Water Supply Management in a Variable Climate

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The Number One Societal Issue:

……..Water…….
Why?
(The National Geographic - 1993)

"Unlike oil, there is no water alternative."

Report from the President
Even More Headlines
(The National Geographic)

California:

by Richard Conniff
photographs by Rick Rickman

Oasis Green was the color of choice when landscaper Les Robin painted this parched lawn in Santa Barbara during the state’s six-year drought. Using a biodegradable dye, he supplied a touch-up kit.

It was an autumn morning before dawn, under a plum black sky, that the ducks and the yack-yack-yacking of mallards. As we passed, the birds seethed up off the water with a sound like waves breaking.

I was here in the Sacramento Valley to consider the Nature Conservancy’s unorthodox proposition that growing rice in California might not be such a dumb idea after all. Once maligned by environmentalists...

Supply
CASE STUDY

Introduction
Consider the Reservoir at Lake Mead, NV

“The lake … has a 50% chance of becoming unusable by 2021 … if demand for water remains unchanged and if human-induced climate change follows. … ‘We have 90% of our water supply coming from Lake Mead’.”

NY Times
February 13, 2008
“Nuclear reactors across the southeast could be forced to throttle back or temporarily shut down later this year because drought is drying up the rivers and lakes that supply power plans with the awesome amounts of cooling water they need to operate.” … “Water is the nuclear industry’s Achilles’ heel.” … “Lake Norman near Charlotte is down to 93.7 feet — less than a foot above the minimum set in the license for Duke Energy Corp.’s McGuire nuclear plant.” … “It would cost 10 times that amount [$5-7 per megawatt hour] if you had to buy replacement power — especially during the summer.”

Associated Press
January 24, 2008
The price for our failure to provide universal safe water and sanitation will be paid by the poorest populations of the world in sickness, lost educational and employment opportunities, and, for a staggeringly large number of people, early death. This is morally unacceptable in a world that values equity and decency. But at present, it appears unavoidable unless we can muster the will and commitment to provide clean, safe water for all.
Why Now?

SPECIAL REPORT GLOBAL WARMING

BE WorRIED. BE VERy WorRIED.
Climate change isn’t some vague future problem—It’s already damaging the planet at an alarming pace. Here’s how it affects you, your kids and their kids as well.

EARTH AT THE TIPPIng POINT
HOW IT THREATEnS YOUR HEALTH
HOW CHINA & INDIA CAN HELP
SAVE THE WORLD—OR DESTROY IT
THE CLIMATE CRUsADERS

TIME

Living with Cancer
The changing science

Beyond Baghdad: Where The Enemy Has Its Own Surge
The Sopranos’ Last Song: What Exit Will Tony Take?

TIME
SPECIAL DOUBLE ISSUE

The Global Warming Survival Guide
51 Things You Can Do to Make a Difference
The Growing Consensus

“warming of the climate system is unequivocal”

and

“very likely due to human activities”
Simulation of 20th Century Warming

Global Temperature Anomalies
from 1890-1919 average

- Observations
- Natural (volc+solar)
- Anthropogenic + Natural (volc+solar+ghg+sulf+ozone)
Zoom to North American Precipitation
(Valid 2021 – 2040)

Projected Change in Precipitation 1950-2000 to 2021-2040
(Percent of 1950-2000)

Average of 19 different climate models (2007)
The Bottom Line

“Water is the delivery mechanism of most climate change impacts”

Kathy Jacobs
Executive Director
Arizona Water Institute
The Bottom Line

Fortunately in Oklahoma....

We Have The Oklahoma Mesonet!
Kingfisher Soil Moisture (30 days)

9/18/2008

2-inch

10-inch

24-inch

30-inch

1.63” Rain

0.63” Rain

0.18" Rain

9/18/2008
Soil Water in the Bank
October 26, 2008 — 25 cm or 10 inches
http://sip.mesonet.org

When is it time to water your lawn? How long do your sprinklers need to run? The Oklahoma Mesonet can help. Click a “Watering” button to start.

Simple Watering

Stillwater, OK
relative humidity: 57%
10-meter wind: NNW 8 mph
rainfall since 7pm: 0"

time of last observation: 11:55 am

sunrise 7:40 am
sunset 6:46 pm
yesterday’s tall fescue water demand: 0.14"

Advanced Watering

Advanced Watering +

6th Annual Water Research Symposium
Midwest City, OK
October 28, 2008
The New Oil — WATER

Thank You