

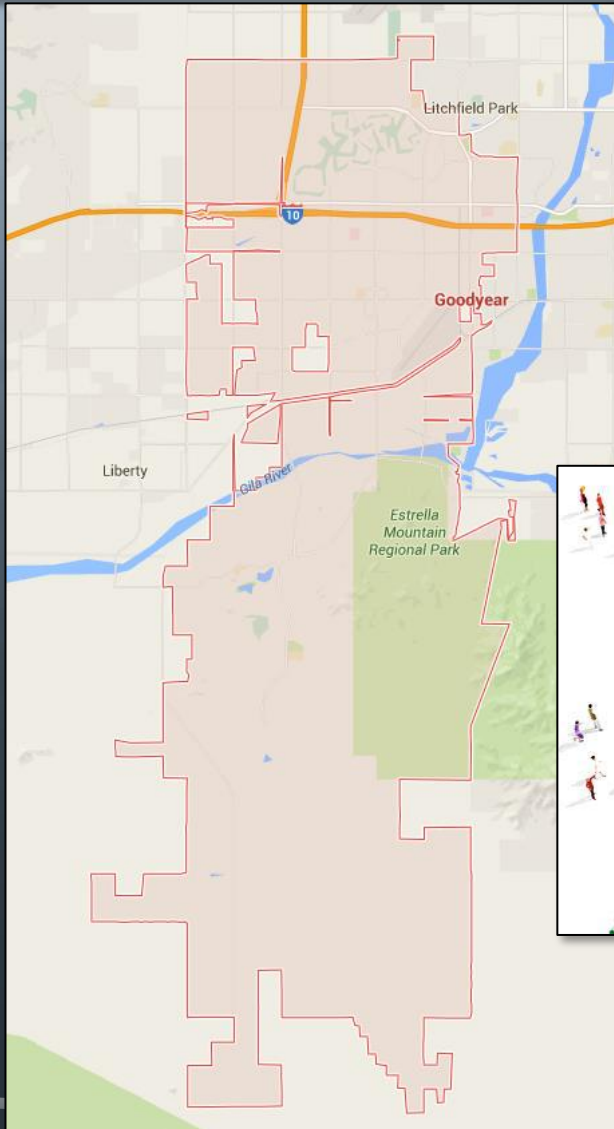


# Water Conservation Pilot Program

Nick Marzec   Sam Battaglini   Chris Hopman  
Shantel Wyke   Grady Douglas

# What is the Problem?

- Significant population growth



# Community Partners



- Mark Holmes
  - Water Resources Manager
- Katie Wilken
  - Planning Manager



- Who are we trying to incentivize?
- What is our objective?
- Where have similar problems been solved?

# Objective

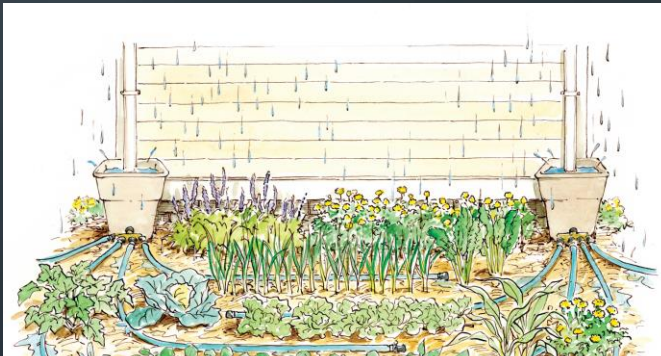
- Reduce or eliminate outdoor water use
  - Target commercial, residential development



[totallandscapecare.com](http://totallandscapecare.com)



[swamplot.com](http://swamplot.com)



[motherearthnews.com](http://motherearthnews.com)



[inhabitat.com](http://inhabitat.com)

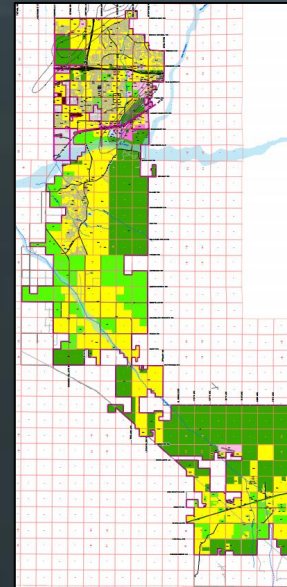


# Progression

- Started with group interest
  - Water conservation is a pressing issue
- Initial thoughts and ideas
  - Goodyear has a lot of potential
- Provided solutions
  - Voluntary incentive-based pilot program
- Discussing program with Mark
- Preliminary research
  - existing incentive-based programs?
  - Goodyear's master plan?
  - collaboration with other teams

# Data Gathering

- Finding program which give specific cost reductions
  - CA, AZ, WA and other states
- Psychological research
  - How will groups respond to particular incentives?
- Specific new development in Goodyear
  - Voluntary incentive-based pilot program



# Stakeholders

- City of Goodyear
  - What is the city's master plan?
  - How do we align the program with the city's vision?
  - How can we avoid mandatory curtailment?
- No agricultural water control
  - State controlled irrigation districts
- Home-builders and developers
  - Focus on new development

# Incentives

- To mutually benefit 2 or more parties
- How can incentives be effective?
  - Oberlin College
- How might incentives fail?
  - Beloit Corporation
- Why might they fail?
- How can this affect Goodyear?



# Incentives

## How they *do* and *don't* work

- Pay is not a motivator
- Rewards punish
- Rewards ignore reasons
- Rewards discourage risk taking
- Rewards rupture relationships
- Rewards undermine interest

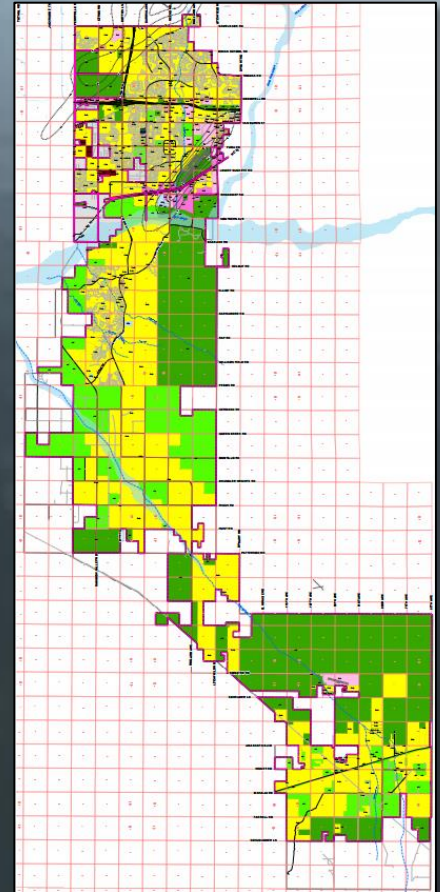


# Program Basis

- Thus, we seek to create an incentive program where
  - Developers have freedom in conservation methods
  - Developers are eager to join
  - Holds businesses to Goodyear's guidelines and standards
  - Preserves the importance of water conservation

# Lessons Learned

- Goodyear is a large city
  - Vast undeveloped regions
  - Large planned development zones
- Legislation changes are difficult
  - Adapting to change may take time
- Many local counties and cities share Goodyear's goals
  - Curbing water use
  - Maintaining existing supply



# Program Structure

- The team selected a point-based system
  - Includes a certification hierarchy
- Inspired by numerous existing systems
- Flexible and dynamic for developers
  - Adjustable scale
  - Expandable actions list
  - Variable incentives

# Program Structure

Methods of Conservation	Points
Use of EPA WaterSense® fixtures	4
Low water use appliances	
-EnergyStar® certified dishwashers (<3gal/cycle)	4
-EnergyStar® certified clothes washer (WF < 3.2)	4
Rainwater capture	
-Cistern	4
-Efficient landscape design	10
-Treated for domestic use	10
Graywater collection (two pipe drainage)	6
- Treatment and reuse systems (no outdoors!)	1
Water heater to faucet distance	
- >50% within 20ft	
- 100% within 20ft	
Paved off-street surfaces are permeable	12
-Rainfall is captured as runoff	
Xeriscaping (100%, excluding vegetable/fruit)	
-No irrigation required (some exclusions)	1
-Minimized lawn area	
- <30% of lot size	2
- <15% of lot size	4
- 0% of lot size	8
-Detached sidewalks with no-water-use planting	8
Irrigation rain sensing shutoff	4
Open space	
-Natural open space features preserved	8
-Storm water retention is integrated into open space	12
<b>TOTAL</b>	<b>137</b>

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Rainwater capture	
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Graywater collection (two pipe drainage)	4
- Treatment and reuse systems (no outdoors!)	6
Water heater to faucet distance	
- >50% within 20ft	3
- 100% within 20ft	6
Paved off-street surfaces are permeable	8
-Rainfall is captured as runoff	4
Xeriscaping (100%, excluding vegetable/fruit)	10
-No irrigation required (some exclusions)	10
-Minimized lawn area	
- <30% of lot size	2
- <15% of lot size	10
- 0% of lot size	14
-Detached sidewalks with no-water-use planting	12
Irrigation rain sensing shutoff	4
Open space	
-Natural open space features preserved	6
-Storm water retention is integrated into open space	12
<b>TOTAL</b>	<b>137</b>



# Why Points

- Numerous organizations, cities, and states use this concept
- LEED:

**LEED v4 for Building Design and Construction: Homes and Multifamily Lowrise**  
Project Checklist

Project Name: \_\_\_\_\_  
Date: \_\_\_\_\_

Y ? N

0	0	0	<b>Location and Transportation</b>	<b>15</b>
Y			Prereq Floodplain Avoidance	Required
<b>PERFORMANCE PATH</b>				
			Credit LEED for Neighborhood Development Location	15
<b>PRESCRIPTIVE PATH</b>				
			Credit Site Selection	8
			Credit Compact Development	3
			Credit Community Resources	2
			Credit Access to Transit	2
0	0	0	<b>Sustainable Sites</b>	<b>7</b>
Y			Prereq Construction Activity Pollution Prevention	Required
Y			Prereq No Invasive Plants	Required
			Credit Heat Island Reduction	2
			Credit Rainwater Management	3
			Credit Non-Toxic Pest Control	2
0	0	0	<b>Water Efficiency</b>	<b>12</b>
Y			Prereq Water Metering	Required
<b>PERFORMANCE PATH</b>				
			Credit Total Water Use	12
<b>PRESCRIPTIVE PATH</b>				
			Credit Indoor Water Use	6
<b>EA PRESCRIPTIVE PATH (continued)</b>				
			Credit Heating & Cooling Distribution Systems	
			Credit Efficient Domestic Hot Water Equipment	
			Credit Lighting	
			Credit High Efficiency Appliances	
			Credit Renewable Energy	
0	0	0	<b>Materials and Resources</b>	
Y			Prereq Certified Tropical Wood	
Y			Prereq Durability Management	
			Credit Durability Management Verification	
			Credit Environmentally Preferable Products	
			Credit Construction Waste Management	
			Credit Material Efficient Framing	
0	0	0	<b>Indoor Environmental Quality</b>	
Y			Prereq Ventilation	
Y			Prereq Combustion Venting	
Y			Prereq Garage Pollutant Protection	
Y			Prereq Radon-Resistant Construction	
Y			Prereq Air Filtering	
Y			Prereq Environmental Tobacco Smoke	
Y			Prereq Compartmentalization	
			Credit Enhanced Ventilation	

Outdoor water use reduction  
Water efficiency  
Prerequisite | Required

Indoor water use reduction  
Water efficiency  
Prerequisite | Required

Building-level water metering  
Water efficiency  
Prerequisite | Required

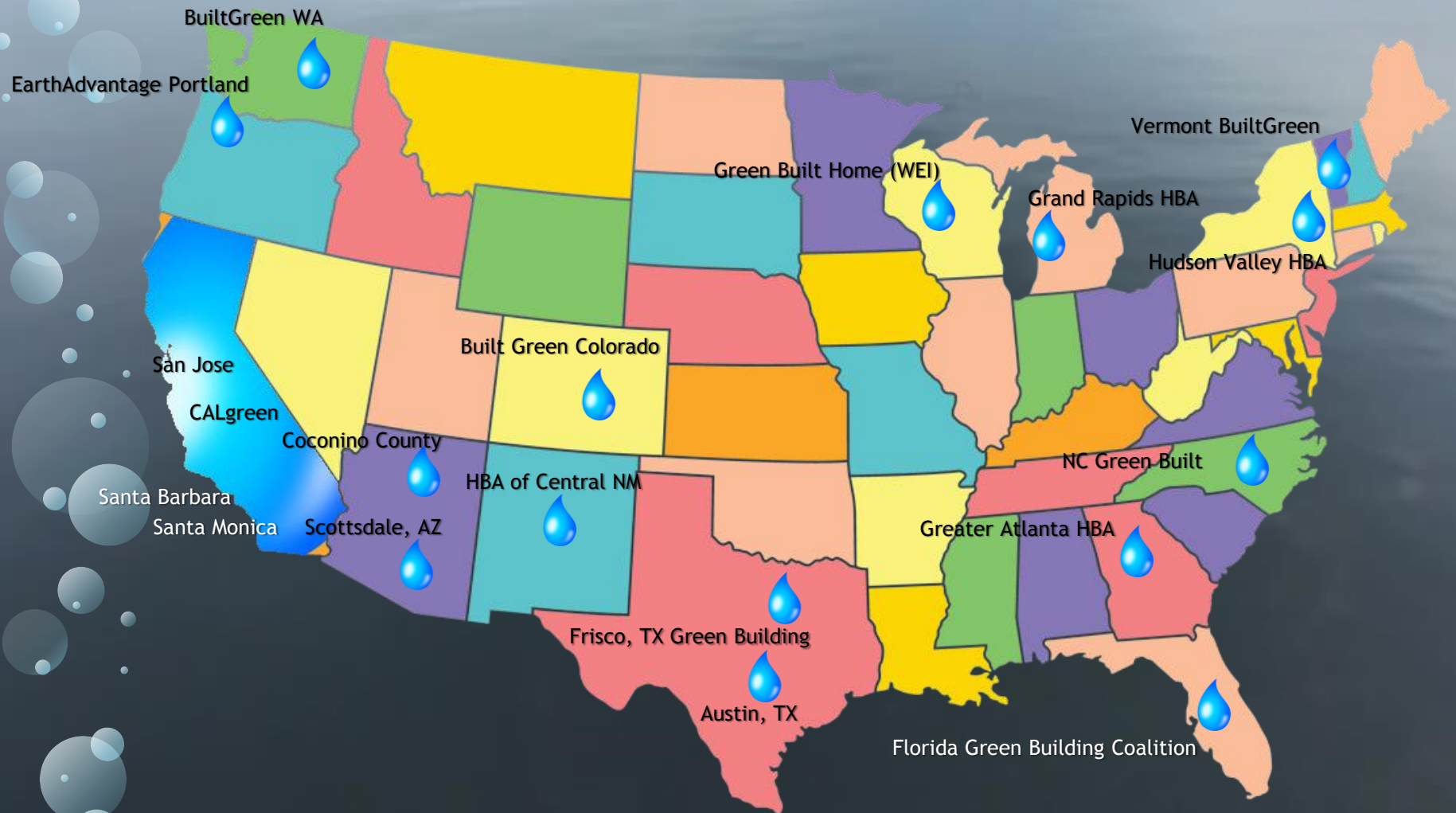
Outdoor water use reduction  
Water efficiency  
Credit | Up to 2 points

Indoor water use reduction  
Water efficiency  
Credit | Up to 6 points

Cooling tower water use  
Water efficiency  
Credit | Up to 2 points

Water metering  
Water efficiency  
Credit | 1 point

# Why Points?



# Program Structure



Permitting process expedited  
City-sponsored certification and recognition



Water connection charges reduced or eliminated  
Design review process expedited



Density bonuses: 10%+ above zoning  
Open space requirements reduced  
Hourly inspection fees reduced



Must obtain LEED certification for homes  
Permitting fees reduced  
City reduces property valuations for fees and taxes

# Program Structure

- Outdoor water usage is high
  - >70% of domestic municipal use
- To better aim incentives, we need to know more
  - Lawns
  - Trees & shrubs
  - Pools
  - Gardens
- Goodyear should investigate further
  - Compare traditional and xeriscaped homes
  - Inefficient irrigation

# Unknown Quantities

- Goodyear has no incentive-based conservation programs
  - Existing programs are educational, voluntary
- Limits local data on incentive efficacy
- Cost benefit analysis
  - Very little quantitative data
  - No fee or tax information





# Necessary to Progress

## Detailed financial data

- More extensive research
  - Taxes
  - Fees
  - Other development costs
- What financial burdens can the city accept?
  - Long-term reductions in fee uptake
  - Fronting costs

# Necessary to Progress

- Cost-Benefit Analysis
  - Financial Data
- Metrics for Success
  - Average Household Water Use
  - Developer Participation
  - Quantity of certified developments