MARTIN SWCD

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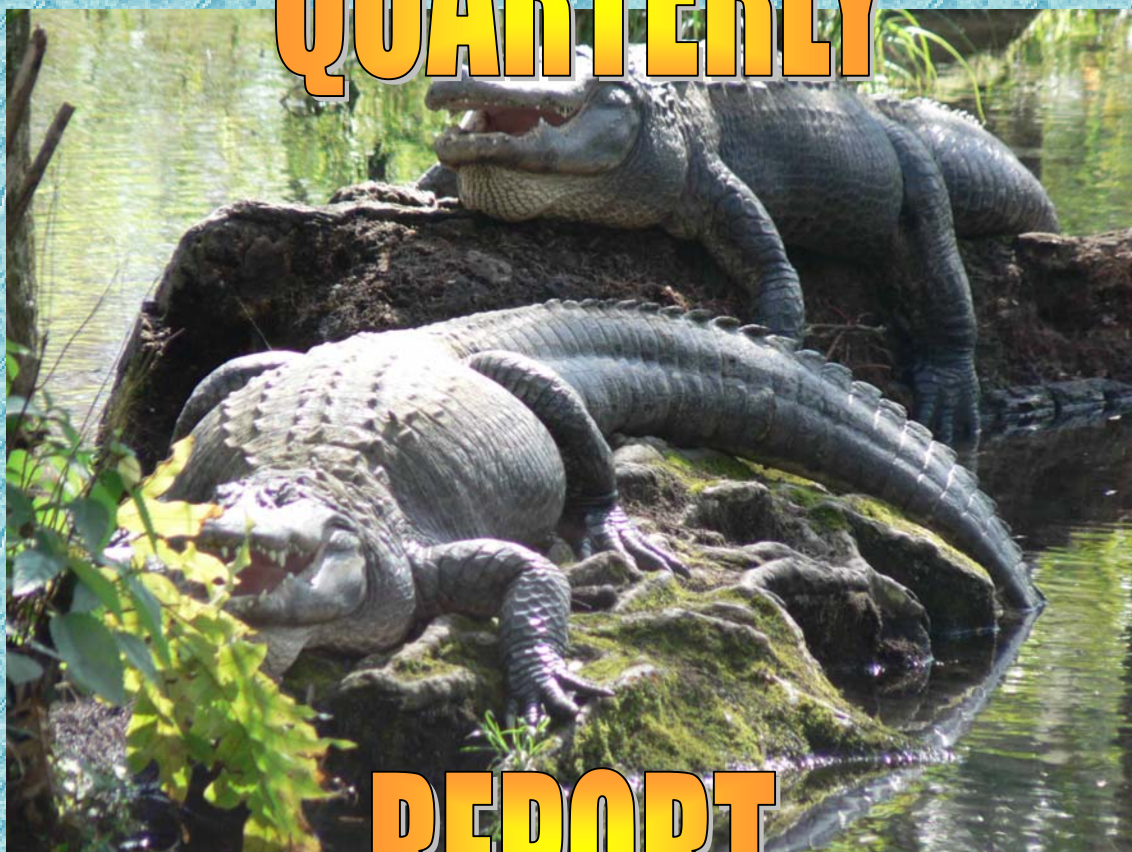
QUARTERLY



REPORT

Fiscal Year 2008

January 1st to March 31st

E-Mail: charleslambert@mailcity.com **Web:** http://mswcd.tripod.com/

Martin Soil & Water Conservation District
FY 2008
MIL 2nd Quarter Report

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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
Office of Agricultural Water Policy
Florida Department of Agriculture and Consumer Services
USDA Natural Resources Conservation Service
Martin County Commissioners.

Abstract

The Martin Urban Mobile Irrigation Lab completed 45 evaluations on 26.86 acres, in the three months starting January 1st 2008 and ending March 31st 2008. These evaluations produced Potential Water Savings (PWS) of 39.0 Ac/Ft per year and Actual Water Savings (AWS) of 1.6 Ac/Ft per year.

MIL Evaluation Waiting List

At this time the Martin MIL has 252 homesites to evaluate, which are comprised of standard residences.

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 1st 2008 and March 31st 2008 the Martin MIL performed 40 evaluations on 26.86 acres and discovered Potential Water Savings (PWS) of 39.0 Ac/Ft per year (Table 1). The Martin MIL performed 5 follow-up evaluations and documented Actual Water Savings (AWS) and Instant Actual Water Savings of 1.6 Ac/Ft per year (Tables 1 and 2).

Problems

The Martin Mobile Irrigation Lab found the two most prevalent problems were “Turf and landscape area irrigated in same zone” (10) and “Operating time too frequent” (52).

Attachment # 1: Martin County MIL

MIL ID: 10 **FY:** 2008 **Quarter:** 2

Zipcode	ID #	Acres	county ID	Soil	System Type	Crop	[1]TDS	pH	Water Source	Pump	Motor	[2]DU	[3]EU	Problems	[4]PWS Ac-Ft	[5]FAWS Ac-Ft	[6]IAWS Ac-Ft	FU
33464	1	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.8			N
33464	2	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.4			N
33464	3	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.3			N
33464	4	1.4	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	2.0			N
33464	5	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.8			N
33464	6	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.9			N
33464	7	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	1.1			N
33464	8	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.6			N
33464	9	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.0			N
33464	10	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.8			N
33464	11	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.7			N
33464	12	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.9			N
33464	13	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	1.4			N
33464	14	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.8			N
33464	15	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	1.4			N
33464	16	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.0			N
33464	17	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	1.1			N
33464	18	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.7			N
33464	19	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.7			N
34996	20	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.1			N
33464	21	0.9	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.2			N
33464	22	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.0			N
33464	23	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.7			N
33464	24	0.3	Martin	0	Sprinkler	Turf	96	6.9	Well	Cent	Electric	65		10,20,50,52	1.7			N
33464	25	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.3			N
33464	26	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.1			N
33464	27	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.9			N
33464	28	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.8			N
33464	29	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.8			N
33464	30	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.6			N
33464	31	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.8			N
33464	32	0.5	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	0.9			N
33464	33	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.3			N
33464	34	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.9			N
33464	35	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.2			N
33464	36	0.7	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.9			N
33464	37	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.7			N
33464	38	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,50,52	1.0			N
33464	39	0.6	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	1.1			N
33464	40	0.8	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65		10,20,52	0.9			N
33464	41	0.1	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65				0.5		Y
33464	42	0.2	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65				0.1		Y
33464	43	0.1	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65				0.7		Y
33464	44	0.1	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65				0.2		Y
33464	45	0.1	Martin	0	Sprinkler	Turf	327	7.6	Well	Cent	Electric	65				0.2		Y
		26.86										**65**	**###**		**39.0**	**1.6**	**0.0**	

Attachment # 2: Original Evaluation and Follow up Tracking Table.

MIL ID: 10

Yr	Qtr ID#	ID No#	Crop	EQIP	Acres	PWS ac-ft	AWS ac-ft	
2007	4	14	Turf		0.1	0.5		*Orig. val.*
2008	2	41			0.1		0.5	*Follow up*
2007	4	15			0.2	0.2		*Orig. val.*
2008	2	42			0.2		0.1	*Follow up*
2007	4	19			0.1	0.7		*Orig. val.*
2008	2	43			0.1		0.7	*Follow up*
2007	4	20			0.1	0.1		*Orig. val.*
2008	2	44			0.1		0.1	*Follow up*
2007	4	22			0.1	0.3		*Orig. val.*
2008	2	45			0.1		0.2	*Follow up*
								Orig. val.
								Follow up
								Orig. val.
								Follow up
								Orig. val.
								Follow up
								Orig. val.
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								Orig. val.
								Follow up

MIL EVALUATION WAITING LIST

MIL NAME: **Martin**

MIL NUMBER: **10**

FEDERAL FISCAL YEAR: **2008** **FEDERAL QUARTER: 2**

COUNTY	COMMODITY		TOTAL COUNT		APPROX TOTAL ACRES
Martin	Residential		252		75

COMMODITY CODES:

- Residential
- Commercial
- Government
- Fruits
- Vegetables
- Dairy
- Nuts
- Nursery
- Other

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;

NIR = Crop water requirement – 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;

Gross application = 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.

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

PWS(man) = measured water use – projected water use

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

$$NIR/DU_{(present)} – NIR/DU_{(projected)}$$

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)

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

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^2)
Time = Time required for needle in water meter to make one complete revolution (s)

No water meter present

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

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

2. Determine distribution uniformity

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

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

Effective application rate = *Average application rate* x *DU*

4. **Calculate operating time**

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

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:

Current usage = *Flow rate* x *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

<u>Problem Descriptions</u> - 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
	Pressure / Application Rate
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
	<u>Emitters / Sprinklers</u>
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
	<u>Maintenance - Irrigation System</u>
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
	<u>Maintenance – Landscape</u>
40	Stream of water blocked by vegetation
41	Variable crop spacing and stage of growth
42	Poor drainage, requiring water control
	<u>Operation / Management</u>
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

SYMBOL	NAME	SYMBOL	NAME
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 to5% 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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