



COMPRHENSIVE PLAN AMENDMENT STAFF REPORT AMENDMENT ROUND 17-A

PLANNING COMMISSION PUBLIC HEARING, OCT. 21, 2016

I. General Data

Project Name: Equestrian Waste
Element: Future Land Use and Introduction & Administration Elements
Project Manager: Lisa Amara, Senior Planner
Staff Recommendation: Staff recommends *approval* based on the findings and conclusions presented in this report.

II. Item Summary

Summary: This proposed amendment would revise the Future Land Use and Introduction and Administration Elements to establish language regarding equestrian waste in order to:

- Define Equestrian Waste and Recycling;
- Allow a Equestrian Waste Recycling Pilot Project on Special Agriculture (SA) future land use designation in the Glades Tier; and
- Clarify the types of agricultural related uses allowed within the SA designation.

Assessment: As the County's equestrian industry has continued to grow, so has the mounting issue of managing equestrian waste. Equestrian waste recycling presents a new management technique that is potentially better for the environment since it reduces nutrient run off (reducing water pollution) and creates recycled bedding and compost that reduces the need for raw material for shavings. Currently the County limits facilities that recycle equestrian waste to the Industrial future land use and zoning which are often located far from the equestrian areas of the County. This amendment proposes to allow a Pilot Project for an equestrian waste recycling facility limited to the Special Agriculture future land use in the Glades Tier in order to allow an additional opportunity for this use closer to the equestrian hub in the Wellington area.

III. Hearing History

Local Planning Agency:

Board of County Commissioners Transmittal Public Hearing:

Department of Community Affairs:

Board of County Commissioners Adoption Public Hearing:

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IV. Intent

The intent of this amendment is to establish a pilot project that would allow an equestrian recycling plant closer to the Wellington equestrian area. Facilities that recycle equestrian waste, including bedding and manure, are allowed by the Unified Land Development Code within the Industrial future land use designation as a “Recycling Plant”. However, the Industrial future land use designation is not allowed within the Rural, Exurban, and Glades Tiers, and therefore not allowed close to the core equestrian areas of the County (Wellington, Loxahatchee Groves, the Western Communities, and the Agricultural Reserve). The amendment proposes to revise the Future Land Use and Introduction and Administration Elements in order to:

- Define Equestrian Waste and Recycling;
- Allow a Equestrian Waste Recycling Pilot Project on Special Agriculture (SA) future land use designation in the Glades Tier; and
- Clarify the types of agricultural related uses allowed within the SA designation.

V. Background

The County and local communities have been faced with the challenges of addressing equestrian waste for many years. As the County’s equestrian industry has continued to grow, so has the mounting issue of managing equestrian waste. A study prepared by the Palm Beach County Sports Commission indicates that the County’s spring polo and equestrian industry is estimated at nearly \$200 million dollars annual based upon spectators, exhibitors and vendors expenditures. The ‘season’ attracts 12,000 to 15,000 people to the County, largely due to the Winter Equestrian Festival which runs from January through March in the Village of Wellington at the Palm Beach International Equestrian Center.

A. Equestrian Waste in Palm Beach County

The average horse produces approximately 50 pounds of manure daily, equating to 8.5 tons annually according to Extension.org. However, the care for stall kept horses generates more than manure waste. Wet and soiled bedding can account for twice the volume of the horse manure. Bedding material is typically comprised of wood shavings, sawdust, or straw. The total stall waste per horse per day is approximately 65 pounds per day. A September 2015 Palm Beach Post article estimated that the 12,000 horses in the Village of Wellington at peak season generate between 80,000 to 100,000 tons of waste annually.

Although there are no sites within the Village’s limits that accept equine waste, the Village requires Best Management Practices, requires livestock waste haulers to be permitted and registered, and requires that the waste is disposed at an approved disposal site registered under Florida Administrative Code Chapter 62-709.320. The Village’s website lists eleven waste haulers and five approved Florida Department of Environmental Protection disposal locations (see Exhibit 6). These disposal locations rely upon traditional methods of handling equestrian waste through composting or tilling into the soil as a fertilizer. The preferred disposal method at the County Solid Waste Authority is for waste to energy at Renewable Energy Facility #2. For additional information regarding equestrian waste characteristics and management, refer to the Horse Manure Management guide issued by Extension.org (Exhibit 5). This publication is intended for horse owners, but provides detailed information regarding effective management at the scale of an individual farm. These principles and practices are generally applicable to large scale commercial operations as well.

Despite these options for legal equestrian waste management, there have been reports of illegal dumping activity in the County. In August 2013, the County adopted revisions to the Unified Land Development Code establish Best Management Practices for Livestock Waste Received from Offsite Sources. The purpose and intent of these regulations is to mitigate potential adverse environmental impacts, pathogens and other nuisances associated with the inappropriate use or disposal of livestock waste received from off-site sources. Adverse impacts include but are not limited to: ground and surface water pollution due to excessive nutrient discharge, specifically nitrogen or phosphorus; odors or other nuisance from improperly stored, composted or spread livestock waste. Exhibit 5, page E-15, provides the following regarding the nutrients from equestrian manure:

“Manure is a source of nutrients for pasture production and can be utilized as part of a pasture management strategy to improve soil quality. The fertilizer value of the 8.5 tons of manure produced annually from a 1,000-pound horse can amount to 102 pounds of nitrogen (N), 43 pounds of phosphorous (P2O5) and 77 pounds of potash (K2O). Nutrient values for manure vary widely.”

Local nutrient contamination from water pollutions stemming from phosphorous pollution leaching from illegal equestrian waste disposal has been documented by Dr. Bill Louda, long time Loxahatchee Groves resident and Florida Atlantic University professor. A letter from Dr. Louda to the Village of Wellington stressing the importance of taking action on equestrian waste management in an environmentally friendly manner is attached in Exhibit 7. The graphic in that exhibit was prepared by Dr. Louda indicating that *“manure sampled from a roadside pickup in Wellington revealed that there is a potential for 73 pounds of phosphorus to leech into surface waters from the manure of just one horse in one year”*.

VI. Data and Analysis

This section provides background information and examines consistency with the Comprehensive Plan.

A. Equestrian Waste Recycling

Over the past several years, new technologies have been developed to address equestrian waste in a more sustainable manner through recycling. Companies have developed technologies that recycle equestrian waste into compost, fire logs, or bedding material. Excerpts from the websites of the two companies that have discussed locating in the County are provided below.

- **Equine Eco Green.** *“Our technology solves equine waste disposal problems. Equine Eco Green® is a green, closed loop, recycling company who's process produces no harmful emissions. Today horse waste is a serious contributor to environmental pollution, and the carbon footprint. Our solution is reclaiming the used animal bedding for reuse, and to repurpose the waste into compost and fire logs. EEG products are safer and healthier for equine respiratory and skin systems. The shavings have less dust and allergens, while retaining the absorption that sets wood bedding apart from straw. Removal and disposal of horse waste for equestrian sports communities has been an ongoing issue for years, and EEG offers the solution. Our patented process for recycling, repurposing and reclaiming horse waste is the best technology available today. Our*

products provide quality, safety, savings and aesthetics by combining commercially available equipment with proprietary techniques.”

- **GreenScene Agritek of South Florida.** *“GreenScene Agritek of South Florida provides a patented and proprietary green infrastructure to solve the Palm Beach County equine waste-bedding crisis while producing a premium recycled wood fiber bedding branded “Refined” Golden HABIT Bedding (High Absorbent Bedding Intentionally Treated) that is cleaner and safer than the original. GSA separates the used horse bedding, consisting of wood chips or shavings, waste hay and organics, through a process of refinement, pasteurization & separation into high quality, premium wood fiber horse bedding for distribution in the local area. The remaining organic fines bi-product will be used as the fuel source to run a carbon neutral facility. GSA has created an environmentally sustainable agricultural business model for the Florida horse Industry - the decreasing availability of good quality bedding material and the increasing cost of waste build up and disposal costs. GreenScene will allow the transfer of used bedding to the GSA facility for recycling, refining and reuse. This GSA process will manage tipping fees and produce competitively priced premium bedding that is locally sourced from Palm Beach County.”*

Under the current Unified Land Development Code (ULDC), an equestrian waste recycling facility as proposed by the above companies would be considered a “Recycling Plant”. Although ‘Composting’ is allowed in the Agricultural Production and Agricultural Reserve future land use designations, a Recycling Plant is only allowed in Industrial zoning districts within the Industrial future land use designation. A Recycling Plant is defined by the ULDC as “a permanent facility designed and used for receiving, separating, storing, converting, baling or processing of non-hazardous recyclable materials that are not intended for disposal. The use may include construction debris recycling or other intensive recycling processes such as chipping and mulching.” The Industrial future land use designation is not allowed in the Rural, Exurban, or Glades Tiers (excluding the Glades Area Protection Overlay), and therefore limited in the areas of the County near Wellington where the bulk of the County’s horse population resides.

D. Proposed Amendment

Ongoing discussions with municipal leaders, representatives from the equine industry, and waste haulers have indicated that there is a growing need for new ways to manage equine waste in the County in a sustainable manner. Although equestrian waste recycling is allowed as a “Recycling Plant” in unincorporated County, this use is limited to industrial areas that are often located far from the source of the equestrian waste. The specific changes are provided in Exhibit 1 and summarized by topic area below:

- A. Definitions.** This amendment proposes to add a definition for Equestrian Waste and Recycling based upon Rule 62-701.200, F.A.C. and Recycling based upon the Ch. 2001-331 Laws of Florida definition. Current definitions established by Florida Statute and Administrative Rules are provided in Exhibit 2, and ULDC related definitions are provided in Exhibit 4.
- B. Equestrian Waste Pilot Project.** This amendment proposes to define Equestrian Waste and Recycling in the Comprehensive Plan, and to allow as a pilot project in Special Agriculture Future Land Use within the Glades Tier. This amendment is proposed as a pilot project to limit the first application of the language before considering allowing the use through this future land use on a broader scale. Currently there are no

buildable sites with Special Agriculture future land use in the County, so the Pilot Project site would need to be approved through the Future Land Use Atlas Amendment process. The proposed amendment establishes location and approval criteria, and establishes that the proposed site must meet all regulatory aspects including the ULDC's Best Management Practices for Livestock Waste Received from Offsite Sources.

- C. Special Agriculture Future Land Use Designation.** The amendment proposes to clarify the types of agricultural uses allowed within the SA designation as either agricultural production related or agricultural industry related. The Introduction and Administration Element of the Comprehensive Plan defines "Agriculture" as follows:

"AGRICULTURAL USES - Activities within land areas which are predominately used for the cultivation of crops and livestock including: cropland; pasture lands; orchards; vineyards; nurseries; ornamental horticulture areas; groves; confined feeding operations; specialty farms; and silviculture areas."

Generally all of the definitions in Florida Statutes or Administrative Codes (Exhibit 2) define agriculture as the use of land to "grow" a commodity. However, as shown the ULDC Use Matrix excerpt (Exhibit 3) and ULDC Definitions (Exhibit 4), many of the uses classified as 'Agriculture' describe uses that define agricultural industries or support uses. This proposed amendment revises language in the Future Land Use Atlas Regulation Section of the Future Land Use Element to define that the SA future land use designation is allowed to be develop with both of these types of agriculture related uses. Existing language regarding the use of the SA future land use designation for commercial support for residents is proposed to be deleted as it is no longer applicable. Language regarding the sale of farm implements to support the farming community will remain.

E. Consistency with the Comprehensive Plan

This proposed amendment will further several provisions in the Future Land Use Element (FLUE) of the Comprehensive Plan, including the items listed below. Unrelated language is omitted for brevity.

1. **FLUE, C. County Directions.** *The Future Land Use Element was created and has been updated based on input from the public and other agencies through citizen advisory committees, public meetings, interdepartmental reviews, and the Board of County Commissioners. All contributed to the generation of the long-term planning directions, which provide the basis for the Goals, Objectives and Policies of the Future Land Use Element. These directions reflect the kind of community the residents of Palm Beach County desire.*
2. **Growth Management.** *Provide for sustainable communities and lifestyle choices by: (a) directing the location, type, intensity, timing and phasing, and form of development that respects the characteristics of a particular geographical area; (b) requiring the transfer of development rights as the method for most density increases; (c) ensuring smart growth, by protecting natural resources, preventing urban sprawl, providing for the efficient use of land, balancing land uses; and, (d) providing for facilities and services in a cost efficient timely manner.*
15. **Agricultural and Equestrian Industries.** *Support and enhance agriculture and equestrian-based industries.*

Staff Assessment: The Introduction and Administration Element defines sustainable community as follows:

“SUSTAINABLE COMMUNITY - A community which is able to adapt to changing conditions without permanently damaging or destroying its long term ability to conserve and use its natural and manmade resources. Limiting waste and pollution, maximizing conservation, promoting efficiency and recycling, and developing local resources without exhausting them are some examples of what can be done to create a sustainable community.”

This proposed amendment will promote sustainable options by establishing additional opportunities for the recycling of equestrian waste in an efficient, environmentally sustainable manner. The products (compost, bedding, etc.) can be re-used locally which will reduce transportation costs, and will reduce the need for trees to be cut down to be processed into fresh bedding.

This amendment will support the above referenced provisions in the Comprehensive Plan and there are no inconsistencies with the policies in the Comprehensive Plan.

E. Departmental & Agency Review

During the course of the preparation of this proposed amendment, the staff report was distributed to several County departments and other agencies for review. The report was distributed to the County Attorney’s Office, the Zoning Division, Solid Waste Authority, Environmental Resources Management, the Office of Economic Sustainability, the County Water Resources Manager, and the Ag Extension Office. As of the printing of this report, there were no negative comments received from any of the reviewing agencies.

F. ULDC Implications

The Planning and Zoning Divisions are working together to process a concurrent or near to concurrent ULDC change to implement the amendment, as well as making additional related changes regarding Equestrian Waste.

VII. Public and Municipal Review

Intergovernmental Plan Amendment Review Committee (IPARC): Notification was sent to the County’s Intergovernmental Plan Amendment Review Committee (IPARC), a clearing-house for plan amendments, on September 27, 2016. At the time of the printing of this report, no calls or written requests for information or objections to the amendment had been received.

Other Notice and Comments: Additional notification was provided to Dr. Bill Louda, FAU Professor and the author of the letter and graphic data provided in Exhibit 7 and summarized in the Background section of this report.

VIII. Assessment and Conclusions

As the County's equestrian industry has continued to grow, so has the mounting issue of managing equestrian waste. Equestrian waste recycling presents a new management technique that is potentially better for the environment since it reduces nutrient run off (reducing water pollution) and creates recycled bedding and compost that reduces the need for raw material for shavings. Currently the County limits facilities that recycle equestrian waste to the Industrial future land use and zoning which are often located far from the equestrian areas of the County. This amendment proposes to allow a Pilot Project for an equestrian waste recycling facility limited to the Special Agriculture future land use in the Glades Tier in order to allow an additional opportunity for this use closer to the equestrian hub of Wellington.

Attachments

| | |
|---|------|
| Exhibit 1 – Proposed revisions in strike-out and <u>underline</u> format | E-1 |
| Exhibit 2 – Florida Statute & Rule Definitions | E-3 |
| Exhibit 3 – ULDC Use Matrix Excerpts | E-7 |
| Exhibit 4 – ULDC Use Definitions & BMPs | E-9 |
| Exhibit 5 – Horse Manure Management – Extension.org | E-13 |
| Exhibit 6 – Village of Wellington Livestock Waste Haulers & Disposal | E-19 |
| Exhibit 7 – Dr. Bill Louda Letter to Village of Wellington, May 6, 2012 | E-20 |

Exhibit 1

A. Introduction & Administration Element, Equestrian Waste, Definitions

REVISIONS: To add definitions. The added text is underlined, and the deleted text ~~struck out~~.

A.1. **NEW EQUESTRIAN WASTE** – Equestrian Waste means manure produced by horses along with soiled bedding material. “Manure” means “Manure” means a solid waste composed of excreta of animals, and residual materials that have been used for bedding, sanitary or feeding purposes for such animals.

A.2. **NEW RECYCLING** - “Recycling” means any process by which solid waste materials are recovered and reused in manufacturing, agricultural, power production, and other processes.

B. Future Land Use Element, Equestrian Waste, Pilot Project

REVISIONS: To establish a pilot project for Equestrian Waste Recycling in the Special Agricultural future land use designation. The added text is underlined, and the deleted text ~~struck out~~.

OBJECTIVE 2.2 Future Land Use Provisions – General

2.2.5 Agricultural

B.1. **Policy 2.2.5-##: Equestrian Waste Recycling Pilot Project.** The County recognizes the importance of the equestrian industry and the need for facilities to manage the equestrian waste in a sustainable manner. Through the Equestrian Waste Recycling Pilot Project, the County may approve an equestrian waste recycling facility in the Glades Tier within the Special Agriculture future land use designation. By December 31, 2021, the County shall review the approved facility and consider whether to amend the Comprehensive Plan to allow additional sites. A proposed Pilot Project site must meet the following criteria in order to be approved:

1. The site must be located in proximity to Southern Boulevard/SR80, either by frontage with direct access or located within 300 feet; and
2. The site must hold a valid development order for composting approved prior to February 1, 2017; and
3. The site must be self contained, comply with all regulatory permits, and comply with the ULDC Article 5, Best Management Practices for Livestock Waste Received from Offsite Sources;

B.2. REVISE Table III.C

**TABLE III.C
FUTURE LAND USE DESIGNATION BY TIER**

| Future Land Use | FLU Category | Tier | | | | |
|-----------------|--------------|------------------------|---------|-------|------------|-------------------------|
| | | Urban/Sub & Glades USA | Exurban | Rural | Ag Reserve | Glades RSA ¹ |
| Agriculture | AP | --- | --- | --- | --- | X |
| | SA | X | X | X | X | --- ³ |
| | AgR | --- | --- | --- | X | --- |
| | Ag Enclave | --- | --- | X | --- | --- |

1. Within the rural towns of Lake Harbor and Canal Point, the following additional future land use designations shall be allowed: Residential from RR-2.5 through MR-5; CL; CL-O; IND; EDC; and INST.
2. Within the Glades Area Protection Overlay, 138.31 acres of EDC future land use designation is allowed.
3. Special Agriculture future land use is allowed in the Glades Tier only for the Equestrian Waste Recycling Pilot Project described in Policy 2.2.5-###.

C. Future Land Use Element, Equestrian Waste, Special Agriculture

REVISIONS: To revise the Special Agriculture future land use designation to clarify the types of agricultural uses allowed. The added text is underlined, and the deleted text ~~struck-out~~.

FLUA Regulation Section, 5. Agriculture, General

unaltered text omitted for brevity

C.1. The County agricultural Future Land Use Designations are depicted on the Future Land Use Atlas and include:

1. Special Agriculture (SA). The SA category shall primarily be used as a transitional agricultural classification and is utilized for more intense agricultural uses and related services. Limited commercial activities that provide a convenience to the rural or agricultural community may be permitted within this category;
2. Agricultural Production (AP). The AP category shall be applied to the Everglades Agricultural Area to protect areas for bona fide agriculture and related farming operations, particularly where conditions favor continued agricultural production. Agricultural Production uses shall be protected from encroachment of incompatible urban land uses;
3. Agricultural Reserve (AGR). The AGR category shall be applied within the Agricultural Reserve Tier, and shall limit uses to agriculture and conservation with residential development restricted to low densities.

unaltered text omitted for brevity

B.4. Special Agriculture Uses. The following land uses and intensities are allowed in areas designated Special Agriculture where permitted by the terms of the Unified Land Development Code:

1. ~~Fruit and vegetable markets and terminals for farm products;~~
2. ~~—Agricultural production uses including, but not limited to, *produce packing plants*, poultry and egg production, nurseries, growing, livestock, kennels, training centers and *potting soil manufacturing*;~~
2. Agricultural industry facilities related to the transportation, storage, recycling, or processing of agricultural products or by-products. Such uses may or may not be associated with a principal use on site. Example uses include, but are not limited to, *packing plants, potting soil manufacturing, chipping and mulching of vegetation (excluding construction debris), agricultural light manufacturing, equestrian waste recycling, and transshipment*;
3. Agriculturally related services such as feed and grain stores and farm implement sales and service and fueling areas restricted solely to agricultural activities;
4. Mining, subject to the limitations;
5. Uses and structures accessory to a permitted use; and
6. Limited residential uses as described below,
 - a) farm labor quarters and camps;
 - b) caretaker's quarters, such as for pump houses;
 - c) dwelling quarters and farm residences for bona fide farm operations; or
 - d) dwelling units allowed as alternative use within the Urban/Suburban, Exurban, and Rural Tiers.

In order to protect existing residential uses, within the Urban/Suburban, Exurban, Rural, and Agricultural Reserve Tiers, intense agricultural or other similar uses in the Special Agricultural (SA) future land use designation shall be limited or restricted. Some agricultural uses and intensities will not be permitted as a right within these Tiers residential areas. While many agricultural uses may be permitted within residential areas, special care shall be taken to protect the existing neighborhoods. Alternative residential designations are depicted on the Future Land Use Atlas for some sites to allow these areas to convert to other uses.

Exhibit 2

Florida Statute & Rule Definitions

570.02 Definitions.—The following words and phrases as used in this chapter and in the agricultural laws of this state, unless the context otherwise requires, shall have the meanings respectively ascribed to them in this section:

(1) “**Agriculture**” means the science and art of production of plants and animals useful to humans, including to a variable extent the preparation of these products for human use and their disposal by marketing or otherwise, and includes aquaculture, horticulture, floriculture, viticulture, forestry, dairy, livestock, poultry, bees, and any and all forms of farm products and farm production. For the purposes of marketing and promotional activities, seafood shall also be included in this definition.

(2) “**Agricultural business products**” means nonconsumable products used in the producing, processing, distribution, and marketing of consumable farm products, including, but not limited to, machinery, equipment, and supplies.

571.03 Definitions.—As used in this part:

(5) “**Agricultural product**” includes any fresh or processed horticultural, aquacultural, viticultural, dairy, poultry, apicultural, or other farm or garden product.

571.23 Definitions.—For purposes of this part, the following terms shall have the following meanings:

(4) “**Agricultural product**” means any fresh or processed horticultural, aquacultural, viticultural, fish or seafood, dairy, poultry, apicultural, or other farm or garden product.

573.103 Definitions.—As used in ss. [573.101-573.124](#):

(1) “**Agricultural commodities**” means any and all aquacultural, agricultural, apicultural, horticultural (including floricultural), viticultural, and vegetable products produced in this state or any class, variety, or utilization thereof, either in their natural state or as processed by a producer for the purpose of marketing such product, or by a processor as herein defined, and shall include, but not be limited to, any one, any combination thereof, or all of the agricultural products, livestock and livestock products, poultry and poultry products, timber and timber products, fish and seafood, and the products of the farms, waters, and forests of this state. “Agricultural commodities” includes citrus regulated pursuant to chapter 601 only for the purpose of funding production research and associated activities related to chemical residue; the term does not include citrus with respect to any other citrus-related activity, whether or not that activity is regulated by or described in chapter 601.

193.461 Agricultural lands; classification and assessment; mandated eradication or quarantine program.—

(1) The property appraiser shall, on an annual basis, classify for assessment purposes all lands within the county as either agricultural or nonagricultural.

(b) Subject to the restrictions specified in this section, only lands that are used primarily for bona fide agricultural purposes shall be classified agricultural. The term “bona fide agricultural purposes” means good faith commercial agricultural use of the land.

1. In determining whether the use of the land for agricultural purposes is bona fide, the following factors may be taken into consideration:
 - a. The length of time the land has been so used.
 - b. Whether the use has been continuous.
 - c. The purchase price paid.
 - d. Size, as it relates to specific agricultural use, but a minimum acreage may not be required for agricultural assessment.
 - e. Whether an indicated effort has been made to care sufficiently and adequately for the land in accordance with accepted commercial agricultural practices, including, without limitation, fertilizing, liming, tilling, mowing, reforestation, and other accepted agricultural practices.
 - f. Whether the land is under lease and, if so, the effective length, terms, and conditions of the lease.
 - g. Such other factors as may become applicable.

62.709.201 Definitions.

The definitions in Rule 62-701.200, F.A.C., apply to this chapter unless the context clearly indicates otherwise. For purposes of this chapter, the following words, phrases or terms shall have the following meaning:

(1) "Anaerobic digestion" means the process by which biological decomposition of organic products is carried out under controlled anaerobic conditions, and that stabilizes the organic fraction into a material which can easily and safely be stored, handled, and used in an environmentally acceptable manner.

(2) "Animal byproducts" means source-separated organic solid waste that is animal in origin, such as meat, fat, dairy, or eggs, and is generated by commercial, institutional, agricultural, or industrial operations. This term includes waste generated by prison facilities, grocery stores, manufacturing or packaging plants, butcher shops, restaurants and abattoirs. This term also includes packaging that has come into contact with animal byproducts. These wastes will be viewed as putrescible waste in this chapter.

(3) "Beneficial use" means, for the purposes of this Chapter, that readily-degradable organics are placed on or in the soils to provide a viable benefit, such as, reducing erosion and water loss, regulating soil temperature, preventing the growth of weeds, or serving as a soil amendment upon decomposition. Placement of materials for purposes of disposal is not considered to be a beneficial use.

(4) "Backyard composting" means the composting of organic solid waste, such as grass clippings, leaves or food waste, generated by a homeowner or tenant of a single or multi-family residential unit or an apartment complex unit, where composting occurs at that dwelling unit.

(5) "Clean wood" means wood, including lumber, tree and shrub trunks, branches, and limbs, that is free of paint, glue, filler, pentachlorophenol, creosote, tar, asphalt, chromated copper arsenate, other wood preservatives or treatments.

(6) "Compost" means solid waste which has undergone biological decomposition of organic matter, has been disinfected using composting or similar technologies, and has been stabilized to a degree that is potentially beneficial to plant growth and that is used or sold for use as a soil amendment, artificial top soil, growing medium amendment or other similar uses.

(7) "Composting" means the process by which biological decomposition of organic solid waste is carried out under controlled aerobic conditions, and that stabilizes the organic fraction into a material which can easily and safely be stored, handled and used in an environmentally acceptable manner. The presence of anaerobic zones within the composting material will not cause the process to be classified as other than composting.

(8) "Composting facility" means a solid waste management facility where solid waste is processed using composting technology. Processing may include physical turning, windrowing, aeration or other mechanical handling of organic matter.

(9) "Curing area" means an area where organic material that has undergone the rapid initial stage of composting is further stabilized into a humus-like material.

(10) "Disinfection" means the selective destruction of pathogens indicated by a reduction in indicator organism(s) as specified in paragraph 62-709.300(8)(a), F.A.C.

(11) "Foreign matter" means the inorganic and organic constituents in a solid waste stream that are not readily decomposed and that may be present in the compost. Foreign matter is metals, glass, plastics, rubber, bones, and leather, but does not include sand, grit, rocks or other similar materials.

(12) "Land reclamation" means the restoration of productivity to lands made barren through processes such as erosion, mining or land clearing.

(13) "**Manure**" means a solid waste composed of excreta of animals, and residual materials that have been used for bedding, sanitary or feeding purposes for such animals. For purposes of this chapter, manure does not include such material generated and managed by normal farming operations, but does include "paunch manure," which is the undigested stomach content of cattle.

(14) "Maturity" means the degree of stability that has been achieved.

(15) "Mesophilic stage" means a biological stage in the composting process characterized by active bacteria which favor a moderate temperature range of 20-45 degrees Celsius. It occurs later in a composting process after the thermophilic stage and is associated with a moderate rate of decomposition.

(16) "Motorized firefighting equipment" means equipment that can be used to control and extinguish fires such as fire trucks, front end loaders, and bull dozers.

(17) "Pre-consumer vegetative waste" means source-separated vegetative solid waste from commercial, institutional, industrial or agricultural operations that is not considered yard trash, and has not come in contact with animal products or byproducts or with the end user. This term includes material generated by grocery stores, packing houses, and canning operations, as well as products that have been removed from their packaging, such as out-of-date juice, vegetables, condiments, and bread. This term also includes associated packaging that is vegetative in origin such as paper or corn-starch based products, but does not include packaging that has come in contact with other materials such as meat. Plate scrapings are specifically excluded from this definition. These wastes are putrescible waste as defined in this chapter.

(18) "Putrescible waste" means solid waste that contains organic matter capable of being decomposed by microorganisms and of such a character and proportion as to be capable of attracting or providing food for birds. The term does not include uncontaminated yard trash or clean wood.

(19) "**Recycling**" means any process by which solid waste, or materials which would otherwise become solid waste, are collected, separated, or processed and reused or returned to use in the form of raw materials or products.

(20) "Size-reduced" means the material has been processed so that it will pass through a 6-inch sieve or has been cut for firewood in no greater than 24 inch lengths.

(21) "Stabilized" means that biological and chemical decomposition of the wastes has ceased or diminished to a level so that such decomposition no longer poses a pollution, health, or safety hazard. The term means that biological decomposition of the waste that was composted or anaerobically digested has occurred to a sufficient degree that will allow beneficial use. As regards composting, it also means that the compost has at least passed through the thermophilic stage.

(22) "Thermophilic stage" means a biological stage in the composting process characterized by active bacteria which favor a high temperature range of 45-75 degrees Celsius. It occurs early in a composting process before the mesophilic stage and is associated with a high rate of decomposition.

(23) “Vector” means a carrier organism that is capable of transmitting a pathogen from one organism to another.

(24) “Vegetative waste” means source-separated organic solid waste that is vegetative in origin, and is generated by commercial, institutional, agricultural or industrial operations that is not considered yard trash. This term includes waste generated by grocery stores, prisons, restaurants, packing houses, and canning operations, as well as products that have been removed from their packaging, such as out-of-date juice, vegetables, condiments, and bread. This term also includes packaging that is vegetative in origin such as paper or corn-starch based products. These wastes are putrescible waste as defined in this chapter. Where the term is not used in conjunction with the term pre-consumer, it included vegetative waste that may have come in contact with the end user.

(25) “Yard trash” means vegetative matter resulting from landscaping maintenance or land clearing operations and includes materials such as tree and shrub trimmings, grass clippings, palm fronds, trees and tree stumps, and associated rocks and soils. For purposes of this chapter, it also includes clean wood.

(26) “Yard trash processing facility” means a yard trash transfer station or a facility at which yard trash is processed into a size-reduced, usable material or is composted, but does not include a facility used for the disposal of yard trash.

Rulemaking Authority 403.704, 403.7043 FS. Law Implemented 403.7043 FS. History—New 2-15-10.

Exhibit 3 Use Matrix Excerpts

Table 4.A.3.A - Use Matrix Excerpts

| Use Type | Zoning District/Overlay | | | | | | | | | | | | | | | | | | NOTE | | |
|---|--------------------------|-------------|--------|-------------|-------------|--------|--------|--------|------------|--------|-------------|--------|-------------|------------------|--------|--------|--------|-------------|------|-----|-----|
| | Agriculture/Conservation | | | Residential | | | | | Commercial | | | | | Industry/Public | | | | | | | |
| | P C | A G R | A P | AR | | R E | R T | R S | R M | C N | C L O | C C | C H O | C G R E | I L | I G | P O | I P F | | | |
| | | | | R S A | U S A | | | | | | | | | | | | | | | | |
| Agricultural Uses | | | | | | | | | | | | | | | | | | | | | |
| Agriculture, Bona Fide | | P | P | P | A | A | A | A | A | A | A | A | A | A | A | A | A | A | 3 | | |
| Agriculture, Light Manufacturing | | D | D | A | | | | | | | | | | | | | P | P | 4 | | |
| Agriculture, Packing Plant | | D | D | A | | | | | | | | | A | | | | D | D | 5 | | |
| Agriculture, Research/ Development | | D | D | | | | | | | | | | | | | | P | P | P | B | 3.1 |
| Agriculture, Renewable Fuels Production | | | P | | | | | | | | | | | | | | | | | 3.2 | |
| Agriculture, Sales and Service | | B | | | | | | | | | A | | P | | | | | | | 6 | |
| Agriculture, Storage | | P | P | P | P | D | D | D | D | P | | P | P | | | | P | P | P | P | 7 |
| Agriculture, Transshipment | | D | D | | | | | | | | | | | | | | D | P | | | 8 |
| Aviculture, Hobby Breeder | | P | P | P | P | | | | | | | | | | | | | | | | 19 |
| Community Vegetable Garden | | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | 32 |
| Equestrian Arena, Commercial | | D | | B | B | B | | | | A | A | B | B | B | P | | B | B | D | D | 47 |
| Farmers Market | | D | | D | | | | | | P | | P | | P | | | P | P | P | D | 52 |
| Farrier | | P | P | P | P | | | | | P | | P | | P | | | | | | | 53 |
| Groom's Quarters | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | 65 |
| Nursery, Retail | | P | | B | A | A | A | A | A | P | | P | | P | | | B | B | | | 88 |
| Nursery, Wholesale | | P | P | D | B | B | B | B | B | B | | P | | P | P | | P | P | P | | 89 |
| Potting Soil Manufacturing | | D | D | | | | | | | | | | | | | | B | D | P | | 99 |
| Produce Stand | | S | S | S | S | A | A | A | A | S | S | S | S | S | S | S | S | S | S | S | 101 |
| Shadehouse | | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | 121 |
| Stable, Commercial | | D | D | D | D | A | A | A | A | B | B | D | D | D | P | | D | D | D | D | 125 |
| Stable, Private | | P | P | P | P | P | B | B | B | | | | | | | | | | | | 126 |
| Sugar Mill Or Refinery | | | P | | | | | | | | | | | | | | | A | | | 127 |
| Utilities & Excavation | | | | | | | | | | | | | | | | | | | | | |
| Air Curtain Incinerator | | | A | | | | | | | | | | | | | | A | A | A | | 9 |
| Chipping and Mulching | | D | B | | | | | | | | | | | | | | B | D | D | | 28 |
| Composting Facility | | D | D | | | | | | | | | | | | | | D | D | D | | 33 |
| Recycling Center | | | | | | | | | | A | | A | | A | | | P | P | P | | 103 |
| Recycling Plant | | | | | | | | | | | | | | | | | B | D | P | | 105 |
| Sanitary Landfill or Incinerator | | | | | | | | | | | | | | | | | | | P | | 117 |
| Solid Waste Transfer Station | | | A | A | A | | | | | | | | A | | | | A | B | P | A | 123 |
| Key: | | | | | | | | | | | | | | | | | | | | | |
| P Permitted by right | | | | | | | | | | | | | | | | | | | | | |
| D Permitted subject to approval by the DRO | | | | | | | | | | | | | | | | | | | | | |
| S Permitted in the district only if approved by Special Permit | | | | | | | | | | | | | | | | | | | | | |
| B Permitted in the district only if approved by the Zoning Commission (ZC) | | | | | | | | | | | | | | | | | | | | | |
| A Permitted in the district only if approved by the Board of County Commissioners (BCC) | | | | | | | | | | | | | | | | | | | | | |

Table 3.E.1.B - PDD Use Matrix Excerpts

| Use Type | PUD | | | | MUPD | | | | | | | | MXPD | | PIPD | | | LCC | | NOTE | | | | | | | |
|---|-------------|-------------|-------------|-----------------------|-------------|--------|--------|--------|--------|--------|--------|-------------|-------------|------------------|----------|--------|--------|--------|------------------|------------------|------------------|------------------|------------------|--------|--------|------|-----|
| | Pods | | | | FLU | | | | | | | | FLU | | Use Zone | | | FLU | | | | | | | | | |
| Use Type | R E S | C O M | R E C | C I V / P | A G L | C H | C L | C H | C L | C H | C R | I N D | E D C | I N S T | C H | C H | C H | C H | I N D / | C O M / | I N D / | M H P D | R V P D | C L | C H | NOTE | |
| Agricultural Uses | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agriculture, Bona Fide | | | | | P | | | | | | | | | | | | | | | | | | | | | | 3 |
| Agriculture, Light Manufacturing | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| Agriculture, Packing Plant | | | | | R | | | | | | | | | | | | | | | | | | | | | | 5 |
| Agriculture, Research/Development | | | | | | P | P | P | P | P | P | P | P | | | | | | P | | P | | | | | | 3.1 |
| Agriculture, Sales And Service | | | | | | | P | | | | | | | | | | | | | P | | | | | | | 6 |
| Agriculture, Storage | | | | | | | | | | | | | | | | | | | | | | | | | | | 7 |
| Agriculture, Transshipment | | | | | | | | | | | | P | P | | | | | | P | | P | | | | | | 8 |
| Aviculture, Hobby Breeder | | | | | P | | | | | | | | | | | | | | | | | | | | | | 19 |
| Community Vegetable Garden | | D | | | | | | | | | | | | | | | | | | | | | | | | | 32 |
| Equestrian Arena, Commercial | | | | R | | | | | | P | | | | | | | | | | | | | | | | | 47 |
| Farmers Market | | | | | | P | | | | P | | | | | P | | | | P | P | P | | | | | | 52 |
| Farrier | | | | | | | | | | | | | | | | | | | | | | | | | | | 53 |
| Groom's Quarters | P | | | | P | | | | | | | | | | | | | | | | | | | | | | 65 |
| Nursery, Retail | | P | | | P | P | | | | | | | | | P | | | | | P | | | | | | | 88 |
| Nursery, Wholesale | | | | | P | | | | | | | | | | | | | | P | | P | | | | | | 89 |
| Potting Soil Manufacturing | | | | | | | | | | | | | | | | | | | | | | | | | | | 99 |
| Produce Stand | | | | | | | | | | | | | | | | | | | | | | | | | | | 101 |
| Shadehouse | | | | | P | | | | | | | | | | | | | | | | | | | | | | 121 |
| Stable, Commercial | | | | | P | | | | | P | | | | | | | | | | | | | | | | | 125 |
| Stable, Private | P | | | | P | | | | | | | | | | | | | | | | | | | | | | 126 |
| Sugar Mill Or Refinery | | | | | | | | | | | | | | | | | | | | | | P | | | | | 127 |
| Utilities and Excavation Uses | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Air Curtain Incinerator | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 |
| Chipping and Mulching | | | | | | | | | | | | P | | | | | | | P | | P | | | | | | 28 |
| Composting Facility | | | | | | | | | | | | P | | | | | | | P | | P | | | | | | 33 |
| Recycling Center | | | | | | | | | | | | P | D | | | | | | P | A | P | | | | | | 103 |
| Recycling Plant | | | | | | | | | | | | P | | | | | | | P | | P | | | | | | 105 |
| Sanitary Landfill Or Incinerator | | | | | | | | | | | | | | | | | | | | | | | | | | | 117 |
| Solid Waste Transfer Station | | | | | | R | | R | R | R | | | | | R | | | | P | R | P | | | | | | 123 |
| Notes: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P Permitted by right | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D Permitted subject to approval by the DRO | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S Permitted in the district only if approved by Special Permit | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R Permitted in the district only if approved by the Board of County Commissioners (BCC) as a requested use. | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Exhibit 4

ULDC Excerpts & BMPs

Matrix Use Definitions Categorized as Agriculture

3. Agriculture, Bona Fide

Any plot of land where the principal use consists of the growing, cultivating and harvesting of crops; the raising of animals, inclusive of aviculture, aquaculture, horses and livestock; the production of animal products such as eggs, honey or dairy products; or the raising of plant material. The following standards shall apply to a Bona-fide Agriculture use, except where pre-empted by State law.

3-1 Agriculture, Research and Development

The use of land or buildings for agriculture research and the cultivation of new agricultural products.

3-2 Agriculture, Renewable Fuels Production

Any facility using biomass as its principal source of feed stock for the production of renewable fuel or fuels and other related renewable products including but not limited to ethanol or fuel ethanol.

4. Agriculture, Light Manufacturing

An accessory agricultural use for the manufacturing of products related to agricultural operations, such as fencing, pallets, crates, or containers. Product components are predominantly assembled from previously prepared materials or finished parts. Manufacturing includes processing, fabrication, assembly, treatment, and packaging of such products, and accessory storage and distribution, but excludes heavy industrial processing or manufacturing.

5. Agriculture, Packing Plant

A facility used for the packing of produce not necessarily grown on site. Activities may also include canning, dehydration, washing, cutting, or basic preparation of raw produce prior to shipment.

6. Agriculture, Sales and Service

An establishment primarily engaged in the sale or rental of farm tools, small implements and farming equipment such as pickers and mowers; sale of livestock, feed, grain, tack, riding attire, animal care products, farm supplies, and the like.

7. Agriculture, Storage

The storage of equipment or products accessory or incidental to a principal agricultural use.

8. Agriculture, Transshipment

A facility engaged in the transferring of agricultural products between two modes of transport, such as from a truck to a railroad car or from local vehicles to long-haul trucks.

99. Potting Soil Manufacturing

An establishment engaged in producing potting soil, including the use of incineration.

Equestrian Matrix Use Definitions Categorized as Agriculture

47. Equestrian Arena, Commercial

An establishment engaged in commercial spectator activities involving equestrian events, but excluding any establishment engaged in gaming, pari-mutual wagering, off-track betting, events or activities held or broadcast for similar purposes.

125. Stable, Commercial

An establishment for boarding, breeding, training or raising of horses not necessarily owned by the owners or operators of the establishment; rental of horses for riding or other equestrian activities, excluding uses classified as an equestrian arena. A commercial stable may be operated in conjunction with a residence and shall comply with the PBACD.

126. Stable, Private

The breeding, boarding, training, or raising care of horses owned by the occupants or owners of the premises. A private stable shall comply with the PBACD.

127. Sugar Mill or Refinery

An establishment for the extraction and refining of sugar from agricultural products.

Matrix Use Definitions Categorized as Utilities

9. Air Curtain Incinerator

A combustion device used to burn trees and brush.

28. Chipping and Mulching

An establishment using equipment designed to cut tree limbs, brush or wood construction debris into small pieces for use as mulch.

33. Composting Facility

A facility designed and used for transforming food, yard waste and other organic material into soil or fertilizer through biological decomposition. This use does not include backyard-composting bins serving individual families.

123. Solid Waste Transfer Station

A facility where solid waste from smaller vehicles is transferred into larger vehicles before being shipped or transported to a solid waste processing or disposal facility. Solid waste may be sorted but not processed at a transfer station.

Matrix Use Definitions Categorized as Industrial

103. Recycling Center

A permanent facility designed and used for collecting, purchasing, storing, dropping-off and redistributing of pre-sorted, recyclable materials that are not intended for disposal. A recycling center shall be used for limited processing of recyclable materials, such as can and glass crushing and sorting.

105. Recycling Plant

A permanent facility designed and used for receiving, separating, storing, converting, baling or processing of non-hazardous recyclable materials that are not intended for disposal. The use may include construction debris recycling or other intensive recycling processes such as chipping and mulching.

ULDC Article 5, Chapter J, Best Management Practices for Livestock Waste Received from Offsite Sources

Section 1 Purpose and Intent

The purpose and intent of these regulations is to mitigate potential adverse environmental impacts, pathogens and other nuisances associated with the inappropriate use or disposal of livestock waste received from off-site sources. Adverse impacts include but are not limited to: ground and surface water pollution due to excessive nutrient discharge, specifically nitrogen or phosphorus; odors or other nuisance from improperly stored, composted or spread livestock waste. [Ord. 2013-021]

Section 2 Applicability

The standards shall apply to the storage or receiving of livestock waste that is received from offsite sources. [Ord. 2013-021]

A. Exemptions

1. Where pre-empted by State law, including but not limited to, the Right to Farm Act. Where applicable, documentation of implemented Best Management Practices or other method of pre-emption shall be required; [Ord. 2013-021]
2. A SWA Designated Disposal Facility; [Ord. 2013-021]
3. The commercial application of fertilizer on non-agricultural property when in compliance with the Palm Beach County Fertilizer Ordinance (Ord. 2012-039); [Ord. 2013-021]
4. Composted manure applied by a homeowner or tenant to residential lawns or gardens; and, [Ord. 2013-021]
5. Ten cubic yards per acre up to a maximum of 20 cubic yards in any 12 month period, with all requirements being met, as listed under Section 3 below. [Ord. 2013-021]

Section 3 Storage or Spreading of Livestock Waste

The storage or spreading of livestock waste that is received from off-site sources is prohibited, unless in compliance with the following: [Ord. 2013-021]

A. Storage

Storage areas shall be covered or contained to prevent run-off or seepage of liquids or materials from the storage area. Storage of livestock waste shall comply with the following: [Ord. 2013-021]

1. Shall not be located within five feet of any structure, unless placed within a structure intended for the storage or composting of such waste; [Ord. 2013-021]
2. Shall not be located within 25 feet of any property line, with exception to internal lot lines of parcels owned by the same entity; and, [Ord. 2013-021]
3. Shall not be within 100 feet of a potable water supply well, a storm drainage system, wetland, pond, canal or other water body. [Ord. 2013-021]

B. Spreading

Livestock waste received from off-site sources shall be spread within 72 hours of delivery, except for less than 10 cubic yards that is actively being composted, or as otherwise approved in a Nutrient Management Plan. Storage shall comply with any applicable livestock waste Storage and Separation requirements. Spreading of livestock waste shall comply with the following: [Ord. 2013-021]

1. Nutrient Management Plan

Prior to receiving livestock waste, an application shall be submitted to the Cooperative Extension Service (CES) for review. Upon completion of the review, the CES shall develop a Nutrient Management Plan which indicates whether

application of any livestock waste is appropriate for the soil condition, and if so, in what amount. [Ord. 2013-021]

a. Application Form and Requirements

The application form and requirements shall be in a manner established by the CES. [Ord. 2013-021]

b. Validity of Nutrient Management Plan

The Nutrient Management Plan shall remain current for three years after its issuance by the CES. A current Nutrient Management Plan must be in place prior to receiving of livestock waste at any time. It shall be a violation of the ULDC, if livestock waste is stored or spread in a manner inconsistent with the current Nutrient Management Plan. [Ord. 2013-021]

2. Separation

The spreading of livestock waste shall not occur: [Ord. 2013-021]

- a. Within 25 feet of any property line, with exception to internal lot lines of parcels owned by the same entity; and, [Ord. 2013-021]
- b. Within 100 feet of a potable water supply well, a storm drainage system, wetland, pond, canal or other water body. [Ord. 2013-021]

Exhibit 5

Horse Manure Management– Extension.org

Horse Manure Management

<http://articles.extension.org/pages/25674/horse-manure-management>

[Horses, Animal Manure Management](#) November 06, 2014 

With proper planning, manure management can be beneficial to both the farm and the environment. This article provides information on environmental and health impacts of manure as well as proper manure storage and management.

J.G. Davis, A. M. Swinker, and Crystal Smith

Introduction

Manure management is a vital part of modern day horse ownership. Many horses spend a significant portion of their day in stalls, accumulating large amounts of manure and stall waste. Horse owners generally have a limited amount of time to spend caring for their equine charges; thus, efficient manure removal and disposal is crucial. Additionally, horse facilities are often managed on relatively small acreage, limiting manure storage and application options.

The intent of this publication is to educate horse owners on the effective management of horse manure. Horse owners will first gain a thorough understanding of the quantity and characteristics of manure produced by horses. Finally, on-site options for handling, storing and treating manure will be discussed, keeping in mind sound facility management and environmental stewardship.

Managing horse manure can be a complex topic, and the principles presented here should be tailored to your specific situation. Please contact your local extension agent or natural resources conservation service field office for technical support.

Horse Manure Production and Characteristics

Horses produce large amounts of manure. In fact, if the manure produced from one horse were allowed to pile up in a 12-foot-by-12-foot box stall for one year, it would accumulate to a height of 6 feet. On any given day, the average 1,000-pound horse will produce approximately 50 pounds of manure. This amounts to about 8.5 tons per year.

Manure is not the only material being removed when stalls are cleaned. Wet and soiled bedding material must also be removed and can equal almost twice the volume of the manure itself. The amount of bedding material removed will vary by type -- shavings, sawdust, straw -- but on average, totals between 8 and 15 pounds. Total stall waste produced averages



between 60 and 70 pounds per day, which amounts to approximately 12 tons of stall waste per year.

When managed properly, horse manure can be a valuable resource. Manure is a source of nutrients for pasture production and can be utilized as part of a pasture management strategy to improve soil quality. The fertilizer value of the 8.5 tons of manure produced annually from a 1,000-pound horse can amount to 102 pounds of nitrogen (N), 43 pounds of phosphorous (P₂O₅) and 77 pounds of potash (K₂O). Nutrient values for manure vary widely. The type and quantity of bedding material included also affects the overall fertilizer value. If a more accurate measure of nutrient content is needed, contact your local cooperative extension office for a list of laboratories that perform manure analysis.

Environmental and Health Impacts

Many horse owners do not have enough land or vegetative cover to properly apply large amounts of manure and nutrients. If not managed properly, manure can deposit excess nutrients into the environment via surface runoff or as a leachate, or water-contaminated with manure, from improper manure storage and land application. This can negatively impact water quality and subject landowners to investigation, and in some cases, legal action under an Agricultural Stewardship Act. For these reasons, horse operations are encouraged to use best management practices and develop a nutrient management plan. Nutrient management plans describe the farm's manure production, soil fertility and recommended manure application and removal rates. For more information on designing a plan specific to your farm's needs or identifying other conservation resources, contact your local cooperative extension office.

Internal parasites, insects, rodents and odors can be manure-related health concerns on horse farms. These issues can be minimized through carefully planned manure storage and handling. Internal parasites may be found in horse manure and can compromise the health and welfare of the horses stabled or grazing the land. Composting manure and properly timed land application can limit the risk of parasite exposure. Insects, especially flies, become a nuisance on farms where stockpiled manure serves as fly larvae habitat. Flies breed when spring temperatures rise above 65-degrees F. Flies deposit their eggs in the top few inches of moist manure, and these eggs can hatch in as little as seven days under optimal temperature and moisture conditions. Therefore, fewer flies will develop if you remove manure from the site or make it undesirable for fly breeding through processes such as composting within a maximum seven-day cycle. Naturally occurring fly predators can also be used to limit the fly population at the manure pile but are no replacement for sound management practices. Rodents can be a problem when manure is stockpiled for extended periods of time, providing them with a warm, safe environment. Additionally, nuisance odor from manure piles can result in strained relationships with neighbors. Composting or timely removal of manure piles will help keep odors to a minimum. Finally, keep in mind that large piles of manure are not aesthetically pleasing to your neighbors or those visiting your farm. Keeping the manure storage site screened with vegetation or fencing or by location will help to enhance the beauty of your farm.

Horse Manure Storage and Utilization

The average horse produces between 60 and 70 pounds of stall waste per day. Multiply this by several horses, and it is easy to see the importance of having methods in place to manage the manure produced on a daily basis. Letting manure pile up in stalls and paddock areas leads to a host of problems. It is not only unhealthy for your horse -- inviting for pests and odors -- and aesthetically unpleasing, but the sheer amount of manure produced will overwhelm you. Many

handling and storage options exist, but it's up to you to choose the method that best suits your horse operation.

Horse operations with available land may choose to apply stall waste to pastures as fertilizer. This should be done based on soil-test results and nutrient needs. A soil analysis is needed to determine the fertility needs of a pasture. Soil analysis is provided through your land-grant university's soil testing laboratory for agricultural operations, which include horse farms, free of charge. Contact your local cooperative extension office for instructions on how to take a soil sample. There are also private laboratories that offer soil-testing services.

In many situations, manure can be picked directly from the stall, deposited into a manure spreader, applied to the pasture and harrowed into the soil. Barns not constructed with a management scheme allowing for stall access by a manure spreader require manure to be carted from the stall to the manure spreader some distance away. In this case, ramps or dropped spreader parking can be helpful to avoid lifting the heavy, cumbersome stall waste. Keep in mind that when spreading manure from stalls bedded with sawdust or shavings, the applied stall waste can stunt plant growth. Wood products contain carbon that soil microbes use for energy but not enough nitrogen to build proteins. The microbes draw nitrogen from the soil to make up for this deficit to such a degree that they can actually limit plant growth. To manage this nitrogen deficiency, nitrogen fertilizer can be applied. Or, to avoid the problem completely, manure can be composted before it is applied to the land.

When direct pasture application is not an option, manure storage facilities become a necessity. The storage facility should be convenient to the barn. A general rule of thumb is to plan for 180 days of long-term manure storage. This allows operations the flexibility to store manure when conditions are not ideal for manure application, as when fields are frozen or wet. This storage area should be accessible to the equipment that will ultimately remove the accumulated stall waste. Manure storage facilities should also be downwind and screened from nearby homes to avoid potential complaints about odors and aesthetics. The size, type and location of manure storage facilities will vary by horse operation based on the amount of manure produced, length of time the manure will be stored and available land area. Always be sure to contact your local authorities regarding zoning regulations and additional restrictions.

Minimum separation distances commonly recommended for composting and manure-handling activities. Source: On-Farm Composting Handbook, NRAES-54

| Sensitive Area | Minimum Separation Distance (feet) |
|--|---|
| Property Line | 50-100 |
| Residence or place of business | 200-500 |
| Private well or other potable water source | 100-200 |
| Wetlands or surface water (streams, ponds, lakes) | 100-200 |
| Subsurface drainage pipe or drainage ditch discharging to a natural water source | 25 |
| Water Table (seasonal high) | 2-5 |
| Bedrock | 2-5 |

Manure Storage Construction

Manure storage should be designed to limit the chance of leachate entering surface and groundwater resources. Ideally, storage piles should be placed on gravel, hardened clay or concrete pads that slope inward. The construction of manure storage sites will vary, based on individual situations and soil types. For instance, concrete pads may be necessary in areas with sandy soils where contaminants are more likely to reach groundwater. Storage piles should not be placed in low-lying or flood-prone areas, and care should be taken to direct water from higher elevations away from the site. The natural resources conservation service or local soil and water conservation district offices can provide individualized manure storage design specifications.

Composting

Composting horse manure is relatively simple but does involve more than simply piling the water. While many farms stockpile their manure, few truly compost. Composting is essentially managed decomposition. Managing the process can virtually eliminate odor, flies, weed seeds and internal parasites found in horse manure and create a valuable soil amendment for resale or for pasture application. To manage a compost pile, the following factors must be taken into consideration: carbon to nitrogen ratio, oxygen, moisture and temperature.



Compost Pile

The microorganisms found in compost are most active when their diet contains about 30 times more carbon than nitrogen, or a C:N ratio of 30:10. Horse manure's C:N ratio is typically 40:1 due to the large amounts of bedding mixed with it but generally doesn't require additional nitrogen provided it has enough moisture and oxygen.

Composting is an aerobic process, that is, it requires oxygen. If a compost pile doesn't get enough oxygen, these anaerobic conditions can result in unpleasant odors, such as those normally associated with stockpiling manure, and slowed decomposition. There are several ways to provide oxygen to a compost pile. The most common way is to turn the pile. For large piles or windrows, turning is generally done using the bucket of a tractor or front-end loader. For smaller piles, a pitchfork will certainly get the job done; but for these operations, you may want to consider using an aerated, static-pile design, which doesn't require turning.

Typical horse-stall waste tends to be dry and will need added moisture to create the ideal conditions for compost microbes. The moisture content should be about 50 percent, or roughly the consistency of a wrung-out sponge. If rainfall does not provide enough additional moisture, the pile may need to be watered periodically. On the other hand, too much water can also be detrimental, displacing oxygen inside the pile and causing anaerobic conditions. If environmental conditions such as rain or snow are providing too much water, the pile may need to be covered. Some compost-storage designs call for permanent roofs, but properly anchored plastic tarps can be just as effective.

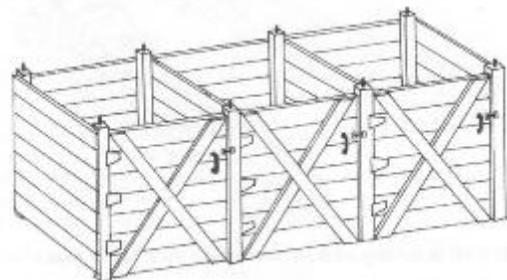
Compost Trouble Shooting

| Problem | Possible Cause | Remedy |
|--|--|--|
| Fresh manure, but pile won't heat up. | The pile is: 1) too dry, 2) too wet; and/or 3) Outside temp is too cold. | 1) Add water evenly to pile. 2) Aerate and cover. 3) Wait for warmer temps and turn as needed. |
| Pile was hot, but now temps are falling. | 1) Pile is settling. 2) Moisture is less than 50 percent. | 1) Turn pile; and/or 2) Add water evenly to pile. |
| Pile is more than 160-degrees F and has gray ash-like mold. | Pile is too dry. | Add water evenly to pile. |
| Pile has gone through two or more heat cycles but still has some material that has not decomposed. | Wood shavings decompose slowly. | Ensure pile has proper moisture content, add water if needed. |
| Pile emits bad odor. | Pile is too wet and has become anaerobic inside. | Turn to aerate and increase water evaporation, apply cover to limit additional rainwater. |

** Table does not include all scenarios, see resources/references for more in-depth publications on the subject.*

One of the best ways to monitor your compost pile is by using a thermometer. Compost thermometers should have a probe at least 36 inches long and are available through many garden supply stores. The goal is to have sustained temperatures of 130- to 150-degrees F in the pile interior. This will optimize decomposition and also kill pathogens and weeds.

Compost-pile design and storage facilities will depend on the size of the operation and the equipment available. For a farm with two to six horses, small static piles, which use perforated PVC pipes to draw in air and don't require turning, may be ideal. While not necessary, the use of multiple bins can allow separation of distinct batches. In this situation, horse manure should be piled approximately 5 to 8 feet high with a base that is two times the width and length of the height. For example, a 10-foot by 10-foot bin could accommodate a pile that is 5 feet high. PVC pipes should be placed after the pile is about 1 foot high so that the ends remain visible as more manure is added.



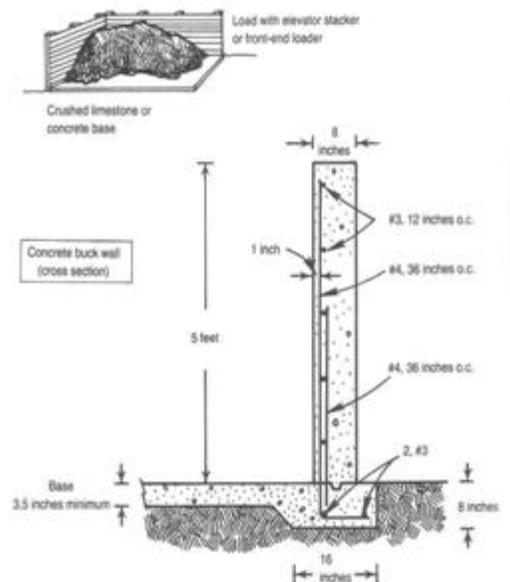
For larger farms with access to bucket loaders, manure spreaders and/or specialized composting equipment, larger piles or windrows may be the most efficient design options. These piles may be slightly larger in height and width and considerably longer but will require periodic turning.

Example of mixing / storage area with buckwall

Compost will decompose more efficiently if the mix is uniform. Starting with a uniform mix is even more important in the case of static piles, since they will not be turned during the decomposition process. Some farms utilize a temporary storage and mixing area to aid in this process.

Benefits of Composting

- Creates valuable soil amendment
- Stabilizes nitrogen into a slow release form
- Avoids the problem of nitrogen immobilization
- Reduces manure volume by 50 percent
- Destroys weed seeds, fly larvae and internal parasites
- Eliminates or reduces the cost of off-site disposal



Conclusion

With careful planning, proper manure management not only protects the environment and increases the efficiency and aesthetics of your farm, but might also save you money while enhancing your pastures. The following resources provide more information on composting and additional facility design specifications.

Field Guide to On-Farm Composting and the On-Farm Composting Handbook, available from the Natural Resource, Agriculture, and Engineering Service(NRAES) at www.NRAES.org.

Horse Facilities Handbook, available from the MidWest Plan Service at www.mwpsHQ.org.

Check out your local university's agronomy handbook containing information on soil production, soil sampling, nutrient management, utilization of organic waste and more.

Exhibit 6

Village of Wellington Livestock Waste Haulers and Disposal

The Village of Wellington has worked to address the equestrian waste generated within the Village by requiring Best Management Practices. The Village's Ordinance 2012-12 amended Chapter 30, Article V of Wellington's Code of Ordinances requires the following:

- "All commercial livestock waste haulers and/or livestock waste self- haulers shall be permitted and registered, as required, annually by Wellington,
- All livestock facilities within Wellington boundaries shall remove livestock waste by either a commercial livestock waste hauler or a livestock waste self-hauler that is registered by Wellington or via composting and the implementation of a nutrient management program,
- Disposal of livestock waste must be within an approved disposal site which is registered to operate under Florida Administrative Code Chapter 62-709.320, and
- Commercial livestock waste haulers and livestock waste self-haulers permits and registrations shall be subject to revocation for failure to abide by the terms of this article."

Approved FY 2015/2016 Livestock Waste Haulers in Wellington:

GIT Waste Management

1150 East Hallandale Beach Boulevard, Suite B
Hallandale Beach, Florida 33009
(561) 600-3407

Gracia Brothers, Inc.

1218 The 12th Fairway
Wellington, Florida 33414
(561) 248-5622

Ida Farm, LLC

361 Cindy Drive
Wellington, Florida 33414
724-689-9088

JH Hauling and Services Inc.

12798 Spinnaker Lane
Wellington, Florida 33414
(561) 248-3344

Little Palm Landscaping and Removal Horse Manure, Inc.

13833 Wellington Trace #434
Wellington, Florida 33414
(561) 632-3754

Palmetto Mills, LLC.

13527 46th Court North
Royal Palm Beach, Florida 33411
(561) 308-1485

Salmana Enterprises, Inc.

1316 B Road
Loxahatchee, Florida 33470
(561) 951-0993

Southern Waste Systems, LLC

(LIVESTOCK WASTE ROLL-OFF CONTAINERS)
2380 College Avenue
Davie, Florida 33317
(954) 615-4057

T.A. Steinman Enterprises

780 Cleary Road
West Palm Beach, Florida 33413
(561) 686-0864

Trucking by Duques

13859 Okeechobee Blvd
Loxahatchee, Florida 33470
(561) 723-4141

Wellington Agricultural Services

PO Box 1229
Loxahatchee, Florida 33470
(561) 790-2347

FDEP APPROVED DISPOSAL LOCATIONS:

Almyra Company N.V.

PO Box 363
Belle Glade, Florida 33430

Atlas Peat & Soil, Inc.

9621 State Road 7
Boynton Beach, Florida 33472

McGill-Brighton

11000 Red Barn Road NE
Brighton Seminole Indian Reservation
Okeechobee, Florida 34974

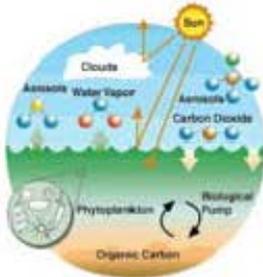
Solid Waste Authority Palm Beach County

6330 N. Jog Rd
West Palm Beach, Florida 33412

United States Sugar Corporation

111 Ponce de Leon Avenue
Clewiston, Florida 33440

Exhibit 7
Dr. Bill Louda Letter



Dr. J. William Louda, Ph.D.
Consultant
Environmental Biogeochemistry
P.O. Box 1238
Loxahatchee Groves, Florida 33470

(561) 791-9241 badlouda@comcast.net



MEMORANDUM

TO: Mayor R. Margolis and Village Council members
Village of Wellington
12300 Forest Hill Blvd.
Wellington, FL 33414

6 May 2012

SUBJECT: Letter of Support, Equine Eco Green, Ms. Shelly Townsend

Dear Mayor Margolis and Honored Council Members;

As a Senior Scientist and Professor of Environmental Chemistry at Florida Atlantic University, long time researcher both within the Comprehensive Everglades Restoration Plan (CERP) and of phosphorous pollution due to equine wastes, as well as being a citizen of the western communities (viz. Loxahatchee Groves), I was approached by Ms. Townsend to review her proposal for the Equine Eco Green concept.

Please note that my endorsement herein, penned on my personal letterhead, is mine alone and does not represent an official position by FAU. A short vita explaining my credentials and history with this subject follows this letter as an appendix.

I have examined Ms. Townsend's proposal and it certainly appears on track for not only handling the equestrian waste stream of Wellington and potentially Loxahatchee Groves. Additionally, the creation of an environmentally friendly manner for the disposal of equestrian waste (viz. manure and urine soaked bedding) will also aid all of us in decreasing and potentially eliminating the illegal and pollution prone disposal of these materials.

Loxahatchee Groves has recently passed an ordinance to stop illegal dumping and to ensure that only permitted haulers are used. The only use of these materials will then be for bona fide agricultural soil amendment with strict setbacks from water bodies.

As you are all aware, the U.S. Army Corps of Engineers and the South Florida Water Management District came down on Wellington years ago for the phosphorous pollution originating in ACME basin B and flowing into WCA-1A (aka A.R.M. National Wildlife Refuge). This was at the May 22, 2002 public workshop and within many other venues. As a direct result of the Best Management Practices (BMPs) following, tremendous amounts of manure and bedding were dumped into Loxahatchee Groves, at that time unincorporated Palm Beach County.

I have had a few students study water quality, particularly phosphorous (P), in the canals of Loxahatchee Groves and C-51. We have given two papers before the Florida Academy of Sciences on the subject (see Appendix) and one Master's student received her M.S.T. from the study of phosphorous leaching from horse manure (Eutrophication of Surface Water Resulting from Equestrian Waste Leaching Phosphorus into the Soil, Charmaine Cintron, 2007, M.S.T. Chemistry and Biochemistry).

As I hope that you can tell, I have had considerable experience dealing with phosphorous pollution from equestrian wastes. Though I have only given nitrogen (N) a passing glance, the fact that equestrian bedding is 'urine soaked' makes it a prime candidate for nitrogen pollution as well. Urea (aka diaminoketone, H_2NCONH_2) is a storehouse of ammonia (NH_3) which is easily oxidized to nitrite (NO_2^-) and nitrate (NO_3^-), primary plant nutrients which are also of great concern in the fresh waters of southern Florida.

As you can hopefully tell, I and a great many other scientists would encourage you do all in your power to assist in the development and implementation of environmentally friendly (aka 'green') manners with which to mediate / eliminate pollution stemming from equestrian waste products. Just as improperly treated human waste creates algal blooms offshore so too does equestrian waste in your backyard, namely the greater Everglades.

I thank you for your time and consideration.



Dr. J. William Louda, Senior Scientist
Organic Geochemistry Group
Department of Chemistry and Biochemistry
and The Environmental Sciences Program
Florida Atlantic University*
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Boca Raton, FL 33431
(561) 297-3309
jlouda@fau.edu

*To reiterate—opinions are mine and do not represent an official statement by FAU.

Additionally, I have no financial link to this project, present or future.

Selected vita citations (full vita, 28 pp. available at <http://www.science.fau.edu/chemistry/faculty/~jlouda/vita.pdf>)

Re: Phosphorous in equestrian waste:

Osetek, J. and Louda, J. W. (2004) Water quality analyses of canals in the agricultural / residential community of Loxahatchee Groves, Florida. 68th. Annual Meeting of the Florida Academy of Sciences. Orlando, FL, March 12-13, 2004. Abstract ENV-10.

Cintron C. and Louda J. W. (2007) Extractability of phosphorous from horse manure and implications for the pollution of the surficial waters and aquifers of southern Florida. 71st. Annual Meeting of the Florida Academy of Sciences. St. Petersburg.

FL. March 16-17. Abstr. ENV.

A few other re Algal Blooms / water quality:

M. Szymczak-Żyła, G. Kowalewska, and J. W. Louda (2011) Sedimentary Chlorophyll-*a* derivatives as indicators of marine eutrophication. *Marine Chemistry* **125**: 39-48.

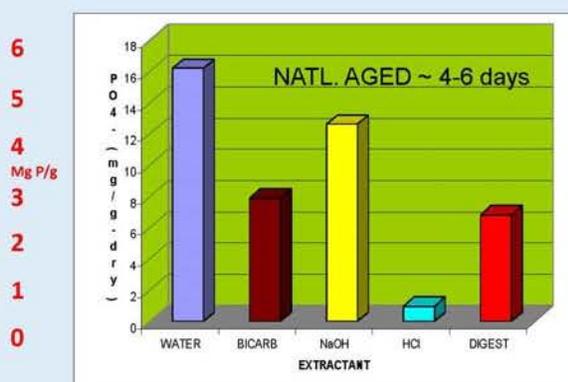
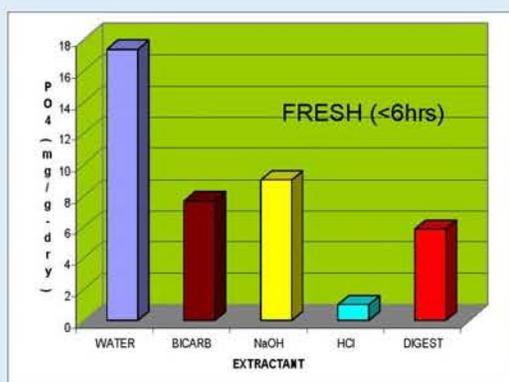
Louda, J. W., Mongkhonsri, P., and Baker, E.W. (2011) Chlorophyll degradation during senescence and death-III: Three to ten year experiments, implications for ETIO-series generation. *Org. Geochem.* **42**: 688-699.

Grant, C.S. and Louda, J.W. (2010) Microalgal pigment ratios in relation to light intensity – Implications for chemotaxonomy. *Aquatic Biology.* **11**: 127-138.

Neto, R.R., Mead, R.N., Louda, J.W. and Jaffe, R. (2006) Organic biogeochemistry of detrital flocculent material (floc) in a subtropical, coastal, wetland. *Biogeochem.* **77**: 283 – 304.

Hagerthey, S. E., Louda, J. W. and Mongkronsri, P. (2006) Evaluation of pigment extraction methods and a recommended protocol for periphyton chlorophyll *a* determination and chemotaxonomic assessment. *J. Phycology* **42**: 1125 – 1136.

P-Speciation in Fresh and Aged Horse Manure (dry wt.)



CONCLUSION: Using only water and dilute bicarbonate, representative of S. Florida soils, horse manure easily leeches an average of about 7.8 grams of phosphorus per gram dry weight of manure. This equates, using the average water content of 40-50%, to an average of 4.7 – 3.9 mg P / gram wet wt. manure. Using the 8.5 tons per horse estimated by P.B.Co. planning, this equates to 454g/lb x 2,000lbs/ton x 8.5 tons = 7,718,000 grams of manure per horse per year. Using an average of 4.3 mg P/g wet wt. this means that 4.3 mg P/g x 7,718,000 g = 33,187,400 mg P per horse per year can leach into the ground and surface waters. Yes that is, 33,187 grams (73 pounds) of phosphorus per horse per year.

J.Wm.Louda (9/28/2016)