

SCHEDULE 4.3

BEST MANAGEMENT PRACTICES PLAN CITRUS

**UNITED STATES SUGAR CORPORATION
HENDRY COUNTY, FLORIDA**

Prepared for



South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Florida 33406

January 12, 2009

Prepared by



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January 12, 2009

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Subject: **Environmental Best Management Practices Plan-Citrus**
 United States Sugar Corporation
 Hendry County
 State of Florida
 Job # 38617-027

Dear Mr. Taylor,

URS Corporation (URS) is pleased to present this Environmental Best Management Practices (BMP) Plan for the United States Sugar Corporation (USSC) citrus properties in Hendry County, Florida.

It is URS' understanding that as the property owner, the South Florida Water Management District (District) desires to have in place a set of general environmental BMPs for the citrus operations that are designed to maintain/protect water quality in accordance with the State's water quality standards, maintain the soil and water quality at the site which will not prohibit the District from using property as a water attenuation reservoir in the near future, and that will concurrently allow for continued economically-viable agricultural production on the site. This BMP plan is designed to meet these expectations by providing guidance to the USSC property on environmental preventative measures to be proactively implemented.

Respectfully Submitted,

URS Corporation

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1.0 OVERVIEW

1.1 INTRODUCTION

The South Florida Water Management District (District) has acquired approximately 180,000 acres of the United States Sugar Corporation (USSC) properties in Palm Beach, Hendry, Glades and Gilchrist Counties, Florida for future restoration purposes such as water storage reservoirs and wetlands. **Figure 1** illustrates USSC citrus properties. Of the 180,000 acres, an estimated 32,000 acres are used for the cultivation of citrus. Currently 21,500 acres are being actively cultivated for citrus. **Figure 2** illustrates the tracts that are utilized for the cultivation of citrus. This Environmental Best Management Practices (BMP) Plan has been prepared for the citrus production portions of the acquired properties. Portions of the citrus acreage are subleased each year for the cultivation of vegetables. These acres that are used for the growing vegetables or other crops should follow the BMP for vegetable farming which is included as part of the U.S. Sugar BMP Plan for Sugar Cane Production. This BMP Plan shall be implemented by future tenants of the District that engage in citrus production on portions of the acquired properties.

During the interim period (from acquisition to construction/land conversion), the District intends to utilize the property for continued agricultural operations primarily for the cultivation of citrus. In general, this BMP requirements document is not regulatory or enforcement based; however, failure of a tenant to implement the BMP Plan will constitute a breach of the tenant's lease with the District. BMPs are production systems and management strategies scientifically shown to minimize adverse water quality and other environmental impacts of citrus production. BMPs can be defined as those operational procedures designed to achieve greatest agronomic efficiency in food and fiber production, while limiting the off-site effects of agricultural operations and maintaining an economically viable farming operation. All BMPs must protect the environment and be economically viable.

There are several sources of research that have been used to develop BMPs for citrus production in Florida. Primary sources include the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), University of Florida/Institute of Food and Agricultural Sciences (IFAS), Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP), and Florida Department of Agriculture and Consumer Services (FDACS). This document cites pertinent documentation from these sources that may guide the implementation, evaluation, verification and validation of each BMP.

The proposed acquisition areas have been cultivated in citrus for approximately 30 to 35 years. The citrus growing areas are divided into four main parcels referred to as Alcoma, Devils Garden, Dunwody and Southern Gardens citrus groves. Each of these main parcels have an office, at least one maintenance shed and chemical storage room, and re-fueling area. Several diesel powered pump stations were identified throughout the properties. Citrus canker wash stations were observed at each of the entrances to the tracts. Personnel indicated that a copper containing solution was utilized in the spray. Agrochemical application was conducted using mobile equipment and chemical storage is onsite. Disposal of chemical containers is conducted offsite. Subject property personnel indicated there have been no central burn pits for removed trees and that trees were burned in many small areas across the site. An agricultural air strip is located on two of the parcels.



1.2 ENVIRONMENTAL SITE ASSESSMENT (ESA)

Phase I and Phase II Environmental Site Assessment (ESA) activities were conducted on the property in August and September 2008 by Professional Services Incorporated (PSI). Identified areas of potential point source concerns associated with the citrus operations are:

- Chemical Storage and/or Maintenance Areas
- Equipment Staging Areas
- Mix and Load Areas
- Fuel Storage / Re-fueling Areas
- Diesel Powered Pump Stations
- Canker Wash Stations
- Airplane Landing Strips

Section 2.0 provides descriptions of a variety of environmental BMPs to be considered as part of the citrus operations. Although all BMPs are important with the need for diligent on-going implementation, particular attention needs to be addressed to the following:

- Pump Stations
- Chemical Storage Areas
- Copper Based Nutrients

Given below is a summary of the observations made during the Phase I ESA, as well as the results of the Phase II ESA at the above referenced areas/issues and URS' recommendations to address the issues.

- Diesel powered pump stations with aboveground storage tanks (ASTs) used to store diesel fuel were observed on the properties. The pump stations are used to control to water in the groves. Soil staining and/or petroleum impacted soils were identified at most of the pump stations. **URS recommends implementing preventative measures for petroleum spills and diesel AST leaks. This should include repairing any leaks and use of absorbent material when leaks and/or spills occur. URS also recommends routine site inspections when the pumps are in operation to verify the pump stations are being properly maintained and in compliance.**
- Chemical and equipment storage areas were observed on the properties. Areas of petroleum and agrochemical stained soil and stressed vegetation were observed at the chemical and equipment storage areas. **URS recommends improving housekeeping at the storage areas. This should include proper handling and storage of agrochemicals and use of absorbent pads and materials at the equipment storage areas. URS also**



recommends monthly site inspections to verify the storage areas are being properly maintained.

- During the Phase I ESA, PSI identified copper based nutrients from the USSC pesticide application records. Due to these copper based nutrients, PSI analyzed for copper in the citrus grove areas during the Phase II ESA. PSI divided the citrus cultivation area into 40-acre grids and sampled approximately 50% of these 40-acre grids that were historically and currently cultivated with citrus. An eight point composite sample was collected from each grid with each aliquot representing approximately 5-acres. Additionally, discrete soil samples were collected throughout the citrus groves in each of the 5-acre grids. All aliquots were collected from a depth of 0 to 6-inches bls using a stainless steel sample barrel. The Phase II ESA sampling did not identified areas of elevated copper in the citrus groves above the Service provisional Snail Kite threshold level of 85 milligrams per kilogram (mg/kg). URS personnel reviewed the current rates of application and amounts of copper based nutrients applied on the USSC property. Utilizing this information, a mass balance equation was developed in order to determine if additional acreage would be impacted by copper based on the current application activities. URS has determined that no acreage would be affected by elevated levels of copper above the Service provisional 85 mg/kg. **Therefore the current agrochemical application regiment in the citrus groves is acceptable. URS recommends sampling select areas within the citrus groves every other year in order to monitor the copper concentrations in the soil. In the event that USSC plans to increase the applications rate of copper based agrochemical, URS recommends that USSC discuss the application increase with the District.**

1.3 OBJECTIVE

Given below are sets of guidelines proposed for the day-to-day citrus farming operations:

- Continued economically-viable citrus grove operations on the properties that is agreeable for implementation by the lessee/tenant during the interim use,
- Maintain/protect water quality in accordance with the State's water quality standards, prevent exceedances of applicable State soil and groundwater Cleanup Target Levels (CTLs) as set forth in Table 1 and 2 of 62-777, F.A.C., and implement such measures as necessary to maintain existing levels of pollutants and not interfere with Lessor's intent to use the premises as a future water resource project,
- Comply with State regulations that are applicable to the citrus grove operations that result in conditions that will maintain the soil and water quality at the site which will not prohibit the District from using the property as a water attenuation project area at the end of the interim use period.
- Comply with permits/consent agreements issued by the District approving the site specific BMP plan for Water Management, Nutrient Management and Fertilizing, and Erosion/Sediment Control and the Discharge Monitoring Plan for nutrients (phosphorus and nitrogen).



A list of agrochemicals currently used was provided to the District. The chemical usage list is included in *Section 6.0 Acceptable Agrochemicals and No Application Periods*. In the event that changes are made to the agrochemical list, a revised list should be provided to the District and should consist of a detailed specific agrochemical and pesticide product list, to include the quantity used, rates of application, and an evaluation of crop areas for effectiveness of the pesticides.

The U.S. Fish and Wildlife Service (Service) document titled “Derivation of No Application Periods for Interim Use Pesticides” defines the no application period as *the period of time prior to the conversion of the agricultural land to conservation purposes (i.e. flooding to create wetlands) during which a particular pesticide hazardous to fish and/or wildlife should not be applied, in order to allow adequate time for breakdown of pesticide residues before use of the land by the Service trust resources. This period of time was defined as five times the median half-life, representing 97% degradation*. A copy of this document is included in **Appendix A**.

1.4 BMP CHECKLIST

A BMP Checklist has been developed for the citrus grove farming on the property represented by the District. The BMP Checklist is provided as a guide for site inspections, observations and verifications as part of the BMP. This checklist identifies areas, issues, and items requiring inspection and verification. The purpose of the BMP Checklist is to insure consistency for each site visit and for other sites with similar agricultural operations. A copy of the checklist is included in **Appendix B**.

The following table provides a quick-glance reference specific to nutrient (phosphorus and nitrogen) load reduction BMPs. As provided in Schedule 4.1, a separate District-approved BMP Plan is required for each land use or crop for nutrient load reduction. BMP Plans shall be implemented across the entire farm acreage (drainage area) with individual BMPs consistently implemented during the water year across each land use (crop) area. The BMP Plans shall include BMPS from each of the following categories: water management, nutrient control practices, and particulate matter and sediment controls. Nutrient control practices at a minimum shall include spill prevention, soil testing, and fertilizer application control. The Table below provides an array of nutrient load reduction BMPs available for selection by operators. However, operators may propose other BMPs, to meet the minimum required BMP equivalent points, for review and approval by the District.

Further discussion of each BMP and key points to assist with advance preparation of BMP site verification and BMP optimization efforts are provided in the following Sections.



Nutrient Load Reduction Best Management Practices BMP Description and Equivalent Points Reference Table

BMP	PTS	DESCRIPTION
NUTRIENT CONTROL PRACTICES		MINIMIZES THE MOVEMENT OF NUTRIENTS OFF-SITE BY ENSURING RECOMMENDED APPLICATION RATES AND CONTROLLED PLACEMENT OF APPLICATION
Nutrient Application Control	2 ½	Uniform and controlled boundary application of nutrients with a minimum 4' setback from canals with no overlapping application for each application method (e.g. banding at the root zone or side-dressing, pneumatic controlled-edge application such as AIRMAX); fertilization through low volume irrigation system applied at root zone (fertigation); controlled placement by fertilization under plastic near root.
Nutrient Spill Prevention	2 ½	Formal spill prevention protocols (storage, handling, transfer, and education/instruction).
Manage Successive Vegetable Planting to Minimize P	2 ½	Avoid successive planting of vegetables or other crops having high P needs to avoid P build up in soils. Includes successive planting with no successive P application.
Recommended Nutrient Application based on Plant Tissue Analysis	2 ½ 5	Avoid excess application of P by determining plant nutrient requirements for adjustments during next growing season (crop specific). Pastures with Bahiagrass – Plant tissue analysis along with soil test is required to make nutrient application recommendation. Citrus– Additional points allowed for citrus because it provides information on current season P requirements.
Recommended Nutrient Application based on Soil Testing	5	Avoid excess nutrient application by determining P requirements of soil and follow standard recommendations for application rates (crop specific).
Split Nutrient Application	5	More efficient plant uptake of P by applying small portions of total recommended P at various times during the growing season. Not to exceed total recommendation based on soil test.
Slow Release P Fertilizer	5	Avoid flushing excess P from soil by using specially treated fertilizer that releases P to the plant over time.
Reduce P Fertilization	5	Reduce the P application rate by at least 30% below standard recommendations based on soil tests and development of site – specific (optimized) recommendations or application methods. Provide basis for reduction credit.
No Nutrients Imported Via Direct Land Application	20	No Application of P, in any form, to the soil for amendments or plant nutrients. (Native and Semi-improved Range can claim this BMP and still apply fertilizer at maintenance, or less than optimum production levels, as a grass supplement every 6-8 years.)



No Nutrients Imported Indirectly Through Cattle Feed	15	No P import to the basin through cattle feed (note: only native range can use mineral supplements or molasses and still meet this BMP)
Nutrient Management Plan	5 - 25	Managing the amount, source, placement, form, and timing of the application of nutrients on lands with cattle operations. See Rule 40E-63.402 (2)



BMP	PTS	DESCRIPTION
WATER MANAGEMENT PRACTICES		MINIMIZES THE QUANTITY OF OFF-SITE DISCHARGES WHICH CARRY NUTRIENTS DOWNSTREAM
½ Inch Detained	5	Delayed discharge (based on measuring daily rain events using a rain gage).
1 Inch Detained	10	
Improvements to Water Management System Infrastructure to Further Increase Water Quality Treatment by Delayed or Minimized Discharge	5	Recirculation of water inside farm boundaries to improve WQ prior to off-site discharge, includes: fallow field flood water with no direct discharge (instead allow to “drain” via evapotranspiration, seepage, use as irrigation water); or Increasing water detention using properly constructed canal berms.
Low Volume Irrigation	5	Use of low volume irrigation methods, e.g. drip irrigation, microjet irrigation.
Approved and Operational Surface Water Reservoir (Fully Certified)*	20	Properly permitted, constructed and maintained storage system meeting specified Environmental Resource Permit (ERP) Basis of Review criteria (version in effect at the time of permitting or in effect at the time of permit modification for modified systems).
Temporary Holding Pond	15	Temporary agricultural activities (as described in Chapter 40E-400, FAC.) with a properly constructed and permitted temporary holding pond.
Overland Sheet Flow Over Entire Property	15	No drainage improvements made to property so that property drains through overland sheet flow, or drainage improvements such as ditches have been removed to restore overland sheet flow drainage to the property.
No Point Discharge of Surface Water	15	Voluntarily disabling of drainage or implementation of other permanent means to prevent point discharge.
Tailwater Recovery System	10	A planned irrigation system in which facilities have been installed and the system is operated to collect, store, and transport irrigation tailwater and/or rainfall runoff that would have been discharged offsite without the system.
Precision Irrigation Scheduling	10	Combination of soil-moisture measuring equipment, specialized irrigation decision tools (e.g. computer software), and/or remote sensing tools to ascertain real-time crop needs to maximize irrigation system performance and to develop precise irrigation scheduling (time, location and amount).

**Surface water reservoir certification refers to a construction completion certification by a Florida licensed Professional Engineer as required in Chapter 40E-4, F.A.C., using Form 0881A for projects permitted



after October 3, 1995, and Form 0881B for projects permitted prior to October 3, 1995, or the current certification requirements of Chapter 40E-4, F.A.C. (except where not required by existing permits).



BMP	PTS	DESCRIPTION
PARTICULATE MATTER AND SEDIMENT CONTROLS		MINIMIZES THE MOVEMENT OF P, IN PARTICULATE MATTER AND SEDIMENTS, OFF-SITE BY CONTROLLING THE AMOUNT OF ERODED SOIL AND PLANT MATTER IN DISCHARGE
Any 2	2 ½	- erosion control by leveling fields - reduce soil erosion using grassed swales and field ditch connections to laterals
Any 4	5	- minimize sediment transport with slow velocity in main canal near discharge structure - minimize sediment transport into canals by constructing ditch bank berms
Any 6	10	- minimize sediment build-up through a canal cleaning program - reduce sediments transported offsite by using field ditch drainage sumps
Any 8	15	- minimize sediment transport with slow field ditch drainage near pumps/structure - reduce sediments transported offsite by maintaining a sediment sump/trap upstream of drainage structure - reduce sediment transport through the use of grassed waterways - reduce sediment transport through the use of filter strips or riparian buffers adjacent to waterways. No P is applied to these areas. - reduce sediments transported offsite by raising culvert bottoms above all ditch bottoms to minimize sediment transport - reduce sediments transported offsite by stabilizing soil through infrastructure improvements at canal/ditch intersections (e.g. flexible plastic pipe, polymer treatment) - maintain sustainable forage growth on pasture to reduce soil erosion/range seedings - reduce soil erosion with constructed ditch bank stabilization - reduce soil erosion with cover crops (not fertilized) - maintain vegetative cover in upland areas to reduce soil erosion - reduce soil erosion with vegetation on ditch banks - minimize P from plants by aquatic weed control (P source) at main discharge locations - reduce debris and aquatic plants (P source) leaving the site by using barriers at discharge locations



BMP	PTS	DESCRIPTION
PARTICULATE MATTER AND SEDIMENT CONTROLS FOR PASTURE MANAGEMENT		MINIMIZES NUTRIENTS IN DISCHARGES THROUGH ON SITE OPERATION AND MANAGEMENT PRACTICES
	2 ½	restricted placement of stored feed and feeders to reduce "hot spots" near drainage ditches
	2 ½	restricted placement of cowpens to reduce "hot spots" near drainage ditches
	2 ½	restricted placement of water to reduce "hot spots" near drainage ditches
	2 ½	provide shade structures to prevent cattle in waterways
	5	low cattle density (1 head/2 acres, nonirrigated pasture)
	10	restrict cattle from waterways through fencing of canals in a manner that protects water quality



2.0 WATER RESOURCE MANAGEMENT

The drainage systems that have been developed in the USSC property to make productive agricultural and urban land have increased drainage frequency, discharge volumes, and the velocity of water discharged from structures within the watershed compared with the natural condition. An existing permit, issued by the District, for the USSC property drainage systems is currently in place. Excess rainfall from high intensity thunderstorms, tropical storms, and hurricanes must be drained to protect agricultural and urban areas from flooding. Under natural conditions, water from these areas would be cleaned by traveling downstream via tributaries before reaching coastal water bodies. Implementation of the practices and policies in this Section will improve water quality and maintain natural variability and the aquatic ecosystems in the USSC citrus production property.

Wherever feasible, citrus growers will implement surface water management strategies consistent with the surface water management or ERP permits. . These surface water management strategies should also consider benefits from improved ditch maintenance and water table management. . It is important to conduct site-specific evaluations to determine if additional measures can be provided on-site and to plan long-term water management strategies that will minimize off-site discharges. .

2.1 WATER TABLE MANAGEMENT

Water table can be managed more efficiently by having sufficient hydraulic capacity in the ditch/canal system, using water control structures on culverts, laser land leveling where appropriate, constructing and maintaining a properly designed drainage system, and actively monitoring the water table. Based on the Phase II ESA, the existing system is satisfactory and is consistent with the District's goals and objectives.

Effective water management of flatwoods soils requires monitoring the water table depth with enough precision to minimize pumping for irrigation and drainage. Knowledge of the water table depth is essential to ensure that adequate drainage can be provided. Since a significant portion of the tree water requirements can come from upward flux from the water table, water table monitoring is an essential tool in irrigation management. Water table manipulation, and associated supplemental irrigation reductions, can also assist in salinity management by reducing the use of low quality groundwater.

2.2 SCHEDULING IRRIGATION AND DRAINAGE

The main management objective is to minimize the overdrainage of the property by the active control of the site water table. Irrigation mostly affects the movement of water-soluble chemicals while drainage mostly affects the movement of chemicals absorbed to soil particles. Irrigation at the properties principally consists of microjet irrigation. The microjet system on the property is effectively operating and is acceptable by the District. Site verification will include discussion and BMP-related records review with operation managers to understand property water management approach and visual observation of structures and tools used to assist with water management decisions.

Operation managers should use real-time weather monitoring to proactively manage or limit drainage and/or irrigation events. Effective water management is achieved through water control structures such as designed culvert sizes and openings or culverts with flashboard risers. Control elevations will be established to initiate and stop draining or pumping. If feasible, the operation manager will partition the property into hydrologic blocks to allow for internal water management as opposed to one location at a downstream point. Water level indicators (e.g., floats, staff gages) will be used to provide a visual



indicator of actual water table levels for use in optimizing water management (drainage and irrigation) practices. Where reservoirs do not exist, daily operation and maintenance of off site discharge structures must be properly recorded on field logs ensuring that established control elevations are met. Field log data shall include recording the water table elevations during pump start-up and shut-down times, and pump rpms as applicable.

Soil moisture measurements should be recorded to determine optimum times for irrigation and irrigation limits. The properties are currently utilizing the Agrolink system that uses soil monitoring probes to measure the soil moisture at various depths down to 36-inches below land surface.

2.3 MODERATE DISCHARGE RATE

Adjust the rate of discharge proportionate to the rate of lateral movement of water through soils. Slowing the discharge rate will lessen the turbulence, reduce sediment movement, reduce erosion, and moderate the impacts on the receiving water body.

2.4 WATER FURROW MAINTENANCE

Maintain a consistent bottom slope on water furrows between beds to achieve uniform drainage. Avoid rutting and sloughing of water furrow areas. Laser or RTK-GPS guided systems on water furrow maintenance equipment can be very effective in producing uniform slopes in water furrows. Where possible, maintain vegetation management programs that minimize soil movement in the event of heavy rains by keeping a grass or vegetation cover on the soil surface in between tree rows. For additional information refer to the Erosion Control and Sediment Management Section in this document.

2.5 MONITOR SOIL MOISTURE

The Agrolink system for soil moisture measurements is used in conjunction with water table observation wells and staff gauged in the canals for irrigation and drainage management to avoid excess soil moisture depletion and minimize water volume requirements during irrigation cycles. This system of soil monitoring is appropriate and acceptable by the District.

2.6 DRAINAGE MANAGEMENT PLAN

Implement and maintain a written drainage management plan that provides specific responses to various types and levels of rainfall. The goal of the plan is a reduction in volume of off-site discharge while maintaining a healthy rooting environment for citrus trees thus maximizing fruit production. The plan will include target water table levels and pump or drainage structure operating procedures that will be used for typical and extreme rainfall events. Consideration should be given to the use of existing canals and ditches for temporary water storage.

2.7 DRAINAGE RATE AND VOLUME

Drainage rates and the volume of water released or discharged following intense rainfall events should provide an adequately drained root zone while minimizing off-site impacts. The system operating the drainage rates and volumes will be in compliance with existing drainage permits.

When the water table approaches the target level, off-site discharges should be moderated. Depending on the grove design, irrigation method (e. g. microirrigation and seepage irrigation), and soil characteristics this may require adjusting pump speed and the discharge structure or pulse drainage. Pulse drainage



involves discharging for short periods of time and then allowing for recharge in the ditches. If adequate drainage in one portion of a grove results in water tables that are below target levels in another area, ditch cleaning, drain-age system redesign, or auxiliary pumps may be needed to achieve more uniform drainage.

2.8 DISCHARGE STRUCTURES

Structures and/or pumps that regulate off-site water discharge should be adequately designed, constructed, and maintained so that target water table levels within the grove can be achieved.

If safety or operational concerns prevent structures from being adjusted to regulate discharges during storm drainage events, they should be rehabilitated or replaced. (e.g. modifying riser-board structures to allow easier water level control). For additional information see your local NRCS and District representative.

2.9 DETENTION, TAILWATER RECOVERY, AND SURFACE WATER USES

Where possible, on-site detention should be utilized to reduce both the rate and volume of off-site discharges.

Detention areas allow all or a portion of the drainage water to be temporarily stored on-site. The excess water can be stored for tailwater recovery or released later at low flow rates. The size, type, and location of proposed tailwater recovery ponds are variables considered when determining the need for an Environmental Resource Permit. Growers should contact their local District office and land manager for guidance on the issue. Most of the citrus groves in the USSC properties have permitted stormwater impoundments.

If a tailwater recovery program is proposed, the planning, construction, evaluation of costs, and permitting will need to be discussed and reviewed by the District.

The properties are all in compliance with Section 2.1 through 2.9 with the exception of Section 2.6 – Drainage Management Plan. It is URS' understanding that USSC is in the process of developing a written Drainage Management Plan for the citrus properties.



3.0 EROSION CONTROL AND SEDIMENT MANAGEMENT

Sediments or suspended solids are recognized forms of water pollution and often result in the loss of ditch or canal capacity. Unlike many chemical pollutants, sediment is a natural component of water bodies and the resources they support. Excessive amounts of suspended solids or sediments are often a product of erosion from unstabilized or disturbed land areas. These solids originate from four primary sources:

- Soil-particles eroded into ditches
- Soil-particles eroded from ditches
- Plant material washed into the ditches
- Plant and biological material growing within the ditches and canals.

Excessive sediments deposited on stream bottoms and suspended in the water column can harm fish spawning and impair fish food sources, reduce habitat complexity, potentially harm public water supply sources, and reduce water clarity.

In addition to potential downstream water quality impacts, the build-up of silts and sediments in the grove/farm-level, secondary, and primary drainage canals reduces ditch and canal cross-section. This reduction in cross-sectional area results in higher water velocities, as compared to an unfilled ditch or canal. This higher water velocity (compared to unfilled ditches/canals) may induce greater amounts of erosion of fine and coarse particles from ditch and canal banks. The presence of shoals and sandbars are good indicators of soil losses. Field erosion also results in site degradation resulting in increased costs for ditch-cleaning and reshaping of beds and furrows. In order to minimize effects of sediment transport in surface water, efforts should focus on keeping soils in the fields and along canal and ditch banks.

Minimizing downstream transport of sediments from groves and canal/ditch banks requires an integrated approach of managing erosion at the grove-level, the secondary canal system level and primary canal system level. It should be noted that maximum sediment losses from groves are expected during construction of new groves or renovation of older ones. Losses from mature, well managed groves will be much lower. The following Sections describe BMPs that are applicable for water conveyances within citrus groves. The selection and implementation of particular BMPs must be based upon site-specific circumstances and management styles.

3.1 RISER-BOARD WATER CONTROL STRUCTURES

Water discharge structures are used to control water table levels and surface water levels in drainage ditches within flatwoods citrus groves. The type of structure selected can significantly influence the quality of water discharges. With riser-board control structures, water is forced to flow over the top of the boards. This flow path creates a low current area towards the bottom of the structure, which facilitates the deposition of sediments and their accompanying nutrients or pesticides, essentially removing them from the discharges. Conversely, screw-gates structures do not create this dead-current zone. Since they open from the bottom, sediments and their accompanying load are swept out along with the discharge water.



3.2 SEDIMENT SETTLING BASINS

Create and maintain localized settling basins (sumps) throughout the groves to trap sediments prior to water discharge points from the grove where practical. Successful sediment traps require site-specific designs, with the following requirements:

- Determine runoff volume and intensity.
- Determine transport and settling rates for sediments of concern.
- Size traps to allow adequate residence time for natural settling to occur - include considerations for allowable storage (fill-up) of trapped sediments.
- Make provisions for materials removed from the ditches so that it does not create a situation that contributes to nutrient loads discharged off site.
- Maintenance access to settling basin area should be provided.
- When sediments are removed, materials need to be placed in a manner that prevents material from sloughing back into the waterway.
- Sediment excavation and removal should be conducted during low stage conditions or during the dry season. This will reduce the likelihood of increasing turbidity and suspended solid loads.

Settling basins or settling ponds are a quick and simple way to remove sediments out of runoff water. Settling basins simply slow down the water, allowing sediments to settle out of the water before the water returns to the receiving water body.

NOTE: Existing detention impoundments may function as sediment settling basins.

Currently, the Devils Garden, Southern Gardens, and Dunwody citrus groves each have a series of sediment settling basins. At these properties, each block in the groves contains a ditch that flows to lateral canals and then to a specific retention pond, depending upon the location on the property. The retention ponds then operate as a series of sumps that allow for the sediment to settle to the bottom of the retention ponds. After adequate residence time occurs, the water from the retention ponds flows to a discharge pond where it is discharged off the property. The Southern Gardens and Dunwody groves each have one discharge pond while the Devils Garden grove contains three discharge ponds. The Alcoma Citrus does not contain retention ponds but rather a canal system that allows for adequate residence time for natural settling prior to being discharged from the property.

3.3 DITCH CONSTRUCTION

Construct ditches and canals with side-slopes consistent with soil types.

3.4 STABILIZE BARE SOILS

Stabilize bare soils and canal or ditch banks by encouraging coverage by noninvasive vegetation. Vegetation types selected should be adapted to grove conditions and should provide maximum stabilization by roots and foliage. Vegetative buffer strips can also serve to reduce the erosion of soil particles. Whenever practical, plant or encourage establishment of native species.



3.5 DITCH BANK CONTOURS

Contour ditch bank top edges or berms to divert water away from the drainage ditch.

This practice will minimize overland flow of storm-water directly down the banks.

3.6 DITCH BANK VEGETATION MAINTENANCE

Broadleaf weed control using herbicides or maintenance mowing of slopes and ditch banks increases grass cover and decreases the proliferation of shade-producing shrubs and weeds, thus reducing erosion from wind and rainfall.

Points to Consider:

- Mechanical mowing does not uproot vegetation and expose soil.
- The use of herbicides shall be conducted with caution and precision to avoid creating areas of bare soil.
- Selective herbicides should be used in order to maintain desired vegetation (e.g. remove broad-leaf vegetation while maintaining grasses).

3.7 PROTECT DITCH BANKS

Protect canal and ditch banks from erosion in areas subject to high water velocities.

In areas where water is constricted (usually at discharge points) or at ditch intersections where velocities are high, rip-rap, concrete, headwalls, or other materials that buffer turbulence should be used to protect ditch banks and reduce sediment transport.

3.8 VEGETATIVE STABILIZATION (WATER FURROWS)

Plant noninvasive vegetation and/or maintain desirable vegetation within all water furrows to prevent/minimize erosion and trap sediments that may result from stormwater runoff or irrigation drainage.

3.9 AQUATIC PLANT MANAGEMENT

When removing vegetation from ditch bottoms, avoid disrupting side slopes.

If a backhoe without a vented bucket is used to remove aquatic plants from grove ditches, special precautions must be taken to prevent washouts. Once a bucketful of vegetation is picked up, the bucket should be raised to allow most of the water to drain out over the deeper part of the ditch. The boom should be swung far enough over the ditch bank so that when the vegetation is dumped, remaining water will flow away from the ditch.

Note that chemical control of mature aquatic vegetation may result in large amounts of labile particulate phosphorus levels from farms. Timing and selection of methods for aquatic vegetation control shall prevent generation of particulate phosphorus due to inappropriate aquatic vegetation control methods and disposal. Glyphosate based herbicide Rodeo may be spot applied on the aquatic vegetation, followed by removal of the dead vegetation. Excessive amounts of Rodeo application are not allowed.



3.10 DITCH MAINTENANCE CLEANING AND DREDGING

Develop and implement a systematic management plan for removing sediments from canals and farm ditches on a regular basis.

Maintenance dredging of existing ditches, canals, and intake and discharge structures shall include the following:

- Spoil material should be removed and deposited on an area that will prevent the movement of the water and excavated spoil material into wetlands or other surface waters.
- Do not remove any more material than is necessary to restore the original design specifications or configurations.
- No significant impacts should occur to previously undisturbed natural areas.
- Erosion and sedimentation control devices (e.g., turbidity screens) should be used to prevent bank erosion, scouring, and to prevent turbidity from discharging into adjacent waters during maintenance dredging.

Removal of excess sediment to the originally designed and constructed cross-sectional area generally increases the canal cross-sectional area and reduces water velocities (compared to same water volume in filled-in systems), thus reducing the potential for bank scouring. Caution should be considered as ditch maintenance, cleaning and dredging beyond the originally designed and constructed cross-sectional area may result in upstream and/or downstream adverse water resource impacts. Routine maintenance of the canals are, in general, conducted on a yearly basis.

If not part of standard ditch/canal maintenance, prior to conducting non-routine maintenance, in order to reduce the potential for misunderstandings with regulatory agencies and adjacent property owners, growers are highly encouraged to initially schedule a site visit with a local District representative to discuss and review the non-routine ditch maintenance activities.

3.11 HERICIDE APPLICATIONS (WATER FURROWS)

Restrict the area of tree-row applied herbicides to within the canopy dripline of the citrus trees.

The restricted herbicide band width will maximize the width of grassed water furrow slopes. Grassed water furrows serve as filters, preventing sediment movement from the fields into the drainage systems.

For young plantings, minimize the width of tree-row applied herbicides and establish vegetation in the water furrows. Smaller band widths will reduce the quantity of herbicides applied, thereby reducing material costs while minimizing potential of soil erosion into the drainage systems. As the trees increase in canopy width, the herbicide band width can be increased to match canopy size.

3.12 MIDDLES MANAGEMENT (HERBICIDE)

Suppress undesirable vegetation on bed tops and in water furrows.



3.13 GROVE DEVELOPMENT/RENOVATION

Upon completion of the soil bedding process within citrus groves, all bare soil areas (except tree rows) should be planted with grass or other vegetation species to minimize soil movement from rain and/or wind.

Bare soil surface, during windy conditions, can provide sufficient soil to blast the bark of young trees and allow movement of soil into water furrows and other drainage systems.

3.14 WATER FURROW DRAIN PIPES

Use PVC drain pipe or flexible pipe to connect all water furrows or field ditches to lateral ditches. Extend the pipe on the downstream side away from the ditch bank to prevent bank scouring.

3.15 WATER FURROW MAINTENANCE

Use water furrow drain pipes with managed vegetation in furrows to reduce surface water transfer velocity from the furrows to the drainage ditches and canals.

3.16 CONSTRUCTION AND TEMPORARY EROSION CONTROL MEASURES

In the event that large-scale, non-routine construction is required, then special measures and/or temporary erosion control measures will be taken during construction and renovation of groves, when culverts and control structures are replaced or repaired, and when there is a major disruption of established vegetation such as during irrigation system installation or when buried water lines are repaired.

Erosion control measures are used to minimize sediment transport and protect the quality of water bodies that receive runoff from disturbed areas. The most common temporary erosion control tools include straw or hay bale barriers, silt screens, and silt fences; however, more permanent control can be obtained through the use of specialized blankets and mats, gabions, and other systems used for soil stabilization.

The cost of erosion control options are highly variable and agricultural producers are encouraged to consider economics and site-specific conditions when selecting the most appropriate erosion control system for a particular action. When selecting an erosion and sediment control method, it is recommended that a NRCS representative, engineer, and/or a District Ag-Team member be consulted. This current erosion control on the property is appropriate and acceptable by the District.



4.0 PEST MANAGEMENT

Over the last 20 years, great strides have been made in the development of crop protection (CP) products that are more target specific, less harmful to the environment and safer to those who handle and apply these products. The development and implementation of responsible farm management practices that promote the proper handling of these products also has contributed significantly to reducing the risk of environmental problems and protecting water resources, pesticide handlers and agricultural workers.

4.1 INTEGRATED PEST MANAGEMENT (IPM)

Adopt an Integrated Pest Management (IPM) program. IPM is an integrated system using a combination of mechanical, cultural, biological, and chemical approaches to best meet the goals of the program. This approach provides better and more economical management of most pests.

IPM is a philosophy of managing pests that aims to reduce farm expenses, conserve energy, and protect the environment. IPM is a broad, interdisciplinary approach using a variety of methods to systematically manage pests which adversely affect people and agriculture. IPM does not, as many believe, mean that no CP products are used. Rather, it means that CP products are only one weapon against pests and they should be used judiciously, and only when necessary.

The goals of an IPM program are:

1. Improved control of pests, through a broad spectrum of practices that work together to keep pest populations below economically significant thresholds.
2. More efficient CP product management through less frequent and more selective use of CP products.
3. More economical crop protection from reduced chemical costs and more efficient protection.
4. Reduction of potential hazards to farmers, workers, consumers, and the environment through reduced CP product exposure.

IPM accomplishes these goals using resistant plant varieties, cultural practices, parasites and predators, other biological controls such as *Bacillus thuringiensis* (BT), and other methods including chemical CP products as appropriate.

The basic steps for an IPM program are:

1. Identify key pests and beneficial organisms and the factors affecting their populations.
2. Select preventative cultural practices to minimize pests and enhance biological controls. These practices may include soil preparation, resistant rootstocks/scions, modified irrigation methods, cover crops, augmenting beneficials, etc.
3. Use trained “scouts” to monitor pest populations to determine if or when a control tactic might be needed.
4. Predict economic losses and risks so that the cost of various treatments can be compared to the potential losses to be incurred.
5. Decide the best course and carry out corrective actions.



6. Continue to monitor pest populations to evaluate results and the effectiveness of corrective actions. Use this information when making similar decisions in the future.

USSC currently has an IPM program in place and the policy has been implemented.

4.2 LABEL IS THE LAW

Read and understand the CP product label. The label is the law. Pay special attention to the “Environmental Hazards” section of the label. This applies to all sections following.

4.3 PRODUCT SELECTION

Select target-specific active ingredients that consider natural systems in epidemiological cycles and modes of action (i.e. insect growth regulators, botanicals, and biologicals).

Agricultural use of CP products should be part of an overall pest management strategy, which includes biological controls, cultural controls, pest monitoring and other applicable practices, referred to altogether as Integrated Pest Management or IPM. When a CP product is needed, its selection should be based on effectiveness, toxicity to non-target species, cost, and site characteristics, as well as its solubility and persistence.

While the focus of the IPM program is for field populations of mites, insects, nematodes disease pathogens and weeds, CP products also are prescribed for post-harvest maintenance of fruit quality. Some of these situations require pre-harvest applications as part of the overall management strategy. Due consideration needs to be given to these treatments in the overall crop BMPs.

4.4 MINIMIZE SPRAY DRIFT

Reduce the potential for drift through appropriate selection of nozzles, spray pressure, and application methods or techniques for the formulation applied and equipment used. Always follow the label.

- Use nozzles that produce as large of a droplet size as possible while yielding adequate plant coverage and pest control.
- Leave a buffer zone according to the crop protection label between the treated field and any sensitive areas.
- Drift control agents can be tank mixed with herbicides to reduce spray drift.

4.5 APPLICATION TIMING

Time CP product applications in relation to current soil moisture, anticipated weather conditions, and irrigation schedule to achieve greatest efficiency.

For weather information:

Florida Automated Weather Network: <http://fawn.ifas.ufl.edu/>

National Oceanic and Atmospheric Administration: www.NOAA.gov

National Oceanic and Atmospheric Administration: <http://weather.noaa.gov/>

The Weather Channel: www.weather.com



4.6 PRECISION APPLICATION OF CP PRODUCTS

Use precision applications of reduced amounts of material to smaller trees in order to minimize application of CP products to non-target areas and result in more efficient utilization of applied materials. The method of CP product application, such as ground or aerial spraying, wicking, granules, etc., is important since the degree of drift and volatilization can vary considerably.

Some “intelligent” spraying systems are equipped with three-dimensional range sensors that can map the image of a tree up to 100 ft away on either side of the sprayer. These sensors feed the size, height, and location of the tree into an on-board computer that then turns on spray nozzles inches before the sprayer reaches the tree and turns them off inches past the tree. The nozzles are controlled by electric solenoid valves which are set up in zones so that only the foliage detected by the scanner is sprayed.

It is important that “intelligent” systems be properly maintained and operated and that equipment operators are trained in their use. Proper operation of “intelligent” systems is essential for efficient use of CP products.

Equipment without intelligent systems should have nozzle arrangement to avoid overspray based on tree height. This is sometimes referred to as “nozzling-down” to conserve spray materials and ensure application to target areas.

Other systems have been developed that utilize sonar for detecting foliage. These systems utilize ultrasonic impulses to detect the presence or absence of trees and plants. Sensors are installed on each side of the sprayer that may be aimed in any desired direction to cover optimal zones. The number of sensors can vary depending on the diversity of tree sizes within the grove.

Regardless of application system, proper training of applicators and maintenance of spray systems is essential to good management.

4.7 MAINTENANCE AND CALIBRATION

Proper calibration and maintenance of CP product application equipment is essential for the proper application of agricultural chemicals. Equipment without “intelligent” systems should be manually nozzled down or otherwise adjusted when necessary to ensure proper application rates.

Calibration is the process of measuring and adjusting equipment performance. Application equipment that must be calibrated includes granule-applying devices; hand, backpack, boom, air-blast and other sprayers; soil fumigation devices; and injection equipment used for chemigation work. Calibration is not difficult. Calibration requires some arithmetic. Consult IFAS publication SM-53 or other publications for details and examples of calibration calculations.

CP product application equipment can deliver the correct amount of CP product to the target site only if it is working correctly. Before you start to calibrate any equipment, first make sure that all components are clean and in good working order.

To accurately calibrate any device, you must be familiar with the machinery. Follow the manufacturer’s directions carefully – they usually explain how to adjust the equipment. Pay particular attention to the parts (such as nozzles and hopper openings) that regulate how much CP product is released. If these parts are clogged, not enough product will be released. If they are worn, too much product will be released.



Keep application equipment properly calibrated and in good repair. Correct measurement will keep you in compliance with the label, reduce risks to applicators, farm workers, and the environment, and save you money. Calibrate using clean water and do not calibrate equipment near wells, sinkholes, or surface water bodies. Measure CP products and diluents accurately to avoid improper dosing, preparation of excess or insufficient mixture, or preparing a tank-load of mixture at the wrong strength.

Proper application of CP products will help reduce farm costs. Improper application can result in wasted chemicals, marginal pest control, excessive carry-over, or crop damage. As a result, inaccurate application is usually very expensive.

4.8 RECORD KEEPING

The Florida pesticide law requires certified applicators to keep records of all restricted use pesticide (RUP). The federal Worker Protection Standard (WPS) requires employers to post information for employees of all pesticides applied. Maintain accurate CP product records to meet legal responsibilities and to document production methods.

CP product record keeping requires you to have current knowledge concerning the application of CP product materials within your area of influence. In addition, Florida law requires that you record the following items to comply with the restricted use pesticide record-keeping requirement:

- Brand or product name
- EPA registration number
- Total amount applied
- Location of application site
- Size of area treated
- Crop / variety / target site
- Month / day / year of application
- Name and license number of applicator (If applicator is not licensed, record his/her name and the supervisor's name and license number.)
- Method of application
- Name of person authorizing the application, if the licensed applicator does not own or lease the property

Florida regulations require that information on RUPs be recorded within two working days of the application and be maintained for two years from the application date (Chapter 487.2051 Florida Statutes). The Worker Protection Standard (WPS) requires information on all CP products to be recorded and posted when a CP product is about to be applied or has recently been applied. WPS requires that records be made available for 30 days after an expired Restricted Entry Interval (REI). Required records must be made available upon request to FDACS representatives, USDA authorized representatives, and licensed health care professionals.



4.9 PROTECT WATER SOURCES DURING MIXING

Protect your water source by keeping the water pipe or hose well above the level of the CP product mixture. This prevents contamination of the hose and keeps CP products from back-siphoning into the water source. If you are pumping water directly from the source into a tank, use a check valve, anti-siphoning device or backflow preventer to prevent back-siphoning if the pump fails.

4.10 SPILL MANAGEMENT

Potential for movement of spilled CP products in water is reduced if the spill is controlled, contained, and cleaned-up quickly. Establish a plan-for-action.

Clean up spills as soon as possible. The sooner you can contain, absorb, and dispose of a spill, the less chance there is that it will cause harm. Always use the appropriate PPE as indicated on the MSDS and the label. In addition, consider the following four steps:

- CONTROL actively spilling or leaking materials by setting the container upright, plugging leak(s), or shutting the valve.
- CONTAIN the spilled material using barriers and absorbent material.
- COLLECT spilled material, absorbents, and leaking containers and place them in a secure and properly labeled container.
- Store the CONTAINERS of spilled material until they can be applied as a CP product or appropriately disposed.

Small liquid spills may be cleaned up by using an absorbent such as cat litter, diluting with soil, and then applying the absorbent to the crop as a CP product in accordance with the label instructions.

Farmers, farm managers, and landowners must comply with all applicable federal, state, and local regulations regarding spill response training for employees, spill -reporting requirements, spill containment, and cleanup. Keep spill cleanup equipment readily available when handling CP products or their containers.

If a spill involves a CP product covered by certain state (Chapter 376.30702 Florida Statutes and Chapter 62-150 Florida Administrative Code) and federal laws (Public Law 965 10 and Public Law 925000 - CERCLA) you may need to report any accidental release if the spill quantity exceeds the “reportable quantity” of active ingredient specified

4.11 PERMANENT MIX-LOAD SITES

USSC currently uses one permanent mix-load station at the Dunwody grove to reduce CP product spillage. A well designed permanent mix/load facility is convenient and provides a place where spill-prone activities can be performed over an impermeable surface that can be easily cleaned. This permanent mix-load station meets IFAS guidelines.

To minimize the risk of CP products accumulating in the environment from repetitive spills, you may wish to construct a permanent mix/load facility with an impermeable surface (such as sealed concrete) so that spills can be collected and managed.



A permanently located mixing and loading facility, or chemical mixing center (CMC), is designed to provide a place where spill-prone activities can be performed over an impermeable surface that can be easily cleaned and permits the recovery of spilled materials.

Locate CP product loading stations away from groundwater wells and areas where runoff may carry spilled CP products into surface water bodies. If such areas cannot be avoided, protect wells by properly casing and capping them and use berms to keep spills out of surface waters.

It is crucial that a CMC facility be properly designed and constructed. Several publications are available to explain design, construction and operational guidelines for permanent mix/load facilities. These publications are listed in the reference section.

Do not build new facilities on potentially contaminated sites, since subsequent cleanup efforts may require the operation to be relocated.

4.12 PORTABLE MIX-LOAD SITES

USSC currently uses portable mix-load stations to reduce CP product spillage over a prolonged period of time. CP product loading areas should be conducted at random locations in the field with the aid of nurse tanks.

Another option for preventing contamination of mixing and loading sites is to use a portable mixing pad. Some are little more than a pad of very durable material, while others are made of interlocking steel sections with a custom fitted liner and built-in sump.

Portable mixing centers usually have no roof, but should be protected from rain. Since the pad may contain CP product residues, the accumulated rain-water may need to be applied as a CP product or disposed of as hazardous waste. A heavy rain can cause the pad to overflow, washing CP products into the environment. A sudden thunderstorm can result in a considerable amount of contaminated runoff, or even a spill. Clean portable mixing centers thoroughly immediately after a spill, because the liner material could be damaged by the CP product formulation. Where practical, portable pads for mixing and loading should be used away from wells or surface water. Never leave a tank unattended while filling.

URS has reviewed the USSC portable mix-load operations and the system is in compliance with IFAS.

4.13 UTILIZE NURSE TANKS FOR RANDOM FIELD MIXING

CP product loading areas should be conducted at random locations in the field with the aid of nurse tanks.

Nurse tanks are tanks of clean water transported to the field to fill the sprayer. Nurse tanks make it possible to move the mixing and loading operation away from permanent sites to random locations in the field. Mixing chemicals at random sites in the field lessens the chance of a buildup of spilled materials in one place.

One variation is a self-contained mix/load trailer with a nurse tank at one end and a mix/load area at the other, where the mixture is pumped directly into the sprayer. Another use is portable containment facilities with nurse tanks to set up a temporary mixing/loading site in a remote field, or on leased land where no permanent structure is practical.



4.14 EXCESS MIXTURE

Mix only the amount of CP products needed during an application period.

It is not always possible to avoid generating excess spray material. The appropriate practices to be followed depend on the type of CP product waste. If there is excess CP product material, use it in accordance with the label instructions.

4.15 CONTAINER MANAGEMENT

Develop and implement procedures to appropriately rinse and dispose of, or recycle agricultural chemical containers. .

- No bags, boxes and group I pesticide containers may be burned on-site.

Try to avoid the need to dispose of CP product containers as wastes by:

- Using containers that are designed to be refilled by the CP product dealer or the chemical company
- Arranging to have the empty containers recycled or reconditioned
- Using soluble packaging when available

When disposal is needed, rinse CP product containers as soon as they are empty. Pressure rinse or triple rinse containers and add the rinse water to the sprayer. Shake or tap non-rinseable containers such as bags or boxes so that all dust and material falls into the application equipment. Always wear the proper personal protective equipment (PPE) when conducting these rinse operations.

After cleaning, puncture the CP product containers to prevent re-use (except glass and refillable mini-bulk containers). Keep the rinsed containers in a clean area, out of the weather, for disposal or recycling. Storing the containers in large plastic bags is one option to protect the containers from collecting rainwater.

Recycle rinsed containers in counties where an applicable program is available, or take them to a landfill for disposal. Check with your local landfill before taking containers for disposal, as not all landfills will accept them.

For information about CP product container recycling programs in your area, contact:

University of Florida Pesticide Information Office 352-392-4721

4.16 EQUIPMENT SANITATION AND WASH WATER HANDLING

Wash-water from CP product application equipment must be managed properly since it may contain CP product residues. If permanent wash stations are not used, excess mixture needs to be properly disposed of or re-used.

- Wash the outside of equipment at random places in the field to avoid chemical build up at a site.
- Avoid washing contaminated equipment in the vicinity of wells or surface water bodies. Dispose of rinse water according to label instructions.
- If permanent wash stations are used, wash water should be reused or properly disposed.



4.17 STORAGE

Design and build CP product storage structures to keep CP products secure and isolated from the surrounding environment. Store CP products in a roofed concrete or metal structure with a lock-able door. Locate this building at least 50 feet from other structures (to allow fire department access) and 100 feet from surface water and from direct links to ground water. Keep CP products in a separate facility, or at least in a locked area separate from areas used to store other materials, especially fertilizers, feed, and seed.

Do not store CP products near burning materials, hot work (welding, grinding), or in shop areas. Avoid storage of CP products in spaces occupied by people or animals. Do not allow smoking in CP product storage areas.

Store personal protective equipment (PPE) where it is easily accessible in the event of an emergency, but not in the CP product storage area to avoid contamination and since that may make PPE unavailable in time of emergency. Check the label and the Material Safety Data Sheets (MSDS) for the safety equipment requirements. Keep a written CP product inventory and the MSDS file for the chemicals used in the operation on site. Do not store this information in the CP product storage room.

Depending on the products stored and the quantity, you may need to register the facility with the Department of Community Affairs and your local emergency response agency. Check with your CP supplier about Community Right-to-Know laws for the materials that you purchase. An emergency response plan should be in place. Emergency response phone numbers are provided in **Appendix C**. All farm personnel should be familiar with the plan before an emergency occurs. Individuals conducting emergency CP product cleanups should be properly trained under the requirements of the Occupational Safety and Health Administration (OSHA).

Do not store large quantities of CP products for long periods of time. Adopt the “first in - first out” principle, using the oldest products first to ensure that the product shelf life does not expire.

Store CP products in their original containers. Do not put CP products in containers that might cause children and others to mistake them for food or drink. Keep the containers securely closed and inspect them regularly for splits, tears, breaks, or leaks. Arrange CP product containers so that labels are clearly visible and legible.

All CP product containers should be labeled. Refasten all loose labeling. Use non-water-soluble glue or sturdy transparent packaging tape to refasten loose labels. Do not refasten labels with rubber bands (these quickly rot and break) or non-transparent tapes such as duct tape or masking tape (these may obscure important product caution statements or label directions for product usage). If a label is damaged, immediately request a replacement from the CP product dealer or formulator. As a temporary supplement to disfigured or badly damaged labels, fasten a baggage tag to the container handle. On the tag write the product name, formulation, concentration of active ingredient(s) and the date of purchase.

Dry bags should be stored on pallets and covered with plastic to ensure they do not get wet. Do not store liquid materials above dry materials. Store flammable CP products separately from non-flammable CP products.



Segregate herbicides, insecticides and fungicides to prevent cross-contamination and minimize the potential for misapplication. Cross-contaminated CP products often cannot be applied in accordance with the labels of each of the products. This may make it necessary to dispose of the cross-contaminated materials as wastes and could require the services of a consultant and hazardous waste contractor.

Use shelving made of plastic or reinforced metal. Keep metal shelving painted (unless stainless steel) to avoid corrosion. Never use wood shelving because it may absorb spilled CP product materials.

CP product storage structures should be identified such that the nature of the contents is made known to those approaching the building.

The BMPs discussed often address the ideal situation of newly constructed permanent facilities. However, the user is encouraged to apply the principles and ideas put forth to existing facilities, and to portable or temporary facilities that may be used on leased land where permanent structures are not practical.

Plans and specifications for CP product storage buildings are available from several sources, including the NRCS of the United States Department of Agriculture, the Midwest Plan Service, and the UF-IFAS Publications Office.

The current CP storage buildings are in compliance with IFAS guidelines.

4.18 EXCESS FORMULATION

When possible, return excess formulated materials to the CP supplier. In most cases, the excess material must be in an unopened, original container. Contact local dealers for their requirements.

The single best practice to handle excess CP product material is to use it as a cp product in accordance with the label instructions.

4.19 PURCHASE AND TRANSPORT

Appropriately planned and timed purchase of CP products can avoid risks associated with protracted storage.

Adherence to instructions provided by product manufacturers relating to transport of CP products can minimize risks of spillage and contamination in the event of accident or other container failure.

Follow directions for transport provided on product label, taking into consideration exposure to temperature, moisture, UV light and other variables.

Ensure packages and containers are properly closed and secured prior to transport, and are retained in original containers and with original product label attached.

Consider restrictions imposed by manufacturers or transportation agencies on transport within enclosed spaces and/or by personal vehicle.

Appropriate spill response materials should always be transported along with CP products to ensure that immediate spill response can be accommodated.



4.20 PRODUCT USE TRAINING

Training of field operators responsible for handling, loading, and operating spray machinery is essential for effective application of agricultural chemicals.

It is essential that information learned at continuing education classes be transferred to application personnel. Special efforts should be taken to ensure that non-English-speaking field personnel understand proper handling, loading, and operating techniques.



5.0 NUTRIENT MANAGEMENT

Good nutrient management is an integral part of a system of agricultural practices that help conserve and protect natural resources. In fact, water and nutrients are oftentimes linked, and the Florida citrus industry has made great strides in converting many existing groves to low volume irrigation systems. These conversions allow more precise nutrient management via the use of fertigation. As such, implementing appropriate nutrient management practices helps maintain or improve agricultural productivity while minimizing environmental risk.

Management of nitrogen and phosphorus levels, in particular, is essential in maintaining healthy surface water bodies and natural systems in the USSC crop production area. These nutrients originate from a variety of land uses, including: agricultural, urban, suburban, and natural areas. Excess nutrients stimulate algal blooms and growth of noxious plants in receiving water bodies and wetlands. This stimulation of growth may eventually result in reduced dissolved oxygen concentrations due to excessive decomposition of plant material. Moreover, lower dissolved oxygen concentrations may stress desirable game fish, and promote less desirable fish species.

Nitrogen and phosphorus are two of the essential elements for plant and animal growth and are necessary to maintain profitable crop and livestock production. They can also increase the biological productivity of surface waters by accelerating eutrophication, the natural aging of lakes or streams brought on by nutrient enrichment. Although eutrophication is a natural process, it can be accelerated by changes in the land use of a watershed that increase the amount of nutrients added to an aquatic system. Nitrogen and phosphorus both affect eutrophication, but phosphorus is the critical element in most fresh water systems.

Where water salinity increases, as in estuaries, nitrogen generally controls aquatic plant growth. Complicating the problem is the fact that eutrophication sometimes occurs many miles from where high-nutrient runoff originally enters the surface water system. By the time the water quality effects are noticeable (sometimes years to decades after the runoff occurs), remedial strategies can be difficult and expensive to implement. This is why source control of nutrients used in fertilization programs is so important.

5.1 EDUCATION

Proper training of the field operators responsible for handling, loading, and operating fertilizer spreading equipment, and for correct maintenance of field equipment is required and can help achieve desired placement of fertilizers, avoid waste, and prevent contamination of open waters.

Re-enforce training with checklists of critical operating points before application of materials. Confirm that each assigned employee is adequately informed about machine operation, rates of discharge, and intended zone of nutrient placement that focuses on “feeding the tree.”

5.2 NUTRIENT MANAGEMENT

Develop a nutrient management plan based upon soil, water, plant and organic material sample analyses and expected crop yields. USDA-NRCS routinely develops nutrient management plans, and requires them for practices that receive cost-share benefits. Nutrient management is: management of the amount, source, placement, form, and timing of the application of nutrients and soil amendments to ensure



adequate soil fertility for plant production and to minimize the potential for environmental degradation, particularly water quality impairment.

5.2.1 General Criteria

1. Nutrient Management Plans shall include the following components, as applicable:
 - Aerial site photographs or maps and a soil map.
 - Current and/or planned production sequence.
 - Soil test results and recommended nutrient application rates.
 - Plant tissue test results, when used for nutrient management.
 - Records for actual fertilizer rate applied. When fertilizer application exceeds recommendations, justification will be required. Assurance should be given by USSC that all over application issues will be resolved.
 - A complete nutrient budget for nitrogen, phosphorus, and potassium for the production system.
 - Realistic yield goals and a description of how they were determined.
 - Quantification of all important nutrient sources (this could include but not be limited to commercial fertilizer, animal manure and other organic byproducts, irrigation water, etc.).
 - Planned rates, methods, and timing (month & year) of nutrient application.
 - Location of designated sensitive areas or resources (if present on the conservation management unit).
 - Guidance for implementation, operation, maintenance, and record keeping.
2. Maximum single application rates of nutrients will be determined based on optimum level of production, producer's goals, soil limitations, site factors, and off-site transport potential.
3. Additional conservation practices that keep nutrients in the soil and root zone area should be planned in environmentally sensitive areas.

Environmentally sensitive areas include, but are not limited to: wetlands, sink holes, wells, mixing sites, karst areas, soils with excessive permeability, and areas that drain into state or federal nutrient restricted areas.

5.2.2 Considerations

1. A nutrient budget worksheet (FL 590-JS) including an estimate of residual amounts present in the soil and in residues of previous crops, along with any organic waste additions, can determine crop nutrient requirements. (The nutrient budget worksheet is available at: <ftp://ftp-fc.sc.egov.usda.gov/NHQ/practice-standards/jobsheets/590js.pdf>) Additional information is needed following further evaluation by the District and USSC.



2. Realistic yield goals should be set based on soil type, crop variety, tree age and condition, tree density, historical yield data, climatic conditions, and fertilizer costs versus returns.
3. The form of fertilizer and its timing, placement, and method of application can be planned to conform to seasonal variations in nutrient uptake throughout crop development.
4. Consider effects of the seasonal water budget on nutrient balance and on the potential loss by surface runoff or leaching into ground water.
5. Evaluate water quality standards and designated use limitations that exist locally or statewide.
6. Avoid excessive or luxury levels of N, P, and K in the soil to reduce the potential for induced deficiencies of micronutrients.
7. Maintain proper soil pH to provide optimum availability of applied nutrients.
8. Use appropriate application methods and fertilizer formulations that minimize nutrient losses.
9. In high water table soils, water table management will affect the availability and movement of nutrients.
10. Proper calibration and use of equipment will improve nutrient material application efficiency and will reduce undesirable over-applications.
11. Avoid same-place loading/transfer sites to preclude excess contamination of soils in working areas.

5.3 NUTRIENT MANAGEMENT AND UTILIZATION OF WASTE RESOURCES

Use of animal waste and other waste products on land in an environmentally acceptable manner can be helpful in maintaining or improving soil, air, plant, and water resources. Wastes include those from farm, feedlot, and dairy operations, compost, and agricultural processing plants.

5.3.1 General Criteria

1. Compliance with Federal, state and local laws is required for all utilization of wastes including liquid, slurry, and solid waste. For example, FDEP Rule 62-709 specifies the criteria for use of compost made from solid waste.
2. Waste application will be accomplished in a manner (timing and rate) such that runoff from the application area will not occur due to the application method used.
3. When making applications of waste products to citrus groves, growers will consider factors affecting rate, timing, and application methods as outlined in Florida NRCS Conservation Practice Standard, Nutrient Management (Code 590), available at: <ftp://ftp-fc.sc.egov.usda.gov/NHQ/practice-standards/standards/590.pdf>.
4. Waste will be applied based on the most limiting nutrient or metal.
5. The soil-limiting nutrient (either N or P) for waste application should be based on the Phosphorus Index calculation (see references for publications showing how the Phosphorus Index is calculated).



6. Crop nutrient removal rates should be based on realistic yields. Crop nutrient removal rates can be obtained from Agricultural Waste Management Field Handbook (AWMFH) or the NRCS has an excellent on-line calculator at: <http://npk.nrcs.usda.gov/>
7. Waste application setbacks shall be increased from surface water bodies, wells, sink holes, or fractures. Setbacks should be based on criteria for effective filter strips as contained in Florida NRCS Conservation Practice Standard, Filter Strip (Code 393) which can be accessed at: <ftp://ftp-fc.sc.egov.usda.gov/NHQ/practice-standards/standards/393.pdf>.
8. Content of waste will be analyzed for nutrient and metal (e.g. copper) content.

5.3.2 Considerations

- Supplemental fertilizer may be needed to meet the needs of the crop at various stages of plant growth.
- USSC currently has a FDEP permit for the application of wastewater on the USSC property. Please note that use of wastewater with high conductance could accumulate salts and nutrients into drainage systems, and possibly affect downstream receiving water bodies. These same water bodies may have specific water quality standards or Total Maximum Daily Loads (TMDL) that could be violated through the introduction of high TDS concentrations. The application of wastewater onto the property should remain in compliance with the FDEP permit.

5.4 EMPLOY TISSUE AND SOIL ANALYSES

Fertilizer applications based on leaf tissue and soil tests will help avoid over-fertilization and subsequent losses of nutrients in runoff water.

Application of mobile elements such as N (nitrogen) and K (potassium) should be made on the basis of leaf tissue analysis and production levels. Elements such as Ca (calcium), Mg (magnesium), and P (phosphorus) should be based on soil testing and leaf analysis, instead of regular applications of specific amounts. The comparison of both types of testing will give production standards for applications which are based on plant need and response, rather than routine applications of standard amounts. Proper fertilization results in high yields and minimal environmental effects.

5.5 USE APPROPRIATE APPLICATION EQUIPMENT

Operate machinery as designed so as to achieve precise and desired placement of nutrient materials at specified rates consistent with the form and source of nutrient materials.

Efficient application practices are critical for insuring fertilizer delivery only to target areas, and for reducing losses to leaching and runoff. The following is a list of application techniques for different formulations of fertilizers. Growers may adopt a combination of placement methods exploiting their respective advantages in efficiency and cost. The ultimate goal is to focus on “feeding the tree” by placing nutrients within the root zone of individual trees or drip-line bands along hedgerows of trees. Avoid placement in areas prone to off-site transport of nutrients.

- Precision Agriculture



- Dry Material Spreaders
- Fertigation
- Boom Applications
- Aerial Application

5.6 EQUIPMENT CALIBRATION AND MAINTENANCE

Proper calibration and maintenance of fertilizer application equipment is essential to avoid misapplication of nutrients.

5.7 APPLY MATERIALS TO TARGET SITES

Place nutrients within the root zone of individual trees or drip-line bands along hedgerows of trees. Avoid placement in areas prone to off-site transport of nutrients, especially water furrows.

5.8 AVOID HIGH RISK APPLICATIONS

Do not apply materials under “high risk” situations, such as before forecasted rainfall. Avoid applications of nutrients during intense rainfall, on bare soils with extreme erosion potential, or when water tables are near the soil surface.

For weather information on the Internet, go to:

FAWN: <http://fawn.ifas.ufl.edu/>

NOAA: <http://www.nws.noaa.gov><http://weather.noaa.gov/>

The Weather Channel: www.weather.com

CNN Weather: <http://www.cnn.com/WEATHER/>

AccuWeather: <http://www.accuweather.com>

5.9 FERTILIZER STORAGE

Use caution when storing fertilizer to prevent contamination of nearby ground and surface water.

Fertilizer will be stored in an area that is protected from rainfall. Always store fertilizers separately from pesticides, solvents, gasoline, diesel, motor oil, or other petroleum products. Many fertilizers are oxidants and can accelerate a fire.

Storage of dry bulk materials on a concrete or asphalt pad may be acceptable if the pad is adequately protected from rainfall and from water flowing across the pad. Secondary containment of stationary liquid fertilizer tanks larger than 550 gallons is addressed in DEP rule 62-762, F.A.C. Even where not required, the use of secondary containment is a sound practice.

5.10 SPILLED FERTILIZERS

Immediately remove any fertilizer materials spilled on ground surfaces and apply at recommended rates to crops.

When possible, place a tarp over ground surfaces where fertilizer transfer operations are conducted. Spilled materials should be transferred to the spreader for application to target sites. Spillage can



contaminate open waters and thereby cause proliferation of aquatic weeds. Operators of fertilizer spreaders shall be trained how to recover spilled materials for spreader application. Removal of some soil with the spilled materials is usually necessary and adequate for proper maintenance of this BMP. By its design, the spreader equipment will apply the fertilizer and soil to the target site.

At fixed loading sites, the area can be cleaned by sweeping or vacuuming (or with a shovel or loader, if a large spill), or by washing down the loading area to a containment basin that is specifically designed to permit recovery and reuse of the wash water. Wash water generated should be collected and applied to the target site.

Discharge of this wash water to water bodies, wetlands, storm drains or septic systems is illegal.

5.11 USE CAUTION WHEN LOADING NEAR DITCHES, CANALS AND WELLS

Minimize the potential for spilled materials to pollute surface waters. When possible, locate mixing and loading activities away (according to local setback requirements) from ground water wells, ditches, canals, and other areas where runoff may carry spilled fertilizer into surface water bodies. If such areas cannot be avoided, protect wells by properly casing and capping them and use berms to keep spills out of surface waters. Recover and apply spilled materials to intended zone of application.

A concrete or asphalt pad with rainfall protection permits easy recovery of spilled material. If this is not feasible, loading at random locations in the field can prevent a buildup of nutrients in one location. In this case, place a tarp on the ground underneath the fertilizer hopper while loading. Do not load fertilizers on a pesticide Chemical Mixing Center (CMC) because of the potential for cross-contamination. Fertilizers contaminated with pesticides may cause crop damage or generate hazardous wastes.

5.12 ALTERNATE LOADING OPERATION SITES

Use multiple fertilizer loading and transfer sites to prevent concentration of nutrients in a single area. If this is not feasible, loading at random locations in the field can prevent a buildup of nutrients in one location.

5.13 USE BACKFLOW PREVENTION DEVICES

Use backflow prevention devices on irrigation and spray tank filling systems to preclude entry of nutrients into surface waters. Never leave a filling-tank unattended.

5.13.1 Filling Tanks in the Field

Special precautions should be taken when filling tanks using a hose. Maintain an air-gap between the filling-hose and the liquid tank-mixture. Never leave a tank unattended when it is being filled.

5.13.2 Fertigation and Backflow Prevention Equipment

An anti-siphon device is a safety device used to pre-vent backflow of a mixture of water and chemicals into the water source, or vice versa. In the case of fertigation, the chemicals are fertilizers. Currently, Florida state law (Florida Statutes Section 487.064 for pesticides and Section 576.087 for fertilizers) requires that backflow prevention equipment be installed and maintained on irrigation systems in which chemicals are injected for agricultural purposes. The possible dangers in fertigation include backflow of fertilizers to the water source causing contamination, and water backflow into the fertilizer storage tank. Backflow prevention is an extremely important practice in the prevention of both ground and surface



water contamination. Backflow to the storage tank can rupture the tank or cause overflow, contaminating the area around the tank and perhaps indirectly contaminating the water source. Safety equipment is available which, when properly used, will protect both the water supply and the purity of the fertilizer in the storage tank.

5.14 SPLIT APPLICATIONS THROUGHOUT SEASON

Dividing the annual fertilizer requirement into two or more applications can minimize leaching during the summer rainy season and help maintain the supply of nutrients over the long growing season of Florida.

Frequent fertigations can be an efficient method of application for N and K while minimizing the potential for leaching of nutrients during excessive rainfall events. The trade-off between costs vs. fertilizer use efficiency and resource protection must be considered.

5.15 EROSION CONTROL

Erosion-control practices will be utilized to minimize soil loss and runoff that can carry dissolved and attached nutrients on soil particles to surface waters. A minimum of four (4) particulate matter and sediment controls shall be implemented from the BMP equivalent points reference table.

Vegetative filter strips are effective in reducing the levels of suspended solids and nutrients.

5.16 IRRIGATION MANAGEMENT

Irrigation should be limited to wetting only the root zone where possible. Excessive irrigation can transport nutrients below the root zone through leaching. Proper scheduling and uniform water distribution are necessary to assure control.

5.17 USE OF ORGANIC MATERIALS

In the event of a surface application (mulching), use of organic materials like horticultural waste and urban plant debris (yard trimmings) should occur when possible to help increase soil organic matter, retain nutrients and moisture, improve biological eco-systems, and supply slowly-released nutrition.

The surface application of slowly-degraded organic waste materials like horticultural waste and urban plant debris can increase soil moisture retention and nutrient-holding capacity. The nutrient additive properties of organic matter support:

- Economical ways to safely use non-hazardous wastes.
- Maintenance or increases in soil organic matter content.
- Protection of water quality.
- Protection of air quality.
- Reduction of energy used in manufacturing chemical fertilizer.

Both microbial mineralization and immobilization can occur during decomposition of high carbon-low nitrogen organic materials like horticultural waste. Mineralization occurs when organic forms of a nutrient are converted to inorganic forms. Immobilization is the reverse of this process where microorganisms convert inorganic forms of nutrients to organic forms. The organic forms of the nutrients are not available to plants as they are bound in some part of the soil organic matter. Plants take up



nutrients in inorganic forms. Thus, immobilization reduces nutrient (particularly nitrogen) availability, while mineralization increases nutrient availability.

Nitrogen-poor organic materials like straw, fresh sawdust and most fresh horticultural waste cause microorganisms to remove large amounts of inorganic nitrogen from the soil during decomposition, since that nitrogen is required to build new microbial cells. This process decreases nitrogen availability to citrus trees. However, the nitrogen consumed by the microorganisms will be slowly released when microbial cells decompose.

5.18 WELL PROTECTION

Prevent ground water contamination by back plugging improperly constructed and/or deteriorated irrigation wells.

This practice involves the protection of existing wells and prevention of problems in wells that are being planned. For existing wells, management activities are aimed at reducing the potential for contamination. This includes evaluating and, if necessary, moving or modifying potential sources of pollution. Such sources of pollution may include fueling areas and/or areas where pesticides and fertilizer are handled or mixed.

The permanent plugging and elimination of such wells may be eligible for cost-share assistance through the District. Please contact your local District Service Office for information.

Points to Consider:

- Anti-siphon devices should be attached to all system discharge points so that backflow siphoning does not contaminate the aquifer.
- Check with local health departments or state water management districts for setback guidelines regarding wells.
- When no longer in use, proper decommissioning or plugging of a well prevents the re-entry of surface water and transport of contaminants to the ground water. Check with your local water management district or USDA-NRCS office for well decommissioning and plugging guidelines.
- Wells should be capped or fitted with valves that close tightly when not in use to reduce the potential for contamination. Artesian wells should be fitted with control valves so that water flow can be regulated or stopped when water is not needed.

5.19 USE APPROPRIATE SOURCES AND FORMULATIONS

Reduce the potential for nutrient leaching and off-site movement by choosing appropriate sources and formulations of fertilizer based on nutritional needs, season (rainy vs. dry), and anticipated weather conditions to achieve greatest efficiency and reduce potential for offsite transport. Utilize controlled-release and slow-release formulations when feasible.

Nitrogen source materials are grouped into three categories: inorganic, synthetic organic, or natural organic. The inorganics and synthetic organics are usually high-analysis materials that are most economical to use in citrus groves. These nutrient source materials are readily available to plants unless



they have been formulated in a controlled-release form. Natural organic materials are less readily available and are usually lower in nutrient analysis.

5.20 SALINITY

Fertilizer sources should be monitored closely in groves with high salinity levels. Fertilizers with high salt index levels can compound existing salinity problems.

Additional discussion on salinity management is found in the Water Resource Management Section.

The frequency of injecting nutrients or of applying granular fertilizer has a direct effect on the concentration of total dissolved solids (TDS) in the soil solution. A fertilization program that uses frequent applications with relatively low concentrations of salts will normally result in less salinity stress than programs using only two or three applications per year. Controlled-release fertilizers and frequent fertigation are ways to economically minimize salt stress when using high salinity irrigation water.

Selecting nutrient sources that have a relatively low osmotic effect in the soil solution can help reduce salt stress. The osmotic effect that a material adds to a soil solution is defined as its salt index relative to sodium nitrate, taken to be equal to 100. Since sources of phosphorus (P) generally have a low salt index, they usually present little problem. However, the salt index per unit (lb) of N and potassium (K) should be considered.

The salt index of natural organic fertilizers and slow-release products are low compared to the commonly used soluble fertilizers. High-analysis fertilizers may have a lower salt index per unit of plant nutrient than lower-analysis fertilizers since they may be formulated with a lower salt index material. Therefore, at a given fertilization rate the high-analysis formulation may have less of a tendency to produce salt injury. For instance, the salt index of a fertilizer blend formulated made from ammonium nitrate and potassium nitrate will be about 30% less than that with the same N-P-K analysis blend formulated from ammonium nitrate and muriate of potash (KCl). In addition, the Cl in KCl or Na in NaNO₃ materials add more toxic salts to the soil solution.

Choose fertilizer formulations that have the lowest salt index per unit of plant nutrients. Increase the frequency of fertilizations, thereby making it possible to reduce the salt content of each application and aid in preventing excess salt accumulation in the root zone. Maintain optimum but not excessive nutrient levels in soil and leaves with rates based on the long-term production from the grove. Fertilizer rates can usually be lower for trees with high salinity since production levels will probably be lower. Leaf tissue analysis should be used to detect excessive Na or Cl levels or deficient levels of other elements caused by nutrient imbalances induced by salt stress. Leaf Na levels greater than 0.2% and Cl levels over 0.5% indicate imminent problems.

High rates of salt application can alter soil pH and thus cause soil nutrient imbalances. Some ions can also add to potential nutrient imbalances in trees. For example, Na can displace K, and to a lesser extent Ca, in soil solutions. This can lead to K deficiency and, in some cases, to Ca deficiency. Such nutrient imbalances can compound the effects of salinity stress. Problems can be minimized if adequate nutritional levels are maintained, especially those of K and Ca.



5.21 CONSERVATION BUFFERS AND SETBACKS

Strategically incorporating vegetative buffers – either naturally occurring ones or planted forbs and grasses – into the citrus grove design can help to protect water quality by providing biological filtration, increasing residence time and/or residual nutrient uptake.

Managed properly, these vegetative areas or conservation buffers may provide pretreatment, formal treatment and other treatment train opportunities. A treatment train effect is simply a combination of nonstructural and structural BMPs, which are generally effective for reducing or preventing non-point source pollution. Generally speaking, there are certain non-cropped areas that could qualify as conservation buffers within a typical agro-eco-system. Vegetated field borders, tree row middles, water furrows, ditch and ditch banks, wetlands/set-back areas and associated reservoir systems are examples.

Depending on the grove's surface water management system design, buffer areas can contribute significantly and help to manage offsite nutrient impacts. This whole farm management approach ultimately reduces a grower's risk of incurring negative environmental consequences. The BMPs discussed below are intended to give the reader information for the practical application of conservation buffers.

5.21.1 Pre-Treatment Options

Manage tree row middles by keeping them well grassed and by maintaining a minimum blade height of two inches. Growers should not rotary mow when standing water is present. Growers may also want to investigate the feasibility of incorporating leguminous plant(s) within the middles, as these plants may be used as an additional source of nitrogen.

Water furrows and lateral ditches should also be managed to encourage grass cover in order to help reduce flow velocities, thus providing an opportunity for particulate matter to settle out. See BMPS in the Erosion Control and Sediment Management Section for more information on water furrow and ditch bank maintenance.

5.21.2 Formal Treatment Options

- **Riparian Buffers** – A riparian buffer is an area of trees and/or shrubs located adjacent to and up-gradient from associated watercourses. Existing groves that border perennial watercourses and were constructed before SFWMD surface water regulations should, when economically feasible, explore the use of a riparian buffer. Water sheet flowing across this type of buffer will be treated before discharging to the watercourse. Air drain-age is an important aspect of crop and tree damage during cold periods. Prior to implementing a riparian buffer, consideration should be given to its effects on air drainage.
- **Dedicated Conservation Buffers** – Grassed waterways and/or filter strips are both excellent conservation buffer choices, and can be used to convey and treat smaller volumes of discharge water with a moderate degree of success. In general, these passive treatment areas are more effective in removing phosphorus that is attached to soil particles rather than dissolved nitrogen. Groves that have some topographic relief should consider using grassed waterways or filter strips to treat and discharge surface water runoff.



- Treatment Train Effects - Consider using a combination of structural and non-structural controls to mitigate the potential for offsite nutrient impacts, especially when discharging to sensitive downstream water bodies. See B17 in the Erosion Control and Sediment Management Section for more information.

5.21.3 Other Required Setbacks

Wetland setback areas, also referred to as wetland buffer zones, provide water quality treatment opportunities. If you have an active Environmental Resource Permit for your grove, you are generally required to abide by an average 25 foot setback. Likewise, NRCS generally requires 50 feet along the path of water flow for a filter strip that is being used to address soluble nutrient problems. NRCS buffer practices are listed below and each practice has slightly different uses that should be matched with the specific site. Each NRCS buffer practice may have different minimum widths and other specifications based on the specific resource problem(s) to be addressed.



6.0 ACCEPTABLE AGROCHEMICALS AND NO APPLICATION PERIODS

Because of the intended future land use, care needs to be taken to ensure that at the time of the property's conversion to a reservoir, that the presence of agrochemicals is minimal and will not cause adverse impacts to the anticipated ecosystem. During the interim use of the property, the intent is to phase out the application of identified pesticides on a specified time table to allow for natural degradation.

In addition, as current landowner, the District must ensure that all application of agrochemicals on the grove is conducted in accordance with all applicable laws and regulations.

The **Chemical Application Restrictions** matrix, given below, should be followed. This matrix is based on the U.S. Fish and Wildlife Service's "Derivation of No Application Periods". A copy of the document is included in **Appendix A**. The agrochemical list should be reviewed annually for the effectiveness of the applied chemical, changes in regulations regarding specific pesticides, and changes in the management and use of the pesticides. The experimental use of pesticides and herbicides is prohibited during the interim period. All agrochemicals must be applied in strict accordance to label instructions and restrictions.



CHEMICAL APPLICATION RESTRICTIONS

The following is an example list of chemicals, and at the completion of the Phase I and II ESA activities, this list may change. The following chemicals have the potential to be used subject to the restrictions noted below.* Chemicals not specifically listed below may be evaluated on a case by case basis and added to the appropriate category below. Chemicals with no analytical test method and identified as a potential environmental risk, the chemical manufacturer will be contacted to obtain the chemical standard. The District will then contract a Florida based laboratory to develop an analytical test method for the chemicals.

Citrus Grove

A. May be used at any time but only according to label restrictions:

2,4-D (<i>Landmaster</i>)	Isopropylamine salt (<i>Arsenal</i>)	Simazine (<i>Sim-Trol</i>)
435 Spray Oil (<i>Sun Pure</i>)	Mineral oil (<i>Saf-t-side</i>)	Triclopyr (<i>Remedy Ultra</i>)
Diuron (<i>Karmex, Direx</i>)	Paraffin oil (<i>Citrufilm</i>)	Dimethyl ammonium chloride (<i>C-soap</i>)
Glyphosate (<i>Roundup</i>)	Phosphoric Acid (<i>Nutriphite Magnum</i>)	

B. Must be discontinued at least 3 months prior to flooding:

Abamectin (<i>Agri-Mek</i>)	Oxamyl (<i>Vydate</i>)	Alkyl dimethyl benzyl ammonium chloride (<i>Bell Quat</i>)
Dimethoate (<i>Dimethoate</i>)	Phosmet (<i>Imidan</i>)	Carbaryl (<i>Sevin</i>)
Fenpropathrin (<i>Danitol</i>)	Trifloxystrobin (<i>Gem Fungicide</i>)	

C. Must be discontinued at least 6 months prior to flooding:

Aldicarb (<i>Temik</i>)	Chloropyrifos (<i>Nufos</i>)	Dicofol (<i>Kelthane</i>)
Cypermethrin (<i>Mustang</i>)	Imidacloprid (<i>Provado</i>)	

D. Must be discontinued at least 1 year prior to flooding:

Bromacil (*Krovar*)

E. Period of discontinuation will be based on the rates of application and copper concentrations in the groves:

Copper Hydroxide (<i>Champ</i>)	Zinc, Manganese, Iron, Magnesium, Nitrogen (<i>Citrite, Dyna Gro</i>)
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F. Must be discontinued at least 2 years prior to flooding:

Mefenoxam (*Ridomil*)

* Any pesticide, regardless of the above categories, that is shown to be present in the soil, at or above the SCTLs, may require additional restrictions, including reductions in use or the complete elimination of its use. These situations will be evaluated on a case-by-case basis.



6.1 COPPER COMPOUNDS

Copper is an essential element required for the successful and economical growing of citrus. It is necessary for chlorophyll formulation in the leaves and acts as a catalyst for other plant reactions. It also has beneficial uses as a fungicide, herbicide, and bactericide. It is applied to the soil surface as a granular additive to fertilizer, and directly to the foliage as a spray mix. The Phase II ESA did not identify elevated copper levels in the citrus groves above the Service provisional Snail Kite threshold level of 85 mg/kg. Based on the information provided by USSC, at the current application rates of copper-based agrochemical, the soils within the citrus groves will not be impacted with copper above the 85 mg/kg threshold.

During this interim use period, soil samples should be collected for select areas within the groves to confirm that residual copper concentrations are not accumulating in the soil. In the event that elevated copper concentrations are detected above the 85 mg/kg threshold, then the District and USSC will jointly evaluate the current copper applications for the citrus operation.

If the yearly sampling again indicates elevated copper above the 85 mg/kg the District and USSC will work together to develop a copper application that will control pests and limit the residual copper levels in the soils as much as practical.



7.0 PETROLEUM AND HAZARDOUS WASTE MANAGEMENT

7.1 GASOLINE AND DIESEL FUEL STORAGE AND CONTAINMENT

The goal of AST management is to minimize the possibility of inadvertent petroleum product discharges and properly manage any spills and cleanups. Stationary fuel storage tanks should be in compliance with the FDEP storage tank regulations (Chapter 62-761, FAC (Petroleum Storage Systems)) for both underground and aboveground storage tanks.

Site verification will include discussion with operation managers to understand the agricultural operation petroleum storage and containment management approach. In addition site inspections will be made to observe the following items:

7.1.1 On-Site Equipment

Permanent fuel pumps should be stationed on concrete or asphalt surfaces away from groundwater wells and ditches, laterals and canals where water runoff may carry or transport inadvertently spilled product. Pumps should be equipped with automatic shut off mechanisms. Aboveground petroleum storage tanks with volumes of 550-gallons or greater must be registered and located within secondary containment systems unless of double-wall construction. Visual inspections should be conducted on at least a monthly basis of the storage tanks and hoses to ensure that the system is free from leakage from tank seams, connections, and fittings.

7.1.2 Fuel Delivery

The fuel delivery driver should report to facility manager upon arrival prior to unloading. An agricultural operation employee should verify available tank capacity prior to product transfer and should remain onsite during delivery to monitor the product transfer. Spill and overfill clean-up equipment, such as absorbent booms or absorbent materials, should be stored nearby for immediate spill containment and clean up.

7.2 EQUIPMENT CLEANING AND MAINTENANCE

The same level of preventive measures should be taken to minimize any adverse water quality impacts from the cleaning of equipment as with agrochemical handling and application. Preventive maintenance and emergency repair of machinery and equipment performed on site should be conducted in a centralized area over an impermeable surface, and be situated at least 100 feet from the closest groundwater well or surface water, grove ditch, lateral, or canal. It is recommended that equipment maintenance be limited to minor or emergency repairs. Onsite maintenance activities, such as engine or mechanical repair, which generate a waste or waste by-product, must be containerized and properly disposed of. Where contamination is already documented in the area, every effort should be made not to increase the existing contamination levels.

Site verification will include discussion with operation managers to understand the agricultural operation hazardous waste management approach. In addition site inspections will be made to observe the following items:



7.2.1 Equipment Maintenance

It is recommended to use compressed air to remove clippings and dust from machinery. This will cause less wear to the equipment's hydraulic seals, eliminates wash water, and produces dry material that is easy to handle. For regular field equipment washdown other than pesticide application equipment, and degreaser or solvents, allow wash water to flow to a grassed retention area, swale, or fields. Do not allow wash water to flow directly to surface water, grove ditches, laterals, or canals. Minimize the use of detergents and use only biodegradable, non-phosphate type. Use spray nozzles that generate high-pressure streams and low volumes that can minimize the amount of water used to clean equipment. If equipment is to be intensively washed, conduct over a concrete or asphalt pad that allows the water to be collected. Collected wash water can be handled through a recycling system, treatment system, off-site disposal at an industrial wastewater treatment facility, or use the wash water for field irrigation.

7.2.2 Solvents and Degreasers

The current facility does not conduct major repairs of equipment on-site. Only routine maintenance is conducted on-site. The introduction of an equipment maintenance area as well as the use of solvents or degreasers onsite must be reviewed and approved by the District prior to the use or construction of the maintenance facility.

Should such approval be granted by the District, general best management practices, recommends the replacement of solvent baths with recirculating aqueous washing units. Soap and water or other aqueous cleaners are often as effective as solvent-based cleaners.

7.2.3 Paint

The USSC properties do not maintain an on-site painting facility. All painting is done manually. The introduction of an equipment painting facility (i.e., paint booth, spray hood, etc.) onsite is not allowed. The painting of equipment by power sprayers is prohibited. Such painting must be conducted off-site.

7.2.4 Used Oil, Coolant, and Lead-Acid Batteries

Each of the main properties currently store new oil, used oil, coolants and/or lead acid batteries on-site. These items are properly marked and stored and are in compliance with local and State regulations. The storage of more than what would be used for daily use of these chemicals and products is prohibited. The construction of a storage area onsite to store these chemicals must be reviewed and approved by the District prior to the storage or construction of the facility.

Used oil, coolant and lead-acid battery activities are not currently stored onsite, and are not approved activities by the District. However, if this type activity should be approved by the District, the following BMP guidelines must be implemented.

Used oil and oil filters should be stored in separate marked containers and recycled. Oil filters should be drained and taken to the same place as the used oil, or to a hazardous waste collection site. Coolants and antifreeze must be recycled or disposed as a hazardous waste. Do not mix used oil with used coolant or sludge from solvents. Lead-acid storage batteries are classified as hazardous wastes unless they are recycled. Batteries should be stored on an impervious surface and preferably under cover until delivery to an authorized recycling facility.



All used oil, coolant, and lead-acid batteries on the properties are stored in containers in accordance with FDEP rules until being transported offsite for disposal by a licensed contractor.

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8.0 SAMPLING AND COMPLIANCE PLAN (CITRUS FIELDS)

8.1 VERIFICATION SAMPLING

Citrus cultivated area sampling will be conducted by the District on an annual basis. Soil samples shall be collected from the cultivated area at randomly selected locations based on the grid pattern and numbering system used in the Phase I/II ESA. The BMP annual sampling event will randomly select a number of those discrete locations sampled during the Phase I/II ESA. The collected samples will be analyzed for a number of parameters of concern. Based on the Phase I/II ESA findings and review of the chemicals list provided by USSC, the sampling activities by the District will involve 5-acre discrete samples using close composite methodology from the top 6-inches of the soil. The collected discrete samples will then be analyzed for a number of parameters of concern.

The number of locations to be sampled are determined according to the *a priori* statistical procedure recommended by the United States Environmental Protection Agency (EPA, 1989, Section 6). This procedure is based on commonly used, well-established statistical hypothesis testing processes, in which, collected data during each year is compared to the baseline dataset in order to detect the presence of any statistically significant difference (EPA, 2000). For determination of the sample size, EPA (1989) suggests a null hypothesis that is equivalent to the condition, under which the baseline and subsequent datasets display statistically significant differences. Conversely, the alternative hypothesis corresponds to a condition, under which the baseline and subsequent datasets are devoid of any statistically significant difference. Each year, upon collection of one round of post-baseline samples, the compiled baseline and subsequent datasets are statistically compared to assess whether further investigations are warranted. The components of the proposed statistical process are described in the following sections.

8.1.1 Determining Number of Baseline Locations

EPA (1989, Section 6.3.2) provides a quantifiable measure for determining an adequate sample size. The sample size is driven by three factors: (a) the chosen decision errors, (b) the variability of the potential contaminants of concern, and (c) the desired resolution, *i.e.*, the difference between the baseline and subsequent datasets that needs to be detected at the chosen confidence. The resulting equation is

$$n = \frac{(z_{1-\alpha} + z_{1-\beta})^2 s^2}{\Delta^2}$$

where,

n = number of grids to be sampled each year

α = the false positive rate, Type I error, or the significance (tolerable error for missing an actual difference between the baseline and subsequent datasets)

$1-\alpha$ = the confidence (probability of correctly identifying a significant change)

β = the false negative rate, or Type II error (tolerable error for incorrectly declaring a difference between the baseline and subsequent datasets)

$1-\beta$ = the test power (probability of correctly identifying the absence of no difference)

$z_{1-\alpha}$, $z_{1-\beta}$ = the confidence and power normal deviates

s^2 = standard deviation of parameter of concern

Δ = The minimum difference between the mean concentrations of the baseline and subsequent datasets to be detected at the chosen confidence

Samples collected at the selected locations during the Phase I/II ESA conducted on the USSC property by PSI in August and September 2008 shall be used as the baseline for comparison to future sampling results. Among parameters of concern, copper has been analyzed extensively during Phase I/II ESA. The reported concentrations of these analytes based on 5-acre discrete samples from citrus fields are used in order to compute their corresponding mean and standard deviation, as listed in Table 8.1. This table also displays the number of samples based on the chosen decision errors. In these calculations, the desired minimum difference is set as 20% of the computed mean concentrations. The resulting sample size is 72 locations, which shall be randomly selected for sampling as part of the BMP efforts, as highlighted in Table 8.1.

8.1.2 Baseline/Subsequent Datasets Statistical Comparisons

Annual BMP sampling will be conducted, at field locations with the same GPS coordinates measured during the initial sampling and at a time mutually agreed upon by the parties so as to minimize damage to field crops, to ensure consistency with the original Phase I/II ESA results. Upon completion of each annual BMP sampling round, the analytic results of parameters of concern will be compared to those compiled in the baseline and previous BMP datasets. For this purpose, a series of comprehensive statistical two-sample tests will be conducted. Pursuant to DON (2002), as listed on Table 8.2, two difference hypotheses will be assessed, including:

- (a) Area-wide differences between the baseline and subsequent datasets: This hypothesis corresponds to a condition, under which the baseline concentrations are consistently different from the subsequent concentrations. Consequently, the statistical tests will be conducted through comparison of mean (parametric) and median (non-parametric) concentrations.
- (b) Localized differences between the baseline and subsequent datasets: This hypothesis corresponds to a condition, under which only the elevated baseline and subsequent concentrations are different. Consequently, the statistical tests will be conducted through comparison of higher concentrations or exceedance ratios in each dataset.

The procedural aspects for the selection and implementation of the cited tests in Table 8.2 are described in details in DON (2002, Chapter 4). Appropriate statistical comparisons, including parametric t-tests, non-parametric Wilcoxon Rank Sum test, and non-parametric Slippage tests, will be conducted annually. Depending on the statistical characteristics of the subsequent datasets, additional test may be performed. In the case of detection of a statistically significant increase at 5% significance, when the increase in mean or median concentrations is greater than 20 percent, among subsequent measured concentrations with respect to the baseline concentrations, additional investigations will be pursued.

The specific objectives of additional investigations are: (a) to determine whether the detected increase in post-baseline concentrations are real, and not numeric artifacts caused by the variability of individual samples results, and (b) if real, to determine whether the detected increases in post-baseline concentrations are due to inappropriate practices by the tenant. For this purpose, additional



investigations will be initiated, including a review of laboratory QA/QC results and information provided by the tenant concerning its chemical use practices during the period of interest. If an increase in mean concentrations is attributed to few outlier samples among post-baseline data, locations associated with these outliers will be re-sampled to ensure the validity of the original results. The cost of additional investigations shall be the responsibility of the party requesting it.

If the District determines that a detected increase in mean or median concentrations in excess of 20% is a numeric artifact caused by the variability of individual samples, or attributed to historic conditions, no further action with regards to the tenant's lease will be pursued. On the other hand, if the increase in mean or median concentrations in excess of 20% is deemed to have been caused by other factors, the District will notify the tenant in writing of its determination and its basis, and the tenant will be requested to implement those measures, if any, that the tenant considers appropriate to prevent further increases in concentrations, including but not limited to additional sampling or best management practices.

If a statistically significant increase in concentrations is detected during a subsequent consecutive year and determined by the District to not be a numeric artifact or caused by variability of individual samples, the tenant shall work cooperatively with the District to develop a more comprehensive BMP plan to reduce or eliminate further increases. The new BMP plan shall be approved by the District, implemented by the tenant, and incorporated into the lease and, in the case of a subtenant, its sublease. In the event a subsequent consecutive sampling event results in a third, consecutive statistically significant increase, the District, in consultation with the tenant, shall review the tenant's standard farming practices, which review should include an assessment of the practices in terms of potential risk to future aquatic ecosystems or human health. If it is determined that the increase in concentrations may cause significant risk to future ecosystems that may be constructed in the area or human health to workers or occupants, the tenant will implement changes to its standard practices prescribed by the District, after joint consultation with the tenant, to reduce the potential for such risk. Failure to implement this review within the prescribed schedule will be considered a default of the tenant's lease.

8.1.3 Summary of BMP Sample Plan

Table 8.3 lists BMP sample plan inside and outside of citrus cultivation areas, as well as the current list of parameters of concern. Given the fact that for a number of parameters of concern there are currently no baseline dataset available, the sample size computations will be repeated after the first round of BMP periodic sampling, which may result in applicable modifications of this BMP Plan to address elevated parameters of concern covering parts or the entire extent of the investigated areas. Future changes in subsequent rounds of BMP may include further division of the investigated areas into more homogenous subareas for the purposes of sampling and statistical comparisons. Such changes may require additional sampling to accommodate the delineated subareas. Furthermore, in the event that obvious and excessive impacts are visibly detected during periodical site visits conducted by the District, a more comprehensive site specific sampling plan, which would depend on the magnitude of the impact, should be developed under the direction of the District and any applicable regulatory agencies. A list of potential parameters to be analyzed for is given below.

EPA Method 8141 (Organophosphorus Pesticides)
EPA Method 8151 (chlorinated herbicides)
EPA Method 6010/7471 (copper)



FL-Pro Method (total residual petroleum hydrocarbons)
EPA Method 8100 (polynuclear aromatic hydrocarbons)
EPA Method 8020 (volatile organic hydrocarbons)



Table 8.1. Statistical Determination of the Number of Baseline Grids

Decision Parameters	Selected Value	Normal Variate
Significance = alpha	5%	$z_{1-\alpha} = 1.64$
Power = 1 - beta	80%	$z_{1-\beta} = 0.84$

Chemical-Specific Parameters	Copper (mg/kg)
Desired Resolution set at 20% of Baseline Mean	6.4
Baseline Mean*	32.2
Baseline Standard Deviation*	21.9
n (Number of Samples)	72

*Computed based on Phase 2 Citrus 5-acre Discrete (CD) Data



Table 8.2. Statistical Comparative Tests

Difference Hypothesis	Test	Comparison	Type
Area-wide Difference	Wilcoxon Rank Sum (WRS)	Median	Non-parametric
	Gehan	Median	Non-parametric
	Student's two-sample t-test	Mean	Parametric
	Satterthwaite t-test	Mean	Parametric
Localized Difference	Slippage	High concentrations	Non-parametric
	Quantile	High concentrations	Non-parametric
	Two-sample test of proportions	Percent of measurements above a given cutoff	Non-parametric



Table 8.3. Summary of Sample Plan

Areas	Number of Samples		Parameters*
Citrus Cultivation Area	72 samples	Annually (5-acre discrete sample using close composite methodology – top 6’')	Copper Dicofol Diuron Mefenoxam
Pump Stations	No Sample	If no staining / stressed or disturbed vegetation	
	1 each site	If impacts observed (five point composite soil sample – top 6’')	EPA Method 602 EPA Method 610 FL-PRO
Chemical and Equipment Storage Areas	No Sample	If no staining / stressed or disturbed vegetation	
	1 each site	If impacts observed (five point composite soil sample – top 6’')	EPA Method 602 EPA Method 610 FL-PRO Copper Dicofol Diuron Mefenoxam

**Parameter Descriptions*

EPA Method 602 (purgeable aromatics)
EPA Method 610 (polynuclear aromatic hydrocarbons)
Copper by EPA Method 6010/7471
Dicofol by EPA Method 8081
Diuron by EPA Method 8151
Mefenoxam by EPA Method 8141



9.0 STANDARDIZED FORM: BMP SITE VERIFICATION FINDINGS SUMMARY

Future BMP site verification visits will be conducted at the request of the District. BMP implementation will be reviewed per the guidelines and ‘Implementation Requirements’ described for each BMP earlier in this document as well as taking site specific issues and time of year into account. The site verification findings, including a written review of observations, site photographs taken, and a summary of records reviewed, are expected to be provided by the field reviewer in a detailed report. The field verified implementation status of each BMP will be classified in one of three categories:

Implementation Verified

Implementation Verified with Comment

Additional Attention Required

The standardized form for reporting *BMP Site Verification Findings Summary* to be included in the BMP field verification report is included in Appendix B.



APPENDIX B
Best Management Practice Checklist

United States Sugar Corporation
Hendry County
State of Florida

Best Management Practices (BMP) Site Verification Checklist

Tract No.:
SFWMD
Representative(s):
Property
Representative(s):
Inspection Date:

BMP	Description/Comment	Implementation Verified	Additional Attention Required
Property Use and Structures			
Housekeeping			
General Site -			
Storage Areas -			
Additional Observations -			
Employee Training			
Schedule -			



Topics -			
Additional Observations -			
Hazardous Material/ Chemical Use			
Chemicals Used -			
Application Type -			
Application Schedule -			
Material Records -			
Additional Observations:			
Petroleum Products			
Product Use -			
Pump Station(s) -			
Storage Location(s) -			
Additional Observations:			
Chemical Storage			
Storage Location -			
Building/Area Type -			



Pump Station(s) -			
Additional Observations:			
Mixing & Loading Areas			
Area Description -			
Area Observations -			
Additional Observations:			
Waste Storage and Disposal			
Waste Types -			
Storage Location -			
Waste Disposal -			
Waste Disposal Records -			
Additional Observations:			
Water Management			
Observations -			
Water Mgmt Controls -			
Weather Monitoring -			
Additional Observations:			



Erosion/Sediment Controls			
Erosion Controls -			
Sediment Controls -			
Additional Observations:			
Exotic Vegetation Management			
Observations -			
Physical Controls -			
Biological Controls -			
Chemical Controls -			
Additional Observations:			
General Field Notes			

Notes:

N/A - Not Applicable



APPENDIX C

EMERGENCY RESPONSE and CHEMICAL HAZARD INFORMATION PHONE NUMBERS

EMERGENCY REPORTING

For Ambulance, Fire, or Police **Dial 911**

State Warning Point

(Department of Community Affairs,
Division of Emergency Management)

24hrs. Toll Free 1-800-320-0519
or (850) 413-9911

National Response Center

(Federal law requires that anyone who releases into the environment a reportable quantity of a hazardous substance [including oil when water is or may be affected] or a material identified as a marine pollutant, must immediately notify the NRC).

24hrs. Toll Free 1-800-424-8802

FDEP Emergency Response, 24 hrs. Toll Free **1-800-342-5367**

HELP LINE NUMBERS

Chemical hazard information and regulatory questions

- **CHEMTREC HOT LINE (Emergency only) 24 hrs**
- SARA Title III help line
- CERCLA / RCRA help line
- Pesticide Container Recycling Program
- Pesticide Information Officer at University of Florida

Toll Free 1-800-424-9300

Toll Free 1-800-535-0202

Toll Free 1-800-424-9346

352-392-4721

COUNTY COOPERATIVE EXTENSION OFFICES

Pam Beach County	559 N. Military Trail West Palm Beach, FL 33415	(561) 233-1700
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Hendry County	1085 Pratt Boulevard Dallas B Townsend Agricultural Center Labelle, FL 33935	(863) 674-4092
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Glades County	900 US Highway 27 SW Moore Haven, FL 33471	(863) 946-0244
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Gilchrist County	125 East Wade Street Trenton, FL 32693	(352) 463-3174
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STATE OF FLORIDA AGENCIES

Florida Department of Agriculture and Consumer Services

Bureau of Pesticides	(850) 487-0532
Bureau of Compliance Monitoring	(850) 488-3314
Division of Agriculture and Environmental Services	(850) 488-3731

Florida Department of Environmental Protection

FDEP Stormwater/Nonpoint Source Management Section (Tallahassee)	(850) 488-3605
FDEP Hazardous Waste Management Section (Tallahassee)	(850) 488-0300
FDEP District offices - West Palm Beach	(561) 681-6800



Florida Fish and Wildlife Conservation Commission

620 South Meridian Street
Tallahassee, FL 32301

(850) 488-4066 or
(850) 488-4069

Water Management Districts

South Florida Water Management District (West Palm Beach)

(561) 686-8800 or
1-800-432-2045

University of Florida (Gainesville)

Pesticide Information Office
Agricultural Law Policy Office

(352) 392-4721
(352) 392-1881

UNITED STATES AGENCIES

EPA National Offices & Numbers

Office of Water
4604, 401 M Street, SW
Washington, DC 20460

(202)-382-5700

(Provides Information on Clean Water Act and related water pollution regulations)

Florida Administrator of EPA Pesticide Registration

Bureau of Pesticides/ Division of Inspection
Dept. of Agriculture and Consumer Services
3125 Conner Blvd., MD-2
Tallahassee, FL 32399-1650

(850) 487-2130

National Pesticide Telecommunications Network

Provides information on pesticides and pesticide poisonings.
Operating 24 hours a day, 365 days a year.

1-800-858-7378