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Radioactive Waste Is a Damaging Agrochemical Byproduct

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STORY AT-A-GLANCE

- Phosphorus is a key ingredient in glyphosate and fertilizer. Phosphate ore is mined and processed, producing tons of radioactive phosphogypsum and millions of gallons of contaminated water
- A lagoon of contaminated water in Florida recently began leaking, threatening to flow over hundreds of acres of radioactive soil before dumping into the local community and waterways
- Millions of gallons were pumped out of the lagoon and directly into Tampa Bay, where environmental experts believe it will trigger an algae bloom and destroy the local water habitat
- Conservation groups in Idaho recently filed a lawsuit, fighting the establishment of another phosphate mine in an area with 13 Superfund sites and a history of manufacturers who don't clean up after themselves

The fact that there are serious issues with the food supply is no longer a secret. There is evidence that toxicity levels in the food supply are rising, and that conventional agriculture has become a leading cause of environmental pollution and destruction. Yet, for change to happen, more people will need to vote with their pocketbook, seeking organically and regeneratively grown produce and pasture-raised, locally sourced meat.

Although the greatest concern comes from processed foods, even whole plant and animal foods can be contaminated. Glyphosate is a popular herbicide commonly

sprayed on soybeans, coffee, whole grains and leafy vegetables. The chemical limits a plant's ability to absorb micronutrients from the soil, creating a deficiency of vital **manganese in the food supply**.

The scale of glyphosate use is unprecedented, and scientists have not yet reached the tip of the iceberg when it comes to understanding the far-reaching environmental and human health effects it has. The chemical is so pervasive that researchers have stated, "In the U.S., no pesticide has come remotely close to such intensive and widespread use."[1]

In January 2020, research published in Environmental Pollution found measurable glyphosate in the urine of infants and children and identified kidney injury biomarkers.[2] As the researchers noted:[3]

> *"There is growing evidence linking glyphosate exposure with the epidemic of chronic kidney disease of unknown origin in farm workers in Central America, Sri Lanka and central India."*

Despite evidence that **glyphosate is detrimental** to human and environmental health, is likely a driving factor in antibiotic resistance and shifting microbial composition of the soil,[4] the herbicide continues to be applied across the world and is the "most widely used herbicide in history."[5] One factor in environmental destruction is phosphate mining, a core ingredient in glyphosate and fertilizers.

Phosphate Mining Funneled to Fertilizer and Glyphosate

The news media have recently covered problems with **Roundup** and its active ingredient **glyphosate**. Lawsuits alleging the products cause cancer are pending in state and federal courts, and glyphosate has a history of producing species of superweeds resistant to the effects of the herbicide.[6]

The production of glyphosate triggers just as many issues with environmental damage as its use. One of the main ingredients is phosphorus, which is produced by extracting it

from phosphate ore[7] mined in Florida and Idaho. In fact, 80% of the ore is mined in Florida, called the “phosphate capital of the world.”[8]

The mining and processing of the ore comes at a significant cost to the state. Phosphate ore is chemically treated to create phosphoric acid. This is in large part a main component to fertilizer. The processing produces large amounts of phosphogypsum, which is a radioactive waste product. The Guardian[9] reports the ratio is 5-to-1. In other words, there are 5 tons of phosphogypsum waste for every 1 ton of fertilizer produced.

The waste product is stored in large piles that can measure hundreds of feet in height and hundreds of acres across. At the top of these "gyp stacks" is a huge waste lagoon that contains highly acidic wastewater contaminated with radioactive heavy metals. These lagoons are lined with plastic to prevent the wastewater from seeping into the surrounding groundwater.[10]

It was the Piney Point phosphate plant in Florida that was recently in the news when one of the lagoons began leaking dangerous wastewater. In response to the leak, officials issued evacuation orders for the estimated 316 homes in the area as they pumped millions of gallons of **contaminated water** from the lagoon directly into Tampa Bay.[11]

The Florida Department of Environmental Protection (DEP) estimated in early April 2021 they had moved 165 million gallons into the channel at Port Manatee. The lagoon originally held 480 million gallons, which threatened to break the gyp stack apart as it leaked.

Experts estimated this could have created a 20-foot wall of contaminated water.[12] The state was quick to assure the residents that the water from the great lagoon was not currently radioactive.[13] The radioactive material is in the phosphogypsum stack, the land surrounding the millions of gallons of wastewater over which any leakage and overflow travels.

Wastewater Threatens Florida Gulf Water

Although the evacuation order ended, the lagoon still contained 300 million gallons of leaking wastewater. So, while experts didn't believe the gyp stack was in immediate danger of crumbling and sending millions of gallons of contaminated water into the surrounding community, the problem was far from over.

Pumps continued to drain the lagoon at a rate of 23,500 gallons per minute after the evacuation order was lifted.[14] In addition to the **release into Tampa Bay**, another phosphate mining company moved water from Piney Point to their facility. Water from the breach in the wall around the lagoon at Piney Point was also stored in a separate lagoon at Piney Point.

In other words, experts scrambled to avert a dangerous threat to the environment, drinking water and surrounding homes that likely should not have existed in the first place. The sole purpose of phosphate mining is to provide phosphorus for fertilizer companies[15] and for the manufacture of glyphosate, which contains 18.3% phosphorus by mass.[16]

It may ultimately be impossible to determine whether the finished product or sourcing the material caused more damage to human health and the environment. What is certain is the financial gain enjoyed by the agrochemical industry. The global fertilizer market was worth $83.5 billion in 2020[17] and estimated to grow 1.69% from 2020 to 2027. This means the industry may be worth more than $93.9 billion by 2027.

In 2015 **Monsanto** posted earnings of $4.7 million for the sale of glyphosate and $10.2 million for the sale of **Roundup Ready seeds** and the sale of genetic traits.[18] Bayer bought the rights to Roundup from Monsanto in 2018 for $63 billion.[19]

Despite billions of dollars Bayer is paying to resolve lawsuits over Roundup cancer claims,[20] the global glyphosate market is estimated to reach $13.31 billion by 2027,[21] which is a phenomenal growth increase from the $4.7 million posted by Monsanto in 2015.

The wastewater from Piney Point tests high in nitrogen and phosphorus and is being unceremoniously dumped into Tampa Bay where experts fear it will trigger significant algal blooms, yet another devastation to the environment and fishing industry.[22]

There are two other gyp stacks with lagoons at Piney Point. Officials believe that an unaddressed breach could result in even greater damage since the water in those lagoons are more toxic and acidic than in the lagoon that leaked. Glen Compton from ManaSota-88, a nonprofit environmental group, told a reporter from The Guardian that should either of those two stacks fail:[23]

> *"… we'd expect to see major impacts to Bishop Harbor, which is one of the prettiest places in the state of Florida. [The harbor] would be totally annihilated. It is really not too strong a term to use."*

The History of Piney Point

Piney Point was built in 1966 and was closed 35 years later. In 2001, the plant, located near Bishop Harbor and the Terra Ceia Aquatic Preserve, was abandoned.[24] During those 35 years, Piney Point has a history of environmental pollution. Within the first year, Borden, the milk and glue company and original owners of the plant, was dumping waste into Bishop Harbor.[25]

They were caught again in 1970. Over the years, the plant changed ownership at least four times. Originally, the gyp stacks were not lined, which allowed radioactive wastewater to seep into the underground aquifer.

At the end of its productive life, Piney Point was owned by Mulberry Corporation, who promised to fix the issues, but the cost to clean up the problem was too much, and the company went out of business.

By 2001, state officials took over the plants and the cost of cleaning up the damage produced by for-profit companies. In 2006, the Tampa Bay Times quoted a state regulator who called Piney Point "one of the biggest environmental threats in Florida history." In that same year, HRK Holdings bought the property.[26]

Fifteen years later, the situation seems to be much the same. Critics blame the DEP, which they believed was protecting the companies and not the environment.[27] The

Tampa Bay Times reported that state records showed the DEP bent the rules to protect the industry.

In 2002 the FDEP began running the wastewater through reverse osmosis filters. However, the process was untested, and the screened-out impurities were dumped back into the lagoons, concentrating the pollution even further.[28]

The newest idea for cleanup efforts at Piney Point was the approval of an injection well.[29] The water would reportedly be cleaned and then pumped underground and the well capped after the lagoons are drained. But it's unknown how much of the impurities can be removed and how much damage would be done to the underground aquifers that supply freshwater on the surface.

Conservation Groups Fight Caldwell Canyon Phosphate Mine

Similar problems are happening at the phosphate mines in southeast Idaho, also called the "phosphate patch." In 2019, the current mine was nearly tapped out, so Bayer applied to state regulators to open a new mine. The Bureau of Land Management did an environmental impact statement, which opponents say failed on several fronts.[30]

In the first place, it did not include the impact a phosphate mine would have on the greater Yellowstone ecosystem and the adjacent wildlife corridor. These are areas that local Native American tribes depend on for food. It is also an area where the greater sage-grouse population lives.

The opponents also point out the 13 other mine sites that are official Superfund sites, which will require millions of dollars and years to clean up. In 2019, a five-year review from the Environmental Protection Agency determined the groundwater contamination continued to happen from sites that had been closed.

The remediation is going slower than predicted and they do not anticipate groundwater standards will be achieved "in the foreseeable future."[31] The proposed project is called the Caldwell Canyon mine and located northeast of Soda Springs, Idaho. Bayer

anticipates extracting ore in 2023 and operating the plant for approximately 40 years. The mine would cover 1,559 acres, 25% of which are public land.

While Bayer claims the mine would be "the most environmentally advanced" with an aim at "leaving the land in better condition than it was,"[32] Hannah Connor from the Center of Biological Diversity does not agree. She spoke with a reporter from Civil Eats, saying:[33]

> *"Mining irredeemably changes the face of the land. You have deep destruction for 40 years. The companies say they'll go through a reclamation process … but looking at reclaimed land, you end up with a landscape that looks extremely different from what was there. It doesn't have the same species, the same topography."*

And, like other companies who have stated they would "clean up the problem," it's unknown whether Bayer would honor the promises they made with the hope of swaying regulators into approving their application.

The application was approved and in April 2021, conservation groups banded together to file a lawsuit to challenge the decision that greenlit the Caldwell Canyon phosphate mine.[34] A significant concern is the development of another mine that may very well become a Superfund site. In a press release the Center for Biological Diversity wrote:[35]

> *"Phosphate from the mine will be used by the German multinational chemical company Bayer AG to manufacture glyphosate, the active ingredient in Roundup herbicides. Glyphosate has been linked to cancer and harm in hundreds of endangered plants and animals …*
>
> *… An environmental review of the proposed mine failed to account for increased selenium pollution to waterways and wildlife, increased radioactive waste and heavy metal pollution resulting from the processing of phosphate ore, and harm to critically imperiled sage grouse.*
>
> *Selenium — a byproduct of phosphate mining — has already caused extensive damage to surface and groundwaters in the region, which will only get worse with increased mining. Selenium pollution has been linked to the deaths of*

hundreds of cows in southeast Idaho and has caused deformities and other harms in birds, aquatic animals and other wildlife."

Let Your Legislatures Know and Vote With Your Pocketbook

You may not live in Idaho or Florida, but the damage to the environment and water supply affects each of us. It's important to let your legislator know your concern over the lack of regulation in the agrochemical business, and more specifically why another phosphate mine is unnecessary when for-profit companies are not willing to clean up their past mistakes.

You can also have an impact on the industry by voting with your pocketbook. Seek out locally sourced, **organically and regeneratively grown produce**. These farmers do not use Roundup Ready seeds or apply glyphosate. To replace phosphorus in the soil most use beef or dairy manure, rock phosphate or bone meal.[36,37] If you're a U.S. resident, the following organizations can help you locate farm-fresh foods near you:

- Local Harvest[38] — This site will help you find farmers markets, family farms and other sources of sustainably grown food in your area.
- Eat Well Guide: Wholesome Food from Healthy Animals[39] — The Eat Well Guide is a free online directory of sustainably raised meat, poultry, dairy and eggs from farms, stores, restaurants, inns and hotels, and online outlets in the U.S. and Canada.
- Community Involved in Sustaining Agriculture (CISA)[40] — CISA is dedicated to sustainable agriculture and small farms.

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