Irrigation Association™

Smart Practices.
Sustainable Solutions.

Water Management Research

Perspective from the Irrigation Association

John Farner
Government and Public Affairs Director

Irrigation Association

The Irrigation Association is the leading membership organization for water management companies and professionals in agriculture, landscape and golf.

2013 STRATEGIC PLAN

Approved September 2013

MISSION:
To promote efficient irrigation

VISION:
To be the recognized authority on irrigation

CORE STRATEGIC INITIATIVES

ADVOCACY

- Government Affairs
- Public Affairs
- Standards & Codes

PROFESSIONAL DEVELOPMENT

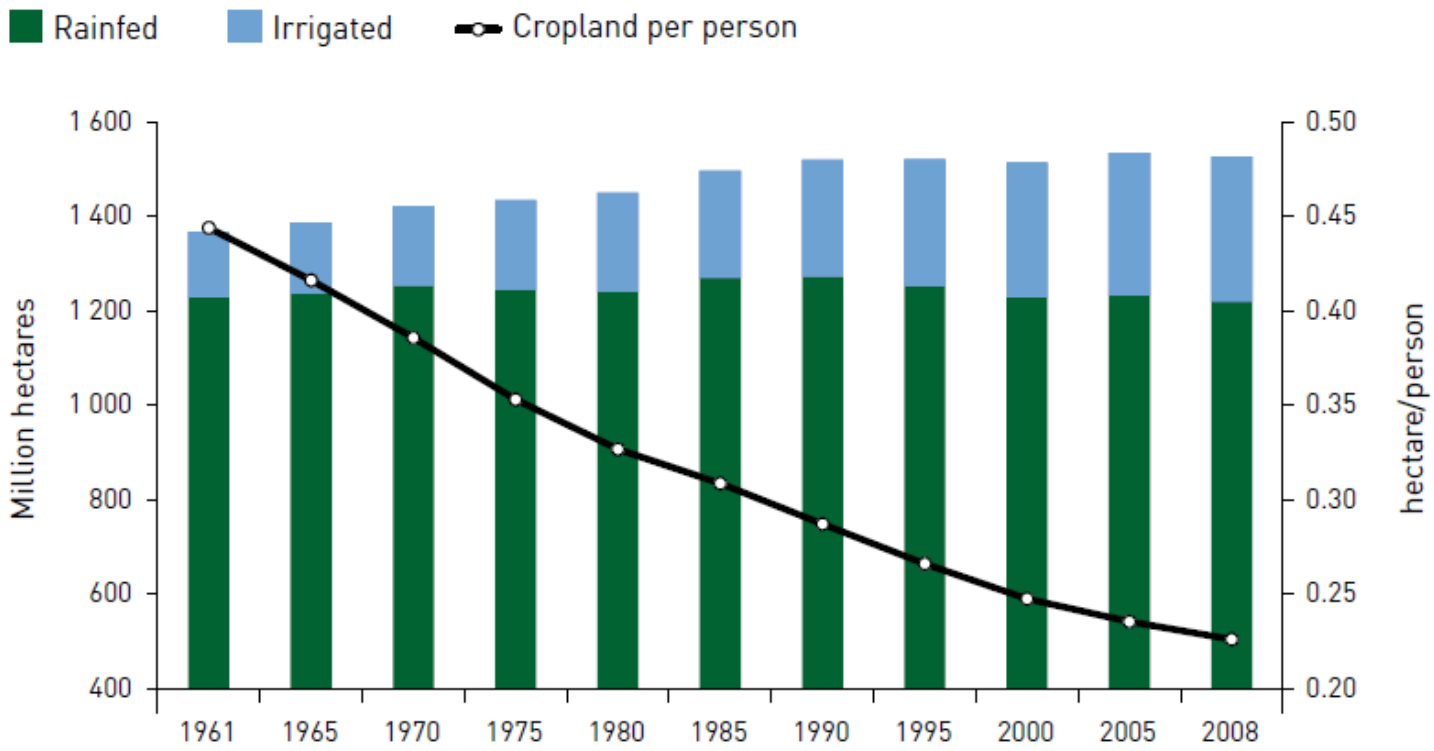
- Education
- Training
- Certification

CORE SUPPORT INITIATIVES

- Membership
- Irrigation Show

Top Issues Facing Irrigated Agriculture

FIGURE 1: EVOLUTION OF LAND UNDER IRRIGATED AND RAINFED CROPPING (1961 2008)



Source: FAO (2010b)

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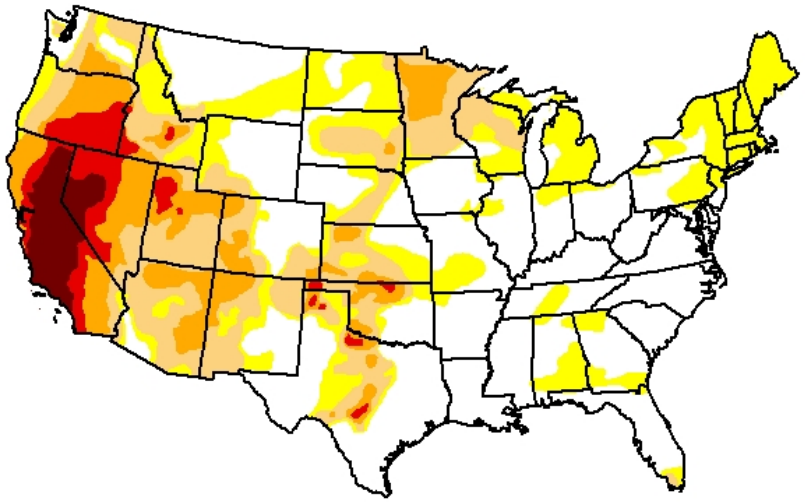
U.S. Drought Monitor

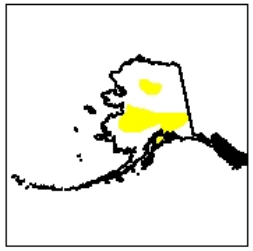
Total U.S.

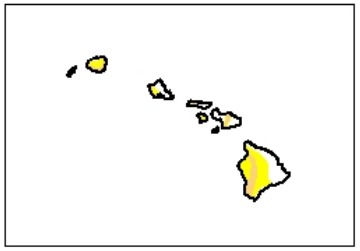
May 12, 2015

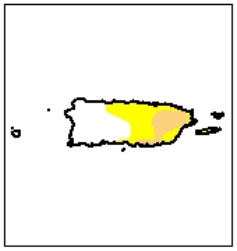
(Released Thursday, May. 14, 2015)

Valid 8 a.m. EDT









Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	49.32	50.68	28.96	14.77	6.00	2.62
Last Week 5/5/2015	49.39	50.61	31.61	17.01	6.57	2.83
3 Months Ago 2/10/2015	55.97	44.03	24.31	13.52	7.09	2.73
Start of Calendar Year 12/30/2014	60.84	39.16	23.96	14.14	7.49	2.12
Start of Water Year 9/30/2014	59.89	40.11	25.54	15.59	7.86	3.22
One Year Ago 5/13/2014	58.73	41.27	31.81	23.42	11.69	3.73

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Mark Svoboda
National Drought Mitigation Center

http://droughtmonitor.unl.edu/

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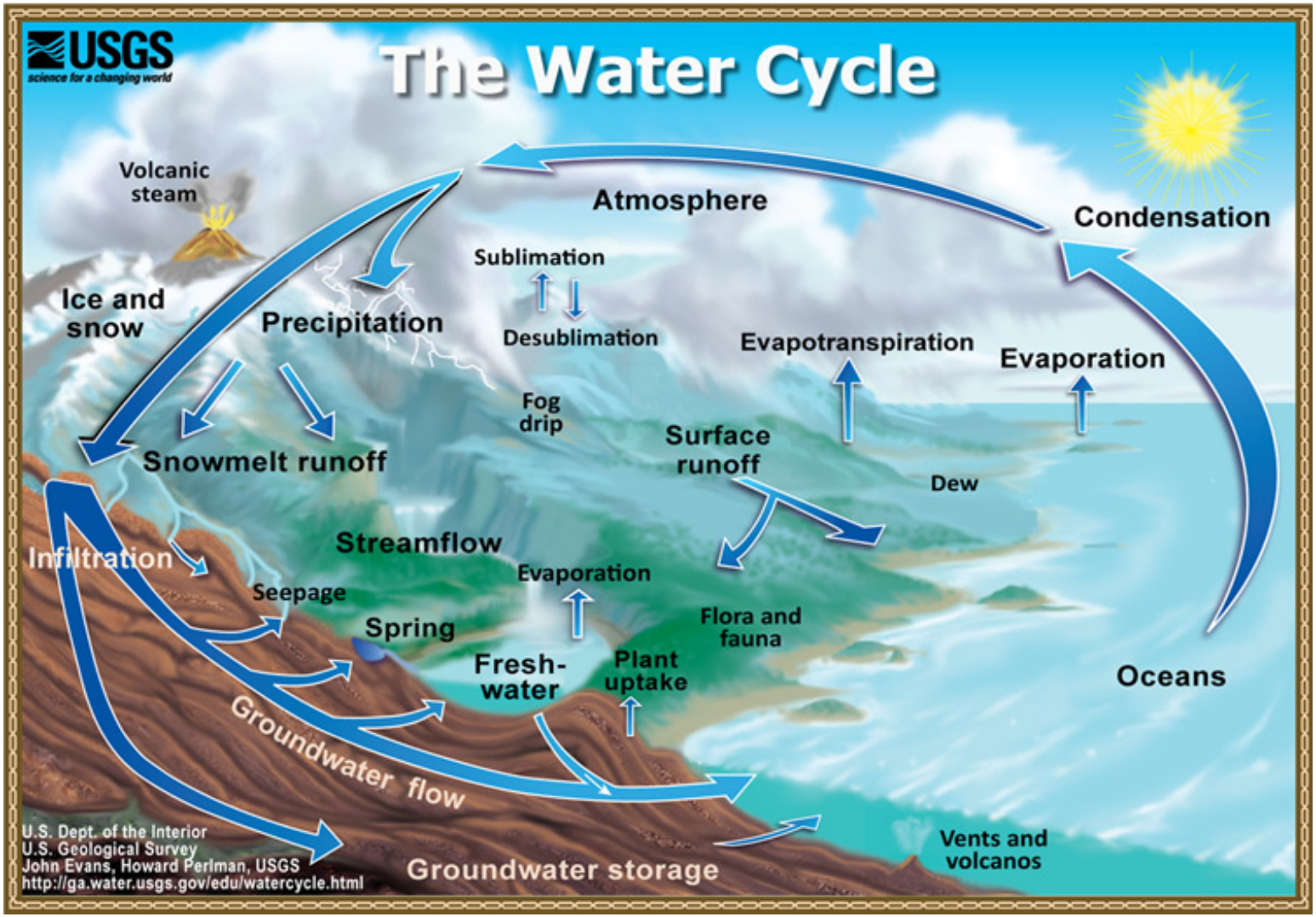
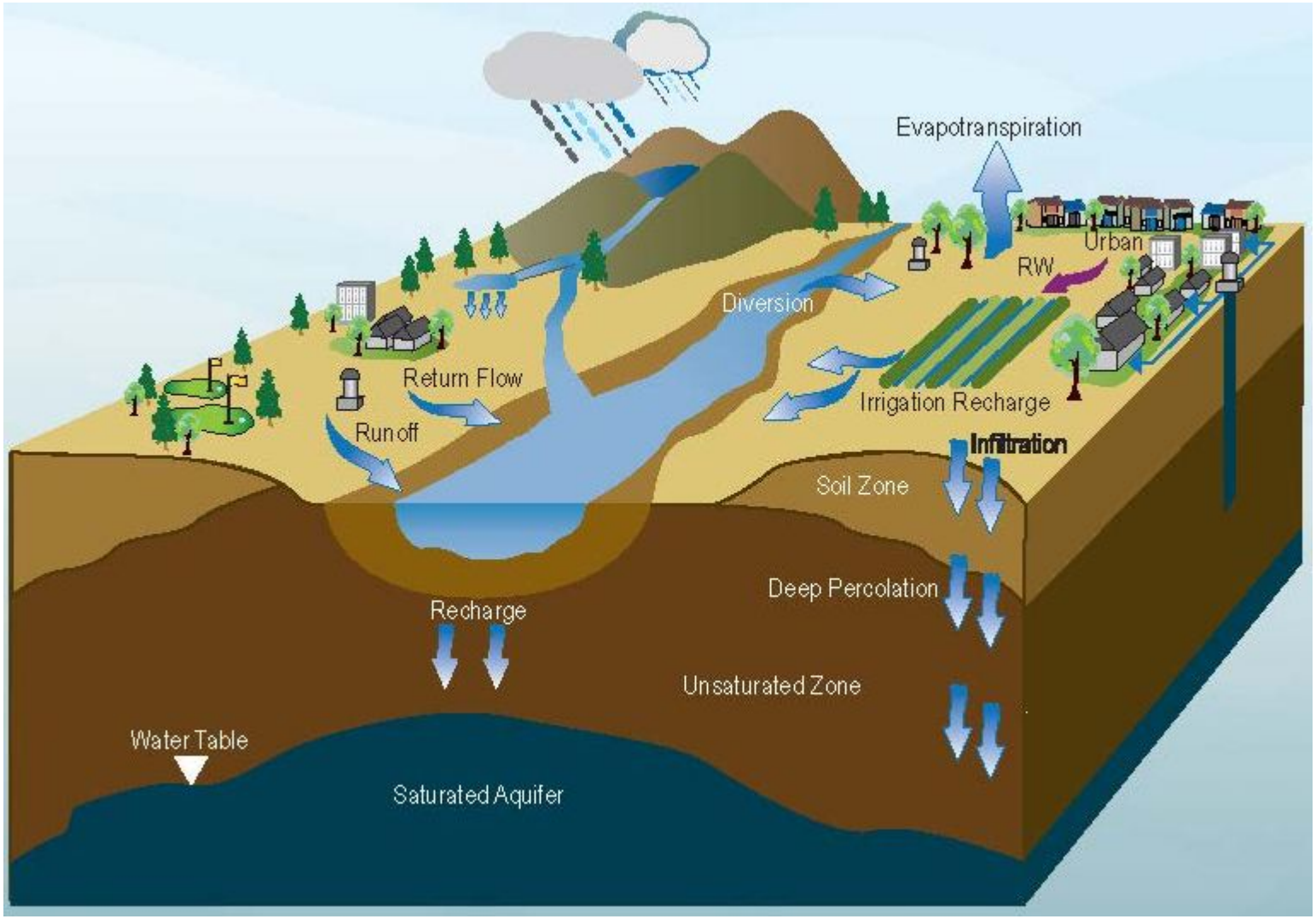



Evapotranspiration
Urban
RW
Diversion
Return Flow
Irrigation Recharge
Run off
Infiltration
Soil Zone
Deep Percolation
Recharge
Unsaturated Zone
Water Table
Saturated Aquifer

Key Geographic Areas

Ogallala Aquifer

Table 3. Change in water in storage in the High Plains aquifer, predevelopment to 2011 and 2009–11, by State and as an overall total, and by comparable methods from this report and previous reports.

[Positive values for increases in water in storage; negative values for decreases in water in storage; accumulated totals by State may differ from aquifer totals because of rounding]

State	Change in water in storage, in million acre-feet					
	Final values calculated for this report, with average-mapped specific yield (range of 2.5 to 27.5 percent)		Calculated for this report, with area-weighted, average specific yield of the aquifer (15.1 percent)		Calculated using methods from previous reports[1]	
	Predevelopment to 2011	2009–11	Predevelopment to 2011	2009–11	Predevelopment to 2011	2009–11
Colorado	-16.9	0.4	-14.8	0.3	-18.7	0.7
Kansas	-62.4	-2.8	-58.2	-2.7	-67.9	-3.2
Nebraska	1.2	4.7	1.1	4.8	-8.1	8.5
New Mexico	-8.7	-0.1	-8.2	-0.1	-11.8	-0.4
Oklahoma	-9.4	-0.5	-7.5	-0.4	-13.8	-0.8
South Dakota	0.1	0.1	0.2	0.1	-0.3	0.2
Texas	-149.7	-4.5	-136.5	-4.1	-150.3	-5.8
Wyoming	-0.4	0.0	-0.7	0.1	-1.7	0.9
High Plains aquifer	**-246.2**	**-2.8**	**-224.6**	**-1.9**	**-272.6**	**0.1**

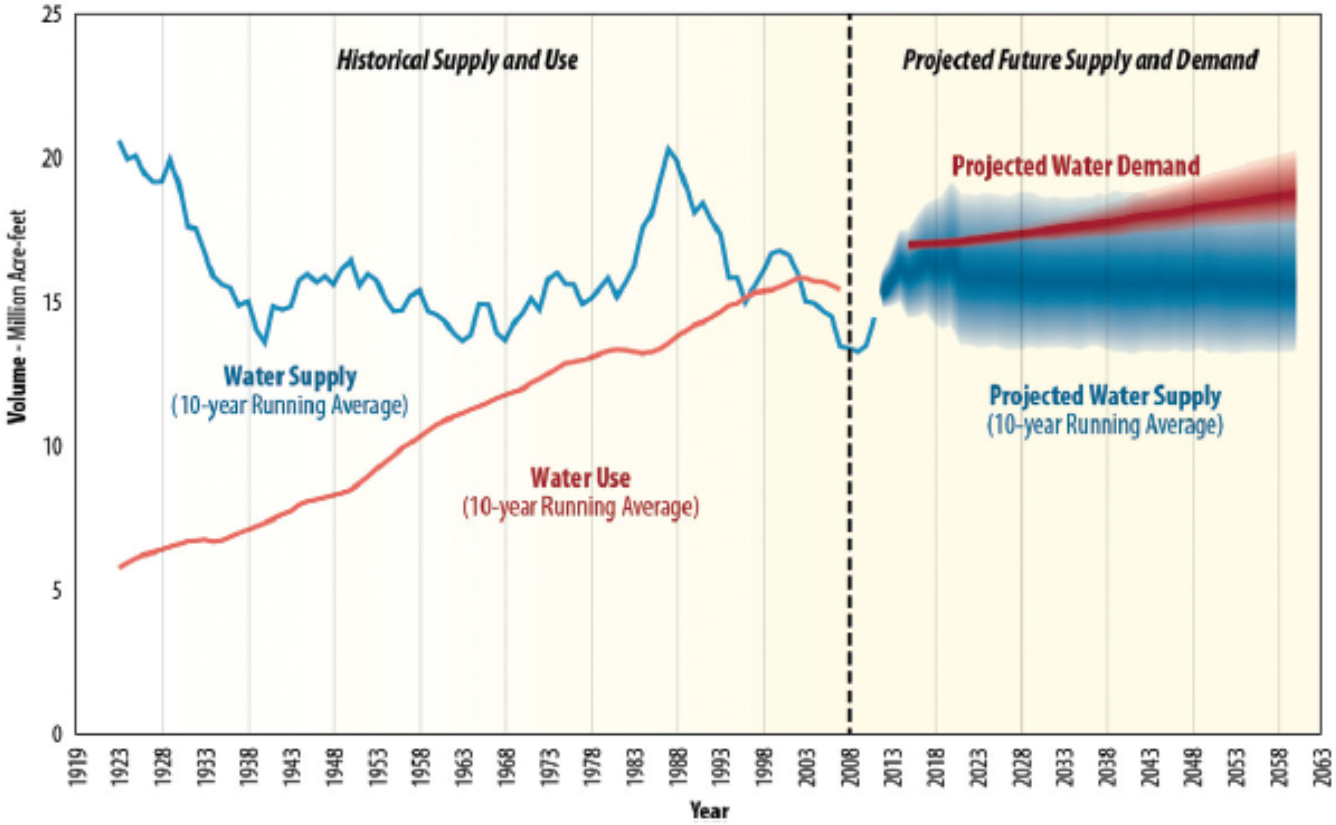
[1]McGuire, 2009, 2011.

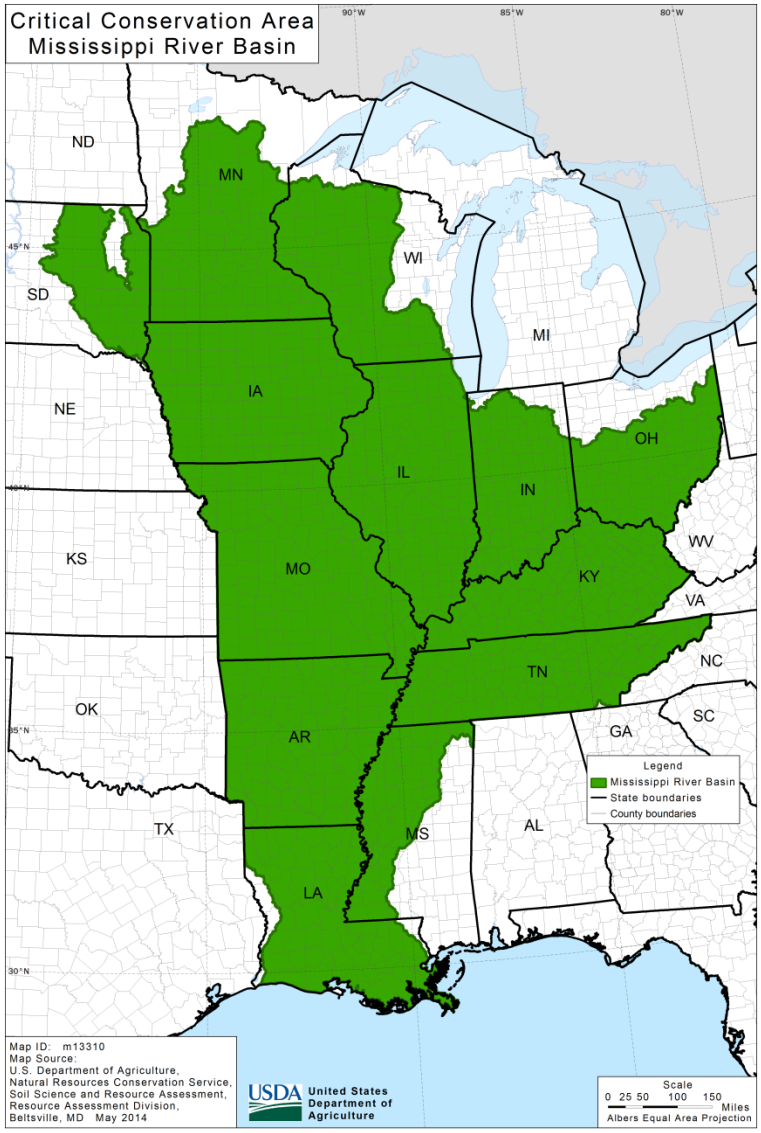
Colorado River Basin

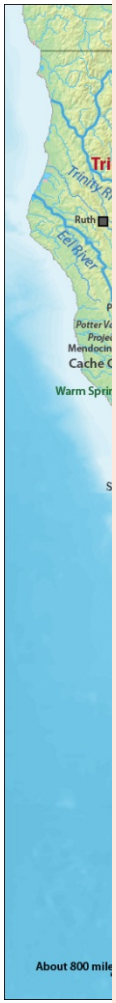
Bureau of Reclamation Study Released in June 2013.

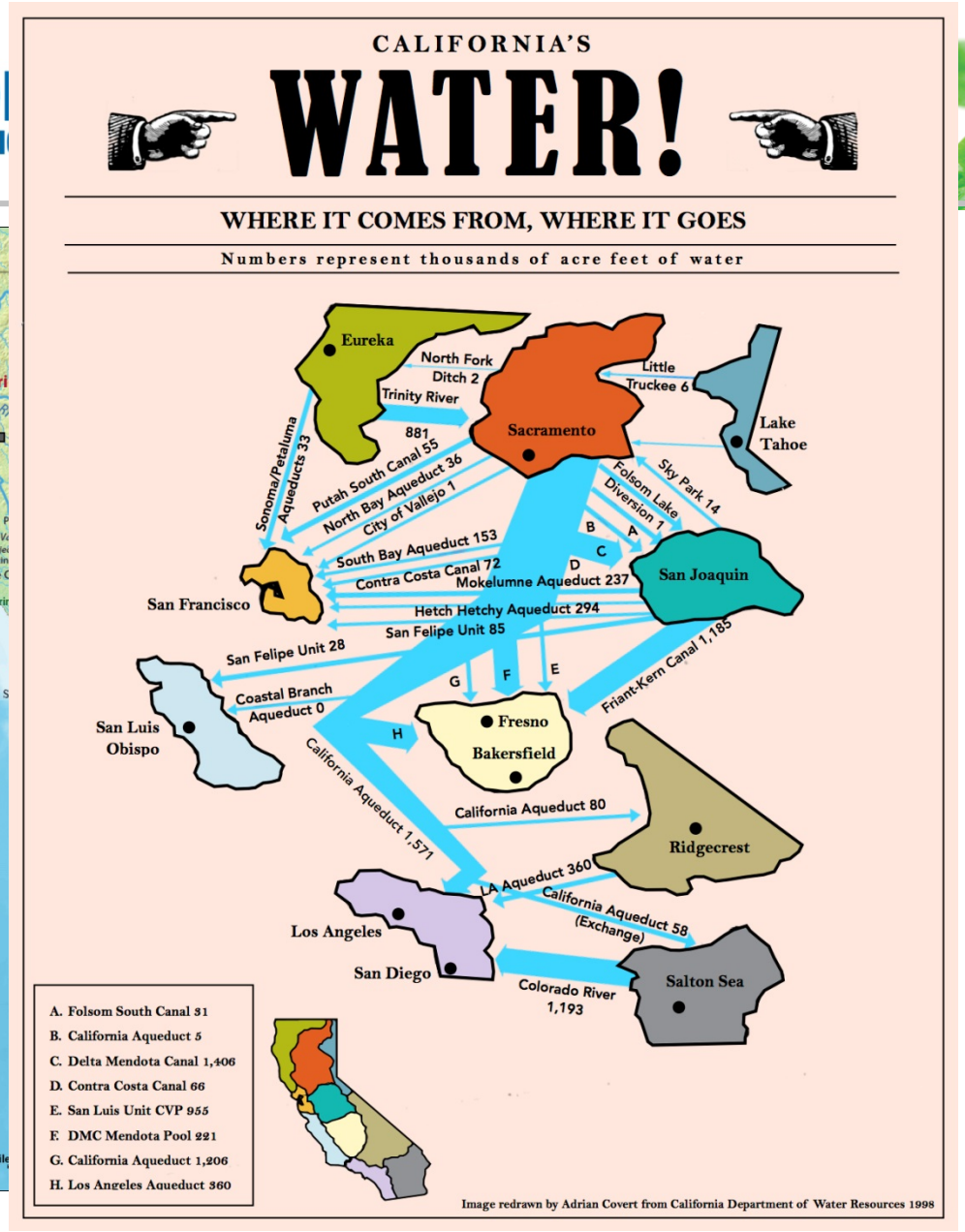
The Study confirmed that the Colorado River Basin faces a range of potential future imbalances between supply and demand. Addressing such imbalances will require diligent planning and cannot be resolved through any single approach or option.

Historical Supply and Use and Projected Future Colorado River Basin Water Supply and Demand




Critical Conservation Area
Mississippi River Basin
90°W
85°W
80°W
45°N
30°N
ND
MN
SD
WI
MI
NE
IA
IL
IN
OH
KS
MO
KY
WV
VA
TN
NC
OK
AR
SC
GA
TX
MS
AL
LA
Legend
Mississippi River Basin
State boundaries
County boundaries
Map ID: m13310
Map Source:
U.S. Department of Agriculture,
Natural Resources Conservation Service,
Soil Science and Resource Assessment,
Resource Assessment Division,
Beltsville, MD May 2014
USDA United States Department of Agriculture
Scale
0 25 50 100 150
Miles
Albers Equal Area Projection




CALIFORNIA'S
WATER!
WHERE IT COMES FROM, WHERE IT GOES
Numbers represent thousands of acre feet of water
Eureka
North Fork
Ditch 2
Trinity River
881
Sacramento
Little
Truckee 6
Lake
Tahoe
Sonoma/Petaluma
Aqueducts 33
Putah South Canal 55
North Bay Aqueduct 36
City of Vallejo 1
Folsom Lake
Diversion 1
Sky Park 14
B
C
P
South Bay Aqueduct 153
Contra Costa Canal 72
D
Mokelumne Aqueduct 237
San Joaquin
San Francisco
Hetch Hetchy Aqueduct 294
San Felipe Unit 85
San Felipe Unit 28
Coastal Branch
Aqueduct 0
G
F
E
Friant-Kern Canal 1,185
San Luis
Obispo
H
Fresno
Bakersfield
California Aqueduct 1,571
California Aqueduct 80
Ridgecrest
LA Aqueduct 360
California Aqueduct 58
(Exchange)
Los Angeles
San Diego
Colorado River
1,193
Salton Sea
A. Folsom South Canal 31
B. California Aqueduct 5
C. Delta Mendota Canal 1,406
D. Contra Costa Canal 66
E. San Luis Unit CVP 955
F. DMC Mendota Pool 221
G. California Aqueduct 1,206
H. Los Angeles Aqueduct 360
Image redrawn by Adrian Covert from California Department of Water Resources 1998

Research Needs and Potential Partnerships with Irrigation Industry

IA Developed Research Priorities in 2005 – Joint with ARS Input

- Irrigation Water Management Practices & Systems
- Wastewater Utilization on Irrigated Land
- Irrigation Standards & Evaluation Guidelines
- Irrigation Sensors, Controls & Information Technologies
- Irrigation System Manufacturing & Recycling

Irrigation Water Management Practices & Systems

Objective: Develop more efficient and economic agriculture irrigation practices and systems that conserve natural resources, increase crop yield and quality, and benefit the environment.

Research priorities include:

- Increasing the efficiency of agriculture irrigation.
- Quantifying the effects of wind on sprinkler irrigation patterns.
- Improving irrigation system energy efficiency.
- Compiling databases for soil conditions, water supplies, crop water requirements and climate conditions.
- Capturing crop-specific water requirements.
- Determining irrigation system potential to control crop temperature.
- Defining irrigation best practices for humid areas.
- Improving techniques to manage salinity.
- Reusing and recycling drainage waters.
- Measuring the impact of agriculture irrigation on water quality.
- Documenting the ecosystem benefits of agricultural irrigation.

Wastewater Utilization on Irrigated Land

Objective: Develop irrigation technologies that use biological and chemical waste and wastewater while protecting water quality and the environment, preserving natural resources and reducing total cost.

Research priorities include:

- Identifying best practices for rural, residential, municipal, food processing and industrial waste disposal.
- Determining best practices for applying solid and liquid animal waste.
- Managing aesthetic and health considerations of wastewater utilization.
- Investigating the positive impact of agriculture irrigation on air and water pollution.
- Improving nutrient management.

Irrigation Standards & Evaluation Guidelines

Objective: Develop standards and evaluation guidelines to improve performance, operator safety and irrigation system management.

Research priorities include:

- Determining criteria for evaluating water application uniformity.
- Optimizing chemical application.
- Developing product standards that meet ANSI, ISO and European Community requirements.
- Specifying system design requirements to ensure operator safety.
- Defining equipment safety requirements for irrigation system design.
- Clarifying short- and long-term system performance requirements.
- Improving irrigation system evaluation based on seasonal versus single-event metrics.
- Developing criteria to evaluate total system areas rather than inappropriate subsets.
- Setting standards for material suitability, and chemical interactions and concentrations.
- Improving system component interchangeability.

Irrigation Sensors, Controls & Information Technologies

Objective: Promote adoption of new technologies for irrigation scheduling, system control and operation, and precision application.

Research priorities include:

- Applying field and remote sensors.
- Implementing information technologies.
- Enhancing automated control systems.
- Developing cost-effective communication systems for data exchange.
- Implementing geographic information systems for differential control of water and chemical application.
- Using global positioning systems to provide input for geographic information systems.
- Developing databases with soil, water supply, crop water requirement and climate condition information for precision irrigation.

Irrigation System Manufacturing & Recycling

Objective: Develop efficient, economic and environmentally responsible manufacturing, recovery and recycling techniques for irrigation systems and components.

Research priorities include:

- Defining appropriate component materials, and recycling and disposal techniques.
- Improving product design, manufacturing processes and product obsolescence to minimize environmental impact.

Looking ahead at research…

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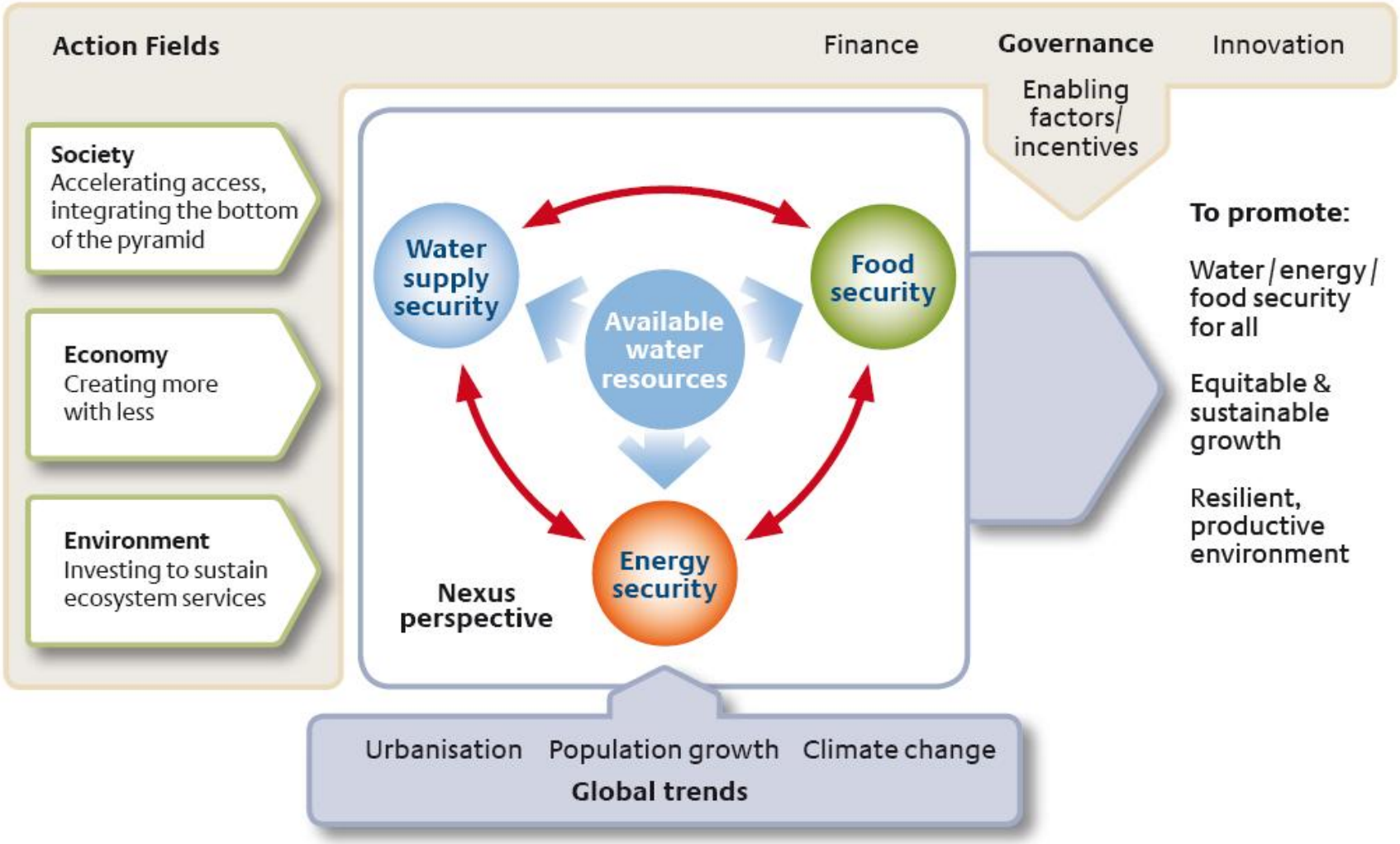
Use of unmanned areal systems in irrigation management.

Water-Energy-Food Nexus

- Embedded energy in irrigation water, which then becomes part of the water (energy) footprint of food.

- Irrigation efficiency = Energy efficiency?


Action Fields
Finance
Governance
Innovation
Enabling factors/ incentives
Society
Accelerating access, integrating the bottom of the pyramid
Economy
Creating more with less
Environment
Investing to sustain ecosystem services
Water supply security
Food security
Available water resources
Energy security
Nexus perspective
To promote:
Water / energy / food security for all
Equitable & sustainable growth
Resilient, productive environment
Urbanisation
Population growth
Climate change
Global trends

Groundwater Recharge

Effects on groundwater recharge due to increases in efficient irrigation.

Yield Productivity

Tying yield productivity into the equation of water savings.

Oxygen.
Food.
Life.

Just add water.

Irrigation ASSOCIATION™

Smart practices.
Sustainable solutions.

John Farner
Irrigation Association
Government and
Public Affairs Director
johnfarner@irrigation.org