

## ENHANCING AND PROTECTING WATER QUALITY, QUANTITY, AND SUPPLY

### STATEWIDE EDUCATIONAL PROGRAMS IN **WATER CONSERVATION**

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#### SITUATION

Water is among Florida's most valued resources and has a wide diversity of water sources with 54,836 miles of rivers and streams, 49,128 miles of canals and ditches, over 1.8 million acres of lakes (7,800 freshwater lakes), reservoirs, ponds, more than 1,000 springs, and over 11 million acres of wetlands. The underlying aquifers yield quantities of freshwater necessary for both human and environmental needs. In addition, 1,350 miles of coastal shoreline, the largest in the contiguous 48 states, face pressure as Florida experiences continued growth in population, tourism and agriculture.

Many of these water resources are downstream of watersheds where approximately 19 million people live and the land is used for agriculture, silviculture, industrial and other intensive uses. High annual rainfall and extreme weather events increase the hydrologic connectivity between land based activities and downstream water resources where the expression of nutrient and other inputs can be further enhanced due to Florida's subtropical and warm temperate climate.

Florida's Department of Environmental Protections (DEP) estimates that by 2020, Florida's population is expected to increase 25 percent from 15.9 million residents today to about 21.8 million residents. Even though Florida averages 54 inches of rain per year, to meet this expected increased demand, Florida will need 9.1 billion gallons of fresh water per day, a 26.4 percent increase from today. Groundwater has been the primary source of water for both public supply and agricultural irrigation in Florida, and since aquifer levels have been dropping, incentives and stricter regulations have been put in place to improve water use efficiency in all types of uses, including urban and agricultural irrigation.

As the demand continues to increase, water supply needs are already exceeding capacity in some areas of the state. There are areas throughout Florida where water resources are stressed, particularly fresh groundwater, and forecasted growth and demand must be addressed by the development of additional water supplies. Florida freshwater supplies are used for agriculture, natural resources, salt water intrusion protection, drinking water, industrial, and many other uses. Water quantity issues in Florida have traditionally been regional in nature but are rapidly becoming a statewide issue. Conservation of existing water supplies is considered the "cheapest new water". To meet water demands, both agricultural and urban irrigators must be educated in water conserving methods and practices along with improved acceptance of waste water reuse and desalination.

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#### PROGRAM OBJECTIVES

Priority-wide objectives:

- Reduce water use in the landscape
- Increase agriculture irrigation efficiency
- Reduce water use in indoor residential and commercial properties
- Increase water reuse and recycling for agriculture and urban populations

Urban program objectives:

Target audience: County Extension Agents, contractors, home owners.

- 50% increase in knowledge gain in BMP landscape cultural practices after attending program.
- 50% attending an FFL program will report a change in behavior and practices within one year.
- 50% of participants will decrease water use (potable, reclaimed, well, desalination) by 35% in landscape irrigation within one year of educational program. Water saving activities include: installation of expanding disk interrupt rain sensor,

calibration of sprinkler system to deliver ¾" water instead of 1", calibration of sprinkler system to replace 60% ET instead of 100%, installation of soil moisture sensor or evapotranspiration controller, conversion of turfgrass area to landscaped bed with microirrigation, conversion of spray head nozzles to multi-stream, multi-trajectory (MSMT) nozzles and installation of pressure compensating heads.

Agricultural program objectives:

Target audience: County Extension Faculty, certified crop advisor, consultants, agricultural producers.

- 50% of participants will increase knowledge in efficient irrigation practices after participating in an IrriGator program.
- 40% of participants will adopt a behavior or practice change within one year of attending an IrriGator program.
- 25% of participants will document water savings and economic benefits one year after the educational program (Water saving activities includes practices identified in Table 1).

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## EDUCATIONAL METHODS

Each of these programs will utilize mass media to spread a unified message about the importance of water conservation throughout the state. Both the FFL and IrriGator programs will use social media, television, and radio to increase awareness of these programs and their messages. Web-based tool kit for urban and agricultural water conservation called Irrigator will be important in making these materials available to agents for consistent programming and evaluation. Guidelines for potential urban water saving are described in **Boyer and Dukes (2015) "Potential ways to quantify water savings of FFL activities"** <https://edis.ifas.ufl.edu/ae515>. Table one provides a short guide for agricultural users, an expanded guide will be developed. These guides can be utilized as examples and goals of water conservation associated with irrigation practice change. Educational methods include:

- Traditional classroom-oriented educational programming
- Surveys of urban and agricultural water users to refine program materials and objectives
- Field days, on-farm demonstrations and hands-on workshops
- Social marketing
- In-service training for Extension faculty
- Electronic media on SolutionsForYourLife.com and extension.org websites
- Print materials including EDIS, press releases, handouts, brochures, and calendars
- Video and other media to be used for online modules and educational components

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## RESULTS

### Short term outcome

Change in knowledge regarding:

- Efficient irrigation techniques for agricultural practices
- Efficient irrigation techniques for homeowners
- Practices to decrease stormwater run-off
- Economic impact of increased water efficiency
- Plant selection for low water use and savings

### Intermediate outcome

Change in behaviors and practices, including:

- Farmers and producers will implement more efficient irrigation methods
- Farmers and producers will actively manage their irrigation systems based on plant water needs or FAWN crop water demand estimates
- Homeowners will be using efficient irrigation techniques (adjusting timers, rain shut-off devices, retrofitting irrigation systems or conversion to microirrigation, improved maintenance)
- GI-BMP attendees will adopt practices (turf selection, management, proper fertilizer applications, efficient irrigation)

### Long term outcome or Impacts

- Reduced water use by growers currently over-irrigating
- Reduced crop water stress with optimum water applications as measured with soil moisture sensors
- Economic savings based on water and energy saved
- Decreased water demand based on data from water management districts.

We believe that we do have the data to develop these impacts, although there is a need to develop evaluation tools for both programs that measure consistent data to create a priority-wide impact and long term outcome.

## NEEDS

This priority needs to develop a **strong marketing message** with united vision and feel to promote the conservation message and accompanying programs. This will require adequate resources, including an **IFAS toolkit** for both the FFL program and the proposed IrriGator program. This toolkit will provide everything from PSA’s to programming templates for presentations and educational programs. To increase the audience of our programs, funding is needed for translation of both the presentations and printed materials to serve diverse audiences. In addition, these toolkits will include **evaluation tools** to result in dependable outcomes and impacts for improved reporting and consistent metrics on the state-wide level. As these programs become increasingly important, it will be vital that there is **funding for training** in these key programs for agents and specialist throughout the state.

**Strong partnerships** are needed with local, state and federal agencies, as well as municipalities and local utilities. Funding for cost share programs such as monetary **incentives** for changes in behaviors and decreased water use will increase the effectiveness of these educational programs and messages. Developing partnerships with corporate businesses and others in the irrigation and water industry will be important in delivering a consistent message and providing the tools and support that are needed to implement change.

## SUPER ISSUES ADDRESSED BY THIS PRIORITY WORK GROUP

- ❖ Resource sustainability and conservation in Florida communities.
- ❖ Awareness and appreciation of food systems and the environment.
- ❖ Financial management for individuals and enterprises.

## URBAN TABLE FOLLOWS FOR PROGRAM INDICATORS

## AGRICULTURE TABLE FOLLOWS FOR PROGRAM INDICATORS

Table 1. Agricultural practices that result in water savings

Irrigation practice modification
1. Time-based schedule to real-time ET (FAWN, smartphone app, or ET controller)
2. Time-based schedule to historical ET and crop coefficients
3. Time-based schedule to using soil moisture sensors (SMS) or tensiometers
4. Seepage to drip irrigation
5. Seepage to subsurface drip irrigation (SDI)
6. Seepage to overhead sprinkler
7. Overhead sprinkler to micro-sprinkler

8. Big gun to overhead sprinkler
9. Overhead sprinkler to drip
10. No soil amendments to using mulch or other soil amendments

## Florida Extension Initiative 2: Enhancing and Protecting Water Quality, Quantity, and Supply Statewide Educational Programs in Urban Water Conservation: *Guidelines for Reporting Urban Landscape Water Conservation Outcomes and Impacts for the 2017 ROA*

Extension agents who conduct urban water conservation programming in Initiative #2, Priority Work Group #1 should use this worksheet as a guide for reporting water conservation outcomes from 2017 programming. UF/IFAS has identified the adoption of specific water conservation behaviors and technologies as our short term indicator variables and gallons of water saved as the long-term indicator variable. By identifying change on our identified indicators variables, we can document the progress we have made on this part of the roadmap. These indicators should be incorporated into program objectives. This document summarizes the indicator variables that should be included in the 2017 ROA/2018 POW. *Please note that this is a living document that is updated at least annually.*

### 2017 Report of Accomplishment (ROA) / 2018 Plan of Work (POW)

To demonstrate contribution to the UF/IFAS Road Map, Initiative 2, agents who conduct landscape water conservation programming should use Boyer and Dukes (2015), Table 1, on page #5, to report gallons of water saved as a result of a minimum of 1 of the 11 behavior changes / technology adoptions identified in [Estimated Water Savings Potential of Florida-Friendly Landscaping™ Activities](#). The leadership of Initiative 2 will use this to generate a statewide report.:

- For the 2017 ROA, agents should 1) document **the number of households adopting at least one behavior/technology change below**; and 2) **report gallons of water saved as a result of at least one behavior/technology change below**.
- For the 2018 POW, agents should also **articulate at least two or three objectives that align with the behaviors/technologies below** to demonstrate contribution to the UF/IFAS Road Map, Initiative 2.

We specifically focus on the number of households who adopt the following:

1. Install expanding disk interrupt rain sensor
2. **Calibrate sprinkler system to deliver ½” or ¾” water instead of 1”**
3. Use UF/IFAS recommendations and calibrate sprinkler system to replace 60% evapotranspiration (ET) instead of 100%
4. Install soil moisture sensor or ET controller
5. Convert turfgrass area to landscaped bed with micro irrigation
6. Convert spray head nozzles to multi-stream, multi-trajectory (MSMT) nozzles
7. Install pressure compensating heads
8. **Reduce irrigation from 3 days/week to 2 days/week**
9. **Reduce irrigation from 7 days/week to 2 days/week**
10. **Reduce irrigation frequency during the winter (Skip a Week)**
11. **Reduce irrigation frequency during the summer**

### Additional Resources and Summary

We have provided [specific sections that should be included into 2017 ROA and 2018 POW](#). These sections are: situation, program objectives, educational methods and activities, outcomes and impacts, and success stories. We have also provided [suggestions for data collection and calculations](#). Finally, [examples are given that can be modified as needed and used to develop each section in your ROA/POW](#).

This worksheet serves as a guide for reporting urban water conservation outcomes from 2017 programming so that progress on the roadmap may be documented. Examples may be modified to fit the local program. **\*Detail may be added to the above based on local activities in accordance with the [PDEC Guidelines for Writing Quality Impact Statements for Workload](#) and the [UF/IFAS Initiative #2 Water Conservation Workplan](#).**