Managing Energy, Water, & Drought – Solutions from the Interior West

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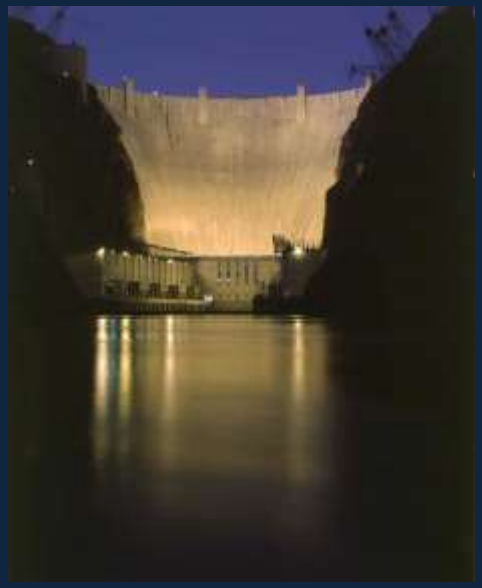
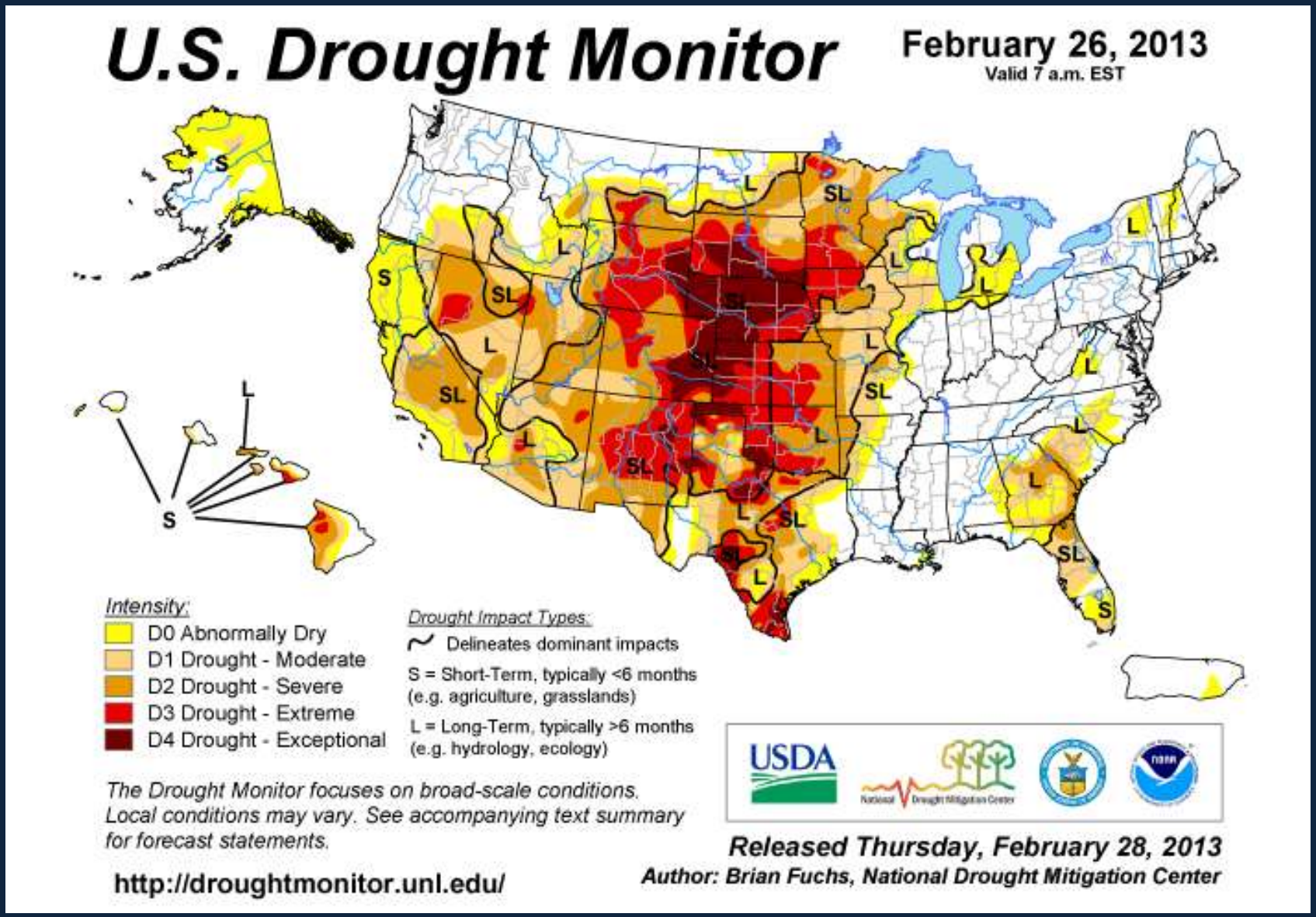
WESTERN RESOURCE
ADVOCATES

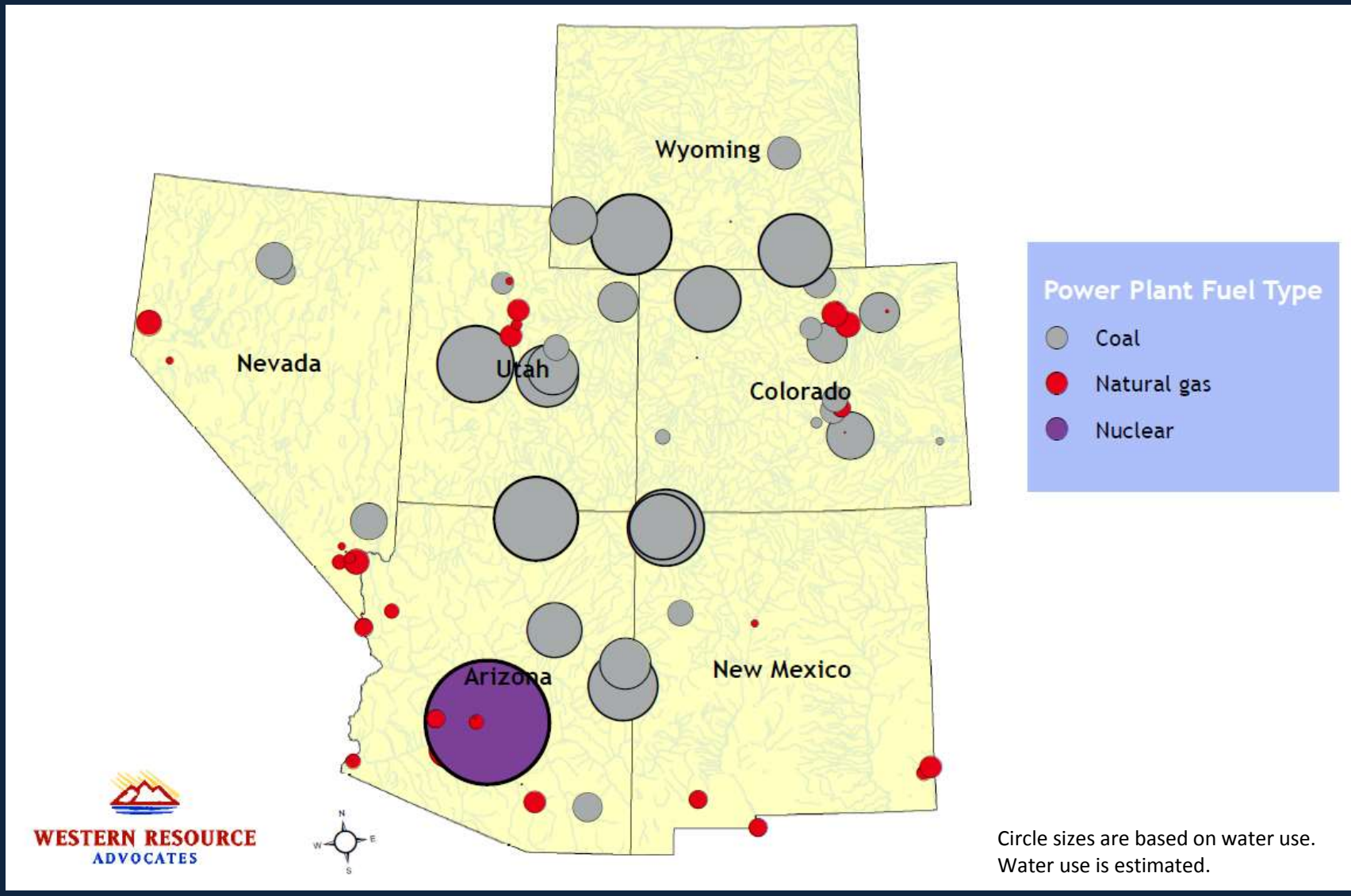
Outline

1. Background
2. Impacts of Drought
3. Management strategies

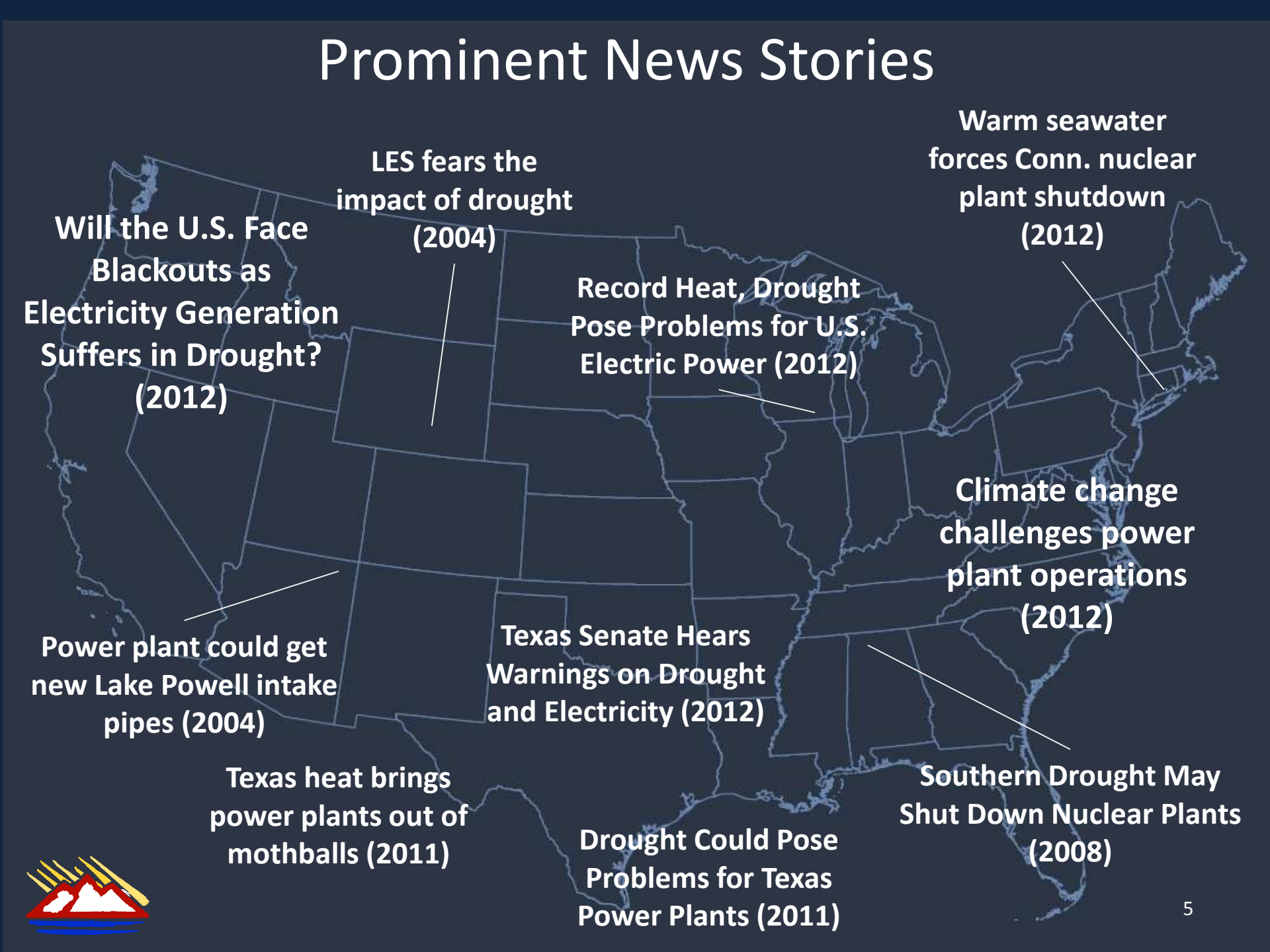



U.S. Drought Monitor
February 26, 2013
Valid 7 a.m. EST
Intensity:
D0 Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
Drought Impact Types:
Delineates dominant impacts
S = Short-Term, typically <6 months (e.g. agriculture, grasslands)
L = Long-Term, typically >6 months (e.g. hydrology, ecology)
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.
http://droughtmonitor.unl.edu/
USDA
Released Thursday, February 28, 2013
Author: Brian Fuchs, National Drought Mitigation Center

Water Use by Power Plants



Prominent News Stories



Impacts of Drought

Impacts of Drought - Texas

- ✓ Increased temperatures → record electricity demands
- ✓ Reduced water levels
  - Plants curtailed: 24 MW
  - Record low water levels: 11,000 MW
  - At risk: 3,000 MW
- ✓ Mothballed plants brought online – 470 MW
- ✓ Water rights curtailed – 1,200
- ✓ Electricity prices skyrocketed


Photo: Wikipedia


Photo: TX OPUC

Impacts of Drought – Australia

- Drought: 2000 – 2010
- Hydro & thermal plants affected
  - 2,343 MW of coal power plants were curtailed
  - Coal mine production and jobs cut
- Prices soared
- Invested in recycled water pipeline

A prolonged drought in South East Queensland compels Tarong Energy to rethink how it uses water
Spectrum.ieee.org

Impacts of Drought

Power plants purchase/lease water from other users.

- Ex: Laramie River Station, Wyoming
- Cooling reservoir at ~10% in January, 2008
- Basin Electric actions: purchased agricultural water and conveyed via 17 mile pipeline; agricultural water required additional treatment

Photo: nytimes.com

Impacts of Drought

Coal

Gas

Hydro

Renew.

ENS

Prices

CO2 Emissions

- *Actual* impacts depends on water rights and other factors.
- *Technology choices can act as a hedge against drought*

NETL: *An Analysis of the Effects of Drought Conditions on Electric Power Generation in the Western United States, 2009.*

How do we manage water-related risks?

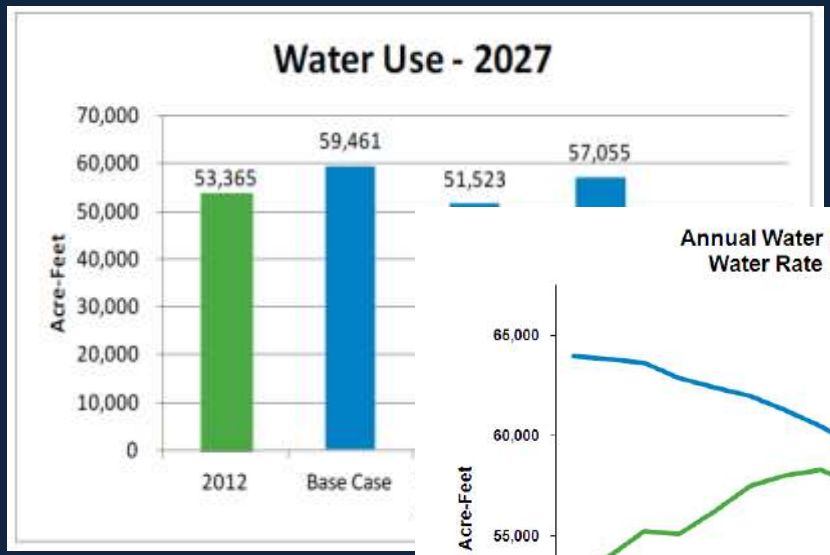
1. Information
2. Value water (and other externalities)
3. Recognize the risk of drought, and the value of water-efficient resources as a hedge

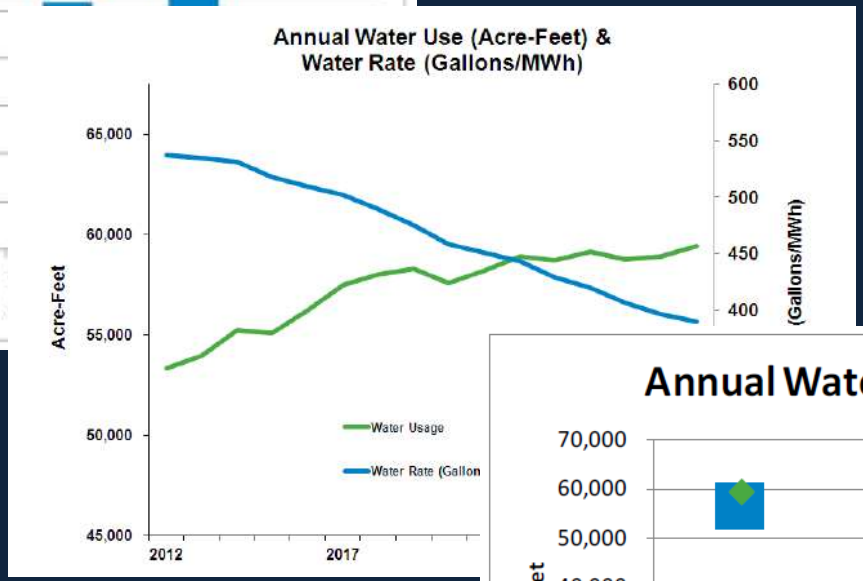
Managing Risk - Information

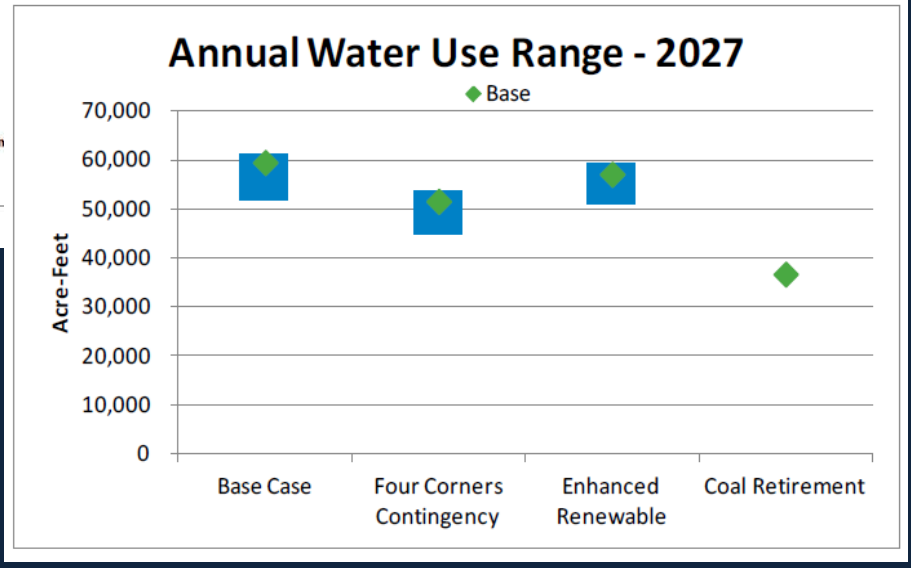
- Arizona
  - APS - began reporting water use and water intensity in 2009
  - Water has played a role in past siting decisions

- Colorado
  - Utilities must report water use and water intensity (2011)
  - Water (and value of water) was a factor in the 2010 Clean Air-Clean Jobs hearings at the PUC

Information - APS







Information – APS

- Qualitative information in resource plan:
  - Strategies to reduce water use/intensity
    1. Four Corners Units 1-3 retirement
    2. Additional renewable energy, energy efficiency, distributed generation
    3. Dry/hybrid cooling
    4. Improving efficiency at existing plants

Managing Risk – Valuing Water

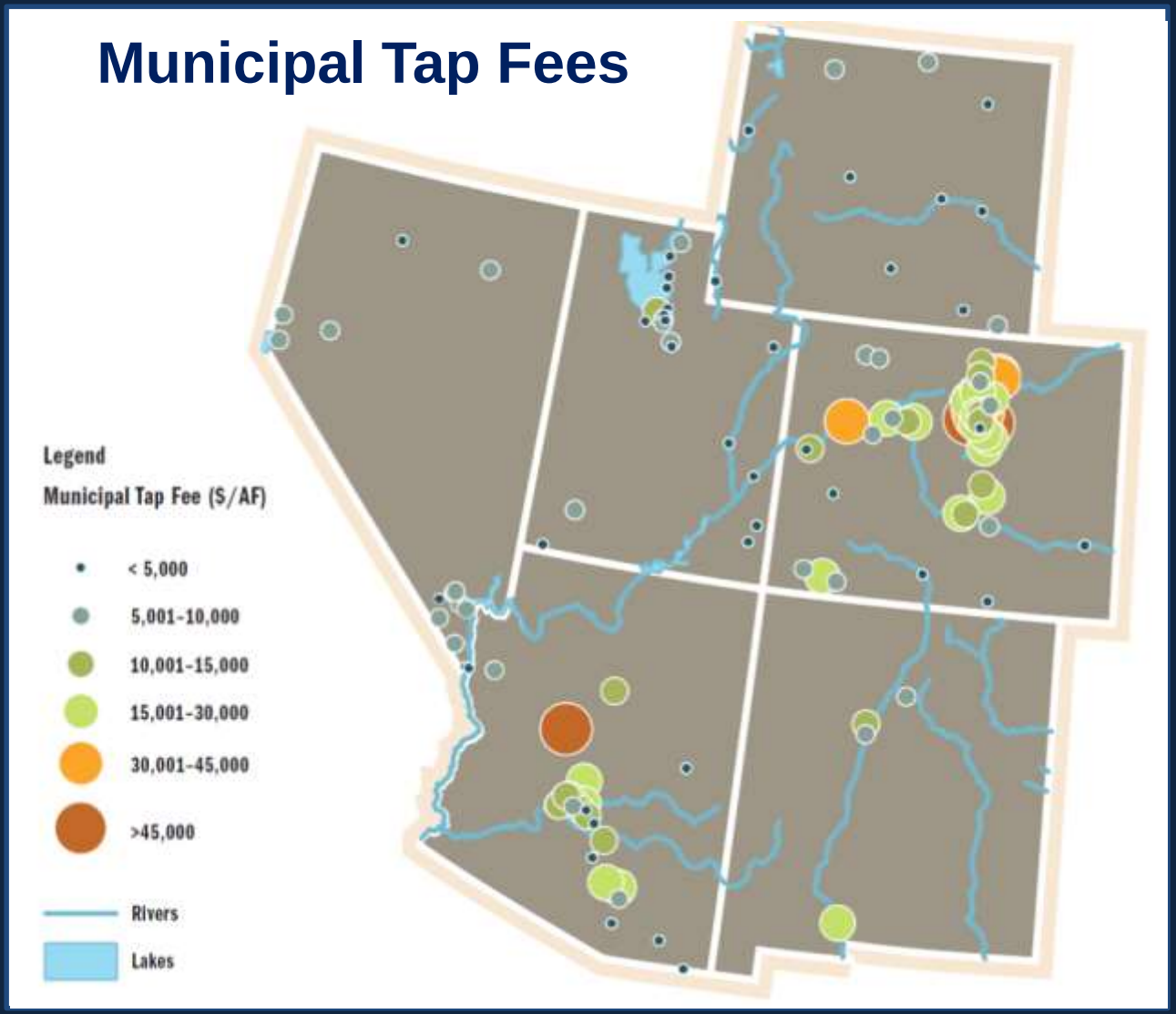
- Current price
- Opportunity cost
- Future values?

Value Water

Depends on:

- *Use*
- *Location*
- *Scarcity*

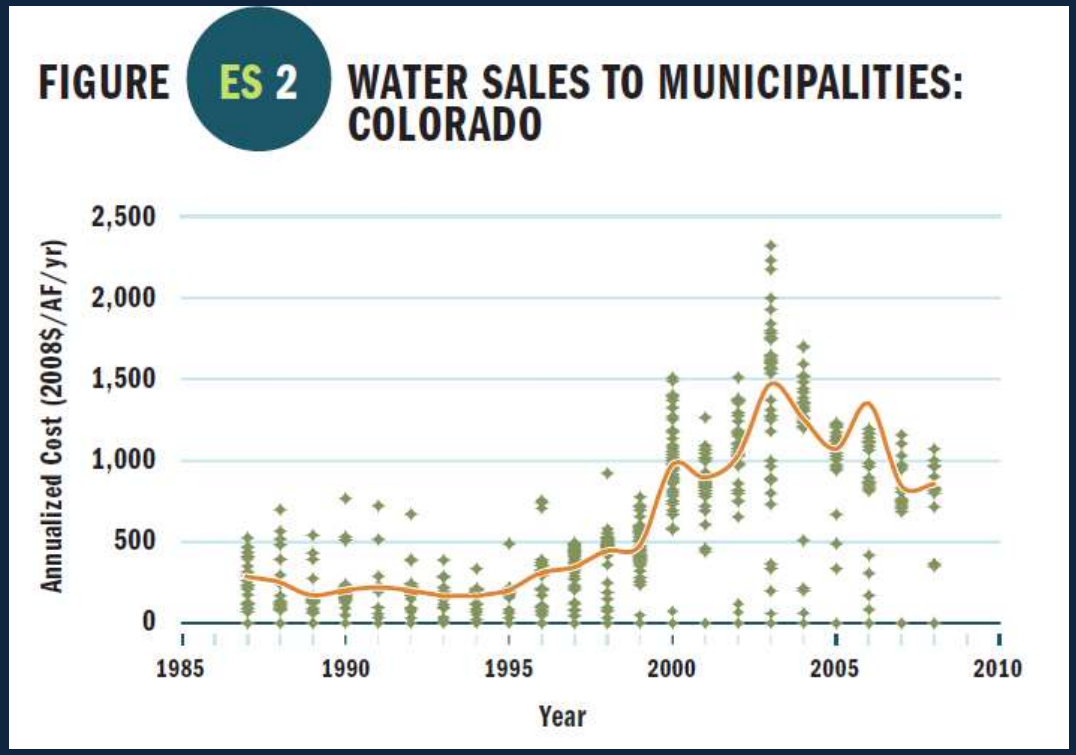
Costs are not annualized, but are adjusted to a common metric ($/AF)



Value Water

- Current opportunity cost
  - Does the current cost reflect future costs?

- *Value/price changes with time*



Recognize Risk

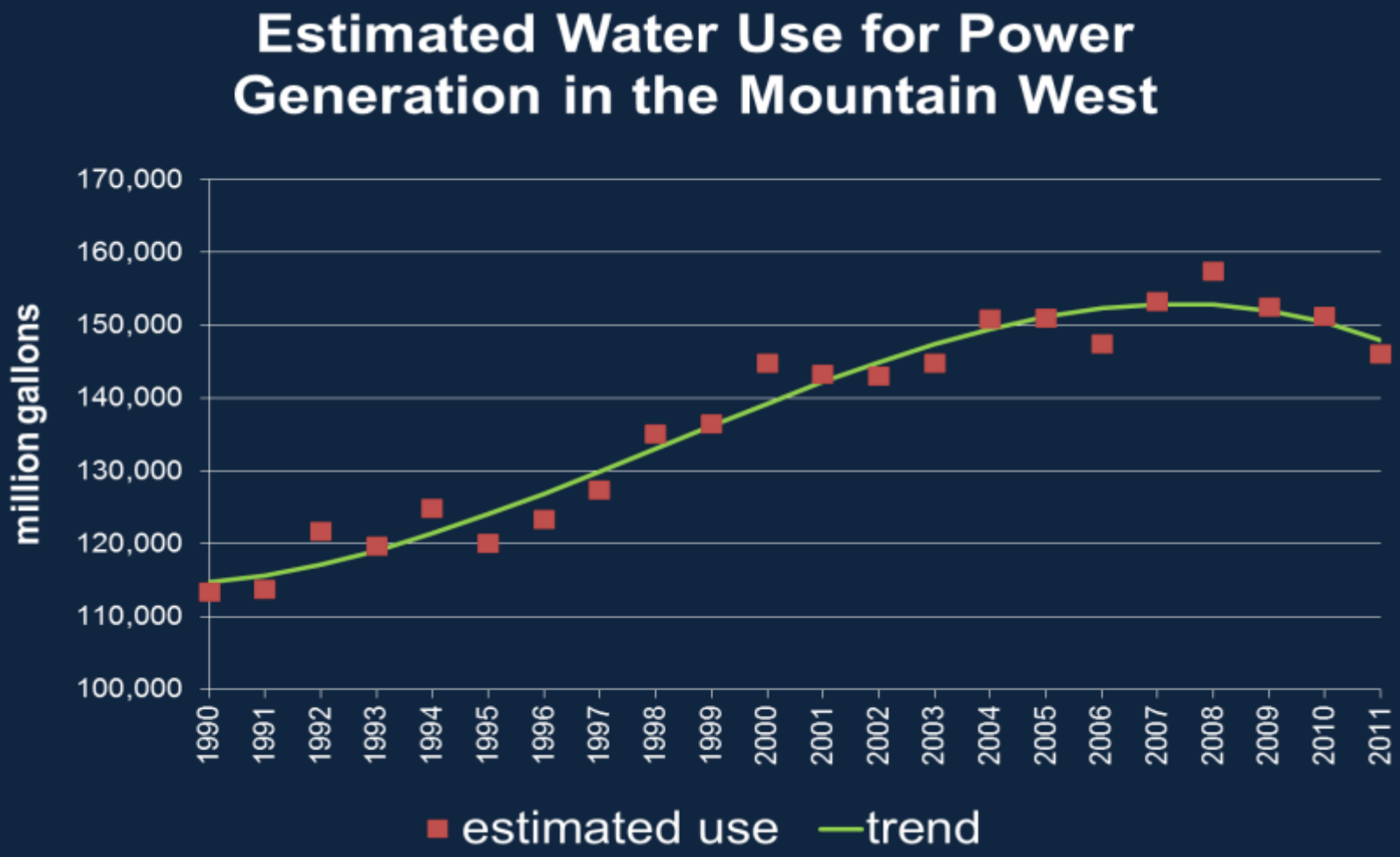
- Develop drought scenarios (PNM)
  - Informed by hydrology
  - 1 yr, 3 yr, longer?

- Include a qualitative discussion of how a resource or portfolio mitigates the risk of drought and other environmental impacts.

Managing Water-Related Risks

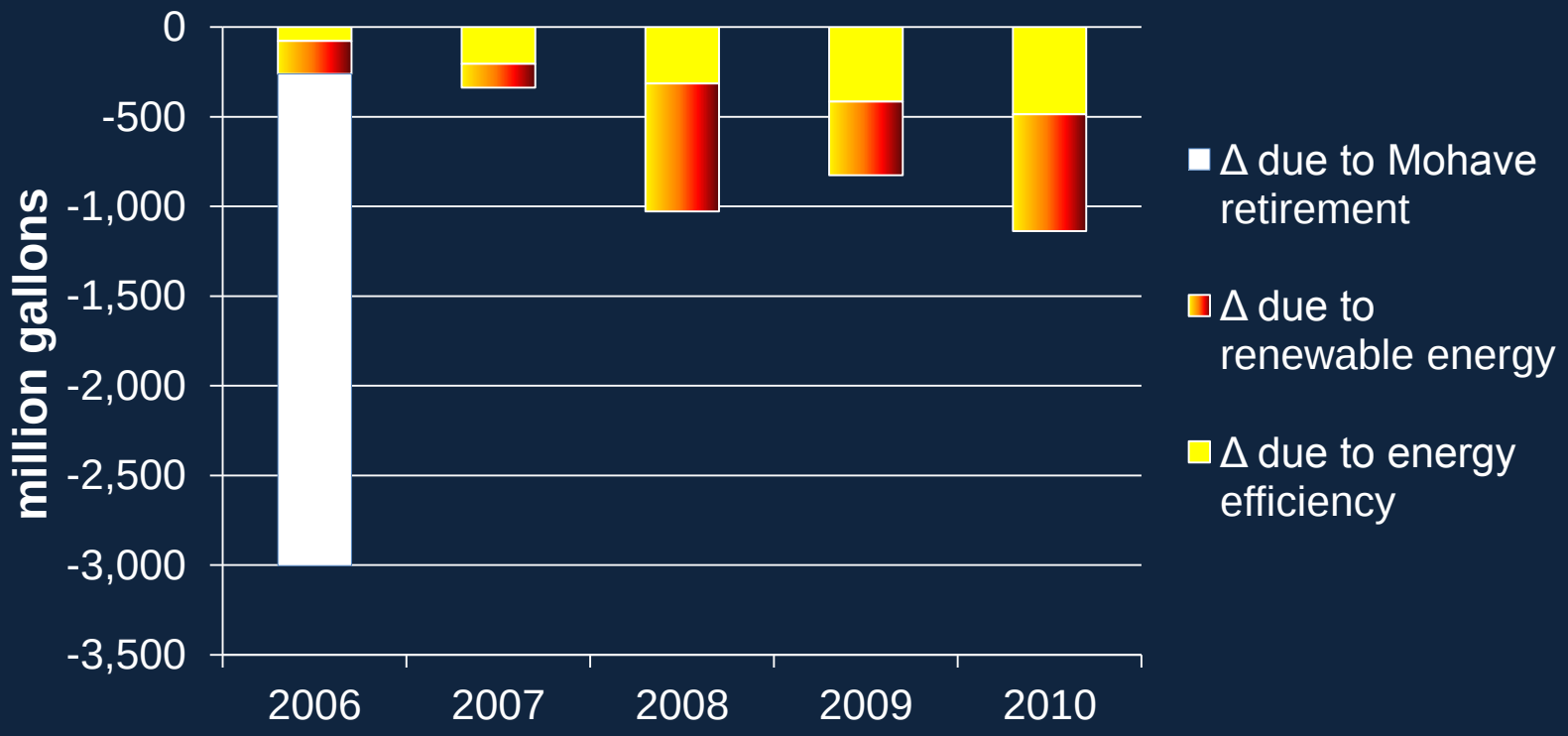
1. Better Information
2. Value water (and other externalities)
3. Recognize the risk of drought, and the value of water-efficient resources as a hedge

Trends


Estimated Water Use for Power Generation in the Mountain West
million gallons
170,000
160,000
150,000
140,000
130,000
120,000
110,000
100,000
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
estimated use
trend

Trends

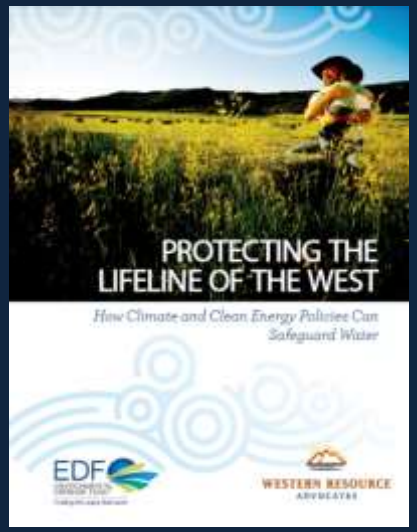
Change in Water Use from Previous Year Due to Clean Energy Events: Mountain West

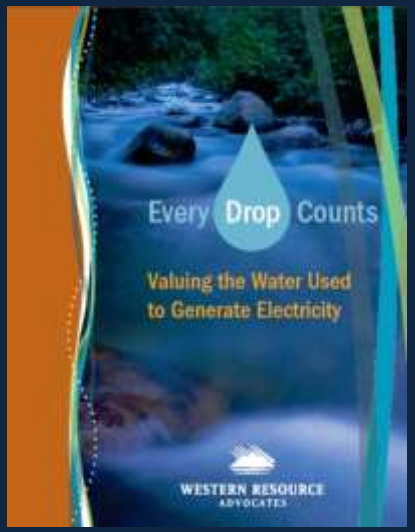


Bridging Water and Energy Efficiency

- Find synergies between efficiency programs
- Integrate water efficiency into DSM
- Look at how water is valued in the cost-benefit analyses of DSM program evaluation

Thank You





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