

November 4, 2008

Tucson-Pima Water Study  
PO Box 2344  
Tucson, AZ 85701

RE: Defining sustainability

Dear Committee Members:

The concept of sustainability has been defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” by the Brundtland Commission. This has generally become the standard definition of the term used today. The context in which it has been used is typically ecological sustainability, but other references have recently discussed the three pillars of sustainable development – environmental, social, and economic [see e.g. Value and Principle #10 of the 2005 World Summit Outcome Document, World Health Organization, September 15, 2005, available at: <http://www.who.int/hiv/universalaccess2010/worldsummit.pdf> ]. I would like to focus here on the notion of economic sustainability, which I believe requires that we permit continued growth in our community – including more population, more commercial development, and most importantly, growth and diversification of our economic base.

Few would disagree that for much of the past century the main business of Tucson has been growth. Continuous and sometimes rapid population growth has been the prime driver of our economic base. Similarly, few would disagree that this type of growth has brought with it numerous problems, ranging from a system where local governments are far too dependent on tax revenues supplied by growth to provide necessary public services to water supplies that are so overstretched they require supplementation from other similarly overstretched supplies to meet current and future demands. Despite this, growth does still need to be a part of the economic base of this community. The blame for the problems growth has led to does not lie with growth itself, but with the way growth has been managed (or not managed).

A primary task of this committee is to try to develop community consensus regarding how our community should grow. I interpret that to mean that continued growth is a part of our future and I believe that the economic sustainability of this community must incorporate growth. Lack of growth may be the ideal of some in this community who yearn for a Tucson remembered, but lack of growth equals stagnation, which will ultimately erode our quality of life. A vibrant community must incorporate some growth, provided that such growth occurs within sensible parameters established by available natural resources and community consensus. Growth is also necessary to create continued opportunities for the next generation to remain in Tucson and contribute to our community.

Accommodating growth, however, will entail some measure of compromise. While I would be delighted to see some of our dry washes flowing again because we have reduced our groundwater pumping to levels that permit rising groundwater levels, I don't believe that type of scenario is consistent with the demands of our current population, much less future population. Also, while some in our community will welcome the creation of higher density, urban development there will still be others who prefer the more suburban lifestyle available on the fringes of the city. People cannot be forced into a lifestyle they do not choose for themselves. Therefore, our community will always sprawl across large tracts of desert, with all the problems that entails.

This does not mean, though, that we must sacrifice our environment at the altar of growth. The two can coexist with careful planning and policies that create the proper incentives to encourage growth in locations and forms that permit protection of our most important natural resources. Residents of established parts of the city should not be asked to subsidize growth on the fringes by using our taxes

to build roads and install other infrastructure. Those costs must be borne by the new development. Rezonings and comprehensive plan amendments to accommodate new development must not be approved without first considering the impact of those developments to water supplies, among other resources, as the county has sensibly initiated recently.

We can make our existing water resources meet the needs of this sensible growth by encouraging greater efficiency. I am a strong proponent of pricing mechanisms that encourage consumers to properly value their water uses – non-essential uses, for which high quality drinking water is not required. It has been said that education will affect the behavior of 10% of the population, while the remaining 90% will respond to price signals. We are currently a very efficient community in our water use, but greater efficiencies can still be achieved. We also have one source of water that is guaranteed to grow along with our population – reclaimed water, which needs to make up a more significant portion of our water supply portfolio over time. Finally, if additional water supplies are needed for the region, the agricultural sector is a likely source, because very small reductions in ag water use can produce very large increases in municipal water supplies.

I wish to thank the committee for taking on this monumental task and hope that my comments provide a helpful representation of the average Tucsonan, struggling to make ends meet in these difficult economic times, while hoping to see Tucson remain a vibrant and enlightened community for many more years.

Sincerely,

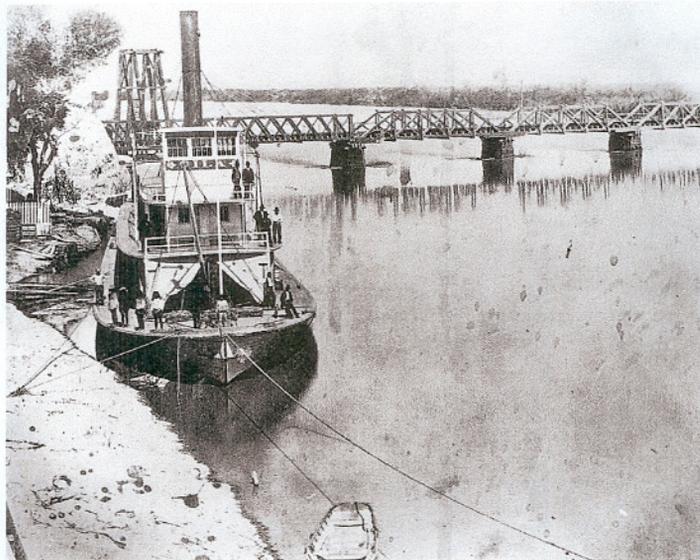
Christopher Brooks

Comments by Nancy Freeman  
Groundwater Awareness League  
www.g-a-l.info

Sustainability is living with our local resources... It means thinking of others.... It means thinking of the future. It means thinking of the environment. In fact, it means “thinking.”

I will speak of sustainability only as it regards water because our Arizona legislators set up a system that makes sustainability impossible in municipalities. When they passed the 1980 Groundwater Act, they grandfathered a 2.5 million acre foot deficit in groundwater pumping in central Arizona. They told the cotton growers, the alfalfa growers, and the mining companies, “you just keep on doing what you are doing,” we can get Federal funds to import Colorado River water to the cities. No problem, that it has to be paid for by American taxpayers and repaid by Arizona taxpayers, many who will never receive any benefit. As a matter of fact, it will be detrimental to those living on the river to see it disappear. Just think, Yuma used to be a sea port.

Yuma, circa 1892



An Arizona Supreme Court Judge, Noel Fidel, has commented on the situation in the context of water litigation in 1999:

The Arizona legislature has erected statutory frameworks for regulating surface water and groundwater based on *Southwest Cotton*. Arizona's agricultural, industrial, mining, and urban interests have accommodated themselves to those frameworks. *Southwest Cotton* has been part of the constant backdrop for vast investments, the founding and growth of towns and cities, and the lives of our people.

So the billion dollar CAP system was meant for municipal use, under the guise of agriculture use, but it was widely known that the agriculture sector would not use it. In the 28 years since 1980, that 2.5 million acre foot deficit means 70 million acre feet of water—enough to water the present population and agriculture use of Tucson, using 300,000 acre feet for 233 years. Currently, non-agriculture usage in all AMA's is just over some 785,000 acre feet per year, so that 70 million

acre feet would have provided water for all Arizonans and industry for 89 years. Then, after giving the groundwater away (the Groundwater Code does state water is a public resource), the legislators told the cities that they had to have an “assured water supply.”

So the model was set and mandated: “Import water, a ‘renewable’ supply from somewhere else to replenish the water use.” So to build a sustainable model on such criteria is simply impossible....

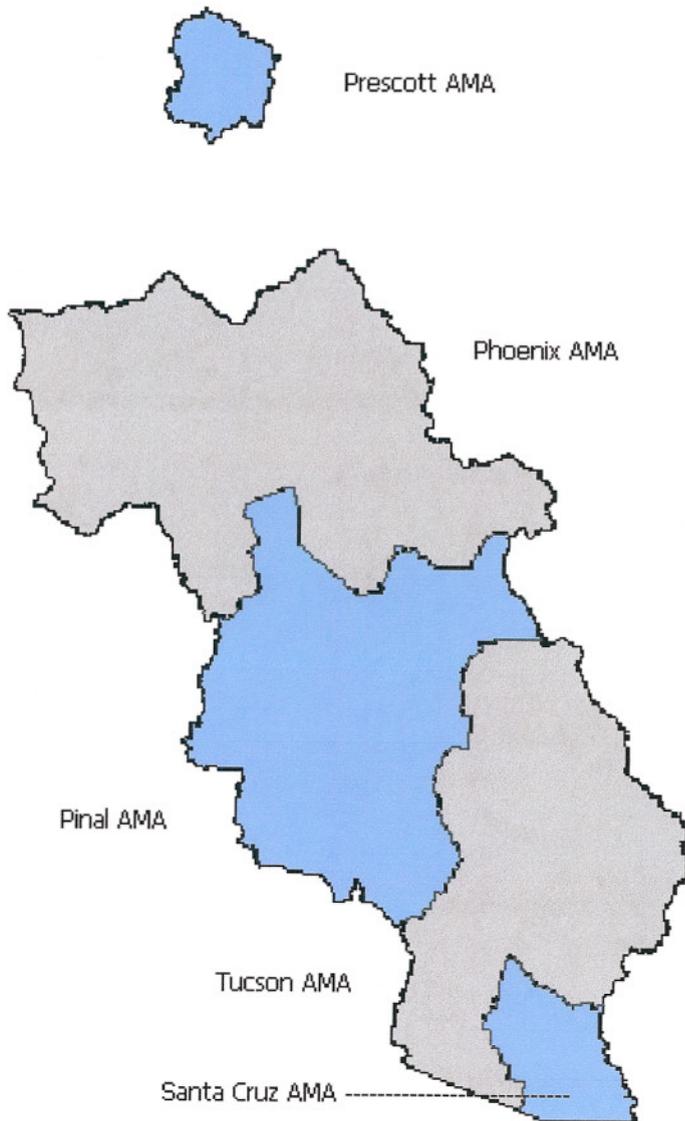
But that’s not all our enlightened legislators did for us. In 1995 the developers pressured them to subsidize development. The Groundwater Code stipulated that there had to be replenishment (not including agriculture or mining)—but the CAP pipeline was not available to replenish in many regions, it was crippling building in certain areas, especially those without water. So the legislator created the Groundwater Replenishment District and put it under the CAP authority to make it look legit. Because the truth is there were no CAP allocations left for the Groundwater Replenishment District to use. So now builders could build in south Pima County and replenish in north Pima County with an unknown supply of water—however, there would be excess CAP water for 20 years.... Never mind that the 100-year-water supply certificates that the State Water Agency issues, they do not include to the Replenishment District water.

So Replenishment District are the ones who need to desalinate water in the Sea of Cortez with total disregard to what a desalinization plant will do to the sustainability of that region. There are successful desalinization projects around the world, but they are delivering the brine out to a deep ocean, not to a small enclosed bay.

What will be the cost? The price tag of a state-of-the-art desalinization plant is now \$1 billion dollars. That’s not including the processing and the pipes for delivery. The “Add water” persons spoke about space for water in the existing CAP pipeline, but they did not speak of the cost of the infrastructure to get the water to the CAP pipeline.

Who will pay for the price? The new water users who come under the Groundwater Replenishment rules? No, all the water users in the water provider district will pay. In other words, all Tucson Water Company customers will pay for the high-priced water, and will affectively be subsidizing new growth—currently 20,000 units, although at this time since Tucson Water does not have capacity for all 144,000 acre feet of their allocation, they do not have to pay for GRD water. We already have the example of the big-spending fiasco at the Yuma desalinization plant. Taxpayers and water users have to be aware of how government agencies love big projects. The Federal project in Yuma cost over a billion dollar when the task could have been accomplished by buying up the agricultural operations for a few million that were dumping salty water into the Colorado, causing the need for a desalinization plant.

So the first step of living within our means with the limitations imposed on us by importing CAP—would be to eliminate the Groundwater Replenishment District, which was created by and for the sake of new development. The second step would be to capture our stormwater.



Prescott AMA

- Over 485 sq. miles
- Consists of 2 sub-basins
- 3 MAF of groundwater in storage
- 20,000 AF of Annual Use

Phoenix AMA

- Over 5600 sq. miles
- Consists of 7 sub-basins
- 287,000 acres of farmland
- Over 2 MAF of annual water use

Pinal AMA

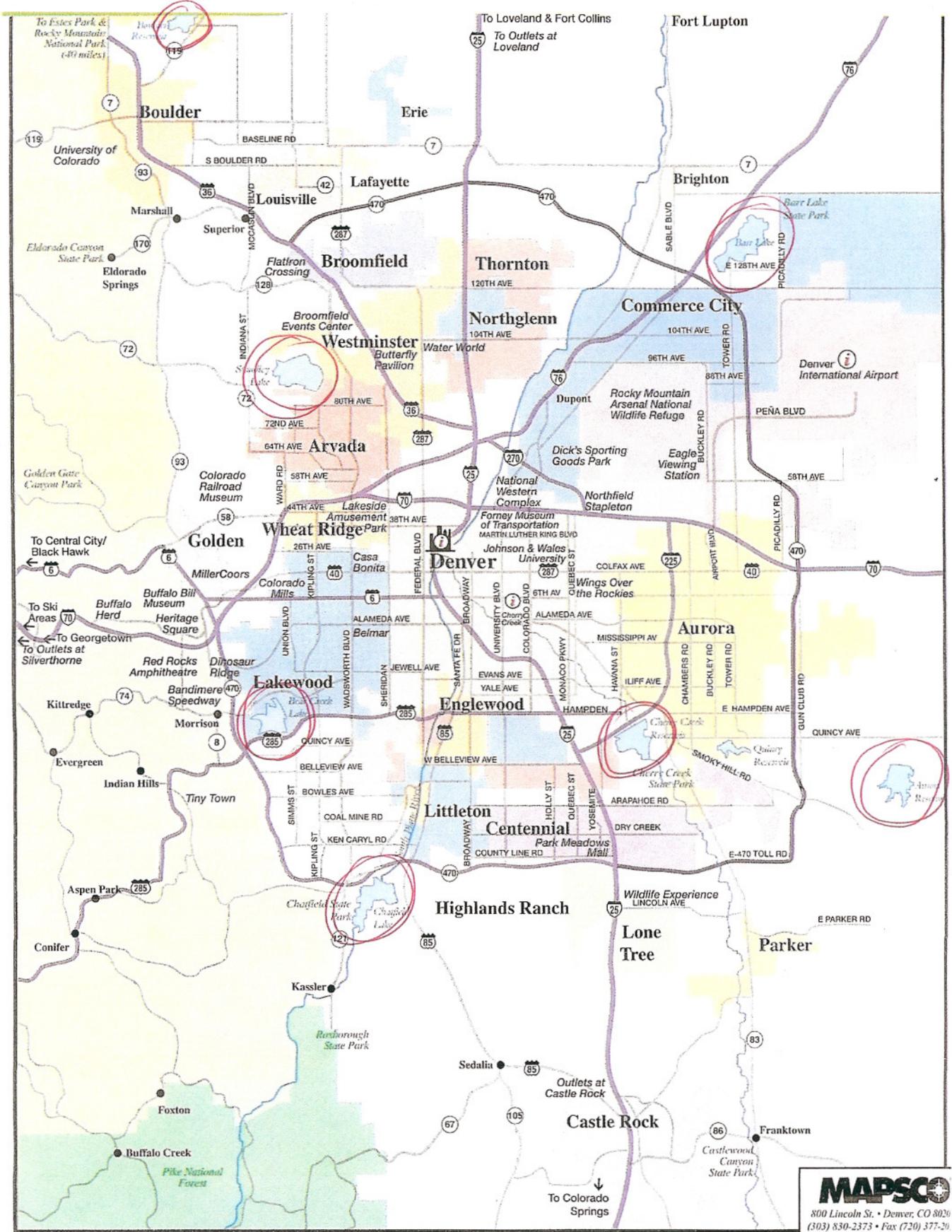
- Over 4,000 sq. miles
- Consists of 5 sub-basins
- 275,000 acres of farmland
- Over 800,000 AF of annual water use

Tucson AMA

- Over 3,800 sq. miles
- Consists of 2 sub-basins
- Over 300,000 AF of annual water use

Santa Cruz AMA

- Over 750 sq. miles
- Consists of 1 sub-basin
- Over 20,000 AF of annual water use



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Thank you for the opportunity to comment on water sustainability. Water use is one of the most pressing issues facing our community. Tucson's water future is much more stable than that of most other western communities; however, Tucson's main water supply has come at an enormous price. To continue down a similar path moves this community away from achieving any semblance of sustainability.

We are limited in the amount of water that can be served in the Tucson region. Our water resources are finite and unreliable. In light of this harsh reality, it is just not prudent to actively facilitate new growth. Instead, land use determinations should be based on the amount of water currently available without causing further damage to the natural environment, and allowing for restoration of riparian systems affected by currently unsustainable practices.

Many proponents of growth, including the Central Arizona Water Conservation District, have a number of plans that they say will provide our desert region with as much water as we need, but only at the expense of the natural environment. These plans include desalination, ground water mining, and canal systems linking us to other, distant rivers, such as the Mississippi. These plans are simply unsustainable, and utilizing water from faraway sources like this would directly contribute to the environmental devastation in other areas. How in the world is shifting the environmental damage to somewhere else a sustainable way to guarantee water supplies for new growth?

Finally, it is important to understand the difference between "safe-yield" and "sustainability" when talking about groundwater supplies. Throughout this process Tucson Water and others have referred to "sustainable" ground water pumping as pumping out the same amount of water that can naturally be recharged. This is wrong. That definition more accurately represents "safe-yield" pumping because it does not take into account the water needs of groundwater-dependent riparian systems or other negative effects caused by excessive groundwater pumping.

Under safe yield rules, without allocating water for riparian systems, the remaining ground-water dependent riparian systems would eventually dry up and die, and previously lost riparian areas would likely never be restored. If Tucson Water and Pima County wish to truly achieve sustainable ground-water use in the Tucson AMA, some amount of water beyond simple safe-yield quantities must be included in the water budget for the maintenance of existing—and resurrection of lost—ground-water dependent riparian systems.

We cannot rely on the Colorado River to supply a constant increasing demand for water. The river was over allocated to begin with; we are in the midst of a serious drought, and the unknown effects of climate change are just starting to unfold. We cannot justify our recent level of growth to continue based on this unreliable source. Nor can we claim sustainability if we continue to drastically impact environmental resources to facilitate growth above the carrying capacity of our region. We are capable of constructing projects of an enormous scale, but just because we can do it doesn't mean we should. We continue to damage the environment to facilitate growth in the middle of the desert, growth that is ultimately unsustainable. It is time to go down another path.

We will be submitting written comments to the committee prior to your next meeting. Thank you.



## Remarks to the City/County Water and Wastewater Study Oversight Committee

October 29, 2008

Thank you for the opportunity to comment this evening. The Center for Biological Diversity is a nationwide non-profit with nearly 200,000 members and online activists scattered throughout the United States and the world, with our headquarters right here in Tucson. We work through science, law, and creative media to secure a future for all species, great or small, hovering on the brink of extinction.

We share a great concern with the other groups that have presented to you from a conservation perspective: ensuring that the solutions our community pursues in securing our water future are truly sustainable. Too often lip service is paid to the concept of sustainability even while we make choices and policies that belie a reasonable definition of the term, or worse, hide unsustainable consequences in faraway places or defer them to future generations. In that respect, we commend this effort to define true sustainability for Tucson and Pima County's water future.

Unfortunately, to some members of our community "sustainability" equates to "guaranteed supply sufficient to maintain unlimited growth." This leads to a myopic focus on large scale augmentation of supply and neglect of local and regional responsibility for consumption. Rather than a hard look at the excessiveness or inefficiency of our current water use or a reasonable limit to the population our water supplies can realistically support in the desert Southwest, we are instead perpetually focused on grand and hugely expensive schemes that would allow us to avoid responsibility, such as diversion, canals, water mining, cloud seeding, desalination, and so on.

I want to take a couple of minutes to address desalination in particular in this context. While on the surface it may seem like a nifty way to tap into a vast new water supply, it comes at great cost, both economic and environmental. Depending on location and construction, a desalination plant can do serious and permanent damage to marine life and surrounding habitat in source waters. The process generates huge waste disposal problems in the form of massive amounts of brine and concentrated chemical additives. And it requires a tremendous amount of energy, which carries an entirely different set of environmental consequences.

Even a project as seemingly innocuous as the Yuma desalination plant has been fraught with problems, offering relatively small amounts of water at exorbitant cost and with unacceptable environmental consequences. Originally proposed to desalinate agricultural runoff to help satisfy Colorado River allocations to Mexico, this extremely controversial and expensive project was shut down after only nine months of operation and has been dormant for 15 years.

In those intervening years, water that was allowed to return to the Colorado River Delta has nourished and restored a small portion of the ecological health and biodiversity that once existed there, in the form of the Ciénega de Santa Clara. But water managers and state officials, eager to apply every available drop of the Colorado to the profit of humanity, consider that water to be “lost” and want to reclaim it. The truth is that the 40,000 acres of habitat created by that “lost” water are virtually all that remains of 2 million acres of lush wetlands that existed before water was diverted from the river in the first place. To organizations such as the Center that oppose this project—and certainly to the myriad species of the Ciénega that rely on that water for survival, several of which are endangered—it is in fact water that was “lost”, but has been found.

However, now that drought and continued unsustainable consumption have changed the context, pressure is building to restart the plant, despite its miserable track record and numerous legal hurdles. It seems that water managers are willing to throw good money after bad in the narrow quest to augment supply. With the threat that shortages are possible unless the plant resumes production, we are being told that we must sacrifice what little is left of one of the great jewels of the natural heritage of the Southwest, in exchange for a relatively small amount of water that may buy a little time but certainly will not solve the problem. At the same time we continue to ignore cheaper, more sensible and less damaging alternatives that are available locally, not the least of which is admitting and addressing the folly of large-scale agriculture in the desert.

In essence, schemes such as desalination allow us to ~~export~~<sup>export</sup> environmental consequences to precious places far away, out of sight and out of mind. We believe that sustainable solutions to our water problems lie not in technological boondoggles but common sense and responsibility. We think it is imperative that a committee such as this focus on local and regional approaches to achieving a truly sustainable balance between necessary consumption, realistic supply, and the needs of a healthy environment, in the hopes that we can avoid water wars and crisis in the future, and that our children will inherit a world in which the wild is still alive. Thank you.

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**SKY  
ISLAND**  
ALLIANCE  
Protecting our Mountain Islands  
and Desert Seas

**Comments on Sustainability to the  
Regional Water Study Oversight Committee  
October 29, 2008**

**Trevor Hare  
Landscape Restoration Program**

**Sky Island Alliance** is a grassroots organization dedicated to the protection and restoration of the rich natural heritage of native species and habitats in the Sky Island region of the southwestern United States and northwestern Mexico. We work with volunteers, scientists, land owners, public officials, and government agencies to establish protected areas, restore healthy landscapes, and promote public appreciation of the region's unique biological diversity.

**The importance of in-stream flows, sub-surface waters, riparian areas, and the impacts of water delivery infrastructure.**

Approximately 90% of the wildlife in the arid southwestern US is dependent on aquatic and riparian resources to fulfill some part of their life history. While a majority of aquatic systems in Pima County have been lost a few remain such as the San Pedro River and Ciénega Creek and are therefore extremely important to protect. Riparian ecosystems supported by shallow groundwater have also been largely lost or degraded due to water diversions, aquifer drawdown and urbanization but can still be found across the county in places like Sabino Creek, Davidson Canyon, Rincon Creek and Sopori Wash..

Our riparian areas also play host to an amazing abundance of rare and endangered species such as the Chiricahua leopard frog and the Mexican gartersnake, black hawks and gray hawks, the Huachuca water umbel and the Canelo Hills ladies tresses, and of course our highly-adapted desert fish.

Beside the obvious benefits of providing water, shade, cover and breeding habitat for animals another important aspect of these aquatic and riparian areas are the connectivity they provide across the landscape and across many barriers, for the daily and seasonal movements and dispersal of animals and plants. For example a mountain lion needs more than 200 square miles in its home range and our Sky Island mountain ranges and other protected areas average less than 50 square miles and so lions must travel between these ranges across the lowlands to find mates and prey and to disperse into unoccupied habitat, and the washes and riparian we are talking about provide the shelter and safe transit needed to achieve this.

Riparian vegetation along watercourses contributes to the retention of water on the landscape. Floodwaters are slowed, soils are held in place by roots and more water infiltrates into the ground.

Protection of riparian areas and aquatic ecosystems also benefits local economies through increased home values, increased recreational opportunities and increased well being as people connect with natural settings.

**Our recommendations to this committee include:**

Protection of our remaining aquatic and riparian ecosystems through the establishment of no-pumping zones where pumping would draw down shallow ground water and no-touch buffer around existing riparian habitat.

We must have a dedicated effluent pool to jumpstart restoration efforts of our degraded riparian ecosystems and to maintain the existing diversity of these systems in the Tucson Basin.

Finally we must implement land-use provisions and reform state law to ensure that future population growth and associated water needs do not exceed available supplies nor impact existing and restorable water dependent ecosystems.

We must also resist the urge to import un-sustainable and environmentally detrimental supplies of water from outside the Tucson Basin. The infrastructure and methods proposed so far to make more outside water available will have large un-reversible impacts to landscapes and wildlife.

In closing I would like to quote an old friend “Growth for growth’s sakes is the ideology of a cancer cell” we can grow but we must grow under the environmental constraints this amazing desert provides.

Thank you for your consideration  
Trevor Hare  
520 624-7080 x14  
trevor@skyislandalliance.org

October 29, 2008

*Sustainability and Context*

To me, any system, whether it is a water delivery system or something else, is sustainable if the following six criteria apply:

- (1) it functions essentially without significant consumption of nonrenewable resources;
- (2) it is essentially pollution-free in all aspects of its operations and has no significant negative impacts on the environment;
- (3) it is affordable by those who must pay for it (without risk of bankrupting anybody or forcing anyone out of their home, including our less fortunate citizens);
- (4) it fulfills all of its intended purposes, including all quality-control parameters;
- (5) it works efficiently and cost-effectively for its intended lifetime, without significant unanticipated maintenance problems or cost-overruns; and
- (6) it does not allow for a temporary overexpansion of human population beyond the carrying capacity of the environment, only to be followed by a catastrophic collapse, as has occurred with past civilizations, discussed by Jared Diamond in his book *Collapse* (2005, Viking, 575 pp.).

In case this definition seems restrictive for our society, let me set the perspective with a few simple facts. Planet Earth has existed for more than 4.6 billion years. Life, in one form or another, has been evolving for more than 3.5 billion years. To set this to a time-scale to which we can relate, consider the 3.5 billion year history of life as occurring within one 24-hour day. The first living cells appeared at a fraction of a second after midnight. The first terrestrial animals with a backbone appeared about 360 million years ago, or about 9:32 p.m. The clock has ticked away past noon and dinnertime, and people aren't here yet. On this time-scale a dinosaur of one kind or another existed for over an hour of life's history (between 10:28 and 11:31 p.m.). Our species, human beings, have been here for only the last 12.4 seconds before midnight, and the Industrial Revolution, with all its consequences for the global environment, has raced through the last 1/200th of a second.

If high-quality human life is going to be sustainable for the first hour after this new midnight, we must get our act together, and this is your opportunity to influence the process.

Charles J. Cole, 6381 W. Sweetwater Dr. Tucson 85745; 520-743-3402.

## Sustainability:

To me Sustainability means that I am living within my means..... In investment terms this means that I am spending the income, rather than spending down the principal. For our community, sustainability should be much the same.... we are not robbing from the future of the community to maintain and expand the present. At a most basic level our principal as a community is our water supplies that we are drawing down below replenishment.

What is the community?? Tucson is as diverse as the people who have come to call this sunbelt city their home. Old timer, pioneer family, new comer, relative newcomer, why are we here? A place that is unlike much of the rest of the US, with the border heritage, sunshine, outdoor lifestyle. I came in 1975 to put down roots, raise my family be part of this community, to make this community my own. I live in a neighborhood that was built out pretty much by 1960. My neighborhood is anchored by the AZ Inn. Mrs. Greenway built the Inn where it is because she wanted to be on City Water, so she built just inside the then City Limits. As a neighborhood, we have enjoyed the support of City infrastructure, water, sewer, streets. What we see of our streets is that they are crumbling under budget problems. We cannot see the water and sewer systems except when they do not "work". Without a well maintained system of water delivery and the reverse waste water delivery to the treatment plant wherever that may be, we as a community will falter.

My neighborhood is characterized by mature vegetation. Our 70 year old pine trees and other large trees provide a special sense of place besides allowing us a number of urban adapted hawks and owls. Part of the sense of place for older Tucson neighborhoods is the trees, the bushes and yes, even our little postage stamp lawns hidden in the privacy of our backyards. Trees and vegetation offset some of our urban heat island, and may even help us as a community peck away at the causes of climate change. This vegetation, though some of it may have survived through dry times, usually needs some irrigation. We pay for the water to maintain our yards and trees. Or now we are trying to arrange for water harvesting to support the greenery we want to enjoy around the "outdoor" room in our yards.

Sustainability in a greater sense, means that we must look at where we live, how we live and the choices and trade offs we can or wish to live with. In the quest to provide for the people who will come, we should not forget that many who came earlier came to a city that was not built out as a subdivision of matching dwellings. We need to take some care that the older inner city will not be destroyed. We've heard about how our sewer infrastructure will need more maintenance if we do not flush enough, wash enough, or we divert too much of our individual home's gray water to our plants. I do not want to see us abandon the Tucson of our grandparents' generation characterized by the Sunshine Club of 1920's promoters. Yes they made sure all the promotions showed palm trees to symbolize warmth. Those business leaders of yore subscribed, I am sure, to the philosophy that what was good for General Motors was good for the nation, but on a local level. I am not sure that this should be our current way of operating, even though land speculation and development have been our Tucson history for over 100 years.

In the last week or so I have been asking others what they think about Sustainability. Here is where we as a community suffer from the churn of transiency and snow bird-ism. I have heard from several that they do not expect to worry about the future beyond a few or so years because, they will either leave, or no longer be. That this City should be a good place for their children and grandchildren, no, their children don't live here and they expect to move to wherever those families have gone. These are the folks whose actions say we should mine the water until it is all gone. Just like the other extraction industries in the past. Take and leave, and we will be like the iconic ghost towns when the mines were no longer profitable. Which is not what sustainability is all about.

I urge that we include a sense of place in our sustainability discussions, the sense of place of the old center of the city and the sense of place of our natural areas. And this sense of place depends upon the maintenance of our water and sewer infrastructure.

Alice Roe

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10.22.2008

Ronald Proctor  
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Sustainability is the ongoing process of securing a quality of life for ourselves and future generations. Over the course of human history, we have been able to sustain ourselves by using abundant and readily accessible resources and the natural world has had the capacity to process the resulting waste. Now however, sustainability is becoming part of our greater understanding because we are realizing we live in a world with limits, and those limitations are causing a decrease in our quality of life, and perhaps a challenge to our existence. The state of our natural ecosystem that yields a continuous flow of valuable goods or services is in a deteriorating state and population pressures are accelerating the problem.

Tucson is a desert community living beyond the carrying capacity of its local resource base. The vast majority of resources are imported, including food, fuel, material goods, and more recently, water delivered through the Central Arizona Canal. We are sustained by a resource transport system that relies almost entirely on fossil fuel. Unfortunately, consumption of fossil fuel supports us on the one hand and strikes with the other. While this transport system supplies us with consumable goods it also produces carbon dioxide, undercutting the stability of our shared climate and destroying the natural capital<sup>1</sup> that needs to remain the basis of our physical support. Carbon dioxide emission reductions should therefore be a major part of the sustainability equation.

Science suggests worldwide levels of CO<sub>2</sub> emissions need to be reduced by between 50% and 85% by 2050<sup>2</sup>. Others argue that zero or negative carbon goals are urgently needed<sup>3</sup>. Regardless of the actual percentage, science is indicating major reductions will be necessary to mitigate climate change. Fortunately, emission reduction agreements have already become stated policy. The Western Climate Initiative<sup>4</sup>, signed by Arizona Governor Napolitano and the U.S. Mayors Climate Protection Agreement<sup>5</sup> signed by Mayor Walkup, both call for large-scale CO<sub>2</sub> emission reductions. A draft greenhouse gas inventory for Pima County and the City of Tucson just released, will help determine the baseline for greenhouse gas reductions and what part the City and County water and wastewater systems should play in meeting these goals. An 85% reduction in CO<sub>2</sub> emissions worldwide by 2050 is a daunting task to say the least. It seems likely a rethinking of infrastructure and level of services will be necessary in order to meet those goals.

One way or another, a sustainable water system will require making sure the whole system satisfies carbon emission goals. In rethinking the water system in this time of environmental fragility and considering the problems associated with carbon emissions, one obvious approach suggests creating a system that inherently requires less energy. Developing water supply that falls naturally at or near point of use can use gravity to advantage, eliminating major environmental and energy costs. The case may be made that

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<sup>1</sup> Natural Capital definition: Natural capital is the stock of natural ecosystems that yields a flow of valuable ecosystem goods or services into the future.

<sup>2</sup> IPCC Fourth Assessment Report. Working Group 3. Mitigation of Climate Change

<sup>3</sup> Spratt, David and Sutton, Phillip. *Climate 'Code Red' - the case for a sustainability emergency*, 2008

<sup>4</sup> [www.westernclimateinitiative.org](http://www.westernclimateinitiative.org)

<sup>5</sup> [www.usmayors.org/climateprotection/agreement.htm](http://www.usmayors.org/climateprotection/agreement.htm)

the water we have been importing over long distances and raised to great heights, may be better used in other ways. Colorado river allotments currently delivered to Tucson may be more efficiently used supporting agriculture in the Colorado River lowlands and restoring the fisheries beyond its delta.

So what might a sustainable water system look like in Tucson? It could be based on non-imported water, catching all necessary rainwater for residential use at or near where it would be used. Charles Cole (who has presented for this committee) has demonstrated that water harvesting can be done, satisfying typical residential water needs in Tucson. A public wastewater system could collect excess or sewer wastewater, purify it to necessary standards, and recirculate it for toilet flushing and distribution to recreational areas and for fire suppression. Aquifer pumping could be discontinued until natural recharge restored surface flows in riparian areas. Once the aquifer was restored, excess water could be banked appropriately. Commercial and industrial users would be responsible for their own water supplies, either by leased catchment or private pipeline, and be responsible for any cost incurred or waste products produced. Water rates would be based on the cost of treatment and pumping (using carbon neutral renewable energy), as well as the amortized cost for the catchment and necessary piping infrastructure. In this whole-system approach, each citizen would be responsible for their actual water use and assessed a share of cost of public amenities such as green space and fire protection.

Any sustainable water supply system for Tucson will need to meet the carbon emissions requirements necessary for climate change mitigation. If we continue to import long distance water, a thorough analysis is needed to prove its merit. Alternatively, one could design a system based on the only truly renewable water resource we have – rainfall. We have technology that allows us to recycle that water to maximize its use for our community purposes. What environmental and financial costs either of these options incur should be compared and brought before an informed public before requesting funding for major public investment.

## **Tucson Regional Water Coalition**

The Tucson Regional Water Coalition is a union of business organizations from across the Tucson Region. Each member business organization is independently governed and staffed. Each maintains policy positions and goals that are discrete to each member organization. However, due to the significance of the issues of water resources and sound management of water resources within the Tucson Region, the member business organizations have united under the umbrella of the Tucson Regional Water Coalition.

Members of these organizations are employers who provide over 250,000 jobs in our community. The coalition represents the business community, however, its regional water efforts set a clear goal to maintain and enhance the quality of life and general prosperity for all who live in our region. It will work to engage water issues with fact based initiatives based on best practices. The coalition stands ready to work with others in the true spirit of collaboration, to be inclusive, willing to compromise and to take the critical actions necessary to ensure a vibrant future for the Tucson Region.

### **Mission Statement**

“Seek to promote policies and actions to; (i) create the long range planning for a sustainable water supply that will support the economic vitality, the current and future population and maintain the quality of life of the Tucson region (ii) identify and maximize the supply of water resources available within and to the Tucson region, , and (iii) implement best practices for the efficient use, conservation and management of water resources in the Tucson region by working in collaboration with all of the regional water and waste water providers, community leaders, community decision makers and the general public.”

## **Tucson Regional Water Coalition Members**

Arizona Builders Alliance  
Alliance of Construction Trades  
Marana Chamber of Commerce  
Metropolitan Pima Alliance  
Northern Pima County Chamber of Commerce  
Safe and Sensible Water Committee  
Southern Arizona Home Builders Association  
Southern Arizona Leadership Council  
Tucson Association of Realtors  
Tucson Metropolitan Chamber of Commerce  
Tucson Utilities Contractors Association

### **Statement on Sustainability**

The Tucson Regional Water Coalition believes that community sustainability dialogues must move beyond bumper stickers and political slogans. Sustainability must become a resource management and resource economics discussion, where tradeoffs between alternatives must first be understood and debated in quantifiable terms. Sustainability cannot be the exclusive domain of environmental protection. The success of local sustainability forums rests on moving debate toward a common language and set of metrics, which fundamentally includes recognizing water as an economic good with economic value to all competing uses/users. Moreover, the Coalition believes cost analysis methods should play a central role in the community's attempt to collectively define sustainability. These proven methods both inform policy debates and provide a common language for responsible management of local resources, ultimately transforming values discussions into viable financial plans.

The Coalition's water resource sustainability principles are not a menu of options to be applied individually or to serve as criteria in case-specific evaluations. Rather, the Coalition offers these principles in their entirety to guide, and in support of, a scenario planning process that seeks to understand costs and benefits on a regional scale.

# **Principles of Sustainable Water Resource Management**

## **Promote Comprehensive Inclusiveness and Transparency.**

- Water management must be based on a participatory approach, involving a balance of technical expertise and expression of community values with an emphasis on consensus building between those representing current and future users, planners, and policy-makers at all levels within the region.

## **Acknowledge that Sound Water Resource Management Knows No Jurisdictional Boundaries.**

- All water providers, users, and uses in the metropolitan area are connected by reliance on regional groundwater supplies to meet annual demand and provide a buffer against drought. Water planning should be conducted at the basin scale (defined as the Tucson AMA) and should involve all users.
- Support shared use of community infrastructure through cost-effective wheeling agreements for delivery of effluent, surface water, imported groundwater, and/or stored renewable supplies to achieve greater integration, reliability, flexibility and reliance on renewable supplies throughout the region.
- Collectively maximize purchase and underground storage of additional surface water and/or imported groundwater supplies, augmenting local groundwater supplies to further insulate the region from cyclical weather patterns.
- All local water supplies—groundwater, CAP, other surface water, and effluent—should be cooperatively used for the maximum economic, social, and environmental net benefit of the region expressed in monetized or quantifiable terms.
- All work products and policies of a local water planning process must be consistent with applicable state laws and policies. In circumstances where local conditions or values conflict with state law and/or policy, the process should seek the appropriate amendments at the state-level.

### **Recognize Water as an Economic Good with Value to all Competing Uses**

- Price signals are an important tool for achieving efficient allocation of water resources. Current retail water rates do not match claims of scarcity and conflict with cultural messages urging conservation.
- Promote policies that facilitate allocation or reallocation of water resources to highest value uses that yield the greatest economic, social, and environmental net benefit for the region expressed in monetized or quantifiable terms.
- Commit to understanding the fundamental relationship between water resources and regional economic development in the form of job retention and creation, and the general prosperity of citizens.

### **Use Economic Analysis to Evaluate Alternatives & Risk**

- Promote non-discriminatory methods, evaluating alternatives objectively and comparing net benefits in monetized or quantifiable terms.
- Promote community-wide conservation goals and standards that maximize acre-feet saved per community dollar spent, focusing policies and finite economic resources on uses/users with the greatest conservation potential.
- Evaluate proven conservation measures as an alternative to supply acquisition, justifying investment decisions on alternatives that yield the greatest economic, social, and environmental net benefit for the region expressed in monetized or quantifiable terms.
- Concerns regarding evolving and/or uncertain conditions should be addressed through iterative risk assessments and decision-making processes, systematically reevaluating risk according to potential financial impact to the region and probability of occurrence.

### **Create Long-Range Financial Plans and Funding Mechanisms**

- A Sustainable Water Resource Management Plan for the region is incomplete without a Budget and Implementation Strategy (Fiscal and Physical). The region must move away from the “plan and pay as we go” approach and develop flexible long-range plans and funding mechanisms to avoid the potential for future crisis management situations.
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Comments by Sharon Megdal, Ph.D. to the City/County Water and  
Wastewater Study Oversight Committee  
Submitted November 6, 2008 via email

Having listened to all of the comments made at the October 22<sup>nd</sup> and 29<sup>th</sup> meetings, I do not know I can offer a definition of sustainability any better than those provided by speakers to the City/County Water and Wastewater Study Oversight Committee. However, I would like to offer the following thoughts.

When I give talks and lectures on Arizona water management, which I frequently do, I often include the following slide:

### **Safe Yield Management Goal “versus” Sustainability**

- Safe-yield: a water management goal which attempts to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an AMA and the annual amount of natural and artificial recharge in an AMA (A.R.S.45-562 A)
- Sustainability: The ability of current generations to meet their needs without compromising the ability of future generations to meet their needs. (Brundtland World Commission on Environment and Development)

Note that I include the word “versus” in quotes. The groundwater management goal for the Tucson Active Management area is safe-yield. Our regulatory framework does not require sustainability. By rule, it allows draw down of aquifers to 1,000 feet below land surface. It includes different rates of draw down for use of Groundwater by members of the Central Arizona Groundwater Replenishment District versus water suppliers who recover water they themselves have stored. It is because of these and other provisions, that you have storage or replenishment occurring far from groundwater pumping. You have to sometimes look multiple layers into the system to understand why certain actions are undertaken and permissible.

The Arizona Department of Water Resources will be developing its Fourth Management Plans soon. Historically, the development of the management plans has served as a vehicle to take stock of where we are as an Active Management Area and look at our progress toward meeting the safe-yield groundwater management goal. As you have learned, the Tucson AMA is not the same as Pima County but does include metropolitan Pima County. It also includes some growing areas in Pinal County. At this time, it is unclear to me to what extent the development of the Fourth Management Plan will serve as a catalyst for regional discussion of our water management goals.

The Tucson region needs to – and, based on my May 2008 interview study, desires to – determine whether the regulatory framework in place is consistent with *our* water management goals. As this committee has learned through its months of study, there are many interconnected and sometimes disconnected parts to the regulatory framework. As a region, we need to determine what we like or dislike about the regulatory framework and then consider the implications of changes to it. Then we may be able to arrive at a set of recommendations, some of which may require statutory change. Even though people may have different values, we may be able to make improvements to our water management framework that moves us closer to goals that we can all agree upon.

## **Water and Sustainability: What it Means to Me**

October 29<sup>th</sup>, 2008

My name is Tracy Williams. I am a lifetime resident.

I would like to thank all of you for how you have conducted yourselves during these past months. Your degree of professionalism, and your commitment to ensuring a balanced, honest and open discussion of this vital issue, has gone a long way toward creating a level of trust among those of us whose jaded views have been fostered by years of exclusionary politics.

I would also like to thank the staff and presenters, who assembled a great deal of information and effective presentations, while dealing with constrained schedules.

It is my hope that all of you will continue this same open, balanced process, not only as you draft your report, but into Phase II as well.

Early in the start of this study, we saw the special interest groups line up to demand a seat at the table. I know first-hand where that can lead. Time and again, we have seen the development community obtain numerous seats at the table by dividing their industry into its multiple parts of builders, small-builders, architects, planners, real estate interests, etc.

If we are lucky, neighbors and environmentalists receive one seat each. This unbalanced approach to critical problem-solving leads to the kind of distorted outcomes that helped to create our current financial crises. We cannot afford such a cavalier approach where water is concerned. Water is a life-and-death issue. It cannot have the bottom line as its sole driving force, nor can it follow the dishonest path of Tucson's recent graywater ordinance, which based its outcome on an incomplete picture of our wastewater's delivery system.

Sustainability needs to include the quality-of-life elements of clean, healthy, unpolluted potable water. The environment needs to be viewed as an equal partner, not only to facilitate this goal, but to become a beneficiary of it.

I do not want to sacrifice the Tucson I love on the altar of the bottom line or trade the Sonoran Desert for one that more closely resembles sub-Saharan Africa, complete with the Baghdad model of water delivery.

There are numerous, less-destructive ways to approach growth that do not rely on wholesale destruction of our desert and that are better suited to help us to achieve a more sustainable, equitable society.

We need your help and commitment to ensure that the remainder of this process does not follow the destructive, political paths of the past, but charts a new course toward a sustainable, inclusive model for problem solving.

## WATER SUSTAINABILITY

by William Crosby, presented to the Tucson/Pima County Water Infrastructure, Supply and Planning Study, 10-29-2008

My name is William Crosby, I live in Tanque Verde. My work is Environmental and Cultural Conservation. sky11@mindspring.com

Sustainability means living within our means, by not overusing our natural resources which we preserve for future generations. For me, at this time, sustainability means being able to at least maintain life as we know it in the Tucson basin. It means being able to maintain the purpose and requirements of the Sonoran Desert Conservation Plan, designed in a large collective group, agreed upon by consensus, and implemented to protect the designated areas and resources as we know them now, into the future.

Sustainability is particularly critical at this time. Tucson is at the end of the line for our most capable supply of water, the CAP. We no longer think of the Central Well Field capacity as a primary resource, because unmanaged growth overused this resource at least twenty years ago. The business of growth has plundered the landscape. The challenging and uncertain resources of the CAP are now more than a backup.

For years we have become accustomed to thinking of our water supply coming from distant sources, breeding a complacency of endless growth that hungers for more yet unrealistic and questionable resources.

It is critical to know the water use requirements of all the water providers and private wells in the Tucson basin so that this can be guaranteed for maintenance of our needs, in a transparent and responsible manner. All stakeholders must be represented.

For twenty years we have experienced extremes in drought and precipitation. For example, in a normal year the Tanque Verde Creek at Wentworth Road has two winter and three summer floods. In 2007, there was not a single flood. And in 2008 the monsoon rains were abnormally high at 12.7 inches. Granted, this is from personal measurement and observation, however, the severe fluctuation of rainfall can not be ignored. Recharge to the aquifers has diminished exponentially so that we now look at rainfall as a supplement to the CAP supplement.

Reclaimed water serves large turf projects. Water harvesting is a needed and obvious tool, now heralded as a requirement in new housing and business development. Perhaps, in the face of the Great Enigma facing humanity - Climate Change, we can consider reform of Arizona Water Law, linking growth to sustainable water supplies.

Historically, organized societies and civilizations survived due to the wisdom of the realization of their vital resources. And when their planning failed, their civil foundation died.

This committee, and this effort, have the potential of ensuring the future of Tucson, to nurture and preserve the extraordinary beauty of this place.

Thank you.

**WATER TESTIMONY  
OCTOBER 29, 2008**

**Thank you for allowing us to speak this evening and thank you for serving on this taskforce. I am here representing myself as a consumer of water in the Tucson Water and Pima County Wastewater service area.**

**When I was preparing for this, I remembered two quotes from people in our past:**

**Sen. Ben Wade, chair of the US Senate committee on territories in 1866 said, "Arizona is like hell; it lacks water and good society."**

**The other better known expression came reportedly from Ben Franklin, "When the well runs dry, we know the worth of water." That is probably where we are today.**

**Sustainability is an important issue. I question whether we can really scientifically tell how much groundwater we have. That is one of the reasons that I think we need to have stronger conservation and water harvesting programs.**

**At the same time, I think we need to be aware that with less water usage, utilities sell less water and that does affect their bottom lines. They have fixed costs that must be met. How will that happen? That is not what your committee is charged with looking at, however.**

**We must import or purchase the right to use CAP water and other supplies that are not being used. And it is equally important that we ensure that no CAP allocations in our AMA be sold to others outside this AMA.**

**The State has required water utilities to develop drought plans. When do those go into effect? It depends upon the water supplies that a utility has and the sources of the supplies.**

**In the late 1990s the Bureau of Reclamation received funding for the Regional Effluent Planning study. How much effluent could be taken from the Santa Cruz for irrigation and other uses while still maintaining the riparian area along the river? I think that is still a valid question today although I am not sure that the study was ever completed due to funding.**

**Effluent is a growing supply of water in our region. Important decisions must be made about its use in the next decade.**

**Some would like to control our water use by limiting growth. State laws will work against that. And the present Legislature is not going to change that any time soon. Witness their refusal to deal with wildcat subdivisions as an example.**

**A major issue for us is the massive sprawl we are seeing. That is happening because of a lack of planning and foresight. It would be much better to grow UP rather than OUT. This would help not only with more frugal water use but on transportation issues as well.**

**The Tucson M & C voted unanimously to take all of the City's annual CAP allocation (144,000 AF) by 2011. It is vitally important that all of that water be recharged and stored for the future. TW is using 62% of its annual allocation.**

**We often fail to recognize that this region has CAP allocations totaling about 260,000 acre feet of water. Some of this is not in use because of the lack of infrastructure. Progress on this is urgent.**

**It is expected that the Secretary of the Interior could declare a shortage on the river in the next couple of years. Why is this important? What impact will it have on our region?**

**First of all, we are paying for water we are not using and allowing others in the State and throughout the West to use it. AZ has junior rights to the Colorado River. The region's- and most particularly Tucson's cut- if there is a declared shortage on the river, will be based on what we are now taking and NOT the full allocation in the region.**

**Instead of bickering over regional issues, we must begin to consider ALL water resources in the region. Where is water located in our region? Who uses it? How can it become more accessible for needed uses? What about water quality?**

**Water is a regional issue and not just one for Tucson and Pima County. I think that supply issues will continue to dominate the region. Planning for the future is essential. That involves working with the entire region.**

**Carol W. West  
October 29, 2008**

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## WWF says reckless consumption threatens the planet

Wed Oct 29, 2008 1:08am EDT

By Laura MacInnis

GENEVA (Reuters) - The Earth's natural resources are being depleted so quickly that "two planets" would be required to sustain current lifestyles within a generation, the conservation group WWF said on Wednesday. The Swiss-based WWF, also known as the World Wildlife Fund, said in its latest Living Planet Report that more than three quarters of the world's population lives in countries whose consumption levels are outstripping environmental renewal.

Its Living Planet Report concluded that reckless consumption of "natural capital" was endangering the world's future prosperity, with clear economic impacts including high costs for food, water and energy.

"If our demands on the planet continue to increase at the same rate, by the mid-2030s we would need the equivalent of two planets to maintain our lifestyles," said WWF International Director-General James Leape.

Jonathan Loh of the Zoological Society of London said the dramatic ecological losses from pollution, deforestation, over-fishing and land conversion were having serious impacts.

"We are acting ecologically in the same way as financial institutions have been behaving economically -- seeking immediate gratification without due regard for the consequences," Loh said in a statement accompanying the report. "The consequences of a global ecological crisis are even graver than the current economic meltdown," he said.

The report said the world's global environmental "footprint" or depletion rate now exceeds the planet's capacity to regenerate by 30 percent. On a per-country basis, the United States and China have the largest footprints, the WWF said.

The United States and Australia rank among the five countries with the largest footprints per person, along with the United Arab Emirates, Kuwait and Denmark. The lowest five are Bangladesh, Congo, Haiti, Afghanistan and Malawi, WWF said. Regionally, only non-EU Europe, Africa, Latin America and the Caribbean remain within their "biocapacity."

Emissions from fossil fuels -- which would be targeted under a successor to the Kyoto climate change accord -- were among the top culprits cited by WWF for the big demands on the planet.

The WWF's Leape said world leaders needed to put ecological concerns at the top of their agenda and ensure the environment is factored into all decisions about consumption, development, trade, agriculture and fisheries management.

"If humanity has the will, it has the ways to live within the means of the planet, but we must recognize that the ecological credit crunch will require even bolder action than that now being mustered for the financial crisis," Leape said.

(Editing by Jon Boyle)