Merit Review: Feb 2016
Plan Updated: Mar 2016

FLORIDA EXTENSION INITIATIVE #2:

ENHANCING AND PROTECTING WATER QUALITY, QUANTITY, AND SUPPLY

STATEWIDE EDUCATIONAL PROGRAMS IN **URBAN WATER QUALITY**

SITUATION

Florida is uniquely characterized by its numerous and valued water resources. The geological and geographical features of Florida are such that water, in the form of surface water, groundwater and salt water, is a prominent feature throughout the state. The FDEP (Florida Department of Environmental Protection) Water Quality Integrated Report identifies 54,836 miles of rivers and streams, 49,128 miles of canals and ditches, over 2,390 square miles of lakes, reservoirs and ponds, more than 1,000 springs, 10.7 million acres of wetlands and 3,625 square miles of estuaries and coastal shoreline. Additionally, Florida has four major aquifer systems, the Floridan, Sand and Gravel, Surficial and Biscayne, which supply 6,873 million gallons water per day; over 90% of all potable water for Floridians.

While Florida has impressive water resources, the FDEP 2014 Regional Water Supply Planning Annual Report estimates fresh water demand by 2030, to be 7.7 billion gallons per day, an increase of 1.3 billion gallons per day. Public supply and agricultural irrigation continue to be the largest categories of water use. Public supply and agricultural demand is projected to increase by 29% and 7.5% respectively between 2010 and 2030. These increases are due to state population growth trends, not increased per capita usage.

Many of these water resources exist within watersheds where approximately 20 million people live (U.S. Census estimate, 2014). A watershed is an area of land where all the water flows into one river or other body of water. Most of the land in these watersheds is used for agriculture, urban living, forestry, industrial and other intensive land uses. High annual rainfall and extreme weather events increase the hydrologic connectivity between land-based pollutant sources and downstream water resources resulting in potential degradation of water quality.

The annual FDEP Integrated Water Quality Assessment Report identifies state waters that are impaired by pathogens, nutrients, mercury and other contaminants. Impaired waters are rivers, lakes, or streams that do not meet water-quality standards and are considered too polluted for their intended uses. These water impairments have been associated with highly urbanized areas, intense agricultural production and industrial land uses.

In urbanized areas landscape management practices, including landscape design, plant selection, mowing, irrigation, fertilizer and pesticide application, and debris management can impact water quality for all Floridians. Florida's urban approach to protecting water quality is centered on Florida Friendly Landscaping™ (FFL) home owner, builder/developer and Green Industry Best Management Practices (GIBMP) programs.

These programs have been developed to reduce non-point source pollution originating from urbanized areas. Non-point source pollutants come from a wide area or a large number of people and is associated with pollutants that move with storm water or irrigation over or through the ground to water bodies or ground water.

UF/IFAS Extension educates homeowners, governmental entities, landscape professionals and others about the science that supports FFL and GIBMP programs and that implementing FFL and GIBMP principles can protect water quality by reducing non-point source pollution. Overall program goals are to increase Floridians' awareness and knowledge of water quality issues and FFL/GIBMP practices, and to promote adoption of FFL/GIBMP principles resulting in behavior changes that will reduce non-point source pollution and the potential for surface and ground water impairment.

PROGRAM OBJECTIVES

The overarching objective of this program is to impact water quality improvements by reducing non-point source pollutants originating from urban sources:

- Green Industry professionals, residential communities, commercial property owners, builders, developers, and policy makers of human activities that affect water quality.

- Increase knowledge and skills of Green Industry professionals and workers for managing environmental and site conditions to reduce nonpoint source pollution through pesticide, landscape and/or irrigation certification, recertification and continuing education programs.

- Change behaviors of urban Florida residents, Green Industry professionals, residential communities, commercial property owners, builders, developers, and policy makers by implementing practices that reduce nonpoint source pollution.

- Through Florida LAKEWATCH, utilize citizen scientists to facilitate "hands-on" citizen participation in the management of Florida lakes, rivers and coastal sites through monthly monitoring activities.

1. Green Industries Best Management Practices training for Green Industry professionals

   Short-Term Objectives
   - Attendees of GI-BMP training will show at least a 15% knowledge gain of GI-BMP and Florida-Friendly Landscaping™ recommended lawn and landscape, irrigation, fertilization, and pesticide management practices as measured by a pre- and post-test.
   - Agent taught programs will result in 75% of attendees achieving a certification score of 75% or higher.

   Medium-Term Objectives
   - Green Industry professionals will increase adoption and utilization of Green Industry Best Management Practices by at least 20% as a result of training received as measured by post-participation surveys. Practices are based on the following indicators:
   - Increase knowledge and skills of Green Industry professionals and workers for managing environmental and site conditions to reduce nonpoint source pollution through pesticide, landscape and/or irrigation certification, recertification and continuing education programs.
   - Change behaviors of Green Industry professionals by implementing practices that reduce nonpoint source pollution.

- Utilization of practices that reduce off-site transport of sediments, nutrients, pesticides and debris to surface and ground water.
- Use appropriate site design and plant selection
- Use deflector shields on fertilizer spreaders
- Read the fertilizer label to determine slow-and quick-release nitrogen sources.
- Use appropriate rates and application methods of fertilizer
- Use appropriate rates and application methods of irrigation
- Use integrated pest management (IPM)
- Educate clients and/or use GI-BMP for marketing

* Examples of specific behavior change practices (not inclusive):

- Utilizing landscape designs that incorporate the right plant in the right place
- Utilizing UF/IFAS landscape plants and plant material installation recommendations
- Correcting improper landscape component or plant material installation
- Converting to a Florida Friendly Landscape™
- Using pervious surfaces in landscape design
- Managing grass clippings and landscape debris according to UF/IFAS and local ordinance recommendations
- Performing soil tests to develop landscape and fertilization management plans
- Utilizing appropriate rates and application methods of fertilizers, pesticides and irrigation
- Performing water testing for salts and/or nutrients to develop irrigation plans
- Calibrating fertilizer and pesticide application equipment
- Respecting the ring of responsibility at waterbodies when applying fertilizers and pesticides
- Protecting the waterfront by planting recommended plant material at edge of waterbody
- Installing expanding disk interrupt rain sensors
- Calibrating irrigation systems to deliver ¾" irrigation
- Calibrating irrigation systems to replace 60% ET instead of 100%
- Installing soil moisture sensors or evapotranspiration controllers

Long-Term Objectives

- Increase awareness and knowledge of Green Industry professionals of human activities that affect water quality.
- Reduce non-point source pollution from urban sources to the extent required in watersheds already known to be impaired (TMDL watersheds).
- In unimpaired watersheds, minimize urban impacts on water quality to the extent possible so that urban loads in these watersheds will not result in impaired conditions in the future.

2. <u>Florida Friendly Landscaping™ programs for residents, homeowner associations (HOAs), and builders and developers</u>

Short-Term Objectives

- 25% knowledge gain by attendees of Florida Friendly Landscaping™ principles as measured by a pre and post-test.

Medium-Term Objectives

- Increase adoption of Florida Friendly Landscaping™ principles by at least 20% as a result of training received as measured by post-participation surveys. Practices are based on the following indicators:
- Utilization of practices that reduce off-site transport of sediments, nutrients, pesticides and debris to surface and ground water use appropriate site design and plant selection
- Use appropriate rates and application methods of fertilizer
- Use appropriate rates and application methods of irrigation
- Use integrated pest management (IPM)

* Examples of specific behavior change practices can be found in the following resources:

- The Nine Principles of Florida Friendly Landscaping™
- Florida Yards and Neighborhoods Recognition program
- *Florida-Friendly Landscaping™ Model Covenants, Conditions And Restrictions For New And Existing Community Associations*
- *FFL Guidelines for Existing Communities*
- *The Florida-Friendly Landscape™ Guide to Plant Selection and Landscape Design*

Long-Term Objectives

- Increase awareness and knowledge of urban Florida resident residential communities, commercial property owners, builders, developers, and policy makers of human activities that affect water quality.
- Change behaviors of urban Florida residents, residential communities, commercial property owners, builders, developers, and policy makers by implementing practices that reduce nonpoint source pollution.

- Reduce non-point source pollution from urban sources to the extent required in watersheds already known to be impaired (TMDL watersheds).
- In unimpaired watersheds, minimize urban impacts on water quality to the extent possible so that urban loads in these watersheds will not result in impaired conditions in the future.

3. <u>Florida LAKEWATCH</u>

Short-Term Objectives

- 10% increase in stewardship through training and utilization of new and active citizen scientists/volunteers
- 20% increase in knowledge gain of citizen scientists/volunteers regarding the functioning of Florida's aquatic resources
- The continued collection and reporting of data on at least 580 lakes, 129 coastal sites, 124 river sites and five springs

Medium-Term Objectives

- Determine how the limnology of Florida lakes impacted by changing geologic gradients everywhere apparent in Florida
- Measuring the variance that is exhibited among and within Florida lakes

- determining trends in the water quality of Florida lakes

Long-Term Objectives

- Increase awareness and knowledge of urban Florida residents, residential communities, commercial property owners, and policy makers of human activities that affect water quality to make informed decisions.
- Through Florida LAKEWATCH, utilize citizen scientists to facilitate "hands-on" citizen participation in the management of Florida lakes, rivers and coastal sites through monthly monitoring activities.
- Reduce non-point source pollution from urban sources to the extent required in watersheds already known to be impaired (TMDL watersheds).
- In unimpaired watersheds, minimize urban impacts on water quality to the extent possible so that urban loads in these watersheds will not result in impaired conditions in the future.

EDUCATIONAL METHODS

Programs will use a variety of methods to deliver education to the targeted audiences using both formal and non-formal structure. Types of educational methods will include: short courses, seminars, classroom instruction, certification and re-certification programs, web-based/internet broadcasts and videos, eXtension modules, e-learning modules, demonstration, radio broadcast, games, factsheets, regional Florida LAKEWATCH volunteer meetings and printed materials. Current statewide water quality programs include (* designates signature programs):

1. GI-BMP (IFAS)*
2. FFL Florida Yards and Neighborhoods Home Owner and Builder/Developer Program (IFAS)
3. Florida LAKEWATCH (IFAS)*
4. Urban Commercial Fertilizer Applicator and Pesticide Certification/Recertification
5. Golf Course BMPs (GCCSA)

The following program areas are identified as needed to supplement statewide water quality training and will either be developed, incorporated into existing programs or identified as an existing program with an agency that UF/IFAS can collaborate with on programming:

1. Homeowner Landscape Care BMP modules,
2. HOA Management BMP modules,
3. Nonpoint Source Pollution Basics,
4. Nutrient cycling in urban landscapes,
5. Scoop the poop campaign,
6. Septic Tank Management recommendations,
7. Sports Turf BMPs,
8. Urban Soil and Water Systems,
9. Salt water intrusion and aquifer depletion prevention,
10. Builder Developer Landscape BMP modules,

RESULTS

Short-Term Outcomes

Residents, homeowner associations, builders and developers, urban property owners and Green Industry professionals will demonstrate increased awareness, knowledge gain, and intent to adopt or change practices defined by Florida Friendly Landscaping™ Programs: Green Industries Best Management Practices, Florida Yards and Neighborhoods Homeowner Program, and the Florida Yards and Neighborhoods Builder and Developer Program, that will impact water quality by reducing non-point source pollutants originating from urban sources.

Indicators*:

- Increased awareness of water quality issues related to nonpoint source pollution.
- Increased knowledge of management practices that have the potential to reduce nonpoint source pollution.
- Enhanced questioning and analysis skills regarding the selection of trees and ornamental plant varieties to make efficient use of water and nutrients through the various stages of plant growth.
- Demonstrates personal and civic responsibility to address inappropriate urban landscape practices impacts on water quality/quantity occurring in their community.

Florida LAKEWATCH will continue to recruit and train citizen scientists/volunteers to monitor the water chemistry of Florida's aquatic resources.

Indicators*:

- The number of citizen scientists/volunteers
- Of the number of citizen scientists/volunteers, the number that increased knowledge of the functioning of Florida's aquatic resources
- The number of participants at annual regional meetings providing interpretation of the findings and general information on lake management and lake ecology.
- General public and stakeholders demonstrate increased awareness and knowledge gain of the findings and general information on lake management and lake ecology.*

Medium-Term Outcomes

Residents, homeowner associations, builders and developers, urban property owners and Green Industry professionals will engage in practices defined by Florida Friendly Landscaping™ Programs: Green Industries Best Management Practices, Florida Yards and Neighborhoods Homeowner Program, and the Florida Yards and Neighborhoods Builder and Developer Program that will impact water quality by reducing non-point source pollutants originating from urban sources.

Indicators*:

- The number of program participants adopting practices.
- Of the management practices adopted, which practices have a high adoption rates.
- The number of program participants reporting reduced fertilizer and/or pesticide use due to adoption of Florida Friendly Landscaping™ or Best Management Practices.
- The number of program participants reporting reduced water/irrigation use due to irrigation system calibration and/or installation of water saving technology.
- The number of program participants reporting monetary savings due to adoption of Florida Friendly Landscaping™ or Best Management Practices.
- DACs inspector observations/reports demonstrating increased GI-BMP practice adoption.
- The number of program participants that become recertified.

Florida LAKEWATCH will continue to collect data from lakes, coastal sites, river and springs and compile reports on nutrient concentrations that demonstrate improved water quality and/or assist in discovering the cause reduced water quality.

- The number of data collection points from lakes, coastal sites, river sites and springs.
- Identification of trends regarding nutrient concentrations that are decreasing or increasing.

* Indicators may be direct counts of program participants, comparison of pre and post program test or quiz results, post program follow-up surveys and/or property inspection surveys or reports.

Long-term Outcomes

Long term program outcomes will improve water quality by reducing non-point source pollution from urban sources to the extent required in watersheds already known to be impaired (TMDL watersheds). In unimpaired watersheds, this program will minimize urban impacts on water quality to the extent possible so that urban loads in these watersheds will not result in impaired conditions in the future.

Water quality impacts will be assessed using industry benchmark reports demonstrating Florida Friendly Landscaping™ Programs: Green Industries Best Management Practices, Florida Yards and Neighborhoods Homeowner Program, and the Florida Yards and Neighborhoods Builder and Developer Program practice adoption relationship to improved water quality, such as:

- Basin Management Action Plan implementation reports and monitoring results (basins that are trying to meet Total Maximum Daily Loads (TMDL) targets),
- Florida Department of Environmental Protection Integrated Water Quality Assessment for Florida Report for compliance with designated uses (increases or decreases in contaminant loads),
- National Pollutant Discharge Elimination System (NPDES) Stormwater Program reports,
- Florida LAKEWATCH reports, and/or
- UF/IFAS research results.

NEEDS

Successful program implementation will depend on or significantly benefit from the following:

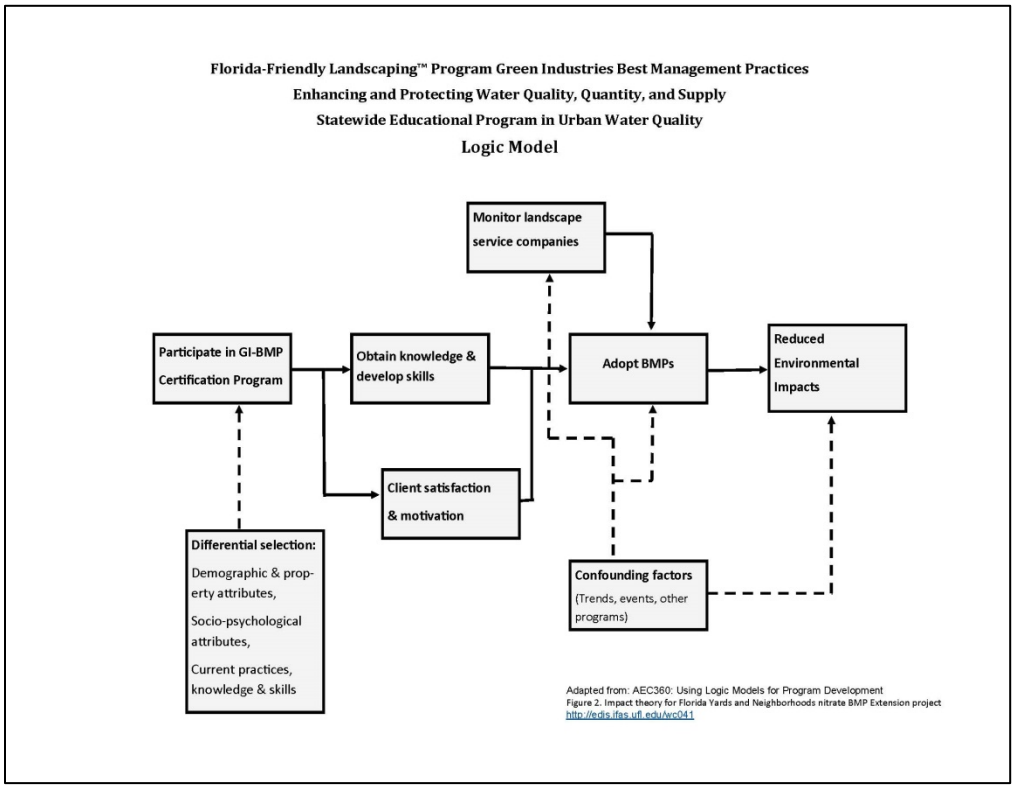
1. Agent needs assessment/self-assessment to determine:
    a. What is the current knowledge level?
    b. Identify knowledge level strengths and weaknesses.
    c. Which objectives, methods, materials are a good fit in their program areas?
2. Development of ISTs for Agents:
    a. Basic training on delivery of water quality program concepts:
        i. Basic training required prior to advance training
    b. Advanced for Agents focusing on non-static water quality concepts:
        i. Utilize Extension Specialists to develop advanced training modules that challenge Agent's knowledge
3. Development of educational materials that will be applicable for state wide programming, training and evaluation.
4. Funding to support:
    a. IST development
    b. Travel
    c. Program evaluation tools.
5. Coordination between state and county faculty to:
    a. Identify local issues
    b. Identify applicable research projects
    c. Identification of collaborative opportunities
    d. Dissemination of research project topics and results
6. Focus and cooperation on a watershed scale moving beyond county boundaries.
7. Engagement of both political and advisory stakeholders in support of program objectives and scientific based results.
8. A web based clearing-house, to house educational materials. Possible site: Water Essentials website.
9. Spanish language educational materials and language resources.
10. Marketing and promotion support for existing and future programs:
    a. Increase use of social media to drive program participation
    b. Brochures, flyers, media advertising (TV, press, radio)
    c. Consistent web based calendar of events
11. Statewide evaluation tools:
    a. Consistent tools that can be used statewide to determine statewide impacts: surveys, evaluations, pre and post tests.
    b. Modify Landscape GI-BMP and FYN evaluations to meet new objective needs.
    c. Tools that can provide evaluation/survey/pre and post-test subject banks to be utilized as a pick and choose as relative to Agent or local programming needs.

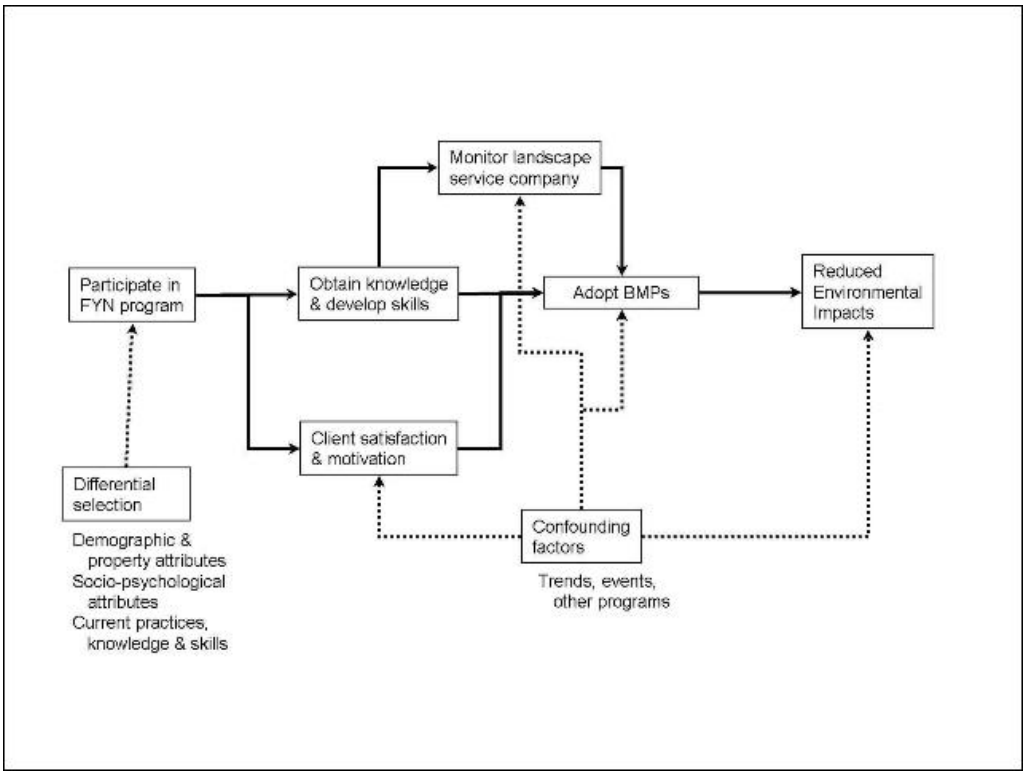
SUPER ISSUES

What Super Issue does this Priority Work Group relate to?

- ❖ Resource sustainability and conservation in Florida communities.

LOGIC MODEL





Source: AEC360: Using Logic Models for Program Development.

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Figure 2. Impact theory for Florida Yards and Neighborhoods nitrate BMP Extension project. http://edis.ifas.ufl.edu/wc041