# The Land and Water Supply Connection: Does Water Limit Growth?

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When I first started to think about this topic and mentioned it to several different people who work in this area, reactions were varied. Usually I would get a look of disbelief and the general response was – isn't it pretty obvious? At some point there will be limits to new water uses. I don't believe that we can hide from the reality of our water supply and in this talk I am going to discuss some of the indications of limits that we are aware of around the state. On the other hand, I don't believe that we can control growth even if people were to agree on this goal, which I doubt they ever would. It's not just a New Mexico problem, at the recent Western States Water Council meeting nearly every western state weighed in: Colorado, Arizona, Nevada, Texas, California, and Washington…too much growth and not enough water.

The question is what steps do we take now?

Our challenge and focus should be to address what is possible and within our control – managing our water resources and our growth to prevent future harm to people, protect rivers and ecosystems, and provide water for food production in the future.

To begin with, we need to think about how much water we have and what is our projected growth? I have struggled with this question; I looked at the regional water plans, growth projections, and projected demand for water. The numbers are elusive and subject to debate.

First, there are the population projections. New Mexico's population is projected to go from 1.8 million to 3.4 million by 2050. But there are many uncertainties regarding growth projections. They are simply estimates and these will change again based upon the cycle of economic and demographic changes that we are going through right now. And they may change in the future due to concerns about water supply or due to any number of factors.

Then there is the projected water supply. Although the regions in New Mexico are quite diverse and water resources can't be easily

generalized, several things are clear: renewable surface water supplies are already allocated to existing uses. These supplies are highly variable from year to year. And in many parts of the state, groundwater is being mined, or groundwater is being withdrawn from aquifers that are connected to streams that are subject to interstate compacts. And right now, even before any new growth, in an average year, if all water rights are exercised, there is a shortfall in supply.

Most regions have prepared some type of a water budget and even though there is variation in the methodology for developing these estimates, every region predicts a shortfall in future supply to meet projected demand.

The magnitude of the supply shortfall varies greatly from region to region and will depend on future drought and climate scenarios, the rate and location of population growth, the rate of increase in energy usage and its water demands, and our ability to adapt, manage, and conserve water. These factors are all uncertain.

If you take all of the regional plans together, and use estimates of current use and use the lower level range of population projections, the plans predict somewhere around a 70 percent increase in withdrawals over current water use for "new needs" by mid-century (these are needs that can be associated with growth – commercial, domestic, and public water supply; and uses 150 gpcd).

The increase varies greatly among regions. The situation is most extreme in the San Juan region, Jemez y Sangre, the Lower Pecos, the Lower Rio Grande, and the Middle Rio Grande with the projected Middle Rio Grande increase dwarfing the other regions, being about half of the total.

Given that concerns over this growth will be exacerbated by drought, climate change, and diminishing aquifers, it's hard to deny that we have limits to growth, especially if we take no action to change how we manage water.

The regional plans provide snapshots of the issues regarding future water supply. In the Lower Rio Grande, both surface water and groundwater are used and with the close proximity to the El Paso and Juarez metropolitan areas (with a population of almost 2 million), competition for water supplies is intense. Even under low growth scenarios, demand exceeds water rights by 2030 and there is a heavy reliance on transfers from agricultural water rights.

Santa Fe is aggressively trying to import water from other regions and get its SJC water online.

On the Canadian river system, water tables in the Ogallala and other aquifers have been dropping rapidly and in the southern plains there are declining aquifers and deteriorating water quality.

In the Estancia basin, groundwater mining has caused serious water level declines in the valley fill aquifer and water rights licenses, declarations and permits far exceed historical pumping.

Drought takes a serious toll around the state with some wells going dry- and communities that depend on aquifers high in the Sacramento Mountains experience serious water supply problems during drought years.

In the San Juan region, most of the existing use is surface water. The San Juan has been subject to shortage sharing agreements and with the prospect of climate change, this may become more pronounced.

Expensive new sources are being explored and pursued. Look at the brackish water projects proposed west of Albuquerque and in Sandoval County and in other regions of the state.

There are huge uncertainties with regard to these proposed supplies. And there are uncertainties associated with many of the sections of the water plans due in part to data gaps or data that is not reliable.

The regional water plans do provide various strategies for how to address future needs: conservation, desalination, transfers of water rights, removal of non-native phreatophytes, watershed restoration, and other measures, but it's clear that there's a huge amount of uncertainty (there's that word again) associated with most of the options both with regard to feasibility of implementation, effectiveness, and cost.

And of course there are huge uncertainties regarding water rights in nearly every part of the state.

The biggest problem or at least the problem that affects the largest number of people is in the Middle Rio Grande. The supply is somewhat set. We have obligations to abide by the Rio Grande Compact and all of the surface water is allocated. The streams are administered in such a way that any new use of water comes with the retirement of an existing use. And water rights are anything but settled in the Middle Rio Grande. Water rights

permits exceed typical supply in most years in part because we have not fully factored in senior Pueblo rights.

In the Middle Valley it is estimated that new uses (to serve domestic, commercial, and public water supply) will need at least an additional 120,000 acre feet in year 2050.

Conservation is the first line strategy and conservation can make a huge difference in stretching the water supply. Santa Fe is a leader among urban areas and the Albuquerque Bernalillo County Water Utility Authority has been effective in reaching its conservation goals thereby extending the time when it will need to seek new resources.

But if we rely solely on conservation to meet growth projections, the existing population will have to dramatically reduce outdoor use of water far beyond the levels we have currently seen. How do we do this without harming communities where thousands of homes have developed with significant amounts of irrigated landscaping?

What is an achievable level of conservation and how do we get there? Since most of the water in the state is used for agriculture (about 75 percent) many people eye transferring water from agriculture as our future safety net. But this raises many issues. First, cyclical drought and climate change may reduce surface water flows and reduce the amount available for agriculture.

Transfers from agriculture to urban have a big impact on the move-from community – its economy and quality of life and culture. Vacant land can affect the efficiency of the irrigation system and the same amount of water may have to be used to charge the ditches to serve less agricultural property. When water is moved from a farm, it can be developed or regrowth of vegetation can occur.

In the Middle Valley where the biggest projected shortfall is, agriculture is a lower percentage of use. To meet demand solely through agricultural water rights transfers would require drying up most of the existing agriculture, which would have a dramatic impact on regional communities, their character, and their economies.

Then, there may not be willing sellers. The acequia associations are trying to protect their communities, their members, their culture, and their senior priority water rights. The law may effectively make some agricultural water unavailable for transfer.

There are also known problems with making agriculture more efficient, although I feel that is a productive avenue to study and explore. We know the arguments. It's not helpful to make agriculture more water efficient, because the consumptive use remains the same and if a portion of the water right is moved, the depletions on the stream may actually increase. But continuing with sporadic transfers may be destroying the viability of some agricultural areas and may not be resulting in wet water savings. We need to better understand the hydrology and scenario planning is needed.

In the recent meetings on the State Water Plan, whether in Moriarity, Portales, Carlsbad, Tucumcari, or you name it, almost every community suggested that they plan to hang on to the water they have and not allow it to be exported to other regions. Moving water will be hard, expensive, and take time.

Water quality concerns are starting to dominate the conversation and in the future, water quality will play an important role in determining water quantity. All over the state there are concerns about water quality in the regional plans: PCBs, nitrates, chloride, and dissolved solids, which exceed New Mexico's groundwater standards; injection of rock-fracturing chemicals; leaking septic tanks.

Despite all of this doom and gloom, I think we can do what we need to do. So much has already been done by the Office of the State Engineer (OSE) and the Interstate Stream Commission. I applaud the Richardson administration and the OSE. They have negotiated settlement agreements, established a Water Cabinet, developed domestic well regulations, established the Strategic Water Reserve, made progress on the adjudications, streamlined the water availability analysis, restored habitat for endangered species, and kept us in compliance with our interstate compacts. In preparation of the State Water Plan and again in the recent meetings held to update the plan, they met with a hundreds of citizens and officials around the state to really understand the issues and priorities in each region.

As I said, I'm not a subscriber to the theory that we can stop growth but I do think that we can manage growth and have an obligation to do so. For the State to do this, they will need more resources. With significant investments in resource measurement and management, maximizing supplies, and conserving, we have the ability to protect ourselves and future generations against

the risks of hardships and suffering due to water shortages.

The future will need to be met from a variety of actions and we do have a number of actions we can take. First, we need to continually improve our understanding of water supply. In every area of the State, there is a need for improved, frequently updated information about how much water is available, how much is allocated and used, what are the implications of continuing or increasing the rate of withdrawal, and what are the implications of changing the use. We address these questions on a case by case basis as a permit is applied for or a water right is transferred, but understanding the long-term cumulative impacts of these decisions is important.

It seems pretty clear that conservation should be the highest priority strategy. In public water systems, we need to create stronger price incentives to encourage the transition from lawns to drought tolerant landscaping in a way that preserves the value and beauty of our cities.

We need to continue to think and explore big picture ideas: alternative reservoir storage to reduce evaporation, aquifer storage and recovery, desalination, and re-use.

Given the uncertainties with our water supply and projected growth and climate, we need to be careful about how we approve new growth so that people aren't building developments that may be without water someday. Here are some modest improvements that might be looked at:

- We need standardized statewide building codes that require the best available water conservation fixtures and low water use landscaping.

- Urban land use approvals should consider lot size and densities. Reducing the average lot size in Albuquerque from the current 6,500 square feet to 5,000 square feet could reduce outdoor water use in new subdivisions to less than 40 gpcd.

- We should look at the water availability process under the subdivision act. Right now if the analysis results in a finding of inadequate water supply, a county is under no obligation to deny the development approval. Some counties have hydrologists who work with the project and modify the proposed development based on the OSE input, but others don't have these resources. Either way, the county is not obligated to report back to the OSE after a finding of inadequacy. It seems like this is a loop that could be closed.

- Domestic wells are in litigation right now. But the OSE has the means to limit their use based on the regulations developed in 2006. They should proceed (and probably are doing so) with developing the information to identify critical management areas where these wells may be affecting streams or causing unacceptable water level declines and not wait for the legal issues to be finally resolved.

- Consistency in plans – counties and towns should at a minimum be required to acknowledge the regional water plans and state that they are consistent or describe why they are not.

I know that some people disregard planning as a frustrating activity with lots of messy public meetings, resulting in documents that no one abides by, or feel that planning is just about making plans for stealing another region's water.

But at its best, I believe that comprehensive basin-wide planning supported by research and sound science – truly engaging the public in the debate – should be the basis for resolving how we approach these issues. Projects should be identified and followed by study and implementation. Given what we know and don't know about our water supply, it is irresponsible not to invest in planning and use planning to direct activities toward the most feasible and cost effective alternatives.

After the comprehensive basin planning is completed, the legislature may have leeway to create a different structure for the negotiated settlement of water rights in areas like the Middle Rio Grande, which are not being adjudicated – maybe a structure like the Montana Reserved Water Rights Commission.

I want to end with a quote from U.S. District Judge Paul Magnuson from a legal decision in the southeastern part of the country – now I know this is a lawyer writing and not nearly as informed as it would be if it was say, an Engineer, but nevertheless it's pretty common sense language that is somewhat hard to argue with. It concern's the Atlanta situation and their water woes, but his message goes to the heart of the topic and I think provides direction to us.

"Too often, state, local, and even national government actors do not consider the long-term consequences of their decisions. Local governments allow unchecked growth because it increases revenue, but these same governments do not sufficiently plan for the resources such unchecked growth will require. Nor do individual citizens consider frequently enough their consumption of our scarce resources, absent a crisis situation such as that experienced in the ACF basin in the last few years. The problems faced in the ACF basin will continue to be repeated throughout this country, as the population grows and more undeveloped land is developed. Only by cooperating, planning, and conserving can we avoid the situation that gave rise to this litigation."

Cooperation, planning and conserving…versus litigation. Or another way to put it, do we want to plan ahead and prevent crises or do we wait for a crisis when it may be too late for some less draconian measure before we change?

I say we go the route of research, data, science, planning, settlement, and implementation. And while we work through this, be careful about how we grow.