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- May 4, 1924 – April 13, 2012
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Presenters
Timothee Sallin

- Actively involved in water conservation, sustainable landscaping and responsible agriculture in Florida over the past 15 years through role as President of Cherrylake.
- Cherrylake is a vertically integrated landscape company providing commercial landscape and irrigation construction and maintenance services and is the largest grower of ornamental trees, palms and shrubs in the State of Florida.
- Cherrylake and sister company IMG Citrus manage over 6,000 acres of land in Florida and have a long track record of sustainable land management and stewardship.
- Passionate about connecting people to plants and promoting healthy ecosystems within our urban environments.
- Actively involved in promoting environmental best practices across diverse industries through collaboration with industry associations such as ULI, ASLA and FNGLA as well as through research and development partnerships with UF IFAS and the SJRWMD.
- A graduate of New College in Sarasota Florida earning a degree in Economics and International Studies.
- Lives in Clermont with wife Ellen and daughter Aria; son Tristan is an undergraduate student at Georgia Institute of Technology.
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
Sustainable Landscaping
Principles and Practices
1. Sustainable Landscaping:

To provide equivalent value to society with landscaping while minimizing the use of inputs, primarily: water, nutrients, horticultural chemicals, labor, fuel and equipment.
To increase the societal value landscaping provides by incorporating functional and environmental goals such as: stormwater management, water quality, wildlife habitat, heat reduction, energy efficiency, economic development and human health and well being.

2. **Sustainable Landscaping:**
Context

Florida Land Development:
Current Conventional Practice
Florida Land Development
Conventional Practice
Florida Land Development
Conventional Practice
Man jailed for brown lawn gets help from neighbors
By Erin Sullivan, Times Staff Writer
In print: Monday, October 13, 2008

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
Tampa Bay Water makes last withdrawal from tapped out reservoir

By Craig Pittman, Times Staff Writer
In Print: Saturday, March 14, 2009

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>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>46</td>
<td>137</td>
<td>130</td>
</tr>
<tr>
<td>2007</td>
<td>5</td>
<td>43</td>
<td>130</td>
</tr>
<tr>
<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>
Water Supply

TBW Carbon Footprint by Supply Type (mtons CO$_2$e)

- 2007: Desalinated 22,494, Surface Water 14,482, Groundwater 26,459
- 2008: Desalinated 75,823, Surface Water 13,747, Groundwater 28,812
- 2009: Desalinated 70,774, Surface Water 15,823, Groundwater 28,812
Development Impacts: Water Quality
Controlling Eutrophication: Nitrogen and Phosphorus

Daniel J. Conley, Hans W. Paerl, Robert W. Howarth, Donald F. Boesch, Sybil P. Seitzinger, Karl E. Havens, Christiane Lancelot, Gene E. Likens

The need to reduce anthropogenic nutrient inputs to aquatic ecosystems in order to protect drinking water supplies and to reduce eutrophication, including the proliferation of harmful algal blooms and “dead zones” in coastal marine eco-systems has been widely recognized. …a cascading set of consequences has been set in motion, arising from massive increases in fixed N additions to the biosphere, largely through the production of fertilizers and increases in fossil fuel emissions. P levels have also significantly increased because of fertilizer use, as well as from wastewater.
Florida Land Development

Conventional Practice
Water Quality (2005)
St Johns River, FL
Water Quality

2005 Fertilizer Consumption (Tons/yr):

- Clay 1,190 5,230
- Nassau 1,540 2,040
- Duval 3,970 23,500
- St Johns 22,780 3,480
Water Quality (2018)
Southwest Florida
Development Impacts: Landscaping
Landscaping Impacts
Conventional Practices
**Landscaping Impacts**

**UF Recommended Practices**

---

**A Guide to Florida-Friendly Landscaping**

*Florida Yards & Neighborhoods Handbook*

---

**Table 2. Fertilization Guidelines for Established Turfgrass Lawns in Three Regions of Florida**

<table>
<thead>
<tr>
<th>Species</th>
<th>North</th>
<th>Central</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahiagrass</td>
<td>2-3</td>
<td>2-4</td>
<td>2-4</td>
</tr>
<tr>
<td>Bermudagrass</td>
<td>3-5</td>
<td>4-6</td>
<td>5-7</td>
</tr>
<tr>
<td>Centipedegrass</td>
<td>1-2</td>
<td>2-3</td>
<td>2-3</td>
</tr>
<tr>
<td>St. Augustinegrass</td>
<td>2-4</td>
<td>2-5</td>
<td>4-6</td>
</tr>
<tr>
<td>Zoysiagrass</td>
<td>3-5</td>
<td>3-6</td>
<td>4-6</td>
</tr>
</tbody>
</table>

*Homeowner preferences for lawn quality and maintenance will vary, so the UF Turfgrass Science program recommends a range of fertility rates for each grass species and location. Also, effects within a localized region (for instance, shade, drought, soil conditions and irrigation) will require using a range of fertility rates. FYN generally recommends applying no more than the lowest of the recommended fertilizer ranges. These recommendations assume that grass clippings are recycled.*
# Landscaping Impacts

## Greenhouse Gas Accounting (Groundwater)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mowing</td>
<td>15 lbs CO$_2$e/1000ft$^2$/yr</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>29 lbs CO$_2$e/1000ft$^2$/yr</td>
</tr>
<tr>
<td>Pesticides</td>
<td>1 lbs CO$_2$e/1000ft$^2$/yr</td>
</tr>
<tr>
<td>Irrigation</td>
<td>34 lbs CO$_2$e/1000ft$^2$/yr  (Groundwater)</td>
</tr>
</tbody>
</table>

.2 MT CO2 or 6% of a solar rooftop
**Landscaping Impacts**

Greenhouse Gas Accounting (Desal)

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

(Desal)

1.5 MT CO2 or 50% of a solar rooftop
CHAIN OF CUSTODY

Integrity

DESIGN  NURSERY  IRRIGATION  INSTALLATION  MAINTENANCE

Continuity  Accountability
Design

Soils

Hydrology

Habitat Types

Plant Communities

Florida Friendly Principles
Design

Species Selection

Irrigation Design

Specifications and Standards

Construction Observation
Nursery

Root Systems

Genetics

Trunk & Crown

Inventory Availability
Irrigation

Pressure Regulation

Low Volume

Flow Sensors

Check Valves
Irrigation

Smart Controllers
Central Control
Climatic Conditions
Quantitative Feedback
Installation

Promote Optimal Establishment

Minimize Stress

Secure Quality Nursery Stock

Adhere To Design Intent
Installation

Follow Best Practices

Focus on the Future

Turnover to Maintenance Team
Maintenance

Minimize Inputs

Optimize Plant Health

Quantify & Document

Employee Growth & Training
Maintenance

Landscape Asset Management

Long Term Planning

Community Engagement

Property Certification
Circle of Inputs

- Water
- Nutrients
- Soils
- AG Chemicals
- Fuel
- Labor

Plant Health
Case Studies: Restoration
Restoration 2006

Conventional Practice
Restoration 2009

Reduced Impact Practice
Quantifying Impacts:
Roads
## Restoration’s Road Infrastructure
### Life Cycle Analysis (50 year life)

#### Inputs

<table>
<thead>
<tr>
<th></th>
<th>2006 Plan</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miles:</td>
<td>Plan 72</td>
<td>39</td>
</tr>
<tr>
<td>Lane miles:</td>
<td>186</td>
<td>103</td>
</tr>
<tr>
<td>Impervious area, ft²</td>
<td>17,000,000</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Landscaped area, ft²</td>
<td>6,000,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Cost</td>
<td>$383,623,680</td>
<td>$238,180,800</td>
</tr>
</tbody>
</table>

#### GHG Emissions

- Mtons CO2e/yr: 13,031, 7,176
- Metric tons CO2e/yr avoided: 5,855
- Initial costs avoided: $145,442,880

---

2,000 solar rooftops - ~$20,000,000
Quantifying Impacts: Landscaping
Restoration 2009

Reduced Impact Design

• The largest lots are 60’ wide
• Compact homes (45’x 70’ lot) 375 ft² landscaped area
• Less than 25% of residences with lots designed for any turf
Landscaping Impacts – Restoration Designs

Resources Accounting

**Inputs**
- Landscaped Area - acres
  - 2006 Plan: 988
  - 2009 Plan: 428
- Pesticides - lbs
  - 2006 Plan: 2,240
  - 2009 Plan: 345
- Fertilizer - lbs N
  - 2006 Plan: 135,000
  - 2009 Plan: 18,400
- Mowing - gal gas
  - 2006 Plan: 33,000
  - 2009 Plan: 4,460
- Irrigation - mgal
  - 2006 Plan: 988
  - 2009 Plan: 63

**GHG Emissions**
- Mtons CO2e/yr:
  - 2006 Plan: 11,685
  - 2009 Plan: 798

**Metric tons CO2e/yr avoided:**

3,600 solar rooftops ~$72,000,000
Madera: Quantifying Impacts
Landscaping (2007)
Madera – Gainesville, FL
Water Consumption by Dwelling Unit Type
Gainesville Regional Utilities (2009 – 2013)

- SFD Homes w/ Irrigation (N=2,338): 358 gallons/day/household
- SFD Homes w/o Irrigation (N=697): 190 gallons/day/household
- Apartments (N=1,420): 116 gallons/day/household
- Condominiums (N=725): 94 gallons/day/household

(Average Daily Water Consumption)
Water (2018)
Madera – Gainesville, FL
TWA & Florida Water Star: Quantifying Impacts
Average Daily Outdoor Water Savings for FWS Homes with Owner-Maintained Landscapes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Homes</td>
<td>38</td>
<td>145</td>
<td>84</td>
</tr>
<tr>
<td>Daily Consumption</td>
<td>181.1 gal/day</td>
<td>184.5 gal/day</td>
<td>525.0 gal/day</td>
</tr>
<tr>
<td>Percentage Savings</td>
<td>47.0%</td>
<td>39.1%</td>
<td>-23.7%</td>
</tr>
<tr>
<td>Daily Savings</td>
<td>150.6 gal/day</td>
<td>118.7 gal/day</td>
<td>-73.1 gal/day</td>
</tr>
</tbody>
</table>
Current Research

H2OSAV
Gainesville Regional Utilities
Turnberry Lake – Alachua County, FL
Gainesville Regional Utilities
Turnberry Lake – Alachua County, FL

H2OSAV - Water Savings, Analysis & Verification

Parcel consumption (gal/day)

Zoom Year All

From Sep 1, 2017 To Sep 1, 2018

Graph showing consumption data with months from Oct '17 to Jul '18.

Legend: Potable, Reclaimed, Irrigation, Total utility average, Total subdivision average.

Download button available.
Current Research
Compost
Compost
LifeSoils (Comand) – Sumter County, FL
LifeSoils (Comand)
On Top of the World – Marion County, FL

7/28/2016

8/5/2016
Certification

Certified Trees

Maintenance Professionals

Irrigation Professionals

Buildings and Sites
CHERRYLAKE WILDERNESS PRESERVE

Panther Habitat Conservation and Wetlands Compensatory Mitigation Bank
Reason 7 believes that consistent and great outcomes are the result of following superior processes. All Reason 7 trees are grown following a strict, documented process, are certified by the nursery and routinely audited to provide buyers with confidence and accountability.
POOR ROOT SYSTEM

Poor root system: Liner root ball was not root pruned as it was shifted into a #1 container.

Figure 8b. Two months after shifting, roots that grew down and around the sides of the liner pot became woody and grew in diameter. These woody roots retained their original orientation, and many of the new roots produced in the #1 container grew from the bottom of the liner root ball.

Figure 8c. Six months after shifting, the main woody roots that had been originally deflected by the liner pot continued to grow in diameter. Many roots that grew near the surface of the root ball originated near the bottom of the liner. The #1 container wall deflected a second set of roots up, down, and around. Some of these roots will become woody and grow into a second set of defects.
**GOOD ROOT SYSTEM**

**Good root system:** Liner root ball was shaved (Fig. 7) when shifted into a #1 container.

Figure 8d. Two months after root pruning and shifting, the new roots grew horizontally and downward. The roots at the top of the container originated from the top of the liner root ball, providing greater stability for the tree.

Figure 8e. Six months after root pruning and shifting, the main woody roots were oriented in a more natural form. Some main roots grew horizontally, while others grew downward. Both horizontal and vertical roots are needed for tree stability. The inner root ball was free from defects such as circling, stem-girdling, and kinked roots. However, this plant should be root pruned again when it is shifted to the next container size or planted in the ground.
Good root systems start in the nursery at propagation in the liner stage and require attention each time the tree is shifted into a larger container. Large main mother roots should grow straight from the trunk without circling the trunk or deflecting downwards...

Most defects such as circling roots in the root ball interior, can be mostly eliminated with appropriate and timely management in the nursery.

*Gilman: Strategies for Growing a High-Quality Root System, Trunk and Crown in a Container Nursery*
Because what is essential is invisible to the eye, Reason 7 has adopted a series of certified processes to give you the peace of mind that you are purchasing the best possible tree on the market – from the tip of its roots, to the top of its canopy.
Certifications

Resilient and Sustainable Landscapes
Certifications
Resilient and Sustainable Landscapes

- Key measurable & verifiable metrics
- Water budgets
- Fertilizer choices/budgets
- Presence of invasive
- Annually recurring review/certification
  - Five years?
  - Homeowner control of HOA?
  - Thru buildout?
- Annually trending toward reduced inputs
  - Establishment
  - Mature
Certifications

88th Street Cottages – Alachua County, FL
Certifications
Turtle Beach – Pinellas County, FL
Incentives

- Impact Fees Credit
- Density Bonuses
- Utility Rates
- Tax Credits
- Cost Share
Gamification

- Purposeful Goals
- Immediate Feedback
- Social Engagement
- Reward Triggers
- Leaderboards
- Social Engagement
1000 TREES
FOR 1000 YEARS
Dr. Pierce Jones
piercejones@ufl.edu
352.392.8074

Program for Resource Efficient Communities
Institute of Food and Agricultural Sciences

Timothee Sallin
timothee@cherrylake.com
352.516.5992
cherrylake.com
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