

Current Trends in Agricultural Wastewater Regulations and Permitting

Jay Poll, CPG

Senior Hydrogeologist/Project Manager
Lakeshore Environmental

**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS

What's Ahead:

- About Me
- About Ottawa County
- Ag. "Regulated Wastes"
- A quick intro. to hydrogeology
- Waste Discharge & Disposal Methods
- Potential Issues
- New Permit for 2011
- Current Issues & Trends in Industry



Jason “Jay” Poll, CPG

- Married with one son who’s 5 years old, we live in Grand Haven
- Graduate of Calvin College – Grand Rapids, MI
 - BS degree in Geology, minor in Environmental Policy
- Environmental consultant for nearly 12 years
 - Environmental investigations, remediation, permitting
- Certified Professional Geologist: AIPG
- Senior Hydrogeologist/Project Manager @ LEI
- Warning! Huge geek for Geology!

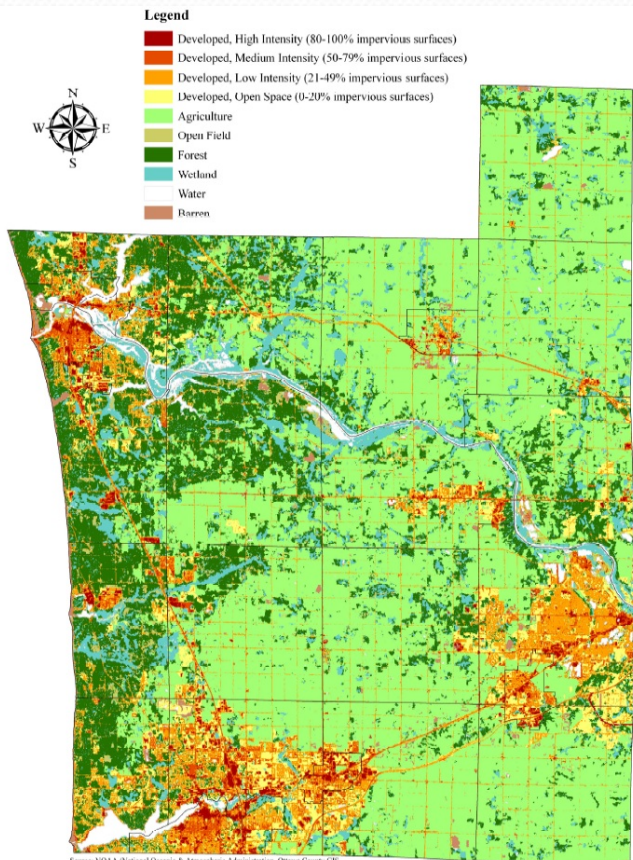
LAKESHORE
ENVIRONMENTAL, INC.



SCIENTISTS • ENGINEERS • PLANNERS

Ottawa County Agriculture

- 177,612.5 Acres of agricultural land in county– 48.1%
 - #1 Land use in county (2006)
 - Top agriculture townships (acres):
 - Polkton Twp.
 - Wright Twp.
 - Chester Twp.
 - Jamestown Twp.
 - Crops & agricultural uses vary:
 - dairy, feed, soy, grain, blueberries.



Ag. Wastes Regulated?

- Ag./food processing waste can be regulated as liquid industrial waste, solid waste or even hazardous waste.
- Ag./food processing waste or residuals are disposed of as either “solid waste” or “liquid industrial waste” *unless* eligible for another disposal method under:
 - Part 115 (Solid Wastes)-AUA, GAAMP..spread on fields...
 - Part 121 (Liquid Waste) regulated unless meets special requirements.
 - **Industrial Waste?**
 - **Hazardous Waste?...**



Industrial Waste, Where?



**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS

Wastewater Discharge & Disposal

- Water used to cool, wash, and move product, sanitation...
- Wastewater **can be** classified as a “liquid industrial waste”
- The cost-effective disposal of wastewater is one of the most significant environmental issues facing the agricultural products, food production & processing industry.
- Agricultural products, food production & processing industry a **focus** for Michigan economic growth.
- **Wastewater discharge and disposal practices have been a target of enforcement by the**

LAKESHORE
ENVIRONMENTAL, INC.



SCIENTISTS • ENGINEERS • PLANNERS



Before we proceed...

... a brief intro to Hydrogeology

**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS

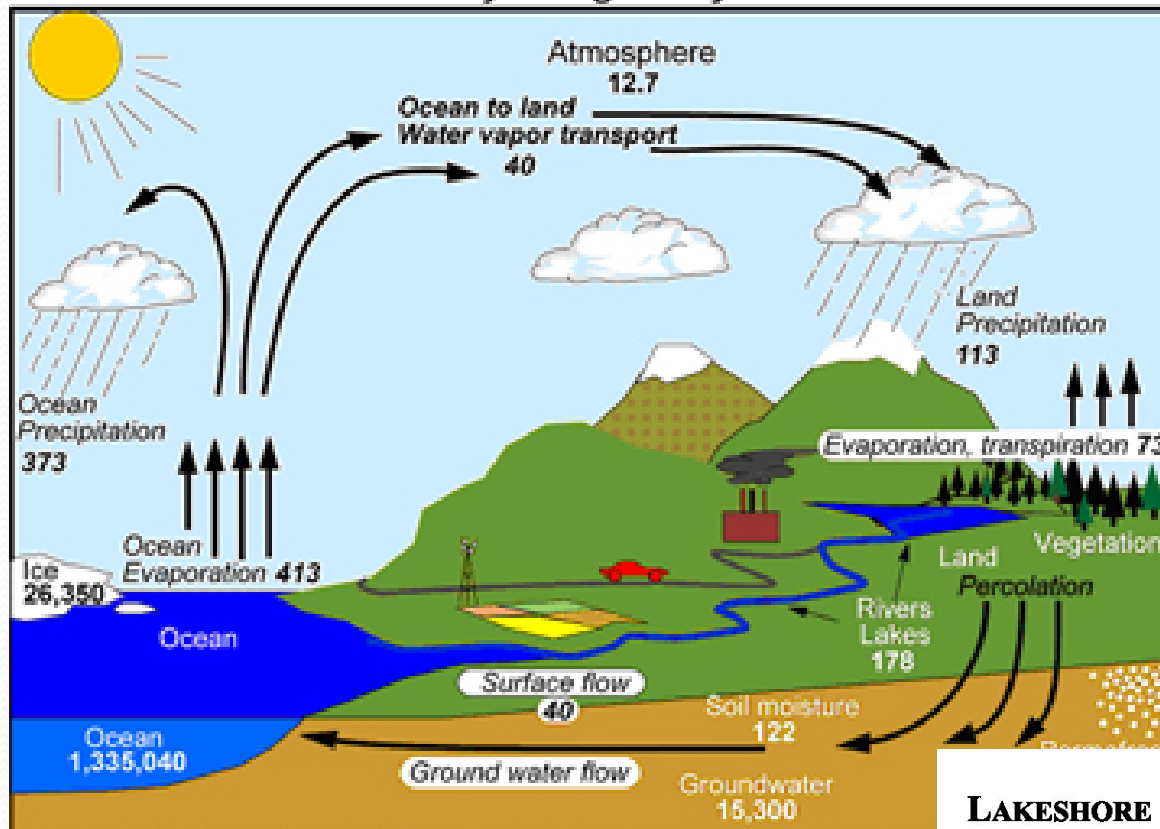
Brief Intro. to Hydrogeology

- Wiki: **Hydrogeology** (*hydro-* meaning water, and *-geology* meaning the study of the Earth) is the area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust, (commonly in aquifers)...
- Wiki: An **aquifer** is a wet underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, or silt) from which groundwater can be usefully extracted using a water well...
- Underground rivers? No...



“Hydrogeology”

Hydrological Cycle



Units: Thousand cubic km for storage, and thousand cubic km/yr for exch

**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS

Wastewater Disposal Options:

- Discharge to publically-owned treatment works (POTW)
 - Available to some in Ottawa County.
 - *Primarily* limited by proximity to POTW & cost...
 - Discharge to surface water
 - Land application
 - Discharge to groundwater
- Focus of Presentation**
- A look to the future: biogas, biofuels...



Discharge Options – Surface Water

- Direct discharge to surface water (NPDES Permit)
 - Need surface water nearby.
 - Pre-treatment (maybe \$\$\$) is typically required in order to meet the permit's discharge limits.
 - NPDES permit
 - Permit fee and application expense
 - Ongoing monitoring requirements



Discharge Options – Land Application

- Land application
 - Process wastewater used in irrigation of crops
 - Often a win/win – water & nutrients when needed most
 - Comply with Generally Accepted Agricultural Management Practices (GAAMPS)
 - Often requires **groundwater** discharge permit.
 - High organic material (& nutrients) in waste can result in high **Biochemical Oxygen Demand (BOD)** which may present an issue to the groundwater...



Discharge Options – Groundwater

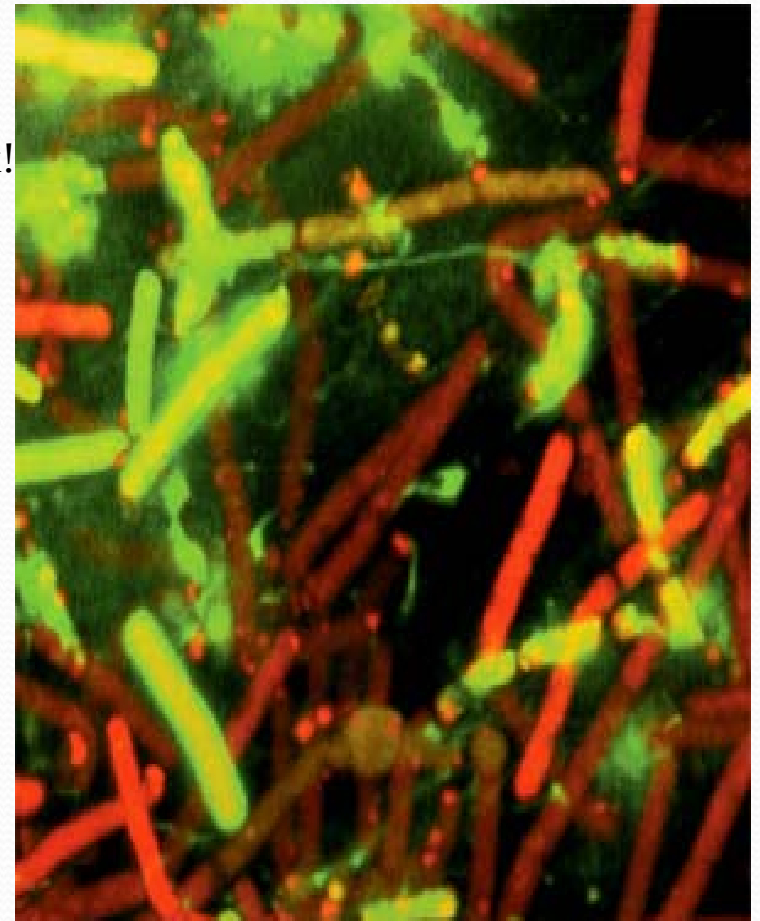
- Groundwater discharge (Part 22 Permit)
 - Requires permit or demonstration that exemption applies.
 - Long list of permits from 2210 “notification” to 2218 permits.
 - Thankfully, smaller & more limited water discharges typically have more simple permits with fewer requirements.
 - Permit fee and cost for completing the application.
 - Some pre-treatment is typically required to meet discharge limits or be *protective of groundwater*.
 - Ongoing sampling & groundwater monitoring requirements.
 - Potential creation of Part 201 “facility” **if not properly managed.**



Potential Issues:

- Wastewater discharge:
 - Millions of gallons? (Often safe to drink!)
 - Food for bacteria in soil & GW!
 - High BOD, low dissolved oxygen
 - Low pH, etc.
- Metals mobilization via REDOX
 - Fe, Mn, As, Pb, etc.

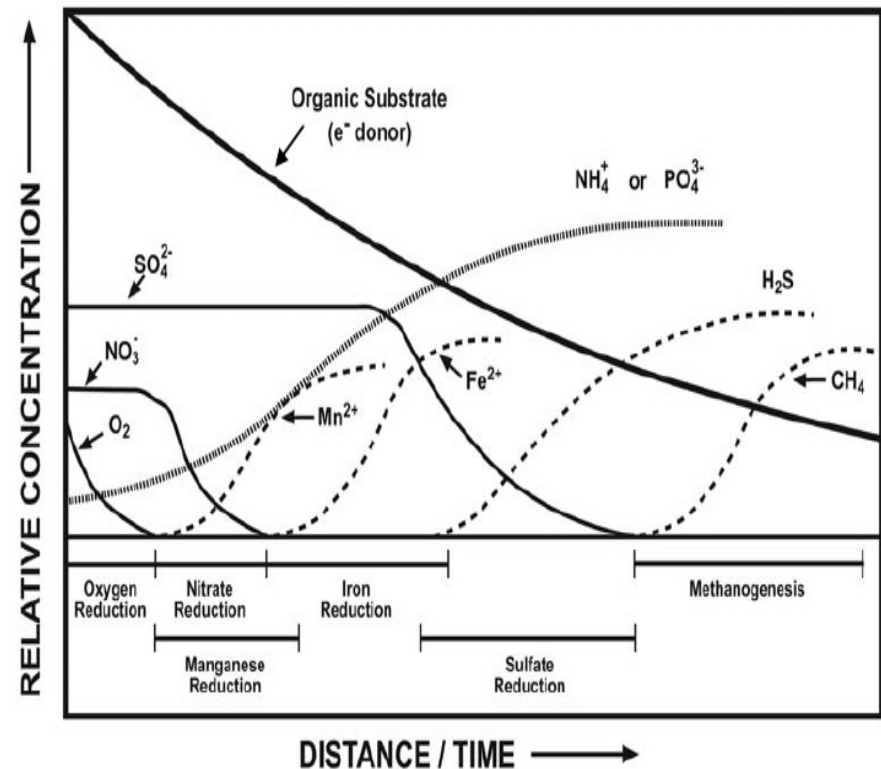
This *bacillus-cereus*...has
the munchies for organics:



What is REDOX Process?

- Wastewater discharge:

- Organic substrate, high BOD, low DO, low pH
- Groundwater/soil runs out of O_2
- Saturation of soils...even less O_2



LAKESHORE
ENVIRONMENTAL, INC.

SCIENTISTS • ENGINEERS • PLANNERS

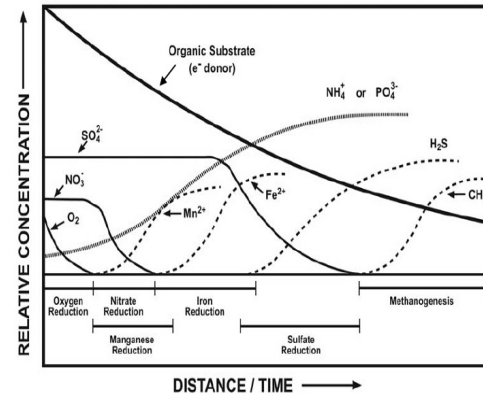


REDOX Process

- Wastewater discharge:

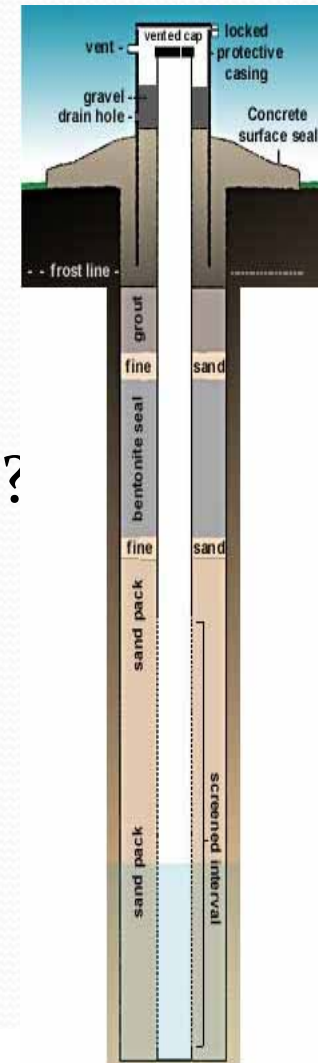
- Organic substrate, high BOD, low DO, low pH
- GW/soil run out of O_2 Saturation of soils...even less O_2
- **Metals mobilization: Fe, Mn, As, Pb, etc.**

- The proper management of wastewater discharge is the most cost-effective solution to the problem.



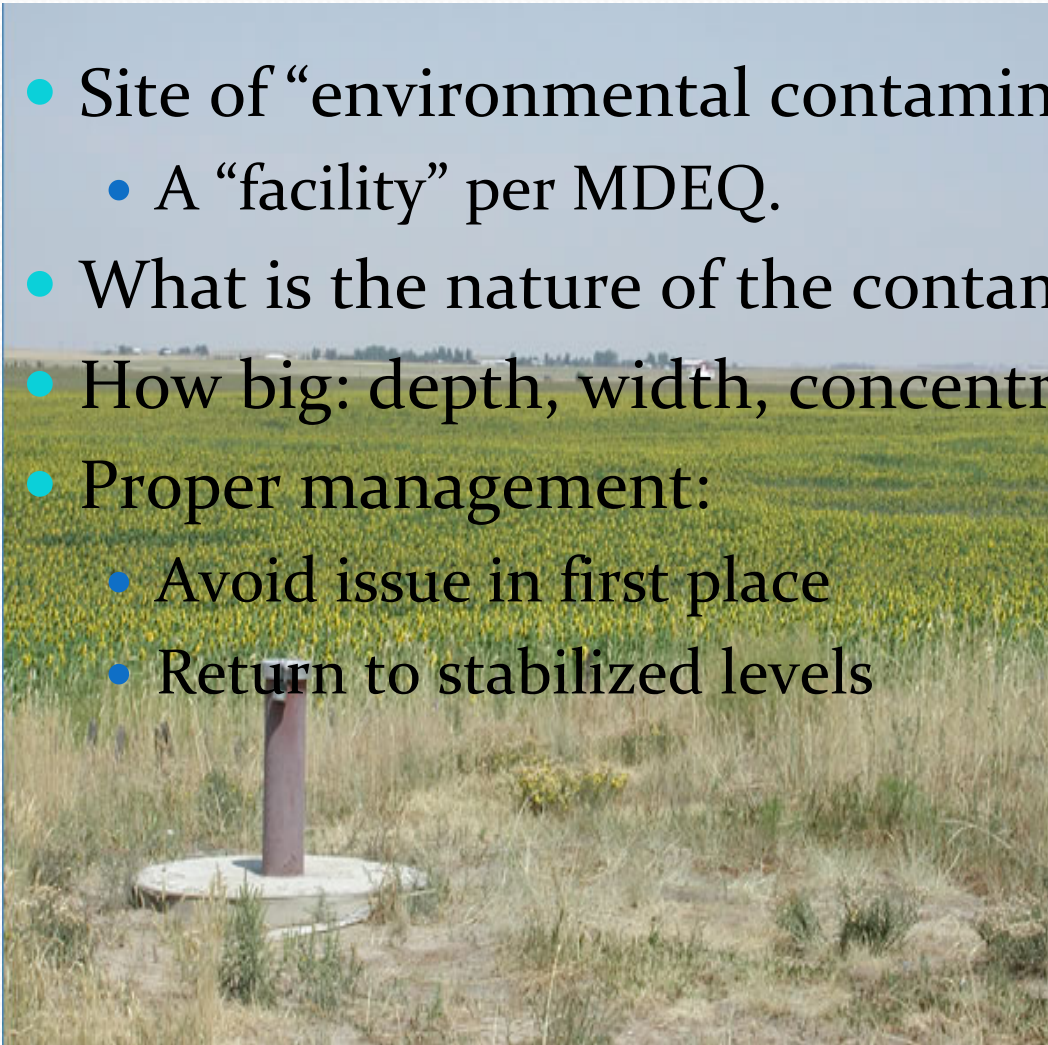
“Part 201” Delineation of Contamination:

- Site of “environmental contamination”
 - A “facility” per MDEQ.
- What is the nature of the contamination?
- How big: depth, width, concentration?
- Proper management:
 - Avoid issue in first place
 - Return to stabilized levels







LAKESHORE
ENVIRONMENTAL, INC.

SCIENTISTS • ENGINEERS • PLANNERS








What's New With the 2218 Permit?

- MDA, MFPA, MDEQ working to “streamline” process 
- Notable differences: 
 - Applicant gets a permit! 
 - New/renewed permittee proposes wastewater management plan that is expected to be protective of groundwater. (90 Days)
 - DEQ accepts if remotely feasible and issues approval. (180 Days)
 - Permit has set schedules for implementation of proposed management plan (1 year).
 - After 4 years, permittee shall submit report detailing whether system was protective of groundwater. If not, 180 days to submit work plan for other wastewater treatment system.
 - **Permit also has schedule to meet Part 201 obligations, if applicable.**
 - Most notably – 90 days to submit RI/FS work plan. 



New Permit...

- Loading vs. concentration limits 
 - High frequency, low volume, etc.
 - Agronomic rates
 - Issues with water conservation?
- Latitude to demonstrate improvement/efficacy 
- Use of soil sensors & loggers to monitor fields 
- Winter irrigation limitations! 
 - November 15 – April 15 ban is the default for permit.
 - Already application ban for solids (Dec. 21 – Mar. 21)
- Snow making? 



Snow Making?

- 2010-2011 “Snow Study” Grant MDA/USDA
- Use of wastewater to make snow during winter months
- Direct land application
 - Insulates underlying soils
 - Promote infiltration, microbial activity & soil based treatment.
- Low volume/high strength when sub-freezing
- High volume/low strength during melt/thaw events
- Grant-funded study (Part II) this winter
- Is this the future of winter irrigation?

**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS

Questions Anybody?

My Contact Information:

- JayP@lakeshoreenvironmental.com
- Mr. Jason E. Poll, CPG
Lakeshore Environmental, Inc.
803 VerHoeks St.
Grand Haven, MI 49417
- 616-844-5050

Thank You!

**LAKESHORE
ENVIRONMENTAL, INC.**



SCIENTISTS • ENGINEERS • PLANNERS