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nebra
North East Biosolids & Residuals Association

Cooperatively promoting the environmentally sound recycling of biosolids and other residuals

Response a *Boston Globe* question about Bay State Fertilizer

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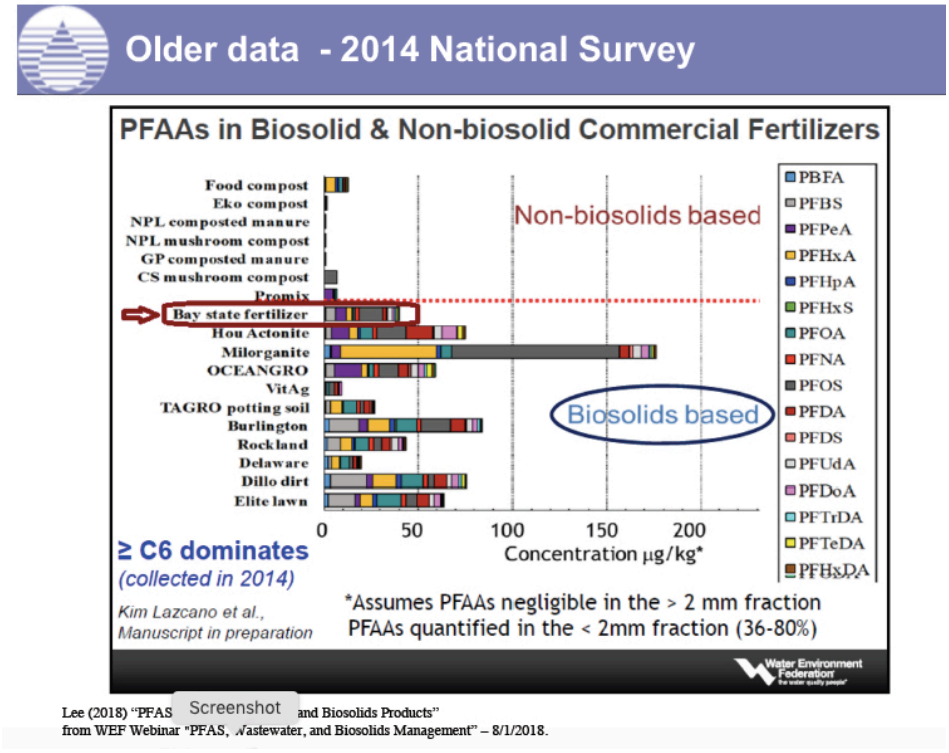

As part of the development of an article regarding PFAS in Boston Massachusetts Water Resources Authority (MWRA) biosolids, a *Boston Globe* reporter, David Abel, asked NEBRA the following question. He had seen an MWRA slide presentation that showed that MWRA's biosolids product, Bay State Fertilizer, had tested at about 40 parts per billion (ppb) for 16 PFAS combined. That PFAS level is similar to many other biosolids. He was comparing that "40,000 ppt" (parts per trillion) to drinking water advisory levels, such as U. S. EPA's 70 ppt and the proposed Massachusetts' 20 ppt.

The reporter's question:

> **Should the state still be selling this fertilizer? Why or why not, and wouldn't the precautionary principle apply here?**

NEBRA's response:

NEBRA's answer is "yes," keep selling Bay State Fertilizer, and, yes, applying the precautionary principle supports continued application to soils of the Boston area's biosolids.

Biosolids recycling to soils is a major national recycling success. Sixty percent (60%) of U. S. wastewater solids are applied to soils. Seattle, San Francisco, Los Angeles, Denver, Chicago, Boston, Concord, Augusta, Burlington, and hundreds of other communities recycle their biosolids. Many major land grant universities have studied biosolids use on soils and accept the practice, finding little risk when used according to regulations. Every U. S. state and Canadian province regulates biosolids

and nearly all allow biosolids use on soils. U. S. EPA, USDA, and U. S. FDA all support biosolids recycling. Thousands of research publications over 45+ years and two major reviews by the National Academy of Sciences have found biosolids use on soils presents "negligible risk" and that "there is no documented scientific evidence that the Part 503 rule [federal regulation] has failed to protect public health." https://www.nebiosolids.org/resources/#/scientific-basis-for-biosolids-use/

Perhaps the most applicable research related to today's issues has been field-level bioassays, where biosolids are applied to soil and crop systems, and a variety of organisms, from microscopic to small mammals, have been monitored for any negative impacts. The results show no significant negative impacts, just significant – and often large - positive changes due to the addition of nutrients and organic matter so vital for soil and ecosystem health. These bioassay studies have always included PFAS – even though PFAS were not measurable in the past – because PFAS have been in biosolids since PFAS have been in use. So these bioassay experiments tested for PFAS as part of the whole system (https://www.nebiosolids.org/resources#/bioassays/).

Biosolids recycling is a significant part of making communities sustainable. Massachusetts has invested hugely in being the east coast leader in addressing greenhouse gas emissions, and a part of that is creating renewable energy from organic material – food waste, biosolids and more – and keeping organic material out of landfills, where it decomposes and releases methane, a potent greenhouse gas. Putting organic matter in soil increases soil carbon sequestration, reducing carbon in the atmosphere (look up the Marin Carbon Project online; and there are a good number of published papers quantifying carbon sequestration from organic matter additions to soils).

Our conservative (low end) estimate of the benefits of recycling the 40% of biosolids that are not put on soils today is that it would keep a net approximately 7.1 million tons of carbon out of the atmosphere each year – the equivalent of 1.5 million U. S. passenger cars removed from the roads. If, instead, we start sending all the recycled biosolids to landfills and incinerators, the result would be increased emissions of about 6.9 million tons – or adding to our roads 1.47 million cars (https://pubs.acs.org/doi/abs/10.1021/es101210k). It may sound like the easy solution for MWRA to send its biosolids to landfill, but we understand that it would cost them $8 million more to do that. And it would have ripple effects in the agricultural markets where Bay State Fertilizer is one of the tools in Massachusetts farmers' toolkits. We would suggest, if you have not already done so, speaking with agricultural specialists or one of the farmers who uses biosolids. The product sells out every year.

Biosolids recycling also provides these significant environmental and job benefits: it enhances soil health, recycles nutrients, reduces fertilizer & pesticide use, strengthens farm economies (thousands of farmers choose to use biosolids because they work), restores vitality to degraded lands, and puts to productive use residuals that every community has to manage. (Wastewater treatment is a vital public health service, and it creates residual solids that have to be managed.) Like other recycling ventures, recycling biosolids is an important part of the local economy, providing more jobs than landfill disposal or incineration.

There are no modern wastewater or biosolids that do not contain PFAS, because these chemicals are so ubiquitous in our daily lives (dust in daycare center: 142 parts per billion or ppb (= 142,000 ppt); cosmetic/foundation: 2,370 ppb for example). Even home septic systems are putting out PFAS at levels close to Massachusetts proposed drinking water and groundwater standards (see Schaider et al. Cape Cod study). So are car washes, local fire stations, landfills, ski areas, beauty parlors, and myriad other households and small businesses. Some goes into the environment directly, some goes down the

drain. (Important Note: all data on PFAS levels in anything but drinking water are somewhat suspect as there is currently no EPA-approved method for analyzing PFAS in anything but drinking water; thus results vary from lab to lab. Current data are valuable for understanding and research, but not for strict regulatory interpretations.)

Water resource recovery facilities (WRRFs) receive the traces of PFAS from our modern environments; they do not manufacture or add PFAS in the process. Some of the PFAS go out with the cleaned effluent to rivers or the ocean: generally in the single digits to 10s of parts trillion (ppt) in effluent. Others concentrate in the solids (sewage sludge). Almost all sewage sludges have PFAS in the single digits to 10s of parts per billion (ppb) range (thay all have at least some). For comparison, Vermont background soil levels for PFAS are in the 0.1 to 5 part per billion range, even where no obvious PFAS source is nearby (https://anrweb.vt.gov/PubDocs/DEC/PFOA/Soil-Background/PFAS-Background-Vermont-Shallow-Soils-03-24-19.pdf).

When biosolids are applied, they are applied for their concentrated nutrient value and are diluted. Thus, applying Bay State Fertilizer – which one test shows had a total of about 40 ppb of all tested PFAS - at the rate needed for an annual corn crop (2 tons per acre) will result in .00016* pounds of total PFAS per acre, which is mixed into 2,000,000 pounds of soil (the weight of the top 6 inches of soil or plow layer). This means that application of Bay State Fertilizer raises the soil level by .08* parts per billion – not a measurable difference. This is then part of the low end of the range of what is an unfortunate reality – ambient background levels of PFAS that exist widely.

Rushing to stop biosolids recycling (or food waste composting, for that matter, which also contains PFAS) would not make any measurable difference in PFAS in the environment, but it will cause the loss of other environmental benefits and cost communities large sums for alternative disposition of solids. Massachusetts and other states have plenty to do focusing on the big sources of PFAS: industrial and fire-fighting discharges and sites with water contamination in the 1000s to 100,000s parts per trillion. And we in the wastewater field are proactively looking upstream, to reduce uses of PFAS and urging more to be phased out soon. Phasing out the most concerning chemicals is the most cost-effective action. (See op-ed: https://news.bloombergenvironment.com/environment-and-energy/insight-the-costs-to-your-community-of-chasing-background-levels-of-pfas.)

So when looking at the big picture, the precautionary principle supports continued biosolids recycling despite PFAS concerns, because of the many environmental benefits – especially net greenhouse gas emissions benefits – of recycling biosolids to soils. Bay State Fertilizer, like the other biosolids products recycled throughout this region, is a success story driven by water quality professionals working 24/7/365 to protect public health and the environment at your local wastewater facility.

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More about PFAS in biosolids and residuals at https://www.nebiosolids.org/pfas-biosolids.