

DELEGATION REQUEST

Name of person speaking: Philippe Lucas by zoom link.

Organization you are representing: Campbell River Environmental Committee

Primary purpose of the organization: Stewardship of water and environment.

Number of members: 1

Mailing address:

8676 Whelan Rd
Black Creek, BC V9J 1J8

Contact name: LeRoy McFarlane

Subject matter: To expand on the BioSolids presentation made by Mike Van Ham of "SYLVIS" to the Electoral Area Services Committee, May 11 2020. CREC believes the committee did not receive a complete picture on the topic of biosolids to make properly informed decisions on future uses and impacts to the Comox Valley community.

Specific request of the regional district, if any (i.e. letter of support, funding): I will forward to you today or tomorrow a summary of CREC's concerns on land application of BioSolids, intended for distribution to the members of the EASC.

Requested meeting date: January 11 2021

Audio-visual equipment needed: zoom link to allow visual presentation by P Lucas

Campbell River Environmental Committee (CREC)
PO Box 20092 STN. A, Campbell River, BC V9W 7Z5

CVRD Electoral Area Services Committee
770 Harmston Ave, Courtenay, BC
V9N 2X6

December 23, 2020

To CVRD Electoral Area Services Committee Members,

Members of CREC listened to the May 2020 presentation by Mike Van Ham to the CVRD Electoral Area Services Committee, concerning the safety of biosolids. Mr. Van Ham is the owner of SYLVIS, a company that earns a profit from researching, recommending and implementing the use of biosolids. We were alarmed by his assessment and recommendation of the use of biosolids. CREC is especially concerned about the method of proxy testing in municipal areas described to you by Mr. Van Ham and that the OMRR¹ does not require testing for many hazardous substances found in biosolids, such as pharmaceuticals, steroids, hormones and PFAS, outlined in the EPA study cited below.

We have been researching biosolids for the past year and have learned from many studies by universities and government agencies and from the experience of countries that tried to utilize biosolids for fertilizer, mine reclamation and forest enhancement, that biosolids are hazardous to humans, the environment.² and wildlife.³

A 2002 University of Georgia study found that through 95% of pathogens can be removed in the treatment of class B sludge, enough remain to pose a serious health risk⁴. "However, public concerns associated with sewage sludges may not be resolved simply by banning Class B sludges. Some level of concern is likely to remain regarding Class A sludges that cause respiratory problems and eye, nose and throat, and skin irritation. Infection control problems associated with processed sewage sludges should be viewed in terms of pathogen-chemical risks."⁵

If you walk through Canadian Tire, be aware that every liquid on their shelves could potentially find its way into the sewer system and therefore show up in biosolids. A similar walk-through London Drugs will remind you that pharmaceuticals and chemicals sold there, might also become a part of biosolids being applied to fields and gardens and show up in our food supply and enter our water and in some cases become airborne.

Switzerland and the Netherlands have discovered the hazards involved with biosolids and have banned them.⁶ Can we learn from their experience or do we have to forfeit our own land first?

Most of us have not given thought to what happens to the sludge remaining after the treatment of our sewage, but that does not mean that the scientific information is not readily available.

In a November 15, 2018 report from the US Office of Inspector General, the EPA identified 352 pollutants in biosolids, 61 of which were designated acutely hazardous, hazardous and priority

pollutants, including pharmaceuticals and steroids.⁷ A 1989 EPA study found 25 groups of pathogens, including E. coli, salmonella, viruses, hepatitis A, intestinal worms, harmful protozoa and fungus. They also found household chemicals, hospital waste, detergents, and heavy metals from industry, synthetic hormones from birth control pills, pesticides, dioxins and a group of compounds linked to cancer.⁸

We have here on Vancouver Island, Philippe Lucas, a Ph.D. candidate at the University of Victoria, a former CRD Director, who has been studying biosolids since 2006. He has vast knowledge and has done impeccable research on the subject. He would be willing to talk to your council via Zoom and give you the information you need to make a responsible decision about what to do with biosolids here in Campbell River and the Comox Valley. Members of CREC have done a great deal of research on the composition of biosolids and have heard Philippe Lucas' presentation on the subject and found his presentation to be accurate and helpful.

We sincerely hope that you will allow science to guide your decision about the use of biosolids in our community.

Sincerely,
The Campbell River Environmental Committee,
Per.

Leroy McFarlane, President

References

1. Organic Matter Recycling Regulation at: https://www.bclaws.ca/civix/document/id/complete/statreg/18_2002
2. Pathogen Risks From Applying Sewage Sludge to Land: <https://pubs.acs.org/doi/10.1021/es0223426>
3. Are Biosolids Safe? <https://oecotextiles.blog/2015/08/25/are-biosolids-safe/>
4. 2002 University of Georgia researchers link increased risk of illness to sewage sludge used as fertilizer American Association for the Advancement of Science (AAAS), https://www.eurekalert.org/pub_releases/2002-07/uog-uog072902.php
5. Pathogen Risks From Applying Sewage Sludge to Land. <https://pubs.acs.org/doi/10.1021/es0223426>
6. Ban on the use of sludge as a fertilizer & Biosolids: mix human waste with toxic chemicals, then spread on crops <https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-1673.html>
<https://www.theguardian.com/environment/2019/oct/05/biosolids-toxic-chemicals-pollution>
7. EPA Unable to Assess the Impact of Hundreds of Unregulated Pollutants in Land-Applied Biosolids on Human Health and the Environment, November 15, 2018
https://www.epa.gov/sites/production/files/2018-11/documents/epa_oig_20181115-19-p-0002.pdf
8. 2002 University of Georgia researchers link increased risk of illness to sewage sludge used as fertilizer American Association for the Advancement of Science (AAAS), https://www.eurekalert.org/pub_releases/2002-07/uog-uog072902.php

Keep Sewage Sludge Off Farms, Fields and Forests in the CRD

After years of debate and discussion, local residents have developed a certain expertise in regards to the potential public health harms and environmental impacts of sewage sludge (otherwise known as “biosolids”). Academic studies examining their impact on the local marine environment confirmed what many of us have long suspected – sewage is unquestionably harming the health of our oceans, and subsequently threatening human health as well. So why would it be any safer to expose our local farms, fields and or forests?

On Feb. 12th the CRD Board voted to overturn the ban on land application of biosolids, and is now planning on applying biosolids as top cover at Hartland landfill. They passed the motion without conducting any public consultation, and without meeting with or consulting any of the 5 Bands who's territory would be affected.

When it comes to public and environmental health, it's imperative to be truthful with local residents; we deserve the facts. The simple truth is that neither the BC Ministry of the Environment nor the CRD are proposing this to improve the local land environment any more than we're currently dumping it into our oceans to grow bigger clams; Provincial and CRD staff are looking for a “quick fix” to for a short-term problem, rather than looking for sustainable solutions that would respect the long-standing ban on land application, and protect the local environment.

While using sludge as ground cover at Hartland may seem like a reasonable approach with limited impacts on the local environment, unfortunately the evidence is clear that biosolids simply do not stay where they are applied. Studies have found that when applied to land, the contaminants in biosolids become windborne, and can be transported dozens of kilometers from their site of application, threatening local animals, habitats, residents, and (especially) CRD staff at Hartland Landfill.

While we can't expect all sides of this debate to agree with every study either for or against the land application of biosolids, there are a few things that we do know and can all agree on:

1. No one can claim that this is a safe practice. In fact, innumerable academic studies and CRD reports have found at least some level of risk in all parameters they examined. There is simply no existing research stating that the land application of biosolids is without risk to human and animal life or the environment, because it isn't.
2. Secondly, the Dogwood Initiative, the Sierra Club of BC, and the Island Organic Producers Association, the Island Chef's Collaborative, the Farmlands' Trust, and local First Nation bands all supported the original CRD ban. There is no public support for the land application of biosolids, and in fact there is very significant public opposition.

3. The land application of biosolids is the flashpoint of a huge controversy throughout Canada and around the world. As a UVic Environmental Law Society review from 2013 found, this practice has resulted in successful lawsuits by farmers and landowners impacted by biosolid application in Canada and the US, as well as bans on land application in Quebec and Ontario municipalities. If the current ban is overturned, there's no reason to believe regional tax payers will be insulated from legal liability and associated lawsuits.

So what are our options? 1) We can make the biosolids safer by putting in technologies to remove heavy metals, polycyclic aromatic hydrocarbons (PAHs) and pharmaceuticals, but the CRD has found this to be too expensive at this time; 2) we can turn biosolids into energy through proven technologies like gasification, which is among the CRDs longer-term options; 3) we can ship these biosolids to cement kilns on the mainland for use as fuel (the current strategy); 4) we can ship biosolids to a biochar facility in Prince George where the carbon they carry can be safely sequestered and turned into a high value end-product (<https://www.bcbiocarbon.com/>).

The 3rd option is the one that the CRD has currently chosen, but the cement kiln on the mainland needs to shut down for maintenance 6 weeks of the year, which is why staff and Directors are looking for a sustainable alternative, and that's where biochar comes in.

Converting our biosolids into biochar is by far the most affordable and environmentally friendly short-term solution for when the cement kilns are under maintenance. It would re-affirm the CRDs commitment to protect the ALR, the local environment and public health, while completely eliminating the inevitable legal liability and public backlash associated with the land application of biosolids at Hartland. In fact, the Province is currently considering biochar generation to address Vancouver's municipal waste stream; it's a proven, effective technology that can solve the CRDs short term biosolid waste disposal issues right now

On February 12th CRD Directors absolutely failed to live up to their responsibility to act as environmental stewards for our region, and to engage in proper consultation on key regional issues. For the sake of our farmers, the health of our residents and local environment, the safety of Hartland staff, and the legacy we leave to our children, please contact CRD Directors and urge them to re-instate the ban on the land application of biosolids: <https://www.crd.bc.ca/about/who-we-are/board-of-directors>. It's quick and easy, and you will make a difference! To learn more about this issue, check out Biosolid Free BC on Facebook.

Philippe Lucas is a PhD student at UVic and a former Victoria City Councillor and CRD Director. He is the founder of Biosolid Free BC.

AP Press - Concerns grow over tainted sewage sludge spread on croplands

By JOHN FLESHER and MICHAEL CASEY, September 12, 2019

LAPEER, Mich. (AP) — For more than 20 years, the eastern Michigan town of Lapeer sent leftover sludge from its sewage treatment plant to area farms, supplying them with high-quality, free fertilizer while avoiding the expense of disposal elsewhere.

But state inspectors ordered a halt to the practice in 2017 after learning the material was laced with one of the potentially harmful chemicals known collectively as PFAS, which are turning up in drinking water and some foods across the U.S.

Now, the city of 8,800 expects to pay about \$3 million to have the waste treated at another facility and the leftover solids shipped to a landfill. Testing has found elevated PFAS levels in just one field where the sludge was spread, but farmers have lost an economical fertilizer source and hope more contamination doesn't turn up.

"I feel bad for them," said Michael Wurts, superintendent of the waste treatment plant, who ruefully recalls promoting sludge as an agricultural soil additive to growers in the community. "The city didn't do anything malicious. We had no clue this was going on."

Lapeer isn't alone. For decades, sewage sludge from thousands of wastewater treatment plants has been used nationwide as cropland fertilizer. It's also applied to sports fields, golf courses and backyard gardens.

The city of Marinette, Wisconsin, has stopped distributing sewage waste, also called "biosolids," to farms after getting high PFAS readings. In Maine, a dairy farm was forced to shut down after sludge spread on the land was linked to high levels of PFAS in the milk.

"It's been devastating. We kind of get treated like we are criminals," said Stoneridge Farm's Fred Stone, whose blood has also tested high for PFAS from what he believes was drinking contaminated water and milk over the years.

The concern is that certain PFAS chemicals, which studies have associated with increased risk of cancer and damage to organs such as the liver and thyroid, could be absorbed by crops grown in soils treated with polluted sludge and wind up in foods. The Food and Drug Administration this year reported finding substantial levels of the chemicals in random samples of grocery store meats, dairy products, seafood and even off-the-shelf chocolate cake, although the study did not mention any connection to sewage waste.

"The FDA continues to work with other federal agencies to identify sources and reduce or eliminate pathways for dietary PFAS exposure including through use of biosolids," spokeswoman Lindsay Haake said.

The extent of any threat to the food supply is unknown because so little testing has been done, scientists say.

“We don’t have a lot of data but the data we have suggests it’s a problem,” Linda Birnbaum, director of the National Institute of Environmental Health Sciences, said at a recent conference in Boston. “We are finding that there are elevated levels of different PFAS in biosolids. We clearly need more research in this area.”

Studies have documented PFAS absorption by some crops — lettuce, tomatoes and radishes among them — from soils fertilized with sewage byproducts. And the EPA’s inspector general reported last year that the agency was falling short in tracking hundreds of pollutants in sludge, including PFAS.

Yet despite growing evidence that at least some sludge is contaminated, the federal government hasn’t limited PFAS in fertilizer or developed a standard for determining safe levels. That leaves fertilizer companies and farmers wondering what to do and fearful of consumer backlash.

“If you want to destroy agriculture in Michigan, start talking about, ‘Hey, it could be contaminated with PFAS,” said Laura Campbell, agricultural ecology manager for the Michigan Farm Bureau. “People will see that and say, ‘Oh, we can’t trust them, we’ll buy from elsewhere,’ even though the problem is no worse in Michigan than it is anywhere else.”

Studies going back almost two decades found PFAS in sludge, primarily from industrial wastewater that flows to municipal treatment facilities. Residential sewage is another source — from carpets, clothes and other household items containing PFAS. The grease- and water-resistant compounds, known as “forever chemicals” because they don’t degrade naturally and are believed capable of lingering indefinitely in the environment, also are found in firefighting foam used at military bases and airports.

Evidence of a link between PFAS-laced sludge and food emerged in 2008, when the EPA found elevated levels of several compounds in sludge that a Decatur, Alabama utility had spread on 5,000 acres of farmland. They were detected in nearby waters and vegetation from the fields. The chemicals were traced to several companies that manufactured and used PFAS.

“I’m very concerned about replicating that in other states,” EPA’s Andrew Lindstrom, whose lab ran tests there, said at the Boston conference. Milk from one dairy contained 270 parts per trillion of PFAS — almost four times the agency’s nonbinding health risk level of 70 ppt for PFOA and PFOS, the two best-known chemicals in the class.

An EPA “action plan” in February acknowledged “information gaps” about tainted sludge. It said the agency was developing better detection methods and assessing risks posed by PFOA and PFOS, which no longer are manufactured in the U.S. but remain widespread in the environment.

“We are studying the potential pathways by which PFAS are getting into biosolids and we are researching alternative methods for removing or destroying PFAS in biosolids if analysis indicates that detected levels are of risk and need reduction,” the agency told The Associated Press in a statement.

Advocacy groups say EPA also should look at chemicals developed as replacements for PFOA and PFOS, which studies found accumulate in edible parts of plants.

“At least EPA should require that sludge be tested for PFAS before being applied to farm fields,” said Colin O’Neil, legislative director with the Environmental Working Group.

Its inspector general reported last year that the EPA had identified 352 pollutants, including PFAS, in biosolids. But the report concluded the agency had too little data and other tools to assess their safety. Regulations require testing for only nine pollutants in sludge, all heavy metals.

Several states are examining sewage sludge for PFAS contamination and assessing potential dangers. Maine has enacted a nonbinding advisory level for PFAS in sludge and New Hampshire is working with the U.S. Geological Survey on a soil study whose results will help them set a standard.

Maine also found most biosolids from more than 30 wastewater treatment plants were above the state's advisory level while neighboring New Hampshire detected PFAS in tests of sludge from two dozen permit holders. Neither state found traceable levels of PFAS in the milk tested.

Based on sludge tests at 41 plants, Michigan ordered several to stop distributing it to farms.

After the state's environmental department ordered some plants to trace PFAS sent to them, several installed treatment systems that sharply reduced their pollution output, spokesman Scott Dean said.

Among them was Lapeer Plating & Plastics, the automotive chrome manufacturer that caused the Lapeer contamination.

But City Manager Dale Kerbyson said the company has reneged on a promise to help cover Lapeer's costs of dealing with the pollution and a lawsuit may be coming. "I don't think the citizens of our city should have to pay for this," Kerbyson said.

Lapeer Plating & Plastics did not respond to email and phone messages seeking comment.

Although they complain about a lack of government standards, some cities and towns fear strict rules that could force costly infrastructure upgrades or sending sludge to out-of-state landfills. And companies worry they will be put out of business.

"This is the biggest issue that has hit the biosolids recycling profession in North America ever, because of regulatory overreaction," said Ned Beecher, executive director of the North East Biosolids and Residuals Association.

Companies that manufacture compost — some from sewage sludge — contend tough standards are premature until scientists determine acceptable PFAS levels.

"We don't want people jumping to conclusions," said Frank Franciosi, executive director of the U.S. Composting Council. If EPA cracks down on anyone, he said, it should be those who manufacture and use PFAS chemicals that enter the waste stream.

Casey reported from Boston. AP reporter Ellen Knickmeyer contributed to this story from Washington, D.C.

Follow John Flesher on Twitter: @johnflesher and Michael Casey at @mcasey1.

Islands Organic Producers Association (IOPA)

<http://www.certifiedorganic.bc.ca/cb/iopa.php>

April 24, 2011

Phillipe Lucas

Victoria Councilor

CRD Board of Directors

Re: Use of bio-solids/sewage sludge on farmland.

This letter is to show our concern and opposition to the use of sewage sludge/bio-solids on farmland. The Canadian Organic Standards, which are followed by the bioregional certification body IOPA, prohibit the uses of sewage sludge on organic farms.

<http://www.cog.ca/index.php?page=organic-regulations>.

Heavy metals found in sewage sludge adversely affect soil microbes that play a significant part in plant growth in organic soils. An article in the Journal of Industrial Microbiology confirms that long-term effects are unknown.

Article found in Journal of Industrial Microbiology. Vol 14. 94-104

Long-term effects of metals in sewage sludge on soils, microorganisms and plants

Steve P. McGrath, Amar M. Chaudri and Ken E. Giller

Abstract

This paper reviews the evidence for impacts of metals on the growth of selected plants and on the effects of metals on soil microbial activity and soil fertility in the long-term. Less is known about. This is not surprising few long-term experiments exist.

It is commendable to search for the opportunity to wisely recycle. We know that Class A bio-solids are treated to reduce most pathogens but what of the cleaners, hormones, medications that find their way into the system when flushed or poured down the drain? The EPA in a study by the National Research Council also has concerns about excess nitrate-nitrogen in regards to long-term impacts on water systems. <http://www.epa.gov/waterscience/biosolids/nas/complete.pdf>.

We are concerned that the long-term impacts of bio-solid application to farmland on water and soil systems are not conclusive. In using bio-solids we may be overlooking potential problems for the farmland foods that come to our tables.

Yours respectively,

Tina Baynes

Director of IOPA

The Guardian

Biosolids: mix human waste with toxic chemicals, then spread on crops

Residual sludge from treating waste water has been turned into a money-spinner but what are the costs to health of ‘the most pollutant-rich manmade substance on Earth’?

Tom Perkins

Sat 5 Oct 2019 07.00 BST

Last modified on Mon 7 Oct 2019 21.45 BST



Dairy cows rest outside at Stoneridge Farm in Arundel, Maine, in August 2019. The farm was forced to shut down after sludge spread on the land was linked to high levels of PFAS in the milk. Photograph: Robert F Bukaty/AP

By some estimates, Americans send about 300m pounds of feces daily from the nation’s toilets to wastewater treatment plants.

While the water is cleaned and discharged, the remaining toxic sewage sludge stays at the treatment plant, and it’s what Sierra Club environmentalist Nancy Raine calls “the most pollutant-rich manmade substance on Earth”.

This “biosolid” sludge is expensive to dispose of because it must be landfilled, but the waste management industry is increasingly using a money-making alternative – repackaging the sludge as fertilizer and injecting it into the nation’s food chain.

Now the practice is behind a growing number of public health problems. Spreading pollutant-filled biosolids on farmland is [making people sick](#), [contaminating drinking water](#) and [filling crops, livestock](#) and [humans](#) with everything from pharmaceuticals to PFAS.

As more biosolid-linked crises develop, some farmers and environmentalists are calling for a ban on the practice.

In 2019, about 60% of sewage sludge produced by treatment facilities will be spread on farmland and gardens, as well as schoolyards and lawns. Sludge holds nitrogen, phosphorus and other nutrients that help crops grow, so the waste management industry lightly treats it and sells it cheaply to farmers who view it as a cost-saving product.

But in fact the excrement from which sludge derives has mixed with any number of 80,000 manmade chemicals that are discharged from industry's pipes or otherwise pumped into the sewer system. By the time the mix lands in treatment plants, it can teem with pharmaceuticals, hormones, pathogens, bacteria, viruses, protozoa and parasitic worms, as well as heavy metals like lead, cadmium, arsenic or mercury. It often includes PCBs, PFAS, dioxins, BPAs and dozens of other harmful substances ranging from flame retardants to hospital waste.

"Spending billions of dollars to remove hazardous chemicals and biological wastes from water, only to spread them on soil everywhere we live, work and play defies common sense," said David Lewis, a former Environmental Protection Agency scientist who opposed spreading sludge on cropland in the mid-1990s as the agency approved the use.

Previously treatment facilities burned sludge or dumped it in the ocean, but the federal government barred the practices because doing so violated clean air rules or created marine dead zones. The EPA now insists spreading the same toxic substance on farmland is safe.

Raine questioned that conclusion, noting that there is very little regulation, very little testing and no knowing what's in each batch of sludge as compositions vary.

In what biosolid testing the EPA has conducted, it identified more than 350 pollutants. That includes 61 it classifies "as acutely hazardous, hazardous or priority pollutants", but the law requires only nine of those be removed. Moreover, the EPA and wastewater treatment plants don't test for or otherwise analyze most of the 80,000 manmade chemicals.

In a scathing [2018 report](#), the EPA office of inspector general noted the agency couldn't properly regulate biosolids, even if it sincerely tried, because "it lacked the data or risk assessment tools needed to make a determination on the safety of 352 pollutants found in biosolids".

Though regulators and industry don't know what's in biosolids, there's strong evidence that it can be dangerous.

A University of North Carolina [study](#) found 75% of people living near farms that spread biosolids experienced health issues like burning eyes, nausea, vomiting, boils and rashes, while others have contracted MRSA, a penicillin-resistant "superbug".

In South Carolina, sludge containing high levels of carcinogenic PCBs was spread on cropland, and in Georgia sludge killed cows. Biosolids are also thought to be partly responsible for toxic algae blooms in the Great Lakes and Florida, and biosolid treatment centers regularly pollute the air around them.



Sewage sludge from the Lapeer wastewater treatment plant in drying beds, where it is being stored until an arrangement is made for permanent disposal, in Lapeer, Michigan. State officials ordered Lapeer to stop distributing its sludge for use as farm fertilizer after it was found to contain toxic PFAS chemicals. Photograph: John Flesher/AP

Meanwhile, sewage sludge is behind a widening PFAS crisis that has contaminated farms in Maine, Michigan, Wisconsin, Alabama and Florida. PFAS, or “forever chemicals”, are linked to a range of serious health problems like cancer, thyroid disorders, immune disorders and low birth weight. The chemicals are a product used to make non-stick or water-resistant products, and are found in everything from raincoats to dental floss to food packaging.

Maine’s testing of 44 fields sprayed with biosolids earlier this year consistently found alarming PFAS levels in the ground, cows and farmers’ blood, which forced one dairy farm to shut down.

“They’re finding kilograms of PFAS in sewage sludge when nanograms are harmful to humans, so you can’t regulate it as a fertilizer,” said Laura Orlando, a civil engineer who tracks problems with biosolids.

Still, state governments continue to allow biosolids to be spread on farmland or sold in compost. In Michigan, an environmental official recently said the state won’t test for PFAS in milk because it doesn’t want to put farmers out of business. A spokesperson for Michigan’s department of environment, Great Lakes and energy did not respond to specific questions about biosolid use, but said the state had increased PFAS testing, and in 2017 it issued suggestions for biosolids applications.

However, the Sierra Club’s Great Lakes manager, Christy McGillivray, noted that Michigan doesn’t have PFAS standards, so “that makes it impossible to regulate”. As of

now, states aren't testing for most of the thousands of chemicals known to be in sludge beyond PFAS.

Biosolids are also creating tension in some rural communities as farmers who use it pollute watersheds, contaminate neighbors' wells or sicken neighbors.

Don Dickerson, a farmer with land in Michigan and Ohio, told the Guardian biosolid dust from an adjacent field had coated his home and crops in the substance. Paul Wohlfarth, a resident of Riga Township, Michigan, said sludge is contaminating his well, and charged that biosolids from the state's cities were "turning Riga Township into a waste dump".

"When you put heavy metals, PFAS, plastics, pharmaceuticals and all that in the soil, sooner or later it gets toxic, and you can't wish that stuff away. You're ruining the topsoil forever," he said.

Though the government is reacting slowly or ignoring problems, companies like [Whole Foods](#), Dole, [Heinz and Del Monte](#) won't buy crops grown in biosolids, while [Switzerland](#), the Netherlands and other countries have banned it.

Still, the wastewater industry has strongly denied that health issues exist and regularly calls any contrary evidence anecdotal.

The Great Lakes water authority, which operates one of the nation's largest biosolid programs, declined interview requests from the Guardian. Despite sludge's chemical makeup, the wastewater industry bills biosolids as "green" and even [sells it](#) as organic fertilizer in stores like Walmart and Lowe's, though packaging doesn't indicate that it's composed of human and industrial waste.

The waste management industry treats sludge in several ways before labeling it fertilizer – air drying, pasteurization and composting are among common methods. Lime is employed to raise the pH level to eliminate odors, and about 95% of pathogens, viruses and other organisms are killed in the process.

But Raine stressed that none of the thousands of chemicals known to be in biosolids, or tens of thousands of manmade chemicals for which the government doesn't test, are removed.

"It has a technical song that sounds pretty good. However, nothing that is done to the sludge removes the chemicals," Raine said. "They just spend a little money on PR to convince us it's nice fertilizer and fail to mention all the other things that are in it."

SELECTED CASES ON BIOSOLIDS APPLICATION TO LAND

**BY GRACE JACKSON, ARTICLED STUDENT
and
BRUCE WARNSBY, LAW STUDENT
October 30, 2013**

This summary was prepared by an articling student and a law student and is for information purposes only. It should not be relied on as legal advice.

The following is a summary of just some of the relevant case law involving the land application of biosolids in North America. The purpose of this summary is to point out areas of potential legal liability which the CRD may wish to investigate before deciding whether or not to repeal its ban on the application of biosolids to lands within the CRD.

PROVINCIAL OVERSIGHT

In British Columbia, in one case so far, the Environmental Appeal Board found that a permit issued by the province of BC allowing the use of biosolids as fertilizer did not ensure protection of the environment as per the necessary requirements under BC's *Waste Management Act (WMA)* (*Organic Producers Assn. of Cawston & Keremeos v. British Columbia (Assistant Regional Waste Manager*¹). In that case, the permit was rescinded.

This case illustrates the potential for omissions by the province in its regulation of biosolids. It also illustrates how various administrative bodies might come to different conclusions about the environmental safety of biosolids application to land.

LOCAL GOVERNMENT JURISDICTION

In the United States, the battle over whether biosolids should be applied to land is being litigated in the context of jurisdiction. On the one hand, there are cases such as *Welch v. Board of Supervisors of Rappanock County*², where a local ordinance banning the land application of sewage sludge was upheld despite provisions of the federal *Clean Water Act* that encouraged the land application of biosolids. On the other hand, there are cases such as *Blanton v. Amelia County*³, where a local ordinance banning biosolids application was overruled by state permits allowing such application.

US case law suggests that courts in that country will attempt to harmonize two levels of regulation over the same subject area, and only if the regulations cannot be harmonized will the state law trump the local law (*O'Brien v. Appomattox County Virginia*⁴, *Queen Anne's Country v. Soaring Vistas*⁵). However, this principle can be applied with inconsistent results.

¹ *Organic Producers Assn. of Cawston & Keremeos v British Columbia (Assistant Regional Waste Manager)* (11 April 2002), 2000WAS-024, online: BCEAP <<http://www.eab.gov.bc.ca/waste/2002WASList.htm>>

² *Welch v Board of Supervisors of Rappanock County*, 888 F Supp 753, 759 (WD Va 1995).

³ *Blanton v Amelia County*, 540 SE 2d 869 871 (2001).

⁴ *O'Brien v Appomattox County*, 293 F Supp 2d 660 (WD Va 2003) affirmed *O'Brien v Appomattox County*, 71 Fed. Appx. 176 (4t ct App 2003).

⁵ *Queen Anne's Country v. Soaring Vistas* 121 Md. App. 140 (1997).

As another example, in *Thayer v. Town of Tilton*,⁶ the Supreme Court of New Hampshire upheld a local ban on the use of more hazardous “Class B” biosolids, stating that federal and state law left space for the town to protect the health and wellbeing of its residents through the ban. Conversely, in the case of *Franklin County v. Fieldale Farms*,⁷ the Supreme Court of Georgia found that allowing such local ordinances would breach the principle of uniformity.

The US battle continues on in places such as Kern County, California, where residents seek to ban the application of biosolids to land despite state legislation that promotes the use of biosolids. That case, *Los Angeles v. Kern County*,⁸ is currently being appealed to the Supreme Court of California.

A similar battle took place in Quebec, in the context of a prohibition on applying biosolids to farm land in Elgin County. Quoting the municipality’s plenary powers to enact by-laws for the general welfare of its people, and the Supreme Court of Canada’s direction to use the precautionary principle to deal with cases of conflicting scientific evidence, the prohibition was upheld at trial. However, on appeal the prohibition was held to be *ultra vires* the municipality and was overturned due to the specific wording of the various laws (*Ferme L’Évasion inc. c. Elgin (Municipalité du canton d’)* 2011 QCCA 967).

These cases demonstrate different approaches that may be taken by courts in trying to deal with divergent rationales for regulation and conflicting scientific evidence about health and environmental concerns.

EMERGING ISSUES

In addition to local governments, it may be that Indian Tribes in the United States also have the ability to regulate the depositing of biosolids on their land. In a September 2013 decision, *St. Isidore Farms v. Coeur D’alene Tribe of Indians*,⁹ the federal District court for Idaho ruled that the tribal court had jurisdiction to deal with concerns of the Tribe. The Tribe is concerned about the health risks for members who consume wildlife which grazes on a property located on the reserve that had sludge injected into it pursuant to state approval. In order to make that finding, the court found that the affidavits and expert evidence presented by the Tribe was sufficient to show that the health and safety of the Tribe may be threatened. To our knowledge, the case is now before the Tribal Court which will weigh the evidence.

While the authority of First Nations in Canada to regulate biosolids has not been addressed in courts to our knowledge, the *Coeur D’alene Tribe of Indians* case illustrates logic that Canadian courts could potentially adopt in considering whether applying biosolids to lands that provide habitat to wildlife may interfere with not just human health, but also aboriginal rights. If there was, for example, a First Nation that had valid health concerns about eating wildlife that had come into contact with biosolids, it is possible that a court could find that the application of biosolids effectively eliminated the aboriginal right to hunt for food or other purposes. It therefore may be

⁶ 151 N.H. 483; 861 A.2d 800; 2004 N.H. LEXIS 186

⁷ 270 Ga. 272; 507 S.E.2d 460; 1998 Ga. LEXIS 1157; 47 ERC

⁸ 214 Cal App 4th 394.

⁹ 2013 U.S. Dist. LEXIS 127705

that the constitutional duty to consult and accommodate aboriginal rights is triggered in relation to governments' decisions to allow the application of biosolids in areas that provide habitat to wildlife that may be eaten.¹⁰

COULD APPROVING THE LAND APPLICATION OF BIOSOLIDS GIVE RISE TO LIABILITY?

Approving the land application of biosolids may open up various parties to legal liability if it results in public health or environmental problems.

HAS LIABILITY BEEN ATTRIBUTED TO THE GOVERNMENT?

The United States Department of Agriculture (USDA) was ordered by a federal judge to compensate a farmer whose cows died due to the land application of biosolids in the case of *R. A. McElmurray v. United States Department of Agriculture*¹¹. In that case, the judge concluded that the USDA had failed to professionally monitor, test and record the toxicity levels of the biosolids it applied to the farmer's land.

CAN FARMERS BE HELD PERSONALLY LIABLE?

It remains the fact that farmers in the US can be held liable for damages caused by the land application of biosolids despite the protections offered by Right to Farm acts. This is because the application of biosolids may be considered to be outside the scope of normal farm practices, and because Right to Farm acts do not protect against negligence, trespass or the escape of a dangerous substance under the rule in *Rylands v Fletcher*. This is also the case despite the US federal *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) if the sludge that is applied to lands ends up containing particularly hazardous materials, and even if the farmer was unaware that the sludge was toxic (*Fallowfield Development Corp. v. Strunk*¹²).

In Quebec, neighbours of a farm storing municipal sludge were awarded a total of \$2000 plus interest and costs due to the presence of odors. The farmer was held liable in that case primarily due to the fact that he had been issued two violations of the provincial environmental quality act (*Maisonneuve c. Fermes Lebec inc.*, 2013 QCCQ 5923 (CanLII)).

Although none of these cases are from BC, they demonstrate the potential for litigation on this topic, and therefore suggest that care be taken in regulating the application of biosolids to lands.

¹⁰ See, for example, *Haida Nation v. British Columbia* (Minister of Forests), [2004] 3 SCR 511, 2004 SCC 73.

¹¹ *R.A. McElmurray v United States Department of Agriculture*, 535 F Supp 2d 1318 (SD Ga 2008).

¹² 1994 WL 498316 (ED Pa).

Over 80,000 Chemicals Are Found in Biosolids

Hydrocarbons, Petrochemicals, Organochlorines

PCBs, PCT, PBB, PBT,
Anthracene,
Pentachlorophenol,
Benzo(g,h,i)perylene,
Benzene, Benzene,
C14-C24-branched,
Polyethylbenzene
residue, Octane,
Hexachlorobenzene,
Ethylbenzene,

Chlorinated Benzenes,
Naphtha (petroleum),
turpentine-oil,
Hydrotreated kerosene,
Hydrocarbon oils,
Hydrocarbons, C10 and
C12, Distillates
(petroleum), Fuel oil,
Creosols, P-Cresol, O-
Cresol,

2-(2H-Benzotriazol-2-yl)-p-cresol,
Hexachlorobutadiene,
N-Nitrosodimethylamine,
Toxaphene, Trichloroethane,
Tetrachloroethane, Hexachloroethane,
Carbon Tetrachloride, Dichloroethylene,
Trichloroethylene, Tetrachloroethylene,
Xylene,

Pharmaceuticals

1,7-Dimethylxanthine,
4-Epianhydrochlorotetracycline,
4-Epianhydrotetracycline,
4-Epichlorotetracycline,
4-Epioxytetracycline,
4-Epitetracycline,
Acetaminophen,
Albuterol,
Anhydrochlorotetracycline,
Anhydrotetracycline,
Azithromycin,
Caffeine,
Carbadox,
Carbamazepine,
Cefotaxime,
Chlortetracycline,
Cimetidine,
Ciprofloxacin,
Clarithromycin,
Clinafloxacin,
Cloxacillin,
Codeine,
Cotinine,
Dehydronifedipine,
Demeclocycline,
Digoxigenin,

Digoxin,
Diltiazem,
Diphenhydramine,
Doxycycline,
Enrofloxacin,
Erythromycin-Total,
Flumequine,
Fluoxetine,
Gemfibrozil,
Ibuprofen,
Isochlorotetracycline,
Lincomycin,
Lomefloxacin,
Metformin,
Miconazole,
Minocycline,
Naproxen,
Norfloxacin,
Norgestimate,
Ofloxacin,
Ormetoprim,
Oxacillin,
Oxolinic Acid,
Oxytetracycline,
Penicillin G,
Penicillin V,

Ranitidine,
Roxithromycin,
Sarafloxacin,
Sulfachloropyridazine,
Sulfadiazine,
Sulfadimethoxine,
Sulfamerazine,
Sulfamethazine,
Sulfamethizole,
Sulfamethoxazole,
Sulfanilamide,
Sulfathiazole,
Tetracycline,
Thiabendazole,
Triclocarban,
Triclosan,
Trimethoprim,
Tylosin,
Virginiamycin,
Warfarin,



Heavy Metals

Aluminum,
Antimony,
ARSENIC,
Barium,
Beryllium,
Bismuth,
Boron,
Bromine,
CADMIUM,
Cerium,
Cesium,
Chromium,
COPPER,
Cobalt,

Dysprosium,
Erbium,
Europium,
Gadolinium,
Germanium,
Gold,
Hafnium,
Holmium,
Iron,
Lanthanum,
Lutetium,
LEAD,
Magnesium,
Manganese,

MERCURY,
MOLYBDENUM,
NICKEL,
Niobium,
Palladium,
Praseodymium,
Rhodium,
Rubidium,
Ruthenium,
Samarium,
Scandium,
SELENIUM,
Silver,
Strontium,

Tantalum,
Tellurium,
Terbium,
Thallium,
Thorium,
Thulium,
Tin,
Titanium,
Tungsten,
Uranium,
Vanadium,
Yttrium,
Ytterbium,
ZINC

Pathogens

Bacteria

FECAL COLIFORM,
Salmonella (2,000 types),
Shigella (4 spp.),
E. coli O157:H7,
Staphylococcus aureus,

Viruses

Adenovirus, Astrovirus,
Calicivirus, Coronavirus,
Enterovirus (Poliovirus),

Protozoa

Cryptosporidium,
Entamoeba histolytica,

Helminths (Parasites)

Ascaris lumbricoides
(roundworm),
Ancylostoma duodenale
(hookworm), Necator
americanus (hookworm),

Fungi

Aspergillus fumigatus,
Candida albicans,
Cryptococcus neoformans,

Prions (spongiform encephalopathy)

Enteropathogenic E. coli,
Yersinia enterocolitica,
Campylobacter jejuni,
Vibrio cholera, Leptospira,
Listeria, Helicobacter,

Coxsackie A, Coxsackie B,
Echovirus, Enterovirus 68-
72), Hepatitis A virus,

Giardia lamblia,
Balantidium coli,

Tainia saginata (tapeworm),
Trichuris (whipworm),
Toxocara (roundworm),
Strongyloides (threadworm),
Ascaris suum,

Epidermophyton spp.,
Trichophyton spp.,
Trichosporon spp.,

Mycobacteria, Aeromonas,
Legionella, Burkholderia,
Endotoxins,
antibiotic resistant bacteria,

Hepatitis E virus,
Norwalk virus,
Reovirus, Rotavirus

Toxoplasma gondii

Toxocara canis,
Taenia solium,
Hymenolepis nana

Phialophora spp.,



Synthetic Chemicals

Dioxins & Furans

Dioxins,
Octachlorodibenzo-P-Dioxin,
1,2,3,4,6,7,8-Heptachlorodibenzo-P-Dioxin,
Octachlorodibenzo Furan, 1,2,3,4,6,7,8-
Heptachlorodibenzo-
Furan (71), 2,3,7,8-Tetrachlorodibenzo-Furan,
1,2,3,6,7,8-Hexachlorodibenzo-P-Dioxin,
1,2,3,4,7,8-Hexachlorodibenzo-Furan ,
1,2,3,7,8,9- Hexachlorodibenzo-P-Dioxin,
1,2,3,6,7,8-
Hexachlorodibenzo-Furan,
"Organics" (carbon-based)

Acetone, Chloroform,
Cyclohexanone,
Bis(2-ethylhexyl) Phthalate,
Bis(2-ethylhexyl)
tetrabromophthalate,
Di-n-undecyl phthalate,
Alkyl benzyl Phthalate, Di-(2-
Ethylhexyl) Phthalate
(DEHP), Butyl Benzyl
Phthalate, Toluene,
2-Propanone,
Methylene Chloride,
Hexanoic Acid,
2-Butanone, Methyl Ethyl
Ketone, Alcohol Ethoxylate,
Alkylphenolethoxylates,
Phenol, Nonylphenol,

Pesticides & Insecticides

Aldrin, Chlordane,
Cyclohexane, Heptachlor,
Endosulfan, Endosulfan-II,
Lindane, Dieldrin, Endrin,
DDT, DDD, DDE, 2,4,5-
Trichlorophenoxyacetic Acid,

PCBs (PolyChlorinated Biphenyls)

PCB-1016, PCB-1232,
PCB-1221, PCB-1242,
PBDEs (PolyBrominated Diphenyl Ethers)
BDE-28, BDE-85,
BDE-47, BDE-99,
BDE-66, BDE-100,

2,2'-methylenebis[4-methyl-
6- nonyl-Phenol, p-
Nonylphenol, 4,4'-
butylidenebis[2-(1,1-
dimethylethyl)-5-methyl-,
4-Methylphenol,
Phenol, 4,4'-(1-
methyleneethylidene)bis[2-(1,1-
dimeth,
Phenol, 4,4'-(1-
methyleneethylidene)bis[2-(1,1-
dimeth,
2,4-dicumylphenol,
p-Dodecylphenol, 2,4,5-
Trichlorophenol,
N-Hexacosane,
N-Tetracosane, N-Dodecane,

Acetic Acid (2,4-
Dichlorophenoxy),
2,4,5-
Trichlorophenoxypropionic
Acid,

2,3,4,6,7,8- Hexachlorodibenzo-Furan,
1,2,3,4,7,8,9-Heptachlorodibenzo-Furan,
2,3,4,7,8-Pentachlorodibenzo-Furan,
1,2,3,4,7,8- Hexachlorodibenzo-P-Dioxin,
1,2,3,7,8- Pentachlorodibenzo-Furan,
1,2,3,7,8- Pentachlorodibenzo-P-Dioxin,
1,2,3,7,8,9- Hexachlorodibenzo-Furan,
2,3,7,8- Tetrachlorodibenzo-P-Dioxin,
Polychlorinated Dibenzodioxin/Polychlorinated Di-
benzofuran (PCDD/PCDF), Tetrahydrofuran, 2,4-
D, 2,4,5-T, dioxin (TCDD),

N-Tetradecane,
N-Triacontane,
N-Eicosane, N-Hexadecane,
N-Octacosane,
Carbon Disulfide,
N-Decane, N-Docosane,
N-Octadecane, P-Cymene,
Benzo(B)fluranthene,
Fluoranthene,
P-Chloroaniline,
Pyrene, Tetrachloromethane,
Trichlorofluoromethane, 2-
Hexanone,
2-Methylnaphthalene,
4-Chloroaniline,
Benzo(a)pyrene

Pentachloronitrobenzene,
Chlorobenzilate, Beta-BHC,
Kepone, Mirex,
Methoxychlor,

PCB-1248,
PCB-1254,
PCB-1260,
BDE-138,
BDE-153,
BDE-154,

Over 80,000
Chemicals Are
Found in Biosolids

• PHAs and PFAs (Per- and polyfluoroalkyl substances) are heavily concentrated in biosolids and have been found in milk, meat and produce in US as a result of land application of biosolids.

• Microplastics now also need to be added to this long list...

• Only a few of these chemicals are tested for or regulated by the BC government.



The Risks of Land Application of Biosolids are Real and Unavoidable...

NOVA SCOTIA ENVIRONMENTAL NETWORK (NSEN) BIOSOLIDS & WASTE WATER CAUCUS (BWWC)

POSITION STATEMENT ON SOIL APPLICATION OF BIOSOLIDS ONTO NOVA SCOTIA'S RURAL AGRICULTURAL LAND

Our Position:

The BioSolids & Waste Water Caucus does not support the use of biosolids on agricultural soils in the Province of Nova Scotia. The Nova Scotia Environmental Network's BioSolids Waste Water Caucus

Earthworms: Diagnostic Indicators of Wastewater Derived Anthropogenic Organic Contaminants in Terrestrial Environments

Chad A. Kinney,^{*,1} Edward T. Furlong,² Dana W. Kolpin,³
Steven D. Zaugg,² Mark R. Burkhardt,⁴ Joseph P. Bossio,⁵
and Stephen L. Werner²

Waste Management & Research

<http://wmr.sagepub.com>

Release of nitrogen and trace metal species from field stacked biosolids

John M. Peckenham, James A. Nadeau, Aria Amirbahman and Richard S. Behr
Waste Management Research 2008; 26; 163
DOI: 10.1177/0734242X07082138

The online version of this article can be found at:
<http://wmr.sagepub.com/cgi/content/abstract/26/2/163>

ENVIRONMENTAL
Science & Technology

ARTICLE

pubs.acs.org/est

Occurrence and Fate of Perfluorochemicals in Soil Following the Land Application of Municipal Biosolids

Jennifer G. Sepulvado,[†] Andrea C. Blaine,[†] Lakhwinder S. Hundal,[‡] and Christopher P. Higgins^{*,†}

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 Supporting Information

Guidance Document:

Potential for Exposure to Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans when Recycling Sewage Biosolids on Agricultural Land

This study contributes to the Georgia Basin Ecosystem Initiative, a partnership that provides tools, support and a framework for action towards sustainability in the Georgia Basin.

Prepared for:

BC Ministry of Water, Land and Air Protection

Environment Canada



...as are controversy and legal liability

Figure 1: Overview of BC Lakewood LLC's Hamm Road property and surrounding areas.



Biosolids Don't Stay Where They are Applied...

This map highlights the minimum area (10km radius) that will be impacted by wind, rain, human and animal dispersal of biosolids following land application at Hamm Rd.

The area impacted by biosolid application at Hamm Rd. due to environmental, animal and human dispersal includes:

- All residences within this 10km radius
- The Black Creek Watershed
- The Comox Watershed
- The Oyster Community Watershed
- Regional farms, fields and forests
- All aquifers, wells, streams and marshes in the area
- etc.



Forest Lakewood - Hamm Road LAP Water Features Map

Legend

- Legal Lot / LAP Boundary
- Black Creek Watershed
- Comox Watershed
- Oyster Community Watershed
- Aquifers
- Streams
- Ephemeral Streams
- Marsh
- Water Buffer 30m
- Lakes and Ponds
- Wells
- Diversions
- Roads



Created By: Graeme Shuttler
Version: v1.0
Date: 2019-08-12
Map Scale: 1:50,000
Coordinate System: NAD 1983 BC Environment Albers
Projection: Albers
Datum: North American 1983
Units: Meter



Biosolid Facts

1. The land application of biosolids is not safe for the environment or human health.

- No academic study or report that's looked into the environmental and human health impacts of land application has ever found this practice to be either absolutely safe or without environmental risks, because it's not.
- EPA or BC policies provide no assurance of safety. They only regulate and test for a small percentage of chemicals, mostly heavy metals. These very policies have been tied to serious harms to human and animal health in Canada and the US.

2. The land application of biosolids is opposed by local residents, regional farmers, food security advocates, First Nation Bands and environmental orgs.

- The Dogwood Initiative, the Sierra Club of BC, the Island Organic Producers Association, the Island Chef's Collaborative, the Farmlands' Trust have all opposed the land application of biosolids.
- There is no public support for the land application of biosolids, and in fact there is very significant public opposition.
- No consultation has taken place with local First Nation Bands that may be affected and that still wildcraft in the region.

Biosolid Facts

3. Land application of biosolids threatens the viability of local farms, and local food security.

- All major grocery store chains on Vancouver Island and throughout BC have explicit policies not to stock or sell products tainted by biosolids, including Thrifty Foods, the largest employer on the island as well as the largest buyer and distributor of island-grown produce.

4. The land application of biosolids creates significant legal liability for governments, farmers and regional taxpayers.

- The land application of biosolids is the flashpoint of a huge environmental controversy throughout Canada and around the world.
- Sweden, Switzerland, Germany, France and Holland have either banned or seriously restricted the land application of biosolids.
- Regional First Nation Bands have not been consulted yet. First Nation Bands in the Nicola Valley have spearheaded a ban on land application that remains to this day.
- The municipality of Cobourg, Ontario and a local farmer have been sued by a fellow resident for the application of biosolids, with the claimant blaming both the municipality and farmer for causing negative health consequences to his family and financial impacts to his land.
- A UVic Environmental Law Society report from 2013 cites significant legal liability for regional governments and farmers that proceed with land application.

Biosolid Facts

5. Thankfully, there are better/safer alternatives available right now.

- Immediate options include fuel for cement kilns on the mainland (CRD has opted for this solution), or thermal conversion by any of several advanced technologies and methods, such as gasification, which yields syngas for fuel, valuable ash and biochar for beneficial reuse.
- Biochar is a proven technology that destroys PFAs and other contaminants, and a sustainable alternative to fossil fuels.
- The Province is already exploring a pilot program to ship Metro Vancouver municipal waste to BC Biocarbon facility in Prince George to turn into biochar.
- BC Biocarbon has successfully tested Vancouver biosolids in their biochar facility.

So What Are Our Options?

1. Proceed with the land application of biosolids

- Creates inevitable risks to the local environment and regional public health.
- Significant opposition from residents, First Nations and environmental organizations.
- High probability of both controversy and legal liability.

2. Explore pyrolysis/BC Biocarbon option

- Meets Provincial demands re. beneficial uses of biosolids.
- Eliminates all legal liability, public controversy, and reputational risk for the regional districts and farmers.
- Re-affirms the regional district's commitment to protect the ALR, the local environment and public health.

Thank you! Questions?

Philippe Lucas
Biosolid Free BC

“Land-applied municipal sewage sludge (biosolids) is a highly complex and unpredictable mixture of biological and chemical pollutants. Biosolids generated in our large industrialized urban centers is very likely the most pollutant-rich waste mixture of the 21st century.”

Dr. Caroline Snyder PhD, Professor Emeritus, Rochester Institute of Technology.
Founder of Citizens for Sludge-Free Land.

“Exposure to mixtures of disruptive chemicals at low doses might be contributing to the high rates of cancer incidence that society is currently facing”

The Halifax Project – 174 scientists from prominent institutions in 28 countries.

“Nearly all chronic diseases are caused by long-term exposure to low levels of environmental contaminants and pollutants. We should be trying to minimize this exposure, not amplifying it”

-Dr. Richard Honour PhD, Plant Pathology/Soil Microbiology, UC-Riverside.
Executive Director, the Precautionary Group.