
WHO SAID WHAT?

Chapter Four

Environmental Stakeholders

Table of Contents

Synopsis.....	1
4.1 Profile Of Participants.....	1
4.2 Summary Of Major Themes	3
A. Meeting the Environment’s Needs for Water	4
B. Living With Limits Imposed by Finite Resources.....	5
C. Focus on Conservation and Demand Management Before Securing New Water Supplies.....	6
D. Avoid High Technology Solutions	6
E. Prioritize Local Water Resources over Imported Water	7
F. Energy, Carbon Footprints, and Climate Change.....	8
G. Dangers in Privatizing Water and Wastewater Systems.....	8
4.3 Comments By Participants	9
4.2.1 Sustainable Tucson	9
Madeline Kiser.....	9
Kai Goodwillie.....	15
Ron Proctor.....	16
Tres English.....	18
Carol Heller.....	19
Linda Ellinor	19
4.2.2 Ecological and Cultural Conservation Organization, William Crosby	19
4.2.3 Coalition for Sonoran Desert Protection, Carolyn Campbell	21
4.2.4 Center for Biological Diversity, Randy Serraglio.....	22
4.2.5 Nature Conservancy, Rob Marshall	23
Rob Marshall.....	23
Julia Fonseca.....	29
4.2.6 Sierra Club, Jenny Neeley	34
4.2.7 Sky Island Alliance, Trevor Hare, Melanie Emerson.....	35
4.2.8 Sonoran Institute, Amy McCoy	37
4.2.9 Tucson Audubon Society, Paul Green, Kendall Kroesen, Christine McVie	38
4.2.10 Cienega Watershed Partnership, Netzin Steklis,.....	41

4.2.11	Natural Systems Solutions, Dave Ewoldt.....	41
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List of Exhibits

Exhibit 4 - 1	Profile of Participation.....	2
Exhibit 4 - 2	Environmental Needs for Water – Riparian Condition.....	25
Exhibit 4 - 3	Groundwater and Stream Flow: Two Scenarios.....	25
Exhibit 4 - 4	Future Growth and Water	26
Exhibit 4 - 5	Mechanism for Protection	27
Exhibit 4 - 6	SDCP Riparian Goals	30
Exhibit 4 - 7	SDCP Inventory of Remaining Ecosystems in Eastern Pima County.....	30

SYNOPSIS

Twenty-three individuals representing twelve environmental organizations engaged with the Joint Study. Twenty individuals submitted fifty-eight comments. Sustainable Tucson was the most actively engaged environmental organization.

Environmental stakeholders focused on expanding the terms of discussion about water and wastewater resource management. Environmental stakeholders stressed respecting the environment's needs for water; learning to live with limits; prioritizing conservation and demand management over securing new water sources; avoiding high technology solutions and importing water; recognizing the salience of energy, carbon footprints and climate change; and avoiding privatization of water.

4.1 PROFILE OF PARTICIPANTS

Exhibit 4-1 below summarizes the environmental stakeholders who engaged with the Joint Study during Phases I and II. Twenty-three Individuals representing twelve organizations participated. Nineteen environmental stakeholders made fifty-one comments: one presentation, thirty-two oral comments, and eighteen written comments.

Several established environmental organizations engaged with the Joint Study, but Sustainable Tucson and the seven representatives from the organization were the most active, in terms of attendance at meetings as well as submitting comments. Members of Sustainable Tucson who were the most active included Madeline Kiser (attended fifteen meetings and submitted eleven comments; Ron Proctor (attended sixteen meetings and submitted four comments); Tres English (attended five meetings and submitted seven comments); and Carol Heller (attended sixteen meetings).

William Crosby, representing the Ecological and Cultural Conservation Organization, attended eleven meetings and submitted seven comments.

Most Environmental Stakeholders submitted comments during either Phase 1.3 – Community Sustainability Discussion or at the Phase 2.4 Public Hearings.

Environmental Stakeholders

Exhibit 4 - 1 Profile of Participation

Organization	Representative	Make Comments				Attend Meetings
		Make Presentations	Oral Comments	Written Comments	Total Comments	
Sustainable Tucson	Madeline Kiser		6	5	11	15
	Kai Goodwillie			1	1	
	Ron Proctor		3	1	4	16
	Tres English		7		7	5
	Linda Ellinor		1		1	1
	Carol Heller		1		1	16
	James MacAdam				0	2
Ecological and Cultural Conservation Organization	William Crosby		6	1	7	11
Coalition Sonoran Desert	Carolyn Campbell		1	1	2	2
	Kathleen Kennedy				0	1
Center for Biological Diversity	Randy Serraglio		1	1	2	1
Nature Conservancy	Rob Marshall	1			1	1
Sierra Club	Jenny Neeley		1	1	2	1
Sky Island Alliance	Melanie Emerson			1	1	
	Trevor Hare		1	1	2	1
Sonoran Institute	Amy McCoy		1	1	2	1
Tucson Audubon Society	Paul Green			2	2	2
	Kendall Kroesen		1	1	2	6
	Christine McVie			1	1	1
Cienega Watershed	Netzin Steklis		1		1	1
Natural Systems Solutions	Dave Ewoldt		1		1	1
AZ Open Land Trust	Diana Freshwater				0	1
	Liz Petterson				0	1
Total		1	32	18	51	

4.2 SUMMARY OF MAJOR THEMES

The environmental stakeholders advocated for a new paradigm for water resource management. Representatives of Sustainable Tucson labeled their paradigm “holistic and adaptive water resource management.” At a minimum, environmental advocates viewed their paradigm as a complement to experts with more traditional engineering and economic backgrounds.”

In more pointed challenges to traditional water experts, Madeline Kiser from Sustainable Tucson wrote,

“So far in our cities, regions, and states, public debate over water as presented by experts” (suggests that) “the times we are facing don’t seem to be exceptional, or potentially dangerous” (and) “through a combination of high tech solutions, such as desalinization and cloud seeding, we will basically be able to bring you your current way of life. But how true is this?”

Randy Serraglio wrote, “to some members of our community ‘sustainability’ equates to ‘guaranteed supply sufficient to maintain unlimited growth,’ a viewpoint he called “myopic.”

Jenny Neeley wrote, “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,” plans which Ms. Neeley deems imprudent.

During Phase 2.3, Public Hearings, environmental advocates urged Mayor and Council to approve the Phase II Report precisely because it articulated a new paradigm. The Coalition for Sonoran Desert Protection deemed the report valuable because it identifies the “need for a new paradigm” in water resource planning. The Tucson Audubon Society defined the report as a “major contribution to water resource planning for the Tucson region”. Madeline Kiser wrote, “We must face new times with new eyes and a new way of looking at and understanding water – a new water paradigm. ...I wish the report stated more firmly at the outset that this is a singular moment – that we need a new paradigm because we haven’t lived through anything like this time of uncertainty.”

Madeline Kiser consistently raises the need for “assembling teams of local and international experts to evaluate the triple bottom line, or potential economic, social and environmental costs and benefits of altering any river or aquifer and presenting potential scenarios of change to the public.” Ms. Kiser says, “sustainable water management means turning to these teams of local and international experts to address the hardest questions ... at the outset of decision-making so that policymakers and the public can fully understand what we’re choosing.” These experts allow for an “exchange of best practices” and a “transparent peer review.” We need to develop “the habit of vigilance, of seeking out the best, of placing where we are in the broadest possible context when evaluating sustainable practices.” Additionally, “sustainable water management would mean holding a visible statewide public forum about what the one conversation which will define the rest: our search for new sources, the ADD Water process.”

For the environmental advocates, the new holistic and adaptive water management paradigm consists of the following seven principles.

A. Meeting the Environment's Needs for Water

Environmental advocates argued that respect for the environment and its need for water is the primary tenet of holistic and adaptive water resource management. For these advocates, the environment is both a user as well as a supplier of water.

During the sustainability discussions, several environmental advocates addressed respect for the environment. Kendall Kroesen wrote about “two big problems with our current water delivery system,” the first of which is the assumption “that humans are the only users of water.” Mr. Kroesen wrote that “We have a responsibility to conserve water for species that need water; to conserve riparian areas for their aesthetic value and other inherent values,” and that “any Comprehensive Water Plan must first protect remaining high water tables that support riparian areas and strive to restore those that have been lost.” Lamenting degradation of the Colorado River Delta caused by diversions from the river, Mr. Kroesen stated, “taking more water from the river, perhaps even maintaining our current level of use, should not be an option.” Mr. Kroesen urged caution in extending the non-potable system for conservation/demand management, arguing, “we should not, in our haste, dedicate all reclaimed water for these purposes. It is important to maintain effluent flow in the Santa Cruz River,” and “it is time to expand the Conservation Effluent Pool and determine a system for actually implementing its use.”

Jenny Neeley stressed “the difference between ‘safe yield’ and ‘sustainability’ when talking about groundwater supplies.” Ms. Neeley argued that “safe yield” does not “take into account the water needs of groundwater-dependent riparian systems or other negative effects caused by excessive groundwater pumping.” To Ms. Neeley, “under safe yield rules ... the remaining ground-water dependent riparian systems would eventually dry up and die, and previously lost riparian areas would likely never be restored.” Ms. Neeley wrote that, in the alternative, “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 maintenance of the existing – and resurrection of lost – groundwater-dependent riparian systems.”

Trevor Hare focused exclusively on the “importance of in-stream flows, sub-surface waters, riparian areas, and the impacts of water delivery infrastructure.” Detailing the multiple benefits of healthy aquatic and riparian areas, Mr. Hare recommended, “protection of our remaining aquatic and riparian ecosystems through the establishment of no-pumping zones where pumping would draw down shallow groundwater and no-touch buffers around existing riparian habitat” and “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.”

Madeline Kiser spoke of a “new paradigm” that designates “nature itself and people as the only two entities that have a right to water.” Ron Proctor recommended that a “sustainable water system ... in Tucson” would require that “aquifer pumping (could) be discontinued until natural recharge restored

Environmental Stakeholders

surface flows in riparian areas” and “once the aquifer was restored, excess water could be banked appropriately.”

Randy Serraglio wrote that, in the years since the Yuma desalinization plant was discontinued, “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 Cienega de Santa Clara (40,000 acres (that) are “virtually all that remains of 2 million acres of lush wetlands that existed before water was diverted in the first place).” Mr. Serraglio argued that, unfortunately, “water managers and state officials, eager to apply every available drop of the Colorado to the profit of humanity, consider that water (supporting the Cienega) to be ‘lost’ and want to reclaim it.” In Mr. Serraglio’s view, “it is in fact water that *was* ‘lost,’ but has been found.” (Kendall Kroesen also spoke about the Colorado River Delta, calling it “formerly one of the greatest freshwater estuaries in the world (that) now receives only one-tenth of 1% of river flow ... (supporting) only 5% of its historic biological productivity.”)

During Phase 2.3, Public Hearings, environmental advocates again addressed respect for the environment in support of the Phase II Report. The advocates supported the report’s calls for respecting the environment; balancing the needs for water of the environment, people and the economy; and prioritizing riparian protection and restoration. The environmentalists advocated for advancing the Conservation Effluent Pool agreement between the city and county as a vehicle for protecting and restoring riparian habitat. The Coalition for Sonoran Desert Protection argued that “the recent coordinated effort by the homebuilding community ... (to) reject the use of effluent for environmental purposes” runs counter to the community’s “long history of supporting the preservation of our natural environment” ... “riparian protection in particular.” The Coalition urged Mayor and Council to reject the recommendation from the homebuilding community that cost/benefit analysis be completed before finalization of the CEP. The Sky Island Alliance stated it “supports the recommendations made regarding riparian habitat, groundwater dependent ecosystems, and the perpetuation of the CEP.” The Tucson Audubon Society said “in particular we support the recommendations made regarding riparian habitat, groundwater dependent ecosystems and the perpetuation of the Conservation Effluent Pool” and see the CEP as “an essential tool needed to achieve these goals.” Madeline Kiser stated, “The ‘economy vs. environment’ rubric presents a false divide...Ultimately, losing nature’s bounty is a business as well as spiritual depletion. Both are costly.”

B. Living With Limits Imposed by Finite Resources

Ron Proctor wrote, “We live in a world of limits.” Madeline Kiser said, “nature is alive and has limits. Jenny Neeley said, “our water resources are finite and unreliable ...” William Crosby defined sustainability as “not overusing our natural resources, which we possess for the future.”

Finite resources and their limits are present day concerns, not speculation about possible futures. For the advocacy groups, uncertainty itself is a manifestation of these limits and a sufficient reason for corrective action (the “precautionary principle”). Madeline Kiser said we need to feel “a sense of urgency in these urgent times.” Ron Proctor wrote, “the state of our natural ecosystem ... is in a

deteriorating and population pressures are accelerating the problem.” Later, Mr. Proctor wrote, “Tucson is a desert community living beyond the carrying capacity of our local resource base.” Trevor Hare warned, “a majority of aquatic systems in Pima County have been lost” and “riparian ecosystems supported by shallow groundwater have been lost or degraded.” Evaluating reliance on the Colorado River, Jenny Neeley wrote, “the river was over drafted to begin with.” William Crosby wrote, “we have experienced extremes in drought and precipitation” and about “the Great Enigma facing humanity – Climate Change.” Trevor Hare wrote, “we can grow but we must grow under the environmental constraints this amazing desert provides.”

C. Focus on Conservation and Demand Management Before Securing New Water Supplies

On one level, conservation and demand management addresses cultural perceptions and personal behavior. Madeline Kiser told us “we need to consume less water, less everything.” Kendall Kroesen noted “a flaw in our current outlook is to confuse the human need for potable water with the current per-capita demand,” with “easily more than half of the water that we use in homes does not need to be potable” (i.e. landscaping irrigation).

Tres English commented, “We don’t talk about needs. We don’t talk about priorities. We talk about demand.” Mr. English talks about setting rights in and priorities for water: “there’s a lot of things that we might want, and if you you’ve got enough money you can get it under our system ...”

On a second level, conservation and demand management means taking “a hard look at the excessiveness or inefficiency of our current water use” (Randy Serraglio). It means substituting rainwater harvesting, gray water systems, stormwater harvesting, xeriscaping, and reclaimed water systems for the use of potable groundwater and surface water sources, recommendations included in comments by Madeline Kiser, Kendall Kroesen, and William Crosby.

On a third level, conservation and demand management involves balancing growth and sustainable water supplies. Randy Serraglio worried about defining sustainable water as a “guaranteed supply sufficient to maintain unlimited growth.” William Crosby spoke of “linking growth to sustainable water supplies.” Trevor Hare wrote of the need to “implement land-use provisions and reform state law to ensure that future population growth and associated water needs do not exceed available supplies.” Randy Serraglio wrote of the need to evaluate “a reasonable limit to the population our water supplies can realistically support in the desert Southwest.” Jenny Neeley wrote, “land use determinations should be based on the amount of water currently available.”

D. Avoid High Technology Solutions

Randy Serraglio identified the danger of a “myopic focus on large scale augmentation of supply.” Mr. Serraglio worried that “water managers are willing to throw good money after bad in the narrow quest to augment supply, to acquire a “relatively small amount of water that may buy a little time, but certainly not solve the problem,’ while we “continue to ignore cheaper, more reasonable and less damaging alternatives.”

As a case in point, Mr. Serraglio addressed desalinization, in particular the Yuma desalinization project. Mr. Serraglio argued that desalinization “comes at great cost, both economic and environmental”; “can do serious and permanent damage to marine life and surrounding habitat in source waters”; “generates huge waste disposal problems in the form of massive amounts of brine and concentrated chemical additives”; and “requires a tremendous amount of energy.” Mr. Serraglio wrote, “we believe sustainable solutions to our water problems lie not in technological boondoggles but common sense and responsibility.”

Madeline Kiser spoke of a paradigm shift that “implicitly questions our current leading paradigm in Arizona that high-tech options, like effluent and desalinization, will allow more and more people to live here, as long as we have money and technology, we can defy nature’s limits.” Ms. Kiser spoke of the need to “evaluate the triple bottom line of what are being called our major options: effluent, desal, importing water from elsewhere, among others.”

Jenny Neeley wrote that “proponents of growth ... have a number of plans (including) desalinization, groundwater mining, and canal systems linking us to other, distant rivers, such as the Mississippi,” which Ms. Neeley defined as “simply unsustainable.”

E. Prioritize Local Water Resources over Imported Water

An issue related to high-tech solutions involves the search for non-local solutions to our water needs. Trevor Hare recommended, “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 landscape and wildlife.” Jenny Neeley worried that “utilizing water from faraway sources like this would directly contribute to the environmental devastation in other areas,” and asked “How in the world is shifting the environmental damage to somewhere else a sustainable way to guarantee water supplies for new growth.” As already noted, Ron Proctor wrote of Tucson as “living beyond the carrying capacity of its local resource base,” with the result “The vast majority of resources are imported, including food, fuel, material goods, and more recently, water delivered through the Central Arizona Canal.”

Looking at the Central Arizona Project, Jenny Neeley wrote, “we cannot rely on the Colorado River to supply a constant increasing demand for water...” Ms. Neeley wrote “Nor can we claim sustainability if we continue to drastically impact environmental resources to facilitate growth above the carrying capacity of our region.”

Randy Serraglio spoke of a “neglect of local and regional responsibility for consumption” and our ignoring “more sensible and less damaging alternatives that are available locally,” such as “admitting and addressing the folly of large-scale agriculture in the desert.”

Ron Proctor identified one characteristic of a sustainable water system in Tucson as “based on non-imported water, catching all necessary rainwater for residential use at or near where it would be used.”

F. Energy, Carbon Footprints, and Climate Change

Ron Proctor focused closely the “consumption of fossil fuels,” that “produces carbon dioxide undercutting the stability of our shared climate.” In Mr. Proctor’s view, “Carbon dioxide emissions should therefore be a major part of the sustainability equation.” Mr. Proctor noted that “One way or another, a sustainable water system will require making sure the whole system satisfies carbon emissions goals,” and “one obvious approach suggests creating a system that inherently requires less energy,” such as “developing water supply that falls naturally at or near point of use (which) can use gravity to advantage, eliminating major environmental and energy costs.” Mr. Proctor suggested as one implication of this strategy that “Colorado river allotments currently delivered to Tucson may be more efficiently used supporting agriculture in the Colorado River lowlands and restoring fisheries beyond its delta.”

Mr. Proctor argued, “If we continue to import long distance water, a thorough analysis is needed to prove its merit,” when compared to “a system based on the only truly renewable water resource we have – rainfall.” Mr. Proctor argued the need to analyze “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.”

Randy Serraglio noted that high tech solutions like desalinization “requires a tremendous amount of energy.” Kendall Kroesen wrote that our Colorado River water “comes with a high energy cost and carbon footprint.”

G. Dangers in Privatizing Water and Wastewater Systems

Linda Ellinor focused exclusively on what she sees as the “increased drive for-profit distribution and ownership and management of water.” Ms. Ellinor reported that “the three big European water companies have bought out the three biggest American private water companies,” and that “these companies and others are now running water systems in such cities as Atlanta, New Orleans, Tampa, Indianapolis, Oklahoma City, Stockton, Milwaukee, Springfield, Pittsburgh, Honolulu to name a few.” However, what frightened Ms. Ellinor was that “the goal of these private concerns is to control 70% of the U.S. market within two decades.”

Ms. Ellinor saw privatization as “every time” resulting in “waste, corruption, the cutoff of service to the country’s poorest peoples, and problems of pollution and wastewater.” Reflecting earlier concerns, Ms. Ellinor believed private water companies were “wedded to very expensive technological solutions ... large desalination plants, for example ... (and) the transportation of water to this area from outside the area,” all of which “may even lead to more serious challenges regarding peak oil and climate change.”

4.3 COMMENTS BY PARTICIPANTS

Eleven environmental stakeholder organizations submitted public comments to the Joint Study. Six individuals submitted comments on behalf of Sustainable Tucson; three individuals on behalf of the Tucson Audubon Society; and two individuals on behalf of the Sky Island Alliance. Environmental Stakeholders submitted fifty-seven comments, forty oral and seventeen written.

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|-------|---|--------|-------------------------------|
| 4.2.1 | Sustainable Tucson | 4.2.7 | Sky Island Alliance |
| 4.2.2 | Ecological and Cultural Conservation Organization | 4.2.8 | Sonoran Institute |
| 4.2.3 | Coalition for Sonoran Desert Protection | 4.2.9 | Tucson Audubon Society |
| 4.2.4 | Center for Biological Diversity | 4.2.10 | Cienega Watershed Partnership |
| 4.2.5 | Nature Conservancy | 4.2.11 | Natural Systems Solutions |
| 4.2.6 | Sierra Club | | |

4.2.1 Sustainable Tucson

Five individuals made comments on behalf of Sustainable Tucson: Madeline Kiser, Kai Goodwillie, Ron Proctor, Carol Heller and Linda Ellinor. These individuals submitted a total of twenty-nine comments, twenty oral and six written comments.

Madeline Kiser

Madeline Kiser submitted twelve comments spread out through all phases of the Joint Study, the largest number of comments of all Environmental Stakeholders. Ms. Kiser called for a new paradigm for water resource management; looked for a sense of urgency in addressing water issues; and argued for convening experts from many disciplines and with broad international experience. Ms. Kiser attended sixteen public meetings.

Phase 1.1 Getting Started

Ms. Kiser made comments at five meetings during Phase I. In oral comments at the **May 21, 2008** meeting, Ms. Kiser discussed a recent Central Arizona Project meeting and the urgency of augmenting water and energy sources, stressing the importance of looking at threats we might face and the costs of projects like desalinization and cloud seeding. Later in the meeting, she raised the question of how the Joint Study was defining an “expert,” noting that Larry Dozier (Deputy General Manager of the Central Arizona Project) “comes from a particular school of thought.” Ms. Kiser also stated, “debate is needed to address the public hunger to be informed on all sides (of the debate) and have a say.” (Emphasis added)

In written comments submitted on **June 11, 2008**, Ms. Kiser raised again her concern that “the decisions you reach and the recommendations that you will make will be greatly influenced by the data you examine and by the expert witness and testimony you choose to turn to” (in particular) “the effects of climate change on both surface and groundwater.” Ms. Kiser worried that “So far in our cities,

Environmental Stakeholders

regions, and states, public debate over water as presented by experts” (suggests that) “the times we are facing don’t seem to be exceptional, or potentially dangerous.” Ms. Kiser saw a mindset believing that “through a combination of high tech solutions, such as desalinization and cloud seeding, we will basically be able to bring you your current way of life. But how true is this?” Ms. Kiser reiterated her recommendation “that all underlying data and the paradigm which ties it together be subject to third party review by a range of experts from outside our state including those who’s training and expertise is in holistic adaptive water management.” (Emphasis added)

Phase 1.2 *Technical Presentations*

At the **September 10, 2008** meeting, which included two technical presentations on global warming and climate change, Ms. Kiser asked the presenters which areas of the world they would look to for best practices and inspirations for dealing locally with warming and change. Ms. Kiser also said we needed stories and narratives to capture the importance of these issues and to help get different opinions into the discussion.

The **October 15, 2008** meeting focused on new water and the ADD Water process. Ms. Kiser asked for a breakdown on where future water supplies would come from; when the price of water would shift to the “order of magnitude” higher level predicted by Tucson Water staff; and why the ADD Water process was not more in the news and what public outreach was being done.

Phase 1.3 *Sustainability Discussions*

Ms. Kiser submitted oral comments to the **October 22, 2008** sustainability discussion. For Ms. Kiser, “sustainable water management involves two categories”: (1) personal behavior and (2) a new paradigm.

1. Personal behavior

On the personal behavior level, Ms. Kiser observes “everywhere a profound cultural shift is taking place; its centering assumption is that we need to consume less water, less everything. Water harvesting, gray water, xeriscaping, all are part of this shift.”

2. New paradigm –

Ms. Kiser called for a new paradigm that starts with the basic fact that “nature is alive and has limits,” and argued that “sustainable water management involves setting into place at the basin, regional and national levels, as well as locally, comprehensive water laws and policies” that reflect this basic fact of nature. Ms. Kiser spoke of a paradigm shift that “implicitly questions our current leading paradigm in Arizona that high-tech options, like effluent and desalinization, will allow more and more people to live here, as long as we have money and technology, we can defy nature’s limits.” Ms. Kiser spoke of the need to “evaluate the triple bottom line of what are being called our major options: effluent, desal, importing water from elsewhere, among others.”

Ms. Kiser envisioned two components to this new paradigm. Ms. Kiser described the first component as “Designating nature itself and people as the only two entities that have a right to water.”

The second component is “assembling teams of local and international experts to evaluate the triple bottom line, or potential economic, social and environmental costs and benefits of altering any river or aquifer and presenting potential scenarios of change to the public.” Ms. Kiser said, “sustainable water management means turning to these teams of local and international experts to address the hardest questions ... at the outset of decision-making so that policymakers and the public can fully understand what we’re choosing.” These experts allow for an “exchange of best practices” and a “transparent peer review.” We need to develop “the habit of vigilance, of seeking out the best, of placing where we are in the broadest possible context when evaluating sustainable practices.” Additionally, “sustainable water management would mean holding a visible statewide public forum about what the one conversation which will define the rest: our search for new sources, the ADD Water process.”

Ms. Kiser stressed that we must feel “a sense of urgency in these urgent times.”

Phase 1.4 Report Writing

During **Phase 1.4**, Ms. Kiser submitted written comments by e-mail. While voicing her appreciation for the energy, openness and inclusiveness of the process during Phase I, Ms. Kiser criticized the draft Phase I Report for not emphasizing “that our water future will be nothing like the past.” Ms. Kiser wrote, “I feel that overall the Phase I report:

- 1) “obscures the immediacy and scale of the challenges we face;
- 2) “Fails to draw on national and global “best practices” for adaptive water management -which would lend concreteness to our own discussion;
- 3) “Provides a lot of data, but fails to highlight the main discussions we need to have, so that policymakers, the public and press can understand what matters most, for example: Looking at climate change and water and energy scarcity all together, what, specifically, will “new water sources” be, and how will we pay for them in a time of recession? Given these factors, how much growth can we accommodate?

“At one of the climate change conferences I mention, California's Director of Water Resources and a lead Australian water expert who helped reform the country's water laws, science and policies, sounded in their presentations very much like Sharon Megdal in her latest WRRRC column. She asks if AZ - like other states which have them – needs a state water plan: an overhaul of our laws, policies and institutions. Similar debates about whether the US needs a national water plan are of course taking place now also.

“How might these conversations affect our regional planning process? At which scale does meaningful change need to take place - with the immediacy of the interrelated crises upon us in mind? There are states and countries that are, individually, and in tandem, facing these crises with a different outlook and approaches than we are and I think it's vital that we not only read of their work and

experience, but invite experienced outsiders to visit and share what they've learned. This, in part and again, to sharpen our debates with concrete examples vs. theories. It's hard to understand why, as we develop a regional conversation about adaptive regional water management, we wouldn't turn first to learn from "best practices" – to enter into what is a global conversation, not just a local one."

Phase 2.1 Technical Presentations

On **August 21, 2009**, Ms. Kiser submitted a memo titled "Finding Best Practices and Peer Reviewers for Large-Scale Water Management Plans." Ms. Kiser submitted this memo at the request of the committee chair and staff, as an opportunity to elaborate on her frequent comments about these matters. Ms. Kiser first presented a seven-page memo, and then made a second submission of a paper by Peter Gleick of the Pacific Institute about Australia and its drought responses.

Introducing her comments, Ms. Kiser stated that:

"Given the complexity and changeability of these times, when the climate is shifting, populations grow, our supplies of energy and water are decreasing, and the ecosystems we depend on are becoming degraded, it's vital that individuals and groups charged with creating large-scale water management plans become familiar with best practices in this complex field." ... "by and large discussions about sustainable water management in Arizona exist as if in a vacuum, at least at the level of public debate, uninformed by decades of work outside the U.S. Values, laws, idiom, methodologies – a holistic approach that's being created around us – to managing water in a time of mounting scarcity and climate change, for the most part don't form part of the local dialogue."

Ms. Kiser argued that:

"Other countries, like Australia and South Africa, as seen as taking the lead in developing new approaches to managing water in a time of scarcity because water scientists and water managers in these countries have taken a significant first step –changing core perceptions about this moment and conveying to the public and policy makers two important concepts. First: Nature is the base of human civilization, and if we are to survive, we need to conserve it ... Second: these are exceptional times, requiring difficult tradeoffs and sacrifice."

The assumption that the "world we're living in is much as it has been and ... our private lives and habits can continue as they have" must be discarded in favor of "transformational changes."

Ms. Kiser presented seven "research results," identifying "shared concepts and understandings evident in large-scale sustainable water management plans."

1. "Water is the source of life. Any alterations to aquatic systems – rivers, wetlands, aquifers – will ultimately affect people, cities, and industries, as well as nature. Any proposed alteration should be measured, as rigorously and transparently as possible, in terms of its social, environmental, and economic impacts.

Environmental Stakeholders

2. “Consensus among diverse groups about the degree aquatic systems will be altered needs to be reached *before* alterations take place. Dialogue about proposed changes – including turning to new technologies to provide new supplies of water – needs to be rigorous, open, inclusive, and transparent, and when possible include outside peer review.

3. “These are exceptional times and demand new ways of understanding and managing water. These times will also demand a strict new conservation ethic reflected in private lives, water laws and adaptive management strategies, often amounting to very difficult decisions and exacting trade-offs.

4. “Australia and South Africa are examples of global best practices for large-scale water reform. National water laws in these countries, which give the right to water first to nature and people, have been translated over two decades into national, regional and basin management policies and plans. This represents a profound shift away from piecemeal legislation based on the belief that water isn’t scarce and on engineering and high-tech solutions to address scarcity.

“In both Australia and South Africa however it’s been extremely difficult to implement laws and policies. The transfer of knowledge between aquatic scientists, trying to make a case for the need to conserve aquatic systems as not only the base of plant and animal species, but of human life and civilization, has been slow, mainly because it takes time to accrue the necessary political will to support nature when there’s ubiquitous pressure to develop. In Australia, climate change is making it extremely difficult to implement management plans (Jamie Pittock, July 6, 2009). But ultimately the process of implementing sustainable management plans will be slow, because it requires a transfer

5. “One of the most important questions when creating large-scale management plans becomes: At which level, or levels – national, state, regional, local – do legal, policy and management changes need to come from, and how will these changes overlap? How will regional water plans, for example, be affected by state or national plans and changes which take shape? Those who are creating large-scale plans, as well as policy makers and the public, need to be able to answer these questions. In Australia and South Africa, national-level reform has led to corollary regional and basin reforms. These plans are linked and support and inform each other.

6. “There’s an awareness among scientists and water managers considered leaders in the field of creating sustainable water management plans that they’re working in tandem with other countries, and are part of an international movement. No one advocates “one-size-fits all” solutions, but a lot of cross-pollinating takes place, and open sharing with the public. Peer review is actively sought, in which local experts bring in outside experts to create meaningful dialogue and provide monitoring. This in an important habit, or trait, integral to the science and policies which have been developed.

7. “Only one of the experts interviewed, Dr. Jackie King, suggested ideas for peer reviewers – pointing to a global need which exists to create teams of peer reviewers with experience who can assist

Environmental Stakeholders

the overwhelming number of communities, regions and countries undergoing the same process as southern Arizona. (Dr. King suggested that we turn to World Bank researchers who have written about best global practices for large-scale water management plans. I can share more, if there's interest.)"

Ms. Kiser presented a two-part wish list for the final Phase II report.

1. "That it state at the outset and without equivocation that this is a new moment in the Southwest, in Arizona, and in our section of the state, and explain why."
2. "That it state at the outset that this new moment will require markedly new ways of understanding water," such as
 - (a) "placing our efforts in the context of the global movement underway, which embraces conserving water for nature";
 - (b) "rigorously and honestly questioning the social, environmental, and economic costs/benefits of top proposed new sources of supply," acknowledging that "There is a lot we don't understand about our choices to increase supply and this uncertainty needs to be prominently mentioned";
 - (c) "Wide-scale investment in creating a new culture of water, a new ethic – conservation, water harvesting, grey water use"; and,
 - (d) "Address the scale, or scales, at which meaningful change will need to come from, and how will these scales overlap? This includes the need and potential for national and state legal and policy reforms."

Ms. Kiser closed with the following comment:

"Even under the best of circumstances, with sound principles and plans in place, the amount of upheaval the planet is experiencing is creating tremendous challenges. Above all, the public and policy makers must understand this, in order to prepare people for a time of sacrifice."

Phase 2.3 Public Hearings

Ms. Kiser submitted her comments on **January 11, 2010**. In her comments, Ms. Kiser made three points:

1. "it would be important that regional dialogue include the question of whether we need a state water plan," which numerous states have adopted or are in the process of adopting, and which is important because 'new water sources' "for now at least largely amount to the Colorado River in one way or another";
2. "it's important that we seek out peer review, especially as regional dialogue proceeds, from outside, internationally-recognized experts who have experience creating regional, state and national water plans"; and,

3. “In future documents I think it is critical to emphasize at the outset why we need a new paradigm. We do, because this is a singular new moment when we face climate change, depleting aquifers and rivers, energy depletion and population growth and other factors all at once.”

On **January 23, 2010**, the *Arizona Daily Star* published a guest opinion by Ms. Kiser supporting the Phase II Report. In this guest opinion, Ms. Kiser wrote, “The report has the potential to dramatically change the future of Tucson and of our state.” Ms. Kiser urged “a vote of support when the City Council convenes on Feb. 17 to discuss it.” Ms. Kiser also wrote, “the science behind it deserves widespread public attention and debate because it shifts the prism through which the one resource life and industry depend on is viewed and understood.”

Ms. Kiser wrote, “The climate is shifting, population is growing, ecosystems are showing signs of stress, aquifers and rivers are depleting, and energy supplies are becoming variable – all at once. Our condition here in the Southwest is considered one of the planet’s test cases for vulnerability.” Ms. Kiser defines this as the “need to match aggregate uncertainty with sustainability principles,” which she identifies as “integrated Water Resource Management.” Ms. Kiser also stated a need for a “dialogue about creating a state water plan. As the report documents, so many local policies intersect with state laws and policies it will likely be hard to manage water sustainability in Tucson and Southern Arizona without addressing the larger thicket of state regulations influencing this area.”

Ms. Kiser wrote, “We must face new times with new eyes and a new way of looking at and understanding water – a new water paradigm. ...I wish the report stated more firmly at the outset that this is a singular moment – that we need a new paradigm because we haven’t lived through anything like this time of uncertainty.”

Ms. Kiser wrote, “The ‘economy vs. environment’ rubric presents a false divide....Ultimately, losing nature’s bounty is a business as well as spiritual depletion. Both are costly.”

Kai Goodwillie

On **April 17, 2008** during Phase 1.1, Getting Started, Kai Goodwillie sent out a “community alert” to the Sustainable Tucson e-mail list acknowledging the Joint Study, inviting Sustainable Tucson members to engage with the study and presenting “key points for our response to the City/County’s request for written input about its water study.” At the April 18, 2008 meeting, Madeline Kiser presented these “key points” orally, following up with additional oral comments at the meetings of May 12 and May 23, 2008.

Mr. Goodwillie’s alert identified the need for “a sound county/city study” at a “critical moment,” characterized by “much uncertainty about how much climate change will affect” water; the “connections between prices and supplies of energy and of water are not well understood”: and we “don’t know the full costs/benefits of some of the alternatives we’re looking to explore like effluent, desalination, importing water ... and cloud seeding. Mr. Goodwillie identified six elements of a “sound study”:

Environmental Stakeholders

1. “Ensure that a range of scenarios related to water supply, worst to best, be created by a team of local, state and also outside experts with experience in holistic and adaptive water management (to complement experts with more traditional engineering and economic backgrounds).” Mr. Goodwillie argues, “respected national water experts and newspapers are suggesting that our situation might be more severe than our local and state experts and news sources” are reporting, which is “helping create distrust among the public.” Mr. Goodwillie states that “we need some form of rigorous peer review, to ensure we are facing the hardest as well as mildest possible scenarios as best we can,” and suggests as possible sources Sandra Postel (Global Water Policy Project); Brian Richter (Nature Conservancy), and Peter Gleick (Pacific Institute).
2. “The study should also ensure that all high-tech options we are considering be evaluated for their potential social and environmental as well as economic costs/benefits.”
3. “Given the range of scenarios we might face, and the potential for rapid change in our region, in Phase I of the study we need to articulate our shared values...”
4. The public needs to have presented to it “in a variety of media” a “clear, understandable document” which lays out the scenarios and evaluations identified above.
5. “Our neighborhood associations could expand to include water task forces.”
6. “The City/County study group should, as part of its mission, conduct a global ‘best practices’ regional water management study.”

Ron Proctor

Mr. Proctor submitted six oral and one written comment. There is no documentation for three of Mr. Proctor’s oral comments: (1) a February 21, 2009 open house during Phase 1.4, Report Writing, (2) comments at the January 12, 2010, and (3) comments at the February 9, 2010 public hearings during Phase 2.3, Report Writing. Mr. Proctor submitted his documented comments during Phase I. Mr. Proctor attended fifteen meetings.

Phase 1.2 Technical Presentations

At the **June 25, 2008** meeting, Ron Proctor, noting that Colorado River water is a major component of Tucson Water’s assured water supply, asked at what point would the water level in Lake Mead need to drop before there would be major repercussions to Tucson’s water supply.

Phase 1.3 Sustainability Discussions

Mr. Proctor submitted written comments to the **October 22, 2008** sustainability discussion. Mr. Proctor defined sustainability as “the ongoing process of securing a quality of life for ourselves and future generations” and “sustainability is becoming part of our greater understanding because we are

Environmental Stakeholders

realizing we live in a world of limits, and those limitations are causing a decrease in our quality of life, and perhaps a challenge to our existence.”

Mr. Proctor wrote, , “Tucson is a desert community living beyond the carrying capacity of its local resource base,” with the result that “The vast majority of resources are imported, including food, fuel, material goods, and more recently, water delivered through the Central Arizona Canal.”

Mr. Proctor focused closely the “consumption of fossil fuels,” that “produces carbon dioxide undercutting the stability of our shared climate.” In Mr. Proctor’s view, “Carbon dioxide emissions should therefore be a major part of the sustainability equation.” Mr. Proctor noted, “One way or another, a sustainable water system will require making sure the whole system satisfies carbon emissions goals.” To achieve that goal, Mr. Proctor said, “one obvious approach suggests creating a system that inherently requires less energy,” such as “developing water supply that falls naturally at or near point of use (which) can use gravity to advantage, eliminating major environmental and energy costs.” Mr. Proctor suggested as one implication of this strategy that “Colorado river allotments currently delivered to Tucson may be more efficiently used supporting agriculture in the Colorado River lowlands and restoring fisheries beyond its delta.”

Mr. Proctor asked what a “sustainable water system in Tucson (might) look like?” Mr. Proctor identified one characteristic of a sustainable water system in Tucson as “based on non-imported water, catching all necessary rainwater for residential use at or near where it would be used.” Mr. Proctor envisioned extensive use of reclaimed water; discontinuing aquifer pumping until “natural recharge restored surface flows in riparian areas.” Mr. Proctor would make “commercial and industrial users ... responsible for their own water supplies”. In Mr. Proctor’s system, 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.” In Mr. Proctor’s system, “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.”

Second, for Mr. Proctor, “Any sustainable water supply system for Tucson will need to meet the carbon emissions requirements necessary for climate change mitigation. Mr. Proctor argued, “If we continue to import long distance water, a thorough analysis is needed to prove its merit,” when compared to “a system based on the only truly renewable water resource we have – rainfall.” Mr. Proctor argued the need to analyze “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.”

Tres English

Mr. English submitted seven oral comments, all during Phase I.

Phase 1.1 *Getting Started*

At the **May 12, 2008** meeting, Mr. English discussed the importance of distinguishing between water uses and water needs.

Phase 1.2 *Technical Presentations*

At the **July 9, 2008** meeting, Mr. English asked whether the county has legal obligations to produce a certain quantity of effluent.

At the **July 23, 2008** meeting, Mr. English asked about the per capita costs of infrastructure.

At the **September 9, 2008** meeting, Mr. English questioned the value of infill development if less than ten percent of the land is vacant and stated that a significant increase in density is not necessarily what he wants from infrastructure.

At the **September 10, 2008** meeting, Mr. English discussed food supply, asking whether we should consider allocating water we currently use for non-food crops to food production in the future.

At the **October 2, 2008** meeting, Mr. English made two comments:

1. Mr. English asked for a definition of sustainable pumpage;
2. Then, Mr. English questioned assumptions about future demand for water and stated we should look toward an increase in Gallons Per Capita per Day (GPCD) because there will be a need to grow more local food.

Phase 1.3 *Sustainability Discussion*

In his comments to the **October 22, 2008** meeting, Mr. English spoke about setting rights in and priorities for water. Mr. English complained, “there’s a lot of things that we might want, and if you’ve got enough money you can get it under our system,” including water. Mr. English noted, “as citizens, we have the lowest right of any water user in the metropolitan area,” while “Higher users are turf users.” This imbalance is because “we have a systematic policy of forcing current users to decrease their water use to pay for the infrastructure capacity so we can give water away to more people.” Mr. English said “the issue of priorities is very simple: how much money you got? If you’re poor and you want to use your water for a high-efficiency garden that would feed your family, you’re going to pay the same rate as a rich family that has a large grass lawn” Mr. English asked whether residents of “La Oeste Gardens ... pay the same rate as a decorative lawn? Should the environment have a lower priority than new development for water? Do current users have to give up their water in order to provide for additional users?”

Carol Heller

Ms. Heller made comments at two meetings during Phase 1.2, Technical Presentations. At the **June 25, 2008** meeting, Ms. Heller asked a question about biosolids, “What kind of crops are is this used upon? And what prevents the runoff from getting into surface water or into groundwater? What kind of contaminants are in the biosolids?”

At the **September 24, 2008** meeting, Ms. Heller asked about Regional Wastewater Reclamation’s biosolids program, asking what crops they are used with; what prevents biosolids runoff from getting into surface water and groundwater; and what contaminants are in biosolids? In a second comment, Ms. Heller asked for measures to address the prospect of the Tucson AMA not achieving safe yield by 2025.

Linda Ellinor

Ms. Ellinor made oral comments at the **October 22, 2008** sustainability discussion. Ms. Ellinor focused exclusively on what she sees as the “increased drive for-profit distribution and ownership and management of water.” Ms. Ellinor reported that “the three big European water companies have bought out the three biggest American private water companies,” and that “these companies and others are now running water systems in such cities as Atlanta, New Orleans, Tampa, Indianapolis, Oklahoma City, Stockton, Milwaukee, Springfield, Pittsburgh, Honolulu to name a few.” However, what was “frightening” to Ms. Ellinor was that “the goal of these private concerns is to control 70% of the U.S. market within two decades.”

Ms. Ellinor saw privatization as “every time” resulting in “waste, corruption, the cutoff of service to the country’s poorest peoples, and problems of pollution and wastewater.” Reflecting earlier concerns, Ms. Ellinor believed private water companies are “wedded to very expensive technological solutions ... large desalination plants, for example ... (and) the transportation of water to this area from outside the area,” all of which “may even lead to more serious challenges regarding peak oil and climate change.”

4.2.2 Ecological and Cultural Conservation Organization, William Crosby

Mr. Crosby made brief comments at six meetings, two during Phase I and four during Phase II. Mr. Crosby attended eleven meetings.

Phase 1.2 Technical Presentations

At the **October 15, 2008** meeting, Mr. Crosby asked about how water Tucson Water delivers inside and outside of the city limits and how active the central well fields are.

Phase 1.3 Sustainability Discussions

Mr. Crosby submitted written comments for the **October 29, 2008** discussion on sustainability. Mr. Crosby defined sustainability as “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.” Mr. Crosby closed his remarks with “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 failed.”

Mr. Crosby wrote, “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.” Mr. Crosby wrote, “we have experienced extremes in drought and precipitation” and notes that his “personal measurement and observation” in his area documents a “severe fluctuation of rainfall (that) cannot be ignored. Recharge to the aquifer has diminished exponentially so that we now look at rainfall as a supplement to the CAP supplement.” about “the Great Enigma facing humanity – Climate Change.”

Mr. Crosby spoke of water harvesting as “a needed and obvious tool” and of “linking growth to sustainable water supplies” as needed corrective actions.

Phase 2.1 Technical Presentations

During Phase II, Mr. Crosby made oral comments at four meetings. At the **March 19, 2009** meeting he requested that a water budget be added to the report; questioned if all stakeholders are at the table; and stated that desalinization and importation of Mississippi River water are “pipe dreams” that should not be even mentioned in the final report. At the **April 23, 2009** meeting, he stated that the Governor is uninformed about the needs of rural water users and asked how they would be included in the report. Later in the meeting, Mr. Crosby asked about regulatory requirements for recharge of reclaimed water, bringing up issues experienced at Christopher City as an example. Ms. Crosby also asked whether the committee was moving in the direction of reforming state water laws. At the **May 21, 2009** report, Mr. Crosby stressed the significance of water efficiency as an important aspect of conservation (i.e., aerating turf makes better use of water) and later spoke to the issue of climate change and its relationship to future flood events.

At the **October 15, 2009** meeting, Mr. Crosby addressed the committee with the following points.

1. Mr. Crosby challenged the idea that Tucson has plenty of water – only at present and only for the very near future, citing the absence of water in the Agua Caliente Wash as an example.
2. Mr. Crosby said, “Southwest Arizona and the Colorado River basin are generally regarded as a global hot spot for drought and climate change. The solution to this will not come from the CAP or a desalination facility in Yuma.”
3. Mr. Crosby said, “There is existing technology to use solar power and/or methane gas from landfills to provide power to pump water. This technology should be pursued.”
4. Mr. Crosby asked for “information from hydrologists as to what our water resources currently are so we can plan for the present population.”

4.2.3 Coalition for Sonoran Desert Protection, Carolyn Campbell

Ms. Campbell, Executive Director of the Coalition for Sonoran Desert Protection, made one oral argument in Phase 1.1 and submitted one written comment in Phase 2.3. In her oral comment, Ms. Campbell discussed structuring a regional water discussion. In her written comment, Ms. Campbell urged approval of the Draft Phase II Report and in defense of the Conservation Effluent Pool.

Phase 1.1 **Getting Started**

Ms. Campbell spoke at the **April 18, 2008** public meeting, addressing issues of public process and inclusion of interests. Ms. Campbell noted that one of the public processes that is being considered is akin to the Sonoran Desert Conservation Plan Steering Committee. Ms. Campbell offered some comments and insights that she learned from the Steering Committee's process. She noted that everyone that asked to be on the Steering Committee was accepted. The stakeholders were only people interested in conservation, native species and land use in unincorporated Pima County. Ms. Campbell informed the Oversight Committee that the Steering Committee never had a chair or officers because of the breath of the stakeholders. Instead, the Steering Committee had a paid facilitator. It never had any subcommittees until the last six months. After four years of deliberation, the Steering Committee presented a set of recommendations to the Board of Supervisors. Ms. Campbell said one cannot come up with a community consensus on an issue of this magnitude if only the middle 60 percent of the interested people participate— you really have to have the broadest spectrum possible. In addition, Ms. Campbell felt the Water Study process would take much longer than anticipated.

Phase 2.3 **Public Hearings**

Ms. Campbell submitted written comments on **February 8, 2010**, in preparation of the February 9 public hearing. Ms. Campbell made two comments: (1) recommending support of the Phase II Report and (2) recommending protection of the Conservation Effluent Pool.

1. Support the Phase II Report

Ms. Campbell wrote, "The Coalition for Sonoran Desert Protection urges you to support the City/County Water and Wastewater Study Phase II Report and direct City staff to proceed, in cooperation with Pima County and other participants, with implementation of the recommendations contained within the report." Ms. Campbell wrote to support "the thorough and transparent public process undertaken during the development of this report." Ms. Campbell said, "The need for a "New Paradigm," as expressed by the Joint Committee, is indeed true. Communities throughout the country understand and embrace this." Ms. Campbell said, "the Coalition has worked successfully with local jurisdictions, particularly with Pima County and the Town of Oro Valley, to enact policies that integrate water resource and land use planning. The definition of a sustainable water future, based on the pillars of comprehensive integrated planning, water supply, and respect for the environment, is well thought out and forward-thinking. We appreciate that "Respect for the Environment" is included as a central tenet in this report."

2. Protect the Conservation Effluent Pool

Ms. Campbell wrote the Coalition was “shocked to see the recent coordinated effort by the homebuilding community requesting that the Mayor and Council reject the use of effluent for environmental purposes.” Ms. Campbell noted the agreement for the Conservation Effluent Pool “was already entered into and signed by the City and the County (Mayor Walkup and Chairwoman Bronson, respectively) in February 2000,” the “agreement was seen by the community as a “watershed event.” And opposition to it “is based on misinformation and seems to imply an alternative agenda for using this effluent pool, such as for golf courses or for drinking water, an option our community has expressed grave concerns about due to a current inability to adequately purify effluent to remove pharmaceuticals and other potentially noxious substances.”

Ms. Campbell wrote, “The CEP is an essential tool needed to achieve these goals and we encourage the Mayor and Council to direct staff to continue to work on detailing how the CEP will be managed and utilized..” Ms. Campbell asked Mayor and Council to “Please reject the recommendation, which is re-stated by multiple members of the development and building industry in their recent comments, that cost-benefit analyses should be completed “before the City and County enter into an agreement committing 10,000 acre-feet of effluent to environmental restoration.”

Ms. Campbell closed with the following comment, “Finally, the City of Tucson has invested considerable resources into projects such as the development of two Habitat Conservation Plans (HCPs), El Rio Medio, Tres Rios del Norte, the restoration of Atterbury Wash and Arroyo Chico, and policies and ordinances that protect riparian habitat and could count as credit with the HCPs going forward. The Phase II Report serves as an important complement to these projects.”

4.2.4 Center for Biological Diversity, Randy Serraglio

Mr. Randy Serraglio submitted written comments to the **October 29, 2008** sustainability discussion. Mr. Serraglio wrote from a “conservation perspective” to define sustainability as “ensuring that the solutions our community pursues in securing our water future are truly sustainable.” Mr. Serraglio worried that “to some members of our community ‘sustainability’ equates to ‘guaranteed supply sufficient to maintain unlimited growth.’” Mr. Serraglio warned against “a myopic focus on large scale augmentation” and a focus “on grand and hugely expensive schemes that would allow us to avoid responsibility, such as diversion, canals, water mining, cloud seeding, desalinization, and so on.” In the alternative, Mr. Serraglio recommended we focus on “local and regional responsibility for consumption,” that we take “a hard look at then 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” and that we look at “cheaper, more reasonable and less damaging alternatives.”

Mr. Serraglio focused on desalinization, in particular the Yuma desalinization project, as a primary example of the wrong approach to sustainability. Mr. Serraglio argued that desalinization “comes at great cost, both economic and environmental”; “can do serious and permanent damage to marine life and surrounding habitat in source waters”; “generates huge waste disposal problems in the

form of massive amounts of brine and concentrated chemical additives”; and “requires a tremendous amount of energy.” Mr. Serraglio wrote, “we believe sustainable solutions to our water problems lie not in technological boondoggles but common sense and responsibility.”

Mr. Serraglio wrote that, during the years that the Yuma desalinization plant has been done, “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 Cienega de Santa Clara (40,000 acres (that) are “virtually all that remains of 2 million acres of lush wetlands that existed before water was diverted in the first place).” Mr. Serraglio argued that, unfortunately, “water managers and state officials, eager to apply every available drop of the Colorado to the profit of humanity, consider that water (supporting the Cienega) to be ‘lost’ and want to reclaim it.” In Mr. Serraglio’s view, “it is in fact water that *was* ‘lost,’ but has been found.”

4.2.5 Nature Conservancy, Rob Marshall

On **September 17, 2008**, Rob Marshall from the Nature Conservancy made a technical presentation on “Environmental Needs for Water.” Mr. Marshall made this presentation at the request of staff and committee. At the request of staff and committee, Julia Fonseca from the County’s Natural Resources, Parks and Creation Department made a companion presentation on “Environmental Needs for Water” at the same meeting. (Both presentations are included under this entry for the Nature Conservancy.

Rob Marshall

Mr. Marshall started by “by reminding us all that our river and riparian systems provide a number of services to us for free, and they also have a number of values, (such as) “provision of drinking water, and water to irrigate our agricultural crops;” “purify our wetlands and our water and they also recharge our aquifers”: “sequester carbon ... provide oxygen ... filter the air ... provide lots of recreation opportunities”; (and) “here in the southwest, in particular, they are very, very valuable for wildlife.” These river and riparian “are very important” (because even though “You don’t have a lot of riparian areas, they’re very small acreage-wise, but they harbor a disproportionate share of the State’s wildlife, so they’re very important from those standpoints.” Mr. Marshall argued that, “when you think about it from the standpoint of they provide service to us, they provide it for free, and those services we have to pay for if they’re not there, this really becomes protecting nature for people.”

Mr. Marshall discussed three issues in his technical presentation: (1) the environmental needs of rivers, wildlife and riparian habitats; (2) the relationship between land use and water availability; and (3) priority mechanisms for land and water protection.

1. Environmental needs for rivers, wildlife and riparian habitat

Mr. Marshall noted “environmental needs for water” is a large topic and that he was going to focus only on “the relationship between our groundwater water and surface water and riparian condition, or riparian health.” Exhibit 4-2 depicts a spectrum of three “riparian conditions,” ranging from

“a perennial reach,” to an “intermittent-wet reach,” and finally to “an intermittent-dry or ephemeral reach.” Each condition is responsive to short-term and long-term changes in surface and groundwater levels.

Mr. Marshall presented the following brief descriptions of each riparian condition.

Perennial Reach

“We have flowing water, so we have an aquatic ecosystem here. We have wetlands plants. When you go up onto the banks, you have riparian trees, shrubs, lots of vegetation. You have high groundwater levels.”

Intermittent-Wet Reach

“When you get into an intermittent reach, here we have water that only flows seasonally. You have lower groundwater tables. Obviously, you don’t have surface water for a good part of the year; you start to lose your marsh vegetation. You start to lose some of the big trees because they can’t access the groundwater, your vegetation gets lower in stature, you have fewer species, less wildlife diversity.”

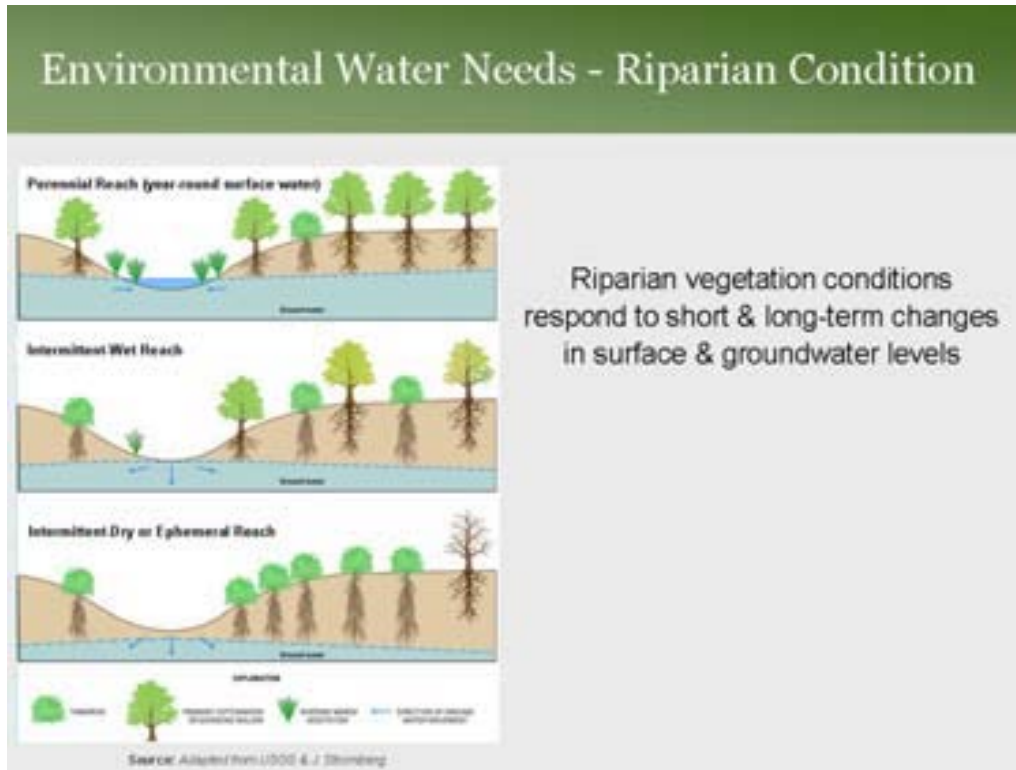
Intermittent-Dry or Ephemeral Reach

“And then you get to the bottom end of the spectrum, these ephemeral reaches, where groundwater levels have dropped to the point where they can’t really support the riparian trees that need saturated soil, so you get shrubs, you don’t have any aquatic community, just much less diversity.”

Mr. Marshall noted that these conditions “occur naturally,” but “also can be exacerbated by human activities.” Mr. Marshall walked “through the relationship between groundwater and our river flow in our alluvial basins, or the aquifers that we have here in Arizona.” Exhibit 4-3 below depicts the relationship between groundwater pumping and stream flow.

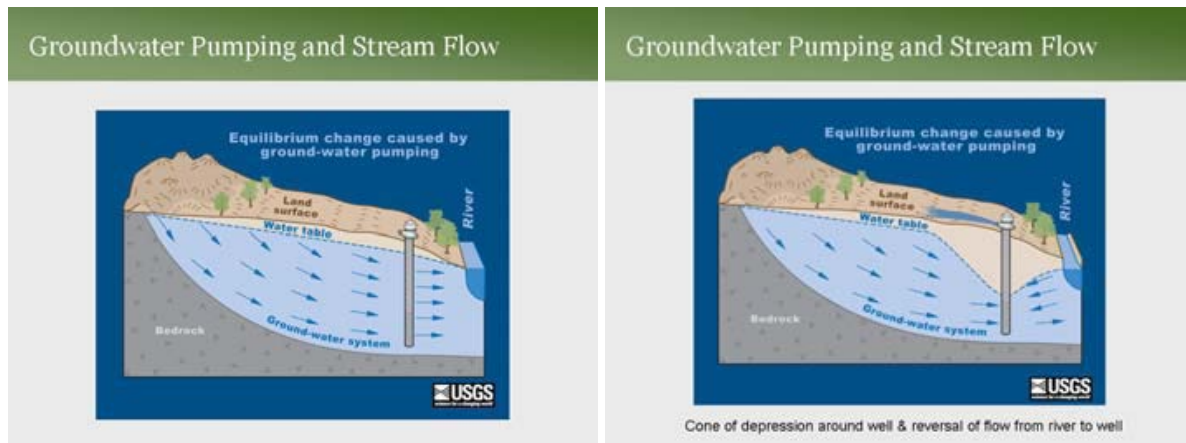
The figure on the left depicts an “equilibrium setting,” in which there currently is “no groundwater extraction out of it” and precipitation falls on the land surface; it infiltrates and forms the water table; it flows towards the river, gets towards the bottom of the valley and pops out as discharge into this river.”

Exhibit 4 - 2 Environmental Needs for Water – Riparian Condition



(Source: Rob Marshall Power Point)

Exhibit 4 - 3 Groundwater and Stream Flow: Two Scenarios



(Source: Rob Marshall Power Point)

The figure on the right depicts a situation where the groundwater pumping “actually starts to draw down water where it creates what we call a "cone of depression." Mr. Marshall said, “if the pump is close enough to the river, or it’s extracting enough water, it’s actually going to start to capture this river flow and change the direction of water from the river back towards the well. And, as it does that, it

Environmental Stakeholders

starts to draw down the water and, over time with enough pumping, you can actually de-water a stream that way.”

Mr. Marshall asked, “Why is this important?” and answered:

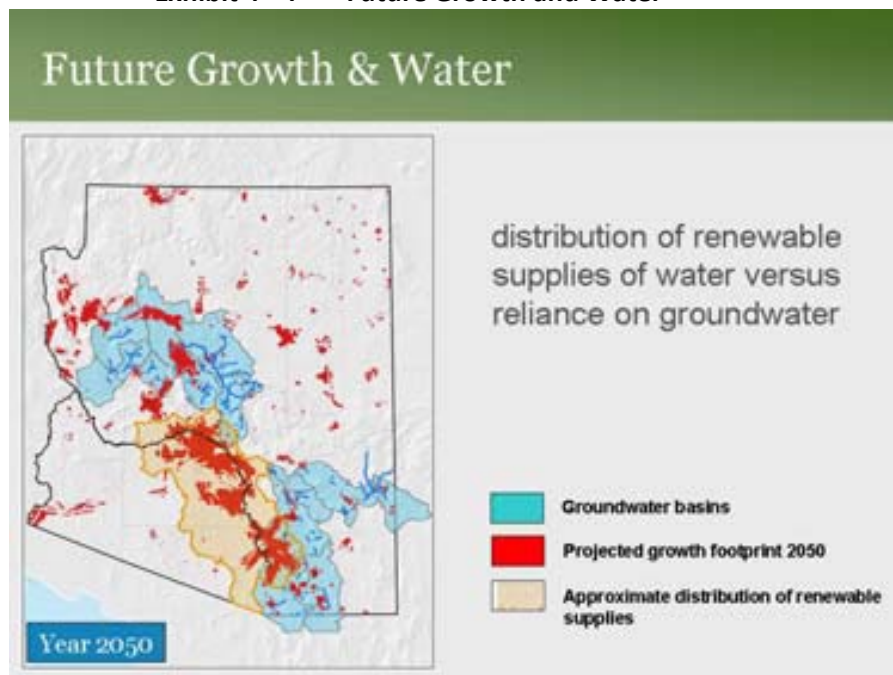
“Well, Southern Arizona’s aquifers - these alluvial basins - actually have lots of water, there is lots of water in these basins; it can furnish a lot of growth, at least over the short-term. The problem is what discharges into the river is what falls from the sky on an annual basis. And so it doesn’t take much impact, or it doesn’t take much groundwater pumping before you start to lower this water table and affect the river flows. And this is the challenge we have in moving forward with growth where the growth will be relying primarily on groundwater supplies.”

2. The relationship between land use and water availability

Mr. Marshall addressed the question: “based on the Department of Economic Security growth projections, Arizona’s slated to double its population by 2050, have over 12 million people, and so the question remains is: Where are we going to obtain the water supplies to furnish that population growth?”

Mr. Marshall presented maps showing the “projected growth footprint 2050”; the location of groundwater basins;” and the “approximate distribution of renewable supplies” (using the three county CAP delivery area as a proxy for renewable supplies), as shown in Exhibit 4-4 below.

Exhibit 4 - 4 Future Growth and Water



(Source: Rob Marshall Power Point)

Environmental Stakeholders

Based on his analysis, Mr. Marshall drew two primary conclusions.

First, the blue areas identify groundwater basins that “are going to be vulnerable to groundwater pumping because they still support discharge, they still give rise to these rivers.” There is “growth is projected to occur in this Maricopa/Pinal County area where there’s really no overlap in those basins, so they’re not going to be drawing from those basins.” However, , a “lot of growth, though, the Prescott/Kingman area, down the San Pedro, even eastern Tucson, lower San Pedro Basin, this are all areas that are going to be, potentially, in conflict with the river and riparian resources that currently exist.

Second, looking at the areas of “approximate distribution of renewable supplies,” Mr. Marshall concludes “You notice a lot of the State does not have renewable water, including here, the San Pedro River and in eastern Pima County. ...“You can see there’s lots of growth that’s projected to happen in areas where we don’t have any renewable water.”

3. Priority mechanisms for land and water protection

Mr. Marshall summarized his presentation by saying:

“There’s two challenges. The first is we need to characterize the desired ecological conditions we want out there in the riparian systems; that’s a scientific challenge; it’s being done all over; it’s pretty straightforward; it takes time; it takes money but it can be done. The greater challenge is a policy challenge and that is to allocate and to secure sufficient water to maintain those conditions.”

Exhibit 4-5 below summarizes the legal obstacles he sees the policy goal of allocating and securing sufficient water to maintain the “ecological conditions” we desire.

Exhibit 4 - 5 Mechanism for Protection

Mechanisms for Protection	Mechanisms for Protection
<p>Protection of rivers limited by lack of legal authority</p> <ul style="list-style-type: none">✓ No state jurisdiction over regulation of groundwater pumping to benefit rivers, springs, wetlands, riparian systems, or wildlife✓ ‘Safe Yield’ provision under Groundwater Management Act allows for use of <u>all</u> annual recharge for human consumption✓ ‘Assured Water Supply’ provision does not require evaluation of impacts to rivers, riparian systems, etc.	<p>Protection of surface water for the environment occurs through indirect measures or tools with limited certainty</p> <ul style="list-style-type: none">✓ Stream adjudications & ‘sub-flow’ ruling✓ Federal actions where Clean Water Act & ESA are invoked✓ Land acquisition with water rights converted to instream flow for benefit of wildlife or ‘sever & transfer’✓ 2007 Pima Co. Plan Amendment requiring impact study?✓ Shift from groundwater to CAP & re-use/recharge have potential but would require secure allocation to environment?

(Source: Rob Marshall Power Point)

Environmental Stakeholders

Mr. Marshall identified legal obstacles to regulating groundwater pumping so it does not water streams and to maintaining in-stream flows necessary to maintain aquatic and riparian habitats.

1. Regulating Groundwater

Mr. Marshall stated, “There’s no State jurisdiction over the regulation of groundwater pumping to benefit river, springs, wildlife, et cetera. There’s no State authority to protect from groundwater pumping.” Mr. Marshall argued that both the safe yield” and “assured water supply” provisions of the groundwater code manage and protect human consumption, not the environment. For example, “the Safe Yield provision under the Groundwater Management Act says you can only take out of the aquifer what’s recharged on an annual basis. ... If you’re allowed to extract all of that, you’re leaving nothing for the river.”

Mr. Marshall further argued, “Similarly, the Assured Water Supply provision, this is about managing human water supplies. There’s no requirement for an evaluation of impacts to rivers, streams, riparian systems, et cetera. And I want to clarify that just because these terms sound good; it’s important that we don’t confuse them with what provisions are actually in there to protect the environment.”

2. Protecting In-Stream Flows

Regarding protection of in-stream flows, Mr. Marshall said, “If we look at the surface water side, there are some mechanisms but, in reality, surface water’s protected really through indirect measures and the level of certainty is very low.” Mr. Marshall identifies give indirect measures of protection and their limitations.

- a. Stream Adjudication – “If we’re fortunate you have a senior right-holder who’s on the downstream end and he or she wants his water, he’s going to have a call on that water all the time, and that water’s going to flow through that river to the downstream end. It’ll benefit the river and the riparian ecosystem, but it’s an indirect benefit; it’s not happening because we set out to protect the river; it’s happening because you have a senior priority water right down at the downstream end. If it’s on the upstream end, I think you can see what happens.”
- b. Federal actions – “You have federal actions to clean water and the Endangered Species Act. These are very blunt tools that were not intended to keep water in rivers. These are last-ditch efforts to stop species from going extinct. They really were not meant to keep water in river or to protect riparian systems, and they don’t do a very good job of it.”
- c. Land acquisition and water rights conversion – “The mechanism that is used most often is the acquisition of land with a water right, and then the conversion of that water right into in-stream flow to benefit wildlife and riparian systems.” ... “There’s two challenges. First, land acquisition land management is very expensive and very few entities can do it. The second is that when you convert that use from agriculture to in-stream, your seniority

- changes. You have the prior appropriation system, we have priority dates, the seniority goes to the earliest dates. Even if you have a very early water right, 1912 water right, when you convert it to in stream flow, your priority right is now 2008, which means you're last on the list when there's a call on water or if there's a drought."
- d. 2007 Pima County Plan Amendment – "the Plan Amendment the Board of Supervisors passed in December of 2007 required an Impact Study; that's actually a very progressive move and a good policy advancement. But, as was mentioned in this Committee, there's no certainty. What will the County do if we have an Impact Study that demonstrates that there will be effects to our riparian systems? It's really an unknown and it's probably fraught with peril, given our litigious society."
- e. Shift to CAP Water – "we can shift from groundwater use to CAP, and that sounds good but, because so much of our area is not serviced by CAP, there's a large infrastructure cost and it'll be a fair amount of time before the infrastructure makes it to those areas and so the question is: Will that infrastructure be in place before we've already had adverse impacts to the rivers?"

Julia Fonseca

Ms. Fonseca defined the purpose of her technical presentation as "sustaining environmental flows for streams and springs in Pima County." Ms. Fonseca said,

"When I use the term "riparian" today, I include the aquatic component, the stream side; it's not just the vegetation. A lot of times people think riparian areas are the lushly vegetated areas along streams, and I want you to also be thinking about the stream-flow component, and also the shallow groundwater ecosystems that support mesquite bosques, which often have a connection to groundwater, as Rob has mentioned."

Ms. Fonseca referred to Pima County's Sonoran Desert Conservation Plan (SDCP), telling the committee and staff that,

"If you realize that the Sonoran Desert Conservation Plan has a lot of ideas that have already been debated at length with the public about where we should go and how we should get there, at least in terms of the ecosystem, this may help frame some of your responses."

Ms. Fonseca identified four "SDCP riparian goals" that were germane to the topic of environmental needs for water (see Exhibit 4-6 below). Ms. Fonseca noted that, "floodplain functions are really important and have been greatly compromised, and it would be a good idea, I think, to have an integrated City/County discussion at some point about surface waters. (Furthermore) Managing Upland Condition ... has everything to do with what land use decisions are made and it affects the ecosystem of riparian areas greatly."

Exhibit 4 - 6 SDCP Riparian Goals

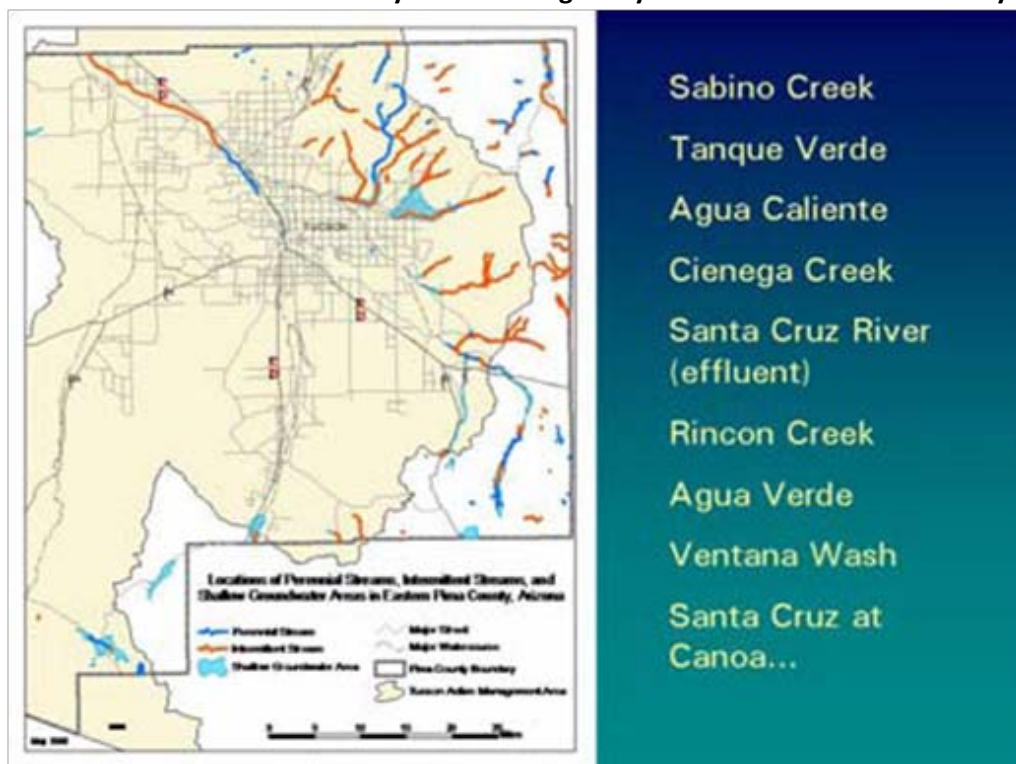
SDCP Riparian Goals

- Maintain floodplain functions
- Manage uplands
- Manage pollutant sources to maintain water quality
- Protect in-stream flows

(Source: Julia Fonseca Power Point)

Ms. Fonseca said her primary focus would be on protection of in-stream flows. Ms. Fonseca noted that the SDCP completed an inventory of remaining ecosystems in eastern Pima County (see Exhibit 4-7 below). Ms. Fonseca commented on this map as it relates to (1) the Avra Valley, (2) historical depletion of riparian ecosystems, and (3) the eastern portion of the Tucson Basin.

Exhibit 4 - 7 SDCP Inventory of Remaining Ecosystems in Eastern Pima County



(Source: Julia Fonseca Power Point)

Environmental Stakeholders

1. Ms. Fonseca noted, “In Avra Valley right here you can see that there’s an absence of these groundwater-dependent ecosystems, and that’s important for you to know. Historically, it never had any flowing streams that were supported by groundwater, and so what that means is one could pump forever out there and never have this kind of link with a stream. That’s good because Avra Valley was purchased as Tucson’s water farm, basically, and there’s been a lot of investment in infrastructure to store water in Avra Valley. Avra Valley is a great place for those kinds of activities.”

2. Ms. Fonseca said, “Historically, there was groundwater discharge along the Santa Cruz River and downtown Tucson and over at San Xavier del Bac, along the Pantano Wash, the Rillito Creek, and those areas have gone away.”

3. Third, Ms. Fonseca told the meeting the inventory provided a surprise: “There’s really a lot left out there in terms of perennial and intermittent streams, and this doesn’t even show the springs. There are over 250 springs in eastern Pima County.”

Ms. Fonseca described three riparian environments and suggested actions that, if taken, would protect and enhance these environments: the northeast Tucson Basin; Cienega Creek; and Santa Cruz River downstream of the Roger Road and Ina Road treatment facilities.

Northeast Tucson Basin

Ms. Fonseca described the northeast Tucson Basin as having, “a number of different streams and springs” supporting “lush riparian environments.” Ms. Fonseca referred to studies that document “a substantial market premium just to be near” these lush environments: “The more lush, the more you pay.”

Ms. Fonseca noted that a lot of the northeast basin was agriculture, with substantial municipal pumping beginning in the 1980S. According to Ms. Fonseca “this area’s largely built-out now, but the groundwater table has been depleted. And, in fact, there was so much depletion, combined with a drought in 1989 that a lot of the wells in the area started to go dry. Wells that people had used for many years. They were generally shallow wells, I might add, along the stream.”

Ms. Fonseca described three actions by the Tucson Mayor and Council to address these trends.

First, “They passed a Resolution, a policy, that restricted the increase of groundwater pumping in this area, and I think they’re probably the only City Council, to my knowledge, in Arizona that’s ever taken a measure to voluntarily restrict groundwater pumping for the combination of reasons that included citizens’ wells going dry, and the protection of the riparian ecosystem.

Second, “they also directed Staff to develop a Conservation Program, and they said the Conservation Program should not only include the Tucson Water Service Area, but also the

Environmental Stakeholders

private water companies' and private users that are out there, so the agriculture people, as well as the 49ers Water Company."

Third, "Tucson Water has built a reclaimed water system since; I think it was by 2006. The reclaimed line to the 49ers' golf course had been extended to the Rincon Valley"

Ms. Fonseca reported that, "this has made a difference. This has reduced the stress to the aquifer in that uppermost part of the Tanque Verde Valley where the storage is most limited underground. And people in the Wentworth area are reporting that their wells have come up, and there is actually stream flow in the stream again along Tanque Verde Creek."

Ms. Fonseca reported, "Farther downstream and along lower Sabino Creek ... the water table is still very low, and it's going to be. It would be a lot harder to make a difference there; that's a lot closer to the Central Wellfield. Not only is there Tucson Water pumping and - and some residual pasture land irrigation, there's also some use for the Tucson Country Club Golf Course, as well as the old Metro Service Area."

Ms. Fonseca said, "One of the issues in the Sabino Creek/Tanque Verde Confluence Area is that Metro has only a few wells and it's a very limited service area, and they have no access in this area to the CAP blend that Tucson Water does. One of the things that could help relieve stress to the aquifer at the Confluence Area there with Sabino Creek and along Sabino Creek further up, would be an interconnection between the two systems. This would allow for a mixture of wells that would be further away from these areas to be used, and also to allow for some CAP blend."

Ms. Fonseca described a third situation in the northeast Tucson Basin:

"Sometimes what's left is, in hydro-geologic terms, these "transiently saturated aquifers" that are close to the surface, so they have an ecosystem role in keeping water up near the root systems of these riparian trees, but they can be drained inadvertently by wells that are perforated all along the casing as many of the old wells are. It would take some sleuthing to find out what these areas are, but it could also be a form of well head protection protecting water quality for some of these companies."

Cienega Creek

Ms. Fonseca called Cienega Creek "the ecological treasure of Pima County; it has a number of rare and endangered species; it's a beautiful place to hike. ... If you ever want to see what the Santa Cruz River was like in San Xavier del Bac and downtown Tucson, this is an example of it."

Ms. Fonseca described how Cienega Creek flows into the Tucson Basin. Ms. Fonseca also described "a hydro-geologic structure -and the groundwater that's recharged in this area does not flow along Pantano Wash, rather it takes a different flow path that goes under the old IBM plant and can be traced even as far as the University of Arizona campus." In addition, "most of lower Cienega Creek ... is in a

Environmental Stakeholders

County preserve.” Ms. Fonseca pointed out two “complications” that limit the effectiveness of “land acquisition alone seldom ... to protect these stream systems.”

First, “This is one place in Pima County where surface flows are diverted for use on a golf course, and that’s pursuant to a historic water right, surface water right of long standing. There’s a dam, most of it’s below ground, there’s hardly any of it sticking up (that diverts water into) “a pipeline about a mile and a half down to the Del Lago Golf Course, and it used to be used for irrigation a long time ago in that area.”

This water has great value to the golf course and homeowners, so “there’s no one willing to sell and for understandable reasons.” One solution would be to substitute reclaimed water for the Cienega Creek surface water. In 1990, the Board of Supervisors approved a large master planned community in the Vail Valley, with a proviso that the golf course switch to reclaimed water, once it becomes available. No reclaimed pipeline has been constructed yet, however. As another approach, Pima County is considering a general obligation bond issue to finance construction of reclaimed water pipelines to this area. Ms. Fonseca argued that, switching to reclaimed water would lower the economic value of the surface water, thereby increasing the possibility of acquisition of the surface water right.

Second, “Another complicating situation is the fact that this area is served by the Vail Water Company (which) sits on this divide between the Cienega Creek Basin and the Tucson Water, so some of the wells are in the Tucson Basin and don’t - we think - affect Cienega Creek. But there are a few wells that are up- gradient of the stream, and so that means that as they’re pumping they will, eventually, have an effect on the Cienega Creek water supply area.”

Ms. Fonseca considered two options to the Vail Water Company problem: (1) an interconnect between Tucson Water and Vail Water Company and (2) Tucson Water acquiring Vail Water Company.

Santa Cruz River, downstream of the Roger Road/Ina Road Treatment Plants

Ms. Fonseca discussed the Santa Cruz River, downstream of the Roger Road and Kina Road treatment plants, describing it as an “effluent-dominated ecosystem,” since the water in the river (1) “is solely effluent, except when it’s mixed briefly with storm water” and(2) “there’s no connection to groundwater; it’s been disconnected. The effluent flow does not mix closely with the groundwater.”

Ms. Fonseca described this reach of the Santa Cruz River as “the County’s largest, longest perennial stream, and it does have the second largest cottonwood-willow forest, second only to Cienega Creek in eastern Pima County. It’s also one of the areas that’s richest in bird life and particularly, migratory waterfowl, something that we don’t have a lot of in Pima County elsewhere. Notably, it is drought-proof.”

Environmental Stakeholders

Ms. Fonseca said of the reach, “although the riparian ecosystem is great, the aquatic ecosystem is quite poor. The County is planning to improve that, and that will have very important riparian and aquatic ecosystem benefits because it will improve the base of the food chain.”

For Ms. Fonseca, the singular policy issue with this reach is “that there’s no water allocated, none of the effluent is really allocated to the river; it’s just there because it needs to be disposed of.” Ms. Fonseca acknowledges the “Conservation Effluent Pool,” “that will not be sufficient to maintain flows in the river, and it was never really intended to do so. So, there are some significant issues associated with keeping the Santa Cruz River flowing if we want to keep those ecosystem benefits there.”

Ms. Fonseca hoped that “we do allocate some water to the Santa Cruz River.” Ms. Fonseca handed out a position paper from the Science Advisory Team for the Sonoran Desert Conservation Plan that specifically recommends assurance of sufficient allocation of water to the Santa Cruz River effluent-dominated reach. The Sonoran Desert Conservation Plan made the same recommendation, an allocation of effluent “to keep the riparian ecosystem along the Santa Cruz River going, because that may be our most ecologically viable stream if some of the more dire global warming projections come true. And even if it isn’t, it is something that right now does provide a lot of the ecological values that we have.”

Ms. Fonseca concluded by saying, “it’s great to re-vegetate areas, but this does not replace the ecosystem benefits of having a flowing stream that gets these pulses of sediment and floods that rework things. Off-channel drip-irrigated, riparian vegetation and created ponds simply do not provide ecosystem function -they are not equivalent. So this is why we need to keep the focus on some of these stream flow issues.”

For Ms. Fonseca, “We need to allocate flows for these ecosystem functions, flows from groundwater, from surface water, from effluent. And I think municipal water companies are uniquely qualified to consider these issues of environmental flows. Private water companies can’t; they are precluded by State statutes.”

4.2.6 Sierra Club, Jenny Neeley

Ms. Neeley presented comments at the **October 29, 2008** sustainability discussions. Ms. Neeley stressed living within limits; respect for the environment; over-allocation of Colorado River water; and opposition to importation of new water supplies.

Ms. Neeley wrote, “Our water resources are finite and unreliable. In light of this harsh reality, it is just not prudent to actively facilitate new growth.” Ms. Neeley, however, worried, “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.” Ms. Neeley saw plans for “desalinization, groundwater mining, and canal systems linking us to other, distant rivers, such as the Mississippi,” which Ms. Neeley defined as “simply unsustainable.” Ms. Neeley worried that “utilizing water from faraway sources like this would directly contribute to the

environmental devastation in other areas,” and asked “How in the world is shifting the environmental damage to somewhere else a sustainable way to guarantee water supplies for new growth.”

Ms. Neeley wrote about “the difference between ‘safe yield’ and ‘sustainability’ when talking about groundwater supplies.” Ms. Neeley argued that “safe yield” does not “take into account the water needs of groundwater-dependent riparian systems or other negative effects caused by excessive groundwater pumping.” To Ms. Neeley, “under safe yield rules ... the remaining ground-water dependent riparian systems would eventually dry up and die, and previously lost riparian areas would likely never be restored.” On the other hand, “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 maintenance of the existing – and resurrection of lost – groundwater-dependent riparian systems.”

Looking at the Central Arizona Project, Jenny Neeley wrote, “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. ” Ms. Neeley wrote, “Nor can we claim sustainability if we continue to drastically impact environmental resources to facilitate growth above the carrying capacity of our region.”

4.2.7 Sky Island Alliance, Trevor Hare, Melanie Emerson

The Sky Island Alliance submitted comments for the sustainability discussion (Trevor Hare) and in preparation for the Mayor and Council’s **February 9, 2010** public hearing (Melanie Emerson). Mr. Hare focused on respecting the environment’s needs for water. Ms. Emerson urged adoption of the Draft Phase II Report and protection of the Conservation Effluent Pool.

Phase 1.3 Sustainability Discussions

Mr. Hare submitted written comments to the **October 29, 2008** sustainability discussion. The central theme of Mr. Hare’s comments on sustainability was “The importance of in-stream flows, sub-surface waters, riparian areas, and the impacts of water delivery infrastructure.” Mr. Hare enumerated several benefits derived from healthy riparian areas, including:

1. “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”;
2. They “play host to an amazing abundance of rare and endangered species”;
3. “the connectivity they provide across the landscape and across many barriers, for the daily and seasonal movements and dispersal of animals and plants”;
4. “Retention of water on the landscape. Floodwaters are slowed, soils are held in place by roots and more water infiltrates into the ground”; and,

Environmental Stakeholders

5. “benefits local economies through increased home values, increased recreational opportunities and increased well being as people connect with natural settings. “

Mr. Hare noted, “A majority of aquatic systems in Pima County have been lost,” and “Riparian ecosystems supported by shallow groundwater have also been largely lost or degraded due to water diversions, aquifer drawdown and urbanization.” Despite these losses, however, Mr. Hare identified areas functioning riparian areas can still be found, such as the San Pedro River, Cienega Creek, Sabino Creek, Davidson Canyon, Rincon Creek, and Sopori Wash. To protect and maintain these resources, Mr. Hare recommended the following actions:

1. “Protection of our remaining aquatic and riparian ecosystems through the establishment of no-pumping zones where pumping would draw down shallow groundwater and no-touch buffer around existing riparian habitat”;

2. “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”;

3. “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”; and

4. “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.”

Mr. Hare closed with a quote from “an old friend “Growth for growth’s sake is the ideology of a cancer cell.” We can grow but we must grow under the environmental constraints this amazing desert provides.”

Phase 2.3 Public Hearings

Ms. Emerson submitted written comments for the **February 9, 2008** public hearing. Ms. Emerson made two basic comments: (1) support the Phase II Study Report and (2) protect the Conservation Effluent Pool.

1. Support the Phase II Report

Ms. Emerson related, “Sky Island Alliance urges you to support the City/County Water and Wastewater Study Phase II Report and direct City staff to proceed, in cooperation with Pima County and other participants, with implementation of the recommendations contained within the report.” Addressing the study process, Ms. Emerson commented, “We appreciate the public process undertaken during the development of this report. The recommendations before you are the result of close to two years of research, study, analysis and public deliberations, which the community has watched and participated in.”

2. Protect the Conservation Effluent Pool

Ms. Emerson noted, “We were dismayed to learn of the recent effort by the homebuilding community requesting that the City reject the use of effluent for environmental purposes.” Ms. Emerson defined the Conservation Effluent Pool as “a wide range of agreed-upon issues surrounding effluent, including a commitment to reserve a specific amount of effluent for riparian projects benefiting the entire community.” Noting the Alliance’s support for study recommendations “regarding riparian habitat, groundwater dependent ecosystems, and the perpetuation of the CEP,” Ms. Emerson argued,

“The CEP is an essential tool needed to achieve these goals and we encourage the Mayor and Council to direct staff to continue to work on detailing how the CEP will be managed and utilized. This increased specificity will lead to improved management of the CEP, benefiting both the owners of this resource and the riparian habitat that depends on it.

4.2.8 **Sonoran Institute, Amy McCoy**

Ms. McCoy made oral comments to the October 29, 2008 sustainability discussion and submitted written comments on the draft Phase I report.

Phase 1.3 Sustainability Discussions

Ms. McCoy made oral comments at the **October 29, 2008** sustainability discussion. Ms. McCoy described the mission of the Sonoran Institute as striving “for healthy landscapes, vibrant economies, and sustainable communities.” The Institute believed “sustainable conservation decisions are made collectively and collaboratively within communities,” and Ms. McCoy offered four recommendations flowing from those beliefs.

1. Ms. McCoy supported integrating “water and land use planning at a regional scale. For sustainability to become operational, there must be policy shifts toward innovation and toward integration of our land use ordinances, tax codes to support incentives, and water management structures.”

2. Ms. McCoy supported balancing “the needs of humans and wildlife.” Ms. McCoy reviewed the benefits provided by riparian areas and states, “These services would be costly and difficult to mimic with technology, but are provided free to us with only the power of the sun. I believe that these riparian ecosystems and natural infrastructures should be factored into our sustainable water management equation.”

3. Ms. McCoy called for defining and clarifying the purposes of different water, “for example, CAP, groundwater, effluent, and rainwater.” Ms. McCoy commended the “City of Tucson’s water harvesting ordinance,” noting “forty percent of our municipal and commercial water uses go to landscaping. By using rainwater, we reduce our reliance on groundwater and provide more nimble and flexible options for citizens.”

4. Ms. McCoy said we need to “ensure conserved groundwater ... remains in the ground, and is set aside for recharge and for possibly unanticipated future need, but also to restore our ecosystems”

Phase 1.4 Report Writing

In comments on the **draft Phase I Report**, Ms. McCoy expressed the need for regional discussions in the future and made five specific comments regarding the draft report:

1. “We must determine the environmental needs for water,” (which should be) “clearly defined and prioritized at the outset,” and “The Sonoran Desert Conservation Plan should serve as the guiding policy document.”

2. We need to “make better use of effluent and wastewater infrastructure investments to meet the multiple goals of restoring our natural environment, recharging groundwater, and creating an adequate water reserve to address unforeseen drought-related or climate change impacts.”

3. “Land-use and water planning need to be integrated and policies should clearly outline where future infrastructure investments will be made.”

4. “The pros and cons of a regional water authority should be examined in the upcoming phases of this effort.”

5. Our current water pricing and financing systems should be overhauled to encourage additional conservation, pay for future services, and ensure that everyone has access to clean sources of water.”

4.2.9 Tucson Audubon Society, Paul Green, Kendall Kroesen, Christine McVie

Kendall Kroesen submitted oral comments on sustainability. Paul Green and Mr. Kroesen submitted written comments on the Phase I study report. Paul Green and Christine McVie submitted comments on February 8, 2010 in preparation for the February 9 public hearing.

Phase 1.3 Sustainability Discussions

Mr. Kroesen made oral comments at the **October 22, 2008** sustainability discussion. In his comments, Mr. Kroesen identified “two big problems with our current water delivery system”: (1) “it assumes that humans are the only user of water” and (2) we “confuse the true human need for potable water with the current per-capita demand.”

1. Environmental need for water

Mr. Kroesen noted that, while in the “western United States, less than 1% of the total land area is covered by the lush riparian vegetation found along rivers, streams and washes” there is extensive dependence on these riparian areas.” Mr. Kroesen noted the following examples of this dependence: “in Arizona and New Mexico, about 80% of all vertebrates”; “More than half of all bird species that reproduce in the region”; and “Seventy percent of threatened and endangered vertebrates in Arizona.” Mr. Kroesen states, “We have a responsibility to conserve water for species that need water; to

conserve riparian areas for their aesthetic value and inherent other inherent qualities; and to protect the wildlife watching industry that represents a significant revenue stream for our region.”

2. True water needs

Mr. Kroesen noted that “about 35% of the water used by Tucson commercial and industrial sites is used outdoors, and 45% of water used by single-family residences is used outdoors; much of that on landscape.” To Mr. Kroesen “this does not represent a need for potable water.” Mr. Kroesen sees Tucson’s moves toward “substituting rainwater, gray water and reclaimed water” for uses for which there is not a true need for potable water and “Tucson Water conservation efforts that were funded recently “as “a welcome start.” Mr. Kroesen warned, however, “At the same time that we expand non-potable delivery systems, we should not, in our haste, dedicate all reclaimed water for these purposes.” Mr. Kroesen said “It is important to maintain effluent flow in the Santa Cruz River” and “It is time to expand the Conservation Effluent Pool and determine a system for actually implementing its use.”

Phase 1.4 Report Writing

On **February 18, 2009**, Mr. Green and Mr. Kroesen made several comments, under three headings.

1. Conservation/Demand Management

Mr. Green and Kroesen wrote, “Finding new sources of water should not be the first priority. Logically, the first priority is conserving water.” They noted the statement in the draft report that “demand management is assumed to be a ten percent reduction in potable demand by 2030,’ and worry that “the implication here is that reductions beyond ten percent are not realistic.” “However, we understand that over the last several years per capita declines in demand have been higher than predicted by water managers. The potential for conservation is, logically, greater than ten percent.” Finally, they noted only one mention of water harvesting in the draft and noted “Water harvesting can make significant contributions to both supply and demand in the required direction.”

2. Colorado River Water/Central Arizona Project

Mr. Green and Kroesen wrote, “Regarding CAP water as a renewable supply is a perilous assumption. Climate change models indicate a decreased flow, earlier peak flow, and decreased soil level measures in the Colorado River watershed.” Regarding a statement in the draft that “we should fully utilize our allocation of Colorado River water,” Mr. Green and Kroesen noted, “Use of Colorado River water is not without ecological costs.” They noted, “In part, Tucson has exported, rather than solved, some of its water-related ecological problems to the Colorado River ecological system,” noting that “CAP supply already causes decimation of ecosystems in the lower Colorado River basin, indicating that even current levels of extraction are unsustainable.” They noted for the Central Arizona Groundwater Replenishment District to allow “growth in some areas ... on the expectation that it will find water” (rather than on) “a guarantee based on water supplies under contract for a full 100 years ... does not appear to constitute planning.”

3. Riparian Area Protection/Restoration

Mr. Green and Kroesen disagreed with an assertion in the draft report that balanced “groundwater withdrawals and natural and artificial recharge” is primarily dependent on agricultural and industrial sector water. Mr. Green and Kroesen said this claim lacks any “explanation of why that is and recommend including such as explanation.” In other comment, Mr. Green and Mr. Kroesen asserted that a table listing riparian restoration projects omits “other projects along the Santa Cruz River, including ones run by Tucson Audubon.” Finally, they stated that “this report rightly expresses concerns about inadequate high groundwater-dependent riparian areas,” but the report “should recommend that the city and county continue to explore increased protections.” One approach to increased protections would be “development of environmental jurisprudence, which promotes the idea that people are only one part of a wider community of beings and that the welfare of each member of that community is dependent on the welfare of the earth as a whole.” Mr. Green and Kroesen argued that characterizing “the effluent-dependent portion of the Santa Cruz River” as a “‘healthy riparian ecosystem’... may be “overstating its quality.” They suggested either “removing the word healthy, or calling it ‘relatively healthy.’” Finally they noted that “no mention is made of the possibility of allowing groundwater aquifers to recover to the extent that surface flows could be restored in some areas,” which they see as “a logical possibility” that “should be assessed,” and should be promoted “as an environmental priority for our region.”

Phase 2.3 Public Hearings

Mr. Green and Ms. McVie submitted written comments on **February 8, 2010**. In their letter, Mr. Green and Ms. McVie “strongly recommend that Mayor and Council adopt a joint resolution with the Pima County Board of Supervisors approving the recommendations described in the Phase II Report, and direct city and county staff to report back to their respective governing body with a detailed action plan and schedules for translating the action plan into ordinances, resolutions, and intergovernmental agreements.” Mr. Green and Ms. McVie supported the Phase II report for four reasons.

1. It “acknowledges a balance is necessary as we address various needs for water.” Mr. Green and Ms. McVie wrote “Tucson Audubon congratulates the Committee on its recommended adoption of a new paradigm that provides a balance across all requirements for water—people, economics, and environment. This is especially important in light of the potential limited supply of water we will face in the future.” The writers advocated for water conservation, noting a “recent U.S. Geological Survey report that documents decreasing water use in the West (with the exception of four states), intense disputes, and ecosystem collapse tied to dwindling supplies.”

2. It “includes ‘Respect for the Environment’ as a key part of the report.” The writers noted in our region “a long history of supporting the preservation of our natural environment.” Citing reports documenting “that Southwest riparian habitats are the fifth most threatened habitat type in the nation,” the writers advocated for the Conservation Effluent Pool, which they see as “an essential tool needed to achieve these goals (support habitat) and we encourage the Mayor and Council to quickly finalize and approve the IGA ... outlying how this CEP will be managed and utilized to benefit riparian habitat.”

3. It “supports the need for a permanent water policy.” The writers referred to the City’s interim “obligated to serve policy,” and stated a “need to adopt permanent water policies” by City and County. To this end, they stated in the Draft Phase II Report, “Goal 2 (Direct Growth to Suitable Areas) and Goal 3 (Integrate Land Use Planning and Water Resources Planning) provide a strong framework to consider the key elements for a water policy.”

4. It “acknowledges the need for cooperation between City and County.” Mr. Green and Ms. McVie wrote, “One of the important successes to already surface as a result of this study is an increased level of cooperation between the City and the County. By supporting the Phase II Report and endorsing its implementation, all of these other projects will also benefit from the resultant shared expertise and increased cooperation.”

4.2.10 Cienega Watershed Partnership, Netzin Steklis,

At the **August 27, 2008** meeting, Netzin Steklis asked about whether the Joint Study was giving any consideration was being given to the surrounding or neighboring watershed (such as the Cienega watershed) and the growth and development of those areas and how that is going to impact the Tucson Basin.

4.2.11 Natural Systems Solutions, Dave Ewoldt

At the **21, 2008** meeting, Dave Ewoldt, Natural Systems Solutions, made the following comments: (1) “sustainability needs to be defined and defined in a broad context”; (2) “anyone who relies on tap water should be concerned about sustainability”; (3) “there is more to look at besides water, i.e. peak oil”; and (4) “growth should be one scenario to consider, but need to look at alternatives and look at upper and lower limits.”