Toxic Sludge In Our Communities: Threatening Public Health And Our Farmlands

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About Toxics Action Center

Toxics Action Center provides assistance to residents fighting toxic hazards in their communities. Since 1987, we have helped over 400 neighborhood groups clean up hazardous waste sites, reduce the use and release of industrial toxins, stop sludge spreading, and oppose the siting of dangerous facilities. When the government refuses to take action and a polluting industry denies that there is a problem, we are a resource for residents concerned about their health and quality of life in their community. We provide residents with information about environmental laws, strategies for organizing, a network to other activists involved in similar battles, and access to legal and technical experts.

Toxics Action Center is funded by donations from concerned citizens and grants from private foundations. This financial support enables us to provide our services free of charge to neighborhoods facing the threats of toxic pollution.

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Harris Parnell
Sludge Field Organizer
Toxics Action Center

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Executive Summary

The Purpose Of *Toxic Sludge In Our Communities: Threatening Public Health and Our Farmlands*

Toxic Sludge In Our Communities: Threatening Public Health and Our Farmlands was written in response to a growing concern and debate about the spreading of sludge on farm fields, wood lots, and rural land throughout Maine.

The report provides information about the dangers associated with sludge as well as recommendations on how to better protect the environment and public health from those dangers at the community level.

What Is Sludge?

Residuals, biosolids, septage, sewage, wastewater byproduct, compost: there are many names for sludge and sludge products. For the purposes of this report, unless otherwise stated, the term "sludge" is used as most people understand it: the sometimes solid, sometimes liquid material generated by wastewater treatment plants and used as fertilizer on fields, in gravel pits, and on forestry lots throughout the state.

Maine's nomenclature for sludge is often confusing. The state refers to wastewater treatment plant sludge as "Type II residuals." Maine also classifies this sludge as "Class A" if it has been treated to reduce germs to background levels (levels normally found in soils) and "Class B" if it has been treated so that germs are reduced by an estimated 90%. For the purposes of this report, these classifications will be used only when necessary.

Why Is Sludge A Problem?

Sludge spreading is a problem that threatens public health and the environment in Maine.

What's In a Name? Sludge By Any Other Name Still Smells As Bad:

After the EPA relaxed the toxic limits of sludge, making it easier to spread the waste, corporate marketers had a difficult time convincing farmers to accept their product because of the negative connotations with its name.

A public relations and lobbying firm, Powell Tate, was then hired with money from an EPA grant to come up with a more aesthetically pleasing name for the products marketed from sludge.

The PR firm coined the term "biosolids."

This re-naming has confused the debate over sludge and has hidden the source of this toxic product.

Sludge contains measurable quantities of pollutants, such as heavy metals, dioxin, and other toxic chemicals. Sludge also contains pathogens--human germs, bacteria, viruses, and parasites. And sludge smells: sludge odor is more than just a nuisance, it is a public health threat, which has been linked to respiratory problems and death.

Thousands of Maine residents are affected by sludge spreading. During 2000, Maine generated 159,893 cubic yards of sludge. According to the Department of Environmental Protection conversion standards (1 cubic yard is equal to 1700 pounds), Maine produced 271,818,100 pounds of sludge in 2000.

There are 226 sludge application sites, most of which are farmlands, in 116 towns across the state.

The land application of sludge in Maine distributes pollutants from large towns and cities to rural areas, far from where they were originally produced.

State and federal agencies regulate sludge spreading, but regulation of this waste is difficult and problematic. Many scientists agree that the current land application rules do not protect human health, agricultural productivity, or the environment. The lack of funding to provide proper regulatory oversight and the very nature of sewage allow for sludge spreading of an unknown quality to occur on our lands.

Maine's regulations do not adequately protect public health and the environment. Maine's regulations:

- Have weak pollution standards;
- Allow for the spreading of sludge containing live pathogens;
- Discourage municipalities from being precautionary and public health oriented by not allowing them to make stricter standards than the state's; and
- Marginalize citizens' voices in the process as the sludge industry has greater access to state regulators than the average citizen.

This report will further explore and define these problems.

The Sludge Solution

If spreading sludge in our communities is dangerous, where should it go? What are we supposed to do with this waste?

The real question is, how can we eliminate the spreading of toxic pollutants on our land and how can we eliminate these contaminants from our wastewater treatment plant so that human waste becomes a truly useful and safe commodity?

Because sludge contains toxic chemicals and other pollutants, the best solution to our sludge problem is reducing these contaminants at their source. By dramatically reducing the use and disposal of industrial and household toxic chemicals we can greatly cut the chemical levels in sludge.

Until the long-term goal of eliminating the use and disposal of toxic chemicals is achieved, the state should:

1. Ban the use of sludge that contains industrial discharges.
2. Require the strictest level of pathogen reduction.
3. Broaden and strengthen sludge testing and toxic limits.
4. Allow municipalities to enact ordinances that are more stringent than the state's regulations through the town meeting or a town-wide vote process.
5. Provide for the long-term pH maintenance and metal monitoring of sludge sites.

In addition to statewide protections, municipalities should also enforce their own protections through strong ordinances controlling sludge. It is, after all, local communities that are most threatened by sludge spreading.

What's In This Guide

Concerned citizens can bring about reform in their communities and in the state through working to organize against toxic sludge. This guide provides a number of recommendations and strategies for residents and community groups to protect themselves from toxic sludge.

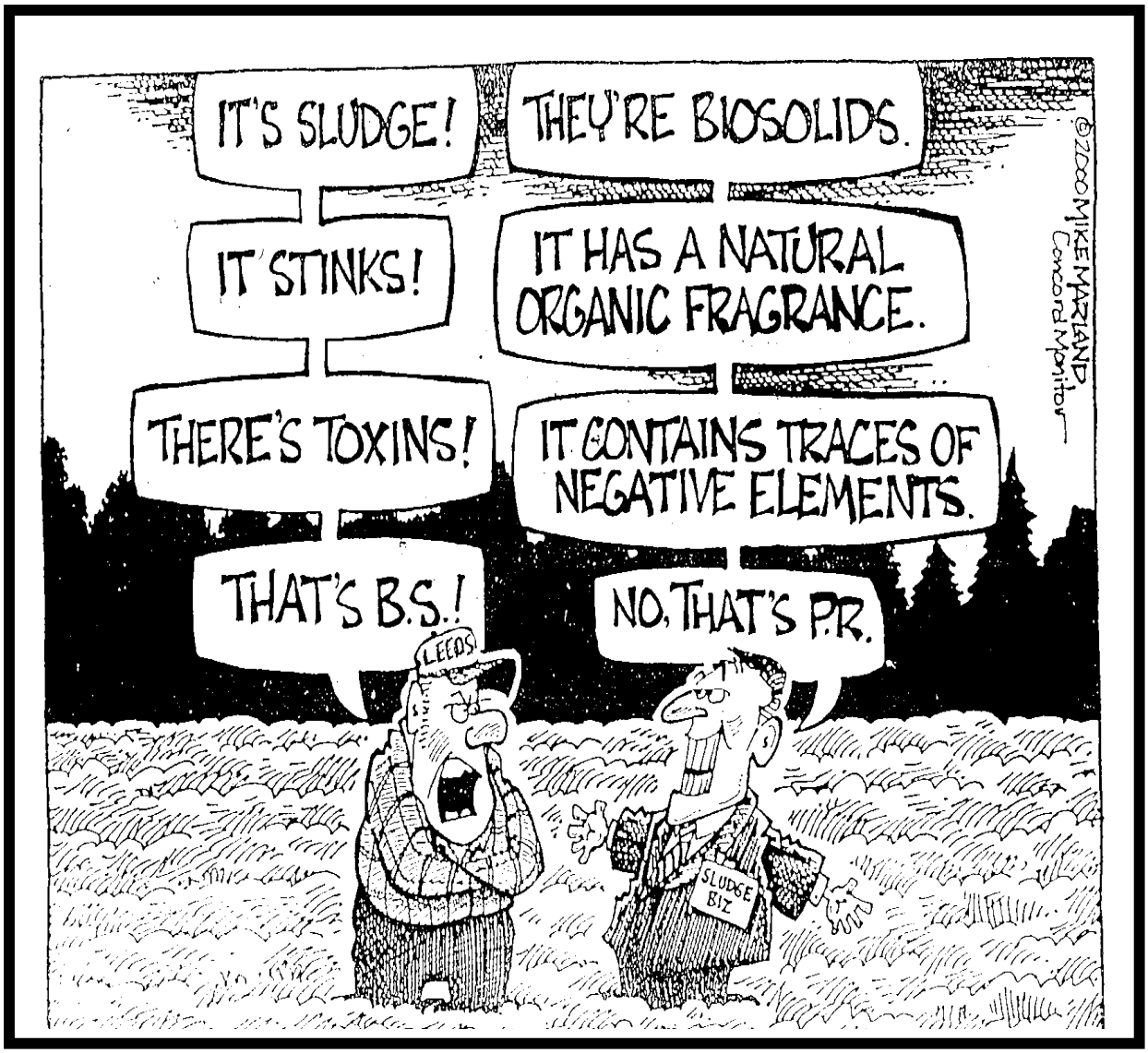
Toxic Sludge in Our Communities: Threatening Public Health and Our Farmlands is divided into three parts and includes an appendix.

Part One places sludge into a historical context. It also describes the general problems with sludge and sludge spreading.

Part Two details sludge laws and regulations in Maine. It points out the specific problems citizens have with these rules. This section also contains a list and a map of all the licensed sludge sites in Maine by town.

Part Three provides state and municipal sludge policy reform recommendations. It also describes what citizens can do to stop the spreading of toxic sludge in Maine.

The **Appendix** provides a glossary, sludge network contacts, and other useful information.


IT'S SLUDGE!
THEY'RE BIOSOLIDS.
IT STINKS!
IT HAS A NATURAL ORGANIC FRAGRANCE.
THERE'S TOXINS!
IT CONTAINS TRACES OF NEGATIVE ELEMENTS.
THAT'S B.S.!
NO, THAT'S P.R.
LEEDS
SLUDGE BIZ
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Part 1:
The Trouble With Sludge

How Toxic Sludge Became Fertilizer

In traditional agricultural societies, human waste was often used to enrich the soil. The Industrial Revolution caused increased urbanization and the need for cities to develop primitive sewer systems to remove human waste. Pipes and gutters were built to dump sewage directly into our lakes, rivers, and oceans.

As industry increased in America, factories began using these primitive sewer systems to get rid of their waste. This practice continued well into 20th century, when industry began widely using toxic chemicals. Using the local sewer system as a dumping ground for toxic waste was an easy solution to their disposal problems and was cheaper than treating their waste on site.

Sewage loaded with toxic chemicals created major public health and environmental disasters throughout the United States: rivers caught fire, public drinking water supplies became polluted, and waste washed up on our beaches. Public outcry from the growing number of disasters led to the passage of the federal Clean Water Act in 1972. This act set water quality standards nationally and provided money to communities to improve sewer systems and create wastewater treatment facilities. Unfortunately, instead of addressing the root of the problem by stopping industrial use and disposal of toxic chemicals, the act instead regulated the amount of pollution large industries could release into sewer systems.

By the late 1970s, extensive sewage systems had been built across the country. Wastewater treatment plants were built to separate solid waste from water, and, following natural and chemical treatment, release water back into the environment, clean of human waste. Unfortunately, they were not built to treat toxic chemical waste.

While these sewage systems and wastewater treatment plants improved public health standards and water quality, they have an ironic flaw. The treatment process creates cleaner water but also creates a toxic byproduct: sludge.[1] In fact, the Clean Water Act rightly defines sludge as a pollutant.

Like all waste, sludge must be disposed of in some way. What to do with sludge has been a source of controversy for the past three decades in the United States.

Through the 1970s and 80s, the federal Environmental Protection Agency (EPA) strictly regulated the land spreading of sludge, effectively prohibiting much of the waste from being

The Infinite Repose of If...

If sludge consisted purely of human waste, *and if* humans weren't subject to so many toxins and pollutants through the course of our everyday lives, *and if* pathogens in sludge were reduced to zero, *and if* landowners could keep strict control over access to their property, then there would be few risks to using sludge agriculturally.

Unfortunately, sludge does contain hundreds of toxic chemicals, heavy metals, and pathogens.

And, unfortunately, laws allow sludge containing live pathogens to be spread.

And unfortunately, it is extremely difficult to keep wildlife, farm animals, and humans out of sludge spread fields.

used on agricultural land. Wastewater treatment facilities could only dispose of sludge in one of three ways: by sending it to a landfill, by incinerating it, or by dumping it 100 miles offshore into the ocean.[2]

Ocean dumping eventually created large under-sea dead areas. In response to public concern, Congress passed the Ocean Dumping Act, which banned ocean dumping of sludge in 1992.[3]

Sludge disposal was then largely limited to landfills and incineration that became expensive for wastewater treatment plants. Municipal treatment facilities then pressured the EPA to relax its standards for the land spreading of sludge on agricultural fields.

Following a number of draft rewrites of EPA regulations, corporate sludge marketing companies and municipal wastewater treatment facilities were successful in relaxing the limits of toxins in sludge for land spreading.

What was once considered hazardous waste became a fertilizer. By classifying sludge as a fertilizer, it became exempted from several waste management regulations.

Marketing Toxic Sludge

Municipal water treatment facilities depend upon corporate sludge brokers to dispose of their sludge. To dispose of it, these private corporations convince farmers and landowner across the country to spread sludge on their fields as a nutrient supplement for their crops.

Sludge is marketed to landowners and consumers in two different ways.

The first, and most obvious, is by offering them free sludge. By convincing individual property owners that sludge is of "agronomic benefit" to their land, sludge brokers are finding extremely cheap disposal sites for sludge that would otherwise have to be shipped to landfills or incinerators at a cost of approximately $70 a ton.[4]

Companies then claim that that everyone wins: treatment plants

have a cheap disposal option for their sludge, which gives taxpayers a break, and landowners get free nutrients for their fields. As an accurate result, the sludge brokers walk away with the disposal fees from the treatment facility. The sludge brokers also escape from potential liability, which is now assumed by the farmer or property owner.

The second way sludge is marketed is by composting or pelletizing it. Then it can be sold or given away as compost or fertilizer.

Since the weakening of sludge regulations in the late 1980s, citizens cross the United States, Maine included, have been fighting to keep sludge from being spread on fields and farmland in their communities.

The two largest sludge brokers in Maine, as reported by the Department of Environmental Protection, are New England Organics and Synagro (formally Bio-Gro).

Activists fighting sludge are up against formidable opponents. Water treatment facilities and sludge brokers have formed powerful trade groups, such as the New England Biosolids & Residuals Association (NEBRA). NEBRA, in turn, is part of an even larger and more powerful group: the National Biosolids Partnership, which is a coalition of groups such as the EPA and Water Environment Federation, whose primary responsibility is to change "public perception" about sludge spreading.

Toxic Secrets of Sludge

Land applied sludge is required by Maine and federal laws to have toxic levels below certain limits and it is treated with lime to reduce pathogen levels. However, no sludge in Maine is completely free of toxic chemicals or pathogens. In fact, after it is treated, Class B sludge still contains a significant amount of pathogens.

The problems with sludge include:

- Sludge contains heavy metals, toxic chemicals, and pathogens.

Dairy Herd Deaths Associated With Sludge[5]

In 1986, Vermont farmer Bob Ruane began spreading sludge on his fields.

Two years later he began to notice health problems in his dairy cows.

Calves were born with deformities and milk production decreased dramatically. Between 1988 and 1991, 101 of Ruane's cows died.

While the sludge he was applying was within the regulatory limits, it contained the highest dioxin levels in Vermont.

Autopsies revealed that the cows showed signs of severe liver damage. Although it is beyond the limits of science to prove direct causation in this case, dioxin has been linked to reproductive and liver problems.

- The testing and regulation of sludge is inadequate and problematic.
- Sludge odors pose a public health threat and lower Maine's quality of life.

Water treatment trade groups and sludge brokers tout the agricultural use of sludge as "recycling." To recycle is to extract and reuse useful material from waste. Sludge spreading, as it is currently practiced, should not be confused with recycling. Sludge spreading redistributes heavy metals and other toxins from large towns and cities to rural areas; it does not recycle them.

Sludge lobbyists also claim that sludge standards are such that the waste poses no threat to human health, wildlife, or the environment.

The truth is, however, that many adverse health effects, several human deaths (see page 13-14), and numerous livestock losses have been associated with sludge use.

Toxics In Sludge

Heavy Metals

All sludge in Maine contains heavy metals. In Maine, wastewater treatment plants usually test monthly for ten heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc.[6]

These metals are persistent—that is, they do not break down in the environment and therefore build up over time. As the Cornell Cooperative Extension states, "most heavy metals remain in the soil for long periods of time, ranging from several decades to many centuries." The heavy metals in land spread sludge therefore become permanent additions to the total quantity in the soil. Even extremely small amounts of heavy metals in sludge, therefore, are dangerous.[7]

High levels of arsenic in food or water can be fatal. Cadmium, chromium, nickel, and selenium have been linked to cancer. Cadmium has also been linked to kidney problems, miscarriages, and stillbirths. Copper, nickel, and zinc are known to cause growth problems in crops. Children exposed to lead can develop behavioral and learning problems. Mercury exposure at key moments in fetal development can cause learning disabilities and neurological disorders. Molybdenum bioaccumulates in grass eating livestock; ingested in excess, it can cause anemia, diarrhea, and growth problems.[8]

These metals can be taken up by the plants that are grown on sludge and re-enter the human food chain via livestock feed. These metals can also leach into groundwater. Highly acidic soils, like those found in Maine, can exacerbate heavy metal leaching.[9]

Pathogens: Bacteria, Viruses, and Parasites

Sludge, by its very nature, contains human pathogens: germs such as bacteria, viruses, and parasites. Whereas exposure to heavy metals can cause problems over time, exposure to these germs is more acute and can cause health problems almost immediately.

Because of the extremely large numbers of pathogens that exist in the world, it is impossible to test sludge for all types of pathogens.

Some common pathogens in sludge include the bacteria E-coli and Salmonella, the virus Hepatitis A, and parasitic worms. Pathogens can cause intestinal problems, other serious illnesses, and death.

Land spread sludge can be treated to nearly eliminate pathogens. By composting sludge, for example, pathogen levels can be reduced significantly.

Unfortunately, federal and state laws allow "Class B" sludge, which has not been treated to the strictest pathogen reduction methods, to be spread. In other words, sludge with live pathogens is being spread throughout the state.

In Ohio, workers handling Class B sludge became infected. The Centers for Disease Control conducted an investigation and found that pathogens in the sludge was the probable source of the infections.[10]

Unfortunately for the residents and workers of Northern New England, wet and overcast climates encourage pathogen growth. Researchers have found that pathogens can survive in sludge for weeks, months, or even years after reduction treatment processes.

Humans can be exposed to sludge pathogens in a number of ways. We might consume vegetables that have pathogens on them. Children might accidentally gain access to a sludge field and become exposed to the germs. Pathogens can also be spread by pets or wildlife, such as deer, that walk through a sludge field. In Maine, many snowmobile trails, used by hunters and off road vehicle riders in winter months, run through sludge

What Sludge Brokers Say About Sludge Opposition: Cockapoopoo!

Companies that provide sludge free of charge to land owners deny that there are any real health or environmental threats from spreading.

Pamela Gratton, the technical services director of Bio-Gro, a division of Wheelabrator Water Technologies, a sludge-brokering corporation, says that opposition to sludge is unfounded:

"When we were young, our mothers talked us into believing it was nasty cockapoopoo. Our mothers teach it to us. So we retain a certain prejudice about everything that goes into the commode," said Gratton.[11]

Many concerned citizens find sludge company PR to be "nasty cockapoopoo." After all, mothers are often right when they say it is better to be safe than be sorry.

fields.

Dioxin: "The Darth Vader of Chemicals"

Dioxin is the unwanted byproduct of chemical processes involving chlorine. According to the EPA, sludge spreading is the largest land distributor of dioxin nationally.[12]

Dioxin is a known carcinogen and has been linked to reproductive problems, genetic damage, and endometriosis. Scientific evidence suggests there is no safe exposure level to dioxin.[13] As one well-known dioxin expert called it, dioxin is "the Darth Vader of chemicals," because you can't see or taste it, but it is deadly.

According to the Maine DEP, the source of dioxin contamination in sludge is not known. It might be discharged into the sewer system by unknown industrial or residential sources. Dairy cattle grazing on sludged land may ingest dioxin and the chemical will then enter humans via milk and meat.

What We Don't Know *Can* Hurt Us

The federal Environmental Protection Agency estimates that there are 70,000 synthetic (not naturally occurring) chemicals. Yet, only 2% of these chemicals have been fully tested. In fact, even the most basic toxicity testing results cannot be found in the public record for nearly 75% of the most widely used of these chemicals.

The ways in which these chemicals affect human health and the ways in which they interact with one another in the environment (their "synergistic effects") are not always known. Despite this, industry only needs to report the discharge of 1% of these chemicals into the waterways and sewers.

Although industries and households release thousands of chemicals, Maine's sludge is only regularly tested for 10 heavy metals and occasionally tested for dioxin and toxic pesticides.

Where Do These Toxics Come From?

Sludge contains heavy metals and other pollutants because industry and households use and release far too many toxic chemicals. The sources of contaminates in sludge are many, depending upon the specific water treatment facility and the community that it serves. Sources of contamination include industrial releases, small business discharges, hospital releases, household waste, leachates from landfills and Superfund sites, including nuclear waste dumps, and municipal water and sewer systems as a whole.[14]

Everything that is discharged into a sewer that leads to a water treatment plant could potentially become part of the sludge that the facility produces.

If a worker at an industrial facility accidentally dumps toxic chemicals down the drain instead of disposing of it properly, those chemicals could end up in the sludge. Likewise, if a home gardener rinses out a bottle containing toxic pesticides in the sink, those toxic pesticides could find their way to the sludge.

Industrial Hazards

As discussed earlier, many chemicals used by industry have not been properly tested and are not regulated or reported. Additionally, even at the safest facilities, accidents happen and toxic chemicals can be released into the waste stream.

Maine requires wastewater treatment plants to work with large industries on reducing and monitoring their waste discharge. This "pretreatment process" is required of companies that discharge a large amount of waste into the sewer system or use a large amount of chemicals that could affect the operation of the sewer system. (A list of these significant industrial users can be obtained from individual wastewater treatment facilities.)

Unfortunately, once companies release heavy metals, or other toxins, into the sewer system, there is no process to remove these chemicals from the sludge. In addition, every industry in the country can discharge 33 pounds of hazardous waste *every month* into wastewater treatment plants, without penalty or reporting.[15]

Small Business Hazards

Many small businesses are not regulated for their toxic releases. Nor are they included in the pretreatment processes. While auto garages, dentist offices, photo developers, dry cleaners, and other small businesses may not individually release a large amount of toxic chemicals, taken as a whole their contribution to chemicals in sludge could be dangerous.

Hospital Hazards

All hospitals are required to dispose of toxic chemicals and biohazards in a state approved manner. Nevertheless, accidents do happen: from a broken mercury thermometer to additional human pathogens being washed down the drain, hospitals can contaminate sludge.

Contamination From Municipal Water and Sewer Systems

Many towns and cities have water and sewer systems made with lead and copper pipes. Lead, copper, and other metals often leach into the waste stream and contaminate sludge. Contamination of sludge can also occur if a town's reservoir is polluted with pesticides and other chemicals for which testing is not required.

Household Hazards

From pesticides (including flea shampoos), to heavy duty cleaning agents and hair coloring products, toxic chemical containing products abound. Any of these chemicals dumped down the drain could end up being spread on a farm field or in a forest.

Sludge Regulation Is Problematic

It is nearly impossible to know the exact levels of toxic materials in each batch of sludge because what is released into the waste stream varies day to day. While sewage waste is treated at wastewater facilities for several days, not every batch of sludge is tested before it leaves the plant.

It is more due to economics than to concerns for health protection, that sludge generators do not test the waste more frequently. For example, waste is often only tested for dioxin twice a year because of the cost of the test.

A worker may accidentally spill pesticides into a sink or storm drain, or someone might illegally dump other toxic chemicals down the drain, and no matter how strict regulations are in the law books, testing could miss these sudden increases in contaminants.

Regulations and testing cannot guarantee sludge safety until toxic chemicals are removed from industrial household use.

Sludge Stinks

The Maine Wastewater Control Association, a trade group of water treatment facilities in the state, claims, "Temporary odors are a necessary inconvenience in the practice of agriculture."[16] The Association also claims that sludge smells similar to manure and that the smell will dissipate "within several days. "

Despite industry propaganda, studies have shown that sludge odors are more than just a nuisance; they are a public health threat.

Harmful gases, called organic amines, can develop from chemical reactions that occur in sludge. These gases are released when the pH of sludge is raised above 10, such as when lime is added. Studies suggest that sludge odor can cause health problems in humans as far as 1600 feet from a site.[17]

A study performed by a former EPA sludge regulator linked sludge odors to "severe irritation to mucous membranes followed by respiratory infections" in residents living near a sludge site. Irritation of the eyes, throat and skin make infection from pathogens in sludge more likely. The study was conducted following the death of a New Hampshire man suffering from respiratory distress in the vicinity of a sludge site.[18]

Residents near sludge sites have not been the only victims of sludge odor. Symptoms associated with organic amine poisoning frequently occur among waste treatment plant workers and drivers who haul sludge.

Deaths Associated With Sludge

At least two deaths have been associated with sludge spreading.

In October 1994, an eleven-year-old boy, named Tony Behun, went dirt bike riding near his home in Osceola Mills, Pennsylvania. Unknowingly, the boy rode through a field covered in Class B sludge. He came home covered in dirt and grime. Two days later, he developed a sore throat, headache, and a boil on his left arm.

Brenda Robertson, his mother, took him to the doctor, who prescribed flu antibiotics. The next day, Tony had trouble breathing. He died after being flown by helicopter to a hospital in Pittsburgh. The final diagnosis was that Tony had died from a bacterial infection.

How her son contracted the infection remained a mystery to Brenda Robertson until five years later when she read about an investigation into her son's death by the Pennsylvania Department of Environmental Protection. Without consulting Brenda, the state published a report concluding that Tony died of a bee sting and that Class B Sludge *was not* spread on property that he went riding on.

After Robertson protested that her son was not stung by a bee before his death, the department conducted another investigation. The new probe concluded that sludge was spread near Robertson's home but the boy's death was caused by the pathogen, Staphylococcus aureus, which "is not known to be found in biosolids [sludge]. " [19]

Despite the Pennsylvania DEP's statement, the federal government lists Staphyloccus aureus as a potential pathogen in sludge.

Another sludge related death occurred in Greenland, New Hampshire. In late October of 1995, the Marshall family had their otherwise quiet lives tragically disrupted. Sludge was being dumped on a field in their rural neighborhood. This was just the beginning of the residents' problems. On Halloween, Joanne Marshall rushed home from work to take her little girl trick-or-treating. When she arrived home and jumped out of her car, she was "greeted by such a stench, it took [her] breath away. "[20] The Marshalls and their neighbors began suffering from nausea, vomiting, stomach cramps, migraine headaches, flu-like symptoms, slowed reflexes and respiratory problems.

Joanne, concerned that so many people in her area were ill, contacted Health and Human services. The man with whom she spoke told her that the sicknesses the neighborhood had been experiencing were symptoms of sludge exposure. She was given the names of several people to contact to test the sludge, but phone calls were either rudely returned or not at all.

On Thanksgiving eve, Joanne kissed her son Shayne, goodnight, not knowing that it would be for the last time. Around four in the morning, Joanne's other son screamed that Shayne was unconscious in his bed. Shayne was rushed to the emergency room where he soon died.

The autopsy stated that Shayne died of respiratory problems, though the underlying cause was "inconclusive." Meanwhile, other residents in the neighborhood were suffering from Pleurisy, abscesses, cysts, unstoppable nosebleeds, migraine headaches and tumors. Many pets in the neighborhood also died from tumors. Synagro, the sludge broker, maintains that there is no proof connecting sludge spreading and health ailments.

Part 2: Sludge in Maine

Active Sludge Sites In Maine

The number of active sludge spreading licenses by town and the generators of the sludge (the wastewater treatment plants) as of January 2000 for towns in Maine is found in Table 1.[21] By the state's definition, an "active" site is one that holds a current permit to land apply sludge should the owner choose. Under this definition, there may be sites listed which are not at the present time being sludged. The state also maintains a list of sites that are "inactive"--that have held permits previously but need to reapply in order to resume spreading--which are not included in this list. A map pinpointing licensed sludge sites for 2000 is available through Toxics Action Center.

Table 1:

Town	Sites	Wastewater Treatment Plants that Generate the Sludge
Acton	2	Portland Water District and York Sewer District
Albion	5	Kennebec Sanitary Treatment and Portland Water District
Alna	1	Wiscasset WWTP
Arundel	4	Kennebunk Sewer District and Wells Sanitary District
Auburn	6	Lewiston-Auburn WPCA and Portland Water District
Baldwin	1	South Portland WWTP
Belgrade	1	Pat Jackson, Inc.
Benton	2	Kennebec Sanitary Treatment and International Paper Company
Bethel	2	Bethel WWTP and Bethel WPCF
Bingham	2	Bingham WWTP
Blaine	1	Mars Hill Utility District
Blue Hill	4	Blue Hill WWTP and Castine WWTP
Boothbay Harbor	1	Boothbay Harbor Sewer District
Bowdoinham	4	Brunswick Sewer District, Lewiston-Auburn WPCA and Pat Jackson, Inc. **
Brewer	1	Brewer WWTP
Brooks	2	Brewer WWTP and Portland Water District
Bucksport	1	Bucksport WWTP
Buxton	4	York Sewer Dist., Wells Sanitary Dist., South Portland WWTP and Portland Water District
Canaan	2	Portland Water District and Kennebec Sanitary Treatment
Cape Elizabeth	1	Saco WWTP/Old Orchard Beach WWTP
Carmel	1	Portland Water District
Casco	1	Portland Water District
Castle Hill	1	Mapleton Sewer District
Chapman	1	Presque Isle Sewer District
Charleston	2	Charleston Correctional Facility; Brewer WWTP
Chelsea	3	Kennebec Sanitary Treatment and VA WWTP
Clinton	1	Kennebec Sanitary Treatment
Cumberland	1	Portland Water District
Dayton	8	Kennebunk Sewer District, South Portland WWTP, Wells Sewer District and York Sewer District

Durham	2	Lewiston-Auburn WPCA
Eastport	1	Eastport WWTP
Eliot	2	York Sewer District
Exeter	1	Portland Water Dist.
Fairfield	4	Kennebec Sanitary Treatment
Falmouth	6	Falmouth WWTP and Town of Falmouth
Farmington	7	Farmington WWTP
Fayette	2	Lewiston-Auburn WPCA
Fort Fairfield	4	Fort Fairfield Utility District
Frankfort	1	Portland Water District
Freedom	1	Portland Water District
Gorham	2	Saco WWTP/Old Orchard Beach WWTP and South Portland WWTP
Grand Isle	2	Grand Isle WWTP
Gray	2	Portland Water District and South Portland WWTP
Greenbush	1	Brewer WWTP
Harrington	1	Babcock Ultrapower-Jonesboro
Harrison	1	Portland Water Dist.
Hartford	1	Lewiston-Auburn WPCA
Hebron	1	Lewiston-Auburn WPCA
Hodgdon	1	Houlton Water Company
Houlton	1	Houlton Water Company
Jackson	4	Brewer WWTP, Portland Water District and South Portland WWTP
Jefferson	1	Thomaston WWTF
Kennebunk	3	Kennebunk Sewer District and Ogunquit Sewer District
Knox	3	Brewer WWTP and Portland Water District
Leeds	1	Lewiston-Auburn WPCA
Lewiston	2	Lewiston-Auburn WPCA
Limestone	2	Limestone Water & Sewer District
Linneus	1	Houlton Water Company
Lisbon	1	Little River Turf Farm
Littleton	1	Houlton Water Company
Lubec	1	Town of Lubec
Lyman	1	South Portland WWTP
Machias	3	Machias WWTP, Town of Machias
Madawaska	1	Madawaska WWTF
Mercer	1	South Portland WWTP
Millinocket	1	Millinocket WWTF
Minot	2	Lewiston-Auburn WPCA
Morrill	1	Portland Water Dist.
Mount Vernon	1	Portland Water Dist.
New Gloucester	1	Lewiston-Auburn WPCA and Portland WD
Newcastle	2	Boothbay Harbor Sewer Dist.
Newfield	3	Portland Water Dist.
Norridgewock	2	Norridgewock WWTP
North Yarmouth	1	Portland Water Dist.
Norway	1	Paris Utility Dist.
Oakland	1	Oakland WWTP
Ogunquit	1	Ogunquit Sewer District

Otisfield	1	Paris Utilities District
Oxford	2	Robinson Manufacturing Company
Palermo	3	Kennebec Sanitary Treatment
Penobscot	1	Castine WWTP
Phillips	1	Farmington Pollution Control Facility
Poland	2	Mechanic Falls Sanitary District and Lewiston-Auburn WPCA
Portland	2	Portland Water District
Pownal	3	Portland Water District
Presque Isle	3	Presque Isle Sewer District and McCain Foods, Inc.
Princeton	1	Bailyville WWTP
Rangeley	1	Rangeley WWTP
Readfield	2	Pat Jackson, Inc.
Richmond	7	Bath Wastewater Pollution and Richmond Utility District
Sabattus	2	Sabattus Sanitary District
Saco	2	Portland Water District and South Portland WWTP
Saint Agatha	2	Saint Agatha Sanitary Dist.
Saint Albans	2	Brewer WWTF and Kennebec Sanitary Treatment.
Shapleigh	1	Kittery WWTP
Sherman	2	National Starch and Chemical Company
Sidney	1	Kennebec Sanitary Treatment
Skowhegan	3	Skowhegan WPCF
Sumner	1	Lewiston-Auburn WPCA
Thorndike	1	South Portland WWTP
Troy	1	Brewer WWTP
Union	1	Portland Water Dist.
Unity	4	Kennebec Sanitary Treatment
Van Buren	1	Van Buren WWTP
Veazie	1	Town of Veazie
Waterford	3	Paris Utility District, Portland Water District and SD Warren Company
Wells	2	Ogunquit Sewer District and Wells Sanitary District
West Gardiner	1	Pat Jackson, Inc.
Westbrook	1	South Portland WWTP
Whitefield	1	Kennebec Sanitary Treatment
Windham	4	Department of Corrections, Portland Water District and South Portland WWTP
Wiscasset	3	Wiscasset WWTP
Woodville	2	East Millinocket WWTF
Woolwich	1	Bath Wastewater Pollution
York	1	York Sewer District
Total	**226**	

Table 2:

Towns With Most Sludge Sites*

Dayton	8
Farmington	7
Richmond	7
Falmouth	6
Auburn	6
Albion	5

* This is a list of towns with the largest number of active sludge sites and does not necessarily represent the towns where the largest quantity of sludge is being spread.

Table 3:

Number Of Permitted Sites By County

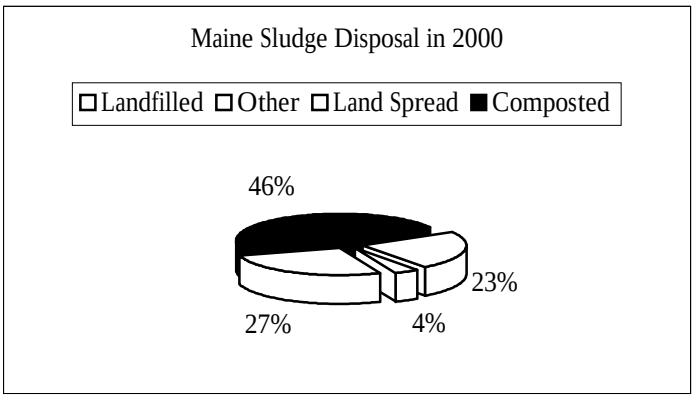
County	**Number of Sites**
York	38
Cumberland	35
Aroostook	22
Waldo	21
Kennebec	20
Androscoggin	17
Somerset	19
Oxford	10
Sagadahoc	8
Penobscot	8
Franklin	7
Lincoln	5
Hancock	7
Washington	8
Knox	1
Piscataquis	0
Total	**226**

By the Numbers

There are 57 wastewater treatment facilities in Maine that produced a combined total of 159,893 cubic yards of sludge in 2000.[22]

Of the 159,893 cubic yards of sludge produced in Maine, nearly a third of which was spread on rural land, farm fields, and woodlots in 116 towns in Maine.

Table 4:



Forty-six percent of Maine's sludge was composted in 2000. There are no public records of where the composted sludge was eventually utilized.[23]

Only 23% of Maine's sludge was land filled in 2000.[24]

State Sludge Regulations: An Overview

Most of the state's rules regarding sludge are contained in the Department of Environmental Protection's (DEP) rules *Chapter 419 Agronomic Utilization of Residuals*. Chapter 419 replaces the old Chapter 567 rules on sludge.

Maine's sludge rules are based on the federal Environmental Protection Agency's CFR 40 *Part 503 Rule* regulating sludge nationally. State regulations must be at least as strict as the federal standards, but states may adopt regulations that are more protective. Maine, in fact, has slightly more protective standards than the federal rules.

In Maine the DEP is charged with regulating sludge spreading. The DEP sets limits for the allowable heavy metals and toxic chemicals in sludge, and sets standards for the topography, soil PH, and the distances sludge can be applied from residences and bodies of water.

All sludge in Maine is disposed of in one of four ways:

1. It is land spread in Maine.
2. It is composted (treated to a strict pathogen reduction standard and sold or given away as compost).
3. It is deposited in landfills.
4. It is sent out of state (primarily land spread in New Hampshire).

Sludge Composition

In order to be considered suitable for compost in Maine, sludge, when tested, must have heavy metal levels lower than the state's screening concentrations standard (see Table 5 Column A).[25]

Even though this type of sludge often contains measurable quantities of heavy metals and other toxins, in federal rules, compost is often referred to as "EQ" or "Exceptional Quality" sludge. In Maine, this type of sludge is referred to as "Class A" sludge. There are no regulations regarding where or how composted sludge may be used in Maine.

Table 5: Sludge Heavy Metals Standards In Maine (mg/kg) (parts per million)

Heavy Metal	Column A Screening Concentration	Column B Ceiling Concentration (max. allowed in Sludge)	Column C Ceiling Concentration in Soil at Site (max. allowed in landfill)
Aluminum	N/A	N/A	100,000
Arsenic	10	41	73
Barium	N/A	N/A	1500
Beryllium	N/A	N/A	7
Cadmium	10	39	39
Chromium	1000	3000	3000
Cobalt	N/A	N/A	70
Copper	1000	1500	1500
Lead	300	300	300
Mercury	6	10	6
Molybdenum	75	75	15
Nickel	200	420	420
Selenium	100	100	100
Silver	N/A	N/A	34
Vanadium	N/A	N/A	300
Zinc	2000	2800	2800

If a wastewater treatment facility's sludge is higher than screening concentrations but lower than the regulated ceiling concentrations (see Table 5 Column B), the sludge may be land applied provided that the sludge generator (the treatment facility) obtains a site-specific license.[26] [See "How Sludge Is Permitted, " below]

Sludge that has heavy metal levels above the ceiling concentrations must be sent to a landfill. Sludge that contains 250 parts per trillion of dioxin must be deposited in a landfill as well. [Note: there are no sludge incinerators in Maine]

How Sludge Is Permitted

Site-specific licenses are permits the DEP grants to spread sludge on a particular field or wood lot. Wastewater treatment facilities are required to apply for site specific licenses to land apply sludge that either:

1. Does not meet screening concentration standards (Table 3 Column A**)**.
2. Or has only been treated to Class B pathogen reduction standards. Class B sludge is sludge that has been treated in such a way as to reduce viruses, bacteria, and parasites by an estimated 90%.

Most of Maine's sludge meets the ceiling concentration criteria (land application levels). This means that most generators are required to apply for site-specific licenses is that their sludge has only been treated to Class B standards (as compared to being treated to Class A standards, the strictest pathogen reduction method which reduces viruses, bacteria, and parasites to estimated soil background levels).[27]

While the wastewater treatment plants (or sludge generators, as they are referred to in Maine regulations) are legally responsible for submitting site-specific license applications, they work closely with sludge brokers and the DEP on the details of the license. Sludge brokers often recruit farmers and other landowners to offer their property as sludge sites. Generators and sludge brokers often consult with the DEP about a specific site before submitting an application to smooth out details of the soon-to-be-proposed license.

When applying for a site-specific license, generators are required to give 30 days public notice before the application is submitted to the DEP. Generators are required to contact abutting landowners to the site, the municipality, and place a notice in a local newspaper. The requirements for obtaining a site-specific sludge spreading license *seem* strict (See Appendix pp. 35-38). It should be noted, however, that very few sludge licenses have been denied.

How Licenses Are Decided

DEP rules require that site-specific licenses be granted or denied on the merits of the application and any public comments they receive. Officially, it is the Commissioner of the DEP that issues the license. But the direct decision makers are the DEP sludge program specialists who recommend whether or not a license should be granted.

If citizens request so in writing, the DEP at its discretion can hold a public hearing to accept comments on an application. Often, the DEP holds public information meetings instead of official hearings. The DEP often encourages sludge brokers and wastewater treatment plants to attend and present information at these meetings.

Of the hundreds of applications that have been sent to the DEP, only a small number have been denied. Often, instead of denying a permit, DEP officials smooth out problem areas before the application process begins.

The DEP issues a draft license once a decision has been made. Citizens have only five days to comment on the draft. After the five-day comment period, a permanent license is granted.

Appealing A License

After a license is granted, citizens have only 30 days to appeal the

Warning: More Toxic Sludge Coming to a Town Near You!

Maine's heavy metals standards for sludge were weakened in 1999.

Until 1999, many of Maine's standards were stricter than federal standards.

In that year, regulators decided to lower Maine's standards closer to federal ones.

The result was that the state's cadmium, chromium, copper, nickel, and zinc allowable levels were weakened.

Since Maine's sludge only very rarely exceeded the previous standards, the only possible explanations for why they were changed are to either allow more heavy metals into our sewers or to allow more toxic out-of-state sludge to be spread on our lands.

decision. In order to appeal the decision, citizens must petition the Board of Environmental Protection (BEP), a citizen board that oversees the DEP. The board is made up of governor appointed industry leaders, professionals, and citizens. In the case of an appeal, the burden of proof is upon the citizens filing the appeal that a site does not meet the state's requirements.

If the appeal process is granted, the BEP acts as judge and jury over the appeal.

Revoking A License

If a license has been granted and the appeals period has expired, citizens can petition the BEP to revoke a license.[28] Although the DEP has never revoked a sludge-spreading license, revocation can occur for the following reasons:

- A condition in the license was not met.
- Facts were misrepresented in the application.
- Spreading at the site poses a threat to the public health or the environment.
- Required standards failed to be included in the license.
- Change in circumstance since license was granted.
- Licensee violated DEP laws.

Again, the Board of Environmental Protection acts as judge and jury over a license revocation hearing. If the BEP's verdict is not satisfactory, the case can be taken to civil court.

According to DEP officials, no sludge license has ever been revoked.

Toxic Sludge And Local Control

Local control is a crucial issue in the sludge debate. It is local residents who have the most to lose from the threats of sludge spreading and who have the most interest in strong public health protections.

Federal rules on sludge (Part 503) allow states *and* municipalities to enact stricter standards than the EPA allows.

Until the late 1980s, municipalities in Maine had a large amount of local control over sludge spreading. Many towns, in fact, had out right bans. At the same time sludge brokers and wastewater treatment plant trade groups were pressuring the federal government to weaken land application limits, Maine state law was changed (MRSA 38 Section 1310-U), forbidding towns to enact stricter standards than the state's limits. While the state still held onto its right to enact stricter standards than those set federally, it revoked such a right from municipalities.

Any ordinance stricter than the state's became void even if it was written decades before the new state law. Towns were stripped of their ability to act with precaution when it came to protecting public health and the environment.

This does not mean, however, that municipalities have no role to play in sludge regulation nor does it mean that towns cannot stop sludge sites from being licensed. Many towns have developed thoughtful and precautionary ordinances that tow the line with regard to state law but still give them authority to control sludge.

If a municipality has a well-written sludge ordinance, then sludge generators must adhere to the ordinance as well as to the state's rules. The state's licensing process, however, does not take into account any local ordinances. It is up to the town managers, code enforcement officers and/or selectmen to enforce any local ordinance.

While the state has preempted local control on sludge, twenty communities in the state have passed stronger ordinances than the state allows. To date, none of these ordinances have been challenged by the state or by the sludge industry.

DEP officials have said that any well crafted, reasonable, and health based ordinance will *most likely* not be challenged by the state or the sludge industry.

The Problems With Maine's Sludge Laws

Regulation Difficulties

Sludge, by its very nature, is difficult to regulate. Depending upon what chemicals are being released into Maine's various sewer systems minute to minute, the toxicity of the state's sludge could vary day-to-day, minute-to-minute.

The state depends upon wastewater treatment plants to self-monitor their sludge quality. Many citizens remain skeptical about this self-monitoring program, because it is like the fox guarding the henhouse. Most wastewater treatment plants are required to test their sludge for heavy metals only once a month and for dioxin only twice a year. These infrequent testing requirements lead to the spreading of sludge of unknown toxicity.

Sludge regulation is also hampered by the limited amount of funds and staffing state and federal agencies have devoted to sludge oversight. The Environmental Protection Agency's New England Region 1 office only has one part time employee enforcing sludge regulation. Maine's DEP has only six funded positions for sludge enforcement.

The difficulties are further exacerbated by the fact that the federal EPA and the state DEP are both promoting *and* regulating sludge. In other words, regulators have competing priorities--they are charged with encouraging land application while at the same time charged with controlling the practice. An audit of EPA sludge management and

enforcement by the Office of Inspector General, released in March 2000, addresses precisely this issue:

> EPA does not have an effective program for ensuring compliance with the land application requirements of Part 503. Accordingly, while EPA promotes land application, EPA cannot assure the public that current land application practices are protective of human health and the environment.

Heavy Metals Standards Are Weak

Maine's heavy metals standards are weak. And they've gotten weaker. It is important to strictly regulate heavy metals because they build up in our soils over time and can destroy soil, threaten water quality, and build up in our food chain, threatening the public health and livestock.

Maine's standards are not protective of the public health when compared to European standards. Maine's heavy metal standards are extremely high compared to levels found naturally in our soil. In fact, state officials weakened five of the heavy metal standards in 1999.

Compared to other industrialized nations, the state's heavy metal standards are significantly less restrictive (see Table 6 below).

Table 6: Maximum Allowed Heavy Metal Standards In Maine and Europe (listed in parts per million)*

Heavy Metal	Denmark	Sweden	Finland	Germany	Netherlands	Norway	European Union	Maine
Arsenic	25	N/A	N/A	N/A	0.15	N/A	N/A	41
Cadmium	0.8	2.0	1.5	5 or 10*	1.25	2.5	20	39
Chromium	100	100	N/A	900	75	100	N/A	1000
Copper	1000	600	N/A	800	75	1000	1000	1500
Lead	120	100	100	900	100	80	750	300
Mercury	0.8	2.5	1	8	0.75	3	16	10
Nickel	30	50	100	200	30	50	300	420
Zinc	4000	800	1500	2500	300	800	2500	2800

*Source for European standards is *The Case For Caution* by Harrison, et al. Maine's standards are found in Chapter 419.

Maine's arsenic standard is 273 times less strict than the Netherlands'. Maine's lead standard is three times more lenient than Sweden and Finland's. Maine's mercury standard is one and a quarter times less strict than Germany's.

Worse than that, the standards were weakened in 1999. As Table 7 (below) shows, the DEP has weakened five of the maximum permissible heavy metal standards upon replacing its previous sludge rules (Chapter 567) with its current ones (Chapter 419). The maximum allowable limits of cadmium have increased nearly four times, the maximum allowable limits of chromium have increase three times.

Table 7: How Maine's Sludge Standards Were Weakened

Heavy Metal	Old Chapter 567 Standard Ceiling Concentrations	New Chapter 419 Standard Ceiling Concentrations	Current State Regulations (419) vs. Former State Regulations (567)
Cadmium	10 parts per million	39 parts per million	3.9 times weaker
Chromium	1000 parts per million	3000 parts per million	3 times weaker
Copper	1000 parts per million	1500 parts per million	1.5 times weaker
Nickel	200 parts per million	420 parts per million	2.1 times weaker
Zinc	2000 parts per million	2800 parts per million	1.4 times weaker

Because the heavy metals standards in Maine's sludge rarely exceed the ceiling concentration levels of the state's old rules (Chapter 567), the only two possible reasons for state officials to weaken the standards are to allow more contaminants into our sewer systems or to allow more out-of-state toxic sludge to be spread on our lands.

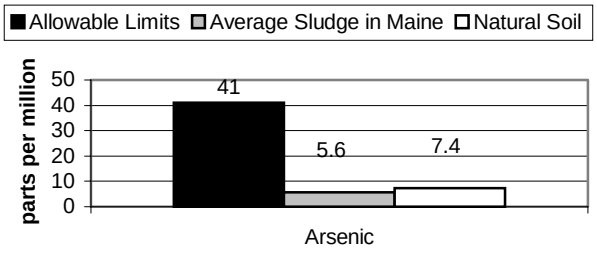
Table 8: Maine's Standards Compared to Natural Average Levels

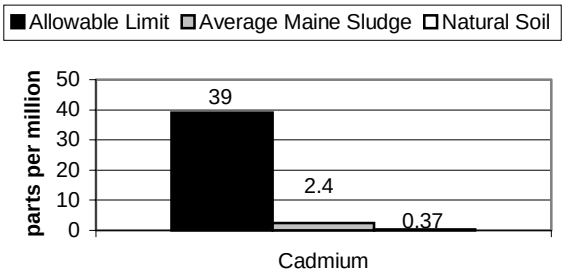
Note that the average sludge in Maine, in most cases, is well above levels found naturally.

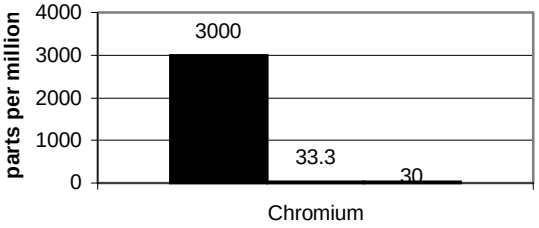
Heavy Metal	Maine's Standard (ppm)	Natural Background (ppm)	Times Higher Maine's Standards Are Than Natural
Arsenic	41	7.4	5.5 times higher
Cadmium	39	0.37	105 times higher
Copper	1500	23.3	64 times higher
Chromium	3000	30	100 times higher
Lead	300	17	17.6 times higher
Mercury	10	0.003	3333 times higher
Molybdenum	75	0.79	94.9 times higher
Nickel	420	18	23 times higher
Selenium	100	0.45	222 times higher
Zinc	2800	68.5	40.8 times higher

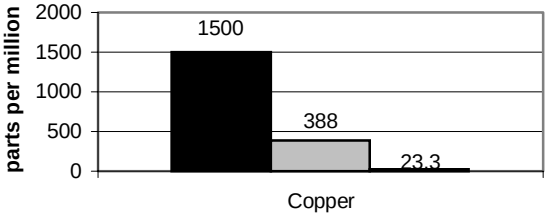
To put Maine's maximum allowable standards in perspective, compare them with both average sludge generated in the state and the heavy metal levels found naturally in Maine soils (Tables 6, 8, and 9).

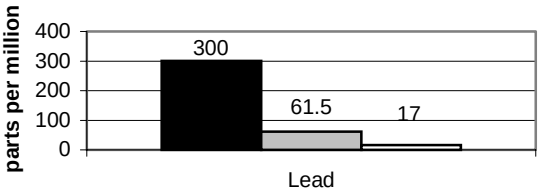
Table 9: Allowable Levels of Metals in Sludge vs. Levels Found in Natural Soils:

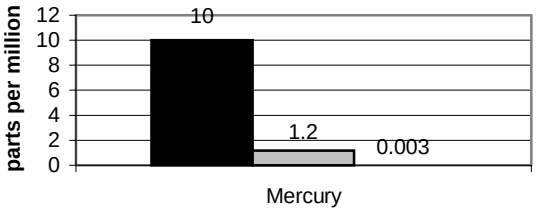


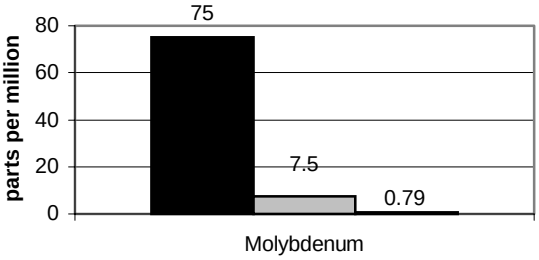


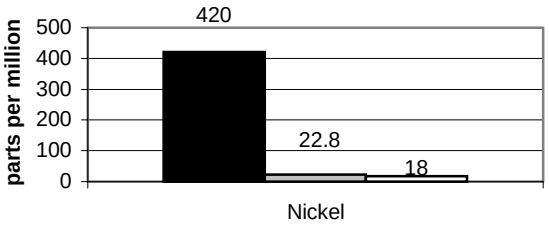


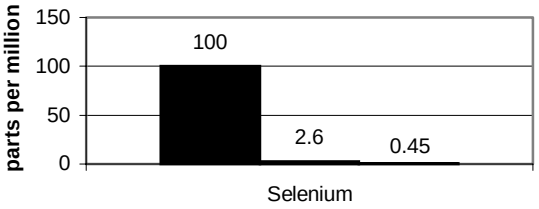












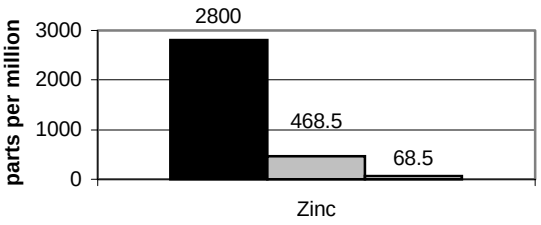


Table 10: Sludge vs. Natural Soil

Heavy Metal	Average Sludge (ppm)	Natural Background (ppm)	Times Higher Maine's Sludge is than Natural Soil
Arsenic	5.6	7.4	Natural is 1.3Xs higher
Cadmium	2.4	0.37	6.4 times higher
Copper	388.0	23.3	16.6 times higher
Chromium	33.3	30	1.1 times higher
Lead	61.5	17	3.6 times higher
Mercury	1.2	0.003	400 times higher
Molybdenum	7.5	0.79	9.4 times higher
Nickel	22.8	18	1.2 times higher
Selenium	2.6	0.45	5.7 times higher
Zinc	468.5	68.5	6.8 times higher

Maine regulation allows over 100 times the average naturally occurring cadmium to be introduced into the environment. They allow nearly 95 times the average naturally occurring molybdenum and allow over 3000 times the average naturally occurring mercury. When put into practice, these standards do little to discourage sewage treatment plants and the individuals and businesses that use our sewer systems from allowing heavy metals to be released. While on average, Maine's sludge rarely exceeds the maximum heavy metal concentration it does have many times the average metals levels found naturally in our soil.[29] For instance, sludge has, on average, over six times the cadmium, three times the lead, and 400 times the mercury than the levels found naturally occurring in soils.

Viruses, Bacteria, and Parasites are a Public Health Threat

DEP regulators have stated that the pathogens in sludge, the bacteria, the viruses, and the parasites, pose a more direct health threat than the heavy metals. Where as heavy metals are dangerous over time, contact with pathogens can cause almost immediate health problems.

Maine regulations allow what is called Class B sludge, which contains a significant amount of pathogens, to be spread in the state.

Despite this regulatory loophole, sludge spreaders are not required to post signs on their property, warning people of pathogen health threats. Sludge with live pathogens is a threat to residents living near sludge fields, to wildlife that travel through the field, to agricultural workers, and to hunters who may wander unknowingly onto a sludged field.

Sludge generators and brokers do have the technology to reduce the pathogens in sludge to natural background levels. Composted sludge, for example, contains lower levels of pathogens, but because the industry is not required to reduce the pathogens in sludge when

spreading on Maine's fields, they do not.

Municipalities Handcuffed

Another major problem with Maine's sludge regulations is that they prevent municipalities from acting with precaution regarding public health. The local officials and residents know their town's geography, their town's people, and their town's economy the best. Yet, due to the state's preemption of local control, towns are discouraged from doing what is in the interest of their town, their residents, and their environment.

Citizens Marginalized

The sludge application process, as it is currently practiced, shows the need for vigilant citizen participation. Citizens need to know what is going on politically at the local level, need to read public notices in the paper, and need to make their voices heard about what is happening in their community in order to follow sludge issues in their towns.

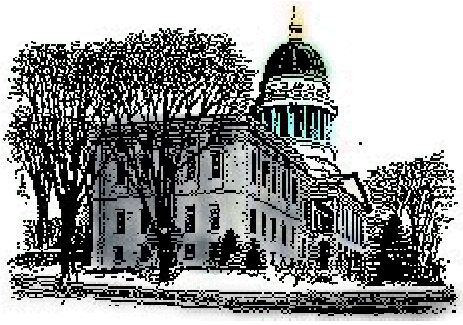
No matter how informed residents are, however, the sludge spreading regulatory process is heavily weighted to favor sludge generators and sludge brokers over concerned citizens.

Sludge generators and brokers have a high level of access with state regulators--access that the average citizen does not enjoy. DEP regulators often meet with sludge brokers to discuss potential sludge sites months in advance of public notification regarding the site. Because the state is both promoting *and* regulating sludge activities, citizens often become frustrated when looking for the answers they need to make informed decisions about sludge.

Part 3: Recommendations

Policy Recommendations for Maine

Much depends upon a healthy Maine environment: our public health, our state's image, and our tourism. Any threat to the environment is a threat to our state's assets. The state needs to enact sludge policies that will protect our people and our special places for generations to come.



When local officials or community groups oppose sludge sites, the first question that they're asked is, "If we don't spread sludge here, what are we going to do with it? "

The real question that needs to addressed for the long term protection of the public health and environment is: how can we both keep toxics from being spread on our soils and eliminate those toxics from the human waste we wish to recycle so that it is a truly safe commodity?

The following recommendations are made with this question in mind. The real sludge solution is eliminating toxic chemicals from being released into our waste stream and into the environment. Spreading toxic chemicals and heavy metals on our land is short sighted and dangerous.

<u>The state should set a goal of phasing out toxic chemicals from use and set a timetable to achieve that goal.</u> To this end, the state could, and should, draw upon several solutions. The state should expand and make stricter its Toxic Use Reduction program. The state should also develop a technical assistance program to aid industry and residents in using fewer toxics. Stricter licensing and enforcement of toxic discharges and emissions should be implemented as well.

Until that long-term goal is achieved, Maine must implement a broad range of interim measures to protect people and the environment from the chemicals and pathogens in sludge:

1. Prohibit sludge that contains industrial discharges from being land applied. The best way to ensure that our rural land is protected from industrial contamination is to ban the use of sludge that contains these toxins.

A Note on Municipal Ordinances

When developing a town ordinance, concerned citizens and local officials should look at examples of existing ordinances.

The model ordinance that the Maine Municipal Association and the Department of Environmental Protection recommend are weak and are not public health conscious.

Some local ordinances, such as Parsonsfield's, enact the state's rules at the local level so that town officials have the same regulatory powers as the state. By enforcing the strict letter of the law, the town can, in effect, be stricter than the state.

Others, such as Clinton's, take that concept a step further and enact requirements that discourage sludge brokers and generators from spreading in their town.

Others still, such as Brunswick, control sludge spreading through strict zoning ordinances.

For copies, contact Toxics Action: 871-1810.

2. Require land spread sludge to undergo the strictest pathogen reduction method available. Sludge with viruses, bacteria, and parasites above background levels should not be land applied.
3. Broaden and strengthen sludge testing parameters. Sludge needs to be tested more frequently for more contaminants. In order to best protect public health and the environment, allowable pollutant levels should be guided not only by toxicology but also by natural background levels as well.
4. Allow municipalities to enact ordinances that are more stringent than the state's through a town meeting or town-wide vote. The people who are most affected by sludge sites are local residents. It is important that these residents have a voice when it comes to decisions that affect their community.
5. Provide for long-term maintenance of sludge sites. Sludge generators should be responsible for testing the pH of all sludge application sites, whether active or closed, and cover the costs of lime (or other amendments) to maintain safe soil pH. All large volume sludge activities should be recorded on deeds so that future potential buyers are aware of past use of the property.

Recommendations for Municipalities

Sludge is an especially important issue for municipalities to oversee: it is local residents that have the most to lose from the threat of sludge.

In municipalities that are home to a wastewater treatment facility, local residents, town officials, and directors of the facility can work together to implement the above statewide recommendations at the local level.

All towns have the authority to ban the use of sludge, or sludge materials (such as compost) on municipal property.

Municipalities can also pass strict ordinances controlling sludge application. Although the state preempts local control on setting strict standards, there are several ways towns can discourage sludge spreading. To date, at least 20 municipalities in Maine have strong effective ordinances regulating sludge.

What Concerned Citizens Can Do

Citizens can protect themselves and their community from the dangers of sludge by being proactively engaged in sludge reform. Depending upon the needs of the community, citizens can reform sludge rules through engaging town officials, using Maine's regulatory processes, and by joining Maine's statewide coalition of local and statewide public health and environmental groups.

For more information for what you can do to protect your community from the dangers associated with sludge, contact Toxics Action Center: (207) 871-1810.

Appendix

Sludge Network Contacts

Maine Contacts

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Glossary

40 CFR Part 503 Rule The federal rules regarding sludge.

Abutter Maine's regulatory definition of an abutter is a landowner whose property is contiguous to the property boundary of the proposed sludge site *and* within one mile of the site.

Active Sludge Sites According to the state, these are sites that hold a current permit allowing generators and landowners to spread sludge should they choose. Generators are required to apply for these licenses when they plan to spread Class B sludge or sludge that contains heavy metals above screening limits.

Agronomic Benefit According to the state, sludge with agronomic benefit provides nutrients to soil/plants that are needed.

Bacteria In this guide, any microscopic organisms that are related to the production of diseases: germs. It should be noted that not all bacteria are harmful: many are active in processes that are beneficial to humans.

Biosolids Industry term for sludge that meets federal land application rules.

Board of Environmental Protection (BEP) A citizen board that oversees and advises the Department of Environmental Protection. BEP members are appointed by the governor.

Class A Sludge Sludge that has been treated to significantly reduce pathogen levels.

Class B Sludge Sludge, though treated, still contains millions of pathogens.

Clean Water Act The federal law regulating the discharge of pollutants to waterways of the U.S.

Cadmium A heavy metal that is cancer causing and linked to miscarriage, still birth, and birth defects.

Centers for Disease Control (CDC) The CDC is the lead federal agency for protecting the health and safety of people.

Chapter 419 Agronomic Utilization of Residuals Maine's rules governing sludge spreading.

Chapter 567 Maine's former rules regarding sludge spreading. These were replaced by Chapter 419.

Compost According to the state, are any solid wastes that have been composted (undergone natural decomposition processes) so that they may be used agriculturally. Under this definition, compost may consist of sludge (below heavy metal screening limits), fish waste, leaves, and industrial wastes.

Department of Environmental Protection (DEP) The agency that oversees the Maine's environmental laws. The DEP regulates and licenses sludge activities in Maine.

Dioxin In this guide, dioxin refers to toxic chemicals created from chlorine products that bioaccumulate, or build up in the food chain. It should be noted that not all dioxin like chemicals have dioxin-like toxicity and toxic ones are not equally toxic. This guide uses the term dioxin to represent dioxins, furans, and PCBs, that exhibit similar toxic effects. These chemicals are known to cause cancer. The most potent form of these has been found to be the most toxic chemical to mankind: extremely small doses (in the parts per trillion) can pose health threats.

Environmental Protection Agency (EPA) The federal agency that oversees the implementation of national environmental laws. The EPA oversees many of the DEP's functions, including sludge spreading. Currently, there is only one EPA employee that oversees all of New England's sludge spreading practices.

Exceptional Quality (EQ) Sludge According to the EPA, this is sludge that can be composted and spread without restriction. Despite its name, this type of sludge can still contain measurable levels of heavy metals, dioxin, and other pollutants.

Heavy Metals Metallic elements that have the potential to cause harm to humans, animals, or plants. They include but are not limited to: arsenic (As), barium(Ba), cadmium(Cd), copper (Cu), chromium (Cr), lead(Pb), mercury (Hg), nickel(Ni), molybdenum (Mb), selenium (Se), and zinc (Zn). All sludge in Maine contains measurable levels of some of these metals.

Inactive Sludge Sites Site for which sludge generators have previously held permits but need to reapply in order to continue spreading (see *active sludge sites*).

Lead A heavy metal, with the scientific label "Pb", that can cause irreversible behavioral and learning problems in exposed children.

Mercury A heavy metal, with that scientific label "Hg", that can cause irreversible learning deficits and neurological disorders in children exposed at key moments in their fetal development.

Municipal treatment facilities These are the town owned or town sanctioned facilities that treat sewage and release cleaner water back into the environment. The waste left over from their process is sludge. They are also referred to as wastewater treatment plants and sludge generators.

Ocean Dumping Act A federal law enacted in the late 1980s that banned the ocean dumping of sludge.

Ordinance A law enacted by a municipality.

Parasites As used in this guide, a parasite is an organism that can grow, feed, and live inside humans or animals.

Pathogens Any microorganism that can cause disease; germs, viruses, bacteria, and parasites are pathogens.

Pesticides Any chemical released into the environment to purposely kill insects, weeds, fungi, and other pests. Herbicides are pesticides that kill plants. Insecticides are pesticides that kill insects. Fungicides are pesticides that kill fungi.

Pretreatment Process Programs run by wastewater treatment plants that work with companies, hospitals, and other large dischargers, to reduce the environmental threat and toxic releases of these sewer users. Not all companies that release toxics into the waste stream are in these programs. To obtain a list of which companies are in a specific wastewater treatment plant's pretreatment process, contact the treatment plant.

Public Health Of or concerning the well-being of community members or the population at large. To protect the public health is to defend individuals' freedom from disease and other health problems.

Recycling The collection and/or reuse of waste materials that would otherwise be disposed of. Sludge lobbyists often refer to the spreading of sludge as recycling. As it is currently practiced sludge spreading does not reuse or recycle waste: it transfers pollutants from areas of industry and heavy population to rural areas.

Septage The human and chemical waste in septic tanks.

Sewage The liquid and solid industrial, hospital, runoff, and human waste mix that is carried off in sewer systems.

Sewer Systems The pipes and other conduits (usually located underground) that carry away household, industrial, hospital, and runoff waste.

Site-specific License According to the state, this is a license that sludge generators must apply for in order to spread sludge that contains live pathogens or heavy metals above screening concentrations on a specific piece of land.

Sludge In this report, the sometimes solid, sometimes liquid waste that is a byproduct of the wastewater treatment plant process. It should be noted that according to the state, the word sludge refers to nearly any material that is carried by water.

Sludge Brokers Private corporations that dispose of and market sludge for wastewater treatment plants.

Sludge Generator In the state's sludge rules, wastewater treatment plants are referred to as sludge generators. According to the state, any company that produces a produces or causes solid waste is a generator.

Wastewater Treatment Plants or Wastewater Treatment Facilities (WWTP or WWTF) Facilities that treat sewage and septage waste and return cleaner water into the environment. These facilities generate sludge. See also *municipal treatment plant).*

Synthetic Chemicals Man-made chemicals: chemicals that do not occur naturally.

Viruses Technical term for any of a group of extremely small infective agents that can cause diseases in human, animal, and plant life: a pathogen.

State Sludge Laws

In order to obtain a site-specific license, state regulations require that the generator submit an application that satisfies the following requirements:

1. The application must contain information demonstrating that the generator has the title or right to spread sludge on the proposed property.[30]

2. The application must contain a summary of the types of crops to be grown on the proposed site, the method of sludge application, and an anticipated spreading schedule. The application must also include a representative soil nutrient analysis for the site.

The sludge must provide "agronomic benefit" to the crops grown on this soil--meaning the generator must show that the site has a need for the nutrients provided for by the sludge. Farms utilizing sludge are required to have a licensed nutrient management specialist develop a whole farm nutrient management plan. This plan is the basis for the above determination that additional nutrients are needed on the farm.[31]

Table 11: Minimum Buffers From Sludge Application Site to Surface Water (Lakes, marine waters, rivers, streams, brooks, intermittent streams)

Buffer Characteristics	Feet from Sludge to Surface Water
0-3% slopes, wooded	35
0-3% slopes, non-wooded	50
3-8% slopes, wooded	50
3-8% slopes, non-wooded	75
8-15% slopes, wooded	100
8-15% slopes, non-wooded	150

3. The application must show that "the water of the state will be protected. " In practice, state regulators ***assume*** that the waters of the state will be protected as long as certain setbacks and spreading requirements are provided for in the application.

To this end, sludge cannot be spread when soil is frozen, snow covered, and water logged. Sludge cannot be spread on land that favors the growth of water loving plants such as wetlands, swamps and others.

The soil of a proposed sludge site must have a six-inch soil cap and a minimum depth to bedrock of 10 inches for perennial crops (such as hay) and 20 inches for row crops (such as corn). Soil types that *might be of concern* can be found in the appendix.

For Class B sludge, spreading may not occur within 25 feet of on-site waterways, including gullies, ravines, and swales. Sludge sites may not be located within 75 feet of a river, perennial stream, or great pond.

Table 12: Minimum Setbacks for Sewage Sludge In Maine

Type of Feature	Feet From Site
Public Well	500
Private Well	300
Property Line *abutters can request 50 feet	25*
Bedrock Outcrop	25
Off-site dwelling or occupied building	300
Surface Water, ditches, gullies, ravines	35
Down-slope soils derived from outwash or stratified drift parent materials with less than 6 inch soil cap	25

The application should also take into account the buffer zones listed in Table 11. A generator can, however, propose smaller buffer zones than found in Table 11 if it provides a rationale for the reduction and include a site-specific soil erosion control plan.[32]

4. The application must include a statement as to whether or not the site is located on or next to a protected natural resource, a sensitive area, and/or a direct watershed to waters. The name of the sensitive area and the distance from the proposed site must also be given. At the DEP's discretion, letters might be required from the Maine Department of Inland Fisheries and Wildlife and from the Natural Areas Program of the Department of Conservation stating that sludge spreading will not "unreasonably adversely impact" protected wildlife or fragile mountain areas.[33]

5. The generator must demonstrate that the sludge spreading will fit "harmoniously into the natural environment." This requirement is "*assumed to be met*" if buffer requirements in Table 11 and the setback requirements in Table 12 are met at the site.[34]

6. The generator must demonstrate that the sludge spreading activity will meet traffic standards for the site. This standard is *assumed to be met* if the sludge spreading activity will result in 16 or less vehicle trips a day.[35]

7. The application must include a site-specific odor control plan to prevent nuisance odors at neighboring properties. [Note: only applies if sludge will be spread on the site more than once.] The state *assumes that odor, air quality, and nuisance standards will be met at the* site if the site is 300 feet from occupied buildings, if there is a site specific odor control plan, and if the licensee notifies the DEP one business day before spreading occurs.[36]

8. The application must prove that the sludge is "non-hazardous" *as defined by the state*. To prove this, the application must include an analysis of the heavy metal levels in the sludge. If the generator's sludge contains heavy metal concentrations above screening concentrations (Table 5 Column A) then the application must include a sampling and monitoring plan as well as demonstrate that the maximum heavy metal soil concentration (Table 5 Column C) will not be exceeded.

The application must also include an analysis of the dioxin level in the sludge. If a generator's sludge contains 27 parts per trillion of dioxin, then the application must include a statement signed by the generator, the landowner, and the operator acknowledging the

dioxin in the sludge to be spread.

The statement must also include an agreement to the following conditions:

- The site will be tested for dioxin within 3 months of the last sludge spreading.
- If the soil on the site contains 27 parts per trillion of dioxin, then livestock intended for human consumption may not be pastured on site, crops for human consumption may not be grown on the site, and the deed to the site must record this information.

The application must also include a sampling plan: how often and in what manner the sludge will be tested for heavy metals and other toxins.[37]

9. The generator of the Class B sludge must also submit a copy of a statement signed by the generator, the landowner, and the operator of the site that the following conditions will be met on the site:

- Sludge will be spread at a minimum of 15 inches above groundwater surfaces. Sludge must be applied before September 15th if any part of the proposed site is in a 100-year flood plain.
- Food crops grown on the site with harvested parts that touch the soil will not be harvested for 14 months after the last sludge spreading.
- If the sludge remains on the land for four months or more before being incorporated into the soil, food crops that grow below the soil cannot be harvested for at least 20 months after the last sludge spreading.
- Food crops, feed crops, and fiber crops grown on the site but do not have harvested parts that might touch the sludge cannot be harvested for at least 30 days after the last sludge spreading.
- Domestic animals are not allowed to graze on the land for at least 30 days after the last sludge spreading.
- Turf grown on the site cannot be harvested for one year after the last sludge spreading.
- Topsoil cannot be mined from the site for at least one year after the last sludge spreading.
- Public access to land with high potential for public contact is restricted from the first sludge spreading and for one year after the last sludge spreading. Signs must be placed at common entranceways, unfenced open areas, and other appropriate locations to provide notice of the restricted area. Public access to land with low potential for public contact is restricted from the first sludge spreading and for 30 days after the last sludge spreading. The DEP may require that signs be placed to provide notice of restricted area.[38]

10. The application must contain site maps, including: a topographical map; a sketch of the site; a tax map; soils map (from U.S. Department of Agriculture); sand and gravel aquifer

map; and a flood zone map.

The site sketch should include all the set backs and buffers that will be incorporated, as well as the location of onsite and abutting roads, wells, and buildings. The topographical maps are used to determine slopes at the site. The soils, sand and gravel aquifer, and flood zone maps are used to determine if the site is suitable, *in a regulatory sense*, for sludge spreading activities.[39]

11. The generator must show financial and technical ability to take responsibility for the sludge.[40]

12. If required by the DEP, the application must include a site-monitoring plan.[41]

13. The application should provide proof that public notice has been given.[42]

Soil Types of Concern

In Maine's previous sludge regulation (Chapter 567), soil types that might not be suitable for sludge spreading were regulated. New regulations (Chapter 419) no longer regulate specific soil types. Instead, the DEP now uses soil characteristics as the regulatory factor. Each sludge site application, however, must contain a map of the soil types for the proposed site. As an easy way for concerned citizens and non-experts of soils to find out if the characteristics of a proposed sludge site are of concern, check the soil type maps for the below soils. If a proposed site contains any of the below soils, notify DEP officials--the site might not be safe for sludge spreading according to regulations.

Adams
Agawam
Allagash
Aurelie
Benson
Cannan
Canadaigua
Colonel
Colton
Cornish
Creasey
Croghan
Daigle
Deerfield
Duane
Duxbury
Eldridge
Fryeburg
Hadley
Hermon
Hinkley
Hollis
Lamoine
Limerick
Lovewell
Lyman
Machias
Madawaska
Mapleton
Masardis
Masardis Variant
Monson
Ninigret
Ondawa
Podunk
Raynham
Red Hook
Sheepscot
Shirley
Stetson
Suncook
Sunday
Swanville
Telos
Thorndike
Waumbek
Westbury
Windsor
Winoosk

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3. IBID

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