DRAFT
IRWP MASTER PLAN
REUSE PROJECT PRIORITY LIST

INTRODUCTION

In March 2004, the City of Santa Rosa adopted the Incremental Recycled Water Program Recycled Water Master Plan (Master Plan – available at http://www.recycledwaterprogram.com/reports_docs.htm). The Master Plan specifies recycled water shall be managed as described in Figure 1 and Table 1. Figure 1 describes the timing of Master Plan implementation, which is that reuse shall be implemented as needed between 2004 and about 2010 when the capacity of the existing system is expected to be achieved and discharge would, if reuse is not implemented, increase above 4,500 million gallons (MG).

The final IRWP Reuse Project Priority List will identify particular reuse and discharge projects to implement the Master Plan, and describe the approximate City of Santa Rosa connection fee and monthly user rates necessary to support Master Plan implementation. This draft IRWP Reuse Project Priority List is intended to provide the Board of Public Utilities (BPU) with a basis for policy decisions to support preparation of IRWP Reuse Project Priority List. The draft will be modified to reflect the BPU's policy decisions. The final IRWP Reuse Project Priority List can be modified by the BPU in the future when priorities and funding conditions change.

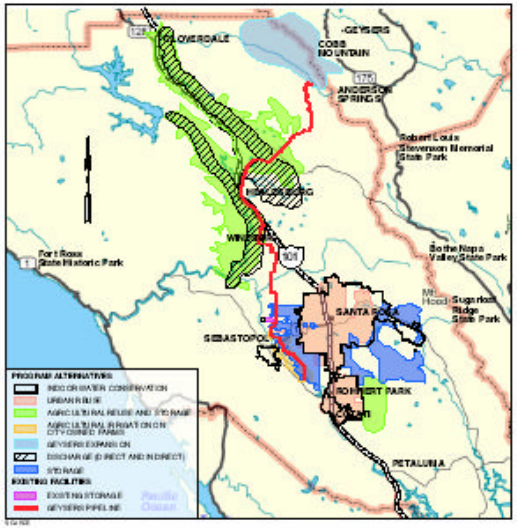
The Reuse Project Priority List is appropriate to identify projects in 2004 because the time necessary to implement the highest priority reuse projects could be sufficiently long such that their implementation would need to begin in 2005 to assure the projects are operational when flows reach the capacity of the existing system (expected in approximately 2010).

Table 1. Allocation of Recycled Water in IRWP

Program Element	Recycled Water Volume (MG)	
	Target	**Range**
Conservation	300	150 to 300
Discharge	4,500[a]	1,600 to 4,500[a]
Geysers Reuse	400	0 to 2,200
Urban Reuse	500	0 to 2,200
Agricultural Reuse	1,000	0 to 2,200
Storage	1,200[b]	250 to 3,190
Total Program	6,700	6,700

[a] Range represents the maximum discharge in driest and wettest years. If discharge is precluded, the lower end of the range could be 0 MG. Laguna discharge is within permit limits (lower end of range could be 0 MG), with remainder to Russian River. River discharge can be direct or indirect.

[b] Storage not included in total program volume.



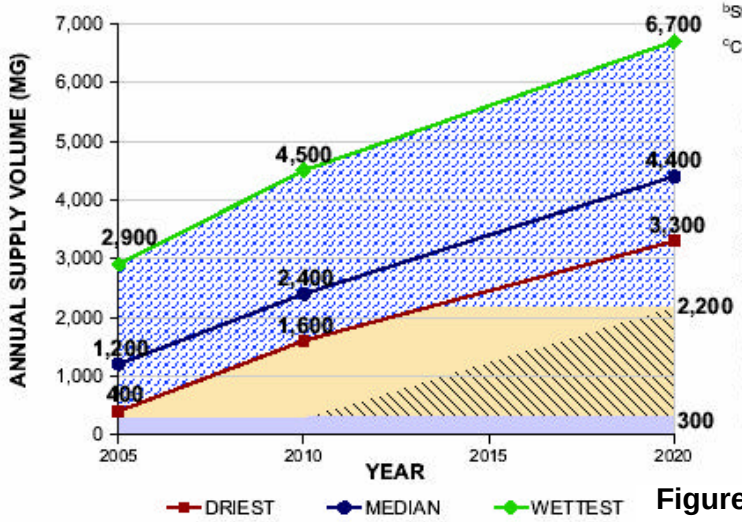
Estimated Costs and Volumes

Program Elements	Estimated Capital Costs[c] ($ million)	Volume Managed (MG) Target	Volume Managed (MG) Range
Conservation	3	300	150 to 300
Discharge	30	4,500[a]	1,600 to 4,500[a]
Geysers Reuse	3	400	0 to 2,200
Urban Reuse	27	500	0 to 2,200
Agricultural Reuse	3	1,000	0 to 2,200
Storage	62	1,200[b]	250 to 3,190
Treatment Plant Expansion	62		
Total Capital Cost	**190**		
Studies	6		
Total Program	**196**	**6,700**	**6,700**

[a]Range represents the maximum discharge in driest and wettest years. If discharge is precluded, the lower end of the range could be 0 MG. Laguna discharge is within permit limits (lower end of range could be 0 MG), with remainder to Russian River. River discharge can be direct or indirect.

[b]Storage not included in total program volume.

[c]Costs reflect target volume.



LEGEND

- Discharge
- Early Implementation Reuse
- Just-in-Time Reuse
- Conservation

RATE IMPACTS:

Existing monthly Santa Rosa average residential user charge is $35.41

Monthly user charge increase (per ESU) = $5.46 ±10% for Santa Rosa

Existing demand fee (per ESU) for Santa Rosa is $4,117

Demand fee increase (per ESU) = $5,600 ±20% for Santa Rosa

Figure 1

MASTER PLAN SUMMARY
SANTA ROSA SUBREGIONAL WATER RECLAMATION SYSTEM
INCREMENTAL RECYCLED WATER PROGRAM

W012004004RDD_81 (7/14/04)

PROJECTS

Increments of reuse are described in Master Plan Table 6. These increments were reviewed as part of the development of this Priority List and, in some cases, modified based on the current understanding of project implementation issues. The result is a list of possible IRWP projects. Appendix A describes the relationship between Master Plan Table 6 projects and projects listed in this Reuse Project Priority List. The project descriptions below are based on a partial knowledge of field conditions and reflect professional judgment as to an appropriate project size and, in some cases, location. Therefore, the projects should be considered illustrative for implementation planning; subsequent evaluation is needed to more precisely size and locate projects. The cost of each project reflects the cost of storage necessary to support the reuse project. Storage cost is estimated based on the assumption that eight gallons of reuse requires five gallons of storage (as described in the Master Plan). The assumed cost of storage is ranges from $48,000 to $63,000 per MG, depending on storage location and is included as needed in all of the cost estimates hereinafter.

AGRICULTURAL REUSE

Table 2 lists possible agricultural reuse projects. Each of the projects is described below.

Table 2. Possible Agricultural Reuse Projects
(Table 1 target for agricultural reuse is 1000 MG/yr, the range is 0-2200 MG)

Name	Description	Estimated Value ($ million)	Capacity (MG/yr)	Estimated Unit Present Value ($ thousand/MG)
Ag-1	City-owned Farm irrigation	36	800	46
Ag-2	East of Rohnert Park (ERP), max possible irrig without ERP storage	35	440	79
Ag-3	ERP with ERP storage	33	377	88
Ag-4	ERP max size with storage	65	783	83
Ag-5	No. County Ag Area (NCAA) Project 1	40	370	108
Ag-6	NCAA Project 2	19	170	111
Ag-7	NCAA Project 3	25	240	103
Ag-8	NCAA Project 4, Max size	294	2700	109
	Total		5880	

Ag-1 – City-Owned Farm Irrigation

This project involves the return of up to 800 MG of irrigation capacity that could not be used as a result of implementing the Geysers Recharge Project. The reclamation system is

constrained by storage capacity. Therefore, City-owned farms upon which irrigation was reduced or eliminated when Geysers went on line can be restored if storage is added back into the system. Implementation of this project therefore involves only the construction of new storage because the other facilities are already in place. Arrangements with lessee farmers would need to be made to begin farming the City-owned farms once again, as they were pre-Geysers.

The amount of storage required depends on when the project is actually implemented. The water balance model described in the Master Plan estimated the storage to reuse ratio was 5:8 for any reclamation project. Therefore, construction of 5/8 of 800 MG, or 500 MG, is expected to result in the 800 MG irrigation capacity being returned to the system. The actual storage required could be calculated more accurately when the project is implemented, based upon the actual Laguna Plant flows.

Ag-2, Ag-3, and Ag-4 – East of Rohnert Park Irrigation

The three increments of East Rohnert Park projects are described in the following paragraphs.

The Ag-2 increment adds 440 MG of capacity and is defined by the maximum amount of irrigation that can be added east of Rohnert Park without adding storage east of Rohnert Park. This therefore utilizes the existing Rohnert Park Reuse pipeline to supply water east of Petaluma Hill Road. However, storage must be constructed elsewhere (such as the Laguna area) to support the reclamation expansion. The storage required would be 275 MG (5/8 of 440 MG).

The Ag-3 increment adds 377 MG of capacity and brings the total reclamation capacity in this area up to 817 MG, which is the capacity level possible based upon the grower survey that was made in preparation of the Master Plan. Using the 5:8 storage/capacity ratio, new storage of 236 MG would need to be developed, and this storage would have to be east of Petaluma Hill Road because the Rohnert Park reuse pipeline would have been pushed to the maximum by the Ag-2 increment.

The final Ag-4 increment of 783 MG represents the maximum capacity of the East Rohnert Park reuse area. This involves irrigating lands which have never been farmed or irrigated before and for which no interest was expressed during the Master Plan process. However, these lands were within the limits of the Feasibility Study. The storage required, using the approximation, would be 489 MG, and it would have to be located east of Petaluma Hill Road.

Ag-5, Ag-6, Ag7 and Ag-8 – North County

The first three North County reclamation increments were developed based upon projects considered viable during the Master Plan process. Since storage in the North County area is essential to any reuse project located there, these Ag-5, Ag-6, and Ag-7 increments are based upon storage projects and supported by an irrigated acreage that is adequate based upon the average irrigated depth for vineyards of 8 inches. Two of the storage projects were in the West Soda Rock Lane vicinity, and one is in the northeast portion of the

Alexander Valley. Any one of these three storage projects could be implemented first, and would depend upon grower negotiations and the readiness of the required distribution system associated with each storage site to deliver the water.

The last North County increment, Ag-8, was developed to meet the maximum size required for a full reclamation program in the North County that would fulfill the needs of the Master Plan under certain scenarios. This increment is not based upon known potential storage projects and is therefore dependent on the development of significant storage in the North County at locations that are currently undetermined.

The total capacity of agricultural reuse projects exceeds 2,200 MG, which is the upper end of the range in the Master Plan. The Master Plan would need to be modified before agricultural reuse projects could be selected that exceed 2,200 MG.

URBAN REUSE

Table 3 lists possible urban reuse projects. Each of the projects are described below.

Table 3. Possible Urban Reuse Projects
(Table 1 target for urban reuse is 500 MG/yr, range is 0-2,200 MG)

Name	Description	Estimated Value ($ million)	Capacity (MG/yr)	Estimated Unit Present Value ($ thousand/MG)
Urban-1	SRG&CC Area	7	81	80
Urban-2	Rohnert Park/Cotati	18	196	90
Urban-3	Santa Rosa Phase 1	32	255	126
Urban-4	Santa Rosa Phase 2	99	703	141
Urban-5	Santa Rosa Phase 3	142	778	182
	Total		2013	

The Urban-1 increment of 81 MG involves the Santa Rosa Golf and Country Club only. This project is essentially the completion of an irrigation pipeline from the existing irrigation system to the golf course which has already been planned by the Reclamation Department. The golf course improvements are assumed to be minimal to allow the conversion to recycled water. Implementation could therefore be accomplished quickly once an agreement is reached with the Golf and Country Club. As with all reclamation projects, a storage expansion would be required.

The Urban-2 increment of 196 MG includes approximately 150 MG of residential development utilizing recycled water, along with 46 MG of park/playground type urban reuse. The parks and playgrounds are areas primarily within Rohnert Park that were not

implemented as part of the Rohnert Park Reuse project in the 1990s because of their distance from the main pipeline and the available reuse capacity. Hookup of these sites would include extension of laterals from the 24-inch-diameter mainline and the necessary agreements with the City of Rohnert Park or Cotati. The residential development sites are generally located just west of Petaluma Hill Road, and serving them with recycled water would first involve lateral extensions from the Rohnert Park Reuse mainline. Then, details would have to be worked out with the developers regarding connection to the dual plumbing systems that they would be providing to the residences. Terms and conditions of the residential properties would need to include the rules for proper water management and penalties for misuse. The cities of Rohnert Park and Santa Rosa would need to develop an agreement as to how the water reuse would be monitored and managed. Finally, the timing of the residential reuse would depend on the timing of the developments themselves and the availability of storage in the reclamation system to support the added capacity.

The Urban-3 increment is comprised of urban reuse within the City of Santa Rosa. The 255-MG capacity is based upon the estimated volume that could be reused in the Northwest and Central areas of Santa Rosa. The piping for this project would likely originate from the West College Ponds of the reclamation system, and the reclamation system would provide the supply volume to keep the ponds filled. A storage expansion project, somewhere in the Laguna area, would be required. Assuming the 5:8 storage/capacity ratio previously discussed, storage of 160 MG would likely suffice. One potential location for this storage expansion could be West College Ponds themselves, with the added storage developed by raising the berms and/or deepening the pond bottoms. Implementation of this capacity increment would require first creating an urban reuse conceptual design which would include identification of specific user sites, pipe routes, and capacity vs. cost analysis of lateral extensions.

The Urban-4 increment is an expansion of the City of Santa Rosa system started with the Urban-3 project. This 703-MG increment would expand into most parts of the city, including Southwest, Southeast, Fountaingrove and Bennett Valley areas. Rincon Valley has been shown to be the least cost effective area to expand into. This increment is based upon existing potable and private well demands only (no development assumed). The pump station established at the West College Ponds may be expandable to provide the needed capacity and the existing reclamation system might convey the needed volume to the West College area, but analysis of the existing reclamation deliveries would need to be made to confirm this. If the reclamation system could not keep up with the urban demands, a new supply pipeline from the Laguna Plant would be necessary, which would likely enter into the Southwest area of the city. Also, another storage expansion would be required. Urban interference in city streets would be significant in some areas during the construction period.

The final urban reuse increment is Urban-5, which has 778 MG of capacity, all within the City of Santa Rosa. This last increment is intended for new development, primarily in Southwest and Southeast areas, but it also includes expansions into more remote areas not reached by the Urban-4 project. A new pipeline from the Laguna Plant would be required, and added storage as with the other increments. On a unit cost basis, this would

be the most expensive expansion because of the higher difficulty in serving the more remote areas and providing less cost effective laterals in terms of the capacity created.

GEYSERS EXPANSION

Table 4 shows the possible increments to the Geysers system.

Table 4. Possible Additional Geysers Reuse Projects
(Table 1 target for geysers reuse is 400 MG/yr, range is 0-2,200 MG)

Name	Description	Estimated Value ($ million)	Capacity (MG/yr)	Estimated Unit Present Value ($ thousand/MG)
Geysers-1	Geysers - 12 mgd to geysers. This equates to the target in Table 1 (+1 mgd relative existing annual average flow of 11 mgd).	16	400	39
Geysers-2	Geysers 16 mgd total flow (+4 mgd)	56	1425	39
Geysers-3	Geysers 19 mgd total flow (+3 mgd)	53	1095	48
Geysers-4	Geysers 25 mgd total flow (+6 mgd)	173	2190	79
Geysers-5	Geysers 25 mgd with additional storage (cost for storage only)	147	1290	114
	Total		6400	

Geysers-1 creates additional Geysers steamfield injection capacity of 400 MG relative to the existing 4,000 MG. It involves an expansion from the existing 11-mgd system to approximately 12 mgd. Since the existing system is designed to provide a reliable capacity of 16 mgd, this expansion requires no new facilities. However, a change in the contract with Calpine would be required. Added storage would be required as with other reclamation alternatives.

Geysers-2 provides for the system to expand to from Geysers-1 capacity of 12 mgd to 16 mgd. No new facilities other than storage are required.

Geysers-3 expands the system from 16 to 19 mgd. The Geysers north pump stations can pump up to 20 mgd, but not reliably because there are no spare units at this flow rate. The

derated capacity is therefore 19 mgd. No new facilities are required other than some reprogramming of the controls systems. More storage is required.

Geysers-4 expands the system from 19 mgd to the ultimate conveyance capacity of the Pine Flat pipelines and north pump stations, which is 27 mgd. The derated capacity is 25 mgd to allow for downtime. This capacity level requires significant expansions to each of the three north pump stations, and some expansion at the Llano Pump Station. More storage is required.

Geysers-5 adds capacity to Geysers-4 by adding storage so that the Geysers system at ultimate capacity can provide more reuse in dryer years subsequent to a very wet year. Therefore, this increment only includes storage.

The total capacity of all geysers expansion alternatives exceeds 2,200 MG, which is the upper end of the range in the Master Plan. The Master Plan would need to be modified before geysers expansion projects could be selected that exceed 2,200 MG.

INDOOR WATER CONSERVATION

The IRWP Master Plan includes indoor water conservation as described in TM No. 2 of the Feasibility Report. The IRWP includes implementation of that portion of the indoor water conservation plans adopted by each of the Subregional partners that had not already been implemented in 2000 (the date of the latest available data at the time that the TM No. 2 was prepared). These plans are based on California Urban Water Conservation Council BMPs. As such, each indoor water conservation plan represents the judgment of each Subregional partner as to its maximum sustainable indoor water savings. The total flow reduction resulting from implementation of the partners' plans after 2000 is estimated to be 300 MG. The conservation component is programmed for implementation by each partner and is therefore not considered further in this report. For comparison purposes, the cost-effectiveness of conservation is about $13,000/MG.

DISCHARGE

An approach to implementing discharge was adopted by the Board of Public Utilities on May 20, 2004. The discharge component was considered prior to reuse because of the long period required to implement the project(s) and because of regulatory compliance considerations and is therefore not considered further in this report. For comparison purposes, the cost-effectiveness of discharge is about $25,000/MG.

LAGUNA PLANT IMPROVEMENTS

Improvements at the Laguna Plant to provide the necessary future capacity (capacity expansion) are included in the IRWP Master Plan, but not in any of the costs described in Tables 2 through 4 above. In addition, the need for improvements at the Laguna Plant to preserve existing capacity were identified during the IRWP process. However, the capacity preservation and expansion costs have changed as the result of additional study to better define and capacity preservation needs at the treatment plant. The current

estimated capacity preservation and expansion costs are summarized in Table 5. The costs in Table 5 are greater than those described in the Master Plan.

Table 5. Estimated Laguna Plant Improvement Costs [a] (millions)			
Project	**Capital**	**Annual O&M**	**Source**
Capacity Preservation	$90	$5.7	CH2M Hill's draft report to be issued in summer 2004
Capacity Expansion	$47	$3.9	
[a] Values in this table are preliminary and subject to revision.			

EVALUATION CRITERIA

The IRWP Master Plan was adopted consistent with the primary and supporting Program objectives adopted in 2002 by the BPU and Council (Figure 2). In addition, the Council passed Resolution No. 25337 (Resolution of the Council of the City of Santa Rosa Adopting a Revised Santa Rosa Subregional Reclamation System Agricultural and Urban Recycled Water Reuse Program) on July 20, 2002 to provide a basis for evaluating reuse opportunities as they might arise. Project evaluation criteria in Resolution No. 25337 are:

1. Proximity of proposed project to existing and/or future pipelines having capacity to deliver water, expansion potential, and proximity to urban boundaries;

2. Portion of project cost borne by project proponent, and Subregional Reclamation System cost/benefit relationship;

3. Impact on future domestic water supplies, including priority for urban reuse projects that will replace the use of potable water; and

4. Consideration of who operates and manages the project.

Resolution No. 25337 criteria and the Program objectives provide the basis for IRWP project evaluation criteria proposed below for the purpose of prioritizing and scheduling IRWP Master Plan projects for implementation. The project evaluation criteria are consistent with the Program objectives and Resolution No. 25337 criteria.

The IRWP project evaluation criteria are as follows:

FIGURE 2. PROGRAM OBJECTIVES

Primary Program Objectives

- Provide wastewater treatment, recycling, and disposal for the Santa Rosa Subregional Reclamation System to accommodate projected growth as indicated in the adopted General Plans in effect as of ~~March~~ July 2002 of each of the Subregional members;
- Develop and operate the wastewater treatment and disposal system in ways that protect public health and safety, protect natural resources including the Russian River and its tributaries, promote use of recycled water, meet current regulatory requirements, and provide flexibility to meet future regulatory requirements.
- Maintain a system and system components that can continue to be successfully financed and that are economically feasible.

Supporting Program Objectives

The supporting objectives are intended to further define the primary Program objectives and to provide guidance in the development, evaluation, and selection of Program alternatives.

- Maximize use of recycled water;
- Maximize reuse opportunities where recycled water will increase the availability of potable water supplies;
- Dispose of reclaimed water in a manner that protects beneficial uses of receiving waters;
- Optimize water conservation;
- Maintain the level of weather-independence (as defined by RWQCB policy) that is provided by the addition of the Geysers Recharge Project to the Subregional Reclamation System;
- Maximize use of existing infrastructure;
- Maintain a disposal system that is manageable and reliable;
- Provide flexibility to accommodate use of recycled water made available by neighboring agencies as deemed appropriate by the City of Santa Rosa.

- **Cost and Cost-Effectiveness.** Cost-effectiveness is defined here as present value cost per million gallons where cost is defined as total project cost without regard to funding source (e.g., ratepayers, project partners, grants, etc). Present value cost is used as the basis for cost-effectiveness. Present value cost is calculated as described in the Master Plan.

- **Potable Water Offset.** Potable water offset refers to the reduced consumption and additional supply of potable water that results from recycled water reuse. Particular IRWP reuse projects have the potential to replace potable water supplies currently being used and to augment the supply of potable water. For example, some of the water currently being used in urban Santa Rosa is derived from the Russian River and delivered to the City by the Sonoma County Water Agency. This water, if replaced by recycled water, would be available as potable supply instead of irrigation. In another example, recycled water supplied to agricultural water users in the North County area

could be available to downstream users as potable supply and/or in-stream uses such as reproductive habitat for federally-protected salmon and steelhead fish.

- **Reuse System Diversity.** Diversity in the reuse and disposal system provides reliability. Each component of the Subregional System is subject to factors that causes the amount of water that can be managed (i.e., successfully reused or disposed) in each type of reuse and disposal to vary. Diversity is achieved by having reuse and disposal options that are subject to different factors or factors that cycle out of phase. For example, addition of Geysers Recharge Project added considerable diversity to the system because annual injection volume is not sensitive to weather, whereas irrigation and discharge are sensitive to weather. Urban irrigation is less sensitive to the weather than agricultural irrigation.

- **Ease of Implementation.** Projects that can be implemented with less difficulty have a greater likelihood of on-time and on-budget completion, and are therefore considered preferable. Ease of implementation is based on such factors as willingness of partners, permitting and construction issues, construction duration, and control of external factors (i.e., a project that is subject to the control of other political jurisdictions).

- **Ease of Operation.** Projects that can be operated with less difficulty have a greater likelihood of compliance with regulations and on-budget operations and maintenance costs and are therefore considered preferable. Ease of operation is based on such factors as willingness of partners, expected regulatory and permit requirements, and technical complexity of system infrastructure.

COMPARISON OF PROJECTS

To provide a starting point for BPU discussion, each project has been given an example score ranging from 1 to 5 (where a higher score represents a more desirable condition) under each criterion, and each criterion has been weighted (where a higher value gives more importance to the criterion). The result of this example scoring is summarized in Table 6. The example scores are explained below.

COST AND COST-EFFECTIVENESS

The cost-effectiveness of reuse projects range from $39,000/MG to $182,000/MG, and the distribution of cost-effectiveness fell into four groups as described in Table 7. Reuse projects were given scores ranging between 1 and 4 based on the grouping as shown in Table 7.

The cost of projects is provided in 2004 dollars based on information in the Master Plan. This cost does not reflect the savings that would be realized by the Subregional System as a result of any contribution by possible project partners.

Table 6. IRWP Reuse Project Priority List (Based on Example Scores[a])

Project	Description	Capacity (MG/yr)	Cost			Potable Offset		Reuse System Diversity Score[a]	Ease of Implementation Score[a]	Ease of Operation Score[a]	Total[c]
			Estimated Value ($ million)	Estimated Unit Present Value ($ thousand/MG)	Score[a]	(MG)	Score[a]				
Criterion Weight[b]					**2**		**3**	**2**	**1**	**1**	
Urban-2	Rohnert Park/Cotati	196	18	90	3	196	5	5	4	2	37.0
Urban-1	SRG&CC Area	81	7	80	3	0	1	5	5	5	29.0
Ag-1	City-owned Farm irrigation	800	36	46	4	0	1	3	4	5	26.0
Ag-6	NCAA Project 2	170	19	111	2	?	2	3	4	4	24.0
Urban-3	Santa Rosa Phase 1	255	32	126	2	147	1	5	4	2	23.0
Ag-7	NCAA Project 3	240	25	103	2	?	2	3	3	4	23.0
Ag-5	No. County Ag Area (NCAA) Project 1	370	40	108	2	?	2	3	3	4	23.0
Geysers-1	Geysers 12 mgd total flow	400	16	39	4	0	1	1	5	5	23.0
Geysers-2	Geysers 16 mgd total flow	1425	56	39	4	0	1	1	5	5	23.0
Ag-2	East of Rohnert Park (ERP), max possible irrig without ERP storage	440	35	79	3	0	1	3	3	4	22.0
Ag-3	ERP with storage	377	33	88	3	0	1	3	3	4	22.0
Geysers-3	Geysers 19 mgd total flow	1095	53	48	4	0	1	1	4	5	22.0
Urban-4	Santa Rosa Phase 2	703	99	141	1	364	1	5	3	2	20.0
Ag-4	ERP max size with storage	783	65	83	3	0	1	3	2	3	20.0
Ag-8	NCAA Project 4, Max size	2700	294	109	2	?	2	3	1	3	20.0
Urban-5	Santa Rosa Phase 3	778	142	182	1	660	1	5	2	2	19.0
Geysers-4	Geysers 25 mgd total flow	2190	173	79	3	0	1	1	1	4	16.0
Geysers-5	Geysers 25 mgd with additional storage	1290	147	114	2	0	1	1	1	3	13.0

[a] Scores are proposed as examples for BPU consideration. High scores represent a more desirable condition. Example scores from 1 to 5 are shown.
[b] Example weighting of criteria are provided for BPU consideration. Higher value indicates the criterion is more important than criterion with a lower value.
[c] Total example scores are calculated by multiplying the example criterion weight by the example score. For example, the total score for Urban-1 is calculated as follows: 2x3 + 3x5 + 2x5 + 1x4 + 1x4 = 37.

Table 7. Cost-Effectiveness Groups and Scores			
Project	**Description**	**Cost Effectiveness $thousands/MG**	**Score**
Geysers-1	Geysers - 12 mgd total flow This equates to the target in Table 1.	39	4
Geysers-2	Geysers 16 mgd total flow	39	4
Ag-1	City-owned Farm irrigation	46	4
Geysers-3	Geysers 19 mgd total flow	48	4
Ag-2	East of Rohnert Park (ERP), max possible irrig without ERP storage	79	3
Geysers-4	Geysers 25 mgd total flow	79	3
Urban-1	SRG&CC Area	80	3
Ag-4	ERP max size with storage	83	3
Ag-3	ERP with storage	88	3
Urban-2	Rohnert Park/Cotati	90	3
Ag-7	NCAA Project 3	103	2
Ag-5	No. County Ag Area (NCAA) Project 1	108	2
Ag-8	NCAA Project 4, Max size	109	2
Ag-6	NCAA Project 2	111	2
Geysers-5	Geysers 25 mgd with additional storage	114	2
Urban-3	Santa Rosa Phase 1	126	2
Urban-4	Santa Rosa Phase 2	141	1
Urban-5	Santa Rosa Phase 3	182	1

Information about the cost impact of Master Plan implementation on connection fees and monthly service rate for Santa Rosa residents for a range of IRWP implementation approaches is provided in Table 8 and Figures 3 – 5. The rate model used to estimate connection fees and monthly service rate is described fully at http://www.recycledwaterprogram.com/images/pdf_mp/Final_HFH_Economics_report.pdf . In addition to including the reuse project costs from Tables 2 through 4, the estimated connection fee and monthly service rate also includes the Laguna plant capacity preservation and improvement costs described in Table 5. The impacts on connection fees and monthly service rates are approximate and preliminary; they are subject to revision as project costs are refined and a more detailed rate study is conducted.

Table 8. Approximate Impact of Range of IRWP Reuse Project Priority List Implementation Approaches on Ratepayers

Implement-ation Plan [a]	Cost Sharing Assumption[a]	Storage Volume Required (MG)	IRWP Total Capital ($millions)		Impact to Ratepayer[d]	
			Treatment Plant[c] & Discharge	Reuse	Maximum IRWP Monthly Rate	IRWP Connection Fee
Baseline [b]		-	-	-	$49.20	$12,462
Target	No cost sharing	1200	$165	$95	$18.45	$5,200
Target	CIP included	1200	$165	$95	$26.47	$6,000
Urban	No cost sharing	1200	$165	$197	$19.90	$11,200
Urban	Irrigation meter customers pay 75% of current rate	1200	$165	$197	$17.81	$11,200
Geysers	No cost sharing	300	$165	$33	$17.72	$4,400
Geysers	Calpine pays for power at mountain PSs	300	$165	$33	$16.40	$4,400

[a] Described in text below

[b] Baseline reflects currently approved rates and connection fees. Values in *Impact to Ratepayer* columns below this row are in addition to baseline values.

[c] The current estimate of treatment plant costs exceed those described in the Master Plan based on more detailed treatment plant study. Treatment plant costs are provided in Table 5. Values in Table 5 are preliminary and subject to revision.

[d] Impacts on Santa Rosa ratepayers are shown. The additional actual rate and additional connection fee for Santa Rosa ratepayers could vary from values shown by up to 15% depending on how costs are allocated to current and future users. Impact on Subregional partner ratepayers is described in http://www.recycledwaterprogram.com/images/pdf_mp/Final_HFH_Economics_report.pdf ..

Figure 3. Approximate Rate and Connection Fees of IRWP Reuse Project Priority List Implementation Approaches Assuming No Revenue Enhancement

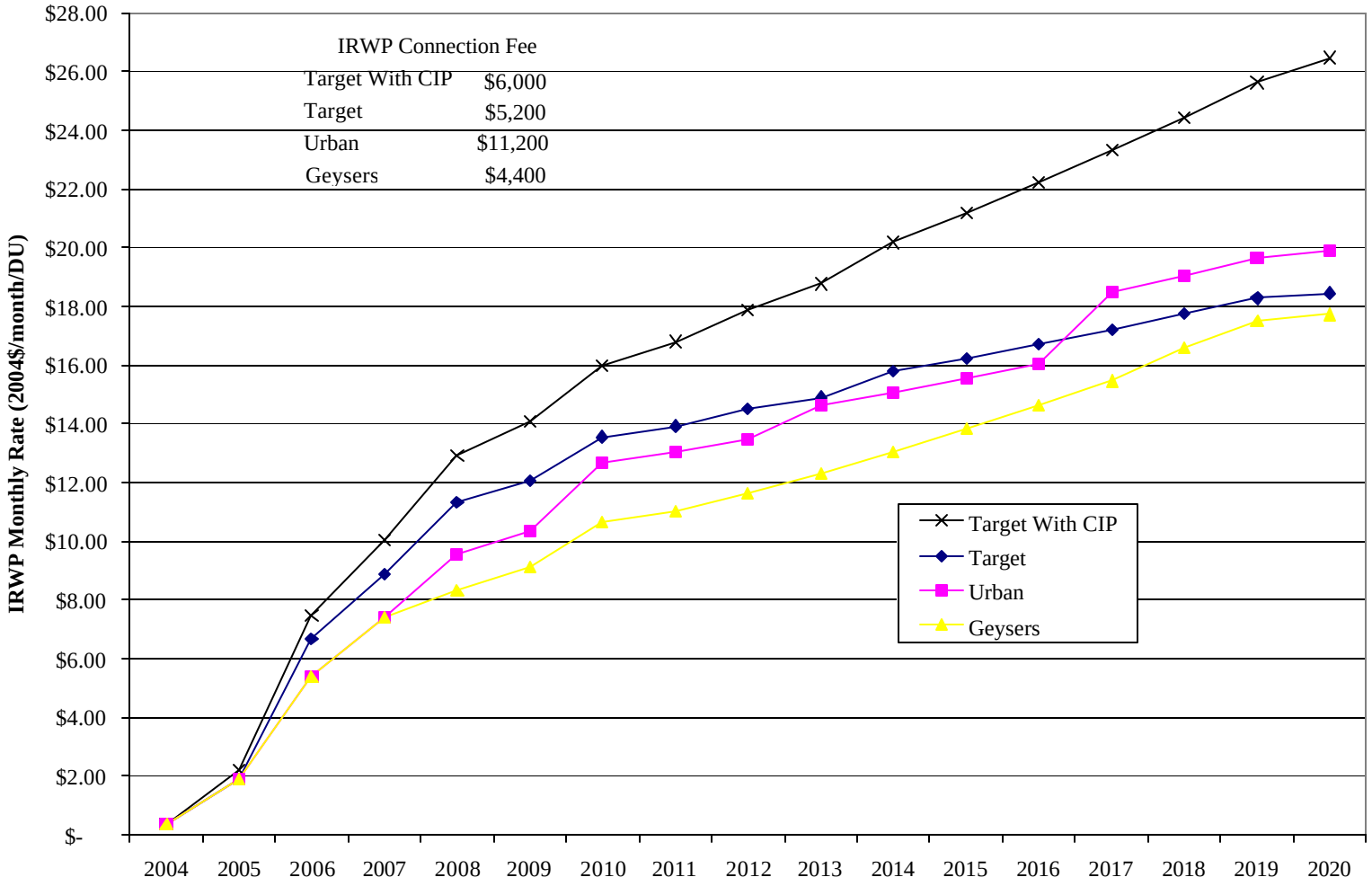


Figure 4. Approximate Rate and Connection Fees of IRWP Geysers Project Showing Effect of Revenue Enhancement

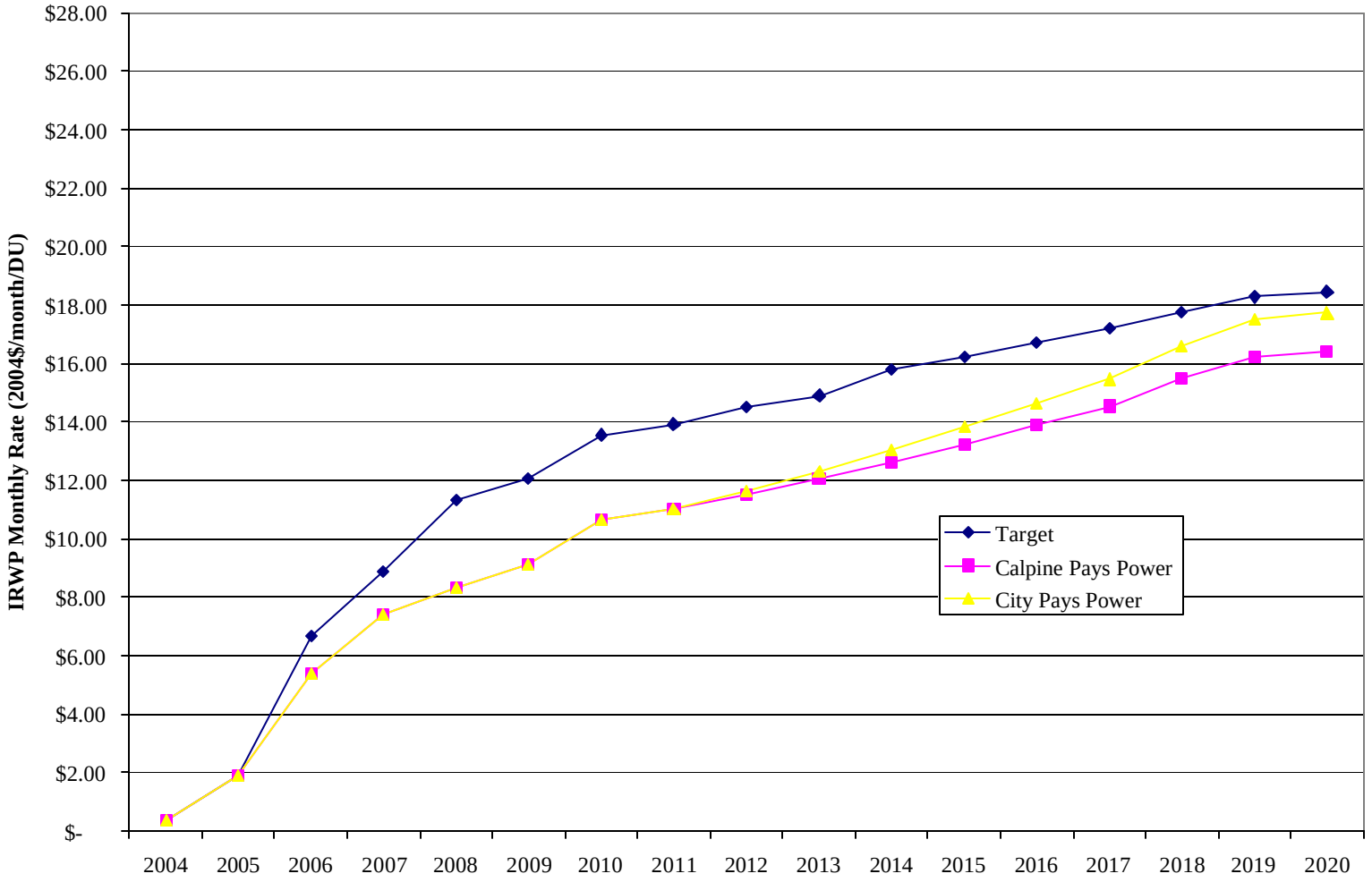
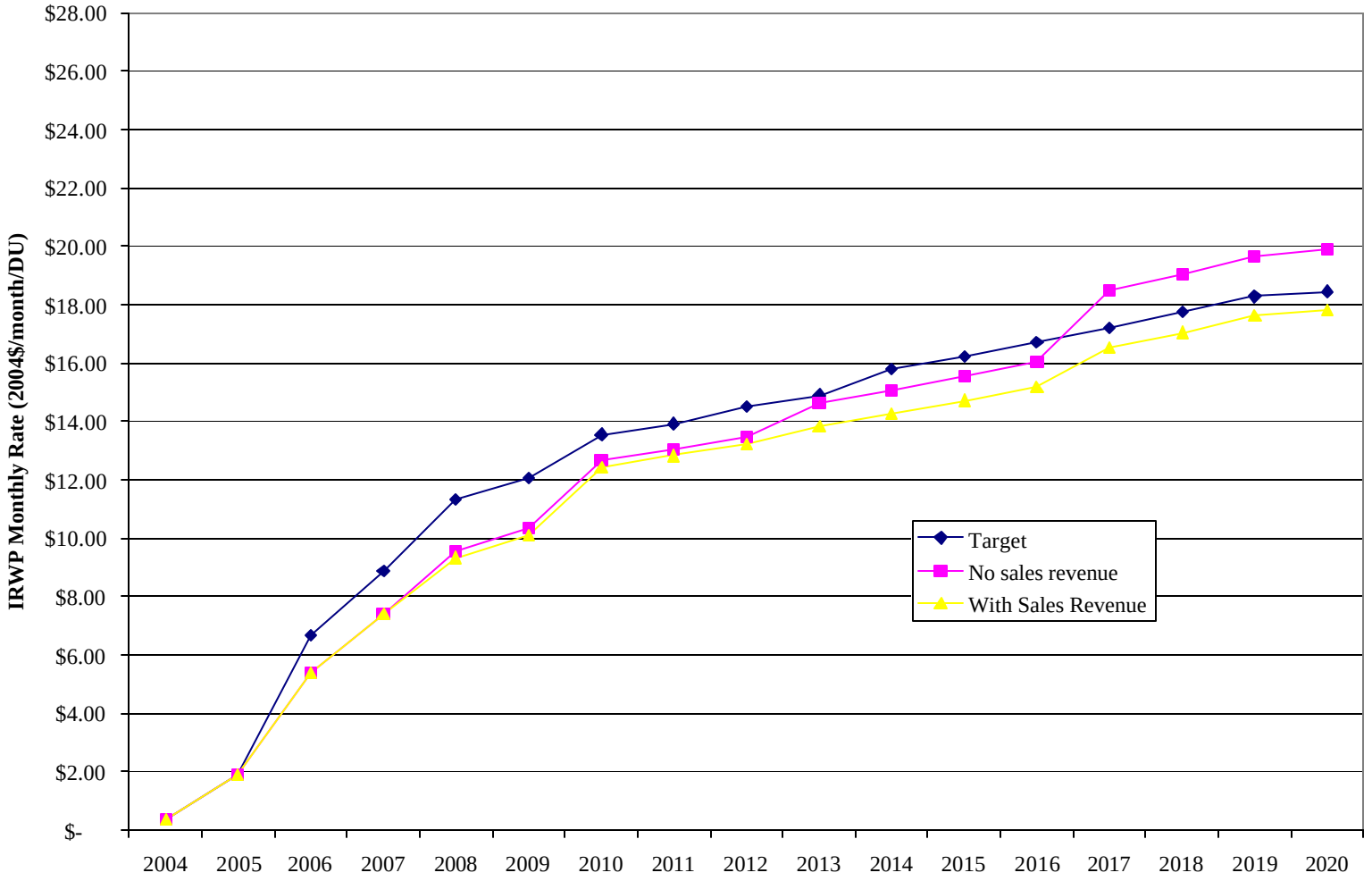


Figure 5. Approximate Rate and Connection Fees of IRWP Urban Project Showing Effect of Revenue Enhancement



The IRWP Reuse Project Priority List implementation approaches for which connection fees and monthly service rates have been evaluated are described as follows:

- Target – This implementation approach represents projects as needed to implement the IRWP targets, with projects implemented in order of descending cost-effectiveness (least cost-effective project implemented last). For example, the target IRWP includes 500 MG urban reuse, and, according to the cost-effectiveness information in Table 6, urban reuse is the least cost-effective reuse option. Therefore when calculating connection fees and monthly service rates for the target program, the urban reuse was the last project to be implemented, although the most cost-effective urban reuse projects necessary to achieve 500 MG capacity were assumed to be implemented.

  The effect of the currently unfunded CIP was evaluated as shown in the *CIP included* row in Table 8. (The ratepayer impact of the currently funded portion of the CIP is included in the values shown in the *Baseline* row in Table 8). This row is shown to illustrate the combined potential impact of the IRWP and the CIP on ratepayers.

- Geysers – The connection fees and monthly service rates of an IRWP implementation approach that achieves 1,900 MG reuse through geysers injection was developed to provide an indication of the smallest expected impact that could result from IRWP implementation. In the primary alternative, all costs are assumed borne by ratepayers, and in the revenue-enhanced subalternative, the steamfield operator is assumed to pay for power to operate the mountain pump stations. Figure 4 compares the monthly service rates for the Target Alternative and these two geysers reuse alternatives.

- Urban – The connection fees and monthly service rates of an IRWP Reuse Project Priority List implementation approach involving only urban reuse were estimated to provide an indication of the greatest expected impact that could result from IRWP implementation. The entire reuse goal of 1,900 MG was assumed to be achieved through urban reuse projects that would be built when needed in order of descending cost-effectiveness. The O&M cost for urban reuse reflects a previous estimate of potable offset value; however this should be considered a gross under-estimate of the true value of potable offset. A subalternative was developed to reflect the reduced monthly service rate resulting from selling recycled water to current and anticipated future City customers using potable supply for irrigation. The revenue estimate is based on sale of about 600 MG at a rate that is 75 percent of that paid for potable supply. Figure 5 compares the monthly service rates for the Target Alternative and these two urban reuse alternatives.

Whenever connection fees and monthly service rates are calculated, an allocation of costs between existing and future needs to be made. This decision will eventually need to be made by each Subregional System partner, but for this analysis the assumption was made that System improvements related to preserving treatment or reuse capacity to the level of 21.3 MGD (or 4,500 MG to total annual flow) are considered to be capacity preservation items, so improvements prior to 2010 are considered preservation (and thus the cost

allocated to current users in the form of monthly service rates), and improvements after 2010 are considered expansion (and thus the cost allocated to future users in the form of connection fees). The additional actual rate and additional connection fee could vary from values shown in Table 8 and Figure 3 – 5 by up to 15 percent depending on how costs are allocated to current and future users.

POTABLE WATER OFFSET

The potable water offset associated with some reuse projects can be estimated while that associated with others cannot. Potable water offset estimates for urban reuse projects provided in Table 6 are taken from Table 1 in the IRWP Feasibility Report TM No. 4. However, the actual water supply benefit resulting from a reuse project depends on how the project is treated under the terms of the agreement between the SCWA and its contractors (which include the three Subregional System partners – City of Santa Rosa, City of Rohnert Park and the City of Cotati). Amendments to this agreement are being negotiated at the time of this draft report's writing and the current status of the negotiations is such that implementing urban reuse projects would not benefit Subregional System partners' future SCWA water supply condition. Therefore, the example potable water offset score for urban reuse projects is low. At such time that an SCWA water supply agreement assures a water supply benefit would result from an urban reuse project, the score could be modified. If Urban Reuse projects are not implemented, this could be inconsistent with Water Supply Assessment for the NW Annexation (scheduled for City Council adoption on 17 August 2004).

Reuse in agricultural irrigation projects east of Rohnert Park (where very little irrigation is currently occurring) and Geysers steamfield injection are considered to have no potable water offset. Reuse in agricultural irrigation projects in the north county area is considered to potentially have a potable water offset benefit but one which cannot be quantified at this time. In the example scoring system shown in Table 7, projects are assigned a score considered commensurate with the current understanding of potable water offset.

REUSE SYSTEM DIVERSITY

Table 9 describes the Subregional System's current reuse and disposal system.

Table 9. Current Subregional System Reuse and Disposal Allocation (average year)		
Subregional System Component	**Volume (million gallons)**	**Fraction (percent)**
Agricultural Irrigation	1,800	21
Urban Irrigation	300	4
Geysers Steamfield Injection	400	47
Discharge	2,400	28
Total	8,500	100

In the example scores shown in Table 6, the highest scores are assigned to urban reuse because it currently represents the smallest allocation fraction as shown in Table 9. All urban reuse projects have a high score because urban would continue to represent a lower allocation fraction than would geysers and discharge even if 1,900 MG urban is implemented. An intermediate score given to agricultural irrigation because increasing agricultural irrigation would enhance diversity relative to geysers. A low score was assigned to geysers since it already represents the largest fraction of the reuse system.

EASE OF IMPLEMENTATION

Ease of implementation was evaluated primarily based on the estimate of how much time would be needed to implement each project (see Table 10). The duration of predesign, CEQA documentation, permitting, final design and construction were estimated on the basis of the Table 9 duration estimate. Factors contributing to long duration are generally considered to create implementation challenges so a lower score was given in the Table 6 example to projects with longer implementation durations. Additional factors influencing the example score are provided in Table 7.

Table 10. Ease of Implementation Example Scores				
Project	**Description**	**Example Score**	**Duration (years)**	**Explanation**
Geysers-1	Geysers - 12 mgd total flow This equates to the target in Table 1.	5	1.25	
Geysers-2	Geysers 16 mgd total flow	5	1.25	
Geysers-3	Geysers 19 mgd total flow	4	1.25	Operationally more difficult than lower flows
Urban-2	Rohnert Park/Cotati	5	2.25	Highly motivated potential users
Urban-1	SRG&CC Area	4	3.5	Experienced irrigators
Urban-3	Santa Rosa Phase 1	4	3.75	
Ag-1	City-owned Farm irrigation	4	4	Storage required, but high degree of control on City lands
Ag-2	East of Rohnert Park (ERP), max possible irrigation without ERP storage	3	4	
Ag-3	ERP with storage	3	4	Construction of storage needed
Ag-4	ERP max size with storage	2	4	Construction of storage needed
Urban-4	Santa Rosa Phase 2	3	5.25	Many users
Ag-6	NCAA Project 2	4	5.75	Construction of storage needed
Ag-7	NCAA Project 3	3	5.75	Construction of storage needed
Ag-5	No. County Ag Area (NCAA) Project 1	3	5.75	Construction of storage needed
Geysers-4	Geysers 25 mgd total flow	1	6	Pump station expansion beyond current easements
Geysers-5	Geysers 25 mgd with additional storage	1	6	Same as Geysers-4 plus additional storage required
Urban-5	Santa Rosa Phase 3	2	6.25	Many users
Ag-8	NCAA Project 4, Max size	1	6.75	

EASE OF OPERATION

Ease of operation was evaluated primarily based on the number of users and the level of oversight necessary to operate the system reliably and in compliance with current regulations. RWQCB currently considers incidental runoff, prevention of which may make urban irrigation infeasible, to be prohibited in the Basin Plan. Thus, urban reuse is given a low example score. RWQCB staff have proposed that the Basin Plan be modified to address this issue. At such time that the Basin Plan is amended, or the BPU has assurance this regulatory issue will be addressed through a Basin Plan amendment or some other means, the score could be modified. Agricultural irrigation is given an intermediate example score because incidental runoff is more easily controlled and avoided and fewer users are involved. Geysers reuse is given a high example score because only one user is involved and regulatory issues are rare.

APPENDIX A

Relationship of Implementation Project to Master Plan Project Names

Reuse Project Priority List Project Name	**Master Plan Project Name**
Ag-1	City-owned Farm irrigation
Ag-2	ERP Agricultural - 1 Max without ERP storage
Ag-3	ERP Agricultural - 2
Ag-4	ERP Agricultural - 3 Max size
Ag-5	NCAA – 1
Ag-6	NCAA – 2
Ag-7	NCAA – 3
Ag-8	NCAA – 4 Max size
Urban-1	Urban Reuse - 1 G&CC Area
Urban-2	Urban Reuse - 4 Rohnert Park/Cotati
Urban-3	Urban Reuse - 2 Santa Rosa Phase 1
Urban-4	Urban Reuse - 3 Santa Rosa Phase 2
Urban-5	Urban Reuse 5
Geysers-1	Not in Table 6
Geysers-2	Geysers - 1 16 mgd
Geysers-3	Geysers - 2 19 mgd
Geysers-4	Geysers - 3 25 mgd
Geysers-5	Geysers - 4 Ultimate capacity with additional storage