AGENDA

Environmental Justice and Just Transition Work Group

October 16, 2017
1:00 PM – 3:00 PM
Hearing Room 50 of the State Capitol (ground level)

AGENDA

- Welcome and Introductions
- Work Group Discussion Topics:
  - Definition of Impacted Communities and Economically Distressed Areas
  - Investment Opportunities
  - Other Topics – Homework Responses
- Public Comment
- Next Steps
- Adjourn

This meeting will be livestreamed. You may access the livestream at: *https://www.oregonlegislature.gov/citizen_engagement/Pages/Legislative-Video.aspx*. You may also participate in this meeting by teleconference by calling 1--877-848-7030, meeting # 7714152.

Meeting materials are posted at: *https://www.oregonlegislature.gov/helm/Pages/ejjt.aspx.*

Memorandum from Working Group Sub-Committee on Most Impacted Communities and Reinvestments

(10/15/17)

CEJ Working Group: Environmental Justice and Just Transition
Sub-Committee: Most Impacted Communities and Reinvestments
10.15.17 DRAFT with notes

1) **Definition of Most Impacted Communities:**

(12) Communities experiencing disparate impacts of climate change or "Most Impacted communities" is defined by an analysis of racial and socioeconomic demographics, overlaid with environmental and public health data by census tract. In identifying 'Most Impacted Communities" the methodology must consider indicators including, but not limited to, the following:

(a) Above the state average percentage nonwhite population;

(b) Above the state average percentage of the population has an income below 200% of the federal poverty limit;

(c) Above the state average percentage of the population over 25 years of age without a high school degree/diploma;

(d) Above the state average percentage of the labor force over 16 years of age are not employed;

(e) Above the state average percentage of the population are over 65 years of age or under 10 years of age

(g) Above the state average cancer risk, with cancer risk being defined as an estimate of an individual's cancer risk as the result of a lifetime of exposure to a range of point and mobile source air toxins within a geographic entity

(h) Above the state average respiratory hazard risk, with respiratory health risk being defined as an estimate of adverse health effects identified by length of time and concentration of exposure to a range of point and mobile source air toxins within a geographic entity

(i) A Native American population on a reservation or tribal trust lands of a federally recognized tribe in Oregon, particularly those reliant on subsistence lifestyles.

Notes:

Geography: Most Impacted Communities are ranked by census tract—the most granular and accurate level of geographic measurement.

Index Score recommended by Portland State University's "Findings Brief for Equity Considerations for Greenhouse Gas Emissions Cap and Trade Legislation in Oregon:"

$$Index = 5.00\% \cdot Cancer\ Risk + 5.00\% \cdot Respiratory\ Hazard + 25.71\% \cdot Race + 25.71\% \cdot Poverty + 12.86\% \cdot Education + 12.86\% \cdot Unemployment + 12.86\% \cdot Age\ /\ 7\ (total\ number\ of\ variables)$$

"The 7 variables at the US census tract level should be combined to create an index score. This allows the census tracts to be ranked from most to least vulnerable to the effects of climate change...

Based on our analyses, scholarly literature, and community input, we recommend the socio-economic variables be given a collective weight of 90% in the score with the environmental exposure variables constituting 10% of the score. While exposure to environmental hazards threatens all people, those people from wealthy backgrounds have greater access to healthcare, remediation services, and political arenas. Wealthier individuals have a greater ability to address, overcome, or be resilient to exposure to environmental hazards.

Given the challenges people from lower income backgrounds face, we further recommend doubling the weight of the income within the demographic variable score. For similar reasons, we also recommend doubling the weighting of the race measure within the demographic variable score. People of color experience disparities in health, educational attainment, etc. Doubling the weighting of the race measure allows for these disparities to be captured in the overall score."

Native American Populations: Certain federally recognized tribes in Oregon have unique fishing and natural resource easement rights to project cultural significant and sovereign resources as well as subsistence lifestyles.

2) **Cut off/Eligibility Threshold:**

Top 50% of Most Impacted Communities (Census Tracts)

Notes: Indicators used for defining Most Impacted Communities largely mirrors criteria used to designate Economically Distressed Counties and Areas. The majority of Economically Distressed Areas are picked up in the top 50% of Most Impacted Communities census tracts. Moreover, many Economically Distressed Areas and counties may span large swaths of geography with little or no population concentrations. Thus, analysis should focus on populated census tracts, which meet most impacted criteria.

3) **Reinvestment % into Most impacted communities**

- Industry Sector Proceeds:
  - 15% Just Transition
  - 70% Most Impacted Communities
  - 15% other that maximizes GHG emission reductions

- Of the 70% investment into Most Impacted Communities, 50% should benefit and be invested geographically within most impacted community census tracts; 20% can be invested in low-income communities/households and to the benefit of most impacted communities.

Notes: *California AB 1550 introduced eligibility criteria to include investment into low-income households within ½ mile of a "disadvantaged census tract." This additional eligibility to low-income households in close proximity to a most impacted census tract may be a route we want to take for increased flexibility.*

4) **Technical assistance proceeds and resources should be provided through administrative fee and/or program proceeds as well as leveraged with other revenue/financial sources.**
    a. Ensure financial and technical resources are available for most impacted communities to engage in development and oversight of program as well as to apply and access program proceeds.
    b. Ensure financial and technical resources to under-resourced jurisdictions to develop, in coordination with local impacted communities, climate action and climate resilience plans.
    c. Identify a lead state agency and funding sources for inclusive planning process to mitigate transition losses for workers and communities potentially impacted by industrial decline due to climate policy

5) **Proceeds can be distributed through both grant based programs and automatic allocation (such as to affordable housing next to low-carbon transit).**
    a. Where Native American populations on a reservation or tribal trust lands of a federally recognized tribe in Oregon qualify for program proceeds, that tribal government will administer proceeds.

Notes: *Some tribes own land off their reservations in trust and in regular ole fee status. If the land is in trust, the tribe exercises regulatory jurisdiction over those lands. If it is in fee, state regulatory jurisdiction applies.*

6) **Investment criteria for all program proceeds includes, but is not limited to, the following:**

- Reduces GHG emissions
- Increases community and climate resilience
- Supports climate adaptation and/or mitigation
- Creates co-benefits to and are geographically located within Impacted Communities census tracts that include, but are not limited to,
    - opportunities for job creation and training,
    - investments in non-roadway infrastructure,

- efficient and affordable housing;
- public transit investments and transportation cost savings;
- local community low-carbon economic development,
- public health and air quality improvements,
- energy cost savings and conservation programs;
- increased community-based development and utilization of clean energy technologies;
- sustainable community infrastructure and increased community resilience, including anti-displacement strategy requirements;
- Habitat and fish restoration and other supports for subsistence lifestyles.

Notes:

Methodology: Like identifying most impacted communities through a rigorous methodology, the State, in partnership with impacted communities, must develop a methodology for consistent eligible program/investment criteria including continuous improvement based on program/investment outcomes evaluation.

Anti-Displacement Strategies and Evaluation: Moving away from fossil fuels requires investment in communities—in buildings, in transportation, and in energy systems. However, this investment can lead to unintended social consequences if community values and equity are not taken into consideration. Renewable energy, sustainable and 'green' investment can contribute to gentrification and displacement. Investments in infrastructure like rapid transit, bike lanes, or renewable energy may contribute to making the area more desirable, and residents may be forced out of the area due to rising property values. Evaluating investments for displacement implications is key as well as accompanying climate investments with anti-displacement strategies. Methodologies and literature for evaluation and prevention strategies are abundant.

Memorandum regarding Climate Investments Grant Program and Just Transition Grant Program (Reiley, LPRO)

10/16/17

MEMORANDUM

Prepared for: Environmental Justice & Just Transition WG
Date: 10/12/2017
By: Beth Reiley
Re: Investment Parameters

LPRO: LEGISLATIVE POLICY AND RESEARCH OFFICE

The Chairs of the Environmental Justice and Just Transition Work Group are planning to facilitate discussion about the purpose and funding preferences included in Senate Bill 1070 (2017) for the Climate Investments Grant and Just Transition grant programs. Please review the relevant sections of Senate Bill 1070 below as it will be the basis for our discussion.

CLIMATE INVESTMENTS GRANT PROGRAM

"(5) The rules adopted by the commission under this section shall provide that the grant committee consult with the Climate Investments in Impacted Communities Advisory Committee created under section 17 of this 2017 Act in reviewing grant applications and making determinations of funding based on a scoring system developed by the commission. The scoring system shall give funding preference to projects and programs that:
(a) Maximize multiple benefits in this state, including but not limited to environmental, social and economic benefits;
(b) Result in greenhouse gas emissions reductions that are cost effective or that are the product of business and research development interests in this state;
(c) Constitute investments in, and facilitate the development of, clean energy infrastructure and technologies in this state;
(d) Complement efforts to achieve and maintain federal and state air quality standards;
(e) Protect impacted communities and economically distressed areas from economic uncertainties associated with climate change or climate change policies;
(f) Make use of domestically produced products to the maximum extent feasible; or
(g) Promote job creation."

JUST TRANSITION GRANT PROGRAM

Section 20(1) "The purpose of the grant program shall be to support economic diversification, job creation, job training and other employment and mental health services for workers and communities in this state that are adversely affected by climate change or climate change policies."

Findings Brief for Equity Considerations for GHG Emissions Cap and Trade Legislation in Oregon (Zapata et al.)

10/16/17

Findings Brief for Equity Considerations for Greenhouse Gas Emissions Cap and Trade Legislation in Oregon

Authored by
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Matthew Harris

Study commissioned by: Coalition of Communities of Color, Oregon Environmental Council, and Portland State University Institute for Sustainable Solutions

Last updated: October 11, 2017

Findings Overview

Historically marginalized populations and vulnerable communities experience disproportionate rates of adverse health outcomes, educational attainment, economic opportunity, and exposure to environmental hazards. Thus, these communities are more likely to experience disparate impacts from the consequences of climate change. Programs targeting greenhouse gas (GHG) emissions and co-pollutants are one way to address both climate change and environmental justice.

This brief shares findings from a research project that investigated equity concerns related to possible Oregon cap-and-trade legislation.[1] Such legislation would offer a market-based approach to reducing GHG emissions through economic incentives. Similar adopted and implemented legislation in California offers important learning opportunities about how to ensure people most vulnerable to the effects of climate change are supported and protected through cap-and-trade legislation (Troung 2014).[2]

In this study we examine how to define and map those communities most vulnerable to the disparate impacts of climate change, identify how specific producers of GHG co-pollutants might create 'hot spots,' and explore how to distribute community benefits to these communities. The work for this project included an extensive review of existing cap-and-trade programs and climate change and health vulnerability assessments, scholarly and practice related literature, as well as interviews with and a survey of Oregon environmental and equity experts to understand how equity goals can be achieved in an Oregon GHG cap-and-trade program. We conducted extensive demographic and spatial analysis to identify and locate the most vulnerable communities to the disparate impacts of climate change as well researched and mapped the relevant producers of GHG emissions and co-pollutants.[3]

Defining and Locating the Most Vulnerable Communities to Climate Change in Oregon

In order to identify those community members most likely to be disproportionately affected by climate change and thus in need of the most consideration for GHG cap-and-trade legislation, we identified variables commonly used in climate change vulnerability assessments around the country as well as discussed in the academic literature. From this list of variables we determined which variables were available across data sets for the state of Oregon.

We sought to use the smallest set of variables possible in order to make it easier for practitioners to obtain, access data for future analyses, and build upon for future work. We chose simplicity over complexity to begin developing more complex indices in the future to ensure equity could be considered in the short term. Based on this work we identified five demographic variables and two exposure variables to combine into a weighted index to rank census tracts across the state.

We identified income, race, education, employment, age, cancer risk, and respiratory hazard at the census tract level as the most effective combination of variables at an appropriate geography for analysis. The demographic variables (income, race, education, employment, and age) capture who is

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[1] For an overview see: State of Oregon Department of Environmental Quality. February 2017. *Considerations for Designing a Cap-and-Trade Program in Oregon*. State of Oregon. Downloaded: http://www.oregon.gov/deq/FilterDocs/ghgmarketstudy.pdf

[2] California recently extended their cap-and-trade program via Assembly Bill 398.

[3] Like any study we are limited by the availability of data as well as its integrity. More discussion about the data sources we selected can be found in the final report. We want to note in particular that these data sets are known to not capture the actual county and the complexity of lives for people of color.

most vulnerable to the impacts of climate change because of their life circumstances (Williams et. al. 2016). The two exposure variables reflect the degree to which people are exposed to air toxics.[4] Together, these two sets of variables capture people most likely to experience negative social determinants of health in their lives (Who Health Organization 2017). People's demographic characteristics often determine their likelihood of being exposed to pollutants. For instance, neighborhoods with more low-income residents and/or people of color are more likely to have polluters sited near or in them (Collins et al. 2016; Troung 2014). Further, people with lower socio-economic status tend to have less ability to move away environmental hazards, access and influence political power structures to address pollutants, and obtain health care. Because of the role these demographic characteristics play in life outcomes, we gave more weight to them in calculating the overall index score. Descriptions of the variables, index scoring and rationale, and additional details follow in the next sections.

Defining the target population

We recommend using the below demographic variables to determine who constitutes the most vulnerable populations to climate change across the state. The variables we selected are consistent with metrics used in other social and health vulnerability and environmental justice risk indices. The recommended variables also reflect community experts' perspectives on demographic characteristics that put marginalized communities most at risk to disproportionately experiencing the impacts of climate change. The variables include:

- Race: Percentage of nonwhite populations (US Census)[5]
- Income: Percentage of an area's population with incomes below 200% of the federal poverty limit (US Census)
- Education: Percentage of the population over 25 years of age without a high school degree/diploma (US Census)
- Unemployment rate: Percentage of the eligible population over 16 years of age not employed (US Census)
- Age: Percentage of the population over 65 years of age and under 10 years of age (US Census)

California does not include race in its comparative index because of a statutory preemption on using race as a component of public policy-making. Fortunately, Oregon does not have the kind of preemption that California does. Race remains one of the most significant predictors and explanatory factors for health outcomes, political and social capital, educational outcomes, and exposure to environmental hazards, we elected to use race as a definitional component for this work. As a metric, it captures specific vulnerabilities that either require significantly more variables to demonstrate risk, or metrics that that may not reflect the experiences of people of color.

However, given California's work and the complexities of discussing race, our community partners requested that we examine how the index ranking would function without a race variable at all.

[4] Two concerns have been raised about the NATA data specific to their use in this study and future work. First, they may reinforce biases against Native American reservations found in datasets. Second, NATA data are older (2011) and the likelihood that NATA data will continue to be updated remains unclear.

[5] All US Census data is from: US Census Bureau. 2011-2016. *American Community Survey 5-Year Estimates*. Downloaded: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml.

Removing race from the equation resulted in several census tracts, namely with large Native American populations and/or with reservations, falling dramatically in the ranking. Given the known challenges Native American communities face coupled with concerns about data integrity and the Census count for Native communities and other people of color, we believe race should be included.[6]

We also recommend using environmental exposure data to help capture the risks related to air toxics. Additional environmental exposure variables such as exposure to lead could be added to future indices; however, as discussed below, we recommend focusing on demographic characteristics. The environmental exposure variables we recommend at this point are:

- Cancer Risk: An estimate of an individual's cancer risk as the result of a lifetime of exposure to a range of point and mobile source air toxins (US Environmental Protection Agency National Air Toxics Assessment)[7]
- Respiratory Hazard Index: An estimate of adverse health effects identified by length of time and concentration of exposure to a range of point and mobile source air toxins (US Environmental Protection Agency National Air Toxics Assessment)

We did not incorporate variables related to economic regions that face serious threats from climate change, or living in areas likely to negatively impacted by climate change such as heat islands or flood plains. We were unable to locate reliable state-level data that captured the relative risks of how climate change may harm local economies or threatens specific areas.

Analytical Geography Level

The definition variables should use US Census geography at the census tract level. Higher geographies such as city, place, or county level are too broad to capture the specific issues related to place based burden or vulnerability. Lower level geographies such as Census block group or Census block often produce high margins of error, especially for communities of color or other marginalized groups.

Index Score

The 7 variables at the US census tract level should be combined to create an index score. This allows the census tracts to be ranked from most to least vulnerable to the effects of climate change. We recommend an index based on the z-scores of each variable. Z-scores allow data to be standardized for comparative purposes.

Based on our analyses, scholarly literature, and community input, we recommend the socio-economic variables be given a collective weight of 90% in the score with the environmental exposure variables constituting 10% of the score.[8] While exposure to environmental hazards threatens all people, those people from wealthy backgrounds have greater access to healthcare, remediation services, and political

[6] We mapped those US census tracts in Oregon where the tracts had z-scores above 1 for those people who identify as other than non-Hispanic white. Collectively, these tracts included 17% of the total state's population, 22% of the state's population living below 200% of the poverty level, and 35% of the state's population of color.
[7] All NATA data from: US Environmental Protection Agency. 2011. National Air Toxics Assessment. Washington, DC: U.S. Environmental Protection Agency. Available: https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results.
[8] Given some of the issues raised about the NATA data, future analyses could examine further reducing the weight of the exposure indicators, or removing the exposure variables altogether. We do not recommend adding additional exposure variables at this time.

arenas. Wealthier individuals have a greater ability to address, overcome, or be resilient to exposure to environmental hazards.

Given the challenges people from lower income backgrounds face, we further recommend doubling the weight of the income within the demographic variable score. For similar reasons, we also recommend doubling the weighting of the race measure within the demographic variable score. People of color experience disparities in health, educational attainment, etc. Doubling the weighting of the race measure allows for these disparities to be captured in the overall score.

With these considerations we recommend the following index score:

$$Index = 5.00\% \cdot Cancer\ Risk + 5.00\% \cdot Respiratory\ Hazard + 25.71\% \cdot Race + 25.71\% \cdot Poverty + 12.86\% \cdot Education + 12.86\% \cdot Unemployment + 12.86\% \cdot Age\ /\ 7\ (total\ number\ of\ variables)$$

Label

Legislation or programming related to GHG carbon markets should use either "communities experiencing disparate impacts of climate change" or "communities vulnerable to climate change" to label or name the target population. The phrase "most impacted" was paired with "communities experiencing disparate impacts of climate change" in the survey and several meetings. However, we think it could also be used with "communities vulnerable to climate change."

Locating those most vulnerable to the impacts of climate change

The following map displays the top 10%, 25%, and 50% of Oregon census tracts based on their vulnerability to the impacts of climate change score (See Figure 1 for the state of Oregon and Figure 2 for a zoomed in view of the Portland metropolitan area). The higher the score, the higher their ranking. The top 50% of census tracts are referred to as the "most vulnerable" census tracts throughout the rest of the report. The decision to use these percentages was for the purpose of analysis. In California they identified the top 25% of those most vulnerable tracks for their cap-and-trade programming. We provided three percentage points to display visually how vulnerability shifted through the state and across the rankings.

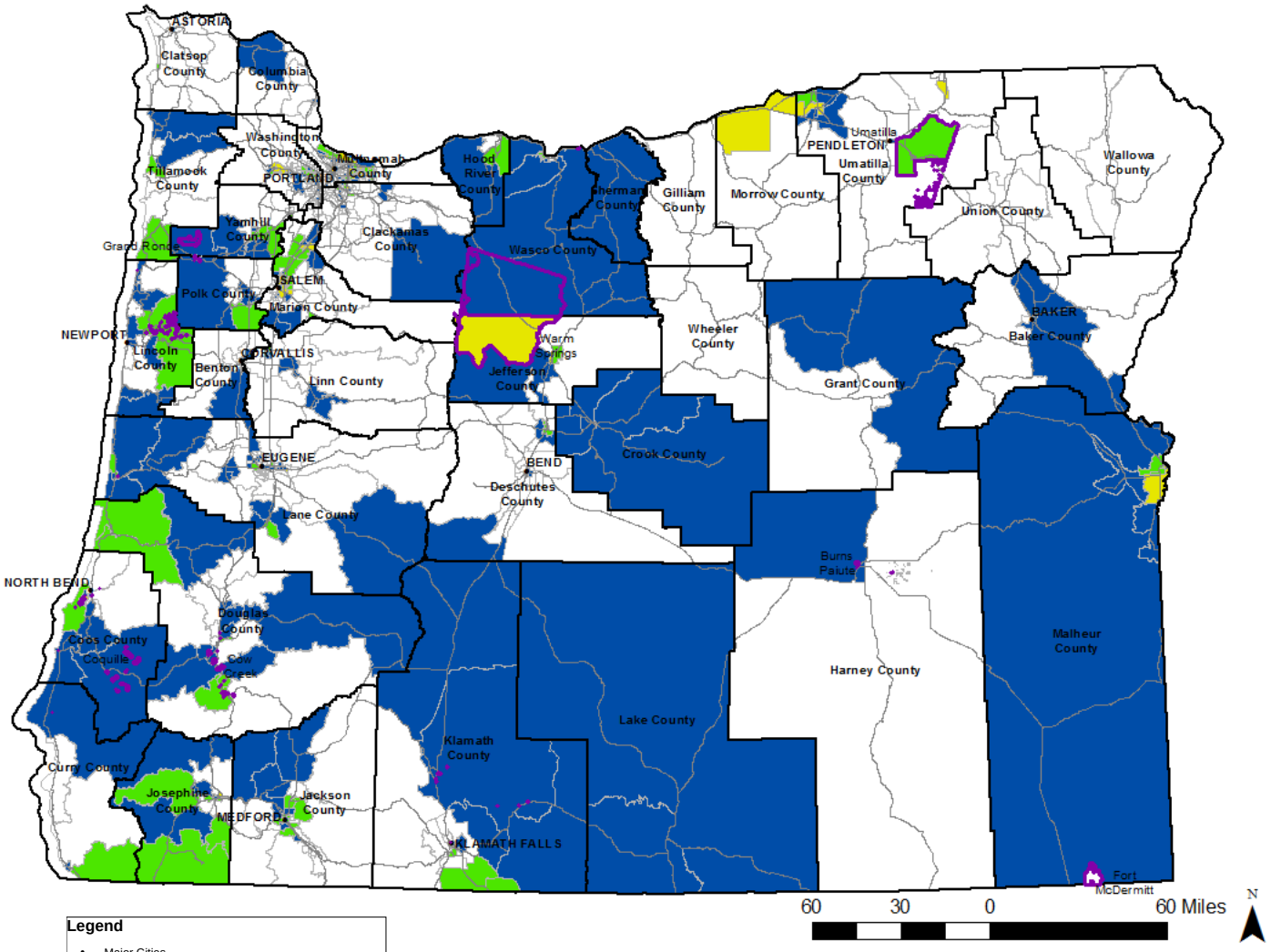

Figure 1: Top 10%, 25%, and 50% of Census Tracts Most Vulnerable to Climate Change in Oregon. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011.*

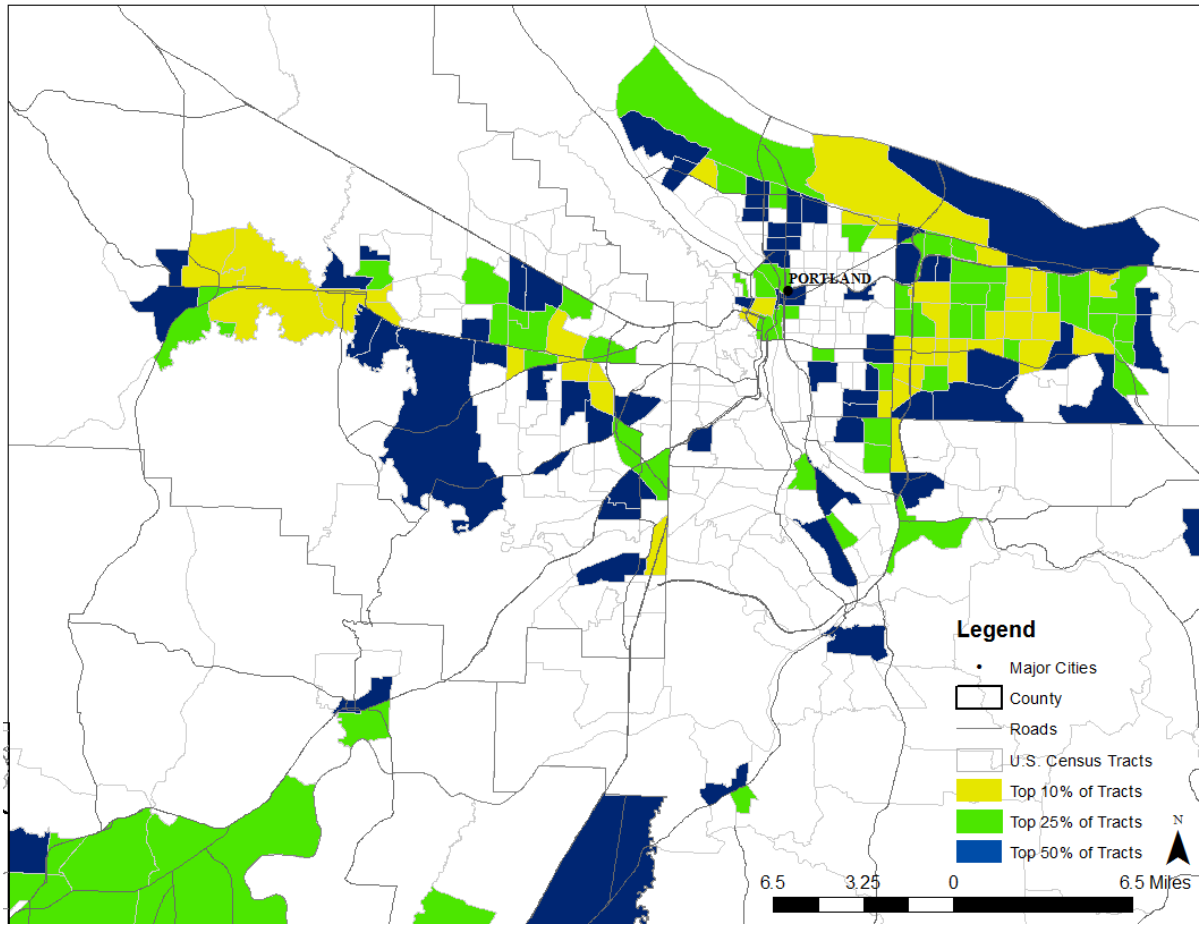

Figure 2*:* Top 10%, 25%, and 50% of Census Tracts Most Vulnerable to Climate Change in Oregon Zoomed View of Portland Metropolitan Area. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011*

Economically Distressed Areas

The initial Oregon legislation introduced in 2016 (SB 1574) stated that economically distressed areas (EDA) would receive 40% of the revenue generated through a cap-and-trade program.[9] EDAs include economically distressed counties (EDCo) and economically distressed cities (EDCi). The definition of an ED area includes similar criteria to the definition we recommend here for identifying the most vulnerable census tracts. The definition of an economically distressed county includes metrics for employment and income among others. For an economically distressed city outside of a county the metrics include educational attainment, employment, poverty, and income. The map at the end of this section shows the intersection between EDAs and the top 50% of most vulnerable census tracts.

We analyzed two sets of census tracts: 1) the complete set of Oregon tracts, and 2) Oregon census tracts divided between economically distressed and non-economically distressed counties (EDCo and non-EDC). To determine whether the EDCo and non-EDC census tracts should be treated separately or

[9] "Economically distressed area" means an area designated as distressed by the Oregon Business Development Department under ORS 285A.020 and 285A.075.
https://olis.leg.state.or.us/liz/2016R1/Downloads/MeasureDocument/SB1574/Introduced

combined, we compared the total state population and the percentages of the state's population in poverty and population of color in the most vulnerable census tracts. We found that separating the EDCo tracts did not add to the number of people living in poverty captured in the top 50% of Census tracts, and did not substantially alter the number of people of color reflected in the total population of the top 50%.

To conduct this comparison, we left economically distressed cities are geographies in the non-EDC data set. EDCi do not follow census tract boundaries. For consistency and ease of analysis, we included those areas in the non-economically distressed county data set to run preliminary analysis. Because these areas have low levels of economic obtainment, many are identified in the top 50% of the most vulnerable census tracts in the index for non-economically distressed counties.[10]

Because of the findings of the comparison and the complexities of the geographies, we recommend analyzing the Census tracts across the state as one population, not differentiating between non-EDC census tracts and EDC census tracts. Because the EDC definition includes some of the same metrics we use to create an index score, the EDC census tracts tend to be ranked highly. Further, given the complexity of analyzing the ED cities located in non-EDC counties, we believe treating all tracts as one population helps ensure a more equitable comparison across census tracts.

There are several reasons a given EDCos' or EDCis' census tracts may not be ranked highly in this index. One is that EDCo and EDCi definitions include components of their jurisdictional boundaries relative economic health. Our index focuses on spatial determinants of health meaning that we focus on individuals and clusters of individuals regardless of the overall economic health of their communities. Future research may examine how well an individual's or spatial concentration of individuals' vulnerability intersects with a county's or city's economic health. To ensure that each EDCo has at least one census tract described as "most" vulnerable, the top 65% of census tracts would need to be used, expanding beyond the top 50% we use in this report. This would also capture all but seven of the census tracts that include significant portions of EDCi boundaries.

Please note that some of the EDCs are sparsely populated or may have all of their population concentrated in one urban area. The state declares an entire county to be economically distressed and this will include all of their census tracts. Our analysis focuses on Census tracts themselves, meaning that some census tracts within an economically distressed county may not be highly ranked in the vulnerability index. This may be due to few people living in the tract, or relatively affluent people in that particular area. For instance, in EDC Harney County the geographically smaller census tract (9601) includes about 5,000 people, and is in the top 50% of census tracts based on its vulnerability score. The other tract (9602) is geographically larger, but fewer people live there (about 200 people).

[10] Oregon's definition for EDAs uses ACS 5-year estimates for education rates, unemployment rates, income, and poverty rates. Our identified most vulnerable tracts intersect with 41 of the 52 economically distressed cities across Oregon. The cities include: Astoria, Barlow, Carlton, Creswell, Estacada, Gaston, Gearhart, Hepner, Ione, Johnson City, Molalla, Philomath, and Warrenton. These cities have significant portions of their land located in a total of 16 census tracts that not in the top 50% of the most vulnerable census tracts.

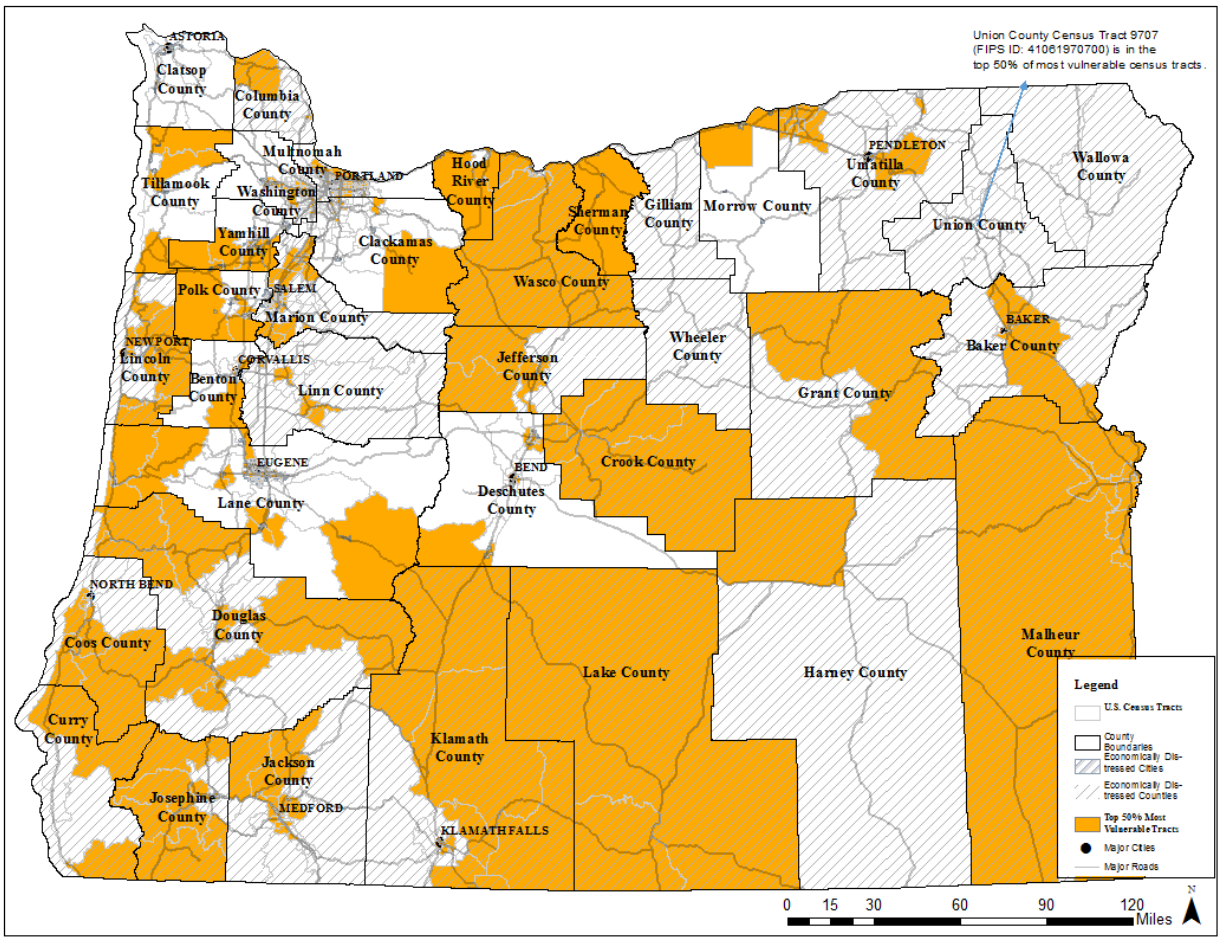

Figure 2: Economically Distressed Areas and Top 50% of Census Tracts Based on Vulnerability Index. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011.*

Potential Co-Pollutant Hot Spots

One concern with the proposed greenhouse gas cap-and-trade policy in Oregon is that it may result in localized concentrations (or hot spots) of co-pollutant emissions in communities vulnerable to climate change. Hot spots are areas of potential "localized concentrations" of toxics or pollutant emissions which may result in "elevated risks of adverse health effects (CA AB 2588, 1987: section 44301). GHG cap-and-trade policy is not typically designed to regulate co-pollutants, and when trading of GHG allowances occurs, facilities may choose to purchase allowances to continue the same level of production, or even expand production; therefore, localized co-pollutant hot spots are a "plausible outcome" under cap-and-trade (Morag-Levine 2007: 104). While many vulnerable communities are exposed to higher concentrations of both point (stationary) and mobile source greenhouse gas emissions, studies have indicated co-pollutants from mobile sources such as motor vehicles tend to be reduced as the result of policies that are aimed at reducing fossil fuel usage or encouraging usage of renewable energy sources.[11] The effect on co-pollutants from point sources tends to be less straightforward. Therefore, this analysis focuses exclusively on analyzing potential hot spots of co-pollutants from point (stationary) sources that may result from a greenhouse gas cap-and-trade policy, and its implications on Oregon communities.

We find that the top three CO_2e emitting industries for point sources in Oregon are fossil fuel and other electric power generation, solid waste landfill, and paper and paperboard mills, accounting for over 78% of all point source anthropogenic emissions. The manufacturing processes for these facilities release co-pollutants such as NOX, CO, sulfur dioxide (SO2), methane (CH4), particulate matter and other air toxins (US Environmental Protection Agency 1997: 38-40), which are associated with negative health impacts. Geographically, the largest concentrations of point source CO_2e emissions are located in the Oregon counties of Morrow, Umatilla, and Columbia. Both Umatilla and Columbia Counties are identified as Economically Distressed counties (Business Oregon 2017a), and Morrow County contains four Economically Distressed cities.

Forty-nine facilities throughout Oregon produced greater than 25,000 metric tons of CO_2e emissions in 2015. Of these 49 facilities, 67% (33 facilities) are located near populations and could pose potential co-pollutant health risks. Sixteen facilities are located within two miles of low-density residential areas and 17 facilities are located within densely populated areas or regional population centers. The sectors of Paper Mills, Paperboard Mills, Iron and Steel Mills, and Solid Waste Landfills pose the highest potential population risks for hot spots due to the combination of high co-pollutant limits and number of facilities within two miles of dense regional population centers.

Table 1: Regulated facilities located within 2 miles of densely populated areas in Census Tracts vulnerable to climate change

Facility Name	Industry Type	County
DPR Construction Inc	Electronics Manufacturing	Multnomah
Entek International LLC	All Other Plastics Product Manufacturing	Linn
International Paper Company	Paperboard Mills	Lane
Microchip Technology Inc	Electronics Manufacturing	Multnomah
Oregon State University	Colleges Univ and Professional Schools	Benton
Oreida Foods Inc	Frozen Specialty Food Manufacturing	Malheur
Owens-Brockway Glass Container Inc.	Glass Container Manufacturing	Multnomah
St John's Landfill	Solid Waste Landfill	Multnomah

[11] State of Oregon Department of Environmental Quality. February 2017. *Considerations for Designing a Cap-and-Trade Program in Oregon*. State of Oregon. Downloaded: http://www.oregon.gov/deq/FilterDocs/ghgmarketstudy.pdf

Focusing on census tracts identified as vulnerable to climate change, we find that 31 of the 49 potentially regulated facilities are located in these tracts. However, only eight of these facilities are located within two miles of densely populated areas or regional population centers. Many of the eight facilities (see Table 1) belong to the industry sectors of frozen food manufacturing, universities and electronics manufacturing, and tend to emit relatively low amounts of harmful co-pollutants such as CO, NOx, SO2 and PM according to the most recent DEQ permits held by the facilities, with the exception of the glass container manufacturing facility.

Top Industry Sectors

In Oregon, the top three carbon dioxide equivalent (CO_2e) emitting industry sectors account for over 79% of all point source anthropogenic emissions: fossil fuel and other electric power generation, solid waste landfill, and paper and paperboard mills. These three industries produced a combined 10,265,875 metric tons of CO_2e emissions in 2015. We used the Oregon DEQ 2015 Greenhouse Gas Facility Emissions dataset of all facilities holding air quality permits for the following analysis.[12]

Geographic Distribution

Forty-two U.S. census tracts (5.1% of all Oregon tracts) contain facilities with point source CO_2e emissions greater than 25,000 metric tons that are potentially within the scope of the cap-and-trade policy. According to U.S. Census estimates, 5% of the total population of Oregon lives within these 42 tracts (207,829 people). These 42 tracts account for 5% of Oregon's communities of color (42,758 people who identify as non-white), and 5% of Oregonians living under 200% of the Federal Poverty Limit (75,102 people). See Figure 2 for the facility distribution throughout the State of Oregon. Fossil fuel electric power generation facilities are the largest emitters of CO_2e, and hold DEQ air quality permits that allow for the largest amounts of co-pollutants such as CO, NO_x and SO2. However, none of these facilities has visible populations located within two miles of the sites.

[12] See: Oregon Department of Environmental Quality. 2017b. 2015 Greenhouse Gas Facility Emissions. Retrieved from: http://www.oregon.gov/deq/FilterDocs/GHGFacilityEmissions.pdf.

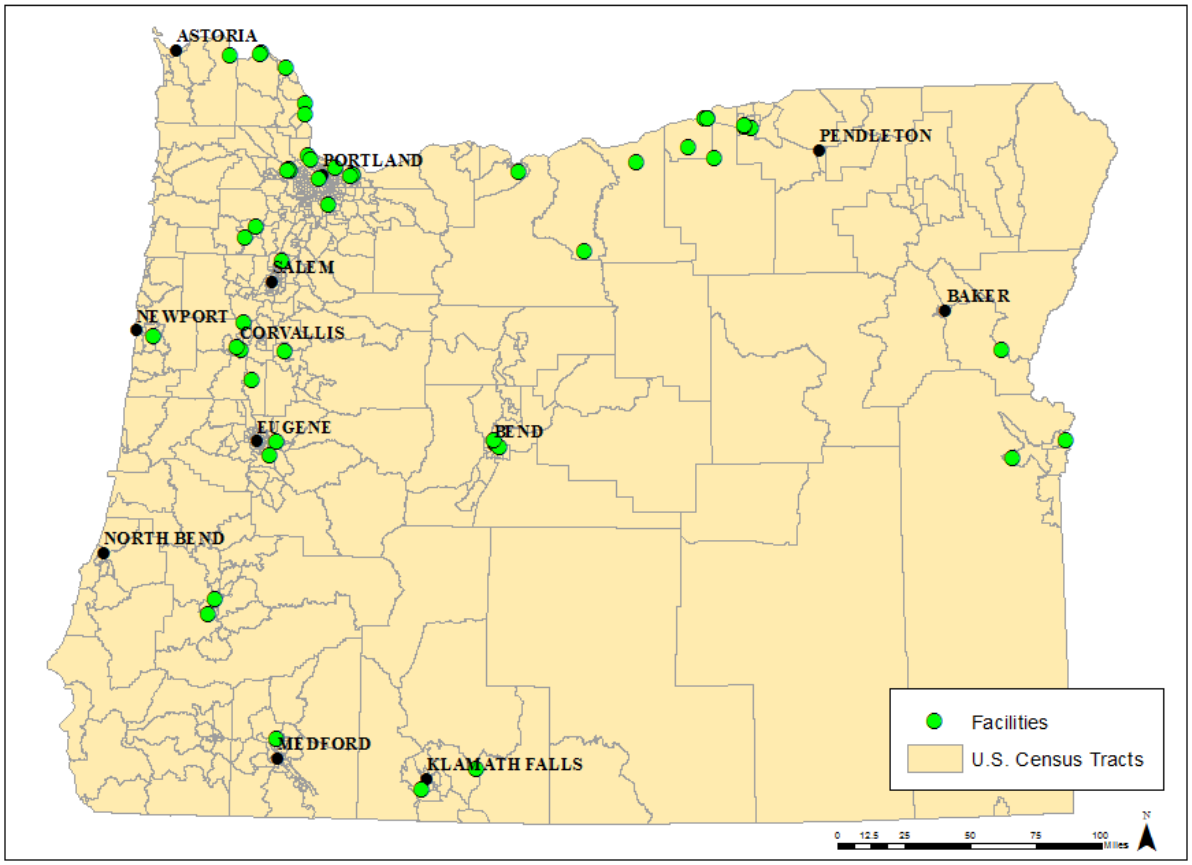

Figure 3: Distribution of Greenhouse Gas Emitting Facilities in Oregon. *All facilities with Air Quality Permits from the Oregon Department of Environmental Quality that produced over 25,000 metric tons of CO_2e emissions in 2015. Data source: Oregon Department of Environmental Quality 2015 Greenhouse Gas Facility Emissions (2017b).*

Co-Pollutants and Communities Vulnerable to Climate Change

Thirty-one facilities with point source CO_2e emissions greater than 25,000 metric tons (out of a total of 49 facilities) are located within U.S. census tracts identified as vulnerable to climate change. Although the majority of the potentially regulated facilities are located within census tracts identified as most vulnerable to climate change, we find that only eight facilities are located within two miles of densely populated areas or regional population centers. Many of the facilities belong in the industry sectors of frozen food manufacturing, universities and electronics manufacturing, which tend to emit relatively low amounts of harmful co-pollutants such as CO, NO_x, SO_2 and PM according to the most recent DEQ permits held by the facilities.

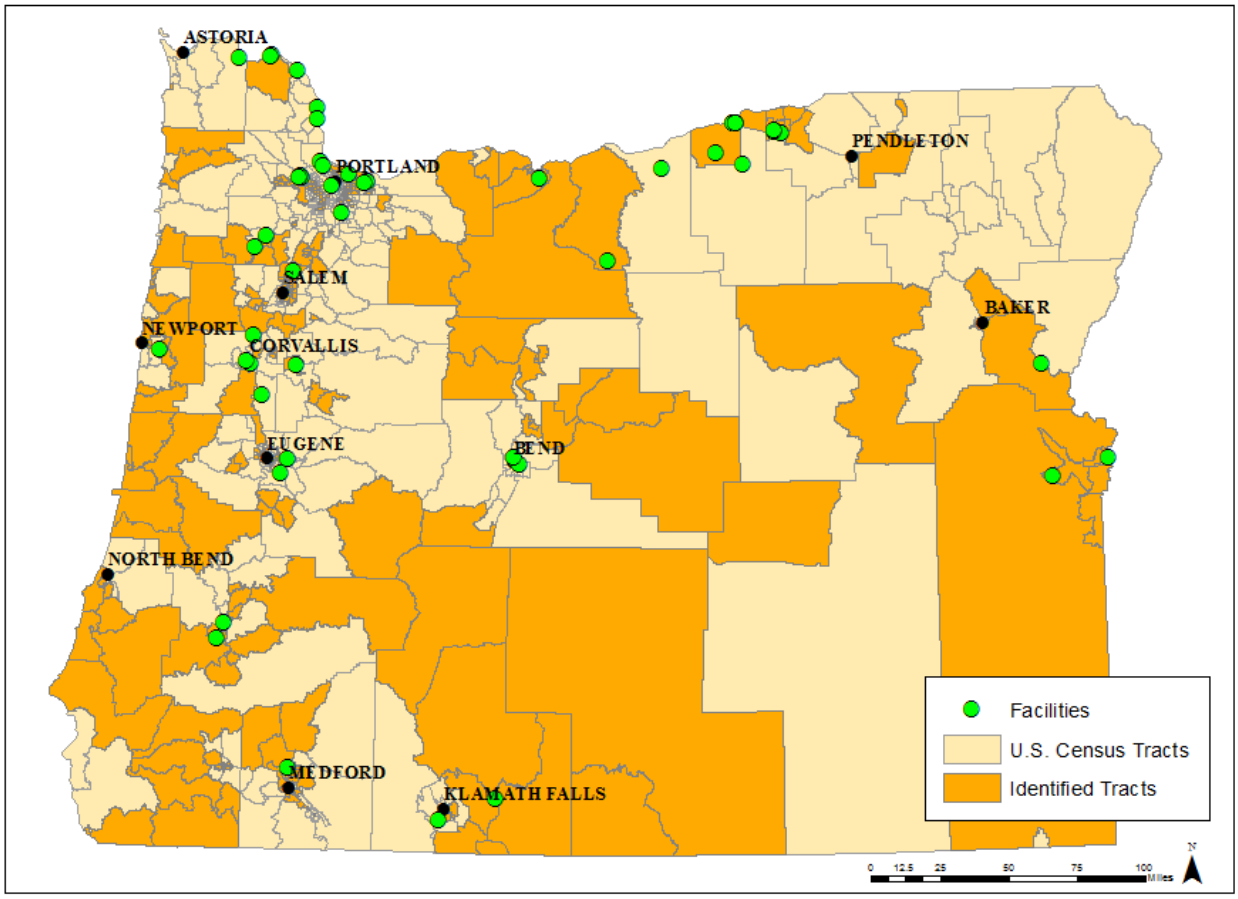

Figure 3: Distribution of Greenhouse Gas Emitting Facilities in Relationship to U.S. Census Tracts Identified as Most Vulnerable to Climate Change. *All facilities with Air Quality Permits from the Oregon Department of Environmental Quality that produced over 25,000 metric tons of CO_2e emissions in 2015. Data source: Oregon Department of Environmental Quality 2015 Greenhouse Gas Facility Emissions (2017b). Most vulnerable to climate change census tracts include the top 50% of census tracts with the highest vulnerability index score.*

Co-Pollutant Hot Spots Recommendations

Current data on existing regulated point source facilities in Oregon do not indicate critical hot spot concerns. However, we strongly recommend that additional co-pollutant data be collected for facilities regulated within the proposed greenhouse gas cap-and-trade policy to properly monitor the potential for localized concentrations (or hot spots) of co-pollutant emissions, particularly in the communities most vulnerable to climate change. In addition, we propose that careful attention be paid to the siting of new facilities as well as the expansions of existing facilities to avoid the future development of co-pollutant hot spots. Finally, while mobile emission sources and smaller emitters (under 25,000 metric tons of CO_2e emissions) are not the focus of this analysis, continued attention should be paid to them to alleviate concentrations of harmful co-pollutants from these sources.

Community Benefits and Distribution

Sharing the benefits accrued through the creation of GHG carbon pricing programs with the communities most vulnerable to impacts of climate change is essential to meeting equity goals in public policy. These co-benefits include the general health benefits associated with reducing co-pollutants associated with GHG emissions as well as distributing revenue accrued through carbon pricing programs to those communities most impacted by climate change. In this section we focus on discussing the types of activities and ways to distribute accrued funding akin to California's plan to distribute cap-and-trade auction proceeds (California Climate Investments 2016).

This study focused on the spatial distribution of people vulnerable to the impacts of climate change. The issues that concentrations of individuals face when responding to economic hardship, severe weather, and natural disasters or when addressing the historic siting of environmental hazards near those communities who are least well off is well documented. However, a spatial approach to understanding equity should not preclude programming or benefits distribution to individuals from backgrounds with low socio-economic profiles. The balance between activities that help places where vulnerable people are living and supporting individuals regardless of where they live should be considered when developing programming.

Identifying Activities

Deciding what types of activities to fund from any revenue generated should be driven by the needs of community members most vulnerable to the effects of climate change. Determining how funds would be allocated should incorporate:

- Dedication of resources specifically to those communities most vulnerable to the effects of climate change.
- Diverse representation on decision-making bodies related to the creation and administration of the funds.
- Community participation in developing and identifying projects for funding.
- Ensuring there is accountability and transparency in program delivery.
- Creation of jobs for community members and technical assistance for women- and people of color-owned businesses.

As a starting point to determine what types of programmatic activities might be applicable in Oregon, we asked community experts which types of activities they would like to see supported through funding generated by cap-and-trade programming via a survey.

Types of activities

Multiple types of activities could be supported through funds generated through carbon pricing programs. From individual household activities such as weatherization programs to community based activities such as job training programs, the types of activities could encompass a wide breadth of programs. Affordable housing, adaptation support for individuals or communities whose economies are severely disrupted by climate change, and workforce development were identified as the top priorities for those people who responded to the survey.

Scale of activities

At this stage, we recommend additional work with community groups to understand the scale and scope of any activities that receive support. In the survey sent to community members, there was not wide agreement about whether fewer, more expensive programs such as job training should be funded instead of more expansive, less costly programs such as individual weatherization programs. While there was clear agreement about the top priorities, without giving community members the ability to weight more concrete trade-offs, we hesitate to strongly advocate for one set of activities at a particular scale over another.

Next Steps for Community Benefits

Additional work should be conducted to determine what types of programs or activities should be supported by generated revenue. In California multiple large workshops were conducted across the state to generate input on community benefits. To reproduce something similar in Oregon, additional resources would need to be set aside to conduct these type of workshops effectively. However, we are concerned that Oregon lacks the number of advocacy, environmental justice, or community development organizations that California has across the state. Previous regional planning level work in California makes it conceptually easier to envision hosting large workshops that are well attended in key geographic areas. In Oregon, there may need to be many more workshops at smaller geographic scales to really obtain the type of turn-out necessary for a decision-making workshop. A more comprehensive survey conducted across the state coupled with key stakeholder interviews or focus groups may yield useful outcomes.

Any work to assess what community groups and members would like to see prioritized should also use realistic estimated GHG cap-and-trade program revenues. Asking people if they would like to support job training programs versus weatherization assistance means something different if there is $100,000 to spend or $1,000,000 to spend. People's decisions about what types of activities to support may also change based on how many people will be served versus how many activities can be supported across how much geography. Forced choice questions will help people understand the trade-offs between activities.

We recommend grounded future research on how to best ensure that any generated revenue be allocated in a way that supports the needs of the most vulnerable communities to climate change in Oregon.

Conclusion and Future Work

In this study we constructed an index to assess who is most likely to experience the disparate impacts of climate change. Our index score draws on social determinants of health, and emphasizes the role of demographic factors in shaping peoples' life outcomes, particularly the role of race and income. Because of the scope of possible GHG cap-and-trade legislation (for point source GHG emissions), we did not incorporate metrics related to environmental hazards such as flooding or economic measures related to local economies likely to be disrupted by climate change. Future work should explore the incorporation of these metrics. Such work takes on increased importance given the unique situation of Native American reservations and Native Americans living off reservation in rural communities, as many of these individuals live a subsistence life-style that will be impacted by climate change but not likely reflected in demographic census metrics related to unemployment or income. Additional metrics related to transportation and housing cost burden could also uncover additional meaningful vulnerability.

We also examined the possible issues related to hot spots. Current data on existing regulated point source facilities in Oregon do not indicate critical hot spot concerns. However, we strongly recommend that additional co-pollutant data be collected for facilities regulated within the proposed greenhouse gas cap-and-trade policy to properly monitor the potential for localized concentrations (or hot spots) of co-pollutant emissions, particularly in the communities most vulnerable to climate change. In addition, we propose that careful attention be paid to the siting of new facilities as well as the expansions of existing facilities to avoid the future development of co-pollutant hot spots. Finally, mobile emission sources and smaller emitters (under 25,000 metric tons of CO_2e emissions) are not the focus of this analysis, and continued attention should be paid to them to alleviate concentrations of harmful co-pollutants from these sources.

Lastly, we researched how to allocate community benefits. While we found broad agreement about the types of activities that community experts would like to see supported (housing and economic development), we found less agreement about the scale of those activities. We recommend that additional research be conducted based on realistic projections of revenues to help community members better understand and envision trade-offs between options.

The framing for this research focused on providing Oregonians an accessible way to understand the disparate impacts of climate change, and how GHG cap-and-trade programming could potentially help address those effects. We believe this work lays the foundation for additional research to ensure that those Oregonians most vulnerable to the effects of climate change receive the support and protection they need and deserve.

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Oregon's Communities Most Vulnerable to Climate Change (Tallmadge, Coalition of Communities of Color)

10/16/17

Oregon’s Communities Most Vulnerable to Climate Change (“most impacted communities”)

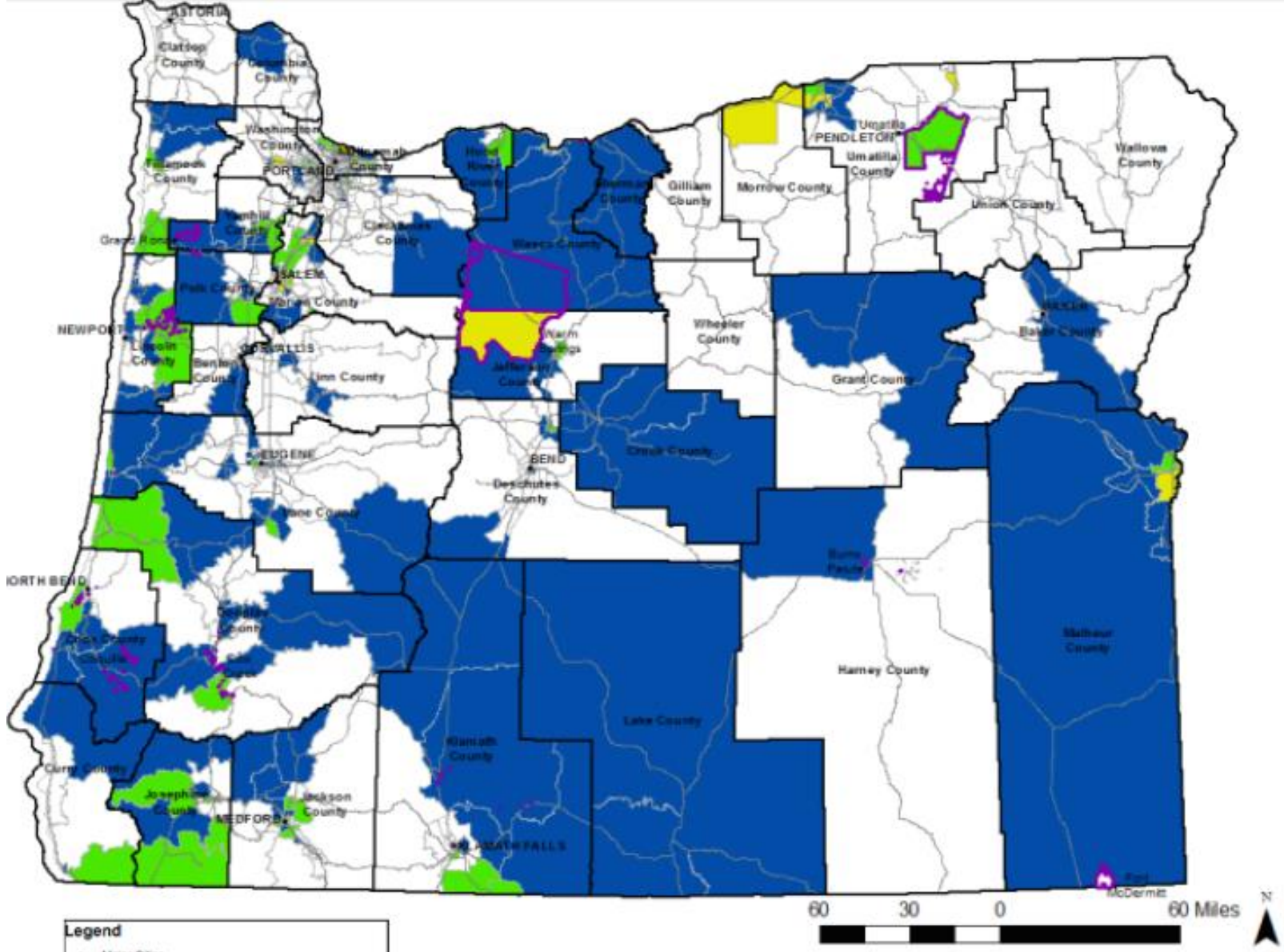


Figure 1: Top 10%, 25%, and 50% of Census Tracts Most Vulnerable to Climate Change in Oregon. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011.*

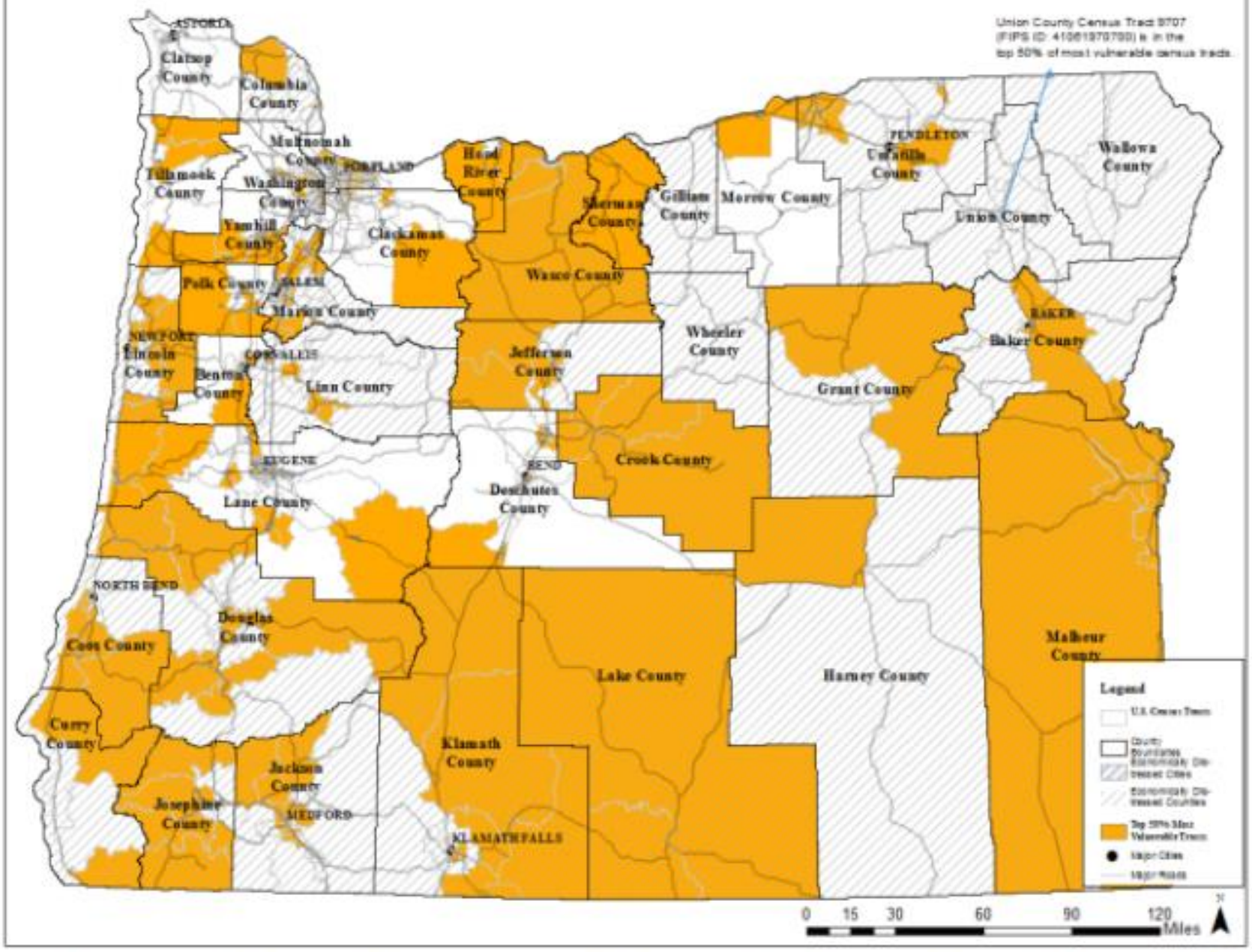


Figure 2: Economically Distressed Areas and Top 50% of Census Tracts Based on Vulnerability Index. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011.*

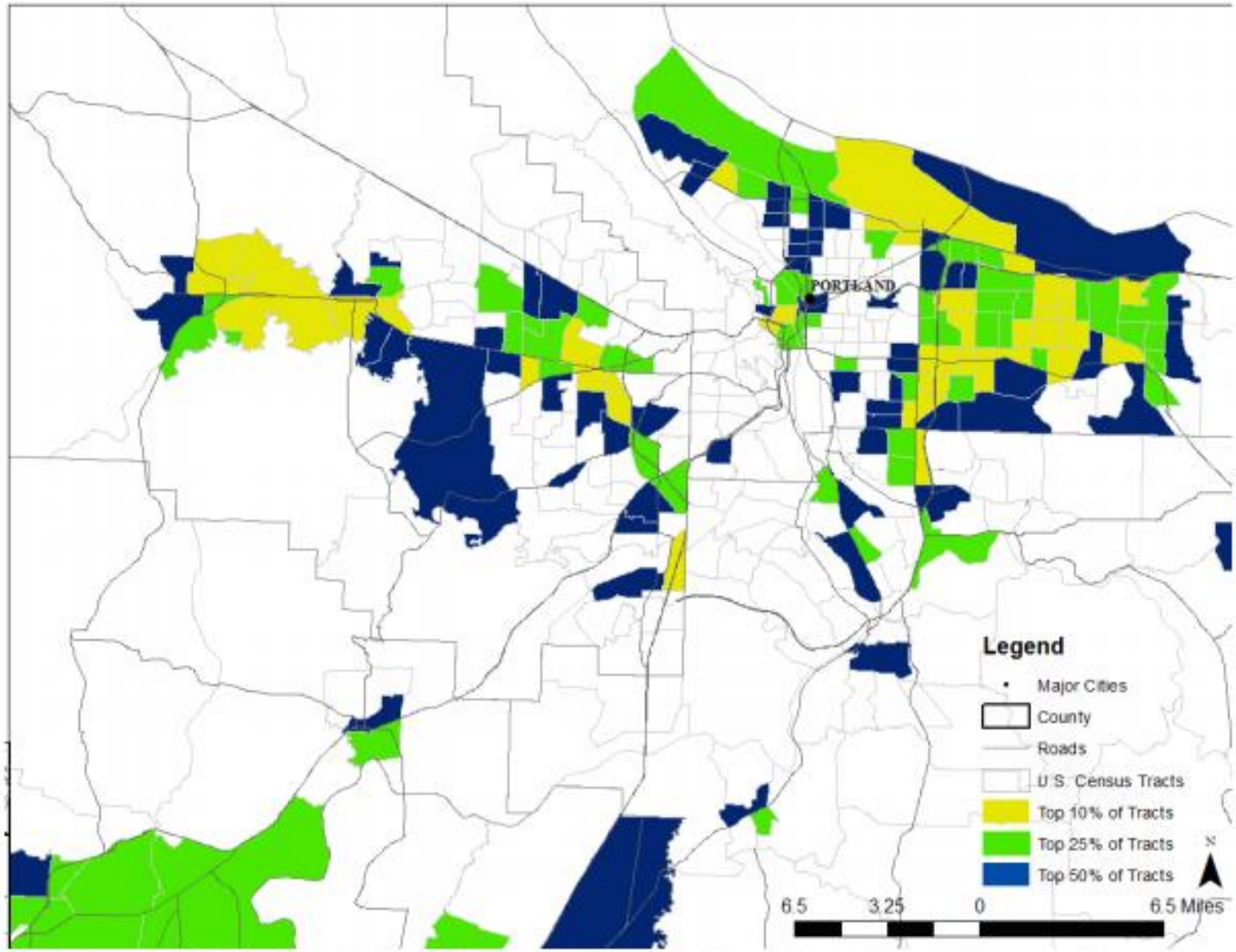


Figure 2: Top 10%, 25%, and 50% of Census Tracts Most Vulnerable to Climate Change in Oregon Zoomed View of Portland Metropolitan Area. *GIS data source: US Census Bureau and State of Oregon. Index scores are based on data from: U.S. Census American Community Survey (ACS) 2011-2015 5 year estimates and the National Air Toxics Assessments (NATA) 2011*

Investment Opportunities

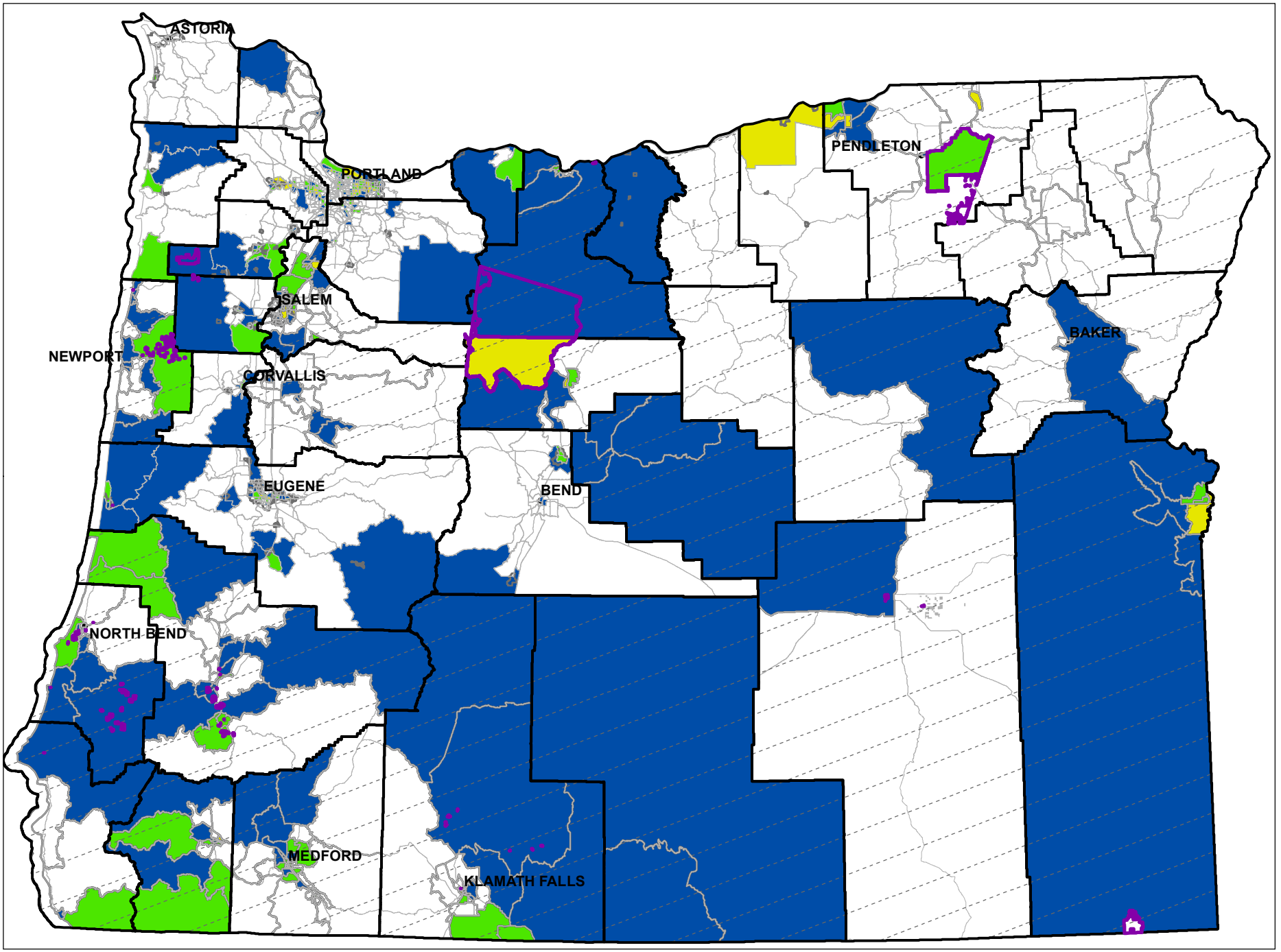
- https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/auctionproceedsmap.htm

Oregon Census Tracts Most Vulnerable to the Impacts of Climate Change (Tallmadge, Coalition of Communities of Color)

10/16/17

OR Census Tracts Most Vulnerable to the Impacts of Climate Change

By: Marisa Zapata, Jenny Liu, & Matthew Harris
Portland State University
October 2017



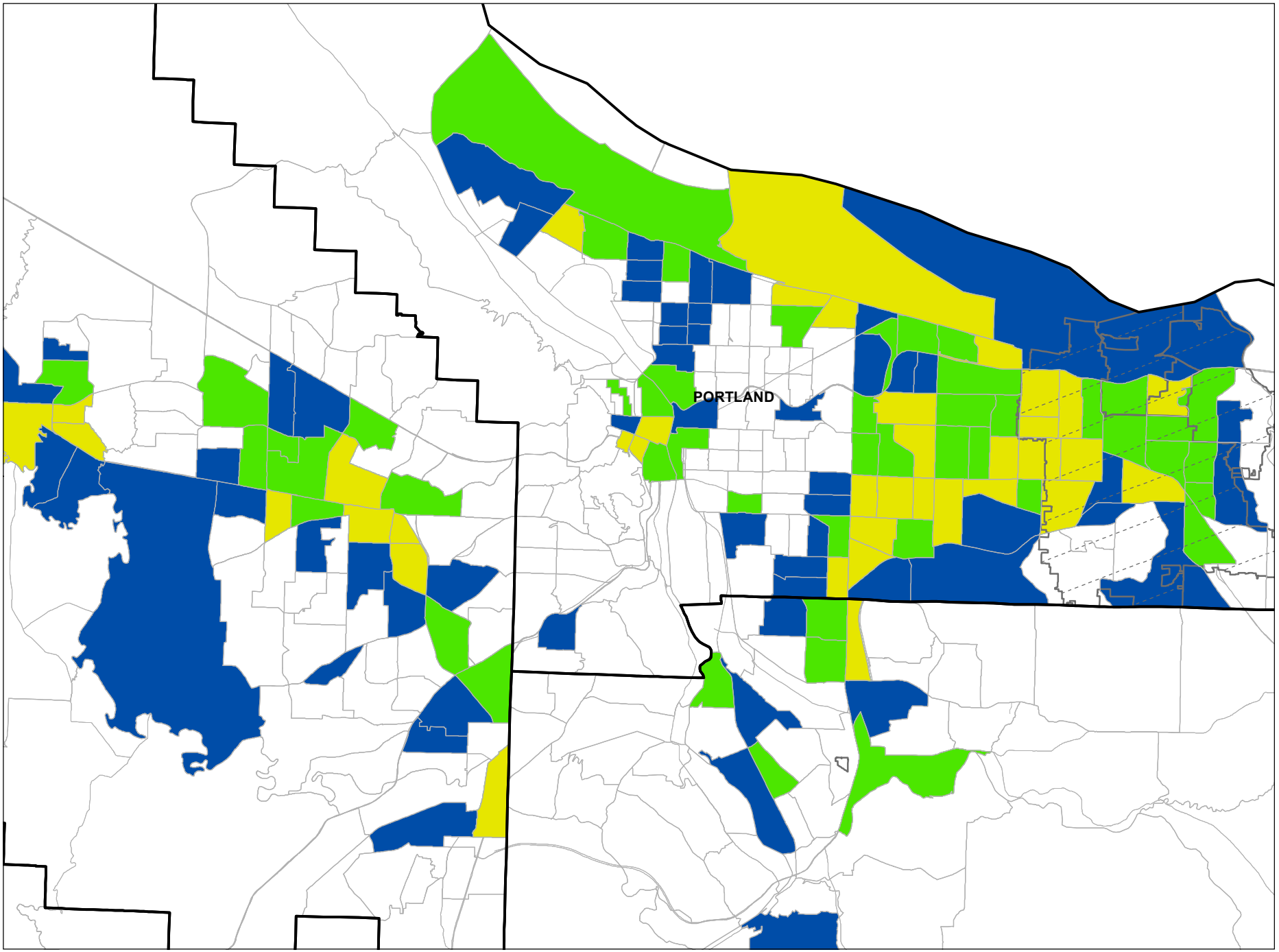
Data source: US Census ACS 2011-2016 and EPA NATA 2011

Oregon Census Tracts Most Vulnerable to the Impacts of Climate Change, Zoomed to Portland Metro Area (Tallmadge, Coalition of Communities of Color)

10/16/17

OR Census Tracts Most Vulnerable to the Impacts of Climate Change Zoomed to Portland Metropolitan Area

By: Marisa Zapata, Jenny Liu, & Matthew Harris
Portland State University
October 2017



Data source: US Census ACS 2011-2016 and EPA NATA 2011

Notes for Summary Tract Sheet and Table (Zapata)

10/16/17

Notes for summary tract sheet

Top percentage break points:

83 tracts = 10%
207 tracts = 25%
413 tracts = 50%

Index Score:

Data from 2011 NATA EPA and US Census ACS 2016 5 Year Estimates
Index calculation Based on Z-scores

Index = $$5.00\% \cdot Cancer\ Risk + 5.00\% \cdot Respiratory\ Hazard + 25.71\% \cdot Race + 25.71\% \cdot Poverty + 12.86\% \cdot Education + 12.86\% \cdot Unemployment + 12.86\% \cdot Age\ /\ 7\ (total\ number\ of\ variables)$$

EDCounty:

1 = Census tracts is in an OR designated economically distressed county
0 = Census tract is not in an OR designated economically distressed county

Significant Portion of EDCity:

We identified census tracts with significant portions of OR designated economically distressed cities. Note that some cities are quite small and there may be more than one in a census tract. There are also cities that crossed over multiple census tracts. More than about 1/3 of the city had to cross into the census tract to be included. The identification was an estimate. Also note that Salem is designated as a distressed city in Polk county, but is automatically classifed as distressed in Marion county.
1 = Census tract is in an OR designated economically distressed city
0 = Census tract is not in an OR desingated economically distressed city

Indian Reservation Land

We indentified all census tracts that included US Census identified Indian reservation, village, or town land
1 = Census tract included Indian reservation land
0 = Census tract does not include Indian reservation land

Indian Land Off Reservation Not Part of Indian Reservation Tract Land

The US Census also identifies Indian land that is not part of the reservation and is being held in trust. We identified census tracts that had land off of the reservation and contained no reservation, village, or town land.
1 = Census tract included Indian land not on the reservation and did not include reservation land
0 = Census tract included Indian land not on the reservation and did not include reservation land

Id2	County	Index Score	Index Rank	EDCounty	Significant Portion of EDCity	Indian Reservation Land	Indian Land Off Reservation Not Part of Indian Reservation Tract Land
41047000502	Marion	*36.22*	1	1	0	0	0
41031940000	Jefferson	*34.66*	2	1	0	1	0
41029000100	Jackson	*31.82*	3	1	0	0	0
41047010304	Marion	*31.61*	4	1	0	0	0
41067032409	Washington	*31.04*	5	0	0	0	0
41047010306	Marion	*29.67*	6	1	0	0	0
41051008301	Multnomah	*29.26*	7	0	0	0	0
41047001602	Marion	*28.88*	8	1	0	0	0
41051009801	Multnomah	*27.85*	9	0	1	0	0
41047010305	Marion	*26.72*	10	1	0	0	0
41047000400	Marion	*25.20*	11	1	0	0	0
41047001701	Marion	*25.03*	12	1	0	0	0
41045970400	Malheur	*24.91*	13	1	0	0	0
41051009101	Multnomah	*23.42*	14	0	0	0	0
41029000201	Jackson	*22.88*	15	1	0	0	0
41051009604	Multnomah	*22.86*	16	0	1	0	0
41051010600	Multnomah	*22.80*	17	0	0	0	0
41051007400	Multnomah	*22.79*	18	0	0	0	0
41051004001	Multnomah	*22.78*	19	0	0	0	0
41047001702	Marion	*22.74*	20	1	0	0	0
41051009606	Multnomah	*22.28*	21	0	1	0	0
41047000501	Marion	*21.39*	22	1	0	0	0
41035971600	Klamath	*20.66*	23	1	0	0	0
41031960201	Jefferson	*20.59*	24	1	0	0	0
41067032501	Washington	*20.14*	25	0	0	0	0
41051008400	Multnomah	*20.08*	26	0	0	0	0
41051008302	Multnomah	*19.85*	27	0	0	0	0
41029000202	Jackson	*19.76*	28	1	0	0	0
41051007300	Multnomah	*19.66*	29	0	0	0	0
41051007600	Multnomah	*19.13*	30	0	0	0	0
41047000701	Marion	*19.04*	31	1	0	0	0
41053005100	Polk	*18.53*	32	0	1	0	0
41051010304	Multnomah	*18.25*	33	0	1	0	0
41047001000	Marion	*17.98*	34	1	0	0	0
41051009701	Multnomah	*17.84*	35	0	0	0	0
41059950200	Umatilla	*17.49*	36	1	0	0	0
41067032902	Washington	*17.29*	37	0	1	0	0
41051009000	Multnomah	*17.06*	38	0	0	0	0
41047001801	Marion	*16.95*	39	1	0	0	0
41047000300	Marion	*16.48*	40	1	0	0	0
41051008600	Multnomah	*16.26*	41	0	0	0	0
41051005600	Multnomah	*16.18*	42	0	0	0	0

41033360500	Josephine	*16.17*	43	1	0	0	0
41047001604	Marion	*16.14*	44	1	0	0	0
41045970500	Malheur	*16.08*	45	1	0	0	0
41051008202	Multnomah	*16.07*	46	0	0	0	0
41051009803	Multnomah	*15.99*	47	0	1	0	0
41039003700	Lane	*15.93*	48	0	1	0	0
41067031200	Washington	*15.64*	49	0	0	0	0
41043020802	Linn	*15.19*	50	1	0	0	0
41051009702	Multnomah	*14.90*	51	0	1	0	0
41067031005	Washington	*14.81*	52	0	0	0	0
41067033200	Washington	*14.81*	53	0	1	0	0
41005022201	Clackamas	*14.80*	54	0	0	0	0
41067032005	Washington	*14.80*	55	0	0	0	0
41051010001	Multnomah	*14.80*	56	0	1	0	0
41035971700	Klamath	*14.29*	57	1	0	0	0
41051009605	Multnomah	*14.15*	58	0	1	0	0
41051000602	Multnomah	*14.02*	59	0	0	0	0
41047000900	Marion	*14.01*	60	1	0	0	0
41051008100	Multnomah	*13.96*	61	0	0	0	0
41067031402	Washington	*13.96*	62	0	0	0	0
41067032901	Washington	*13.83*	63	0	1	0	0
41067032410	Washington	*13.71*	64	0	0	0	0
41051009501	Multnomah	*13.67*	65	0	0	0	0
41047001503	Marion	*13.51*	66	1	0	0	0
41067031100	Washington	*13.22*	67	0	0	0	0
41039004200	Lane	*13.20*	68	0	1	0	0
41059951200	Umatilla	*13.17*	69	1	0	0	0
41039003800	Lane	*13.16*	70	0	1	0	0
41029001601	Jackson	*13.13*	71	1	0	0	0
41059951000	Umatilla	*13.12*	72	1	0	0	0
41047001802	Marion	*13.02*	73	1	0	0	0
41003001101	Benton	*12.89*	74	0	0	0	0
41051005500	Multnomah	*12.81*	75	0	0	0	0
41067031705	Washington	*12.77*	76	0	0	0	0
41035971200	Klamath	*12.65*	77	1	0	0	0
41039003900	Lane	*12.62*	78	0	1	0	0
41011000504	Coos	*12.55*	79	1	0	1	0
41039001904	Lane	*12.44*	80	0	1	0	0
41049970100	Morrow	*12.34*	81	0	1	0	0
41035971800	Klamath	*12.26*	82	1	0	0	0
41051000601	Multnomah	*12.26*	83	0	0	0	0
41059950900	Umatilla	*11.92*	84	1	0	0	0
41045970300	Malheur	11.88	85	1	0	0	0
41071030802	Yamhill	11.66	86	0	1	0	0
41047010303	Marion	11.65	87	1	0	0	0
41051001602	Multnomah	11.65	88	0	0	0	0
41005022108	Clackamas	11.63	89	0	0	0	0

41051008500	Multnomah	11.49	90	0	0	0	0
41071030202	Yamhill	11.30	91	0	1	0	0
41051009201	Multnomah	11.24	92	0	0	0	0
41051009301	Multnomah	11.16	93	0	0	0	0
41051010411	Multnomah	10.93	94	0	1	0	0
41027950400	Hood River	10.72	95	0	0	0	1
41059940000	Umatilla	10.59	96	1	0	1	0
41017000900	Deschutes	10.52	97	0	1	0	0
41039004300	Lane	10.47	98	0	1	0	0
41039004000	Lane	10.29	99	0	1	0	0
41071030801	Yamhill	10.21	100	0	1	0	0
41051001101	Multnomah	10.21	101	0	0	0	0
41047001601	Marion	10.17	102	1	0	0	1
41051008201	Multnomah	10.02	103	0	0	0	0
41035970600	Klamath	9.97	104	1	0	0	0
41067031606	Washington	9.87	105	0	0	0	0
41051009502	Multnomah	9.73	106	0	0	0	0
41067031706	Washington	9.61	107	0	0	0	0
41043020801	Linn	9.54	108	1	0	0	0
41043020400	Linn	9.48	109	1	0	0	0
41047001603	Marion	9.33	110	1	0	0	0
41029000406	Jackson	9.28	111	1	0	0	0
41039002102	Lane	9.22	112	0	1	0	0
41051009804	Multnomah	9.20	113	0	0	0	0
41051009302	Multnomah	9.10	114	0	0	0	0
41051007500	Multnomah	9.05	115	0	0	0	0
41051010410	Multnomah	8.82	116	0	1	0	0
41067031613	Washington	8.73	117	0	0	0	0
41051002303	Multnomah	8.70	118	0	0	0	0
41045970200	Malheur	8.60	119	1	0	0	0
41029000300	Jackson	8.57	120	1	0	0	0
41005021602	Clackamas	8.53	121	0	0	0	0
41047001502	Marion	8.51	122	1	0	0	0
41067031300	Washington	8.39	123	0	0	0	0
41043020500	Linn	8.37	124	1	0	0	0
41053020203	Polk	8.32	125	0	1	0	0
41029000405	Jackson	8.13	126	1	0	0	0
41029000203	Jackson	8.12	127	1	0	0	0
41005022907	Clackamas	8.03	128	0	0	0	0
41051007900	Multnomah	8.00	129	0	0	0	0
41035971500	Klamath	7.99	130	1	0	0	0
41039004800	Lane	7.89	131	0	1	0	0
41019010000	Douglas	7.82	132	1	0	0	0
41029000602	Jackson	7.80	133	1	0	0	0
41051009603	Multnomah	7.69	134	0	1	0	0
41031960202	Jefferson	7.64	135	1	0	0	0
41003001001	Benton	7.53	136	0	0	0	0

41039000706	Lane	7.50	137	0	1	0	0
41067031612	Washington	7.50	138	0	0	0	0
41005021601	Clackamas	7.45	139	0	0	0	0
41067033102	Washington	7.42	140	0	1	0	0
41035970700	Klamath	7.41	141	1	0	0	0
41051010303	Multnomah	7.41	142	0	1	0	0
41015950400	Curry	7.38	143	1	0	0	0
41039003302	Lane	7.37	144	0	1	0	0
41051007800	Multnomah	7.33	145	0	0	0	0
41051001702	Multnomah	7.23	146	0	0	0	0
41051007202	Multnomah	7.22	147	0	0	0	0
41029000502	Jackson	7.19	148	1	0	0	0
41029001301	Jackson	7.17	149	1	0	0	0
41051009400	Multnomah	7.11	150	0	0	0	0
41019130000	Douglas	7.08	151	1	0	1	0
41039001302	Lane	7.04	152	0	1	0	0
41019190000	Douglas	7.04	153	1	0	1	0
41065970400	Wasco	7.01	154	1	0	0	0
41067030900	Washington	6.97	155	0	0	0	0
41003001102	Benton	6.92	156	0	0	0	0
41039004403	Lane	6.85	157	0	1	0	0
41047010701	Marion	6.85	158	1	0	0	0
41039003301	Lane	6.76	159	0	1	0	0
41053020302	Polk	6.75	160	0	1	0	0
41029001302	Jackson	6.68	161	1	0	0	0
41019200000	Douglas	6.65	162	1	0	1	0
41051010408	Multnomah	6.54	163	0	1	0	0
41051000902	Multnomah	6.37	164	0	0	0	0
41039000707	Lane	6.22	165	0	1	1	0
41047001703	Marion	6.15	166	1	0	0	0
41033361600	Josephine	6.03	167	1	0	0	0
41033360701	Josephine	6.02	168	1	0	0	0
41033360900	Josephine	5.99	169	1	0	0	0
41065970500	Wasco	5.97	170	1	0	0	0
41067032606	Washington	5.91	171	0	0	0	0
41057960800	Tillamook	5.77	172	0	0	0	0
41005021802	Clackamas	5.77	173	0	0	0	0
41051010405	Multnomah	5.69	174	0	1	0	0
41033361100	Josephine	5.59	175	1	0	0	0
41051003701	Multnomah	5.49	176	0	0	0	0
41051000502	Multnomah	5.43	177	0	0	0	0
41067031403	Washington	5.40	178	0	0	0	0
41033361400	Josephine	5.35	179	1	0	0	0
41051010100	Multnomah	5.30	180	0	1	0	0
41017000800	Deschutes	5.28	181	0	1	0	0
41033361200	Josephine	5.27	182	1	0	0	0
41039004401	Lane	5.23	183	0	1	0	0

41041951800	Lincoln	5.23	184	1	0	1	0
41051003901	Multnomah	5.22	185	0	0	0	0
41005021200	Clackamas	5.19	186	0	0	0	0
41029001900	Jackson	5.16	187	1	0	0	0
41051009202	Multnomah	5.15	188	0	0	0	0
41051005100	Multnomah	5.15	189	0	0	0	0
41067031609	Washington	5.12	190	0	0	0	0
41035971900	Klamath	5.08	191	1	0	1	0
41007950900	Clatsop	5.07	192	0	1	0	0
41029001602	Jackson	5.05	193	1	0	0	0
41071030601	Yamhill	5.05	194	0	1	0	0
41003010600	Benton	5.03	195	0	0	0	0
41029000800	Jackson	4.95	196	1	0	0	0
41071030702	Yamhill	4.92	197	0	1	0	0
41011000502	Coos	4.85	198	1	0	1	0
41019020000	Douglas	4.82	199	1	0	0	0
41047002502	Marion	4.79	200	1	0	0	0
41057960500	Tillamook	4.76	201	0	1	0	0
41051004900	Multnomah	4.74	202	0	0	0	0
41029000501	Jackson	4.73	203	1	0	0	0
41051005700	Multnomah	4.71	204	0	0	0	0
41067030700	Washington	4.68	205	0	0	0	0
41039004502	Lane	4.66	206	0	1	0	0
41071030900	Yamhill	4.65	207	0	1	0	0
41039003201	Lane	4.62	208	0	1	0	0
41065970800	Wasco	4.62	209	1	0	1	0
41019050002	Douglas	4.54	210	1	0	0	0
41067031615	Washington	4.49	211	0	0	0	0
41005021700	Clackamas	4.43	212	0	0	0	0
41053020303	Polk	4.42	213	0	1	0	0
41039003400	Lane	4.42	214	0	1	0	0
41045970600	Malheur	4.40	215	1	0	0	0
41047001803	Marion	4.40	216	1	0	0	0
41051004101	Multnomah	4.39	217	0	0	0	0
41019120000	Douglas	4.28	218	1	0	1	0
41051008800	Multnomah	4.18	219	0	0	0	0
41005980000	Clackamas	4.13	220	0	0	0	0
41019160000	Douglas	4.12	221	1	0	1	0
41039001902	Lane	4.11	222	0	1	0	0
41067030803	Washington	4.10	223	0	0	0	0
41051004102	Multnomah	4.08	224	0	0	0	0
41025960100	Harney	4.08	225	1	0	1	0
41039000404	Lane	4.03	226	0	1	0	0
41051010200	Multnomah	3.99	227	0	1	0	0
41035970400	Klamath	3.94	228	1	0	0	0
41041951000	Lincoln	3.94	229	1	0	0	0
41067031703	Washington	3.92	230	0	0	0	0

41051008901	Multnomah	3.88	231	0	0	0	0
41051009102	Multnomah	3.83	232	0	0	0	0
41039001301	Lane	3.83	233	0	1	0	0
41003000600	Benton	3.82	234	0	0	0	0
41051007700	Multnomah	3.79	235	0	0	0	0
41043030401	Linn	3.78	236	1	0	0	0
41011000300	Coos	3.73	237	1	0	1	0
41037960200	Lake	3.70	238	1	0	0	0
41051000701	Multnomah	3.67	239	0	0	0	0
41071030701	Yamhill	3.67	240	0	1	0	0
41071030502	Yamhill	3.57	241	0	1	1	0
41051009904	Multnomah	3.54	242	0	1	0	0
41033360702	Josephine	3.51	243	1	0	0	0
41067033101	Washington	3.43	244	0	1	0	0
41051003402	Multnomah	3.38	245	0	0	0	0
41051002903	Multnomah	3.34	246	0	0	0	0
41039002504	Lane	3.33	247	0	1	0	0
41013950200	Crook	3.28	248	1	0	0	0
41015950100	Curry	3.26	249	1	0	1	0
41017001600	Deschutes	3.24	250	0	0	0	0
41067031006	Washington	3.24	251	0	0	0	0
41011001100	Coos	3.21	252	1	0	1	0
41039001903	Lane	3.21	253	0	1	0	0
41013950400	Crook	3.20	254	1	0	0	0
41051003401	Multnomah	3.19	255	0	0	0	0
41061970700	Union	3.12	256	1	0	0	0
41059950800	Umatilla	3.12	257	1	0	0	0
41039002700	Lane	3.06	258	0	1	0	0
41065970700	Wasco	3.05	259	1	0	0	0
41051008700	Multnomah	3.03	260	0	0	0	0
41035970200	Klamath	2.97	261	1	0	1	0
41013950100	Crook	2.88	262	1	0	0	0
41003010702	Benton	2.86	263	0	0	0	0
41031960302	Jefferson	2.85	264	1	0	0	0
41043030904	Linn	2.82	265	1	0	0	0
41051010407	Multnomah	2.79	266	0	1	0	0
41029000700	Jackson	2.78	267	1	0	0	0
41051003803	Multnomah	2.75	268	0	0	0	0
41039002101	Lane	2.71	269	0	1	0	0
41035970100	Klamath	2.60	270	1	0	0	0
41033360100	Josephine	2.46	271	1	0	0	0
41035970500	Klamath	2.42	272	1	0	0	0
41047000200	Marion	2.41	273	1	0	0	0
41033360800	Josephine	2.39	274	1	0	0	0
41047010400	Marion	2.39	275	1	0	0	0
41047010307	Marion	2.38	276	1	0	0	0
41039003102	Lane	2.38	277	0	1	0	0

41053020202	Polk	2.37	278	0	1	0	0
41051008001	Multnomah	2.31	279	0	0	0	0
41019090000	Douglas	2.28	280	1	0	0	0
41067031610	Washington	2.24	281	0	0	0	0
41041951400	Lincoln	2.24	282	1	0	0	0
41051010002	Multnomah	2.18	283	0	1	0	0
41051002203	Multnomah	2.08	284	0	0	0	0
41065970600	Wasco	2.05	285	1	0	0	0
41071030501	Yamhill	1.95	286	0	1	0	0
41067032604	Washington	1.94	287	0	0	0	0
41013950300	Crook	1.91	288	1	0	0	0
41065970300	Wasco	1.89	289	1	0	0	0
41029001002	Jackson	1.87	290	1	0	0	0
41067030801	Washington	1.85	291	0	0	0	0
41059951300	Umatilla	1.85	292	1	0	0	0
41039000904	Lane	1.78	293	0	1	0	0
41067031003	Washington	1.77	294	0	0	0	0
41047001402	Marion	1.76	295	1	0	0	0
41019030000	Douglas	1.76	296	1	0	0	0
41017000200	Deschutes	1.74	297	0	1	0	0
41067031611	Washington	1.74	298	0	0	0	0
41051008002	Multnomah	1.73	299	0	0	0	0
41033361500	Josephine	1.73	300	1	0	0	0
41051008902	Multnomah	1.73	301	0	0	0	0
41039002301	Lane	1.67	302	0	1	0	0
41001950300	Baker	1.63	303	1	0	0	0
41051010306	Multnomah	1.63	304	0	1	0	0
41047001401	Marion	1.60	305	1	0	0	0
41051005200	Multnomah	1.60	306	0	0	0	0
41029000900	Jackson	1.55	307	1	0	0	0
41067032610	Washington	1.53	308	0	0	0	0
41051003302	Multnomah	1.47	309	0	0	0	0
41029001700	Jackson	1.45	310	1	0	0	0
41039000903	Lane	1.45	311	0	1	0	0
41039001201	Lane	1.43	312	0	1	0	0
41041950400	Lincoln	1.40	313	1	0	0	0
41039005100	Lane	1.38	314	0	1	0	0
41009970700	Columbia	1.37	315	1	0	0	0
41039002600	Lane	1.34	316	0	1	0	0
41067032003	Washington	1.32	317	0	0	0	0
41039002501	Lane	1.32	318	0	1	0	0
41029001100	Jackson	1.27	319	1	0	0	0
41029002700	Jackson	1.13	320	1	0	0	0
41059951100	Umatilla	1.09	321	1	0	0	0
41043030402	Linn	1.08	322	1	0	0	0
41029001200	Jackson	1.00	323	1	0	0	0
41011000900	Coos	0.94	324	1	0	0	0

41051003301	Multnomah	0.88	325	0	0	0	0
41041950304	Lincoln	0.87	326	1	0	0	1
41041950800	Lincoln	0.86	327	1	0	0	0
41045970700	Malheur	0.82	328	1	0	0	0
41067032502	Washington	0.76	329	0	0	0	0
41039000500	Lane	0.76	330	0	0	0	0
41039001500	Lane	0.75	331	0	1	0	0
41039000705	Lane	0.73	332	0	1	0	0
41051003802	Multnomah	0.71	333	0	0	0	0
41011001000	Coos	0.67	334	1	0	1	0
41011000503	Coos	0.66	335	1	0	0	1
41005022904	Clackamas	0.65	336	0	0	0	0
41047010801	Marion	0.62	337	1	0	0	0
41027950100	Hood River	0.59	338	0	1	0	0
41047010202	Marion	0.36	339	1	0	0	0
41027950300	Hood River	0.31	340	0	0	0	0
41023960100	Grant	0.30	341	1	0	0	0
41047001100	Marion	0.28	342	1	0	0	0
41037960100	Lake	0.26	343	1	0	0	0
41039000708	Lane	0.25	344	0	1	0	0
41071030201	Yamhill	0.20	345	0	1	0	0
41051009907	Multnomah	0.17	346	0	1	0	0
41009970800	Columbia	0.17	347	1	0	0	0
41051000501	Multnomah	0.14	348	0	0	0	0
41045970900	Malheur	0.13	349	1	0	0	0
41039003202	Lane	0.07	350	0	1	0	0
41039001202	Lane	0.05	351	0	1	0	0
41051001801	Multnomah	-0.01	352	0	0	0	0
41067033301	Washington	-0.05	353	0	1	0	0
41051003601	Multnomah	-0.06	354	0	0	0	0
41051000702	Multnomah	-0.08	355	0	0	0	0
41005022107	Clackamas	-0.12	356	0	0	0	0
41017001800	Deschutes	-0.14	357	0	0	0	0
41043030903	Linn	-0.18	358	1	0	0	0
41009970200	Columbia	-0.20	359	1	0	0	0
41039000702	Lane	-0.23	360	0	1	0	0
41019180000	Douglas	-0.24	361	1	0	1	0
41047002102	Marion	-0.26	362	1	0	0	0
41047010802	Marion	-0.28	363	1	0	0	0
41043020700	Linn	-0.29	364	1	0	0	0
41043030800	Linn	-0.33	365	1	0	0	0
41067032503	Washington	-0.35	366	0	0	0	0
41067032300	Washington	-0.38	367	0	0	0	0
41035971100	Klamath	-0.46	368	1	0	0	0
41029002800	Jackson	-0.46	369	1	0	0	0
41051000301	Multnomah	-0.51	370	0	0	0	0
41041951100	Lincoln	-0.53	371	1	0	0	0

41043020600	Linn	-0.55	372	1	0	0	0
41039002404	Lane	-0.58	373	0	1	0	0
41041950900	Lincoln	-0.60	374	1	0	0	0
41051003801	Multnomah	-0.63	375	0	0	0	0
41065970200	Wasco	-0.67	376	1	0	0	0
41015950302	Curry	-0.69	377	1	0	0	0
41001950400	Baker	-0.70	378	1	0	0	0
41041950601	Lincoln	-0.73	379	1	0	0	0
41041951700	Lincoln	-0.73	380	1	0	0	0
41051002100	Multnomah	-0.84	381	0	0	0	0
41005023401	Clackamas	-0.84	382	0	0	0	0
41041950303	Lincoln	-0.88	383	1	0	1	0
41005021400	Clackamas	-0.93	384	0	0	0	0
41017001001	Deschutes	-0.97	385	0	1	0	0
41067030501	Washington	-0.98	386	0	0	0	0
41057960100	Tillamook	-1.02	387	0	1	0	0
41047002101	Marion	-1.09	388	1	0	0	0
41051006403	Multnomah	-1.11	389	0	0	0	0
41039002001	Lane	-1.11	390	0	1	0	0
41001950500	Baker	-1.12	391	1	0	0	0
41041951600	Lincoln	-1.14	392	1	0	0	0
41005022500	Clackamas	-1.15	393	0	0	0	0
41039002800	Lane	-1.21	394	0	1	0	0
41047001501	Marion	-1.24	395	1	0	0	0
41029001001	Jackson	-1.27	396	1	0	0	0
41071031000	Yamhill	-1.29	397	0	1	0	0
41053020400	Polk	-1.32	398	0	1	1	0
41059950700	Umatilla	-1.33	399	1	0	0	0
41019150000	Douglas	-1.34	400	1	0	1	0
41029002900	Jackson	-1.35	401	1	0	0	0
41019170000	Douglas	-1.36	402	1	0	1	0
41011000700	Coos	-1.38	403	1	0	0	1
41057960300	Tillamook	-1.39	404	0	0	0	0
41035971300	Klamath	-1.41	405	1	0	0	0
41067031806	Washington	-1.45	406	0	0	0	0
41051003602	Multnomah	-1.45	407	0	0	0	0
41019100000	Douglas	-1.47	408	1	0	0	0
41003010400	Benton	-1.51	409	0	0	0	0
41055950100	Sherman	-1.52	410	0	1	0	0
41067031812	Washington	-1.57	411	0	0	0	0
41047000600	Marion	-1.59	412	1	0	0	0
41005021000	Clackamas	-1.62	413**	0	0	0	0
41017001700	Deschutes	-1.63	414	0	0	0	0
41051003603	Multnomah	-1.65	415	0	0	0	0
41005021100	Clackamas	-1.68	416	0	0	0	0
41029002400	Jackson	-1.68	417	1	0	0	0
41029002600	Jackson	-1.69	418	1	0	0	0

41005021500	Clackamas	-1.69	419	0	0	0	0
41035972000	Klamath	-1.69	420	1	0	0	0
41047002000	Marion	-1.72	421	1	0	0	0
41039003101	Lane	-1.75	422	0	1	0	0
41051003501	Multnomah	-1.76	423	0	0	0	0
41053020304	Polk	-1.79	424	0	1	0	0
41051006801	Multnomah	-1.83	425	0	0	0	0
41067031804	Washington	-1.83	426	0	0	0	0
41033360300	Josephine	-1.83	427	1	0	0	0
41009970300	Columbia	-1.84	428	1	0	0	0
41047002303	Marion	-1.85	429	1	0	0	0
41039004501	Lane	-1.85	430	0	1	0	0
41067032001	Washington	-1.86	431	0	0	0	0
41067031704	Washington	-1.87	432	0	0	0	0
41047010201	Marion	-1.93	433	1	0	0	0
41061970400	Union	-1.94	434	1	0	0	0
41025960200	Harney	-1.97	435	1	0	1	0
41051004002	Multnomah	-1.99	436	0	0	0	0
41011000100	Coos	-2.06	437	1	0	1	0
41047001200	Marion	-2.08	438	1	0	0	0
41051002402	Multnomah	-2.11	439	0	0	0	0
41067031512	Washington	-2.14	440	0	0	0	0
41061970100	Union	-2.16	441	1	0	0	0
41051006702	Multnomah	-2.19	442	0	0	0	0
41051001701	Multnomah	-2.20	443	0	0	0	0
41005023902	Clackamas	-2.21	444	0	1	0	0
41065970100	Wasco	-2.22	445	1	0	0	0
41067030401	Washington	-2.24	446	0	0	0	0
41051004800	Multnomah	-2.24	447	0	0	0	0
41023960200	Grant	-2.25	448	1	0	0	0
41019050001	Douglas	-2.29	449	1	0	0	0
41061970200	Union	-2.42	450	1	0	0	0
41001950600	Baker	-2.43	451	1	0	0	0
41057960200	Tillamook	-2.45	452	0	1	0	0
41005022101	Clackamas	-2.48	453	0	1	0	0
41019140000	Douglas	-2.48	454	1	0	0	0
41005023404	Clackamas	-2.49	455	0	0	0	0
41035970300	Klamath	-2.54	456	1	0	0	0
41029001400	Jackson	-2.57	457	1	0	0	0
41035971400	Klamath	-2.59	458	1	0	0	0
41039002503	Lane	-2.59	459	0	1	0	0
41067031616	Washington	-2.67	460	0	0	0	0
41005022206	Clackamas	-2.69	461	0	0	0	0
41047010600	Marion	-2.71	462	1	0	0	0
41067030806	Washington	-2.71	463	0	0	0	0
41039002902	Lane	-2.72	464	0	1	0	0
41017001500	Deschutes	-2.73	465	0	0	0	0

41033360600	Josephine	-2.77	466	1	0	0	0
41033361300	Josephine	-2.82	467	1	0	0	0
41039003600	Lane	-2.85	468	0	1	0	0
41053005300	Polk	-2.91	469	0	1	0	0
41033360400	Josephine	-2.93	470	1	0	0	0
41039000902	Lane	-2.94	471	0	1	0	0
41011000400	Coos	-2.94	472	1	0	0	1
41011000600	Coos	-2.96	473	1	0	0	0
41001950200	Baker	-2.97	474	1	0	0	0
41043020100	Linn	-2.99	475	1	0	0	0
41043020300	Linn	-2.99	476	1	0	0	0
41005022400	Clackamas	-3.01	477	0	0	0	0
41059951400	Umatilla	-3.02	478	1	0	1	0
41039001400	Lane	-3.04	479	0	0	0	0
41021960100	Gilliam	-3.07	480	1	0	0	1
41005024200	Clackamas	-3.12	481	0	1	0	0
41019110000	Douglas	-3.12	482	1	0	1	0
41039002302	Lane	-3.17	483	0	1	0	0
41053020204	Polk	-3.17	484	0	1	0	0
41051000802	Multnomah	-3.18	485	0	0	0	0
41067031404	Washington	-3.20	486	0	0	0	0
41071030602	Yamhill	-3.22	487	0	1	0	0
41051004200	Multnomah	-3.30	488	0	0	0	0
41047010502	Marion	-3.31	489	1	0	0	0
41061970500	Union	-3.36	490	1	0	0	0
41019210000	Douglas	-3.40	491	1	0	1	0
41005022906	Clackamas	-3.41	492	0	0	0	0
41047010503	Marion	-3.42	493	1	0	0	0
41011000200	Coos	-3.42	494	1	0	0	0
41017000700	Deschutes	-3.45	495	0	1	0	0
41059950600	Umatilla	-3.45	496	1	0	0	0
41039000100	Lane	-3.46	497	0	0	0	0
41051002902	Multnomah	-3.48	498	0	0	0	0
41005022905	Clackamas	-3.48	499	0	0	0	0
41057960400	Tillamook	-3.59	500	0	1	0	0
41069960100	Wheeler	-3.61	501	1	0	0	0
41051007201	Multnomah	-3.61	502	0	0	0	0
41039001102	Lane	-3.66	503	0	1	0	0
41005023500	Clackamas	-3.81	504	0	1	0	0
41029001800	Jackson	-3.83	505	1	0	0	0
41009970500	Columbia	-3.87	506	1	0	0	0
41067032404	Washington	-3.91	507	0	0	0	0
41029000403	Jackson	-3.92	508	1	0	0	0
41063960200	Wallowa	-3.94	509	1	0	0	0
41029002300	Jackson	-3.95	510	1	0	0	0
41039001803	Lane	-3.96	511	0	1	0	0
41003010800	Benton	-3.96	512	0	1	0	0

41005021900	Clackamas	-3.97	513	0	0	0	0
41029002100	Jackson	-3.99	514	1	0	0	0
41067031004	Washington	-4.02	515	0	0	0	0
41007950100	Clatsop	-4.07	516	0	1	0	0
41003000100	Benton	-4.07	517	0	0	0	0
41029001500	Jackson	-4.12	518	1	0	0	0
41067031513	Washington	-4.15	519	0	0	0	0
41051001601	Multnomah	-4.16	520	0	0	0	0
41067032408	Washington	-4.17	521	0	0	0	0
41005023800	Clackamas	-4.18	522	0	0	0	0
41067031614	Washington	-4.19	523	0	0	0	0
41039002904	Lane	-4.20	524	0	1	0	0
41015950200	Curry	-4.21	525	1	0	0	0
41053005201	Polk	-4.22	526	0	1	0	0
41031960100	Jefferson	-4.24	527	1	0	0	0
41067032004	Washington	-4.24	528	0	0	0	0
41005020800	Clackamas	-4.34	529	0	0	0	0
41007950500	Clatsop	-4.35	530	0	1	0	0
41059950500	Umatilla	-4.37	531	1	0	0	0
41039004100	Lane	-4.38	532	0	1	0	0
41039000403	Lane	-4.41	533	0	1	0	0
41067031907	Washington	-4.41	534	0	0	0	0
41051001000	Multnomah	-4.43	535	0	0	0	0
41067031504	Washington	-4.44	536*	0	0	0	0
41039002201	Lane	-4.47	537	0	1	0	0
41047010100	Marion	-4.48	538	1	0	0	0
41005022603	Clackamas	-4.52	539	0	0	0	0
41005022708	Clackamas	-4.56	540	0	0	0	0
41067030402	Washington	-4.59	541	0	0	0	0
41029000601	Jackson	-4.60	542	1	0	0	0
41067031807	Washington	-4.60	543	0	0	0	0
41051000200	Multnomah	-4.61	544	0	0	0	0
41067033000	Washington	-4.66	545	0	1	0	0
41007950200	Clatsop	-4.67	546	0	1	0	0
41071030301	Yamhill	-4.70	547	0	0	0	0
41061970800	Union	-4.80	548	1	0	0	0
41043030200	Linn	-4.80	549	1	0	0	0
41059950400	Umatilla	-4.81	550	1	0	0	0
41063960100	Wallowa	-4.89	551	1	0	0	0
41063960300	Wallowa	-4.92	552	1	0	0	0
41067032406	Washington	-4.94	553	0	0	0	0
41051006602	Multnomah	-4.94	554	0	0	0	0
41043030600	Linn	-4.95	555	1	0	0	0
41047002800	Marion	-4.97	556	1	0	0	0
41067032407	Washington	-4.98	557	0	0	0	0
41067031509	Washington	-5.01	558	0	0	0	0
41067031911	Washington	-5.02	559	0	0	0	0

41039002002	Lane	-5.03	560	0	1	0	0
41039004900	Lane	-5.07	561	0	1	0	0
41001950100	Baker	-5.07	562	1	0	0	0
41067031617	Washington	-5.08	563	0	0	0	0
41041950100	Lincoln	-5.09	564	1	0	0	0
41029003002	Jackson	-5.11	565	1	0	0	0
41067031910	Washington	-5.12	566	0	0	0	0
41039004700	Lane	-5.22	567	0	1	0	0
41053005202	Polk	-5.25	568	0	1	0	0
41051001400	Multnomah	-5.27	569	0	0	0	0
41017000300	Deschutes	-5.28	570	0	1	0	0
41039005300	Lane	-5.32	571	0	1	0	0
41035970900	Klamath	-5.32	572	1	0	0	0
41051003702	Multnomah	-5.34	573	0	0	0	0
41005022000	Clackamas	-5.39	574	0	0	0	0
41039001600	Lane	-5.39	575	0	0	0	0
41039001801	Lane	-5.39	576	0	1	0	0
41067032609	Washington	-5.39	577	0	0	0	0
41007951100	Clatsop	-5.42	578	0	1	0	0
41051010500	Multnomah	-5.46	579	0	0	0	0
41067032603	Washington	-5.47	580	0	0	0	0
41067030502	Washington	-5.50	581	0	0	0	0
41019080000	Douglas	-5.51	582	1	0	0	0
41005020900	Clackamas	-5.55	583	0	0	0	0
41043030100	Linn	-5.60	584	1	0	0	0
41039003500	Lane	-5.62	585	0	1	0	0
41049970200	Morrow	-5.64	586	0	1	0	0
41067031511	Washington	-5.74	587	0	0	0	0
41005022105	Clackamas	-5.77	588	0	0	0	0
41007950300	Clatsop	-5.77	589	0	1	0	0
41051002901	Multnomah	-5.78	590	0	0	0	0
41067031514	Washington	-5.78	591	0	0	0	0
41051005000	Multnomah	-5.80	592	0	0	0	0
41067031912	Washington	-5.82	593	0	0	0	0
41019040000	Douglas	-5.85	594	1	0	0	0
41033361000	Josephine	-5.86	595	1	0	0	0
41005022800	Clackamas	-5.86	596	0	1	0	0
41039005000	Lane	-5.90	597	0	1	0	0
41005020401	Clackamas	-6.00	598	0	0	0	0
41005022103	Clackamas	-6.04	599	0	0	0	0
41035970800	Klamath	-6.05	600	1	0	0	0
41067032108	Washington	-6.13	601	0	0	0	0
41057960600	Tillamook	-6.18	602	0	0	0	0
41067033400	Washington	-6.20	603	0	0	0	0
41067031805	Washington	-6.25	604	0	0	0	0
41019060000	Douglas	-6.27	605	1	0	0	0
41051002000	Multnomah	-6.33	606	0	0	0	0

41017000500	Deschutes	-6.36	607	0	0	0	0
41009970900	Columbia	-6.37	608	1	0	0	0
41005023002	Clackamas	-6.38	609	0	0	0	0
41005021300	Clackamas	-6.40	610	0	0	0	0
41067031908	Washington	-6.41	611	0	0	0	0
41041950602	Lincoln	-6.41	612	1	0	0	1
41043030300	Linn	-6.42	613	1	0	0	0
41015950301	Curry	-6.46	614	1	0	0	0
41059950300	Umatilla	-6.47	615	1	0	0	0
41067031815	Washington	-6.47	616	0	0	0	0
41005022707	Clackamas	-6.49	617	0	0	0	0
41051009903	Multnomah	-6.52	618	0	1	0	0
41043020200	Linn	-6.54	619	1	0	0	0
41003000500	Benton	-6.55	620	0	0	0	0
41027950200	Hood River	-6.56	621	0	0	0	0
41017001902	Deschutes	-6.57	622	0	0	0	0
41051002702	Multnomah	-6.57	623	0	0	0	0
41067032608	Washington	-6.57	624	0	0	0	0
41005022605	Clackamas	-6.63	625	0	0	0	0
41051005900	Multnomah	-6.64	626	0	0	0	0
41051003502	Multnomah	-6.65	627	0	0	0	0
41003000202	Benton	-6.66	628	0	1	0	0
41011000800	Coos	-6.72	629	1	0	0	0
41005022301	Clackamas	-6.73	630	0	0	0	0
41051010409	Multnomah	-6.73	631	0	1	0	0
41039001001	Lane	-6.74	632	0	1	0	0
41067031904	Washington	-6.75	633	0	0	0	0
41059950100	Umatilla	-6.76	634	1	0	0	0
41047010702	Marion	-6.77	635	1	0	0	0
41007950600	Clatsop	-6.79	636	0	0	0	0
41067031813	Washington	-6.81	637	0	0	0	0
41047002600	Marion	-6.82	638	1	0	0	0
41039001101	Lane	-6.92	639	0	1	0	0
41067031508	Washington	-6.93	640	0	0	0	0
41039002403	Lane	-7.04	641	0	1	0	0
41051006802	Multnomah	-7.06	642	0	0	0	0
41007951200	Clatsop	-7.10	643	0	0	0	0
41007950400	Clatsop	-7.10	644	0	0	0	0
41039003000	Lane	-7.11	645	0	1	0	0
41051006200	Multnomah	-7.12	646	0	0	0	0
41039002401	Lane	-7.14	647	0	1	0	0
41051005800	Multnomah	-7.17	648	0	0	0	0
41005023700	Clackamas	-7.18	649	0	0	0	0
41051004700	Multnomah	-7.21	650	0	0	0	0
41047002301	Marion	-7.21	651	1	0	0	0
41039002903	Lane	-7.21	652	0	1	0	0
41047002201	Marion	-7.22	653	1	0	0	0

41017000600	Deschutes	-7.23	654	0	0	0	0
41003001002	Benton	-7.23	655	0	0	0	0
41017000401	Deschutes	-7.24	656	0	0	0	0
41051004500	Multnomah	-7.28	657	0	0	0	0
41051009905	Multnomah	-7.32	658	0	1	0	0
41067030200	Washington	-7.33	659	0	0	0	0
41047010501	Marion	-7.35	660	1	0	0	0
41051000901	Multnomah	-7.35	661	0	0	0	0
41005020303	Clackamas	-7.35	662	0	0	0	0
41039000300	Lane	-7.36	663	0	0	0	0
41051006404	Multnomah	-7.37	664	0	0	0	0
41003000900	Benton	-7.39	665	0	0	0	0
41003000400	Benton	-7.40	666	0	0	0	0
41017001200	Deschutes	-7.41	667	0	0	0	0
41005020600	Clackamas	-7.47	668	0	0	0	0
41067031814	Washington	-7.47	669	0	0	0	0
41041951500	Lincoln	-7.50	670	1	0	0	1
41005024400	Clackamas	-7.54	671	0	0	0	0
41039005200	Lane	-7.55	672	0	1	0	0
41043030700	Linn	-7.55	673	1	0	0	0
41009971100	Columbia	-7.56	674	1	0	0	0
41067032800	Washington	-7.57	675	0	0	0	0
41067030600	Washington	-7.59	676	0	0	0	0
41005024304	Clackamas	-7.62	677	0	0	0	0
41005023901	Clackamas	-7.62	678	0	1	0	0
41067033600	Washington	-7.64	679	0	0	0	0
41029000404	Jackson	-7.66	680	1	0	0	0
41067031507	Washington	-7.71	681	0	0	0	0
41007950700	Clatsop	-7.71	682	0	1	0	0
41039001700	Lane	-7.74	683	0	1	0	0
41051001301	Multnomah	-7.74	684	0	0	0	0
41071030101	Yamhill	-7.82	685	0	1	0	0
41057960700	Tillamook	-7.83	686	0	0	0	0
41043030500	Linn	-7.83	687	1	0	0	0
41051000801	Multnomah	-7.83	688	0	0	0	0
41017001002	Deschutes	-7.92	689	0	0	0	0
41051006701	Multnomah	-7.93	690	0	0	0	0
41051001802	Multnomah	-7.94	691	0	0	0	0
41047002700	Marion	-7.98	692	1	0	0	0
41051002701	Multnomah	-7.99	693	0	0	0	0
41019070000	Douglas	-8.05	694	1	0	0	0
41051006002	Multnomah	-8.06	695	0	0	0	0
41051001102	Multnomah	-8.07	696	0	0	0	0
41051002502	Multnomah	-8.11	697	0	0	0	0
41061970300	Union	-8.12	698	1	0	0	0
41005024302	Clackamas	-8.17	699	0	0	0	0
41017002000	Deschutes	-8.18	700	0	0	0	0

41053020500	Polk	-8.18	701	0	1	0	0
41039005400	Lane	-8.20	702	0	1	0	0
41051006502	Multnomah	-8.20	703	0	0	0	0
41005022205	Clackamas	-8.29	704	0	0	0	0
41047002202	Marion	-8.30	705	1	0	0	0
41043030902	Linn	-8.30	706	1	0	0	0
41007951300	Clatsop	-8.31	707	0	1	0	0
41051003100	Multnomah	-8.32	708	0	0	0	0
41041951300	Lincoln	-8.36	709	1	0	0	0
41005022302	Clackamas	-8.38	710	0	0	0	0
41039000200	Lane	-8.46	711	0	1	0	0
41051001202	Multnomah	-8.52	712	0	0	0	0
41029002500	Jackson	-8.53	713	1	0	0	0
41051000401	Multnomah	-8.54	714	0	0	0	0
41051000402	Multnomah	-8.55	715	0	0	0	0
41051009906	Multnomah	-8.57	716	0	1	0	0
41047001300	Marion	-8.58	717	1	0	0	0
41039004600	Lane	-8.58	718	0	1	0	0
41051004602	Multnomah	-8.65	719	0	0	0	0
41029003001	Jackson	-8.67	720	1	0	0	0
41051003902	Multnomah	-8.72	721	0	0	0	0
41067032700	Washington	-8.74	722	0	0	0	0
41051003200	Multnomah	-8.80	723	0	0	0	0
41047002304	Marion	-8.86	724	1	0	0	0
41005023202	Clackamas	-8.87	725	0	0	0	0
41067031506	Washington	-8.88	726	0	0	0	0
41017000402	Deschutes	-8.90	727	0	0	0	0
41031960301	Jefferson	-8.95	728	1	0	0	0
41039000800	Lane	-9.05	729	0	0	0	0
41005022702	Clackamas	-9.06	730	0	0	0	0
41067032607	Washington	-9.07	731	0	0	0	0
41003010100	Benton	-9.10	732	0	0	0	0
41005023201	Clackamas	-9.14	733	0	0	0	0
41039002202	Lane	-9.16	734	0	1	0	0
41047002501	Marion	-9.19	735	1	0	0	0
41051010402	Multnomah	-9.24	736	0	1	0	0
41041951200	Lincoln	-9.24	737	1	0	0	0
41051003000	Multnomah	-9.24	738	0	0	0	0
41051004601	Multnomah	-9.30	739	0	0	0	0
41005021801	Clackamas	-9.32	740	0	0	0	0
41051001900	Multnomah	-9.34	741	0	0	0	0
41029002000	Jackson	-9.36	742	1	0	0	0
41039001002	Lane	-9.44	743	0	1	0	0
41039000402	Lane	-9.44	744	0	1	0	0
41017002100	Deschutes	-9.47	745	0	0	0	0
41005022208	Clackamas	-9.47	746	0	0	0	0
41051002802	Multnomah	-9.48	747	0	0	0	0

41067032103	Washington	-9.50	748	0	0	0	0
41051001201	Multnomah	-9.50	749	0	0	0	0
41003010300	Benton	-9.56	750	0	0	0	0
41005020200	Clackamas	-9.60	751	0	0	0	0
41005023600	Clackamas	-9.73	752	0	0	0	0
41029002200	Jackson	-9.74	753	1	0	0	0
41051010305	Multnomah	-9.78	754	0	1	0	0
41051006300	Multnomah	-9.79	755	0	0	0	0
41005020302	Clackamas	-9.83	756	0	0	0	0
41071030102	Yamhill	-9.92	757	0	1	0	0
41017001100	Deschutes	-9.99	758	0	0	0	0
41009970400	Columbia	-10.05	759	1	0	0	0
41005020304	Clackamas	-10.07	760	0	0	0	0
41061970600	Union	-10.22	761	1	0	0	0
41067030805	Washington	-10.24	762	0	0	0	0
41051000100	Multnomah	-10.33	763	0	0	0	0
41005022606	Clackamas	-10.37	764	0	0	0	0
41009971000	Columbia	-10.40	765	1	0	0	0
41005023300	Clackamas	-10.41	766	0	0	0	0
41067030300	Washington	-10.43	767	0	0	0	0
41005024000	Clackamas	-10.46	768	0	0	0	0
41039004404	Lane	-10.50	769	0	1	0	0
41035971000	Klamath	-10.52	770	1	0	0	0
41039001804	Lane	-10.59	771	0	1	0	0
41005022602	Clackamas	-10.64	772	0	0	0	0
41005024100	Clackamas	-10.67	773	0	0	0	0
41017001300	Deschutes	-10.68	774	0	0	0	0
41039004405	Lane	-10.82	775	0	1	0	0
41051007000	Multnomah	-10.82	776	0	0	0	0
41051002401	Multnomah	-10.83	777	0	0	0	0
41067032107	Washington	-10.89	778	0	0	0	0
41071030302	Yamhill	-11.04	779	0	0	0	0
41051001302	Multnomah	-11.15	780	0	0	0	0
41051002600	Multnomah	-11.16	781	0	0	0	0
41051006501	Multnomah	-11.17	782	0	0	0	0
41005024303	Clackamas	-11.18	783	0	0	0	0
41067030102	Washington	-11.20	784	0	0	0	0
41051006100	Multnomah	-11.21	785	0	0	0	0
41005020504	Clackamas	-11.27	786	0	0	0	0
41005022207	Clackamas	-11.37	787	0	0	0	0
41051002801	Multnomah	-11.39	788	0	0	0	0
41005022710	Clackamas	-11.40	789	0	0	0	0
41009970600	Columbia	-11.48	790	1	0	0	0
41005022901	Clackamas	-11.53	791	0	0	0	0
41051006001	Multnomah	-11.55	792	0	0	0	0
41051000302	Multnomah	-11.59	793	0	0	0	0
41067032200	Washington	-11.78	794	0	0	0	0

41003010900	Benton	-11.78	795	0	1	0	0
41003010200	Benton	-11.78	796	0	0	0	0
41051001500	Multnomah	-11.82	797	0	0	0	0
41005020505	Clackamas	-11.87	798	0	0	0	0
41017001901	Deschutes	-11.96	799	0	0	0	0
41051002501	Multnomah	-11.98	800	0	0	0	0
41005023403	Clackamas	-12.02	801	0	0	0	0
41005020403	Clackamas	-12.08	802	0	0	0	0
41071030400	Yamhill	-12.10	803	0	1	0	0
41005020100	Clackamas	-12.36	804	0	0	0	0
41067033302	Washington	-12.39	805	0	1	0	0
41051006900	Multnomah	-12.55	806	0	0	0	0
41051004300	Multnomah	-12.56	807	0	0	0	0
41005023100	Clackamas	-12.56	808	0	0	0	0
41067030101	Washington	-12.84	809	0	0	0	0
41067032110	Washington	-12.87	810	0	0	0	0
41005020501	Clackamas	-13.18	811	0	0	0	0
41005020503	Clackamas	-13.22	812	0	0	0	0
41067031909	Washington	-13.30	813	0	0	0	0
41005023001	Clackamas	-13.45	814	0	0	0	0
41051007100	Multnomah	-13.48	815	0	0	0	0
41047002400	Marion	-13.50	816	1	0	0	0
41005020404	Clackamas	-13.79	817	0	0	0	0
41051006601	Multnomah	-13.95	818	0	0	0	0
41017001400	Deschutes	-14.05	819	0	0	0	0
41067032104	Washington	-14.28	820	0	0	0	0
41005020700	Clackamas	-14.43	821	0	0	0	0
41067032109	Washington	-14.60	822	0	0	0	0
41017000100	Deschutes	-14.65	823	0	0	0	0
41051006402	Multnomah	-15.31	824	0	0	0	0
41067033500	Washington	-15.99	825	0	0	0	0

Comparison of Cap-and-Trade Programs; California, Ontario, Quebec, and Oregon SB 1070

(10/17/17)

Comparison of Cap-and-Trade Programs:
California, Ontario, Quebec and Oregon SB 1070*

	California's cap-and-trade program	Ontario's cap-and-trade program	Quebec's Carbon Market	Oregon Senate Bill 1070
Population	38 million	14 million	8 Million	4 million
Gross Regional Product	US $2.6 trillion	US $763 billion	US $380 billion	US $227 billion
Participating Jurisdictions	California, Quebec & Ontario	California, Quebec & Ontario	California, Quebec & Ontario	Designed to connect with California, Quebec & Ontario
Greenhouse Gases Covered	Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluocarbons (PFCs), nitrogen trifluoride (NF_3), other fluorinated greenhouse gases	Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, nitrogen trifluoride and other such contaminants as may be prescribed by regulation	Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), perfluocarbons (PFCs), nitrogen trifluoride (NF_3), other fluorinated greenhouse gases	"Greenhouse gas" includes, but is not limited to, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexaflouride and nitrogen trifluoride
Sectors Covered	Electricity (including imports) and industry in 2013; plus ground transportation and heating fuels in 2015	Electricity (including imports), industry, and certain fuel suppliers and distributors	Electricity (including imports) and industry in 2013; plus ground transportation and heating fuels in 2015	Air contamination source as defined in ORS 468A.005, electricity (including imports), fossil fuels that generate greenhouse gases when combusted, all beginning in 2021
Emissions Threshold	Emitters of at least 25,000 metric tons CO_2e annually, except for electricity imports for which the threshold is essentially 0	A facility or natural gas distributor that emits 25,000 tons or more of greenhouse gas emissions per year, or a fuel supplier that sells more than 200 litres of fuel per year	Emitters of at least 25,000 metric tons CO_2e annually, except fuel importers for which threshold is much lower to prevent small importers crossing the Western border avoiding the program	25,000 metric tons for all sources (a higher threshold for imported power than CA and a higher threshold for fuel importers than Quebec)
Target	Approximately 40% below 1990 emissions by 2030	37% below 1990 by 2030 Interim targets may be established	37.5% below 1990 levels by 2030	45% below 1990 levels by 2035
Status	First auction on November 14, 2012; compliance obligations began January 1, 2013	Compliance obligation began January 1, 2017. Linkage with Quebec and California is now established to begin in 2018	Compliance obligations began January 1, 2013	n/a
Allocation Method[1]	Mixed – some free allocations for industry;	Enabling legislation authorizes Minister to distribute allowances registered participants in	Free allocation for some sectors, auctions for others	Similar to California; mixed – some free allocations for

[1] See information on recent changes to leakage calculations in California on page 3.

* This chart was published in the California Cap-and-Trade Program Summary by the Center for Climate and Energy Solutions (January, 2014) and has been updated to reflect recent changes in WCI jurisdictions and the provisions of Oregon Senate Bill 1070 by the Oregon Legislative Policy and Research Office staff (October, 2017).

	full auction for fuels, consignment for utilities	accordance with regulations either free of charge or at auction. Requires Minister to describe by 1/1/2021 how free allowances will be phased out.		industry; full auction for fuels, consignment for utilities
Price Floor at Auction	$10 per metric ton for both 2012 and 2013 before rising 5% per year (plus inflation) starting in 2014	Will need to be identical to CA & QC	$10 per metric ton price floor starting in 2012 and rising 5% for each year thereafter (plus inflation)	Will need to be identical to CA & QC
Affiliations	Helped establish Western Climate Initiative in 2007	Joined Western Climate Initiative in 2008	Joined Western Climate Initiative in 2008	Joined Western Climate Initiative in 2008
Linkage Status	Linked with Quebec starting in 2014	Linking with California and Quebec in 2018	Linked with California in 2014	Would enable linking with WCI
Offset Limit	Offsets can now account for 8% of a regulated entity's compliance obligation; changing to 4% for 2021-2025, and 6% for 2026-2030. Post-2020, one-half of offsets must come from inside CA.	Can account for 8% of a regulated entity's compliance obligation	Can account for 8% of a regulated entity's compliance obligation	Can account for 8% of a regulated entity's compliance obligation, however this can be reduced for entities in impacted communities
2013 Offset Use Limit - Millions of Offset Credits	13	N/A	2.1	N/A
Types of Offset Categories	1) U.S. forest and urban forest project resources; 2) Livestock projects; 3) Ozone depleting substances projects; 4) Urban forest projects	Developing 11 new offset protocols tailored to Ontario. Has retained Climate Action Reserve to develop up to 13 protocols; 3 priority projects types: landfill gas capture and destruction, ozone depleting substances capture and destruction, and mine methane capture and destruction. Other protocals to include: afforestation and reforestation, anaerobic digestion (organic waste and manure), conservation cropping, emission reductions from livestock (enteric), forest (avoided conversion and improved forest management), grassland, N_2O reductions from fertilizer management, organic waste management, refrigeration systems, urban forest	1) Covered manure storage facilities – CH_4 destruction; 2) Landfill sites – CH_4 destruction; 3) Destruction of ozone depleting substances (ODS) contained in insulating foam recovered from appliances. Developing 11 new offset protocols tailored to the environmental and economic landscape in Quebec	Directs Oregon to develop standards in a manner that allows DEQ to explore and encourage opportunities for development in Oregon

Leakage – Recent Changes in California

For background on emissions leakage, see "Considerations for Designing a Cap-and-Trade Program in Oregon, Department of Environmental Quality, February 14, 2017, pages 38-39.

The original metrics for determining emissions leakage risk (trade exposure and emission intensity) in California have been modified by recent changes to the regulation, as discussed below. The final regulation order which contains all recent changes made to the cap-and-trade program can be found here: https://www.arb.ca.gov/regact/2016/capandtrade16/ctfinro.pdf For a specific discussion of the changes California Air Resources Board staff considered and implemented to industry assistance factors due to the leakage studies conducted, see this attachment: https://www.arb.ca.gov/regact/2016/capandtrade16/attachb.pdf

The formula for allocation to prevent leakage is generally summarized as:

Allocation = AF x B x c x o

Where:

- AF is the assistance factor given to a particular level of leakage risk;
- B is the industry benchmark
- C is the cap adjustment factor to reflect the declining overall emissions cap; and
- O is the entity-specific output

The assistance factor declines over time for some industries that are deemed low or medium risk for leakage. Three studies of potential emissions leakage in California were completed in 2016 and staff have made some changes to the metrics used to determine leakage risk for the program post-2020. The primary change appears to be that staff are now calculating assistance factors and leakage risk based on a summation of an international assistance factor to minimize potential international leakage and a domestic assistance factor to minimize potential domestic leakage. Both components range between zero and 100 percent and are summed to yield the total assistance factor for a sector. Determining each part of the new assistance factor formula requires a separate set of calculations which are based, in part, on the studies of emissions leakage that California ARB commissioned.