This presentation premiered at WaterSmart Innovations

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“Irrational Irrigation - Applied to Water Conservation Practices”

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“Knowing the solutions to the problems is not the problem, rather knowing the problems is the problem.”

- Cable Jones

Irrational –

adjective

1. without the faculty of reason; deprived of reason.

2. without or deprived of normal mental clarity or sound judgment.

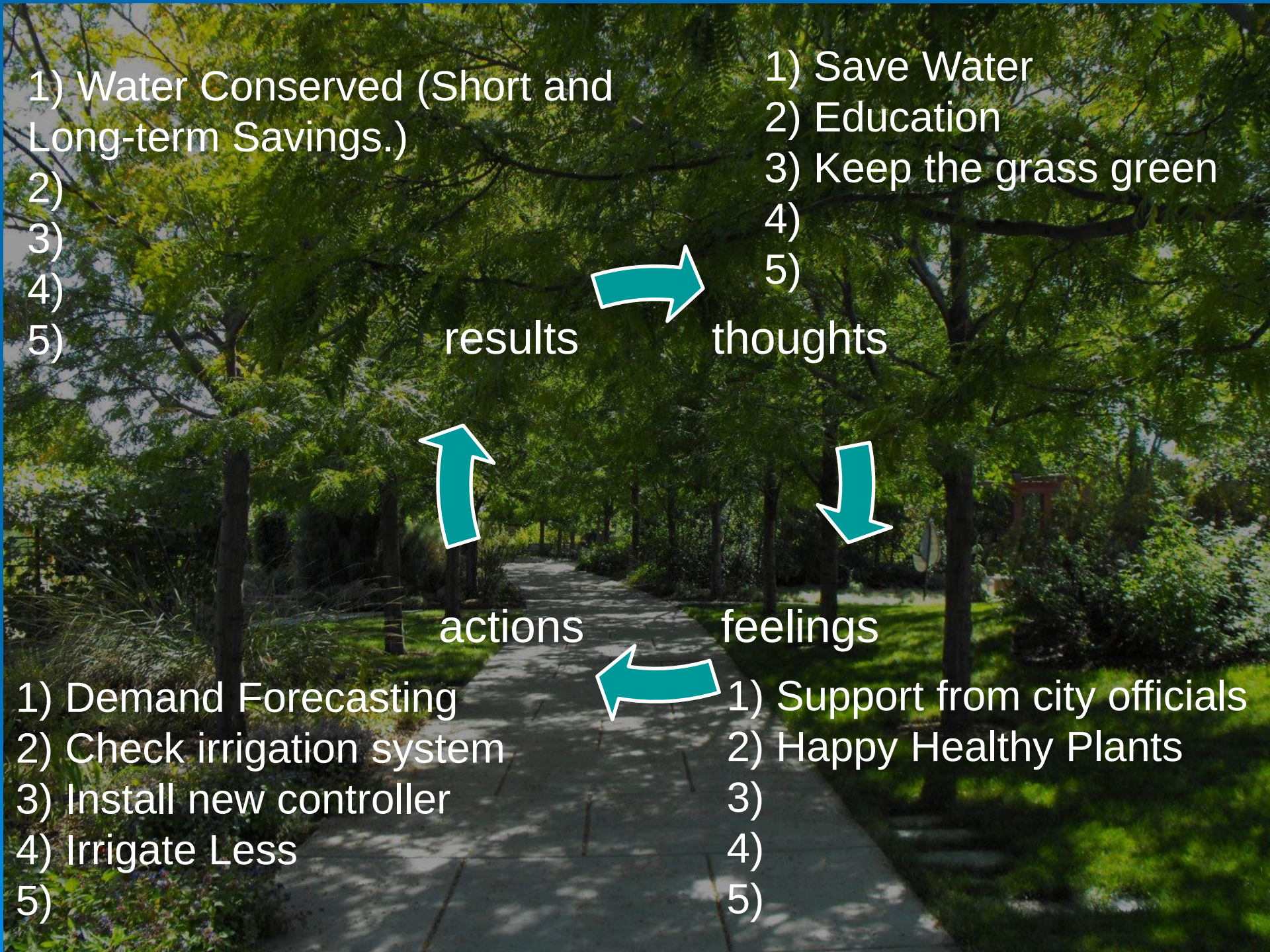
3. not in accordance with reason; utterly illogical.

Price Drops ↓ Buy Slightly More

Price Increases ↑ Cut Back by 2 ½ times

Irrational Response

(Story taken from “Sway” by Ori Brafman and Rom Brafman, page 18.)


1) Water Conserved (Short and Long-term Savings.)
2)
3)
4)
5)
results
1) Save Water
2) Education
3) Keep the grass green
4)
5)
thoughts
actions
feelings
1) Demand Forecasting
2) Check irrigation system
3) Install new controller
4) Irrigate Less
5)
1) Support from city officials
2) Happy Healthy Plants
3)
4)
5)

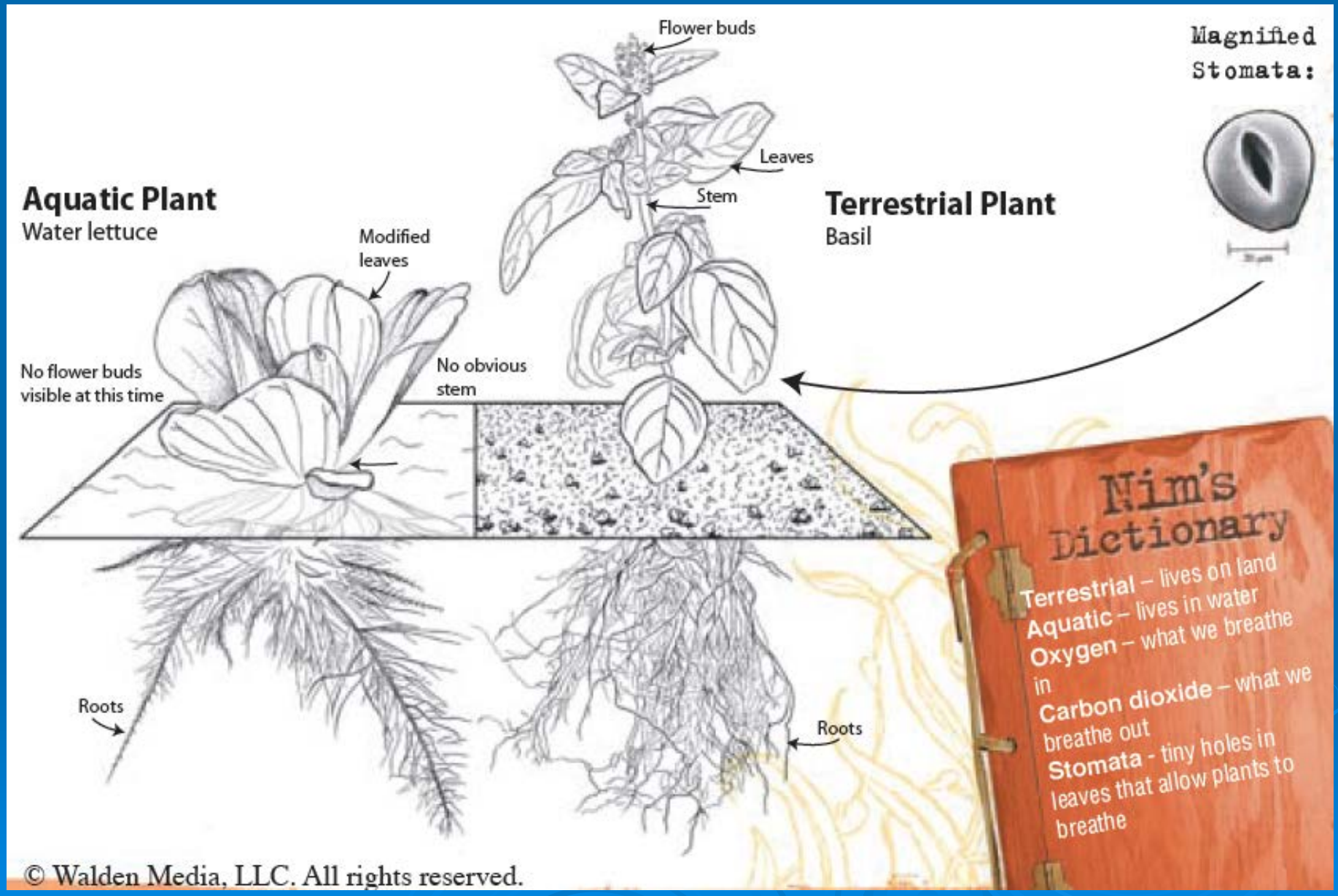
Many are resistance to change. WHY?

PEOPLE'S MINDS: Green = Healthy and Happy

PEOPLE THINK:
What is ___% of Healthy(Green)? = Sick Turf/ Dead turf

CORRECT THOUGHTS/FEELINGS:
What is ___% of Green? = GREEN/ Healthier

Happy Healthy Turf & Happy Trees & Shrubs



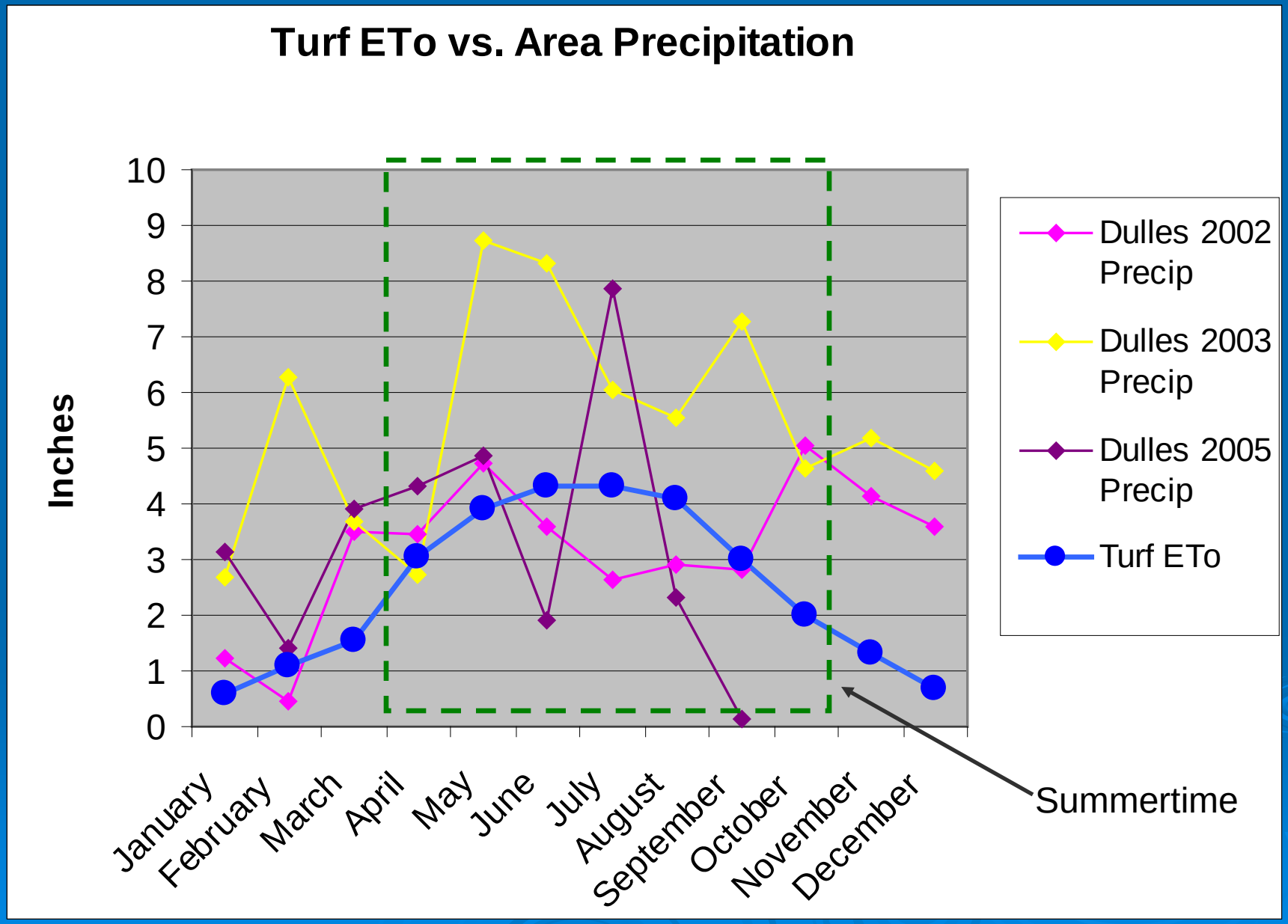
Landscape

More than 12 years old


12 years old
Jordan Valley Water Conservation Gardens
South Jordan, UT

Example:
Too much
water

Versus:
Natural
Xeriscape
Size

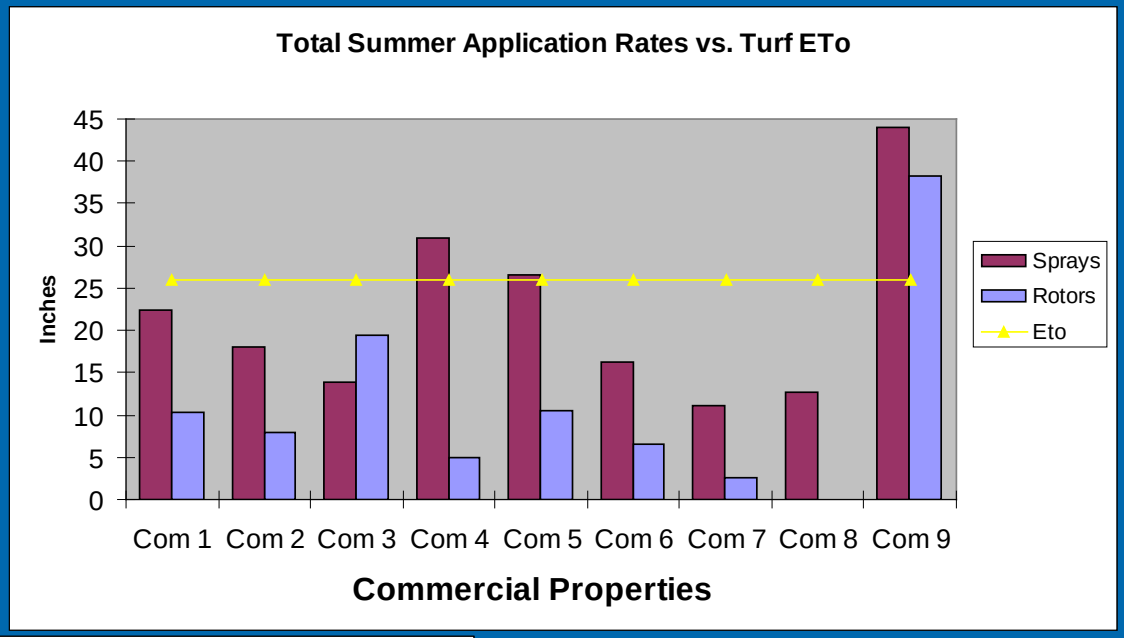


(Unpublished Master's Thesis from Master's of Horticulture: Water-Efficient Landscaping Emphasis 2005)

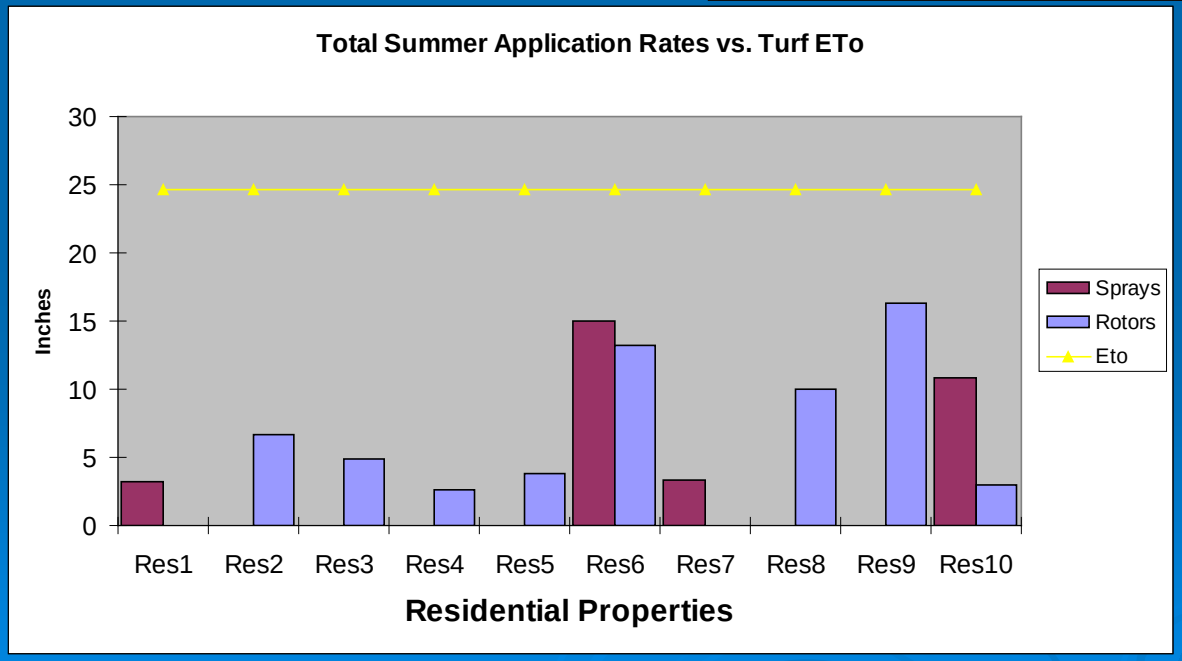
This resident said, “Due to the very dry summers in Northern Virginia, irrigation systems are critical in maintaining the landscape.”

Photos Taken August 11, 2005

(Unpublished Master’s Thesis from Master’s of Horticulture: Water-Efficient Landscaping Emphasis, 2005)

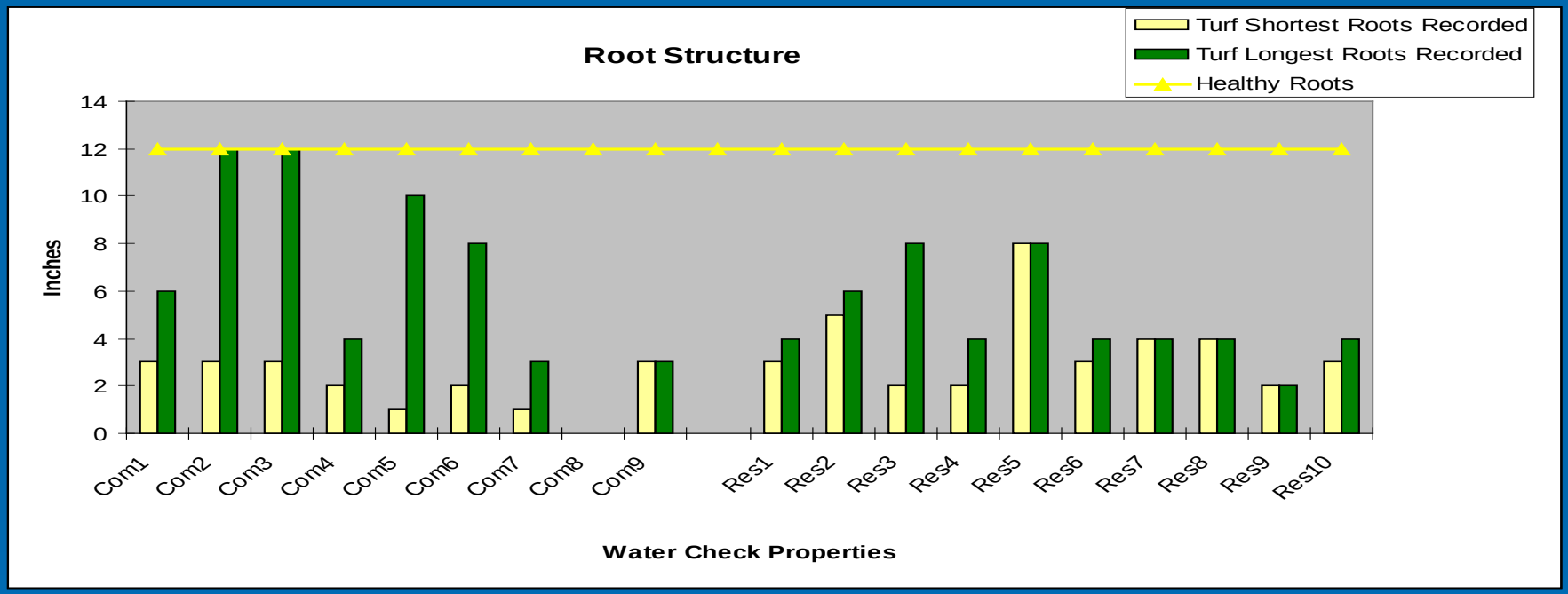


113 applications of water



53 applications of water

(Unpublished Master's Thesis from Master's of Horticulture: Water-Efficient Landscaping Emphasis, 2005)



(Unpublished Master's Thesis from Master's of Horticulture: Water-Efficient Landscaping Emphasis,2005)

Rotors not installed to equal head to head spacing cause lower than default ½ inch.

½ inch/hr

.08 inches applied per day

3/8 inch/hr

.06 inches applied per day

Typical **runtime** for rotors in high rainfall areas = 10 minutes.

Northern Virginia

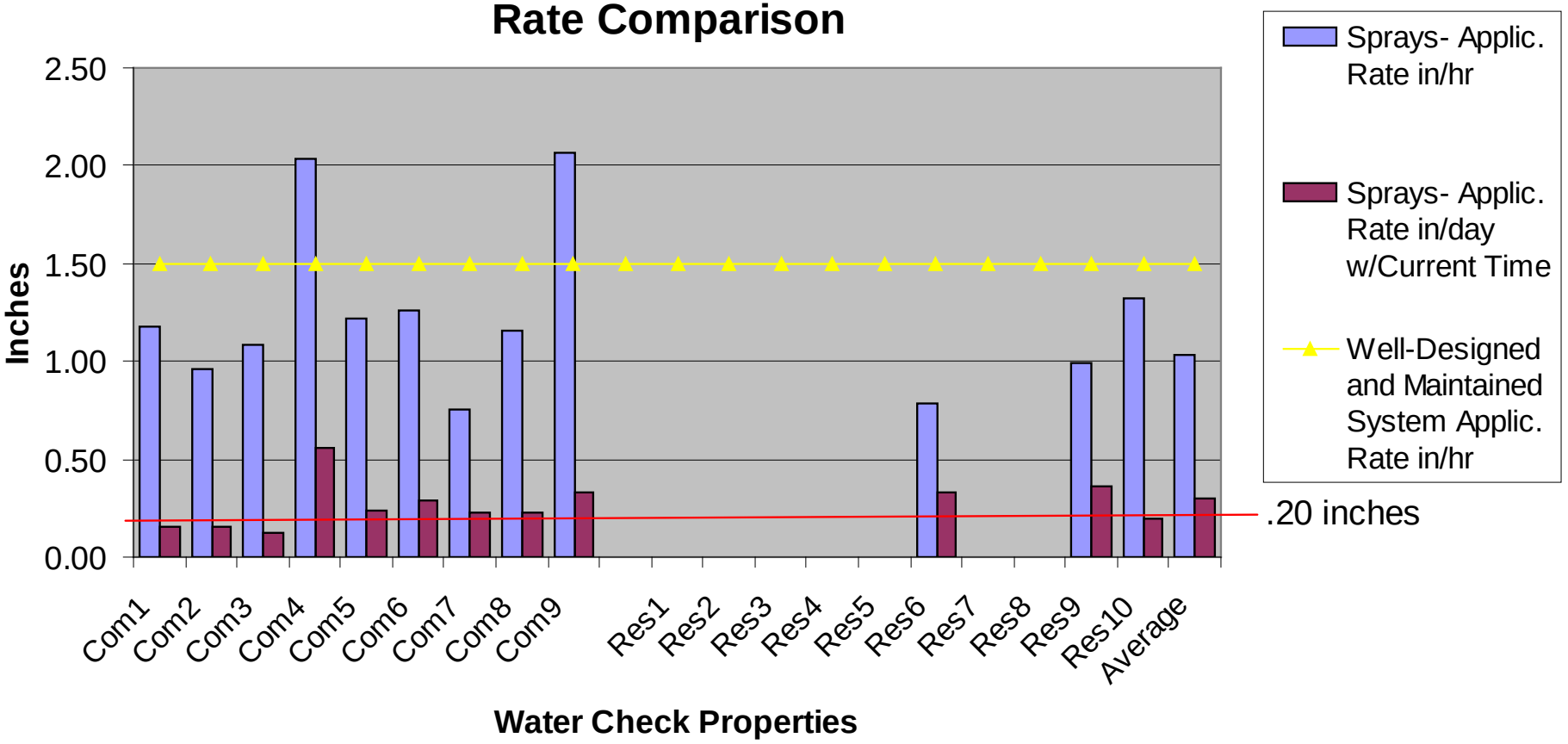
Month

	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
ET_o :	1.33	1.68	2.69	3.87	4.55	5.49	5.58	4.85	3.69	2.6	1.87	1.36	**39.56**
Average Daily:	0.04	0.05	0.09	0.12	0.15	0.18	0.18	0.16	0.12	0.08	0.06	0.04	

Average Min: .04” ETo Daily

Average Max: .18” ETo Daily

Current vs. Well-Designed and Maintained System Application Rate Comparison



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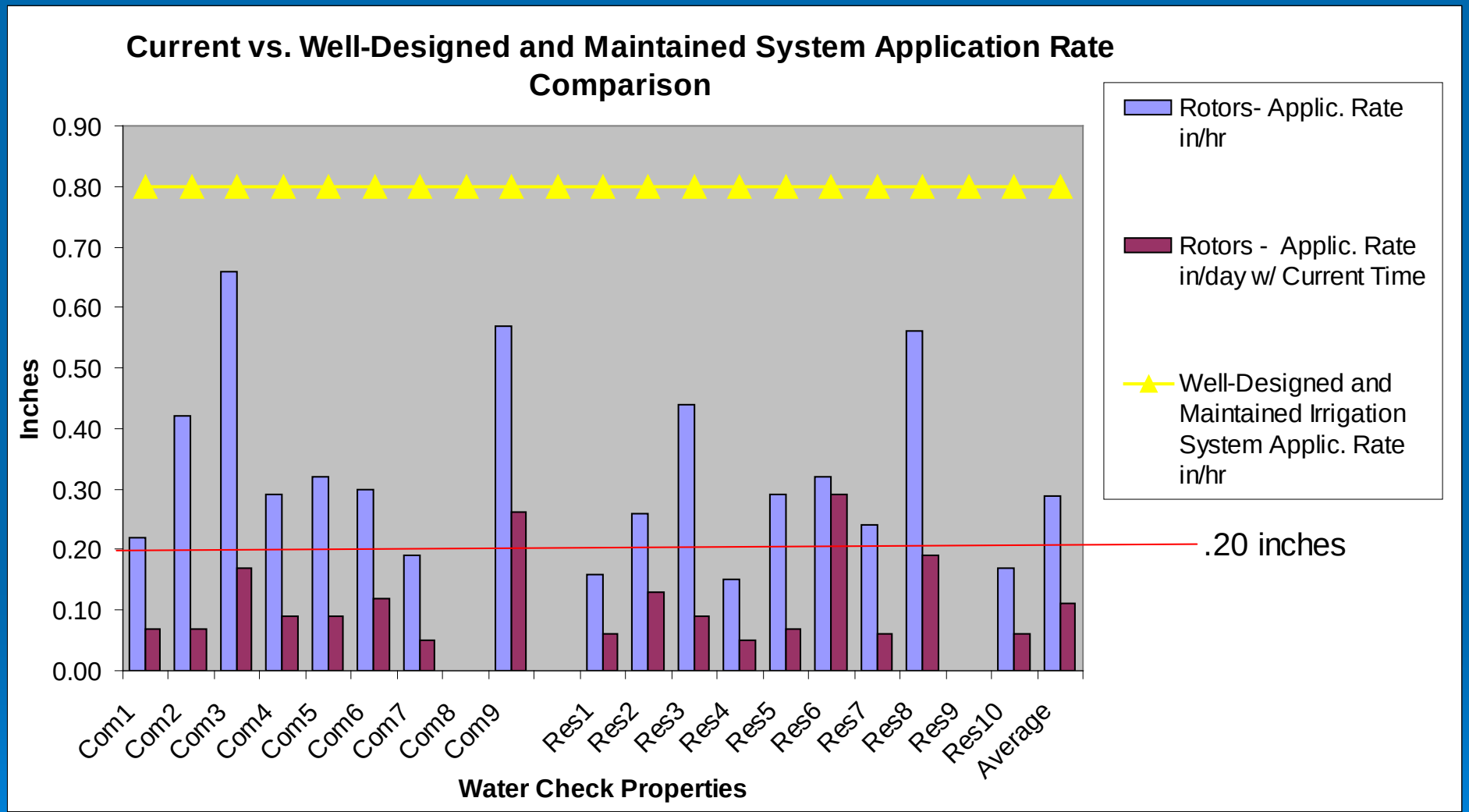
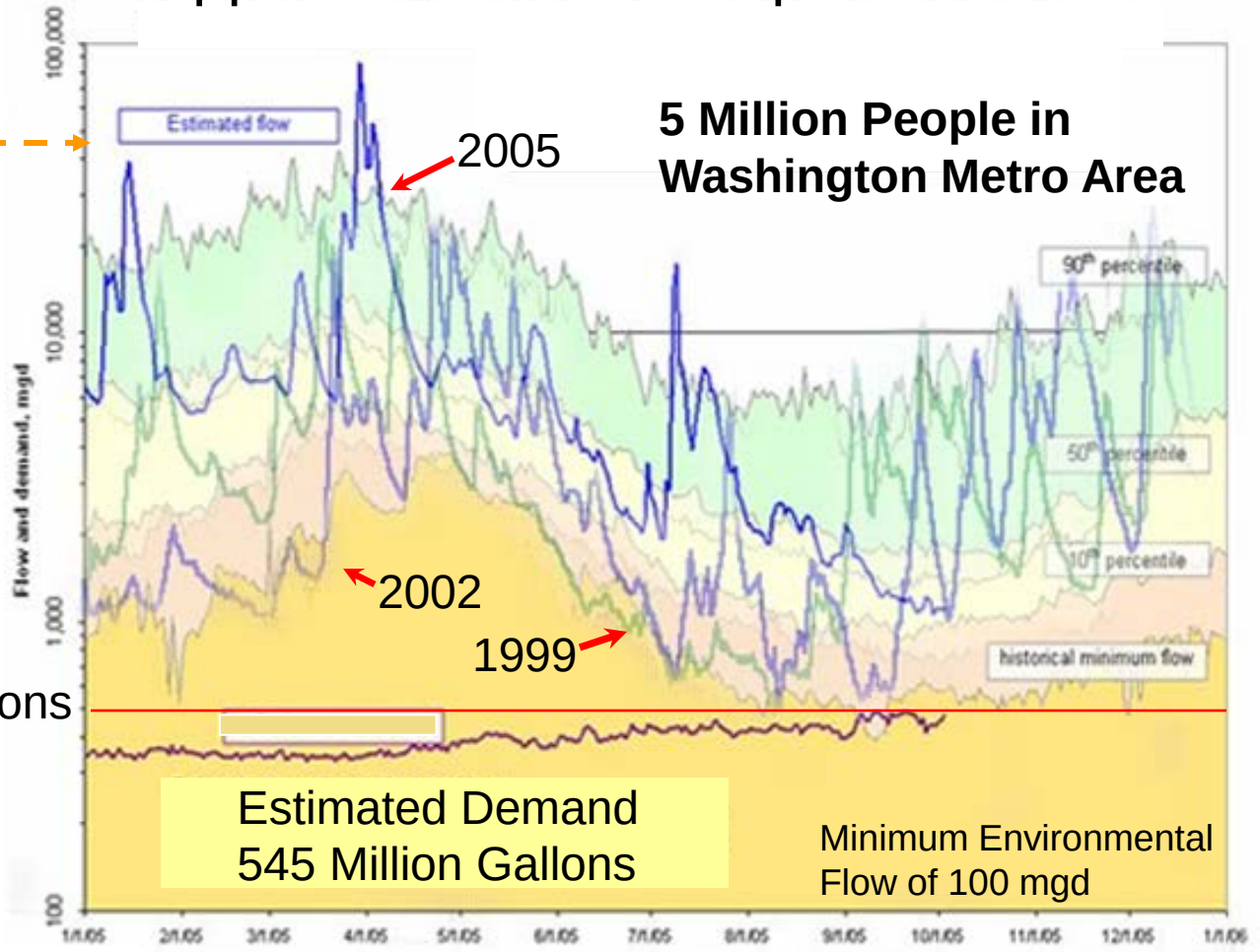


(Unpublished Master's Thesis from Master's of Horticulture: Water-Efficient Landscaping Emphasis)

Potomac River Supplies 75% of municipalities water

Total Amount in Storage Reservoirs 58.4 Billion Gallons Supplies 25% of area water



Restrictions 600-700 Million Gallons

0

Potomac Watershed Drainage Area: 11,560 sq. miles

545,000,000 gallons = 1,672 acre foot

Estimate Outdoors Water Use: **40%**

218,000,000 gallons = 669 acre foot

(Unpublished Master's Thesis from Master's of Horticulture: Water-Efficient Landscaping Emphasis)

Question: Does the presence of overcast days decrease irrigation?

Texas campus - Irrigation Usage (gallons)				
2006	2007	2008	2009	2010
10,827,599	**3,622,489**	10,785,262	11,160,384	10,099,496

Dallas/Fort Worth - Monthly and Annual Precipitation

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2010	2.76	2.83	3.57	2.03	1.09	2.08	3.13	0.41	9.09	1.16	1.5	1.95	31.60
2009	0.82	0.72	5.56	3.54	4.36	3.98	2.09	1.64	6.52	8.05	1.76	1.85	40.89
2008	0.27	2.3	6.07	3.85	2.21	0.84	0.81	2.82	0.84	2.29	4.53	0.27	27.10
2007	5.58	0.43	3.81	2.82	8.34	11.1	5.54	0.35	4.99	3.53	1.22	2.34	50.05
2006	2.25	3.85	4.4	1.86	1.9	0.34	1.78	0.52	2.6	4.34	2.58	3.33	29.75

1974-present: Dallas/Fort Worth International Airport

1) Historical Rainfall occurs quickly mostly downpours, all in one day or two days with little the rest of the month

2) Higher Number of Overcast Days than of the other years

3) During Overcast Days - Grass/Turf Color is not on the front of people's minds

4) Irrigation Systems not turned on until later in summer

Residential/Commercial Problem: Changing the Controller for Seasons

Irrigation Schedule - Northern Utah	
Month	**Interval**
Startup until April 30	Once every 6 days
May	Once every 4 days
June	Once every 3 days
July	Once every 3 days
August	Once every 3 days
September	Once every 6 days
October 1 to Shutdown	Once every 10 days

Irrigation Schedule - Southern Utah	
Month	**Interval**
Startup until March 31	Once every 8 days
April	Once every 5 days
May	Once every 4 days
June	Once every 3 days
July	Once every 3 days
August	Once every 3 days
September	Once every 5 days
October	Once every 7 days
November 1 to Shutdown	Once every 10 days

Fort Worth/Dallas Areas Irrigation Schedule												
Interval of Irrigation (Days)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bermuda	30	21	14	7	4	3	3	4	4	6	14	30
Rye	14	10	7	4	3	grass dies out				3	10	14

Add Station 2: Step 6 of 6

Sprinkler Output - Spray Head

Specify the precipitation rate of your sprinklers. Measuring your sprinkler output will help ensure an accurate watering schedule for this station.

An easy way to check your sprinkler output is to use three empty tin cans of identical size.

1. Place them at different distances from the sprinkler, within the sprinkler pattern, as shown here.
2. Turn on the water for 15 minutes.
3. Empty all water into one of the cans.
4. Using a ruler, measure the depth of the water.
5. Divide by three to get the average.
6. Multiply by four to get inches per hour.

○ Enter inches per hour:

◉ Use default (1.5 inches/hr.)

« Back | Continue »

Programming screen of ET Water brand of central controller.

Outdoor WCM:

Irrigation Controller Programming (Correcting Precip Rate)

# of schools: 108

Per Unit Investment: $300 (2 Catch Cup Tests per school)

Total Investment: $32,400

Total Irrigation Water Gallons Saved: **22,523,810**

Total Dollar Savings @ city rate: **$98,452**

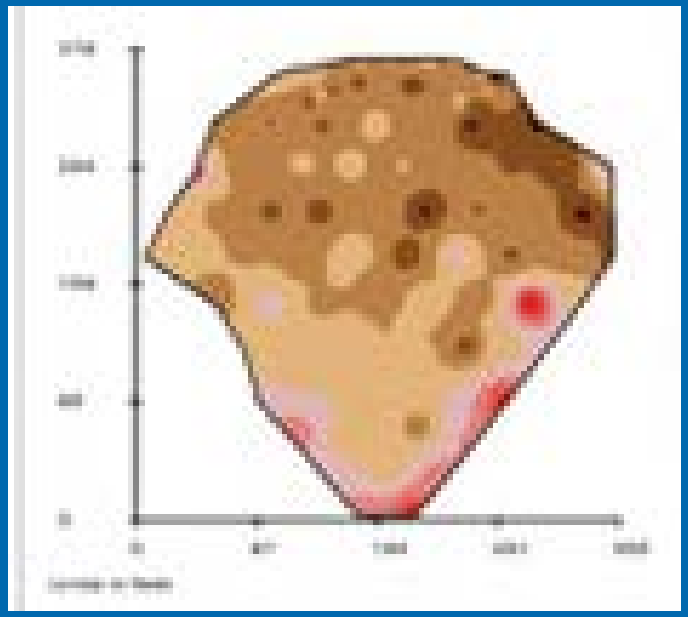
Simple Payback: 3.6 months

- The track, which cost $750,000…….
- the cost of the proposed high school track reconstruction project…..estimated $615,000 to $450,000 or lower, representing a “bare bones” approach.
- The proposal….cost about $200,000….the track would be resurfaced using a “flood and chip” process, extend the track’s life….five to seven years.
- That project projected to cost $1.3 million if it were included in the 2012-13 budget, for complete track replacement.

High Schools in Hard water areas

1) Damage to due to hard water buildup from over spray by irrigation system.
2) The cost of replacing the track is hugely expensive.
3) Replacement delayed if irrigation system was designed subsurface or with spray heads spraying inward set in the concrete around the entire field.

Soil Moisture (TDT Sensor)



Compaction Testing

Why?
Ground needs to Cushion Players
Problem: Ground is saturated, game is played, compaction happens. Existing irrigation scheduling creates the problem.
Current Solution: Aerate or replace the turf & start again, expensive

Correct Solution: Irrigate to Field Capacity, Ground Holds Structure, Cushions Players

Expectations Kept At Status Quo Before/After Water Conservation Program

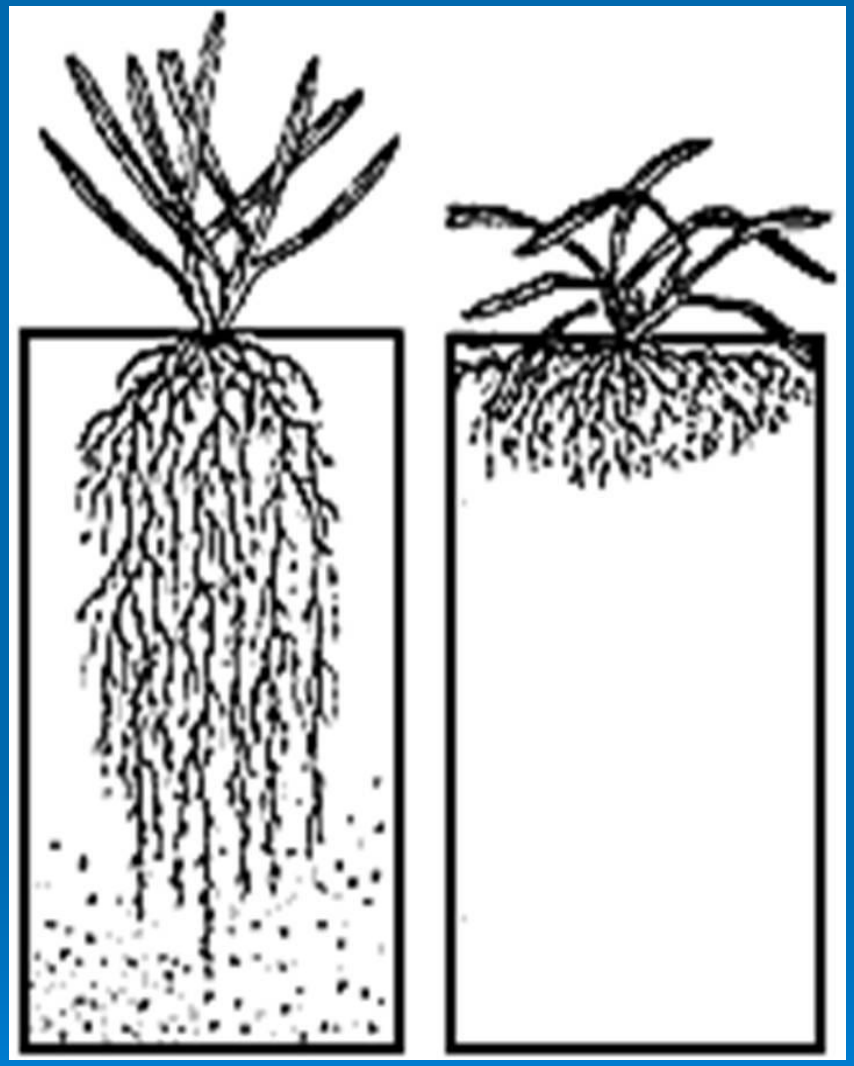
Brown Out Coefficient: Level of Acceptable Dormancy

Pre-Program: Due to Over Irrigation

Post-Program: Due to Training roots for Drought Tolerance, deep roots = slower appearance of dormancy

Deep Roots

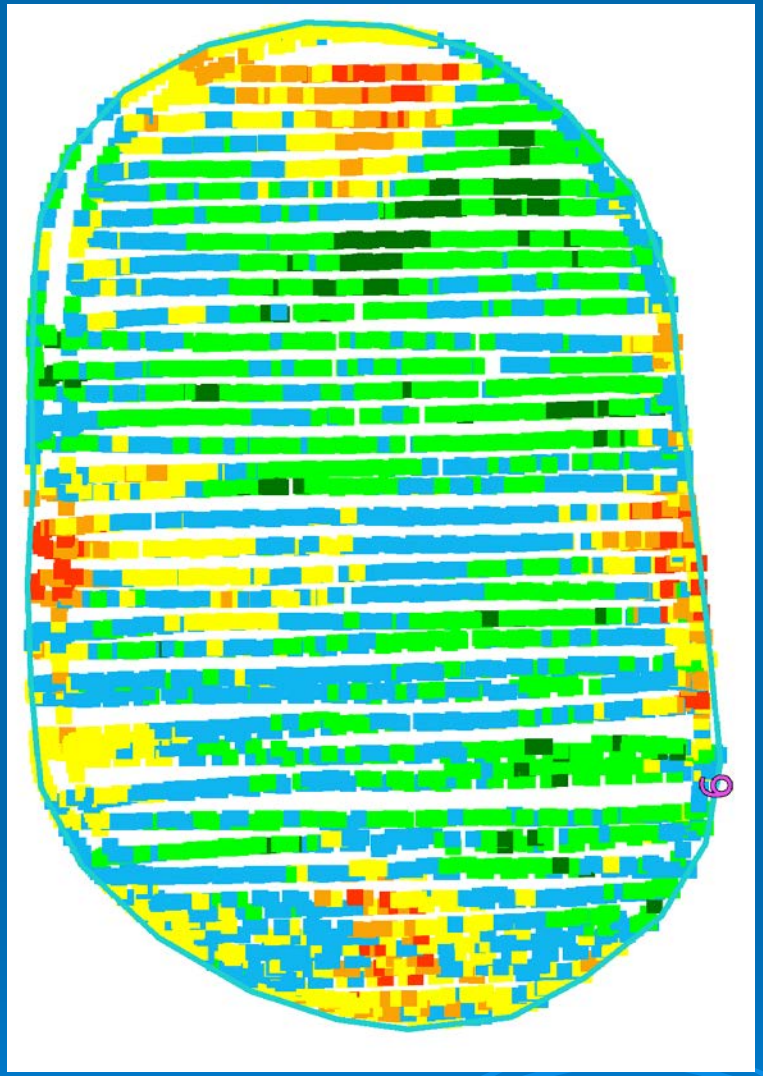
Drought Tolerant Turf goes into dormancy a lot slower and recovers a lot faster once cool temperature returns.



Cool Season Turfgrass

Shallow Roots

Run out of water,
Turf goes into dormancy almost over night.



Infrared/Near-Infrared Sensors (NDVI)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