Cascadia mapping shows climate inequities

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Residents of 152 cities and towns in the Pacific Northwest are particularly vulnerable to climate-fueled wildfires. Residents of 60 other communities are most susceptible to floods. And people living in 75 towns are most liable to suffer — maybe even die — because of heat waves.

That's according to a new analysis released Wednesday by news agency InvestigateWest and planning firm Headwaters Economics. It drills down to towns where, for example, sparse tree canopies and older residents make communities more susceptible to heat waves than younger populations in leafier places.

The analysis looks at likely climate disasters and examines factors such as the number of people with disabilities, how many live in poverty, the proportion that rents their home and how many of the vulnerable are Black, Indigenous or people of color.

In short, the analysis pinpoints how the human toll liable to be taken by climate change spreads far across the map, especially into rural areas of Washington state and Oregon. It highlights where circumstances such as income and race will — without targeted action — place communities at greater risk as climate change advances.

It's just the latest in a series of studies to create new data-driven methods to identify and address unequal environmental risks.

"You can have neighborhoods right next to one another and one may be twice as bad off during a flood. Not because they're more flooded. But because their housing is worse," said Michael Brauer, a professor at the University of British Columbia's School of Population and Public Health, whose team in August 2020 released a climate vulnerability index looking at how socioeconomic and other factors can affect vulnerability to climate-fueled natural disasters.

These demographic maps are identifying environmental unfairness, engaging communities and beginning to spur the redesign of government programs to target limited government resources where they can have the greatest impact.

InvestigateWest commissioned Headwaters to produce maps zeroing in on communities whose characteristics leave them most exposed. The work is part of a yearlong reporting project, Getting to Zero: Decarbonizing Cascadia. Headwaters drew on data from the U.S. Forest Service, the Federal Emergency Management Agency, the U.S. Census Bureau and a group of federal agencies called the Multi-Resolution Land Characteristics Consortium.

The maps produced by Headwaters for InvestigateWest display vulnerability to fire, floods and extreme heat.

One observation that jumps out of all three maps: climate vulnerability is to be found across Oregon and Washington. It is widespread in rural areas.

While these climate vulnerability maps allow rural residents and leaders to see what a changing climate means for their communities, that does not guarantee they will believe that climate change is responsible.

Take the town of Grand Coulee, Washington, in the high desert of Washington's Okanogan region. It is one of only two communities that the InvestigateWest and Headwaters research shows to be simultaneously extra susceptible to fire, flooding and extreme heat. (The other is The Dalles, a small Oregon city in the Columbia River Gorge that found itself dangerously close to several destructive fires during Cascadia's record-shattering 2020 wildfire season.)

Grand Coulee Mayor Paul Townsend told InvestigateWest he has "a hard time" seeing the connection between climate change and natural disasters, such as the wildfires that threatened his community in 2020.

"I have mixed emotions about the whole climate change issue," Townsend said.

Nor does better information guarantee that action will follow. Townsend, for one, acknowledges that Grand Coulee has vulnerable residents. But he said in the case of a disaster, better information would be of little use without state and federal support.

"Some people have no financial resources for any kind of shelter. And, of course, our city revenues don't have any margin for helping with that," said Townsend.

Washington state officials are working to alert rural citizens to the threat.

Last month, a reporter from Wenatchee asked the head of Washington's Energy Policy Office what help the state's newly released decarbonization plan offered to rural citizens, such as farmers and ranchers who use a lot of diesel fuel. Glenn Blackmon had a specific answer, noting the plan's call for production of clean fuels, including hydrogen likely to be generated by utilities in eastern Washington.

But his first response served as a warning.

"If we're not successful in addressing climate impacts, rural areas will be among the hardest hit with things like wildfires," Blackmon said.

See it to change it

What all of these new digital tools share is an overlay of environmental and demographic data. They do not merely reveal where, for example, the air is most fouled by exhaust from diesel trucks, or where future heat waves are likely to be most intense. This sort of mapping adds information that tells us who lives nearby, and how they live. It identifies communities where environmental threats compound each other and where they may cause the greatest harm.

Consider wildfire vulnerability. Fire risk predictions by U.S. Forest Service scientists, developed for the agency's Wildfire Risk to Communities tool launched last April, show that Washington and Oregon's most intense wildfires are most likely to occur east of the Cascade mountains.

But the interactive Wildfire Vulnerability map plots more than just communities facing heightened fire risk. It highlights those that confront higher risk as well as above-average levels of poverty and rental housing — including some towns and small cities west of the Cascades. Such as Fife, a Tacoma, Washington, suburb that's at elevated fire risk and also has 61% rental housing, more than double the average for Oregon and Washington. Powers, a town in southwest Oregon, makes the map because of fire risk and 21% of its roughly 1,000 residents lived in poverty, according to 2018 census data. That's also double the regional average.

The socioeconomic factors matter because they limit residents' ability to prevent fires by, for example, upgrading to fire-resistant roofing.

"Renters rarely have the autonomy to make such changes to their home, and families living in poverty may not have the financial means," said Megan Lawson, an economist with Headwaters Economics.

Lawson said helping community organizations and government target limited resources was one of the key goals for the Forest Service's Wildfire Risk to Communities program. "If you're just looking at physical exposure to risk, it could lead to a misallocation to places that are going to be able to rebuild or pop back more easily," she said.

Visualizations for flooding and extreme heat commissioned by InvestigateWest similarly combine different socioeconomic factors to highlight communities at heightened vulnerability. The 60 communities vulnerable to flooding have above average flood risk plus above average poverty and racial and ethnic diversity. Poverty and systemic racism such as redlining practices trap families in low-lying areas, and Lawson noted that recovering can be more difficult because communities with low property values are less likely to qualify for federal grants.

The Heat Vulnerability map uses lack of tree cover as a proxy for extreme heat risk. The 75 communities with extreme vulnerability to heat in Washington and Oregon have above average rates of people living in poverty, adults over 65 and people with disabilities. Extreme heat events disproportionately harm seniors and people with disabilities, and those who also live in poverty may have less access to health care, have less insulated housing and lack air conditioning — all factors that dial up danger during heat waves.

Other mapping efforts target pollution

Washington state agencies are beginning to use one of the first statewide systems for mapping environmental inequity, developed in 2019 by Seattle-based climate justice coalition Front and Centered and the University of Washington.

Washington's Department of Ecology was an early adopter of the Washington Environmental Health Disparities Map. For example, the agency used the map to parcel out some of the $141 million paid to Washington from legal settlements with Volkswagen after the automaker tampered with its vehicles' tailpipe pollution controls. To date, more than $61 million has been directed to communities highly impacted by pollution to purchase pollution-cutting equipment, such as electric school and transit buses.

Steering those funds means those communities are not being "left out" as Washington transitions to cleaner energy, according to Esther Min, who led the interactive tool's technical design as part of her doctoral work at the University of Washington. "That's how these tools really come to life," she said.

The disparities map draws data from eight databases on 19 indicators of community health, including race and ethnicity, poverty, toxic releases from facilities, lead risk from housing, and low birth rate. Weighting algorithms then weave that data into 0 to 10 rankings of overall environmental disparity for each census tract in the state.

Min said that ranking makes the maps easy to understand, by design. "We wanted it to be trusted and evidence-based, but also easily used and thus widely applied," said Min, who now works at both the university and Front and Centered.

Washington's disparities map was inspired by a forerunner created for California, CalEnviroScreen, but adds important regional customizations, according to Min. For example, it includes transportation costs, in addition to housing costs, to assess each community's affordability. Min said that provides a more representative measure for Washington's rural areas.

Aurora Martin, co-executive director at Front and Centered, says more agencies are beginning to use the tool, including Washington's Department of Health and Department of Natural Resources. The advocacy group hopes to also spur its use by affected communities to document their lived experiences in the fight for more equitable treatment.

"Communities of color can really use it on the ground on a local level to effectuate local and broader policy changes," Martin said.

A state environmental justice task force recently affirmed the map's value, but also highlighted a lack of participation by Washington's Indigenous communities.

The task force issued a final report last month calling the tool "robust" and its disparity rank "easy to understand" and "powerful." It called for "routine" use of disparities rankings to assess how agency programs may help or harm highly impacted communities and to set and track state goals for reducing inequity.

However, the state task force also noted some limitations, including the fact that Indigenous communities were not formally consulted and business interests were not represented during the disparities map's creation. Failure to consult with Indigenous peoples fits a larger pattern: Despite outreach by staff and members to five Tribal nations, the state was unable to fill a seat designated for a Tribal representative.

The report notes that this deprived the task force of "invaluable expertise, historical perspective, and ecological knowledge," and decried the ongoing failure as unacceptable: "State government is accountable to repairing the environmental harms done to Tribes and Indigenous communities, and the path towards healing that harm includes meaningful and authentic relationships."

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A child plays in the sand at Cannon Beach as Haystack Rock disappears in smoke in early September as fires blanketed the state in smoke.
Hailey Hoffman/The Astorian