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Housing, cars don't mix

Land-use policies put more people near freeways — and in a danger zone

BY JIM REDDEN

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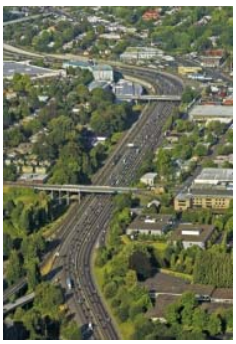
Portland State University professor Linda George admits she is an atmospheric scientist, not a political one.



An Oregon DEQ report estimated the concentrations of vehicle-produced toxics along area freeways; the heavily traveled Interstates 5 and 84 (left) scored the highest.

L.E. BASKOW / TRIBUNE FILE PHOTO

George thinks that might help explain why she is questioning the central land use-planning decision that has made Portland a national leader on growth-management issues.

City, regional and state land-use policies call for new development to be concentrated in existing urban centers and along major transportation corridors. But as George sees it, motor vehicle-related pollution is significantly worse along such corridors, potentially threatening the health of everyone who lives near them.

"The closer you are to the source of pollution, the more you are exposed to it," said George, an associate professor at PSU's Environmental Science and Research Program.

For years public policies have encouraged more development — including high-density housing — in and around downtown Portland, which sits at the nexus of Interstates 5, 405 and 84.

The result has been an explosion of housing in such areas as the Pearl District, which is located near the northern juncture of I-5 and I-405, and the South Waterfront District, much of which is located under the Marquam Bridge that carries I-5 over the Willamette River.

Future plans call for building more housing in the Central Eastside Industrial District, located along I-5 near its intersection with I-84.

According to George, studies conducted by the Oregon Department of Environmental Quality show high levels of pollution in all those areas (see graphics linked below).

She is analyzing the DEQ data as part of a study that shows some of the pollution to be more than 100 times higher than levels considered safe by the state agency.

Her studies show that such levels can be found 500 meters — more than a quarter of a mile — from area freeways. The pollution includes toxics suspected of causing cancer, immune system disorders and other serious health problems.

"We should be asking whether land-use policies should be encouraging people to move closer to where we know pollution is the worst," she said.

Commissioner Sam Adams, a strong supporter of denser urban housing projects, admits air pollution has not been adequately considered in the city's redevelopment decisions.

"Dealing with air pollution is something that should be included in all land-use and transportation decisions," said Adams, who added he is working on a Green City policy that will help address this issue in the future.

Conflict looms for policies

Joe Zehnder, the principal planner with the Portland Planning Bureau, defends compact urban development as a way to reduce dependence on automobiles.

He said there are many public programs and policies to reduce pollution, including increased funding for mass transit and encouraging the development of environmentally friendly fuels.

At the same time, Zehnder admits that it may take years for these efforts to significantly reduce pollution, especially because a large share of freeway traffic is traveling between other cities, states and even countries.

"There may be a conflict between the short- and long-term goals," Zehnder said.

George first began studying pollution around Portland-area freeways in the 1990s. At that time, the Oregon Department of Transportation was considering adding lanes to I-5 through North Portland.

George remembers transportation officials saying that motor vehicle-related pollution was almost nonexistent more than 100 meters from the freeway.

George set out to test the assumption, aided by students in one of her classes and members of the Environmental Justice Action Group, a grass-roots organization concerned about the effects of pollution on low-income and minority communities in North and Northeast Portland.

They placed hundreds of plastic tubes lined with chemicals to measure nitrogen dioxide levels at different distances from the freeway.

Although nitrogen dioxide is not considered dangerous, it is an easy and reliable way to measure the spread of other pollutants from internal combustion engines.

"Nitrogen dioxide is a marker," George said.

The tubes picked up high levels of nitrogen dioxide even 500 meters from the freeway — deep into the neighborhoods that I-5 cuts through in North and Northeast Portland.

The findings helped persuade the officials to abandon the freeway-widening plan — and convinced George that further study was required.

Toxics go east with the winds

A short time later, the DEQ receives some funding from the Environmental Protection Agency to study levels of certain kinds of toxics along Portland-area freeways.

Toxics are potentially harmful chemicals and particles produced by internal combustion engines that are not governed by state or federal laws.

They include benzene, which is suspected of damaging the immune system, and diesel particulates, which are thought to cause chronic respiratory problems and lung cancer.

The EPA publishes a National Air Toxics Assessment that measures levels of toxics across the country by county. The EPA funding allowed the DEQ to estimate the levels of 12 toxics by neighborhood.

The Portland Air Toxics Assessment was released in 2005. Using computer-modeling techniques, it estimated that high concentrations of the toxics exist along area freeways. The modeling also predicted that especially high concentrations exist at the intersection of Interstates 5 and 84, the two most heavily traveled freeways in the area.

George is refining the DEQ data as part of a joint study with PSU urban affairs professor Vivek Shandas. Their work already has produced several maps showing disturbingly high concentrations of toxics along area freeways.

Because the winds in the Portland area blow predominately from the west, the concentrations are heaviest on the east side of the freeways. But the maps show high concentrations on both sides of the freeways, including several areas where many housing developments have been built or planned in recent years.

One map prepared by George measures the Cancer Benchmark Quotient in the Portland area, which she explains is the ratio between the estimated median exposure to an air toxic and the benchmark concentration at which it is suspected of causing cancer.

The DEQ has set the benchmark as the concentration that produces a 1 in a million risk of causing cancer with a lifetime exposure. The map shows concentrations higher than the DEQ benchmarks within the city and increasing close to the major freeways. Some concentrations are 184 times the benchmark.

Although George said she has not studied land-use policies closely, she

understands the fundamental concept of preserving farm and forest lands by concentrating new development along major transportation corridors.

She also supports the public efforts cited by Zehnder to reduce automobile use and clean up their emissions.

But George also agreed with Zehnder that even if those efforts succeed, it will take years to reduce the potential health problems caused by motor vehicle-related pollution that only now is being documented.

"Certainly, people who are thinking of moving near a freeway need to consider the potential health effects on them and their families," said George, who hopes to begin submitting her study to peer-reviewed journals by the end of the year.

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Motor vehicle related toxics and potential health problems:

Benzene – Immune system damage. Genetic damage. Blood disorders, including anemia and excessive bleeding. Increased incidence of leukemia.

Diesel particulates – Chronic respiratory effects. Lung cancer.

1,3-Butadiene – Increase in cardiovascular diseases. Effects on the central nervous system. Eye, nose and throat irritation. Cancer.

Acetaldehyde– Cancer.

Formaldehyde – Chronic eye, nose and throat irritation. Increased incidence of menstrual disorders and pregnancy problems. Lung and nasal cancer.

Source: Oregon Department of Environmental Quality

Related graphics:

Cumulative cancer benchmark quotients

Observed nitrogen dioxide concentrations in North Portland, 2005