# This presentation premiered at WaterSmart Innovations

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# Navigating HOA Water Budgeting with GIS

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SCOTTSDALE WATER

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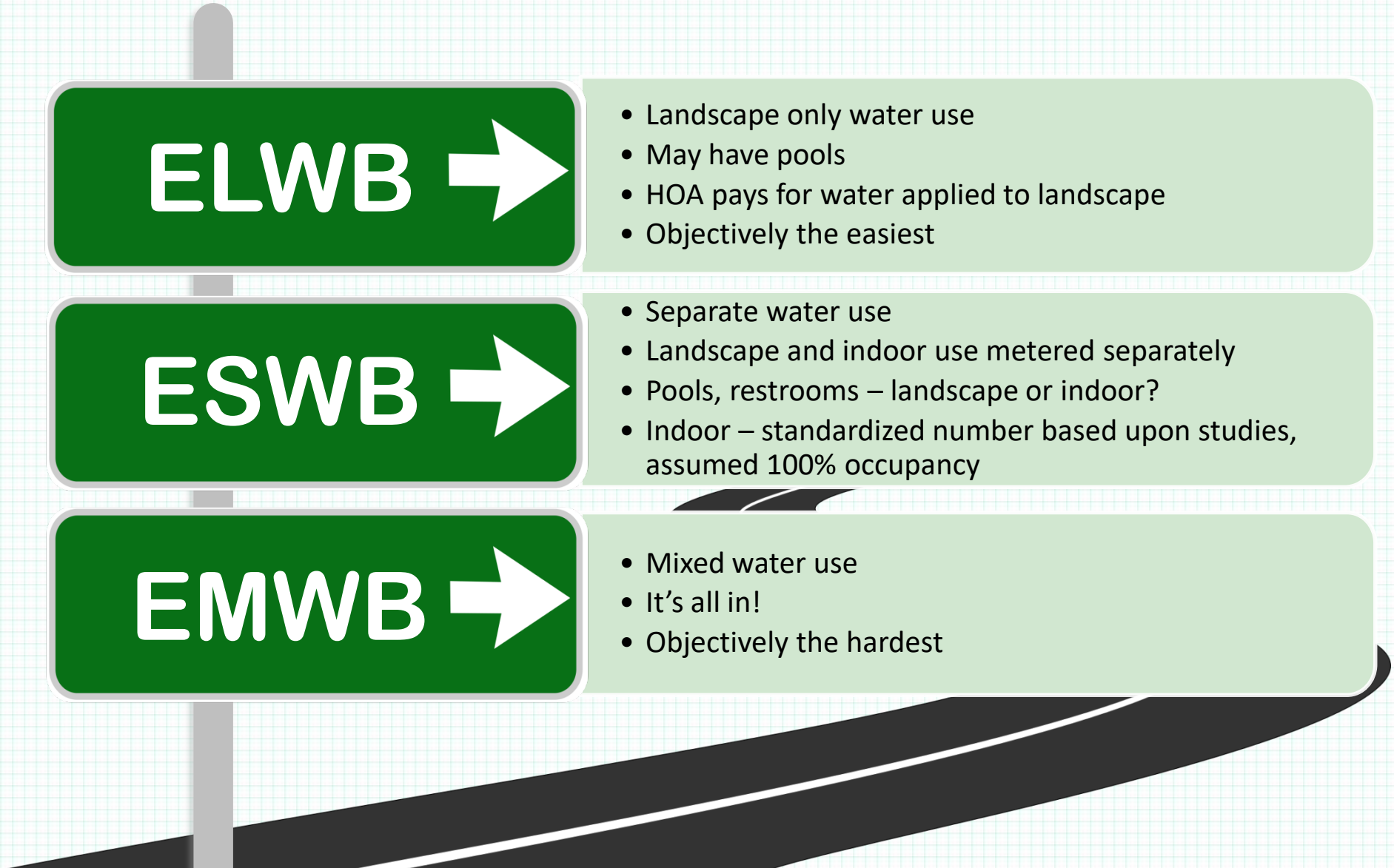
# Program History

- Private consultants
  - Binders, large projects, yearly timeline
  - Success minimal
- Site visitation
  - In-house, 2 main field personnel
  - More successful, with caveats
  - Highlighted need to easily replicate
    - Mass produce budgets
    - Need to make budgets equal and therefore comparable

# Scottsdale HOA Characteristics

- HOA definition: not one size fits all
- Owner/Tenant situations
- Seasonal residents
- High board turnover
- Split of “south” and “north”
  - Marketing for these is very different
- Various metering possibilities


# Metering Options



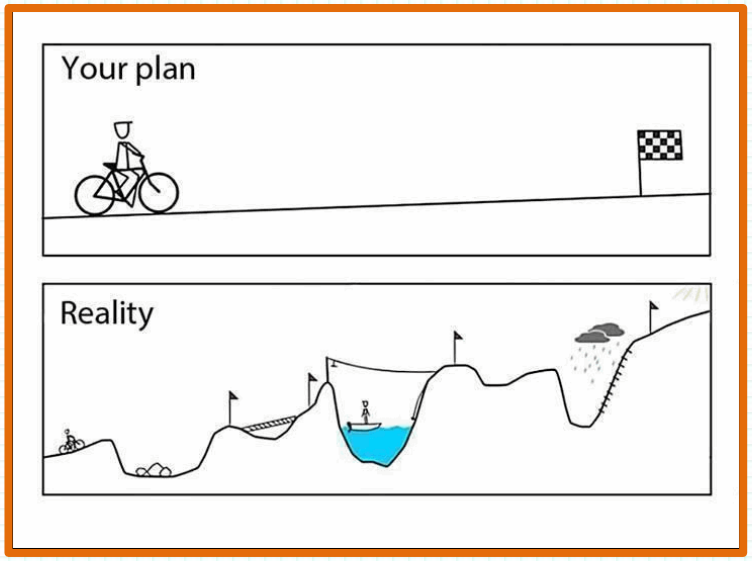

- Landscape only water use
- May have pools
- HOA pays for water applied to landscape
- Objectively the easiest

- Separate water use
- Landscape and indoor use metered separately
- Pools, restrooms – landscape or indoor?
- Indoor – standardized number based upon studies, assumed 100% occupancy

- Mixed water use
- It's all in!
- Objectively the hardest

# Expectation vs. Reality

- Over 700 HOAs receiving Scottsdale Water
- “Easiest” are newer, Xeriscaped, landscape-only meters; “hardest” are older, lush, mixed use meters
- Expectation: go for the easiest and tackle harder budgets when the program is more developed
- Reality: new rebate launch, hard cases seek help

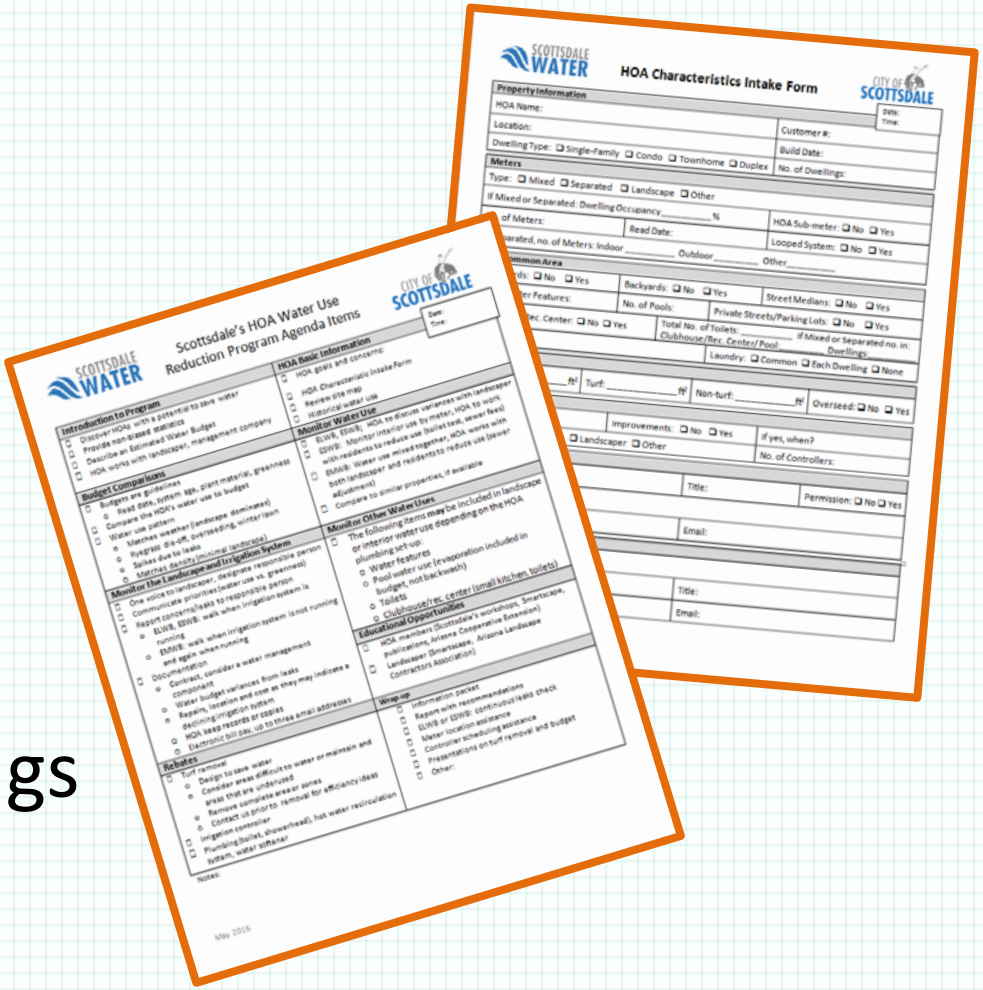


# Program Goals

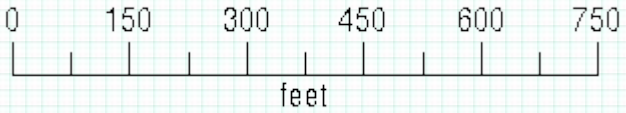

- Provide potential to save
- Gather non-biased statistics
- Benchmark for comparison
- Highlight conservation programs
  - New rebate program launched July 1, 2016
  - Landscape consultations
  - Presentations
  - Monthly reports (eventually)

# Program Process

- If landscape only → irrigation specialist
- Initial Meeting
  - Intake form
  - Standardized agenda
- Decision on report and/or budget
- Measurement via GIS
- Presentation of findings
- Recommendations



# Why use GIS to measure?



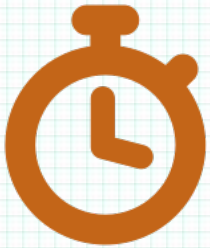

Ultimately both human controlled

| | COMPUTER | FIELD |
|---|---|---|
| Accuracy | Depends | Depends |
| Detail | Depends | Depends |
| Revision | Easy | Difficult |
| Consistency | High | Low |
| Time | Minimal | Intensive |
| Multi-use | Yes | No |

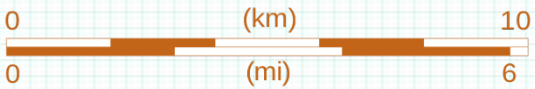
- Every city will have its own needs!
- High HOA volume + staff availability = need to streamline
- The greatest advantage of the computer is the consistency and creation of a database

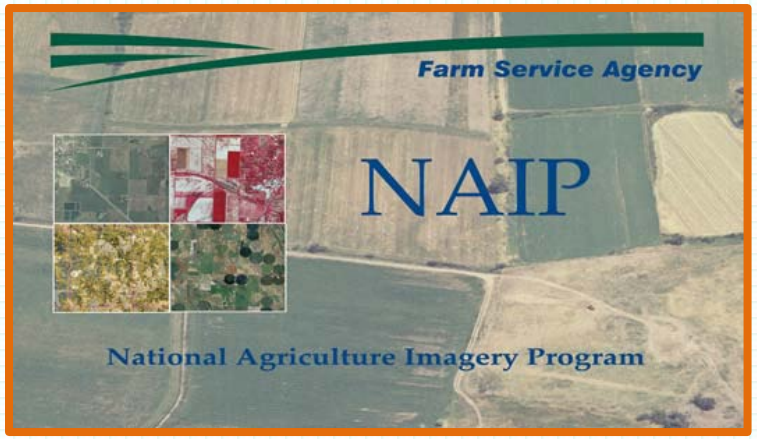
# Challenges of Using GIS

- ArcMap
  - Processing time and extent
  - Confusion
- Photography
  - Availability (sources, in-house, NAIP, studies)
  - Scale
  - Season
- Staff (human error)
  - Time
  - Approval of software
  - Installation of software
    - Space on hard drive & RAM
  - Need of NIR Band







# South

Mostly grass with condos or townhomes

# Middle

Larger units with
isolated patches of grass
and Xeriscape lining

# North

Desert, little to no grass

# Integration with other Platforms

- AMR/AMI – WaterSmart
- Rebates – Aiqeous
- Leaks/Complaints – VCC Reporting System
- Outdoor Water Efficiency Checks
- Water use information – NorthStar

*"Deciding to learn GIS to make a single map would be kind of like saying you want to learn Excel to make one graph."*

-Bill Rankin

# Doing the Math

$$\text{Estimated Annual Landscape Water Budget Per Hydrozone*} = \frac{(A \times ET_0 \times K_c \times CF)}{IE}$$

| | | |
|---|---|---|
| A | Coverage Area | The plant canopy or turf coverage in square feet. |
| $ET_0$ | Reference Evapotranspiration | The water lost in inches per year due to weather conditions. |
| $K_c$ | Plant coefficient | Adjustment factor used to account for the variability between reference $ET_0$ and the plant species or hydrozone. |
| CF | Conversion Factor | Gallons of water needed to cover one square foot with one inch of water. |
| IE | Irrigation Efficiency | Adjustment factor for irrigation performance. |

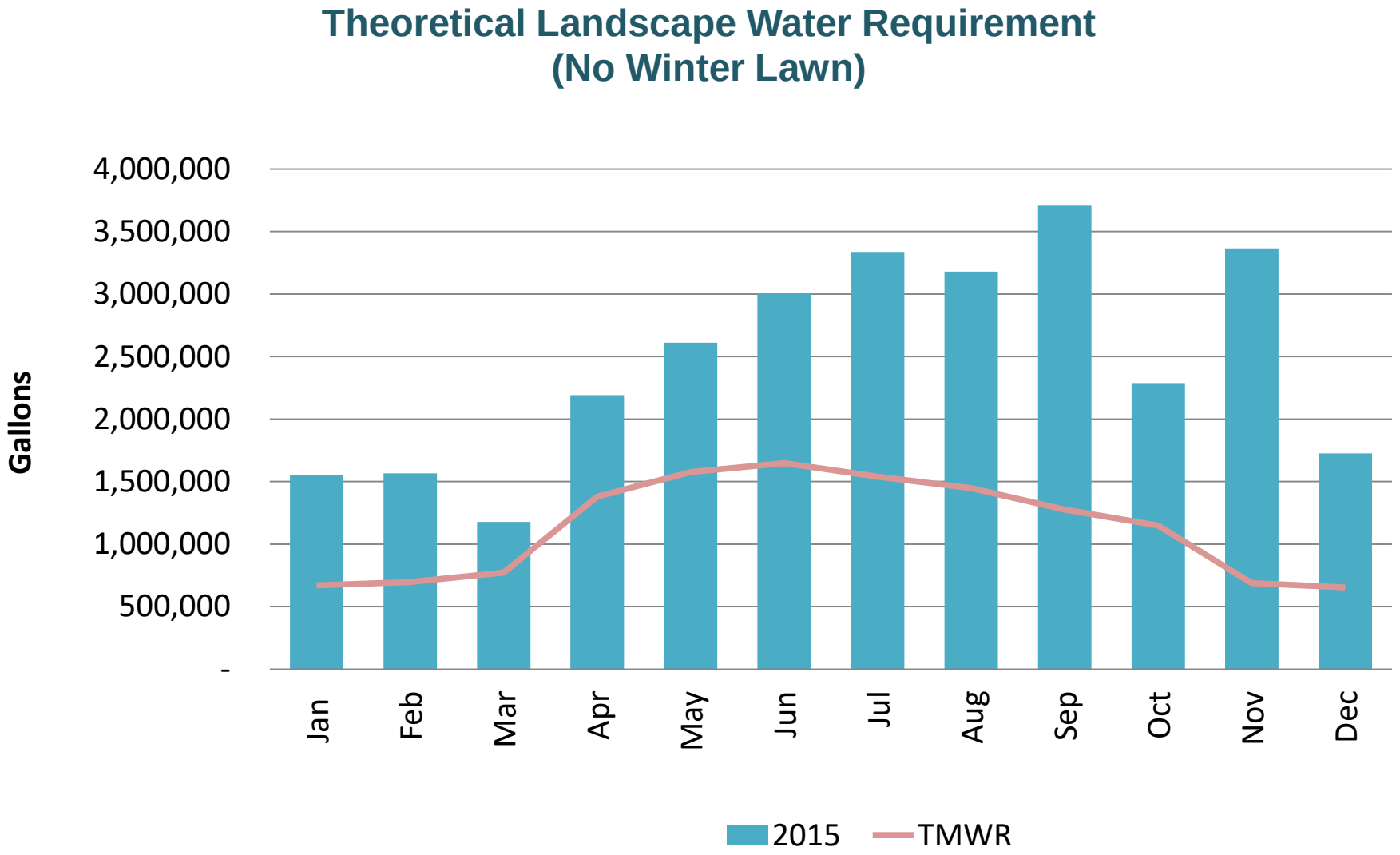
**A portion of the landscaped area having plants with similar water needs and root depths.*

# Doing the Math

Estimated Annual Landscape Water Budget Per Hydrozone* $= \frac{(A \times ET_0 \times K_c \times CF)}{IE}$

| | | |
|---|---|---|
| A | Coverage Area | Square feet calculated from GIS modeling. |
| $ET_0$ | Reference Evapotranspiration | Chaparral (Scottsdale Parks & Rec) for south, Desert Ridge (AZMET) for north. |
| $K_c$ | Plant coefficient | Range of 0 to 1.<br>Typically use .1 to .3 for low-water-use plants; .6 to .8 for turf and high-water-use plants. |
| CF | Conversion Factor | .623; number of gallons of water needed to cover one square foot with one inch of water. |
| IE | Irrigation Efficiency | <u>Spray Nozzle</u><br>HE = 71%<br>LE = 50%<br><br><u>Drip</u><br>HE = 90%<br>LE = 70% |

# Reporting & Recommendations



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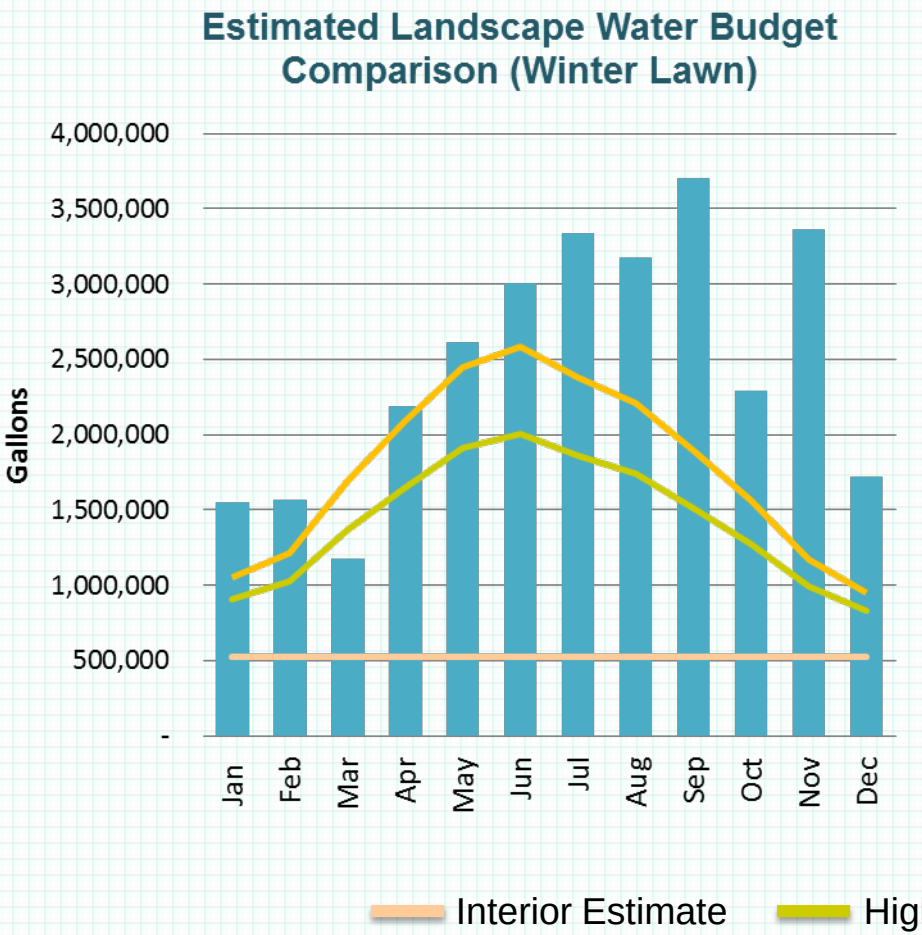
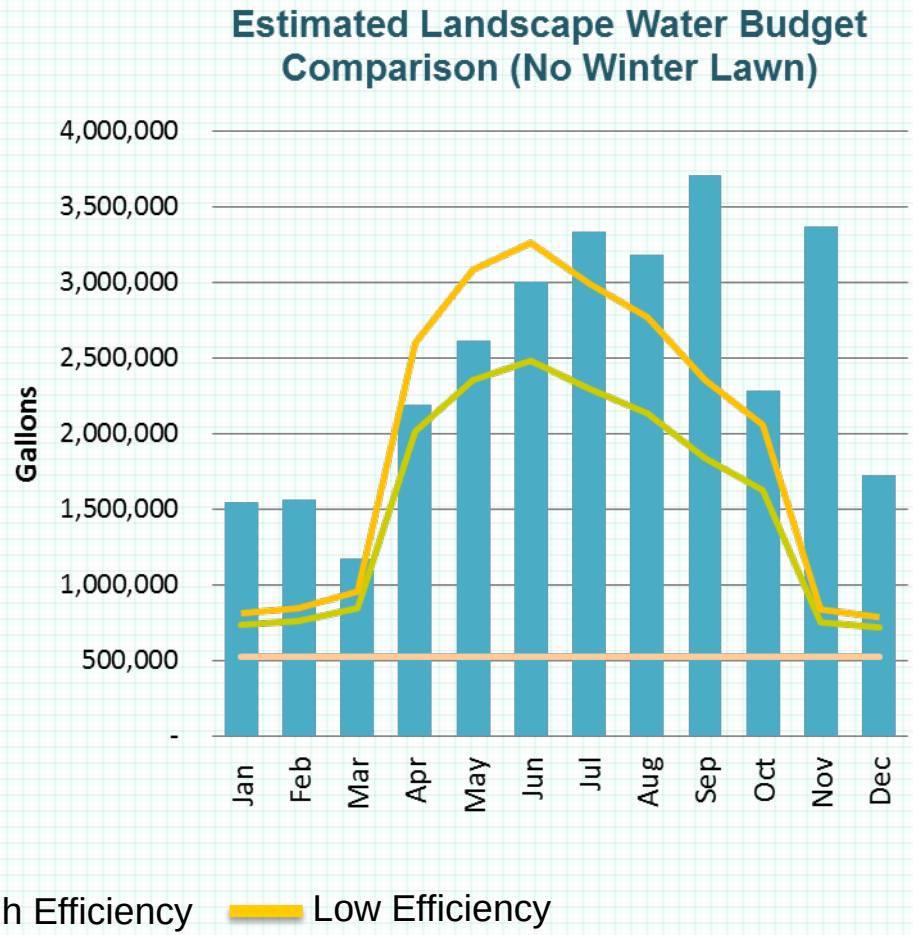
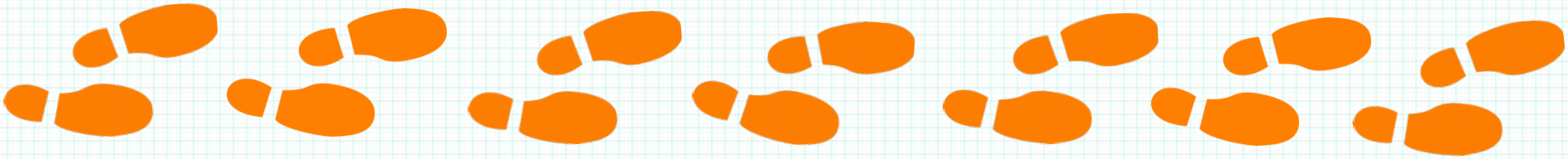



Interior Estimate  High Efficiency  Low Efficiency

# Next Steps



- Deliver budget and/or report to the HOA
  - Conversations about potential water savings
  - Presentations to the community
  - Implement
    - Large variance in execution time
- Begin marketing to “easier” HOAs (low hanging fruit)
- Educate internal customers

# Questions?

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