

WATER FORUM

By the Sacramento Area Water Forum
and the Foothill-Forum Water Group

down

Progress Toward A Regional Water Agreement

*Mark -
Dave -
See especially p 23 - 28*



January
1996

Final Proof - reduced (96%)

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Table of Contents

<i>Executive Summary</i>	1
<hr/>	
<i>Background</i>	6
Who are the Sacramento Area Water Forum and the Foothill - Forum Water Group?	6
Why Do We Need an Agreement — What is Broken?	8
What Has Held Up Solutions to Our Problems?	10
How is the Water Forum Using Interest Based Bargaining to “Get to Yes”?	11
Coordination With Federal and State Agencies	12
<hr/>	
<i>What We're Asking of You Now! — Stakeholder Review by March 1, 1996</i>	13
<hr/>	
<i>Schedule for the Agreement</i>	14
<hr/>	
<i>What Proposals Are Under Serious Consideration?</i>	15
Preserving the Lower American River	15
<i>Reasonable and Feasible Alternatives</i>	15
<i>Improved Fishery Flow Pattern</i>	15
<i>Reduced Daily Flow Fluctuations</i>	15
<i>Habitat Improvements</i>	15
Providing a Reliable Water Supply	17
<i>Additional Surface Water Supplies</i>	17
<i>Groundwater</i>	25
<i>Water Conservation:</i>	28
<i>Agricultural Water Recycling</i>	32
<i>Water Reclamation</i>	32
<hr/>	
<i>Costs</i>	33
<hr/>	
<i>Impacts on the Lower American River Fishery</i>	34
<hr/>	
<i>What Are the Tradeoffs — Is Everyone Doing Their Part?</i>	38
<hr/>	
<i>What Are the Remaining Challenges?</i>	41
<hr/>	
<i>Water Forum and the Question of Auburn Dam</i>	45
<hr/>	
<i>Environmental Impact Report Process</i>	45
<hr/>	
<i>Sample Resolution</i>	46
<hr/>	
<i>Glossary</i>	48

The Sacramento City-County Office of Metropolitan Water Planning, created in 1991, coordinates and staffs the work of the Water Forum. The majority of funding for this effort is provided by the city and county of Sacramento with assistance from Foothill stakeholders

The Water Forum uses professional mediation and facilitation services provided by the California Center for Public Dispute Resolution, a joint program of California State University, Sacramento and McGeorge School of Law, University of the Pacific.

Executive Summary

A diverse group of business and agricultural leaders, environmentalists, citizens groups, water managers, and local governments has come to a significant conclusion. Their unanimous finding is that unless we act now, the region is looking at a future with water shortages, environmental degradation, contamination, limits to economic prosperity, and stiff competition from other areas for our water.

Joining together as the Water Forum, these community leaders from the Sacramento, Placer and El Dorado region have spent over 18,000 hours of their time researching all the causes and consequences of this gridlock. They have commissioned recognized experts to conduct engineering, biological and legal studies. Based on all of this, they now recognize that the only way to break the gridlock is to develop a cooperative program that must achieve two coequal objectives:

- Provide a reliable and safe water supply for the region's economic health and planned development through to the year 2030;

AND

- Preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River.

Water Forum members have identified a range of proposals that are under serious consideration to meet the two coequal objectives:

Reliable and Safe Water Supply

Water Conservation and Reclamation

Water districts would continue and expand programs to help their customers use water efficiently. Where it is reasonable and feasible, water would be reclaimed and recycled for appropriate uses.

Additional Diversions

Additional water would be diverted from the Sacramento, American and Feather rivers to meet the needs of existing residents, businesses, agriculture, and future growth in approved general plans. These diversions would be accompanied by conditions on their use that would ensure protection of the fishery, wildlife, recreation, and aesthetic values of the Lower American River. Specifics on proposed diversion amounts are described beginning on page 17.

Safe Water Supply

Any Water Forum agreement must ensure that our water supplies are protected from contamination and our drinking water meets or exceeds all applicable state and federal requirements.

Increased "Conjunctive Use"

Water suppliers would expand this water management program that relies more heavily on the use of surface water when it is available during wet periods and increased use of wells during drier periods. Increased conjunctive use would help water suppliers meet needs while reducing impacts on rivers and reservoirs during droughts. Specifics of the conjunctive use proposals are described beginning on page 24.

25



Preservation of the Lower American River

Reasonable Feasible Alternatives

Water suppliers would implement reasonable - feasible alternatives to increased diversions from the American River. In addition to expanding water conservation programs, water suppliers would pursue alternatives wherever they are reasonable and feasible: reclamation, conjunctive use, alternative sources, etc.

Improved Fishery Flow Pattern

An improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River would be implemented. This would result in an improvement to the Lower American River's fall-run chinook salmon fishery. However the pattern of releases that would improve conditions for the salmon, along with the increased diversions under consideration, would impact the already marginal conditions for another important species, steelhead. This is an issue that the Water Forum will discuss and it will be part of the negotiations.



Reduced Daily Flow Fluctuations

Another benefit to the fishery can come from reducing daily flow fluctuations on the Lower American River. For instance, one day last Spring flows on the American River were cut 9,500 cubic feet per second over a four hour period - stranding many juvenile fall-run chinook salmon. The Water Forum would work with the Bureau of Reclamation, operators of Folsom Dam, to reduce these wide variations.

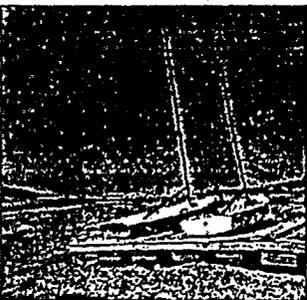
Habitat Improvements

Habitat of the Lower American River would be improved in order to protect its outstanding fishery, wildlife, recreational, and aesthetic values. These improvements could include spawning gravel management, better temperature control for water released from Folsom Reservoir for the Lower American River, maintenance of riparian vegetation along the river, etc.

Remaining Challenges

To date the Water Forum has discussed a range of proposals that could resolve many of the water problems facing this region. However the region's success in meeting its water supply and environmental protection needs is dependent on resolution of a number of issues described beginning on page 41. The five toughest of these remaining issues are:

S Assurance of water supply reliability in dry years *with*



It is absolutely essential that any Water Forum agreement assure that residents, businesses and agriculture will not be faced with severe water shortages and moratoriums on economic development. Similarly, the Lower American River's fishery, wildlife, recreational, and aesthetic values must be protected. In wetter years there is enough water for all uses and protection of the Lower American River. It is in drier years that conflicts are possible.

There are three challenges to this issue: The first is to agree on how much water can be diverted from the American River, particularly in dry years, without damaging its fishery, wildlife, recreational, and aesthetic values. The second is to agree on alternative sources of water that would substitute for some of the increased American River diversions during those dry years. The third is to agree on funding those dry year alternatives. It is essential that any Water Forum agreement include dry year water supply reliability.

+ *An improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River.* CWR

The Water Forum has worked with federal, state and private fishery experts to identify a better pattern of releases from Folsom Reservoir for Lower American River fishery flows. This improved pattern, along with other proposals to benefit the fishery, would offset the impacts of the increased diversions.



It is absolutely essential to the Water Forum Final Agreement that a better pattern of fishery releases be implemented. This will require continued consultation with the state and federal fishery agencies and approval by the U.S. Bureau of Reclamation and/or State Water Resources Control Board.

While there would be improved conditions for the fall-run chinook salmon, the pattern of fishery releases, along with the proposed increased diversions, would negatively affect already marginal conditions for the steelhead. The Water Forum will include steelhead conditions in its negotiations.

East Bay Municipal Utility District Point of Diversion

EBMUD has a contractual entitlement with the U.S. Bureau of Reclamation to divert 150,000 acre feet of water from the American River, although the diversion was limited by the Hodge Decision (described on page 22). They have always wanted to divert that water from the Folsom South Canal which is above the Lower American River.

However, the Folsom South Canal does not extend all the way to EBMUD's aqueduct that delivers water to their service area. To extend Folsom South Canal, EBMUD would still have to comply with requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

These laws require analysis of the impacts of their diversions in addition to all other diversions which are reasonably foreseeable. Should EBMUD divert from the Folsom South Canal, there would probably not be enough water left to adequately meet the water supply needs of this region and fishery flow needs for the Lower American River in dry and normal years.

CEQA and NEPA also require analysis of a reasonable range of feasible alternatives that would reduce significant impacts. Last fall the EBMUD Board of Directors instructed their staff to begin the engineering and environmental analysis of their preferred diversion from the Folsom South Canal.

In response to a request from the Water Forum, EBMUD also instructed their staff to analyze an alternative of a cooperative project with San Joaquin and Sacramento interests to divert that water from the Sacramento River downstream of the mouth of the American River.

This alternative offers the opportunity for EBMUD and San Joaquin interests to have Water Forum support for a project that would meet their need for a reliable water supply. One possibility would be a diversion from the Sacramento River immediately below the mouth of the American River or at Freeport. Cost sharing partners could include EBMUD, City of Sacramento, Sacramento County, perhaps the City of Galt, other South Sacramento County interests, and San Joaquin County interests.

Water Forum members believe this is a potentially reasonable and feasible alternative that would protect the fishery, wildlife, recreational, and aesthetic values of the Lower American River and should be actively pursued by the Water Forum and EBUMD.

Water Meters and Conservation Pricing.



Although State law already requires water meters for new residences, the issue of meters for existing residences is extremely controversial in many parts of this region. An independent poll revealed that although a majority (55%) of residents in the region support water meters, a significant minority (29%) strongly object. That opposition has made it hard for some water agencies to enact meter retrofit programs.

The proposal under consideration provides that the Water Forum Final Agreement include a goal to implement water meters and other water conservation Best Management Practices by all water purveyors by the year 2030. This goal provides water purveyors with implementation flexibility and allows purveyors, such as the City of

Sacramento which has a Charter prohibition on the installation of meters, to pursue an innovative voluntary retrofit program accompanied by incentives such as lower rates for those who meter and conserve.

The challenges to the implementation of meter retrofit are many including public understanding and acceptance of the importance of this conservation tool and the costs that can be associated with meter installation and reading.

Costs and Equity.

Solutions must be equitable, fiscally responsible and make the most efficient use of the public's money. All proposed costs need to be scrutinized to ensure that the goals of the Water Forum are met in the most cost effective way. As soon as the Water Forum stakeholders review this Progress Report and provide their input, the proposals will be analyzed to determine which are financially feasible.

Costs must also be allocated equitably. There is lively discussion and negotiation underway on how the Water Forum should address equity.

One proposal under consideration would be for the Water Forum agreement to include a commitment by public agencies to base rates, fees, assessments, and taxes on cost of service. Any variations would require public notice and hearing before local agency adoption.



An alternative approach would be for the Water Forum to defer to local agencies how they set rates, fees, assessments, and taxes to implement the Water Forum agreement. This issue will be part of the Water Forum negotiation.

The proposals under consideration would not require new levels of government. Most, and perhaps all, of these could be implemented by existing public agencies or through joint powers agreements among existing public agencies.

NO box, move up, same font/size. Not with costs and equ

Public and Stakeholder Review

This Progress Report is one of the ways that proposals under serious consideration are being shared with the public. Although these are by no means final, they are presented for the stakeholders' and public's serious consideration.

Stakeholder organizations are asked to provide the following by March 1, 1996:

- Your comments on the proposals under serious consideration which are described in this Progress Report.
- A resolution from your organization authorizing your representative to proceed with the negotiation.

Please keep in mind that at this time we are asking for your feedback, not your approval of these proposals. Water Forum representatives will use your feedback to prepare a Draft Water Forum Agreement which will be available for public and stakeholder review this spring. By late summer a complete agreement will be ready for public review and stakeholder approval.

Approval of the final agreement will include a commitment by each stakeholder to support all approvals required to make the agreement work, e.g. changes in points of diversion, place of use, improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River, new facilities, habitat improvements, water exchanges, etc.

Please keep in mind that at this time we are asking for your feedback, not your approval of these proposals.

Who Are the Sacramento Area Water Forum and the Foothill - Forum Water Group?

The Sacramento Area Water Forum and the Foothill - Forum Water Group are a stakeholder coalition of six major interest groups composed of business and agricultural groups, water interests in Sacramento, Placer and El Dorado counties, environmental interests, citizen groups, and local government.

Due to the large number of participants, the stakeholders selected representatives to engage in preliminary negotiations. Since 1993, these representatives have contributed over 18,000 hours of their time learning the complex issues and drafting cooperative proposals. After extensive public review, approval of an agreement will rest with the boards of the stakeholder organizations.

Water Forum Stakeholders and Their Designated Representatives

BUSINESS

- AKT Development
Chris Vrame
- Associated General Contractors (AGC)
Randy Sater
- Building Industry Association of Superior California (BIA)
Jim Ray, Jr, Bruce Houdesheldt, Kimberley Dellinger (9/93 to 8/95)
- Labor & Business Alliance (LABA)
Maurice Read, Bill Meehan (9/93 to 9/94)
- Sacramento Association of Realtors (SAR)
Brian Holloway
- Sacramento Metropolitan Chamber of Commerce
Roger Niello, Suzanne Phinney, Ray Thompson
- Sacramento-Sierra Building & Construction Trades Council
Maurice Read, Bill Meehan (9/93 to 9/94)

ENVIRONMENTAL

- Environmental Council of Sacramento (ECOS)
Alan Moll, Gail Ervin
- Friends of the River (FOR)
Charlie Casey, Ron Stork
- Save the American River Association, Inc. (SARA)
Jim Jones, Bill Reavley
- Sierra Club - Mother Lode Chapter - Sacramento Group
Clyde Macdonald, Tom Whitney, Vicki Lee

PUBLIC

- City of Sacramento
Jim Sequeira, Gary Reents
- County of Sacramento
Keith DeVore, Donna Dean, Rob Sherry
- League of Women Voters of Sacramento
Joseph Poppleton
- Sacramento County Alliance of Neighborhoods (SCAN)
Kae Lewis
- Sacramento County Taxpayers League
Joe Sullivan
- Sacramento Municipal Utility District (SMUD)
Brian Jobson

WATER

Arcade Water District
Ed Schnabel

Arden Cordova Water Service
Ed Schnabel

Carmichael Water District
Ed Schnabel

Citizens Utilities
Herb Niederberger

Citrus Heights Water District
Jim English

City of Folsom
City Councilmember Sara Myers, Gordon
Tomberg, Bob Blaser (9/93 to 6/95)

City of Galt
City Councilmember Bob Kraude, Robert
Kawasaki

Clay Water District
Gerald Schwartz

Del Paso Manor County Water District
Ed Schnabel

Elk Grove Water Works
Mike Kenny

Fair Oaks Water District
Jim English

Florin County Water District
Mike Kenny

Fruitridge Vista Water Company
Mike Kenny

Galt Irrigation District
Gerald Schwartz

Natomas Mutual Water Company
Peter Hughes, Tom Barandas

Northridge Water District
Dewight Kramer

Omochumne-Hartnell Water District
Gerald Schwartz

Orange Vale Water Company
Jim English

Rancho Murieta C.S.D.
Ed Schnabel

Rio Linda Water District
Ed Schnabel

Sacramento County Farm Bureau
Gerald Schwartz, Denny Lewis

Sacramento Metropolitan Water Authority
Ed Schnabel

San Juan Water District
Jim English

Tokay Park Water Company
Herb Niederberger

Foothill-Forum Water Group and Their Designated Representatives

City of Roseville
City Councilmember Claudia Gamar,
Derrick Whitehead

El Dorado County Water Agency
Merv de Haas, Jack Warren

El Dorado Irrigation District
Rob Alcott

Georgetown Divide Public Utility District
Marie Davis

Placer County Water Agency
Dave Breninger, Einar Maisch, Jack Warren

S. G. H. W.

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Why Do We Need an Agreement — What is Broken?

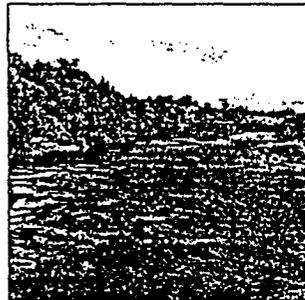
As residents of our region look at the American and Sacramento rivers they assume that we have enough water to meet all of our present and future needs. But unless we act now that will no longer be true.

Representatives of the region's business and agricultural groups, environmental groups, taxpayer advocates, water suppliers, citizens groups, and local governments have reached a unanimous conclusion. Unless we come together now on a plan we can all agree with, we will face a future with water shortages, environmental degradation, contamination, limits to economic prosperity, and stiff competition from other areas for our water.



Water Shortages

Unless adequate water supplies are made available, many existing residents, businesses and agriculture will suffer shortages during California's periodic droughts. This would also limit our economic development and planned growth. The region's current population of over 1 million people is expected to double over the next 30 years.



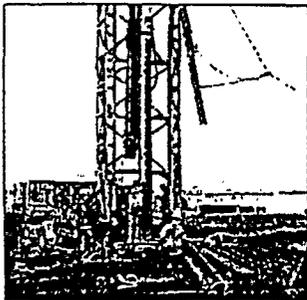
Lower American River

The Lower American River is nationally recognized for its beauty, fisheries and recreation. Each year there are over 5 million visitor-days recorded for the American River Parkway. We need to find ways to protect the River for our enjoyment and generations to come.



Contamination

Past actions have contaminated parts of our groundwater. Unless we continue to contain and correct these problems, some of the wells that provide our drinking water could become contaminated.



Groundwater Reliability Threatened

Over reliance on wells in some areas has lowered the water table as much as 90 feet. If nothing is done, the problem will get worse, pumping costs could double, some shallow wells could go dry.



Others Are Eyeing Our Water

Statewide water shortages make American River water look attractive to others. Unless we work together, others could exploit differences among us for their gain.



Drinking Water Reliability At Risk

Some purveyors obtain all of their water from surface sources; other purveyors get their water solely from wells. There are always some disadvantages to having only one source of supply. For instance, if there is a toxic spill in one of our rivers, water could not be diverted until the problem cleared. We will have a more reliable supply if most of the purveyors have multiple sources of water.



New Laws and Regulations

Constantly changing health and environmental rules come with benefits, but they can also make it harder to provide sufficient quantities of affordable water. We need to find cost effective ways to protect our health and our environment.

What Has Held Up Solutions to Our Problems?

Here in the American River watershed, our biggest stumbling block to balanced water solutions is that individual groups — water purveyors, environmentalists, local governments, business groups, agriculturalists, and citizen groups — have been independently pursuing their own water objectives — without much success. In many cases competition among groups has generated protests, lawsuits and delay. Even though well over \$10 million has been spent in the past decade pursuing single purpose solutions, there has been little to show for these fragmented efforts. Gridlock has hit our water solutions.

In today's complex water environment there is no longer an option for "I Win — You Lose" solutions. Either everyone with a stake in the outcome cooperates in the solution, or everyone faces stalemate.

How is the Water Forum Using Interest-Based Negotiation to "Get to Yes"?

To avoid these problems diverse groups, each with a stake in the region's water future, joined together in 1993 and authorized their representatives to participate in the Sacramento Area Water Forum. Moving well beyond the traditional "Blue Ribbon Committee" style of operating, the group chose to approach their long standing conflicts as a formal policy negotiation and hired a professional mediator to assist them in the effort.

This type of collaborative decision making on public issues, involving large numbers of community stakeholders with diverse interests, requires the use of a staged process that begins with a detailed planning and organizational phase. What groups have a stake in the outcome? Will they negotiate in good faith? Are the deal breakers involved in the effort? How are decisions made? These are the kinds of questions the Water Forum successfully addressed in its early months.

Early on, the Water Forum also agreed on goals and a mission statement:

"Through community participation, formulate a plan for the region which will provide an adequate, safe and reliable water supply in an environmentally sound and cost effective manner. The plan shall provide for the efficient management of available surface water, groundwater, reclaimed water resources, and water conservation to meet both the region's water needs through the year 2030 and protect our environment."

In early 1994, stakeholder organizations formally approved the Water Forum's mission, goals and groundrules. The Water Forum then embarked on an extensive educational process, building a common understanding of the region's water needs and resources. Through an innovative process called interest-based negotiation, Water Forum members began to identify their groups' concerns and learned about the concerns of other groups.

Originally pioneered by Harvard University researchers, this conflict resolution method requires negotiators to initially put aside their traditional demands and instead focus on the underlying reasons behind both their own and their adversaries' concerns. We call this moving beyond "positions" to understanding "underlying interests." Water Forum members now jokingly refer to it as "leaving their guns at the door."

Once underlying interests were articulated, the group's ability to brainstorm creative approaches to our water problems dramatically increased. This is because the negotiators as a group began to fashion solutions that simultaneously respected the needs of all of the stakeholder interests. The group was finally prepared for the tough negotiations ahead.

By the spring of 1995, the Sacramento Area Water Forum representatives negotiated 65 Draft Principles to guide the development of the solution. After those were publicly reviewed, 40 stakeholder organizations voted to have their representatives continue negotiation toward a regional water agreement.

At the start of 1995, water suppliers and local agencies in Placer and El Dorado counties, located in the area of origin for the American River, joined the collaborative process. This three county effort is now referred to simply as the Water Forum. More recently, discussions have begun with East Bay Municipal Utility District and San Joaquin County interests to explore mutual opportunities.

PHOTO
Meeting

Universities Provide Mediation Expertise

The California Center for Public Dispute Resolution has provided invaluable mediation and facilitation services to the Water Forum since its inception. The Center, a joint program of CSU, Sacramento, and McGeorge School of Law, University of the Pacific, works closely with stakeholder representatives and Water Forum staff to assure that each step of this complex process builds understanding and trust while moving the group toward substantive and durable agreements.

For the past months, the Water Forum has been negotiating a range of proposals that are under serious consideration to meet the region's water supply needs projected to the year 2030 and protect the fishery, wildlife, recreational, and aesthetic values of the Lower American River. Through an iterative brainstorming process, successive trial balloons are developed, tested and reframed.

On January 26, 1996 stakeholders of the Water Forum will sponsor Water Summit '96 at the Sacramento Convention Center. That will be one of many opportunities for open, public discussion of all these proposals. The Water Forum members will continue to consult with their stakeholder organizations as they develop the Draft Agreement in the spring of 1996 and prepare the Final Agreement later in the summer.

Although the interest-based approach is fundamental to our success, other factors are operating to make this collaborative process work. Chief among these is that no group has assurance of a much better deal elsewhere. Also significant is that the Water Forum involved the potential "dealbreakers" in the effort. Additionally, negotiators regularly communicate with their constituencies (stakeholder organizations), ensuring a constant feedback loop between the Water Forum and the broader community. And finally, our region is blessed with leaders from all walks of life who have been willing to volunteer countless hours over the three years necessary to forge consensus.



Coordination with Federal and State Agencies

Cooperation and in many cases approval by federal and state agencies will be required to implement agreements reached by Water Forum members. For instance, the State Water Resources Control Board will have to approve amendments to existing water rights permits. The U.S. Bureau of Reclamation will be called upon to implement the improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River. Fishery agencies will be consulted throughout the negotiation and approval processes.

Recognizing this, the Water Forum has regular coordination meetings with top management from each of these agencies:

- State Water Resources Control Board
- California Department of Fish and Game
- California Department of Water Resources
- U.S. Bureau of Reclamation
- U. S. Fish and Wildlife Service

CALFED (The joint program of federal and state agencies to find long term solution to the problems of the Bay-Delta)

At those meetings, proposals being investigated by the Water Forum are discussed with the state and federal agencies. They have agreed to alert the Water Forum of any fatal flaw or "red flags" that could be of major concern to their agencies. Through this early consultation, the Water Forum maximizes the prospects that its agreements will be acceptable to those agencies.

What We're Asking of You Now!

Stakeholder Review by March 1, 1996

Now it is time for stakeholder organizations to review this "Progress Toward a Regional Water Agreement" and again provide guidance to their representative. As you do this, engage your representative in a thorough discussion. Find out the "Why's" behind the proposals under serious consideration. Listen to what they have learned. They understand the potential tradeoffs necessary for a win-win solution.

Stakeholder organizations are asked to provide the following by March 1, 1996:

- Your comments on the proposals under serious consideration which are described in this Progress Report.
- A resolution from your organization authorizing your representative to proceed with the negotiation.

Please keep in mind that at this time we are asking for your feedback, not your approval of these proposals. Your Water Forum representatives will use your feedback to prepare a Draft Water Forum Agreement which will be available for public and stakeholder review this spring. By late summer a Final Water Forum Agreement will be ready for public review and stakeholder approval.

Also as you review this report please remember that the Final Agreement will be a balanced package, the result of much public review and input, and give and take by all parties. No one group will get everything it wants, but each should get what it really needs. By this summer when it is presented for stakeholder final approval, it will include many interrelated pieces that could not be separated without destroying the overall solution. Therefore after all of the public review, input and refinement, stakeholder organizations will be asked this summer to ratify the Final Agreement without revisions that could unravel the solution.

Please keep in mind that at this time we are asking for your feedback, not your approval of these proposals.

Schedule for the Agreement

Stage 1 Fall 1993 Organization

Stakeholder Board Actions:

- Agreed to Participate and Appointed Representative
- Approved Mission and Groundrules

Stage 2 Through Fall 1994 Education

Stakeholder Board Actions:

- Discussed Their's and Others' Issues and Interests

Stage 3 Spring 1995 Draft Principles

Stakeholder Board Actions:

- Provided Early Review and Authorization to Proceed

Stage 4 January 1996 Report on Progress Toward a Regional Water Agreement

Public Review and Stakeholder Board Actions:

- Review Proposals Under Serious Consideration
- Provide Guidance
- Authorize Stakeholders' Representatives To Proceed

Stage 5 Spring 1996 Draft Agreement

Public Review and Stakeholder Board Actions:

- Review Draft Solution
- Provide Guidance

Stage 6 Summer 1996 Final Agreement

Public Review and Stakeholder Board Actions:

- Review Final Agreement
- Approve As a Comprehensive Agreement Without Revisions
- Agree to Participate in Implementation of the Agreement

Stage 7 Agreement

Begin Implementation

What Proposals Are Under Serious Consideration?

The Forum has two major, coequal objectives:

- Providing a reliable and safe water supply for the region's economic health and planned development through the year 2030.
- Preserving the fishery, wildlife, recreational and aesthetic values of the Lower American River.

Preserving the Lower American River

Reasonable and Feasible Alternatives

Water suppliers would implement reasonable – feasible alternatives to increased diversions from the American River. In addition to implementing water conservation programs, water suppliers would implement alternatives wherever they are reasonable and feasible: reclamation, conjunctive use, alternative sources, etc.

Improved Fishery Flow Pattern

An improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River would be implemented. The existing legal requirement for minimum flows on the Lower American River was set over 40 years ago. It allows flows in the river during dry years to be as low as 250 cubic feet per second, although the U.S. Bureau of Reclamation voluntarily releases greater amounts. Since the standard was adopted, the fishery has significantly declined. As part of an acceptable solution there needs to be an improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River that will preserve and enhance the river's fishery values. (See Sidebar – "An Improved Flow Pattern")

Reduced Daily Flow Fluctuations

Another benefit to the fish can come from reducing daily flow fluctuations on the Lower American River. For instance one day last spring flows on the American River were cut 9,500 cubic feet per second over a four hour period – stranding many juvenile fall-run chinook salmon. The Water Forum would work with the Bureau of Reclamation, operators of Folsom Dam, to reduce these wide variations.

Habitat Improvements

In addition to flow related proposals, there are other ways to help the fishery. These include improvements to spawning gravels, better control of the temperature of water released from Folsom Reservoir, maintenance of riparian vegetation along the river, etc. Negotiations are underway to identify mechanisms for funding improvements such as these.

Public Trust

The Public Trust doctrine is designed to protect the rights of the public to use water courses for commerce, navigation, fisheries, recreation, open space, preservation of ecological units in their natural state, and similar uses for which those lands are uniquely suited. It is based on the California State Constitution and goes back to English Common Law. The California Supreme Court stated in the National Audubon case, "The state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible."



Proposals Under Serious Consideration

An Improved Flow Pattern

A major goal of the Water Forum is to preserve and, as much as possible, enhance the Lower American River fishery. How can this be accomplished when the Water Forum also recognizes the need to increase diversions from the river to meet the region's growing population?

One area for major improvement is a better pattern of water releases from Folsom Reservoir. Currently, the U.S. Bureau of Reclamation makes relatively high releases in the middle of the summer to meet needs of its contractors and the water quality needs of the Bay-Delta. This lowers Folsom Reservoir and depletes the amount of water available for release in the fall when chinook salmon return to spawn. It also means that water remaining in Folsom Reservoir for release in the fall is frequently not cool enough for salmon spawning.

Beginning in December 1994, the Water Forum convened a Fish Biologists Working Session of fish experts with special knowledge of the Lower American River. Their charge: To develop a set of common recommendations on how to achieve maximum benefits for fish species for different Lower American River water availabilities. Participants included representatives from the U.S. Fish and Wildlife Service, California Department of Fish and Game, State Water Resources Control Board, U.S. Bureau of Reclamation, and representatives from the Water Forum.

After several months, the Fish Biologists Working Session participants came to general agreement regarding which fish species should be given priority when there are constraints in water availability. They also developed a pattern by which available water can be released from Folsom Reservoir in a "fish friendly" manner consistent with the reservoir's flood control objectives. Their conclusion is that this pattern appears to maximize instream flows and temperature conditions for fall-run chinook salmon in the Lower American River.

This Fish Biologists Working Session Pattern of Flows will somewhat reduce summer flows to conserve water for release in the fall. The summer flows will still provide for Lower American recreation and will actually keep Folsom Lake higher longer for summer recreation.

However, the pattern of releases that would improve conditions for the salmon, along with the proposed increased diversions, would impact the already marginal conditions for another important species, steelhead. This issue will be included in Water Forum negotiations.

This work is being closely coordinated with the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service. Both agencies are working to improve the pattern of fishery releases as required by the Central Valley Project Improvement Act. Analysis is underway to confirm that with the new pattern of releases the Bureau will still be able to meet its commitments to its contractors and the Bay-Delta by more closely coordinating the operation of all of its reservoirs.

Participants in the Fish Biologists Working Session provided a number of other recommendations on how Water Forum agreements can better protect fisheries and the other important natural resources of the Lower American River. An Executive Summary from the Fish Biologists Working Session including two pages of Agreement Statements are available for those who would like more information.

Providing a Reliable Water Supply

A safe and reliable water supply for the region's economic health and development through the year 2030 is the other coequal objective. It depends on water conservation, water recycling, water reclamation, developing additional surface water supplies, and conjunctive use of surface and groundwater. Any Water Forum agreement must ensure that our water supplies are protected from contamination and our drinking water meets or exceeds all applicable state and federal requirements. Here are the proposals under serious consideration to provide a safe and reliable water supply (See map on page 24):

Additional Surface Water Supplies

Even with the aggressive water conservation, recycling, reclamation, and conjunctive use proposals described in following sections of this Progress Report, additional diversion of surface water will still be required to meet the region's water needs to the year 2030.

The proposals under consideration recognize that purveyors have different opportunities and constraints based on their location. Therefore they are grouped into four categories: Upstream Diversion Proposals; Upstream Diversion Proposals Utilizing Intermittent Supplies; Lower American River Diversion Proposals; and Proposals to Meet the Needs of Purveyors Who do Not Divert From the American River.

UPSTREAM DIVERSION PROPOSALS

(Upstream of the Lower American River)

These water purveyors divert upstream of Nimbus Dam and the Lower American River. They include San Juan Water District and its family including Fair Oaks Water District, Orange Vale Water Company and Citrus Heights Water District; Arden Cordova Water Service; Sacramento Municipal Utility District; City of Folsom; Folsom Prison; Placer County Water Agency; City of Roseville; Forresthill Public Utility District; El Dorado Irrigation District; and Georgetown Divide Public Utility District.

These purveyors are higher in elevation and more distant from alternative sources such as the Sacramento or Feather rivers. Some, such as the City of Folsom, the El Dorado Irrigation District and Georgetown Divide Public Utility District, have no usable groundwater immediately beneath them. These factors combine to limit the range of reasonable and feasible alternatives potentially available to reduce diversions from the American River.

Currently these purveyors divert approximately 145,100 acre feet annually from the American River above the Lower American River. By the year 2030, even with implementation of water conservation Best Management Practices, they will need to divert an additional 152,600 acre feet from the American River in most years (for a total of 297,700 acre feet) to meet the projected water needs of planned growth.

By the year 2030 there is also a need for another 20,000 acre feet of water for planned growth in Roseville and 25,000 acre feet for planned growth in southwest Placer County. A proposal under serious consideration for meeting these needs, which total 45,000 acre feet, is a diversion from the Feather River.

Water Forum members believe that in most years upstream diversion of 297,700 acre feet can be compatible with the other, coequal objective of preserving the fishery, wildlife, recreation, and aesthetic values of the Lower American River. However, diverting this much in dry years could jeopardize the goal of protection of the Lower American River. Therefore Water Forum members are investigating the alternatives identified on page 19 to determine how much of their water needs could be met by sources other than the American River in dry years.

What's an Acre Foot?

An acre is about the size of a football field. An acre foot is the amount of water that would cover one acre of land one foot deep. It equals 325,800 gallons. That is about how much water five people use a year for drinking, washing, and landscape watering.

1990 and Proposed Year 2030 Diversions Upstream of the Lower American River

(in acre feet annually)

	1990 Diversions	Projected Additional Future Diversions	Total 2030 Projected Diversions ¹
San Juan Water District (in Sacramento County) ²	44,200	13,000	57,200
Arden Cordova Water Service	3,500	1,500	5,000
Sacramento Municipal Utility District	15,000	15,000	30,000
City of Folsom	17,900	15,000	32,900
Folsom Prison	2,000	0	2,000
Placer County Water Agency (PCWA) ³	8,500	27,000	35,500
City of Roseville ³	15,000	27,000	42,000
San Juan Water District (in Placer County)	8,000	17,000	25,000
Forresthill Public Utility District	1,000	0	1,000
El Dorado Irrigation District	20,000	28,400	48,400
Georgetown Divide Public Utility District	10,000	8,700	18,700
	145,100	152,600	297,700

¹ Assumes demand reductions as a result of expanded water conservation programs (BMPs).

² These estimates include water for San Juan Water District and water they serve to Fair Oaks Water District, Citrus Heights Water District and Orange Vale Water Company.

³ This assumes that in addition to the American River diversions indicated, PCWA would divert 25,000 acre feet from the Feather River to meet a part of their year 2030 needs and Roseville would divert 20,000 acre feet from the Feather River to meet part of their year 2030 needs. Analysis is underway to determine if the assumed Feather River diversion is a reasonable and financially feasible alternative.

Potential Dry Year Alternatives for Upstream Diverters

(Upstream of the Lower American River)

- Additional conservation practices in dry years
- Conjunctive use by San Juan Water District
- Conjunctive use by the City of Roseville
- Conjunctive use by Arden Cordova Water Service
- Placer County reoperation of their reservoirs
- Interbasin transfer
- Maximize use of water which would be diverted from the Feather River for San Juan and Northridge water districts
- Accounting for operation of Upper American River Project reservoirs
- Additional reclaimed water
- Groundwater to meet SMUD's needs
- Use of groundwater in the vicinity of Aerojet after it has been treated to meet all applicable health and safety standards
- Extending Sacramento County's Sunrise distribution system in order to deliver Sacramento River water to the City of Folsom
- Willing buyer - willing seller purchase of water from agricultural customers in the region
- Physical and operational improvements to increase the efficiency of PCWA's system for delivering Yuba-Bear River water
- Additional, relatively small reservoirs in El Dorado County (e.g. Texas Hill and Small Alder)

The opportunities for specific upstream diverters vary with their circumstances:

Northeast Sacramento County municipal and industrial needs served by the San Juan family including San Juan Water District, Citrus Heights Water District, Fair Oaks Water District, and Orange Vale Water Company

By the year 2030, diversions from above the Lower American River would be increased by 13,000^{MM} acre feet in most years. The San Juan Water District also provides retail water service in Placer County. In most years diversions from above the Lower American River would be increased by about 17,000 acre feet for their service area in Placer County. In drier years conjunctive use, interbasin transfers and other alternatives would reduce the need for these additional diversions.

Arden Cordova Water Service

By the year 2030 Arden Cordova Water Service (ACWS) would increase diversions from the Folsom South Canal in most years by 1,500 acre feet. This source will continue to be combined with current and future groundwater sources and in drier years they would rely more on groundwater.

ACWS and the City of Folsom have an agreement transferring 5,000 acre feet of ACWS's 10,000 acre feet entitlement to Folsom. Conditions of this agreement could change in the future which would enable ACWS to divert an additional amount up to 6,500 acre feet in most years. If this occurs the City of Folsom would need to find an alternative supply to the American River for the 5,000 acre feet. For the proposals under consideration, 5,000 acre feet of ACWS entitlement is incorporated into the City of Folsom's diversion total listed in the table on page 18.

Proposals Under Serious Consideration

City of Folsom

By the year 2030 the City of Folsom would increase diversions from Folsom Reservoir in most years by 15,000 acre feet. An option that needs further investigation for meeting water needs in dry years involves agreements with other agencies such as Northridge and San Juan water districts to exchange water. With this type of exchange the City of Folsom could still meet its needs without an overall increase in American River diversions.

Sacramento Municipal Utility District

By the year 2030 SMUD would increase its diversions from the Folsom South Canal by 15,000 acre feet as its demand for water at power plants increases over time. Like other purveyors it is investigating alternative sources to meet some of its water needs in drier years. One option is groundwater from areas adjacent to Rancho Seco. This and other options need further investigation and negotiation by the Water Forum.

SMUD would divert other quantities of its entitlement from points further downstream. SMUD is also assigning 15,000 acre feet of its unused entitlement to Sacramento County in return for the county's contribution to a cost effective delivery of water to SMUD cogeneration power plants by the City of Sacramento. Lastly, SMUD could also share more of its unused entitlement with other water users in the South Sacramento County area.

El Dorado Irrigation District and the Georgetown Divide Public Utility District

El Dorado Irrigation District and the Georgetown Divide Public Utility District serve areas where there is no groundwater aquifer. They are also fully metered and reclaim water to the maximum extent allowable. Therefore their only possible source of supply to meet new growth is increased diversions from the American River. By the year 2030 they would increase their American River diversions in most years by 37,100 acre feet. One option they are investigating is increased storage in new, relatively small reservoirs to capture water in wetter years so that diversions could be reduced in drier years.

Placer County Water Agency, PCWA, and City of Roseville

By the year 2030 PCWA and Roseville's combined demands for surface water will increase by 99,000 acre feet. PCWA and Roseville are investigating all potentially reasonable and feasible options in an attempt to limit the net increase in American River diversions to 54,000 acre feet in most water years.

One option initially appears favorable to make up the 45,000 acre feet difference. Under this option, PCWA would implement an exchange with the State Water Project whereby State Water Project water would be diverted from the Feather River to meet agricultural needs in western Placer County and municipal and industrial needs in southwest Placer County and possibly the City of Roseville. In return, Placer County Water Agency would release an equivalent amount of water from their reservoirs on the Middle Fork of the American River and allow it to flow down the American through the Lower American River section for the benefit of the fishery. When the water reached the confluence with the Sacramento River, its "title" would transfer to the State Water Project, thereby completing the exchange.

The package of proposals described in this Progress Report assumes that this Feather River diversion will occur in the future. However it will be some time before this exchange can actually be approved and implemented. It is possible that some substantial, unavoidable environmental, financial, institutional, or other obstacle would prevent that exchange. Therefore the Water Forum must develop a non-Feather River option to deal with that contingency.

Also under consideration is an extension southeast from Placer County Water Agency's proposed treatment plant at the southwest corner of Placer County. This extension would allow an interconnection with the San Juan - Northridge pipeline currently under construction. This would provide all participating agencies with redundant sources for increased reliability.

Proposals Under Serious Consideration

PCWA and Roseville are also investigating alternatives such as reoperation of PCWA reservoirs, increased reclamation, improvements to the Yuba-Bear delivery system, and additional conjunctive use to meet some of their needs in drier years. This would further reduce the need for American River diversions in drier years.

UPSTREAM DIVERSION PROPOSALS UTILIZING INTERMITTENT AMERICAN RIVER SUPPLIES

Northridge Water District, Rio Linda Water District, McClellan Air Force Base, Arcade Water District, and Citizens Utilities

Suppliers in this area are currently reliant on groundwater. Conjunctive use is a proposal under consideration. By the year 2030 Northridge Water District would divert a maximum of 29,000 acre feet of water via the San Juan Water District facilities when the flows in the Lower American River were above a mutually agreed upon standard. Negotiations are underway to identify and agree upon that standard. This water could be used for in-lieu recharge or injection by some or all of these water districts.

Southeast Sacramento County agricultural users, the City Water District, Orochumbe-Hartnell Water District, Galt Irrigation District, and agricultural users in a portion of the unorganized areas of southeast Sacramento County

By the year 2030 these agricultural users, who have few options for alternative surface water supplies, would divert a maximum of 35,000 acre feet of water from the Folsom-South Canal when flows in the Lower American River were above a mutually agreed upon standard. Negotiations are underway to identify and agree upon that standard.

LOWER AMERICAN RIVER DIVERSION PROPOSALS

There are three agencies that divert from the Lower American River: Carmichael Water District, Arcade Water District and the City of Sacramento.

Carmichael Water District

Carmichael Water District (CWD) is presently under a non-compliance order from the Department of Health Services which limits diversions to 8,000 acre feet annually. Historic diversions have ranged up to 12,000 acre feet, with peak hour diversions up to 50 cubic feet per second. CWD is in the planning stage of a water treatment plant which is required to bring them into compliance with the Surface Water Treatment Rule. For the modeling work done to assist the negotiations, CWD was assumed to divert 8,000 acre feet in the driest year. The model's base year was 1990. However, during that year CWD had operational constraints on their diversion facilities from the American River. Discussions and negotiations with CWD are continuing.

Arcade Water District

For the proposals under consideration, Arcade Water District (AWD) is assumed to divert 2,000 acre feet in the driest year. AWD is in the planning stage for a water treatment plant to utilize their existing diversion facility more efficiently. AWD and the City of Sacramento have a draft agreement for the balance of their contractual entitlements which would be limited by the Hodge flow restrictions similar to the City of Sacramento. Discussions and negotiations with AWD are continuing.

City of Sacramento and its Place of Use, which includes Del Paso Manor County Water District, a portion of Arcade Water District, a portion of Citizens Utilities, a portion of Northridge Water District, Fruitridge Vista, Florin County Water District, a portion of the Florin-Cordova Water Service, a portion of the Sacramento County Water Maintenance District, and Lake Tahoe Water Company;

The City of Sacramento diverted about 50,000 acre feet in 1990 from the Lower American River at the Fairbairn Treatment Plant just downstream of the Howe Avenue Bridge. With its current capacity it could effectively divert and treat approximately 90,000 acre feet annually.

Proposals Under Serious Consideration

Under the proposal being considered, the City of Sacramento would double the diversion and treatment capacity at the Fairbairn Treatment Plant. The City of Sacramento would use the new diversion capacity only when river flows at the mouth of the American River exceed the Hodge flow. (See Sidebar, "What's the Hodge Decision?").

By the year 2030, during periods when the Hodge threshold was not met, the City of Sacramento would limit diversions from the American River to 90,000 acre feet in all but the driest years. In those driest years it would further limit its American River diversions to 50,000 acre feet.

In years when the Hodge threshold was met, the City of Sacramento could divert up to 200 million gallons per day. In addition, biological studies would be initiated that could further refine the threshold for diversions.

Whenever the flows at the mouth of the American River are less than the Hodge flow, the City of Sacramento could not use its expanded diversion capacity and would instead rely on increased use of Sacramento River water, groundwater or a combination of both.

What's the "Hodge Decision"?

The earlier sidebar article, "A Better Flow Pattern," discussed how the water released by Folsom Dam can be better managed to benefit the American River fishery. However there still remains the question of what flows of water are needed to sustain the Lower American River fishery. Knowing this can help inform decisions on when additional water can be diverted from the river without undue harm to the fish.

Existing flow requirements, known as Decision D - 893, were set 40 years ago when much less was known about the life cycles and needs of the fish, particularly fall-run chinook salmon. Since then we have learned more about them and watched as their population further declined under the outdated standard.

In 1970 the East Bay Municipal Utility District (EBMUD) contracted with the U.S. Bureau of Reclamation for water that would be diverted from the Lower American River into the Folsom South Canal at Nimbus which is upstream of the Lower

American River. Parties including Sacramento County, the Environmental Defense Fund, and Save the American River Association sued EBMUD over concern about how these increased diversions would further impact the Lower American River fishery. Millions of dollars were spent on legal costs and fishery studies.

At the end of the 17 year lawsuit Judge Hodge evaluated all of the evidence and issued his decision which balanced the needs of the fishery with EBMUD's contractual entitlement to American River water. Judge Hodge said that because EBMUD had reasonable and feasible alternatives for meeting its needs, it could use the Folsom-South Canal diversion only

when specified flows would remain in the river. These flows have come to be known as the Hodge Flows.

While Judge Hodge's decision applies only to parties to that lawsuit, the Water Forum is considering the same standards for any water district that was found to have reasonable and feasible alternatives.

The Water Forum also recognizes that some agencies, such as those at higher elevations, have no reasonable and feasible alternatives to increased American River diversions in most years and therefore probably would not be held to the Hodge standard.

D - 893

September 15 - December 31	500 cubic feet per second
January 1 - September 14	250 cubic feet per second

Hodge Decision

October 15 - February	2,000 cubic feet per second
March - June	3,000 cubic feet per second
July - October 14	1,750 cubic feet per second

Proposals Under Serious Consideration

PROPOSALS TO MEET THE NEEDS OF PURVEYORS WHO DO NOT DIVERT FROM THE AMERICAN RIVER

In the region there are several other purveyors that do not fit into the preceding categories. Proposals to meet their needs are described here:

South Sacramento County municipal and industrial needs served by Sacramento County and Elk Grove Water Works

Suppliers serving municipal and industrial uses in the south part of Sacramento County could conjunctively use surface water and continue to rely on groundwater wherever it is sufficient for their needs. To serve planned future growth to the year 2030 including the Elk Grove – Laguna – Vineyard area (known as Zone 40) and the Elk Grove Water Works, there would also be increased diversions of up to 78,200 acre feet from the Sacramento River.

City of Galt

The City of Galt would in the near term continue to pump groundwater to meet projected demands. In order to protect its groundwater supplies, the City of Galt would support efforts by adjacent agricultural groundwater users to utilize surface water in a conjunctive use program.

The City of Galt could potentially be a partner with EBMUD, the City of Sacramento, Sacramento County, the agricultural water users in the southwestern portion of Sacramento County, and water users in San Joaquin County in a project to divert water from the Sacramento River.

Rancho Marineta Community Service District

This District presently has water diversion and storage entitlements from the Cosumnes River. They desire to improve the reliability of their system in dry years by developing alternative sources.

Natomas Mutual Water District

Natomas Mutual Water District has adequate surface water supplies from the Sacramento River to meet its needs. To the extent that water conservation in their district could free up water, they are interested in sharing that water supply with others in the region. Those who benefit could help finance the conservation improvements in Natomas Mutual.

East Bay Municipal Utility District and San Joaquin County interests

EBMUD and San Joaquin County interests are pursuing diversion of water from the Folsom South Canal upstream of the Lower American River. That diversion would endanger the Water Forum's two coequal goals of: providing a reliable and safe water supply for the region's economic health and planned development through the year 2030; and preserving the fishery, wildlife, recreation, and aesthetic values of the Lower American River. X

Despite their long standing and continued preference for the Folsom South Canal point of diversion, EBMUD has agreed to cooperate with Water Forum members in investigating the possibility of a cooperative project to divert water from the Sacramento River immediately below the mouth of the American River or at Freeport. In dry years EBMUD's water could be transported south to connect with their Mokelumne River Aqueduct. In other years the water could be used in south Sacramento and San Joaquin counties for conjunctive use.

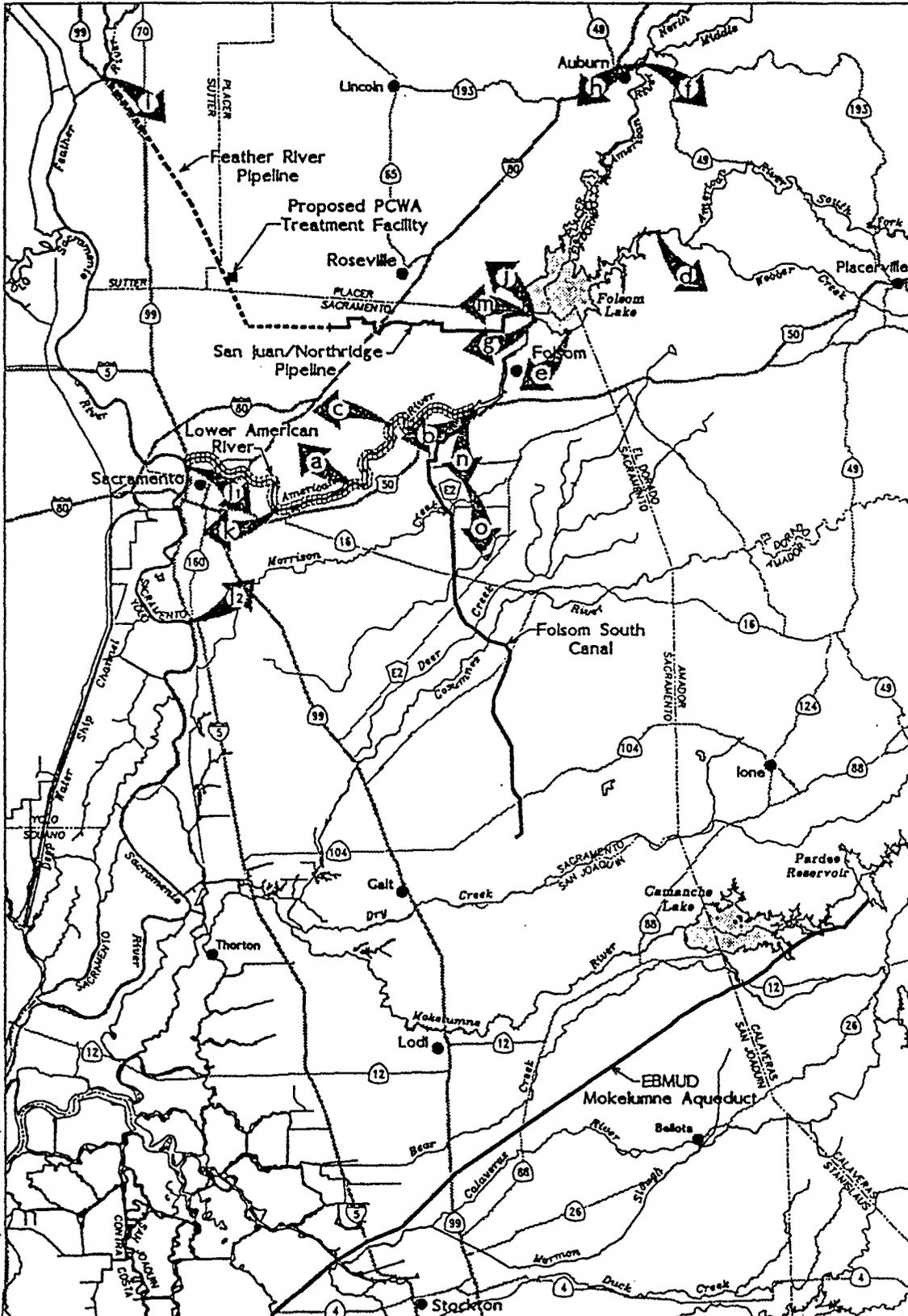
The Water Forum and its members could provide strong support for EBMUD to secure the approvals necessary for it to divert its Central Valley Project water from immediately below the mouth of the American River or at Freeport. Participants in this joint use project could include the City of Sacramento, Sacramento County, the City of Galt, the agricultural water suppliers in the southwestern portion of Sacramento County, and water users in San Joaquin County.

Proposals Under Serious Consideration

Proposals Under Serious Consideration by the Water Forum



January 1996



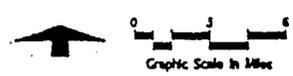
Lower American River Protection:

- Improved Pattern of Flow Releases
- Reduced Daily Flow Fluctuations
- Habitat Improvements
- Implement Reasonable & Feasible Diversion Alternatives: Conjunctive Use, Conservation & Reclamation

Diversion Proposals (Alphabetic):



- a Arcade Water District
- b Arden/Cordova Water Service
- c Carmichael Water District
- d El Dorado Irrigation District
- e City of Folsom
- f Georgetown Divide Public Utility District
- g Northridge Water District
- h Placer County Water Agency
- i Placer County Water Agency & possibly City of Roseville & Northridge Water District
- j City of Roseville
- k City of Sacramento
- l City of Sacramento, County of Sacramento & possibly East Bay M.U.D. & San Joaquin County Interests
- m City of Sacramento, County of Sacramento & possibly East Bay M.U.D. & San Joaquin County Interests
- m San Juan Water District
- n S.M.U.D.
- o South East County Agricultural



C-040866

C-040866

Groundwater

Through a Water Forum Agreement our vital groundwater resource would be protected. In addition, if it was managed in conjunction with surface water availability, the groundwater basin could provide storage capacity to bank water that would be used to meet demand during dry years. To achieve the objectives of groundwater protection and greater overall water availability, an agreement has to address sustainable yield, conjunctive use, institutional arrangements, and financing.

Within the context of this proposal, "sustainable yield" is the amount of groundwater which can be safely pumped from a groundwater basin over a long period of time while maintaining acceptable groundwater elevations thus avoiding undesirable effects which might include increased pumping costs, accelerated movement of underground pollutants, etc. Sustainable yield is a balance between pumping and basin recharge and is expressed as the number of acre feet which can be safely pumped from the basin on a long term average annual basis.

"Conjunctive use" is the planned management and use of groundwater in conjunction with surface water to improve the overall reliability of a region's total water supply. For example, in wet years when surface water is available, groundwater pumping is reduced or eliminated and surface water is used allowing the groundwater basin to be replenished. In dry years when surface water is in short supply, the water which has been accumulating in the basin is pumped for use and surface water diversions are reduced. Additional surface water diversions in some years are necessary to implement conjunctive use. Conjunctive use is expressed in acre feet per year.

Because of the hydrology of the region, the groundwater basin in the Sacramento area is divided into three distinct sections: the North Area (north of the American River extending into southern Placer County), the South Area (between the American and Cosumnes rivers), and the Galt Area (south of the Cosumnes River). It is similar to a single serving dish with three separate compartments. There is no reliable groundwater on the west slope of El Dorado County.

The following purveyors utilize the groundwater basin for some or all of their water supply. There are also residents, businesses and agriculturalists who pump groundwater from the basin.

North Area

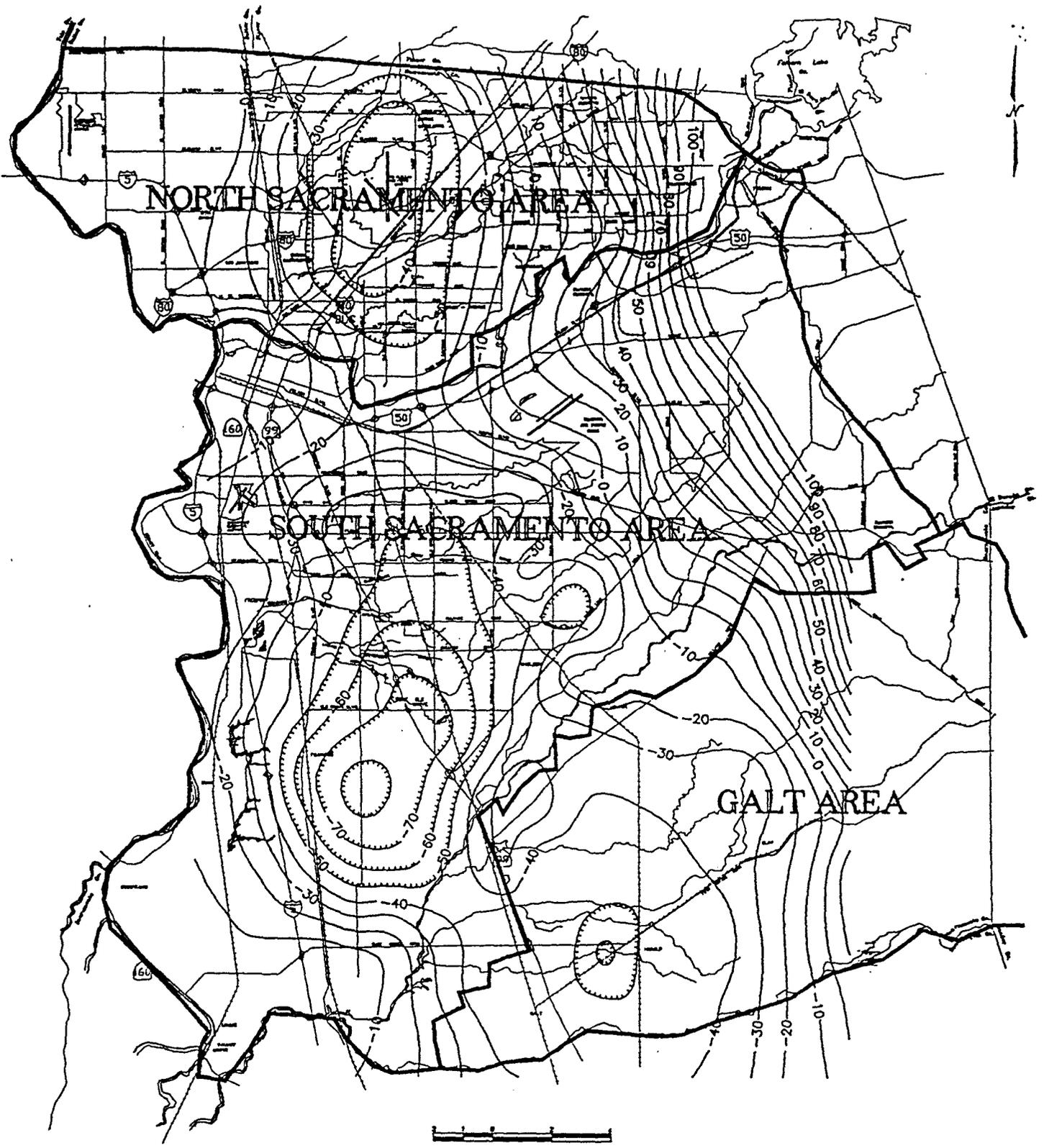
Arcade Water District, Arden Cordova Water Service (Arden area), Carmichael Water District, Citizens Utilities Company (portion), Citrus Heights Water District, Del Paso Manor County Water District, Fair Oaks Water District, McClellan Air Force Base, Metro Airport, Northridge Water District, Orange Vale Water Company, Rio Linda Water District, Sacramento County WMD (portion).

South Area

Arden Cordova Water Service (Cordova area), Citizens Utilities Company (portion), Elk Grove Water Works, Florin County Water District, Fruitridge Vista Water Company, Mather Air Force Base, Omochumne Hartnell Water District (portion), Sacramento County WMD (portion), Tokay Park Water Company, Sacramento County Zone 40.

Galt Area

City of Galt, Clay Water District, Galt Irrigation District, Omochumne Hartnell Water District (portion).



SACRAMENTO COUNTY
FALL 1990 GROUNDWATER ELEVATIONS
(MEAN SEA LEVEL)

C - 0 4 0 8 6 8

Consultants have analyzed the impacts of various sustainable yield amounts for the three ground-water basin areas. Based on these results, proposed sustainable yields amounts have been developed. Assumptions and impacts in Placer County need to be discussed and verified.

With the yields proposed, only minor increases in the rate of contaminant movement can be expected. The most extreme case is at the Army Depot where the rate of lateral movement will increase from 576 feet per year to 633 feet per year. Land subsidence is expected to be negligible. The preliminary proposals and results are presented below:

NORTH AREA

The estimated average sustainable yield is 131,000 acre feet which represents the year 1990 pumping amounts.

To help meet year 2030 demands, a program would be implemented to use the groundwater basin conjunctively with average annual surface water supplies ranging from 4,400 to 18,000 acre feet. The source of the surface water for the conjunctive use operation would be diversions of up to 29,000 acre feet annually from the American River when flows exceeded a mutually agreed upon threshold. Another potential source would be diversions from the Feather River.

The North Area basin would be stabilized at a minimum elevation of approximately -83 feet, mean sea level, with a range from -70 to -87. This represents a decline of 22 feet from 1990 elevations at the lowest level within the cone of depression.

SOUTH AREA

The estimated average annual sustainable yield is 273,000 acre feet which represents year 2005 projected pumping amounts. The projected 2005 pumping amounts for the south area took into consideration the cost of delivery of surface water and the impacts which occur due to the lower stabilized groundwater levels.

To help meet year 2030 demands, a program would be implemented to use the groundwater basin conjunctively with average annual surface water diversions from the Sacramento River ranging from 21,900 to 48,200 acre feet. The County of Sacramento is pursuing an additional firm water supply of 30,000 acre feet from the Sacramento River in most years to help meet year 2030 needs.

The South Area basin would be stabilized at an elevation of approximately -123 feet, mean sea level, with a range from -116 to -130. This represents a decline of 51 feet from 1990 elevations at the lowest level within the cone of depression.

GALT AREA

The estimated average annual sustainable yield is 115,000 acre feet which represents year 1990 pumping amounts.

Conjunctive use would be implemented, dependent on the availability of a surface water supply, to enhance groundwater levels.

The Galt Area basin would be stabilized at a minimum elevation of approximately -64 feet, mean sea level, with a range from -50 to -70. This represents a decline of 21 feet from 1990 elevations at the lowest level within the cone of depression.

Groundwater Management

In the fall of 1994, the Sacramento Metropolitan Water Authority (SMWA) and the Water Forum undertook a joint study entitled "Institutional Framework for Implementation of a Sacramento Area Wide Groundwater Management Program." The study was completed in October 1995 and its recommendations are now being reviewed by the Water Forum's Groundwater Negotiation Team and the Groundwater Committee of SMWA.

Because the hydrology of the Sacramento region differs and groundwater problems vary, the study suggests that the area be divided into three groundwater zones: the North Area (north of the American River and extending into southern Placer County), the South Area (between the American and Cosumnes rivers) and the Galt Area (south of the Cosumnes River). Each area might have a different governance structure.

For example, in the North Area most of the water purveyors are already members of the SMWA. Through additional joint powers agreements with

those purveyors who are not currently members, SMWA could exercise its existing authority under state law to implement the North Area's groundwater management plan. In the South Area, because Sacramento County has taken the lead in pursuing surface water, they might fulfill this function. In the Galt Area, hydrologic conditions may not immediately require a groundwater management plan; however, it would be important to initiate a program to monitor groundwater conditions.

Potential arrangements for financing a groundwater management plan (service charges, fees, credits, exchange pools, etc.) as well as mechanisms to facilitate cooperation and coordination among the three areas are now under discussion. Specific recommendations including: governance; financing; and representation of residents, businesses and agriculturalists who also pump groundwater from the basin will be jointly developed by the SMWA Groundwater Committee and the Water Forum Groundwater Negotiation Team for stakeholder review and comment early in 1996.

Water Conservation

Water purveyors in the region have been working hard to conserve water through implementation of many of the 16 water conservation Best Management Practices (BMPs) listed on page 30. It is proposed that any Water Forum Final Agreement must include continued commitment to these BMPs with a goal of implementation of BMPs by the year 2030. How this goal will be implemented is still being negotiated.

WHY IS BMP IMPLEMENTATION SMART?

Continued commitment to the water conservation BMPs will benefit water purveyors, customers and the environment because this:

- maintains local control and allows each water purveyor to implement conservation programs on a schedule tailored to their needs and resources.
- reflects growing public support for the conservation of limited natural resources and the importance of adequate water supplies.
- allows water districts to optimize the use of existing facilities.
- delays or reduces the capital investments required for capacity expansion of water and wastewater treatment facilities even though the service area may grow.
- is essential for the state and federal agency approvals which will be required for any Water Forum plan as well as approvals for specific projects.

WHAT NEEDS TO BE DONE?

The most challenging BMPs to implement are listed below with an explanation of the status, difficulties, and some of the options that have been suggested for future implementation. Under the conservation proposal, purveyors would be able to select and develop the implementation options best suited to their particular conditions in order to achieve the goal of BMP implementation by 2030.

Meters With Conservation Rates for Existing Connections

Approximately 18% of all services in the region now have meters. Many commercial/industrial accounts are metered. In 1992 a state law was passed requiring meters on new residences although the law did not require meters to be read. The challenges are public understanding and acceptance of the importance of this BMP and the costs that can be associated with meter installation and reading.

Possible options for future implementation:

- Voluntary retrofit programs which allow participants to see their metered use and then choose between continuing on a flat rate or changing to "pay for what you actually use" rate. In the San Juan Water District, many customers are choosing to pay for their actual use.
- Full scale retrofit programs with scheduled installation. El Dorado Irrigation District implemented such a program for their El Dorado Hills service area.
- Meter installation at change of service. This option relies on the fact that the average housing turnover rate is 11.5 years. However, this proposal would not link meter installation with home sales or the escrow process.
- State or federal government legislation for a retrofit of meters. Under this option, the rules and schedule for implementation may be predetermined by an outside entity and supersede any local law or legal requirement.

The City of Sacramento has a Charter section prohibiting meters for existing residences. In the city's case, an innovative voluntary retrofit program with financial incentives as described above may be the preferred option.

Landscape Efficiencies

Dan Pratt, the Sacramento gardening expert known locally as the "Garden Doctor," says he sees as many plants killed by overwatering as by all other causes combined! With approximately 50% of all urban water use occurring outdoors, many water districts are well underway with education programs to improve efficiency and conservation in landscaping design and maintenance. The major problems are overwatering, watering when evaporation rates are high, and irrigation equipment that is not properly maintained and adjusted.

It should be noted that according to the Sacramento Tree Foundation, the implementation of water conservation BMPs will not result in the loss or degradation of the region's unique urban forests and landscapes.

Water Use and Methods of Pricing

Overall, the goals of any rate structure are to generate sufficient revenues to maintain efficient and reliable utility operation, and to provide fairness in the allocation of utility service costs. Metered rates means water customers pay for actual water used. Flat rates means that all customers within the same use category pay the same amount, regardless of the amount of water used.

In addition to differences in personal water use habits, use will also vary from district to district and is usually a function of lot size. One local manager in the eastern part of Sacramento County, where lot sizes are particularly large, found that 15% of the customers in the district accounted for 80% of all the water use in the winter. With flat rates, this means that 85% of the people in this district are subsidizing the excessive use of water by others.

Conservation pricing applies to metered water use and requires that rates for water use increase as the quantity used increases. Thus conservation pricing provides a financial incentive for conscientious use and conservation. Water meters are essential if a water district is to provide metered rates and conservation pricing.

Possible options for future implementation:

- Continued education and outreach programs which target the largest water users and wasters. Specific projections of the water needed to maintain site landscaping adjusted to reflect seasonal evaporation/plant transpiration should be provided to the largest irrigators.
- Incentives for the landscape industry, building industry, schools, and park and recreation districts to modernize and maintain irrigation equipment.
- Purveyor cooperation to implement California Irrigation Management Information System (CIMIS) stations throughout the region to help irrigation managers determine when to irrigate and how much to apply.
- Incentives to modify landscaping for increased water use efficiency.
- Installation and use of water meters and conservation rates greatly improves landscape watering efficiencies by providing financial incentives to water correctly and efficiently.

Ultra-Low Flush (ULF) Toilet Replacement

California Plumbing Codes require the installation of ULF (1.6 gallon) toilets in new construction which saves approximately 3.5 gallons per flush over older models. ULF toilet retrofitting programs have shown that the water savings average 44 gallons per day for toilets replaced in a multiple family complex and 28 gallons per day saved in single family retrofits.

Water Conservation Best Management Practices

In 1991 an innovative state-wide effort by urban water agencies and public interest groups resulted in a Memorandum of Understanding (MOU) which has been signed by 112 water agencies, 17 public interest groups and 43 other interested parties. The signatory water suppliers agreed to implement comprehensive conservation Best Management Practices (BMPs). These BMPs are listed below:

1. Interior and exterior water audits and incentive programs for single-family residential, multi-family residential and governmental/institutional customers.
2. Plumbing - new and retrofit.
3. Distribution system water audits, leak detection and repair.
4. Metering with commodity rates for all new connections and retrofit of existing connections.
5. Large landscape water audits and incentives.
6. Landscape water conservation requirements for new and existing commercial, industrial, institutional, governmental, and multi-family developments.

7. Public information.
8. School education.
9. Commercial/Industrial water conservation.
10. New Commercial/Industrial water use review.
11. Conservation pricing.
12. Landscape water conservation for new and existing single-family homes.
13. Water waste prohibition.
14. Identification of water conservation coordinator.
15. Financial incentives.
16. Ultra-low flush toilet retrofit program.

Many purveyors in this region have implemented some of the BMP's such as in school education programs and public information programs. However other BMP's such as metering and ultra low flush toilet rebate programs have not been widely implemented here.

Proposals Under Serious Consideration

Possible options for future implementation

- Team with community organizations to retrofit ULF toilets. These programs pay the community, church or school organization a fee for every toilet replaced while saving water for the utility and generating good will and conservation training in all types of neighborhoods.
- Retrofit ULF toilets at the change of service as described above for water meters. This option relies on the fact that the average housing turnover rate is 11.5 years. However, this proposal would not link ULF replacement with home sales or the escrow process. Individual purveyors would work with their community and boards to determine funding and cost sharing programs.
- As water meters are installed and used, and rates begin to reflect water used, consumers will have an incentive to implement ULF retrofits.

Interior Audit Programs

These programs identify the opportunities within the home for water savings. While these programs can be quite effective, some water districts are concerned about the training and on-going costs and liability for completing the audits.

Possible options for future implementation

- Partnership between water purveyors and energy utilities to provide joint energy/water audits.
- As water meters are installed and used and rates begin to reflect water used, consumers will have an incentive to conserve water within the home.

AGRICULTURAL WATER CONSERVATION

Agricultural water conservation efficiencies are projected to increase 5% by the year 2030. Much of the present conservation is driven by each farmer's effort to reduce the cost of water. As an example, agriculture in south Sacramento County uses water that is pumped from the ground by large electrical motors. In this case, by reducing the amount of hours these motors are operated in an effort to reduce their electrical costs the farmers are also conserving water. Conversely, efforts to conserve water result in reduced operating expense to the farmer. This linkage explains the high level of water efficiencies that exist in this region.

In addition to the current level of conservation, the Water Forum endorses the concept of Total Farm Management (TFM). The goals of TFM are:

- Efficient use of water and all resources.
- Increased viability of the agricultural industry.
- Enhanced environmental benefits from agriculture.

The concept of TFM links all farm inputs (i.e. energy costs, labor costs, cropping decisions, crop management, soil characteristics, environmental factors, etc.) as a way of improving the productivity of the farm. TFM also embraces the use of Integrated Pest Management as a method of controlling crop pests and weeds and increasing farm efficiencies.

The Water Forum's support for TFM reflects a genuine interest in the long term success and prosperity of the agricultural community. Agricultural water districts and companies, in cooperation with other interests, will continue to support water conservation practices within the framework of TFM.

Agricultural Water Recycling

Agricultural water users, particularly in the Natomas area, will continue and expand programs to recycle water. This is an effective water conservation technique, especially for crops such as rice grown on clay soils. Keeping the water on the field or recycling in the drainage system also provides time for pesticides in the water to breakdown before any drainage is discharged into the area's rivers. Additionally, farmers have access to the recycled water for use on other crops at a reduced cost.

Water Reclamation

Whenever reclaimed water can be substituted for potable water, it reduces this region's need to tap the groundwater or divert surface water from the rivers. Where it is reasonable and feasible, municipal waste water will be reclaimed and recycled. Consistent with all state and federal health regulations, reclaimed water would be used for safe uses such as golf course irrigation and industrial cooling processes. Water reclamation is already underway or planned in El Dorado County, City of Roseville, City of Galt, and Sacramento County.

Costs

Solutions must be equitable, fiscally responsible and make the most efficient use of the public's money. All proposed costs need to be scrutinized to ensure that the goals of the Water Forum are met in the most cost effective way. Early in the Water Forum process, the need for cost information became apparent. Before solutions could be fully evaluated, cost information and a process for determining who benefits and who pays needed to be developed.

A financial and economic consulting firm has developed an economic model to provide needed information regarding the relative cost and financing of proposed alternatives. The model incorporates land use and water demand projections, identifies required facilities and related costs, allocates costs to water districts and other areas of benefit, and provides an estimate of connection fees and monthly utility charges. The model can simulate the effects of project costs to existing versus new customers for any combination of benefiting districts or other areas.

Because only Sacramento County land use data were available to the Water Forum when the model was constructed, the model's use is limited to analysis of proposals within that county. For proposals outside of Sacramento County, those purveyors will use their existing procedures to develop information regarding the relative cost and financing of those alternatives. As soon as the Water Forum stakeholders review this Progress Report and provide their input, the proposals will be analyzed to determine which are financially feasible.

There is lively discussion and negotiation underway on how the Water Forum should address equity. One proposal under consideration would be for the Water Forum agreement to include a commitment by public agencies to base rates, fees, assessments, and taxes on cost of service. Any variations would require public notice and hearing before local agency adoption.

An alternative approach would be for the Water Forum to defer to local agencies on how they set rates, fees, assessments, and taxes to implement the Water Forum agreement. This is an issue that will be part of the Water Forum negotiation.

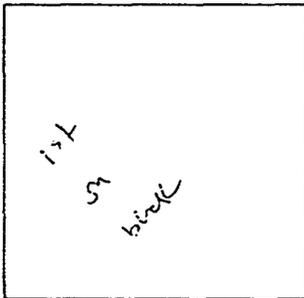
Impacts on the Lower American River Fishery

Several of the proposals under consideration will result in improvements to the Lower American River conditions for fall-run chinook salmon. These include the reduced daily flow fluctuations and habitat improvement. However, the proposal that will result in the greatest improvement compared to current conditions is the improved pattern of releases from Folsom Reservoir for the Lower American River. (See "An Improved Flow Pattern" on page 16.)

However the pattern of releases that would substantially improve conditions for the salmon, along with the proposed increased diversions, would negatively impact the already marginal conditions for another important species, steelhead. This issue will be part of the Water Forum negotiation.

The impacts of the improved pattern have been analyzed for this stage of the negotiations. Impacts of reduced daily flow fluctuations and habitat improvement will provide additional benefits that will be analyzed in the future.

In addition to the proposals to improve the conditions for the salmon, increased diversions described in "Additional Surface Water Supplies" on pages 17 to 23, are also part of the package of proposals under serious consideration. Water Forum members believe that in most years upstream diversion of 297,700 acre feet (145,100 acre feet currently diverted plus increased diversions of 152,600 acre feet¹) to meet year 2030 needs can be compatible with the other, coequal objective of preserving the Lower American River.



In developing the proposals under serious consideration, the impacts on the fishery were considered at the same time diversion proposals were developed. This iterative process allows fishery protection to be considered concurrent with measures to provide a reliable water supply.

In order to provide fishery impact information, the Water Forum commissioned hydrologic and biological analyses. The analysis compared conditions for the chinook salmon and steelhead as they exist now versus conditions in the year 2030 with both the improved pattern of fishery flow releases and the assumptions on increased diversions. The analysis does not reflect additional benefits to the fishery that would result from the reduced daily flow fluctuations and habitat improvement.

For the purpose of the analysis of impacts on the fishery, the following assumptions about diversions were included:

¹ This assumes that in addition to the American River diversions indicated, PCWA would divert 25,000 acre feet from the Feather River to meet a part of their year 2030 needs and Roseville would divert 20,000 acre feet from the Feather River to meet part of their year 2030 needs. Analysis is underway to determine if the assumed Feather River diversion is a reasonable and financially feasible alternative.

Assumptions Regarding Year 2030 Diversions From the American River Used in the Analysis of Fishery Impacts

(As noted in this Progress Report, additional analyses and negotiations must occur before Water Forum members will be ready to agree on increased diversion amounts. However the following assumptions are consistent with the proposals under consideration. If the proposals can be achieved, the impacts on the fishery would be as indicated later in this section.)

UPSTREAM DIVERTERS

(Except Northridge Water District and southeast Sacramento County agriculture)

- Driest years (approximately 4 years out of 70) – diversions of approximately 150,000 acre feet (equivalent to how much they diverted in the base year–1990.)
- Drier years (approximately 8 years out of 70) – diversions gradually increasing from approximately 150,000 acre feet as the estimate of forecasted inflow increased.
- Other years (approximately 58 out of 70) – diversions of 300,000 acre feet.

UPSTREAM DIVERTERS WITH INTERMITTENT AMERICAN RIVER SUPPLY

(Northridge Water District and southeast Sacramento County agriculture)

- In years when forecasted inflow exceeded 1.56 million acre feet for the period between March and November, Northridge diversion of 29,000 acre feet and southeast Sacramento County agriculture diversion of 35,000 acre feet. (1.56 million acre feet is the total of the water diverted upstream plus the volume needed to meet the Hodge flow in the Lower American River for the March to November period.)

LOWER AMERICAN RIVER DIVERTERS

- In 23 of the drier years out of 70, the City of Sacramento diversion of approximately 91,000 acre feet.
- During periods when the flow at the mouth of the American River exceeded Hodge flows (47 years out of 70), City of Sacramento diversions of up to 128,000 acre feet.
- Because negotiations have not yet occurred with Arcade Water District and Carmichael Water District, no assumptions regarding their diversions in other than the driest years were included.

EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD)

- All diversions would be from the Sacramento River immediately below the mouth of the American River or at Freeport.

PLANNED IMPROVEMENTS TO FOLSOM DAM SHUTTERS

- Already planned modification of Folsom Dam shutters to improve temperature control of water releases is assumed as part of both the current condition as well as the year 2030 calendar.

Conclusions

FALL-RUN CHINOOK SALMON

For chinook salmon spawning and egg incubation, the net effect of the improved pattern of fishery flow releases, along with the assumptions on increased diversions, would result in conditions better than what now exist:

- Water temperatures would be increased during the early part of the fall spawning period (i.e. October). However the flows would be substantially increased during October which would result in increased habitat for spawning. Also, for the remainder of the spawning and incubation period when temperatures are lower (i.e. better), month-to-month flows would be more stable and slightly higher.

For chinook salmon rearing the net effect of the improved pattern of fishery flow releases, along with the assumptions on increased diversions, would provide flow and temperature conditions similar to what now exists:

- Conditions (flow and temperature) would be similar or slightly better for chinook salmon rearing during early spring (March and April).
- Conditions (flow and temperature) would be slightly less favorable for chinook salmon rearing during late spring (May and June).

Overall, the net effect of the improved pattern of fishery flow releases, along with the assumptions on increased diversions, would be better conditions for chinook salmon spawning and egg incubation than now exist.

STEELHEAD

Another species of concern is steelhead. Most of the steelhead habitat in upstream reaches of the American river and its tributaries was above the present location of Nimbus Dam. It was in these cooler waters where the majority of steelhead would spawn and where their young would grow for one or more years before migrating to the ocean. Construction of Folsom and Nimbus Dams cut off access to all of their upstream habitat.

Below the dams unfavorable summer water temperatures persist in the Lower American River. Unlike fall-run chinook salmon who migrate to the ocean the year in which they hatch, young steelhead will stay in the river for one or more summers. Summer temperatures in the Lower American River exceed those which provide favorable rearing conditions for steelhead.

There is very little that could be done to reduce summer water temperatures to optimal levels for steelhead in the Lower American River. For these reasons the Lower American River is not considered to be prime steelhead habitat. Despite the unfavorable conditions, some steelhead still live in the Lower American River.

While there would be improved conditions for the fall-run chinook salmon, the pattern of fishery releases, along with the proposed increased diversions, would negatively affect already marginal conditions for the steelhead. This issue will be part of the Water Forum negotiations.

What Could Make the Results of This Analysis Change?

THE RESULTS WOULD CHANGE IF THE ASSUMPTIONS USED IN THE ANALYSIS CHANGE.

For instance, if in drier years upstream purveyors increased their diversions compared to current levels, there would be less water for the fish in those drier years. Additional analysis is being undertaken to determine if the fishery values of the Lower American River could still be preserved despite a higher level of drier year diversions.

THE RESULTS WOULD CHANGE IF THE IMPROVED PATTERN OF FISHERY FLOW RELEASES FROM FOLSOM RESERVOIR FOR THE LOWER AMERICAN RIVER WOULD RESULT IN UNACCEPTABLE IMPACTS ON THE REST OF THE STATE'S WATER SYSTEM.

For instance, the improved pattern of fishery releases could have some impact on the yield of the Central Valley Project, the State Water Project or the ability to meet Bay - Delta water standards. If an unacceptable impact was identified, then the pattern of fishery flows would have to be revised, thereby altering the fishery impact conclusions.

It is worth noting that the Central Valley Project Improvement Act dedicated 800,000 acre feet of water for fishery improvements exactly of the type envisioned by proposals being considered by the Water Forum. Very preliminary evaluation suggests that any impacts on the rest of the state's water system caused by implementing a Water Forum agreement can be mitigated by dedication of a reasonably foreseeable portion of the 800,000 acre feet. As the Water Forum proposals mature, there will be the extensive analysis of any potential impacts and communication with any other potentially affected parties.

THE RESULTS WOULD CHANGE IF FURTHER ANALYSIS IDENTIFIED CURRENTLY UNFORESEEN IMPACTS TO OTHER FISH SPECIES IN THE LOWER AMERICAN RIVER.

The Fish Biologists Working Session convened by the Water Forum had the expertise of federal, state and private biologists most familiar with the river. Participants in the Working Session believe that non-salmonid species (meaning fish other than steelhead and salmon) would not be adversely impacted by the improved pattern of fishery flows. However more analysis of potential impacts on other species will be performed as part of the Water Forum EIR.

What are the Tradeoffs? — Is Everybody Doing their Part?

In the Water Forum process each stakeholder has to ensure that their basic underlying interests are met. Water suppliers and businesses have to be assured a safe and reliable water supply. Environmentalists have to be sure that the fishery, wildlife, recreation, and aesthetic values of the Lower American River will be protected. Taxpayers and ratepayers have to be sure that any costs are reasonable and that any rates, fees, assessments or taxes necessary to fund the recommended measures are equitable.

However in an interest-based negotiation no one party can achieve 100% of its objectives at the expense of the other stakeholders. This means that everyone must be involved in the give-and-take process. Each party that is giving up something for the overall solution needs to know that all the other parties are also contributing to the solution.

Water Suppliers Including Foothill Purveyors

Water suppliers would be able to continue providing clean, safe and highly reliable water supplies to their communities. By having a comprehensive agreement, they would avoid the gridlock that has paralyzed new water development.

There are a variety of actions they would "give" to achieve this benefit. First, they would agree to exercise their water rights in ways that also protected the Lower American River fishery.

For instance the City of Sacramento would exercise its water rights by expanding its diversion and treatment plant at Fairbairn. This would be a significant gain for the city. However the city would also agree to "give" by limiting its use of the new capacity to wetter years when the Hodge standard was met. To meet needs during drier years they would build additional facilities to divert water entitlements from the Sacramento River.

In many cases there does not have to be classical "give-and-take," tradeoff. Instead there is a mutually beneficial "win-win." For instance the Placer County Water Agency's more environmentally acceptable diversion from the Lower Feather River would be its least expensive option while also reducing the need for less environmentally acceptable diversions from the American River.

Water conservation measures are another example of a win-win. The water districts and their ratepayers save due to reduced diversion, treatment, distribution and wastewater treatment costs. The environment will benefit because less water has to be removed from the area's rivers and groundwater basins.

Environmentalists

Environmentalists are also participating in the give-and-take. As part of a Water Forum agreement the environment would benefit in a variety of ways. Water suppliers' implementation of reasonable and feasible alternatives including water conservation, reclamation, conjunctive use, and alternative water sources will limit the need to increase diversions from the area's rivers. It is important to note that implementation of the water conservation BMPs will not result in the loss or degradation of the region's unique urban forests and landscapes.

The improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River would improve conditions for the fall-run chinook salmon. Reducing daily flow fluctuations will result in further improvement. Habitat improvements such as gravel replenishment, additional water temperature control for fish releases, vegetation management, etc. would have additional benefits.

Environmentalists would also benefit by the preservation of agricultural land that would be facilitated by a reliable water supply. Consistency of water planning with the approved general plans would be another benefit.

As part of their "give," the environmentalists would join with all other Water Forum members to support the new diversions included under the agreement consistent with growth identified in approved general plans. Furthermore, they would support all approvals needed to make the solution work, e.g. changes in points of diversion, place of use, facilities, water exchanges, etc.

Public Including Ratepayers, Taxpayers and Neighborhood Groups

The public will benefit by a more reliable, safe water supply especially during the inevitable drought periods that we will face. They will avoid the inconveniences and losses resulting from severe rationing. The local economy will also have a reliable water supply so that our local jobs can be preserved and new jobs can be created.

Good water quality is another benefit of the agreement. Protection of surface and groundwater will ensure that our drinking water continues to meet increasingly stringent federal and state standards.

The public will also benefit from maintaining the fishery, wildlife, recreation, and aesthetic values of the Lower American River. With over five and a half million visitor days, the American River Parkway is already one of the most appreciated parks west of the Mississippi. The Water Forum agreement will preserve the values that make the Parkway so popular.



In order for the public to achieve these benefits there is of course an increased cost. The Water Forum includes taxpayer advocates and neighborhood representatives who are watchdogging the solution to be sure it is the most cost effective approach for achieving all of the benefits and that costs are allocated equitably.

South Sacramento County Agriculture

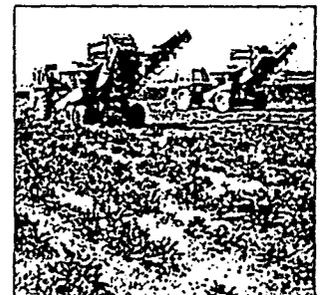
Agriculture is an important and valued part of the Sacramento community and economy. A strong agricultural economy helps preserve agricultural lands and natural habitat. Agriculture has long sought the use of additional surface water in the practice of normal agricultural operations.

Agricultural water users in southeast Sacramento County would divert a maximum of 35,000 acre-feet from the Folsom South Canal when flows were above a mutually agreed upon standard. Negotiations are underway to identify and agree upon that standard. This surface water will be used in conjunction with ground water which is the primary source of water supply for this agricultural area. Additional surface water for agricultural uses would benefit the community by conserving ground water for use during drier years.

Agricultural water users in southwest Sacramento County may benefit from a joint use project to divert water from the Sacramento River.

Agricultural water users, while seeking support for additional surface water, will join with other Water Forum members in supporting the improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River.

By implementing the Total Farm Management concept, additional water conservation will be incorporated with their other farming practices. This will save water, money, and have additional spin-offs, such as reduced use of fertilizers and pesticides.

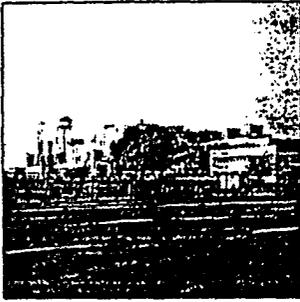


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Business

Both existing and new businesses will benefit from the Water Forum agreement. A reliable and affordable water supply is important for all businesses and crucial for the health of the regional economy. For instance major employers such as Campbell Soup and Hewlett-Packard as well as residential developers need to know that they will have a reliable water supply. Some of these businesses receive water from their own wells.



We need to demonstrate a reliable water supply for the region to support the planned development and to attract the new jobs needed by our residents. The types of clean industries favored by our region are not going to locate here if they believe production will have to be reduced or curtailed during periodic droughts. The reliable water supply provided by an agreement will provide for our region's economic development and planned growth.

Like all other stakeholders, business will also have to contribute to the solution. Their support for environmental improvements and conservation programs will add a powerful voice. In addition they will have to pay their fair share for facilities and programs needed to make the overall solution work.

East Bay Municipal Utility District

As described earlier, EBMUD is pursuing the diversion of water from the Folsom South Canal upstream of the Lower American River. That diversion would endanger the Water Forum's goals of: providing a reliable and safe water supply for the region's economic health and planned development through the year 2030; and preserving the fishery, wildlife, recreation, and aesthetic values of the Lower American River.

Despite their long standing and continued preference for the Folsom South Canal point of diversion, EBMUD is analyzing a cooperative project with Sacramento and San Joaquin interests to divert water from the Sacramento River either immediately below the mouth of the American River or at Freeport.

This would have several major advantages for EBMUD. First, neither of these alternative points of diversion would be subject to the Hodge restrictions. That would allow EBMUD to exercise their full contractual entitlement to Central Valley Project water. This would also assist them in renewing their contract with the U.S. Bureau of Reclamation.

Second, it would give them a way to access the water in the driest years when they need it the most. One option could be direct diversion in dry years. Another might be to use the water conjunctively with groundwater in both south Sacramento County and San Joaquin County.

Third, a cooperative project would give them cost sharing partners. Cost sharing would reduce EBMUD's costs for the diversion.

Fourth, participation in a cooperative project with the Water Forum would greatly facilitate EBMUD's compliance with the California Environmental Quality Act (CEQA) and the Natural Environmental Policy Act (NEPA).

Like all other parties, EBMUD would also have to give to the solution. Their largest contribution would be to wait until after the water flowed down the American River before diverting it.

This proposal has the major advantage of being both affordable and achievable.

What Are the Remaining Challenges?

These proposals under serious consideration are based on several assumptions. Converting these assumptions into reality poses several challenges. Each of these challenges must be resolved by the Water Forum before an agreement is drafted, publicly reviewed, refined, and presented to Stakeholder boards as a Final Agreement ready for their approval:

Assurance of Reliable Water Supplies in Dry Years

In wet years, there is adequate water for the fall-run chinook salmon and for full diversions from the American River to meet consumptive needs through to the year 2030. In dry years, fishery, wildlife, recreation, and aesthetic values of the American River could not be sustained if the purveyors diverted the full amounts. Proposals under serious consideration include less than full diversions in those dry years. Water purveyors are looking for alternate sources they can tap in those dry years to ensure that their customers have adequate water supplies. Options being analyzed include a mixture of alternative sources, conjunctive use, water exchanges, imports, and demand reduction programs, etc. For a Water Forum agreement to work, it is absolutely essential that adequate and reliable water supplies be available in dry years. A major challenge is to develop agreements for equitable sharing of costs for facilities that will provide dry year water supply reliability.

Improved Pattern of Fishery Flow Releases from Folsom Reservoir for the Lower American River

One of the absolutely essential elements in making the solution work is implementation of the improved pattern of Folsom Reservoir releases for the Lower American River. The proposals under serious consideration include increased diversions in most years from the American River. One essential way to offset the impacts of those increased diversions is through the benefits of the improved fishery flow pattern. ← plan text

Under the Central Valley Project Improvement Act (CVPIA), the U.S. Fish and Wildlife Service is charged with the responsibility of recommending flows to restore naturally spawning anadromous fish in the American River. Their recommendations will be analyzed as part of the CVPIA Programmatic Environmental Impact Statement (PEIS). That is one of the reasons the Water Forum has maintained the closest possible coordination with state and federal agencies including the U.S. Fish and Wildlife Service. The Water Forum's goal is to have its fishery flow pattern be as close as possible to the flow pattern that will come out of the CVPIA. Without implementation of the improved pattern there is no basis for Water Forum agreement.

While there would be improved conditions for the fall-run chinook salmon, the pattern of fishery releases, along with the proposed increased diversions, would negatively affect the already marginal conditions for the steelhead. The Water Forum will include steelhead conditions in the negotiations.

East Bay Municipal Utility District Point of Diversion

EBMUD has a contractual entitlement with the U.S. Bureau of Reclamation to divert 150,000 acre feet of water from the American River, although the diversion was limited by the Hodge Decision (described on page 22). They have always wanted to divert that water from the Folsom South Canal which is above the Lower American River.

However, the Folsom South Canal does not extend all the way to EBMUD's aqueduct that delivers the water to their service area. To extend Folsom South Canal, EBMUD would still have to comply with requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

These laws require analysis of the impacts of their diversions in addition to all other diversions which are reasonably foreseeable. Should EBMUD divert from the Folsom South Canal, there would probably not be enough water left to adequately meet the water supply needs of this region and fishery flow needs for the Lower American River in dry and normal years.

CEQA and NEPA also require analysis of a reasonable range of feasible alternatives that would reduce significant impacts. Last fall the EBMUD Board of Directors instructed their staff to begin the engineering and environmental analysis of their preferred diversion from the Folsom South Canal.

In response to a request from the Water Forum, EBMUD also instructed their staff to analyze an alternative of a cooperative project with San Joaquin and Sacramento interests to divert that water from the Sacramento River downstream of the mouth of the American River.

This alternative offers the opportunity for EBMUD and San Joaquin interests to have Water Forum support for a project that would meet their underlying need for a reliable water supply. One possibility would be a diversion from the Sacramento River immediately below the mouth of the American River or at Freeport. Cost sharing partners could include EBMUD, City of Sacramento, Sacramento County, perhaps the City of Galt, other south Sacramento County interests, and San Joaquin County interests.

Water Forum members believe this is a potentially reasonable and feasible alternative that would protect the fishery, wildlife, recreational, and aesthetic values of the Lower American River and should be actively pursued by the Water Forum and EBMUD. If this issue is not resolved by the time the Water Forum agreement is ready to be approved, the agreement will need to address this issue.

An Acceptable Method of Implementing Water Conservation Best Management Practices Including Water Meters and Conservation Pricing

Conservation does two things relevant to the Forum's goals. First, it extends the existing supply thereby meeting the needs of some of the planned growth. Second it reduces the need for additional diversions from the American River. Implementation of water conservation Best Management Practices, including an acceptable metering and pricing program, landscape water conservation and ultra-low-flush toilet programs is essential to making the agreement work for water suppliers and the environment.

Costs, Funding and Equity

Solutions must be equitable, fiscally responsible and make the most efficient use of the public's money.

There is lively discussion and negotiation underway on how the Water Forum should address equity. One proposal under consideration would be for the Forum agreement to include a commitment by public agencies to base rates, fees, assessments, and taxes on cost of service. Any variations would require public notice and hearing before local agency adoption.

An alternative approach would be for the Forum to defer to local agencies on how they set rates, fees, assessments, and taxes to implement the Forum agreement.

Another part of this challenge is to agree on how improvements to the habitat of the Lower American River could be funded. One proposal being considered would be for all diverters from the American River to help fund habitat improvements in the Lower American River.

These monies would be used to fund Lower American River habitat improvements beyond what will be funded by the Central Valley Project Improvement Act Restoration Fund. The Forum would make a concerted effort to get an equitable share of CVPIA Restoration Funds spent on Lower American River improvements. Those diverters who already pay into the CVPIA Restoration Fund would be credited so that they would not have to contribute to two restoration activities for the same water.

For any Water Forum agreement to be implemented, all stakeholders will have to be sure that the goals of the Water Forum are met in the most cost effective way and that costs are allocated equitably.

Feather River Diversion

This diversion and exchange would allow some of the needs in Southwestern Placer County, and possibly northern Sacramento County and the City of Roseville to be met by Feather River water. That would reduce the need to increase American River diversions. However it will be some time before this exchange can actually be approved and implemented. It is possible that some substantial, unavoidable environmental, financial, institutional, or other obstacle would prevent that exchange. Therefore the Water Forum must develop a non-feather River option to deal with that contingency.

State and Federal Regulatory Cooperation

The elements of the Water Forum solution will require numerous governmental appraisals and coordination. Examples include U.S. Fish and Wildlife Service coordination, State Fish and Game reviews, U.S. Bureau of Reclamation implementation of the improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River, State Water Resource Control Board approval of changes in place of use and points of diversion, and California State Water Project's participation in the Feather River exchange. Water Forum representatives meet regularly with top state and federal regulators to assure that this cooperation will continue through the implementation phase.

Groundwater Management

Methods need to be identified to ensure that the groundwater resources will be adequately managed. Consideration must be given to the needs of groundwater users including agriculture, individual residences, and large businesses. Among agencies that rely on groundwater, options for governance such as joint powers agreements need to be explored.

Potential arrangements for financing a groundwater management plan (service charges, fees, credits, exchange pools, etc.) as well as methods to facilitate cooperation and coordination among the three groundwater basin areas are now under discussion. Specific recommendations on a comprehensive groundwater management plan, including governance and financing will be developed through a continuing cooperative effort by the Water Forum and the Sacramento Metropolitan Water Authority.

Impacts on the Rest of the State's Water System Caused by this Package of Proposals

The improved pattern of releases from Folsom Reservoir for the Lower American River fishery could have some impact on the yield of the Central Valley Project, the State Water Project or the ability to meet Bay - Delta water quality standards.

Fortunately for the Water Forum, the Central Valley Project Improvement Act dedicated 800,000 acre feet of water for fishery improvements exactly of the type envisioned by proposals being considered by the Water Forum. Very preliminary evaluation suggests that any impacts on the rest of the state's water system caused by these proposals can be mitigated by dedication of a reasonably foreseeable portion of the 800,000 acre feet.

Implementation and Monitoring Plan

There also needs to be some way to ensure that all elements of the agreement are implemented and monitored to ensure that it accomplishes what is intended. As new information is developed, there needs to be some way of sharing that with the stakeholder organizations so that further improvements can be made. A proposed Implementation and Monitoring Plan will be a part of the draft and final agreements.

The proposals under consideration would not require new levels of government. Most, and perhaps all, of these could be accomplished through existing agencies or joint powers agreements.

Verification of Data

All preliminary conclusions need to be verified. For instance the impact of all elements of an agreement on the American River fishery need to be checked as extensively as possible. Similarly the ability of the solution to provide adequate amounts of water for consumptive needs in droughts must be thoroughly verified.

Water Forum and the Question of Auburn Dam

The Water Forum as a group does not take a position on Auburn Dam. Individual members of the Water Forum and stakeholders they represent have strong and divergent positions on Auburn, therefore as a group they would never be able to come to consensus on Auburn.

The Water Forum does not address flood control issues, which are being addressed by local, state and federal agencies as a part of a process that has been underway since 1986. However the proposals under consideration are fully consistent with continued operation of Folsom Dam for flood control.

Members of the Water Forum recognize that Auburn Dam is being thoroughly debated in other regional, state and federal venues. While the Auburn debate continues, there are pressing issues concerning regional water supply, quality and Lower American River fisheries which the Water Forum is committed to addressing now.

The Water Forum is focusing on important and prudent solutions acceptable to every major constituency. Most of these solutions are necessary with or without Auburn. With or without Auburn Dam, the region needs facilities to divert, treat and distribute water supplies. We also need measures to protect the Lower American River fishery.

The Water Forum is considering the costs for each proposed solution under discussion. Once the specifics of the Forum solution are identified, they will be compared to the facilities and measures which would be needed if Auburn Dam were built. All of this information will be provided to the public for review.

Environmental Impact Report Process

Adoption of the Water Forum Final Agreement by a public agency will be an action which is subject to the California Environmental Quality Act (CEQA). When an agency's action may have a significant adverse effect on the environment, CEQA requires the preparation of an environmental impact report (EIR).

The City of Sacramento and County of Sacramento, through the City-County Office of Metropolitan Water Planning, are preparing the EIR for the Water Forum agreement. The process began with the release of a Notice of Preparation (NOP) in August, 1995 and comments were received from Federal and State agencies, water agencies, other local agencies and special districts, business interests, and the public.

A Draft EIR will be prepared and circulated to the public for review and comment. After this public review, a Final EIR will be prepared which includes public comments, responses to significant environmental points raised, and changes to the EIR resulting from those responses. The City of Sacramento City Council and County of Sacramento Board of Supervisors will review the Final EIR and certify that it was completed in compliance with CEQA.

Stakeholders who are public agencies will be able to meet their CEQA obligations for approving the Water Forum Final Agreement by relying on the certified EIR. Stakeholders that are not public agencies will also be able to consider the EIR's analysis when they take final action on the Water Forum Agreement. The Final EIR will be available to the stakeholder agencies and other regulatory agencies to use as the foundation for subsequent environmental review of implementing actions and construction projects.

Sample Resolution

Water Forum

PROGRESS TOWARD A REGIONAL WATER AGREEMENT

Whereas, representatives of business and agricultural groups, environmental interests, citizen groups, local government, and water interests have reached the unanimous conclusion that unless we come together now on a plan we can all agree with, our region, which includes Sacramento, Placer and El Dorado countywide areas, will face a future with water shortages, environmental degradation, contamination, limits to economic prosperity, and stiff competition from other areas for our water; and

Stakeholder organizations are asked to provide the following by March 1, 1996:

- Your comments on the proposals under serious consideration which are described in this Progress Report.
- A resolution from your organization authorizing your representative to proceed with the negotiation.

Whereas, the mission of the Water Forum is, "Through community participation, formulate a plan for the region which will provide an adequate, safe, and reliable water supply in an environmentally sound and cost effective manner. The plan shall provide for the efficient management of available surface water, groundwater, reclaimed water resources, and water conservation to meet both the region's water needs through the year 2030 and protect our environment;" and

Whereas, in the spring of 1995, Water Forum representatives developed 65 Draft Principles to further guide the development of a water agreement for the region. These were subsequently reviewed and commented upon by the stakeholder organizations who then authorized their representatives to proceed with negotiation; and

Whereas, after intensive education and research, Water Forum representatives have identified a range of proposals that are under serious consideration to meet the region's water supply needs projected to the year 2030 and protect the fishery, wildlife, recreation, and aesthetic values of the Lower American River in a fiscally equitable and responsible manner; and

Whereas, any solution must ensure: reliability and certainty of water supplies; protection of the American River; meeting and or exceeding all state and federal water quality standards; efficient use of all water supplies by water conservation (demand management); conjunctive use of water supplies; fairness and equity of costs and rates; compatibility with regulatory agencies' requirements; acceptability by the general public and stakeholder organizations; and the fostering of continued regional cooperation; and

Whereas, there are several remaining challenges that must be resolved by the Water Forum before an agreement is drafted, including major ones such as: assuring reliable water supplies in dry years; implementing an improved pattern of fishery flow releases from Folsom Reservoir for the Lower American River; East Bay Municipal Utility District point of diversion; Feather River diversions; agreeing upon an acceptable method of implementing water conservation best management practices including water meters and conservation pricing; and assuring that all costs are necessary and will be apportioned equitably; and

Whereas, based upon stakeholder review of ^{and} comments on the *Report on Progress Toward a Regional Water Agreement*, the Water Forum representatives will develop a draft solution package for our review and refinement that will ultimately lead to a Final Agreement that will be presented to us as a total package for our approval; and

Whereas, we have been presented with a *Report on Progress Toward a Regional Water Agreement* including proposals under serious consideration related to providing a reliable and safe water supply and preserving the fishery, wildlife, recreation, and aesthetic values of the Lower American River; and

Whereas, we have reviewed and discussed this *Report on Progress Toward a Regional Water Agreement* including the proposals under serious consideration;

Now therefore it be resolved, that the attached comments (if any) on the proposals under serious consideration contained in the Progress Report are hereby transmitted to the Water Forum; and

Be it further resolved, that our Water Forum representatives are hereby authorized to proceed with the development of a Draft Water Forum Agreement.

Approved by _____ On _____
NAME DATE

X

Glossary

Sources of definitions indicated in italics

Acre foot

An acre is about the size of a football field. An acre foot is the amount of water that would cover one acre of land one foot deep. It equals 325,800 gallons. That is about how much water five people use a year for drinking, washing, and landscape watering.

Aquifer

A geologic formation that stores, transmits and yields significant quantities of water to wells and springs. *Water Education Foundation*

Bay-Delta Standards

Standards to balance and protect all beneficial uses of San Francisco Bay-Delta water - including fishery and other instream uses - and to modify existing water rights if necessary to achieve that balance. *Volume I of United States Bureau of Reclamation American River Water Resources Investigation (USBR ARWRI)*

Best Management Practices (Water Conservation)

A policy, program, practice, rule, regulation or ordinance of the use of devices, equipment or facilities which is an established and generally accepted practice that results in more efficient use or conservation of water, or a practice that has been proven to indicate that significant conservation benefits can be achieved. *MOU Regarding Water Conservation in California*

California Environmental Quality Act

An act conceived primarily as a means to require public agency decision makers to document and consider the environmental implications of their actions. *Guide to the California Environmental Quality Act: Remy & Thomas*

Central Valley Project Improvement Act (CVPIA)

This Act amends the Central Valley Project (CVP) reauthorization act of 1937 and reauthorized the CVP to add mitigation, protection, and restoration of fish and wildlife as project purposes equal to agricultural and domestic uses, and to make fish and wildlife enhancement a project purpose equal to power. *USBR ARWRI*

Change of Service

Point of time at which a water service account is transferred.

Conjunctive Use

The planned joint use of surface and groundwater to improve overall water supply reliability. *Water Education Foundation*

Conservation Pricing

Pricing which provides an incentive to reduce average or peak use, or both. *MOU Regarding Water Conservation in California*

Contractual Entitlement

A water entitlement based on a contract, such as a contract with the United States Bureau of Reclamation for Central Valley Project water.

Cost Effective

A case where the benefits of a project are greater than the overall cost.

CVPIA Programmatic Environmental Impact Statement

The program level document prepared by the United States Bureau of Reclamation on the Central Valley Project Improvement Act to comply with the requirements of the National Environmental Policy Act.

Deal Breaker

A person who causes a bargain or agreement to fail.

Draft Water Forum Agreement

The draft of the specific details of the Water Forum agreement, including a Draft Implementation and Monitoring Plan. The Draft Agreement will be available for stakeholder and public review and feedback in spring of 1996.

Equity

The state, ideal, or quality of being just, impartial, and fair.

Final Water Forum Agreement

The formal agreement among the Water Forum representatives that will be presented to stakeholder organizations in late summer 1996 for ratification without revision. The Final Agreement will include a final Implementation and Monitoring Plan. The Final Agreement will include many interrelated pieces that could not be separated without destroying the overall solution.

Fishery Flow (Pattern)

Pattern of river flows needed for spawning, incubation and rearing of young fish as well as migration of juvenile and adult fish. *Water Education Foundation*

Inter-basin Transfer

Water transfers from entities outside of a watershed to entities within a watershed.

Interior Audit Program

A program which identifies the top water users and offers a water use audit service that will identify where water can be saved and provides incentives sufficient to achieve customer implementation. *MOU Regarding Water Conservation in California*

Landscape Efficiencies

What is achieved through skillful planting and irrigation design, appropriate use of plant materials, and intelligent management to assure landscape development that avoids excessive demands and is less vulnerable to periods of severe drought. *Water Conservation Ordinance for Landscape Water Conservation*

Memorandum of Understanding (MOU)

A means of gaining formal consensus between two or more parties on a particular complex issue.

Meter Retrofit Programs

Programs targeted toward unmetered homes and businesses which either install a new meter or repair an existing meter to provide for billing based on volume of use. *MOU Regarding Water Conservation in California*

Point of Diversion

The place along the stream channel where a diverter takes control of the water. *How to File an Application to Appropriate Water, State Water Resources Control Board*

Public Trust

The legal doctrine that protects the rights of the public to use water courses for commerce, navigation, fisheries, recreation, open space, preservation of ecological units in their natural state, and similar uses for which those lands are uniquely suited. It is based on the California State Constitution and goes back to English Common Law. The California Supreme Court stated, "The state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible." *National Audubon (33Cal.3d 419 1983)*

Reasonable-Feasible

Practicable and in accord with reason.

Reclaimed Water

Municipal, industrial or agricultural wastewater treated and managed to produce water of quality suitable for additional uses.

Riparian Vegetation

Of, adjacent to, or living on, the bank of a river or, sometimes, of a lake, pond, etc. *Webster's New World Dictionary*

State Water Project

California's state - owned and operated water project consisting of 22 dams and reservoirs which delivers water 600 miles from the Sacramento Valley to Los Angeles. *Water Education Foundation*

Sustainable Yield

The amount of water that can be withdrawn from a groundwater basin without producing an undesirable result. *Water Education Foundation*

Subsidence

Sinking of the land surface due to a number of factors, of which groundwater extraction is one. *Water Education Foundation*

Total Farm Management

A comprehensive method of integrated management to improve total productivity of the farm.

Ultra-low Flush (ULF) Toilet

A 1.6 gallon toilet. *MOU Regarding Water Conservation in California*

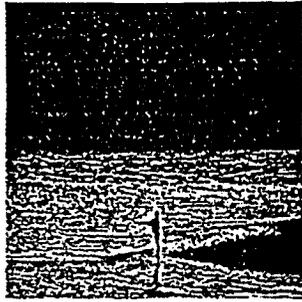
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Where do these photos go?



pg. 34



These are the same photo cropped 2 different ways - which do you prefer?

100



pg. 307



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