

**Climate Change, Drought & Environment**

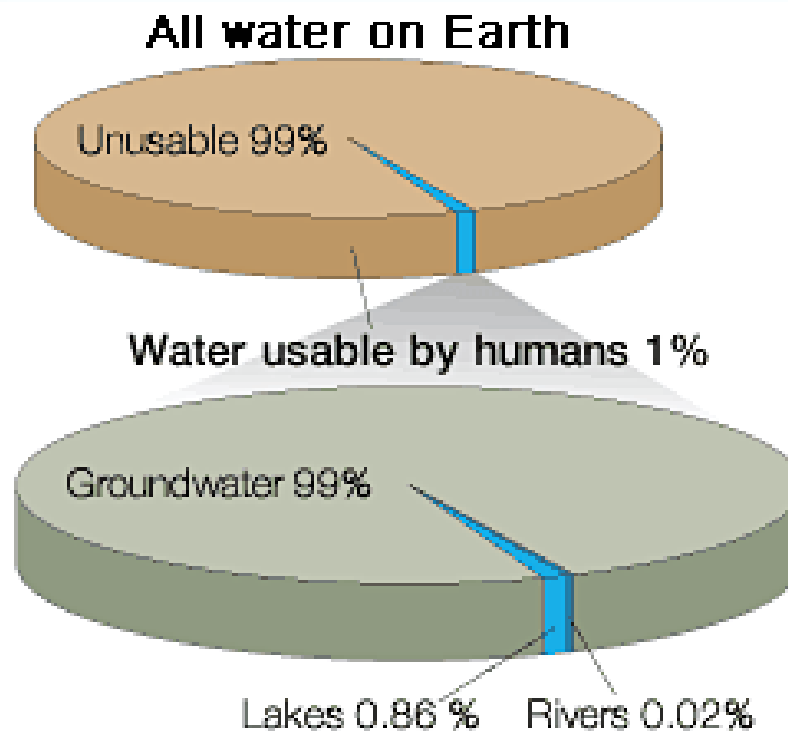
**The Definitive Crisis  
of the 21st Century**

**Freshwater Scarcity**

**We Call it Planet Earth, but it is Planet H<sub>2</sub>O**

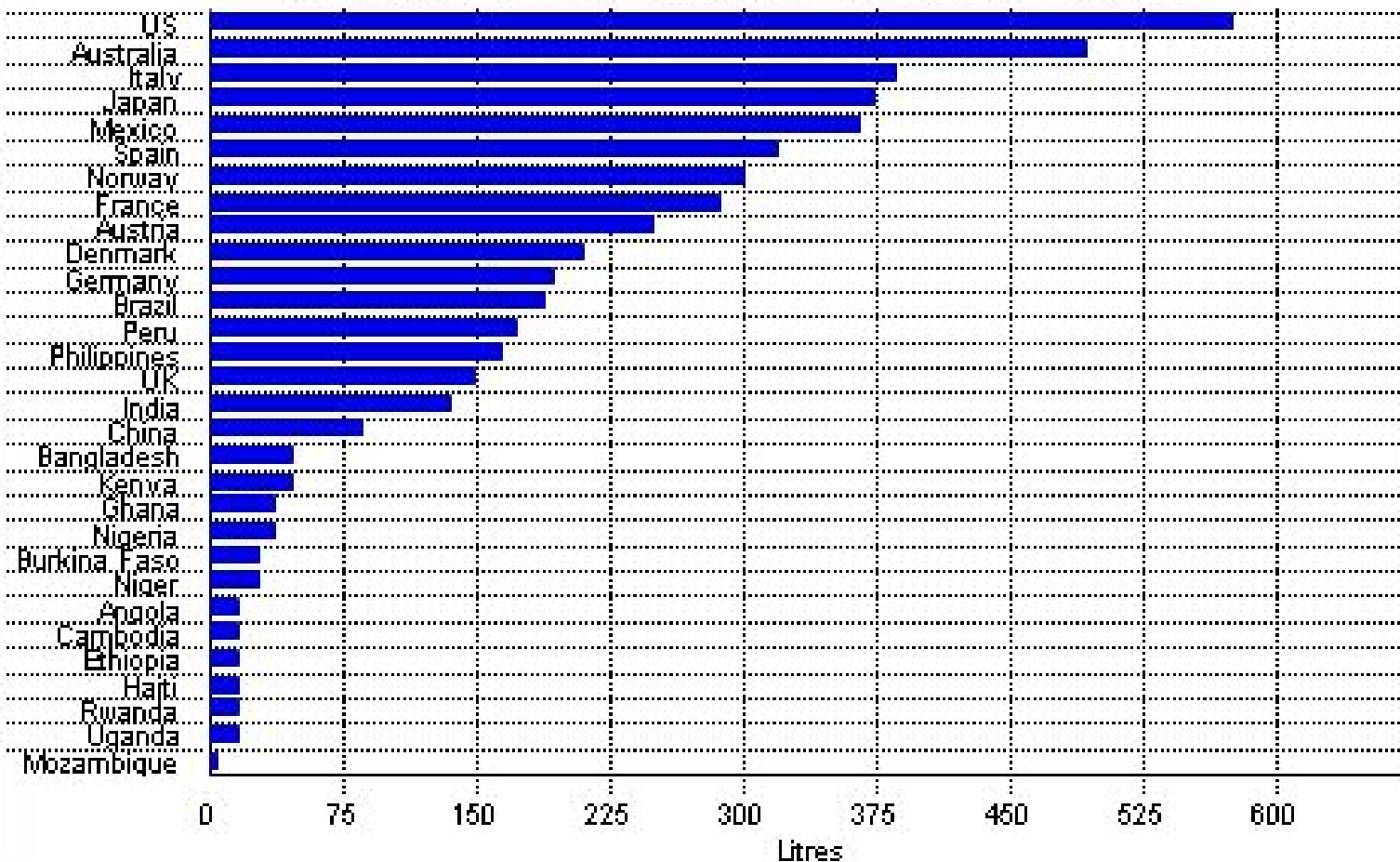


**It is Saline Water**



Evidence suggests that the major global crisis of the 21<sup>st</sup> century will be widespread freshwater scarcity.

## Average Water Use Per Person Per Day



United Nations Development Program - Human Development Report 2006

[www.data360.org](http://www.data360.org)

## Water Use Facts:

- Water consumption doubles every 20 years, outpacing population growth.
- By 2025 demand will exceed supply by 56%.
- Direct linkage between:
  - water
  - energy
  - food
  - security

# Global Protracted Droughts





Darren Stallwitz, stands in his cornfield, in Dumas, Texas, and Aug. 13, 2011.







## Vladimir Putin bans grain exports as drought and wildfires ravage crops

- More than a third of cultivable land in Russia destroyed
- Wheat prices hit 23-month high on commodities market

Tom Parfitt in Moscow

The Guardian, Thursday 5 August 2010 13.35 EDT



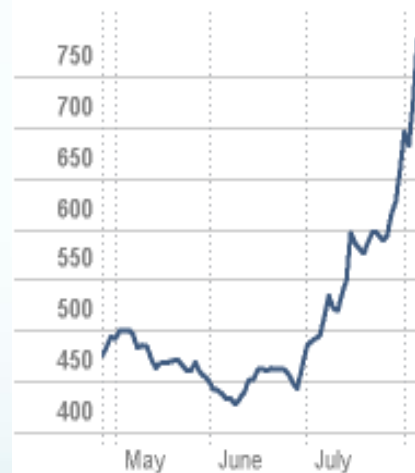
### Wheat (bushel)

725.75

+248.25

+34.21%

At market close  
08/06/2010



Source: Reuters

The New York Times

# In the US: Water Shortages

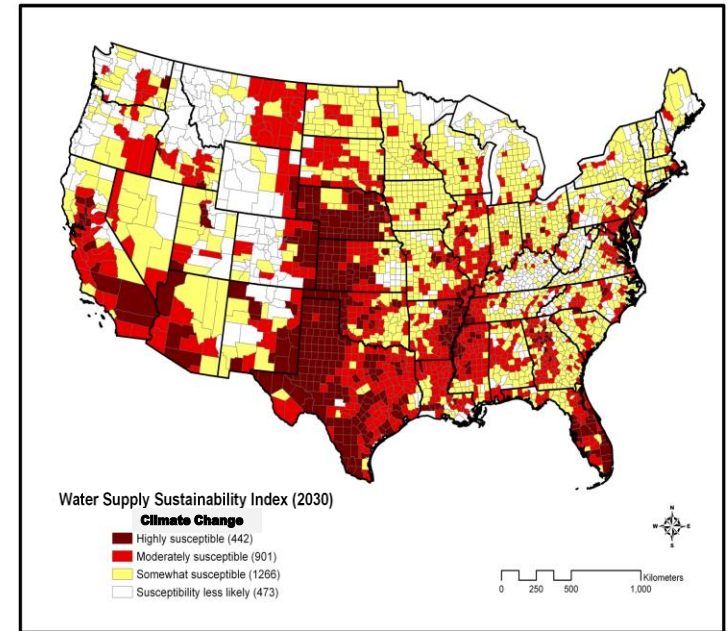
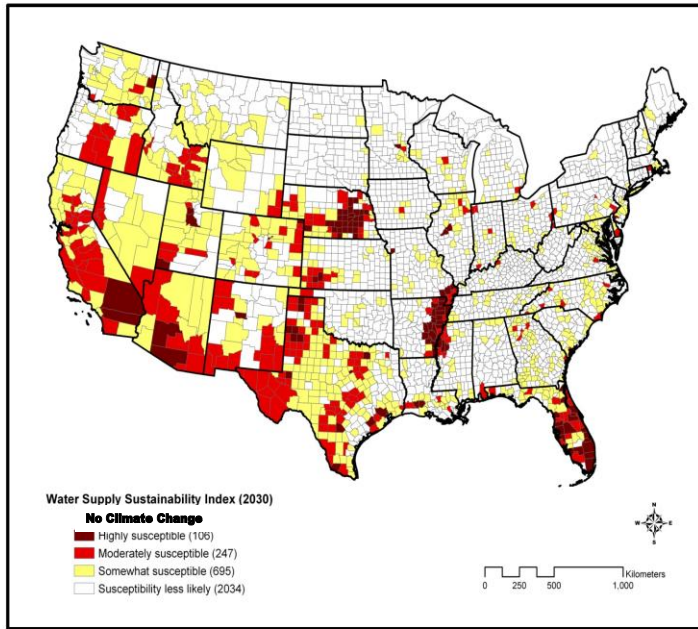


Metropolitan Water District of Southern California reduced supplies to member agencies and 19 million residents



Lake Lanier in Cumming, Georgia - major freshwater source for greater Atlanta, epic droughts, 2007/2008 & 2011.

## Projected Water Sustainability Index (2030): US



Under today's climate conditions

With predicted climate change factored in

Source: National Resources Defense Council. (2010). Climate Change, Water, and Risk: Current Water Demands Are Not Sustainable. Washington, DC.

# What We Need:

- Education in water conservation
- R & D to:
  - Reduce use in agriculture.
  - Increase efficiency in all sectors.
  - Reduce energy costs of desalination.
  - Reduce power plant cooling requirements
  - Find a new source



## What We're Working On:

Stimulate technology innovation through the  
*Sustainable Water Challenge.*



\*cash prize directly funded by Congress through GAO Red Book (GAO-04-261SP Appropriations Law-Vol. 1. Page 4-162) for details about the challenge go [www.sigmaksi.com](http://www.sigmaksi.com)

# Why Offer a Prize?



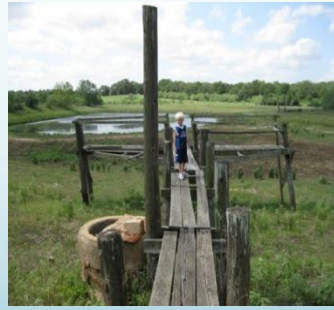
- The McKinsey Report notes aggregate value of awards has tripled to \$375+ million
- The CRS Report found prizes as high as \$10 million and more than \$500 million for unique ideas
- The US agencies offering prizes include DOD, DARPA, DOE, EPA, and NASA.

# Goals: Produce, Prevent, Protect

**Produce** drinking water at a competitive cost.

**Prevent** freshwater shortages that impact agricultural food production.

**Protect** the environmental gains and enable maintenance that sustains aquatic ecosystems in the future.



Concurrently with the announcement of the  
***Sustainable Water Challenge***  
several companies came forward.

TransGlobal H2o in Houston has developed a technology that allows  
farmers to irrigate with low saline groundwater



[www.tgh2o.com](http://www.tgh2o.com)

## Buckeye, Arizona Day - 23



## Buckeye, Arizona Day - 62



## Buckeye, Arizona Day - 62

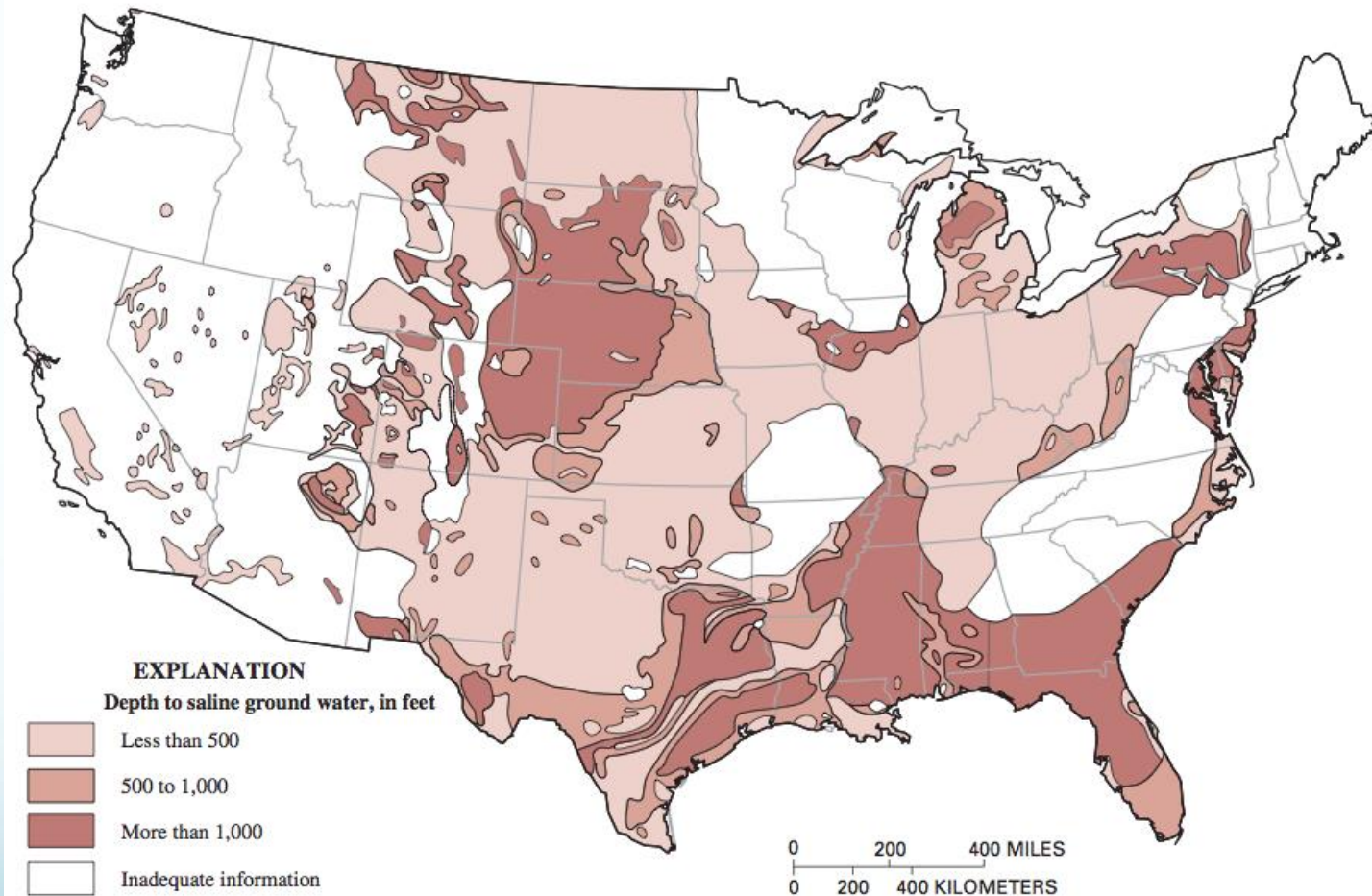


## Buckeye, Arizona Day – 113



## ***Why is this Important?***

**Low saline water is a vast and underutilized water source.**



**Figure 1.** Depth to saline ground water in the United States (generalized from Feth and others, 1965)



# Thank You!

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***The Sustainable Water Challenge***

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