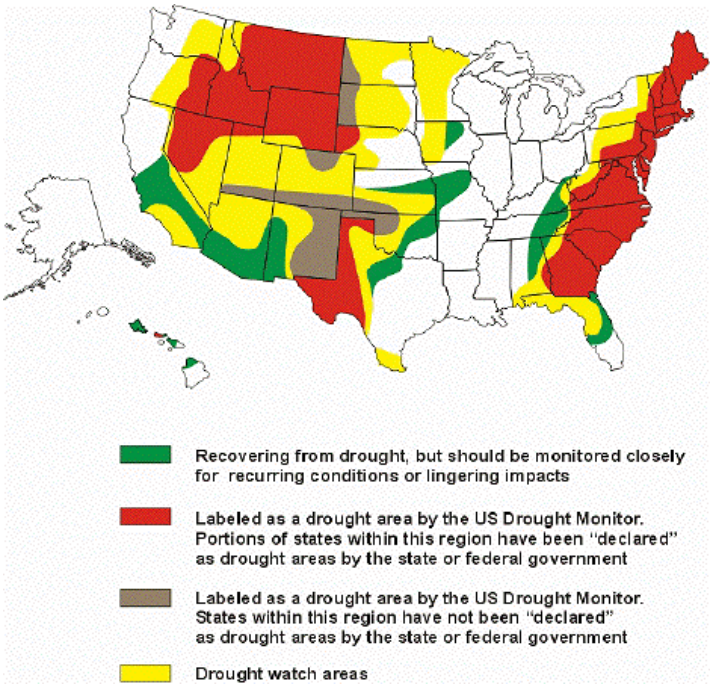
Drought Worsens in United States

"If we don't have replenishing rains that really begin to fill the reservoirs and ... start refilling some of the groundwater tables, then we're going to continue to deplete our water resources and the economic and environmental impacts of that are going to just be devastating."

- Don Wilhite, Director, National Drought Mitigation Center, University of Nebraska, Lincoln, March 29, 2002



Graphic of intensifying drought in the U.S., February 9 - March 15, 2002, courtesy National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska.

March 30, 2002 Narrowsburg, New York - Since the dry, warm fall and winter of 2001-2002, rivers on the East Coast of the United States have reached the lowest levels on record. In December, it was so bad in the Cannonsville Reservoir of the Delaware River watershed that its muddy bottom was exposed for the first time since it was built. That reservoir, which helps provide water to Manhattan, had only 3% of its water capacity. In fact, half the drinking water for New York City comes from three reservoirs in the Delaware River watershed and all three right now have less than *half* their normal water levels.

Wells have run dry in Maine and New Hampshire. Georgia and South Carolina are suffering from three years of consecutive drought. West Texas, Colorado, New Mexico and Arizona are drought tinderboxes. More than half the United States now is facing water shortages and it's only March. What happens over the next five months as temperatures rise into the summer and an El Nino brewing in the Pacific begins to affect weather patterns, further reducing moisture along the East Coast?

This week I talked with Bill Douglass, Executive Director of the Upper Delaware Council, Inc., in Narrowsburg, New York. His council oversees the big Delaware River watershed. He and his colleagues are now very concerned about the low reservoir levels.

Interviews:

Bill Douglass, Executive Director, Upper Delaware Council, Inc., Narrowsburg, New York: "These reservoirs have gone to extremely low capacities over the past several months. In fact, back in December, the one reservoir was down to approximately 3% of its capacity.

Only 3%?

Yes, that's the Cannonsville Reservoir.

That would mean you were seeing mud in the bottom?

Oh, definitely. I think the lowest I'd ever heard it go down to in the past was approximately 17%. Typically there would be a couple feet of snow up in the Catskill Mountains and that would come out in the spring rains of March, April and May. But right now, there is little to no snow pack in the mountains.

What is the demand for water in New York City?

The figure I've heard most recently is approximately 1.5 billion gallons of water a day is what they use.

If you take that against all three reservoirs being less than half of what they should be ...

Right.

And this is March 29. How serious is it if we do not get rain this spring and given the fact there is no snow pack?

Well, I think in the upper basin above say Port Jervis, New York, where the three states come together, we were running a deficit of about 12 inches of rain from the past year. We typically get roughly 43 or 44 inches of rain a year. So, that deficit is what has lead us into this drought. And without the snow pack that would normally help refill, the word I'm getting from experts in the field is that this coming summer, if we haven't made significant impacts on bringing that deficit up, we are going to be in very serious trouble to meet all the water demands that we have here.

The three issues that we're looking at here are:

1) The ground water levels and the wells that are tested by the State of Pennsylvania on a regular basis, many of those wells have had record lows in them in the past several months.

In fact in New Hampshire and Maine, people have been having to hire people to drill new wells trying to find new water because there older wells have all gone dry.

Yes. So, that's one aspect of the whole water regime. Ground water levels are

low.

2) The second is the stream levels are also low. That's in part based on the ground levels because the base that flows out of any stream is contributed by the ground water that flows into them.

3) And the rivers are dependent upon snow pack and there is no snow pack.

That's correct.

So, in all three categories, there is no prognosis for there to be a sudden increase of water in the near future.

Right, because we have ground water problems, we have snow pack and stream problems and we've got reservoir storage problems.

We are just starting into spring with a likely hot summer coming, especially if we go into an El Nino which usually increases temperatures on the East Coast.

Sure, and as soon as the vegetation starts growing, the grasses and trees, they are going to start sucking up ground water and typically the ground water levels will start going down again because of the uptake by the vegetation.

Is it fair to say that all the officials you are talking with are extremely concerned about water rationing this summer?

Oh, yes, yes, they are.

A big question is: if through the 1990s and into 2002 every year it has been warmer and warmer and that is hard data. If we are now beginning to see an offshoot result of global warming coming in no snow pack and less and less water, has anybody been working on a projection that if the reservoirs go empty, the ground table water gets lower and lower, what happens when there is no water to provide these populations? Where do we turn to if there ids no water in the normal places? Do we have to import bottled water from other states?

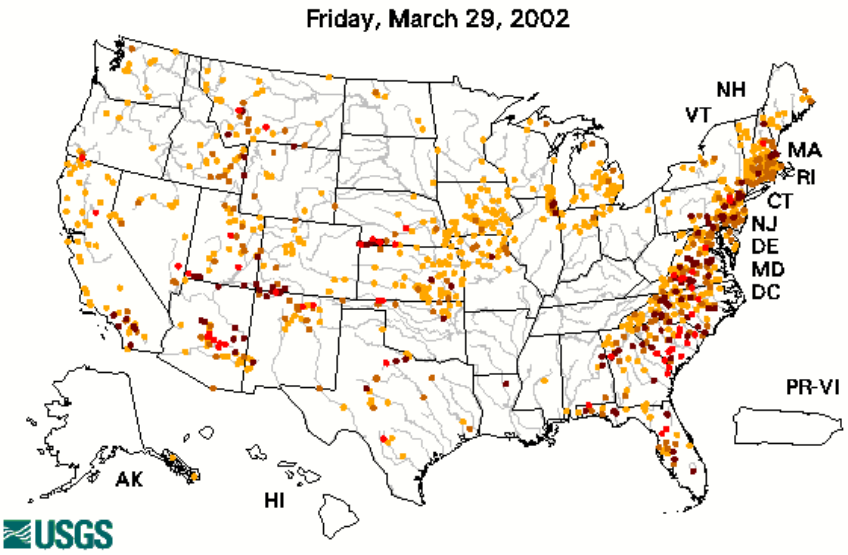
I'm sure there will be some of that going on. The city of New York does have a small operation it could turn on for withdrawing some water from the Hudson River. They have a plant that's in existence. They've used it only once or twice in the past several decades.

But that wouldn't provide a billion and a half gallons a day.

No, not even close. But it would be a supplement.

Would you say right now it is a fair speculation that the city of New York and surrounding region might be faced with such serious rationing this summer if this drought persists that even taking baths and showers might be really limited?

If the drought situation continues without the reservoirs filling, those types of activities would certainly be curtailed."



More than half the United States is suffering low water levels in rivers as of March 29, 2002. Map of below normal
7-day average stream flow, yellow = "below normal;" light brown = "moderate hydrologic (water) drought;"
dark brown = "severe hydrologic drought;" and red = "extreme hydrologic drought."
Map graphic courtesy the U. S. Geologic Survey.

National Outlook

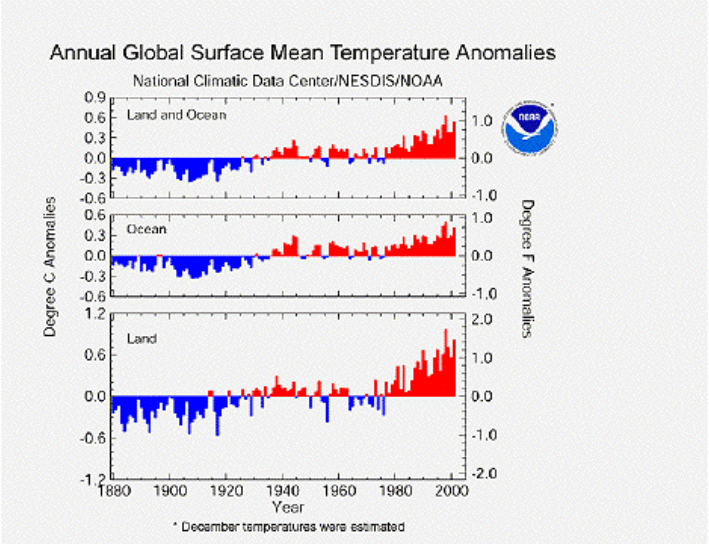
The U. S. Geological Survey which tracks the flow of rivers nationwide reports that more than half the United States has lower than normal water levels. As in the Delaware River watershed, ground water is drying up in many regions. More than a thousand wells have gone dry in small towns in Maine and New Hampshire which have had the driest winter on record. Some residents have paid a lot of money to drill new, deeper wells; others are buying and hauling drinking water from springs in other towns. Western states such as Arizona, New Mexico, California and Colorado are worried about fires. Ranchers in the Northern Plains don't have enough water to support their cattle herds and Montana wheat crops are down 45% from where they were in the mid-1990s. Farmers in Georgia and South Carolina are trying to survive after three years of drought and stunted crops. Great Lakes boaters and fishermen are watching water levels drop, afraid another tourist season will be diminished.

Low water levels in Lake Michigan, June 2000 © by Jaye Lunsford,
courtesy U. S. Geological Survey, Water Resources Division, Michigan District.

We've had more than a decade of progressively warmer years. The winter of 2001 to 2002 was the warmest on record in North America. If this continual

warming trend is a product of general global warming caused by greenhouse gas build up, will severe droughts become more common? I talked about the current nation-wide drought with Don Wilhite, Director of the National Drought Mitigation Center at the University of Nebraska in Lincoln.

Don Wilhite, Ph.D., Climatology, Director of the National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska: "In terms of global warming, the point needs to be made that you can't take a single episode, a single event, whether it's a drought or hurricane or a flood event and say, 'Ah, that's an indication of global warming.'



A shift to persistent global warming since the 1980s, graph courtesy NOAA National Climatic Data Center.

But we've had more than a decade of progressively warmer temperatures.

Yes, and the probability of getting warmer each year in consecutive years is very, very low. And so, one point that people who are supporters of the concept and theory of global warming, they would say the likelihood of that occurring is so low that something has to be going on. There are some, a few, disbelievers out there. But you can also look at other events: the number of extreme rainfall events around the world and those have been going up. The records we have been breaking in not just global mean temperature, but also looking at mean temperatures in terms of this past winter or this past December, January and February, individual months for many parts of the country.

Another indicator is just the occurrence of more extreme events which is what you would expect with global warming so you would not have just maybe more floods, but also more droughts and more heat waves and a whole variety of things. There is a lot that is going on here and the weather is very complex and the climate system very difficult to predict with any accuracy.

What is the forecast for fire threat this summer if we have drought conditions in over half the United States?

Well, the prognosis right now is not very good. I was just reading a report today from Colorado and Colorado is reporting dryness in a lot of the forested areas that is equal at this point in time to what they would normally be in the middle of summer. It is a situation we see in New Mexico right now and Arizona which is extremely dry and Colorado is extremely dry, West Texas, and then a lot of other parts of the west, plus the whole East Coast that we talked about.

Given the fact that this is just the end of March and we have a long way to go through August, what is the worst case scenario that you can see developing in the United States?

Well, in the western U. S., you're going to see that you're not going to get much recovery.

Meaning there isn't going to be much rain?

Yes, the situation particularly in the west where they rely so heavily on snow pack and then the runoff to fill reservoirs and to feed irrigation systems and hydroelectric power and all of that - if you don't have a snow pack, that's what gets you through from one year to the next. The snow season is almost over. So, it's unlikely that in most of the western U. S. where they depend on snow pack, if they don't have it now and much of the western U. S. is in a situation of say 50 to 70% normal snow pack - it's unlikely that they are going to make up that deficit at this point.

Now, in other parts of the country, you could as we were talking about NPR today, there could be a situation where precipitation begins to return to normal and if you average 5 inches in the month of April, that you get your five inches. That's going to alleviate a lot of problems for let's say the homeowner who wants to water their lawn - natural rainfall is going to take care of a lot of that.

But what if there is no more natural rainfall? what if we are in a period with El Nino out in the Pacific in which rainfall in Pennsylvania, New York and so forth along the East Coast is not going to reach any of its normal levels and we're going into the warmest part of the year?

Yeah.

And into the late spring and summer with no ability to refill?

Yeah, in that case, first of all, I would say that you have to remember that even when there is a drought, there is still rainfall. So that you are looking at precipitation that is maybe 60-70% of normal, but you are getting some rain fall. That will help some. But if you don't have replenishing rains that really begin to fill the reservoirs and also help out the agriculture in the areas and start refilling

some of the ground water tables, then you're going to continue to deplete the resource and the economic and environmental impacts of that are going to be just devastating.

Could we be moving into a new era in which the global warming climate cycle could be creating bigger droughts, bigger water areas, these bigger swings that the computers have said would happen, and that if Manhattan and some of the cities along the East Coast are facing the conditions in which reservoirs and ground water are basically empty, would the federal government then act in declaring a national emergency? And if so, how would that work?

I don't know. Certainly, in terms of drought they have never declared a national emergency. In fact, the President - my understanding is that the President of the U. S. has never declared a drought emergency. Usually it stops with the Secretary of Agriculture. But if you got into a situation where it became a national emergency, it would have to be something that would revert to the President. I certainly don't envision a situation where this dry situation is going to continue for multiple years where you're going to have a very severe depletion of ground water and no recharge of reservoirs that would take a while to recover. So, I don't know if this, I wouldn't say this is any part of a long term trend.

But what if it were?

If it were, then you are painting a worse case scenario. And with global warming, we don't really know how the climate is likely to be changed at the local or regional scale. We talk about global warming in terms of increasing global mean temperatures. But how this is all going to wash out for local areas in terms of how it's going to affect their temperatures because the temperatures aren't going to rise the same amount for every location. Some areas could even cool in global warming. some areas, particularly the Arctic and polar areas are expected to warm up more than any other area. The equatorial areas will warm up less. What I'm more concerned about is the impact of sort of the combination of global warming and increasing temperatures along with changes in precipitation. Because even if precipitation increases for an area, the increase in temperature can compensate in the sense that evaporation is increased.

Bear Creek, Allegany County, Maryland, August 5, 1999 drought.
Photograph courtesy U. S. Geological Service.

So, you get into a drought-wet-drought cycle?

Right.

Could we be facing the same kind of situation that set up the 'Dust Bowl' of the 1930s?

Well, potentially there is no reason why we can't have consecutive and many consecutive years of drought. From a climatological perspective, the 6 or 8 consecutive years of drought that effected large portions of the country during

the 1930s, there is no reason why that couldn't re-occur, either in the central part of the U. S. or in some other part of the country. the southwest and southern great plain states had 6 to 8 years of consecutive drought during the late 1940s to the mid-1950s. California went through 6 consecutive years of drought from the late 1980s to the early 1990s.

Is the Bush Administration now talking with you and others about the seriousness of the drought situation?

It is my understanding that right after the Easter break, there is going to be a bill introduced by Senator Pete Dominici (NM) in the Senate. It is called the National Drought Preparedness Act of 2002. And this legislation has been drafted for about the last 6 or 8 months by organizations like the Western Governors Assoc. and Southern Governors Assoc. and we've had input on that as well. My understanding is that the administration is in support of that legislation."

More Information:

From Delaware River Master's Office:

As of March 25, 2002, with no snow pack, very low river levels and diminishing ground water tables, the current status of water in the three reservoirs of the Delaware River Watershed that provide half the drinking water for New York City and water for New Jersey and Pennsylvania:

a) The Cannonsville Reservoir which is the one on the West Branch, is at **38.5%** capacity. It can hold 1,150 feet of water or 95.706 billion gallons. It had only 3% of that amount in December.

b) The Pepacton Reservoir is at **47.8%**. It can hold 1,280 feet or 140.190 billion gallons.

c) The Neversink is at **40.1%**, the smallest of the three. It can hold 1,440 feet or 34.941 billion gallons.

Websites:

http://drought.unl.edu/ndmc

http://www.drought.noaa.gov

http://water.usgs.gov/waterwatch/W_dryw_map.html

http://www.cpc.ncep.noaa.gov

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