Purpose

The purpose of this document is to provide general guidance regarding the environmental requirements for proper disposal of animal carcasses as a result of a catastrophic mortality event due to highly pathogenic avian influenza (HPAI). This virus is highly contagious among birds, but has not been transmitted to people. While some birds can carry the virus and survive, the disease is fatal to poultry with the host dying within approximately three days.

Commercial poultry farms include egg production, broilers for meat, and breeder farms. Poultry farms can range from a few thousand birds to hundreds of thousands of birds on one farm. Once contracted on site, the HPAI virus could rapidly spread throughout the flock. Current recommendations from the Florida Department of Agriculture and Consumer Services (FDACS) and the United States Department of Agriculture (USDA) are to de-populate all birds on site to stop the spread of the virus.

Guidance is needed because a large mortality event will likely overstress normal practices for management of animal carcasses. This guidance is intended to supplement any requirements in existing laws or regulations, existing department permits, and recommendations made by FDACS and USDA for the proper management of animal carcasses.

This document provides general guidance that may have different implications based on your specific circumstances. Operators must comply with all Florida Department of Environmental Protection (DEP) permits, if applicable. It is expected that affected facilities will contact the Department’s District Office in their area to discuss specific disposal considerations. District contact information can be found prior to the References section at the end of this document.

Disposal Options

The following options for the disposal of animal carcasses in the case of a catastrophic mortality event are currently acceptable practices recognized by FDACS and USDA. This list is not provided in order of preference or priority.

* On-Site Composting
* On-Site Cremation/Incineration
* On-Site Burial
* Off-Site Composting at a Permitted Composting Facility
* Off-Site Cremation/Incineration
* Off-Site Burial at a Permitted Class I Landfill

On-Site Composting

Animal carcasses can be quickly broken down into compost using the right materials, equipment and practices. Composting is a normal function practiced at most farms and does not trigger any

environmental requirements, other than setbacks and the general obligation to spread or dispose of the compost in a responsible manner.

Composting is an aerobic digestion process using oxygen and carbon sources (organic materials) to break down animal carcasses. The heat generated by this process is sufficient to destroy the virus in the carcasses as well as in the poultry litter. According to USDA, the virus dies when exposed to 140° F for ten minutes or lower temperatures for longer periods of time.

Generally, carcasses are placed in layers separated by an approximately equal thickness of organic material to provide a suitable carbon-to-nitrogen ratio. USDA estimates approximately 2-3 pounds of carbon material per pound of carcass. The organic material may consist of dry poultry litter, wood chips, saw dust, yard trash or other similar bulking agent. The top is then covered with 2 feet of bulking material or soil.

Note that FDACS has developed an electronic form for calculating the amount of organic material needed for composting. Also, in regards to sources of organic materials, the Southern Waste Information eXchange, Inc. (SWIX) is a non-profit group that specializes in finding clients to recycle and re-use waste materials such as biomass (e.g., sawdust, wood chips, yard trash, etc.). Please see references section below for links to contact information for SWIX.

*On-Site Composting – In House*

FDACS and USDA highly recommend composting of carcasses on site, in the houses where the animals were de-populated, as the best carcass disposal method. This method is advantageous because used poultry litter can be used as a carbon source and the building provides protection from scavengers as well as excess moisture.

The following is a general description of composting in house, based on USDA recommendations. Carcasses should be placed in layers approximately 1-foot to 2-feet thick that are separated by an approximately equal thickness of organic material to provide a suitable carbon-to-nitrogen ratio. The top should then be covered with 2 feet of carbon bulking material or soil. Depending on the method of depopulation, it may be necessary to add moisture to the carcasses. During the primary compost process in house, no turning, agitation or active aeration should occur. Temperature monitoring and sampling is required to ensure destruction of the virus. If composting is to be completed in-house, compost should be turned no sooner than 14 days, and then removed after a total of approximately 30 days in house, based on satisfactory monitoring. Alternatively, once the initial 14-day primary compost process is complete along with satisfactory monitoring, compost may be moved outside for the secondary curing process. For further information and best management practices, please contact USDA or FDACS.

Composting in houses does not trigger any unique environmental requirements, other than the general obligation to spread or dispose of the compost in a responsible manner and to comply with existing permits.

*On-Site Composting – Outside Houses*

If in-house composting is not possible, then FDACS and USDA recommend composting on site but outside the poultry houses. Due to the potentially large volume of animal carcasses, multiple compost piles or windrows are preferable to one, large compost pile so the composting operation can be better controlled. Best management practices identified by FDACS and USDA, summarized above, should be followed when composting animal carcasses.

DEP recommends the following when composting occurs outside:

1. Compost piles or windrows should not be placed in areas that frequently flood.
2. Compost piles or windrows should be located:
3. At least 200 feet from a potable or irrigation water well,
4. At least 200 feet from a natural or artificial body of water, and
5. At least 100 feet from the property boundary.
6. Whenever possible, compost piles or windrows should be covered with a fleece blanket or other breathable material that will shed water but transfer air. A cover captures the heat produced, protects from scavengers, and sheds rain.

On-Site Cremation/Incineration

Incineration or cremation is the reduction of animal carcasses to ash by combustion. Supplemental fuels are used to achieve the temperature necessary to cremate the carcass and any incidental materials such as poultry litter. This method destroys the avian influenza virus.

*Portable Cremation Units*

Truck-mounted portable cremation units can be transported to the site and set up quickly for carcass disposal. These units typically consist of two chambers. Animal carcasses are fed into the primary chamber through a loading hatch. During cremation, exhaust gases from the primary chamber enter the secondary chamber that completes combustion. Diesel is typically fired in both the primary and secondary chambers and the exhaust gas is exposed to 1600 °F for at least one second. When properly designed and operated, there is little or no smoke present.

Portable units are normally batch-loaded units with capacities of up to 2 tons of carcasses per hour. The units can be operated continuously around the clock. Ash is raked out manually, but does not disrupt continuous operation. Assuming an average of 5 lb per bird carcass, as well as continuous operation, a 1.5 ton per hour cremation unit could dispose of 14,400 carcasses per day. Two units side-by-side could dispose of 28,800 carcasses per day.

Owners or operators of portable cremation units would need an air permit, an exemption from air permitting, or other authorization (e.g., as part of an emergency order). DEP recommends that portable cremation units be located:

1. In areas that are not subject to flooding,
2. At least 50 feet away from any wildlands, brush, combustible structure, or paved public roadway, and
3. Whenever possible, at least 100 feet away from any occupied building.

*Portable Air Curtain Incinerators*

Air curtain incinerators (ACIs) may be used for the destruction of animal carcasses, provided FDACS has determined that the need for destruction of such carcasses constitutes an emergency requiring the use of open burning pursuant to Rule 62-256.700(6), F.A.C. An ACI consists of an air manifold, a blower, a diesel engine and a refractory-lined firebox. A wood fire is started in the firebox. The air manifold is located on one side and blows air across the top. The “air curtain” captures the smoke and recirculates it back into the fire. Carcasses are loaded into the firebox by a bucket loader or other similar piece of equipment.

Portable ACIs used for this purpose are exempt from the requirement to obtain an air permit pursuant to Rule 62-210.300(3)(a), F.A.C. However, such portable ACIs must comply with the conditions of the exemption, which includes applicable requirements for setbacks, authorized fuels, operation, visible emissions, etc. [Rule 62-210.300(3)(a) and (c), F.A.C.]

Operation of the ACI should be by trained professionals. This will ensure proper operation, good combustion practices, and compliance with applicable ACI requirements. Ash generated by ACIs pursuant to carcass disposal is generally considered a solid waste and may be disposed of at a Class I landfill.

DEP recommends that portable ACIs be located in areas that are not subject to flooding. In addition, the conditions of exemption require an ACI to be located:

1. At least 50 feet away from any wildlands, brush, combustible structure, or paved public roadway, and
2. At least 300 feet away from any occupied building.

On-Site Burial

Burial of animal carcasses results in anaerobic digestion (limited oxygen) which produces leachate, carbon dioxide, methane, and trace amounts of hydrogen sulfide. Depending on the specific circumstances, decomposition can take many years. Burial requires long-term management of the disposal site to prevent contamination to water sources, mitigate damage by scavengers and weather, and mitigate odors.

Pathogens and contaminants in underground water bodies can survive for an extended period of time (30 days or more) and can travel long distances, depending on specific soil and water characteristics. Due to Florida’s high water table and unique geography, burial is prohibited without a technical analysis conducted by a qualified professional (geologist or engineer) that demonstrates low risk of potential contamination to wells, aquifers, groundwater, surface waters, etc. The analysis must be based on site-specific characteristics and must be approved by DEP prior to an avian influenza outbreak and prior to burial. USDA’s Natural Resources Conservation Service (NRCS) provides an online tool called the Web Soil Survey (<http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>) for determining site-specific soil characteristics and water table information. This information helps facilities to make a general assessment of the appropriateness of burial as an option.

Prior to approval, the proposed burial area will be inspected by DEP staff to confirm the site specific characteristics and conclusion that burial demonstrates a low risk of contamination to water resources. Any farm identifying burial as a disposal option in its USDA-mandated Flock Plan will be inspected by DEP staff to confirm DEP requirements are being met.

If site-specific characteristics allow for burial, burial can either be below ground in trenches or pits, or above ground. Burial within bodies of water or wetlands is prohibited. Burial within Spring Protection Areas (see ‘References’ section below) and 10-year flood plains pose a high potential risk to pollute drinking water, groundwater and water bodies. DEP recommends the following practices be followed for burial.

1. The disposal areas should be located:
2. At least 500 feet from any potable or irrigation water wells,
3. At least 200 feet from a natural or artificial body of water, and
4. At least 100 feet from the property boundary.
5. The bottom of the disposal area must be at least 2 feet above the seasonal high water table for sites with low soil permeability. Larger distances between burial pits and seasonal high water tables may be required for sites with high permeability.
6. Disposal areas should be at least 3 feet wide, long enough to accommodate needed capacity, and separated by at least 3 feet of undisturbed soil.
7. Surface water runoff should be controlled to prevent it from running onto or through the carcass disposal areas. Care should also be taken to protect manmade fish ponds.
8. Based on practices recommended by USDA for burial below ground, carcasses should be placed in a pit or trench in 1 foot layers and covered with 1 foot layers of soil until filled. Once the elevation reaches natural grade, the trench or pit filled areas should be covered with an additional 2 feet of compacted soil. This additional ‘crown’ will help shed rainfall away from the disposal area. Best management practices identified by FDACS and USDA should be followed when burying animal carcasses.
9. Based on practices recommended by USDA for burial above ground, carcasses should be placed in 2-feet thick lifts and covered with approximately 6 inches of soil over each lift. When the final elevation is reached, the mound should be covered with 2 feet of soil ensuring that all carcasses are completely covered. The sides of the mounds should have a gradual slope and be vegetated as soon as possible to prevent erosion. Best management practices identified by FDACS and USDA should be followed when burying animal carcasses.

For information on the local water table, contact the local water management district or the county agricultural extension office. For information on the general suitability of burial in a specific area, see the website at USDA’s Natural Resources Conservation Service: <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Professional assistance is needed to make a site-specific determination.

Based on well locations and well and soil characteristics, it may be prudent to place monitoring well(s) between the disposal area and a water well. Contaminating the groundwater, drinking water, or surface water could result in a corrective action (e.g., removing the waste and restoring water quality) and/or fines.

Off-Site Composting at a Permitted Composting Facility

Off-site composting facilities are authorized to accept animal carcasses. An off-site composting facility must be permitted or registered under Chapter 62-709, F.A.C. and should be contacted first to ensure the operator will accept and process the animal carcasses. Composting at the facility should generally follow the criteria provided above for composting on site except as modified by the facility’s specific composting requirements. Permitted and registered composting facilities in Florida can be located at the following web site: <http://appprod.dep.state.fl.us/www_wacs/Reports/SW_Facility_Count.asp>

Transportation of animal carcasses to the composting facility should be in transport vehicles and/or containers that prevent spillage of the carcasses or associated residues. Biosecurity measures required by FDACS and USDA must be followed at the poultry farm as well as the permitted composting facility to clean and decontaminate trucks, other equipment and associated personnel. These biosecurity measures are critical to prevent the spread of the disease.

Off-Site Cremation/Incineration

The same procedures, setbacks, and requirements for on-site cremation/incineration apply to off-site cremation/incineration. See also “Disposal on Adjacent Lands,” below.

Portable air curtain incinerators are authorized for disposal of animal carcasses off site, provided FDACS has determined that the need for destruction of such carcasses constitutes an emergency requiring the use of open burning.

Owners or operators of off-site cremation units/incinerators would need an air permit, an exemption from air permitting, or other authorization (e.g., as part of an emergency order).

Transportation of animal carcasses for off-site cremation/incineration should be in transport vehicles and/or containers that prevent spillage of the carcasses or associated residues. Biosecurity measures required by FDACS and USDA must be followed at the poultry farm as well as the cremation/incineration facility to clean and decontaminate trucks, other equipment and associated personnel. These biosecurity measures are critical to prevent the spread of the disease.

Off-Site Burial at a Permitted Class I Landfill

Class I landfills are authorized to accept poultry carcasses for disposal as biological waste. Landfills should be contacted first to ensure that the landfill will accept animal carcasses. All Class I landfills are lined and have leachate collection systems to prevent groundwater contamination. In addition, some Class I landfills have gas collection systems that collect and manage landfill gases needed to control organic emissions and odors.

Landfills must consider traffic flow to minimize contact between the trucks hauling animal carcasses and other on-site equipment. In general, carcasses should be placed in a segregated area of the landfill’s working face and covered as soon as possible. Pursuant to recommendations by FDACS and USDA, landfills should also develop a plan to avoid contact with any birds that frequent the landfill.

Permitted Class I landfills in Florida can be located at the following web site: <http://appprod.dep.state.fl.us/www_wacs/Reports/SW_Facility_Count.asp>

Transportation of animal carcasses to landfills should be in transport vehicles and/or containers that prevent spillage of the carcasses or associated residues. Biosecurity measures required by FDACS and USDA must be followed at the poultry farm as well as the landfill to clean and decontaminate trucks, other equipment and associated personnel. These biosecurity measures are critical to prevent the spread of the disease.

Disposal on Adjacent Lands

In certain situations, adjacent lands may be suitable for disposal, via composting, cremation/incineration or burial. Suitability depends on a number of factors such as landowner permission, size, and ability to meet the disposal siting locations and practices, as stated above. Please contact the DEP District Office in your area to discuss specific considerations regarding disposal on adjacent lands. Some agricultural permitting exemptions may apply.

Biosecurity Measures (Cleaning and Disinfection)

Biosecurity measures are those strategic and physical practices that will prevent the spread of the disease. This includes cleaning and disinfection (C&D) stations to disinfect vehicles, equipment or personnel. Such C&D stations should be located as to minimize impacts to water bodies. These areas should be located at least 500 feet from any on-site or off-site potable well, irrigation well or surface water. Alternatively, runoff may be contained using a lined container that is regularly drained and the runoff disposed of properly. C&D stations should also follow recommendations from FDACS and USDA regarding disinfection procedures and agents.

Maintaining Available Options

Any one of the disposal methods mentioned above could be quickly overcome by the sheer quantity of carcasses or the unavailability of equipment or materials. A farm planning for emergency carcass disposal should maintain all viable options and consider implementing more than one disposal method at a time based on the specific farm and event.

Site-Specific Requests

This document provides general guidance covering most circumstances. However, unique site-specific features may suggest that one or more disposal or siting requirements may be reduced while still providing reasonable assurance of environmental resource protection.

With regard to burial, it may be possible for a farm with unique site qualities to show low risk of water contamination and allow burial otherwise prohibited. However, for the vast majority of the facilities and their locations, generally available data suggests there will be few of these opportunities.

Professional assistance is needed to make a site-specific determination. Site-specific requests will be reviewed by DEP district offices. The primary points of contact are the Assistant District Directors. Contact information is provided at the end of this document.

Consequences

Following the guidance provided in this document (good composting practices, setbacks, etc.) minimizes the risk of environmental impacts and DEP permitting and compliance and enforcement processes. Failure to follow the guidance and practices in this document could lead to environmental damage for which the party will be held responsible. Remedies can include, but not be limited to, fines, imposed monitoring requirements, restitution, and remediation. Facilities with existing DEP permits will be required to meet permit requirements.

DEP District Contact Information

*DEP District Office Websites*: <http://www.dep.state.fl.us/secretary/dist/default.htm>

*Central District Office*

Counties: Brevard, Lake, Marion, Orange, Osceola, Seminole, Sumter, and Volusia

Address: 3319 Maguire Boulevard, Suite 232, Orlando, FL 32803-3767

Phone: (407) 897-4100

Aaron Watkins, Assistant District Director

*Northeast District Office*

Counties: Alachua, Baker, Bradford, Clay, Columbia, Dixie, Duval, Flagler, Gilchrist, Hamilton, Lafayette, Levy, Madison, Nassau, Putnam, St. Johns, Suwannee, Taylor, and Union

Address: 8800 Baymeadows Way West, Suite 100, Jacksonville, FL 32256-7590

Phone: (904) 256-1700

Jim Maher, Assistant District Director

*Northwest District Office*

Counties: Bay, Calhoun, Escambia, Franklin, Gadsden, Gulf, Holmes, Jackson, Jefferson, Leon, Liberty, Okaloosa, Santa Rosa, Wakulla, Walton, and Washington

Address: 160 Governmental Center, Suite 308, Pensacola, FL 32502-5794

Phone: (850) 595-0700

Benjamin Blitch, Assistant District Director

*South District Office*

Counties: Charlotte, Collier, DeSoto, Glades, Hendry, Highlands, Lee, Monroe, and Sarasota

Address: 2295 Victoria Avenue, Suite 364, P.O. Box 2549, Ft. Myers, FL 33902-2549

Phone: (239) 344-5600

Jennifer Carpenter, Assistant District Director

*Southeast District Office*

Counties: Broward, Dade, Indian River, Martin, Okeechobee, Palm Beach, and St. Lucie

Address: 3301 Gun Club Road MSC 7210-1, West Palm Beach, FL 33406

Phone: (561) 681-6600

Jennifer Smith, Assistant District Director

*Southwest District Office*

Counties: Citrus, Hardee, Hernando, Hillsborough, Manatee, Pasco, Pinellas, and Polk

Address: 13051 N. Telecom Parkway, Temple Terrace, FL 33637-0926

Phone: (813) 470-5700

Kelly Bishop, Assistant District Director

References and Available Information

Florida Administrative Code: <https://www.flrules.org/>

Florida Department of Agriculture and Consumer Services

FDACS – Avian Influenza Information: [Link](http://www.freshfromflorida.com/Divisions-Offices/Animal-Industry/Agriculture-Industry/Chicken-Poultry/Avian-Influenza-Information)

Florida Department of Environmental Protection (DEP)

DEP District Office Websites: <http://www.dep.state.fl.us/secretary/dist/default.htm>

DEP Permitted Class I Landfills and Composting Facilities: [Link](http://appprod.dep.state.fl.us/www_wacs/Reports/SW_Facility_Count.asp)

DEP Florida Aquifer Vulnerability Assessment (FAVA): [Link](http://www.dep.state.fl.us/geology/programs/hydrogeology/fava.htm)

Florida Department of Health: [Link](http://www.floridahealth.gov/diseases-and-conditions/diseases-from-animals/novel-influenza-viruses.html)

Florida Statutes: <http://www.leg.state.fl.us/Welcome/>

FloridaGardner.com

List of Agricultural Extension Office by County: <http://www.floridagardener.com/countyext.htm>

Incineration/Cremation

Florida DEP, Division of Air Resource Management

Permitting and Exemptions: David Read at 850-717-9000 ([david.read@dep.state.fl.us](mailto:david.read@dep.state.fl.us))

Florida Emergency Management

Logistics and Providers: Chuck Hagan at 850-410-1263 ([charles.hagan@em.myflorida.com](mailto:charles.hagan@em.myflorida.com))

Southern Waste Information eXchange, Inc. (SWIX)

Website: <http://swix.ws/>

Resource Map: <http://wastemap.org/>

Gene Jones at 800-441-7949 ([Gene@swixusa.org](mailto:Gene@swixusa.org))

University of Florida Digital Collections

Spring Protection Areas Map: <http://ufdc.ufl.edu/UF00094761/00001/1x?vo>

United States Department of Agriculture (USDA)

USDA Animal and Plant Health Inspection Service (APHIS): [Link](http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/business-services/sa_mrpbs_divisions/sa_emssd/ct_emssd_main/!ut/p/a1/vVJNU4MwFPwtHjzSPAIIPULVltqqM4otXJhAA01bEkzSqv_eQE-OU60Xc8rb2fe1b1GGlijj5MBqopngZNfF2VXuxgHGDuAY3BmGEKIXB0aJbT-DIaSGMH2YYDsyhPH4JoL4_nb26N9NMdx55-WPxuHE9WcA4AYY4utocu0P5wDx1Xn5cOKF8Fv-AmUoK7lu9RqlpF0zlZeCa8p1vmOFJPLjEhTJxV7mlSj3qo-KvWKcKpUrKg-spEe0kW2h8hU7MGXEO2K0UWp1CaU-_vKGMN51bEu2Qqntexi7lWsNKYDlBo5jBQaySur71bCing0Fmp4hAZbz0bw2ZYleW4xXAi2_D9Rj_Rho-XUgU4FtXl-z0EjRLf-u0fKftOj1_8VBPeEni_SEHzxgJKx3ojB-XkQo206CRLx1S4e8cAIjm6QVlVQO1kJ1m7-xcmDMP9irFRnU4oBSYzL_9Akc9PTHm7ZNkiRN4Hi7OtDDeONtFxZJw4tPnaAxOg!!/?1dmy&urile=wcm%3apath%3a%2Faphis_content_library%2Fsa_our_focus%2Fsa_emergency_response%2Fct_emergency_response_landing_page)

USDA-APHIS - Animal Disease Information: [Link](http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/animalhealth?1dmy&urile=wcm%3apath%3a%2FAPHIS_Content_Library%2FSA_Our_Focus%2FSA_Animal_Health%2FSA_Animal_Disease_Information)

USDA-APHIS - Carcass Disposal Guidance, Decision Tree: [Link](http://www.aphis.usda.gov/emergency_response/tools/aphis_disposal_tree.shtml)

USDA-APHIS - Highly Pathogenic Avian Influenza, Response Plan, The Red Book: [Link](http://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai_response_plan.pdf)

USDA-APHIS - National Animal Health Emergency Management System, Disposal: [Link](http://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/disposal_nahems.pdf)

USDA-APHIS – Standard Operating Procedures, Disposal: [Link](http://www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_disposal.pdf)

USDA National Agricultural Library

USDA Carcass Disposal Website: [Link](http://awic.nal.usda.gov/farm-animals/disaster-planning/carcass-disposal)

USDA Natural Resources Conservation Service (NRCS)

USDA-NRCS – Portal for State Soil Surveys: [Link](http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)

USDA-NRCS – Animal Mortality Facility – Emergency Disposal: [Link](http://www.flsart.org/acmwg/carcass_disposal_guidance/USDA.NRCS%20Animal%20Mortality%20Emergency%20Disposal.pdf)

United States Environmental Protection Agency (EPA)

Disposal of Infected Birds by Avian Influenza – An Overview of Considerations and Options

EPA530-R-009, August 11, 2006: [Link](http://nepis.epa.gov/Exe/ZyNET.exe/P1005SS9.txt?ZyActionD=ZyDocument&Client=EPA&Index=2006%20Thru%202010&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C06THRU10%5CTXT%5C00000012%5CP1005SS9.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1)

Water Management Districts: <http://www.dep.state.fl.us/secretary/watman/>

Professional Associations

Florida Department of Business and Professional Regulation

Website: <http://www.myfloridalicense.com/dbpr/>

Florida Association of Professional Geologists

Website: <http://fapg.org>

Florida Engineering Society

Website: <https://www.fleng.org/>

Florida Section of the Air & Waste Management Association (AWMA)

Website: <http://www.awma.org/about-awma/sections-chapters-council/florida-section>