Spring 2015

The Planet, 2015, Spring

Beth Carlson  
*Western Washington University*

Huxley College of the Environment, Western Washington University

Follow this and additional works at: [https://cedar.wwu.edu/planet](https://cedar.wwu.edu/planet)

Part of the [Environmental Sciences Commons](https://cedar.wwu.edu/planet/69), [Higher Education Commons](https://cedar.wwu.edu/planet/69), and the [Journalism Studies Commons](https://cedar.wwu.edu/planet/69)

Recommended Citation

[https://cedar.wwu.edu/planet/69](https://cedar.wwu.edu/planet/69)

This Book is brought to you for free and open access by the Western Student Publications at Western CEDAR. It has been accepted for inclusion in The Planet by an authorized administrator of Western CEDAR. For more information, please contact westerncedar@wwu.edu.
DEAR READER,

Land to protect extends far beyond remote mountaintops, melting arctic ice caps and delicate wetlands. The environment, and problems with it, exist everywhere — on our farms, in our cities, in our schools, in our homes.

Between 1980 and 2013, emissions of the six most common air pollutants dropped by 62 percent. However, environmental problems persist, and they disproportionately affect marginalized communities — the driving idea behind the environmental justice movement. This movement was catalyzed in black churches of the southern United States in the ’80s. In 1987, a seminal report found race was a better indicator of hazardous waste facility locations than any other variable, including household income and real estate values.

On February 11, 1994, President Bill Clinton signed an executive order directing federal agencies to address environmental hazards that affect low-income communities or people of color. This was the first ever presidential action regarding environmental justice.

As directed, federal agencies implemented environmental justice programs, but they have yet to provide much help. Racial disparities in the distribution of toxic waste are worse today than they were in 1987. People of color comprise more than half of the American population living within 3 kilometers of a commercial hazardous waste site, according to a 2007 article. To learn more about this study, and one of its authors, see page 36.

In this issue, The Planet set out to explore the expansive intersection of the environment and society. We found an intricate, tangled web stretching from contaminated Lummi Nation shellfish beds in Portage Bay and an oil and gas pipeline resistance camp in northern British Columbia, to a dumping ground for defunct electronics near the coast of Ghana.

The Earth’s resources are the basis of our livelihoods. Human society is bound to even the most remote mountaintops and delicate wetlands. In our complex world, environmental problems and social disparities are one and the same.

Embrace complexity,

Beth Carlson
Editor-in-Chief

THE PLANET MAGAZINE is the quarterly student publication of Western Washington University’s Huxley College of the Environment. We are dedicated to environmental advocacy through responsible journalism.

This issue of The Planet is printed on Mohawk Via uncoated bright white paper. It is made from 30% recycled content. Mohawk is a certified Women Owned Business Enterprise and is the first U.S. paper mill to offset 100% of its electricity with wind power renewable energy credits. It is also the first U.S. premium paper mill to shift toward carbon neutral production. Basically, they’re environmental superheroes. We are proud to support them.
IN THIS ISSUE

CULTURE ON THE COAST
by Anne Elliott
Renewed whaling request sparks debate among biologists, NOAA and Makah tribal members.

PATH OF RESISTANCE
by Michelle Dannehy
Something stands in the way of three proposed pipelines through the Wet'suwet'en territory: the Unis'tot'en resistance camp.

FAITH IN JUSTICE
by Sarah Sharp
The "father of environmental justice" describes the impact of the movement, as mission groups are asked to serve, not to save.

STORIES

06 TRACKING CONTAMINATION
by Emily Eckroth
The Lummi Nation closes its shellfish farms as common bacteria make their way into the Nooksack River.

09 RECLAIMING THE RIVER
by Celeste Lymn
A dwindling salmon population in the Nooksack River draws attention to water management issues and tribal treaty rights.

12 SURROUNDED BY INDUSTRY
by Nick Jenner
At the core of Seattle's industrial district, residents of Duwamish Valley breathe some of the city's most heavily contaminated air.

15 FOOD FOR TOTS
by Elise Dresel
The Puget Sound Food Hub, a network of 30 local farms, provides fresh produce to low-income preschools in King County.

23 DRILLING DILEMMA
by Jamin Eberharter
Seattle, Washington, becomes an Arctic oil drilling battleground as Foss Maritime holds permits to port oil rigs at Terminal 5.

26 THE BITTER TRUTH
by Emma Stratton
Farmworkers in Washington speak out about poor working conditions and pesticide use in agriculture.

29 MURKY WATER
by Claire Manning
Yakima Valley's high concentration of dairy farms and manure waste could be the source of contaminants in the area's drinking water.

32 ELECTRONIC WASTELAND
by Shauna Brennan
Near the coast of Ghana lies a dumping ground where unprotected workers pull apart electronic waste — posing risks to both the workers and their surroundings.

ON THE COVER

The sun was setting and I hadn't felt the rush of getting "the shot" of the day. Suddenly, a perfect light glinted from the windows of downtown, in stark contrast to the industry all around me. A group of men were chatting and laughing amongst themselves, waiting for fish deemed too contaminated for human consumption to bite at their lines. And there it was, the shot: the juxtaposition of the Emerald City wrung clean of its industry steeped in the fish and banks of the Duwamish.

- Mallorie Estenson
Research biologist Jonathan Scordino remembers driving to Neah Bay at 3 a.m., May 1999 to witness members of the Makah tribe hunting a gray whale. By the time Scordino arrived, whalers were already on the water, as were animal rights activists.
"IT WAS WINDY and rough," said Glenn Johnson of the tribe, who was in the hunters' canoe, Hummingbird.

According to Scordino, protesters circled around Hummingbird in motorized boats and shouted obscenities.

"Don't say anything, control your excitement. Let's go get this whale," Johnson told fellow whalers.

"The way those guys were antagonizing everybody, it was amazing watching the Makah as an outsider," Scordino said. "They didn't retaliate."

Once the whale had been harpooned, it was dead in 8 minutes. Johnson said it was a record kill. Makah canoes pulled the whale to shore where community members had gathered. After two trucks failed at towing the whale onto the beach, tribe members offered a collective hand.

"They put eight lines on it. There had to be 200 heads. It was like waves," Scordino said. "Everybody heaved together and there was just this energy. It was the entire Makah community and everyone was excited."

The 1999 hunt was the tribe's first in more than 70 years.

Barring one illegal hunt in 2007, no whale hunts have occurred since 1999. The Marine Mammal Protection Act banned hunting marine mammals in U.S. waters in 1972. The Makah council submitted a formal request to continue whaling in 2005. Ten years later, the tribe's request remains unanswered.

Keith Johnson, president of the Makah Whaling Commission, said the five Makah men who committed the 2007 illegal hunt believed that their treaty rights trumped the MMPA.

In 1970, heavy wind and rain uncovered hundreds of tribal artifacts that had been buried 500 years earlier, Scordino said. These artifacts revealed an emphasis on spiritual whaling in early Makah culture, which renewed the tribe's interest in the tradition.

"This was an era of Native American revival, of it being a proud heritage instead of one that was scorned," Scordino said.

Cultural whaling practices have been passed down in his family for many generations, Johnson said.

"One cold, icy, wintry morning at 6 a.m., I was out there digging up the next medicines to be used in the initiation process, which were nettles," Johnson said. "And our uncle, he says, 'This is what is going to prepare you for life and anything that is going to come your way. If you get knocked out of the canoe, the stinging nettles will give you strength to get back in.'"

Johnson was initiated to become a whaler when he was 6 months old.

Some see culture as an invalid justification for the proposed hunt. Catherine Pruett of Sea Shepherd Legal said it is neither the time nor place to continue whaling, and that other tribal nations understand that.

At an environmental impact meeting on April 27, Pruett quoted the First Nations Environmental Network's statement that said, "Not all indigenous people support Makah whaling. While we respect treaty rights, this is a political reason being used for killing and not a true meaning of need and subsistence when it comes to taking another being's life."

Johnson said that animal rights have swayed politicians to outwardly oppose the tribe's whaling proposal, despite the fact that the Makah may need the hunt to keep their culture alive.

"Anti-whalers control votes. Never mind our treaty right. Never mind the fact that you're looking at an endangered species right now," Johnson said.

In 1982, the International Whaling Commission put a pause on commercial whaling. The Eastern North Pacific gray whales recovered and were removed from the Federal List of Endangered Wildlife in 1994.
Makah Chairman Ben Johnson Jr. submitted the tribe’s waiver request in 2005. The request sought a waiver that would allow them to take up to 20 gray whales in any five-year period, subject to a maximum of five gray whales in any calendar year.

Johnson said that if this proposal passed, every hunt would be based on need. “We want people to know that we are prayerful and respectful of the whale, and it’s a food source,” Johnson said. “A lot of our people here are unemployed and would love to have meat on the table that wouldn’t cost them anything other than to go down and grab it and bring it home.”

A new concern with whaling is that certain populations of gray whales are too small to sustain a hunt. Compared to the Eastern North Pacific population of 20,000, the Western North Pacific whales are estimated at 130, and the Pacific Coast Feeding Aggregation are around 190, according to D.J. Schubert, a wildlife biologist.

Gray whales can only birth one offspring at a time and the smaller populations are still threatened, said Naomi Rose, a marine mammal scientist.

“They’ve probably recovered to the point where they are no longer endangered. Should they have been taken completely off the list? Probably not,” Rose said. “Quite frankly, every gray whale population is threatened at this point.”

Since recovering from endangered status, ocean damage and climate change now threaten the gray whales. Adding hunts to the list could disrupt their evolutionary recovery, Rose said.

Like any animal, gray whales fill a unique ecological function. They skim the sea floor when they feed, lifting up sediments that sift through their bristly mouth, leaving a cleaner environment for bottom dwellers, Schubert said.

“If we lose the Pacific Coast Feeding Aggregation, I don’t think anyone’s really contemplated how that could change the ecology of where they live,” he said.

At the environmental impact meeting on April 27, NOAA reviewed six alternatives listed on the current draft environmental impact statement. One is a no-action alternative, which would deny the Makah their request to whale.

At the meeting, Morgan Bloomer from the Chippewa Nation defended the Makah’s treaty rights of “taking fish and of whaling or sealing at usual and accustomed grounds.”

“They have made their treaty, and their treaty comes before your constitution,” Bloomer said. “Before, not after.”

Will Anderson of Green Vegans also attended the meeting. He said that treaties should adapt as culture does.

“The treaty was written in an ecosystem that no longer exists, both ecologically and socially,” Anderson said. “The primary purpose of a culture, above all else, is to adapt to ecosystems.”

One alternative would require close communication between whalers and biologists who could identify the whales.
"With that, the hunt would become more scientific," Johnson said. "Not a spiritual hunt."

The comment period for NOAA's drafted impact statement ends June 11, after which an extension period will be considered if a decision cannot be reached.

If an alternative allowing the hunt is selected, an administrative judge would consider it during a formal, on-the-record hearing.

"We just want to tell our side of the story and let people know that we respect those individuals who want to change our beliefs and want to change us again and again and again. We still listen to them," Johnson said.

Johnson thinks the tribe could be whaling within the next ten years and believes that it would have serious positive impacts for the tribe.

"Whalers have a way of life that we want to bring to the little ones," Johnson said. "Straight and narrow, in the canoe, living the life of a whaler."

Because whalers are drug tested, Johnson said it has the potential to keep young people in the tribe off drugs.

"This is our legacy," Johnson said. "You see it here. This is a living culture."

PROPOSED GRAY WHALE HUNTING TERRITORY

In 2005, the Makah Tribal Council submitted a formal request for a NOAA whaling permit. If accepted, the permit would allow Makah whalers to hunt a maximum of 20 gray whales in a five-year period. According to the request, hunting would occur in a section of the Pacific Ocean marked in red on the map below.


ANNE ELLIOTT is a writer who is enthusiastically studying public relations and environmental studies at Western Washington University. She hopes to make an impact through her writing, whether on an artistic or informative front.

KEELY KILLBREW is a junior pursuing a degree in visual journalism. She is an enthusiastic outdoor adventurer and hopes to one day help save the world by telling stories.

In the kelp beds off Baada Point in Neah Bay, a gray whale searches through the sea plants to find its primary source of food: amphipods. The Environmental Impact Statement, now open for public comment, describes smaller groups of whales that could be adversely affected if one of their members were killed.
Flowing down the Nooksack River into Portage Bay, fecal coliform, a bacteria commonly found in human and animal feces, contaminates the shellfish beds of the Lummi Nation. The bacteria’s presence in Portage Bay prompted the tribe to partially close down their shellfish operation — a centerpiece of Lummi culture and economy.

The Lummi Nation depends upon the Nooksack to support their way of life, as do local farmers. While the source of the fecal coliform is unclear, the lives attached to this waterway could be permanently changed if the sources are not repaired.

Shellfish, such as oysters, clams and mussels, feed by filtering the water around them, said Jean Snyder, shellfish restoration program lead for the Washington State Department of Health. An oyster can filter at least 25 gallons of seawater a day, Snyder said.

"Because they filter so much water, they are very sensitive to water pollution and accumulate bacteria and toxins in their bodies," she said in an email.

According to the Environmental Protection Agency, coliform bacteria generally do not pose a danger to people or animals. However, they indicate the presence of other bacteria and viruses that can cause typhoid, dysentery, hepatitis A and cholera.

In January 2015, one testing site indicated a 120-fold increase in fecal coliform in just one month, according to Shellfish Bacteriological Water Quality Surveys by the Department of Health. The extreme change led the Department of Health and the Lummi Nation to conditionally close roughly 40 percent of Portage Bay to shellfishing.

People of Lummi Nation rely on shellfish beds in Portage Bay, downstream of the Nooksack River, to feed themselves and others.

“Our community relies on the opportunity to harvest seafood both for commercial and subsistence purposes,” said Timothy Ballew II, owner of Rich Appel Farms in Ferndale, Washington, is pumped into ponds and stored over the fall and winter to be used as fertilizer on agricultural fields in the spring and summer. Owner Rich Appel tests soil quality to ensure excess manure does not contaminate waterways.
Lummi Nation chairman, in a press release. “When that opportunity is taken away, our community suffers.”

Upriver, dairy farmers rely on their cows and the land.

Dairy farmer Rich Appel of Appel Farms on the Nooksack River manages waste produced by more than 900 cows with two lagoons, each holding 3.5 million gallons of manure.

Appel recycles his cows’ manure, a natural fertilizer, by spreading it on pastures and corn fields. He tests the soil quality and crop nutrients to ensure excess manure does not contaminate waterways when spring comes.

He said he is proud of his farm’s incident-free record and encourages regular water quality testing and inspections.

In an attempt to reduce fecal coliform levels, many Washington state agencies — including Whatcom County Public Works, Department of Ecology, Department of Health and Department of Agriculture — are teaming up to combat this issue by increasing water quality monitoring.

“The monitoring tells us where we need to go to find the problems. We use that to dial in on where the sources are,” said Doug Allen, manager of the Department of Ecology Bellingham field office.

Once high-risk sites are identified, Ecology works with the farm or landowners to provide technical and financial support to remedy the issues.

However, dairy farms aren’t the only source of fecal coliform.

Ginny Prest is the manager of the Dairy Nutrient Management Plan with the Washington State Department of Agriculture.

“All of the other livestock operations, whether they’re a confined operation or not, do not have that regulatory oversight in the same context that dairies do,” Prest said. “There is no actual legal requirement for the other livestock operations [to develop a plan].”

The Department of Agriculture regulates dairies, while Ecology regulates other types of livestock operations, Prest said.

Land in the upper Nooksack River is also being developed for agricultural and residential purposes. Where there are people, there are septic systems — 13,000 of them that could all contaminate the river with fecal coliform, Snyder said.

The wastewater treatment plants for the cities of Everson, Lynden and Ferndale dump treated wastewater into the Nooksack River.

Recent non-dairy agricultural expansion may be a contributing factor as well.

“Not all the sources of fecal coliform are ‘fecal’ in origin. Fresh sawdust, for instance, can have high levels of fecal coliform,” said Michael
Isensee, an inspector with the Dairy Nutrient Management Program. "There are a lot of potential sources when testing for fecal coliform because it’s actually an indicator test — it’s not a test for any particular bacteria."

Runoff from berry farms could be adding to bacteria levels. However, the bacteria may not indicate the presence of other potentially harmful diseases.

Besides domestic sources of contamination, runoff from Canada may also contribute to the contamination of Whatcom County’s waterways.

Over 10 different tributaries flow into Whatcom County from Canada. Double Ditch, a relatively small waterway near Lynden, Washington flowing from Canada, had some of the highest fecal coliform levels of 10 sites documented in the last three years, Isensee said.

Fecal coliform from Double Ditch impacted the entire 40 kilometers of water flowing to Portage Bay, Isensee said.

The agricultural community, the Lummi Nation and local, state and federal agencies collaborated on finding and correcting pollution problems that caused a 1996 to 2006 closure of Portage Bay shellfish beds, said Merle Jefferson, the executive director of the Lummi Natural Resources Department. He has worked with the agency for more than 30 years.

“I remember when the Portage Bay shellfish beds were re-opened in 2006 with great fanfare. Unfortunately, community members have not maintained their efforts,” Jefferson said in a press release.

As a result, tribal members who did not pollute the water nevertheless have to suffer the consequences of actions or inactions of upstream neighbors, Jefferson said.

"It’s like the fox watching the hen," he said. "They monitor themselves."

The upward trend in the presence of fecal coliform bacteria is only projected to increase.

Appel recognizes this trend and looks to the community for help.

"We would love it to be a simple question and answer," Appel said, "but a lot of the time with our environment, it’s a bit more complicated than that."

EMILY ECKROTH is an environmental studies major at Western Washington University. She’s an avid fly fisher and rescue diver, and spends her free time reading or being near the water.

KATE WELCH is a sophomore at Western Washington University who enjoys photography, making maps and urban planning.

ABOVE: The Lummi Nation shellfish hatchery seeds numerous areas on the tidal flats surrounding the Lummi peninsula with geoducks, oysters and manila clams. Hundreds of Lummi people harvest them to sell and feed their families each year.
In a time beyond memory, fish were so plentiful that the tribes of the Pacific Northwest were said to walk the rivers on the backs of salmon. Now a tap drips in suburbia while a salmon gasps in a diminished river bed. Just like the fish, the tribes have little water, when they once had much more.
IN 2011, THE Nooksack Tribe and Lummi Nation sought federal government involvement in negotiations of their rights to the Nooksack River. A Department of the Interior decision would not only help protect and restore the water tribes are entitled to, but recognize poor water management by Washington state, which has restricted water flow and depleted the salmon populations on which the tribes depend.

According to the National Oceanic and Atmospheric Administration, river flow supports shelter, entry points to and from the sea and gravel runs where salmon reproduce. Adequate flow also minimizes strandings and high temperatures in the river.

"We've got a perfect storm of negative impacts to salmon," Boggs said.

The Nooksack River runs through the Lummi and Nooksack reservations. As part of the Point Elliott Treaty, reservations should be a practical and permanent homeland that supports healthy salmon populations for the tribes to utilize, according to Jeremy Freimund, water resource manager for Lummi Natural Resources.

Salmon stocks are at 8 percent of historical levels, said Oliver Grah, Nooksack Tribe water resource manager.

Salmon not only support the economy of these tribal nations, but also ensure the continuance of their culture, Grah said.

"We have some fishermen here who love to fish. They just like salmon fishing, it's in their blood," MacWilliams said.

According to the 2011 Treaty Rights at Risk initiative, tribes feel let down by the federal government. They do not believe the government is doing all it can to protect treaty resources. Poor policy, misused regulation and lack of cooperation is to blame, according to the initiative.

"There are enough regulations on the books. They are simply not enforced," said Gary MacWilliams, Nooksack tribal member and resource manager. "They look the other way."

Eric Hirst is on the Board for Resources for Sustainable Communities and part of the local project Water-Work. A large amount of water usage in Whatcom County is illegal, Hirst said.

"I don't think it's good for society for everybody to know that there is a state law on the books and there is a large segment of society that is not following the law," Hirst said. "Either we need to change the law or enforce the law."

Agriculture is the biggest user of water, Hirst said. The city of Lynden is also overdrawing in the county, although they are not permitted to, he said.

According to the Department of Ecology, irrigation, power generation, livestock watering, crop support and well sites are some water uses pulled from the Nooksack River.

Rich Appel is the co-owner of Appel Farms. His farm holds a permit to draw water from the Nooksack River for irrigation. However, it is very difficult for other farm owners in the area to obtain a new permit in order to use water legally, he said.

When the state allows illegal withdrawals, it reduces the Nooksack River flow, said George Boggs, executive director of the Whatcom Conservation District.

PREVIOUS PAGE: The North Fork Nooksack River flows along fields of grazing cows. With low riverbanks, agricultural production and livestock can further deplete the quantity of water in the Nooksack, says Eric Hirst, a member of the Board for Resources for Sustainable Communities. A large number of farmers in Whatcom County violate their water-use permits, Hirst says.

RIGHT: According to National Oceanic and Atmospheric Administration, water storage, withdrawal and use for agricultural purposes are impacting salmon in the Nooksack River. Erosion and sediment increases result in loss of gravel necessary for salmon habitat. Between 80 to 90 percent of historic stream bank habitat has been destroyed.

BOTTOM RIGHT: The Visitor's Center in the Kendall Creek Hatchery exhibits life stages of Coho salmon. According to the National Oceanic and Atmospheric Administration, flow interference disrupts gravel runs where salmon reproduce. Salmon support the economy of tribal nations and ensure cultural continuance, says Oliver Grah, the Nooksack tribe water resource manager.

DAY 20 DAYS 40 DAYS 55 DAYS 70 DAYS
DEVELOPMENT OF CORD SALMON EGGS ---- WASHINGTON DEPARTMENT OF
Deforestation, population growth, minimized water storage in glaciers and increasing temperatures due to climate change combine with illegal withdrawals to reduce the quantity of water in the Nooksack, Boggs said.

In the 1908 case Winters v. United States, the U.S. Supreme Court acknowledged tribes' primary water rights as part of the Point Elliott Treaty, Grab said.

According to Freimund, water rights in Washington state are decided by the Prior Appropriation Doctrine, which means that water rights are given on a first come, first serve basis. However, the exact amounts of water that belonged to the tribes were not guaranteed.

"The tribes believe that they have senior water rights to everyone else, and that very well may be. The issue in most areas of the state, and here as well, is that it's never been quantified, so we don't know what their water rights are," said Doug Allen, manager of the Bellingham field office for the Department of Ecology.

According to Freimund, in 2011, both the Lummi Nation and Nooksack Tribe sent a request to the United States government asking them to file a lawsuit to quantify their water rights to protect salmon populations. No response has been made at this time.

According to the Department of the Interior, solving tribal water rights is part of its mission to prioritize resolving environmental American Indian affairs.

According to Freimund, the Nooksack Tribe and Lummi Nation have been trying to negotiate their water rights with Washington State since 1995. In 1999, the negotiations broke down when non-tribal negotiators stated that a trial was necessary to resolve the disagreement. The lawsuit was resolved in 2009, but only quantified water rights for the Lummi Peninsula. The rest of the water in the Nooksack and Lummi reservations, such as the Nooksack River, is still unquantified.

"The federal government has an obligation to follow through with the terms of the treaty: to be the tribe's trustees and protect the tribe," said Grab. "That's all in exchange for allowing Europeans to come and live here. The federal government never allowed local and state governments to own the resources."

A decision from the federal government could take years, Hirst said.

"I might well be dead before anything's done," he said.

CELESTE LYMN is an Australian exchange student at Western Washington University, majoring in conservation biology. Her interests include exploring new places and cultures, sustainable living and human rights.

KEELY KILLEBREW is a junior pursuing a degree in visual journalism. She is an enthusiastic outdoor adventurer and hopes to one day help save the world by telling stories.
In southern Seattle, past the skyscrapers of downtown, another picture exists: the polluted Duwamish River. People living in the Duwamish Valley have life expectancy rates 13 years shorter than in one of the city's most affluent neighborhoods.

THE DUWAMISH RIVER, named a federal Superfund site by the Environmental Protection Agency in 2001, runs straight through the core of Seattle's industrial district. For over a century, the river, also known as the Duwamish Waterway, has served as a corridor for the city's cargo ships and a dumping ground for its hazardous industrial chemicals. The surrounding area, the Duwamish Valley, is frequently trafficked by trucks, trains and planes.

Seattle's South Park, Georgetown and Beacon Hill neighborhoods, squeezed tight into the valley, all share a breathing zone with the city's industry. This breathing zone ranks highly in air pollution and lack of access to a healthy environment, according to the Duwamish Valley Cumulative Health Impacts Analysis, or CHIA, compiled by the University of Washington and the Duwamish River Cleanup Coalition.

Duwamish Valley's Georgetown neighborhood is surrounded on all sides by industrial traffic: bound by the Duwamish River and Interstate 5 on either side, trapped by railroads to the north and locked in by Boeing Field to the south. Meanwhile, industrial trucks regularly weave their way through the neighborhood's streets.

"We're just like a little island, and everything is just going on around us," said Kelly Welker, a resident of Georgetown.

Welker, a CT scan technician working for the Cancer Care Alliance, has been living in the Georgetown neighborhood for nine years with her husband and 6-year-old son. For the past two or three years, Welker said that she has experienced a harder time breathing.

"I feel like I need a running start just to take a breath," Welker said. Breathing became such an issue for Welker that last winter she decided to get a CT scan of her lungs. The scan results didn't indicate anything in particular, though her doctor advised her to use an inhaler and consider moving from the neighborhood.

"I can't just up and move," Welker said. "It's not economic for us right now. We don't have the ability to do that."

After witnessing other Georgetown residents and their children develop asthma, Welker worries her son will also acquire the respiratory illness. Duwamish Valley neighborhoods have the most childhood asthma hospitalizations in Seattle, according to CHIA.

In 2015, the Department of Civil and Environmental Engineering at Hayang University published a review of particulate matter health impacts. According to the review, particulate matter — small, inhalable particles released from the burning of wood and petrol fuels — can linger in the atmosphere long after being released. Inhalation of particulate matter is strongly correlated to chest discomfort, shortness of breath, coughing, heart disease, diabetes, hospitalizations, premature death and more.

Traffic is the main source of diesel particulate matter, which produces a finer particulate matter that lingers longer in the air and penetrates deeper into the lungs, according to the review. Each day, shipping trucks trace their way through Duwamish Valley neighborhoods, compounding their particulate matter with that of nearby trains, ships and airplanes.
James Rasmussen is the coordinator of the Duwamish River Cleanup Coalition and was born and raised in Beacon Hill. According to Rasmussen, some of the worst diesel emissions come on the days when companies are loading or unloading their container ships. Trucks drive through the neighborhoods to get to the port and sometimes even sit idle in the neighborhoods while waiting to unload freight.

According to Welker, Prologis, an industrial real estate developer, has filed plans to install a new 14-acre, two-story warehouse in Georgetown for trucks to load and unload freight. Welker said the two-story warehouse would be a terrifying addition to her neighborhood.

“I understand that this is the industrial area, but there are other industrial areas,” Welker said. “And if you have an industrial area that already has such a high count of diesel particulates — such a high amount of children with asthma or respiratory issues — couldn’t you spread that out a little bit?”

In February, Welker noticed a factory breaking down drywall across the street from her block. At night she saw giant floodlights illuminating thick dust clouds rising in the air. At first there was a neighborhood joke about the taste in the air, but months later no one thought it was funny, she said.

Around the same time that Welker noticed the factory, Megan Davis, a Georgetown resident for 15 years, noticed that her 8-year-old son was experiencing unusual congestion and sneezing.

According to Davis, her 4-year-old daughter has been to the emergency room multiple times for problems stemming from asthma. The neighborhood’s air quality certainly doesn’t help, Davis said. From the time when her daughter’s symptoms emerged, Davis said her family had been considering moving from the area.

Welker made a Facebook page for community members to voice their dust concerns.

Seattle holds city council meetings for citizens to voice concerns. According to Welker, many Georgetown residents affected by pollution sometimes have more than one job or have kids and don’t have time to attend city council meetings.

“Even if you email somebody, you know it’s probably not going to them — it’s going to whoever checks their email and determines that it’s important enough to look at that day,” Welker said. “I think we get disheartened because it’s been going on for so long.”

One of Welker’s neighbors has already moved because of his health issues and noticed he could breathe much better outside the area, Welker said.

Alberto Rodriguez, project manager for the Duwamish River Cleanup Coalition, works in the area but does not call it home. Rodriguez lives in an area just west of Laurelhurst, an affluent neighborhood where residents will live an average 13 years longer than those of the Duwamish Valley, according to CHIA.

The Duwamish Valley has more trucks, whereas the Laurelhurst area has more trees to filter the particulates in the air, Rodriguez said.

According to CHIA, a disparity in tree canopies exists between the Laurelhurst and University District zip code and that of Beacon Hill,
Over the course of the 20th century, the Duwamish River was straightened to make way for city development and industry. Industrialization dramatically reduced the volume of water flowing through the Duwamish River. Elimination of wetland habitats and pollution of air and water burdened ecosystem health. Residents in Duwamish neighborhoods closest to industrial traffic are experiencing health problems from breathing airborne pollution from industry and highways.

Map developed from burkemuseum.org/waterlines.

Georgetown and South Park. About 20 percent of the Laurelhurst and University District zip code is covered by tree canopy, compared to about 6 percent of canopy coverage in the Duwamish Valley.

Troy Abel, a Western Washington University professor, published research in the American Journal of Public Health examining unequal distribution of Seattle pollution.

Since 1990, the number of industrial sites in Seattle and the volume of toxins in the air have decreased, according to Abel’s study. However, Seattle’s toxic release sites are shown converging on the Duwamish Valley along with citizens of lower socioeconomic status as a result of gentrification.

Gentrification, as generally defined by Abel’s report, is the process by which citizens of higher socioeconomic status move into a neighborhood, raising its housing prices and forcing residents of lower socioeconomic status into more affordable, often more polluted neighborhoods.

Between 1990 and 2000, the Duwamish Valley neighborhoods’ population of people of color increased from 37.5 percent to 53.4 percent.

According to Abel’s study, Sound Propeller Services was responsible for 95 percent of Seattle’s air pollution production in 2007. The ship propeller company relocated out of the gentrifying Lake Union area and into the Duwamish Valley.

Since Abel’s study began in 1990, 14 new or relocated facilities moved nearby the Industrial District of South Seattle, whereas fewer facilities relocated to gentrifying areas such as Lake Union and downtown Seattle.

Even though individual decisions may have been rational, collective city permit decisions concentrated environmental injustices in South Seattle, Abel said.

The city works with the EPA and the Duwamish River Cleanup Coalition to clean the Duwamish Superfund site and its surrounding communities. However, the Duwamish Valley’s breathing zone remains saturated by industrial emissions.

To see multimedia coverage of this story, visit theplanetmagazine.net.

NICK JENNER is a visual journalism major who enjoys meeting new people, exploring foreign places, capturing photos, reading and taking long walks in the woods.

KRAMER JANDERS is a senior studying visual journalism and business at Western Washington University. After class, he enjoys taking photographs, cooking and the outdoors.
The classroom is buzzing with little voices. Three- and four-year-old hands grab at the fresh blueberries and egg sandwiches sitting on plates before them. At most, the breakfast they are eating has traveled 161 kilometers to reach them.

STORY ELISE DRESEL | PHOTOS KATY COSSETTE

THE PUGET SOUND Food Hub is a network of 30 small- to medium-sized farms operating co-operatively in the Puget Sound region. Like a park-and-ride, the Food Hub allows farmers to drop off food to be distributed in a single large delivery to grocery stores, hospitals and schools in the community. This reduces the amount of driving for farmers to transport food themselves. The Food Hub provides access to locally farmed food for 67 low-income preschools and daycares in King County.

The Food Hub started in 2009 as a weekly wholesale market in the parking lot of the Skagit Valley Food Co-op. It quickly became a food distributor spanning six Washington counties with three distribution centers called aggregation sites.

The sites are located in Skagit, Whatcom and King counties. Local farmers can drop off products to whichever location is closest to them. From there, the food is loaded into one of three trucks and transported throughout the Puget Sound region.

Buyers can order from 10 or 12 farms, write one check, make one credit card payment and have one delivery when they need it, said Robin Crowder, marketing and development director of the King County aggregation site 21 Acres.

"It makes the logistics so much easier for the farmers and the buyers," Crowder said.

The Community Day School Association is one of the Puget Sound Food Hub's buyers. The CDSA orders food from the Food Hub for six preschools in the Seattle area.

The CDSA received a grant from the Humanlinks Foundation to purchase from the Food Hub to broaden the preschools' food access and selection.
Cloud Mountain Farm in Everson, Washington is a nonprofit farm part of a thriving network of 30 local farms operating together in the Puget Sound Food Hub. The mission of the Puget Sound Food Hub is to market, aggregate, and distribute locally produced food from local farms to grocery stores, hospitals, restaurants, preschools and universities.

PREVIOUS PAGE: At Madrona Community Day School in Seattle, Washington, students are given breakfast and lunch provided by the Puget Sound Food Hub.

BOTTOM LEFT: Dave Publow, Food Hub coordinator at Cloud Mountain Farm in Everson, Washington, walks through cherry trees. Publow emphasizes the significance of the close relationship between farmer and buyer achieved through the Food Hub.

BOTTOM RIGHT: Erik Olson owns a first-generation farm, Well Fed Farms in Bow, Washington. He does most of the work himself, including watering small plants in his greenhouse.

The Food Hub delivers fresh fruit, vegetables, meat, dairy and eggs to preschools, Jennifer Cooper, operations business compliance manager for CDSA, said.

“It has filled this need that we have that we can’t necessarily meet from ordering just from Costco,” Cooper said.

The CDSA schools are Title One. This means they qualify for additional federal funding because they are low-performing or serve a disproportionate number of low-income families.

“We see a lot of children that come in with a bag of chips and a soda for lunch because that’s what some families can afford,” Cooper said.

Diverse, nutritious and local food is a part of the CDSA preschools’ daily routine.

“The Food Hub is helping us create healthy eating habits for children so they can have that later in life, so they can be prepared to learn in school. If you’re hungry you can’t do that. We’re nourishing the children on a fundamental level,” Cooper said.

Erik Olson, owner and operator of Well Fed Farms, sells through the Puget Sound Food Hub.

“Part of what I would like to do with my work is provide as much good food as possible to the people who it can do the most good for,” Olson said. “That includes marginalized groups of people.”

Unlike other distribution services, everything is source-identified and labeled by each different farm. The Puget Sound Food Hub never owns the food.
"The farm is responsible for quality. It's a real hybrid between going to a farmer's market and having a distributor. You are buying directly from a farm," said Harley Soltes, the owner of Bow Hill Blueberries, the Skagit Valley aggregation site.

The Puget Sound Food Hub coordinator of the Cloud Mountain Farm Center, Dave Publow, emphasized the importance of a close relationship between farmer and buyer.

"When someone is faceless, you can basically disregard them. It happens in all professions. And in this time of ours, you need to put a face on things. When you see that face and trust this person, you will be more likely to buy it and enjoy it," Publow said.

The Puget Sound Food Hub focuses on keeping food transportation to a minimum, keeping carbon emissions down.

Approximately 950 cases of asthma, 16,870 missed schools days, 43 hospital admissions and 37 premature deaths could be attributed to worsened air quality from food imports, according to freight transport projections by the California Air Resources Board.

"Carbon footprint on small farm deliveries can be pretty bad as we grow this local market. We are trying to mitigate climate change as much as possible because food distribution is a culprit," said Lucy Norris, former director of The Puget Sound Food Hub.

The importance of eating and buying local fuels the Puget Sound Food Hub.

"Some people think when they are buying local that also includes something from Yakima. I mean yeah, Yakima is better than Florida, but if you can have it all in this one area, that's even better," Publow said.

From the farm to the preschool breakfast table, the Puget Sound Food Hub is reaching consumers who are not only close by, but who need it most.

The assistant director of the CDSA's Madrona location, Meghann Kelly, works with and feeds the preschoolers everyday.

"Everything is interconnected for us with the students' learning," Kelly said. "This is where we should be doing the right thing. Not the easy or cheap thing, but what is best for them long term."

---

ABOVE LEFT: Two preschoolers at Madrona Community Day School in Seattle, Washington eat eggs and blueberries during the class breakfast. The Community Day School Association schools are Title One, meaning they are low-performing or serve a disproportionate number of low-income families.


ELISE DRESEL is a graduating senior pursuing a degree in creative writing and a minor in communications. She enjoys reading, traveling and spending time with friends.

KATY COSSETTE is a freshman intending to major in visual journalism. Her passion is capturing social issues through photography.
Nestled in the woods alongside the Wedzin Kwah, also known as the Morice River, lies a small cabin, bunkhouse, pithouse and garden. These structures make up the Unist'ot'en camp. Residents hunt and trap, collect drinking water directly from the river and live by their traditional laws and customs. While the Unist'ot'en camp is a home and way to reconnect with the land, it was also built for another purpose: to block pipelines.
THE WET’SUWET’EN TERRITORY in British Columbia, Canada is the site of three oil and gas pipeline projects. The Pacific Trails Pipeline and Coastal GasLink would carry liquefied natural gas from fracking fields through the traditional territory of the Unist’ot’en, one five clans of the Wet’suwet’en people. While some Wet’suwet’en First Nations have established partnerships with these companies to increase employment opportunities and provide job and skills training, other indigenous people have joined resistance efforts to prevent these projects.

THE UNIST’OT’EN RESISTANCE CAMP

Freda Huson, spokesperson for the Unist’ot’en clan, and Toghestiy, hereditary chief of the Likhts’amisyu clan, built the Unist’ot’en camp five years ago. Likhts’amisyu and Unist’ot’en are both clans of Wet’suwet’en people.

First and foremost, the Unist’ot’en camp is their home, Huson said. The camp has also become a place for healing, she said.

“We’re reclaiming who we are by reconnecting back to the land and actually living on the land. That is why we are living out here in the cabin,” Huson said.

They built the cabin to obstruct the routes of the proposed pipeline projects, which are planned to be built through a main salmon spawning channel, Huson said.

“Our people are salmon people. We depend on the salmon,” Huson said.

Only 10 percent of traditional Unist’ot’en territory remains. Most of the land is used for mining, logging, agriculture and urban development, Huson said.

“Our generation decided that we are not going to sit back and watch this 10 percent disappear as well. That is the only land we have left,” she said. “This is our livelihood. We depend on the moose. We depend on the fish.”
The Unist'ot'en camp is a grassroots effort supported by people who share the belief that everyone has a role in protecting the environment, decolonization and in moving away from destructive economic systems. Supporters contribute monetary funds, food and tools to the camp, Huson said.

"We don't accept any government or NGO funding because we know a lot of their funding is funneled through corporations that we are fighting," Huson said.

Supporters from all over the world come up to the camp year-round to help with projects and to share knowledge and skills, Huson said. Toghestiy said roughly 600 to 700 supporters come to the camp each year and many more people support the camp from afar.

OWNERSHIP AND RIGHTS TO LAND

Gordon Christie, an associate professor at Allard School of Law at University of British Columbia and director of the Indigenous Legal Studies program, has taught aboriginal law for 12 years.

According to a 1997 Canadian Supreme Court case, the Wet'suwet'en people hold title and ownership of their traditional lands, Christie said.

While aboriginal title recognizes ownership of the land, the Canadian federal government can still pass laws to regulate land use, Christie said.

"I can't think of anything that isn't caught up in the list of things they said could be authorized," he said.

According to the 1997 case, Delgamuukw v. British Columbia, in order for the Canadian federal government to infringe on aboriginal title they must first engage in meaningful consultation with the title holders.

"OUR PEOPLE DON'T REALLY PROSPER, THEY JUST GET CRUMBS FROM THESE DESTRUCTIVE INDUSTRIES AND THEN THEY GET TO SUFFER THE CONSEQUENCE OF THE DESTROYED LAND."

FREDA HUSON, SPOKESPERSON FOR UNIST'OT'EN CLAN

Meaningful consultation was never really defined in court, Toghestiy said, and often comes in the form of a letter from an industry requiring a response in 30 days or less.

"It is a completely dysfunctional system," Toghestiy said.

While consultation is required for land use projects, consent from the title holder is not, Christie said.

"What a lot of First Nations really want is to have a say in what goes on in their land. They want to be the ones that have a say on whether pipelines go across it," he said.

PIPELINE PROMISES

Karen Ogen is the elected Chief of the Wet'suwet'en First Nation, one of six nations of the Wet'suwet'en people. As elected chief, she represents the interests of 243 members of the Wet'suwet'en First Nation, she said.

The Wet'suwet'en First Nation has signed onto benefit agreements with both the Pacific Trails Pipeline and Coastal GasLink, she said.

"If oil or gas were discovered in our lands and territories, would you sit on it and do nothing and continue to administer poverty?" Ogen said.

"Or do we look at this as an opportunity that is going to help our people on the different issues of poverty within our territory?"

The Wet'suwet'en First Nation faces many issues of poverty including poor housing conditions, lack of housing, overcrowding and limited education funding, Ogen said.

Robert Metcs is president of Havlik Metcs Limited, an advisory firm specializing in the relations between First Nations, industry and governments in Canada. According to their website, Havlik Metcs Limited acted as the lead negotiator and advisor for the First Nations Limited Partnership, a benefit agreement between the Pacific Trails Pipeline and the 16 First Nations impacted by the pipeline.
Over its 35 years of operation, the Pacific Trails Pipeline will generate $585 million for the First Nations Limited Partnership, Metcs said.

The Pacific Trails Pipeline Aboriginal Skills and Employment Partnership was created to provide First Nations people with the skills training needed to be employable by the Pacific Trails Pipeline, said Barry Vickers, executive director of the PTP ASEP Training Society.

Levi Cabral, network services coordinator at Kelowna College, received funding from the PTP ASEP to help pay for post-secondary schooling at Kelowna College's Network Security Specialist Program. Cabral said he did not receive funding from his First Nation band, so he applied for funding through the PTP ASEP.

"If the band can't fund you, then maybe people can't go off to college or get the training they need for finding careers," Cabral said. "With the help, they can find a career that can support them for their life."

Cabral said that while these pipeline projects bring jobs and training to aboriginal communities, he has mixed feelings about them.

"I can see a lot of the economic benefits for aboriginal communities fading over time, but environmental risks are always going to be there, and they are not going away anytime soon," Cabral said.

"If there is any major damage to our environment, no amount of money would ever be worth that happening," he said.

INTER-COMMUNITY CONFLICT

Many indigenous communities in British Columbia have both active traditional systems of governance and band councils. Band councils were created in the late 1800s and early 1900s by the Canadian federal government as a part of the Indian Act, Christie said.

"In a lot of communities in Canada there is this acceptance that this is their government. Many of these band councils have legitimacy in the eyes of the reserve community, but not all of them," Christie said.

To some indigenous communities, traditional systems of governance are seen as equally legitimate — if not more legitimate — than band councils. An interesting community conflict occurs when these two systems of government don't see eye to eye, Christie said.

In the case of the Pacific Trails Pipeline, consultation began about seven years ago with the hereditary chiefs, Huson said. At that time, the Wet'suwet'en territory, covering 22,000 square kilometers of land in British Columbia, is home to the Unist'ot'en, one of clans comprising the Wet'suwet'en nation. The Unist'ot'en camp is built on the proposed pathway of three major pipeline projects in resistance against construction. The planned pipeline would transport oil and liquified natural gas across the province for export to countries in Asia at high rates — 525,000 barrels of crude oil per day, and 50 billion metric tonnes per day of liquified natural gas if put into operation.

TERMS TO KNOW

FIRST NATIONS/BANDS First Nations, or bands, are sub-groups of indigenous nations in Canada. They are created by the federal government and regulated by the Indian Act of 1876. The band is the basic unit of Indian government recognized by the federal government and is governed by a band council.

BAND COUNCIL Governing body of a First Nation/band created by the Indian Act. Comprised of an elected chief and several band councilors.

CLAN A traditionally defined group of people belonging to particular Tribes or Houses, which identify families and territories.

HEREDITARY CHIEF Leader chosen by traditional, or non-Indian Act, means.

ELECTED CHIEF Leader elected by band members to govern a First Nation or band as part of the band council; recognized by the federal government and the Indian Act.
Supporters come to the Unist'ot'en camp year round to help build the resistance movement and camp. Chelsea Taw and John Robitaille from Bellingham cut plywood to build kitchen cabinets for the main cabin pictured in the background.

TOP: Supporters come to the Unist'ot'en camp year round to help build the resistance movement and camp. Chelsea Taw and John Robitaille from Bellingham cut plywood to build kitchen cabinets for the main cabin pictured in the background.

BOTTOM: From left to right: Hereditary Chief Toghestiy, supporter Kasha Kanaka from Vancouver and supporter Andrew Eckles from Bellingham walk the trap lines. Trapping, along with hunting and fishing, provides food for the camp.

all of the hereditary chiefs rejected the proposal, so the Pacific Trails Pipeline approached the band council.

Ogen said she is not sure if the hereditary chiefs are aware of conditions of poverty that their people face, or if they care.

"Good governance from my perspective is that we are able to take care of our people and our land at the same time,” Ogen said.

Huson said she does not believe the projects will benefit their people.

“I've never seen any [natural resource] projects that come through our communities bring our people out of poverty,” Huson said. “Our people don't really prosper, they just get crumbs from these destructive industries and then they get to suffer the consequence of the destroyed land.”

FUTURE OF THE UNIST'OT'EN CAMP

A new anti-terror bill in Canada, Bill C-51, was passed May 6, 2015. This bill labels industrial activities, such as the building of pipelines, as "critical infrastructure" for Canada's economy, Toghestiy said.

“According to the [Royal Canadian Mounted Police] report that was put out two years ago, they consider us a threat to the 'critical infrastructure,”’ Huson said. “They say ‘a group in northern BC’ and we know it is us.”

Huson said that the bill was created to criminalize indigenous people trying to protect their land.

“That's not going to work because this is not Canada, this is Unist'ot'en territory,” Huson said.

As for pipelines in their immediate future, their answer stays firm, Huson said.

"We're not moving, we're not going anywhere,” Huson said. “They are not coming through. Period.”

EDITOR'S NOTE: Michelle Dannehy, the reporter for this story, spent ten days in December 2014 volunteering at the Unist'ot'en camp.

MICHELLE DANNEHY is a senior studying environmental justice with an emphasis in social justice education. She is inspired by the resistance efforts of frontline communities and is dedicated to social justice work.
The sun rises above a group of kayakers as a small speck appears on the horizon. It is early on the morning of April 17, and as the kayakers paddle out on the waters of Port Angeles, Washington, the speck grows larger and larger until it towers more than 30 stories above their fleet. The Polar Pioneer — one of two Shell Oil Company drilling rigs that will temporarily reside in Seattle — has arrived.
SHELL OIL COMPANY received conditional approval from the Department of Interior to conduct exploratory drilling in the Chuckchi Sea. Shell Oil Company, the U.S. subsidiary of Royal Dutch Shell, has eyes set on docking the two massive oil rigs at Terminal 5 before journeying to the Arctic this summer to drill up to six wells. The city of Seattle has been thrust into the spotlight as a battleground against drilling in the Arctic and its direct relation to climate change.

The Port of Seattle’s Terminal 5 sits on the western side of the Duwamish River, directly across the water from the city’s skyline, and has been empty since July 2014. In February of 2015, it was leased to Foss Maritime and their customer Shell Oil, on a two-year contract, according to Foss spokesperson Paul Queary.

Over the two years of the lease, the contract will bring in more than $13 million in rent. The Port also gave notice that approximately eight vessels would dock over winter at Terminal 5, creating much less of an impact than the 700 container, cruise and bulk-carrier vessels that visited the terminal in 2014, according to a letter from Port CEO Theodore Pick.

“It's pretty frustrating sometimes in our democracy to see the power that big money has in making decisions,” said Mike O’Brien, a Seattle City Council member. “The oil companies are a prime example of that. They can throw around billions of dollars, influencing political outcomes and policy decisions that benefit their bottom line at the expense of the average person.”

An estimated 15 billion barrels of oil and over 2 trillion cubic meters of natural gas lie beneath the surface of the Chukchi Shelf alone, according to a 2005 U.S. Geological Survey study. This is less than three times the 6.95 billion barrels of petroleum products the U.S. consumed in 2014, according to the U.S. Energy Information Administration.

The rigs will be towed to the Arctic and move into the Chukchi Sea by July 1, 2015 if conditions allow. The rigs will then be moored and begin to drill six exploratory wells, according to the Revised Outer Continental Shelf Exploration Plan.

Noble Drilling is the owner of Noble Discoverer, one of the two oil rigs set to dock in Seattle. Noble Drilling recently pled guilty to eight separate violations, including false entries in the Oil Record Book, discharging wastewater directly overboard and reconfiguring machinery after it had passed inspection, according to the U.S. v. Noble Drilling LLC Plea Agreement.

This all happened in 2012, before and during the time the Noble Discoverer was in the Chukchi Sea and under contract with Shell Offshore Inc.

“Three years ago, Shell finally got a drill bit in the ground up in the U.S. Arctic. Twelve hours later, an ice floe the size of Manhattan, 50 kilometers long, forced it to pull up its drill bit and run away from the drill site,” said Niel Lawrence, director of the National Resources Defense Council’s Alaska program.

The Arctic’s remoteness is a large aspect of the area’s high-risk factor. The nearest Coast Guard station is more than 1,600 kilometers away, there is no major airport along the coast and there is no deep-water port, Lawrence said. Essentially, no infrastructure along the Arctic coast could support a spill recovery launch. Getting resources into the area would be a huge task, he said.
Other elements of the Arctic can also render oil spill cleanup techniques inadequate, Lawrence said. Ice floes, along with 6- to 10-meter waves, high winds and cold temperatures make it hard for things to go as planned, he said.

Both containment booms and mechanical skimmers cannot work with large swells and ice. Burning the oil is not reliable due to cold temperatures, and no dispersants have been successfully tested in the Arctic, Lawrence said. The Arctic also has a very short drilling season due to the seasonal ice pack that forms in the fall. After that, the waters are inaccessible for seven or eight months.

"If you haven’t cleaned up the oil, and heaven help you if you haven’t stopped an undersea gusher by the time the pack ice moves in, all of that oil continues to flow and spread under the ice and move with the ice hundreds of miles over the course of the winter," Lawrence said. "When the thaw comes, you have a catastrophe the likes of which the world has never seen."

Thomas Webler, an assistant professor at Huxley College of the Environment, received a grant to examine oil spill planning and studied the results of the Exxon Valdez oil spill 20 years after the incident.

"I think in a lot of ways we don’t understand how when something that dramatic happens, it interrupts so many facets of our lives," Webler said. "Planners aren’t accustomed to dealing with multiple types of impacts, they focus on just the ecological impact."

Protesters have responded with opposition to Shell’s presence in the Northwest.

"This thing needs to encounter resistance on every leg of its journey," said Eric Ross, organizing director of the Backbone Campaign.

"For it to come into Port Angeles in the harbor, to be welcomed here without resistance — we couldn’t stand for that."

Ross helped organize and was part of the flotilla of kayaks that met the Polar Pioneer in the waters of Port Angeles. Protests have also taken place on Seattle’s waterfront, even before the rigs arrival at Terminal 5, where protesters held signs saying, "You Shell Not Pass" and "The World Is Not 4 Sale."

"We need good jobs in this city and we need a planet that we can live on," O’Brien said. "We need our industrial land to stay above high tide, and we don’t have to pick between those two."
An airblast sprayer is treating an orchard, drenching the leaves with a chemical mix of pesticides and fungicides. The workers at the farm next door are hit with drift. Not a gentle mist, but a spray to their faces and backs. The neighboring farm has no legal requirement to notify neighbors of pesticide application.
"All farmworkers are asking for is the opportunity to be healthy," said Rosalinda Guillen, executive director at Community to Community Development and former Skagit County farmworker. "Stop using pesticides. Stop using dangerous pesticides that are not only hurting me, but hurting the land and the consumer. Help me to be healthy."

According to the EPA, pesticides help increase agricultural production by killing off undesirable plant and insect species, also lowering the price of food. Guillen said pesticides are a major threat to farmworker health.

According to a study from the University of Pennsylvania in 2006, nausea, headaches, stomach pain and skin and eye problems resulted from exposure to the main components of common pesticides. Researchers looked at the effects pesticides have on farmworkers and found links between pesticides and chronic ailments like memory problems, respiratory issues, depression, miscarriages and cancer.

Pesticides bioaccumulate with repeated exposure. Bioaccumulation is when a chemical is absorbed by the body at a greater rate than it is lost, said Merrill Peterson, professor of biology at Western Washington University.

**MODES OF EXPOSURE**

In the fields, pesticides are applied using sprayers from the ground or from the air. All pesticide machinery must be operated by a worker. Consequently, pesticide applicators are often exposed to pesticides directly, as reported in a 2004 study in the Annual Review of Public Health. According to the study, farmers have a greater risk of mortality from nervous system cancers and illnesses impacting the lymphatic system.

Pesticide applicators encounter high risks, said Joanne Prado, epidemiologist at the Washington Department of Health's Pesticide Illness Monitoring and Prevention Program. High-risk jobs often have stringent safety and regulations associated with them.

According to the EPA's Worker Protection Standard, employers are required to provide personal protective equipment to workers.
mixing, applying or entering areas where pesticides are used in addition to following safety recommendations listed on the chemical label.

The Washington State Department of Agriculture's Farmworker Training Program aims to mitigate non-compliance with educational programs for farmers and their employees centered on pesticide safety, said Margaret Tucker, manager of pesticide licensing for the Department of Agriculture.

Despite having these pesticide regulations, attitudes and beliefs about the health risks of exposure is different among farmers, according to a 2009 research paper in the American Journal of Public Health.

According to the paper, financial pressure to skimp on protective gear and safety procedures to work faster and misunderstanding of pesticide toxicity were major themes in farmworker beliefs and attitudes toward pesticides.

Farmworkers in Washington state and across the U.S. face more health concerns than pesticide exposure.

According to the Bureau of Labor Statistics, the average annual income of farmworkers in the U.S. was $20,020 — below the national poverty line for a family of four.

"Farmworkers do not have the resources to get attorneys, to go through the whole documentation process," Guillen said.

According to the Seattle Civil Rights and Labor History Project, farm work pays little and is physically demanding. Historically, farmworkers have been excluded from many political institutions.

"Every time a farmworker steps out of line, we're just crushed," Guillen said.

The life expectancy of a farmworker is 49 years old, compared to the national average of about 80.

"The production quotas, the piece-rate wage process and pesticides shorten our lives," Guillen said.

Production quotas perpetuated by industry, politics and consumers complicate movement toward improving working conditions for farmers.

Production rates for Washington state farms set a record high for the third consecutive year in 2013 with $10.2 billion, according to a U.S. Department of Agriculture press release.

The power lies with who is paying Washington's labor force, Prado said. Questions are raised about whether the governor and policy makers are cutting back on bilingual investigators or if programs are carefully evaluated. It is about money and power, but within our democracy some power still rests with voters. Voters can give power to politicians that want

EMMA STRUTTON is an environmental science major at Western Washington University. She loves the outdoors and insects and plans on pursuing entomology after she graduates.

KATE WELCH is a sophomore at Western Washington University who enjoys photography, making maps and urban planning.
In Yakima, Washington, a small white house sits encircled by five large-scale industrial dairy farms. The 79-year-old woman living at the house says her private well water is contaminated by nitrate. She is not the only one.

According to the National Water Quality Assessment program, Yakima County was ranked first in the state for dairy production in 2004, making dairy farming one of the most prominent forms of agriculture in the Lower Yakima Valley.

Concentrated Animal Feeding Operations, or CAFOs, are agricultural operations that produce high volumes of manure. These operations can increase groundwater concentrations of nitrate if their manure is not handled correctly. Nitrogen from farm manure mixes into soil and groundwater, increasing the nitrate concentration in local well water supplies over time.

Helen Reddout, a former teacher and the president of the Community Association for the Restoration of the Environment, currently lives in Lower Yakima Valley and owns a private well that exceeds the EPA's clean, drinkable water standard of 10 milligrams per liter of nitrate.

Reddout has been a part of the 2013 lawsuit against CAFOs in the Lower Yakima Valley, educating community members and students about nitrate contamination.

Reddout provided free nitrate testing strips for her seventh grade students so they could test their wells.
Herds of cows at an industrial dairy farm in Yakima, Washington, produce a large volume of manure that can increase the levels of nitrate in private water wells of the residents of Yakima Valley.

Above left: Helen Reddout, 79, is a resident of Yakima Valley living in the middle of five large industrial CAFOs. Water from Reddout's home in Yakima Valley exceeds the EPA's clean drinking water standard. The maximum amount of nitrate allowed in drinking water is 70 milligrams per liter.

Above right: Reddout is the president of the Community Association for the Restoration of the Environment, educating the community members and students about nitrate contamination. When Reddout was a teacher, she would hand out free nitrate testing strips to her students so they could test their drinking water at home.

One of Reddout's students, Sally, tested her well water during her first trimester of pregnancy and found its nitrate levels exceeded the maximum contaminant level.

Reddout informed her student not to drink the contaminated water to avoid the health risks for the baby.

At certain concentrations, drinking nitrate-contaminated water is related to the onset of methemoglobinemia in infants, a short-term and non-lethal condition caused by a lack of oxygen in the bloodstream, according to a 2005 Environmental Health Perspectives article. Often called blue baby syndrome, methemoglobinemia causes infants to become blue and lethargic until their blood's oxygen levels are able to return to normal.

Seven months later, after the child was born, Reddout asked Sally how the baby was doing and how she was handling the contaminated drinking water.

Rather than buying bottled water due to the expenses, Sally had been boiling the nitrate-contaminated water before drinking it or feeding it to her baby, Reddout said.

Because water evaporates more rapidly than nitrate, boiling nitrate-contaminated water removes water from the pot as steam, but the nitrate stays behind. This effectively makes the solution more harmful to an infant's health.

Education on water quality and contamination for students and families is not sufficient, Reddout said.

"We were having to define [CAFO] and actually educate the public as to what it was," Reddout said. "There was no knowledge at all. They just thought it was a farm."

In 2010, the EPA named Yakima Valley one of the top 10 environmental justice priority areas in the U.S., said Charlie McKinney, water quality manager for the Washington State Department of Ecology Central Regional Office. This office serves seven counties in central Washington, including Klickitat, Okanogan and Yakima.

"The reason why the EPA finally became proactive, or at least active, here is because they understood that the impact of the contaminated water would be hitting these largely Hispanic and native populations," said Jessica Black, the associate director at the Center for Native Health and Culture and an environmental science professor at Heritage University.

Yakima County has more dairy cows than any other county in the state, McKinney said.

In Yakima, there are far too many dairy cows for the available acreage and, as a result, over-application of manure causes serious groundwater contamination in the area, Tebbutt said.

Manure management can also be challenging on farms with fewer cows.

Nutrients in manure, when properly applied, are not an issue, said Larry Stap, co-owner of Twin Brook Creamery, located in Lynden, Washington.

"It's the improper application that has the potential to be an issue," Stap said.

To mitigate manure waste, some CAFOs and family farms are searching for alternative waste management strategies.

At Twin Brooks Farm, Stap uses an upright storage tank to reduce the chances of contamination. The storage tank holds 5.2 million liters.
of manure and has a cement foundation, which blocks leakage of nutrients, he said.

Using information from public meeting sessions between farmers and Yakima community members, Ecology prioritizes problems related to manure management, said Jon Jennings, CAFO permit writer for Ecology.

The knowledge in the community about CAFOs has gradually increased over time, Reddout said.

Health organizations within the Lower Yakima Valley are participating in community programs to distribute information about nitrates to both Spanish- and English-speaking communities, Black said.

Scientists and policy makers are aware the increase of CAFOs over the past few decades has contributed to high nitrate levels and are looking for ways to mitigate health impacts. However, nitrate contamination will be a long-term issue for those in Yakima Valley.

"These nitrates won't go away," Reddout said. "Not in my lifetime."

In 2015, the lawsuit against the four CAFOs in the Lower Yakima Valley was settled out of court.

While control measures to regulate CAFOs are still being determined, Reddout has a vision for future farming.

Reddout said she would like to see these concentrated animal feeding operations come to an end, bringing dairies back into the historical family farm structure.

"I've lived here for sixty-some-odd years and we've had dairies here all that time," she said. "We never had problems with them. You'd go by and say 'Oh, there's cow manure.' You wouldn't go by and have dry heaves because of the sewage smell."
Ibrahim Abdulai, a "chief" in Accra, decides who is allowed to incinerate disposed materials at this e-waste site in Ghana. It took five minutes to convince this suspicious man to be a part of the photo, said Kevin McElvaney, who created the Agbogbloshie photo collection. (Photograph courtesy of Kevin McElvaney.)

AGBOGBLOSHIE, A SUBURB of Accra, Ghana, is home to the largest electronic-waste dumping site in the country, a wasteland of decommissioned electronics from abroad. People living in poverty migrate there from around the region to find work dismantling old electronics. They search for valuable metals that can be sold, while the remaining scraps are burned. Because of this, researchers study the people living there to understand the effects of e-waste on human health and the environment.

According to a 2011 electronic waste recycling and disposal journal, approximately 80 percent of the 31 million metric tons of electronic waste produced throughout the world each year end up in impoverished communities.

Workers lacking protective gear scavenge through yards of discarded electronics to find metals that can be sold amongst a sea of waste. The dismembered electronics and plastic casings that remain go up in thick clouds of billowing smoke.

German photographer Kevin McElvaney portrays living conditions of the people who live and work in this e-waste dumpsite.

"Everyone is able to start working here, and that is part of the problem," McElvaney said in an email.

While visiting Agbogbloshie, McElvaney remembers speaking with Mohamed Cammera, who had traveled from the Ivory Coast hoping to find work and was extremely grateful to be there. For those living in poverty throughout Africa, Agbogbloshie is known as a place to find work.

"His whole family died in civil war struggles, and for him, this was a new beginning," McElvaney said.

According to a 2013 article published by the Population Reference Bureau, fine particulate matter is released when e-waste is burned. This...
Matter contains metals known to be harmful in high doses, and has been linked to health issues.

Lailah Akita, a Ph.D. student of geoscience and co-author of a 2013 study monitoring soil health in Agbogbloshie, said incineration is the only way Agbogbloshie residents can manage large amounts of waste. Akita was born in Accra, Ghana. She moved to Germany to pursue her education and study soil contaminants in Agbogbloshie.

According to the study Akita co-authored, soil at the site contained levels of lead and mercury exceeding regulated standards set by the United States Environmental Protection Agency.

According to a 2010 article on developmental toxins in e-waste, high levels of lead in the blood during childhood development is correlated with cognitive disabilities. Mercury could likely have similar effects on brain health as lead.

Contaminants spread through incineration drain into the soil when it rains, affecting aquatic systems, Akita said. According to a 2009 assessment on the impacts of e-waste, lead and mercury make their way into water systems after leaching through the soil into groundwater.

E-waste workers are exposed to these chemicals through inhalation and skin contact, while other people and animals are exposed to the contaminants through inhaling smoke, drinking water and eating produce.

Even small cuts can become a big problem in this toxic environment, McElvaney said. With a poor health care system and no health insurance, an infected open wound can result in death.

According to a 2013 article published in Urban Geography about the e-waste economy in Ghana, Agbogbloshie has many informal economies. These economies are not taxed nor regulated by the government, meaning landowners can essentially hire cheap labor to clear land for more e-waste.

Starting in the mid-1980s, reduced government regulation and rapid urbanization in Ghana allowed its international e-waste economy to flourish, according to the 2013 e-waste economy study. In 2004, the Ghanaian government eliminated import taxes on used computers, incentivizing other countries to send electronics to Ghana.

Akita said she believes that it is also important to regulate the e-waste itself. Because the U.S. has strict e-waste regulations set in place, it is cheaper for manufacturers to ship the waste to countries such as Ghana that do not enforce e-waste policy, Akita said.

"We have to have guidance for the qualification and examination of the products that come into the country," Akita said.

According to both Akita and McElvaney, better e-waste policy education is needed to enact political reform and social change. Long-term environmental plans must be evaluated and everyone should get involved, but only the Ghanaians can build their nation, Akita said.

McElvaney said he is using his exhibition to raise awareness about Agbogbloshie.

"It became clear that I can and have to use these striking images to change something," McElvaney said.  

SHAUNA BRENNAN is an environmental studies major minoring in geographic information systems. Her love for ecology drives her curiosity to explore the environment through a journalist's platform.

**METALS ON A MOTHERBOARD**

**COPPER (Cu)**
Copper is the main conducting metal on printed circuit boards. According to the Agency of Toxic Substances and Disease Registry, inhalation of copper fumes can cause skin irritation, dizziness, and headaches. In large amounts, copper can cause liver or kidney failure.

**LEAD (Pb)**
Lead is used in soldering metals, which connect and protect components on a circuit board. According to the EPA, inhalation of lead particles can lead to sensory impairment and decreased muscular coordination. It can also cause increased blood pressure in adults and organ failure and death in children.

**GALLIUM ARSENIDE (GaAs)**
Gallium arsenide is a chemical component used in electronic transistors and semiconductors. According to an article in Toxicology and Applied Pharmacology, exposure to gallium arsenide is associated with chronic toxicity of the kidneys, liver, lungs and reproductive organs.
Robert Bullard, known as the “father of environmental justice,” describes himself as an accidental environmentalist. Bullard owes his wife, attorney Linda McKeever Bullard, for all his years in the movement’s history. She drafted him into research for her 1979 lawsuit against the state of Texas for planning to build a landfill in the middle of a black neighborhood.
IT WAS AN accident he does not regret. Galvanized by African-American churches in the 1980s, the environmental justice movement has since extended beyond the southern pocket of the United States to include organizations from every world religion.

BEGINNINGS OF THE ENVIRONMENTAL JUSTICE MOVEMENT

Bullard collected data for the class-action lawsuit Bean v. Southwestern Waste Management, Corp., alongside 10 of his students in a research methods class at Texas Southern University in 1979.

The study, “Solid Waste Sites and the Black Houston Community,” found all the city landfills and three out of the four privately owned landfills were located in black neighborhoods in Houston, though African-Americans only constituted 25 percent of the city’s population.

Although the waste management company won the lawsuit and the landfill was eventually constructed in the neighborhood, the case set an important precedent of legal action for the environmental justice movement in the years to come, Bullard said.

In 1982, the environmental justice impetus gained national attention. During weeks of demonstrations in Warren County, North Carolina, more than 500 people were arrested for protesting the siting of a hazardous PCB landfill, he said.

Similar to the leadership of the civil rights movement, many of the protesters and community activists were women of color.

“You might see men in the front in a lot of the photo ops, but when it comes to getting the job done and moving things along, it’s women. I take my hat off to the women who are leading,” he said.

Following the Warren County protests, the United Church of Christ Commission for Racial Justice published the first national report on the locations of toxic waste facilities, “Toxic Wastes and Race in the United States.” According to the report, race was a stronger predictor of the facilities’ location than all other factors, including socioeconomic status.

The UCC commission’s research in “Toxic Wastes and Race in the United States” evaluated the proximity of each racial group to uncontrolled toxic waste sites. Using data from the 1980 census, the study found Washington state had the fifth greatest number of American Indians living in communities with hazardous waste facilities: 69 percent of the state’s total Indian population.

According to a 2010 article in the Union Seminary Quarterly Review, American Indians began experiencing environmental injustice 500 years ago in their struggle for land sovereignty.

But the term environmental justice did not begin to permeate our language until the last two decades, Bullard said.

A SEASON OF LISTENING AND UNDERSTANDING

For some local churches like Faith Church in Issaquah, Washington, the first step toward addressing environmental justice issues is to take a few steps back. On April 10, 10 adults and two children piled into a white church van to drive two hours east to the Yakama Nation Reservation.

Faith Church’s trip was simply an introduction to what Youth Director Cody Charland called a season of listening and understanding.

The mission group partnered with Mending Wings, a Native American Christian organization. The purpose of their three-day trip was to come as learners, immerse in a different culture and hear the American story as told by the Native peoples, who have been subject to a series of environmental injustices, Charland said.

For close to 25 years, Mending Wings founder Corey Greaves worked with native youth under the leadership of non-American Indians.

“No offense to them, but they didn’t really know what they were doing,” Greaves said. “They were working within that same colonial Christian model that has been a dismal failure among our people for the last 500 years.”

His frustration culminated at the 2005 Native American Youth Conference for the Presbyterian Church of the USA in Albuquerque, New Mexico, he said.

“The only thing that really made it a Native American youth conference was that there were Native American youth there. But it sounded, felt, smelled, looked like any other Euro-American youth conference that you would find anywhere else,” he said.
“WHEN WE TALK ABOUT THE PROGRESS WE’VE MADE, WE NEED TO DO A BETTER JOB OF DIVERSIFYING OUR ENVIRONMENTAL ORGANIZATIONS, BUT ALSO DIVERSIFYING THE FUNDING — OF WHO GETS FUNDING TO DO WHAT. WE’RE STILL LAGGING IN THE LATTER.”

ROBERT BULLARD, “FATHER OF ENVIRONMENTAL JUSTICE”

By the end of the conference, Greaves said he felt restless. When he flew back to Yakima, he immediately created Mending Wings.

Greaves said the name of the organization came to him in a vision on his last night in Albuquerque. At the time, Greaves could not anticipate what would become of Mending Wings in 10 years, which is now one of the largest faith-based native youth organizations in the country.

Today, Mending Wings invites churches like Faith Church to attend student mission trips at the Yakama Nation reservation.

Mending Wings requests all visiting church groups ask permission first, come with humility and willingness to learn, and never assume they are coming to help, Greaves said.

“I hate that word — help. ‘We’re coming to help the Indians! We don’t need your help,’ Greaves said. ‘Come to serve. Don’t come to save.’

Often, church groups are surprised by the work they are asked to do, said Josh Yoder, an intern at Mending Wings.

“A lot of times it means we’re pulling weeds and doing yard work, and we’ve had groups not feel valuable because that’s all they were doing with their skill sets, but it’s what they want. It’s what the person that owned the house wanted,” Yoder said. “They didn’t need their house painted. They didn’t need a new porch. They wanted their yard weeded.”

Beyond plucking weeds and shoveling gravel, Charland said his mission group was impacted by the Yakama people’s stories of oppression and injustice.

“I’m not Native American so it feels like I’ve been on a different side and I don’t want to be,” Charland said. “I really think God’s on the side of the oppressed.”

THE FUTURE OF THE MOVEMENT

Two decades after the initial Race and Toxic Wastes study was published, the UCC commissioned a follow-up study in 2007, which found people of color to be more concentrated in areas with commercial hazardous sites than they were in 1987.

“[The findings] showed we have to keep our eyes on the prize and keep vigilant,” Bullard said. “These problems are not going away.”

In order to propel the movement forward, he said more funding needs to be allocated to environmental justice groups led by people of color.

“When we talk about the progress we’ve made, we need to do a better job of diversifying our environmental organizations, but also diversifying the funding — of who gets funding to do what. We’re still lagging in the latter,” Bullard said. “Those recommendations we made in 2007 are just as relevant today as they were back then.”

Despite necessary changes in funding, the core principles of environmental justice drafted and adopted in 1991 at the first National People of Color Environmental Leadership Summit remain.

The multi-ethnic, intergenerational summit continues to meet every year. Representatives, including churches and activists from around the globe, discuss everything from the impacts of climate change to the facets of healthy neighborhoods.

Though the movement has grown globally, communities still stand at the center. Vulnerable communities must be protected and decisions should not be made in their absence, Bullard said.

“If we are really to progress as a nation and as a society, we must eliminate those disparities, those artificial barriers that keep us apart.”

Please visit theplanetmagazine.net for in-depth coverage.

SARAH SHARP is a sophomore pursuing a degree in journalism. She enjoys telling the personal stories of those who rarely have the chance to be heard.

BRIANNA STOUTENBURGH can be found in the steep alpine of the Cascades with her camera in hand, ready to capture the beauty of the great outdoors.
Increased oil transportation via rail resulted in five explosive train derailments in the first five months of 2015. According to the U.S. Energy Information Administration, U.S. oil production growth in 2014 was the largest in more than 100 years, largely due to oil extraction from shale formations located in the center of North America. Many different groups are debating risks of oil trains—from elected officials of the U.S. and other sovereign nations, to industry representatives and first responders.

WENDELIN DUNLAP is a graduate student at Huxley College studying environmental education and is the director of Learning Environment Action and Discovery, a service-learning club on campus. She loves exploring and reporting on current environmental issues.

Unequal access to nutritious food is correlated to diseases such as diabetes, obesity and malnutrition. The Beacon Food Forest provides free, local produce for anyone and works to bring community together to grow food. Its permaculture design mimics a woodland ecosystem. The Food Forest not only grows food for the community, but also works to enrich the soil and improve the urban landscape.

PAUL BIKIS is an outdoor photographer and adventure enthusiast. He hopes to use visual journalism to inspire others to preserve the outdoors and provide equal access to healthy food.

**THE METRIC SYSTEM**

The Planet, an independent publication rooted in science, has switched to the metric measurement system because it is widely used in scientific literature. Constantly converting from the imperial system is difficult, so see our table of common references online at theplanetmagazine.net/metric-system.

The Planet strives for accuracy and will correct any factual errors promptly and courteously. Please alert us if you spot any inaccuracies.
“Those of us living in environmental justice communities are the canary in the coalmine. We feel the problems right now, and have for some time... No community should be saddled with more environmental burdens and less environmental benefits than any other.”

MAJORA CARTER
ENVIRONMENTAL JUSTICE ADVOCATE, SOUTH BRONX