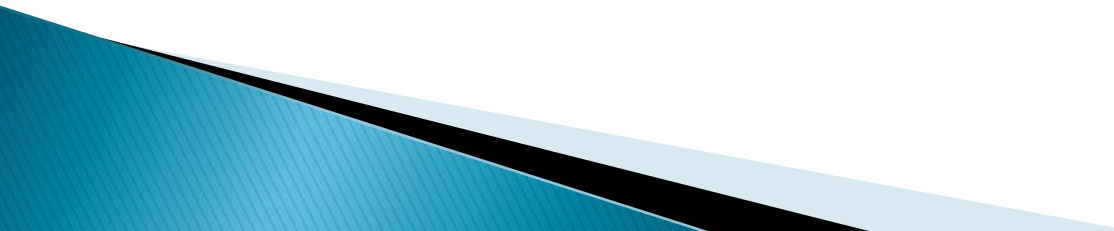


# COLORADO RIVER AT CROSSROADS

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# RIVER FACTS

- ▶ 1350 MILES LONG THRU 7 STATES AND 2 COUNTRIES
  - ▶ 25+ MILLION PEOPLE
  - ▶ 2 MILLION ACRES OF IRRIGATION
  - ▶ COMPLEX LEGAL AND INSTITUTIONAL FRAMEWORK
  - ▶ 60 MAF STORAGE
  - ▶ 10 BILLION KWH OF HYDRO ANNUALLY
  - ▶ LIFEBLOOD OF SOUTHWEST
- 

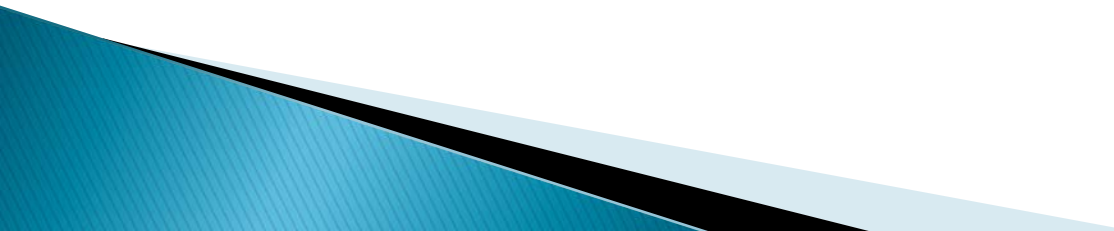
# RIVER OVER ALLOCATED

▶ UPPER BASIN	7.5 MAF
▶ LOWER BASIN	7.5 MAF
▶ MEXICO	1.5 MAF
▶ TOTAL ALLOCATED	16.5 MAF
▶ MEASURED HISTORIC FLOW	15.0 MAF
▶ OVER ALLOCATION	1.5 MAF

# LONG RECOGNIZED PROBLEM

- ▶ BASIN STUDIES IN THE 60'S AND 70'S
  - ▶ NEED FOR AUGMENTATION IDENTIFIED IN THE 1968 COLORADO RIVER BASIN PROJECT ACT
  - ▶ ACTUAL USE HAS BEEN LESS THAN ALLOCATION
  - ▶ CURRENT USE IS ABOUT 14.3 MAF
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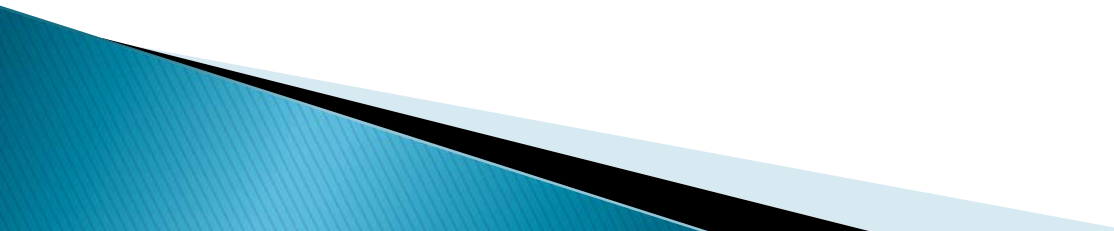
# THE PROBLEM IS HERE

- ▶ 12 YEAR HISTORIC DROUGHT
  - ▶ COLORADO RIVER STORAGE REDUCED TO NEARLY 50% OF CAPACITY
  - ▶ CLIMATE MODELS SUGGEST AVERAGE FLOW WILL BE 13.7 MAF
  - ▶ 600 KAF DEFICIT TODAY
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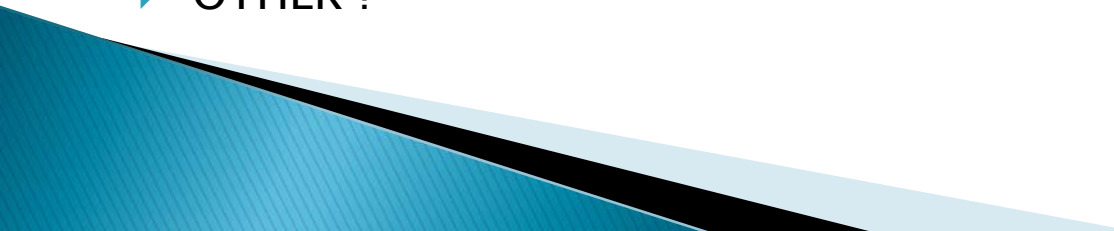
# RESPONSE TO DATE

- ▶ 2007 SHORTAGE/BANKING GUIDELINES
  - ▶ 2009 BROCK RESERVOIR
  - ▶ INCREASE IN CONSERVATION AND REUSE
  - ▶ WATER TRANSFERS
- 

# WHAT DOES THE FUTURE HOLD? BY 2060

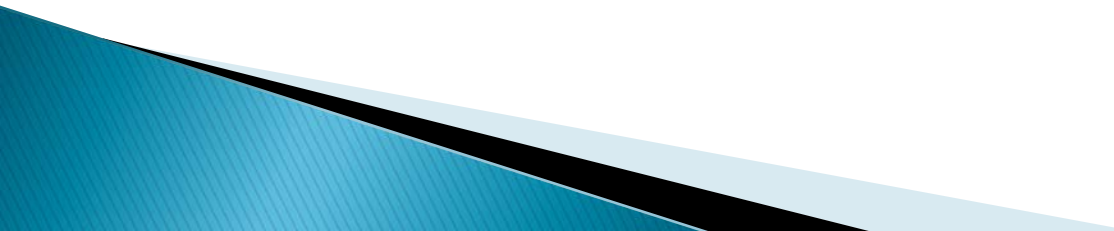
- ▶ SLOW GROWTH WATER DEMAND – 15.3MAF
  - ▶ FAST GROWTH WATER DEMAND – 17.7 MAF
  - ▶ PROJECTED SUPPLY 13.7 MAF
  - ▶ DEFICIT OF 1.6 TO 4 MAF
  - ▶ BASIN STUDY DEFICIT OF 3.5 MAF
- 

# WHAT ARE THE OPTIONS?

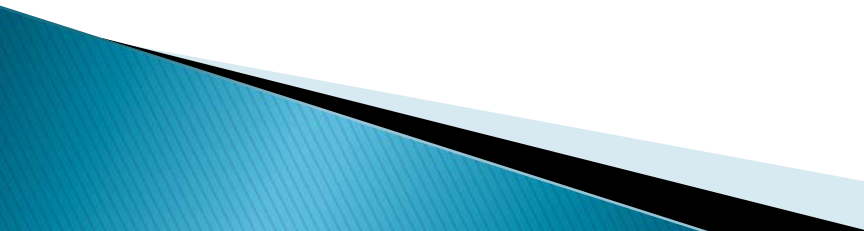
- ▶ WEATHER MODIFICATION
  - ▶ M&I CONSERVATION
  - ▶ AG CONSERVATON/TRANSFER
  - ▶ REUSE
  - ▶ VEGETATION MANAGEMENT
  - ▶ LEGAL AND INSTITUTIONAL CHANGES
  - ▶ DESALINATION
  - ▶ AUGMENTATION FROM OTHER BASINS
  - ▶ OTHER ?
- 



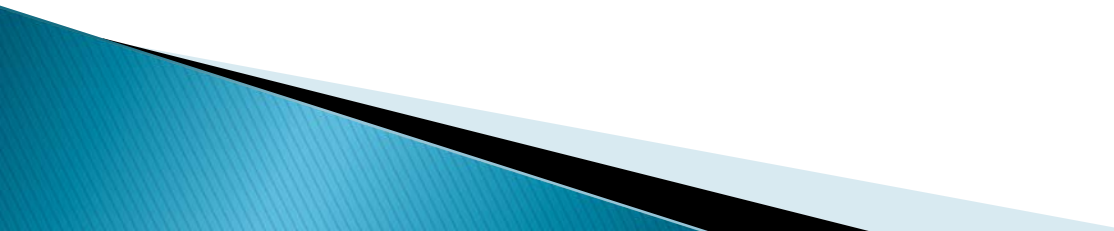
# WEATHER MOD

- ▶ INEXPENSIVE – \$30/AF
  - ▶ HARD TO MEASURE AND ACCOUNT FOR (10%)
  - ▶ INTERBASIN CONCERNS
- 

# M&I CONSERVATION

- ▶ \$500+ PER AF
  - ▶ CONCERN FOR DEMAND HARDENING
  - ▶ MAY CAUSE REDUCED RETURN FLOWS IN BASIN
  - ▶ WOULD BE DONE LOCALLY – MAY NOT BENEFIT COLORADO SYSTEM
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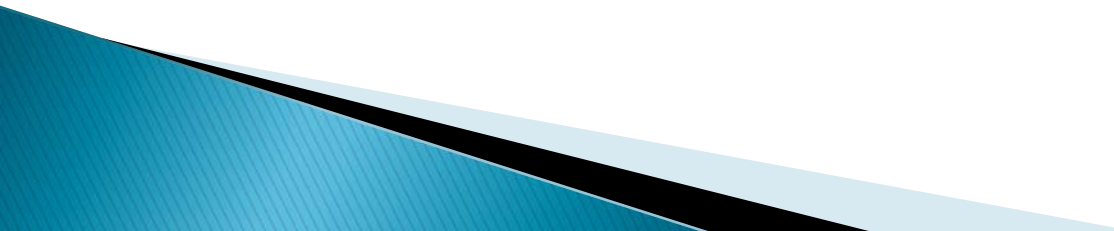
# AG CONSERVATION/TRANSFERS

- ▶ \$150 TO \$500 PER ACRE FOOT
  - ▶ POTENTIALLY LOTS OF WATER
  - ▶ WILL REQUIRE FOLLOWING WITHIN BASIN
  - ▶ LOCAL ECONOMIC/SOCIAL EFFECTS
  - ▶ LEGAL AND INSTITUTIONAL CONSTRAINTS
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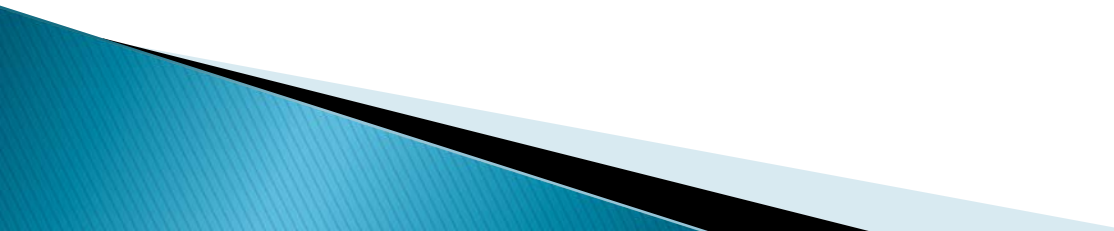
# VEGETATION CONTROL

- ▶ \$400 PER ACRE FOOT
- ▶ DIFFICULT TO MEASURE AND ACCOUNT FOR

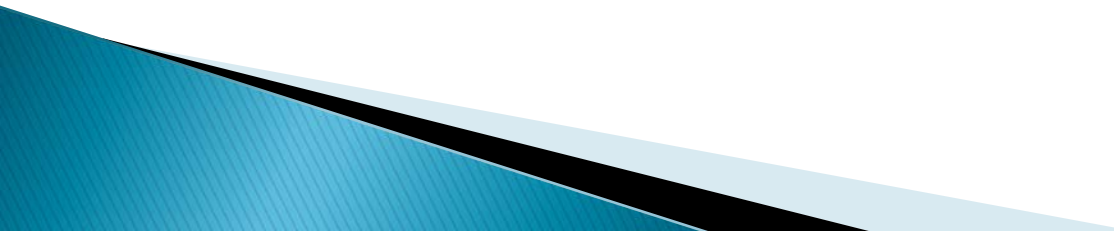
# MAJOR LEGAL AND INSTITUTIONAL CHANGE

- ▶ COULD ENHANCE INTERSTATE/INTERBASIN COOPERATION (WATER MARKETS, ETC.)
  - ▶ VERY DIFFICULT – WOULD REQUIRE CONSENSUS
  - ▶ SOME CHANGES WILL EVOLVE OVER TIME
- 

# DESALINATION

- ▶ \$1000 TO \$2000 PER ACRE FOOT
  - ▶ BRACKISH, PACIFIC OCEAN, GULF OF CALIFORNIA
  - ▶ WOULD REQUIRE EXCHANGES WITH CALIFORNIA OR MEXICO
  - ▶ ENERGY INTENSIVE
  - ▶ ENVIRONMENTAL PERMITTING MAY BE DIFFICULT
- 

# INTERBASIN AUGMENTATION

- ▶ COLUMBIA, MISSOURI, MISSISSIPPI
  - ▶ I
  - ▶ \$1800+ PER ACRE FOOT
  - ▶ REGIONAL CONFLICTS
  - ▶ FRONT RANGE EXCHANGE
  - ▶ 600 KAF INCREMENTS
  - ▶ WATER QUALITY
  - ▶ ENVIRONMENTAL PERMITTING
- 

# WHAT IS THE ANSWER?

- ▶ ALL OF THE ABOVE
  - ▶ USE BASIN STUDY AS A FRAMEWORK
  - ▶ MANY OPTIONS REQUIRE DECADES
  - ▶ NEED TO START NOW
  - ▶ STATES AND BUREAU DEVELOPING NEXT STEPS
  - ▶ PROMOTE UNIFIED APPROACH
- 