

Climate Change, Water and People: A Geographer's View

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Climate Change Workshop for Teachers**

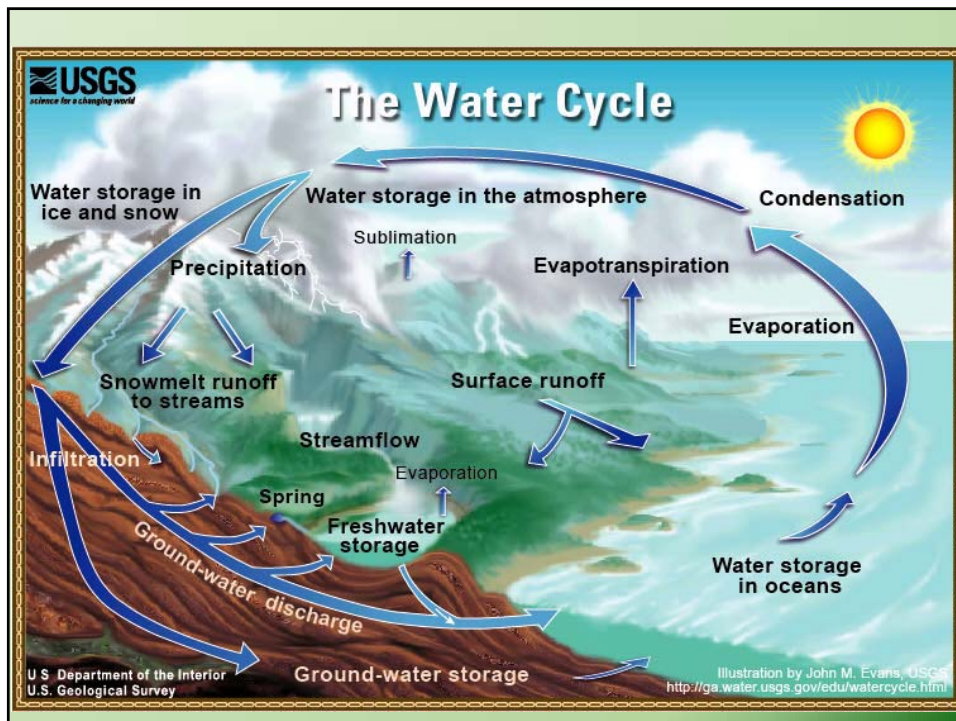
March 10th 2012

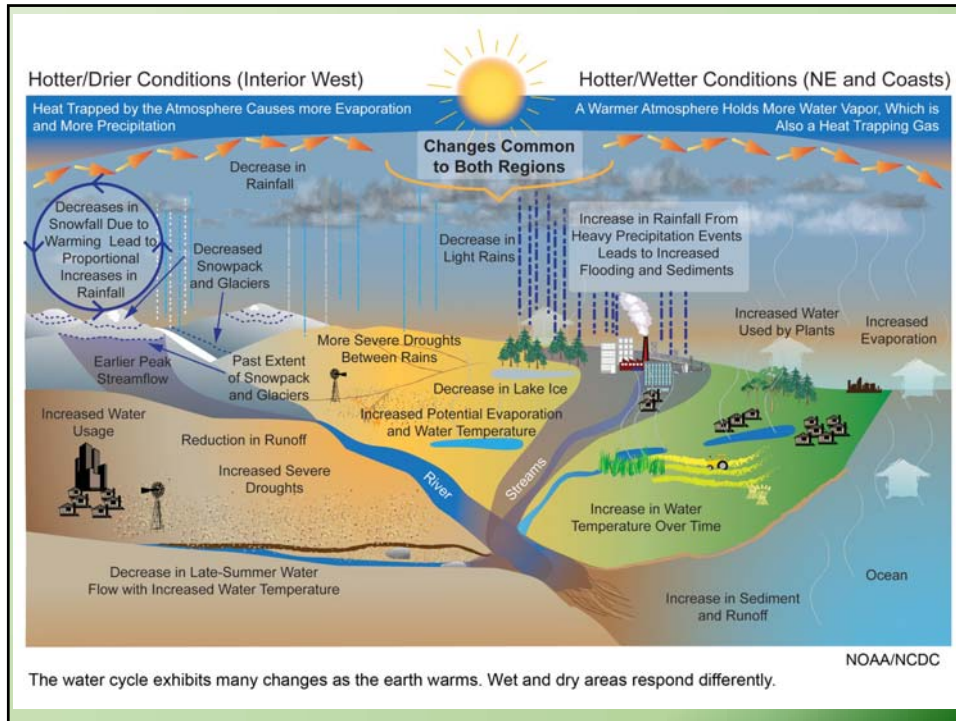
- **INTRODUCTION**
- **HUMAN GEOGRAPHY AS A LENS: THE SOCIO-SPATIAL DIALECTIC**
- **DON'T MESS WITH THE HYDROLOGICAL CYCLE: QUANTITY, QUALITY and FLUX**
- **TELLING THE CLIMATE CHANGE STORY: DOUBTERS, INTERGENERATIONAL EQUITY and THE VILLAGE IDIOT**
- **A TALE OF TWO STATES: PLANNING FOR DROUGHT; THINKING ABOUT ADAPTATION**
- **INTO THE SUN CORRIDOR: SUPPLY, STATIONARITY, and VARIABILITY**
- **CLIMATE CHANGE DOWN UNDER: THE BIG DRY**
- **VIRTUAL WATER, POWER AND LIVELIHOODS**
- **QUESTIONS, COMMENTS**

Places are created and recreated...

People create places; places create people...

Season this with a complex geography of space and power at different scales...





Doubters, Intergenerational Equity and the Village Idiot

TPMDC

Rick Perry: Climate Change Is A Hoax Drummed Up By Scientists Looking To Make Money



Video Interlude

<http://www.youtube.com/watch?v=7sGkVDNdJNA>

<http://youtu.be/vgvnqv1-D4GP>

<http://youtu.be/s-LBXWMCAMTR>

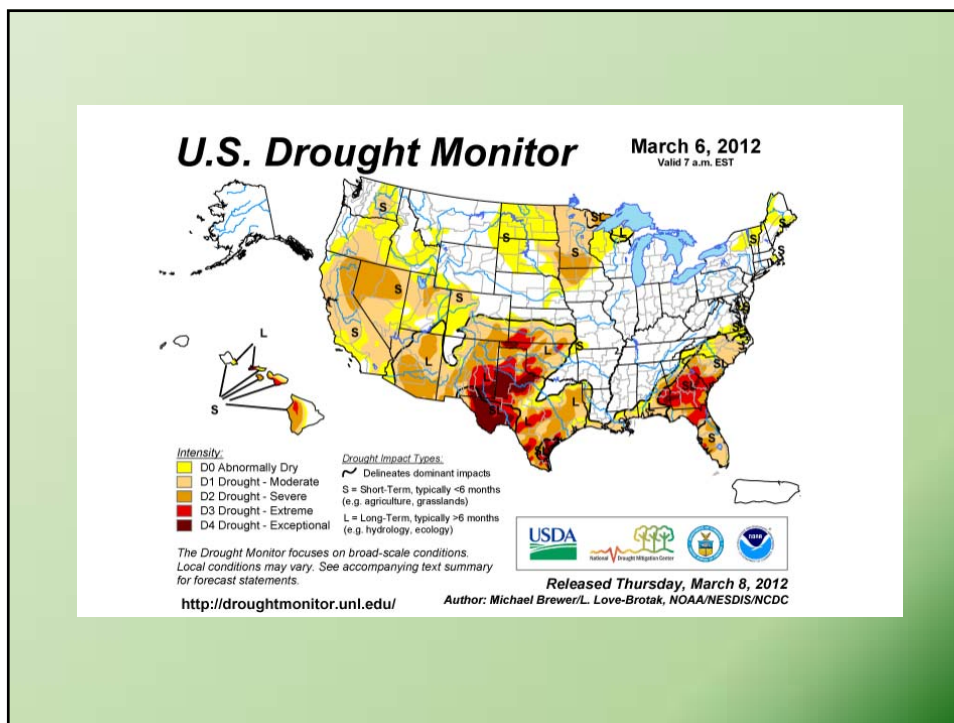
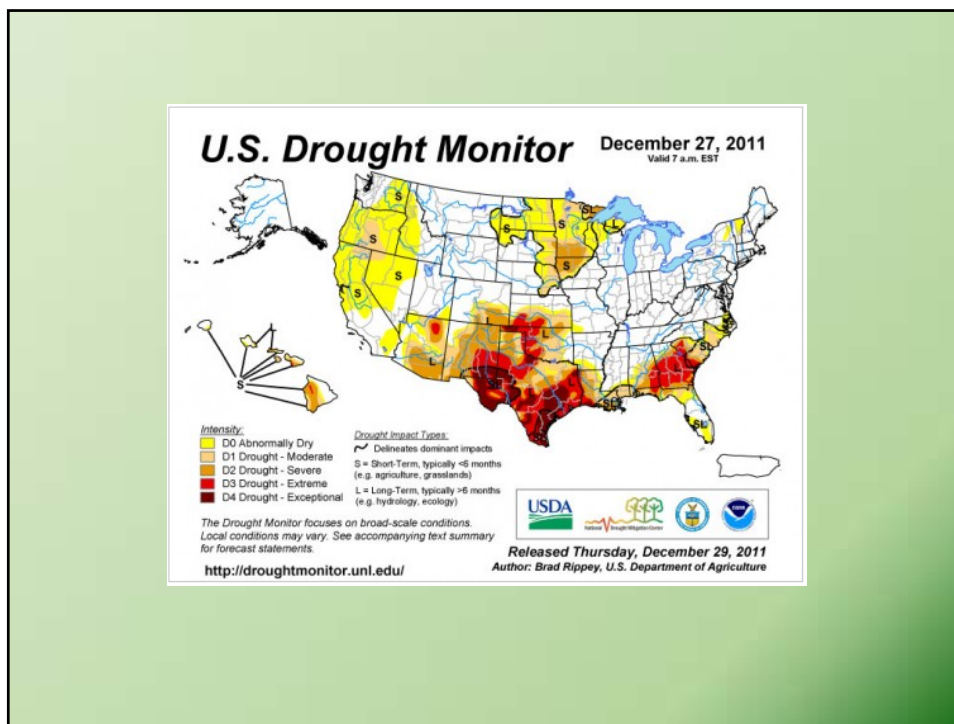
<http://youtu.be/QU7BO35n47IT>

<http://youtu.be/O9d-MTfw0UQ>

A tale of two states...

TEXAS and drought

CALIFORNIA and adaptation...



Susan Combs
Texas Comptroller of Public Accounts

THE IMPACT OF THE 2011 DROUGHT AND BEYOND

TEXAS DROUGHT MONITOR

ABNORMALLY DRY
DROUGHT - MODERATE
DROUGHT - SEVERE
DROUGHT - EXTREME
DROUGHT - EXCEPTIONAL

Source: U.S. Drought Monitor, NOAA Climate Prediction Center, as of January 5, 2012

The report was released about a month ago – it's a great little report and very accessible with good graphics and comparative information – what is interesting is that there is not ONE SINGLE MENTION of climate change as a causal factor or even a factor at all!

environment360
Opinion, Analysis, Reporting & Debate

08 MAR 2012: REPORT

California Takes the Lead With New Climate Initiatives

Long ahead of the rest of the U.S. on environmental policy, California is taking bold steps to tackle climate change – from committing to dramatic reductions in emissions, to establishing a cap-and-trade system, to mandating an increase in zero-emission vehicles. The bottom line, say state officials, is to foster an economy where sustainability is profitable.

BY MARK HERTSGAARD

Environment 360 at Yale is a super little resource for current affairs and analysis – interviews and quotes from a variety of perspectives... in this case a discussion of **MITIGATION**.

WATER MANAGEMENT IMPACTS DUE TO WARMING

- Reduced Water Supply from the Sierra Snowpack
- Changes in Water Quality
- Increased Evapotranspiration Rates from Plants, Soils and Open Water Surfaces
- Moisture Deficits in Non-irrigated Agriculture, Landscaped Areas and Natural Systems
- Increased Irrigation Needs
- Increased Agricultural Water Demands Due to a Longer Growing Season.
- Increased Urban Water Use, at Possible Expense of Agriculture Water.

WATER MANAGEMENT IMPACTS DUE TO SEA-LEVEL RISE

Increased Stress on Sacramento-San Joaquin Delta Levees

Saltwater Intrusion into Estuaries, Bays, and Coastal Groundwater:

- o Change Water Quality
- o Transform Ecosystems
- o Reduce Freshwater Supplies

WATER MANAGEMENT IMPACTS DUE TO PRECIPITATION CHANGES

- Possible Precipitation Decreases - From 12-35 Percent Compared to Historical Annual Averages
- More Winter Precipitation Falling as Rain Instead of Snow
- Intense Rainfall Events - More Frequent and/or More Extensive Flooding
- Droughts - More Frequent and Persistent
- Possible Decreasing Water Quality:
 - o Longer Low-flow Conditions
 - o Higher Water Temperatures
 - o Higher Contaminant Concentrations

Source: California Statewide Adaptation Strategy, 2009, Chapter 7

According to California officials:

Dynamic management is something we should be doing anyway – it’s about conservation and demand reduction; changes in storage and storage management; attention to the bay area delta levee system and many other things – it’s about PLANNING – some call it “no regrets” planning.

Will desalinization be a larger part of the picture especially for LA and San Diego?

It’s not just about people directly but also about how we interact with the environment in broader ways – a holistic perspective brings even more challenges.

Geographers think about space and place at different SCALES bearing in mind the ways in which territoriality and power shape human experience...

Factor in borders and boundaries and one territory's "solution" can be another's "problem" – in the context of climate change it's the transboundary water issue

Familiar cases:

The Colorado River

The Nile River Basin

The Mekong River Basin

Big questions? Who is in control? How is power over decision-making shared? How do decisions balance demands for water and management of water? How do historically marginalized peoples get a seat at the table? Or is there even a table?

INTO THE SUN CORRIDOR: SUPPLY, STATIONARITY, and VARIABILITY

Supply = physical water inputs (rain, surface water that can be transported and made available, and pumped groundwater that is replaced naturally every year)

Stationarity = Natural systems operate within a fixed range – based on historical data about rainfall, river flows, temperature and so on, reasonable predictions of system behavior can be made.

- The stationarity principle includes such concepts as 50 year or 100 year floods – key concept: we have designed and built flood control systems and allocated water rights on this basis. It's a key to the way in which we've managed water resources in the U.S. and could be the biggest challenge for future management.

Variability = very significant in the Sun Corridor... one argument is that they have coped with it and therefore will be able to cope with even more of it in the future. But are they right?

** It's a complex situation with water budgets that are internal and external to the region. Can increased variability bring cooperation and effective management?

Adapted from "Watering the Sun Corridor" from Morrison Institute for Public Policy and the On Point Show from WBUR Jan 5th 2012

Three things to think about:

**Short, Medium and Long-Term disruptions
in supply both in the historical sense AND
in the future.**

The concept of hardening of demand.

**Will adaptation yield enclaves of wealth
and power living the “green lifestyle?”**

Adapted from “Watering the Sun Corridor” from Morrison Institute for Public Policy and the On Point Show from WBUR Jan 5th
2012

XERISCAPING

Australia: The Big Dry

- very significant changes in agriculture (now only 2.5% of the economy but using 2/3 of the water supply?)
- 50% reduction in sheep populations, rice production collapsed, cotton production collapsed
- they are learning FAST and they see climate change exacerbating supply issues and variability
- length of time, severity and spatial extent of drought are key
- agricultural changes, bushfires and drought, dust storms

Adapted from "The World's Water" 2012

Australia: Observations on responses to the big dry

- changing human-environment relations is difficult (e.g. cutting subsidy payments to unprofitable farmers = destroying the heritage of the country? Places aren't just "real" they are imagined!)
- increasing "duck water" is difficult!
- building markets for water is a complex process and can involve third party speculation and uneven benefits and costs
- and then the floods of 2010-2011 came... "Fresh Hope for the Nation as Drought breaks"

Adapted from "The World's Water" 2012

VIRTUAL WATER: POWER, LIVELIHOODS, and OUTCOMES

Thinking about the ways in water moves around in agricultural and other products... water footprint, water as part of environmental chains...

There could be an upside to this... regions with water shortages could save water used in food production for other needs and import water-rich foods.

There is also a potential downside... If a country grows and exports a water-intensive crop it is exporting water. While it gets \$ for the crop, the distribution of that \$ may not offset water losses. If the availability of water is compromised by climate change and economic changes then acute shortages of potable water for drinking, washing, and local food production may be impaired.

Places are created and recreated...

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Season this with a complex geography of space and power at different scales...

***Beyond “managing for resilience,”
society’s capability to adapt will
ultimately depend on our ability to be
flexible in setting priorities and
“managing for change.”***

Adapted from: Preliminary review of adaptation options for climate-sensitive ecosystems and resources

<http://www.climate-science.gov/Library/sap/sap4-4/final-report/default.htm#finalreport>

**Thanks for Listening and
Have a great day!**