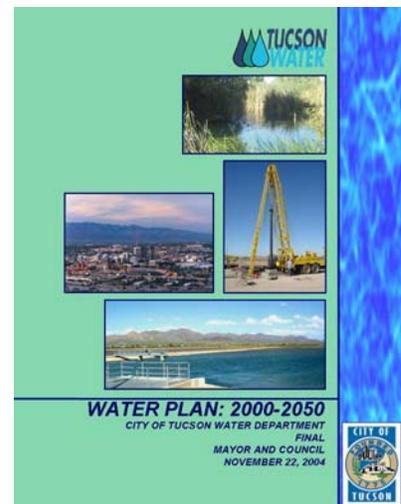


UPDATE TO WATER PLAN: 2000-2050

EXECUTIVE SUMMARY

This is the first update to *Water Plan: 2000-2050*, and it provides the City of Tucson's Mayor & Council with a renewed view of the community's water-resource future. The City of Tucson Water Department (Tucson Water) issued *Water Plan: 2000-2050* in 2004 to initiate a dialogue between the Utility and the community about the water-resource challenges which need to be addressed in the coming years. Although the substantive issues and challenges remain largely the same, the planning timeframes within which to address them have changed. The Update also accounts for revised population projections that have since been developed, an increase in the City's Central Arizona Project allocation, and changed planning assumptions and priorities which have evolved in the three years since *Water Plan: 2000-2050* was issued.

Both *Water Plan: 2000-2050* and this Update clearly demonstrate that the community served by Tucson Water has the water resources available to provide a long-term, sustainable water supply. This supply is sufficient not only for Tucson Water's current residents but also for those who are projected to come in the next several decades. Tucson Water's rate payers have already invested in developing the Utility's water-resource portfolio and its extensive water distribution systems. As a result, the community's remaining water-resource challenges primarily involve increasing system reliability and securing sustainable water supplies for new growth in the decades beyond.



The extent and timing of future growth in areas to be served by Tucson Water will be determined by land-use issues currently being addressed by planning authorities in the region. The recommendations in *Water Plan: 2000-2050* and this Update provide the Utility with the flexibility needed to accommodate future land-use decisions while ensuring a safe and sustainable water supply for Tucson Water's customers.

Both *Water Plan: 2000-2050* and this Update emphasize the need for the Utility to continue pursuing three general initiatives in order to ensure sustainable growth in the community:

1. Utilize fully the renewable water resources the City of Tucson currently has available;
2. Achieve more efficient water use through expanded conservation programming; and

3. Acquire additional water supplies to increase reliability and meet future demand.

Tucson Water has taken specific actions which directly support these initiatives. With regard to the first, Tucson Water plans to purchase the City's entire Central Arizona Project allocation in 2009. The Utility is also investing in additional reclaimed water production facilities to meet projected demand. Both of these actions will allow the Utility to further reduce its historical reliance on ground water and increasingly shift to renewable supplies.

Managing water demand is a critical component of any water-resource plan. Further reductions in per capita water demand will have a significant bearing on the water resources and system improvements that will be needed over time. Water conservation, improving the Utility's distribution system efficiency and drought preparedness are three areas where progressive steps have been taken with notable results.

Tucson Water has begun exploring opportunities to acquire additional water supplies to augment its already substantial water-resource portfolio. It is anticipated that acquiring additional resources will become increasingly competitive and costly both locally and statewide. Tucson Water is working with the Central Arizona Water Conservation District who is actively exploring ways to play the leading role in acquiring additional supplies for water interests in Maricopa, Pinal, and Pima Counties. If this effort proves successful, it could minimize in-state competition, reduce acquisition costs, and provide the physical means to convey additional renewable supplies to Tucson Water's service area.

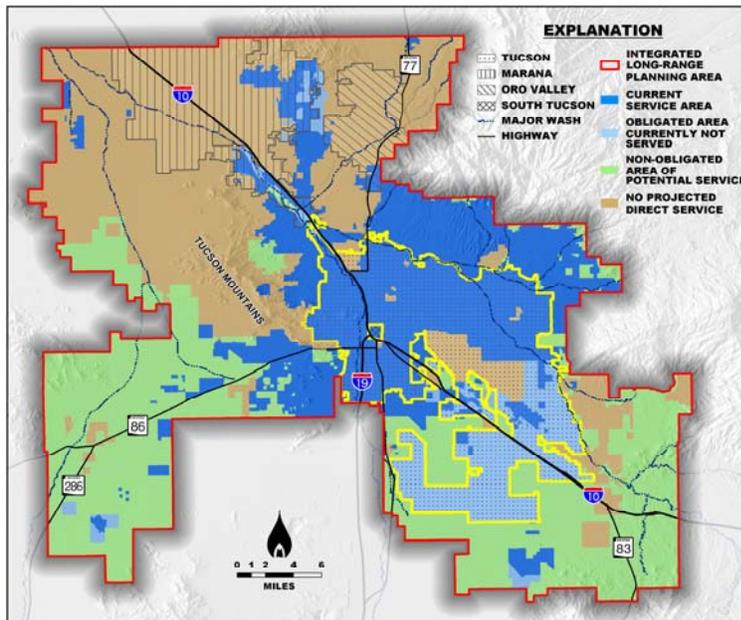
This Update also highlights several developments and changes which have occurred since *Water Plan: 2000-2050* was issued in 2004:

- New population projections through 2030 have been developed that directly influence projected water demand;
- The Utility has increased its annual Central Arizona Project allocation by 8,206 acre-feet with the finalization of the Arizona Water Settlements Act;
- Inclusion of a scenario analysis which assesses potential impacts to future water demand based on possible changes in the size of its ultimate service area and to the possible implementation of more aggressive demand-management measures;
- The possibility that the Secretary of the Interior may declare a shortage on the Colorado River sooner than previously projected;
- The need to further assess the community's preference regarding the long-term mineral content of the Colorado River water/ground-water blend to provide a final recommendation to Mayor & Council in 2008;
- Greater recognition of the potential long-term impact that climate change may have on the Utility's available water resources and the community's annual and seasonal demand for water.

Many of these and other changes and developments have been discussed over time with the City Manager's Office, the City of Tucson's Citizens' Water Advisory Committee, the Environment, Planning and Resource Management Subcommittee of the Mayor & Council, and the City of Tucson Mayor & Council. This Update summarizes the substance of these discussions and provides additional information about the evolving planning environment.

LONG-RANGE PLANNING AREA REVISITED

The Long Range Planning Area, shown on Figure ES-1, includes areas currently served by Tucson Water (dark blue) and undeveloped areas that the Utility is obligated to serve (light blue).



These two areas are collectively referred to as the “Obligated Area”, and represent areas within the City limits or areas where the utility is currently contracted to serve. The remaining geographic areas (shown in green) are non-obligated areas of potential service. The Obligated Area and the non-obligated areas of potential service are collectively referred to as the Utility’s “Potential Service Area.” Areas shown in brown are those where Tucson Water has no plans to provide direct service.

Figure ES-1: Long Range Planning Area.

Regional Cooperation within the Long Range Planning Area

Even though Tucson Water has no plans to provide direct service to areas shown in brown on Figure ES-1, the Utility continues to evaluate local water management issues and to work cooperatively with water providers that serve these areas. Over the years, Tucson Water has been an active participant in many formal and informal local groups, such as the Southern Arizona Water Users Association (SAWUA), discussing various water management issues. In 2004 Tucson Water began discussions about regional cooperation on water resource issues with the largest water providers in the area. Those discussions resulted in a 2006 proposal from SAWUA for a cooperative water supply organization.

At approximately the same time, the Central Arizona Water Conservation District (CAWCD) Board developed a strategic plan that included the goal of acquiring additional water resources on the behalf of all water providers within its three-county service area. In effect, CAWCD proposed to perform the same functions as envisioned under the SAWUA proposal but on a much larger and far reaching scale. In addition, Pima County has proposed the establishment of a countywide water-and-wastewater authority which would include all public and private water and wastewater providers within the county.

As these alternative proposals have been discussed, local water providers have also continued to discuss potential cooperative projects related to water supply and management. The discussions

have included concepts such as joint projects for delivering renewable water supplies to areas of need, common issues and concerns for coordinated lobbying at the State level, and consideration of water credit transfers to reduce costs to ratepayers and meet water management goals.

POPULATION PROJECTIONS

Revised projections were used to develop population estimates for Tucson Water’s Obligated Area and its Potential Service Area; these projections are graphically shown on Figure ES-2. The Obligated Area population is estimated to increase from 638,936 in 2000 to approximately 990,000 in 2030 and to just over 1.1 million by 2050. The Potential Service Area population is estimated to be about 1.1 million in 2030 and almost 1.3 million in 2050.

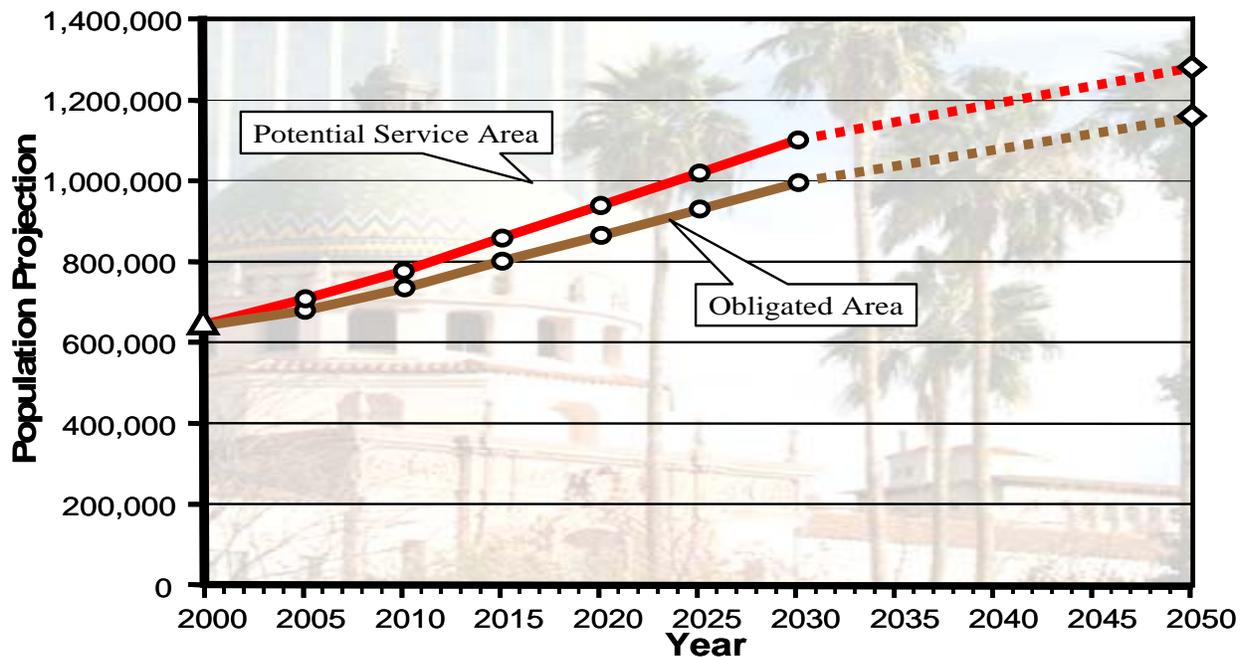


Figure ES-2: Population Projections.

PROJECTING WATER DEMAND

Two significant issues have arisen since the development of *Water Plan: 2000-2050* regarding the extent of the City’s future water service area and the extent to which additional water demand-management (i.e., water conservation) measures are implemented. This Update addresses these emerging issues by presenting four future demand scenarios.

First, the City of Tucson historically has provided water service throughout the area characterized in this Update as the Potential Service Area; the City’s willingness to serve within this area typically has been limited only by the availability of infrastructure to serve proposed new development. On December 11, 2007, the City Manager announced a new interim policy under which the City will not agree to serve any new developments outside its Obligated Area until such time as the Mayor & Council adopt a comprehensive policy regarding the City’s future water service area. This new policy, if adopted by Mayor & Council, could significantly change demand projections and the timing of resource utilization for the Tucson Water service area.

Second, the Community Conservation Task Force recommendations have been developed but the extent to which these recommendations will be implemented has not yet been determined. Additional water conservation measures over and above what was recommended by the Community Conservation Task Force have also been recommended. However, expanding existing programs and implementing new, more aggressive conservation measures will require additional investment and community support. In combination with a potential new policy on service area expansion, decisions regarding the future level of water conservation efforts will also impact future demand and resource utilization in the Tucson Water service area.

As a result of these new developments, four water demand projections based on the combinations of two variables were developed for this Update. The two variables are service area size and level of demand management (see below). Demand management for this Update involves increased conservation measures and increased distribution system efficiencies that result in fewer system losses.

Variable #1: Service Area Size - Reduce (or increase) the size of the potential area that will be directly served by Tucson Water. In this analysis, the future service area size is projected to be either the Obligated Area or the Potential Projected Service Area.

Variable #2: Level of Demand Management - Invest (or not invest) in implementing additional, more aggressive water demand-management measures to reduce potable Gallons Per Capita Per Day. In this analysis, additional demand-management is assumed to be a ten percent reduction in potable demand by 2030. This reduction is based on information generated by the Community Conservation Task Force and by the Utility’s Water Loss Control Program.

These two variables combine into four unique sets of assumptions each of which is represented in one of the demand scenarios shown in Figure ES-3. The results of a resource-demand analysis of the resultant four scenarios illustrate how changes in two planning variables could impact water resource utilization and the City’s Assured Water Supply designation in future years.

	With Additional Demand Management	Without Additional Demand Management
Obligated Area	Scenario A	Scenario B
Potential Service Area	Scenario C	Scenario D

Figure ES-3: Matrix of Demand Scenarios.

Scenarios A and *C* approximate futures which assume additional investment in more aggressive programs will occur. For comparative purposes, *Scenarios B* and *D* represent futures which assume there would not be additional investment in such demand-management measures.

Review of Figure ES-4 indicates that projected water demand, as represented by each of the four scenarios, is highly sensitive to the size of the area to be served and whether the Utility invests in more aggressive demand-management measures.

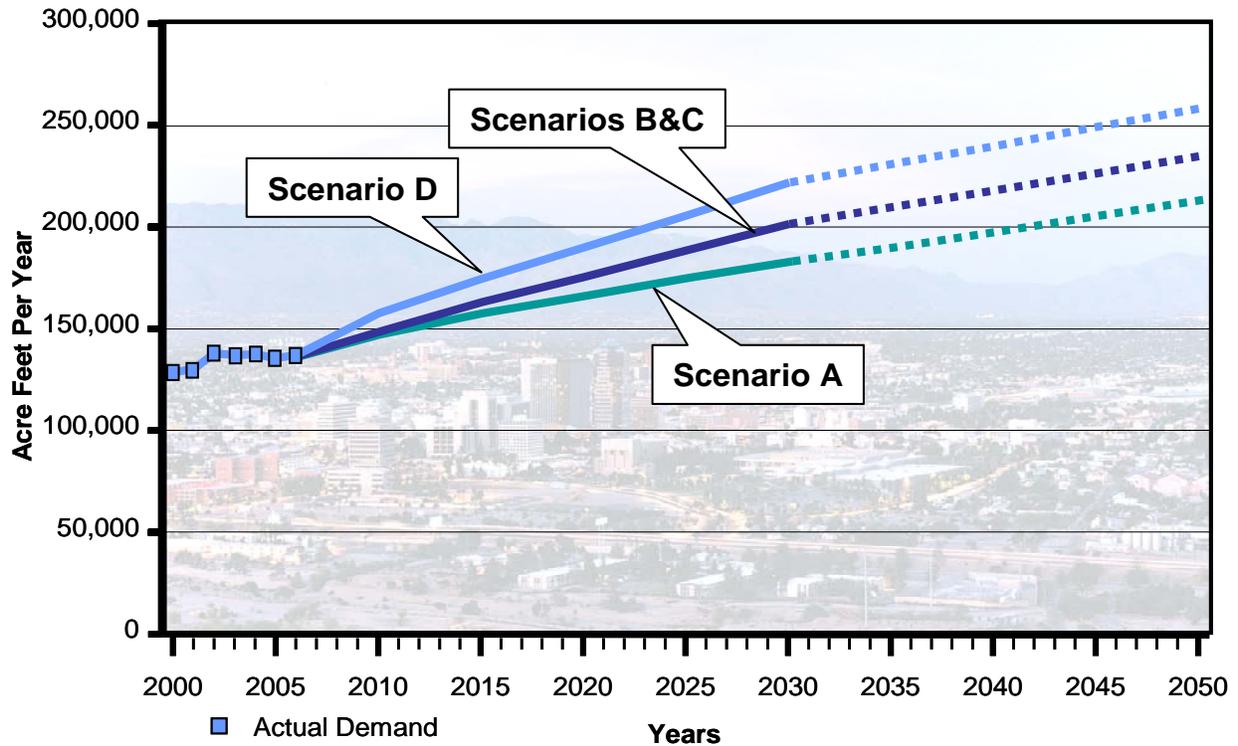


Figure ES-4: Projected Demand Scenarios.

Of the four, *Scenario A* has the smallest increase in projected water demand through 2050. This projection represents future water supply needs within the smaller Obligated Area and assumes that more aggressive demand-management strategies can be successfully implemented with the support of the community. Under this scenario, the Utility’s total water demand is projected to increase from 128,141 acre-feet in 2000 to approximately 180,000 acre-feet in 2030 and to about 215,000 acre-feet by 2050.

The demand scenario which approximates the largest projected increase in demand is represented by *Scenario D*. This worst-case demand projection represents the most conservative portrayal of the Utility’s future water supply needs. It assumes that the larger Potential Service Area would be served solely by Tucson Water and that additional demand-management programs would not be implemented above and beyond those already in place. Under this scenario, the Utility’s total water demand is projected to increase to approximately 220,000 acre-feet per year by 2030 and about 255,000 acre-feet by 2050. *Scenarios B* and *C* are indistinguishable in terms of projected water demand and represent a mid-range increase in water demand through 2050.

IMPLEMENTING THE PLAN

The recommended resource utilization plan presented in *Water Plan: 2000-2050* consists of a schedule for implementing programs and projects common to many possible water-resource planning futures and specifies the scope and timing of critical water-management decision points within the planning horizon.

Balancing Projected Demand with Available Resources

Success in implementing the resource utilization plan and in addressing the critical water-management choices to be made in 2008 and later will help determine how the Utility's water-resources portfolio will be utilized in future years. These actions will determine to a considerable degree how quickly Tucson Water will use its available water supplies, when additional water supplies will need to be developed or acquired, and how demand may be managed in the future. For purposes of illustration, four demand-resource projections are presented which correspond to *Scenarios A, B, C, and D*. These demand-resource projections approximate potential resource utilization possibilities and demonstrate how future changes in the planning assumptions could impact resource planning decisions and the City's AWS designation. Only Scenarios A and D are summarized in this Executive Summary since they provide end-member perspectives on the two critical planning assumptions analyzed.

Scenario A – Increased Demand Management in the Obligated Area

In addition to decreasing future demand by limiting the Utility's service area expansion to the smaller Obligated Area, this scenario is predicated under the assumption that the Utility's potable Gallons Per Capita Per Day would gradually be reduced by ten percent by 2030. The latter would be achieved by implementing more aggressive demand-management measures beyond those already in place.

Figure ES-5 provides a view of how the Utility's resource utilization is projected to occur under *Scenario A*. The Utility's total water demand is projected to increase from 128,141 acre-feet in 2000 to approximately 180,000 acre-feet in 2030 and to about 215,000 acre-feet by 2050. This projected increase in water demand over time is the smallest of the four scenarios. Under this scenario, projected potable demand would exceed the sum of the City's annual Central Arizona Project allocation, its Incidental Ground-Water Recharge increment, and its annual Central Arizona Ground Water Replenishment District contracted volume by about year 2032. However, Tucson Water would still have available the balance of its renewable effluent resources not committed to the Utility's reclaimed water system and its reserve of non-renewable ground-water credits.

The City could extend its Assured Water Supply (AWS) designation to about 2050 by depleting its reserve of ground-water credits; instead, Tucson Water recommends these credits be preserved as long as possible to provide planning flexibility for the future. It is more prudent to use these credits as short-term transitional supplies while additional renewable supplies are being acquired and/or developed.

Tucson Water recommends that the resource planning priority be placed on developing additional renewable resources such as the City’s effluent supplies, additional imported supplies or a combination of both. In this manner, new growth after 2032 would become more hydrologically sustainable and the City’s AWS designation could be extended well beyond 2050. Of the four future scenarios analyzed, *Scenario A* delays the need to develop or acquire additional renewable supplies furthest into the future and maximizes planning flexibility to deal with future uncertainties.

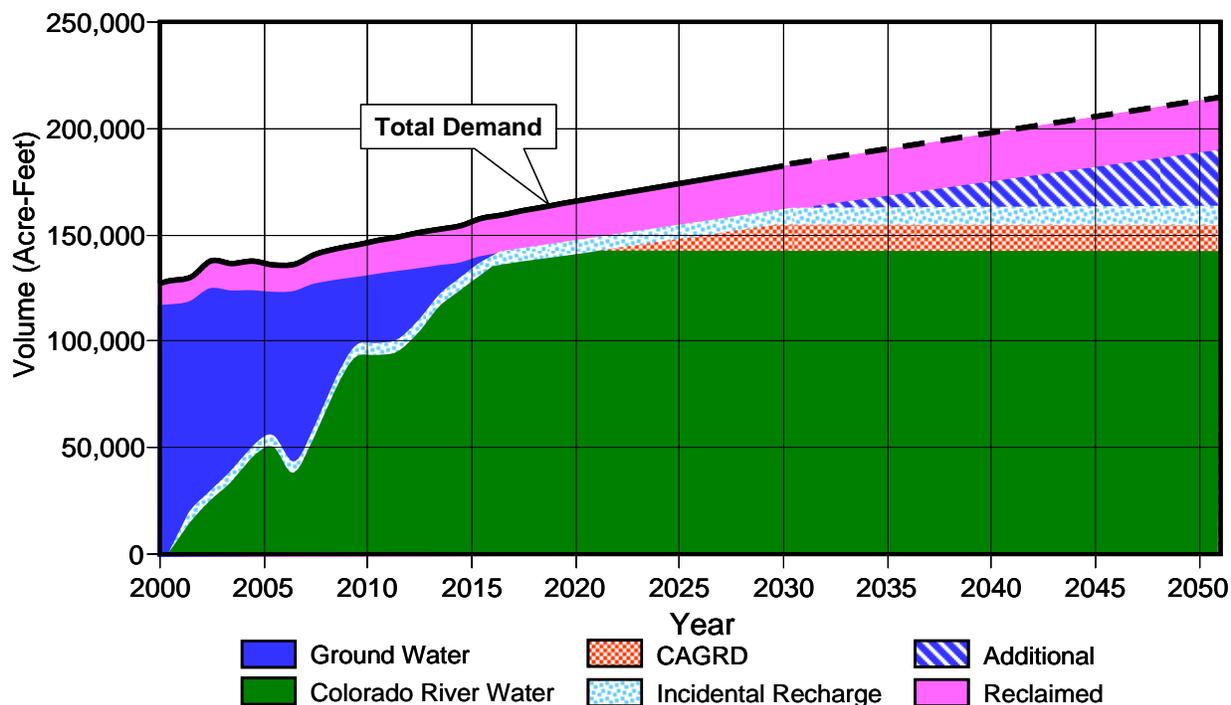


Figure ES-5: Scenario A, Projected Demand and Water Resource Utilization: 2000-2050.

Scenario D – Without Additional Demand Management in the Potential Service Area

Scenario D is based on the conservative demand assumptions used in *Water Plan: 2000-2050*. The Utility’s total water demand is projected to increase to approximately 220,000 acre-feet per year by 2030 and about 255,000 acre-feet by 2050. It differs from *Scenario A* by assuming that the entire Potential Service Area would be served by Tucson Water (an area twice as large as the Obligated Area) and no additional demand-management measures would be implemented within the 50-year planning horizon.

Review of Figure ES-6 indicates that projected potable demand would exceed the sum of the City’s annual Central Arizona Project allocation, its Incidental Ground-Water Recharge increment, and its annual Central Arizona Ground Water Replenishment District contracted volume by about 2017. Tucson Water would still have available beyond 2017 the balance of its renewable effluent resources and its reserve of non-renewable ground-water credits.

The City could extend its AWS designation to about 2025 by depleting its reserve of groundwater credits; as with *Scenario A*, Tucson Water recommends these credits be preserved as long as possible to provide planning flexibility for the future. Tucson Water recommends that the resource planning priority be placed on developing additional renewable resources such as the City’s effluent supplies, additional imported supplies or a combination of both. In this manner, new growth after 2017 would become more hydrologically sustainable and the City’s AWS designation could be extended further out in time. Of the four future scenarios analyzed, *Scenario D* is the least able to delay the need to develop or acquire additional renewable supplies and provides the least planning flexibility with which to deal with future uncertainties. The demand-resource projections associated with *Scenario B* and *Scenario C* are equivalent and would fall in between those shown for *Scenario A* and *Scenario D*.

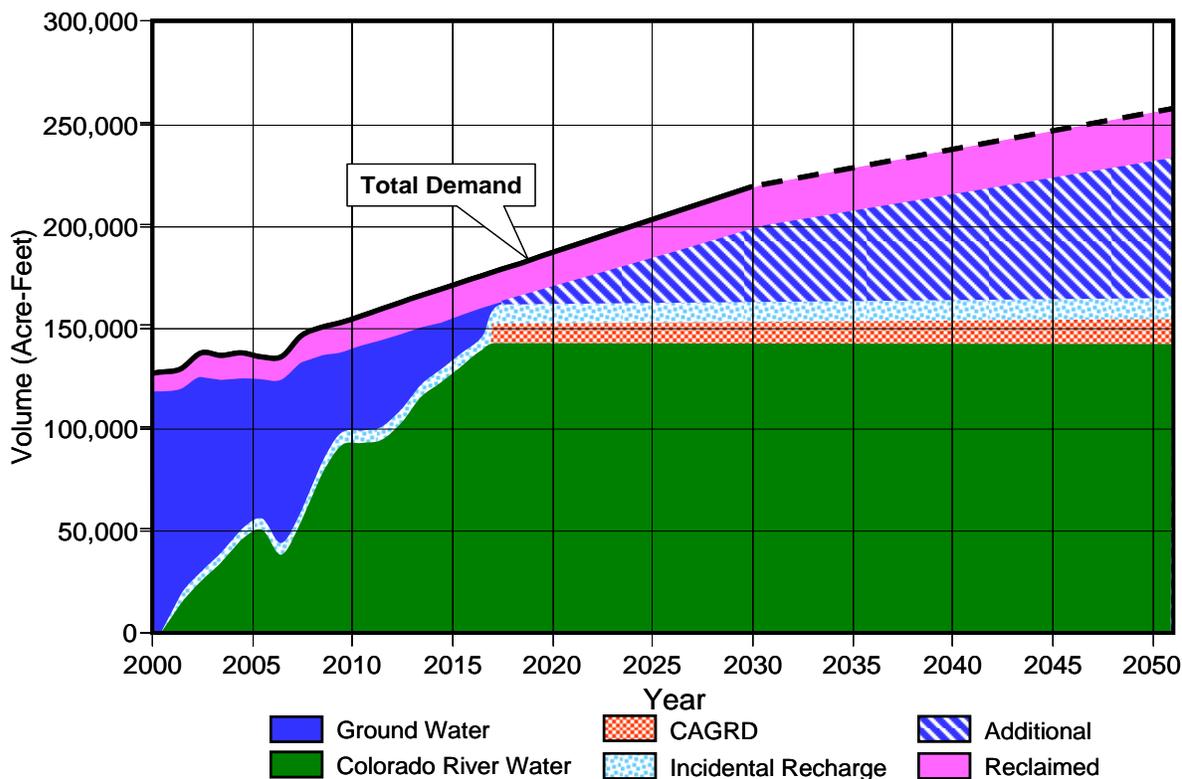


Figure ES-6: Scenario D Projected Demand and Water Resource Utilization: 2000-2050.

Decision Points

Water Plan: 2000-2050 outlined four critical decisions to be made at two key points in time: 2006 and 2014. In this Update, the key decision points have been revised. The first decision point is projected to occur in 2008 and the timing of the second decision point is dependent upon which of the four potential demand scenarios is relevant.

Decision Point 2008

In *Water Plan: 2000-2050*, the first two resource-management decisions pertaining to the use of Colorado River water were projected to be made in 2006. The first decision was concerned with

the long-term mineral content of the Clearwater blend of ground water and recharged Colorado River water. In the coming months, the Utility will provide Mayor & Council its recommendation regarding mineral content so that a final decision can be made in 2008.

The second decision focused on whether the Utility should consider bringing a surface (direct) water treatment plant into service for a portion of the City's current Central Arizona Project allocation. The results of recent analyses indicate that continuing to rely on recharge and recovery provides Tucson Water with greater operational performance and planning flexibility at less cost. Therefore, Tucson Water has implemented several projects to ensure sufficient facilities are in place to fully utilize the City's entire Central Arizona Project allocation as early as 2009.

The Next Decision Point

The Next Decision Point pertains to the development of additional renewable water supplies and is dependent upon which of the service area and demand-management options are adopted by the Mayor & Council. *Scenarios A, B, C and D* illustrate how these options impact the timing of the Next Decision Point and determine how far into the future the City's AWS designation can be extended with the City's currently available water resources. Depending on the direction from the Mayor & Council, the timing of the Next Decision Point may vary from as early as 2014 under *Scenario D* to as late as 2027 under *Scenario A*. The City's AWS designation may extend to 2025 or perhaps beyond 2050.

CONCLUSIONS

Many of the recommendations and conclusions noted in *Water Plan: 2000-2050* have already been implemented while others are currently in process or have been revised to reflect the changing planning environment. The updated recommendations are summarized below.

- 1. Emphasize "Wet" Water Management Strategies:** The community's sustainable future ultimately depends on maintaining a physical hydrologic link between renewable water sources and the infrastructure needed to convey those waters to customers within the projected service area.
- 2. Utilize Renewable Ground Water:** Tucson Water plans to limit its ground water withdrawals at or below this hydrologically sustainable level in order to ensure the long-term viability of the aquifer within the Utility's service area.
- 3. Preserve City's Ground-Water Credits for Longer Term:** The City could extend its AWS designation under any future scenario by depleting its reserve of non-renewable ground-water credits in the near or mid terms. Instead, Tucson Water recommends that these credits be preserved as long as possible to provide planning flexibility for the future. It is more prudent to use these credits as short-term transitional supplies while additional renewable supplies are being acquired and/or developed. This would ensure that the water resources needed to support new growth will be hydrologically sustainable.

- 4. Reassess the Water-Quality Target for Colorado River Water:** Customer preferences are being reassessed through the on-going *Decision H20* program by linking costs and environmental sustainability issues with potential mineral level targets. The goal is to finalize this aesthetic water-quality management decision in 2008.
- 5. Fully Utilize Colorado River Water:** Between CAVSARP, SAVSARP, and the Pima Mine Road Recharge Project, the Utility will have sufficient recharge capacity in place to fully use its Central Arizona Project allocation as early as 2009.
- 6. Fully Utilize Effluent for Future Supply:** Tucson Water recommends that the resource-management goal should be to maximize the future use of the City's effluent through additional treatment and recharge in order to augment the aquifer within Tucson Water's service area.
- 7. Acquire Additional Water Supplies:** The City of Tucson is already exploring opportunities to acquire potentially available supplies to augment its water-resource portfolio. The availability of additional water resources will become increasingly competitive and costly both locally and statewide. The Utility is encouraged that the Central Arizona Water Conservation District is actively exploring ways to play the leading role in acquiring additional supplies for water interests in its three-county service area.
- 8. Manage Water Demand:** Tucson Water is taking a number of actions to further manage demand including expanded conservation programming, reducing lost and unaccounted for water, encouraging the practice of water harvesting, and providing public information programs. Additional demand management efforts have been evaluated and recommended by the Community Conservation Task Force to further reduce per capita potable water use.
- 9. Adjust Development Fees to Shift the Cost of Growth to New Customers:** Tucson Water has developed a financial plan that continues to shift the cost burden of growth to new customers as they are added to the system. The Utility recommends that in the future, development fees be adjusted to ensure that existing customers do not inordinately bear the cost of growth.
- 10. Continue to Expand Regional Cooperation:** Tucson Water has taken steps to initiate new cooperative efforts and expand existing ones with local providers. These cooperative actions focus on acquiring additional sources of water supply, developing resource credit banking agreements, and exploring potential win-win arrangements to wheel renewable resources within the region.

The resource utilization plan will periodically be reassessed and revised as planning assumptions and circumstances change over time. This is the first Update to *Water Plan: 2000-2050*, and there will be others in the years to come. As the present unfolds into the future, the primary necessity is to prepare for change since it is the only certainty. This recognition reinforces the need for continuous planning and wise water management.

