Southern Florida
Outdoor Ornamental Nursery Scenario

This scenario is one of a suite of scenarios intended to represent outdoor ornamental nursery scenarios in the United States. It should be noted that nurseries are diverse and represent a range of topographic, cultivation, and plant types. Scenarios, when possible have been developed to represent conservative nursery practices that will yield "high-end" runoff, but not unrealistic of actual nurseries in the area. Similarly, selection of curve numbers are based on best available data from TR-55 until further calibration can be performed using regional runoff data, which at the time of scenario development is generally unavailable for nurseries. Figure 1 provides an overview of available curve numbers from TR-55 in order to provide context to the relative magnitude of the curve number used in this scenario. The closest curve number that could be associated with outdoor nurseries is for "farmsteads", due to similar cover conditions. Curve numbers are generally among the highest available, exceeded primarily by soils in poor condition.

This scenario is parameterized to generally represent outdoor ornamental nursery production in southern Florida. The scenario nominally represents outdoor ornamental nurseries in Dade County, FL since it is the county with the most number of acres in production in the region. In 2002, the state of Florida ranked 2nd in the U.S. for total number of ornamental nursery acres in the outdoors (i.e., not under glass), with approximately 49,770 acres in the open (USDA, 2002). Approximately 16% (7,888 acres) of the total outdoor acreage is located in Dade County. Dade County has over 950 nurseries (Garofalo, 2002). Nursery operations range from as small as 1-2 acres to large operations employing dozens of workers. MLRA 156A dominates southern Florida and completely contains Miami-Dade County.

The specific type of nursery represented is a container nursery that grows primarily tropical plants and other woody ornamentals and vines. There are three main types of nurseries in Florida: 1) field nurseries; 2) outdoor container operations; and 3) indoor, or greenhouse operations. Indoor operations are not applicable for modeling pesticide application and field runoff and are therefore not represented by this scenario. Due to the warm climate in southern Florida, nurseries tend to produce large, field-grown tropical material. Field nurseries typically produce woody ornamentals planted directly in the ground which are later dug, "balled-&- burlapped" for sale (Garofalo, 2002). Container nurseries generally grow similar plants as field nurseries, however plants are grown in pots and the ground is covered with a cloth that prevents weed and root growth, but allows water to flow freely. The nursery industry in Florida is dominated by container operations, with nearly 80% of all operations producing container grown plants (University of Florida, 2000).

Plants cultivated by outdoor nurseries are diverse. Field nurseries typically produce palms, trees, and large shrubs. Many nurseries take advantage of southern Florida's climate to grow tropical material (Garofalo, 2002). Based on 2003 nursery production data (USDA, 2004a), the largest number of nursery plants grown in Florida

are broadleaf evergreens (16 million plants), deciduous shrubs (17 million plants) and "other woody ornamentals and vines" or those that do not fit in one of the other USDA plant categories (23 million plants). These same categories also receive the most pesticide applications (239, 363, and 293 thousand pounds a.i. per year, respectively) (USDA, 2004b). For this scenario, crop parameters have been selected when possible to be representative of typical outdoor nursery practices in southern Florida, specifically Dade County. In general, this scenario represents field nurseries growing mainly *tropical material and other woody ornamentals* which are common in Dade County. Some nursery managers intercrop smaller plants with larger ones to produce early income while others prefer to plant even age blocks from which all plants are sold in a short time period (Garofalo, 2002). For the purposes of this scenario, it is assumed that container nurseries grow even aged plants.

Metfile W12839 is the closest meteorological station to Dade County, FL and is within approximately 20 miles of the county centroid. Its data were collected in Miami, FL located in the south-eastern part of the state. The station is located approximately 4 meters above mean sea level (AMSL) which is comparable to Dade County which generally ranges from 2-4 meters AMSL. Miami receives an average rainfall of 59 inches (NOAA, 2006) and most of the rainfall occurs during the hot and humid rainy season (May-October). Irrigation is required year-round, even during the rainy season (Garofalo, 2002).

Soils used for field nursery production consist of alkaline clay called marl (Garofalo, 2002). Marl is found mainly in south-eastern Dade County. Soil thickness varies from a few inches to several feet. Some nurseries are located on engineered, or "made" soils consisting of a gravely loam. Based on the Official Soil Survey of Dade County, nurseries are located predominantly on the Perrine-Biscayne-Pennsuco association used for field-grown trees and shrubs, ranging from 600 to 800 trees or shrubs per acre (USDA, 1987). According to the Soil Data Mart (USDA, 2006a), the predominant soil series in Dade County is the Biscayne (marl) series (Table 5). The Biscayne series consists of shallow, poorly and very poorly drained, moderately or moderately rapidly permeable soils over limestone in fresh water and tidal marshes and sloughs, as well as in broad, low, coastal flats and elongated sloughs in Southern Peninsular Florida (USDA, 2003). Exact locations and geographic extent of nurseries in the region are not available; therefore soils were selected based on soil recommendations of Garofalo (2002), the Soil Survey of Dade County (USDA, 1987), the geographic extent of nursery supporting soils in the area (USDA, 2006a), the drainage group, slope, and erodibility. According to the official soil series description for Biscayne soils (USDA, 2003), areas that have been drained or those areas with water control are used for growing vegetable crops, ornamental shrubs, and trees. Only one soil (Terra Ceia) in the county was listed as a benchmark soil (USDA, 2006b) however it is of lesser extent and more importantly is not listed as supporting ornamental nursery crops (USDA, 2000a) and therefore was not used for parameterization. In developing this scenario, preference was given to selecting a soil that is in hydrologic group "C" or "D", and is capable of supporting outdoor nurseries (EPA, 2004). The Biscayne series was selected for this scenario since it is of large extent in Dade County (USDA, 2003), is a hydrologic

group D soil, and is capable of supporting outdoor ornamental nursery production (USDA, 2003). Biscayne soils represent the 90th percentile of vulnerability in drainage for soils in Dade County It is in the 90th percentile for erodibility (0.32) and is only exceeded in erodibility by one soil type (Table 5).

Biscayne is a Hydrologic Group D soil, which represents approximately 17% of the soils in Dade County (excluding urban soils) (Table 5). Biscayne soils have a USLE K factor of 0.32, which is common to four other soils in Dade County. Approximately 10% of Dade County soils have a pH lower than Biscayne soils. However, soil pH is not currently a PRZM input parameter and is not expected to often affect chemical fate in the acidic range. Based on the official soil series description, Biscayne soils have an A horizon from 0 to 5 inches (0-12 cm) deep, and a C horizon from 5 to over 15 inches (12-38 cm) deep (USDA, 2003). Soil parameters for this scenario were based on "Biscayne marl, drained" soils.

Version 2 of this scenario includes corrected parameter values that replace values outside of the ranges that PRZM is designed to accept. The corrections included setting AMXDR and CORED equal to ANETD (*i.e.*, 32.5 cm).

Table 1. PRZM 3.12 Climate and Time Parameters for Dade County, FL – Ornamental Nurseries.

Parameter	Value	Source/Comments
Starting Date	Jan. 1, 1961	Meteorological File Miami, FL (W12839)
Ending Date	Dec. 31, 1990	Meteorological File Miami, FL (W12839)
Pan Evaporation Factor (PFAC)	0.775	PRZM Manual Figure 5.1. Value represents most of southern Florida.
Snowmelt Factor (SFAC)	0	PRZM Manual guidance. No snowfall observed at Miami Int'l Airport (NOWData, NOAA).
Minimum Depth of Evaporation (ANETD)	32.5 cm	PRZM Manual Figure 5.2 (EPA, 1998) Set to guidance default for free draining soils.

Table 2. PRZM 3.12 Erosion and Landscape Parameters for Dade County, Florida – Ornamental Nurseries.		
Parameter	**Value**	**Source/Comments**
Method to Calculate Erosion (ERFLAG)	4 (MUSS)	PRZM Guidance (EPA, 2004)
USLE K Factor (USLEK)	0.32	USDA NRCS Soil Data Mart (http://soildatamart.nrcs.usda.gov/) Value listed for the soil series Biscayne marl, drained.
USLE LS Factor (USLELS)	0.2	LS equation (Haan and Barfield, 1978) LS value for 1 % slope and 400' slope length
USLE P Factor (USLEP)	1.0	Set to 1.0 for orchards as per PRZM Scenario Guidance (EPA, 2004).
Field Area (AFIELD)	172 ha	Area of Shipman Reservoir watershed (PRZM Guidance, EPA, 2004)
NRCS Hyetograph (IREG)	4	PRZM Manual Figure 5.12 (EPA, 1998)
Slope (SLP)	1%	USDA NRCS Soil Data Mart (http://soildatamart.nrcs.usda.gov/) Mid-point for the soil series Biscayne marl, drained (0-1.9%). PRZM Scenario Guidance (EPA, 2004).
Hydraulic Length (HL)	600 m	Shipman Reservoir (PRZM Guidance, EPA, 2004)
Irrigation Flag (IRFLAG)	1	Irrigation is required year-round, even during the rainy season. (Garofalo et al., 2002 The Commercial Ornamental Horticulture Industry in Miami-Dade County)
Irrigation Type (IRTYP)	3	3 = over canopy sprinkler. Irrigation Guidance for developing PRZM Scenario, Table 3; (June 15, 2005); and (Muñoz-Carpena, 2003)
Leaching Factor (FLEACH)	0.1	Default value. Irrigation Guidance for developing PRZM Scenario, Table 3; (June 15, 2005).
Fraction of Water Capacity when Irrigation is Applied (PCDEPL)	0.5	Default value. Irrigation Guidance for developing PRZM Scenario, Table 3; (June 15, 2005).
Maximum Rate at which Irrigation is Applied (RATEAP)	0.1	Default value. Irrigation Guidance for developing PRZM Scenario, Table 1; (June 15, 2005). Set based on cropping curve number.

Table 3. PRZM 3.12 Crop Parameters for Dade County, Florida – Ornamental Nurseries.		
Parameter	**Value**	**Source/Comments**
Initial Crop (INICRP)	1	Default value
Initial Surface Condition (ISCOND)	2	2 = cover crop. Grass is planted between rows. Based on high-resolution color aerial photography of ornamental nurseries in Miami county.
Number of Different Crops (NDC)	1	Set to number of crops in simulation. Default value.
Number of Cropping Periods (NCPDS)	30	Set to weather data in meteorological file: Miami, FL (W12839)
Maximum rainfall interception storage of crop (CINTCP)	0.1	Table 5-4 PRZM manual, light density crops (EPA, 1998).
Maximum Active Root Depth (AMXDR)	32.5 cm	80% of Florida's nursery operations are containerized (University of Florida, 2000). However, this value was set to equal the minimum depth of evaporation (ANETD).

Table 3. PRZM 3.12 Crop Parameters for Dade County, Florida – Ornamental Nurseries.

Parameter	Value	Source/Comments
Maximum Canopy Coverage (COVMAX)	60%	Based on high-resolution color aerial photography of ornamental nurseries in Miami county.
Maximum Canopy Height (HTMAX)	457 cm (15ft)	Height varies widely as many different cultivars are grown. Some nurseries sell plants up to 15 feet (http://www.nursery-report.com/Search/Default.asp)
Soil Surface Condition After Harvest (ICNAH)	2	2 = cover crop. Grass is planted between rows. Based on high-resolution color aerial photography of ornamental nurseries in Miami county.
Date of Crop Emergence (EMD, EMM, IYREM)	1/01/61	Values are set to keep E/T and canopy coverage terms working correctly for this evergreen scenario.
Date of Crop Maturity (MAD, MAM, IYRMAT)	02/01/61	Values are set to keep E/T and canopy coverage terms working correctly for this evergreen scenario.
Date of Crop Harvest (HAD, HAM, IYRHAR)	31/12/61	Values are set to keep E/T and canopy coverage terms working correctly for this evergreen scenario.
Maximum Dry Weight (WFMAX)	0.0	Not used in scenario
SCS Curve Number (CN)	86, 86, 86	TR-55, Table 2-2c (USDA 1986). Value for farmsteads – buildings, lanes, driveways, and surrounding lots, hydrologic group D.
Manning's N Value (MNGN)	0.023	RUSLE Project; Uc0STSTN for Tampa, FL strawberry with No Till (Soil disturbance is limited to a planting operation) and light cover (cover code 5). These data were used to approximate values for nurseries in southern Florida as no data for ornamental nurseries were included in the project. (USDA, 2000b)
USLE C Factor (USLEC)	0.023 - 0.326	RUSLE Project; Uc0STSTN for Tampa, FL strawberry with No Till (Soil disturbance is limited to a planting operation) and light cover (cover code 5). These data were used to approximate values for nurseries in southern Florida as no data for ornamental nurseries were included in the project. (USDA, 2000b). Note: RUSLE dates and C factors from the RUSLE project have been reordered and tied to emergence dates.

Table 4. PRZM 3.12 "Biscayne marl, drained" Soil Parameters for Dade County, Florida – Ornamental Nurseries

Parameter	Value	Source/Comments
Total Soil Depth (CORED)	32.5 cm	This value was set to equal the minimum depth of evaporation (ANETD).
Number of Horizons (NHORIZ)	3	NRCS Soil Data Mart (SDM) (http://soildatamart.nrcs.usda.gov). The fourth horizon from SDM excluded because it is bedrock.
Horizon Thickness (THKNS)	10 cm (HORIZN = 1) 2 cm (HORIZN = 2) 20.5 cm (HORIZN = 3)	NRCS Soil Data Mart (SDM) (http://soildatamart.nrcs.usda.gov). The third horizon set according to the total soil depth (CORED).
Bulk Density (BD)	1.1 g/cm^3 (HORIZN = 1) 1.1 g/cm^3 (HORIZN = 2) 1 g/cm^3 (HORIZN = 3)	NRCS Soil Data Mart (SDM) (http://soildatamart.nrcs.usda.gov). Midpoint of the reported range. PRZM Scenario Guidance (EPA, 2004).
Initial Water Content (THETO)	0.17 cm^3/cm^3 (HORIZN =1) 0.17 cm^3/cm^3 (HORIZN =2) 0.17 cm^3/cm^3 (HORIZN =3)	NRCS Soil Data Mart (SDM); values are mean 1/3-bar water contents of Biscayne marl, drained soils.

Compartment Thickness (DPN)	0.1 cm (HORIZN = 1) 2.0 cm (HORIZN = 2) 4.1 cm (HORIZN = 3)	NRCS Soil Data Mart (SDM) (http://soildatamart.nrcs.usda.gov). PRZM Scenario Guidance (EPA, 2004). The third horizon set according to the horizon thickness (THKNS).
Field Capacity (THEFC)	0.17 cm^3/cm^3 (HORIZN =1) 0.17 cm^3/cm^3 (HORIZN =2) 0.17 cm^3/cm^3 (HORIZN =3)	NRCS Soil Data Mart (SDM); values are mean 1/3-bar water contents of Biscayne marl, drained soils.
Wilting Point (THEWP)	0.1 cm^3/cm^3 (HORIZN =1) 0.1 cm^3/cm^3 (HORIZN =2) 0.1 cm^3/cm^3 (HORIZN =3)	NRCS Soil Data Mart (SDM); values are mean 15-bar water contents of Biscayne marl, drained soils.
Organic Carbon Content (OC)	2.61 % (HORIZN = 1) 2.61 % (HORIZN = 2) 1.16 % (HORIZN = 3)	NRCS SDM; values for horizons 1 to 3 = mean %OM / 1.724. PRZM Scenario Guidance (EPA, 2004).

Sensitive Parameter Uncertainties

Meteorological File

As characterized above, Metfile W12839 (Miami, FL) is the closest metfile to Dade County, which was used to represent this scenario. The metfile is located approximately 20 miles from the center of Dade County and is generally representative of southern Florida area.

Slope

The scenario USLELS value was calculated with the Haan and Barfield equation (1978) using a 1% slope and an assumed 400-foot slope length, as per PRZM scenario development guidance (EPA, 2004). A slope of 1% was selected because it is midpoint of the range for Biscayne soils according to USDA (USDA 2006b). This scenario may underestimate runoff for nurseries located on slopes greater than 1%

USLE C Factor and Manning's N Value

The RUSLE Project does not include data for ornamental nursery crops. Therefore, USLE C Factor and Manning's N values were selected from data on Florida Strawberry with no till due to the similarities between conditions. Approximately 80% of Florida's nursery operations are containerized (University of Florida, 2000) therefore a no till RUSLE file was chosen. Of the available locations, Tampa Florida has the most similar meteorological conditions, no till, and light and cover as this scenario.

Soil Data

No geospatial data were available to determine the exact locations and geographic extent of nurseries in the region. The USGS GIRAS Landuse/Landcover data for the Conterminous United States includes a nurseries classification; however the data are generally 25 years old at the time of this scenario development and preliminary review of the data indicates that nurseries are not well represented. This is likely due to the

resolution of the data (30 m) and age of the data set (based on 1970's and 80's imagery). As a result, soils were selected based on soil recommendations on information from Garofalo (2002), the geographic extent of the listed soils in the area, the drainage group, slope, and erodibility. The soil selected is a hydrologic group D soil.

Crop Parameters

Outdoor ornamental nurseries are highly diverse in the numbers, sizes, and types of plants grown. Ornamental nurseries also vary in the cultivation methods which can range from potted plants (container operations) to field nurseries that may harvest and package plants as bare root or balled and burlapped. This scenario has been parameterized to be representative of the most "typical" nursery plants in the area (see description above). Runoff and erosion may be over or underestimated depending on the type of nursery modeled and a sensitivity analysis has high value in this regard.

Curve Number

The curve number is the most sensitive parameter in PRZM scenarios. The curve number for this scenario was based on TR-55 (Table 2-2c). Nurseries can be covered in roads, wooded areas, field borders, and buildings. Therefore the curve number closest to this scenario was the value for a hydrologic group D soil representative of farmsteads, buildings, lanes, driveways, and surrounding lots. Runoff and erosion may be under or over-estimated for alternative nursery operations and model validation has high value in this regard. Based on preliminary investigation, no runoff data are available for validating runoff from outdoor nursery operations in this geographic area.

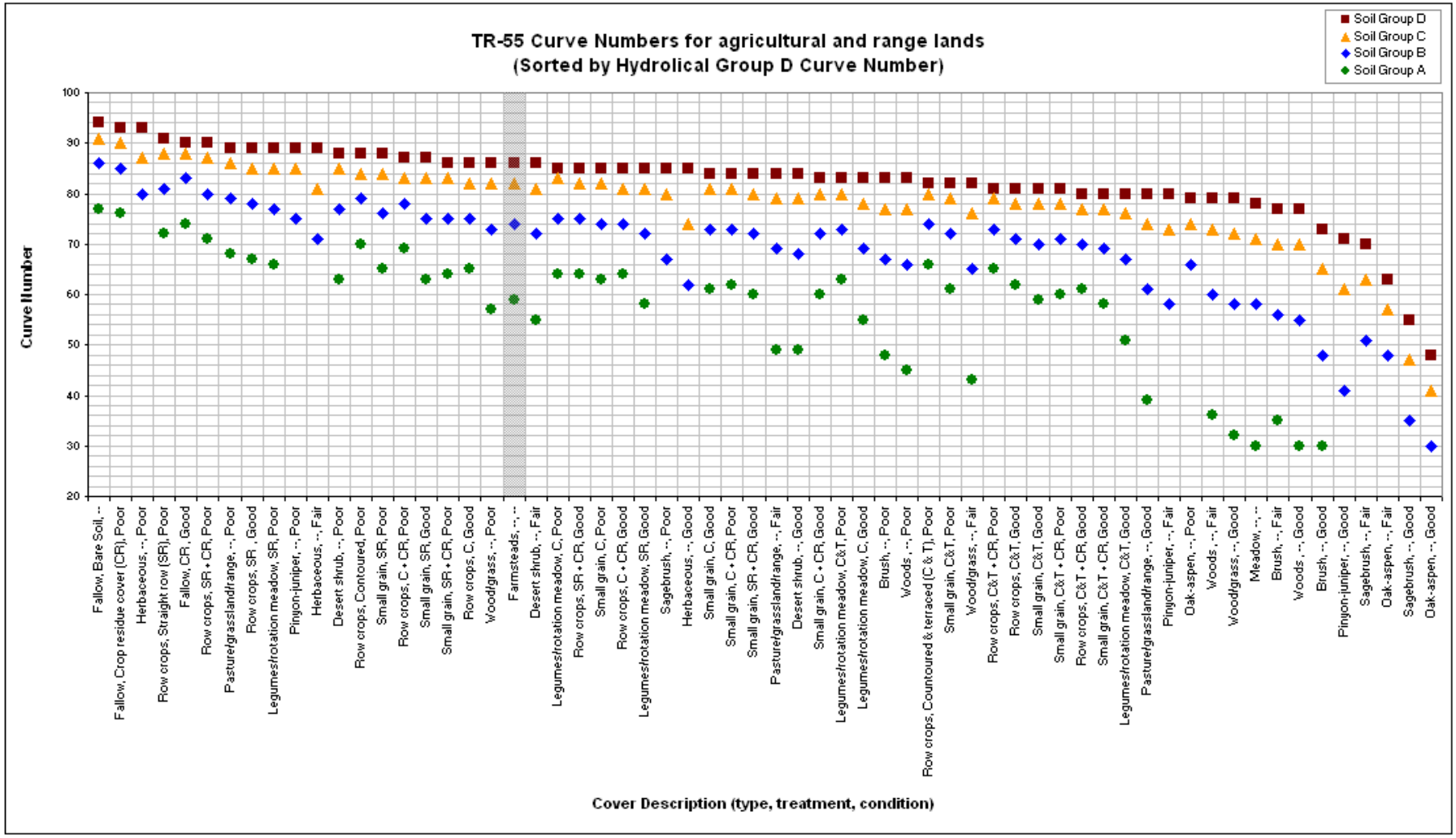

Figure 1. TR-55 (USDA, 1986) Farmstead curve number used for scenario development relative to other available cover types, soil treatments, and conditions.

Table 5. Soils of Dade County, FL Ranked by Area [a, b]										
Soil	**Total Acres**	**% Area[b]**	**Hydrologic Group**	**Erodibility**	**Slope**	**pH**	**OM**	**Sand**	**Silt**	**Clay**
Biscayne	80540	17.4%	B/D	0.32	0 - 1.9	7.9	4-4.5	10	77	13
Udorthents	62050	13.4%	A	0.02-0.1	0-60	7.9	0.5	40-93	4.5-40	2.5-20
Krome	58620	12.7%	A	0.20	0 - 2	7.9	6.5	43	39.5	17.5
Perrine	53440	11.6%	D	0.32	0 - 1	7.6-8.2	4-5	1-6	70.5-83	16-23.5
Lauderhill	45850	9.9%	B/D		0 - 1.9		75	0	0	0
Dania	35330	7.6%	B/D		0 - 1.9		75	0	0	0
Vizcaya	29860	6.5%	D	0.10	0 - 2	7.2	25	20	60	20
Chekika	26830	5.8%	D	0.37	0 - 2	7.9	6.5	40	42.5	17.5
Pahokee	20140	4.4%	B/D		0 - 1		82.5	0	0	0
Pennsuco	13750	3.0%	D	0.32	0 - 1	8.2	4.5	1-3	79-80	17-20
Terra Ceia	8780	1.9%	D		0 - 1		72.5	0	0	0
Hallandale	4690	1.0%	B/D	0.10	0 - 2	5.8	1.5	98	0.5	1.5
Opalocka	3780	0.8%	D	0.10	0 - 2	6.7	4.5	97	2	1
Margate	3750	0.8%	B/D	0.10	0 - 2	5.3	2.5	97	0.5	2.5
Plantation	3410	0.7%	B/D		0 - 1		35	0	0	0
Tamiami	3100	0.7%	D		0 - 1.9		70	0	0	3
Demory	2370	0.5%	D	0.10	0 - 2	6.7	12	70	6.5	23.5
Cardsound	2260	0.5%	D	0.32	0 - 2	6.7	6.5	18.1	50.9	31
St. Augustine	1070	0.2%	C	0.10	0 - 2	7.3	2	97	2	1
Matecumbe	780	0.2%	D		0 - 2		85	0	0	3
Dade	610	0.1%	A	0.10	0 - 2	7.3	2.5	98	1	1
Pomello	520	0.1%	C	0.10	2 - 5	5.3	0.75	98	1	1
Kesson	490	0.1%	D		0 - 0.9		35	0	0	0
Canaveral	310	0.1%	C	0.10	0 - 5	7.5	1	98	1	1
Basinger	230	<0.1%	B/D	0.10	0 - 2	6	1.25	97	1	2

Notes:
[a] pH, OM, Sand, Silt, and Clay are based on representative values from USDA Soil Data Mart.
[b] Table excludes USDA Soil Data Mart areas for urban land, beaches, water, and waters of the Atlantic ocean.

Literature Cited

EPA. 1998. Carsel, R.F., J.C. Imhoff, P.R. Hummel, J.M. Cheplick, and A.S. Donigian, Jr. PRZM-3, A Model for Predicting Pesticide and Nitrogen Fate in the Crop Root and Unsaturated Soil Zones: Users Manual for Release 3.0. National Exposure Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens, GA.

EPA. 1999. Jones, R.D., J. Breithaupt, J. Carleton, L. Libelo, J. Lin, R. Matzner, and R. Parker. Guidance for Use of the Index Reservoir in Drinking Water Exposure Assessments. Environmental Fate and Effects Division, Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington, DC.

EPA. 2004. Abel, S.A. Procedure for Conducting Quality Assurance and Quality Control of Existing and New PRZM Field and Orchard Crop Standard Scenarios. Environmental Fate and Effects Division, Office of Pesticide Programs, U.S. Environmental Protection Agency, Washington, DC. Revised 2004.

Garofalo, J. 2002. The Nursery Industry in Miami-Dade County. Publications for the horticultural professionals of Miami-Dade County, Fact-sheet No. 58.

Garofalo, J., E.C. Worden, T. Frohne, and T. Stevens. 2002. Section 4: The Commercial Ornamental Horticulture Industry in Miami-Dade County. In: Degner, R.L., T.J. Stevens, and K.L. Morgan. Miami-Dade County Agricultural Land Retention Study, Appendix A, Vol. 2. Fla. Agri. Market Res. Center, IFAS, University of Florida, Gainesville, Fla. p. 110.

Haan, C.T. and B.J. Barfield. 1978. Hydrology and Sedimentology of Surface Mined Lands. Office of Continuing Education and Extension, College of Engineering, University of Kentucky, Lexington KY 40506. pp 286.

Muñoz-Carpena, R., J.H. Crane, G.D. Israel, and J. Garofalo. 2003. Ornamental growers' water use and conservation practices in Miami-Dade County, ABE347. Fla. Coop. Ext. Service, IFAS, Univ. of Fla., Gainesville, Fla. p. 4. Online at: http://edis.ifas.ufl.edu/AE260.

NOAA. 2006. Climate Normals at Major Weather Observing Stations in all 50 States, Puerto Rico, and Pacific Islands. National Oceanic and Atmospheric Administration (NOAA), Environmental Satellite, Data, and Information Service. Online at: http://www1.ncdc.noaa.gov/pub/data/ccd-data.

UFLIAS. 2006. University of Florida Institute of Food and Agricultural Sciences Extension Commercial Ornamentals Program for Miami-Dade County. Online at: http://miami-dade.ifas.ufl.edu/Programs/commorn.htm.

University of Florida. 2000. Food and Resource Economics Department. A Decade of Change in Florida's Ornamental Plant Nursery Industry, 1989 to 1999. Online at: hortbusiness.ifas.ufl.edu/EIR00-3.pdf

USDA. 1986. Urban Hydrology for Small Watersheds. United States Department of Agriculture, Natural Resources Conversation Service. Technical Release 55.

USDA. 1987. Official Soil Survey of Dade County, Florida. Online at: http://soils.usda.gov/survey/online_surveys/florida/dade/index.html.

USDA. 2000A. Official Series Description – TERRA CEIA Series. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). October 2006. Online at: http://ortho.ftw.nrcs.usda.gov/osd/dat/T/TERRA_CEIA.html

USDA. 2000B. Revised Universal Soil Loss Equation (RUSLE) EPA Pesticide Project. U.S. Department of Agriculture, National Resources Conservation Service (NRCS) and Agricultural Research Service (ARS).

USDA. 2002. 2002 Census of Agriculture. U.S. Department of Agriculture, National Agricultural Statistics Service (NASS). Online at: http://www.nass.usda.gov/census/census02/preliminary/2002censusdates.htm.

USDA. 2003. Official Series Description – BISCAYNE Series. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). October 2006. Online at: http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi?-P.

USDA. 2004a. Nursery Crops 2003 Summary. United States Department of Agriculture National Agricultural Statistics Service. October. 2006. Online at: http://usda.mannlib.cornell.edu/usda/nass/NursProd//2000s/2004/NursProd-07-26-2004.txt.

USDA. 2004b. Agricultural Chemical Usage 2003 Nursery and Floriculture Summary. United States Department of Agriculture National Agricultural Statistics Service. October. 2006. Online at: http://usda.mannlib.cornell.edu/usda/current/AgriChemUsNursFlo/AgriChemUsNursFlo-09-15-2004.txt.

USDA. 2006a. Soil Survey Areas of Dade County, Florida. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), Soil Data Mart. October. 2, 2006. Online at: http://soildatamart.nrcs.usda.gov.

USDA. 2006b. Benchmark Soils of Florida. U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). October 2006. Online at: http://ortho.ftw.nrcs.usda.gov/cgi-bin/osd/osdname.cgi?-P.

Contacts

Joe Garofalo, Ph.D.
Commercial Ornamentals Agent
University of Florida IFAS Extension
18710 SW 288 St.
Homestead, FL 33030 Phone: 305-248-3311
Email: jgarofalo@ifas.ufl.edu