

The Future of Groundwater in California: Lessons in Sustainable Management from Across the West

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May 4, 2018



EDF's Western Water Program

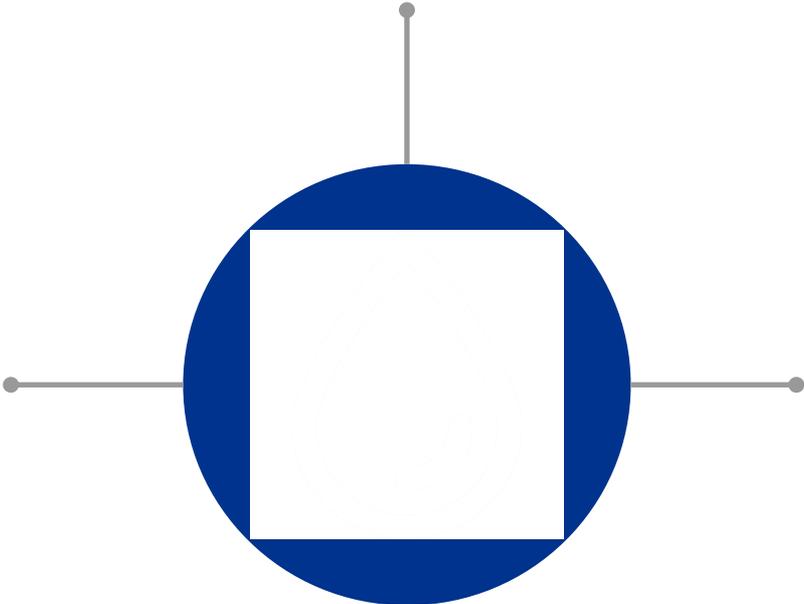


EDF'S WESTERN WATER PROGRAM

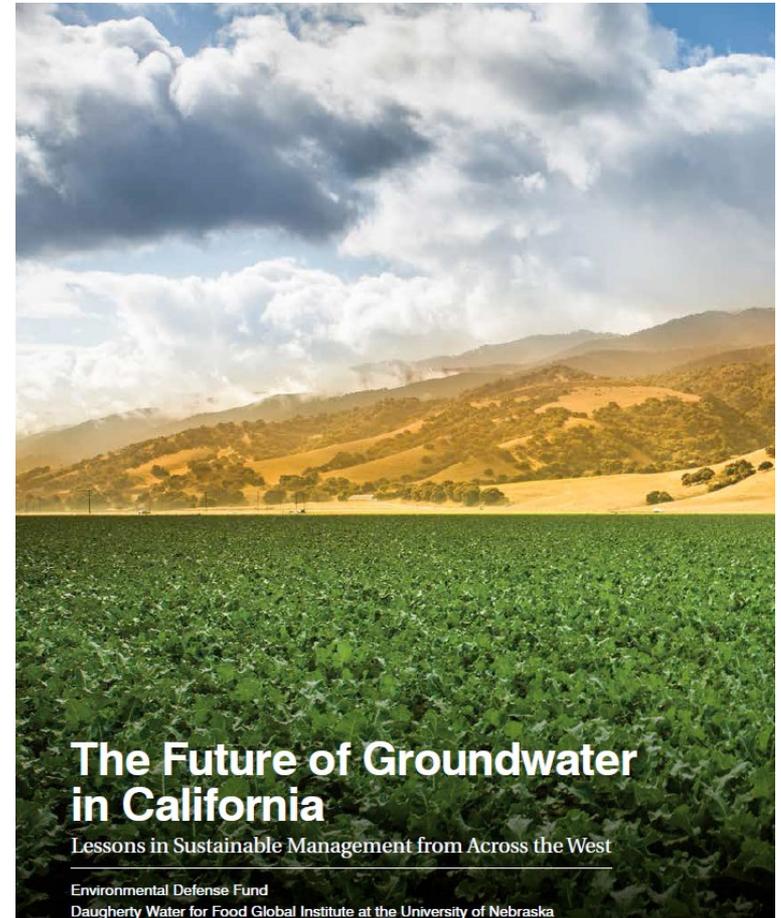
Creating healthy water trading programs

Advancing sustainable groundwater management

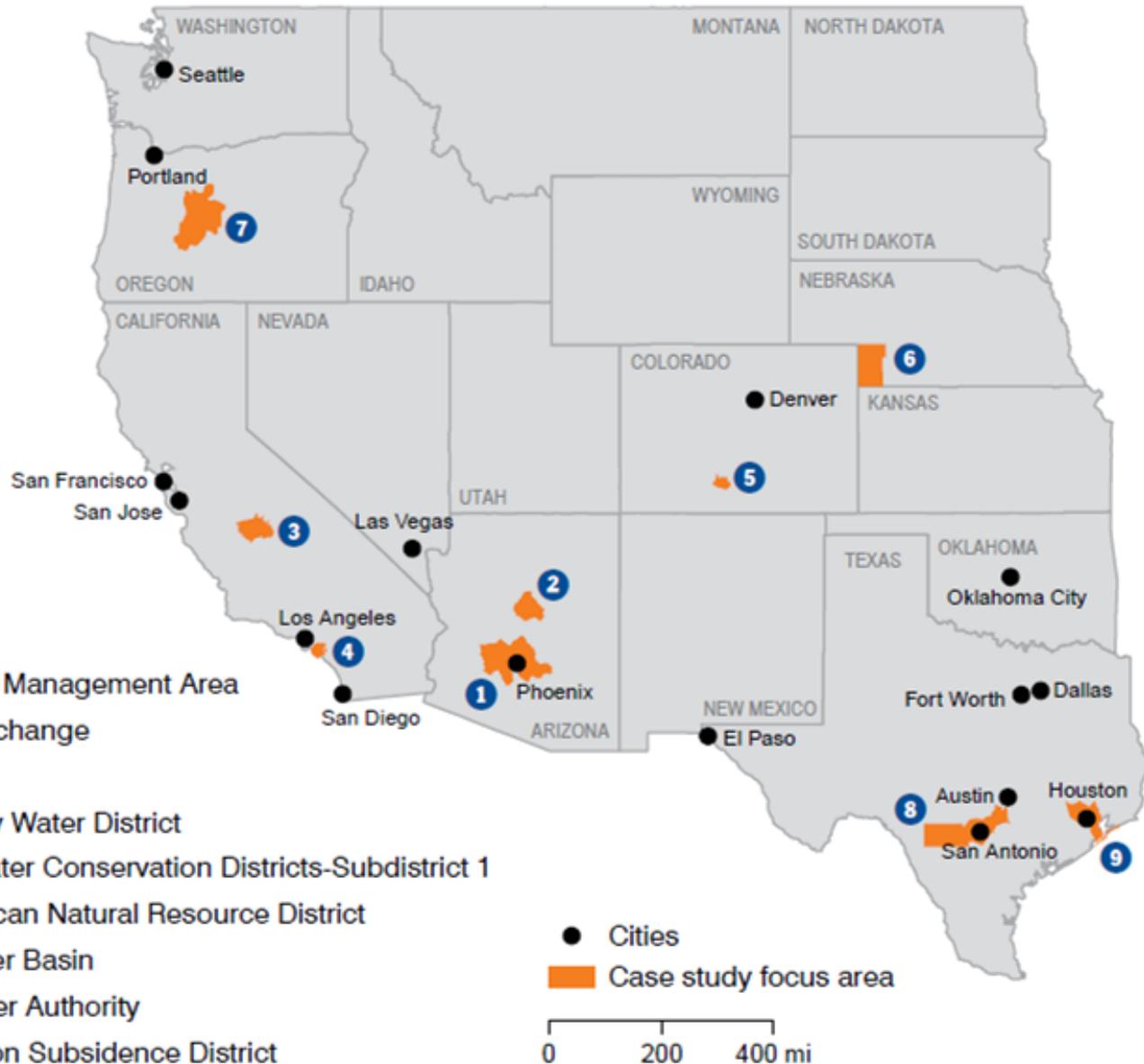
Planning for resilient ecosystems and communities



Advancing Sustainable Groundwater Management



Groundwater Management Case Studies



SGMA Undesirable Results

Groundwater challenges across case studies

State	Management area	Dominant water use(s)	Challenge 1	Challenge 2	Challenge 3	Challenge 4	Challenge 5
AZ	Phoenix AMA	Ag/Urban	•				•
	Verde River Exchange	Ag/Urban	•			•	
CA	Kings Basin	Ag	•		•		•
	Orange County Water District	Urban	•	•			
CO	Rio Grande Water Conservation District	Ag	•		•	•	
NE	Upper Republican NRD	Ag	•		•	•	•
OR	Deschutes River Basin	Ag/Urban				•	
TX	Edwards Aquifer Authority	Ag/Urban	•		•	•	•
	Harris-Galveston Subsidence District	Urban	•	•	•	•	

Tools Used to Address Groundwater Challenges

- Regulatory
- Incentive-based
- Agency supply augmentation and protection
- Education and outreach



Regulatory Tools

Regulatory tools used across case studies

Management area	REGULATORY TOOLS						
	Moratoria or limits on new wells/irrigated acreage	Permitting systems for wells	Quantified and allocated irrigation/pumping rights	Certification of irrigated acreage	Metering of wells (self-reported)	Metering of wells (monitored)	BMPs without cost share
Phoenix AMA	•	•	•	•	•		•
Verde River Exchange							
Kings Basin							
Orange County Water District					•		
Rio Grande Water Conservation District	•	•	•		•		
Upper Republican NRD	•	•	•	•		•	
Deschutes River Basin	•	•	•		•		
Edwards Aquifer Authority		•	•		•		•
Harris-Galveston Subsidence District		•	•		•	•	

Incentive-based Tools

Incentive-based tools used across case studies

INCENTIVE-BASED TOOLS							
Management area	Taxes, fees or surcharges	Land retirement projects	Managed aquifer recharge (landowner is lead beneficiary)	Offset program	Recharge, depletion or storage credits	Transfer of credits, permits or rights	BMPs with cost-share
Phoenix AMA					•	•	
Verde River Exchange				•	•		
Kings Basin			•			•	•
Orange County Water District	•						
Rio Grande Water Conservation District	•	•		•	•	•	
Upper Republican NRD	•	•				•	•
Deschutes River Basin	•			•	•	•	
Edwards Aquifer Authority				•		•	
Harris-Galveston Subsidence District	•						•

Supply Augmentation and Protection Tools

Agency supply augmentation and protection tools across case studies

AGENCY SUPPLY AUGMENTATION AND PROTECTION TOOLS

Management area	Stream augmentation projects	Managed aquifer recharge (agency lead)	Aquifer storage and recovery	Infrastructure upgrades (paid for by agency)	Reservoir operation	Seawater intrusion barriers	Recycled water
Phoenix AMA		•	•	•	•		
Verde River Exchange							
Kings Basin		•		•	•		
Orange County Water District		•		•	•	•	•
Rio Grande Water Conservation District	•	•		•			
Upper Republican NRD	•			•			
Deschutes River Basin	•			•			
Edwards Aquifer Authority	•		•	•			
Harris-Galveston Subsidence District				•	•		

Example Case Study Summary Page

CASE STUDY 5 / COLORADO

Rio Grande Water Conservation District (Subdistrict No. 1)



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CHALLENGES FACED (SGMA UNDESIRABLE RESULTS)



PREDOMINANT WATER USES



Agricultural

TOOLS USED TO ACHIEVE MANAGEMENT GOALS

Regulatory

- ▶ Moratorium on new wells
- ▶ Permitting system for wells
- ▶ Quantified pumping rights
- ▶ Metering of wells (self-reported)

Incentive-based

- ▶ Fees
- ▶ Offset program with transferable recharge credits
- ▶ Land retirement projects

Agency supply augmentation and protection

- ▶ Stream augmentation projects
- ▶ Infrastructure upgrades (paid for by agency), including managed aquifer recharge

Education and outreach

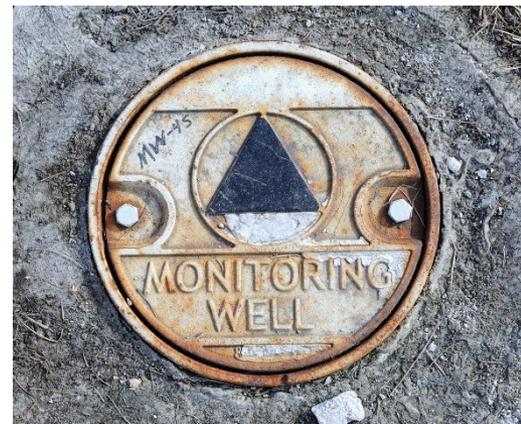
See page 68 for education and outreach tools to achieve management goals.

LESSONS LEARNED

- ▶ Fees on groundwater pumping and incentives to fallow land can be effective methods to reduce groundwater use.
- ▶ Community support for water management goals helps enable successful implementation of programs, such as land retirement and pumping fees.
- ▶ Water users will rely on surface water to avoid a groundwater pumping fee.

Summary of Lessons Learned

- Trust and Community Involvement
- Accurate Data
- A Portfolio of Approaches
- Assuring Performance
- Access to Adequate Funding





Thank you!

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Report Link:

<https://www.edf.org/ecosystems/future-groundwater-california>