FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

OFFICE OF AGRICULTURAL WATER POLICY

REPORT ON THE IMPLEMENTATION OF AGRICULTURAL BEST MANAGEMENT PRACTICES

OCTOBER 2009

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Prepared by

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

OFFICE OF AGRICULTURAL WATER POLICY

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EXECUTIVE SUMMARY

Agricultural water quality and quantity Best Management Practices (BMPs) are an integral part of water resource protection. The Florida Legislature has recognized this in various statutes, including the Florida Watershed Restoration Act (403.067, F.S.), under which the Florida Department of Environmental Protection establishes total maximum daily loads (TMDLs), water quality targets, for impaired waters. Under the Act, nonpoint sources, including agriculture, are responsible for implementing BMPs to help achieve TMDLs. BMPs include management and structural practices, such as efficient use of fertilizer, efficient irrigation, erosion control, stormwater ponds, and setbacks from waterbodies, among others.

OFFICE OF AGRICULTURAL WATER POLICY BMP IMPLEMENTATION ASSURANCE

The Office of Agricultural Water Policy (OAWP) within the Florida Department of Agriculture (FDACS) develops, adopts, and assists in the implementation of BMPs for "traditional" agricultural commodities (those other than silviculture or aquaculture). Producers participate in OAWP BMP programs by submitting Notices of Intent (NOIs) to implement the BMPs, along with a checklist of practices applicable to the acres being enrolled.

The OAWP conducts an Implementation Assurance program to follow up with producers on their BMPs. The program has three components: the Suwannee River Partnership (SRP), the statutorily established Lake Okeechobee Protection Program (LOPP), and the remaining areas of the state. Because of program-specific needs, the follow-up process for each of these three components is somewhat different. Implementation Assurance in the SRP and LOPP are driven primarily by site inspections because there are more staff resources dedicated to these priority areas. To provide BMP follow up and programmatic evaluation for the rest of the state, with limited resources, the OAWP conducts mail-out surveys on a cyclical basis by commodity, followed by selected site visits.

The 2008 OAWP Implementation Assurance Report addressed the SRP, the LOPP, the Ridge Citrus program, and the Indian River Area Citrus program. Subsequent to the completion of the report, random site visits were conducted on sites enrolled in the Ridge and Indian River citrus programs. A summary of the site visit findings is contained in the body of the report. The 2009 report addresses the SRP, the LOPP, citrus in the Peace River and Manasota basins, and the Gulf Citrus program. The report findings are summarized below, with more detail contained in the body of the report.

SUWANNEE RIVER PARTNERSHIP

Forty of the 46 dairies in the basin (87%) have Conservation Plans, which contain the BMPs to be implemented. Six farms have chosen not to participate formally in the BMP program at this time, although they do carry out many of the practices. Of the 40 dairies participating, 37 farms are fully implementing their plans (representing approximately 35,000 cows out of about 37,000).

In the last year, 45 poultry farms have either gone out of business or lost their contract with Pilgrim's Pride. All 119 poultry farms left in the basin are participating in BMP implementation, and 118 have fully implemented Conservation Plans.

In 2008, 32 dairy and 101 poultry operations received at least one site inspection, and some of those received additional visits. The total number of inspections was 53 for dairy and 190 for poultry. The percentage of *Satisfactory* ratings given during dairy inspections was: 88% for dairy collection and transport, 79 % for manure storage, 91% for manure utilization, and 30% for record keeping. The percentage of *Satisfactory* ratings given during poultry inspections was: 100% for litter management, 99%for mortality management, and 47% for litter records. The relatively low percentage for record keeping is due in large part to the fact that FDACS inspectors assign a *Conditional* rating if no one is available to produce the records.

As of September 30, 2009, about 141,476 acres of crop farms in counties wholly or partially within the Suwannee River Water Management District were enrolled in BMPs under the FDACS Water Quality/Quantity BMPs for Vegetable and Agronomic Crops. This represents about 78% of the crop farm acreage in the basin. The follow-up process for these operations will be part of OAWP implementation assurance activities for vegetable and agronomic crops statewide, and may also include periodic site visits by SRP staff.

LAKE OKEECHOBEE WATERSHED

Between February and September 2009, OAWP staff visited nineteen operations, representing a total of 23,724 out of approximately 584,580 acres enrolled in the Lake Okeechobee Watershed. These operations included: thirteen cow/calf; one cow/calf and sod; two cow/calf and row crops; one row crop; one container nursery, and one citrus. Site Inspections addressed nutrient management (primarily applications of phosphorus) and irrigation management.

During the previous evaluation period, FDACS staff inspected 57 cow-calf operations with completed Conservation Plans, which represent 100,500 enrolled acres. As of September 30, 2009, approximately 124,224 acres had been inspected, about 21 percent of the total enrolled acres in the watershed.

The nineteen site visits included evaluations of records, as well as structural and management BMPs addressing nutrient management (for phosphates) and irrigation management. Fifteen (79%) of the operations visited received an overall *Satisfactory* rating, and four (21%) received an overall rating of *Conditional*. The four *Conditional* ratings were due to structural BMPs that are awaiting approval from the Natural Resources Conservation Service, which is providing cost share for the structures. One of the operations with a *Conditional* rating also was lacking appropriate records.

CITRUS BMP IMPLEMENTATION

The *Water Quality/Quantity BMPs for Gulf Citrus Groves* (Gulf Citrus BMPs) manual applies to the production of citrus in southwest Florida, which includes the flatwoods citrus-producing regions of Charlotte, Collier, Glades, Hendry, and Lee counties. The *Best Management Practices for Citrus Groves in the Peace River and Manasota Basins* (Peace - Manasota Citrus BMPs) manual applies to the production of citrus in South-West Florida, which include the flatwoods citrus-producing regions of Charlotte, DeSoto, Hardee, Manatee, and Sarasota counties. The BMPs in both these manuals address water management, sediment transport, pesticides, nutrients, and aquatic

plants. Participating growers are expected to implement the BMPs applicable to their operations. Applicable practices are those that address site-specific water quality and quantity issues and are technically and economically feasible to implement.

The surveys for Gulf Citrus and Peace - Manasota Citrus BMPs addressed only the irrigation and nutrient management BMPs because these 30 practices are considered the key water quality BMPs in the manual, and a survey containing all 67 BMPs would have been excessively long. For the most part, the other BMPs in the manual address regulated activities, which are subject to review and compliance checks by other programs or agencies.

Results of Citrus BMP Surveys

Gulf Citrus

In March 2009, each of the 18 growers enrolled in the Gulf Citrus BMP program were mailed a survey. Of the 18 mail-outs, 9 surveys were submitted, representing 44.35% of the enrolled acreage. Four other producers (44.33% of the enrolled acreage) did not submit the survey, but responded by phone or mail that they were still in production and continuing to implement the BMPs. The remaining five producers (11.32% of the enrolled acreage) gave no response and could not be contacted. **Table 1** summarizes the survey response rates, associated acreages, and survey results.

TABLE 1. SUMMARY OF GULF CITRUS BMP SURVEY RESULTS		**ENROLLED ACRES**	**BMP STATUS**	**BMP IMPLEMENTATION RATE***
Surveys Mailed	**18**	**85,594**		
Surveys Submitted	9	37,962	Active	91.64%
Other Responses	4	37,942	Active	Unknown
No Response	5	9,690	Presumed Inactive	Unknown

** Ratio of BMPs identified by growers as being implemented to related management actions being conducted*

On average, the nine producers who completed the survey identified 94.17% of the practices surveyed as being implemented in their operations. The remaining BMPs were identified by the respondents as not applicable or not technologically or economically feasible. Based on responses to a series of questions about BMP-related management actions conducted on these operations, the survey showed that these 9 producers collectively were implementing 91.64% of the practices they identified.

Peace River-Manasota Basins Citrus

In March 2009, 51 of the 52 producers listed in the BMPTS under the Peace River-Manasota basins citrus program were mailed a survey. The remaining producer (whose operations included 158 of the 281 NOIs submitted under the program) received a site visit from OAWP staff to review records and conduct the survey in person. Of the 52 surveys, a total of 36 were submitted, representing 41,665 acres (86.78% of the enrolled acreage). Seven other producers, representing an additional 2,423 acres (5% of the enrolled acreage), did not submit the survey, but responded

by phone or mail that they were still in production and continuing to implement the BMPs. Eight producers (2,638 acres - 5.49 % of the enrolled acreage) gave no response, and could not be contacted. The remaining operation was confirmed as not being in production. **Table 2** summarizes the survey response rates, associated acreages, and survey results.

TABLE 2. SUMMARY OF PEACE RIVER-MANASOTA BASINS SURVEY RESULTS

		ENROLLED ACRES	BMP STATUS	BMP IMPLEMENTATION RATE
Surveys Distributed	**52**	**48,007**		
Surveys Submitted	36	41,665	Active	96.94%
Other Responses	7	2,423	Active	Unknown
No Response	8	2,638	Presumed Inactive	Unknown
Other	1	1,281	Confirmed Inactive	N/A

On average, the producers who completed the survey identified 78.64% of the 30 practices surveyed as being implemented in their operations. The remaining BMPs were identified as not applicable or not technologically or economically feasible. Based on responses to a series of questions about BMP-related management actions conducted on these operations, the survey showed that these 36 producers collectively were implementing 96.89% of the practices they identified.

OVERALL BMP IMPLEMENTATION RATES BY PROGRAM

The BMP programs covered in this report each have their own unique characteristics and complexities, as do their related implementation assurance activities. It is risky to rely upon a snapshot of the outcomes of these programs because of the varying methods of evaluation used. The figures in **Table 3** provide a conservative estimate of the overall rate of implementation for each program, based on survey and/or site inspection results. The figures below must be considered in the context of the detailed results and discussion presented in this report.

TABLE 3. OVERALL BMP IMPLEMENTATION RATES BY PROGRAM *(ROUNDED NUMBERS)*

SUWANNEE RIVER *(site visits)* *Dairy:* *Poultry:*	 72% Satisfactory rating 82% Satisfactory rating
LAKE OKEECHOBEE *(site visits)*	79% Satisfactory rating
GULF CITRUS *(written survey)**	92% implementation of applicable BMPs
PEACE/MANASOTA CITRUS *(written survey)**	97% implementation of applicable BMPs

** Quantitative, not qualitative, assessment*

OBSERVATIONS AND FUTURE STEPS

The 2008 Implementation Assurance Report included steps OAWP staff would take to address potential issues identified by OAWP staff while conducting BMP implementation assurance. The status of these proposed actions is contained in the body of the report.

ACRONYMS

BMAP Basin Management Action Plan

BMP Best Management Practice

BMPTS Best Management Practices Tracking System

FDACS Florida Department of Agriculture and Consumer Services

FDEP Florida Department of Environmental Protection

GAP Good Agricultural Practices

LOPP Lake Okeechobee Protection Plan

LOW Lake Okeechobee Watershed

NOI Notice of Intent (to implement BMPs)

OAWP Office of Agricultural Water Policy (within FDACS)

SFWMD South Florida Water Management District

SRP Suwannee River Partnership

TMDL Total Maximum Daily Load

TABLE OF CONTENTS

INTRODUCTION

AGRICULTURAL BEST MANAGEMENT PRACTICES

Best management practices (BMPs) are individual or combined practices determined through research, field testing, and expert review to be the most effective and practicable means for improving water quality, taking into account economic and technological considerations. BMPs may be developed for both urban and agricultural pollutant sources.

Two key categories of BMPs are nutrient management and irrigation management. Nutrient management addresses the type, amount, timing, and placement of fertilizer. Reduced fertilizer application rates, soil and tissue tests, fertigation (fertilizing through irrigation), split fertilizer applications, foliar applications, controlled-release fertilizer, fertilizer spreader shut-off valves, and variable-rate fertilizer spreaders are among the nutrient management BMPs. Irrigation management involves the maintenance, scheduling, and overall efficiency of irrigation systems. It typically includes conversion to low-volume systems; soil moisture monitoring; scheduling according to rainfall, temperature, and other climatic conditions; water placement; and plant groupings.

AGRICULTURAL BMPS AND TOTAL MAXIMUM DAILY LOADS

The Florida Department of Environmental Protection (FDEP) identifies impaired waters and develops and adopts Total Maximum Daily Loads (TMDLs) for impaired waters. A TMDL is a water quality target that establishes the maximum amount of a given pollutant a water body can absorb without exceeding applicable water quality standards. Pollutants for which TMDLs have been set include total phosphorus, total nitrogen, iron, and fecal coliform bacteria, among others. FDEP is authorized by statute to develop basin management action plans (BMAPs) in coordination with affected interests, to achieve the TMDLs set for specific water bodies.

Under the Florida Watershed Restoration Act, agricultural nonpoint pollutant sources included in a BMAP must either implement FDACS-adopted BMPs, or conduct water-quality monitoring prescribed by FDEP or the applicable water management district, to demonstrate compliance with pollutant reductions established in the TMDL. Otherwise, these sources may be subject to enforcement by FDEP or the applicable water management district. Ongoing implementation and maintenance of BMPs that FDEP has verified as effective and FDACS has adopted by rule provides a presumption of compliance with state water quality standards.

FDACS OFFICE OF AGRICULTURAL WATER POLICY

The 1995 Florida Legislature established the Office of Agricultural Water Policy (OAWP) within FDACS to facilitate communication and coordination among federal, state, and local agencies, environmental representatives, and the agriculture industry on agricultural water resource issues. As directed by state statutes (sections 403.067, 570.085, Florida Statutes, and others) FDACS, through OAWP, works cooperatively with agricultural producers and industry groups, environmental representatives, the FDEP, the water management districts, the university system, and other interested parties to develop and implement agricultural BMP programs that address both water quality and water quantity.

PARTICIPATING IN OAWP BMP PROGRAMS

Agricultural producers can enroll in OAWP BMP programs by submitting a Notice of Intent (NOI) to implement BMPs, which is included in the adopted BMP manuals. The manuals and NOIs can be obtained from the OAWP website, OAWP field staff, or county extension offices.

The OAWP assists agricultural producers in implementing BMPs. It employs field staff and contracts with service providers to help producers understand and implement the BMPs selected on their NOIs. Depending on the region of the state, service providers include the soil and water conservation districts, University of Florida Institute of Food and Agricultural Sciences, and resource development and conservation councils. They give technical assistance to producers and help conduct BMP cost-share programs, as funding allows. The OAWP also helps provide educational workshops and other opportunities for farmers to learn about BMPs. OAWP-funded Mobile Irrigation Labs identify and demonstrate irrigation efficiency techniques to growers.

Table 4 shows the key BMP rules and manuals the OAWP has adopted to date, and those under development or revision. BMP rules, adopted manuals, and staff contact information are located at http://www.floridaagwaterpolicy.com .

TABLE 4. FDACS AGRICULTURAL BEST MANAGEMENT PRACTICES PROGRAMS

OAWP BMP INITIATIVES	RULE	AREA(S) OF APPLICATION	MANUAL/ RULE STATUS
Ridge Citrus	**5E-1**	Lake Wales Citrus Ridge Area	**Adopted** - All to be consolidated into a single statewide citrus manual
Indian River Area Citrus	**5M-2**	All or part of Volusia, Brevard, Indian River, St. Lucie, Martin, Okeechobee, Palm Beach counties	
Citrus Groves in Peace River and Manasota basins	**5M-5**	All or part of Manatee, Sarasota, Hardee, DeSoto, Charlotte counties	
Gulf Citrus	**5M-7**	All or part of Hendry, Glades, Lee, Collier and Charlotte counties	
Lake Okeechobee Watershed	**5M-3**	Lake Okeechobee watershed	**Adopted -** Under revision to cover the Northern Everglades and Estuaries Protection Program area
Vegetable/Agronomic Crops	**5M-8**	Statewide applicability	**Adopted - Under revision**
Container Nurseries	**5M-6**	Statewide applicability	**Adopted - Under revision**
Sod Farm	**5M-9**	Statewide applicability	**Adopted**
Cow/Calf Operations	**5M-11**	Statewide applicability	**Adopted**
Specialty Fruits and Nuts	**TBD**	Statewide applicability	Targeted for adoption 2010
Equine/Horse Farm	**TBD**	Statewide - specified commercial facilities	Targeted for adoption 2010

The OAWP records and tracks enrollments via a best management practices tracking system (BMPTS), and has begun mapping acres enrolled, to give a general picture of BMP coverage around the state. The success of the mapping effort varies by region, depending on the availability and accuracy of geographic information system data.

Follow Up on BMP Implementation

The OAWP conducts an Implementation Assurance program to follow up with producers on their BMPs. The program has three components: the Suwannee River Partnership (SRP), the statutorily established Lake Okeechobee Protection Program (LOPP), and the remaining areas of the state. Because of program-specific needs, the follow-up process for each of these three components is somewhat different. Implementation Assurance in the SRP and LOPP are driven primarily by site inspections because there are more staff resources dedicated to these priority areas. To provide BMP follow up and programmatic evaluation for the rest of the state, with limited resources, the OAWP conducts mail-out surveys on a cyclical basis by commodity, followed by selected site visits. The specifics of these three components are discussed in the following section.

Collecting data on BMP enrollment and implementation helps FDACS:

- ✓ Provide accountability and demonstrate the level of producer adherence to BMPs.
- ✓ Identify needs for additional education and implementation assistance for producers.
- ✓ Communicate the importance of BMP implementation to producers
- ✓ Measure the success of BMP programs – This is particularly important to help maintain legislative, agency, and public support for this incentive-based approach to reducing agricultural impacts to water resources.
- ✓ Keep NOI records up to date, so OAWP can more accurately report program enrollment rates and provide producers with program updates and information.

BMP IMPLEMENTATION ASSURANCE - PROCESS AND FINDINGS

I. SUWANNEE RIVER PARTNERSHIP BMP IMPLEMENTATION ASSURANCE

PROCESS

The Suwannee River Partnership (SRP) region is a priority area for FDACS, the Suwannee River Water Management District, FDEP, local governments, and others, who developed an agreement in 1999 to work together to: *provide researched-based solutions that protect and conserve the water resources within the Suwannee River Water Management District by emphasizing the implementation of voluntary or incentive-based programs.* SRP goals include achieving 80-100 percent farmer participation in BMP implementation, operation, and maintenance, through the use of Natural Resource Conservation Service Conservation Plans and FDACS-adopted BMP manuals. The primary targeted operations are dairies, poultry operations, and vegetable and row crop farms. The process for BMP implementation assurance in the Suwannee River Partnership is described below.

Dairy and Poultry Farms

Annually, FDACS inspectors from the Dairy and Animal Industry divisions visit dairy and poultry farms participating in the Suwannee River Partnership, to ensure that BMPs are maintained. The inspectors fill out evaluation forms and assign a rating of *Satisfactory*, *Conditional*, or *Unsatisfactory*.

For a *Satisfactory* rating: No further action is required, other than regular inspections.

For a *Conditional Satisfactory* rating: the following steps are taken, as needed:

- Within 30 days of inspection: Technician visit
- Within 60 days of inspection: If issues not resolved after first Technician visit another visit is conducted
- Within 90 days of inspection: If issues not resolved after second Technician visit, FDACS staff visit is conducted
- Within 120 days of inspection: If issues not resolved after FDACS staff visit, FDEP staff visit is conducted

For an *Unsatisfactory* rating: The following steps are taken, as needed:

- Within 7 days of inspection: Technician visit
- Within 37 days of inspection: If issues not resolved after first Technician visit another visit is conducted
- Within 67 days of inspection: If issues not resolved after second Technician visit, FDACS staff visit is conducted
- Within 90 days of inspection: If issues not resolved after FDACS staff visit, FDEP staff visit is conducted

The BMPs commonly reviewed during dairy and poultry site inspections are:

Structural BMPs Reviewed

- **Dairy**
  - Barns or structures that collect manure
  - Pipes or structures that transport manure
  - Manure storage facilities
  - Irrigation systems and other mechanisms for applying manure to crops
- **Poultry**
  - Litter Storage Barns
  - Dead Bird Composters
  - Litter Application Equipment

Management BMPs Reviewed *(Dairy and Poultry)*

- Proper operation and management of structures
- Manure/nutrient application rates
- Soil and manure testing
- Record keeping

Vegetable and Row Crop Operations

SRP staff and technicians visit vegetable and row crop operations that receive cost-share funds, to ensure that they are keeping fertilization and irrigation records, which is a cost-share requirement. The OAWP will conduct a follow-up process for these operations as part of implementation assurance activities for vegetable and agronomic crops statewide.

FINDINGS FOR THE SUWANNEE RIVER BASIN

BMP Implementation assurance activities have been formally conducted in the Suwannee River Basin since 2005. The Suwannee River Partnership has produced two detailed annual reports on BMP "quality assurance." The BMP participation rates and site inspection findings summarized below are from the 2008 annual report.

BMP Participation Rates

Dairies

Forty of the 46 dairies in the basin (87%) have Conservation Plans. Six farms have chosen not to participate in formal BMP implementation at this time. Of the 40 dairies participating:

- Thirty-seven farms are fully implementing their plans, representing approximately 35,000 cows out of about 37,000 (95%) in the basin.
- Forty dairies have installed structural waste management systems.

Poultry

All 119 poultry farms in the basin are participating in BMP implementation. Of these, 118 have fully implemented Conservation Plans, including installed structural waste management systems.

Vegetable and Agronomic Crops

As of September 30, 2009, about 141,476 acres of crop farms in counties wholly or partially within the Suwannee River Water Management District were enrolled in BMPs under the FDACS Water Quality/Quantity BMPs for Vegetable and Agronomic Crops. This represents about 78% of the 180,000 acres of vegetables and row crops in the basin (*acreage based on 2004 FDEP land use information*). The follow-up process for these operations will be part of OAWP implementation assurance activities for vegetable and agronomic crops statewide, and may also include periodic site visits by SRP staff.

Site Inspection Findings

In 2007, 32 dairy and 101 poultry operations were inspected at least once, and some were visited twice or more. The total number of inspections was 53 for dairy and 190 for poultry. Inspection categories for poultry operations are litter management, mortality management, and litter records. Inspection categories for dairy operations are dairy collection and transport, manure storage, manure utilization, and dairy record keeping. Not all inspection categories were ranked during each inspection.

Ratings

The Suwannee River Partnership produces an annual report on implementation assurance, titled the *BMP Quality Assurance Annual Report*. **Table 5** shows the ratings given for BMP implementation by inspection category, according to the 2008 annual report. The ratings for record keeping may not accurately reflect the level at which this practice is conducted. This is because FDACS dairy and poultry operation inspectors do not normally schedule their inspections, and if the producer is not available at the time of the visit to provide records for review, the inspector gives a rating of *Conditional* in this category.

TABLE 5. SUMMARY OF SITE INSPECTION RESULTS FOR THE SUWANNEE RIVER BASIN (2008)

BMPs	SATISFACTORY		CONDITIONAL		UNSATISFACTORY	
DAIRY (30 OPERATIONS VISITED)	**Note**: Some dairy operations visited more than once					
Dairy Collection and Transport	45	88%	5	10%	1	2%
Manure Storage	41	79%	11	21%	0	0%
Manure Utilization	48	91%	4	7%	1	2%
Dairy Record Keeping	16	30%	30	57%	7	13%
POULTRY (129 OPERATIONS VISITED)	**Note**: Some poultry operations visited more than once					
Litter Management (188 ratings)	190	100%	0	0%	0	0%
Mortality Management (185 ratings)	181	99%	2	1%	0	0%
Litter Records (180 ratings)	89	47%	97	52%	1	1%

Inspection Category Descriptions

- **Dairy collection and transport** – includes maintaining and operating the collection and transport components within a waste management system, such as feeding or free stall barns, concrete pads, concrete ditches, pipes, collection pits, sand traps, and solids separators, among others. These facility components are evaluated based on a standard outlined in the operation/maintenance section of the farm's Comprehensive Nutrient Management Plan.
- **Dairy manure storage** – includes maintaining and operating the manure storage components of the waste management system. Factors that are evaluated include the storage area having an adequate freeboard level to allow for large storm events, maintaining the areas, and preventing spills.
- **Dairy manure utilization** – includes utilization of manure solids and wastewater on a growing crop to recycle nutrients to minimize water quality impacts. The evaluation includes an assessment of the total quantity of nutrients being applied to a spray field to ensure the system is kept in nutrient balance.
- **Poultry litter management** – includes storing and utilizing manure/litter from poultry operations in a manner to reduce water quality impacts. Evaluation includes an assessment of whether the operation is properly storing litter, and of the total quantity of nutrients being applied to an application field (normally pasture or forage harvested for hay) to ensure the system is kept in nutrient balance.
- **Poultry mortality management** – includes proper composting of dead birds on a poultry operation. Evaluation includes an assessment of whether dead birds are properly mixed with carbon-containing material, and turned properly to maintain correct temperatures for adequate composting.

Although the most common deficiency indicated in BMP implementation was in record keeping, the ratings in this category may not be reliable, as previously noted. In August 2009, SRP staff began conducting poultry BMP inspections, and will begin handling the dairy site inspections in January 2010. They will schedule their visits to ensure the ability to conduct record-keeping reviews.

II. Lake Okeechobee Watershed BMP Implementation Assurance

Process

The Northern Everglades and Estuaries Protection Program, section 373.4595, F.S., mandates the implementation of FDACS-adopted BMPs verified by FDEP as effective, on all lands within the Lake Okeechobee Watershed. Producers who do not implement BMPs must conduct water quality monitoring prescribed by FDEP or the South Florida Water Management District (SFWMD), in order to demonstrate compliance with the SFWMD's Works of the District program. Ongoing implementation and maintenance of the BMPs affords a presumption of compliance with state water quality standards for the pollutants the BMPs address.

FDACS is responsible for working with agricultural landowners to implement phosphorus-load-reducing BMPs on farms and ranch lands in the Lake Okeechobee Watershed. The OAWP has a dedicated staff person to visit the operations within the basin that have submitted an NOI. To

date, these have been the cow-calf operations that have implemented Conservation Plans. However, dairy, nursery, citrus, and other agricultural commodities will also receive formal site inspections. The overall approach to implementation assurance in the watershed is summarized below.

- Each operation is visited upon completion of cost-shared structural BMPs, to ensure these BMPs have been properly installed, prior to receiving state cost-share funds.
- Overall Implementation Assurance site inspections are conducted generally in order of when Conservation Plans are completed and implemented, within 6 months of plan implementation.
- Staff fills out a review/checklist form and assigns an overall rating of *Satisfactory*, *Conditional*, or *Unsatisfactory*
- For operations that receive a *Satisfactory* rating, no follow-up visit is necessary. However, OAWP staff will conduct "routine" site visits as workload allows. At this time, maintenance of structural BMPs will be reviewed and rated.
- For a rating of *Unsatisfactory* or *Conditional*, there will be a scheduled follow-up inspection, usually within 120 days, to check on progress.
- Additional follow-up site visits will be scheduled as circumstances warrant.
- Producers who repeatedly decline to implement BMPs will be referred to the DEP or the SFWMD for follow up regarding the required monitoring.

The BMPs commonly reviewed during site inspections are:

Structural BMPs
- ✓ Culverts/Culvert risers
- ✓ Fences
- ✓ Water troughs/ well capping

Management BMPs
- ✓ Nutrient management
- ✓ Maintenance of structural BMPs
- ✓ Record keeping

FINDINGS FOR THE LAKE OKEECHOBEE WATERSHED

BMP PARTICIPATION RATES

Approximately 584,580 acres are enrolled in the Lake Okeechobee Protection Program under 250 NOIs. Site inspections in this program focus primarily on cow/calf operations with conservation plans because of the significant cost share provided and the importance of the BMPs to phosphorus management, which is a priority of the South Florida Water Management District.

SITE INSPECTION FINDINGS

Between February and September 2009, OAWP staff visited nineteen operations, representing a total of 23,724 out of approximately 584,580 acres enrolled in the Lake Okeechobee Watershed. These operations included: thirteen cow/calf; one cow/calf and sod; two cow/calf and row crops; one row crop; one container nursery, and one citrus. Site Inspections addressed nutrient

management (primarily applications of phosphorus) and irrigation management, and included evaluations of records, as well as structural and non-structural BMPs.

During the previous fiscal year, FDACS staff inspected 57 cow-calf operations with completed Conservation Plans, which represent 100,500 enrolled acres. As of September 30, 2009, approximately 124,224 acres had been inspected, about 21 percent of the total enrolled acres in the watershed.

Nutrient Management (Phosphates)

Eight of the nineteen operations inspected had made phosphate applications. Of these, seven had adequate, up-to-date records of the soil test analysis, and applications were in line with the test analysis. The remaining producer was lacking appropriate records, and is expected to address this deficiency. Four producers had crops that required tissue testing in relation to phosphate applications, and three of those had performed tissue testing.

Irrigation Management

Seven producers had irrigation records and received *Satisfactory* ratings in this management category. The remaining twelve producers do not use irrigation systems; therefore this management category is not applicable to them.

Structural BMPs

Four producers are awaiting approval of structural BMPs from the Natural Resources Conservation Service, which is providing cost share for the structures. As a result, these four producers received *Conditional* ratings. One of the four was also lacking adequate nutrient management records, as discussed above. A fifth producer will be installing a well at his own cost, and will be notifying FDACS when the well is installed, at which time FDACS staff will make a follow-up visit. The well is not integral to the water quality protection BMPs, and therefore did not affect the producer's *Satisfactory* rating.

Summary of Ratings

Fifteen (79%) of the operations visited received a *Satisfactory* rating, and four (21%) received a rating of *Conditional*. The four *Conditional* ratings were due to structural BMPs that are awaiting approval from the Natural Resources Conservation Service, which is providing cost share for the structures. One of the operations with a *Conditional* rating was lacking appropriate records. **Table 6** provides a summary of the site inspection findings by category for the Lake Okeechobee Watershed BMP Program.

TABLE 6. SUMMARY OF SITE INSPECTION RESULTS FOR LAKE OKEECHOBEE WATERSHED[1]

NUTRIENT MANAGEMENT (PHOSPHATES)	Y	N	NA
Does the producer have records on BMP implementation available for review?	7	1	11
Are the records up to date?	7	1	11
Do the records adequately document the implementation of the BMPs?	7	1	11
Was a soil sample performed?	6	1	12
Was a tissue sample performed?	3	1	15
Is P fertilizer applied at rates specified by soil and/or tissue test results?	7	1	11
Is the nutrient management component of the site-specific conservation plan fully implemented?	6	2	11
IRRIGATION MANAGEMENT	**Y**	**N**	**NA**
Does the producer have records on BMP implementation available for review?	7	0	12
Are the records up to date?	7	0	12
Do the records adequately document the implementation of the BMPs?	7	0	12
Have the applicable irrigation management BMPs been implemented per schedule?	7	0	12
STRUCTURAL BMPS	**Y**	**N**	**NA**
Were all physical BMPs implemented per the conservation plan?	14	5	

BMP CATEGORIES (17 OPERATIONS VISITED)	S	C	U	NA	% S
Nutrient Management (for phosphates)	17	2	0	0	89
Irrigation Management	7	0	0	12	100
Structural BMPs	14	5	0	0	74
OVERALL RATINGS	15	4	0		79

[1] **S** - *Satisfactory*; **C** - *Conditional*; **U** - *Unsatisfactory;* **N/A** - *Not Applicable*

III. BMP IMPLEMENTATION ASSURANCE OUTSIDE THE SRP AND THE LOW

Due to the large workload involved in conducting BMP follow up in areas of the state outside of the Suwannee River Partnership area and the Lake Okeechobee Watershed, OAWP staff developed a standardized approach, which can be modified as needed for different commodities or regions of the state. This approach is summarized below. The combination of mail-out surveys and randomly selected site visits allows limited staff resources (one person) to collect substantial data.

- For each program/commodity, identify the BMPs that will be the focus of implementation assurance activities, primarily nutrient and irrigation management BMPs.
- Mail Data Update Sheet to all property owners/leaseholders who have submitted NOIs.
- Distribute surveys to all property owners/leaseholders who have submitted NOIs *(after culling out duplicate NOIs and NOIs for operations known to be no longer in business or participating in BMPs)*.
  - Use mail-out survey distribution.
  - Stagger distribution by programs.

  - Conduct follow-up to non-responders (allow 3 to 4-week response time after initial distribution, then re-send survey, make phone calls, etc., as appropriate).

- Use randomly selected site visits as spot checks/quality control to support the survey process, observe practices, check records, gather information on education and technical assistance needs, stay in touch with growers and their circumstances, etc. Conduct site visits up front where a large number of NOIs have been submitted for a single operation (NOI threshold varies for each program).
- For post-survey site visits, rank BMP implementation as *Satisfactory*, *Conditional*, or *Unsatisfactory*.
- OAWP staff or contractors conduct individualized follow up to sites not satisfactorily implementing BMPs, with resources targeted to priority areas (such as basins with adopted BMAPs.)

The planned timeline for these implementation assurance activities, shown in **Table 7**, is based on the length of time each BMP program has been in effect. This schedule may be modified to reflect various priorities. For instance, as FDEP establishes TMDLs and develops associated BMAPs, the dominant agricultural land use(s) within the BMAP area may receive expedited attention, if necessary.

TABLE 7. APPROXIMATE TIMELINE FOR OAWP IMPLEMENTATION ASSURANCE OUTSIDE THE SUWANNEE AND OKEECHOBEE REGIONS

BMP IMPLEMENTATION ASSURANCE ACTIVITIES	ESTIMATED TIMELINE
Ridge Citrus	Completed 2008 – Site Visits 2009
Indian River Citrus	Completed 2008 – Site Visits 2009
Peace River/Manasota Citrus	Survey Completed – Site Visits Pending
Gulf Citrus	Survey Completed – Site Visits Pending
Statewide Vegetables/Agronomic Crops	Summer 2010
Statewide Container Nursery	Fall 2010
Statewide Sod	2011
Statewide Cow/Calf	2012
Statewide Equine (to be adopted)	Within 3-4 years of manual adoption
Statewide Specialty Fruit/Nut (to be adopted)	Within 3-4 years of manual adoption

RIDGE CITRUS BMPS - SITE VISITS

Note: *The Ridge Citrus BMP is a single, multi-faceted practice that focuses on the rate and timing of nitrogen applications to citrus groves grown on Florida's sandy ridge soils.*

Ten producers enrolled in the *Nitrogen Best Management Practices for Florida Ridge Citrus* were randomly selected for on-site visits following the mail-out survey (*results reported on in the July 2008 OAWP BMP implementation report*). Each of the 214 enrollees was assigned a contact reference number, based on the producer's listed telephone number. An online program was then used to randomly re-order the numbers. The first ten randomly generated

numbers were cross-referenced to the list with the producer names, and those producers were contacted. Of these ten producers, three had gone out of production. One had already sold the grove for development, and the other two groves were being marketed for development.

OAWP staff visited the other seven operations, conducting interviews and reviewing grove production records pertaining to nitrogen application rates and scheduling. These seven operations ranged from a 12-acre grove on the north end of the Ridge Citrus production area in Putnam County to a nearly 1600-acre grove at the south end in Highlands County. Record-keeping systems varied from pocket notebooks with fertilizer receipts to electronic database systems. In all seven cases, the operations were adhering to the BMP, and had appropriate records.

INDIAN RIVER CITRUS BMPS – SITE VISITS

In conjunction with a program-wide mail-out survey, site visits were conducted on four of the largest operations enrolled in the *Water Quality/Quantity BMPs for Indian River Area Citrus Groves* program, in order to conduct the written survey and observe BMP implementation. Six operations were originally chosen for site visits, however, staff was not able to contact or locate one grower, and one cancelled several appointments. OAWP staff determined that nearly all management (nonstructural) BMPs are being conducted on the four operations visited, as summarized below.

- The producers are monitoring water tables, and some are employing tensiometers on some of their fields to monitor soil moisture levels. Where possible, water tables are being managed by appropriate drainage techniques. Irrigation is limited to what is necessary to maintain production.
- Each of the four operations have well-established employee education programs, and take steps to ensure that field staff know both the "how" and the "why" of proper nutrient applications.
- There is extensive use of both soil and tissue testing to minimize excessive nutrient application, and equipment is being maintained and calibrated prior to applications. The use of precision application equipment continues to increase, and many producers are convinced that this technology quickly pays for itself in fertilizer savings.
- Loading operations are conducted away from sensitive areas, and fertilizers that are inadvertently spilled in the loading process are immediately removed and applied to the groves.

One practice not commonly selected as being applicable was the incorporation of organic materials into soils (D16). This practice was meant to encourage the incorporation of bio-solids and bio-sludges as an economical means of soil improvement and nutrient enrichment. However, the use of these materials is counter to Global GAP (*Good Agricultural Practices*) criteria, and affect product marketability abroad. As a result, the practice is not currently being implemented by these four large-scale producers who participate in the Global GAP program.

In summary, the growers were implementing all the practices, either partially or fully, that they had indicated were applicable to their operations. They were using the practices where they could, and expanding those practices into other areas as possible.

2009 Survey Findings for Gulf Citrus and Peace River-Manasota Basins BMPs

The Gulf and Peace River Area Citrus Groves BMP Implementation Surveys were developed to capture the current implementation of applicable nutrient and water management BMPs by the producers. The first page of the survey allowed producers to indicate which of the 30 BMPs surveyed they had selected on their NOIs, and the status of each BMP's implementation *(fully implemented, partially implemented, or reason not implemented)*. OAWP staff did not confirm whether the BMPs the growers identified on the survey were an exact match with the BMPs selected on their NOIs.

The survey also contained a series of "yes/no" questions about current management actions conducted on the citrus operations. This provided a means to double check reported BMP implementation by comparing, on a programmatic level, the BMPS producers identified as being implemented to their responses about related management actions. This comparison illustrates whether what is expected from these enrollees is actually happening in the field. For example, Question 1 of the survey relates to BMP A1 (Water Table Management):

1. *Which of the following water table management tools do you use on your operations?*
    a. *Water Table Observation Wells*
    b. *Ditch/canal system with sufficient hydraulic capacity*
    c. *Water control structures on culverts*

A "yes" answer to one or more of options a. through c. would confirm that the BMP is being implemented.

In some cases, a producer may not have had to or been able to implement a practice that was selected on an NOI (e.g., the problem was addressed in another way or the practice was not economically not feasible), and/or a producer may have implemented practices not selected on an NOI.

Gulf Citrus BMP Implementation

In March 2009, each of the 18 growers listed in the BMPTS under the Gulf Citrus BMP program were mailed a survey. Collectively, these 18 growers represent a total of 85,594 enrolled acres. Of the 18 mail-outs, 9 surveys were submitted. Four other producers did not submit the survey, but responded by phone or mail that they were still in production and continuing to implement the BMPs. The remaining 5 producers did not respond after repeated attempts to contact them, and are presumed to be inactive at present. It is not clear whether these producers are still in production. OAWP staff will make an additional attempt to contact these producers before categorizing them "inactive" in the BMPTS. **Table 8** summarizes the survey response rates and status of BMP program participation.

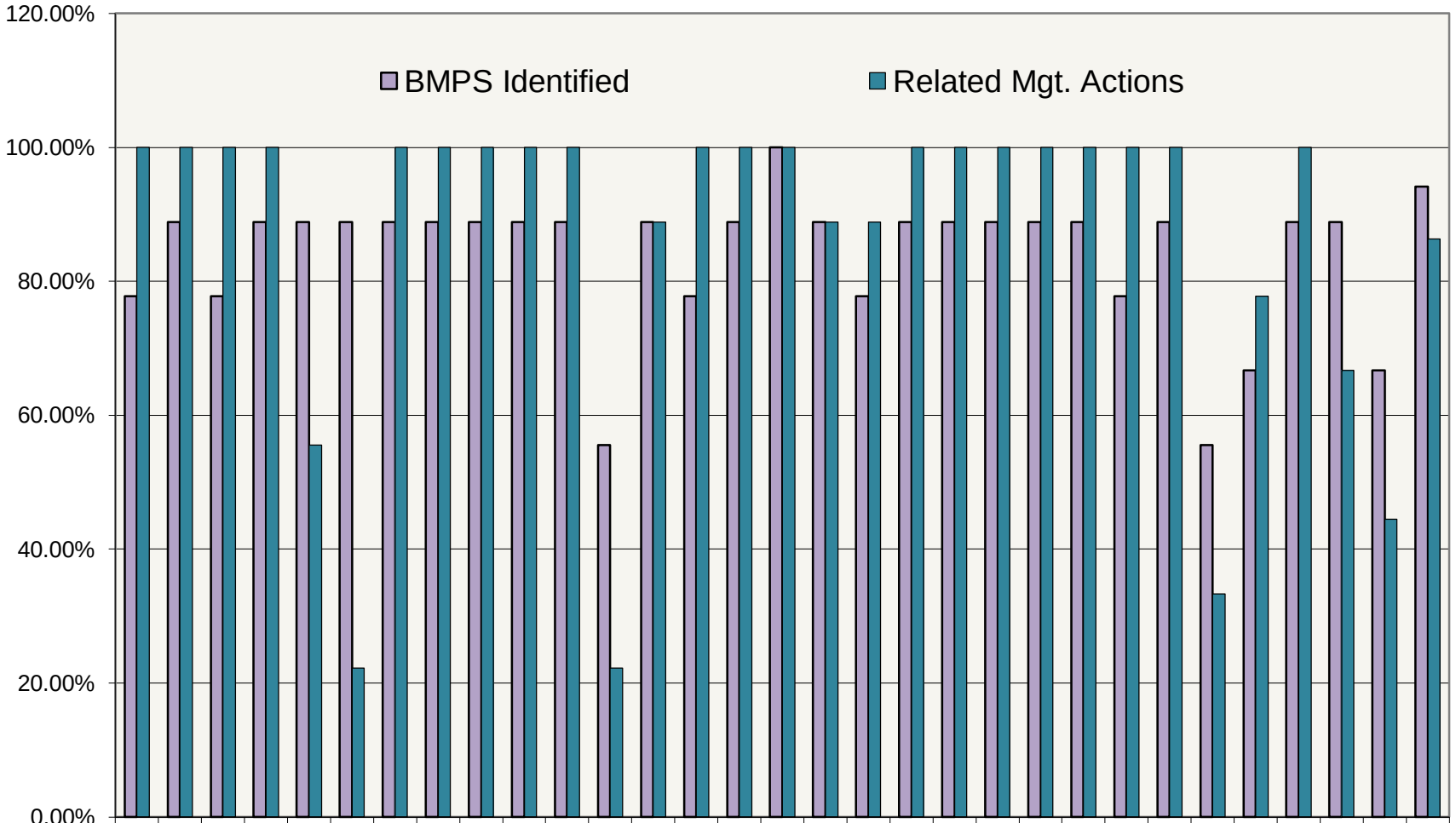
TABLE 8. GULF CITRUS BMP SURVEY RESPONSE RATE AND PROGRAM PARTICIPATION

	# of Producers	*Related NOIs*	*Related BMPTS Acres*
SURVEY RESPONSE INFORMATION			
Enrollments	18	52	85,594.05
Surveys mailed	18	52	85,594.05
On-site surveys conducted	0	0	0
Responses to survey via mail	9	22	37,961.83
Responses by Phone (no survey submitted)	4	21	37,941.64
Non-submittals	5	9	(9,690.58)
PROGRAM PARTICIPATION STATUS			***Adjusted Acres***
Confirmed active	13	43	75,903.47
Confirmed **in**active	0	0	0
Presumed **in**active (no response)	5	9	(9,690.58)
NOIs/Acres confirmed **in**active on active operations		0	0

Gulf Citrus BMP Survey Findings

On average, the survey respondents identified 94.17% of the BMPs surveyed as being implemented on their operations (see **Figure 1**). The remaining BMPs were identified by the respondents as not applicable or not technologically or economically feasible. The average actual implementation rate (ratio of grower-identified BMPs to BMP-related management actions being conducted) was 91.64%. **Figure 2** shows the BMPs being implemented by each survey respondent, based on the management action questions. The far-right column contains a description of the BMPs that were surveyed, and on which the questions were based.

FIGURE 1. GROWER-IDENTIFIED *GULF CITRUS BMPS* VS RELATED MANAGEMENT ACTIONS BEING IMPLEMENTED *(BASED ON NUMBER OF RESPONDENTS TO THE BMP SURVEY)*



	A1	A2	A3	A4	A5	A6	A7	A8	A9	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	ALL
BMPS Identified	77.78	88.89	77.78	88.89	88.89	88.89	88.89	88.89	88.89	88.89	88.89	55.56	88.89	77.78	88.89	100.0	88.89	77.78	88.89	88.89	88.89	88.89	88.89	77.78	88.89	55.56	66.67	88.89	88.89	66.67	94.17
Related Mgt. Actions	100.0	100.0	100.0	100.0	55.56	22.22	100.0	100.0	100.0	100.0	100.0	22.22	88.89	100.0	100.0	100.0	88.89	88.89	100.0	100.0	100.0	100.0	100.0	100.0	100.0	33.33	77.78	100.0	66.67	44.44	86.30

FIGURE 2. IMPLEMENTATION OF GULF CITRUS BMP-RELATED MANAGEMENT ACTIONS

Acreage	8,006	1,234	900	7,754	2,034	357	5,770	899	11,008		
BMP	**BMP Implementation Status**									**Cumulative Acreage***	**BMP Description**
A1										37962	**Water Table Management** (ditch/canals, control structures, active monitoring)
A2										37962	**Scheduling Irrigation and Drainage** (maintain water table that optimizes production)
A3										37962	**Moderate Discharge Rate** (limit off-site discharge to rate of lateral drainage)
A4										37962	**Water Furrow Maintenance** (to achieve uniform drainage)
A5										23182	**Monitor Soil Moisture** (to manage irrigation and drainage)
A6										8988	**Drainage Management Plan** (written drainage management plan)
A7										37962	**Drainage Rate and Volume** (managed to minimize off-site impacts)
A8										37962	**Discharge Structures** (safe, effective, easy to adjust to meet target levels)
A9										37962	**Detention, Tailwater Recovery, and Surface Water Use** (sufficient onsite capacity)
D1										37962	**Education** (proper training of field operators)
D2										37962	**Nutrient Management** (written plan based on sample analyses and expected yields)
D3				**E**						1591	**(Nutrient Management and) Utilization of Waste Resources**
D4										37605	**Employ Tissue and Soil Analyses** (to avoid over-fertilization)
D5										37962	**Use Appropriate Application Equipment** (for precise, consistent applications)
D6										37962	**Equipment Calibration and Maintenance** (to avoid misapplication of nutrients)
D7										37962	**Apply Materials to Target Sites** (within root zone area or drip-line of trees)
D8										35928	**Avoid High Risk Applications** (of fertilizer when runoff or leaching is possible)
D9										35928	**Fertilizer Storage** (proper precautions taken while fertilizer is stored onsite)
D10										37962	**Spilled Fertilizers** (immediately removed from ground surface)
D11										37962	**Use Caution When Loading Near Ditches, Canals, and Wells** (fertilizer loading)
D12										37962	**Alternate Loading Operation Sites** (to prevent concentration of nutrients)
D13										37962	**Use Backflow Prevention Devices** (on irrigation and spray tank filling systems)
D14										37962	**Split Applications Throughout Season** (multiple applications during year)
D15										37962	**Erosion Control** (minimize soil and nutrient losses due to runoff)
D16										37962	**Irrigation Management** (proper scheduling and uniform water distribution)
D17	**E**			**E**					**E**	3833	**Incorporate Organic Materials** (as a means of soil amendment)
D18										29057	**Well Protection** (properly decommission inactive wells)
D19										37962	**Use Appropriate Sources and Formulations** (fertilizer sources and formulations)
D20										33794	**Salinity** (choose fertilizers with lowest salt index/nutrient unit)
D21				**E**						4524	**Conservation Buffers and Setbacks** (to help manage offsite nutrient impacts)

Key				
	"YES" response to management action questions	***blank***	**Identified by grower as Not Applicable**	*** Cumulative acreage based on "YES" responses to management action questions**
	"NO" response to management action questions; E - Also identified by grower as Economically Not Feasible			

PEACE RIVER/MANASOTA BASINS CITRUS BMP IMPLEMENTATION

In March 2009, 51 of the 52 producers listed in the BMPTS under the Peace River-Manasota basins citrus program were mailed a survey. The remaining producer (whose operations included 158 of the 281 NOIs submitted under the program) received a site visit from OAWP staff to review records and conduct the survey in person. Collectively, these growers represent a total of 48,007 enrolled acres. Of the 52 mailed surveys, 35 were submitted. Seven other producers did not submit the survey, but responded by phone or mail that they were still in production and continuing to implement the BMPs. One producer was confirmed inactive. The remaining eight producers did not respond after repeated attempts to contact them, and are presumed to be inactive. It is not clear whether these producers are still in production. OAWP staff will make an additional attempt to contact these producers before categorizing them "inactive" in the BMPTS. **Table 9** summarizes the survey response rates and status of BMP program participation.

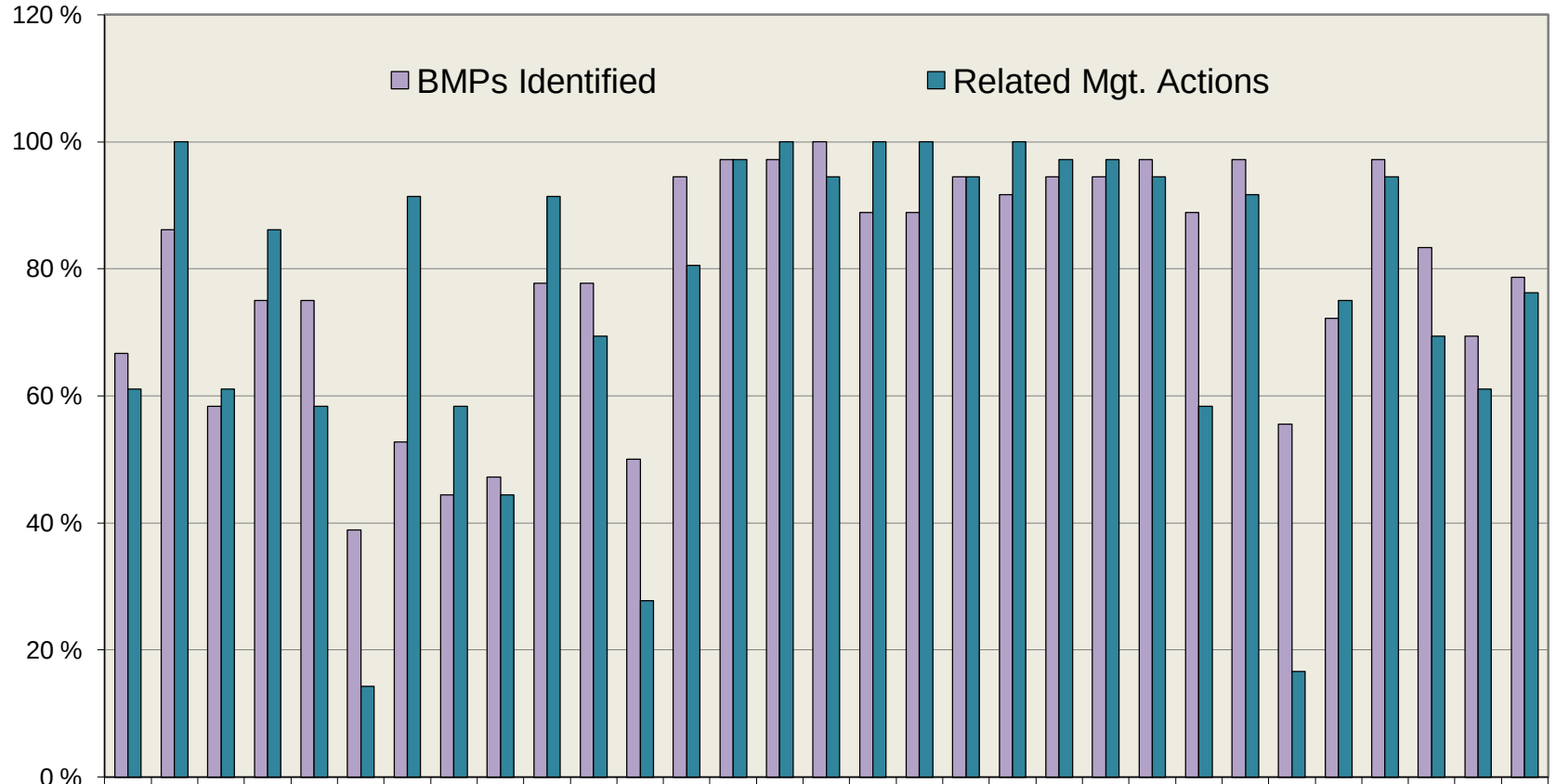
TABLE 9. PEACE RIVER BMP SURVEY RESPONSE RATE AND PROGRAM PARTICIPATION

	# of Producers	*Related NOIs*	*Related BMPTS Acres*
SURVEY RESPONSE INFORMATION			
Enrollments	52	281	48,007.18
Surveys mailed	51	123	31,293.76
On-site surveys conducted	1	158	16,713.42
Responses to survey via mail	35	86	26,204.37
Responses to data update sheet only	7	19	2,423.00
Non-submittals	9	18	2,666.39
PROGRAM PARTICIPATION STATUS			***Adjusted Acres***
Confirmed active	43	254	43,890.46
Confirmed **in**active	1	1	(28.75)
Presumed **in**active (no response)	8	17	(2,637.64)
NOIs/Acres confirmed **in**active on active operations		9	(1,450.33)

Peace River - Manasota Basins Citrus BMP Survey Findings

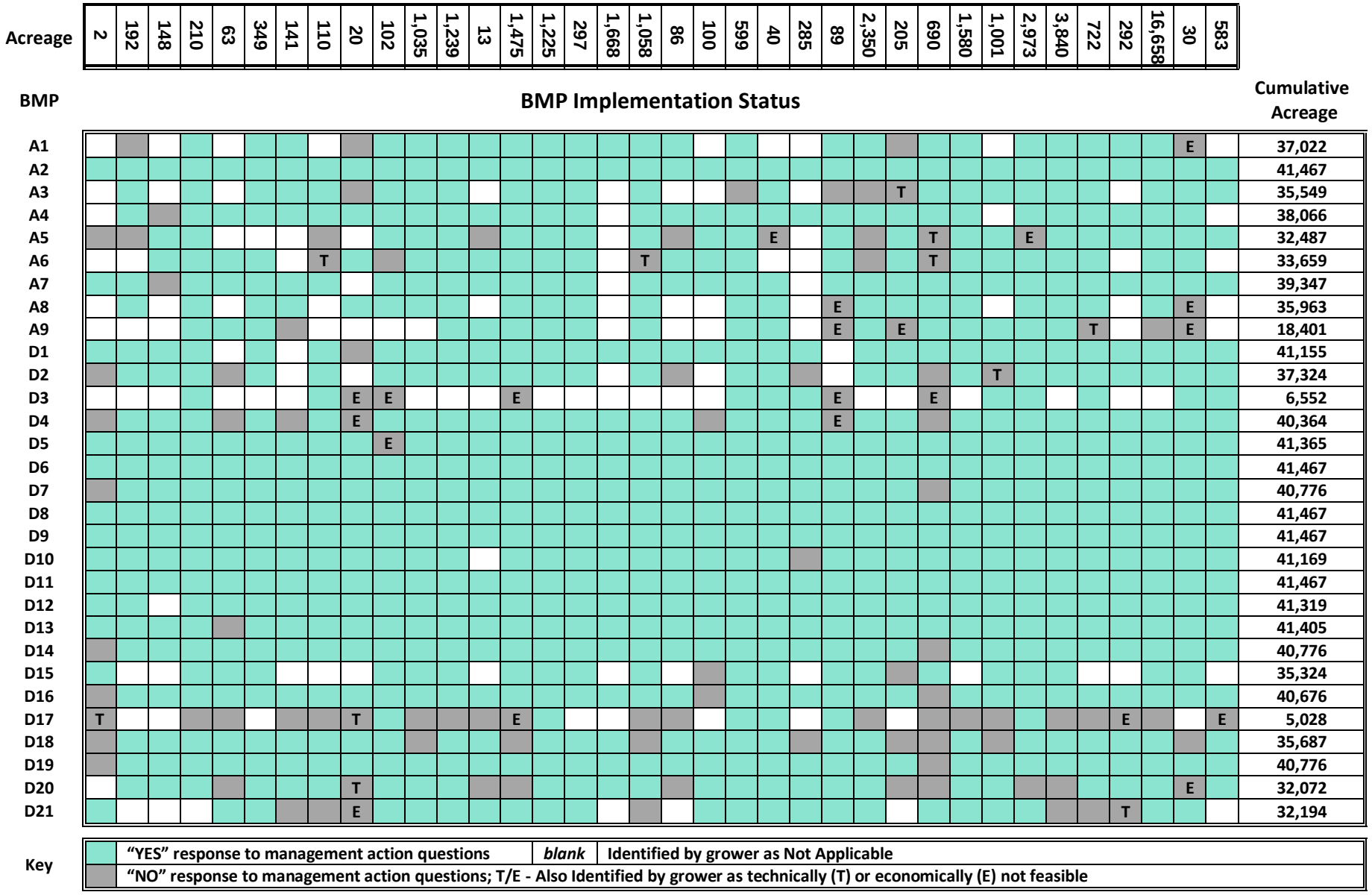
On average, the survey respondents identified 78.64% of the 30 practices surveyed as being implemented in their operations (see **Figure 3**). The remaining BMPs were identified as not applicable or not technologically or economically feasible. The average actual implementation rate (ratio of grower-identified BMPs to BMP-related management actions being conducted) was 96.89%. **Figure 4** shows the BMPs being implemented by each survey respondent, based on the management action questions. The far-right column contains a description of the BMPs that were surveyed, and on which the questions were based.

FIGURE 3. GROWER-IDENTIFIED *PEACE RIVER-MANASOTA CITRUS BMPS* VS RELATED MANAGEMENT ACTIONS BEING IMPLEMENTED *(BASED ON NUMBER OF RESPONDENTS TO THE BMP SURVEY)*



	A1	A2	A3	A4	A5	A6	A7	A8	A9	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	ALL
BMPs Identified	66.67	86.11	58.33	75.00	75.00	38.89	52.78	44.44	47.22	77.78	77.78	50.00	94.44	97.22	97.22	100.00	88.89	88.89	94.44	91.67	94.44	94.44	97.22	88.89	97.22	55.56	72.22	97.22	83.33	69.44	78.64
Related Mgt. Actions	61.11	100.00	61.11	86.11	58.33	14.29	91.43	58.33	44.44	91.43	69.44	27.78	80.56	97.22	100.00	94.44	100.00	100.00	94.44	100.00	97.22	97.22	94.44	58.33	91.67	16.67	75.00	94.44	69.44	61.11	76.20

FIGURE 4. IMPLEMENTATION OF PEACE RIVER-MANASOTA BASINS CITRUS BMP-RELATED MANAGEMENT ACTIONS



* Cumulative acreage based on "YES" responses to management action questions

Discussion of Gulf and Peace River/Manasota Basins Citrus BMPs Not Fully Implemented

Below is a discussion of key BMPs that some Gulf Citrus and Peace River/Manasota basins Citrus survey responders indicated were being implemented on their operations but were significantly under-represented in their responses to related management actions.

Practice A2 - Scheduling Irrigation and Drainage

While practice A2 is fully or partially adhered to by 100% of the respondents in the Gulf Citrus BMP program, there are two areas of weakness. Sub-practice A2.3 deals with managing salinity. Saltwater intrusion into irrigation sources can be a concern. However, only 77.78% of the respondents (51.13% of respondent acreage) indicated that they have their irrigation source analyzed annually. Annual irrigation source water analysis would be of benefit to all producers in areas subject to saltwater intrusion.

In the Peace River-Manasota basins BMP program, practice A2 is fully or partially adhered to by 100% of the producers. However, only 38.89% of the respondents (75.53% of the respondent acreage) indicated that they have their irrigation source water analyzed annually. Mobile Irrigation Lab services (A2.4) were utilized by only 27.78% of the respondents (32.57% of the respondent acreage).

Practice A5 - Monitor Soil Moisture

Use Tensiometers, capacitance sensors, or other soil water monitoring devices along with water table observation wells for irrigation and drainage management to avoid excess soil moisture depletion and minimize water volume requirements during irrigation cycles.

This may be a confusing BMP for the producer, in that the BMP check list only states "*A5. Monitor soil moisture*," which the producers do, but not necessarily in the same manner as the BMP manual provides. The producers responding to the survey recognize the importance of monitoring soil moisture in making irrigation management decisions, as evidenced by the high selection rate. The manual refers to specific monitoring devices being used "along with water table observation wells." The Gulf Citrus survey responses indicated that 62.50% of the respondents (accounting for 62.55% of the acreage) are using these monitoring devices.

Due to the inherent variability of tensiometers and electronic capacitance moisture sensors, the difficulties involved in their proper installation and maintenance, and the expense involved ($200-$300 per sensor), it is doubtful that these are really appropriate as citrus production tools. The more direct reading from water table monitoring wells makes them a useful, relatively simple-to-maintain and economic tool.

Practice A6 - 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 should be a reduction in volume of off-site discharge while maintaining a healthy rooting environment for citrus trees thus maximizing fruit production. The plan should 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.

There was a great discrepancy in responses regarding how the drainage management plan BMP is being implemented. From Gulf Citrus survey responders, the question "Do you have a written drainage management plan that addresses various levels of rainfall?" received only a 22.22% affirmative response (23.68% of the respondent acreage). Only 16.67% of the Peace River-Manasota Citrus responders answered "yes" to the question (14.71% of respondent acreage). However, 77.78% of the Gulf Citrus respondents (79.44% of the respondent acreage) and 61.11% (81.17% of the respondent acreage) were implementing practices that indicate these producers do have a plan for drainage management (although not written). Considering that the specific aspects asked about in the survey may not be logistical concerns on all properties, the actual percentage of acres meeting the goal of this BMP may be even higher than the percentage shown by the survey responses.

Practices D3 and D17 - Use of Organic Materials

D3 *- 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, municipal waste treatment plants, and agricultural processing plants.*

D17 *- Increase the surface application (mulching) of organic materials like horticultural waste and urban plant debris (yard trimmings) when possible to help increase soil organic matter, retain nutrients and moisture, improve biological ecosystems, and supply slowly-released nutrition.*

While the use of these materials (in D3 and D17) may be cheaper and provide a means of disposing of waste products, there are related practical issues. One concern is the potential accumulation of heavy metals and pharmaceuticals (particularly in the form of hormones) in waste products. Many producers have come to realize that the utilization of these organic waste products can limit the market for their product, making the practices economically not feasible. Implementation rates for these BMPS among Gulf Citrus survey responders were 22.22% of the respondents for D3 (4.19% of the acreage), and 33.33% (10.10% of the acreage) for D17. Among Peace River-Manasota Citrus growers, implementation rates were 27.78% (15.80% of the respondent acreage) for D3 and 16.67% (12.13% of the respondent acreage) for D17. This may indicate that the larger producers (who are more concerned about meeting GAP requirements) are hesitant to utilize waste resources.

D21 - 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.

This was indicated as applicable by 66.67% of the Gulf Citrus respondents (48.20% of respondent acreage). However, when asked "Do you use vegetative conservation buffers to reduce potential off-site nutrient runoff?" only 44.44% (11.92% of respondent acreage) answered "yes."

As the BMP manual indicates: *"There are certain non-cropped areas that could qualify as conservation buffers within a typical agro-ecosystem. Vegetated field borders, tree row middles, water furrows, ditch and ditch banks, wetlands/setback areas and associated reservoir systems are examples."* In that context, most (if not all) of the growers are likely implementing this BMP. A grove inspection would reveal the various ways that producers are slowing discharge rates and increasing on-site nutrient retention using non-crop vegetation.

STATUS OF FUTURE STEPS PROPOSED IN THE 2007-08 BMP IMPLEMENTATION ASSURANCE REPORT

The 2007-08 Implementation Assurance Report included steps OAWP staff would take to address potential issues identified by OAWP staff while conducting BMP implementation assurance. Below is a summary of the status of key items.

TABLE 10. STATUS OF IDENTIFIED FUTURE STEPS FROM 2007-08 IMPLEMENTATION ASSURANCE REPORT

Region	Action	Status/Comments
Statewide	Continue to refine BMP manuals; adopt manuals for sod, cow/calf, equine, fruit/nut	sod and cow/calf manuals adopted; equine and fruit/nut manuals to be adopted in 2010
Statewide	Review existing BMP manuals for needed improvements, and revise as necessary	In progress
Statewide	Consolidate citrus manuals into one statewide manual - Update provisions	In progress
Statewide	Promote continued emphasis on importance of BMP implementation, with attention to record keeping	Being communicated on a continuous basis, via one-on-one contact with producers and producer associations, formal presentations, articles, etc.
Statewide	Explore development of BMP section in industry newsletters	In progress
Statewide	Ensure follow-up contact with producers w/in 90 days of enrollment	Requirement of contractors and OAWP staff to do so
Statewide	Enhance BMP enrollment process to ensure that producers are receiving adequate help in selecting/ understanding applicable BMPs	OAWP has developed guidelines for conducting site-specific BMP assessment/enrollment, which contractors and staff are expected to follow
Statewide	Evaluate practices for possible priority for cost share and educ./tech. assistance	In progress; however, cost-share funds are minimal at this time
Statewide	Update data in BMPTS and other OAWP systems	In progress - this will be a continuous process
Statewide	Develop NOI information update postcard for contacting producers at least every two years	Planned for 2010
Statewide	Consider comparing practices on NOIs to BMPs indicated on survey as being on the NOIs	Current tracking system does not allow this for This would require considerable time and effort. It is still a possibility, but is not currently a priority
Statewide	Complete survey-based site visits for Ridge and IRC	Completed
Statewide	Develop single database to track IA evaluations and data statewide	Planned for 2010
SRP	Continue to conduct site inspections for animal operations at least once a year	In progress
LOW	Amend the Lake Okeechobee rule (5M-3) to incorporate NEEPA; expand types of acceptable soil tests	In progress
LOW	Continue to visit each operation enrolled in the LOW	76 operations inspected as of September 2009. 54 additional targeted by the end of 2010.

SRP *- Suwannee River Partnership*
LOW *- Lake Okeechobee Watershed*