[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Comment on Highway 36 Public Health Assessment

I am concerned that the government doesn't stop the practice of spraying herbicides or pesticides when people are being exposed to them. I am concerned that you make people of the area take precautions, instead of changing your harmful practices. I am concerned for the health of the people being exposed.

Why does the government spray pesticides/herbicides when many people don't want it? We all have a right to LIFE according to the Declaration of Independence.

Also, it's all our forest, so where do you (the government) get off deciding for our public lands? It should be left to nature to handle organically, because she does a far better job than corrupt mankind does.

Sincerely,
[redacted]

OFS
Oregonians for Food & Shelter
Serving Oregon Since 1980
(503) 370-8092
FAX: (503) 370-8565
www.ofsonline.org

Oregonians for Food & Shelter

1149 Court Street NE ♦ Suite 110 ♦ Salem, Oregon 97301-4030

A non-profit coalition to promote the efficient production of quality food and fiber while protecting human health, personal property and the environment, through the integrated, responsible use of pest management products, soil nutrients and biotechnology.

9 August 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

I am writing on behalf of the 13,000 individuals, businesses and natural resource organizations that are members of Oregonians for Food & Shelter (OFS) to comment on the Highway 36 Exposure Investigation Public Health Assessment (PHA) dated May 9, 2013.

OFS is a grassroots coalition representing farmers, foresters, and other urban, chemical users in Oregon, all of whom are closely following the Highway 36 Exposure Investigation. We are following this investigation due to the significance of the charges being levied by some members of the community. If the accusations are founded, there are problems that need to be fixed. Conversely, if the charges are proven unfounded, it will be important to end the investigation and reassure the public that aerial spraying with 2,4-D and atrazine as currently conducted poses no risk to the public. We are prepared for either scenario and would hope that Oregon Health Authority (OHA) is as well. Science should be our guide and we need to go where it leads us.

While we question why OHA is collecting comments on what is supposed to be a scientific report, we will take the opportunity to comment on the PHA, and hope to see our suggestions included in the final draft.

Fall 2011 Sampling

2,4-D

Conclusion 7: "However, there were a slightly greater than expected number of participants whose urinary 2,4-D levels were greater than the NHANES 75th percentile. The difference approached, but did not attain, statistical significance."

We are concerned with the use of the NHANES 75th percentile as a benchmark for assessment. There is no justification given for why a comparison was made to the 75th percentile NHANES value. Conclusion 7 further indicates that the number was not statistically significant. Despite this, readers are given the impression that these exposure numbers are of concern despite the fact that the PHA further notes that

"[T]he weight of available scientific evidence indicates that the 2,4-D levels measured in EI participants' urine do not pose public health risks." The unjustified inclusion of the 75th percentile comes across as "statistical fishing."

On page 22 of the report under "Summary of Fall 2011 Sampling", the second bullet point states that:

"[B]ecause statistical significance tests on urinary 2,4-D levels were equivocal, OHA cannot conclude whether EI participants were statistically different than the general U.S. population with respect to urinary 2,4-D levels at the time of sampling."

This assertion is contradictory to the actual analysis of the data summarized on pages 17-18. Comparisons to the NHANES 90th percentile show that "this number was not higher than expected". Even when the results were compared to the arbitrary 75th percentile, the numbers were not statistically significant.

The 2,4-D concentrations from the Fall 2011 sampling show that the numbers are what should be expected for any like population in the United States. That is what the report should reflect.

Forestry Practices

Under the "Uncertainties and Limitations" section of the PHA, the following statement appears:

"*It is not known if the Exposure Investigation resulted in changes to pesticide application practices in the investigation area, and therefore if exposure conditions have changed for Highway 36 corridor residents."*

This suggests that landowners deliberately changed application practices because of the investigation. This accusation should have some basis if it is to appear in the report. Contrary to the assertion made here, a review of application records show no major changes in application practices after the EI began. The above statement implies that forestry landowners have not acted in good faith regarding the investigation, and that is simply not true. This statement should be backed up with data or removed from the report.

This section of the report highlights the lack of understanding about forestry operations that has been a persistent issue throughout the Highway 36 Exposure Investigation. We encourage OHA to better engage with forestry landowners and the Oregon Department of Forestry to gain a better understanding of how our private forestlands are managed.

Spring 2011 Community Collected Samples

We were very concerned to see the inclusion of community collected samples in the PHA. There are significant gaps in the chain-of-custody for the urine samples, and inclusion because the results were "not statistically different" is not a scientifically sound justification.

There are several issues that need to be addressed in regards to the community collected urine samples:

1.) By the reports own admission, only 20 of the 39 samples had complete chain-of-custody documentation. That means that over 48% of the tested samples did not have a complete chain-of-custody record. In any scientific research, that number is completely unacceptable.

2.) *"OHA was not able to adjust the urinary 2,4-D and atrazine results for creatinine because the 39 samples were not tested for creatinine."* Without using a creatinine comparison value, the concentration values found in the samples can't be used to draw any conclusions about exposure.

3.) Residents collecting their own urine samples admit that they used a number of methods to try and determine when sprays were occurring. One method used was collecting a "second sample after: hearing, seeing, and/or filming an aerial spraying;" If a resident attempted to get close enough to film a spray, they could have exposed themselves by being in the application area. This could lead to urinary concentrations brought on by exposures caused by the resident's activity, not due to spray methods.

4.) Of the 39 samples tested, 30 were taken prior to any reported applications of 2,4-D or Atrazine. As the report notes, Atrazine and 2,4-D metabolites are quickly excreted from the body so any detectable concentrations would need to be from a recent exposure. The report does nothing to explain why Atrazine metabolites were found in all 30 of the samples taken prior to application. Atrazine is a "restricted use" pesticide so all applications in the region would have had to be reported. This suggests that residents were exposed somewhere outside the region. The report does nothing to address this important contradiction.

5.) According to the report, "[*W]hile the levels of 2,4-D were statistically similar in the two groups, the levels of atrazine were significantly higher in the postapplication samples compared to the baseline samples."* The PHA then goes on to report that, "*There were four known applications of atrazine, all aerial applications and all coapplied with 2,4-D."* The report offers no explanation as to how if the atrazine exposure was due to drift from one of these reported applications, there was no additional exposure to 2,4-D. If the application resulted in the claimed drift of 2+ miles, one would expect to find a higher level of exposure to both herbicides, not just one.

Conclusions

The best way to conclude the investigation is to have strong scientifically sound data. The data are clear that no one tested in the EI area was exposed to either Atrazine or 2,4-D at levels that would cause a health concern. Additionally it is clear that exposure to a broader list of pesticides through water, soil, or homegrown food is not a concern.

While we appreciate that there is still some question about air as a potential pathway for exposure, we are hopeful that sufficient protocols can be put together to obtain sound data.

Since the other potential pathways to exposure have been eliminated, testing air as a pathway should be the final step in this investigation. There should be agreement that if air monitoring results show no exposure to pesticides at levels of health concern, the investigation will be concluded.

This report highlights the danger in not clearly articulating the results from the investigation. The ambiguity and caveats throughout the PHA do not offer comfort, but promote concern. The EPA health benchmarks are scientifically rigorous and offer protection for human health. That standard is what should be used in this, and any future reports.

Lastly, OHA should seriously reconsider the inclusion of the community collected data in the PHA. As outlined above, too many questions remain about the validity of the data, and including it in a scientific report gives it more credibility than is warranted. The final PHA should either address all of the concerns noted above, or remove the data from the report.

Thank you for considering our comments on the report, and we look forward to continue working with you as the investigation reaches is final stages.

Sincerely,

Scott J. Dahlman
Executive Director

CC:

The following is what I said at the OHA public meeting on May 28th, submitted here for my comments.

Hello,
my name is [redacted] and I live on Fish Creek Road. I was 11 years old when I tested positive twice for both Atrazine and 2,4-D.
I was 12 when the States testing showed 2,4-D in me for a third time. In 2011 my little brother and I had severe coughing and mild vomiting for 7 months. No doctor could explain it.
The helicopters have been gone for the last year and a half, and so has our cough. When you're all sitting there at work, please remember the children trying to grow up with these potentially dangerous chemical exposures.
Thank you

[redacted]

side note from mom...
We took allergy panels and we changed their diet, nothing changed. We then left the State for a full month, and Tobbe's cough went away, only to come back after our return. Not only did their cough go away when the helicopters stopped coming, but we all stopped getting colds with such frequency. The sprays start up again in August.

[redacted]
Cottage Grove, OR 97401
July 18, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Re: Public Comment Release
Public Health Assessment
Highway 36 Corridor Exposure Investigation

Dear Members of the Environmental Health Assessment Program,

I am submitting these comments on behalf of the Siuslaw Watershed Guardians, which submitted water quality data to the Highway 36 Corridor Exposure Investigation.

1. There are two errors in the chart on page 33 showing the Siuslaw Watershed Guardians' water quality testing results. Both are in the column showing the results for Hexazinone:

a. In the first row, showing the result for the original sample at Fish Creek near the Mouth, the amount of Hexazinone per POCIS should be 64 nanograms, not the 50.7 that is shown. The lab report shows 192 nanograms in the sample; therefore the correct entry should be 192 divided by 3, or 64.

b. In the sixth row, showing the result for the original sample at Nelson Creek downstream of Almaisie Creek, the amount of Hexazinone per POCIS should be 13.6 nanograms, not the Not Detected that is shown. The lab report shows 40.8 nanograms in the sample; therefore the correct entry should be 40.8 divided by 3, or 13.6.

Please advise if you need an additional copy of the lab reports to verify these amounts.

2. The POCIS sampler that was located in Lake Creek above Fish Creek showed detections of Atrazine, Desethyl Atrazine and Hexazinone, but the pesticide application records show that there were no prior applications of those chemicals in the watershed above the sampling point. This is strong evidence that the contamination occurred through drift from pesticide applications in adjoining watersheds.

3. The OHA report indicates, at page 32, that the Oregon Department of Environmental Quality "typically" finds atrazine and hexazinone in waters throughout the state. However, a review of sampling sites used by DEQ shows that these detections have typically been in larger streams draining much larger watersheds that typically contain many land uses, including agriculture. The sampling sites used by the Siuslaw Watershed Guardians were, with the exception of the Lake Creek sampler, sites on very small streams draining very small watersheds where forestry is typically the primary land use.

4. Other potential sources of pesticides in the watershed which have not been investigated include Triangle Lake itself (water, sediments), as well as air-borne contaminants released when treated

lumber is burned.

Siuslaw Watershed Guardians reserves the right of its members to submit additional comments within the comment period.

Sincerely,

[redacted]

On Behalf Of
Siuslaw Watershed Guardians

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Highway 36 EI Comment

I am very concerned about the inclusion of urine samples that were collected in the Spring of 2011 by persons who followed few scientific protocols. The PHA states that only
20 of the 39 samples had complete chain of custody documentation. In any study those numbers would be unacceptable and should not be considered.
These persons could have contaminated there samples or themselves any number of ways. The way to properly conduct a PHA is to rely on scientifically
sound data. Fall 2011 sampling shows that the numbers were what is to be expected for any like U.S. population. **This is what the report should reflect.**

Scientific data indicates that no one tested in the EI area was exposed at levels that would cause a health problem. Also the EI fails to indentify how any exposure
occurred. If any further investigations are considered they should be limited to sound scientific protocols.

It is my opinion that the agencies involved have spent enough time and resources on this matter. The EPA health benchmarks are developed based on good science
and offer protections for public health.

Thank you for your interest and consideration of my comments.

[redacted]
Newberg, OR 97132

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: FLY SWATTER

A fly swatter is a non-selective pesticide. It can kill living things.
It would never pass EPA regulations. And there are no instruction, safety or otherwise, nor disposal regulations for the plastic chemical.

I refuse to buy/eat organic foods. Too many pesticides. Why don't organic apples have worm holes in them?

And they're used at up to 100s of lbs/acre (regulated down to <1 oz/acre). And many are not regulated. How much soap (lye) is safe to eat?

--
[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Triangle Lake

[redacted]

It is naive to assume that a human body exposed to pesticides does not suffer at some point on the spectrum of harm. Possibly our collective loss of rational thinking in that regard is an indication of the degree of our toxification.

[redacted]
Deadwood, Oregon 97430

[redacted]

From: [redacted]
Sent: [redacted]
To: 'EHAP INFO'
Cc: 'Farrer David G'
Subject: RE: comments re Hwy 36 Investigation

[redacted]
If it can be tagged on, here is one additional thought that expands on point #2 below.

It is important to look at the consequences of herbicide use in Oregon forest. Given the forcefulness of concern that has been generated in the Triangle Lake area, it is completely understandable and appropriate that the studies are focusing on that area. At the same time, there are other areas of the state where the concentration of spraying is significantly higher, due to the lack of public ownership. Accordingly, I hope and suggest that future studies look at the issues based on where the greatest problems are likely to be – and independent of the factor of where Oregonians are the most vocal about the problems.

Thank you - [redacted]

[redacted]

From: [redacted]
To: ehap.info@state.or.us
Subject: comments re Hwy 36 Investigation

To: Public Health Dept. Staff
From: [redacted]
Re: Comments on Exposure Investigation Assessment
7.28.2013

I write as a citizen, family forest owner, and former member of the state Board of Forestry to share four comments regarding the assessment:

1) First, I would like to commend those responsible for the serious and professional way that the assessment has been conducted. This important and appreciated.
2) **Understanding Herbicide Impacts on Oregon Forests** – Though I understand that specific concerns have led to your focus on the geography surrounding the Triangle Lake are, I hope and suggest that ongoing studies should broaden the area of focus to include those forest lands where the use of herbicides in most concentrated. It appears that much of the study area includes lands with checkerboard ownership alternating between BLM and private. Given the relatively low level of chemical use on the BLM lands, it means that your studies are focused in areas with roughly half of the herbicide concentration of the areas that are 100% private industrial forest lands. To truly understand the extent of herbicide impacts, it seems appropriate and important to have some of the research done in areas that are representative of the state's most intensive forest management. An example of this would be the headwaters of Rock Creek in the Nehalem Watershed, near Hwy. 26. It would also seem to be important to conduct studies that the industrial operators are not aware of, given the potential for research to be compromised by operators changing their chemical application practices when they know that date are being collected.
3) **Holistic vs. Reductionistic Assessments** – Though I understand that the nature of the division of responsibilities between state agencies presents challenges in doing this, I feel strongly that future research into the impacts of chemical use in Oregon forests should use a holistic and integrated approach by investigating the impacts on all of the major living communities in the study are – human and more than human. Continuing to do research in isolated silos compromises our collective success in fulfilling our responsibilities to accurately understand the impacts of chemical use across the landscape.
4) **Legal Responsibilities and Rights –** Though it may be outside of the scope of your study, I feel that it would strengthen the assessment of a section was added that clearly outlined both the specific responsibilities that state agencies and leaders have for monitoring, analyzing, and regulating use of chemicals in Oregon forests, and the rights of Oregonian related to use of chemicals in Oregon forests. I would assume that this would include such things as may right, as a forest owner, to use chemical, and the right of my neighbor not to be poisoned by the chemicals that I use. One role of government is to sort out how best to balance these two rights. Your assessment would be more helpful if it both highlighted these types of tensions and explained how we currently resolve the tensions between these two rights.

Thank you for the work you and done, and thank you, in advance, for the good work that you will continue to do.

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: RE: Toxic Exposure Assessment Blachly

I am writing in response to the Public Comment period on the 'assessment' of the Oregon Chemical Exposure Investigation. How would it be possible to conduct an assessment without the data from the Drift study proposed in the Investigation? Will this Assessment conduct a Spray Drift study? If so, who will conduct this Study?

The State of Oregon has pesticide exposure data from the citizens of Blachly who paid for the lab testing at the own expense, since the State of Oregon has yet to put up funds for testing. Blachly citizens testing has documented that 59 people in Blachly found high levels of Atrazine and 24D in their urine. Will the Assessment use these public data?

How will the Assessment assess the pesticide application data from Oregon Dept of Forestry? Will the State of Oregon assess pesticide exposure to people in the areas where pesticides have already been permitted by the State? In how many areas? How much money is now budgeted for urine testing of the Oregon Citizens living in these pesticide-spray permitted areas?

How will the State of Oregon assess Chemical Trespass in light of the Oregon Constitution:
Section 1. Natural rights inherent in people. We declare that all men, when they form a social compact are equal in right: that all power is inherent in the people, and all free governments are founded on their authority, and instituted for their peace, safety, and happiness.

What responsibility resides with the State of Oregon for the safety of the People of Oregon, with particular respect to Chemical Trespass, or being poisoned without consent or knowledge, with legal permits issued by the State of Oregon? How is the State now protecting Oregon citizens from Chemical Trespass?

I will await your responses with great interest.

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: The willful poisoning of Oregon

Not one of you doesn't suspect that spreading poison around the environment is harmful. Not one of you will not be ashamed of your complicity in this poisoning of Oregon. Not one of you will escape the results of your complicity as your environment degrades and you and your children sicken.

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: comments on the draft report

I have looked at the report. My memory is not totally clear, but I believe a similar sort of study was done in a nearby drainage of the Alsea River, specifically, the Five Rivers and Lobster Creek valleys in the 1970's. I believe the complaint was of health risks such as higher risk of spontaneous human abortions connected to the use of herbicides, including 2,4D and 2,4,5T. I believe that study likewise failed to find a connection or elevated risk. I also recall that a later connection was alluded to between the elevated abortion risk and the neglected fields of the area having an abundance of Tansy Ragwort. This invasive weed was shown to be connected to abortion in cattle that fed on it. It was a violation to allow it to grow in Lincoln County at the time. One of the principal families behind the complaints subsequently had a tragic home fire and lost some children. The fire was connected to an illegally built structure. Are there relevant violations here as well? My wife was pregnant at the time and we were very dependent on venison that came from similar timber lands. We were alarmed for no reason. Are there people like us in Western Oregon alarmed for no reason?

[redacted]

Pacific Rivers Council .org

SUBMITTED VIA EMAIL

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

RE: COMMENTS ON HIGHWAY 36 CORRIDOR EXPOSURE INVESTIGATION

Dear Investigation Team,

Pacific Rivers Council (PRC) would like to thank you for the opportunity to provide comments on the Oregon Health Authority's (OHA) Highway 36 Corridor Exposure Investigation (EI), issued May 9, 2013.

PRC's mission is to protect and restore rivers, their watersheds and the native species that depend on them. We do this for the benefits that healthy watersheds provide to present and future generations, and for the intrinsic virtues of rivers themselves. The use of pesticides on private forestland has potential adverse effects on water quality, which directly influences both the health of communities that rely on surface water for drinking and recreational activities, and native aquatic species, including Endangered Species Act (ESA)-listed Coho salmon. For these reasons, PRC offers the following comments on the OHA's EI to ensure that these issues are further addressed by the Investigation Team.

In addition to these comments, PRC is including a conceptual environmental monitoring plan (EMP) for the Highway 36 area as a supplement to this comment letter. The EMP is designed to provide a starting point for discussion about monitoring the presence of pesticides in the environment. Further discussion and refinement of the EMP is expected and welcomed, and PRC requests to be consulted in the development of any monitoring program.

We have organized our comments into "General Comments" and "Specific Comments" sections. The general comments address our overall concerns about the completeness of the investigation, and the need for a whole watershed assessment. Our specific comments address the OHA's Conclusion 9-13 regarding the EI inability to identify source(s) or potential pathway(s) of pesticide exposure.

Again, we thank you for the opportunity to provide comments on this important investigation. If you have any questions, please do not hesitate to contact me.

Sincerely,

Greg Haller
Conservation Director

Cc: CAPT Richard Kauffman, Regional Director, Agency for Toxic Substances and Disease Registry

Synopsis of Comments

General Comments:

- The OHA, and all other involved agencies, have not provided a satisfactory assessment of the risk to public health from exposure to pesticides used on private forestlands.
- Insufficient environmental data is the cause for the OHA's inability to determine with certainty the source of pesticides or exposure pathways.
- Detection of pesticides in residents' urine samples indicates the probability that pesticide applications are in violation of registered product labels and presents an increased risk of drift.
- The presence of pesticides in the surrounding environment jeopardizes the overall health of the region's ecosystems, especially because the region contains a vast network of streams and critical habitat for ESA-listed Coho Salmon.

Specific Comments:

- The source of pesticide exposure is crucial information that is needed to adequately address public health risk. (Issue 1)
- Active and passive air monitoring are necessary because of the high probability of pesticide drift. (Issue 2)
- The OHA did not considered all reasonable and plausible route of pesticide exposure when it concluded that drinking water, soil, and homegrown food are not potential exposure pathways. (Issue 3)

General Comments

The stated purpose of the EI is "to fill important data gaps by collecting and analyzing environmental, human biological and other data" to answer questions regarding public exposure to pesticides. While the EI is a step in the right direction, PRC believes that the OHA, and all other involved agencies, have not provided a satisfactory assessment of public health risks resulting from pesticide applications in the Highway 36 investigation area. This EI concluded that Highway 36 residents were exposed to 2,4-Dichlorophenoxyacetic acid (2,4-D) and atrazine in spring 2011, and 2,4-D in fall 2011. However, data collected by the investigation team was not adequate to determine the source(s) or exposure pathway(s) of these pesticides. As public health is the concern, identification of source(s) and pathway(s) of exposure constitute important information needed to guide appropriate actions, ensuring that the public's health is protected for present and future generations.

First, the inability of this EI to identify a source or exposure pathway indicates that important information is missing. PRC recognizes that this inability to determine the source(s) and pathway(s) through which residents are exposed to pesticides arises as a result of insufficient environmental data. The investigation team did not collect a representative set of environmental data to characterize the region's watersheds, which is an important component of a thorough public health assessment. The value of a watershed has been recognized in the U.S. Environmental Protection Agency (EPA)

Healthy Watersheds Initiative. The initiative states that a healthy watershed provides many benefits to a community, such as "sufficient amounts of clean water required for healthy aquatic ecosystems; habitat for fish and wildlife; safe drinking water; and recreation as well as mental and physical health benefits; and help reduce vulnerability to climate and land use change impacts and costs for adaptation."[1] We strongly urge the investigation team to take a whole watershed approach to protect the integrity of the ecosystems in this region.

Secondly, the use of pesticides in the Highway 36 corridor may be in violation of the EPA approved product labels as evidenced by detection of pesticides in residents' urine samples. There is heavy reliance on pesticide use on private forestlands to control unwanted vegetation. Pesticide applications in this region (and the majority of Oregon's private forestland) are of concern because of the nature of aerial pesticide applications. Forestry pesticide aerial applications are outside the normal operating guidelines of product labels and have an increased risk of drift, especially in Oregon, because of extreme slope angles, variable microclimates (e.g., wind eddies), and downslope winds.[2,3] OHA's findings indicate that residents have been exposed to these pesticides, confirming the presence of pesticides in the environment outside of the targeted application area. Consequently, this finding also increases the probability that applicators are in violation of EPA registered product labels for 2,4-D, atrazine, and other pesticides. Product labels state that it is a violation of federal law to use pesticide(s) in a manner inconsistent with labeling. It is also the responsibility of pesticides applicators to make appropriate adjustments to account for weather conditions and application method to prevent spray drift. The actual weather conditions and methods used by applicators are difficult to evaluate because there is no requirement for applicators to release pesticide use information to the public. However, given the steep terrain in the region, pesticide applicators use helicopters flying at heights reaching 100 feet (ft).[4] This practice exceeds the product label recommended maximum height of ten feet, which is used by the EPA to assess drift risk, and can greatly increase pesticide drift potential. A simple modeling exercise with AgDRIFT Tier III Forestry (Appendix A) verified increased drift occurrence with increasing boom height and wind speed. All modeled boom heights (10, 20, 40, 50, and 100 ft) and wind speed of 4 miles per hour (mph) indicated pesticide drift beyond 60 ft downwind from spray origin. Modeled boom heights of 40 and 50 ft showed >20% of sprayed materials deposited 50 ft downwind. Modeled boom height of 100 ft showed 50% of sprayed materials deposited over 150 ft downwind. Increasing the wind speed to 10 mph (boom height 40 ft) increased overall deposition distance (20% of sprayed material) by approximately 100 ft. Current pesticide practices and regulations for private forestland are far too lenient and, as demonstrated by this EI, do not ensure the containment of harmful chemicals necessary to protect the environment and human health.

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[1] Healthy Watersheds Initiative: National Framework and Action Plan. EPA, August 2011. Publication Number: EPA 841-R-11-005.
[2] Lobet. Ingrid. (2012). In Oregon, Residents Struggle to Solve a Pesticide Mystery. *The Atlantic*. Retrieved from May 3, 2013.
[3] Turner, Stuart. (2011). Potential Off-Target Pesticide Movement: Aerial Application in the Oregon Coastal Range. BOF Meeting Minutes April 29, 2011 Attachment 18
[4] Turner, Stuart. (2011)

Lastly, evidence of pesticides in the surrounding environment is a major concern for the overall health of the region's ecosystems, especially because the region contains a vast network of streams and critical habitat for ESA-listed Coho salmon, as well as cutthroat trout and steelhead.[5] The Highway 36 investigation area contains an expansive network of watersheds that the Oregon Department of Fish and Wildlife (ODFW) has designated as salmon and steelhead habitat. Additionally, ODFW has designated Fish Creek as Core Cold Water Habitat. In spring 2011, the Siuslaw Watershed Guardians (SWG) conducted water quality samplings using a passive technique, Polar Organic Chemical Integrative Samplers (POCIS). The study detected atrazine, atrazine metabolite, and hexazinone in 4 of 5 sample sites in the Fish Creek watershed. Available spray records acquired by Beyond Toxics show significant aerial application of pesticides in the Fish Creek watershed that are adjacent to and crossing over surface water. These data indicate that pesticide contamination may have resulted from direct surface water overspray, runoffs, or drift. A toxicology study by Nieve-Puigdoller et al.[6] in 2007 indicates that atrazine is harmful to smolt development in Atlantic salmon causing ionoregulatory, growth and endocrine disturbance. The study also reported a 9% mortality rate over a 21 days exposure time. While the SWG dataset did not detect 2,4-D, it should be noted that 2,4-D was sprayed in Fish Creek watershed in spring 2011, before POCIS deployment.

The importance of 2,4-D in the discussion of pesticides drift is evidenced by court-ordered buffer zones of 60 feet for ground application and 300 feet for aerial application adjacent to salmon supporting waters. These court-ordered buffer zones resulted from Washington Toxics Coalition, et al. v. EPA (2004). Initial review of 2,4-D EHE (an ester form) toxicology by the EPA indicated "No Effect" findings for Northern California/Southern Oregon Coastal Coho salmon, thus, no buffer zones requirement was enforced. However, the recent Biological Opinion released June 30, 2011 by the National Marine Fisheries Service (NMFS), as a product of EPA consultation request required by ESA Section 7, found that the herbicide 2,4-D is "likely to jeopardize the existence of Pacific salmonids [including Coho salmon], and likely to destroy or adversely modify designated critical habitat for ESA-listed salmonids."[7] NMFS also indicated that the ester form is the most toxic form of 2,4-D. Pesticide spray records acquired through the OHA investigation process showed that two 2,4-D ester formulations, 228-95-71368 and 71368-11, were applied in the Highway 36 investigation region. These pesticides records also revealed that most pesticide applications contain a mixture of two or more pesticides. The significance of exposure to multiple pesticides was studied by Laetz et al. with association to the National Oceanic and Atmospheric Administration (NOAA) Fisheries indicated that a mixture of organophosphate (OP) and N-methyl carbamate (CB) pesticides produced additive or synergistic AChE inhibition in the brains of juvenile

[5] Oregon Biodiversity Information Center. (2010). Rare, Threatened and Endangered Species of Oregon. Institute for Natural Resources, Portland State University, Portland, Oregon.
[6] Nieves-Puigdoller, K., Björnsson, B.T., McCormick, S.D. (2007). Effects of Hexazinone and Atrazine on the Physiology and Endocrinology of Smolt Development in Atlantic salmon. *Aquatic Toxicology.* 84(1): 27-37.
[7] NMFS. (2011). NMFS Endangered Species Act Section 7 Consultation, Biological Opinion: Environmental Protection Agency registration of pesticides containing 2,4-D, triclopyr BEE, diuron, linuron, captan, and chlorothalonil. Washington, D.C.: U.S. Department of Commerce.

Coho salmon. Laetz et al. concluded that "salmon exposed to mixtures containing some of the most intensively used insecticides in the western United States showed either concentration-additive or synergistic neurotoxicity as well as unpredicted mortality."[8] The information presented above demonstrates that forest practices in Oregon, and specifically in the Highway 36 investigation area, are posing immediate danger to ESA-listed Coho salmon and critical aquatic habitats.

Specific Comments

The following are PRC's comments and recommendations regarding the OHA's Conclusions 9 – 13.

Issue 1: The OHA concluded that there is insufficient information to confirm that local pesticide applications are the source of pesticide found in residents' urine, but concluded that such applications may be a contributing source of human exposure.

Comment 1: The unresolved question regarding the source of pesticide exposure presents a public health risk that needs to be addressed immediately. PRC agrees with the OHA's recommendations for continual release of data regarding pesticide application and the development of consistent pesticide application record-keeping. Additionally, PRC strongly agrees with OHA's recommendation that state agencies implement a notification system concerning imminent pesticide applications to sensitive populations. PRC has valuable experience and insight for improving regulatory standards and would like to be a consulted in this process.

Issue 2: The OHA was unable to determine air as a potential pathway of exposure.

Comment 2: The fact that there is currently no proper pesticides air monitoring program in the region is very concerning. AgDRIFT modeling indicated that pesticides were drifting over 300 ft with simple input parameters that only represent a constant application meteorological condition and terrain. Given the variability of meteorological conditions and terrains in the investigation area, pesticide drift is more likely than AgDRIFT modeling indicates. Thus, air quality data is critical to sufficiently assess public health risks and addresses residents' concerns regarding pesticides usage. Pesticide drift management is focused on aerial drift, but PRC recognizes that that volatilization is also an important transport mechanism that should be considered. PRC agrees with the OHA's recommendation for widespread passive air monitoring before and during pesticide applications in the fall and spring seasons of pesticide application. However, PRC also strongly recommends the use of active air sampling (AAS) in addition to passive air sampling (PAS). We recommend that both methods be implemented, because AAS provides a short-term resolution (< 1 month), whereas PAS provides a long-term resolution (seasonal trends). We also recommend that a continuous sampling AAS technique be used because episodic sampling will not be able to properly represent

[8] Laetz, Cathy, A., et al. (2009). The Synergistic Toxicity of Pesticide Mixtures: Implications for Risk Assessment and the Conservation of Endangered Pacific Salmon. *Environmental Health Perspectives*. 117(3): 348-353.

pesticides drift events. For more information regarding the basis of PRC's recommendations, please refer to the publication by Hayward et al.[9] in Environmental Science & Technology.

Issue 3: The OHA concluded that drinking water, soil, and homegrown food are not potential pathways of residents' exposure.

Comment 3: Drinking water, soil, and homegrown foods are not be the only potential sources of residents' exposure. Environmental data collected by the investigation team is not representative of the region's environment and residents' daily activities. While the data collected by the investigation team does support the OHA's conclusions, this dataset represents localized exposure pathways within the vicinity of residents' homes. This investigation did not fully consider all potential pathways of residents' exposure, because it failed to acknowledge residents travels and use of the region's outdoor setting. Recreational uses of Triangle Lake and other surface waters (e.g., creeks and ponds) present a reasonable and plausible route of pesticide exposure, because residents frequently use these bodies of water for recreating. Additionally, other recreational activities such as hiking, camping, and hunting are activities that can lead to residents' exposure to pesticides. Pesticide trespass onto public-use area should be in consideration as it poses health risks not only to local residents but also visitors of this region that seek recreational opportunities that are present. PRC strongly recommends collection of additional environmental data that will be representative of the environment and watershed(s) in the Highway 36 investigation area. This information will help to fill important information gaps. An in-depth environmental monitoring campaign of the aquatic and terrestrial ecosystem, as well as biota sampling, will provide the necessary information to determine pesticides exposure source(s) and pathway(s).

In conclusion, PRC is an advocate of a whole watershed approach to land management and the protection of native aquatic species. The presence of pesticides in the environment raises our concern for the well-being of ESA-listed Coho salmon, steelhead and other aquatic organisms. We recognize that the problem is not limited to aquatic species. Improper pesticide use affects a wide range of communities, from human to wildlife, that rely on the natural resources and intrinsic values that a healthy watershed provides. The encroachment of pesticides in the watershed and residential areas, as evidenced by the urine analysis and the water sampling, are indications that current pesticide practices in the Highway 36 region are not adequate. Analysis utilizing AgDRIFT Stream Assessment provided strong evidence that the problem of pesticide drift can be minimized with the development of strict buffer zones to protect residents and aquatic species (See Appendix A). Thus, PRC recommends that the OHA work with Oregon Department of Environmental Quality, Oregon Department of Forestry, EPA and NMFS to investigate the creation of buffer zones fully protective of human and aquatic health.

[9] Hayward, S. J., Gouin, T., & Wania, F. (2010). Comparison of Four Active and Passive Sampling Techniques for Pesticides in Air. Environmental Science & Technology, 44(9), 3410-3416.

ENVIRONMENTAL MONITORING PLAN
Highway 36 Corridor

Introduction

The Oregon Health Authority (OHA) published an Exposure Investigation (EI) report on May 9, 2013, pertaining to pesticide exposure risk to residents along the Highway 36 corridor. Biological data (i.e. urine samples) collected by the OHA and privately by residents indicated that residents have been exposed to the pesticides 2,4-Dichlorophenoxyacetic acid (2,4-D) and atrazine. However, the limited environmental data collected by the EI investigation team was a limiting factor in determining the source(s) and exposure pathway(s) of these pesticides.

The purpose of this Environmental Monitoring Plan (EMP) is to collect the necessary data to determine the source(s) and exposure pathway(s). Environmental monitoring of water and air quality at various locations will provide the essential environmental data to fill information gaps present in the EI of Highway 36 corridor. This EMP outlines a preliminary approach to investigate the presence of pesticides in various environments—aquatic, riparian, and residential. Further development and refinement of the EMP is expected and PRC encourages the OHA to consult with the Oregon Department of Environmental Quality (DEQ), the U.S Environmental Protection Agency (EPA) and the U.S. Geological Survey (USGS) in the development of any monitoring plan. PRC would like to participate in those discussions should such a plan be contemplated.

Design of the sampling timeline is a critical element of this EMP because 2,4-D and atrazine are readily degraded in the environment. A temporal sampling effort will capture the background baseline concentration, and eventual degradation and/or transport of pesticides in the environment. The details of pesticide transport given by a temporal dataset will provide the insight necessary for the development of a notification and warning system for sensitive human populations.

A comprehensive monitoring plan will provide a complete assessment of the settings in which residents live in. This information can be used to determine the extent of the risk that use of pesticides have on public health and the environment in the Highway 36 region. More importantly, information collected can provide a tool for decision-makers to implement changes to pesticide practices to protect the public health and the environment.

Project Description

In order to assess pesticide exposure source(s) and pathway(s), we recommend that environmental monitoring of air and water occur during the spring and fall seasons, with at least six sampling regions within the Highway 36 corridor. Sample site selections are based on proximity to known locations of aerial application of pesticides, to aquatic environments and areas with public access. In addition to the six proposed study regions, we recommend monitoring of air and tap water at public buildings, such as schools,

markets, gasoline stations, etc. Residents in the investigation area should be consulted to identify locations of high priority. We also recommend two separate datasets: short-term and long-term. The short-term dataset will be used to assess acute pesticide exposure risk to residents and native aquatic species. The long-term dataset will be used to assess chronic pesticide exposure. Combined, these datasets will illustrate the pesticide concentrations in the environment that residents and native aquatic species inhabit.

Environmental data (air, water, sediment and biota) should be collected before aerial spray events to provide background conditions, followed by a temporal sampling regiment. This sampling timeline will provide the necessary data for appropriate comparison and analysis of pesticide drift and persistence in the environment. In addition to aerial drift, pesticide runoff can be characterized by additional temporal sampling following a precipitation event. While drift and runoff can be differentiated, the methods presented in this EMP do not allow differentiation of pesticide volatilization. The collection of sediment with water samples will provide information about the partition of pesticide between water and sediment. The partition information will provide valuable insight into to the fate of pesticides in the aquatic environment and can be used to assess exposure risk.

The scope of this EMP is extensive and encompasses a large study area. Thus, this environmental monitoring project requires multi-agency participation from the OHA, DEQ, EPA and USGS as well as cooperation from pesticide applicators. Additionally, this project presents an excellent opportunity to involve university research communities, such as at the University of Oregon, Oregon State University, and the Oregon Health Sciences University for technical and personnel resource supports.

Method

Surface water, pore water, sediment, biota (invertebrates and amphibians), and air data should be collected before and after known pesticide applications to monitor for a range of pesticides. Pesticides of special interest are 2,4-D and atrazine. Monitoring should occur during the fall and spring season when the pesticides of interest are used. In addition, tap/drinking water should be collected from the municipal water supply on a weekly basis throughout the monitoring season.

Active and passive sampling techniques should be used to collect surface water and air data. The combination of both active and passive sampling will provide short-term and long-term exposure information.

We recommend that water quality and atmospheric data be collected to accompany surface water, pore water, sediment, and air samples. Water quality data should include flow rate, temperature, pH, turbidity, dissolved oxygen, conductance, total dissolved solids (TDS), and alkalinity. Stream flow rate should be determined, as outlined by the EPA Stream Flow.[10] Handheld multiparameter instruments (*e.g.*, YSI Professional Plus)

[10] EPA. 5.1 Stream Flow. Retrieved from the EPA website: http://water.epa.gov/type/rsl/monitoring/vms51.cfm

can be used to measure temperature, pH, dissolved oxygen, specific conductance, and TDS. Chemical field kits and turbidity meters (CHEMetrics, Inc.) can be used to measure alkalinity and turbidity, respectively. In addition, we also recommend the collection of meteorological data, including wind speed, direction, temperature, relative humidity, and precipitation. Given the potential for highly variable weather conditions, meteorological data needs to be measured at air monitoring sites.

Sampling should occur before the application of pesticides to adequately characterize the baseline level of pesticides. Following an application event, a temporal sampling effort (*e.g.*, 6 hr, 24 hr, 48 hr, 5 days, and 14 days) should be conducted to characterize the persistence (if any) of pesticides in the proximate area. A second temporal sampling effort should be conducted if precipitation occurred near the 14 day period (e.g. 6 hr. 24 hr, and 48 hr).

The following chart outlines the sampling and analysis methods for the different sample types proposed by the EMP. The sampling method was not identified for some sample types because it is assumed that established standard operating procedures would be used. Specific analysis methodology is listed for 2,4-D and atrazine because different analytical methods are needed. This summary chart is presented to provide the basis for further discussion and improvement of the sampling and analysis techniques that would be implemented in any environmental monitoring plan.

Sample Type	**Sampling Method**	**Analysis Method**		
		2,4-D	Atrazine	General
Surface water				
Passive	POCIS[11]	LC-ES/ITMS	LC-ES/ITMS	EPA 1699
Active		EPA 8151A	EPA 508.1	EPA 1699
Tap water		EPA 8151A	EPA 508.1	EPA 1699
Pore water		EPA 8151A	EPA 508.1	EPA 1699
Sediment		EPA 8321B	USGS 5-C3	EPA 1699
Air				
Passive	PUF Disk	EPA TO-10A	EPA TO-10A	EPA TO-10A
Active	PUF Disk w/ LV-AAS**	EPA TO-10A	EPA TO-10A	EPA TO-10A
Biota		EPA 1699	EPA 1699	EPA 1699

* Liquid chromatography-electrospray ion trap mass spectrometry
** Low volume active air sampling

Site Description The investigation area is located along the Highway 36 corridor in Lane County, OR between Junction City and Mapleton. The majority of residents and farms are located in valleys that are downslope of private forestry operations that practice clear cutting and pesticide application (aerial and ground). Lane County is a coastal region of the Western Cascade with varying topography and climate. Forestry in this region occurs

[11] USGS. (2004). Polar Organic Chemical Integrative Sampler. Retrieved from USGS website: http://www.cerc.usgs.gov/pubs/center/pdfdocs/pocis.pdf

on mountainsides that have slopes of 40 to 70 degrees and 1000-foot change in altitude. The mountain landscape contains ridges and valleys which are associated with highly variable air movement. [12] This coastal region also receives very high annual precipitation (50 to 150 inches) between October and June[13] . The steep and variable topography of the region, and high precipitation, allow for high probability of pesticide drift and runoff downslope of application sites.

The fauna of the Western Cascades includes large and small herbivores and carnivores (elk, deer, beaver, otter, etc.), a variety of birds (blue and ruffed grouse, mountain quail, owls, hawks, songbirds, etc.), and anadromous fish (Coho, Chinook, Chum, Pink salmon, Steelhead and sea-run Cutthroat trout). Additionally, the region is habitat for more than 7,000 species of arthropods, amphibians, reptiles and slugs.[14] The distribution of the fauna of the Western Cascade can vary and certain species may not be present in some areas. For instance, Chum and Pink salmon are not found in the investigation area.

There are six (6) proposed surface water monitoring regions within the investigation area, represented in Figure 1 and 2. These regions were selected to represent the vast network of watersheds present in the OHA's EI area that are accessible by the public for recreational opportunities. Additionally, the region's watersheds are designated by the Oregon Department of Fish and Wildlife (ODFW) as salmon and steelhead habitat; Fish Creek is considered Core Cold Water Habitat.

Individual sample sites at the six proposed study regions should be treated as unique samples that define a particular area, and should not be combined for analytical purposes. The three samples ('sites') collected at each sample site should also be treated as unique samples, but can be combined for analytical purposes to achieve detection limit.
The actual location of sampling may differ from locations proposed in this EMP. However, selection of alternative sample sites should have close proximity to active pesticide applications (aerial and ground). PRC would like to be involved in the actual selection of monitor sites.

[12] Turner, Stuart. (2011). Potential Off-Target Pesticide Movement: Aerial Application in the Oregon Coastal Range. BOF Meeting Minutes April 29, 2011 Attachment 18
[13] Forester Service. (n.d.) Chapter 25, Ecological Subregions of the United States: Western Cascades. Retrieved July 24, 2013 from http://www.fs.fed.us/land/pubs/ecoregions/ch25.html#M242B
[14] USDA Forest Service. (n.d.)

Figure 1. OHA-identified investigation area.

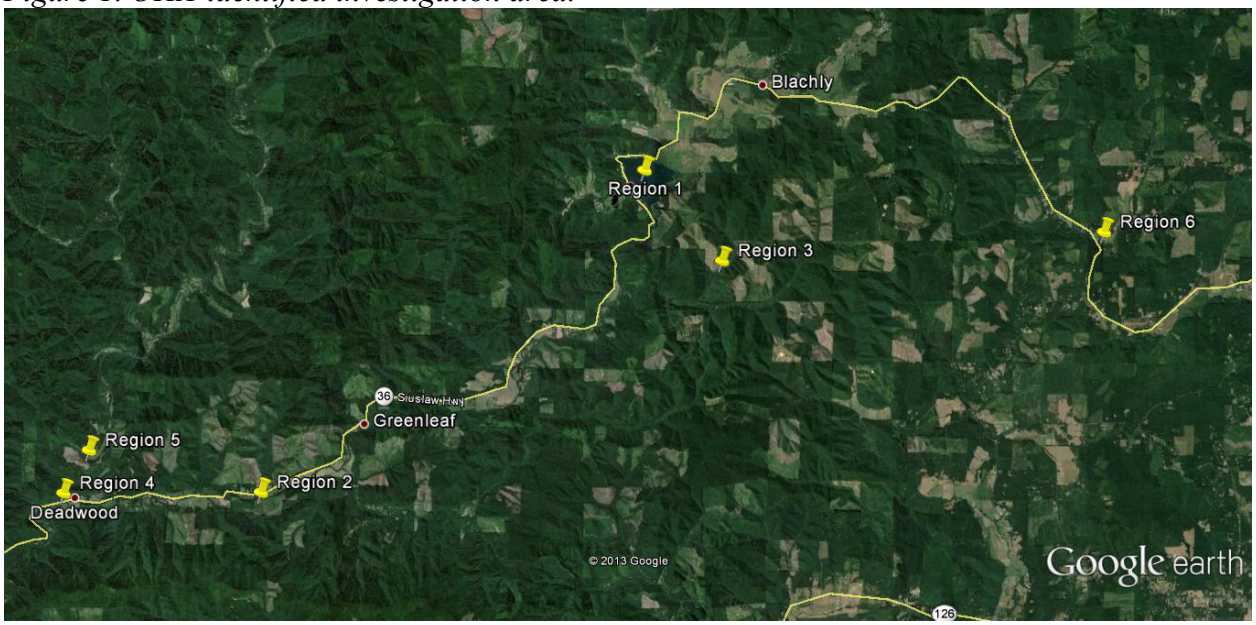


Figure 2. Overview of the six study regions' location within the OHA's Highway 36 investigation area.

Study Region 1: Triangle Lake

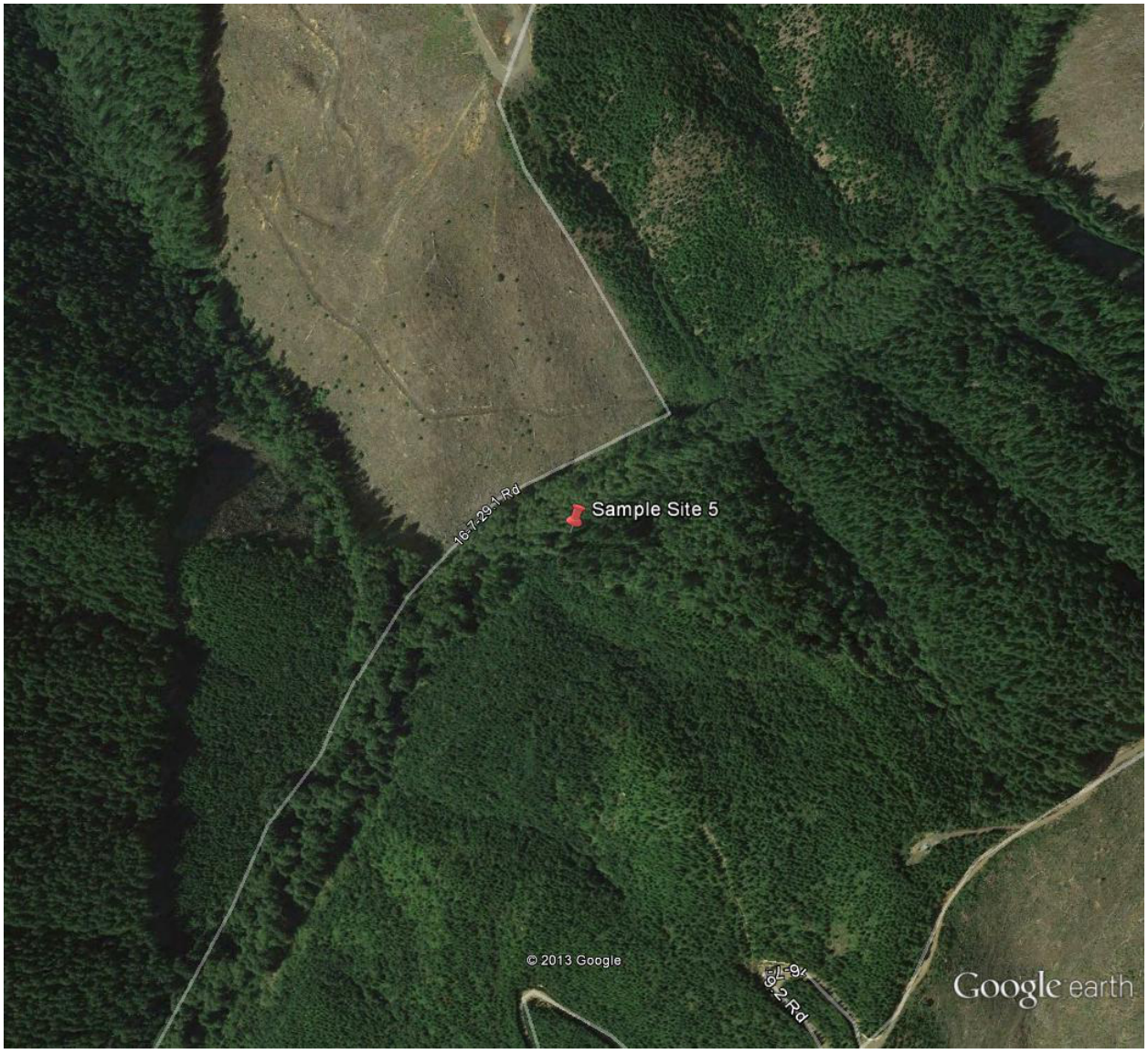
The Region 1 study area is Triangle Lake. Triangle Lake is an important recreational destination in the area and would make an ideal location for environmental assessment. There will be three sample sites for this study area: Sample Site 1 (44°10'25.86"N, 123°34'49.95"W), Sample Site 2 (44°10'15.29"N, 123°34'5.30"W), Sample Site 3 (44° 9'50.64"N, 123°34'17.58"W). Each sample site will include 3 sites parallel to the bank as shown in diagram below. The distance between each sampling site is not represented by the distance between yellow dots in diagram.

Study Region 2: Lake Creek between Deadwood and Greenleaf

The Region 2 study area is located between townships Deadwood and Greenleaf. This region is chosen for its proximity to clear cut forest, and location between two townships. There will be one sample site for this study area: Sample Site 1 (44° 5'46.28"N, 123°42'7.70"W). This sample site will include 3 sites across the stream channel as shown in diagram below. Distance between each sampling site is not represented by the distance between yellow dots in diagram. Additional sample sites may be added as necessary.

Study Region 3: Fish Creek

The Region 3 study area is Fish Creek. This region is chosen for its proximity to clear cut forest, because it is a major tributary to Lake Creek, and because it provides recreational opportunities to the general public. There will be one sample site for this study area: Sample Site 1 (44° 9'1.92"N, 123°32'58.37"W). This sample site will include 3 sites across the stream channel. Sample sites are not shown in diagram because the water path is not clearly indicated. Additional sample sites may be added as necessary.



Study Region 4: Deadwood Landing County Park

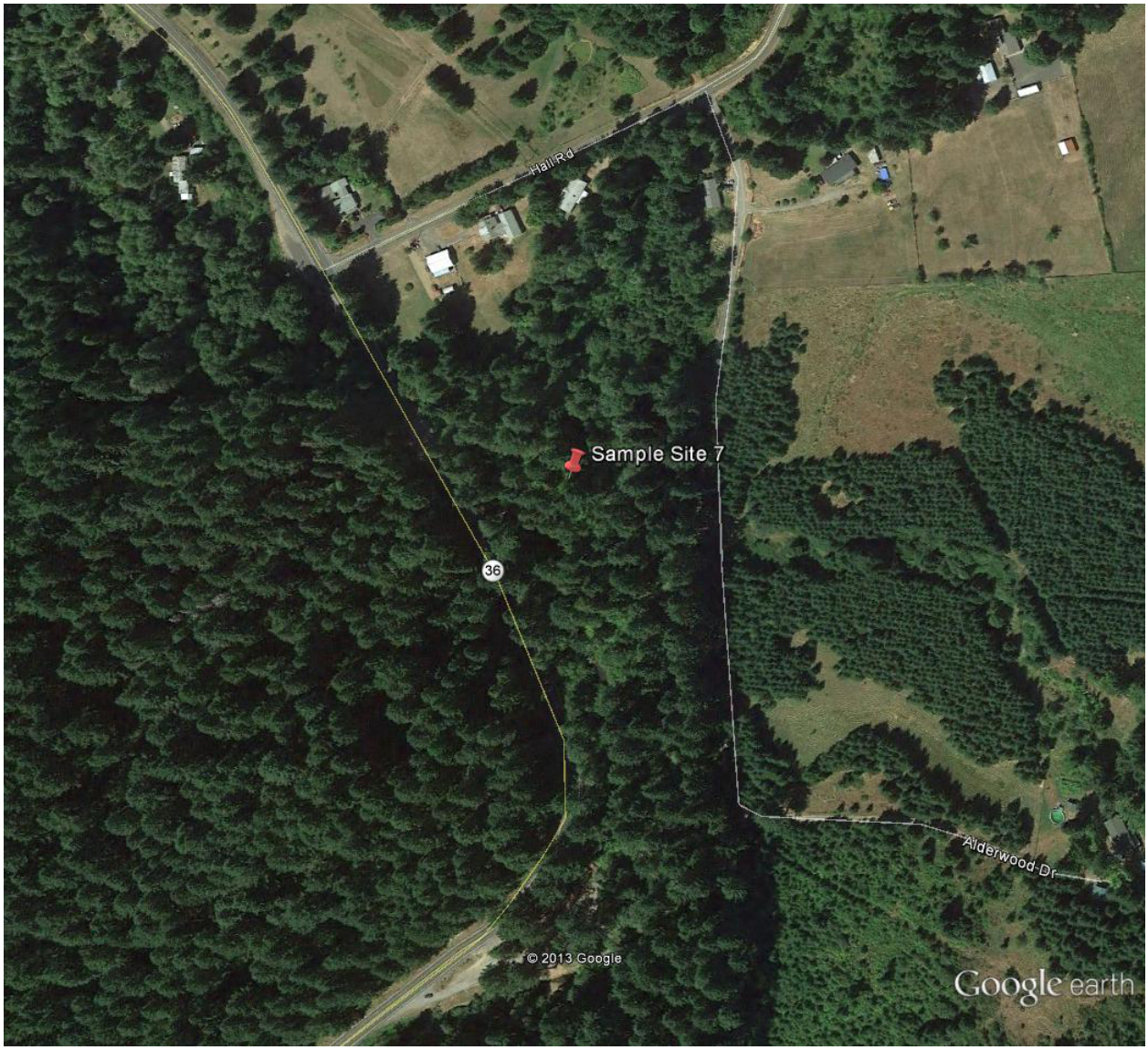
The Region 4 study area is Deadwood Landing County Park. This region is chosen for its public access and recreational opportunities. There will be one sample site for this study area: Sample Site 1 (44° 5'41.15"N, 123°46'1.47"W). This sample site will include 3 sites across the stream channel as shown in diagram below. Distance between each sampling site is not represented by the distance between yellow dots in diagram. Additional sample site may be added as necessary.

Study Region 5: Deadwood Creek

The Region 5 study area is Deadwood Creek. This region is chosen for its proximity to clear cut forest, its role as a major tributary to Lake Creek, and its public recreational opportunities. There will be one sample site for this study area: Sample Site 1 (44° 6'18.87"N, 123°45'35.71"W). This sample site will include 3 sites across the stream channel as shown in diagram below. Distance between each sampling site is not represented by the distance between yellow dots in diagram. Additional sample sites may be added as necessary.

Study Region 6: Alderwood State Park

The Region 6 study area is Alderwood State Park. This region is chosen for its public access and recreational opportunities. There will be one sample site for this study area: Sample Site 1 (44° 9'26.09"N, 123°25'21.55"W). This sample site will include 3 sites across the stream channel. Sample sites are not shown in diagram because the water path is not clearly indicated. Additional sample site may be added as necessary.



Appendix A
AGDRIFT MODELING RESULT
Tier III Forestry

Model Inputs

Constants
- Aircraft: Hiller Soloy Turbine
- Drop Size Distribution: ASAE Medium to Coarse
- Flight Line: 20
- Swath Width: 1.2x Wingspan
- Swath Displacement: Fraction of Swath Width (0.2)
- Wind Direction: -90 degree
- Atmospheric Stability: Overcast
- Canopy Type: None
- Surface Roughness: 0.0246
- Spray Materials
  - Specific Gravity (Carrier): 1
  - Specific Gravity (Nonvolatile): 1.14
  - Evaporation Rate: 84.76 (μm^2/°C/sec)
  - Nonvolatile Fraction: 0.0176
  - Active Fraction: 0.0026
  - Spray Volume Rate: 0.719 (gal/ac)

Variables
- Boom Height: 10 to 100 ft (feet)
- Wind Speed: 4 to 10 mph (mile per hour)
- Temperature: 40 to 70 °F
- Relative Humidity: 40 to 100 %
- Upslope angle: 45 to 60 degree

Base Model

The base model represents typical pesticide application conditions in the investigation area. Input for variables were determined through spray record data.

Variables
- Boom Height: 40 ft
- Wind Speed: 4 mph
- Temperature: 60°F
- Relative Humidity: 60 %
- Upslope angle: 45 degree

Model Sensitivity Test

The base model was used to assess sensitivity of temperature, relative humidity, slope angle, boom height, and wind speed to deposition distance. Changes to temperature and relative humidity did not produce noticeable change to the deposition distance. Different slope angles did produce noticeable change in deposition curve, but is relatively insignificant. Changes to boom height and wind speed showed significant change in deposition distance.

Temperature

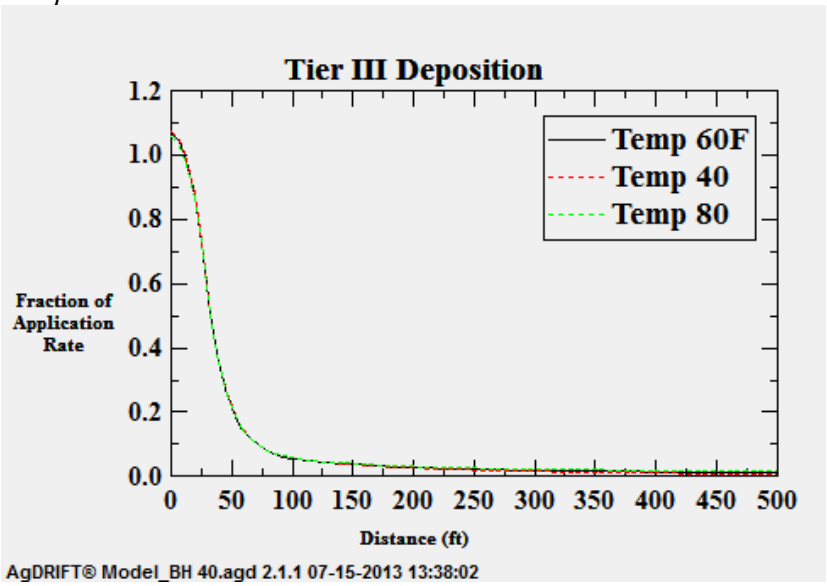


Figure 3. Deposition profile for different temperature scenarios.

Relative Humidity

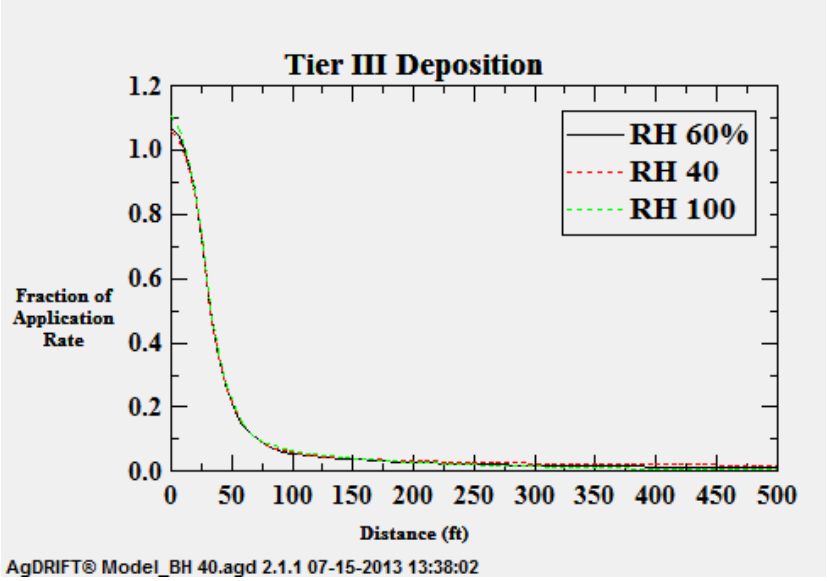


Figure 4. Deposition profile for different relative humidity scenarios.

Slope Angle

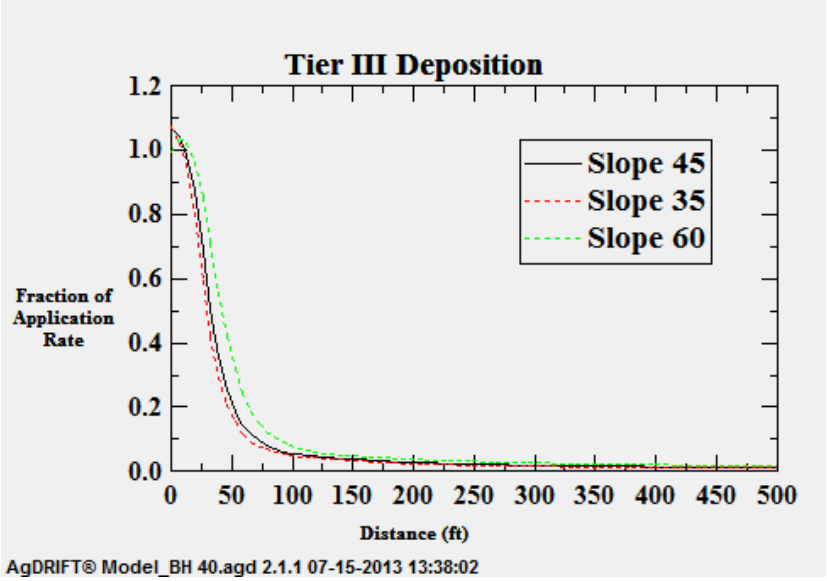


Figure 5.Deposition profile for different slope angle scenarios.

Boom Height

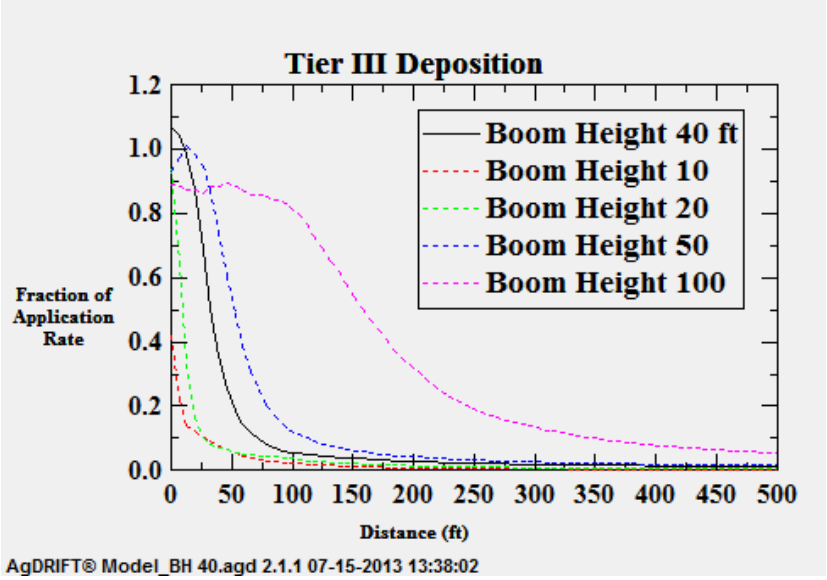


Figure 6. Deposition profile for different boom height scenarios.

Wind Speed

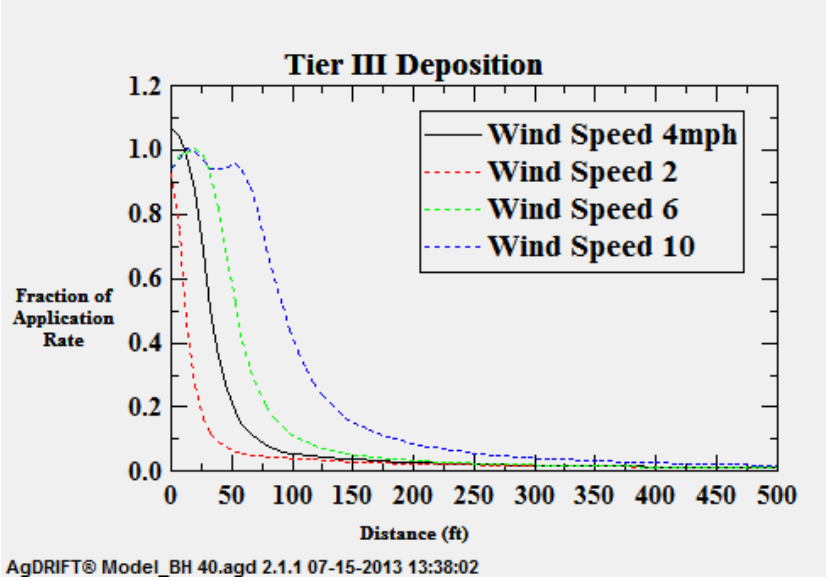


Figure 7. Deposition profile for different wind speed scenarios.

Stream Assessment

Stream assessment analyses were performed using base model. Default geometry inputs were used for stream assessment with the exception of the distance from edge of application area to center of stream (DFEAACS). Two inputs, 60 and 300 ft, were used as DFEAACS to assess current buffer zone regulation versus court ordered buffer zone resulting from Washington Toxics Coalition, et al. v. EPA 2004.

Stream Assessment Inputs

- Spray Line Length: 328.08 ft
- Turn-Around Time: 30 sec
- Stream Width: 9.84 ft
- Stream Depth: 1.64 ft
- Flow Rate: 396.3 gal/s
- Riparian Interception Factor: 0
- Instream Chemical Decay Rate: 0
- Recharge Rate: 0

The result indicates drastic reduction of in-stream contamination at all four time points. A 60 ft buffer zone scenario results in 150 to 245 ng/L between 1,000 and 13,000 ft. With a 300 ft buffer zone, stream contamination decreased to 12 to 15 ng/L.

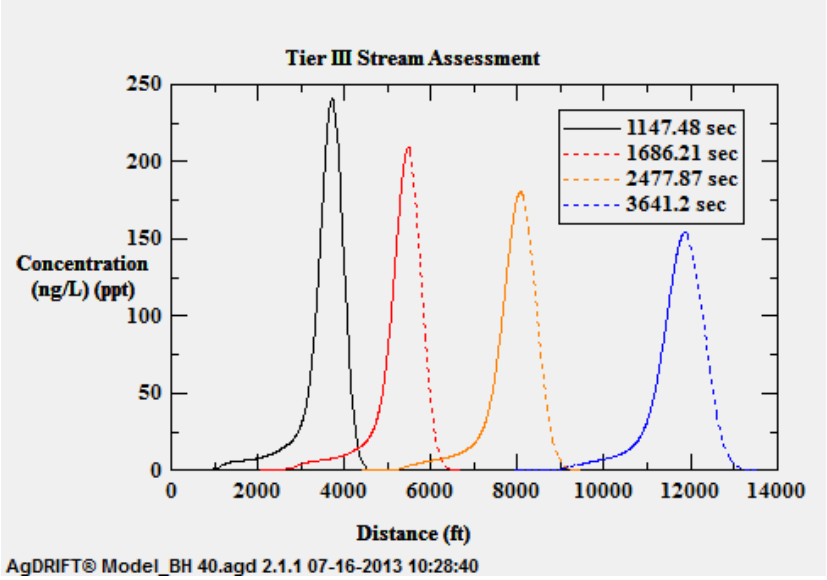


Figure 8. Base inputs with 60ft buffer zone

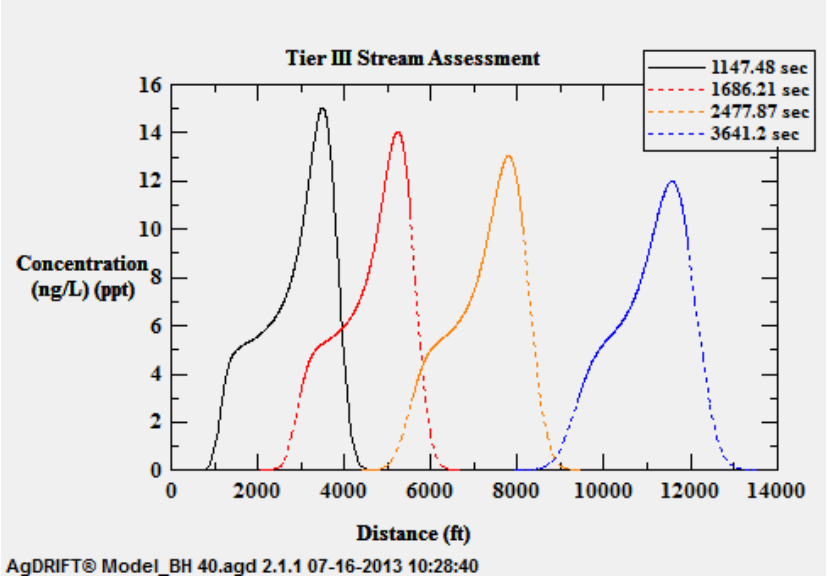


Figure 9. Base inputs with 300ft buffer zone

OFIC
Oregon Forest Industries Council
1149 Court Street NE, Suite 105
P.O. Box 12826 Salem, Oregon 97309 / Phone 503/371-2942 / Fax 503/371-6223

August 9, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232
Ehap.info@state.or.us

RE: Highway 36 Corridor Exposure Investigation: Public Health Assessment

Dear Sir or Ma'am:

The Oregon Forest Industries Council (OFIC) is a trade association representing large forest landowners and forest products manufacturing-related firms. OFIC members collectively own more than 90% of Oregon's private, large-owner forestland base, and take great pride in sustainably managing a native resource over multiple generations.

The culture of forest landowners includes a commitment to rely on rigorous science to inform management activities. This continues to be evidenced in strong support of Oregon's first-in-the-nation Forest Practices Act to protect forest resources – clean water, fish and wildlife habitat, recreation and quality wood products.

The following comments pertain to the draft Public Health Assessment that was produced in conjunction with the Highway 36 Corridor Exposure Investigation. While comments offered here are provided with the intent of significantly improving the draft document, the fact that a public comment process is included as an element to any scientific investigation is objectionable in the first instance.

Forest practices, including the application of herbicides, have been controversial for years. Disagreements about such practices are not new; nor is the topography of Triangle Lake unique. Indeed, the Triangle Lake area is very much like dozens of other communities in the Oregon Coast Range: near water features like lakes and rivers and surrounded by forested hillsides that are dissected by numerous small streams.

Several OFIC members own and manage considerable acreage within the study area. These companies, their employees, and their contractors have experienced harassment, intimidation and vandalism in the Triangle Lake over the span of 30 years. OFIC expressed reservation about the public health investigation on two points: 1) the absence of urine collection protocols utilized in the community collected samples; and 2) concern that an exposure investigation would exacerbate existing tensions.

Unfortunately, both reservations have borne fruit. Those landowners and local residents who were willing to speak publically about opposition to the conduct and continuation of this investigation have experienced increased and intensified acts of vandalism. Further, the so-called community-collected data now appear to have gained legitimacy within the draft report, in spite of the fact that

collection protocols were not observed and would never be acceptable in any standard labor or court venue.

OFIC has carefully reviewed the draft PHA report and notes the investigation has not found data that points to a determination that spray drift occurred and further, if drift did occur, that it resulted in any exposure rising to a public health concern. OFIC would request the Oregon Health Authority (OHA) reconsider proceeding further with the Highway 36 Corridor Exposure Investigation.

With respect to finalizing the draft PHA report, the following comments and other suggestions are respectfully submitted:

1) Incorporation of the community's self-collected data in the body of the report is objectionable. As previously noted, no standard urine testing chain-of-custody or control practice was employed. While the community's self-collected data may appropriately raise the question of whether or not a PHA should occur, no self-collected data should ever be included or utilized in the actual investigation, which all parties expect to meet unbiased, scientific standards. Inclusion of the community's self-collected data erodes confidence in the draft report and the credibility of the investigation, altogether.

2) It is inappropriate for an agency of the State of Oregon to write a technical report that has or gives the impression of bias. For example, see page 4, conclusion 7, *"…the difference approached but did not attain, statistical significance."* Statistical significance is a pass/fail test, not a subjective bench mark. This and similar phrasing weakens the report by fostering a perception of subjective valuation statements about the data. OFIC recommends that OHA engage an independent reviewer to edit the document for professional standards and objectivity.

3) The draft report raises questions about how data was either parsed or clumped prior to running analyses. The urine analysis is especially confusing when it comes to identifying the community self-collected data as either "pre" or "post" application. Also, the analysis uses comparisons to the NHANES data, but different portions use confidence intervals of 75% or 95% with no discussion as to why. OFIC recommends that OHA engage an independent third party to review all statistical analysis.

4) Buried in conclusion number 14 is the following statement, *"The levels of 2,4-D measured in Highway 36 investigation area residents urine in spring and fall of 2011* ***were below levels expected to harm people's health.***" (Emphasis added.) Rigorous systems are established to register herbicides for use in the United States. Voluminous data are collected and analyzed prior to setting standards for exposure; in this case biomonitoring equivalents for 2,4-D. This conclusion is the definitive finding of the report. It should be presented as a dominant finding and could be more affirmatively stated, for example, "…below levels determined by the EPA to pose any health risks."

5) OHA undermines national EPA methodology in statements like the last bullet on page 7 which asserts, "*There is a limited but growing body of scientific evidence on the health effects from exposure to multiple pesticides, which indicates that multiple chemical interactions* ***may pose an unknown but potentially greater*** *risk than exposure to single chemicals;*" (emphasis added). OHA cannot reasonably expect any registrant to go through an exhaustive list of possible combinations either prior to registration or after introduction.

6) OHA continues to use "pesticide" data when herbicide-specific data is available. The synergistic effects alluded to are generally with much more toxic insecticides. Available evidence on herbicides used in combination finds more antagonistic combinations than synergistic. And the worst case scenario was only a multiple of two times toxicity (see Acute Toxicity of Commonly Used Forestry Herbicide Mixtures to *Ceriodaphnia dubia* and *Pimephales promeias*," Environmental Toxicology 27(12): 671-684). The claim of "*potentially greater risk*" overstates available information and appears to bias what is known about the health effects of herbicides.

7) On behalf of its members, OFIC strongly objects to the assertion in the draft report that forest landowners may have changed practices during the investigation. After repeated attempts to explain our industry, OHA appears either unwilling or unable to accept that spray timing and constituents are not fixed. Last minute decisions are made routinely to meet the conditions encountered literally at that point of time on that day. OHA's suggestion that OFIC members changed practices in some way to affect the outcome of the study is incorrect and offensive. OFIC requests this be removed from the final document and that similar assertions of opinion made in public venues be curtailed.

On closing, a consideration: Forest management activities by their very nature can be extraordinarily personal and emotional for many people. OFIC and its members have a strong cultural ethic that utilizes best practices informed by ongoing science and analysis. The credibility of this science is what motivates landowners to "do the right thing" and provides a common language by which we communicate with the pubic, ensuring forestlands will continue to be productive, healthy and sustainable. We take seriously the awesome responsibility of an industry sector that directly employs 70,000 Oregonians and significantly impacts the quality of our state's rural counties.

Your consideration of the comments offered above is sincerely appreciated.

Chris Jarmer
Director, Water Policy and Forest Regulation

Email cc: Richard Whitman, Governor's Office
Peter Daugherty, ODF
Dale Mitchell, ODA
Greg Pettit, DEQ

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Triangle Lake pesticides

About twenty years ago I owned a parcel of forestland, accessed by Rust Road, that overlooked Triangle Lake. My husband and I consistently backpack sprayed atrazine and 2,4-D to control the grass and forbs on our tree farm. As a matter of fact, we sprayed those chemicals on other forest properties that we own. We have never suffered any side effects. And that was in the days when no protective clothing was advised to be worn.

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Pesticides= agent orange

We are a military family at has dealt with the long term effect of agent orange. The military has seen the generational effects of these chemicals. These are some of the same chemicals used in the pesticides discussed here in Oregon. The public should take note that recently the military began to openly acknowledge this connection and has began massive compensation not only to the service member but also to their children. Since these chemicals are passed to the children conceived in a certain time after exposure. I am confident that the military's findings will aid to the victims that are still fighting for protection. I am personally appalled by Oregon's official response which has tried to actually suppress the victims. I would encourage you to ban the chemical use and create a victim outreach so that you can properly assess the damages that the victims will be compensated for.

[redacted]
For the Creation of Intentional Communities

Sent from my iPad

[redacted]

From: [redacted]
[redacted]
To: 'ehap.info@state.or.us'
Subject: Herbicides in forestry

Timber companies have embraced the science if silviculture in the Pacific Northwest because they are able to grow trees with high yields and limited environmental impact. (Especially when you consider the tropical alternatives) The global demand for wood will be satisfied one way or another. Over regulation in this area will result in a net loss of global conservation and environmental responsibility.
Please consider the science when making decisions related to forest pesticide use. Atrazine and 2 4 D applications are scary to the uninformed observer. The people of Triangle Lake would be well served to accept the timber companies' offer to educate the public about the safe use of forest herbicides.

[redacted]
Professional Forester

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Cc: [redacted]
Subject: Herbicide & Pesticide use

To whom it may concern,

I like many others in business are upset by the concerns of the anti pesticide & herbicide groups who are continuing to make it difficult for contractors who use these agents in a safe & admirable way as directed be the manufacturer & government around the Triangle Lake region. I am in the cranberry business & we experience some of the same issues in our endeavors which copies what the timber industry & others in farming are continually going through with these anti everything groups.All of us in agriculture want to provide a safe environment & naturally a safe product to consume whether it be a log or a stalk of corn. Thank you .

Regards,

[redacted]
[redacted]
[redacted]
Bandon, Or.97411

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Highway 36 Corridor Exposure Investigation

I am writing you in regard to my concerns on the Public Health Assessment written on the Hwy. 36 Corridor Exposure Investigation.

The key conclusion in the report states that "no levels expected to cause health effects were documented in the investigation" yet some of the language in the report may erroneously lead readers to believe the study did find a risk of health effects when it clearly did not. The data verified that no one tested in the Exposure Investigation was exposed to either Atrazine or 2,4-D at levels that would cause a health concern. The 2,4-D concentrations in the fall of 2011 sampling show that exposure levels are what should be expected for any like population in the U.S. and that is what the report should reflect. Atrazine and 2,4-D are two of the most studied herbicides in the world today, and have been repeatedly shown to not pose a risk to humans and the environment from real world levels of exposure. Should not science be our guide in this investigation?

[redacted]

Public Health Assessment
Highway 36 Corridor Exposure Investigation

Comments by Dr. Michael Newton

Professor Emeritus, Oregon State University College of Forestry

August 9, 2013

My credentials

My basis for commenting on an investigation of herbicides and potential exposure to rural humans in a forested area is based on 55 years of studying herbicides as applied in forests and elsewhere. I am not a toxicologist; I work with toxicologists. For several decades, most of my research responsibility was in evaluating forest herbicides, their efficacy, behavior, fate and ecological impacts. Some work on human exposure and dermal absorption was part of that. I have published over 100 articles on a wide array of the topics associated with herbicide behavior and efficacy, including three books. One of the books, a 438-page assessment with hundreds of references, Biological and Physical Effects of Forest Vegetation Management was on behalf of the Washington Department of Natural Resources, and was co-authored with Dr. Frank Dost, Extension Toxicologist at Oregon State. I also wrote EPA's Silvicultural Chemicals and Protection of Water Quality, (EPA-910/9-77-036; 226p.) and a general reference book, Handbook of Weed and Insect Control Chemicals for Forest Resource Managers, 1978, 214p. published by Timber Press; co-author Dr. Fred Knight, Director of the University of Maine School of Forestry, and eminent entomologist. I was co-leader of a Public Health Service study, Behavior of Forest Chemicals in the Environment, 1962-1967, with Dr. Virgil Freed, Head, Department of Agricultural Chemistry at Oregon State University, which investigated persistence and mobility of brush control chemicals then used in forests, primarily phenoxy herbicides and atrazine. In 1972, I led field investigations for the National Academy of Sciences in Vietnam during the war on the persistence and mobility of phenoxy herbicides and picloram in soil and water (Agents Orange and White) after high rates of application. In 1980, I led a half-million-dollar study on fate of glyphosate in forest ecosystems, and in late 1990s led studies of glyphosate and imazapyr persistence in soils in a wide variety of climates in Oregon and Alaska. Results of all these studies are available in scientific journals.

General comments.

This investigation harnessed superb facilities and technical expertise to analyze an improbable effect from very low environmental exposure to low-toxicity chemicals. The chemicals involved in the OHA Investigation are among the most commonly used agricultural chemicals in the world. Atrazine has been in use since 1962 on a wide scale, as the primary weed killer in corn. Phenoxy herbicides, primarily 2,4-D, has been used on tens of millions of

grain crops per year throughout agricultural areas in this country and elsewhere. The mobility, potential for such of chemicals in ordinary use in assessing toxicological effects in humans and wildlife, have been the subject of thousands of scientific papers. Their persistence in the human and wildlife food chains is well known, and the two classes of products differ widely. The degree to which they bind to soils and organic material in ways that limit mobility and availability to produce intoxication after application has been subject to many investigations, including my work. My over-all observation is that if one detects a few parts per trillion in urine, and that this detection differs slightly or not at all from the general population, *there is no possibility of identifying the source, and that the exposures are trivial and low priorities for investigations.*. This should have been a guiding principle in this investigation as soon as the first evidence of urine samples had been evaluated.

The point of this comment is that infinitesimal concentrations of 2,4-D can be found almost everywhere there is human habitation in this country; atrazine's greater persistence allows it to be found similarly although its use is not as widespread in non-agricultural uses. Detectable concentrations of these products can be found virtually everywhere in the lower 48 states. Such quantities are not associated with health problems; the level of investment in this investigation implies that the level of risk justifies a large national effort.

The use of pesticides, generically, is an emergent social issue in our culture. Ability to detect them in fractions of parts per trillion means they can be found if one looks anywhere near urban or agricultural areas. Publications about their toxic effects, especially regarding herbicides falsely imply imply that they are more hazardous than many environmental chemicals, among which combustion products substantially more toxic are everywhere. Reports of detection instill panic in healthy citizens despite abundant evidence of huge safety factors when compared to the amounts that might conceivably produce toxic symptoms. In the absence of heavy use in the immediate vicinity of citizens, including applicators who are subject to dermal contact from time to time, the toxic hazard of these products does not, and cannot, represent a toxicological hazard to citizens. The laws regarding their use guarantee this. Only extraordinary violations of these laws will lead to potentially harmful effect, and those are primarily limited to plant life.

Pursuant to the above generalizations, it is my opinion that this costly endeavor to respond to citizen concerns about unremarkable contact with herbicides is avoidably excessive. Its findings would likely be the same in most urban and rural populations in agricultural areas.

This report asks two general questions:

1. Are persons in the Highway 36 Corridor exposed to pesticides from local applications, and
2. What are they, what dosages to citizens are involved, what are the sources and routes of contact, and what are the health consequences.

The answers to these questions *are predictable*. The answer to the first is: *almost certainly*. Properly qualified, it would have added that chemicals detected are impossible to identify as to source because these products are so widely distributed. The answers to the second, are: A. Many wood-smoke and other combustion derivatives, paving hydrocarbons, distillation products of petroleum and its combustion products under high pressure and temperature. *Way down the list of toxic hazards are environmental traces of 2,4-D, glyphosate, imazapyr, atrazine* and so on. B. Less than a *ten-thousandth or even a millionth* of a potentially harmful dose. C. Sources: *Almost anywhere upwind.* Atmospheric pollutants travel great distances; combustion products are among the most common. D. Routes of exposure: *wind, food, clothing, entering treated areas before products are d*ry. E. *None*.

The answers to these questions are undoubtedly the same almost everywhere if one spends enough money on analytical chemistry. We all carry residues of hundreds of chemicals that would be harmful in large quantities; most chemicals are toxic at some level. *The lack of evidence of widespread damage to plants is prima-facie evidence that the concentrations in the human environment are harmless to any fauna*. Such evidence *is the logical first step* in any search for a source of herbicides as intoxicants. A preliminary check of urine samples indicating very few parts per trillion of phenoxys or atrazine is verifiable evidence that the further investigation at this level is an egregious expenditure of public funds following a groundless claim.

The finding of levels equal to or slightly exceeding those of the general population *confirms the general statement above about the universal presence of such chemicals in the environment*. This is the logical result of modern vegetation management practices that feed and protect us. If all the potentially toxic substances in our environments were subject to comparable demands on public health facilities, this country would be bankrupt quickly. For example, combustion products of firewood include hundreds of products, many of which are extremely toxic but fortunately low in abundance. The protocols involved in guaranteeing safe use of these chemicals are provided in the registration process, unlike combustion products. It is germane that periodic renewals of pesticide registrations are required to ensure that improvement in analytical detection and toxicological parameters are included in recommendations for continued safe use.

My general conclusion is that reference to the above concepts would have saved a great deal of the OHA's time and energy and allowed those resources to deal with far higher risks elsewhere in the human environment. One hopes that such an approach would help minimize panic among citizens who have been educated to fear chemicals, yet detect any real health problem so associated. Experience tells that a simple number is enough to terrify. Having said that, the care with which OHA summarized the conclusions is laudable except for one factor: it understated the degree to which the detected chemicals have enormous safety factors, and failed to represent where they were in the toxicological spectrum of chemicals that afflict us all, *in proper perspective.*

[redacted]
Medford OR 97501

[redacted]

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232
attn: hap.info@state.or.us

Following are my comments on the draft Public Health Assessment,
Highway 36 Corridor Exposure Investigation.

I believe that the EI did a good job overall in investigating the concerns from citizens about potential exposures from local pesticide application practices. My comments focus on the exposure issue and conclusions.

OHA reached one conclusion related to the question:
Are residents in the Highway 36 Corridor being exposed to pesticides from local application practices?
Conclusion 1:
This investigation found evidence that residents of the investigation area were exposed to pesticides or herbicides in spring and fall 2011. ***However, it was not possible to confirm if these observed exposures occurred as a result of local application practices or were from other sources.***
In all this, I believe sentence 2 of this conclusion needs to be at the forefront in any policy change discussion.

OHA reached three conclusions related to the question:
To what levels are they being exposed?

Conclusions 6, 7, 8 showed statistics for exposure to the two compounds.
C6 was higher than the general US population,
C7 was no different than general US population,
C8 had no population data for comparison.
C6 and C7 use a 2002 sample of general US population as the benchmark. This benchmark is removed from the subject area in both space and time, but was the best available. In all this I think that the PHA should recognize that any rural farming or forestry populations are going to have greater exposure levels than US urban populations to these compounds. If the comparison base was stratified for this bias, I did not see it in the PHA.
C8 correctly states that without baseline data, there is no basis for comparison.

What are potential source(s) of the pesticides to which they are exposed?
Conclusion 9:
There is insufficient information to confirm that local pesticide applications are the source of pesticides found in the urine of participating Highway 36 investigation area residents. However, available evidence suggests it is possible that reported applications may have contributed to the levels detected in participants' urine.
I believe the last sentence should be struck from the final PHA. It is conjecture, and has no place in the assessment. You could just as well state "it is possible that participants somehow contaminated their urine before sampling".

Regarding other conclusions regarding pathways and health risks, I believe the PHA does a good job.

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Pesticides and herbicide hearings.

As the attentive son of an entomologist and plant pathologist, I am well aware of the pros and cons of pesticides. The revolution these chemicals made in defeating global famine in the 40's is well known and by now forgotten. There is also another great truth. The one where we did not know what years of applying these chemicals would do. Instead of stiffening regulations as we became aware of the problems of accumulated residue in the environment, we have now loosened regulations. Instead of recognizing the dangers we have moved to ignoring the dangers. Instead of independent testing in university settings, we no longer test at all. I remember as a child when a threat was found that had been unknown before, the chemical was either banned or was stiffly monitored and regulated. These things were new then and thus were given respect accordingly. However over time we found these to be far more dangerous in ways we never anticipated. Over time profits were far more important than safety. Study of the impacts of these chemicals was pushed aside. We no longer know how much we really don't know. No one is even tasked with finding out. Much of the research infrastructure at the universities has been dismantled from those days.

People must come first and caution should always be top priority. Proof must be long and enduring always over a great deal of time and circumstance. Cost of harm has to be greater concern than a profit. Climate change is making it harder for any specie to adapt and survive. Unfettered use of materials improperly studied make it harder for all species. That includes us. Let's think before we take risks that are not necessary.

Sincerely: [redacted]

June 4, 2013

Environmental Health Assessment Program
Portland, OR

Dear Colleagues:

What follows is the substance of my remarks during the public comments period at the Triangle Grange meeting of May 28. I appreciate the opportunity to communicate with you.

In your opening statement, you indicated that the central question in the investigative report is "whether people have been exposed to hazardous substances." You clearly have found that in fact they have been exposed; the remaining question is *how dangerous* the exposures have been, to whom, and under what circumstances.

As I read your findings, it is apparent that the data are less than adequate thus far to reach firm conclusions. The data suffer from several problems, including lack of comparability, limited "N," different test qualities, and specificity with respect to time, season, and location. Your report is consequently replete with tentative language, such as "not expected to harm," "not possible to determine," and "it is possible that." The data can thus be cherry-picked to support just about any position on aerial spraying—or might simply be ignored and the report as a whole dismissed as useless.

But I propose a different reading. I think you not only should continue your research; you should also conclude that the dangers are sufficiently real and ongoing as to require a pause—a moratorium—on aerial spraying until such time as more conclusive research results can be obtained. This is the essence of the precautionary principle, as I'm sure you recognize. You are charged with protecting the public's health and the environment, and you already have sufficient evidence to justify the need for precaution, and thus for a moratorium. The forest and other industries can surely wait on your further findings; but public health cannot wait. Surely enough cancers and other terrible diseases have been reported in the Triangle Lake spray area to warrant a temporary halt to aerial spraying.

Some people—perhaps some of you—might say that calling for a moratorium constitutes advocacy and thus falls outside the purview of your charge. I disagree, and point to the "next steps" (p. 8) in your interim report. One piece of advice you offer is to urge that state agencies notify "sensitive populations" of spraying in a timely manner so that "they could take action to avoid exposure to those applications"—in other words, to flee from their homes. Why is that advice directed to state agencies and not to the industries that are spraying? (Your advice strikes me as being similar to having aircraft drop leaflets on villages in a war zone so that people have some time to avoid being bombed!) This is, frankly, unconscionable advice that I hope you will drop from your final report. But in any case, since your report does venture into recommendations, a moratorium is a modest proposal that deserves inclusion.

You are doing important work under difficult conditions. I hope you will not be discouraged by those people who would like you to stop research. The Highway 36 case brings together the kinds of competing interests that we see all over the state and the nation, not to mention internationally. But not all interests are equal; the health and well-being of people surely come first. I trust that you will put your professionalism to work on their behalf.

Sincerely,

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Hyw 36 Public Health Assessment-Public COmments

Congratulations on your report. It can't have been easy. but it's a step along the way in making changes so that we have accurate data on WHAT and WHEN biocides are sprayed, and in the long term to phasing out their use for such frivolous and spurious uses, such as this one: wholesale spraying, of total environments to get a few extra board feet of timber at the cost of poisoning people, fish, deer, frogs, native plants, not to mention insect and macroinvertebrates.

We applaud your recommendations and next steps and sincerely hope , for the greater good of all concerned, they will get carried out.

Sincerely,

[redacted]
Walton, Or

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Highway 36 Interim Public Health Assessment Public Comment

Importance: High

Public comment submitted by [redacted] Selma, Oregon, August 9, 2013

Re: "Public Health Assessment Highway 36 Corridor Exposure Investigation" of May 9, 2013, Prepared by the Environmental Health Assessment Program, Oregon Health Authority under Cooperative Agreement with the Agency for Toxic Substances and Disease Registry.

Citizens' of our communities human rights are being violated by the state supported use of millions of pounds of toxic chemicals applied onto our human and natural communities every year. Citizens of Highway 36 are not alone. Across the state we stand with them. They are our heroes and we are all "citizens of Highway 36" because we all face the same violation of our human rights.

My family has suffered from this poisoning and this has been documented and confirmed by our physician. I live at Camp Ecostery, a showplace where sustainable practices have been implemented for 45 years. At Camp Ecostery we remove trees for lumber and wood products, and have a saw mill; but it is the natural community that retains and regenerates our forest ecosystem. We don't poison them or our neighbors.

One afternoon in the fall of 2010, my husband, became exposed to herbicides when he was walking along our property near the boarder of adjoining timber industry owned recently clearcut land, and a gust of wind came down upon him. Around 3 am that night, he woke up sweating, terrible headache, abnormally high BP, dizzy and disorientated. These were all things that had never happened to him before. The next day, he was still ill and went to see his doctor. His liver enzyme lab test results that had been normal prior to the exposure were very elevated. Months of further blood tests, scans, biopsy and abnormal liver function left doctors searching for answers. Finally a fairly confident diagnosis of a very rare autoimmune liver disease was given, which had a very scary outcome, often resulting in a need for a liver transplant and doctors prescribed drugs that we believed were dangerous. My husband did not wish to take further toxins into his body and we finally found a doctor in Coos Bay that had a great deal of experience helping people exposed to forest herbicides and with autoimmune reactions.

This doctor said that my husband's illness had been caused by toxic exposure and said that he completely agreed that all evidence indicated that his illness had been caused from the herbicide that he was exposed to that afternoon before he became so ill. The doctor told him that he must avoid any future exposure to these sprays. He put him on a treatment plan and after some months the liver enzyme blood tests began to show improvement and now are much closer to normal yet still double of his pre-exposure level. We have been told that such chemicals would likely be sprayed again in the coming years on this land adjoining ours. Pesticide exposures have led to serious liver diseases in many people, and many other known harmful impacts to the health of humans and wildlife.

Beyond the physical consequences: The mental and emotional stress has been huge, This robbed us of time and peace of mind for 3-4 years trying to stop the planned spray, writing letters, researching, constantly reaching out to agencies, officials, knowledgeable individuals, organizations, researching laws, and surveying for endangered fish; which were found, and taking turbidity tests to show potential contamination; which it did. And then having failed in our efforts to stop the spray, dealing with the problems from the spraying: The worry about a dangerous illness and searching for help for his illness; having our land, creeks and ponds flooded with contaminated water with toxic chemicals during the rainy season; and the loss of domestic water use for fear of contamination with toxins. The externalized damages caused by large timber companies from the use of these chemicals, is huge monetarily, environmentally, emotionally, and in quality of life.

The clearcut land, once home to thousands of native plants and animals, was turned into raw barren dirt; and then when life began to return, it was poisoned. The rains washed these poisons along with massive amounts silt onto our land. The fish disappeared from our creeks and ponds. The deer that had been feeding off the herbicided vegetation had mottled shaggy coats. The hundreds of moths and other insects that cling to our screens by the night lights disappeared. The bats that swooped continuously across our front picture windows were absent. The owls that perched on the branch

waiting for large moths were no longer there, nor were the many water birds and ducks that had spent their days in our ponds. The songbirds didn't sing. The frogs no longer leap from the shore as we walk by the ponds. The chain of life had been broken. Today some wildlife has returned, but the impacts are horribly present and lasting.

I also was exposed to herbicides sprayed on a clearcut owned by a large timber company about 15 years ago and recall that I was so ill that I spent several days flat in bed. When I felt better we went to the local ODF office and asked what was sprayed. The state forester said that it was a harmless herbicide called atrazine. We know atrazine is not harmless. I will never know if my chemical sensitivities and other health issues stem from that exposure. Until you do your work people will continue to be exposed to very toxic substances with no proof to support the harm we know is being done.

I have friends and neighbors that have suffered from the effects of these herbicides sprayed on clearcuts near them. I do not know of anyone that wants these chemicals sprayed into our communities, other than perhaps large timber company owners. I wonder if these timber company owners would like to drink water from our domestic water tanks that have legal water rights (predating their ownership) collecting water from lands below and near their sprays. We are not given a choice; these toxins are poured onto lands that drain into our domestic water collection systems.

Oregon's Right to Farm and Forest laws, and Oregon's Department of Forestry, shields and protects timber companies; in fact encourage these practices at the expense of the people of Oregon who are forced to suffer ill health, economic hardship, and loss of quality of life.

As I write this, we; our communities' elderly and young children; firefighters; farmers and other laborers; and all our community members are being inundated by toxic smoke coming from huge fires in herbicided tree farms.

I am taking the time today to join others in demanding our human rights, and that it is your obligation to protect and provide a healthier future for ourselves and our environment. It is past time to put an end to practices that poison in our air, our water, our land, our children, our community. I share with many others in my community the following concerns with regards to the Highway 36 Public Health Assessment and Exposure Investigation:

Of significance is the fact the Investigations own EPA scientist indicated at the first Town Hall meeting July of 2011 that in all probability the source of the trespass was Drift. Yet, without so much as one drift study or a viable determination as to how citizens ended up with poisons in their urine, have now come up with an 'assessment', of an investigation that has been on hiatus for well over a year.

Our state has a long and sorted history of chemical trespass and abuse. That history however has not so much as hindered the use, application or spraying of millions of pounds of toxic chemicals within our communities, every single year. The vast majority of which are highly hazardous, especially in small/ tiny doses, ironically or when considering the many chemical cocktails they use, none of which are EVER tested, but continue to inundate our lives, on multiple fronts. This Investigation is crucial, not just for those living within the Investigation area, who have sadly already established the fact they've been poisoned, but the importance of this investigation is for ALL Oregonians. Certainly it is important for anyone who may choose or wish to live within a healthy community or environment. We share the same air and water resources in many cases. Truth be told, we are all in this toxic soup together.

Small, chronic doses of many, if not most of the poisons our state uses, on a regular basis, are HIGHLY toxic. Their chronic, systematic use is not going to end, until the truth is revealed and our state acknowledges we have a serious problem. One that is reflected, on a daily basis in the children throughout the spray zones, with ailments now considered 'normal': Asthma, allergies, ADHD, and cancer to name but a few.

We all deserve better. We have every right to a healthy environment. We have every right to a healthy community, in which to raise our families and or live our lives. We also have every right not to be used as guinea pigs, at the whim of Corporations and or a State that literally promotes these poisons. Their ability to poison us 'legally', more often than not without our knowledge, and certainly without our consent, is a key factor in responding to this 'assessment'. Our right to Health is being denied us, by none other than our State.

In addition to the lack of much needed drift studies, the hiatus, as well as the long delay all the while allowing the pesticide use to continue, I add my voice to the following concerns:

59 of the 64 urine samples taken in the fall of 2011 had detectable levels of 2,4-D in their urine. Of those 59, 22 individuals had levels of 2,4-D with metabolites above the NHANES (the standard) 75th percentile levels. The Investigation notes "this number was higher than expected and approaches statistical significance, which is typically defined by a p-value of 0.05 or less." The p-value found was 0.06, or one one-hundredth greater than OHA's stated significance level of <0.05.

The Oregon Health Authority also opted to exclude a child, under six years of age. According to OHA, this decision was made because “there are no NHANES values for comparison for children under age six. Yet, all data indicates children are far more susceptible to pesticide exposures than adults, as well as the risks. This makes it all the more critical that they be included in an assessment. Worth noting: Had OHA included this child’s numbers in their assessment, then the p-value of the 75th percentile finding would have been statistically significant, as in <0.05.

The Investigation indicates the spring sampling in 2012 was suspended by OHA because “the areas that were slated for applications of 2,4-D and/or atrazine were in remote locations which have very few residents.” Yet, the Investigation fails to indicate that ALL pesticide applications were suspended by major timber companies in and around the Investigation area. Most interesting was the fact the companies which spray the most atrazine and 2,4-D in the area, stopped doing so after the OHA’s announcement that it would be sampling individuals urine for exposures. That being the case however, one cannot help but wonder why OHA did not then use similar communities with similar topography to continue with their investigation. Across the state same exact factors are present: rural, residential properties, located beneath steep, private timber properties where pesticides are sprayed. Would not alternative locations in fact have provided an excellent resource to determine if what took place in Blachly was unique, or more importantly common, throughout our state? Especially in light of the fact citizens have been attesting to trespass for many years.

The assessment indicates on pages 28-30 that OHA “cannot confirm the relatively elevated atrazine levels in post-application urine samples were from a specific pesticide application, the contribution of multiple applications in the area, or some other source.” Indicating the lack of “site- or time-specific information” about the persistence and movement of atrazine in the environment, after it was applied, to justify the conclusions or lack of conclusions drawn. Yet, spray records obtained by OHA, as well as other groups, provide the exact information OHA claims to lack. The spray records in fact indicate all the pertinent information needed, relative to the spray applications, pesticides applied, etc, etc. It therefore makes no sense to not be able to draw a conclusion. Plus, surely an aerial drift expert could help determine if the exposures were caused by the suspected aerial applications. Of utmost importance however: Based on the relative and available data, how else could the atrazine found in these participants’ urine have gotten there, but for the aerial applications that occurred nearby? In knowing the extent of available data and scientific research that has been provided to this Investigation, indicating exposures to pesticides occurs from aerial spraying, how do OHA and/or ASTDR draw the conclusions made in this assessment? Especially, in light of the fact the primary purpose of these very agencies is to “protect the public”?

Throughout the assessment the Investigation indicates there is lack of information concerning atrazine’s impact on biological organisms, including humans. Yet, again there is ample science, studies and information to dispel such a conclusion. Many such studies repeat the fact even small exposures of atrazine can pose serious health risks, to both humans and the environment, water in particular. (see below). It is somewhat of a mystery, knowing all of the data and peer-reviewed science available; indicating chronic and or low dose levels of atrazine presents risks, to both humans and the environment why OHA would not have pursued all of this information before making any assessment. Especially, in light of the fact this poison has already invaded the bodies of 34 known citizens.

It is imperative that this Investigation realizes one the greatest risks for citizens, not just in Blachly but throughout our state, is the fact we have no way to protect ourselves, as these practices continue. Not so much as a warning, a phone call, or a notice to indicate toxic chemicals are eminent and will be sprayed next to or near one’s home and or property within a specific time frame. This issue makes this entire Investigation, along with the fact it remains on hiatus, all the more disturbing.

Please contact me if you wish further information regarding my experiences with pesticide poisoning or these comments. Thank you for consideration of these comments,

Sincerely,

[redacted] Selma, Oregon 97538

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If you are not yet familiar with the risks or dangers pesticides, please note the following links.

These are but some of the science, peer reviewed studies, research and medical assessments attesting to the dangers of pesticides, Atrazine in particular.

*Keynote speech by Professor Tyrone Hayes (Atrazine ‘expert’)

Beyond Pesticides 31st National Pesticide Forum, April 5-6, 2013, Albuquerque, NM.
"Sustainable Families, Farms, and Food: Resilient communities through organic practices,"

-- Tyrone Hayes, PhD, professor and research scientist, University of California, Berkeley

http://www.youtube.com/watch?v=NVinMMQNtrU

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*Journal of San Francisco the Medical Society-Environmental Health Report

*Environmental Health: A Decade of Progress

Philip R. Lee MD; Steve Heilig, MPH; Michael Lerner, PhD; and Elise Miller, MEd

*Reducing Cancer Risks: Margaret Kripke, PhD, on The Environment and Cancer

*Environmental Chemicals: Large Effects from Low Doses

Laura N. Vandenberg, PhD; R. Thomas Zoeller, PhD; J.P. Myers, PhD

http://www.cumulativeimpacts.org/documents/June.pdf

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Scientists Are Clear: Chemicals Do Harm - Especially in Low Doses
http://www.momsrising.org/blog/scientists-are-clear-even-in-low-doses-chemicals-do-harm/

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Our Stolen Future:

~Human impacts of endocrine disruption

http://www.ourstolenfuture.org/NewScience/human/human.htm

~Mixtures of chemicals

http://www.ourstolenfuture.org/NewScience/synergy/mixtures.htm

~Low dose effects

http://www.ourstolenfuture.org/NewScience/lowdose/lowdose.htm

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Scientific evidence on the health effects of low-dose exposure to endocrine disrupting chemicals (EDCs). | APP Advocate Precautionary Principle

http://appprecautionaryprinciple.wordpress.com/2011/06/01/scientific-evidence-on-the-health-effects-of-low-dose-exposure-to-endocrine-disrupting-chemicals-edcs/

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The Economics of Atrazine

http://ase.tufts.edu/gdae/Pubs/rp/EconAtrazine.pdf

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Chemical trespass: Big burden, little bodies

http://www.panna.org/blog/chemical-trespass-big-burden-little-bodies

***

Effects of prenatal exposure to a low dose atrazine metabolite mixture on pubertal timing and prostate development of male Long-Evans rats.

http://www.ncbi.nlm.nih.gov/pubmed/20727709

***

Illinois pesticide drift; New atrazine research; Scientific American calls for independent GM science; more...

http://www.panna.org/resources/panups/panup_20090730#1

***

Atrazine poses unreasonable risks to humans and wildlife at concentrations detected in the environment.

http://www.beyondpesticides.org/gateway/pesticide/atrazine.htm

***

No more secret atrazine science | Pesticide Action Network

http://www.panna.org/blog/no-more-secret-atrazine-science

***

Atrazine and nitrate in public drinking water supplies and non-hodgkin lymphoma in Nebraska, USA.

http://www.ncbi.nlm.nih.gov/pubmed/23515852

***

European Union bans atrazine, while the United States negotiates continued use

http://www.ncbi.nlm.nih.gov/pubmed/16967834

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U.S. EPA Probes Herbicide Atrazine for Human Health Threats

http://www.ens-newswire.com/ens/oct2009/2009-10-08-01.html

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Low levels of the herbicide atrazine alter sex ratios and reduce metamorphic success in Rana pipiens tadpoles raised in outdoor mesocosms.

http://www.ncbi.nlm.nih.gov/pubmed/20368127

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Pesticide Mixtures, Endocrine Disruption, and Amphibian Declines: Are We Underestimating the Impact?

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1874187/?report=classic

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Agrichemicals in surface water and birth defects in the United States---See conclusion

http://onlinelibrary.wiley.com/doi/10.1111/j.1651-2227.2008.01207.x/full

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Atrazine Reference studies

http://atrazinelovers.com/r4.html

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Atrazine:Toxicology

http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/atrazine

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Atrazine-Induced Aromatase Expression Is SF-1 Dependent: Implications for Endocrine Disruption in Wildlife and Reproductive Cancers in Humans

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1867956/

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“Inert” Hazards in 2,4-D Herbicides

http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/24d-factsheet

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THE PEER REVIEWED PUBLISHED SCIENCE WHICH LINKS PESTICIDE EXPOSURE AND CHILDHOOD DISEASE

http://appprecautionaryprinciple.wordpress.com/2011/12/03/the-peer-reviewed-published-science-which-links-pesticide-exposure-and-childhood-disease/

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Low doses, Big Effects: Scientists seek 'fundamental changes' in testing, regulation of hormone-like chemicals

http://www.environmentalhealthnews.org/ehs/news/2012/low-doses-big-effects

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Strengthening Toxic Chemical Risk Assessments to Protect Human Health

http://www.cumulativeimpacts.org/documents/strengthening-toxic-chemical-risk-assessments-report.pdf

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'There are no safe doses for endocrine disruptors'

“After reviewing hundreds of studies, my colleagues and I have concluded in a new report that there truly are no safe doses for these hormone-altering chemicals.

Studies have examined people from the general population and found associations between low levels of hormone-altering compounds and infertility and other reproductive problems, cardiovascular disease, neurodevelopmental effects, obesity, abnormal bone health, cancer and other diseases. The overall cost to society is enormous, and it continues to rise. Academic, regulatory and industry scientists must work together to identify and replace such chemicals that are ubiquitous in everyday consumer products. Reducing and eventually eliminating these exposures is absolutely needed to protect human health. “

Laura Vandenberg - a Postdoctoral Fellow at the Levin Lab Center for Regenerative and Developmental Biology at Tufts University

http://www.environmentalhealthnews.org/ehs/news/2012/opinion-endocrine-disruptors-low-level-effects

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Oregon Tilth---Drift Happens

http://tilth.org/education-research/in-good-tilth-magazine/articles/2010/21iii/drift-happens

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[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Hwy 36 Exposure investigation comments

Hello,

I appreciate all the work that PARC and OHA have done on this matter. However after the results of the study and the conclusion was drawn, there is no more need for investigation.

The results you found were not atypical. Any results that did make you wonder were from questionable gathering techniques. I firmly believe you should not have included the self collected data from the pitchfork rebellion as it did not follow your protocol.

The two chemicals you were testing for have had numerous research and studies done on them and prove time after time they are safe when used responsibly and to the label. Farmers have sprayed both for decades and ill side effects have yet to be seen.

If you were to continue the investigation, please carefully monitor the activities of the folks who have accused the area foresters and farmers of exposure. As I stated before their self collection of data is highly suspect since it does not match with correlation of spraying activities. I would also encourage you to test farmers outside the area, who use the same chemicals to see what exposure they experience.

But most importantly I urge you to **end** the investigation since your initial results showed nothing overly surprising.

Thank you!

[redacted]

STARKER FORESTS, INC.

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Steven R. Wyatt, Treasurer • Randy L. Hereford, Timber Manager • Marc G. Vomocil, Forestry Manager

August 8, 2013

To: Oregon Health Authority
Environmental Health Assessment Program

From: Marc Vomocil
Forestry Manager
Starker Forests, Inc.

What: Comments on the Public Health Assessment for the Highway 36 Corridor Exposure Investigation Dated May 9, 2013

Thank you for the opportunity to provide public comments on the Highway 36 Corridor PHA. This is a very complex situation that warranted a very rigorous, tightly controlled investigation based entirely on exacting scientific protocol. I would urge that rigorous science protocol continue to be used going forward at all stages of the investigation. This is an area where imaginations can run wild and create scenarios in people's minds that don't exist in reality. That is why measurements and careful data analysis are critical.

My interpretation of the results and conclusions to-date is reassuring that no harmful levels of exposure to herbicides applied by forest landowners occurred. This is a confirmation that current herbicide application techniques are effective and that the Forest Practices Act regulations are sufficient to protect public health of those living near forest operations. That is the only reasonable conclusion one could reach and that is what the report should clearly state. The investigation was needed, it was done (albeit in some ways that opened it up to justified criticisms, e. g., questionable "self-sampling"), no evidence of harmful pesticide exposure levels was detected, so now it's time to end the investigation. The report should clearly and forcefully state that without any implied uncertainty. To do anything else would suggest a bias against herbicides. I trust OHA is completely unbiased and is led to conclusions only by rigorously evaluating data.

Sincerely,

Marc Vomocil

Marc Vomocil
Forestry Manager
Starker Forests, Inc.

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Triangle Lake Area

To Whom it May Concern;

I would like to comment on the Hwy 36 Corridor Exposure Investigation.

My family farms and uses pesticides according to the label. Our applicators are trained and certified by the state on the correct way to calculate and apply pesticides. If the applicator does not apply chemicals according to the label, our crop could be damaged and/or unable to market.

We have used Atrazine and 2, 4-D for many years with great results, and with no residual drawbacks. There has been NO Health effects determined from Atrazine and 2, 4-D and have been repeatedly proven safe.

Words like may, could, maybe, or should have no place in science based facts. We need to look at the facts and not assume any pesticide is unsafe just because It is being applied. The proven benefits out way the assumed negative results.

Thank you

[redacted]
[redacted]

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

RE: COMMENTS ON HIGHWAY 36 CORRIDOR EXPOSURE INVESTIGATION

8/9/2013

Dear OHA, and ATSDR Investigation Team,

Beyond Toxics is providing these comments on the Oregon Health Authority's (OHA) Public Health Assessment for the Highway 36 Corridor Exposure Investigation . Your draft report was released on May 9, 2013.

Beyond Toxics is a non-profit chartered in the State of Oregon and founded in 2001. **We use** environmental justice engagement and community-based environmental research to ensure environmental protection and health for all communities. Serving a unique role in Oregon, Beyond Toxics advocates for environmental justice and human rights values based on sound environmental research. We pursue meaningful advancements in Oregon's environmental policy.

The stated purpose of the Public Health Assessment is to "fill an important data gap that will allow us to determine if people are being exposed to pesticides in the Highway 36 corridor, and if so, the health implications of these exposures (ii)." Beyond Toxics' comments are based on:

- Ten years of experience as an environmental advocate providing community assistance for rural Oregonians seeking help and solutions to forestry pesticide spray exposures.
- An in-depth analysis of the spray records collected for the Investigation Area, 2009-2011. Our examination of the pesticide spray records and our GIS and policy examination will provide a level of informed analysis that will help the Investigation Team meet their state purpose.

Our comments address the following topics:

1. Public Health Assessment Investigation Strengths
2. Public Health Assessment Investigation Gaps
3. Pesticide detections in urine sampling and implications for human health
4. Low-level, chronic health effects from repeated exposures to pesticides for children
5. Patterns of forestry chemical applications in the study area
6. Comparison of Washington and Oregon Forestry Practices Act and policy issues related to aerial applications of herbicides in a watershed and near rural residential areas

Issue 1: Public Health Assessment and Investigation Strengths

1. The Public Health Assessment (PHA) confirms that residents in the Triangle Lake study area have been exposed to pesticides and that those exposures have been verified through biomonitoring and urinalysis.
2. The PHA points out that there is a limited but growing body of evidence on health effects from exposure to multiple pesticides, which may pose potentially greater risks that a single chemical exposure. This investigation confirms that participants in this study were exposed to more than one pesticide. The data also strongly suggest that the exposure is low level and chronic.
3. The PHA draws attention to the fact that this investigation cannot determine the health effects that rural residents can experience from low level, chronic pesticide exposures.
4. Referencing a literature review, the PHA cites evidence that pesticides can be expected to drift over many miles, certainly 2 – 4 miles, and likely more than 4 miles. Based on this evidence, the PHA will continue to determine the source of the pesticide exposures and will develop and deploy an air sampling plan for forestry and agricultural pesticides.
5. The PHA makes a number of important points about long term issues and next steps that must be address to protect public health, including:
    a. Develop consistent pesticide application record keeping;
    b. Allow public notification of pesticide applications in such a way to ensure that the public can protect themselves, particularly vulnerable populations;
    c. Taking action to ensure that agencies shall coordinate, collaborate and share resources to serve the public good;
    d. Additional biologic testing is needed, including testing for a larger range of pesticides in both human bodies and the environment;
    e. Continued access to pesticide spray records;
    f. Widespread air sampling before and during pesticide sprays;
    g. Acknowledging that residents have the right to know in advance about pesticide sprays – when, where, what and how much – so that there might be some opportunities for vulnerable people and families with children to take precautionary actions.

Issue 2: Public Health Assessment and Investigation Gaps

1. The Public Health Assessment (PHA) verified that pesticides used in forestry aerial spray applications were found at detectable levels in the urine of local residents, however the OHA Investigation failed to address that this fact would likely constitute a violation of the pesticide label and would be an illegal use.

2. The PHA states that the available evidence suggests that reported pesticides uses in the area "may have contributed to the levels detected in the participants' urine," but demurs from identifying a source of Atrazine. The PHA fails to do the necessary analysis to determine a source. Because Atrazine is a restricted pesticide, its legal use is only in commercial forestry or agricultural applications, not by non-licensed residents in the area. Thus the source of Atrazine metabolites detected in urine samples would be commercial forestry or agricultural uses.

3. The PHA fails to adequately address the potential for low-level, chronic health effects from repeated exposures to pesticides. The use of the phrase "not expected to harm people's health" does not correlate with the types of ongoing exposures for these rural residents. OHA has not acknowledged that forestry and Christmas tree pesticide applications are a long-standing issue for residents in other Oregon rural communities, that the issue is not isolated to Triangle Lake. Oregonians from Tillamook all the way to Josephine counties have long complained to the Pesticide Analytic Response Center (PARC) about health harms from what is suspected to pesticide exposures from tree farming and harvesting practices. The Report treats the Triangle Lake study area data as if it is an isolated situation, with no prior history of complaints and no relationship to complaints filed with PARC or ODA from other Oregonians living near commercial forestry operations. Not only is this PHA a "snap shot in time," it is also a small case study indicative of pesticide exposures happening all over this state.

4. The PHA fails to adequately address the potential for low-level, chronic health effects from repeated exposures to pesticides, especially for children. OHA must separately evaluate exposure of children to pesticide drift and immediately impose safeguards to protect children from pesticide exposures. OHA cannot prove that repeated, low-level and chronic exposures to 2,4-D and Atrazine are safe for children. The PHA acknowledges that Atrazine is an endocrine disruptor, which can pose a serious health risk to fetuses, infants and children. As such, any conclusions that these exposures are below levels expected to harm children's health are misleading and false. The final report should omit any statement suggesting that the Investigative Team thinks that the level of exposure to pesticides is not expected to harm children.

5. The PHA fails to address the fact that 2,4-D was detected in urine samples of 92% of the residents tested in fall 2011, despite that fact no 2,4-D was used in forestry or agricultural applications during the fall, with the last reported 2,4-D spray occurring in May 2011. It is unlikely that 92% of the residents used any 2,4-D products in the fall months, particularly since many of the residents do not use any pesticides on their residential property. The PHA should add a discussion as to whether 2,4-D may be more persistent in the environment than previously reported, might have a longer urinary half-life than previously reported, or that 2,4-D exposures might be from residual environmental exposures. The report should make recommendations about future investigations be to better understand the fate of 2,4-D in a forestry ecosystem and to understand how the (latent) exposure is occurring.

6. Conclusion 9 appears erroneous. The agency concluded that there is insufficient information to confirm that local pesticide applications are the source of Atrazine found in the urine of participating Highway 36 investigation area residents. To the contrary, all the data indicates that forestry aerial sprays were the source of the atrazine metabolites. The only documented use of atrazine in the study area was forestry aerial sprays, and urine levels showed increases above earlier levels when tested pre- and post- aerial sprays using Atrazine. Atrazine is a Restricted pesticide and is not allowed to be used on residential properties or by non-licensed applicators.

7. The basis of the decision for Conclusion 11 is misleading. Atrazine or 2,4-D were not detected in drinking water samples taken in fall 2011, most likely because neither chemical was used by the commercial pesticide operators since spring 2011. It is possible that spring sampling would find pesticide detections. Thus, drinking water cannot be eliminated as a potential exposure pathway for future exposures.

8. The Investigation Team has failed to acknowledge their responsibility to uphold human rights. State and federal governments are responsible for regulating agricultural, forestry, industry, manufacturing and other sectors to protect the public's health. It is a basic human right to have full access to a clean and healthy environment. It is a human right not to be exposed to hazardous chemicals that have trespassed onto one's own private property from another property. Ignoring and denying basic human rights erodes trust in state and federal agencies and officials, and those responsible for perpetuating policy decisions that do not protect the public health.

9. The basis of the decision for Conclusion 19 and 20 are misleading. Beyond Toxics has long served as a community resource from outside the community. Our organization is well informed about the pesticide exposure issue, has monitored the community's response to the problem for many years, and has provided leadership over time. We observe that a great deal of frustration and friction arises from the lack of credible and meaningful response from state agencies and the Board of Forestry. The community needs a response from the government that respects citizens' rights not to be poisoned and eliminates pesticide exposure from chemical trepass. Beyond Toxics has witnessed years of demeaning censure and disparagement from members of the PARC Board in response to Oregon residents who have come before them. These are simple people who attempted to obey the regulations and protocols of filing pesticide exposure complaints with state agencies and giving testimony to both civil servants and policy decision-makers. They have become frustrated and upset with how they are treated. We know of many people who have simply given up trying to communicate with PARC; their complaints about exposures are not being considered in the current investigation because they have become "invisible" to the government.

   Denying meaningful public input and blaming the impacted community for conflicts and dysfunction is a classic violation of the principles of environmental justice. This entire Investigation should adopt an environmental justice lens and furthermore require that state agencies represented on the PARC Board and the Board of Forestry receive environmental justice trainings.

   The EPA defines environmental justice and the public participation mandate thus:

   > Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. **Fair treatment** means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations or policies. **Meaningful involvement** means that: (1) people have

an opportunity to participate in decisions about activities that may affect their environment and/or health; (2) *the public's contribution can influence the regulatory agency's decision;* (3) their concerns will be considered in the decision making process; and (4) the decision makers seek out and facilitate the involvement of those potentially affected. [accessed 8/8/2013 at http://www.epa.gov/environmentaljustice/basics/ejbackground.html]

10. By treating the Highway 36 Investigation as an isolated incident, the PHA fails to assess the overall risk of pesticide exposure and how the increase of that risk is related to Oregon's forestry chemical policy. The Oregon Forest Practices Act is a 40 year old policy and is ineffective in protecting rural communities from the impacts of forestry operations for their homes, schools, gardens, drinking water and other activities; the OFPA fails to monitor pesticide applications and the environmental fate of these chemicals, fails to ensure that any aerial practice does not exceed the product label recommended maximum height of ten feet which is used by the EPA to assess drift risk off-site drift; does not address weather, slope, wind direction and swath adjustment for moving wind and fog; and does not address deposition, run-off and chemical-laden sediment in streams.

Issue 3: Pesticide detections in urine sampling and implications for human health

Facts: The PHA report states that both the community collected urine samples in the spring of 2011, as well as the samples collected by state and federal agencies in the fall of 2011 confirmed that residents were being exposed to 2,4-D. In many cases the level of 2,4-D was "higher than levels found in the general population." (p.2) Atrazine was also detected in the urine samples taken in spring 2011. In the fall 2011, 92% of the EI participants had detectable levels of 2,4-D in their urine. This 92% figure excluded children six years old and younger. Other chemical products that were sprayed by industrial forestry companies, including Hexazinone, Triclopyr, Glyphosate, Clopyralid, Imazapyr, Metsulfuron methyl, and Sulfometuron methyl were not tested.

Gaps and Problems:

Increased Aerial Applications: The Investigation did not comment on the significant increase in the use of herbicides from spring 2009, to spring 2010 and then again in spring 2011. In fact, there was a 226% increase in aerial applications of herbicides over the three year period. The increase corresponds with the increase in public health complaints from residents in the Lake Creek watershed. The report should acknowledge the correlation between increased herbicide spray and public health problems and complaints.

Numbers of participants with detections of herbicides in their urine: The PHA does not address whether the finding that 100% of residents in spring 2011 and the 92% of residents in fall 2011 had detectable levels of herbicides in their urine is "normal." Is it "normal" to have 92% and 100% of residents in a small, isolated community test positive for herbicides? Also the PHA did not comment upon the significant increase in 2,4-D and Atrazine detected in some participant's pre-spray urine samples and post-spray samples taken in spring 2011. The PHA

glosses over the health ramifications of pesticide detections that were above the NHANES 75th and 95th percentiles. The statistical significance level (p value = 0.06) suggests that there is a high likelihood that commercial pesticide use is correlated with pesticides detected in urine samples. The final PHA report should do more to address the pervasive presence of commercial and, in the case of Atrazine, a restricted herbicide, and the public health policy implications of off-site pesticide occurrences.

Incorrect Data in the PHA: 1) On page 21 and 23, the PHA concludes that only two commercial applications of pesticides occurred prior to the urine sampling on August 30 and 31, and that these were ground pesticide applications. However, according to the official spray records obtained by Beyond Toxics, one aerial spray took place on 8/18 and three aerial sprays took place 8/28-29 (see table below). OHA did not do urine testing for the chemicals used in late August, 2011, nonetheless, it is important to include the full data set in the report.

Date	Notification #	Operator	Chemicals	Type of Spray	Number of Acres
8/18/11	**2011-781-00567**	Weyerhaeuser	Glyphosate; Metsulfuron methyl; Imazapyr; Methylated Seed Oil	Aerial	92
8/28/11	**2011-781-00559**	Starker	Sulfometuron methyl; Glyphosate; Induce	Aerial	33
8/29/11	**2011-551-00325**	Starker	Sulfometuron methyl; Metsulfuron methyl; Glyphosate; Induce	Aerial	50
8/29/11	**2011-551-00335**	Starker	Sulfometuron methyl; Metsulfuron methyl; Glyphosate; Induce	Aerial	38

2) On page 23, the PHA states that "eight of the thirteen known ….pesticide applications that occurred during fall 2011 … used Glyphosate." However, according to the official spray records obtained by Beyond Toxics, there were thirteen instances of Glyphosate use.

8/2/11	2011-781-00405	Aug 2/Rosboro/95 acres	95	G I M S Dy
8/18/11	2011-781-00567	Aug 18/WEYCO/92 acres	92	G I M Mso
8/28/11	2011-781-00559	Aug 28/Starker Forest/33 acres	33	G S In
8/29/11	2011-551-00325	Aug 29/Starker Forest/50 acres	50	G M S In
8/29/11	2011-551-00335	Aug 29/Starker Forest/38 acres	38	G M S In
9/9/11	2011-551-00269	Sept 9/Giustina Resources/137 acres	137	G I M S Syl
9/20/11	2011-781-00221	Sept 20/WEYCO/48 acres	48	G I M S Mso
9/20/11	2011-781-00567	Sept 20/WEYCO/57 acres	57	G I M Mso
9/20/11	2011-781-00567	Sept 20/WEYCO/60 acres	60	G I M Mso
9/20/11	2011-781-00625	Sept 20/WEYCO/66 acres	66	G I M S Mso

9/20/11	2011-781-00625	Sept 20/WEYCO/48 acres	48	G I M Mso
9/20/11	2011-781-00625	Sept 20/WEYCO/76 acres	76	G I M Mso
9/23/11	2011-781-00632	Sept 23/Freres Lumber/160 acres	160	G M Sta

Legend:
G – Glyphosate; I – Imazapyr; M – Metsulfuron methyl; S – Sulfometuron methyl; In – Induce MSO – Methylated Seed Oil; Sta – Stayput

3) The PHA contains no information on how chemical tank mixes (including adjuvants and inert ingredients) may accentuate or exacerbate other chemicals interactions between environment and human biomarkers.

Multiple Chemicals: The study acknowledges that laboratories may not have the technical capability to test biomarkers for exposure to pesticides other than Atrazine and 2,-D. There are biomarkers for Glyphosate; the PHA needs to include an explanation of why Glyphosate was not tested and describe plans to include Glyphosate biomarkers in future studies. More explanation is needed to describe the potential presence of the other pesticides used in the area as potentially damaging to human health.

Tank Mixes: The pesticide records prove that timber companies are using tank mixes of pesticides and adjuvants. In other words, Beyond Toxics' review of the spray records confirms that it is a common forestry practices to concoct and spray mixtures of chemicals in each pesticide application event. Commercial foresters often refer to these tank mixtures as "chemical soups." Examples of tank mixes include:

- ⊡ 2,4-D, Atrazine, Hexazinone, Foambuster
- ⊡ Chlopyralid, Hexazinone, Foambuster
- ⊡ Glyphosate, Imazapyr, Metsulfuron Methyl, Sulfometuron Methyl, Methylated Seed Oil

There are many versions of tank mixes, in addition to the three examples above, taken from the spray records. Choices of tank mixes are made independently by the pesticide applicator. There are no regulations to cover the practice of mixing more than one active ingredient, inerts and adjuvants. Adjuvants, such as Foambuster and methylated seed oil are also toxic chemicals.

Recommendations:

1. Complete a thorough analysis of the pesticide data using spray records data from 2009 through 2013. Look for trends and examine the forestry pesticide practices and human health and environmental data to determine the source of pesticides exposures.
2. Perform air sampling and monitoring, and test for biomarkers in accordance with the seasonal cycles of forestry pesticide spray. Beyond Toxics has analyzed the seasonal trends and found that Atrazine, 2,4-D, Clopyralid and Hexazinone are typically used in the spring. Glyphosate, Imazapyr, Triclopyr, Metsulfuron methyl and Sulfometuron methyl are typically used in the summer and fall. Fall urine samples should be analyzed for Glyphosate.

3. The study concluded that a 'p' value of 0.06 could be interpreted as no statistical significance difference in the 34.4% of participants whose 2,4-D range was above the NHANES 75the percentile. Lack of unequivocal statistical significance should not be dismissed as a lack of firm data— with a 'p' value of 0.06, we know that there is a 94 percent certainty that a statistically significant result is true. The study should have taken into account the unique characteristics of this rural community, their dietary habits, their relative geographic isolation, the fact that nearly 60% have verified that they do not use pesticides on their property, and most importantly, the fact that the samples were taken in the fall season, when 2,4-D and Atrazine were not sprayed on nearby forestry or agricultural properties. This "lens' into the characteristics of the Triangle Lake community should be accounted for in the discussion of the statistical analyses.
4. Detection of pesticides in residents' urine samples indicates the probability that pesticide applications violate registered product labels and present a heightened drift risk. Beyond Toxics recommends that the Investigation Team undertake a thorough investigation of aerial forestry spray practices, including height of aerial craft at time of spray, weather, wind, temperature, droplet size, pesticide product, tank mixing and the use of adjuvants.

Issue 4: Low-level, chronic health effects from repeated exposures to pesticides for children

Protecting children's health and ensuring the right to develop normally and in good health is one of the primary responsibilities of society, and certainly the government. Children receive short shrift in this report. The PHA report devotes about one-third of a page (page 36) to the issue of children's health considerations. Compare that amount to more than nine pages about community characteristics and conflicts (pages 37-46).

Members of the Investigation Team were heard to publicly state that children's health is adequately covered by the various RfD's and BE's for chronic exposure. They conclude that because the detections were below these limits, children are not at risk for harm. On page 37 the authors claim that OHA has designed conclusions and recommendations that will protect children from dangerous chemical exposures. However, not a single conclusion of the 20 conclusions offered address children's health and risk of exposure. Not one of the seven recommendations offered will protect children's health; in particular the second recommendation in the second set of recommendations suggests that "sensitive populations" be notified so that they can take action to avoid exposures. How does the PHA suggest that children take action to protect themselves if there are no recommendations to reduce and eliminate pesticide exposures from forestry and agricultural applications near homes, schools, bus stops, playing fields, churches, parks, etc. Would OHA suggest that children be removed from their homes, schools and daily activities as many as thirty-six times each year, thirty-six being the number of forestry pesticide sprays in the Triangle Lake study area during 2011?

The Investigative Team, particularly ATSDR and OHA, must expeditiously evaluate exposure of children to pesticide drift and impose safeguards to protect children from pesticide exposures. One of the many routes by which children are exposed to pesticides is through pesticide drift.

Beyond Toxics strongly recommends an immediate adoption of interim prohibitions on the use of drift-prone pesticides near homes, schools, or wherever children congregate.

Children have smaller bodies, immature organs and metabolic systems, and as a result, can't break down toxins as well as adults. This makes children especially vulnerable to pesticide exposures. Immediate preventive action is critical.

In conclusion, OHA has failed to assess children's unique special susceptibilities to the adverse health effects of such exposures at various stages of development.

Recommendations:

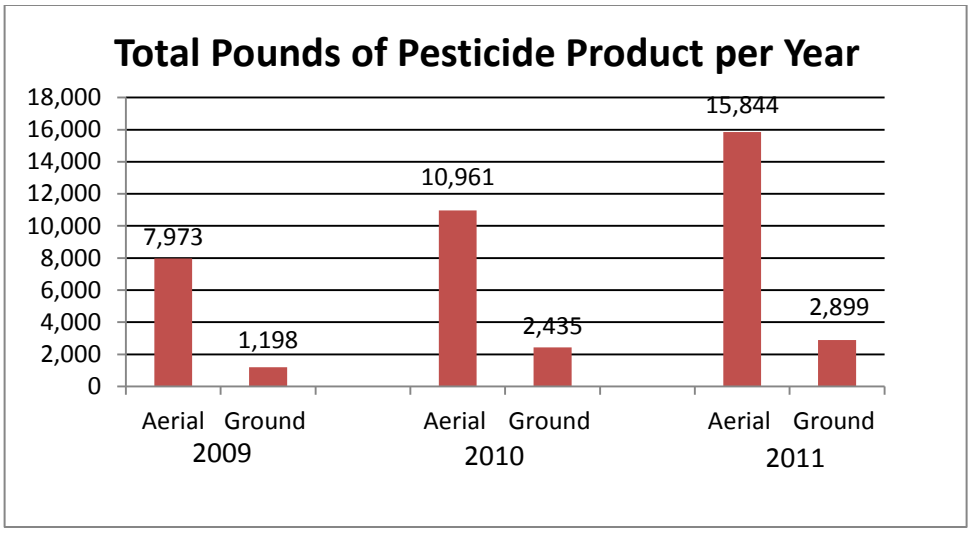
Some state and local jurisdictions have adopted buffer zones to protect children from pesticides. Under FIFRA, the EPA has the authority to impose restrictions for health and safety reasons and to require changes in pesticide labeling to protect against unreasonable risks to vulnerable populations such as children, the public or the environment. Beyond Toxics recommends a minimum buffer zone of two miles and additional restrictions on boom height, wind, fog, rain and pesticide products allowed.

Issue 5: Patterns of forestry chemical applications in the study area

Interested individual residents in the Triangle Lake investigation study area made public records requests to the State of Oregon for the records that were obtained from timber operators, and then made those records available to Beyond Toxics. Beyond Toxics carried out an analysis of the pesticide spray records. Some key facts of our analysis that pertain to the PHA are:

- From 2009 through 2011, at least 41,310 pounds (20.7 tons) of pesticide product[1] were sprayed on commercial timber lands and some state forestry land within the Triangle Lake Study Area.
- Total pesticide pounds increased 99% from 2009 to 2011.
- Increased aerial spray activity in 2011 was especially evident in the spring months, with a 226% increase of the amount in pounds of pesticide product applied by aerial spray from Spring 2009 to Spring 2011.

1 Pesticide Product is the active and inactive (inert) ingredients as listed on the product label, but does not include the carrier (such as water).



- We calculated that there was a 27.6% increase in pounds per acres aerial sprayed from 2009 to 2011. **Error! Reference source not found.** shows the percent increase as pounds per acre per year. Pounds of pesticide product per acre by year.

Pounds of pesticide product per acre by year

Year	Pounds/Acre Aerial Sprayed
2009	5.6
2010	6.6
2011	7.2

- Records show that there was a steady increase in the chemicals most commonly sprayed.

Percent increase of pesticide product most often sprayed from 2009 to 2011

	Aerial Sprays	Ground Sprays
2,4-D	80%	22%
Atrazine	73%	0% (not used)
Glyphosate	4%	71%
Hexazinone	38%	29%
Imazapyr	13%	61%
Triclopyr	0%	31%

- The Oregon Forest Practices Act limits access to spray data to only three years. This limitation makes it difficult to look for trends over time. However, the three years of spray data indicate there is a pattern of repeated pesticide sprays on each unit. Many units were sprayed two and three times within the three year record window. Sprays often included a variety of chemicals. Tank mixes were common.

- The three years of data show the common practice of repeating sprays on the same unit of land. This is important data that contributes to our understanding of low level, chronic exposures for impacted communities. The PHA omits any data analysis about an accumulation of exposures from the practice of repeating sprays on the same unit of land.

- The study does not adequately address the issue of tank mixes with multiple active ingredients, inerts and adjuvants and what this might mean for individual and cumulative exposures and associated health risks. The issue of environmental accumulations of mixtures of chemicals is pertinent to this PHA.

- The PHA narrowly focuses on assessing risk by comparing urine sampling results to RfD's, BE's and NHANES. However, the PHA failed to use any other method of assessing toxicity and risk, and thus failed to assess trends in human health and environmental toxicity according to the applicator, the seasonal trends, and the chemical or chemical mix used. Beyond Toxics used the Field Use Environmental Impact Quotient (EIQ) developed by researchers at Cornell University to provide a context for evaluating the risk from pesticide sprays (J. Kovach, 1992).
    - A timber operator's choice of 2,4-D, Atrazine and Hexazinone (all chemicals sprayed in the spring) have the highest environmental impacts relative to other chemical choices. The EIQ rating system can help us determine which companies are having a higher environmental and public health impact, and educate landowners on which chemicals they can use to have less of an impact. Atrazine has the highest EIQ for the chemicals used in forestry operations in the Triangle Lake Study Area. Hexazinone and 2,4-D have the second highest EIQ ratings.

- One timber operator consistently chooses spray practices that have the highest Environmental Impact Quotient. The table below shows the EIA ratings by date, operator and unit size for the year 2011. The high environmental impact quotient is for 2,4D and Atrazine, which is used almost exclusively by one timber operator. This pattern bears out year after year. (See Attachment 1)

Recommendations:

1. Obtain spray records for 2009-2013.
2. Ascertain why there have been increases in
    a. Number of spray applications
    b. Pounds of pesticide applied
    c. Increase in the pesticide products sprayed
    d. Increase in the pounds applied per acre
3. Fill in the data gaps to evaluate how repeated applications, tank mixes, adjuvants and aerial spray may increase risk to public health.
4. Use different ways to evaluate the spray data for environmental toxicity and impacts to public health. RfD's and BE's are narrow ways to view the data; we recommend a systems approach.

5. Evaluate individual practices of the timber operators and make recommendations to develop policies that ensure the safest practices that will protect nearby communities from aerial drift and exposure to 2,4-D and Atrazine.

Comparison of Washington and Oregon Forestry Practices Act and policy issues related to aerial applications of herbicides in a watershed and near rural residential areas

The PHA made some recommendations that were aimed at meeting the Investigation goal, to "fill an important data gap that will allow us to determine if people are being exposed to pesticides in the Highway 36 corridor, and if so, the health implications of these exposures (ii)."

Many of the recommendations involve gathering better data, having access to records and allowing the public to know in advance when sprays will occur. One of those recommendations pointed out the need for more spray records to comprise a comprehensive record that could be used to interpret air sampling and assess trends.

The PHA does not identify what policies must change in order to get more data, protect the public, and implement additional monitoring and sampling.

Recommendations:

Beyond Toxics suggests that the final report reference the Washington Forest Practices Act as a viable model for policy changes that would:

1. Align forest practices in neighboring states;
2. Create consistency for timber operators who have operations in both Washington and Oregon, and have a history of compliance with the Washington Forest Practices Act;
3. Promote monitoring and metrics, two aspects of developing good science and reliable data;
4. Provide a blueprint to update the 40 year old Oregon Forest Practices Act to reflect new information about health and environmental harms associated with pesticide use.
5. Provide the suggested notification of upcoming pesticide sprays that are necessary for rural communities who seek to protect their families, their home grown food and their property.

Attachment 2 is a comparison between the Washington Forest Practices Act and the Oregon Forest Practices Act.

Beyond Toxics recommends that the federal agencies on the Investigation Team set a goal of complying with the 1994 Presidential Executive Order 12898 on Environmental Justice . Compliance would mean that:

1. *the public's contribution can influence the regulatory agency's decision;*
2. *their concerns will be considered in the decision making process; and*
3. *the decision makers seek out and facilitate the involvement of those potentially affected.*

The first step is to open up a community discussion about how Oregon could improve its forestry practices and ecosystem health by aligning policies with Washington state.

Conclusion

In conclusion, Beyond Toxics has focused its comments on an analysis of the pesticide spray records in relationship to human health concerns. We have also raised important issues related to compliance with environmental justice requirements and human rights principles. Paramount is our recommendation that the Investigative Team do much more to assess children's health and to recommend policies that eliminate the burden of pesticide exposure for Oregon's rural children.

We would also like to incorporate and reference the comments submitted by the Pacific Rivers Council, who used our data to make recommendations for an integrated watershed approach to land management and the protection of native aquatic species. We agree with their recommendation that the Investigation Team needs to carry out an in-depth environmental monitoring campaign of the aquatic and terrestrial ecosystem, as well as biota sampling, to provide the necessary information to determine pesticides exposure source(s) and pathway(s), and to protect ESA-listed Coho salmon, steelhead and other aquatic organisms.

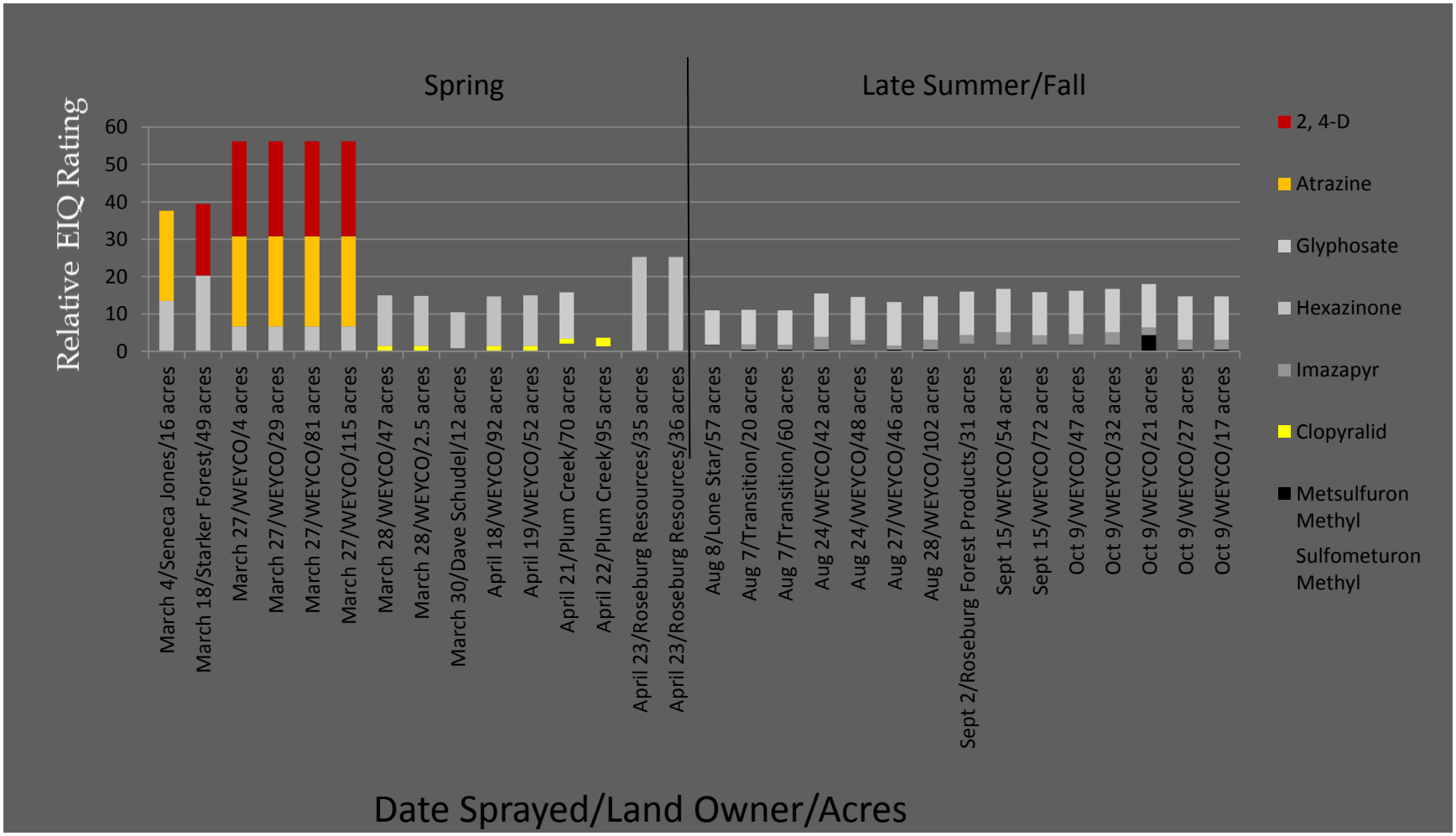
Thank you for the opportunity to comment.

Sincerely,

Lisa Arkin, Executive Director

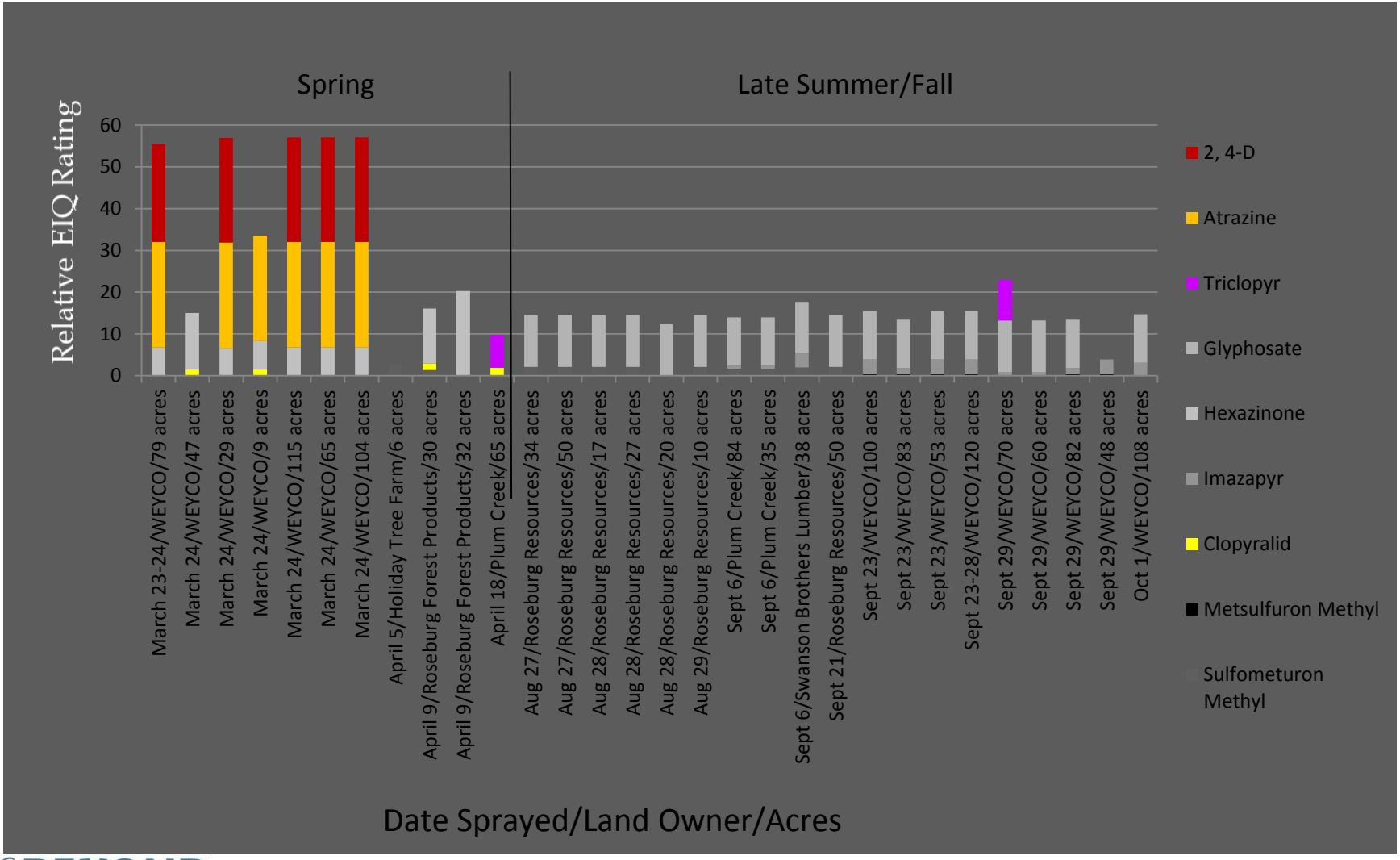
Beyond Toxics

Aerial Sprays 2009 Field Use EIQ Ratings



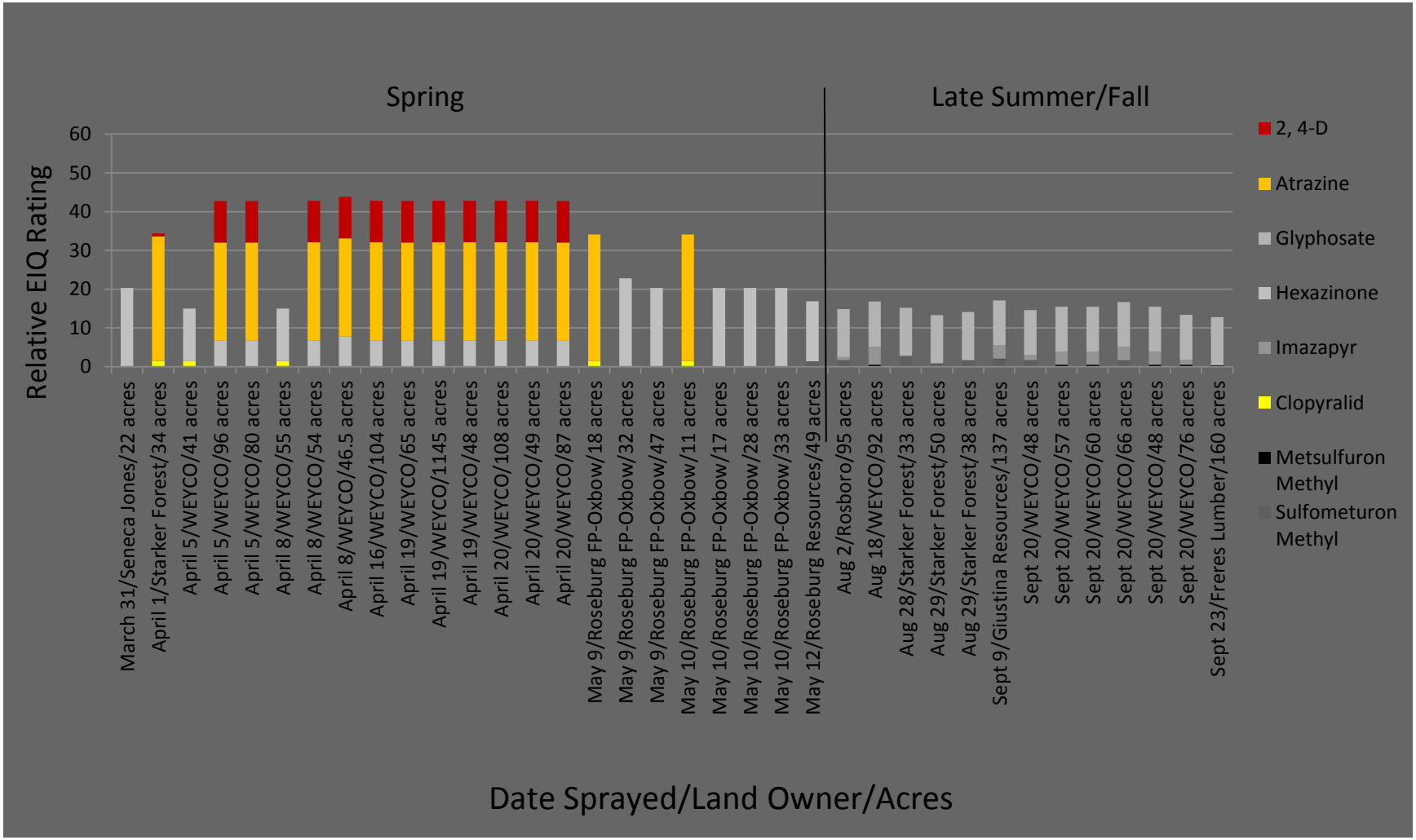
BEYOND TOXICS

Aerial Sprays 2010 Field Use EIQ Ratings



BEYOND TOXICS

Aerial Sprays 2011 Field Use EIQ Ratings



BEYOND TOXICS

Comparison of Aerial Spraying Pesticides Regulations

Protection Area	Washington State Forest Practices Act	Oregon State Forest Practices Act
Domestic Water Supply	200’ & triggers Special Review	60‘
Fish Bearing Stream Buffer	100-150’ for Forests similar to the Coast Range	60‘
Perennial Non Fish Stream Buffer	50-100’	0‘
Intermittent Non Fish Stream Buffer, with surface water present	50-100’	0‘
Buffer next to Residences	200’	None
Buffer next to Agriculture Lands	100’	None
Posting Site	Must post 5 days in advance and 15 days after spraying	No posting
Comply with Federal ESA	Yes	No

BEYOND TOXICS

Comparison of Aerial Spraying Pesticides Regulations, con't

	Washington State Forest Practices Act	Oregon State Forest Practices Act
Public Comments Allowed	Yes	No
Agency Review Period	3 Weeks	No Review
Application Records Available to the Public	Yes	No
Years Records are Kept	7 years	3 Years
Ground Water Protection Areas	Spray Application in vulnerable ground water areas trigger a Class 4 SEPA Review; Chemicals Identified as Not Allowed: Atrazine, Bromacil, Dcpa, Disulfoton, Diuron, Hexazinone, Metolachlor, Metribuzin, Picloram, Prometon, Simazine, Tebuthiuron	None

BEYOND TOXICS

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us

Thank you for accepting my comments.

Briefly, I am very concerned that people are being exposed to airborne pesticides against their will, and outside of their control.

Atrazine in particular is a dangerous chemical, banned in the EU, and its use should not be allowed anywhere in Oregon.

Instead of caving to the Timber billionaires as usual, or stalling, the governor should take action now to prevent people from being poisoned by careless spraying of chemical agents.

[redacted]

Williams, Oregon

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: forestry herbicides

Reading about the pesticides found in the urine of local people in western Lane County is extremely worrisome. I may not be a resident of the area, but this is a small example of poisons that we, citizens are being subjected to against our will, and it is guaranteed to ruin our health. This must stop, not only near children, but everywhere! ***We don't want these contaminants!!!*** They accumulate in our water, the land, our food, the air and everything. ***Small amounts are not acceptable*** because multiple exposures become significant amounts ***We don't want it!***

We count on you, the leaders of our country to protect us from hazardous substances. Our political leaders are not doing their job! They give complete freedom to the corporations that are profiting by these products at the cost of our health and eventually the survival of our civilization. Please do not allow this kind of thing to continue!

Thank you for considering my thoughts.

[redacted]

[redacted]

In response to your request for additional information, comments and questions regarding the Triangle Lake Investigative report, I have enclosed documentation of an aerial spraying exposure incident that occurred in Curry County on October 19th, 2012, within approximately 1.5 miles of the incorporated City of Gold Beach population 2200+. The elected officials, agency directors and individuals reading this information need to be aware that the strict guidelines or protocol that dictates the use of herbicides in forestry practices was not being followed or enforced. **With the prevailing weather conditions on the Southern Oregon Coast it is virtually impossible to be in compliance for aerial spraying as weather station data confirms.**

On the morning of October 19th, 2012 I spotted a helicopter with spraying wands flying off the West end of my property, due east of Gold Beach. I immediately called the Oregon Department of Forestry office in Coos Bay and asked why I had not been notified since I had paid for a notification subscription for aerial spraying in that vicinity.(see attachment 1) I spoke with an individual from the office who said they would fax me the information about what chemicals where to be sprayed. I informed them about my concerns regarding the shifting high winds blowing from all directions. They responded by saying they would notify my local Stewardship Forester, for Curry County, about the situation. I then received faxes totaling 32 pages form the Oregon Department of Forestry office in Coos Bay indicating the spray zones in the sections adjacent to my property intended for aerial application of Herbicides, **(Notification Numbers 2012-740-01253, 2012-740-00270 & 2012-740-1263).**

I immediately called the local Stewardship Forester, and asked why the spraying was taking place during high winds and asked for them to witness the incident. Their comment was that they would respond as soon as possible. After arriving at my residence adjacent to the spray zone, at approximately 10:45 am, we discussed what was happening and noted the wind speed and precipitation present. They witnessed the helicopter flying in the area, and I asked if this was right? Their reply was, "No". I then asked, "What are you going to do about it?" We also discussed future spraying events planned. Their comment was that they would contact the property manager and encourage both parties to try and work together on future aerial applications.

On March 22nd, 2012 I received **Notification (213-740-00395),** (see map attachment 2), by mail informing me of a proposed aerial spray along my North property line, part of a proposed 211 acre spray zone. I called the Stewardship Forester and informed her that the property manager had not contacted me prior to this notification to work on this together as suggested. She said she would contact the property manager. I received a call from the property manager stating that he was willing to meet to discuss the aerial spraying and a meeting time was set for April 1, 2012 at 4PM.

At this meeting, I and several of my neighbors met with property manager of proposed spray site, the helicopter pilot, and the forester who facilitated the meeting. The ODF forester asked what our concerns were. We stated that we were concerned about our health, water contamination of our domestic drinking supply as well as the ponds in the spray zone and the species present which included amphibians. The ODF forester said that the aerial spraying complies with strict regulations. We also asked the pilot and property manager for the Daily chemical application records for the October 19th, 2012 aerial spray event and were denied. The meeting was ended abruptly.

The ODF forester asked if he could come observe the proposed spray area. He and the helicopter pilot visited the areas in question shortly after the meeting. I showed him the pond which was located within the spray zone and expressed my concerns about possible contamination of the pond water being a domestic water supply. We also discussed the domestic water supply and how it might be affected. He also stated that he was noting my concerns and would pass along the information to the Stewardship Forester.

I later learned about a weather station located adjacent to my property, approximately 100 yards from the Western boundary that recorded wind speed and precipitation. I was able to access the data online and document the conditions of the October 19th, 2012 spray incident. (Attachment 3) This weather station, known as NW04 W4 Flynn Prairie, elevation 1543 ft., may be accessed at, http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=NWCC&rawsflag=2

To this day I still do not know what chemicals were used on October 19th, 2012. I fell ill for several months following the October 19th aerial spraying event with a lingering respiratory ailment.

I have had numerous conversations with representatives from various departments and agencies regarding this situation. With the prevailing weather conditions on the Southern Oregon Coast it is virtually impossible to be in compliance for aerial spraying as the weather station data confirms.

After I obtained the weather records online I contacted the Dept. of Agriculture and asked that an investigation be opened on the Oct 19th, 2012 spraying. I also stated that I wanted to know what chemicals where used. I was informed that they would not investigate information 6 months old, that the event had to be under investigation in order for the information to be released, and that I would have to deal with the Forestry department to get that information. I have since learned that without an active investigation into the event I cannot have access to that information.

In conclusion, aerial spraying should be banned on the Oregon Coast due to prevailing weather patterns that make compliance impossible as weather station data confirms. It is also impossible to contain the dispersal of chemicals used in forestry practices in an area with such high precipitation levels. Please note that on October 19th, 2012 precipitation levels in the spray zone for the following 4 days produced 2.75 inches of rain. With a minimum of 60 inches of rain annually, how can it not end up in our streams, rivers and domestic water sources many of which are springs and wells? Manual release is the only safe forestry practice under these conditions. It will also create jobs and boost local economies.

Please consider this carefully. The Triangle Lake investigation shows, these chemicals are not able to be contained within the prescribed spray zones and affect residential areas. There is also a growing body of research linking chemical runoff with low fish hatchery returns and altered migration patterns affecting the recreational fishing industry these coastal towns rely on.

For additional information, enclosed please find a link to the OPB broadcast of the Triangle Lake investigation report.

http://earthfix.opb.org/land/article/oregonians-fear-forest-herbicides-could-do-harm/

All contacts have been documented with and supported by telephone records. Please contact me if additional information needed.

[redacted]

DEPT OF FORESTRY
UNIT 12
P.O. BOX 4395
PORTLAND, OR 97208-4395

Gen File # 0-2-3-408

Receipt **A-** 64953

RECEIPT

Received Check (Form of Payment) No. # 6753 (Ck#, MO#, etc) Coos Bay (Headquarters), Oregon 10-8-12 (Date)

In the Amount of Twenty-five dollars no/cents Dollars $ 25.00

From: [redacted]

County: COOS

Received Payment
STATE FORESTER

By BAQuackenbush

Description	Revenue/Expenditure Code					Total Amount
	Index XXXXX	PCA XXXXX	Project XXXXXX	Phase XX	Object XXXX	
Subscriber fees for Coos District for T37S R14W Sections 4, 5, 8, 9, 15 located in Curry Co. for one year 10-8-12 thru 10-8-13.	74000	51600				25.00

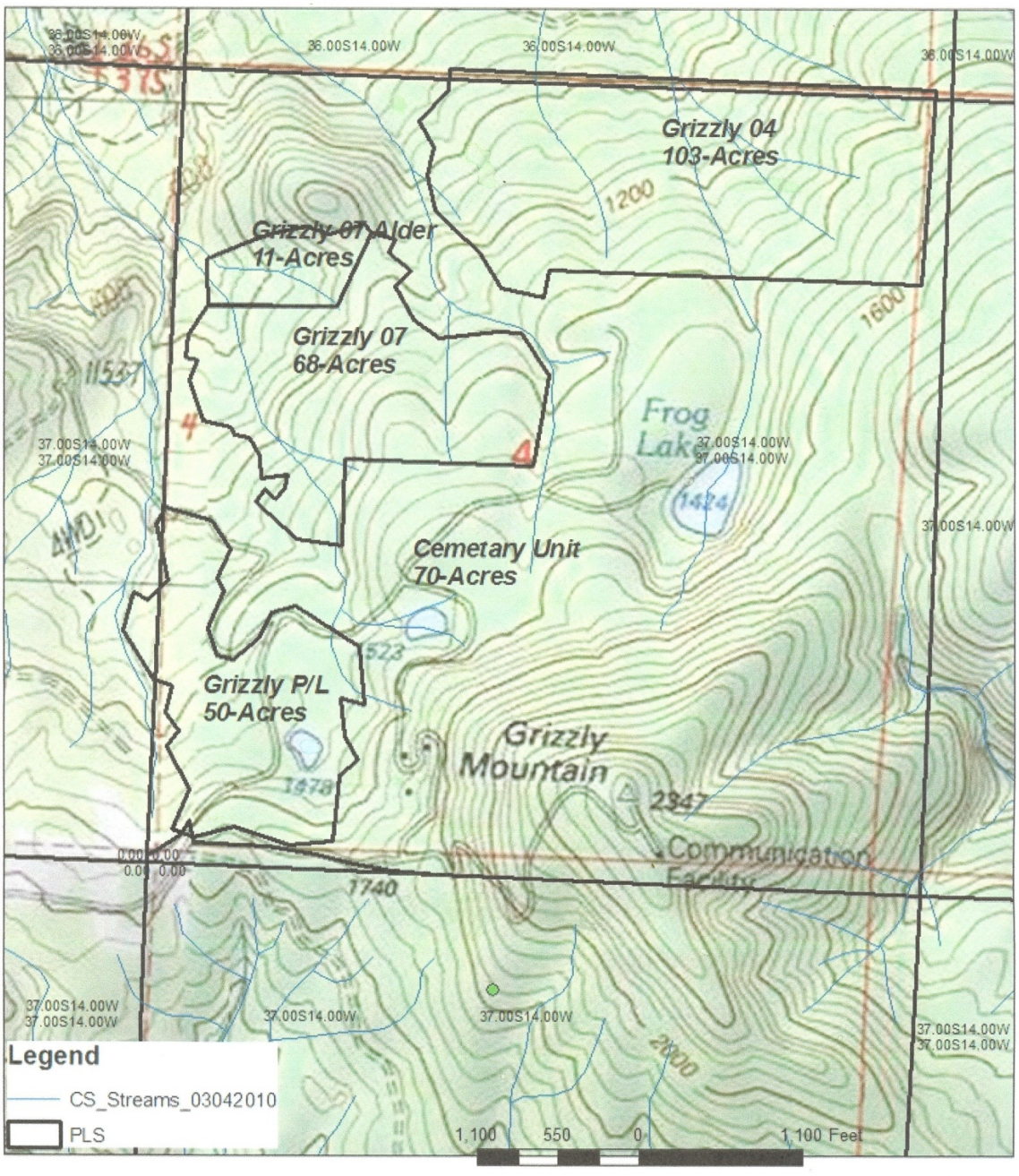
Deposited to: Lock Box ☐ Direct Deposit ☒

Date Sent: 10-8-12
Deposit #:

Invoice # _____ (If applicable)
Receipt # _____ (assigned by Fiscal Services)

White-Recipient Yellow-Fiscal Services Pink-Fiscal Services Goldenrod-Field Copy

Crook Timberlands LLC 2013 Grizzly Mtn. Block Aerial Spray Approximately 211-Acres
Located in Township 37 South, Range 14 West W.m.,Sections 4, and 5
Curry County, Oregon



Past Weather Conditions for FPRO3

Observations prior to selected time: October 20, 2012 - 00:00 PDT

Weather Conditions at October 19, 2012 - 23:13 PDT

	23:13	24 Hour Max	24 Hour Min
Temperature	52.0° F	59.0 at 9:13	51.0 at 16:13
Dew Point	51.7° F	51.7 at 18:13	37.7 at 9:13
Relative Humidity	99%	99 at 18:13	45 at 9:13
Wind Speed	5 mph from S	19 at 14:13	5 at 4:13
Wind Gust	8 mph	27 at 13:13	8 at 23:13
Solar Radiation	0.0 W/m*m	213.0 at 12:13	0.0 at 0:13
Fuel Temperature	52.0° F	61.0 at 12:13	51.0 at 5:13
10 hr Fuel Moisture	24 gm	24 at 23:13	9 at 0:13
Battery voltage	13.00 volt	13.50 at 14:13	13.00 at 1:13

Precipitation accumulated since midnight: -, in 24 hours: 0.27"

Tabular Listing: October 18, 2012 - 23:00 through October 20, 2012 - 00:00 PDT

Triangle Lake/Hwy 36 Comments

Time(PDT)	Temperature	Dew Point	Relative Humidity	Wind Speed	Wind Gust	Wind Direction	Quality check	Solar Radiation	Precipitation accumulated	Fuel Temperature	10 hr Fuel Moisture	Battery voltage
	° F	° F	%	mph	mph			W/m*m	in	° F	gm	volt
23:13	52.0	51.7	99	5	8	S	OK	0.0	88.58	52.0	24	13.00
22:13	52.0	51.7	99	7	12	S	OK	0.0	88.58	52.0	24	13.00
21:13	52.0	51.7	99	8	10	S	OK	0.0	88.58	52.0	22	13.00
20:13	52.0	51.7	99	6	12	S	OK	0.0	88.57	52.0	20	13.00
19:13	52.0	51.7	99	8	15	S	OK	1.0	88.57	52.0	19	13.00
18:13	52.0	51.7	99	9	13	S	OK	0.0	88.57	53.0	16	13.00
17:13	52.0	51.5	98	11	15	S	OK	0.0	88.54	53.0	14	13.10
16:13	51.0	50.5	98	11	22	SSW	OK	0.0	88.42	51.0	11	13.20
15:13	53.0	49.8	89	15	24	S	OK	0.0	88.31	53.0	10	13.30
14:13	57.0	41.0	55	19	27	S	OK	8.0	88.31	59.0	10	13.50
13:13	58.0	41.4	54	18	27	S	OK	211.0	88.31	60.0	10	13.40
12:13	58.0	43.3	58	15	21	S	OK	213.0	88.31	61.0	10	13.30
11:13	57.0	46.5	68	15	19	S	OK	159.0	88.31	59.0	10	13.20
10:13	59.0	40.9	51	13	17	S	OK	109.0	88.31	60.0	10	13.00
9:13	59.0	37.7	45	10	15	S	OK	56.0	88.31	60.0	10	13.00
8:13	58.0	37.9	47	11	14	S	OK	8.0	88.31	58.0	11	13.00
7:13	56.0	42.3	60	9	11	SSW	OK	0.0	88.31	55.0	10	13.00
6:13	52.0	47.6	85	5	9	SSW	OK	0.0	88.31	51.0	10	13.00
5:13	53.0	44.2	72	5	9	SSW	OK	0.0	88.31	51.0	10	13.00
4:13	56.0	41.0	57	5	10	SSW	OK	0.0	88.31	54.0	10	13.00
3:13	57.0	39.1	51	9	12	S	OK	0.0	88.31	55.0	10	13.00
2:13	57.0	40.0	53	7	9	S	OK	0.0	88.31	54.0	10	13.00
1:13	56.0	39.1	53	7	9	S	OK	0.0	88.31	53.0	9	13.00
0:13	57.0	39.5	52	6	11	S	OK	0.0	88.31	54.0	9	13.10
23:13	60.0	38.0	44	8	10	S	OK	0.0	88.31	57.0	9	13.10

NW04 W4 Flynn Prairie weather station, elevation 1543 ft located approximately 100 yards off Western property boundary

Triangle Lake/Hwy 36 Comments

October 19th, 2012 spray area in proximity to weather station facing south

Weather Station proximity to coastline and incorporated city limits within approximately 1 ½ miles

>

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us

To whom it may concern,

I would like to make some comments on the OHA exposure investigation in the HWY 36 area. I find the lack of science and absence of common sense in the study troubling to say the least. The one area that I think is the most lacking in good objective science is the data orchestrated by [redacted] that was allowed into the study. This data seems to be falsified, and the most glaring fact supporting this idea is the fact that nobody can figure out where the atrazine came from in [redacted] February samples. The fact that OHA can't figure out where the atrazine came from but would still include this interested party data flies in the face of good science and common sense. The other point I would like to bring to light is the activities of Karen Bishop. While this investigation was ongoing Karen was posting opinions on the use of herbicides of the facebook page stop timber spraying in lane county. She is supposed to be the liason to the community and an unbiased third party. Instead she has already formed an opinion and is showing it on facebook. That is called unprofessional. The last comment I would like to make is that this whole thing is a publicity stunt being put on by [redacted] and OHA is having the wool pulled over their eyes.

Thank you,

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Comment for hwy 36 exposure investigation

this literature review should be pertinent to any pesticide study.

https://www.premierinc.com/epp/downloads/01-systematic-review-canada-pesticides.pdf

[redacted]

EHAP
800 NE Oregon St., Ste. 640
Portland, OR 97232
Ehap.info@state.or.us

Re: Public Health Assessment Hwy 36 Corridor Exposure Investigation

As residential owners and operators of an organic farm one mile north of Route 36, our community and those we serve have a vital economic and social interest in the recent report regarding pesticide exposure to residents on the Hwy 36 Corridor. While we appreciate the earnest and time consuming efforts of the PARC team, having attended two public meetings, we feel that this investigation does not go far enough to protect the health of the residential community in the area and would like to submit the following comments:

1) Because there is evidence of pesticide/herbicide exposure despite a paucity of data, and because the OHA has expressed a sincere interest in the health of the local residents, we feel one conclusion of this investigation should recommend a moratorium on aerial helicopter applications in the area as a precautionary principle to protect the dozens of residents in the area whose subjective reports, alongside PARC's investigation, point to likely airborne pathways of exposure in the process of elimination. The implicit conclusion that aerial pesticide/herbicide applications are benign until a proven pathway if found, given the extensive first hand experience, initial urine data, and visual evidence of local residents, is biased towards the status quo, and against common sense and a basic human ethic of care.

2) We encourage PARC to continue to study the effects of pesticide/ herbicide applications in the forested rural Oregon, making an effort to:

- include larger sample sizes to gain statistical significance
- establish adequate scientific measures to test the air
- obtain accurate chemical applicator records including private applicators
- investigate research into the impact of pesticide/herbicide impact on human health including research in addition to EPA data, and evidence of the synergistic effect of multiple and chronic chemical exposure for both adults and children
- study long term health data for residents in rural forested areas

3) While understanding that divisiveness is not healthy for any local community, and many expressions of local distress have been disrespectful and counterproductive, we'd like the PARC team to recognize that their actions also serve a role in the system, and being "neutral scientists" does not exempt the group from impacting the conflict and potentially further polarizing the community. In particular, we'd like PARC to

- respond with more concern to those most vulnerable and expressing distress – this includes validating subjective experience rather than invalidating this experience as untrue until proven by research to be otherwise
- holding an appropriate empathetic presence to those whose lives have been seriously impacted by events described to the PARC team
- allow residents to speak directly to the PARC team in any future meetings rather than have the community "speak to one another," an action which appears self protective rather than productive. It is also obfuscating to communicate details of the investigation and government agency intricacies beyond the interest and understanding of most participants, rather than distill this information in an appropriate manner in order to open the discussion in a more constructive manner.
- avoid advice that can sound patronizing, and assessment that local conflict can be reduced to "property rights issues" or "different values." All people value health – this is not up for question. When encountering hostility, anger or lack of trust, it may be useful to look into the ways in which they are also a response to the way in which the public agencies have failed to protect public health in the past despite the good intentions of this current PARC team. While not conducive mindsets to positive change, we feel it is inappropriate to blame local residents for poor behavior on top of their original and long standing complaint and to reduce this very serious environmental issues to lifestyle preferences.

We appreciate the opportunity to comment on this process and consideration of the content above.

Sincerely,

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Chemicals

How could we ever come to the conclusion that chemicals could ever be good for us. Putting together cocktails of these horrifying substances and spraying them overhead is beyond comprehension.
This earth has been our best advocate and we have done nothing but abuse it and the innocent other creatures that are unfortunate enough to reside here with us. This is abuse and we have done it over and over again.

[redacted]
Oregon

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: DRAFT Public Health Assessment (PHA) related to the Highway 36 Exposure Investigation

- I have worked in the agricultural industry for over 30 years and no one should ever need to be exposed to either Atrazine or 2, 4-D at any level regardless of the falsely perceived needs of the forestry and agricultural industries.
- The forestry and agricultural industries have shown no sincere regard to pubic health concerns other than to expand their profit margins.
- True, Atrazine and 2,4-D are two of the most studied herbicides in the world today, **however the studies have for the most part been funded by the chemical industry** so of course they have shown to not pose a risk to humans and the environment.
- The 2, 4-D concentrations in the Fall of 2011 sampling show that exposure levels are what should be expected for any like population in the United States; **this does "NOT" mean that these levels should be tolerated.**
- Bad Science ran by the chemical industry should "NOT" be our guide.

Thanks for your time,

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: comment on Hwy 36 spray

To OHA Regulator

Until scientific evaluations studying the potential of toxic trespass have been completed and analysed, for the safety and well being of the communities please put a moratorium upon any spraying of pesticides onto timberlands that are within a one mile radius of homes and schools
thank you for your consideration.

Respectfully,
[redacted]

Deadwood, Oregon

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Via E-mail to: ehap.info@state.or.us

Comments by [redacted] submitted: 8/8/13

I fully support and encourage the continuation of the Hwy 36 Exposure Investigation. The evidence that has been and will be collected, including air samples, will help Oregon see that the health of it's citizens are being compromised by State allowed corporate timber practices. My comments are as follows.

I've read this interim report over and over, and yet there are NO protections laid out for our children in the entire report. In fact, many of us out in the investigation area feel that the addition of the *community concerns* section was added to divert our attention from the real problem: how corporate money and corporate institutions are being more protected than our children!!!

At the last community gathering OHA sponsored, I asked the following question....

Question: **How do the recommendations in the report protect children from these potentially dangerous exposures?**

Answer: This PHA is an interim report, which means that the exposure investigation is still in the information gathering phase. The recommendations in this interim report are primarily focused on actions that will enable OHA to get the information needed to finish the investigation. We know that children are more vulnerable to chemical contamination. The public health assessment process builds in a wide margin of protection for children and other vulnerable populations. As we obtain more information about the sources of exposure, we will make more specific recommendations. It is also important to note that stress can increase a person's susceptibility to environmental exposures, and children may be more susceptible to stress occurring in family and social situations in their community because they have less control over the relationships in their lives than adults do.

This answer is sorely lacking any real substance when it comes to protecting our children. The wide margin of protection that should be put in place is a MORATORIUM ON THE USE

OF ALL PESTICIDES in the investigation area until you are certain *where* these poisons are coming from and *how* our children are being poisoned by them. I homeschool my children, therefore they are in the investigation area most of their waking (and sleeping) lives!!!!

My 5 year old at the time has tested positive for both Atrazine and 2,4-D (3x's), and the Investigation has the gall to say they dropped his results for this investigation?? That particular act made the rest of the results just short of being statistically significant. Children are most susceptible to pesticides because they are still developing, and we're talking exposure to ***endocrine disruptors. H***ow is this not an emergency?!! I find it absolutely atrocious that our government agencies are unable to control the corporate timber industry, and have a say in their practices, particularly practices that HARM *the most vulnerable population amongst us*!! The Governor himself told Standing Together to Outlaw Pesticides that his arms are tied due to the timber industries influence on governmental agencies and on politics!

I'd like to talk about the Exposure Pathway Analysis now. We clearly have contact between a person and chemical, for most people tested positive for 2,4-D and some of us for Atrazine. Let's go through the elements and see if we have a COMPLETE pathway!!

*A chemical source is released into the environment... aerial spraying.

*A way or medium in which the chemicals move in the environment... water and air.

*An exposure point or location where people come into contact with the chemicals... homes and schools, seeing there is contamination of Imazapyr in the water of the school well!!!

*An exposure route by which people have physical contact with the chemicals... breathing and swallowing, again because the school well is contaminated with imazapyr!

*An exposed population that comes into contact with the chemicals... every person within 2 miles of a timber spray... in other words, every person living in the 8 townships that are being investigated!
Clearly all the criteria for a COMPLETE exposure pathway have been met, though no where

in the report does the investigation admit or confirm there is a complete exposure pathway happening. Why?

Let's talk about those pathways, starting with water. On page 32 of the PHA under the heading of *Results*, it states that two of the contaminates (atrazine, hexazinone) are typically found by DEQ in waters throughout the state, as if that makes it OK somehow!!?? The waters tested by DEQ are larger bodies of water. Fish Creek is a small 5 mile creek, whose only land use above the sampling site are forestry, tree farms, BLM, tree farms. There is only one conclusion as to where those pesticides are coming from!! My children, along with many neighboring children swim in that water!! Not to mention everyone downstream of Fish Creek, that would be Lake Creek, then the Siuslaw, all being exposed to these potentially dangerous chemicals. The listed uncertainty is the fact that there is no stream flow rate provided. These chemicals ***aren't even supposed to enter the waters of the state***... who cares about stream flow!!!! We rationalize the contamination of water with statements like “these are typically found in waters of the State”, this doesn't make it right!!
We rationalize our exposures to atrazine and 2,4-D in our bodies with outrageous claims that the general US population is just as exposed. What does that achieve?

My 6 and 11 year old are positive for the chemicals atrazine and 2,4-D. Atrazine is banned in other Countries. The Oregon State Agencies are still allowing this poisoning to happen. Aerial and backpack sprays are slated to start August 1st, 2013 in the investigation area, without any restrictions, observations, or thought to what those sprays might do the health of the children. I was part of the Barr study, so I know for a fact that my families post-spray test results, which showed spikes in exposure to atrazine and 2,4-D, were absolutely after a spray. I filmed the spray from afar. I have documented proof as to when we took our pre-spray samples, post-spray samples, and when the helicopter was in the air. We now know that atrazine and 2,4-D were sprayed in the area. I don't understand how this isn't proof enough.
On page 35 of the PHA it states that many chemicals are more toxic via the inhalation pathway, than the ingestion pathway. And you haven't had the fund to test the most toxic route of exposure?? The residents have made it clear, this is the way we are being exposed!!! On the same page it mentions that these samples are only a snapshot in time. What were the levels at the time of actual acute exposure? We won't know, because the timber industry doesn't cooperate!!

Chemical trespass: Big burden, little bodies

http://www.panna.org/blog/chemical-trespass-big-burden-little-bodies

I'd like to address the 2012 sampling, or lack of sampling. The excuse given for suspending spring sampling was because the area slated for applications were in remote locations, with few residents. Is this a coincidence? I think not.

In the document titled *Hwy36ExposureInvestigationUpdate20110914.docx*

it states....

Two participant recruitment areas were identified as priority areas for selecting participants in sample collection. ***Those areas were selected based on a 1.5 mile proximity to 2010 and 2011 clearcuts, with the assumption those areas would receive treatments in 2011 and 2012***, and to concentrate participants along highway for ability to contact.

In the same document it states....

ODF will schedule monthly face-to-face meetings. If there was an elevated level of concern or questions, ODF would schedule meeting as needed. *One of the objectives of the meetings would be to discuss the spring pre- and post-spray phase of the investigation and to coordinate with landowner on spray plans.* AND A Plan for bi-weekly email updates (sooner if the plan changes or when decisions are made). ODF agreed to be the conduit to provide information to landowner representatives.

And in another document titled *Hwy 36 Protocol Final 11.16.11.pdf*, it states...

The Oregon Department of Forestry will identify areas that have been clear-cut in 2010-2011. Based on GIS information, OEPH will contact people who live within 1.5 miles of the property boundaries of the spray area and invite them to participate in the testing.

Both of these above documents lead anyone to believe that the timber industry didn't cooperate with the State Investigation, making it impossible for them to sample, or even continue with the investigation itself. Any person impeding any other investigation would be thrown in jail! Did the timber industry suffer any penalties, specially in light of the fact it took over a year to get the spray records?? NOT EVEN A SLAP ON THE WRIST!!!

If you listen to the Community Meeting that was sponsored by OHA on May 28th, 2013 you hear Jae Douglas say the reason that sampling was suspended was **due to a misunderstanding** as to how harvests occur and the ways pesticides occur after harvest.

I would think that a State Investigation would do their research and NOT make these mistakes. ODF is a government agency that knows the workings of how timber operates. **Why didn't ODF clarify the process with OHA when recruitment started?** And even more important, WHY IS THE INVESTIGATION WORKING SO CLOSELY WITH THE VERY INDUSTRY ITS INVESTIGATING?

The investigation has held hands with the timber industry at every move!! For example, in the document titled *Landowner_Cooperation_memo_20120120.pdf* it states...*In order to select participants and ensure the pre-spray sampling occurs prior to spring spraying,* ***the investigation team needs to know the location of spring spray units by Thursday, January 26, 2012,*** *as well as assurance that landowners will not start spraying prior to the completion of pre-spray sampling.*

This shows there was plenty of time and effort to make sure that OHA has the correct locations.

Also....

In the initial design, the investigation area was selected based on Notification of Operations data for harvest units in 2010 and 2011. Based on this data, the PARC team identified eight townships for inclusion in the investigation area and identified priority areas within those townships based on harvest units and population location. ***As we discussed this approach with landowners...***

In the same document it goes on to explain what measures OHA are taking to ease the worries of the timber industry!...

Liability and Risk to Contractors

Landowners have expressed a concern regarding liability and risk to contractors from potential lawsuits resulting from the exposure investigation. Even if landowners prevail in a court action, the potential costs of litigation may offset any benefit of spraying harvest units. The risks associated with lawsuits may also discourage spray companies from accepting contracts associated with the investigation. While the PARC investigation cannot guarantee that information generated will not be used in a lawsuit, the following approach can minimize that risk:

• PARC will provide observers on all spray operations to document that the operation was conducted in compliance with the pesticide label requirements and Forest Practice regulations. The Departments of Agriculture and Forestry (and possibly the EPA) will each provide an observer to cover both State and Federal regulatory requirements. This approach may decrease the exposure from a lawsuit under Oregon's "right to farm and forest law" (ORS 30.9300), by providing documentation that the forestry practices were done in accordance with state and federal regulations.

The above statement clearly show us that OHA had the corporations welfare in mind, more so than the health of the children. What about the liability and risk to my children as you stand

watching them spray? PARC states they will provide observers on all spray operations to make sure the operation is in compliance. Shouldn't that safeguard always be in place when spraying such dangerous chemicals? Dangerous enough chemicals that the EU decided to ban some of them. Did you look at the science the EU used to make their decision to ban these potentially dangerous chemicals??

European Union bans atrazine, while the United States negotiates continued use
http://www.ncbi.nlm.nih.gov/pubmed/16967834

This is how the memo finishes...

Next Steps
As discussed in the introduction, the PARC exposure investigation is at a critical juncture. The investigation team needs to know location of spring spray units by Thursday, January 26th in order to move forward with the investigation as originally designed. ***We sincerely hope that this memo provides sufficient assurance for landowners to continue cooperating with the investigation, so that we are able to move ahead as planned.***
If landowners provide the information on the location of spring spray units we will have the necessary information to begin recruitment of participants, and will continue to actively work with landowners to fully resolve the issues identified in this memo in order to ensure that spring spray operations will be carried out under normal forestry business practices.

Sounds to me as if the government agencies are bartering and even pleading with timber to cooperate. This is unacceptable to our children. You are bartering with their life!

I hope the comments submitted by everyone will result in a much stronger Assessment.
A Health Assessment that will consider the **health** of the **children**, rather than cave into corporate timber and political pressures.

The Oregon Health Authority should be free to make assessments and health related decisions without political pressure, and this hasn't been the case. I suggest you add that to the next draft under *Next Steps*.

Thank you for taking the time to read and take into consideration, my comments on the weak PHA. This is a very important piece of evidence concerning timber spray practices, and we want to get it right. They have been spraying for over 30 years in this area.
We need your help stopping it.

[redacted]

Here are links to some research and articles...

Scientists Are Clear: Even in Low Doses, Chemicals Do Harm - Atrazine
http://www.momsrising.org/blog/scientists-are-clear-even-in-low-doses-chemicals-do-harm/

Environmental Chemicals: Large Effects from Low Doses
Laura N. Vandenberg, PhD; R. Thomas Zoeller, PhD; J.P. Myers, PhD
http://www.cumulativeimpacts.org/documents/June.pdf

Scientific evidence on the health effects of low-dose exposure to endocrine disrupting chemicals (EDCs). | APP Advocate Precautionary Principle
http://appprecautionaryprinciple.wordpress.com/2011/06/01/scientific-evidence-on-the-health-effects-of-low-dose-exposure-to-endocrine-disrupting-chemicals-edcs/

Our Stolen Future:
Human impacts of endocrine disruption
http://www.ourstolenfuture.org/NewScience/human/human.htm

Mixtures of chemicals
http://www.ourstolenfuture.org/NewScience/synergy/mixtures.htm

Low dose effects
http://www.ourstolenfuture.org/NewScience/lowdose/lowdose.htm

THE PEER REVIEWED PUBLISHED SCIENCE WHICH LINKS PESTICIDE EXPOSURE AND CHILDHOOD DISEASE
http://appprecautionaryprinciple.wordpress.com/2011/12/03/the-peer-reviewed-published-science-which-links-pesticide-exposure-and-childhood-disease/
***

Low doses, big effects: Scientists seek 'fundamental changes' in testing, regulation of hormone-like chemicals
http://www.environmentalhealthnews.org/ehs/news/2012/low-doses-big-effects
***

Strengthening Toxic Chemical Risk Assessments to Protect Human Health
http://www.cumulativeimpacts.org/documents/strengthening-toxic-chemical-risk-assessments-report.pdf
***

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: comments

I am writing you in regard to my concerns on the Public Health Assessment written on the Hwy. 36 Corridor Exposure Investigation.

The key conclusion in the report states that “no levels expected to cause health effects were documented in the investigation” yet some of the language in the report may erroneously lead readers to believe the study did find a risk of health effects when it clearly did not. The data verified that no one tested in the Exposure Investigation was exposed to either Atrazine or 2,4-D at levels that would cause a health concern. The 2,4-D concentrations in the fall of 2011 sampling show that exposure levels are what should be expected for any like population in the U.S. and that is what the report should reflect. Atrazine and 2,4-D are two of the most studied herbicides in the world today, and have been repeatedly shown to not pose a risk to humans and the environment from real world levels of exposure.
We should not produce documents that lead to public hysteria. Science should be our guide in this investigation.

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Hwy 36 Corridor Investigation

Hello E-Hap
I have lived and traveled through this area for over 70 years. I have relatives who live in the area that the sample was taken. I did take the time to read all 106 pages of the report.

My conclusion from the data and evidence presented is: there is no apparent health hazard, nor risk to the residents in the sample area. I also conclude: that under the forest practices act, proper application when spraying and applying, presents no risk to area residents.

Questions:
1 I would like to know the study cost and why shouldn't the PITCH GANG share the costs?
2 When the urine tests were analyzed, were there illegal drugs found in the samples? (meth or marijuana)?
3 From the other samples (water, air, ground) were there other questionable illegal drugs indications?

Thank you for allowing me to comment on the study outcome.

[redacted]

Public Comment on OHA Report on Hwy 36 Pesticide Investigation by [redacted] and Triangle Lake Pesticide Poisoning Victims United,

A Division of the Pitchfork Rebellion Forest-Dwellers Support Group

Introduction and Brief Summary

First, a thank-you to OHA and other team members that worked hard to produce the preliminary report on your key findings.

In the following response to the current OHA preliminary findings related to the first phase of the Highway 36-region pesticide exposure investigation, we will call on OHA and its various state and federal team members to take certain specific actions. Other than this 'Intro and Summary,' the rest of this Public Comment consists entirely of that list of specific requested actions – actions related to this investigation and, specifically, to the OHA preliminary report itself – and some pertinent appendices.

OHA is a part of PARC. The dominant agency element of PARC has long been the Pesticide Division of the Oregon Department of Agriculture. Quite honestly – and very demonstratably – the Pesticide Division – including its PARC co-chair Dale Mitchell – is effectively controlled/heavily influenced by Oregonians for Food and Shelter and the corporations that serve on their Board and make up their membership.

So, the context of the current PARC investigation is that an element of PARC – OHA – is the lead agency in a pesticide-related investigation that must be accomplished within an existing context in which the pesticide laws, rules, and EPA-accepted safety-studies have all been **already previously dominated** – set in place – **by the pesticide makers.**

Nevertheless, being the eternal optimist – I really do typically see the proverbial 'cup' as half *full* – I have hope that this study will lead to positive changes in current pesticide laws in Oregon. Because the Governor made OHA the lead agency on the investigation, the investigation has a chance to be fair and balanced.

BE HONEST NOW: If the Governor had not made OHA the co-chair of PARC and, had not OHA been made the lead agency of this investigation, do any of you team members believe that this investigation would have ever gone as far as it already has? Do you honestly believe that Dale Mitchell would have conducted the same sort of investigation?

So, there is hope. Hope that the human beings that work within some of these agencies will recognize gross injustice when they see it and act accordingly. Our hope is that fair-minded human beings will recognize the corporate shenanigans that have created the overall context in which this investigation is taking place and 'think-outside-the-box'; only then can true justice – and common sense – prevail in this situation.

NOTE: All investigative team members by now must know that OFS has organized a group of Triangle Lake heavy-pesticide-using commercial farmers to act as their surrogates. And what has that group officially called upon OHA to do with this investigation? ANSWER: **To end it! (OFS has also instructed the politicians that they have control over to try and kill funding or otherwise put a stop to this investigation.) Ask yourselves: WHAT IS THE REAL REASON THAT INDUSTRY AND THEIR SURROGATES DO NOT WANT A FAIR**

AND UNBIASED PESTICIDE INVESTIGATION THAT INCLUDES AIR-SAMPLING TO OCCUR? Industry knows what the investigative team is going to find if it does the vigorous air-sampling as called for in the OHA preliminary report.

You will notice that throughout the following list of specific requests, our thrust is toward 'Best Science' and vigorous investigation. If you have a murder investigation and one side does not want it investigated, that should tell you something! As your report correctly reports, Pitchfork Rebellion – despite our provocative name – has for years simply asked that "an unbiased investigation be conducted to determine whether or not pesticide drift is occurring as alleged by many residents and, if so, what size buffer zone would be needed to prevent chemical drift from spray locations onto the lands – and into the bodies – of residents." As noted below, **phase one of your study has answered the first question in the affirmative: Yes, undesired pesticide exposures are occurring.** Phase two – unless it is shut-down or limited by OFS and its surrogates – can provide the answer to the second question. **Below we explain the particulars we feel must be included in regard to that deployment of air-sampling devices.**

We also speak directly to several of the key findings in the report, offering some critique and suggestions, even a couple of complements on work well-done!

Specific Requests in Regard to the OHA Preliminary Report on the Hwy 36 Pesticide Exposure Investigation

1. We call on OHA and other investigation team members, both State and Federal, to implement the planned 'phase two' deployment of air-sampling devices in the investigation area in a vigorous manner according to the protocol of 'Best Science' in regard to such an undertaking. By 'vigorous' we mean that the deployment should be 'robust' rather than 'token'; specifically, in this regard we call for: a) Many *dozens* of air sampling devices be deployed;
b) The devices should be deployed at various distances from a variety of spray locations that, though most should be aerial sprays, should also include, for later comparison, at least some large-scale ground applications (back-pack sprays); the inclusion of some ground sprays will enable 'best science' to determine whether or not the assumption that aerial-sprays result in greater drift distances and more chemical trespass than ground applications is actually correct, and, if correct, what the actual amount of difference actually is;
c) The predominant type of spray location chosen for deployment of air-sampling devices should be the 'classic' example that we original petitioners have repeatedly described to the investigative team: **locations where a clear-cut is on a very high slope directly above a valley, like the photographs I showed during the most recent Grange Hall meeting; after all, it has always been our allegation that it is those sort of conditions that result in the complaints of trespass by residents and led to this exposure investigation** (nearly 100% of the people that have made official complaints to PARC over the last decade that alleged chemical drift of aerial-sprayed pesticides onto their properties and into their bodies **HAVE BEEN PEOPLE THAT VERIFIABLY – just consult aerial photography for that verification (I already have) – LIVED ON FLATLANDS DIRECTLY BENEATH HIGH LANDS THAT WERE AERIAL SPRAYED.** Thus, if the majority of the locations that you deploy air-sampling devices are not of this 'classic' variety, we will consider it to have been bogus. The majority of ground-applications that are monitored should also be similarly 'classic': high elevation locations with air-sampling done in the valley immediately beneath. Nothing else is pertinent to this investigation except for comparison value.

2. While we appreciate that some of the above described 'vigorous' air-sampling will be done with the advance permission of the sprayers/landowners (i.e. Timber companies and the helicopter companies that do the spraying) – this will enable you to place the closest sampling-devices right on the actual property line and then at variable distances – we request that, in the interest of 'best science', a good percentage of the spray locations tested should be **'BLIND**

TESTS', meaning that nobody but the investigative team knows that air-sampling devices have been placed. Clearly, if a company knows that you are watching – and sampling – their particular spray location, they will likely – certainly potentially – alter their normative behavior. That alteration of normative behavior would skew the data required, rendering your final results questionable in regards to being applicable to the sort of normative spraying conditions that exist in the real world, when they are not being closely monitored. Ways in which they can alter their normative behavior includes: equipping helicopters with different equipment than is commonly used in the area; instructing the helicopter pilots to perform in a manner that is different than when not being watched (just ask agronomist [redacted] about that!), and using products that do not drift as far as the products they would normally use when not being watched. Some spray locations would naturally be easier to do 'blind testing' on than others; locating those would be the main element needed to pull this idea off successfully.

3. In order to successfully pull off the sort of 'blind-testing' called for in number two above, we call for you to do some 'blind-testing' near clear-cuts in similar coastal mountain locations but **OUTSIDE THE CURRENT INVESTIGATION AREA. Only then can true 'blind' testing be accomplished, since EVERY SPRAY WITHIN THE INVESTIGATION AREA WILL BE HANDLED DIFFERENTLY BY INDUSTRY THAN TYPICAL.** To get some real 'blind testing' done, you need to go outside the official test region. Assuming that you want to do this, whose permission would you need? Can the governor grant this permission to expand the area to enable some 'blind-testing'? Or would the PARC Board need to sign on to this idea? Or can you do it without asking any additional permission?

4. Time for a complement or two: This, the official Public Comment of Triangle Lake Pesticide Poisoning Victims United, hereby acknowledges – and sincerely offers our 'THANKS' – to the investigative team members for having **DONE AN EXCELLENT JOB OF ENABLING PUBLIC PARTICIPATION IN THIS STUDY BY HOLDING A SERIES OF MEETINGS IN OUR TOWN AND IN ESTABLISHING A USER-FRIENDLY WEBPAGE DEDICATED TO THE STUDY.** The 'open mic' format at the meetings has enabled many people that had felt the government was ignoring them for years to have the opportunity to ask questions face-to-face in town hall-style meetings. **Thank-you!**

5. While we praise the fact that your key findings include the facts that: a) We were exposed to pesticides that turned up in urine analysis; and b) Your honest admission that you are not capable of rendering an opinion on the health consequences of simultaneous exposure to a 'cocktail' of several pesticides rather than one, **we call on you to give that fact far greater weight when you render your viewpoint on whether or not our the exposures you are hereby acknowledging are 'harmful' or expected to result in adverse health consequences LONG TERM; specifically, WE HEREBY REQUEST THAT IN YOUR REVISION OF THE PRELIMINARY REPORT THAT WE ARE NOW COMMENTING ON, THAT YOU CHANGE ANY AND ALL FINDINGS THAT STATE THAT YOU DON'T EXPECT THE ACKNOLWLEDGED EXPOSURES TO RESULT IN SIGNIFICANT HEALTH CONSEQUENCES TO THE FOLLOWING, MORE ACCURATE, STATEMENT: "Because OHA cannot assess the harm related to repeated and chronic exposure to such 'cocktails' (several pesticides and their inert ingredients all at once), OHA cannot truly assess the potential health consequences of pesticide exposures than DID IN FACT INCLUDE MULTIPLE PESTICIDES AT ONCE**; to offer such an opinion would be too ignore our own finding that we cannot assess the harmful effects of such chemical cocktails."

6. In support of the request just made in number five above for a change in your preliminary finding in regard to 'harm' and potential 'health consequences', we also ask you to **MAKE PROMINENT MENTION IN YOUR REPORT AND IN THE SUMMARY OF YOUR REPORT THAT "because none of the people studied were given urine samples on the same day that they were exposed and, significantly, lived an average of more than a mile from**

the spray locations that likely resulted in the exposures, we cannot render an opinion in regard to the harm rendered to persons that live within a few hundred feet of similar sprays. We, OHA, hereby acknowledge that this investigation has not studied the urine of persons that live within a few hundred feet of the sprays, and is in fact based solely on the urine levels of persons that, in the Barr study, lived an average of 1.5 miles away, and, in the Fall 2011 OHA/EPA study, lived an average of several miles from the known 2.4-D spray locations.

7. In regard to the section of your preliminary report that addressed internal community relations and, in your opinion, the value of a mediator, we hereby agree but with one key difference: The mediation process would be valuable but the participants in the mediation should not be the local farmers who are serving as surrogates for Oregonians for Food and Shelter; rather, the mediation should be between industry reps and those community members that feel we have been harmed by their practices. I – the lead petitioner to the EPA – have never once had any problem with a local farmer or any other community member. No local farmer uses aerial spray, and most local farms are not on the highlands above homes. The only conflict between any local farmer and anti-pesticide person that I am aware of was over ten years ago [redacted] a local farmer/neighbor over alleged chemical drift. That was once incident in ten years. The local commercial farmers that have been acting as Triangle Lake area surrogates for OFS were contacted by OFS just prior to this study and instructed to make it seem like their was a big community division over this issue. OFS put fear into them – scaring them by telling them that this study could lead to an end to their being able to use pesticides to earn a living on their farms – but that fear did not exist – in any large-scale way – until OFS' paid propagandists began visiting the local farmers and indoctrinating them. **So, I would suggest toning-down your section on frayed community relations; it really is not so bad, though an organized effort has been made to make it appear that way.**

8. We don't think that you adequately describe the health consequences of atrazine or 2,4-D, believing that you rely too much on studies that are biased toward industry. (see appendix section for materials related to this viewpoint)

9. If the air-sampling occurs as planned and is the sort that we described in numbers one through three above, data will finally be available to answer that second key question: What degree of buffer zone would be appropriate in order to prevent chemical drift onto resident's property and into their bodies. At that time, with that data, instead of a simplistic 'one-mile buffer zone fits-all' model, we can propose larger buffer zones on certain types of spray locations that verifiably result in more chance of long-range drift than other types. For example, aerial sprays done at a relatively high elevation in relation to human dwellings within a mile or less – the classic example of a mountain top being sprayed with homes in a valley immediately beneath – would deserve a greater buffer zone than a spray that is not on a high elevation and/or not near homes. Whether or not ground applications at high elevations above homes deserve a buffer zone would be answered according to facts rather than mere opinion; we will have actual data to inform us.

Gathering this information is the most important thing that could be done to finally solve this problem. One would have hoped that industry would have happily embraced this effort to let 'best science' inform the ongoing debate over pesticide drift and proposed buffer zones. As you have obviously witnessed yourselves, thus far industry has not embraced this opportunity to gather unbiased facts in order to inform public policy on this critical issue. If they would quit that sort of behavior and embrace this golden opportunity to find out the actual truth about drift, their credibility would be raised immensely. Right now their credibility is about as low as it can get as they do all in their power to prevent the acquisition of the true facts.

END OF SPECIFC REQUESTS IN REGARD TO THE PRELIMINARY OHA-AUTHORED STUDY.

Below is a list of important appendices to this public comment. Please take the time to read them.

Sincerely and with Thanks, [redacted], on behalf of Triangle Lake Pesticide Poisoning Victims United.

Appendix One: Register-Guard Guest Editorial on OHA Preliminary Report

Appendix Two: Oregonians For Food and Shelter Board of Directors

Appendix Three: Latest Research Shows Low Doses More Dangerous Than Previously Known

Appendix One: Newspaper Guest Editorial

Study of pesticides' effects should be expanded

Register-Guard

BY DAY OWEN

An investigative team led by the Oregon Health Authority and the U.S. Environmental Protection Agency came to Triangle Lake on May 28 to publicly release the first stage of their ongoing pesticide exposure study. That report, centered on the coastal mountain range near Triangle Lake, is now open for public comment.

The report includes the key finding that nearly all of the approximately 100 persons who gave urine samples in either spring or fall of 2011 were found to have timber industry pesticides in their urine.

Significantly, the report found that those persons given two urine tests in the spring — one before an aerial spray and another within 48 hours after the spray — saw their levels of atrazine spike.

Persons who tested positive for atrazine lived an average of two and a half miles from the aerial spray.

Though their levels of atrazine are not considered too dangerous by the government, no urine tests have yet been given to people who live closer to the aerial sprays.

What would their levels be?

Oregon law provides no herbicide buffer zone at all around homes and schools. Helicopters can spray poison from the sky right up to your property line. It drifts several miles!

My daughter, 15 at the time, was sickened when a helicopter sprayed above her school bus stop at 7 a.m.

Not mentioned in the OHA report is the shocking news that, after finding that the Triangle Lake school drinking water had imazapyr in it, the investigative team asked the U.S. Department of Agriculture to check the drinking water at other rural Oregon schools. Half of the 22 schools had pesticides in their drinking water. Many of the schools had more than one pesticide in the water, with two Corvallis schools — Dixie Elementary and Fairplay Elementary — leading the pack with 12 pesticides each!

Importantly, the OHA report admits that: "We are unable to determine the health effects of exposure to multiple pesticides at low doses" because "current methods do not allow for a determination of risk resulting from exposure to multiple chemicals."

That is a reference to what's called the "additive effect," by which two or more pesticides combine in the body to produce a far more toxic combination. Beyond Pesticides reports: "A 1999 study found that mixtures of three common groundwater contaminants … at concentrations allowable in groundwater by the EPA are capable of altering immune, endocrine, and nervous system functions."

The OHA report also admits: "We are unable to determine if the levels of atrazine metabolites found in participants' urine in the spring of 2011 indicate harm to health."

Atrazine has been banned in Europe due to safety concerns. In tests, it has turned male frogs into female frogs that can only give birth to male frogs. Beyond Pesticides reports: "Atrazine has been shown to be harmful to humans, mammals and amphibians even when the amount used is less that the government allows."

When asked by Oregonian reporter Scot Learn about the growing call for an emergency aerial spray buffer zone around human habitations, Gov. John Kitzhaber's spokesman, Tim Raphael, said that "the governor wants to wait for the EPA to fill in information gaps on airborne exposures to pesticides."

That is a reference to the planned second phase of this ongoing exposure investigation. The EPA plans to deploy air-sampling devices around clear-cuts in the test region by spring of 2014. They will be placed at various distances from a wide variety of aerial and ground sprays; this should determine exactly how far the poisons are drifting, and whether aerial spray drifts farther than ground applications.

I live in the Triangle Lake test area. The timber companies own, clear-cut and spray the mountain tops, and homeowners occupy the flatland beneath the sprays. Many claim to have been sickened and want the now-proven chemical trespass to be outlawed.

Unlike past years, industry is now largely avoiding spraying in the test region, apparently attempting to wait out the study.

So, if the governor hopes to have a success with the deployment of the air sampling devices, we beg him to expand the investigation to include other similar regions of the coastal mountains of Western Oregon. That way, industry will not be able to simply avoid spraying in the relatively small test area around Triangle Lake and thus ruin the study!

Day Owen is the founder of The Pitchfork Rebellion, a forest dwellers support group that can be contacted at P.O. Box 160, Greenleaf, OR 97430.

Appendix Two: OFS Board of Directors (2011 but you get the picture)

Oregonians for Food and Shelter, Inc. 2011 Board of Directors

AGRICULTURE & FOOD PROCESSORS:

Mark Dunn, 2011 Vice Chairman
Barry Bushue
Jean Godfrey
Mike Iverson
Rick Jacobson
Jerry Marguth, Past Chairman
Carol Russell
Craig Smith
Currently vacant

J.R. Simplot Company
Oregon Farm Bureau Federation
Columbia Gorge Fruit Growers
Oregon Fresh Market Growers Association
NORPAC Foods, Inc.
Oregon Seed Council
Russell Cranberry Company
Northwest Food Processors Association
Oregon Association of Nurseries
Oregon Wheat Growers League

FORESTRY & WOOD PRODUCTS:

Eric Geyer, 2011 Vice Chairman
Jerry Anderson
Ron Borisch
Andy Bryant
Mike Fahey
Jake Gibbs
David Hampton
Chris Jarmer
Greg Miller

Roseburg Forest Products
Forest Capital Partners, LLC
Longview Timber Corp.
Yamhill Environmental Services
Columbia Helicopters, Inc.
Lone Rock Timber Management Company
Hampton Affiliates
Oregon Forest Industries Council
Weyerhaeuser Company

CHEMICAL, PROFESSIONAL APPLICATORS, and other BUSINESSES:

Bruce Alber, 2011 Chairman
Curt Dannen
Mike Diamond
Debbie Ego
Danelle Farmer
Cindy Finlayson
Jim Fitzgerald
Jerry Harchenko
Doug Hoffman
Brendan McCarthy
Kent Pittard
Bryan Stuart
Andrea Vogt
Anita Winkler

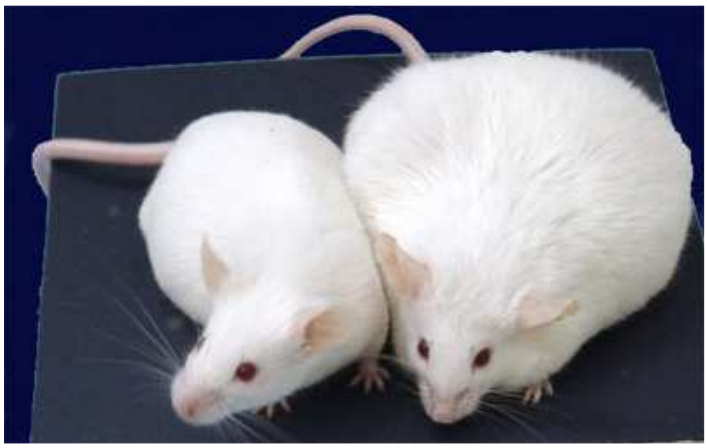
Wilbur-Ellis Company
Crop Production Services, Inc.
Monsanto Company
Rasmussen Spray Service
Syngenta Crop Protection
Umatilla Electric Cooperative, Inc.
Far West AgriBusiness Association
Pacific NW Aerial Applicators Alliance
WILCO – Winfield, LLC
Portland General Electric
DuPont
Western Regional Alliance
RISE
Oregon Water Resources Congress

Appendix Three: Low Doses More Dangerous/New Research

(Scroll Down to next page; had formatting problem)

Low doses, big effects: Scientists seek 'fundamental changes' in testing, regulation of hormone-like chemicals

Small doses can have big health effects. That is a main finding of a new report, three years in the making, published Wednesday by a team of 12 scientists who study hormone-altering chemicals. Dozens of substances that can mimic or block hormones are found in the environment, the food supply and consumer products, including plastics, pesticides and cosmetics. One of the biggest controversies is whether the tiny doses that most people are exposed to are harmful. Researchers led by Tufts University's Laura Vandenberg concluded after examining hundreds of studies that health effects "are remarkably common" when people or animals are exposed to low doses. "Fundamental changes in chemical testing are needed to protect human health," they wrote.



Retha Newbold

At a small dose of 1 part per billion, an estrogenic drug called DES causes obesity. But at 1,000 ppb it causes weight loss. The drug was given to pregnant women in the 1940s through 1970 to prevent miscarriage, and it caused cancer and other health effects in their offspring

By Marla Cone
Editor in Chief
Environmental Health News
March 15, 2012

Small doses can have big health effects.

That is a main finding of a report, three years in the making, published Wednesday by a team of 12 scientists who study hormone-altering chemicals.

Dozens of substances that can mimic or block estrogen, testosterone and other hormones are found in the environment, the food supply and consumer products, including plastics, pesticides and cosmetics. One of the biggest, longest-lasting controversies about these chemicals is whether the tiny doses that most people are exposed to are harmful.

In the new report, researchers led by Tufts University's Laura Vandenberg concluded after examining hundreds of studies that health effects "are remarkably common" when people or animals are exposed to low doses of endocrine-disrupting compounds. As examples, they provide evidence for several controversial chemicals, including bisphenol A, found in polycarbonate plastic, canned foods and paper receipts, and the pesticide atrazine, used in large volumes mainly on corn.

The scientists concluded that scientific evidence "clearly indicates that low doses cannot be ignored." They cited evidence of a wide range of health effects in people – from fetuses to aging adults – including links to infertility, cardiovascular disease, obesity, cancer and other disorders.

"Whether low doses of endocrine-disrupting compounds influence human disorders is no longer conjecture, as epidemiological studies show that environmental exposures are associated with human diseases and disabilities," they wrote.

The scientists concluded that scientific evidence "clearly indicates that low doses cannot be ignored." They cited evidence of a wide range of health effects in people –from fetuses to aging adults – including links to infertility, cardiovascular disease, obesity, cancer and other disorders. In addition, the scientists took on the issue of whether a decades-old strategy for testing most chemicals – exposing lab rodents to high doses then extrapolating down for real-life human exposures – is adequate to protect people.
They concluded that it is not, and so they urged reforms. Some hormone-like chemicals have health effects at low doses that do not occur at high doses.

"Current testing paradigms are missing important, sensitive endpoints" for human health, they said. "The effects of low doses cannot be predicted by the effects observed at high doses. Thus, fundamental changes in chemical testing and safety determination are needed to protect human health."

The report was published online Wednesday in the scientific journal Endocrine Reviews. Authors include scientists University of Missouri's Frederick vom Saal, who has linked low doses of bisphenol A to a variety of effects, Theo Colborn, who is credited with first spreading the word about hormone-disrupting chemicals in the late 1980s and University of California, Berkeley's Tyrone Hayes, who has documented effects of atrazine on frogs.

The senior author is Pete Myers, the founder of Environmental Health News and chief scientist of Environmental Health Sciences.

Linda Birnbaum, director of the National Institute of Environmental Health Sciences, said the new report is valuable “because it pulls a tremendous amount of information together” about endocrine-disrupting compounds. Her agency is the main one that studies health effects of contaminants in the environment.

Linda Birnbaum, director of the National Institute of Environmental Health Sciences, said in many cases, industry is still asking "old questions" about chemical safety even though "science has moved on." Birnbaum said she agrees with their main finding: All chemicals that can disrupt hormones should be tested in ultra-low doses relevant to real human exposures, she said.
In many cases, chemical manufacturers still are asking “old questions” when they test the safety of chemicals even though “science has moved on,” she said. “Some of the testing paradigms have not advanced with the state of the science.” Birnbaum wrote an editorial on Wednesday referencing the new report.

Nevertheless, for most toxicologists, Birnbaum said the report does not offer a big shift from what they are doing. The NIEHS already conducts low-dose testing of chemicals, including looking for multi-generational effects such as adult diseases that are triggered by fetal exposures.

“Some people keep slamming the toxicologists. But you can’t paint everyone with the same brush,” Birnbaum said.

However, the scientists who wrote the report said that low-dose science "has been disregarded or considered insignificant by many." They seemed to aim much of their findings at the National Toxicology Program and the U.S. Food and Drug Administration. The FDA in 2008 discounted low-dose studies when it concluded that bisphenol A (BPA) in consumer products was safe. Two years later, the agency shifted its opinion, stating that they now will more closely examine studies showing low-dose effects. The National Toxicology Program in 2008 found that BPA poses “some risks” to human health but rejected other risks because studies were inconsistent.

Several of the report’s authors have been criticized by some other scientists and industry representatives because they have become outspoken advocates for testing, regulating and replacing endocrine-disrupting compounds. The scientists, however, say they feel compelled to speak out because regulatory agencies are slow to act and they are concerned about the health of people, especially infants and children, and wildlife.

Industry representatives say that just because people are exposed to traces of chemicals capable of altering hormones doesn’t mean there are any harmful effects. They say that the studies are often contradictory or inconclusive.

"Based on the evidence, it is concluded that these 'low dose' effects have yet to be established [and] that the studies purported to support these cannot be validly extrapolated to humans." *-Michael Kamrin, Michigan State University* In a statement, the American Chemistry Council, which represents chemical companies, said Wednesday that the industry “has committed substantial resources to advancing science to better understand any potential effects of chemical substances on the endocrine system. While we have not had an opportunity to fully review this paper, Michael Kamrin, emeritus professor of Michigan State University, has concluded ‘low dose’ effects have not been proven, and therefore should not be applied to real-world conditions and human exposures.”
"Based on the evidence, it is concluded that these 'low dose' effects have yet to be established [and] that the studies purported to support these cannot be validly extrapolated to humans," Kamrin, a toxicologist, wrote in the International Journal of Toxicology in 2007.

But vom Saal and other scientists have said that tests that do not find low-dose effects of chemicals such as BPA are often industry-funded, and they often have tested the wrong animals or the wrong doses, or don’t expose the animals during the most vulnerable time of fetal growth.

Endocrinologists have long known that infinitesimal amounts of estrogen, testosterone, thyroid hormones and other natural hormones can have big health effects, particularly on fetuses. It comes as no surprise to them that manmade substances with hormonal properties might have big effects, too.

“There truly are no safe doses for chemicals that act like hormones, because the endocrine system is designed to act at very low levels,” Vandenberg, a postdoctoral fellow at Tufts University’s Levin Lab Center for Regenerative and Developmental Biology, told Environmental Health News.

But many toxicologists subscribe to “the dose makes the poison” conventional wisdom. In other words, it takes a certain size dose of something to be toxic. They also are accustomed to seeing an effect from chemicals called “monotonic,” which means the responses of an animal or person go up or down with the dose.

The scientists in the new review said neither of those applies to hormone-like chemicals.

“Accepting these phenomena should lead to paradigm shifts in toxicological studies, and will likely also have lasting effects on regulatory science,” they wrote.

In the report, the scientists were concerned that government has determined "safe" levels for “a significant number of endocrine-disrupting compounds” that have never been tested at low levels. They urged “greatly expanded and generalized safety testing.”

“Accepting these phenomena should lead to paradigm shifts in toxicological studies, and will likely also have lasting effects on regulatory science,” the scientists wrote."We suggest setting the lowest dose in the experiment below the range of human exposures, if such a dose is known,” they wrote.
Vandenberg said that there may be no effect or a totally different effect at a high dose of a hormonal substance, while a lower dose may trigger a disease.

The breast cancer drug tamoxifen "provides an excellent example for how high-dose testing cannot be used to predict the effects of low doses," according to the report. At low doses, it stimulates breast cancer growth. At higher ones, it inhibits it.

“Imagine taking 100 individuals that are representative of the American population and lining them up in order of exposure to an EDC

[endocrine-disrupting compound] so that the person on the far left has the least exposure and the person on the far right has the most. For many toxic chemicals, individuals with the highest levels of exposure, at the right end of the line, have the highest incidence of disease. But for some EDCs, studies suggest that people in the middle of the line have the highest risk," Vandenberg said.

She compared hormones, which bind to receptors in the body to trigger functions such as growth of the brain or reproductive organs, to keys in a lock.

"The more keys that are in the locks, the more of an effect that is seen. But at some point, the locks are overwhelmed and stop responding to the keys. Thus, in the lower range, more keys equals more of an effect, but in the higher range, more keys equals less of an effect," she said.

Vandenberg predicted the report "will start conversations among academic, regulatory and industry scientists about how risk assessments for EDCs can be improved."

"The question is no longer whether these phenomena exist, but how to move forward and deal with them."

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: chemical spray

We are being poisoned...plain and simple. Shame on government or whoever else who put profits above the health of the people. The day is rapidly approaching where the "poison pushers" will be in fear of their lives. We the people have awoken.
Sincerely,
[redacted]

[redacted]

[redacted]

[redacted]

Thanks again for taking the time to present at the Triangle Lake Grange re: Hwy 36 Investigation. I appreciate your willingness to examine additional research concerning the negative impacts of atrazine. As you know, this is a developing field - while there may be no BE for atrazine at the current moment, I believe that the body of evidence tilts strongly in favor of enacting rules and regulations that provide for increased protections for human health and the environment. I hope that you will incorporate some type of statement or conclusion concerning these studies (or others you may find) into the final Health Assessment. Considering that a frog exposed to only 1 PPB atrazine can switch genders, the precautionary principle would indicate that OHA should, at the very least, caution against atrazine's continued use in environmental conditions that are conducive to causing human exposures - conditions which include topography similar to that found in the Triangle Lake / Blachly area, where residents live at the bottom of the forested hills upon which atrazine and other forestry herbicides are aerially applied year after year.

Due to the size of the various attached studies, I will be sending several e-mails to your address. Can you please confirm that you have received these e-mails to ensure they didn't wind up in your spam folder?

Thanks, and have a great weekend.

[redacted]

[redacted]

[redacted]

[redacted]

August 8, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Via E-mail to: ehap.info@state.or.us
Via U.S. Mail

To Whom It May Concern:

On behalf of Standing Together to Outlaw Pesticides ("STOP"), please accept these comments concerning the Oregon Health Authority's ("OHA") Highway 36 Corridor Exposure Investigation (the "Investigation"), dated May 9, 2013. At the outset, we would like to thank OHA for their efforts in conducting this public health assessment. That being said, we believe there are significant shortcomings in the way the assessment was researched, reviewed, and implemented. First and foremost, STOP is dismayed that this "public health assessment" was largely derailed by the sudden and conspicuous cessation of aerial pesticide applications by timber companies in the investigation area. Rather than discuss the reasons or impacts of this cessation, the Investigation instead cites it as a mere factual occurrence. OHA and other investigators should have the courage to step up and call this behavior exactly what it is: an attempt to artificially influence the Investigation in a way that prevents *any* finding that human exposures to forestry pesticides occurred. STOP urges OHA, ASTDR, and the rest of the Investigation team to carefully consider their duty to protect the public interest and to revise the Investigation to account for these external influences.

STOP has the following additional concerns about the scope and findings of the Investigation:

Comment One

One of the important findings of the Investigation pertains to the Fall, 2011 urine sampling, wherein 59 of the 64 sampled participants had detectable levels of the herbicide 2,4-D in their urine. Of those 59, 22 individuals had levels of 2,4-D metabolites in their urine above the NHANES 75th percentile levels. The Investigation notes that "[t]his number was higher than expected and approaches statistical significance, which is typically defined by a p-value of 0.05 or less." Investigation at p.

18. The p-value for the finding was 0.06, or one one-hundredth greater than OHA's stated significance level of <0.05.[1]

Importantly, OHA opted to exclude one participant from its analysis, a child under the age of six years old. This decision was made because, according to OHA, "[t]here are no NHANES values for comparison for children under six years old." Investigation at p. 18 n. 5. We believe that OHA should include this child and reevaluate the statistical significance of the presence of 2,4-D in participants' urine. Because the perspective of the Investigation is focused on protecting the public health, it is more than reasonable for OHA to include a young child in its evaluation of whether a public health risk is present. Young children are more susceptible to pesticide exposure than are adults, making their inclusion in the public health assessment even more crucial. Moreover, had OHA included this child, then the p-value of the 75th percentile finding would likely have been statistically significant, i.e., <0.05. As such, we request that OHA review its analysis and determine whether inclusion of this participant creates a statistically significant finding.

Comment Two

The Investigation states that the spring, 2012 sampling was suspended by OHA because "the areas that were slated for applications of 2,4-D and/or atrazine were in remote locations which have very few residents." The Investigation fails to point out that all pesticide applications were suspended by major timber companies in and around the Triangle Lake / Blachly area. While no overt intention can be drawn by this sudden suspension of aerial applications, it is certainly suspicious that the companies which spray the most atrazine and 2,4-D in the area ceased those practices subsequent to OHA's announcement that it would be sampling individuals' urine for exposures. As discussed above, the Investigation team needs to address this issue head-on and discuss its implications.

Moreover, why didn't OHA look to other similar communities (with similar topography) to assess whether exposures to 2,4-D and atrazine occur under similar circumstances to those found in the Investigation area? The exact same factors are present across the State: rural, residential properties located beneath steep, privately-held timberland upon which pesticides are aerially applied. It stands to reason that sampling in these areas would provide useful, directly comparative data to the Triangle Lake / Blachly area.

---

[1] It is worth noting that many scientific studies use a p-value of <0.10 as an indicator of statistical significance. This lower statistical threshold is a more appropriate metric in situations such as this, where the state government is investigating whether private activity threatens the public health. Risks to the public health should be evaluated liberally, and a p-value of <0.10 should have been used by OHA.

Comment Three

Pages 28-30 of the Investigation discuss the urine samples obtained by community members pre- and post-application in spring, 2012. The Investigation makes four primary conclusions about this data:

1) Post-spray samples had "levels of atrazine [that] were significantly higher" than the pre-spray samples.
2) Only four known applications of atrazine occurred less than 24 hours before the collection of the post-spray samples; these applications were all aerial.
3) Atrazine that is aerially applied can move *at least* 2-4 miles away from application sites.
4) The four atrazine applications which occurred just prior to the post-spray sampling were between 2 to 4 miles away from the sampling locations.

Despite the force of these conclusions, OHA determined that it "cannot confirm the relatively elevated atrazine levels in post-application urine samples were from a specific pesticide application, the contribution of multiple applications in the area, or some other source." Investigation at 34. We believe this determination is unsupportable. The four conclusions made by OHA demonstrate a strong, direct causal connection between the significantly higher atrazine levels found in participants' urine and the four atrazine applications that occurred nearby in the 24-hours immediately preceding collection of the urine samples.

OHA faults the lack of "site- or time-specific information" about the persistence and movement of atrazine in the environment after it was applied to justify its determination that no conclusions can be drawn from the data. But the spray records obtained by OHA (and by other groups) provide the *exact* information OHA claims it lacks. These spray records indicate the amounts of pesticides applied, wind speed, the pressure at which pesticides were applied, the nozzle and droplet size, relative humidity, temperature, the time of the application, and information about the topography of the application site. OHA should either re-evaluate this data or consult with an aerial drift specialist to assess the extent of which these exposures were caused by the reported aerial applications.

More importantly, OHA should amend the Investigation to state what is readily apparent from the available data: the *only* possible source of the atrazine found in these participants' urine was from the aerial applications that occurred nearby. Considering that protection of the public health is the primary mission of OHA and ASTDR, it is exceedingly frustrating for the Investigation to reach conclusions that are inconsistent with the available data and science, especially when that data indicates that exposures to pesticides were likely caused by aerial applications.

Comment Four

Throughout the Investigation, there are comments about the lack of information concerning atrazine's impact on biological organisms, including humans. On June 3, 2013, the undersigned transmitted numerous studies to Dr. David Farrer, the principal toxicologist involved in the Investigation. These studies (and others) demonstrate that even small exposures to atrazine can have deleterious effects on human health and the environment. While the science behind chronic and low-level doses of atrazine is still building, we believe there is sufficient information in the field for OHA to make an informed conclusion that the types of exposures experienced by members of the Triangle Lake / Blachly community will have negative impacts on these individuals' health. Indeed, when read with reference to the widespread cancers reported by members of the community during the Grange meetings, it seems evident that pesticide exposures are causing undue harm to the public health in the area.

We request that OHA amend the Investigation to include a discussion of the studies that were provided to Dr. Farrer and whether those studies indicate that the documented exposures in the investigation area may have an impact on human health and the environment.

Comment Five

Despite these shortcomings, the Investigation proposes that the State should "explore the feasibility of implementing a system that would allow sensitive populations to be notified of imminent pesticide application in such time and with such specificity that they could take action to avoid exposure to those applications." Investigation at 54. Members of STOP and the Triangle Lake / Blachly community have been requesting State agencies to implement such a system for several years. We request that OHA work with Legislative Counsel to develop a bill that would address this public health concern. Oregonians have a right to know when and where pesticide applications will occur that threaten their person and property.

Conclusion

STOP urges the Investigation team to revise the Investigation in accordance with the above comments. We hope the upcoming air sampling will fully confirm what residents in the area have suspected for years: pesticides drift from their intended targets, exposing community members to harmful poisons.

Sincerely,

[redacted]

August 9, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232
Ehap.ino@state.or.us

RE: Highway 36 Corridor Exposure Investigation: Public Health Assessment

To Whom It May Concern

[redacted]. We own and manage timberland within the boundaries of the Hwy 36 Corridor Exposure Investigation area. We have read the Public Health Assessment (draft) and have several concerns about this document as presented.

It is our opinion that the ñself-collectedò data is not reliable and should not be considered useable for the purpose of the Public Health Assessment. This data was provided by a group of people in the community that strongly opposes the use of pesticides and forest management in general. As an example of this unreliability, the draft PHA notes the difficulty in identifying whether the ñself-collectedò samples are either ñpreò or ñpostò application. The entire PHA is fatally flawed by the use of data provided by such a biased source.

The report also fails to address the many potential pathways to exposure and makes the assumption that it is likely caused by spray drift from aerial applications. This conclusion is not justified by the sample results. The 2011 fall urine samples determined that 92% of the participants had detectable levels of 2, 4-D (of which all were below levels expected to harm peopleôs health) However, the report does not address the fact that 2, 4-D was not aerially applied in this same time period. How can one conclude that the source of exposure is spray drift when 2, 4-D was not even aerially sprayed in the preceding months? Conclusion 9 of the report states there is ñinsufficient information to confirm that local pesticide applications are the sourceé .However, available evidence suggests it is possibleò. Where is this evidence?

By conducting the Hwy 36 Exposure Investigation the Oregon Health Authority has stepped directly into a hotbed of anti-spray activism. This poorly designed study and biased PHA only exasperates an already volatile situation. The PHA contains no meaningful information other than the fact that Hwy 36 residents have been exposed to levels of chemicals that are not expected to harm peopleôs health (as determined by the EPA). The only statistically sound conclusion the report makes is that the residents of the Hwy 36 Corridor are no different than the vast majority of other Americans. The application of pesticides has been controversial for years and as responsible landowners we welcome any science that provides verifiable evidence and potential solutions to

issues of concern. A more tightly controlled drift study, in topography similar to the Hwy 36 Corridor, would likely provide such meaningful information. Unfortunately the draft PHA does not make any such contribution and therefore we ask that this report be rewritten or remain unpublished.

Thank you for your time and consideration.

Sincerely,

[redacted]

August 8, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Comments on the Highway 36 Exposure Investigation report:

My review of the May 9th, 2013 report found many areas of great concerns.

The State of Oregon and Federal Government has spent hundreds of thousands of taxpayer dollars because of the complaints of a few people who oppose the legal use of herbicides. The start of the investigation began when these folks presented some self-collected and handled urine sample data as "fact". These samples had no proper chain of custody procedures documented, nor were the samples handled by an unbiased third party. No scientific report should accept such samples into the body of data.

Of all the exposure data in this report, none show data anywhere near the levels of health concern. The EPA has reviewed decades of toxicology studies for the two herbicides 2,4-D and Atrazine and established safety levels for human exposure. None of the data was near these safety levels of health concern.

In the OHA collected urine data from the fall of 2011 showed no levels of Atrazine and very low levels of 2,4-D. Those levels were very similar to the general US population levels. Just because laboratory procedures can find tiny amounts of a chemical, that does not equal a risk. Once again, the data showed levels far below any EPA recognized health concern levels.

The soil, water, and home grown food sampling showed no level of contamination concerns. This again shows that there is not a problem in this region that is unique as some anti-chemical locals claim.

The plan to conduct air sampling concerns me very much because of the risk of easy vandalism. An air sampler will probably suck in samples of air at certain intervals to a filter for later analysis. Anyone who would like to contaminate the sampler could just spray the air intake and ruin the sample, giving erroneous data. There have been other cases of vandalism to farmers' equipment in the area over the past two years, so there could well be some people who would not hesitate to vandalize air sample equipment. Any data from vandalized equipment would therefore be worthless.

In conclusion, all of data shows that there are no health concerns. Therefore, the OHA and other agencies have done their job and should shut down this waste of taxpayer dollars. There are other real public health concerns that could use the funding that has been spent on this project.

[redacted]

[redacted]

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Re: Public Comment Release
Public Health Assessment
Highway 36 Corridor Exposure Investigation

Dear Members of the Environmental Health Assessment Program:

I am submitting these comments regarding the public comment release of the report of the public health assessment done as part of the Highway 36 Corridor Exposure Investigation.

As part of a project in which I am assisting the non-profit group Beyond Toxics, I have examined all of the pesticide application records provided by the Oregon Department of Forestry to citizens in May, 2012, as a result of various public records request, as well as 26 additional records provided to me and to Beyond Toxics by Kevin Weeks (now deceased) of the Oregon Department of Forestry in February, 2013.

My review of those records suggests that there are at least three records of pesticide applications in the study area during 2011 that were not reviewed by the investigation team.

Missing Spray Records:

Three ground spray records that were labeled by ODF as 2010 sprays actually are records of sprays that, according to the content of the records, took place in 2011. It appears that in two instances, ODF incorrectly labeled the spray record, and that in one instance, a spray notification was filed in November of 2010 but the spray actually occurred in 2011.

None of these sprays appear to be reflected in the Figures and Tables on pages 61 – 65.

The record labeled by ODF as "2010-781-00332-1" is actually a record of a spray done pursuant to notification number 2011-781-00332. The record itself does not show the acreage sprayed, but the FACTS data system maintained by the ODF shows that it was intended that 400 acres be sprayed. The FACTS database shows that this pesticide application was called "2011 Noxious Weed Treatment" by the landowner, Plum Creek Timberlands. The application record shows application by Nick's Timber Services of a total of 2.9 gallons (27.26 pounds) of 2,4-D and 3.63 gallons (32.66 pounds) of Triclopyr on June 7, 2011, within the study area. A copy of this record is included as Exhibit A.

Perhaps most importantly, this record shows 2,4-D being applied in the watershed later than was assumed in the draft report, in June, 2011, whereas the draft report shows the last application of 2,4-D to be in May, 2011.

The record labeled by ODF as “2010-781-00516-8” is actually a record of a spray done pursuant to notification number 2011-781-00516-8. The map accompanying the application record shows a total acreage of 120 acres, although a very small portion is shown as within Township 18S, which is not within the study area. Again the record shows the landowner as Plum Creek Timberlands and the pesticide applicator as Nick's Timber Services. The record shows an application of a total of 9.75 gallons of Imazapyr (90.29 pounds) occurring over 7 days from July 26 through August 22, 2011. A copy of this record is included as Exhibit B.

The record labeled by ODF as “2010-781-00830-2” appears to be accurately labeled. A notification with that number was filed on October 12, 2010. The application record shows an application on 4 acres owned by Ruth Millard of .75 pounds of Oust XP (sulfometuron methyl) on May 5, 2011. A copy of this record is included as Exhibit C.

These additional records showing application on 520 additional acres of 27.26 pounds of 2,4-D, 32.66 pounds of Triclopyr, 90.29 pounds of Imazapyr and .75 pounds of sulfometuron methyl should be included in the investigation's database, as well as the charts and tables currently on pages 61-65 of the report.

Pesticide Application Record Inconsistencies:

There are a number of other conflicts, inconsistencies and obvious errors in the pesticide application records provided by ODF.

In May, 2012, ODF originally provided a total of 79 application records labeled as being for 2011 for the Triangle Lake Study Area to community members who had requested them. 35 of those records were for aerial applications within the study area. The additional 44 were for ground and roadside applications within the study area.

In February, 2013, in response to an inquiry, ODF provided 26 additional application records, of which 6 were for the year 2011, all ground sprays.

Thus ODF has provided to the public a total of 85 application records labeled as 2011, 35 for aerial sprays and 50 for ground sprays.

However, Table 20 on page 66 of the draft report shows only 82 files received from ODF. In addition, as was discussed earlier in these comments, there were 3 additional records from ODF labeled as 2010 but showing applications in 2011. Thus there should be 88 records from ODF in OHA's database, not 82. It cannot be determined from the information in the draft OHA report precisely which of these ODF records OHA lacks.

In reviewing all of the pesticide application records provided by ODF, I found that of the 244 records provided, at least 65 (27%) lacked one or more of the items of information required by ODF rules for pesticide applicators on forest land. That is a dismal compliance rate, and has clearly affected the ability of investigators to accurately determine what products were applied, when, and where. The OHA's recommendation that “ODA and ODF work with pesticide applicators to develop consistent

pesticide application record-keeping processes to ensure that application record data are accurately maintained and usable" is absolutely critical to protecting the health of Oregonians.

Two Application Records With Same ODF Label:

In May, 2012, ODF provided a copy of an application record labeled 2011-781-00221-2, which showed an aerial application of herbicides by Weyerhaueser to a unit named Templeton North on September 20, 2011. A copy of this record is included as Exhibit D. Later, in February, 2013, ODF provided an additional record, also labeled 2011-781-00221-2, which showed a ground application of herbicides by Weyerhaueser to a unit named Borland NE on May 16, 2011. A copy of this record is included as Exhibit E. Both of these units are within the Triangle Lake study area.

A review of the FACTS database shows that the record originally provided by ODF was probably mislabeled and should have been labeled 2011-781-00567-2, which is the number of a notice of aerial herbicide application filed by Weyerhaueser on July 22, 2011, for application to a unit named Templeton North between August 8 and December 31, 2011. The later record provided by ODF in February, 2013, labeled 2011-781-00221-2, for the unit Borland NE, is probably labeled correctly.

ODF's representative stated that all these records had been provided to OHA, but the report does not contain enough information to verify that this is true.

Units of Measurement of Pesticides:

The OHA draft report contains total amounts for various pesticides, but using two different units, pounds and gallons, based on the pesticide formulation used. Then in Table 19, colors are used to indicate which pesticides were used the most. That table indicates that hexazinone was the pesticide used the most in the study area in 2011.

It is possible to convert the liquid chemicals from gallons to pounds by using the density or other information contained on the product's label or MSDS (Material Safety Data Sheet). I was able to do this for the pesticide applications documented on the ODF records for 2009 through 2011. The following table summarizes my results for 2011:

Pesticide	**Aerial – Original Units**	**Aerial - Pounds**	**Ground – Original Units**	**Ground - Pounds**	**Total - Pounds**
2,4-D	324.87 gallons	3,165.77 pounds	3.4 gallons	31.96 pounds	3,197.73
Aminopyralid	0	0	5 gallons	47.55 pounds	47.55
Atrazine	701.63 gallons	6,449.06 pounds	0	0	6,449.06
Clopyralid	9.95 gallons	96.42 pounds	0	0	96.42
Glyphosate	371.32	3772.99 pounds	126.20 gallons	1,280.05 pounds	5,053.04
Hexazinone	86.81 pounds	86.81 pounds	1,154.04 pounds	1,154.04 pounds	1,240.85

Imazapyr	118.17 gallons	1,049.33 pounds	102.48 gallons	936.22 pounds	1,985.55
Metsulfuron Methyl*	51.62 pounds	51.62 pounds	17.10 pounds	17.10 pounds	68.72
Sulfometuron Methyl*	104.42 pounds	104.42 pounds	28.76 pounds	28.76 pounds	133.18
Triclopyr	0	0	555.61 pounds	555.61 pounds	555.61
Total Pounds of Pesticides Applied in Study Area in 2011					**18,827.71**
* Combination products containing these two ingredients were allocated based on the proportion of their active ingredients.					

Thus, the application records provided by ODF show that forestry accounted for over 9 tons of pesticide products applied in the Triangle Lake Study Area during the year 2011.

It is also clear, after converting the products to the same units, that hexazinone was not the most-heavily used pesticide in the watershed. In fact, atrazine was the most-used pesticide in the watershed, followed by glyphosate, then 2,4-D, then imazapyr, and only then hexazinone. It should also be noted that while the amounts of metsulfuron methyl and sulfometuron methyl applied were relatively small, that the application rates for these two chemicals are far lower than the other chemicals used. These chemicals kill plants at extremely low concentrations.

Sources of Atrazine:

The forestry records show a total of 701.63 gallons (6,449.06 pounds) of atrazine applied in 2011, all aerially. This is the same total as shown by OHA in Table 19. Therefore, all of the recorded applications of atrazine in the study area during the year 2011 were from forestry aerial sprays.

The Environmental Protection Agency has classified atrazine-based products as Restricted Use Pesticides, meaning that only certified or licensed applicators may apply these products. Thus if atrazine were used for other purposes in the study area in 2011, those uses should have been reported to the Oregon Department of Agriculture. Since all of the atrazine identified by OHA was applied by forest operators, it follows that none was used by licensed operators for other purposes.

OHA's Conclusion 8 is that urine samples from spring of 2011 had detectable levels of atrazine, but in Conclusion 9, the agency indicates that there is insufficient information to confirm that local pesticide applications are the source of pesticides found in the urine of participating Highway 36 investigation area residents. The justification states that ". . . because we did not have site- and time-specific information about atrazine persistence and distance traveled, we were unable to confirm a specific source for the pesticides that were detected in residents' urine."

It is incomprehensible how the agency could avoid concluding that forestry aerial sprays were the source of the atrazine metabolites found in residents' urine. The only documented use of atrazine in the study area was in forestry aerial sprays, and urine levels tested shortly after aerial applications of atrazine showed significant increases above earlier levels, as documented in the draft report. Atrazine is a Restricted Use Pesticide, making it highly unlikely that residents in the study area use it on their

property in any way.

Sources of 2,4-D:

Further, the vast majority of 2,4-D use documented in the study area was from forestry operations. ODF application records show that 328.27 gallons (3,197.73 pounds) of 2,4-D were used for forestry in 2011, compared to the total of 345.4 gallons shown in Table 19, meaning that over 95% of the 2,4-D in the study area came from forestry.

Again, it is incomprehensible how the agency could avoid concluding that forestry aerial sprays were the source of the 2,4-D found in residents' urine. Urine levels tested shortly after spring aerial applications of 2,4-D showed increases above earlier levels, although the difference was not considered statistically significant.

Drop in Levels of Pesticides in Urine:

On page 4 of the draft report, ODA makes the following statement: "This investigation documented the presence of 2,4-D and atrazine in the urine of residents. There was a drop in those levels between the spring and fall 2011 *for reasons that are currently unknown.*" [Emphasis added.] This statement is very hard to understand, given that the application records examined by OHA show very clearly that atrazine and 2,4-D were applied aerially in the spring but were not applied at all in the fall. Table 19 on page 64 of the draft report shows no applications of either of these chemicals after May (although another section of these comments show that there was an application of 2,4-D in June which had been mislabeled by ODF and was therefore overlooked by the OHA).

The reason for the drop in atrazine and 2,4-D in urine levels is obvious: the timber industry uses these chemicals only in the spring. It is extremely puzzling why OHA could not draw that very obvious conclusion. Maintaining a rigorous scientific study does not require abandoning logic and common sense.

Adjuvants:

The report does not document the use of adjuvants (various additives) that were applied concurrently with pesticides. These products, which are not subject to the same labeling requirements as active ingredients, are used for a variety of purposes, including making the product stick to vegetation, reducing foam, and reducing drift. Many of these products are considered toxic in their own right, yet OHA did not examine their use in the study area.

Synergistic Effects:

The OHA report mentions only briefly the potential synergistic effects of combinations of pesticides such as the frequent combinations of 2,4-D and atrazine used aerially in the study area. So-called "tank mixes" are very common for both ground and aerial sprays, as the application records document clearly. Another combination of four pesticides (glyphosate, imazapyr, metsulfuron methyl and sulfometuron methyl) is frequently applied in the study area, sometimes in combination with additional adjuvants such as methylated seed oil.

Cancellation of Spring, 2012, Urine Testing:

The original investigation design, as described on page 16 of the draft report, was to include urine sampling before and after nearby ground or aerial spraying in the spring of 2012. However, as explained on page 23 of the draft report, the spring sampling was suspended on March 8, 2012, "because the areas that were slated for applications of 2,4-D and/or atrazine were in remote locations which have very few residents." On page 7 of the draft report, OHA states that "It is not known if the Exposure Investigation resulted in changes to pesticide application practices in the investigation area, and therefore if exposure conditions have changed for Highway 36 corridor residents."

In fact, the pesticide application records provided by ODF for the years 2009 through 2011 document very clearly that for all three years, atrazine and 2,4-D were heavily applied in the study area during the spring. The records document that the following amounts of 2,4-D and atrazine were applied in the study area for the years 2009 through 2011:

Year	Atrazine – aerial	Atrazine – ground	Total – Atrazine	2,4-D – aerial	2,4-D – ground	Total – 2,4-D
2009	183.75 gal. (1,718.06 lb.)	0	183.75 gal. (1,718.06 lb.)	66.44 gal. (624.51 lb.)	2.63 gal. (24.76 lb.)	69.07 gal. (649.27 lb.)
2010	300.75 gal. (2,760.89 lb.)	0	300.75 gal. (2,760.89 lb.)	98 gal. (921.20 lb.)	0.01 gal. (0.09 lb.)	98.01 gal. (921.29 lb.)
2011	701.63 gal. (6,449.06 lb.)	0	701.63 gal. (6,449.06 lb.)	324.87 gal. (3,165.77 lb.)	3.4 gal. (31.96 lb.)	328.27 gal. (3,197.73 lb.)
Total	1,186.13 gal. (10,928.01 lb.)	0	1,186.13 gal. (10,928.01 lb.)	489.31 gal. (4,711.48 lb.)	6.04 gal. (56.81 lb)	495.36 gal. (4,768.29 lb.)

Application records from 2012 are not available; however, according to the OHA report, no sprays of 2,4-D or atrazine were planned for the spring for the study area. This is totally contrary to the pattern which is clearly established by the records for 2009 through 2011, showing heavy use in the study area of atrazine and 2,4-D in the spring. Thus it seems fairly clear that the timber companies in the study area changed their practices by avoiding the use of 2,4-D and atrazine (the only two chemicals which OHA can test for in urine) and instead using other chemicals in their place.

Volatilization of Pesticides:

The OHA draft report mentions, but does not discuss, the possibility of volatilization of pesticides as a possible source in the study area. A recent study by the U.S.D.A.'s Agricultural Research Service indicates that under certain conditions, more pesticide product can be lost to volatilization than to surface runoff. **Comparison of Field-scale Herbicide Runoff and Volatilization Losses: An Eight-Year Field Investigation,** Timothy J. Gish, John H. Prueger, Craig S.T. Daughtry, William P. Kustas, Lynn G. McKee, Andrew L. Russ and Jerry L. Hatfield, Journal of Environmental Quality 2011 40: 5: 1432-1442 doi:10.2134/jeq2010.0092. The study showed that revolatilization is significant when ground moisture is high and temperatures are increasing, the exact conditions in Oregon in the spring. A pre-publication version of this study is included as Exhibit F.

Community Conflict:

The draft report contains two conclusions regarding community conflict over the issue of pesticide use in the study area. In my opinion, this is what is popularly called a "red herring" designed to distract attention from the fact that stress in the study area has resulted from the abject failure of Oregon's state agencies to responsibly address the concerns of study area residents for up to seven years before this investigation began. While I believe that the OHA staff who are participating in this investigation are approaching their work professionally and responsibly, there is no doubt that the residents of the study area have been ignored, insulted, and treated badly for many years by the Oregon Departments of Forestry and Agriculture, as well as the multi-agency Pesticide Analytical and Response Center (PARC). In my 18 years as a water quality specialist for the Oregon Department of Environmental Quality, I saw first hand how individuals who complained about pesticides to state agencies were ignored, vilified, and demonized by staff from ODA and ODF in particular. It is the nature of regulatory agencies in this country to develop strong ties with the regulated community, and in this case, those ties have interfered with the ability of ODA and ODF in particular to appropriately respond to community concerns regarding potential ill effects from pesticides.

The following statement is taken from page iii of the draft report:

> The Highway 36 Corridor EI is a multi-agency effort to respond to several community members' requests to investigate possible exposures to pesticides and herbicides used in applications in the Highway 36 corridor.

In fact, the impetus for this investigation was not the requests of community members to investigate possible exposure to pesticides and herbicides; it was the testimony of a national expert in pesticide exposure that residents' urine tested positive for 2,4-D and atrazine, at levels higher than found in the general population. Requests by residents for investigation were routinely ignored by state agencies for years, and it was only when exposure was already documented by urine testing that the state took notice.

With all due respect, I suggest that starting out this report with such an obviously self-serving statement that stretches the truth will do little to add to the report's credibility. It would be refreshing, indeed, if the authors would acknowledge the truth—that it was only after pesticide exposure had been documented by urine tests from an acknowledged national expert that state officials took any action at all.

Miscellaneous Concerns:

On page 1 of the draft report, it is stated that community collected urine, water and air samples were analyzed by privately contracted analytical laboratories at Emory University in Atlanta, Georgia. That statement is correct only regarding the urine samples; the air and water samples were analyzed by Anatek Laboratories in Moscow, Idaho.

On page 62 of the draft report, the paragraph between the figure and table summarizes Table 18, but fails to mention the 18 documented roadside applications of pesticides. It should also be noted that

most of these roadside applications were done on private timberland by industrial timber companies.

Conclusion:

Due to the actions of the timber companies in the study area, this investigation has barely started. I urge those in charge of this investigation to expand the study area to include all of the state, and to re-design the study in such a way that the timber companies and pesticide applicators will not know when or where samples are being taken. I urge those in charge to invest appropriate resources so that adequate air, water and biological samples can be taken that will provide answers rather than simply raise more questions. I urge those in charge to pursue air testing for all chemicals used on forest and agricultural lands in Oregon, and to conduct such tests in adequate numbers that conclusions can be drawn.

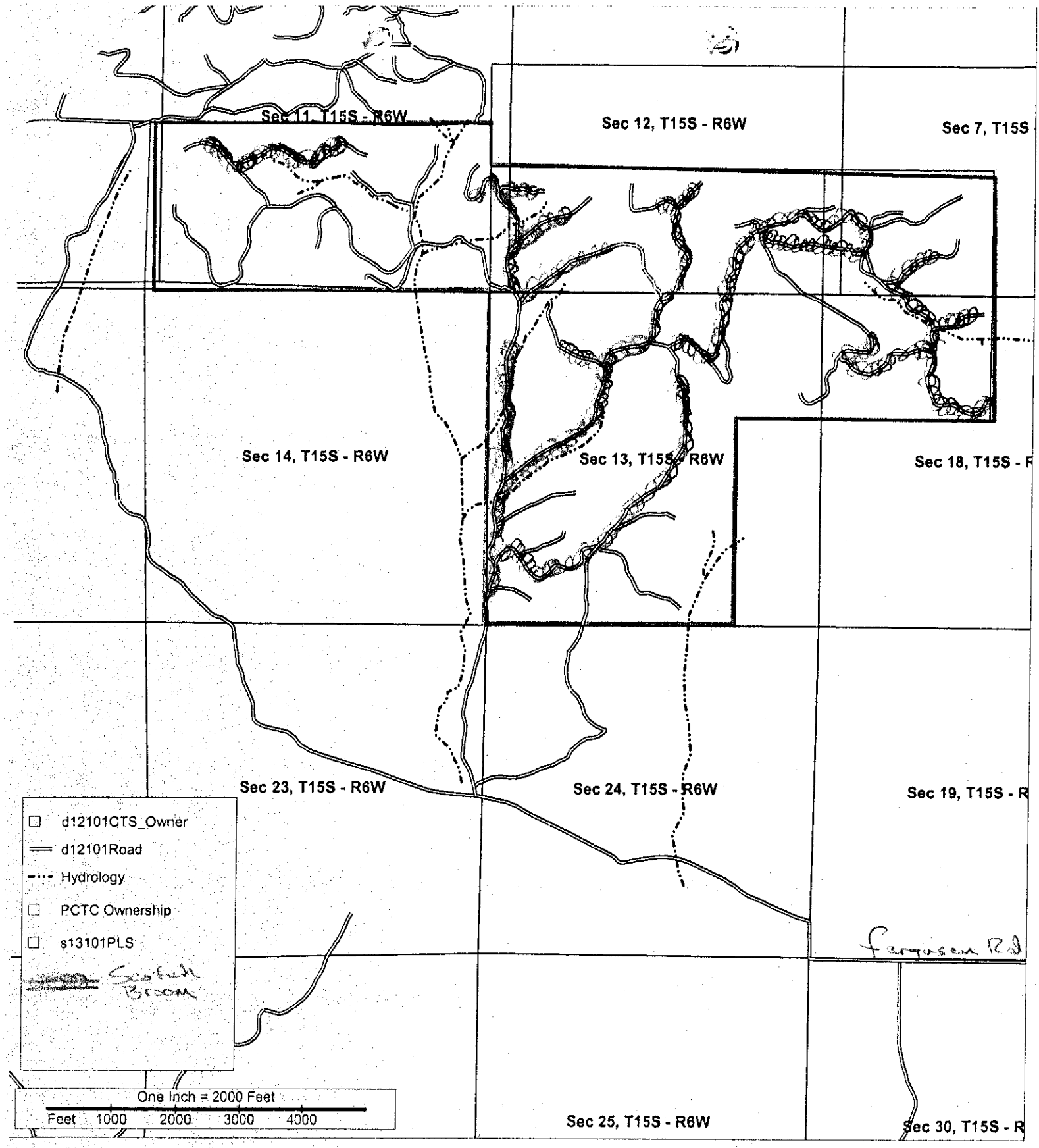
Finally, I urge that an additional recommendation be added: That ODF adopt as a temporary emergency rule a two-mile buffer zone for pesticide application around existing residences and schools. This will provide some measure of protection during the potentially years it will take for this investigation to be completed given the active resistance of the timber and pesticide industries in Oregon.

Respectfully submitted,

[redacted]

[redacted]

Attachments



Browning Ridge

Scotch Broom Project

NotF: 2010-781-0332
unit: 1

2011 781 00332

County: Lane

N

. ..STICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Scotch Broom
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074

3. **Dates of application:** June 7 2011 Tues

4. **Time of application (start & stop times)**: 0600-1500

5. **Location of Application:** Browning

6. **Type of equipment used:** Backpack Sprayer and Hose and Gun

7. **Pesticide used**: Forestry Garlon XRT EPA 62719-553 2,4-D LV6 EPA REG # 71368-11, MSO
   a. **Company of Manufacturer**: Various
   b. **Active Ingredient by %:** Tryclopy 68% 2,4-D 86 %, Oils
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 2%, 2.5%, .6%
   a. **Total amount of Chemical used:**
   b. **Total volume of output (chemical + carrier/acre):** 145 Gallons of Mix

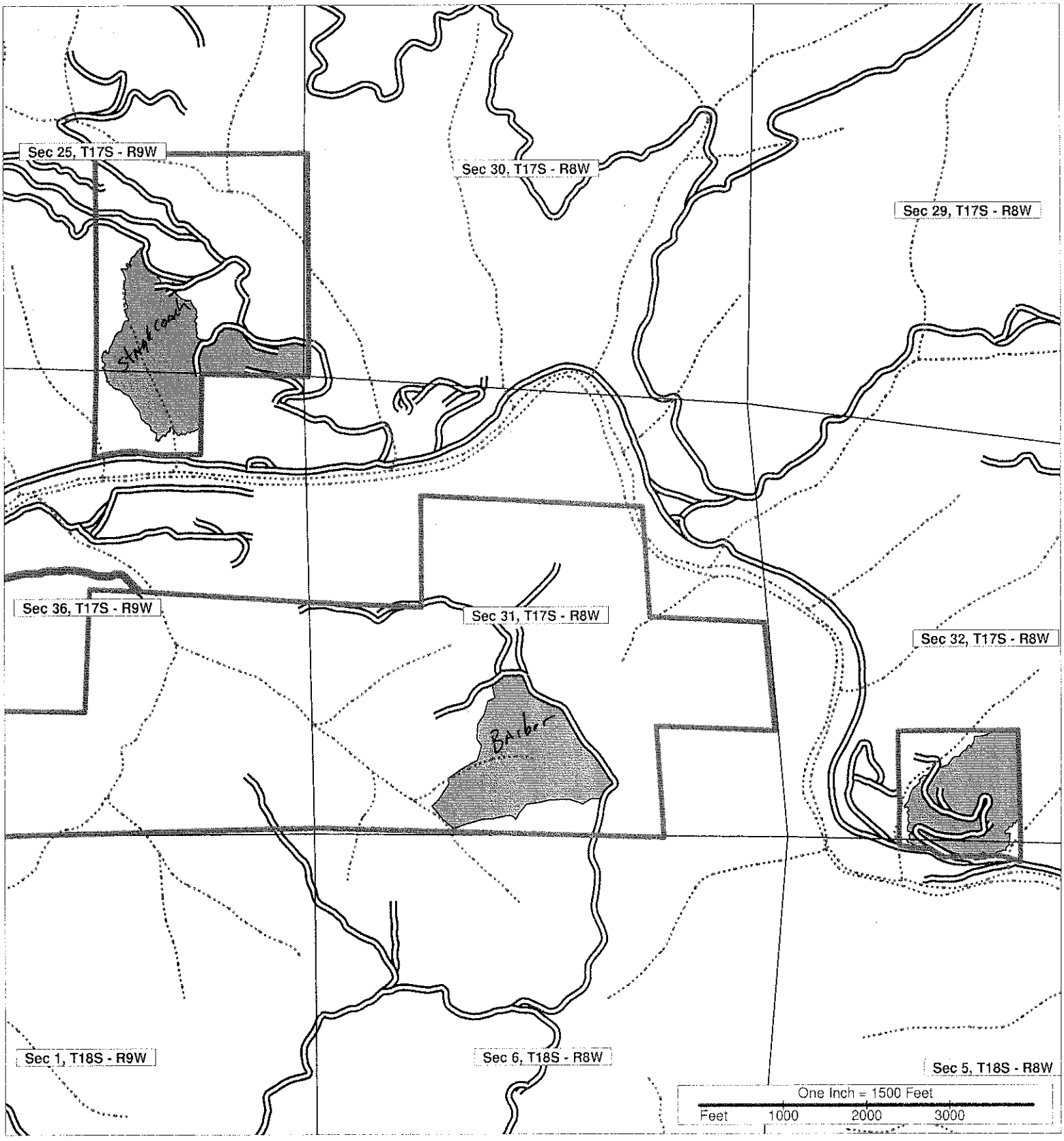
9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Scotch Broom

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	62
d. **% Humidity:**	78	78

2011 781 00332



Notif: 2010-781-00516

Unit: 8

Barber Stage

Section: 25,36/31,32/5

T17/18S- R8,9/8W

Acres:120

Property Line

Stream

Roads

Treatment Area

Lane County

Lat: 44 2' 49" Long: -123 42' 7"

N

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** July 26 2011

4. **Time of application (start & stop times)**: 0700-1630

5. **Location of Application:** Barber Stage

6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.25 Gal
   b. **Total volume of output (chemical + carrier/acre):** 2.5 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	45

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** July 27 2011

4. **Time of application (start & stop times)**: 06300-1530

5. **Location of Application:** Barber Stage

6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.25 Gal
   b. **Total volume of output (chemical + carrier/acre):** 2.5 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	45

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** July 29 2011

4. **Time of application (start & stop times)**: 06300-1630

5. **Location of Application:** Barber Stage

6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.25 Gal
   b. **Total volume of output (chemical + carrier/acre):** 2.5 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	45

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** August3 2011

4. **Time of application (start & stop times)**: 0630-1430

5. **Location of Application:** Barber Stage

6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.5Gal
   b. **Total volume of output (chemical + carrier/acre):** 3 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	45

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** August 8 2011

4. **Time of application (start & stop times)**: 0600-15300

5. **Location of Application:** Barber Stage and Neeley

6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.5Gal
   b. **Total volume of output (chemical + carrier/acre):** 3 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	75
d. **% Humidity:**	78	50

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** August 15 2011

4. **Time of application (start & stop times)**: 0630-1530

5. **Location of Application:** Stagecoach Unit behind Green gate @ 6 mile
6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.25 Gal
   b. **Total volume of output (chemical + carrier/acre):** 2.5 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	50

2011 781 00516

PESTICIDE APPLICATION RECORD

1. a. **Project Name (Unit):** Hack and Squirt 2011
   b. **Operator:** Nick Domes; Nick's Timber Services Inc. #179082

2. **Name of Applicator**: Nick Domes #179083 Elias Hernandez CIST #0147500 Sergio Gonzalez CIST #0167568 Mauricio Chaves CIST #1013549 Morfilio Gallegos CIST #1013074 Fidel Garcia CIST # 0176255

3. **Dates of application:** August 22 2011

4. **Time of application (start & stop times)**: 0630-1530

5. **Location of Application:** Stagecoach Unit behind Green gate @ 6 mile and Bald Mtn
6. **Type of equipment used:** Hack and Squirt

7. **Pesticide used**: Polaris AC
   a. **Company of Manufacturer**: Nufarm
   b. **Active Ingredient by %:** Imazapyr 53%
   c. **Type of formulation:**
   d. **Supplier of Chemical:** Plum Creek

8. **Rate of application used**: 50% in Water
   a. **Total amount of Chemical used:** 1.75 Gal
   b. **Total volume of output (chemical + carrier/acre):** 3.25 Gal

9. **Areas treated:** All of project area on map
   a. **Estimated acres treated:**
   b. **Total project size in acres**:

10. **Primary target species**: Big Leaf Maple

11. **Stage of development**: actively growing

12. **Weather conditions:**	**Start**	**End**
a. **wind velocity**	1-3	1-3
b. **wind direction**	South	South
c. **temperature**	58	80
d. **% Humidity:**	78	50

2011 781 00516

2010-781-00830 UNIT 2

1. Crop Owner and 2. Location

[redacted]
Cheshire, OR

3. Date and 3 Time

5-6-11 _7:15 am – 3:30 PM

4. Supplier

Crop Production Services
4195-B Salem Industrial Drive
Salem, OR 97301
1800 452 8324

5. Trade name & strength:

Oust #352-601

6 Amount

3 oz /acre x 4 acre = 12 oz total

Carrier was 37 gallons of water

7. Crop

Newly planted Doug Fir trees

8. Apparatus

Solo Back Pack sprayer

9. Name Paul Millard (541) 7474669. AG-L0088847CPA.

10. Throw away date 5-6-2014

Notification Number 2010-781-00830 C

Weyerhaeuser PROPRIETARY

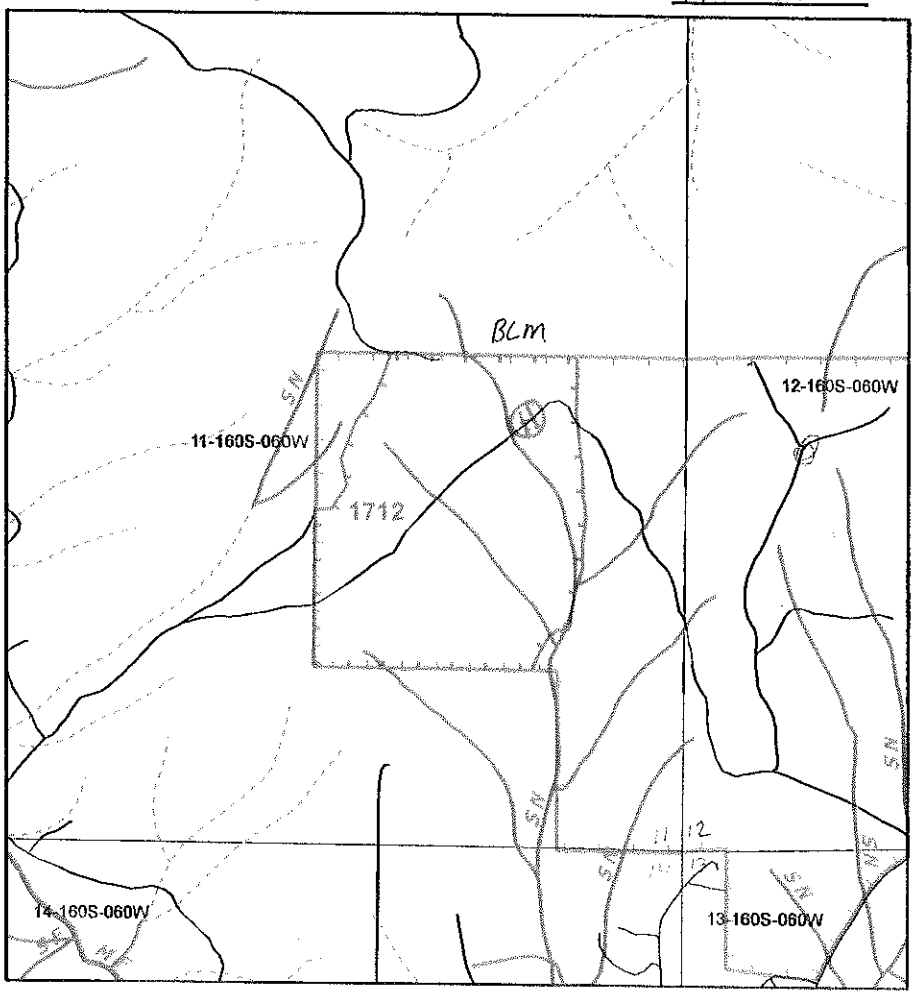
Notif: 2011-781-00221
Unit: 2
Sat Aug HP #16

Weyerhaeuser Company
South Valley WesternTimberlands
P.O. Box 1819, Eugene, OR 97440
(541) 744-4600 (541) 746-2511 [24 hrs.]

Area/Road No. TEMPLETON NORTH

Aerial Herbicide Application Report

District: South Valley **Season** FALL 2011



Sec(s)	11		
Twp(s)	16S		
Rge(s)	6W		

Elevation: 960 Scale 1" = 1,000

Unit(s)	Date(s)	Time of Day (Begin/End)
1712	9/20/11	12:50P / 1:30P
		/
		/

Type of Equipment: HELICOPTER
Application Method: BROADCAST
Contractor/Co.: WEYERHAEUSER Co.
Full name of applicator/certification #: WAYNE HAZZARD AG-L00009194C
FAA No.: N105W
Boom Type: CONVENTIONAL
Nozzle Size: ACCUFLOW .025
Pressure: 25 PSI

Date	Time	Temp °F/°F	Wind Dir/Spd	RH%
9/20/11	12:50P	63/72	1-2 W	60%

Reforestation Unit #:
Chemical Supplier: X Helena ___ Wilbur-Ellis
X Containers rinsed at least 3x & recycled
Comments:

Date 9/20/11 By

Note: This record shall be kept for 3 years in accordance with ORS 634.146.

Unit	Acres	Chemical/Ac (Trade Name) Chemical Sulframate Extra	Accord XRT	Polaris SP	MSO	Surfactant-Carrier/Ac	Water G/Acre	Total G/Acre	Site Prep	Release	Target Species
1712	53	4oz	0.5 gal	~~24~~ 12oz	0.25 gal		9.1	10	X		Salal, Blberry, fern, Hazel, etc
Actual	48	12LB	24GL	4.5G	12GL		439G	480G			

Written plan required? Yes ☐ No ☒

Resource to be protected:
Submitted to: Date
Contractor Signed: Date
State Approved Date:

Additional Requirements
☐ Neighbor Notification:
☐ Wetland Protection:
☐ Open Water/Rainfall:
☐ T/E Protection:
☒ Other: Dusty Landing ?

Date State Notification Submitted: 7/27/11

Notes: 15-day waiting period cannot be waived for aerial spray. Full name of all applicators and trainees applying pesticide must be recorded. All information must be recorded within 30 days following the pesticide application.

Accord Conc., #62719-324
Arsenal AC, #241-299
Chopper, #241-296
Conifer-90, #34704-689
Escort, #352-439
✓ Other: Sulfamate Extra 352-622-85588

Garlon 4, #464-554
Oust XP, #352-601
Transline, #62719-259
Velpar DF, # 352-581
✓ Other: Accord XRT # 62719-556
✓ Other: Polaris SP 228-538

NOTF: 2011-781-00221 Borland NE (1653

Unit: 2

Weyerhaeuser PROPRIETARY

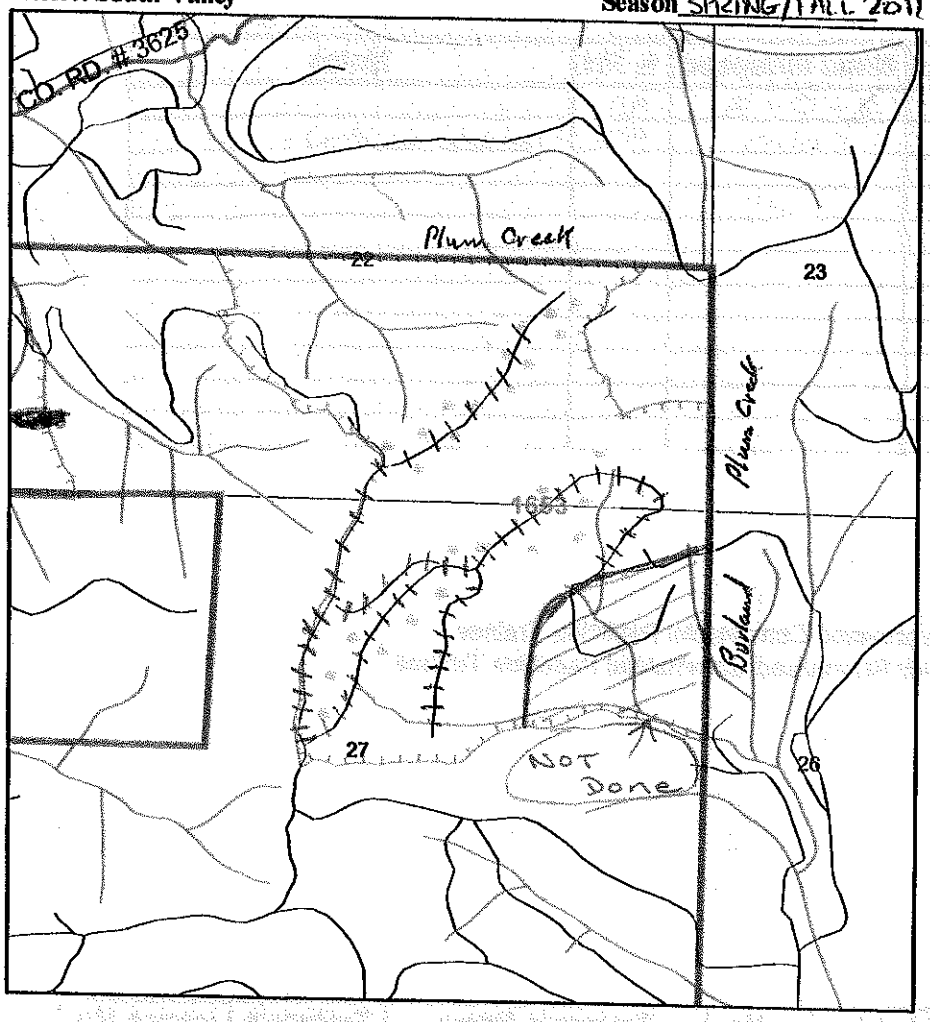
Weyerhaeuser Company
South Valley Operations Western Timberlands
P.O. Box 1819, Eugene, OR 97440
(541) 744-4600 (541) 746-2511 [24 hrs.]

Ground Herbicide Application Report

Area/Road No. BORLAND NE

District: South Valley

Season SPRING/FALL 2011



Sec(s)	23	26	
Twp(s)	16S	16S	
Rge(s)	6W	6W	

Elevation: 700 - 1000 Scale 1" = 1,000'

Type of Equipment: BACKPACK
Application Method: FOLIAR / WICK + SQUIRT

Contractor/Co.: OFMS

Full name of applicator/certification #:
Gilbert Salgado 170225

Reforestation Unit #: 2001 - P129
Estimated Trees/acre
Harvest Completion
Site Preparation Date

Meter-Jet® Specifications:
10 milliliters mix applied per tree
19 square feet treated (area per tree)

Chemical Supplier (Check One):
___Helena Chemical ___Wilbur Ellis
__Containers rinsed at least 3x & recycled
Comments:

Date 5/16/11 By Gilbert Salgado

Unit	Acres	Chemical/Ac (Trade Name) Chemical		Surfactant-Carrier/Ac			Water G/Acre	Total G/Acre	[redacted]		[redacted]
		GARLON XRT	MSO	Dye							
1653	20	.75%	1%							X	Scotch [redacted]
Actual		.3375 gal.	.45 gal.	.35156 gal.							

Note: This record shall be [redacted]

Written plan required? Yes ☐ No ☒

Resource to be protected:
Submitted to: Date
Contractor Signed: Date
State Approved Date:

Additional Requirements
☐ Neighbor Notification:
☐ Wetland Protection:
☐ Open Water/Rainfall:
☐ T/E Protection:
☐ Other:

Date State Notification Submitted:

Accord XRT II, #62719-324
Arsenal AC, #241-299
Chopper Gen 2, #241-296
LV6 EC, # 71368-11
Atrazine 4L #66222-36
Escort, #352-439

Garlon 3A, #62719-37
Garlon 4 Ultra, #464-554
Sulfomet, #352-401-85588
Transline, #62719-259
Velpar L, # 352-392
Other:

Notes: 15-day waiting period cannot be waived for aerial spray. Full name of all applicators and trainees applying pesticide must be recorded. All information must be recorded within 30 days following the pesticide application.

Unit NO: 1653

Date	Time	Temperature	Wind dir/speed	% RH	Notes
5/16/11	12:30	62	S-0-3	50	
END	3:00	65	Calm	50	Lemen crew

Trainee Pesticide Licenses:

Type of Licence:
- ___ Directly Suprevised Commercial Pesticide Trainee
- ✓ Immediately Suprevised Commercial Pesticide Trainee

Pumps
2+3+2+2

Trainee's Name	Trainee's Licence No.	Trainee's Name	Trainee's Licence No.
[redacted]	10009164		
	1666097		
	1000136		
	1645672		
	1012375		
	[redacted]		

Comparison of Field-scale Herbicide Runoff and Volatilization Losses: An Eight-Year Field Investigation

Timothy J. Gish,* John H. Prueger, Craig S.T. Daughtry, William P. Kustas, Lynn G. McKee, Andrew L. Russ, and Jerry L. Hatfield

An 8-yr study was conducted to better understand factors influencing year-to-year variability in field-scale herbicide volatilization and surface runoff losses. The 21-ha research site is located at the USDA–ARS Beltsville Agricultural Research Center in Beltsville, MD. Site location, herbicide formulations, and agricultural management practices remained unchanged throughout the duration of the study. Metolachlor [2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl) acetamide] and atrazine [6-chloro-*N*-ethyl-*N*′-(1-methylethyl)-1,3,5-triazine-2,4-diamine] were coapplied as a surface broadcast spray. Herbicide runoff was monitored from a month before application through harvest. A flux gradient technique was used to compute volatilization fluxes for the first 5 d after application using herbicide concentration profiles and turbulent fluxes of heat and water vapor as determined from eddy covariance measurements. Results demonstrated that volatilization losses for these two herbicides were significantly greater than runoff losses ($P < 0.007$), even though both have relatively low vapor pressures. The largest annual runoff loss for metolachlor never exceeded 2.5%, whereas atrazine runoff never exceeded 3% of that applied. On the other hand, herbicide cumulative volatilization losses after 5 d ranged from about 5 to 63% of that applied for metolachlor and about 2 to 12% of that applied for atrazine. Additionally, daytime herbicide volatilization losses were significantly greater than nighttime vapor losses ($P < 0.05$). This research confirmed that vapor losses for some commonly used herbicides frequently exceeds runoff losses and herbicide vapor losses on the same site and with the same management practices can vary significantly year to year depending on local environmental conditions.

Herbicides play an important role in maintaining worldwide food and fiber production by controlling weeds that compete for water and nutrients. Although the use of pesticides in the United States has increased from 38 million kg of active ingredient in 1964 to 221 million kg of active ingredient in 1979, the total mass of herbicide used in the United States has remained steady since 1979 (Aspelin, 1994; USGS, 2002). Atrazine and metolachlor are two of the most widely used herbicides in agriculture with more than 30 million kg (a.i.) of metolachlor and 33 million kg (a.i.) of atrazine being applied to U.S. crops in 2002 alone (USGS, 2002). The USEPA (2008) classified both atrazine and metolachlor as nonvolatile and identified their major off-site transport mechanism as surface runoff. However, field monitoring of herbicide fluxes from all possible off-site loss pathways is essentially nonexistent. Environmental monitoring of herbicides is complex because they are not chemically conservative and can be adsorbed to soil particles and/or exist in the liquid and vapor phases (Majewski and Capel, 1995). The distribution of a pesticide among the sorbed, liquid, and gaseous states is a function of its physiochemical properties, the soil's biological/physiochemical properties, and climatic variables, which, in turn, govern the pesticide's environmental dispersal (Symons, 1977; Jury et al., 1983; Taylor and Spencer, 1990; Tsal and Cohen, 1991; Majewski and Capel, 1995; Cousins et al., 1999; Prueger et al., 2005; Gish et al., 2009). To maintain productive and sustainable agricultural systems, there is a need to understand field-scale processes governing herbicide use and off-site movement.

Herbicide field studies where all off-site transport mechanisms are monitored are rare, although specific aspects of pesticide movement have been rigorously studied. The three major off-site transport mechanisms for herbicides are surface runoff, leaching, and volatilization into the atmosphere. Among these transport mechanisms, herbicide runoff has been the most intensively studied and is generally <3% of that applied (Wauchope, 1978; Baker, 1980; Hall et al., 1983; Felsot et al., 1990; Haith and

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Abbreviations: EST, Eastern Standard Time; OPE3, Optimizing Production Inputs for Economic and Environmental Enhancement site; PUF, polyurethane foam.

Rossi, 2003; Domagalski et al., 2008). Herbicide leaching has also been intensively studied, but tile drain studies suggest that that herbicide runoff is more detrimental to the environment than herbicide leaching (LaFleur et al., 1975; Muir and Baker, 1976; Ng et al., 1995). Unfortunately, field-scale pesticide leaching losses in non–tile-drained fields is difficult to quantify since heterogeneity and preferential flow creates uncertainty in flux estimates (Koplin et al., 1998; Jarvis, 2002; Elliott et al., 2000; Malone et al., 2004a; Malone et al., 2004b; Kodesova et al., 2008). Of the three major off-site transport mechanisms, herbicide volatilization is studied the least, even though typical losses from crop production fields range from 2 to 25% of that applied (Grover et al., 1988; Glotfelty and Schomburg 1989; Wienhold and Gish, 1994; Prueger et al., 1999; Rice et al., 2002; Prueger et al., 2005). Once in the atmosphere, herbicides can be degraded or deposited in nontargeted areas via wet or dry deposition (Bidleman and Christensen, 1979; Bidleman, 1988; Burrows et al., 2002). Frequently, a portion of the applied herbicide that has volatilized into the atmosphere is transported and subsequently deposited in streams, rivers, and lakes (McConnell et al., 1998; Alegria and Shaw, 1999; Thurman and Cromwell, 2000; Kuang et al., 2003). As a result, there is a need to simultaneously quantify herbicide losses from the major off-site transport pathways at the field scale so environmental risks can be more accurately formulated.

Herbicide surface runoff is a concern in many watersheds because intensive agriculture may be adjacent to sensitive ecosystems (Capel et al., 2008). Typical runoff losses for most herbicides are <1 to 2% of that applied (Wauchope, 1978; Baker, 1980). In rare situations, such as when a major rainfall event follows the application of a wettable powder formulation on a sloped field, as much as 15% of the pesticide applied can be lost through runoff (Baker, 1980; Haith and Rossi, 2003). Additionally, the herbicide application rate, water solubility, formulation, management practices, and landscape features are also important factors influencing herbicide runoff (Caro, 1976; Wauchope, 1978; Hall et al., 1983; Felsot et al., 1990; Domagalski et al., 2008). Regardless of the pesticide mass lost from runoff, detrimental impacts decrease with increasing distance from the application site due to dilution from other runoff sites, streams, rivers, and lakes.

Herbicide volatilization occurs in two steps—evaporation from soil and plant material, followed by dispersion into the atmosphere by diffusion and turbulent mixing (Taylor, 1995; Prueger et al., 2005). Because herbicide volatilization is complex, several methods have been developed to obtain estimates of pesticide volatilization at the field scale. Parmele et al. (1972) developed an aerodynamic method based on gradients of wind speed, temperature, and pesticide concentrations collected over a uniform area. Denmead et al. (1977) developed an integrated horizontal flux approach that uses pesticide concentration and horizontal wind speed profiles. For certain conditions, a theoretical profile shape method, which measures wind speed and pesticide concentration at a single height above the soil, may be useful (Wilson et al., 1982). Recently, wind, temperature, water, and herbicide profile data have been used to calculate eddy diffusivities of water, temperature, and momentum, which were subsequently used to calculate herbicide volatilization fluxes where turbulent flow conditions may exist (Prueger et al., 2005, Gish et al., 2009). The benefit of this latter approach is that atmospheric stability and nighttime pesticide vapor losses can be monitored.

The objective of this study was to conduct a long-term investigation where field-scale herbicide runoff and volatilization losses were simultaneously determined. This 8-yr investigation: (i) lends insight into the relevance and variability of off-site transport mechanisms under variable field conditions, (ii) determines the impact of local field conditions on the off-site transport mechanisms, and (iii) determines the impact of daytime and nighttime conditions on herbicide volatilization.

Materials and Method

Site Description and Pesticide Application

The research site is a 21-ha agricultural production farm located at the USDA, Henry A. Wallace Beltsville Agricultural Research Center, in Beltsville, MD (near lat. 39° 01′44″, long. 76° 50′46.1″). A variety of data, including general soil properties, crop parameters, and geophysical, meteorological, and remotely sensed data are acquired annually on this site, which is called Optimizing Production Inputs for Economic and Environmental Enhancement site (OPE3). One of the principal objectives of OPE3 is to determine field- and catchment-scale fluxes of agricultural inputs. The site contains four fields, which range from 3.6 to 4.2 ha, each draining into a first-order stream and riparian wetland, and each delimited with earthen berms (Fig. 1). The soils are variable but sandy, with the majority being typic hapludults, coarse-loamy, siliceous, mesic. The surface soil textures range from sandy loam to loamy sand, have an average organic matter content of <3%, and are well drained. Additionally, the 7 ha surrounding the eddy covariance meteorological station (fields 1 and 2) is relatively flat with 80% of the surface having slopes <2%. Tillage, crop, residue management, and pesticide formulations and application rates are the same for the entire 21-ha research site.

Surface and Energy Balance/ Meteorological Instrumentation

Surface energy balance and eddy covariance instrumentation were mounted on a 10-m tower and used to measure net radiation, soil heat flux, and sensible and latent heat flux densities. Net radiation and soil heat flux were measured with a CNR–1 net radiometer (Kipp & Zonen, Inc., Bohemia, NY) and 3 HFT–1 soil heat flux plates (Radiation Energy Balance Systems, Inc. Seattle, WA), respectively. The CNR–1 was positioned 4 m above the soil surface. Six soil heat flux plates were buried at 0.08 m below the soil surface, all within 3 m of the meteorological tower. Above each soil heat flux plate are two Type–T (copper–constantan) soil thermocouples buried at 0.02 and 0.06 m. Soil temperature data were used to compute the storage component of the above-the-soil heat flux plates. A 3-D sonic anemometer (Campbell Scientific, Inc., Logan, UT) and L17500 infrared hygrometer (LICOR, Inc., Lincoln, NE) measured sensible and latent heat fluxes as the covariance of the vertical wind velocity with air temperature and water vapor density. Soil surface temperatures were monitored using precision infrared thermocouple sensors (Model IRTS–P, Apogee Instruments, Logan,

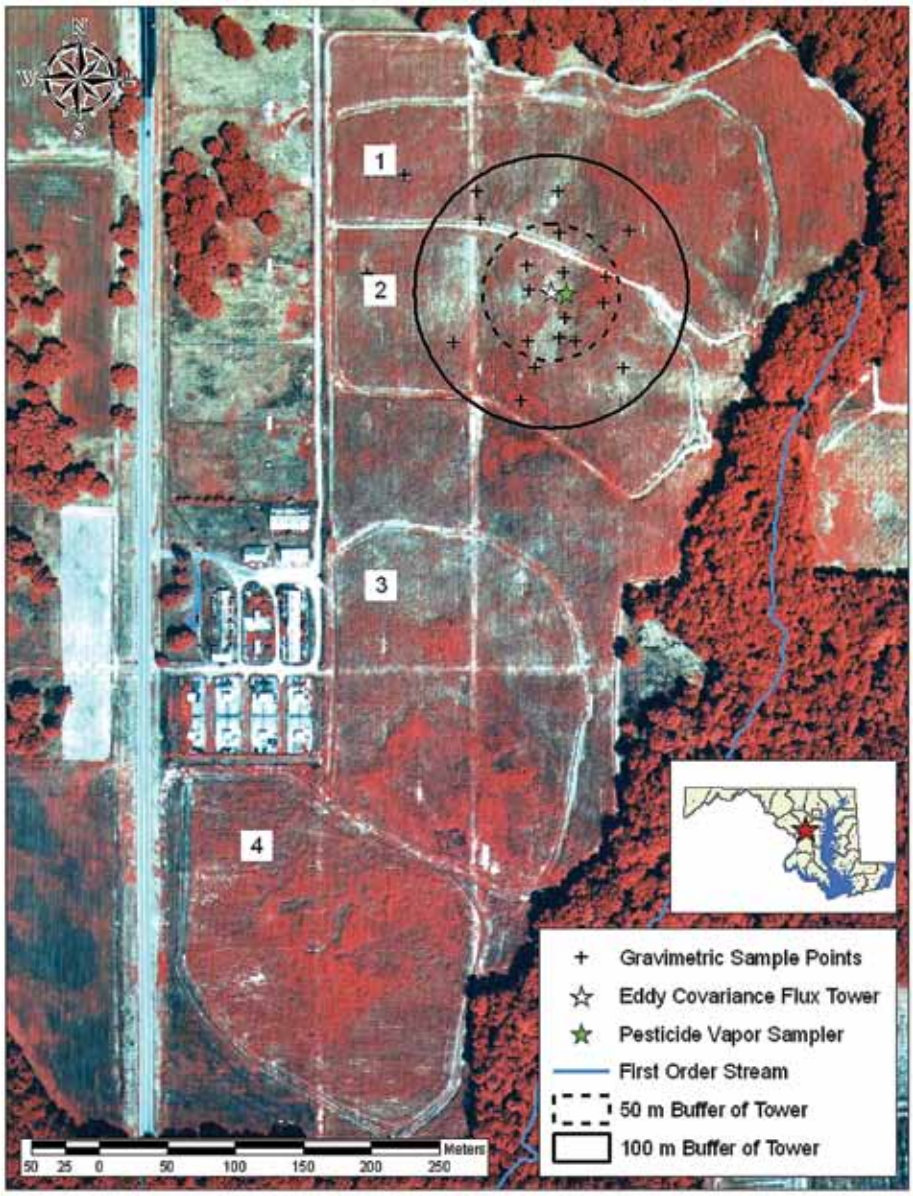

Fig. 1. Optimizing Production Inputs for Economic and Environmental Enhancement field site (OPE3), showing location of eddy covariance meteorological station and early morning soil sampling locations for a representative year. Numbers denote individual fields. The dotted circle represents a distance of 50 m from the eddy covariance meteorological station, whereas the solid circle represents a distance of 100 m.

UT). Standard local surface meteorological instrumentation was mounted on the tower to measure mean wind speed and direction, relative humidity, and precipitation. Data from the standard meteorological instruments were stored as 30-min averages. Additionally, the sampling frequency was 20 Hz for the eddy covariance and 10 s for the energy balance system.

Herbicides Application and Detection

Herbicides were coapplied as a surface broadcast spray onto a tilled, bare soil surface. Timing of planting and herbicide applications (Table 1) varied across years as a function of local precipitation patterns and technical and/or logistical problems that are typically encountered with any planting operation. With the exception of 2003, herbicides were applied within 2 d after the corn was planted. In 2003, the spring was unusually wet and planting was delayed until early July and herbicides were subsequently applied a week later. In all cases, atrazine was applied at 1.13 kg ha^{-1}, whereas metolachlor was applied at 1.51 kg ha^{-1} as S–metolachlor over the entire 21-ha site. Each year the herbicide mass applied was achieved by using two herbicide formulations (Table 2).

Surface runoff was monitored with a 46-cm H–flume, flow meter bubbler, and sampler (Isco, Lincoln, NE). Flumes were calibrated by collecting runoff volumes at various runoff rates and using these data to correct the factory calibration. Sampling frequency was based on water flow. One runoff sample was generally collected for every 1200 L of surface runoff and subsequently refrigerated at 5°C until they could be analyzed. Runoff samples were typically stored less than 24 h before being quantitatively analyzed. Observed herbicide runoff concentrations and surface water fluxes were combined to generate daily herbicide runoff fluxes. Surface runoff was monitored at least 1 mo before planting and pesticide application. Monitoring continued until harvest when runoff samplers were turned off due to freezing conditions.

The vapor flux gradient technique links atmospheric vertical profile concentrations of metolachlor and atrazine with a pesticide eddy diffusivity term computed from turbulent fluxes of momentum, heat, and water vapor to compute pesticide fluxes (Baldocchi et al., 1988; Verma, 1990). The metolachlor and atrazine volatilization fluxes are computed as the product of a mean vertical pesticide concentration gradient and a turbulent–transport coefficient. Using the flux gradient approach for pesticide flux estimates is based on extending the assumption that transport similarity exists for pesticide vapor as it does for scalar and mass properties of momentum, sensible heat, and water vapor. This is reasonable since only the vapor phase of the pesticide above the soil matrix is of interest here. A more detailed discussion of this approach is found in Taylor (1995) and Prueger et al. (2005).

Atrazine and metolachlor vapor sampling began approximately 30 min after application and continued every 2 h for the first 120 h (5 d) after application. Each sampling mast had four glass canisters (0.0254 m i.d. by 0.15 m), each at a different height—0.3, 0.6, 1.2, and 1.95 m above the soil surface. The glass canisters were tapered at one end to a stem of 0.0085 m diameter and were connected with Tygon tubing to a high volume air vacuum pump (Model TFIA, Staplex, Inc., Brooklyn, NY) calibrated to a flow rate of approximately 50 L min^{-1} through each sampling canister. The individual canisters

were also wrapped with aluminum reflective tape to prevent photodegradation of the samples. Each glass canister initially contained two polyurethane foam (PUF) plugs (0.0254 m diam. by 0.075 m length) that were precleaned using separate ethyl acetate washes and allowed to air dry. After precleaning, 20 PUF plugs were randomly selected and analyzed as blanks. No interfering peaks were observed above our detection limits. In the canister, the first PUF plug served as the primary metolachlor and atrazine vapor trap, whereas the second inline PUF plug was analyzed to determine if any pesticide got past the primary PUF. Analysis of the second PUF supports Prueger et al. (2005) who found essentially no metolachlor on the second PUF >24 h after herbicides had been applied. As a result, after 48 h, each glass canister contained just one PUF plug. Airflow rates through the PUF canisters at each height were measured and recorded at the beginning and end of each sampling interval. After each sampling period, the PUF plugs were placed in glass containers, secured with Teflon-lined lids, and stored in a freezer at –20°C.

All soil water and air samples were quantitatively analyzed for atrazine and metolachlor using a Hewlett–Packard 5890 Series II (replaced with a 6890 in 2006) GC equipped with a nitrogen–phosphorus detector. All PUF plugs were individually extracted with ethyl acetate for 4 h using a Soxhlet technique. Blank and fortification recovery controls were also included in sample extraction batches to determine extraction efficiency (96% ± 9, n = 88) and to detect contamination from laboratory procedures (all blanks were free of interfering peaks). Two sets of soil samples were collected at 4:30 a.m. Eastern Standard Time (EST), one for herbicide surface soil concentrations and the other for surface soil moisture. The soil surface samples were collected from 20 predetermined 1 m^2 locations within fields (Fig. 1). Each soil can (38.5 cm^2 area and 5 cm deep) used for herbicide analysis was refrigerated at –20°C until samples could be analyzed (generally <1 yr). After thawing, soil samples were extracted with 4:1 methanol/water. Then, the methanol was rotary evaporated. Runoff water samples were filtered through glass microfiber filters. Soil extracts and runoff water samples were then loaded onto prepared C18 Sep–Pak solid phase extraction cartridges (Waters Corporation, Milford, MA). Each C–18 cartridge was treated beforehand with 2 mL ethyl acetate, 2 mL methanol, and 10 mL deionized water. Herbicides in the soil and water extracts were eluded off the C–18 cartridges with ethyl acetate to which trifluralin was added as an internal standard. Metabolites of atrazine and metolachlor were analyzed but are not reported because of their low concentrations and sporadic detection. The limit of detection for both herbicides was 5 ng m^{-3}.

Soil Moisture

Surface soil moisture observations consisted of gravimetric samples (38.5 cm^2 area and 5 cm deep) collected during pesticide application and subsequently at 4:30 a.m. EST. These samples were taken within 150 m of the meteorological station and were used to monitor shallow soil water conditions that were most likely to be in equilibrium with the soil surface. A stratified random design was used each year to select the 20 sampling locations. Fifty percent of these soil moisture monitoring sites (10 locations) were randomly selected within 50 m of the eddy covariance meteorological station, whereas 40% of the sites (eight locations) were randomly selected from 50 to 100 m away, and finally 10% (two locations) were located >100 m from the meteorological station but within the field boundaries. These soil water content observations were subsequently combined to determine an average soil moisture value.

Results and Discussion

Variability in Field Conditions

The timing of precipitation events relative to herbicide application can dramatically influence both runoff and volatilization. As a result, all precipitation starting a week before herbicide application and 40 d after is shown in Fig. 2. Over the 8-yr period, there was a wide range in precipitation patterns. For example, rainfall occurred a few days before herbicide application for 2000 through 2004, whereas no meaningful precipitation occurred the week before application for 2005 through 2007. Additionally, during 2001 several rainfall events occurred shortly after application, whereas for other years, like 2007, no significant rainfall occurred within 25 d after herbicide application. Rainfall shortly before application increases the likelihood of enhanced herbicide volatilization and herbicide surface runoff (Goodrich et al., 1994; Gish et al., 2009). As a result, the precipitation patterns alone would suggest low herbicide volatilization losses and minimal surface runoff losses in years 2005 through

Table 1. Atrazine and metolachlor application dates and runoff losses.

Year	Application date	No. of runoff events†	Runoff losses (percentage of applied)	
			Atrazine	Metolachlor
2000	13 June	8	0.04	0.03
2001	20 June	8	2.94	2.45
2002	24 April	9	<0.01	<0.01
2003	14 July	5	0.91	0.42
2004	21 May	3	<0.01	<0.01
2005	10 May	4	0.18	0.11
2006	3 May	4	0.06	0.06
2007	8 May	0‡	Likely <0.01	Likely <0.01

† No. of runoff events during the first 5 mo after herbicide application.

‡ Herbicide runoff was monitored for only the first month after application. During this time no runoff was observed.

Table 2. Herbicide application rates and physiochemical characteristics.†

Herbicide characteristic	Atrazine	Metolachlor
Water solubility (at 20°C)	30 mg L^{-1}	530 mg L^{-1}
Vapor pressure (at 20°C)	0.04 mPa	1.7 mPa
Soil half-life	60 to 100 d	15 to 70 d
Mobility	Moderately mobile	Moderately mobile
Formulations	Dual II Magnum Bicep II Magnum	
Application rate	1.13 kg ha^{-1}	1.51 kg ha^{-1}

† Gianessi and Marcelli (2000) and USEPA (2008).

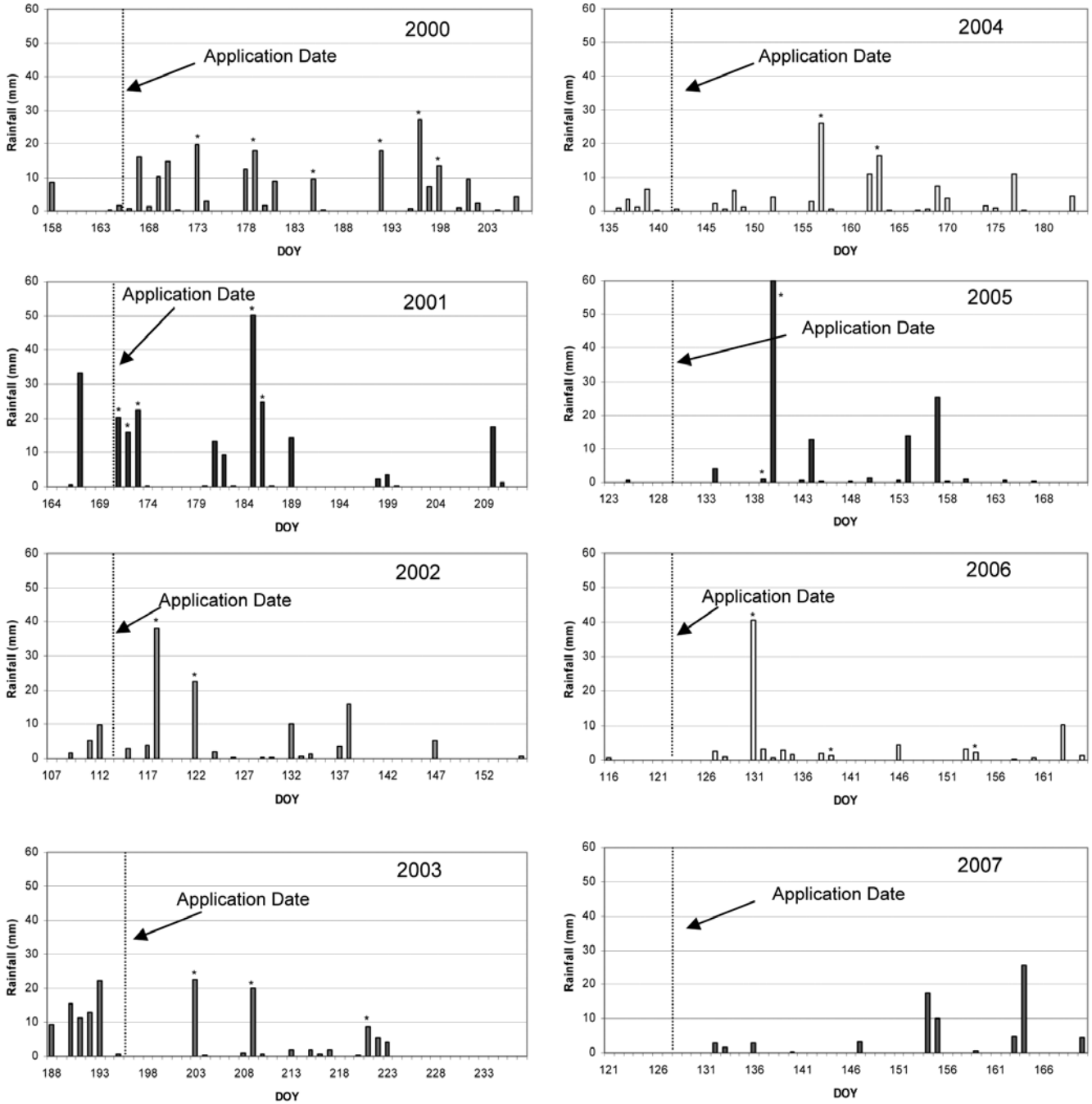

Fig. 2. Precipitation 1 wk before and 40 d after pesticide application. Asterisks denote precipitation events that generated surface runoff.

2007. On the other hand, with rain occurring on 5 of the 7 d before application in 2003, the moist soils would tend to favor enhanced herbicide volatilization (Prueger et al., 2005).

Surface soil moisture at the time of application is critical to herbicide volatilization since moisture influences herbicide volatilization flux rates (Prueger et al., 2005; Gish et al., 2009). Daily surface gravimetric soil water contents for the top 5 cm are shown in Table 3. Soil moisture at the time herbicides were applied, T_o, were highest for 2003, followed by 2001 and 2004. On the other hand, T_o surface soil water contents were the lowest for years 2006 and 2007. The years 2000, 2002, and 2005 had intermediate surface soil moisture values relative to the other 5 yr. Although T_o of 2003 was the wettest, no significant rain fell that year until the volatilization study was terminated. In 2001, it rained the evening herbicides were applied and each night thereafter for two additional nights. During 2004, there was a slight rain event the evening after application, but it did not rain again until the volatilization study was terminated. During 2006 and 2007, no rain fell until 5 d after herbicide application. As a result, during the 8-yr study a wide range of surface moisture conditions were encountered.

The 2003 growing season was atypical and will generally be discussed separately from the other 7 yr. During 2003, it rained several times each week from mid-April through early July, which delayed planting and pesticide applications. Since the corn had been planted a week earlier, herbicides had to

Table 3. Daily surface soil water contents for the top 5 cm of soil.†

Year	Gravimetric soil water content (SD)					
	Hours after herbicide application					
	T_o	≈20	≈44	≈68	≈92	≈116
	kg water kg soil^{-1}					
2000	0.16 (0.02)	0.15 (0.03)	0.15 (0.02)	0.23 (0.03)	0.19 (0.03)	0.22 (0.03)
2001	0.19 (0.06)	0.24 (0.03)	0.25 (0.05)	0.27 (0.07)	0.24 (0.06)	0.21 (0.05)
2002	0.15 (0.02)	NS‡	0.15 (0.02)	0.13 (0.02)	NS	0.21 (0.04)
2003	0.23 (0.07)	0.21 (0.07)	0.19 (0.07)	0.18 (0.07)	0.17 (0.07)	0.18 (0.08)
2004	0.18 (0.03)	0.18 (0.04)	0.15 (0.03)	0.14 (0.04)	0.13 (0.04)	0.17 (0.03)
2005	0.13 (0.04)	0.13 (0.04)	0.13 (0.04)	0.12 (0.05)	0.14 (0.05)	0.19 (0.03)
2006	0.11 (0.02)	0.10 (0.03)	0.10 (0.03)	0.10 (0.03)	0.09 (0.03)	0.14 (0.02)
2007	0.08 (0.04)	0.07 (0.04)	0.07 (0.04)	0.06 (0.04)	0.06 (0.05)	0.15 (0.03)

† Gravimetric surface soil water contents collected at time of herbicide application and subsequently every day at 4:30 a.m. (Eastern Standard Time).

‡ No soil moisture samples taken due to poor weather conditions (thunderstorms).

be sprayed to kill emerging weeds before the corn grew much higher. This delay in herbicide application was not a typical agronomic practice but was due to the frequent rainfalls. At the time herbicides were applied in 2003, parts of the OPE3 field site (located >100 m from the flux towers) were saturated (ponded). Much of the remaining surface area at the time of herbicide application was near saturation, which made obtaining accurate gravimetric samples with cans nearly impossible. Air trapped in the soil sampling cans (when inverted) would likely force some of the water out of the soil so that at least the T_o soil water contents in 2003 are underestimated. The likelihood of some soil water sampling loss in 2003 is supported by surface water contents observed in 2001 (after T_o). During 2001, the second through fourth days after application showed higher soil water contents than during T_o of 2003, even though no saturated conditions were observed anywhere on site during 2001. As a result, 2003 may represent a worst-case scenario for herbicide vapor behavior as soils were near saturation and the delayed planting resulted in spraying when energy inputs and temperatures were high.

Herbicide Runoff

Herbicide losses through runoff are thought to be the greatest off-site transport mechanism for atrazine and metolachlor because both are moderately mobile, moderately persistent, and have low vapor pressures (Lyman et al., 1990; Gianessi and Marcelli, 2000; USEPA, 2008). Herbicide concentrations in the surface runoff over the 8-yr period are shown in Fig. 3. Maximum runoff concentrations for both herbicides occurred in 2001, when runoff occurred within the first day after application and then decreased exponentially with time. For years 2002, 2004, and 2007, the maximum runoff concentration never exceeded <10 μg L^{-1} for any herbicide runoff event. Thus, these years were excluded from Fig. 3. Although quantifiable herbicide runoff losses were observed in 2000, 2003, 2005, and 2006, no significant concentrations in runoff were observed ≥30 d after application. Surprisingly, a significant rainfall event occurred during 2002 within a week of application, but surface runoff concentrations never exceeded 5 μg L^{-1} for either herbicide for any runoff sample. Although the herbicides were applied in April in 2002 when surface soil temperatures were cold (2°C), the reasons for the low runoff losses are not known. During the wettest year, 2001, runoff losses of atrazine exceeded 2.9% of that applied, whereas metolachlor runoff losses were 2.5% (Table 1). Wauchope (1978) and Shipitalo and Owens (2006) also observed that herbicide runoff was the greatest when

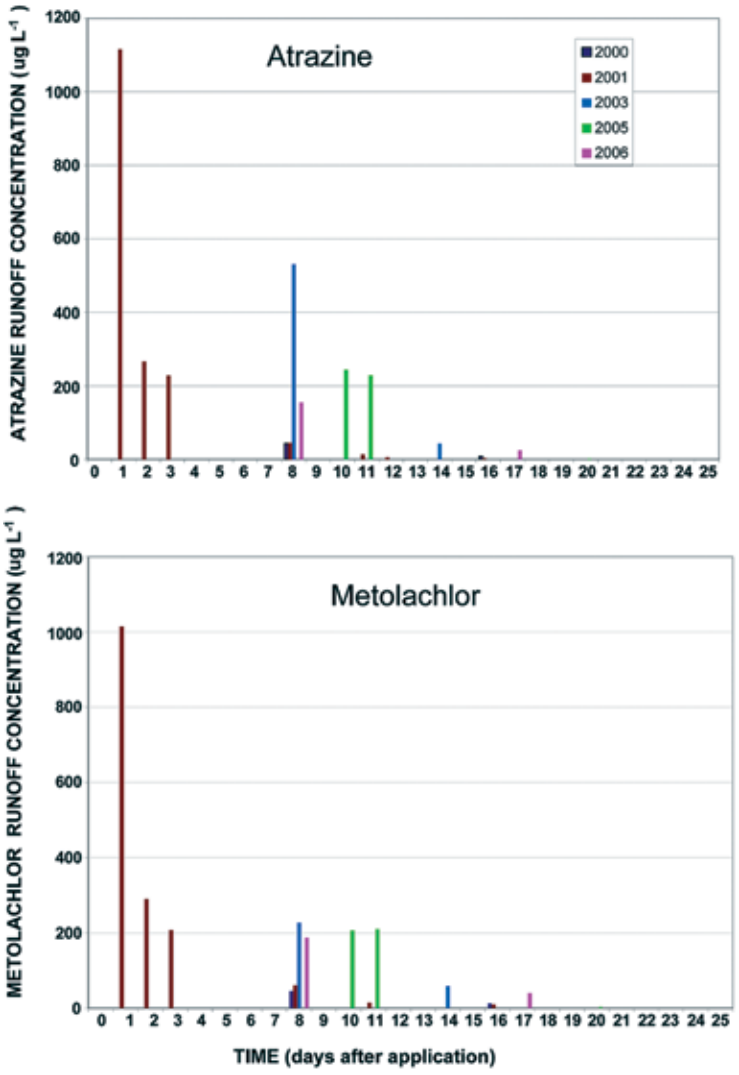

Fig. 3. Multiyear herbicide surface runoff. Runoff for years 2002, 2004, and 2007 are not shown, as the maximum herbicide runoff concentration for each of these 3 yr was <10 μg L^{-1}.

rain events occurred closest to application. However, due to the general lack of significant rainfall shortly after application on this site, herbicide runoff losses for 5 of the 8 yr were much less than 1% of that applied for either herbicide. No herbicide runoff was measured throughout all of 2007, likely because no water runoff occurred the first month after application (system was operating for the first month after application of 2007). Because this site has low organic matter content (<3%), adsorption is expected to be minimal, increasing potential runoff (Caro, 1976; Spark and Swift, 2002). Additionally, when organic matter contents are low the clay mineral content becomes the dominant adsorption factor (Laird et al., 1992; Jenks et al., 1998), but this surface soil has a low clay content <10%.

Out of the 8 yr, only 5 generated significant herbicide runoff. An 8-yr average herbicide runoff concentration with days after application revealed an exponential decreasing function with coefficients of determination of 0.73 for atrazine and 0.78 for metolachlor. The 8-yr exponential fit also suggests that, in general, herbicide runoff concentrations 2 wk after application would be <8 μg L^{-1} for atrazine and <12 μg L^{-1} for metolachlor. With the first meaningful precipitation events occurring well after 2 wk during 2004 and 2006, it is not surprising that these years generated negligible herbicide runoff. Furthermore, if each year is considered a replicate, significant differences between atrazine and metolachlor can be evaluated. Although atrazine and metolachlor have different water solubilities, there was no significant difference in herbicide runoff losses ($P > 0.05$). In general, the low herbicide runoff fluxes observed on this site are likely due to the low slope (generally <2%) because herbicide runoff generally increases with surface slope (Hall et al., 1983; Felsot et al., 1990). Wauchope (1978) reported that herbicide runoff from a 3% slope can be as high as 2% of that applied, whereas slopes of 10 to 15% may result in herbicide runoff losses >5% of that applied. As a result, the low observed herbicide runoff values are probably due to little rainfall within the first 2 wk after application, low surface slopes, and perhaps the sandy, well-drained characteristics of the research site.

Herbicide Soil Surface Residues

Herbicide soil recoveries in the top 5 cm for each sampling time varied over the 8 yr. The least amount of variability occurred at the time of application, where T_0 atrazine mean recoveries for the 8 yr were 76% of the anticipated application rate with a standard deviation of 37%, whereas the 8-yr mean metolachlor T_0 recoveries were 72% ± 35%. Subsequent variability in spatial herbicide soil residue concentrations during the early morning (4:30 a.m. EST) sampling were also high for periods T_1, T_2, T_3, T_4, and T_5, where atrazine coefficients of variation were 67, 86, 63, 64, and 57%, respectively. Metolachlor soil residue spatial variability was similar to atrazine with coefficients of variation ranging from 45 to 60% for the same time periods.

Each year, atrazine and metolachlor average soil residue mass decreased exponentially with time. Although herbicide spatial variability is high in these soil samples, soil moisture appears to influence herbicide dissipation in the top 5 cm of soil (Fig. 4). Although 2001 and 2005 did not experience extreme moisture conditions, they are representative of moist and dry years, respectively (Table 3). For both atrazine and metolachlor, the moist year (2001) shows the largest loss occurring within the first 24 h after application. As a result, the enhanced recovery of both herbicides in dry soil is generally in response to reduced volatilization (Glotfelty et al., 1984, Prueger et al., 2005), although some runoff also occurred during 2001.

Herbicide Volatilization

Although many studies do not monitor nighttime herbicide vapor losses, the use of eddy covariance data allows nighttime losses to be accurately determined. However, herbicide volatilization was monitored for only 5 d and many of the cumulative volatilization curves in Fig. 5 through Fig. 7 indicate that volatilization losses would have likely continued past 5 d, so these vapor flux losses are conservative estimates. Over the 8 yr, there is considerable variability in cumulative herbicide volatilization losses. For soil conditions typical of agronomic crop production (excluding 2003), cumulative metolachlor volatilization ranged from 6 to >23% of that applied (Fig. 5), with a 7-yr average vapor loss of 9.5% of that applied and a CV of 80%. Atrazine cumulative volatilization losses

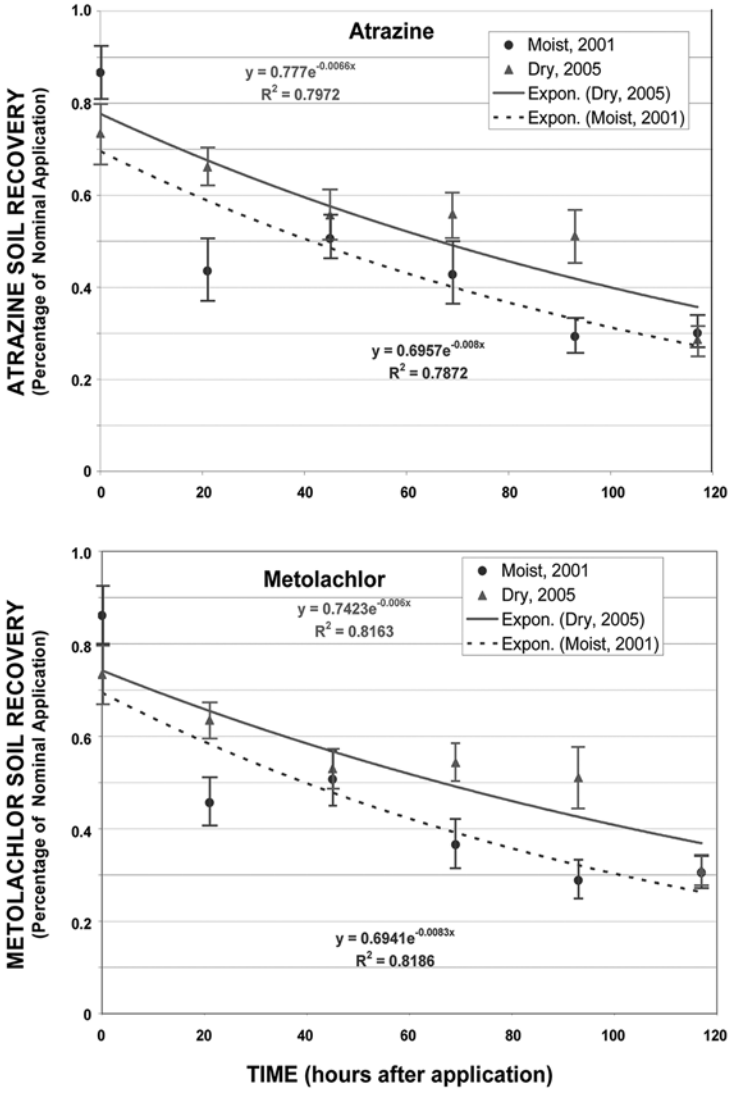

Fig. 4. Soil dissipation of metolachlor and atrazine as a function of time. Error bars denote ± 1 standard error of the mean.

were much lower, ranging from <2 to 6% of that applied (Fig. 6), with a 7-yr mean of 4% of that applied and a CV of 40%. The magnitude of metolachlor volatilization corresponded well with surface soil moisture conditions, with 2001 having the greatest losses followed by 2004. For the driest soil conditions, 2006 and 2007, metolachlor volatilization was minimal, ranging from 6 to 7% of that applied. Cumulative atrazine volatilization losses were similar to metolachlor, with the highest vapor losses occurring during wet years (2004 and 2001). However, the lowest atrazine losses occurred in 2002 when <2% of that applied was lost after 5 d. The low atrazine losses in 2002 may have been due to low temperatures because spraying occurred in April of that year. For the driest years, 2006 and 2007, atrazine volatilization ranged from 3 to 4% of that applied. Using an exponential fit, the coefficients of determination for herbicide volatilization with the T_0 surface soil moisture content were 0.80 and 0.94 for atrazine and metolachlor, respectively. As a result, for typical Maryland agronomic conditions, soil moisture has a critical impact on cumulative metolachlor vapor losses as they frequently exceed 15% of that applied. On the other hand, for identical soil and meteorological conditions, atrazine was less influenced by soil moisture.

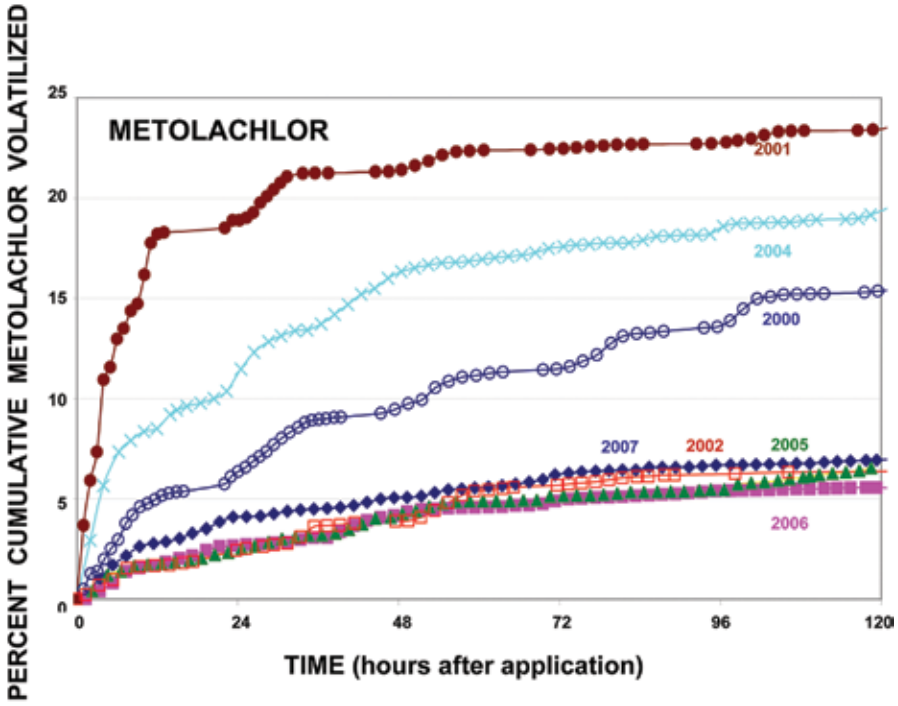

Fig. 5. Cumulative field-scale metolachlor volatilization losses (expressed as percent applied) as a function of time. Each year shown reveals atrazine volatilization losses from field conditions common to crop production activities.

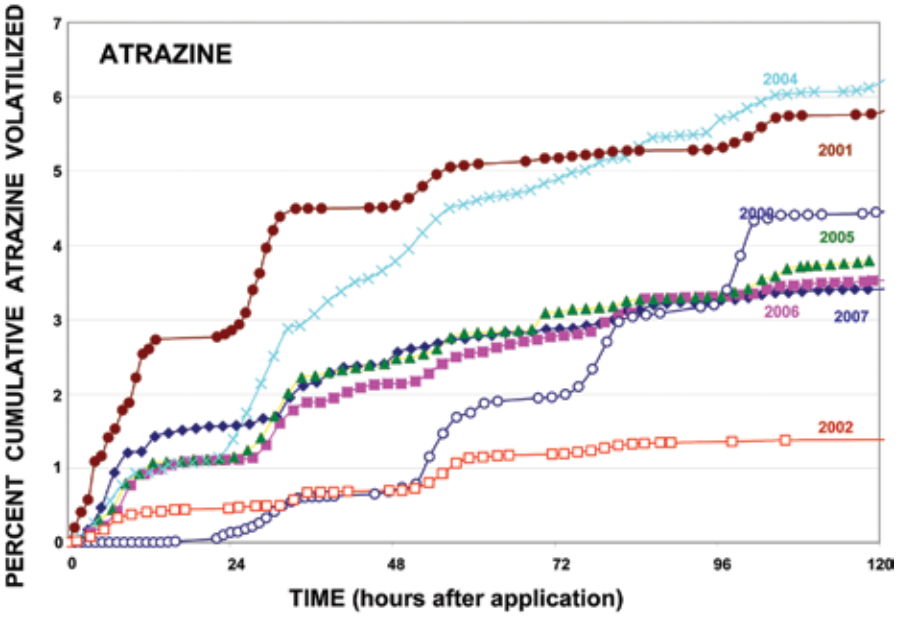

Fig. 6. Cumulative field-scale atrazine volatilization losses (expressed as percent applied) as a function of time after application. Each year shown reveals atrazine volatilization losses from field conditions common to crop production activities.

Herbicide vapor losses were always much greater than those observed in surface runoff. Over the 8-yr period, metolachlor volatilization losses were 10 to >150 times larger than metolachlor runoff losses. Similarly, atrazine volatilization losses were 2 to >130 times larger than those observed in surface runoff. The greatest difference between volatilization and runoff losses occurred when runoff was negligible. Small rain events after herbicide application may not generate runoff but can significantly influence herbicide volatilization (Prueger et al., 2005; Gish et al., 2009). When each year is considered a replicate, herbicide volatilization losses were significantly greater than runoff losses (P = 0.007). Averaged over years, herbicide loss by volatilization dominated surface runoff by a factor of 9 for atrazine and 45 for metolachlor (Table 4). As a result, although rarely monitored, metolachlor and atrazine volatilization is a critical off-site transport mechanism for these two common herbicides.

The impact of surface soil moisture on herbicide volatilization may be primarily due to its influence on the herbicide vapor pressure. As the vapor pressure increases, the herbicide increasingly favors the vapor phase and is more readily volatilized. In the field, an "effective" herbicide vapor pressure is likely to be lower than the vapor pressure of the "pure" chemical due to interactions with the soil surface. For example, early studies detected a significant positive correlation between herbicide vapor pressure and herbicide volatilization (Farmer et al., 1972; Glotfelty et al., 1984). Later, it was observed that dry soil conditions favored soil adsorption, which reduced the vapor pressure of the herbicide and decreased herbicide volatilization (Spencer et al., 1969; Spencer and Cliath, 1974; Taylor and Spencer, 1990). Spencer and Cliath (1974) also measured the herbicide vapor

pressures in soil at various soil water contents and demonstrated greater volatilization losses from wet soils than dry soils. And last, Glotfelty et al. (1984) and Gish et al. (2009) demonstrated that herbicide vapor losses increased more with increasing soil water content than with increasing organic matter.

During 2003, it rained at least weekly from early April through early July. Although most of the field site is well drained, the site was very wet in 2003—nearing saturation. Thus, special tractor tire modifications were required to avoid getting stuck during herbicide application. Additionally, during 2003, the herbicides were applied in the summer (14 July) when energy inputs were high. Although recent studies have shown an increase in herbicide volatilization with increasing surface soil moisture (Prueger et al., 2005), these results may be a worst-case scenario (Fig. 7). After 5 d, volatilization was 62% of the applied metolachlor and 12% of the applied atrazine. Results from the 4:30 a.m. soil samples taken at 5 d after herbicide application also support the vapor flux data in that 65% of the applied metolachlor and 29% of the applied atrazine had dissipated from the top 5 cm of soil. As a result, although both herbicides are considered nonvolatile, 95% of the metolachlor lost after 5 d had done so through volatilization compared to 41% for atrazine.

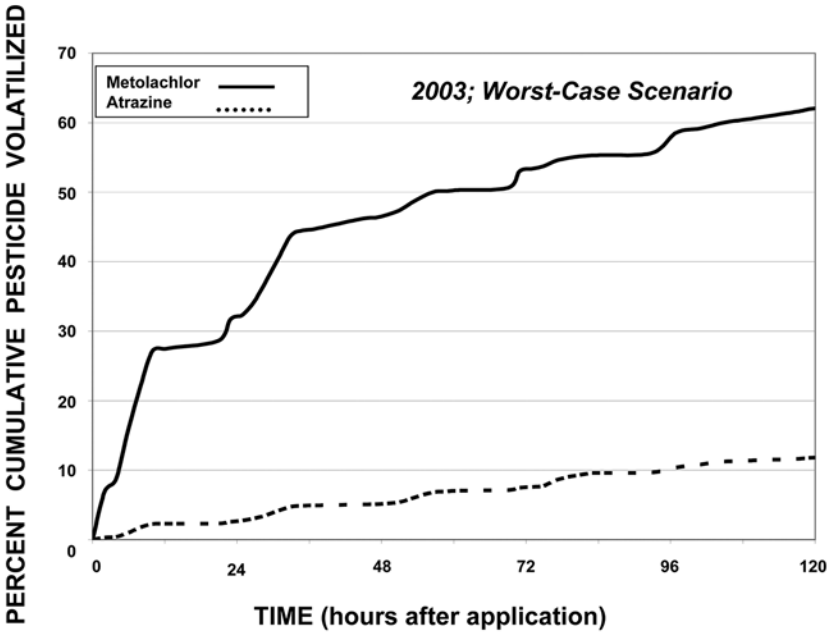

Fig. 7. Field-scale metolachlor and atrazine volatilization losses where soil water contents are approaching saturation in some locations.

Table 4. Herbicide and off-site transport mechanism comparison.

	Atrazine (%)†	Metolachlor (%)†	Pooled over herbicide
Runoff	0.52	0.39	0.47
Volatilization	5.04	18.23	11.64
Pooled over off-site transport mechanism	2.79	9.31	

† Eight-year average herbicide values represented as percentage of applied.

Cumulative metolachlor and atrazine losses for all 8 yr are shown in Table 5. Since 2003 was an atypical year, it was initially excluded from the calculated averages and estimates of variability. However, if included, the 8-yr average atrazine vapor loss would be 5% of that applied with a CV of 62%, whereas the 8-yr metolachlor average would be 16% of that applied and exhibiting a CV of 125%. Differences in mean losses and variability are likely due to metolachlor's greater water solubility and higher vapor pressure relative to atrazine (Table 2). As reported by Prueger et al. (2005), metolachlor volatilization was highly variable even though organic matter, soil texture, herbicide formulation, and agricultural management practices were unchanged throughout the 8 yr. Atrazine volatilization, on the other hand, was much less variable and appears to be influenced less by soil moisture, perhaps due to its lower water solubility.

Eddy covariance flux data allow nighttime vapor losses to be monitored, allowing a comparison of daytime and nighttime losses (Fig. 8 and 9). Average daytime metolachlor vapor losses (excluding 2003) were 9% of that applied but exhibited a great deal of variability with a standard deviation of 7% and CV of 75%. Nighttime metolachlor losses averaged 3% of that applied and had a standard deviation of only 1%, which generates a CV of only 36%. Nighttime metolachlor vapor losses were similar to daytime losses when the soils were dry (2005, 2006, and 2007) but were much lower than daytime losses when soils were moist (2000, 2001, 2003, and 2004). However, even if the 8 yr were considered replicates, daytime metolachlor vapor losses were significantly larger than during the nighttime vapor losses ($P < 0.05$). As a result, nighttime losses were fairly constant, but daytime losses were larger and more variable.

Atrazine daytime vapor losses averaged 3% of that applied, whereas nighttime losses were 0.8%. Variability for both daytime and nighttime atrazine losses were similar with a daytime standard deviation of 1.3% and nighttime standard deviation of 0.4%, which generated CVs of 40% for daytime and 51% for nighttime. For both metolachlor and atrazine, the majority of the volatilization occurred during the day. However, unlike metolachlor, atrazine daytime volatilization losses were always much greater than nighttime losses, regardless of the soil moisture status. As a result, if the 8 yr were considered as replicates, day-

Table 5. Yearly cumulative herbicide volatilization losses.†

Herbicide	Yearly herbicide volatilization losses (% of applied as a function)							
	2000	2001	2002	2003	2004	2005	2006	2007
Metolachlor	15.4	23.5	6.4	62.2	19.4	6.5	6.9	5.6
Atrazine	4.4	5.8	1.5	11.8	6.1	3.8	3.5	3.4

† Cumulative losses are for only the first 5 d after application.

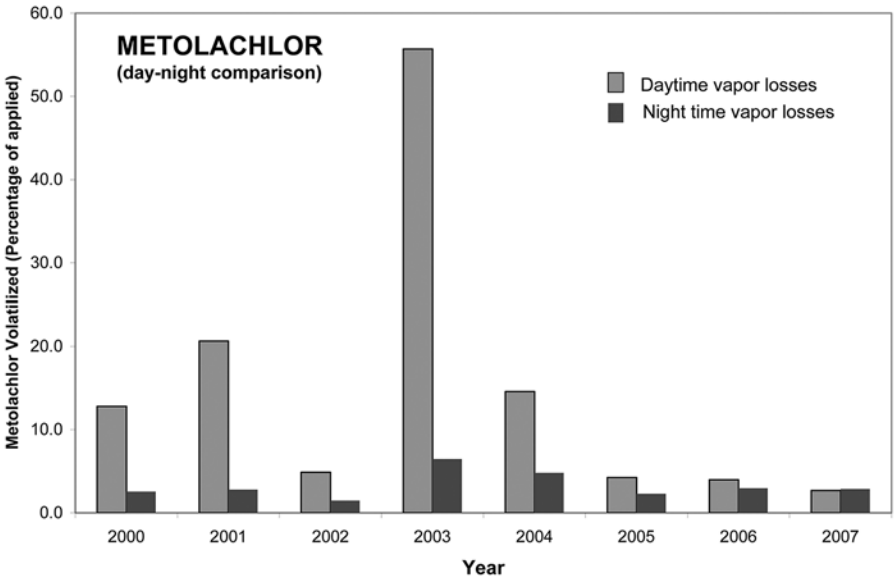

Fig. 8. Comparison of day and night metolachlor volatilization losses.

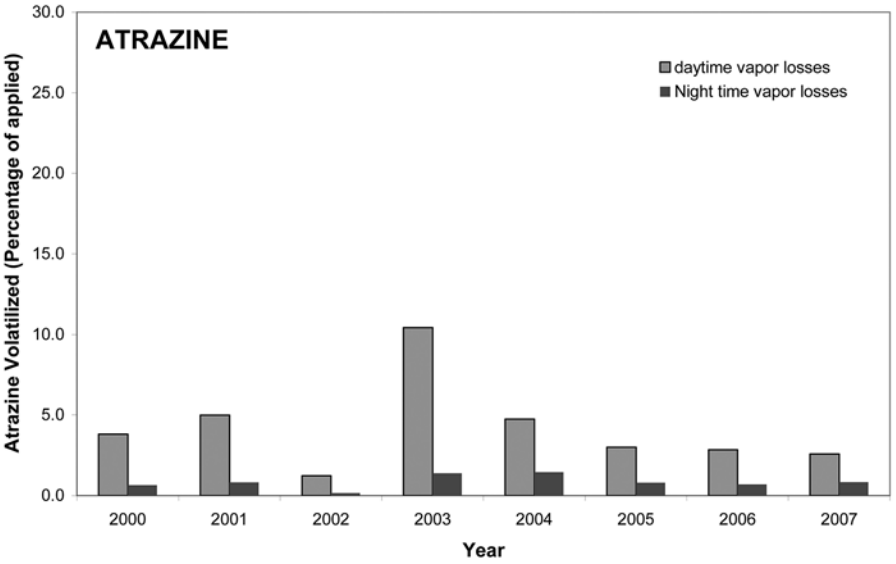

Fig. 9. Comparison of day and night atrazine volatilization losses.

time atrazine vapor losses were significantly larger than nighttime vapor losses ($P < 0.03$).

Conclusion

Metolachlor and atrazine volatilization and runoff was monitored and evaluated over an 8-yr period. Both atrazine and metolachlor vapor losses exhibited extensive year-to-year variability, even though agricultural management practices, herbicide formulation, crop, soil texture, and organic matter were unchanged. Metolachlor and atrazine vapor losses were both influenced by surface soil moisture, but metolachlor was affected to a greater degree. During the 8-yr investigation, a worst-case scenario occurred when herbicides were applied during high air temperatures and surface soil moisture conditions were near saturation. During this worst-case scenario, 63% of the applied metolachlor was lost through volatilization in only 5 d, whereas, for these same extreme conditions, 12% of the applied atrazine was lost through volatilization. Excluding the worst-case scenario, average herbicide vapor losses were 9% for metolachlor and 4% for atrazine. When soils were moist, herbicide vapor losses increased dramatically, even though both of these herbicides have low vapor pressures. Daytime is the critical period governing herbicide volatilization. Nighttime losses of metolachlor and atrazine were fairly constant and atrazine nighttime losses were minimally affected by soil moisture.

During this study, atrazine and metolachlor volatilization was much greater than runoff losses. Runoff losses for both herbicides were generally much less than 1% of that applied. Only once in 8 yr, in 2001, did the atrazine surface runoff loss exceed 2.9% of that applied, whereas metolachlor runoff was 2.5% that same year. However, when herbicide runoff was significant, volatilization was also extensive because both processes are influenced by soil moisture. During 2001, precipitation occurred the day of application and 2.5% of the applied metolachlor was lost through surface runoff during the growing season. However, 23.5% of the applied metolachlor was lost through volatilization during the first 5 d after application. Additionally, herbicide volatilization losses were significantly larger than surface runoff ($P < 0.007$), and averaged over the two herbicides, loss by volatilization was about 25 times greater than surface runoff loss. This research confirms that vapor losses for some commonly used herbicides frequently exceed runoff losses. Furthermore, herbicide vapor losses on the same site and with the same management practices can vary significantly from year to year. This process will need to be fully understood if formulations and management practices are to be developed for reducing herbicide loads to the environment.

Acknowledgments

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[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Highway 36 Cooridor Exposure/ Investigation Public Health Assessment

I am 83 years old and may have been the first person to spray 2,4-D in 1947. I've continued to use 2,4-D for all these years from 1947 to 2013. I do not certainly apply these chemicals daily, but I do use them as part of my Integrated Pest Management Program each year. 2,4-D is a very valuable herbicide that I have no fear of and haven't observed any detriment to my health throughout my lifetime. I have not used atrazine lately, but at one time it was labeled for use on perennial ryegrass. I applied this chemical for weed control and it was quite an effective control. Again, this herbicide is widely used throughout the U.S. I have no concern about using it today for killing weeds. Attrazine and 24D have been tested for over 30 years, and to my knowledge, have had no detrimental effect to the public in this area. These two chemicals

In conclusion, the levels at Triangle Lake are not now nor have they ever been high enough to cause any sort of health concerns. No one tested in this investigation was ever exposed to Atrazine or 2, 4-D levels that would cause any sort of a health concern. Both of these chemicals atrazine and 2,4-D are valuable tools in both agriculture and forestry.

Chemicals protect us from diseases carried by insects and enable us to grow crops. Without essential chemicals (herbicides, insecticides and fungicides) the world today would starve.

Sincerely,

[redacted]

Gold Dust Potato Processors, Inc.

*541-723-2600 * P.O. Box 830 Merrill, OR 97633 * 30203 Micka Rd Malin, OR 97632 * www.golddustfarms.com*

To whom it may concern,

As a resident and active member of the community, I feel I should comment on what is currently going on with the Highway 36 Corridor investigation. This investigation has become a very controversial issue. Before I continue, I would like to state that all of my quotes are coming straight out of the Public Health Assessment prepared by the Oregon Health Authority in order to avoid any misrepresentations.

There are many key things within the report that show that no evidence was found alluding to any significant health problems/concerns to residents within the investigation. The report stated that "the concentrations of pesticides found in both soil and water samples were **not at levels high enough to cause harm** to human health, including children and other population groups who may be especially sensitive to pesticide exposure." To further illustrate this point, urine tests were conducted and results showed that "the levels of 2, 4-D measured in the Highway 36 investigation area in spring and fall 2011 were **below** levels expected to harm people's health."

Studies of local drinking water found that "only three of 36 drinking water samples collected in fall 2011 within the Highway 36 investigation area had detected concentrations of pesticides and the concentrations measured at the time of sampling were **thousands of times lower** than health-based comparison values." Given the evidence, I ask to discontinue further investigation into the highway 36 corridor since continuing the costly effort would only further waste taxpayer dollars when all evidence shows no posing health concerns/threats.

As far as the pesticides that were found, not only were they below levels that would call for any health concerns, there is no direct evidence that such pesticides came from local farm application practices over other sources. OSHA did no evaluate exposures to pesticides that occurred outside the investigation area and so it is likely that many residents whom left the study area periodically could have been exposed to such pesticides from other uses other than those common to the investigation area. Looking over all of the evidence conducted, it appears that the very limited and responsible use of herbicides/pesticides in the region's farms and nearby forestlands pose no health risk to the residents.

Thank you for your time and consideration.

Sincerely

[redacted]
[redacted] Gold Dust Potato Processing, Inc.

[redacted]
Portland, OR 97216
June 4, 2013

EHAP
800 NE Oregon St., # 640
Portland, OR 97232

RE: Recent Oregonian article about Urine samples showing herbicide
Gentlemen:

It is very important that there be continued testing regarding herbicides affecting anyone within "drifting" areas near spraying, not only in the area mentioned in the article (near Triangle Lake, west of Eugene), but anywhere in the state or nation.

My husband [redacted], 85 years old, was diagnosed 25 years ago with Parkinson's Disease, and is now in the late stages of the disease, which not only affects movement, but also cognition and many other aspects of daily life. Starting in his teens he was very active skiing, hiking, rock and mountain climbing, ski patrol work, and mountain rescue work continuing into the 1960's and 1970's.

He graduated in Forestry from OSC (now U) in 1952, and his first job was with the Tree Farm Management Service in Eugene, a company that did a variety of forestry work for a number of companies that were not large enough to have a staff forester. Of many services done for these companies, one was road side spraying using herbicides. Keith and others of the crew who did this work were cautioned to avoid getting any of the spray on themselves, and to shower and change clothes as soon as possible, but Keith admits that they probably did not do this in a timely fashion.

It has been suggested that one of the causes of Parkinson's Disease could be exposure to herbicides and/or pesticides. Generally Parkinson's starts early without any visible symptoms for many years such as tremor, while the Dopamine in the brain that is responsible for body movements and so much more gradually becomes less and less, and by the time PD is diagnosed approximately 80% of the dopamine production capability usually active in our bodies is gone.

We have been living in an assisted living facility for approximately 1 ½ years in order for there to be more help for Keith in the activities of daily living, which is not inexpensive. There is no actual proof that herbicides caused Keith's Parkinson's Disease. It is my belief, however, that it certainly had an effect on his body. In order that the possibility of contracting PD or other neurological diseases not spread to people of any age near areas that are sprayed, I urge more testing be done, soon, and on a regular basis.

Sincerely,

[redacted]

[redacted]

From: [redacted]
Sent: [redacted]
To: ehap.info@state.or.us
Subject: Assessment Response - sorry - edited version

Importance: High

Dear Investigative Team,

Today, is the last day to respond to your 'assessment' of a Chemical Exposure Investigation that began in the Fall of 2011, was subsequently put on hiatus by your team, in the Spring of 2012, and where it has remained ever since.

I am not able in all honesty to thank you for this opportunity, as my attorney has down in our STOP response. I am as appalled today as I was at your first town hall in 2011, after realizing when the helicopter of Atrazine flew by my home and sprayed the 70 acres I was had retired and vested my retirement in a state that deemed the spraying of poisons in my neighborhood was perfectly legal.

Knowing this investigation began with 34 citizens poisoned with Atrazine and 2,4D in their bodies, including [redacted] son and the many folks I've since met, and knowing you then chose to put this investigation on hiatus, during peak spray season no less, now a full year and several sprays later, NO I am not able to thank you for much at all.

The fact many of the very citizens KNOWN to be poisoned have begged you and this state for years to stop these practices, again does not help. Add the over 30 years history of this abuse and try as I might I cannot pull out of me anything BUT anger at what has been and continues to be promoted by this state and allowed by this very investigation.

To now have to address an 'assessment', of an investigation that barely got it's feet wet, knowing drift was the elephant in the room but knowing as well that MONEY was the reason why no drift studies were performed and the poisons continue. Thanking you, is off the table.

Of significance is the fact your own EPA scientist indicated, at the first Town Hall meeting July of 2011, that in all probability the source of the trespass was Drift. Yet, without so much as one drift study or determination as to how citizens ended up with poisons in their urine, you have somehow come up with an 'assessment' of an investigation that has been on hiatus for well over a year is beyond words.

To then conclude: Small doses are not significant, or that you did not have enough information on the Atrazine applications, to draw any viable conclusions.

Those of us living within range of timber clear-cuts very much know there is chemical trespass from timber industry. The smell in the air, burning eyes, headaches for starters.
To live in a state that continues to use, apply and spray **millions** of pounds of toxic chemicals within our communities and state, every single year, is not acceptable. We all know the vast majority of these chemicals are highly hazardous, especially in small/tiny doses ironically and certainly considering the chemical cocktails that are used. It is crucial for me to once again state, this is a state issue, not exclusive to Lane County. Find a clear-cut and find repeated us of toxic chemicals. It is also vitally important to state: NO AMOUNT OF TOXIC POISONS SHOULD EVER BE DEEMED 'ACCEPTABLE' BY ANY STANDARD!!!

The reality is, the possibility/PROBABILITY of exposure from Chemical Trespass in Oregon is profound. From the clear-cut spraying, to the endless road spraying, to our parks, schools, and golf courses, we are potentially, in all probability, being exposed. The fact many of the same folks now poisoned in Blachly have been begging this state, many of you and or your agencies to stop these timber sprayings **for years**, speaks volumes to the neglect of and by our state and its agencies, paid to protect us.
The science is in (see below). Small, chronic doses of many, if not most, of the poisons our state uses, on a regular basis, are HIGHLY toxic. The chronic, systematic exposures we face are in truth all the more risky.

We all deserve better. We have every right to a healthy environment. We have every right to a healthy community, in which to raise our families and or live our lives. We also have every right not to be used as guinea pigs, at the whim of Corporations and or a State that literally promotes these poisons. Their ability to poison us 'legally', more often than not without our knowledge, and certainly without our consent, is a key factor in responding to this 'assessment'. Our right to Health is being denied by none other than our State.
Add the fact this Governor who once took a Hippocratic Oath to do no harm but tells our STOP team that the timber industry has his hands tied, was and still fueling my ANGER.

Here are the key issues with your assessment:

~ 59 of the 64 urine samples taken in the Fall of 2011 had detectable levels of 2,4-D in their urine. Of those 59, 22 individuals had levels of 2,4-D with metabolites above the NHANES (the standard) 75th percentile levels. The Investigation notes "this number was higher than expected and approaches statistical significance, which is typically defined by a p-value of 0.05 or less." The p-value found was 0.06, or one one-hundredth *greater* than OHA's stated significance level of <0.05.

~The Oregon Health Authority also opted to exclude a child, under six years of age. According to OHA, this decision was made because "there are no NHANES *values* for comparison for children under six years old. Yet, all data indicates children are far more susceptible to pesticide exposures than adults, as well as their risks. This makes it all the more critical that they be included in an assessment. Worth noting: Had OHA included this child's numbers in their assessment, then the p-value of the 75th percentile finding would have been statistically significant, as in <0.05.

~ The Investigation indicates the Spring sampling in 2012 was suspended by OHA because "the areas that were slated for applications of 2,4-D and/or atrazine were in remote locations which have very few residents." Yet, the Investigation fails to indicate that ALL pesticide applications were suspended by major timber companies in and around the Investigation area. Most interesting was the fact the companies which spray the most atrazine and 2,4-D in the area, stopped doing so *after* the OHA's announcement that it would be sampling individuals urine for exposures. That being the case however, one cannot help but wonder why OHA did not then use similar communities with similar topography to continue with their investigation. Across the state same exact factors are present: rural, residential properties, located beneath steep, private timber properties where pesticides are aerially sprayed. Would not alternative locations in fact have provided an excellent resource to determine if what took place in Blachly was unique, or more importantly common, throughout our state? Especially in light of the fact citizens have been attesting to trespass *for many years*.

~The assessment indicates on pages 28-30 that OHA "cannot confirm the relatively elevated atrazine levels in post-application urine samples were from a *specific* pesticide application, the contribution of multiple applications in the area, or some other source." Indicating the lack of "site- or time-specific information" about the persistence and movement of atrazine in the environment, after it was applied, to justify the conclusions or lack of conclusions drawn. Yet, spray records obtained by OHA, as well as other groups, provide the ***exact*** information OHA claims to lack. The spray records in fact indicate all the pertinent information needed, relative to the spray applications, pesticides applied, etc, etc. It therefore makes no sense to not be able to draw a conclusion. Plus, surely an aerial drift expert could help determine if the exposures were caused by the suspected aerial applications. Of utmost importance however: Based on the relative and available data, how else could the atrazine found in these participants' urine have gotten there, but for the aerial applications that occurred nearby? In knowing the extent of available data and scientific research that has been provided to this Investigation, indicating exposures to pesticides occurs from aerial spraying, how does OHA and/or ASTDR draw the conclusions made in this assessment? Especially, in light of the fact the primary purpose of these very agencies is to "protect the public"?

~ Throughout the assessment the Investigation indicates there is lack of information concerning atrazine's impact on biological organisms, including humans. Yet, again there is ample science, studies and information to dispel such a conclusion. Many such studies repeat

the fact even small exposures of atrazine can pose *serious* health risks, to both humans and the environment, water in particular. (see below).

It is somewhat of a mystery, knowing all of the data and peer-reviewed science available; indicating chronic and or low dose levels of atrazine presents risks, to both humans and the environment why OHA would not have pursued all of this information *before* making *any* assessment. Especially, in light of the fact this poison has already invaded the bodies of 34 *known* citizens.

~ It is imperative that this Investigation realizes one the greatest risks for citizens, not just in Blachly but throughout our state, is the fact we have no way to protect ourselves, as these practices continue. Not so much as a warning, a phone call, or a notice to indicate toxic chemicals are eminent and will be sprayed next to or near one's home and or property within a specific time frame. This issue makes this entire Investigation, along with the fact it remains on hiatus, all the more disturbing.

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Here is but a few of the studies I've put together to PROVE OUR CASE as to the risks and or dangers pesticides pose.

These are but *some* of the science, peer reviewed studies, research and medical assessments attesting to the dangers of pesticides, Atrazine in particular.

***Keynote speech by Professor Tyrone Hayes (Atrazine 'expert')**

Beyond Pesticides 31st National Pesticide Forum, April 5-6, 2013, Albuquerque, NM. "Sustainable Families, Farms, and Food: Resilient communities through organic practices,"

-- Tyrone Hayes, PhD, professor and research scientist, University of California, Berkeley

http://www.youtube.com/watch?v=NVinMMQNtrU

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***Journal of San Francisco the Medical Society-Environmental Health Report**

*Environmental Health: A Decade of Progress

Philip R. Lee MD; Steve Heilig, MPH; Michael Lerner, PhD; and Elise Miller, MEd

*Reducing Cancer Risks: Margaret Kripke, PhD, on The Environment and Cancer

*Environmental Chemicals: Large Effects from Low Doses

Laura N. Vandenberg, PhD; R. Thomas Zoeller, PhD; J.P. Myers, PhD

http://www.cumulativeimpacts.org/documents/June.pdf

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Scientists Are Clear: Chemicals Do Harm - Especially in Low Doses
http://www.momsrising.org/blog/scientists-are-clear-even-in-low-doses-chemicals-do-harm/

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Our Stolen Future:

~Human impacts of endocrine disruption

http://www.ourstolenfuture.org/NewScience/human/human.htm

~Mixtures of chemicals

http://www.ourstolenfuture.org/NewScience/synergy/mixtures.htm

~Low dose effects

http://www.ourstolenfuture.org/NewScience/lowdose/lowdose.htm

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Scientific evidence on the health effects of low-dose exposure to endocrine disrupting chemicals (EDCs). | APP Advocate Precautionary Principle

http://appprecautionaryprinciple.wordpress.com/2011/06/01/scientific-evidence-on-the-health-effects-of-low-dose-exposure-to-endocrine-disrupting-chemicals-edcs/

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The Economics of Atrazine

http://ase.tufts.edu/gdae/Pubs/rp/EconAtrazine.pdf

***

Chemical trespass: Big burden, little bodies

http://www.panna.org/blog/chemical-trespass-big-burden-little-bodies

***

Effects of prenatal exposure to a low dose atrazine metabolite mixture on pubertal timing and prostate development of male Long-Evans rats.

http://www.ncbi.nlm.nih.gov/pubmed/20727709

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Illinois pesticide drift; New atrazine research; Scientific American calls for independent GM science; more...

http://www.panna.org/resources/panups/panup_20090730#1

***

Atrazine poses unreasonable risks to humans and wildlife at concentrations detected in the environment.

http://www.beyondpesticides.org/gateway/pesticide/atrazine.htm

***

No more secret atrazine science | Pesticide Action Network

http://www.panna.org/blog/no-more-secret-atrazine-science

***

Atrazine and nitrate in public drinking water supplies and non-hodgkin lymphoma in Nebraska, USA.

http://www.ncbi.nlm.nih.gov/pubmed/23515852

***

European Union bans atrazine, while the United States negotiates continued use

http://www.ncbi.nlm.nih.gov/pubmed/16967834

***

U.S. EPA Probes Herbicide Atrazine for Human Health Threats

http://www.ens-newswire.com/ens/oct2009/2009-10-08-01.html

***

Low levels of the herbicide atrazine alter sex ratios and reduce metamorphic success in Rana pipiens tadpoles raised in outdoor mesocosms.

http://www.ncbi.nlm.nih.gov/pubmed/20368127

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Pesticide Mixtures, Endocrine Disruption, and Amphibian Declines: Are We Underestimating the Impact?

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1874187/?report=classic

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Agrichemicals in surface water and birth defects in the United States---See conclusion

http://onlinelibrary.wiley.com/doi/10.1111/j.1651-2227.2008.01207.x/full

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Atrazine Reference studies

http://atrazinelovers.com/r4.html

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Atrazine:Toxicology

http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/atrazine

***

Atrazine-Induced Aromatase Expression Is SF-1 Dependent: Implications for Endocrine Disruption in Wildlife and Reproductive Cancers in Humans

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1867956/

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“Inert” Hazards in 2,4-D Herbicides

http://www.pesticide.org/get-the-facts/pesticide-factsheets/factsheets/24d-factsheet

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THE PEER REVIEWED PUBLISHED SCIENCE WHICH LINKS PESTICIDE EXPOSURE AND CHILDHOOD DISEASE

http://appprecautionaryprinciple.wordpress.com/2011/12/03/the-peer-reviewed-published-science-which-links-pesticide-exposure-and-childhood-disease/

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Low doses, Big Effects: Scientists seek 'fundamental changes' in testing, regulation of hormone-like chemicals

http://www.environmentalhealthnews.org/ehs/news/2012/low-doses-big-effects

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Strengthening Toxic Chemical Risk Assessments to Protect Human Health

http://www.cumulativeimpacts.org/documents/strengthening-toxic-chemical-risk-assessments-report.pdf

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'There are no safe doses for endocrine disruptors'

“After reviewing hundreds of studies, my colleagues and I have concluded in a new report that there truly are no safe doses for these hormone-altering chemicals.

Studies have examined people from the general population and found associations between low levels of hormone-altering compounds and infertility and other reproductive problems, cardiovascular disease, neurodevelopmental effects, obesity, abnormal bone health, cancer and other diseases. The overall cost to society is enormous, and it continues to rise. Academic, regulatory and industry scientists must work together to identify and replace such chemicals that are ubiquitous in everyday consumer products. Reducing and eventually eliminating these exposures is absolutely needed to protect human health. “

Laura Vandenberg - a Postdoctoral Fellow at the Levin Lab Center for Regenerative and Developmental Biology at Tufts University

http://www.environmentalhealthnews.org/ehs/news/2012/opinion-endocrine-disruptors-low-level-effects

***

Oregon Tilth---**Drift Happens**

http://tilth.org/education-research/in-good-tilth-magazine/articles/2010/21iii/drift-happens

***

2,4-D the EPA and a death in Oregon
http://www.greens.org/s-r/078/07-22.html

Most sincerely,

[redacted]

[redacted]
[redacted]

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The further a society drifts from the truth, the more it will hate those who speak it. ~George Orwell

Our Story: Original NPR Version
Ingrid Lobet with Living on Earth presents our chemical nightmare.
http://cironline.org/reports/oregonians-fear-harmful-effects-timberland-herbicides-3731

Newest-PBS Version
Majestic Forests in Oregon at Risk from Timber Industry and Chemical Spraying
http://www.pbs.org/newshour/bb/environment/july-dec12/forests_09-12.html?print

"He who is not angry when there is just cause for anger is immoral. Why? Because anger looks to the good of justice. And if you can live amid injustice without anger, you are immoral as well as unjust."
- St. Thomas Aquinas (1225-1274)

Facebook: Latest news and updates - www.facebook.com/pages/PreciousDirtPesticide-Awareness-Coalition-IVCAPS/142914135781373

"We should all be concerned about the future, because we will have to spend the rest of our lives there." ~ C. F. Kettering

Our Petition: Asking our Goveror to issue a moratoriam to stop the Pesticides -(only he can) Help us STOP 2,4-D, Atrazine and other toxins from being sprayed into our communities.
http://www.change.org/petitions/governor-kitzhaber-stop-the-spraying-of-toxic-chemicals-into-oregon-s-communities

Ever Forward!

Precious Dirt
www.PreciousDirt.org
P.O. Box 376
Selma, OR. 97538
[redacted]

There's a difference between knowing the path and walking the path. ~ The Matrix

Syngenta Crop Protection, LLC.
P.O. Box 18300
Greensboro, NC 27419-8300

EHAP
800 NE Oregon St. Suite 640
Portland, OR 97232
Electronically submitted: ehap.info@state.or.us

Subject: Syngenta Crop Protection, LLC Comments on the Oregon Health Authority Interim Public Health Assessment and Exposure Investigation

To Whom It May Concern,

Syngenta Crop Protection, LLC appreciates the opportunity to comment on the subject document. Our observations can be found as an attachment to this letter entitled "Comments on the Oregon Health Authority (OHA) Interim Public Health Assessment Highway 36 Corridor Exposure Investigation." These comments address the data used for the atrazine portion of the assessment, representation of the atrazine database and regulatory reviews, and appropriate design of the proposed air monitoring study.

We hope these comments are helpful and look forward to discussing the air sampling methodology as you move forward with that study.

Sincerely,

N. Beth Carroll, Ph.D.
Sr. Stewardship Manager
Regulatory Affairs

Syngenta
PO Box 18300
Greensboro, NC 27419

phone 336 632 7178
fax 336 632 7065
mobile 336 549 4353
beth.carroll@syngenta.com

1 Attachment

Comments on the Oregon Health Authority (OHA) Interim Public Health Assessment Highway 36 Corridor Exposure Investigation

Submitted by Syngenta Crop Protection, LLC

Summary

This Exposure Investigation (EI) and corresponding Interim Public Health Assessment (PHA) should be based on "best available data" to ensure maximum quality, objectivity, utility and integrity as required under the Information Quality Act. The "best available data" on atrazine includes the extensive toxicological database on parent atrazine and its metabolites, and pharmacokinetic characterization that provide an understanding of reliable urinary detections of atrazine and its metabolites. Based on atrazine's physical characteristics and metabolism, results from some community member's urine samples are not plausible. Since, in part, some of the actual data used in the Interim PHA from some community resident's urine samples are of questionable origin and quality, and have no clear verification of the chain of custody (as discussed below) additional high quality up-to-date data must be included before robust, scientifically derived conclusions can be drawn. In the Interim PHA, the atrazine database has been incorrectly or incompletely cited (as discussed below). Also, within the Interim PHA, issues must be resolved to ensure that best available data are used and that sample design problems are identified to substantiate data reported is of the maximum data quality.

The OHA recommends in the Interim PHA that: *US EPA work with the Exposure Investigation team on developing a sampling and analysis plan designed to evaluate exposures to pesticides in air…* Current study plans are to produce a *quantitative sampling technique including refined analytical methods for currently used pesticides.* Study design and validation are critical to data accuracy and usefulness. As such, the study design should be complete and be relative to spatial, vertical and temporal distributions of the vapor/particle phase; and there should be other exposure information if these data are used in an assessment. Syngenta Crop Protection, LLC ("Syngenta") appreciates the opportunity to submit additional information on the sampling design (which will be provided under separate cover) and are pleased to answer questions on the study design recommendations.

Introduction

The OHA prepared the subject Interim report as part of an ongoing PHA and EI for the Highway 36 Corridor site in Lane County, Oregon. The Highway 36 Corridor EI is a multi-agency effort to respond to several community members' requests to investigate possible exposures to pesticides applied in the Highway 36 corridor. Atrazine was detected in some of the urine samples taken by some community residents; subsequent urine, water, soil, and vegetation sampling by the State did not find detectable residues of atrazine or its metabolites. Proposals for follow-up sampling, including an air monitoring program have not yet been implemented or executed. Syngenta is concerned about certain statements in the Interim PHA with regard to: toxicological characterization of atrazine, determination of a "biological equivalency", credibility of urinary detections, and we are interested in the design of the proposed follow-up sampling plan.

Mischaracterization of Toxicology

The atrazine toxicological database is extensive and thorough reviews by the Environmental Protection Agency (USEPA) and regulatory bodies worldwide should be cited in the Interim PHA. In the Interim PHA, under the heading of "Evaluation of Health Outcome Data" the following statement is made:

> *We also do not know which effects to look for because there is limited scientific evidence on the health effects associated with atrazine exposure*

USEPA and worldwide reviews of the overwhelming scientific database shows that there are not health effects associated with atrazine. Atrazine is one of the most studied pesticides in the world and has been repeatedly shown to not pose a risk to humans from exposure to environmentally relevant concentrations. The herbicide has undergone a thorough, comprehensive and transparent review over the past 20 years and has an unprecedented state-of-the-art science database. According to the USEPA: "The atrazine toxicity database is extensive. The Agency has reviewed these toxicity studies and has a high degree of confidence in the scientific quality of the toxicity studies conducted with atrazine. Special studies examining the toxicology of atrazine have been performed by the registrant in addition to the required guideline studies" (USEPA, 2006).

Recently USEPA opened the atrazine docket (docket EPA-HQ-OPP-2013-0266) to initiate "registration review", the normal 15-year cycle registration update required for all pesticides. In the USEPA preliminary work plan, USEPA states "An extensive amount of atrazine toxicity and effects data have been submitted to and reviewed by the Agency. There are no remaining data gaps anticipated for the registration review of atrazine." (USEPA, 2013).

Parts of the Interim PHA mischaracterize the toxicological & human health data base for atrazine. *Appendix E* uses two short paragraphs to describe the extensive toxicological database for atrazine and doesn't adequately represent the current state of knowledge on atrazine. Several statements in *Appendix E* can be taken out of context if not taking into account environmental exposures. The Joint FAO/WHO Meeting on Pesticide Residues (JMPR) conducted a toxicological evaluation of atrazine in 2007 and published it in 2009. The JMPR states that "The database on atrazine was extensive, consisting of a comprehensive set of GLP-compliant guideline studies with atrazine and its four key metabolites, as well as a large number of published studies" and "investigations of other modes of action did not provide any evidence that atrazine had intrinsic estrogenic activity or that in increased aromatase activity *in vivo*" (WHO, 2009). http://www.who.int/foodsafety/chem/jmpr/publications/monographs/en/index.html

In 2010, the atrazine drinking-water guideline prepared for the Third Edition of the WHO Guidelines for Drinking-water Quality was revised following the 2008 publication of the 2007 Joint FAO/WHO Meeting on Pesticide Residues (JMPR) evaluation of atrazine and its environmental metabolites (WHO, 2008) http://www.fao.org/docrep/010/a1556e/a1556e00.HTM. Based on the 2007 JMPR review, the Guideline Value of 100 ppb was derived for the sum of atrazine and its chloro-s-triazines in 2010 (WHO, 2010) http://www.who.int/water_sanitation_health/dwq/chemicals/dwq_background_20100701_en.pdf

In the June 2013 registration review docket, the Human Health Risk Scoping Document (USEPA 2013) http://www.noticeandcomment.com/EPA-HQ-OPP-2013-0251-fdt-13678.aspx, USEPA discusses the extensive toxicology data set reviewed by five Scientific Advisory Panels (SAP), and states, "…atrazine has been classified as "Not Likely to be Carcinogenic to Humans"… The Agency concluded, and the SAP concurred, that the new experimental toxicology studies on cancer did not alter or contradict the major key events in the neuroendocrine mode of action (MOA) leading to mammary gland tumors in the rat or the conclusion that the MOA leading to mammary gland tumors in the rat is not relevant to humans." The USEPA also states that "EPA concluded the epidemiology evidence are not strong enough to warrant a change to its current cancer classification for atrazine…" (USEPA, 2013a).

Limited information provided in *Appendix E* fails to represent the comprehensive toxicological database on atrazine, and is solely "hazard" based, thereby ignoring potential exposures based on relevant environmental concentrations. PHA Question 2 (e) asks "What health *risks* are associated with these exposures?" Scientifically valid data on both *hazard* *and exposure* are required to conduct an appropriate characterization of potential *risk* associated with atrazine. http://www.epa.gov/risk_assessment/basicinformation.htm#risk

The Interim PHA statement that *there is not enough evidence to determine if atrazine increases the risk for cancer in humans* is not supported by *Appendix E* or atrazine's extensive database. *Appendix E* contains the statement: *Based on epidemiologic evidence, EPA has concluded that atrazine is 'not likely to be carcinogenic to humans.*' These findings are consistent with the Agricultural Health Study, an extensive multiyear study sponsored by the National Cancer Institute, the National Institute of Environmental Health Sciences, the National Institute for Occupational Safety and Health and the USEPA http://aghealth.nih.gov/. Other government agencies and independent organizations — including the WHO (IARC, 1999; WHO 2008, 2009, 2010) and regulatory agencies in the United Kingdom (United Kingdom Pesticide Directorate. 2000), Canada (PMRA, 2003, 2004, 2007), and Australia (APVMA 2004, 2008) — have reached similar conclusions.

The atrazine MOA that leads to mammary tumors is unique to the Sprague-Dawley (SD) rat. Scientifically valid research has shown that this MOA is *not relevant* to humans. Key points relating to the hazard assessment conducted on atrazine by other National and International authorities are given in the following table.

Scientific Reviews from Worldwide Regulatory Bodies

	EU-UK (2000)	Australia (2004, 2008)	IARC (1999)	USEPA (2000, 2003, 2006)	WHO (2007, 2009, 2010)
Genotoxicity	Not Genotoxic	Not Genotoxic	Not Genotoxic	Not Genotoxic	Unlikely to be Genotoxicity
Animal Evidence	Mammary – Female SD Rat	Mammary – Female SD Rat	Mammary – Female SD Rat	Mammary – Female SD Rat	Mammary – Female SD Rat
Mode of Action (MOA)	Adequately Explained MOA confined to Female SD Rat	MOA Unique to Female SD Rat	MOA Unique to Female SD Rat	MOA Unique to Female SD Rat	MOA Unique to Female SD Rat – Not relevant to humans
Relevance	Not Relevant to Humans	Not Relevant to Humans	Not Relevant to Humans	Not Relevant to Humans	Not Relevant to Humans
Epidemiology	Not Evaluated	Data Support the Absence of Any Carcinogenic Potential	Inadequate Evidence in Humans for Carcinogenicity	Human Cancer Risk Not Likely	Does not support causal association
Classification	Carcinogen classification not appropriate	Absence of Any Carcinogenic Potential	Not classifiable Group 3	Not Likely to be Carcinogenic in Humans	Not Likely to pose a carcinogenic risk to humans

Determination of "Biological Equivalency (BE)"

The Interim PHA was unable to compare atrazine results with a bio-monitoring equivalent (BE) because there is not a BE for atrazine. However, information on derivation of the BE for atrazine and its metabolites was discussed and submitted by Syngenta (September 21, 2011) to the OHA, Oregon Department of Agriculture, Oregon Department of Environmental Quality, ATSDR and EPA Region 10. Information on derivation of an atrazine BE was based on the extensive atrazine database and by application of a Physiologically Based Pharmacokinetic (PBPK) model. An Excel spreadsheet-based Forward- and Back-Calculator tool was provided.

Based on the PBPK model, the urine detections in samples taken by some community members in spring 2011 are not plausible. Samples were taken to purportedly represent "pre- and post-spraying" and assumed passive exposure via air or water. As indicated in Syngenta's September 21, 2011 submission, atrazine is rapidly metabolized, predominately to diamino-chloro-s-triazine (DACT), within hours of exposure. Furthermore, worker exposure studies have clearly characterized likely urine concentrations of DACT after known levels of exposure. This knowledge, together with atrazine's low vapor pressure and the application of the Calculator render the results from the 2011 "pre-spray" samples as unrealistic. Even if atrazine had been

applied in the fall of 2010 (pre-spray community samples), the physico-chemical properties and metabolism data on atrazine provides no scientific basis for urine detections to have occurred months later at the levels reported for some of the spring 2011 community samples.

In the current EPA Atrazine problem formulation, EPA conducted Screening Tool for Inhalation Risk (STIR) modeling for estimating upper bound wildlife exposure through inhalation using atrazine's vapor pressure ($2.89x10^{E-7}$ torr at $20^{o}C$), molecular weight (215.69 g $mole^{-1}$ and maximum application rate (4 lbs a.i.$acre^{-1}$). Their conclusion was "inhalation exposure via spray drift and/or vapor-phase of atrazine alone did not appear to be a concern" (USEPA, 2012).

Methodology

The methodology used in this EI evolved to include urine, surface water and ambient air samples collected by certain residents in the community in periods of time not necessarily corresponding to methodology/timing used by OHA and its agency partners. Some of the 2011 "pre- and post-spraying" urine samples obtained from certain residents have no clear chain of custody and should be considered, at best, anecdotal. Twenty of the community samples did not qualify for a complete chain of custody, yet, because an analysis of these samples was not statistically different from samples with complete chain of custody, all samples were included in this PHA.

Samples without confirmed chain of custody do not meet the "Data Quality Indicators for Validity" for *Completeness* including *Precision* and *Accuracy* (EPA, 1992a). Without chain of custody, these samples should not have been included in the assessment. In fact, the ATSDR Public Health Assessment Guidance Manual contains the following advisement: Because different parties collect environmental samples for different reasons, the quality of environmental data for a given site can vary widely from one sampling project to the next. Though such observations may be useful for planning more refined sampling programs, they generally are not useful for generating rigorous measures of chemical-specific environmental contamination. (ATSDR, 2005).

Follow-up Sampling Plan: Air Sampling

The Highway 36 Corridor study was not designed to measure specific routes (e.g. spray drift or volatilization). Sampling frequency and interval were not appropriate for exposure analysis of volatilization and drift. The Interim PHA states *Lack of air monitoring data during the fall and spring pesticide application seasons represents a significant data gap. Without this air monitoring data, exposure via ambient air either from direct drift or volatilization cannot be ruled out*. Thus the air sampling methodology did not have capability to address quantitative and qualitative source apportionment.

Despite the implausible results from some of the community members urine samples the spring 2011 community urine sampling, OHA recommends additional air sampling. The Interim PHA recommends that: *US EPA work with the Exposure Investigation team on developing a sampling and analysis plan designed to evaluate exposures to pesticides in air and to address gaps in the data needed to answer Exposure Investigation questions. At the time of publication of this report, passive air monitoring over several application seasons appears to be the best option to collect communitywide air data*. To collect scientifically valid air monitoring data, it is prudent for the

study design to be complete and to be relative to spatial, vertical, and temporal distributions of the vapor/particle phase of the ambient concentration coupled with the exposure duration.

Final Assessment

An additional recommendation from OHA is to: "Develop and release a final Public Health Assessment report which will include all previous sampling data, pesticide application data from 2009-2011 and air sampling data collected by the EPA." If valid air sampling results are obtained, there should be other exposure information for use in any analysis. Syngenta suggests that issues with the Interim Report must be resolved to ensure the best available data is used and that sample design problems are identified to substantiate data reported are of maximum quality.

An extensive data base, reviewed by worldwide regulatory authorities has repeatedly shown atrazine to not pose a risk to humans from exposure to environmentally relevant concentrations. Some of the community member's urine data used in the Interim PHA is of questionable origin and quality, and additional high quality, up-to-date data must be included before robust scientifically derived conclusions can be made. Regulatory Science Reviews from authorities around the world continue to confirm the safe use atrazine, and Syngenta looks forward to discussing the atrazine data and these comments in the near future.

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