Sewage Sludge and Biosolids in Ohio: Updates and Resources

SWOWEA November Plant Operation Seminar and Section Meeting

November 16, 2023

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Ohio Environmental Protection Agency

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Ohio's Biosolids Program

- Goals of biosolids program
  - protect public health and the environment
  - encourage the beneficial reuse of biosolids
  - minimize the creation of nuisance odors
- Biosolids program regulates
  - disposal or beneficial use of sewage sludge and biosolids in Ohio
- Rules in Ohio Administrative Code (OAC) 3745-40

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Ohio's Biosolids Program Does Not Include:

- Drinking water treatment residuals → Beneficial Use Permits
- Sewage sludge incinerator ash → Beneficial Use Permits
- Industrial wastewater sludge → **Permit-To-Install Land Application Management Plan** (ONLY IF AGRONOMIC BENEFIT)
- Grit and screenings → Solid Waste
- Grease trap waste → Solid Waste
- Domestic, commercial, or industrial septage → Local HD

Ohio EPA Division of Surface Water
Ohio EPA Division of Materials and Waste Management

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Ohio's Biosolids Program Does Include:

- Grease trap waste
- Domestic, commercial, or industrial septage

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When Is Sludge Considered Biosolids?

- Screening (5/8” or less)
- Metals
- Pathogen reduction
- Vector attraction reduction

Metal	Limit (mg/kg dry weight basis)
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

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Ohio Biosolids Classifications

Exceptional Quality (EQ)
- Pathogens significantly reduced
- Lawn, home garden, and bulk use

Class B
- Pathogens reduced to levels that protect human health & the environment
- More site restrictions
- Can meet any of the pathogen & vector attraction reduction alternatives

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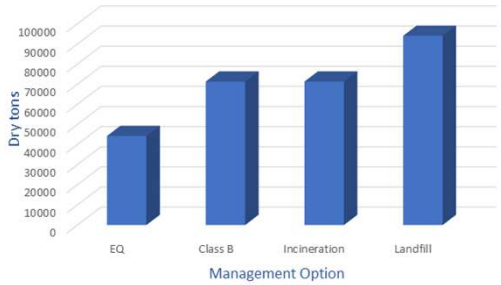
Sewage Sludge Management in Ohio - 2022



280,996 dry tons
41% beneficial use
33% landfill
25% incineration

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Pathogen Reduction	Vector Attraction Reduction
P1 – Geometric Mean of 7 Fecal Coliform Samples	VAR1 – 38% Volatile Solids Reduction
P2 – Aerobic Digestion	VAR2 – Bench Scale Anaerobic Digestion
P3 – Air Drying	VAR3 – Bench Scale Aerobic Digestion
P4 – Anaerobic Digestion	VAR4 – Specific Oxygen Uptake Rate
P5 – Class B Composting	VAR5 – Aerobic process Time and Temperature
P6 – Lime Treatment	VAR6 – Lime Treatment
P7 – Equivalent Process to Significantly Reduce Pathogens	VAR7 – Greater Than or Equal to 75% Solids
P8 – Time and Temperature Regime	VAR8 – Greater Than or Equal to 90% Solids
P9 – High pH and High Temperature Process	VAR9 – Injection
P10 – Exceptional Quality Composting	VAR10 – Immediate Incorporation
P11 – Heat Drying	
P12 – Thermophilic Aerobic Digestion	
P13 – Beta Ray Irradiation	
P14 – Gamma Ray Irradiation	
P15 – Pasteurization	
P16 – Equivalent Process to Further Reduce Pathogens	

Exceptional Quality Biosolids must use one of these options

Class B Biosolids can use any pathogen reduction and vector attraction reduction option

Options described in OAC 3745-40-04
Documentation listed in OAC 3745-40-09

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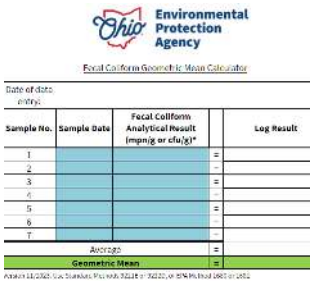
Pathogen Reduction: P1 Fecal Coliform Sampling

- Method in OAC 3745-40-04
  - 7 representative grab samples
  - Calculate the geometric mean
  - <2,000,000 MPN or CFU
- Documentation in OAC 3745-40-09
  - Analytical report for each test
  - Calculation of the geometric mean
  - If in NPDES tables, report the geometric mean (not individual values) on eDMRs


Fecal Coliform Geometric Mean Calculator

Sample No.	Sample Date	Fecal Coliform Analytical Result (mpn/g or cfu/g)*		Log Result
1			=	
2			=	
3			=	
4			=	
5			=	
6			=	
7			=	
Average			=	
Geometric Mean			=	

Calculator and instructions on Ohio EPA Biosolids webpage

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Vector Attraction Reduction: VAR4 SOUR Test

- Method in OAC 3745-40-04
  - **S**pecific **O**xygen **U**ptake **R**ate
  - For aerobically digested sludge
  - High variability: use geometric mean of 7 tests over several weeks
  - Results of 1.5 mg O/hr/g or less pass this test
- Documentation in OAC 3745-40-09
  - DO readings every minute for 15 minutes
  - Temperature correction and SOUR calculation
  - Total solids

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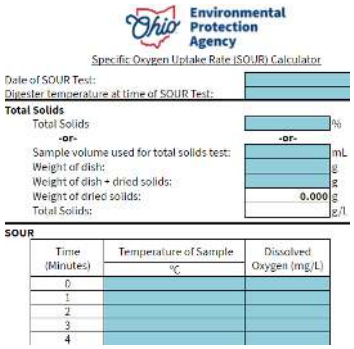
Updated Resource – SOUR calculator

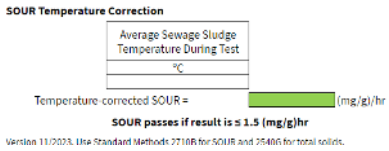

Specific Oxygen Uptake Rate (SOUR) Calculator

Date of SOUR Test:
Digester temperature at time of SOUR Test:

Total Solids
Total Solids %
-or-
Sample volume used for total solids test: mL
Weight of dish: g
Weight of dish + dried solids: g
Weight of dried solids: 0.000 g
Total Solids: g/L

SOUR

Time (Minutes)	Temperature of Sample °C	Dissolved Oxygen (mg/L)
0		
1		
2		
3		
4		


SOUR Temperature Correction

Average Sewage Sludge Temperature During Test °C

Temperature-corrected SOUR = (mg/g)/hr

SOUR passes if result is ≤ 1.5 (mg/g)hr

Version 11/2023. Use Standard Methods 2710B for SOUR and 2540G for total solids.

Calculator and instructions on Ohio EPA Biosolids webpage

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New Resource – SOUR test SOP template


DRAFT SOUR Test Standard Operating Procedure
INSERT FACILITY NAME

SOUR Test

Standard Operating Procedure

Vector Attraction Reduction Option #4
For Biosolids Treatment

INSERT FACILITY NAME
NDPES #INSERT NPDES NUMBER

INSERT FACILITY STREET ADDRESS
INSERT FACILITY STREET ADDRESS LINE 2

Template on Ohio EPA Biosolids webpage

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3. Frequently Asked Questions

1. [illegible]

[illegible]

2. [illegible]

[illegible]

3. [illegible]

[illegible]

4. [illegible]

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Other Components of a Biosolids Program

- **Authorized sites (Class B only)**
- **Agronomic rates**
- **SOPs –** sampling, **program narrative**
- Harvest restriction
- Isolation distances
- NANIs
- Field storage
- Signage
- Forecast, precipitation, frozen ground
- Records

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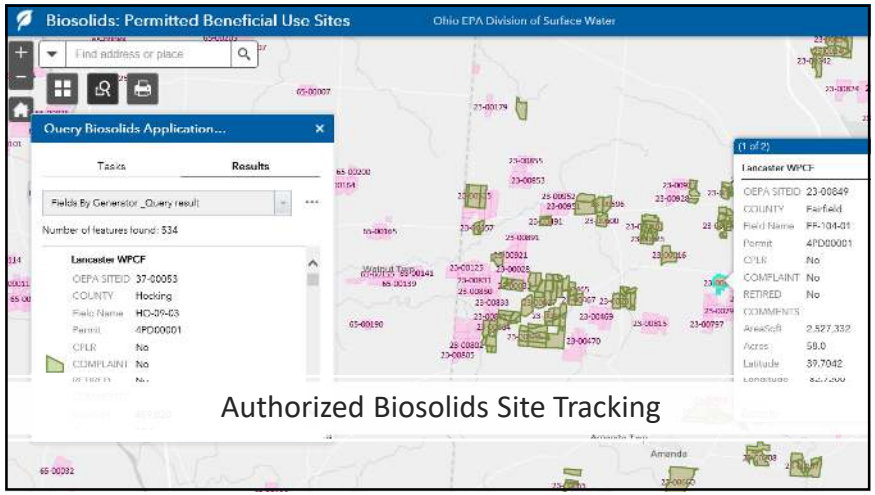

Authorized Biosolids Site Tracking

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Class B Beneficial Use Sites

- New Sites: BUA 1-5
- Site Transfers: AFT 1-6
- Acreage Amendment: AA 1-4
- Annual Site Re-certification

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Application for Authorization: Class B Biosolids Beneficial Use Sites

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House Bill 33 (the state budget bill)

- Ohio EPA is no longer required to publish public notices in the legal section of local newspapers
- Weekly Review and Public Notices webpage https://epa.ohio.gov/help-center/public-notice-jump
- The Ohio EPA biosolids webpage also includes a link and instructions to locate public noticed **biosolids site authorizations**

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Calculate the agronomic rate before you land apply!

Agronomic Rate means a rate of application of nutrients from any source to the land or an amount of nutrients removed by crop based on:

1. Nutrient content of the biosolids,
2. Crop nutrient requirements, and
3. Soil phosphorus

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Soil Phosphorus Level (ppm Bray-Kurtz P1 extraction)	Agronomic Rate (use most limiting)					Additional Notes
	Nitrogen Rate	< 250 lb/ac P_2O_5	250 to 500 lb/ac P_2O_5	Multi-Year P_2O_5	P-Index	
0-40	X	X	X_1		X	[1] Must be injected or incorporated within 24 hrs and no further P application for 3 yrs.
41-100	X			X_2	X	[2] Max of 5 yrs. and no further phosphorus application for number of years spread.
> 100					X	

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New Resource: Narrative template

Required by rule

- EQ: OAC 3745-40-09(C)(1)(c)
- Class B: OAC 3745-40-09(C)(3)(c)

A narrative description, in the form of a standard operating procedure, of how the pathogen reduction and the vector attraction reduction options meet Class B or EQ requirements.

(details on next slide)

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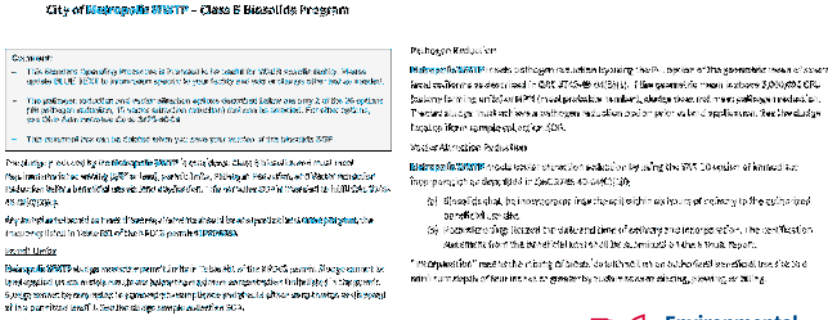
New Resource: Narrative template


City of [redacted] – Class B Biosolids Program

Template on Ohio EPA Biosolids webpage

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Sludge Outfalls

Outfalls/stations:

- 581 = Class B land application
- 584 = EQ sale/distribution/land application
- 585 = incineration
- 586 = landfill
- 588 = transfer to another NPDES permit holder

B. Description of the location of the required sampling stations are as follows:

Sampling Station	Description of Location
1PG00018001	Final effluent following disinfection but before discharge to an unnamed tributary of Banklick Creek (Lat: 39N 17' 17"; Long: 84W 34' 52")
1PG00018586	Sludge hauled to a mixed use sanitary landfill in an emergency
1PG00018588	Sludge, in gallons, transferred to another NPDES Facility
1PG00018602	Surface Sandfilter Bypass Weir (Lat: 39N 17' 16"; Long: 84W 34' 50")

NPDES permit sampling stations in Part 2 of permit

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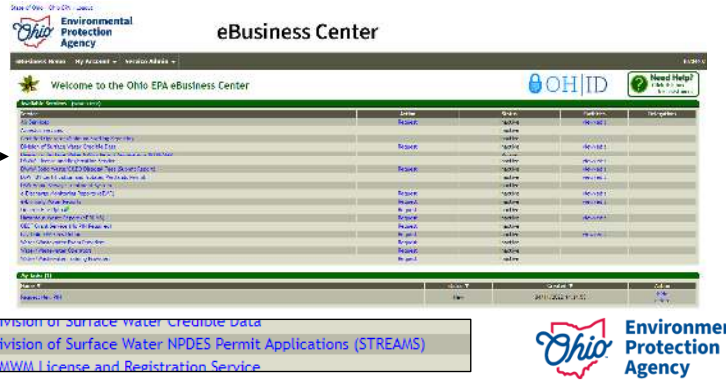
Annual Sludge Reports Due March 1



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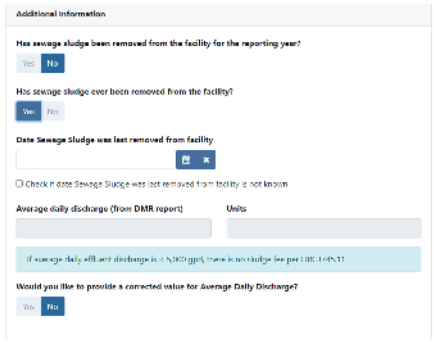
Reporting for NPDES permittees that had no sludge removed the previous calendar year



What if no sludge was removed from your facility in 2022?

- Select "No" on annual sludge report
- Select "zero discharge" on eDMRs

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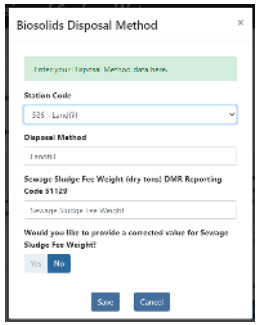
Reporting for NPDES permittees that do not land apply biosolids



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Reporting for NPDES permittees that land apply biosolids

Part I, B. - SLUDGE MONITORING REQUIREMENTS-LAND APPLICATION

1. Sludge Monitoring. During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee shall monitor the treatment works' final sludge at Station Number 0PB00087581, and report to the Ohio EPA in accordance with the following table. See Part II, OTHER REQUIREMENTS, for location to sample and monitor the sludge .

Table - Sludge Monitoring - 581 - Final

Effluent Characteristic	Discharge Limitations							Monitoring Requirements		
	Concentration Specified Units				Loading* kg/day					
Parameter	Maximum	Minimum	Weekly	Monthly	Daily	Weekly	Monthly	Measuring Frequency	Sampling Type	Monitoring Months
00400 - pH - S.U.	-	-	-	-	-	-	-	1/Year	Grab	December
00611 - Ammonia (NH3) In Sludge - mg/kg	-	-	-	-	-	-	-	1/Year	Composite	December
00627 - Nitrogen Kjeldahl, Total In Sludge - mg/kg	-	-	-	-	-	-	-	1/Year	Composite	December

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Reporting for NPDES permittees that land apply biosolids

- Verify tables are completed
- Attach agronomic rate calculations for each site used that year
- Provide **complete** documentation for pathogen reduction and vector attraction reduction
  - Reminder: these requirements are listed in OAC 3745-40-04 and OAC 3745-40-09
- Certifications

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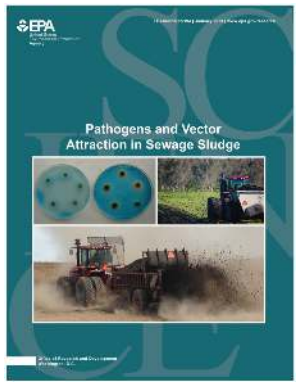
Updated Resource: White House Document



Your best biosolids resource, now updated!

https://www.epa.gov/biosolids/control-pathogens-and-vector-attraction-sewage-sludge

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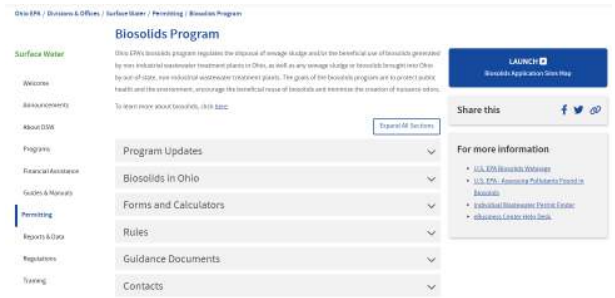
Updated Resource: Biosolids Webpage



https://epa.ohio.gov/divisions-and-offices/surface-water/ permitting/biosolids-program

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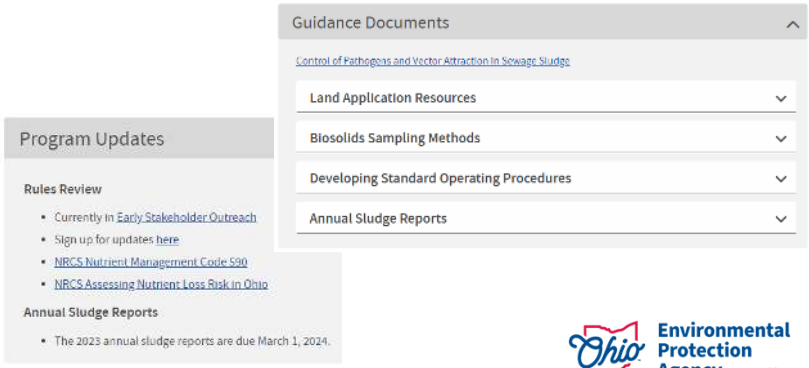
Updated Resource: Biosolids Webpage



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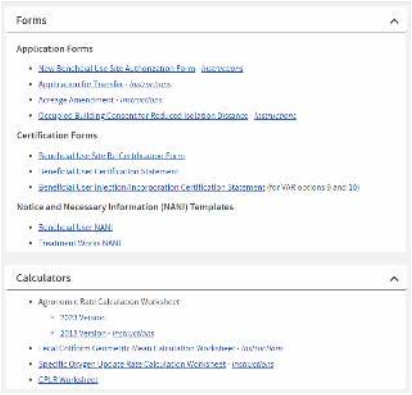
Updated Resource: Biosolids Webpage



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Compliance Assistance (OCAPP)

- Ohio EPA Office of Compliance Assistance and Pollution Prevention (OCAPP)
  - Free and confidential assistance
  - Provides a variety of on-site assistance services
  - Assistance completing and submitting permit applications and reports, including navigating Ohio EPA's e-Business Center
- Benefits
  - Save money
  - Improve business performance
  - Achieve environmental compliance
  - Reduce liability and potential for violations or penalties
  - Protect your workers' health and safety
  - Help preserve natural resources

Hotline: 800-329-7518

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Biosolids Rule Review

- Current rules: Ohio Administrative Code (OAC) 3745-40
  - Effective December 1, 2018
- Rules are reviewed every 5 years
- Early Stakeholder Outreach ends Nov. 29th
- Public comment period TBD. Rules likely not finalized until end of 2024
- Get involved! https://epa.ohio.gov/divisions-and-offices/surface-water/regulations

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New Biosolids Program Contacts

Betsy Sheerin (VanWormer)
Statewide Biosolids Program Supervisor
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Thank You!

Ohio EPA biosolids team

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Biosolids Coordinator
Southwest District Office

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Additional Information

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Biosolids Classifications
OAC 3745-40-04

Screening requirement for land application (5/8")

Biosolids Classification	Pathogen Reduction	Additional Pathogen Requirements	Vector Attraction Reduction	Metals Concentration Limits
Class B	P1 - P16	None	VAR1 – VAR10	Tables D-1, D-3[2]
Bulk Exceptional Quality[1]	P8 – P16	Fecal coliform or Salmonella sp. Bacteria reduction	VAR1 – VAR8	Tables D-1 and D-3
Exceptional Quality	P8 – P16	Fecal coliform or Salmonella sp. Bacteria reduction	VAR1 – VAR8	Tables D-1 and D-3

1 - EQ in quantities greater than 1 ton
2 - D-3 as applicable for Class B

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Vector Attraction Reduction: VAR9 Injection

Subsurface placement of liquid biosolids

- Four inches or more underground
- At an authorized beneficial use site

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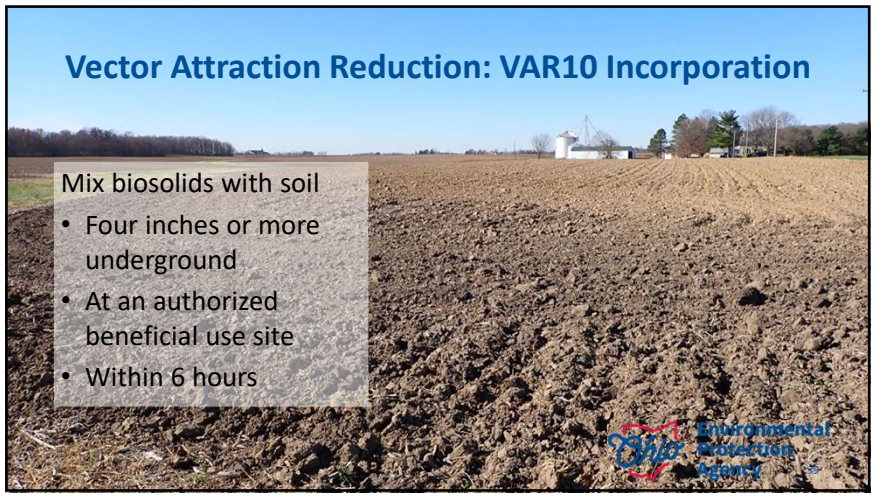
Vector Attraction Reduction: VAR10 Incorporation



Mix biosolids with soil

- Four inches or more underground
- At an authorized beneficial use site
- Within 6 hours

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Type of Crop	Description	Time for Harvest After Beneficial Use	Example Crops
Food crops	Harvested parts touch biosolids	14 months	
Food crops	Harvested parts below the surface; Biosolids on surface > 4 months	20 months	
Food crops	Harvested parts below the surface; Biosolids on surface < 4 months	38 months	
Other food, feed, and fiber crops	-	30 days	
Pasture	Animal Grazing	30 days	
Landscaping Vegetation	High potential for public exposure	1 year	

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Isolation Distance Requirements

	Surface Application (feet)	Injection/Immediate Incorporation (feet)
Bedrock	3	3
Surface Waters	33	33
Sinkhole	300 without grass buffer; 100 with grass buffer	300 without grass buffer; 100 with grass buffer
Occupied Building	300	100
Private Water Source	300	100

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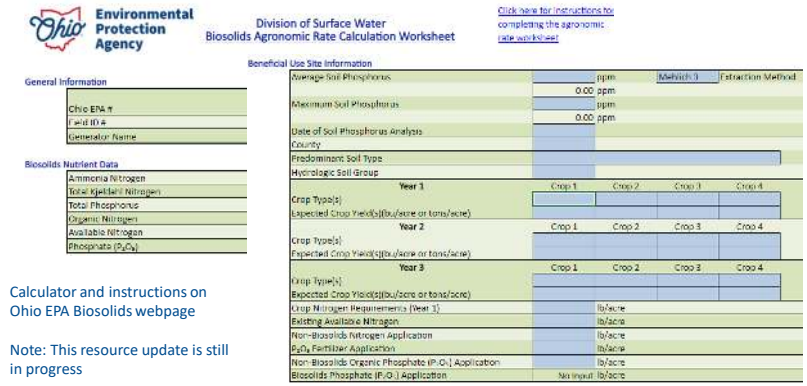
Updated Resource: Agronomic Rate Calculator



Calculator and instructions on Ohio EPA Biosolids webpage

Note: This resource update is still in progress

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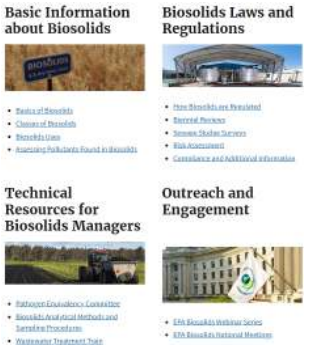
Other Resources



U.S. EPA Biosolids webpage

- U.S. EPA Biosolids - https://www.epa.gov/biosolids
- Ohio EPA Biosolids – https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/biosolids-program
- 40 CFR Part 503 - https://www.ecfr.gov/current/title-40/chapter-I/subchapter-O/part-503
- Ohio Administrative Code 3745-40 - https://codes.ohio.gov/ohio-administrative-code/chapter-3745-40
- Biosolids analytical methods: https://www.epa.gov/biosolids/biosolids-analytical-methods-and-sampling-procedures

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Technical Resource

- Technical Assistance Webinar Series
  - https://www.epa.gov/compliance/technical-assistance-webinar-series-improving-cwa-npdes-permit-compliance
  - Presenters: Experts from states, U.S. EPA, and private industry
  - Recorded webinars

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