



Regulatory Changes, Nutrient Management and Public Concern's Impact on Biosolids Management

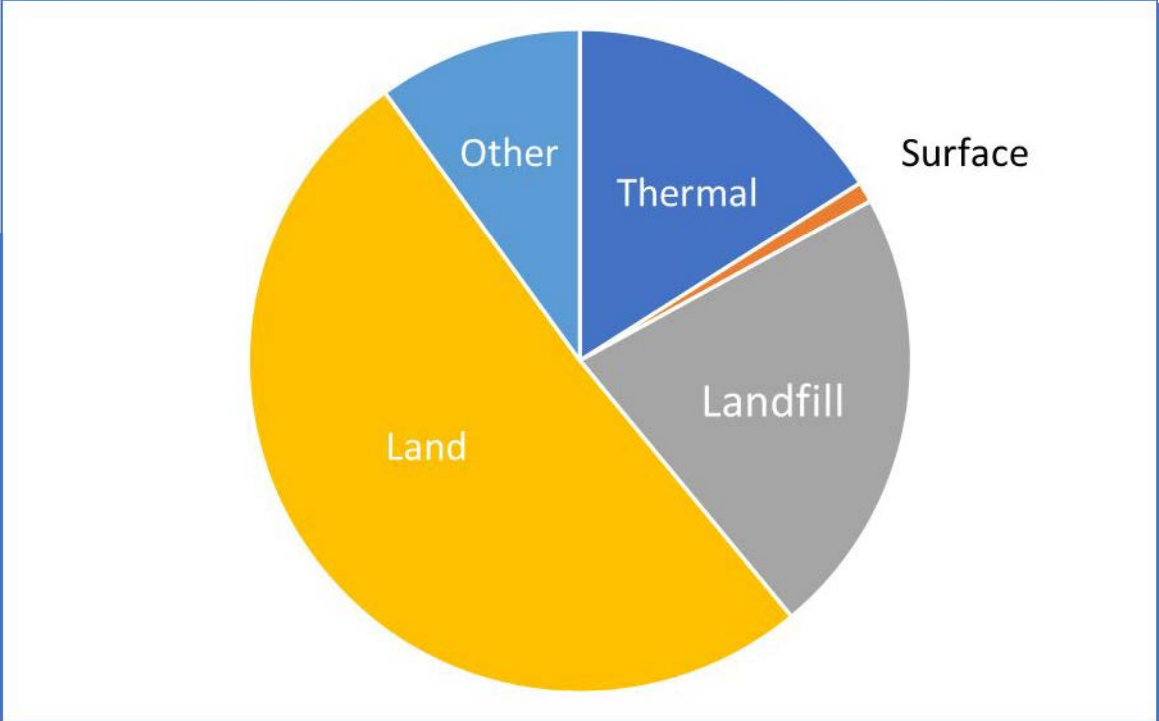
*The more things
change.....*

January 25, 2022

Agenda

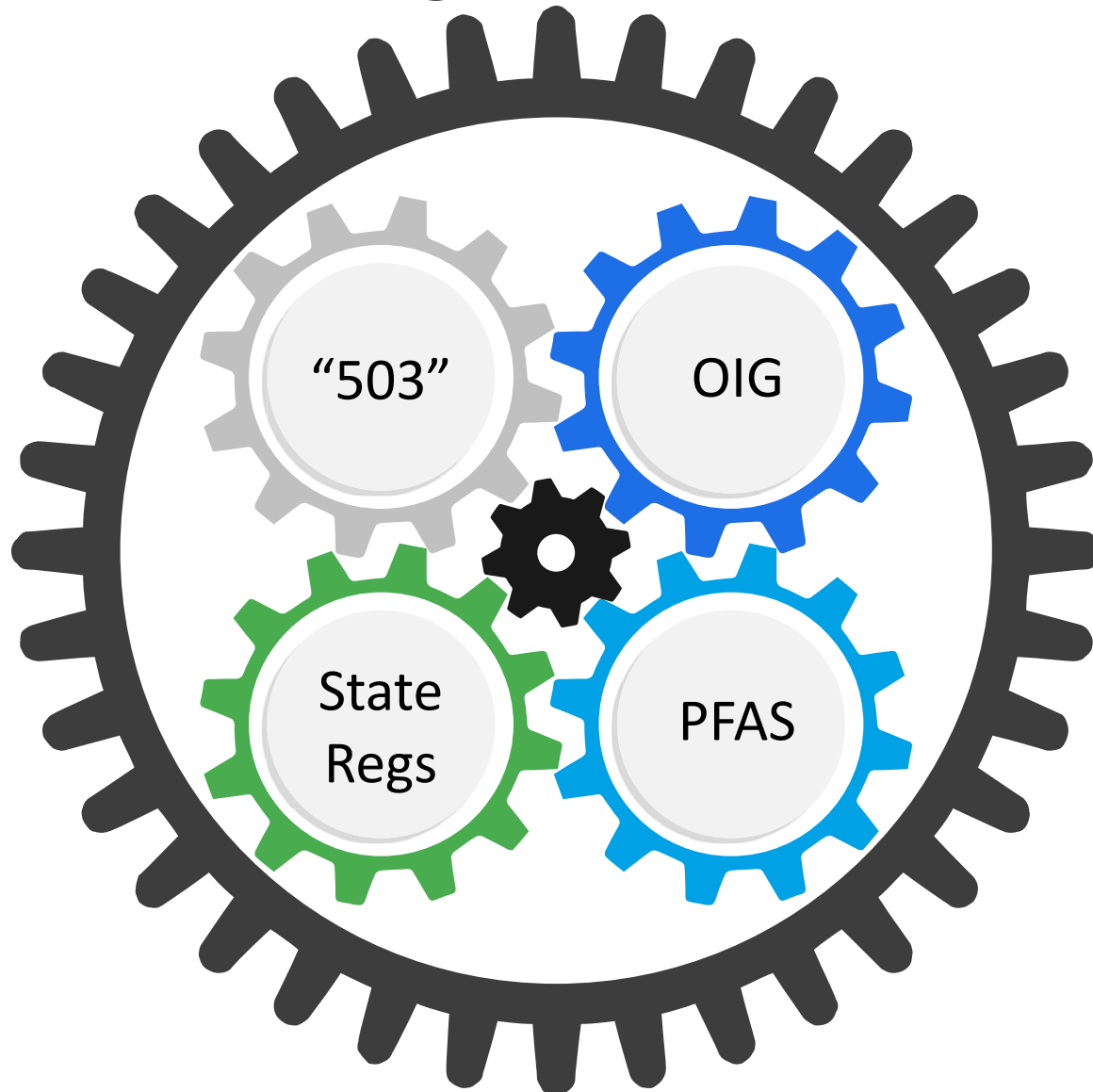
- Focus on beneficial use
- Discuss current drivers
- Compare to issues faced in the past
- Discuss how we can use experience to continue moving forward

US Biosolids Management Practices



in 2019 from the USEPA ECHO Database

Current Regulations and Potential Drivers



40 CFR 503

- 1993 regulation defining process and product requirements for biosolids generation and use

Office of Inspector General (OIG) Report

- 2018 Review of 40 CFR 503 Rule
- Driving federal rule assessments and more
- Cited in several biosolids bans (OK)

Per- & Polyfluoroalkyl Substances (PFAS)

- EPA regulatory priority
- Significant state level activity

Changes to State regulations

- CA SB 1383; removes Organics from Landfills
- FDEP 62-649 FAC Phosphorus and GW
- Regulations impact biosolids end use



Federal Regulations

Federal Regulations

The Standards For The Use or Disposal of Sewage Sludge,
40 CFR Part 503

Published in the Federal Register on February 19, 1993

Consists of five subparts;

- Subpart A - General Provisions
- Subpart B - Land Application
- Subpart C - Surface Disposal
- Subpart D - Pathogens and Vector Attraction Reduction
- Subpart E - Incineration

We will focus on Subpart B - Land Application

“503 Rule” Subpart B, related to Land Application



Pollutant Limits

- Risk-based
- 9 metals
- 4 sets of limits

Pathogen Reduction

- Class A
- Class B

Vector Attraction Reduction (VAR)

- 11 options (8 quality-based, 3 practice-based)

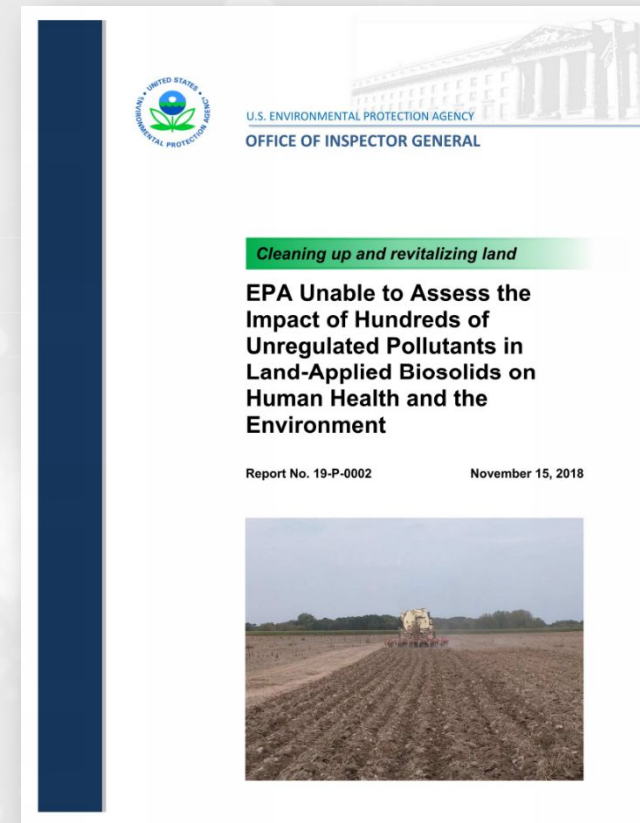
“Exceptional Quality “EQ” biosolids meet most stringent pollutant limits + Class A + quality-based VAR
EQ Biosolids can be distributed for use without further Federal requirements

Federal Regulations

Over the years, the adequacy of the 503 rule has been questioned,

The most recent challenge has come from the EPA's Inspector General Report

Released on November 15, 2018
Outlined numerous concerns



Office of Inspector General (OIG) Report: Concerns



Unregulated Pollutants

- 352 unregulated chemicals (including 48 hazardous under RCRA or NIOSH and 35 EPA priority pollutants)
- Risk assessments, additional research needed to demonstrate safety



Recordkeeping

- Inconsistent compliance monitoring goals and methods between EPA and states



Pathogen Reduction

- Uncertainties regarding effectiveness of Class A Alternatives 3 and 4
- Lack of clarity on fecal coliform sampling methods



Safety Statements

- Website statements do not reflect uncertainties regarding unregulated pollutants



Biosolids Labels

- Labels do not disclose unregulated pollutants/data gaps

Some of the EPA Office Of Water's Concerns

Inaccuracies

- EPA must promulgate new regulations every two years (EPA must investigate)
- EPA cannot regulate the 352 pollutants due to lack of data (not true for all pollutants)
- Hazardous pollutant designations in other programs apply to CWA

Misperceptions

- Report title "EPA unable to assess hundreds of unregulated pollutants..." (not supported)
- Presence equated to risk
- Inspections more stringent in authorized states (more complicated than that)
- No work performed on risk assessments (data collection ongoing, tools under development)

Context

- Biosolids benefits ignored
- Declining European land application
 - Different drivers (driven by economics)
- Ignores countries relying heavily on land application

OIG Rebuttal (June 2020)



We are concerned about how the science is presented in the OIG report. It is biased, raises alarm...and is taken out of context.



*EPA Office of
Water*

- Drafted by members of the USDA W-4170 Committee
 - Biosolids industry experts with decades of experience researching biosolids
 - Leaders: **Greg Kester (CASA)**, Nick Basta (OSU), Ian Pepper (UA), Linda Lee (Purdue)
- Performed literature review and a hierarchical risk assessment using soil screening levels and chemical persistence
- Findings: Only a small fraction of the pollutants of concern identified by the OIG may warrant further study

The OIG report is not the first “push back” on 503...

In August 1997 The Cornell Waste Management Institute published;

“The Case for Caution; Recommendations for Land Application of Sewage Sludges and Appraisal of the U.S.EPA’s Part 503 Sludge Rules”

Authors; Ellen Harrison, Murray McBride and David Bouldin

Questioned the level of protection by the risk assessment used in the development of the Part 503 regulations

Cornell's Case for Caution

The USEPA requested the USDA's Agricultural Research Service evaluate the working paper

The Agricultural Research Service report;

- Addressed the major points raised by CWMI.
- Provides a comparison of biosolids to other nutrient sources.
- Concludes that the use of biosolids in agriculture and horticulture is beneficial and that the Part 503 regulations are highly protective.

The report addressed Cadmium, Zinc, Dioxin, Lead, Pathogens and Sustainability

Cornell's Case for Caution

The Cornell working paper suggests that EPA only considered 100 years of application.

USDA, Agricultural Research Service noted that the statement is incorrect.

- The risk assessment for the Part 503 Regulations presumed 1,000 tons per hectare had already been applied to the garden soils.
- The USDA report states that if the biosolids were applied at the Nitrogen fertilizer rate between 50 and 500 applications would be required.

The report also states that crop rotation would make it unlikely that biosolids would be applied in numerous consecutive years.

Several studies have supported the 503 rule...

2002 National Academy of Science report “**Biosolids Applied to Land: Advancing Standards and Practices**”; found that “there is no documented scientific evidence that the 503 rule has failed to protect public health”

2015 Food and Drug Administration’s “**Standards for the Growing, Harvestings, Packing and Holding of Produce for Humans Consumption**” noted that adherence to the 503 regulations remains an appropriate approach to the use of biosolids for the growing of the covered produce.



PFAS

PFAS Contributors and Concerns



WRRF Effluent

- PFAS not effectively removed by conventional activated sludge treatment
- Some PFAS higher in effluent than influent because of transformation of precursors
- Long-chain PFAS adsorb to wastewater solids

Land-applied Biosolids

- Primary concern is transport to drinking water sources from land application or surface disposal
- Greater concern with shallow groundwater
- Potential uptake by plants being investigated, but not yet a focus
- Dermal contact not a concern

PFAS Action Plan Activities That Could Impact Biosolids

Topic	PFAS Investigations/Proposals
CERCLA inclusion	Will follow through on the regulatory development process for listing perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) as hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
Toxics Release Inventory (TRI) inclusion	Issued advanced notice of proposed rulemaking that would allow the public to provide input on adding PFAS to the TRI toxic chemical list
PFAS manufacturing and importation restrictions	Proposal to ensure that certain persistent long-chain PFAS chemicals cannot be manufactured in or imported into the United States without notification and review under the Toxic Substances Control Act (TSCA) is currently undergoing interagency review at the Office of Management and Budget
CWA inclusion	Exploring data availability and research to support the development of Clean Water Act human health and aquatic life criteria for certain PFAS
Biosolids risk assessments	In the early scoping stages of risk assessments for PFOA and PFOS in biosolids, to better understand any potential health impacts. Anticipated completion 2024

EPA's PFAS Strategic Roadmap:

Commitments to Action 2021 - 2024

- Research
 - Increase understanding of PFAS exposure on human health and the environment
- Restrict
 - Prevent PFAS from entering the air land and water
- Remediate
 - Accelerate clean up of PFAS contamination

EPA's PFAS Strategic Roadmap:

Commitments to Action 2021 - 2024

- Publish final toxicity assessment for Gen X and five additional PFAS (PFBA, PFHxA, PFHxS, PFNA, PFDA) *Gen X published October 2021.*
- Publish health advisories for Gen X and PFBS. *Spring 2022.*
- Restrict PFAS Discharges from industrial sources through Effluent Limitation Guidelines program, *Ongoing expected 2022*
- Leverage NPDES permitting to reduce PFAS discharge. *Expected 2022*
- Publish improved analytical methods. *Fall 2022 and fall 2024*
- Publish final recommended Ambient WQ Criteria for PFAS. *Winter 2022, Fall 2024*

EPA's PFAS Strategic Roadmap:

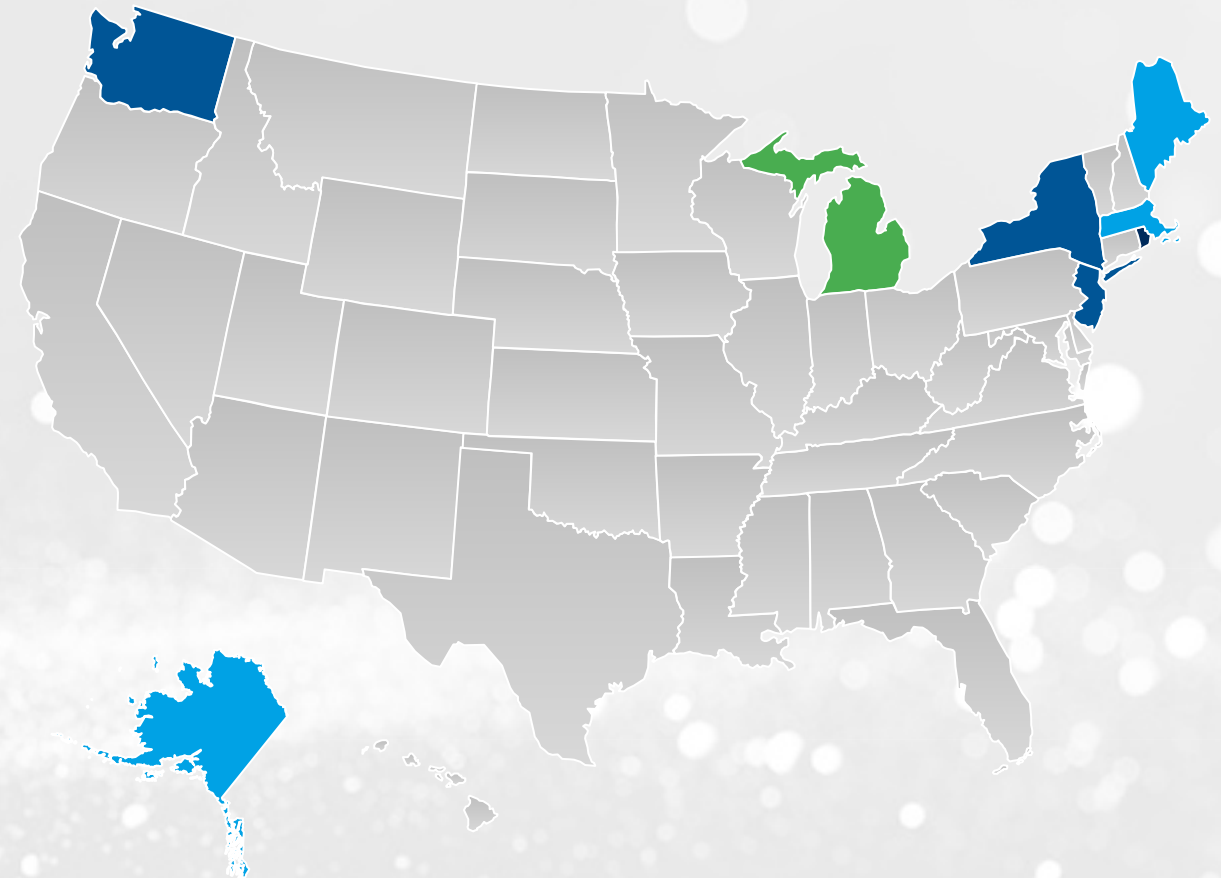
Commitments to Action 2021 - 2024

- Enhance data availability on PFAS in Fish Tissue. *Summer 2022, Spring 2023.*
- **Finalize Risk Assessment for PFOA and PFOS in biosolids. *Winter 2024***
- Undertake nationwide monitoring for PFAS in drinking water. *Final rule 2022*
- Establish a national primary drinking water regulation for PFOA and PFOS. *Proposed rule fall 2022, final 2023*

State Rules implemented prior to Federal Risk Assessment and rules

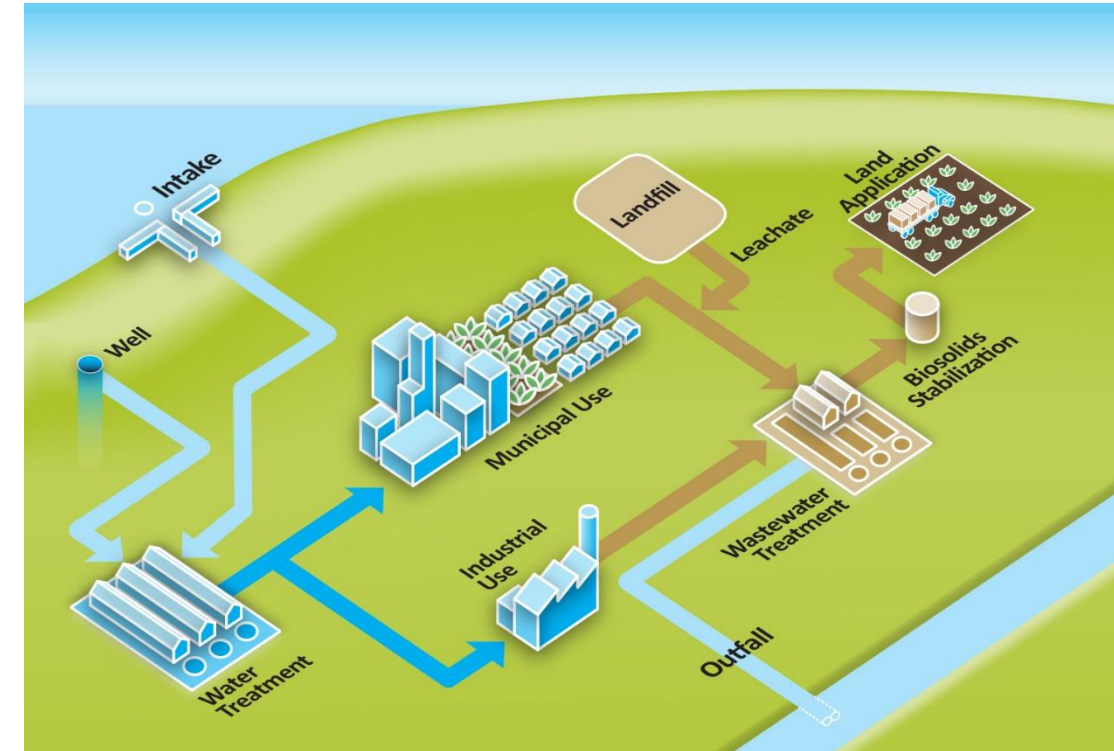
- Screening concentrations (ME established, MA proposed, AK proposed then suspended)
- IPP-focused controls (MI)
- Non-municipal source reduction
 - Food packaging (WA, bills in NY, RI, NJ assessing)
 - Firefighting foam (MI, NY)

Soil/Solids Concentrations Collection System Controls Non-municipal Source Reduction



Potential PFAS Management Framework

- Industrial Pretreatment Program (IPP)
- Must set industrial discharge limits to prevent
 - Pass through (to receiving water)
 - Limits on solids management method
- Approach appears favored by MI (role model), EPA and CA
- Challenges for full implementation
 - Requires surface water quality standards, approved analytical methods, ability to calculate fate through WRRF
- MI has adopted surface water quality standards, using to determine upstream treatment needs



PFAS in Biosolids, A Southern Arizona Case Study

October 2020

- A Study conducted by Pima County Regional Wastewater Reclamation Department, Jacobs Engineering, the University of Arizona and the National Science Foundation.
- Conducted in response to a temporary moratorium by the County on land application of biosolids
- Reviewed long term biosolids application sites along with Irrigated sites and sites without application or irrigation at depths from 1 to 9 feet

PFAS in Biosolids, A Southern Arizona Case Study

October 2020

- Very low concentrations, 2 ppb to 4 ppb, in irrigated and biosolids amended soils
- 90 percent of PFAS was attenuated within the top 6 feet of soil with the vast majority in the surface foot of soil



State Regulations

Changing State Regulations for Land Application

- In response to algal blooms, the State of Florida is concerned about excess of Phosphorus being land applied along with Nitrogen in biosolids land application programs.
- The State has revised their biosolids regulations, Chapter 62-640 of the Florida Administrative Code (FAC). The revisions went into effect in June 2021
- Revisions require estimating application rates based on Nitrogen and Phosphorus and using the lower application rate.
- They also include provisions based on depth to seasonal high groundwater

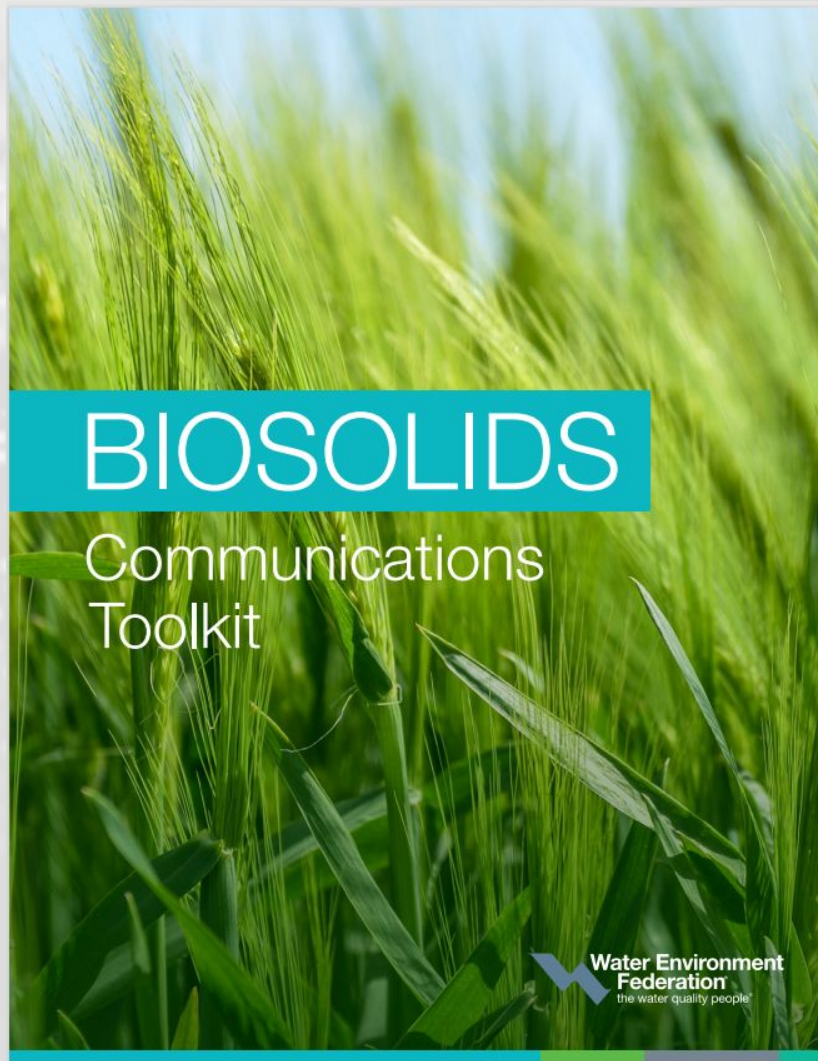
If we can not meet the Nitrogen demand the benefit of biosolids are reduced.

Let's put this into context...

- The State of Florida Produces approximately 350,000 dry tons per year of Biosolids.
- Approximately 2/3 of those biosolids are beneficially used.
- IF all those biosolids were land applied, at 3 dry tons per acre, with:
 - A Nitrogen concentration of 6% and
 - A Phosphorus concentration of 2.5 %,
- Those biosolids would provide approximately 11% of the total Nitrogen used and approximately 14% of the total Phosphorus used in Agriculture each year in the State



Public Outreach

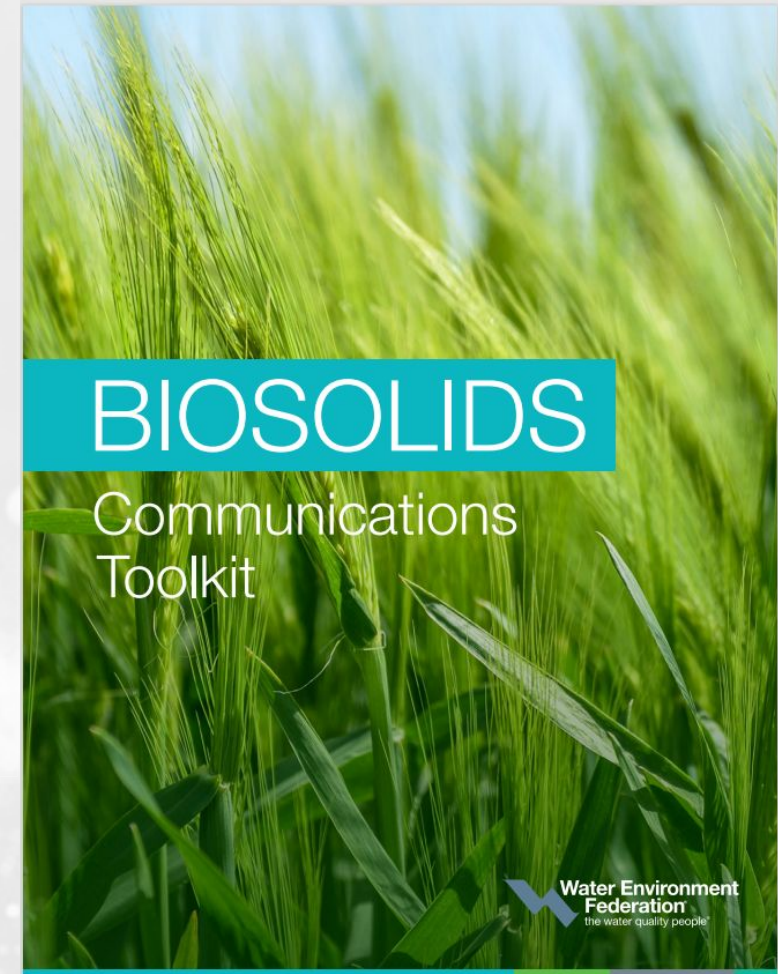


We Need to expand Public Outreach

- WEF has Developed a Biosolids Communication Toolkit and is providing training

Biosolids Communication Tool Kit

- Elevating the conversation
- 10 things to do now
- Create a communication and outreach plan
- Key Messages
- Handling Difficult Conversations
- How to measure success



Provides excellent information, examples and case studies

This is not WEF's first program focused on public outreach and understanding

- WEF Previously Published
 - The Communications Plan on Biosolids
 - Published on July 19, 1993
 - Five months to the day after the 503 Regulations went into effect
 - 28 Years before the Biosolids Tool Kit

The Communications Plan on Biosolids

- Prepared by Powell Tate
- Identified communications objective
 - Enhance Public Perception
 - Help advance the goals of the EPA fostering beneficial use
 - Support municipal management programs of biosolids
 - Improve the environment and protect human health

The goal was to kick off the campaign on Earth Day 1994

What we have learned and what we have gained

- 28 years after the publication of the 503 rules we are still beneficially using approximately 50 percent of the biosolids generated in the US
- The technologies available now allow us to produce better and more consistent biosolids products

What we have learned and what we have gained

- We have addresses to concerns expressed by the public and other interested parties over the years
- We addressing the concerns that are expressed now.
- We have documented the benefits of biosolids use

Biosolids Benefits

Improve Drought Resistance

Organic matter provided through biosolids can increase water retention, improving drought resistance and promoting more efficient water utilization

Improve Soil Structure

Biosolids can enhance the physical structure of soil, reducing its erosion potential

Improve Nutrient Use

Organics in biosolids help plants more effectively utilize nutrients, reducing nutrient loss by leaching

Replace Fertilizer

Biosolids nutrients can replace fossil-fuel intensive fertilizers

Biosolids Benefits

Enhance Soil Biota

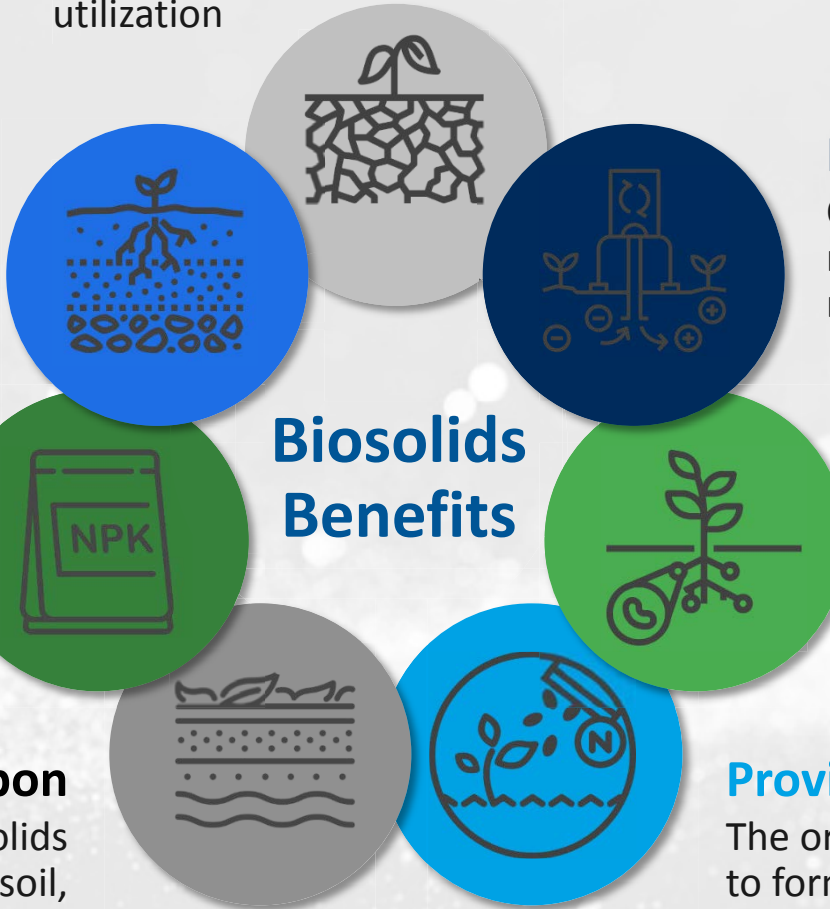
Organic matter in biosolids spurs the activity of soil organisms which are essential for productive soils

Sequester Carbon

The organic matter in biosolids sequesters carbon in the soil, reduces greenhouse gas emissions

Provide Slow Release Nitrogen

The organic N in biosolids slowly turns to forms needed for plants, better matching nutrient needs as plants grow



Need to expand public outreach

We need to use this to our advantage.

Samantha Villegas said in an interview regarding the WEF's New Biosolids tool kit;

To impact public opinion regarding any topic:

Be first,

Be loudest

Be the most frequent

While this historically is not our style, we should not feel pushy

.....What we have going for us is the truth and the science

Promote the Benefits

- User some older ideas using new technology

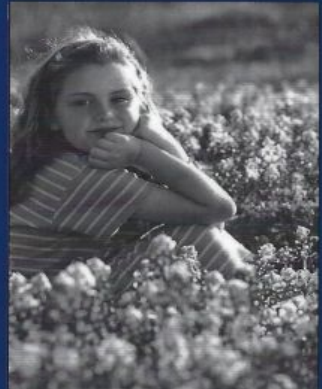
What does this **sunflower** need to grow?

- Water
- Sunlight
- Biosolids
- All of the above



Sunflowers need water, sunlight, nutrients and organics to grow. Biosolids provide organic material and nutrients to soil. This benefits the plants and the soil, increasing the soil's water holding capacity and reducing erosion.

If you answered, *All of the above*, visit us at www.wef.org and "click" on whybiosolids to collect your sunflower growth kit prize.



4,000,000
babies born each year in the U.S.

332,000,000
acres of farmland in the U.S.


94,000
square miles of surface area of the Great Lakes

337,000,000,000
gallons of water used each day in the U.S.

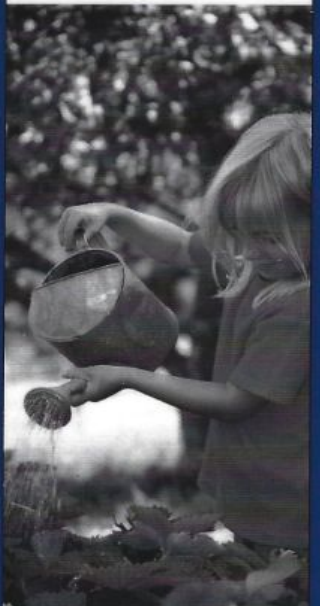
500,000
acres of farmland fertilized in the U.S. last year using biosolids

Biosolids recycling benefits our soil and supports our crops. The use of biosolids not only provides nutrients they provide organics to improve soil characteristics and reduce erosion potential.

To learn more statistics about biosolids recycling, visit us at www.wef.org and "click" on whybiosolids.




water
essential to our existence



biosolids
the useful product of water reclamation

Biosolids provide nutrients and organics to our land. Last year over half of all the biosolids generated in the United States were recycled. To take a new look at biosolids, visit us at www.wef.org and "click" on whybiosolids.



Need to expand public outreach

And now when compared to 1993.. we have the internet, PowerPoint, social and the list of 10 things to do today in the tool kit.. We need to use this to our advantage.

Let's commit to doing one of the 10 things listed in the toolkit each month.

Let's not wait another 28 years

**Building
a World of
Difference.®**