City / County
Water & Wastewater Infrastructure, Supply and Planning Study

2011-2015
Action Plan for Water Sustainability

Comprehensive Integrated Planning
Water Supply
Demand Management
Respect for Environment

A City of Tucson and Pima County Cooperative Project
The Governing Boards
October 2010

City of Tucson Mayor and Council
Robert Walkup, Mayor
Regina Romero, Ward 1
Paul Cunningham, Ward 2
Karin Uhlich, Ward 3
Shirley Scott, Ward 4
Richard Fimbres, Ward 5
Steve Kozachik, Ward 6

Pima County Board of Supervisors
Ann Day, District 1
Ramón Valadez, District 2
Sharon Bronson, District 3
Raymond J. Carroll, District 4
Richard Elías, Chairman, District 5

The Governing Boards of the City of Tucson and Pima County adopted Resolution No’s. 21479 (February 2010) and 2010-16 (January 2010) establishing shared goals and recommendations for sustainable water planning. The Governing Boards further directed staff to implement the goals and recommendations through an Action Plan. The enclosed City/County Action Plan for Water Sustainability fulfills this charge.

City/County Goals for Water Sustainability

COMPREHENSIVE INTEGRATED PLANNING

Goal: Encourage sustainable urban forms - Ensure that the form of growth enhances beneficial water/energy, environment, economic and social outcomes through inclusion of diverse housing types and compact, environmentally sensitive and walkable communities.

Goal: Direct growth to suitable growth areas - Direct future growth away from environmentally sensitive areas and closer to existing infrastructure through infrastructure investments, regulation, policies, and open space acquisitions.

Goal: Integrate land use and water resources planning - Enhance efforts to link land use and water resources planning to foster increased use of renewable water resources in new development and to balance economic, environmental and human needs for water.

Goal: Growth should pay for itself over time and be financially sustainable - Ensure that the full cost of new development is considered and that growth related costs for water and wastewater are recovered.

RESPECT FOR ENVIRONMENT

Goal: Preserve existing riparian areas through coordinated regulation, policy, and outreach - Pursue a coordinated approach to preserving existing riparian areas and foster increased public support of protection and maintenance of healthy ecosystems.

Goal: Identify needs and opportunities for future restoration - Pursue a collaborative, comprehensive and systematic strategy to identify needs, opportunities, resources and partnerships to implement cost-effective regional environmental restoration.

Goal: Ensure that public projects are multi-benefit including restoration, stormwater management, recharge and public amenity - Maximize beneficial use of reclaimed water, rainwater and stormwater in flood control, water and wastewater treatment facilities and other capital projects.

Goal: Ensure the future of riparian and aquatic habitat along the effluent-dependent reach of the Santa Cruz River - Evaluate alternative strategies for protection of the riparian and aquatic habitat along the effluent-dependent reach of the Santa Cruz River building upon prior research and planning studies.

Goal: Develop water supply for the environment - Ensure an adequate amount of water is available to meet the seasonal needs of restored habitats.
City/County Goals for Water Sustainability (Continued)

**WATER SUPPLY**

**Goal: Work collaboratively to acquire new water supplies for reliability** - Expand cooperative efforts to buttress our existing supplies and diversify our water resource portfolio to prepare for potential shortages stemming from climate change and drought.

**Goal: Maximize and make efficient use of effluent and other locally renewable water supplies** - Reduce use of groundwater for non-potable water needs through greater emphasis on locally-renewable resources such as reclaimed water, rainwater and gray water.

**Goal: Address regulatory barriers to maximizing local supplies** - Pursue regulatory changes that will protect public health and safety yet provide flexibility to foster increased uses of reclaimed water to offset use of groundwater for non-potable demands.

**Goal: Be Prepared for climate change and drought** - Pursue adaptive, flexible, multi-pronged preparedness strategies such as diversification of water supplies, improved demand management increased reliance on water harvesting.

**DEMAND MANAGEMENT**

**Goal: Increase the effectiveness of conservation programming through coordinated planning and evaluation** – Improve monitoring of water use trends to increase our ability to target inefficient and high water use areas, and to encourage innovation in water conservation research, methods, and reporting.

**Goal: Establish common water conservation goals and targeted methods** – Develop shared goals to provide a foundation for increasing regional consistency and coordination.

**Goal: Manage demand through the design of the built environment** – Incorporate consistent low water usage development standards into new construction and establish land forms that reduce the “water footprint” of the built environment.

**Goal: Manage demand through changing behaviors** – Enhance coordinated education programs to enable implementation of efficient practices. Assess public preferences for conservation to better understand and communicate the benefits of conserving water.

**Goal: Increase the use of rainwater and stormwater** – Coordinate efforts to maximize and evaluate the benefits of rainwater harvesting to meet outdoor needs, reduce demands on potable supplies, increase floodwater retention and limit migration of contaminants.

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*Water in the desert is precious. We must provide for our future generations.*

**Phase 1 and 2 Water Study Reports and background information are available at:**

[www.tucsonpimawaterstudy.com](http://www.tucsonpimawaterstudy.com)
Acknowledgements

The contributions of the people listed here to the successful completion of the City/County Water Sustainability Action Plan are greatly appreciated.

This Action Plan fulfills the direction provided in the City and County Resolutions (No. 21478 and 2010-16 respectively) to define the actions to be taken next to implement the shared City/County goals and recommendations as described in the Phase II Water Study Report (December 2009).

City/County Water Study Program Managers
Nicole Ewing Gavin
City of Tucson
Melaney Seacat
Pima County

Core City of Tucson Staff
Mike Letcher
City Manager
Richard Miranda
Deputy City Manager
Jeff Biggs
Director, Tucson Water
Chris Avery
Deputy Director, Tucson Water
Sandy Elder
Deputy Director, Tucson Water
Albert Elias
Director, Department of Housing and Community Development
Leslie Ethen
Director, Office of Conservation and Sustainable Development
Karen LaMartina
Intergovernmental Coordination Supervisor, City of Tucson, Tucson Water
Ralph Marra
Water Resources Management Administrator, Tucson Water

Core Pima County Staff
Charles H. Huckleberry
County Administrator
John Bernal
Deputy County Administrator, Public Works
Nicole Fyffe
Special Assistant to the County Administrator, Pima County
Suzanne, Shields
Director, Pima County Regional Flood Control District
Michael Gritzuk, P.E.
Director, Pima County Regional Wastewater Reclamation Department
Eric Wieduwilt, P.E.
Deputy Director, Planning, Engineering and CIP, Pima County Regional Wastewater Reclamation Department
Edward F. Curley
Strategic Planning Manager, Pima County Regional Wastewater Reclamation Department
Kathy Chavez
Water Policy Manager, Pima County Regional Wastewater Reclamation Department
Arlan Colton
Planning Director, Pima County Planning
Jim Dubois
Principal Hydrologist, Regional Wastewater Reclamation Department
Tedra Fox
Sustainability Manager, Pima County Administrator’s Office
Brenda Garcia
Administrative Support Specialist, Pima County Regional Wastewater Reclamation Department
Using a soil probe is a good way to check watering depth and assure that your plants have enough water.
Acknowledgements (Continued)

Water Supply Team
Chris Avery
(Water Supply Team Lead), Chief Water Counsel, City of Tucson, Tucson Water
Kathy Chavez
(Water Supply Team Lead), Water Policy Manager, Pima County, Regional Wastewater Reclamation
James Dubois
Principal Hydrologist, Pima County, Regional Wastewater Reclamation
Evan Canfield
Chief Hydrologist, Pima County, Regional Flood Control District
George Kuck
Maintenance Manager, Pima County, Natural Resources, Park and Recreation
Harlan Agnew
Attorney, Pima County, Attorney’s Office
Karen Dotson
Reclaimed Water/Backflow Prevention Program Coordinator, City of Tucson, Tucson Water
Karen LaMartina
Intergovernmental Coordination Supervisor, City of Tucson, Tucson Water
Melodee Loyer
Water Quality and Operations Engineering Manager, City of Tucson, Tucson Water
Ralph Marra
Water Resources Management Administrator, City of Tucson, Tucson Water
Stephen Dean
Water Quality/Operations Administrator, City of Tucson, Tucson Water
Tom Helfrich
Public Works Division Manager, Pima County, Regional Flood Control District
Respect Environment Team
Leslie Ethen
(Environment Team Lead), Director, City of Tucson, Office of Conservation and Sustainable Development
Suzanne Shields
(Environment Team Lead), Director, Pima County, Regional Flood Control District
Carla Danforth
Environmental Planning Manager, Pima County, Regional Flood Control District
Chris Avery
Chief Water Counsel, City of Tucson, Tucson Water
Evan Canfield
Chief Hydrologist, Pima County, Regional Flood Control District
Harlan Agnew
Attorney, Pima County, Attorney’s Office
James Dubois
Principal Hydrologist, Pima County, Regional Wastewater Reclamation
Jane Duarte
Capital Planning and Development Manager, City of Tucson, Parks and Recreation
Jennifer Becker
Principal Hydrologist, Pima County, Regional Flood Control District
John Kmiec
Environmental & Regulatory Compliance Supervisor, City of Tucson, Tucson Water
Julia Fonseca
Environmental Planning Manager, Pima County, Office of Science and Conservation
Karen Dotson
Reclaimed Water/Backflow Prevention Program Coordinator, City of Tucson, Tucson Water
Kerry Baldwin
Natural Resources Division Manager, Pima County, Natural Resources, Parks and Recreation
Linda Smith
Principal Planner, City of Tucson, Tucson Water
Ralph Marra
Water Resources Management Administrator, City of Tucson, Tucson Water
Ries Lindley
Lead Planner, City of Tucson, Tucson Water
Sherry Ruther
Environmental Planning Manager, Pima County, Development Services
Tom Helfrich
Public Works Division Manager, Pima County, Regional Flood Control District
Wally Wilson
Lead Hydrologist, City of Tucson, Tucson Water
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In April 2008 the City of Tucson and Pima County initiated a joint effort for sustainable water resource planning known as the “City/County Water and Wastewater Infrastructure, Supply and Planning Study” (Water Study). The City/County Water Study is a multi-year effort to identify ways the City and County, which respectively own and operate the region’s primary water and wastewater utilities, can work together to advance more cooperative and sustainable water planning.

After two years of intensive study under the guidance of a joint City/County Citizens Advisory Committee, City and County staff prepared the Phase 2 Water Study Report. The Phase 2 Report built upon the Phase 1 Report that preceded it and establishes a framework for sustainable water resources planning including 19 goals and 56 recommendations within four interconnected elements: Water Supply, Demand Management, Comprehensive Integrated Planning and Respect for Environment.

The City of Tucson Mayor and Council and the Pima County Board of Supervisors adopted the Phase 2 Report through City and County resolutions (No. 21478 and 2010-16 respectively), and directed staff to work together to create an Action Plan for implementing the Phase 2 goals and recommendations.

The following Action Plan represents a dramatic shift in business as usual for the City and County. It advances a set of 87 specific actions grouped within 14 City/County programs to implement the Phase 2 goals and recommendations and to achieve the following outcomes within the five-year planning horizon:

• Water, wastewater and stormwater resources are planned in an integrated fashion.
• More renewable water resources including effluent, reclaimed, stormwater and rainwater and greywater are put to use in an efficient manner.
• Water resource policies help further economic goals.
• Collaborative efforts are undertaken to acquire new water, to achieve greater flexibility in use of existing supplies, and to align and enhance standards for water use efficiency.
• Improved water quality resulting from regional wastewater treatment facility upgrades (i.e. the Regional Optimization Master Plan or ROMP) is matched to needs for recharge, environmental restoration and public amenities such as parks, golf courses and ball fields.
• Land use, infrastructure and water resources planning are linked and foster optimum use of renewable water resources in future growth areas and increased water and energy efficiency outcomes in new development.
• Water is dedicated and allocated to environmental needs, sensitive riparian ecosystems are preserved and maintained, and cost-effective and collaborative environmental restoration projects are advanced.
• Public values are considered in water resources planning and public awareness of the human, environmental and economic benefits of improving water use efficiency is increased.

“We Americans are spoiled. We wake up in the morning and turn on the tap, and out comes as much water as we want for less than we pay for cell phone service or cable television.”

- Robert Glennon, Morris K. Udall Professor of Law and Public Policy, Rogers College of Law, University of Arizona, from “Unquenchable: America’s Water Crisis and What to Do About It,” 2009
Prior to the delivery of renewable Central Arizona Project (CAP) water, the Tucson region was the largest metropolitan area solely dependent on non-renewable groundwater resources. Beginning in the 1940s, groundwater withdrawals began to exceed replenishment and, like other growing areas of the state, the Tucson area began to experience groundwater overdraft leading to the lowering of groundwater tables and subsequent loss of riparian habitat, subsidence and declines in water quality.

The 1980 Arizona Groundwater Management Act (GMA) gave the state control of groundwater pumping and established a statewide goal known as “Safe Yield” within the Phoenix, Tucson and Prescott Active Management Areas (AMAs). Safe yield means that by 2025 the AMAs must pump groundwater at a rate no greater than the rate of natural and artificial replenishment. To reach safe yield by 2025, water users in the AMAs must offset all the groundwater uses that total more than the net natural recharge with renewable resources, like CAP water and effluent, or with artificial recharge.

The Arizona Department of Water Resources (ADWR) administers the safe yield goal through a series of ten-year management plans for each AMA. The Tucson AMA is currently operating under the Third Management Plan and the Fourth Management Plan is under development. Despite positive progress toward attaining the safe yield goal, ADWR notes in its Third Management Plan: “given current projections, the AMA will not reach safe-yield by 2025.”

Although of critical importance, even if the safe yield goal were met, it would not solve all the issues related to groundwater overdraft. Under the 1980 GMA, development may continue to mine groundwater through purchase of paper water recharge credits from the Central Arizona Project. State law allows for withdrawals in one part of the AMA to be offset by recharge in another, hydrologically disconnected location. As such, safe yield applies strictly on an AMA-wide basis and can result in continued problems related to localized overdraft within sub-basins. A Safe Yield Task Force is currently deliberating on the topic of how to address the challenges of meeting safe yield in the Tucson AMA and the Fourth Management Plan, when completed, will provide specific steps to reach safe yield.

Additionally, the City / County Water and Wastewater Study recognized the need to go beyond safe yield when establishing a framework for sustainable water planning. In the Phase I Report the Oversight Committee concluded: “A definition of sustainable water management must consider the regional impacts of water use at the watershed scale and the localized impacts to aquifers and groundwater-dependent ecosystems. It must establish a link between sustainable groundwater use and the provision of renewable water sources to areas impacted by groundwater overdraft.”

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*“Water management involves great complexities, especially when dealing with growth, water scarcity and recognition of environmental water needs. If the solutions were easy, we’d have identified them. Collectively, on multiple geographic scales and across water using sectors, we must work together to develop and implement solutions.”*

--Sharon B. Megdal, Director, Water Resources Research Center, University of Arizona, from “Water Policy Innovations and Challenges in Arizona”; Rural Connections; May 2010
The primary sources of water addressed in this Action Plan are managed by three utilities: The City of Tucson, Tucson Water Department operates and maintains the potable and reclaimed water systems; (2) Pima County Regional Wastewater Reclamation Department (RWRD) operates and maintains a regional wastewater conveyance and treatment system that generates the effluent used in the City of Tucson’s reclaimed system; and (3) The Pima County Regional Flood Control District (RFCD) manages stormwater resources.

This Action Plan focuses on activities that will advance integrated water resource planning for all these sources of water within the combined service areas of Tucson Water and Pima County Regional Wastewater Reclamation Department. Many of the activities are well suited to being implemented in partnership with other jurisdictions, water and wastewater providers and stakeholders and, where feasible and appropriate, the City and County will include outreach to potential partners as they implement these activities.

Tucson Water serves approximately 800,000 customers and accounts for 72% of municipal demand in Pima County. As depicted in the map above, the City’s obligated service area extends outside of its incorporated boundaries. Pima County is the Designated Management Agency for all of Pima County except the Tohono O’odham Nation and the Town of Sahuarita. The Pima County RWRD provides 97% of the total treatment capacity for Pima County. For further details on infrastructure, supply and capacity of each of these two utilities see the Phase I Water Study Report at www.tucsonpimawaterstudy.com.

Additionally, the Phases 1 and 2 Water Study reports highlighted the importance of rainwater and stormwater as a supplemental source of locally renewable water. Historically, stormwater has been treated as a safety hazard and managed for disposal not for beneficial use. The Phase 2 goals include a heightened emphasis on integrating land use and water resources planning which includes incorporating beneficial use of stormwater as feasible in new development and capital improvement projects. The Pima County Regional Flood Control District is responsible for regional flood control needs in Pima County including constructing major flood control facilities, purchasing flood and erosion-prone land, operating the community’s flood warning system, and providing floodplain management activities for all unincorporated county areas. This includes activities aimed at enhancing wildlife, recreation and riparian habitats along watercourses and floodplains and constructing and operating groundwater recharge facilities that also have flood control benefits, among other services.
The City/County Water Sustainability Action Plan spans the five-year period from January 2011 to December 2015. It is a living plan that will be modified along the way as needed in response to changing conditions such as the evolution of a regional process for sustainable water planning. Inter-disciplinary teams of staff from the following City and County departments developed the Plan:

• City/County Administration
• City of Tucson, Tucson Water Department
• Pima County Regional Wastewater Reclamation Department
• Pima County Regional Flood Control District
• City/County Sustainability Offices
• City/County Planning and Development Services Departments
• Pima County Department of Environmental Quality
• City/County Transportation Departments
• City/County Parks and Recreation Departments
• City of Tucson Department of Housing and Community Development

The Action Plan describes a range of activities with timelines to implement the goals and recommendations in the Phase 2 Report. Many of the recommendations and goals of the Phase 2 Report involved refinements or expansions to existing City and County programs. As such, the activities are organized within City/County programs to ensure that the action plan moves forward despite the resource constraints both the City and County are operating under due to the economic downturn. The programs and activities are designed to be implemented with current resources. In some cases, additional resources would allow actions to be completed more quickly and would allow for an enhanced implementation. However, the Plan does not rely on additional resources to move forward. Some activities have existing grant funding associated with them, and City and County staff will be pursuing additional partnerships and outside funding to support implementation of other activities.

A joint City/County Staff Steering Committee will continue to meet on a quarterly basis to coordinate and oversee the Action Plan implementation. To track and measure progress, staff have included 11 indicators of success across the four elements. Over the next year, the Steering Committee will continue to meet to develop baselines and targets for the indicators. This will allow the development of an annual “City/County Report Card” on sustainable water planning. This annual report card will be developed and distributed to elected officials, citizen advisory committees and posted on the City/County Water Study website (www.tucsonpimawaterstudy.com), at the end of each year of the five year Action Plan.
Partnership Opportunities Stemming from Action Plan

Opportunities for partnerships are identified throughout the Action Plan and the City and County are committed to ensuring on-going public outreach and education through participation in regional efforts, updates to the City/County Citizen Advisory Committees and Planning Commissions, and maintenance of the City/County Water Study website.

Following are examples of activities identified in the draft City/County Action Plan that could benefit from being implemented in partnership with regional stakeholders such as the University of Arizona (UA), the Southern Arizona Water Users Association (SAWUA), Water Conservation Alliance of Southern Arizona (Water CASA), Pima Association of Governments (PAG), the Arizona Department of Water Resources (ADWR), and business and environmental interested parties among others.

**Environmental Collaboration**
The Respect for the Environment element relies heavily on collaboration and regional partnerships to address riparian restoration and preservation including the following activities: (1) coordinating for future bond funding to acquire riparian habitat for preservation; (2) establishing a working group to advance cost-effective, regionally coordinated environmental projects; (3) developing a coordinated riparian habitat preservation outreach program; and (3) extending reclaimed water lines to Vail to protect Cienega Creek.

**Pumping Recharge Disconnect**
The hydrologic disconnect between where pumping of groundwater occurs and where it is recharged as groundwater replenishment is a significant regional problem, primarily outside the Tucson Water service area, that will require a regional solution. The City and County are currently participating in a Safe Yield Task Force and the emerging regional process for water sustainability to address the pumping/recharge disconnect. In addition, Tucson Water is working to implement wheeling agreements with other providers to deliver renewable wet water resources to areas that currently rely on groundwater.

**Research and Evaluation**
There is a need for better data collection to determine how best to direct efforts toward drought planning, water conservation programming, and groundwater and environmental monitoring. Better data can also be used to
gauge the water conservation potential of new development and of specific measures such as water harvesting. This is considered an appropriate arena for engaging in a regional dialogue to improve the quality and usefulness of the data gathered.

More robust cost-benefit analysis tools are needed for future integrated resource planning and decision making to better account for environmental, energy, social preference and other impacts and trade-offs associated with different supply and demand scenarios.

**Water Conservation Goals and Education**

Establishing measurable water conservation goals was identified as a regional item. The City and County have identified a benchmark study as an initial step to gather background information on measurable goals. Related to this, a common glossary of terms and more consistent outreach, education and standard methods (e.g. for water harvesting and greywater use) are needed.

**Scenario Planning**

The City and County envision holding a scenario planning forum with regional stakeholders and drought and climate change experts to further the Study’s goals related to climate change preparedness and drought planning.
Action Plan: Comprehensive Integrated Planning

Introduction
The Phase 2 Report recognized that water and growth are connected in a variety of ways and that achieving a sustainable water future will require a rational plan for growth that addresses the form, location and cost of growth, as well as the efficient and sustainable allocation of water to serve growth. The action plan for Comprehensive, Integrated Planning includes three programs that aim to ensure the community grows in a rational and sustainable manner. The programs and activities proposed include long term and broad-based policies as well as shorter term tools and strategies.

The Phase 2 Report identified four goals and 12 recommendations to address the following key Water Study topics:
- City / County agreement on the location of future growth increment in 2050
- The influence of urban form, water and infrastructure planning on where this future population growth increment will occur
- Ensuring that this future growth occurs in a manner that does not disadvantage or adversely impact existing residents or the environment, economy and conservation of our resources.

Programs to Address Phase 2 Goals and Recommendations
The Action Plan for Comprehensive Integrated Planning includes 23 discrete activities to implement the Phase 2 Goals and Recommendations. These activities are grouped into the following three City/County program areas:

1. General and Comprehensive Plan Updates
2. Smart Growth Tools and Regulations
3. Linking Water and Land Use Planning

PROGRAM 1: GENERAL AND COMPREHENSIVE PLAN UPDATES
The General Plan and the Comprehensive Plan are the major planning documents for the City and County respectively that guide land use, urban design, and many other public services and infrastructure investments. As required by State law, these plans need to be updated by 2015. The updates to these Plans provide an opportunity to influence future growth patterns in the region. In addition to updating the elements in the Plans in line with the Phase 2 Report, there are new aspects proposed to ensure the updated plans lead to actions such as an analysis of infrastructure and public facilities needs, designation of suitable growth areas and job centers, exploration of pre-zoning to encourage growth in line with the Plans, an infrastructure phasing plan, and an implementation component.

PROGRAM 2: SMART GROWTH TOOLS AND INCENTIVES
There are several specific activities that the City and County plan to undertake in addition to the longer term efforts to update the General and Comprehensive Plans. A sustainability audit of the City and County land use codes as well as some specific amendments to the County Code are aimed at encouraging sustainable urban forms.
There will also be efforts made through research and outreach to identify opportunities to promote mixed uses, well-designed density and infill. In terms of directing growth, improvement districts will be evaluated as a tool to fund open space acquisition and the City will explore legislative changes to allow transfer of development rights from the unincorporated area to the City. The development of a fiscal sustainability model is proposed in order to understand the true costs and funding mechanisms to provide public services and infrastructure based on various land use patterns.

**PROGRAM 3: LINKING WATER AND LAND USE PLANNING**

The activities within this program seek to address the historic disconnect that has existed between land use planning and water resources and infrastructure planning. Wheeling and recharge agreements as well as participation in the Safe Yield Task Force are activities aimed at addressing the hydrological pumping/recharge disconnect and bring more renewable supplies to the region. Implementation of the City’s new Water Service Area Policy and “water resource checkbook” will ensure that renewable water supplies are available for jobs and growth within City limits. Implementation of the County’s Comprehensive Plan Water Policy Element and the proposed comprehensive water resource pilot study in the Southwest area will ensure that use of renewable water supplies and efficient water use is adequately planned for as part of new development in unincorporated Pima County.

A pilot study of integrated water planning in the southwest area, to be led by Pima County, is identified. This study will supplement the existing sustainability framework known as the “Southwest Infrastructure Plan” or “SWIP” and provide a model for improved integration of land use and water resource planning in future growth areas.
Phase 2 Goals and Recommendations

Goal 1 Encourage sustainable urban forms

1.1 Require and encourage smart growth principles

Goal 2 Direct growth to suitable growth areas

2.1 Encourage growth in four (4) suitable growth areas/existing built environment as highest priority
2.2 Link capital planning and land use planning/direct investment to desired growth areas
2.3 Acquire open space to define desired growth areas
2.4 Conduct regional growth scenario modeling

Goal 3 Integrate land use planning and water resources planning

3.1 Conduct comprehensive water resource planning outside of the obligated service area
3.2 Consider obligated service area expansion based on above analysis and additional criteria
3.3 Continue to track resources for new development/County Water Element, City Water Checkbook
3.4 Peruse wheeling and recharge agreements
3.5 Work toward regional solutions to address hydrological pumping/recharge disconnect

Goal 4 Growth should pay for itself over time and be financially sustainable

4.1 Put mechanisms in place to ensure fiscal sustainability of new development
4.2 Continue to ensure “growth pays for growth” in Water and Wastewater financial planning
# Comprehensive Integrated Planning Action Plan

## PROGRAM 1: GENERAL AND COMPREHENSIVE PLAN UPDATES
(Restrictions Addressed)

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<td>1</td>
<td>Analyze infrastructure and public facilities needs in preparation for updates to the Plans. (2.1)</td>
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<td>Update the Urban Form elements of the Plans to encourage smart growth and sustainable urban form. (1.1)</td>
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<td>Review and update Water Elements in Plans to ensure consistency with City/County Water Study recommendations and state requirements. (1.1)</td>
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<td>Explore policy to provide for pre-zoning in growth areas as part of updates to the Plans. (2.1)</td>
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<td>5</td>
<td>Identify and designate suitable growth areas in the updates to the Plans. (2.1)</td>
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<td>Identify and designate employment and job centers in the updates to the Plans. (2.1)</td>
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<td>Establish infrastructure and service phasing boundaries within growth areas. (2.2)</td>
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<td>Develop an implementation component for each of the Plans. (2.2)</td>
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<td>9</td>
<td>Link County Conservation Acquisition Program with updated Plans. (2.3)</td>
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## PROGRAM 2: SMART GROWTH TOOLS AND INCENTIVES

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<td>10</td>
<td>Identify opportunities to promote mixed uses and well-designed density. (1.1)</td>
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<td>11</td>
<td>Revise County's Cluster Ordinance to improve water efficiency of new development. (1.1)</td>
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<td>12</td>
<td>Evaluate improvement districts as a tool to purchase natural areas/riparian habitat. (2.3)</td>
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<td>13</td>
<td>Work with TREQ to advance public/private collaboration toward economic base job creation (employment with a multiplier effect) and urban revitalization, including ensuring that water resource policies are aligned with economic goals. (2.1)</td>
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<td>14</td>
<td>Conduct a Land Use Code sustainability audit to identify opportunities to encourage sustainable urban forms. (1.1)</td>
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<td>15</td>
<td>Explore conservation subdivision requirement in Conservation Land System (MBB) to better integrate new development into environmentally sensitive areas. (1.1)</td>
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<td>16</td>
<td>Identify and address barriers to infill. (2.1)</td>
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<td>17</td>
<td>Develop a fiscal sustainability model. (4.1)</td>
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<td>18</td>
<td>Explore City transfer of development rights (TDR) to help direct growth to suitable growth areas. (2.1)</td>
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## PROGRAM 3: LINKING WATER AND LAND USE PLANNING

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<tr>
<td>19</td>
<td>Continue wheeling negotiations between Tucson Water and other water providers to deliver more renewable supplies to the region. (3.4)</td>
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<td>20</td>
<td>Participate in the Safe Yield Task Force to address pumping recharge disconnect. (3.5)</td>
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<td>21</td>
<td>Implement Tucson Water Service Area Policy and annual water resource &quot;checkbook balance&quot; review. (3.2)</td>
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<td>22</td>
<td>Implement Pima County Water Resource Element to assess water resource impacts of new development. (3.3)</td>
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<td>23</td>
<td>Conduct a pilot study of integrated water resource planning in the Southwest area. (3.1)</td>
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Comprehensive Integrated Planning

Accomplishments

Below are some examples of previous accomplishments that support the Phase 2 Goals and Recommendations for Comprehensive Integrated Planning.

City of Tucson Houghton Area Master Plan (HAMP)- Adopted June 7, 2005, the HAMP guides development in the Houghton Road corridor according to Smart Growth principles such as mixed use, compact, environmentally-sensitive, pedestrian/transit friendly designs, and cost effectiveness.

City of Tucson Sustainability Assessment- City of Tucson is utilizing “Energy Efficiency and Conservation Block Grant” funding to prepare a sustainability analysis of the Land Use Code and recommendations for revisions to address barriers within the Code to achieving sustainable development.

Incentives for Infill- In 2005 the City of Tucson enacted the Roadway Impact fee which establishes a discounted rate for the Central Benefit District to encourage infill in the urban core.

Pima County Southwest Infrastructure Plan (2007)- Establishes sustainability principles that guide land use policies and infrastructure investments to direct sustainable growth and development in the Southwest area. The Plan also provides infrastructure sustainability strategies and measurable implementation objectives.

Pima County Transfer of Development Rights (TDR)- Establishes statutory authority and a framework for inter-jurisdictional transfers of development rights providing new tools for environmental protection.

Indicators of Future Success

- Percent increase in residential units/acre
- Percent increase in City/County Residential Building Permits issued within suitable growth areas
- Percent increase in total water used in suitable growth areas that comes from renewable water sources
Introduction
Respecting the environment means recognizing that water is not only key to our continued economic expansion, it is also essential to a vibrant and healthy environment. There must be an appropriate balance between water use for consumption and growth, and the acknowledgment that our environment is also a consumer of water resources and a healthy environment is essential to our long term well being. As a result, certain water reservations for the environment should be made and sustained.

The City and County began the Water Study with a baseline of shared policy goals for the environment reflecting a commitment to: (1) minimize additional loss of riparian habitat, (2) protect existing riparian areas against vulnerability to climate change and continuing human actions, and (3) where circumstances allow, restore degraded ecosystems to greater functionality.

The Phase 2 Report built upon this common policy framework for environmental protection and identified five goals and 13 recommendations to address the following key Water Study questions:

- What are the existing and future water demands for the environment and how should the community prioritize these needs?
- Why are environmental projects that improve ecosystem functions important?
- How and where can we best preserve and improve ecosystem functions?
- Where are future opportunities for environmental projects in proximity to existing and future water resources?
- What are the opportunities for protecting environmentally sensitive natural riparian areas, including areas of shallow groundwater and perennial and intermittent streams that support unique riparian vegetation, in eastern Pima County?

Programs to Address Phase 2 Goals and Recommendations
The interdisciplinary City/County Action Plan team for Respect for Environment identified 26 discrete activities to implement the Phase 2 Goals and Recommendations. These activities are grouped into the following four City/County program areas:
1. Collaboration for Environmental Restoration
2. Preservation and Protection of Riparian Areas
3. Incorporation of Multiple Benefit Features into Capital Improvement Projects
4. Development of a Lower Santa Cruz River Management Plan
Respect for the Environment
(Continued)

**PROGRAM 1: COLLABORATION FOR ENVIRONMENTAL RESTORATION**

Riparian habitat restoration in the region is influenced by various habitat conservation plans including the Pima County Multi-Species Conservation Plan and the City of Tucson’s Habitat Conservation Plan. These plans encompass a variety of restoration needs, opportunities, and resources such as:

- **Needs for 404 mitigation** – The Clean Water Act requires riparian restoration when wetlands or streams are disturbed.

- **Options for in-lieu mitigation in compliance with local watercourse ordinances** – Where barriers exist to doing restoration onsite, it may be possible to collect a fee in lieu of mitigation that can be used for restoration elsewhere.

- **Availability of the Conservation Effluent Pool** – The “Conservation Effluent Pool” was formed via an Intergovernmental Agreement (IGA) Between the City and County and includes up to 10,000 acre feet of effluent that may be allocated to environmental uses.

- **Existence of a Conserve to Enhance program** - This is a program to link dollars saved on water bills as a result of individual water conservation actions to a fund for environmental restoration. This program is being developed through the University of Arizona Water Resources Research Center in partnership with private, non-profit and local governmental agencies.

To cost effectively implement environmental restoration in light of the diversity of needs, opportunities and resources, public/private partnerships will be pursued to establish priorities for allocation of water for the environment and a regional direction for coordinated and collaborative riparian restoration.

**PROGRAM 2: PRESERVATION AND PROTECTION OF RIPARIAN AREAS**

The purpose of this program is to continue to support the acquisition of high quality riparian areas, while taking more active steps to address threats to the long-term quality of publicly owned lands. The program also focuses on the revision and/or implementation of policies and regulations in order to protect existing riparian habitat.
PROGRAM 3: INCORPORATION OF MULTIPLE BENEFIT FEATURES INTO CAPITAL IMPROVEMENT PROJECTS
The purpose of this program is to provide multi-benefit features in association with capital projects that have a dedicated water supply or that can accommodate water harvesting features. In addition to supporting the development of multi-benefit features in proposed recharge and wastewater reclamation facilities, this program is intended to result in the development of standards and guidance for the incorporation of multi-benefit features in future, but as yet unplanned, capital projects.

PROGRAM 4: REFINEMENTS TO LOWER SANTA CRUZ RIVER MANAGEMENT PLAN
The future of the lower Santa Cruz River is uncertain. Either too much effluent or too little effluent in the river can lead to erosion and/or environmental damages, yet it is important that effluent be reused as a valuable water resource. The purpose of this program is to develop a Management Plan for the Lower Santa Cruz River that addresses the preservation of habitat values currently present under various future effluent flow scenarios. Building upon the planning efforts undertaken as part of Tres Rios del Norte (TRDN), this program will focus on developing a more detailed resource assessment of the Lower Santa Cruz River, evaluating the impacts of various potential future effluent flow levels, and implement pilot projects aimed at assessing options for maintaining habitat under changed future flows.
Phase 2 Goals and Recommendations

Goal 1  Preserve existing riparian areas through coordinated regulation, policy, and outreach

1.1 Continue preservation through acquisition, regulation, education and outreach

1.2 Address non-exempt wells and surface water diversions affecting riparian areas

Goal 2  Identify needs and opportunities for future restoration

2.1 Develop regional policy on regulatory compliance projects

2.2 Collaborate regionally on riparian restoration

2.3 Work with ADEQ on water quality standards for habitat restoration

Goal 3  Ensure that public projects, are multi-benefit

3.1 Pursue multi-benefit public projects using reclaimed water

3.2 Pursue stormwater management opportunities in areas dominated by impervious surface

Goal 4  Ensure the future of riparian and aquatic habitat along the effluent-dependent reach of the Santa Cruz River

4.1 Advocate for changes to allow full recharge credit for Secretary of Interior effluent

4.2 Develop a "Lower Santa Cruz River Management Plan"

4.3 Build upon pilot restoration demonstration projects to develop a portfolio of multi-purpose projects

4.4 Incorporate in-channel and off-channel recharge facilities features

Goal 5  Develop water supply for the environment

5.1 Finalize the IGA for the Conservation Effluent Pool

5.2 Link water conservation to environmental preservation/restoration
Respect for Environment Action Plan

**PROGRAM 1: COLLABORATION FOR ENVIRONMENTAL RESTORATION**  
(Recommendations Addressed)

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<tbody>
<tr>
<td>1</td>
<td>Finalize the Conservation Effluent Pool (CEP) implementing agreement, establish City/County CEP Administrators and implement the CEP program. (5.1)</td>
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<td>2</td>
<td>Establish a Regional Restoration Working Group to inventory existing and potential resources, develop a list of criteria for prioritizing and selecting restoration projects and identify an initial list of projects that meet these criteria. (2.2)</td>
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<td>3</td>
<td>Inventory City and County lands to identify properties suitable for riparian restoration (2.2)</td>
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<td>4</td>
<td>Coordinate development of a volunteer-based stewardship program with Tucson Audubon Society pending their receipt of grant funding. (1.1)</td>
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<td>5</td>
<td>Continue to work with Tucson Audubon Society and the Army Corps of Engineers on a watershed-based approach to utilizing Audubon’s, and potentially other entities’, 404 in-lieu mitigation fees/funds. (2.1)</td>
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<td>6</td>
<td>Begin the development of outreach and educational materials to inform the community about the importance of riparian areas and continue to build awareness of and support for their protection and restoration. (1.1)</td>
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<td>7</td>
<td>Participate in the Conserve to Enhance (C2E) program to develop a funding source to acquire water supplies for environmental restoration. (5.2)</td>
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**PROGRAM 2: PRESERVATION AND PROTECTION OF RIPARIAN AREAS**

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<tr>
<td>8</td>
<td>Adopt and implement Lee Moore Basin Management Plan to protect riparian habitat in a future growth area. (1.1)</td>
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<td>9</td>
<td>Adopt revised County riparian mitigation guidelines associated with their riparian habitat preservation ordinance. (1.1)</td>
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<td>10</td>
<td>Finalize City’s new Riparian Area Protection Ordinance and seeks approval from Mayor and Council. (1.1)</td>
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<td>11</td>
<td>Identify ways to improve data sharing between the City and County and develop annual monitoring reports that address threats within shallow groundwater areas. (1.2)</td>
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<td>12</td>
<td>Apply for a County incidental take permit associated with their Multi-Species Habitat Conservation Plan and implement the Conservation Land System and associated guidelines. (1.1)</td>
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<td>13</td>
<td>Continue to develop the City Southlands Habitat Conservation Plan. (1.1)</td>
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<td>14</td>
<td>Inventory high-value riparian areas and develop a monitoring/management database. (1.1)</td>
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<td>15</td>
<td>Improve management of public lands through field assessments and where necessary implement remediation to address such things as trespassing and cleanup needs. (1.1)</td>
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<td>16</td>
<td>Develop response/management guidelines, including responsible agency, notification and response requirements, and follow-up needed to address threats to publicly owned lands. (1.1,)</td>
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<td>17</td>
<td>Pursue bond funding for acquisition of natural areas and riparian habitat, and for extension of reclaimed lines to Vail area (1.1 / 1.2)</td>
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<td>18</td>
<td>Finalize City Southlands Habitat Conservation Plan and applies for an incidental take permit. (1.1)</td>
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**Respect for Environment Action Plan (Continued)**

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<th>PROGRAM 3: INCORPORATION OF MULTIPLE BENEFIT FEATURES INTO CAPITAL IMPROVEMENT PROJECTS</th>
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<tr>
<td>19. Develop a guidance document for retrofitting detention basins and develop a list of basins that offer opportunities for habitat restoration and/or recreation. (3.1)</td>
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<td>20. Retrofit Kolb Road detention basin for environmental restoration using stormwater as a demonstration project. (3.1)</td>
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<td>21. Develop a guidance document for multi-purpose design of parks including water harvesting, green development, and wildlife habitat to complement the recreational features and reduce future operational costs. (3.1)</td>
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<tr>
<td>22. Develop a joint policy that incorporates rainwater harvesting, stormwater detention, non-potable water use, recreation, and ecological amenities to the extent feasible in Capital Improvement Project budgets. (3.1)</td>
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<th>PROGRAM 4: REFINEMENT OF LOWER SANTA CRUZ RIVER MANAGEMENT PLAN</th>
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<tr>
<td>23. Finalize Tres Rios del Norte (TRDN) Feasibility Study which will provide a broad concept for restoration along the Santa Cruz River, and then review the various alternatives with the Restoration Working Group to identify local priority projects to evaluate further. (4.2)</td>
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<td>24. Develop refined estimates of evapotranspiration and infiltration along the effluent dominated reach of the Santa Cruz River. (4.2)</td>
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<tr>
<td>25. Construct an environmental restoration project in a former gravel pit using effluent flowing in the river from Roger Road, as well as tributary stormwater flows, to evaluate how to best manage habitat to transition from effluent dependent to using stormwater harvesting as a water source. (4.3)</td>
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<td>26. Conduct scenario planning to evaluate, under different effluent flow scenarios, options for maintaining riparian and aquatic habitat along the river. (4.2)</td>
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Below are some examples of previous accomplishments that support the Phase 2 Goals and Recommendations for Respect for Environment

The Sonoran Desert Conservation Plan (SDCP) – Diverse interests across the region came together through the SDCP planning process to identify which natural areas and cultural sites in Pima County are most important to conserve, and which areas are more suitable for development. In 2004, Pima County voters approved $163 million to implement the SDCP resulting in the purchase to date of over 47,000 acres of land including critical riparian habitat and areas that provide significant ground water recharge to the Tucson basin.

Multi-Benefit Projects - The County and City have both incorporated multi-benefit features, including restoration/habitat enhancement in previous capital projects. Examples include Kino Detention Basin, Sweetwater Recharge/Wetland Facility, the High Plains Recharge Project, and Southern Avra Valley Storage and Recovery Project (SAVSARP). There are, however, opportunities that may have been, or may in the future be missed without a clear commitment to and guidelines for incorporating multi-benefit features into these types of projects.

The Conservation Effluent Pool Intergovernmental Agreement (IGA) has been created that allocates up to 10,000 acre feet of effluent for environmental restoration. A draft implementing IGA is in process.

Indicators of Future Success

• Increase in acres of riparian habitat permanently preserved

• Increase in acres of riparian habitat restored

• Percent increase in non-regulatory CIP project budgets to fund multiple benefits such as restoration, water harvesting, or public amenity
Action Plan: Water Supply

Introduction
Appropriately managing current water resources to protect public health and safety and assuring that water resources are renewable, balanced with demand, reliable, and efficiently used are key elements of a sustainable water future. With climate change and drought potentially affecting water demand and supply, the need to secure additional water supplies for the future to buttress existing supplies is another principle objective. The Phase 2 Water Study Report concluded that “we need to act conservatively and responsibly to manage our water resources.” Responsible management includes diversifying the water resource portfolio to reduce dependence on imported water that is vulnerable to shortage. Increasing conservation and maximizing the use and re-use of renewable, locally-generated water sources are other objectives. A comprehensive approach to sustainability also includes protecting, preserving and, where feasible, improving water quality. While effluent is a significant component of the region’s renewable supply, higher quality effluent renders it a more flexible resource that strengthens sustainability.

In Phase 2 of the Water Study staff evaluated the following questions related to water supply:

• How regional collaboration can potentially facilitate securing additional renewable water resources as befits their respective missions
• What could be done to ensure that the long-term future water supply is not acquired at the expense of our current residents or the environment
• How the city and County can work together to increase the use of reclaimed or recycled water for turf irrigation to reduce groundwater pumping
• How the City and County can ensure the strict compliance with water quality requirements in the region and how they are preparing for future regulatory requirements for emerging contaminants

Programs to Address Phase 2 Goals and Recommendations
The interdisciplinary City/County Action Plan team for Water Supply identified 30 discrete activities to implement the Phase 2 Goals and Recommendations. These activities are grouped into the following four City/County program areas:

1. Water Supply and Water Quality
2. Effluent Management
3. Regulatory / Policy Advocacy for Effluent/Reclaimed Water, Stormwater and Gray Water
4. Drought Preparedness
PROGRAM 1: WATER SUPPLY AND WATER QUALITY
While there is not an immediate supply issue, it is prudent that Tucson Water secure new, renewable water resources in order to assure future reliability of our water resource portfolio. This effort is particularly important in the face of potential impact of extended drought and climate change on both the Colorado River watershed and local conditions.

Action to bolster our water supply should include maximizing use of locally renewable water resources such as stormwater harvesting, rainwater harvesting and gray water use.

Effluent is a significant component of the region's renewable water supply, but it is also a source of discharge of trace levels of emerging contaminants for which no regulatory standards have been set. Tucson Water protects drinking water sources with a “multiple barrier approach.” Through substantial planned wastewater facility improvements, the Regional Wastewater Reclamation Department is enhancing effluent water quality. Both Tucson Water and Pima County must remain vigilant of about water quality to protect and preserve existing and future water supply sources.

PROGRAM 2: EFFLUENT MANAGEMENT
Tucson Water has constructed an extensive reclaimed system over the past 25 years. The use of reclaimed water must be considered within the broader context of sustainability with the goal of maximizing our water resource portfolio as a community. While reclaimed water is an important tool for putting effluent to use, there are multiple valued uses for effluent, and these uses should be maintained over time. The use of reclaimed water for irrigation, environmental purposes and aquifer augmentation should be evaluated in the overall context of maximizing the community’s water resource portfolio. The key is matching up the most effective and resource-efficient water source with the needs of a particular site.

PROGRAM 3: REGULATORY ADVOCACY FOR EFFLUENT/RECLAIMED WATER, STORMWATER AND GRAY WATER
The Arizona Department of Water Resources (ADWR) and Arizona Department of Environmental Quality (ADEQ) regulate the use of effluent, reclaimed water, stormwater, and gray water. It is important that appropriate standards are in place to protect public health and the environment. At the same time, water regulations need to be aligned with sustainability objectives in order to foster increased use of renewable water supplies. Staff should participate in, and advocate for, state initiatives that address regulatory barriers to maximizing local supplies.

PROGRAM 4: DROUGHT PREPAREDNESS
Uncertainty about the impacts of climate change and prolonged drought require that an adaptive, flexible and regularly updated scenario planning approach be in place. A multi-pronged preparedness strategy can lead the community to become more resilient in the face of a variety of potential future water resource scenarios. This program will ensure the community is prepared for the water resource impacts resulting from climate change and drought and that adaptive strategies are in place.
Water Supply

Phase 2 Goals

Goal 1  Work collaboratively to acquire new water supplies for reliability
   1.1 Maximize opportunities to acquire ADD water supplies through regional cooperation
   1.2 Acquire additional supplies to buttress Tucson Water's CAP allocation and serve growth in the obligated service area
   1.3 Consider all costs and benefits in the acquisition of new supplies

Goal 2  Maximize and make efficient use of effluent and other locally renewable water supplies
   2.1 Balance uses of effluent - reclaimed, environment and aquifer recharge
   2.2 Continue to implement ROMP improvements
   2.3 Stay vigilant about water quality
   2.4 Evaluate reclaimed expansion from the efficiency and overall water resource portfolio perspectives
   2.5 Continue to evaluate graywater expansion
   2.6 Continue to encourage rainwater harvesting

Goal 3  Address regulatory barriers to maximizing local supplies
   3.1 Address groundwater credits to provide incentives to convert to reclaimed
   3.2 Move to Class A+ water for the reclaimed system
   3.3 Work with ADEQ and ADWR regarding water quality standards for riparian projects

Goal 4  Foster increased use of reclaimed water
   4.1 Expand financing options
   4.2 Maintain private payer and explore pricing incentives to encourage conversion
   4.3 Lower operating cost through efficiencies
   4.4 Consider reclaimed water in new developments
   4.5 Consider other uses of reclaimed water for municipal and environmental supply needs
   4.6 Increase the amount of effluent dedicated to reclaimed
   4.7 Attract additional reclaimed customers based on efficiency considerations and benefits

Goal 5  Be prepared for climate change and drought
   5.1 Continue multi-pronged planning approach
   5.2 Use scenario planning
## Water Supply Action Plan

### Program 1: Water Supply and Water Quality

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<tr>
<th>Recommendation</th>
<th>Year 2011</th>
<th>Year 2012</th>
<th>Year 2013</th>
<th>Year 2014</th>
<th>Year 2015</th>
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<tbody>
<tr>
<td>1. Acquire new water supplies through Project ADD Water.</td>
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<td>2. Identify future water needs for Tucson Water in the 2050 Tucson Water Plan.</td>
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<td>3. Provide updates to Mayor and Council, Board of Supervisors, Citizens’ Water Advisory Committee and Regional Wastewater Reclamation Advisory Committee on research and regulation related to water quality. (2.3)</td>
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<td>4. City purchases full City of Tucson CAP allocation and increases recharge. (1.3)</td>
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<td>5. Update 2050 Tucson Water Plan to consider costs, benefits, and tradeoffs of acquiring new water supplies including costs of Project ADD Water in the 2050 Tucson Water Plan Update. (1.3)</td>
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### Program 2: Effluent Management

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<tr>
<td>6. Incorporate reclaimed, environmental and aquifer recharge uses into Tucson Water’s Effluent Master Plan. (2.1)</td>
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<td>7. Develop a joint recharge project in the Southeast Area (Proposed: Joint Southeast/Houghton Area Recharge Project [SHARP]). (2.1)</td>
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<td>8. Expand Sweetwater Recharge Facility. (2.1)</td>
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<td>9. Cooperate with the Bureau of Reclamation to develop demonstration recharge projects in the Santa Cruz River. (2.1)</td>
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<td>10. Implement Regional Optimization Master Plan (ROMP) improvements to Pima County’s metropolitan wastewater reclamation facilities. (2.2)</td>
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<td>11. Maximize beneficial use of City’s effluent and assess the potential to convey other party’s effluent entitlements to enable beneficial use region-wide through Tucson Water’s Effluent Master Plan efforts. (2.4)</td>
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<tr>
<td>12. Assess impacts of graywater on sewer system. (2.5)</td>
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<tr>
<td>13. Identify and assess a range of practical incentives, including improved water quality to encourage more customers to hookup to the City’s reclaimed water system in the preparation of the Tucson Water Effluent Master Plan. (3.2)</td>
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<tr>
<td>14. Pursue bond funding for reclaimed water system expansion benefitting public use projects. (4.1)</td>
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<td>15. Assess the possibility of creating price incentives to encourage expanded reclaimed water use in the preparation of the Tucson Water Effluent Master Plan. (4.2)</td>
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<tr>
<td>16. Increase reclaimed water system efficiencies through preparation of Tucson Water Effluent Master Plan. (4.3)</td>
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<td>17. Consider reclaimed water in new developments through updating of the General Plan and Comprehensive Plan(s). (4.4)</td>
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<td>18. Evaluate the feasibility of extending the reclaimed infrastructure to County Parks. (4.5)</td>
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<tr>
<td>19. Evaluate the feasibility of extending the reclaimed infrastructure to City Parks. (4.6)</td>
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<td>20. Prepare effluent plan for use of County share of effluent. (4.6)</td>
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<tr>
<td>21. Identify additional reclaimed water customers. (4.7)</td>
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</table>
## Water Supply Action Plan (Continued)

### PROGRAM 3: REGULATORY/POLICY ADVOCACY FOR EFFLUENT/RECLAIMED WATER, STORMWATER AND GRAYWATER

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>22</td>
<td>Advocate for regulatory changes that will expand the use of graywater through participation in Blue Ribbon Panel. (2.5)</td>
</tr>
<tr>
<td>23</td>
<td>Advocate that Arizona Dept. of Environmental Quality recognize rainwater harvesting and green infrastructure as stormwater management Best Management Practices through participation in Blue Ribbon Panel. (2.6)</td>
</tr>
<tr>
<td>24</td>
<td>Advocate for change in Arizona Dept. of Water Resources policy to provide Groundwater Savings Facilities credits for turf irrigation through participation in Blue Ribbon Panel. (3.1)</td>
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<tr>
<td>25</td>
<td>Advocate for numeric rather than technology-based standards for reclaimed water through participation in Blue Ribbon Panel. (3.2)</td>
</tr>
<tr>
<td>26</td>
<td>Seek flexibility in water quality standards and permitting for riparian enhancement and environmental restoration projects using reclaimed water through participation in Blue Ribbon Panel. (3.3)</td>
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<tr>
<td>27</td>
<td>Advocate for change in regulations to allow remediated groundwater in reclaimed water system through participation in Blue Ribbon Panel. (4.5)</td>
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</tbody>
</table>

### PROGRAM 4: DROUGHT PREPAREDNESS

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>28</td>
<td>Update Tucson Water Plan 2050 to include multi-pronged approach for drought preparedness. (5.1)</td>
</tr>
<tr>
<td>29</td>
<td>Update City of Tucson Water Department Drought Preparedness and Response Plan. (5.2)</td>
</tr>
<tr>
<td>30</td>
<td>Update Pima County Drought Management Plan. (5.2)</td>
</tr>
</tbody>
</table>
Accomplishments

Below are some examples of previous accomplishments that support the Phase 2 Goals and Recommendations for Water Supply

Shift from Groundwater to Renewable Water Resources – The construction of Tucson Water’s CAVSARP and SAVSARP recharge and recovery facilities has resulted in beneficial use of its CAP allocation and a corresponding reverse in the declines of groundwater levels in the central basin.

Tucson Water – Water Plan: 2000-2050 (and subsequent updates) – Provides an integrated resource plan addressing a range of scenarios, current and potential future supplies, demand management strategies and projected demand.

The Pima County Comprehensive Plan Amendment for Water Resources – Requires new development at the Rezoning and Comprehensive Plan Amendment stages to provide pertinent information on water resource impacts, supply sources and water conservation measures.

Indicators of Future Success

• Increase in amount of reclaimed water delivered

• Increase in amount of effluent recharged in constructed or managed recharge facilities

• Increase in amount of CAP recharged in Tucson area recharge facilities or in Groundwater Savings Facilities
“In this region we have done all the cheap and easy things to save water and extend their supplies so everything done from here on out must be justifiable fiscally, environmentally, and socially (triple bottom line) and must be weighed against any and all other engineered or acquisition solutions to water supply issues.”

-Val Little,
Water CASA

**Action Plan: Demand Management**

**Introduction**

The Phase 2 Report recognized that Tucson Water has a long history of high profile, diverse water conservation programming in the region which has contributed to a strong water conservation ethic locally and to sustained reductions in per capita water use over the past three decades. Going forward, it will be important to establish economic thresholds to consider in analyzing cost benefit impacts of demand management programs, but also the fiscal, environmental and social tradeoffs associated with demand management and water supply options.

The Phase 2 Report identified five goals and 9 recommendations to address the topics identified in the Water Study Scope of Work which were to identify ways to 1) Improve consistency of standards and ordinances; and 2) Ensure that water conservation protects future supplies and does not simply make population growth possible.

**Programs to Address Phase 2 Goals and Recommendations**

The interdisciplinary City/County Action Plan team for Demand Management identified 9 discrete activities to implement the Phase 2 Goals and Recommendations. These activities are grouped into the following three City/County program areas:

1. **Planning and Evaluation**
2. **Consistent Standards and Guidelines**
3. **Education and Outreach**

**PROGRAM 1: PLANNING AND EVALUATION**

The programs and activities in the Action Plan for Demand Management include an emphasis on data collection to understand water conservation potential, costs and benefits of different demand management measures such as water harvesting, and public values and awareness of the benefits of water conservation.

**PROGRAM 2: CONSISTENT STANDARDS AND GUIDELINES**

The design of the built environment has a significant impact on long-term water usage rates. Increased emphasis on common standards for water efficient technology and design in new development is a priority.

**PROGRAM 3: OUTREACH AND EDUCATION**

Tucson Water has significant outreach and education programs in place. Going forward, the City and County are committed to increasing consistency in water conservation information and education programming. Drought messaging must be developed that incorporates a regional theme, without hindering individual utilities ability to respond appropriately for their specific system needs. These are areas with opportunity for partnerships with other jurisdictions and water providers.
Demand Management

Phase 2 Goals and Recommendations

Goal 1 Increase the effectiveness of conservation programming through coordinated planning and evaluation

1.1 Collect uniform data on water use patterns to identify conservation potential
1.2 Use triple bottom line and cost/benefit analysis to improve conservation programming
1.3 Employ adaptive planning approach to drought preparedness

Goal 2 Establish common water conservation goals and targeted methods

2.1 Establish regional, measurable water efficiency and conservation goals
2.2 Develop regional water conservation approaches

Goal 3 Manage demand through design of the built environment

3.1 Review development regulations for consistency and improved potable water conservation

Goal 4 Manage demand through changing behaviors

4.1 Gather public input regarding quality of life trade-offs associated with water efficiency
4.2 Advance a regional approach to conservation education, communication, pilot projects and training

Goal 5 Increase the use of rainwater and stormwater to reduce demands on potable supplies

5.1 Develop design guidelines for neighborhood stormwater harvesting
5.2 Analyze expanded water and stormwater harvesting potential and benefits
## Demand Management Action Plan

### PROGRAM 1: PLANNING AND EVALUATION
(Recommendations Addressed)

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Action Plan</th>
<th>Year</th>
<th>Year</th>
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<th>Year</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Collect data on current conditions to provide a foundation for assessing potential to reduce the water/energy footprint of new development, and work with regional water utilities to identify opportunities for uniform data collection. (1.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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<tr>
<td>2</td>
<td>Analyze the effectiveness of City of Tucson water harvesting ordinance as well as the overall potential for expanded water and stormwater harvesting (5.2).</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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<tr>
<td>3</td>
<td>Conduct a benchmark study of water efficiency goals, success indicators and best management practices to inform regional dialogue. (2.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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<tr>
<td>4</td>
<td>Evaluate outdoor water use requirements, water budgeting methods, drought tolerant plant lists and appropriate watering practices for urban desert landscapes, and use results to inform development of more efficient and consistent outdoor water use standards and practices. (3.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
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### PROGRAM 2: CONSISTENT STANDARDS AND GUIDELINES

<table>
<thead>
<tr>
<th>Recommendation</th>
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<th>Year</th>
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<tbody>
<tr>
<td>5</td>
<td>Develop a model City/County building code to reduce the water/energy footprint in new and renovated buildings. (3.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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<tr>
<td>6</td>
<td>Expand City's ordinance-related graywater education program to include guidelines and education on use of graywater outdoors. (3.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>7</td>
<td>Develop design guidelines for neighborhood stormwater harvesting to encourage the creation of habitat and water efficient landscapes. (5.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
</tr>
<tr>
<td>8</td>
<td>Develop a commercial green building rating system to increase the consistency and effectiveness of water and energy efficiency standards in the commercial sector. (3.1)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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### PROGRAM 3: OUTREACH AND EDUCATION

<table>
<thead>
<tr>
<th>Recommendation</th>
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<tbody>
<tr>
<td>9</td>
<td>Work with regional water utilities to develop coordinated and consistent demand management strategies, practices, surveys and messages. (2.1 / 4.1 / 4.2)</td>
<td>2011</td>
<td>2012</td>
<td>2013</td>
<td>2014</td>
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</table>

### Water Use by Class

**Single Family**
- Outdoor: 45% of Demand
- Toilet: 14%
- Shower: 12%
- Faucet: 10%
- Washers: 13%
- Leaks: 7%
- Other: 2%

**Multi-Family**
- Outdoor: 35% of Demand
- Toilet: 15%
- Shower: 12%
- Faucet: 13%
- Washers: 12%
- Leaks: 10%
- Other: 10%

**Commercial & Industrial**
- Outdoor: 26% of Demand
- Kitchen: 6%
- Restroom: 16%
- Process: 17%
- Cooling: 15%
- Laundry: 2%
- Other: 9%
Indicators of Future Success

- Increase in public awareness that conserving water resources helps maintain water supplies for both environmental and human needs.
- Decreasing trends in residential water use in new developments.

Accomplishments

Below are some examples of previous accomplishments that support the Phase 2 Goals and Recommendations for Demand Management:

- Tucson Water’s Community Conservation Task Force (CCTF) recommended a plan based on cost benefit analysis for enhanced water use efficiency programs with a focus on technology. The CCTF recommendations to Mayor and Council resulted in the development of a conservation fee to fund Tucson Water’s conservation programs.

- The City of Tucson Water Harvesting and Graywater Ordinances – Adopted in 2008, these ordinances mandate that new commercial development utilize water-harvesting practices to meet 50% of the site landscape water requirement and dual plumbing to allow for graywater system installation in new homes.

- Pima County 2006 and 2007 Water Conservation Code Amendments – Requirements now in place for waterless urinals and automatic faucets in commercial buildings, sub-water meters in multi-family construction, pool covers for new pools and use of reclaimed water for new golf courses. In new construction, separate reclaimed-ready irrigation plumbing and irrigation with seasonal adjustments and rain sensors are required and restrictions on large water fountains and water features and turf areas are in place.

- Pima County Green Building and LEED Certification programs were established in 2008 promoting the construction of sustainable homes.
Connectivity of Action Plan Elements

The four elements of Comprehensive Integrated Planning (CIP), Respect for Environment (RFE), Water Supply (WS) and Demand Management (DM) are strongly inter-connected. As such, activities to address one recommendation in many cases also address cross-linked recommendation(s) in a different element. To minimize redundancy, the Action Plans for each element list activities only once. The table below depicts key activities that address multiple recommendations:

**Cross Linked Activities and Recommendations**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Recommendations Addressed</th>
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</thead>
<tbody>
<tr>
<td><strong>CIP Activity No.13:</strong> Conduct a Land Use Code sustainability audit to identify opportunities to encourage sustainable urban forms</td>
<td><strong>CIP Recommendation 1.1:</strong> Require and Encourage Smart Growth Principles</td>
</tr>
<tr>
<td><strong>CIP Activity No. 11:</strong> Revise County’s Cluster Ordinance to improve water efficiency of new development</td>
<td><strong>DM Recommendation 3.1:</strong> Review Development Regulations for consistency and improved potable water conservation</td>
</tr>
<tr>
<td><strong>CIP Activity No. 2:</strong> Update the urban form elements of the Comprehensive and General Land Use Plans (Plans) to encourage smart growth and sustainable urban form</td>
<td><strong>CIP Recommendation 2.3:</strong> Acquire open space to define desired growth areas <strong>RFE Recommendation 1.1:</strong> Continue (riparian) preservation through acquisition, regulations, education, and outreach</td>
</tr>
<tr>
<td><strong>CIP Activity No. 9:</strong> Link County Open Space Bond Program with updated Plans</td>
<td><strong>CIP Recommendation 1.1:</strong> Require and Encourage Smart Growth Principles <strong>RFE Recommendation 1.1:</strong> Continue (riparian) preservation through acquisition, regulations, education, and outreach</td>
</tr>
<tr>
<td><strong>CIP Activity No. 14:</strong> Explore conservation subdivision requirement in Maeveen Beehan-Conservation Lands Systems to better integrate new development into environmentally sensitive areas.</td>
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</table>
### Cross Linked Activities and Recommendations

<table>
<thead>
<tr>
<th>Activity</th>
<th>Recommendations Addressed</th>
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</table>
| **CIP Activity No. 17**: Explore City Transfer of Development Rights (TDR) to help direct growth to suitable growth areas. | **CIP Recommendation 2.1**: Encourage growth in four (4) suitable growth areas / existing built environment as highest priority  
**RFE Recommendation 1.1**: Continue (riparian) preservation through acquisition, regulations, education, and outreach |
| **CIP Activity No. 12**: Evaluate Improvement Districts as a tool to purchase open space. | **CIP Recommendation 2.3**: Acquire open space to define desired growth areas  
**RFE Recommendation 1.1**: Continue (riparian) preservation through acquisition, regulations, education, and outreach |
| **DM Activity No 1**: Collect data on current conditions to assess potential to reduce the water/energy footprint of new development. Work with regional water utilities to identify opportunities for uniform data collection | **DM Recommendation 1.1**: Collect uniform data on water use patterns to identify conservation potential  
**CIP Recommendation 1.1**: Require and Encourage Smart Growth Principles |
| **DM Activity No 4**: Evaluate outdoor water use requirements, water budgeting methods, drought tolerant plant lists and appropriate watering practices for urban desert landscapes. Use results to inform development of more efficient and consistent outdoor water use standards and practices | **DM Recommendation 3.1**: Review Development Regulations for consistency and improved potable water conservation  
**CIP Recommendation 1.1**: Require and Encourage Smart Growth Principles |
| **DM Activity No. 2**: Analyze the effectiveness of City of Tucson water harvesting ordinance as well as the overall potential for expanded water and stormwater harvesting | **DM Recommendation 5.2**: Analyze expanded water and stormwater harvesting potential and benefits  
**RFE Recommendation 3.2**: Pursue stormwater management opportunities in areas dominated by impervious surfaces |
### Cross Linked Activities and Recommendations

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<tr>
<td><strong>DM Activity No. 7:</strong> Develop design guidelines for neighborhood stormwater harvesting to encourage the creation of habitat and water efficient landscapes</td>
<td><strong>DM Recommendation 5.1:</strong> Develop design guidelines for neighborhood stormwater harvesting&lt;br&gt;<strong>RFE Recommendation 3.2:</strong> Pursue stormwater management opportunities in areas dominated by impervious surfaces</td>
</tr>
<tr>
<td><strong>DM Activity No. 5:</strong> Develop a model City/County building code to reduce the water/energy footprint in new and renovated buildings.</td>
<td><strong>DM Recommendation 3.1:</strong> Review Development Regulations for consistency and improved potable water conservation&lt;br&gt;<strong>CIP Recommendation 1.1:</strong> Require and Encourage Smart Growth Principles</td>
</tr>
<tr>
<td><strong>WS Activity No. 27:</strong> Update Tucson Water Plan 2050: Multi-pronged approach for drought preparedness</td>
<td><strong>WS Recommendation 5.1:</strong> Continue multi-pronged planning approach&lt;br&gt;<strong>DM Recommendation 1.3:</strong> Employ Adaptive Planning Approach to Drought Preparedness</td>
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<tr>
<td>Programs Addressing Multiple Goals</td>
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<td><strong>Programs</strong></td>
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<td><strong>Respect for Environment</strong></td>
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<td><strong>Water Supply</strong></td>
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<td><strong>Comprehensive Integrated Planning</strong></td>
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<tr>
<td><strong>Goals</strong></td>
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<tr>
<td><strong>Encourage sustainable urban form</strong></td>
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<td><strong>Direct growth to suitable growth areas</strong></td>
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<tr>
<td><strong>Integrate land use and water resources planning</strong></td>
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<td><strong>Growth should pay for itself over time and be financially sustainable</strong></td>
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<td><strong>Preserve existing riparian areas through coordinated regulation, policy, and outreach</strong></td>
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<td><strong>Identify needs and opportunities for future restoration</strong></td>
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<td><strong>Incorporate water harvesting and habitat creation in public and private projects</strong></td>
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<tr>
<td><strong>Ensure the future of riparian and aquatic habitat along the effluent-dependent reach of the Santa Cruz River</strong></td>
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<td><strong>Develop water supply for the environment</strong></td>
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<td><strong>Establish common water conservation goals and targeted methods</strong></td>
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<tr>
<td><strong>Maximize and make efficient use of effluent and other locally renewable water supplies</strong></td>
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<td><strong>Factor increased use of reclaimed water</strong></td>
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<td><strong>Be prepared for climate change and drought</strong></td>
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<tr>
<td><strong>Increase the effectiveness of conservation programming through coordinated planning and evaluation</strong></td>
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<tr>
<td><strong>Manage demand through design of the built environment</strong></td>
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<th><strong>Comprehensive Integrated Planning</strong></th>
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<tbody>
<tr>
<td><strong>Program 1:</strong></td>
<td><strong>General and Comprehensive Plan Updates</strong></td>
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<td><strong>Program 2:</strong></td>
<td><strong>Smart Growth Tools and Regulations</strong></td>
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<td><strong>Program 3:</strong></td>
<td><strong>Linking Water and Land Use Planning</strong></td>
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<td><strong>Program 4:</strong></td>
<td><strong>Collaboration for Environmental Restoration</strong></td>
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<td><strong>Program 5:</strong></td>
<td><strong>Program 1:</strong></td>
<td><strong>Preservation and Protection of Riparian Areas</strong></td>
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<td><strong>Program 6:</strong></td>
<td><strong>Program 2:</strong></td>
<td><strong>Creating Multi-benefit Public Projects</strong></td>
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<td><strong>Program 7:</strong></td>
<td><strong>Program 3:</strong></td>
<td><strong>Lower Santa Cruz River Management Plan</strong></td>
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<td><strong>Program 8:</strong></td>
<td><strong>Program 4:</strong></td>
<td><strong>Water Supply and Water Quality</strong></td>
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<td><strong>Program 9:</strong></td>
<td><strong>Program 5:</strong></td>
<td><strong>Effluent Management</strong></td>
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<td><strong>Program 10:</strong></td>
<td><strong>Program 6:</strong></td>
<td><strong>Program 3:</strong></td>
<td><strong>Regulatory/Policy Advocacy</strong></td>
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<tr>
<td><strong>Program 11:</strong></td>
<td><strong>Program 7:</strong></td>
<td><strong>Program 4:</strong></td>
<td><strong>Drought Preparedness</strong></td>
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<td><strong>Program 12:</strong></td>
<td><strong>Program 8:</strong></td>
<td><strong>Program 1:</strong></td>
<td><strong>Planning and Evaluation</strong></td>
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<tr>
<td><strong>Program 13:</strong></td>
<td><strong>Program 9:</strong></td>
<td><strong>Program 2:</strong></td>
<td><strong>Consistent Standards and Guidelines</strong></td>
</tr>
<tr>
<td><strong>Program 14:</strong></td>
<td><strong>Program 10:</strong></td>
<td><strong>Program 3:</strong></td>
<td><strong>Outreach and Education</strong></td>
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