

BMP Development & Implementation for Indian River Citrus

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UNIVERSITY OF
FLORIDA

Institute of Food and Agricultural Sciences

Indian River Citrus

220,000 ac in 7-county area
Grapefruit marketed
throughout world





Bedded Citrus
Shallow Rooting
Variable Soils
High Water Table







- High intensity rain storms
- Sandy soils
- High value crops
- Coastal areas
 - Shallow water table
 - Limited root zone

Florida BMP Overview

- **1999 – Legislature enacted Florida Watershed Restoration Act (FWRA)**
 - **Outlines process for FDEP to implement TMDL for impaired waterbodies**
 - **Purpose of FWCA was to better coordinate the numerous pollution control efforts implemented prior to 1999 and develop standards to address future water quality issues**

Florida BMP Overview

- FWRA requires TMDLs for all pollution sources – urban and agriculture included
- FDEP lead agency – coordinates efforts with FDACS, WMDs, Soil & Water Cons. Districts, environmental groups, local governments, etc.
- FDACS has leadership role for agriculture

An aerial photograph of a coastal region. In the foreground, a wide, sandy beach runs along the edge of a large, dark blue body of water. Behind the beach is a residential area with numerous houses and buildings. Further inland, there are green spaces and a road. The background shows a vast expanse of water with many small, low-lying islands or peninsulas, suggesting a complex estuarine or coastal environment. The sky is clear and blue.

Why BMPs?

IRL has greatest diversity of species in North America

- **3,000 + species identified**

- **35 on threatened or endangered lists**

IRL designated as a priority water body by Legislature - SWIM, 1987

EPA designated IRL as “*estuary of national significance*” - 1990

IRL part of National Estuary Program - 1991

Parameters of concern in the IRL and SLE

Nutrients and metals

Total Nitrogen (TN)

Total Phosphorus (TP)

Total Suspended Solids (TSS)

Arsenic (As)

Copper (Cu)

Pesticides

Atrazine

Diazanone

Ethion

Endosulfan

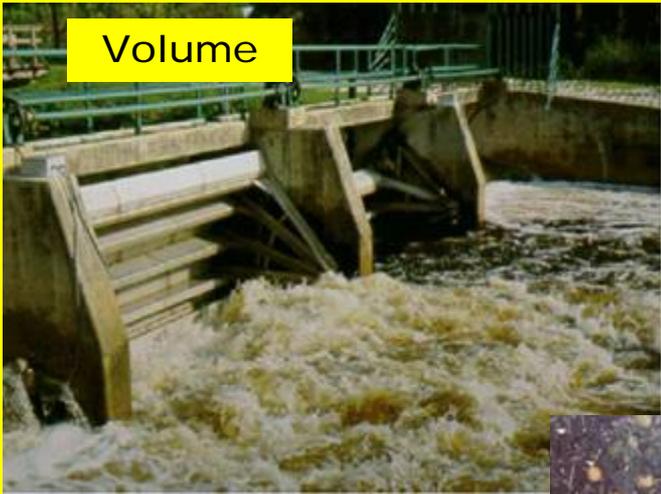
Simazine

Fresh
Water

BMP Development

Dec 98 – Mar 99: Production Committee of IRCL (with FDACS and UF/IFAS) began BMP development

- 6–page draft developed**
- Presented to interested groups on Mar 26**



Volume



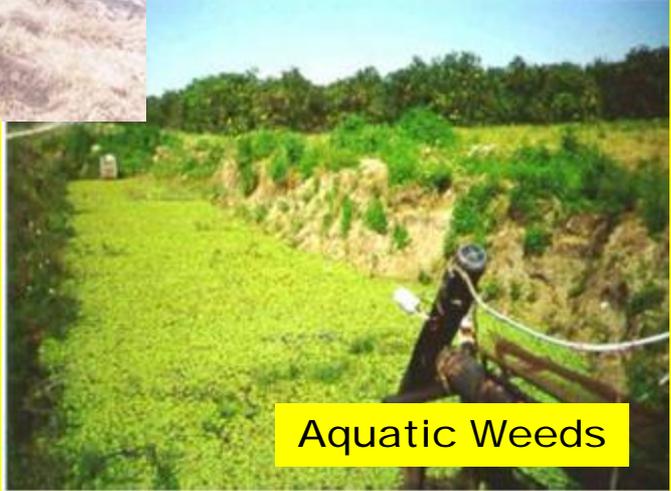
Sediment



Fertilizer



Pesticides



Aquatic Weeds

BMP Development

Apr 99 - Feb 00

- Subcommittees formed to develop/refine BMPs.
- Initial members appointed by the Ag. Commissioner
- Subcommittee had grower-chairman plus 8-10 members representing various interested agencies and groups
- As interest in the BMP process increased, the number of people involved increased to over 60

Agencies Represented in BMP Development

- ③ Florida Citrus Mutual
- ③ Florida Department of Agriculture and Consumer Services
- ③ Florida Department of Environmental Protection
- ③ Florida Farm Bureau
- ③ Florida Fertilizer and Agricultural Chemical Association
- ③ Indian River Citrus League
- ③ South Florida Water Management District
- ③ St. John's River Water Management District
- ③ St. Lucie River Initiative
- ③ University of Florida, Indian River Research and Education Center
- ③ University of Florida, Cooperative Extension Service
- ③ USDA Agricultural Research Service
- ③ USDA Natural Resource Conservation Service

Water Volume

***Travis Murphy, River Country Citrus**

Brian Boman, UF-IFAS
Doug Bournique, IR Citrus League
Hugo Carter, Martin County
Paul Driscoll, Driscoll Citrus Service
Boyd Gunsalus, SFWMD
Jack Hebb, UF-IFAS
Dick Hellstrom, LBFH
Don Loving, SFWMD
Linda McCarthy, FDACS
Victor McDaniel, SJRWMD
Esa Ontermama, A. Duda and Sons
Tom Stopyra, Diamond R
Gene Swearingen, Consolidated Citrus
Ed Weinberg, SLR Initiative
Paul Whalen, SFWMD
Chris Wilson, UF-IFAS
Mike Ziegler, Ag. Resource Mgmt.

Pesticides

***Stan Carter, McAuthur Groves**

Calvin Arnold, UF-IFAS
Brian Boman, UF, IFAS
Paul Driscoll, Driscoll Citrus Service
Jane Foos, FDACS
Greg Graves, FDEP
Mary Ann Gosa, Florida Farm Bureau
Boyd Gunsalus, SFWMD
Jack Hebb, UF-IFAS Extension
Tom Hill, Florida Farm Bureau
Carol Johnson, FDACS
Victor McDaniel, SJRWMD
Esa Ontermama, A. Duda and Sons
Richard Pfeuffer, SFWMD
Ron Polumbo, FMC, Inc.
Max Quackenbos, SLR Initiative
Gary Roderick, FDEP
Dommonick Scotto, D.L. Scotto Co.
Liberta Scotto, UF, IFAS
Patti Sime, SFWMD
Donna Smith, USDA-NRCS
Tom Stopyra, Diamond R Fertilizer
Ed Stover, UF-IFAS IRREC
Paul Whalen, SFWMD
Chris Wilson, UF-IFAS
Mike Ziegler, Ag Resources Mgmt.

Nutrients

***Mike Ziegler, Ag. Resource Mgmt.**

Robert Adair, Kerr Center
Calvin Arnold, UF-IFAS
Brian Boman, UF-IFAS
Doug Bournique, IR Citrus League
David Calvert, UF-IFAS
Paul Driscoll, Driscoll Citrus
Al Goldstein, SFWMD
Greg Graves, FDEP
Boyd Gunsalus, SFWMD
Kevin Henderson, SLR Initiative
Tom Hill, Florida Farm Bureau
Charles Holtzower, Tampa Farm Serv.
Carol Johnson, FDACS
Greg Knecht, FDEP
Lex Kromhout, IR Citrus League
Victor McDaniel, SJRWMD
Esa Ontermama, A. Duda and Sons
Gary Roderick, FDEP
Liberta Scotto, UF-IFAS
Kim Shuggar, FDEP
Pete Spyke, Arapaho Citrus
Ruth Stanbridge, Indian River Co. Comm.
Tom Stopyra, Diamond R
Gene Swearingen, Consolidated Citrus
Winston Tooke, USDA-NRCS
Marc Von Canal, SJRWMD
Paul Whalen, SFWMD
Chris Wilson, UF-IFAS
Mike Ziegler, Ag Resources Mgmt.

Sediment

***Paul Driscoll, Driscoll**

Citrus Service
Brian Boman, UF, IFAS
Jim Collins, SLR Initiative
Boyd Gunsalus, SFWMD
Jack Hebb, UF, IFAS
Esa Onterman, A. Duda
Liberta Scotto, UF, IFAS
Donna Smith, USDA-NRCS
Pete Spyke, Arapaho Citrus
Bob Ulevich, SFWMD
Don West, St. Lucie County
Paul Whalen, SFWMD
Chris Wilson, UF, IFAS

Aquatic Weeds

***John D'Albora, J. D'Albora Co.**

Michael Adams, Adams Ranch
Calvin Arnold, UF-IFAS
Brian Boman, UF-IFAS
Boyd Gunsalus, SFWMD
Jack Hebb, UF-IFAS
Johnny Moose, Citrus Grower
Esa Ontermama, A. Duda & Sons
Talmage Rogers, Rogers Bros.
Vernon Vandiver, UF-IFAS
Paul Whalen, SFWMD
Chris Wilson, UF-IFAS
Mike Ziegler, Ag. Resources

BMP Development

May 00: Document adopted by Steering Committee

Aug 00: Approved by EPA

Sep 00: EPA 319 funds obtained to print document by DEP

Oct 00: Document released to growers

Jun 02: Adopted by Rule (FDACS)

01-07: Implementation and Education activities

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



Figure D-9a. Spilled fertilizer at loading site. Note areas where grass has been burned back due to the spillage.



BMP Manual adopted as Rule by FDACS



DRAFT INDIAN RIVER CITRUS BMP RULE

February 14, 2000

5M-2 INDIAN RIVER CITRUS BEST MANAGEMENT PRACTICES

5M-2.001 PURPOSE: This rule adopts the *Water Quality/Quantity BMPs for Indian River Citrus Groves*, (published May 2000) as provided by Chapter 403.067(7)(d), Florida Statutes (F.S.), for the counties of: Brevard, Indian River, Martin, Okeechobee, Palm Beach, St. Lucie and Volusia. It also establishes record keeping requirements for the purpose of verifying implementation, and procedures for submitting a notice of intent to comply.



**Adopted
June 2002**

Implementation Committee

Appointed by Steering Committee in May 2000 to guide the implementation process

- ③ Corporate citrus organizations
- ③ Citrus care-taking operations
- ③ Family owner/operators
- ③ Production managers
- ③ IFAS Extension & Research
- ③ FL Farm Bureau
- ③ SFWMD
- ③ FDACS
- ③ FDEP
- ③ USDA-NRCS
- ③ IR Citrus League
- ③ FL Citrus Mutual

Florida BMP Overview

- Growers conduct an assessment of farming operation and list BMPs they have or will enact
- A summary of practices is submitted to FDACS in a *Notice of Intent to Implement*
- Once enrolled, growers must maintain records and provide documentation regarding the implementation of all BMPs
- FWRA grants *Presumption of Compliance* with state water quality standards to landowners enrolled in voluntary BMP programs
- Growers become eligible for cost share funding from various sources after enrollment

Indian River Citrus BMP Implementation Team

(funded by EPA 310 grant)

- Grove Evaluation
- BMP Checklist
- BMP Recommendations
- Cost Share Funding
- Demonstrations
- Employee Training
- Sprayer Calibration
- GIS maps



BMP Checklist

63 questions to assess BMP implementation status

CITRUS GROWER BEST MANAGEMENT PRACTICES CHECKLIST

I. INTRODUCTION

The following checklist is designed to assist Indian River Area Citrus Growers in identifying the appropriate Best Management Practices (BMPs) or group of strategies for their specific site and growing conditions. The results should be kept on file and reviewed annually to document implementation of BMPs, and to determine whether further practices may be appropriate. Providing the information requested below for the Introduction Section is not mandatory, but listing this voluntary information will help the grove manager select BMPs that are appropriate for their specific grove configuration.

Grower Information: Please fill in below.

- A.) Property Owner: _____
- B.) Grove Name: _____
- C.) County: _____
- D.) Tax ID Number: _____
- Section: _____
- Township: _____
- Range: _____
- E.) Grove Acres: _____
- F.) Bed Configuration: _____
- G.) Tree Spacing: _____
- H.) Rows Per Bed: _____
- I.) Number of Trees Per Acre: _____
- J.) Irrigation Method: Drip Micro Flood

Note:

A YES answer for any question indicates that the grove being surveyed is in compliance with the referenced BMPs. A NO answer indicates that the referenced BMPs might improve the environmental performance of the grove, but implementation of all BMPs so referenced is not required. Review BMPs listed for questions that were answered NO. Select specific BMPs from those indicated by a NO answer that are appropriate for application to the grove unit surveyed. These BMPs to be implemented should be listed in Section VIII (BMPs to be implemented). (Note: Implementation of all BMPs indicated blank with a NO answer is not required.)

Use the comment section at the end of this document (Section VI) to explain why certain BMPs from questions that were answered NO will not be implemented. The comment section can also be used to elaborate on any items or questions that may be unclear or ambiguous, or to explain particular grove conditions. Comments should be referenced to the specific section and question number of the survey. N/A may be used if the question or section does not apply to that particular grove.

Numbers listed next to the answer box refer to specific BMPs references in "Water Quality/Quantity BMPs for Indian River Area Citrus Groves", the BMP manual.

Grove Evaluation Date: _____

II. WATER VOLUME Irrigation Practices

- | | YES | NO | N/A | BMP |
|---|--------------------------|--------------------------|--------------------------|---------|
| 1. Are irrigation events scheduled based on evapotranspiration, rainfall events, water table wells, or other scientific data? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A1, D15 |

Infrastructure

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------|
| 2. Can on-site detention or storage be provided using the present system of canals and ditches? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A6, A7 |
|---|--------------------------|--------------------------|--------------------------|--------|

Drainage Management

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------|
| 3. Are pumps and/or discharge structures set up to achieve uniform drainage throughout the grove? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A2, A3 |
| 4. Following intense rainfall events are drainage rates and volumes considered when releasing water minimizing off site impact? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A2, A1 |
| 5. Are attempts made to adjust the rate of lateral movement of water throughout the soil, lessening turbulence? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A3, A2 |
| 6. Are practices used to maintain bottom slope on furrows between beds to achieve uniform drainage? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A4 |

Water Table Management

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------|
| 7. Are water table wells and/or tensiometers used to avoid excess moisture depletion? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A2, A1 |
| 8. Do you follow a well written drainage management plan that provides specific directions based on levels of rainfall? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A6, A2 |
| 9. Are groundwater levels monitored to meet tree water demands and prevent root pruning? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A1, A2 |

III. SEDIMENT

Drainage Structures:

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|----|
| 10. Are culverts with functional riser/sinker boards installed on appropriate lateral and side ditch connections? If so are they being maintained properly? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B1 |
| 11. Are settling basins maintained in front of drainage inlets within water furrows? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B2 |

Ditch Infrastructure

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|----|
| 12. Are there settling basins or sumps to trap sediment at field ditch connections to laterals and other main canals prior to discharge? If so are they being maintained? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B2 |
| 13. Are ditches and canals constructed with proper side bank stabilization methods; i.e. sloping or shoring? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | B3 |

Notice of Intent

NOTICE OF INTENT TO IMPLEMENT

In accordance with Florida Statute 403.067(7)(d) and Rule 5M-2.005 FAC the following information is hereby submitted as proof of my intent to implement *Water Quality/Quantity Best Management Practices for Indian River Area Citrus Groves*. Contact the BMP Implementation Team at 772-468-3922 ext. 171 if you have questions or would like assistance completing the Checklist or this form.

Grove Name _____ Grove Acres _____

Property Tax ID # _____ County _____

Authorized Local Contact _____

Local Contact Address _____

Local Contact Telephone _____

Grove Owner or Leaseholder _____

Grove Owner or Leaseholder Address _____

Complete the *Citrus Grower Best Management Practices Checklist* and use the results to fill out the Notice of Intent to Implement. Submit the completed Notice of Intent to Implement to the Department of Agriculture and Consumer Services at the address below. **Keep the completed Grower Checklist in your files along with a copy of your completed Notice(s) of Intent.** You must complete the Grower Checklist and submit the Notice of Intent if you wish to receive a presumption of compliance with state water quality standards. A submitted Notice of Intent is also a requirement to be eligible for some sources of BMP cost share funding.

Signature of Grove Owner or Lease Holder _____ Date _____

Note – Please submit one form for each Grove location or Tax ID Number.

Mail the completed form to: FDACS – OAWP
1203 Governor's Square Boulevard
Suite 200
Tallahassee, Florida 32301

Candidate BMP Checklist

Instructions: Using the Indian River *Citrus Grower Best Management Practices Checklist*, check "yes" for all BMPs currently practiced and "no" for BMPs not currently implemented. For those BMPs that will be implemented in the near future, enter the year you plan initiate the BMP in the "year" column. Enter N/A in the "year" column if the practice is not applicable to your operation or if it conflicts with other BMPs that have been implemented. See the latest version of *Water Quality/Quantity BMPs for Indian River Area Citrus* for details on particular BMPs listed.

EXCESS WATER

YES NO YEAR

- ___ A1. Water table management.
- ___ A2. Scheduling irrigation and drainage.
- ___ A3. Moderate discharge rate.
- ___ A4. Water furrow maintenance.
- ___ A5. Monitor soil moisture.
- ___ A6. Drainage management plan.
- ___ A7. Drainage rate and volume.
- ___ A8. Discharge Structures.
- ___ A9. Detention.

SEDIMENT TRANSPORT

YES NO YEAR

- ___ B1. Riser board water control structures.
- ___ B2. Sediment settling basins in all ditches.
- ___ B3. Ditch construction.
- ___ B4. Stabilize bare soils.
- ___ B5. Ditch bank vegetation maintenance.
- ___ B6. Aquatic plant management.
- ___ B7. Ditch cleaning program.
- ___ B8. Ditch bank contours.
- ___ B9. Protect ditch banks.
- ___ B10. Vegetative stabilization (water furrows).
- ___ B11. Herbicide Applications (water furrows).
- ___ B12. Water furrow maintenance.
- ___ B13. Settling Basins (sumps).
- ___ B14. Water furrow drain tiles.
- ___ B15. Take precautions during construction.
- ___ B16. Sediment traps upstream of pump intake.

PESTICIDES

YES NO YEAR

- ___ C1. Reduce spray drift.
- ___ C2. Timing of application.

- ___ C3. Turn sprayer nozzles off at row ends.
- ___ C4. Equipment calibration and maintenance.
- ___ C5. Training.
- ___ C6. Integrated pest management.
- ___ C7. Pesticide spill management.
- ___ C8. Precision Application.
- ___ C9. Maintain soil pH.
- ___ C10. Read and understand the label.
- ___ C11. Pesticide application equipment washwater.
- ___ C12. Prevent backflow to water sources.
- ___ C13a. Mixing and loading activities (permanent location).
- ___ C13b. Mixing and loading activities (temporary location).
- ___ C14. Pesticide container management.
- ___ C15. Pesticide selection.
- ___ C16. Pesticide record keeping.
- ___ C17. Pesticide storage.
- ___ C18a. Excess pesticide mixture.
- ___ C18b. Excess formulation (raw product).

NUTRIENTS

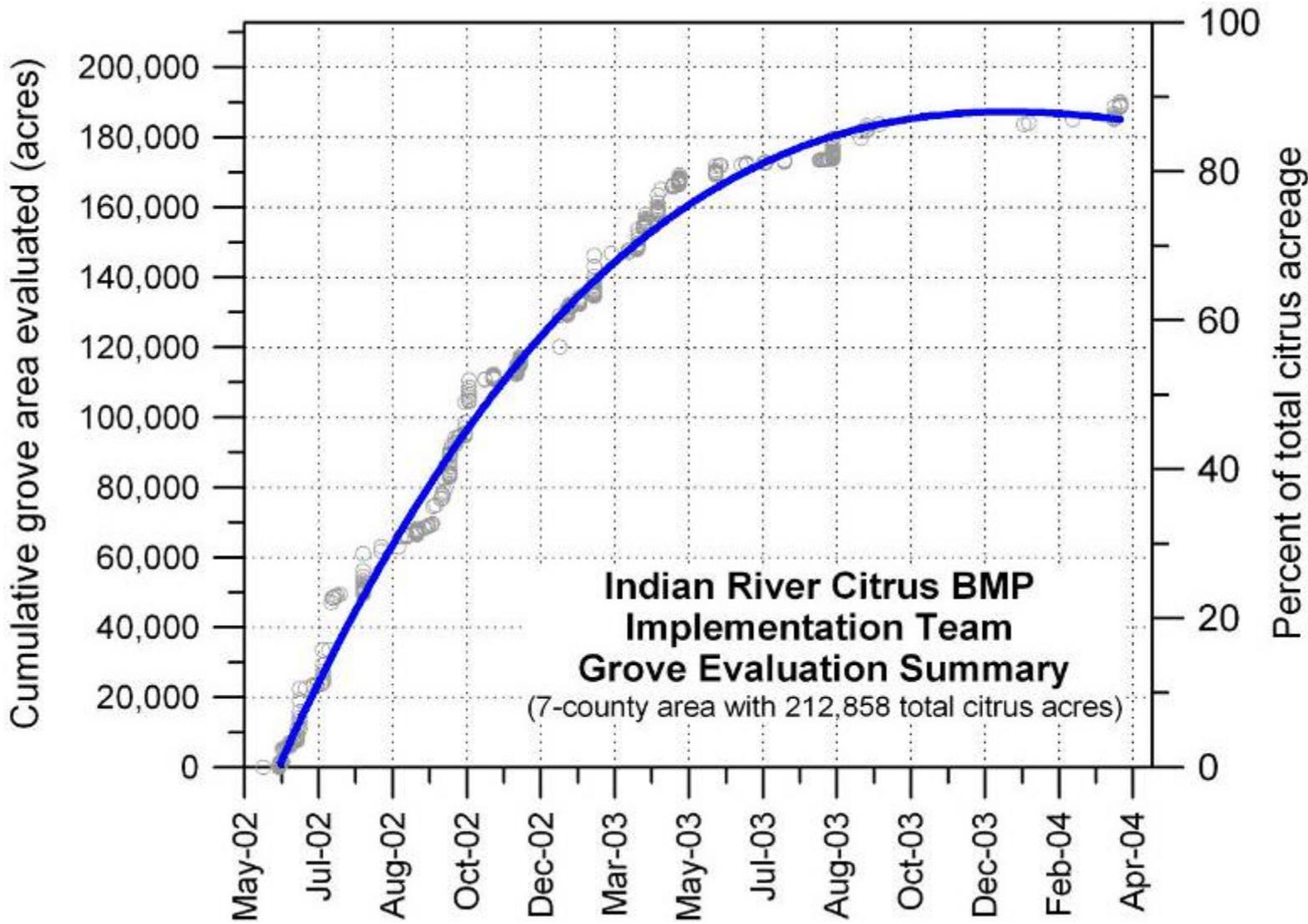
YES NO YEAR

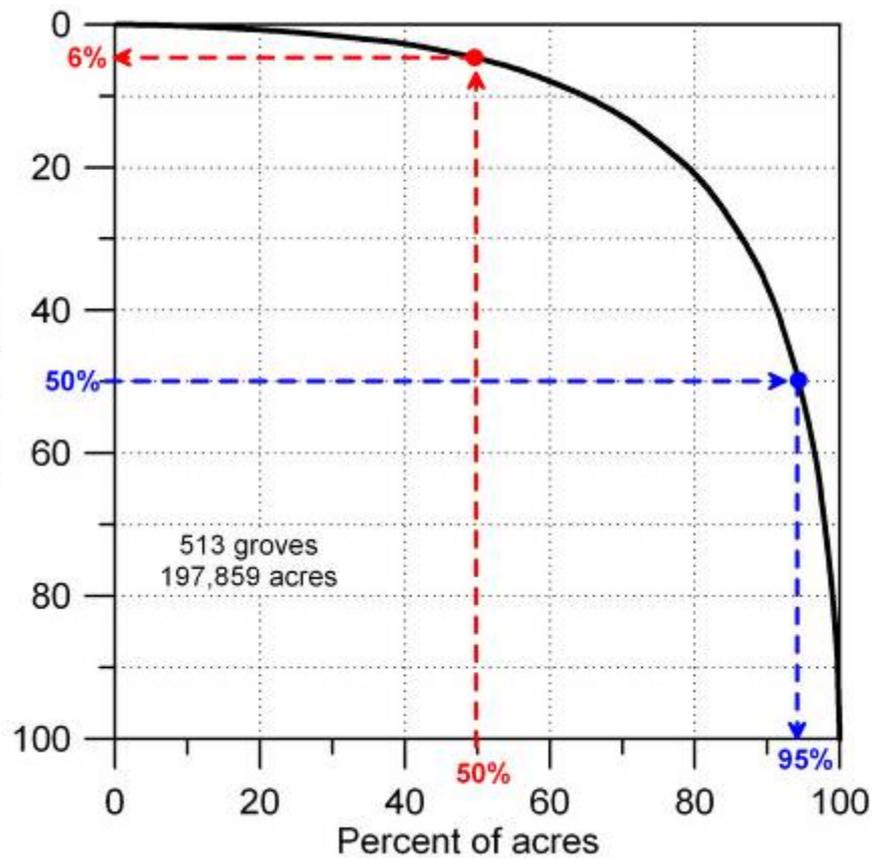
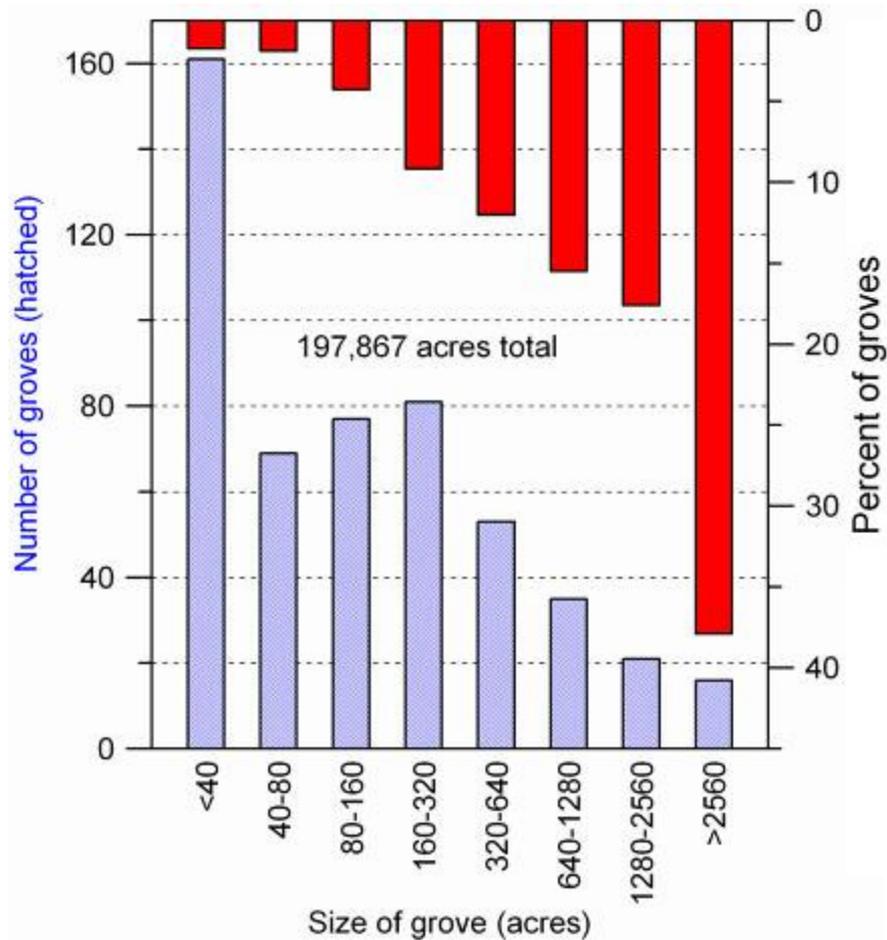
- ___ D1. Education.
- ___ D2. Nutrient management.
- ___ D3. Employ tissue and soil analyses.
- ___ D4. Use appropriate application equipment.
- ___ D5. Equipment calibration and maintenance.
- ___ D6. Apply materials to target sites.
- ___ D7. Avoid high-risk applications.
- ___ D8. Fertilizer storage.
- ___ D9. Spilled fertilizers.
- ___ D10. Use caution when loading near ditches, canals, and wells.
- ___ D11. Alternate loading operation sites.
- ___ D12. Use backflow prevention devices.
- ___ D13. Split applications throughout season.
- ___ D14. Erosion control.
- ___ D15. Irrigation management.
- ___ D16. Incorporate organic materials.
- ___ D17. Well protection.
- ___ D18. Use appropriate sources and formulations.

AQUATIC PLANTS

YES NO YEAR

- ___ E1. Physical control (barriers, traps, baffles, mechanical means).
- ___ E2. Biological control (carp, insects, disease)
- ___ E3. Chemical control





Summary of BMPs implemented by acres and number of groves

(194,986 acres and 499 groves)

Referenced BMP		Acres				No. of Groves			
		Yes (acres)	(%)	No (acres)	N/A (acres)	Yes (No.)	(%)	No (No.)	N/A (No.)
Excess Water									
A1. Water table management	A1	163,300	84%	-	31,666	487	98%	-	14
A2. Scheduling irrigation/drainage	A2	166,671	85%	-	28,243	475	95%	1	24
A3. Moderate discharge rate	A3	193,370	99%	1,500	116	496	99%	1	5
A4. Water furrow maintenance	A4	177,057	91%	5,455	12,474	448	90%	7	47
A5. Monitor soil moisture	A5	107,098	55%	17,115	65,661	363	73%	36	103
A6. Drainage management plan	A6	125,546	64%	10,453	51,388	385	77%	51	66
A7. Drainage rate and volume	A7	193,464	99%	35	1,483	479	96%	2	21
A8. Discharge structures	A8	189,939	97%	661	4,381	453	91%	11	38
A9. Detention	A9	116,790	60%	-	27,627	316	63%	13	37

EDUCATION

is the key to
success for
voluntary BMP
implementation

Indian River Citrus BMP Field Guide



September 25, 2003
University of Florida, IFAS
Indian River Research and Education Center

Publication No. FTP2003-4

**Florida
Grower**

best
management
practices



for indian river area
citrus groves

SPONSORED BY:



Indian River Citrus BMP Workshops

Objectives:

- !See BMPs demonstrated
 - !Discuss industry experiences
 - !Target grove owners and production mgrs
-



- Dec 10 – Efficacy & runoff of pesticides
- Jan 10 – Mapping, scouting, records
- Feb 11 – Aquatic weeds
- Mar 10 - Irrigation
- Apr 7 – Drainage
- May 7 – Fertilization

Riser Board Structures



Aquatic Weed Control



Precision Application Equipment



Sprayer Calibration



County Ag Tours



Martin 101





Mall Displays

Indian River
Mall in Vero
Beach

Treasure
Coast Mall in
Jensen Beach

BMP Programs for field workers



- At grower's request
- Conducted for grove employees
- Taught mainly on-site at grove
- Programs in English and Spanish
- BMPs, WPS, Safety
- Over 3000 ag laborers per year taught
(typically 1 laborer for each 100 acres)

Training Materials

- **Workbooks (English/Spanish)**

- Why BMPs are important
- Grade school level
- Explanations
- Questions

- ! Understanding the Pesticide Label for the Citrus Grove Worker

- ! Personal Protection Equipment for the Citrus Grove Worker

- ! Equipment Safety for the Citrus Grove Worker

- ! Herbicide Application BMPs for the Citrus Grove Worker

- ! Pesticide Application BMPs for the Citrus Grove Worker

- ! Fertilizer Application BMPs for the Citrus Grove Worker

- ! Aquatic Vegetation Management BMPs for the Citrus Grove Worker

- ! Drainage Management BMPs for the Citrus Grove Worker

- ! Irrigation Management BMPs for the Citrus Grove Worker

- ! Flash Board Riser Structure BMPs in Citrus Groves

- ! BMPs for Citrus Grove Maintenance Facilities

- **10-15 minute videos (English/Spanish)**

Grove Worker Training

30-minute sessions
English & Spanish



General Safety
First Aid
Fire Training
CPR
Spill Cleanup
Heat Stress
Tractor Safety
BMPs
ATV Safety



Clientele	2001-2006 Avg.
Growers, Consultants, Prod. Mgr.	2338
CEUs	4631
CCAs	1260
Ag workers	2644
Non-ag	769

BMP-related EDIS publications available online at: <http://edis.ifas.ufl.edu>

Pub. No.	Title
SL-195	Flatwoods Citrus Best Management Practice: Soil Stabilization
SS-498	Flatwoods Citrus Best Management Practice: Riser-Board Structures
HS140	Sensor-Controlled Spray Systems for Florida Citrus
HS139	Pesticide Mix-Load and Sprayer Wash-down Systems for Florida Citrus
CH185	Fertigation Nutrient Sources and Application Considerations for Citrus
CH184	Chemigation Equipment and Techniques for Citrus
CH181	Aquatic Weed Management in Citrus Canals and Ditches
CH177	Water Quality Monitoring Programs for Environmental Assessment of Citrus Groves
CH176	Understanding Water Quality Parameters for Citrus Irrigation and Drainage Systems
CJ165	Drainage systems for flatwoods citrus
CH151	Water Table Measurement and Monitoring for Flatwoods Citrus
AE216	Detention/Retention for Citrus Stormwater Management



LOGO

- Symbolism
- Recognition
- Action



Changes

- ?Frequent worker training (nearly all growers)
- ?On-site stormwater detention facilities (6)
- ?Replacement of screw gates with riser board structures (106)
- ?Construction of modern chemical storage buildings
- ?Portable mix/load facilities (15)
- ?Improved irrigation management
- ?Chemigation infrastructure (15)
- ?Aquatic weed barriers (6)
- ?Much improved ditchbank vegetation management and grade stabilization
- ?Variable rate fertilizer applicators and precision spray equipment (76 conversions)

BMP Web Site

www.citrusBMP.ifas.ufl.edu

- Complete BMP manual
- Includes full text of 75+ references related to BMPs
- Site contains other citrus-related materials
- Workshop handouts and PowerPoints

Summary

- ❖ In Feb 2001, the IR Citrus BMP effort was recognized as a model for successful approaches for environmental problems at meeting of the Environmental Council of States
- ❖ **BMPs will be normal operation in the future**
 - ❖ Golf courses, container nursery, pasture, cow/calf
 - ❖ Vegetable, equine, sod, silviculture, row crops
 - ❖ Ridge citrus, Peace River Citrus, Gulf Citrus
 - ❖ Urban – Florida Yards & Neighborhoods program



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<http://CitrusBMP.ifas.ufl.edu>