



Agenda

DATE 5/6/16 TIME 11:35am

SERVED BY David Chapman

RECEIVED BY [Signature]

MAYOR'S COMMITTEE ON DISABILITY

THURSDAY, MAY 19, 2016

10:00 A.M.

CITY COUNCIL CHAMBERS

200 LINCOLN AVENUE, SANTA FE, N.M.

1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF THE AGENDA
4. APPROVAL OF MINUTES: FOR THE APRIL 21, 2016 MEETING
5. PUBLIC COMMENTS (15 MIN. TOTAL)
6. NEW BUSINESS
 - a) INTEGRATED PEST MANAGEMENT – VICTOR LUCERO, CITY OF SANTA FE IPM PROGRAM MANAGER, ROBERT CARTER, PARKS & RECREATION DIRECTOR AND RICHARD THOMPSON, PARKS DIRECTOR
7. OLD BUSINESS
 - a) MCD SUB-COMMITTEE REPORTS
 - b) TAXI UPDATE – AURORE BLECK
 - c) COMMUNITY DAY SUMMARY & GUIDE TO ACCESSIBILITY – AURORE BLECK
 - d) PROW TRANSITION PLAN UPDATE – DAVID A. CHAPMAN
 - e) SECOND STREET AND CERRILLOS ROAD UPDATE – DAVID A. CHAPMAN
 - f) NCRTD AND SFT FEASIBILITY STUDY UPDATE – DAVID A. CHAPMAN

ITEMS FROM MEMBERS AND STAFF (3 MINUTES)

- g) ADJOURN

NEXT MEETING JUNE 16, 2016

PERSONS WITH DISABILITIES IN NEED OF ACCOMMODATIONS, CONTACT THE CITY CLERK'S OFFICE AT 955-6520, FIVE (5) WORKING DAYS PRIOR TO MEETING DATE.

THIS IS A FRAGRANCE FREE MEETING

****Please notify Marcia Bowman, Chair at 438-4382 and/or David A. Chapman, ADA Coordinator/Liaison, at 955-2012 if you are unable to attend.**

**SUMMARY OF ACTION
MAYORS COMMITTEE ON DISABILITY
CITY COUNCIL CHAMBERS
200 LINCOLN AVENUE
Thursday, May 19, 2016**

<u>ITEM</u>	<u>ACTION</u>	<u>PAGE</u>
CALL TO ORDER		1
ROLL CALL	QUORUM	1
APPROVAL OF AGENDA	APPROVED	1-2
APPROVAL OF MINUTES April 21, 2016	APPROVED	2
<u>NEW BUSINESS</u>		
INTEGRATED PEST MANAGEMENT	INFORMATION/DISCUSSION	3-7
PUBLIC COMMENT	INFORMATION/DISCUSSION	7-9
<u>OLD BUSINESS</u>		
MCD SUBCOMMITTEE REPORTS	INFORMATION/DISCUSSION	9-10
TAXI UPDATE	INFORMATION/DISCUSSION	10
COMMUNITY DAY SUMMARY AND GUIDE TO ACCESSIBILITY	INFORMATION/DISCUSSION	10
PROW TRANSITION PLAN UPDATE	INFORMATION/DISCUSSION	10
SECOND STREET AND CERRILLOS ROAD UPDATE	INFORMATION/DISCUSSION	11
NCRTD AND SFT FEASIBILITY STUDY UPDATE	INFORMATION/DISCUSSION	11

**ITEMS FROM MEMBERS AND
STAFF**

INFORMATION/DISCUSSION

11

ADJOURNMENT

ADJOURNED

12

**MAYORS COMMITTEE ON DISABILITY
CITY COUNCIL CHAMBERS
200 LINCOLN AVENUE
Thursday, May 19, 2016, 10:00 am**

1. CALL TO ORDER

The meeting of the Mayor's Committee on Disability was called to order by Marcia Bowman, Chair at 10:00 am on Thursday, May 19, 2016, at City Hall in the City Council Chambers, 200 Lincoln Avenue, Santa Fe, New Mexico.

2. ROLL CALL

MEMBERS PRESENT

Marcia Bowman, Chair
Aurore Bleck, Vice Chair
Dave McQuarie
Julie Tambourine
Mary McGinnis
Michael Wirtz
Nancy Pieters

MEMBERS ABSENT

Meriam Jawhar, Excused
Coby Livingstone, Excused

OTHERS PRESENT

Councilor Rene Villarreal
David Chapman, City of Santa Fe Staff Liaison
Victor Lucero, Parks Department, Pest Management
Rob Carter, Parks and Recreation Department Director
Richard Thompson, Parks Department
Sign In Sheet of Members of the Public Attending incorporated into these minutes
as Exhibit "1"
Elizabeth Martin, Stenographer

3. APPROVAL OF AGENDA

Chair Bowman asked that Public Comments be moved to below New Business

MOTION A motion was made by Mr. McQuarie, seconded by Mr. Wirtz, to approve the agenda as amended.

VOTE The motion passed unanimously by voice vote.

4. APPROVAL OF MINUTES
April 21, 2016

Chair Bowman said on page 1 it should say everywhere she looked in Ecuador.

Mr. Wirtz said page 13, the first sentence, it should say he may not follow the Resolution in its entirety.

Chair Bowman said on page 4 it should say David asked.

Mr. McQuarie said on page 1, under others present, it should say Joseph Maestas. On page 1 Chair Bowman said Ron Ortiz Dinkel, on page 7, strike register, on page 10, paragraph 7, it is an ADA compliant.

Chair Bowman said on page 8 please clarify by adding names.

Mr. Bleck said on page 5, paragraph 7, it should say will be in limbo. On page 8, first paragraph, it is Transit Advisory Board, on page 10, second paragraph, it is Transit Advisory Board.

Ms. Tambourine said we all appreciate our stenographer and her input, however it would be helpful if we could have more quotes and not summarizing. She would like to request verbatim minutes.

Chair Bowman said she did not want to read that much.

Ms. Tambourine said she would like to add that she has to speak for people who are homeless and homeless Veterans. She would like what she said in detail included in the minutes out of respect for them. There are many Veterans who are disabled by neuro toxins. Veterans tell her parks are their living room and that is relevant to this discussion. Also she spoke about a serious issue at the Chavez center. She would like the detail of those statements about the family bathrooms that the disabled have to use. She also spoke about working very closely with Rob Carter on issues and having regular meetings with him and staff.

MOTION A motion was made by Ms. Bleck, seconded by Ms. Pieters, to approve the minutes as amended.

VOTE The motion passed unanimously by voice vote.

5. NEW BUSINESS

A. INTEGRATED PEST MANAGEMENT PROGRAM

Ms. Tambourine stated that if Mr. Lucero used his video presentation she and others will have to leave the meeting due to sensitivity issues.

Mr. Lucero said he will do presentation without the screen part of the presentation. He introduced himself as the Integrated Pest Management Manager for the City of Santa Fe Parks and Recreation Department. He said he wanted to present to this Committee what he presented to the Public Works Committee with respect to Integrated Pest Management. He asked that the Committee bear with him as he reads to them what his slides indicated.

Mr. Lucero reviewed his presentation which is incorporated herewith into these minutes as Exhibit "2".

Chair Bowman asked what chemical controls have you used in the last month.

Mr. Lucero said since he started last year he has requested and initiated a herbicide application once and will provide the Committee with the exemption and documentation that was given to him. The application was on Rufina Street on the medians minus the medians at Thomas Ramirez Elementary School and far west median.

Chair Bowman asked what was used.

Mr. Lucero referred to his memo which is incorporated herewith to these minutes as Exhibit "3".

Elisa Boyles, a member of the audience, asked what weeds were you trying to eradicate and what time of day did you spray.

Mr. Lucero said it was on 4-23-16, the notice was on 4-19-16, the time was 8:15 am, it was terminated at 10:30 am, it was 51.5 degrees F, the wind velocity was 1.8 miles per hour from the east. It was annual grasses. He referred to his memo.

Ms. Tambourine said if you are not familiar with the IPM Ordinance he is reporting his record keeping, and is establishing that he has met those requirements.

Chair Bowman asked is this the only chemical you have used within the city.

Mr. Lucero said yes, since his employment

Chair Bowman asked have there been any contractors using chemicals in the City.

Mr. Lucero said the Railyard Corporation hired a contractor to do their landscaping services who sprayed the area by the restrooms. It was unknown by him until he received emails and phone calls asking him why he lied about his pesticide applications and why was he spraying near the public restrooms in the Railyard Park. He investigated. He then met with the Railyard Corporation and the contractor, went over the IPM Ordinance with them and informed them that they were in violation of the Ordinance.

Ms. Tambourine asked who was at that meeting.

Mr. Lucero said he was there with Bob Siqueiros the City Project Manager for the Railyard and Railyard Corporation representatives.

Ms. Tambourine asked who is the contractor.

Mr. Carter said we cannot divulge the name of the contractor.

Mr. Lucero said after explaining and working through the details, they admitted what they did and we immediately ordered a cease and desist.

Chair Bowman asked as far as you know that is the only other application in the City

Mr. Lucero said on his charge yes. They have to go through his office to do that.

Ms. Tambourine said we do have an Ordinance and need to abide with it. When you are implementing IPM it takes cooperation among everyone. We have to have our citizens involved in this too. She has worked with the City to get volunteer weeders together. Thank you for being here today from the City. She and Rob are working on getting a volunteer task force together to recruit and get volunteers to weed and support the City in this. In the IPM Ordinance, which is a law, the City is to have a strategy in place on City owned property. It says the IPM Coordinator shall keep records of all pesticide activities for two years in his department and five years in the archives. That includes the name and address of the pesticide applicator. The City is not disclosing who the contractor was at the Railyard. Under the City Integrated Pest Policy it talks about pest elimination on City property. It says the City exercises its power to ensure purchases and public monies are used in compliance with the Ordinance. That would apply to the lease agreement.

Mr. Lucero said that is correct and that is why he met with the Railyard Corporation. They are the lessee.

Ms. Tambourine said you talked about the City's ongoing responsibility for conducting education programs.

Mr. Lucero said he is having an IPM event this Saturday at the Railyard Park on identifying pests and other items. Everyone is welcome.

Ms. Tambourine said the implementation of the City Integrated Pest Policy has to comply with the Ordinance. It gives thirty days to have a revised plan. Regarding lease agreements, when the City enters into a new lease agreement or extends terms, they have to require the lessee to comply. One of the things listed is that the lease shall identify their IPM contact person. When did the Railyard last do that.

Mr. Lucero said during his tenure, on May 9th. He is the IPM contact person.

Ms. Tambourine said it appears that there needs to be an IPM contract person with the Corporation that is leasing. If you are unaware of one the City should have taken action to get one.

Mr. Carter said Victor is the IPM Manager for the City of Santa Fe so he oversees all of the properties of the City. He maintains every piece of IPM needed for the City.

Ms. Tambourine said so Victor is responsible for the failure by not knowing about it.

Mr. Carter said no, this was the Corporation and the contractor who were unaware and we took care of the situation as soon as we could.

Ms. Tambourine said the lessee shall comply with the Ordinance. Obviously the Railyard did not do that. This is what happens when we don't work together and point fingers. You can point all kinds of ways that the City did not do what they should. Do you have the date.

Mr. Lucero said no, not with me.

Ms. Tambourine asked are they telling you it was just one application or more.

Mr. Lucero said they are telling me one application.

Mr. Tambourine said the difficulty is that within twenty four hours of the time that the information is requested, the City is supposed to provide it. Pest management records shall be made available to the public within twenty four hours. You now have information about what happened three weeks ago. She is the one who was poisoned by the pesticides that were put down. You have this information and it should be provided within twenty four hours which you have now been given. She has been working with Rob very closely and has a great rapport with him. She has 100%

confidence in him and his staff, but we have a major problem here that has already caused serious consequences. She is not represented by an attorney. She cannot get the City Attorney to meet with her. She needs help. She cannot get this information and it should be available. It is not being given.

Mr. Carter said we are waiting on the information from the contractor and the Railyard Corporation so we can add it to our records. Please understand they have been notified, told to cease and desist and they cannot use any pesticides on the property in the future.

Ms. Tambourine said this is a case in point and shows what happens when we don't all work together. It is a much bigger problem in communications than just Mr. Lucero. She is being given two dates from the Railyard and has not been given any other information. She is being told it was Round Up that was used and that is toxic to bees. It persists in the soil. She doesn't know how many other people are being exposed. She thinks someone needs to hear that yesterday she was trying to get information from the Railyard to give to her Doctor. Her Doctor told her she needs to be in bed or hospitalized immediately and it is life threatening. She can't get information. We need to all work together. She is employing those of us who can take action to support Mr. Lucero and the City and give them crews to help pull these weeds and avoid these pesticides if possible. If not, Rob Carter and his crew are going to do their job.

Mr. Lucero said the types of control efforts in IPM are not going to go away. He wanted to remind everyone that Integrated Pest Management is just what its name says, integrated. He has created a website and would like to point out that from that website he has had several people call him and deal with him one-on-one on issues. The website has information about what IPM is and about notifications and the Ordinance. One day prior notice is to be given, however, he puts notices up 72 hours ahead. Some concerns have been misinterpreted and miscommunicated. Everything he does in the public sector is public information. He has nothing to hide and is trying to be as transparent as possible.

Ms. Bleck asked might there be other lessees who are not aware of the Ordinance.

Mr. Lucero said he does not know of any but will do his best to contact Department Heads within each City Department and investigate.

Mr. Wirtz asked what is the website.

Mr. Lucero said go to the City of Santa Fe, Parks and Recreation, then scroll down to IPM and click there. It is there. It also suggests links like the Environmental Protection Agency, insect ID websites and others.

Ms. Tambourine said she would like to make a statement to think about and talk

about in the future. On the memo it says request for pesticide exemption and it says these manual efforts have failed to remove growing points thus the request for an exemption. She suggests in the future that you explore the volunteer continual weeding and use that. Can you get the information on who the contractor was and how much chemical was used.

Mr. Lucero said it is a legal issue.

Ms. Tambourine said when she went to the City Attorney's office she was told that the City Attorney can't talk to you. The City Attorney's job is to protect the City. Think about what it means to protect the City. When you have someone who has been poisoned and you won't give them the information they need we are not helping the citizens. We want to get well. We are really sick. We need to stand down from our anger. Please use this situation as a means to come together to work with the City and make our City clean, attractive and pest free.

Ms. Tambourine asked if she could have permission to send around a sign up sheet for volunteers weeders.

Chair Bowman said yes you can.

Chair Bowman said we will now open this up to public comment. We have a long agenda and have fifteen minutes set aside for public comment. No one will be given more than two minutes.

6. PUBLIC COMMENT

David Curley said you defined a pest as something that harms people, animals or the environment. The purpose of any use of chemicals is pestilent. It kills bees and sickens dogs. It harms people susceptible to pesticides. That needs to be removed from your tool box.

Paul Paryski said he thinks the Sierra Club would like to be assured that no toxic chemicals have been used and suggests that the City might consider adopting a precautionary principal in the products bought and used. The products should have to be proven nontoxic and perhaps consider a ban on such products as Roundup.

Arthur Firstenberg said what he is not hearing so far is what are your plans for using cautionary pesticides. Are you planning to use more of it on medians and parks. You said in Public Works that you are planning on using it north of the Convention Center.

Mr. Lucero said the plans for using pesticides are per the IPM guidelines and

used if the pest population deems a need for a pesticide. He can't tell you where because it would be in areas where perennial weeds are targeted. He is glad to post on the website when we may do it. Today we don't have a plan to spray pesticides. If we do, we guarantee they will be based on the protocol guidelines at IPM.

Mr. Firstenberg asked will you be using any at the Convention Center.

Mr. Lucero said we are using manual labor and thermal cultivation. It will probably be an area to evaluate. Plans change. With respect to the injection of tree pests it is disturbing to see spray drift. The technology exists to completely eliminate that drift. One of the intended pesticides he would like to test on elms is Azidicthin. The Intent is not to make a toxic environment. He loves this town but as an IPM professional he has to follow the signs. Our elms are in decline. This is an opportunity to intervene on their behalf with injections of low doses.

Sondra Goodwin said even though plants are wind pollinated, bees will collect pollen from them. The bees get on the corn she grows in her garden. When she sees all the dandelions she thinks they are beautiful. She collects the seeds and brings them to her garden. The grass here is a plant out of place. It uses a ton of water. We need to rethink and educate the public. Bees are important. If people can't enjoy their basketball game because they get pricked, she can't enjoy her parks because she can't sit down due to poison. She would like a citywide ban on all pesticides and chemicals. It needs to change.

Ann McCampbell said she has been head of the IPM Taskforce, a citizen group who works with the City. We helped develop the Ordinance. We went through two years of Resolutions and three years of meetings on managing weeds. The decision was that the City was not going to manage their weeds with pesticides. She is impressed with the credentials of Victor. Except for bringing nonnative agents to kill weeds. Santa Fe does not want classical management. We don't want pesticides of any kind. Former Councilor Bushee was the sponsor of the Ordinance. There was an email from her to Mr. Carter that the intent was not to use pesticides to deal with weeds. Mr. Carter responded that he would do everything in his power to not use harmful things. This is a departure from the intent of the Ordinance. We have always worked with the IPM Coordinator. Victor did not come to the meeting they arranged. We were told we have to file a public information request to the Department for information.

Caline Wells said she is a native New Mexican. She grew up with goat heads and choyo. Now she has a child she takes to the park but it is often impossible. When she heard of the possibility of parks being sprayed she was alarmed. She is a substitute teacher and is at the schools often. A few people she talked with who are parents are very concerned if playgrounds are an option for pesticides. It is a real concern.

Chair Bowman said they said there are no plans to do that.

Ms. Wells said she would like a guarantee.

Chair Bowman said they said they would give a 72 hour notice.

Ms. Wells said she read last night that these chemicals should not be near a public water supply. We need notification for four hours after spraying as well.

Adele Rosen said we are like a little microcosm of the world here. When you walk into big stores all you see are chemicals. It goes far beyond the City and what they are doing. There is no separation between a drop of poison going into water and insects on the water. The world is in an extreme state.

Elisa Boyles asked regarding Adopt the Medians does that fall within the IPM as well.

Mr. Carter said the Adopt a Median program is run through the Keep Santa Fe Beautiful part of the Public Works Department. We work with them diligently to make sure they are following the Ordinance. We are working right now on developing a new program called an Adopt a Park program. Maybe some of you would like to adopt a park to help maintain and pull weeds to keep us from having to use anything. We are looking at ways to not use pesticides. We would love to get rid of the use of pesticides and herbicides.

Luka Boles said pesticides should not be used. They kill bees and they hurt bees who come to the parks. Stop spraying pesticides. Burn up the pesticides and try to stop using them.

Chair Bowman said she is an organic gardener and beekeeper but she does believe these guys are trying. Thank you all for coming.

7. OLD BUSINESS

A. MCD SUBCOMMITTEE REPORTS

Transportation

Ms. Bleck said she has nothing to report except that the members of the Transit Advisory Board have not been renewed except for Mary. We are continuing to serve.

Media

Ms. Tambourine said she had a meeting with Rob Carter about the issue at the Chavez Center. David is involved too. We have been talking about the issue of the

Supremacy Clause. Under that any state law or Ordinance that becomes law, if there is a conflict or interference with Federal law that makes any state law or city Ordinance unconstitutional and unenforceable. The issue is the three family bathrooms with showers in them. They have disability placards on them. They are for people with disabilities. We need those family bathrooms for access.

Chair Bowman asked what does this have to do with publicity.

Ms. Tambourine said she should have made these statements under comments.

Plan Review

Mr. McQuarie said we have not reviewed any plans this month. Regarding the bus center we reviewed previously and gave a negative review, we cannot approve plans without knowing about the shelters. We have to know. He understands from some city employees that different divisions are going ahead and doing the street. They will not be compatible with regulations. Federal regulations say they cannot make a barrier. He has requested this Committee notify the City that they are in violation of Federal regulations and that they need to return the grant to the Department of Transportation. They are not making the area accessible. They are starting to do things without our review and comment like the bus center at the mall. We have not received the plans. Where is it going.

B. TAXI UPDATE

Ms Bleck said Mr. Martínez offered to help train the cab drivers for the accessible cab. We sent an email to Mr. Knowles and he wrote back that he can take care of it. It is up and running. Maybe David can contact the lady with Highlights to take pictures of the accessible cab for the City website.

C. COMMUNITY DAY SUMMARY AND GUIDE TO ACCESSIBILITY

Ms. Bleck said she was there from 9:30 to noon. Everything went well.

Mr. Chapman said it all went extremely well. He appreciated everyone's participation. He gave out almost all of the brochures.

D. PROW TRANSITION PLAN UPDATE

Mr. Chapman said we have a summary of the kickoff meeting we had. He has prepared a dictionary of terms. The group will be reviewing that via a conference meeting next week and he will keep Mr. McQuarie in the loop on that.

E. SECOND STREET AND CERRILLOS ROAD UPDATE

Mr. Chapman said we had a meeting and looked over the plans. It is 60% to 70 % complete. He has given it to Mr. McQuarie for review and will get with him. It is happening. The project is scheduled to start next July, 2017. They expect it to take 90 days.

Mr. McQuarie said he looked quickly at the plans and for the most part they look pretty good. They don't show clarity on the plans of where the pedestrian walkway will be in reference to the location of the bus stop. The shelter takes up the whole space so there is no pedestrian route. That may have to be corrected some. It is mandatory to have certain signs at a bus facility. There is no indication of that required signage. They need to include it. It shows the western curve of the road. They don't locate the eastern curve. Where is the bus stop for there.

F. NCRTD AND SFT FEASIBILITY STUDY UPDATE

Mr. Chapman said an RFP was issued May 9th and is due back by June 6, 2016 for the study. The evaluation will be done between June 13th and June 18th. July 8th is the anticipated date for the award. There is a link to that RFP he can give to the Board. It is 48 pages.

8. ITEMS FROM MEMBERS AND STAFF

Mr. Wirtz said he is sure glad he asked Victor Lucero to show up today. It was a fantastic meeting. We will go from there.

Ms. Tambourine said it was a tough meeting . Everyone did excellent.

Ms. Bleck said last month we talked a bit about people complaining about the Pacheco Post Office. She called in a detailed complaint. They took out the benches.

Ms. Pieters said they just put them out back and are not even using them.

Ms. Tambourine said she had a meeting with Deputy Chief of Police Andrew Padilla. It is important that people explain why it is important for people with disabilities to participate in active shooter training. He gets it. We need to be present to explain to officers and people getting training to make sure they know about disabled people getting out of buildings. We all have invitations to participate in the meetings. She will get that information to the Board.

Chair Bowman said her class is starting up again Wednesday, May 25th.

9. ADJOURN

The meeting adjourned at 12:00 noon.



Marcia Bowman, Chair



Elizabeth Martin, Stenographer

35. Lisa Bello FNP Nurse Practitioner Health Care Provider 474 4917 liabello6@gmail.com

A	B	C	D	E
1	Date: May 19, 2016	Wednesday, May 18, 2016		Topic: Integrated Pest Management Policy
2	Rahima Schmal, PhD	Psychologist / self	Rahima 236@gmail.com	Mayor's Committee on Disability
3	Name	Organization	Phone	E-mail Address
4	Carol Williams	Psychologist / self		cw117am@comcast.net
5	Howard Bleicher	SELF		HOWARDBY@COMCAST.NET
6	Vina Lodes	"		Above
7	DANIEL FERNANDEZ	Governor's Commission on Disability	476-0415	daniel.fernandez@state.nm.us
8	MARCUS C. KURT			mccurk1017@gmail.com
9	PAUL PRYSKI	Sierra Club	992-1984	PPARYSKI@AOL.COM
10	DAVID CURLEY	ROSE GARDEN	773-248	CURLEY300@GMAIL.COM
11	ANNE CURLEY	DECKKEEPER RETOWNER	"	"
12	Adele Rosen	Advocate Against Poison	231-0843	adrosen@comcast.net
13	CORINA VAN TOWTEN	Bee Keeper throughout garden	660-3718	CORINACORINE@aol.com
14	James Cape	Beetle Watch		jamcape@aol.com
15	James Cape	Beetle Watch		
16	Dennis Carroll	KSFR Radio News	231-0852	Carroll.news1@gmail.com
17	Tawnya Laveta	self	660-7779	TLAVETA@gmail.com
18	Ranella Phillips	SELF	466-3837	randana49@yahoo.com
19	Shenequa Lawrence	NCS Task Force cochise	479 4506	raue-earth@cybermesq.com
20	Ann McCampbell MD	IAM Task Force	466-3632	Dr Ann MCC@aol.com
21	Kitty (Kathryn) Sherlock	Unitarian Universalist - Environmental Task Force	473-9095	KCSherlock43@yahoo.com
22	Arthur Firstenberg	NPM Task Force	471-0129	bearsfar@fastmail.fm
23	Michael Blasman	Doctors Without Borders (pastor)	983-8706	michaelblasman@gmail.com
24	Christa Obuchowski	self	984-1879	christaj@mac.com
25	Roberta Brito	city of SF	955-6554	
26	Mike Beste	SF Resident	983-9090	mbeste@msn.com
27	Maureen O'Dowd	SF Resident	473-0124	maureenodowd@hotmail.com
28	GUDRUN HOERIG	SF Resident	466-2115	gudrunhoerig@gmail.com
29	Kathleen Polich, Esq. RN	SF resident	304557043	kpolrich@hstbail.com
30	Alice Ladage PhD	Pastoral Counseling Ctr	476-6791	Aladage@aol.com
31	JACKIE WOODEN	SF resident	5033183819	
32	Caline Welles	SF Resident	505-820-1511	Calinewelles@gmail.com
33	Sandra Goodwin	SF resident		lip2@hotmail.com

31 Elisa Boyles 505.603.1366 eboyles@gmail.com
 32 Casey Mickelson SF Resident/owner Downtown Subscription cmjckey@gmail.com
 33 Linda Wiener self-IPM specialist in private practice 505-884-2391 thebug lady@aol.com
 34. Mary Rives self 413-210-7757 Rives@gmail.com

Exhibit

	NAME (PRINT)	ORGANIZATION	PHONE	E-MAIL ADDRESS
(35)	Peter Moom	Ste Resident		noom.peter@gmail.com
(36)	Chris O'Kiz	C.O.S.F.		
(37)	Bill / Xbn	STE RESIDENT		
68	Anna Hansen	ST River Commissioner		dahindeesegno@ 9820155 newmexico.com
(39)	Marjorie Young	MCS Task Force	438-3779	marjorieyoung 2308@gmail.com
40	John Otter		699-8329	johnotter@q.com
41	Suzanne Otter	Santa Fe Resident	505-471-9073	suzanne.otter@gmail

City of Santa Fe, New Mexico

memo

Date: April 13, 2016

To: Richard Thompson, Parks Division Director

From: Victor Lucero, IPM Program Manager

RE: Request for Pesticide Exemption (Rodeo, Zaltys) On Rufina Street Medians
For Vegetation Management

Item & Issue:

Traffic medians including crack and crevice on hardscape portion of the medians on Rufina Street are infested with both annual and perennial weeds. Previous efforts to manage vegetation include mechanical control using string trimmers, hand pulling, grubbing with pick mattock, hoes and shovels. Flame cultivation and the use of weed barriers have also been executed. These efforts have failed to remove growing points thus the request for exemption to use herbicide for chemical control.

Trade name of herbicides requested for use for post emergent control:

Rodeo herbicide; Active ingredient, 53.8 % glyphosate isopropylamine salt; EPA Reg. # 62719-324

Application Rate: 8.0 ounces per 4 gallons water

Zaltys WDG herbicide; Active ingredient, flumioxazin 51%; EPA Reg. # 59639-120-91234

Application Rate: 1.0 ounce per 4 gallons water

The following protocol will be followed:

1. Notice will be via IPM web page, telephone and signage at east and west ends of Rufina St.
2. Posting/ notice will be on 4/19/2016 for schedule application date of 4/23/2016.
3. Posting/notice will remain for 5 days post treatment.
4. Application by certified applicator, Victor Lucero, NMDA Lic. No. 64386.
5. All manufacture label and safety requirements will be followed.
6. Application will be cancelled if weather conditions are unfavorable (wind/rain).
7. Two medians closest to Ramirez-Thomas school will not be treated.
8. Low volume back pack sprayer will be used as delivery system.
9. Record of application will be filed per NMDA requirements.

Action Recommended:

For your review and approval: ☒ Approved  Date: 4.13.16

Cc: IPM Mgr. File

Exhibit "2"

Business/Agency Name

Address, Phone Number

Date: 4/23/16

Time In: 8:15 a.m.

Time Out: 10:30 a.m.

Customer Name (Contact Name): S.F. Parks Dept.

Application Address/Location: Rufina Street Medians

City, State: Santa Fe, NM

Pesticide Name	EPA Reg. No.	Active Ingredient %	Mix Rate	Total amount applied
1. Zaltys	59639-120-91234	Flumioxazin 51%	1.0 oz / 4 gal	8 gallon
2. Rodeo	62719-324	glyphosate 53.8%	1.5 % v/v / 4 gal	8 gallon
3.				
4.				
5.				8 gallons total

Pesticide	Specific Target Pests	Sites of Application and Comments
1.	Annual - Perennial Weeds	Rufina St. Medians ** see comments
2.	Annual - Perennial Weeds	Rufina St. Medians "
3.		
4.		
5.		

Temperature: 55.1 F Wind Velocity: 1.8 mph Wind Direction: E

Applicator's Full Name, License Number: Victor S. Lucero 64386

Further Information Concerning Application:

*** Did not apply pesticide to 2 medians at Ramirez-Thomas school and gravel bed on median west of Rufina St. and Calle Atajo.

Zaltys @ 1.0 oz / 4 gallons H₂O

Rodeo @ 1.5% v/v / 4 gallons = 7.68 oz / 4 gallon dilution

Total Spray Solution = 8 gallons H₂O, 2.0 oz Zaltys, 15.36 oz Rodeo, as tank mix.

Target Pests: annual + perennial weeds.

Category	Product Name	Pesticide Use Limitations	Target Pest	Click and Print		EPA Reg. No.	Ingredients	Potential site	Caution
Insecticide	Advion Ant Bait	DO NOT TREAT AREAS THAT ARE EASILY ACCESSIBLE TO CHILDREN AND PETS. Do not apply ant gel to areas where food/feed, food utensils or food processing surfaces may come into contact and become contaminated.	Broad spectrum: controls all key Street Feeders, PLUS additional species	View Label	View MSDS	352-748	Indoxacarb 0.05%	Used in building storage or office areas.	Caution
Insecticide	Advion Cockroach Bait		large and small cockroaches	View Label	View MSDS	352-668	Indoxacarb 0.05%	Used in and around building areas as BAIT STATIONS	Caution
Insecticide	Advion Ant Bait Arena	Placement of 1-4 ant bait arenas where ants are observed inadequate to control normal ant infestations.	foraging ants, Fire ants or harvester ants, use a broadcast/dired mound treatment product.	View Label	View MSDS	352-664	Indoxacarb 0.1%	Used in and around building areas as BAIT STATIONS	Caution
Insecticide	Advion Cockroach Gel Bait	DO NOT TREAT AREAS THAT ARE EASILY ACCESSIBLE TO CHILDREN AND PETS. Do not apply ant gel to areas where food/feed, food utensils or food processing surfaces may come into contact and become contaminated.	All prevailing pest species of cockroaches	View Label	View MSDS	352-652	Indoxacarb 0.6%	Used in building storage or office areas.	Caution
Herbicide	Aquamaster	May damage non-target plants. Use for emergent plants in ponds, lakes, drainage canals, and areas around water or within watershed areas. Only as a last resort when other management practices are ineffective.	Only effective on actively growing plants	View Label	View MSDS	524-343	glyphosate, isopropylamine salt 53.8%	Medians and pathways. Use in specific areas for required line of site applications or site visibility.	Caution
Insecticide	Summit B.T. Briquets		Mosquitoes & Psychodid Flies	View Label	View MSDS	6218-47	Bacillus thuringiensis subsp. israelensis solids, spores and insecticidal toxins	Used in retention/detention water holding areas	Caution
Herbicide	Transline	no grazing restrictions following applications with Transline when used at labeled rates.	Control of broadleaf weeds and woody brush in non-crop areas, forest sites, wildlife openings including grazed areas. Selective to warm- and cool-season right-of-way grasses including fescue, brome and native grass species. Excellent selectivity, allowing it to be used over many conifers and hardwood species	View Label	View MSDS	62719-259	clopyrrolid 40.9%	Medians and pathways. Use to control broadleaf weeds and woody brush species. Safe to use around trees	Caution
Herbicide	Pendulum 3.3 EC	Pendulum will not control established weeds, it is a pre-emergent. Yellowing agent can stain hard surfaces	OIL BASED formulation of pendimethalin and controls over 40 types of broadleaf weeds and target grasses.	View Label	View MSDS	241-341	pendimethalin 37.4%	Medians and pathways. Use in specific areas for required line of site applications or site visibility.	Caution
Insecticide	Andro Insecticide Ant Bait	2 - 5 tablespoons around mound	Mound Ant Control	View Label	View MSDS	241-322	Hydramethylnon .073%	Mound building Ant control in parks	Caution
Herbicide	Tenacity		pre-emergence and post-emergence herbicide - weeds and grass species	View Label	View MSDS	100-1287	Mesotrione 40%	Medians and pathways. Use in specific areas for required line of site applications or site visibility.	Caution
Herbicide	Quickcalver		Control of silver-chinned moss occurring on golf course greens and tees	View Label	View MSDS	279-3285	Carfentrazone-ethyl	Golf Course applications	Caution
Fungicide	HERITAGE G	Do not apply directly to water, or to areas where surface water is present. Caution must be followed when disposing of equipment washwater or rinsate.	Control of turf diseases in lawns around residential, institutional, public, commercial and industrial buildings, turf areas of parks, recreational areas and athletic fields, and golf courses. See Label for specific fungal diseases and rates of application	View Label	View MSDS	100-1323	Azoxystrobin: Methyl(E)-2-(6-(2-cyanophenoxy)pyrimidin-4-ylmethyl)-3-methoxycarbonyl	For use as a preventive, must be applied prior to finding of a problem only in areas where history has been established	Caution

Herbicide	Avenge AG	Avoid contact with desirable vegetation	Control of actively growing weeds less than 6"	View Label	View MSDS	82042-4	d-limonene 55%	non crop areas including driveways, sidewalks, borders, greenhouse buildings, trees, flower beds	Caution
Herbicide	Semara	Do not irrigate one hour before or after application; Do not apply more than 24 ounces per acre per year. Do not apply to saturated soils or prior to a rain event.	annual/perennial weeds pre and post emergent	View Label	View MSDS	59638-120-91234	flumioxazin 51%	non crop areas turf and ornamental	Caution
Herbicide	Zaliga	Do not apply more than 24 ounces per acre per year; Do not reapply within 30 days.	annual/perennial weeds pre and post emergent	View Label	View MSDS	59638-120-91234	flumioxazin 51%	right of way, medians parking and storage areas, fence line, airports bare ground non-crop areas	Caution
Herbicide	Civitas WeedFREE	Do not irrigate 24 hours after application Do not apply prior to rain. Spray when weeds are young and actively growing Delay mowing 1-2 days after application	Broad leaf weeds	View Label	View MSDS	69528-15	2,4-D dimethylamine salt 0.885% Mecoprop-P, dimethylamine salt 0.573% Dicamba, dimethylamine salt 0.109%	Putting Greens and other improved turf sites.	Caution
Fungicide	Subdue MAXX	Do not apply more than the maximum season total for the active ingredient as stated on the label of the product containing the lowest seasonal total on that crop.	damping off and root-stem disease and foliar disease organisms	View Label	View MSDS	100-796	Metenocam 22%	Ornamental, greenhouse landscape, non-fruit bearing container grown plants	Caution
Fungicide	Actinovate SP	Apply prior to disease onset; follow practices known to reduce disease development	Soil borne and foliar diseases	View Label	View MSDS	73314-1	Streptomyces lydicus WYEC 108 0.0371%	Greenhouse, nursery landscape, Interscape ornamentals transplant dip soil drench	Caution
Insecticide	AzoSol	Medium Rate For preventative to medium infestations when pests are present; 2-3 tsp/1000 sq. ft.	Control of whiteflies, scale insect and caterpillar larvae, bark beetles.	View Label	View MSDS	81899-4	Azintrachin 6%	Nursery, greenhouse, landscape plants, trees	Caution
Fungicide	Phospho-Jet	For terrestrial use only	For control of Root rot, Phytophthora, Anthracnose disease organisms	View Label	View MSDS	74578-3	Phosphoric acid 45.8%	Landscape (Deciduous and Pine) trees	Caution
Insecticide	IMA-Jet	Do not apply this product, by any application method, to linden, basswood or other Tilia species in the State of Oregon.	For control of Leafhoppers, Leaf miners, Mealybugs, Psyllids, Soft scales, Trips, Whiteflies	View Label	View MSDS	74578-3	Imidacloprid 10%	Ornamental trees	Caution
Herbicide	Rodao	No Soil Activity: Weeds must be emerged at the time of application to be controlled by this product.	For control of herbaceous and woody vegetation as foliar or cut stump treatment.	View Label	View MSDS	62719-324	Glyphosate isopropylamine salt 53.8%	Rights of way, industrial sites, railroads, airports, recreational areas, rangeland, other non-crop sites	Caution
Herbicide	Gardon 4 Ultra	Do not apply directly to water, to areas where surface water is present	Control of woody plants and annual and perennial broadleaf weeds in non-crop areas	View Label	View MSDS	62719-527	Triclopyr 60.45%	Cut stump application on non-crop areas including rights of way, industrial sites, and roadways.	Caution

Tawnya Laveta <tlaveta@gmail.com>

pesticide reports and local bans

1 message

Tawnya Laveta <tlaveta@gmail.com>

Wed, May 18, 2016 at 5:25 PM

To: Tawnya Laveta <tlaveta@gmail.com>

http://nau.edu/Green-NAU/_Forms/SLM/Review-of-Herbicide-Toxicity-to-Humans/<http://www.panna.org/sites/default/files/KOF-report-final.pdf>http://www.centerforfoodsafety.org/files/glyphosate-faq_64013.pdf<https://takomaparkmd.gov/initiatives/safegrow/list-of-restricted-pesticides/>**Tawnya Laveta**

tlaveta@gmail.com

505-660-7779

Santa Fe, New Mexico

Exhibit "3"

A Literature Review of Herbicide Toxicity to Humans

Focusing on herbicides used on the Flagstaff campus of Northern Arizona University

Erin Miller: *Senior pursuing B.S. in Chemistry, Environmental Caucus, Northern Arizona University, Nov. 2012*

Abstract

With the goal of reaching scientifically supported conclusions about the health effects of the five herbicides used on Northern Arizona University's campus, this literature search was carried out over a span of several months. Scientific databases, journals, and websites were searched through for relevant, published, and peer-reviewed studies. The methodologies and results of these studies were documented. In conjunction with one another, the studies provide strong evidence of an association between exposure to a majority of these herbicides and serious health problems.

Introduction

This literature search was conducted as a project of the Sustainable Environmental Practices Action Team of the Environmental Caucus, with the intention of collecting and summarizing scientific data on the effects on human health of the herbicides used on Northern Arizona University's Flagstaff campus: Roundup Pro, Lontrel Turf and Ornamental, Pendulum Aquacap, Speedzone Southern Broadleaf, and Gallery 75 Dry Flowable. It does not specifically address the possible environmental hazards of these herbicides. Although the debate concerning herbicides' safety related to human health is ongoing, there is ample evidence of their toxicity.

In 2004, the Ontario College of Family Physicians released a literature review entitled "Pesticides Literature Review" which urges "that people reduce their exposure to pesticides¹ wherever possible," for they found "consistent links to serious illnesses such as cancer, reproductive problems and neurological diseases, among others" (1). The report's principle findings include:

- "Many studies reviewed by the Ontario College show positive associations between tumours and pesticide exposure [...]."
- "Previous studies have pointed to certain pesticides, such as [2,4-dichlorophenoxyacetic acid] and related pesticides, as possible precipitants of Non-Hodgkin's Lymphoma [...]."
- "The review team uncovered a remarkable consistency of findings of nervous system effects of pesticide exposures."

It was also consistently seen that children exposed to pesticides increasingly suffered from various cancers, including Non-Hodgkin's Lymphoma and Leukemia. While the Ontario College reviewed studies of numerous pesticides, not just those found on NAU's campus, it reported negative health effects across all brands of commonly used pesticides and herbicides. Each herbicide product is manufactured with potent ingredients that fulfill a similar task: eradicating unwanted vegetation. A trend is emerging that correlates the use of these chemicals with human illness, and this literature review is meant to shed light on the specific herbicides used on the NAU Flagstaff campus.

¹ Herbicides are a sub-category of pesticides.

Methodology

The research resources available through the Northern Arizona University Cline Library were extensively used, including the following databases: CSA Illumina, ACS Publications, SciFinder, Web of Science, and Wiley Online Library. Specific chemical names were searched for within these databases and the searches were refined, if possible, to include results pertaining to toxicology. When utilizing the SciFinder database, the Chemical Abstracts Service (CAS) registry numbers² for the chemicals present in each of the five pesticides were obtained and used for subsequent research. The list produced for each search was scoured for studies having titles and summaries focusing primarily on the targeted herbicide; these studies were then manually filtered through for definitive conclusions concerning the herbicide, positive or negative.

Additionally, the "Find Journals" link was used from the Cline Library website. This tool offered another route for the discovery of pertinent studies and information. Journals were sought out by inserting words into the search bar that were contained within or completed the title of a scientific journal (i.e. "toxicology"). A journal was selected and its issues were examined for applicable studies and articles. Google Scholar was also used to find studies by searching for specific chemicals as well as the marketed herbicides' names. When scientific studies simply could not be located for one herbicide, Gallery 75 Dry Flowable, its Material Safety Data Sheet provided an array of determined facts about the nature of its chemicals.

Initially, the "Beyond Pesticides" website was used as a source of accumulated studies relating to the toxicology of

pesticides. A number of these dealt with the herbicides specific to Northern Arizona University's campus, and were cited once confirmed as peer-reviewed sources. Also, a list of scientific terms with unknown definitions was compiled and Professor Betty Brown of NAU's Health Sciences faculty was consulted for their meanings so that each study could be understood more thoroughly.

In order to cite each source used within the report, the American Chemical Society style of citation was used which entails the following: Sources are listed numerically according to their order of appearance in the report under References; in-text, they are labeled with said numbers in parentheses.

Results

Roundup Pro (Active ingredient: isopropyl amine salt of glyphosate: 50.2%) - Non-selective herbicide

The Occupational Safety and Health Administration, or OSHA, according to its standard 29 CFR 1910.1200³, classified Roundup as "hazardous." A product of Roundup's combustion is carbon monoxide, which is a toxic gas. Two studies (2, 3) connect an increased occurrence of the cancer Non-Hodgkin's Lymphoma with exposure to glyphosate, both of which conducted case-control studies consisting of cancer registry members and randomly-selected people from the general populace. Interviews performed by professionals were held to obtain herbicide use information from each participant. Another study (4) found that certain pesticides, including glyphosate, are "significantly positively associated with current Rhinitis," or the

² CAS numbers are assigned to each chemical for ease of research concerning specific substances.

³ "Ensures that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees," according to OSHA's website.

inflammation of internal areas of the nose which may hinder sleep and the ability to learn. The subjects of this study were over 2,000 pesticide applicators from the Agricultural Health Study, and it was concluded that "exposure to pesticides may increase the risk of rhinitis."

An additional study (5) "evaluated the toxicity of four glyphosate (G)-based herbicides in Roundup (R) formulations" on human umbilical, embryonic, and placental cells: "All [Roundup] formulations cause total cell death within 24 hours." These scientists concluded that "adjuvants⁴ in Roundup formulations are not inert," but are instead active. Another study investigating the effects of glyphosate on human placental cells (6) found that it – especially in the Roundup mixture – is toxic to these placental cells "within 18 hours with concentrations lower than those found with agricultural use." They conclude that "toxic effects of Roundup, not just glyphosate, can be observed in mammals," and that "the presence of Roundup adjuvants enhances glyphosate bioavailability and/or bioaccumulation⁵."

Another study (7), citing that "cutaneous⁶ exposure to a glyphosate-containing herbicide has been postulated as contributing to Parkinsonism," conducted an experiment in which rats were orally administered single doses of glyphosate and then tested through blood samples. It was concluded that "although the bioavailability was low, glyphosate and its metabolite AMPA⁷ were eliminated from plasma slowly and therefore would be diffused to target tissues to exert systemic effects." However, the authors also state, "The

toxicokinetic⁸ characteristics of glyphosate identified in this study warrant further research on possible mechanisms of toxicity of this herbicide." A different experiment (8) "studied the effect on cell cycle regulation of the widely used glyphosate-containing pesticide Roundup," using "sea urchin embryonic first divisions following fertilization, which are appropriate for the study of universal cell cycle regulation without interference with transcription." It was shown that "0.8% Roundup (containing 8 mM glyphosate) induces a delay in the kinetic of the first cell cleavage⁹ of sea urchin embryos," calling into question "the safety of glyphosate and Roundup on human health."

The only study (9) found in the literature search that suggested Roundup presents no human health concern included studies "performed for regulatory purposes as well as published research reports." This study was conducted on behalf of Monsanto – Roundup's manufacturer – by Robert Kroes, Gary M. Williams and Ian C. Munroe. According to the Aspartame Toxicity Info Center (10), Robert Kroes and Gary M. Williams "joined with Ian C. Munroe, the president of the Cantox Health Sciences International corporate advocacy group, to work with Monsanto to review its herbicide, glyphosate" (10).

Lontrel Turf and Ornamental (Active ingredients: "Clopyralid MEA Salt": 40.9%; "isopropanol": 5.0%; "ethylene oxide, propylene oxide and di-sec-butylphenol polymer": 1.0%) – broad-spectrum herbicide for thistle control in vegetable cultivation

As listed in the Material Safety Data Sheet (MSDS), OSHA refers to this herbicide as a "Hazardous Chemical," and

⁴ Drugs or other substances that enhance the activity of another.

⁵ The accumulation within living organisms of toxic substances occurring in the environment.

⁶ Relating to or involving the skin.

⁷ Mimics AMPA receptor, which allows passage of calcium, sodium, and potassium.

⁸ What rate a chemical will enter the body and what happens to it once it is in the body.

⁹ Motion of the first cell separation.

its SARA Hazard Categories¹⁰ are both "Immediate Health Hazard" and "Delayed Health Hazard". The standards held by these organizations are listed in Appendix A. Few peer-reviewed scientific studies reporting on the safety of Lontrel could be located. The one report (11) found with a high caliber of credentials and data is titled "Teratologic Evaluation of 3,6-Dichloropicolinic Acid in Rats and Rabbits," 3,6-dichloropicolinic acid being known also as Clopyralid. The report immediately divulges the fact that its authors "performed these studies in the Toxicology Research Laboratory of The Dow Chemical Company," the manufacturer of Lontrel. Negative effects of exposure to Lontrel were reported. Pregnant rats and rabbits were fed Clopyralid at various doses and the consequences on their gestation were observed: "Pregnant rats in the 250-mg/kg/day groups gained significantly less weight than controls on Days 6 through 15 of gestation," and "the mean fetal body weight was significantly increased at the 75-mg/kg/day dose level." Additionally, there were numerous fetal alterations as a result of exposure to Lontrel's ingredient Clopyralid: "Examination of the fetuses for skeletal alterations revealed a significant increase in the incidence of bilobed centra¹¹ of the thoracic vertebra in the 15-mg/kg/day group"; "One fetus with a hemivertebra¹² and three fetuses with polydactyly¹³ were observed in the 250-mg/kg/day dose group. These alterations were considered to be major malformations. Lastly, "A significant decrease in the incidence of delayed

ossification¹⁴ of centra of the cervical vertebrae," or an unusual speeding up of bone formation, "was observed in the 75- and 250-mg/kg/day dose groups," but is "not considered to be of toxicological significance."

Pendulum Aquacap (Active ingredient: "Pendimethalin": 38.7%) – pre-emergent broadleaf

The MSDS for this specific substance presents the following information: "If product is heated above decomposition temperature, toxic vapours will be released," such as carbon monoxide and nitrogen oxides; Pendulum is "not readily biodegradable"; and OSHA states, "Chronic target organ effects reported." One study (12) was performed in hopes of either confirming or refuting other studies' conclusions about endocrine¹⁵ disrupting effects of different pesticides, as well as the facts that the US Environmental Protection Agency classified pendimethalin as a possible human carcinogen (group C)¹⁶ and as a 'slightly toxic' compound (toxicity class III). These authors found that "the higher two doses of pendimethalin, 300 and 600 mg/kg/day, elicited a small but significant increase in absolute uterine weight," which is indicative of Pendulum's ability to affect and disrupt pregnancy. Another study (13) examined the damage done by certain pesticides and found that "pendimethalin induced cytotoxicity¹⁷ in Chinese hamster ovary (CHO) cells treated for 3 hours." The report is ended with the relation of these findings to other analyses' declarations that "incidences of rectum and lung cancers are associated with

¹⁰ Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986).

¹¹ The main vertebra dividing into two lobes.

¹² Vertebra that is incompletely developed on one side.

¹³ the presence of more than five digits on a hand or foot.

¹⁴ Bone formation.

¹⁵ Glands that secrete hormones directly into the bloodstream.

¹⁶ See Appendix A, under EPA

¹⁷ The degree to which something is toxic to living cells.

pendimethalin, and that DNA damage is one of the factors for carcinogenicity."

A third study (14) evaluated "environmentally relevant, low-dose exposures to agrochemicals and lawn-care pesticides for their direct effects on mouse preimplantation embryo development," using pendimethalin, but also using dicamba, 2,4-dichlorophenoxyacetic acid (2,4-D), and mecoprop, or MCPP – all of which are ingredients present in other herbicides used on the NAU campus. It was found that "dicamba alone or combined with pendimethalin or 2,4-D and atrazine induced significant levels of cell death¹⁸." Another study (15) focused on "the potential associations between the use of a number of pesticides and pancreatic cancer" using the Agricultural Health Study cohort, which consists of "over 89,000 participants including pesticide applicators and their spouses." It was discovered that "applicators in the top half of lifetime pendimethalin use had a 3.0-fold (95% CI 1.3–7.2, *p*-trend = 0.01)¹⁹ risk compared with never users." The confidence interval (CI) relates that 95% of the time, a person's risk of pancreatic cancer was multiplied by a number in the given range (1.3 to 7.2); the *p*-trend says that this conclusion would be disregarded if its probability was any less than .01, or 1%. The authors conclude their report with the statement, "These findings suggest that herbicides, particularly pendimethalin and EPTC²⁰, may be associated with pancreatic cancer."

¹⁸ Technically, "apoptosis" or programmed cell death; necessary cell death that, for example, separates toes.

¹⁹ A study's confidence interval (CI) shows the reliability of a study's estimate; a study's *p*-trend value gives the probability of getting a test statistic that is at least as extreme as the one observed (often .01 or .05).

²⁰ A different but unrelated pesticide.

Speedzone Southern Broadleaf (Active ingredients: 2,4-Dichlorophenoxyacetic acid (2,4-D): 10.49%; dicamba: 0.67%; carfentrazone-ethyl: 0.54%; propionic acid (MCPP): 2.66%) – post-emergent broadleaf

A facet of the WHO, called the International Agency for Research on Cancer (IARC), has catalogued carcinogenic substances and compounds. It classifies "chlorophenoxy herbicides" as "Possibly carcinogenic to humans." 2,4-D, a main ingredient of Speedzone, is a part of this group.

Additionally, the MSDS for Speedzone contains the following information: OSHA refers to the substance as "hazardous"; its SARA Hazard Categories are both "Immediate Health Hazard" and "Delayed Health Hazard"; and its byproducts from combustion include carbon monoxide and nitrogen oxides. One study (16) tested the effects of phenoxyacetic acids on mice, including a mixture of 2,4-D and 2,4,5-trichlorophenoxyacetic acid. "Subcutaneous injections were given from day 6 through day 14 of pregnancy," and various health levels were recorded. Ultimately, "It was found that both preparations at the high dosage (110 mg/kg/day) were teratogenic²¹ and embryotoxic²²." A similar study (17) tested five herbicidal phenoxycarboxylic acids, including 2,4-D and MCPP which are both found in Speedzone. These authors found that "all 5 were embryotoxic and teratogenic."

The same study (14) that applied to Pendulum's ingredients also pertains to Speedzone. Again, its authors evaluated "environmentally relevant, low-dose exposures to agrochemicals and lawn-care

²¹ Able to disturb the growth and development of an embryo or fetus.

²² Adversely affecting the growth and/or development of an embryo.

pesticides for their direct effects on mouse preimplantation embryo development," using pendimethalin, but also using dicamba, 2,4-D, and (MCP). The methodology involved incubating groups of embryos "in vitro with either individual chemicals or mixtures of chemicals simulating exposures encountered by handling pesticides, inhaling drift, or ingesting contaminated groundwater." As stated before, "Dicamba alone or combined with pendimethalin or 2,4-D and atrazine induced significant levels of cell death (apoptosis¹⁸)."

Also, "The highest percentages of apoptosis were observed for embryos [...] incubated with the individual herbicides dicamba, 2,4-D, and MCP (all $p \leq 0.05$)," all of which are contained within Speedzone. Another analysis (18) "investigated the developmental toxicity in mice of a common commercial formulation of herbicide containing a mixture of 2,4-D, mecoprop [MCP], dicamba, and inactive ingredients." It was observed that "herbicide administration caused a decrease in the number of live-born pups at all dosage levels." Moreover, it was cited in this report that "A higher than normal frequency of human births with central nervous system, urogenital, circulatory/respiratory, or musculoskeletal anomalies in western Minnesota has been linked to the use of 2,4-D and other phenoxyacetic acid-derived herbicides." As a possible explanation, these authors state that "the interaction between 2,4-D, mecoprop [MCP], and dicamba leads to effects different from those of 2,4-D alone or that the inactive ingredients present in the commercial formulation have effects of their own that are more important than those of the active ingredients."

Gallery 75 Dry Flowable (Active ingredient: Isoxaben: 75%; other ingredients (kaolin and crystalline silica): 25%) – Selective pre-emergent broadleaf

Isoxaben is classified by the EPA as having "suggestive evidence of carcinogenic potential" (Class C), while the MSDS for Gallery 75 states that it "contains component(s) which, in animals, have been shown to cause liver and kidney effects. Repeated excessive exposure to crystalline silica may cause silicosis, a progressive and disabling disease of the lungs." Also, under "Cancer Information" on the MSDS, crystalline silica is said to be listed as a carcinogen under OSHA Standard 29 CFR 1910.1200; also, "an increase in non-malignant liver tumors was observed with isoxaben in one of two species tested." Gallery 75 is classified by SARA as "an immediate health hazard" and "a delayed health effect."

Very little additional scientific information regarding this herbicide could be found. The "Beyond Pesticides" website, dedicated to providing Internet links to peer-reviewed herbicide studies, presents a chart of compiled information which states that isoxaben may cause the following health effects: cancer "possible," kidney/liver damage (19). In addition, an organization titled Pesticide Action Network (PAN) calls isoxaben "highly hazardous" (20).

Discussion

Roundup Pro – Non-selective herbicide

Over the span of three years (2009-2011), an average of 1,601 gallons per year of Roundup Pro were applied to the Northern Arizona University campus.

Several studies were found to arrive at conclusions generally similar to one another: Roundup and its individual ingredients – even those labeled as inert – are correlated with an increased risk of health problems. Rhinitis and Non-Hodgkin's Lymphoma are two examples of illnesses that, based on the results of above studies, are associated with exposure to glyphosate, the main ingredient of Roundup. Two different studies found that glyphosate kills human cells – placental, umbilical, and embryonic – and another study's results reinforce a link between a "glyphosate-containing herbicide" and Parkinsonism. An extensive literature study titled "Safety Evaluation and Risk Assessment of the Herbicide Roundup and Its Active Ingredient, Glyphosate, for Humans" assembled statements made by several agencies and institutions saying, "Reviews on the safety of glyphosate and Roundup herbicide that have been conducted by several regulatory agencies and scientific institutions worldwide have concluded that there is no indication of any human health concern."

Lontrel Turf and Ornamental – broad-spectrum herbicide for thistle control in vegetable cultivation

Over the span of three years (2009-2011), an average of 1,762 gallons per year of Lontrel were applied to the Northern Arizona University campus.

Aside from the information obtained from Lontrel's MSDS, only one scientific study (11) could be found using the described methodology of this report. At

one point it states, "No single major malformation occurred at an incidence that was significantly greater than that of controls," referring to fetal alterations of the rats that were experimented on. The wording of this statement seems to imply that, while no single major malformation occurred, the cumulative malformations were noteworthy. The authors continue to describe the abnormalities that were observed in rat litters whose mothers were fed varying Clopyralid doses during gestation. For example, vertebra formation was altered in rats belonging to the 75- and 250-mg/kg/day dose groups. This observation's importance is dependent on the standard which the authors use to define "toxicological significance," which is not listed in the report. Nonetheless, there is an indication from this and other observations documented in the report that exposure to Clopyralid may be associated with fetal deformities. Moreover, it is declared in this study that the authors performed their work in the laboratory of The Dow Chemical Company, the manufacturer of Lontrel.

Pendulum Aquacap – pre-emergent broadleaf

Over the span of three years (2009-2011), an average of 1,651 gallons per year of Pendulum were applied to the Northern Arizona University campus.

In addition to the EPA's designation of Pendulum as a possible human carcinogen, studies found a correlation between pendimethalin exposure and illnesses in the uterus and embryos of test subjects – most often rats. Pancreatic cancer was also regularly found to be an effect of exposure to this herbicide. One particular study (14) looked not only at the toxicity of Pendulum's pendimethalin, but also of dicamba, 2,4-D, and MPCC (in Speedzone) on "mouse preimplantation embryo development." The fact that health

problems arose due to exposure to these individual chemicals as well as combinations of them is extremely relevant to Northern Arizona University's current grounds keeping situation, which utilizes herbicides composed of all of these substances. Also, pre-emergent broadleaf chemicals such as Pendulum are sprayed in abundance and on vast areas; this and the fact that Pendulum is not readily biodegradable (but instead remains a long term danger as residue on affected grasses) heightens the threat of Pendulum and therefore the importance of promptly curtailing its use.

Speedzone Southern Broadleaf – post-emergent broadleaf

Over the span of three years (2009-2011), an average of 5,423 gallons per year of Speedzone were applied to the Northern Arizona University campus; it is also classified by the IARC of the WHO as "possibly carcinogenic to humans."

Speedzone is also the other herbicide to which the above-mentioned study (14) pertains, for it is composed of dicamba, 2,4-D, and MCPP – the other three chemicals that produced abnormalities in embryo health. In combination with pendimethalin, Pendulum's primary ingredient, significant levels of cell death" were noticed. The most extreme levels were seen in "embryos incubated with the individual herbicides dicamba, 2,4-D, and MCPP." Aside from this study, others consistently found exposure to Speedzone's chemicals to cause disruption in the development of embryos.

Gallery 75 Dry Flowable – Selective pre-emergent broadleaf

Over the span of three years (2009-2011), an average of 4,277 gallons per year of Gallery 75 were applied to the Northern Arizona University campus.

Isoxaben – the main active ingredient of Gallery 75 – is classified by the EPA, as mentioned before, as having "suggestive evidence of carcinogenic potential." And while no scientific studies relating to the toxicity or lack thereof for this herbicide could be found, the Material Safety Data Sheet for Gallery 75 provides some information and analyses of the substance's effects on mammalian health. For example, "Repeated excessive exposure to crystalline silica may cause silicosis, a progressive and disabling disease of the lungs," and crystalline silica is "listed as a carcinogen for hazard communication purposes under OSHA Standard 29 CFR 1910.1200." Also, Gallery 75 "contains components which, in animals, have been shown to cause liver and kidney effects, including non-malignant tumors." Without further confirmation of this herbicide's toxicity from peer-reviewed research reports, the information from the MSDS seems sufficient to warrant caution regarding the overall safety of using Gallery 75 Dry Flowable.

Conclusion

Executive Conclusions	
Roundup Pro	<ul style="list-style-type: none"> • "Hazardous," according to OSHA • Associated with Non-Hodgkin's Lymphoma • Toxic to placental and embryonic cells • Inert ingredients actually active and harmful
Lontrel Turf and Ornamental	<ul style="list-style-type: none"> • "Hazardous Chemical," according to OSHA • Weight abnormalities during rat gestation with regular dosage • Skeletal problems in newborn rats whose mother was exposed
Pendulum Aquacap	<ul style="list-style-type: none"> • "Possible human carcinogen," according to EPA • "Chronic target organ effects," according to OSHA • Cytotoxic, or toxic to living cells • Pancreatic cancer associated with extensive exposure
Speedzone Southern Broadleaf	<ul style="list-style-type: none"> • "Possibly carcinogenic to humans," according to IARC; • "Hazardous," according to OSHA • Teratogenic and embryotoxic in rats (harms fetuses) • "Caused a decrease in the number of live-born pups"
Gallery 75 Dry Flowable	<ul style="list-style-type: none"> • "Carcinogenic potential," according to EPA • "Carcinogen," according to OSHA • "May cause silicosis, a progressive and disabling disease of the lungs" with lengthy exposure

Based on the conclusions of each of these published studies, one can justifiably be wary of using herbicides, especially on NAU's heavily populated campus. While differences in methodology will result in conflicting inferences, it is clear that the procedures employed by these peer-reviewed studies revealed harmful herbicide behaviors in mammalian and other relevant test subjects. Furthermore, three of the five herbicides used on campus are classified as possible human carcinogens, while thousands of gallons are being applied annually.

Analogous is the dilemma of second-hand cigarette smoke. Many endorsers of cigarettes deny the hazard of second-hand smoke. Despite this, policies are enforced to protect the public from unintentional inhalation of this smoke: signs are posted that require cigarettes to be consumed at least a certain distance from buildings, and one cannot smoke inside most establishments such as bars and restaurants. This makes quite obvious the concern of policy-makers about the hazards of exposure to second-hand smoke. Much scientific data was collected and analyzed before effort was put into the act of reducing the public's undesired contact with second-hand smoke; a similar effort could be the outcome of acknowledging the conclusions of studies like those contained in this literature review of herbicides.

The Ontario College of Family Physicians recommends that the public "avoid exposure to all pesticides wherever and whenever possible" and emphasizes "researching and implementing alternative organic methods of lawn and garden care" (1). Alternatives do exist, and a healthier environment can be created with their use. More urgently, the eradication of herbicides can save lives and preserve the health of humans. Effort must be put forth, however, to accomplish this increasing necessity.

References

- 1: Ontario College of Family Physicians. *Pesticides Literature Review*. Toronto: Ontario College of Family Physicians, 2004. Print.
- 2: Hardell, L., M. Eriksson, and M. Nordstrom. "Exposure to pesticides as risk factor for non-Hodgkin's lymphoma and hairy cell leukemia" *Leukemia and Lymphoma* 43.5 (2002): 1043-049. *Oxford Journals | Medicine | American Journal of Epidemiology*. Web. 2 Nov. 2010. <<http://aje.oxfordjournals.org/cgi/content/full/162/9/849>>.
- 3: De Roos, A. J. "Integrative Assessment of Multiple Pesticides as Risk Factors for Non-Hodgkin's Lymphoma among Men." *Occupational and Environmental Medicine* 60.9 (2003): 11e-11. Print.
- 4: Slager, R. E., J. A. Poole, T. D. LeVan, D. P. Sandler, M C R. Alavanja, and J. A. Hoppin. "Rhinitis Associated with Pesticide Exposure among Commercial Pesticide Applicators in the Agricultural Health Study." *Occupational and Environmental Medicine* 66.11 (2009): 718-24. Print.
- 5: Benachour, Nora, and Gilles-Eric Seralini. "Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells." *Chemical Research in Toxicology* 22.1 (2009): 97-105. Print.
- 6: Richard, Sophie, Safa Moslemi, Herbert Sipahutar, Nora Benachour, and Gilles-Eric Seralini. "Differential Effects of Glyphosate and Roundup on Human Placental Cells and Aromatase." *Environmental Health Perspectives* 113.6 (2005). Print.
- 7: Anadón, A., M.R. Martínez-Larrañaga, M.A. Martínez, V.J. Castellano, M. Martínez, M.T. Martín, M.J. Nozal, and J.L. Bernal. "Toxicokinetics of Glyphosate and Its Metabolite Aminomethyl Phosphonic Acid in Rats." *Toxicology Letters* 190.1 (2009): 91-95. Print.
- 8: Marc, J., O. Mulner-Lorillon, S. Boulben, D. Hureau, and R. Bellé. "Pesticide Roundup Provokes Cell Division Dysfunction at the Level of CDK1/cyclin B Activation." *Chemical Research in Toxicology* 15.3 (2002): 326-31. Web. 4 Jan. 2011.
- 9: Williams, Gary M., Robert Kroes, and Ian C. Munro. "Safety Evaluation and Risk Assessment of the Herbicide Roundup and Its Active Ingredient, Glyphosate, for Humans." *Regulatory Toxicology and Pharmacology* 31.2 (2000): 117-65. Print.
- 10: Aspartame and Manufacturer-Funded Scientific Reviews." *Holistic Medicine Web Page*. Web. 04 Feb. 2011. <<http://www.holisticmed.com/aspartame/burdock/>>.
- 11: Hayes, W. C., F. A. Smith, J. A. John, and K. S. Rao. "Teratologic Evaluation of 3,6-Dichloropicolinic Acid in Rats and Rabbits." *Toxicological Sciences* 4.1 (1984): 91-97. Print.

- 12: Ündeğer, U., M. Schlumpf, and W. Lichtensteiger. "Effect of the Herbicide Pendimethalin on Rat Uterine Weight and Gene Expression and in Silico Receptor Binding Analysis." *Science Direct*. Feb. 2010. Web. 5 Nov. 2010.
- 13: Patel, Sushila, Mahima Bajpayee, Alok Kumar Pandey, Devendra Parmar, and Alok Dhawan. "In Vitro Induction of Cytotoxicity and DNA Strand Breaks in CHO Cells Exposed to Cypermethrin, Pendimethalin and Dichlorvos." *Toxicology in Vitro* 21.8 (2007): 1409-418. Print.
- 14: Greenlee, Anne R., Tammy M. Ellis, and Richard L. Berg. "Low-Dose Agrochemicals and Lawn Care Pesticides Induce Developmental Toxicity in Murine Preimplantation Embryos." *Environmental Health Perspectives* (2004). Print.
- 15: Andreotti, Gabriella, Laura E. Beane Freeman, Lifang Hou, Joseph Coble, Jennifer Rusiecki, Jane A. Hoppin, Debra T. Silverman, and Michael C.R. Alavanja. "Agricultural Pesticide Use and Pancreatic Cancer Risk in the Agricultural Health Study Cohort." *International Journal of Cancer* 124.10 (2009): 2495-500. Print.
- 16: Båge, Gertrud, Eva Cekanova, and K. S. Larsson. "Teratogenic and Embryotoxic Effects of the Herbicides Di- and Trichlorophenoxyacetic Acids (2, 4D and 2, 4, 5-T)." *Basic and Clinical Pharmacology and Toxicology* 32.6 (1973): 408-16. Print.
- 17: Roll, R., and G. Matthiaschk. "10. Comparative Studies on the Embryotoxicity of 2-methyl-4-chlorophenoxyacetic Acid, Mecoprop and Dichlorprop in NMRI Mice." *Arzneimittel-Forschung* 33.10 (1983): 1479. Print.
- 18: Cavieres, Maria F., James Jaeger, and Warren Porter. "Developmental Toxicity of a Commercial Herbicide Mixture in Mice: I. Effects on Embryo Implantation and Litter Size." *Environmental Health Perspectives* (2002). *BNET*. Web. 2 Jan. 2011.
- 19: "Health Effects of 30 Commonly Used Lawn Pesticides." Beyond Pesticides/NCAMP, Apr. 2005. Web. 2 Nov. 2010. <<http://beyondpesticides.org/lawn/factsheets/30health.pdf>>.
- 20: "PAN International List of Highly Hazardous Pesticides." *Pesticide Action Network International*. PAN Germany for PAN International, Jan. 2009. Web. 12 Nov. 2010.

Appendix A: Organization Backgrounds and Standards

(Information obtained from organizations' respective websites)

Pesticide Action Network (PAN)

1. "Since its founding in 1982, Pesticide Action Network (PAN) has been the civil society organisation (CSO) most steadily and continuously calling for effective international action towards the elimination of hazardous pesticides."
2. "For the FAO [Food and Agriculture Organization] initiative supported by the FAO Council, the COAG [Committee on Agriculture], the FAO/WHO Panel of Experts for Pesticide Management and others, there needs to be clarification of when the progressive ban of highly hazardous pesticides (HHP) should happen, and who should make it happen. These are questions not being dealt with in this publication."
3. "A pesticide is considered to be highly hazardous by PAN if it has one of the following characteristics,
 - high acute toxicity (including inhalative toxicity) and/or,
 - long-term toxic effects at chronic exposure (carcinogenicity, mutagenicity, reproductive toxicity, endocrine disruption) and/or,
 - high environmental concern either through ubiquitous exposure, bioaccumulation or toxicity, and/or
 - known to cause a high incidence of severe or irreversible adverse effects on human health or the environment"

World Health Organization (WHO)

1. General Statement: "Pesticides are chemical compounds that are used to kill pests, including insects, rodents, fungi and unwanted plants (weeds). Pesticides are used in public health to kill vectors of disease, such as mosquitoes, and in agriculture, to kill pests that damage crops. By their nature, pesticides are potentially toxic to other organisms, including humans, and need to be used safely and disposed of properly."
2. WHO Pesticide Evaluation Scheme (WHOPES)
 - a. "*The WHO Pesticide Evaluation Scheme (WHOPES)* was set up in 1960. WHOPES promotes and coordinates the testing and evaluation of pesticides for public health. It functions through the participation of representatives of governments, manufacturers of pesticides and pesticide application equipment, WHO Collaborating Centres and research institutions, as well as other WHO programmes, notably the International Programme on Chemical Safety."
 - b. "In its present form, WHOPES comprises a four-phase evaluation and testing programme, studying the safety, efficacy and operational acceptability of public health pesticides and developing specifications for quality control and international trade."
3. International Programme on Chemical Safety (IPCS)
 - a. "The objective of chemicals assessment is to provide a consensus scientific description of the risks of chemical exposures. These descriptions are published in assessment reports and other related documents so that governments and international and national organizations can use them as the basis for taking preventive actions against adverse health and environmental impacts."
4. International Agency for Research on Cancer

- a. Website: <http://monographs.iarc.fr/ENG/Classification/>
- b. Page titled "Evaluation of Carcinogenic Risks to Humans" lists commercial products deemed harmful and cancer-causing
- c. Listed according to hazard strength

Occupational Safety and Health Administration (OSHA)

1. "Congress created the Occupational Safety and Health Administration (OSHA) to ensure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance."
 - a. Standard 29 CFR 1910.1200 (Toxic and Hazardous Substances)
 - i. "Health hazard" means a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes."
 - b. Appendix A (Health Hazard Definitions)
 - i. "The determination of occupational health hazards is complicated by the fact that many of the effects or signs and symptoms occur commonly in non-occupationally exposed populations, so that effects of exposure are difficult to separate from normally occurring illnesses. [...] The situation is further complicated by the fact that most chemicals have not been adequately tested to determine their health hazard potential, and data do not exist to substantiate these effects."
 - c. Appendix B (Hazard Determination)
 - i. "The hazard determination requirement of this standard is performance-oriented. Chemical manufacturers, importers, and employers evaluating chemicals are not required to follow any specific methods for determining hazards, but they must be able to demonstrate that they have adequately ascertained the hazards of the chemicals produced or imported in accordance with the criteria set forth in this Appendix."

Environmental Protection Agency (EPA)

1. <http://www.pesticide.org/get-the-facts/ncap-publications-and-reports/general-reports-and-publications/corrected-2010-cancer-report-public.pdf>
2. "EPA was established to consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. EPA's mission is to protect human health and to safeguard the natural environment—air, water, and land—upon which life depends."
3. Superfund Amendments and Reauthorization Act (SARA)
 - a. "Amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)"

- b. "SARA reflected EPA's experience in administering the complex Superfund program during its first six years and made several important changes and additions to the program."
 - c. "SARA also required EPA to revise the Hazard Ranking System (HRS) to ensure that it accurately assessed the relative degree of risk to human health and the environment posed by uncontrolled hazardous waste sites that may be placed on the National Priorities List (NPL)."
- 4. Group C: "Possible Human Carcinogen"/"Suggestive evidence of carcinogenic potential"
 - a. "There is limited evidence that it can cause cancer in animals in the absence of
 - b. human data, but at present it is not conclusive."



WHY IS THERE CONCERN ABOUT GLYPHOSATE AND CANCER?

The World Health Organization's (WHO's) cancer authorities – the International Agency for Research on Cancer (IARC) – recently determined that glyphosate is “probably carcinogenic to humans” (Group 2A). Glyphosate is the most heavily used pesticide in the world thanks to widespread planting of Monsanto's Roundup Ready crops, which are genetically engineered to survive spraying with it. Use and exposure will increase still more if glyphosate-resistant turfgrasses currently being developed for lawns, playing fields and golf courses are introduced.

WHERE DO EPA AND WHO'S IARC STAND ON GLYPHOSATE'S CARCINOGENICITY?

In 1985, EPA classified glyphosate as a possible carcinogen based on experiments showing tumors in glyphosate-treated rodents. Input from Monsanto led to a dubious reinterpretation of these studies by EPA, and reclassification of glyphosate as non-carcinogenic in 1991.¹ IARC has thus far published only a brief summary of its glyphosate assessment, which is based on multiple lines of evidence: kidney, pancreatic and other tumors in glyphosate-treated test animals; epidemiology studies

showing higher rates of cancer in glyphosate-using farmers; and research showing that glyphosate damages DNA and chromosomes, one mechanism by which cancer is induced.² IARC's full assessment is due out in 2016.

WHOSE ASSESSMENT IS MORE RELIABLE: IARC OR EPA?

IARC is the world's leading authority on cancer. Its glyphosate determination was made by unanimous decision of 17 qualified scientists led by Dr. Aaron Blair, a distinguished epidemiologist recently retired from the U.S. National Cancer Institute.³ IARC's assessment is up-to-date, analyzing all the relevant available research, while EPA's last comprehensive assessment of glyphosate occurred in 1993. IARC considered a broad range of evidence, including human epidemiology and other peer-reviewed studies, while EPA did not assess epidemiology and relied almost entirely on unpublished industry studies.⁴ IARC is an independent agency whose sole mission is human health. While EPA is charged with protecting human health as well, it is also subject to considerable pressure from pesticide companies whose products it regulates. EPA is currently re-assessing glyphosate, and has said it will consider IARC's findings.

HOW DOES GLYPHOSATE COMPARE TO OTHER AGENTS THAT CAUSE OR MAY CAUSE CANCER? The evidence implicating glyphosate as a human carcinogen is not as strong as that for smoking or asbestos (IARC Group 1, "carcinogenic"), but stronger than that for DDT, parathion (both insecticides) or infection with type 2 HIV virus (Group 2B, "possibly carcinogenic").⁵

BUT DOESN'T IARC CONSIDER SUNLIGHT AND ALCOHOL TO BE CARCINOGENIC? Although IARC primarily assesses chemicals, it also evaluates the carcinogenic potential of other "agents,"⁶ which has unfortunately been used by some in a misguided attempt to cast doubt on its glyphosate determination. In fact, IARC's classifications of UV radiation and alcohol as "carcinogenic" are well-supported by science. Dermatologists regard excessive exposure to UV radiation (a component of sunlight) as the most important preventable cause of skin cancer.⁷ According to the American Cancer Society, "alcohol is a known cause of cancers" of eight different organs.⁸ The point is not that sunshine or drinking a few beers will kill you, but that you can reduce your risk of cancer by avoiding frequent sunburns and cutting back on heavy drinking. One important distinction here is that you can choose to wear sunscreen or drink less, but for most of us it is difficult to reduce our exposure to chemicals like glyphosate.

IS IARC'S ASSESSMENT RELEVANT TO ACTUAL HUMAN RISK OF CANCER? A formal risk assessment evaluates both the inherent toxicity of a substance (called hazard) and our exposure to it. While a toxic substance is always hazardous, the risk it poses depends upon the circumstances of exposure.⁹ While IARC does not directly evaluate exposure (it is a hazard assessment), it does consider the results of qualified epidemiological studies, which evaluate risk from actual exposure under real-world conditions. Three epidemiology studies of farmers show a link between glyphosate and non-Hodgkin's lymphoma (NHL), an immune system cancer.¹⁰ Another finds a "suggestive association" between glyphosate and a related immune system cancer, multiple myeloma (but not NHL), and recommends follow-up given the herbicide's widespread use.¹¹ Because there is typically a time lag of decades between exposure to a carcinogen and elevated cancer rates, and glyphosate use has skyrocketed over the past 10-15 years, the full effects of glyphosate's rising use remain to be discovered.

IS THE GENERAL PUBLIC AT RISK FROM GLYPHOSATE? Because of glyphosate's extremely intensive use (300 million lbs./year, more than four times that of the second-leading pesticide, atrazine), it is regularly found in food (e.g. bread), the air, rainfall and surface waters.¹² Glyphosate is found at similar frequencies and levels in the urine of farm and non-farm family members, including children, suggesting similar levels of exposure.¹³ Glyphosate has also been detected in human blood.¹⁴ EPA's maximal "safe" level of glyphosate exposure is six times higher than Europe's,¹⁵ and 17.5-fold higher than the level EPA itself set in the early 1980s.¹⁶ EPA's latest high-end estimate of infant exposure to glyphosate exceeds the level it regarded as safe in the 1980s;¹⁷ and is five times higher than the maximum level suggested by independent scientists.¹⁸

ARE THERE OTHER PROBLEMS WITH GLYPHOSATE ASSESSMENTS? EPA's assessments of glyphosate share the weaknesses of all the Agency's pesticide regulation. Most testing has involved only the active ingredient glyphosate, even though formulations (e.g. Roundup) used in the real world are often more toxic due to the presence of additional, often undisclosed, ingredients.¹⁹ While we are all exposed to multiple pesticides in our food, water and air, EPA does not consider the additive or synergistic effects of exposure to glyphosate together with other pesticides. Finally, EPA's practice of basing its decisions almost entirely on studies conducted or commissioned by the pesticide registrant introduces serious conflicts of interest,²⁰ and excludes pertinent evidence from peer-reviewed studies by independent scientists.²¹

DO OTHER HERBICIDES POSE CANCER RISKS? Massive use of glyphosate with Roundup Ready crops has generated an epidemic of glyphosate-resistant weeds. In response, pesticide companies are poised to introduce a host of "next-generation" GE crops resistant to herbicides such as 2,4-D and dicamba as well as glyphosate. These new GE crops will trigger an unprecedented and increasingly toxic spiral of weed resistance and herbicide use in American agriculture, for instance, a several-fold rise in 2,4-D and dicamba applications, with no countervailing reduction in glyphosate.²² Exposure to 2,4-D and dicamba is linked to non-Hodgkin's lymphoma (NHL), the same cancer with which glyphosate has been associated.²³ Herbicide exposure in general is also linked to increased rates of Parkinson's disease.²⁴

ENDNOTES

- ¹ EPA (1991). Memorandum on Second Peer Review of Glyphosate, U.S. Environmental Protection Agency, 10/30/91.
- ² Guyton KZ et al. (2015). Carcinogenicity of tetrachlorvinphos, parathion, malathion, diazinon, and glyphosate. *Lancet Oncology* (March 20th), doi:10.1016/S1470-2045(15)70134-8.
- ³ Pollack A (2015). Weed killer, long cleared, is doubted. *New York Times* 3/27/15; and Gillam C (2015). Scientist defends WHO group report linking herbicide to cancer. *Reuters* 3/26/15.
- ⁴ EPA (1993). Glyphosate Reregistration Eligibility Decision. U.S. Environmental Protection Agency, Sept. 1993, App. C.
- ⁵ See IARC List of classifications at <http://monographs.iarc.fr/ENG/Classification/index.php>.
- ⁶ IARC also assesses biological organisms (e.g. viral infections), behavioral practices (e.g. tobacco smoking), occupational exposure (e.g. as firefighter), physical agents (e.g. surgical implants), and foods or components of food (e.g. coffee and caffeine), collectively referred to as "agents." See IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Preamble, at <http://monographs.iarc.fr/ENG/Preamble/CurrentPreamble.pdf>.
- ⁷ American Academy of Dermatology: Melanoma FAQs. <https://www.aad.org/media-resources/stats-and-facts/conditions/melanoma-faqs>.
- ⁸ American Cancer Society: Alcohol Use and Cancer. The organs are the mouth, throat, larynx, esophagus, liver, colon, rectum and breast, see: <http://www.cancer.org/cancer/cancercauses/dietandphysicalactivity/alcohol-use-and-cancer>.
- ⁹ Key factors include the timing and level of exposure. Children and fetuses are generally more susceptible to harm than adults; and while greater exposure is generally thought to mean greater risk, lower levels of hormone-disrupting chemicals sometimes cause more harm than higher levels (Vandenberg LN et al. 2012. Hormones and endocrine-disrupting chemicals: low-dose effects and nonmonotonic dose responses. *Endocrine Reviews* 33(3): 378-455).
- ¹⁰ Guyton et al., 2015.
- ¹¹ De Roos AJ et al. (2005). Cancer incidence among glyphosate-exposed pesticide applicators in the Agricultural Health Study. *Environmental Health Perspectives* 113(1): 49-54.
- ¹² For 2012 agricultural use of glyphosate (>280 million lbs.) and atrazine (70 million lbs.) in the U.S., see charts below maps at pertinent links on http://water.usgs.gov/nawqa/pnsp/usage/maps/compound_listing.php?year=2012&chilo=L. For non-farm uses of glyphosate (18-23 million lbs./year), see: EPA (2011). Pesticide Industry Sales and Usage: 2006 and 2007 Market Estimates, EPA, Feb. 2011, Tables 3.7 & 3.8. For glyphosate in food, see FoEE (2013). Human contamination by glyphosate. Friends of the Earth Europe, June 2013. For lack of testing in U.S., see: Gillam C (2015). Regulators may recommend testing food for glyphosate residues, *Reuters*, 4/20/15. For glyphosate in air, rain and surface water, see Chang F-C et al. (2011). Occurrence and fate of the herbicide glyphosate and its degradate aminomethylphosphonic acid in the atmosphere. *Environ Toxicol Chem* 30(3): 548-555; and Coupe RH et al. (2011). Fate and transport of glyphosate and aminomethylphosphonic acid in surface waters of agricultural basins. *Pest Manag Sci* 68(1): 16-30.
- ¹³ Curwin BD et al. (2007a). Urinary pesticide concentrations among children, mothers and fathers living in farm and non-farm households in Iowa. *Ann. Occup. Hyg.* 51(1): 53-65; and Curwin BD et al. (2007b). Pesticide dose estimates for children of Iowa farmers and non-farmers. *Environmental Research* 105: 307-315. For Europe, see FoEE (2013). Human contamination by glyphosate. Friends of the Earth Europe, June 2013.
- ¹⁴ Aris A, Leblanc S. Maternal and fetal exposure to pesticides associated to genetically modified foods in Eastern Townships of Quebec, Canada. *Reprod Toxicol.* 2011; 31(4): 528-533.
- ¹⁵ "Acceptable daily intake" (ADI) or the equivalent "chronic population adjusted dose" (cPAD), expressed as milligrams glyphosate per kilogram body weight per day: 0.3 in Europe vs. 1.75 mg/kg/day in the U.S. For Europe, see http://ec.europa.eu/food/plant/protection/evaluation/existactive/list1_glyphosate_en.pdf, Appendix II; for US, see EPA (2006). Glyphosate human health risk assessment for proposed use on Indian mulberry and amend use on pea. EPA, 9/29/06, p. 21.
- ¹⁶ For EPA's setting of the glyphosate ADI at 0.1 mg/kg/day in the early 1980s (vs. 1.75 to-day), see EPA (1983). Glyphosate (Roundup) on wheat. March 3, 1983.
- ¹⁷ See EPA (2006) in footnote 14, Table 6.1.2, maximum infant exposure = 0.127562 mg/kg/day, 28% higher than the 1980's ADI of 0.1 mg/kg/day (see EPA 1983 in last footnote).
- ¹⁸ Antoniou M et al. (2012). Teratogenic effects of glyphosate-based herbicides: divergence of regulatory decisions from scientific evidence. *J Environ Anal Toxicol* 34:006. doi:10.4172/2161-0525.S4-006, suggesting an ADI of 0.025 mg/kg/day based on teratogenic rather than carcinogenic effects.
- ¹⁹ See references at: <http://earthopensource.org/gmomythsandtruths/sample-page/4-health-hazards-roundup-glyphosate/4-2-myth-strict-regulations-ensure-exposed-safe-levels-roundup/>
- ²⁰ Boone MD et al. (2014). Pesticide regulation amid the influence of industry. *BioScience* 64: 917-922.
- ²¹ Myers JP et al. (2009). Why public health agencies cannot depend on good laboratory practices as a criterion for selecting data: the case of bisphenol A. *Environmental Health Perspectives* 117(3): 309-315.
- ²² Mortensen DA et al. (2012). Navigating a critical juncture for sustainable weed management. *Bioscience* 62(1): 75-85.
- ²³ Schinasi L, Leon ME (2014). Non-Hodgkin lymphoma and occupational exposure to agricultural pesticide chemical groups and active ingredients: a systematic review and meta-analysis. *Int. J Environ. Res. Public Health* 11: 4449-4527. McDuffie HH et al (2001). Non-Hodgkin's lymphoma and specific pesticide exposures in men: cross-Canada study of pesticides and health. *Cancer Epidemiology, Biomarkers & Prevention* 10: 1155-1163.
- ²⁴ For instance, see: Brighina L et al. (2008). Alpha-synuclein, pesticides and Parkinson disease. *Neurology* 70: 1461-1469.

*Kids on the Frontline
Pesticide Action Network of N. America*

Table of Contents

Executive Summary	1
Chapter 1: Widespread Use & Exposure	4
Chapter 2: Rural Children on the Frontline	7
Chapter 3: Increasing Cancer Risk	11
Chapter 4: Altering Brain Development	15
Chapter 5: Four Farming States in Focus	18
Chapter 6: Time for a Healthier Food System	28
Appendix A: Key Study Summaries	35
• Asthma & respiratory function	
• Birth defects & birth outcomes	
• Brain & nervous system harms	
• Childhood cancer	
• Diabetes & obesity	
• Reproductive harms	
Appendix B: Glossary of Key Terms	39
Appendix C: Top Pesticides Used	40
Appendix D: Online Resources	41

Kids on the Frontline

Executive Summary

A little over 100 years ago, Congress enacted the first U.S. pesticide law. The Insecticide Act of 1910 put labeling guidelines in place to protect farmers from unscrupulous vendors attempting to sell pesticide products that didn't perform as advertised.

To this day, we control pesticides through a system of registration and labeling, with a primary goal of getting products to market. The result? Each year, more than 680 million pounds of pesticides are applied to agricultural fields across the country. This 2007 figure—the most recent government estimates available—climbs to more than a billion when common non-agricultural pesticide uses are included.

We believe this is too much. Ever-stronger science shows that even at low levels of exposure, many of these chemicals are harmful to human health—and children's developing minds and bodies are particularly vulnerable. It is also increasingly clear that alternative, less chemical-intensive approaches to farming are not only viable, but would strengthen the resilience of agricultural production.

Put simply, there is no need for our food and farming system to put our children's health at risk from chemical exposure.

Kids on the Frontline builds on the findings of *A Generation in Jeopardy*, our 2012 report summarizing the state of the science linking pesticide exposure and children's health harms. In addition to highlighting the latest scientific findings, this new report focuses in on the particular health risks pesticides pose to children in rural agricultural communities.

Rural children experience the same chemical exposures faced by children in communities across the country from pesticide residues on food and applications in schools, parks and homes. They face additional exposures when agricultural chemicals contaminate water supplies or drift from nearby fields. These rural exposures and their impacts on children's health are the primary focus of this report. We examine the particular vulnerabilities of children in rural communities, highlight the results of studies in rural and agricultural areas, and present specific data on four agricultural states—California, Hawai'i, Iowa and Minnesota—that tell distinct stories of pesticide exposure in rural communities.

Key findings

Scientists have understood for decades that children are particularly vulnerable to the harms of pesticide exposure. Quickly growing bodies take in more of everything; they eat, breathe and drink more, pound for pound, than adults. As physiological systems undergo rapid changes from the womb through adolescence, interference from pesticides and



Ever-stronger science shows that even at very low levels of exposure, pesticides are harming children's health.

industrial chemicals—even at very low levels—can derail the process in ways that lead to significant health harms.

For children, the timing of these exposures is often particularly important. At critical moments of development, even very low levels of pesticide exposure can derail biological processes in ways that have harmful, potentially lifelong effects.

In our review of government health trend data and recent academic research, we found the following:

Overall, childhood health problems continue to climb. Childhood cancer incidence continues to rise (see Figure A), as do rates of autism spectrum disorder, attention deficit hyperactivity disorder and other developmental disabilities. Some birth defects are also on the rise.

Fast-rising childhood cancers have strong links to pesticides. Evidence linking pesticide exposure to increased risk of leukemia and brain tumors continues to mount, with new “meta-analysis” studies pointing to higher risks among children in rural agricultural areas. Incidence of these two cancers is rising more quickly than other types of childhood cancer.

More science links pesticides and neurodevelopmental harms. The body of evidence linking prenatal pesticide exposure to childhood brain and nervous system harms was already very strong in 2012, and it has gotten stronger. New studies link increased risk of developmental disorders and delays—including autism spectrum disorder—to prenatal proximity to agricultural fields where pesticides are sprayed.

Rural children's "double dose" of pesticide exposure is cause for concern. Children in agricultural communities are exposed to pesticides above and beyond the widely shared exposures from food residues and applications in schools, parks, homes and gardens. In some cases, these children also experience economic and social stressors that can exacerbate the health harms of agricultural chemicals. Across the country, rural children are on the frontlines of pesticide exposure.

Recommendations

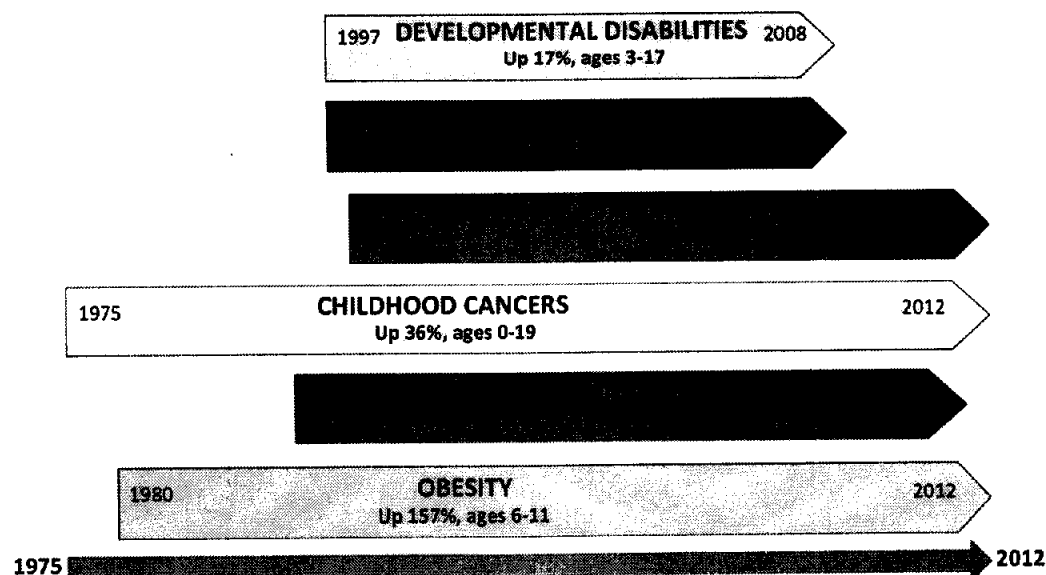
The best way to protect children from pesticide harms is to dramatically reduce the volume of use nationwide. We believe this shift is both achievable and long overdue.

The burden of protecting children from dangerous chemicals cannot rest with individual families; policy change is required. Our recommendations below reflect both the current momentum toward building a healthier national system of food and farming, and the growing urgency of the pesticide problem. Though non-farm pesticide applications can also put children in harm's way, these recommendations

focus specifically on protecting children from **exposure** to agricultural pesticides.

- 1. Reduce overall pesticide use.** It's time to set an ambitious national use reduction goal for agricultural pesticides. Once this goal is in place, policymakers at all levels should act quickly to implement strong policies and programs to reach the goal—including, among other measures, publicly accessible use reporting systems to track progress.
- 2. Protect children first.** Our national use reduction goals should prioritize action on those pesticides most harmful to children. In addition, protective pesticide-free buffer zones should be established around schools, daycare centers and other sensitive sites in rural agricultural areas across the country.
- 3. Invest in healthy, innovative farming.** We need to provide significant and meaningful support, incentives and recognition for farmers stepping

Figure A: Childhood Health Harms on the Rise, 1975–2012



Public health statistics show steady increases in many childhood diseases and disorders over the past 30 years. Those highlighted are just some of the health harms on the rise.

Sources: SEER Cancer Statistics Review 1975–2012, National Cancer Institute; Boyle, Coleen A., et al. "Trends in the Prevalence of Developmental Disabilities in US Children, 1997–2008." *Pediatrics* 127, no. 6 (June 2011): 1034–42. doi:10.1542/peds.2010–2989; Ogden, Cynthia L., et al. "Prevalence of Childhood and Adult Obesity in the United States, 2011–2012." *JAMA* 311, no. 8 (February 26, 2014): 806. doi:10.1001/jama.2014.3201; Dabelea, Dana, et al. "Prevalence of Type 1 and Type 2 Diabetes Among Children and Adolescents From 2001 to 2009." *JAMA* 311, no. 17 (May 7, 2014): 1778. doi:10.1001/jama.2014.3201.

off the pesticide treadmill. National and state programs must prioritize investment in healthy, sustainable and resilient agricultural production.

These commonsense measures are both ambitious and achievable. The current, continuous increase in pesticide use ignores accumulating scientific evidence of human health harms. This is unacceptable.

What's standing in the way?

Our current system of industrial agriculture and pest control relies on chemical inputs sold by a handful of corporations. These multinational entities wield tremendous control over how we grow our food, from setting research agendas in public institutions to production and sale of farm inputs including seeds, fertilizers and pest management products.

Not surprisingly, these same corporations also hold significant sway in the policy arena, investing millions of dollars every year to influence voters and policy-makers at the local, state and federal levels. Their aim is to protect the market for pesticides, seeds and other agrichemicals. As public concern about the health impacts of pesticide products has grown in recent years, the pesticide industry has also invested heavily in public relations campaigns to influence the national conversation about food and farming.

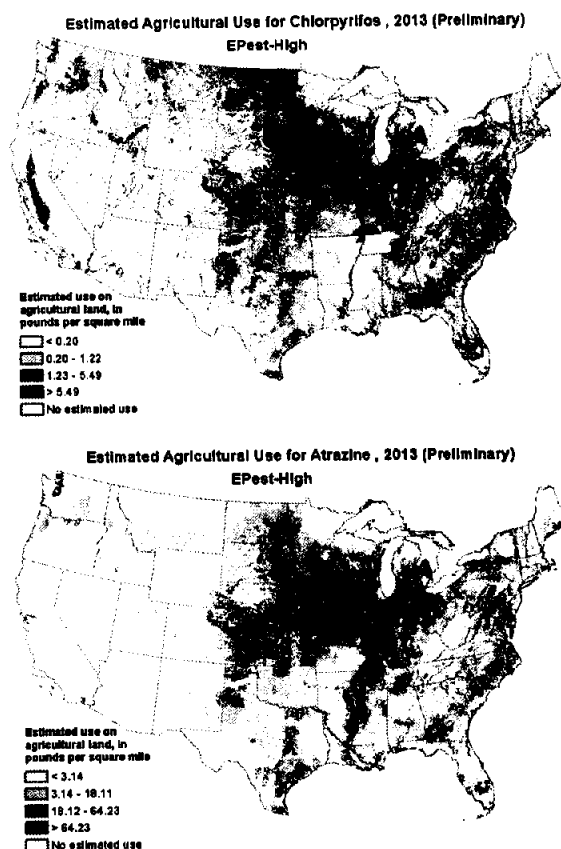
The result is a system of food and farming that serves the interests of these corporations well.

It does not, however, adequately protect public health or serve the common good. Farmers, farmworkers and their families are regularly exposed to chemicals known to harm human health. The health of children in rural communities is compromised by near continuous exposure to pesticides where they live, learn and play.

We are increasingly optimistic that the commonsense changes we propose are within reach. As the science linking pesticides with children's health harms grows ever stronger, awareness of the problem, as well as support for real solutions, continues to grow. In addition, on-the-ground evidence from the U.S. and around the world shows us that implementing our recommendations would boost—rather than undermine—the quality and quantity of food available.

We can and must fix this broken system. It's time to support farming practices that sustain our agricultural economy and produce abundant, healthy food that is accessible to all.

Figure B: Estimated Agricultural Use for Two Pesticides, 2013



These maps from the U.S. Geological Service (USGS) show national use patterns for two widely used pesticides, out of more than 1,200 currently registered for use in the United States. Chlorpyrifos is an insecticide used on a wide range of crops across the country; atrazine is an herbicide heavily used on corn, soy and other row crops.

Sources: Thelin, G.P., and W.W. Stone. "Estimation of Annual Agricultural Pesticide Use for Counties of the Conterminous United States, 1992–2009." U.S. Geological Survey Scientific Investigations Report, 2013–5009. USGS, 2013. "U.S. Geological Survey, National Water-Quality Assessment (NAWQA) Program." *Pesticide National Synthesis Project*, April 14, 2016. <http://water.usgs.gov/nawqa/pnsp/usage/maps/about.php#limitations>.

Note: USGS estimates use of about 480 pesticides based on a combination of use data compiled by proprietary surveys of farms and county-reported harvested crop acreage. Estimations based on neighboring counties were used for areas that did not report harvested acreage. The reliability of these estimates generally decreases with the scale of use. These maps reflect the higher end of these estimates for use in 2013.

Initiatives > Safe Grow > List of Restricted Pesticides

LIST OF RESTRICTED PESTICIDES

The Safe Grow Act places restrictions on the use of cosmetic pesticides for lawn care on public and private property. Effective March 2014, the City prohibits Commercial Pesticide applicator from applying restricted pesticides for lawn care purposes on private property or public rights-of-way in the City. While, for a property owner or tenant the law went into effect on January 1, 2015.

The restricted pesticide list includes all items that are (a) carcinogenic or likely to be carcinogenic to humans by the U.S. Environmental Protection Agency (EPA); (b) Class 9 pesticides by the Canadian Ministry of the Environment; and (c) Class 1 Endocrine Disruptors by the European Commission. The table is updated once a year on or before March 1st to reflect any changes made by the EPA, Canadian Ministry of the Environment and the European Commission.

This is the current list of restricted pesticides. The list was updated on 2-26-2016.

Safe Grow

Active Ingredient Name	Likely to be a Carcinogenic to Humans (U.S. EPA)	Category 1 Endocrine Disruptor (EU)	Banned For Cosmetic Use (Canada)
2,4-D			x
2,4-Dichlorophenoxybutyric Acid (2,4-DB)		x	
4-CPA			x

Abamectin			X
Acephate			X
Acetamiprid			X
Acetochlor		X	
Acifluorfen Sodium	X		
Alachlor	X	X	
Aminocyclopyrachlor			X
Aminopyralid			X
Amitrole		X	X
Anthraquinone	X		
Atrazine (plus related triazines)		X	X
Azoxystrobin			X
Bensulide			X
Bentazon (present as the sodium salt)			X
Benthiavalicarb-Isopropyl	X		
Bifenthrin		X	
Bispyribac-Sodium			X
Boric Acid		X	
Boscalid			X
Bromacil			X
Butachlor	X		
Captan	X		X
Carbaryl	X	X	X

Carbathin (Carboxin)		X
Carfentrazone-Ethyl		X
Chlorantraniliprole		X
Chlorothalonil	X	X
Chlorpyrifos		X
Chlorsulfuron		X
Chlorthal (dimethyl ester DCPA or acid)		X
Clopyralid		X
Clothianidin		X
CMNP (Pyrazachlor)	X	
Cocamide Diethanolamine	X	
Cyantraniliprole		X
Cypermethrin		X
Cyprodinil		X
D-Cis, Trans Allethrin		X
D-Phenothrin		X
Dazomet		X
Deltamethrin	X	X
Diazinon		X
Dicamba		X
Dichlobenil		X
Dichlorprop		X
Dichlorprop-P Isomer (present as 2-ethylhexyl ester)		X

Diclofop-Methyl	x	
Dicloran		x
Dicofol		x
Dimethoate		x
Diquat		x
Dithiopyr		x
Diuron	x	x
Endosulfan		x
Epoxiconazole	x	
Ethoprop	x	
Etridiazole		x
Fenbutatin Oxide		x
Fenitrothion		x
Fenoxaprop-P-Ethyl (isomer)		x
Fenoxycarb	x	
Ferbam (Ferric dimethyldithiocarbamate)		x
Fludioxonil		x
Flumioxazin		x
Fluopicolide		x
Fluxastrobin		x
Fluroxypyr 1-Methylheptyl Ester		x
Fluthiacet Methyl	x	
Folpet		x

Fosamine Ammonium			X
Fosetyl-Al			X
Furfural	X		
Furilazole (MON 13900)	X		
Glufosinate Ammonium			X
Glyphosate			X
Halosulfuron-Methyl			X
Hexavalent Chromium (CRVI)	X		
Hexazinone			X
Hexythiazox	X		
Imazalil	X		
Imazapyr			X
Imidacloprid			X
Iprodione	X		X
Iprovalicarb	X		
Isofetamid			X
Isoprazam	X		
Isoxaflutole	X		
Kresoxim-Methyl	X		
Lactofen	X		
Lambda-Cyhalothrin		X	X
Lindane		X	
Linuron		X	

Malathion			X
Maleic Hydrazide			X
Mancozeb		X	X
Maneb		X	
MCPA			X
Mecoprop (D-isomer)			X
Mepanipyrim	X		
Mesotrione			X
Metalaxyl-M and S-Isomer			X
Metaldehyde			X
Metam Sodium	X	X	X
Metconazole			X
Metiram		X	X
Metribuzin		X	
Metsulfuron Methyl			X
Mon 4660	X		
Myclobutanil			X
Naled			X
Napropamide			X
Oryzalin	X		
Oxadiazon	X		
Oxine Benzoate			X
Oxycarboxin			X
Oxyfluorfen	X		

Paraquat			X
Pentachlorophenol		X	
Penthiopyrad			X
Permethrin	X		X
Phosalone			X
Picloram		X	
Pirimicarb	X		
Potassium Dichromate*	X		
Propachlor	X		
Propamocarb Hydrochloride			X
Propiconazole			X
Propineb	X		
Propoxur			X
Propyzamide			X
Pymetrozine	X		
Pyraclostrobin			X
Pyraflufen Ethyl	X		
Pyrethrins			X
Pyroxasulfone			X
Quintozene			X
Resmethrin	X	X	X
Rotenone			X
S-Metolachlor			X
Sedaxane	X		

Simazine			X
Spinosad			X
Spirodiclofen	X		
Terbutryn		X	
Tetrachlorvinphos	X		
Tetramethrin			X
Thiabendazole	X		X
Thiacloprid	X		
Thiamethoxam			X
Thiophanate-Methyl	X		X
Thiram		X	X
Tolylfluanid	X		
Tribufos	X		
Trichlorfon	X		
Triclopyr			X
Trifloxystrobin			X
Trifluralin		X	X
Triforine			X
Trinexapac-Ethyl			X
Triticonazole			X
Vinclozolin		X	
Zineb		X	X

The table includes all the pesticide that are (a) carcinogenic or likely to be carcinogenic to humans by the U.S. Environmental Protection Agency (EPA); (b) Class 9 pesticides by the Canadian Ministry of the Environment; and (c) Class 1 Endocrine Disruptors by the European Commission. The table is updated once a year on or before March 1st to reflect any changes made by the EPA, Canadian

Ministry of the Environment and the European Commission.



City Of Takoma Park | 7500 Maple Avenue | Takoma Park, MD | 20912

Phone: 301-891-7100 | Fax: 301-270-8794