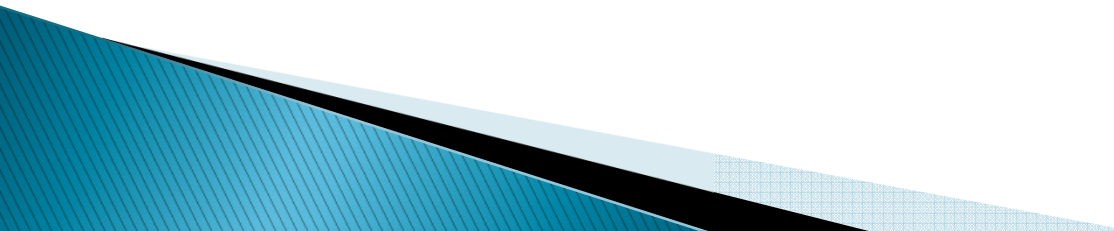


WATER IN THE 21ST CENTURY

ROBERT W JOHNSON
SENIOR CONSULTANT HDR ENGINEERING
SENIOR ADVISOR WATER STRATEGIES
EXECUTIVE VICE PRESIDENT NWRA

THE PROBLEM

▶ INCREASING DEMAND

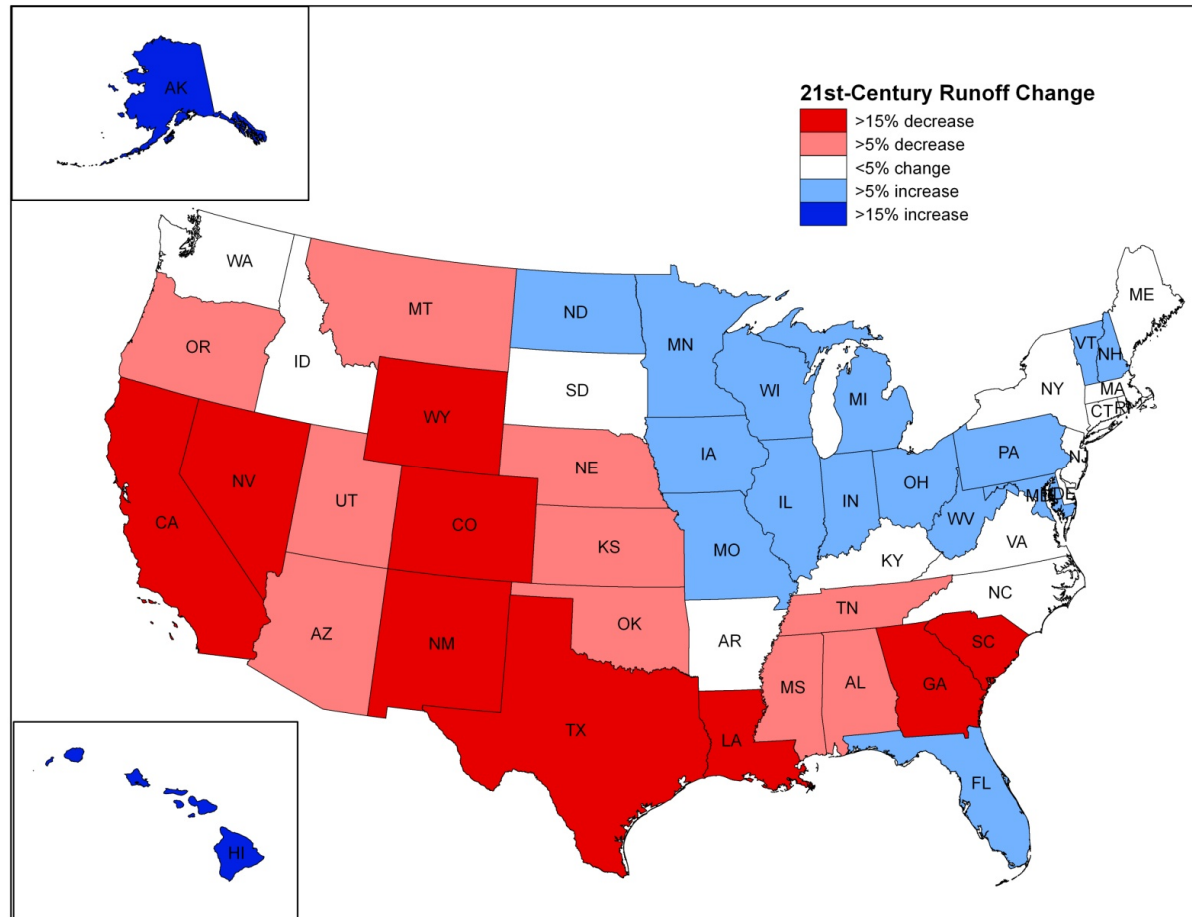
- Environmental Needs
 - Energy Nexus
 - Native American Reserved Water Rights
 - Population Growth
- 

THE PROBLEM

▶ DECLINING SUPPLIES

- Drought
- Climate Change

HOW STATES WILL BE AFFECTED BY CLIMATE CHANGE



THE PROBLEM

▶ LEGAL AND INSTITUTIONAL

- Prior Appropriation
- State/Regional Differences

TOOLS FOR A SOLUTION

▶ CONSERVATION AND REUSE

- In Basin Problem

▶ WATER MARKETS

- Legal & Institutional
 - Rural Economies
 - Agriculture Important
 - In Basin Problem
- 

TOOLS FOR A SOLUTION

- ▶ HABITAT CONVERSATION PLANS

- ▶ DESALINATION

 - Exp/Env

STORAGE

Exp/Env

AUGMENTATION

Exp/Env/L&I

CHANGE LEGAL AND INSTITUTIONAL

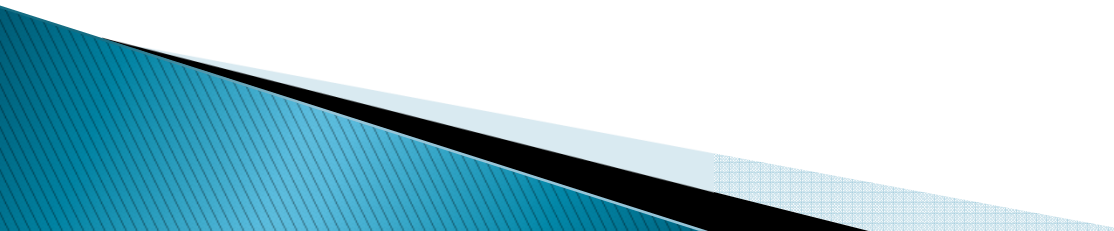
Helps in Implementing Other Tools

Very Difficult/Paradigm Shift



EXAMPLES

RIO GRANDE

- ▶ TEXAS
 - ▶ SACRAMENTO/SAN JOAQUIN DELTA
 - ▶ PLATTE RIVER
 - ▶ YAKIMA RIVER
 - ▶ COLUMBIA RIVER
 - ▶ ACT AND ACF RIVER BASINS
- 

EXAMPLES

▶ COLORADO RIVER –CC/DROUGHT/ENV

- C&R/WM/AUG/L&I/DESAL/HCP

RIO GRANDE – CC/DROUGHT/ENV

- C&R/WM/AUG/HCP/DESAL

TEXAS – CC/DROUGHT/ENV

C&R/WM/DESAL/AUG/HCP/STORAGE/L&I

SACRAMENTO/SAN JOAQUIN – ALL

C&R/STORAGE/HCP/L&I/DESAL/WM

MISSOURI/PLATTE RIVERS – ENV/L&I

HCP/L&I/INFRASTRUCTURE



EXAMPLES

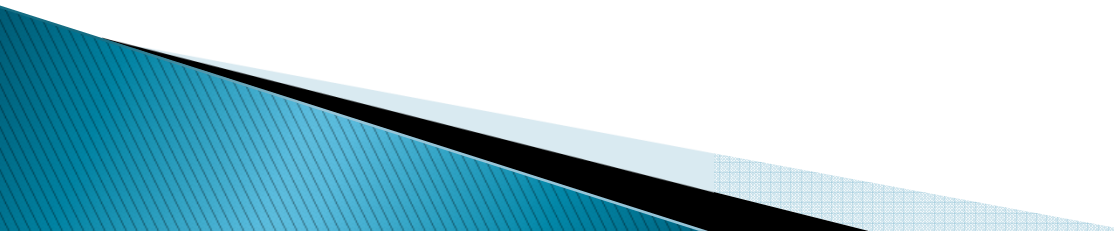
- ▶ COLUMBIA SYSTEM – ENV/OTHER
 - HCP/INFRASTRUCTURE

ACT/ACF RIVER SYSTEMS – L&I/DROUGHT/CC/ENV
L&I/STORAGE

GREAT BASIN – ALL
C&R/WM/HCP

AUSTRALIA – DROUGHT/CC/ENV
C&R/WM/L&I

OBSERVATIONS

- ▶ SOLUTIONS TAKE TIME
 - ▶ NECESSITY IS THE MOTHER OF INVENTION
 - ▶ RELATIONSHIPS ARE IMPORTANT
 - ▶ NO COOKIE CUTTERS
 - ▶ LEADERHIP IS CRITICAL
- 

THANK YOU