APPENDIX F. Needs Assessment - Recharge Goals, Risk Concerns and Possible Methods of Participation

A. Goals of Survey Participants

The goals listed below were expressed by the interviewees on behalf of specific entities. They are interrelated and overlapping, but each represents a distinguishable set of preferences and intentions by which recharge projects are judged. Capital letters (A) separate subgroupings that have differentiable implications for recharge projects.

1. Water Credits. This objective reflects the need for groundwater pumping credits because of ADWR regulations. The various reasons for wanting credits include: a) to meet AWS requirements (or in anticipation of meeting those requirements); b) to avoid relying on the CAGRD to replenish; c) in anticipation of other regulatory incentives (e.g., to offset GPCD violations or golf course water use); and d) in anticipation of development of a market for credits. This objective implies no bias with respect to the location of the facility where credits are accrued; that is, the entity may prefer that the facility be near or distant to meet other objectives.

2. CAP Use. This objective includes: (A) The desire to take wet CAP water from the canal. This implies having a specific use (e.g., farming) or a direct stake in the use of the water itself and therefore an interest in proximity to the canal. (B) The desire to obtain some benefit from a CAP allocation. This implies willingness to sell, lease, or exchange an allocation or to participate in USFs or GSFs at a distant location. (C) The desire to see CAP water used in the Tucson AMA, which implies the lack of a direct stake in the use of the wet water.

3. Effluent Use. This objective reflects the desire either (A) on the part of entities with current supplies of effluent to put them to use as renewable water or (B) on the part of other entities to gain control of effluent produced within their area of jurisdiction. Where effluent is collected and treated has implications for the location of its use. A third goal (C) is the general desire to see more use of reclaimed wastewater in the basin.

4. Income. This objective implies that the entity sees involvement in recharge projects as a source of revenue (and/or marketable credits).

5. Groundwater Level Stabilization/Restoration. This objective may or may not contain concerns about subsidence. It includes the desire to apply wet water (A) within the entity's area of jurisdiction or (B) in areas of identified water level decline.

6. Shortage Insurance. This objective implies consciousness of risks to the reliability of water supplies, either because of potential groundwater contamination, canal outages, or future shortages on the Colorado River. It suggests the desire to store wet water in the basin. The two groupings are (A) the need to bring renewable supplies to the area to be available as an alternative supply and/or for long-term groundwater storage or savings; and (B) the a need for

system redundancy and/or short-term storage.

7. Population Growth and Development. This objective reflects the desire to accommodate anticipated growth and ancillary amenities, including new golf courses, or to promote growth.

8. Cost Control. This objective may be interpreted as (A) attention to the bottom line or (B) desire to reduce cost uncertainties.

9. Land Use Controls. This objective focuses on links between water availability and land use. It implies the desire to direct development of certain types to certain areas to protect the quantity and/or quality of groundwater or advance other policy goals (such as reducing "urban sprawl").

10. Community Involvement. Participation in recharge and groundwater savings activities is motivated by a sense of community membership that may or may not imply a commitment to promoting "the public good" or desire to improve the sector's public image.

11. Water Balance. Entities wish to balance water supply and water demand without mining groundwater. This probably implies the goal of using directly or storing renewable water (CAP and/or effluent) in the area of jurisdiction. It may or may not be couched in terms of "sustainability" or "basin management" and may include expression of values of appreciation and protection of the desert environment and its resources.

12. Environmental Enhancement. This objective may be (A) the general expression of a value or may (B) imply a commitment to create, restore, and/or maintain riparian habitat and/or recreational opportunities apart from other recharge benefits.

13. Indian Water Settlements Implementation. This objective entails enabling SAWRSA CAP allocations and exchange water delivery for use on the reservation (for farming, habitat restoration, generation of transferrable groundwater credits, generation of funds to pay for water supply deliveries, etc.).

14. Farming. This objective implies a desire to obtain a reliable, schedulable source of wet water of suitable quality. It also implies a positive value for farming beyond its economic return.

15. Responsiveness to Consumers/Public. Activities are in response to consumer/public demands.

16. Drinking Water Quality. This objective encompasses the issues of health and aesthetic appeal of drinking water. It may or may not be associated with concerns about raw CAP water quality and/or treatment methods and treated CAP water quality. It also may or may not imply a desire to save the highest quality water (groundwater) for domestic use.

17. Conservation Requirements. This objective seeks help in meeting conservation

requirements (GPCD). Entities may view the provision of renewable water supplies as a higher use of resources than stipulated conservation programs.

The following tables show the objectives, and their relative level of importance, to all of the entities interviewed.

Survey Participants

1. ASARCO
2. Avra Valley Coop
3. AWBA
4. BKW Farms
5. U.S. Bureau of Reclamation
6. CAWCD
7. CAGRD
8. CMID
9. Community WC of Green Valley
10. Cyprus Sierrita
11. FICO
12. Flowing Wells
13. Green Valley WC
14. Interchange WC
15. Kai Farms
16. Marana
17. Metro DWID
18. Oro Valley
19. Pascua Yaqui
20. Pima County FCD
21. Pima County Parks & Rec
22. Pima County Wastewater Management
23. Sahuarita
24. San Xavier District (TON)
25. Spanish Trail WC
26. Arizona State Land Dept
27. Tucson Water
28. Tucson - Ward 6

RECHARGE GOALS (SURVEY PARTICIPANTS 1 - 15)															
GOALS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Storage credits						P	P		S					P	
2A. Use CAP water					S	P			P						
2B. Benefit from CAP allocation							P		P			S	P		
2C. See CAP water used in TAMA				S		P					T			P	
3A. Put effluent supply to use					P										
3B. Capture and use effluent locally								T					S	P	
4. Income/revenue stream															T
5A. Reverse GWL decline		S		S					T		S			P	T
5B. Prevent GWL decline			P			S									
6A. Alternative water supply and/or long-term storage			P			P			P		S	P	P	S	P
6B. Supply system redundancy and/or short-term storage				P	S						S				
7. Population growth (golf)		P					P						P		
8A. Minimize costs of meeting objectives	P	S	S	S		P	P	P	P	P	P		T	P	
8B. Control recharge to reduce cost uncertainties		P							S						
9. Land use controls															
10. Community involvement	T			S			S	S	S	S	T	S			S
11. Water balance						S			S					P	
12A. Environmental enhancement values				T	S					T			S		
12B. Riparian habitat and/or recreational opportunities					S									T	
13. Implementation of Indian water settlements			S		P										
14. Farming				P				P			S				
15. Responsiveness to consumers/public			S					T	T			T			
16. Drinking water quality									P						P
17. Conservation requirements (GPCD)									P			P			

RECHARGE GOALS (SURVEY PARTICIPANTS 16 - 28)													
GOALS	16	17	18	19	20	21	22	23	24	25	26	27	28
1. Storage credits	P	P	P		S	P	S			P	P	P	
2A. Use CAP water	S	P		P							S	P	T
2B. Benefit from CAP allocation	S	P*		S						S	S		
2C. See CAP water used in TAMA		P*											
3A. Put effluent supply to use							P					S	
3B. Capture and use effluent locally	P	P	P										
4. Income/revenue stream	S			P	S						S		
5A. Reverse GWL decline		S							P			S	S
5B. Prevent GWL decline					S								
6A. Alternative water supply and/or long-term storage		P	T					S	P		S	P	
6B. Supply system redundancy and/or short-term storage		P	P										S
7. Population growth (golf)	P		P	S				P		P	S		
8A. Minimize costs of meeting objectives	S			P						P			S
8B. Control recharge to reduce cost uncertainties	S	P		S								S	
9. Land use controls	S						S	P	P		S		
10. Community involvement	T	S		T	P				S				S
11. Water balance		P		T		S			P	T			S
12A. Environmental enhancement values		T	S			P			P				
12B. Riparian habitat and/or recreational opportunities			S		P	P		T	P	T			S
13. Implementation of indian water settlements									P			T	T
14. Farming				T					P				
15. Responsiveness to consumers/public	S	P	P									P	n/a
16. Drinking water quality	P	P	P										P
17. Conservation requirements (GPCD)		P											

* Assumes CAP allocation to Metro is approved.

P	Primary objective
S	Secondary objective
T	Tertiary objective

B. Survey Participant Concerns about Risks of Recharge

By far the most often mentioned risk was:
1. Long-term effects on the aquifer and groundwater quality. This risk was mentioned in conjunction with both CAP water and effluent and refers to the higher salinity of those waters. For some, these risks were highest for well-injection recharge and lowest for GSFs. In one instance, (A) this risk was associated with the desire to recharge at locations distant from existing wells; (B) there was no such association for others. For some (C) it was an argument in favor of GSFs.

Other risks mentioned by two or more entity representatives were:
2. Groundwater contamination. This risk refers to the mobilization of contaminants by recharge.

3. Third-party harms. Concerns were expressed that storage and/or recovery by another entity will have a negative impact on groundwater levels, existing wells' yields or water quality, land values, and/or growth potential in or near the responding entity's area of jurisdiction.

4. Flooding. The risk is that recharge projects will increase the threat of flood damage either directly in flood-prone areas (by raising water levels and reducing infiltration capacity) or indirectly by increasing riparian vegetation.

5. Rejected recharge. There is a risk that artificial recharge will displace some naturally occurring recharge, rather than adding to it.

6. Effects of in-lieu CAP water use on agriculture and mining. Some stated concerns about increases in the cost of production, decreased yields, and salt buildup on land from in-lieu recharge.

7. Post-recovery treatment. This risk is that recovered water may have to be treated.

8. Cost-effectiveness. This risk refers to cost uncertainties involved in both (A) choosing recharge as a water management strategy alternative and (B) making a choice among projects.

9. Credit accrual - security and value. There is uncertainty about the number of credits accrued, how the performance of partners affects that number, and/or the value of those credits. This concern includes uncertainty about future regulatory decisions.

10. Cost recovery. Entities may not be able to recover CAP water and/or recharge project costs under ACC rulings.

11. Legal Liability. This risk refers to any of several possible sources of liability including contamination of existing wells, other third-party impacts, and accidents on site.

12. ESA requirements. The ESA and requirements for protection of endangered native fish may affect the feasibility of recharge projects.

The following table shows the risks, and the relative levels of significance, mentioned by each entity interviewed. (Note: All of these risks are taken into consideration by entities when developing recharge facilities. The following table shows the three most important risks for each entity; however, entities are likely to be concerned with all of these risks.)

PERCEIVED RISKS OF RECHAGE																												
RISKS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1a. Long-term water quality impacts (local)													P															
1b. Long-term water quality impacts (general)					P			P	P						P	P	P	P		P		P	P	P				
2. Contaminant mobilization				S				P	P							P		P									P	P
3. Third-party harms	P	P								P						P								P		S		
4. Flooding																T			P	T						S		
5. Rejected recharge												T							T	T								
6. Effects on agriculture & mining	P			P						P	P				S											S		
7. Post-recovery treatment																	P	P	T									
8a. Cost-effectiveness of recharge					P				P			P					S									P		
8b. Cost-effectiveness of project						P	P												S									
9. Credit accrual			S																T							P		S
10. CAP cost recovery		S							P				P	P														
11. Legal liability			T																S	S	S		S		P	S		
12. ESA requirements					P				S								P											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

P	Primary objective
S	Secondary objective
T	Tertiary objective

C. Potential Contributions to Recharge Projects by Surveyed Entities

The table below displays potential recharge participants and the contributions they may be able and willing to make to a project.

PARTICIPANTS' CONTRIBUTIONS TO RECHARGE										
	Funding			Water			Project Assistance			
	Capital	Revenue stream	Other *	CAP water	Effluent	GW credits	Land	Infrastructure	Monitoring &/or Data	Technical Expertise
Bureau of Reclamation	X		X		X				X	X
CAWCD	X	X		X		X		X	X	X
CAGRD	X	X						X		
State Land Department				X			X			
Dept of Water Resources			X						X	X
AWBA		X		X						
Pima County FCD	X		X				X		X	X
Pima County	X	X	X		X†				X	X
City of Tucson	X	X	X	X	X		X	X	X	X
Metropolitan DWID	X	X	X	X #					X	X
Town of Marana	X	X	X							
Town of Oro Valley	X	X	X	X						
Com WC of Green Valley		X		X						
Green Valley WC		X		X						
Flowing Wells				X						
Cortaro-Marana ID				X		X	X	X	X	
Avra Water Coop										
Kai Farms	X					X	X	X		
BKW Farms						X	X	X		
FICO						X	X			
ASARCO						X				

PARTICIPANTS' CONTRIBUTIONS TO RECHARGE										
	Capital	Revenue stream	Other *	CAP water	Effluent	GW credits	Land	Infrastructure	Monitoring &/or Data	Technical Expertise
Cyprus-Sierrita						X				
Interchange WC	X						X			
Spanish Trail WC		X		X						
Tohono O'odham Nation				X		X‡	X			
San Xavier District of TON				X		X‡	X			
Pascua Yaqui Tribe	X		X	X		X‡	X			

* Other funds include contributions to technical and feasibility studies, participation in design and development, and programs supporting ancillary benefits. Contributors are not necessarily funding agencies.
† Restrictions on use of PC effluent under current IGA
‡ No mechanism currently exists for accruing pumping credits from recharge on tribal land
# Assumes CAP allocation to Metro is approved