Turf Removal Metrics:
Measuring Motivation and Market
Transformation

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Irvine Ranch Water District

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Building Drought Resilient Communities

- Californians are familiar with drought and calls for conservation
- Alliance for Water Efficiency – Demand Hardening study
  - Customers retain considerable ability to change indoor behavior
  - Substantial reductions attainable in outdoor use
- Programs and outreach opportunities
  - Develop outreach campaigns that activate values and motivate
  - Help redefine social norms and encourage a new landscape aesthetic
  - Create feedback loops to generate targeted outreach

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IRWD's Focus: Outdoor Savings

- 16% reduction target from SWRCB
  - State mandate creates conditions for innovation
  - 80% of accounts are residential-potable
- New Outdoor Allocation formula
  - 30% reduction in potable outdoor allocation
  - Drought-tolerant plants and drip/spray irrigation
- Rightscape Campaign & Workshop Series
  - The right plants, equipment, and schedule
- Turf Removal Program
  - Highly impactful, data rich, & ripe for study

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Major Questions

PROGRAM IMPACT
- Are we saving water? If so, when are we saving water?
- What is driving customer participation?

MOTIVATION & NORMS
- What motivates customers to install drought-tolerant landscaping?
- Is there a significant difference in motivation between participants and non-participants?
- Are we reaching new markets and building new norms?

MULTIPLIER EFFECT
- Is there a measurable diffusion rate/multiplier effect of the program?
- Does this effect increase or decrease in response to social, economic, or demographic variables?
- Which landscape types tend to cluster and/or proliferate more rapidly?
- Which landscape types produce the most savings?

FEEDBACK & INSTITUTIONAL LEARNING
- Do any patterns emerge from our analysis that could inform program development and/or outreach strategies?

The Grand Plan: Nested Study

Step 1: Turf program evaluation (Group 1)
- Group 1: Turf removal program participants
- Annual evaluation of savings and effectiveness

Step 2: Program participation survey (Group 1)
- On-going, semi-annual survey

Step 3: Multiplier effect study (Group 2)
- Group 2: Customers who converted their landscapes, but did not participate in the turf removal program
- Utilize spatial-temporal statistical analyses to determine and/or measure a multiplier effect

Step 4: Landscape preference survey (Group 3)
- Group 3: Non-participants with turf landscapes

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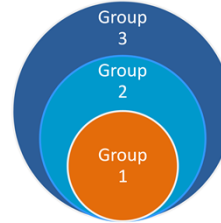
• Group 2 may include those who dropped out of the program or deemed ineligible because they completed the project prior to applying to the program

Turf Removal Program – Irvine Ranch Water District

• Turf Removal Program Overview
  ○ Began in 2011
  ○ Minimum of 250 sq. ft.; no maximum
  ○ Irrigation conversion required
  ○ Pre & post inspections by IRWD staff
  ○ $2 per sq. ft.
  ○ Leverage other rebates & partnerships
  ○ Fiscal Years 11-12 through 14-15
  ○ Over 1500 participants

•Reduce risk to consumers by reducing the purchase price of a product, which decreases the risk to a consumer trying an unfamiliar product
  •Homes are primary financial asset and significant portion of personal debt
  •Innovative landscapes types might present a risk to an individual's financial investment and overall wealth
•Front yard
  oInherently public
      •"What is open to be seen is also judged" – social pressure to conform, reinforcement
      •"powerful connective tissue…and inherently democratic medium" (AJ Downing)
•"Wildness" or "messiness" of native landscaping
•Maintained landscape indicates presence of caretakers and "cues to care", sense of order, "the virtues of labor", "respect for neighbors"
•Descriptive norms: entail typical patterns of social activities or choices, aka 'standard practice' or THE LAWN
•Injunctive norms: Involve judgment of un/desirability of specific actions. Ex) Neat, orderly, interpreted as neighborly

Total Residential Water Savings

	ACRE FEET/YEAR SAVINGS	AVERAGE % REDUCTION
FY11-12	1.35	-17.4%*
FY12-13	0.85	-8.8%*
OVERALL SAVINGS	2.19	-12.7%*

*Data is not weather normalized
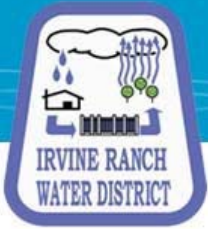
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•FY11-12: GALLONS SAVED CALCULATED BY SUBTRACTING THE SUM OF EACH PARTICIPANT'S AVERAGE ANNUAL USE OF FISCAL YEARS 11-12, 12-13, & 13-14 FROM FISCAL YEARS 8-9, 9-10, & 10-11
•FY12-13: GALLONS SAVED CALCULATED BY SUBTRACTING THE SUM OF EACH PARTICIPANT'S AVERAGE ANNUAL USE OF FISCAL YEARS 12-13 AND 13-14 FROM FISCAL YEARS 8-9, 9-10, 10-11, & 11-12; FYs 08-09 AND 09-10 WAS INCLUDED IN THE PRE-ANALYSIS BECAUSE THEY WERE DRIER THAN FYs 10-11 AND 11-12
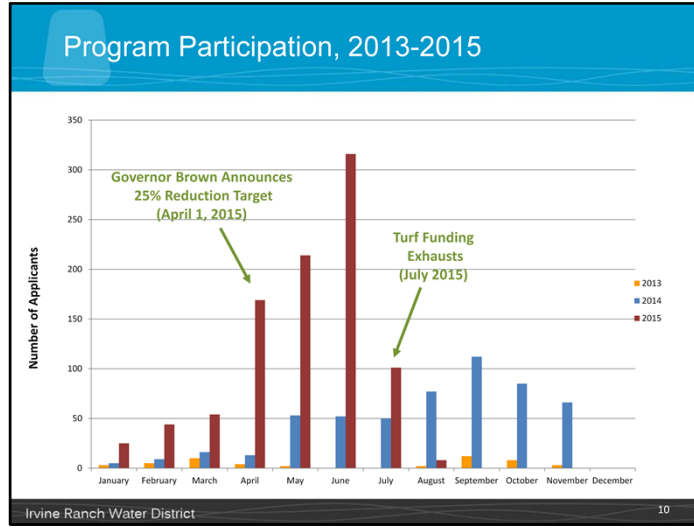•OVERALL SAVINGS IS A WEIGHTED AVERAGE FROM FY11-12 AND FY12-13

Water Savings by Month

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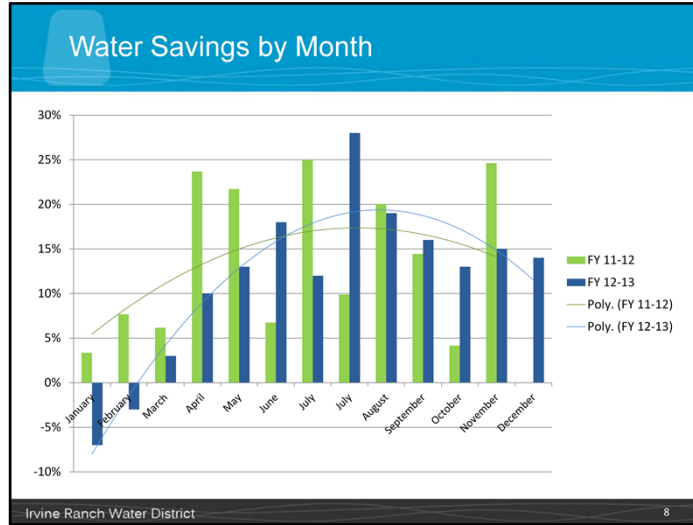
•AVERAGE WATER SAVINGS ARE CALCULATED FOR EACH MONTH AND THE PRE AND POST PERIODS FOR RESPECTIVE YEAR ARE COMPARED

Program Participation & Outreach, 2013-2014
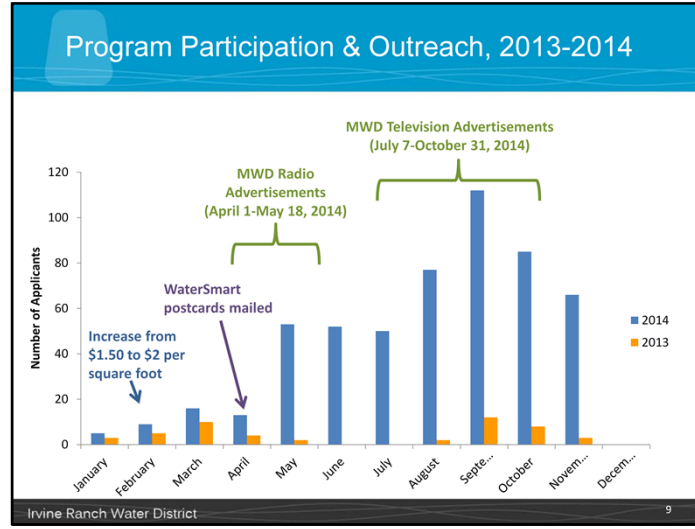
-Irvine benefits from its media market

-Irvine benefits from its media market

Turf Rebate Participation Survey

- Literature Review
  - Landscape Design & Preferences
  - Social Norms & "Neighborhood Effect"
  - Extrinsic and Intrinsic Motivation
- Email Survey – 300 participants
  - 50% response rate
- Findings
  - Demographics
  - Composition of Front & Back Yards
  - Landscape Material Correlations
  - Integrated Analysis of Motivation

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Front Yard & Landscape Design Choices

- Front yard is inherently public
  - "What is open to be seen is also judged"
- External display of internalized public expectations of maintenance, aesthetics, & appearance
  - Maintained landscape indicates presence of caretakers, sense of order, "the virtues of labor", "respect for neighbors"
  - Concern about the "wildness" or "messiness" of native landscaping
- Homeowners are risk averse
  - Primary financial asset & significant portion of personal debt
  - Non-traditional landscapes present a risk to an individual's financial investment and overall wealth

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Countering the Neighborhood Effect

- Societal norms vary at different scales
  - Sharpening of conformity at the neighborhood scale
  - Tendency act in accordance with the norms established by their neighborhood
- Actions influenced by formal and informal institutions
  - Ordinances and HOA Covenants, Codes, & Restrictions
  - Self- and socially reinforced behavioral regularities and expectations
- Our aim with the turf program:
  - Weaken descriptive norms prescribing lush green lawns
  - Strong injunctive/moral norm messaging of acceptable behavior
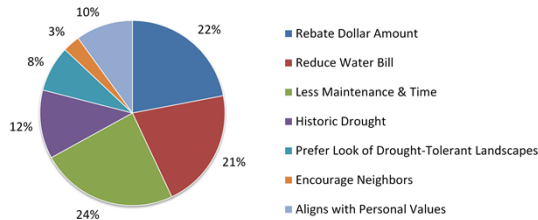
(Cialdini et al., 1990)

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oOutreach materials and educational campaigns
oLeverage partnership with WaterSmart
•Reduce risk to consumers by reducing the purchase price of a product, which decreases the risk to a consumer trying an unfamiliar product
    •Homes are primary financial asset and significant portion of personal debt
    •Innovative landscapes types might present a risk to an individual's financial investment and overall wealth
        •Front yard
            oInherently public
                "What is open to be seen is also judged" – social pressure to conform, reinforcement "powerful connective tissue…and inherently democratic medium" (AJ Downing)
•"Wildness" or "messiness" of native landscaping
•Maintained landscape indicates presence of caretakers and "cues to care", sense of order, "the virtues of labor", "respect for neighbors"
•Descriptive norms: entail typical patterns of social activities or choices, aka 'standard practice' or THE LAWN
•Injunctive norms: Involve judgment of un/desirability of specific actions. Ex) Neat, orderly, interpreted as neighborly
•An injunctive norm is based on what ought to be; or in simpler terms, an injunctive norm involves your perception of whether a behavior will be approved or disapproved by a given group. Injunctive norms are often referred to as moral norms because behavior is governed by the moral values of the individual.

Exploring the Continuum of Motivation

- Extrinsic motivation
  - Actions driven by external rewards, such as money, praise, or rebates
  - Becomes more common as we age and acquire social responsibilities
- Intrinsic motivation
  - Actions internally driven by "inherent satisfaction"
  - Tasks related to deeply held values are more motivating

Legend:
- Rebate Dollar Amount
- Reduce Water Bill
- Less Maintenance & Time
- Historic Drought
- Prefer Look of Drought-Tolerant Landscapes
- Encourage Neighbors
- Aligns with Personal Values

Pie chart values: 22%, 21%, 24%, 12%, 8%, 3%, 10%

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- Appeal to Existing Values: Money, Time, Convenience, Functionality, Personal Aesthetic Preferences, Public Appearance/Social Reputation, Physical health, Environmental motivations
- Promote New Values:
  - Environmental Stewardship, new aesthetic/sense of place, shared investment in community/social equity, patience

Data Collection & Analysis

- Free Survey Tools
  - Google Forms, Survey Monkey, Survey Gizmo, and more
- Encourage a 'culture of sharing'
  - Please copy, modify, and/or redistribute my survey
- SPSS package for social science
  - Analyze nominal and ordinal data
  - Yes/No, Likert scale

Turf Removal Participation Survey
* Required

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Water Efficiency Made Easy

Basic Personal Information

Please enter your name below. *

Please enter your address in space below. *

Please provide your email address in the space below.

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Marketing & Outreach

- Top 3 sources of information
  - ○ 41%, Pipeline bill inserts
  - ○ 20%, Neighbor, friend, 'word of mouth'
  - ○ 15%, Contractor or Landscaper

- Notable sources
  - ○ 5%, Radio or television advertisement
  - ○ 2%, HOA
  - ○ <1%, Social Media (e.g. Facebook, Twitter)

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•Radio & Television cross market
•Social Media – difficult market to tap into

Demographics – IRWD Turf Rebate Participants

Attribute	Participants	Irvine
Bachelor's Degree or Higher	88%	65%
Median Household Income	68% > $95,000 41% > $150,000	$90,585
Median Home Size	2,420 sq. ft.	2,580 sq. ft.
Median Lot Size	6,450 sq. ft.	-
Median Year Built	1978 (Range: 1920 -2013)	1992
Median Time @ Residence	15 years	-
Median Time in So Cal	90% > 15 years	-

- Irvine: 65% with bachelor's degree or higher
- $90,585 averagee annual household income
- 1992 median year home built

Landscape Composition - Summary

What did you install in your front and back yards? Check all that apply.

FRONT YARD
- 78% of respondents
- Artificial turf correlated negatively with all landscape materials
- Most commonly installed items:
  - Mulch: 37%
  - Native plants: 37%
  - Artificial turf: 35%
  - Rocks: 22%
  - Cacti/Succulents: 20%

BACK YARD
- 62% of respondents
- Artificial turf correlated negatively with all landscape materials
- Most commonly installed items:
  - Artificial turf: 29%
  - Mulch: 24%
  - Native plants: 18%
  - Pavers: 13%
  - Rocks: 12%

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Front Yard - Correlations

- Mulch & Natives: .724**
- Rocks & Natives: .535**
- Natives & Cacti/Succ: .523**
- Rocks & Cacti/Succ: .476**
- Natives & Artificial turf: -.412**
- Mulch & Non-natives: .398**
- DG & Cacti/Succ: .393**
- Mulch & Cacti/Succ: .389**
- DG & Natives: .375**

- Rocks & Mulch: .373**
- Rocks & DG: .363**
- Rocks& Non-natives: .350**
- Mulch & Artificial turf: -.328**
- Pavers & Cacti/Succ: .323**
- Natives & Non-natives: .323**
- DG & Non-natives: .319**
- Cacti & Artificial turf: -.295**

**Correlation is significant at the 0.01 level (2-tailed)

Back Yard - Correlations

- DG & Natives: .558**
- Rocks & Natives: .490**
- Rocks & Sand: .487**
- Mulch & Natives: .485**
- Rocks & Mulch: .484**
- Pavers & Cacti/Succ: .460**
- Rocks & Pavers: .443**
- Mulch & Cacti/Succ: .432**

- Natives & Cacti/Succ: .414**
- Sand & Natives: .383**
- Rocks & Cacti/Succ: .344**
- Pavers & Natives: .320**
- Mulch & Non-natives: .317**
- Mulch & Sand: .316**
- Mulch & DG: .308**

**Correlation is significant at the 0.01 level (2-tailed)

Back Yard Composition

Rocks
Mulch
Pavers
Decomposed Granite
Sand
Non-native Plants
Native Plants
Cacti & Succulents
Permeable Concrete
Bioswale
Artificial Turf
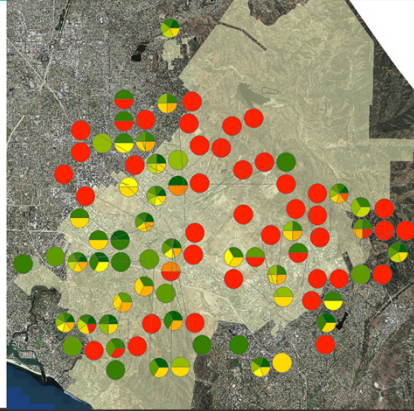
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Motivation-High Scores

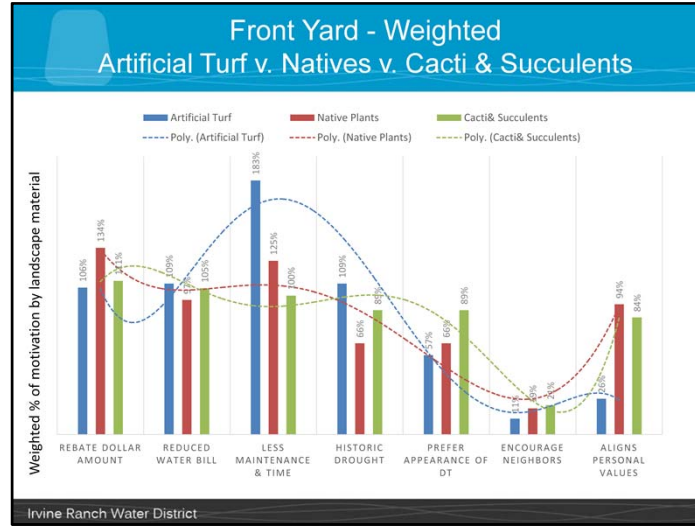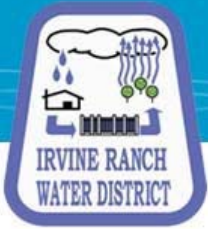**Please indicate the top 3 factors that most influenced your decision to remove your lawn.**

- First Choice:
  - Reduce maintenance time & cost (33%)
  - Rebate dollar amount (17%)
  - Historic drought (15%)
- Second Choice:
  - Reduce water bills (25%)
  - Reduce maintenance time & cost (24%)
  - Rebate dollar amount (24%)
- Third choice:
  - Reduce water bills (26%)
  - Rebate dollar amount (25%)
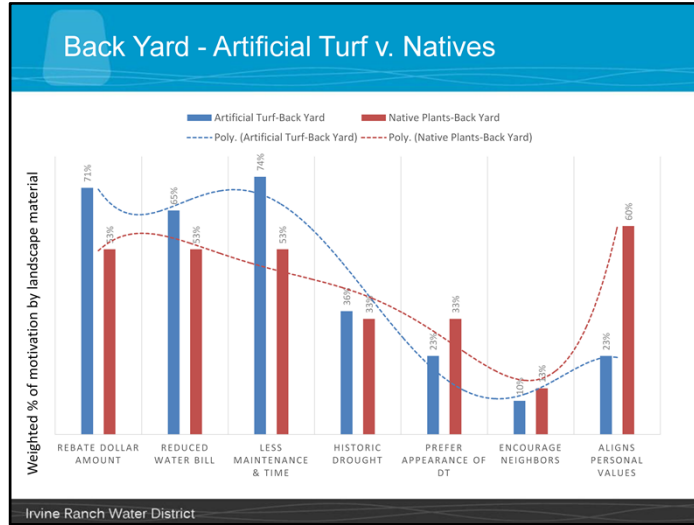 - Reduce maintenance time & cost (15%)

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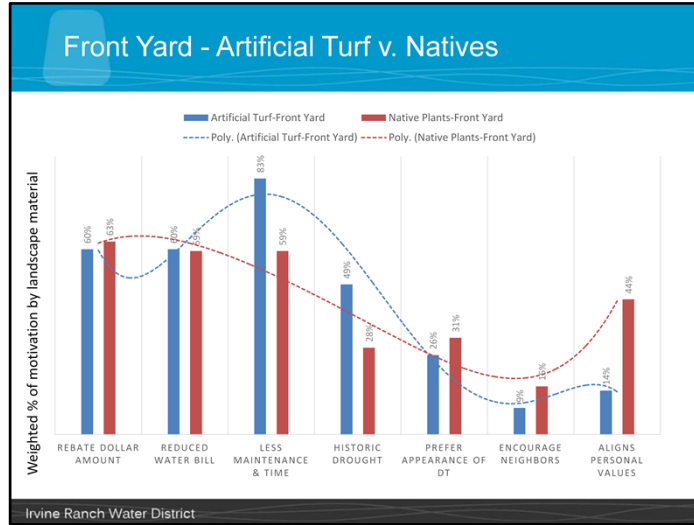
Front Yard - Artificial Turf v. Natives

- Hypothesis: fundamentally different motivations
- polynomial trendline

Front Yard - Weighted
Artificial Turf v. Natives v. Cacti & Succulents

- •Hypothesis: fundamentally different motivations
- •polynomial trendline

Back Yard - Artificial Turf v. Natives

- Hypothesis: fundamentally different motivations
- polynomial trendline

Back Yard - Weighted
Artificial Turf v. Natives v. Cacti & Succulents

• Hypothesis: fundamentally different motivations
• polynomial trendline

Perception of Neighborhood

What percentage of the homes in your neighborhood have drought-tolerant front yards?

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•polynomial trendline

Perception of Other Neighborhoods

Compared to other neighborhoods, does your neighborhood have fewer, more, or about the same of drought tolerant landscapes?

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- polynomial trendline

Perception– Self and the Other

Percent of Drought Tolerant Lawns in Your Neighborhood

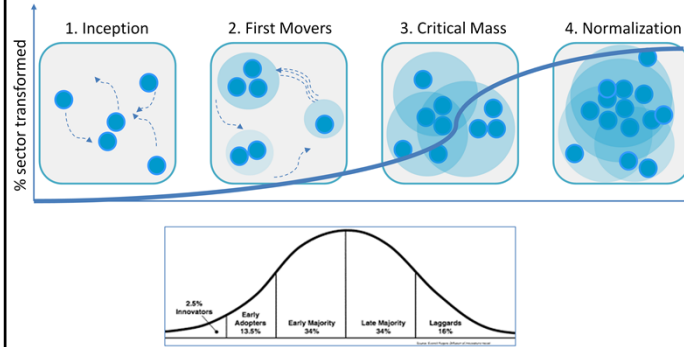Perception of Other Neighborhoods' Landscapes

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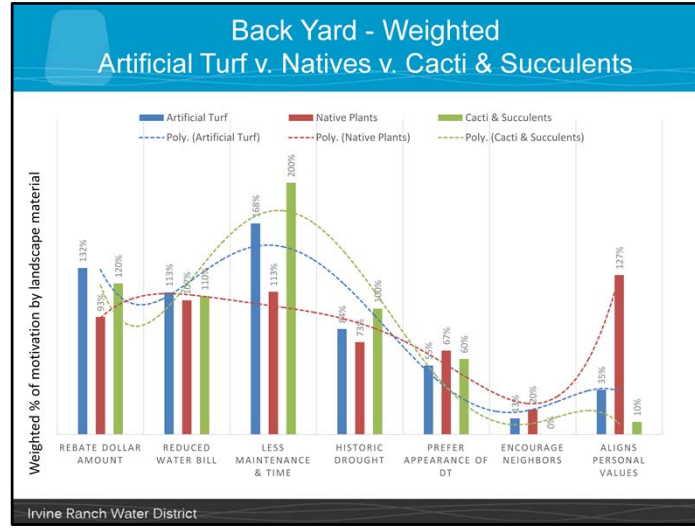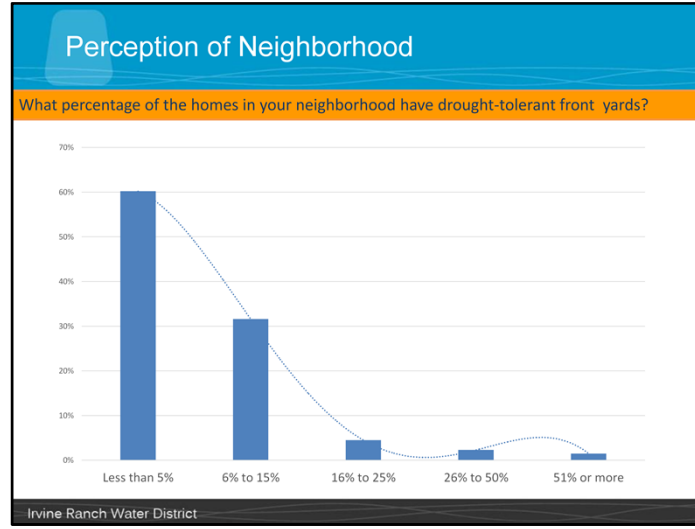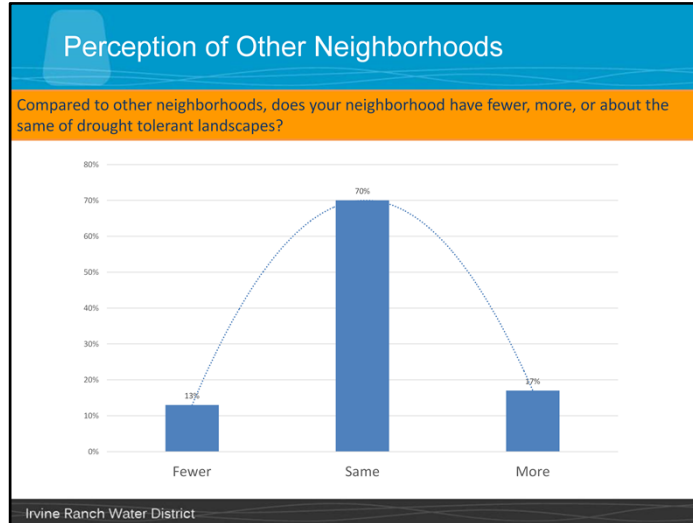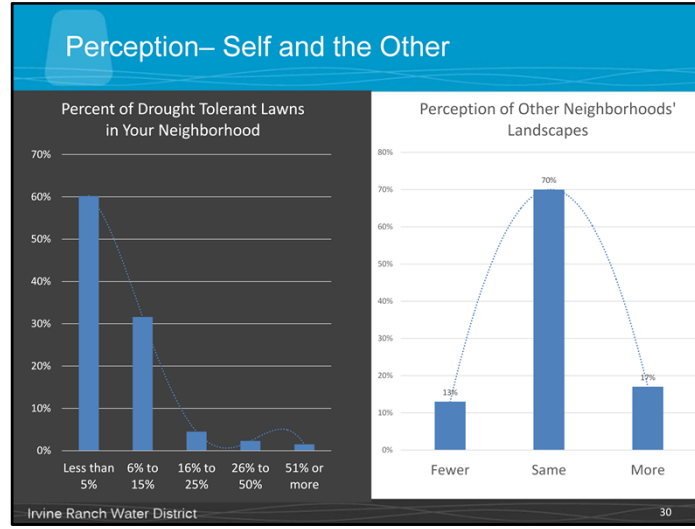
•"Compared to your neighborhood, do other neighborhoods have fewer, more, or about the same amount of drought-tolerant landscapes?"
•No matter how they perceived their own neighborhood (a lot or a little), most felt that their neighborhood had the same amount as other neighborhoods.
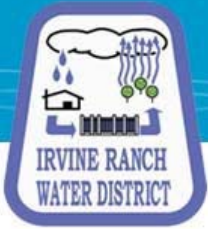•Good application for geospatial analysis

Are We Reaching New Markets?

Less than 5% — — — Poly. (Less than 5%)

29% 50% 62% 63%

FY 11-12   FY 12-13   FY 13-14   FY 14-15
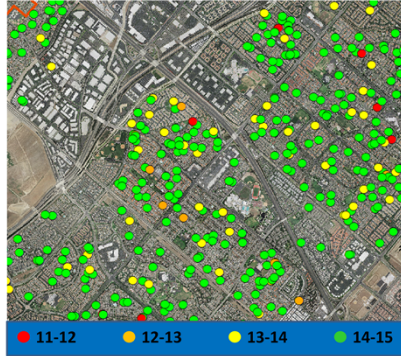
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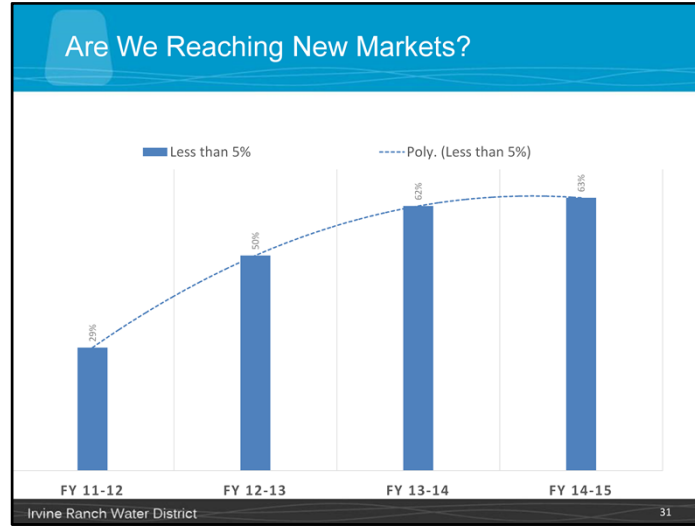
•polynomial trendline

Market Transformation

Adapted from: International Institute for Environment and Development

Measuring Market Transformation

Pilot Study – Multiplier Effect

- Which landscape and irrigation types did they install?
- When did they install their drought tolerant garden?
- Why did they convert their turf (e.g. save time and money, personal values, etc.)?
- How are participants and non-participants related in space and time?
- Which characteristics lead to more water savings?
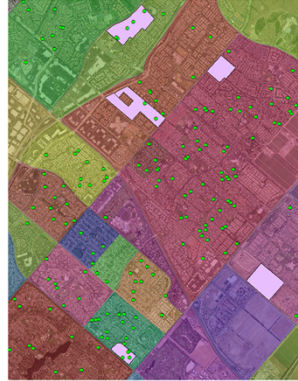
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•DCSE will obtain the information regarding the turf removal program participants – address, date of turf removal, etc. (corresponding with the survey forms). DCSE will identify / map the locations of the turf program participants, and their neighbors in the 14 neighborhoods. This will facilitate planning the survey.

Survey of Landscape Archetypes

Brown lawn — Artificial Turf — Desert/Southwest — Drought Tolerant

On-Site Data Collection

- ArcGIS Collector
- Green Infrastructure Template
- Data collection through tablet or smart phone
- Software free from ESRI
- Integrates with ArcGIS
- On-site digitization of landscape types

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Findings

- Present findings at WaterSmart Innovations Conference
- Thursday, October 8, 2015

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Thank You!

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