

Fall 2016

The Planet, 2016, Fall

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THE PLANET

THE HUMAN HEALTH ISSUE FALL 2016



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Go to NASA's website on climate and you'll see some hard-hitting facts about climate change: Global temperatures are about 0.9 degrees celsius warmer than in 1880; the Arctic loses about an eighth of its summer ice every decade; atmospheric carbon dioxide levels are above 400 parts per million and seas are rising by 3.4 millimeters per year.

Yes, these numbers are alarming. But I wouldn't blame someone if they didn't jump to their feet when they heard the sea rose a few millimeters last year. Call it narcissism or empathy, but people often don't care about numbers without a human impact on the other side. This quarter, our reporters examined those human impacts.

We sifted through alleys in one of Canada's poorest zip codes with a team of graduate students studying urban rat ecology. We walked through the historic brick buildings of Fairhaven, Washington, which could endanger people in an earthquake. We met scientists racing to produce a vaccine for Zika virus. We teamed up with an analyst to calculate how toxic the air we breathe is in Whatcom county.

Environmental problems are often human problems, if you look hard enough. And we humans are responsible for looking for solutions. So please, dear reader, take a look with us.

To our good health,

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ON THE COVER

A biologist from the National Oceanic and Atmospheric Administration found kilograms of pharmaceuticals entering the Puget Sound from wastewater plants. This photo illustrates a fraction of the drugs the researcher found entering the Sound every day.

Photo illustration by Katy Cossette

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BELLINGHAM ACTIVISTS PROTEST THE DAKOTA ACCESS PIPELINE

STORY BY FREDERICA KOLWEY

PHOTO BY JESSE NICHOLS



Community members in Bellingham, Washington protest the Dakota Access Pipeline on Oct. 28, 2016.

Community members and Western Washington University student clubs held a march in downtown Bellingham, Washington on Oct. 28, 2016, in support of the Standing Rock Sioux tribe and others protesting the construction of the Dakota Access Pipeline in North Dakota.

The pipeline is expected to cost \$3.7 billion and span 1,800 kilometers from North Dakota to Illinois. It would cross the Missouri River near Bismark, North Dakota, a drinking water source for the region.

Organizers distributed signs and chant sheets to attendees, and the local organization Food Not Bombs made food for participants. The march in Bellingham was planned and executed in less than 24 hours as people reacted to the National Guard raid of the protest camp the day before.

Bellingham activists had wanted to do something for a while, said Maru Mora of Community to Community, a Bellingham organization that works to empower women and immigrants. She said the march came together Thursday night after law enforcement groups, including the National Guard, arrested over 100 protestors.

"We are following the leadership of the native groups [at Standing Rock]," Mora said. "We demand [government officials] withdraw their law enforcement and suspend the pipeline indefinitely."

The arrests at Standing Rock occurred on the same day as a federal court acquitted seven members of the group that occupied the Malheur National Wildlife Refuge in eastern Oregon. For Mora, this exemplified injustice in the U.S. criminal justice system.

Members of the Standing Rock Sioux tribe began protesting the construction of the Dakota Access Pipeline in early spring 2016. Legally, the U.S. Army Corps of Engineers owns the land under the river. Even so, the National Historic Preservation Act requires the federal govern-

ment to consult with native tribes before starting construction projects to avoid disrupting sacred lands.

The Standing Rock Sioux sued the U.S. Army Corps of Engineers in July for not consulting them before Energy Transfer Partners began the pipeline construction. The tribe also claimed the pipeline construction violates the Clean Water Act and the National Environmental Protection Act.

In early October, a federal appeals court ruled against the Sioux tribe's request for an emergency injunction to halt construction of the pipeline. The next day, the Department of Justice, the Department of the Army and the Department of the Interior issued a statement asking Energy Transfer Partners to voluntarily pause construction on the pipeline. They have not complied with the request.

On October 24, Standing Rock Sioux Chairman David Archambault II asked the U.S. Department of Justice to investigate unnecessary use of police force and violations of protesters' civil rights. As of this writing, around 400 people have been arrested. 📍

Editor's note: This is a developing story. We will include major updates in the online version of the story following the print release. Visit www.theplanetmagazine.net to read the online version.

FREDERICA KOLWEY is a senior designing a degree through Huxley College of the Environment called environmental justice through journalism.

JESSE NICHOLS is the Editor-in-Chief of *The Planet*. He studies visual journalism at Western Washington University.

VOTERS REJECT STATE CARBON TAX INITIATIVE

STORY BY REBEKAH WAY

PHOTO BY NIC ULMER

The second attempt to reduce greenhouse gas emissions through legislation in Washington state fell flat this election season.

State voters rejected Initiative 732, which sought to tax carbon emissions. Despite being the first carbon tax initiative in the United States, I-732 received little support from environmental groups, and nearly 60 percent of voters opposed the measure, according to preliminary results.

The measure would have reduced Washington's carbon emissions by about 2 percent each year, according to Carbon Washington, the organization that introduced the initiative. Washington's carbon dioxide-equivalent emissions totaled 92 million metric tons in 2012, according to the Washington State Department of Ecology. Had the initiative passed, Washington's sales tax would have decreased by half a penny per dollar spent, while taxing carbon

polluters \$15 per ton starting in 2017, eventually rising to \$100 per ton of carbon emitted.

Washington voters represented a mindset spreading across the nation and the world, indicating people are concerned about climate change and want to take action, according to a statement released by Carbon Washington. The group also acknowledged its grassroots supporters, citing itself as the largest effort to educate voters on climate change in Washington state. The campaign reached nearly one million voters by phone, and over 100,000 through canvassing, according to Carbon Washington's statement.

The measure was introduced around the time of Gov. Jay Inslee's carbon cap-and-trade proposal, which he failed to get through the Legislature in 2015. The Carbon Pollution Accountability Act, a part of Inslee's proposal, would have put a limit on carbon emissions and fined major polluters to avoid increasing future emissions. It would have generated \$1 billion each year, which would have gone toward transportation, education and supporting disadvantaged communities, according to Inslee's website.

I-732 planned to direct money toward low-income working families through a tax rebate. This 8-year-old program had never been funded, but I-732 would have provided \$1,500 to 460,000 low-income working families each year, Samara Villasenor, a spokesperson from the Yes On 732 campaign, said in an email.

However, some opponents didn't think

this was enough. Members of the Washington State Chapter of the Sierra Club argued the initiative disregarded those who feel the impacts of pollution and climate change most: communities of color and low-income people. The group said it fell short of its goal to create an equitable climate policy, according to a statement it released in September 2016.

Other opponents, like the group No On 732, warned of a higher gas tax, increased utility costs straining household budgets and a state revenue loss of \$800 million that could take money from investments in education and health care.

After I-732, Carbon Washington hopes to put a price on carbon through the state Legislature, and to be an example to other states, according to its statement.

"The world is warming at an alarming rate," Villasenor said. "And putting an effective price on carbon emissions is the single most important thing we can do to reverse this trend." 🌍

REBEKAH WAY is a Western Washington University junior studying journalism and music. She loves jazz, radio and learning new things about the world.

NIC ULMER is a junior pursuing a degree in visual journalism. He is inspired by telling stories through a visual medium. He believes it is becoming a powerful method to inform people.

INITIATIVE 732 ELECTION RESULTS BY COUNTY



Source: Washington Secretary of State
Map by Jesse Nichols



Ballots fill bins at the Whatcom County Auditor's Office on Nov. 8, 2016.



Sanitary Service Company trucks sit behind a fence at their depot in Bellingham, Washington. Fleet vehicles are a major source of diesel particulate matter in Whatcom County.

HOLD YOUR BREATH

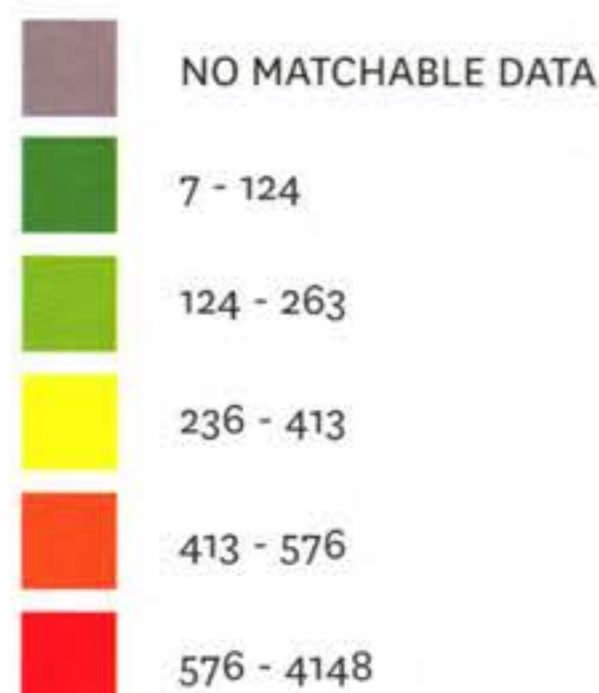
STORY BY NICK JENNER

PHOTOS BY EDWARD CLEM

Nancy shucks sunflowers into a plastic tub. The tub rests against a tall concrete wall, separating the York Community Farm from Interstate 5. For the most part, the highway on the other side of the wall doesn't bother Nancy. The odor and noise are annoying at times, and she and the other farm workers make sure to rinse the produce before eating it. Nancy, who declined to give her last name, works as a garden intern in one of the neighborhoods with the most toxic air in Whatcom County. A vast majority of comes from one source: diesel.

CANCER RISK FROM AIR POLLUTION IN WASHINGTON

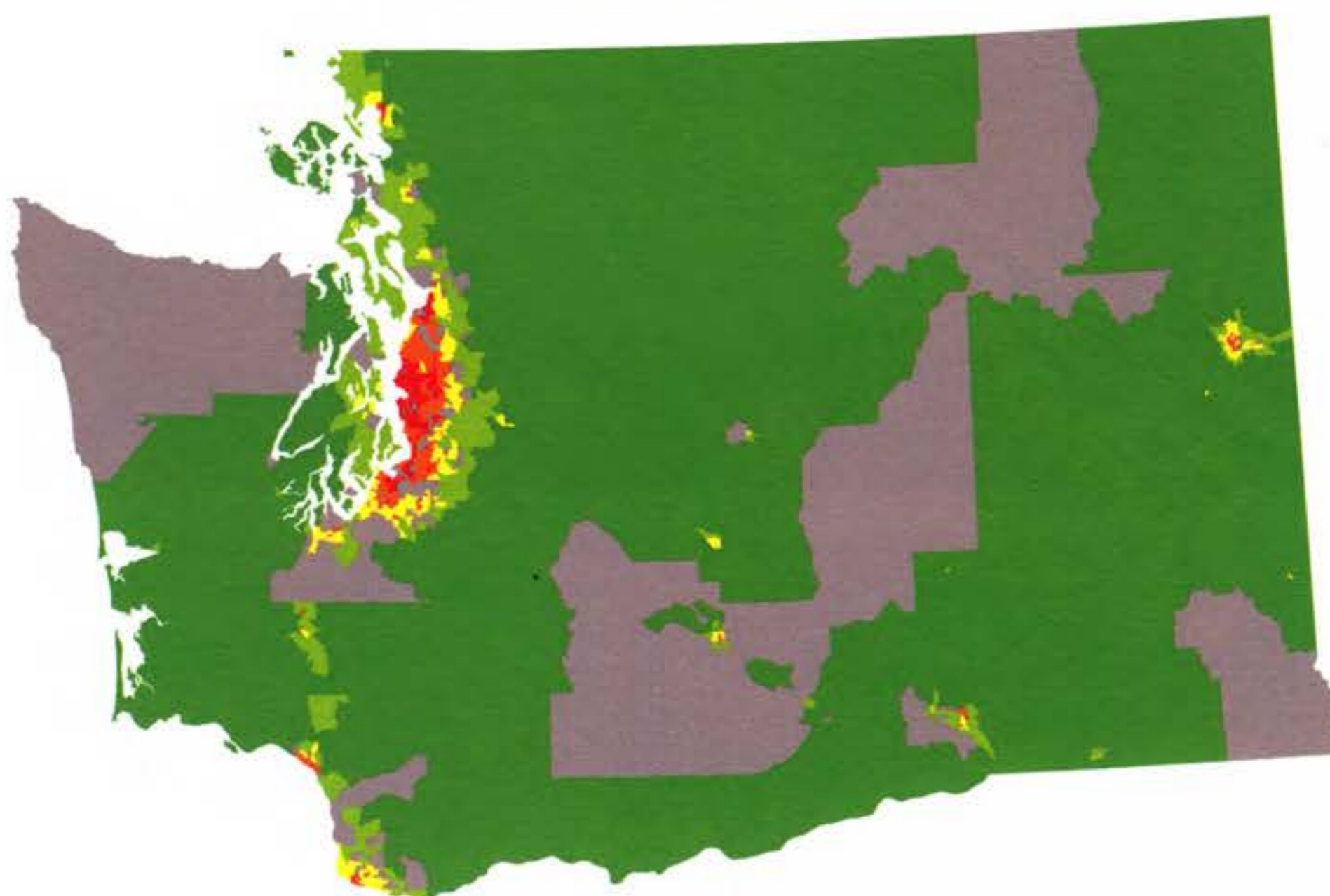
CANCER RISK FROM AIR POLLUTION (PER 1 MILLION PEOPLE)



WHATCOM COUNTY



WASHINGTON STATE



HOW WE DID IT

The Planet used data from the latest EPA National Air Toxics Assessment, then added the calculated cancer risk from diesel based on a statistic from the California Office of Environmental Health Hazard Assessment for how many cases of cancer they expect from a certain amount of diesel. Red represents the 20 percent of census tracts with the highest cancer risks due to air pollution in the state. Green represents the 20 percent of census tracts with the lowest.

*Source: Environmental Protection Agency, Western Washington University, U.S. Census Bureau, and Esri 2016
Cartography by Gus Landefeld*

WHATCOM COUNTY GENERALLY has low levels of air pollution, according to an independent analysis of Environmental Protection Agency data conducted by *The Planet*. However, the census blocks housing downtown Bellingham, Washington, and Western Washington University ranked highest in cancer risk from air pollution. Out of 1 million people, the air pollution levels in that neighborhood would likely cause an additional 50 people to get cancer.

But that calculation excludes diesel emissions. Add the data into a cancer-risk formula for diesel from the state of California, and the risk in those same neighborhoods skyrockets to over 1000 per million. The cancer

risk for diesel alone is about 10 times that of all the other toxic chemicals combined.

This number is lower than larger cities like Seattle. According to *The Planet's* analysis, the average diesel risk in Bellingham is 65 percent lower than in Seattle.

It's difficult to pin down diesel sources. The higher levels of diesel in Bellingham could stem from the heavy-duty trucks coming to and from the Port of Bellingham, nearby buildings with diesel-emitting machinery, railroad locomotives and construction sites in the area, according to Washington State Department of Ecology's list of diesel sources. It could also come from heavy-duty vehicles on the interstate, roaring barely a foot away from

Nancy and her sunflowers.

In 2005, heavy on-road sources, like semi trucks or buses, produced over 1,450 metric tons of diesel fine particles statewide, making it the number one source of diesel emissions in the state, according to Ecology.

Kathy Strange, a technical analysis manager at the Puget Sound Clean Air Agency, said much of the air pollution in Seattle comes from a combination of on-road sources, like large vehicles, and off-road sources, including trains and ships carrying cargo to and from the port. Diesel particulate matter takes several hundred meters to dissipate, exposing many communities and employees who are near emission sources.



Ecology lists diesel as the most toxic air pollutant in the state in terms of carcinogenic potency. It published multiple studies associating diesel with lung cancer, asthma, reproductive problems and cardiovascular disease. It's not the only organization to recognize its danger.

Diesel exhaust represents around 80 percent of the cancer risk in the Puget Sound region, said Kimberley Cline of the Puget Sound Clean Air Agency. Cline works as the coordinator of a program called the Clean Cities

Coalition, which aims to promote national security and environmental protection through technology to wean the country off imported petroleum.

The coalition formed in 1993 and has implemented strategies to reduce air pollution such as diesel particulate matter. The coalition runs the ScRAPs program, which encourages drivers to scrap their heavy-duty diesel trucks with older engines, and offers to sell them a discounted replacement truck with an engine from 2010 or newer.

Although agencies like Ecology, Puget Sound Clean Air Agency and even the World Health Organization see enough proof linking diesel emissions to cancer, others are more hesitant.

The EPA, the International Agency for Research on Cancer, the National Toxicology Program and the National Institute for Occupational Health only list diesel as a potential, likely or reasonably anticipated carcinogen.

The EPA National Air Toxics Assessment displays a map of air pollution, but doesn't account for diesel in the cancer risk. State and federal agencies use the map to model air pollution and set priorities on certain pollutants and emitters. But without diesel, agencies could overlook polluted areas. The EPA stated the information included in its assessment is not definitive, and is merely used to narrow down areas of interest.



ABOVE: Cars drive along Interstate 5 in Bellingham, Washington.

LEFT: Exhaust pours from a tailpipe in Bellingham, Washington. Inhalation of diesel fuel poses significant risks of cancer to humans, according to the California Office of Environmental Health Hazard Assessment.

The air quality in Washington appears to be relatively good, if diesel is excluded from the assessment.

“Looking at our data from the last five or ten years or so, our air quality would have to be categorized as ‘overwhelmingly good,’” said Axel Franzmann, atmospheric measurement manager for Northwest Clean Air Agency, which monitors air quality in Whatcom, Skagit and Island counties.

Now, researchers in Boston and Seattle are trying to get to the bottom of just how diesel affects human health, said Sverre Vedal, a professor of environmental and occupational health sciences at the University of Washington.

That work includes monitoring people who spend several hours breathing air inside a controlled diesel emissions room. The room is designed to isolate diesel emissions from other factors in the environment. So far, the researchers have been able to link diesel-emission exposure to narrowing blood vessels, which can raise blood pressure for hours after the subjects leave the room, Vedal said.

For many people, diesel emissions are an aspect of daily life. You might create it on your way to the store, or see it rising in thick, dark plumes in the distance. You might smell it from time to time creeping over a tall, concrete wall, like Nancy. 🌍



Workers tend to crops at a community garden adjacent to Interstate 5 in Bellingham, Washington.

NICK JENNER is a senior earning a visual journalism degree and a minor in sociology. In the past, he wrote for *The Planet*, investigating pollution near the Duwamish River in Seattle. He enjoys meeting people and visiting places with a good story.

EDWARD CLEM is a 23-year-old visual journalism student and photographer from Seattle, Washington. Edward is a passionate skier and outdoorsman who considers photography to be a powerful medium for exposing environmental injustice.

CLEANING UP THE STATE'S DIRTIEST AIR

VIDEO BY **AARON GILLIS**

Surrounded by freeways and industry, South Seattle is home to some of the worst air in Washington state. Citizens of the community rallied together to build a green wall, a wall of plants designed to purify the air and remove particulate matter emitted from nearby vehicles.

AARON GILLIS is a video journalist for *The Planet* with a passion for multimedia production.



Visit *The Planet* website at www.theplanetmagazine.net to see this video and more



RAT PACK

STORY BY GABRIEL BRENNER
PHOTOS BY SERENA CUEVA

Welcome to Blood Alley: a place where used needles and garbage line the dimly lit street, and makeshift homes are created from broken pieces of furniture and tattered blue tarps. Kaylee Byers, dressed in a bright green rain jacket with her hair pulled back in a ponytail, greets the local residents as she kneels in a rain-soaked gutter to check a rat trap she placed there a few months earlier.

LEFT: Kaylee Byers, a doctoral candidate at University of British Columbia, inspects a rat for an ear clip. Every captured rat is marked and labeled before they are released, in order to track disease movements.



BYERS IS A University of British Columbia student researcher working for the Vancouver Rat Project, testing rats in the Downtown Eastside neighborhood of Vancouver, British Columbia for signs of MRSA, a bacterial strain resistant to common antibiotics. The study, which began in 2010, is one of the first of its kind to study how rat movements relate to the spread of disease.

Chelsea Himsworth, the lead researcher at the Vancouver Rat Project, identified MRSA in 22 of the 637 rats they tested. The researchers found identical bacterial strains in both the urban rats and the local human and animal populations, leading them to believe MRSA is spreading between people and rats scavenging trash in alleyways.

MRSA, or methicillin-resistant *Staphylococcus aureus*, can be life-threatening, with symptoms including sores and boils that may eventually lead to serious skin infections.

“THERE ARE NO RAT SURVEILLANCE PROGRAMS IN ANY OF THE CITIES, WHICH IS CONCERNING.”

- KAYLEE BYERS
DOCTORAL CANDIDATE
UNIVERSITY OF BRITISH COLUMBIA

Now, Byers and her team are trying to determine if traditional pest control is worsening the problem of MRSA and other diseases spreading from animals to humans.

The probability of a MRSA infection varies from one block to another, according to the Vancouver Rat Project. Urban rats live in tightly packed colonies, where pathogens like MRSA spread easily. The rat researchers suspect conventional pest control displaces these rat packs, and infected rats can spread out and infect other colonies.

Each week, researchers check traps, collect blood, saliva and stool samples from any captured rats, and then release the rodents in the same places they were caught.

“We’ve been out for four months and we’ve caught 400 rats,” Byers says.

This project also acts as a framework for a future rat surveillance program the Vancouver Rat Project hopes to start with current federal pest control programs.

“There are no rat surveillance programs in any of the cities, which is concerning,” Byers says.

Beneath the faux gas lamp lights, the Downtown Eastside, also known as Gastown, is Vancouver’s central cosmopolitan neighborhood. Despite the art galleries and boutiques, the neighborhood is also one of the poorest in Canada. The Downtown Eastside contains Canada’s only two safe injection sites, where residents can bring drugs and obtain sanitary needles.

“Gastown is one of the swankier areas of Vancouver,” Byers says, turning a corner onto busy Hastings street. “And then you have tent city right next to it.”

Back in Blood Alley, Byers winds her way from trap to trap with methodical precision. She pushes away trash bags of soiled napkins and diapers, checking to see if a rat has fallen for the peanut butter bait.

Most people are excited about the project, Byers says, lifting a baby rat out of a trap and putting it in a cage. "People want to see fewer rats, but at the same time they don't want rats harmed," she says. Many local residents tell Byers and her team whether they have seen any rats scurrying around in the alleys.

Byers and her team work out of a white panel van they park alongside the alleyways. Two bright orange biohazard stickers mark the back doors, hinting at the cargo it carries. Inside, graduate student Michael Lee gently places a recently-caught rat on a stainless steel operating table. While working with the Vancouver Rat Project, Lee is writing his thesis to determine if rat ecology and the urban environment affect the spread of diseases between humans and animals.

"Most of our work is taking samples," Lee says, as he places a breathing mask of anesthesia over the mouth snout of the rat. The team collects vials of urine, feces, blood and saliva and places them in separate cubbies that go to the main lab for further testing.

In order to keep rats warm in the winter and prevent hypothermia, the team puts out basins of hot water and small heat packs. "It's like they go to a little rat spa," Byers says as she places the cages of sleeping rats above large plastic basins to collect any more feces and urine they might excrete overnight.


The researchers give each rat they catch an ear tag with a laser-etched number, so if they catch the rat again, they can tell if it has been infected.

The ear tags also act as surveillance devices, showing if the rat has traveled to a different alleyway or zone in the Downtown Eastside.

"Are rats a source of MRSA for us? Probably not. They probably got it from us," Byers says as she takes off her dirt-stained surgical gloves.

Even though there have been no definitive cases of rats transmitting MRSA to humans, Byers and her team believe this work adds important information to the study of how diseases spread and our understanding of the way rats live.

The Vancouver Rat Project plans to eventually expand into other areas of Vancouver, testing rats to see if MRSA or other pathogens are present.

"If your concern is that people are going to get ill from rat-associated diseases, then you should really be studying the population most at risk for that," Byers says. "And that is the Downtown Eastside." 

GABRIEL BRENNER is a senior studying business and sustainability. He is passionate about coffee, music, and the environment, and wants to have his own travel blog about all three.

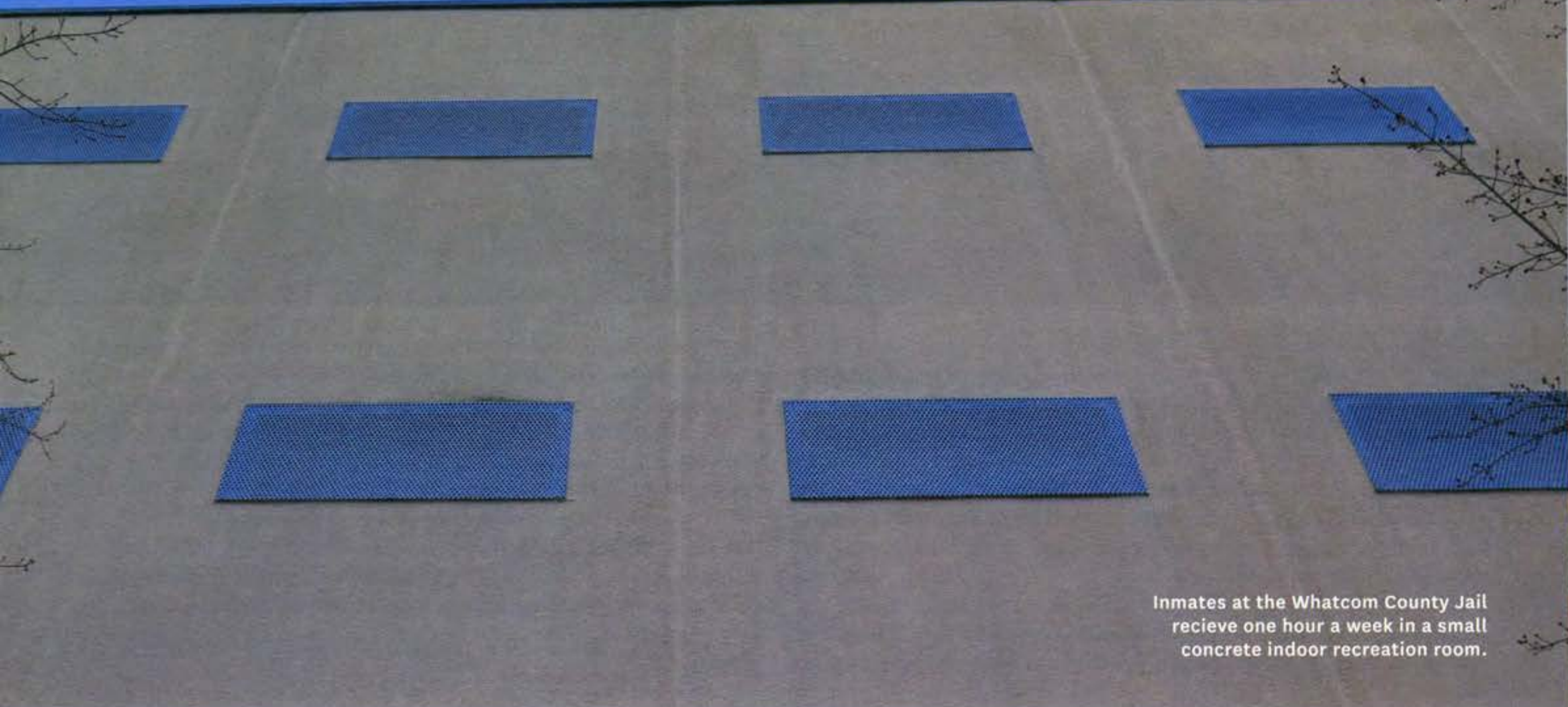
SERENA CUEVA is a senior at Huxley College studying geography and environmental education. After graduation, she hopes to take her environmental knowledge and love for photography to the global community.

BELOW: A rat sits in a cage in an alley in Vancouver, British Columbia. Each alley is marked by numbers, allowing the scientists to carefully track where rats are found.



LOCKED IN

STORY AND PHOTOS BY KATY COSSETTE



Inmates at the Whatcom County Jail receive one hour a week in a small concrete indoor recreation room.

Laurel Walden, an inmate at the Whatcom County Jail, hadn't been outside for four months. Walden is from Skagit County, and worked as a massage therapist before coming to the jail.

"Even just picking up garbage would be great," Walden said.

INMATES AT THE Whatcom County Jail do not get to go outdoors. Instead, they receive one hour a week in a graffiti-marked, concrete-walled recreation facility about half the size of a basketball court with eight screen windows spaced around the room.

More than half of U.S. inmates have a mental health disorder, according to a 2014 report by the American Psychological Association. The stress of incarceration can exacerbate pre-existing medical conditions and cause the inmates with mental illnesses to act out, according to the association.

Bréon Williams is an inmate at the Whatcom County Jail. Williams has Intermittent Explosive Disorder, a disorder marked by sudden violent outbursts, and is unable to secure a trustee position at the jail. To make trustee, inmates must be medically cleared and free of infractions. Trustees cook meals, do janitorial work and can join work crews. For many inmates at the jail, a work crew might be their only chance to get outdoors.

Without exercise equipment, the inmates have to make creative use of their recreation time. Some men use each other as weights and some women make jump ropes out of sheets, said Alyson Batchelder-Bestle, a re-entry specialist at the jail. Spending time in the fresh air of the recreation space is often calming for inmates, she said.

"We make makeshift footballs out of toilet paper rolls and we just throw them around," Williams said. "We put a sock over it."

In September 2012, the American Civil Liberties Union of Montana sued Missoula County on behalf of a group of county jail inmates claiming unfair treatment in their access to outdoor recreation. The Missoula County Detention Center let male inmates outdoors five times a week for one hour a day, but only let female and juvenile inmates exercise in an indoor recreation room. The ACLU alleged it was case of age and gender discrimination, and violated the U.S. Constitution's Eighth Amendment's prohibition of cruel and unusual punishment.



“When I interacted with [the plaintiffs] over a period of months, it was clear to me that their physical and mental health was deteriorating,” said Anna Conley, an adjunct professor at the Alexander Blewett III School of Law at University of Montana, who worked as a staff attorney on the case.

Plaintiffs in the case testified they suffered physical and psychological damage to their health after repeatedly being denied outdoor access. They reported accounts of depression, hair loss, insomnia and panic attacks due to lack of fresh air and sunlight.

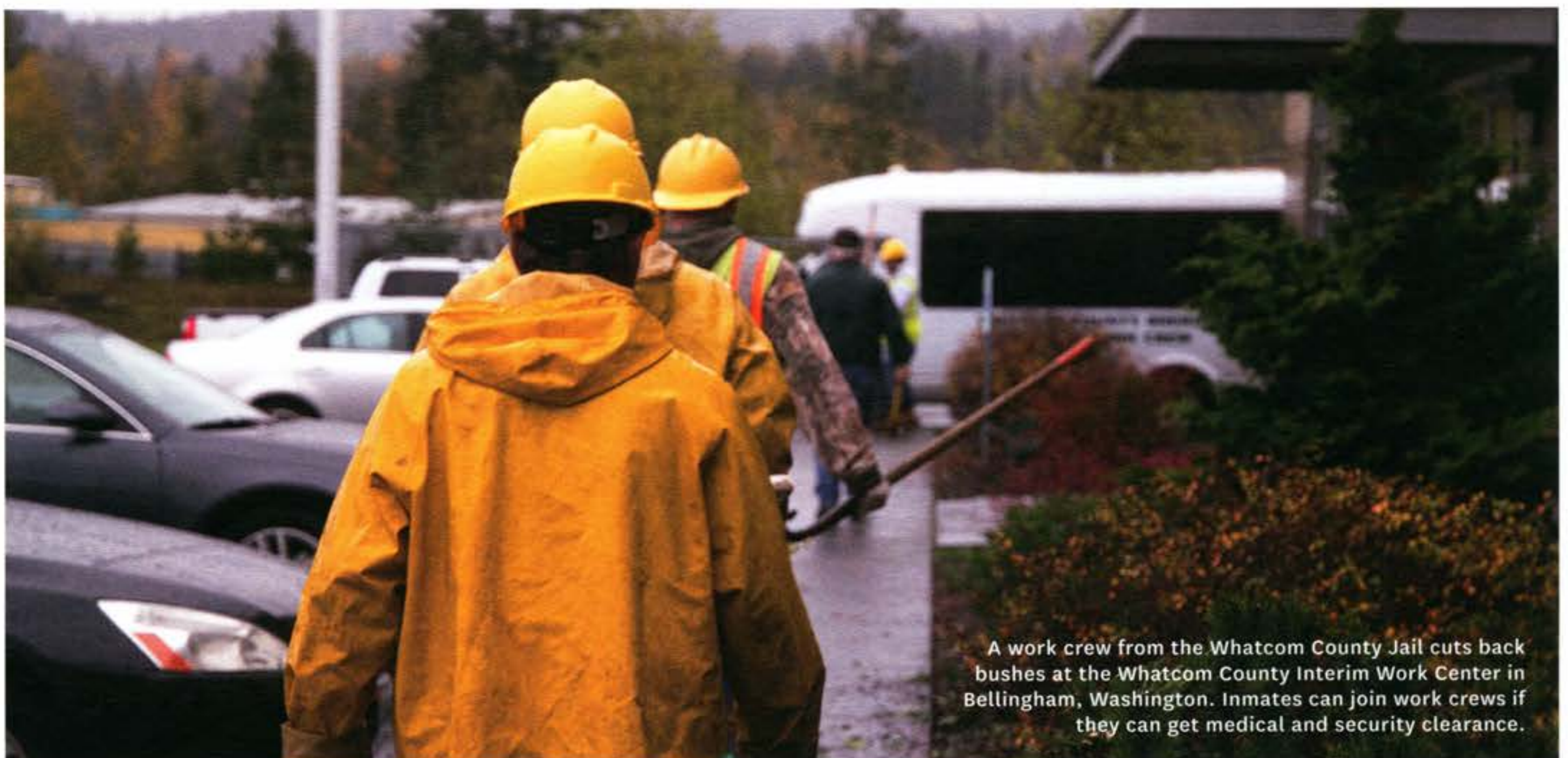
In October 2013, a federal judge found the Missoula County Detention Facility violated the constitution and ordered it to build outdoor recreation facilities for the female, juvenile and segregated prison populations.

“It’s incredibly important that prisoners be treated humanely,” Conley said. “And when they’re not treated humanely, people advocate on their behalf and ensure they are treated humanely.”

Michael Sparks, a senior investigator for the Bellingham Public Defender’s office, has been with the agency since its creation in 1982. In his 34 years with the agency, Sparks has never seen a case involving lack of outdoor recreation in the Whatcom County Jail. He said the recreation room in the jail technically counts as an open-air recreation facility, since the room has open screen windows.

To get around the challenge of providing inmates with access to the outdoors, the Sustainability in Prisons Project is bringing the outdoors to inmates. The project, a collaboration between the Evergreen State College and the Washington State Department of Corrections, provides gardening and environmental education programs in Washington state prisons.

Forest ecologist and former Evergreen faculty member Nalini Nadkarni founded a project called the Blue Room in 2013, adding to the list of programs the project provides. The Blue Room is a blue-tinted room



A work crew from the Whatcom County Jail cuts back bushes at the Whatcom County Interim Work Center in Bellingham, Washington. Inmates can join work crews if they can get medical and security clearance.

LEFT: The Whatcom County Jail recreation facility used to have a basketball hoop, but it was removed because the games became violent.

in several prisons equipped with plants and a projector to display scenes of nature on the walls.

The room is intended for inmates in solitary confinement for 23 hours a day. Inmates receive one hour in this room each day, and can choose from a variety of nature videos, including the mountains, ocean or forest.

"The officers that are in the programs are noticing it's calming people down. That's often the reason they are in segregation: because they're really stressed and they're really reactive," said Kelli Bush, the program manager at the Sustainability in Prisons Project. "The connection with nature is a much simpler way to do it than locking them down."

That said, it would be hard to offer these programs in a jail setting because people are there for a shorter period of time, Bush said. Prisons usually conduct a six-week evaluation for mental health and violent tendencies when an inmate enters the prison. Jails don't do this screening, so they're often more cautious about the programs they offer, she said.

There are still ways to incorporate nature programs into jails. Jails can offer lectures about science or the environment, which can inspire inmates to further their education, she said.

"Education is the most effective way to reduce recidivism," Bush said.

Inmates in the Snake River Correctional Facility had 26 percent fewer violent offenses after watching the nature videos, according to research from the clinical psychotherapist Patricia Hasbach.

The inmates at the Whatcom County Jail are still finding ways to stay close to nature.

"I actually sleep by the windows upstairs because it makes me feel better. I'm more connected to nature," Laurel Walden said. From her window, she can see the courthouse, trees and the Bellingham skyline. "It's not a lot, but at a certain angle it's pretty." 📍

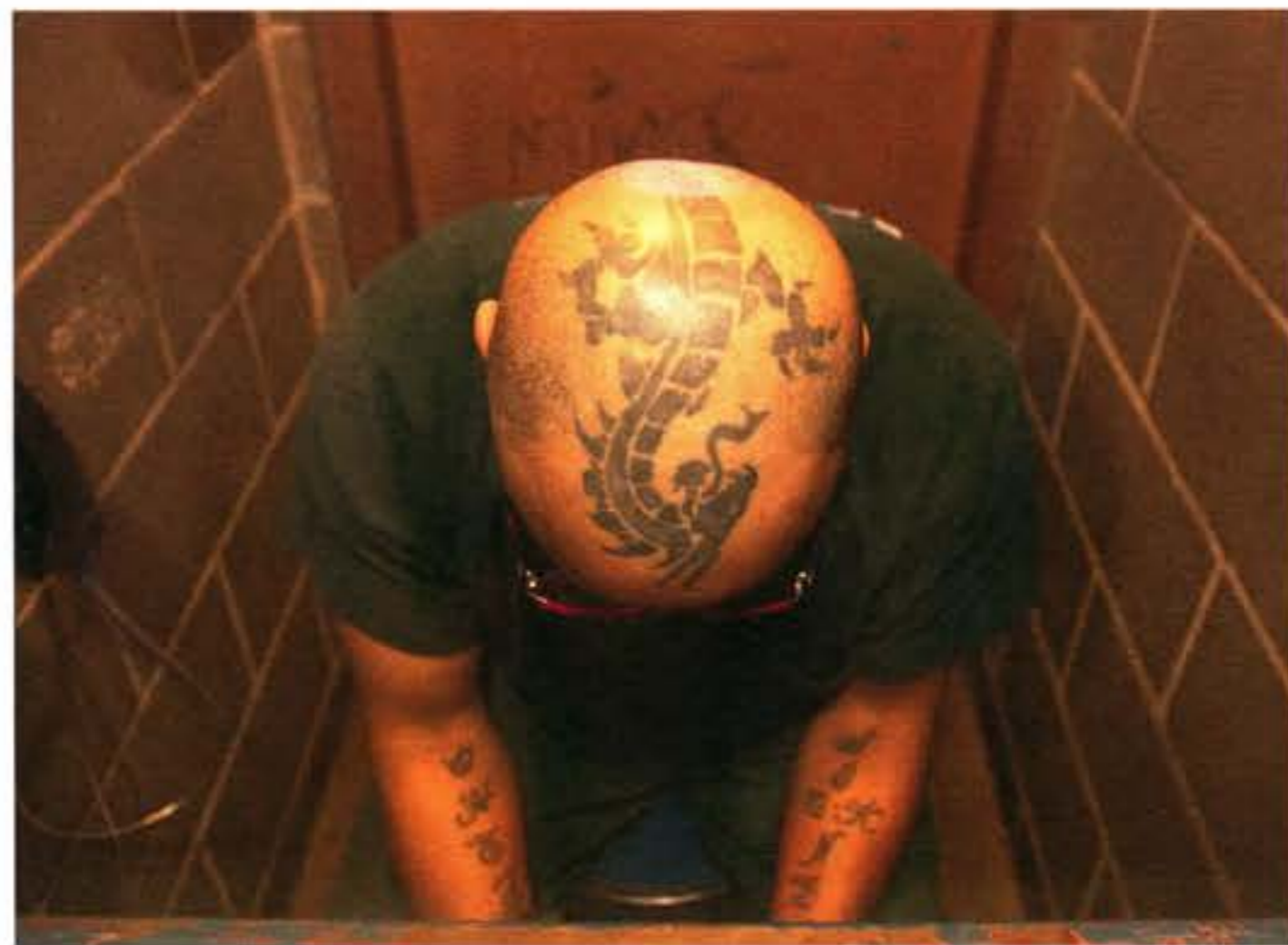
KATY COSSETTE is a junior studying visual journalism. She is interested in going beyond the standard coverage of human issues in the media.

"IT'S INCREDIBLY IMPORTANT THAT PRISONERS BE TREATED HUMANELY, AND WHEN THEY'RE NOT TREATED HUMANELY, PEOPLE ADVOCATE ON THEIR BEHALF AND ENSURE THEY ARE TREATED HUMANELY."

- ANNA CONLEY

FORMER STAFF ATTORNEY

AMERICAN CIVIL LIBERTIES UNION OF MONTANA



ABOVE: Bréon Williams, 45, is an inmate at the Whatcom County Jail. He is awaiting trial for second degree assault. He does push-ups in his cell to stay fit.

OIL ON THE TRACKS

STORY BY MARINA PRICE
PHOTOS BY EDWARD CLEM



Driving through downtown Mount Vernon, Washington on a dark windy night, you might not even notice the unassuming small home-turned-office building at 1015 2nd Street.

But step inside, and it's a whole new scene. Stacks of pizza boxes are balanced on the reception desk. Beer, wine and snacks sit on a folding table. Posters and protest signs line the walls. People of all ages are sitting on tables, counters and crowding into narrow hallways. It's Oct. 6, 2016, and the members of the Project Skagit: Stop Oil Trains team are celebrating.



"IT REALLY CAUGHT us by surprise," Eddy Ury said, while setting down a stack of papers titled, "Proposed Oil Terminals." Ury is the Clean Energy Organizer at RE Sources for Sustainable Communities, a nonprofit organization based out of Bellingham, Washington, a half-hour drive north.

In 2013, Shell Oil Company began working on a plan to increase their shipments of crude oil from North Dakota on trains running through Skagit County by six new oil trains per week. Ury and his team had been organizing letter-writing workshops, reviewing legal literature and identifying public comment periods they could use to speak with county officials who had the authority to halt the proposal.

But on Thursday afternoon, just three hours before members planned to discuss the

next steps in tackling the proposal, Shell announced it was withdrawing from the plan, citing economic reasons.

"But we keep fighting that good fight," a woman shouts from the crowd.

The fight for safer oil transport in Washington is just beginning. Shell's announcement will give Ury and his counterparts time to direct their energy toward a similar proposal from Tesoro, another oil company with a refinery just a few kilometers south in Anacortes. Ury expects Shell will try again in a few years.

"They're going to wait a few years until people aren't paying attention," he said.

The oil-by-rail conflicts in Washington state are relatively new ones. Mass crude oil-by-rail transport, using unit trains of 100 or more cars, didn't happen before 2011 in Washington state.

ABOVE: An oil train travels north along Samish Bay toward oil refineries in Ferndale, Washington. In July 2013, an unattended freight train carrying Bakken crude oil derailed and exploded in Lac-Mégantic, Quebec, damaging the city and claiming 47 lives.

They only came about after large-scale fracking operations began in western North Dakota around the same time. The extracted crude oil needed to be refined, and refineries along Washington's coast were accessible by rail.

Many of the concerns revolve around safety. A derailment and explosion in Lac-Mégantic, Quebec in July 2013 killed 47 people who lived near the tracks, destroyed 40 buildings and set the surrounding town ablaze. Sixteen oil cars derailed along the Columbia River in Oregon in June 2016, burning for 10 hours and spilling thousands of liters of oil. The town was evacuated and community members were required to boil their water, due to an unsafe emergency well.

Safety concerns have prompted the Tesoro refinery in Anacortes to go above and beyond the requirements. The refinery employs around 350 full-time workers and has a crude oil capacity of 120,000 barrels per day. The company began only using CPC-1232 cars in 2014, Brendan Smith, a spokesperson for Tesoro, said in an email. These cars are modified versions of DOT-111 cars, which are falling out of use due to safety hazards. DOT-111 cars were involved in the Lac-Mégantic disaster in 2013.

The company hasn't had a spill large enough to require reporting at the Anacortes crude by rail offloading facility in three years, Smith said.

Over 3 million people live near railroad tracks in Washington, according to the Washington State Department of Ecology. They are all within the "blast zone" for evacuation: a 0.8-kilometer radius for a derailed oil car and a

"ALL OIL SPILLS CAUSE DAMAGE TO THE ENVIRONMENT. WHETHER IT'S HUNDREDS AND THOUSANDS OF GALLONS OR A COUPLE TEASPOONS THAT DROP INTO A LAKE, IT'S ALL DAMAGING."

- LISA COPELAND

*OIL SPILLS COMMUNICATIONS COORDINATOR
WASHINGTON STATE DEPARTMENT OF ECOLOGY*

1.6-kilometer radius for a fire or spill.

Virginia Wolff is a retired family practice physician and oil-by-rail activist living in Bow, Washington. She has been urging local agencies to evaluate what she describes as extensive safety risks associated with oil-by-rail transport.

"I am acutely aware of not only the richness of the environment we are blessed with, but also of its vulnerability," she wrote in a scoping comment to Shell.

She is concerned with the risks associated with a large scale explosion, fire or spill, as well as less obvious effects. Traffic delays impact timely transportation for emergency medical services. She cited the World Health Organization in outlining the negative impacts sustained rail noise can have on cognitive performance in

children. She also pointed to studies showing the dangers of inhaling diesel particulates and other emissions, which she said can contribute to lung damage and serious respiratory risks.

According to Ecology, 71 crude oil rail cars passed through Whatcom County each day in 2014, which was the lowest in any county that saw oil-by-rail movement on their railroads. Over 120 rail cars passed through Skagit County each day.

Whatcom and Skagit Counties are representative theatres for the oil-by-rail debate occurring at local, state and federal levels nationwide. This fight is fueled by the proximity of refineries at Cherry Point and Anacortes, the low cost of moving oil across Washington, and the hundreds of coastal towns and cities along their route.



Smoke billows from the Phillips 66 oil refinery in Ferndale, Washington.

Critical decisions made about the future of oil transit in the state are often made at the local level. The Whatcom County Council, a group of seven Whatcom County residents who represent just over 200,000 people, chose to enact a six-month hold on any new transportation of unrefined oil-by-rail through Cherry Point. This was largely due to the overwhelming public effort made by Ury's group, RE Sources, and other local groups, like Stand Up To Oil and Evergreen Islands.

At a larger scale, Ecology is cracking down on oil safety, too. The state is the first in the country to implement state-regulated rules surrounding oil safety and preparedness.

Gov. Jay Inslee signed off on five new rules in 2015. The rules require annual safety demonstrations from all companies shipping oil in Washington state, and provide grants to communities without access to emergency services.

"Really what we're doing here is trying to bring the same level of standard to the inland side of our state where the railroads are," said Lisa Copeland, the oil spills communications coordinator for Ecology.

Washington's stringent oil-by-vessel laws have helped to secure the record for the lowest spill rate volume in the nation. When oil trains came to the state in 2012, officials worked to mediate the impacts this new movement could have.

Ecology doesn't have the authority to ban oil trains, Copeland said. Instead, it aims to decrease the risks associated with oil movement in the state, she said.

"All oil spills cause damage to the environment. Whether it's hundreds and thousands of gallons or a couple teaspoons that drop into a lake, it's all damaging," Copeland said. "We're doing everything we can to make sure the environment is protected." 🌱



MARINA PRICE is a journalism student at Western Washington University. She is passionate about writing, music and environmental policy.

EDWARD CLEM is a 23-year-old visual journalism student and photographer from Seattle, Washington. Edward is a passionate skier and outdoorsman who considers photography to be a powerful medium for exposing environmental injustice.


ABOVE: Living only a few hundred meters from the train tracks, Danny Rambo sits in front of his home on Chuckanut Drive, south of Bellingham, Washington. Rambo said he has concerns about both the safety and potential environmental impacts of a derailment in the Samish Bay area.

BELOW: Oil train cars sit on tracks in Ferndale, Washington. Some fear oil trains pose a threat to Whatcom County due to their risk of explosion if a crash occurs.



ZEROING IN ON ZIKA

STORY BY ROSSELLA BERNOCCO
PHOTOS BY EDWARD CLEM



An *Anopheles Punctipennis* mosquito, a close relative of the *Aedes Aegypti* mosquito that carries and transmits the Zika virus, sits on display. Zika can cause microcephaly in fetuses of infected women, a condition that causes babies to be born with smaller than normal heads and have abnormal brain development.

At first glance, the Infectious Disease Research Institute, a nonprofit global health organization, blends into the bakery and fitness center downstairs. But inside the four-story building on the north edge of downtown Seattle, white-coated scientists weave between bays of whirring machinery and multi-colored vials. While the atmosphere seems hushed and calm, these people are part of a frantic international race to create a vaccine against the Zika virus.

VACCINE

The synthesized RNA vaccine is introduced, typically through injection.



ANTIGEN

The synthesized RNA, normally derived from DNA, enters a protein that creates a representation of the Zika virus.



RESISTANCE

Immune system cells can identify and study the Zika antigen to create an antibody to fight off any future Zika infection.



SINCE 2015, when the virus first gained worldwide attention, Zika has swept into 47 countries, and infected around 32,000 in the United States and its territories. Amid growing evidence that the virus can cause severe brain damage in fetuses, researchers are rushing to block its spread. The scientists in Seattle are working to produce a vaccine to fight Zika, but it won't happen overnight. It's not a sprint. It's a marathon.

"Vaccines, in general, tend to take 10 to 25 years to get one that you can buy," said Neal Van Hoeven, a senior scientist for the institute.

Van Hoeven and his colleagues hope to make a breakthrough with a relatively new type of vaccine relying on RNA to protect against infection. Just months ago, that idea got a boost from the National Institutes of Health, which awarded the Infectious Disease Research Institute a \$491,000 grant to pursue the idea.

RNA vaccines deliver the genetic information immune system cells need in order to recognize and fight the virus in the future. They can be more effective than other vaccination methods, said Dan Stinchcomb, senior vice president of developmental viral disease programs at the institute. Scientists can also manufacture RNA vaccines synthetically, without growing any living material.

Due to its novelty, only a few established ways to manufacture and deliver an RNA vaccine exist. Since Zika is an emerging disease, little data exists on how to measure the vaccine's effectiveness.

Sometimes funding lags behind the emergency. In the end of September, Congress allocated \$1.1 billion to fight Zika after seven

months of negotiations. Congress put \$397 million toward vaccine development and virus testing.

Researchers need to run tests on animals and people of every target age group before the Food and Drug Administration will approve the vaccine for public use.

"Everything works in a laboratory mouse," Van Hoeven said. "The translation into human beings isn't so smooth."

During the Ebola outbreak of 2014, scientists seemed quick to react with a vaccine, starting the final phase of clinical trials just a year later. But researchers had been developing an Ebola vaccine for over 20 years in response to outbreaks since the 1970s, Stinchcomb said.

Compared to Ebola, Stinchcomb and his team are nearly starting from scratch.

Prior to the recent outbreaks, Zika wasn't seen as a major threat. Zika is usually not life threatening, often only causing a fever or a rash. Researchers weren't concerned about the virus until they linked it to microcephaly, a birth defect that causes brain damage in fetuses, in 2015.

But the institute isn't alone in the race for a vaccine. Pharmaceutical companies, including GlaxoSmithKline and Sanofi, are currently working on Zika vaccines as well. In August 2016, the company Inovio announced it had begun a clinical study of a DNA Zika vaccine in 160 human subjects.

Meanwhile, in Seattle, Stinchcomb said the institute is only in the early research stages. Next year if all goes as planned, they will take the next step in this long race, beginning animal and human clinical trials. 🌐



ABOVE: A researcher works in a lab at the Infectious Disease Research Institute in Seattle, Washington.

ROSSELLA BERNOCCO is a public relations major at Western Washington University. She wants to raise awareness about environmental issues through her work as a journalist.

EDWARD CLEM is a 23-year-old visual journalism student and photographer from Seattle, Washington. Edward is a passionate skier and outdoorsman who considers photography to be a powerful medium for exposing environmental injustice.

TACKLING TOXICS

UNPACKING THE NATION'S KEY CHEMICAL SAFETY LAW

STORY BY FREDERICA KOLWEY AND JESSE NICHOLS

President Gerald Ford signed the Toxic Substances Control Act into law in 1976, a time before cars required seat belts and gasoline still contained lead. The law gave the Environmental Protection Agency the power to track and regulate toxic household chemicals, and supporters praised it as a major step for chemical safety. In the 40 years since, the EPA successfully banned only nine chemicals under TSCA.

HOW THE NEW LAW AFFECTS WASHINGTON

	REGULATED BY WASHINGTON	EPA PLANS TO EVALUATE	REGULATED BY EPA
	LEAD	✓	
	CADMIUM	✓	
	PCBs		✓
	BISPHENOL-A	✓	
	MERCURY		✓
FLAME RETARDANTS	TDCPP	✓	
	TCEP	✓	
	decaBDE		✓
	HBCD	✓	
	TBBPA	✓	

IN JUNE OF THIS YEAR, President Obama signed a new version of the law, now called the Frank R. Lautenberg Chemical Safety for the 21st Century Act. It is the first time the bill has been updated since 1976. Critics called the original law ineffective, not giving the EPA enough real power to keep dangerous chemicals off the market. Despite the updates to the law, environmental advocates and some government officials have criticized it for not going far enough to protect public safety.

"We are disappointed in what the reform ended up looking like based on what it could have been," said Holly Davies, a senior toxicologist for the Washington State Department of Ecology and a member of the EPA's Chemical Safety Advisory Committee for TSCA. "It doesn't actually give EPA as much authority as it looks like."

The new law requires the EPA to test the safety of every chemical on the market today as well as any new chemicals developed in the future. By some estimates this means reviewing over 80,000 chemicals.

The law states the EPA must identify and begin evaluating 20 chemicals within three and a half years. At a rate of 20 chemicals every three and a half years, it would take over a

thousand years to get through all 80,000 chemicals, not to mention the estimated 1,000 new chemicals introduced each year.

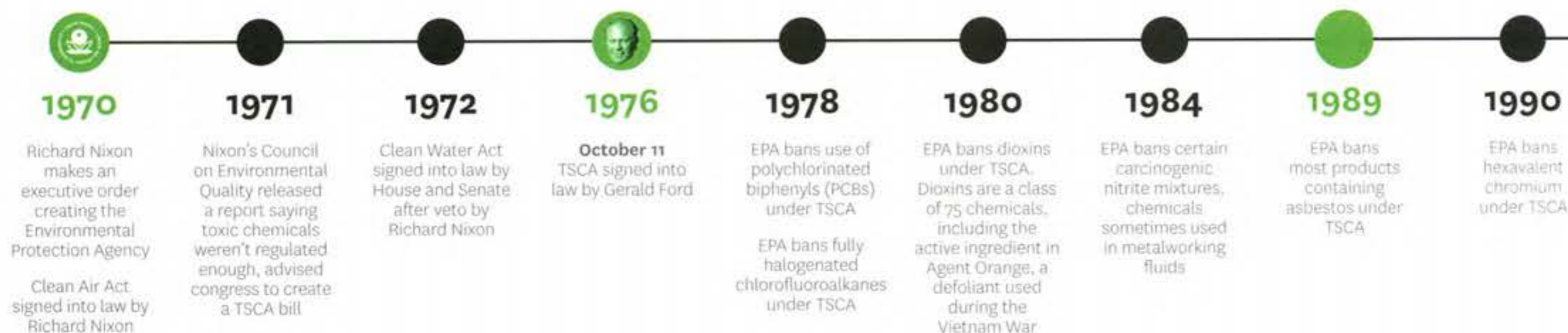
"We're slogging along at the rate U.S. politics permits these things to happen," said John Kissel, a professor in the environmental and occupational health sciences department at the University of Washington and a member of the EPA Advisory Committee. "In a politically pragmatic kind of way, we're moving forward."

Kissel hopes technology can improve to significantly speed up the process. Scientists can often group chemicals together based on similarities in their chemical properties to estimate potential human health or environmental risks.

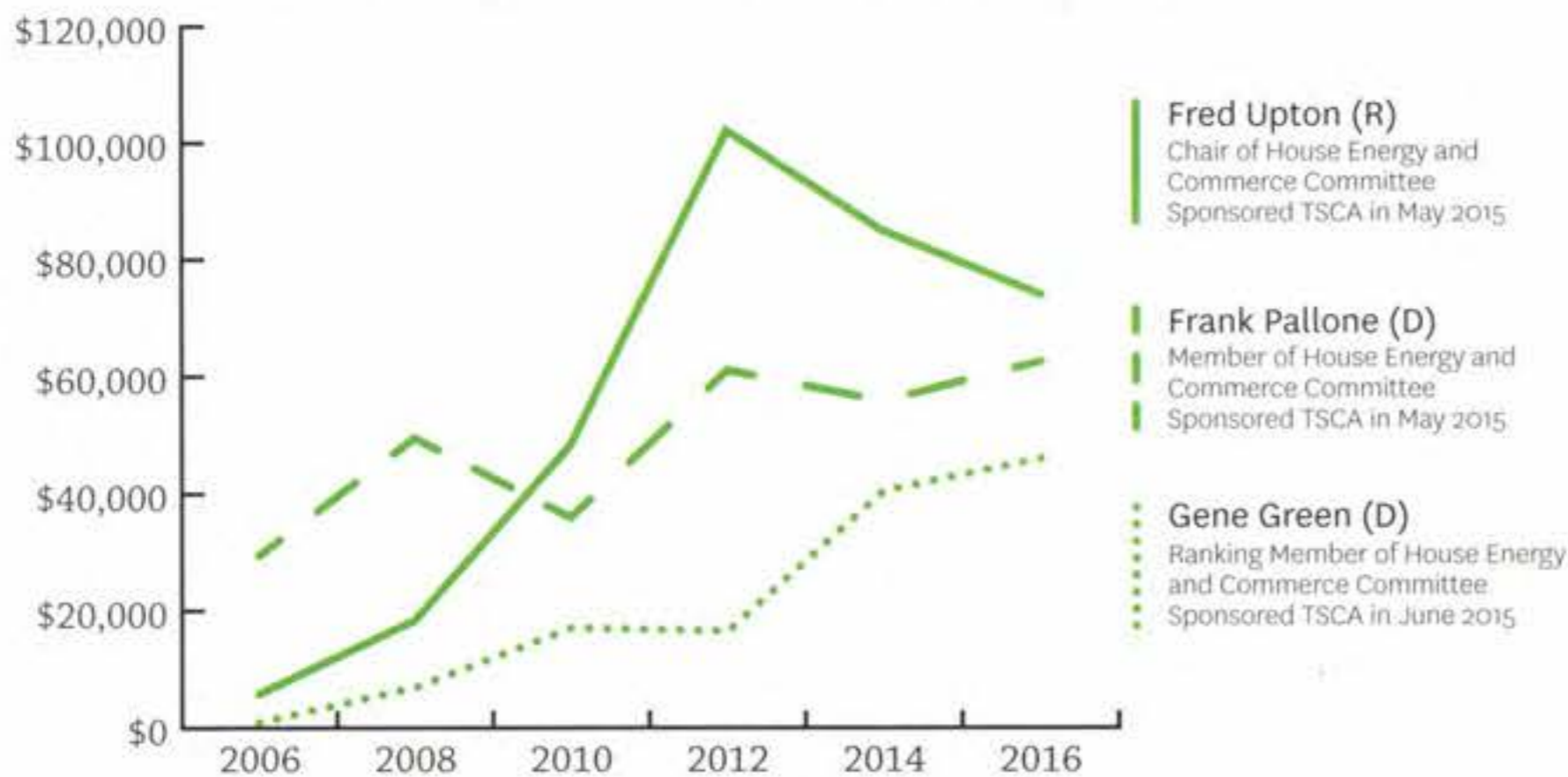
That's what scientists like Kissel are trying to do. He's part of a group researching how toxic chemicals affect people. He is working with a program that combines data on chemical properties and human interaction with the environment to model the risks people face from exposure to different chemicals. The ultimate goal is to have enough data to predict how a chemical compound will affect someone without having to wait until they are actually exposed.

As of now, the EPA has tested five chemicals and is in the process of evaluating almost

Source: EPA and Washington State Department of Ecology



MONEY FROM CHEMICAL INDUSTRIES



Source: Center for Responsive Politics

a dozen more. The EPA also listed five other chemicals it plans to regulate within three years that are known to be especially toxic, bioaccumulative and persistent in the environment. Under a special provision of the new law, the EPA can pass regulations on these chemicals without completing a full risk evaluation.

Any regulations the EPA passes under TSCA create a national standard for chemical safety. Unlike other federal legislation, like the Clean Air Act, states can't pass more stringent regulations on top of what the EPA sets under TSCA.

States like Washington have passed some of the nation's strictest chemical safety laws. Critics argued national regulations could lead to lower overall safety standards. A national standard also makes it easier for chemical manufacturing companies to do business nationwide, allowing them to conduct "one-stop regulatory shopping," as Kissel calls it.

Any chemical legislation passed before April 22, 2016 is safe from the new federal law, though. Slipping in just under the wire on April 1, Washington Gov. Jay Inslee signed a law banning the use of five flame retardants at a concentration higher than 1,000 parts per million in any children's products or residential

upholstered furniture.

Washington also restricts the use of lead, cadmium, mercury, phthalates — a class of chemicals used in plastic goods — and bisphenol-A — a chemical used mostly in food packaging. All of this legislation will not change with the new federal law.

While the law might not be the massive overhaul some were hoping for, its many caveats might allow states like Washington to continue advocating for stricter chemical reform alongside the EPA's slow march toward change. The EPA looks at evidence from scientists in Washington to inform its decisions, and the law is relatively lenient in what it allows states to continue to regulate on their own, Davies said.

"I don't think the EPA's actions will hamper what we're doing," she said.

FREDERICA KOLWEY is a senior designing a degree through Huxley College of the Environment called environmental justice through journalism.

JESSE NICHOLS is the Editor-in-Chief of *The Planet*. He studies visual journalism at Western Washington University.

CHEMICALS OF INTEREST

The Planet interviewed an Environmental Working Group lawyer, the communications manager at Toxic Free Future and two members of the EPA's Chemical Safety Advisory Committee for TSCA. These five classes of chemicals were mentioned again and again as chemicals the EPA should look at first in their risk assessments.



FLAME RETARDANTS

Flame retardants are commonly used in furniture and car seats. Babies and children are the most vulnerable to adverse health effects from flame retardants. Exposure to flame retardants may be linked to reduced I.Q., learning disorders, reduced fertility, thyroid disruption and cancer.



1-BROMOPROPANE

1-Bromopropane is a chemical used in dry cleaning as a degreaser and as a paint solvent. It is a probable carcinogen, a neurotoxin and has been linked to developmental and reproductive harm.



ASBESTOS

Asbestos is used in a variety of home building and insulation materials. It is a known cause of various cancers and asbestosis, a noncancerous lung disease.



BPA

BPA is a chemical used in some soup cans and other food packaging, as well as some cash register receipts. It has been linked to cancer, diabetes and infertility.

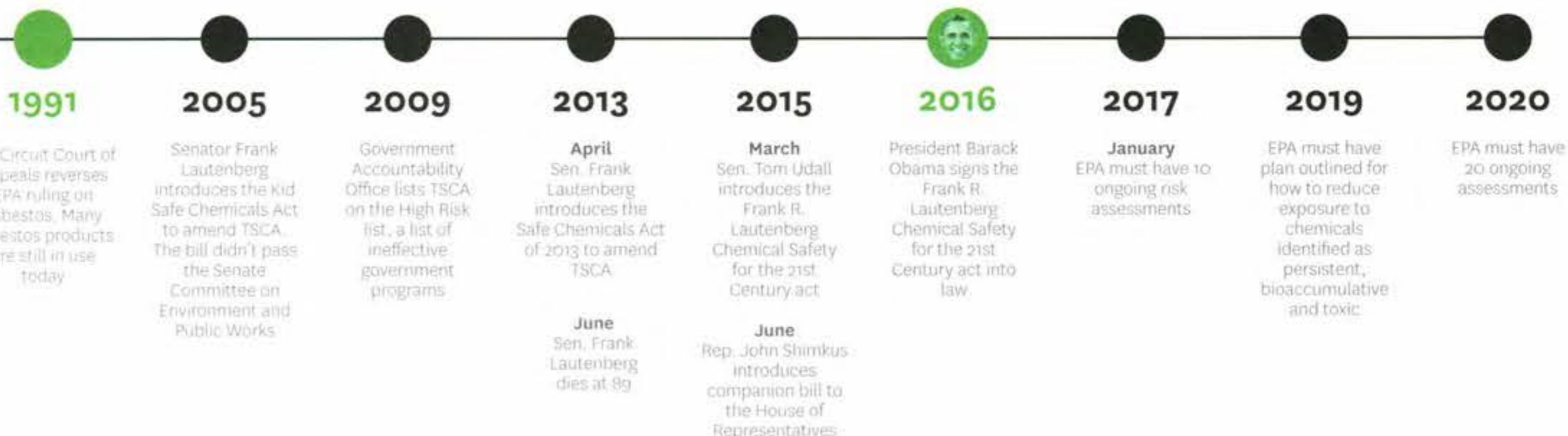
Under TSCA, EPA can only evaluate non-food uses of BPA. The Food and Drug Administration regulates BPA in food-related products. The FDA banned the use of BPA in some food packaging especially products used by babies and young children.



PHTHALATES

Phthalates are a class of chemicals used in PVC piping, plastic wrap and some plastic toys. They may disrupt male reproductive processes and developmental processes in females.

Source: EWG and EPA



FLUSHED

STORY BY ALEXA EDDY

PHOTOS BY KATY COSSETTE

Before Mark Henderson sold his house, he had to get his septic tank pumped. The septic tank contractor lifted the lid and asked if anyone in the house had been on antibiotics. Henderson was floored — he had taken antibiotics two weeks prior. He asked how the contractor knew, and looked in the septic tank. It was black. “Antibiotics killed all the bugs in your septic tank,” the contractor said.

NOT EVERYTHING TRAVELING down the drain disappears. Researchers estimate over 100 kilograms of pharmaceuticals — drugs like OxyContin, cocaine and Valium — enter the Puget Sound every day. Scientists are beginning to look into methods to reduce contaminants in wastewater outflow.

Jim Meador is an aquatic toxicologist for the National Oceanic and Atmospheric Administration. In the summers of 2013 and 2014, Meador and his colleagues started collecting water and fish from the Puget Sound, he said. Analysis of the water taken from areas near wastewater treatment plants revealed a slew of chemicals and traces of drugs, including OxyContin, cocaine, Valium, Zoloft, ibuprofen, Metformin, birth control hormone and various antibiotics. Meador also found high levels of Prozac, amphetamines, antidepressants and

other drugs in the tissue of juvenile Chinook salmon tested in the Puyallup River estuary, which is fed in part by the outflow of Tacoma’s Central Wastewater Treatment Plant.

Outflow from wastewater treatment plants in the Puget Sound Region contained higher levels of pharmaceuticals than outflow measured from the 50 largest treatment plants in the United States, according to Meador’s study. Local wastewater treatment plants could discharge up to 44,000 kilograms of dissolved drugs annually, according to the study. Over 80 drugs and personal care products were found in the outflow of sewage treatment plants flowing into the Sound.

Scientists only started looking into the effects of human drug use on the aquatic environment about 15 years ago, said Mark Henderson, a water quality specialist for the Wash-

ington State Department of Ecology.

Amid the hiss of machinery at the city of Bellingham’s Post Point Wastewater Treatment Plant, the peaceful sounds of Bach echo throughout the lobby — opposite of what you might expect from a place that often uses the term “sludge.” Wastewater treatment plants can remove many contaminants and solids from the water, but most aren’t designed to remove pharmaceuticals.

“We don’t specifically filter out pharmaceuticals,” said Eric Johnston, assistant director of operations at the plant. “But we do have a program in the city to try to give people an opportunity to properly dispose of their pharmaceuticals.”

Most pharmaceuticals don’t enter wastewater as distinct solids. Instead, they’re often dissolved in urine, so typical treatments can’t





ABOVE: Operations supervisor Karl Lowry walks toward the clarifiers at the Post Point Wastewater Treatment Plant in Bellingham, Washington. The clarifiers sink solids in the wastewater to the bottom.

always filter them out. Henderson said he thinks a better approach would be to figure out how to break down all the pharmaceuticals during the treatment process, rather than try to filter them.

Ecology regulates wastewater treatment plants, tracking acidity, biological oxygen demand and metals coming out of the plants. But the department doesn't monitor pharmaceuticals in the wastewater, Meador said.

The human body does not completely metabolize all the compounds, so pharmaceuticals end up in the wastewater. Pharmaceuticals can also wash off of the human body or people can improperly discard them in toilets, sinks or trash. Drugs used for livestock, pets or aquaculture can also make it into the environment.

It's difficult to reduce the chemicals entering the waterways, Meador said.

“THERE ARE MILLIONS OF GALLONS PER DAY GOING INTO THESE PLANTS, YOU JUST CAN'T PUT A FILTER ON IT AND TAKE IT OUT.”

- JIM MEADOR

AQUATIC TOXICOLOGIST

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



“There are millions of gallons per day going into these plants,” he said. “You just can’t put a filter on it and take it out.”

Few studies exist on the effects the current concentrations of these chemicals have on the environment, said Robert Daguillard, a spokesperson for the Environmental Protection Agency, in an email. Pharmaceutical concentrations in wastewater pose little risk to human health, Daguillard said. However, fish might not be so safe.

Fish breathe and drink water, exposing them to more water than humans, Daguillard said. Scientists haven’t tested the impacts of these drugs on most aquatic species, so they


have to extrapolate from the effects on other species. These estimates suggest a low risk, but little data exists on the potential toxicity of these drugs to fish, he said.

Wastewater can be like a fingerprint of the drug-use patterns in each city. For example, wastewater from Bremerton contained higher levels of caffeine and birth control hormone than the water near Tacoma. Scientists and law enforcement agencies have even sampled wastewater to identify drug-use patterns in cities, Henderson said.

“Police departments in bigger cities are using chemical tracking for illegal drugs to track down in which neighborhoods they are more

prolific,” Henderson said.

Drugs might have a life beyond the flush. Improving wastewater treatment will be a slow process, Meador said, but he’d like to see it happen.

“We are trying to help the ecosystem and keep things as pristine as possible,” he said. 

ALEXA EDDY is a senior studying communications and public relations. She is dedicated to sustainable living and works in nonprofit fundraising. She is passionate about linking people who care to causes that matter.

KATY COSSETTE is a junior studying visual journalism. She is interested in going beyond the standard coverage of human issues in the media.

ABOVE: Biologist Jim Meador discovered an array of drugs in the Puget Sound near wastewater outputs. Meador calculated around 4.6 kilograms of metformin, a diabetes medicine, came out of the wastewater plant in Tacoma on the day he took his samples. Photo Illustration.

LEFT: Wastewater is 95 percent pure when it goes from Post Point Wastewater Treatment Plant into Bellingham Bay.



BUILT TO BREAK

STORY BY RACHEL HUNTER
PHOTOS BY KATY COSSETTE

Drop, cover and hold — this is still the standard practice during an earthquake. Possibly the most important part of this instruction is to cover. Cover yourself from things that might be falling: picture frames, bookshelves or maybe even the ceiling and walls around you.



People cross the street in front of a masonry building in Fairhaven, Washington.

IN 2010, the Federal Emergency Management Agency assessed Bellingham, Washington for its earthquake building safety. Bellingham was ranked high risk, scoring a D on a scale from A to F. Many of the riskiest buildings surround shoppers who line the inside of historic shops and walk the cobblestone streets of the Fairhaven neighborhood.

A magnitude 9.0 earthquake, caused by a break of the Cascadia subduction zone where two tectonic plates meet off the Washington coast, would devastate parts of the Pacific Northwest, said Rebekah Paci-Green, director of the Resilience Institute at Western Washington University.

"The big one' could happen next Tuesday, or it could happen in 500 years," said Jackie Caplan-Auerbach, an associate professor of geology at Western Washington University. "Both would be in the realm of fairly normal."

Unreinforced masonry buildings would be the most dangerous structures in Bellingham during an earthquake, Paci-Green said. These buildings, built with brick or stone, could crumble off their frames.

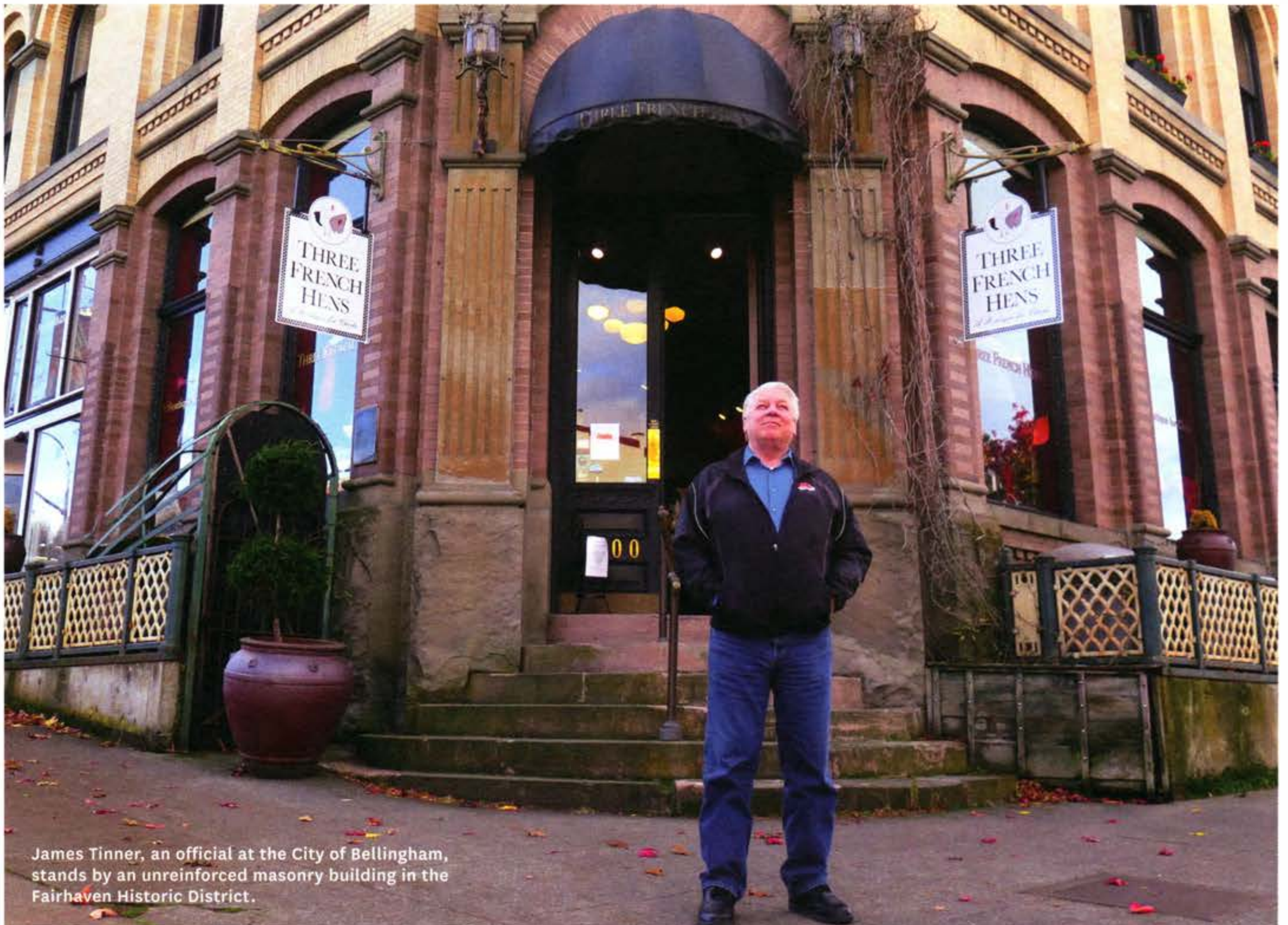
Whatcom County didn't adopt seismic building codes until the mid-1970s, Paci-Green said. Builders didn't fully understand earthquakes and structural design until the early 2000s. Many Bellingham buildings were built before these codes existed, and few have been retrofitted since their initial construction, she said.

"Earthquakes don't kill people," Caplan-Auerbach said. "Nobody dies from shaking to death. People die because buildings fall."

Unless the building was built or retrofitted in the last 25 years, people living or working in any brick building in the small commercial center of Fairhaven, are at risk, said James Tinner, a building official in the Department of Planning and Development for the city of Bellingham. Nearly all of downtown and Fairhaven are lined with unreinforced masonry buildings.

**"EARTHQUAKES
DON'T KILL PEOPLE,
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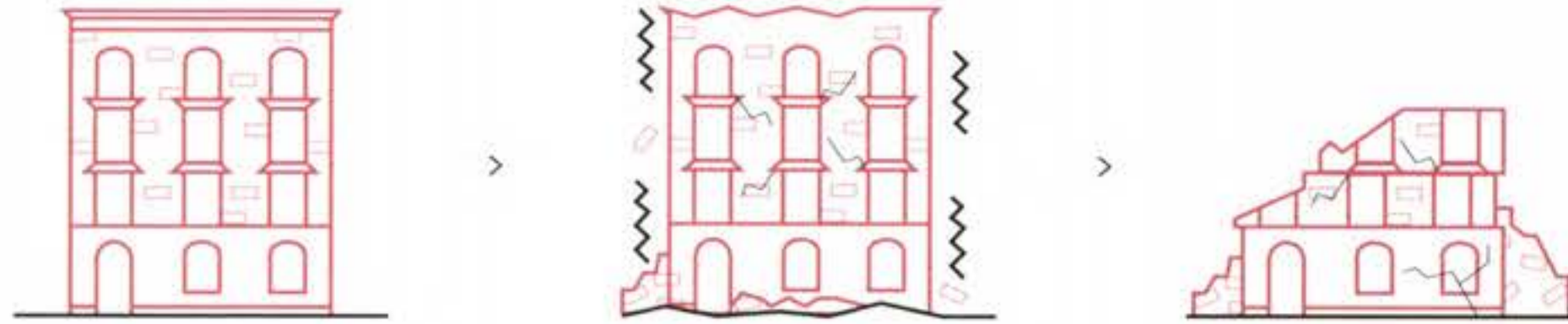
- JACKIE CALPLAN-AUERBACH
ASSOCIATE PROFESSOR OF GEOLOGY,
WESTERN WASHINGTON UNIVERSITY



James Tinner, an official at the City of Bellingham, stands by an unreinforced masonry building in the Fairhaven Historic District.

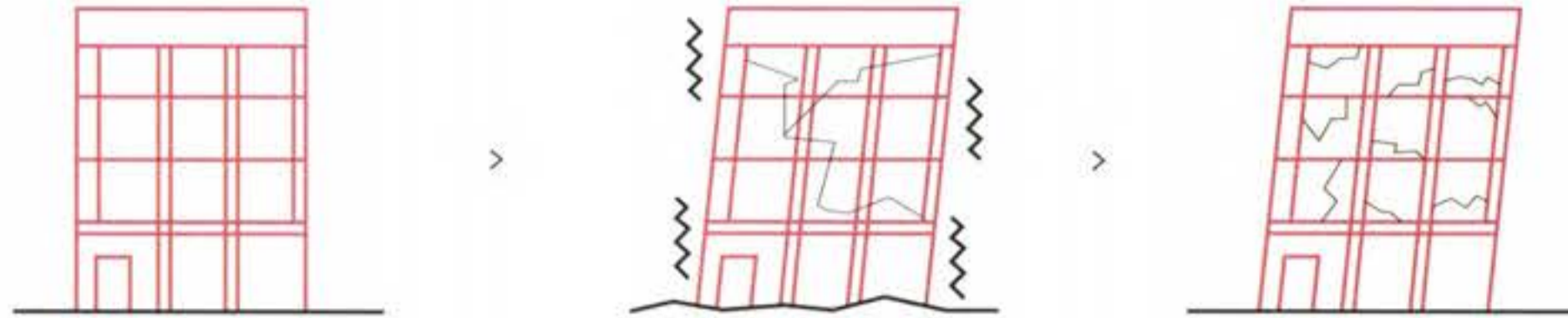
BRICK BUILDINGS

During an earthquake, the bonding substance between bricks isn't enough to hold them together, resulting in bricks shaking apart.



STEEL BUILDINGS

Steel buildings might bend during a large earthquake and not return to their original forms, resulting in a slightly bent structure seen mainly at the joints of the building.



WOOD BUILDINGS

Wood buildings can sometimes bend during an earthquake and then return to their original form once the movement is over.



Source: James Tinner, building official for the city of Bellingham Department of Planning and Development.

Imagine a stack of rocks, one on top of the other, all stuck together by a sticky substance called mortar. There's nothing but mortar to keep these rocks held together. In a big shake, like an earthquake, they will literally shake apart, Tinner said.

The old bank in the center of Fairhaven, now home to the boutique Three French Hens, was built in 1900. This building is a perfect example of an at-risk unreinforced masonry building, Tinner said. In a magnitude 9.0 earthquake, these buildings would collapse, he said.

Owners can retrofit a building, but it can be costly and must be planned far in advance, Caplan-Auerbach said.

Picture a shoe box with no lid. If you push in two opposing corners, it's flimsy and will begin to cave in, Tinner said. Now put the lid on the shoe box and push in on the corners. The lid, connected to the rest of the box, reinforces it, and the sides no longer cave in. Connecting the roof and floors to the walls can help ensure a building's survival and safety during an earthquake, he said.

In 2015, Western started renovating Carver Gymnasium. Seismic retrofitting is a major part of the renovation, Paci-Green said. Part of this process is connecting the floors, walls and ceiling together. On the east

side of the building are two red diagonal steel beams for seismic support, Paci-Green said.

Unreinforced masonry is the most dangerous type of building, but it's not necessarily the materials that pose risks; it's how they're put together, Paci-Green said. Brick, a very brittle material, is not the best to withstand an earthquake. But if it's reinforced with steel or retrofitted, brick would hold up better.

In 2010, the National Hazards Earthquake Reduction Program published a formula to calculate the earthquake risk of every city in the United States. The assessment assigned each city a grade based on an equation looking at the safety of its buildings given the possible intensity of ground shaking, the city's location and population. This assessment gave Bellingham a D grade.

Other states, like California, have stricter seismic codes for homes, offices and schools, Tinner said. If a picture or wall decoration is heavier than about two kilograms, it has to be bolted to the walls. If a hanging

BELOW: Burnt clay bricks are the most common and among the most risky building materials for earthquake safety, Tinner said.



plant is connected to the ceiling, it has to be attached with two closed-eye hooks, according to a California schools earthquake guide. Washington does not have any of these strict codes, Tinner said.

The best thing people can do to prepare for an earthquake is to act as though it would happen tomorrow, Caplan-Auerbach said. It's important for building owners to find out if their structures are seismically sound, she said.

Phyllis McKee does not worry much about 'the big one.' McKee owns both buildings in Finnegan's Alley in Fairhaven. One was built in 2001, and the other was built over 90 years ago, she said. The newer building is up to date with seismic codes and the other was inspected and has no problems, McKee said.

Communities and individuals who assess their risks and make response plans are less likely to be impacted by casualties and damage, according to an earthquake risk assessment by FEMA.

"We need to recognize that this earthquake is going to happen, and that life will be better the better prepared we are," Caplan-Auerbach said.

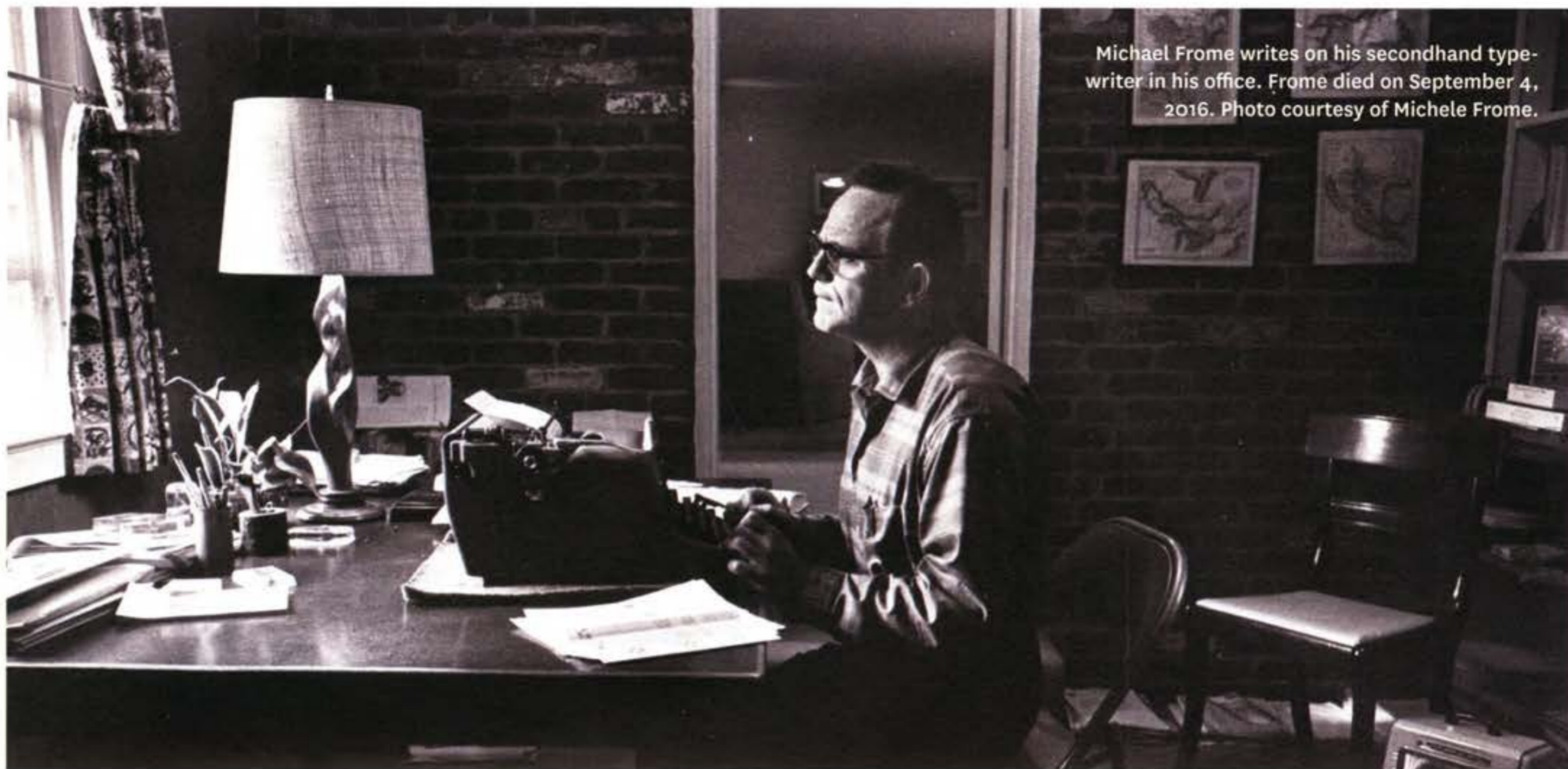


RACHEL HUNTER is a senior studying public relations and Spanish. She hopes to begin a career in community outreach with a professional sports organization.

KATY COSSETTE is a junior studying visual journalism. She is interested in going beyond the standard coverage of human issues in the media.

BELOW: Parapets — decorations along the edge of a building — can fall apart during an earthquake.





Michael Frome writes on his secondhand typewriter in his office. Frome died on September 4, 2016. Photo courtesy of Michele Frome.

REMEMBERING A PLANET PIONEER

STORY BY JESSE NICHOLS

Two years ago, I worked my first quarter with *The Planet*, as a videographer. The magazine was celebrating its 35th anniversary, and my editor assigned me to chronicle its history. I sifted through piles of old issues. I spoke with students and faculty advisers spanning decades. Throughout my reporting, one name kept coming up: Michael Frome.

Frome was an environmental journalist who served as *The Planet's* faculty adviser from 1988 to 1995. He was 5 feet 7 inches tall, and often sported a mustache and large sunglasses. People who knew him described him as passionate, brutally honest and unafraid to defend the things he treasured.

Frome was born in New York City in 1920. As a teenager during the Depression, he was a labor union activist with the Young Communist League in New York City. As a young man, he flew as a navigation pilot for the U.S. Army Air Corps in World War II. After the war, he became a member of Veterans for Peace. He started his writing career as a reporter at the *Washington Post* in 1945, following in the footsteps of his hero, the early 20th-century muckraking journalist Lincoln Steffens.

Frome started writing about the environment as a freelancer in the early 1960s. He had traveled the national parks in the 1950s, as a public relations worker for the American Automobile Association, and saw stories he wasn't seeing in the news. He was an environmental journalist at the forefront of the environmental movement, and he saw an opportunity for a new kind of journalism.

"He was a journalist that doesn't fit in with modern journalistic principles," his daughter, Michele Frome, said. "He did not believe in objectivity. He felt that a journalist should be subjective. A journalist should be fighting for and against things."

Michael embraced opinion and point of view. He felt the environment was too precious for objectivity. His writing was well-researched, poetic and full of unapologetic activism. It even lost him jobs at times, but he took pride in his martyrdom.

"I was introduced once," he told me in a phone call in 2015. "He said, 'Here's Mike Frome, he's been fired from every job he ever had.' And everybody cheered."

Frome came to Huxley College at Western Washington University

in 1987 to be what he described as the "environmental journalist-in-residence." He taught environmental journalism and advised *The Planet*, a scrappy eight-year-old student publication at the time.

Frome had high expectations for his students. He was blunt and critical of sloppy writing. Students would often walk out of his office in shock after he critiqued their drafts, several former students told me. But beyond harsh critiques, Frome was a role model, and often stayed in touch with students as a mentor and friend long after they graduated.

Frome believed in his writing style. But more than that, he respected tenacious writing, objective or not. He resented journalism that printed claims as fact or equated truth with falsehood in the name of balance. He valued research and discovery.

The Planet today is different than it was under Frome's leadership. We choose to strive for impartiality and fairness. But we also strive for tenacity, investigation and discovery. We try our best to not let objectivity become tepid journalism.

Frome published 12 books in his lifetime, and was always working on another. In the last two years of his life, his vision declined to the point where he couldn't read the computer screen. He would dictate his emails, books and monthly newsletters to his daughter, Michele.

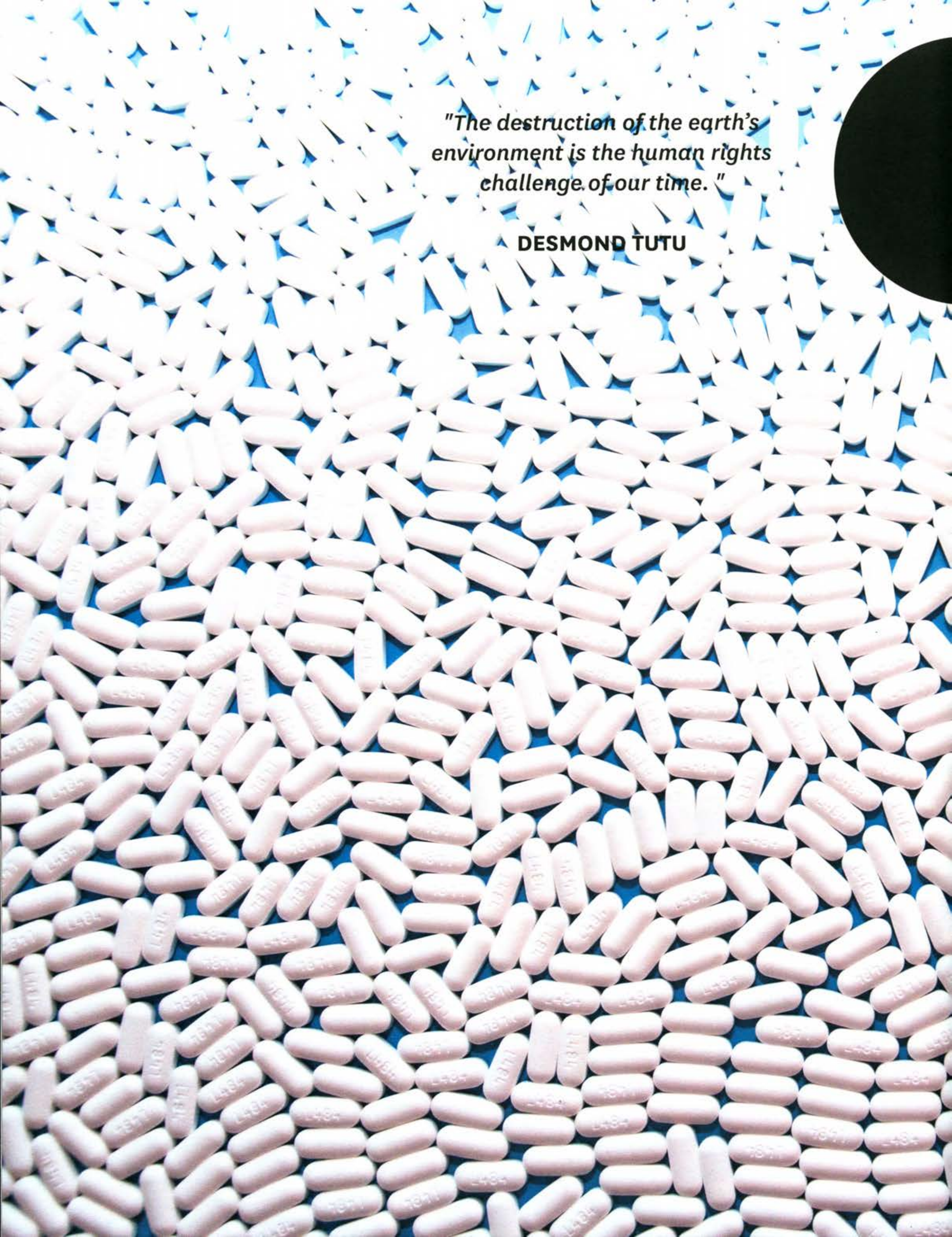
"He was constitutionally incapable of not writing," Michele Frome said. "I can't tell you how many times he said, 'This will be my last book,' and it never was."

In his 96 years of life, Frome witnessed nearly a century of environmental change. He felt discouraged that environmental progress had slowed its pace from the '60s, '70s and '80s. He didn't like it. So he made a decision to focus his writing on people doing good, no matter how small their victories.

Frome underscored his outlook with a coda he'd say at the end of every conversation: "Be of good cheer, the best is yet to come." He ended our phone call with that in 2015.

Thank you, Michael, for your service to *The Planet* and your lifetime of contribution to environmental journalism.

Be of good cheer.



*"The destruction of the earth's
environment is the human rights
challenge of our time."*

DESMOND TUTU