Implementing Water 2070: Water Conservation Planning for Florida Communities

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- We educate, advocate and negotiate to protect Florida’s high quality of life.
- Our bipartisan board of directors includes advocates and experts from across the state.
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- May 4, 1924 – April 13, 2012
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- One of the founders of 1000 Friends of Florida
- First Secretary of the Florida Department of Community Affairs
- His accomplishments recognized with the John M. DeGrove Eminent Scholar Chair in Growth Management and Development at Florida Atlantic University
- To find out more, please visit: www.1000friendsofflorida.org/dr-degrove/
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OR

Email [vyoung@1000fof.org](mailto:vyoung@1000fof.org) for more information
The PowerPoint is available at www.1000friendsofflorida.org
This webinar has been approved for:

- 1.5 AICP CM CREDITS for planners (#9115194)
- 2 CLE credits for Florida attorneys (#1608561N)
- 1.5 Contact Hours for Florida Environmental Health Professionals
- No credits for Certified Floodplain Managers

There is a link to a **BRIEF SURVEY** in the follow-up email you will receive. Please take a few minutes to give us feedback!

https://www.surveymonkey.com/r/waterplanning
Upcoming Dr. John M. DeGrove Webinars

We are now planning the Spring 2017 webinar series. All webinars are noon to 1:30 unless otherwise noted.

- **Register Now!** Wednesday, March 22 – 2017 Florida Legislative Update
- April Topic Pending
- Wednesday, May 17 – 2017 Florida Legislative Wrap Up

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- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits
Presenters
Dr. Pierce Jones

- Professor at the University of Florida
- Directs Program for Resource Efficient Communities
- An interdisciplinary group that promotes the adoption of “best design, construction and management practices” in master planned developments
- Program directly participates in land development and building projects that adopt and demonstrate “green” practices
- PhD in Mechanical Engineering from the University of Florida in 1980
Dr. Nicholas Taylor

- Works with the University of Florida - Program for Resource Efficient Communities (PREC) as an IFAS State Specialized Extension Agent
- Research interests include utility data analysis to identify effective water and energy conservation measures and evaluation of land development impacts
- Also coordinates research and outreach efforts between PREC, regional utility providers, governmental agencies and non-profit groups.
Implementing Water 2070
Implementing Water 2070:
Water Conservation Planning for Florida Communities

Pierce Jones & Nick Taylor
Program for Resource Efficient Communities
Program for Resource Efficient Communities

We promote application of design, construction and management practices that minimize environmental degradation and make more efficient use of energy, water and other natural resources in master planned communities.
Florida Land Development
Florida Land Development

Population

- **1980**: 10,000,000
- **2005**: 17,000,000
- **2030**: 28,000,000
## Florida Land Development

### Building Permits: Single-Family Detached

<table>
<thead>
<tr>
<th>Year</th>
<th>Permits</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>208,000</td>
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<tr>
<td>2006</td>
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<td>2007</td>
<td>70,000</td>
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<td>2008</td>
<td>39,000</td>
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<td>2009</td>
<td>27,000</td>
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<tr>
<td>2015</td>
<td>67,700</td>
</tr>
<tr>
<td>2016</td>
<td>74,400</td>
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</table>
Florida Land Development

The Bonita Bay Group™ offers exceptional community living with its environmentally sound development philosophies and innovative designs. Residents enjoy traditional neighborhood gathering spots, recreational facilities and access to community parks that blend seamlessly with surrounding habitats.

Distinctive Lifestyle Experiences
Florida Land Development

Oakland Park
Oakland Avenue Lot

**FRONT YARD**
- Trees ........... minimum of 2 canopy trees and 2 accent trees
- Shrubs .......... 20% minimum
- Groundcover .... 15% minimum
- Turf .......... 60% maximum

**SIDE YARD**
- Trees ........... minimum of 1 canopy tree and 2 accent trees
- Shrubs .......... 30% minimum
- Groundcover .... 0% minimum
- Turf .......... 70% maximum

**ALLEY YARD**
- Shrubs .......... 30% minimum
- Groundcover .... 0% minimum
- Turf .......... 70% maximum
Florida Land Development

Conventional Practice
Florida Land Development
Conventional Practice
BAYONET POINT — "He's in prison for God knows how long because we can't afford to sod the lawn," said his sobbing daughter, Jennifer Lehr.

Prudente has owned a home in the deed restricted community since 1998. The covenants require homeowners to keep their lawns covered with grass.

Free from jail, Joseph Prudente, 66, inspects his new lawn with pride Sunday. Prudente, who says he barely has enough to pay the mortgage, was jailed for having a brown lawn.
Development Impacts: Water Supply
Get used to having a brown lawn for a while. As of this week, Tampa Bay Water has virtually drained its 15 billion-gallon reservoir.

From now until the summer rainy season, it must rely on its two remaining sources of water: its sometimes troubled desalination plant and the dwindling supply in the underground aquifer. "It's going to be a long couple of months waiting for the rainy season," Tampa Bay Water spokeswoman Michelle Robinson said Friday.
Water Supply

TBW Annual Production by Supply Type (MGD)

- Desalinated
- Surface Water
- Groundwater

<table>
<thead>
<tr>
<th>Year</th>
<th>Desalinated</th>
<th>Surface Water</th>
<th>Groundwater</th>
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</thead>
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<tr>
<td>2006</td>
<td>46</td>
<td>137</td>
<td>5</td>
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<td>2007</td>
<td>43</td>
<td>130</td>
<td>5</td>
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<td>2008</td>
<td>19</td>
<td>42</td>
<td>113</td>
</tr>
<tr>
<td>2009</td>
<td>17</td>
<td>33</td>
<td>128</td>
</tr>
</tbody>
</table>
Florida Land Development

Pasco County
Development Impacts:
Landscaping
Landscaping Impacts
Conventional Practice
Landscaping Impacts

Greenhouse Gas Accounting (Groundwater)

Mowing: 15 lbs CO$_2$e/1000ft$^2$/yr

Fertilizer: 29 lbs CO$_2$e/1000ft$^2$/yr

Pesticides: 1 lbs CO$_2$e/1000ft$^2$/yr

Irrigation: 34 lbs CO$_2$e/1000ft$^2$/yr (Groundwater)
Landscaping Impacts

Greenhouse Gas Accounting (Desal)

Mowing: 15 lbs CO$_2$e/1000ft$^2$/yr

Pesticides: 1 lbs CO$_2$e/1000ft$^2$/yr

Fertilizer: 29 lbs CO$_2$e/1000ft$^2$/yr

Irrigation: 579 lbs CO$_2$e/1000ft$^2$/yr

(Desal)
Development Impacts: Water Consumption Patterns
Setbacks

30 percent or more of the site will be under mature canopy within 20 years. Staff must confirm that the HOA includes provisions for tree planting and maintenance...

Final approval shall include as-built landscape plan certification from a registered landscape architect certifying that the landscaping is installed and functioning as intended, that prohibited and discouraged non-native vegetation listed in Table 406.16.2 has been removed, and that all of the provisions of this Chapter have been met.

The land owner shall submit a Certificate of Compliance, in a form acceptable by the Director, to the County as a condition of issuance of a Certificate of Occupancy.
Water and Wastewater Services
This development is located in the Urban Cluster and will connect to central water and sanitary sewer provided by Gainesville Regional Utilities.
Plum Creek’s Proposal: Envision Alachua
A community discussion on the future of East County
CONVENE BY PLUM CREEK

welcome
A community planning process shaping the future of Alachua County on lands owned by Plum Creek.
2013 AWARD OF EXCELLENCE IN BEST PRACTICES FLORIDA CHAPTER, AMERICAN PLANNING ASSOCIATION

the vision is getting clearer...

sector plan application
The Envision Alachua Sector Plan application was shaped by the community and has been submitted to Alachua County for its review.

news and features
December 27, 2013:
A boon for eastern Alachua County?
The Plum Creek Timber Company has spent 2½ years building 349

Members of the Envision Alachua Task Force answer the question, "Why Here? Why Now?"
Goal D
Water
Address long-term needs for water supply, water quality and water conservation

- Identify and protect water recharge areas
- **Develop communities that optimize water conservation and achieve a 50 percent or greater reduction in water usage based on current usage**
- Apply Florida-friendly guidelines for landscaping
- Demonstrate leadership in resource management by promoting and adopting innovative ways to meet water needs
- Capture, treat and reuse storm water to the maximum extent feasible
Water Consumption Patterns:
Alachua County
Residential Water Consumption Baselines
Alachua County, FL

Dwelling Units in Sample - 5,180:
- All units constructed since 2000
- Single-family detached in 28 neighborhoods - 3,035
- Apartments in 10 complexes - 1,420
- Condominiums in 18 associations - 735

Baseline Metrics:
- Metered water use in years 2009, 2010 and 2013
- Average gallons per day (gpd) per household
Condominiums

Union Street Station
Residential Water Consumption Baselines
Condominium (SFA, MF < 10, & MF > 10)
Apartments
Hampton Oaks
Residential Water Consumption Baselines

Apartment Complex (MF < 10 & MF > 10)

Average Daily Water Consumption

Weighted Average

Gallons/Day/Household

LEWIS PLACE    WOODLANDS    COTTAGE GROVE    ASBURY PARK APPTS    BROOKSIDE APPTS    HAMPTON OAKS    GAINESVILLE PLACE    BARRINGTON RIDGE...    EASTGATE APPTS    OAK HAMMOCK

116
Single Family Detached
Turnberry Lake
Residential Water Consumption Baselines
Single Family Detached (SFD)

GALLONS/DAY/HOUSEHOLD

- **Average Daily Water Consumption**
- **Irrigation Group Average**
- **Non-Irrigation Group Average**

- **358**
- **190**

<table>
<thead>
<tr>
<th>Community</th>
<th>Gallons/Day/Household</th>
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</thead>
<tbody>
<tr>
<td>Turnberry Lake</td>
<td>565</td>
</tr>
<tr>
<td>Arbor Greens</td>
<td>537</td>
</tr>
<tr>
<td>Cambridge Forest</td>
<td>435</td>
</tr>
<tr>
<td>Wilds Plantation</td>
<td>375</td>
</tr>
<tr>
<td>Elose Gardens</td>
<td>355</td>
</tr>
<tr>
<td>Eagle Point</td>
<td>348</td>
</tr>
<tr>
<td>Mentone</td>
<td>304</td>
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<tr>
<td>Willow Oak</td>
<td>271</td>
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<tr>
<td>Wescaster</td>
<td>260</td>
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<tr>
<td>Longleaf</td>
<td>259</td>
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<tr>
<td>Capri</td>
<td>225</td>
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<tr>
<td>Brookfield</td>
<td>216</td>
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<tr>
<td>Belmont</td>
<td>203</td>
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<tr>
<td>Hickory Forest</td>
<td>195</td>
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<td>South Point</td>
<td>187</td>
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<tr>
<td>Ellis Park</td>
<td>174</td>
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<tr>
<td>Broadmoor Place</td>
<td>160</td>
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<tr>
<td>Weatherly</td>
<td>150</td>
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<tr>
<td>Sorrento</td>
<td>140</td>
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<tr>
<td>Lake Forest</td>
<td>135</td>
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<tr>
<td>North...</td>
<td>120</td>
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<td>Cedar Grove</td>
<td>110</td>
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<td>Blues Creek</td>
<td>100</td>
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<tr>
<td>Cobblefield</td>
<td>100</td>
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</tbody>
</table>
Single Family Detached

Turnberry Lake

200,000 gallons/year
Water Supply

200,000 gallons/year
Residential Water Consumption Baselines
Dwelling Unit Types Comparison

<table>
<thead>
<tr>
<th>Dwelling Unit Type</th>
<th>Average Daily Water Consumption</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFD Homes w/ Irrigation (n=2,338)</td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>SFD Homes w/o Irrigation (n=697)</td>
<td>190</td>
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<tr>
<td>Apartments (n=1,420)</td>
<td>116</td>
<td>232</td>
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<tr>
<td>Condominiums (n=725)</td>
<td>94</td>
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</tbody>
</table>
Sector Plan

Objective 10.4.3 – Water Resource Protection

- **Policy 10.4.3.1 Water Supply Strategy**
  - Residential lots... shall not be irrigated with potable water except for a limited period during the initial establishment of landscaping;
  - The priority for the use of reclaimed water shall be given to environmental restoration projects, industrial users and agricultural users. Single family lots shall not receive reclaimed water;
  - There shall be no individual wells for individual residences or businesses. All wells... shall be monitored as part of the utility system;
Sector Plan

Objective 10.4.3 – Water Resource Protection

- **Policy 10.4.3.2 Conservation – first** The EASP shall use conservation-first strategies within the EA-EOMU for water supply that include, but are not limited to, living within a water budget that recognizes supply limitations and reflects the value of the resource; minimizing water demand embedded within community design features such as buildings, hardscapes and landscapes; using Florida Friendly Landscaping principles to retain and/or establish landscapes that require no supplemental irrigation or nutrients (fertilization) beyond that provided by natural rainfall and possible minimal alternative water supply including reuse.
Residential Water Consumption Baselines

Single Family Detached

- **Average Daily Water Consumption**
- **Irrigation Group Average**
- **Non-Irrigation Group Average**

<table>
<thead>
<tr>
<th>Location</th>
<th>Gallons/Day/Household</th>
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</thead>
<tbody>
<tr>
<td>Turnberry Lake</td>
<td>512</td>
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<tr>
<td>Arbor Greens</td>
<td>498</td>
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<tr>
<td>Cambridge Forest</td>
<td>490</td>
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<tr>
<td>Wilds Plantation</td>
<td>482</td>
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<tr>
<td>Town of Tioga Gardens</td>
<td>480</td>
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<tr>
<td>Eagle Point</td>
<td>478</td>
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<td>Willow Oak</td>
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<td>Westchester</td>
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</tr>
<tr>
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<td>470</td>
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<td>Blues Creek</td>
<td>442</td>
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<tr>
<td>Cobblefield*</td>
<td>440</td>
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</tbody>
</table>

**358**

**190**
Water Consumption Patterns: "Running Annual Water Budgets"
CITY OF CLERMONT
ORDINANCE NO. 2010-11-C

DIVISION 1. ADMINISTRATION

Definitions:

(26) “Running Annual Water Budget” shall mean a water budget based on twelve (12) consecutive months of irrigation water consumption.

DIVISION 2. IRRIGATION

(6) All properties that receive water for landscape irrigation must have a separate landscape irrigation meter. The City shall establish a Running Annual Water Budget (RAWB) for each landscape irrigation customer based on property size, pervious area, and an annual landscape irrigation application rate of 35 inches.

September 28, 2010
October 11, 2011

SUBJECT: City of Clermont
Consumptive Use Permit Number 2478

PERMIT CONDITIONS:
34. The permittee shall continue to implement... Running Annual Water Budgets (RAWBs)... require that customers... who receive water for landscape irrigation have a separate landscape irrigation meter and comply with the approved RAWB for their property. Properties that exceed the RAWB may be fined by the City. A report detailing the activities in this program must be included in the Water Conservation Plan summary.
Water Consumption Patterns: Quantifying Use?
Tommy Williams Homes: Longleaf Community
Annual Water Cost 2013

Legend
(in Dollars per year)

- More than $1800
- $1350 - $1799
- $900 - $1349
- $450 - $899
- Less than $450

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community.
Toho Water Authority: Florida Water Star℠ Impact Evaluation
Toho Water Authority Conservation Programs

Florida Water Star℠ Requirements

Requirements:

• Indoor water savings from
  o Water-efficient toilets, showerheads & faucets
  o Water-efficient dish and clothes washers

• Outdoor water savings from
  o Use of drought tolerant plants & shade
  o Reduced areas of high-volume irrigation
  o Efficient irrigation design & micro-irrigation
Toho Water Authority Conservation Programs
Florida Water Star℠ Impact Evaluation

Objectives:

• Indoor water savings – Compare FWS with conventional residential properties
  o Owner-occupied
  o Rental properties

• Outdoor water savings - Compare FWS with conventional residential properties
  o Owner-maintained landscapes
  o Master-maintained landscapes
## Toho Water Authority Conservation Programs

### Data Sources

<table>
<thead>
<tr>
<th>Data Field</th>
<th>Description</th>
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<tbody>
<tr>
<td>Premise ID</td>
<td>Address level location ID</td>
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<tr>
<td>Customer ID</td>
<td>Annual year of consumption</td>
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<tr>
<td>Service Point ID</td>
<td>Meter level location ID</td>
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<tr>
<td>Meter Type</td>
<td>Potable, Irrigation, Reclaimed</td>
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<tr>
<td>Usage</td>
<td>Metered consumption amount</td>
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<tr>
<td>Meter Read Date</td>
<td>End date of meter reading</td>
</tr>
<tr>
<td>FWS</td>
<td>List of FWS certified home by subdivision and builder</td>
</tr>
<tr>
<td>FWS Characteristics</td>
<td>List of subdivisions that had no backyard irrigation, had master-maintained</td>
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<tr>
<td></td>
<td>landscapes or were master-metered for landscape irrigation.</td>
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Toho Water Authority

Toho Water Authority
# Toho Water Authority Conservation Programs

## Data Sources

<table>
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<td>Property Appriasal parcel ID</td>
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<tr>
<td>Lot Size</td>
<td>Parcel size</td>
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<tr>
<td>Building Footprint</td>
<td>Base area of the residential structure.</td>
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<tr>
<td>Additional Hardscape</td>
<td>Area of patios, pools, driveways, storage buildings, etc.</td>
</tr>
<tr>
<td>Year Built</td>
<td>Year property was built</td>
</tr>
<tr>
<td>Sale Date</td>
<td>Date of sale by the builder to the residential owner</td>
</tr>
<tr>
<td>Conditioned Floor Area</td>
<td>Space conditioned living area of the home</td>
</tr>
<tr>
<td>Bedrooms</td>
<td>Number of bedrooms in the home</td>
</tr>
<tr>
<td>Bathrooms</td>
<td>Number of bathrooms in the home</td>
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<tr>
<td>Homestead Exemption</td>
<td>Indicator for Homestead exemption on the property</td>
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Toho Water Authority Conservation Programs
Florida Water Star℠ Indoor Requirements
### Toho Water Authority Conservation Programs

**Measured FWS℠ Indoor Water Savings**

#### Average Annual Indoor Water Savings for FWS Homes by Occupancy type (2015-2016)

<table>
<thead>
<tr>
<th></th>
<th>All FWS</th>
<th>FWS - Owner Occupied</th>
<th>FWS - Rental</th>
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</thead>
<tbody>
<tr>
<td>Number of Homes</td>
<td>229</td>
<td>186</td>
<td>43</td>
</tr>
<tr>
<td>Annual Consumption</td>
<td>59 kcal/yr</td>
<td>57 kcal/yr</td>
<td>68 kcal/yr</td>
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<tr>
<td>Percentage Savings</td>
<td>6.6%</td>
<td>6.9%</td>
<td>5.5%</td>
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<tr>
<td>Annual Savings</td>
<td>4.1 kcal/yr</td>
<td>4.3 kcal/yr</td>
<td>3.5 kcal/yr</td>
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</table>
Toho Water Authority Conservation Programs

Measured FWS℠ Indoor Water Savings

Average Annual Indoor Water Savings for FWS Homes by Occupancy type (2015-2016)

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<td>Percentage Savings</td>
<td>6.6%</td>
<td>6.9%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Annual Savings</td>
<td>4.1 kcal/yr</td>
<td>4.3 kcal/yr</td>
<td>3.5 kcal/yr</td>
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</table>
### Toho Water Authority Conservation Programs

#### Measured FWS℠ Indoor Water Savings

**Average Annual Indoor Water Savings for FWS Homes by Occupancy type (2015-2016)**

<table>
<thead>
<tr>
<th></th>
<th>All FWS</th>
<th>FWS - Owner Occupied</th>
<th>FWS - Rental</th>
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</thead>
<tbody>
<tr>
<td>Number of Homes</td>
<td>229</td>
<td>186</td>
<td>43</td>
</tr>
<tr>
<td>Annual Consumption</td>
<td>59 kcal/yr</td>
<td>57 kcal/yr</td>
<td>68 kcal/yr</td>
</tr>
<tr>
<td>Percentage Savings</td>
<td>6.6%</td>
<td>6.9%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Annual Savings</td>
<td>4.1 kcal/yr</td>
<td>4.3 kcal/yr</td>
<td>3.5 kcal/yr</td>
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</tbody>
</table>
Toho Water Authority Conservation Programs
Measured FWS℠ Outdoor Water Savings

Average Annual Outdoor Water Savings for FWS Homes with Owner-Maintained Landscapes

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Number of Homes</td>
<td>38</td>
<td>145</td>
</tr>
<tr>
<td>Annual Consumption</td>
<td>66 kcal/yr</td>
<td>67 kcal/yr</td>
</tr>
<tr>
<td>Percentage Savings</td>
<td>47.0%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Annual Savings</td>
<td>55.0 kcal/yr</td>
<td>43.3 kcal/yr</td>
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</table>
Toho Water Authority Conservation Programs

Measured FWS℠ Outdoor Water Savings

Average Annual Outdoor Water Savings for FWS Homes with Owner-Maintained Landscapes

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Toho Water Authority Conservation Programs

Measured FWS℠ Outdoor Water Savings

Average Annual Outdoor Water Savings for FWS Homes with Master-Maintained Landscapes

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</thead>
<tbody>
<tr>
<td>Number of Homes</td>
<td>38</td>
<td>145</td>
<td>84</td>
</tr>
<tr>
<td>Annual Consumption</td>
<td>66 kcal/yr</td>
<td>67 kcal/yr</td>
<td>192 kcal/yr</td>
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<tr>
<td>Percentage Savings</td>
<td>47.0%</td>
<td>39.1%</td>
<td>-23.7%</td>
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<tr>
<td>Annual Savings</td>
<td>55.0 kcal/yr</td>
<td>43.3 kcal/yr</td>
<td>-26.7 kcal/yr</td>
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Summary:

- Owner occupied SFD residential water savings are significant from a strategic water supply planning perspective.
- Residences with master maintained landscapes are performing significantly worse than expected.
- On-going direct measurement and verification of program impacts are essential to achieving water conservation goals.
Toho Water Authority Conservation Programs
Iterative Analysis

Analysis Timeline

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</table>

- Florida Water Star Programs
- TWA Metering Data
- All TWA Conservation Programs
- TWA Metering Data
- AMI Data
Water Consumption Patterns: Geo-visualizing Data
Questions?
Questions and Answers
If you have questions:

- Your webinar control panel includes a “Questions” box
- Please click on “+” sign and type any questions in this box
- Please refer to the slide number and/or speaker when you post your question
- Please keep your questions succinct!
- Staff will ask the presenters questions, as time permits
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This webinar has been approved for:

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- 2 CLE credits for Florida attorneys (#1608561N)
- 1.5 Contact Hours for Florida Environmental Health Professionals
- No credits for Certified Floodplain Managers

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