

# Citrus BMP Implementation in Florida's Gulf Citrus Production Area: Pesticides<sup>1</sup>

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## Introduction

Citrus groves in the five-county Gulf region (Charlotte, Collier, Glades, Hendry, and Lee) are spread across 178,000 acres. This area represents about 25% of both the total citrus acreage in the state as well as the total production volume. In the mid 1980s and early 1990s, the Gulf Citrus Production Area (GCPA) experienced an increase in commercial production of citrus. This shift occurred because the GCPA had a warmer climate, sufficient water supply, and inexpensive land compared to the central ridge of Florida, which was the traditional citrus production area until that time.

Constant and dependable water supply from surface and groundwater sources is essential for profitable citrus production. In the past several years, the lower west coast of Florida, encompassing most of the GCPA, faced both water quantity and quality issues. A major factor in these water issues has been the urban population growth in the coastal areas that has created increased water demand. The South Florida Water Management District (SFWMD) estimates that water supply demand is expected to increase by 27% by 2020 (compared to 1995). Water supply issues must be addressed for present needs and future planning. In addition to water supply, the region also faces nutrient-loading issues that have impacted the ecosystem. A Total Maximum Daily Load (TMDL) program for the

Caloosahatchee River, C139, and the Big Cypress Basins is expected to be completed between 2009 and 2011. Located in southeast Hendry County, the C139 basin (170,000-acre) is hydrologically linked to Florida's Everglades through a stormwater treatment area (STA) and is already regulated, limiting phosphorus (P) discharges through required implementation of Best Management Practices (BMPs). The SFWMD has set a limit on P loading (adjusted for rainfall) that can be discharged from the C139 basin. For 2009, the target load was 13.7 metric-tons while the actual load was 52.3 metric-tons.

The development and implementation of citrus BMPs to address water quality issues is promoted actively by state agencies. The Gulf Citrus industry in association with UF/IFAS, Florida Department of Agriculture and Consumer Services (FDACS), SFWMD, and Florida Department of Environmental Protection (FDEP) has developed a citrus BMPs manual that was released in February 2006. The objective of the manual is to identify and implement the use of citrus BMPs within the GCPA to reduce environmental impacts.

Through a legislative process, FDACS can provide participating growers a **presumption of compliance** with water quality goals associated with the TMDL process if the grower agrees to implement a set of practices from the

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Best Management Practices (BMPs) manual. Essentially, presumption of compliance assumes that a grower has or will implement a selected set of BMPs and that the grower has taken necessary steps to comply with the intent of the TMDL goals.

Several of the citrus pesticide BMPs identified in the manual have already been developed and implemented throughout the GCPA region. Some pesticide BMPs that were prevalent in the GCPA groves dealt with proper management of excess pesticide solution, washing of pesticide equipment on a concrete pad with sump, and spraying of outside rows inwardly using nozzles on one side while directing it away from water bodies or drainage ditches. A survey was conducted in cooperation with Gulf Citrus Growers Association (GCCGA) and FDACS to quantify the current level of BMP implementation and to identify the BMPs that might be adopted with the help of cost-share programs. The goal of this document is to describe the survey and discuss the results for pesticide-related BMPs.

## BMP Survey

The survey was designed to capture grove-specific BMP adoption data with some general questions descriptive of grove management, specific to pesticide management, and about the importance of BMPs with regard to water quality benefits and grove profits. The survey questionnaire included questions to determine if a BMP was practiced *consistently*, *sometimes*, or *not practiced* at all. Growers also had a choice to enter their responses for cases where they “*disagreed with the practice*,” “*plan to use*,” and “*would use if cost shared*.” The “*would use if cost shared*” was perceived as an important outcome from the survey because this choice determined the potential for implementation of a specific BMP if federal and/or state cost-share funds were made available to offset a portion of the implementation cost.

## Survey Procedure and Area

Sixty groves comprised the 115,791 acres of the surveyed area (Table 1). The surveyed acreage was distributed between large ( $\geq 1000$  acres), medium (250 - 1000 acres), and small groves ( $\leq 250$  acres). The survey was conducted by personal interviews rather than a mail-out/mail-back technique.

From a water quality standpoint, percent of the area with a specific BMP implemented is more important than percent of the total number of groves that implement a specific BMP. Therefore, almost all of the *large* groves in the region (104,170 acres) were included in the survey. Seventy-five

percent (9982 acres) of *medium*-sized groves in GCPA were included in the survey. The area occupied by the *small* groves included in the survey was 1,639 acres. The grove name and location were kept confidential. Pesticide survey questions were coded as P1, P2, etc. The survey form (**Appendix 1**) indicates the question codes and associated questions. The total acreage for a specific practice was summed based upon grower response.

## Extent of Pesticide BMP Implementation in GCPA

Effective measures have been taken in the past few years to optimize crop production in Florida. Pesticide use has successfully reduced the risk of crop damage from pests. Pesticides have been developed that are more pest-specific and environmentally friendly. Development and implementation of Best Management Practices (BMPs) also help in protecting water resources as well as the health of pesticide handlers.

Table 2 presents the coverage area as percent of acreage for individual pesticide BMPs for the survey choices: *no*, *yes*, *would if cost-shared*, and *sometimes*.

### Inspection of Pesticide Storage Areas (P1)

**Routine inspections of pesticide storage areas to check for leaks and spills (P1) were conducted on 92% (106,496 acres) of the total surveyed area.**

Transport of spilled pesticides to surface water and ground-water can be controlled or avoided if spills are controlled. Routine inspections of pesticide storage areas can help in early detection of leaks and spills.

### Storage of Containers in Contained Area (P2)

**Storage of containers in a containment area to prevent runoff into streams, ditches, and/or wellheads (P2) was practiced on 88% (102,144 acres) of the surveyed area. This practice was not implemented on a small percentage (5%, 5,847 acres) of the total surveyed area.**

Storage of containers isolated from the surrounding environment, preferably in a roofed concrete or metal structure, is an important practice. Pesticide structures should be at least 50 feet from other structures and 100 feet from surface waters. Placing storage structures according to these requirements prevents or diminishes the chances of pesticides contaminating runoff water, which in turn can contaminate other surface water and groundwater sources.

### ***Management of Excess Pesticide Solutions (P3)***

**Excess spray solutions containing pesticides were managed properly by applying to a target site at labeled rates (P3) on 98% (113,591 acres) of the area.**

Although it is always recommended to mix the pesticides in the amounts advised on the label, it is possible to generate excess mixed material. Since pesticides are highly toxic, even a small concentration could be fatal. Thus, applying of pesticide excess should be done in accordance with the label instructions.

### ***Turning off Sprayer Nozzles (P4)***

**On a large percentage of the surveyed area (97%, 111,891 acres), pesticide handlers turned off sprayer nozzles at the trunk or foliage of the last tree in a row before they entered the new block (P4).**

Pesticide handlers are trained to keep pesticide spraying limited to the desired area. To keep application within the targeted area, applicators should turn off the sprayer nozzles when spraying of one row is completed.

### ***Label Recommendations Concerning Wind Speed (P5)***

**Pesticide handlers from 94% (108,616 acres) of the surveyed area consistently followed label recommendations concerning wind speed when spraying pesticides (P5). On 4.3% (4,975 acres) of the surveyed area, this practice was only implemented some of the time.**

Taking wind speed into consideration and adjusting the equipment to the label-recommended application rate also keep the sprayed material within the targeted area.

A number of practices could be adopted to minimize spray drift. A few spraying systems are furnished with sensors that can map the image of a tree and store its dimensions in a computer, and the system turns on spray nozzles inches before the equipment is brought near the tree. Use of equipment that has these sensors is increasing, but it is not used widely throughout the industry. Nevertheless, standard application equipment could be adjusted to keep spray drifts to a minimum.

### ***Nozzle Selection to Reduce Spray Drift (P6, P7, P8, P9)***

**Nozzle selection to reduce spray drift (P6) was a consistent practice on 95% (109,791 acres) of the surveyed area, whereas on 2% of the area, nozzle selection was only**

**followed sometimes. Growers representing 1.5% of the surveyed area reported that this practice was not needed because they had adapted some other technique for spray drift control.**

**Nozzle adjustment between beds and furrows to reduce spray drift (P7) was followed on 96% (111,371 acres) of the surveyed area.**

**Measures taken to reduce spray drift by adjusting spray pressure (P8) were adapted on 89% (103,056 acres) of the surveyed area in the GCPA. On about 3% of the surveyed area, this practice was utilized sometimes, whereas on another 3% of the area this action was not practiced at all. Growers representing approximately 5% of the area did not consider the practice appropriate for their operations.**

**Another measure to reduce spray drift is the use of drift control materials (P9), which were utilized on 69% (79,535 acres) of the surveyed area. On approximately 19% of the area, this practice was utilized on an occasional basis.**

Techniques that minimize spray drift include the following: use of nozzles that produce large droplets during application for adequate plant coverage; calibration and adjustment of nozzles between beds and furrows; adjustment of spray pressure; and mixing of drift control materials and agents with the pesticides. Efficient management of spray drift can be attained by implementation of one method or a combination of methods.

### ***Spray Direction (P10)***

**The practice of spraying the outside row inward using nozzles on one side only, with spray directed away from aquatic areas (P10), was utilized on 99% of the GCPA surveyed area.**

Spray drift minimization through the methods discussed above plays an important role in avoiding contamination of surface waters. However, spraying pesticides with nozzles on the inward side to direct spray only toward the desired area could augment the effects of the other practices.

### ***Locked Storage Facilities (P11)***

**Agrichemicals were found to be stored in locked facilities (P11) on 91% (105,011 acres) of the surveyed area. Growers representing a small percentage (4.6%, 5,039 acres)**

**of the surveyed area would implement this practice with cost-share support.**

Due to their toxic nature, pesticide chemicals should be stored in an isolated facility with lockable doors. This management practice prevents easy access and also allows separation of other farm materials from the pesticides, consequently preventing any chances of cross-contamination.

#### ***Concrete Floors with 4-inch Lip (P12)***

**Presence of a concrete floor with a 4-inch lip (P12) was found on 49% (57,182 acres) of the surveyed land. Growers from a large portion of the surveyed area, 34% (39,570 acres), reported the absence of a concrete pad with a 4-inch fluid-retaining lip. However, cost-share programs could enhance the construction of properly designed concrete pads with the required retaining lip on 16% of the surveyed area, which is 46% of the area where this structure was absent.**

Pesticide storage facilities with an impermeable surface, preferably a concrete pad, could minimize the amount of pesticides seeping into the ground in case of leakage or large spills. A 4-inch lip can contain and direct the spilled fluids to a sump for proper disposal, minimizing the risk of further contamination.

#### ***Washing of Pesticide Equipment (P13)***

**Washing of pesticide application equipment (P13) was done on a concrete pad with a sump on 30% (35,296 acres) of the surveyed acreage, whereas cost share was projected to increase this practice on another 31% (33,663 acres) of the surveyed area. On 16% (17,999 acres) of the land area, the practice of washing application equipment on a concrete pad with a sump was not done at all, and on another 16% of the surveyed area, the practice was implemented sometimes.**

Similar to the above practice, washing of pesticide application equipment on a concrete pad with sumps safely controls wash water and allows proper disposal of the resulting solution.

#### ***Wash-Water Reuse (P14)***

**Collection and reuse of pesticide equipment wash water (P14) was not a popular practice as indicated by its use on only 23% (26,996 acres) of the total surveyed area. On 36% of the surveyed area, collection and reuse of wash water was not practiced at all, which corresponded to**

**38% of the surveyed area, where an interest in the practice was reported if it was supported through cost share.**

Since washing of pesticide application equipment on a concrete pad with a sump was performed on only 31% of the surveyed land, collection and reuse of that water are low within the GCPA. This trend was due to the absence of a concrete pad with sump in the surveyed groves. Cost-share programs to install concrete pads with sumps could increase implementation of both P13 and P14 by large percentages.

#### ***Use of Devices to Prevent Back-Siphoning (P15)***

**Use of anti-siphoning devices or any other measure to prevent back-siphoning of chemicals into ditches, canals, or wells (P15) was a popular BMP measure, as it was adopted on 92% (107,036 acres) of the area. On only 4% of the area, this measure was not in use at all.**

Water sources can be protected by keeping water pipes above the level of pesticide mixture sites. This design reduces chances of back-siphoning of pesticide mixtures into the water source. If water is being pumped directly from the water source to the mixing tanks, a check valve, anti-siphoning device, or backflow-preventing device is recommended so that back-siphoning could be avoided in case of pump failure.

#### ***Use of Concrete Pad on Mixing Sites (P16)***

**Presence of a concrete pad with a sump on frequently used sites for pesticide mixing (P16) was found on 21% (24,605 acres) of the surveyed area. On only 20% of the area, a concrete pad with sump was not present. Further observation of the survey data revealed that growers from 43% of the surveyed area reported that this practice was not applicable on their groves. On a small percentage of the surveyed area, use of this practice would likely be implemented with cost-share assistance.**

In many cases, pesticides are mixed at or near the same site year after year. The presence of a concrete pad with a sump can minimize contamination from small spills and leaks to surface water and groundwater sources. Mixing and/or loading of pesticide can cause spills that have serious environmental consequences. Thus, mixing/loading operations should be performed on impervious concrete pads. Concrete pads are easy to clean and reduce the chances that the pesticide mixture will infiltrate into the soil below the pad.



### *Location of Mixing/Loading Stations (P17)*

**Location of mixing/loading stations where runoff may not carry spilled chemicals into surface waters (P17) was prevalent on 92% (106,979 acres) of the surveyed area in the GCPA.**

A well-constructed mix/load station reduces the chances of pesticide spillage. Properly sited, the mix/load station provides the convenience of mixing and loading on an impermeable surface. Additionally, proper siting reduces chances of environmental contamination.

### *Use of Portable Mixing Stations (P18)*

**Use of portable mixing/loading stations or ‘water-only nurse’ tanks (P18) was present on 81% (93,527 acres) of the total surveyed area. On an additional 10% of the area, this BMP was practiced only occasionally.**

Another option for preventing contamination from mixing and loading activities is to use portable mixing stations. The portable nature of these stations reduces the chance of chemical buildup, which can happen if the mixing/loading is done on a permanent site without a properly designed concrete pad. However, it is recommended that portable mixing/loading sites be complemented with nurse tanks. Nurse tanks are used to store clean water for the sprayer, and they make it convenient for mixing/loading activities. Also taking into account the portable nature of these stations, they allow random sites to be chosen on the farm that are properly sited to avoid adjacent water bodies.

### *Frequency of Use of the Same Temporary Mixing Stations (P19)*

**Use of the same temporary mixing station sites more than once in the same year (P19) was done on 34% (39,874 acres) of the surveyed area. On 15% (16,840 acres) of the surveyed area, use of temporary mix locations more than once in the same year was an infrequent practice.**

Mixing and loading done on a single site more than once in a year can promote chemical buildup from spills, especially if the site is not equipped with the appropriate concrete pad, four-inch lip, and sump.

## **Additional BMP Implementation Using Government Programs**

The success of any BMP program depends greatly on grower participation. To encourage involvement, state and federal agencies have created cost-share programs to partially defray the costs for selected BMPs. Survey information was analyzed to identify those BMPs that would be readily implemented if some form of cost sharing was available. Additionally, BMPs targeted for cost sharing should also greatly increase both human safety and environmental protection. Lastly, cost sharing targeted BMPs would have to be both financially supported and implemented by growers.

Pesticide BMPs should optimize pest control, reduce costs of farm operations, conserve energy, and protect the environment. To attain these objectives successfully, a combination of management and structural BMPs is required. Coverage of pesticide BMPs in the GCPA, interpreted from the survey, was encouraging.

By far the most practiced BMPs were spraying of pesticides inwardly by using nozzles only on one side while directing the spray away from any aquatic areas and management of excess pesticide spray solutions. These two BMPs were practiced on more than 98% (114,599 acres) of the GCPA area.

BMPs, such as turning off sprayer nozzles when changing rows, nozzle adjustment between beds and furrows, nozzles selection, and label recommendation concerning wind speed when spraying pesticides, were also practiced on 94% (108,616 acres) to 96% (111,891 acres) of the GCPA survey area.

About 88 to 92% of the GCPA practiced BMPs such as storage of containers in a contained area to avoid runoff into surface water, monitoring of spray pressure to reduce spray drift, location of mix/load stations away from the surface water bodies, inspection of pesticide storage area, use of locked facilities for storing pesticides, and prevention of back-siphoning of chemicals into water sources. Although more than 68% of these BMPs were implemented on 80% to 99% of the total surveyed area, there were at least three practices that could be promoted through cost-share incentives.

A structural BMP, such as construction of a concrete pad with 4-inch lip in pesticide storage facilities, could be an expensive procedure, particularly when the storage facilities are old and do not meet new, recommended standards.

Growers from **16%** (18,164 acres) of the surveyed area supported the construction of the concrete pad if they received cost-share incentive.

Pesticide equipment has to be washed frequently, preferably after every use. However, the wash water is likely contaminated with pesticide residues, posing a potential environmental risk if the wash water is not disposed of correctly. This water should not be discarded but collected and applied to a pest-prone area. Allowing the wash water to enter the soil at the washing station can cause the water to contaminate surface water or groundwater. Thus, equipment washing stations constructed of impervious surfaces, such as concrete pads with sumps, allow proper handling and disposal of wash water. Growers representing **31%** (33,663 acres) of the surveyed area in the GCPA agreed to adopt washing of the equipment on a concrete pad with sump if the cost was supported by a government program. Usage of pesticide equipment wash water could be possible if the pesticide is washed on the concrete pad. The two BMPs are intertwined with each other. The numbers for increase in acreage for the collection and reuse of wash water is reported to increase from 23.3% to **38%** (41,683 acres) with cost share. The percent change for the two BMPs with cost share is close to each other. It seems that growers who did not already have the concrete pads on their groves didn't feel the initiative to invest in the construction of one to adopt this practice unless they got support from the government.

Concrete pads with sumps are also recommended for mixing/loading on permanent stations. On only 30% of the surveyed area, concrete pads with sumps were present on permanent mixing/loading stations.

On 43% of the area, growers reported that permanent mixing stations were not practical for their operations. Apparently, these growers used portable mixing stations (80%, 93,527 acres). Cost-share programs could bring slight improvement (**5%**) in the installment of concrete pads with sumps on permanent mixing/loading stations.

A few storage facilities still remain where new recommendations (including the use of locked storage facilities) are not implemented. Current use of locked storage facilities was high within the GCPA. However, this management practice could also see an increase in coverage by **4%** (5,039 acres) with cost-share programs.

## Summary

The citrus BMP survey quantified the level of pesticide BMP implementation in the GCPA. Survey results indicated that most pesticide BMPs were already implemented within the GCPA. It is evident that growers are mindful of the environmental and health implications and are actively implementing most pesticide BMPs, as evident from the survey, which indicated that 13 out of the 19 listed pesticide BMPs were practiced on at least 80% of the total surveyed GCPA area. This high level of pesticide BMP implementation throughout the GCPA is a clear indication that the citrus industry is proactively involved in reducing environmental impacts, which will be minimized when using pesticides according to BMPs. Based upon this survey result, growers are aware of the detrimental effects to water quality if pesticides are handled inappropriately.

Many BMPs are useful in prevention of pesticide in surface water bodies, including the following:

- Spraying of pesticides toward the crop and away from any aquatic areas, including ditches;
- Measures for spray drift reduction (nozzle selection and adjustment, controlling spray pressure, and use of other drift control materials);
- Regular inspection to check for leaks; storing of containers in contained areas; and
- Use of anti-siphoning devices.

These BMPs were implemented extensively by growers throughout the GCPA.

An informative BMP manual has been developed for the GCPA. This manual includes BMPs dealing specifically with pesticides. Continuous educational offerings dealing with changes in BMPs and water quality regulations should be offered to keep GCPA growers informed. Cost-share programs could provide some incentives to the growers with the implementation of more expensive BMPs, especially those dealing with structures and security.

Although this survey has established consistent and keen use of pesticide BMPs, it is recommended that a similar survey be conducted in a few years to document the changes and coverage of BMP implementation. Studies like these provide much-needed feedback on the success of the BMP education and cost-share programs.

## For More Information

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## APPENDIX 1

What is your business (circle all that apply)?

☐ Owner of grove(s)

☐ Citrus production manager

☐ Caretaker

☐ Consultant

☐ Chemical or equipment salesperson

☐ Other (specify) \_\_\_\_\_

How many acres of citrus do you manage and which county (s)? \_\_\_\_\_

When you decide to use a citrus BMP, please rate how important it is for the BMP to return a net profit on the investment:

☐ Very Important

☐ Moderately Important

☐ Slightly Important

☐ Not at all Important

When you decide to use a citrus BMP, how important it is for you to be certain that the BMP will prevent pollution:

☐ Very Important

☐ Moderately Important

☐ Slightly Important

☐ Not at all Important

What type of irrigation system do you use?

☐ Very Important

☐ Moderately Important

☐ Slightly Important

☐ Not at all Important

Table 1. Distribution of surveyed area by grove size.

Grove Size	Area (Acres)	Number of Groves	Area (%)
Large	104,170	31	90
Medium	9,982	18	9
Small	1,639	11	1.0
Total	115,791	60	100

Table 2. Survey results for pesticide BMPs.

Pesticide Question Codes	Total area (acre) and percent of GCPA acreage for the four survey responses <i>no, yes, would if cost-shared, and sometimes</i>							
	No		Yes		Would if cost-shared		Sometimes	
	Acreage	%	Acreage	%	Acreage	%	Acreage	%
P1 (routine inspection)	1495	1.3	106496	91.8	0	0.0	0	0.0
P2 (container storage)	5847	5.0	102144	88.1	0	0.0	0	0.0
P3 (excess pest. mgt.)	0	0.0	113591	97.9	0	0.0	0	0.0
P4 (nozzles off)	0	0.0	111891	96.5	0	0.0	0	0.0
P5 (wind-speed)	0	0.0	108616	93.7	0	0.0	4975	4.3
P6 (nozzle selection)	0	0.0	109791	94.7	0	0.0	1700	1.5
P7 (nozzle adjustments)	2220	1.9	111371	96.0	0	0.0	0	0.0
P8 (spray pressure)	3375	2.9	103056	88.9	0	0.0	3000	2.6
P9 (drift control)	7215	6.2	79535	68.6	0	0.0	21841	18.8
P10 (outside row spraying)	1192	1.0	114599	98.8	0	0.0	0	0.0
P11 (agri-chem storage)	3611	3.1	105011	90.5	5039	4.6	530	0.5
P12 (4" lip concrete floor)	39570	34.1	57182	49.3	18164	16.7	0	0.0
P13 (concrete pad sump)	17999	15.5	35296	30.4	33663	30.9	18800	16.2
P14 (wash-water reuse)	41412	35.7	26996	23.3	41683	38.3	1700	1.5
P15 (anti-siphoning devices)	4591	4.0	107036	92.3	164	0.2	0	0.0
P16 (spill and leaks mgt.)	23665	20.4	24605	21.2	5435	5.0	1480	1.3
P17 (load stations location)	4000	3.4	106979	92.2	0	0.0	4812	4.1
P18 (system of portable mix stations)	10803	9.3	93527	80.6	0	0.0	11297	9.7
P19 (mix location use more than once a year)	49044	42.3	39874	34.4	0	0.0	16840	14.5



Table 3. What is your current use of the following practices? NOTE that not all are BMPs (check all answers that apply to your use).

Survey Question Code	Question Description
P1	Are routine inspections of the pesticide storage area conducted to check for leaks and spills?
P2	Are containers stored in a contained area to prevent runoff into streams, ditches, or wellheads?
P3	Are excess spray solutions containing pesticides managed properly by applying to a target site at labeled rates?
P4	Are sprayer nozzles turned off at the trunk of the last tree in the row and a pass made around the outside perimeter of the block (wrapping), or nozzles off at foliage of last tree?
P5	Do you follow label recommendations concerning wind speed when spraying chemicals?
P6	Is appropriate nozzle selection used to reduce spray drift?
P7	Are appropriate measures taken to reduce spray drift using nozzle adjustment between beds and furrows?
P8	Are appropriate measures taken to reduce spray drift using spray pressure?
P9	Are appropriate measures taken to reduce spray drift using drift control materials?
P10	Is the outside row sprayed inward using nozzles on one side only, with spray directed away from aquatic areas?
P11	Are all agri-chemicals stored in a locked facility?
P12	Does this facility have a concrete floor with a 4" lip?
P13	Is application equipment washed on a concrete pad with a sump?
P14	Is pesticide equipment wash water collected and reused?
P15	Are anti-siphoning devices or other measures utilized to prevent back siphoning of chemicals (fertilizer, pesticides etc.) into ditches, canals, or wells?
P16	If pesticides are mixed at or near the same site year after year, is there a concrete pad with a sump to minimize contamination from small spills and leaks?
P17	Are mix/load stations located where runoff will not carry spilled chemicals into surface water bodies?
P18	Do you use a system of portable mix / load stations or water only nurse tanks?
P19	Are the same mix locations used more than once in the same year?