

**A History of the Pacific Northwest Forestry Practices &  
A Case For Discontinuing Aerial Application of Herbicides  
in East Jefferson County**

**March 11, 2019**

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Photographer: Magnolia / Devianart

## Introduction

My name is Jessica Randall, and I live in Port Townsend, Washington. I've been a resident of Jefferson County for 10 years. I lived in the city of Port Townsend since 2009, and moved out to the county in 2014. My mostly wooded 16.5 acres is called "open spaced timber" and is bordered on two sides by clearcuts/tree farms owned by Pope Resources. As far as education, I have a Masters of Science degree in Acupuncture and Oriental Medicine, and my undergraduate degree began in Pre-medicine and ended up in Art with an emphasis in Sculpture. I tell you this because you should be aware that I don't have a degree in Law or Forestry, which would be very handy to have at this moment. But I do have an awareness and appreciation for the big picture, and have studied graduate level biochemistry, microbiology, immunology, pharmacology and endocrinology before studying Traditional Chinese Medicine.

Most of the patients I treat have cancer or autoimmune diseases, both of which have potential origins of environmental toxins and/or chemical food additives. So for the last 20 years, I have been forced to look at what we are creating in our environment, and how we are managing these new and troubling levels of pathogens and chemical entities which effect us all at some point in our lives. Before you roll your eyes and classify me as a "hippy conservationist", I want you to understand how important it is in my world to work with the science that exists at this point and have empathy for my patients who are struggling to survive. I work with people who are treated with chemotherapies and immune suppressors, which are inherently toxic and in many ways deleterious to health and well-being. But for these folks, these pharmaceuticals are sometimes saving their lives. So I understand the balance between doing harm in the short term in order to benefit the long term. When we have reversed this, and are only focused on the short term while doing harm in the long-term... well, this is where I raise my eyebrows and start asking questions. As should you.

In order to understand the issue of aerial herbicide application on the forests of the Pacific Northwest (PNW), and specifically East Jefferson County, I had to do a significant amount of research into the history of the timber industry, including technological advances in forestry practices, taxation and our economic dependence on this industry, the changes in our ecosystem in the last few decades due to human activity, conservationism, and the evolution of land ownership in the PNW. This paper tries to cover some of the pertinent components of these issues in order to understand the complete picture, to see how we have arrived at where we are now. The complexity of the forest industry, the social history of the region and our current understanding of the ecosystem we live in deserves a much larger volume of work to truly appreciate it. The list of references at the end of the paper will give you more resources, if you are interested in exploring this further.

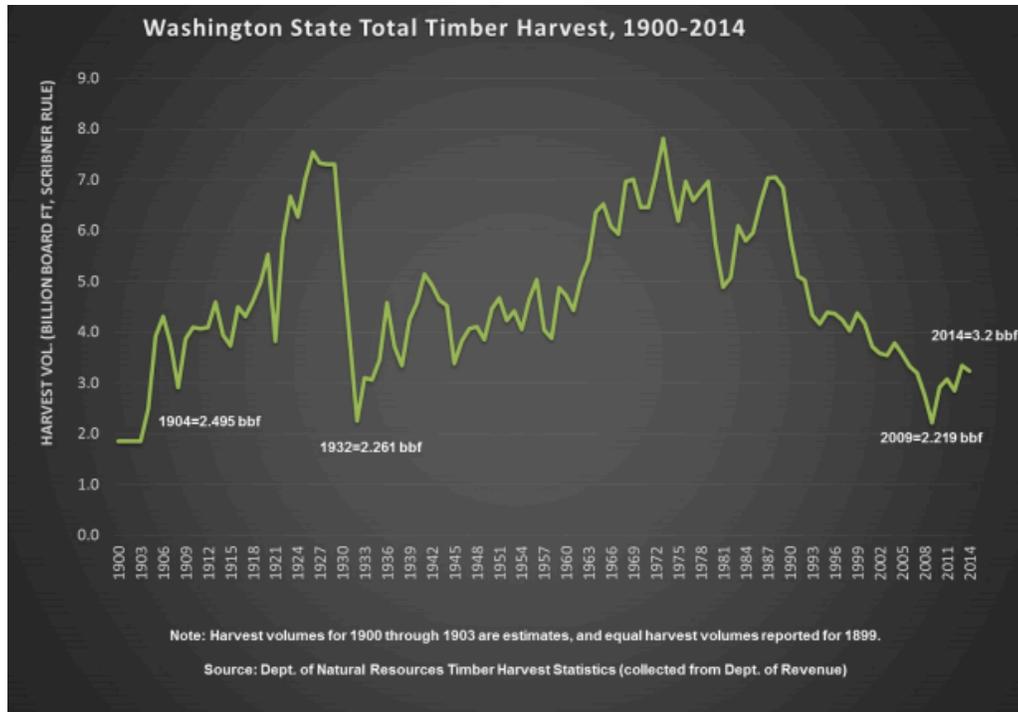
## **The Great Balancing Act of Creating Sustainable Timber Farms, Maintaining Safe Labor Practices, Preserving the Environment, and Enjoying our Surroundings**



### **History**

Sustainability, safe practice, the preservation of the environment, and our enjoyment of it. With every advance in industry, technology or the introduction of a new chemical or physical process, we are forced to re-examine these four issues. What will be affected by this new advancement? What is the effect of it on future generations? Every step of progress in one direction should force us to consider the other three factors. My field of medicine is rife with progress. The number of new pharmaceuticals that make it onto the shelf is much smaller than those who have tried to get there. All have undergone years of double-blind experiments and rigorous testing. Yet despite this, every practitioner knows that the new pharmaceutical “wonder drug” that is approved by the FDA needs to be taken with a grain of salt. Every practitioner knows that the research may be flawed or skewed by a corporate interest, that the negative side effects may not show up until much later, and the science behind the pharmacology is probably lacking. We all accept that there is a lot we don’t know.

When I read back over our history of accomplishments and failures in terms of our timber industry, I don’t see this same sense of caution. I see many “wonder drugs”, in terms of equipment and process, many with negative side effects. And then years, even decades, may pass before regulations can be put into place to limit the negative impacts. Look for a minute at the volume of timber harvest since 1900:



Published by the Washington Forest Protection Association  
[http://www.wfpa.org/wp-content/uploads/2017/11/2015-16-leg-fact-sheet-forestry-is-an-economic-engine\\_4.pdf](http://www.wfpa.org/wp-content/uploads/2017/11/2015-16-leg-fact-sheet-forestry-is-an-economic-engine_4.pdf)

This timeline begins in 1900, but timber harvest in the Pacific Northwest actually began around 1850. The European migration to Oregon and Washington was basically ignited by the forestry industry, and increased dramatically with governmental land grants to potential homesteaders. As the US gradually suppressed the native population and drove them onto reservations, the desire was to have Europeans, also known as the new American citizens, occupy the territory and claim its resources for their own use and for sale to the rest of the nation. To accomplish this, the US government began giving away land that had once belonged to the Native Americans in what was called The Donation Land Claim Act of 1850, then later in 1862 as the Homesteading Act. Both encouraged settlers to claim land, first at 320 acres, then 160 acres per adult in each family, in exchange for a very small cost and the promise to reside on it and develop it within 5 years.

The Pacific Northwest was covered in trees. Huge cedars, hemlocks, fir, spruce, alders and maples covered the landscape all up and down the western Washington and Oregon Territories. The first explorers were amazed at the forests, and immediately saw it as a huge resource for the occupation and construction of the burgeoning west coast cities.

“Aboard the Discovery, British explorer George Vancouver traveled along the southern shore of the Strait of Juan de Fuca in 1792 and described the landscape as "luxurious." "The whole had the appearance of a continued forest extending as far north as the eye could reach," he wrote, "which made me very solicitous to find a port in the vicinity of a country presenting so delightful a prospect of fertility." Evergreen State: Exploring the History of Washington's Forests; A Curriculum Project for Washington Schools, p. 4.

Thousands of settlers began occupying the heavily forested land, but eliminating the trees to build roads and create agricultural land was very difficult. Many folks who originally settled using grants eventually gave up their land to timber companies, and the homesteaders moved into urban areas to make a living. This evolution provided fertile ground for the first logging and lumber companies and lumber mills.



Homesteaders in Washington (Darius Kinsey)

By the 1850's, there were over two dozen mills in Puget Sound. In 1878, Congress passed the Timber and Stone Act, which followed on the heels of the Homesteading and Donation Land Grant Acts. In this case, though, the land was sold for \$2.50 per acre, with a limit of 160 acres, of land that was deemed unfit for farming. These land sales provided opportunities for illegal acquisitions by the larger timber corporations.

“Though the Timber and Stone Act was designed to give individuals ownership of 160-acre timber tracts, in reality it often served to put large blocks of forest land into corporate ownership. When a new tract opened for entry, a lumber company would recruit a number of individuals, have each make his perfectly legal purchase, and then buy the lands from them. All this could be arranged so that the person who actually "bought" the land from the government received nothing more than a little pocket cash and a pleasant trip to the mountains.” [https://www.nps.gov/parkhistory/online\\_books/dilsaver-tweed/chap3i.htm](https://www.nps.gov/parkhistory/online_books/dilsaver-tweed/chap3i.htm)

While California endured the Gold Rush, Washington experienced the Timber Rush. The question was, who was going to be able to fell all of those big trees, mill them and sell the lumber? The rush was on. And the chief contestants were... The Hudson Bay Company, Weyerhaeuser, and our own Pope and Talbot.

Jefferson County's most prestigious lumber company, Pope and Talbot, previously called The Puget Mill Company and now called Pope Resources, built their first mill at Port Gamble in 1852. By 1892, they owned 186,000 acres of timberland in Oregon and Washington. Today, Pope Resources owns 111,000 acres of timberland, approximately 3,240 acres of development property in Washington, and a minority interest in 91,000 acres owned by their subsidiary, ORM Timber Funds, in Washington and Oregon. Their land holdings continually increase and decrease over the years, with purchases and sales of timberland and real estate too complicated to keep track of. Looking at the timeline, it's easy to imagine the extent of the forest holdings in those early and middle years of large production. And it's interesting that today their actual land holdings are very similar to what they were when they began, about 166 years ago.

### **Equipment and Progress**

From 1850-1900, trees were cut by axe and saw, and men, horses and mules moved the logs. The Steam Donkey, invented in 1882, but probably not widely used until a few years later, helped to schlepp the logs down steep grades to the water for transport. Steam Donkeys were dangerous, with cables sometimes moving logs overhead, and accidents to workers were common. I read one story where the crew had sarcastically named their machine "Mankiller". Timber harvest had begun on the coastline, where water transport was available. With the advance in equipment, more logging could occur inland. The Steam Donkey was integral to this development. Despite its peril, it allowed the industry to transport logs much further, opening up a larger area to logging, and thus larger profits.

The chainsaw, first invented in the late 1800's for surgery, was eventually developed and applied to forestry around 1927, but not used here until about 1947. The first chainsaws designed for the timber industry were heavy and quite large, requiring two people to operate them. The portable chain saw was well in use by 1950, but the decline of logging was also in effect at that point, mainly due to the use of other materials for building. Any logger nowadays would be hard pressed not to have his or her chainsaw at hand. But trees were being cut without them for centuries. When we look at the tools of the trade and observe the incredible advancement in this industry, it's easy to see why there are no old growth forests left, just small pockets of old growth trees in heavily protected areas surrounded by "managed forests" and tree plantations.



Falling team, National Lumber and Manufacturing Company, ca. 1920 (KINSEY 289)



A Tigercat 860C Fellerbuncher (2018)

As more sophisticated equipment was invented, logging became easier, but with each step, there were new issues. Sometimes the fall left behind clogged rivers and other waterways, or fuel and other debris left by logging companies polluted the land. When the equipment rusted and broke down, it was often abandoned, as it was too expensive to transport back to the shop for repairs.

### **Working Conditions and Taxes**

Other negative side effects of progress affected the workers. The crews needed to be trained, or the work was intensely dangerous. Even with training, being a lumberjack was (and still is) one of the most dangerous jobs in the PNW. Seasonal work creates an inconsistent and transient labor force. Therefore, workers aren't as well trained, nor are they connected to the community. Problems would often arise between the lumberjacks and the townspeople. The crews themselves were typically unruly, and sometimes violent and raucous in their demeanor. Loggers were known to spend their days "cutting wood, drinking alcohol and fighting." The destruction and debris left in their wake was also an issue. Water supplies were damaged, pastureland was ruined. There's a story told on the website of the Gig Harbor Museum of History of a skid road that ran adjacent to the schoolhouse. A skid road was an oiled, wooden chute for logs to travel down to the water. The logs would move very quickly down the chute. The logs on this particular chute would occasionally jump the barrier and hit the corner of the schoolhouse! Eventually, they moved the skid road

away from the building. It's difficult to imagine our community allowing such a thing. Safety standards were different in those days.

To alleviate some of these social problems and poor working conditions, the government began to impose more regulations on timber companies. Unions were formed to safeguard workers' rights and taxes were raised to cover work-related injuries and appease the community who resided near the logging sites. The taxes often went to support schools and local infrastructure. Timber taxes also benefitted fire departments, which had a direct positive effect on local timberlands. The timber taxes are still in existence, often helping to fund school levies and other county infrastructure needs. Currently, Timber Tax is 5% of a logging company's earnings, 4% going to the county and 1% to the state. The projected Timber Tax for Jefferson County for 2019 is:

<b>TOTAL AMOUNT FORCASTED FOR TIMBER TAX DISTRIBUTION:</b>	FOR BOND LEVIES:	\$118,230.47
	FOR SCHOOL M & O LEVIES:	\$132,835.05
	FOR REMAINING DISTRICTS:	\$941,693.56
	RESERVE FOR 2020 DISTRIBUTION:	\$238,551.82

Value, Levy and Data for Tax Year 2019, [www.co.jefferson.wa.us](http://www.co.jefferson.wa.us)

Forestry was an open venture for a few decades, but eventually, the federal government and conservationists moved in. To offset the increasingly limited availability of timber resources, the Division of Forestry was established in 1885, and in 1891 the Forest Reserve Act passed, setting aside large tracts of forest as federal land. Under Theodore Roosevelt, also known as "the naturalist President", 7.4 million acres of Washington forest came under federal protection in 1905, and the US Forest Service was born. Between 1900 and 1910, unregulated clearcutting was controlled. In 1907, The University of Washington opened its School of Forestry to educate and promote stewardship over the state's natural resources. Yet despite these new entities, the real issue was the rapidly diminishing forest. The Pacific Northwest was the last resort for lumber. The Eastern and Midwestern trees had already been cut, and the timber that served the entire nation had shifted to Oregon, Washington, and parts of Northern California. What once seemed like a limitless supply of trees was quickly dwindling. The heyday of logging our forests was starting to take its toll. Too many timber companies were cutting down too many trees, leaving the landscape scarred and the watershed damaged. As old-growth forest disappeared rapidly, the United State's timber resources ceased to appear limitless.

## Further Metamorphosis of Timber Practices The Emergence of Tree Farms



The timber industry was changing, and not only by the hand of the government, but mainly by their own hand. How many trees are still standing in the PNW forests? How long would it take to cut them all down? And who is going to step forward to protect the natural landscape, which we know at this point affects all of us, at every level...

Conservation groups, with the long-term issues in mind, were definitely standing on the side of the public, the environment and responsible harvesting. By this time, the forests needed their own protection. And the species of flora and fauna, which had lived in the previously existing forests, needed protecting as well. Their habitat had been destroyed. The timber industry needed to change its practices drastically in order to preserve the product: trees. And the way they thought it should happen, in order to secure their corporate interests and maintain the level of paper and wood products that meet consumers' needs, was to manage forests like we manage annual crops. The private forest industry and the US Forest Service began cultivating timber plantations.

The tree farm they envisioned would eventually become a monoculture: genetically engineered, sunlight-preferring Douglas fir, the most lucrative and useable tree product available. The trees would be harvested en masse, as in clearcut. The land would be prepared, as in sprayed with herbicides, before a new crop of fir trees were planted. The planting cycle would be shortened from 50-80 years to about 30-40. Like all long-term interventions, it has a host of negative side effects. Today, there are no buffers on roadsides to make the plantations less visually disturbing. Forest habitats for animals and insects who use older trees as homes, need sufficient undergrowth for food and nesting and a diversity of flora and fauna to survive, would have to lessen their populations or move on. Public notice regarding chemical spraying would only be available to residents with borders on their land, and even those notices would be minimal, sometimes late, sometimes nonexistent. The nutrients available in the soil of these plantations is lessening with each cycle. This practice of clearcutting, herbicidal treatment and replanting a Douglas Fir monocrop is still happening today.

As I mentioned at the beginning of this article, in medicine, practitioners always think of the long-term effects of a treatment. Short-term relief may be helpful, but if it over-used, it will result in poor health. This happens because the human body has evolved over time and through many challenges. It has systems that maintain homeostasis, adapting to changes and compensating for them. Those systems, which are proficient at achieving equilibrium by their own checks and balances, are more sophisticated than any intervention we

can do. So all health care practitioners know that despite their good intentions, any long-term medical intervention will have its negative side effects over time. The same thing is true for our ecosystem. The history of clearcutting is very complex. A study that is worth reading about the history of clearcutting published by the Forest History Society. It is titled "Controversy Over Clearcutting Timeline" and written by Gerald Williams, Ph.D. (see References). The author quotes Ivan Doig in his classic 1975 article "The Murky Annals of Clearcutting" summarized the clearcutting controversy when he wrote:

"Professional foresters were honestly disagreeing about silvicultural alternatives, but mostly on economic grounds... All in all, [the arguments should]...serve as a classic lesson that disputes over the use of our [national] forests are not going to be decided on ecological merit alone. Nowhere near it."

By the early 1950's, forestry "research" concluded that clearcutting was the best method of harvesting Douglas Fir. But basically, selection harvesting had proved to be a process easily taken advantage of. Larger and more lucrative trees were harvested and the others were left behind, resulting in a very weak forest filled with undesirable trees. In the late 1960's, and as a result of the post World-War II frenzy to harvest timber to meet wood and housing needs, clearcuts were popular. One area that drew the attention of the conservationists was the Bitterroot National Forest in Montana and Idaho, which underwent extensive clearcutting. At that time, the US Forest Service hid the clearcuts behind a stand of trees along the roadsides. As the public became aware of the practice, forestry experts became enraged. They knew the other negative side effects of clearcutting, such as the removal of all non-target tree species, the decrease of basic nutrients that are released in a normally decaying forest, and the disturbance in the habitat of fish, birds, animals, insects, fungi, microorganisms and plants. Protests, led by a retired Bitterroot Forest supervising engineer, and newspaper articles written by Dale Burk, who later wrote a book on "The Clearcut Crisis: Controversy in the Bitterroot" and a University of Montana team studying the situation, inflamed the opposition to the timber industry action. Other groups, supporters of the Tongass National Forest in Alaska and of the Monongahela National Forest in West Virginia, and a group of turkey hunters, also in West Virginia, contributed to the debate and stood up against the US Forest Service, which resulted in a temporary ban on clearcutting. But the 1973 ban on clearcutting on lots of more than 40 acres was quickly overturned in 1975. Commercial interests won out again.

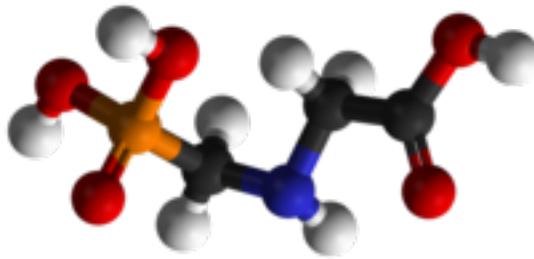
Researching the ebb and flow of conservationist activism and forestry legislation and the push back from corporate interests is exhausting. Every move toward conservation resulted in a countermove to support big business. Even drastic measures, such as the hiatus on clearcutting to save the Northern Spotted Owl, were turned over in record time.

Given the sheer number of conservationist groups that need to be present to battle the profit-seeking big businesses clearly show the inequity of the situation. Big business has a very strong arm, even in the presence of scientific proof which contradicts their practices. By this time, some government agencies, such as the US Forest Service and the Department of Natural Resources, had started to be majorly infiltrated by big business. This seems to happen with every lucrative industry. At some point, some lawmakers become beholden to the industry, while others are more long-term thinkers. We will see the Environmental Protection Agency later find themselves in a similar predicament in regard to their protection of Monsanto's chemical products.

The tug of war between the corporations and the conservationists began at the end of the 1800's, and to this day, hasn't really stopped. Conservationists, and Presidents with naturalist leanings who side with conservationists, would encourage regulations to hold lumber companies in check, while governmental leaders who side with big business would not listen to the public's complaints. Since Theodore Roosevelt in the early 1900's, our government, and both Democratic and Republican parties, have more often sided more with industry than with nature. Corporations have rights on par with American citizens. Lakes, rivers, mountains and the flora and fauna that they support, don't have these rights, despite the fact that we depend upon them for things we need to survive: clean air, water, and materials for shelter.

The issues on the table today are not about heavy equipment or labor practices, per se, but with the application of toxic chemicals and their harmful effects on humans and other creatures, and their far-reaching deleterious effects on the environment. Science and public awareness are catching up to industry.

### Today's Issue: Herbicides



Model of a glyphosate molecule (Wikipedia)

Herbicides are a type of pesticide used to control unwanted foliage. Sometimes herbicides are applied at the end of the growing cycle, as in the cultivation of grains. The herbicide, in this case usually glyphosate, desiccates the leaves of the plant, forcing the plants in the crop to mature simultaneously, and thereby making it easier to harvest. The chemical remains in the part of the plant that is harvested, and we ingest it. Timber companies use herbicides in the forestry application after clearcutting a field of trees and before replanting it with Douglas Fir trees. Two or three additional applications of herbicides are used in the early years of the fir tree plantation. The fir trees are relatively unharmed by the chemical, while the competition is eliminated. Herbicides also contain other chemicals that increase its efficacy by helping it to be dispersed evenly through the air, helping it stick to leaves, and helping it to not break down too quickly. These chemicals are called adjuvants. Adjuvants are not considered active ingredients, and it is not necessary to have them listed on the label. They are chemicals that are under the radar of research and scientific scrutiny. A publication by Beyond Toxics, written in 2013, entitled "Oregon's Industrial Forests and Herbicide Use: A Case Study of Risk to People, Drinking Water and Salmon" gives us this example of an herbal cocktail used in a forest application:

- **GIM mso:** Glyphosate-Imazapyr-Metsulfuron Methyl-Methylated Seed Oil
- **2AH fo gr:** 2,4-D- Atrazine-Hexazinone-Foambuster-Grounded
- **CH fo gr:** Clopyralid- Hexazinone-Foambuster-Grounded

FINAL\_Report\_OregonIndustrialForest\_and\_HerbicideUse\_12-17-13.pdf

The same source reports the following, regarding the chemical mixtures:

"Research suggests that mixing chemicals can lead to synergistic effects. Chemicals applied in a mix can interact with each other, which may result in more harmful environmental effects than when applied individually (Laetz, 2009) (Hayes, 2006). In other words, the effects of synergistic doses cannot be predicted by the effects observed at single doses. Consequently, the impacts to people, fish and other organisms from these tank mixes are not clearly understood and they cannot be considered scientifically sound practices. In a literature review published by the U.S. National Center for Biotechnology Information (Silins & Högberg, 2011), researchers suggest that chemicals that act as endocrine disrupters and carcinogens have long-term impacts via epigenetic mechanisms. The authors concluded, "solid evidence

shows that these groups of chemicals can interact and even produce synergistic effects.” Even lesser amounts of herbicides within a chemical mix may produce toxic impacts during sensitive windows of vulnerability, such as fetal development and early childhood. “

The active ingredients of herbicides contain chemicals that are toxic to plants, often disrupting their growth and development by inhibiting pathways that build proteins or interrupting hormonal pathways that contribute to growth. These same chemicals can interrupt protein and/or hormonal synthesis in some species of fish, amphibians, insects and other organisms. But most, such as glyphosate, don't interact with metabolic pathways in mammals. In humans and other animals, however, these chemicals can trigger the immune system in harmful ways, causing or increasing the chances of developing cancers of the immune system, such as lymphoma. Glyphosate is one of those chemicals that can do that. There is now evidence that prolonged exposure can increase the chances of developing Non-Hodgkin's Lymphoma by 41%.

<http://www.washington.edu/news/2019/02/13/uw-study-exposure-to-chemical-in-roundup-increases-risk-for-cancer/>

Most of us will not have prolonged exposure to these chemicals. But we all have some exposure, from eating foods that have been treated with herbicides, such as cereals, drinking wine (100% of wine contains glyphosate), or playing on a grassy park or playground that has been treated with herbicides. There is a great diversity in the immune systems of humans. In our day-to-day lives, we see one person easily catching a cold, where another person remains free of the viral infection. The same is true at the cellular and molecular level. One child can play in a grassy area that had been sprayed with herbicides and have no noticeable response. And another may be reacting in ways that trigger a systemic immune response such as lymphoma, a hyper-activation of the white blood cells in the bone marrow. Our scientists have not yet figured out how to tell which child will be susceptible to the disease, or why one person's immune system will be triggered, while another's can handle the chemical exposure. Because of this, using herbicides for any application is risky. We are using toxic chemicals in our environment and crossing our fingers that they will not affect us.

Herbicides are most often applied to timberland in an effort to control plants that are in competition with the Douglas fir tree monoculture crop. Herbicides used in forestry are often applied via plane or helicopter, and these practices are imperfect, often causing the chemical to drift onto neighboring farms or residences. The herbicides used in forestry are now known to take up to a year to break down into more inert substances, entering waterways that feed larger rivers, lakes and oceans. These chemicals disturb the vegetative growth of these more sensitive wetlands, as well as do harm the fauna of these areas.

For Washington State forests, one scientist did the math:

“A report in Oregon documented 18,000 pounds of pesticides sprayed on forest lands in one year (within a study area of 184,320 acres). If these quantities are extrapolated to the roughly eight million acres of private forestland in Washington State, it is probable that hundreds of thousands of pounds of chemicals have been applied in Washington.”

Gina Roberti “Spraying in North Cascades Forests?” SEP 12, 2018,

quoting from [https://www.dnr.wa.gov/publications/bc\\_fpb\\_mtgpacket\\_2\\_20160511.pdf](https://www.dnr.wa.gov/publications/bc_fpb_mtgpacket_2_20160511.pdf), p. 25

Applying chemicals to the environment presents problems that extend beyond human exposure. Many herbicides are composed of elements such as nitrogen and phosphorus, which are utilized as food for other plants and bacteria. The atomic structure of glyphosate, the most abundant herbicide in the United States, is C<sub>3</sub>H<sub>8</sub>N<sub>0</sub>O<sub>5</sub>P. Glyphosate takes up to a year to break down in soil, leaching the elements into the groundwater over that period of time. The nutrients feed the regional flora and fauna, encouraging some species to proliferate. One example of this proliferation is in the population of the bacterium in blue-green algae. Blue-green algae is not really an algae, but a photosynthetic cyanobacteria, which naturally grows in aqueous environments, such as lakes. We have blue green algae in most of the lakes in Jefferson County. Certain

circumstances will encourage the bacterium to “bloom”, creating a visible blue-green sludge over the surface of the lake.

Dr. Joseph Mercola, DO, summed up the relationship between blue-green algae and glyphosate with these points:

Phosphorus is a known driver of toxic blue-green algae, or cyanobacteria, as they use it readily for fuel  
Glyphosate is a synthetic phosphonate herbicide and cyanobacteria can utilize the phosphonate portion of the glyphosate molecule for “food”

Toxic algae may be thriving, in part, due to increasing usage of glyphosate, which was found to be likely to stimulate algal blooms

Glyphosate is also capable of releasing phosphorus from the soil and spikes in dissolved reactive phosphorus (DRP) runoff have increased with increased use of glyphosate

<https://articles.mercola.com/sites/articles/archive/2018/02/06/toxic-water-crisis.aspx>

Several conservation groups are studying the connection between the blue-green algae problem as linked to the use of glyphosate. The largest area affected is due to the planting of GE crops that are resistant to glyphosate and the agricultural run-off of phosphate feeding a huge cyanobacteria bloom on Lake Erie.

“Phosphorus—attributed to farm runoff carried by the Maumee River—has long been identified as a leading culprit feeding the excessive blooms in the western Lake Erie basin. Now, according to a new study from chemistry professor Christopher Spiess, a significant correlation has been established between the increased use of glyphosate to the percentage of dissolved reactive phosphorus (DRP) in the runoff.”

<https://www.ecowatch.com/glyphosate-sprayed-on-gmo-crops-linked-to-lake-eries-toxic-algae-bloom-1906543478.html>

For more information on other states’ actions against glyphosate in terms of blue green algae blooms:

Wisconsin’s lakes are also suffering:

<https://dnr.wi.gov/lakes/bluegreenalgae/>

And Florida’s:

<https://jacquithurlowlippisch.com/2017/03/19/is-agricultures-use-of-glyphosate-feeding-lake-os-explosive-algae-blooms-professor-geoffrey-norris-slrirl/>

## Toxic Cyanobacteria Blooms in East Jefferson County

**WARNING**

**TOXIC ALGAE PRESENT**  
Lake unsafe for people and pets

Until further notice:

- **Do not swim or water ski.**  
No nade ni riegue el esquí en el lago
- **Do not drink lake water.**  
No beba el agua del lago
- **Keep pets and livestock away.**  
Animales domésticos y ganado de la subsistencia lejos
- **Clean fish well and discard guts.**  
Limpie los pescados bien y deseche la tripa
- **Avoid areas of scum when boating.**  
Evite las áreas de la espuma cuando canotaje

Call your doctor or veterinarian if you or your animals have sudden or unexplained sickness or signs of poisoning.

Call your local health department:	Report new algae blooms to Department of Ecology: <b>360-407-6000</b>
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For more information: [www.doh.wa.gov/ehp/algae/default](http://www.doh.wa.gov/ehp/algae/default)  
[www.ecy.wa.gov/programs/wq/plants/algae/index.html](http://www.ecy.wa.gov/programs/wq/plants/algae/index.html)

Washington State Department of Health

In 2006, two dogs died and one went into a coma after being in contact with the water at Lake Anderson, in Jefferson County. It appeared that they had come into contact with anatoxin-a, a toxic product of cyanobacteria. In response to those incidents, Jefferson County Public Health began monitoring the levels of anatoxin-a and microcystin. Both are toxic products of cyanobacteria, which have short and long term health risks to humans and other mammals. Anatoxin-a is a potent neurotoxin and microcystin is toxic to the liver. In normal amounts, these toxins are not problematic, but in recent years, the algae blooms have become excessive and because of that, the lakes are periodically closed to recreational use.

In 2012 and 2015, Jefferson County Public Health published its own studies of cyanobacteria and its related toxins in our area. In 2012, the project monitored four lakes: Lake Anderson, Lake Leland, Gibbs Lake and Sandy Shores Lake. Three lakes were studied in 2015: Lake Leland, Lake Anderson and Teal Lake. These lakes have all been noted to have algae blooms in earlier years. In 2008, Lake Anderson had the highest anatoxin-a levels ever recorded in the entire world. This may be due to the specific strain of cyanobacteria (*Anabaena* sp. WA102) that produces large amounts of anatoxin-a.

The first study spans 2009-2010, and the second 2013-2014, with some mention of earlier studies for comparison. The first study used samples from each lake of the cyanobacteria and nutrient samples (nitrogen and phosphorus). Anderson Lake and Lake Leland had the highest levels of toxin in 2008 and 2009, with huge disparities in those years.

“In 2009, Anderson Lake and Lake Leland were again the top two lakes with the highest anatoxin-a concentrations in the state of Washington, with 144.0 (June 1) and 122.0 (May 11) micrograms per liter, respectively. This is less than a thousandth of the 2008 level for Anderson Lake, but over five times the 2008 level for Lake Leland (WSDOE 2009). We have no explanation for this great disparity in toxin levels between the two years for both lakes. These peak levels for both lakes were still over 100 times the minimum safe level for this toxin (i.e., 1 microgram per liter). Anderson Lake anatoxin-a levels in 2009 exceeded the minimum safe level of 1 microgram per liter on 17 of 20 sampling occasions (85%) over a five-month period from April 15 (first sampling date) through September 8 (final sampling date), almost identical to the pattern seen in 2008 (Table 4).”

Another anomaly occurred in regard to Gibbs Lake. Normally, the algal blooms are most pronounced in the late summer to fall, when the surface temperatures reach 72-80 degrees Fahrenheit. In 2009, the lake experienced a bloom at only 39 degrees Fahrenheit:

“During this study, we recorded a toxic algae bloom in Gibbs Lake on December 17, 2009, at a surface water temperature of only 4 degrees C (39 degrees F), that had a cell count high enough to place it in the “Caution” status (59,000 cells per mL; 94% Aphanizomenon, 6% Anabaena) (Table 3). We were unable to obtain a toxin assay of this sample. This may be a record low temperature for a cyanobacterial bloom of this size in Washington State. On the same date, and with similar surface water temperatures, (2.6-4.5 degrees C, or 37-40 degrees F), the other three lakes sampled had very small numbers of algae of any kind.” p.15, Final Report for Jefferson County Lakes Monitoring Water Quality Assessment, 2012

In the second study, the researchers, Evan Dobrowski and Michael Dawson studied cyanobacteria at shallow and deep levels and the phosphorus that feeds the algae. The first study reported high phosphorus levels in the shallow samples in comparison to the deep samples, which is opposite of the norm. This may be accounted for by the use of an aerator in Lake Anderson to provide more oxygen to the deeper lake regions in order to maintain the fish population. As a result of the study, it was found that the aerator was in fact not contributing oxygen, but only stirring up sediment from the bottom of the lake. The aerator was turned off and has not been in use since 2011, yet the phosphorus levels continue to rise.

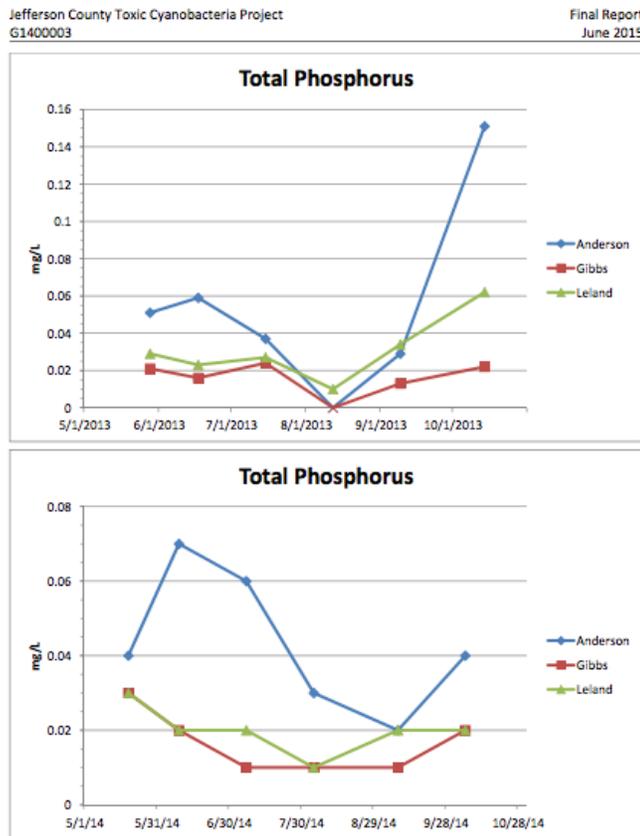


Figure 8, Total Phosphorus Plots

These anomalies in our regional lakes have not been explained. It would take more research to understand why we see such variability in toxin levels, bloom times, and phosphorus levels. One explanation is that we are experiencing the same problem that Lake Erie and other lakes are experiencing. We have a contaminant: herbicides, pesticide and fertilizer use in the neighboring forest, roadsides, landscaping and agricultural land. If lakes and streams in other parts of the country are experiencing episodes of blue green algae blooms

due to phosphorus feeding from herbicides like glyphosate, how can it be possible that we are immune to this same phenomenon here in the Pacific Northwest?

### Other causes of algal blooms

Herbicides are not the sole cause of toxic cyanobacterial infestations in our lakes. One resource, a Washington State University study written by Gretchen Rollwagen-Bollens and Stephen Bollens casts the net pretty widely...

“...Increasing evidence demonstrates that the eutrophication process (the increase of nutrient levels in a body of water, which encourages plant growth and discourages animal growth) in lakes is being accelerated by human activity, through sewage and fertilizer inputs, deforestation, road construction, real estate development and other disturbances in lake watersheds, and is contributing to an increase in frequency and intensity of cyanobacteria blooms (e.g. Sellner et al. 2003, Paerl 2008).”

[https://wrc.wsu.edu/documents/2017/11/2014wa381b\\_rollwagen-bollens.pdf/](https://wrc.wsu.edu/documents/2017/11/2014wa381b_rollwagen-bollens.pdf/)

And the source goes on to say...

“Also, in a multivariate statistical analysis conducted on weekly measurements of water quality (e.g. temperature, turbidity, pH, dissolved oxygen), inorganic nutrient concentration (e.g. nitrate, nitrite, ammonia, orthophosphate), and the abundance and taxonomic composition of algae and cyanobacteria from 2007-2010 in Vancouver Lake, we found that the environmental factors most strongly associated with cyanobacteria blooms were orthophosphate and ammonium concentrations. **However, nutrient availability could only explain ~35-50% of the variance in algal abundance** (Lee et al. in press)” (my emphasis).

When we see numbers like ~35-50%, as in the last sentence of the quote, we know that eliminating the chemical spraying of herbicides is a change we need to make. Herbicides may not be the sole cause of algal blooms, but they contribute enough to get our attention.

### The Environmental Protection Agency’s Stance on Herbicides

The EPA is well aware that the chemicals used as herbicides are toxic. In fact, their toxicity contributes directly to their efficacy. The EPA also admits that herbicides contain many unknowns, as the chemicals may change over time, and the systems affected in plants, animals and other organisms may not show the effects of exposure until much later, or even until future generations. They also admit that the toxic effects of herbicides can be increased by other factors, such as temperature, pH, oxygen concentration, and the presence of other chemicals, such as when herbicides are combined, or their adjuvants. In our forests, we are always combining various herbicides before applying them. None of this has been studied.

For example, the EPA website states,

“The potential effects of herbicides are strongly influenced by their toxic mode of action and their method of application. The molecular site of action is challenging to predict because structural associations have not been identified (Duke 1990), but modes of action are well established. Herbicides can act by inhibiting cell division, photosynthesis or amino acid production or by mimicking natural plant growth hormones, causing deformities (Ross and Childs 1996).”

<https://www.epa.gov/caddis-vol2/caddis-volume-2-sources-stressors-responses-herbicides>

The website goes on to list various species of organisms other than the target plant life, that are adversely affected by two common herbicides, glyphosate and atrazine, both of which are used in our forests. It is common knowledge now that every organism, no matter how small and seemingly insignificant, is part of the web of life. We're seeing a disastrous decline in insects, including bees worldwide. And the number one cause for this is herbicides and pesticides.

The Environmental Protection Agency (EPA) is our go-to for monitoring safe forestry practices. We count on them to have our backs. But unfortunately, they have been contaminated by big business.

According to the Natural Resources Defense Council, a two-year investigation found that the U.S. Environmental Protection Agency (EPA) used a regulatory loophole to approve 65% of 16,000 pesticides that pose a potential threat to public health. In 1978, Congress gave the EPA authority to issue approvals on a conditional basis for pesticides needed to address public health emergencies. The agency was to use this authority sparingly. However, in an internal review, the EPA said it had widely (98% of the time) misused its "conditional registration" of pesticides from 2004 to 2010.

However, other government agencies are just beginning to turn around. Disturbed by the destruction of the world's ecosystems, the Federal Government is trying to lure business into saving the environment. How can we make conservationism profitable?

The US Department of Agriculture is labeling undisturbed forests as beneficial entities. And they're calling them Ecosystem Services. The United Nations has created The Millennium Ecosystem Assessment, a four-year assessment, prepared by over 1300 experts, of the "conditions and trends of the world's ecosystems". Their website also states, "scientists predicted that ecosystem degradation could grow significantly worse in the first half of the 21st century, with important consequences to human well-being." They use the following categorical standards:

Provisioning Services or the provision of food, fresh water, fuel, fiber, and other goods;  
Regulating Services such as climate, water, and disease regulation as well as pollination;  
Supporting Services such as soil formation and nutrient cycling; and  
Cultural Services such as educational, aesthetic, and cultural heritage values as well as recreation and tourism.

[https://www.fs.fed.us/ecosystemservices/About\\_ES/index.shtml](https://www.fs.fed.us/ecosystemservices/About_ES/index.shtml)

## **Our Responsibility**



Most of our government entities, however, like the EPA and US Forest Service, and even some of our local representatives, are swayed by the influence of large corporations. Democracy Now's Amy Goodman

interviewed a journalist who wrote about the original producer of Roundup/glyphosate. Here is the the intro to her piece...

“As Monsanto comes under scrutiny for allegedly hiding the dangers of its weed killer Roundup, we talk to a reporter who says the company attempted to censor and discredit her when she published stories on their product that contradicted their business interests. Carey Gillam is a veteran investigative journalist and author of “Whitewash: The Story of a Weed Killer, Cancer, and the Corruption of Science.”  
([https://www.democracynow.org/2018/8/14/how\\_monsanto\\_plants\\_stories\\_suppresses\\_science](https://www.democracynow.org/2018/8/14/how_monsanto_plants_stories_suppresses_science))

Clearly, if large corporations are going to move forward, sometimes illegally, using potentially harmful chemicals and practices in the name of profit, it's up to the general public and our elected officials to protect ourselves. Once again, we are looking at the balance of the four entities: sustainability, safe practice, the preservation of the environment, and our enjoyment of it. We are hard put in this era of human error regarding our wastefulness of resources and disregard for their negative side effects. We will be making many changes in our lifestyle and industry over the next decades to save our world. It is up to our community leaders... educators, lawmakers, community representatives, spiritual leaders, and so on, to inform themselves and educate their communities in order to help us make these changes.

### Recent Actions Against Herbicidal Spraying in Washington State

The Washington State Department of Agriculture issued 12 enforcement actions for herbicide or pesticide spray violations in 2017, 21 in 2018 and 6 actions as of Feb. 25, for 2019. Most of these were drift violations: spraying people, vegetation or land that was beyond the spray area.

Lack of compliance in notifying neighbors before a spray, or failing to post a notice in a recently sprayed area motivated Native Americans in the Columbia River area to change the rules for notification of herbicidal spraying. In 2016 the Upper Columbia United Tribes initiated a rule change that included giving more advance notice to neighbors within a mile of a treated area. I could not find any rule change that was in effect from their efforts.

(WA DNR Forest Practices memorandum (minutes) on Aerial spraying of herbicides, including a tribal letter, etc., pp. 19-41 [https://www.dnr.wa.gov/publications/bc\\_fpb\\_mtgpocket\\_2\\_20160511.pdf](https://www.dnr.wa.gov/publications/bc_fpb_mtgpocket_2_20160511.pdf))

Research on glyphosate and its effects on the environment continue...

**Glyphosate and dicamba herbicides increase antibiotic resistance in bacteria**

Published: 12 October 2018

Share 4.3K Like 4.3K Tweet LinkedIn Share



Antibiotic resistance development in bacteria increased by a factor of up to 100,000 times faster than occurs without the herbicide

**Canadian Journal of Forest Research**

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**Article**

**The presence of glyphosate in forest plants with different life strategies one-year after application**

Lisa June Wood, PhD

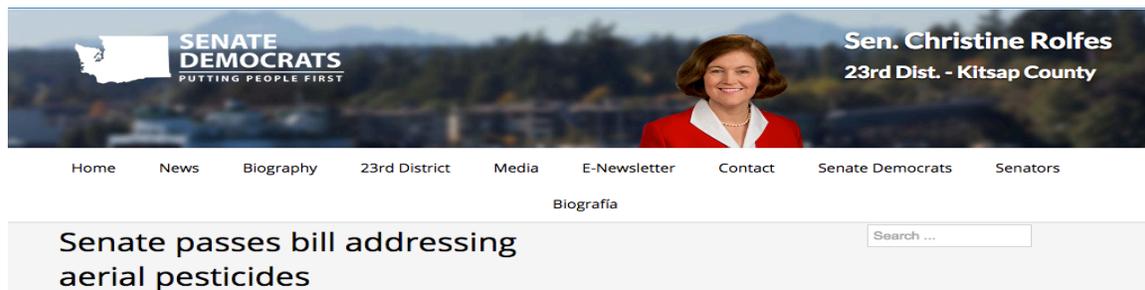
Published on the web 08 January 2019.  
Received August 06, 2018.

Browse the Journal

Canadian Journal of Forest Research, <https://doi.org/10.1139/cjfr-2018-0331>

List of Issues

Kitsap County, faced with an up and coming clearcut and aerial herbicidal spray, contacted the community Environmental Legal Defense Fund (CELDF), and local representatives attended a Democracy School to learn how to defend themselves against local illegal and/or harmful activities of the timber industry. In February, leaders from Jefferson County Washington Coalition to Stop Toxic Aerial Spraying spoke up in Olympia, illustrating the need for more study on the negative side effects of herbicides sprayed on the Tree Farms in our area. As a result, the WA State Senate recently passed a bill asking for a work group to study the issue. The work group consists of community members, agency officials, legislators, forestland owners, tribal leaders, organic farmers, aerial applicators, weed control experts, and additional policy experts. We are asking our legislators for their attention in supporting our land and our livelihood. Let's keep our bees alive for another hundred years.



OLYMPIA – Threats to public health and the overall environment from pesticides sprayed above forestlands would be the focus of a working group created by legislation passed by the Senate today on a 47-0 vote.

Senate Bill 5597, sponsored by Sen. Christine Rolfes (D-Bainbridge Island), establishes a legislative work group to develop recommendations for improving best management practices for pesticide use. The group must report its findings, recommendations, and draft legislation to the governor by November.

The legislation was prompted by concerns from residents in Kitsap County over the spraying process and chemicals being applied to area forestlands.

“We know there are many legitimate health and environmental concerns posed by the use of these pesticides,” Rolfes said. “This bill is designed to bring community members and environmental advocates together to take a fresh look at our sustainable forest practices and share new technologies and ideas.”

For progress on the bill, click on:

<https://app.leg.wa.gov/billsummary?BillNumber=5597&Initiative=false&Year=2019>

As I mentioned at the beginning, in medicine, if there is one study that shows that a new pharmaceutical agent is potentially dangerous to the public, it is removed from the shelves and researched further. There are occasionally mistakes, and corporate interests manage to manipulate the system and pervade over public oversight. But instead of lowering our standards to these errors, we should be cautious and conservative in the advancement of technologies and processes in every industry. We stand now at the precipice of environmental collapse. We cannot any longer stand by and watch it happen without action to stop the destruction.

If we look back over the history of the timber industry, we see the good, the bad, the ugly and the beautiful... We see monumental changes in technology and process. From handsaws to fellerbunchers. From rogue lumberjacks to unionized crews with health care.

But mostly, we see changes in the forest itself. Huge old growth forests, teeming with diversity and undisturbed by human's profit-seeking interference have turned into tree plantations: plots of land stripped

by herbicides, giving hearth and home to a monoculture of genetically modified trees, in short growing cycles, a patchwork of erosive soils devoid of understory species of plants, mushrooms, animals, insects, and filled instead with opportunistic species of berries, grasses and slash and fall debris. For a person who believes in the interconnectedness of the planet and her various progeny, one of the saddest sites is driving by a slash-covered clearcut, with a few sentinel trees standing at odd angles: a veritable sign of the destruction we have created in a world we rely on for subsistence.

Sustainability is a popular word as we move into an era dominated by our Earth's precarious stance of increasing global temperatures and melting polar ice caps. One well-known, contributing factor to sustainability in our ecosystem is diversity. Diversity protects any species from disease and adverse conditions, such as inclement weather, fire, and other natural challenges. In terms of diversity, the forest industry has forced us in the other direction. We have cut down the 98% of our old growth forests, destroyed the diverse and complex environment that they provided, and replaced almost half of the original acreage with monoculture tree plantations. The new genetically modified Douglas Fir trees are clear cut, with very few left standing along streams or in empty fields. Most of these will end up as fall after a couple of windstorms. The land is sprayed with chemical herbicides that eliminate any competitors to the timber company's crop, while simultaneously eliminating crucial pollinators and other organisms that provide the foundation for other species to survive. The wildlife habitat is sacrificed for profit, the land is rife with scarring from heavy equipment, and runoff down slopes is heavy, taking with it nutrients and chemicals to neighboring lands and water sources and spilling into bodies of water to foster organisms like cyanobacteria which render them uninhabitable.

This is a sad story of wastefulness and environmental abuse to those who are paying attention to what our science is now telling us about the necessity of all creatures, of the interconnectedness of all living things. Fifty years ago, fungi were basically indicative of moist environments. Now they are known as bio-remediators and their mycelium as a vast communication network of nutrient sharing between trees and other living organisms. Our diverse ecosystem has been perfecting itself over billions of years. Any change we make will have negative side effects. If we are to be decent stewards of the land, we need to be gentler with our approach, and eliminate harmful chemicals and monoculture plantations. If there is a shortage of timber, we will learn to rely on other materials, and hopefully become more respectful and responsible human beings in the process.

Appendix A  
Federal Government Declares a Moratorium on Herbicides

UCLA 73,  
Washington 59  
Details in Sports, Section C

# The Register-Guard

Partly sunny  
Weather details, Page 2A

117TH YEAR, NUMBER 131

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THE REGISTER-GUARD

EUGENE, OREGON, FRIDAY, MARCH 2, 1984

4 Sections, 48 Pages

25 CENTS

## Judge imposes ban on herbicides

### No-spray order affects Oregon, Washington forests

From Register-Guard  
and Wire Service Reports

A ban on herbicide spraying was imposed Thursday by federal Judge James Burns in Portland on all national forest land in Oregon and Washington and on all Bureau of Land Management forests in Oregon.

Burns said his injunction will remain in effect until the two federal agencies complete a "worst-case analysis" of the effects of the use of herbicides. The order, handed down in U.S. District Court just before 10 p.m. Thursday, is the most sweeping ban against the forest use of the chemicals yet issued by the courts.

Burns said the injunction applies to all aerial and ground applications of herbicides, which are used primarily to kill underbrush that competes with young trees for water and soil nutrients and to prepare sites for planting by removing unwanted vegetation.

The ruling came in a lawsuit filed by three environmental organizations — the Northwest Coalition for Alternatives to Pesticides, based in Eugene, and

the Oregon Environmental Council and the Audubon Society of Portland.

Burns said there will be no exceptions to the ban. He said it applies to the spraying programs of the two agencies "in their entirety," including the use of herbicides in research and program-testing programs, in nurseries, in programs to control noxious weeds and in the use of chemicals in stem injections, called "hack and squirt."

Wallace Shiverdecker, public affairs officer for the U.S. Forest Service's Pacific Northwest Regional Office in Portland, said the ban puts a halt to a 1984 vegetation management program that included the planned aerial application of herbicides to 18,278 acres and ground herbicide application to 24,900 acres in national forests in the two states.

"It looks like it will have a significant impact on a lot of our programs for management of resources," he said. "We may be able to do some of the work with manual control methods, but that depends upon getting more money and more people — and we have a ceiling on hiring."

Shiverdecker said the Forest Service estimates

that it would cost almost \$12 million more to substitute manual control methods to treat the number of acres scheduled for aerial spraying.

"Right now we don't have the money or the manpower to do it," he said. The bulk of the spraying had been scheduled this spring, he said.

In Eugene, Jerry Mason, public affairs officer for the Willamette National Forest, said his agency has delayed issuing an environmental assessment on this year's Willamette forest spray program because of the pending court decision.

He said the ban will have the least effect on an alternative that proposes manual brush control methods for 1,800 acres and ground and aerial spraying for 1,400 acres. Even under that alternative, the injunction means a 44 percent reduction in acres to be treated, he said.

Ed Clibbert, public affairs officer for the BLM's state office in Portland, was unable to provide figures on that agency's projected spray program for

Turn to HERBICIDES, Page 4A

### Chronology of events:

**MAY 1974** — In Oregon, Citizens Against Toxic Sprays in a federal court suit sought an end to use of 2,4,5-T in the Siuslaw National Forest.

**FEBRUARY 1977** — With the suit continuing, the anti-spray group reported traces of dioxin were found in the milk of nursing mothers in Five Rivers, a small community in the Siuslaw National Forest area. Dioxin is an extremely toxic chemical that is found in 2,4,5-T.

**APRIL 1978** — The U.S. Environmental Protection Agency reported that dioxin and 2,4,5-T might be the cause of cancer and birth defects in humans. Forest Service officials were ordered to observe more stringent regulations on use of the herbicides. In late summer, under pressure from Oregon Gov. Bob Sivak, the State Board of Forestry ordered no spraying of the herbicides 2,4,5-T and Silvex, both of which contain dioxin, within a 200-foot buffer strip near streams.

**MARCH 1979** — The EPA suspended use of 2,4,5-T herbicides until its potential threat to human health could be reassessed. The

Turn to CHRONOLOGY, Page 4A

# Chronology—Coho

Continued from Page One

Continued from Page One

agency cited the possible link between the sprays and miscarriages of pregnant women in the Five Rivers area. Chemical corporations sued to overturn the suspension but in April 1979, a federal judge in Washington, D.C., banned use of the herbicides until the hearings could be completed.

**MARCH 1981** — The EPA hearings to make the suspension permanent were halted to allow attorneys for the agency and major chemical companies to attempt a negotiated settlement — but no agreement was reached.

**APRIL 1981** — A Five Rivers resident, Paul Merrell, filed a lawsuit to prevent the Siuslaw National Forest and Bureau of Land Management from using the herbicides near his home.

**MARCH 1983** — Two anti-herbicide groups, Save Our Ecosystems and Citizens for Alternatives to Toxic Sprays, filed a lawsuit in federal court contending that the BLM failed to prepare a "worst-case" analysis on the dangers of use of the herbicides as ordered earlier by U.S. District Judge Helen Frye. Hearings on the suit were held before U.S. District Judge Robert Belloni.

**APRIL 1983** — Judge Belloni ordered a ban on spraying of the herbicides within 25 miles of the Siuslaw National Forest, an injunction directed against the Forest Service and BLM until a "worst-case" analysis was completed. The ban produced confusion among the federal agencies and they appealed.

**MAY 1983** — Judge Belloni lifted the ban, citing reports that he said show that without the herbicides "the harm to reproduction of young trees in the forests would be great." However, the U.S. Ninth Circuit Court of Appeals put the ban back in place and then a few weeks later revised the ruling to allow some uses.

**JUNE 1983** — A lawsuit to prohibit spraying on federal lands in Oregon and Washington was filed by the Northwest Coalition for Alternatives to Pesticides, Oregon Environmental Council and Portland Audubon Society.

you get down to these low levels, there really aren't enough fish to provide a meaningful commercial fishery," he says.

He estimates the sport fishing quota south of Cape Falcon will be only 110,000 to 120,000 fish, down from 211,000 last year. Last year's actual catch in that area was only 137,000, however, and most of the fish were much smaller than usual.

The prospect of no commercial quotas at all does not sit well with some fishermen. They have had small pieces of the coho pie before, but never have gone completely hungry.

"It's going to just about wipe out our troll industry," says Al Seelig, of

## Herbicides—

Continued from Page One

1984. He said resource staff people were out of the office.

The Eugene BLM district tentatively planned to treat slightly more than 12,000 acres of Lane County lands this season — but a federal 9th Circuit Court of Appeals injunction in January in another herbicide lawsuit already has halted the Eugene BLM spray plans.

The Forest Service and BLM scheduled a news conference today in Portland to discuss the effect of Burns' injunction.

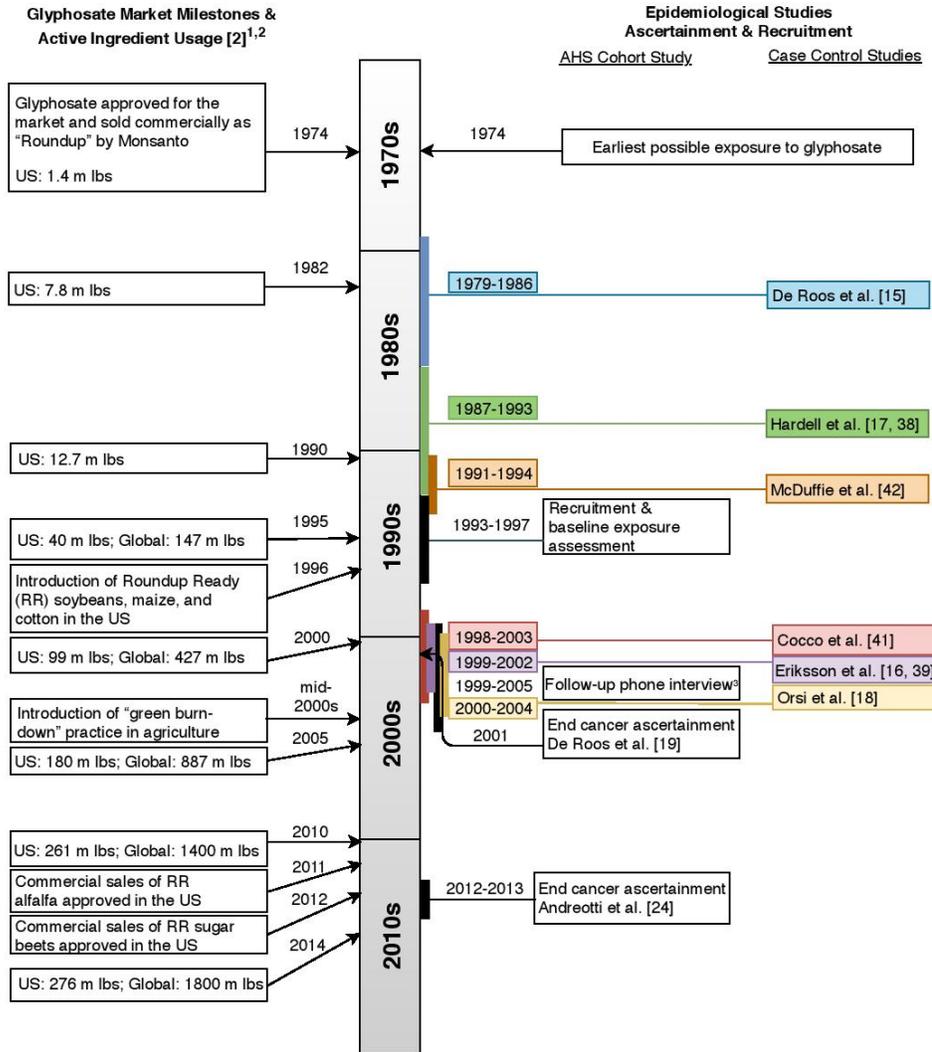
The plaintiffs in the lawsuit claimed that the two federal agencies failed to comply with the National Environmental Protection Act by not properly evaluating the effect of the spraying.

The judge had ruled against the Forest Service and BLM in the case in early January, ordering the two agencies to prepare a worst-case analysis but stopping short of issuing an injunction.

At that time, Burns said in a written opinion that the two agencies "have balked and delayed in the face of direct court orders."

## Appendix B

### A Timeline of Glyphosate and Its Scientific Review



**Figure 3: Timeline of glyphosate use milestones in relation to cohort and case-control study events**

<sup>1</sup> Glyphosate active ingredient usage includes agricultural and non-agricultural applications

<sup>2</sup> m = millions; lbs = pounds

<sup>3</sup> Completed by 63% of AHS participants

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Lary M. Dilsaver and William C. Tweed

©1990, Sequoia Natural History Association, Inc.

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Submitted by Gretchen Rollwagen-Bollens and Stephen Bollens

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