

!!!!!!NANCY'S HOT TOPIC!!!!!!

A Historical Perspective

- '02 - The Everglades Project — 2000 Water Resources Development Act —
Restoring surface water flow to South Florida
- '03 - Klamath Falls, Oregon — Farmers vs Fish
- '04 — The Great Lakes — Water level decrease
- '05 - Klamath Falls Revisited — The effect on California's fishing industry 2
years after.
- '06 - The Mississippi Delta — Coastline loss and the Gulf of Mexico dead Zone
- '07 - Arkansas — Mississippi Aquifer decline and poultry farm pollution? Are extinctions
important?

!!!!!!!Just The Facts Mam!!!!!!!

!!!!!!NANCY'S HOT TOPIC!!!!!!

**WATER, WATER, EVERYWHERE –
AND NOT A DROP TO DRINK ***

**Nancy Marley
GCEP
UALR**

*Apologies to Samuel Taylor Coleridge

The Rime of the Ancyent Marinere – published in *Lyrical Ballads* – 1798 – Revised 1817



*Day after day, day after day,
We stuck, nor breath nor motion;
As idle as a painted ship
Upon a painted ocean.*

*Water, water, everywhere,
And all the boards did shrink;
Water, water, everywhere,
Nor any drop to drink.*



Man bites Nature
Nature bites back.

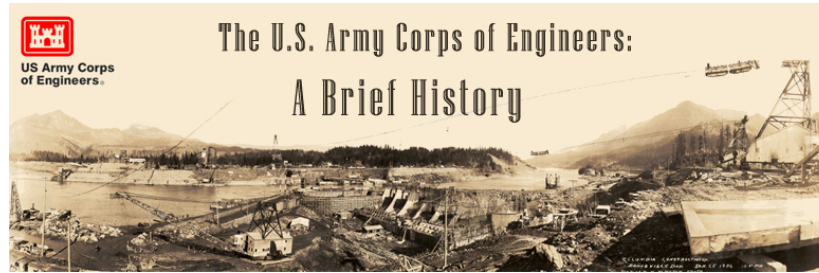


Mississippi River Drainage Basin



Mississippi Drainage Basin

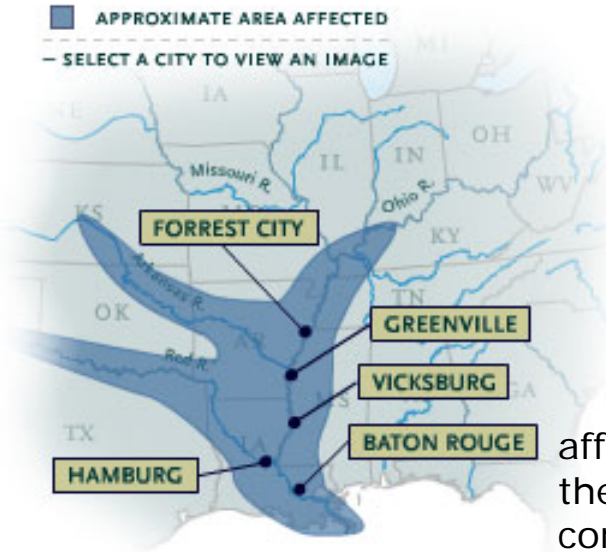
- 3rd largest drainage basin in the world, exceeded only by the Amazon and Congo.
- Drains 41 percent of the 48 contiguous states of the US.
- Covers more than 1,245,000 square miles.
- Includes all or parts of 31 states and two Canadian provinces.



- George Washington appointed the first engineer officers of the Army on June 16, 1775, during the American Revolution, and engineers have served in combat in all subsequent American wars.
- Established as a separate, permanent branch on March 16, 1802. Gave the engineers responsibility for founding and operating the U.S. Military Academy at West Point.
- 19th century - Supervised the construction of coastal fortifications, lighthouses, jetties, piers, and mapped navigation channels.
- Corps of Topographical Engineers mapped much of the American West separate existence (1838—1863).
- 20th century - became the lead federal flood control agency. Significantly expanded its civil works activities, becoming major provider of hydroelectric energy, recreation, responding to natural disasters.

What happens in the Mississippi Drainage Basin Effects Arkansas

Flood of 1927



Arkansas City, Arkansas, during the 1927 flood. From "The Big Flood" written for grade 100
a view of a flooded house being used.



affected an area of 27,000 mi². (about the size of all the New England states combined)

>130,000 homes were lost

700,000 people were displaced.

246 flood-related deaths reported.

~\$350 million dollars in property damage (equivalent to ~ \$5 billion dollars today)



Flood Control Act of 1928 - the world's longest system of levees was built.

2008 River Flooding



SBA Stands Ready to Assist Victims of Recent Severe Storms and Flooding in Mississippi

At least 40 towboats were forced to tie up and wait for water levels to drop.

At any one time, more than 400 barges operate on the Upper Mississippi, the nation's most important commercial waterway. So, the closures were significant for financial markets.

And.....Closer to home.....



High water pouring down the White River cause historic flooding in cities along its path in eastern Arkansas.



NBC News: Arkansas Prepares for Worst Flooding in 25 Years



March 24, 2008: "The National Weather Service in North Little Rock estimated the river rose 7 feet in the last 4 days, with a crest of 33.5 feet anticipated for Tuesday afternoon."

Meanwhile.....

Historic drought gripping much of the Southeast



“Relentless N. Carolina drought could be devastating in '08”

“Tennessee Town Runs Out of Water in Southeast Drought”

“Northern Alabama has become acre after acre of shriveled cornstalks”

“Southeast Drought Wreaks Havoc On Hay Supplies, Leading Farmers To Despair”

“Drought could force nuclear reactors in Southeast to shut down“

“Drought Allows Florida to Clean Bottom of Lake Okeechobee”

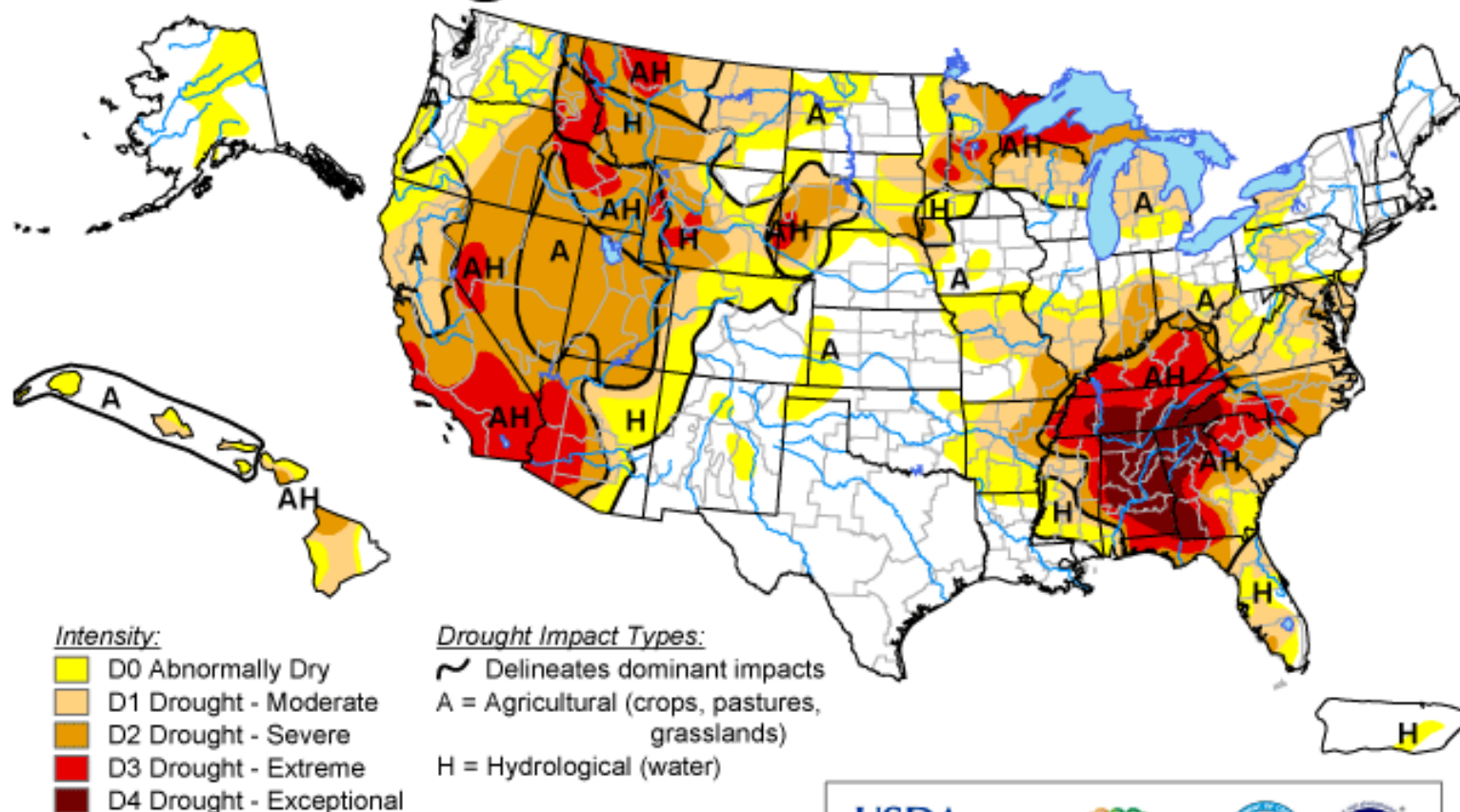


The dimensions of the drought, the most severe the Southeast has seen in 113 years, are staggering. The federal Department of Agriculture’s Drought Monitor has said that 32 percent of the Southeast region is in a state of D4 drought, the most severe category.

U.S. Drought Monitor

August 21, 2007

Valid 8 a.m. EDT



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

<http://drought.unl.edu/dm>



Released Thursday, August 23, 2007

Author: Richard Heim/Jay Lawrimore/Liz Love-Brotak,
NOAA/NESDIS/NCDC

Lake Lanier – Atlanta's Main water source



Lake Lanier - History

- 1946 Congress okays Buford Dam construction

targeted at developing the nation's rivers systems for national defense, flood control, power production, navigation and water supplies.

- 1949 Funds allocated and 1950 ground breaking
- 38,000-acre reservoir with over 692 miles of shoreline.

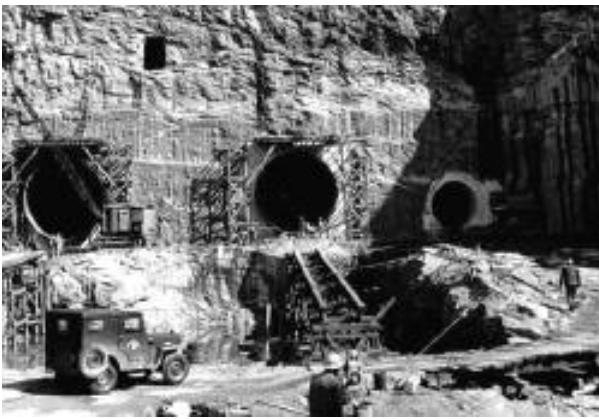
government would also have to acquire the rights to over 56,000 acres of land and see to the relocation of over 700 families.

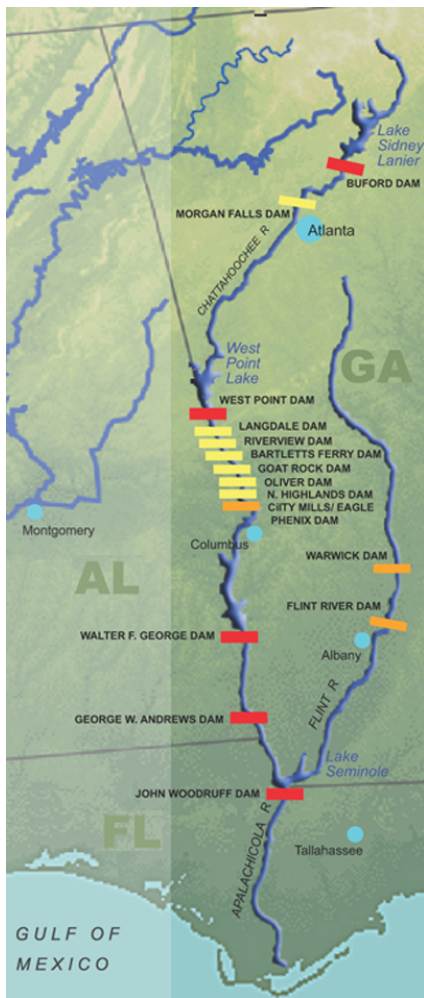
- 1956 Dam Gates closed and Lake slowly forms

filled with water from the Apalachicola, Chattahoochee and Flint Rivers

- May 25, 1959 - Lake levels reached full pool level of 1070'

- Named Lake Sidney Lanier after Poet and Musician who lived in the Chattahoochee River area during Post Civil War era.





Massive water consumption by the households and industries of the metropolitan Atlanta results in greatly reduced water downstream.

Water released back into the system from Atlanta is of poor quality. Small flows from reservoirs are released to dilute urban wastes

Reductions in reservoir water levels would threaten a multimillion-dollar recreational industry, fisheries in Apalachicola, endangered mussels and sturgeon in the Chattahoochee River and hydroelectric power requirements downstream.

The Army corps -- under an agreement reached in the 1980s with U.S. Fish and Wildlife Service, the state of Florida and downstream users -- releases 5,000 feet of water per second from Buford dam.



BATTLE OVER WATER RIGHTS FOR LAST 18 YEARS..

Georgia – Alabama – Florida --- Tennessee too..

Called the 2nd Civil War



1986 - The Corps of Engineers entered into contracts with several Georgia municipalities to enlarge withdrawals from Lake Lanier

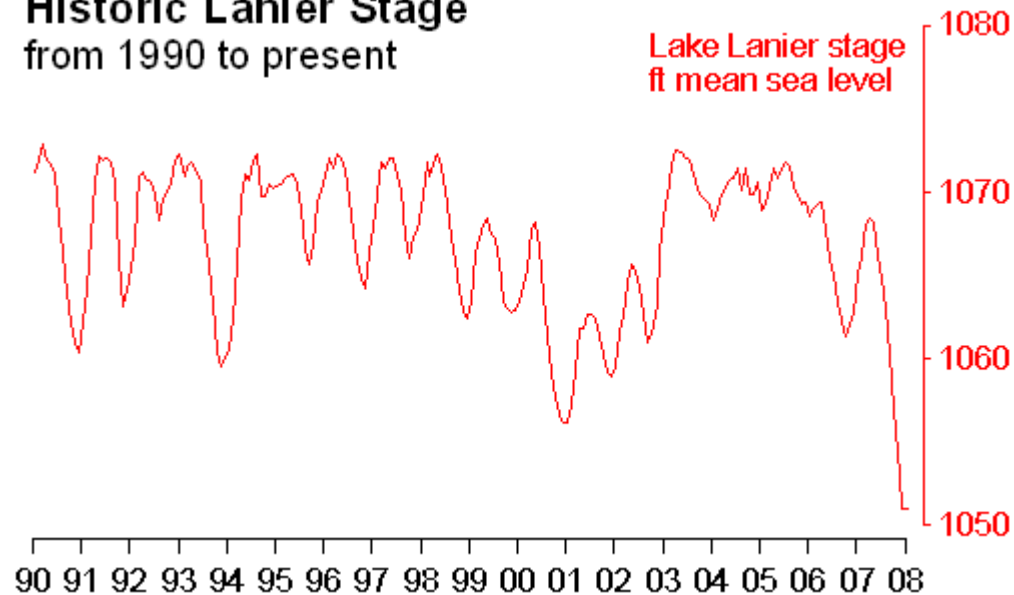
1989 - proposed to increase diversions from Lake Lanier to Atlanta by as much as 50 percent.

1990 - Alabama and Florida sued in 1990 to stop the Corps of Engineers from carrying out these proposals. Alabama also challenged other plans for new reservoirs in western Georgia as threatening to Alabama's development plans. Florida was anxious to assure sufficient water flow into Apalachicola Bay to nourish oysters and other marine life.

1997 - Memorandum of Agreement among those states and the federal government. Southeastern Water Compact. Froze present uses on both river systems in place while the three states and the Corps of Engineers undertook to consider how to resolve the controversy.

2007 – Severe Drought hits.

Historic Lanier Stage from 1990 to present



2007:

The corps came under fire when it accidentally released 22 billion extra gallons of water from Lake Lanier just as the region was sinking into a deep drought.

Oct, 2007: Atlanta, where rainfall totals are more than 16 inches below normal, said they could run out of drinking water in a matter of weeks.

Georgia Gov. Sonny Purdue filed a motion in Florida Federal Court to require the Corps to stop water releases. The next day, he declared a state of emergency in 85 counties and requested that President Bush temporarily exempt Georgia from the Endangered Species Act.

“We think it’s a betrayal of the people of the Apalachicola Basin. We’re already under chronically low water conditions....we’re already seeing negative impacts from that in the oyster beds and upriver and this is just going to create more negative impacts.”

Army Corps and Georgia vs Alabama and Florida

2008 – Drought Continues

Feb. 15: Governors of Alabama, Florida and Georgia scheduled to announce whether they have reached a negotiated settlement to their 17-year water war. They missed this deadline.

April 15: Corps of Engineers announces new water sharing plan that allows greater storage in upstream lakes and reservoirs but may harm threatened species in Florida.

- Alabama and Georgia took them to court.
- At this point – Alabama and Florida have stopped the extra water use – unless it goes to Supreme Court...



Georgia Gov. Sonny Perdue did more than pray for rain (though he did that, too): he asked the feds to let his state hold back more water in its reservoirs rather than maintain federally mandated river flows into Alabama and Florida.

Georgia is also toying with the idea of “correcting” an 1818 survey in order to move its northern border with Tennessee up a mile, which would give it access to water from the Tennessee River.

Needless to say, Tennessee officials are not amused. If they really do try to pull this off, we will do whatever we have to do to defend ourselves. My constituents have no desire to live in Georgia. *Marion County Mayor, Howell Moss*

"tomorrow they might come for our Jack Daniels or George Dickel,"

NEW YORK TIMES - Georgia Claims a Sliver of the Tennessee River

By SHAILA DEWAN

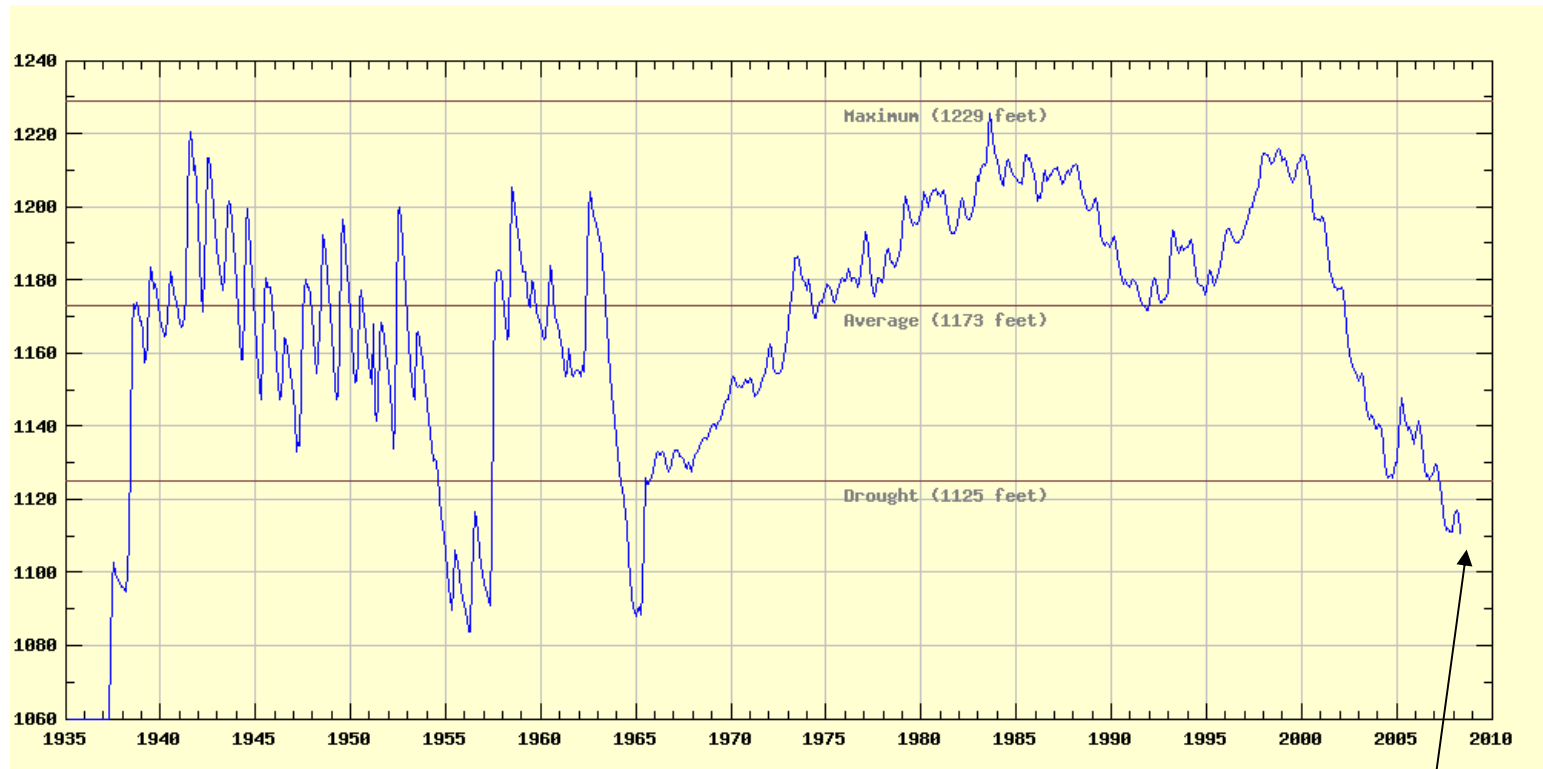
Published: February 22, 2008



Would Allow Access to Tennessee River by Georgia – 1818 error in surveying claimed by Georgia to get the WATER

Western U.S.

LAKE MEAD – HOOVER DAM



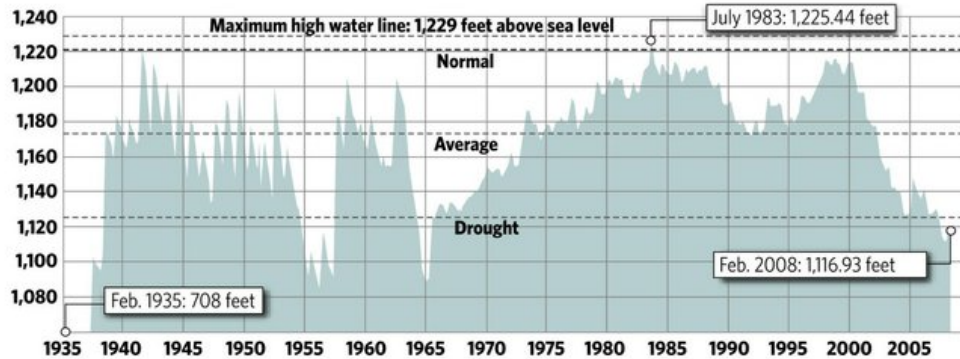
<http://www.arachnoid.com/NaturalResources/>

Data from U.S. Dept. of Interior - Bureau of Reclamation

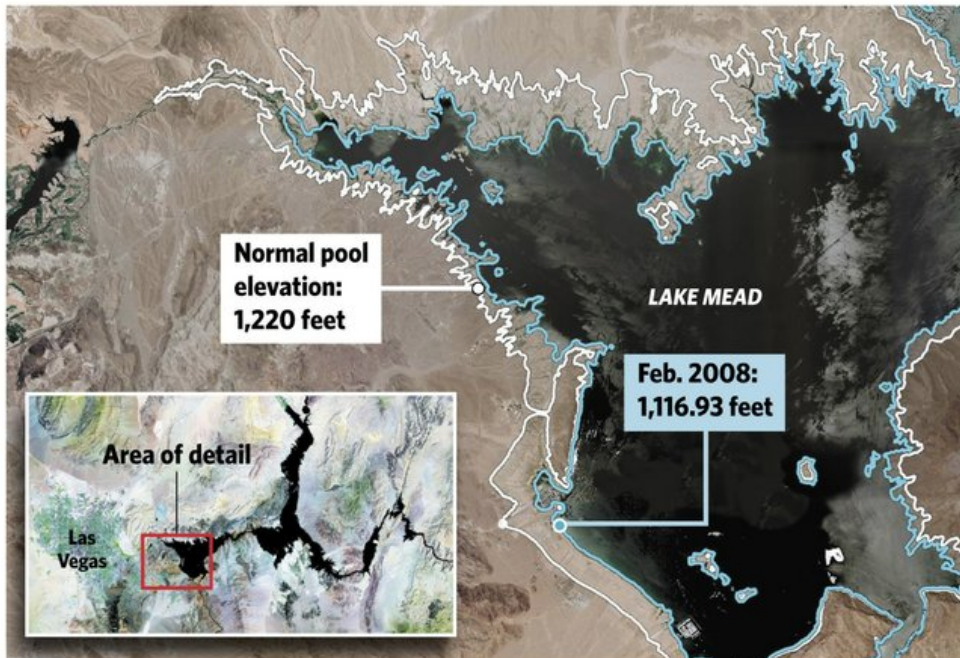
Water Level

Lake Mead's water level 103 feet below normal

Lake Mead's water height has fluctuated since the lake's creation in 1935, when Hoover Dam was finished. Lake Powell, upstream from Lake Mead, began to fill in 1965 and helped ease the flow peaks and troughs that were seen in Lake Mead. The normal lake level, or "pool elevation," is 1,220 feet; the top of the dam's spillways is at 1,221 feet. The dam can hold water up to a height of 1,229 feet above sea level. A look at the lake's water levels since 1935:



What that looks like from above



SOURCE: Interior Department's Bureau of Reclamation

LAS VEGAS SUN

Lake Mead Water Level has been dropping steadily..

Consistent with Climate Model Predictions for the US Western States.

California, Nevada, Arizona, Colorado, etc. all being impacted.

Remains of St. Thomas surface

When Hoover Dam was completed in 1935, the small town of St. Thomas was one of several that eventually became submerged as the basin filled and Lake Mead's footprint grew. But with the decline of the lake's water level, the foundations of buildings that once were part of St. Thomas have emerged.



LAS VEGAS SUN

St. Thomas was covered by Lake Mead and is now high and dry..

Further evidence of the constant battle for water..

And “man-made” lake having trouble being maintained...

MONO LAKE....Not just freshwater bodies..

Level is decreasing.. May put special ecosystem at risk



MONO LAKE BRINE SHRIMP..

VERY SALTY
ALKALINE LAKE

Similar to others that
support this type of
shrimp..

And SHORE BIRDS.



Phalaropes

I don't think people have changed from thinking 'This is a drought problem' as opposed to 'This is a long-term problem,'" Craig said. "And I think that's the critical transition."

The real profound, prolonged drought that has happened in Florida, Alabama, and Georgia, is the drought of political leadership and political will to say 'no' to rampant growth, to say 'yes' to environmental and water conservation, and to really decide once and for all that communities should be about having sustainability and quality of life, not about making developers a lot of money by cramming in as many people as they can and then walking away once there's a problem.

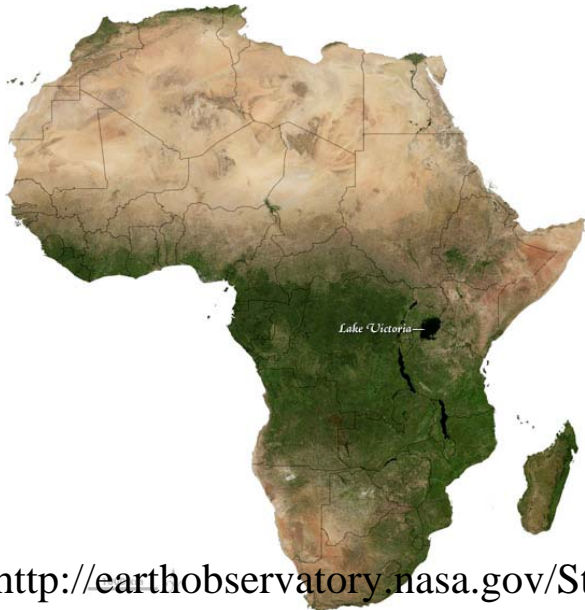
- IPCC report consistent with flooding in some areas.. Droughts in others..
- Flooding along major river systems and shorelines
- Southeast becomes grassland savannah
- Southwest to see more desertification
- ITS NOT JUST U.S.

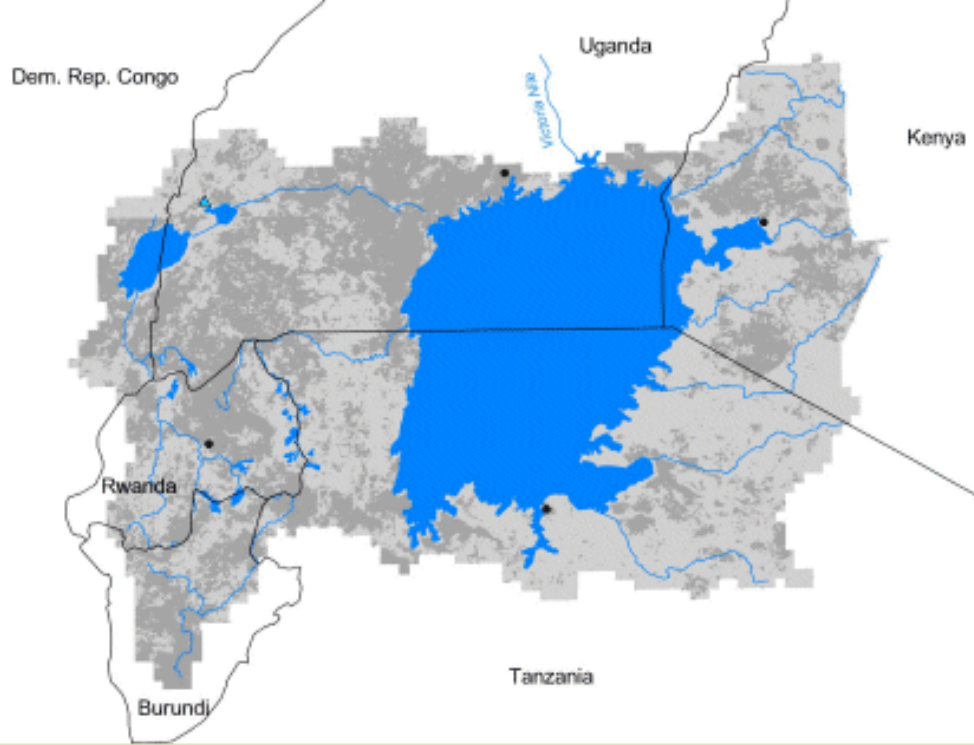
Lake Victoria - Africa

- 27,000 Sq miles.. Second to Lake Superior

Water Level has been DROPPING FAST..

(NOTE.. Great Lakes have 25 % of World Fresh Water Supply.. And their level is dropping too.





World Resources Institute

Revenga, C., S. Murray, J. Abramovitz, and A. Hammond, 1998.
 Watersheds of the World: Ecological Value and Vulnerability.
 Washington, DC: World Resources Institute.

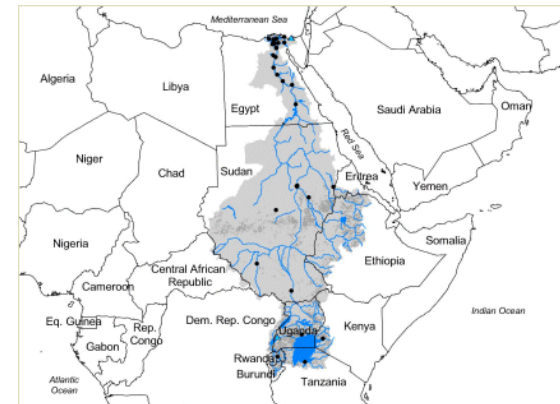
PART OF NILE
 WATERSHED..

Kenya, Uganda,

Tanzania – 30 million
 people use this lake for
 water, fishing, etc.

As water level drops

Fishing moves to
 deeper waters – has led
 to Ugandan arrests of
 significant numbers of
 Kenyan fisherman in
 Ugandan waters.



WATER HYACINTH – BIG PROBLEM...

(African version of Kudzu – non native species invasion)

VERY FAST GROWING

LOWER LEVELS - MORE POLLUTION

PLANTS INCREASE LEADING TO

REDUCTION OF OXYGEN LEVELS AND LOWER FISH POPULATION



Source: National Geographic

Boats photograph by Sean Bryan; water hyacinth photograph by George F. Mobley/NGS

Summary:

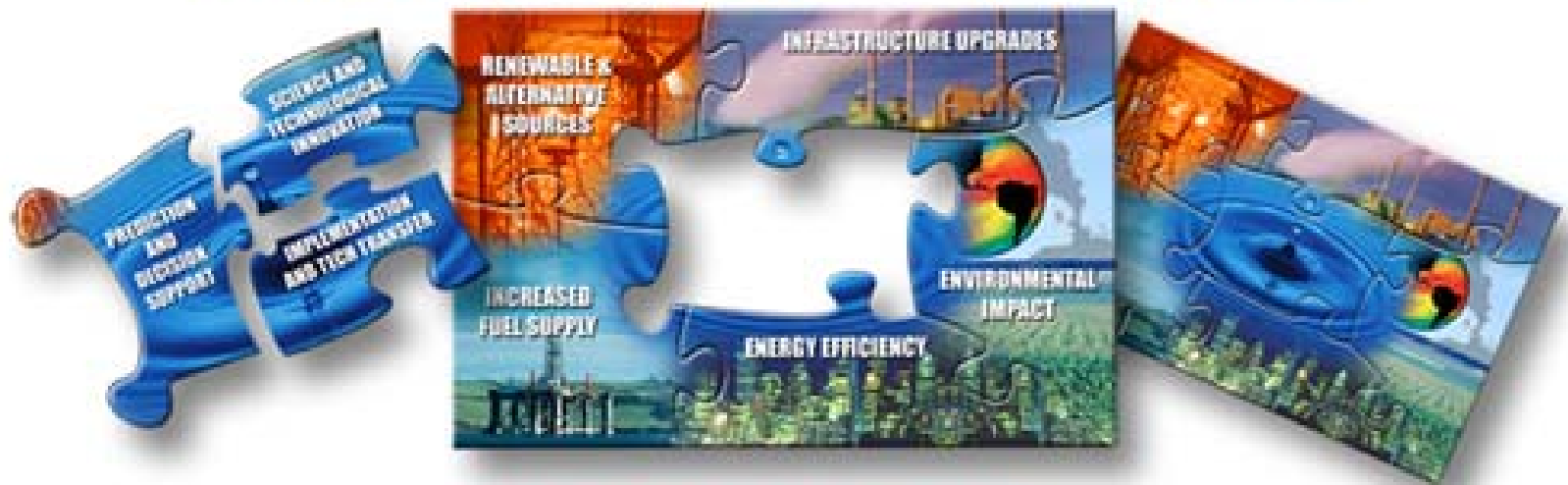
WITH INCREASING POPULATIONS.. AND ENERGY USAGE – COMES INCREASED WATER DEMAND

WATER IS GREAT SOLVENT – SO EASILY BECOMES BRACKISH, POLLUTED, ETC. FRESHWATER IS AT A HIGH PREMIUM – WORLD WIDE.

INCREASING GLOBAL FORCING – LEADS TO WARMING – AND EVAPORATION OF WATER MORE RAIN IN SOME PLACES – LOTS OF OTHERS INCLUDING WESTERN U.S. – AFRICA DESERTS GROW BIGGER – i.e. INCREASED DESERTIFICATION

COAL, AGRICULTURE, ETC.
All require WATER.....

completing the energy sustainability puzzle



THE ENERGY-WATER NEXUS
a strategy for energy and water security

<http://www.sandia.gov/energy-water/>

SO.. BIOFUELS?

REQUIRES AGRICULTURAL FEEDSTOCK.....CORN?

A LOT OF WATER.. FERTILIZERS and PESTICIDES

FERTILIZERS, ETC.. Lead to Water Pollution GULF OF MEXICO HYPOXIA

IS THIS SUSTAINABLE?



http://www.gulfhypoxia.net/Research/_images/Watershed_DeadZoneX.jpg

Some Questions:

1. Who wins the water wars? Army Corps.....Farmers vs Landscapers vs Recreation vs Fish vs Environmental Concerns.....States/Nations/Town level battles
2. Is possession 9/10ths of the law?
3. Should endangered species take priority? Should we care about extinctions?
4. Alternative Energy..... Coal in Western U.S. is lower sulfur – but will require water and “strip-mining” leads to more water pollution.. Biofuels will require more water where will we get it from?
5. How to manage our water resources?

Headlines in 2007

- **Atlanta faces severe water crisis, residents asked to limit water usage** LaPorchia Collins, Southern Digest - 10/19/07
- **Bill Shipp: Water crisis is a failure of state's leadership** – Athens Banner-Herald 10/20/07
- **Atlanta Shudders at Prospect of Empty Faucets**
By SHAILA DEWAN and BRENDA GOODMAN 10/22/07 – New York Times.
- **Top Scientists Warn of Water Shortages and Disease Linked to Global Warming** – New York Times – IPCC report – 3/12/07