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Implications of Deficit / Surplus Irrigation for Targeting Conservation Programs

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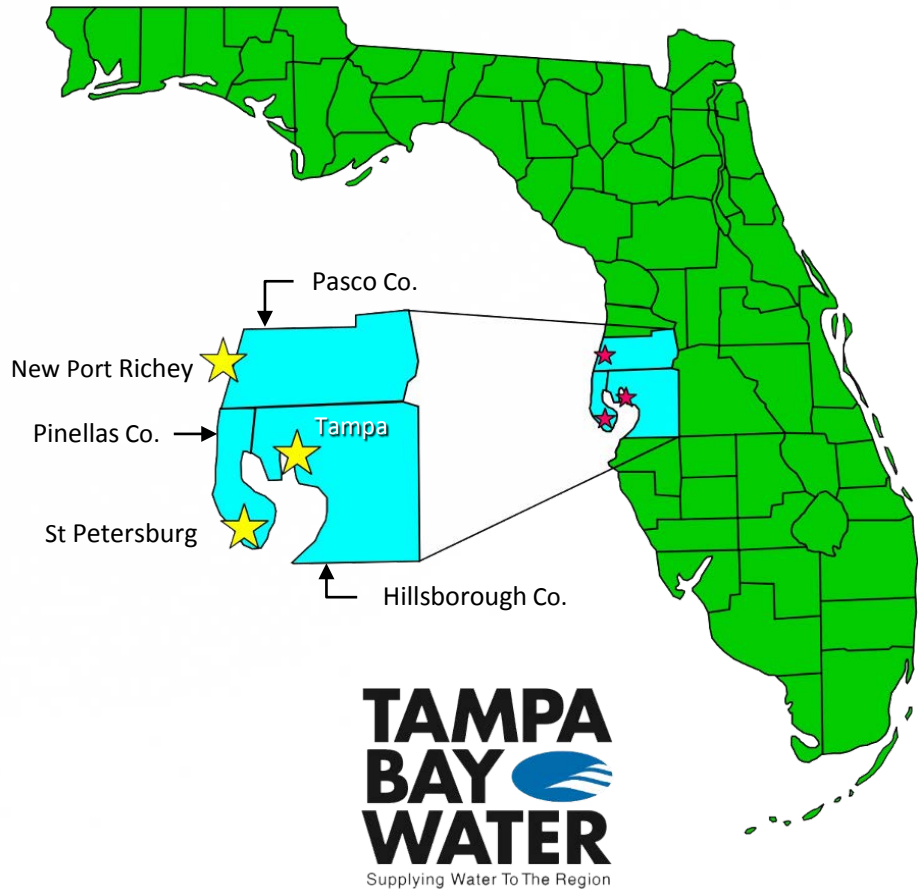
Presentation Overview

- Background
- Estimating Surplus / Deficit Irrigation
- Distribution of Surplus / Deficit Irrigators
- Potential for Program Implementation
- Implications for the Tampa Bay Region
- Conclusions

Background

Tampa Bay Water

- Regional water wholesaler
- 6 Member Governments
- Baseline demand forecasted to increase
 - 2011: ~ 230 mgd
 - 2035: ~275 mgd



Demand Management Plan Purpose

- **Make better plans on how to integrate this work with decisions on supply development**
- **Identify and evaluate regional water use efficiency potential**
 - Opportunities to defer need for capital investment / O&M costs
- **Integrate demand management into supply planning process**
 - Compare efficiency and supply projects using the same criteria, including cost

Increased water use efficiency provides regional benefits

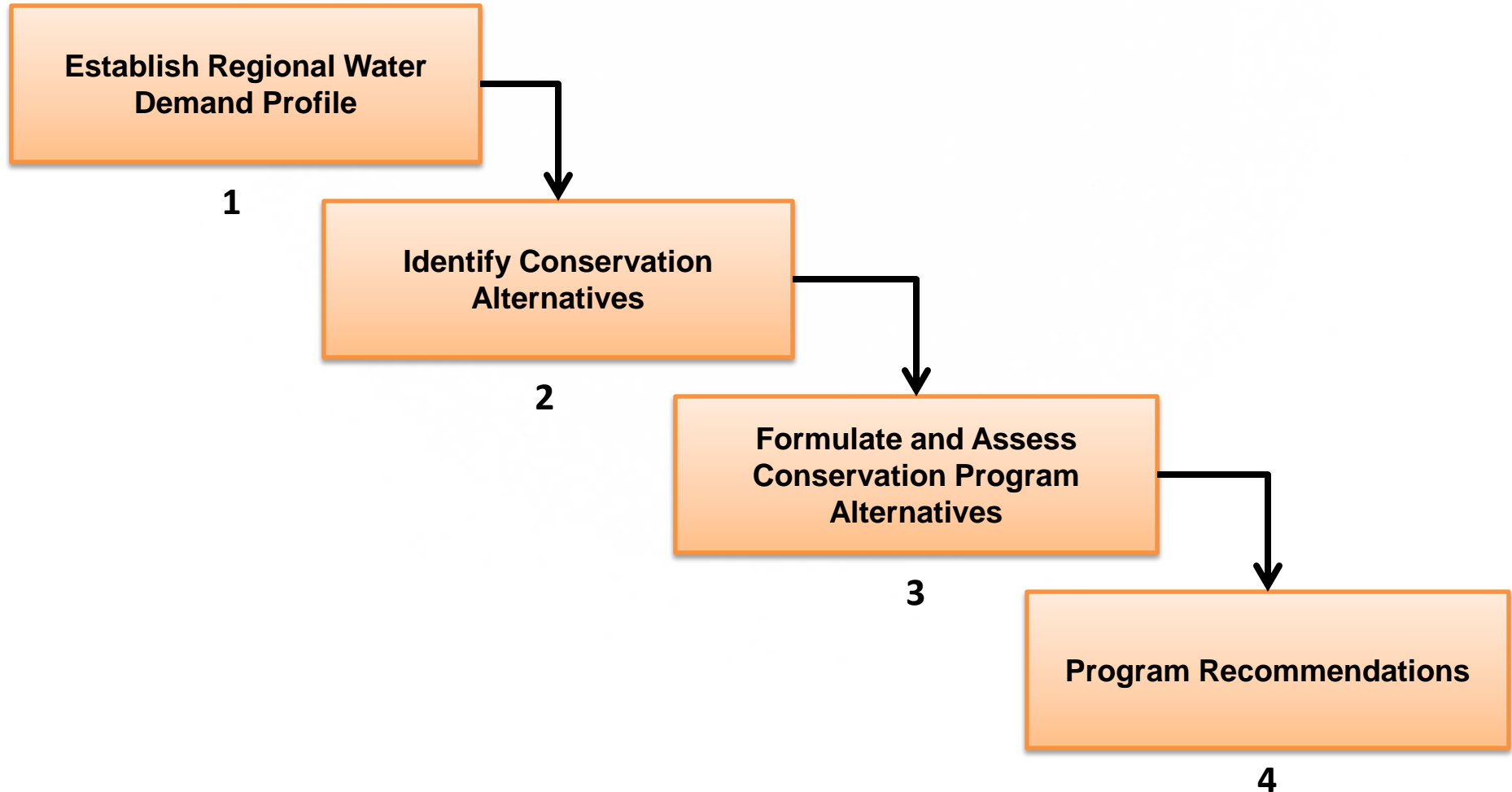
- Conserved water = economic benefits
 - 1 mgd saved = \$15 - 20M capital cost deferment
 - 1 year deferral of \$100M capital project saves agency \$5M in interest
- Avoided energy and chemical *operating costs*



Background information

- U.S. Energy Policy Act effective (EPAAct, 1994)
 - Agency completed first Demand Management Plan (1997)
 - Dependability of EPAAct savings unknown
 - Market for water efficient products has evolved post-EPAAct
 - Cost of future supply options has increased
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- 2008 Board approved Demand Management Plan update to be included in 2013 Long-term Water Supply Plan

Key Project Components

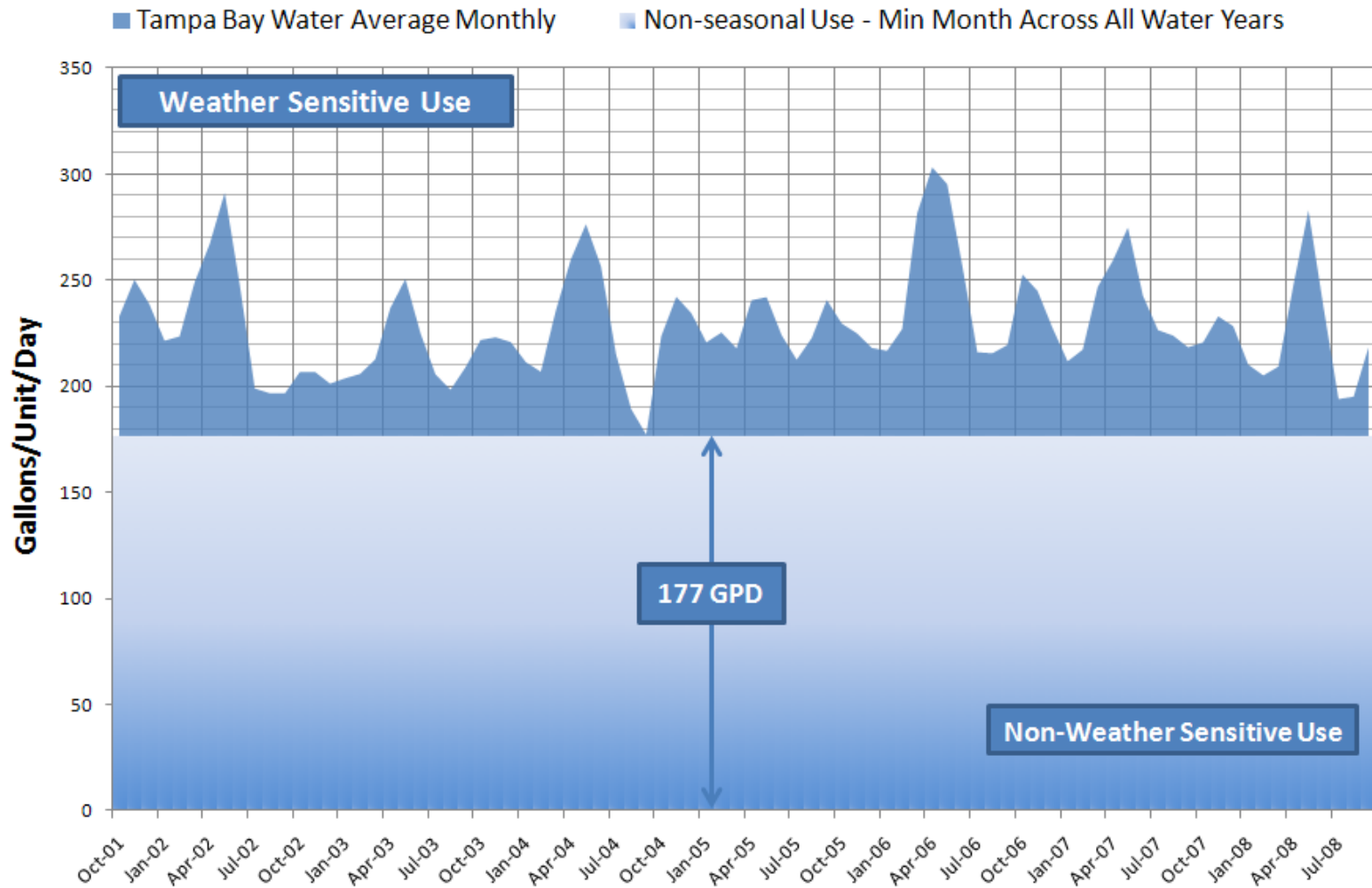


Estimating Surplus / Deficit Irrigation

Objectives

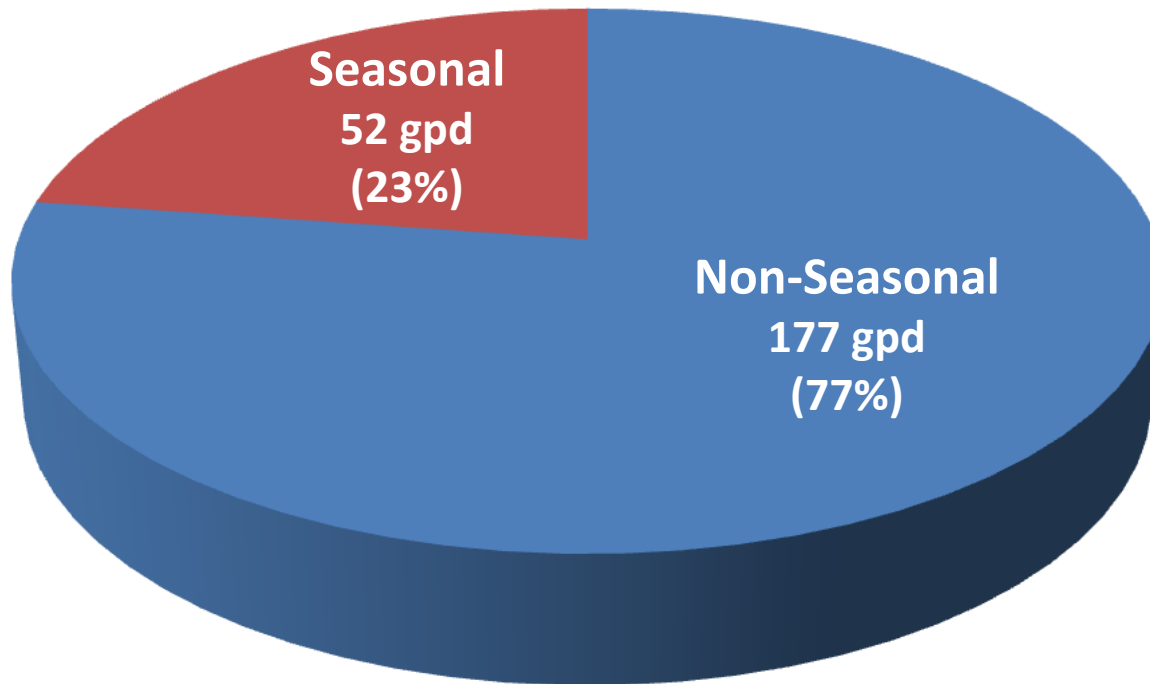
- Evaluate regional program savings to-date
- Further explore potential opportunities
 - Program selection
 - Water savings potential
 - Target customers
- Where does potential exist across user groups?
- Establish attainable goals for Tampa Bay region
 - Total reduction in outdoor water use?
 - Increase outdoor water use efficiency?

Differentiating Indoor Use from Total Use (Single Family)



Annual Average Single Family Use

Tampa Bay Water Wide = 229 gpd
(7-year annual average per unit use)



Gallons/Capita/Day

Total:	88
Non-seasonal:	68
Seasonal:	20

Defining Single Family Irrigation Use

**Indoor water use average
assumed: 177 gpd**

- Market segmentation based on indoor use
 - Irrigators
 - Non-irrigators
- Customers using >177 gpd, assumed to irrigate



Estimating Theoretical Watering Requirements

- Calculated ET rate used to evaluate surplus
- Assumed combined landscape (turf/shrubs)

$$LWR_H = RTM \times \left[(ET_o \times K_L) - R_e \right] \times \frac{A}{C_u}$$

RTM = Run Time Multiplier Where 1 = 100 percent efficiency

ET_o = Annual ET_o

K_L = Crop Coefficient (Turfgrass, Central/Southwest Florida)

R_e = Effective Rainfall (Tampa Effective Rainfall)

A = Irrigated area

C_u = Cubic Feet to Gallons conversion factor = 1.6043

Defining Surplus / Deficit Irrigation

1. Identify assumed irrigators (customers using >177 gpd)
 - Excludes customers with reclaimed water
2. Estimate of theoretical requirements based on landscape area
3. Estimate irrigation use (>177 gpd)
 - Deficit irrigators
 - Irrigation estimate $<$ theoretical requirement
 - Surplus irrigators
 - Irrigation estimate $>$ theoretical requirement

Surplus / Deficit Irrigation Study Groups Analyzed

1. Regional Survey - results provided important info
 - PPH / irrigation system / alternative sources
2. All customers in region
 - Assumptions regarding indoor / irrigation use
 - Utility billing data provides info about reclaimed water
 - Compared to survey results
3. Regional conservation programs
 - Analyzed pre/post, surplus/deficit water use
 - Irrigation evaluations
 - Florida Yards & Neighborhoods Program (landscape modifications)

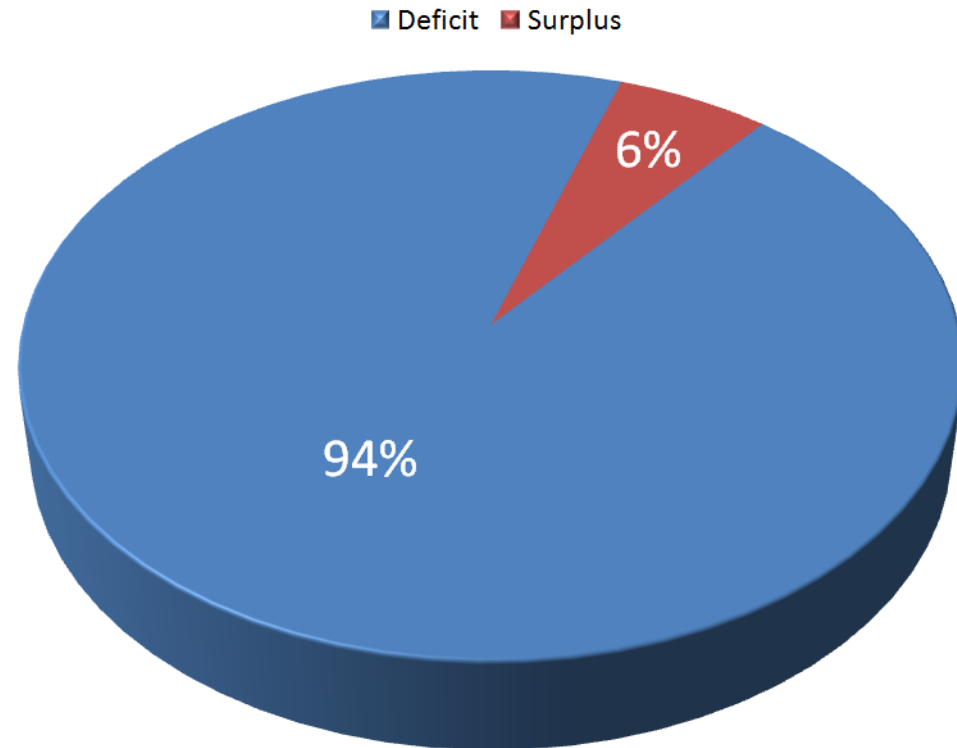
Distribution of Surplus / Deficit Irrigators

Proportion of Surplus / Deficit Irrigators in Regional Survey

Small proportion of customers surplus irrigate!

	Deficit	Surplus
Customers	6%	94%
Total Use	266	544
Irrigation Use	123	408
Greenspace	8,265	6,240

Surplus homes have smaller yards on average (33%)



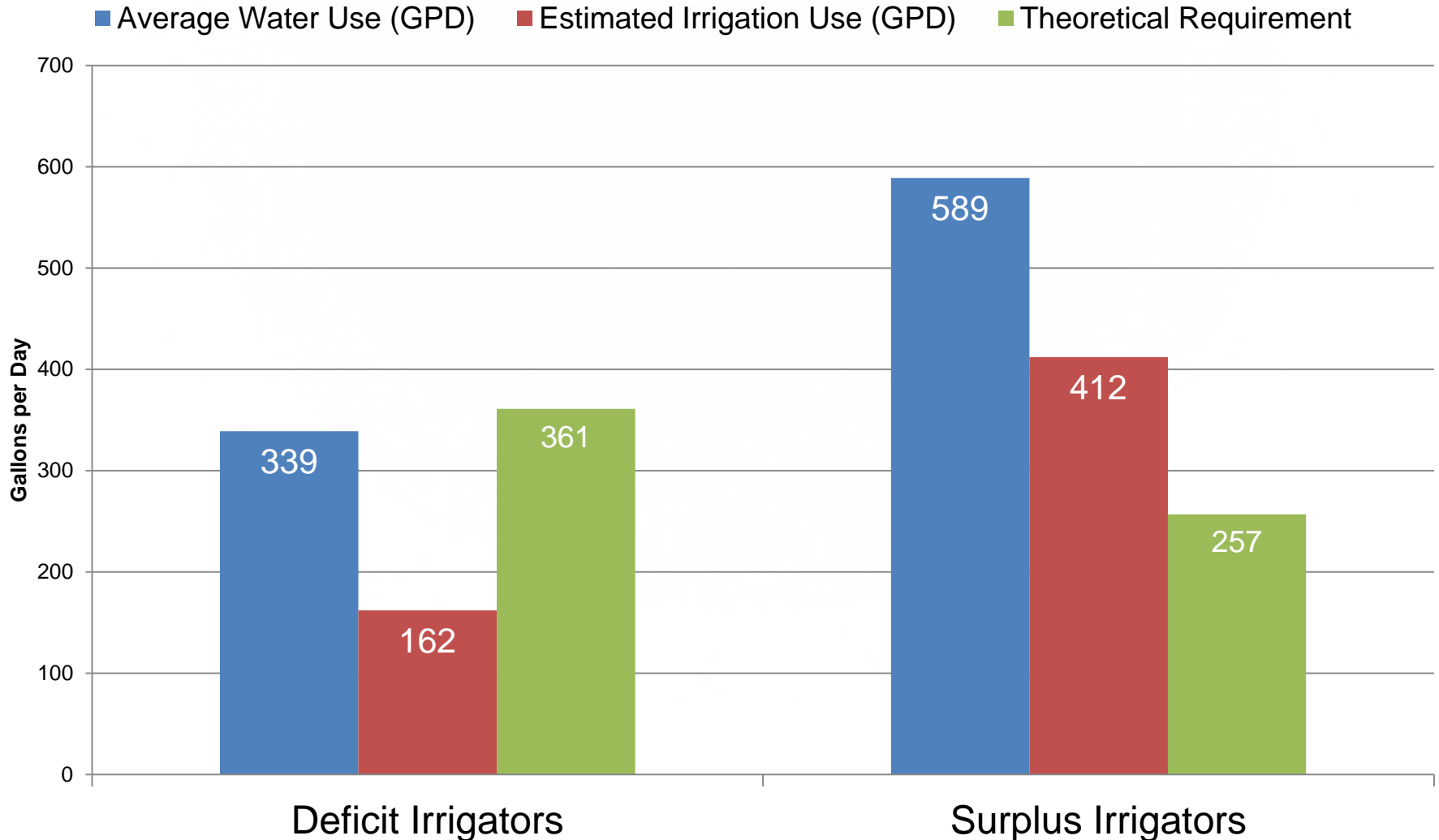
Comparison of Surplus Irrigators in Survey and All Customers Groups

Variable	Survey Customers w/ In-ground System	All Customers
Count	64	39,026
% of Total	6%	9%
Green Space Est	6,240	6,026
Average Water Use (GPD)	544	589
Estimated Indoor Water Use*	136	177
Estimated Irrigation Use (GPD)	408	412
% Irr Use	75%	70%
Surplus (GPD)	138	155
% Surplus	51%	61%
Surplus ET Savings Potential (GPY)	50,312	56,756

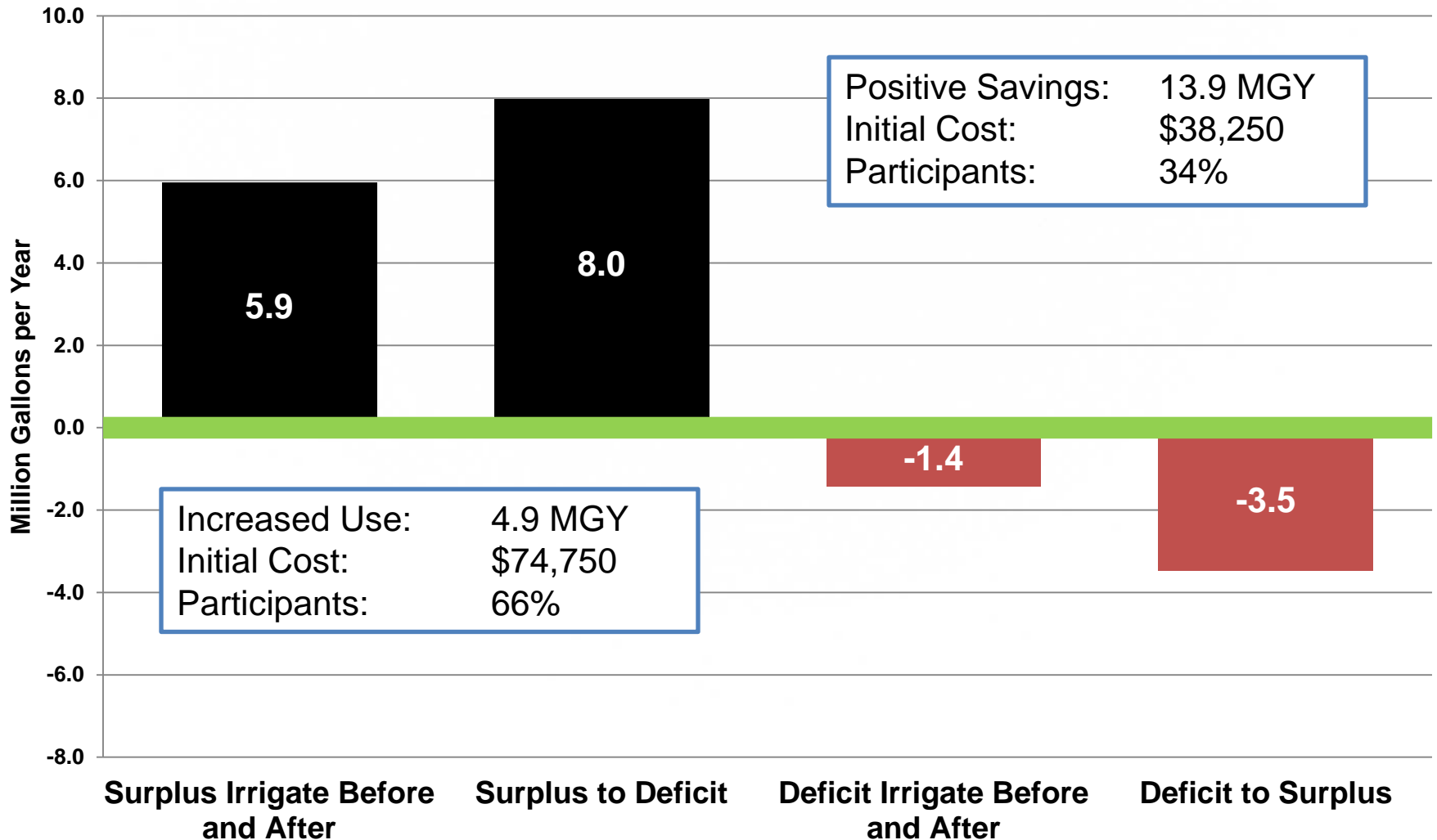
Comparison of Deficit Irrigators in Survey and All Customers Groups

Variable	Survey Customers w/ In-ground System	All Customers
Count	477	184,841
% of Total	44%	44%
Green Space Est	8,265	8,955
Average Water Use (GPD)	262	286
Estimated Indoor Water Use*	138	177
Estimated Irrigation Use (GPD)	123	109
% Irr Use	47%	38%
Deficit (GPD)	-234	-274
% Deficit	-66%	-71%

Regional Total Average Water Use vs. Estimated Irrigation Use

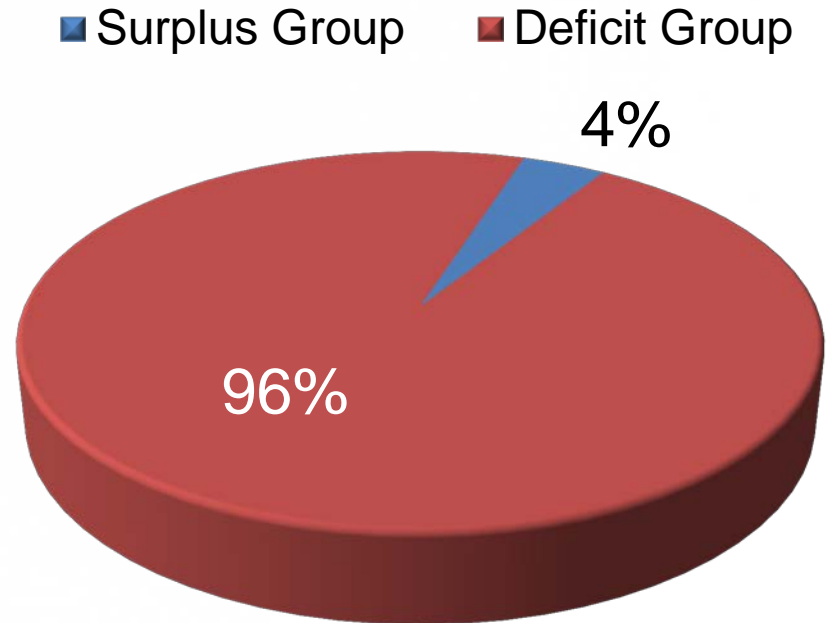


Irrigation Evaluation Program Water Savings



Florida Yards & Neighborhoods Program Evaluation

- Majority of participants early adopters
- Increases in efficiency still recognized
 - 13% pre-post reduction
 - ~9,000 GPY
- Theoretical water requirements may not be applicable

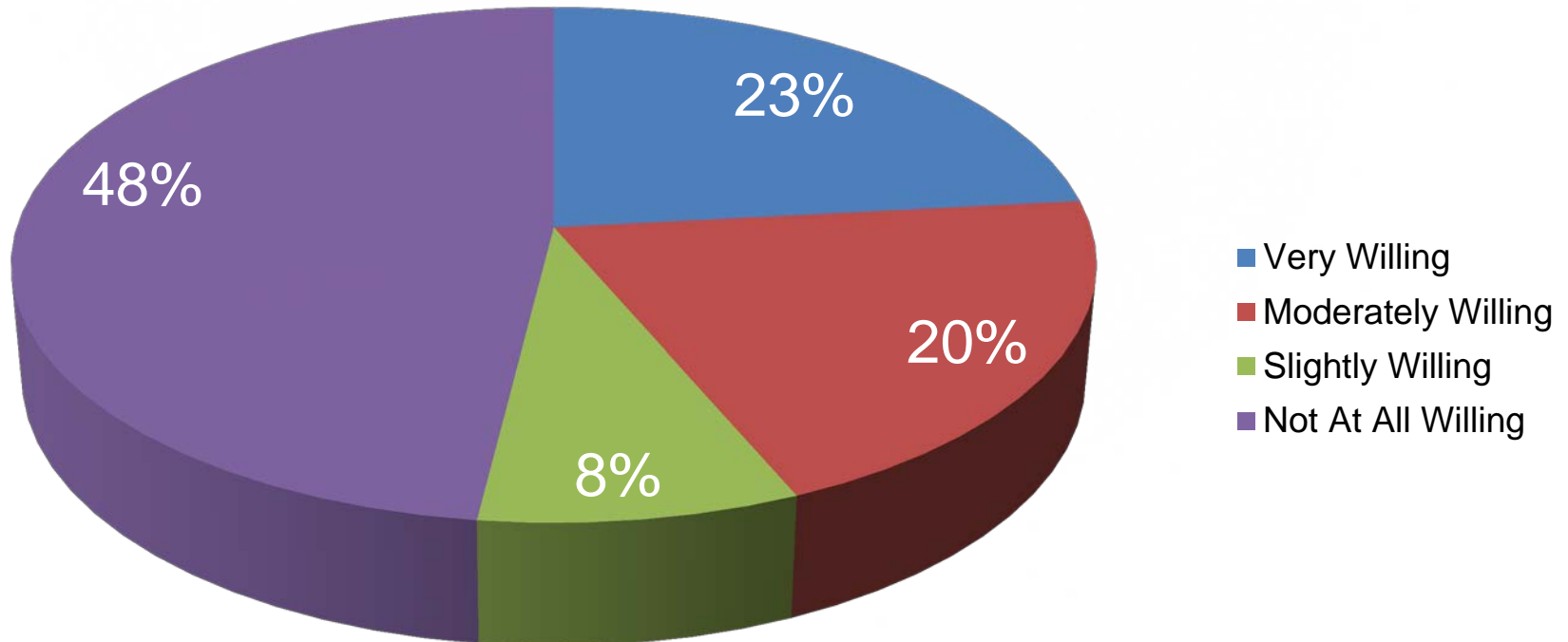


**Significant water savings potential if
non-adopters targeted correctly.**

Implications

Are customers willing to modify landscape?

Yes!



Matching measures and savings options with the right customers

- Weather-based and Soil Moisture Sensors
 - Reduce surplus to 0%
 - most likely associated with SMS for SF sector in Florida
 - Some SMS users to deficit irrigate
 - user preference, not technology based
- Irrigation evaluations
 - % reductions for both surplus and neutral deficit
- Landscape modifications
 - Use % deficit pre and post FYN for potential
- Source substitution (if applicable)
 - All irrigation removed from potable use

Conclusions

- Formulation of irrigation efficiency programs must consider surplus/deficit irrigation factors
- Deficit irrigation practices can influence outdoor program savings potential
 - Program selection
 - Customer targets
- In Tampa Bay Water Region
 - Deficit irrigation seems to be the norm
 - Greatest potential seems to exist for reducing surplus irrigation water use down to theoretical needs
- Market segmentation needed to inform program development

Questions

