Overview of Arizona's Water Supplies and Challenges

University of Arizona Cooperative Extension: Water In-Service

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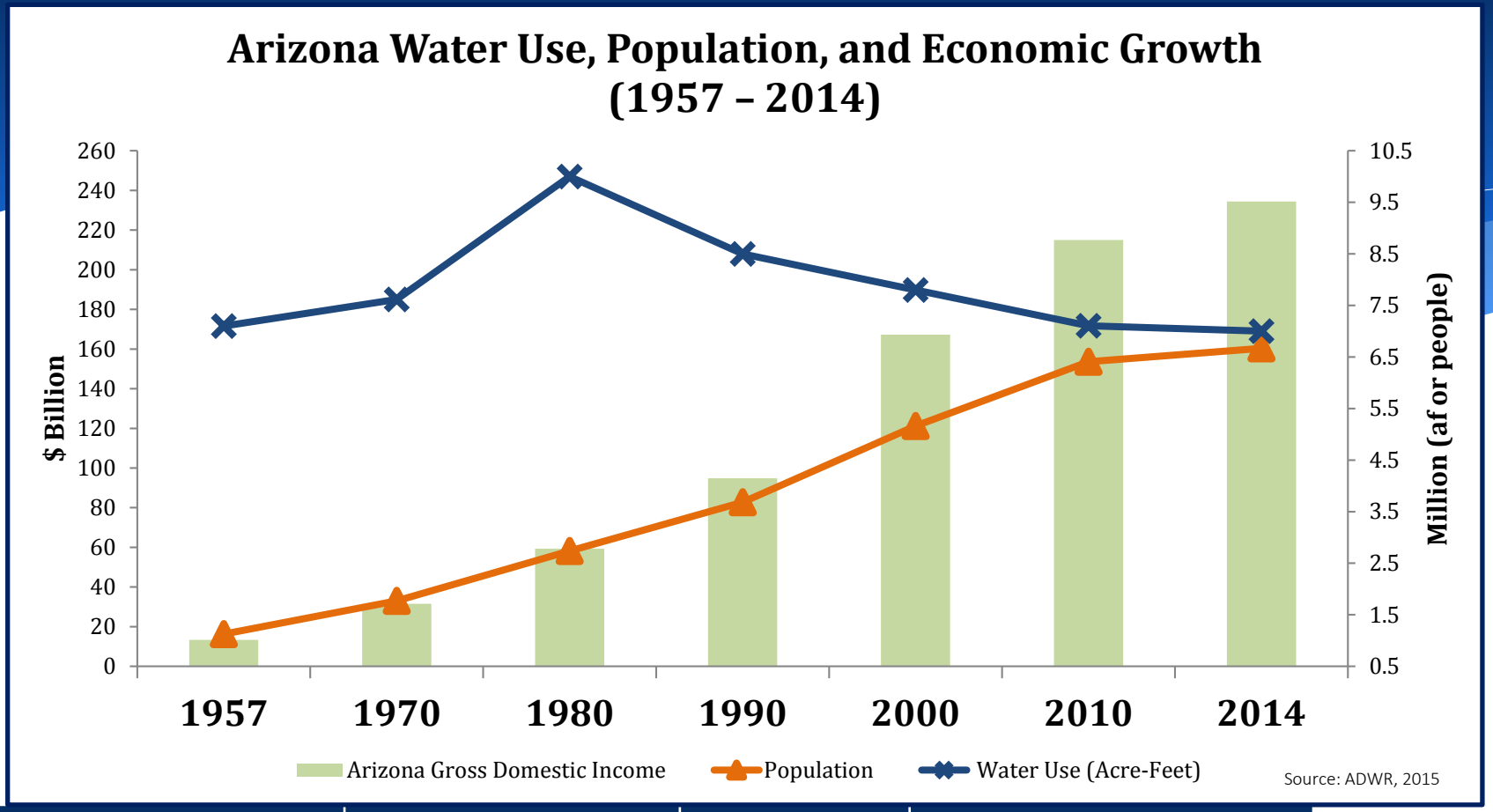
Arizona Department of Water Resources

August 11, 2016

Arizona's Water Management Success



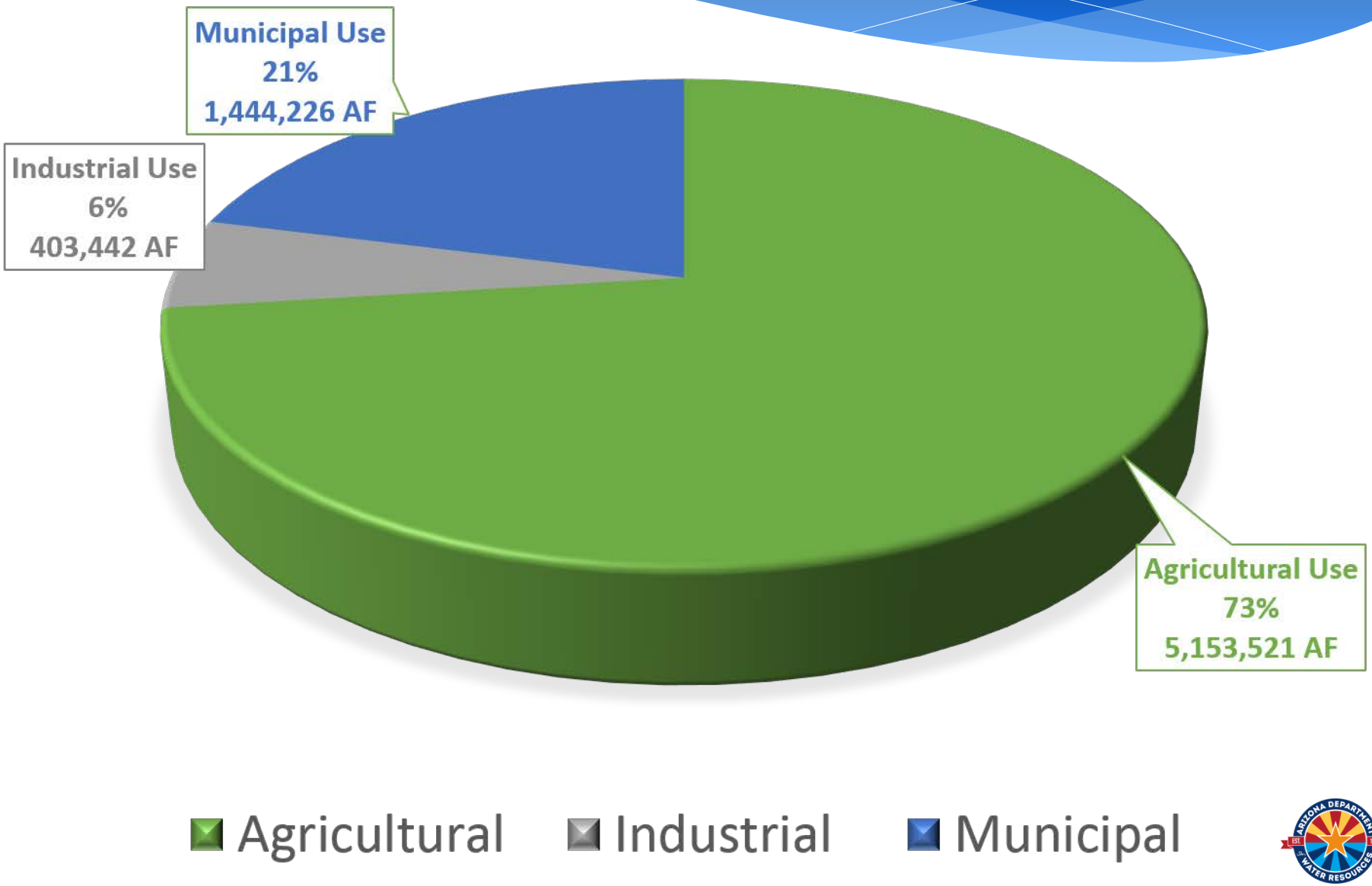
Timeframe	Total Water Use (in million acre-feet)	Population (in millions)	Gross Domestic Income (in billions)
1957	7.1maf	1.1	$13.4
2014	7 maf	6.7	$234.5
Change from 1957-2014	-1%	493%	1,652%

Arizona's Water Supply
Annual Water Budget 2014

Water Source	Million Acre-Feet (MAF)		% of Total
SURFACE WATER			
Colorado River		**2.8**	**40 %**
CAP	***1.6***		***23%***
On-River	***1.2***		***17%***
In-State Rivers		**1.2**	**17%**
Salt-Verde	***.7***		
GROUNDWATER		**2.8**	**40%**
RECLAIMED WATER		**0.2**	**3%**
Total		**7 MAF**	

Source: ADWR, 2015

Arizona's Water Use by Sector (2014)



Arizona's Water Resources Challenges

Driving Forces

- 17 year ongoing drought
- Population and economic growth will increase demand for water

Short-term Challenges

- Risks to Colorado River Supply
  - Shortage on the Colorado River System is likely
    - 10% Probability in 2017
    - 56% Probability in 2018
  - Recurring Lower Basin annual deficit

Medium-term Challenges

- Water resources in rural areas of the state are more stressed
  - Primary water source is groundwater
  - Lack of groundwater regulation
  - Lack of groundwater data
  - Rural areas lack the resources to address their issues

Long-term Challenges

- Growing statewide imbalance between existing water supplies and demand projected in the next 25 years and 50 years

Current Status of In-State Surface Water & Groundwater Supplies

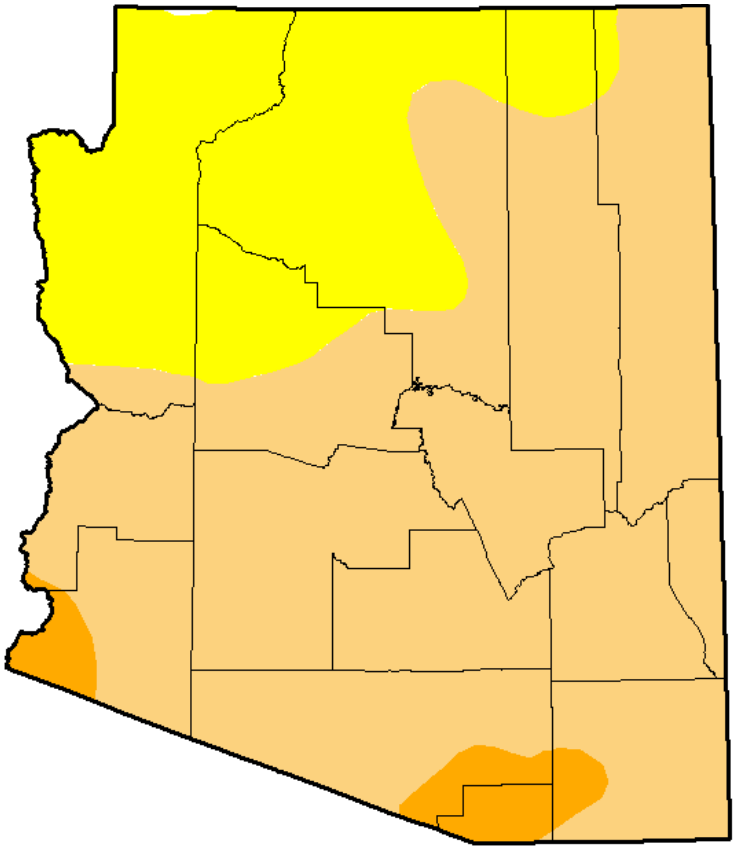
Short-term Drought Conditions

- 72% of State impacted (moderate to severe conditions)
- One year ago 75% of State impacted

SRP System

- Storage 50% full v. 52% 1 year ago

Short –term Drought Status
August 2, 2016

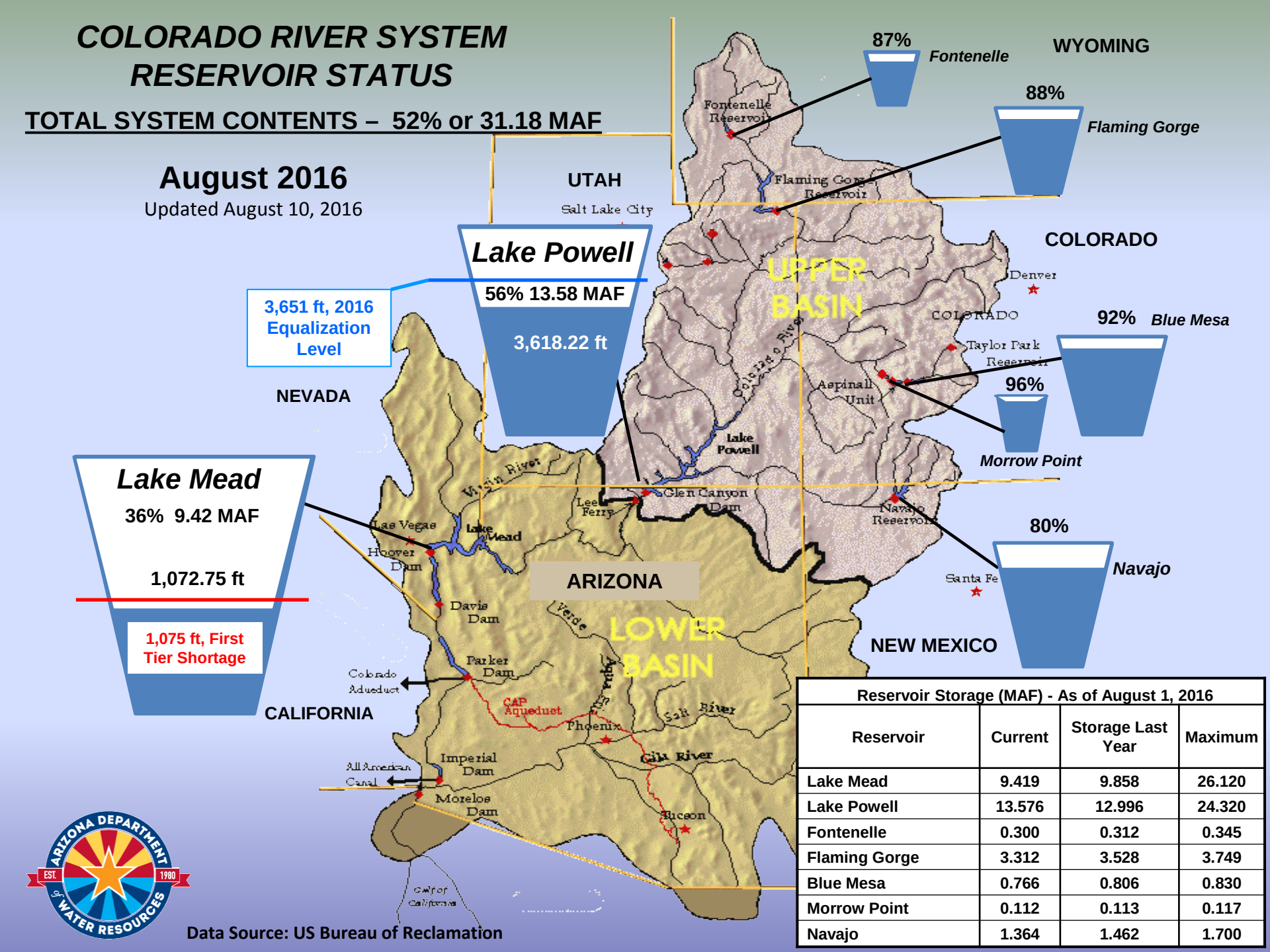


COLORADO RIVER SYSTEM RESERVOIR STATUS

TOTAL SYSTEM CONTENTS – 52% or 31.18 MAF

August 2016

Updated August 10, 2016



Reservoir Storage (MAF) - As of August 1, 2016			
Reservoir	Current	Storage Last Year	Maximum
Lake Mead	9.419	9.858	26.120
Lake Powell	13.576	12.996	24.320
Fontenelle	0.300	0.312	0.345
Flaming Gorge	3.312	3.528	3.749
Blue Mesa	0.766	0.806	0.830
Morrow Point	0.112	0.113	0.117
Navajo	1.364	1.462	1.700

Data Source: US Bureau of Reclamation

Percent of Traces with Lake Mead Operating Condition

Results from April 2016 MTOM/CRSS[1,2,3] (values in percent)

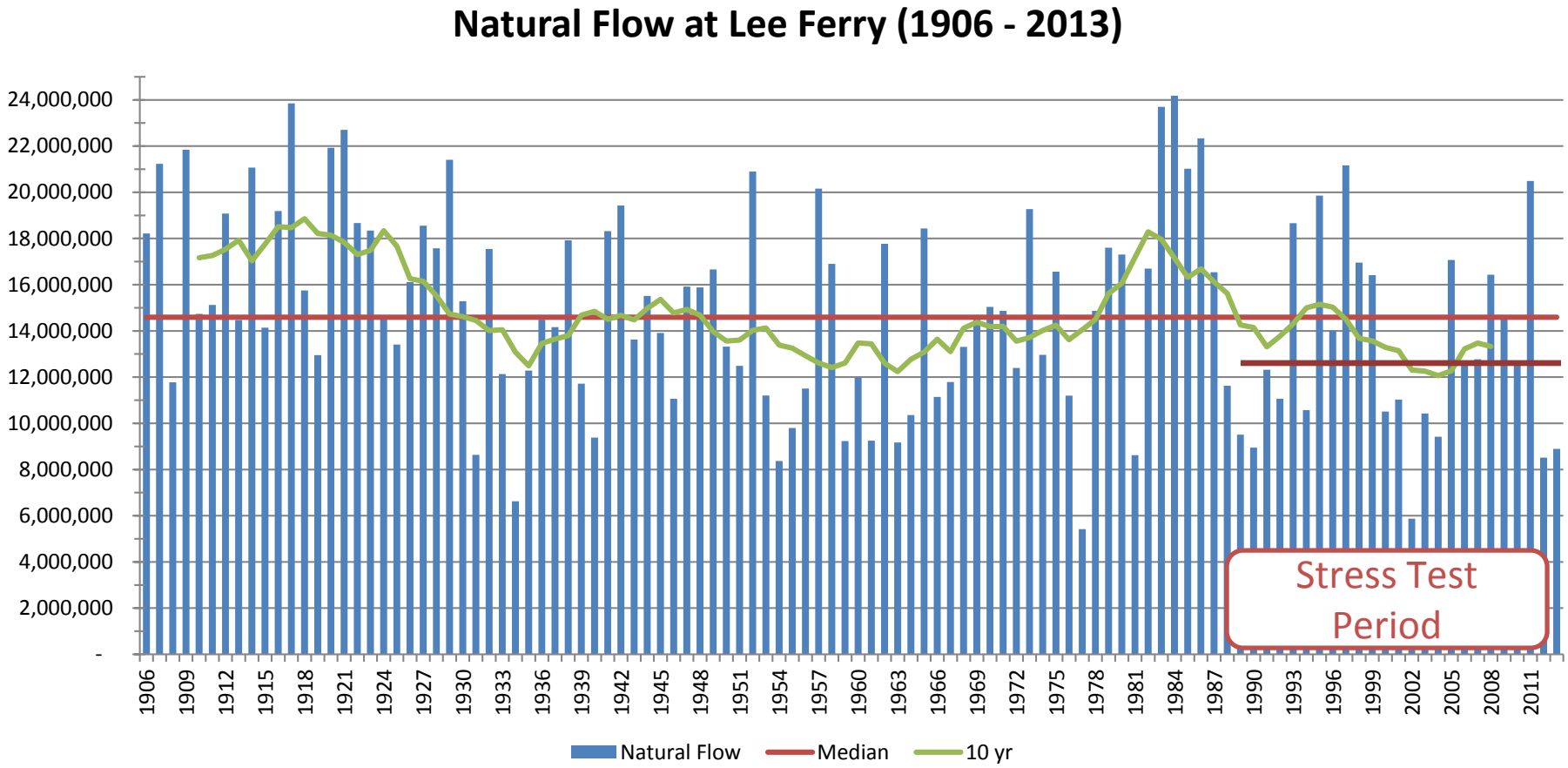
Lake Mead Operating Condition	2017	2018	2019	2020	2021
Shortage Condition of any amount (Mead ≤ 1,075 ft)	**10**	**56**	**64**	**64**	**61**
Shortage – 1st level (Mead ≤ 1,075 and ≥ 1,050)	*10*	*56*	*46*	*40*	*33*
Shortage – 2nd level (Mead < 1,050 and ≥ 1,025)	*0*	*<1*	*18*	*18*	*18*
Shortage – 3rd level (Mead < 1,025)	*0*	*0*	*<1*	*6*	*10*
Surplus Condition of any amount (Mead ≥ 1,145 ft)	**0**	**<1**	**4**	**8**	**12**
Surplus – Flood Control	*0*	*0*	*0*	*1*	*2*
Normal or ICS Surplus Condition	**90**	**44**	**32**	**28**	**27**

[1] Reservoir initial conditions based on results from 30 simulations of December 31, 2016 conditions using the Mid-term Probabilistic Operations Model (MTOM).

[2] Each of the 30 initial conditions were coupled with 107 hydrologic inflow sequences based on resampling of the observed natural flow record from 1906-2012 for a total of 3,210 traces analyzed using the Colorado River Simulation System (CRSS).

[3] Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.

Observed Hydrology & "Stress Test"



CAP
CENTRAL ARIZONA PROJECT

Protection Volume Analysis

Volumes needed to *absolutely protect* Lake Mead's elevations 1,025 ft and 1,000 ft through 2026

Hydrology	Lake Mead Elevation: **1,025 ft.**			Lake Mead Elevation: **1,000 ft.**		
	Maximum in any year (MAF)	First Year that Maximum Occurs	Average through 2026 (MAF)	Maximum in any year (MAF)	First Year that Maximum Occurs	Average through 2026 (MAF)
Observed	3.0	2023	0.97	1.5	2023	0.56
Climate Change	6.0	2021	2.8	4.5	2021	2.4
Combined	6.0	2021	2.3	4.5	2021	2.2

Efforts to address challenges on the Colorado River Drought Contingency Planning

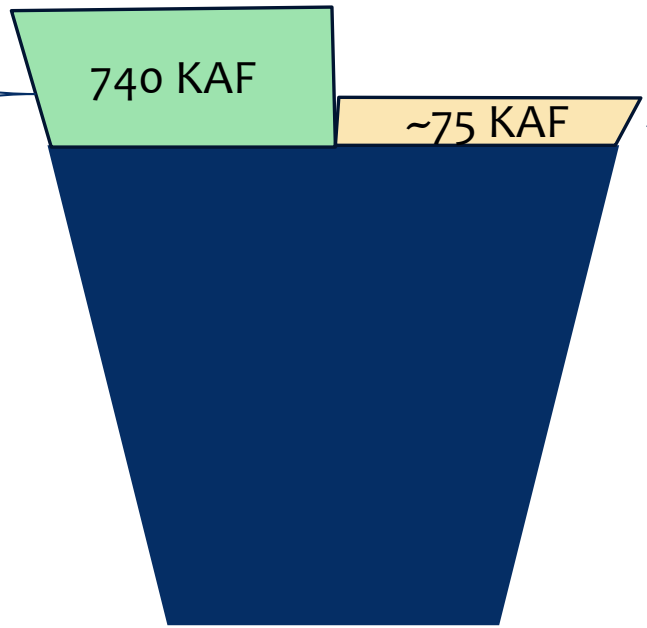
- ADWR Director serves as Arizona's Principal on matters relating to the Colorado River (A.R.S. 45-107(D))
- Discussions between:
  - Basin States
  - Department of the Interior
  - Other contract holders
- Goal of discussions:
  - Restore risks to levels achieved in the 2007 Guidelines
  - Conserve 1.5 – 3.0 MAF in Lake Mead over the next 5 years
  - Reduce the risks of Lake Mead falling below 1,000 ft. elevation as we saw in the 2013 model projections
- Memorandum of Understanding
  - Central Arizona Project = 345,000 AF
  - Metropolitan Water District = 300,000 AF
  - Southern Nevada Water Authority = 45,000 AF
  - Bureau of Reclamation = 50,000 AF

Lake Mead Protection Actions

2 Programs to Protect Lake Mead Elevations:

- ***Lower Basin Pilot Drought Response Actions MOU (LB MOU)***
- ***Pilot System Conservation Program (PSCP)***

LB MOU '14 – '17 Volumes:
CAP = 345 KAF
MWD = 300 KAF
BOR = 50 KAF
SNWA = 45 KAF



PSCP Phase 1 '15-'16:
Total funding = $11 M
($8.25M LB/$2.75M UB)
BOR = $3M
CAP = $2M
SNWA = $2M
MWD = $2M
Denver Water = $2M

PSCP Phase 2 '16 –'17:
Total funding = $7.5 M
($6.5 M LB/$1.0M UB)
BOR = $4M
CAP = $1M
SNWA = $1M
MWD = $1M
Denver Water = tbd

Lower Colorado River Basin Drought Contingency Discussions (2013-2014)

- Discussions began in June 2013 between Upper Basin and Lower Basin states principals. Met with Secretary of the Interior soon after.
- Driving factor was sustained drought and substantially decreased water levels in Lake Powell.
- Believed – "Everyone is affected and everyone must participate in the solutions." Control our own destiny!
- No single sector of water users can provide the solution.
- Monthly meetings and calls.
- Resulted in Memorandum of Understanding for Pilot Drought Response Actions

Lower Colorado River Basin Drought Contingency Discussions (2015-2016)

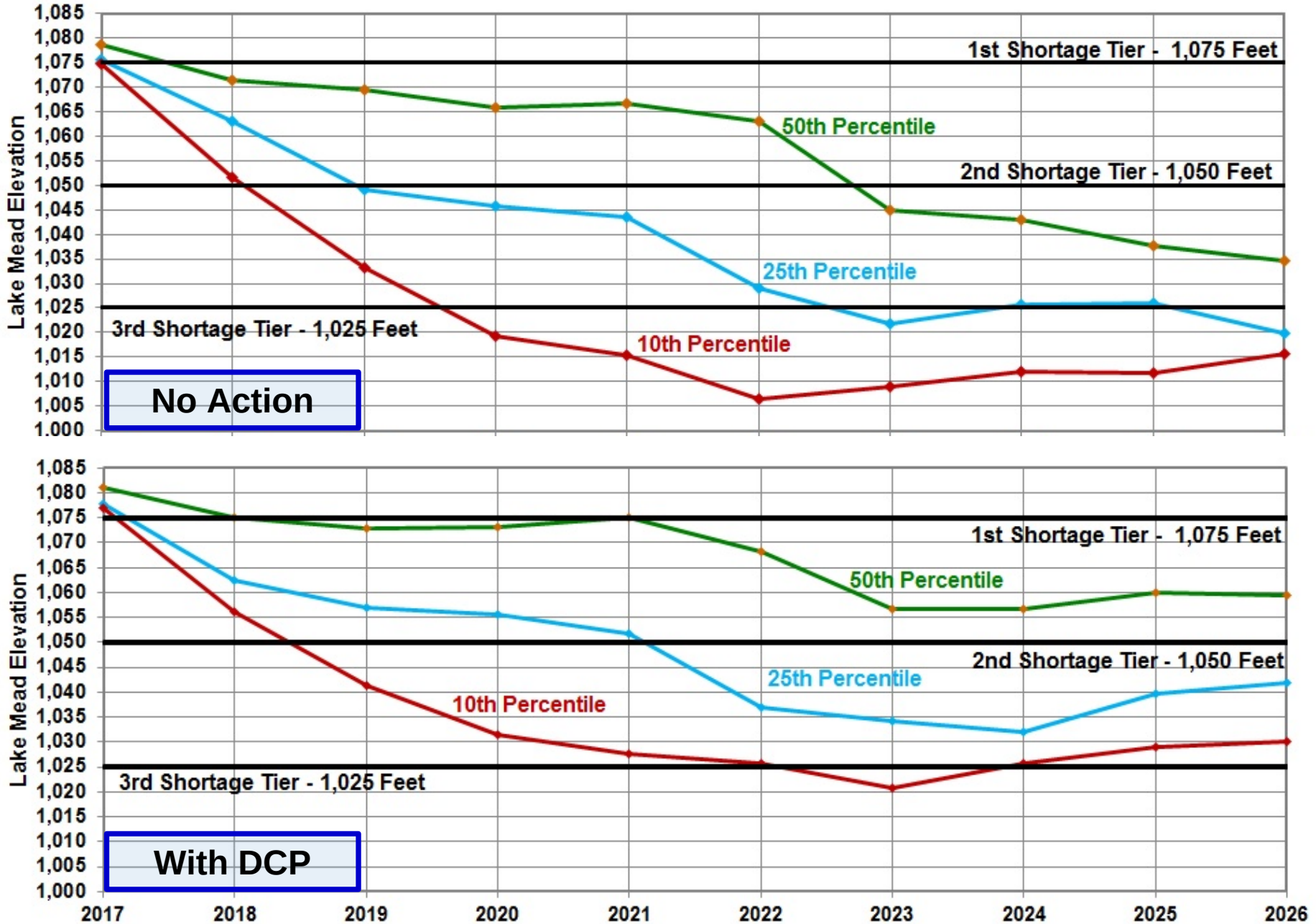
- The Lower Basin States have been meeting monthly since July 2015; these meetings have included Reclamation but not the Upper Basin States
- The parties recognize the need to develop additional operational tools for the Lower Basin States to utilize through December 31, 2025 to address potentially critical elevation declines in Lake Mead
- Any new agreement would supplement the 2007 Interim Guidelines

LBDCP Water Use Reductions

Lake Mead Elevation	AZ [2007]	AZ [Plan]	AZ TOTAL	NV [2007]	NV [Plan]	NV TOTAL	CA [2007]	CA [Plan]	CA TOTAL	BOR	TOTAL
1090-1075	0	192K	192K	0	8K	8K	0	0	0	100k	300k
1075-1050	320K	192K	512K	13K	8K	21K	0	0	0	100k	633k
1050-1045	400K	192K	592K	17K	8K	25K	0	0	0	100k	717k
1045-1040	400K	240K	640K	17K	10K	27K	0	200K	200K	100k	967k
1040-1035	400K	240K	640K	17K	10K	27K	0	250K	250K	100k	1,017k
1035-1030	400K	240K	640K	17K	10K	27K	0	300K	300K	100k	1,067k
1030-1025	400K	240K	640K	17K	10K	27K	0	350K	350K	100k	1,117k
<1025	480K	240K	720K	20K	10K	30K	0	350K	350K	100k	1,200k

Revised on 11/18/15 to include US and TOTAL reductions

Lake Mead – Selected Percentile Elevations
Stress Test Hydrology – "No Action" and With DCP



Lower Colorado River Basin Drought Contingency Discussions Next Steps

- Continue to assess demand, hydrology and distribution scenario modeling to frame range of impacts.
  - NIA Pool, tribal entities, agricultural pool, other excess water users
  - On-River participation decreases impacts
- Discussion regarding the voluntary reductions in Arizona and development of Arizona consensus
  - Director has appointed a group of stakeholders
  - Public meetings to follow
- Communication & messaging (ongoing)
- Finalize DCP among Lower Basins States (Arizona, California & Nevada) & Reclamation
  - Include board actions
  - Fall time frame
- Arizona legislature
- Federal legislation

Planning for Arizona's Water Future
Governor Ducey's Water Initiative

Purpose: To help ensure the certainty and vitality of Arizona's water supply long into the future.

- Announcement made on October 5, 2015
- Continues the work published in Arizona's Strategic Vision
- Implemented December 16, 2015 through Executive Order 2015-13

Executive Order 2015-13

Relating to the Implementation of the Arizona Water Initiative
(Supersedes and Rescinds Executive Order 2014-10)

Whereas, in January of 2014, the Arizona Department of Water Resources released "Arizona's Next Century: A Strategic Vision for Water Supply Sustainability" (Strategic Vision) that identified key priorities, timelines and action items to maintain sustainable water supplies for Arizona into its next century;

Whereas, the Strategic Vision divided the state into twenty-two planning areas and analyzed the water demands and supplies for each and identified strategies for meeting water demands into the future;

Whereas, sustainable water supplies are essential to the economic vitality and quality of life for Arizona and its citizens;

Whereas, the proactive measures taken by the State of Arizona have resulted in a current state of resiliency with respect to its water supplies;

Whereas, Arizona Governor Janice K. Brewer established the Governor's Council on Water Supply Sustainability on November 4, 2014 that published an Initial Report on December 31, 2014;

Whereas, the Initial Report recommended that working groups be formed to develop, evaluate and prioritize recommendations and potential partnerships regarding water supply augmentation and water supply infrastructure needs;

Whereas, the Initial Report proposed workgroups to address desalination, funding, rural issues, and stakeholder engagement;

Whereas, implementation of the Strategic Vision and the recommendations of the Initial Report is imperative for the future of Arizona;

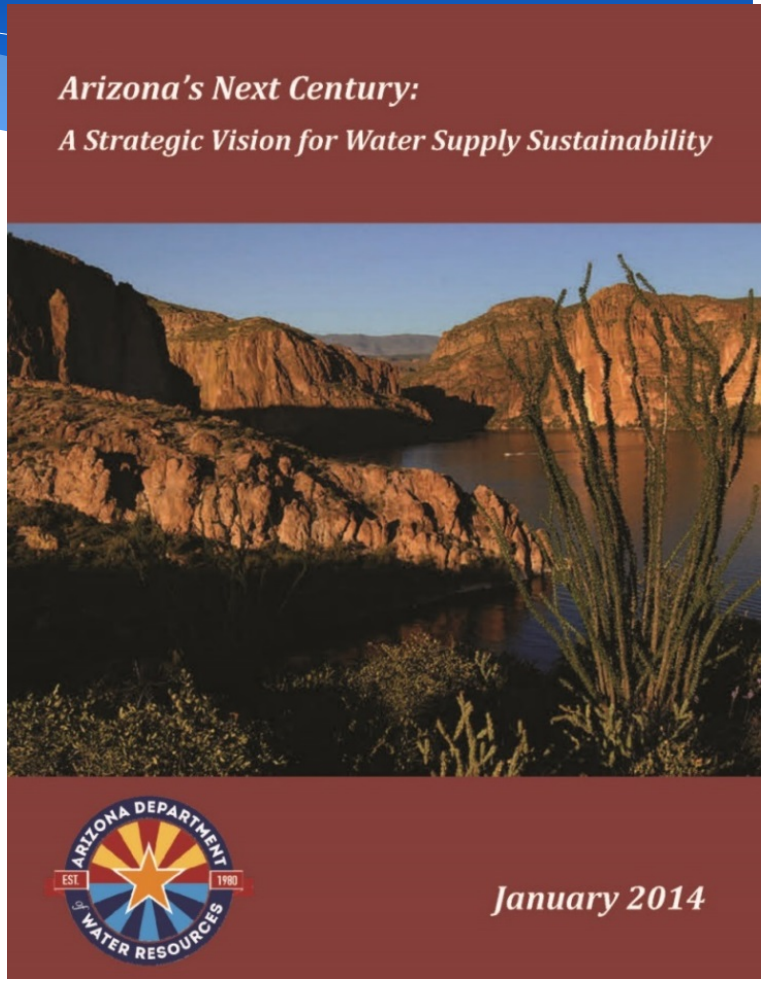
Whereas, on October 5, 2015, I announced a Water Initiative that will implement the Strategic Vision and address the recommendations of the Initial Report through two tracks to insure the certainty of Arizona's water supply into the future;

Whereas, the first track will focus on a stakeholder driven analysis of the twenty-two Strategic Vision planning areas and the second track will be a council that will investigate long-term water augmentation strategies for the state;

Arizona's Strategic Vision for Water Supply Sustainability

- ***Purpose:*** To identify strategies to help address Arizona's future water needs and provide a stable economy for the future
  - Used existing information
  - Identified local options first
  - Identified priority strategies

- Published in January 2014



Governor's Water Initiative
First Track – Planning Area Process

First track:

- Prioritize and evaluate all of the 22 Planning Areas identified in the Strategic Vision
- ADWR will work closely with 22 Planning Areas individually to refine water supply and demand issues and identify strategies to meet future water demands
- Goal to develop stakeholder driven set of solutions for future water demand and supply imbalances
- Goal is to complete the process within a Planning Area within 1 year
- Cochise, Northwest Basins and the West Basins are the initial Planning Areas

Governor's Water Initiative
Second Track:
Governor's Water Augmentation Council

Second track:

- Goal: to investigate long-term augmentation strategies, explore additional water conservation opportunities and identify infrastructure needs
  - Members appointed by the Governor to represent water resource experts, industry leaders, NGOs, local government, watershed groups
  - ADWR Director serves as chairman
  - Council will report back to the Governor with policy direction or statutory changes
  - ADWR provides staffing and technical assistance
  - Annual progress report due July 1st

Questions?

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PROTECTING
ARIZONA'S WATER SUPPLIES
for ITS NEXT CENTURY