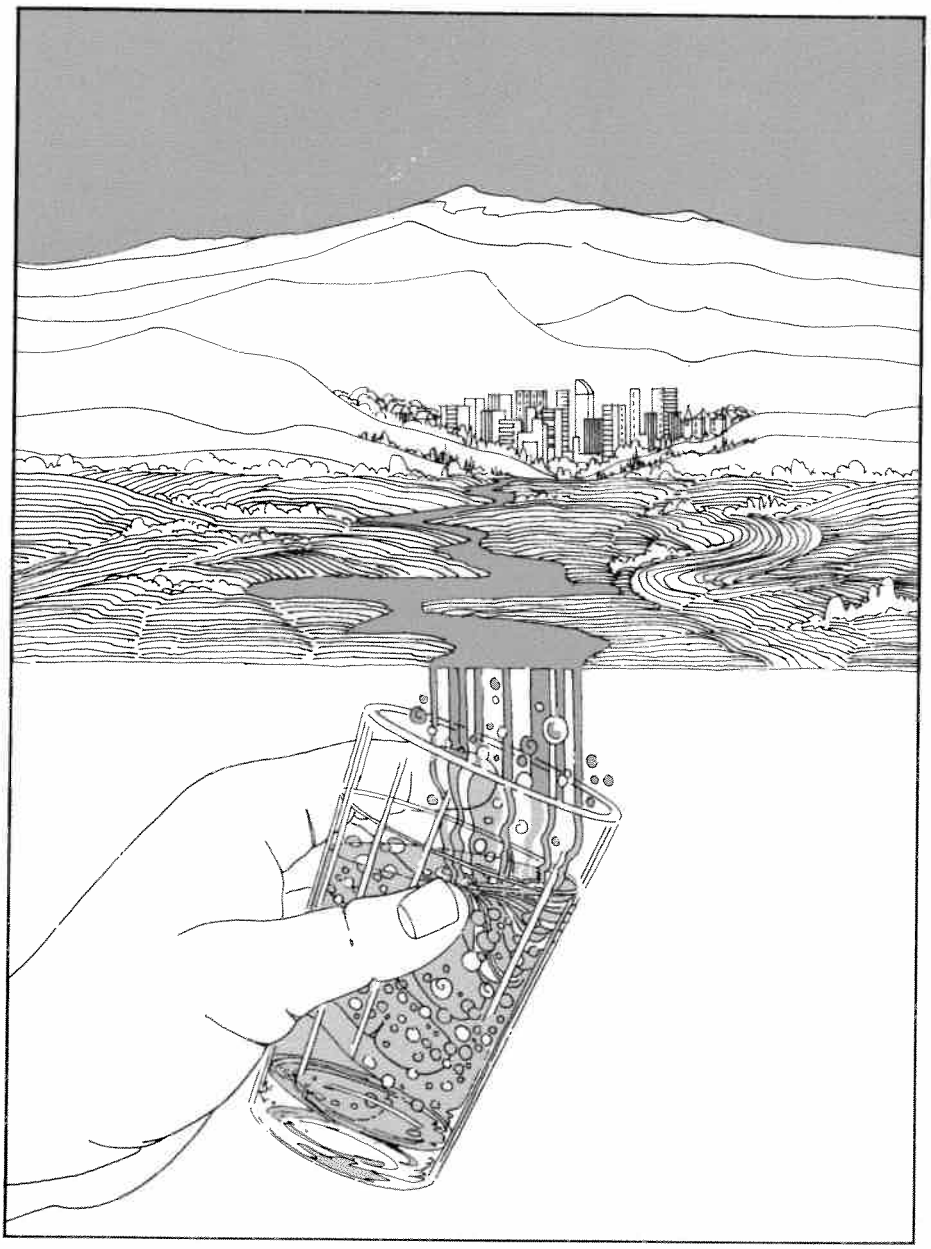
# Colorado Citizens Water Handbook



## Colorado Water: The Next 100 Years

A Colorado Endowment for Humanities Project.

Information Series No. 67
Colorado Water Resources Research Institute
November 1991

# COLORADO CITIZENS' WATER LAW HANDBOOK

Original Edition for
Colorado Endowment for the Humanities Project

**COLORADO WATER: THE NEXT 100 YEARS**

Sponsored by
Front Range Community College
Westminster, Colorado

by

George Vranesh, P.E., E.M., L.L.B.

Photographs by Barbara Preskorn

Edited by Kathleen Cain
FRCC College Relations Office

Cover by Bob Coonts, Graphic Design, Inc.
Fort Collins, CO

Order from:
Colorado State University
Bulletin Room
Aylesworth Hall
Fort Collins, CO 80523


Boulder, Colorado
Second Printing, 1991

Children playing in Medano Creek, Sand Dunes National Monument

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Pumping water into canal

# PREFACE

This handbook will help citizens learn about the intricacies of Colorado water law and define the role of water engineers. The author is George Vranesh, a natural resources attorney, mining engineer, and author of a three-volume text, *Colorado Water Law.*

This is an in-depth handbook designed to better prepare the public to participate in community and state decisions regarding water. Many citizens are already involved; the handbook can serve as a further reference. A general overview is available in the Colorado League of Women Voter's publication, ***Colorado Water.***

This handbook was specifically prepared for participants of the Colorado Endowment for the Humanities project Colorado Water: The Next 100 Years, a series of programs and discussions held during 1990 in the state's seven water divisions.

The public programs addressed past, current, and future use of water in Colorado as the use relates to cultural values, historical development, and current law. In discussion, participants will focus on the spirit of the laws of the future. Choices and options regarding future use of surface water and groundwater, implications of long-range weather patterns, and population growth projections will also be subject to discussion.

New environmental guidelines (e.g., the Clean Water Act) being administered by the federal government through the U.S. Environmental Protection Agency, are already influencing current Colorado water law. These new requirements, combined with projected increases in demands for water during the next century, indicate that legal changes regarding water are inevitable.

Colorado water law is unique and some other states have modeled their laws after Colorado's. It is important to note that water laws vary considerably throughout the southwest.

Public interest and involvement has never been so important to the lives of future generations. The programs are designed to reach a variety of citizens, including those just beginning to understand water policies and to be interested in the future of water in Colorado. As a result of participating in the programs, it is hoped that more Coloradans will become involved in local, regional, state, and interstate water decisions.

Barbara Preskorn
Westminster, Colorado
December 1989

# OVERVIEW

## Colorado Endowment for the Humanities

## PROGRAMS ON COLORADO WATER

Throughout Colorado history, the acquisition of water rights and construction of storage, distribution, and treatment plants for water dominated the thinking of public officials. Social values demand that water be made plentiful enough to keep a semi-arid land green, support numerous industries, and continue to be safe for consumption. Determining how water will be used in the future and how much will be allotted for specific uses is subject to evolving values.

Watering fields near Monte Vista

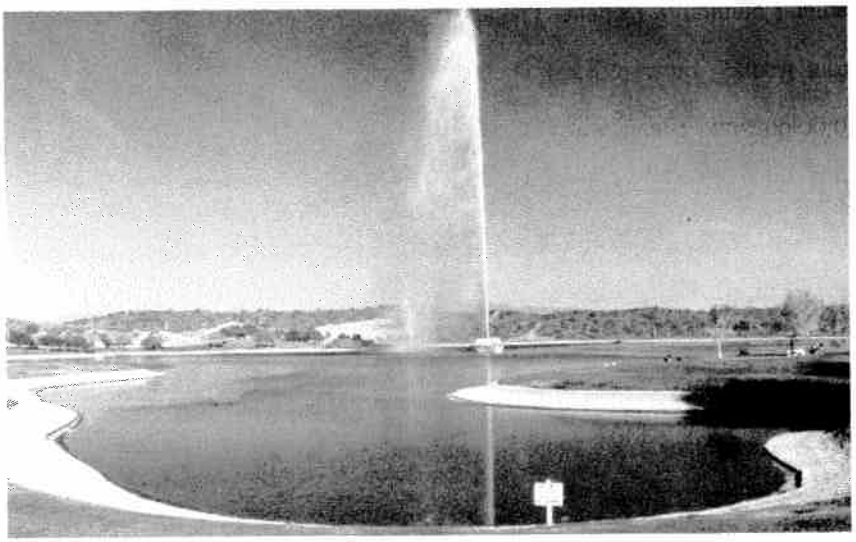
Approximately 85% of Colorado's water is used for agricultural purposes. Other demands for water include domestic, municipal, business, recreational, and industrial. In order to support increasingly diverse and urban populations throughout the state, it has been necessary to store great quantities of water for future use and to divert water across mountain ranges.

Current federal and state environmental and public health regulations compound the issues surrounding water management. Improving effective conservation measures, replenishing depleted aquifers*, maintaining minimum stream flows*, protecting recreational and environmental values, and controlling salinity and non-point source* contamination will be

*See Definition of Terms

included in future considerations. The water problems of the next 100 years could consist of increased social and legal conflicts, since water, for the most part, is appropriated. It is already over appropriated--on paper, at least. Mounting tensions over the most efficient use of water and the increasing demand for water can be lessened only by conscious effort. Coloradans need to consider the best use of all the state's water. Joining together to solve common water problems will be challenging but most worthwhile. Water systems used by past civilizations, as well as those used in Colorado, will be considered as models in the public discussions.

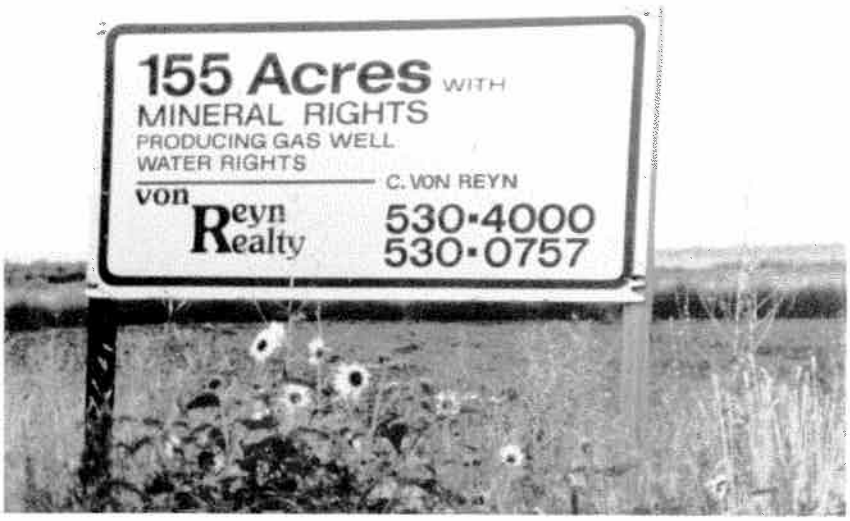
Values regarding water held by traditional societies in arid areas differ from current values. Traditional societies practiced conservation by restricting almost all uses to subsistence activities. Those who study the water use of traditional societies conclude that these societies have used and consumed, per person, only a fraction of the water consumed by our society.



fountain near Phoenix

Today's values about water use and management, differ
from those of indigenous people in the Southwest

Modern water systems in Colorado are more extensive and sophisticated than any used in the past. Present systems include moving water over or through mountains (transmountain diversions*) and creating electrical energy at hydro-plants. There has never been a time when so much water has been provided so consistently in times of drought. But during the current drought cycle, Coloradans face limits as to how to further divide appropriated water. Hence, new technologies and new interests, which can co-exist with water laws, are under consideration.




Water rights are now commonly sold

Water Law History

The "Colorado Water" presentations include colorful stories of how and why water law developed in Colorado. As the population increased and agricultural, municipal, and mining interests grew, the order in which water was used was systematized. The first one to claim to have used the water beneficially* was considered the most senior. In times of scarcity, those holding junior rights might not be able to use water at all. This lead to Colorado becoming the first state to adopt a strict appropriation* system for water usage. It is often referred to as the Colorado Doctrine and sometimes referred to as the First-in-Time, First-in-Right Doctrine, or the Prior Appropriation Doctrine. Water rights in Colorado are held separate from other property rights.

During the past century, the circumstances governing the creation of water laws have changed considerably. While long ago one could claim a water right, now little remains available through this means and now water rights (pp. 7-33) most often must be purchased, rather than simply claimed.

During the past century also, Colorado's water laws have made possible unprecedented engineering marvels. With the help of federal grants, water has been made available in regions of Colorado previously inhabited by a small number of indigenous people. Fifty years ago, water projects were designed for fifty years of use; planning for the next 100 years is now more complicated and challenging. Fifty years ago legal considerations were primarily technical: Today cultural, economic, social, and aesthetic values are being weighed along with the technical. Interstate compact*(p. 28) agreements and an international treaty with Mexico compound the scope of what must be considered in long-range planning.

Economic and Cultural Values of Water

Today only a small number of Coloradans routinely work directly with or manage water. And even among this small percentage, most water managers, users, attorneys, engineers, agriculturalists, and politicians possess only a partial understanding of water law and policy.

Current attitudes towards water are shaped by a knot of political, legal, business, industrial, economic, agricultural, recreational, spiritual, and environmental interests. Short-range gains, combined with a multitude of long-range considerations, make a challenging tangle for the ordinary citizen.

Yet knowing how to "run" water is essential to understanding Colorado's economic and social fiber. One Colorado division engineer says it is important that Colorado citizens know four things: "readin', ritin', 'rithmetic, and runnin' water." Future agricultural, industrial, business, recreational, domestic, and municipal interests and well being throughout the state will depend on having sufficient supplies of usable water.

Water is a both a commodity and an amenity in our society. Shares can be bought and sold in the market place. The competition for water rights has grown. An enormous economic market for water exists. Presently, some water developers and water users are having difficulty securing projected future requirements. Compounding this predicament are the social changes and human emotion which sometimes ensue when water rights are bought from agriculturalists and the water transported to other regions, usually urban centers. Water economics is as great an issue as are those of water availability and water quality. Trying to balance the economic value of water with life-sustaining and aesthetic values has forced many Coloradans into sharp disagreement with each other.

The fact that approximately one half of all attorneys in the U. S. who specialize in water law live and practice in Colorado reflects the extraordinary amount of legal activity here in relation to other states. Original interstate compact agreements did reduce conflict over

water among states. In most cases these agreements continue to minimize conflicts even though strains on regional and neighborly relations with other states have not subsided.

Programs Designed to Stimulate Public Involvement

The "Colorado Water" programs have not been designed to resolve existing conflicts. They provide a means for the public to gain awareness of overall water matters and to discover the different values held about water in other regions of the state. It is hoped that increased involvement will stimulate citizens to help define long-range goals for the public good and to work together to meet established goals. In addition to participating in a CEH meeting in their own water division, it is hoped that Coloradans will attend other ongoing meetings about water matters.*

As a result of the CEH "Colorado Water" programs, a speaker's bureau will be formed and made available through the Colorado Endowment for the Humanities.

* To mention a few:

• The Colorado Water Workshop sponsored by Western State College of Colorado in Gunnison every July enables water users, attorneys, and managers to share realities and concerns regarding water matters with each other and the public.

• The Colorado Water Congress, a non-profit water organization whose office is located in Denver, holds many workshops throughout the state and hosts an annual convention. The Congress publishes the ***Colorado Water Almanac and Directory,*** which includes categories of water organizations, current legislative water issues, potential water projects, and the function and activities of specific water agencies. This listing includes the forty-six Water Conservancy Districts and the three Water Conservation Districts which hold regional meetings.

• The Colorado Water Resources Research Institute at Colorado State University in Ft. Collins hosts an annual conference and publishes a newsletter which includes announcements of public forums and meetings regarding water.

• The Natural Resources Law Center at the University of Colorado in Boulder hosts several meetings annually and publishes relevant books and papers.

• The University of Denver College of Law hosts an annual conference on marketing and transfers of western water rights.

## SPONSORS AND ADVISORS

Colorado Water: The Next 100 Years -
Determining Cultural and Economic Values Using an Historical Perspective

Project Advisors

| | |
|---|---|
| Dr. William Buckles | University of Southern Colorado |
| Dr. Patricia Limerick | University of Colorado, Boulder |
| Mr. Charles Patterson | hydrologist and geologist |
| Dr. Marianne Stoller | Colorado College |
| Dr. Daniel Tyler | Colorado State University |
| Dr. Duane Vandenbusche | Western State College |
| Mr. George Vranesh | attorney and engineer |
| Dr. James Wescoat | University of Colorado, Boulder |

Project Director

| | |
|---|---|
| Ms. Barbara Preskorn | Front Range Community College |

Community Resource Individuals

| | |
|---|---|
| Dr. Jeris Danielson | State Engineer, Colorado Division of Water Resources |
| Mr. Richard MacRavey | Executive Director, Colorado Water Congress |
| Ms. Sally Ranney | President, American Wilderness Alliance |

Primary Sponsors

Colorado Endowment For The Humanities
1836 Blake Street Suite #200
Denver, CO 80202
(303) 292-4458

Front Range Community College
3645 W. 112th Ave.
Westminster, CO 80030
(303) 466-8811

Commentary on Concerns and Objectives of Advisors

August 26, 1989

The advisors are most concerned with attracting public interest and with promoting increased involvement in water matters through public programs. They will seek delegates from a cross-section of community groups, organizations, and professions to participate in a public program in their water division. Citizens who ordinarily shy away from meetings about water matters will be encouraged to attend.

The advisors believe that decisions about water are symptomatic of the future. If we degrade it, we degrade ourselves. If we respect it and take care of it, self respect is also nurtured. Public involvement in water quality and use issues is important to the wise use of Colorado's waters and in the utilization of the state's full allotment.

It is hoped that these meetings will stimulate citizen-based solutions to conflicts over water. Water means conflict in Colorado, and the advisors feel that resolutions to social and political conflicts can be enhanced through increased public awareness.

The programs will begin with a short lecture on how societies have organized themselves in relation to water, and how water has been valued and used in past civilizations. It will be shown how attitudes toward water use can lead either to wise cooperative agreements or to overuse and misuse of natural resources, the latter resulted in the disintegration of many societies.

Ordinary citizens will have a chance to reflect on the directions which might be taken for the public good, if the agreed objective is to create long-lasting water management systems. They will be given the opportunity to consider hypothetical situations in relation to their values. The participants will listen to short talks given by several professionals who will use past, present, and proposed newspaper headlines as a way to stimulate the discussion.

The headlines of the future will feature the worst case scenarios and best case scenarios, such as "Water Shortage Worsens: Thousands Migrate to Western Slope" and "Millions of Gallons Saved with New Sprinkler System." Who would have guessed in 1985 or even in 1988, that the Environmental Protection Agency would say no to the Two Forks Project? (Headlines, Aug. 30, 1989) Panel members will consider some ideas which might be surprising.

A statement resulting from the discussion will reflect the spirit of future water law. During the discussion, participants will consider changes that might occur in attitudes, economy, and lifestyles, if the projections under consideration were to come about. These statements will be published collectively and distributed to participants and other interested parties.

In addition to imparting information about the basics of current water law and the history of water development in Colorado, the advisors want participants to come away from the programs with a sense of how water can be managed amiably for the good of the whole during the twenty-first century.

The current problems and conflicts in Colorado do not appear to be technological, but rather cultural and territorial. The water court, the Colorado legislature, and federal policies currently provide a battleground. Attitudes regarding water invites territoriality and possessiveness. Now that the state's waters are appropriated, the ideal of plenty of clean water is being confronted at many levels.

A large infrastructure of water agencies and organizations in combination with complex state water laws and federal policies has created a situation whereby a small percentage of the population controls water. Most will agree that water is an inherent right, yet the power of decision remains in the hands of a few.

Few citizens understand how it all works. In the past they have been content to allow experts to oversee their interests, but water remains the property, and the responsibility, of all Colorado citizens. Some citizens are now taking a stronger interest in what happens to water.

Some community groups have succeeded in taking control of their interests in water matters. The well-being of others is seemingly outmaneuvered by corporations or other vested interests. There is a need for constructive programs and workshops.

Some of the issues which are and will be capturing the public's attention are:

1. realities of scarcity of water in a semi-arid region
2. enforcement of laws regarding wasting water
3. chemical contaminants in both surface and groundwater
4. conservation of water; the myths of conservation
5. building more reservoirs and diversions, dam safety
6. economic value of water as it is sold and traded as a commodity
7. counterproductiveness of penalizing farmers for efficiency
8. implications of continued population growth on water demands
9. advocacy for the "silent voices" of animals and plants
10. effects of inappropriate behavior upon environment based upon traditional beliefs of "invasion and conquest" and "rain will follow the plow"
11. the development of new technological devices; water-saving, snow-making, etc.
12. the development of new technological systems that allow for more effective water resources management

In the news, both those charged with overseeing current water management and storage projects and those charged with monitoring the potential ecological and environmental impact of the development projects, present emotionally intense and persuasive arguments. Many in the public sector probably aren't prepared to hear the debates, and therefore shy away from an public hearings.

Rather than simply have citizens listen to or participate in debate, the advisors feel that the citizenry should first discover viable choices and be better prepared to act upon them with a collective voice.

The advisors will encourage follow-up presentations and meetings. A speaker's bureau for water programs will be established through the Colorado Endowment for the Humanities. Formal debates might be scheduled, or divisional debate teams created. Each of these ideas would enhance statewide consideration for the problems to be resolved and would lead to greater appreciation of concerns in all regions.

Sponsors of Handbook

Sponsors are thanked for their generous support for the publication of the first edition. Their help has made the handbook possible. It has proved to be useful for both water professionals and the public.

Aims Community College, Greeley

Colorado Community College and Occupational Education System, Denver

Colorado Mountain College, Glenwood Springs

Colorado State University, Fort Collins

Front Range Community College, Westminster

Lamar Community College, Lamar

Metropolitan State College, Denver

Otero Community College, La Junta

Pueblo Community College, Pueblo

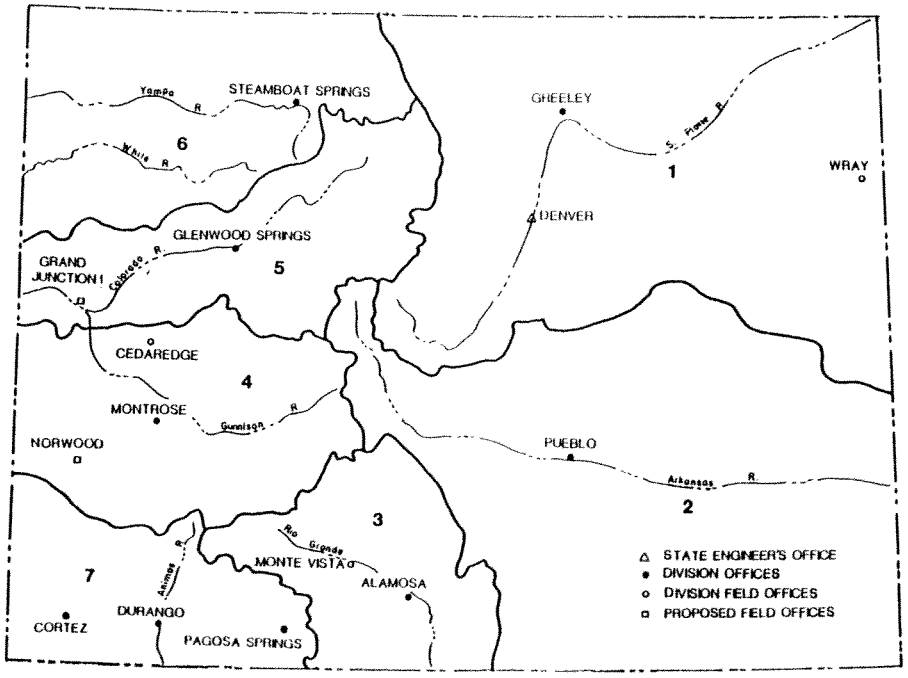
Red Rocks Community College, Golden

Western State College of Colorado, Gunnison

BRIEF DESCRIPTION AND SUMMARY -- 1990 PROJECT ACTIVITIES

Adopted from project director's final report to the Colorado Endowment for the Humanities.

| | | |
|---|---|---|
| Meetings were held in | Glenwood Springs | January 13 |
| | Alamosa | February 17 |
| | Pueblo | March 3 |
| | Greeley | March 17 |
| | Ft. Collins | September 8 |
| | Durango | October 6 |
| | Montrose | October 27 |
| | Steamboat Springs | November 10 |




Office of the State Engineer
Division and Field Offices

A project advisory board meeting was held in August 1989 to outline major project goals and objectives regarding the future of water in Colorado. Public meetings were held between January and November 1990 in each of the seven Colorado water divisions. Speakers used historical contexts to discuss cultural and economic values held by Coloradans, in relationship to future water development and management. Transcripts of these presentations will be available through the Colorado Water Resource Research Institute at Colorado State University, late summer 1991.

Program format

The program format was designed to acknowledge the involvements and connections which many Coloradans already have with water, as well as to interest and inform the not-so-involved segment of the public. Discussions focused on the immediate future, although there was a conscious effort to plan for the next century.

The participants enjoyed the informal approach of the scholars and the human interest stories regarding water the speakers shared. Many speakers developed imaginative ways of projecting far into the future. All were well prepared. Most often, individual water matters relevant to participants were discussed and served as examples to link the present to future water needs. Although the subject was serious, meetings were punctuated by humorous exchanges. There was overwhelming support for furthering the public understanding needed to move toward cooperative agreements through collaborative efforts whereby those holding diverse water interests could be provided more options before seeking legal resolutions to water disputes.

Concluding the speaker's remarks, a scholar, usually Dr. Daniel Tyler, historian from Colorado State University, reviewed historical contexts which provided specific points for the audiences to deliberate. Summarizing and synthesizing the speakers' sometimes divergent views, this scholar highlighted their comments as well as audience questions, concerns, and reactions.

Role of scholars and water professionals

Recognized scholars in history, law, anthropology, political science, economics, and geography -- all with varied backgrounds in water--served as speakers and discussion leaders providing background information and diverse perspectives regarding future water needs of citizens, businesses, municipalities, and regions. It was recognized that a wide range of themes would have to be presented by the speakers to adequately address the multiple perspectives, backgrounds, needs, and interests of the general public, including individuals well immersed in water matters. For

Dr. James Wescoat
Moderator, Pueblo

that reason, professional scientists and engineers were included as speakers.

Moderating participant discussion

The interaction between the speakers, the moderators (respected individuals selected for their ability to allow all viewpoints to be fairly represented), and the participants allowed for a cross section of opinions, needs, and issues particular to each region, as well as existing organizational alignments, to emerge. Consensus was guided by the moderator and achieved not through voting but through listening and interchange of ideas.

Questions and comments from the audience

Support and participant response

Attendance, local sponsorship, and reception of programs were rated good to excellent. Audience numbers ranged from 250 (Alamosa) to 65 (Steamboat Springs) and averaged more than 100 per session. Although some participants attended out of general interest, with little or no background in water matters, most had some personal, professional, civic, or educational involvement. Their needs ranged from seeking information and interaction to needing

clarification on water rights and protecting vested interests in water. In addition, many letters and telephone calls were received at Front Range Community College supporting and contributing to the project.

Water Education

Participant discussion repeatedly focused on the need for a better educated public. Many suggested more education about laws and regulations governing natural resources and water management in the public schools and through public forums. It was apparent that the basic language of water law and management is not universally understood. Citizens are asked by water professionals to form opinions regarding proposed water management practices and projects. Before they can form opinion they would benefit from understanding the basic articles of the prior appropriation doctrine contained in the Colorado Constitution. Yet the state engineer's office estimates that the majority lack awareness of its principal points.[1]

Participants felt that public understanding of water law and management would be essential to the development of a statewide water plan, a subject brought up at almost all meetings. State water management agencies and organizations in Colorado might develop a plan which would engender basic awareness and water resource education leading to more public trust.

Many of these agencies and organizations sponsor public programs. Advisors to the project indicate there is growing recognition that these efforts should be coordinated and that the schools, colleges, and universities should also be involved. Public forums were suggested in addition to short courses and seminars for specific groups (teachers, civic, legislative, neighborhoods, service groups) and the integration of the material into social science, social studies, and humanities curricula.

Great concern over implications of increasing population

Many participants expressed alarm over the implications of population growth. Several speakers and participants related the reduced availability of potable water to the necessity for cities and real estate developers to provide evidence of secured water for the coming century.

1. Historically, interactive responsibility was delegated to representatives who, in the process, developed specialized and complex language and systems of procedure which now are like a foreign language to those represented. The disparity between reality and public awareness and ability to communicate is acute.

Of questionnaires completed at the "Colorado Water: Liquid Gold" exhibit, 1990 state fair, 23% of the respondents felt they had enough knowledge to understand state water issues. Sixty-six percent responded that water resource education should be available. Sixty-two percent responded that television and newspapers are their sources of information about water matters. Additionally, few knew the percentages of water distribution to user groups. Most surveyed thought that cities used approximately 50% of this water, whereas 5% is correct. The fact that water is "used" as many as nine times before it is exhausted may contribute to this confusion.

Several participants projected escalating social and political pressures as a result of the predicted doubling of population in Colorado in the coming century.

Colorado's population doubled between 1960 and 1985 and grew by 10 percent during the past decade. Social, political, and legal pressures over water continue to increase. This led participants to concur that Coloradans need to do everything possible now to reduce or reverse these pressures as they relate to expanding populations and so minimize the burden of future generations.

Dr. Jeris Danielson,
State Engineer
Colorado Division of
Water Resources

Acknowledging the complexities of the issues

The scholars and project director witnessed both strained communications and a remarkable degree of cooperation in using and transferring water between, within, and throughout regions of the state. Complex social dynamics seen at the meetings confirm that the water "coin" is multifaceted. Because of the complexities, adequate representation of all perspectives at each meeting was not possible, but current issues were not side-stepped. Debate was possible because moderators were carefully selected for their ability to maintain orderly meetings.

Nearly 1,000 people attended all sessions, devoting one day to this process which provides evidence that people are willing to participate in a most challenging task. Many came to learn the language spoken by water officials. The audiences were tolerant of differences and appreciative of the opportunity to learn and exchange views. In several cases, groups with disparate opinions, intolerant of each other's views and activities in some previous community meetings, did listen and talk with each other. In others, participants focused on the immediate

rather than the long-range situation because of the impact that immediate changes in law or its interpretation will have on the region's economy and culture.

On the surface, rifts in consensus appear to be between the agriculturalists, developers, technocrats and the environmentalists, conservationists, preservationists. Yet at every meeting there was evidence that alignments are formed based upon a variety of circumstances; labeling does not always reflect the actual situation. Many water users, owners of water related businesses, developers, and recreationalists expressed an appreciation for a future environment with clean water which is also supportive of wilderness and wildlife. On the other hand, it was pointed out that some farmers do not like their water too clean because it then lacks minerals. The question arose, "How far do we take a PH balanced environment?"

Some participants maintained that more water storage projects will be needed in the future. Some argued that enough already exist and that current water project proposals could cause injury, potentially beyond repair. It was hoped by several participants that as "water language" and the greater issues become clear, divisionary labeling may lessen. One speaker at Greeley sparked debate when he argued, for the sake of discussion, that Colorado water laws be discarded altogether and new ones created which more adequately consider all factors involved in planning large scale water storage projects. Other speakers and participants suggest that the current laws with refinements will serve future needs, while others adamantly support current laws, with no changes.

Malcolm Murray, Denver Water Board member, in the wake of the Two Forks project, described how state and federal laws governing water work in concert.

What was accomplished in these meetings

Through presentations and discussions focused on history and cultural values regarding water development, this series of public meetings confirmed the economic complexity, social conflicts, and the array of local, state, and federal political and legal processes leading to and associated with current agreements over use, distribution, and management of Western water.

Judge Donald A. Carpenter served as Water Judge, South Platte River Basin, 1969-1979

The participants enjoyed the socialization and the sharing of history and thoughts regarding the future. Because, as one speaker said, "No one can prove me wrong" and because we were not engaged in an actual decision-making or political action process, there was tolerance for considerable opinion to be heard and expressed. Though hot debate sometimes pursued, that too was kept within acceptable limits.

Many individuals would like to see the traditional methods of how water is considered for the benefit of the whole reassessed because much has changed since the origin of many water laws. Water conservation and efficient use is much more emphasized today. For example, a rancher from Snowmass (and former Pitkin County commissioner), suggested that crops he currently grows at the higher elevation might be more efficiently grown at lower elevations. He did not wish to suffer economic injury, but he could see water savings by growing these crops elsewhere.

Likewise, as urbanites move toward xeriscaped yards and water saving devices for homes and businesses, cooperative patterns are emerging. Many expressed hope that this willingness to change water use habits would significantly reduce derogatory terms being used

to describe relationships such as "water grabbing," "water hording," and "sponges." "Denver bashing" is a common occurrence. It was observed that most groups and regions expect that the "other guy" is going to have to do the changing in order for balance to be obtained.

There were suggestions that, collectively, more efficient methods of watering and irrigating, more drought resistant crops, reduced domestic water consumption, and human dietary needs that would reduce the per capita consumption of water would indicate that cooperative agreements are working. On the other hand, it was pointed out by one speaker that the state can go too far in water conservation measures. If use is restricted too much, then downstream users are denied their right to water.

There was general agreement that future engineering and technological achievements will be driven by newly developing values supported by many Coloradans and reflected in federal laws and regulations. While public values, interests, and opinions are shifting, and the building of additional large scale water projects affecting regional economies and geography are being debated, more educational opportunities leading to public consensus would provide political leaders with direction in how to promote Colorado.

Professor of political science, Dr. Henry Caulfield, discussed decline of federal involvement in water development projects.

The reality of the water situation throughout the southwest needs to be expressed in terms that are understood by the general public so, for example, those who come to live here from regions where water is more plentiful are not shocked by reality. If the perception of the West as a vast "blooming desert" with springs of unending supply is to be changed, it was stressed that clear and simple language is necessary and correct information needs to be readily accessible.

Rather than resolving public issues over water, the programs were designed to clarify the questions and to identify quests the public wished pursued. The most prominent public issues discussed were:

** Resolving social issues associated with water transfers, storage, mining, recreation, water quality, hydro-electric power, and water for the general environment, wildlife, and wilderness.

** Making water education accessible to all citizens to match increased interests and need to know about water matters.

** How to maintain adequate and affordable water supplies to agriculturalists.

** How to obtain public support for water conservation and efficiency measures in both rural and urban settings.

** Managing water in metropolitan areas today that assure water availability for future development.

** The relationship of population centers and increasing population to water availability. Should people be encouraged to move where the water is, or should more water be brought to where people reside?

** How to provide water for new interests without threatening old water interests. Can Coloradans agree to consume considerably less water per capita than customarily allotted without decreasing standards of living (as research at the Rocky Mountain Institute indicate are possible) or resulting in negative social or cultural effects? When there are major shifts in way of life created by individual or corporate water transfers, how much weight/voice should those affected have in the transactions?

** How to interest the public in committing resources to the development of a comprehensive state water plan by utilizing the existing network of water agencies and organizations.

** The need for language and methods of communication which promote consensus-building, rather than perpetuating polarizations, as well as providing arenas where all voices can be respected.

The success of this endeavor can be attributed to humanities scholars working together with water professionals. While engineers and attorneys are usually associated with the political and legal decision-making processes regarding water, it is now recognized that Colorado's future social well-being depends on more extensive community, regional, and statewide public communications in the arbitration of delicate human relationships extending beyond the jurisdiction of the courtroom and the state capitol.

For example, The Colorado Council of Churches recently issued a statement regarding the human condition in the San Luis Valley as a result of litigation over water. While having a day in court or having representation on boards and in the legislature has maintained balance in the past, there was plenty of evidence that the expertise of humanities scholars and the citizenry in general is both needed and wanted.

Historian, Dr. Daniel Tyler, discussed the importance of cooperative agreements in development of state's water system.

Relationship between increasing population, drought, sustenance needs of all living beings

At nearly every meeting the doubling of the population which is predicted both globally and within Colorado over the next 100 years was addressed. There is widespread recognition

that as the world population increases, the demand for potable water will increase even as water conservation methods are applied. Questions were raised by participants regarding the possibility of a compounding crisis over water, due to the predicted drought cycles. It is the perception of many participants that open lines of communication among citizens through a variety of educational and participatory means could ease tensions and contribute to maintaining cooperative agreements.

It was frequently pointed out that technological advances provided by water engineering projects and water conservation plans and devices used both in agriculture and for domestic purposes are credited with enabling record numbers to maintain productive livelihoods, and achieve sophisticated cultural levels.

Dr. Daniel Luecke, Environmental Defense Fund, defined a mature water market.

Economic value of water

Participants expressed beliefs that old technologies will be used with newly developed technologies to resolve the limited availability of potable water. Predictions were made that costs will soar to develop, acquire, clean, negotiate, and litigate water in order to provide it for all who want sustenance, recreation, aesthetic, agricultural, business, and industrial purposes.

It was predicted that this mature water market[2] will necessitate a reevaluation of inherent rights to water. If costs are kept affordable then subsidies will have to increase, which is contrary to the economic theory of supply and demand. On the other hand, if usable water can be developed and obtained only through economic supply and demand and must pay for itself, then its value as essential to sustaining life becomes important ethically and politically as well. Discussion included questions about the limits of how far water can be stretched through conservation methods without being accompanied by changes in social values in developing projects needing large quantities of water where evaporative losses are high, and not absolutely necessary to maintain either life or an economic base.

Examples of scholarly perspectives

Historian Daniel Tyler reviewed past technological accomplishments used to provide water where it was needed primarily to grow food for humans and animals. He described the severe effects of drought cycles on farmers in past decades and attributed the resulting conditions on storage facilities and supply systems inadequate to accommodate human need. He stressed the necessity for citizen involvement to plan and create adequate water management systems that benefit all Coloradans, in order to decrease the need for federal involvement in state water matters.

Anthropologist William Buckles advocated that technological fixes for human water needs be accompanied by consideration for the needs of the whole and to come to terms with the semi-aridness of the region. He illustrated many cultures which successfully adapted to arid regions with just a fraction of the water currently available in Colorado. He emphasized that the limits of the eco- and bio-systems have to be considered, along with human needs and desires. For example, he questioned the wisdom of using massive green lawns as points of attraction at such places as golf courses and college campuses in arid and semi-arid regions. He suggested that dry land golf courses and xeriscaped college campuses replace those which are high consumers of water by advocating higher economic costs associated with them. While most speakers focused on the biological and economic importance of water, Dr. Buckles included information regarding water's spiritual significance to several societies.

Geographer James Wescoat discussed the intricate relationships in Colorado between population centers and their locations, the social impact of industrial and metropolitan water users which are increasingly converting agricultural water rights to industrial and domestic uses, and the water recreation business interests. He compared these to weather patterns and natural

2. Defined by Dr. Daniel Luecke at the Greeley meeting as being reached when all available water is appropriated according to law, and the usual method of acquiring a water right is obtained through purchase agreement. Water is then classified as a commodity to be bought and sold on the open market. Colorado water law was established on the assumption that usable water was readily available and all that needed to be done was to apply it to a beneficial purpose and file with the water court to assure the availability of that amount.

cycles of water availability which are beyond human control. He encouraged more public involvement in resolving the social effects resulting from business and political decisions.

As one outcome of these meetings, anthropologist Marianne Stoller recommended that participants arrange to meet with others in different regions to discuss common interests and differences. As an example, she cited the potential benefit of people of the Gunnison-Montrose region meeting with residents of the San Luis Valley. She saw that as more representatives from the eastern slope meet with those from the western slope, and as more representatives from the northeastern division meet with those from southern and western divisions, opinions and appreciation would improve.

At the Alamosa meeting, Dr. Stoller provided participants with information regarding Spanish land grants relevant to current claims being made for aquifer water underlying the whole of the San Luis Valley. The Valley's majority believe their way of life will be seriously disrupted by this project, yet water law may provide means for this water transfer project to be realized. She also talked of how the Spanish, Indian, and white cultural groups worked together to develop the desert region through water cooperatives.

Legal case studies were cited by George Vranesh as illustrations of how Colorado water law developed first from mining interests, then agricultural interests, and more recently the interests of the environment. He frequently clarified the letter of the law during discussion when individuals had questions.[3]

Future changes in water laws in relation to increased need

While need to govern mining and agricultural water uses molded the development of Colorado's water laws, many speakers believe these laws will be modified to accommodate new and growing public interests. Although the majority of the public is unaware that agricultural,

3. For example, since 1969 the priority of water rights is established each year. Each adjudication year sets priorities of right for that year. For example, all water rights filed in 1970 are senior to any water rights filed in 1971. Within each year the earliest date controls. If a right is filed in December 1970 with a first use of 1890, it is senior to a January 1970 right with a 1970 date. But any and all water rights filed in 1971 are junior to rights filed in 1970 regardless of the date of first use. Therefore each adjudication year establishes priorities for that year only. The oldest right of a specific year is entitled to its full share before the more junior right is entitled to any water.

not urban users, consumes the larger percent of the state's water supply,[4] interest is in metropolitan, environmental, and recreational use. The general public is interested in securing water rights for metropolitan areas for at least the next 100 years, as well as preserving pristine wilderness, restoring polluted waters, and supporting water related business and recreation interests. Most remain unaware of the amount of water needed to support the population's food needs.

A paper distributed by the Rocky Mountain Institute, Snowmass entitled "Western Colorado Perspective on Better Water Management in Colorado" illustrates some of the water-saving technology and practices which may commonly be used in the future.

Illustrating this point, water attorney Marcia Hughes suggested at the Steamboat Springs meeting that consumption of water might be controlled by allotting each household a set number of gallons per year which would be recycled until depleted.[5]

Water Attorney Marcia Hughes
Denver

4. According to the state engineer's survey at the 1990 Colorado State Fair, the majority thought that the city of Denver used somewhere between thirty-five percent and fifty-five percent of the state's water, whereas Denver uses approximately three percent.

5. Water is recycled nine times before it is "consumed" through the diversion-return system currently in use. At the present time the above technology is not cost effective; however, in the future, similar technology may be necessary.

Other speakers addressed the needs of less populated communities in southern and western Colorado. People in these regions are currently going to water courts and to the legislature seeking changes which will protect what they feel is in the best interests of the state as a whole.[6] Legislators from the western slope and south central regions of Colorado are pursuing legislation that would more evenly disperse the power of the vote throughout the state. Much of the fear and bad feeling toward the Denver metropolitan area exists because the balance of power rests within a twenty-five mile radius of the state capitol.

State engineer, Dr. Jeris Danielson, clarified projections for increased water needs within each water division and how this water might be acquired. He stressed that water conservation, or savings over what is currently used, will account for some of this needed water and did not feel that we would have to give up green golf courses.

Legal costs vs. costs of discourse and debate

There is doubt among rural populations that legislation which would promote citizen approval of interbasin water transfers will be approved by legislators representing metropolitan areas. Many participants advocated the institution of communication methods where reasonable discourse and formal debate could be given a chance to resolve many aspects of the disputes in question and the people have a chance to get to know and appreciate others in differing circumstances.

It was brought up that long-range ecological, biological, geological, and social effects are currently projected into total costs of future water projects. Costs of legal proceedings are escalating with fewer assurances of final approval being granted at federal levels. Simultaneously, costs for restoring the environment and compensating for injury on older projects are adding up. It is recognized that Colorado citizens pay for these legal proceedings[7] through their taxes and memberships and some pay the price, as well, of emotional duress created as these legal actions proceed, some taking years to resolve. Many participants could see that, in addition to being better prepared to participate politically, that enormous public and private litigation costs are strong motivators to invest in mutually beneficial educational and public forum opportunities.

Some speakers predicted that several more water projects will be built sometime in the next century because increased human need would eventually outweigh social and environmental impact costs. Although those who champion the cause of Colorado's environment, wilderness, and wildlife are generally opposed to such actions, some projects may meet with general approval. For example, Dr. Ralph Clark of Gunnison proposed a large recycle-redistribution

6. The Basin of Origin bill would require the approval of the people in the region affected in order for water transfers to take place beyond the immediate river basin.

7. It should be noted that every transfer of water from one place to another--one type of use to another type--requires court action.

project for Colorado River water, appropriated for use within the state according to interstate compact agreement, but which instead has been enjoyed by downriver users without compensation to Colorado. This project would not effect regions not already under heavy use but could benefit river basins short of needed supplies.[8] Proposals such as this would be good to discuss statewide at the public level.

Repeatedly, concern was expressed over the real possibility of losing livelihoods and whole cultural existences in rural areas to cities and some recreational developments which can afford to pay many times over the agricultural value of water. Although there is a general recognition that some of the water used traditionally by agriculturalists is going to be needed to support metropolitan areas and cities, interest was expressed in preventing severe shock to rural communities and farm regions.

As the water market continues to mature and as more water is sold or dedicated for municipal, recreational, or environmental use, there is hope that greater water efficiency practiced by agriculturalists will balance this shift in water allocations. It was suggested that farm and ranch communities must maintain a stable source of quality water if Colorado is to maintain its agricultural base and picturesque reputation. It is the prediction and hope of Ken Spann, Gunnison valley rancher and lawyer, that Coloradans will appreciate the historical and aesthetic values of cattle-grazing country enough to consciously preserve much of the land and water needed for this purpose.

Many farmers and ranchers expressed concern over the possibility of water being dedicated to forests and wildlife through court action.[9] On the other hand, while cutting of trees and brush is practiced along many rivers to obtain more water for agriculture, several agriculturalists who attended these meetings defended in-stream flow protection for the environment and, at another meeting, opposed cutting of trees to make more surface water available for agricultural purposes.

Some wondered why individual owners of water rights could not leave their water in the stream; and why, under current law, it is necessary that this function be governed by the Colorado Water Conservation Board. They expressed an interest in laws being changed to allow individual dedication of water to streams.

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8. Of the 15,000,000 acre feet of water in the Colorado River (average annual), Colorado's share is 3,855,000 acre feet per year. Colorado currently consumes 1,800,000 acre feet per year and the remainder going to California. State Representative Scott McInnis (Glenwood Springs) suggested that California may develop desalination plants to solve their severe water shortages. This would be particularly relevant if Colorado were to retain this water within the state; however, according to current California dollars spent per acre foot, it would cost ten times as much to desalinate water.

9. Water for forests and wildlife take on the date of initiation of appropriation, none going back beyond the date when designated as a U.S. forest.

William McDonald, then director of the Conservation Board, explained at the Greeley meeting, it is a matter of applying water to beneficial use that gives individuals the water right which is lost with non-use. He explained that individuals never own the water, they only hold the right to use it. Leaving it in the stream does not constitute use, except if dedicated for that purpose.

William McDonald, Director,
Colorado Water Conservation Board

Related activities

This project provided impetus for several related activities. A slide presentation about the Rio Grande River was given by Water Division 3 Engineer, Steven Vandiver, in Del Norte. Following the Alamosa meeting invitations were extended to two scholars to make other presentations in the San Luis valley.

The project director arranged for historically relevant exhibits (photographic, newspaper articles, early promotional brochures for settling in Colorado's western region) at nearly all meetings. In Greeley, a concurrent exhibit was available at the local museum.

The Front Range College Relations Office created a 30-minute video entitled *Colorado Water: The Next 100 Years*, about the project. This Crossroads program was directed by Kathleen Cain and Freeman Crocker. The show was broadcast on several cable stations throughout summer and fall of 1990.

Participant follow-up

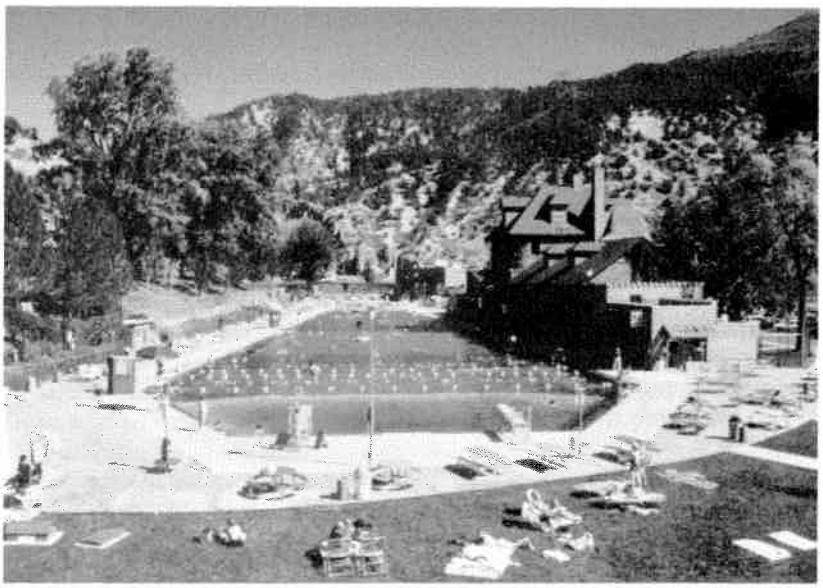
To maximize the benefits of these programs, summaries of speaker presentations and audience discussion at each meeting will be available. Statements from each division meeting reflecting participant desires regarding the spirit of future water laws will be available. They will note similarities and diverse opinion expressed at the meetings. Participants will be able

to compare their own circumstances and opinions with those in other regions and gain appreciation and better understanding of the water needs of others.

Long-range goals

The long-range goal of this project is to have contributed to reduced polarizations over water management issues, to have contributed to statewide communications and educational programs leading to general consensus on water use issues and delivery methods, and to have enlightened the general public regarding the cultural climate of Colorado. The advisors and project director believe that consensus-building developed in non-advocacy settings where regional and statewide interests and well-being are shared will lead to these objectives.

It is recognized that conscientious and diligent communication efforts will be required to maintain a system which is inclusive of all voices and where cooperation and collaboration reign. There exists potential of water resource education easing the need for water litigation. If more opportunity is provided for citizens to be involved, gain information and facts, take coursework, then negotiations over water matters may become easier or hopefully, will not continue to escalate in complexity. In one hundred years, if water education and less formal negotiation processes are successful, the state economy may be less invested in formal litigation practices.



Rejuvenation at hot springs pool next to
Colorado River, Glenwood Springs

## I. DEFINITION OF TERMS

As the following terms are used in the text, they will be followed by an *. A basic understanding of them before the text is read will make the reading easier.

Abandonment of Water Right The abandonment of a water right results from an intent to abandon, coupled with an act evidencing that intent. A conditional water right may be terminated by the water court for failure to pursue a completed appropriation with diligence. The non-use of a perfected water right for an extended period may itself be evidence of an intent to abandon.

Adjudication The judicial process through which the existence of a water right is confirmed by court decree.

Adverse Use Using decreed water owned by another appropriator. Adverse use for a continuous period of eighteen years may result in loss of ownership by the decreed owner and allow subsequent usage by the adverse user.

Appropriation The capture, impounding, or diversion of water from its natural course or channel and its application to some beneficial use, private or personal, by the appropriator to the entire exclusion of all other persons. In Colorado, the purported appropriator must have a legally vested interest or a reasonable expectation of procuring such interest in the lands or facilities to be served by such appropriation. The purported appropriator must also have a specific plan and intent to divert, store, or otherwise capture, possess, and control a specific quantity of water for specific beneficial uses.

Appropriation Doctrine The system of water law dominant in the western United States under which: (1) the right to water is acquired by diverting water and applying to a beneficial use; and (2) a right to water is superior to a right acquired later in time.

Appropriator The person or persons who have taken water for beneficial use. A junior appropriator is a person whose right to waters of a given stream is later in time compared with the rights of another user. A senior appropriator is a person whose right to waters of a given stream is prior in time compared with the rights of another appropriator.

Aquifer A saturated water-bearing formation or group of formations which yield water in sufficient quantity to be of consequence as a source of supply.

Basin Rank The relative seniority of a water right as determined by its date of adjudication and the date of appropriation. The Basin Rank of a water right determines its ability to divert in relation to other rights in periods of limited supply, subject to the rule of the futile call.

Beneficial Application or Use Amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the appropriation is lawfully made. Uses recognized as beneficial include domestic, agricultural, industrial, municipal, and recreational, as well as minimum stream flows filed by the state.

California Doctrine A legal doctrine retaining aspects of both riparian rights and the principles of prior appropriation.

Call The request by an appropriator for water which the person is entitled to under a decree. Such a call will force those users with junior decrees to cease or diminish their diversions and pass the requested amount of water to the downstream senior making the call.

Colorado Doctrine The doctrine regulating water usage by priority of appropriation as opposed to riparian rights. See Appropriation Doctrine.

Compact An agreement between states, apportioning the waters of a river basin to each of the signatory states, as approved by Congress.

Conditional Water Right An unperfected water right coupled with right to perfect it with reasonable diligence.

Decree An official document issued by the court that defines the priority, amount, use, and location of the water right.

Depletion Use of water in a manner which makes it no longer available to other users in the same system.

Designated Groundwater Groundwater which, in its natural course, would not be available to and required for the fulfillment of decreed surface rights, in areas not adjacent to a continuously flowing natural stream wherein groundwater withdrawals have constituted the principal water usage for at least fifteen years preceding the date of the first hearing on the proposed designation of the basin.

Designated Groundwater Basin An area established by the Groundwater Commission. Once a groundwater basin is designated, an appropriation thereof can only be made by application to the commission.

Developed Water Water that is produced or brought into a water system through the efforts of mankind; and would not have entered the water system on its own accord.

Diligence Action taken towards the perfection of a conditional water right. In Colorado, when a conditional right is granted by the court, the applicant must demonstrate in a quadrennial proceeding steps that have been taken toward perfecting that right. If diligence in perfecting an appropriation is not demonstrated, the right is lost.

Diversion Removing water from its natural course or location, or controlling water in its natural course or location by means of a ditch, canal, flume, reservoir, bypass, pipeline, conduit, well, pump, or other structure or device.

Division Engineer The person charged, by delegation, from the state engineer, Division of Water Resources, Colorado Department of Natural Resources, with the duty of administering water flows and diversions within a specific water basin.

Duty of Water The amount of water needed to meet reasonable irrigation needs. Sometimes defined as 1 CFS for each 40 acres of land irrigated.

Effluent Discharge Disposal of water previously used for municipal and household purposes: sewage discharge.

Futile Call Arises when the cessation of diversions by a junior appropriator would not result in a significant increase in water available to a downstream senior appropriator. In such cases the call need not be honored.

Irrigation District A legal entity created by statute in order to develop large irrigation projects.

Minimum Streamflow Requirement Water right decreed to the Colorado Water Conservation Board requiring that a set amount of water be maintained in a water course for the purpose of reasonably maintaining the environment. Also known as Instream Flow. The minimum streamflow right takes its place in the appropriation system in the manner of another junior water right, although diversion of the water is not required.

Plan for Augmentation A detailed program to increase the supply of water available for beneficial use by developing new or alternate means or points of diversion by: pooling water resources; water exchange projects; providing substitute supplies of water; the development of new sources of water; or other appropriate means.

Point Source Pollution from a specific location. Non-point source is from a general area.

Priority Seniority date of a water right or conditional water right to determine relative seniority to other water rights and conditional water rights which derive water from a common source. Priority is a function of both the appropriation date and the relevant adjudication date of the right.

Riparian Doctrine A legal concept in which owners of lands along the banks of a stream or body of water have the right to reasonable use of the waters and a correlative right protecting against unreasonable use by others that substantially diminishes the quantity or quality of water. The right is appurtenant to the land and does not depend on prior use. Riparian rights are not recognized in Colorado.

State Engineer The person charged by state law with the supervision and administration of water and the enforcement of decreed priority and legislative enactments. The state engineer discharges the obligations imposed on the state of Colorado by compact or judicial orders and coordinates the work of the division of water resources with other departments of state government. The state engineer has rule-making obligations and supervisory control over measurements, record keeping, and distribution of the public waters of the state and all employees under his direction, and any other such acts as may be reasonably necessary to enable the performance of his duties.

Tributary A tributary is generally regarded as a surface water drainage system which is interconnected with a river system. Under Colorado law, all surface and groundwater, the withdrawal of which would affect the rate or direction of flow of a surface stream within 100 years, is considered to be tributary to a natural stream.

Water Court A specific district court that has exclusive jurisdiction to hear and adjudicate water matters. There are seven water courts in Colorado, each presided over by a water judge who is also a district court judge. The seven water courts are located in:

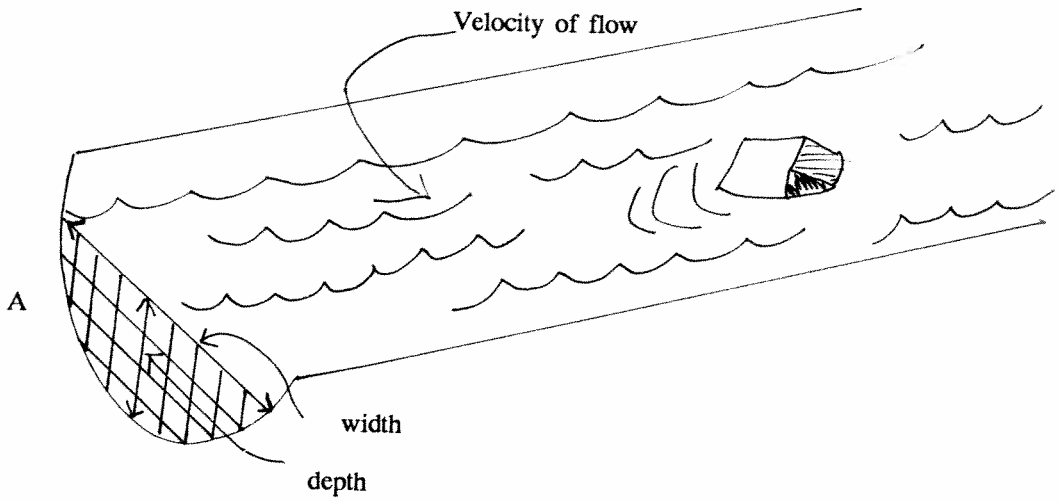
Division 1 - Greeley
Division 2 - Pueblo
Division 3 - Alamosa
Division 4 - Montrose
Division 5 - Glenwood Springs
Division 6 - Steamboat Springs
Division 7 - Durango

## II. CONVERSIONS AND WATER MEASUREMENTS

Water quantity is measured in two ways: rate of flow and stored volume.

Flowing Water

Water in rivers, streams, canals, pipes, culverts, etc., is measured in terms of volume per amount of time. The most commonly used value is cubic feet per second or CFS. This "flow" or discharge (Q) is commonly measured by calculating the cross-sectional area of the channel or pipe and multiplying that figure by the velocity of the flowing water.




The calculation is as follows:

Cross-sectional area (A)

average width (ft) x average depth (ft) = Area ($ft^2$) x Velocity (ft/sec) = $ft^3$/sec. = CFS (cubic feet/sec.)

Examples of how these flows are estimated:

- A trickling desert stream may be 0.5 CFS.
- A riverlet may be 1-3 CFS.
- A mountain brook can range anywhere from 1 to 20 CFS.
- A small stream can be difficult to stand in if Q (the flow rate) is greater than 10 CFS.
- A medium-sized rushing mountain stream could be from 60-80 CFS. It is possible but difficult to stand upright in this water. A larger river on a flatter gradient with a channel about 60-80 ft. wide could be 220 CFS and it would also be hard to stand in.

Some examples of flowing volumes of water:

- Water flowing at 1 CFS will deliver 448.8 gallons/minute (GPM). In one day this will deliver 648,000 gallons or 0.648 million gallons per day.
- A barrel is 42 gallons, therefore a flow of 1 CFS will deliver 15,387 barrels per day (BPD) or 641 barrels per hour (BPH).
- 1 cubic foot of fresh water weighs 62.4 lbs.
- The Mississippi has an average annual flow of 620,000 CFS. The Colorado River generally flows less than 100,000 CFS.

Water in Reservoirs

- Stored water and reservoir water is commonly measured in acre-feet.
- An acre is a square unit 208.21 ft x 208.21 ft = 43,560.0 $ft^2$.
- One foot deep equals 43560.00 $ft^3$ which is also 325,851 gallons and also 7,758 barrels.
- One inch per hour of runoff from one acre equals one CFS and a flow of one CFS for one day equals 1.98 acre feet. (AF/D).
- A football field is 45,000 square ft ($ft^2$), which is just over an acre.
- A small reservoir could hold a few thousand acre-feet.
- Large reservoirs such as Horsetooth, Blue Mesa, and Pueblo can each hold many thousands of acre-feet of water.
- On an individual basis, Coloradans using 150 gallons per day would use approximately one acre-foot every six years. The average urban family uses approximately one acre-foot per year.

Water Facts*

It takes:

4-7 gallons per minute for a shower (low-usage showerhead, 2.5-5 gal.)
22 gallons to grow one pound of potatoes
300 gallons to make one loaf of bread
770 gallons to refine one barrel of petroleum
1,157 gallons to make one bushel of wheat
4,000 gallons to provide one pound of beef
25,000 gallons to make a ton of steel
188,500 gallons to make a ton of paper
600,000 gallons to make a ton of synthetic rubber

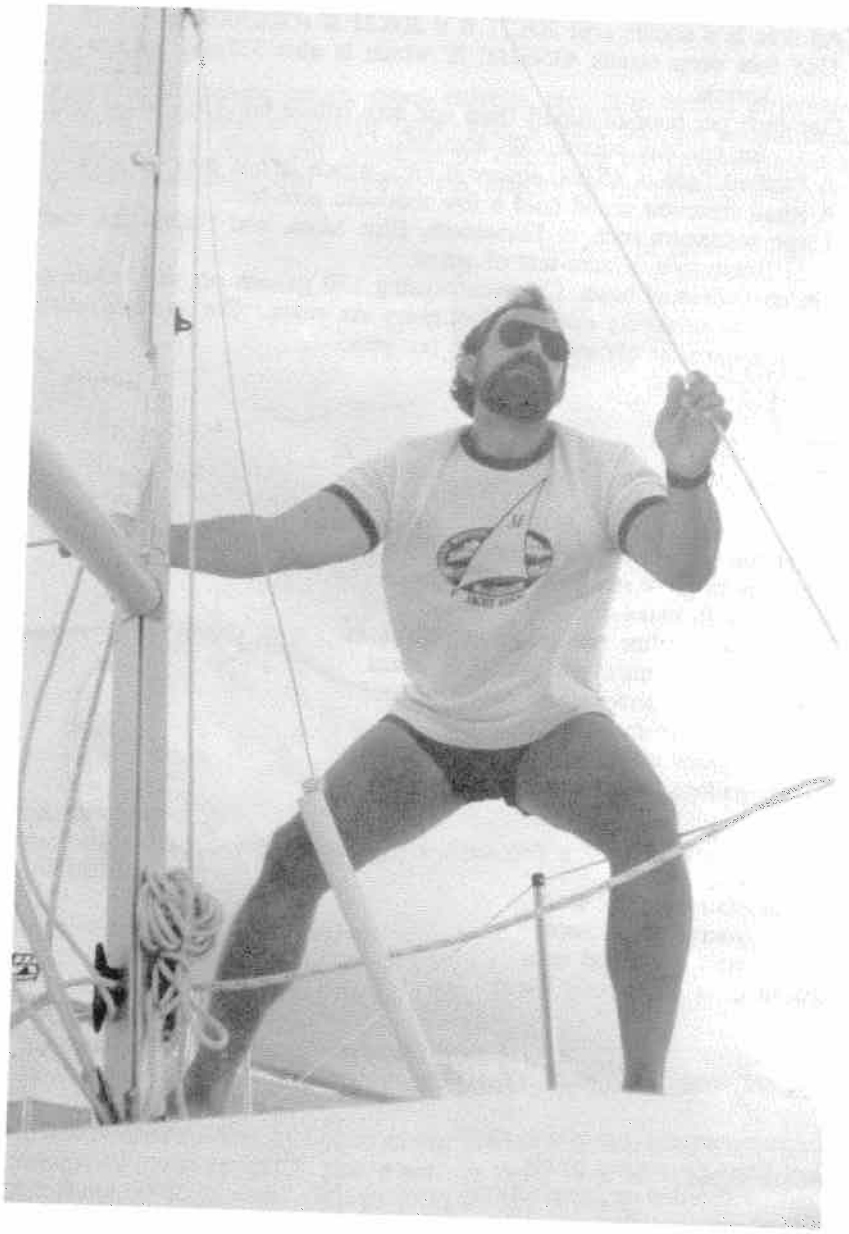
Water makes up:

92% of your blood plasma
80% of your muscle tissue
60% of your red blood cells
50% of most other body tissue

Gallons of water consumed per millon BTUs (heat units) produced:

| | |
|---|---|
| Nuclear powered generating plants . . . . | 78-202 |
| Coal fired generating plants . . . . . | 52-132 |
| Coal gasification or liquefaction . . . . . | 13-62 |
| Coal slurry pipeline . . . . . | 12 |
| Hydroelectric dams . . . . . | -0- |

*Material from the Northern Colorado Water Conservancy District, the Colorado River Water Conservation District, and the Colorado River Water Users Association.



Sailing on Colorado's reservoirs is a popular recreational activity

## III. LEGAL ENVIRONMENT

### A. COLORADO WATER LAW

Colorado is an appropriation doctrine* state. The riparian rights doctrine* was never followed in Colorado. The distinction between the doctrines is that an appropriator acquires rights in tributary water by taking the water and applying it to a beneficial use; presence of water on or running across land does not in and of itself create rights, as it would under the riparian doctrine.

Colorado was the first state to adopt a pure appropriation* system. This became known as the Colorado Doctrine*, as distinguished from the California Doctrine*, which attempted to recognize both riparian and appropriation rights.

The Colorado constitution declares that the unappropriated water of every natural stream is the property of the public, subject to appropriation, and that the right to divert unappropriated waters of any natural stream to beneficial uses shall never be denied. The constitution also provides that, between those using water for the same purpose, priority of appropriation shall determine the better right. These constitutional expressions of the appropriation doctrine have been supplemented by a legislative declaration that all waters of the state have always been and are the property of the public, dedicated to the use of the people, subject to appropriation and use in accordance with the law.

Coffin v. Left Hand Ditch Co. 6 Colo. 443 (1882)

We conclude, then that the common law doctrine giving the riparian owner a right to the flow of water in its natural channel upon and over his land . . . is inapplicable to Colorado . . . and we hold that, in the absence of express statutes to the contrary, the first appropriator of water from a natural stream for a beneficial purpose has, with the qualifications contained in the constitution, a prior right thereto, to the extent of such appropriation. (Note: For more information see page 117 in 3 volume text.)

Colorado administers surface streams and tributary* groundwater aquifers as a unified system, both being subject to the appropriation doctrine and to administration based upon the priorities of the stream system. Waters which are not tributary to surface streams are not subject to the constitutionally mandated system.

1. State Organizational Structure for Water Administration and Control: Engineering and Judicial

Responsibility for water administration and control in Colorado is divided between the state engineer*, the executive director of the Division of Water Resources of the Colorado Department of Natural Resources, and the judiciary. Specifically, a district court judge is designated a water judge in each of the seven water divisions of the state, as established by the 1969 act (pg. 13). The state engineer has exclusive jurisdiction to administer, distribute, and regulate the waters of the state. The water judges have exclusive jurisdiction to preside over water matters in the district courts, referred to as Water Court*, within their specific water divisions.

"Water matters" are those matters specified by statute to be heard by the water judges. They include determinations of amounts and priorities* on applications for water rights and determinations of rights with respect to proposed changes of rights, plans for augmentation*(pg. 21), and quadrennial (every four years) findings of diligence in the perfection of conditional* rights. Neither the water judges nor the state engineer grant or create water rights. Water rights are self-initiated and are confirmed by judicial decree*. It is the responsibility of the state engineer and division engineers to administer and distribute water in accordance with court adjudicated decrees.

Water matters, in addition to adjudication* of claims, include all matters involving beneficial application of water or priorities of appropriation, enforcement of orders of the state engineer or division engineers, and validity of rules and regulations of the state engineer. The water judge usually appoints water referees who handle day-to-day matters and rule on water rights. Any dispute of the referees ruling is retried de novo by the water judge, that is, without regard to testimony presented to the referee. The judge's decision may be appealed directly to the Colorado Supreme Court.

*See Definition of Terms, p. 1.

2. Administration of Water Rights

The state engineer is charged with administering and distributing the waters of the state. As chief of the Division of Water Resources, this individual is responsible to the executive director of the Department of Natural Resources. He has general supervisory control over measurement, record-keeping, and regulating the distribution of the public waters of the state. The state engineer appoints a division engineer* for each division. The actual administration and distribution of water is conducted through the division engineers' offices. Each division engineer has assistants and each division is further divided into district field offices, headed by water commissioners who are members of the division engineer's staff.

Parshall flume on University of Colorado campus

Wadsworth v. Kuiper 193 Colo. 95, 562 P2d 1114 (1977).

We hold that the State Engineer does have standing and that he could file a protest even though he has not filed a statement of opposition.

. . . Prior to the adoption of the Water Rights Determination and Administration Act of 1969, the State Engineer had no standing to appear as a part. . . The 1969 Act changed this. (Note: For more information see page 507 of 3 volume text.)

Administration, distribution, and regulation of the use of both surface and underground water is accomplished through the promulgation of rules and regulations, and through issuing orders to individual owners and users of water rights. Those holding junior rights wishing to divert* out of priority* from surface streams or groundwater aquifers must seek approval from the water court for a plan for augmentation*. Such a plan will require the junior diverter to come forward with reliable sources of replacement water to protect the senior rights from depletions to the stream.

Private water engineers[1] are retained to present the facts of each case. They must be prepared to testify as an expert witness in water matters. The water engineer must also assist an appropriator's* attorney in order to present a case favorable to the client.

3. Administration of Wells

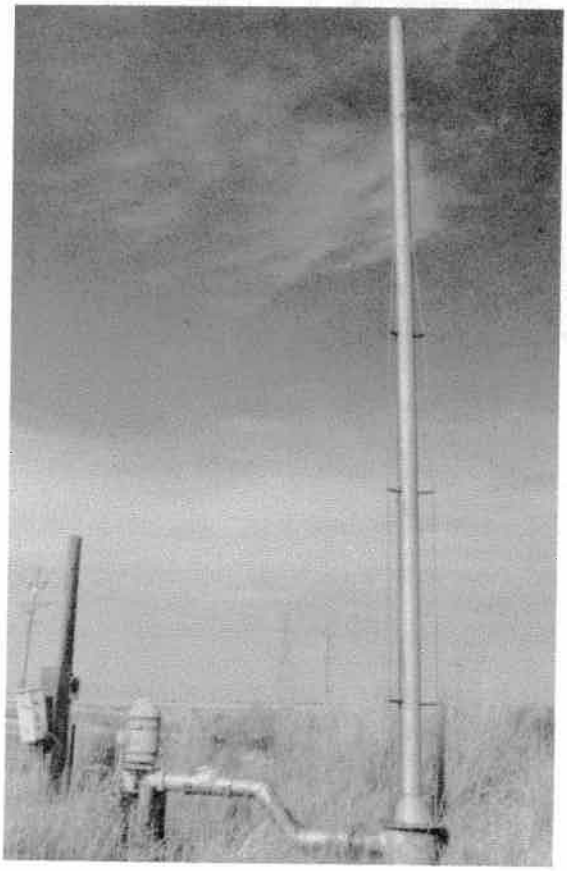
The state engineer is charged with the initial authority to grant or deny well permits. Such a permit is essential to construct a well for the appropriation of groundwater. Water withdrawn from a gravel pit is also treated as a well. Denials may be challenged in water court. Whatever the court determines prevails. Wells in designated basins are treated differently and are administered by the Colorado Groundwater Commission.

4. Resolution of Water Use Conflicts

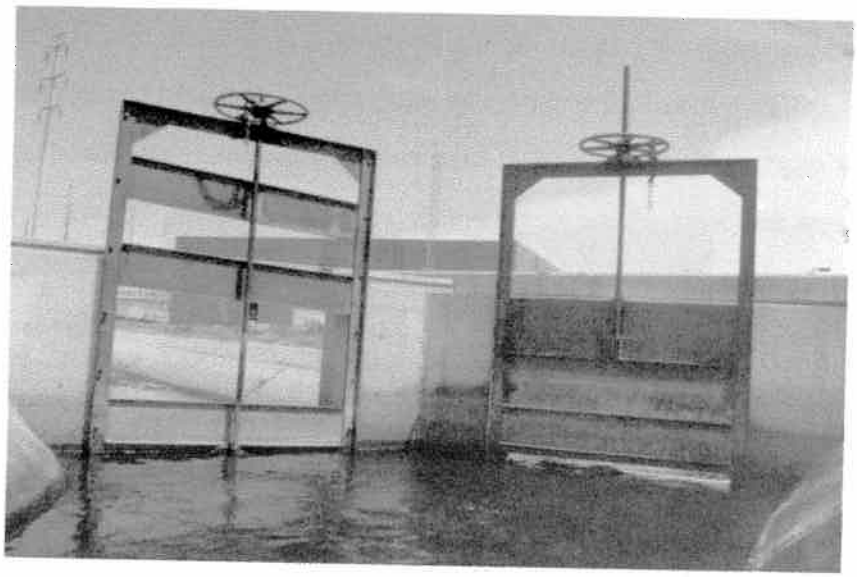
The basic rule set forth in the state constitution is that between competing users of water, priority of appropriation determines the better right. Consequently, in times of short supply, the uses of persons whose appropriations are junior are curtailed; water is available to those whose appropriations are senior in time and right.

The state officials charged with administration and distribution of water (the state engineer, the division engineers, and water commissioners) are governed by the priorities for water rights established by judicial decrees entered in court adjudication proceedings.

[1]A private engineer usually works the same way as an attorney to represent the client in court.



Water well, typical farm installation



Headgates

5. The 1969 Act

In the enactment of the 1969 Water Right Determination and Administration Act, the Colorado General Assembly changed the procedures for adjudicating water rights. A water clerk and a water judge were appointed for each of the seven water divisions. Water applications are now accepted on a continuous basis. Each calendar year is regarded as a separate adjudication, comparable to previous supplemental adjudications. Each right filed in one calendar year is senior to rights filed in subsequent years, regardless of the actual date of first usage.

Before 1969, separate adjudication proceedings were conducted for each of the state's former water districts. Supplemental adjudications were held whenever a water user desiring an adjudication of a new appropriation petitioned the appropriate district court. After a petition was filed, the proceedings were open to other users in the district to adjudicate or dispute claims for new rights that had arisen since the completion of the previous adjudication.

It is always important to determine whether a water right was obtained in original or in supplemental adjudications*, since water rights decreed in supplemental adjudications are junior to those decreed in previous adjudications, regardless of the date of first use.

Water referees are appointed by the water judges to make any necessary investigations and to issue rulings. Any person who wants a determination of a water right, conditional water right*, change of water right, plan of augmentation*, or quadrennial finding of reasonable diligence in perfecting a conditional water right, may file an application, at any time, with the water clerk of the appropriate division. Anyone who thinks he may be injured may file a statement of opposition. The application is first submitted to the referee who, after publication and investigation, may either rule on it or refer it back to the water judge.

When a referee's ruling is protested, or when the referee refers a matter back to the water judge, formal hearings are held, in accordance with the Colorado Rules of Civil Procedure. In the case of a protested ruling, the water judge is not bound by the referee's ruling, but is charged with the duty to confirm, modify, reverse, or remand the ruling. In matters referred to the water judge, a hearing is held which will result in either the issuance of a judgement and decree or a denial of the application. Appellate review of decisions of the water court is provided for in the Colorado Supreme Court.

The 1969 adjudication procedure applies to new appropriations of all waters of the state except for water in certain designated groundwater basins*. Stock watering, domestic, and certain other wells not exceeding a flow of fifteen gallons per minute may, but are not required to be adjudicated, although a well permit is required.

The Colorado constitution provides that whenever the waters of any natural system are not sufficient, those using the waters for domestic purposes shall have preference over those claiming for any other purpose; and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes. The courts have held that the preference is not self-executing, but must be exercised by condemnation and the payment of compensation by the preferred user-condemner to the condemnee whose right, though not preferred, is nevertheless senior in priority.

Industrial use is last in the list of preferred uses and therefore cannot condemn either municipal or irrigation uses, but may purchase senior domestic or irrigation rights.

6. Related Agencies

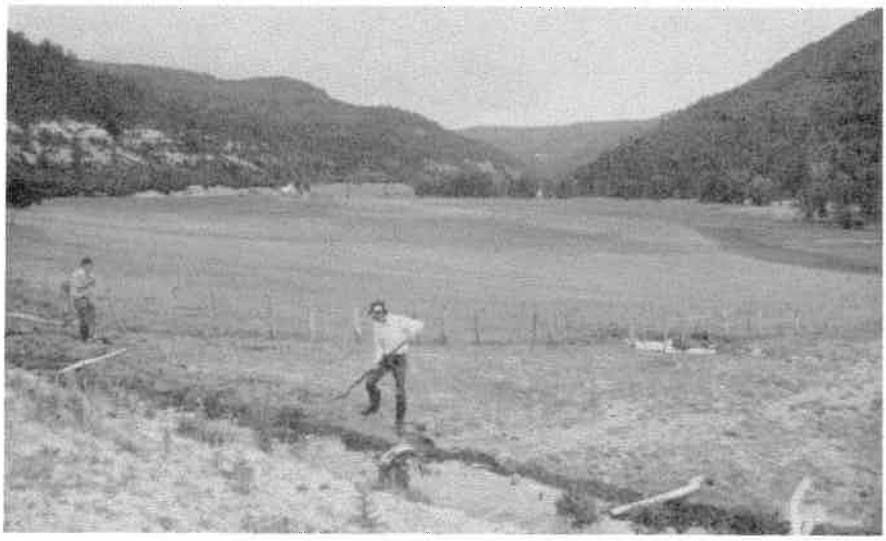
Although water quality questions have not been the direct concern of the water court, there is increasing activity because of water rights matters and environmental constraints. The state of Colorado, operating through the Colorado Water Quality Control Commission, has assumed primary enforcement authority for the National Pollution Discharge Elimination System (NPDES) program.

The **Water Quality Control Commission** is involved in a systematic stream classification program which has a further impact on waste water returning to the classified stream segment.

The **Colorado Mined Land Reclamation Board** reviews the sufficiency of water rights in the course of the mined land reclamation permit approval process. Besides detailing the effects of the proposed mining operation on surface and groundwater, the operator is required to estimate project water requirements and to indicate the water rights and sources of water to supply those requirements.

The **Colorado Water Conservation Board** was created in 1937 with the power to: (1) foster, encourage, and assist in the financing of various types of districts, mutual companies, and other agencies created under federal and state laws; (2) cooperate with the federal government and others in formulating plans and gathering information about water plans and projects; (3) submit drafts of proposed federal and state legislation; (4) investigate plans and activities of the federal government and other states which might affect interstate waters of Colorado; (5) confer and appear before appropriate agencies and the court to protect Colorado's interests in interstate waters in Colorado; (6) acquire real property for flood prevention or flood control with respect to federally authorized projects; (7) promote water conservation in the state in order to secure the greatest utilization of such water; and (8) contract for the construction of conservation projects inside and outside the state and perfect water rights in the name of the Department of Natural Resources.

The board continuously studies the water resources of the state, including present and potential uses, and has authority to conduct state water planning under the Federal Water



Ranchers near Stoner irrigate meadow

Resources Planning Act. The board also has the power to file claims for minimum stream flows (in stream flows) to protect the environment to a reasonable degree. The board has pursued such filings in many drainages.

7. Method of Acquiring Rights

The Colorado constitution declares that the right to divert and put unappropriated water to beneficial use "shall never be denied." There has never been a requirement to make an application to an administrator for a right to appropriate tributary water, although permits are required to drill wells. No priority will be awarded in court for a well unless a well permit has been awarded. Additionally, no priority will be awarded unless there is evidence either of denial of the well permit application by the state engineer or of failure to act on an application within six months of filing. This information is presented to the water judge.

The first essential step of an appropriation is the actual diversion of water with intent to apply it to beneficial use. An appropriation is initiated by taking an action on the ground,

Transit

such as a survey, coupled with an existing intent to apply the water to beneficial use.

Farmers' High Line Canal and Reservoir Co. v. Southworth, 13 Colo. 111, 21 P. 1028 (1889) The supreme court, in 1889 stated: "The appropriation of water within the meaning of the constitution consists of two acts - First, the diversion of the water from the natural stream, and, Second, the application thereof to beneficial use." (Note: For more information see page 111 of 3 volume text.)

The existence of an appropriation is confirmed and the priority of a water right is determined in an adjudication proceeding before a water judge. An application for a water right is made to the water clerk in the appropriate division. Applications must set forth a legal description of the diversion, a description of the source of the water, the date of initiation of the appropriation, the amount of water claimed, and the use of the water. A priority date is based on the date of initiation of appropriation. No award of priority made in one calendar year can be senior to an award made for rights for which applications were filed in a previous calendar year. An exception exists when the federal government files for water rights. The federal government has reserved water rights as well as the opportunity to claim water as would

any other citizen. The federal right dates back to the creation of the right for which the water is required.

Priorities may be obtained for conditional water rights in the same manner as those listed above. The appropriation date reverts to the earliest date on which the claimant can demonstrate the initiation of an appropriation. The date of initiation is the time at which an intent to appropriate coexists with an action manifesting that intent.

In order to claim and maintain an original priority date, an appropriator of a conditional water right must demonstrate reasonable diligence in perfecting the appropriation from that date forward. Once a conditional right is adjudicated, showings of reasonable diligence must be made before the water court every six years, until the appropriation is perfected. When the water right is perfected an application to make a water right absolute is made to the water court.

8. Rights of Way

In Colorado, any person owning a water right is entitled to a right-of-way through the lands which lie between the point of diversion and the point of use, for the purpose of transporting water for beneficial use. The power of eminent domain is conferred on water rights owners for the purpose of acquiring such a right-of-way, but no occupied land can be subjected to the burden of more than one ditch or other structure without the landowner's consent. The shortest and most direct route practical must be selected.

> All persons and corporations shall have the right-of-way across public, private and corporate lands for the construction of ditches, canals and flumes for the purpose of conveying water for domestic purposes, for the irrigation of agricultural lands, and for mining and manufacturing purposes, and for drainage, upon payment of just compensation. (COLO. CONST. art XVI-7)

On federal lands, no right of eminent domain exists. Rights-of-way must be acquired under the terms of FLPMA, the Federal Land Policy and Management Act of 1976. Though the secretaries of Agriculture and the Interior departments are both bound by this statute, each department has issued different permitting regulations for rights-of-way on lands under their management.

9. Measure of the Appropriative Right

The concept of beneficial use not only prescribes the uses for which water may be diverted, it is also the basis for determining or measuring the water right. No one may divert more water than is reasonably needed for the intended use. This amount may vary, depending on the nature, place, and time of use. Water usage is not limited to a specific season, but to the needs of a specific beneficial use, depending on the circumstances in each case.

Under the classical appropriation rules, every natural stream was available for use by any person who would appropriate the waters to a beneficial use. No particular proceedings were required, the simple act of taking the water and applying it to beneficial use constituted the act of appropriation, and the appropriator thereupon had a right of priority dated as of the time of his application of the water, which right was superior to every later-dated appropriation, and subordinate to every earlier-dated appropriation. (J. SAX, WATER LAW (1968)) (Note: For more information see page 64 of 3 volume text.)

Direct flow rights and storage rights for future use are recognized but there can be no such right obtained for speculative purposes. The problem of speculation arises when an attempt is made to appropriate water for use by persons other than the claimant, where no contractual or direct agency relationship exists between the claimant and the ultimate user.

Direct flow rights are measured by the rate of flow in cubic feet per second. A direct flow water right is entitled to a certain rate of flow, usually determined by the duty of water* and limited by the capacity of the ditch or canal, and applied for such periods of time as may be reasonably necessary to fulfill the appropriator's announced purpose at the time the appropriation is made. Storage rights are quantified in a volumetric manner and are usually limited to the capacity of the reservoir in acre-feet of water. The right to fill and refill may also exist.

Appropriators are entitled to be supplied in the order of their priorities. The most senior appropriator is entitled to be supplied to the full extent of the original appropriation, even when there is insufficient water in the river to meet the demands of junior appropriators. The uses by junior appropriators are curtailed if a senior appropriator puts a "call"* on the river to the water commissioners, to satisfy the senior's lawful demand for water. The call is, however, subject to the futile call* rule. No reduction of any lawful diversion because of the

operation of the priority system shall be permitted unless it would increase the amount of water available to and required by water rights having senior priorities. However, if water flowing past an upstream junior would not flow to the far reaches of the stream, then a senior appropriator far down stream might not get to exercise their usual priority right.

Junior appropriators have a right for stream conditions to be continued as they existed at the time of their appropriation. No appropriator may change the manner of diversion and use of water in any way that would alter stream conditions to the injury of other appropriators. Conflicts regarding injury usually arise when application is made to the water court to change the type, place or time of use of a water right, or the location of the point of diversion.

10. Changes, Sales, Transfers, and Instream Flows

In Colorado water rights are treated as real property and may be sold or transferred freely, so long as such change does not injure the vested rights of others. A change of water right may be made only with approval of the water judge. An application for change must be filed with the water court in the division where the water is located.

The application for change of a water right must describe the water right for which a change is sought, its amount and priority, and the change. The proposed change will be approved by the court only if it will not injure other vested rights. If it would injure other rights, the transfer must be denied, unless there are terms and conditions imposed to protect the vested rights. The terms and conditions may include: limits on use of the water subject to the change; relinquishment of part of the decree for which change is sought; reduction or abandonment of other decrees used by the applicant; time limits on diversion of water; and such other conditions as are necessary to protect vested rights. Approval may be conditioned on further reconsideration by the water judge on the question of injury to vested rights, or on any other provision which the water judge deems proper in order to protect the rights and interests of persons involved.

Colorado law also authorizes the substitution or exchange of water, in which either individuals or private or public entities may substitute supplies of water to senior appropriators to satisfy the rights of the senior. In return, the suppliers may take and use amounts of water

STICKLER V. CITY OF COLORADO SPRINGS
16 Colo. 61, 26 P. 313 (1891)

. . . After reviewing the authorities, the court said, "It seems to be well settled by these decisions that a prior appropriator of water from a stream may change the point of diversion and the place of use, without affecting his rights of priority . . . the right to make such change dependent upon the condition that the change shall not injuriously affect others. (Note: For more information see page 589 of 3 volume text.)

equivalent to those supplied to the senior appropriator. A practice of substitution or exchange may constitute an appropriative right and may be adjudicated as any other right.

The State of Colorado is also authorized to acquire water for instream flows. This water may be donated or purchased for the purposes of remaining in the stream. The Colorado Nature Conservancy generally purchases or otherwise acquires such water and donates this to the State of Colorado for instream uses. At this time, only the State is authorized to designate water for instream flow purposes. (In this document, minimum stream flow is also used to describe instream flow regulations.)

11. Plans for Augmentation*

The most innovative plan contained in the 1969 act is the one for augmentation. This is a detailed program to increase the supply of water available for beneficial use by allowing a junior appropriator to replace the depletions to the stream at a time and place that will overcome injury to vested senior rights. The junior appropriator may then divert water out of priority without curtailment. To be valid, a plan for augmentation must be approved by the water court. Because new municipal and industrial uses of water have the least seniority, augmentation is useful in the effort to integrate new development into the water rights framework without causing undue disruption.

"Plan for augmentation" means a detailed program to increase the supply of water available for beneficial use in a division or portion thereof by the development of new or alternate means or points of diversion, by pooling water resources, by water exchange projects, by providing substitute supplies of water, by the development of new sources, or by any other appropriate means. COLO. REV. STATE 37-92-103(9) (Note: For more information see page 407 of 3 volume text.)

Several methods of replacing water have been used. The most widely used method is the dry-up of acreage historically irrigated with water from reliable water rights: water which would have been lost to the stream system through transpiration and evaporation is made available to replace depletions caused by the new use. Transbasin return flows, where water from one watershed (river basins) is put into other watersheds, is also a major source of replacement water. Other sources are obtained by the development of new storage capacity and available non-tributary water.

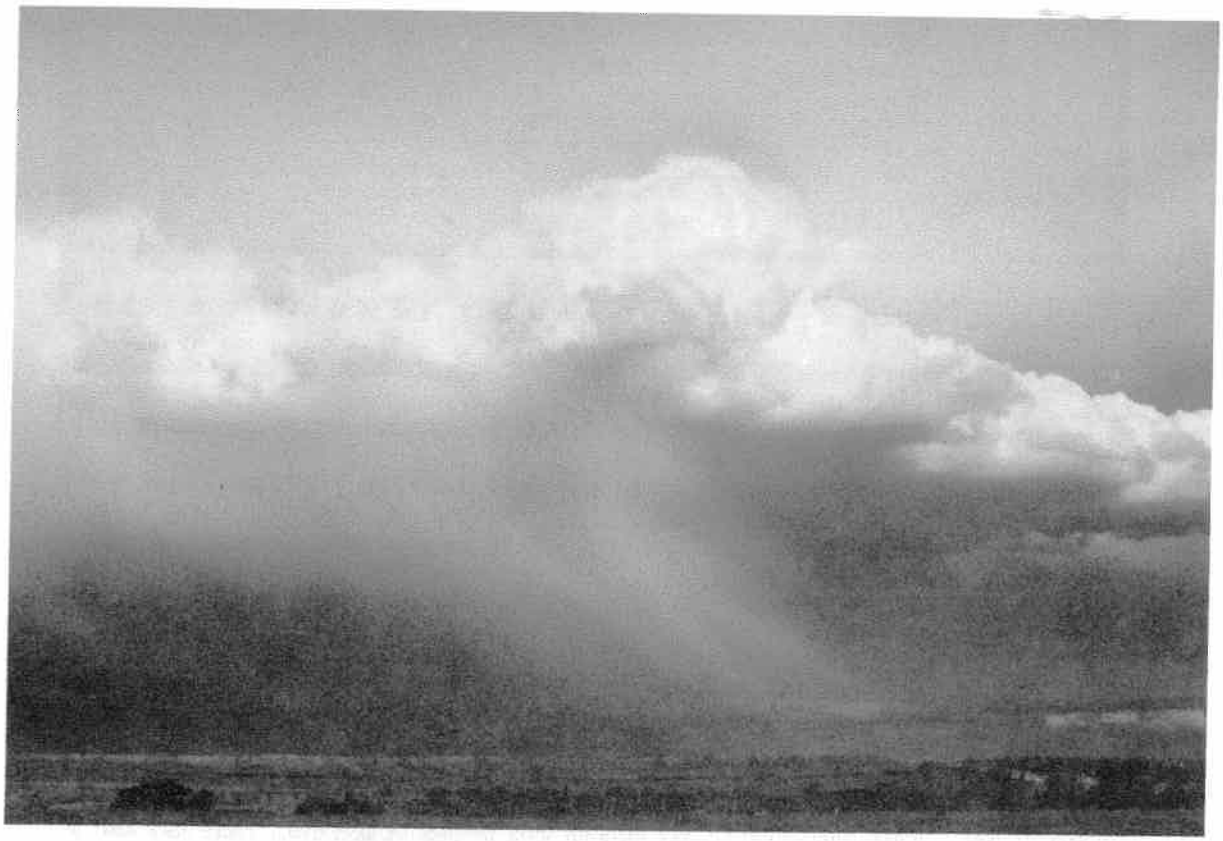
12. Loss of Rights

Colorado has no forfeiture statute whereby water rights are automatically lost as a matter of law. Water rights may be lost through long periods of non-use. They may also be lost in whole or in part by abandonment. Some states have statutes whereby water rights that are not exercised for a specific period of time are automatically lost.

Abandonment* is defined by statute: "The termination of a water right in whole or in part as a result of the intent of the owner thereof to discontinue permanently the use of all or part of the water available thereunder." Ten years of non-use presumes abandonment. Abandonment of a conditional water right occurs as a result of failure to develop the proposed appropriation with reasonable diligence*, or failure to file and sustain the diligence application.

The 1969 Water Rights Act essentially codified existency case law by providing that abandonment is the termination of a right as a result of the owner's intent to permanently discontinue its use. [COLO REV. STAT. 37-92-103(2)]

A 1977 case Or v. City and County of Denver [194 Colo. 125, 572 P2d 805 (1977)] reminds us that even under the statute, the question of intent to abandon a water right is an issue of facts to be determined on a case-by-case basis and that the water court's finding will be affirmed where there is evidence to support the finding. (Note: For more information see page 648 of 3 volume text.)



Rain clouds near Pueblo

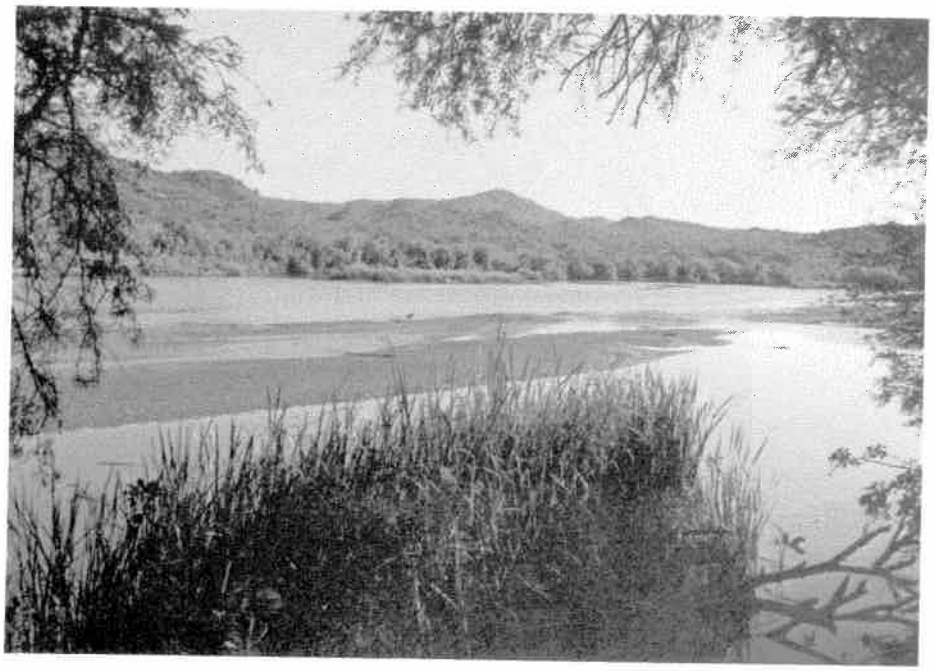
Water rights may also be lost through adverse use*. Adverse use by another appropriator for the statutory period of eighteen years may result in the loss of the water right. Applying the doctrine of adverse use to appropriative rights is limited by the rule that water not needed by an appropriator for beneficial use belongs to other appropriators on the stream. Similarly, reservoir seepage that returns to the stream system is available for appropriation, as is any other unappropriated water of the stream. No right by virtue of adverse use can arise against the stream, since under Colorado law a person has a right to take water; therefore, any such taking cannot be adverse.

13. Storage Waters, Artificial Lakes, and Ponds

Colorado law recognizes and provides for appropriation by storage of water that will subsequently be applied to beneficial use. Reservoirs may be constructed in the channel or bed of a natural stream, or elsewhere. Storage decrees authorize one reservoir filling annually.

More than one priority may be obtained to permit more than one annual filling. The court has also awarded the right to fill and refill reservoirs under certain conditions. The state engineer's approval of plans for constructing and completing reservoirs is required by law when the height of the dam exceeds ten feet or the surface area exceeds twenty acres, or the capacity of the dam exceeds 100 acre-feet. Before 1986 reservoir owners were held strictly liable for damages arising from leakage, overflow, or floods caused by the breaking of embankments. After 1986 this was changed to liability for negligence rather than strict liability.

Even on "over-appropriated" stream systems, water may be available for storage during various times of the year, typically during the non-irrigating season. Storage water applications are submitted to the water court for adjudication and decree in a form similar to other water rights. To protect the priority date during construction, filings for conditional rights are advised once the "first step" on the ground has been performed.

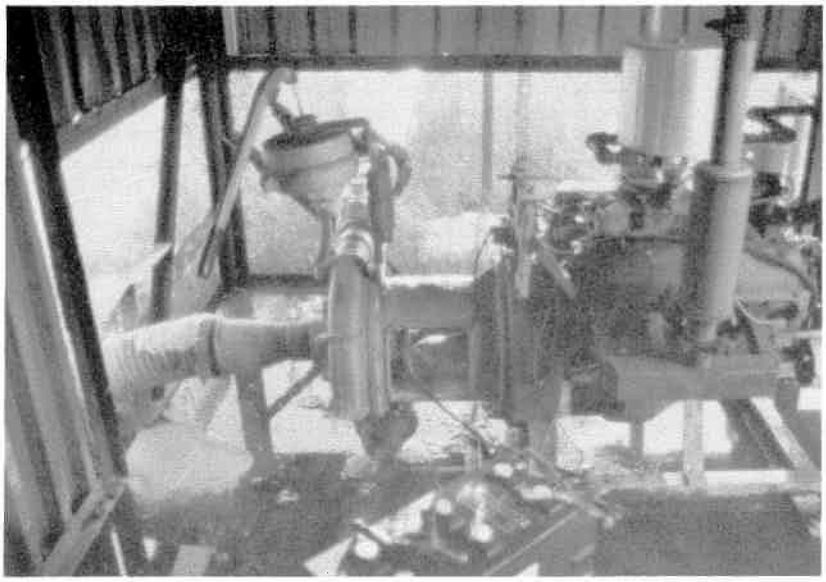


Wetlands

14. Groundwater

The appropriation doctrine in the Colorado constitution applies to the "unappropriated waters of any natural stream." In general, water tributary to a natural stream has been treated as water subject to appropriation. Tributary groundwater is treated as part of the surface stream system.

Barker Reservoir



Well pump and house

The right to store water has been affirmed by the legislature as early as 1879 and was subsequently approved as fulfilling the constitutional requirements of a beneficial use. . . The Colorado Supreme Court first faced the issue of interpreting this statute in People ex rel. Park Reservoir v. Henderlider . . . The court held that plaintiff's storage rights were fully integrated into the appropriation system and they could divert for storage even where water was needed for direct use by downstream juniors. (Note: For more information see page 186-187 of 3 volume text.)

Hall v. Kuiper, 181 Colo. 130, 510 P. 2d 329 (1973)

. . . The applicants cannot justify their right to well water upon the conclusion that no particular surface appropriator could show material injury. We ruled otherwise in Fellhauer v. People, 167 Colo. 320, 447 P2d 986 (1968).

"The defendant has urged most repeatedly that the plaintiff did not prove that the withdrawal and use of water injured any particular senior appropriator and no particular senior user made a call for the water taken by defendant. . . . we hold that whenever a court or water administration official can make a finding that the pumping of a junior well materially injures senior appropriators who are calling generally for more water, there exists a legitimate and constitutional ground and reason for the regulation of the well and a showing of a call against that well by a particular senior user is not necessary . . . (Note: For more information see page 267-268 of 3 volume text.)

The status of water not tributary to a natural stream had been in doubt until the Groundwater Management Act in 1965 authorized the creation of "designated groundwater" basins by the Colorado Groundwater Commission. Within these basins, designated groundwater, by definition, would appear to include all water not tributary to any natural stream, or at least not in practice a part of the source of supply of appropriators from any natural stream. Designated basins are found principally in the aquifers underlying the high plains areas of eastern Colorado.

Non-tributary waters include those waters which, if withdrawn, would not affect the rate or direction of flow of a surface stream within one hundred years for more than 1/10 of one percent of the average annual diversion. Outside of the designated basins, the landowner or an assignee is allowed to withdraw one percent of the non-tributary water calculated to be in storage under the land in each year. The constitutionality of this statutory provision, and other questions regarding the status of non-tributary waters not in designated basins, was recently litigated and the statute upheld.

Where significant groundwater resources are available, development is often preferred for reasons of quality and continuity of supply. Wells can be used as alternate points of diversion for decreed surface rights in some instances. In other cases, decreed surface rights can be used as a source of augmentation water to replace depletions from wells.

15. Water Organizations

An in-depth analysis of the many water organizations in Colorado is beyond the scope of this handbook. This brief list can help readers obtain assistance from specific organizations.

Joint ditches exist when two or more individuals take water from a single headgate. There is usually no formal charter or organization associated with this group. Users are treated as tenants in common.

Mutual Ditch Companies are organized in the same way as private corporations but they are not-for-profit companies. Company assets are generally limited to the water rights and the ditch system. The organization's primary purpose is to distribute water to members.

Carrier Ditch Companies are created by statute and organized for the purpose of distributing water to shareholders. The companies own the water rights and sell shares, for profit. The number of shares determines the amount or percent of water to which the individual is entitled.

Cities and Towns acquire water by one of four methods: appropriation, purchase, condemnation, or leasing. The water department is headed by an individual responsible for obtaining sufficient water for current and future municipal needs. Municipalities have no preferred status in obtaining water. They do have the statutory right to condemn senior water rights and pay fair compensation for the taking.

Irrigation Districts are created by statute. Their primary purpose is to conduct water-related activities beyond the ability of individual water appropriators. The districts are empowered by law to construct diversion facilities, ditches, canals, and reservoirs for the use of their members.

Other Organizations such as the state government, the Colorado Water Conservation Board, water and sanitation districts, conservation districts, metropolitan districts, groundwater

management districts, and numerous federal agencies assist with water development in Colorado. There are also a number of other governmental and non-governmental agencies organized to assist water appropriators. A complete list can be found in the *Colorado Water Congress Almanac Directory*.

16. Interstate Compacts

Colorado shares its water with nine other states and has entered into a number of agreements with all nine. These interstate compacts apportion waters which originate in Colorado. A compact is an agreement between two or more states that is approved by Congress.

Central Arizona Project Aquaduct

Tributary of Little Colorado River

Interstate compacts stem from the Compact Clause of the United States Constitution; Article 1 Section IV Clause 3. The nine compacts are:

Colorado River Compact

November 24, 1922

Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming

LaPlata River Compact

November 27, 1922

Includes Colorado and New Mexico

South Platte River Compact

April 27, 1923

Includes Colorado and Nebraska

Rio Grande Compact

1938

Includes Colorado, New Mexico, and Texas

Republican River Compact

December 31, 1943

Includes Colorado, Kansas, and Nebraska

Costilla Creek Compact

September 30, 1944, Amended February 7, 1963

Includes Colorado and New Mexico

Upper Colorado River Compact

October 11, 1948

Includes Arizona, Colorado, New Mexico, Utah, and Wyoming

Arkansas River Compact

December 14, 1948

Includes Colorado and Kansas

Animas - La Plata Project Compact

June 7, 1969

Includes Colorado and New Mexico

Each compact has specific terms and conditions of water allocation. For a detailed discussion see *Interstate Water Compacts* by Dr. Jeris A. Danielson in Colorado Water Almanac and Directory. See also *Colorado Water Law* by George Vranesh.

17. Indian Water Rights

The federal government, in reserving public lands, may withhold water from appropriation under state law. The doctrine of federal reserved rights was first applied to Indian water rights in the landmark 1908 Winters vs. United States case. The United States is trustee of Indian reservations rather than proprietor.

In the Winters case, the Supreme Court affirmed that an 1888 treaty implied reserved water rights for the Ft. Belknap Indian Reservation in Montana. Since the purpose of the reservation was to convert the Indians from a nomadic people to a pastoral people, the reservation of water was clearly necessary to accomplish the purposes for which the reservation was established.

Winters v. United States
207 U.S. 564 (1908)

This case, as we view it, turns on the agreement of May, 1888 resulting in the creation of Fort Belknap Reservation . . . It was the policy of the Government, it was the desire of the Indians, to change those habits and to become a pastoral and civilized people. . . . The lands were arid and, without irrigation, were practically valueless . . . and this, it is further contended, the Indians knew, and yet made no reservation of the waters . . . The power of the Government to reserve the waters and exempt them from appropriation under state laws is not denied, and could not be . . . This was done on May 1, 1888. Under one of two means - the federal government could enter into agreements with the Indian nations concerning the disposition of Indian rights and the property clause under which the United States could reserve water and exempt it from appropriation. . . Generally the date of the water right is the date that the reservation was created. (Note: For more information see page 1494 of 3 volume text.)

In 1963 the Supreme Court applied the Winters doctrine to uphold reserved rights for five Indian reservations along the Lower Basin of the Colorado River. The court determined that in establishing Indian reservations the United States reserved use of enough water to irrigate the irrigable portions of the reserved lands. A 1979 supplemental decree of this case determined that usage need not be limited to agricultural uses, since other uses contribute to the continued development of the Indian tribes.

A number of limitations are placed on federal trustee power in relation to Indian water rights. For example, ambiguities in treaties are to be interpreted in favor of the Indians. Thus, the Indians will be deemed to have reserved rights not expressly granted away.

Tribes have the right to hire private attorneys to represent their claims in water matters, because, on occasion, there are conflicts of interest between the federal government and tribes. In such a situation adequate representation of both interests by the same counsel is impossible. According to Cohen's *Handbook of Federal Indian Law*, Indian tribes retain the power to regulate Indian activity on Indian lands, but their jurisdiction does not extend to regulation of non-Indian activity on non-Indian lands. The corollary to this is that the states may not regulate Indian activity on Indian lands without the consent of Congress.

Indians who historically occupied the area now known as Colorado include the Arapahoe, Cheyenne, Apache, Kiowa, Comanche, Shoshoni, and Ute tribes. With one exception, the tribes were transferred to reservations in Oklahoma or Wyoming. The only land in Colorado still held by an Indian tribe is that held by the Southern and Mountain Utes, whose reservations are located in the southwestern corner of the state.

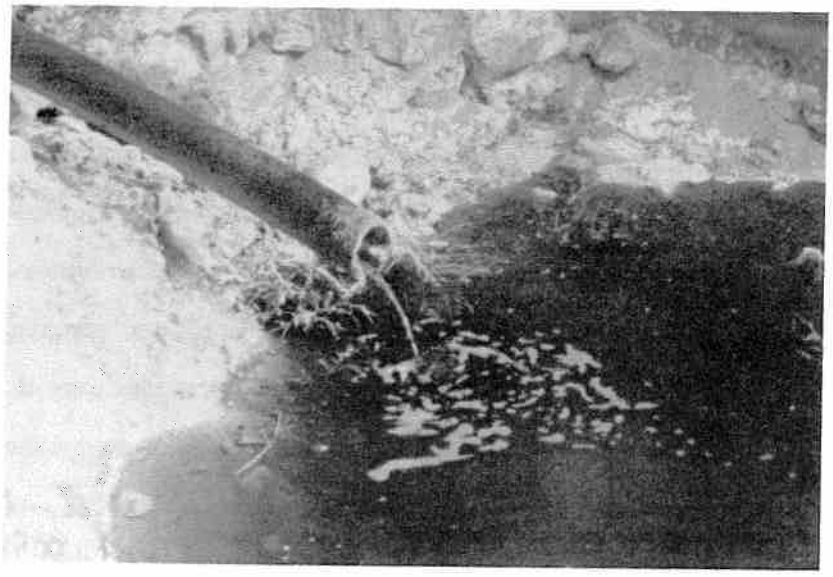
The priority date used for Ute reserved water rights is 1863, the date the reservation was established. The treaty of 1863 recognized the exclusive right of the Indians to Western Slope lands and provided goods and funds for the maintenance of the Indians and for the development of stock raising.

If the 1858 date for the Lower Boulder ditch is used for the first priority date in Colorado; and the oldest unadjudicated rights of record in Colorado are those of the settlers in the San Luis Valley who initiated irrigation practices in the mid 1830s and subsequently adjudicated in April, 1852, then the Ute's right of 1863 possesses some of the oldest water rights. Recently Congress confirmed that the Ute tribes are able to lease water downstream to water users in New Mexico, Arizona, and California. Tribes now can exercise previously unused water rights to lease or sell water to users in other states. This has generated some recent controversy among junior water right holders in Colorado who may lose their right to use water.

18. Conclusion

Colorado water laws are flexible and allow for innovative methods to obtain water supplies for new projects. New users and those holding junior water rights must develop management techniques which will protect those holding senior rights from injury. Such a water management program for any large project or recreational use must involve a complex storage system that can provide a sure supply of water and replacement water to protect vested rights.

Protecting the stream system from injury involves the broader considerations of climate, topography, and hydrology. Specific considerations must be given to the priority, location, timing, and type of historical usage on the stream system. Only through a complex management and storage program can a sure water supply be developed for the junior appropriators, while meeting the required protection need for senior water rights holders.



Polluted water in Colorado

Plastic lined tailings pond

## B. WATER QUALITY PROBLEMS AND ATTENDANT ENVIRONMENTAL IMPACTS: FEDERAL INVOLVEMENT

### 1. Overview

Developing a major water supply may have a significant impact upon the environment. Withdrawing pristine water from the stream system and discharging waste waters to the stream will affect water quality. It is imperative that any water quality programs be integrated with the acquisition and use of water in Colorado. The federal and state governments have initiated a number of laws, rules, and regulations in an attempt to keep streams "drinkable and fishable". The battle is never ending. Water quantity and water quality can no longer be treated as separate issues. This section highlights several important items of legislation which play a significant role in the areas of water quality and quantity.

### 2. Salinity

The states of the Colorado River Basin, as well as the governments of the United States and Mexico, have long been concerned with the concentrations of total dissolved solids in the waters of the Colorado River. The concentration of such dissolved solids is commonly known as "salinity."

Withdrawal of pristine waters for beneficial use increases the salinity level in the affected tributaries and in the Colorado River mainstream. The Colorado River currently carries about nine million tons of salt annually as it flows to the Gulf of Mexico. It has been stated that any withdrawal of water in the upper basin would increase the salinity problems of the lower Colorado River.

At the same time, the Colorado River Basin Salinity Control Act of 1974, P.L. (Public Law) 93-320, provides for the construction of salinity control units designed to reduce the salinity at Imperial Dam, near Yuma, Arizona. The first four units to be constructed are designed to achieve a reduction of 48 mg/liter. This is a start, but the reduction will not materially change the quality of water. The total dissolved salts will still exceed 950 parts per million (ppm). The maximum federal drinking water standards are set not to exceed 500 ppm. Further development of any new major water-consumptive industry in the project area would be at cross purposes with the attempts to control salinity in the Colorado River.

The Colorado River Basin Salinity Control Act was designed to meet U.S. commitments stated in the agreement of August 30, 1973 (Minute Order 242) with Mexico and the Treaty of February 3, 1944. The Federal Water Pollution Control Act (FWPCA) of 1972 (P.L. 92-500), as amended by the Clean Water Act, in 1977, placed limits on effluent discharges of pollutants while also protecting ambient water quality by allowing for possible implementation of more stringent limitations.

In 1961 the average amount of the salinity in water delivered to Mexico nearly doubled, from about 800 ppm to over 1500 ppm. Farmers in the Mexicali Valley complained of crop damage. Some efforts to reduce the salinity have resulted in a reduction to 1140 ppm. A more effective and permanent solution had to be implemented. The goal of the program was a zero discharge of pollutants by 1985.

Salt Intrusion

The Colorado River Basin Salinity Control Act (P.L. 93-320) and the Federal Water Pollution Control Act are compatible in that P.L. 92-500, as amended, (Clean Water Act) authorizes water quality standards for receiving waters, while P.L. 93-320 authorizes the construction of four salinity control units and the study of twelve others. The Environmental Protection Agency (EPA), in its administration of the Clean Water Act, works actively with state programs to regulate saline discharges to the Colorado River system. The state is involved in setting numeric criteria for salinity control.

The EPA has announced a policy of attempting to force other governmental agencies to consider salinity control in implementing land use decisions. The importance of this policy is underscored by the fact that any new appropriation will certainly require the approval of either the BLM or the Forest Service or both for pipeline and reservoir rights of way, and for diversion facilities on public lands.

Yuma Salinity Plant

3. Clean Water Act

The Clean Water Act provides for technology-based effluent* limitations on the quantities, rates, or concentrations of pollutants from their point sources. The act also protects ambient water quality by imposing a stream classification system. The system may eventually result in more stringent effluent limitations.

Because water is a scarce resource, for the purpose of any new appropriations of water it is assumed that discharge of waste waters will involve careful consideration of treatment cost versus the cost of recycling or non-polluting disposal.

Clean "clear cool water"

The EPA has said it will review industrial effluent discharges* for consistency with the approved Colorado River salinity standards through the National Pollution Discharge Elimination System Permit Program (NPDES). The objective of this program is a zero saline discharge wherever practical. The EPA encourages the use of low-quality, high-saline waters in operations, but discourages low-quality discharges.

4. Clean Water Act--Dredge and Fill Permits

Under Section 1344 of the Clean Water Act (FWPCA 404), it is necessary to secure dredge and fill permits before discharging either dredge or fill materials to navigable waters. This will fully apply to the construction of dams, diversion facilities, or pipelines which are on, in, or across navigable waters, as those terms are defined by the federal government. Dredge and fill permits may be required as a condition of receiving right-of-way approval for dams, reservoirs, and pipe lines from the United States.

5. National Environmental Policy Act

Any large water project is subject to a full environmental impact statement (EIS) review under the National Environmental Policy Act (NEPA) of 1969. The EIS review addresses potential water quality problems created by construction and operation of a project, as well as attendant water diversion and storage facilities. The EIS review must include an evaluation of alternatives to a project, in addition to considering environmental impacts and irreversible commitments of resources. The water management project should be designed to mitigate, to the extent possible, adverse environmental impacts.

6. Wild and Scenic Rivers

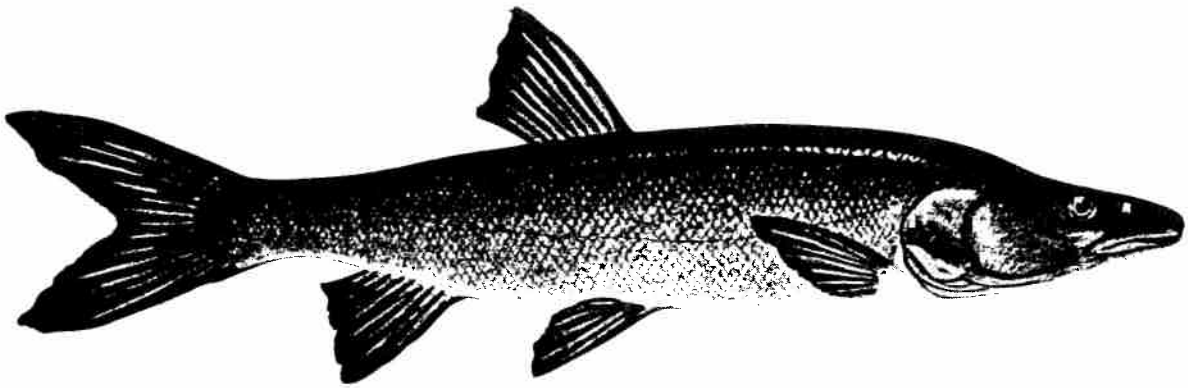
The EIS also evaluates the impact of the project on other federal environmental programs. Since the Wild and Scenic River Act (P.L. 90-542) was passed, segments of almost every major river have been suggested for addition to the Wild and Scenic Rivers system. Such designation may prohibit water development near the designated segment. More importantly, any diversion of water upstream from the segment would have an impact on the existing level of stream flow within the segment. In 1975, P.L. 93-621 amended the Wild and Scenic Rivers Act to designate various stream segments for study in order to determine eligibility for inclusion.

7. Endangered Species Act

In accordance with the Endangered Species Act, the existence of rare and endangered species must also be considered. The federal endangered species list includes the bald eagle, an occasional winter resident along major waterways in Colorado, as well as the Colorado Squawfish and the Humpback Chub, both found in the lower stretches of the Yampa and

Colorado Rivers. Two other species listed by the state of Colorado as endangered include the Humpback Sucker and Bonytail Chub.

The Colorado Division of Wildlife oversees the recovery program for endangered fishes of the upper Colorado River. The endangered fish recovery program allows fish to be recovered while allowing water development to proceed in this river basin. The Recovery Program provides an agreed-upon process for conducting consultations on new water projects in accordance with Section 7 of the Endangered Species Act. According to Section 7, federal agencies shall not take any action that is likely to jeopardize the continued existence of threaten and endangered species.



Colorado Squawfish

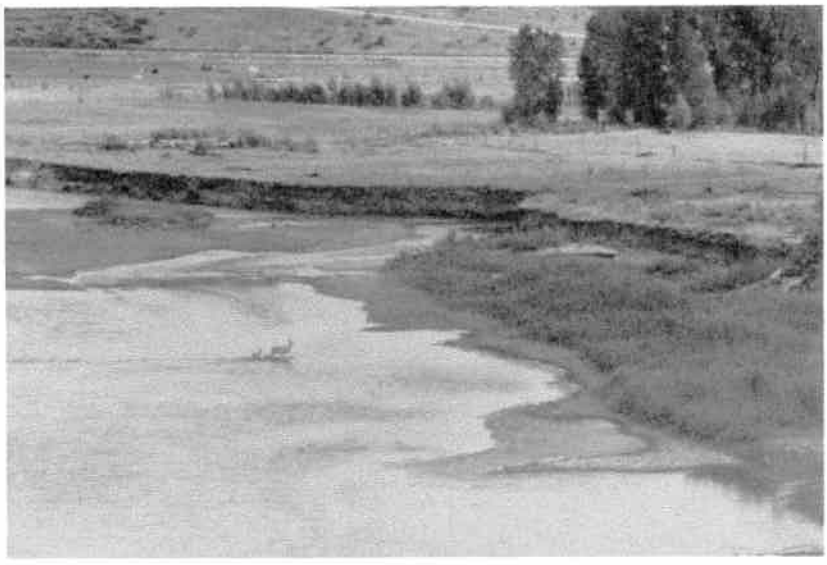
(Courtesy of Colorado Division of Wildlife)

8. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (1970) requires that wildlife conservation receive equal consideration and coordination with water resource development. The act requires federal agencies involved in such projects to consult with the U.S. Fish and Wildlife Service and with the head of the state agency that administers wildlife resources. This requirement applies directly to agencies exercising their permitting and licensing powers, and is expected to be a consideration in shaping future permit approval for water acquisition, storage, and transport facilities.

9. Impact of Wilderness Designations

The Bureau of Land Management has recently surveyed roadless areas for study as possible wilderness, in accordance with a directive contained in the Federal Land Policy and Management Act of 1976. A similar survey by the Forest Service resulted in the designation of over one million acres of new wilderness areas in Colorado. The location of wilderness near a proposed project, could affect the likelihood of receiving necessary federal approval and the tenor of EIS review. Water diversion features would not be allowed in such areas.



Deer crossing Yampa River

10. Air Quality Problems

Construction of a major water system project is not expected to have a long-term impact on air quality. Large-scale construction activities may, however, result in a significant deterioration of air quality within the area of the EPA's permit program. Such activities may require that fugitive dust emissions be lessened during construction phases of a project. Because any major water program is expected to fall within the EPA's program, the permitting process should be initiated well before construction begins.

11. Resources Conservation and Recovery Act

Though not directly related to water diversion, waste disposal activities, including disposition of spent shales, fall under the guidelines of the Resource Conservation and Recovery Act (RCRA) of 1976, P.L. 94-580. RCRA concerns itself with the disposal of solid wastes and with the production and disposal of hazardous wastes. RCRA has had a marked regulatory impact on runoff and groundwater leaching from waste water.

Leaking drums

12. Toxic Substances Control Act

Depending on the nature of the waste streams produced, the Toxic Substances Control Act (TSCA) of 1976, P.L. 94-469 may also have an impact. Designed to control substances that pose an unreasonable risk to public health or the environment, the act regulates wastes not controlled under other acts, such as the Clean Air Act, Clean Water Act, or the Safe Drinking Water Act.

Other federal environmental laws may affect any large water operation. The overall water management plan must focus on acquisition as well as quality constraints and state and federal regulation.

C. Right-Of-Way Problems

Water planning requires the acquisition of extensive rights-of-way for reservoirs, ditches, pipe lines, and related facilities. Rights-of-way over private lands can be acquired by traditional methods of purchase or condemnation. Where public lands are concerned, acquisition procedures have undergone significant changes.

The Federal Land Policy and Management Act of 1976 repealed almost all legislation regarding the grant of rights-of-way on the public lands. Title V of the act (Sections 501-511) established new procedures for granting such rights-of-way, including those for reservoirs. By its terms, the act applies to lands managed by both the BLM and the Forest Service. Both agencies have issued regulations in this area, with significant variations in language.

1. BLM Procedures

The Department of the Interior, Bureau of Land Management, issued new regulations that came into effect on July 31, 1980. The regulations established procedures for preapplication and application of right-of-way. The purpose of the preapplication is to identify potential constraints associated with the right-of-way grant, to evaluate the application's consistency with the area land use plan, and to schedule processing of the application. Several factors to be considered in the preapplication stage are anticipated cost reimbursement requirements, environmental and management issues, and the need for additional on-the-ground investigations.

Ideally, the preapplication process will be used to coordinate activities with federal, state, and local agencies.

Besides demonstrating financial ability to complete the project, the applicant must reimburse the government for all work involved in the processing. This includes preparing environmental analyses and any necessary environmental impact statements. Charges for engineering surveys, resource inventories, and detailed land use analysis must also be reimbursed. After the right-of-way has been issued, the applicant must reimburse the United States for all costs involved in monitoring the construction, operation, and maintenance of the right-of-way.

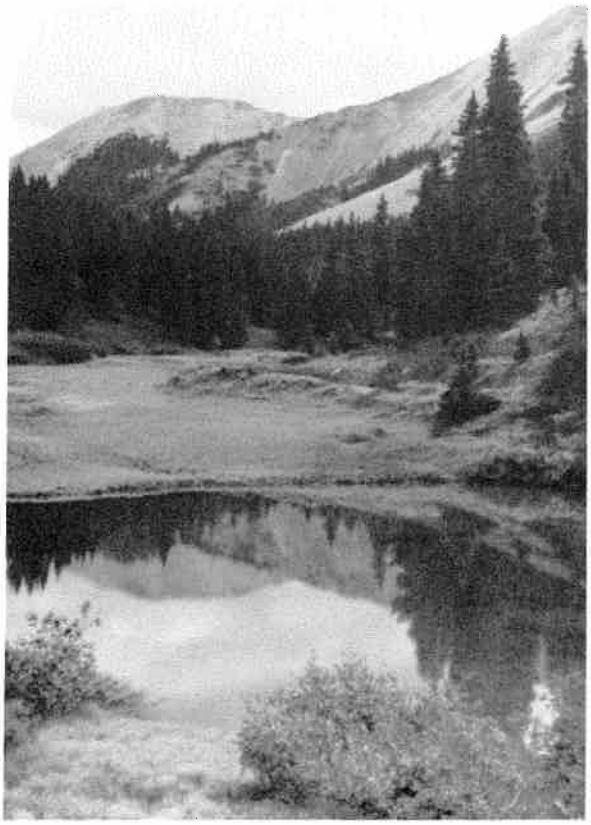
Presently, no time limit is imposed on the government for processing an application. Several grounds exist for denying the right-of-way, including public interest factors. If the right-of-way is issued, rental fees are payable in advance on an annual basis, based on the fair market value of the rights granted.

The regulations contain detailed guidance for determining the appropriate area to be occupied by the right-of-way and the time period for which the right shall remain effective. The secretary of the Department of the Interior may impose certain conditions on the grant, including, but not limited to, a requirement that the right-of-way be restored, revegetated, and rehabilitated upon termination. The secretary may also impose bonding requirements to insure that funds are available to complete such rehabilitation. Conditions designed to prevent damage to scenic, aesthetic, cultural, and environmental values may also be imposed. The Interior Department right-of-way process involves a detailed procedure with a significant chance of imposing substantial costs and time delays upon the applicant.

2. Forest Service Procedures

Theoretically, the regulations issued by the Forest Service on June 6, 1980 (effective July 7, 1980) parallel those of the BLM. The Forest Service has chosen to retain its traditional special use permit process, however, as modified to fit the regulations of the Federal Land Policy and Management Act of 1976.

Like those of the BLM, the Forest Service regulations have a period of preapplication and consultation. During this phase possible conflict of land use can be analyzed. The extent of fees, charges, and bonding requirements can also be determined, and any environmental problems likely to occur can be anticipated and discussed. If temporary use of the land is required in order to perform activities that relate to the application, temporary use permits can be authorized. Unlike the BLM, the Forest Service does not presently require reimbursement for the cost of processing the application, which may also include later supervision and monitoring activities. Approval of an application by the Forest Service may be conditional, based upon the applicant obtaining any other necessary documents or water rights. After the



High mountain lake near Silverton

application is submitted, a Forest Service officer assesses the applicant's qualifications and completes the required environmental analysis. This can be either an environmental assessment or an environmental impact statement. In order to solicit input, federal, state, and local agencies and the public will be given adequate notice that the application has been submitted.

The application may be denied for nearly the same reasons as those in the BLM regulations, including incompatibility with existing land management objectives, the public interest, and federal or state laws. The application may also be denied because the applicant cannot demonstrate financial responsibility or technical competence.

All rights not expressly granted by the approval are retained by the Forest Service. The area of land where occupancy is permitted is generally limited to the amount necessary for construction, operation, and maintenance of the proposed facility. Land size may also be limited to protect the public health, safety, and environment. As with BLM regulations, the duration of the use may be limited by several factors, including the life span of the facility, public benefit, and project financial arrangements.

The regulations outline terms and conditions of use. Specifically authorized are terms and conditions relating to minimizing the damage to scenic and aesthetic values, fish and wildlife habitat, and other environmental aspects. Compliance with state standards may be mandated where those standards are more stringent than the federal guidelines. The authorized officer may require that bond be posted to assure compliance with the conditions imposed by the special use authorization or any applicable law, regulation, or order. Rental fees are charged commensurate with the market value of the use authorized.

Though the regulations issued by the Department of the Interior appear to be more detailed and mechanical than those of the Forest Service, the true measure of fairness and workability depends on the spirit and manner in which they are implemented. It is clear that the acquisition of rights-of-way will be subject to the scrutiny of an environmental impact statement review, most likely in conjunction with review of the whole project. To avoid needless federal opposition, right-of-way acquisition should be coordinated with water rights filings.

Corn field, northeastern Colorado

## IV. WATER SUPPLY AND ACQUISITION OF GROUNDWATER[1]

The potential for developing a water supply for any large project can exist in one source or in several sources. These sources are the groundwater aquifers underlying deeded, patented, and leased land, as well as surface waters. The use of each source has distinct advantages and disadvantages.

Under Colorado water law, groundwater is either tributary or non-tributary. Shallow aquifers are almost always considered tributary. Detailed engineering analyses are required to determine whether the deeper aquifers are non-tributary, except where geologic formations are defined by statute to be non-tributary. It is a legal presumption that all groundwater is tributary until proven otherwise.

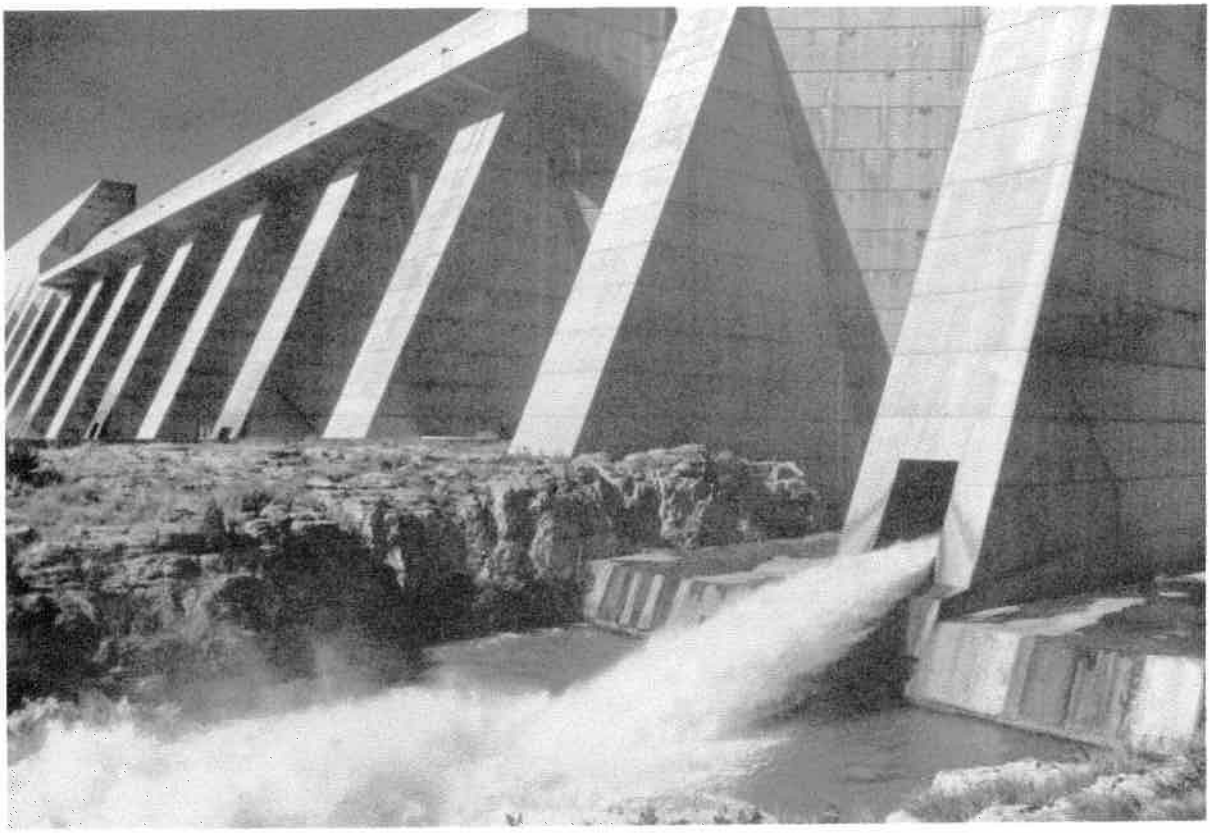
Another category of water may also exist beneath certain properties. This water is considered to be partially tributary (sometimes refered to as not non-tributary) if connected to surface streams in a marginal manner. Withdrawal of partially tributary water may affect the rate or direction of flow of a surface stream, but the overall depletions to the stream system cannot equal the total amount of water withdrawn. Theoretically, the augmentation (replacement) requirements needed to match such depletions would be less than the total usage from the aquifer. The replacement requirements for such water is presently four percent of the withdrawal. Whether or not water can properly be classified as being partially tributary requires hydrologic analysis.

As discussed, tributary groundwaters are not necessarily limited to the rate at which they can be withdrawn. But since new groundwater withdrawals are quite junior in the priority system, depletions to the stream system during times when there is a call on the river must be replaced in order to prevent injury to senior appropriators. The usual way to accomplish such protection is a plan for augmentation. As noted in the previous paragraph, if water can be successfully classified as partially tributary, the total replacement might be less than the total depletion.

[1]Refer to designated groundwater and designated groundwater basin in Definition of Terms.

In certain instances water which is not tributary to a stream system, but which has been made available to the stream system, has been classified as developed* water. It is not yet clear how the courts would regard developed water, since the concept seems to be at odds with Senate Bill 213. This bill limits the rate of withdrawal of non-tributary water from aquifers. It also requires the consent of the landowner as a prerequisite to making groundwater withdrawals.

Cattails along eastern Colorado canal



The dam at Pueblo Reservoir

## V. ENGINEERING FUNDAMENTALS OF WATER LAW

Water law encompasses many disciplines. A water lawyer must understand the law as well as engineering fundamentals associated with water law. Generally speaking, a lawyer does not fully understand the engineering requirements and an engineer is not versed in what is needed in court. In order to contain costs, a lawyer should do just enough to prevail in the litigation. It is a lawyer's responsibility to understand what the water engineer is required to prove.

### 1. The Office of Water Records

A number of records may affect the outcome of a specific water right. An engineer must be aware of and become familiar with them all. Sources of information may include: the offices of the state engineers, division engineers, and water commissioners; U.S. Geological Survey; U.S. Forest Service; U.S. Soil Conservation Service; and other state and federal agencies.

### 2. The State Engineer's Office

The state engineer's office is located in Denver. The state engineer is directly responsible for documenting the flows of all the rivers of the state, for regulating diversions of all the ditches and reservoirs within the state, and for overseeing the fulfillment of compact requirements.

The state engineer is responsible for regulating groundwater as well as surface diversions. There are some 25,000 wells in Colorado under his supervision. Since the Colorado Supreme Court has determined that the Colorado water priority is an integrated system, water rights, including tributary wells, are regulated according to their priority date.

### 3. The Adjudication* Process

In order to determine the priority date that will be enforced by the state engineer, an applicant must file in water court to firm up the right. The adjudication process has been in place since 1891 and has evolved to the present system of water courts under the 1969 Act.

### 4. Calls* On The River

Water officials regulate calls on the river throughout their divisions. If a call is in

conflict with other divisions, they coordinate the diversions so that the most senior call on the river gets its appropriated amount before juniors can take water. There are exceptions. The senior must place the water to beneficial use and the call cannot be futile. That is, water must reach the senior in sufficient quantity to be beneficially used.

It does not matter what type of crop the senior is growing. The farmer is entitled to sufficient water for that crop up to the decreed quantity. A farmer will at times change the type of crop being grown and use the allocation of water later in the year when there is less water in the stream. This change is generally permitted, provided the other conditions remain constant. Enlarged irrigated acreage is not permitted.

5. Tabulations

Water rights in Colorado are tabulated according to priority date. Tabulation of water rights is coordinated by the state engineer. The priority date and quantity decreed for each water right is tabulated in each of the water divisions. The tabulation list indicates whether a specific water right is junior or senior to other competing water rights on a stream.

Copies of the rulings of the seven water courts are sent to the state engineer. This office coordinates and tabulates priority numbers for each right. These records are available for inspection or purchase by anyone who wishes to determine priority and quantity of entitlement of water diverters. It is often a function of a water engineer or water attorney to obtain such information for a client.

6. Abandonment*

A water right may be abandoned by declaration of the owner or by non-use for the statutory period of eighteen years. Generally a non-use of ten years is a presumption of abandonment. The water court however, makes the final determination. In a contested proceeding a water engineer must supply appropriate data to assist a water judge in making the appropriate ruling.

7. Conditional Water Rights*

Sometimes a project is too large to be completed within a specific time period. In order to protect its priority standing, an appropriator may ask the court to decree a conditional water

right. This action establishes a quantity and a date. The appropriator must then appear in court every four years to prove that there has been diligent effort toward completing the project. It is often the function of the water engineer to make a factual determination of the extent of diligence and to testify accordingly. Whenever the water is put to a beneficial use, the appropriator* must come into court to show the actual use. At that time the right can be decreed absolute and no longer subject to court scrutiny as to diligence.

8. Injury

Any change can be made to a water right--change in time and place of use, change from one use to another--so long as there is no injury to the vested rights of other users. This is the basic premise for flexibility of Colorado water law. Any such change, however, must be brought before the court. Any water user that may be injured must file a protest. A trial before the court will determine the extent of injury. If there is injury, the change will be denied unless terms and conditions can be imposed by the court to prevent injury.

It is a water engineer's function to determine injury or non-injury. If there is injury the engineer must be prepared to propose specific terms and conditions to the court that will remove the injury and allow the transfer to take place.

9. Historic Use

The amount of water used at the original place of use is the limiting factor for transfer to the new use. Historic use is defined as the amount of water in cubic feet per second and acre-feet per year diverted at the original headgate.

It is a water engineer's function to determine the first day and last day of diversions. These generally are limits for the new use. An engineer must also determine the historic consumptive use and the historic return flow in acre-feet per year. These also are limitations on the amount of water allowed to be used at the new place of use.

A water year is defined as a twelve month period between October 1 and September 30 of each year. The water commissioner's records are kept according to a water year. The process is complex and requires a great deal of study by the water engineer. It may even require the use of modeling to reconstruct historic and future uses.

10. Value Of A Water Right

Water rights must often be appraised for value. A water right can be sold separately from the land, since it is an interest in real property, unless such a sale is prevented in the by-laws. Each water right has a specific value depending upon its location, priority date, quantity, historic use, and intended new use.

The water right may be represented as a diversion from a specific ditch, shares in a mutual ditch company, shares in a carrier ditch company, or units in a federal project such as the water associated with a conservation or conservancy district. A water engineer must make a factual determination from which to ascertain the value of the specific water right.

11. Water Quality

Water quality is becoming more important in water transfers. Return flow must be examined for water quality. Generally the waste water and return flow water at the new point of discharge cannot exceed pollution limits established at the original place.

Fun at Water World, Thornton

## VI. SUMMARY AND CONCLUSION

Water rights in Colorado have been, for the most part, already appropriated for specific projects. There is strong competition for water among municipalities and agricultural and industrial operations. On paper at least, every river system is over-appropriated. The value of each subsequent right is dictated by the needs of senior appropriators*. However, not all decreed* rights divert at the same time, nor are all decreed rights assured of a safe yield of water under existing conditions.

A determination of total water availability is clouded by uncertainty. State water laws change with each session of the legislature and with each decision of the Colorado Supreme Court that relates to water. The farmer and irrigator have large stakes in water matters. It has been said on more than one occasion, "Take my money--take anything I have--but leave my water alone."

Environmental concerns arise in regard to every aspect of water acquisition and development. Expert teams made up of water attorneys and engineers are needed in order to properly perfect a water right. They are needed to provide effective means of water management.

It is interesting to project what the next one hundred years will bring to Colorado water law. During the past one hundred years water usage has changed from meeting mostly irrigation needs to meeting increased municipal and industrial demands. The next one hundred years will most probably see an increase in this trend. Court cases involving environmental concerns will most probably bring about additional adjustments in thinking about how water is used and managed.

## CONSTITUTION OF COLORADO

## ARTICLE XVI

### Mining and Irrigation

**Section 5. Water of streams public property.** -The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.

**Section 6. Diverting unappropriated water-priority preferred used.** -The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

**Section 7. Right-of-way for ditches, flumes.** -All persons and corporations shall have the right-of-way across public, private and corporate lands for the construction of ditches, canals and flumes for the purpose of conveying water for domestic purposes, for the irrigation of agricultural lands, and for mining and manufacturing purposes, and for drainage, upon payment of just compensation.

**Section 8. County commissioners to fix rates for water when.**- The general assembly shall provide by law that the board of county commissioners in their respective counties, shall have power, when application is made to them by either party interested, to establish reasonable maximum rates to be charged for the use of water, whether furnished by individuals or corporations.

George Vranesh giving a lesson in geology

VITA

GEORGE VRANESH
P.O. Box 4632
Boulder, CO 80306

Legal Employment:

Active from 1961 to 1987 in the practice of law. Was senior partner of the law firm of Vranesh and Raisch, Boulder, Colorado. Practice generally limited to natural resources law; represented clients in water transfer proceedings, water acquisition matters, obtaining decreed water rights, mining matters, and land use matters. Presently retired but involved in update of three-volume treatise on Colorado Water Law.

Education:

University of Colorado School of Law (LL.B, 1961)
Colorado School of Mines (E.M. 1951)

Professional Affiliations:

American Bar Association, Member of Council of the Natural Resources Section
Colorado Bar Association
American Institute of Mining, Metallurgical & Petroleum Engineers
Colorado Mining Association, Past Director
Professional Engineer, State of Colorado

Selected Publications and Presentations:

"Water Contingency Planning or What Happens When the Well Runs Dry," a talk presented to the National League of Cities. San Francisco, California, December, 1977.

"Water for Oil Shale Development in Western Colorado," a paper presented at the Colorado School of Mines, Golden, Colorado, 10th Oil Shale Symposium Proceedings, p. 34, April 1977.

Coauthor, "Geothermal Resources: Water and Other Conflicts Encountered by the Developer-An Alternative Energy Source Which is 'Gathering Steam', 13 Land and Water Law Review 1 (1977)

Previous Employment:

| | |
|---|---|
| 1961-1963 | Project Engineer, Legal Counsel, Stearns Roger Corporation Denver, CO. |
| 1959-1961 | Design Engineer, Office of Research Service, Physics Department, University of Colorado, Boulder, CO. |
| 1953-1961 | Partner, Ouray Uranium Company, Moab, Utah |
| 1952-1953 | Mining Engineer, Idarado Mining Company, Ouray, CO. |
| 1951-1952 | Engineer, Lockheed Aircraft Corp., Burbank, CA. |
| 1951-1951 | Engineer, Great Northern Iron Ore Prop., Hibbing, MN. |

**This publication was financed in part by the Department of the Interior, U.S. Geological Survey. The contents of this publication do not necessarily reflect the views and policies of the Department of the Interior, nor does mention of trade names or commercial products constitute their endorsement by the United States Government.**