

Questions & Requests for Information from the First GWAC Meeting



May 13, 2016
ADWR Staff

Question:

What is the cost of lining irrigation ditches and is there data for where and how many lined irrigation ditches there are?



Response:

- * Several studies have considered this
- * USBR is the most thorough and extensive
- * Estimates Construction Costs for various canal lining types and projects range from \$0.76 per square foot to \$4.33 per square foot¹

Analysis:

Economic and local factors all drive this. It is apparent from the data that we do have to take a look at the local process to see if there are available gains.

Question:

What would the conservation savings be used for and what are the impacts of creating that conservation?



Response:

- * Conserving groundwater would leave more water in the ground to avoid depleting Arizona's aquifers and to sustain Arizona's future population. Maintaining healthy aquifers helps to reduce subsidence.
- * Conserving Colorado River water can create Intentionally Created Surplus (ICS) which means that the contractor that created that water can take delivery of it in a later year. This helps to maintain the elevation of Lake Mead. Colorado River water conservation could also be used to create system water that benefits the whole system.^{2,3}
- * Surface water conservation may make more water available for downstream users

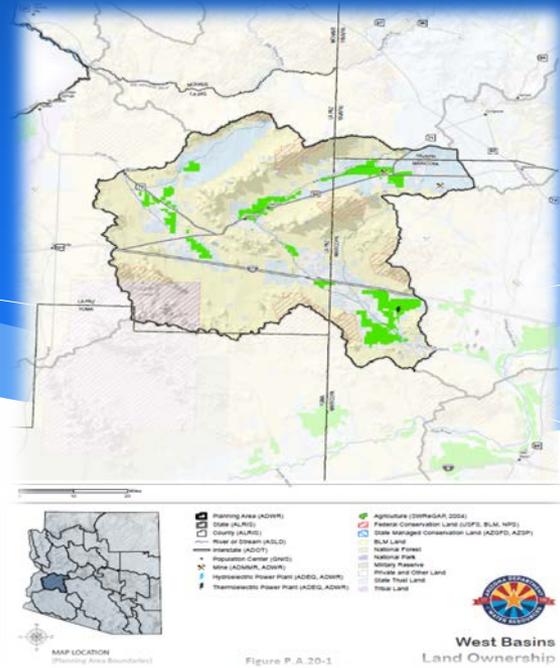
Analysis:

What water is conserved
(or used) for varies locally.



Question:

Where is the water being used in the Planning Areas? And by which sector?



Response:

- * Water use data for each planning area is available from WRDC estimates in the 2014 Strategic Vision
- * It is likely that data needs to be updated for statewide use sector demand
- * First steps in each planning area: assess the data we do have and request entities from each use sector to voluntarily provide relevant data

Analysis:

We have water use estimates from the Strategic Vision for all 22 Planning Areas. We also have AMA use data that is collected annually.

Question:

Can you advise me where to find data regarding Arizona agricultural water demand trends over the last few decades? I'm particularly interested in info explaining the decrease in ag water demand as a percentage of Arizona's total water demand, but would also like more general statistics on agricultural water demand throughout the state.

Response:

List of sources for finding crop water use data:

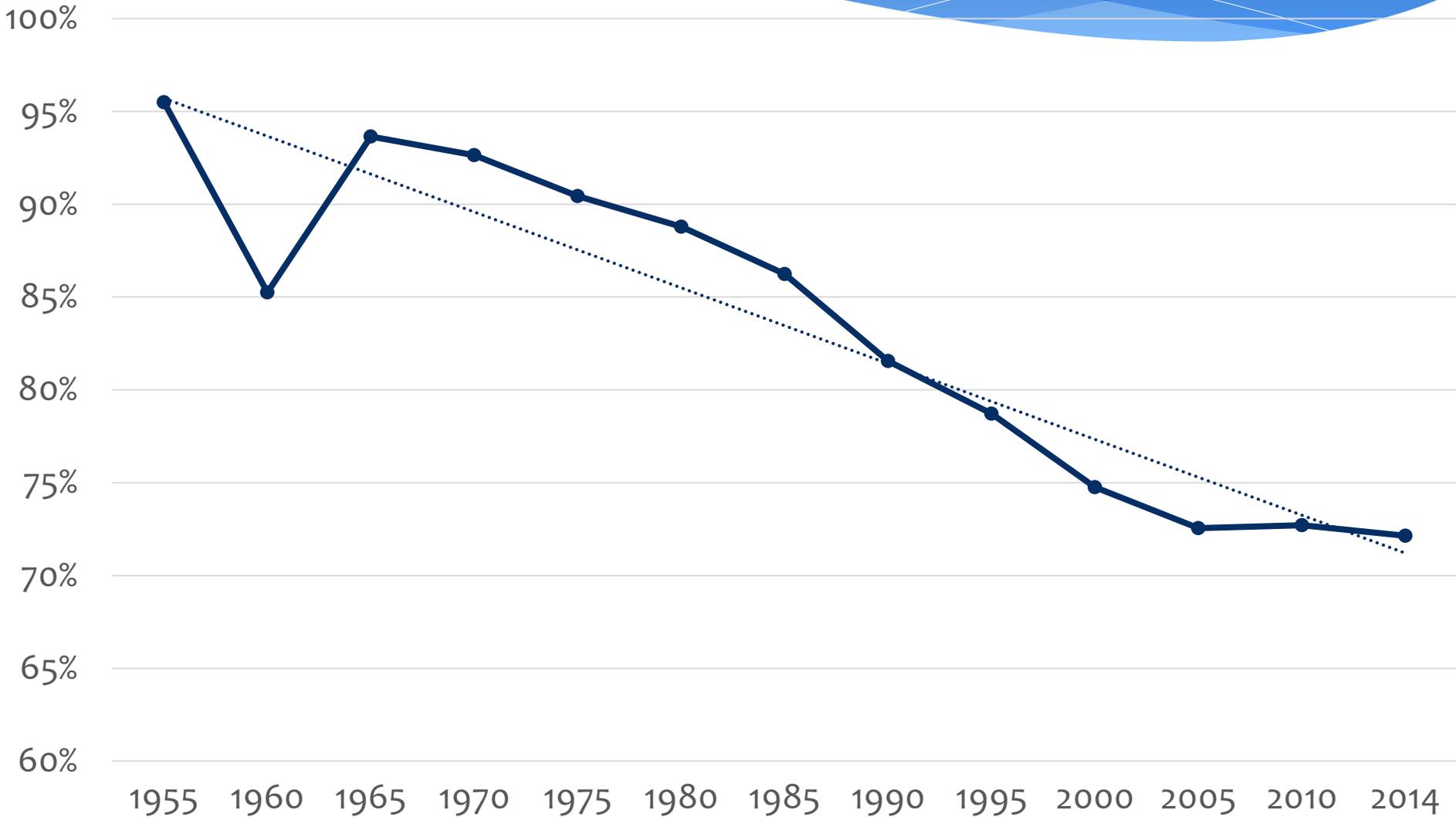
- * USDA NASS database:

<http://quickstats.nass.usda.gov/>

- * USGS basin surveys

http://waterdata.usgs.gov/az/nwis/water_use

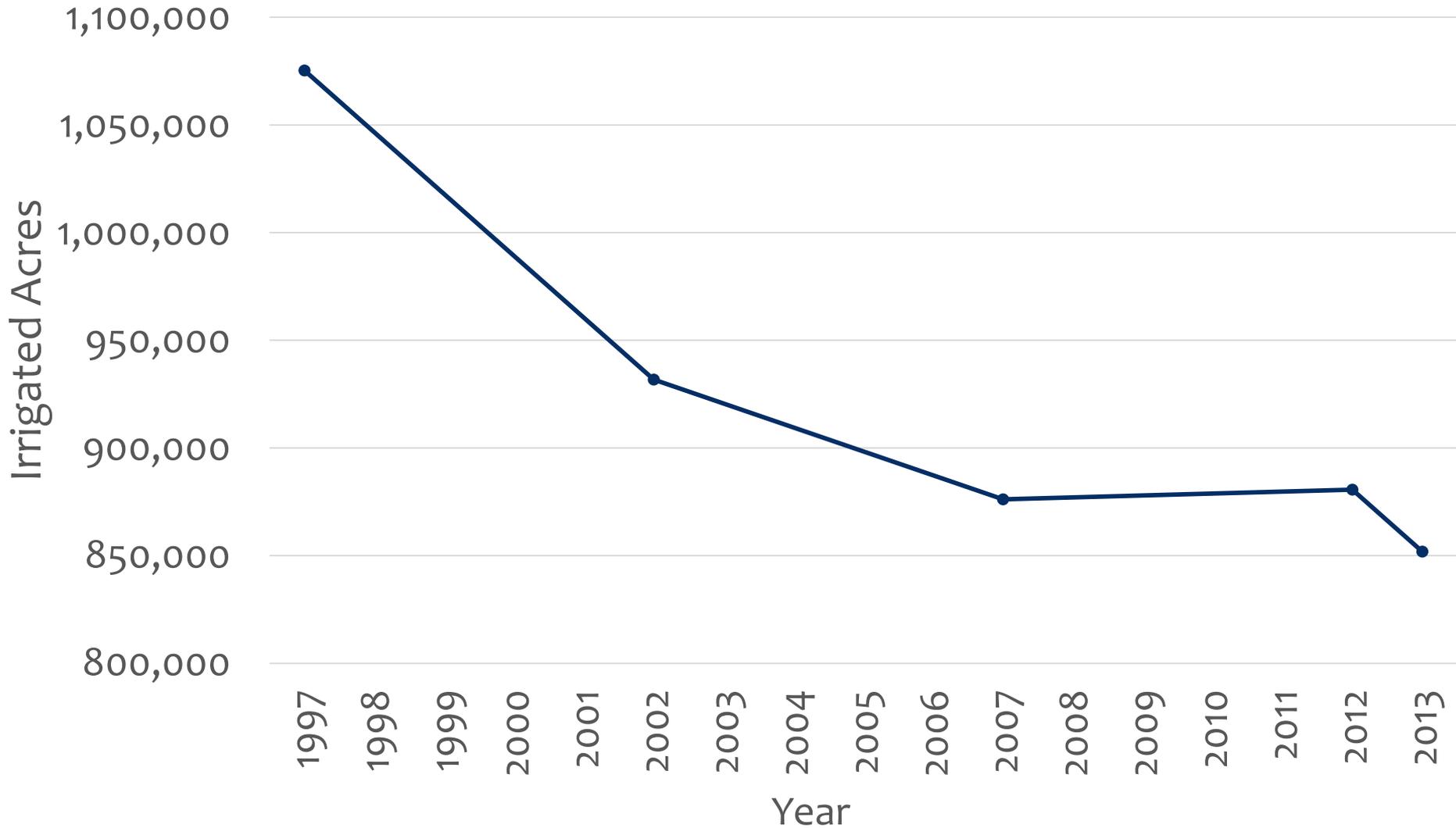
Statewide Agricultural water use as a percent of total Statewide water use



Source: ADWR

This slide has been added after the May 13, 2016 meeting

Ag Land - Irrigated Acres (USDA Survey Data)



Question:

Can we see recent statistics regarding municipal water trends that have been declining recently (past 2-3 years) and show the decline of water use in the cities?



Response:

Municipal Water Demand

- * Non-AMA cities:
Up to 9% decrease in municipal water demand
- * AMA cities :
General trend is decrease in GPCD.
Although there is slight increase in use with rising populations, there is overall a decrease in demand per person.

Analysis:

Many municipalities in Arizona have been reducing their residential use → increase in municipal conservation.

Question:

Have Any Studies Analyzed The Impact That Turf Removal Would Have On The Urban Heat Island Effect In The Phoenix Metro Area?



Response:

Studies that look at Urban Heat Island Effects:

“LANDSCAPE CONFIGURATION AND URBAN HEAT ISLAND EFFECTS: ASSESSING THE RELATIONSHIP BETWEEN LANDSCAPE CHARACTERISTICS AND LAND SURFACE TEMPERATURE IN PHOENIX, ARIZONA”, CONNORS, J.P., GALLETTI, C.S., CHOW, WINSTON T.L. 19 DECEMBER 2012.

“USING WATERED LANDSCAPES TO MANIPULATE URBAN HEAT ISLAND EFFECTS: HOW MUCH WATER WILL IT TAKE TO COOL PHOENIX?” GOBER, PATRICIA, BRAZEL, ANTHONY, QUAY, RAY, MYINT, SOE, GROSSMAN-CLARKE, SUSANNE, MILLER, ADAM AND ROSSI, STEVE(2010), JOURNAL OF THE AMERICAN PLANNING ASSOCIATION, 76: 1, 109 — 121

Analysis:

The studies showed that urban temperature variation is impacted by factors like:

- * Land cover type
- * Structures in the study area
- * Amount of water use in neighborhoods
- * Albedo Effect and Sun angle



Photo credit: Christian Heeb/Aurora Photos

Foot Notes:

1Irrigation Ditch Lining

- * **The USDA Natural Resources Conservation Service 2007 estimate:**
 - * (\$26/linear foot) for concrete lining irrigation ditches
- * **US Department of the Interior released a 7 Year Durability Report on Canal Lining Projects (1999)**
 - * Evaluated canal lining alternatives using Benefit/Cost analysis
 - * Concrete lining showed a favorable Benefit/Cost ratio when applying a value to water per acre-foot.
 - * The study included several different lining types (i.e. Concrete, Geomembrane)
- * **Natural Resources Conservation Service**
 - * Conservation Practice Standard, Irrigation Ditch Lining Code 428-1 (Provides USDA standards for Irrigation Lining)
 - * (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046881.pdf)
- * **NRCS**
 - * most current (2007) basic cost estimation of concrete lined
 - * (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_068146.pdf)
- * **ADWR AMA lining requirements**
 - * Third Management Plan, Chapter 4 Section II, 4-104 Conservation Requirements part 1.
 - * (http://www.azwater.gov/AzDWR/WaterManagement/AMAs/documents/ch4-phx_001.pdf)
- * **US Bureau of Reclamation**
 - * Construction Cost Tables of Canal Lining Projects Report, June 2001.
 - * (<http://www.usbr.gov/pn/programs/wat/publications/constcost.pdf>)

Footnotes:

What would the conservation savings be used for and what are the impacts of creating that conservation?

^{2*} 2007 guidelines: *Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead*, 73 Fed. Reg. 19,873, 19,886-89 (April 11, 2008).

^{3*} Memorandum of Understanding Among the United States of America, Through the Department of the Interior, Bureau of Reclamation, the Central Arizona Water Conservation District of Southern California, the Southern Nevada Water Authority, the Arizona Department of Water Resources, the Colorado River Board of California and the Colorado River Commission of Nevada for Pilot Drought Response Actions, December 10, 2014.

Foot Notes:

Where is the water is being used in the Planning Areas? And by which sector?

- * Tables with county information can be found on the ADWR J:drive (*J:\Arizona Water Initiative\GWAC\Data\AG use by county & J:\Arizona Water Initiative\GWAC\Data\USGS 2010 Industrial and Domestic Use by County*)
- * (USGS) Water Use Data for Arizona (<http://waterdata.usgs.gov/az/nwis/>)
- * (ADWR) Planning Area Land Ownership by sector spatial distribution ([http://www.azwater.gov/AzDWR/Arizonas Strategic Vision/](http://www.azwater.gov/AzDWR/Arizonas_Strategic_Vision/))

Works Cited

Heat Islands

- * ***USING WATERED LANDSCAPES TO MANIPULATE URBAN HEAT ISLAND EFFECTS: HOW MUCH WATER WILL IT TAKE TO COOL PHOENIX?'***, GOBER, PATRICIA, BRAZEL, ANTHONY, QUAY, RAY, MYINT, SOE, GROSSMAN-CLARKE, SUSANNE, MILLER, ADAM AND ROSSI, STEVE(2010), JOURNAL OF THE AMERICAN PLANNING ASSOCIATION, 76: 1, 109 — 121
 - * ASU study focuses on the types of ground cover by water use that influences surface temperature.
 - * The study found that simply moving from watered urban landscapes to unwatered would actually increase urban temperatures(Gober et al., 2010).
 - * The impact on the UHI would be dependent on land surface characteristics such as concrete and grass ground cover (Gober et al., 2010).

Works Cited

Heat Islands

- * **“LANDSCAPE CONFIGURATION AND URBAN HEAT ISLAND EFFECTS: ASSESSING THE RELATIONSHIP BETWEEN LANDSCAPE CHARACTERISTICS AND LAND SURFACE TEMPERATURE IN PHOENIX, ARIZONA”, CONNORS, J.P., GALLETTI, C.S., CHOW, WINSTON T.L. 19 DECEMBER 2012, SPRINGER SCIENCE AND BUSINESS MEDIA DORDRECHT 2012.**
 - * Study examines the spatial pattern of land use types (mesic, xeric and Industrial) in Phoenix in relation to surface temperatures and determines correlations (if any) that exist between land-surface temperature variances and the spatial patterns.
 - * The results show that landscape composition influences temperature but not for all areas and land uses (Connors,J.P. et al., 2012).
 - * Study illustrates that in order to mitigate UHI effects, consideration must be made regarding the composition and spatial configuration of landscapes (Connors,J.P. et al., 2012).

Thank You

