A scenario planning process was used to develop Water Plan: 2000-2050. Scenario planning results in pathways to multiple, equally possible futures. The commonalities among the pathways provide the Utility with flexibility as it proceeds into the future.

CHAPTER SIX

THE PLANNING PROCESS

In developing *Water Plan: 2000-2050*, Tucson Water used the best information available to create pathways to a range of possible futures. The futures and the pathways leading to them are identified through a rational process taken to its logical conclusion.

INTEGRATED RESOURCE-PLANNING COMPONENTS

Tucson Water developed *Water Plan: 2000-2050* by evaluating the following components:

1. **Total Water Demand**. This component is based on projections of service area population and per capita water-use rates. As detailed in Chapter Three, *Projections of Population and Water Demand*, Tucson Water's service area population is projected to grow from 638,936 in 2000 to approximately 1.3 million by 2050. This translates into an increase in total annual water demand from 128,521 acre-feet in 2000 to approximately 253,000 acre-feet by 2050.

2. **Available Water Supplies**. Potentially available water supplies and the projects and programs that would be required to utilize them within the 50-year planning period were described in Chapter Four, *Available Water Resources*. Tucson Water's three primary sources of supply are local ground water, Colorado River water, and effluent. Tucson Water's annual water supplies are conservatively projected to include 50,000 acre-feet of hydrologically sustainable ground water, 135,966 acre-feet of Colorado River water, and by the year 2050, 66,000 acre-feet of effluent. While the 50,000 acre-feet per year of ground-water pumping is hydrologically sustainable during the planning period, continued pumping of that quantity would exhaust the City of Tucson's portfolio of ground-water credits before 2100. Without the acquisition of additional water resources, the Utility may not be able to retain its AWS designation after 2035. Additional potential supplies have been identified that may be acquired in order to meet water demands during the planning period and beyond 2050.

3. **Potable Water Distribution System**. Improvements to the potable water system will be required as peak capacity increases from its current level of 196 MGD to an estimated 408 MGD in 2050. The current state of the water system and the tools used to plan for future improvements are discussed in Chapter Five, *Water Delivery Systems*. Tucson Water conducted a conceptual-level assessment of system upgrades and expansions needed to meet spatially distributed increases in projected water demand through 2050.

4. **Estimated Costs**. Costs of water system improvements, water treatment infrastructure needs, and water-resource development projects were estimated for each of the alternative pathways. These costs are discussed in Chapter Seven, *The Recommended Plan*.

These four basic planning components formed the foundation upon which a recommended long-range water-resource plan was developed. This plan will be used to initiate a dialogue with the community regarding the critical decisions that will need to be made over time. The planning process must provide a high degree of flexibility in initiating capital improvements since they will be implemented in a planning environment where conditions and basic assumptions will inevitably change over time. An effective plan has to be adaptable to changing circumstances.

The 50-year planning period is divided into three major timeframes that represent major milestones: near-term (2000-2014), mid-term (2014-2025), and long-term (2025-2050). Primary objectives of the near-term period are to expand the Clearwater Program to fully utilize Tucson Water’s annual Central Arizona Project allocation, assess the implementation of a more aggressive demand management program, and pursue the acquisition of additional renewable water resources. Tucson Water has established a system equity fee which is applied to new development to recoup past investments expended to provide additional system capacity to accommodate future demand. This is commonly referred to as a “backward-looking” fee. A “forward-looking” water-resource development fee will also need to be implemented to pay for future system improvements and to purchase additional water resources.

The mid-term period will usher in the need to shift effluent reuse from its current non-potable emphasis to indirect reuse for potable supply. However, if the Utility acquires sufficient additional supplies in the near term and an aggressive demand management program reduces per capita water usage, then the reuse of effluent for indirect potable supply could be delayed. In the interim, effluent would continue to be a viable water resource for other uses such as to offset ground-water pumping and to exchange for other water supplies.

As seen from the present, the long-term period may primarily be concerned with obtaining and developing additional high-cost water supplies for use beyond 2050. The uncertainties, issues, and challenges will become more complex as the region grapples with increasingly limited water resources, an expanding population, and increasing development pressure.

PLAN DEVELOPMENT PROCESS

Resource planning begins when projected water demand and potentially available supplies are analyzed. This analysis generates a range of resource-management options. Assessment of these options commonly involves selecting a plan that leads to what may be the most-probable or desirable outcome. This process may be appropriate when there are fewer uncertainties in the future. However, when the planning process focuses on only one possible outcome, the ability to cope with an uncertain future could be constrained.

As shown in Figure 6-1, the result of a one-dimensional approach is the selection of what is perceived to be the most-probable or preferable outcome and the development of a pathway that leads directly to it. Such a one-dimensional view of the future could result in reduced planning flexibility and increased vulnerability. Unanticipated changes in conditions or in the planning assumptions could cause the plan to fail. If the failure is significant enough, recovery may come with great expense, organizational trauma, and a loss of public trust.

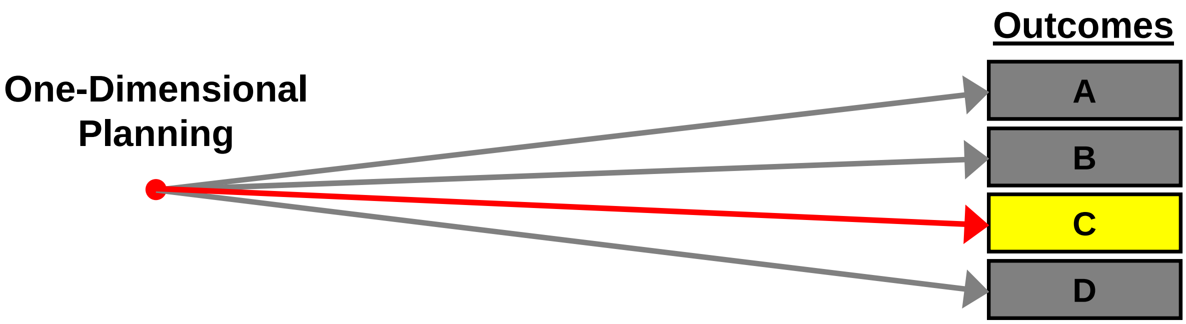

Figure 6-1: The One-Dimensional Planning Approach.

To avoid the potential pitfalls of the one-dimensional planning approach, Tucson Water utilized a more flexible planning process by adopting a "scenario planning" approach. This is a multi-dimensional approach that takes into account many possible futures which in turn provides for greater planning flexibility.

Scenario Planning: Planning for Multiple Futures

Scenario planning gained widespread popularity among private businesses in the 1990s after a publication by Peter Schwartz (1991) titled *The Art of the Long View*. There are many scenario planning methods currently advocated, but Tucson Water adapted the Schwartz model to serve its needs.

Scenario planning provides organizational flexibility by planning for multiple possible futures (scenarios) each of which is considered equally likely to occur. Descriptions of each possible future are developed providing the basis for evaluating the various projects and programs that should be implemented to realize those futures. The resulting series of projects and programs is referred to as the pathway to each future.

Scenario planning is superior to the more one-dimensional planning approach when there are many critical planning uncertainties. Under the scenario planning approach, each possible future is considered equally likely to occur to maintain a multi-dimensional view of the future. The process involves building one-dimensional pathways to each possible future; however, the objective is to identify the common elements that lie on these different pathways. These are the programs and projects (i.e. elements) that are common to each of the identified futures as shown on Figure 6-2. By following the path of common elements, capital investments are directed toward projects that apply to multiple futures providing confidence that the decisions made today will remain viable. This multi-dimensional approach is the essence of scenario planning.

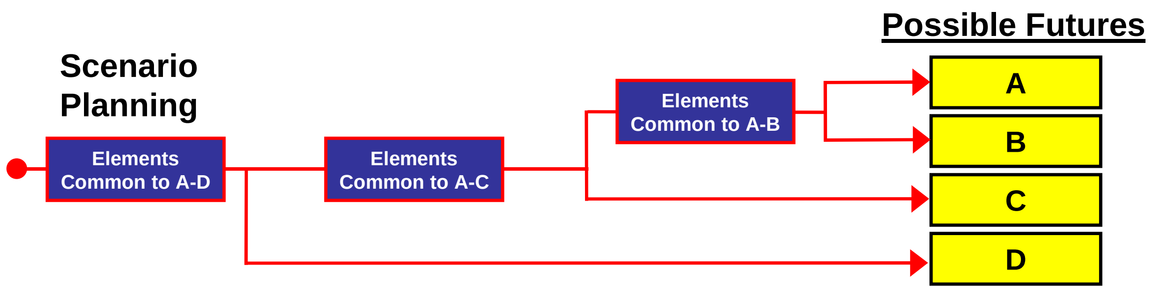

Figure 6-2: The Scenario Planning Approach.

There are a number of other factors that are characteristic of scenario planning. One is the consideration of critical uncertainties. Scenario planning is not based solely on what is known about a given subject; rather, it is based upon identified critical uncertainties that could have a major impact on the future and hence on the success of any planning effort. The process enables planners to respond to future issues as they develop and to describe the opportunities and challenges that each future presents (Schwartz, 1991). As the planning environment changes over time, the scenario planning process will be revisited to establish a new baseline of data and assumptions to develop a new range of possible futures.

Scenario planning also ensures that less-tangible but extremely important factors such as political uncertainties and public sentiment are incorporated into the process. The acknowledgement of these variables in the planning process enables planners to develop reality-based pathways to futures. This will ensure that the resulting long-range plan will have sufficient flexibility to identify and respond to changes that will inevitably arise.

In water-resources and system planning, certain elements are less variable and hence more predictable than others. For instance, a water distribution system will require continuous evaluation to ensure that it is upgraded and expanded in concert with increasing demand. Water delivery must be cost-effective, responsive to customer preferences, operationally efficient, and consistent with federal, state, and local regulations. Conversely, developing sustainable sources of supply in arid, rapidly growing areas has to address many variables which may have a high degree of uncertainty. Communities can grow faster or slower than expected, regulations will generally become more stringent, and public sentiment can shift.

SCENARIO PLANNING FOR *WATER PLAN: 2000-2050*

Tucson Water applied the scenario planning process to assess how best to use its most abundant and currently available renewable water supplies: Colorado River water and municipal effluent. The potential acquisition of additional water resources is uncertain. If additional water resources are successfully acquired in the future, they will be integrated into the planning process. The integration of the scenario planning assessments for the two known renewable water supplies created a matrix of possible futures that formed the basis for the recommended plan. A step-by-step description of the scenario planning process and how it was applied under each assessment are provided in Appendix D: *Planning Methodology*. The outcomes of both scenario planning assessments are presented in this section.

Outcomes of Scenario Planning for the Clearwater Program

The Clearwater Program was developed to maximize Tucson Water's use of its Central Arizona Project allocation by blending Colorado River water with native ground water. As shown on Figure 6-3, four futures were developed based on the following critical uncertainties:

1. What is the public's threshold for paying for discretionary water-quality improvements to the Clearwater blend?

2. Will the public accept the use of the Hayden-Udall Treatment Plant for direct treatment of Colorado River water?

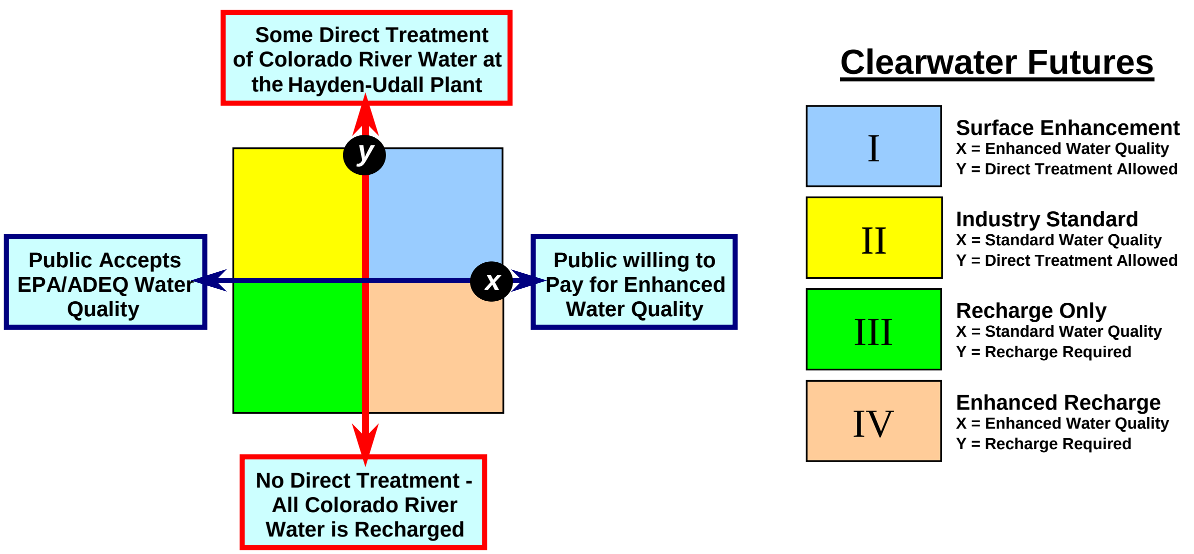

Figure 6-3: The Four Scenario Planning Futures Developed for the Clearwater Program.

The first critical uncertainty is portrayed on the *x*-axis. The left side of this axis represents futures where the public would accept a blended water quality that meets EPA and ADEQ primary drinking water standards. The right side of this axis represents the public's willingness to pay for discretionary improvements above and beyond these standards. The second critical uncertainty is portrayed on the *y*-axis. The top of this axis establishes the possibility that the public would accept some direct treatment of Colorado River water at the Hayden-Udall Treatment Plant. The bottom part of the axis represents futures where the public would require that all Colorado River water be recharged prior to use for potable supply. The resulting four quadrants shown on Figure 6-3 correspond to four equally possible futures (I, II, III, and IV) associated with the water-resource management goal of maximizing Tucson Water's use of its Central Arizona Project allocation through the Clearwater Program.

Pathways were developed for each of the four futures defined in Figure 6-3. These pathways consist of the project and program elements that were specified to realize each of the four futures. An analysis was conducted to identify the elements that were common to all four pathways and the critical decision points that occur where pathways branch off over time. Five elements that are common to all pathways prior to the first critical decision point were identified as shown on Figure 6-4. The first critical decision centers on whether the Hayden-Udall Treatment Plant can be used for direct treatment or whether all Colorado River water must be recharged prior to use. As each critical decision is approached or as conditions and assumptions change, the scenario planning process will be revisited to determine whether a new set of possible futures should be developed.

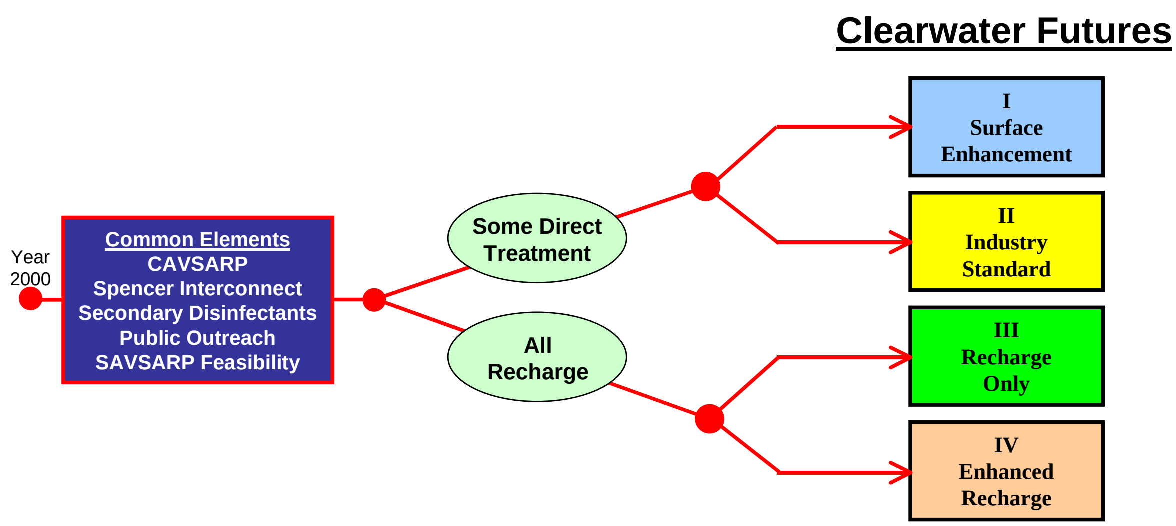

Figure 6-4: Clearwater Program Common Elements and Pathways.

Outcomes of Scenario Planning for Effluent Reuse

Another key water-resource planning challenge was to identify how effluent could be best used as a source of supply. Effluent is the only water supply that increases as the service area population grows. Eight futures were developed based on three critical uncertainties:

1. Will Tucson Water customers accept the use of effluent to augment the potable supply?

2. Should effluent be recharged prior to reuse?

3. Should all effluent be treated to potable standards or should the effluent be treated to standards specific to the type of use?

As shown on Figure 6-5, the first critical uncertainty is portrayed on the *x*-axis. The *Potable Use* end of the axis establishes the possibility that the public would be willing to accept effluent to augment potable supply while the *No Potable Use* end represents futures where the public would reject the use of effluent for potable reuse.

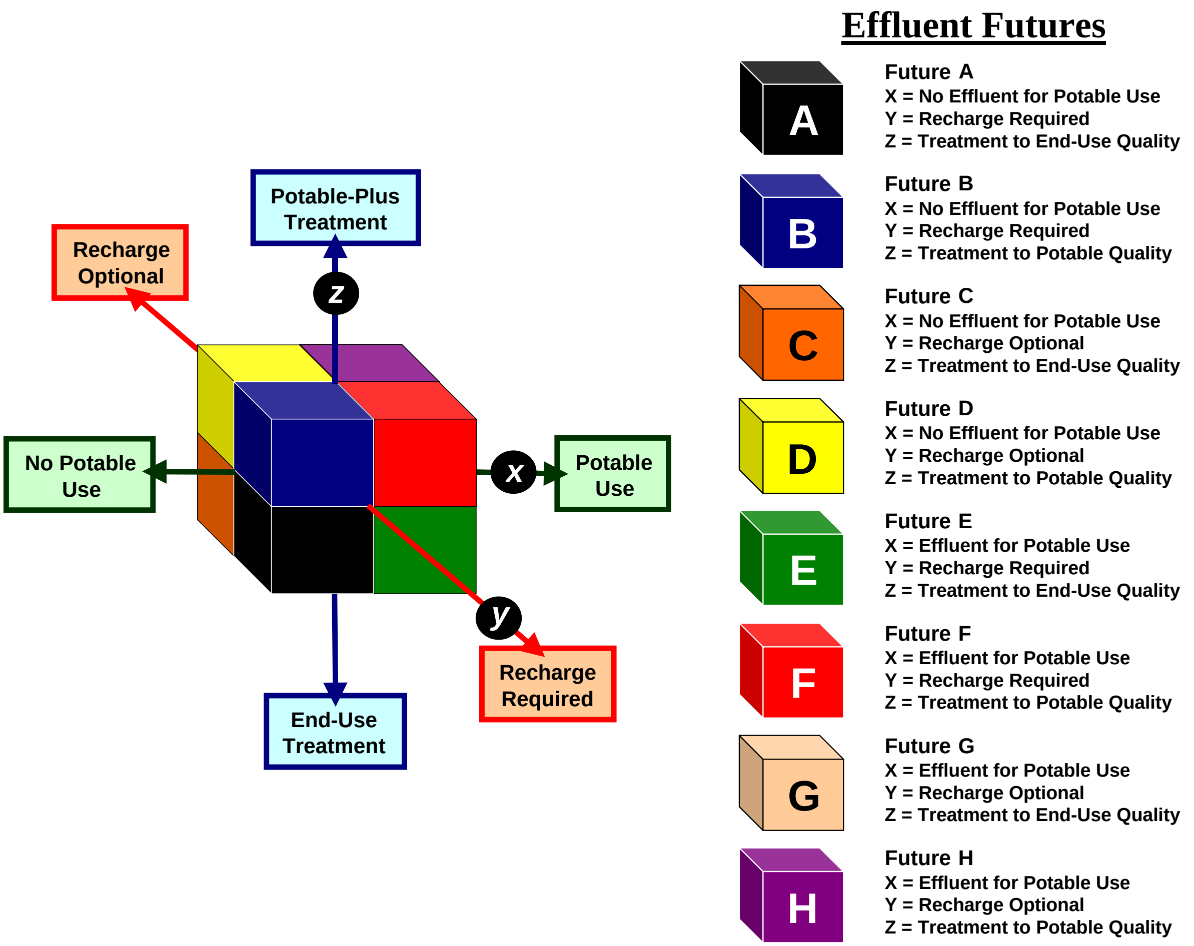

Figure 6-5: The Eight Scenario Planning Futures Developed for Possible Effluent Reuse.

The second critical uncertainty is portrayed on the *y*-axis. The *Recharge Optional* end of the axis establishes that the public would be willing to accept some direct treatment of effluent while the opposite *Recharge Required* end represents futures where the public would require recharge prior to potable reuse. Like the Clearwater assessment, the latter means that all effluent would have to be recharged before it could be made available to customers for potable supply.

The third critical uncertainty is portrayed on the *z*-axis. The *Potable-Plus Treatment* end of the axis establishes that all effluent will at minimum be treated to primary drinking water standards or better while *End-Use Treatment* represents futures where effluent would only be treated for the specified end-use. For instance, effluent used for non-potable purposes would only be treated to reclaimed water-reuse standards. The resulting eight boxes shown on Figure 6-5 correspond to eight equally possible effluent-reuse futures (A through H).

Eight pathways were specified to realize each of the futures (Figure 6-6). Review of the project and program elements associated with each pathway indicated that 14 elements (Common Element Set #1) were common to all pathways prior to the first decision point. At this decision point, a critical choice will have to be made about whether to expand the reuse of effluent or continue current effluent disposal practices. If expanded use of effluent is pursued, additional common elements have been identified (Common Element Set #2).

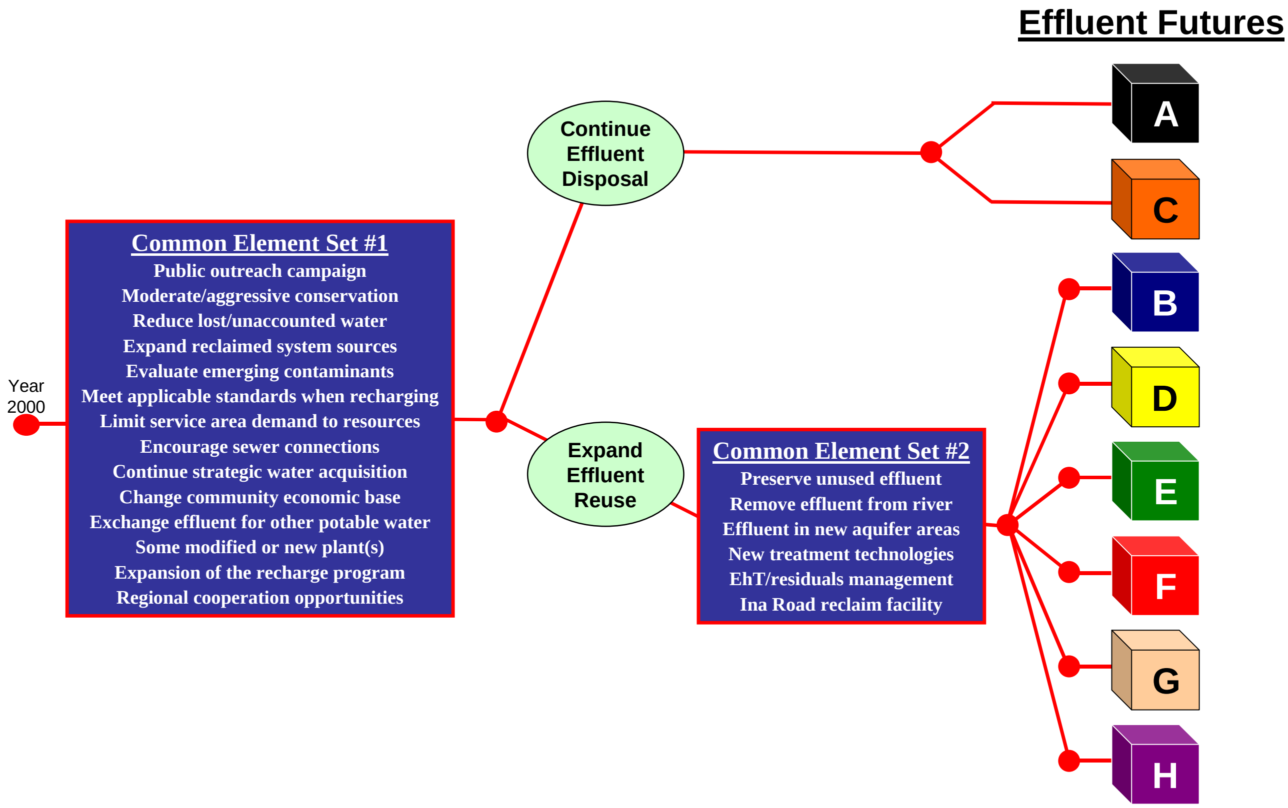

Figure 6-6: The Sets of Common Elements for Effluent Reuse.

COMBINING THE SCENARIO PLANNING ASSESSMENTS

To merge the futures identified for implementing the Clearwater Program and the possibilities associated with effluent reuse, Tucson Water identified the effects that near-term Clearwater Program decisions will have on mid- to long-term options for effluent reuse. Each of the four Clearwater Program futures chronologically precedes all eight of the effluent reuse futures. Futures from within these two sets were uniquely mixed and matched to form a total of 32 "combined futures." These combined futures collectively constitute a wide range of planning possibilities through which to utilize both Colorado River water and effluent. As described in Appendix D: *Planning Methodology*, the 32 combined futures were reduced to 28. The remaining 28 combined futures are defined by 14 sets of paired planning pathways. Each set of pathways presents a choice with regard to the mineral content of the Clearwater blend (Colorado River water and ground water) that define each of the 28 combined futures.

The combined futures and the 14 paired pathways were grouped by their shared characteristics into four Families of Futures. These characteristics include the range of effluent reuse options deemed acceptable, the potential role of recharge, the technologies which may be used to treat Colorado River water and effluent to acceptable levels of quality, and the level of operational flexibility provided under each Family of Futures. Based on shared characteristics, the four Families of Futures were identified:

- *No Effluent for Potable Use*
- *Total Recharge*
- *Combined Technology*
- *Treatment Flexibility*

These Families of Futures represent unique combinations of the four futures associated with Clearwater Program and the eight futures associated with effluent reuse. The four resulting Families of Futures are described below and summarized in Figure 6-7.

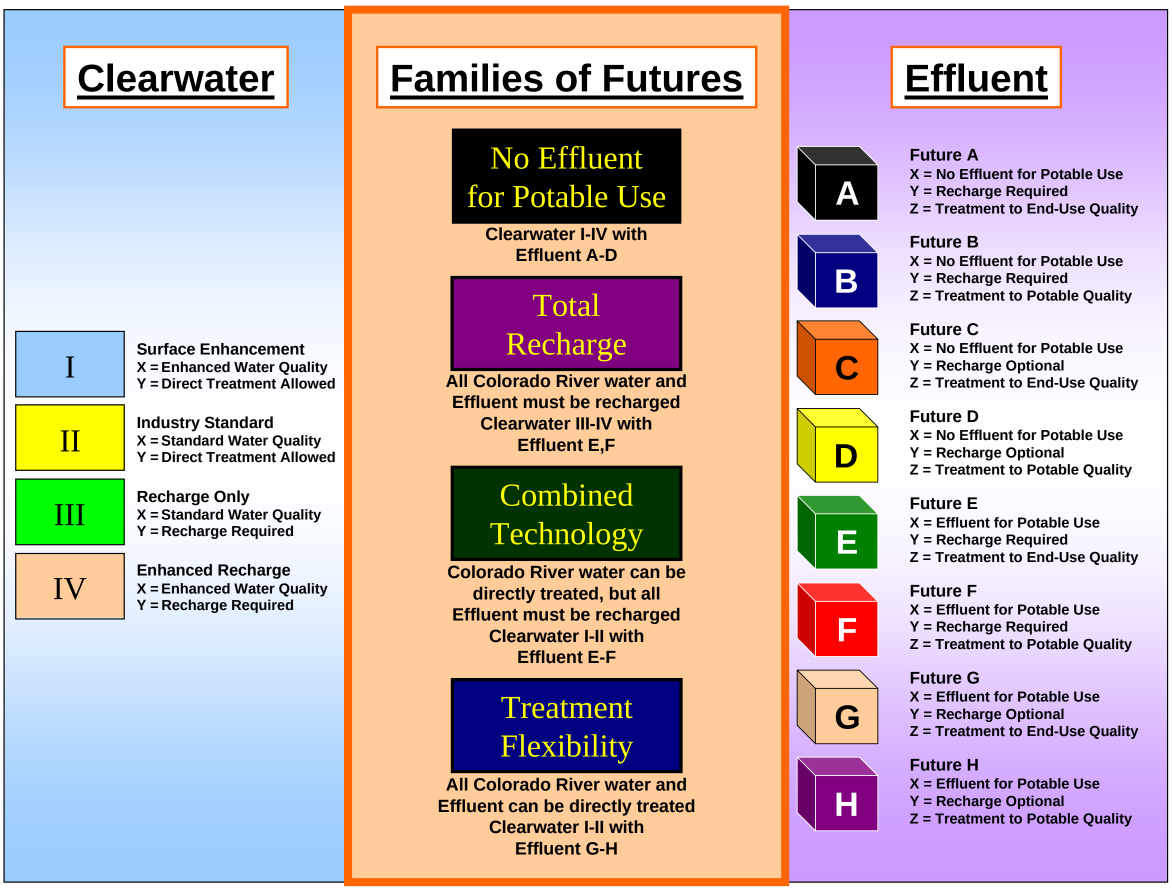

Figure 6-7: The Families of Futures.

<u>No Effluent for Potable Use</u>

In this Family, no effluent would be used for potable supply. Unless additional supplies are acquired or the per capita water usage rate is reduced through the successful implementation of a more aggressive demand management program, an eventual shortfall in potable supply would likely occur before 2020. This shortfall would result from the finite availability of the City of Tucson's Central Arizona Project allocation and the Groundwater Management Act's programs which preclude overdrafting within the Tucson AMA. This plan assumes that Tucson Water will not pump more ground water annually than is hydrologically renewed in the service area. In this Family, drought resistance is minimal since effluent is not fully utilized to help offset shortfall years on the Colorado River system. This Family includes all four futures developed for the Clearwater Program (I, II, III, and IV) but only four of the eight effluent futures (A, B, C, and D). This accounts for 16 of the 28 combined futures.

Under *No Effluent for Potable Use*, Tucson Water would not be able to retain its AWS designation for growth beyond 2015 without acquiring additional water resources or reducing the per capita water usage rate. This Family could allow the Utility to maintain its AWS designation if effluent is stored to accrue paper-water credits to offset ground-water pumping at rates beyond what is hydrologically sustainable (effluent futures B and D). This would violate a primary planning goal of achieving sustainable pumpage.

Total Recharge

Under *Total Recharge*, Tucson Water would be able to make full use of its available Colorado River water and effluent resources through recharge and recovery. Under this Family, all Colorado River water and effluent would be recharged as part of the treatment process prior to being used to satisfy potable demands. The impacts of future drought would be minimal since the total volume of available water supply is larger. This would require an aggressive expansion of Tucson Water's recharge and recovery capabilities. This Family accommodates two Clearwater Program futures (III and IV) and two effluent futures (E and F). This accounts for four of the combined futures.

While this Family could meet projected total demand through 2050, additional supplies would need to be acquired and/or per capita demand would need to be reduced to be sustainable beyond the 50-year planning period. However, without new supplies or a reduction in demand, the City of Tucson's AWS designation would likely not be retained to accommodate growth beyond 2035.

Combined Technology

In the *Combined Technology* Family, Tucson Water would again be able to make full use of the available Colorado River water and effluent resources for potable and non-potable supply. The Utility would have the ability to use direct treatment and/or recharge and recovery for Colorado River water supplies. However, all effluent would be recharged prior to being used to satisfy potable demands. The impacts of future drought would be minimal since the total volume of available water supply is larger. All effluent would be recharged resulting in continued expansion of Tucson Water's recharge and recovery capabilities. This Family accommodates two Clearwater Program futures (I and II) and two effluent reuse futures (E and F). This accounts for four of the combined futures.

Again, while this Family could meet projected total demand through 2050, additional supplies would need to be acquired and/or per capita demand would need to be reduced to be sustainable beyond the 50-year planning period. However, without new supplies or a reduction in demand, the City of Tucson's AWS designation would likely not be retained to accommodate growth beyond 2035.

Treatment Flexibility

In *Treatment Flexibility*, Tucson Water would not only be able to make full use of the available Colorado River water and effluent source waters, but the manner in which these supplies are treated is completely flexible. Tucson Water could use direct treatment technologies and/or recharge and recovery for all Colorado River water and effluent supplies. Similar to *Total Recharge* and *Combined Technology*, the impacts of future drought would be minimal. This Family accommodates two Clearwater Program futures (I and II) and two effluent futures (G and H). This accounts for four of the combined futures.

As with *Total Recharge* and *Combined Technology*, this Family could meet projected total demand through 2050. Additional supplies would need to be acquired and/or per capita demand would need to be reduced to be sustainable beyond the 50-year planning period and to retain the City of Tucson's AWS designation to accommodate growth beyond 2035.

PATHWAYS TO 2050

Over the next 50 years, Tucson Water must implement a number of projects and programs to increase the use of renewable water supplies to meet growing water demand. Depending on what the future holds, some projects and programs will continue to be useful while others may not. Tucson Water must plan and prepare for the range of possibilities defined by the four Families of Futures. Scenario planning provides a framework to identify common elements that are applicable under the broadest range of possible futures. To identify these elements, the 14 paired pathway sets containing various programs and projects were developed based on the defining characteristics of the possible futures. One defining characteristic, the mineral content of the Clearwater blend, was used as the "toggle switch" that defined each paired pathway. This toggle switch can be turned to TDS concentrations of either 500 to 650 mg/L or 450 mg/L along each of the 14 pathways. Therefore, 14 pathways cover the full range of possibilities represented by the 28 combined futures. Tucson Water assessed these pathways and identified the projects and programs that lead to multiple futures. The identified sequence of common elements over the 50-year planning period established the foundation of the recommended water-resource plan.

Pathway Directions

The 14 pathways that lead to the combined futures are presented on Figure 6-8. The pathways are affected first by decisions made regarding the treatment technology used for Colorado River water (direct treatment versus recharge) and the target TDS concentration of the Clearwater blend (450 mg/L versus 500 to 650 mg/L). As the community makes these critical decisions, some of the possible futures will evolve while others may fade away.

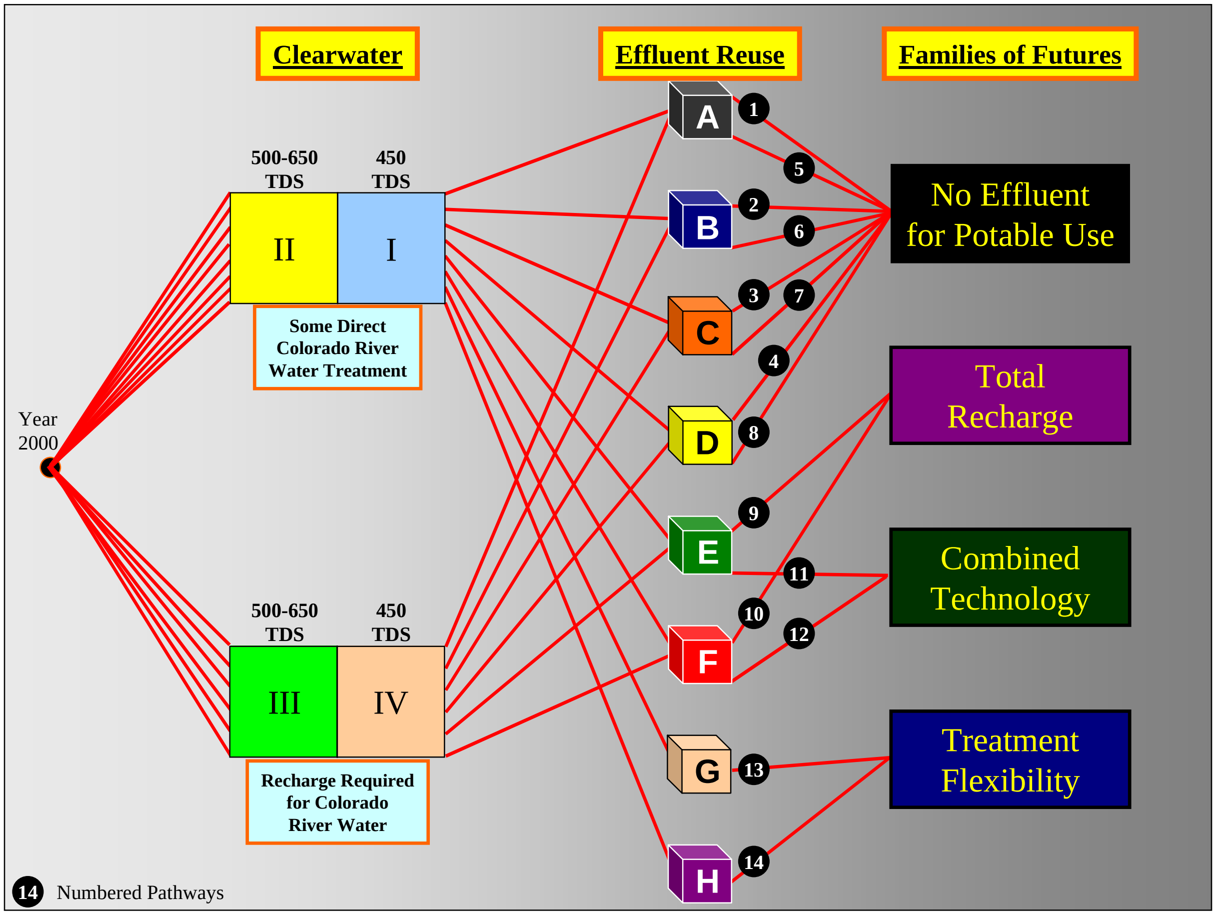

Figure 6-8: Pathways to the Families of Futures.

Looking beyond this first critical decision point regarding the use of Colorado River water, decisions on the reuse of effluent will need to be made. To capture the range of possible effluent reuse decisions, pathways were extended from each of the four possible Clearwater futures to each of the eight effluent reuse futures. The Families of Futures are defined by pathways that lead to combined futures which share a similar characteristic such as *No Effluent for Potable Use*.

Pathway Elements

A set of projects and water supply sources served as a pool of discrete elements from which each of the pathways was assembled. These projects and supply sources fall into three general categories: potable system, reclaimed system, and major pipelines. The elements used in the pathways are described in detail in Appendix D: *Planning Methodology*.

The projects that were used to develop each of the 14 pathways are presented in Table 6-1. Table 6-1 depicts the major pipelines, potable system projects, and reclaimed system projects included in each pathway and the years they would go into service to realize one of the four Families of Futures.

Pathway	Spencer Interconnect	Avra Valley Main Augmentation	Effluent Pipeline to Avra Valley	Effluent Pipeline to Tucson Basin	Ina Road Interconnect	Expand CAVSARP Recharge to 80k	SAVSARP Phase I	Rehabilitate Hayden-Udall	SAVSARP Phase II	Enhanced Treatment at Hayden-Udall	Effluent Recharge at CAVSARP	Effluent Recharge at Pima Mine Road	Expand CAVSARP Operations to 100k	Sweetwater Enhanced Treatment Plant	Expand CAVSARP Recovery	Effluent Recharge at CAVSARP	Expand Sweetwater Recharge Facilities	Expand Reclaim Plant	Reclaimed System Recharge Project	Clearwater Future(s)	Effluent Reuse Future	Family of Futures
	Major Pipelines					Potable System											Reclaimed System					
1	2006	2009				2005		2009		2011*							2007		2012	I/II	A	No Effluent for Potable Use
2	2006	2009	2017		2017	2005		2009		2011*	2017			2017			2007		2012	I/II	B	
3	2006	2009				2005		2009		2011*								2007		I/II	C	
4	2006	2009	2017		2017	2005		2009		2011*	2017			2017				2007		I/II	D	
5	2006	2009				2005	2007		2009	2011*							2007		2012	III/IV	A	
6	2006	2009		2017		2005	2007		2009	2011*		2017					2007		2012	III/IV	B	
7	2006	2009				2005	2007		2009	2011*								2007		III/IV	C	
8	2006	2009		2017		2005	2007		2009	2011*		2017						2007		III/IV	D	
9	2006	2009	2017		2017	2005	2007		2009	2011*	2017		2017	2017	2025		2007		2012	III/IV	E	Total Recharge
10	2006	2009	2017		2017	2005	2007		2009	2011*	2017		2017	2017	2025		2007		2012	III/IV	F	
11	2006	2009	2017		2017	2005		2009		2011*	2017			2017	2025		2007		2012	I/II	E	Combined Technology
12	2006	2009	2017		2017	2005		2009		2011*	2017			2017	2025		2007		2012	I/II	F	
13	2006	2009		2017	2025	2005		2009		2011*		2017		2025		2025		2007		I/II	G	Treatment Flexibility
14	2006	2009		2017	2025	2005		2009		2011*		2017		2025		2025		2007		I/II	H	

* This element can be "on" or "off" in all fourteen pathways and serves as the "toggle switch" for the mineral content of the Clearwater Blend.

NOTE: Detailed descriptions of each potential project can be found in Appendix D: Scenario Planning for *Water Plan: 2000-2050* .

Table 6-1: Pathways to 2050 – Schedules of Projects.

All pathways assume the annual use of 50,000 acre-feet of Tucson Water's portfolio of ground water through 2050 and full utilization of the City of Tucson's annual Central Arizona Project allocation. However, Tucson Water's effluent resource is used in varying degrees under the 14 pathways. Under four pathways (Pathways 1, 3, 5, and 7), effluent would only be used in the reclaimed system to meet non-potable demands.

In four other pathways (Pathways 2, 4, 6, and 8), effluent not used in the reclaimed system would be banked in long-term storage facilities. The recharge credits accrued through these long-term storage activities could be used to offset additional ground-water pumping in excess of the annual sustainable rate; however, this could cause a shift back toward localized over-drafting of the aquifer and declining ground-water levels. In the remaining six pathways (Pathways 9 through 14), the effluent not utilized through the reclaimed system is used to augment potable water supplies.

Criteria Assessment – Distinguishing the Pathways

Nine assessment criteria were developed to rate the overall benefits and drawbacks of each of the 14 possible pathways. These criteria were developed from a wide range of factors that could serve as performance measures. Many of these factors could not be used as distinguishing criteria because they were common to all 14 pathways and were considered "neutral." These neutral factors applied equally to all pathways while the nine assessment criteria served to distinguish the pathways. The assessment criteria and the neutral factors are described in detail in Appendix D: *Planning Methodology*.

Each of the nine criteria is assigned to one of three assessment categories: Source Water, Operations, and Environment. The criteria were developed in order to evaluate the overall capability of each pathway to meet Tucson Water's planning goals:

- Meet Projected Total Demand.
- Utilize Renewable Resources.
- Meet Water-Quality Targets.
- Achieve Sustainable Pumpage.
- Manage Costs and Rate Impacts.
- Comply with Assured Water Supply Program.

Each criterion is assigned a rating from one to ten points where the highest score fully expresses the value embodied in any given criterion. The point sum of the ratings is the measure of how well each pathway meets the overall planning goals.

Review of Table 6-2 indicates that Pathways 9 through 14 are rated higher than Pathways 1 through 8. The more highly rated pathways lead to three Families of Futures: *Total Recharge*, *Combined Technology,* and *Treatment Flexibility*. The main element that sets Pathways 9 through 14 above Pathways 1 through 8 was their ability to maximize use of renewable resources with emphasis on effluent utilization.

Pathway	Colorado River Water Source Acceptance	Effluent Water Source Acceptance	Renewable Supply Utilization	Meeting Projected Water Demand	Source Reliability	Impacts To Recharge Neighbors	Riparian Issues	Salinity Control	Subsidence Prevention	TOTAL	Clearwater Future(s)	Effluent Reuse Future	Family of Futures	Planning Goal Achievement
	<<<<<Source Water>>>>>			<<Operations>>		<<<<<<<<Environment>>>>>>>>				Overall				
1	5	10	1	1	1	10	5	4	1	38	I/II	A	No Effluent for Potable Use	FAIL
2	5	10	5	4	1	5	10	1	5	46	I/II	B		FAIL
3	5	10	1	1	1	10	5	4	1	38	I/II	C		FAIL
4	5	10	5	4	1	5	10	1	5	46	I/II	D		FAIL
5	10	10	1	1	3	5	5	4	1	40	III/IV	A		FAIL
6	10	10	5	4	3	1	10	1	5	49	III/IV	B		FAIL
7	10	10	1	1	3	5	5	4	1	40	III/IV	C		FAIL
8	10	10	5	4	3	1	10	1	5	49	III/IV	D		FAIL
9	10	5	10	10	10	1	1	7	10	64	III/IV	E	Total Recharge	PASS
10	10	5	10	10	10	1	1	7	10	64	III/IV	F		PASS
11	5	5	10	10	7	5	1	7	10	60	I/II	E	Combined Technology	PASS
12	5	5	10	10	7	5	1	7	10	60	I/II	F		PASS
13	5	1	10	10	5	10	1	10	10	62	I/II	G	Treatment Flexibility	PASS
14	5	1	10	10	5	10	1	10	10	62	I/II	H		PASS

Table 6-2: Rating of Pathways to 2050.

Increasing use of effluent and fully utilizing Colorado River water are critical factors which contributed to Pathways 9 through 14 realizing four of the planning goals: Meet Projected Total Demand, Utilize Renewable Resources, Achieve Sustainable Pumpage, and Comply with Assured Water Supply Program. The use of effluent has the added benefit of providing greater operational reliability because it is locally generated and immediately available. In addition, Pathways 9 through 14 provide the community the best options to prevent continued subsidence by controlling ground-water withdrawals and stabilizing water levels in the aquifer.

In the one-dimensional planning process, it would be tempting to choose one of these highly rated pathways and follow it without deviation. However, this approach would limit Tucson Water's flexibility in addressing future possibilities. In the planning approach used in this assessment, the most highly rated pathways and their associated futures serve as indicators of the programs and projects that could best achieve the stated planning goals. As the community evolves, these planning goals may change.

Because change is the one certainty, all potential pathways are retained in developing the recommended plan. The common elements in all the pathways provide the direction and the flexibility needed to manage uncertainty and the inevitable challenges which lie ahead. Chapter Seven, *The Recommended Plan,* describes the recommended long-range water-resource plan and the assessment of common elements that led to its development.