2016 Arizona Water Summit

ANDY STAPLES, ASGCA
STAPLES GOLF DESIGN
JUNE 21, 2016


WATER
An architect's view on what's going on…


Never has efficiency been so attainable than now, nor has it ever been so important.

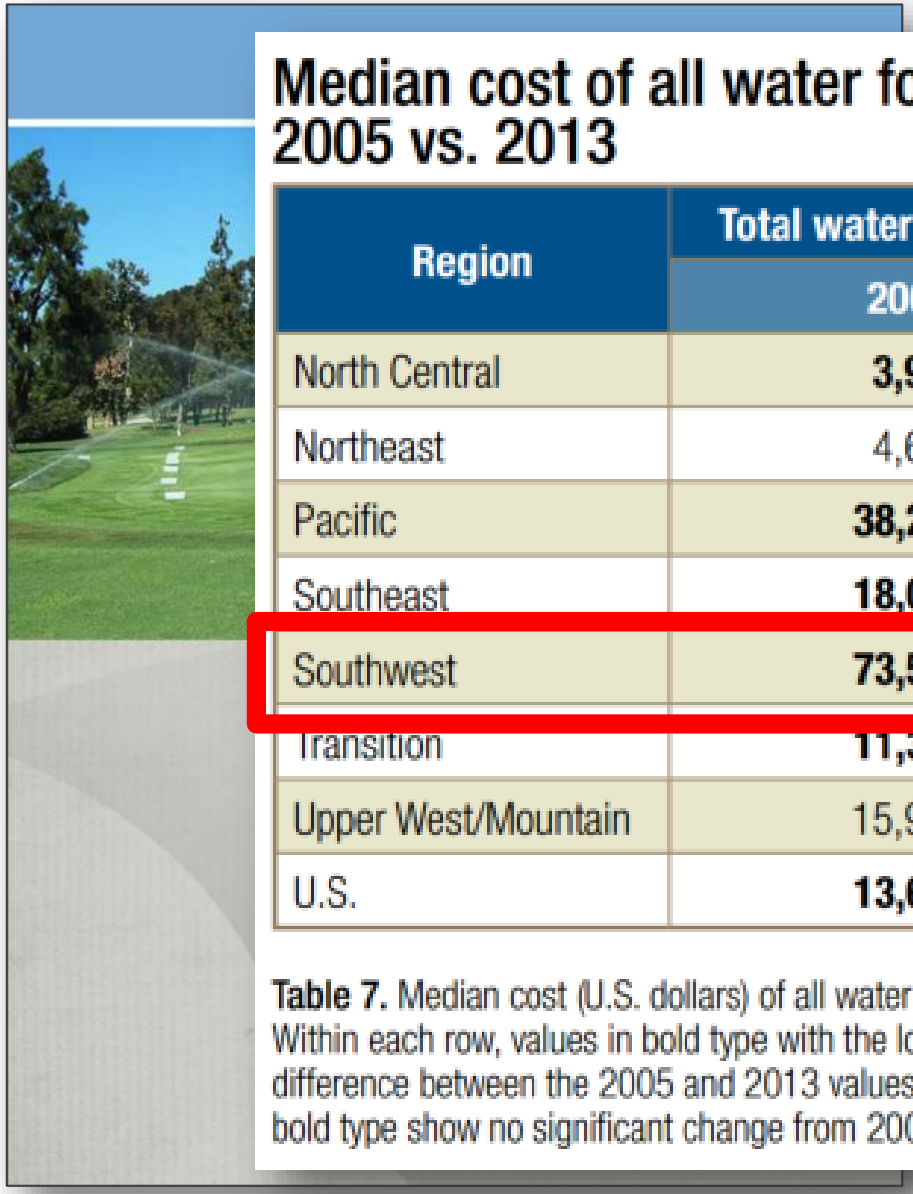
Simon Sinek:

How great leaders inspire action

TEDxPuget Sound · 18:04 · **Filmed** Sep 2009

43 subtitle languages

View interactive transcript



Median cost of all water for an 18-hole golf course, 2005 vs. 2013

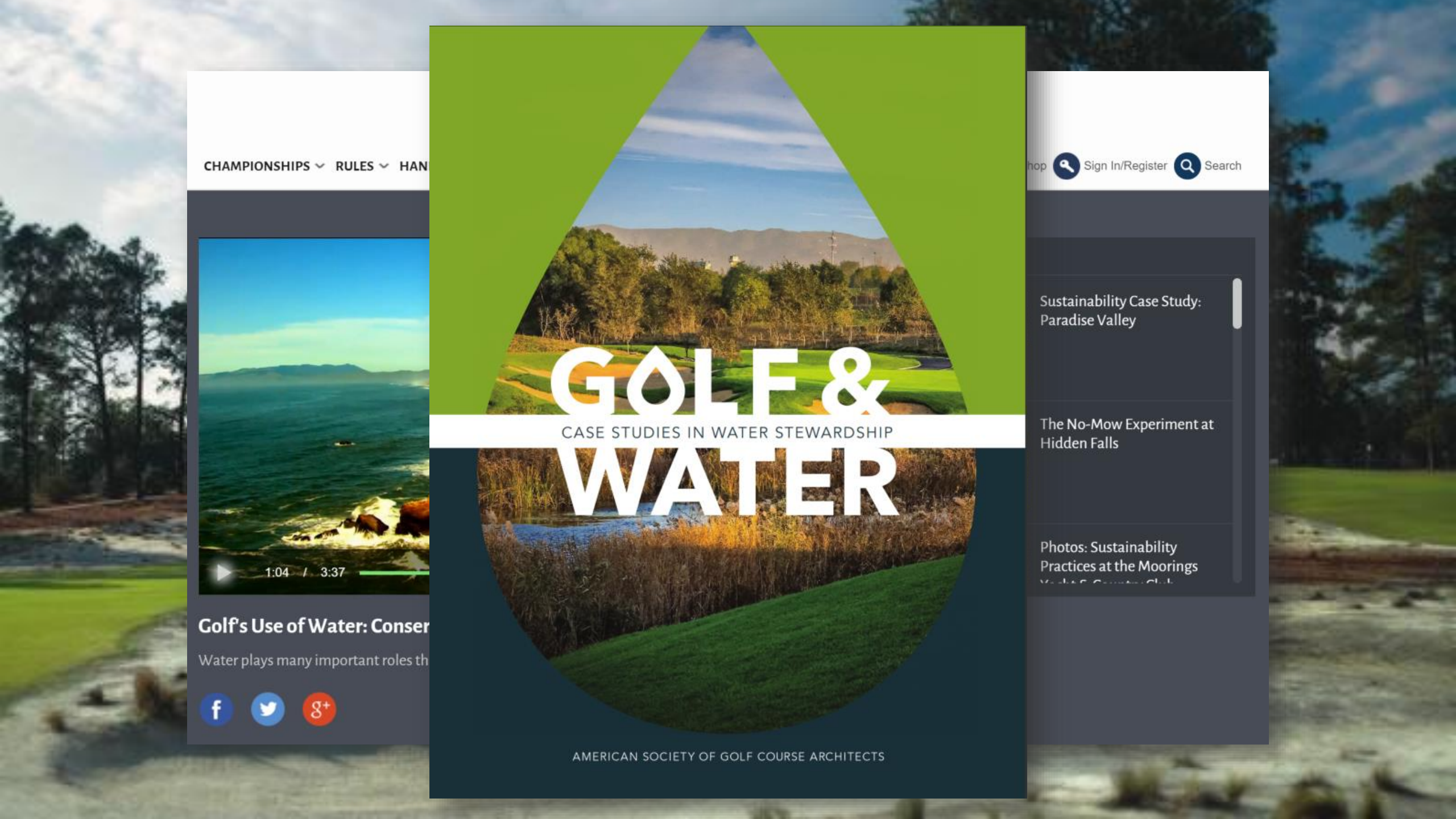
Region	Total water cost/18-hole golf course (U.S. dollars)	
	2005	2013
North Central	**3,991**	**1,734***
Northeast	4,643	7,202
Pacific	**38,263***	**159,730**
Southeast	**18,025***	**28,854**
Southwest	**73,598***	**140,301**
Transition	**11,357***	**16,415**
Upper West/Mountain	15,960	20,431
U.S.	**13,645***	**23,870**

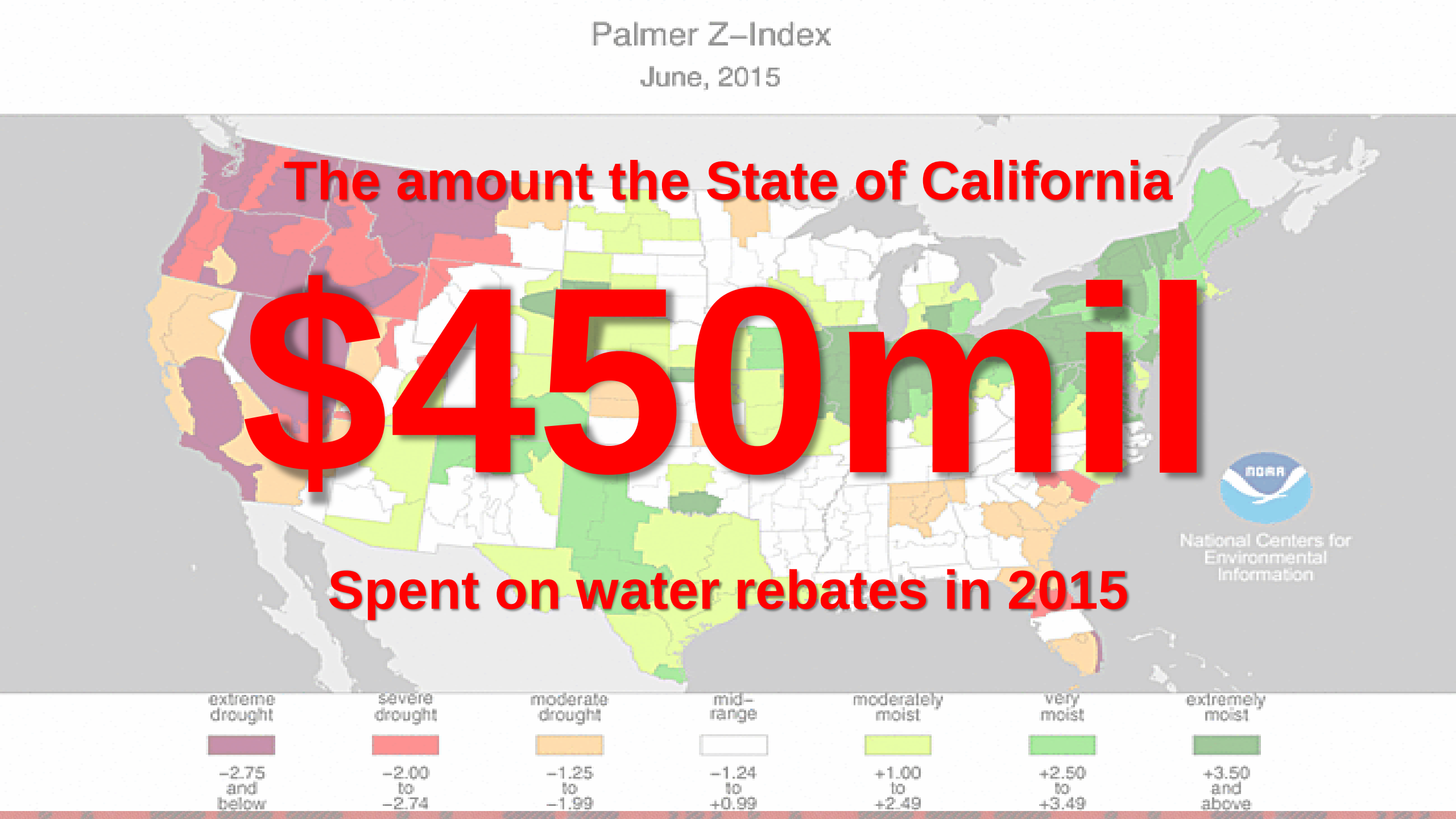
Table 7. Median cost (U.S. dollars) of all water for an 18-hole golf course in 2005 vs. 2013. Within each row, values in bold type with the lower value followed by an asterisk show a significant difference between the 2005 and 2013 values, at the 90% confidence level. Values that are not in bold type show no significant change from 2005 to 2013.

, 2005 vs. 2013

t/year	
2013	% change
1,859,021	-21.8
198,041	-25.7
94,194	-19.4
107,185	-0.6
548,524	-39.3
532,149	0.2
181,379	-25.4
197,548	-5.4

-feet, 2005 vs. 2013.


CHAMPIONSHIPS
RULES
HAN
hop
Sign In/Register
Search
1:04 / 3:37
Golf's Use of Water: Conser
Water plays many important roles th
Sustainability Case Study: Paradise Valley
The No-Mow Experiment at Hidden Falls
Photos: Sustainability Practices at the Moorings
GOLF &
CASE STUDIES IN WATER STEWARDSHIP
WATER
AMERICAN SOCIETY OF GOLF COURSE ARCHITECTS

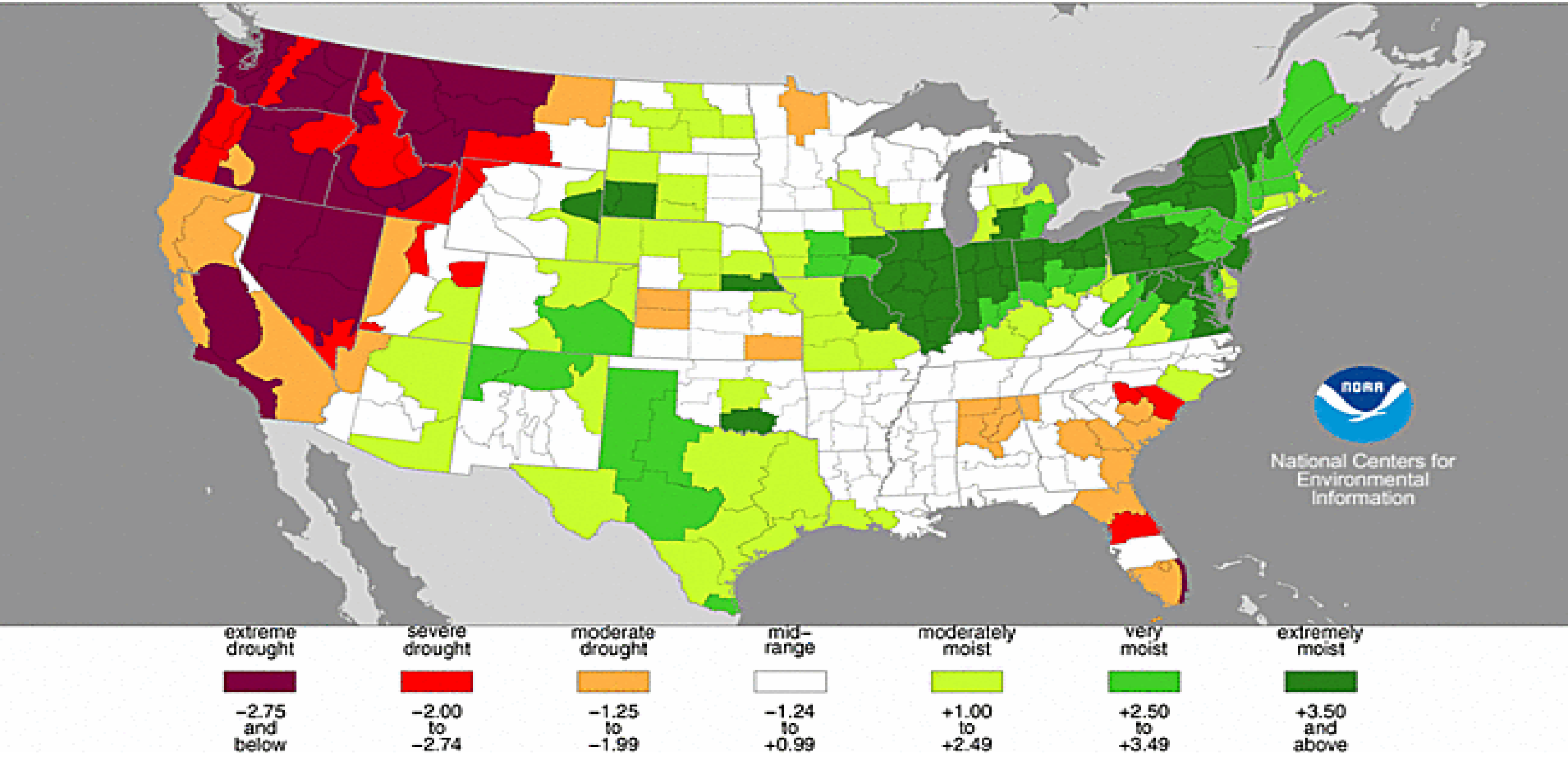

Palmer Z–Index
June, 2015
The amount the State of California
$450mil
Spent on water rebates in 2015
National Centers for Environmental Information
extreme drought
severe drought
moderate drought
mid–range
moderately moist
very moist
extremely moist
–2.75 and below
–2.00 to –2.74
–1.25 to –1.99
–1.24 to +0.99
+1.00 to +2.49
+2.50 to +3.49
+3.50 and above

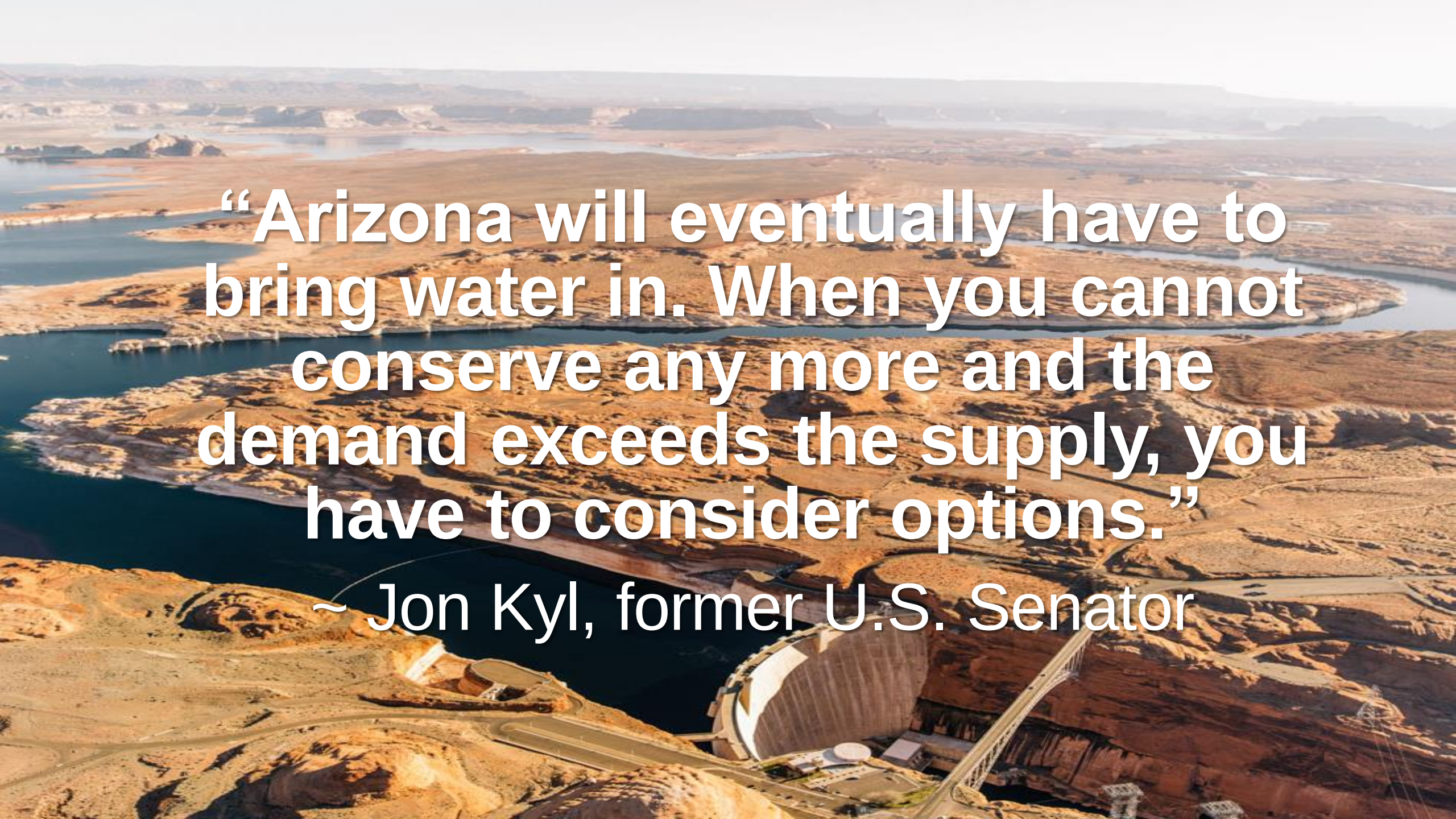

Amount the U.S. spends annually
$4 Billion
on energy efficiency programs

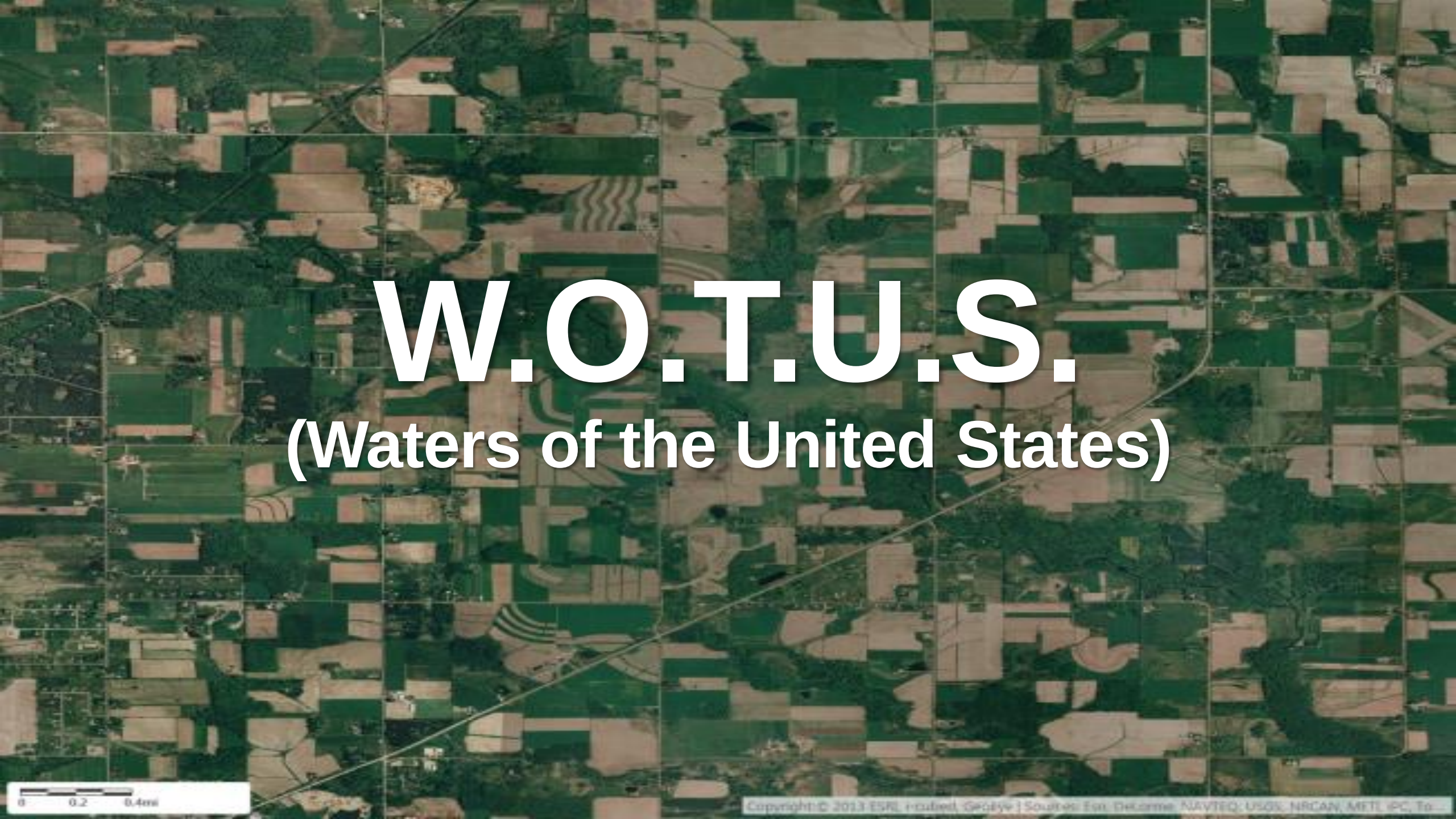

It’s the “WHY” in
what we do!

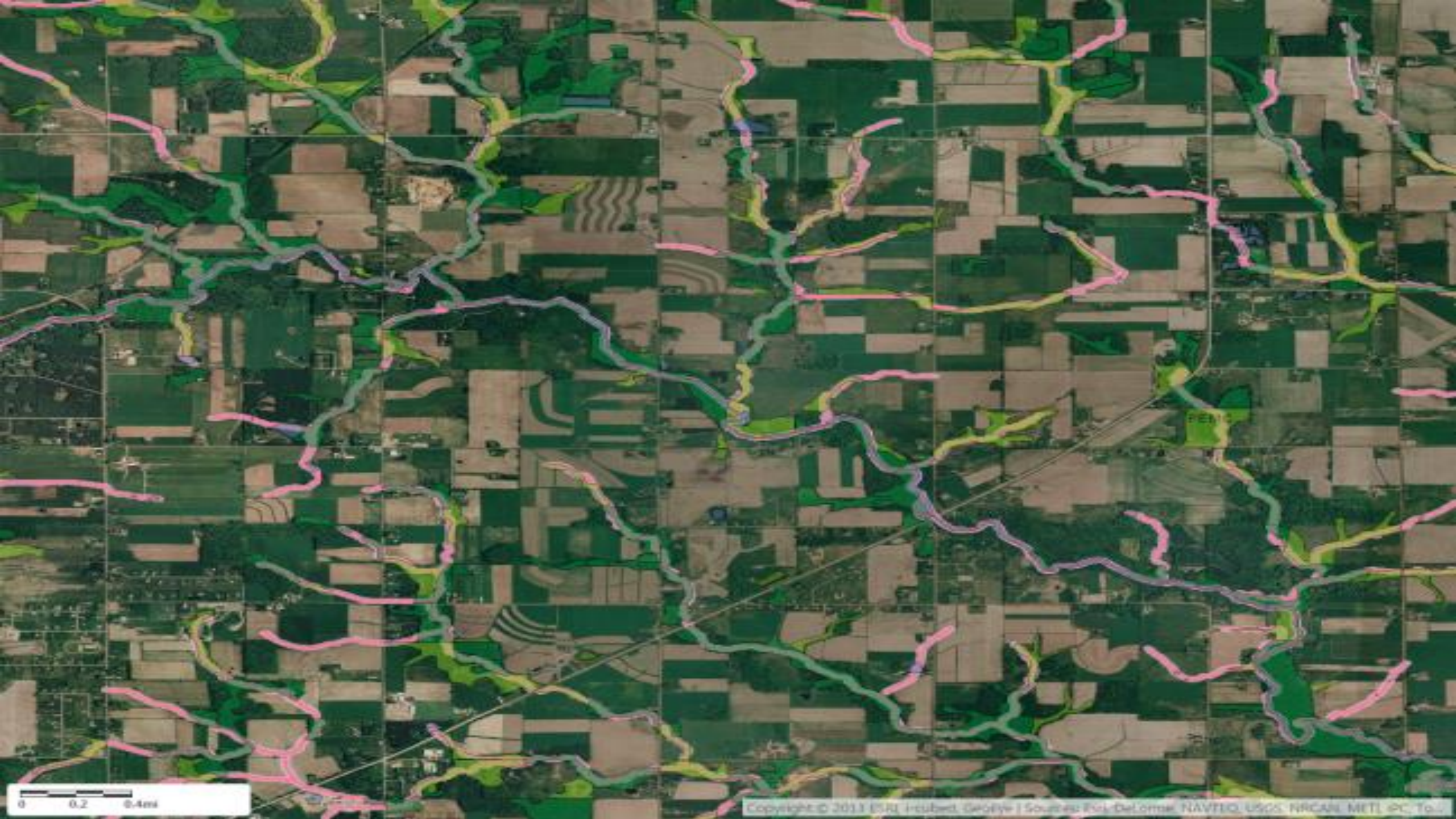
Palmer Z–Index

June, 2015




“Arizona will eventually have to bring water in. When you cannot conserve any more and the demand exceeds the supply, you have to consider options.”
~ Jon Kyl, former U.S. Senator


W.O.T.U.S.
(Waters of the United States)
0 0.2 0.4mi
Copyright © 2013 ESRI, i-cubed, GEBCO | Source: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, To...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0.2
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Copyright © 2013 DigitalGlobe | Sources: FirstDefense, NAVTEQ, USGS, NRCAN, METI, PC, To...


FEMC
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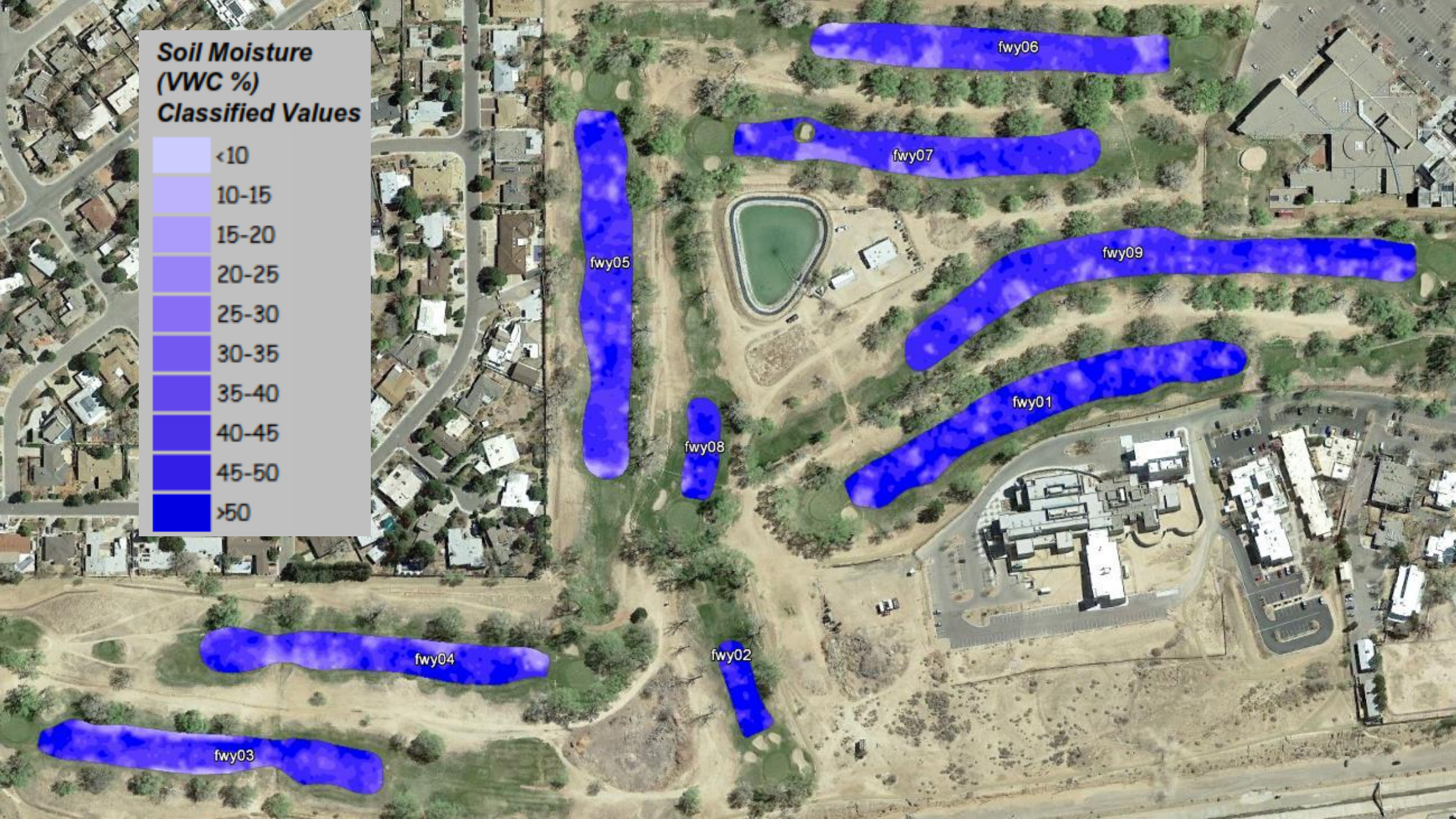
Welcome To
The Future


Soil Moisture
(VWC %)
Classified Values
<10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-50
>50
fwy06
fwy07
fwy05
fwy09
fwy01
fwy08
fwy04
fwy02
fwy03

USGA Resource Management Tool

Jim Moore
Director, Green Section Education

USGA


Thanks!

2016 Arizona Water Summit

GARY BRAWLEY, AMERICAN SOCIETY OF GOLF COURSE ARCHITECTS
GARY BRAWLEY GOLF DESIGN
JUNE 21, 2016

GOLF & WATER in ARIZONA

HISTORY

- Pre 1980/1984
- Post 1984

Prior to 1980 No Law to Govern Water Use

1980 Arizona Legislature Passed a Comprehensive Groundwater Management Act.

- **Established Active Management Areas in the primary Population and Agricultural Areas which included Phoenix and Tucson.**
- **Involved some of my predecessors as well as other golf industry representatives.**
- **Any golf course constructed Post 1984 would be required to meet these new requirements .**

GOLF & WATER in ARIZONA

HISTORY

- Pre 1980/1984
- Post 1984

Conservation requirements for new regulation 18 hole golf courses in Phoenix AMA

Constructed post 1984 and minimum of 6,200 yards in length

Example calculation for maximum annual allotment based on 18 holes:

LANDSCAPE TYPE	MAX ACRES	MAX ACRE-FEET
Turf Acres	5 acres/hole	441 af
Additional Turf And Low Water Use Acres:	5 a-f/hole	90 af
Lake Acres	0.14 acres/hole	15.62 af
TOTAL ALLOTMENT		**546.62 a-f/yr**

- Acre-Foot Definition
  - Amount of water needed to cover 1 acre 1 foot deep
  - 1 acre-foot = 325,851 gallons
  - 1 acre-foot is enough water for approximately 8 individuals per for a year
- Maximum application rates
  - Turf = 4.9 a-f/acre
  - Low water use landscape = 1.5 a-f/acre

GOLF & WATER in ARIZONA

HISTORY

TODAY

Public Perception in a water crisis is that ALL golf courses should be closed.

In the Phoenix AMA Golf Courses only use ~5% of the Total Water

The WATER issue today as it relates to the golf industry is NOT just about turf reduction on golf courses, but CONSERVATION and EFFICIENCIES that are going to bring AWARENESS to the public that we as an industry are sustainable users of water and in many cases are LEADING the way for everything in the green industry.

GOLF & WATER in ARIZONA

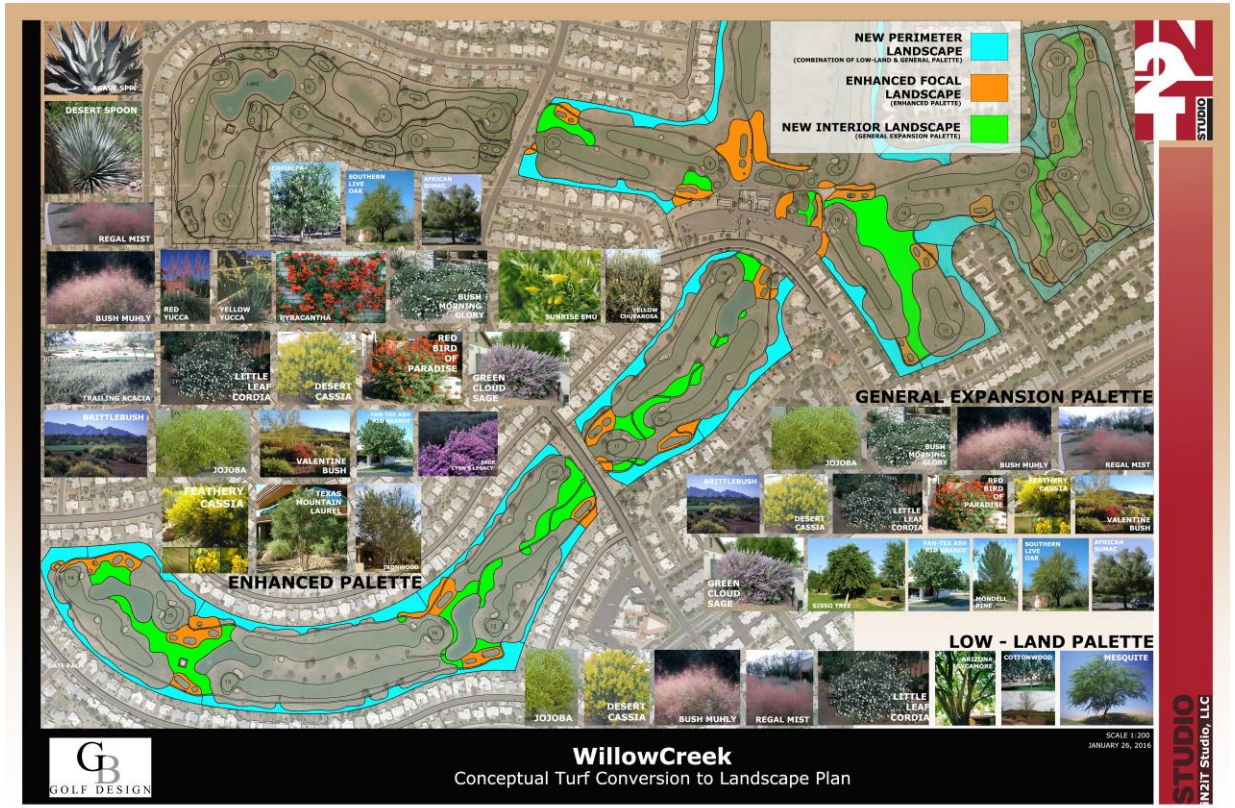
HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #1

- Turf Conversion to Low Water Landscape
  - Built 1970
  - 36 Holes (18 Regulation / 18 Executive) and Driving Range
  - Currently 230 Acres of Turf



- 76 - Acres to Low-Water Use Landscape Plants
- 258 a-f / year – Water Conservation
- 2,067 – Number of Individuals able to sustain annually

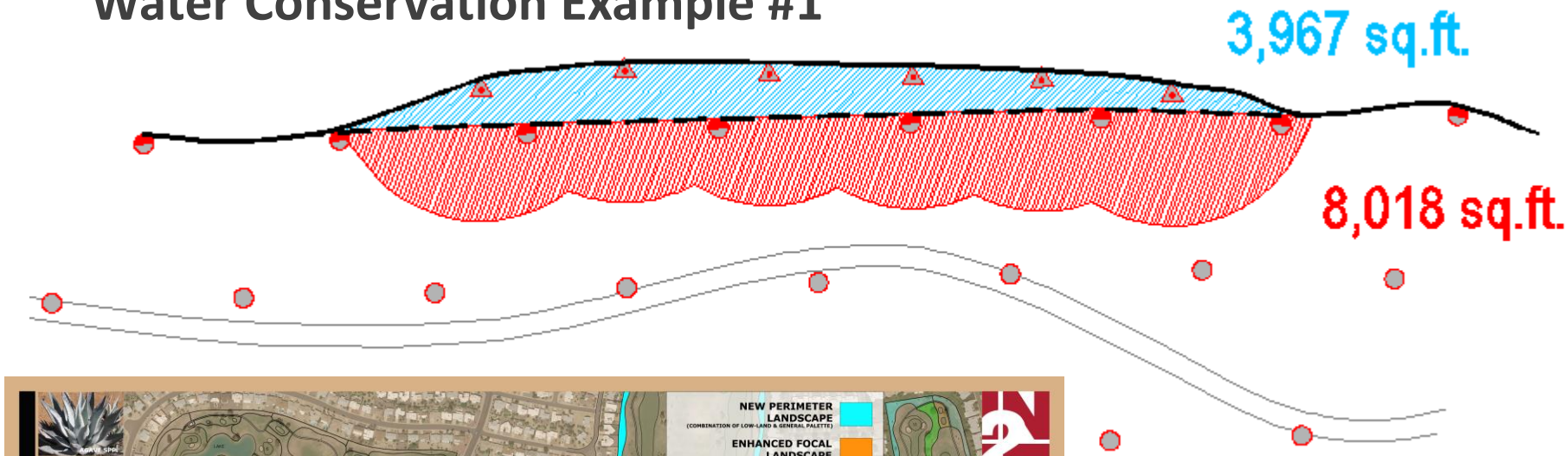
GOLF & WATER in ARIZONA

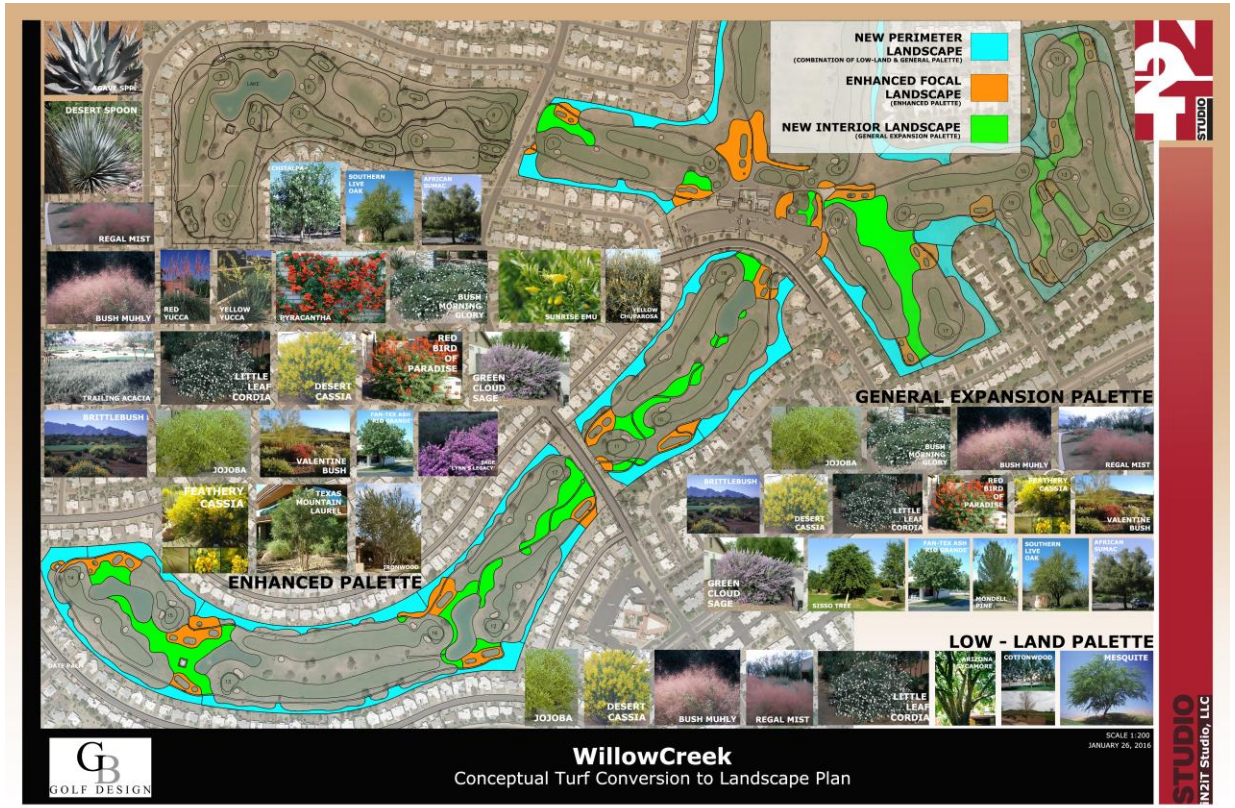
HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #1





- 148,497 gallons / 0.45 a-f wasted per year in over watering.

GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #2

- 16 year old system
- Uses existing spacing
- Replaced all heads and satellites
- Each head placed on individual station
- New Programming
- SAVINGS – 5%
  - 26 a-f / year – Water Conservation
  - 212 – Number of Individuals able to Sustain Annually

GOLF & WATER in ARIZONA

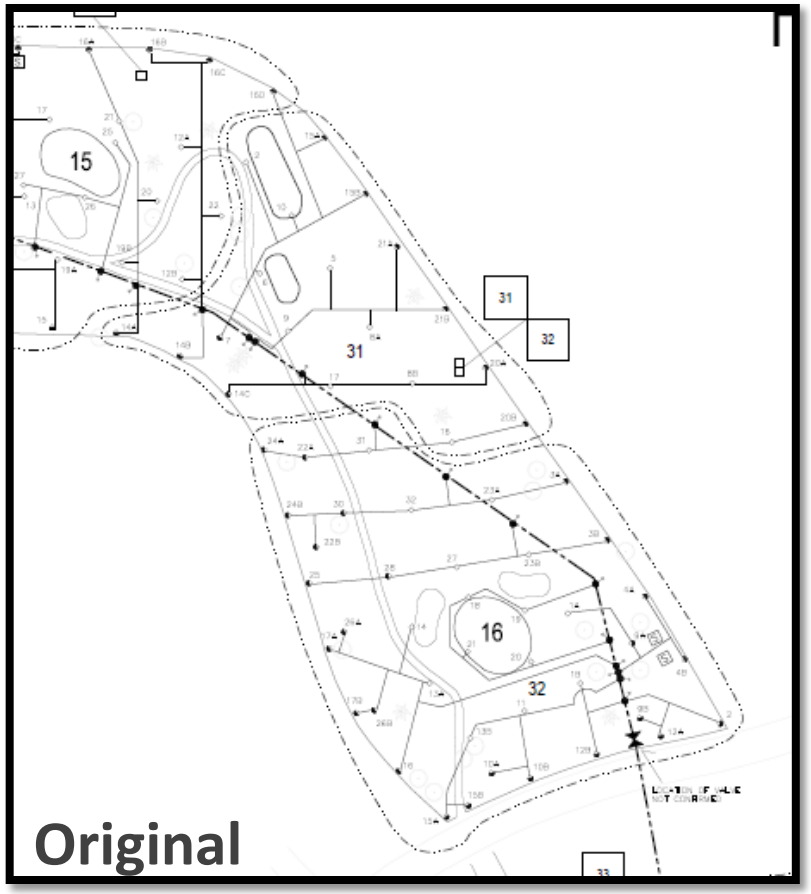
HISTORY

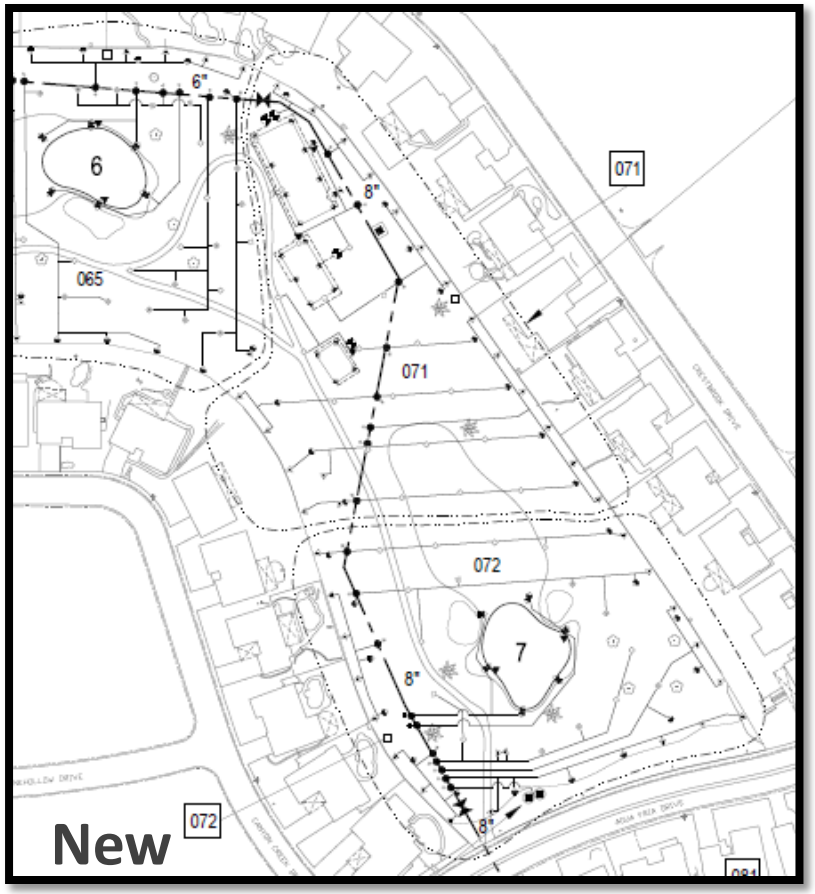
TODAY

CONSERVATION EXAMPLES

Water Conservation Example #3

- Complete New Irrigation System
  - Original - 1700 Heads; 75 – 100 foot spacing
  - New - 3200 Heads; 60 foot spacing





GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #3

- Complete New Irrigation System
  - Original - 1700 Heads; 75 – 100 foot spacing
  - New - 3200 Heads; 60 foot spacing
- SAVINGS ~10%
  - 53 a-f / year – Water Conservation
  - 424 – Number of Individuals able to Sustain Annually

GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #4

- Using smaller irrigation heads to irrigate only tee surface during cool season (overseed) when surrounds are being left dormant.

- 3,174 sq.ft. – area of tee surface to be irrigated.

GOLF & WATER in ARIZONA

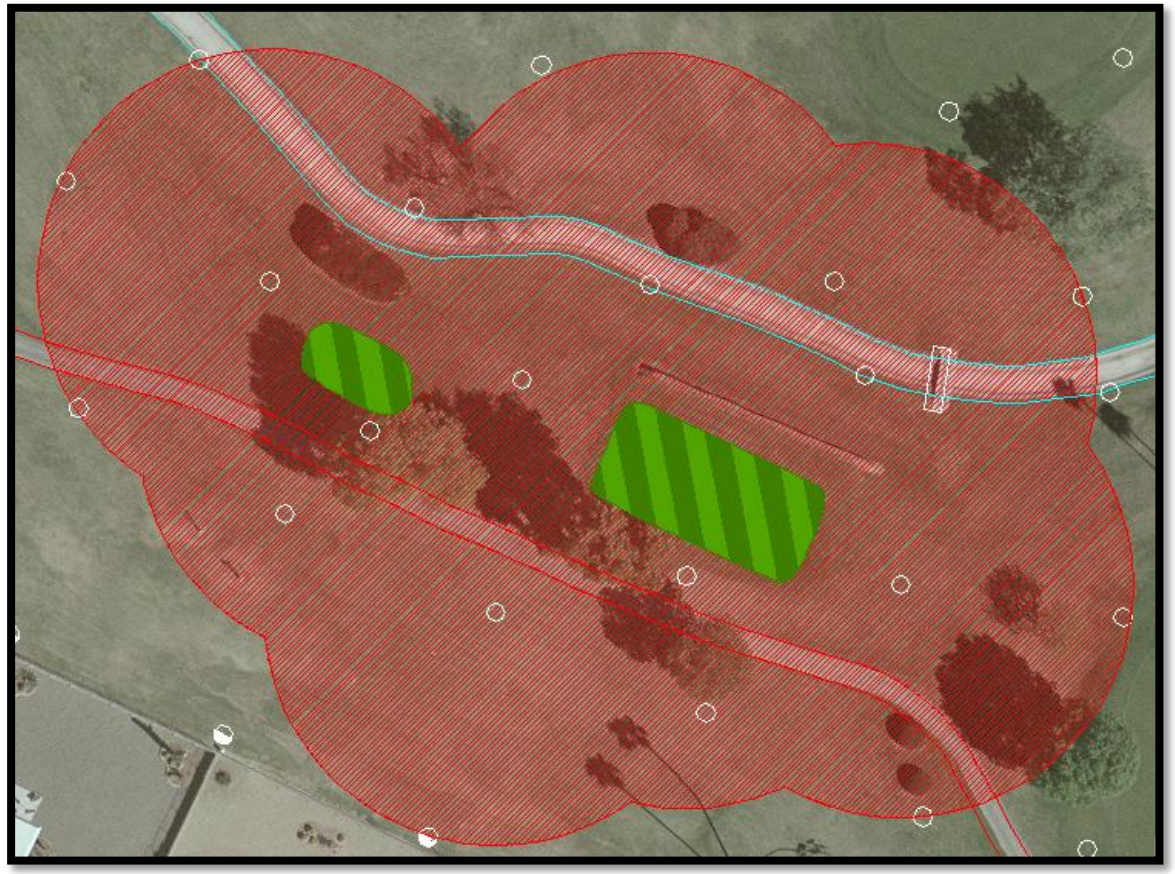
HISTORY

TODAY

CONSERVATION EXAMPLES

Water Conservation Example #4

- Using smaller irrigation heads to irrigate only tee surface during cool season (overseed) when surrounds are being left dormant.



- 3,174 sq.ft. – area of tee surface to be irrigated.
- 66,650 sq.ft. – amount of area covered by irrigation when only tee surface needs irrigation.
- 3.3 a-f – amount of water wasted during period of cool season.

GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

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GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

Other Water Conservation Efforts Currently Taking Place

- Using MP Rotors on Tees Instead of Sprays
  - More Efficient / Less Runoff
- Tee Construction Methods – Subsurface Irrigation (in trial)
  - Drip Systems / Soaker Hose
  - Capillary Concrete (2” layer below 6” layer of tee sand).
- Irrigation Lake Renovations (increase depth / new liners).
- Water Recycling / Rain Water Harvest
  - Comprehensive Drainage Approach for Water to Be Available for Irrigation
- Turf Grasses
  - U of A Turfgrass Research (both for play and out of play areas).
- Soil Moisture Testing
  - Optimal Levels / <u>EFFICIENCY</u>

GOLF & WATER in ARIZONA

HISTORY

TODAY

CONSERVATION EXAMPLES

SUMMARY

SUMMARY

200 – Approximate Number of Golf Courses in Phoenix Metro Area

18,000 – Total Number of Irrigated Turf Acres on Golf Courses

88,200 – Acre Feet of Water Used Annually by Golf Courses for Turf

10% - Target CONSERVATION by Every Golf Course

70,560

Number of Individuals the Golf Industry would be able to sustain annually from a targeted 10% water conservation effort.

QUESTIONS & ANSWERS

2016 Arizona Water Summit

ANDY STAPLES & GARY BRAWLEY