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### Organizing from the Ground Up: Watershed Initiatives: The Recent Truckee River Experience

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#### Citation Information

Pelcyger, Robert S., "Organizing from the Ground Up: Watershed Initiatives: The Recent Truckee River Experience" (1993). *Water Organizations in a Changing West (Summer Conference, June 14-16)*. <https://scholar.law.colorado.edu/water-organizations-in-changing-west/32>

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Robert S. Pelcyger, *Organizing from the Ground Up: Watershed Initiatives: The Recent Truckee River Experience*, in *WATER ORGANIZATIONS IN A CHANGING WEST* (Natural Res. Law Ctr., Univ. of Colo. Sch. of Law 1993).

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**ORGANIZING FROM THE GROUND UP:  
WATERSHED INITIATIVES  
THE RECENT TRUCKEE RIVER EXPERIENCE**

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**Conference on  
WATER ORGANIZATIONS IN A CHANGING WEST  
Natural Resources Law Center  
University of Colorado School of Law  
June 14-16, 1993**

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## **I. Background**

Historically, water related planning and projects in Reno/Sparks, a metropolitan area of northwestern Nevada, also known as the Truckee Meadows, were undertaken by several different entities in a fragmented way. A private utility decided how water would be provided within its service area. The Cities of Reno and Sparks owned and operated the major sewage treatment plant. In the 1980s, Washoe County began to develop and implement its own water supply and sewage treatment plans with little or no consultation or coordination with the utility or the Cities. Projects were undertaken on an individual basis without any integrated planning. No one local entity had overall responsibility for achieving compliance with Truckee River water quality standards which were frequently violated to the detriment of the Pyramid Lake Paiute Tribe and the endangered and threatened fish of Pyramid Lake.

In 1989, the Cities of Reno and Sparks and Washoe County were directed by the Nevada Legislature to develop a regional plan. The three entities were not able to agree on the water component of that plan. They resorted to an arbitrator who found that responsibility for the water resources planning and development should be vested at the County level and that the first order of business should be the initiation of a comprehensive water supply and water quality study. The primary goal of the Study was to develop plans to meet the region's water supply and sewage treatment needs for the next 20 years in a manner that brought the Truckee River into compliance with the applicable water quality standards.

The Pyramid Lake Paiute Tribe has a vital interest in all issues that affect the Truckee River, particularly in improving the quality of water in the lower Truckee River and in Pyramid Lake. The Tribe actively participated in the Study as a member of the Technical Advisory Committees (TACs) established to review the progress of the study and to provide technical advice and recommendations.

## **II. The Study**

The Study was projected to take about 15 months and cost about \$1 million. It will probably wind up taking about 27 months and costing closer to \$2 million.

During the course of the Study, a split developed between the County Commissioners (which also serves as the Regional Water Board) and the consultants hired to prepare the Study on the one hand and the TACS on the other. The County and its consultants favored capital intensive, structural solutions, such as a groundwater importation project and extensive reuse of treated sewage effluent, whereas the TACs recommended non-structural alternatives such as making better use of existing storage facilities, conservation, water augmentation through acquisition of agricultural water rights, and reduction in non-point source loadings through retirement of agricultural lands. The divergent approaches and the

dialogue between the respective advocates are captured in the May 7, 1993 Report of the TACs. A copy of that Report is attached.

There are both substantive and procedural lessons to be gleaned from the recent Truckee River regional water planning effort. Substantively, for the first time all water related issues, including water supply, sewage treatment, drainage, flood control and water quality were analyzed comprehensively and holistically, as opposed to individually on a project-by-project basis. Two major benefits of this approach were considering the relative merits of each individual project and setting priorities about the best way to spend the community's limited financial resources. When responsibility and decision-making were fragmented, no one considered alternatives which were outside their geographical are or authority or how much the community could afford to spend or what the priorities should be.

The environmental as well as the economic benefits of conservation played a major role in the deliberations. The focus on improving water quality allowed each option or group of options to be evaluated on the basis of its relative contribution to achieving compliance with the applicable water quality criteria.

Procedurally, the formation of the TACs and the active involvement of the Tribe influenced both the progress and the outcome of the Study. The TACs, which included representatives of environmental groups and of the three local governments as well as developers, engineers and planners, were able to achieve a remarkable degree of consensus. The Tribe's participation brought an awareness of the downstream impacts of the various alternatives and hopefully will result in settlement of an existing lawsuit as well as avoidance of future conflicts.

Technical Advisory Committees  
of the Regional Water Board  
and the Regional Water Study

RECEIVED

MAY 17 1993

FREDERICKS, PELCYGER,  
HESTER & WHITE

APPROVED MAY 7, 1993

RECOMMENDATION

Background

Over the last several months, the Technical Advisory Committee to the Regional Water Board and the Technical Advisory Committee for the Regional Water Study have met jointly at least once a week to review the progress of the Regional Water Supply and Quality Study (RWSQS) and to provide technical input to that study. The TACs also reviewed in detail and commented upon all of the technical memoranda developed as a part of Phase II of the study. The membership of these committees (TACs) represents a variety of diverse expertise and interests with respect to water supply and water quality, yet they approached the assigned tasks with a commonality of interest remarkable even to the membership.

Principles of Water/Wastewater Management

The members of the TACs agreed informally from the beginning on several broad principles that should guide the study:

- (1) The best solutions would be those which endeavored to meet both the needs of the community and the needs of the Pyramid Lake Paiute Tribe. This is necessary not only to settle the pending lawsuit related to the expansion of the Truckee Meadows Water Reclamation Facility to 40 mgd, but also to prevent future lawsuits and to improve the water quality/environment/fishery of the lower Truckee River.
- (2) Full support must be given for implementing all elements in the Negotiated Settlement and Public Law No. 101-618.
- (3) Water quality standards adopted for the Truckee River must be met.
- (4) Nonstructural solutions (including conservation) are more cost effective and potentially provide the greatest environmental benefit.
- (5) The solutions implemented should expend the least amount of money to achieve the greatest long-term benefits.
- (6) Increased management options, specifically increased storage capacity and increased ability to properly time the release of Truckee River water, should be pursued to expand the benefits provided by the Negotiated Settlement.

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## RWSQS Assumptions

It is important to note that the consultants who prepared the study used a very conservative approach with which the TACs did not always concur. Because of this approach, the study concentrates primarily on capital-intensive structural facilities rather than non-structural solutions. It should also be noted that a number of assumptions were used in the study without the full concurrence of the TACs.

Some of the assumptions which were questioned by the TACs are:

- (1) The agricultural water demand for 2012 was estimated to be 17,600 acre feet/yr based on water righted parcels over one acre remaining agricultural until 2012 as indicated on the County Area Plans. Changing the assumption that parcels greater than one acre in size will retain their water rights for agricultural irrigation rather than sell those rights as their value increases could significantly alter the community's water balance needs and the timing of future facilities.
- (2) In TAC #3 (N), an assumption is made that all conservation will occur outdoors and that indoor water use will remain the same. Use of this assumption means that there will be no dollar savings in wastewater facilities in TAC #3. Whereas, if one assumes that conservation will occur both inside and outside so that the ratio of sewage to water use is the same as in the Water Board case (46%), then there is less need to expand or construct the wastewater treatment facilities outlined in the study.
- (3) It was assumed that the only way to improve the diversity of the region's water supply is through an importation project or construction of a water treatment facility in the South Truckee Meadows (STM). It was also assumed that the STM creeks provide a reliable water supply without a dam or other storage facility.
- (4) The study relies heavily on wastewater reuse to meet water quality standards due to the assumption that the Truckee Meadows Water Reclamation Facility (the Reno/Sparks plant) has a limited ability to discharge larger volumes of effluent.
- (5) Groundwater utilization at levels lower than existing pumping rights in Spanish Springs Valley and the South Truckee Meadows are assumed in the study.
- (6) Except for Scenarios L & N, the study assumes that other resources will be used first to meet the water demand and the Negotiated Settlement will be used to make up the remaining demand.



### Key Findings

A number of significant findings were made during the study. Some of these are:

- (1) Reductions in outdoor watering are a benefit only to water supply, while reductions in indoor usage benefit both water supply and wastewater treatment capacity.
- (2) Use of the Truckee Meadows Project in Spanish Springs Valley requires the construction of a separate wastewater treatment facility because TMP water cannot be used in any area that discharges its treated wastewater to the Truckee River.
- (3) Purchases of water from the Truckee Division of the Newlands Project will significantly benefit cui ui.
- (4) Wastewater reuse reduces the availability of water rights for municipal use.
- (5) The reuse program will hurt downstream irrigators during droughts.
- (6) The preliminary costs of facilities for the Water Board case are extremely high when compared to the projected population increase for each area.

### Critical Omissions

Some important information was not included in the study. Examples are:

- (1) The study does not adequately analyze nonstructural alternatives which have the potential to significantly reduce the need for construction of facilities (hence costs).
- (2) The study does not contain an analysis of acquiring more reservoir storage on the Truckee River system.
- (3) No present worth analysis (timing/sequencing of facilities) was conducted. A present worth analysis would highlight the advantages of pay-as-you-go projects as opposed to large lump-sum projects.
- (4) The study does not provide the cost per acre-foot for water supply developed from various sources.
- (5) The study contains no least cost analysis of individual service areas and no economic cost/benefit analysis of any of the alternatives.
- (6) No satisfactory examination of revenue sufficiency or customer cost impact has been conducted.

- (7) The study contains only a cursory review of flood control. Flood control should be studied as an integral part of water supply.
- (8) The study does not compare actual basin demands to projected demands to indicate reasonableness of future projections.
- (9) Fernley was not included in the study because it is part of Lyon County. Fernley water and wastewater studies should be integrated with those for Wadsworth.
- (10) The capabilities of Westpac's existing infrastructure to transport water to the North Valleys, Spanish Springs Valley and the South Truckee Meadows were not considered in the study.
- (11) The study does not address the retirement of water rights and facilities in those areas where groundwater pumping may exceed the perennial yield.
- (12) The water resource utilization is done on an annual basis which does not reflect monthly conditions. This may result in an inaccurate analysis of storage and groundwater utilization.

#### Flood Control

The study includes a flood control element which was developed under a separate contract and reviewed by a separate technical advisory committee. The level of effort to develop the concept level flood control plan was not comparable to that expanded in the study. No alternatives to the proposed facilities set forth in the plan were developed and a different approach to calculating project costs was used. No attempt was made by the study team or the TACs to integrate the flood control element into the scenario process.

#### Scenario Approach

In the midst of the study, the Regional Water Board opted to change to a scenario process and adopted a number of policies to guide the development of the scenarios. The Board designed a scenario (known as the Water Board Case) which they believed outlined the most likely set of circumstances and then developed variations to that scenario (Scenarios A-H) to accommodate those circumstances which they thought might change. Upon recommendation of the TACs, the Water Board approved the addition of six additional scenarios (Scenarios I-N) to the study. The TACs did not concur that the Water Board Case represented the most likely set of circumstances; and, in fact, it results in more facilities than the TACs believe are necessary during the 20 year planning period.

## Water Supply Diversity

Policy No. 5 as adopted by the Regional Water Board requires the reduction of the region's dependency on Truckee River water by diversifying water supply sources. The Water Board case includes three mechanisms to provide diversity of supply. They are:

- (1) Use of creek waters tributary to the Truckee River.
- (2) Conjunctive use of existing groundwater resources.
- (3) Groundwater importation.

The TACs have interpreted the intent of this policy as a desire to achieve greater reliability of supply, a goal with which the TACs concur. Improved reliability is needed to withstand both droughts and supply interruptions caused by mud or contaminant events in the river. Various other means, which should be examined for cost and effectiveness, exist to enhance the reliability of the river. Among these are:

- (1) Local off-stream storage of river water.
- (2) Strengthened system interconnections among purveyors.
- (3) Increased pumping capacity of local groundwater for short-term use.
- (4) A pipe from Stampede Reservoir, via Dog Valley to the Highland Ditch, to bypass the river channel.

Improved drought reliability will result from completion of the Negotiated Settlement. It is important to note, however, that if each subarea within the region relies on a separate water source, regional reliability will not be attained. This can only be achieved by interconnecting sources and systems.

## Conservation

Although conservation is not analyzed as a part of the study, it clearly allows the Region to grow at the rate anticipated in the Regional Plan while avoiding the need for some costly water and wastewater facilities during this planning period. All of the scenarios in the study (with the exception of TAC #3) use 312 gpcd in the Central Truckee Meadows, 100 gpcd in Sun Valley and 250 gpcd in other areas outside of Westpac's service area for planning purposes. Current water usage in the Westpac system during the last few years of the drought has been 270 gpcd and current water usage outside of Westpac's service area ranges from less than 100 gpcd in Sun Valley to 494 gpcd in the Thomas Creek area. Thus reducing overall water demand to 250 gpcd is only a modest goal for the Region and one that is already established as a part of the Regional Plan (see Truckee Meadows Regional Plan, page 101).

A conservation program consisting of voluntary twice weekly watering (with a reduction in compliance by 1/3 to reflect the voluntary status), showerhead and toilet retrofits in 2/3 of the existing homes, and installation of water meters on existing residences costs approximately \$46,000,000 over a ten-year period and saves approximately \$250,000,000. This program would eliminate the need to construct the Spanish Springs Valley Wastewater Treatment Facility or to expand the South Truckee Meadows Wastewater Treatment Facility from 1.5 mgd to 6 mgd. In addition to eliminating the need for these facilities, the number of acres needed for land application of effluent (reuse) is correspondingly reduced. Over a ten-year period, this conservation program also saves approximately 19,220 AF/yr of water and reduces the amount of sewage by approximately 9,480 AF/yr.

New growth will continue to bring in sufficient water rights to meet its demand; water resources conserved by existing water users should be used for increased drought reserve and improvements to water quality, fishery and recreation.

### Water Quality

One element common to all of the scenarios is a reuse program. The amount of wastewater to be reclaimed is 24,500 acre feet in each scenario, except Scenario A (Low Growth) in which the amount is 21,400 acre feet. This requires a massive capital program to implement and requires approximately 6,700 acres (10.5 square miles) of land to irrigate. In addition, if the initial water source is surface water, then return flow requirements must be met - adding additional costs to the reuse program. The TACs have not been convinced at this point that enough land will be available to implement a program of this size for a long enough period of time to warrant the investment in the infrastructure.

While some reuse is necessary, beneficial and economically viable, the TACs are not convinced that an extensive reuse program is the most cost-effective way to meet water quality standards. Although the Brock computer model is too limited at this point to be able to simulate the benefits to water quality of a flow augmentation program, the TACs are confident that, when the model is refined and appropriate flow data collected, it will be apparent that the best approach will be to increase flows in the lower Truckee River below Derby Dam and have the State provide a credit for this as it relates to the nitrogen standard in the discharge permit for the Truckee Meadows Water Reclamation Facility.

In conjunction with the flow augmentation program, another important component needed to improve water quality is the non-point source pollution control program. This program would reduce the nutrient loadings and total dissolved solids which drain into the Truckee River from non-point sources, particularly agricultural lands. An important element of this program is the purchase of

water rights and the retirement of agricultural lands which are contributing pollution to the Truckee River. This program could be extremely beneficial to the community if negotiations were pursued to provide for the upstream storage of the water associated with these water rights. With storage, the water could be released at the appropriate times to:

- (1) Maintain minimum stream flows through the Truckee Meadows.
- (2) Increase flows below Derby Dam to meet water quality standards.
- (3) Provide a drought year water supply for the recreational facilities in the community which are irrigated with Truckee River water through the existing ditch system.
- (4) Provide increased drought protection beyond that provided in the Negotiated Settlement.

The TACs are therefore recommending that the Regional Water Board actively participate in the Truckee River Operating Agreement and other ongoing federal efforts to implement future water rights acquisition from the Truckee Carson Irrigation District (TCID), Truckee Division for environmental/water quality/water supply benefits and to acquire additional upstream storage.

If the Water Board is successful in this endeavor, it may be possible to expand the Truckee Meadows Water Reclamation Facility beyond that contemplated in the study and continue to meet water quality standards without:

- (1) Adding new treatment processes to the plant.
- (2) Expending large dollar amounts for an extensive reuse program.
- (3) Constructing a new wastewater treatment facility in Spanish Springs Valley.
- (4) Building a new water treatment facility in the South Truckee Meadows.
- (5) The need for a water importation project before 2012 if coupled with a water conservation program that reduces demand to 250 gpcd.

## Recommendations

The TACs recommend that:

- (1) The Regional Water Board aggressively pursue a conservation program and that the first three priorities for that program be (1) water meters; (2) toilet and shower head retrofits; and (3) continuation of twice a week (maximum) lawn watering on a voluntary basis. Based on American Waterworks Association data, additional conservation measures should be pursued following the implementation of these three priorities.
- (2) A priority of any reuse program be to serve parks, public lands, golf courses, cemeteries, and open spaces, when said reuse can be done in a cost effective manner that protects water quality.
- (3) Agricultural lands (such as UNR farms) and industrial developments be considered for the reuse program only when they are in close proximity to the source of the effluent to avoid building a large pipeline to serve lands whose use may be subject to change.
- (4) The Regional Water Board actively participate in the Truckee River Operating Agreement (TROA) and other ongoing federal efforts to implement future water rights acquisition from the TCID Truckee Division for environmental/water quality/water supply benefits and to acquire additional upstream storage.
- (5) Non-structural alternatives be thoroughly evaluated prior to commencing design or construction of any of the proposed facilities in the study.
- (6) The Regional Water Board adopt and implement the TACs strategy for the provision of water and wastewater services as indicated on page 10 of this document. This program is estimated to cost \$516,000,000 in capital costs (1993 dollars) over the next 20 years as compared to \$766,000,000 for the Water Board case.
- (7) Before any policy is adopted to the effect that the region should design its water supply system to meet a drought exceeding seven (7) years in duration, a thorough analysis of the probability and economic impact should be conducted.
- (8) The Regional Water Board develop policies directly relating to the flood control element and the communities' approach to floodplain management similar to those developed for water supply, water quality and wastewater treatment.
- (9) The flood control element be integrated into the water supply plan.

## Action Plan

The TACs recommend the following short-term action plan to the Regional Water Board:

- (1) Support and participate in measures that will result in reducing TCID demand to 254,000 AF annually.
- (2) Participate in securing provisions in TROA for upstream storage of water rights for environmental/water quality/water supply purposes.
- (3) Refine the Brock Model to accurately reflect water quality results of flow augmentation.
- (4) Begin conservation program implementation, including metering, as soon as possible.
- (5) Lobby with the Nevada Division of Environmental Protection (NDEP) for nutrient credits when flows are increased in the lower river and/or agricultural lands are retired.
- (6) Identify the most significant non-point loading sources and (a) acquire/retire the worst offending land uses and (b) develop and implement cost-effective non-structural projects to reduce nutrient loadings to the Truckee River.
- (7) Develop groundwater management/conjunctive use program region-wide.
- (8) Investigate local off-stream storage of river water or alternate delivery systems to improve the reliability of the Truckee River water source, such as use of Helms Pit discharge and conversion of the reservoir at the South Truckee Meadows Wastewater Treatment Facility to potable use.
- (9) Examine non-structural flood control alternatives, including land use management.
- (10) Expedite the construction of a raw water pipeline to deliver Truckee River water on a reliable, year-round basis to the Chalk Bluff Treatment Plant.
- (11) Identify water/wastewater needs for the area along the Truckee River from Vista to the Marble Bluff Dam, including the Fernley/Wadsworth area.
- (12) Expedite the extension of the Lawton interceptor to the stateline to eliminate septic tanks and upstream wastewater treatment facilities to improve water quality and protect the Truckee Meadows primary drinking water supply.
- (13) Develop and implement full scale unit process testing at the Truckee Meadows Water Reclamation Facility to evaluate nutrient removal capabilities during various seasonal conditions.

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**TACs STRATEGY FOR PROVISION OF  
WATER AND WASTEWATER SERVICES BY AREA\***

<u>Area</u> <u>Service</u>	North Valleys	Spanish Springs	Central TM (Incl. Verdi, Sun Valley)	South TM
Water Source and Quantity	5990 AF Truckee River + 900 AF of Local Groundwater	9410 AF Truckee River + 900 AF of Local Groundwater	66,500 AF Truckee River + 7100 AF Local Groundwater	10,000 AF Local Groundwater
Conservation	Maintain Current Usage Per Capita or 250 gpcd, whichever is less	Do not Exceed 250 gpcd- Enforce New Building Codes	Reduce to 250 gpcd by Meters, 2x/ Week Watering and Toilet/ Showerhead Retrofits	Do not Exceed 250 gpcd- Enforce New Building Codes
Wastewater	Local Treatment (3.5 mgd) & Reuse (3030 AF/yr)	Convey to TMWRF (4740 AF/yr) (5 mgd)	Treat 46 mgd at TMWRF Reuse 8350 AF/yr Locally on Golf Courses, Parks UNR Farms (CES Study) ----- Discharge 33,250 AF** to River	Treat 1.5 mgd Locally & Reuse on Golf Courses (1600 AF)  ----- Export 3000 AF/yr to TMWRF

\*TACs did not develop a separate strategy for CSV, Wadsworth and WV.

\*\*This level of discharge would be permitted as a result of increased flows in the lower river and reduced nutrient loadings from non-point sources.

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