MARTIN SWCD

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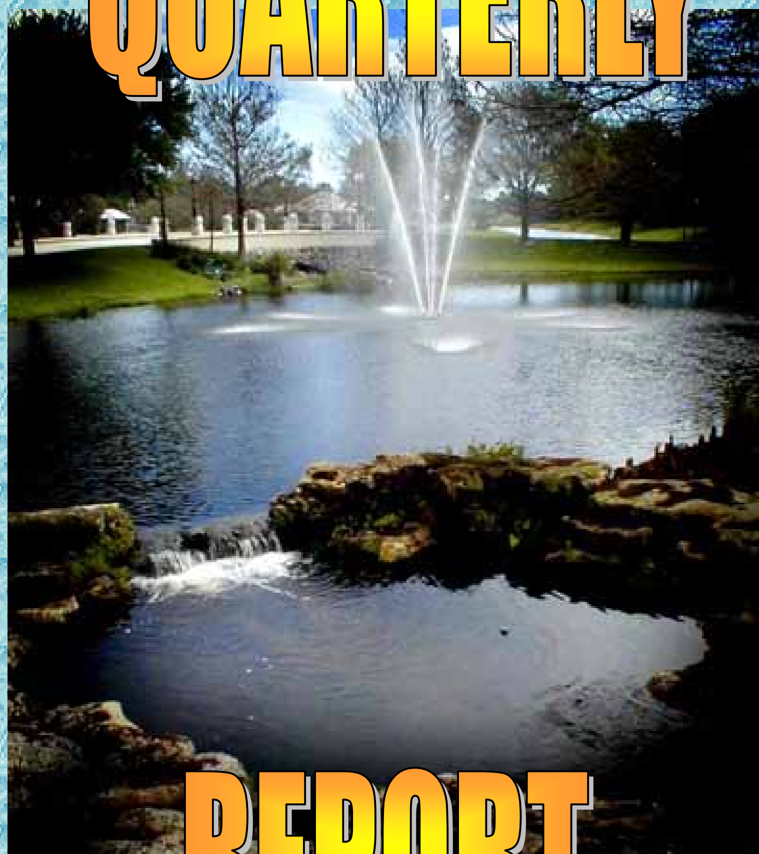
QUARTERLY



REPORT

Fiscal Year 2004

April 1st to June 31st

E-Mail: mswcd@earthlink.net **Web:** http://www.martinswcd.org

Martin Soil & Water Conservation District
FY 2004
MIL 3rd 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
USDA Natural Resources Conservation Service
Martin County Commissioners.

Abstract

The Martin Urban Mobile Irrigation Lab completed 35 evaluations in the three months starting April 1st 2004 and ending June 30th 2004. These evaluations produced Potential Water Savings (PWS) of 8,352,783 gallons per year (25.6 acre-feet per year) and Actual Water Savings (AWS) of 920,952 gallons per year (2.8 acre-feet per year).
The Martin Mobile Irrigation Lab made 91 water conservation presentations contacting 3642 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 April 1st 2004 and June 30th 2004 the Martin MIL performed 35 evaluations on 11.6 acres and discovered Potential Water Savings (PWS) of 8,352,783 gallons per year (Table 1). The Martin MIL performed 5 follow-up evaluations and documented Actual Water Savings (AWS) of 920,952 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 additional Actual Water Savings was gained.

Problems

The Martin Mobile Irrigation Lab found the two most prevalent problems were “Turf and landscape area irrigated in the same zone” (10) and “Mixed sprinkler sizes & unmatched precipitation in the same zone” (20).

FY 2004 MOBILE IRRIGATION LAB LOG

MIL ID: 06 FY: 2004 QTR: 3rd County: Martin

ZIP CODE	EVAL ID #	ACRES	SYSTEM TYPE	SOIL	WATER SOURCE	pH	TDS	SYSTEM AVE. DISCHARGE (GPM)	DU	RATING	PROBLEMS	PWS GALLONS	AWS GALLONS	Follow-UP Y/N
34957	M043969	0.10	Sprinkler	34	Well	7.9	345	53.50	65	Fair	10	99,485		N
34957	M043970	0.23	Sprinkler	34	meter	8.2	214	68.01	65	Fair	10	180,990		N
34957	M043971	0.14	Sprinkler	34	Well	7.3	377	60.00	65	Fair	10,20,30,53	289,903		N
34957	M043972	0.12	Sprinkler	34	Meter	8.4	199	44.57	65	Fair	10,20,53	164,420		N
34957	M043973	0.50	Sprinkler	34	Well	7.4	344	85.50	65	Fair	10,20,53	195,633		N
34957	M043974	0.12	Sprinkler	34	Meter	8.4	207	48.77	65	Fair	10,53	497,876		N
34957	M043975	0.13	Sprinkler	34	Meter	8.7	201	52.55	65	Fair	10,53	121,555		N
34957	M043976	0.12	Sprinkler	34	Meter	8.5	247	79.20	65	Fair	10,53	303,385		N
34957	M043977	0.10	Sprinkler	34	Meter	8.5	203	42.76	65	Fair	10,53	102,681		N
34996	M043978	0.36	Sprinkler	0	Well	7.5	344	47.00	65	Fair	10	634,091		N
34990	M043979	1.27	Sprinkler	0	Lake	8.5	180	303.24	65	Fair	10	791,723		N
34990	M043980	0.70	Sprinkler	0	Lake	8.5	180	112.70	65	Fair	10	82,216		N
34990	M043981	0.60	Sprinkler	0	Well	0.0	0	126.50	65	Fair	10	556,738		N
34957	M043982	0.10	Sprinkler	34	Well	7.7	361	62.00	65	Fair	10,53	291,595		N
34996	M043983	0.49	Sprinkler	0	Well	7.4	311	39.75	65	Fair	10,20,53	208,717		N
34990	M043984	0.45	Sprinkler	0	Well	7.3	197	93.00	65	Fair	10,20,40	533,112		N
34996	M043985	0.59	Sprinkler	0	Well	7.3	299	72.00	65	Fair	4,10,53	116,998		N
34957	M043986	0.12	Sprinkler	34	Meter	8.5	147	31.16	65	Fair	10,53	85,268		N
34996	M043987	0.21	Sprinkler	0	Well	7.4	311	31.00	65	Fair	10,53	150,579		N
34996	M043988	0.23	Sprinkler	0	Well	7.1	407	40.00	65	Fair	10,20,53	182,336		N
34996	M043989	0.48	Sprinkler	0	Well	7.4	311	44.00	65	Fair	10,20	211,364		N
34957	M043990	0.13	Sprinkler	34	Meter	7.6	241	57.48	65	Fair	10,53	274,258		N
34996	M043991	0.77	Sprinkler	0	Well	7.4	311	55.50	65	Fair	10,20	244,894		N
34996	M043992	0.45	Sprinkler	0	Well	7.4	311	58.00	65	Fair	10,20	250,160		N
34996	M043993	0.56	Sprinkler	0	Well	7.4	311	18.65	65	Fair	10,20	119,255		N
34996	M043994	0.49	Sprinkler	0	Well	7.4	311	39.75	65	Fair	10,20	208,717		N
34957	M043995	0.10	Sprinkler	34	Meter	8.5	203	56.53	65	Fair	10	211,999		N
34957	M043996	0.13	Sprinkler	34	Well	7.4	314	78.50	65	Fair	10,53	371,698		N
34996	M043997	0.50	Sprinkler	0	Meter	7.7	149	108.08	65	Fair	10,20	509,795		N
34957	M043998	0.18	Sprinkler	34	Meter	8.4	199	45.00	65	Fair	10	169,706		N
34957	M043999	0.13	Sprinkler	34	Meter	8.6	202	62.84	60	Fair	4,40,53	30,404	294,112	Y
34957	M043000	0.16	Sprinkler	34	Meter	8.2	184	38.46	65	Fair	20,50,53	83,902	239,986	Y
33455	M043001	0.59	Sprinkler	41	Well	7.3	381	85.00	65	Fair	20,26,53	0	171,678	Y
34957	M043002	0.09	Sprinkler	34	Meter	8.4	184	70.41	65	Fair	26,31,53	71,440	150,241	Y
34957	M043003	0.15	Sprinkler	34	Well	8.6	194	55.50	65	Fair	10,20,52	5,892	64,935	Y
TOTALS	35	11.6										8,352,783.4	920,952.0	

PWS and AWS - Gallons

Table 2. Original Evaluation and Follow up Tracking Table

ID#	Crop	System Type	Acres	PWS	AWS	
M041905	Mixed	Sprinkler	.13	324,516		*Orig. Eval.*
M043999	Mixed	Sprinkler	.13		294,112	*Follow up*
M041917	Mixed	Sprinkler	.16	323,888		*Orig. Eval.*
M043000	Mixed	Sprinkler	.16		239,986	*Follow up*
M041919	Mixed	Sprinkler	..59	143,966		*Orig. Eval.*
M043001	Mixed	Sprinkler	.59		171,678	*Follow up*
M041924	Mixed	Sprinkler	.09	181,277		*Orig. Eval.*
M043002	Mixed	Sprinkler	.09		150,241	*Follow up*
M041915	Mixed	Sprinkler	.15	70,827		*Orig. Eval.*
M043003	Mixed	Sprinkler	.15		64,935	*Follow up*

Conservation Education/Outreach

Between April 1st 2004 and June 30th 2004 Martin Mobile Irrigation Lab gave 91 presentations to school, homeowners, homeowners associations, and other interested groups, reaching 3642 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. ICC training took place at Martin Downs in lieu of the usual meeting.

TABLE 3. MOBILE IRRIGATION LAB CONSERVATION EDUCATION REPORT
NAME OF LAB: MARTIN MOBILE IRRIGATION LAB
PERIOD BETWEEN: APRIL 1ST 2004 AND JUNE 30TH 2004

DATE	TYPE OF PRESENTATION	NAME OF GROUP	NUMBER ATTENDING	LOCATION	TIME
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	36	Jensen Beach	28 Hrs.
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	7	Palm City	4 Hrs.
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	20	Stuart	9 Hrs.
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	2	Hobe Sound	1 Hrs.
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	2	Tequesta	1 Hrs.
3rd Quarter	Report & Verbal Presentations	Homeowners, Neighbors & Walk-ins	4	Indiantown	2 Hrs.
3rd Quarter	Free Rain Sensor Marketing	Homeowners (Door to Door)	36	North Martin County	22 Hrs.
3rd Quarter	Airing of Television Segment	MIL TV appearance FYI	2500	Sewell's Point	12 Hrs.
3rd Quarter	Board Meeting	Florida Yards & Neighborhoods	15	Stuart	4 Hrs.
3rd Quarter	Training & Management presentation	Irrigation Conservation Committee	20	Palm City	12 Hrs.
3rd Quarter	Airing of Television Segment	TV interview - Rain Sensor Program	1000	Stuart	7 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;

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)

$$AAR = \frac{Volume}{Area \times Time} \times 5775.4$$

OR

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

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

$$Flow\ rate = \frac{Volume}{Time} \times 0.01585$$

OR

$$\text{AAR} = \frac{Total\ Flow\ Rate}{Area} \times 96.25$$

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

2. Determine distribution uniformity

$$DU = \frac{Low\ quarter\ average}{Total\ average} \times 100$$

OR 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

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

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:

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

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
	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
	Emitters / Sprinklers
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
	Maintenance - Irrigation System
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
	Maintenance – Landscape
40	Stream of water blocked by vegetation
41	Variable crop spacing and stage of growth
42	Poor drainage, requiring water control
	Operation / Management
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 Streets2001** - For location maps
e.) **Sierra Land Design** - For irrigation design & illustration
f.) **Microsoft Office2000** - For Publications (web site, flyers, award certificates, presentations, etc. etc..)
g.) **Adobe Acrobat 5.0 –** 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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