



*Central California
Regional Water
Recycling*

Executive Summary for Scoping/Screening Phase of the Step 1 Feasibility Study

March, 1995

CCRWR Participating Agencies

- ☼ Alameda County Water District
- ☼ California State Department of Water Resources
- ☼ Central Contra Costa Sanitary District
- ☼ City of Millbrae
- ☼ City of Palo Alto
- ☼ City of San Jose
- ☼ Delta Diablo Sanitation District
- ☼ Dublin-San Ramon Services District
- ☼ East Bay Dischargers Authority
- ☼ East Bay Municipal Utility District
- ☼ San Francisco Department of Public Works
- ☼ San Francisco International Airport
- ☼ San Francisco Public Utilities Commission
- ☼ San Francisco Water Department
- ☼ San Joaquin River Exchange Contractors Water Authority
- ☼ San Luis & Delta Mendota Water Authority
- ☼ Santa Clara Valley Water District
- ☼ South Bayside System Authority
- ☼ U.S. Bureau of Reclamation
- ☼ Zone 7 Water Agency (Alameda County)



Summary of Progress Achieved on the Step 1 Feasibility Study

The goal of the Central California Regional Water Recycling (CCRWR) Step 1 Feasibility Study is to identify project(s) that will provide total recycling of Bay Area wastewater, maximize local reuse, maximize water supply benefits, maximize environmental benefits, and minimize costs and environmental impacts. The approach taken to meet this goal has been to conduct an initial scoping/screening assessment of potential markets and then to complete a more detailed evaluation of potentially viable alternatives. Together these efforts represent the Step 1 Feasibility Study. This document is the Executive Summary for the scoping/screening phase of Step 1.

The four-month scoping/screening phase involved public outreach, assessment of local reuse, assessment of potential markets, development of regional alternatives, and preliminary screening of alternatives.

A number of steps were performed to identify potentially viable regional recycling alternatives. First, potential users were surfaced through a public information/outreach process and through direct interviews of participating agencies and stakeholders. Public workshop participants identified issues associated with regional water recycling:

- Recycled Water Quality
- Treatment Technologies
- Conveyance and Storage Facilities
- Salt Management
- Costs, Benefits, and Funding

After identifying potential market sites and quantifying how much local non-potable reuse will reduce the amount available for export, regional recycling alternatives were developed. A preliminary screening was conducted based upon estimated water use and interest in Bay Area recycled water. Costs were estimated at an order-of-magnitude level to compare alternatives, and potential feasibility was estimated by comparing costs of alternatives to the cost of no project (continuing discharges to San Francisco Bay and developing other new water supplies).

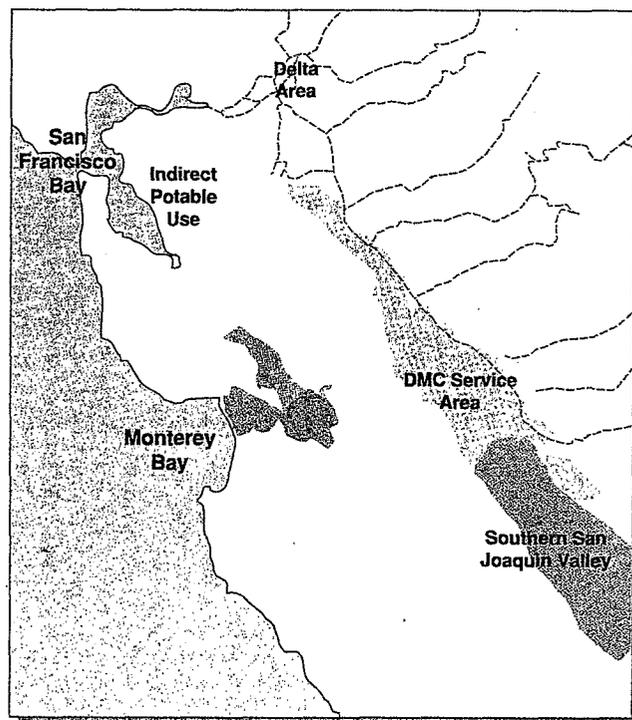
At the Definition of Feasibility Workshop held in January 1995 additional feasibility criteria were developed in the following categories:

- Technical
- Economic
- Environmental
- Public Acceptance
- Political/Institutional

The top ranked criteria from the workshop will be utilized to evaluate alternatives in the next phase of the Step 1 Study. Based upon this evaluation, recommendations will be made as to which regional alternative(s) should be carried forward in a Step 2 EIR/EIS.

After a preliminary screening of all the alternatives suggested by the public, five areas of use were recommended for further analysis in the Step 1 study:

1. Delta-Mendota Canal (DMC) Service Area
2. Sacramento-San Joaquin Delta Area
3. Monterey Bay Area
4. Southern San Joaquin Valley
5. San Francisco Bay Area (Indirect Potable Use)



Potentially viable areas of use



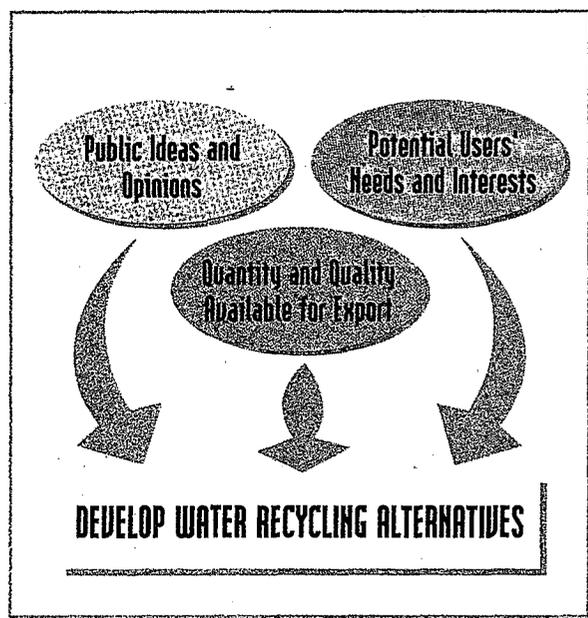
Public Involvement Activities

The CCRWR study team held a series of public workshops to explore the potential acceptability of a regional Bay Area water recycling project. Farmers, urban water users, government officials, environmental interests, water and wastewater agency representatives, and others attended the workshops to learn more about the regional water recycling concept and discuss issues related to such a project.

Input received at public workshops significantly affected the direction of the study.

In November and December 1994, six workshops were held in San Francisco, San Jose, Tracy, Santa Nella, Salinas, and Sacramento, California. These workshops provided the public a chance to share perspectives on the regional water recycling concept.

Workshop participants felt water recycling was a good idea and suggested additional water recycling alternatives. Export alternatives suggested include the State Water Project, Suisun Marsh, Delta Islands, and the Salinas Valley area. Many participants suggested that the recycled water be treated to appropriate standards and supplement existing drinking water supplies.



Public input was important in the identification of alternatives

Study Purpose and Schedule: 1) Clarification of the study's driving forces, purpose, and schedule. 2) Ability to adequately complete studies in identified time frame. 3) Further opportunities for public involvement.

Potential Markets and Uses: 1) Additional export markets. 2) Supplementing existing drinking water supplies.

Recycled Water Quality: 1) Impacts on crops and soil. 2) Marketability of crops. 3) Effects of recycled water discharges on wildlife habitats.

Treatment Technologies: 1) Clarification of different treatment processes. 2) Treatment facility operational contingencies. 3) Higher levels of treatment to provide use flexibility.

Salt Management: 1) Salt content in recycled water. 2) Effect on soils and groundwater. 3) Potential receiving water impacts. 4) Alternative treatment technologies to reduce salt content.

Conveyance and Storage Facilities: 1) Potential conveyance facilities and storage locations. 2) Impacts on communities.

Costs Versus Benefits: 1) Cost of recycled water to communities and users. 2) Potential water costs to those communities without a water recycling strategy.

Local/Regional Government Participation: 1) Support for strategies to increase the use of recycled water. 2)

Coordination between local, regional, and statewide water recycling projects.

Public involvement will continue to be solicited throughout the remaining portions of the study. After the technical analyses for the feasibility study are complete, scoping workshops will be held in preparation for conducting a Programmatic Environmental Impact Report/Environmental Impact Statement (EIR/EIS) as part of the Step 2 process.

Market Assessment for Regional Water Recycling Alternatives

One of the major purposes of the scoping/screening effort was to investigate all potential markets for a Bay Area regional water recycling project. Possible uses of recycled water were identified from initial public involvement activities, feedback received at the public workshops, and from a review of previous studies.

The market study area shown includes the following potential uses outside the Bay Area:

- ✿ Marsh enhancement flows to Suisun Marsh
- ✿ Agricultural irrigation in the Delta Islands
- ✿ Salinity repulsion in the Delta
- ✿ Agricultural irrigation in the Eastern San Joaquin Valley
- ✿ Agricultural irrigation and wildlife refuge flows in the DMC Service Area
- ✿ Agricultural irrigation and wildlife refuge flows in Southern San Joaquin Valley
- ✿ Agricultural irrigation in the Monterey Bay Area

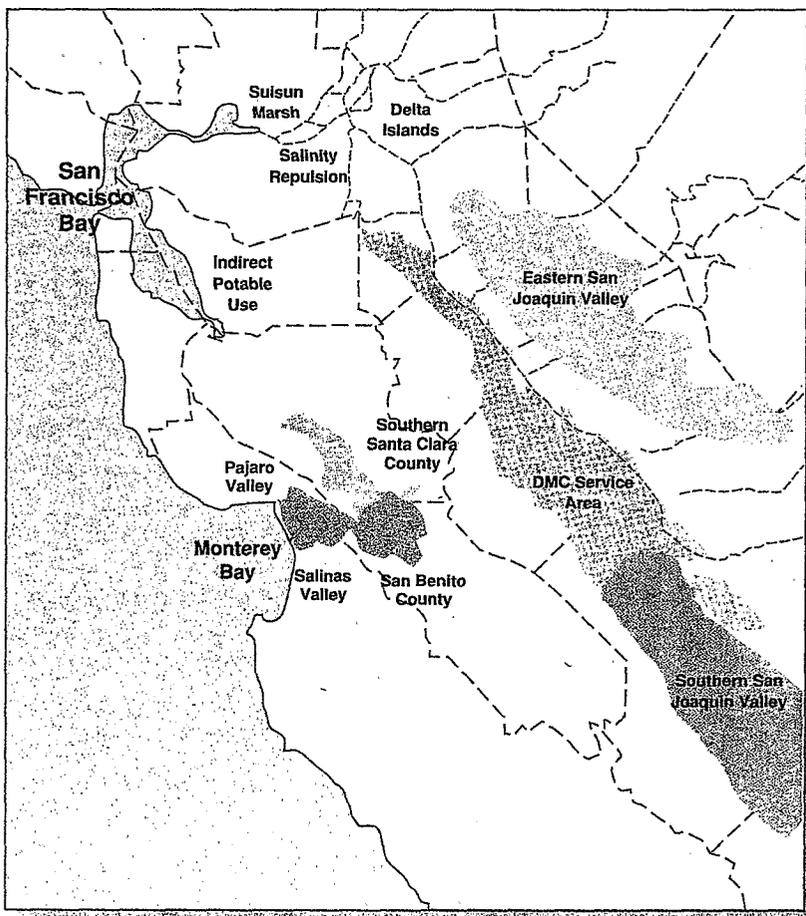
In addition, another use in the San Francisco Bay Area was identified in the public workshops: the concept of total local water recycling by indirect potable use. The State Department of Health Services has adopted a preliminary policy allowing the use of recycled water for potable purposes if: 1) the recycled water is treated beyond tertiary levels (with reverse osmosis [RO] treatment), and 2) storage of the treated water is provided for one year prior to blending into the potable supply.

The market assessment identified the needs and interest of potential users of Bay Area recycled water.

Study team members conducted interviews with potential users of recycled water and reviewed background reports to conduct an initial screening of the identified uses. For each potential use the study team determined current and future water demand, water quality requirements, potential for recycled water use, and the potential for exchanging recycled water for the existing supplies being used. The potential users' interest in utilizing recycled water was also identified as were specific issues that would require

mitigation if a regional water recycling alternative were implemented for that use.

The market assessment showed that the water needs of Suisun Marsh are variable and further study of this area would only be viable in conjunction with another alternative that supplies recycled water to the Delta area. Water needs of other potential market areas are significant. The assessment results showed that irrigation districts in the Eastern San Joaquin Valley were not interested in studying the use of recycled water in their areas. Representatives from the DMC Service Area, the Southern San Joaquin Valley, and the Monterey Bay Area, however, did express an interest in learning more about the concept of regional water recycling.



Market study areas



Assessment of Local Bay Area Water Recycling

An assessment of local Bay Area water recycling was conducted to ascertain the quantity and quality of water available for export. Preliminary results from a survey being conducted as part of the Step 1 Study were reviewed. Previous studies were also reviewed and information was collected for local projects being planned by Bay Area agencies.

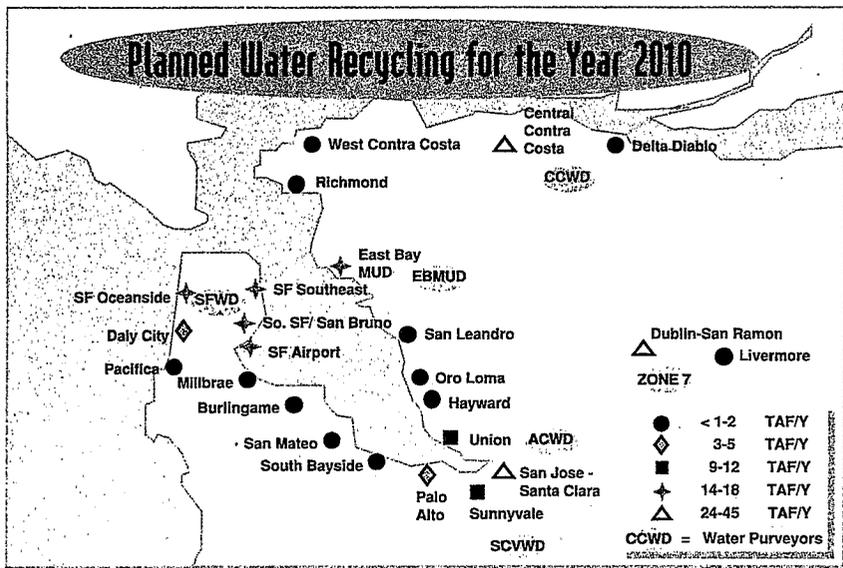
This and other studies for local use in the Bay Area assume recycled water would be treated to "disinfected tertiary levels" as specified in California's Code of Regulations, Title 22. Recycled water treated to these levels can be used for the following beneficial uses:

- ☼ Landscape irrigation
- ☼ Agricultural irrigation
- ☼ Supply for recreational impoundments
- ☼ Spray fountains
- ☼ Industrial cooling or other industrial processes
- ☼ Fire fighting
- ☼ Vehicle washing
- ☼ Toilet flushing
- ☼ Soil dampening for dust control
- ☼ Washing yards, lots, and sidewalks
- ☼ Wildlife and marsh enhancement
- ☼ Streamflow augmentation

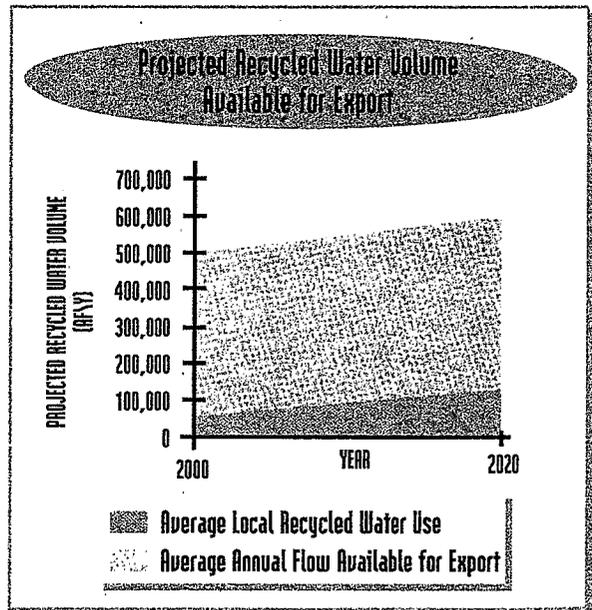
Local water recycling projects planned for implementation by the year 2010 are shown in the figure to the left below. Identifying the ultimate potential for local water recycling will require an assessment of cost-effectiveness of local versus regional water recycling. Other issues such as the benefits of a regional trunk line for recycled water around the Bay must also be analyzed.

The concept of regional water recycling assumes that local Bay Area recycling will be maximized first.

The survey of Bay Area water and wastewater agencies identified current and planned water recycling projects. Since 1970, the volume of water recycled annually in the Bay Area has risen from less than 10,000 to over 23,000 acre-feet per year (AF/Y). Local water recycling is expected to increase to approximately 120,000 AF/Y over the next 25 years. As shown on the figure below, this will leave greater than 400,000 AF/Y available for beneficial uses outside the Bay Area.



Local use is expected to be significant



More than 400,000 af/y will be available for export

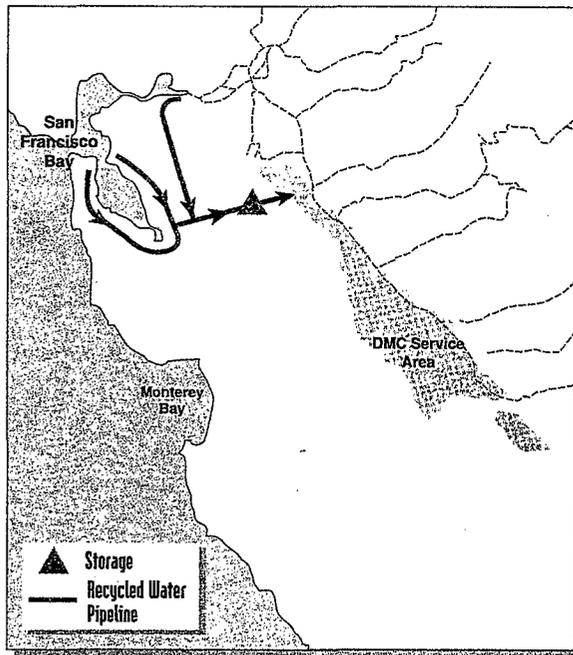


Development of Regional Water Recycling Alternatives

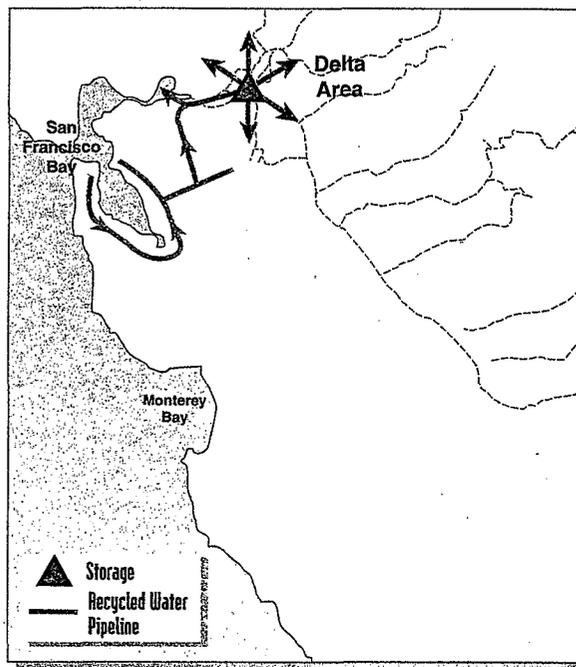
Project alternatives were developed for further evaluation based upon public input, results of the market assessment, and the local reuse assessment. A preliminary screening of potential water recycling alternatives was performed to focus on areas that could or wanted to receive large volumes of recycled water. Six project alternatives with various sub-alternatives were developed for detailed evaluation in the next phase of the Step 1 Feasibility Study.

Regional Water Recycling Alternatives

1. Recycled water to the DMC Service Area
 - a. Tertiary treated recycled water
 - b. RO treated recycled water
2. Recycled water to the Sacramento-San Joaquin Delta Area
 - a. RO treated recycled water for salinity repulsion
 - b. Tertiary treated recycled water to Delta Islands
 - c. RO treated recycled water to Delta Islands
3. Recycled water to the Monterey Bay Area
 - a. 100,000 AF/Y of tertiary treated recycled water
 - b. 400,000 AF/Y of tertiary treated recycled water
4. Recycled water to the Southern San Joaquin Valley
 - a. Tertiary treated recycled water with DMC conveyance
 - b. Tertiary treated recycled water without DMC conveyance
5. Recycled water to storage for indirect potable use (RO treated with one year detention storage)
6. No Project Effluent Management
 - a. Tertiary treatment and Bay discharge
 - b. RO treatment and Bay discharge



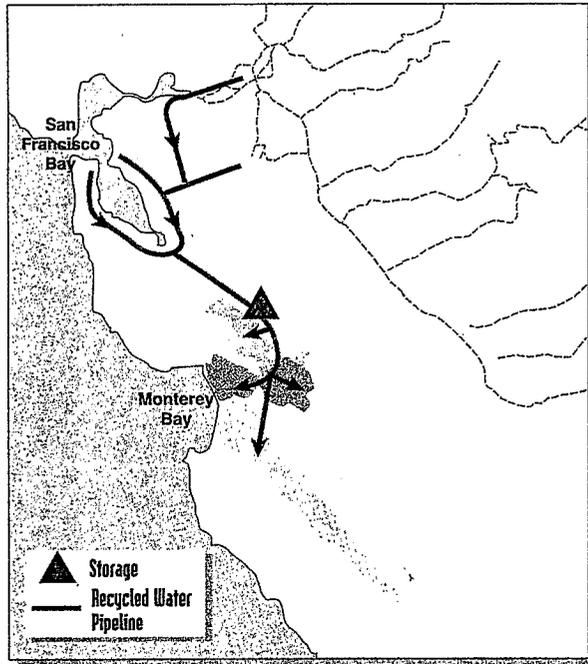
Alternative 1: Recycled water to the DMC Service Area



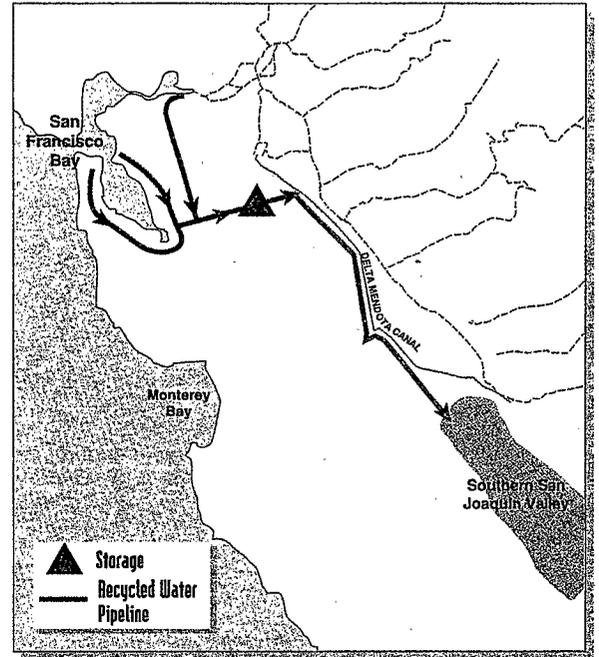
Alternative 2: Recycled water to the Sacramento-San Joaquin Delta Area



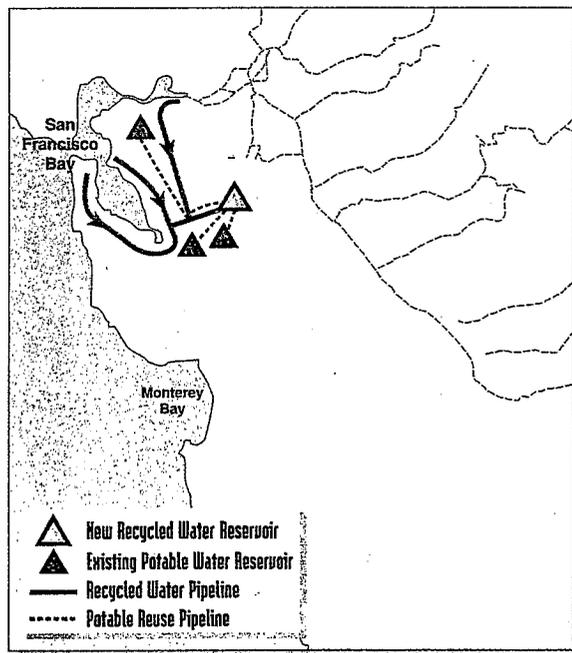
Development of Regional Water Recycling Alternatives



Alternative 3: Recycled water to the Monterey Bay Area



Alternative 4: Recycled water to the Southern San Joaquin Valley



Alternative 5: Recycled water to storage for indirect potable use

For the No Project alternative, an assumption was made that future San Francisco Bay discharge limitations would require wastewater treatment plants to be upgraded to: a) tertiary treatment with outfalls into deep water in the bay, or b) RO treatment with current discharge locations. For all alternatives with RO treatment, an assumption was made that a brine line to the ocean would be necessary. Other methods of dealing with brine will be evaluated in the detailed evaluation of alternatives.

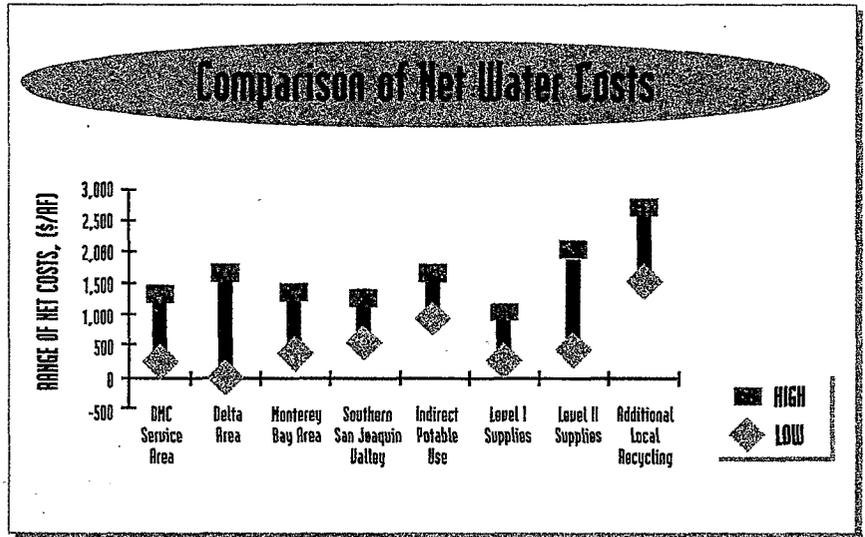
For Alternatives 1 and 4 an assumption was made that incremental salt loadings would either have to a) be reduced in the recycled water to levels of existing water supplies (by source control and/or treatment), or b) removed from agricultural drainage in the valley (by RO treatment in the valley or by transporting the quantity of salts imported back to the ocean for discharge).



Comparison of Alternative Water Supply Costs

A preliminary economic analysis of the alternatives was completed in the scoping/screening phase. Capital and operation and maintenance costs were estimated and converted to annual life cycle costs for each subalternative. The costs of the No Project subalternatives were then subtracted from each of the Alternative 1-5 subalternative costs to obtain a range of net water supply costs. These net costs represent the value of regional water recycling from a water supply perspective only since the value of effluent management has been subtracted.

The range of net costs for each service area are compared to the range of costs anticipated for other future water supplies in the figure to the right. The other future water supply options include Level I supplies currently being implemented (such as urban water conservation and construction of the Los Vaqueros Reservoir) and Level II supplies being planned for possible future implementation (such as construction of Auburn Dam and desalination of seawater). The costs for Level I and Level II water supplies were obtained from the Department of Water



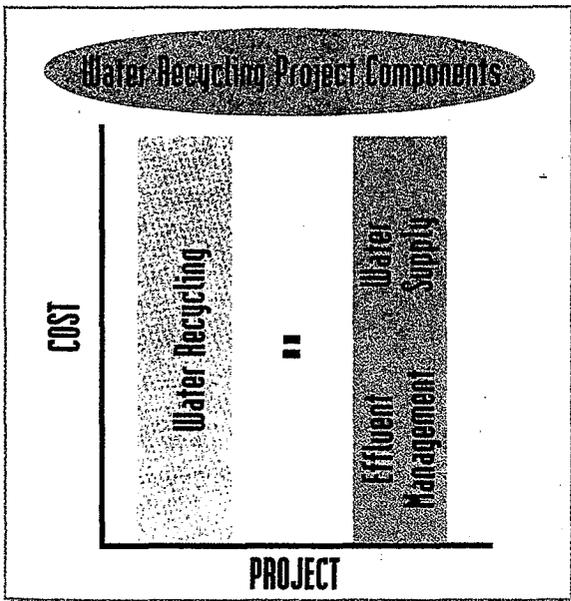
The range of net water costs is compared to other new water supplies

Resources and Bureau of Reclamation. The costs for additional local recycling (such as providing dual plumbing for toilet flushing) were obtained from the local water recycling studies being conducted by participating agencies.

This economic evaluation illustrates that the potential value of regional water recycling is comparable to other future water supply projects.

The alternative costs will be refined and compared to benefits in the next phase of the Step 1 Study. Benefits are expected to include the facts that implementation of regional water recycling would:

- Provide a new, reliable, drought-proof source of water.
- Help meet future water needs of cities, farms, and fish and wildlife.
- Provide overall improvement of water quality in the Bay/Delta environment.

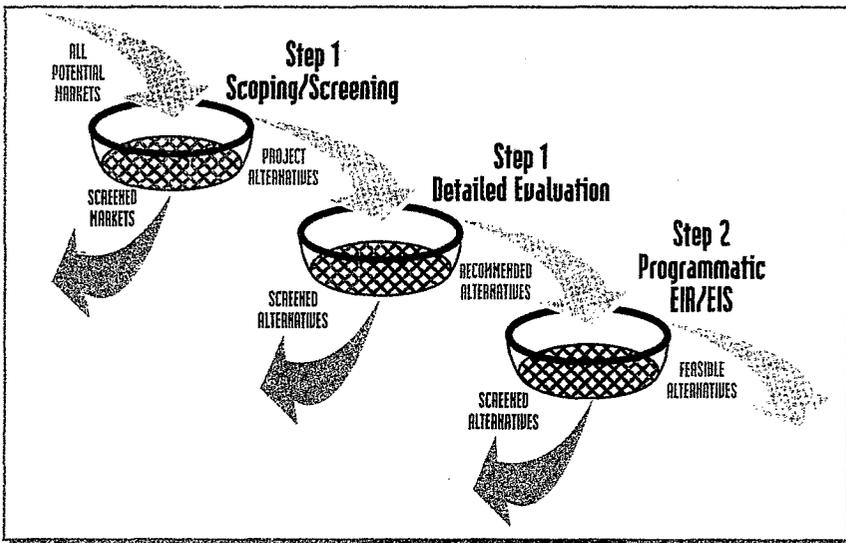


A regional water recycling project would provide effluent management and water supply benefits



Definition of Feasibility Workshop

At the "Definition of Feasibility" Workshop held on January 27, 1995, the participating agencies ranked the importance of criteria to be used in assessing project feasibility. Utilizing this criteria the alternatives will be further screened in the next phase of Step 1. Final screening of alternatives will occur in Step 2 of the feasibility study with completion of a programmatic EIR/EIS.



Screening of alternatives will occur throughout the feasibility study

Workshop participants considered input from stakeholders and the needs of their specific agencies in defining feasibility criteria. The results of the workshop are summarized in the table to the right. In general, the goals of the study described on page one of this Executive Summary were reaffirmed with this effort.

Top Ranked Feasibility Criteria

- Technical**
 - ☼ Meets users' water quality requirements
 - ☼ No net increase of salts in basin of use
 - ☼ Protects existing potable water supplies
 - ☼ Reuses a significant amount of water locally
- Economic**
 - ☼ Net cost of water less than other new supplies
 - ☼ Costs can be equitably allocated
 - ☼ Long-term economic advantage demonstrated
- Environmental**
 - ☼ Provides net positive gain for environment
 - ☼ Maintains or enhances public health
 - ☼ Improves conditions in the Bay/Delta
- Public Acceptance**
 - ☼ Satisfies health and safety perceptions
 - ☼ Widespread public acceptance can be achieved
- Political/Institutional**
 - ☼ Politically acceptable funding mechanism can be developed
 - ☼ Integrated, multiple-purpose solutions can be achieved
 - ☼ Compatible with other water supply and water recycling efforts
 - ☼ Coordination between governmental agencies can be achieved



Recommendations and Next Steps for the CCRWR Study

The primary recommendation coming out of the scoping/screening phase of Step 1 was to conduct a detailed evaluation of the following six regional water recycling alternatives:

- ☼ Alternative 1: Recycled Water to the DMC Service Area
- ☼ Alternative 2: Recycled Water to the Sacramento-San Joaquin Delta Area
- ☼ Alternative 3: Recycled Water to the Monterey Bay Area
- ☼ Alternative 4: Recycled Water to the Southern San Joaquin Valley
- ☼ Alternative 5: Recycled Water to Storage for Indirect Potable Use
- ☼ Alternative 6: No Project Effluent Management

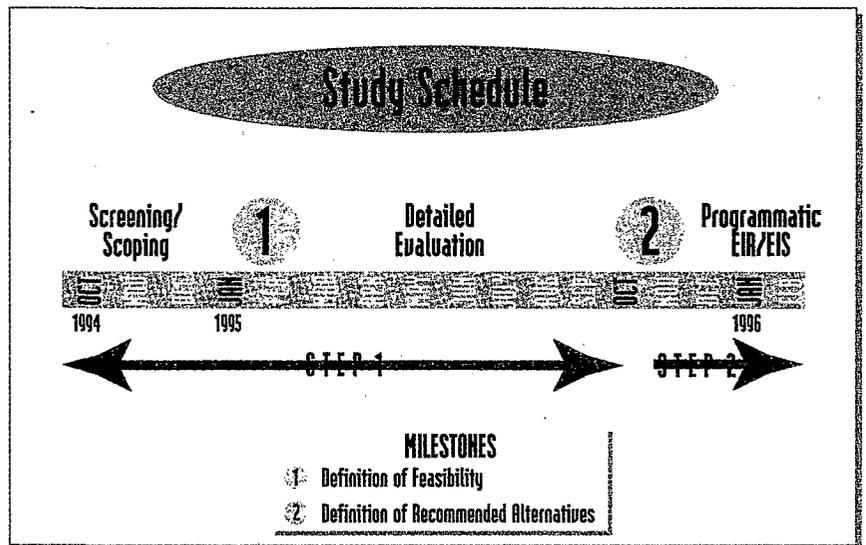
The feasibility criteria defined at the workshop will provide objective standards by which to evaluate these six alternatives.

The Step 1 Feasibility Study will evaluate technical, economic, environmental, public acceptance, and political/institutional factors related to the regional water recycling alternatives. Key issues to be addressed in the Step 1 Study for each alternative include water quality requirements, storage, and salt management. The costs of each alternative will be compared to the benefits and the value of the benefits will be assessed. This analysis will determine the preliminary feasibility of each alternative and will result in recommendations as to which alternative(s) should be evaluated further in a Step 2 Programmatic EIR/EIS.

To complete the Step 1 Study by October 1995, a CCRWR Study Team, composed of staff from participating agencies and consultants, will be dedicated to the project and work full-time

in the Project Office. Periodically, work will be reviewed and critiqued by six technical committees, composed of senior staff members from participating agencies.

The Step 1 Feasibility Study is being jointly funded by 15 Bay Area water and wastewater agencies and the U.S. Bureau of Reclamation. Additional state and federal agencies are also providing assistance in the form of "in-kind" services. A Regulatory Agency Advisory Committee has been formed to advise the Study Team on water quality objectives and other regulatory issues. A Stakeholder Committee is advising the Study Team on the compliance of alternatives with feasibility criteria from their business, agricultural, and environmental perspectives.



The Step 1 Feasibility Study will be completed by October, 1995



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