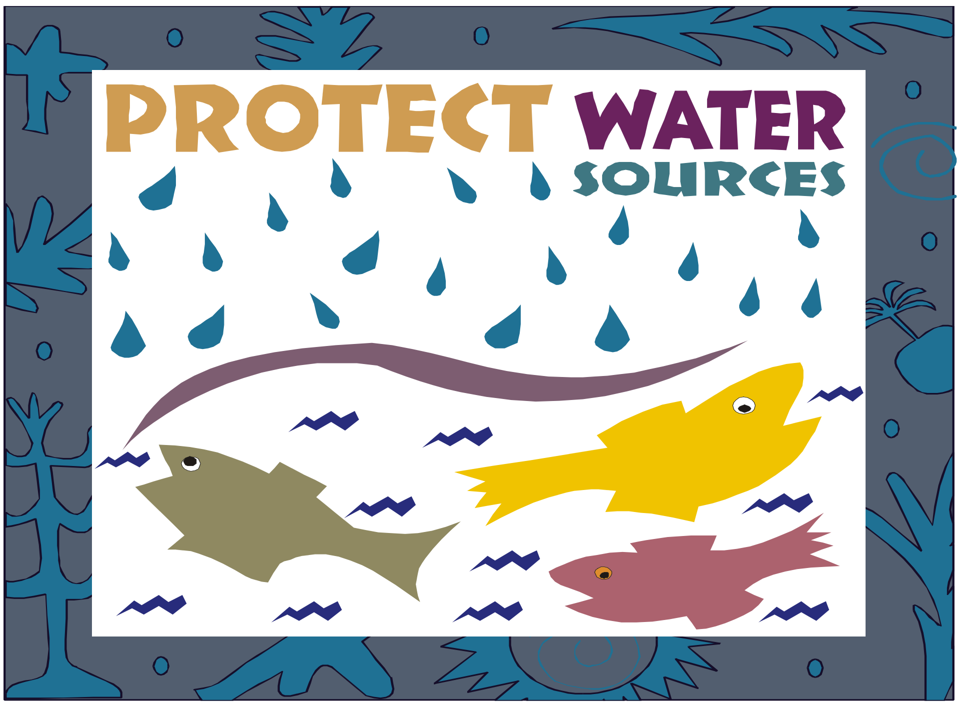
THE BIG CYPRESS BASIN URBAN MOBILE IRRIGATION LAB

2018 2nd Quarter Report

COLLIER SOIL AND WATER CONSERVATION DISTRICT
NATURAL RESOURCES CONSERVATION SERVICE
BIG CYPRESS BASIN



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Abstract

The Big Cypress Basin Urban Mobile Irrigation Lab (MIL) completed 32 evaluations for the second quarter of project year 2018. These evaluations produced Potential Water Savings (PWS) of 42.5 million gallons of water per year (130.5 acre-feet). Of the 32 evaluations, 4 were follow-up evaluations performed for Follow-Up Actual Water Savings (FAWS) of 1.1 million gallons of water per year (3.3 acre feet). And with changes to the homeowners' controllers, the MIL had Immediate Actual Water Savings (IAWS) of 22.4 million gallons of water (68.8 acre feet) just by reducing long run times and multiple programs on irrigation controllers. These are documented in attachment #1. The Follow–up evaluations with their original evaluations are documented in Attachment #2.

The Big Cypress Basin Urban Mobile Irrigation Lab will be acknowledged during evaluations and the numerous Rookery Bay Best Management Practices (BMP) training courses and the Waterwise and Other Irrigation Concepts course available to contractors of Collier County at Rookery Bay. The Big Cypress Basin Urban MIL has contacted Florida Gulf Coast University in efforts to conserve our natural resource and promote awareness of the MIL. The MIL also reaches the community through PowerPoint presentations and conservation expositions. The MIL is preparing an irrigation demonstration for the Annual Master Gardener Southwest Florida Yard and Garden Show.

Summary

The Big Cypress Basin Urban Mobile Irrigation Lab (MIL) completed 32 evaluations for the second quarter of 2018. The evaluations produced Potential Water Savings (PWS) of 42.5 million gallons of water per year (130.5 acre-feet). Of the 32 evaluations, 4 were follow-up evaluations. The follow-up evaluations produced a Follow-Up Actual Water Savings (FAWS) of 1.1 million gallons of water per year (3.3 acre-feet). And with changes to the homeowners' controllers, the MIL had Immediate Actual Water Savings (IAWS) of 22.4 million gallons of water per year (68.8 acre-feet) just by reducing long run times and multiple programs on irrigation controllers. The Big Cypress Basin Urban Mobile Irrigation Lab evaluated 53 acres of land in Fiscal Year 2018.

The Big Cypress Basin Urban Mobile Irrigation Lab Completed the following for Fiscal 2018:

- 32 evaluations
- 4 were follow-up evaluations
- Master Gardener Training at the IFAS Extension

Introduction

The Big Cypress Basin Urban Mobile Irrigation Lab's 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 efficiency 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 conducted next. If pressure and flow are found to be uniform, a catch can test is performed to determine optimum run times for the zones in the system.

Common Problems

The average operator is unaware of watering restrictions and what the proper irrigation schedule should be for their lawn and landscape. Most systems evaluated this year were using municipal sources that are expensive to operate or dual systems that have limitations on usage. The main concerns were saving money and water. Most of the evaluations requested this year were from other customer referrals and MIL flyers. The Mobile Irrigation Lab and evaluation report gives system operators and managers a realistic view of what their systems can do and how to improve their systems to save water. The major problems were blocked sprinklers and wrong settings and times on the controllers. Homeowners often have multiple programs running and overlapping other programs. Many rain sensors are bypassed and set too high. Unmatched precipitation rates with rotors on the same zone as fixed sprinklers were found almost on every site. Residents have lawn and landscaping zones watering together and overwatering landscaping areas.

Conservation Education/Outreach

For the second quarter 2018, the Big Cypress Basin Urban Mobile Irrigation Lab has been reaching out to home owners and land owners from our temporary facility in North Fort Myers NRCS Field Station.

Training

The training of the Master Gardeners in Collier County continues with conservation as the main objective around the Extension Office in Naples. The MIL held an irrigation training repair class at the damaged IFAS Extension Facility in efforts to keep the irrigation system working after Hurricane Irma.

Attachment # 1: BCB MIL 2018

MIL ID: BCB **FY:** **2018** **Qtr** 2

Zipcode	ID #	Acres	county ID	Soil	System Type	Crop	Water Source	$_2$DU	Problems	$_4$PWS Ac-Ft	$_5$FAWS Ac-Ft	$_6$IAWS Ac-Ft	FU
34104	17	2.0	Collier	.8	Sprinkler	Turf	Lake	65	10,20,21,34,40,50,52,54,55	1.9	0.0	0.0	N
34104	18	2.5	Collier	.8	Sprinkler	Turf	Lake	50	10,20,21,24,30,40,50,52,53,54,	4.3	0.0	0.0	N
34104	19	2.0	Collier	.8	Sprinkler	Turf	Lake	65	10,20,21,24,34,50,52,54,55	4.4	0.0	2.7	N
34104	20	0.5	Collier	.8	Sprinkler	Turf	Lake	65	10,21,32,34,40,50,52,53,54,55	1.7	0.0	1.3	N
34104	21	0.1	Collier	.8	Sprinkler	Turf	Lake	75	21,50,52,53,54,55	0.5	0.0	0.0	N
34145	22	0.3	Collier	.8	Sprinkler	Turf	City	70	10,32,34,53	0.0	0.2	0.0	Y
34104	23	0.3	Collier	.8	Sprinkler	Turf	County	65	3,10,20,21,26,32,40,52,53,54,55	0.4	0.0	0.4	N
34117	24	2.0	Collier	.8	Sprinkler	Turf	Well	65	10,20,21,30,32,40,52,53,54,55	0.4	0.0	0.0	N
34145	25	0.5	Collier	.8	Sprinkler	Turf	City	50	10,21,24,31,32,40,50,52,54,55	1.1	0.0	0.9	N
34145	26	0.3	Collier	.8	Sprinkler	Turf	City	50	3,6,7,10,20,21,22,25,30,32,52,53,54,55	0.5	0.0	0.0	N
34102	27	1.0	Collier	.8	Sprinkler	Turf	City	70	3,7,10,32,40,50,52,53,54,55	1.9	0.0	1.9	N
34113	28	6.0	Collier	.8	Sprinkler	Turf	City	70	4,10,20,34,40,54,55	9.3	0.0	0.0	N
34116	29	5.0	Collier	.8	Sprinkler	Turf	Lake	70	10,30,32,40,50,52,54,55	21.4	0.0	0.0	N
34117	30	1.5	Collier	.8	Sprinkler	Turf	Well	60	4,5,10,30,32,40,51,53,54,55	0.5	0.0	0.0	N
34145	31	0.3	Collier	.8	Sprinkler	Turf	City	60	10,20,30,32,40,51,52,53,54,55	0.4	0.0	0.2	N
34145	32	0.5	Collier	.8	Sprinkler	Turf	City	65	3,10,20,21,32,40,53,54,55	1.1	0.0	0.8	N
34102	33	1.0	Collier	.8	Sprinkler	Turf	Reclaimed	70	3,10,20,34,52	0.0	2.5	0.0	Y
34116	34	5.0	Collier	.8	Sprinkler	Turf	Lake	70	3,10,30,32,40,50,52,54,55	1.1	0.0	0.0	N
34145	35	4.0	Collier	.8	Sprinkler	Turf	Reclaimed	70	3,10,20,21,40,50,52,53,54,55	13.4	0.0	11.1	N
34145	36	0.3	Collier	.8	Sprinkler	Turf	City	65	3,10,20,32,40,50,52,54,55	1.1	0.0	0.9	N
34145	37	5.0	Collier	.8	Sprinkler	Turf	Reclaimed	70	3,10,40,50,52,53,54,55	21.1	0.0	15.6	N
34145	38	3.5	Collier	.8	Sprinkler	Turf	Reclaimed	70	3,10,52,53,54,55	11.6	0.0	8.6	N
34145	39	6.0	Collier	.8	Sprinkler	Turf	Reclaimed	70	3,10,20,21,40,52,53,54,55	18.4	0.0	14.0	N
34113	40	0.3	Collier	.8	Sprinkler	Turf	Reclaimed	60	4,7,10,20,22,23,30,40,50,52,53,54,55	0.5	0.0	0.1	N
34104	41	0.3	Collier	.8	Sprinkler	Turf	County	70	3,20,21,25,40,53	0.0	0.1	0.0	Y
34113	42	1.5	Collier	.8	Sprinkler	Turf	Reclaimed	75	3,10,,20,21,40,50,52,54,55	7.2	0.0	5.7	N
34145	43	0.3	Collier	.8	Sprinkler	Turf	City	50	4,7,10,20,21,22,30,32,34,50,52,54,55	0.5	0.0	0.3	N
34113	44	0.3	Collier	.8	Sprinkler	Turf	Reclaimed	60	3,10,21,23,32,40,50,53,54,55	0.2	0.0	0.0	N
34113	45	0.3	Collier	.8	Sprinkler	Turf	Reclaimed	65	4,5,10,20,23,25,34,40,50,52,54,55	3.0	0.0	2.4	N
34113	46	0.3	Collier	.8	Sprinkler	Turf	Reclaimed	60	4,5,7,10,23,34,40,50,52,54,55	2.4	0.0	2.0	N
34103	47	0.3	Collier	.8	Sprinkler	Turf	County	50	3,7,10,20,21,36,30,31,33,34,50,52,53,54,55	0.5	0.0	0.0	N
34103	48	0.3	Collier	.8	Sprinkler	Turf	County	70	3,10,21,40,51,53,	0.0	0.6	0.0	Y
		53.113						**64**		**130.5**	**3.3**	**68.8**	

2. Distrubution uniformity

4. Potential Water Savings

5. Follow up actual water savings

6. Instant actual water savings

Attachment #2 Original Evaluation and Follow up Tracking Table

MIL ID: BCB 2018 2nd Quarter

Yr	Qtr ID#	ID No#	Crop	EQIP	Acres	PWS ac-ft	AWS ac-ft
2017	4	90	Turf	Sprinkler	0.3	0.2	0
2018	2	22	Turf	Sprinkler	0.3	0	0.2
2017	3	84	Turf	Sprinkler	1	4.05	0
2018	2	33	Turf	Sprinkler	1	0	2.48
2018	1	9	Turf	Sprinkler	0.3	0.07	0
2018	2	41	Turf	Sprinkler	0.3	0	0.07
2018	2	47	Turf	Sprinkler	0.25	0.46	0
2018	2	48	Turf	Sprinkler	0.25	0	0.58

MOBILE IRRIGATION LAB CONSERVATION EDUCATION REPORT ATTACHMENT 3
BIG CYPRESS BASIN URBAN MOBILE IRRIGATION LAB
2ND QUARTER 2018

DATE	TYPE OF PRESENTATION	NAME OF GROUP	NUMBER ATTENDING	LOCATION	TIME
2/13/2108	**Irrigation Training**	**Master Gardeners**	**5**	**IFAS Extension**	**4**

4 hours 2nd Quarter

NOTES: **EXPOSITIONS ARE GREAT OPPORTUNITIES FOR THE MILS TO GET FAMILIARIZED WITH NEW PRODUCTS AND NEW INNOVATIONS IN THE IRRIGATION INDUSTRY AND ALSO OUTREACH FOR PARTNERSHIPS AND FUNDING.**

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 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 Irrigation Guide. 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.

$$\mathbf{NIR/DU_{(present)} - NIR/DU_{(projected)}}$$

Actual Water Savings (AWS) - The total amount of water which is saved for a period of x years 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.

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

$$\textit{Average application rate} = \frac{\textit{Volume}}{\textit{Area} \times \textit{Time}} \times 5775.4$$

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

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

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

2. Determine distribution uniformity

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

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:

$$Current\ usage = Flow\ rate \times time$$

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)

If water meter records units of gallons, use the following equation:

$$Flow\ rate = \frac{10\ gallons}{Time} \times 60$$

Where *Flow rate* = Flow through a particular zone (gpm)
Time = Time required for the needle on the meter to make one complete revolution(s)

If no water meter is present, determine the flow rate from each sprinkler within one zone and add them all together.

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

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

Appendix B Problem Descriptions

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

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