams from the 303(d) list.

Now is the time to initiate bold steps to reduce demand through water conservation before a deeper water supply crisis develops, and to address future conditions which are projected to be further stressed by climate change such as longer, hotter summers, and periods of persistent droughts.



“The Blob is an anomalous body having sea surface temperature much above the normal (+2.5°C), seen here in a graphic of April 2014 by the NOAA” (from Wikipedia article: “The Blob (Pacific Ocean).” The phenomenon was detectable into the fall of 2018. It is thought to affect West Coast weather patterns as well as ocean food web nutrient levels by dampening upwelling of deep, cold, nutrient-rich ocean waters.

Source: Wikipedia, 2016, “The Blob (Pacific Ocean),” [https://en.wikipedia.org/wiki/The\\_Blob\\_\(Pacific\\_Ocean\)](https://en.wikipedia.org/wiki/The_Blob_(Pacific_Ocean))

**Climate survey results**

**58% of the respondents who volunteered to participate in community efforts would help to develop water cisterns and catchments.**

## Climate Survey Results

### How confident are you that the federal, state, and local governments can effectively reduce greenhouse gases?

On September 13, 2019, the Newport News Times reported "Low stream flow is forecasted to continue for the Siletz River, a water source relied upon by the communities of Newport, Toledo, Siletz and Seal Rock. In addition to impacting drinking water supplies, low stream flow can have significant impacts on farm, forest, recreation and natural resources sectors. Officials say preparation and timely response to low stream flow conditions are vital to the health and safety of local communities." The article cites requests by the cities of Newport, Toledo, and Siletz and the Seal Rock Water District, asking their customers to conserve water by minimizing outdoor irrigation, refrain from washing cars and other non-essential uses of water for the remainder of the summer and early fall low-flow season.

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## Climate survey results

### How confident are you that the federal, state, and local governments can effectively reduce greenhouse gases?

<b>Very confident</b>	<b>21%</b>
<b>Somewhat confident</b>	<b>40%</b>
<b>Not at all confident</b>	<b>35%</b>
<b>No answer</b>	<b>4%</b>

### How confident are you that business and industry can reduce greenhouse gases?

<b>Very confident</b>	<b>27%</b>
<b>Somewhat confident</b>	<b>37%</b>
<b>Not at all confident</b>	<b>30%</b>
<b>No answer</b>	<b>6%</b>



# " Our climate action goal of carbon neutrality by 2035

## The science behind our climate action goals

The United Nations International Panel of Climate Change (IPCC) has set a goal to keep global average temperature increases below 2°C (3.6°F) above pre-industrial conditions—often referred to as the “guardrail goal.” This correlates to keeping atmospheric CO<sub>2</sub> concentrations roughly around 450 ppm.

To achieve the guardrail goal and avoid devastating climate impacts, the IPCC states we must aim to be “carbon neutral” by 2050 and become “carbon negative” for the following 50 years – requiring us to pull greenhouse gases out of the atmosphere into our soils, vegetation on land and in our oceans, and through technologies that have yet to be tried at scale. Given that climate scientists have usually been under-stating the extent of the climate crisis, we are assuming that the tipping point has already been breached. Our Lincoln County climate action goal—informed by the IPCC and advice from other climate experts—is for

- By 2021, Lincoln County citizens will vote on an initiative to establish a carbon neutral goal by 2035 and establish a public corporation to direct local climate efforts.
- By 2023, the public corporation, Lincoln County governments, Central Lincoln PUD, Siletz Tribe, and large businesses will have plans developed to become carbon neutral by 2035.
- By 2025, initial carbon sequestration projects will be in place to ramp up in the next ten years to offset 250,000 tons of CO<sub>2</sub> emissions.



### GUARDRAIL GOAL

A goal identified by the IPCC to avoid catastrophic, irreversible impacts from climate change. The goal equates to keeping the level of CO<sub>2</sub> in the atmosphere below 450 ppm which is probably too high of a level.

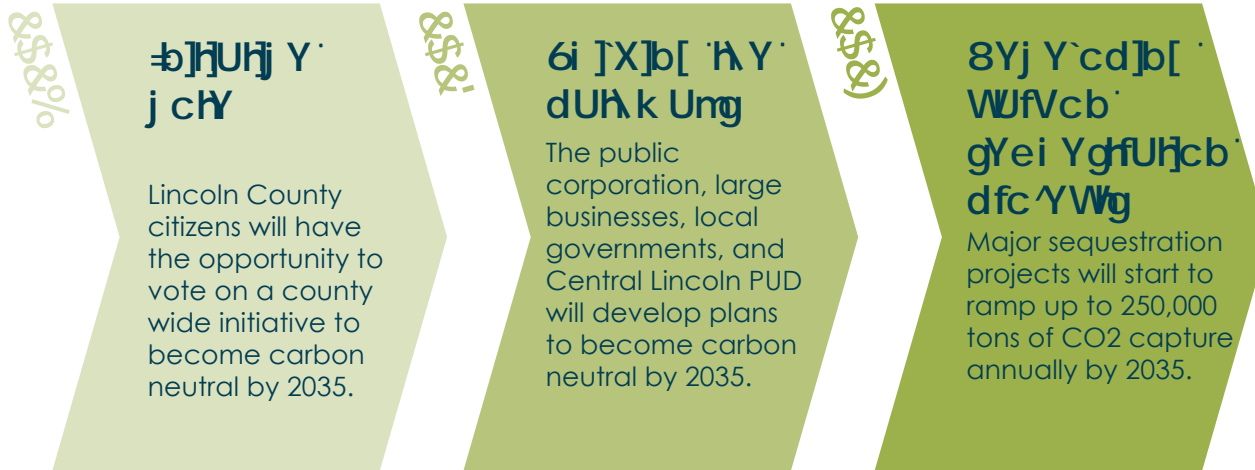
**Our goal:**

By 2035, Lincoln County will be carbon neutral, meaning we will balance the amount of greenhouse gases we emit with the amount we remove from the atmosphere.

**Climate survey**

Over 70% of the respondents support the development of wind/solar energy and related jobs along the central Oregon coast. 65% support wave energy and related jobs along the central Oregon coast.

Initial five year Lincoln County climate action goals



### Our carbon footprint

Based upon an EPA mobile and non-mobile computer-generated model run by the Oregon Department of Environmental Quality, mobile emissions (transportation) generate approximately 489,000 metric tons of CO2. An additional 17,000 metric tons of CO2 are generated by non-mobile sources such as construction, logging, and other mobile business activities. Local emissions are those that are generated inside of the community's geographic boundaries, including combustion emissions, emissions from electricity generation that serves the community and gasses that escape into the atmosphere, so called "fugitive emissions," such as leaks from gas lines or refrigerants for cooling.

Further study needs to be completed to better refine the amount of CO2 equivalent emissions throughout the county.



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The total inventory of greenhouse gas emissions within a geographic area.

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### What does "no net emissions" or "net zero" mean?

"No net emissions" means overall, Lincoln County citizens will either offset or reduce their greenhouse gas emissions completely. In other words, our community's homes, businesses and structures will emit no more greenhouse gases than they consume, either through energy efficiency, using renewable sources or by purchasing emission offsets. Like a bank account, the "net balance" of greenhouse gas emissions at the end of the year will be zero across all of Lincoln County.



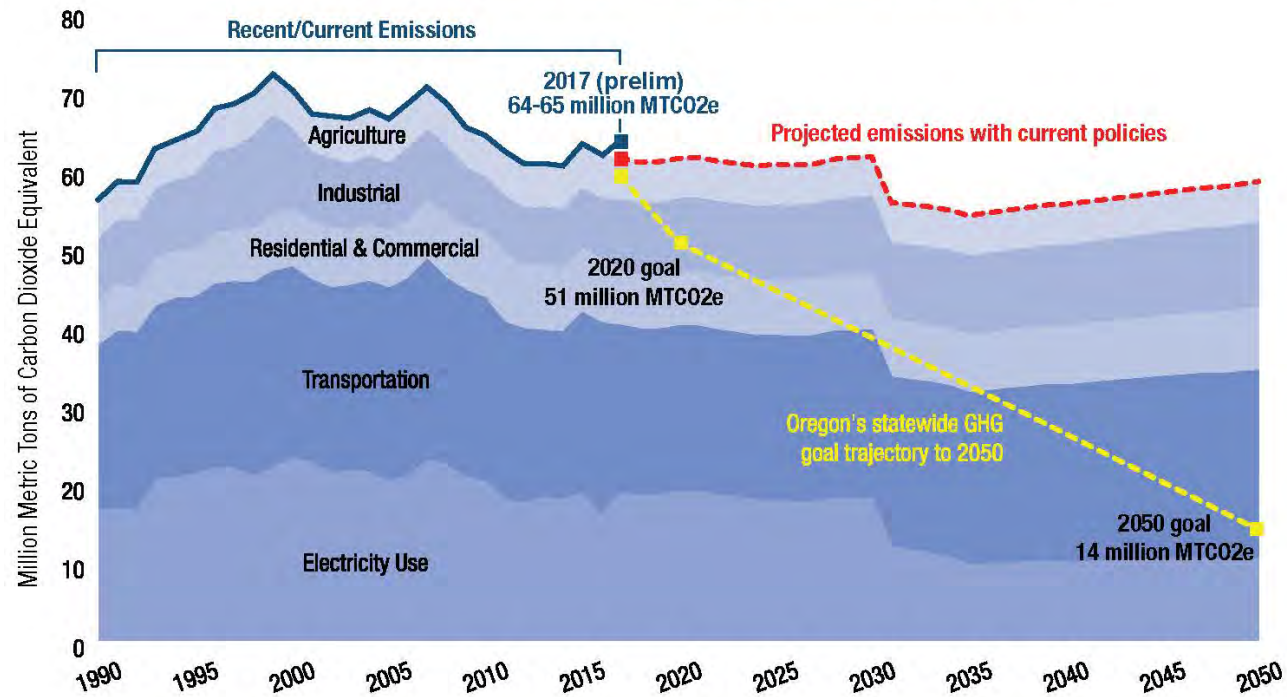
# How fast do we have to change in the state of Oregon?

Due to the walkouts by the Republican Senate and House members in both the 2019 long session and the 2020 short session, Governor Kate Brown signed an executive order on March 10, 2020 that establishes the same aggressive greenhouse gas emission reduction goals that were contemplated under the Senate Bill 1530. The executive order will seek to reduce emissions to 45% below 1990 levels by 2035 and to 80% below 1990 levels by 2050. Our goal in Lincoln County is more ambitious to achieve a carbon neutral goal by 2035 as a leader to further reduce emissions that are already accumulated in the atmosphere.

Greenhouse gas reduction benchmarks to reach carbon neutrality by 2050

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	2025	2030	2035	
Carbon neutral by 2035	15%	45%	100%	4%

Figure 1. Oregon past and projected greenhouse gas emissions compared to goals





# Lincoln County Climate Action Plan

As part of our effort to develop this citizen-driven Lincoln County climate action plan, we contacted the Oregon Department of Environmental Quality for an estimate of the amount of greenhouse gases generated in Lincoln County. The DEQ does not have a report on actual greenhouse gas emissions in Lincoln County except for a few facilities such as the Georgia Pacific mill in Toledo that are required to track their CO2 emissions. To the credit of DEQ, an air quality specialist ran a special EPA computer model program that can generate on-road and non-road emissions for a particular region in the United States. That EPA model report estimated on-road emissions of 489,121 tons of CO2 annually for Lincoln County.

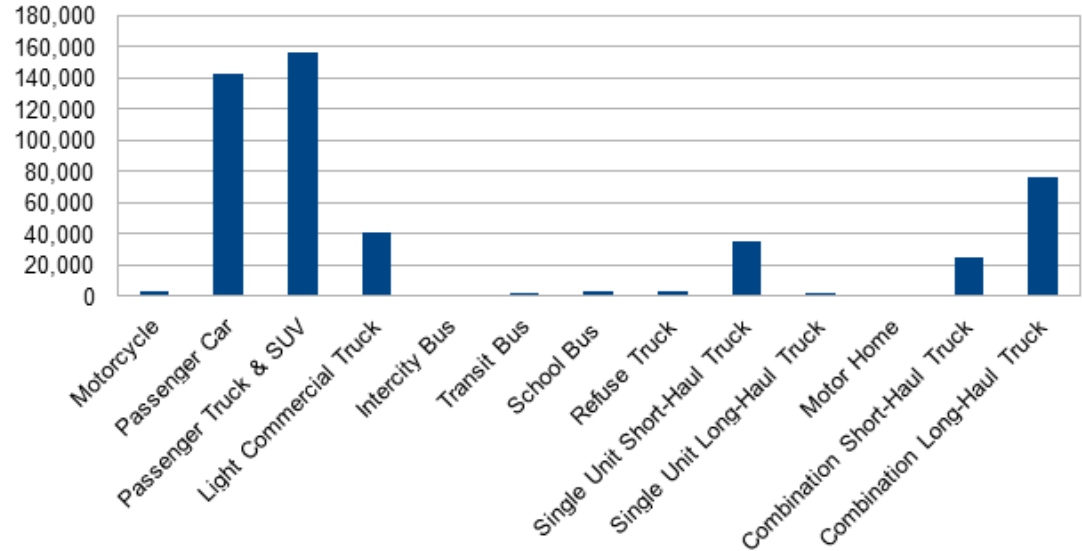
## Vehicle use

Passenger trucks and SUVs account for 156,000 metric tons while passenger cars total 142,000 metric tons, which combined account for 61% of the total on-road emissions. Since the EPA program is a national modeling of likely emissions, the EPA program likely under-estimates certain categories such as motorhome emissions that occur along our scenic coast of Lincoln County. The EPA modeling program also estimated non-road emissions such as logging, construction and other activities total to be 17,000 metric tons. Please note the significant difference in the amount of CO2 tons between the two charts regarding mobile emissions versus non-road emissions.

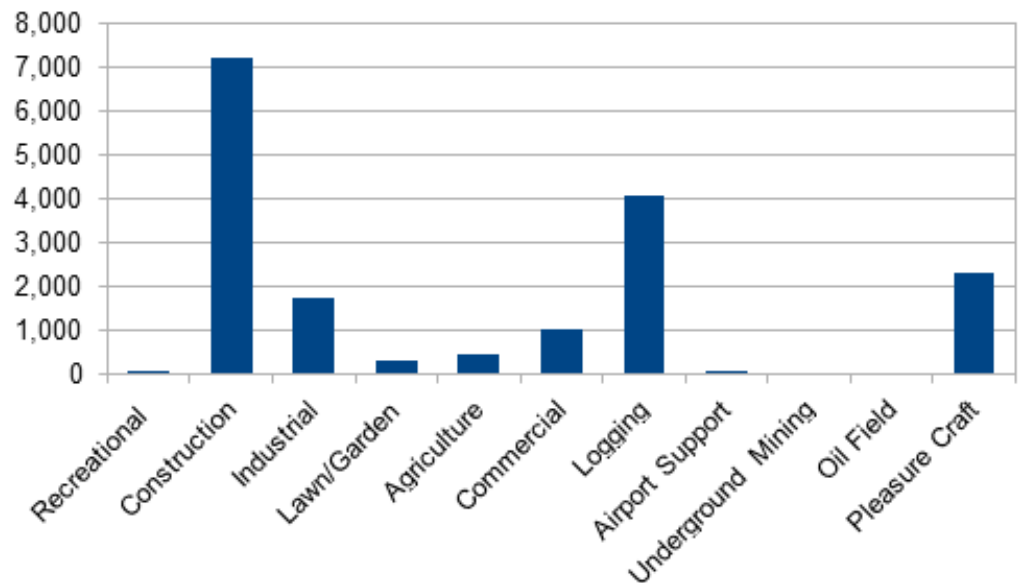
The EPA model for non-road emissions likely does not properly capture CO2 emissions from the maritime industry which is not accurately represented by "pleasure craft." The logging category should also be analyzed separately.

Note that the model only tracked road and non-road emissions, but not buildings electrical use.

Lincoln County mobile emissions (metric tons)



Lincoln County non-road emissions (metric tons)



## Top Ten Largest CO2 emitters in Oregon

Name of facility	CO2 emissions by tons/year	Type of facility
Portland General Electric Company (Boardman)	2,617,254	Fossil Fuel Electric Generation
Hermiston Power LLC	1,175,627	Fossil Fuel Electric Generation
Portland General Electric Company (Coyote Springs)	1,096,407	Fossil Fuel Electric Generation
Portland General Electric Company (Beaver)	1,008,337	Fossil Fuel Electric Generation
Klamath Energy LLC	955,631	Fossil Fuel Electric Generation
Georgia-Pacific Toledo LLC	862,420	Paperboard Mills
Georgia-Pacific Consumer Operations LLC*	771,377	Paper Mills
Hermiston Generating Company, L.P.	719,622	Fossil Fuel Electric Generation
Ash Grove Cement Company	715,806	Cement Manufacturing
International Paper - Springfield	670,988	Paperboard Mills

Source: DEQ permitted source GHG emissions



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The Georgia-Pacific mill in Toledo provides employment for several hundred employees and secondary employment to many supporting small and large businesses. Because of the high wages paid at the facility relative to tourist-related jobs, it is important to keep the facility operational.

However, for every five tons of CO2 emissions generated by Lincoln County residents and tourists driving their fossil fuel cars, the GP facility itself generates eight tons of CO2 emissions. This facility will be covered in legislation under what is referred to as an "energy intensive trade exposed industry", which calls for such facilities to utilize

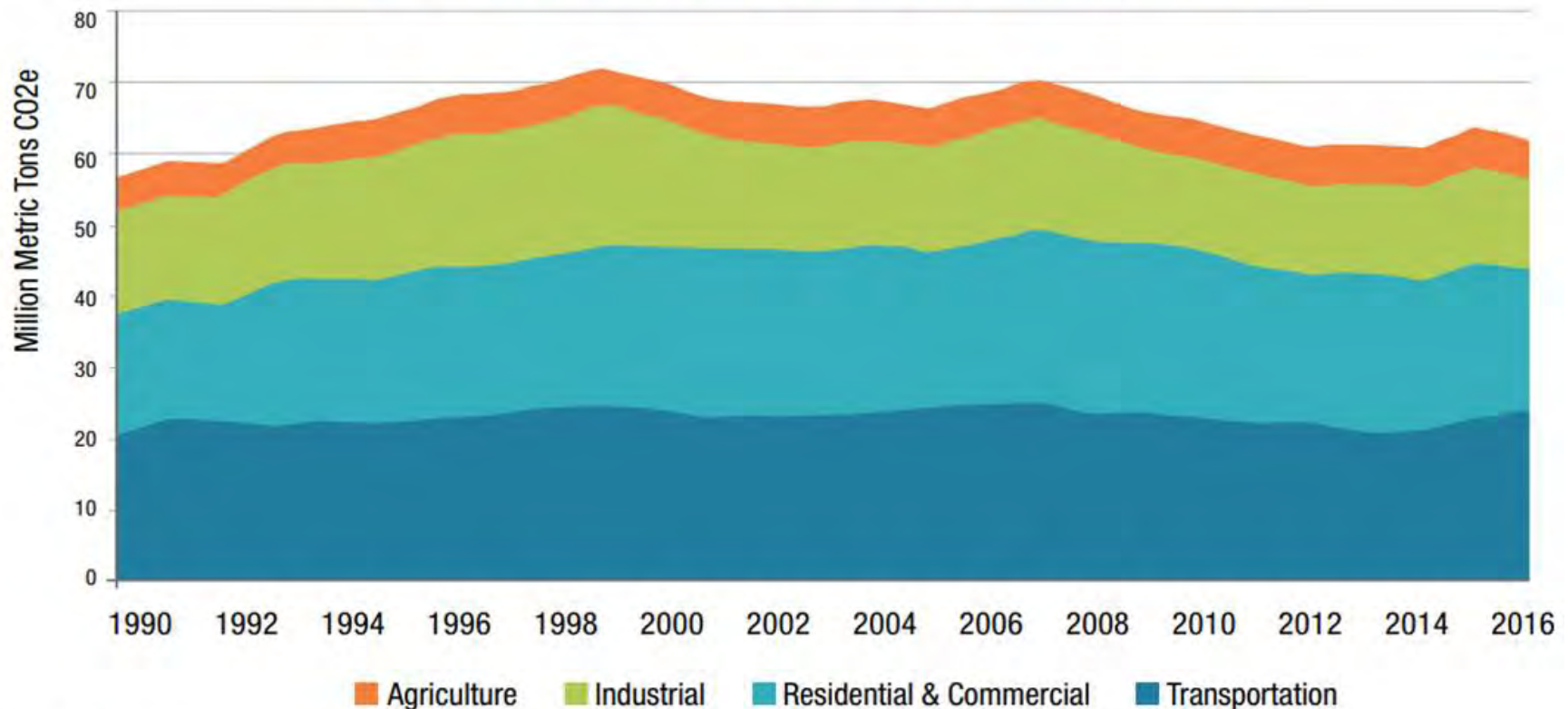
"best available technology" to reduce environmental effects." For purposes of analysis in this climate action plan for the county to become carbon neutral by 2035, we are excluding this facility. Over the course of the next fifteen years as we move towards becoming carbon neutral, we will expect Georgia-Pacific to invest sufficient capital to significantly reduce its CO2 emissions at this facility so that this GP facility can become a national model for sustainability, CO2 reduction, and preservation of good paying jobs

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The DEQ provided us with modeling results from an EPA national model that attempts to estimate the amount of CO2 emissions for Lincoln County at slightly more than 500,000 metric tons. To put this 500,000 metric tons in perspective, the DEQ has been assembling CO2 emissions for the past 25 years as displayed in the chart below. While the greenhouse gas emissions have been declining somewhat over the years, Oregonians and the associated businesses and industries are currently generating approximately 64 million metric tons. According to an article in the Guardian, the average American is responsible for approximately 19.8 tons of CO2 annually. Based on that, one can then make some ballpark calculations:

- \* 2017 population estimate of Lincoln County is 48,920 tons, therefore estimated CO2 emissions by Lincoln County residents is
- \*  $48,920 \times 19.8 \text{ tons} = 968,616 \text{ tons}$
- \* Much of Lincoln County is serviced by the Central Lincoln Public Utility District. According to the CLPUD literature, over 99% of their electricity is non-carbon generated primarily through hydropower.
- \* Given the estimated range of 968,616 metric tons and the EPA model of the CO2 emissions of 489,000 metric tons of only the transportation sector in Lincoln County, the EPA estimate would appear to be in the ballpark.

**Figure 5. Statewide sector-based greenhouse gas emissions: 1990-2016**







## Recognizing the role of human rights

Because climate change is the common concern of all humankind, and because securing the rights of its citizens is the central purpose and function of governments at every level, this Climate Action Plan recognizes and explicitly declares that human rights will be respected, protected and fulfilled in all our efforts to mitigate and adapt to the climate crisis.

By **respecting** human rights we mean that this government will refrain from taking any actions that would interfere with citizens' enjoyment of their rights. By **protecting** human rights we mean that this government will insure that third parties over which we have any authority – such as businesses, other private entities and other government entities – do not violate our citizens' rights. And by **fulfilling** human rights government will take positive measures to ensure the realization of rights for all members of our community.<sup>1</sup>

We agree with the 2015 Paris Agreement<sup>2</sup> which, in its Preamble reminds all nations of the importance of human rights:

*Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity.<sup>3</sup>*

We concur with the 2019 United Nations report, *A Safe Climate: Human Rights and Climate Change*,<sup>4</sup> which identifies the following rights as having special relevance in the climate crisis:

- Right to life
- Right to water and sanitation
- Rights of vulnerable populations
- Right to health
- Rights of the child
- Right to food
- Right to a healthy environment



- **Human Rights**

The right to life is universally recognized in human rights law. In 2018, the Human Rights Committee stated that

*“environmental degradation, climate change and unsustainable development constitute some of the most pressing and serious threats to the ability of present and future generations to enjoy the right to life.”*

In order to uphold the right to life, states have an obligation to take effective measures to mitigate climate change, enhance the adaptive capacity of vulnerable populations and prevent foreseeable loss of life.<sup>5</sup>

- **Health**

The adverse health impacts of climate change include not only premature deaths but also increased incidences of respiratory disease, cardiovascular disease, malnutrition, stunting, wasting, allergies, heat stroke, injuries, water-borne and vector-borne diseases and mental illness. Dengue fever is the most rapidly spreading vector-borne disease, with a thirtyfold increase in global incidence that is largely attributable to climate change. Hundreds of millions of people are exposed to extreme weather events annually, resulting in injuries, illnesses, and mental health impacts. Climate change also erodes many of the key social and environmental determinants of health, including access to adequate food and water, clean air, culture and livelihoods. Health is also affected by climate-related displacement, migration and reduced access to health-care services.<sup>6</sup>

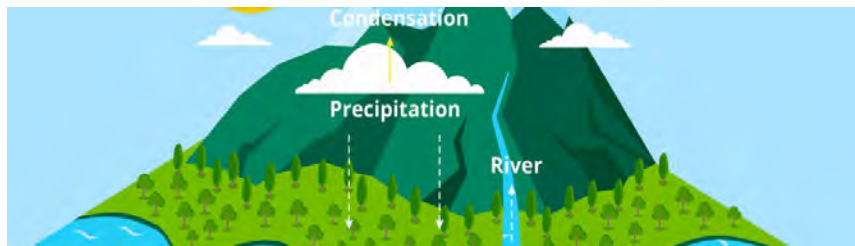


- **Food Security**

The Universal Declaration of Human Rights and the International Covenant on Economic, Social and Cultural Rights include food as part of the right to an adequate standard of living, with the Covenant referring to the fundamental right of everyone to be free from hunger.<sup>1</sup>

Food production, food security and the enjoyment of the right to food are affected by shifting precipitation patterns, higher temperatures, extreme weather events, changing sea ice conditions, droughts, floods, algal blooms and salinization. Changes in climate are already undermining the production of major crops, such as wheat, rice and maize. Without adaptation, or where adaptations fall short, this is expected to worsen as temperatures increase and become more extreme. In the oceans, temperature changes, bleaching of coral reefs and ocean acidification are affecting fisheries. Climate change also exacerbates drivers of food insecurity and malnutrition, such as conflict and poverty.<sup>7</sup>

**7** *49% of the respondents who responded positively to participating in community efforts would help develop community gardens.*



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Climate change is affecting precipitation patterns across the world, with some dry areas receiving less precipitation and wet areas receiving more frequent and intense precipitation. The four key elements of the rights to water and sanitation are threatened: availability, accessibility, acceptability and quality. The Intergovernmental Panel on Climate Change warned of particularly high vulnerability to water stress in small island developing States and parts of Africa, Asia and Latin America. Climate change has already contributed to a water crisis in the Plurinational State of Bolivia, where glaciers are receding and water rationing has been required in major cities. Indigenous pastoralists in Turkana County, Kenya, are struggling because climate change is negatively affecting water supplies, grazing opportunities and livestock herds, and increasing competition, conflict and insecurity.<sup>8</sup> Turkana women and girls bear the burden of longer walks to obtain potable water.

The right to sanitation may be threatened when water is increasingly scarce, and when floods, intense precipitation or other extreme weather events damage infrastructure or impair access. The rise in extreme weather events owing to climate change increases the risk of water-borne diseases, including typhoid fever and cholera.<sup>9</sup> The complexity of our relationship with water, which is both a basic necessity for life as well as an essential requirement for agriculture and many industrial processes, means that the pressure placed on water supplies by climate change has the potential to impact in a number of negative ways. Northern Hemisphere spring snow cover and glacier volumes will significantly decrease. These changes to the cryosphere are projected to negatively affect

the world's population supplied by such water from mountain ranges. Water supplies will also be affected by weather extremes such as floods and droughts, and salt-water inundation due to storm surges and sea-level rise change.<sup>10</sup>



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The Convention on the Rights of the Child, in describing the right to health, explicitly requires that States act in the best interests of the child and consider "the dangers and risks of environmental pollution." Children and young people around the world are increasingly outspoken about the impacts of climate change on their rights and their future and the need for urgent action. In response to the call for inputs for the present report, one indigenous youth leader observed that (continued on next page)

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*76% of the respondents support building more electric car charging stations.*





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“Earth is a giving planet ... Everything we ever needed to live, to survive, to enjoy the wonders of the world was provided by nature, yet we humans have become the most dangerous threat to life on Earth.”<sup>11</sup>

Children are particularly vulnerable to health problems exacerbated by climate change, including vector-borne diseases, malnutrition, acute respiratory infections, diarrhoea and other water-borne illnesses. Extreme weather events pose unique threats to the health and well-being of young bodies and minds. Globally, over 500 million children live in high or extremely high drought severity zones and 115 million are at high risk from tropical cyclones. By 2040, almost 600 million children will live in regions with extremely limited water resources. The United Nations Children’s Fund warns that “climate change will harm the poorest and most vulnerable children first, hardest and longest.”

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As noted in the Special Rapporteur’s previous reports, the right to a safe, clean, healthy and sustainable environment is recognized in law by at least 155 Member States. The substantive elements of this right include a safe climate, clean air, clean water and adequate sanitation, healthy and sustainably produced food, non-toxic environments in which to live, work, study and play, and healthy biodiversity and ecosystems. These elements are informed by commitments made under international environmental treaties such as the United Nations Framework Convention on Climate Change, wherein States pledged to “prevent dangerous anthropogenic interference with the climate system”, or in other words to maintain a safe climate.<sup>12</sup>

Every person has the right to live in an environment adequate for his or her health and well-being, and the duty, both individually and in association with others, to protect and improve the environment for the benefit of present and future generations.<sup>13</sup>

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*76% of our respondents are willing to reduce their carbon footprint*



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The Intergovernmental Panel on Climate Change observed that 'people who are socially, economically, culturally, politically, institutionally, or otherwise marginalized are especially vulnerable to climate change.'<sup>14</sup> This includes people or communities whose vulnerabilities are caused by poverty, gender, age, disability, geography and cultural or ethnic background. Although at risk, these people often have the potential to contribute to climate solutions when empowered to do so.

The worst impacts afflict those who have contributed least to the problem and who have the fewest resources to adapt to, or cope with, the impacts. For example, during droughts, women and children in low-income countries are often disproportionately affected because of their responsibilities for collecting water and firewood. On the other hand, male farmers face elevated risks of suicide during droughts. Understanding gender differences in vulnerability, roles and capacity is essential for designing fair and effective climate actions.<sup>15</sup>

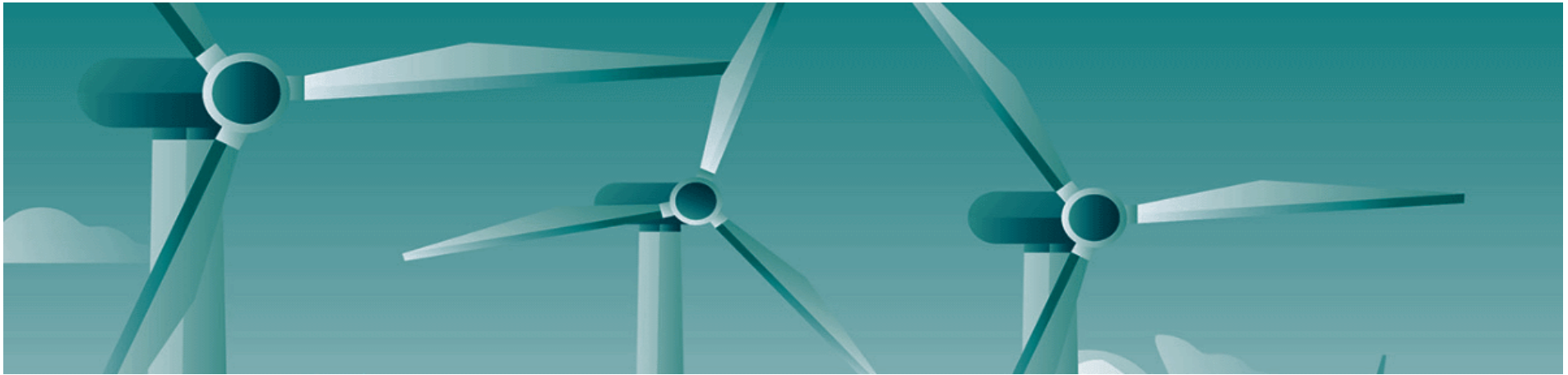
In 2018, the Committee on the Elimination of Discrimination against Women recognized that climate change impacts, including disasters, have a disproportionate effect on women.<sup>16</sup> Women experience greater financial and resource constraints, lower levels of access to information, and less decision-making authority in their homes, communities and countries.<sup>17</sup>

In its recommendations to states (concluding observations), the Committee has repeatedly urged states to take into account the greater vulnerability of women by adopting a human rights-based approach to all decisions related to adaptation, mitigation, disaster risk reduction and climate finance.<sup>18</sup> The Committee has made specific recommendations regarding older women and rural women, two groups with particular vulnerabilities to climate change.<sup>19</sup> Women are also leaders and vital agents of change, maximizing use of their knowledge and resources to help families to adapt.<sup>20</sup>

Despite contributing little to the problem, roughly 400 million indigenous peoples around the world are especially vulnerable to climate change because of their close connection to nature and dependence on wildlife, plants and healthy ecosystems for food, medicine and cultural needs. On the other hand, indigenous people can make important contributions to solutions, through traditional knowledge, legal systems and cultures that have proven effective at conserving land, water, biodiversity and ecosystems, including forests...<sup>21</sup>

Persons with disabilities could also be disproportionately affected by climate change. The Committee on the Rights of Persons with Disabilities emphasized that states must ensure that the requirements of all persons with disabilities are taken into consideration when designing and implementing adaptation and disaster risk reduction measures.<sup>22</sup>

***We pledge to fully respect, protect and fulfill the rights of all our community members, with particular attention to those who are most vulnerable and most at risk.***



## Utilizing more renewable energy sources

Utilizing more renewable energy sources not only contributes to the efforts to reduce the impacts of climate change but also creates greater self-sufficiency for communities of all sizes. Over the last decade Lincoln County has studied and provided education on the benefits of renewable energy – especially wind and solar energy. We live in an area where the electricity provided is near the cheapest anywhere which makes the economic feasibility of wind and solar projects more difficult. However, from the standpoint of emergency preparedness where a large natural disaster (earthquake/tsunami) could leave us without power for many months sources of renewable energy become almost priceless.

*Like most technologies, the cost per unit of energy has dropped dramatically over the last decade. More efficient solar panels and wind turbines, development of higher capacity and less expensive batteries, community scale solar and wind farms and the development of microgrids have all contributed to delivering a local source of renewable energy at a less expensive cost.*

*Some will argue that coastal Oregon is not an ideal location for solar or wind energy, and yet there are countries around the world with similar climates that have fully embraced these technologies. For example, Germany has about the same average yearly solar potential as Alaska (3.08 sun hours/day). Newport has 3.72 sun hours per day, plus when solar is less available we move into a windier winter period which benefits wind energy. Germany has had significant solar energy since 2005 when the percentage of total electricity consumption provided by solar was only 0.2% (1,282 Gigawatt hours, GWh = one million kilowatt hours). By 2017 the annual solar generation grew to 39,401 GWh or 6.6% of total electricity consumption. In Alaska solar energy is used to power remote areas (replacing diesel generators), and the grid connected capacity took off in 2014.*





## 4.1 Sustainability coordination of activities and tasks

In January of 2008, Lincoln County identified the need to add sustainability coordination of activities and tasks to an existing position. Because of the environmental nature of solid waste management and the education and experience of the current Solid Waste District (SWD) Program Manager, sustainability responsibilities and tasks were added to that position.

The three elements of the sustainability – environmental, social, and economic - all fell within the scope of this position allowing for a wide variety of investigation, education and projects. This chapter reports the activities carried out for the feasibility and education of utilizing renewable energy sources in Lincoln County.

## 4.2 Renewable energy lab

During 2009 and 2010 the SWD worked to try to establish a renewable energy lab at one or two county middle or high schools. The lab would facilitate education of renewable energy from wind and solar sources and allow students to directly observe and study how/if these technologies were viable for Lincoln County. There was a lot of interest but not enough commitment to make this program happen.

The main idea behind the Watt Wagon was to provide a visible and operating wind and solar platform that could be used for education at events and schools throughout the County. A secondary use of the trailer was the potential for providing an energy source for running radios and other emergency gear during disaster events.

In addition to the 1,000-watt wind generator and 200-watt solar panel the trailer was set up with batteries to store energy (up to 200 amp-hr at 24 volts or about 4,800 watts), a charge controller to charge the batteries and a power inverter to run 120-volt appliances, tools, computers, etc. Various instruments are used to display weather conditions, voltage, amperage and watts. These data could then be used for any number of educational exercises that promote an understanding of renewable wind and solar energy, the relationship of local weather to generating renewable energy and the mathematics that we need to understand energy systems.

The Watt Wagon made its first appearance at the Oregon Coast Community College (South Beach) on April 13th, 2011. During Earth Week it was in Siletz on Tuesday, April 19th, on the Newport High School Campus on Earth Day (Friday, April 22nd), and at the Oregon Coast Aquarium on Saturday, April 23rd. The trailer continued to make appearances at schools and events around the county through 2013.



## Lincoln County Sustainability Report

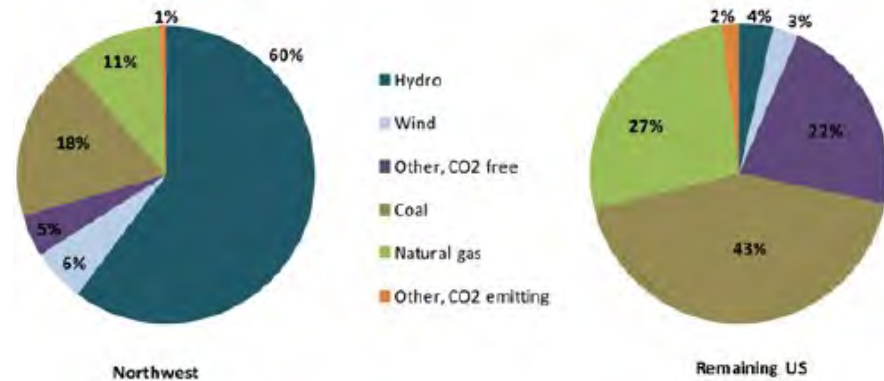
In January of 2008, Lincoln County identified the need to add sustainability coordination of activities and tasks to a current position. Because of the environmental nature of solid waste management and the education and experience of the current Solid Waste District (SWD) Program Manager, sustainability responsibilities and tasks were added to that position.

The three elements of the sustainability – environmental, social and economic all fell within the scope of this position allowing for a wide variety of investigation, education and projects. This chapter reports the activities carried out for the feasibility and education of utilizing renewable energy sources in Lincoln County.

## Renewable Energy Feasibility Study

During 2009 and 2010 the SWD worked to try to establish a renewable energy lab at one or two county middle or high schools. The lab would facilitate education of renewable energy from wind and solar sources and allow students to directly observe and study how/if these technologies were viable for Lincoln County. There was a lot of interest but not enough commitment to make this program happen.

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## Community Wind Project

While the Watt Wagon appeared at various schools and events around the county the SWD began designing a wind resource feasibility study. No recent wind resource data is available for the county. This study would be designed to find out if it is financially feasible and beneficial for a small community wind project to be installed in Lincoln County?

Interest in the study grew after a road field tour to Grayland, Washington, on March 7, 2011. The 2010 population of Grayland is listed as only 953 people and yet they have active volunteers that participate in various lower income support activities well beyond expectations from such a small community. The group – Coastal Community Action Program (CCAP) serves the Grays Harbor and Pacific Counties area.

As we approached Grayland from the South, we could see 4 large scale (1.5 MW GE SLE turbines turning on the hillside behind town similar to a site could be any appropriate clear-cut in Lincoln County. The day was relatively warm for March as we pulled into a cafe that is powered directly from energy produced by the turbines. We had lunch while the project was described to us by CCAP representatives.

This project was provided some state grants as well as favorable financing and they have been able to net \$500,000 annually. A local PUD purchases the power, so all of the energy produced is used locally with no power sale distribution outside of the project.

1. Assist over 1,000 families with services annually.
2. Increased tourism
3. Created a model of self-sufficiency for other community-based organizations
4. Long-term financial stability for CCAP programs

With the Grayland, Washington tour accomplished wind maps, contour maps and Aerial photo/map overlays were used to identify potential wind study test sites. The idea was to find a reasonable that would not be prohibitively expensive to develop (e.g. need to make a road, remove timber, etc.). We were fortunate to learn that the Oregon Department of Energy had recently hired a new renewable staff position – Trace Meginbier. On December 11, 2011 he joined us for a tour of four or five possible sites and agreed with our number one choice of a location in North Newport just east of the old land fill.

On April 13, 2012 we were in the field for a second wind study site selection tour with Kirk Slack (Oregon Community Wind). Kirk confirmed the same site after realizing that a site just to the south on Oregon Department of Transportation property would likely require us to work through a lengthy agreement process etc. In June we described our project and potential sites to the Energy Trust of Oregon and they gave pre-approval that they would like be able to fund half of the wind feasibility study if we could provide the other half of the cost of the project as match.

From June 2012 – through 2013 we made presentations that requested match money from local partners, but as we gained one commitment for some funding, we would lose another. During this same time period the reality of just how long Lincoln County could be without power following a major earthquake/tsunami event brought the need to be more self-sufficient with local power sources.



In January of 2014 the Lincoln County Board of Commissioners approved the match money for a Lincoln County Wind Feasibility Study. Preparation of the site for installing a 50-meter meteorological tower (MET) began in May of 2015, and the tower was installed over a three-day period September 29 – October 1. The MET began collecting wind resource data (wind direction, wind speed, temperature) on October 2, 2015 and continued until a second data collection unit malfunctioned on May 30, 2019.

Oregon State University provided us a preliminary and final analysis of the data collected. The first report for data collected October 3, 2015 – October 14, 2016 showed promising wind speed, document that wind comes from the East far more often than we think, and that with only a 50-meter tower there may be some wind shear issues that need to be more fully evaluated. One rule-of-thumb for the feasibility of commercial scale wind power generation is the Capacity Factor which is the amount of power generated divided by the Name Plate Capacity or maximum power a given wind turbine could generate under ideal conditions. Ideally a Capacity Factor of 30% or greater indicates possible commercial scale installation.

*Report One (Phil Barbour, November 15, 2016)*, showed that the SWT 2.3-108 reached that level (30%) and a common GE 1.5SL-77 had a Capacity Factor of 26%. It is noted that the author does not have access to the power curves for more modern turbines and that some of those would likely have resulted in higher Capacity Factor percentages.

On average the SWT 2.3-108 would generate 6,170.8 megawatt hours (Mwh) and an additional 736.1 Mwh (10.6%) would be attributed to various power losses (e.g. transmission line loss, turbulence, high wind cycling). Those amounts combined equal the 23,000 Mwh Name Plate Capacity of the SWT 2.3-108 turbine.

A second final report (*Phil Barbour, February 28, 2019*) summarized the data collected from October 3, 2015 – December 31, 2018. The results were similar except that the Capacity Factors dropped to 27% and 23% for the SWT 2.03-108 and GE 1.5 SL-77 turbines, respectively. Several factors could have contributed to the lower values. One important transition point was the installation of a new data collection terminal which may not have been calibrated exactly the same way as the first box.

As mentioned earlier a shear analysis is a critical piece of information for a wind turbine site. Large differences in the wind speed at various heights above ground create many issues for wind turbines.



Photo credit: City of Milwaukie



Photo credit: City of Milwaukie



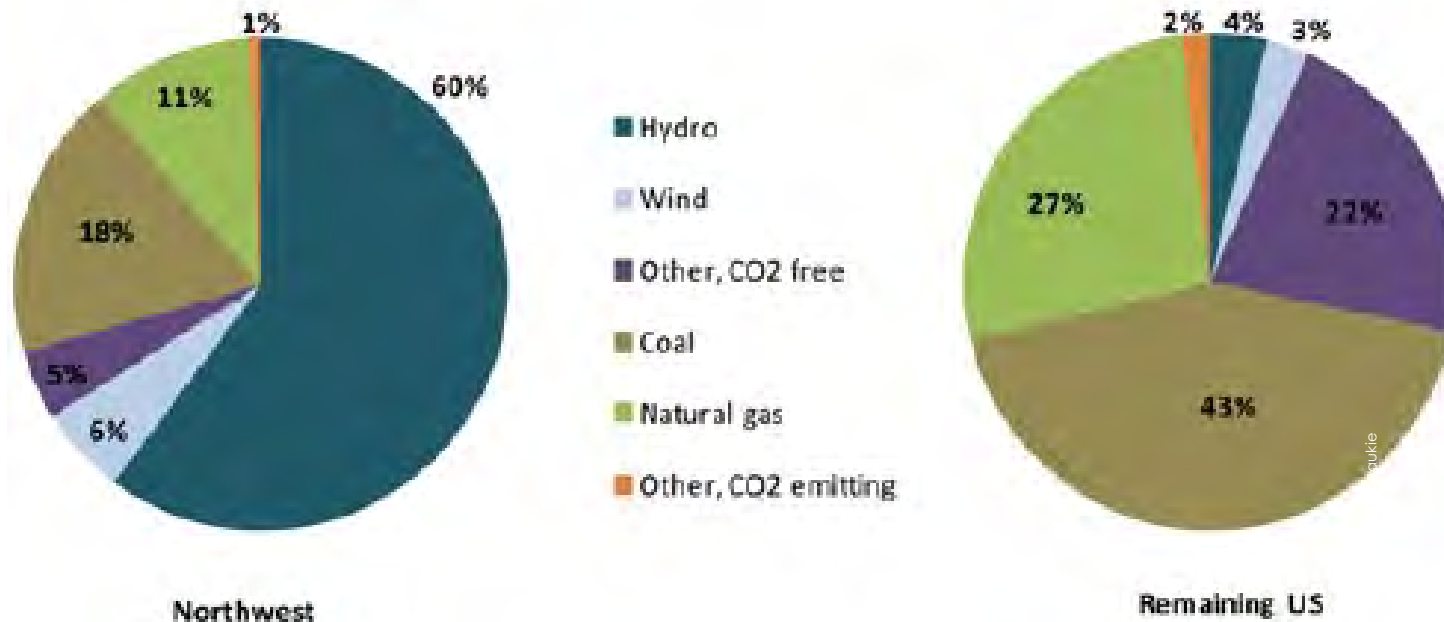
Photo credit: City of Milwaukie

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A wind model is used to predict wind speeds above the height of 50 meters (164 feet), but the hub height of a commercial turbine that might be installed at our study site could be 65 or 80 meters and more importantly the rotor blades could reach as high as 102 meters (335 feet) to 134 meters (440 feet). Because it was difficult to tease out the wind shear issues, we planned to install a different technology called SODAR (SO<sup>N</sup>ic Detection and Ranging). SODAR is a meteorological instrument used as a wind profiler to measure the scattering of sound waves by atmospheric turbulence. SODAR systems are used to measure wind speed at various heights above the ground, and the thermodynamic structure of the lower layer of the atmosphere. These systems are in fact nothing more than sonar systems used in the air rather than in water.

In an ideal situation SODAR is set up neat the MET for a side by side comparison of the data collected. The advantage of SODAR is that it can measure wind characteristics up to 200 meters (656 feet) which gives a direct measure of the wind characteristics in which a turbine would be operating. During July 2017 – June 2018 we planned to conduct the side—by-side MET/SODAR study both unfortunately funding was not included in the budget. This work would still be invaluable even without the direct comparison to out MET.

Power generation mix in the Pacific Northwest compared to the rest of the United States – PNUCC 2014



# Public outreach and education

There is a general lack of awareness in Lincoln County of the worldwide Climate Emergency we are facing and what that portends for us. In an effort to inform as well as engage more of the private and public sectors of our community there needs to exist an aggressive, creative and immediate action plan to address this shortfall in our body politic. We need to build a social and political will that speaks to the need of our necessary preparation in adapting to and mitigating the effects of our rapidly changing environment. To this end we are proposing a list of possible actions and strategies. These will be accounted for, tracked, implemented and reported on in the "New Green Coast" web site.



## 5HYbX`di V`]Wa YYH]b[ g`cb`h`Y` W]a UHY`W]g]g`

Over the past three years 350 Oregon Central Coast and the Citizen Climate Lobby have provided free public educational and informative events.



## Youh`]bj`c`j`Ya`Ybh`

There is a dire lack of knowledge in the student body. This needs to be addressed by more active involvement of the Lincoln County School District through a more comprehensive climate science curriculum and assistance to those students already involved wanting to expand their base of activists.



## G]b]cf`]bj`c`j`Ya`Ybh`

Our outreach needs to touch our senior citizens who not only have the time to volunteer but the moral obligation to assist in helping remedy a situation which we have created by virtue of our lifestyles and complacency in effectively addressing the degrading environment.

## FY`]]`]ci`g`cca`a`i`b]]Yg`

Our religious communities will be called upon for not only spiritual support but for ethical reasons to address this crisis in sermons and congregational events that alert and educate parishioners of the need at hand and to act in behalf of God's creation.

## 5f]g]cca`a`i`b]]Yg`

The Arts community can be actively addressing the unfolding environmental catastrophe, much like what was accomplished in the 1930's with the Works Progress Administration with the employment of artists to illustrate, educate and tell the new story. In this case it is the Green New Deal that needs to be supported with music, drama, visual art, film and the literary arts. Also the Artistic Community is be called upon for the creation of venues where we might come together to support our efforts in a spirit of celebration and joy.



# ORGANIZATION STRATEGIES

Ways Lincoln County businesses and organizations can help us reach our climate action goals



## A Uf[ ]bU`]nYX cca a i b]hYg

Our outreach needs to address inequity especially as it pertains to the homeless and those in need of low cost housing. There have been successful ways of dealing with this issue in the past that should be revisited; for example, poor farms. This matter could be approached in new creative ways as well, for example, by seeing this population not as a problem but rather as a possible asset to the community. This could be accomplished by, in addition to providing shelter, providing this population with an opportunity to find a respectable place in the community. In exchange for seeing to their shelter needs they would care for street and public landscape by removing debris, which they contribute. With a minimal amount of training in a sheltered work program setting, they might be taught how to grow food and flowers not only to help feed themselves but as a service to the community.



## hX]] Ybci g'cca a i b]hes

Build a coalition with the indigenous community. Sponsor their environmental efforts.

## C h Yf`Dcgg]V`]hYg

Invite Oregon Coast Community College and Hatfield Marine Science Center to create climate change internships or job shadow programs where recent high school graduates gain experience and possible future employment on climate-related issues.

Create an Internet registry of climate change related jobs in the private and public sectors, including policy, planning and positions within NGOs and universities.



## Gi g]bYggz`7 ]j ]MUbX`GcV]U`

These communities need to be much more involved and vocal in addressing this Climate Emergency. It's as though there is a collective amnesia or denial of this unfolding disaster. Leaders in these communities need to be identified and notified of their civic responsibility.

## OH Yf d c g g V Y public outreach and education d f c Y W g

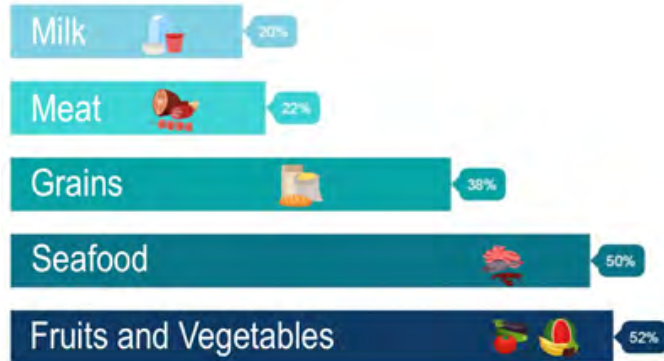
- A. Group or individual letter writing campaigns to elected officials, newspapers, blogs and magazines
- B. Create climate emergency facts campaign - make videos, post on social media, make posters, banners weekly school newspaper columns.
- C. Start a study group and learn the facts. Share your knowledge with family and friends – “Each One Teach One”.
- D. Expand Drivers Education and training to include impacts of emission of motor vehicles – encourage the use of electric vehicles.
- E. “Hands Across the Pacific Crest Trail” where people, especially youth, walk their part of the trail reporting on the environmental impacts of climate change using a video testimony to spread the word through social media.
- F. Begin a climate friendly travel incentive where local attractions are touted rather than distant travel especially by air.
- G. Sponsor demonstration e-car shows.
- H. Create a competition in which people, especially youth, have the opportunity to win recognition for their work on reducing greenhouse emissions in homes, schools, and workplaces.
- I. Create a Youth Climate Emergency Fund for:
  - 1. Innovative academic research in environmental studies
  - 2. School / community climate action projects
  - 3. Individual projects
- J. Tree Planting Campaign
- K. Create Youth Turf – community green spaces and community gardens
- L. Earth Retreats where participants who are non-native spend time with native participant in the wilderness to learn traditional values, ways and ceremonies

## Household Strategies: Reducing food waste

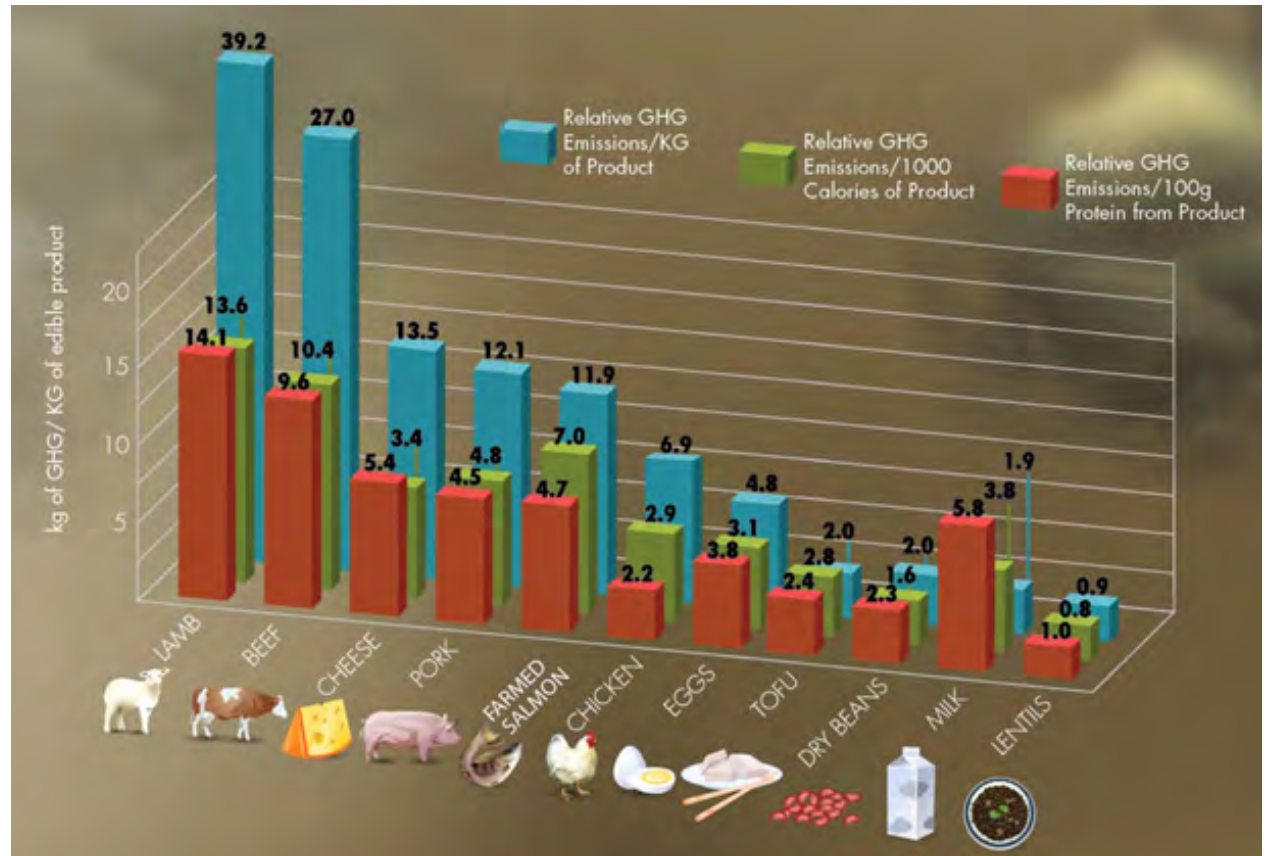
One of the greatest places for action is reducing food waste and considering the carbon footprints of the types of food we consume. The average American household wastes more than a fifth of all the milk, meat, grains, seafood, and fruits and vegetables they buy. When considering which types of foods we should consume, meat and dairy products tend to have a much higher carbon footprint than other food options. This is often from the production of feed and from manure management.

Proportion of food wasted by average American households – NRDC, 2017

### What gets wasted?



Emissions from different food sources – Menus of Change, 2017



Reducing food waste, donating edible food, and composting unavoidable food waste, are meaningful ways that Lincoln County residents and businesses can reduce our carbon footprint.

As the chart on the right shows, eating more dry beans such as lentils rather than meat products has a much lower amount of greenhouse gas emissions than meat.



## HOUSEHOLD STRATEGIES: Reduce air travel and buy carbon offsets

Ways Lincoln County households can help us reach our climate action goals



### Reduce your air travel

Consider alternative travel options that are less impactful

[Learn more about the impact of air travel from the New York Times](#)



### Buy carbon credits to offset your impact

Can't avoid the trip? Buy a credit to help mitigate the impact

[Check out the options on Terrapass](#)



### Choose a green vehicle

Consider an electric vehicle, hybrid or car with high mileage-per-gallon

[Learn how you could save money through the Oregon Clean Vehicle Rebate Program](#)

If possible, telecommute or carpool to avoid transportation emissions

Bike, walk or take public transit to work

Consider ridesharing, bike-sharing and scooter-sharing opportunities rather than owning a car if they are carbon neutral, electric or hybrid

### Results from our survey questionnaire:

*How much of your income would you be willing to pay for actual mitigation costs to reduce greenhouse gases and mitigate human-caused climate change?*

Income	Respondents
1%	12.4%
2%	9.0%
3%	11.6%
4%	1.6%
5%	25.6%
Nothing	19.0%
Other	20.6%

## BUSINESS AND ORGANIZATION STRATEGIES

Ways Lincoln County businesses and organizations can help us reach our climate action goals



### Invest in green vehicles

If buying or leasing a new vehicle for your fleet, consider an electric, hybrid or high mileage vehicle

[Learn how you could save money through the Oregon Clean Vehicle Rebate Program](#)



### Help your employees reduce their travel emissions

Use telecommuting and video conferencing when possible

[Learn about telework options from the U.S. General Services Administration](#)



### Incentivize transit

Provide incentives or purchase passes for employees who choose to commute by public transit, alternative transportation or carpooling

**Install showers in your workplace and provide bike parking to encourage active transportation among your employees or members**

[Learn more ideas to encourage bike commuting](#)

**Locate your business or organization and hold events near transit connections**

**Consider ridesharing, bike-sharing and scooter-sharing opportunities if they are carbon neutral, electric or hybrid**

**Host a “commute clinic” to encourage active transportation**

[Engage the Street Trust about a possible commute clinic](#)

**Offset air travel**

[Check out the options on Terrapass](#)

**Install electric vehicle charging stations for customers and employees**

**Promote a “no idling” policy with your motor fleet and vendors who deliver goods and services**

[Consult the National Idling Reduction Network for ideas](#)

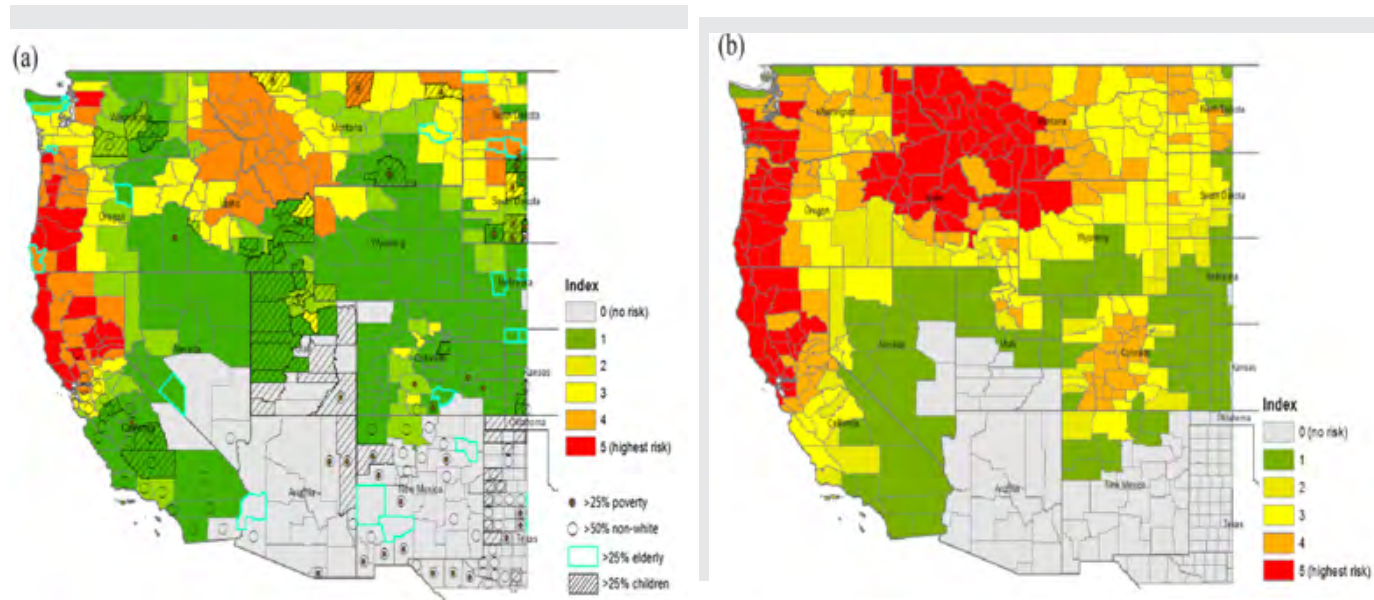
# PUBLIC HEALTH AND EMERGENCY PREPAREDNESS



This section addresses strategies for keeping our community healthy and safe as we experience the impacts of climate change.

## Why it matters

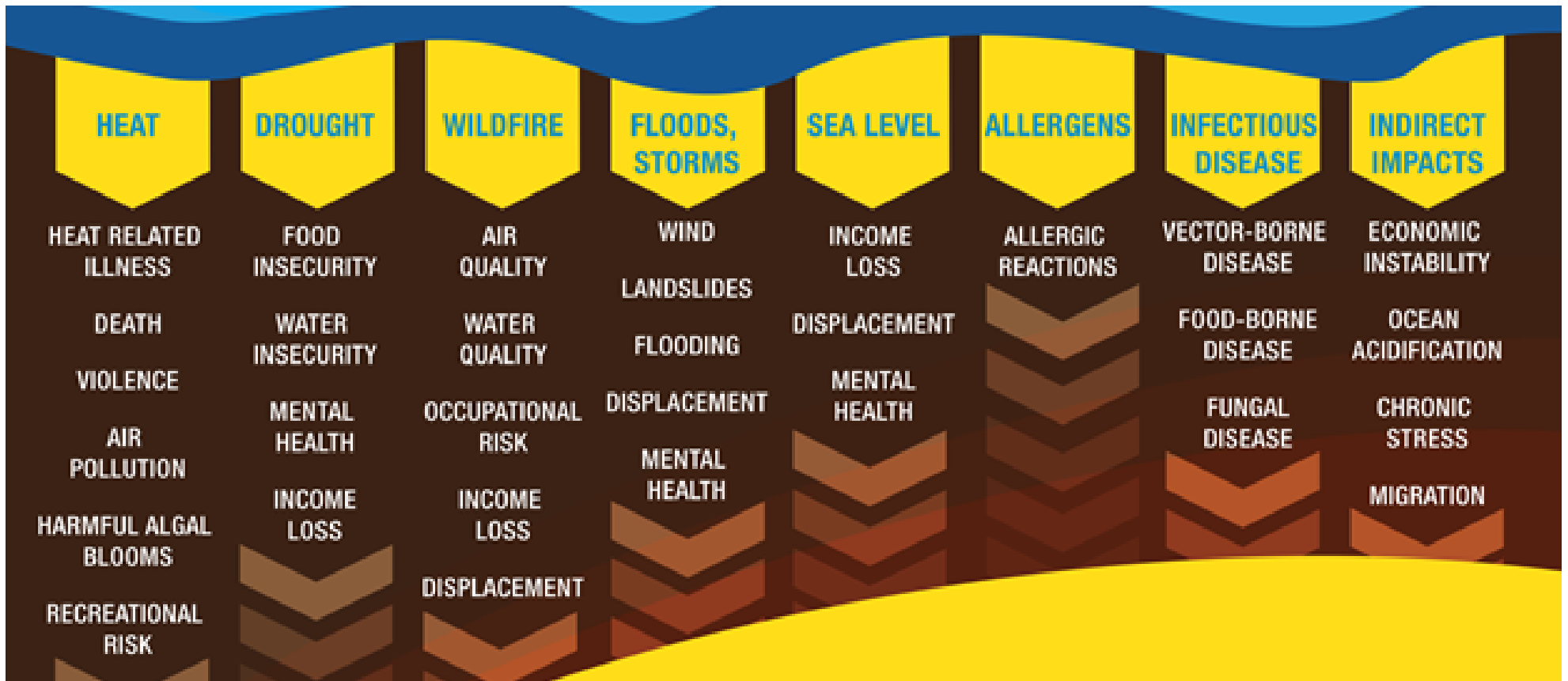
Acute climate events resulting from climate change include heat waves, increase wildfires in our region, decreased air quality, flooding risk and more. For example, the maps below demonstrate the expected air quality impacts that will follow the increased wildfire in the western United States. By 2050, almost all of Oregon will experience high-risk levels of particulate air pollution from wildfires in the warmer months. These acute events must be addressed through a planned, coordinated response—being proactive and setting processes in place now will help us adapt and respond quickly when the time comes. Particulate air pollution from wildfires in the western United States under climate change, (a) 2004-2009 to (b) 2046-2051 – (Liu, 2016)





# Climate change triggers and potential health and public safety impacts

Oregon Health Authority, Oregon Climate and Health Profile, 2014



## Prioritized strategies

This table from the Oregon Health Authority presents the adaptation actions prioritized through the climate action planning process related to public health and emergency preparedness. It summarizes how the action will be implemented and the timescale for completion. Results of co-benefits analysis are also summarized for each action. These actions are intended to plan for future physical conditions to ensure safety and ongoing service to the community

## ‘BUh fU`W]a UHY`ZcfYghgc`i h]cbg`cZYf`Ub` cddcfh b]mhc`cZgYh`cWU`[ UgYa ]gg]cbg

A number of countries around the world are developing plans to reduce greenhouse gases and to decarbonize their economies. A number of research papers have described the potential of natural climate solutions to sequester anywhere from 15% to 20% of their carbon dioxide emissions. For Lincoln County, we are going to be more ambitious and strive for a 50% offset in our carbon dioxide emissions through natural climate forest solutions.

### E i ]W`g a a Ufm

This section analyzes the potential to sequester 253,500 metric tons of locally produced CO<sub>2</sub> emissions in Lincoln County through forest sequestration. Using forest lookup tables for a 55-year old Douglas-fir forest, approximately 26,691 acres would need to be sequestered through voluntary agreements annually at an estimated cost of \$100 per carbon ton for an estimated cost of \$2.6 million. Based upon a projected consumption of 27 million gallons of gasoline in Lincoln County, there would be a ten cent tax on the cost of gasoline for the county to become carbon neutral by the year 2035.

### <ck`hc`WU`W`UHY`WUfVcb`gYei Ygfh]cb`]b`hfYYg3

For this analysis, we are relying on a US Forest Service publication entitled: *Methods for Calculating Forest Ecosystem and Harvested Carbon with Standard Estimates for Forest Types of the United States*, Northeastern Research Station, General Technical Report NE-343. The report is authored by James E. Smith Linda S. Heath Kenneth E. Skog and Richard A. Birdsey.

The abstract states: This study presents techniques for calculating average net annual additions to carbon in forests and in forest products. Forest ecosystem carbon yield tables, representing

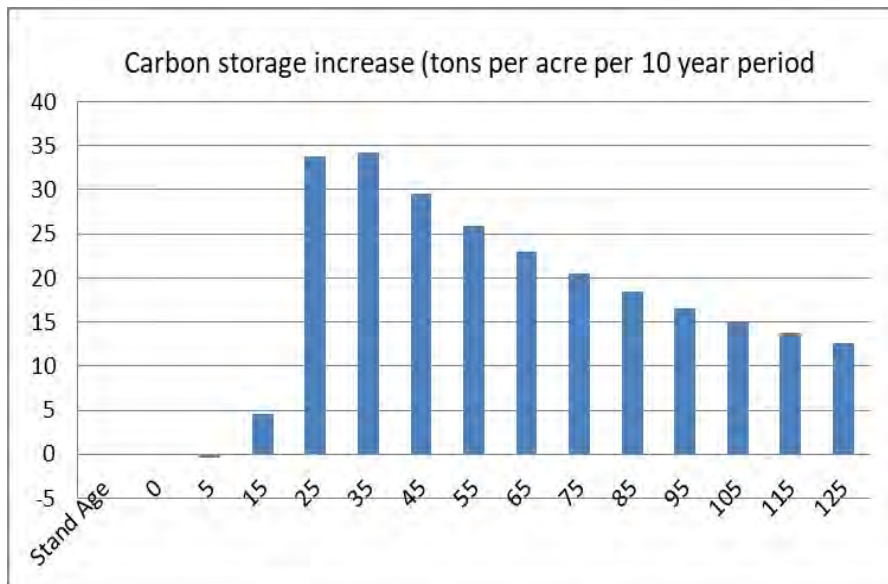
stand level merchantable volume and carbon pools as a function of stand age, were developed for 51 forest types within within 10 regions of the United States. . . . The estimates and methods in this report are consistent with guidelines being updated for the U.S. Voluntary Reporting of Greenhouse Gases Program and with guidelines developed by the Intergovernmental Panel on Climate Change.



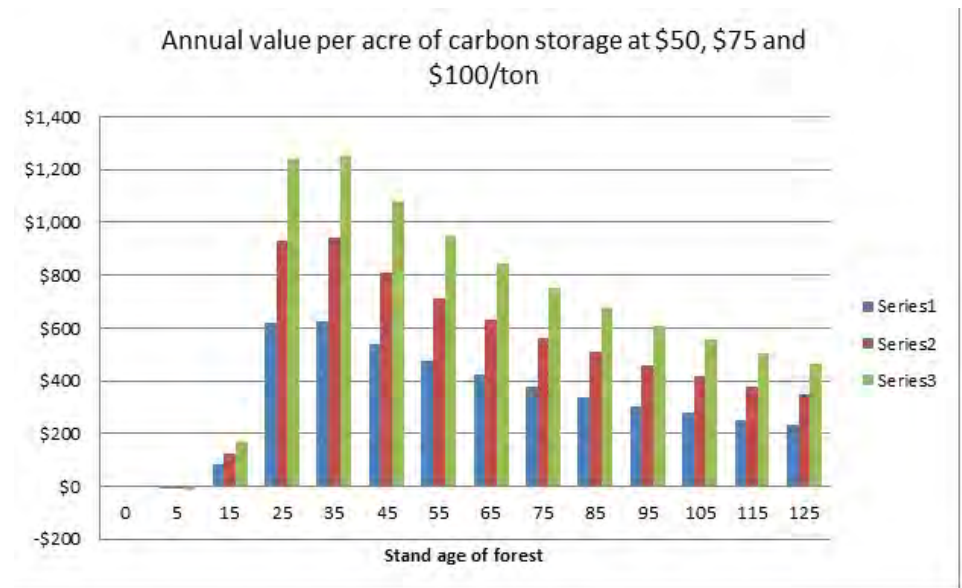
Depending upon environmental and human management factors, trees grow at a variety of different volumes annually. A coastal, west-side Douglas-fir forest will grow trees much faster than an east-side lodgepole pine forest. Absent some type of disturbance, a west-side Douglas-fir forest will maintain a much larger amount of stand volume and the subsequent carbon storage sequestration in the trees than an east-side lodgepole pine forest.

The report includes a number of lookup tables of carbon storage for both west-side and east-side Pacific Northwest forests. The report included a lookup tables for west-side Douglas-fir volumes as well as additional table calculation for high productivity and high intensity Douglas-fir forests (presumably reflecting industrial forest lands). In an effort to reduce the enormous complexity of this draft climate action plan, we are not including several charts and graphs from the USFS report. The following chart shows the amount of carbon that will be sequestered by a west-side Douglas fir forest.

The chart shows an accelerating amount of carbon storage in Douglas-fir forests beginning in the stand age of 15 years and continuing until the stand age reaches 55 years.



where little value is placed on shared resources. Sometime in the future, the price of carbon dioxide will be appropriately valued after the immense costs of drought, wildfires, and flooding begin to be reflected in the insurance markets. The current value of the carbon market tends to range in the \$10 to \$20 range which is much too low. The following chart generates annual values based upon \$50, \$75, and \$100 per ton respectively for a 55-year age stand.



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The current value of the carbon markets understates the true cost of excessive amounts of CO2 in the atmosphere. The under-valuing of the carbon market is a classic example of the "tragedy of the commons"



## 4.1.1. Carbon Sequestration

As described above for assumptions, this report assumes that the DEQ estimate of mobile and non-mobile emissions totaling 507,000 metric tons is a reasonable ballpark number. We are going to assume that technological advances by the year 2035 will reduce CO<sub>2</sub> emissions in trucks and car by 50% in Lincoln County. This figure may be unrealistic and future reports can recalculate that amount. Based upon those assumptions, the amount of CO<sub>2</sub> to be sequestered is 253,500 metric tons.

Since we used the stand age of 55 years in the previous example, we will continue to use that 55 year stand age which sequesters 25.9 tons of carbon over a ten year period, or approximately 2.5 million tons of carbon sequestered annually. Another wrinkle in the calculation is to convert the carbon tons to CO<sub>2</sub> equivalents per ton.

That is, CO<sub>2</sub> contains two molecules of oxygen for every one molecule of carbon. There is also a difference in the molecular weight of the carbon and oxygen molecules. The relationship between carbon and CO<sub>2</sub> is 3.667. The CO<sub>2</sub> equivalent of carbon needs to be multiplied by 3.667, which would equal 95 CO<sub>2</sub> equivalent tons over ten years, or 9.5 tons of CO<sub>2</sub> sequestered annually.

The calculation to determine number of acres to be sequestered is a fairly simple calculation:

$$\text{Amount of sequestered emissions} \frac{253,000}{9.5} = 26,691 \text{ acres}$$

Productivity CO<sub>2</sub> volume by acres

Admittedly, that is a pretty large number of acres of productive forestlands that need to be sequestered annually which numerically shows why the current price per carbon is vastly under-stated.

## 4.1.2. Carbon Pricing

While current carbon prices range in the \$10 to \$20 per ton figure, we are assuming that the value of a carbon ton will increase quite substantially in the years to come as the climate crisis intensifies. We use a price point of \$100 per ton in the year 2035. The annual cost to sequester 26,691 acres would be \$2,669,115.

Once again, it's important to put this cost figure in perspective. In 2017 and 2018, federal and state agencies spent \$489 million and \$515 million respectively to pay for the costs of wildfire suppression in Oregon. Those costs are only expected to increase in the years to come.

This next step will calculate how many gallons of gasoline were burned to produce the 253,500 tons of CO<sub>2</sub> pollution. A gallon of gasoline generates 20 lbs of CO<sub>2</sub>. Since we are dealing with 253,500 metric tons, we need to convert that amount into lbs of CO<sub>2</sub>.

$$253,500 \text{ tons of CO}_2 \times 2,200/\text{lbs per ton}$$

$$= 557,700,000 \text{ lbs. of CO}_2$$

Since we have calculated the total number of lbs of CO<sub>2</sub> in 253,500 tons of CO<sub>2</sub>, the next step is to calculate the number of gallons that were burned:

$$\frac{557,700,000 \text{ lbs of CO}_2}{20 \text{ lbs CO}_2 \text{ per gallon}} = 27,885,000 \text{ gallons}$$

That is, 27,885,000 gallons of gasoline were burned to produce the 253,500 tons of CO<sub>2</sub> pollution emissions

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Based upon the earlier analysis, the cost to sequester 26,691 acres of forestlands annually is \$2,669,115. Therefore, the carbon tax per gallon is:

$$\frac{\$2,669,115}{27,885,000 \text{ gallons}} = \$0.10 \text{ per gallon}$$

To put this additional gas tax into perspective, the pictures on gasoline prices in three different cities in Oregon were all taken on August 19, 2019. The price of unleaded gas in Newport was \$3.23, in Florence was \$2.93 and in Springfield was \$2.82.



Florence



Newport



Springfield

## K UYf'l gY. Recommended Solutions and Actions

Listed below are potential actions that city and County municipalities could implement to address the water problem and goal statements. A list of potential residential conservation measures that could be considered are presented below starting with the simplest/lowest cost to implement (i.e., Tier 1), followed by more complex residential solutions (Tier 2), and new construction (Tier 3). This list is not intended to be a complete or exhaustive list of water conservation measures, but rather is provided here as a starting point, as a work in progress to be expanded as new information and technologies become available.

### Tier 1 (i.e., Low-hanging fruit):

- Public education: 10 Ways to Save Water at Home; insert brochures into monthly water bills during May – October to begin changing the culture of water use/waste prevention at the home; <[https://www.americanrivers.org/rivers/discover-your-river/top-10-ways-for-you-to-save-water-at-home/?gclid=EAlaIqobChMlnJKgv4a55wIVSdbACh2QOwYeEAAYASAAEgLBLfD\\_BwE](https://www.americanrivers.org/rivers/discover-your-river/top-10-ways-for-you-to-save-water-at-home/?gclid=EAlaIqobChMlnJKgv4a55wIVSdbACh2QOwYeEAAYASAAEgLBLfD_BwE)> (American Rivers, 2020a).
- Retrofit residential households and small business with conservation solutions: metered water fixtures (i.e., touch/push button on-demand water fixtures); dual flush toilets; smart meter for showers; water-smart controller for landscape irrigation; tankless water heater; <<https://www.sjwater.com/our-company/news-media/water-blogged/6-smart-and-stylish-water-saving-devices-and-gadgets>> (San Jose Water, 2020).

### Tier 2: residential retrofit

Rainwater harvesting systems for beneficial use: <[http://www.google.com/url?sa=f&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKewif2q\\_zlLnnAhVbZc0KH WeICT0QFjABegQIAhAB&url=http%3A%2F%2Fwww.seattle.gov%2FDPD%2FPublications%2FCAM%2FCAM520.pdf&usg=AOvVaw1AdGvMUcpgG8AzNrl3OWBt](http://www.google.com/url?sa=f&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKewif2q_zlLnnAhVbZc0KH WeICT0QFjABegQIAhAB&url=http%3A%2F%2Fwww.seattle.gov%2FDPD%2FPublications%2FCAM%2FCAM520.pdf&usg=AOvVaw1AdGvMUcpgG8AzNrl3OWBt)> (City of Seattle, 2009).

### Tier 3: new construction – incorporate into design and permitting process:

- Rainwater harvesting systems for non-potable use (see City of Seattle guidance at web link above)
- Minimize impermeable surfaces and include bioswale to reduce stormwater runoff and increase groundwater infiltration, with added benefit of less stormwater impacts to water quality in streams, estuaries and ocean.gray-water recycling;
- Composting toilets

In addition, a multi-pronged regional program is needed, such as water audits and feasibility studies, to develop an in-depth understanding of use, needs, issues, constraints, partnerships and funding to prioritize water conservation at the municipal, industry, and watershed scales. These program-level actions should include:





- Perform a water conservation audit on all major water users, i.e. city services, farms, breweries, processing plants, mills, hotels/motels. Identify opportunities and evaluate cost saving for retrofit upgrades versus replacement of infrastructure.
- Consider offering cost shares incentives, based on the above analysis to incentivize installation of water conserving technologies.
- Require that any cost-share incentive program is contingent upon increasing the water rates to reflect actual costs including externality costs (e.g., mitigation of ecosystem impacts).
- Appoint a working group to include county, municipalities, businesses and conservation entities to pursue the above actions.
- Develop educational curriculum and incentive programs that lead to better citizen and business understanding and awareness of hydrological systems, range of water uses, and water management issues to meet water supply resiliency objectives.
- Update county land use guidance to improve land management practices that incorporate “green infrastructure” from ridgetop to reef. A 21st century approach to water resources conservation recognizes “green infrastructure” as the core of water management practices. Green infrastructure is the most cost-effective and flexible way for communities to deal with the impacts of climate change such as larger and more frequent floods as well as more severe droughts. The approach has three critical components (American Rivers, 2020b):
- Protect healthy landscapes like forests and small streams that naturally sustain clean water supplies.
- Restore degraded landscapes like floodplains and wetlands so they can better store flood water and recharge streams and aquifers.
- Replicate natural water systems in urban settings, to capture rainwater for outdoor watering and other uses and prevent storm water and sewage pollution.
- As more and more communities adopt these approaches, together we will create a path to a sustainable future, with shared respect and responsibility of stewardship for protection of our limited water resources in a manner that solidifies water supply reliability and ecological resiliency for the economic stability and benefit of all citizens, businesses, municipalities as well as all life that resides within the lands and watersheds of Lincoln County.
- **Outreach and coordination across water suppliers**, users, and stakeholders will be necessary for development and implementation of effective conservation measures. including the County, municipalities, agriculture, timber management, other businesses, fish and wildlife agencies, water quality agencies, and non-governmental organizations/advocates (e.g., Midcoast Watersheds Council, Mid-Coast Water Planning Partnership, Oregon Central Coast 350.org).
- Appoint a working group to include County, municipalities, agricultural interests, businesses and conservation advocates to explore all water conservation opportunities.





## Going Forward



This section describes the next steps to move toward a carbon neutral by 2035 goal for Lincoln County

### Why it matters

Our community and all its inhabitants have developed around the natural patterns of the systems all around us. Our trees have provided comfort, water absorption, soil retention, clean air and mental well-being for generations. With the climate changing, the trees we care for and plant will be challenged by more water in the winter and less water and more heat in the warm months. As our climate moves to a two-season year, we will have to select species that can provide all the benefits or “ecosystem services” that we all enjoy, but can withstand drought, heat and fire.

### Passing climate emergency resolutions

If you think that the Covid 19 pandemic was disruptive, climate change in the decades to come will render the Covid 19 pandemic a mere asterisk in history books. History will likely record the failure of the human race to take action to reduce gas emissions when the scientific evidence was irrefutable. Just as we in the 20th century can't believe that some human beings



US House of Representative Kurt Schrader (D-OR) and Lincoln County Commissioner Kaety Jacobson. CCL and 350 OCC have met with both elected officials a number of times over the past two years to ask for climate action. To date, the actions of Lincoln County, Newport, and Lincoln City have been limited to passing climate resolutions while failing to agree to develop a climate action plan for the county.

supported the institution of slavery, future generations such as the Millennials will look back in disgust at the Baby Boomers for failing to act decisively.

## Why there is a need for a carbon neutral by 2035 initiative

In the spring of 2018, volunteers for 350 Oregon Central Coast and Citizens Climate Lobby approached the city of Newport and Lincoln County about climate resolutions and the establishment of a Lincoln County public/private climate change partnership. While the city and county did pass resolutions in support of the partnership, neither the county or the city have ever made any genuine attempt to launch such a partnership. In the spring of 2019, volunteers for the two organizations approached the cities of Lincoln City, Newport, and Lincoln County to begin the development of climate action plans with modest requests of \$10,000, \$15,000, and \$15,000 respectively. Interestingly, Lincoln City agreed to set aside \$10,000 for its newly formed sustainability committee. Lincoln County refused to provide any funding and the city of Newport very grudgingly set aside \$10,000 in its \$90 million budget after four budget presentations. Given the lack of support from the county and the city, this climate action plan was developed without any funds from the local governments.



Brian Ettling of CCL - Portland has spoken several times in Newport.

Lincoln County citizens should be given the opportunity to vote on whether they want to adopt a goal to become carbon neutral by 2035. The state of Oregon has a goal to achieve an 80% reduction in greenhouse gas emissions by 2045. Our effort is certainly much more ambitious.

Since the Georgia Pacific (GP) facility generates more greenhouse gases than any other manufacturing facility in the state of Oregon, we would expect that GP will need to spend tens of millions of dollars for carbon capture, carbon offset projects, or other technological improvements to reduce its greenhouse gas emissions.

There is a need for this initiative given the lack of action on the part of Lincoln County and its cities and towns to address climate change. Passage of a carbon neutral goal would send a message to both governments and industry that the citizens of Lincoln County want action taken to address climate change.

The initiative process will take time and effort. According to the Lincoln County clerk's office, depending upon the language of the initiative, we would need to gather either 1,454 signatures for the 6% threshold or 1,938 signatures for the 8% threshold.

We will have a two year window in which to gather signatures once the initiative language has been approved. The initiative could be placed on the ballot in either May or November of any year. In order to continue to move forward, we will likely try to get the initiative on the ballot for the November 2021 election.



CCL NW regional gathering in Vancouver in Feb 2020



Climate change rally in Salem in February 2020 at the State Legislature

In the near term, we will need to continue to have virtual public meetings. Whenever the Covid 19 pandemic lessens, we will need to start gathering signatures and support for the initiative.

## Emergency climate resolution

Each of the cities and towns in Lincoln County should pass an emergency climate declaration - just as those same towns and cities proclaimed a Covid-19 emergency. A sample of the draft emergency climate resolution is displayed:

WHEREAS, in the view of our core members and those members in agreement with them it is hereby declared that Lincoln County is in the state of climate emergency.

WHEREAS, every measure in civil society and government to restore a safe climate will be taken including, but not limited, to the following;

1. Phasing out of fossil fuels and ending greenhouse gas emissions as quickly as possible to establish a zero emissions economy
2. Full transition to a regenerative agriculture, fishery and forest economy.
3. Promoting plant based diets.
4. Reducing meat and cheese consumption.
5. Promoting wide-spread conservation and restoration of ecosystems. (water, soil, forests, etc.) in efforts to end the Sixth Mass Extinction.
6. Implementing a rapid and safe drawdown and removal of all excess carbon from the atmosphere.
7. Preserve and protect our planet Earth.

8. WHEREAS, the scale of action necessary to achieve these measures will require unprecedented levels of public awareness, engagement, and deliberation to develop and implement effective, just and equitable policies to address the climate emergency.



WHEREAS, with economic and social justice as a guiding principle, Lincoln County will act by initiating an Emergency Climate Action Plan to rapidly move from an ecologically, socially, and economically extractive local economy to one that is regenerative, as well as advocating for the regional, national and international efforts necessary to reverse global warming and the ecological crisis.

WHEREAS, the damage done by the current average global warming of one degree centigrade demonstrates that the earth is already too hot for safety and justice as seen through stronger and more frequent wild fires, floods, rising seas, diseases, droughts and extreme weather.

NOW BE IT FURTHER RESOLVED by the core members as signed below and those in agreement with them, that we petition our county commissioners as well as all other elected county officials to resolve to enact this Lincoln County Climate Action Plan in order to accelerate the following climate action goals:

1. By 2021 Lincoln County citizen will vote on an initiative to become carbon neutral by 2035
2. By 2023 Central Lincoln PUD will have no net carbon emissions from its electricity use.
3. By 2035 Lincoln County will be carbon-neutral through carbon sequestration and

technological advances.

BE IT FURTHER RESOLVED to beseech all citizens of Lincoln County to live in their daily lives an eco-consciousness that seeks to heal and protect Earth's land, water and air from an ecologically, socially, and economically extractive local economy to one that is regenerative, as well as advocating for the regional, national and international efforts necessary to reverse global warming and the ecological crisis.



## Plan updates

We recognize that this climate action plan is missing some critical elements such as an estimate for greenhouse gas emissions from residential and businesses. We also recognize that future events will profoundly impact our initial plan. For example, the COVID-19 virus has greatly affected business activity. We will be issuing updates to this plan on a regular basis.

## Stay involved! Climate action involves us all

We encourage you to come forward with your ideas to strengthen and inform our community's climate action efforts. By acting together, we will make Lincoln County a flourishing county that is entirely equitable, delightfully livable, and completely sustainable.

A4 News-Times • Newport, OR Wednesday, April 24, 2019

### Earth Day fair informs, connects community

Rhonda Fry, manager of Oceans Natural Foods Co-operative in Newport, mans her table at the Earth Day Climate Fair. The Monday night event at the Newport Public Library hosted dozens of people in the community for a night of talks about recycling, watersheds, and other topics of interest to the local environment.

BY MADELINE SHANNON Oregon Central Coast, Of The News-Times worked together to put on the event featuring speakers from the greater Newport community, including former Newport City Councilor Mark Saeleens and Thompson's Sanitary Service Recycling Coordinator Aimee Thompson. Children from Sam Case Elementary School, some of whom attended Newport City Council meetings leading up to the city's passage of the bag ban ordinance, had science displays on ways to go green.

"We have a nice range of ages at this meeting," Desmond said. "Here, we have people under age 15, which is nice, so that's one of the bigger things I started taking out of this is that we have younger people here tonight."

Many other members of the community enjoyed the informative Earth Day event, drawing new information from each speaker or seeing the impact certain speakers have on the community. "I was glad to see the kids here again," said Cynthia Jacoby, a current Newport City Councilor. "They still have the enthusiasm for it and they're really excited. I felt like they really had an impact politically and I hope that keeps on and they're activists as they grow up."

Jacoby added, "I like the idea of the seven generations. It's thinking ahead, not just about today's corporate profits."

While each speaker at the Earth Day Climate Fair had different messages, Thompson ended her presentation with a sentiment that rang familiar to many in the audience. "It's to think seven generations into the future," Thompson said. "Decide whether the decisions we're making today are going to benefit us in the future."

Kids from Sam Case Elementary School in Newport talked about recycling and the new plastic bag ban in Newport at the Earth Day Climate Fair at the Newport Public Library Monday night. (Photos by Madeline Shannon)



## Section Writers

### Bill Kucha

Bill Kucha, who lives just south of Depoe Bay, wrote the Public Outreach and Education section beginning on page 46. Bill founded the 350 Oregon Central Coast group and is an accomplished artist. One of his large watercolors can be seen at the Newport City Hall. A resident of Lincoln County since 1976, Bill is working as an artist and art teacher.



### Joanne Cvar

Joanne Cvar, who lives in Waldport, wrote the Preparing for impacts Sea Level Rise section beginning on page



### Fred Holzmer

Fred and Mike co-wrote the Water supply, Conservation, and Resiliency section beginning on page

### Mike Broili

Fred and Mike co-wrote the Water supply, Conservation, and Resiliency section beginning on page

### Mark Saleens

Mark wrote the Solar and Wind Energy section beginning on page

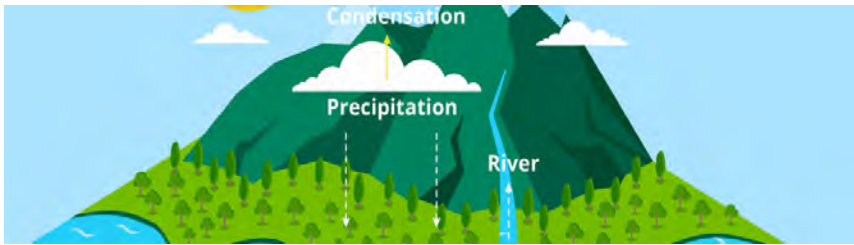
### Tom Kerns

Tom wrote the Human Rights section beginning on page

### Martin Desmond

Martin Desmond, who lives in Newport, wrote the sections on natural climate forest solutions and regional fire risk. He served as the general editor for the development of the climate action plan. When Martin's granddaughter Lillian was approaching two years of age, she was learning to speak by memorizing what people told her. Martin, his daughter Rachael, and Lillian were making a sand castle at Lost Creek Beach, south of Newport. Martin told Lillian that "he was a real beach bum." Lillian looked at her grandpa and nodded. One minute later, Lillian said, "Grandpa is a real bum." Martin then realized that his two-year old granddaughter had completely seen through him.





## Regeneration: The soil can save us!

*It is estimated that at least 50 percent of the carbon in the earth's soils has been released into the atmosphere over the past centuries. Bringing that carbon back home through regenerative agriculture is one of our greatest opportunities to address human and climate health, along with the financial well-being of farmers.*

*Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming , By Paul Hawken, 2016*

### Regeneration: Act of renewal and restoration

Regenerative agriculture comprises an array of techniques that rebuild soil and, in the process, sequester carbon. Typically, it uses cover crops and perennials so that bare soil is never exposed, and grazes animals in ways that mimic animals in nature. The process is photosynthesis. A plant takes carbon dioxide out of the air and, with the help of sunlight and water, converts it to sugars. Every bit of that plant – stems, leaves, roots – is made from carbon that was once in our atmosphere. Some of this carbon goes into the soil as roots. The roots, then, release sugars to feed soil microbes. These microbes perform their own chemical processes to convert carbon into even more stable forms, enriching the soil.

#### The problem:

Before farmland was cultivated, it had soil carbon levels of from 3% to 7%. Today, those levels are roughly 1% carbon. If every acre of farmland globally were returned to a soil carbon level of just 3%, 1 trillion tons of carbon dioxide would be removed from the atmosphere and stored in the soil –

equal to the amount of carbon that has been drawn into the atmosphere since the dawn of the Industrial Revolution 200 years ago.

Pesticide use kills the beneficial microbes in the soil and is wiping out insect populations and ecosystems around the world, threatening food production. Industrial farming is also directly responsible for the destruction of rivers, streams, and fisheries; the oceanic dead zones and the dying of the Great Barrier Reef; the loss of native prairies and grasslands, essential for birds; and the near extinction of crucial pollinators.



The pandemic we are currently experiencing illuminates the connections between the way we grow and produce our food, the environment, and our health. What we do to our environment, we do to ourselves. All over the world, industrial agriculture has pushed small-scale farmers deeper into forests, where novel pathogens exist. The decimation of forests has also sent those who bring wild animals into city markets deeper into remote forest areas, resulting in human exposure to these pathogens.

And our processed, packaged food supply lacks important nutritional components that help to protect our health and keep our immune systems functioning optimally. Additionally, these foods are contaminated with environmental chemicals — from additives to pesticides to food packaging, causing unprecedented numbers of people to develop diet-related chronic diseases.



## Regeneration: The solution

Through systemic solutions—a massive draw-down simultaneous with less emissions, we can reverse global warming, as opposed to slowing it down. With carbon sequestration, we can draw down excess carbon to reverse global warming, restore bio-diversity, and make healthy organic goods accessible for everyone. We can build a positive message, not just to survive but to thrive.

So how can we increase the carbon content of soil? Through “regenerative” farming practices, including composting, planting cover crops, no-till farming, rotating crops, reducing chemicals and fertilizers, and managed grazing (combining trees, forage plants and livestock together as an integrated system, a technique called “silvopasture”). These practices have been demonstrated to drive carbon into the soil and keep it there, resulting in carbon-enriched soils that are healthier and more resilient to extreme weather conditions and show improved water permeability, preventing the rainwater runoff that contributes to rising sea levels and rising temperatures. Evaporation from degraded, exposed soil has been shown to cause 1,600% more heat annually than all the world’s powerhouses combined. Regenerative farming methods also produce increased microbial diversity, higher yields, reduced input requirements, more nutritious harvests and increased farm profits.

The extraordinary thing about de-industrializing food and farming, restoring grasslands and reversing deforestation—moving several hundred billion tons of carbon back from the atmosphere into our soils, plants and forests—is that this regeneration process will not only reverse global warming and

re-stabilize the climate, but will also stimulate hundreds of millions of rural (and urban) jobs, while qualitatively increasing soil fertility, water retention, farm yields and food quality.

Regenerative agriculture also offers ecological benefits far beyond carbon storage: it stops soil erosion, remineralises soil, protects the purity of groundwater and reduces damaging pesticide and fertilizer runoff.

We need farms that respect the inherent balance in traditional farming methods: care of the soil and water, a balance that includes a mix of animals and crops, space for pollinators and other crucial wildlife to flourish, and natural and sustainable methods of pest control. The benefits of raising and grazing beef cattle, sheep, goats, dairy cows, poultry and pigs “in ways that mimic nature” are many. These practices are more humane, they rebuild soil fertility and they sequester carbon in the soil.

As the Rodale Institute points out, organic livestock raising practices, including rotational grazing, manure management, methane capture for biogas production, and improved feeds and feed additives, can drastically reduce livestock-related emissions and, because of the massive acreage currently devoted to livestock production (nearly 2.5 times greater than croplands), can safely sequester approximately 60% of the total greenhouse gases that humans, animals, cars, and industry are pumping out every year.



Millions of organic farmers, ranchers, conservationists, and backyard gardeners (supported by millions of organic consumers) are demonstrating that we can build a healthy alternative to industrial agriculture.



## Regeneration: The solution

Our growing organic movement is proving that we can not only feed the world with healthy food, but also reverse global warming, by capturing and sequestering billions of tons of climate-destabilizing greenhouse gases in the soil.

### Implementation

The majority of Americans must not only stop buying chemical, GMO, globally sourced and so-called "natural" food, and switch to organic and more locally and regionally produced products, but we must also rise up as a political movement and change public policy.

We must boycott the fossil fuel-emitting, soil-destroying, climate-destructive products of industrial agriculture and the junk food industry. We must support those farmers and businesses whose products regenerate our health, our soils and our forests. Marketplace pressure, public education, and public policy change must go hand-in-hand.



**Table 1: Water Supply Municipalities, Stream Source, and Use Data in Lincoln County**  
 (refers to pages 19 - 23 and pages 53 - 54)

Municipality	Stream Source	Contact	Use*
Lincoln City	Schooner Creek	Dept. of Public Works (541) 996-2154	2.5 Million gallons/day Summer; 1.2 Million gallons/day Winter
Newport	Big Creek & Siletz River (Also has water rights on Rocky Creek)	Dept. of Public Works (541) 574-3370	3.17 million gallons/day (4.91 cfs p/d) in July 2019 (only draw water from Siletz River, June through October)
Siletz	Siletz River	(541) 270-5206	200,000 gallons/day Summer; 100,000 gallons/ day Winter
Toledo	Mill Creek & Siletz River	Dept. of Public Works (541) 336-2247	2 Million gallons/day (from Siletz River in Summer) *also supplies Seal Rock Water District; Mill Creek in the Winter
Seal Rock	Siletz River via Toledo		
Depoe Bay	North Creek & Rocky Creek	(541) 765-3005 --	
Waldport	Eckman Creek, North Weist Creek, South Weist Creek	Dept. of Public Works (541) 563-2929 --	
Yachats	Yachats River		

Kernville, Siletz Keys, Salishan, Gleneden Beach, Coronado Shores, Bella Beach, Lincoln Beach, Seagrove, Fogarty Creek State Park, and the Siletz Bay Airport

--\* Use data reported as of January 2020

Drift Creek and tributary referred to as "Side Creek"  
<http://kgblbwater.com/>



## Water Supply, Conservation and Resiliency - List of References (pages 19 -23 and pages 53 - 54)

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< [https://www.americanrivers.org/rivers/discover-your-river/top-10-ways-for-you-to-save-water-at-home/?gclid=EALalQobChMlnJKgv4a55wIVSdbACh2QOwYeEAAYASAAEgLBld\\_BwE](https://www.americanrivers.org/rivers/discover-your-river/top-10-ways-for-you-to-save-water-at-home/?gclid=EALalQobChMlnJKgv4a55wIVSdbACh2QOwYeEAAYASAAEgLBld_BwE) >. Website accessed on February 6, 2020.

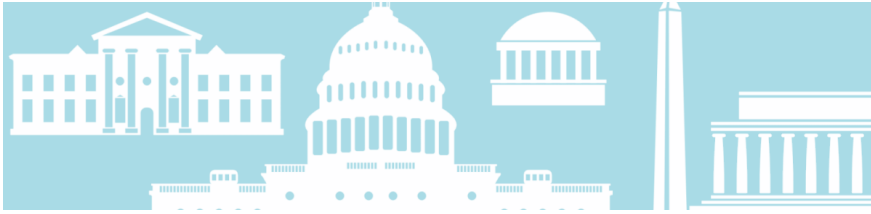
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## Human Rights - List of footnotes

(pages 30 - 35)

<sup>1</sup> See United Nations Office of the High Commissioner for Human Rights, "What are human rights?" <https://www.ohchr.org/EN/Issues/Pages/WhatareHumanRights.aspx>

<sup>2</sup> The Paris Agreement entered into force on 4 November 2016 and is available at [http://unfccc.int/files/essential\\_background/convention/application/pdf/english\\_paris\\_agreement.pdf](http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf).

<sup>3</sup> Quoted in Hey, Ellen and Violi, Federica, The Hard Work of Regime Interaction: Climate Change and Human Rights, a paper presented at the Annual General Meeting of the Royal Netherlands Society of International Law (Preadvies Koninklijke Nederlandse Vereniging voor Internationaal Recht), 2018, p 2. The authors continue: "In addition, other paragraphs of the Preamble refer to 'equitable access to sustainable development and the eradication of poverty,' 'safeguarding food security and ending hunger' and 'the imperatives of a just transition of the workforce and the creation of decent work [Paragraphs 9 and 10, Paris Agreement, respectively]." It thereby refers to a right to sustainable development, the right to food and labour rights."

<sup>4</sup> This report was issued in October 2019 by the United Nations Special Rapporteur on Human Rights and the Environment. <http://srenvironment.org/report/a-safe-climate-human-rights-and-climate-change>

<sup>5</sup> Safe Climate: A Report of the Special Rapporteur on Human Rights and the Environment (July 15, 2019) p18.

<sup>6</sup> Safe Climate: A Report of the Special Rapporteur on Human Rights and the Environment (July 15, 2019) pp19-20

<sup>7</sup> Safe Climate: A Report of the Special Rapporteur on Human Rights and the Environment (July 15, 2019) p20

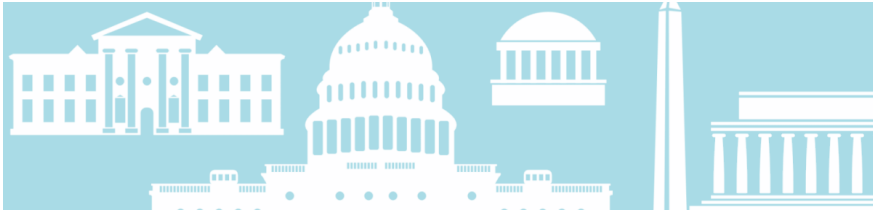
<sup>8</sup> Human Rights Watch, "There is no time left: climate change, environmental threats, and human rights in Turkana County, Kenya" (Human Rights Watch, 2015)

<sup>9</sup> Safe Climate: A Report of the Special Rapporteur on Human Rights and the Environment (Oct 16, 2019) p21

<sup>10</sup> from Bridget Lewis, Environmental Human Rights and Climate Change: Current Status and Future Prospects, p 162

<sup>11</sup> Safe Climate: A Report of the Special Rapporteur on Human Rights and the Environment (Oct 16, 2019) p22

<sup>12</sup> Safe Climate: A Report of/35 the Special Rapporteur on Human Rights and the Environment (July 15, 2019) pp22-23



## Human Rights - List of footnotes

(pages 30 - 35)

<sup>13</sup> “Convention on access to information, Public Participation in decision-Making and access to Justice in Environmental Matters,” June 25, 1998, aarhus, denmark, at <http://www.environmentandhumanrights.org/resources/aarhus%20convention.pdf>.

<sup>14</sup> IPCC, “Summary for policymakers”, Climate Change 2014: Impacts, Adaptation, and Vulnerability (IPCC 2014)

<sup>15</sup> World Health Organization, Gender, climate change and health (WHO, 2014)

<sup>16</sup> General recommendation No. 37 on gender-related dimensions of disaster risk reduction in the context of climate change and A/HRC/41/26

<sup>17</sup> United Nations Development Programme (UNDP), Gender Equality in National Climate Action: Planning for Gender-Responsive Nationally Determined Contributions (UNDP 2016)

<sup>18</sup> Center for International Environmental Law and Global Initiative for Economic, Social and Cultural Rights, States’ Human Rights Obligations in the Context of Climate Change: 2019 Update (Center for International Environmental Law and Global Initiative for Economic, Social and Cultural Rights, 2019.)

<sup>19</sup> General recommendation No. 27 on older women and general recommendation No. 34 on the rights of rural women.

<sup>20</sup> World Health Organization, Gender, climate change and health (WHO, 2014)

<sup>21</sup> Permanent Forum on Indigenous Issues, “Climate change and indigenous peoples” (Permanent Forum on Indigenous Issues, 2008)

<sup>22</sup> Safe Climate: A Report of/35 the Special Rapporteur on Human Rights and the Environment (July 15, 2019) pp23-24