Biosolids Use and Regulations in Florida

September 2018
What are Biosolids?

The treatment of domestic wastewater produces two principal end products: effluent and biosolids.
• Biosolids are the solid, semisolid or liquid material produced during the treatment of domestic wastewater.

• Defined as, “solid organic matter recovered from a sewage treatment process and used especially as fertilizer – usually used in plural.”
Biosolids Management Options for a Wastewater Treatment Facility

• A wastewater treatment facility can choose from several biosolids use or disposal options:
  o Transfer to another facility
  o Landfill
  o Distribution and marketing (fertilizer)
  o Incineration
  o Bioenergy (potential)
  o Land application

• The wastewater treatment facility’s permit will state which use or disposal option the facility is allowed to use.
Biosolids Management in Florida

• Total Production → 340,000 dry tons/year.

• Estimates indicate approximately two-thirds are beneficially used and one third is landfilled.

• Each year, 10,000 - 20,000 dry tons of pellets are imported, distributed and marketed as fertilizer.
Currently, there are three regulatory classes of biosolids for beneficial use based on treatment/quality:

- Class B – minimum quality for beneficial use
- Class A – intermediate quality for beneficial use
- Class AA – highest quality for beneficial use

Land application - Class B (could also be higher classes).

Distribution and marketing as a fertilizer - Class AA (equivalent to Class A Exceptional Quality (EQ) under EPA regulations).

Regulations are based on the beneficial use and the class of biosolids to minimize potential risks from pathogens, nutrients and other pollutants.
Treatment

• Treatment is required to reduce or eliminate pathogens:
  o Class B treatment (significantly reduce pathogens)
  o Class A/AA treatment (eliminate pathogens)

• A vector attraction reduction option/treatment process must be met (reduces attractiveness to insects, birds, rodents, etc.).

• Site restrictions are required for Class B to minimize potential exposure.
Nutrients

• Biosolids land application rates are limited to rates that provide for crop nutrient needs; phosphorus restrictions apply in certain geographic areas of Florida.

• Land application sites must have a site-specific nutrient management plan (NMP).

• Site restrictions minimize potential impacts – site slopes, setbacks, depth to ground water, etc.

• While not commonly land applied, Class AA biosolids distributed and marketed as fertilizers (due to their high level of treatment) are exempt from the nutrient restrictions for land applied biosolids.
Other Constituents

• Limits for nine metals were developed for biosolids based on an extensive EPA review and risk assessment:
  • Arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium and zinc

• Two categories of pollutant limits were developed:
  o Pollutant concentration limits for biosolids
    ▪ Ceiling limits
    ▪ More restrictive Class AA limits
  o Cumulative pollutant loading limits for application site

• Site restrictions minimize potential impacts – site slopes, setbacks, depth to ground water, etc.
• Federal – Title 40 CFR Part 503 (Florida is not delegated Part 503)

• State - Chapter 62-640, Florida Administrative Code (F.A.C.)
  • Primarily based on Part 503 but addresses additional items of concern

• Local ordinances
• Promulgated in February 1993 after long rule-making effort

• Based on an extensive risk assessment and peer review (14 different exposure pathways)

• Technology based standards for pathogens

• Self-implementing (i.e., do not issue permits)

• Florida is not delegated Part 503, few states are delegated

• Does not address phosphorus

• EPA biennial review
Florida Biosolids Regulations

- First regulations adopted in 1984 (solid waste rule)
- Chapter 62-640, F.A.C.
  - Effective in 1991, revised in 1998 and 2010
  - Adopted primary components of the Federal Part 503 regulations
  - Key differences with federal rules:
    - Permits issued addressing biosolids
    - Nutrient Management Plan (added in 2010)
    - Phosphorus provisions
    - Additional management requirements and site restrictions
Biosolids Distribution and Marketing – Class AA Biosolids

• Distribution and marketing is the sale or giveaway of the biosolids as a fertilizer without restrictions on use
  • Stringent pathogen reduction requirements and pollutant limits
  • Safe for public use
• Approximately 39 Florida facilities produce Class AA
  • Larger facilities – treatment processes tend to be expensive
  • Primarily sold or given away in bulk quantities
  • Some are blended into commercial fertilizer blends
• Wide variety of treatment processes
• Trend appears to be a slow, steady increase in Class AA
• Under the 2010 rule revisions, Class AA must be distributed and marketed as a “fertilizer” or to someone with a fertilizer license (otherwise land application requirements apply, i.e. site permit and NMP)
• Many Class AA entities are appearing on the Florida Department of Agriculture’s annual fertilizer tonnage report; note, some traditional fertilizer companies blend Class AA into custom fertilizer blends but this is not apparent in the annual fertilizer tonnage report
Various Types of Florida Class AA Products/Processes

- Pellets
- Heat-Dried
- Compost
- Autothermal Thermophilic Aerobic Digestors (ATADs) - liquids
- Advanced Anaerobic Digestion
- BCR Neutralizer – chlorine dioxide process
- Alkaline
  - Bioset
  - Nviro
  - Lime Pasteurization
Class AA – Heat Drying
Other Class AA

Chlorine Dioxide

Two Phase Anaerobic Digestion

Composting

High temperature, high pH
Florida Class AA Facilities
Florida Class AA Biosolids in 2016

- 39 Florida facilities produced 191,344 dry tons of final Class AA biosolids product
  - 187,149 dry tons distributed and marketed in Florida
  - 4,195 dry tons distributed and marketed outside of Florida
- 5 out-of-state facilities shipped in 9,966 dry tons
- A total of 197,115 dry tons of Class AA biosolids product was distributed and marketed in Florida in 2016
Biosolids Land Application

- Land application is the beneficial use of biosolids at a permitted site following a nutrient management plan (NMP) and site management requirements
  - Biosolids contain macronutrients (N and P) and micronutrients (Cu, Fe, Mn, etc.) that can be used by crops
  - Biosolids increase the organic content of the soil
- There are approximately 140 permitted land application sites in Florida
  - Haulers are the most common site permittees (instead of the land owner or utility)
  - Utilities commonly contract with haulers/appliers instead of applying the biosolids themselves
DEP and Biosolids Sites

DEP permits the treatment facilities and the land application sites

- **Facility permittee treats and monitors biosolids**
  - Pathogen reduction, vector attraction reduction, metals limits
  - Treatment, monitoring and hauling records
  - Reporting - DMRs and land application annual summary report
  - Treatment Facility Biosolids Plan identifies the application sites where the treatment facility may send its biosolids
  - Class AA distribution and marketing requires a fertilizer license or must be sold or given to someone with a fertilizer license (exception for compost outside Northern Everglades watersheds)

- **Site permittee must operate and apply the biosolids in accordance with their permit and state and federal regulations which requires:**
  - Site and application zone requirements
  - Crop and biosolids application rates
  - Record keeping - hauling, applications, soil pH, etc.
  - [Biosolids Application Site Annual Summary](#) reports loadings
  - Class AA distribution and marketing does not require a permitted site
Biosolids land application sites must be permitted

- Individual permit is required, except a site may be permitted as part of a facility permit if the facility is the only facility using the site.

- Applicant must submit a **Biosolids Site Permit Application**, DEP Form 62-640.210(2)(d), and a site-specific nutrient management plan (NMP) submitted with the permit application:
  - Determines application rates based on crop nutrient need
  - Phosphorus assessment
  - Soil fertility testing

- Must meet site requirements addressing site slope, storage, seasonal high ground water table, setbacks, signage, cumulative application limits, public access, and harvesting restrictions, etc.

- The site permittee does not have to be the land owner – instead, the site permittee could be a biosolids hauler/contractor, or a wastewater treatment facility permittee.
Biosolids site in Osceola and Brevard Counties, shows the application zones, setbacks, etc.

- This site has 30 application zones covering 5,736 acres
- The odd shapes of the application zones, or fields, primarily result from setback buffers (i.e., wetlands, surface waters, residences, etc.)
Regulatory Program for Land Application – NMP

- Rule 62-640.500, F.A.C., requires a nutrient management plan (NMP) to be submitted with the permit application for an agricultural site.

- NMP must be site specific - submitted with site permit application
  - Signed by certified nutrient management planner (CNMP) or P.E.
  - Identifies application zones, NMP implementation, site operation and maintenance, and record keeping (for NMP), maps, soil survey, soil fertility testing frequency
  - Includes any soil, water, plant tissue and biosolids analyses, as applicable

- Application rates are the heart of the NMP
  - Considerations include phosphorus assessment (Florida P-Index), all nutrient sources, nitrogen mineralization, realistic annual yield goals, biosolids calcium carbonate equivalency, method of land application, calculations

- Additional requirements apply in Northern Everglades and Estuary Protection Program areas (Section 373.4595, Florida Statutes)
P-Index

- Chapter 62-640, F.A.C., requires the NMP to include an assessment of the potential for phosphorus movement from each application zone.

- The Florida Phosphorus Index (P-Index) is a field-by-field evaluation tool to assess the potential risk of phosphorus loss from an agricultural field to surface and ground waters based on the phosphorus source, application rate, site characteristics, soil types, and management practices.

- Published by the Florida Natural Resource Conservation Service (NRCS) and developed in cooperation with other stakeholder agencies.
  - “The Florida Phosphorus Index: A Phosphorus Risk Assessment Tool,” 190-FLAGRFH, 8/04
  - UF IFAS has published guidance on the P-Index for each individual county in Florida that can be used by permittees when using the P-Index [http://edis.ifas.ufl.edu/topic_series_florida_phosphorous_index](http://edis.ifas.ufl.edu/topic_series_florida_phosphorous_index)

- The P-Index helps evaluate if nutrient management (i.e. application rates) at a biosolids site should be based on nitrogen (N) or phosphorus (P).

- The P-Index needs updating – NRCS has been working on an update.
Regulatory Program for Land Application – Site Requirements

- Record keeping requirements include
  - Hauling records of deliveries
  - Site logs for applications to each zone (i.e., field)
- Application rates are limited by the NMP
- Cumulative loading tracking/limits
- Annual reporting of loadings to each zone
- Tracking of biosolids off-site is prohibited
- Objectionable odors are prohibited
- Department conducts site visits, inspections, compliance and enforcement
### Regulatory Program for Land Application – Site Setbacks

<table>
<thead>
<tr>
<th>Setback Feature</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Class I water, Outstanding Florida Water, or Outstanding National Resource Water</td>
<td>1,000 ft</td>
</tr>
<tr>
<td>*Other surface water</td>
<td>200 ft</td>
</tr>
<tr>
<td>*Other surface water – if biosolids incorporated or injected</td>
<td>100 ft</td>
</tr>
<tr>
<td>Subsurface fractures, sinkholes, or other conduits to groundwater</td>
<td>200 ft</td>
</tr>
<tr>
<td>Private potable well</td>
<td>300 ft</td>
</tr>
<tr>
<td>Public potable well</td>
<td>500 ft</td>
</tr>
<tr>
<td>**Occupied buildings - biosolids stored or stockpiled for more than 7 days</td>
<td>1,320 ft</td>
</tr>
<tr>
<td>**Occupied buildings - Class B only</td>
<td>300 ft</td>
</tr>
<tr>
<td>Occupied buildings - Class B only; incorporated or/injected</td>
<td>100 ft</td>
</tr>
<tr>
<td>Property lines - Class B only</td>
<td>75 ft</td>
</tr>
</tbody>
</table>

* Setbacks from surface waters shall be vegetated.

**May be reduced with building owner consent.

Note - Setbacks do not apply to surface waters owned entirely by one person other than the state which are located completely within the property and will not discharge from the property.
• Depth to groundwater
• Runoff provisions (rain events, site slope, frequently flooded sites)
• Soil pH
• Class B pathogen related restrictions
  - Public access restrictions
  - Harvesting restrictions
  - Grazing restrictions
  - Disclosure of restrictions at sale
• Notifications – cattle grazing, molybdenum
Regulatory Program for Land Application – Site Requirements

• Alkaline-treated/lime-stabilized biosolids
  o Must be applied within 24 hours of delivery to site
  o Must be injected/incorporated or meet a 1,320 ft setback

• Storage requirements
  o Temporary storage (staging) is limited to 7 days
  o Long term storage area must meet 1,320 ft setback

• Advisory signs required

![Signs example]
In 2007, legislation passed requiring applicants for land application sites in the Lake Okeechobee (including Kissimmee River), St. Lucie River, Caloosahatchee River watersheds to submit a demonstration of no-net loading for phosphorus/nutrients.

- All 43 sites existing at the time of the legislation stopped land application as the facility permits allowing land application expired.
- If a site is permitted in one of these areas, the site records will need to include annual documentation that no-net loading of phosphorus/nutrients was met by accounting for all phosphorus applied to the site with the amount of phosphorus exported in products generated on the site.
- Class AA biosolids distributed and marketed as fertilizer are not subject to the provisions.
Septage Management Facilities Regulated by DEP

• The land application of septage under Florida Department of Health regulations was prohibited after June 30, 2016 (Section 381.0065(6), Florida Statutes)

• Approximately 80-90 septage businesses under DOH were affected by the statute

• DEP permits for biosolids treatment facilities (BTFs), and septage management facilities (SMFs) are regulated under Chapter 403, Florida Statutes, and may continue to accept, treat, and land apply biosolids and/or septage under Chapter 62-640, F.A.C.

• Under DEP rules, septage is regulated as “biosolids”

• Since 2016, DEP has issued 42 septage management facility permits
Florida biosolids-related bioenergy technologies and projects

- **Gasification**
  - Maxwest (City of Sanford) – no longer operating

- **Supercritical Water Oxidation**
  - Orlando pilot project

- **Anaerobic Digestion Produces energy (methane production)**
  - Significant volume of biosolids leftover
  - Harvest Energy Garden facility in Orlando; planned St. Pete facility (there are also some older facilities)

- **Waste-to-energy facilities**
  - A few facilities have option in permit to burn biosolids
  - Usually dried or pelletized biosolids
  - Air permit required/mercury concerns
Maurice Barker
Biosolids Coordinator
maurice.barker@dep.state.fl.us
850-245-8614

DEP’s Biosolids Webpage:
https://floridadep.gov/water/domestic-wastewater/content/domestic-wastewater-biosolids