Emerging Water Shortages Are No Mirage

by David Stauffer

On a spring day in 1977, newly elected U.S. Senator Malcolm Wallop, from Wyoming, sat down for the first face-to-face interview in his Capitol Hill office. He paused no more than a millisecond in answering the interviewer's first question, which asked the reason he'd sought to represent his state in Washington. "Water," he said. "I want to protect the water resources of the citizens of Wyoming."

The reporter – me – was taken aback. As someone who'd at the time spent his entire life no farther west than Chicago, the notion that anyone would seek elective office principally to act as a guardian of water seemed ludicrous.

Today, Wallop's concern for water would make more sense to a reporter from any part of the U.S. The "water wars" that shaped the U.S. Interior West from the earliest days of its settlement by whites grow almost daily in their intensity.[1] They're increasingly erupting in other parts of the country – prominently including the national capital region – where only a few years ago few were troubled about who owns water or whether there's plenty of it for everyone.

"There are water shortages now or looming all across the country," says Tom Ash, of HydroPoint Data Systems, a developer of weather-based landscape irrigation software. Ash points to a report last year from the U.S. General Accounting Office that says Americans can expect water shortages under "normal" conditions, accompanied by severe economic, environmental, and social impacts.

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Barr Lake, east of Denver, Colorado shows evidence of the drought conditions common in recent years in many parts of the country.

"Water Czar"

"A New Frontier in Water Wars Emerges in the East," headlines an article in the *New York Times* (March 3, 2003), noting that water-related "tensions have long been common in the arid West. But their emergence in the East is relatively recent. … Along rivers like the Savannah, the Pee Dee, the Roanoke, the Chattahoochee, and the Potomac, Eastern states are wrangling over a question that suddenly seems to matter very much: Whose water is it?"

The extent to which water problems have inundated once abundantly watered regions is indicated by a 19 percent jump in water consumption over the past 10 years, the *Times* reports, by Washington, D.C., and its adjacent Maryland and Virginia suburbs. "On a peak day last summer, the [region's] three utilities sucked 583 million gallons from the Potomac [River], about 85 percent of its volume at the time, and reduced the flow to near its legal minimum of 100 million gallons a day."

One seemingly well watered community where shortage became routine is Frederick, Maryland. Several years ago, the city's work on a new water and sewer master plan brought to light previously unrecognized permit limitations on the town's withdrawal of water from the Monocacy River, its principal water source. Combined with other factors, the city's picture of current and future water availability quickly turned bleak, and city planning and community development director Chuck Boyd routinely spent enough of his working days on water issues to earn the unofficial title of Frederick "water czar." Among other recent water-related duties, he's prepared a strategic interim water plan, written administrative guidelines to implement a new city water ordinance, and chaired the city's water service committee.

What brings so much of the country to its increasing preoccupation with water resources? A January 2003 report on drought in Colorado describes transition from expansion to maturity of the "water economy," in which: "1) water users are linked by elaborate physical systems and are increasingly interdependent economically; 2) new supply options are limited; 3) costs of new supply are rapidly escalating; and 4) federal subsidies have evaporated."

The same report also notes that as more water is removed from its natural

continued on next page

1 Author's Note: While there are many views of what constitutes the "Interior West," I would argue that it is the land between the 100th and 120th meridians. The 100th, conveniently, is the north-south line that marks the eastern boundary of the Texas panhandle. The 120th, also conveniently, is the north-south line that draws the border between Northern California and Nevada. Within this area are portions of 9 states, and all of 8 states. The single most distinguishing feature for much of this land area is that annual precipitation is under 20 inches — more than anything else, this has shaped the history, culture, character, and economy of the entire region.

A Brief Water Glossary

The terms below, gathered from a number of sources, are sometimes used when water issues come before planning commissioners.

Acre-foot – The amount of water needed to cover one acre of land one foot deep – about 326,000 gallons – enough to meet the annual water needs of one large family or two small families.

Aquifer – An underground layer of rock, sediment, or soil that is filled or saturated with water, usually in large quantities. For more on aquifers, see page 17.

Greywater – Wastewater from clothes washing machines, showers, bathtubs, hand washing, lavatories, and sinks that are not used for disposal of chemical or chemical-biological ingredients.

Groundwater – The supply of fresh water found beneath the earth's surface, usually in aquifers, which supply wells and springs. For more on groundwater, see page 17.

Impervious — The quality or state of being impermeable; resisting penetration by water or plant roots. Impervious ground cover like concrete and asphalt affects the quantity and quality of runoff.

Instream use – Use of water that does not require withdrawal or diversion from its natural watercourse; for example, use of water for navigation, recreation, and support of fish and wildlife.

Recharge – Increase in groundwater storage from precipitation, infiltration from streams, or human activity (artificial recharge).

Reclaimed water – Wastewater that has been cleaned so that it can be reused for most purposes except drinking.

Reservoir – A pond or lake, often man-made, where water is collected and stored until it is needed.

Runoff – Surface water entering rivers, freshwater lakes, or reservoirs.

Surface water – All water, fresh or salt, on the earth's surface.

Water table – The top level of water stored underground.

Watershed – The lands above a given point on a waterway that contribute water runoff.

Emerging Water Shortages...

continued from previous page

locations for human use, adverse ecological effects can become more pronounced. Numerous fish species, for example, must have certain volumes and velocities of streamflow to spawn successfully. And water in its natural state increasingly supports human economic activity – not just for such venerable pursuits as fishing and boating, but now, too, for outdoor "adventure" venues such as in-town kayaking courses.

"As you add more values to considerations of water allocation, you geometrically multiply the complexity of water resource decisions," says consulting hydrologist Steve Boand, a past mayor of Castle Rock, Colorado, and former chair of the Douglas County, Colorado, water advisory board. Douglas County had the highest percentage population growth of all U.S. counties from 1990 to 2000.

A growing number of planning commissioners and planners across the country are finding they must deal with the complexities of water scarcity and allocation issues in their consideration of proposed subdivisions, comprehensive plans, and other deliberations. Tom Ash details the glum reality regarding water that more planners must contend with:

- Population in most water-stressed areas is increasing.
- Water demand will continue to increase, particularly for outdoor landscape irrigation.
- Water runoff from over-watered urban landscapes will grow as a local environmental problem.
- "Crisis management" is currently the rule in dealing with water shortages.

The Cheap Water Is Gone

The Interior West is the cradle of today's nationwide water battles because the region has been shaped by the scarcity of water. "The West is a desert," wrote Bernard DeVoto, noted chronicler of the West. "Everything in Western history, Western life, and Western society is in some way referable to the desert."

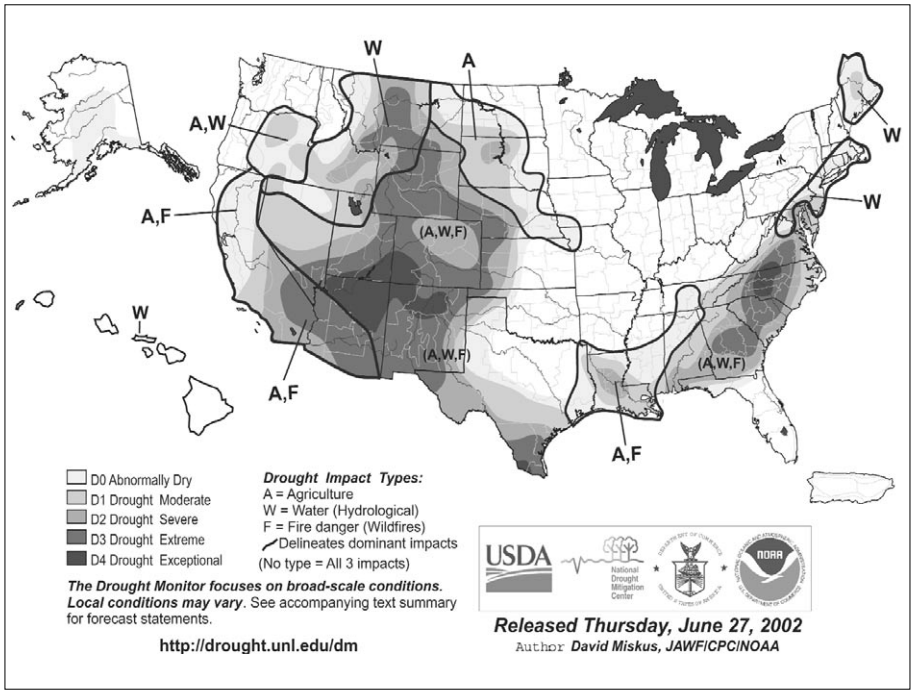
"Out here, people often use fighting words when they talk about water," says veteran Douglas County, Colorado, planner Betty Allen, who currently serves as assistant director for community development. "Water rights are part of the bundle of property rights, and right now water is one hot commodity."

The Interior West's water resources are so limited that water supplies in places have been strained from the earliest days of significant white settlement. Today, water battles are breaking out in other regions because the population "carrying capacity" of their water resources – far greater than that of the Interior West – is at last being exceeded. This is not to claim there's a hard ratio between numbers of people and amounts of water, but instead that water resources are beginning to prove inadequate for the profligate water consuming lifestyle of today's Americans. (The World Health Organization reports, for example, that people in rich countries use 10 times as much water per capita as people in poor countries.)

Yet even the absolute amount of fresh water available in the U.S. is not by itself a problem. Instead, today's emerging water shortages are caused principally by the ever more daunting expense of: (1) moving water from where it is naturally abundant to where it is in demand, and (2) tapping the more inaccessible water that remains today, after many population centers have by now skimmed off the readily available supplies.

The upward lift that naturally forces water in aquifers toward the surface, called artesian pressure, is gradually lost as water closest to ground level is extracted. That makes continuing extraction ever more expensive. "The cheap water isn't there any more," says Douglas County planner Allen.

As for moving water laterally from point to point, as with canals, aqueducts, and other man-made devices, "politics determines the flow of water more so than engineering," says Littleton, Colorado, water resources engineer



Water shortages and drought are not just Western phenomena, but have also struck many parts of the East. The U.S. Drought Monitor map for the week of June 27, 2002 (typical of the Spring and Summer of that year) showed simultaneous, and widespread, drought conditions East and West.

Bruce Lytle. "We don't develop all the water we could, because we're all coveting our own little fiefdoms."

The Planning-Water Link

Also hampering planners in addressing water scarcity issues is the public's tendency to latch onto simplistic solutions. Perhaps the two most frequent of these are that a temporary drought is to blame for current shortages and that measures discouraging the influx of migrants from other counties, states, or regions would end shortages.

• While drought of the past two to six years in many parts of the U.S. has certainly contributed to water shortages, experts say it has been the sole culprit in few places. What's more, researchers are finding that the more they study the history, impacts, and dynamics of drought, the more complex and less predictable it becomes. Some historical evidence, for example, indicates that the "average" U.S. precipitation in the last half of the 19th century and most of the 20th, on which today's weather records are based, may have been a period of historically greater moisture in some regions. And investigators have found that short-term cycles of drought and wetness are nested in longer term cycles – possibly extending over periods of 300 to 500 years.

• Restrictions on in-migration may offer hope at first glance. But here, too, complications arise. "People have the idea that their water is being used by folks who settle here after fleeing California," Lytle observes. He notes that a significant share of growth in communities where population is booming can be attributed to "natural" increases of births exceeding deaths. "Do we want to tell our kids they can't stay here?"

So anyone's hope for a quick cure for water shortages is likely misplaced. Says Frederick's Chuck Boyd, "Planning and water should be closely linked. Development of any sort will increasingly involve important questions of water availability."

No Question Is Dumb

Given the increasing importance of water in planning, what might planning commissioners and commissions do to more effectively address water issues – and even contribute to easing water

continued on next page

Some Observations

by Larry Pflueger

Dave Stauffer has identified a number of problems related to water scarcity, especially our profligate use of water. What we haven't done in places such as Florida (where I work as a regional planner) is sufficiently educate people to the fact that this isn't "back home." There is an expectation that they will have a beautiful turf lawn just like they did "up north." It's unpopular politically to tell the truth about potable water use, so we address the problem using only conservation measures rather than attempt to educate the people about the environment they live in. It doesn't help that every residential development is sold with pictures of extensive landscaping and turf, further reinforcing people's preconceptions about what life in Florida is all about.

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Selected Web Resources on Water Scarcity and Allocation

• "City of Frederick [Maryland] Water Allocation Ordinance Administrative Guidelines Manual." Go to <www.cityof frederick.com> and scroll down on the left margin to "Ordinances/ Laws" and click on "Water Allocation Administrative Guidelines."

• "Waste Not, Want Not: The Potential for Urban Water Conservation in California." Go to the website of the Pacific Institute, <www.pacinst.org>, and click on "Publications," then, under "Recent Reports and Papers," on the publication title.

• "What the Current Drought Means for the Future of Water Management in Colorado." Available from Colorado Trout Unlimited at <www.cotrout.org>. Click on the publication title on the home page.

Emerging Water Shortages...

continued from previous page

shortages or restrictions? Today's veterans of past water battles suggest these actions:

1. *Question the adequacy of "wet water" supplies no matter how well you're fixed for "paper water."* Cities and counties by the score are finding, to their alarm, that legal assurances of water availability have little or nothing to do with on- or in-the ground presence of the physical substance. That's why Colorado's Douglas County now requires proof from developers of adequate wet water to serve all proposed projects subject to county review. What's required "is not just that piece of paper," says planner Betty Allen, "but an analysis that proves adequate wet water." Douglas County contracts with three hydrologists of its own to review and confirm analyses provided by developers.

2. *Examine the implications for water in planning and development initiatives.* The need to ascertain water availability for new subdivision developments may be obvious, but don't overlook similar considerations elsewhere. In Maryland, for example, an aggressive state-level smart growth program "in some ways worked too well," says Frederick planner Chuck Boyd. Additional growth, successfully channeled from the surrounding county to the city, seems to have exacerbated Frederick's water problems. Smart growth "isn't necessarily a bad thing," Boyd says, "but you need to recognize all of its dynamics. When you push in on the growth balloon in one place, it pops out in another place. If that's what you want, the place it pops out has to be given the resources to deal with it."

3. *Try cooperative approaches.* Battles among every sort of combatant – state vs. state, upper watershed vs. lower, agricultural vs. urban, and so forth – have mostly failed to produce a flow of anything other than lawsuits. But that sad history is ending in some instances. "We're beginning to see some fruitful cooperative efforts," says water engineer Bruce Lytle, noting that some of Colorado's larger cities are entering agreements for use of formerly agricultural water, in some cases avoiding past charges of raiding the life's blood of family farms and ranches.

4. *Get rid of code provisions mandating water-hungry landscaping.* Many city and county codes – including those in some of the country's most arid jurisdictions – require landscaping that's ill-suited to dry times or climes. Some of the most drought-wracked areas are proactively killing such provisions. Colorado lawmakers, for example, passed legislation urging cities, homeowners associations, and subdivision developers to change ordinances and covenants that mandate use of bluegrass or other vegetation inappropriate to dry climate. They also barred any new covenants that restrict use of xeriscaping – landscaping that uses plants and other elements appropriate in an arid climate.

> WATER IS LIKE ANY OTHER TECHNICAL ISSUE. YOU NEED TO KNOW ENOUGH TO ASK THE RIGHT QUESTIONS.

5. *Seek to enact measures that conserve water.* Average residential water consumption in U.S. cities and counties could be dramatically reduced with a few relatively painless actions. Leading the pack are steps that reduce over-watering of America's lawns and landscapes, which by themselves can cut as much as 50 percent of the average household's outdoor watering consumption (which itself can account for 50 percent of total household water use in some states) and at the same time yield a much lower water bill and healthier lawn for homeowners.

"We can put in all the drought-tolerant plants we want and we won't save a drop until we stop over-watering," says water conservation expert Tom Ash. He also notes that retrofitting residential plumbing with low-flow devices reduced household water consumption in Southern California by 25 percent, and that a toilet and showerhead flow restriction effort in Santa Fe saves one million gallons of water daily.

6. *Ask questions and demand clear answers.* Chuck Boyd contends that when the subject is water, "no question is a dumb question." Insist that planning staff, retained experts, and developers and other applicants provide solid numbers and plain-English explanations of water-related concerns.

"When you ask a straightforward question, such as whether there's enough water to support a proposed development, insist on a direct and simple answer," says Colorado hydrologist Steve Boand. You're a commissioner, not a hydrologist – which means part of your job is to know "the general facts and have an awareness – not knowledge – of the science. … Water is like any other technical issue. You need to know enough to ask the right questions and evaluate the arguments opposing experts put forward." Says Boyd: "Commissioners need to be comfortable that their decisions are well informed and look as far to the future as possible."

SUMMING UP:

Scarcity of water – which has had a direct impact on the land use, economy, and politics of the Interior West since its first settlement by whites – is being experienced today across the U.S., even in some of the country's most well-watered areas. Current and projected shortages are increasingly a concern of planners and planning commissions, in deliberations ranging from the content of comprehensive plans to consideration of water availability for new subdivisions.

Planning commissioners are well advised to learn the essentials of water consumption in their areas – where it comes from, how much is available, and how it might be conserved – because water worries are unlikely to recede anytime soon. ◆

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