

# MARTIN SWCD

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## QUARTERLY



## REPORT

Fiscal Year 2006

**January 1st to March 31st**

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# **Martin Soil & Water Conservation District**

## **FY 2006**

**MIL 2<sup>nd</sup> Quarter Report**



### **DISTRICT BOARD MEMBERS**

<b>Dave Lennard</b>	<b>Chairperson</b>
<b>Jerry Levitz</b>	<b>Treasurer/Secretary</b>
<b>John Stanley</b>	<b>Supervisor</b>
<b>Patrick Hayes</b>	<b>Supervisor</b>
<b>Nobel Hendrix</b>	<b>Supervisor</b>

### **ADMINISTRATIVE ASSISTANT**

**Susan Barrett**

### **MIL TEAM**

**Charles A. Lambert - Markus Braunschweiger**



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## **Acknowledgements**

The Martin Soil and Water Conservation District (MSWCD) recognizes the following entities for their technical support and funding for the Martin Urban Mobile Irrigation Lab:

South Florida Water Management District  
USDA Natural Resources Conservation Service  
Martin County Commissioners.

## **Abstract**

The Martin Urban Mobile Irrigation Lab completed 35 evaluations in the three months starting January 1<sup>st</sup> 2006 and ending March 31<sup>st</sup> 2006. These evaluations produced Potential Water Savings (PWS) of 21,409,416 gallons per year (65.703 acre-feet per year) and Actual Water Savings (AWS) of 12,121,673 gallons per year (37.200 acre-feet per year).

The Martin Mobile Irrigation Lab made 38 water conservation presentations contacting 516 people in the process.

## **Introduction**

The Martin Soil and water Conservation District Urban Mobile Irrigation Lab was established in 1998. Its mission is to promote water conservation through on-site evaluations of irrigation systems and conservation education.

## **Evaluation Methods**

There are three levels of evaluation; visual inspection, pressure and flow check, and the catch can test. Visual inspections are conducted first to determine if the system is in disrepair or has poor coverage. If the system is found to be in poor condition the other levels of evaluation are not carried out. Pressure and flow checks on individual sprinkler heads or emitters are carried next. If pressure and flow are found to be uniform a catch can test may be performed to determine optimum run times for the zones in the system.

## **Evaluation Results**

Between January 1<sup>st</sup> 2006 and March 31<sup>st</sup> 2006 the Martin MIL performed 32 evaluations on 36.1 acres and discovered Potential Water Savings (PWS) of 21,409,416 gallons per year (Table 1). The Martin MIL performed 3 follow-up evaluations and documented Actual Water Savings (AWS) of 553,947 gallons per year (Tables 1 and 2). By recommending time clock adjustments, other system adjustments and quick repairs that could be carried out during the initial evaluation an additional 11,567,725 gallons Actual Water Savings was gained, bringing total (AWS) to 12,121,673 gallons.

## **Problems**

The Martin Mobile Irrigation Lab found the two most prevalent problems were “Operating time too frequent” (52) and “Unmatched precipitation” (20).

## FY 2006 MOBILE IRRIGATION LAB LOG

MIL ID: 10

FY: 2006

QTR: 2nd

County: Martin

ZIP CODE	EVAL ID #	CROP	ACRES	SYSTEM TYPE	SOIL	WATER SOURCE	pH	TDS	SYSTEM AVE. DISCHARGE (GPM)	DU	RATING	PROBLEMS	PWS Ac/Ft	AWS Ac/Ft	Follow-UP Y/N
34996	2 - 36	Turf	0.3	Sprinkler	34	Well	7.1	308	66	65	Fair	10,20,50	0.393		N
34990	2 - 37	Turf	0.9	Sprinkler	34	Well	7.2	276	128.5	65	Fair	10,20,50	1.317		N
34996	2 - 38	Turf	0.6	Sprinkler	34	Well	7.6	222	103	65	Fair	10,50,53	1.407		N
34996	2 - 39	Turf	0.6	Sprinkler	34	Well	7.6	222	20	65	Fair	10,50,53	0.340	0.430	N
34996	2 - 40	Turf	0.5	Sprinkler	34	Well	7.6	205	130.5	65	Fair	10,50,52	5.248		N
34996	2 - 41	Turf	0.5	Sprinkler	34	Well	7.7	358	78.5	65	Fair	10,20	0.250		N
34957	2 - 42	Turf	0.1	Sprinkler	34	City	8	184	70.4	65	Fair	10,52	0.565		N
33455	2 - 43	Turf	1.7	Sprinkler	34	Surface	8.5	255	104	65	Fair	10,20,52	2.950	1.742	N
33455	2 - 44	Turf	1.6	Sprinkler	34	Surface	8.5	255	88.5	65	Fair	10,20,52	2.438	1.482	N
33455	2 - 45	Turf	0.7	Sprinkler	34	Surface	8.5	255	35	65	Fair	10,20,52	2.144	1.759	N
33455	2 - 46	Turf	1.0	Sprinkler	34	Surface	8.5	255	42.5	65	Fair	10,20,52	1.117	0.712	N
33455	2 - 47	Turf	2.1	Sprinkler	34	Surface	8.5	255	132.5	65	Fair	10,20,52	3.451	2.220	N
33455	2 - 48	Turf	1.4	Sprinkler	34	Surface	8.5	255	65.5	65	Fair	10,20,52	1.742	1.097	N
33455	2 - 49	Turf	1.8	Sprinkler	34	Surface	8.5	255	80	65	Fair	10,20,52	2.119	1.340	N
33455	2 - 50	Turf	1.4	Sprinkler	34	Surface	8.5	255	77.8	65	Fair	10,20,52	2.151	1.303	N
33455	2 - 51	Turf	1.8	Sprinkler	34	Surface	8.5	255	81	65	Fair	10,20,52	2.144	1.357	N
33455	2 - 52	Turf	1.0	Sprinkler	34	Surface	8.5	255	46.5	65	Fair	10,20,52	1.185	0.779	N
33455	2 - 53	Turf	1.1	Sprinkler	34	Surface	8.5	255	68.5	65	Fair	10,20,52	1.882	1.147	N
33455	2 - 54	Turf	1.0	Sprinkler	34	Surface	8.5	255	70	65	Fair	10,20,52	1.965	1.172	N
33455	2 - 55	Turf	1.1	Sprinkler	34	Surface	8.5	255	95.9	65	Fair	10,20,52	2.810	1.606	N
33455	2 - 56	Turf	1.1	Sprinkler	34	Surface	8.5	255	71	65	Fair	10,20,52	1.975	1.189	N
33455	2 - 57	Turf	1.0	Sprinkler	34	Surface	8.5	255	56.5	65	Fair	10,20,52	1.530	0.946	N
33455	2 - 58	Turf	1.5	Sprinkler	34	Surface	8.5	255	67.6	65	Fair	10,20,52	1.797	1.132	N
33455	2 - 59	Turf	0.8	Sprinkler	34	Surface	8.5	255	61.5	65	Fair	10,20,52	1.803	1.030	N
33455	2 - 60	Turf	1.9	Sprinkler	34	Surface	8.5	255	117.5	65	Fair	10,20,52	3.320	1.968	N
34957	2 - 61	Turf	0.1	Sprinkler	34	City	7.8	194	53	65	Fair	10,52	0.621		N
33455	2 - 62	Turf	1.5	Sprinkler	34	Surface	8.5	255	146	65	Fair	10,20,52	4.408	2.446	N
33455	2 - 63	Turf	1.6	Sprinkler	34	Surface	8.5	255	98.9	65	Fair	10,20,52	2.828	1.657	N
33455	2 - 64	Turf	0.8	Sprinkler	34	Surface	8.5	255	36	65	Fair	10,20,52	0.985	0.603	N
33455	2 - 65	Turf	0.9	Sprinkler	34	Surface	8.5	255	28.5	65	Fair	10,20,52	0.656	0.477	N
33455	2 - 66	Turf	2.0	Sprinkler	34	Surface	8.5	255	117.5	65	Fair	10,20,52	7.073	5.906	N
34996	2 - 67	Turf	0.4	Sprinkler	34	Well	7.9	191	64	65	Fair	20,50,52	1.089		N
34957	2 - 68	Turf	1.3	Sprinkler	34	City	7	99	101.3	65	Fair	10,50,52		0.959	Y
34957	2 - 69	Turf	0.1	Sprinkler	34	City	7.7	140	26.3	65	Fair	10,50,52		0.263	Y
34957	2 - 70	Turf	0.1	Sprinkler	0	City	7.7	140	32.5	65	Fair			0.478	Y
<b>TOTALS</b>	<b>35</b>		<b>36.1</b>										<b>65.703</b>	<b>37.200</b>	

Table 2. Original Evaluation and Follow up Tracking Table

ID#	Crop	System Type	Acres	PWS	AWS
M054146	Mixed	Sprinkler	1.29	487,461	
	Mixed	Sprinkler	1.29		312,780
M054151	Mixed	Sprinkler	.09	109,104	
	Mixed	Sprinkler	.09		85,904
M054160	Mixed	Sprinkler	.06	156,000	
	Mixed	Sprinkler	.06		156,000
	Mixed	Sprinkler			
	Mixed	Sprinkler			
	Mixed	Sprinkler			
	Mixed	Sprinkler			

*Orig. Eval.*  
*Follow up*  
*Orig. Eval.*  
*Follow up*  
*Orig. Eval.*  
*Follow up*  
*Orig. Eval.*  
*Follow up*  
*Orig. Eval.*  
*Follow up*

### Conservation Education/Outreach

Between January 1<sup>st</sup> 2006 and March 31<sup>st</sup> 2006 Martin Mobile Irrigation Lab gave 38 presentations to school, homeowners, homeowners associations, and other interested groups, reaching 516 people. These presentations are documented in Table 3.

### Training (in-house or staff training)

There has been a weekly Staff meeting in which some training has taken place, presided over by George Johnson of NRCS.

**TABLE 3. MOBILE IRRIGATION LAB CONSERVATION EDUCATION REPORT**  
**NAME OF LAB: MARTIN MOBILE IRRIGATION LAB**  
**PERIOD BETWEEN: OCTOBER 1<sup>ST</sup> 2005 AND DECEMBER 31<sup>ST</sup> 2005**

<b>DATE</b>	<b>TYPE OF PRESENTATION</b>	<b>NAME OF GROUP</b>	<b>NUMBER ATTENDING</b>	<b>LOCATION</b>	<b>TIME</b>
2 <sup>nd</sup> Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	9	Stuart	11 Hrs.
2 <sup>nd</sup> Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	2	Palm City	1.5 Hrs.
2 <sup>nd</sup> Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	10	Jensen Beach	10 Hrs.
2 <sup>nd</sup> Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	41	Hobe Sound	40 Hrs.
2 <sup>nd</sup> Quarter	Pick up & Repair & Booth Set Up	Martin County Fair Grounds	0	Stuart	11 Hrs.
2 <sup>nd</sup> Quarter	Booth Exhibit-Soil Profiles	Martin County Fair Event	Appx. 100	Stuart-Martin Co. Fair Grounds	52 Hrs.
2 <sup>nd</sup> Quarter	Meetings, Exam prep, Errands	Envirothon	0	Martin, St. Lucie, Ind Riv	40 Hrs.
2 <sup>nd</sup> Quarter	Set Up day, cooking, Event day	Envirothon Event	350	Stuart, Jensen Beach, Ft. Peirce	13 Hrs.
2 <sup>nd</sup> Quarter	Print & frame photos-Deliveries-Erands	MSWCD Business & Requests	0	Martin County, St. Lucie	10 Hrs.
2 <sup>nd</sup> Quarter	Home Owners Assn Presentation	PineCroft	4	Hobe Sound	3 Hrs.

**NOTES :**

## Appendix A Definitions

### AWS and PWS Definitions

The goal of an irrigation evaluation is to determine the capacity and efficiency of an irrigation system. This information is then used to develop a sound Irrigation Water Management Plan in which, irrigation water is applied only when needed and only in amounts which can be fully utilized by healthy plants.

Properly managed irrigation is used to supplement natural rainfall. The amount of irrigation required annually is the Net Irrigation Requirement (NIR) and is defined as;

$$\text{NIR} = \text{Crop water requirement} - \text{Effective rainfall}$$

The efficiency of an irrigation system is defined in terms of Distribution Uniformity (DU) for sprinklers and Emission Uniformity (EU) for microirrigation. These terms are defined in the **USDA-NRCS Urban Irrigation Evaluation Manual**. These numbers, in the form of percentages, are used to calculate the run times of irrigation events. The annual water use of a properly managed irrigation system is;

$$\text{Gross application} = \text{NIR/DU or EU}$$

Potential Water Savings (PWS) – The total amount of irrigation water that can be saved annually by following the recommendations derived from an irrigation system evaluation.

$PWS_{(\text{management})}$  - The amount of irrigation water that can be saved annually by schedule changes (run time and frequency) alone.

$$\text{PWS}(\text{man}) = \text{measured water use} - \text{projected water use}$$

$PWS(\text{design})$  – The additional amount of irrigation water that can be saved annually by improving the performance of the system and readjusting the schedule.

$$\text{NIR/DU}_{(\text{present})} - \text{NIR/DU}_{(\text{projected})}$$

Actual Water Savings (AWS) - The total amount of water which is saved for a period of 1 year as a direct result of following the recommendations derived from an irrigation system evaluation.

Instant AWS can be achieved if repairs are made, resulting in quantifiable water savings or if the controller settings are adjusted (schedule change) at the time of the evaluation or when the report is delivered.

AWS schedule changes can be documented in person or by phone and AWS design and repairs can be documented by follow-up evaluations.

## Appendix B Methods

The following definitions and formulas are taken from the “Mobile Irrigation Laboratory Urban Irrigation Evaluation & Troubleshooting Training Manual” (Mickler1998).

### 1. Determine average application rate (Meter records water use in gallons)

$$AAR = \frac{\text{Volume}}{\text{Area} \times \text{Time}} \times 5775.4 \quad \text{OR} \quad AAR = \frac{\text{Final Reading} - \text{Initial reading}}{\text{Area} \times \text{Operating Time}} \times 96.25$$

Where *Average application rate* = Inches per hour (iph)  
*Volume* = Volume required for needle in water meter to make one complete revolution (gal)  
*Area* = Irrigated area (ft<sup>2</sup>)  
*Time* = Time required for needle in water meter to make one complete revolution (s)

### No water meter present

$$\text{Flow rate} = \frac{\text{Volume}}{\text{Time}} \times 0.01585 \quad \text{OR} \quad AAR = \frac{\text{Total Flow Rate}}{\text{Area}} \times 96.25$$

Where *Flow rate* = Gallons per minute (GPM)  
*Volume* = Volume collected (ml)  
*Time* = Time that water was collected (s)

### 2. Determine distribution uniformity

$$DU = \frac{\text{Low quarter average}}{\text{Total average}} \times 100 \quad \text{OR} \quad \text{Use DU estimate sheet}$$

When *DU* = Distribution uniformity in percent  
*Low quarter average* = Average volume in the 25% of cans that received the least water (ml)  
*Total average* = Average volume of all cans (ml)

**3. Determine the effective application rate**

$$\text{Effective application rate} = \text{Average application rate} \times DU$$

**4. Calculate operating time**

$$\text{Watering time} = \frac{\text{Plant water requirement}}{\text{Effective application rate}} \times 60$$

Where *Watering time* = Suggested time that a zone should be operated (min)  
*Plant watering requirement* = 0.5 or 0.25 depending on location (in)  
*Effective application rate* = From step 3 (iph)

**5. Determine water used per operating cycle**

When used per operating cycle is calculated by the following equation:

$$\text{Current usage} = \text{Flow rate} \times \text{time}$$

Where *Current usage* = Total water used for a given zone per irrigation cycle (gal)  
*Flow rate* = Determined from equations below (gpm)  
*Time* = Time a zone is operated during a scheduled irrigation cycle (min)

## Appendix C

**Problem Descriptions** - Problems are irrigation system or management factors that limit irrigation system performance or efficiency. Problems are noted during the site visit, system evaluation, and/or through discussions with the operator.

Code	Description of Problems
<b>Pressure / Application Rate</b>	
1	Under-sized pump for number and type of sprinkler heads or emitters
2	Pressure loss between pump and sprinklers/emitters due to inadequate pipe size
3	Higher pressure than manufacturer's specifications
4	Lower pressure than manufacturer's specifications
5	Low pressure due to water supply
6	Different pressure between manifolds
7	Small wetted area
8	Application rate > soil infiltration rate (ponding)
9	Air in pipelines
10	Turf and landscape area irrigated in the same zone
11	Pressure variation due to elevation differences
<b>Emitters / Sprinklers</b>	
20	Mixed sprinkler/emitter sizes & unmatched precipitation in the same zone
21	Mixed sprinkler/emitter brands or types in the same zone
22	Poor emitter/sprinkler uniformity due to worn orifice
23	Poor overlap due to improper sprinkler/emitter alignment or spacing
24	Various riser heights in same zone
25	Emitter/sprinkler spacing varies in same zone
26	Missing/malfunctioning emitters or sprinklers
27	Missing/malfunctioning pressure gauge/regulator/filter
<b>Maintenance - Irrigation System</b>	
30	Leaks and broken valves, pipe, laterals lines (Poly-tubing), emitters, sprinklers
31	Clogged filter or filter screen
32	Sprinkler heads not properly adjusted, causing overflow on paved areas
33	Clogged emitters/nozzles (due to biological, chemical or physical factors)
34	Leaning sprinklers/emitters causing non-uniform distribution
35	Malfunctioning valves
<b>Maintenance – Landscape</b>	
40	Stream of water blocked by vegetation
41	Variable crop spacing and stage of growth
42	Poor drainage, requiring water control
<b>Operation / Management</b>	
50	Operating time too long
51	Operating time too short
52	Operating time too frequent
53	No rain shut-off device
54	No soil moisture measuring device or rain gage
55	No irrigation water management plan

## Appendix D

### MARTIN COUNTY SOIL TYPES

<u>SYMBOL</u>	<u>NAME</u>	<u>SYMBOL</u>	<u>NAME</u>
2	Lawnwood fine sand	42	Hallandale sand
3	Lawnwood fine sand, depressional	44	Boca fine sand
4	Waveland sand	45	Hilolo fine sand
5	Waveland sand, depressional	46	Sanibel muck
6	Paola sand, 0 to 8% slope	47	Pinellas fine sand
7	St. Lucie sand, 0 to 8% slope	48	Jupiter sand
8	Palm Beach sand, 0 to 8% slope	49	Riviera fine sand, depressional
9	Pomello sand, 0 to 5% slope	50	Okeelanta Variant, muck
10	Basinger fine sand, depressional	51	Pompano fine sand, occ. flooded
12	St. Johns Variant sand	52	Malabar sand
13	Placid sand	53	Arents, 2 to 35% slope
14	Satellite Variant sand	54	Oldsmar fine sand, depressional
15	Electra fine sand	55	Basinger fine sand
16	Oldsmar fine sand	56	Wabasso sand, depressional
17	Wabasso sand	57	Chobee loamy sand
19	Winder sand	58	Gator muck
20	Riviera fine sand	60	Tequesta variant muck
21	Pineda sand	61	Hobe fine sand, 0 to 5% slope
22	Okeelanta muck	62	Nettles sand, depressional
23	Urban land	63	Nettles sand
24	Orsino sand, 0 to 5% slope	64	EauGallie fine sand
25	Beaches	65	Tuscawilla sand
26	Pompano fine sand	66	Holopaw fine sand
27	Arents, organic substrat, 0 to 2% slope	67	Aquents, frequently flooded
28	Canaveral sand, 0 to 5% slope	68	Pits
29	Canaveral sand, 0 to 5% slope	69	Hontoon muck
30	Bessie muck	70	Canova Variant muck
31	Cocoa Variant sand	72	Adamsville Variant sand, 0 to 5% slope
32	Udorthents, 0 to 35% slope	73	Samsula muck
33	Paola-Urban land complex, 0/8% slope	74	Torry muck
34	St. Lucie-Urban land complex, 0/8%	75	Ft. Drum fine sand
35	Salerno sand	76	Valkaria fine sand
36	Arents, 0 to 2% slope	77	St. Lucie sand, 8 to 20% slope
38	Floridana fine sand, depressional	78	Pomello Variant fine sand
39	Quartzipsamments, 0 to 8% slope	79	Terra Ceia Variant muck
40	Sanibel muck	86	Paola sand, 8 to 20% slope
41	Jonathan sand, 0 to 5% slope		

## Appendix E

### Software programs utilized:

- a.) **Microsoft Excel**  
**Corel Quatro Pro** - For Spreadsheet programs
- b.) **Microsoft Word**  
**Word Perfect** - For word processors
- c.) **Adobe Photo Shop 7.0** - For scanning & photo manipulation
- d.) **Microsoft Streets2005** - For location maps
- e.) **Sierra Land Design** - For irrigation design & illustration
- f.) **Microsoft Office2005** - For Publications (web site, flyers, award certificates, presentations, etc. etc..)
- g.) **Adobe Acrobat 6.0** – For reports published on the internet and transferred by E-mail

## Appendix F

### Program History

(Brief history of individual lab.)

(Brief history of Florida's MIL program)

Lab Start Dates

1988 Lower West coast MIL  
1992 South Dade MIL  
1992 Indian River Lagoon MIL  
1994 Palm Beach MIL  
1994 Lee MIL  
1998 Martin MIL  
2000 St. Lucie MIL  
2001 Big Cypress Basin MIL

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# Envirothon 2006



# Winning Teams



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