



Ditch and Reservoir Company Alliance

# DITCH COMPANY HANDBOOK

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# PREFACE

by Justice Greg Hobbs

Ditches help to invent and reinvent Colorado. A magnificent but harsh landscape, prone to cycles of flood and drought, has become a habitable place due to them.

The study of ancient water works in the Americas—paleohydrology—reveals a 2,000-plus year history of community organization based on good public-works water supply and drainage practices.

In Peru and the Lake Titicaca region, the Pukara, Wari, Tiwanaku, and Inca peoples constructed canals and aqueducts to carry water for growing food and to feed fountains and cisterns for drinking water and ceremonial rituals—at such sites as Tiwanaku, Pikillacta, Chokepukio, Machu Picchu, Tipon, and Moray.

On the limestone caprock of the Yucatan Peninsula within Guatemala, 12 small reservoirs encircle Tikal. The causeways into and out of this great Mayan ceremonial center doubled as ditches to fill them.

The Hohokam constructed hundreds of miles of canals for growing crops in Arizona's Salt and Gila River drainages beginning as early as 300 B.C.

In Colorado's Mesa Verde, ancient Puebloans operated four reservoirs between 750 and 1100 A.D. Upstream diversion ditches fed the two canyon-bottom reservoirs.

Water from intermittent storm runoff was so precious it was used for drinking only, not irrigation. These early Coloradans were dry land farmers.

The Hispanos of northern New Mexico had nearly 400 acequias in place by the 1800s. These direct flow ditches

were the centerpiece of community livelihood. To have a share of water for your fields, you had to help maintain the Mother Ditch and her laterals.

In 1858, Lt. Joseph C. Ives of the U.S. Topographical Engineers saw how the Hopi on their mesas, dating back centuries, were growing peaches, watering sheep, tending gardens, and supplying drinking water from springs through strategically-placed stone conduits and reservoirs. The oldest continuously-operating water right in Colorado is the San Luis People's Ditch of 1852, constructed by Hispano settlers soon after the 1848 Treaty of Guadelupe Hidalgo brought the great Southwest into the United States.

No, the Anglo Mormons and the miners did not invent Western water use!

Recent tree ring studies show that each generation faced recurrent drought cycles, some of seemingly impossible duration. How to survive in the Americas is how to cope with water scarcity. Smart soil and water management has always been the key to community possibility.

In its very first session, the Colorado Territorial legislature in 1861 set forth an irrigation water law, not a mining water law, contrary to popular legend, although customs of the miners in making claims probably had an influence. It

contained two fundamental features: Water could be taken from any "stream, creek or river...to the full extent of the soil, for agricultural purposes" and any person with land removed from the water source "shall be entitled to a right of way through the farms or tracts of land which lie between...

## A Profession of Rivers

Men and women reflecting lakes and rivers should a profession humble make.

A person who professes rivers for a living must profess them living, too. From mouth to source profess them by degree and gravity bodies entire unto themselves, capable of feeling vibrant, sick, at rest, stirred up, seeking, open to flowing through the energy of others, returning to one's self. Rivers erode, eat firmaments, uproot, or quietly fill the silk of cornstalk capillaries, by rivers are we called to serve;

Rivers trace the face of the land and of every creature, lakes reflect heaven's depth and breadth, Career enough for any man or woman, fish or bird, state or nation, lake or river.

—Greg Hobbs

above and below him" for the construction and operation of "water facilities...to irrigate his land."

Water and ditches—the right to beneficially use water in priority, combined with the right to cross the lands of others with water structures—reside at the core of Colorado's 1876 Constitution. Over the course of 145 years since territorial days, many decisions of the Colorado Supreme Court and statutes of the General Assembly have reinforced Colorado's dependence on its greatest treasure, the public's water resource.

In 1879 and 1881, the legislature assigned to state courts the responsibility for adjudicating water use priorities, and directed the State Engineer, division engineers, and local water commissioners to administer them, curtailing junior uses in times of short supply. In 1903, the legislature provided for the adjudication of all other types of water rights, in addition to agriculture. In 1919, the General Assembly required that all water rights be adjudicated in the courts; if not, they would not be enforced.

By the start of the 20th century, the South Platte, Arkansas, and Rio Grande river basins were interlaced with ditches. Reservoir construction to capture spring runoff and manage direct flow diversions within ditch systems was well under way. This was the era of private water development centering on mutual ditch and reservoir companies. A share of a mutual company represents a prorata ownership in the water right and the water facility assets it owns. These organizations of landowner water users pooled their money and muscle to develop and maintain water facilities for ranching and farming.

From the commercial impetus and the food supply the mutual ditch and reservoir company owners provided sprang the cities, while mining camps and towns came and went. For-profit water and land companies attempted to gain a toehold; most failed. Commerce and industry tied itself mostly to municipal water suppliers.

Throughout the 20th century, a multitude of local governmental entities came into being—cities and water conservancy, water conservation, and water and sanitation districts—whose job it was to supply water for growth through water infrastructure financed by tax levies and bond issues secured by user fees.

The federal government, through the reclamation program in cooperation with local sponsoring districts, assisted with the construction of large storage and delivery facilities that others could not or would not finance. These projects, like the Colorado Big-Thompson in northeastern and the Fry-Ark in southeastern Colorado, provided imported, supplemental water to existing farms, growing cities, and new businesses along the Front Range.

At the start of the 21st century the most severe drought of recorded history—combined with the over-appropriation of Colorado's interstate share of Platte, Arkansas, and Rio Grande river waters, remind us that:

- (1) junior rights are subservient to senior rights in the priority system of water administration, and must be curtailed in times of short supply unless juniors replace their depletions to the stream by augmentation plans;
- (2) the most valuable water rights available to serve Colorado's population growth in the coming decades are the

existing senior water use rights of the mutual ditch and reservoir companies;

- (3) efficient water use and water conservation practices are indispensable to stretching the available water supply for all the uses we now recognize as beneficial, including recreation and the environment;
- (4) in light of a current population of 4.5 million persons and 2 million+ additional residents expected by 2030, Coloradans must find a way to use whatever Colorado River basin water is still available under the 1922 and 1948 compacts; and
- (5) this magnificent state and its people probably cannot sustain themselves into the future unless public entities can continue to acquire the use of mutual ditch and reservoir company water rights through leases and/or purchases.

How the water right holding farmers and the water right needing cities—the urban, suburban, and rural people—get along will largely shape Colorado's way of life, look, and feel. The 2005 session of the General Assembly chartered statewide and local basin roundtables in pursuit of this worthy work.

Can there be accords on agricultural water transfers that combine limited permanent changes of water rights with pooled, rotating water leasing and land fallowing programs? Can the Front Range urban area, particularly fast-growing Douglas County water suppliers who are now 90 percent dependent on non-renewable Denver Basin bedrock aquifer water, join cities like Denver and Aurora to form water supply agreements to keep agriculture in business and rural communities viable, while bringing needed water to the cities? Will Colorado's new statewide water needs and water supply assessment process, with the aid of the roundtables, harness durable vision to well-chosen action? Will the agricultural users who wish to continue farming be protected from protracted absurdly expensive war-like litigation?

As non-farmers join ditch and reservoir company boards because of changes in share ownership, the most important conversations about these and other questions concerning the lay of the land and waters may occur along the ditches and the laterals, on the shores of the reservoirs, and in the meeting rooms where the members of the board of directors and mutual company shareholders meet and vote—and wherever buyers and sellers, lessors and lessees, of mutual ditch and reservoir company shares confer to contract with each other.

So it's humbling to learn how these very important—but largely unknown-to-the-public local water organizations—are adapting to changes they neither sought nor expected.

That's the aim of this handbook, to educate shareholders and citizens about the role of these quintessential community organizations. May this book be studied well! May it help Coloradans in good ways.

The perpetual agricultural democracy envisioned by Thomas Jefferson and John Wesley Powell, and many of the multi-racial settlers who became Coloradans before us has become the great residential democracy of the plains, rivers, canyons, mesas, and mountains of this the great headwaters state.

Where people are is where water will go. And because contemporary citizens value fish and wildlife, parks, recreation, and open space, water will go there also, through public and private investment.

We are dependent on the rivers and interdependent on each other. To put our money, muscle, minds and hearts into this community work of cultivating the fruit of the public's water resource is Colorado's enduring heritage and its praiseworthy destiny.

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# INTRODUCTION

Welcome to the second edition of the DARCA Ditch Company Handbook. The first, published in 2005, was provided to DARCA members to assist them in the operation of their ditch and reservoir companies. A diverse team of Colorado water experts authored the initial publication's eight articles. In this edition, we included 13 new chapters, along with revisions of the originals. Many thanks go to the authors who donated their time to provide materials for the handbook. Their generosity toward DARCA makes this valuable information accessible to water providers across Colorado. Special thanks to Dick Stenzel for the beautiful photographs that grace the handbook's cover. The handbook is available in PDF format and on DARCA's Web site.

John McKenzie  
Project Manager

**The Colorado Water Conservation Board granted DARCA money  
to publish this handbook.  
We appreciate both the grant and the recognition.**

**Special thanks to the DARCA Board:**

**Matthew Cook, President  
Phil Bertrand, Vice-President  
Gregg Ten Eyck, Treasurer  
Karen Rademacher, Secretary  
Ron Brinkman  
Carrie Ciliberto  
Mannie Colon  
Janet Enge  
Dale Trowbridge  
Craig Ullmann**

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- A Guide to Weather and Climate Information**—*John Wiener, Ph.D., Institute of Behavioral Science, CU*

# ARTICLES OF INCORPORATION

*By Jack F. Ross, Esq., Joanne Herlihy, Esc., and John R. Heronimus, Esq., Dufford & Brown P.C.*

## Origin and purpose

Mutual ditch companies are specialized, not-for-profit business organizations authorized by the Colorado Legislature to enable water users under a common ditch or reservoir system to pool their financial resources for the development of that system and to provide a mechanism for the orderly, equitable distribution of water and to share the costs to operate and maintain it.

## Mutual ditch company

Historically, individual farmers combined their resources to organize mutual ditch companies for the express purpose of diverting and delivering water to irrigate their lands. The farmers received stock in the company in return for their contributions of water rights, real property ditch assets, water-related equipment, and capital. The stock represents an actual ownership interest in the water rights, water and real property assets, and a right to delivery of a pro rata share of the water in the. A mutual ditch company's purpose is to distribute water to its shareholders, not to make a profit. This unique or special purpose sets a mutual ditch company apart from other types of corporations.

Colorado law specifically provides for the formation of a mutual ditch company pursuant to C.R.S. § 7-42-101 et seq., as well as the provisions, as applicable, of the Colorado Business Corporation Act, C.R.S. § 7-101 through 117 and the Colorado Revised Nonprofit Corporation Act, C.R.S. § 7-121 through 137.

Because of its special nature, there are two important differences between a mutual ditch company and other corporations. Typically, for profit corporations can raise capital through the sale of stock or corporate property, earnings or obtaining loans. Once they are in operation, mutual ditch companies are usually unable to raise more capital through the sale of stock. Unlike other corporation, a mutual ditch company has the power to levy assessments on its stock to raise money to meet expenses. See C.R.S. § 7-42-104.

Unlike carrier ditch company contract rates, discussed below, assessments made by a mutual ditch company are not subject to regulation by any one other than its own shareholders. Second, even though it is a nonprofit corporation, a mutual ditch company has shareholders and issues stock. Regular nonprofit corporations do not issue stock and its

participants are known as members, not shareholders or stockholders.

## Carrier ditch company

In contrast to a mutual ditch company, a carrier ditch company is a for profit company that carries "water for sale to consumers who have contracted with the company." See *Nelson v. Lake Canal Company*, 644 P.2d 55, 58 (Colo. App. 1981). A carrier ditch company owns a special interest in the water rights, the real property ditch assets and the water related equipment necessary for water diversion and delivery.

Consumers under a carrier ditch company contract for delivery of water upon payment of an annual contract rate. By statute, they have the right to continue to purchase water annually and perpetually upon payment of the contract rate. See C.R.S. § 37-85-102. Because a carrier ditch is a for profit company, it is entitled to a reasonable return on its investment over and above costs.

The opportunity for a carrier ditch company to make a profit creates a need for regulation of rates. In Colorado's early history, it was feared that the carrier ditch companies would take advantage of the small independent consumer farmers who relied on them by charging unreasonably high rates. The Colorado Constitution's drafters eliminated the danger by giving the counties' boards of commissioners the power to set carrier ditch companies' maximum rates. See Colorado Constitution Article XVI, § 8. See C.R.S. § 7-42-107.

## Articles of incorporation

The articles of incorporation is a formal document used to create the ditch company. It also governs, in broad terms, the purpose of the company, its authority to conduct business and its relationship with its shareholders. The document is filed with the Colorado secretary of state and the company pays a filing fee.

The articles of incorporation of a mutual ditch company must contain certain mandatory information as provided by statute. See C.R.S. § 7-102-102. Such information includes the:

- Name of the entity;
- Information regarding shares;
- Name and address of the registered agent;
- Corporation's principal office address; and the
- Name and address of each incorporator.

Unlike other corporations, See C.R.S. § 7-42-101 requires that there be a minimum of three incorporators

The mutual ditch and reservoir statute requires that the articles of incorporation of a mutual ditch company state:

- Stream, channel, or source from which the water is to be taken;
- Point or place at or near which the water is to be taken;
- Location, as near as may be, of any reservoir intended to be constructed;
- Line, as near as may be, of any ditch or pipeline intended to be constructed; and
- Use that is intended. See C.R.S. § 7-42-101.

The articles of incorporation also may provide provisions concerning the purpose or purposes for incorporation, management of the business of the corporation and regulation of its affairs. See C.R.S. § 7-102-102.

The articles are generally more difficult to change or amend than the bylaws. When drafting articles of incorporation, carefully think through the intended purposes of the company, what authority it needs or should have, and the relationship it plans with its shareholders. Draft the provisions to fit the company. Generally, handle the specific terms and conditions dealing with the management, operation and administration of the corporation be in the bylaws.

### **Benefits of incorporation**

Unincorporated ditches, otherwise known as co-tenancy ditches, can experience significant problems involving operations, delivery and operations cost sharing..

Each co-tenant's share of the water and ditch is typically described in his/her deed as an undivided portion of the water right, but he/she has no evidence of how much the neighbors own.

In the absence of some kind of joint operating agreement, no mechanism exists to govern ditch operations or water delivery, and each co-tenant has an equal right to open and close the ditch diversion structure and his own lateral turnout. This arrangement often leads to what one judge called "unseemly breaches of the peace along the ditch bank."

Similar problems emerge when it's time to pass the hat for money to operate and maintain the ditch. The typical contribution rule is that each co-tenant is obligated to pay his pro rata share of running the ditch from the headgate to his lateral turnout, but not beyond. Disagreements over that apportionment method can lead to protracted litigation.

### **Incorporation eliminates all of this.**

The amount of stock each shareholder owns defines his pro rata share of both water deliveries and the ditch maintenance expense. Instead of shareholders helping themselves to what they consider their share, the water is distributed by a ditch rider employed by the company. The mechanism of the mutual company is a proven, ideal way to simplify and harmonize the operation, not only of major ditches, but also of lateral ditches with numerous users.

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●  
DARCA

# SAMPLE ARTICLES OF INCORPORATION OF A MUTUAL DITCH COMPANY

Parenthetical comments are shown in [italics].

## ARTICLES OF INCORPORATION OF ABC [Mutual] DITCH COMPANY

For the purpose of forming a mutual ditch company pursuant to C.R.S. § 7-42-101 et seq. and the provisions of the Colorado Revised Nonprofit Corporation Act, the undersigned, being three natural persons of the age of eighteen years or more, hereby make, execute and acknowledge the following articles of incorporation.

*[The name of the company can, but is not required to, reflect its mutual ditch status.]*

### ARTICLE I Name

The name of the corporation shall be ABC [Mutual] DITCH COMPANY (hereinafter referred to as “the Company”).

*[The name of the company is required by C.R.S. § 7-102-102 (1)(a).]*

### ARTICLE II Duration

The period of duration of the Company shall be perpetual.

*[The duration of the company can be set by the incorporators at any length of time short of perpetual. However, it is not generally recommended to identify less than a perpetual duration.]*

### ARTICLE III Purposes

*[The purpose or purposes of the company is not required to be set forth in the articles of incorporation. However, C.R.S. 7-42-101(1) does at least require that the articles of incorporation state: the stream, channel, or source from which the water is to be taken; the point or place at or near which the water is to be taken; the location, as near as may be, of any reservoir intended to be constructed; the line, as near as may be, of any ditch or pipeline intended to be constructed; and the use to which the water is intended to be applied. See Sample Article III subparagraphs A and B below. The Incorporators should carefully consider, with counsel, the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]*

The purposes for which the Company is organized and the nature of the business to be carried on by it, without pecuniary gain or profit, are as follows:

- A. To acquire, own, hold, improve, manage, control, operate, repair and maintain the real property commonly known as the [name of ditch], together with all water rights related thereto, whether now existing or as may be acquired in the future, including the water right originally decreed to [identify decreed water rights]. The source of supply of said water right is [identify source of supply]. [Identify the point of diversion, the line of the ditch].
- B. To use the yield from said water rights for the benefit of shareholders who own the rights to its use for all beneficial purposes recognized by law.

C. To furnish and distribute to all shareholders their pro rata share of each year's net annual yield of water produced in the exercise of the water rights managed by the Company.

D. To do all and everything necessary, suitable, or proper for the accomplishment, attainment, or exercise of any of the objects and purposes set forth herein, and to do every other act or thing incidental or appurtenant to or growing out of or connected with those objects and purposes.

The enumeration of any specific purpose shall not be construed to limit or restrict in any manner the general rights of the corporation as provided by law, nor shall the expression of one purpose be determined to exclude another.

#### **ARTICLE IV Principal Office**

The Company's principal office is [identify principal office].

*[Identification of the principle office of the company is required by C.R.S. § 7-102-102 (1)(d).]*

#### **ARTICLE V Powers**

[Description of the powers of the company is not required to be included in the articles of incorporation. However, the incorporators should consider, with advice of counsel, enumerating at least the basic powers to do business the corporation possesses as recommended below.]

In furtherance of its purposes but not otherwise, the Company shall have the following powers:

A. All of the powers and privileges conferred upon nonprofit corporations and mutual ditch companies by the common law and the statutes of the State of Colorado in effect from time to time.

B. All of the powers necessary, suitable, proper or desirable to perform the obligations and duties and to exercise the rights and powers of the Company including, without limitation, the following powers:

1. To make, in the manner prescribed by law, assessments on its capital stock, to be levied pro rata on the shares of stock for the purpose of meeting operating expenses, paying any indebtedness of the Company, or both, and to enforce such assessments according to Colorado law.

2. To have a perpetual lien upon its capital stock and the water rights represented by the same for any and all assessments duly levied until the same shall be fully paid.

3. To keep in good order, condition and repair, all of the assets of the Company.

4. To obtain and maintain, to the extent available, all policies of insurance appropriate or required by law.

5. To protect and defend the assets of the Company from loss and damage by suit or otherwise.

6. To own, hold, improve, manage, control, operate, repair and maintain the assets of the Company in connection with its affairs, subject to these Articles of Incorporation and the Bylaws.

7. To pay all expenses in connection with the performance of its duties and the exercise of its powers and all office, legal, accounting and other expenses incident to the conduct of the business of the Company, specifically including all licenses, taxes, charges, fees, assessments or governmental charges levied or imposed against the assets of the Company.

8. To borrow funds and to give security therefore in order to pay for any expenditure or outlay required pursuant to law, these Articles of Incorporation or the Bylaws, and to execute all instruments in evidence of such indebtedness as the Board of Directors may deem necessary or desirable.

9. To enter into contracts within the scope of the Company's duties and powers, and to do all other acts necessary, appropriate or advisable in carrying out any purpose of the Company with or in association with any person, firm, association, corporation or other entity or agency, public or private.

10. To establish bank accounts which are interest bearing or non-interest bearing, as may be deemed advisable by the Board of Directors.
11. To keep and maintain detailed, full and accurate books and records showing in chronological order all of the receipts, expenses, and disbursements of Company funds and, upon the vote of a majority in interest of the shareholders, to cause a complete audit to be made of the books and records by a certified public accountant.
12. To supervise all officers, agents and employees of the Company and to see that their duties are properly performed.
13. To designate and remove the personnel necessary for the operation, maintenance, and repair and replacement of the assets of the Company.
14. To adopt, alter, amend and repeal such Bylaws as may be necessary or desirable for the proper management of the affairs of the Company, provided however, that such Bylaws may not be inconsistent with or contrary to any provisions of law or these Articles of Incorporation.

## **ARTICLE VI** **Capital**

The aggregate number of shares which the Company shall have authority to issue is [identify number of shares of stock] shares, without par value, which shares shall be designated "Common Stock." Such Common Stock shall be fully assessable. No assessment shall, however, be made unless the question of making such assessment shall first be submitted to the holders of the Common Stock of the corporation at the annual meeting, or at a special meeting called for that purpose, and a majority of the holders of Common Stock, either in person or by proxy voting thereon, shall vote in favor of making such assessment.

*[Information regarding shares of the company (the information required by C.R.C. § 7-106-101) is required to be included in the articles of incorporation by C.R.S. § 7-102-102 (1)(b). The Incorporators should seek advice of counsel in determining how best to draft the voting provisions to effect the goals of the company.]*

## **ARTICLE VII** **Voting**

Each outstanding share of Common Stock shall be entitled to one vote and each outstanding fractional share of Common Stock shall be entitled to a corresponding fractional vote on each matter submitted to a vote of shareholders, except that at each election for directors every shareholder entitled to vote at such election shall have the right to a number of votes equal to the number of such shareholder's shares and fractional shares of Common Stock multiplied by the number of directors to be elected. A shareholder may cumulate such votes for the election of directors to be elected, but not for any other purpose.

*[This is a sample voting rights section for demonstration purposes only. Voting rights of the shareholders should be carefully considered by the Incorporators, with advice of counsel, and should be drafted to fit the specific needs of the company.]*

## **ARTICLE VIII** **Preemptive rights**

The shareholders shall have no preemptive rights to acquire any unissued or treasury shares of stock of the Company, securities convertible into shares, or securities carrying stock purchase options or warrants to acquire any unissued or treasury shares of stock of the Company.

*[This is a sample section dealing with preemptive rights for demonstration purposes only. The Incorporators should carefully consider, with advice of counsel, what rights shareholders will and will not have and draft the provisions of the articles of incorporation to fit the specific needs of the company.]*

## **ARTICLE IX** **Quorum of Shareholders**

A quorum at any meeting of shareholders of the Company shall consist of a majority of the shares of the Company entitled to vote at such meeting, and the same proportion of the shares of any class entitled to vote as a class at such meeting, represented in person or by proxy.

[This is a sample section dealing with quorum issues for demonstration purposes only. The Incorporators should carefully consider, with advise of counsel, what quorum provision will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]

## ARTICLE X

### Regular Shareholder Vote

At any meeting of shareholders at which a quorum is present, the affirmative vote of a majority of the shares present in person or by proxy and entitled to vote on the matter shall be the act of the shareholders.

[This is a sample section dealing with shareholder voting for demonstration purposes only. The Incorporators should carefully consider, with advice of counsel, what voting requirements will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]

## ARTICLE XI

### Shareholder Voting on Extraordinary Actions

With respect to the following extraordinary actions which may be taken by the Company, and which require the vote or concurrence of the holders of the outstanding shares of the Company shares entitled to vote thereon, the following affirmative vote of such shares shall be required to constitute approval of such action.

- A. Two-thirds to amend the Articles of Incorporation.
- B. Two-thirds to voluntarily dissolve the Company by the act of the Company or to revoke voluntary dissolution proceedings previously initiated by the Company.

[This is a sample section dealing with shareholder voting for demonstration purposes only. The Incorporators should carefully consider, with advice of counsel, what voting requirements will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]

## ARTICLE XII

### Right of Directors and Officers to Contract with Company

It being the express purpose and intent of this Article to permit the Company to engage in transactions with other corporations, firms, associations, or entities of which any or all of the directors and officers of the Company may be directors, officers, or members or in which any or all of them may have pecuniary interests, no contract or other transaction between the Company and one or more of its directors or any other corporation, firm, association, or entity in which one or more of its directors are directors or officers or are financially interested shall be either void or voidable solely because of such relationship or interest or solely because such directors are present at the meeting of the board of directors or a committee of the board which authorizes, approves, or ratifies such contract or transaction or solely because their votes are counted for such purpose if:

1. The fact of such relationship or interest is disclosed or known to the board of directors or committee which authorizes, approves, or ratifies the contract or transaction by a vote or consent sufficient for the purpose without counting the votes or consents of such interested directors; or
2. The fact of such relationship or interest is disclosed or known to the shareholders entitled to vote and they authorize, approve, or ratify such contract or transaction by vote or written consent; or
3. The contract or transaction is fair and reasonable to the Company.

Furthermore, common or interested directors may be counted in determining the presence of a quorum at a meeting of the board of directors or a committee of the board which authorizes, approves, or ratifies any such contract or transaction.

[These provisions are not required to be included in the articles of incorporation. However, it is recommended that the incorporators consider, with advice of counsel, what will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]

## ARTICLE XIII

### Board of Directors

The business and affairs of the Company shall be conducted, managed and controlled by the Board of Directors. The number of directors of the Company shall be fixed by the bylaws, or if the bylaws fail to fix such a number, then by resolution adopted from time to time by the Board of Directors, provided that the number of directors shall not be less than three (3) nor more than five (5).

Members of the Board of Directors shall be elected in the manner set forth by the Bylaws and shall either be, or represent persons or entities entitled to receive water from the facilities of the Company. Directors may be removed and vacancies on the Board of Directors shall be filled in the manner provided in the Bylaws.

The initial Board of Directors shall consist of three (3) persons. The names and addresses of the members of the initial Board of Directors who shall serve until the first annual meeting of shareholders and until their successors are duly elected and qualified, are as follows:

[names and address of initial Board of Directors]

Any vacancies on the Board of Directors occurring before the first election of Directors by the shareholders shall be filled by the remaining Directors.

*[These provisions are not required to be included in the articles of incorporation. However, it is recommended that the incorporators consider, with advice of counsel, what will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]*

#### ARTICLE XIV Officers

The Board of Directors may appoint a President, one or more Vice Presidents, a Secretary, a Treasurer and such other officers as the Board of Directors in accordance with the provisions of the Bylaws deems to be in the best interests of the Company. The officers shall have such duties as may be prescribed in the Bylaws and shall serve at the pleasure of the Board of Directors.

*[This provision is not required to be included in the articles of incorporation. However, it is recommended that the incorporators consider, with advice of counsel, what will fit the specific needs of the company and draft the provisions of the articles of incorporation accordingly.]*

#### ARTICLE XV Initial Registered Office and Agent

The initial registered office of the Association shall be [insert address of registered agent office]. The initial registered agent at such office shall be [insert name of registered agent].

*[Identification of the initial registered office and agent of the company is required by C.R.S. § 7-102-102 (1)(c).]*

#### ARTICLE XVI Dissolution

In the event of the dissolution of the Company, either voluntarily by the shareholders, by operation of law or otherwise, those assets of the Company which are held for the benefit of the shareholders including any water rights held by the Company and not directly by the shareholders and corresponding water distribution system shall be returned to the shareholders. Any additional assets shall be disposed of pursuant to the requirements of law.

*[A description of what happens in the event of dissolution is not required to be included in the articles of incorporation. Dissolution of a corporation and distribution of assets is otherwise provided for by statute. However, because statutes change, the incorporators should consider including what they intend to happen in the event of dissolution.]*

#### ARTICLE XVII Incorporation

The incorporators of this Company and their address is as follows:

Name

Address

*[Identification of the true name and address of each incorporator of the company is required by C.R.S. § 7-102-102 (1)(e). For formation of a mutual ditch company, C.R.S. § 7-42-101(1) requires that there be at least three (3) incorporators.]*

Executed this \_\_\_\_ day of \_\_\_\_\_, 2005.

---

[Incorporator]

---

[Incorporator]

---

[Incorporator] STATE OF COLORADO

)

) ss.

CITY AND COUNTY OF DENVER )

The foregoing instrument was acknowledged before me on this \_\_\_\_ day of \_\_\_\_\_, 2005, by  
, and

Witness my hand and official seal.

Notary Public

My commission expires:

[Name and address of registered agent] hereby consents to appointment as the initial Registered Agent of the Company.  
\_\_\_\_\_, 2005.

[*Name of Registered Agent*]

The name and mailing address of the individual who causes this document to be delivered for filing is [Insert name and address].

F. Action Items:

Retrieve and review a copy of your company's Articles of Incorporation

G. For further information:

Colorado Secretary of State's website at <http://www.sos.state.co.us>.

Colorado Ditch and Reservoir Companies statutes, C.R.S. § 7-42-101 et seq.

Colorado Business Corporation Act, C.R.S. § 7-101 through 117.

Colorado Revised Nonprofit Corporation Act, C.R.S. § 7-121 through 137.

Colorado Water Law, George Vranesh, Volume 2 (1987) at 929-950.

# BYLAWS

*By Randolph W. Starr*

The Colorado Revised Nonprofit Corporation Act, Section 7-121-401 (5) defines bylaws as: "...the code or codes of rules, other than the articles of incorporation, adopted pursuant to [statute] for the regulation or management of the affairs of the ... corporation irrespective of the name or names by which such rules are designated, and includes amended bylaws and restated bylaws."

The Colorado Business Corporation Act applicable to profit corporations, in Section 7-102-106 (2), states: "The bylaws of a corporation may contain any provision for managing the business and regulating the affairs of the corporation that is not inconsistent with law or with the articles of incorporation."<sup>1</sup>

Bylaws are enacted by the shareholders of a mutual irrigation corporation and may contain provisions about the regulation, management, operation and conduct of corporate affairs. But the bylaws cannot violate the terms of the articles of incorporation, or any law that applies to the corporation. The bylaws of most mutual irrigation corporations deal with:

- Stockholders and issuance and transfer of shares of stock;
- Meetings of stockholders, board of directors;
- Meetings of board of directors and officers
- Contracts, loans, mortgaging of property, bank accounts, fiscal year; and
- Ditch and/or reservoir operations.

Most of the subjects need to be fairly detailed, although many ditch companies get along with bylaws enacted more than 100 years ago. The sample set of bylaws included in the handbook contain provisions needed by mutual irrigation companies to deal with modern transactions. Each ditch company needs to tailor its bylaws to its own circumstances so operations proceed based on clear rules of conduct.

The number of members of the board of directors is traditionally an odd number to avoid tie votes. Board members usually receive a small stipend or fee for attending a board meeting, but ditch companies pay no salary or other benefits to board members. The ditch company may employ some board members. Watch out for conflicts of interest. Sometimes there is "cumulative voting"<sup>2</sup> of the shares of stock so that a minority number of shares can control the election of

at least a minority of the members of the board. The voting usually, though, is based on "one share-one vote."

The board is in charge of management of the company. The officers of the company are elected by the board of directors<sup>3</sup> to carry out the board's decisions and directions. The directors must be aware of their liability for their actions and be careful in the administration of the ditch company's affairs. Colorado statutes establish a standard of conduct for board members of nonprofit corporations, but since the provisions of the nonprofit corporation statutes or the profit corporation statutes may not apply to a mutual irrigation company under Title 7, Article 42, the legislature extended the same protections available to those types of corporations to mutual irrigation companies.<sup>4</sup>

Officers' jobs are set out in the bylaws, and also carry liability. Questions about what those liabilities are should be directed to legal counsel familiar with corporate representation and especially mutual irrigation companies. The author strongly suggests that each mutual irrigation company obtain general liability insurance in the maximum limits that can be afforded and also an errors and omissions policy for the benefit of the board and officers.

Issuing stock certificates in a mutual irrigation corporation can cause a great deal of consternation for ditch company secretaries. Up-to-date provisions in the bylaws give guideposts to stockholders and to ditch company secretaries. Shares may be transferred only on the books of the ditch company, and many corporations now do not issue original certificates because of the problems that lost stock certificates pose. Electronic registration of stock certificates and digitally imaged certificates are preferred so that transfers are done by the secretary and only facsimiles of the certificates are given to the stockholders, lienholders and others.

## Amendments to Bylaws

Generally the stockholders reserve the power to change the bylaws. Some corporations allow the board of directors to change the bylaws and then grant a right of the stockholders to "veto" a board-adopted bylaw. But the essence of operations of a mutual irrigation corporation is contained in the bylaws and the stockholders should generally be in charge of making and amending the bylaws.

The level of approval of bylaw changes also varies from company to company. Most bylaws require more than a ma-

jority—any vote of the shareholders that is more than half of the shares represented at a duly called stockholders meeting. The normal vote requirement is a two-thirds or more approval. Some companies require three-fourths. The supermajority vote requirement is a way to dissuade changing the bylaws too often. Also, a supermajority approval usually cannot be obtained for controversial or overreaching bylaw changes.

Bylaws' provisions build in protections for the best interests of the company as a whole. For instance, the company may institute staggered terms for board members so that if a stockholder group takes over voting control of the company at the annual meeting, not all of the directors can be booted out of office at the meeting. Limiting proxy voting is another way to make it harder for a minority to seize control and make changes detrimental to the majority.

### Stock assessments

The provisions in the bylaws regarding assessments on stock must conform to the provisions of Section 7-42-104. The provisions in the sample bylaws incorporate the statute's provisions so company operations comply with state law. Then, assessments are properly made and the ditch company can take action if the assessments are not paid.<sup>5</sup> Special assessments for major capital improvements, such as rebuilding the main headgate or dam in the river, rehabilitating a dam, or lining a large section of the ditch, should go to a vote of the stockholders.

### Requests for documents

On occasion the board or an officer of the ditch company or the ditch rider receives a request for information from the ditch company. Having a bylaw provision or a policy is a prudent business practice. A sample policy follows this section in the handbook. It's based on the holding of the court in *Left Hand Ditch Co. v. Hill*, 933 P.2d 1 (Colo., 1997) in which the Colorado Supreme Court ruled on a stockholder's request for a list of the ditch company's stockholders for the purpose of marketing of stock. The author strongly suggests that ditch companies not withhold information from stockholders except for the clearest of cases, such as employee records or attorney-client communications.

### The "Catlin" bylaw

The bylaws of the ditch or reservoir company usually contain some of the details of the administration of the company's water. The bylaws, being relatively hard to change, contain the important principals for ditch or reservoir operations that stockholders need / should know and that continue from year to year.

The sample bylaws contain some of the ones that the author has drafted over the years. There are many others that could be added and should be added as notice to new (and old) stockholders and users. The board should be authorized in the bylaws to also adopt operating rules that can be initiated quickly, such as drought-related rules. Write down all of unwritten rules so there are no surprises for stockholders and other users and so ditch riders can be politicians instead of paladins.

The bylaws are a good place to put in "who pays to replace the headgate / weir," "a stockholder can / cannot change a headgate setting," "what happens if you take too much water by mistake," and "how do we allocate water in a water-short year."

In *Fort Lyon Canal Co. v. Catlin Canal Co.*, 642 P.2d 501 (Colo. 1982), the Colorado Supreme Court enforced a bylaw provision of the ditch company that required a stockholder to take a plan for change in a water right to the board of directors of the ditch company for review before filing a Water Court application for approval for the change in water right. The court held, in essence, that not only does the water owner (shareholder) have to get the approval of the water court for a change in water right, but the water owner may also be required by the bylaws or articles of incorporation of a ditch company to apply for the approval of the ditch company in which the water is carried. The board of the ditch company would then have the opportunity to review the application to see if there might be an injury to the ditch system if the proposal for change was detrimental.

In *City of Thornton v. Bijou Irrigation*, 926 P.2d 1 (Colo. 1996), the Colorado Supreme Court stated: "We have addressed the legitimacy of imposing regulations on water rights more strict than the applicable statutory requirements in cases concerning mutual ditch company bylaws, and we have consistently upheld reasonable limitations on the statutory rights of a water user. See, e.g., *In re Application for Water Rights of the Fort Lyon Canal Co.*, 762 P.2d 1375, 1379 (Colo. 1988); *Fort Lyon Canal Co. v. Catlin Canal Co.*, 642 P.2d 501, 509 (Colo. 1982); *Model Land & Irrigation Co. v. Madsen*, 87 Colo. 166, 285 P. 1100 (1930)."

Here is a sample of a bylaw crafted to grant the board a first right to deal with a stockholder's change in water right proposal.

Each stockholder or person receiving water through the Corporation's system desiring to change the place to which any water the stockholder or person may be entitled shall be delivered or to make any change in water rights of any kind or nature shall make prior written request to the Board. If in the opinion of the Board, such change can be made without injury to the ditches, the reservoirs, the Corporation or other stockholders, such water may be delivered to such place or places as requested upon such terms and conditions imposed by the Board. After such Board approval, such person shall notify in writing all stockholders and other persons affected by the change prior to such change.

In the end, since a stockholder has a right to apply for a change in water right, it is doubtful that a ditch company board of directors may absolutely prohibit a stockholder from applying for a water right change in Water Court.

Any categorical refusal without a rational basis by the board of directors to approve a change in water right could be litigated in the context of the case before the Water Court.

This bylaw does allow the board to see the stockholder's application early in the process, so that negotiations about accommodations for the change can occur earlier rather than later, after the ditch company files a protest of the change in Water Court. Also if the stockholder fails or refuses to submit the application to the board before running off to Water Court, the ditch company could object to the Water Court Referee or Judge that the stockholder failed to comply with the bylaws.

One of the most important state statutes for mutual irrigation company law is the Colorado Constitution's codified provisions regarding a ditch right of way or easement:

7-42-103. Right-of-way.

Any ditch, reservoir, or pipeline corporation formed under the provisions of law shall have the right-of-way over the line named in the certificate, and shall also have the right to run water from the stream, channel, or water source, whether natural or artificial, named in the certificate through its ditch or pipeline, and store the same in any reservoir of the company when not needed for immediate use. The line proposed shall not interfere with any other ditch, pipeline, or reservoir having prior rights, except the right to cross by pipe or flume; nor shall the water of any stream, channel, or other water course, whether natural or artificial, be diverted from its original channel or source to the detriment of any person or persons having priority of right thereto, but this shall not be construed to prevent the appropriation and use of any water not theretofore utilized and applied to beneficial uses.

The typical question by a new landowner is, "Why do you think you can come onto my land and burn up my trees and my landscaping just to clean your ditch?"

There is an answer. Just what are the rights and source of right for the ditch system? Usually there are no known written easement grants for any portion of the ditch system; and except for the recent subdivisions within which a written easement was obtained, the ditch company only knows that its ditch has existed for many, many years in the same location.

Undoubtedly some recorded deeds for properties across which the ditch crosses refer to the ditch—and some undoubtedly do not—and no specific location or statement of the rights of the ditch company are mentioned. Likewise, no specific easement width is mentioned in any of the recorded deeds.

Most of the older ditches were built more than 100 years ago. The ditch company assesses its stockholders for the cost of maintenance and upkeep of the ditch on an annual basis. The distinction between a ditch company with water rights and a lateral ditch company or field ditch without water rights is not critical to a discussion of the easement rights of the ditch company.

Irrigation ditches were constructed in Colorado long before it became a territory or a state. Territorial laws recognized the appropriation of water from natural drainage ways for irrigation and mining uses. The Colorado's constitution recognized the water rights existing at the time it was admitted to statehood, and recognized the irrigation and mining ditch systems that existed at that time, as well as the ditch systems that could be built later. In 1861 the following statute, with small subsequent amendments, was passed by the territorial legislature:

*Any person owning a water right or conditional water right shall be entitled to a right-of-way through the lands which lie between the point of diversion and point of use or proposed use for the purpose of transporting water for beneficial use in accordance with said water right or conditional water right.*

The statute guarantees an easement for ditches from natural streams to irrigable land by an appropriator.

Many ditches were established in the mid 1860s. Most 19th century ditches were constructed without written easements from the affected landowners. This is certainly logical since landowners benefited by the ditch construction, and they usually received water for irrigation of their land.

With the advent of rural subdivisions, many residents are unaware of Colorado's long history of ditch company rights, and of private landowners who have private ditches across neighbor's property, for ditch maintenance, use and operation.

Please see Chapter 6 for a detailed discussion of the ditch easement and how to protect it against urbanization.

DARCA

<sup>1</sup>The proper spelling of bylaws is "bylaws" and not "by-laws." For those who prefer the British version it is "bye laws," however from now on one should not hyphenate bylaws for to do so is to use improper American grammar.

<sup>2</sup>"Cumulative voting" means the stockholder has the number of votes based on the number of shares owned that is then multiplied by the number of board positions that are up for election, and then all of the votes can be cast for one candidate.

<sup>3</sup>Some ditch companies directly elect the officers of the company at the annual stockholders meeting and then the officers become the board of directors.

<sup>4</sup>7-42-118. Liability of stockholders, directors, and officers. Stockholders, directors, and officers of corporations formed under the provisions of this article shall enjoy the same measure of immunity from liability for corporate acts or omissions as stockholders, directors, and officers of corporations formed under the "Colorado Business Corporation Act", articles 101 to 117 of this title, or as members, directors, and officers of nonprofit corporations formed under the "Colorado Revised Nonprofit Corporation Act", articles 121 to 137 of this title.

<sup>5</sup>Assessments for a lateral ditch company may be hard to collect due to the fact that a lateral ditch does not have any water rights attached to the stock ownership. It is tempting for a landowner who no longer uses the lateral ditch to stop paying assessments. With a "cooperative" main ditch the provisions of Article VI, Subsection 2d. can be used to prevent the transfer of the "parent ditch" shares until the stockholder also takes the lateral ditch shares. The author also believes that the lateral ditch company can bring an action in court on equitable grounds to force a landowner to continue to pay assessments even though the landowner irrevocably waives rights of irrigation from the lateral ditch.

# SAMPLE BYLAWS

BYLAWS  
OF  
THE \_\_\_\_\_ IRRIGATION AND RESERVOIR COMPANY

ARTICLE I  
OFFICES

The principal office of the Corporation in the State of Colorado shall be located in the County of \_\_\_\_\_ or \_\_\_\_\_. The Corporation may have such other offices, either within or without the state of incorporation as the Board of Directors may designate or as the business of the Corporation may from time to time require.

ARTICLE II  
STOCKHOLDERS

**1. ANNUAL MEETING.**

The date of the annual meeting of the stockholders shall be set by the Board of Directors each year, but if the directors do not otherwise specify, it shall be held on the first \_\_\_\_\_ (day of week) of \_\_\_\_\_ (month) in each year at the hour of \_\_:00 o'clock a.m. / p.m., for the purpose of electing directors and for the transaction of such other business as may come before the meeting. If the day fixed for the annual meeting shall be a legal holiday such meeting shall be held on the next succeeding business day.

**2. SPECIAL MEETINGS.**

Special meetings of the stockholders, for any purpose or purposes, unless otherwise prescribed by statute, may be called by the President or by the directors, and shall be called by the President at the request of the holders of not less than \_\_\_ (suggestion--25) per cent of all the outstanding shares of the Corporation entitled to vote at the meeting.

**3. PLACE OF MEETING.**

The directors may designate any place within \_\_\_\_\_ or \_\_\_\_\_ County, Colorado, unless otherwise prescribed by statute, as the place of meeting for any annual meeting or for any special meeting called by the directors. A waiver of notice signed by all stockholders entitled to vote at a meeting may designate any place, either within or without the state unless otherwise prescribed by statute, as the place for holding such meeting. If no designation is made, or if a special meeting be otherwise called, the place of meeting shall be the principal office of the Corporation.

**4. NOTICE OF MEETING.**

Written or printed notice stating the place, day and hour of the meeting and, in case of a special meeting, the purpose or purposes for which the meeting is called, shall be delivered not less than \_\_\_ (suggest 10) nor more than \_\_\_ (suggest 90) days before the date of the meeting, either personally or by mail, by or at the direction of the President, or the Secretary, or the officer or persons calling the meeting, to each stockholder of record entitled to vote at such meeting. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail, addressed to the stockholder at the stockholder's address as it appears on the stock transfer books of the Corporation, with postage thereon prepaid.

**5. CLOSING OF TRANSFER BOOKS OR FIXING; OF RECORD DATE.**

For the purpose of determining stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, or in order to make a determination of stockholders for any other proper purpose, the directors of the Corporation may provide that the stock transfer books shall be closed for a stated period but not to exceed, in any case, \_\_\_ (suggest 20) days. If the stock transfer books shall be closed for the purpose of determining stockholders entitled to notice of or to vote at a meeting of stockholders, such books shall be closed for at least \_\_\_ (suggest 7) days immediately preceding such meeting. In lieu of closing the stock transfer books, the directors may fix in advance a date as the record date for any such determination of stockholders, such date in any case to be not more than \_\_\_ (suggest 20) days and, in case of a meeting of stockholders, not less than \_\_\_ (suggest 7) days prior to the date on which the particular action requiring such determination of stockholders is to be taken. If the stock transfer books are not closed and no record date is fixed for the determination of stockholders entitled to notice of or to vote at a meeting of stockholders, the date on which notice of the meeting is mailed shall be the record date for such determination of stockholders. When a determination of stockholders entitled to vote at any meeting of stockholders has been made as provided in this section, such determination shall apply to any adjournment thereof.

**6. VOTING LISTS.**

The officer or agent having charge of the stock transfer books for shares of the Corporation shall make, at least \_\_\_ (suggest 2) days before each meeting of stockholders, a complete list of the stockholders entitled to vote at such meeting, or any adjournment thereof, arranged in alphabetical order, with the address of and the number of shares held by each, which list, for a period of \_\_\_ (suggest 1) day prior to such meeting, shall be kept on file at the principal office of the Corporation and shall be subject to inspection by any stockholder at any time during usual business hours. Such list shall also be produced and kept open at the time and place of the meeting and shall be subject to inspection of any stockholder during the whole time of the meeting. The original stock transfer book shall be *prima facie* evidence as to who are the stockholders entitled to examine such list or transfer books or to vote at the meeting of stockholders.

**7. QUORUM.**

At any meeting of stockholders \_\_\_\_\_ (suggest one-fifth up to a majority—i.e. 50% + 1 share) of the outstanding shares of the Corporation entitled to vote, represented in person or by proxy, shall constitute a quorum at a meeting of stockholders. If less than said number of the outstanding shares is represented at a meeting, a majority of the shares so represented may adjourn the meeting from time to time without further notice. At such adjourned meeting at which a quorum shall be present or represented, any business may be transacted which might have been transacted at the meeting as originally notified. The stockholders present at a duly organized meeting may continue to transact business until adjournment, notwithstanding the withdrawal of enough stockholders to leave less than a quorum.

**8. PROXIES.**

At all meetings of stockholders, a stockholder may vote by proxy executed in writing by the stockholder or by the stockholder's duly authorized attorney in fact. Such proxy shall be filed with the Secretary of the Corporation before or at the time of the meeting.

**9. VOTING.**

Each stockholder entitled to vote in accordance with the terms and provisions of the Articles of Incorporation and these bylaws shall be entitled to one vote, in person or by proxy, for each share of stock entitled to vote held by such stockholder. A fractional share shall be entitled to a fractional vote in the same amount as the fractional share. Upon the demand of any stockholder, the vote for directors and upon any question before the meeting shall be by ballot. All elections for directors shall be decided by plurality vote; all other questions shall be decided by majority vote except as otherwise provided by the Articles of Incorporation or the laws of this State.

**10. ORDER OF BUSINESS.**

The order of business at all meetings of the stockholders shall be as follows:

1. Roll Call.
2. Proof of notice of meeting or waiver of notice.
3. Reading of minutes of preceding meeting.
4. Reports of Officers.
5. Reports of Committees.
6. Election of Directors.
7. Unfinished Business.
8. New Business.

**11. INFORMAL ACTION BY STOCKHOLDERS.**

Unless otherwise provided by law, any action required to be taken at a meeting of the stockholders, or any other action which may be taken at a meeting of the stockholders, may be taken without a meeting if a consent in writing, setting forth the action so taken, shall be signed by all of the stockholders entitled to vote with respect to the subject matter thereof.

**12. MANNER OF ACTING.**

If a quorum is present, the affirmative vote of the majority of the shares represented at the meeting and entitled to vote on the subject matter shall be the act of the stockholders, unless the vote of a greater proportion or number is otherwise required by statute or by the Articles of Incorporation or these bylaws.

**13. VOTING OF SHARES BY CERTAIN STOCKHOLDERS.**

Shares standing in the name of another corporation or other entity may be voted by such officer, agent or proxy as the bylaws of such corporation or the organization document of such other entity may prescribe, or, in the absence of such provision, as the board of directors of such other corporation or the authorized authority of such other entity may determine.

Shares standing in the name of a deceased person, a minor ward or an incompetent person may be voted by an administrator, executor, court appointed guardian or conservator, either in person or by proxy without a transfer of such shares into the name of such administrator, executor, court-appointed guardian or conservator. Shares standing in the name of a trustee may

be voted by the trustee, either in person or by proxy, but no trustee shall be entitled to vote shares held by the trustee without a transfer of such shares into the trustee's name.

Shares standing in the name of a receiver may be voted by such receiver and shares held by or under the control of a receiver may be voted by such receiver without the transfer thereof into the receiver's name if authority so to do be contained in an appropriate order of the court by which such receiver was appointed.

A stockholder whose shares are pledged shall be entitled to vote such shares until the shares have been transferred into the name of the pledgee, and thereafter the pledgee shall be entitled to vote the shares so transferred.

Shares of stock held in cotenancy by two or more persons shall be voted by only one individual as determined by the cotenants; and the Corporation may rely on the vote of any one of the cotenants whose name appears to correspond to the name of one of the cotenants on the records of the Corporation.

Neither shares of its own stock belonging to this Corporation, nor shares of its own stock held by it in a fiduciary capacity, nor shares of its own stock held by another corporation if the majority of shares entitled to vote for the election of directors of such corporation is held by this Corporation may be voted, directly or indirectly, at any meeting and shall not be counted in determining the total number of outstanding shares at any given time.

Voting by a stockholder that is not an individual shall be allowed only upon presentation to the Corporation prior to or upon registration at each stockholders' meeting satisfactory evidence (as determined by the board of directors) entitling the individual presenting the evidence to vote for such stockholder.

Shares whose voting rights are vested in the Secretary or any other officer of the Corporation by agreement, court order or otherwise, shall be voted by the Secretary as directed by the Board of Directors.

#### 14. VOTING BY BALLOT.

Voting on any question or in any election may be by voice vote unless the presiding officer shall order or any stockholder shall demand that voting be by ballot.

### ARTICLE III BOARD OF DIRECTORS

#### 1. GENERAL POWERS.

The business and affairs of the Corporation shall be managed by its Board of Directors. The directors shall in all cases act as a Board, and they may adopt such rules and regulations for the conduct of their meetings and the management of the Corporation, as they may deem proper, not inconsistent with these bylaws and the laws of this State.

#### 2. PERFORMANCE OF DUTIES.

A director of the Corporation shall perform the director's duties as a director, including the director's duties as a member of any committee of the Board upon which the director may serve, in good faith, in a manner the director reasonably believes to be in the best interests of the Corporation, and with such care as an ordinarily prudent person in a like position would use under similar circumstances. In performing the director's duties, a director shall be entitled to rely on information, opinions, reports, or statements, including financial statements and other financial data, in each case prepared or presented by persons and groups listed in paragraphs (a), (b), and (c) of this Paragraph 2; but the director shall not be considered to be acting in good faith if the director has knowledge concerning the matter in question that would cause such reliance to be unwarranted. A person who so performs the director's duties shall not have any liability by reason of being or having been a director of the Corporation. Those persons and groups on whose information, opinions, reports, and statements a director is entitled to rely upon are:

- a. One or more officers or employees of the Corporation whom the director reasonably believes to be reliable and competent in the matters presented;
- b. Counsel, public accountants, or other persons as to matters which the director reasonably believes to be within such persons' professional or expert competence; or
- c. A committee of the Board upon which the director does not serve, duly designated in accordance with the provision of the Articles of Incorporation or the bylaws, as to matters within the committee's designated authority, which committee the director reasonably believes to merit confidence.

#### 3. NUMBER, TENURE AND QUALIFICATIONS.

The number of directors of the Corporation shall be \_\_\_\_\_ (an odd number usually from 3 to 9). Each director shall hold office for a \_\_\_ (suggest one year—however if the board is of sufficiently large size then multi-year terms may be used and staggering of terms may be used) year term or until the director's successor shall have been elected and qualified.

1. No Board member shall be eligible to become or remain a director who is not a stockholder of the Corporation. Provided, however that a director may qualify by reason of having been designated by a person that is not an individual to represent such stockholder.

2. When stock ownership is held jointly, only one of the joint members may be elected a director.

3. If a director shall cease to be eligible to become or remain a director by reason of any of the provisions herein, such director may be removed by the vote of the majority of the Board of Directors and the vacancy thus created, filled as hereinafter

as a "per diem" in lieu of itemization of expenses. The stockholders, or if not set by the stockholders, the Board shall set the "per diem." Nothing herein contained shall be construed to preclude any director from serving the Corporation in any other capacity and receiving compensation therefor.

## **15. PRESUMPTION OF ASSENT.**

A director of the Corporation who is present at a meeting of the directors, at which action on any corporate matter is taken shall be presumed to have assented to the action taken unless the director's dissent shall be entered in the minutes of the meeting or unless the director shall file the director's written dissent to such action with the person acting as the Secretary of the meeting before the adjournment thereof or shall forward such dissent by registered mail to the Secretary of the Corporation immediately after the adjournment of the meeting. Such right to dissent shall not apply to a director who voted in favor of such action.

## **16. EXECUTIVE AND OTHER COMMITTEES.**

The Board, by resolution, may designate from among its members an executive committee and other committees, each consisting of one or more directors. Each such committee shall serve at the pleasure of the Board.

# **ARTICLE IV**

## **OFFICERS**

### **1. NUMBER.**

The officers of the Corporation shall be a President, a Vice-President, a Secretary and a Treasurer, each of whom shall be elected by the directors. Such other officers and assistant officers as may be deemed necessary may be elected or appointed by the directors. All officers of the Corporation, except the Secretary, shall be stockholders of the Corporation.

### **2. ELECTION AND TERM OF OFFICE.**

The officers of the Corporation to be elected by the directors shall be elected annually at the first meeting of the directors held after each annual meeting of the stockholders. Each officer shall hold office until the officer's successor shall have been duly elected and shall have qualified or until the officer's death or until the officer shall resign or shall have been removed in the manner hereinafter provided.

### **3. REMOVAL.**

Any officer or agent elected or appointed by the directors may be removed by the directors whenever in their judgment the best interests of the Corporation would be served thereby, but such removal shall be without prejudice to the contract rights, if any, of the person so removed.

### **4. VACANCIES.**

A vacancy in any office because of death, resignation, removal, disqualification or otherwise, may be filled by the directors for the unexpired portion of the term.

### **5. PRESIDENT.**

The President shall be the principal executive officer of the Corporation and, subject to the control of the directors, shall in general supervise and control all of the business and affairs of the Corporation. The President shall, when present, preside at all meetings of the stockholders and of the directors. The President may sign, with the Secretary or any other proper officer of the Corporation thereunto authorized by the directors, certificates for shares of the Corporation, any deeds, mortgages, bonds, contracts, or other instruments which the directors have authorized to be executed, except in cases where the signing and execution thereof shall be expressly delegated by the directors or by these bylaws to some other officer or agent of the Corporation, or shall be required by law to be otherwise signed or executed; and in general shall perform all duties incident to the office of President and such other duties as may be prescribed by the directors from time to time.

### **6. VICE-PRESIDENT.**

In the absence of the President or in event of the President's death, inability or refusal to act, the Vice-President shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President. The Vice-President shall perform such other duties as from time to time may be assigned to the Vice-President by the President or by the directors.

### **7. SECRETARY.**

The Secretary shall keep the minutes of the stockholders' and of the directors' meetings in one or more books provided for that purpose, see that all notices are duly given in accordance with the provisions of these bylaws or as required, be custodian of the corporate records and of the seal of the Corporation and keep a register of the post office address of each stockholder which shall be furnished to the Secretary by such stockholder, have general charge of the stock transfer books of the Corporation and

in general perform all duties incident to the office of Secretary and such other duties as from time to time may be assigned to the Secretary by the President or by the directors.

#### 8. TREASURER.

If required by the directors, the Treasurer shall give a bond for the faithful discharge of the Treasurer's duties in such sum and with such surety or sureties as the directors shall determine. The Treasurer shall have charge and custody of and be responsible for all funds and securities of the Corporation; receive and give receipts for moneys due and payable to the Corporation from any source whatsoever, and deposit all such moneys in the name of the Corporation in such banks, trust companies or other depositories as shall be selected in accordance with these bylaws and in general perform all of the duties incident to the office of Treasurer and such other duties as from time to time may be assigned to the Treasurer by the President or by the directors.

#### 9. SALARIES.

The salaries of the officers shall be fixed from time to time by the directors and no officer shall be prevented from receiving such salary by reason of the fact that the officer is also a director of the Corporation.

### ARTICLE V CONTRACTS, LOANS, CHECKS AND DEPOSITS

#### 1. CONTRACTS.

The directors may authorize any officer or officers, agent or agents, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or confined to specific instances.

#### 2. LOANS.

No loans shall be contracted on behalf of the Corporation and no evidences of indebtedness shall be issued in its name unless authorized by a resolution of the directors. Such authority may be general or confined to specific instances.

#### 3. CHECKS, DRAFTS, ETC.

All checks, drafts or other orders for the payment of money, notes or other evidences of indebtedness issued in the name of the Corporation, shall be signed by such officer or officers, agent or agents of the Corporation and in such manner as shall from time to time be determined by resolution of the directors.

#### 4. DEPOSITS.

All funds of the Corporation not otherwise employed shall be deposited from time to time to the credit of the Corporation in such banks, trust companies or other depositories as the directors may select.

### ARTICLE VI CERTIFICATES FOR SHARES AND THEIR TRANSFER

#### 1. CERTIFICATES FOR SHARES.

Certificates representing shares of the Corporation shall be in such form as shall be determined by the directors. Such certificates shall be signed by the President and by the Secretary or by such other officers authorized by law and by the directors. All certificates for shares shall be consecutively numbered or otherwise identified. The name and address of the stockholders, the number of shares and date of issue, shall be entered on the stock transfer books of the Corporation. All certificates surrendered to the Corporation for transfer shall be cancelled and no new certificate shall be issued until the former certificate for a like number of shares have been surrendered and cancelled, except that in case of a lost, destroyed or mutilated certificate a new one may be issued therefor upon such terms and indemnity to the Corporation as the directors may prescribe. Lost certificates may also be issued pursuant to Section 7-42-113, C.R.S., as amended.

#### 2. TRANSFERS OF SHARES.

(a) Upon surrender to the Corporation or the transfer agent of the Corporation of a certificate for shares duly endorsed or accompanied by proper evidence of succession, assignment or authority to transfer, it shall be the duty of the Corporation to issue a new certificate to the person entitled thereto, and cancel the old certificate; every such transfer shall be entered on the transfer book of the Corporation which shall be kept at its principal office.

(b) The Corporation shall be entitled to treat the holder of record of any share as the holder in fact thereof, and, accordingly, shall not be bound to recognize any equitable or other claim to or interest in such share on the part of any other person whether or not it shall have expenses or other notice thereof, except as expressly provided by the laws of this State.

(c) The officers of the Corporation shall not issue certificates for shares in the Corporation for less than (insert smallest number of shares or smallest fractional share that the company desires to transfer), except that certificates shall be issued in lieu of shares of stock of less than one (1) which were in existence on (insert date of en-

actment of this bylaw0. This provision of the bylaws shall be liberally construed to prevent the issuance of fractional shares of stock in the Corporation.

(d) Upon request of any of the incorporated lateral ditch companies that receive water delivery from the Corporation, the Secretary of the Corporation shall not complete transfers of certificates for shares for a stockholder of the Corporation that also has shares of stock in the lateral ditch company without the authorization of the secretary of the lateral ditch company. It is the intent of this bylaw provision to require the transferee of the shares of the Corporation to also be the transferee of the shares of the lateral ditch company to ensure that the transferee shall be required to pay the assessments of and abide by the bylaws, rules and regulations of the lateral ditch company whether or not the facilities of the lateral ditch company are utilized by the transferee.

## **ARTICLE VII FISCAL YEAR**

The fiscal year of the Corporation shall begin on the 1st day of January in each year.

## **ARTICLE VIII ORGANIZATION AND DIVIDENDS**

This Corporation is organized as a nonprofit corporation exclusively for irrigation purposes. The directors may not declare or pay dividends on the outstanding shares of the Corporation.

## **ARTICLE IX SEAL**

The directors shall provide a corporate seal which shall be circular in form and shall have inscribed thereon the name of the Corporation, the state of incorporation, year of incorporation and the words, "Corporate Seal."

## **ARTICLE X WAIVER OF NOTICE**

Unless otherwise provided by law, whenever any notice is required to be given to any stockholder or director of the Corporation under the provisions of these bylaws or under the provisions of the Articles of Incorporation, a waiver thereof in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

## **ARTICLE XI AMENDMENTS**

These bylaws may be altered, amended or repealed and new bylaws be adopted by the following method: A vote of the Board of Directors at any regular meeting of the board, or at any special meeting called for that purpose, provided that notice of intention to move an amendment or other change, together with the text of such amendment or change, shall have been filed with the secretary, in writing, at least ten days before such meeting; and when any such notice is filed with the secretary, the secretary shall at once mail to each of the members of the board a copy of such notice. [Insert provision here for voting requirements above a majority vote of the stockholders, such as 2/3 or \_ of the quorum or such as a majority of all issued and outstanding shares.]

## **ARTICLE XII INDEMNIFICATION**

The Corporation shall indemnify each of its directors, or officers, agents, and employees or former directors, officers, agents, or employees or any affiliated organization to the maximum extent permitted by law.

## **ARTICLE XIII LIABILITY**

Personal liability of a director of the Corporation for monetary damages for breach of fiduciary duties as a director of the Corporation to the Corporation or to its stockholders is eliminated to the maximum extent permitted by law.

## **ARTICLE XIV DISTRIBUTION OF WATER**

1. A manager (superintendent or ditch rider) may be appointed by the Board and shall have charge of the waters carried by the Corporation's system under the direction of the Board.
2. No stockholder shall take or cause to be taken more than the stockholder's proportionate share of water from the system.
3. No one shall draw water from the system without prior permission from the manager.
4. The Corporation may transport water allotted by \_\_\_\_\_ (insert names of supplemental water providers), Conservancy District or any other foreign water not owned by the Corporation, for individuals who are stockholders or non-stockholders of this Corporation, upon such terms and conditions and for such considerations as the Board of Directors of the Corporation may from time to time determine. Delivery of such water shall be made at an established point in the Corporation's system, and the stockholder or non-stockholder shall arrange for the transportation of the water from the point of delivery to the place of use.
5. The Board of Directors shall have the unrestricted discretion to control the location and construction of checks, headgates and other diversion structures installed in the system, and as a condition for permitting any such checks, headgates or diversion structures to require compliance with such structural or engineering specifications as are reasonably necessary to insure the safety and structural integrity of the system and the unimpeded and undiminished flow of water therein.
6. It shall be the policy of the Corporation, its directors and officers that all decreed water allocated to or delivered by the Corporation to its stockholders or others shall be beneficially used and administered only within the boundaries of the Corporation's area of service.
7. Each stockholder or person receiving water through the Corporation's system desiring to change the place to which any water the stockholder or person may be entitled shall be delivered or to make any change in water rights of any kind or nature shall make prior written request to the Board. If in the opinion of the Board, such change can be made without injury to the ditches, the reservoirs, the Corporation or other stockholders, such water may be delivered to such place or places as requested upon such terms and conditions imposed by the Board. After such Board approval, such person shall notify in writing all stockholders and other persons affected by the change prior to such change.
8. Except as hereinafter provided, no water shall be furnished to other than stockholders and to stockholders only in proportion as the amount of stock the stockholders own or control is to the whole capital stock of the Corporation. It is made the duty of the manager of this Corporation each and every year before any water is drawn from the reservoirs of the Corporation, to ascertain as near as may be the amount of water contained in said reservoirs, and to make and estimate of the number of days said water can be continuously run in the ditches of the Corporation upon a basis of 1/10 cubic foot water per second time per share, and stockholders desiring to use water for irrigation, may have the same turned out to them upon this basis at a regular hour on any day between May 1 and October 31 each year (both dates inclusive). In order that water may not be run to disadvantage or waste, it shall be necessary that at least \_\_\_\_\_ CFS be ordered to initiate or to continue daily water delivery service. All river water belonging to the Corporation run in the ditches, and all surplus water turned into the reservoirs after they have been measured shall be divided pro rata among the stockholders. All water not delivered pursuant to such calls prior to the first day of November shall be forfeited to the Corporation for the benefit of all its stockholders to be apportioned among them for delivery during the next succeeding year.

## **ARTICLE XV**

### **ASSESSMENT ON STOCK AND LIEN**

1. If the Corporation deems it necessary to raise funds to keep its ditches, canals, or reservoirs in good repair or to pay any indebtedness theretofore contracted or the interest thereon, the Corporation shall have power to make an assessment on the capital stock thereof, to be levied pro rata on the shares of stock payable in money, labor, or both, for the purpose of keeping the property of the Corporation in good repair and for the payment of any indebtedness or interest thereon.
2. But no such assessment shall be made unless the question of making the assessment is first submitted to the stockholders of the Corporation at an annual meeting or at a special meeting called for that purpose, if a quorum is present, and the majority of stock represented at such meeting, either by the owner in person or proxy, entitled to vote thereon shall vote in favor of making such assessment; and if said stockholders fail to hold any such meeting or fail to make or authorize any assessment within ninety days after the close of the Corporation's fiscal year, the directors shall have power to make any such assessment at any regular or special meeting called therefor for that year.

3. The Corporation hereby provides for the sale and forfeiture of shares of stock for such assessment as provided in subsection (4) of this section and has the benefit of said subsection (4) for the recovery of such assessments by forfeiture or sale of the stock in default, and the Corporation shall have a perpetual lien upon such shares of stock and the water rights represented by the same for any and all such assessments or other amounts due until the same are fully paid. The Corporation hereby provides that no water shall be delivered until assessments or any other amounts due are paid. Unpaid assessments shall bear interest at the rate of 18% per annum compounded annually from the date due.

4. The shares of stock shall be deemed personal property and transferable as such in the manner provided by the bylaws. A forfeiture or sale of stock on failure to pay the assessments or any other amounts due that from time to time may become due are to be conducted in the manner provided in this bylaw. No forfeiture of stock shall be declared as against any estate or against any stockholder before demand has been made for the amount due thereon either in person or by written or printed notice duly mailed to the last known address of such stockholder at least thirty days prior to the time the forfeiture is to take effect. If the assessment is not paid within such 30 day period, then the Secretary is directed to cancel on the books and records of the Corporation, the stock for which the amount due is unpaid, and is directed to reissue the stock in the name of the Corporation. At the next annual meeting of the stockholders of the Corporation, such stock shall be offered for sale to the stockholders and shall be sold to the highest bidder. If the proceeds from the sale are insufficient to satisfy the amount due the Corporation, including all reasonable and proper costs of making and giving such notice, the Corporation may maintain an action to recover such deficiency. The proceeds of any sale, over and above the amount due on said shares, shall be paid to the delinquent stockholder.

Enacted by the Board Of Directors of the Corporation on

, 2\_\_\_\_.

#### POLICY STATEMENT

##### THE \_\_\_\_\_ DITCH AND RESERVOIR COMPANY

SUBJECT: Access to Company's Books, Records or Minutes

DATE: \_\_\_\_\_, 2\_\_\_\_

STATEMENT: Release of information contained in the books, records or minutes of the Company shall be controlled in the following manner:

A. General Public. The following information of a general or routine nature regarding the Company shall be available to persons either by written or oral request:

- A.1 The Company's Articles of Incorporation, Bylaws, charges, rules and regulations;
- A.2 Formal audit reports rendered periodically by independent auditors;
- A.3 Any publications the Company may have for general distribution; and

A.4 Publications subscribed to or otherwise obtained by the Company bearing on one or more aspects of the organization and operation.

B. Stockholders

B.1 In addition to the above information available to the general public, the following information shall be available to a stockholder of the Company by either written or oral request:

- B.1.1 The operating and other financial reports that are regularly made to lenders to the Company;
- B.1.2 monthly or periodic or special operating and financial reports submitted by Management to the Board of Directors;
- B.1.3 adopted budgets for current and future operations and capital improvements;
- B.1.4 adopted work plans for the Company's future construction, operation and maintenance of its system; and
- B.1.5 the Minutes of any prior stockholder meeting.

## B. Stockholders

B.2 In addition to the above information available to the general public and the stockholders, the following information shall be available to a stockholder of the Company by formal written request on the attached form:

B.2.1 Information that is germane to the requesting stockholder's interest as a stockholder of the Company; and

B.2.2 other information specifically approved by the Board of Directors.

Information Not to be Released. The following information is confidential and will not be released.

1. information in relation to any threatened or pending lawsuit against the Company or any Director or employee of the Company without a court order, the Company's Board approval, or advice of counsel;

2. information that will, or may invade the privacy of any person, employee or Director of the Company, or violate any of their rights;

3. information that would violate an agreement or contract with third parties with respect to trade secrets;

4. information that might result in an adverse action against the Company, its Board of Directors or employees;

5. information that may be used to adversely affect the Company with third-party negotiations; or

6. information contained in confidential communications between the Company and its legal counsel.

Information for Financial Institutions & Regulatory Agencies. The above information may be released to financial institutions and to regulatory agencies as necessary or required to carry on the affairs of the Company.

Release of Information. Upon compliance with the above requirements and authorizations, information shall be released as promptly as possible during regular business hours. At the sole discretion of the Company, a charge for multiple copies of information or for the cost to produce the requested information that exceeds a minimal cost may be required and shall be paid in advance.

Information Not Specifically Covered. Any information requested by a person or a stockholder not specifically covered above must receive approval of the Manager and the Company's legal counsel. If the Manager initially determines that the request for information should not be granted, he may withhold disclosure of such information pending consideration by the Board of Directors of the Company.

ATTESTED: By action of the Board of Directors at its regular meeting held \_\_\_\_\_, 2\_\_\_\_.

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President

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Secretary

#### REQUEST FOR INFORMATION FORM

THE \_\_\_\_\_ DITCH AND RESERVOIR COMPANY

Stockholders Name: \_\_\_\_\_

Address: \_\_\_\_\_

Specific nature and details of the information requested:

Specific purpose or purposes for which this information is desired:

Names, address and relationship to the Company of all persons or organizations for whom this information is desired or to whom the applicant proposes to show or share such information:

What additional information or access to records and personnel will be required if the above information is supplied as requested?

Dates and times the applicant desires access to the Company's books, records, minutes and personnel:

I hereby state that I am a stockholder of the Company. The information I hereby have requested is for no one's use other than those as specified above. I also hereby covenant that I will not share this information with anyone other than those specified above or allow this information to be used in any other way or for any other purpose other than as set forth above.

Signature of Stockholder -  
Applicant

STATE OF COLORADO )  
 ) ss.

COUNTY OF \_\_\_\_\_)  
Subscribed and sworn to before me by \_\_\_\_\_ on this \_\_\_\_\_ day of \_\_\_\_\_, 2\_\_\_\_.

## Notary Public

My commission expires: \_\_\_\_\_

Address:

[SEAL]

provided. Nothing contained in this Article III shall, or shall be construed to, affect in any manner whatsoever the validity of any action taken at any meeting of the Board of Directors.

#### **4. REGULAR MEETINGS.**

A regular meeting of the directors shall be held without other notice than this bylaw immediately after, and at the same place as, the annual meeting of stockholders. The directors may provide, by resolution, the time and place for the holding of additional regular meetings without other notice than such resolution.

#### **5. SPECIAL MEETINGS.**

Special meetings of the directors may be called by or at the request of the President or any two directors. The person or persons authorized to call special meetings of the directors may fix the place for holding any special meeting of the directors called by them.

#### **6. NOTICE.**

Notice of any special meeting shall be given at least \_\_\_ (suggest 5) days previously thereto by written notice delivered personally, or by electronic mail or mailed to each director at the director's business address. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail so addressed, with postage thereon prepaid. If notice be given by electronic mail, such notice shall be deemed to be delivered when the electronic mail is delivered to the electronic network. The attendance of a director at a meeting shall constitute a waiver of notice of such meeting, except where a director attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened.

#### **7. QUORUM.**

At any meeting of the directors the majority shall constitute a quorum for the transaction of business, but if less than said number is present at a meeting. The act of the majority of the directors present at a meeting at which a quorum is present shall be the act of the directors. A majority of the directors present may adjourn the meeting from time to time without further notice. The associate director shall not be counted in determining a quorum.

#### **8. MANNER OF ACTING.**

The act of the majority of the directors present at a meeting at which a quorum is present shall be the act of the directors.

#### **9. INFORMAL ACTION BY DIRECTORS.**

Any action required or permitted to be taken by the Board of Directors or by a committee thereof at a meeting may be taken without a meeting if a consent in writing setting forth the action so taken, shall be signed by all of the directors or all of the committee members entitled to vote with respect to the subject matter thereof.

#### **10. PARTICIPATION BY ELECTRONIC MEANS.**

Any members of the Board of Directors or any committee designated by such Board may participate in a meeting of the Board of Directors or committee by means of telephone conference or similar communications equipment by which all persons participating in the meeting can hear each other at the same time. Such participation shall constitute presence in person at the meeting.

#### **11. NEWLY CREATED DIRECTORSHIPS AND VACANCIES.**

Newly created directorships resulting from an increase in the number of directors and vacancies occurring in the Board for any reason except the removal of directors by the stockholders may be filled by a vote of a majority of the directors then in office, although less than a quorum exists. Vacancies occurring by reason of the removal of directors by the stockholders shall be filled by vote of the stockholders. A director elected to fill a vacancy caused by resignation, death or removal shall be elected to hold office for the unexpired term of the director's predecessor.

#### **12. REMOVAL OF DIRECTORS.**

Any or all of the directors may be removed for cause by vote of the stockholders.

#### **13. RESIGNATION.**

A director may resign at any time by giving written notice to the Board, the President or the Secretary of the Corporation. Unless otherwise specified in the notice, the resignation shall take effect upon receipt thereof by the Board or such officer, and the acceptance of the resignation shall not be necessary to make it effective.

#### **14. COMPENSATION.**

No compensation shall be paid to directors, as such, for their services, but by resolution of the Board a fixed sum and expenses for actual attendance at each regular or special meeting of the Board may be authorized. Such amount may be designated

# MUTUAL IRRIGATION AND RESERVOIR COMPANIES

*By Ray Anderson*

Mutual irrigation and reservoir companies, essentially cooperatives, are the most common organizations delivering water to Colorado's irrigated farms. Farmer/irrigators own the capital stock and control the companies' operations. Three types of companies operate in the state:

- Canal and reservoir companies supplying both direct flow and storage water to farmers under their ditches;
- Canal or ditch companies supplying only direct flow water; and
- Reservoir companies supplying only storage water.

The last two often operate out of the same offices and deliver water in the same canal; some canals carry water of more than one reservoir company. In these cases, a farmer must own stock in both the canal and reservoir company in order to receive both types of water.

Larger irrigation companies organize lateral companies with stock owned by farmers along the lateral. The laterals receive water from the main company.

Mutual irrigation companies typically hold the water rights and are the appropriators of water from the streams. The water can be used anywhere within the service area of the company. Farmers gain the right to use water through the ownership of capital stock in the irrigation and reservoir company.

Water deliveries are based on the numbers of shares owned and have no necessary relationship to the amount of land irrigated. Shares are not evenly distributed among water users or over the land irrigated by the system. As a consequence, a seasonal variation in water supply has different effects on water users within a system, depending on their holdings.

Companies usually levy annual assessments on capital stock to meet maintenance and operation expenses. Some systems that carry reservoir water levy running charges to help defray expenses. This can be in the form of fees paid or a portion of water run. Thus, a farmer's operation and maintenance costs and water deliveries are both calculated on the basis of the shares of stock owned.

Outstanding stock ranges from as few as eight shares to more than 10,000. Water allocated per share can range from a little as half an acre foot per share to as much as 400 to 600 acre feet per share. Allocation of smaller quantities per share has the advantage of greater flexibility of ownership and reduces the need for fractionalization when shares are sold.

## Water measurement

Water is measured in either by volume or flow. Acre feet —the volume of water covering one acre to a depth of one foot, or 325,850 gallons—is used for volume of water. Flow is measured in various ways. The most common measure is cubic feet per second of time, often noted as cfs. Direct flow water rights are held in terms of cubic feet per second and the river commissioner diverts water into canals on the basis of cfs. One cfs flowing for 24 hours delivers 1.982 acre feet., usually rounded off as 2 acre feet.

Another flow rate is a miner's inch. A miner's inch or just "inches" is supposed to be equal to 1/40 of a cfs, but may vary from company to company. Some use 55 inches, some use 60 and some use the traditional 40 inches per cfs. If a water rights decree describes a flow rate in miner's inches, Colorado statute provides that one cfs equals 38.4 miner's inches. This is sometimes called a "statutory inch".

## Water allocation during the irrigation season

Water supply available during the irrigation season is estimated from mountain snowpack reports.

Given the water supply outlook, most irrigation companies inform the stockholders of anticipated amounts of water available per share. The estimates are usually quite conservative so the company can be certain it can deliver the amount of water anticipated. Additional allocations are often made as the season progresses and as water becomes available.

After receiving information about water supply, farmers can calculate total expected supply and the seasonal availability of the water. Direct river diversions are usually available early in the season, while storage water can be called to meet early or late needs. With water supply information at hand and knowing the general water requirements of crops, farmers can plan to plant the acreages of crops that will maximize income.

An irrigation company typically gives water users an account, much like a checking account in a bank, specifying the amount of water available to the shares of stock owned. As water is delivered, the amount is deducted.

## Operating procedures

The major irrigation systems have formal distribution rules and. Water often is delivered to many users from a variety of

sources under several different kinds of canal and reservoir company stock, making it necessary to closely control water and keep precise delivery records.

Water runs in most larger systems are made weekly during the season, for three, four, five or seven days each. In order to coordinate deliveries on a canal, the ditch officials must know in advance how much water the farmers will want during a particular run. They also need to know the expected flow in the river in order to judge how much water will be available from that source, so that reservoir releases can be planned to supplement direct diversions if the diversion is inadequate.

In cases where exchanges of reservoir for river water are to be made, all companies involved must know the timing and, and the exchange must be cleared with the river commissioner.

A large irrigation company in northeastern Colorado has a specific water allocation regimen that illustrates various water ordering and delivery rules. Each Saturday, the officials of the major irrigation systems and the water commissioner have a conference to determine deliveries for the coming week, based on anticipated river flow and reservoir releases. Any evening during the week, irrigation officials and the river commissioner can confer by phone to make adjustments necessitated by river flow changes.

So that company officers have advance knowledge of the weekly water requirements of their constituent farmers, delivery rules typically specify that farmers who want to irrigate beginning Monday must call the company office by noon on the preceding Saturday to place their orders. And there may be other requirements. For example, each water user must place an order for the first day of the run, along with any additional days. This is done so the company can be sure there is sufficient demand to start the canal and to spread out the delivery over a three-, five- or seven-day period.

Later in the season, when the company must rely on a reservoir, and there are not enough orders to reach 250 rights of reservoir water (180 cfs), the secretary declares an insufficient demand and no water is run. Whenever undelivered orders fall below 200 rights, the run is stopped until orders for more than 250 rights are again effective. This procedure saves labor and water that would be lost from running a low head of water in the canal.

If a farmer does not want to irrigate early in the week, he/she can order the smallest quantity the company will deliver on the first day, have the water shut off for one or two days and then have water delivered again late in the run for one, two or more days. Alternatively, he/she will arrange with a neighbor to take his/her full first day's run, and the neighbor can repay the water later.

Some companies place time quotas on the water deliveries. They specify, for instance, that 30 percent of each farmer's water allotment must be run by July 1, 50 percent by Aug. 1 and 70 percent by Sept. 1. All accounts are reduced to these levels at specified dates so that a water user who used less than 50 percent by Aug. 1 would nonetheless have only 50 percent remaining after that.

Time quotas are employed to use stream flow as it becomes available and to prevent water users from placing too heavy a demand on the ditch system late in the season. Quotas better utilize both direct and reservoir water when they are allocated on the same stock. They also prevent those who rent water from profiting on late season shortages.

The irrigation company's secretary keeps a record of water used by farmers. Each day that water is run, the quantities delivered are deducted from the farmers' accounts. Most farmers frequently check their account status, so they can plan future orders in relation to crop needs.

Companies' operating rules do not specify any drought or water-short years special procedures because each farmer has a water allotment, which reflects the seasonal status of water supply. He/she can use it, subject only to regulations needed to operate the canal in hydraulic terms. The use of water in times of shortage is left to the discretion of the water users.

As for the hydraulic rules, the canal companies have special procedures when demands for water exceed the capacities of the canals, which is likely to occur when supply is plentiful and use is high because of hot temperatures and rapid growth of

crops. Such a rule is designed to give canal stockholders preferential treatment and to make farmers who own mostly reservoir water wait until canal stockholders have been served. Postponement of water delivery normally lasts for only a few days. If deliveries get very far behind demand, the company can run water for seven days a week.

During water shortages, company officials may, for hydraulic reasons, schedule fewer runs, aggregating the smaller supplies to maintain an effective delivery.

The larger canals run by divisions. A run is started at a specified time when water deliveries are begun in the canal's upper division. Enough water is turned into the canal to serve the division and to begin filling the second division and so on, until eventually all divisions are delivering water to farmers at the same time.

At the end of a run the upper division is shut down first, then the second, on down to the last division which may finish deliveries a day or so after the first division has shut down. There may be one or more large check dams in the canals of each division to maintain the water level necessary to make deliveries.

Since the main canals on large systems are 25 to 30 feet wide and may be 10 feet deep, these check dams are major structures. The canal superintendent adjusts the major canal checks to assure that each division and major laterals receive adequate water each day during the run.

Most companies deliver the same quantity of water per share to all water users regardless of their location on the canal. A few of the companies, though, deliver different quantities to different divisions. A company may deliver 30 inches per share on the upper division, 25 inches per share on the

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*In cases where exchanges of reservoir for river water are to be made, all companies involved must know the timing and, and the exchange must be cleared with the river commissioner.*

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middle division and 20 inches per share on the lower division. On the face of it, this policy may seem to penalize lower end water users but, the lower division picks up runoff from the canals at higher elevations. Frequently the runoff meets or exceeds the amount per share at the lower end of the canal as at the upper end.

Each division has a ditch rider who measures the water at the head of his division to determine there is enough inflow to fill the farmers' orders. He also opens and closes or adjusts headgates to make sure that the water is delivered to the proper users. On most systems the ditch riders lock all headgates to keep farmers from adjusting them during a run. Locking headgates is practiced for two reasons: to keep any user from getting more water than his/her entitlement, and to keep farmers from closing headgates and flooding canals lower on the system.

The small companies—those with service areas less than 5,000 acres—generally deliver water to farmers on an informal basis. One man functioning as superintendent, record keeper and ditch rider handles water distribution problems as he travels up and down the ditch setting headgates to deliver water to the farmers. He knows how many shares each water user has and how much water each is entitled to receive, and he can adjust deliveries to make the most effective use of water available in the canal.

When demands get too great for the water available, the superintendent sets up specific delivery times for farmers or he institutes rotations or other means of rationing water to meet demands. Most farmers will be served within a few days of when they order water. The small systems allow for greater flexibility in water delivery, and generally have more water per acre to deliver to farmers so that delays in water delivery are not serious.

### Irrigation water rental

In the South Platte Basin water rental procedure has developed in response to continuing small water supply imbalances among farmers. Imbalances are always present, because of new crop patterns, well development, additional land added for irrigation, and transfers of water stock. To help adjust without revamping the whole, water rentals have developed.

Under the prior appropriation doctrine, water is attached to the lands for which it was initially appropriated. If an appropriator uses water on lands located elsewhere, or if he grants or sells it to others for this purpose, or does not use the water the basic water right can be lost.

In the South Platte-Cache La Poudre water rights are held by the canal companies and not by individuals. The significance of company holding of water rights is that the water is attached to the company's service area as a whole and not to any specific farm.

Water users own stock in the company rather than water rights, and water dividends or allotments are declared on the basis of stock ownership rather than land owned in the service area. Stocks—and the water dividends—are treated as personal property that can be bought, sold, or rented for the season or a shorter period at will. Such transactions are pos-

sible normally only within the confines of the service area of the company that owns the rights.

Reservoir companies' stock and water dividends also are treated as the personal property of the individual owners who are free to buy, sell, or rent them. Reservoir water is more amenable to renting than direct flow because it is normally delivered on a demand basis, and it can be delivered in more than one canal system.

Water rental practices vary by irrigation companies according to their size, historical development, and other factors. Rental procedures for representative companies in the Cache La Poudre-South Platte area are presented in Table 1. The small companies typically keep no record of transfers. Any exchange of water is arranged between individuals with the ditch rider making the delivery changes.

The major irrigation companies, with several hundred water users, usually maintain a rental service in the company office. The stockholders who have excess water list it with the secretary, and those needing more contact the secretary to obtain it.

In some companies, the board of directors sets the rental price, and everyone who buys or sells water does so at the established price. Other companies post the asking price along with the quantity of water offered. Users who need additional water take the lowest price posted or haggle with the shareholder.

If the season turns hot and dry, the shares available for rent are quickly taken up and the price rises. If it rises sufficiently, more shares will appear on the market because farmers with low return uses for the water, such as pasture or hayland irrigation, will find it more profitable to rent. All three types of water are involved in this process and the prices are generally the same.

Most rentals involve relatively small quantities of water, indicating the marginal values of this water. During most years transfers within the irrigation companies are for less than 50 acre feet of water per transaction.

Within irrigation companies the rental rates for water generally reflect the yearly stock assessment plus an interest charge on the market value. Beyond this the rates will vary with the status of the area's water supply. When the supply is short, higher prices reflect water's higher marginal.

By using the rental system, seasonal adjustments in the water supply can be avoided. The rental market, while dealing only in a relatively small amount of water, makes possible a better adjustment of the land-water relationship than is found in many western irrigated areas.



# FINANCE & PERSONNEL

by Cecil McPherron, Anderson & Whitney, P.C., CPAs

An organization's board members have a fiduciary responsibility to the shareholders and others who deal with the company. The extent of that responsibility has received more attention since the disclosure of management improprieties in several publicly-held companies. Ensuring accurate financial information and board review are important to fulfill the board's duties.

Like any nonprofit entity, ditch companies raise revenues to meet annual expenses, required capital improvements and contingency funds. Stockholder assessments are the means for providing revenues in most cases. The process should follow steps outlined in the organization's bylaws. Detailed records must be maintained, and receivables must be reconciled with receipts and outstanding balances. It's the board's job to review the reconciliation and list of outstanding assessments at regular board meetings.

The board's responsibility for monitoring expenditures typically starts when it adopts and approves an annual budget. The budget establishes a spending plan for the year and provides a means to compare actual expenditures against spending.

Financial reports can be as simple as a list of revenues and expenditures with beginning and ending cash balances, or as formal as financial statements. The type and extent of financial reporting is dictated by the size of the organization and the board's involvement in the ditch company's daily operations. Timeliness takes precedence over complexity when it comes to financial reporting.

Other financial aspects that require board review include the sale or purchase of assets at a predetermined dollar value; incurring debt; investment transactions; annual budget approval; changes in ownership of shares; and approval of significant contracts.

Board members are ultimately responsible for seeing that a system of appropriate internal controls is present. Internal controls include policies and procedures that:

- Pertain to the maintenance of accurate and reasonably detailed records;
- Provide reasonable assurance that transactions are properly recorded and authorized; and
- Safeguard assets.

To do so, the board should set policies:

- To establish an internal control system, such as depositing all cash receipts intact on a daily basis;
- For employees to obtain management approval for invoices prior to payment;
- To separate authorized check signers and those with bookkeeping responsibilities;
- To assign the review of bank reconciliations to a person without other bookkeeping responsibilities; and
- To require management approval of employee time records.

Ultimately, common sense goes a long way toward establishing internal controls.

## Employment issues

Common law employees perform work the employer legally controls and directs. An independent contractor is one who the payer directs only what is to be done. The independent contractor generally determines the method and procedure to complete the work. In the setting of a ditch company, most workers will fit the definition of a common law employee. Ditch riders, superintendents, and office staff normally would be employees.

The ditch company may have independent contractors for some positions. Independent contracting allows a person to offset his/her income with ditch-company related expenses. The ditch company saves payroll taxes and avoids the associated paperwork.

Prevent problems by establishing minimum personnel standards. When hiring a new employee, maintain:

- An employee personnel file—The file should contain the application for employment; a job description, W-4 Form; Form 1-9, which may be filed separately; and a current information sheet containing a current address, wage rate, and health insurance coverage if applicable.
- Form W-4—This form contains information that enables the ditch company to apply the correct withholding tables to the wage payments. Changes to employee withholding or marital status should be documented with a new Form W-4.

- Form 1-9 -This form is required for new hires and documents the employee's eligibility for employment in the United States.
- For employees hired after Dec. 31, 2006 Colorado employers are required to affirm the employer has:
  - Examined the legal work status of the employee;
  - Retained file copies of employee documents used to provide legal status;
  - Has not falsified employee identification documents; and
  - Has not knowingly hired an authorized alien.
- The affirmation form is at the Colorado Department of Labor and Employment Web site.
- Continuation and portability for group health insurance. The employer should check with its insurance carrier to determine the requirements that apply.
- Hiring records. Federal law now requires employers to send information to a state directory for purposes of child support enforcement. A completed Form W-4 may be used for this purpose. Send the form to Colorado State Directory of New Hires, PO. Box 2920, Denver, CO 80201-2920 or fax it to (303) 297-2595.

### **Payroll tax compliance**

Federal and state payroll tax withholding and remittance require accurate recordkeeping, and timely filing and payment. Failure may subject the ditch company to monetary penalties and time consuming correspondence. Ultimately, "responsible persons" as defined by the IRS can incur personal liability if a company fails to remit withheld payroll taxes. An officer, check signer, and board members may be "responsible persons" depending on the circumstances.

A ditch company may handle the payroll function in-house using internal employees. Outside assistance may be obtained from local bookkeeping and accounting firms, including preparation of payroll checks and filing of tax returns. Firms such as ADP and Paychex also offer a complete payroll service that can be cost effective and insure timely tax returns.

Withholdings from employees' paychecks include income, Social Security and Medicare taxes. Taxes, along with the employer's match for Social Security and Medicare, are reported and reconciled on Form 941, Employers Quarterly Federal Tax Return. Form 941 is due at the end of the month, following each calendar quarter. The payment method depends on the total tax amount for the quarter. If the total for the quarter is less than \$2,500, the tax may be paid by enclosing a check with Form 941. If the tax exceeds \$2,500, remit the tax by electronic transfer or by deposit at a local bank using an IRS-provided deposit coupon. The IRS Publication 15 (Circular E) has more information on signing up for electronic transfer.

Form W-2 must be given to each employee by Jan. 31 of the following year. Copies of Form W-2 along with the W-3 transmittal form are submitted to the Social Security Administration no later than Feb. 28th of the subsequent year. All of the federal and state payroll tax forms must agree. The total wages and taxes per the quarterly Forms 941 must agree with the W-2 forms and W-3 form sent at the end of the year. If the forms do not agree, correspondence from IRS will soon follow.

The federal unemployment tax return, Form 940, is filed annually at the end of the year and a relatively small amount is due for each employee. Colorado has a similar system of quarterly tax returns with deposits paid either by check or electronic transfer. Colorado unemployment tax returns are filed quarterly.

### **Workers compensation insurance, overtime, and expense reimbursement**

All Colorado employers are required to carry workers compensation insurance for employees as well as independent contractors who do not have their own insurance. Ditch companies should contact their insurance carriers for coverage.

Overtime in Colorado is payable to employees who work more than 12 hours in a day or more than 40 hours per week. Overtime is payable at 1 1/2 times the normal hourly rate.

Effective Jan. 1, 2007, the minimum wage in Colorado is \$6.85 per hour. Certain administrative employees are exempt from overtime and minimum wage requirements. An administrative employee is exempt if all of the following conditions are met:

- Salary of not less than \$455 per week; \$910 biweekly; \$985.83 semimonthly, or \$1,971.66 monthly;
- Primary duty of performing office or nonmanual work directly related to the management or general business operations of the employer; and
- Primary duty includes the exercise of discretion and independent judgment with respect to matters of significance.

The ditch company may reimburse employees for out-of-pocket expenses related to the performance of their jobs, including the use of their personal vehicles. To be excluded from an employee's W-2 form, the reimbursement should be pursuant to an accountable plan. That is, the employee submits a list of expenses, with receipts if applicable, and is reimbursed for actual expenses.

### **Job descriptions and employee handbook**

Many small employers rely on an informal understanding of the job duties between management and employees, rather than prepared job descriptions. A written job description provides the employee with a written record of the tasks and responsibilities required to adequately perform the job. It determines where responsibility begins and ends, and confers the ditch company's authority on an employee. In a complete job description, include:

- Job title;
- Immediate supervisor;
- Who the employee supervises;
- The primary purpose of the job;
- The essential duties of the job;
- Safety concerns related to the job; and
- Working conditions unique to the job.

### **Income tax issues**

Most Colorado ditch companies will be organized as ditch and reservoir companies under Colorado statutes. Even so,

the corporation is a taxable entity

If at least 85 per cent of the ditch company's annual revenue is from member assessments, the company may apply for exemption from federal income tax. The exemption is obtained by filing an application, Form 1024, with the IRS. After a favorable review, the company is no longer subject to federal and state income tax. The ditch company is still required to file IRS Form 990, Return of Organization Exempt from Income Tax, if gross annual receipts exceed \$25,000. Form 990 is due on the 15th day of the fifth month after the end of the fiscal year.

In a year when the ditch company doesn't meet the 85 percent test, it is a taxable corporation. Typically this happens when investment income and/or gain from property sales exceeds 15 percent of gross receipts. Corporate returns are due on the 15<sup>th</sup> day of the third month after the end of the fiscal year.

#### Outside help

Each ditch company must decide which accounting tasks are best handled internally and which require outside help. Local accounting firms are often used for annual tax filings and financial statements for distribution to stockholders. By-laws and sometimes creditors of a ditch company may require financial statements prepared by an outside accountant. Local bookkeeping and accounting services can do the detail work required for reporting and financial statement preparation.

DARCA

# WATER RIGHTS

by Joe Tom Wood P.E., Martin and Wood Water Consultants, Inc.

*Author's note: Parts of this chapter are incorporated directly from the "Citizen's Guide to Colorado Water Law," published by the Colorado Foundation for Water Education. Text taken from the guide is italicized rather than footnoted. Footnotes and numerals – e.g., FN7 – refer to the numbered items on the recommended reading list.*

## Introduction

**Water right—A property right to the use of a portion of the public's surface or tributary groundwater resource obtained under applicable legal procedures.**

Colorado statutes (37-92-103(12)), 10 C.R.S. (2001) define a water right as "a right to use in accordance with its priority a certain portion of the waters of the state by reason of the appropriation of the same."

Colorado's water law system follows the doctrine of prior appropriation, meaning that the first person who diverts and uses the water from a given stream has the better right (in time) as compared to anyone else who later comes upon the same stream and later diverts and uses water from the stream.

In the 1850s miners in Colorado used streamwater to pick gold out from sands and gravels. They adopted the prior appropriation doctrine miners in California used. Had there been bounteous supplies of water in either state, no one would have cared who was using water. But Colorado and the California gold mining areas were arid. So, the California miners adopted a system. In drier times this first miner might be the only miner to have any water.

Colorado's State Constitution adopted the prior appropriation doctrine in Article XVI, Section 5: "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 people of the state, subject to appropriation as hereinafter provided." Section 6 adds: "The right to divert the unappropriated water of any natural stream shall never be denied."

Colorado's Constitution indicates the people of Colorado own the state's waters, subject to the right to appropriate the unappropriated waters for one's beneficial uses. That's very simple, very understandable, and very fair. But, of course, with human involvement over the passage of time, it's become complex.

You might ask, "How will I know a water right when I see one?"

You can't really.

Interested people can read a court decree which describes one, or can go to where a water right is diverted from a stream and see one at work irrigating a field of corn or alfalfa.

In a paper written and delivered by Colorado Supreme Court Justice Greg Hobbs, he defines a water right as "a right to use waters of the natural stream - which includes surface water and tributary groundwater - when water would be naturally available to it in order of priority for diversion at its decreed location under its decreed priority in the amount of its decreed beneficial use." [FN1]

## Parts of a water right

Justice Hobbs has also described a water right as a bunch of sticks in "the bundle of a water right." [FN2] And, indeed, I think, a water right is just like a bundle of sticks.

Justice Hobbs' bundle of sticks might be more fully described to include:

- Date of appropriation;
- Date of adjudication;
- Date of priority;
- Point of diversion;
- If for storage, a place of storage;
- Rate of flow for a diversion, usually in cubic feet per second, or cfs, or an amount of storage, usually in acre feet;
- Type of beneficial use, such as mining, irrigation, domestic or municipal, among others;
- Place of use; and
- Time of use.

In my own words, the sticks in the water rights bundle are:

## Date of appropriation—the date the appropriator took action to create the water right.

About 150 years ago, the date of appropriation would most likely be the date someone, such as the appropriator, began to dig a ditch, or the date water was first diverted and used for a beneficial purpose. Now, the date of appropriation more likely corresponds to the date a person files an application with the water court.

**Date of adjudication, or adjudication date—the date a court enters a decree confirming a water right**

Prior to the “1969 Act” state district courts had jurisdiction over water matters and would enter decrees, which confirm a water right. Once the court did so, the water right would be and still is described as “a decreed water right.” The date that the court entered the decree is known as the date of adjudication. Since 1969, the water courts have had jurisdiction over water matters in Colorado, and the adjudication date has become the year the application was filed, with exceptions for certain exchanges.

**Date of priority—the date by which the water right is, or should be, administered within the priority system.**

This stick is the most important. The priority date tells you how far up or down the line the right falls in time with respect to other rights in the same stream system. Of all of Justice Hobbs’s sticks, the priority date by itself defines the prior appropriation doctrine that governs Colorado’s use of water.

If you have a water right in the first adjudication of water rights in the area in which the right’s point of diversion is located, the priority date is identical to the date of appropriation. This is a general rule.

These first adjudications were general in nature. Newspaper notices were published to encourage people to go to court and file claims for a water right and pursue water rights by decree from the state district court. Many people did. They gave testimony and obtained a decree which also confirmed numerous other persons’ water rights at the same time and in the same decree. These are called original adjudications.

Did people stop diverting water after the original decrees were entered across the state in the 1880s, 1890s, 1900s, and perhaps later? Of course not. People continued to take out ditches, to build reservoirs, and to use water in towns and cities. Then came supplemental adjudications, when people sought to confirm their newly developed water rights judicially, *after* the date of entry of the original adjudication.

Supplemental adjudications occurred in two ways: Some were general, and they involved the simultaneous adjudication of numerous water rights. In others, a supplemental decree was entered by the court for a single water right.

The general rule is that no water right adjudicated in a supplemental adjudication can take precedence over any water right adjudicated in a prior decree, or no one can take a priority date that is more senior than the junior-most date from the prior adjudication. This is called the postponement doctrine.

If you think that the way that the state is incorrectly administering the priority date of your water right, talk to the state engineer’s representative, the local water commissioner or the division engineer, or your attorney.

**Point of diversion—the location on a stream where water is diverted**

The point of diversion in Colorado is what we call a legal point of diversion, usually, but not always, defined by reference to section, township, and range.

One of the more colorful legal descriptions of a decreed point of diversion in Colorado is for Fairplay’s water right on the Middle Fork of the South Platte River “at any convenient point or points in the immediate vicinity of said town...” It includes the likewise colorful decreed use of “the driving of stock to the stream for watering.”

**Types of water rights**

The types of water rights include direct flow, storage, and exchange rights—all of which may be conditional or absolute—instream flow, minimum lake level and recreational in-channel diversion rights.

**Direct flow**

A right that takes its water directly from the surface stream or tributary groundwater for immediate application to beneficial use. It is expressed in cubic feet per second of flow.

**Storage water right**

A right to impound water in priority for later use, expressed in number of acre feet of water the reservoir or storage vessel can hold.

**Exchange decree**

A water court decree that allows an upstream junior diverter to take the water that would usually flow to a senior downstream diverter. The upstream junior diverter must provide the downstream senior diverter with a suitable replacement supply of water, in amount, timing, and quality, from some other source.

An exchange water right might more properly be defined as an “appropriative right of exchange,” because it, too, operates within Colorado’s priority system.

The exchange right may be tough to grasp. Let’s say we have the junior Joe Ditch upstream, and a senior Tom Ditch downstream on the same stream. Water supply on this stream is limited, and there’s only enough water for the senior, downstream Tom Ditch to divert. The junior, upstream Joe Ditch may not divert under our priority system, because to do so would deprive the senior, downstream Tom Ditch, of water to which it is lawfully entitled. So, here’s where the exchange comes in to allow the junior, upstream Joe Ditch, to divert without injuring the senior, downstream Tom Ditch.

Junior, upstream Joe Ditch acquires an additional source of water to provide to the stream above the senior, downstream Tom Ditch’s diversion point. This additional source in

the old days frequently came from water stored in a reservoir. This still works, but today's sources often include treated wastewater that is legally reusable.

In any event, let's say that the junior Joe Ditch wants to divert 2 cfs, which, without the exchange, would deprive or injure, the senior, downstream Tom Ditch. To operate the exchange, the owner of the Joe Ditch releases 2 cfs from a reservoir into the stream above the Tom Ditch's point of diversion, allowing the junior Joe Ditch to divert 2 cfs. The Tom Ditch gets just as much water with the exchange as without it. No harm, no foul.

### Instream flow

A water right held by the state to protect or improve the water-dependent natural environment.

In the 1970s Colorado enacted a law that enabled the Colorado Water Conservation Board to appropriate waters of the state instream "to preserve the natural environment to a reasonable degree," and the right to appropriate a minimum streamflow decree was vested solely in the CWCB.

A minimum streamflow decree can exercise its priority date against junior rights on the one hand, but it can also continue to exercise its priority entitlement to flow against junior water rights even when it is itself out of priority.

### Minimum lake level

Like the CWCB's minimum streamflow rights, they're for the fishes, the picnics, the book readers, and so on. (I like fishing and reading.) This right can call out junior, upstream rights. A minimum lake level right is likewise unique in that it is immune from being called out by a senior downstream right, at least insofar as no one else being able to infringe upon it when both that someone else's right and the CWCB's right are subject to a senior, downstream call.

### Recreational in-channel diversion (an RICD right)

Water right held by a local governmental entity for structures that control the flow of water for boating and kayaking.

The recreational in-channel diversion right is a relatively new water right in Colorado. By statute, the adjudication of such a right requires involvement by the Colorado Water Conservation Board. Pueblo, Avon and Steamboat Springs made applications for such rights, and the Colorado Water Conservation Board conducted hearings on the applications.

Recreational rights tend to preclude subsequent appropriations, within the entire drainage basin above them, for other beneficial uses, such as irrigation, storage, municipal, and even recharge for well augmentation plans. Considering the scores of recharge-and-well-augmentation plans recently applied for along the lower South Platte River, one can only ask what would have happened if the Town of Julesburg, at the very low end of the South Platte, had first filed for such a recreational right. Hmm.

### Groundwater use

*According to the 1965 Ground Water Management Act, every new well in the state of Colorado that diverts tributary, nontributary, Denver Basin groundwater, or geothermal resources must have a permit. Groundwater use rights depend on the source of the groundwater and the type of beneficial use.*

In order to obtain a permit to drill a well, one must file an application with the Colorado Division of Water Resources, also known as the State Engineer's Office. To obtain a water right decree for tributary groundwater, one must file a well permit application and submit other required documentation to the appropriate water court.

### Decree copies

First, list the water rights you believe your ditch company owns. Call your local water commissioner or the division engineer, or, if you have a water lawyer or engineer, work with him or her to prepare your list. That's where to start.

If the decrees aren't available from the water attorney or engineer, ask for copies from the local Water Commissioner or the Division Engineer, or the State Engineer's office in Denver. The Records Section of the State Engineer's Office is on the 8<sup>th</sup> floor of the Centennial Building at 1313 Sherman Street, telephone number 303-866-3581. Copies are 50 cents per page. Another way to obtain copies of your decrees is to hire a professional—either a consulting engineer, an attorney, or other water professional—to get them.

Once you have copies of all of your decrees, read them, and when you have time, read them again...and again. If you have several water rights, put all of the decrees in a notebook and index them by court case number or by the name of the water right. Keep the notebook in a handy place. You'll want to be able to find it when you need to.

### Water courts

In 1969 the Colorado General Assembly passed the Water Rights Determination and Administration Act of 1969.

Most water attorneys and water engineers refer to it as the 1969 Act. Prior to the act the state district courts handled water rights adjudications.

The act set up the Water Court system, establishing one for each of the seven major river systems and designating corresponding Water Divisions. For example, Water Division 1 consists of the South Platte River drainage area, and Water Division 2 is the Arkansas River drainage.

The act said the Colorado Supreme Court would designate a State District Court judge to be the Water Court judge for each of the Water Courts, along with an alternate Water Court judge to act in the event of a conflict of interest, or if the regular Water Court judge's docket was too full.

The act also provided for a water referee to process Water Court applications to the point of entering a referee's ruling. When entered, the ruling goes to the water judge for his or her review and likely adoption as the Water Court's decree. If a party to the application, either the applicant or an objector, believes that the result of the ruling will be unacceptable, that party may make a motion to the court to place the matter in the water judge's hands to avoid the burden of further fruitless proceedings before the referee.

Most Water Court cases are resolved to the point of a decree, without the need and expense of having a trial before the water judge. Many water professionals believe settling a water matter by negotiation beats the cost, expense, and the unknown outcome of trying the case before the water judge.

Sometimes, for a variety of reasons, parties find themselves in court. The water judge holds a trial, preceded by a dis-

covery process wherein designated witnesses typically give sworn testimony in a formal deposition, and expert witness reports and exhibits are typically prepared and distributed.

If an agreement still is not reached, the water judge conducts a trial, complete with opening arguments, presentation of evidence and testimony by the applicant and the objectors, closing arguments, sometimes briefs, and frequently the tender of a proposed decree by a court-designated party, usually the prevailing party.

Once the decree is entered, any party may appeal. Water court appeals go directly to the Colorado Supreme Court.

### Water court resume

The 1969 Act provided for monthly publication of all applications for water rights of any and all kinds in the Water Court resume. Its purpose is to put interested parties on notice of the applicant's plan to use water.

The resume provides a description of what the applicant seeks, be it a direct flow or storage right; a plan for augmentation; a change of water right; an appropriative right of exchange; or a finding from the Water Court that one has been diligent in putting his/her conditional water right to beneficial use, but hasn't done so yet; or a finding that he/she has perfected, or made absolute, a portion or all of his/her conditional water right.

Each water court publishes its resume every month, usually in the first half of the month following the month when applications are received. Parties who wish may file statements of opposition. They must be filed by the end of the second month after the month the applications were filed.

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The CFWE "Citizen's Guide" describes an augmentation plan as "*a court-approved plan designed to protect senior water rights, while allowing junior water rights to divert out of priority*".

Put another way, it's a balancing act. When a junior water right diverts out of priority, it takes water out of a stream. An augmentation plan adds water to the stream in an amount, place, and time to balance the effect. An augmentation plan keeps the stream whole. When an augmentation plan functions properly, it is as if the junior water is not diverting at all, and, therefore, not depriving the senior right of the amount of water to which it is entitled.

### A call

Demand for administration of water rights. In times of water shortage, the owner of a decreed water right will make a "call" for water. The call results in shut down orders against undecreed water uses and decreed junior water rights as necessary to fill the beneficial use need of the decreed senior calling right.

Justice Hobbs cites an 1894 Department of Interior report in effectively defining a call, which he says could easily have been written in 2002.

"The theory upon which the law is based is simple, but the details for enforcing this are complicated and not always efficient. The primary object is to secure to each irrigator the use of an amount of water equivalent to that originally employed by him according to the date at which such employment was made. That is to say, the first settler on a stream should be

secure in the use ever after of the amount of water originally diverted and used, and if there is a surplus the next settler should have an amount equivalent to that originally used by him, and so on. At times of drought the persons utilizing the water last in order of time should be deprived of it and this shutting out should continue in the reverse order of the dates of appropriation until those holding what are known as prior rights have a full supply..."

It is the last sentence that defines how a call should operate: by curtailing junior users until the last senior water user is satisfied.

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### Recommended reading

1. "How to Value Your Water Right, The Legal Framework," by Justice Gregory J. Hobbs, Jr., delivered to the Lower South Platte Forum, Feb. 23, 2005.

Justice Hobbs begins his discussion on the day of reckoning for wells by referring to the 1951 landmark decision of the Colorado Supreme Court, which stated that the presumption under Colorado law is that all ground water is tributary. Hobbs warns that just because a person has a water right, he does not automatically have a reliable water supply, as "no farmer can make it rain or snow."

2. "Priority: The Most Misunderstood Stick in the Bundle," by Gregory J. Hobbs, Jr., 32 Environmental Law 37, 2002.

Justice Hobbs describes priority's role as starting with the policy of water as a public resource. Hobbs cautions that the lack of administration and enforcement and changes in public policy threaten to destroy the value of a water right.

3. "Colorado Water Law: An Historical Overview," by Justice Gregory J. Hobbs, Jr., 1 University of Denver Water Law Review 1, 1997.

Justice Hobbs provides a colorful history of the development of Colorado water law, beginning with the Justinian Code of the 5th century which enunciated the riparian doctrine. Colorado rejected the riparian doctrine in the 19<sup>th</sup> century in favor of the priority doctrine. He describes the development of the communal acequias in New Mexico, which influenced development of ditches in Colorado. Included is a description of key Colorado Supreme Court decisions that illustrate how Colorado's water law evolved.

4. "Developing A Water Supply in Colorado: The Role of An Engineer," by Daniel S. Young and Duane D. Helton, P.E., University of Denver Water Law Review, spring 2000.

The article describes the engineer's role in the many facets of our work in water, including the need to understand the priority system, prevention of injury to other water rights in a change case, assisting an attorney with the water court application, and the presentation of expert testimony.

5. "Colorado's 1969 Adjudication and Administration Act: Settling In," by Justice Gregory J. Hobbs, Jr., University of Denver Water Law Review, fall 1999.

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ment of prior adjudication acts adopted by the State of Colorado, beginning with the Adjudication Act of 1879, which established state court jurisdiction over irrigation rights.

6. "Out-of-Priority Water Use: Adding Flexibility to the Water Appropriation System," by Lawrence J. MacDonnell, *Nebraska Law Review*, 2004.

MacDonnell lays out the three legal mechanisms that allow out-of-priority diversions in the western United States and provides a well-documented historical context for situations and judicial decisions.

7. Colorado Supreme Court Opinion in *Empire Lodge Homeowners' Association v. Anne Moyer and Russell Moyer*, No. 00SA211, as modified Feb. 11, 2002.

The en banc opinion delivered by Justice Hobbs details many basic water right features, a description of a plan for augmentation, and a discussion of the State Engineer's lack of authority at the time to approve substitute water supply plans.

8. "Silver Fox of the Rockies, Delphus E. Carpenter and Western Water Compacts" by Daniel Tyler, *University of Oklahoma Press*, Norman, 2003.

Delph Carpenter believed that the compact clause of the U.S. Constitution provided a means by which reasonable men could reach agreement on the equitable apportionment of water between two or more states. Carpenter devoted much of his life's energy to providing water for Colorado's future.

9. Textbooks

- a. "Acquiring, Using, and Protecting Water in Colorado," by The Law Firm of Trout, Witwer & Freeman, P.C., Bradford Publishing, August 2004.
- b. "Engineering Aspects of Water Law," by Leonard Rice and Michael D. White, Krieger Publishing Company, 1991.

# WATER RIGHTS

By Joe Tom Wood

*Author's note: Parts of this chapter are incorporated directly from the "Citizen's Guide to Colorado Water Law," published by the Colorado Foundation for Water Education. Text taken from the guide is italicized and bold rather than footnoted. Footnotes and numerals—e.g., FN7—refer to the numbered items on the recommended reading list.*

## Introduction

**Water right—A property right to the use of a portion of the public's surface or tributary groundwater resource obtained under applicable legal procedures.**

Colorado statutes (37-92-103(12)), 10 C.R.S. (2001) define a water right as “a right to use in accordance with its priority a certain portion of the waters of the state by reason of the appropriation of the same.”

Colorado's water law system follows the doctrine of prior appropriation, meaning that the first person who began to divert and use water from a given stream has the better right (in time) as compared to anyone else who later came upon the same stream and later began to divert and use water from the stream.

In the 1850s miners in Colorado began to use water from streams to pick gold out from sands and gravels. They adopted the prior appropriation doctrine that miners in California had earlier used. Had there been bounteous supplies of water in either state, no one would have cared who was using water, or where, or how much. But Colorado and the California gold mining areas were arid. So, the California miners adopted a system whereby the first miner to divert and use water had the better or prior right to the water in the stream. In drier times this first miner might well be the only miner to have any water. Colorado's State Constitution adopted the prior appropriation doctrine in Article XVI, Section 5: “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 people of the state, subject to appropriation as hereinafter provided.” Section 6 adds: “The right to divert the unappropriated water of any natural stream shall never be denied.”

Our Constitution indicates the people of Colorado own the state's waters of the State, subject to the right to appropriate the unappropriated waters for one's beneficial uses. That's very simple, very understandable, and very fair. But, of course, with human involvement over the passage of time, it's become complex. You might ask, “How will I know a

water right when I see one?” You can't really.

Interested people can read a court decree which describes one, or can go to where a water right is diverted from a stream and see one at work irrigating a field of corn or alfalfa.

In a paper recently written and delivered by Colorado Supreme Court Justice Greg Hobbs, he defines a water right as “a right to use waters of the natural stream - which includes surface water and tributary groundwater - when water would be naturally available to it in order of priority for diversion at its decreed location under its decreed priority in the amount of its decreed beneficial use” [FN1].

## Parts of a water right

Justice Hobbs has also described a water right as a bunch of sticks in “the bundle of a water right”. (FN2) And, indeed, I think, a water right is just like a bundle of sticks.

Justice Hobbs' bundle of sticks might be more fully described to include:

- Date of appropriation;
- Date of adjudication;
- Date of priority;
- Point of diversion;
- If for storage, a place of storage;
- Rate of flow for a diversion, usually in cubic feet per second, or cfs, or an amount of storage, usually in acre-feet, or af;
- Type of beneficial use, such as mining, irrigation, domestic or municipal, among others;
- Place of use; and
- Time of use

In my own words, these “sticks” in the water rights bundle are:

- *Date of appropriation—the date that the appropriator took action to create the water right*

In the old days, some 150 years ago or so, the date of appropriation would most likely be the date someone, such as the appropriator, began to dig a ditch, or the date water was first diverted and used for a beneficial purpose. Now, the date of appropriation more likely corresponds to the date that someone files an application with the water court.

- *Date of adjudication, or adjudication date—the date that a Court enters a decree confirming a water right*

Prior to the “1969 Act,” state district courts had jurisdiction over water matters and would enter decrees, which confirm a water right. Once the court did so, the water right would be and still is described as “a decreed water right.” The date that the court entered the decree is called the date of adjudication. Since 1969, the water courts have had jurisdiction over water matters in Colorado, and the adjudication date has become the year the application was filed, with exceptions for certain exchanges.

- *Date of priority - the date by which the water right is, or should be, administered within the priority system.*

This “stick” is the most important. The priority date tells you how far up or down the line the right falls in time with respect to other rights in the same stream system. Of all of Justice Hobbs’s sticks, the priority date by itself defines the prior appropriation doctrine that governs Colorado’s use of water

If you have a water right in the first adjudication of water rights in the area in which the right’s point of diversion is located, the priority date is identical to the date of appropriation. This is a general rule, which may not be the case in some areas, the Arkansas River perhaps being a notable exception.

These first adjudications were general in nature. Newspaper notices were published to encourage people to go to court and file claims for a water rights and pursue water rights by decree from the state district court. Many people did. They gave testimony and obtained a decree which also confirmed numerous other persons’ water rights at the same time and in the same decree. These are called original adjudications.

Did people stop diverting water after the original decrees were entered across the state in the 1880s, 1890s, 1900s, and perhaps later? Of course not. People continued to take out ditches, to build reservoirs, and to use water in towns and cities. Then came supplemental adjudications, when people sought to confirm their newly developed water rights judicially, after the date of entry of the original adjudication.

Supplemental adjudications occurred in two ways: Some were general. They involved the simultaneous adjudication of numerous water rights. In others, a supplemental decree was by the court for a single water right.

The general rule is that no water right adjudicated in a supplemental adjudication can take precedence over any water right adjudicated in a prior decree, or no one can take a priority date that is more senior than the junior-most date from the prior adjudication. This is called the postponement doctrine.

If you think that the way that the state is incorrectly administering the priority date of your water right, you should talk to the state engineer’s repre-

sentative, the local water commissioner or the division engineer, or your attorney.

- *Point of diversion—the location on a stream where water is diverted*

The point of diversion in Colorado is what we call a legal point of diversion, usually, but not always, defined by reference to section, township, and range.

One of the more colorful legal descriptions of a decreed point of diversion in Colorado is for Fairplay’s water right. It includes the likewise colorful use of “the driving of stock to the stream for watering” has its decreed point of diversion on the Middle Fork of the South Platte River “at any convenient point or points in the immediate vicinity of said town...”

### Types of water rights

The types of water rights include direct flow, storage, and exchange rights—all of which may be conditional or absolute—instream flow, minimum lake level and recreational inchannel diversion rights.

#### Direct flow

*A right that takes its water directly from the surface stream or tributary groundwater for application to beneficial use. It is expressed in cubic feet per second of flow (cfs).*

#### Storage water right

*A right to impound water in priority for later use, expressed in number of acre-feet of water the reservoir or storage vessel can hold.*

#### Exchange decree

*A water court decree that allows an upstream diverter to take the water that would usually flow to a downstream diverter. The upstream diverter must provide the downstream diverter with a suitable replacement supply of water, in amount, timing, and quality, from some other source.*

An exchange water right might more properly be defined as an “appropriative right of exchange” because operates within Colorado’s priority system

The exchange right may be tough to grasp. Let’s say we have the junior Joe Ditch upstream on a stream, and a senior Tom Ditch downstream on the same stream. Water supply on this stream is limited, and there’s only enough water for the senior, downstream Tom Ditch to divert. The junior, upstream Joe Ditch may not divert under our priority system, because to do so would deprive the senior, downstream Tom Ditch of water to which it is lawfully entitled. So, here’s where the exchange comes in that allows the junior, upstream Joe Ditch to divert without injuring, the senior, downstream Tom Ditch.

The owner of the junior, upstream Joe Ditch acquires an additional source of water to provide it to the stream above the senior, downstream Tom Ditch’s point of diversion. This additional source of water in the old days came most fre-

quently from water stored in a reservoir. This still works, but today's sources frequently include treated wastewater that is legally reusable.

In any event, let's say that the junior, upstream Joe Ditch wants to divert 2 cfs, which, without the exchange, would injure the senior, downstream Tom Ditch to the tune of 2 cfs. To operate the exchange, the owner of the Joe Ditch releases 2 cfs from a reservoir into the stream above the Tom Ditch's point of diversion, allowing the junior Joe Ditch to divert 2 cfs. The Tom Ditch gets just as much water with the exchange as without it. No harm, no foul.

#### Instream flow

***A water right held by the state to protect or improve the water-dependent natural environment.***

In the 1970s Colorado enacted a law that enabled the Colorado Water Conservation Board to appropriate waters of the state instream "to preserve the natural environment to a reasonable degree." and the right to appropriate a minimum streamflow decree was vested solely in CWCB.

A minimum streamflow decree can exercise its priority date against junior rights on the one hand, but it can also continue to exercise its priority entitlement to flow against junior water rights even when it is itself out of priority.

#### Minimum lake level

Like the CWCB's minimum streamflow rights, they're for the fishes, the picnics, the book readers, and so on. (I like fishing and reading.) This right can call out junior, upstream rights. A minimum lake level right is likewise unique in that it is immune from being called out by a senior downstream right, at least insofar as no one else being able to infringe upon it when both that someone else's right and the CWCB's right are subject to a senior, downstream call.

#### Recreational in-channel diversion

***Water right held by a local governmental entity for structures that control the flow of water for boating and kayaking.***

The recreational in-channel diversion right is a relatively new water right in Colorado. By statute, the adjudication of such a right requires involvement by the Colorado Water Conservation Board. The City of Pueblo recently made application for such a right, and the Colorado Water Conservation Board conducted a hearing on the application.

Recreational rights tend to preclude subsequent appropriations, within the entire drainage basin above them, for other beneficial uses, such as irrigation, storage, municipal, and even recharge for well augmentation plans. Considering the scores of recharge-and-well-augmentation plans recently applied for along the lower South Platte River, one can only ask what would have happened if the Julesburg, at the very low end of the South Platte, had first filed for such a recreational right.

#### Groundwater use

***According to the 1965 Ground Water Management Act, every new well in the state of Colorado that diverts tribu-***

***tary, nontributary, Denver Basin groundwater, or geothermal resources must have a permit. Groundwater use rights depend on the source of the groundwater and the type of beneficial use.***

In order to obtain a permit to drill a well, one must file an application with the Colorado Division of Water Resources, also known as the State Engineer's Office. To obtain a water right decree for tributary groundwater, one must file a well permit application and submit other required documentation to the regional water court.

#### Decrees copies

First, list the water rights you believe your ditch company owns. Call your local water commissioner or the division engineer, or, if you have a water lawyer or engineer, work with him or her to prepare your list. That's where to start.

If the decrees aren't available from the water attorney or engineer ask for copies from the local Water Commissioner or the Division Engineer, or, the State Engineer's office in Denver. The Records Section is on the 8th floor of the Centennial Building at 1313 Sherman Street, telephone number 303-866-3581. Copies are 50 cents per page.

Another way to obtain copies of your decrees is to hire a professional—either a consulting engineer, an attorney, or other water professional—to get them.

Once you've gotten copies of all of your decrees, read them, and when you have time, read them again... and again. If you have several water rights, put all of the decrees in a notebook and index them by court case number or by the name of the water right. Keep the notebook in a handy place. You'll want to be able to find it when you need to.

#### Water courts

In 1969 the Colorado General Assembly passed the Water Rights Determination and Administration Act of 1969.

Most water attorneys and water engineers refer to it as the 1969 Act. Prior to the act the state district courts handled water rights adjudications.

The act set up the Water Court system, establishing one for each of the seven major river systems and designating corresponding Water Divisions. For example, Water Division 1 consists of the South Platte River drainage area, and Water Division 2 is the Arkansas River drainage.

The act said the Colorado Supreme Court would designate a State District Court judge to be the Water Court judge for each of the Water Courts, along with an alternate Water Court judge to act in the event of a conflict of interest, or if the regular Water Court judge's docket was too full.

The act also provided for a water referee to process Water Court applications to the point of entering a referee's ruling. When entered, it goes to the water judge for his or her review and adoption as the Water Court's decree. If a party to the application, either the applicant or an objector, believes that the result of the ruling will be unacceptable, that party may make a motion to the court to place the matter in the water judge's hands.

Most Water Court cases are resolved to the point of a decree, without the need and expense of having a trial before

the water judge. Many water professionals believe settling a water matter by negotiation beats the cost, expense, and the unknown outcome of trying the case before the water judge.

Sometimes, for a variety of reasons, parties find themselves in court. The water judge holds a trial, preceded by a discovery process wherein designated witnesses give sworn testimony in a formal deposition, and expert witness reports and exhibits are prepared and distributed.

If an agreement still is not reached, the water judge conducts a trial, complete with opening arguments, presentation of evidence and testimony by both the applicant and the objectors, closing arguments, sometimes briefs, and frequently the tender of a proposed decree by a court-designated party.

Once the decree is entered, any party may appeal. Water court appeals go directly to the state supreme court.

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DARCA

# DEALING WITH URBANIZATION AND DEVELOPMENT

by Jeffrey J. Kahn  
*Bernard Lyons Gaddis & Kahn PC*

As Colorado's population continues to increase, commercial, residential and other types of development will intersect with ditch company easements. A failure to protect the ditch's integrity and associated easement can result in the company's inability to deliver water. With planning and diligence, it's possible to protect against, and perhaps even benefit from, urban encroachment.

## Be vigilant

To protect an easement from encroachments or modifications, a ditch company must be aware of the proposed changes. Here's how:

- Notify the planning staff of all counties and municipalities where the ditch facilities are located.
- Request in writing that the planning staff place the ditch company on the "referral list" for any land use applications in the ditch easement area.
- Request a ditch company "sign-off" be required on any plat or other document allowing development that affects the ditch's easement.
- Physically inspect the ditch easement as often as possible, particularly during the non-irrigation season when it may not be carrying water. Landowners adjacent to the ditch, in the absence of seeing ditch company employees, may place culverts, bridges or other crossings in the easement during the winter without any notice to the ditch company. If a landowner is, for instance, grading adjacent to the ditch, ask if changes will occur within the ditch easement. Unless the ditch company knows of impending encroachments or modifications, it cannot protect itself. Consider filing a survey with the county and clerk and recorders office specifying the ditch easements' location and extent. Any developer or other title researcher would be made aware of the easement and it would be included as an exception in the title policy. This encourages developers and others to contact the ditch company before encroaching on or modifying an easement.

## Identify what the company owns

Once a company identifies a proposed encroachment or modification, the ditch company must identify what it owns. It may actually own the land on which the ditch was con-

structed—a fee ownership—or it may own an easement, in which case another person owns the land, subject to the ditch company's rights to conduct activities within the easement. A written and recorded easement is known as a deeded easement. Or, it may be unwritten, a prescriptive easement or easement by use.

The ditch company should review its records for any deeds for the land or for an easement. If that review does not reveal the nature of the its ownership, the company may want to ask the landowner or developer for a copy of his/her title insurance policy. The title policy will list as an exception, in Schedule B, any recorded documents, including any grant of an easement or right-of-way, affecting the identified parcel of land. If a title policy is not available, the ditch company may consider hiring a title company to research the recorded documents. Many title companies will do this for a reasonable hourly fee.

The implications of the different forms of ownership are:

- Deeded or fee ownership. The ditch company owns the land on which the ditch is located. No one can enter without the company's permission. The ditch company has the absolute right to refuse entry, the placement of any structures, or any modification of the ditch or easement, subject to possible condemnation.
- Deeded easement. The deed or grant to the ditch company defines its rights on the land subject to the easement. The deed or grant may specify uses of the land the landowner can make. It is unlikely that the landowner has the right to modify the ditch, but the grant of easement may permit the landowner to use the easement land for a variety of purposes, including landscaping, recreation and sometimes crossing the ditch. Frequently a deeded easement will not specifically describe the rights of the ditch company or the remaining rights of the landowner in which case the rights of the ditch company and the landowner are determined as if the easement were a prescriptive easement.
- Prescriptive easement. If no easement is recorded, the ditch company has a prescriptive easement, or easement by use. A prescriptive ditch easement is obtained under Colorado law by constructing and operating the ditch. The Colorado Supreme Court in *Rogers v. Lower*

*Clear Creek Ditch Co.*, 63 Colo. 216, 218, 165 P. 248 (1917) described the law for establishing prescriptive ditch easements:

*“Whatever may be law in other jurisdictions, it is established in this state that where a ditch owner is permitted, without interference, to construct an irrigating ditch over the land of another, and the ditch is put in use, a right of way is thereby acquired, and the necessity for condemning, to obtain possession, is obviated.*

Also see the Supreme Court opinion in *Kane v. Porter*, 77 Colo. 257, 259, 235 P. 561 (1925) where the court stated, “[W]hen one constructs a ditch on the land of another with his knowledge and with his consent or without his interference a right of way is acquired.”

And the Colorado Court of Appeals opinion in *Hitti v. Montezuma Valley Irrigation Co.*, 599 P. 2d 918, 920, 42 Colo. App. 194 (1979) was: “Once the ditch has been constructed and is operating, consent may not be withdrawn, the right of maintenance may not be denied and the owner of the ditch has a title equivalent to one acquired by grant.”

The extent or width of a prescriptive ditch easement has been described by the Colorado Supreme Court as “[a]ll that is reasonably necessary to the convenient and proper use and maintenance of the ditch.” *Neville v. Loudon Co.*, 78 Colo. 548, 242 P. 1002 (1926) See also *Rogers*, 63 Colo. at 220, 65 P. at 249 (“The right of way acquired, [is] reasonably necessary for a ditch of that character.”)

In determining an easement’s width, ditch companies should rely on what has been used historically. For instance, have both sides of the ditch been used in the past?

Be wary of solely determining the easement’s extent on ordinary ditch operations and maintenance. Twelve feet from the ditch bank may be sufficient for a pick-up truck and ordinary operation and maintenance, but may not be sufficient for a cement truck if the company wants to line a section of the ditch or repair a lined section. Similarly, 12 feet may not be adequate for major cleaning or repairs. A ditch company may want to reserve easements on both sides of the ditch for equipment and access. Don’t assume only ordinary operations and maintenance when determining the ditch easement’s width. Plan for unusual or extraordinary circumstances.

## Company goals

A ditch company, aware of a proposed encroachment or modification and knowledgeable of the legal nature and extent of its easement, should identify its strategy and goals. For instance:

- Protect the ability to deliver water at least as efficiently as in the past.
- Preserve the historic right to operate, maintain, repair and replace, if necessary, the ditch and improvements without added expense or time.
- Obtain certainty concerning the location and extent of the easement by legally describing and recording a document identifying the ditch easement and specifying in writing the right and obligations of the ditch company.

the landowner and any third parties in the ditch easement.

- Obtain reimbursement for any out-of-pocket expenses incurred by the ditch company in dealing with the encroachment or modification.
- Provide additional revenue to the company in the form of crossing fees, relocation fees, or the like.
- Protect against any liability imposed as a result of the encroachment or modification.

These goals may vary. Evaluate each situation individually to determine the best outcome for the company. For instance, revenue expectations of the company resulting from a relocation and piping of the ditch should be higher than a simple proposed utility crossing. Instruct staff to apply the goals of the company on a case-by-case basis rather than establishing forms or policies constituting a one-size-fits-all approach.

## Elements of an agreement

Each agreement allowing an encroachment into the ditch easement or a modification of the ditch will be different. Use the elements below as an initial checklist, deciding which are applicable.

**1. License or crossing agreement.** Many companies grant licenses or enter into license agreements to allow crossings of their ditch easements. Either one does not necessarily grant permanent rights. A license may be revoked. A license agreement only grants a permit or license to do certain work or place certain structures in the easement. It is generally used for ditch crossings and ditch easements. A license agreement is not appropriate where the ditch or ditch easement is being relocated —horizontally or vertically, i.e. placed underground—or where the fundamental nature of the ditch is being changed, for example where the ditch is being concrete lined. Typical elements of a license or crossing agreement:

- Name the parties to the agreement.
- Designate the location of the work, often by attaching a legal description—to allow the agreement to be recorded and any obligations with the property described.
- Describe the work to be done and the structures to be placed into the ditch easement, often by attaching approved plans and specifications as an exhibit to the agreement.
- Mark the expiration date of the license, revoking the license if the work is not done by a certain date.
- Limit when the work can be done—for example, only Nov. 1 through April 15, the non-irrigation season.
- Specify performance standards, especially concerning the carriage of water. Often this may be in the form of a general statement such as “no greater loss than prior to the work”.
- Specify maintenance, repair and replacement

obligations. These are often assigned to the licensee.

- Include a legal description of an easement that will be deeded to the ditch company when the license agreement is signed. This is common where the licensee is the landowner. It cannot be accomplished where the licensee is a utility company and does not own the land, but is simply conducting the work with permission from the landowner.
- Require a reimbursement letter before starting the license agreement process to ensure the ditch company incurs no out-of-pocket expenses. The letter may require a pay-as-you-go plan from the licensee applicant.
- Set a license fee to be paid to the ditch company at execution.
- Include a provision protecting the ditch company from liability by having the licensee hold the ditch company harmless and indemnify the ditch company from any liability. There is a question as to whether public entities can agree to such a provision without a vote of their constituents. It may represent debt under the Colorado's constitution. Thus, in such circumstances, the provision may be prefaced by the phrase "to the extent permitted by law. In the alternative, ditch companies have inserted a provision stating that the licensee is solely responsible for the licensed structure and any resulting damages or injury is its liability. Such a provision is not binding on a tort claimant, but may be persuasive in apportioning liability between the licensee and ditch company.
- Attach a liquidated damages provision, such as: "*One thousand dollars per day paid to the ditch company for any day after April 15 that the company cannot provide water as a result of the work licensed herein.*") Warning: The validity and enforcement of a liquidated damages provision is legally complicated and an attorney should review the provision before inclusion in a license agreement.

A sample of a license agreement for a crossing is attached along with a sample reimbursement letter. Beware of using forms without carefully considering the particular factual circumstances. Eliminate or modify provisions that are not applicable. Add those that are necessary but not included in the sample agreement.

**2. Boring agreement.** Electrical, cable and telecommunication companies may want to bore under the ditch and ditch easement to lay cable or pipe. If the installation does not affect the ditch or the easement because it is sufficiently below the ditch and does not daylight in the easement, the utility company does not need a license from the easement holder. In many instances the utility company will want an agreement with the

ditch company because to assure the ditch won't have water in it during construction or so the ditch company has notice of the bore and will not damage or interfere with it. A boring agreement should be much shorter and simpler than a crossing agreement. It assumes there is no installation on the easement and no modification of the ditch. As a result, many utilities believe that little or no compensation should be paid to the ditch company for entering into a boring agreement. A sample is attached.

**3. Relocation agreement.** Frequently developers, municipal entities or special districts want to move the ditch and easement to benefit their land or facilitate the construction of roads. This presents a different legal context than a crossing agreement since the ditch company is being asked to relinquish its existing easement and accept a new one. If the ditch is being moved into an underground pipe or being concrete lined, maintenance, repair and replacement become more difficult, if not impossible, to accomplish. It is common for the company to demand that the party requesting the relocation assume maintenance or to ask the requesting party to pay an amount sufficient to cover any future, necessary repairs. Compensation may be determined by the value of the relocation and may greatly exceed the normal license fee. It is necessary that the ditch company obtain a deeded easement at the new location since the old easement will be abandoned. A form relocation agreement is attached.

The placement of the ditch underground, even along the same course, should be treated as a relocation. It is a vertical relocation and changes the ditch's fundamental nature. The concrete lining of a surface ditch without a relocation may be handled by a license agreement, but the ditch company should consider carefully the maintenance, repair and replacement obligations to insure no additional financial obligations are placed on the ditch company.

### No agreements reached

1. Unauthorized encroachments. Ditch companies may discover unauthorized encroachments. If a company wants it removed, deal with it now. The longer it remains, the harder it is to remove.

Landscaping and trees that interfere for ordinary and reasonable maintenance may be simply removed. Other, more permanent encroachments, such as buildings or landscaping that does not pose an immediate problem, may be more difficult to deal with. The company may not want to remove these encroachments unilaterally if they don't interfere with operation and maintenance, because the company could be liable for the landowners' damages. If negotiations with the landowner fail, the company should consider a legal action asking a court to order the encroachments removed. While a legal action may be

expensive and time consuming, the alternative is to allow the encroachment to become permanent by adverse possession. Ditch companies should carefully consider the pros and cons.

2. **Judicial resolutions of ditch relocation disputes.** A 2001 opinion of the Colorado Supreme Court, *Roaring Fork Club v. St. Jude's Company* 36 p. 3d 1229 (Colo, 2001), set forth new rules for the relocation of prescriptive ditch easements. The court found that in order to proceed with relocation, a landowner must show that the proposed relocation would not:

- Significantly lessen the utility of the ditch easement;
- Increase the burdens on the owner of the ditch easement; and
- Frustate the purpose for which the ditch easement was created.

If the landowner makes such a showing, the court should allow the relocation to proceed. Court proceedings are lengthy and landowners may be motivated to negotiate a resolution to avoid delay. The St. Jude case is also inapplicable to deeded easements or situations where the ditch company owns the land in fee. Finally, the St. Jude case does not allow condemnation of ditch easements to allow for a relocation where the power to condemn has not been otherwise granted to the landowner.

3. **Condemnation of ditch company easements.** Certain public entities may have the power to condemn existing ditch easements and relocate a ditch. Before a company accepts the proposition that a public entity may condemn a ditch easement for purpose of relocation, it should have its attorney analyze the condemnation authority of the public entity. An Adams County district court judge found that the condemnation authority granted by the state to the E-470 Highway Authority was inferior to the condemnation power of a mutual ditch company. Thus, the judge ruled the E-470 authority could not condemn and relocate the easement owned by the mutual ditch company in that case. While this case was not appealed, and has very limited effect on other counts, it spotlights an is-

sue: Any ditch company threatened with condemnation should closely examine the situation.

### Drainage to ditches

A ditch company is not required to accept storm water drainage from a development if it will harm the ditch as a result of entering at a greater rate, in a greater total amount or at a different location than what occurred before development. The ditch company is also not required to accept storm water containing harmful pollutants that did not previously enter the ditch. Again, it is important to participate in land use proceedings to ensure new storm drainage is not directed into the ditch without the company's agreement.

A company may choose to accept the drainage if the compensation or benefit to the company makes it worthwhile. A sample drainage agreement is attached. Before entering into such an agreement, the company should investigate and protect against increased liability resulting from the ditch overtopping as a result of the drainage. The company should also be sensitive to a claim that the storm drainage may be an out-of-priority diversion which has to be returned to the stream.

### Recreation

Along with a lot of problems, urbanization and development may bring at least one opportunity—to lease or sell assets for recreation. Use of a reservoir for recreation, including fishing, boating, waterskiing and swimming, can be valuable. Many companies have signed lucrative leases or put together transactions involving those rights.

Protection from liability resulting from accidents should be carefully crafted and insurance should be maintained by the company and required of any. Ditch companies may also explore recreational leases, but a ditch easement is likely to be limited to use for ditch operations and maintenance, unless the underlying landowner consents. If the company owns lands in fee, then it may lease those lands for recreational use in the same manner as any landowner.

DARCA

permitted to inspect the Installation or replacements and repairs during construction. Upon completion of the Installation, the Ditch Company may inspect the Installation.

5.2 The Ditch Company's right to inspect the Licensee's Installation or replacement of the Installation in no way relieves the Licensee of its liability for improper Installation. The Ditch Company's inspection is solely for the benefit of the Ditch Company and creates no obligation to the Ditch Company.

## 6. REIMBURSEMENT OF EXPENSES.

6.1 The Licensee agrees to reimburse the Ditch Company (or pay directly) for all reasonable engineering and legal costs incurred by the Ditch Company in preparing and approving this License Agreement and the costs of inspection as described in paragraph 5.

6.2 Statements for the costs chargeable to Licensee hereunder will be forwarded to Licensee and the same shall be paid to the Ditch Company within 30 days after the billing date. If payment has not been received by Ditch Company within 30 days, Licensee shall have breached this License Agreement and Ditch Company may institute legal proceedings to collect the amount due and owing. In such proceeding, Ditch Company shall be entitled to its costs and reasonable attorneys' fees from Licensee.

## 7. MAINTENANCE.

7.1 Licensee specifically agrees and pledges to maintain, repair and replace the Installation described in EXHIBIT B so as not to require the Ditch Company to maintain, repair or replace it. If Licensee fails to properly maintain, repair or replace any portion of the Installation for which it is responsible after ten days' notice of the need for same, Ditch Company may, at its own option, conduct its own maintenance, repair or replacement, and Licensee shall reimburse Ditch Company for the cost of such work within 30 days. In the event Licensee fails to maintain, repair or replace the Installation, it shall be held liable for any loss, damage or injury to Ditch Company. If the Ditch Company conducts its own maintenance, repair or replacement, it does not waive the right to hold Licensee liable for damages caused by Licensee's failure to maintain, repair or replace.

7.2 In the event of an emergency, Ditch Company or Licensee may conduct maintenance or repair immediately, giving notice to the other party as soon as possible at the emergency contacts identified in paragraph 11. If Ditch Company conducts emergency work, it shall be reimbursed for the cost of the work. Under no circumstances shall the Ditch Company be responsible or held liable for damages to the Installation resulting from maintenance or repair to the Ditch.

**8. WATER LOSS.** The Licensee agrees that the Installation will not increase carriage or transit loss over the loss which occurred historically. The Licensee agrees to compact earth materials so that such additional water losses will not occur. If the Licensee's Installation increases carriage or transit loss in the Ditch, the Licensee agrees to repair the construction to prevent such additional loss.

## 9. LIABILITY AND INDEMNIFICATION.

9.1 By virtue of entering into this License Agreement, the Ditch Company: (1) assumes no liability for use, operation, or existence of the Licensee's Installation; and (2) assumes no additional responsibilities or obligations related to the Licensee's future or additional activities in the area described in EXHIBIT A which are required by this License Agreement.

9.2 The Licensee agrees to indemnify and hold harmless the Ditch Company, from all claims and liability for damage or injury to property or persons arising or caused directly or indirectly by the Licensee's construction, restoration, maintenance of, or failure to maintain, the Installation and the Licensee's occupancy and use of the area located in EXHIBIT A.

**10. EASEMENT RIGHTS.** The License granted to the Licensee herein in no way restricts the Ditch Company's right to the use of its easement to construct, operate, or maintain all existing structures and facilities of the Ditch.

**11. NOTICES.** Any notice required or permitted by this License Agreement shall be in writing and shall be deemed to have been sufficiently given for all purposes if sent by certified or registered mail, postage and fees prepaid, addressed to the party to whom such notice is intended to be given at the address set forth below, or at such other address as has been previously furnished in writing to the other party or parties. Such notice shall be deemed to have been given when deposited in the U.S. mail.

**DITCH COMPANY:****COPY TO:**

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**LICENSEE:****COPY TO:**

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**12. WAIVER OF BREACH.** The waiver by any party to this License Agreement of a breach of any term or provision of this License Agreement shall not operate or be construed as a waiver of any subsequent breach by any party.

**13. RECORDATION.** This License Agreement shall be recorded at the cost of Licensee and shall be binding on any successors of the Parties. The obligations and benefits of this License Agreement shall specifically run with the land described in **EXHIBIT A**. The failure to record all or portions of **EXHIBIT B** because of the size of the documents shall not affect this License Agreement.

**14. EXHIBITS.** All exhibits referred to in this License Agreement are, by reference, incorporated in this License Agreement for all purposes.

Dated: -----

*[signature blocks to be inserted]*

**[name] DITCH COMPANY and  
[other party name]**

**BORING LICENSE A GREEMENT**

**1. PARTIES.** The parties to this Boring License Agreement are the *[name of ditch company]* (“Ditch Company”), and *[other party name]*, (“Licensee”). The Ditch Company and Licensee are jointly referred to as the Parties.

**2. RECITALS.** The Licensee desires to obtain the permission of the Ditch Company to bore beneath the *[name]* Ditch (“Ditch”) at the location described in **EXHIBIT A**. The Ditch Company agrees to permit the construction of the bore, subject to the terms, conditions, covenants and agreements set forth in this Boring License Agreement.

**ACCORDINGLY, IN CONSIDERATION OF THE MUTUAL PROMISES SET FORTH IN THIS BORING LICENSE AGREEMENT, THE PARTIES COVENANT AND AGREE AS FOLLOWS:**

**3. CONSTRUCTION.**

**3.1.** Pursuant to the terms of this Boring License Agreement, the Licensee is granted the license to bore beneath the Ditch pursuant to the plans and specifications approved by the Ditch Company and attached hereto as **EXHIBIT B**. The Ditch Company’s review of the plans and specifications is solely for its own benefit and creates no obligation on the Ditch Company.

**3.2.** All portions of the Ditch’s bottoms, sides, banks and all portions of the Ditch Company’s easement shall be maintained in their original condition so the flow of the water in the Ditch runs at the original amount and velocity. Any and all fencing and other facilities appurtenant to the Ditch Company’s easement shall be maintained in the condition of such facilities and appurtenances prior to construction.

**3.3.** The Licensee shall not spill any dirt, debris or other foreign material into the Ditch. In the event that dirt, debris or other foreign material is spilled into the Ditch, the Licensee agrees to completely clean the affected portions of the Ditch.

**3.4.** The Licensee agrees that the bore shall proceed expeditiously and with reasonable diligence from the commencement of the bore to its completion. The bore shall be completed no later than *[date]*. If the bore is not completed by *[date]*, then this Boring License Agreement expires and is of no force or effect.

**3.5.** If the Licensee’s bore interrupts the Ditch Company’s water supply for any reason, the Licensee shall be responsible for all damages incurred by the Ditch Company and its shareholders. The Parties specifically agree that the Ditch Company’s shareholders are third party beneficiaries of this Boring License Agreement.

**3.6.** Licensee is responsible, at its own expense, for obtaining all local, state and federal permits or approvals and for compliance with all local, state and federal laws and regulations including but not limited to land use and environmental laws and regulations, and specifically including the Endangered Species Act, prior to beginning the bore. Licensee shall indemnify the Ditch Company for any and all costs, damages, fines, and fees, including reasonable attorneys’ fees incurred by the Ditch Company

**[name] DITCH COMPANY****LICENSE AGREEMENT FOR CROSSING**

**1. PARTIES.** The parties to this License Agreement are the *[name of ditch company]*, (“Ditch Company”), and *[other party name]*, (“Licensee”). The Ditch Company and Licensee are jointly referred to as the Parties.

**2. RECITALS.** The Licensee desires to obtain the permission of the Ditch Company to construct *[number of crossings]* crossing(s) across the *[name of ditch]*. Licensee owns property legally described in **EXHIBIT A**. The Ditch Company agrees to permit the proposed crossing, subject to the terms, conditions, covenants and agreements set forth in this License Agreement. Accordingly, in consideration of the mutual promises set forth in this License Agreement, the Parties covenant and agree as follows:

**3. CONSTRUCTION.**

- 3.1 Pursuant to the terms of this License Agreement, the Licensee is granted the license to construct *[description of project]* (“the Installation”) pursuant to the plans and specifications approved by the Ditch Company and attached hereto as **EXHIBIT B**. The Ditch Company’s review of the plans and specifications is solely for its own benefit and creates no obligation on the Ditch Company.
- 3.2 All portions of the Ditch, bottoms, sides, banks, and all affected portions of the Ditch Company’s easement which are disturbed by the Licensee’s Installation shall be restored to their original condition so the flow of the water in the Ditch runs at the original amount and velocity. Any and all fencing and other facilities appurtenant to the Ditch Company’s easement shall be replaced in a condition at least equal to the condition of such facilities and appurtenances prior to construction.
- 3.3 The Licensee shall not spill any dirt, debris or other foreign material into the Ditch. In the event that dirt, debris or other foreign material is spilled into the Ditch, the Licensee agrees to completely clean the affected portions of the Ditch.
- 3.4 The Licensee agrees that the Installation shall proceed expeditiously and with reasonable diligence from the commencement of construction to its completion. The Installation shall be completed by *[date]*. If the Installation is not completed by that date, this License Agreement expires and is of no force or effect.
- 3.5 If the Licensee’s construction interrupts the Ditch Company’s water supply for any reason, the Licensee shall pay as liquidated damages *[\$amount]* per day for any day that the Ditch Company has a request for water from a shareholder and cannot deliver water to that shareholder or shareholders as a result of the Installation.

**4. LICENSE FEE.** The Licensee shall pay to the Ditch Company a license fee of *[\$amount]*. The license fee shall be paid upon execution of this License Agreement to the commencement of the Licensee’s construction. This license fee shall be in addition to any other costs for which the Licensee is responsible pursuant to this License Agreement.

**5. INSPECTION.**

- 5.1 The Licensee shall notify the Ditch Company at least five (5) days prior to commencement of the Installation, or replacement or repair of the Installation permitted by this License Agreement, except for emergency repairs which are provided for in paragraph 7 of this License Agreement. The Ditch Company is

as a result of Licensee's failure to obtain such permits or approvals or failure to comply with all applicable laws and regulations.

**4. LICENSE FEE.** The Licensee shall pay to the Ditch Company a license fee of \$[amount] upon Licensee's execution of this Boring License Agreement. This license fee shall be in addition to any other costs for which the Licensee is responsible pursuant to this Boring License Agreement.

## **5. INSPECTION.**

**5.1.** The Licensee shall notify the Ditch Company at least three (3) days prior to commencement of the bore, or the replacement or repair of the bore permitted by this Boring License Agreement. The Ditch Company is permitted to inspect the bore during construction or replacements and repairs of the bore. The Ditch Company may inspect the bore upon its completion.

**5.2.** The Ditch Company's right to inspect the Licensee's bore or the repair or replacement of the bore in no way relieves the Licensee of its liability for improper boring. The Ditch Company's inspection is solely for the benefit of the Ditch Company and creates no obligation to the Ditch Company.

## **6. REIMBURSEMENT OF EXPENSES.**

**6.1.** The Licensee agrees to reimburse the Ditch Company (or pay directly) for all reasonable legal costs incurred by the Ditch Company in preparing, approving and enforcing this Boring License Agreement and for costs associated with billing and collecting those amounts for the Ditch Company.

**6.2.** Costs chargeable to Licensee shall be paid within thirty (30) days of the billing date. If payment has not been received by the Ditch Company within thirty (30) days, then Licensee shall have breached this Boring License Agreement and the Ditch Company may institute legal proceedings to collect the amount due and owing. In such proceeding, the Ditch Company shall be entitled to its costs and reasonable attorneys' fees from Licensee.

**7. MAINTENANCE.** If the Licensee's bore is defective, then the Ditch Company may give written notice of such defective or hazardous condition to the Licensee and the Licensee shall correct such defect or hazard within ten (10) days. If Licensee fails to correct such defect or hazard within ten (10) days or such additional time as may be agreed by the Parties, then the Licensee shall have breached this Boring License Agreement and the Ditch Company can avail itself of all remedies including, but not limited to, correcting the defect itself and collecting the expense from the Licensee.

## **8. LIABILITY AND INDEMNIFICATION.**

**8.1.** By virtue of entering into this Boring License Agreement, the Ditch Company: (1) assumes no liability for use, operation or existence of the Licensee's bore; and (2) assumes no additional responsibilities or obligations related to the Licensee's future or additional activities in the area depicted in **EXHIBIT A** which are required or permitted by this Boring License Agreement.

**8.2.** The Licensee agrees to indemnify and to hold harmless the Ditch Company from all claims and liability for damage or injury to property or persons arising or caused directly or indirectly by the Licensee's construction, restoration, maintenance of, or failure to maintain the bore.

**9. EASEMENT RIGHTS.** The License granted to the Licensee herein in no way restricts the Ditch Company's right to the use of its easement to construct, to operate or to maintain all existing structures and facilities of the Ditch.

**10. NOTICES.** Any notice required or permitted by this Boring License Agreement shall be in writing and shall be deemed to have been sufficiently given for all purposes if sent by certified or registered mail, postage and fees prepaid, addressed to the party to whom such notice is intended to be given at the address set forth below, or at such other address as has been previously furnished in writing to the other party or parties. Such notice shall be deemed to have been given when deposited in the U.S. mail.

## DITCH COMPANY:

**COPY TO:**

**LICENSEE:**

**COPY TO:**

**11. WAIVER OF BREACH.** The waiver by any party to this Boring License Agreement of a breach of any term or provision of this Boring License Agreement shall not operate or be construed as a waiver of any subsequent breach by any party.

12. **EXHIBITS.** All exhibits referred to in this Boring License Agreement are, by reference, incorporated in this Boring License Agreement for all purposes.

13. **BINDING EFFECT AND RECORDING.** This Boring License Agreement shall be recorded at the cost of the Licensee and shall be binding upon, the Parties, and their respective legal representatives, successors and assigns. The failure to record all or portions of **EXHIBIT B** because of the size of the documents shall not affect this Boring License Agreement.

**14. ATTORNEYS' FEES.** If any party breaches this Boring License Agreement, the breaching party shall pay all of the non-breaching party's reasonable attorneys' fees and costs in enforcing this Boring License Agreement whether or not legal proceedings are instituted.

DATED:

*[signature blocks to be inserted]*

# HISTORY OF DARCA

by Karen Rademacher, DARCA's founder and first Executive Director

Although DARCA had its official beginnings in 2001, I'll preface this account of its origins with a short bit of my own history.

I grew up in the Denver suburbs—Arvada, to be exact. All four of my grandparents grew up on farms in Nebraska, but as a suburban kid I was pretty far removed from agriculture. A neighborhood ditch near the present site of the Arvada Center for the Arts and Humanities was a favorite haunt, an ideal spot for catching crawdads, building dams and ruining shoes. The larger Croke and Church canals were just a couple of blocks away and were ideal for tubing (or at least so I heard) if you had a mom who'd let you do that sort of thing. I vividly remember a school field trip to Arvada's water treatment plant near the foothills west of town. But beyond that, there was really nothing in my upbringing that would indicate any sort of obsession with ditches and water and irrigated agriculture.

During my first year in engineering at Colorado State University, a Denver consulting firm announced a summer position to the freshman engineering classes. Being the only applicant, I got the job. My first duties were to summarize diversion records for various ditches all around the state. I can still remember the sense of fascination I had with this stuff. Paging through the records, I saw evidence of hundreds of ditch companies all across the state, all of them with exotic and imaginative names. Apparently most of them had been in business since before Colorado became a state. Who knew? Detailed records had been kept by water commissioners and I researched and transcribed handwritten records dating back to the 1930s and before.

It wasn't too long before I got to actually meet and greet some of the folks associated with these *ditch companies*. They had tales to tell of fathers and grandfathers working for the ditch company, literally "riding the ditch" on horseback. Typically, a large ornate safe in the back room of the company office held dusty, yellowed ledger books and hand-drawn maps. Some companies still had the original stock certificates that were printed when the company was formed and were continuing to use them to transfer shares to new owners.

I also started to see a previously unknown social network out there comprised of people who share water.

I graduated from college and worked in consulting and for a conservancy district. I had contacts with ditch companies

from time to time but didn't typically get the insider's point of view. I did have the opportunity to observe, however, the difficulties associated with running these antiquated corporations amidst all the trappings of modern life. I saw how ditch companies had few friends—not even neighboring ditches were to be trusted. Too much information shared with state officials might disrupt an operating practice that shareholders depended on. Realtors and water brokers were seen as misinformed opportunists and engineers were just a bunch of clueless city slickers.

By contrast, the typical ditch company official was brimming with operational knowledge handed down from his predecessors. He could convert inches to cubic feet per second to acre feet on the fly; he could cite obscure water statutes by article and section number; he had read and interpreted complicated supreme court opinions; and he knew how to handle water thieves and problem shareholders without resorting to firearms. These guys were *much* more interesting than the *professionals*!

Life's circumstances kept me on the periphery of water stuff for a while. A new marriage and then new babies kept me out of water altogether for a time. But the peanut-butter-and-jelly-sandwich assembly line was interrupted one noon by a phone call from a nearby town hall, "We heard you know something about water." A single part-time gig soon turned into a thriving consulting business with a half-dozen clients. I set up shop in a nearby office building where I shared office space with a ditch company. And here's where the history of DARCA really begins.

I had a small part to play in a study funded by the Colorado Water Conservation Board. The study evaluated the feasibility of ditch companies providing raw water irrigation taps to residential development. Leading the study was John Wilkins-Wells, head of the Sociology Water Lab at Colorado State University. John and I had several conversations about the realities of running a ditch company in modern times. A chance comment about how somebody should form an organization to help these guys was met with, "Why don't you do it, Karen?" And so the rest, as they say, is history.

With John's help, I fleshed out some ideas and put together a sort of outline of what needed to be done. On May 7, 2001, I sent off an e-mail to Longmont attorney Jeff Kahn to get his opinion, and hopefully, an offer to help. He re-

sponded immediately with not only his enthusiastic support but also an offer of free legal services to help get things off the ground. DARCA is greatly indebted to the firm of Bernard, Lyons, Gaddis and Kahn P.C. for their continuing support.

As part of the incorporation process, we needed a name. I wanted one that had a good acronym and that also had an internet domain name available. A first stab was Alliance of Ditch and Reservoir Companies, and I purchased [www.adrc.org](http://www.adrc.org) just to be safe. But then Jeff came through with the suggestion of DARCA and a week later I bought [www.darca.org](http://www.darca.org).

John arranged for me to speak at a couple of workshops he organized through the Sociology Water Lab. The first was in Grand Junction Sept. 18, 2001. This was a week to the day after the events of Sept. 11. I don't remember much about the content of that workshop, but I do remember the long faces all around the room; no one even had the energy to clap appreciatively after the presentations.

A second workshop, with the audience in a better mood, was Sept. 27 in Fort Collins. At both events, I pitched the concept of DARCA and asked for volunteers to help form a sort of "steering committee". Response was positive, enough so that we started making plans to officially incorporate and convene an organizing meeting.

During October and November, with help from Jeff's law firm, we applied for our federal employee identification number and filed incorporation papers.

Our organizing meeting was scheduled for Monday, Nov. 26, 2001. Jeff suggested the Silverthorne Public Library as a central meeting location. The meeting room was free, and Jeff offered to pick up the tab for a catered lunch. Invitations were sent and meeting materials prepared.

Nov. 25 was probably the biggest snow of the season, and unbeknownst to us, pretty much the *only* snow of the season. I decided to drive up the day before so that I could arrive at the library early to get set up. It was a white-knuckle drive the whole way with SUVs bouncing in pinball-machine-like fashion off the guardrails on Floyd Hill. The morning of Nov. 26 was cold and snowy. If only I had a way to contact folks and cancel the meeting...

A few hardy folks made the trip, however. John McKenzie, Matt Cook, Jeff Kahn and I constituted the organizational committee. Piles of food sat mostly untouched since the sane volunteers were smart enough to stay home. The four of us did manage to conduct some important business. We adopted the organization's first bylaws; we appointed myself as secretary and first executive director; and we adopted a membership dues schedule so that we could begin recruiting members and bringing in some revenue.

We scheduled our first board of directors meeting for Friday, Jan. 25, 2002 when many folks would be in town for the Colorado Water Congress' annual convention. Bob Krugmire of the City of Westminster hosted the meeting. Our first board members attended: Matt Cook, Coors Brewing Company; Ron Brinkman, Greeley and Loveland Irrigation Company; Phil Bertrand, Grand Valley Irrigation Company; Jill Baty, Highland Ditch Company; Don Chapman, Riverside Irrigation District; Jeris Danielson, former State Engineer; Bob Krugmire; and Janet Enge, numerous La Plata County ditch companies. Ron Brinkman came with a check in hand and we were pleased to welcome the Greeley and Loveland Irri-

gation Company as our first member ditch company.

DARCA was on a roll now. I conducted the organization's affairs from my basement office. Much of the first year was spent recruiting members, preparing promotional materials and newsletters and making plans for our first annual convention. There were a couple of noteworthy events during the first summer.

First was the development of a mailing and marketing list. It turns out that actually *finding* all of Colorado's ditch companies was a bigger task than I imagined and it remains unfinished. Most ditch companies were organized before Colorado's corporate statutes took on a modern form. After filing their articles of incorporation, many ditch companies never again had contact with the secretary of state. For hundreds of them, their original articles of incorporation remain the only evidence of their existence.

Records from the Division of Water Resources also are spotty. The State Engineer is charged with delivering water in priority to the owners of water rights. He is not charged with taking note of *who* actually *owns* water rights. Often the name of the water right is different from the name of the ditch company. Some ditch companies own bits and pieces of other water rights and other ditch companies and the company name bears no relation to the water rights tabulation.

So I spent a considerable amount of time that summer trolling through phone books, unofficial mailing lists and other odd sources of information. I am indebted to more folks than I can count for helping me come up with usable mailing information.<sup>1</sup>

A second development that summer was the big West Slope road trip. Members in the western half of the state felt personal appearances could really go a long way toward recruiting members. In addition, the Board decided Durango would make a nice spot for our first-ever convention. Having never planned an event of this magnitude before, I thought it best to personally make arrangements for meeting space, food and lodging. So I merged the recruiting and convention planning into a single, week-long road trip.

I left the kids with Grandma and during the week of July 22, 2002, I traveled to Glenwood Springs, Grand Junction, Durango and Cañon City. Along the way, I managed to get Internet connections to post a sort of online travelogue of my adventures. This was before wireless connections were available, and it involved complicated credit-card calling using a telephone modem. I made a lot of friends on that trip and also witnessed first hand the impacts of the greatest drought

<sup>1</sup> In 2003, the legislature passed a law to collect fees from owners of all water rights in order to help fund the Division of Water Resources. While I felt this was bad law, I was secretly hoping it might at last provide a nice publicly-accessible tabulation of water rights owners and their corresponding mailing addresses. Division engineers and water commissioners all across the state had to scramble to collect information and billing invoices were actually sent to water rights owners at one point. Success is mine, I thought! But just as the Holy Grail was within grasp, the law was repealed and state officials suddenly claimed that the data they had collected could not be retrieved from the database for public use unless big programming fees were paid.

of recent history.

Our first annual convention was in Durango Feb. 26-28, 2002. Like our organizing meeting, it coincided with the best snow of the season, costing us more than a few attendees and one speaker. Still, about 75 people attended and it was a resounding success. Special credit must go to Richard Ballantine, publisher of the *Durango Herald*, who gave us loads of publicity and also hosted an awesome reception at the machine shop of the Durango and Silverton Railroad.

DARCA eventually outgrew my basement and for a while we had office space adjacent to the Highland Ditch Company, where I could personally observe the inner workings of a ditch company from time to time. Eventually, the thrill of the startup was gone and managing DARCA started to feel more administrative than creative. I was itchy to get back to engineering.

At this writing, I am once again gainfully employed as an engineer and am pleased to continue contributing to DARCA as a plain old board member. It looks as though DARCA is a going concern and though we've had a few bumps in the road, I think we're all in it for the long haul.

A complete list of everyone who has contributed to DARCA's success would constitute a thick appendix to this book. I always credit John Wilkins-Wells and Jeff Kahn as DARCA's co-founders since they really inspired me to move this project forward. I must also single out Matt Cook as DARCA's capable and energetic board president.

Being part of DARCA's founding was indeed a most excellent adventure and I look forward to watching and being a part of new chapters of DARCA's history.

DARCA

# AN INTRODUCTION TO GIS

by Nils Babel, Riverside Technology, inc

*“A Geographic Information System is a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information; that is, data identified according to location. Practitioners also define a GIS as including the procedures, operating personnel, and spatial data that go into the system”*

—United States Geological Survey, 2007

A GIS can be a useful tool to manage, analyze, and display a variety of information about land cover, urban growth, hydrology and irrigation.

Many ditch and reservoir companies use some type of GIS data, whether they use a GIS. For example, waypoints or routes collected with a GPS unit, digital USGS maps, aerial photos and address locations are all forms of data a GIS can use. Additional GIS data is available for free on the Internet, as are several freeware GIS programs.

These data, together with software, can be used to implement a low cost GIS system for a ditch or reservoir company. By creating a spatial database and map interface for managing infrastructure, ditch and reservoir companies can print specialized maps for meetings or shareholders, locate shareholders or customers on a map and determine which headgate or lateral is nearby, and integrate data with the company's existing water management or ordering system.

## GIS Applications

GIS is used, in one way or another, by most industries today. Many land use planning, resource management and utility management organizations use GIS on a routine basis. The uses can range from general data management and record keeping to complex spatial analysis and decision support. A few examples:

## Natural resources

The U.S. Forest Service uses GIS to maintain detailed information about forest stands. Each forest stand polygon can include information about species type, density, health, pest infestation, harvest schedule and more. This can be combined with roads, slope, elevation, soil type, hydrography and land ownership details to answer questions and solve problems. Ditch and reservoir companies can obtain this data from the Forest Service to help with planning.

## Land use and agricultural planning

Cities, municipalities and a variety of agencies throughout Colorado use GIS to help create spatial layers to estimate the population growth, zoning changes and urban expansion. Agricultural water supplies face increasing pressure from municipal demands, and the data can be very useful for a ditch and reservoir company struggling to understand change in its system. The data also can be used to monitor encroaching development and to determine the possible impact.

## Water utility companies

Many water utility companies use GIS to manage infrastructure and track work orders. Their databases contain information on water and sewer mains, laterals, hydrants, valves, meters and manholes (Figure 1). The data is typically connected in a geometric network; the mains and laterals are connected in the GIS to allow flow path tracing and navigation. The water utilities can determine which pipes are affected by a water main break, or which path water will need to take around a pipe that has been shut down because of a break. Utility companies also use the GIS to respond to work orders and perform system maintenance. Field workers receive maps or use GPS units that show the location of hydrants or manholes that need attention.



Figure 1. Water pipeline distribution network

## Colorado Decision Support System

The Department of Water Resources and Colorado Water Conservation Board used GIS to build the Colorado Decision Support System. Riverside Technology, inc., created GIS data for the CDSS that is used for water budget modeling and planning, as well as record keeping and historic analysis. The data includes irrigated acreage, diversion structures, hydrography, irrigation service areas and irrigation ditches. Figure 2 shows a 3D view of some data, which is available to the public.



Figure 2. SPDSS irrigated parcels in 3D

## Ditch and reservoir company applications

Many ditch and reservoir companies use GIS differently. The most typical is to produce maps that display service areas and headgates. Companies with GIS capabilities may produce these maps inhouse, while those without typically hire a contractor to generate maps on demand, as well as support other GIS activities.

**Maps**—Companies that have their own GIS can make maps to display different parts of their systems or different data layers to help with planning sessions or board meetings.

**Inventory**—The GIS is used by companies to keep a detailed inventory of their infrastructure, including headgates, laterals and reservoirs. This allows them to store additional information, such as size, type, material, and condition, for each asset. Maps are generated that show the ditches – lined, unlined or piped – in the system.

**Maintenance**—A maintenance plan often is developed using a GIS inventory. A schedule can be developed and tracked with the GIS, allowing the manager to see exactly when and where ditches have been cleaned or burned, which headgates need repair or replacement, or any other plans for maintenance. GIS eliminates confusion about the where, as well as the what and when elements of canal maintenance, and reduces costly inefficiencies.

**Water Management**—The GIS can be linked with an existing water management database or shareholders list to aid day-to-day water activities. Some ditch and reservoir companies link their orders to the GIS so they can display ditch and headgate maps with current orders on them (Figure 3). The GIS can locate shareholders and headgates, place orders through a map interface, and display maps on the Internet showing the current status of the system for shareholders and ditch riders.

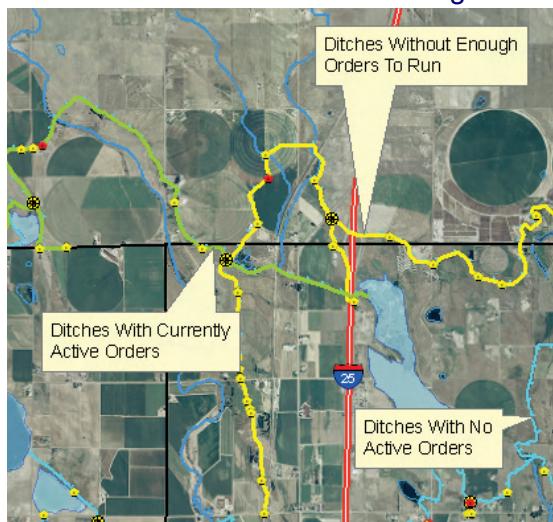


Figure 3. Active orders on a ditch system

**Planning and analysis**—A well developed GIS allows a company to perform more complex analysis. For example, once the ditch and reservoir system is integrated with other spatial layers, such as soils data, it is straightforward to determine what soil type is on each section of ditch, helpful when calculating water losses along a measured section of the ditch network. Municipalities have future growth data which can be used to assess changing water demands and other impacts to help companies plan.

## SCADA

Supervisory Control and Data Acquisition automates and controls the flow of water through an irrigation system by radio signals. GIS provides a SCADA system an existing spatial infrastructure and geometric network that connect laterals and headgates. The GIS and maps in combination with SCADA can manage the flow of water. To learn more about SCADA systems please refer to the SCADA section of this handbook.

## Common terminology and data types

**Projection**—transforming geographic data from the earth's surface to a flat plane; the name of such a transformation; e.g., Mercator Projection.

**Datum**—a geodetic reference system, usually divided into vertical and horizontal standards. A horizontal datum is based on a given ellipsoid and specified latitude-longitude coordinates for certain points (Chrisman, 2002); e.g., North American Datum of 1983 (NAD83).

**Coordinate system**—a specified combination of projection and datum that allows information to be displayed and located in a map or a GIS; e.g., Universal Transverse Mercator Zone 13 (UTM zone 13). Knowing the coordinate system of data is very important because data in different coordinate systems will often not line up in certain types of software.

**Raster**—a type of file format that stores data in a uniform grid, or pixels. Raster data typically stores one numerical value per pixel. This type of data is often used in GIS to display information that covers an area uniformly,

e.g., aerial photography, elevation model, digital topo maps or land cover data. Some common file types used to display raster data are: GeoTIFF (.tif), Jpeg (.jpg), MrSID (.sid), and IMAGINE (.img)

**Vector**—a type of file format to display points, lines, and polygons. Vector data stores the xy location of all the points that make up a feature and then connects them to form point, line or polygon features. The features then are connected to a database. This allows the storage of attributes with each spatial feature, e.g. roads and highways, rivers, and county boundaries. Some common file types used to display vector data include: Shapefile (see below), Personal Geodatabase (.mdb), AutoCAD (.dwg, .dxf), and MapInfo (.mif), and Atlas (.agf).

**Shapefile**—a widely used file type for storing vector data, developed by ESRI. A shapefile consists of three files with extensions, .shp, .shx, and .dbf.

**Geodatabase**—a spatial database used to store several different vector features in a single repository. The Geodatabase was developed by ESRI and can be stored in different common database management systems. The most common type of Geodatabase is the Personal Geodatabase. It is built on top of the Microsoft Access infrastructure and has a .mdb extension.

**GPS**—Global Positioning System is a system of satellites developed by the U.S. Department of Defense. Using a GPS unit, a person can track and receive signals from satellites to determine their location. Many different GPS units are available that provide accuracy ranging from +/-20 feet to less than a foot. Common GPS unit manufacturers include Garmin, Magellan, Trimble, Leica and Thales.

**DEM or DTM**—Digital Elevation Model or Digital Terrain Model is a raster feature that stores an elevation value in each pixel. A DEM can be used to visualize the landscape and perform terrain analysis.

**Metadata**—data that describes a data set. GIS data often comes with metadata that describes what coordinate system it is in, the attribute definitions, the author of the data and its intended use.

## Available GIS data

Many types of GIS data are freely available on the Internet. Much of it can be used by ditch and reservoir companies to begin building a GIS. Useful, basic include: hydrologic features, a DEM, land cover data, irrigation infrastructure, and aerial photography.

**Colorado Decision Support System**—the CDSS, created by CWCB and DWR created a wealth of data available for ditch companies. It includes hydrologic features, irrigated parcels, irrigation ditch service areas, diversion structures, wells, and climate and transportation data. The CDSS Web site is <http://cdss.state.co.us/DNN/default.aspx>. The Map Viewer link will open an online map viewer. Download in shapefile format through the Products/GIS link.

**National Hydrography Dataset**—the NHD is a nationwide dataset created by the USGS. It contains streams,

rivers, ditches and pipelines mapped at 1:24,000 scale. Download through a map interface from: <http://nhd.usgs.gov/data.html>.

**National Elevation Dataset**—created by USGS, NED is a high resolution seamless elevation dataset in raster format available for the entire United States. The elevation units are in meters and each pixel is equal to 30 meters (1 arc second) on the ground. Some areas of Colorado have data available at 10 meter pixel size (1/3 arc second). Download from an interactive data viewer at <http://ned.usgs.gov/>.

**National Land Cover Dataset**—NLCD is a seamless land use / land cover dataset created by the USGS. It represents the land cover of the conterminous United States in the year 1992 and 2001. Download from the same interactive data viewer as the NED: <http://ned.usgs.gov/>.

## Available software

The many types of GIS software available vary in function, intended use and cost. They can be broadly divided into three groups: GPS/Recreational GIS, freeware GIS viewers, and full-featured GIS analysis software. Links to the GIS products are provided in the last section of this chapter.

**GPS/Recreational GIS**—Available GPS and recreational GIS software range from \$50 to \$200. Designed to interface with a recreational GPS unit, they provide some mapping capability but typically are not considered genuine GIS software for two reasons: (1) They do not allow complex queries or spatial analysis. (2) They typically require all the data to be in a proprietary format and do not allow additional GIS data. Some examples of this software include Garmin Mapsource, National Geographic TOPO, and Delorme.

**Freeware GIS/GPS Viewers**—Many vendors have begun making free GIS viewers and/or GPS download software that allow functions from basic GIS viewing and queries to spatial data editing. They also allow data to be added to a map and symbolized with different categories. Some examples: DNRGarmin, GPS Utility, ArcExplorer by ESRI, ArcReader by ESRI, TatukGIS Free Viewer by TatukGIS, and uDig by Refractions Research.

**Full Featured GIS Analysis Software**—GIS analysis software allows users to create a fully functional GIS on a desktop or served through the Internet and to make spatial analysis and queries. It is also capable of making professional-style maps. ESRI is the industry leader with ArcView and the ArcGIS product suite, ArcMap and ArcCatalog. Other GIS vendors include AutoDesk, with AutoCAD and AutoCAD Map, and MapInfo.

## GIS Tutorial

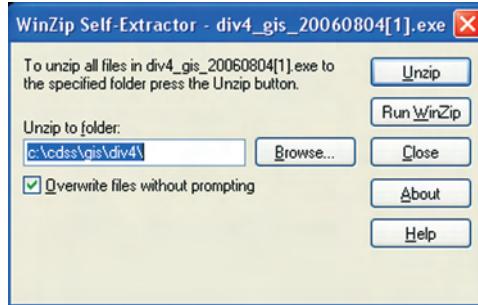
This section of the chapter provides a brief tutorial for downloading GIS software and data and creating a simple map. The tutorial is presented in a stepwise procedure that readers can follow and perform at their own pace. An Internet connection, preferably broadband, is necessary for this demonstration.

1. Download Software
  - 1.1. Open Internet Explorer or equivalent Web browser,
  - 1.2. Go to <http://www.esri.com/software/arceexplorer/index.html>.
  - 1.3. Click on the Download Now button.
  - 1.4. Under ArcExplorer 9.2-Java Edition click on the Download with Instructions link. Then click Download ArcExplorer 9.2 for Windows.
  - 1.5. On the next page type your email address. If you do not have an account with ESRI then you must register with them first.
  - 1.6. After registering and entering your email address click the arcexplorer92\_windows.zip link from the table.
  - 1.7. Click Save on the File Download window. Choose a location on your local drive to save the file. The file will take a few minutes to download. When the file download completes click Open.
  - 1.8. In the WinZip window click Extract. Choose a location on your local drive to extract the data to. Ensure that the 'Use folder names' option is checked. Click Extract.

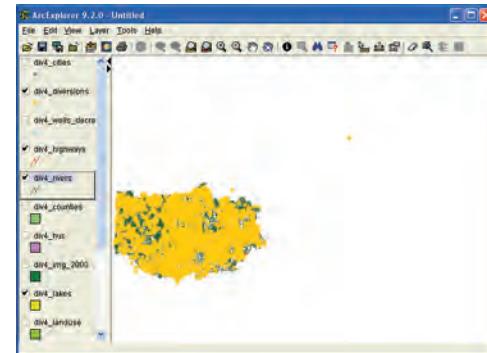


- 1.9. Using Windows Explorer, browse to C:\Temp\Arc-Explorer\_Java\Disk1\InstData\VM (C:\Temp is from the example above. If you chose a different location from the extract window then go there to find the ArcExplorer\_Java folder).
- 1.10. Double click the AEJava.exe file. Follow all of the defaults to install the software.
2. Download Data.
  - 2.1. Open Internet Explorer or equivalent browser.
  - 2.2. Go to <http://cdss.state.co.us/DNN/GIS/tabid/67/Default.aspx>.
  - 2.3. This page lists data from the CDSS. The data is divided into division or basin. Download any basin you like. For this demonstration we will download Division 4 – Gunnison.
  - 2.4. Click the link for Division 4 Layers.

- 2.5. Click Run. The download will take a few minutes.
- 2.6. In the WinZip Self-Extractor window accept the default location and click Unzip.



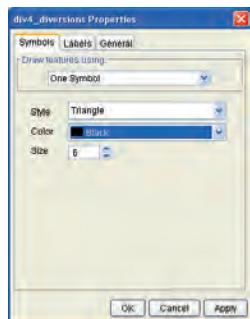
3. Create and Use a GIS
  - 3.1. Open ArcExplorer by clicking Start/All Programs/ArcGIS/ArcExplorer Java Edition.
  - 3.2. Add data to your map.
  - 3.2.1. In the map window click the Add Layers button.
  - 3.2.2. Click the expansion button next the Local row Local. Then Browse to C:\cdss\GIS\div4.
  - 3.2.3. The right pane of the window lists all of the Shapefiles available in the div4 directory.
  - 3.2.4. While holding down the Ctrl key click div4\_cities, div4\_counties, div4\_diversions, div4\_highways, div4\_huc, div4\_irrig\_2000, div4\_lakes, div4\_landuse, div4\_plss, div4\_soils, div4\_townships, div4\_wells\_decreed, and divisions. Then click the Add Layers button again. Close the Catalog window.
  - 3.2.5. The ArcExplorer window will display a list of the data on the left (table of contents).
  - 3.3. Make layers visible by placing a check mark next to them. Click the box next to div4\_diversions, div4\_highways, div4\_rivers, and div4\_lakes. Your map should look something like this:



- 3.4. Set the map units to meters (the data is in UTM so the units are meters). Click View-Scale Bar Properties-Map Units-Meters.
- 3.5. Use the magnifying glass and draw a box over a portion of the Gunnison basin to zoom in.
- 3.6. Change the color and symbology of a layer.
- 3.6.1. Double click the diversions layer in the table of contents. This opens the layer properties window.

ArcExplorer allows you to draw features with One symbol, Graduated Symbols based on a quantity in an attribute, or Unique symbols for all values in an attribute.

3.6.2. Choose One Symbol, Triangle, Black, and size 6.

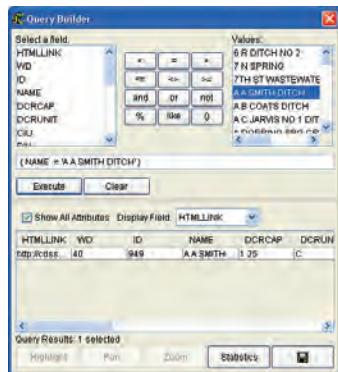


3.6.3. Use the Layer properties to change the rivers to blue and the highways to red.

### 3.7. Create a Query

3.7.1. Select the div4\_diversions layer in the table of contents.

3.7.2. Click the Query Builder button . Click Name in the Select a field window, click yes in the message window. Click the = button. In the Values window, scroll down to AA SMITH DITCH and click it. Click the execute button. Your query window should look like this:



3.7.3. Click on the row in the results window and click the highlight button. Close the Query builder window.

### 3.8. Zoom in to the yellow selected dot.

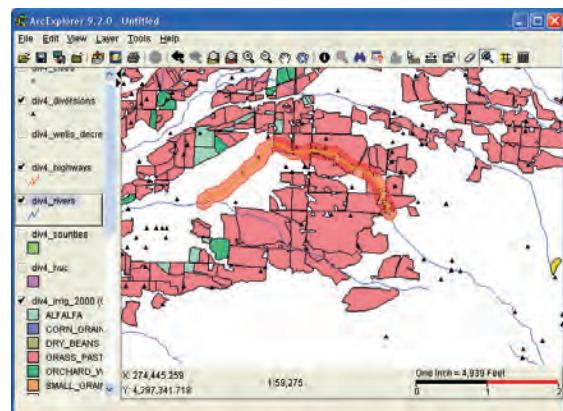
3.9. Open the div4\_irrig\_2000 layer properties window. Change the symbology to Unique Values using the CROP\_TYPE attribute. Choose Minerals for the color scheme.

### 3.10. Create a buffer.

3.10.1. Select the div4\_rivers layer in the table of contents.

Using the select features tool use a rectangle to draw a box around the river in the center of your screen.

3.10.2. Click the buffer tool . Under the buffer distance type 500, change the buffer units to feet, click OK. Your map should look something like this:



3.11. Access the help menu.

3.11.1. Click Help-Help Contents.

3.11.2. Read the Introduction to ArcExplorer-Java edition.

3.11.3. Begin exploring other features of ArcExplorer.

This brief tutorial demonstrates a small portion of possibilities that are available with freely available data and software. This demonstration used ArcExplorer for the software. Other free software such as uDig and TatukGIS offer more functionality and analysis, such as editing spatial data. A link to download their software is provided below in the Web links section. A professional GIS contractor can also assist you in compiling data and creating a functional GIS to match your needs.

### Web Links

ESRI

<http://www.esri.com/index.html>

MapInfo

<http://www.mapinfo.com/location/integration>

DNRGarmin

<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>

uDig

<http://udig.refractions.net/confluence/display/UDIG/Home>

TatukGIS

<http://www.tatukgis.com/products/viewer/viewer.aspx>

CDSS

<http://cdss.state.co.us/DNN/default.aspx>

The National Map

<http://nationalmap.gov/>

USGS GIS

<http://www.usgs.gov/science/science.php?term=445>

USGS Map Projections Poster

<http://erg.usgs.gov/ibp/pubs/MapProjections/projections.html>

**Works Cited**

United States Geological Survey. *Geographic Information Systems Poster*. Maintained by USGS Eastern Region PSC 4. Feb. 22, 2007, [http://erg.usgs.gov/isp/pubs/gis\\_poster/](http://erg.usgs.gov/isp/pubs/gis_poster/)

Chrisman, Nicholas. *Exploring Geographic Information Systems 2<sup>nd</sup> ed.* New York: John Wiley & Sons, Inc., 2002.

**About the Author:**

Nils Babel is a GIS analyst for Riverside Technology, inc. ([www.riverside.com](http://www.riverside.com)). He specializes in spatial analysis, natural resources, GIS systems for irrigation and water management, GIS design, cartography and water rights mapping. Contact him at [ncb@riverside.com](mailto:ncb@riverside.com). 

# MODERATELY PRICED SCADA IMPLEMENTATION

*by Stephen W. Smith, Aqua Engineering  
& Donald O. Magnuson, New Cache la Poudre Irrigating Co.*

## Abstract

In northeastern Colorado and many other western states, mutual irrigation companies have functioned effectively in delivering raw water for agriculture since the late 1800s. Shareholder organizations that hold the decree or decrees, they were initially farmer financed remain so today.

As shareholders modernize canals, Supervisory Control and Data Acquisition System, or SCADA, provides either monitoring or monitoring and control of operations from a centralized location. Data and information such as canal flows and reservoir storage data can also be easily posted to the canal company's Web site for management and shareholder access.

SCADA systems once were perceived as too costly for most mutual irrigation companies, but the hardware and software is increasing in function, decreasing in cost, and becoming much more viable for private enterprises.

Several case studies are cited, in particular, the New Cache La Poudre Irrigating Company, which implemented SCADA for initial monitoring of flows and later for remote manual gate actuation. SCADA implementation by Riverside Irrigation District, also described, uses a satellite uplink to keep costs reasonable.

## Background and Introduction

SCADA has been with us a long time, mostly for industries that could afford the technology. For many years, irrigation was not an industry that warranted the steep hardware cost. Then, some manufacturers began to develop a specialized SCADA from their own proprietary hardware and software.

In the mid 1980s we began to see adapted SCADA systems specifically intended for irrigation projects that could afford it—golf irrigation, in particular. In landscape irrigation, we referred to these systems as “centralized irrigation control.” These early systems were further adapted to accommodate distributed sites such as school districts or municipal park departments.

In 1986, Pueblo became the first city in the country to implement centralized irrigation control for distributed park sites. During this period, specialized SCADA systems found a niche in irrigation and those systems, by a myriad of proprietary names, have lasted for almost 25 years.

Where was agricultural irrigation to be found in this picture? A few irrigation central control systems were in agricultu-

ture, but generally, the steep cost of past SCADA systems put them out of reach. . During the early 1990s, implementing SCADA on a site cost \$5- to \$10,000, without gate actuation hardware, high compared to a classic chart recorder installation on a weir or flume, or a manual actuation of valves, headgates and checks by a ditch rider.

SCADA costs decreased to a price is affordable to mutual irrigation companies. Often smaller ones do not have an office or a staff per se, but a SCADA central system can be located anywhere that is practical. SCADA can provide smaller companies cost effective features that result in significantly improved canal operations, deliveries to shareholders, and reduced liabilities.

## SCADA Concepts

Generic definitions are appropriate to help describe basic SCADA concepts. The central system is microcomputer based and interface software is used to communicate with remote sites. The software that provides an umbrella over everything is called a human-machine interface or HMI. The key hardware at remote sites is a remote terminal unit, or RTU.

The HMI software can be proprietary and published by the manufacturer or it can be generic and published by software companies that write HMI programs compatible with many types of the hardware. Flexible and broadly compatible programs are known, for example, as Wonderware, Lookout, and Intellution.

Communication can be via wire line (hard wired), telephone, fiber optics or radio. Radio for most canal operations is preferred although the canal easement does present the potential for easy fiber optic installation<sup>1</sup>. The SCADA industry has standardized largely on a communication protocol called Modbus which is quite flexible. Modbus is considered antiquated by many because it was developed for wire line applications and not the higher speeds possible, such as radio.

Remote terminal units are essentially a small computer that can be programmed for the specific requirements at individual sites. The RTU is also the point at which sensors are connected. A site with only one requirement, e.g. monitoring the water surface elevation in a flume or weir, would have a water level sensor wired to it. The RTU then communicates

<sup>1</sup> The Dolores Project in Cortez, Colo. utilizes fiber optic communication.

to the central system or conversely, the central system can initiate a call to the RTU. The preferred communication is two-way communication. In other words, the central can call the RTU or the RTU can call the central. It is important to note that the RTU can be monitoring one or more sensors and perform logical operations and even create an exception report or alarm. If flows or water levels exceed a pre-set limit at a point in the canal system, an alarm can be raised or action can be taken in the form of gate or check adjustments. Alarms can appear at the central computer or even be transmitted to a cell phone or pager.

There are multiple levels at which SCADA can be implemented. Beginning with monitoring only, and then expanding the initial system to other sites and adding capability and features to sites is quite appropriate.

SCADA implementation can be described function and utility to the canal company;

- Monitoring only;
- Remote manual operations;
- Local control; and
- Fully automated operations.

Each level results in increasing capability within the SCADA system, but each also costs more. The additional cost is largely at the remote sites, not at the central workstation. The central workstation becomes a fixed cost except for HMI upgrades and the inevitable computer hardware upgrades.

Figure 1 shows a simple SCADA monitoring site installed in a rated canal section historically used by the New Cache la Poudre Irrigating Company in Lucerne, Colo. For many years, water surface elevations have been monitored at this location using a Steven's recorder and by manually reading the gauge twice per day by the ditch rider. With SCADA, data is transmitted by radio to the central computer on a frequent basis. At the central computer, the data is reported continuously on the HMI screen. NCLPIC is investigating full SCADA to improve canal operations, and to monitor and report its well augmentation plan.



Figure 1. A rated canal section is remotely monitored using a SCADA system. RTU equipment is 12-volt DC powered from a solar panel that maintains a charge on a battery. Communication with the site is via radio

The HMI screen can and should be unique to the user and the circumstance. Figure 2 shows an example of the HMI screen in use by district staff at the Dolores Project near Cortez, Colo. This screen is simple and intuitive. Radial gate (check structure) positions are depicted graphically, each in a somewhat lower position in the HMI screen, to indicate the canal itself. The operator may raise or lower gates, and therefore water surface elevations in canal pools, by using very small incremental gate movements. Interestingly, Dolores Project staff can and do make changes in their own HMI software interface without assistance from an outside consultant or system integrator.

With simple monitoring using a SCADA system, sensors are installed that meet monitoring requirements such as water level sensors. Data is collected on the central system and can then be directly viewed by a system operator or plotted depending on needs and functional requirements.

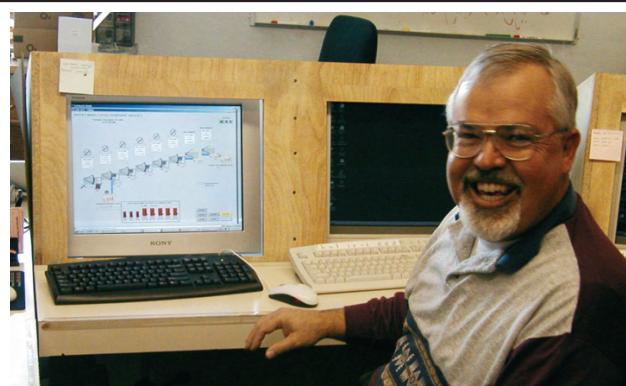


Figure 2. Chuck Lurvey, district engineer for the Dolores Project in Cortez, Colo., sits in front of the SCADA central computer. Radial gate icons on the HMI screen indicate the water surface level in the canal and the gate positions of the radial gates at checks along the canal.

With remote manual operations, as the name implies, the operator can raise or lower gates and effect the canal operation from the central computer. This is called remote manual because gate movements are implemented by the canal company staff, just as if they were at the gate or check. But gate adjustments can be made much more frequently and therefore canal operations, overall, can become more real time and precise.

With local control, the RTU at a particular site is programmed to maintain a set upstream water surface level or to open a gate if a water surface level increases beyond a set point as with a storm event.

Full canal automation is possible. This ultimate benefit of SCADA has been widely discussed for two decades, but there are actually very few canals operated under what would be called full automation. One semantical note is important here. Some would refer to a canal as being automated, with any SCADA implementation, but what they often mean is that the canal is operated under a remote manual scenario using SCADA equipment. For our purposes, full canal automation is a system in which computer programs control processes from irrigation order inputs through algorithm-driven gate adjustment schedules for some future time. This level of automation is not an easily programmed or implemented process.

Figure 3 shows an actuated canal check structure which is integrated with SCADA.



Figure 3. This check structure is controlled by Rubicon gates integrated with the SCADA system and used for water surface level control or flow control.

### Case studies

#### Central Arizona Irrigation and Drainage District

The Central Arizona Irrigation and Drainage District has implemented SCADA over much of the district's 60 miles of canal. CAIDD utilized SCADA for many years, in recent years upgraded its SCADA system at a relatively low cost. Using the existing gates, actuators, and other infrastructure, the district staff installed new SCADA equipment on 108 sites for an equipment cost of approximately \$150,000.

Most of the district's checks are operated in remote manual mode. See Figure 4 which shows the day operator at the central system. The upstream water surface elevation at all 108 check structures can be viewed simultaneously on three side-by-side computer monitors. Using SCADA, gate adjustments can be made in increments of 1/8<sup>th</sup> inch, which coincidentally equates to a change in flow of roughly one cubic foot per second.



Figure 4. An operator at the Central Arizona Irrigation and Drainage District near Phoenix monitors primary flows and water surface elevations on the 60-mile canal. The SCADA system was implemented at relatively low cost using affordable RTU equipment and spread spectrum radios for communication.

A 15-mile lateral reach of the Maricopa Stanfield Irrigation and Drainage District's canal system is operated by Water Conservation Lab staff under full automation. MSIDD,

Central Arizona's sister system, uses a program developed by the Agricultural Research Service, Water Conservation Laboratory, in Phoenix, Ariz. SacMan, which stands for Software for Automated Canal Management, has been under development for approximately five years. SacMan runs in parallel with the HMI software and interface and is used to operate a key MSIDD canal in a fully automated mode.

A key approach to affordable SCADA for CAIDD was spread spectrum radios. These radios do not have a federal licensing requirement. The radios search for a clear frequency, use that frequency if it is unused, or proceed to another frequency if necessary. The line of sight range for a spread spectrum loop antenna is two miles and the line of sight range for a directional antenna is five. Any one antenna can serve as a repeater radio to other radios. So, with a linear project like a canal system, communication can be achieved by using the radios in a daisy-chain fashion to increase the effective communication distance.

Figure 5 shows a spread spectrum radio and a directional antenna installed on a galvanized steel pipe at one of CAIDD's check structure sites.



Figure 5 shows a spread spectrum radio and a directional antenna installed on a galvanized steel pipe at one of CAIDD's check structure sites.

#### New Cache La Poudre Irrigating Co. (Greeley #2)

New Cache La Poudre Irrigating Company operates one of the larger systems in northeastern Colorado. It is known as the Greeley No. 2 Canal. The company holds decrees on the Poudre River and diverts approximately 600 cubic feet per second when all the decrees are in priority. In recent years, NCLPIC also initiated a well augmentation plan for more than 100 member wells within the company's historic service area.

In 2003, the company commissioned an initial demonstration of SCADA (monitoring) with one of the key rated sections

on the Greeley No. 2 system. This demonstration showed clearly that real time data could be used effectively and that improved monitoring significantly aided management of day-to-day operations as well as annual reporting of flows.

After considerable study, including tours of CAIDD, the Dolores Project near Cortez, and Imperial Irrigation District in California, the company elected to implement SCADA for further monitoring of flows as well as gate actuation at key checks and outlet gates. Rubicon gates were selected because of suitable flow measurement accuracy that is possible along with gate actuation. One existing radial gate was actuated with a Limitorque actuator. A UHF radio frequency was licensed to the company and the communications for the entire system are facilitated using a repeater on a water tower near the company's Lucerne, Colo., offices.

Because Rubicon gates were selected, the Rubicon Total Channel Control HMI was evaluated and ultimately selected. The system consists of five Rubicon gates, one actuated radial gate, and monitoring of one rated section. A key gate outlet used to waste excess water in storm events allows for continuous monitoring of canal water surface elevations. Storm flows can be dumped to avoid increased liability and risk of a canal breach.

### Riverside Irrigation District

Riverside Irrigation District located in Fort Morgan, Colo., operates a canal that is more than 100 miles in length. The company delivers water to well recharge structures which must be monitored to meet the required reporting demands for flows and volumes associated with recharge. Automata RTU equipment, specifically the Automata Minisat, was linked to satellites. Data is accessed through an Internet Web page. Although there is an annual recurring cost for satellite communication, this approach allows a very low SCADA entry cost and minimal capital investment to meet the site requirements without having to travel to individual recharge sites for data collection. Six sites are in operation. Riverside invested approximately \$18,000 to date since early 2004. It expects to gradually expand the system as warranted and as can be afforded.

### Affordable Implementation

Table 1 contrasts SCADA implementation costs at varying levels and compares them to flow data collection using a Stevens

recorder device, as might have been most common in the past. So, for example, if it were necessary to replace an existing Stevens recorder at a flume or weir at \$2,450 (second column), the existing equipment might be replaced with an RTU using satellite communication at a cost of approximately \$3,000 plus annual costs of \$435 (third column). This incremental additional cost is likely quite palatable given the ease of data collection.

Additionally, assuming a central computer is already in place, the cost of real time assess to the additional site would be approximately \$3,000 as well (fourth column). If the added features and sophistication of alarm condition reporting is desirable, then this cost increases to approximately \$4,000 (fifth column).

### Summary

SCADA has become more affordable in recent years and is likely quite useful now to mutual irrigation companies for monitoring, remote manual operations, or even for full canal automation in the not so distant future. The technology has changed rapidly and is expected to continue to change and become more flexible and intuitive. The cost can also expected to drop. This will encourage mutual irrigation companies to adapt to and adopt these technology. 

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Table 1

**Cost Comparison for Various Means of Recording**  
**Flow Data at a Measurement Structure**

	<b>Chart Recorder<sup>1</sup></b>	<b>Log Data &amp; Upload to Satellite<sup>2</sup></b>	<b>Log Data &amp; Upload to Local Central Computer<sup>3</sup></b>	<b>Log Data, Upload to Local Central Computer, and Create Alarm Condition<sup>4</sup></b>
<b>Equipment Cost, \$</b>	\$2,200	\$2,500	\$2,500	\$3,500
<b>Installation Cost, \$</b>	250	\$500	\$500	\$500
<b>Total Installed Cost, \$</b>	\$2,450	\$3,000	\$3,000	\$4,000
<b>Monthly Recurring Cost, \$</b>	\$0	\$435 per year (\$36 per month)	\$0	\$0

1 Presumed to be a Stevens Recorder type chart recorder device.

2 Presumed to be an Automata Mini-Sat device with a satellite uplink and no central computer. Data is accessed via a web site.

3 Presumed to be an existing SCADA implementation based on Automata equipment using spread spectrum radio communications.

4 Presumed to be an existing SCADA backbone installation with Motorola M RTU with either spread spectrum or UHF licensed radio communications.

# SECTION 404 PERMITTING ASSOCIATED WITH IRRIGATION DITCHES AND DRAINS

by Steve Dougherty, ERO Resources Corporation

## Background

The discharge of dredged and fill material into American waters is regulated by the U.S. Army Corps of Engineers and Environmental Protection Agency under Section 404 of the Clean Water Act. Historically, non-tidal irrigation ditches and drains excavated on dry land were excluded. (33 CFR, Part 328.3(b)). The Corps reserves the right on a case-by-case basis to individually determine whether a particular water body falls under its jurisdiction and now many irrigation ditches and drains are considered to be U.S. waters.

Farmers, ranchers and ditch companies must maintain their canals, ditches and drains and periodically construct new facilities. Construction and maintenance can involve the discharge of dirt, rock, concrete, or dredged materials into canals, ditches or nearby water, posing potential Section 404 permitting issues.

## What changed?

Prior to 2001, irrigation canals, ditches and drains in Colorado constructed on dry land typically were not subject to permitting under Section 404. After 2001, a decision in *Headwaters, Inc. v. Talent Irrigation District* (243 F.3d 526, 9<sup>th</sup> Cir. 2001), some canals were considered waters of the U.S.

In the *Talent* case, canals that receive water from natural streams and lakes and divert water to streams and creeks, were considered connected as tributaries to other waters of the U.S. In 2004, in a settlement of a potential lawsuit, the Corps reached an agreement that the *Headwaters v. Talent Irrigation District* decision would be binding on the Northwestern Division of the Corps in areas covered by the 9<sup>th</sup> Circuit. Washington, most of Oregon, most of Idaho and part of Montana make up the 9<sup>th</sup> Circuit. Although not in the same circuit, northeastern Colorado is in the Omaha District, a part of the Northwestern Division.

Although the *Talent* decision and Northwestern Division settlement do not currently apply to Colorado, the Corps in Colorado does apply its Section 404 jurisdiction to irrigation canals, ditches, and drains that, under normal circumstances, intercept the entire flow of a natural drainage (perennial, intermittent, or ephemeral) that is also a water of the U.S. and the irrigation canals, ditches, or drains flow into another water of the U.S. The irrigation canal, ditch or drain is considered a water of the U.S. from the point the irrigation ca-

nal, ditch, or drain intercepts the natural drainage to where the irrigation canal, ditch or drain flows into a water of the U.S. The irrigation canal, ditch, or drain must also have an ordinary high water mark or continuous wetlands to be a water of the United States.

This is not an uncommon situation in Colorado, as many ditches intercept the entire flow of minor drainages along the path of the ditch. Please note that the *partial* diversion of a water of the U.S. and delivery of that water to another water of the U.S. does not, at this time, make the canal, ditch, or drain a water of the U.S. in Colorado.

## Mostly not 404 Situations

Canals, ditches, and drains that do not normally drain to a water of the U.S. are not considered a water of the U.S. For example, canals, ditches, and drains that end in a field, closed basin, or pond have no surface tributary connection to a water of the U.S. and are not subject to the Corps' jurisdiction. Canals, ditches, and drains that divert water from a water of the U.S. and return water to a water of the U.S., but do not intercept a natural drainage are not considered by the Corps a water of the U.S. in Colorado. Similarly, the Corps does not take jurisdiction of a canal, ditch, or drain upstream of the first point where the entire flow of a natural drainage is intercepted.

## Exemptions

The Corps' regulations provide the following two exemptions that can apply to irrigation canals, ditches or drains. Activities that meet the requirements of an exemption do not require any Section 404 permitting. It is recommended that the project proponent verify that the proposed activity qualifies for the exemption.

### Agricultural Exemption (33 CFR Section 324.4(3))

The agricultural exemption applies to the construction or maintenance of farm or stock ponds or irrigation ditches or maintenance (but not construction) of drainage ditches. The exemption also applies to associated structures, such as headgates, siphons, pumps, wing walls, weirs, and diversion structures. In the Omaha District, this exemption can apply to any irrigation ditch, for example, it does not have to be used solely for agriculture, as long as it still provides irrigation services.

**Maintenance Exemption (33 CFR Section 304.4(2))**

The maintenance exemption includes routine maintenance as well as reconstruction of recently damaged parts of currently serviceable structures such as dikes, dams, levees, groins, riprap, breakwaters and bridge abutments. This exemption does not include any modification that changes the character, scope or size of the original fill design.

**What Doesn't Qualify**

Many activities involving irrigation canals, ditches, and drains should qualify for either the maintenance or the agricultural exemption but don't. The Corps has several nationwide permits, or NWPs, that can be used to authorize certain activities that involve discharges (Table 1). The NWPs are a streamlined permit process for work with minimal impacts. Many NWPs require that the people in charge of the project notify the Corps and obtain authorization. (See 72 Fed. Reg. 11092 (March 12, 2007).) Verify that whoever is in charge contacts the Corps even if notification is not required. The Corps has 45 days to respond.

**Table 1. Nationwide Permits that may be Useful for Activities in Ditches and Drains.**

Permit	Activities Authorized
NWP 3 Maintenance	Repair, rehabilitation, or replacement of currently serviceable structures. Try and fit activity under maintenance exemption, if possible.
NWP 5 Scientific Measurement Devices	Small weirs and flumes to record water quantity and volume. Discharge of fill is no more than 25 cubic yards.
NWP 18 Minor Discharges	No more than 25 cubic yards of fill and no more than 0.10 acre of loss of wetlands.
NWP 41 Reshaping Existing Drainage Ditches	Can be used to modify the cross-sectional configuration of currently serviceable drainage ditches constructed in waters of the U.S. Cannot expand the area drained by the ditch or expand the original design capacity of the ditch.
NWP 46 Discharge into Ditches	Authorize up to 1 acre of loss of waters of the U.S. for work in ditches and canals constructed in uplands that are determined to be waters of the U.S.

The majority of activities typically associated with irrigation canals, ditches, and drains will qualify for either the exemptions or the NWPs discussed.

Activities that do not qualify for the exemptions or the NWPs will need to be authorized under the individual per-

mit process. The individual permit process can be lengthy and typically takes the Corps at least 90 to 120 days to process.

**Recommended Strategies**

When possible, a project proponent should first determine if the canal, ditch or drain is subject to the Corps' jurisdiction, and if it is, if it qualifies for an exemption. Any Corps authorization, including NWPs, must also comply with federal laws, such as the Endangered Species and National Historic Preservation acts. Exemptions do not trigger the Corps' compliance with these laws. The recommended sequence for determining Section 404 jurisdiction for irrigation canals, ditches and drains is shown in Figure 1. Have the Corps verify all determinations.

Qualifying under an exemption or NWP does not give the project proponent unlimited access to adjoining waterways and wetlands to accomplish the activity. NWPs have conditions that must be met and the exemptions only apply to the activity. For example, the maintenance and agricultural exemptions allow construction and maintenance of an irrigation ditch, deposits or sidecast materials from the ditch are not allowed in wetlands or waters.

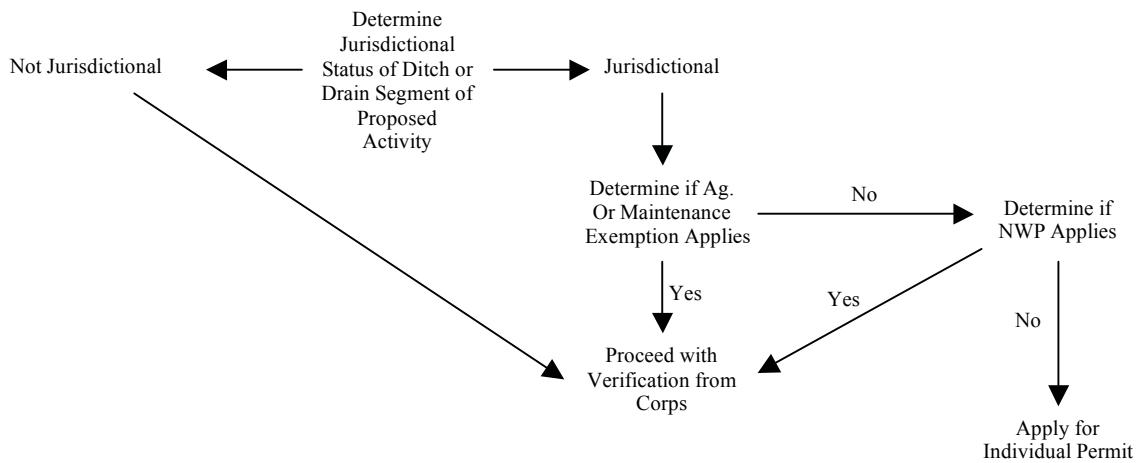
**Coordination with the Corps**

Colorado is divided into three districts:

1. Omaha District – Northeastern Colorado, South Platte River, and its tributaries  
Contact: Denver Regulatory Office  
9307 South Wadsworth Blvd.  
Littleton, CO 80128-6901  
(303) 979-4120
2. Sacramento District – West Slope of Colorado  
Contact: Colorado/Gunnison Basin Regulatory Office  
400 Road Ave., Room 149  
Grand Junction, CO 81501-2563  
(970) 243-1199
3. Albuquerque District – Arkansas and Rio Grande rivers and their tributaries  
Contact: Southern Colorado Regulatory Office  
200 South Santa Fe Ave., Suite 301  
Pueblo, CO 81003  
(719) 543-9459

Section 404 policy and application inconsistencies exist among the three Corps districts. The Corps does not have a unified policy over irrigation canals, ditches or drains in Colorado, nor does it have reference or published information on what is considered waters of the U.S. Regulatory field office staff may know on some canals, ditches and drains, so a phone call can often save some time. 

Figure 1. Sequences for Determining Section 404 Jurisdiction for Irrigation Canals, Ditches, and Drains



# SECONDARY WATER SYSTEMS

by John Wilkins-Wells, Assistant Professor, Senior Research Scientist, Sociology Water Lab,  
Department of Sociology, Colorado State University

*Note: This is a version of Chapter 6 taken from a special report on secondary water systems prepared for the Colorado Water Conservation Board, Department of Natural Resources, State of Colorado. For a copy of the full report, go to <http://waterlab.colostate.edu>. Look for the hyperlink Dual Systems (aka, Secondary Water Supply). Download the copy for free.*

The Davis and Weber Counties Canal Company of Sunset, Utah, is frequently used as a model for secondary systems' establishment, operations and administrative requirements. The Kennewick Irrigation District, based in Kennewick, Wash., is considered a competing model. Both case studies are informative and cover a variety of circumstances.

Surprisingly, secondary water service is a tradition in the West. Irrigation districts and canal companies in California and Utah provided lawn and garden water on a limited basis as early as the turn of the century, in addition to supplying irrigation water. Then, secondary service was usually provided through open ditches, but occasionally it was piped.<sup>1</sup> The two case studies presented in this report, along with the information provided in Figures 40 through 50, will show the level of sophistication that these systems have achieved today.

The belief is that traditional agricultural suppliers reap revenue to improve current facilities, such as canals and headgates, when they manage secondary water supply systems. The business operations, meanwhile, enhance traditional enterprises, allowing them to adjust more effectively to urbanization in their service areas.

Secondary systems reduce the pressure on municipalities to seek and transfer water out of productive agricultural areas to meet potable water and urban landscape demands. The transfers often occur in areas where agricultural suppliers could provide a secondary supply for landscapes. Each year water treatment costs rise. With secondary water service, municipalities benefit because they can use filtered instead of expensive treated water on lawns.

Admittedly, in interviewing irrigation district and canal company representatives today, some voiced mixed feelings about the concept. Some growers said secondary systems may promote even faster urban encroachment. Urban growth onto irrigated lands may have more to do with county and municipal land use policies and codes than it does with an innovative water service. In California, Proposition 13 contributed significantly to urbanization in agricultural areas.<sup>2</sup>

Figure 40 – Pine View Water Users Association Secondary System Service Area

This photo area overlooking Ogden, Utah is provided secondary water service by the Pine View Water Users Association, formally an agricultural water supplier.

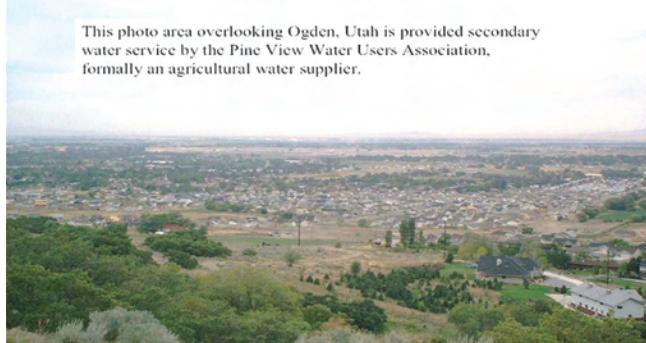


Figure 40 – Pine View Water Users Association Secondary System Service Area. This area overlooking Ogden, Utah, receives secondary water service by the Pine View Water Users Association, formally an agricultural water supplier.

Figure 41 – Small Storage Facility that Pressurizes Secondary Water Delivery in the North Ogden Area, under the Pine View Water Users Association

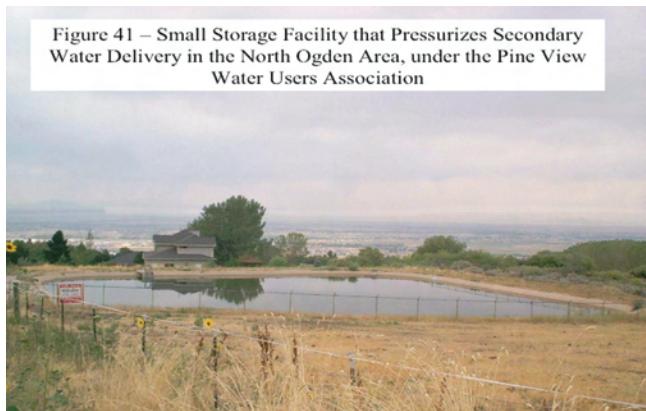


Figure 41 – A small storage facility pressurizes secondary water delivery in the North Ogden Area, under the Pine View Water Users Association.

Figure 42 – Forebay for Pressurizing Secondary Water off a Main Canal under the Pine View Water Users Association



Figure 42 – A forebay is used to pressurize secondary water off a main canal under the Pine View Water Users Association.

Figure 43 – Pump House for the Pine View Water Users Association Secondary System, Ogden, Utah



Figure 43 – Pump house for the Pine View Water Users Association Secondary System, Ogden, Utah.

Figure 44 – Pump System that Filters and Pressurizes the Pine View Water Users Association Secondary System



Figure 44 – The pump system filters and pressurizes the Pine View Water Users Association Secondary System.

Figure 45 – City of Highland Secondary System Service Area

This photo area overlooking the City of Highland, Utah is provided secondary water service managed by the City of Highland.



Figure 45 – City of Highland Secondary System Service Area  
This view overlooks the City of Highland, Utah, which receives secondary water service managed by the city.

Figure 46 – Small Storage Facility that Pressurizes Secondary Water Delivery in the City of Highland, Utah



Figure 46 – A small storage facility pressurizes secondary water delivery in Highland, Utah.

Figure 47 – Pump House for the City of Highland Secondary Water System

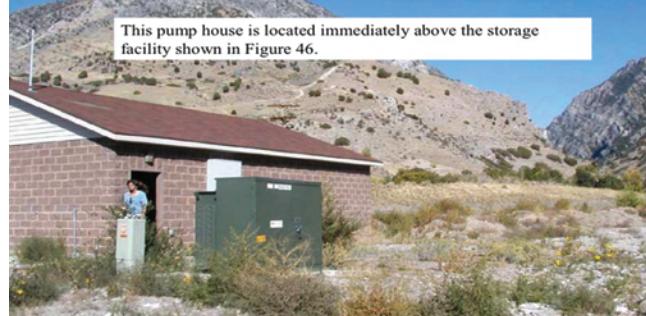


Figure 47 – Highland's pump house is located immediately above the storage facility shown in Figure 46.

Figure 48 – Pump System Filtering and Pressurizing the City of Highland Secondary System



Figure 48 – A pump system filters and pressurizes Highland's system.

Figure 49 – City of Highland, Utah, Residential Area Served by Secondary Water

The City of Highland secondary system has 1700 connections, representing approximately 95% of the city population.



Figure 49 –Highland's secondary system has 1,700 residential connections, representing approximately 95 percent of the city's population.

## Urban Encroachment

Managing urban growth continues to be a major issue for county and municipal governments throughout the nation.<sup>3</sup> In irrigated areas, urban encroachment contributes significant costs to operating a canal company or irrigation district. Although long an issue for the more populous West Coast states, many prime irrigation counties in the Rocky Mountain region now face rapid urbanization, leading to rising agricultural production costs.

One observer concluded tax incentives, right-to-farm legislation, acquisition and/or transfer of development rights, agricultural zoning and various combinations of such policies still lack proven effectiveness in minimizing some of the more negative aspects of urban growth, particularly its impact on agricultural production.<sup>4</sup>

One factor linking urban encroachment to the increased agriculture costs is the impact it has on irrigation districts and canal companies' operations. The enterprises can have up to four kinds of operating costs today:

- Traditional annual costs borne by these enterprises to operate and maintain water delivery systems;
- Bond, loan or federal repayment contracts for infrastructure development and/or major improvements;
- Costs imposed on canal delivery systems as a result of urban encroachment, but which irrigation districts and canal companies can recoup some form of reimbursement fee, for example for pass-through costs; and
- Costs imposed on irrigation districts by urban encroachment, but for which reimbursement fees are difficult to design and collect, such as non-pass-through costs.

Examples of the fourth category include costs for increased irrigation district liability directly linked to subdivision development; maintaining, protecting and ensuring routine access to rights of way; removing urban trash from canals; damage to canal systems from urban storm runoff; urban-related vandalism of equipment and facilities, vehicle; pedestrian trespass; and pressures to move or pipe open irrigation ditches to accommodate subdivision needs.

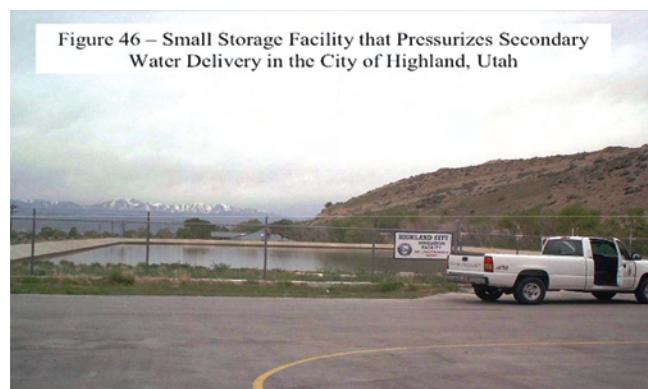


Figure 46 – Small Storage Facility that Pressurizes Secondary Water Delivery in the City of Highland, Utah

These and a host of other costs—by and large absent from irrigation district budgets 20 years ago—are now routinely borne by irrigators, in whole or in part, through the water

assessments. The district taxes irrigators annually pay to operate and maintain their irrigation facilities cover the expenses. County and municipal land use codes provide little protection to irrigation district and canal company lands and rights of way. Development plans submitted to county planning offices frequently affect irrigation districts negatively, and there are no real means to compensate districts for subdivision development. Urbanization around irrigated lands can improve the farm equity through increased land values, and this is desirable to many growers. Elsewhere, some canal companies benefit from municipal takeover in return for promises to guarantee reductions in annual water assessments for irrigators. However, lowered farm income due to urbanization's subtle effects may encourage growers to exit production earlier than they might under more favorable circumstances. This process may be ameliorated in part by irrigation districts entering into secondary water supply management. It allows these traditional enterprises to exercise more oversight of the urban encroachment process and potentially enjoy the benefits.

## Case studies

Both Davis and Weber Counties Canal Company and Kennewick Irrigation District remain predominately agricultural. They deliver water to farmlands and their boards are largely farming-oriented in perspective. They are attempting to accommodate urban development in the best way possible by ensuring that costs associated with urban encroachment are pass-through costs rather than non-pass-through costs. This becomes apparent when examining how secondary supply systems are organized, financed, and operated.

### Davis and Weber Counties Canal Company

The Davis and Weber Counties Canal Company was established in 1894, although a predecessor organization goes back to the early 1870s. The company was conceived and constructed with one purpose: to provide reliable irrigation water supplies to farmers. It fulfilled its goal for more than 100 years. Davis and Weber have been important dairy, fruit and grain producing counties in the intermountain region. Approximately 20,000 acres of the original 40,000 acres of prime irrigated land under D&W are still farmed today, contributing to a highly valued rural lifestyle on the outskirts of Ogden and Salt Lake City.

Since the late 1970s, the area surrounding the canal company has become largely urbanized. The area experienced a 3 percent or greater annual growth rate through most of the 1990s. In 1985 the canal company's board of directors and management began to investigate the potential for alternative uses of raw irrigation water within the service area. This move was driven by the need to find additional sources of revenue to improve the water delivery system. Water assessments rose because of to the expenses associated with urban encroachment, most caused by the failure of citizens and even local government to respect canal and pipeline corridor easements. More employees were hired to address urban issues. Farmers were simply not able to afford continued assessment increases to pay for non-pass-through costs.<sup>5</sup>

Foremost in the farmers' minds was to keep existing water rights attached to the canal company service area. Given the

subdivision development in the area, providing pressurized raw irrigation water for lawns and gardens could produce valuable new sources of revenue for the canal company to upgrade its aging open channel irrigation system. In April 1985, a firm that had provided D&W with engineering services was hired to prepare a feasibility study.

The firm conducted a series of meetings with cities and developers. The meetings were designed to acquaint them with possible options to cope with their growing demand for treated water, much of which was applied on lawns and ornamentals. This idea was tantamount to developing a second D&W pipeline system, creating a "dual system" for subdivisions. One piped water system would convey municipal treated water, while the D&W pipe system would convey raw, filtered irrigation water for residential landscapes. In effect, it was a partnership between a mutual water company and municipalities.

Traditionally, a secondary water supply was conveyed through open ditches to older residential areas. The state water agency was responsible for funding water infrastructure projects, and it was favorable to promoting pressurized secondary system development.

D&W then commissioned a feasibility study for the pressurized secondary water system. The proposal involved several project phases. The state engineer responded, setting aside \$37 million for the project. The D&W secondary system would be developed in stages, each requiring a portion of the construction money. D&W gradually brought secondary water service to thousands of Kaysville-Sunset-Westpoint-Roy-Riverville-area homes.

D&W stockholders dedicated of 5,000 acre-feet of water for the secondary system, creating a major selling point for the state. It translated into half an acre-foot of water for each of the 10,000 shares in the company. The historical water yield for D&W stock had been good, averaging about 7 acre-feet per share. Consequently, asking the stockholders to dedicate a small fraction of the annual water allocation to each share of stock was not overly burdensome. About 1,000 shares were allocated annually for a water rental pool in the company service area.

## Getting Started

The stockholders initially floated the idea of using the water rental pool for the secondary system, but the state rejected the use of the less-permanent rental pool water to underwrite a secondary system. So, the canal company stockholders permanently dedicated company stock. One provision: As the secondary system developed, the canal company would replace the shareholders' water, presumably through additional water purchases in the region, with the secondary system proceeds. The plan was a positive signal to the state agency and to the company board members and stockholders that the secondary system would have an adequate supply for the future. Additional water for the secondary system, as it expanded over time, would be assured through an ordinance-driven water turnover requirement imposed on developers. It would be sufficient amount to supply expansion as urban build out.

Although it took several years to convince the stockholders, it was a popular idea once they understood the concept's benefits. Only 1 percent of those present voted against the 1988 board resolution authorizing the project.

To place lawn and garden watering under non-potable sources would relieve the cities in that area of Utah from the increasing cost of using treated water for the same purpose. Municipal

water treatment systems were designed to accommodate the peak demand for outdoor water use during the summer months, as well as for fire suppression needs. The cost of potable water treatment is even more of a factor today because of new drinking water standards. The idea of a canal company providing pressurized raw irrigation water service looked like a win-win situation for everyone. The cities were slow to see the big picture, and often looked suspiciously at a canal company's involvement.

Once they were convinced that D&W was serious, state development funds were in place, and the developers saw the benefit and could communicate their interest to the cities, the concept took hold. It should be mentioned that there was never any consideration about D&W meeting fire suppression needs through its secondary supply design, and to this day, other canal companies in Utah draw from the D&W experience do not venture into providing fire suppression.

Agreement was reached in the early stages between D&W and the cities that the secondary system would provide water only during the canal company's traditional irrigation season, early April to early November. This was in conformity with the water rights and general access to water by the canal company. If drought conditions were to occur during the winter, which occasionally happens along Utah's Wasatch Front Range, some hand watering of more expensive ornamentals could occur via municipal potable water systems. Turf, on the other hand, had sufficient restorative powers to withstand winter drought conditions, particularly if vigorous root growth was promoted during the normal growing season.

In April 1988, D&W officially applied to the Utah Division of Water Resources for funding. In August, the agency approved funding in the amount of \$37 million, including the first phase of the project to serve the city of Kaysville, Utah. An agreement was signed between D&W and Kaysville, ensuring D&W of its secondary supplier role. Construction contracts were awarded in September 1989 for a small secondary system feeder reservoir east of Highway 89, along with the secondary supply pipelines to serve Kaysville. In December 1989, Layton, Utah, was included in the project and land was purchased for a small reservoir site. In May 1990, Sunset was included, and D&W purchased property for another one-acre reservoir. Additional construction was completed through 1992. As of 2002, three surrounding communities received some secondary water supply service from D&W.

## Working With Local Municipalities

The agreement signed by D&W with each of these cities spelled out ordinances, mutual covenants, canal company maintenance procedures, city obligations, fees and assessments, and rate adjustments for future users. Presently, the cities collect and remit secondary service fees to the canal company by first billing the homeowner an initial connection fee, and then the annual water fee, paid in monthly installments as part of the homeowner's utility bill. The cities also collect a nominal fee per homeowner account to administer the secondary supply billing. The canal company does not have to bill the secondary water users, but receives a periodic check from the cities.

Cooperation from the cities involves more. In order for the secondary supply system project to be successful, several city initiatives had to support it. They included the requirement that all residents within the city boundaries pay the secondary con-

nection fee and annual user fee, and that subdivision developers are required to construct the system under the canal company's design guidelines and supervision. In this way engineering design and quality of service is maintained.

The cities assisted the canal company with ensuring that a portion of all water remaining on the land and used in the area be transferred to the secondary system. As subdivisions were built in the D&W service area, developers were given options for meeting the water turnover requirement of 3 acre feet per acre for the secondary system. The developer could pay D&W the equivalent dollar value at the going rate of canal company stock, in which case D&W would purchase the water. Alternatively, the developer could bring the water to the canal company at his expense, or could bring a combination of cash and water stock to the canal company. Today this is routinely accomplished before permits are issued by the cities or counties for development. Again, this policy is enforced through local ordinances. The water stock accumulated for the secondary system is earmarked as "treasury stock", dedicated to the secondary system. A similar approach, an entirely separate water account for secondary service is feasible with irrigation districts.

In the process of establishing service and relieving the burden on local municipalities, the canal company developed a new revenue source to help finance a much needed and long overdue rehabilitation of its entire irrigation system. This benefited the agricultural water users, many of whom still use older, open channel systems. The secondary water supply tap fees are used to repay the loan obtained from the state agency and to continually upgrade the canal company's agricultural water supply system. Approximately 80 percent of the revenue from secondary system residential tap fees covers the state agency repayment contract, while the remaining 20% finances canal company O&M and system-wide improvements, including upgrading open ditches and older irrigation infrastructure, installing SCADA systems, and developing GIS capabilities to monitor subdivision development.

The original contract with the state called for a loan repayment schedule based on a projected annual population growth rate for the area of 3 percent. If it was exceeded in any given year, it was agreed that excess revenue generated could be held in reserve or used to finance canal company improvements. This happened for several years in the 1990s. The windfall for the canal company led to major rehabilitation of some of the open channel system. The company was still able to maintain nonprofit status by making these improvements, which also included some water purchases and work on distant reservoir systems.

Given the costs associated with urban encroachment (see also the paper titled "Urbanization of Irrigation Systems"), including the increased cost of liability insurance, the supplemental revenue strengthened the canal company's economic position; allowed the annual assessment for agricultural water users to remain constant and relatively low, over the years; benefited agricultural production; and stabilized farm income.

Secondary water service is a good way to increase district income necessary to pay the costs of managing a canal system passing through an urban corridor. Again, D&W still provides agricultural water service to nearly 20,000 acres of prime irrigated land, kept in production despite considerable urban pressures. Farmers continue to farm, and the irrigated lands are valued for their production, open space and the mixed economy they provide. It is an income transfer of sorts, the cost of urbanization to

the district paid for by subdivision homeowners.

### Secondary Service Connections

Attached to this report are several examples of administrative documents pertaining to secondary systems. They can be reviewed for pertinent information on the various considerations. Typical secondary service infrastructure consists of a pipeline in the residential street serving a small housing subdivision. An extension to each house is tapped into the street pipeline in the planter strip along the curb. One-inch pipelines are extended from the planter strip connection to individual household points in the yard. A 3/4-inch riser, painted red and tagged as non-potable water, is the raw water and irrigation system service connection for the household. Secondary system valve box access lids in the streets are clearly distinguishable from the valve box access lids of the municipality's potable system.

Education programs in the use of outdoor raw irrigation water connections are organized by the cities. One gentleman who grew up in the area keenly remembers the admonition as a child to not drink from the secondary supply. This legitimate concern has been overcome through aggressively educating the community about raw irrigation water systems.

In the D&W service area, initial service connection hookup costs are commonly linked to lot size; the connection size then determined the monthly water charge. This is a flat rate service charge, with water use and conservation governed by the combined factors of pipe and lot size. For instance, a 3/4-inch connection services lots one-half acre or smaller, while 1-inch connections are installed on lots larger than one-half acre. Connections for lots larger than an acre are handled on a case-by-case basis.

Some farm operations also were connected to the secondary system. The larger acreages have lower tap rates, reflecting their water needs and ability to pay. However, most of the secondary infrastructure installed as part of the D&W system has limited the service to lots less than two acres in size; that is, to residential landscape irrigation.

Initially, there was some concern that the cost of secondary water to homeowners would not be affordable. It would have to be shown that hooking up to a secondary system would, at the very most, not increase a homeowner's water bill, and would ideally reduce it, if not immediately, at least over time. As the systems were installed, it became apparent that even if water costs didn't initially diminish, they would.

Utah fixed capital costs were fixed by the loan repayment, while the cost of potable municipal water was expected to increase over time as water treatment expenses and inflation rose. Since as much as 60 percent of the water was for landscape purposes, a fixed rate would almost invariably result in reduced costs in future years.

Metering water deliveries was discussed initially, but the technology was not available for raw water being conveyed through small pipelines, even when filtered. More important, installing, reading, and maintaining meters, and managing the data on water use, would be prohibitive. The use of meters was not economically justifiable. They may as well go ahead and continue putting treated water on lawns and gardens. Besides, there was a limit to the amount of water a homeowner could put on a residential lot. Both the canal company and the municipalities were disinclined to meter raw water for fear people would view it as a purposeful way to change landscapes and lifestyle, and to

conserve water. Of course, these remain points of debate among planners and water conservation advocates in Utah.

Cities cooperating with D&W passed local ordinances that protect as well as help govern overall system management and hold developers responsible for acquiring the water to supply their subdivisions. Secondary service must be preapproved in writing by the canal company before a city approves a subdivision plan and issues a building permit. This is only reasonable, given the investment made by the canal company, and is no different from a municipal policy pertaining to potable water. All construction drawings of the secondary supply system built and installed by the developer in a new subdivision must be in accordance with the canal company's standards and approval. Once installed and operational, the developer transfers the subdivision's secondary system to the canal company with a 12 month warranty. The process is similar to the requirements, design and construction approach of other utilities.

Communities received informational brochures, that included:

- Guidelines for property and sprinkler connections;
- The process to apply for secondary service; and
- A service inspection checklist to compliance with the rules, fees for service calls, and health safety concerns.

The pressurized secondary service was new to most people. New homeowners received written materials and the D&W staff visited with them about the system. Today, only indoor connections are potable. All outdoor taps and risers are indicated as non-potable, and simple hose bibs that might encourage human consumption are prohibited on the secondary supply. Lot sprinkler systems must be part of the overall subdivision design.

A standard covenant indicates a landowner's acreage, or fraction thereof, to be irrigated. The covenant subsequently was used to determine the tap size. The canal company visually verifies compliance. If additional acreage is to be irrigated in the future, or if the acreage is split for further development, the property owner is required to pay all applicable fees for additional taps, and to comply with the canal company's flat rate structure requirements.

In recent years, municipalities increased emphasis on metering potable water deliveries to homes as a result of the need to conserve high-cost treated water. Although the idea is commendable and likely to prevail, there are some equity issues that involve the potential cost of residential water to different income groups. In other words, low-income groups may be expected to carry more of the burden in the future, as metering becomes the norm.

D&W has no evidence to date that the flat rate structure results in excessive water consumption for landscapes. The absence of meters has kept water affordable to lower and fixed income groups.

A more centralized distribution system appears essential to the success of these systems. Some recent efforts to develop secondary systems involve the use of homeowners associations to operate and maintain secondary systems. Based on observations of these systems in several states, the policy is not recommended. A more centralized secondary system, with a pump serving several thousand homes, and total system oversight by a parent irrigation district or canal company, is a much better way to go.

### The Kennewick Irrigation District

The Kennewick Irrigation District began service in southeastern Washington in the late 1800s. The district was officially organized in 1917. Farmers are still the primary customers in the irrigation district operations plan.

The district has 88 miles of canal, four ditch riders and a maintenance crew of six. There are 19,171 customers in the district, the vast majority of which are secondary system accounts. Some household non-potable water is from wells, and some is pumped directly from the Columbia River. However, the district draws its main water supply from the Yakima River, as do seven neighboring irrigation districts. Like a typical district, KID delivers only raw irrigation water. It is not involved in managing a potable domestic water supply system for anyone in its service area.

Water users, who have been managing small amounts of raw irrigation water for lawns and gardens at an old open ditch irrigation turnout or lateral, approached the Kennewick Irrigation District about forming their own local improvement district to pressurize their residential irrigation system. Improvement districts are referred to locally as "LIDs." A LID is like a small incorporated lateral or homeowners association, but in this case it is organized to obtain a reliable pressurized raw water supply for lawns and gardens. In reality, it is generally a large subdivision, or a combination of smaller subdivisions, organized into a LID.

Such entities can be formed around a historical headgate of the district, or a point of diversion that originally served several farms. The farmland has been subdivided under the headgate, and the Kennewick District still delivers water, which now is under the management of a local improvement districts. There are currently about 150 LIDs in the Kennewick area.

Upon a subdivision or homeowner's request to consider the organization of a LID, Kennewick determines the feasibility and desirability of a small improvement district. A vote is then taken of the people affected by the proposal. The voting public in this case might consist of 50 households.

If the resolution passes and the KID board of directors approves, Kennewick assists the improvement district in finalizing its membership. The parent district finances

the cost of developing the LID. In one example, KID loaned \$100,000 to a new local improvement district to develop its secondary supply system, amortizing the cost for the LID homeowners and charging interest.

The development and annual operation costs for the local improvement district are tied to the number of members in the LID. These operation costs are prorated across all members. Generally, the more people in a LID, the cheaper the raw water for each homeowner. Thus, the cost of untreated landscape water service varies from one LID to the next.

The Kennewick Irrigation District system delivers water to the local improvement district by running a waterline down the subdivision street, and then connecting each residence with a 3/4-inch valve to supply untreated water to the property. The LID can have this connection installed above or below ground. Changes or breakage are billed to Kennewick, not to the LID individuals. The Kennewick Irrigation District only interacts with the LIDs, not with individuals. The LID also pays for its own street cutting and road repairs. If a line breaks in the road, the local improvement district pays for those repairs.

What is being described here is an engineering design somewhat intermediate between the Davis and Weber Counties Canal

Company secondary system and that of a small secondary system operated by a homeowners association. It may be under a small subdivision reservoir, or pressurized at a headgate along a principal irrigation canal. The Kennewick district began incremental development. As LIDs formed, the system grew to its current configuration of 150 mini districts.

Discussions with the KID staff and board tend to support the conclusion that the Davis and Weber design is probably better in the long run, where there is no homeowners association interface between the parent district and individual homeowners. Unlike D&W's fully centralized system, the Kennewick design requires some degree of leadership and responsibility from the subdivision homeowners association. It is believed that, although many homeowners associations are well run, this organizational framework depends too much on one or two individuals in the mini-district assuming the responsibility of maintaining the system. It is not believed to be sustainable in the long run. Kennewick has found that many of homeowners associations dissolve after a few years, leaving the subdivision secondary system in a sort of purgatory where homeowners pray for eventual deliverance from their plight by the parent district.

### Conclusion

Irrigation districts and canal companies are entering into several new agreements with cities to make more efficient and beneficial use of water and to accommodate urban growth in innovative ways. Farmers express a strong desire to remain in business as long as their water supply can be guaranteed, and as long as their irrigation district or canal company can effectively work with city or county planners, developers and new homeowners.

Pressurized secondary water supply systems represent a major new form of business venture for traditional irrigation enterprises. They can be used to address challenges, are capable of generating revenue to upgrade existing irrigation facilities for agricultural water use, and to meet new environmental concerns. In most instances, the entry of irrigation districts and canal companies into secondary water supply management has been a revenue generator. Such a venture finances agricultural irrigation system improvements in a way that could not be achieved otherwise. It often allows the water district or canal company to have more control over its water rights. However, it also raises new concerns and demands for water service uncommon in irrigation districts and canal companies.

Irrigation district boards tend to struggle with this innovation. It is certain that secondary water delivery to subdivisions and other fractional water users for non-agricultural purposes is not possible for all irrigation enterprises. It is clear that the potential is there for additional revenue sources to meet future agricultural water delivery needs for some time to come for those that can accommodate secondary systems.

Most of all, secondary water supply management provides a means to formalize the responsibilities local governments have toward the irrigation facilities, allows the irrigation enterprise to convert non-pass-through costs into pass-through costs, and improves liability protection. The down side is the continued urbanization of irrigated farmland. However, when managing secondary systems, these irrigation enterprises become role players and stakeholders in the urbanization process. They are not simply disgruntled bystanders. To the degree that control over the irrigation district's destiny is minimally guaranteed, second-

ary water supply management has distinct benefits for irrigated agriculture in the face of increasing urbanization.

### Postscript

In July 1999, a major breach occurred in the main canal of the D&W system, seriously damaging 70 homes under the canal. Contrary to the advice given by the canal company to the local municipality not to approve homebuilding under its 100-year-old highline canal, and despite the service it provided, homeowners filed a class action lawsuit against D&W for its supposed negligence in managing its canal system.

Like mudslides, earthquakes and other natural disasters, nature can take its toll on aging irrigation infrastructure. The problem is exacerbated by inadequate and often shortsighted county and municipal land use codes that place homeowners in harm's way through unrestricted subdivision development near man-made waterways. A recently passed county land use code in a neighboring state, and one designed with all of the state-of-the art conservation easements practices and development transfer credits, had only one sentence in a 258-page land use code addressing business needs, liability concerns and interests of irrigation districts and canal systems.

For this reason, the protection of canal and pipeline corridor easements and associated infrastructure remain a major problem in established irrigated areas throughout the West. Meanwhile farm income continues to decline, and water supplies to the farm represent a major crop production cost leading to a decline in farm income. Farm income subsidizes urban sprawl through increasing non-pass-through costs left unaddressed by land use codes. The overall process leads to a feeling of impermanence on the part of growers. They sell when the price is right, rather than face continued costs and liability concerns.

Secondary water supply management can lead to stronger partnerships between traditional irrigation districts, and counties and municipalities. It also allows continued multi-purpose land use and open agricultural space. To accomplish this, counties and municipalities must commit to protect farmers' and irrigation districts' economic interests.

DARCA

### Sources

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<sup>2</sup> Fulton, William, and Paul Shigley, "Guide to California Planning," 3rd edition. Solano Press (2005).

<sup>3</sup> "Saving American Farmland: What Works." The American Farmland Trust (1999).

<sup>4</sup> Nelson, A.C., "Economic Critique of U.S. Prime Farmland Preservation Policies," in Journal of Rural Studies (6:2:1990).

**Sample Community Fact Sheet On A Secondary System***Provided courtesy of a Utah canal company.*

DRY DITCH CANAL COMPANY (OR IRRIGATION DISTRICT) AND NEW METROPOLIS CITY PRESSURE IRRIGATION (SECONDARY WATER) SYSTEM COOPERATION BETWEEN NEW METROPOLIS CITY AND THE DRY DITCH CANAL COMPANY

**Introduction**

The Dry Ditch Canal Company or irrigation district has provided water to agriculture since 1881 for an area covering approximately 30,000 acres. Our company recently developed a program to construct pressure systems for irrigating lawns and gardens in any part of our service area where the residents of New Metropolis City, or unincorporated areas around New Metropolis City or rural residential subdivisions are willing to support such a project. The secondary water system serving the outskirts of New Metropolis City is only one phase of our overall system and future plans.

A number of factors must be taken into consideration when approaching the initial cost to develop a secondary water system. In order to qualify for low interest loan funds from the State or bonding agent, the developer of a secondary system, such as ourselves, must first purchase or otherwise dedicate water to serve the system. In addition, it is necessary to provide the funds to pay the local share of 15 percent of the capital cost to develop and construct the project. The 15 percent is an agreement between our canal company and the state funding agency. The cost to purchase water and pay the local share for a project the size of our New Metropolis City project will be between \$1.5-2 million.

The canal shareholders set aside a bank of water to initiate secondary water projects in our traditional service area. The company water right is a high priority right – one of the best in the State. The shareholders will receive no financial return for the use of this bank of water. They have been willing to contribute to this bank of water because it will provide a beneficial use for our Canal Company water right and stabilize our Canal Company as the area converts from agricultural to residential use.

The initial water supply for the pressurized secondary system in New Metropolis City will come from this bank of water, or water attached to the land being subdivided, as in an irrigation district situation. Water for future users as the system grows will come from shares owned or purchased by the company. This becomes our treasury stock for the secondary water system.

The ability of the company to make the initial water supply available for the project is a significant factor in lowering the initial cost of the project and thereby making the project feasible. Even if enough water is available to purchase today, it would be very costly to purchase enough and pay the expense to start our secondary supply project.

**The Proposed Project**

The New Metropolis City project includes the construction of a storage reservoir, a transmission pipeline, and the pressurized secondary supply distribution system. Our storage reservoir for our new pressurized system, recently completed, is located quite near to our Canal Company office and our main irrigation canal. The capacity of the reservoir is about 25 acre feet. It is constructed of native earth material at the site and covered with a 5-inch thick reinforced concrete liner. The concrete liner

will help prevent the water from seeping from the reservoir, and will also provide a hard surface so our equipment can get into the reservoir to clean out sediment and other material after the water is turned out at the end of the irrigation season. Remember, our pressurized secondary supply system only provides water to residences during our traditional irrigation season, but of course, this has not been a limitation to our efforts.

A network of open joint pipelines underlies the concrete liner to drain away any water that seeps through the liner of our reservoir and to keep the natural water table below the level of the reservoir. If the water table is allowed to rise above the level of the bottom of the reservoir, it might float and damage the concrete liner. The combination of the concrete liner and the underdrain system also provides protection from potential high ground water to homes in the area. The reservoir is set at the same elevation as our main canal so that it is not possible to overflow the banks of the reservoir and cause flooding or damage to surrounding properties. The reservoir is sized to provide storage for the secondary supply system that serves New Metropolis City, and also surrounding areas as other distribution systems are added.

The transmission pipeline delivers water from the storage reservoir to the New Metropolis City area. The pipeline is mortared and coated steel pipe and ranges in size from 30-inches to 24-inches in diameter. The distribution system is made up of plastic (PVC) pipelines in all of the existing streets in New Metropolis City (and surrounding unincorporated areas or rural residential subdivisions). The system also includes service lines from the main line to the property line of each user (residential parcel).

Distribution pipelines will be sized so that, together with properly sized lines added in future subdivision construction, the entire service area can be served when fully developed. The pipelines are installed with a constant slope so that they can be drained during the winter months to prevent freezing. It will be necessary for property owners to do the same with the sprinkler systems they install on their own property.

**Project Costs**

The probable cost of the project is approximately \$5 million. This includes the construction costs for storage, transmission, distribution system, service to the property line of each user, street repair, etc., for a complete and workable system. Each user will be responsible for whatever he chooses to do for residential parcel sprinkler lines, valves, etc. on his own property.

**The Annual User Fee**

The annual cost to the user is determined as follows:

First, it is of course necessary to provide enough income to repay the capital cost of construction of our secondary supply system. The money to pay for the cost of construction is in the form of a low interest loan from the State funding agency. The terms of the loan are 5 percent interest, with a 35-year repayment period.

Secondly, the State requires that, in order to qualify for the low interest loan funds, the system users must pay a minimum fee for water service. Using this criterion, the State has determined for our project that the users must pay a minimum of \$13 per month or \$156 per year for repayment of the loan.

In addition, the Canal Company must collect enough to pay for operation and maintenance of the system, including a share of the cost of maintaining our traditional agricultural water delivery system. It is estimated that the system can be effectively operated and maintained for \$44 per year, per user. Thus the annual user fee is \$156 plus \$44 or \$200 per year.

### One-Time Connection Fee

The Canal Company is committed to eventually replace the water to the Canal Company shareholders that was dedicated by them and set aside to start the secondary system. In addition, the Canal Company must purchase water to serve all future users of the secondary system as it expands. A one-time connection fee will be used to finance the purchasing of additional water, which is \$200 for up to 0.50 acre. This will be increased for those who come onto the system after construction is completed. A copy of the proposed rate structure follows:

- Initial connection fees are due by April 1, 1993. Initial connection fees can be paid in full or in installment payments beginning June 1992;
- Connection fees for all new construction shall be paid with the building permit. We request that you consider paying the connection fee as soon as possible.

Early subscribers will qualify for a rate cheaper than subsequent subscribers. Payment of the annual service charge will be made in twelve (12) equal monthly installments with the regular City utility bill.

What will the canal company or traditional irrigation district do?

- The Canal Company will provide the funding and the water, and construct the project.
- The Canal Company will own, operate and maintain the system after it is installed.
- The Canal Company will purchase water from the property owners when they develop their land and transfer their farm irrigation water to the secondary system.

### Connection Fee for Late Subscribers

\$500

Pipe:  $\frac{3}{4}$  inch Up to 0.50 Acre

Size: 1 inch Over 0.50 Acre to

Lot size: 1 acre

\$750; over 1 acre \$750 plus \$187.50 per 0.25 Acre or part thereof over 1 acre

### Connection Fee for Early Subscribers

Pipe:  $\frac{3}{4}$  inch Up to 0.50 Acres \$200.00

Size: 1 inch Over 0.50 Acre to 1 Acre

\$300 over 1 acre; \$300 plus \$75 per 0.25 acre or part thereof over 1 acre

The Canal Company will operate and maintain the main storage facilities and canal system so that the water supply will be properly safeguarded.

### What will New Metropolis City do?

This proposed project cannot be accomplished without a cooperative effort between the Canal Company and New Metropolis City. In order for the project to work it will be necessary for

the City to require:

- All residents to pay the connection fee and the annual user fee, and
- All developers to construct the required secondary water works in future subdivisions.

The City will work with the Canal Company to ensure that the water that is now used in the area remains on the land and is transferred to the secondary system. The City will collect all fees as a part of their regular utility billing system and transmit the funds to the Canal Company.

### How will I as a homeowner get into the system?

Application to use the irrigation water is to be made at the City Administration Building. It will be necessary to know the total acreage of land and the acreage that is to be watered if that is less than the total. The fee will be calculated and you will be asked to sign the Application-Agreement form. Once the application has been signed and approved, connection can be made to the service line installed by the Contractor at your property line.

When the construction is completed and the system is ready to go into operation, the City or Canal Company will inspect your connection to the system and turn on the water to your property.

### Summary Comments

- Non-treated water is generally considerably less expensive and more readily available than treated water.
- Approximately 50-60 percent of the water used in a community will be used outdoors. All this water can be untreated or secondary water.
- If an existing community is provided with a secondary water system, the present potable system will then have the capacity to serve approximately double the population that it could serve before.
- While the cost to the user is very reasonable, it is probable that, in the early years of the project, there will be those who have small areas to water who will pay more for their total water bill than they are now paying. However, the cost for the secondary water will be quite stable since the capital cost is fixed for the repayment period of 35 years, while it is very probable that the cost for treated water will increase substantially over the coming years.

*(Provided Courtesy of a Canal Company in Utah)*

DESIGNATION OF PROPERTY TO BE SERVED BY YOUR CANAL COMPANY OR IRRIGATION DISTRICT PRESSURIZED SECONDARY SUPPLY SYSTEM

\_\_\_\_\_(Name of homeowner or property owner) of the (city), (hereinafter referred to as "Applicant") and the Dry Ditch Canal Company, (hereinafter referred to as the Canal Company), hereby mutually agree as follows:

- Applicant is an owner of real property located at (location of property), said property being situated within the service area of the Dry Ditch Company Pressurized Irrigation System. There are ordinances in force in (city) which require pressure irrigation for all new development.
- Applicant has designated \_\_\_\_\_ (number of acres or fraction thereof) of his property to be served by the secondary supply system and requested that the pressure

irrigation fees be calculated on that area. The Canal Company has reviewed the request and verified that the area so designated is correct. The remaining acre(s) of Applicant's property shall not be irrigated by the pressure irrigation system, but will be watered from \_\_\_\_\_

\_\_\_\_\_(list other source of water). If at any point in the future, the Applicant desires to irrigate the remainder of his/her property by means of the pressurized secondary irrigation system, or if the property is divided and developed further as residential property, Applicant shall pay all applicable fees and comply with the requirements of the Canal Company.

3. This Agreement shall run with the land and be binding on the parties hereto, their successors or assigns. Should the services of an attorney be required to enforce the Agreement, the defaulting party agrees to pay a reasonable attorney fee.

In Witness Whereof.....

CITY ORDINANCE PERTAINING TO  
SECONDARY SUPPLY SERVICE

(Provided Courtesy of a Canal Company in Utah)

ORDINANCE NO.\_\_\_\_\_

Whereas, the City Council (City) has determined it is in the best interest of the City to use irrigation water instead of treated water to meet the irrigation needs of the citizens; and, Whereas, the City has entered into an agreement with the Dry Ditch Canal Company (Enterprise) to install, maintain and operate a pressure irrigation system within the City; and, BE IT ORDAINED BY THE CITY COUNCIL OF CITY, STATE:

1. Pressure Irrigation System.

(a) A Pressure Irrigation System shall be defined as a piped water distribution system of nontreated water, for the purposes of irrigation only.

(b) All building lots shall be served by pressure irrigation.

(c) The developer shall install the pressure irrigation system and provide a connection for the building lot concurrent with construction of the other off-site improvements pertaining to that building lot.

(d) For undeveloped land that has water rights as of (date), including land now being served by the Enterprise and /or The Last Chance Canal Company (an affiliate of the Enterprise), the developer shall convey to the Enterprise, and upon payment of fair market value by the Enterprise for such water rights, a minimum of three (3) acre feet of water, per gross acre (the total area of the lot prior to any improvements or development) of newly developed land served by the pressure irrigation system.

(e) All new connections to the pressure irrigation system as well as the pressure irrigation construction plans must be pre-approved in writing by the Enterprise prior to issuance of a building permit by the City.

(f) All construction and drawings of the pressure irrigation system shall be in accordance with the Enterprise's standards and approval.

(g) The pressure irrigation water facilities constructed for delivery of irrigation water to the new development shall, upon approval by the Enterprise, be transferred to the Enterprise with a twelve (12) month warranty by the developer. Subsection X-X of the City Subdivision Ordinance

applies to this warranty.

(h) This Ordinance applies to all development which does not have final plat approval as of the passage of this Ordinance.

This Ordinance shall become effective on the \_\_\_\_\_ day of \_\_\_\_\_ 1996.

ADDITIONAL ADMINISTRATIVE MATERIALS FOR  
SECONDARY WATER SUPPLY

(Provided Courtesy of a Canal Company in Utah)

STATEMENT (LETTER) FROM THE CANAL COMPANY OR  
IRRIGATION DISTRICT TO THE RESIDENT RECEIVING SEC-  
ONDARY WATER SUPPLY

Dear Resident:

The first phase of the Dry Ditch Irrigating Company (DDIC) Lawn and Garden Irrigation Project, No- Name town (or rural subdivision) Phase I, is under construction. We expect to have service available to Phase I users by (date). Phase 2 should be complete by (date) and Phase 3 by (date).

We have enclosed the following materials to familiarize you with the project:

1. Guidelines for Property Owner Connection
2. Rules and Regulations of the DDIC Pressure Irrigation System
3. Application for Service
4. Inspection Checklist

You will note that very careful consideration has been given to protecting the public health. Although we have had very few problems with pressurized secondary water supply in our community or subdivision, the potential exists for improper use of the system. Please educate your families and monitor the use of this water by small children.

Fees for this service will be:

ACCESS FEE \$\_\_\_\_\_

This is a one-time fee and must be paid in full by (date).

SERVICE CHARGE \$\_\_\_\_\_

This is an on-going fee and will be billed in 12 equal monthly payments on your utility bill.

The above charges are for property located at \_\_\_\_\_

GUIDELINES FOR PROPERTY OWNER CONNECTION

The following notes are presented for your information regarding the water service from your new pressure irrigation system.

1. General. In most instances a service line will run from a water main (down the middle of the street) to a valve box located behind your curb (in the planter strip), or if there is no curb, near your property line. For service lines that serve two water users, the line will "tee" inside the service box and a separate line will run to your and your neighbor's property line. The line from the main to the service box will be 1 1/2-inch diameter pipe and the line from the service box to the property line will be either 3/4 inch or 1-inch diameter depending on lot size. For single services, a 1-inch diameter pipe will be used from the main to the service box.

2. Shut-off Valves. There will be a valve on each service line

inside the service box. This valve is for use by DDIC personnel only. It is required that you install a shut-off valve on the service line to your property at the time you connect to the system. This will provide a means for you to shut off the water to your lines.

3. Filters. Provisions have been made by DDIC for both screening and settling of solid material from the water before it enters the pipeline system. However, there will be foreign material such as small sticks, pieces of leaves and water weed, etc. that will find its way into the secondary supply system. An additional filter should be installed on the property side of the shut-off valve required in item 2 above.

4. Use of the System.

a) The water in the pressure irrigation system is not suitable for drinking. It is required that all faucets or other exposed parts of this system be painted red so as to alert people that it is not clean water. Handles must be removable to prevent access by small children. Pressure irrigation water shall not be piped into any home or accessory building.

b) There are sprinkler heads and other water system equipment designed for use with water containing some debris. Sand and grit, even small amounts, may cause excessive wear in some equipment. Careful selection of the equipment used throughout your system will greatly reduce future problems.

5. Pressure. System pressure will vary depending on your location and the usage in the system. Minimum pressure will be about 50 psi.

6. Connection to Existing Sprinkler Systems. When connecting the pressure irrigation water to an existing sprinkling system the following steps should be taken:

a. Physically disconnect the existing sprinkling system from the treated water service line. A valve is not adequate separation regardless of the condition of the valve.

b. Call the City Public Works office at xxx-xxx for an inspection. A minimum of 24 hours advance notice must be provided. The City will use the checklist provided in this packet.

## RULES AND REGULATIONS OF THE PRESSURE IRRIGATION SYSTEM

### PLEASE OBSERVE THE FOLLOWING RULES:

#### 1. WATER IS A BASIC COMMODITY REQUIRED FOR HUMAN SURVIVAL

a) Use only the amount of water you need to adequately irrigate your land.  
b) Think of others, and realize our water resources are limited. When you use more than the amount of water allotted to your land you are using water that belongs to your neighbors.

#### 2. DO NOT WASTE WATER

a) Water must not be left running unattended.  
b) Adjust sprinklers so water will not get into streets and gutters.  
c) Use only what water is needed. Too much water can damage lawns and crops.  
d) Repair leaky valves and broken lines.

#### 3. THE FOLLOWING REGULATIONS AND ORDINANCES ARE APPLICABLE:

- a) It is unlawful to use the untreated water from the pressure system for other than irrigation purposes. REMEMBER—THIS WATER IS UNTREATED AND NOT FOR HUMAN CONSUMPTION.
- b) It is unlawful to interconnect the pressure irrigation lines with the potable water system in any way.
- c) It is unlawful to install irrigation and potable water lines in the same trench.
- d) It is unlawful to connect or extend the irrigation lines into any building or connect same to a fire hydrant.
- e) It is unlawful to expose any service line valve or tap above ground without identifying it by painting and maintaining any such exposed portions bright red to distinguish same from the treated water system.
- f) It is unlawful to contaminate any water supply or distribution lines.
- g) It is unlawful to operate hydrants or sprinkling control valves without a removable key unless valves are of the quick coupling type, or without removing such keys or valves when not in use. Handles must be removable to prevent access by small children.

#### 4. FOR THE WASTEFUL USE OF WATER OR FAILURE TO COMPLY WITH THESE RULES AND REGULATIONS, DDIC AND THE CITY MAY:

- a) Discontinue water service for the remainder of the season.
- b) Impose a charge for disconnection of service line and for reconnection as may be established from time to time by DDIC and approved by the City Council.
- c) Purchase and install, at the property owner's expense, an individual water meter, and assess the additional annual cost of reading, operating and maintaining the same.

#### 5. RULES AND REGULATIONS MAY BE AMENDED AT ANYTIME TO PROVIDE FOR MORE EQUITABLE DISTRIBUTION OF WATER

a) Emergency and special time of use of water may be required in which event appropriate notice will be given.

#### 6. AN APPROVED APPLICATION FOR SERVICE IS REQUIRED FROM DDIC BEFORE CONNECTING INTO THE PRESSURE IRRIGATION SYSTEM

- a) Every effort will be made to correct misunderstandings that exist before water is turned off, or meters installed, or fines imposed.
- b) Please contact DDIC if you have any questions regarding the operation of the pressure irrigation system or the above rules and regulations.
- c) Phone xxx-xxxx.

## APPLICATION FOR SERVICE

### DRY DITCH IRRIGATION COMPANY PRESSURE IRRIGATION SYSTEM – PHASE I

Name: Address:

Telephone:

The undersigned hereby applies for an irrigation water connection to the DDIC irrigation system in accordance with the PLAN SHOWN AT THE BOTTOM OR REVERSE SIDE OF THIS SHEET.

(PLAN MUST SHOW location of service lines, valves, valve

boxes, filters and taps.)

Applicant has read the rules and regulations and hereby agrees, in the event this application is granted, that he will:

- a) Comply strictly with the rules and regulations of DDIC and the City as above set forth, or hereafter amended or adopted, and stated in the application agreement.
- b) Consent to let representatives of DDIC and the City enter his premises at any reasonable time for the purpose of inspecting his irrigation distribution system.
- c) Consent to the discontinuance of his water service in the event he should violate any rule or regulation related to use of the pressure irrigation.
- d) Notify the City when installation of his pressure irrigation system or any future alterations thereto, is complete and ready for inspection, and not connect to the system nor cover any trenches until such facilities, alterations or additions are inspected and approved.

Permit granted \_\_\_\_\_ Dated this day of \_\_\_\_\_

\_\_\_\_\_ BY

Applicant

Inspection made 20\_\_ BY

DRAWING (Use Reverse Side if Necessary)

#### INSPECTION CHECKLIST

#### DDIC PESSURE IRRIGATION SYSTEM – CITY PROPERTY OWNERS INSPECTION

Name of owner/Date/Address

YES/NO

1. Is the master valve adequate, properly located and installed?
2. Is the irrigation distribution system interconnected to any culinary distribution system?
3. Are any of the irrigation distribution lines installed in the same trench as culinary lines is there a minimum 5 feet of horizontal separation?
4. Do any of the irrigation distribution lines connect or extend into buildings or connect to a fire hydrant?
5. Are all the exposed service lines painted bright red?
6. Are all the hydrants and sprinkling control valves controlled with removable keys or quick coupling removable connections?
7. Is the system providing irrigation water to any adjoining property that has no irrigation water allotted?
8. Is the system installed in a manner that will prevent unnecessary waste of water?
9. Are the pipes and valves used in the system adequate for pressure?
10. Is there any other problem with the system not noted above?

# URBANIZATION OF IRRIGATION SYSTEMS

*John Wilkins-Wells, Ph.D., Sociology Water Lab, CSU<sup>1</sup>*

## Abstract

The cost of water for irrigated agriculture, and a large part of its economic value, is the operation and maintenance of gravity surface deliveries. The cost of delivering water to farms is a production cost, similar to seed, fertilizer, energy, machine repair, capital improvements to land, interest on operating capital and other expenses in a typical farm budget.

Irrigators pay for water through annual irrigation district land taxes, federal project water service charges, or canal company water assessments. If the cost of water for agricultural use increases because of the failure of the urban development process to protect canal and pipeline corridor easements, then urbanization may be said to decrease net farm income.

## Introduction

Urbanization has positive and negative effects on agricultural production. When urbanization occurs adjacent to irrigation systems, farm property values increase. Irrigators throughout the West have experienced this positive aspect, and it is one of the reasons why farm sales have risen dramatically, but also why conservation easement programs are more successful today than previously. The negative effects: increased operating costs due to residential and commercial subdivision development in the irrigation system service areas (Photo 1).

Bearing in mind the positive effects, this article explores



Photo 1. Urban Encroachment on a Canal

important facets of the negative aspects of urbanization. Emphasis is placed on scarce irrigated farm income lost

through urban encroachment, and how this may contribute to irrigators' feelings of impermanence about the future of agriculture, leading to reduced incentives to make farm improvements, modernize canal systems and thereby conserve water. The article concludes with suggestions on how irrigation districts and canal companies can be protected, and better protect themselves, from the more negative effects of urban encroachment.

Irrigation districts and canal companies, or joint stock companies, in the West have historically operated as not-for-profit entities. Because water is an important farm budget item, these traditional suppliers deliver water at cost to irrigators. Operational costs of these systems include employee salaries, payroll taxes, employee pensions and benefits, legal, accounting and engineering services, and a host of miscellaneous costs. A study completed at Colorado State University in the late 1990s showed the annual operating costs in the Rocky Mountain region had risen steadily since 1945. When corrected for inflation, annual O&M costs have been more constant over the years, while administrative costs have risen sharply. Legal costs have risen exponentially, particularly in the last 20 years.

In 1995, 36 sampled Rocky Mountain non-reimbursable federal contract irrigation districts and several large mutual irrigation companies reported total annual costs per assessed irrigated acre:

- O&M = \$7.75 per irrigated acre;
- Administrative = \$11.87 per irrigated acre;
- Debt payment = \$0.88 per irrigated acre;
- Special projects = \$0.17 per irrigated acre.

Total costs were about \$21 per irrigated acre, on the average, although some districts with pumping costs were considerably higher. These figures, which are indicative, are similar to those reported recently for all irrigation districts under federal water projects. Costs are generally much higher in districts with water service contracts with the Bureau of Reclamation, which includes many irrigation districts operating in Colorado and California's Central Valley.

These costs do not tell the whole story. In the study conducted by Colorado State University, an attempt was made to estimate the portion associated with urbanization. Unfortu-

nately, most enterprises do not itemize such costs, although many are considering doing so. As a result, the effects of urban encroachment were estimated by comparing the O&M and administrative costs of these enterprises according to where they were located.<sup>7</sup> O&M costs, excluding administrative and salary costs, were comparable regardless of where they were located. Administrative and salary costs nearly doubled if an enterprise was located in an urbanizing county.

Twenty years ago, the major concerns of an irrigation district or canal company were supplying adequate water to irrigators in a timely fashion, while dealing with tree roots, moss, gophers and an occasional grumpy water user or board member. Today, these enterprises must deal with stormwater from residential subdivisions, trash, vandalism, trespassing, drownings in canals, municipal and developer demands for canal crossings, the piping of open laterals, and pressure from municipalities to use canal easements for trails and other recreational activities. Of course, there are the ever-present attorney fees to protect the enterprises' interests, as urbanization intensifies in traditionally agricultural counties.

Canals can be viewed as a nuisance by subdivision residents rather than an economic resource for farms and irrigators' needs are generally not part of the new subdivision's community knowledge base. Because of a somewhat reduced emphasis on self-reliance in the community value system, irrigators are constantly blamed by new subdivision residents for the inconveniences and risks associated with living around agricultural production systems. Local farm production, though, has an important economic multiplier effect, even for mostly urbanized counties.

The old agricultural trade center, once located in the middle of an irrigated area to serve commodity production needs, has become urbanized. The change gradually expanded from the center, across canal systems (Figure 1), and brought trash, vandalism, pollution and drownings. Water is diverted from the river or major feeder canal, but must pass through this urban corridor to get to the remaining lands in production, which may continue to remain extensive well into the urban transition. Irrigators who pay for irrigation district and canal company salaries to deal with these urban encroachment issues thereby incur the costs. District managers and canal company superintendents report that more than 50 percent of their staffs' time is spent addressing urban encroachment issues. These costs were simply not a factor before urbanization.

Figure 2 shows new residential subdivisions (shaded) be-



Figure 1. Urban Encroachment Across Canal Systems

ing built along a canal system serving a world-class orchard area in Colorado's Grand Valley. Trash and vandalism result when subdivisions straddle canals, inviting trespassing along irrigation ditch easements. New community members are attracted to water systems in an arid environment. They often demand that municipal leaders seek means of converting the canal systems into recreational facilities, as an alternate transportation route for those wishing to bike to work, or as a stress-reliever for those who jog. These requests are often insensitive to the potential costs imposed on irrigators and food producers.

Much trash is windblown, but a considerable amount is

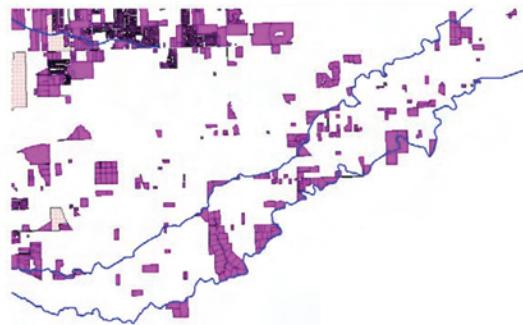


Figure 2. Residential Parcels (shaded) Straddling Canals.

deposited as a result of trespassing on irrigation ditch easements. Vandalism appears to happen frequently at the fringe of the urban corridor, where there is low community visibility and little option of enforcing community norms. Of course, pedestrian and recreational access onto canal easements increases the potential for trash and vandalism. Unfortunately, municipal law enforcement agencies throughout the region generally view this issue as a low priority, despite the property damage and occasional drownings.

Although deaths from accidental drownings are down nationally, they are a constant threat to irrigation districts and canal companies due to liability. Most state laws protect open ditch operators from the "attractive nuisance" type of lawsuit. A new threat is on the horizon: the "hidden trap" doctrine. Many past fatalities were clearly the result of trespassing. Today, though, they can easily occur in the subdivision's backyard because housing is built immediately adjacent to, or even straddling, open canals.

As an example, Colorado reported 14 irrigation ditch drownings between the 1993 and 1997, representing 29 percent of all accidental drownings in the state. New Mexico reported 49 between 1989 and 1997,<sup>10</sup> nearly 18 percent of all accidental drownings in that state. A recent drowning incident study of other Rocky Mountain states found similar rates. The region experienced a 2.5 percent or greater growth rate in the last decade. Near-drownings may represent a factor of 5 relative to drownings, and a large percentage result in permanent physical or psychological impairment to the victim, such as speech and behavioral disorders.<sup>11</sup>

Liability is an evolving issue. Traditionally, canal and ditch owners were not absolutely liable for damage caused by seepage, overtopping or failure of these facilities. This legal doctrine was upheld in an era when the concern was usually just an adjoining farm. Canal owners have a duty

to keep facilities in good repair. Subdivision residents—with considerably different values regarding reasonable care in the construction, operation and maintenance—closely scrutinize ditch and canal owners. More court decisions adverse to irrigated agriculture gradually reflect changing social values.

Many new administrative costs associated with canal water delivery for agriculture appear to be urban related. They may total millions of dollars annually throughout the West. This contributes to a reduction in agricultural profit margins, and may drive farmers out of agriculture earlier than they might prefer, and it may have a snowball effect.

### Farming on the Urban Fringe

Farming on the urban fringe can have many challenges, benefits and costs. Urbanization of prime agricultural land can have positive effects, including improved equity through the increased market value of farm real estate and water rights in urban fringe areas. Many farmers benefit from the increased paper value of their land and water as urbanization occurs. They can borrow against it, if necessary, to improve farm operations. Urbanization's negative effects for farmers: higher costs for labor, legal services and water delivery.

Urbanization of prime farmland continues to be a major issue for county and municipal governments throughout the nation.<sup>12</sup> Although for many years an issue for irrigated lands in the more populous West Coast states, many important irrigation counties in the Rocky Mountain region now face this issue as well.<sup>13</sup> In an important theoretical discussion of farmland preservation policies and their effectiveness in slowing urban encroachment, the conclusion was that such practices as tax incentives, right-to-farm legislation, transferable development rights, conservation easements, agricultural districting, agricultural zoning and various combinations of these policies still lacked empirical evidence as to their effectiveness as land use planning tools.<sup>14</sup> More recently, it has been suggested that problems associated with the urbanization of agricultural lands may be more a function of who owns agricultural land than anything else.<sup>15</sup> Speculative transfer of farm ownership out of the hands of farmers and into non-agricultural ownership may result in overall reduced concern about farm issues in local government planning offices.

Some argue that reduced farm income, combined with urbanization, may contribute significantly to the farm impermanence syndrome, the increased willingness of farmers to sell farm assets, including land and water, and reduce their capital improvements at a faster rate than normally expected. Clearly, declining farm income and increased farm real estate values associated with urbanization may have increased the opportunity costs of farming in many locales. In many instances, inadvertent losses, such as increased costs of water deliveries because of disruptions in service from housing, might contribute more to rising opportunity costs than commodity prices themselves.

When farm capital improvements are reduced as a result of this growing feeling of impermanence, water quality and soil erosion problems can be exacerbated. The feeling may lead to a lack of interest in modernizing and/or maintaining efficient irrigation practices for water conservation. The benefits and mission of important federal cost-share programs,

such as USDA's Environmental Quality Incentives Program, can be compromised.

When irrigated land is converted into industrial-commercial uses or housing subdivisions, fairness would seem to dictate the change should not result in an economic burden for farmers. Subdivision development should be reviewed carefully to ensure development does not lead to increased land taxes or water assessments for farmers. To do otherwise is to promote, intentionally or not, a grower's feeling of impermanence about farming's future in the area.

If local government has indeed voiced a desire to work with irrigated agriculture to maintain mixed land use, reduce farm production costs, and promote the modernization of irrigation practices, then it would seem reasonable that this same local government would do everything it could to send the right signals to the development community. These include:

- Continued proactive policies pertaining to agriculture's needs;
- Adequate local government oversight of the urban development process; and,
- Protection of existing agricultural infrastructure, such as canal and pipeline corridor easements, when farmers are still using them.

### The Subdivision Plat Review Plan

Like building across an earthquake fault, in a floodplain or on an unstable hillside, building next to, under, or over an irrigation canal should require a substantial planning review process to protect homeowners and businesses from hidden dangers and to protect irrigators from potential liability. The language in county and municipal land use or building codes frequently makes minimal reference to risks and liabilities associated with development on or around irrigation systems.

Many irrigation districts lack a proper means to thoroughly review subdivision plats and evaluate their impact on changing hydrology and irrigation canal operations. Districts and canal companies, essentially nonprofit in nature, have limited resources to address an issue that developers and local government planning agencies should address to protect public or private interests.

New residential subdivisions on or around regional canal systems belie the slippage in existing county codes designed to protect agricultural production facilities and infrastructure. Residential dwellers frequently complain to irrigation district employees that their property rights are violated during canal cleaning or a scheduled ditch burning. Urbanites have no direct vested interest in agricultural production, and generally do not live by the norms and values typically associated with it. They are pitted against irrigators in a never-ending quarrel over canal access, weeds, tree removal, vandalism and threatened lawsuits.

In many developments, rerouting canals and drains may be necessary. Proposed subdivision plans may make little or no provision for continued ingress or egress. These realignment and access issues can present severe problems for maintenance and for local ditch riders, and may be the source of constant social friction and reduced community spirit between irrigators and urbanites. The process feeds on

itself in a negative sociological way.

A canal easement is nothing more than an interest in land that allows one person to do something else on another person's land. With a canal easement, the person who owns the canal or small ditch has the right for it to cross someone else's land to irrigate farmland. The easement doesn't give the holder the exclusive right to use the land. The underlying landowner has the right to use all of his land, including the portion that contains the easement, as long as the landowner does not unreasonably interfere with the easement owner's rights.

In legal language, the landowner of the property over which the easement runs holds the *servient estate* right. The property benefited by the easement holds the *dominant estate* right. In the Rocky Mountain region at least, where these issues were studied in detail, the rights of the dominant estate are generally superior to the servient estate. The big problem everywhere in the West is that recorded canal easements are often not transferred when the land is sold. They are deleted from the land deed, or the canal easement width gets redefined over time.<sup>17</sup>

In Photo 2, a homeowner living along a canal is exercising his servient estate right by using a portion of the canal road, and off the main street, to park his auto in his backyard under a tree. By law in most states, such an action would normally be permitted, as long as it did not interfere with canal maintenance. In



Photo 2. Urban Encroachment Across Canal Systems

Photo 3, the homeowner has extended a ranch fence across the irrigation district drainage easement, interfering with maintenance access along the drainage canal. In this case, the irrigation district has the right to legally remove the ranch fence, perhaps after an uncomfortable quarrel with the landowner. Drainage systems, considered second irrigation systems, are an essential part of all irrigation systems and are as important to protect in the development process as easements.



Photo 3. Encroachment on a Drainage Easement

Meanwhile, local government's desire to use canal roads for biking or walking, is achieved at the expense of growers who have spent millions of dollars over 100 years to maintain the canals for irrigation. Photo 4 shows a small subdivision along a canal with a concrete path leading to the canal maintenance road in the background. This invitation to trespassers, including children, has occurred in the name of municipalities encouraging people to bike to work. Often landowners are asked by the city to grant public recreational easements on land underneath the canal easement. Public use of canal easements ultimately violates the rights of landowners who may not want to see pedestrian traffic in the back of their residences, as well as the irrigation district and its easement rights.

In the eagerness to provide recreational opportunities for



Photo 4. Residential Access to Canal Roads

urban dwellers, municipalities are asking irrigation districts and canal companies throughout the West to allow public access. Some irrigation enterprises relent. Others have entered into trail agreements, presumably indemnifying irrigators from lawsuits over injuries or drownings. Yet, it is certain that as values change, courtroom interpretations will too when lawsuits are filed because of accidents. Under various state premise liability acts, no duty or responsibility is generally owed to a trespasser.

For invitees, reasonable care must be exercised by the landowner. For the licensee, such as when a canal entity permits public access for a fee, there is clear duty to notify people of danger. When an irrigation district invites or allows the general public onto its canal system, or when a district, in cooperation with a municipality, converts a private easement to a public one, it is probably redefining the trespasser as an invitee, or so a future courtroom decision might conclude! These are some of the concerns irrigation district and canal company managers voice when municipalities twist their arms to allow access.

Another issue is the use of irrigation canal systems as municipal storm drains. This request by municipalities has grown in recent years because of the obviously well-placed location of irrigation canals, and is a way of reducing public expenditures for storm drainage, or avoiding placing an unpopular special stormwater tax district on the election ballot. Irrigation canals were not engineered to carry surge flows associated with stormwater runoff. They often have soft banks and become narrower at the end. Over time, stormwater could damage crops and prime soils. Under the updated Clean Water Act, the destination of urban storm flows will be scrutinized as point sources of river basin pollution. In

short, municipalities and developers need to plan for stormwater disposal from developed areas by funding and organizing stormwater drainage districts, rather than relying on 100-year old irrigation systems.

How does an irrigation district respond to all of these issues? Get involved in the planning process. This can be costly in terms of employee time. Remember, the district is an agricultural water delivery entity, not a utility. Often the referrals or notifications of new housing subdivision plans arrive during a busy time of the year for the enterprise, or during the winter, when staff is reduced. Irrigation districts should review initial and final subdivision plats before signing off on them. The districts need to file comments municipal and county planning offices about water management problems with seepage into residential properties during the irrigation season when the water table is likely to rise. Have the comments inserted into the subdivision plan and made part of the record. Send comments to the municipal or county planning office, the surveyor in charge of the plat, the landowner and the developer. Proactive measures prevent bad things from happening. It's more difficult than to ask for changes after later in the process. Throughout the West, irrigation district managers are being strongly encouraged to "minimize their proof problem" through the thorough review of subdivision plats.

Insufficient resources generally are applied to the referral, or notification process, for irrigation districts. It is ideal to have one dedicated staff member in the county and/or municipal planning office trained to address agricultural water supplier needs in the plat review process. This includes maintaining an updated list of all irrigation enterprises, large and small, in the area. Excellent cooperation from irrigation districts and canal companies is easy to obtain if it is understood that such information is for the purpose of protecting their interests. Certified mailing of referral letters may be needed in instances where the current irrigation district board member or manager's mailing address is outdated. Proper notification of the irrigation district benefits the enterprise as well as the planning office and developer. In many instances, disputes, misunderstandings and loss of time and money could have been avoided through proper notification and continued monitoring of subdivision plat changes.

When referral letters arrive during the irrigation season, the district may have a difficult time responding immediately. Known instances of two weeks or less for such referral responses are clearly inadequate and generally unfair to districts. Such practices may even be purposely designed to limit comments, a practice that can seriously undermine community cooperation and spirit, along with the planning office's legitimacy of professionalism.

The quality of information provided to an irrigation district is important. Inadequate or unusable information, the forwarding of preliminary plats only, and the inability of the district to review and sign off on final plat versions are sore points for districts throughout the West. Often more detailed irrigation and drainage surveys are needed to ensure there will not be problems with the subdivision in the future.

Plat surveys should be designed to protect the developer against hidden costs, as well as to prevent problems for the future homeowner. Flood, overflow or seepage easements may need to be considered. These may not have been needed when

adjoining lands were principally agricultural, but may be necessary today when the same land is covered with houses. Although main canals often are indicated on subdivision plats, farm laterals frequently are omitted. This may cause serious problems for an individual grower and for homeowners.

Routine consultation with the irrigation district is needed when surveys are being conducted. There may be irrigation facilities the surveyor needs to know about, such as tile drains or pipes, buried as part of an effort to enclose open ditches for water conservation purposes. The same effort taken toward other utilities would be suggested in this case. Admittedly, many irrigation districts do not have good information on the whereabouts of their buried facilities. For the most part, it was not an issue for them until the onset of urbanization. Districts must attend to this issue more diligently, and they need the cooperation of local government to do so. This is a small price for local government to pay in order to ensure equity in the community.

Several counties in the Rocky Mountain region, for instance, have gone to the trouble of placing more information on the subdivision plat pertaining to the right to farm in the area. This may include rather specific comments in local ordinances that protect canal facilities and farming practices. The language in ordinances also can be strengthened, specifying the obligations and responsibilities of subdivision dwellers.

There is a clear need for mechanisms that would protect the right of irrigation districts to thoroughly review development plans, similar to those procedures granted to utility companies, and in ways that do not impose added costs on the district. Time spent by district staff writing up a review of a development plan ought to be charged to the subdivision developer. County and municipal planning and engineering offices should aggressively support the practice. This may be accomplished through special fees to recoup O&M and administrative costs associated with subdivision service. Remember, agricultural producers, not the general public, pay for the operation and maintenance of irrigation facilities unless the public uses the canal and its water supply.

Irrigation districts have the duty to keep their canals in a state of good repair. They generally are not liable for damage caused by seepage, overtopping or failure of their canals, but are liable for negligent construction, and operation and maintenance. Utility companies generally have the right to run their lines in, upon, and under canal systems, but not in the canal easement. Whoever installs canal crossings should maintain them. When a canal right of way is owned in fee, under federal water projects for example, the right of way can be prohibited for any purpose. Under a conventional prescriptive easement, the issue will be whether the proposed recreational or other use unreasonably interferes with the easement. The burden of proof in maintaining the easement is on the easement owner.

## Conclusions

Old established irrigation districts operated and maintained with farm income through annual land taxes or assessments are experiencing considerable cost increases because of urbanization in the West. The problem did not exist before subdivisions were developed. Whatever apprehensions growers have about staying in agriculture are exacerbated by

the feeling of impermanence when faced with policies unfriendly to agriculture.

Meanwhile, local governments have been reluctant, hamstrung by inadequate legislation, or outright aggressive in supporting efforts to convert canal rights of way to public use for trails and other activities. As a result, people who want to farm are denied bit by bit the opportunity to pursue their economic activity of choice.

County and municipal land use codes are strategic to reducing any burden on farm income due to costs resulting from urbanization. Although many county land use codes address the preservation of prime agricultural lands, these codes could contain better language. This is not a criticism of local government. Most county planning offices have little time or resources to respond the way they would like to.

Irrigation enterprises can do a lot for themselves. For instance, counties typically charge fees for subdivision review. This charge represents a reimbursement for taxpayers' monies used to review and process subdivision plats generated by the private sector. Irrigation districts could be permitted to charge similar fees when the review is conducted by a staff member. The fees should reflect real, documented, costs to the district. For this, the district would appear to need improvements in record keeping that clearly show these costs. Charges for land splits, water right transfers, crossing fees, and special fees for irrigation and drainage studies should be documented in a way that shows the time and materials spent on activities by district staff.

The routine enforcement of easements is critical. Weak enforcement is an invitation to violation. It is usually necessary today to exert more diligence of the *dominant estate* right. Allowing utilities to be merged or buried in canal or lateral easements may bring on problems when it becomes necessary to repair or replace structures. Again, the cooperation of a dedicated employee who tracks such issues in the local planning office is essential to ensuring cooperation and trust in the subdivision development process.

Irrigation districts may need to improve their overall record keeping, or chart of accounts, to reflect what managers and ditch riders do. For instance, purchases and work orders for urban-related activities performed by irrigation district staff are not invoiced in a way that would allow the district to itemize costs separately at the end of the fiscal year. Recording an invoice or maintenance work order to note whether it is agricultural, urban or both would generate an urban encroachment cost report. The report, in turn, would allow irrigation and canal boards to better assess costs that could be minimized or avoided. Implementing transaction fees will require better documentation of costs. Otherwise, subdivision developers and homeowners may accuse irrigation companies of taking advantage of them.

Modest changes can be made in bylaws. Some canal companies modified their stock assessment to reflect these costs. For instance, there are canal companies that charge a higher rate for the first share of stock—effectively, a new class—to recoup the expense of delivering water to fractional shareholders, many of which are subdivision owners of canal stock. This defrays costs mostly unrelated to agricultural production: trash removal, repairing damage by vandals, responding to complaints and resolving disputes among fractional

shareholders. Irrigation districts are beginning to invoke the same policy for small tracts, too.

Land use code improvements can go a long way toward solving a lot of these issues. Subdivision developers, some planners, and even elected officials often come from parts of the country where irrigation is not practiced, and are generally unaware of irrigators' rights. Including a procedural checklist in the code, delineating the steps developers must take would ensure irrigation districts have the opportunity to participate in the process. The checklist also could include concise procedures to address drainage issues. Information about easements and irrigators' rights can be spelled out in the code.

Obviously, it is unnecessary in all cases to have state codes that mirror local ones. The need for local codes is a reflection of special circumstances when a more general code doesn't cover an issue. Whenever an opportunity arises to craft a state code that covers a family of issues, it seems fairs and prudent to do so.

Secondary water service, irrigation districts or canal companies providing pressurized nonpotable landscape water through a separate pipeline to the residential lots is an innovation that appears<sup>18</sup> to be helping the public's perception of irrigation districts.<sup>19</sup> If an irrigation district is to adapt to urbanization, it may be better in the long run to offer new subdivisions reliable and desirable water service, rather than to continuously battle residential property owners over canal easements and the like. Part of the revenue earned by the irrigation district from providing such service can be used to cover the cost of dealing administratively with urban encroachment issues.  DARCA

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<sup>2</sup> In determining land conservation easement benefits to farmers, whether in the form of income tax credits or other mechanisms, many conservation easement programs compute the difference between the land's farm production value and its development value. Generally, the closer to urban areas a farm is located, the greater the differential spread between farm use and development use, and thus the conservation easement is a benefit to the farmer.

<sup>3</sup> Information presented in this article is based on research conducted at Colorado State University, and funded through the U.S. Bureau of Reclamation's Science and Technology Program. "Management Practice Study II-County Land Use Impacts on Irrigation Districts." See <http://waterlab.colostate.edu> for more details.

<sup>4</sup> For those unfamiliar with irrigation districts, still one of the best publications ever written explaining the nature and purpose of these irrigation enterprises was a USDA circular published in 1953, and a work that still should be more widely distributed to city planners and developers for the purpose of better understanding the nature of these enterprises. See W. Hutchins, "Irrigation-Enterprise Organizations". USDA, Circular No. 934. October 1953.

<sup>5</sup> Wilkins-Wells, J., Anderson, R.L., "Irrigation Enterprise Management Practice Study." Science and Technology Program. U.S. Bureau of Reclamation (1999). See <http://waterlab.colostate.edu>.

<sup>6</sup> "Water Systems Operation and Maintenance: Cost Trends." Tech-

nical Service Center. U.S. Bureau of Reclamation (2001). TSC computations often include costs associated with operating federal projects in their entirety. When irrigation district costs are separated out, these costs tend to match the 1999 Colorado State University study, controlling for inflation.

<sup>7</sup> Wilkins-Wells, J., and Coulter, T., "The Effect of Urbanization on the Cost of Operating an Irrigation District or Canal Company, Contemporary Challenges for Irrigation and Drainage". U.S. Committee on Irrigation and Drainage, 14<sup>th</sup> Technical Conference (1998).

<sup>8</sup> Based on extensive personal interviews with irrigation district managers throughout the West.

<sup>9</sup> "Colorado Death by Drowning 1993-1997". Colorado Department of Public Health (2000).

<sup>10</sup> "Drownings in New Mexico". New Mexico Department of Health, Bureau of Vital Records and Health Statistics (1999).

<sup>11</sup> Wintermute, G.J., "Childhood Drowning and Near-Drowning in the United States." American Journal of Diseases of Children, Volume 144, June 1990. This national study reported 14.6 emergency room visits linked to water accidents for every reported drowning.

<sup>12</sup> "Saving American Farmland: What Works?" American Farmland Trust (1999).

<sup>13</sup> For one of the more comprehensive reviews of water issues affecting the West Coast states, and much of the rest of the region as well, see Thompson, B.H. Jr., "Institutional Perspectives on Water Policy and Markets", in California Law Review (81:3:1993).

<sup>14</sup> Nelson, A.C., "Economic Critique of U.S. Prime Farmland Preservation Policies", in Journal of Rural Studies (6:2:1990).

<sup>15</sup> Geisler, C.C., "Fallowing Our Bliss: The Receiving End of Sprawl". Paper presented at the Rural Sociological Society meeting (August, 1999).

<sup>16</sup> Nelson (1990:123) describes the farm impermanence syndrome as "characterized by farmers believing that agriculture in their area has limited or no future and that urbanization will absorb

the farm in the not too distant future. It is manifested through disinvestment in farming inputs, sale of tracts of land for hobby farm or acreage development, shifting of crop selection from those that are labor or capital intensive to those that require little or no labor investment, and farmers becoming themselves speculators on land conversion."

<sup>17</sup> I am grateful to several attorneys who have provided information on easements and other legal issues affecting irrigation enterprises, as part of 15 workshops conducted throughout the West from 2001-2006. These workshops were conducted as part of Management Practice Study III, U.S. Bureau of Reclamation, Science and Technology Program. See materials at <http://waterlab.colostate.edu>

<sup>18</sup> The Nampa-Meridian Irrigation District, once entirely agricultural in its water service, now is predominately a supplier of pressurized residential lawn and garden water. It is a regional innovator in the protection of its irrigation facilities through many different kinds of administrative documents, so called master agreements, of which irrigation districts in other areas can adopt. In addition, the Nampa-Meridian Irrigation District has much greater status in the community than it would have if it had restricted its operational philosophy to traditional water management practices. This status, at least theoretically, improves the political position of the district when it comes to dealing with municipalities and developers. It is a service provider. However, it has been observed that many irrigation district and canal company boards in the West have difficulty accepting the need to follow the Nampa-Meridian model in dealing with urbanization. See materials on secondary water systems at <http://waterlab.colostate.edu>.

# DIRECTOR & OFFICER RESPONSIBILITIES AND LIABILITIES

*by Carrie L. Ciliberto, Esq., Ciliberto & Associates, LLC  
and Zachary Smith, University of Denver JD Candidate*

## **Introduction**

This is a basic overview of ditch company officer or director's responsibilities and liabilities. It is not all-inclusive and does not provide legal advice for specific situations. Seek legal advice from a licensed attorney who has the appropriate knowledge and experience if you have questions.

## **Directors and Officers' Standards**

A director acts as part of a board and directs an organization's actions, as determined by the board, for the benefit of its members. An individual director is intended to have limited powers, exerting them through a single vote. The board has considerable powers. An individual director can be held personally accountable for the board's decisions unless he or she acts "(a) [i]n good faith; (b) [w]ith the care an ordinarily prudent person in a like position would exercise under similar circumstances; and (c) [i]n a manner the director or officer reasonably believes to be in the best interests of the nonprofit corporation."<sup>1</sup>

When selecting directors and officers, predetermine the criteria for nominees. Consider an individual's experiences and expertise and what he or she can bring to the organization. Choose competent, knowledgeable people, possibly with different perspectives, to create the most effective governing body. You may also want to adopt some minimum qualifications for service. For example, require the director or officer to be a member or shareholder in the organization.

The standard legal requirements for directors and officers include the following:

**Duty of Care:** An officer or director must act in an informed and reasonable manner. This includes attending meetings, being adequately informed, exercising independent judgment, and adopting/maintaining appropriate control and monitoring procedures, particularly when delegating responsibilities to advisory bodies, committees, members, employees, outside consultants, volunteers or other persons. It is important that directors and officers meet on a regular basis and that such meetings have an agenda, follow the appropriate rules of procedure, and that accurate minutes and other relevant documents are properly prepared, distributed and retained on file.

<sup>1</sup> Section 7-128-401(1), C.R.S.

**Duty to Govern:** The officers and directors are given the responsibility to manage the business affairs of the organization. As such, they must appreciate and understand the expectations of the members. They must delegate as necessary and maintain proper controls over such delegations. They must also keep current and accurate books, records, reports and other written documentation of their actions as may be prudent and/or necessary for the benefit of the organization and its members.

**Duty of Diligence:** This is the standard of skill and care expected when governing a corporation. The American Bar Association's Model Business Corporation Act states that directors and officers "shall discharge their duties with the care that person in a like position would reasonably believe appropriate under similar circumstances,"<sup>2</sup> which is generally analogous to Colorado's above-referenced standard. Generally, simple negligence will not breach this duty, based upon the "business judgment rule" which protects officers and directors.

**Duty of Loyalty:** This standard requires directors and officers to exercise their powers in good faith and in the best interests of the organization. Generally, they must avoid conflicts of interest. There are some conflicts, when disclosed properly, that may be waived with consent of their organizational peers and/or members. However, some conflicts cannot be waived, and thus the director or officer should resign or at least abstain from participation in that matter. Directors and officers must also uphold confidentiality when prudent or necessary. They must not participate in self-dealing, where one exerts influence or power for an action, or inaction, for personal advantage, or compete with the corporation or its members. A director or officer must always act with the organization's best interests in the forefront.

**Duty of Obedience:** Directors and officers must comply with all applicable federal, state and local laws, as well as the charter, articles, bylaws, and any other valid and applicable corporate rules and regulations. This issue may arise, for example, in regard to executive compensation, loans or distribution of assets.

<sup>2</sup> American Bar Association, Model Business Corporations Act Annotated, Third Edition (2005), §8.30(b).

These duties are owed to the corporation and to its individual members. Directors and officers can be held personally liable to the corporation and/or its members for damages that result from a failure to abide by the various standards. If directors and officers fulfill their legal responsibilities and duties, they should be protected from liability unless they personally act in a tortious way or commit a crime.

### Colorado Ditch Director and Officer Liability

The Colorado Legislature passed the Colorado Revised Nonprofit Corporation Act in 1998, which placed directors and officers of ditch corporations generally into the liability category of nonprofit directors and officers. Ditch officers “will not, as such be deemed personally liable for the acts, debts, liabilities, and obligations of the nonprofit corporation.”<sup>3</sup> Stated another way, solely by holding a position as officer or director does not make a person automatically liable. Personal actions outside of normal care or the commission of a crime can eliminate this immunity.

The applicable statute, Section 7-128-401, C.R.S., requires actions of good faith, of ordinary care, and actions that the director or officer reasonably believes to be in the best interests of the corporation. A director or officer is permitted to rely on information the person receives from other officers or employees the person reasonably believes to be reliable and competent.<sup>4</sup> The statute provides an example of an act of bad faith: If the director or officer knows that reliance on a person is not warranted, that director or officer has acted outside of good faith.

Generally, directors and officers are not liable for torts committed by subordinate employees or volunteers unless the director or officer was involved personally in the act, or committed a criminal offense.

Ditch company volunteers may be protected by the Colorado Volunteer Service Act, which states that volunteers are not liable as long as they are “acting in good faith, within the scope of the volunteer’s duties and not involving willful or wanton acts.”<sup>5</sup> Employees and volunteers acting within the scope of their position can be considered agents of the organization, and as such the organization can be held liable for their actions.

The director or officer is also not liable to individual members or to the corporation as long as he or she performs duties in compliance with the law. Directors do retain certain obligations to shareholders. In the Colorado case *Left Hand Ditch Co. v. Hill*, members of a ditch company sued the director for additional access to the company’s financial and membership records. The Colorado Supreme Court ruled that members are allowed to inspect the records of the ditch company to which they belong. In that case a ditch director was trying to limit other shareholders’ access, and he was ordered by the court to allow the members’ inspection.<sup>6</sup>

### Ditch Company Liabilities

Generally a ditch company is required to keep its ditch in good and proper repair. In the case of *City of Longmont v. Henry-Hobbs*<sup>7</sup>, a mother sued the city after her son accidentally drowned in an irrigation ditch. While the ditch was owned and operated by a ditch company, the court found the city responsible for the death, because it agreed to maintain that ditch section in exchange for using it as part of the city’s stormwater drainage system.

The court focused its attention on which entity was directly responsible for the maintenance of the spillway where the boy drowned. The court found the city responsible. Other spillways Longmont operated included protective cages. Unfortunately, this particular spillway had none.

As a side note, under the agreement, the city agreed to indemnify the ditch company for damages caused to third parties by overflowing stormwater. Ditch companies may include indemnification clauses in contracts with shareholders, whether they are municipalities, individuals or third parties.

As long as the ditch company keeps the ditch in good repair, generally it is not liable for property damage from seepage or storm runoff. In addition to maintenance, ditch companies are responsible for maintaining proper measuring devices. They also must ensure that all shareholders in good standing receive their proportionate shares of the available water.

A duty of care is owed to persons entering the ditch company’s property and its easement. The standard is different depending on the legal status of person entering. For example, a trespasser, “one who intentionally and without consent or privilege enters another’s property,”<sup>8</sup> is owed the lowest standard of care. The ditch company can be held liable for willful, wanton, reckless or deliberate acts of endangerment.

A stricter standard is owed to a licensee, “a person who has a privilege to enter upon land arising from the permission or consent, express or implied, of the possessor of land, but who goes on the land for his own purpose.”<sup>9</sup> The ditch company generally has a duty to use reasonable and due care, and to warn of known dangers. The highest standard of care is owed to an invitee, “[a] person who is on property of another for economic benefit of owner or for the economic benefit of both parties.”<sup>10</sup> The company must warn not only of known dangers, but also any dangers of which it should have been aware.

### Indemnification and Insurance

Colorado law provides guidelines as to how a ditch company may indemnify its directors and officers. An officer is entitled to mandatory indemnification for proceedings because that person was an officer, if that officer is successful in that person’s defense.<sup>11</sup> Generally, ditch companies may indemnify any officer, employee, fiduciary or agent, so long as it is within the best interests of the corporation and its members.<sup>12</sup>

<sup>7</sup> *City of Longmont v. Henry-Hobbs*, 50 P.3d 906, (Colo. 2002).

<sup>8</sup> Black’s Law Dictionary, Sixth Edition.

<sup>9</sup> Id.

<sup>10</sup> Id.

<sup>11</sup> Colorado Revised Nonprofit Corporation Act, C.R.S.A. §7-129-103.

<sup>12</sup> Id. at §7-129-103.

<sup>3</sup> Peter C. Guthery, *Survey of the Law of Colorado Nonprofit Entities*, Colorado Lawyer, Apr. 27, 1998, at 2.

<sup>4</sup> Colorado Revised Nonprofit Corporation Act, C.R.S.A. §7-128-401.

<sup>5</sup> Guthery, *supra* 4, at 2.

<sup>6</sup> *Left Hand Ditch Co. v. Hill*, 933 P.2d 1, (Colo. 1997).

A ditch company may purchase insurance to cover its liability to third parties, and to cover its officers and directors. When obtaining any insurance coverage, read and understand the agreement prior to purchase. For the best policy and price, consider the exclusionary terms and conditions. They are just as important as what the policy covers.

**Conclusion**

Although a ditch company may limit personal liability, it cannot be eliminated entirely. Exceptions to personal liability protections include breaches of loyalty; intentional misconduct; knowing violation of the law; and the receipt of improper personal gain. Choose officers and directors wisely. Proper planning can often prevent or eliminate potentially costly issues for the ditch company, its directors, officers and members. If you anticipate or encounter a questionable situation, seek competent legal advice.

 DARCA

# HOLDING A GREAT MEETING

by Janet Enge, Animas Consolidated Ditch Company

Tight groups buzzing in the back of the room, or people shaking hands as they people walk out the door. Heated discussions around the tailgates, or issues resolved in genial spirits.

It's not too difficult to assess when a ditch company meeting wasn't all that great, when people don't like the way things turned out or when they think their opinions weren't heard.

If no one is satisfied with the results of the meeting, and the issues aren't resolved, those meetings are a complete waste of time. Plus, in the situation where too little water has to be divided among too many competing demands, unresolved issues almost always surface again with more rancor.

So what's the secret to bringing people together and ensuring a good meeting, even a great meeting? It's all about getting the Rs together.

## Recognition

Why do people even participate in ditch meetings? They come to encounter different ideas and interests, and to acquire new approaches to shared problems. They come to meet their neighbors. They come for mutual encouragement, support and inspiration. They come voluntarily, in good faith, to exercise the noble goal of free speech by free people.

Each participant adds value to the meeting, and each brings a personal agenda that also represents common concerns. Shareholders in mutual ditch companies have the right to receive notices of meetings, the right to attend, and the right to participate. They have the right to elect officers to represent the whole, placing the responsibility for conducting good meetings squarely on the shoulders of their leaders.

Open participation is the strength of the meeting, and recognizing the statutory obligation to treat all participants fairly and equally makes a great springboard for a great meeting.

## Responsibility

By beginning with impersonal and impartial leadership, the facilitator sets the tone of the meeting. Responsible leadership assures the will of the majority while protecting the rights of the minority, discourages politics, and uses honest data to inform. Leaders must put aside their own personal agendas to act in the good of the whole, for controlling others means first controlling oneself.

Shareholders also have a responsibility to the meeting. They came to participate, so they need to do exactly that.

It's easy to sit silently in a meeting, then criticize the process. The chairperson is responsible for redirecting the silent negative toward the proactive, by conveying the attitude that no one has the right to criticize unless they are willing to personally take steps to remedy the situation.

Participating, though, doesn't mean steamrolling everyone else. Great leaders accept their responsibility when they step in to keep control of the meeting, to invite discussion, and to close it. Anything less shows little respect for the attendees. Everyone else in the room is usually grateful when the leader says, "Given our agenda, we can only afford to spend 15 minutes on this item before making a final decision."

Enlisting the group's opinion by asking, "Is this what we want to spend our time talking about?" also works. The by-laws can always be amended to establish a time limit for individual speeches.

If the chairperson feels a need to air his or her views, let someone else chair the meeting. Doing so earns respect from the shareholders for not taking advantage of a leadership position.

## Respect

Respect, more than anything else, can make a meeting meaningful and productive. Respect the fact that the people gathered have considerable obligations outside this meeting and are contributing precious time. The best tool for respecting time is a straightforward and simple agenda. It's an easy to document to create, especially for a ditch company meeting, where so many of the items are similar year to year. Without an agenda, the meeting seems to drag on forever and rambles from topic to topic, to end with no apparent result.

A bell-shaped agenda sets out a warm-up stretch, where the attendees begin to work as a group on simple, easy items before they get to the controversy. Then the hardest items can be attacked when everyone is focused on the meeting, and a degree of cooperation has been established. Instead of letting the meeting fizzle out, the final stretch holds simpler business, perhaps the kudos, and a forward look to make the last moments of a great meeting a positive ending.

**Sample Agenda**

- I. Call the meeting to order  
Stick to the clock.
- II. Establish credentials (statement of quorum)  
Verifying a quorum makes the meeting legal and ensures there is enough representation to act as a whole.
- III. Statement of purpose  
Stating the purpose clearly outlines exactly why this meeting was called, and what this meeting will achieve.
- IV. Reading of minutes  
Minutes are so often ponderously repetitious, but they do act as a reminder of the business most recently before the group, and the direction the team was going. If the minutes are written with objectivity and accuracy, they need only contain the precise facts of actions taken. A record of the motions acted upon is all the law requires.
- V. Old business  
These are the outstanding issues or unfinished projects before the assembly. If the prior meetings were effective, this should be a short list.
- VI. New business  
New business, and the financial reports, are the primary reasons to call a meeting. A note here on financial reports: Don't neglect the second oversight. If your ditch company doesn't receive more than \$25,000 a year from all sources of revenue, it isn't necessary to file the annual 990 tax report, but it is still sound practice for the officers of the ditch company to audit the financials regularly.  
All business is brought before the assembly in one of two ways:
  1. By making a motion that the assembly consider or act on something, or
  2. By presenting a report to the assembly.
 The chair then opens the debate by restating the motion and second, and asking for discussion. When everyone has had a chance to voice their concerns, the matter can be brought to a vote.
- VII. Announcements  
Announce the next meeting, announce any event that could benefit the shareholders, but don't forget that this is also a good place to give special recognition for valuable contributions. Close crisply.
- VIII. Adjournment  
Again, **stick to the clock.**

Meetings haven't really changed that much in our world's history. The Romans had the same problems in their meetings that we do today. Even in the 13th century, scarce resources had to be allocated among competing demands, and people had to meet to discuss common interests and decide on action. The roots of how we run our meetings today stem from parliamentary law created in the Roman senate. A set of rules written in 1893, General Henry M. Robert's "New Robert's Rules of Order," are the format most nonprofit organizations follow.

**Robert's Rules**

Robert's Rules, by today's standards, may seem complex and a bit archaic. Still, adopt these or a series of guiding rules in the ditch company bylaws. Otherwise, a company risks defending the legality of actions taken in a meeting on the grounds that the group has no official rules to govern the motions.

Most ditch companies today practice a rather relaxed version of Robert's Rules, but a first-hand acquaintance with them is always a good idea. The fundamentals always need to be observed. From the moment the president calls the meeting to order, he or she is responsible for enforcing the rules of and deciding on all questions of order, subject to the appeal of two members. Without a grounding in Robert's Rules, it is impossible to fulfill this duty. There are many short, inexpensive books with the rules set in clear, easy-to-read language. The larger the gathering, and more contentious the group, the more precise the organization and conduct in the meetings must be.

Considering this notion of motions, researching Robert's Rules shows that some motions take precedence. Main motions can only be considered one at a time, and only when no other motion is before the assembly. Privileged motions, incidental motions, and secondary motions all have special considerations. But one of the nicest things to remember is that a motion to fix the time to adjourn takes precedence over all other privileged motions.

Don't forget to check your bylaws to see when you can pass motions by simple majority, or which motions need a two-thirds majority to be legal.

**Referrals**

So what happens when the directors have done their best to facilitate the meeting, and fistcuffs still seem inevitable? Bring out this great tool:

**Refer** to the bylaws. The assembly as a whole has adopted these laws to rule themselves. If a set of bylaws specifically tailored to a ditch company doesn't exist, spend the money to get some. Then make certain they agree with the articles of incorporation. Language written in the 1800s is obscure and generally doesn't reflect the way ditch companies operate today.

**Refer** to the experts. When the discussion gets hot, and veers away from facts, refer to an outside source to take the heat down. This moves the discussion to the next meeting, and the timeout is an opportunity to let cooler heads prevail.

**Refer** to committees. Committees are the workhorses of any organization, and are often underutilized in ditch companies. Members can either be appointed or elected, but committees spread the burden of work, and involve more people in the decision-making process. Audit committees, dispute resolution committees, special projects committees, publicity committees, and bylaws committees have clear advantages. There is always the option of a committee of the whole, where the entire assembly works on a project.

Refer to a closed session. Using executive sessions has to be done with extreme care. They are used to discuss disciplinary actions or character investigations, subjects of such sensitivity that releasing the material to the public could be considered libel. The directors must weigh carefully the sensitivity of an issue against the public's right to information.

Effective meetings involve information and action decided by vote, but great leaders add more. They set a goal and stick to it. They put decisions to the group, allowing the group to own the meeting. They follow the tenet: All shall be heard, but the majority shall decide.

Great leaders remember that volunteers don't want their time wasted, and they know exactly what people are looking for. When a meeting has a defined purpose, has invited participation, has addressed each item on the agenda, and has assigned follow-up action, shareholders can honestly say, "That was a great meeting!"

DARCA

## References

"Meetings and Parliamentary Procedure—Simplified," by Irving Engelson

"How to Run an Effective Meeting," by Barry L. Shoop Ph.D.

"Brazen Careerist," by Penelope Trunk, Oct.10, 2006

## Great Quotes

"Our stern alarums changed to merry meetings."

—William Shakespeare, *King Richard III*

"Whoever invented the meeting must have had Hollywood in mind. I think they should consider giving Oscars for meetings: Best Meeting of the Year, Best Supporting Meeting, Best Meeting Based on Material from Another Meeting..."

—William Goldman, novelist & screenwriter

"Football combines the two worst things about America: It is violence punctuated by committee meetings."

—George Will, political columnist in the *International Herald Tribune*

"To jaw-jaw is always better than to war-war."

—Sir Winston Churchill quoted at a White House Luncheon  
June 26, 1954

# CONFLICT IS NOT A FOUR-LETTER WORD: SOME ADVICE FOR DITCH AND RESERVOIR COMPANIES

by MaryLou M. Smith, *Aqua Engineering, Inc.*

In a word, what ditch and reservoir companies are all about is WATER.

And water brings on a huge amount of conflict.

Some of us may be getting a little tired of hearing what Mark Twain said about it: "Whiskey's for drinking, water's for fighting."

Well, I've changed it up a bit. Over the door of my office I have a big banner that reads: "Whiskey's for drinking, Water's for...Conflict Resolution."

Spending hard-earned money on litigation isn't the best way to solve water conflict. Our water attorneys, and others who specialize in conflict resolution, can help us solve conflicts in more effective ways.

One approach the whole state is trying right now is the interbasin roundtable approach. HB1177 laid out a plan whereby stakeholders in every basin in Colorado meets to hash out their own conflicts regarding water, and then begin to hash iron out conflicts with the other basins. The IBCC is a joint statewide committee with representatives from each basin and some at-large appointments by the governor and the legislature. It was formed to more or less coordinate and work with the issues brought to it by the basins.

I have been attending meetings of several of the roundtables and of the statewide IBCC since the process began in 2005, and my take on it is that the process is working just as it was designed to. Working with conflict takes time. And it's messy. But that doesn't mean it can't work.

So, let's talk about how you, as members of ditch company boards, can improve your ability to work with conflict. Because, let's admit it:

We are human.

We have differences.

Conflict is inevitable.

In fact, conflict is what gives life texture. If we didn't have problems to solve, which is what conflict is, we would be bored stiff. Tension allows the thread to engage the cloth in a sewing machine. You have to have the warp and the woof, the threads going in opposite directions from each other, to hold a piece of cloth together.

However, conflict left unresolved can drain:

- Time;
- Emotional energy;
- Money;
- Good will; and
- Image/Reputation.

Conflict is not a four-letter word.

It can actually lead to:

- Better results, (two heads are better than one); and
- Better relationships;

If we use our imagination and seek to truly understand our differences, we can actually figure out how to settle disagreements in ways that exceed our expectations and improve our relationships.

Let's look at the issue of conflict from the point of view of a ditch company board member. The likely kinds of conflicts may include how to:

- Get along among yourselves in setting policy and making decisions;
- Work through conflicts you may have with your staff;
- Resolve conflict with developers, government agencies' representatives, and others with whom you have to do business; and
- Negotiate a business deal.

Below we will explore how to:

- Pick your battles;
- Put your best foot forward in resolving conflict; and
- Proceed when you can't solve the conflict.

## Possible reactions to conflict

- Ignore it—hope that it will go away on its own;
- Take action aggressively (hard);
- Take action passively (soft); or
- Take action assertively (hard on the problem, soft on the relationship).

## Picking your battles

A conflict is worth your attention when it:

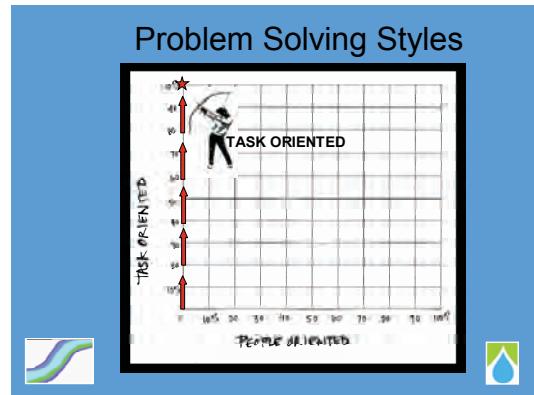
- Distracts you from more important issues;
- Harms a relationship that's important to you;
- May damage your image or reputation;
- Is likely to escalate; and
- When it has a propensity to spread to other people or circumstances.

## Task/People Scale

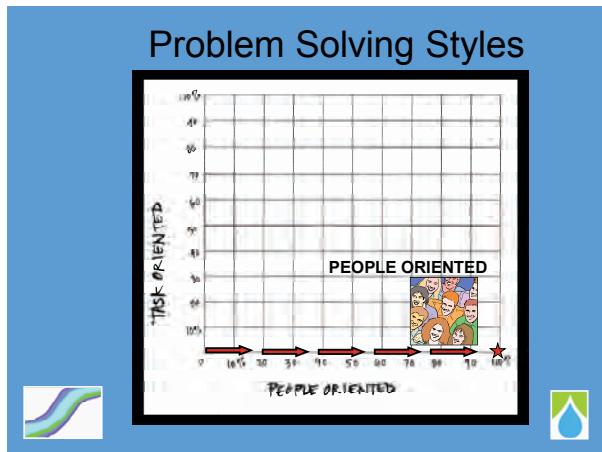
"You say we can resolve conflict such that we come up with better results AND better relationships. I have pretty high ideals, and I like for things to be done right. How can I keep from compromising those high ideals, and especially how can I do that while staying on good terms with the other folks in my group?"

Good question. The answer has to do with learning how to pay attention both to the task and to the people at the same time. Let's look at a graph that's sometimes used to show where people fall in terms of their approach to solving problems.

Some people are **task-oriented**—they are highly motivated to get the task done and to get it done right. Those folks max out on the **Task** axis.



Some folks are **people-oriented**—they are highly motivated to make sure everyone gets a chance to participate in decision making and that everyone's views are respected. Those folks max out on the **People** axis.



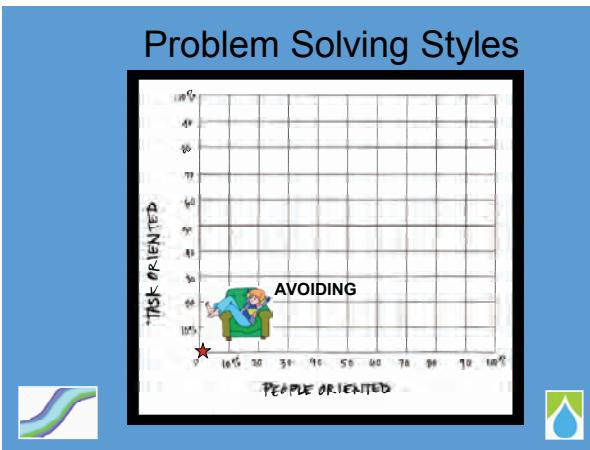
But few of us are totally in one of these camps or the other. Almost all of us see the value in paying attention to the peo-

ple end of things as well as the task end of things.

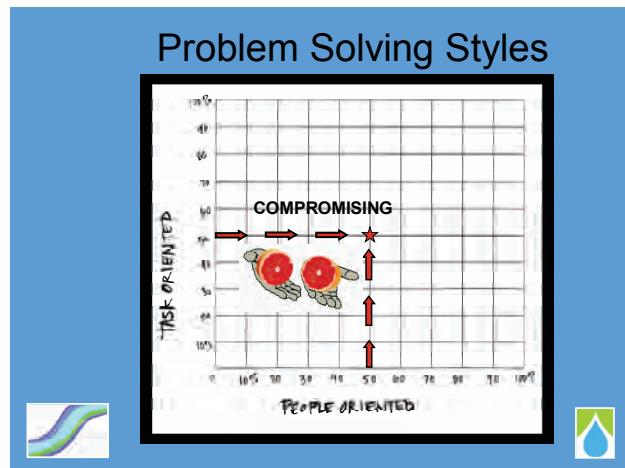
Those who **do** fall almost totally in the **Task** category are the ones likely to do anything to get their way, regardless of what it does to anyone else.

Those who **do** fall almost totally in the **People** category are the ones likely to do anything to keep everybody happy, without much concern for the actual task at hand. But there are any number of combinations that we might fall under. Let's look at a few:

1. If we are not very high on either the **Task** axis or the **People** axis, we are probably somewhat disinterested altogether—in either the task or the people. You could call us **Avoiders**. Few of us are avoiders all of the time, but most of us are avoiders in situations that don't interest us.

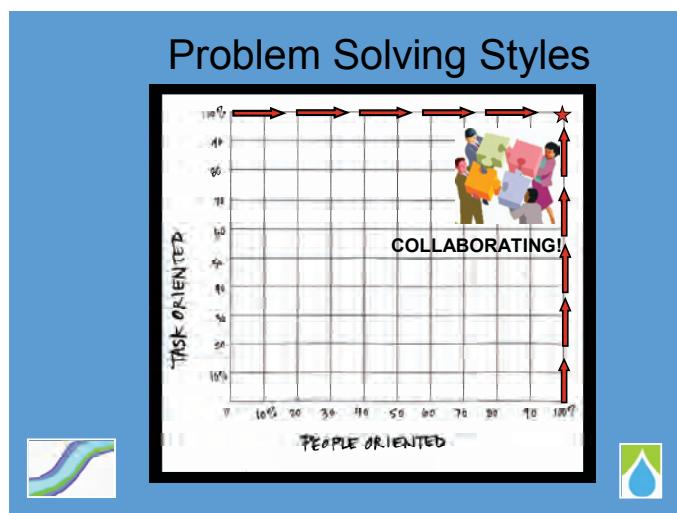


2. If we are somewhere in between, that is we care almost equally about the task and the people involved, the lines tend to come together in the middle. These folks might be the most likely to be willing to compromise their ideas with others in the group. Let's call these folks **Compromisers**.



3. The really well-adjusted folks, those most likely to end up with a creative solution better than anyone could have dreamed of, with the relationships actually enhanced, are those few among us who can manage to keep our eye equally on both balls—the one we call **Task** and the one we call **People**. These folks can be

called **Collaborators**. They **Co-Labor** with other people to come up with a result which is spectacular—they accomplish the Task while managing to maintain good relationships at the same time.



Let's apply this to conflict resolution. We have all seen the individual who wants his/her way at all costs and doesn't care whether he/she is perceived as obnoxious. We have seen the person who is so anxious for everyone to be happy that he or she will give in to just about anything the other party asks for. And we are quite familiar with those times we have been willing to compromise, though if we think back on it, we may remember those as times when nobody was really very happy with the end result.

The collaborators are the ones who get the best results in conflict resolution.

When you care about both the people and the task, you are more likely to be able to sustain the solutions you come up with together. Without bringing along the people, solutions often won't stand the test of time.

In our complex world, we need to educate ourselves and our kids to be collaborators. The complex problems we face require creative solutions which evolve from multiple views. Think of it as a diverse gene pool. From this perspective, conflict is healthy, but only if we know how to use it to good advantage, by co-laboring with others to come up with good solutions.

OK, so now I have convinced you to care about both the task **and** the people. How do you do that? How can you learn to be a collaborator?

First, if we are extremely task oriented, or people oriented, we have to realize that we aren't going to change overnight. But just like you learn what your weaknesses are in a sport, and work to compensate for them, the same is true of conflict resolution. Half the battle is recognizing a trait in yourself. Assess where you are.

Second, we can build on and improve the good traits we already have or know about which come in handy in conflict resolution. Traits like listening to the other person, not raising our voices, not interrupting.

Third, we can learn and practice proven conflict resolution techniques.

### We CAN Learn How to Do IT

Being skilled at resolving conflict is every bit as important as other traits we look for in a successful board member/farmer/business person.

We pride ourselves on our ability to solve problems like how to raise the yield on our crops or save water or use our chemicals more effectively. Why not pride ourselves on our ability to solve people problems?

We all need training in conflict resolution, and we all need opportunities to practice.

Some people think it's a touchy-feely kind of thing. That what we are talking about is getting people to circle around a campfire and sing Kum-bah-yah. But conflict resolution is **NOT** kum-bay-yah, it's roll-up-your-sleeves hard work.

We often assume technical types aren't good at solving people problems, but we sell them short. They can be just as good as the rest of us, if they value learning the skills required and putting them into practice.

If we were to work as hard at solving people problems as we do at solving technical problems, the world would be a completely different place. We **ASSUME** we can't solve the people problems before we even give it a chance. In technology we use trial and error and keep trying new things without giving up. Why don't we do the same with people? We are too quick to say that it didn't work and go back to our old habits. If we did that in technology, where would we be? It takes courage.

Let's look at some conflict resolution techniques we can learn:

### Interest-Based Negotiation vs. Positional Bargaining

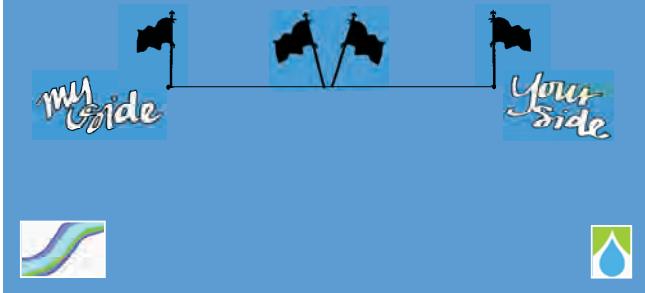
The traditional way to negotiate can be called positional bargaining.

I have my position, you have yours. We duke it out, or we come to a compromise. Typically, I make my position extreme, expecting you to do the same, so there will be room for us to meet somewhere in the middle. Like this:



## Positional Bargaining

May be we even agree to meet in the middle



But generally, neither of us really comes away very satisfied. There are better ways to resolve conflict than positional bargaining.

Let's take a look at a different approach, interest-based negotiation. We come to the table without positions. I know what my interests are, you know what your interests are, and we take a good, hard look at both sets to see if we can come up with something that satisfies both of us.

Think of it this way:

My **position** is what I want.  
My **interests** are why I want it.

Here's a story to capture the difference between positional bargaining and interest based negotiation. Two men were quarreling in the library. One man wanted the window open. The other man wanted the window closed.

Those were their two positions:

Window open.  
Window closed.

They bicker about how much to leave it open: a crack, half-way, three quarters of the way—that's positional bargaining.

No solution satisfies them both.

Enter the librarian. She asks the first man why he wants the window open. His answer? Fresh air. She asks the second man why he wants the window closed. His answer? To avoid the draft.

Those are their interests:

Fresh air.  
Avoid the draft.

After thinking a minute, the library opens wide a window in the next room, bringing in fresh air without a draft.

By looking at interests vs. positions, a solution was not far away.

We almost always step into a conflict with our position ready. So does our adversary. The first step we can take in conflict resolution is to take a look at our positions and break them down into the interests which underlie them.

We each have our positions. We can each explore what

went into coming up with those positions.

We can begin to see that some of our interests are:

- The same (shared interests);
- Different but not in conflict (compatible interests);
- Slightly in conflict; and
- Greatly in conflict.

By breaking our positions down into interests, we can identify where we can agree and we can greatly clarify where the problem really lies. Seeing all these pieces laid out gives us the chance to consider options for mutual gain. We can begin to see how the interests could be put together in a colorful way to come up with a solution.

Remember, it isn't enough to just present our own interests. We have to be willing to really listen to the other fellow's interests. As William Ury and Roger Fisher say in the book "Getting to Yes":

"The ability to see the situation as the other side sees it, as difficult as it may be, is one of the most important skills a negotiator can possess. It is not enough to know that they see things differently. If you want to influence them, you also need to understand empathetically the power of their point of view and to feel the emotional force with which they believe in it. It is not enough to study them like beetles under a microscope; you need to know what it feels like to be a beetle. To accomplish this task you should be prepared to withhold judgment for a while as you 'try on' their views."

People listen better if they feel they have been understood. The better you really listen to them, and replay for them what you heard their interests to be, the better they will really listen to you and your interests. Don't worry: *Understanding* their point of view is not the same as *agreeing* to it.

If you show you are interested in them and that you respect their interests, they will think of you as an intelligent person whose ideas might also be worth listening to!

Acknowledge that their interests are a significant part of what needs to be solved. Bring their interests into your conversation.

"Gee, I see your point. I have been focusing on x, but I can see that y is important too. Hmm...wonder how we could figure out how to do both. Tell me more about what you are thinking, maybe that will help."

And then:

"I see. Yep, for sure there's A and B to think about. This is sure complex. Let me tell you about F and G. That's something we need to think about, too."

By collaborating instead of each of us promoting our own individual position, we are taking all the energy that was directed at each other and instead directing that same energy at our mutual problem: how to get both of our interests met. Not **you against me**, but **you and me** against **the problem**.

Here's how "Getting to Yes" authors Mr. Ury and Mr. Fisher put it:

"However difficult personal relations may be between us, you and I became better able to reach

an amicable reconciliation of our various interests when we accept that task as a shared problem and face it jointly."

### Inventing Options

Now let's explore another powerful technique for resolving conflict. It's called inventing options. This is where creativity comes in.

Inventing Options:

1. Separate this phase from the deciding phase.
2. Brainstorm to come up with ideas which could be made into options.
  - **Sit side by side** toward the blackboard, flip chart or screen;
  - **No-criticism rule**—Quantity is more important than quality;
  - **Multiple Angles** Approach the conflict from every conceivable angle. For instance, what would a lawyer suggest, a doctor, a teacher, a preacher, an insurance salesman, a schoolchild? And,
  - **Record ideas fully** in full view of everyone—to give them credence.
3. Try to build some potential options from the ideas generated during the brainstorming.
  - Star the most promising ideas; then
  - Play with those ideas: Shape them, build on them, whittle them, expand them, improve them. In doing this, sometimes the ideas that were **not** starred get tacked on to the starred ideas in some way.
4. Decide on a time and place for moving to the next stage, which is to evaluate the ideas and make a decision. Sometimes it helps to let some time elapse and let people think over the ideas.

It is critical to separate the act of developing options from the act of deciding on them. Discussing options differs radically from taking positions. Positions cut off discussion whereas outlining options invites additional options. By discussing options, you are opening up the room, giving everyone some elbow room, opening up the windows, bringing in some fresh air.

The greater the number and variety of options, the better. In a book called "Wisdom of Crowds" we learn the best decisions come from a diverse group of people if you can get them to work together. The trick is to avoid "group-think" which happens when everybody agrees on everything. Often you miss out on good answers, much less the best answers.

Dovetail differing interests, by putting things together in a way that satisfies everyone. Remember the nursery rhyme:

*Jack Sprat could eat no fat, his wife could eat no lean.  
And so, between the two of them, they licked the platter clean!*

In a nutshell: Look for items that are low cost to you and high benefit to them and vice versa. Differences in interests, priorities, beliefs, forecast and attitudes toward risk all make dovetailing possible.

Creative invention of solutions opens doors wide and produces a range of potential agreements satisfactory to each

side. Generate many options before selecting among them. Invent first, decide later.

Obstacles that inhibit inventing an abundance of solutions:

- Judging possibilities too early. Judgment hinders imagination. Don't pounce on the drawbacks of a given possibility before giving it a chance. Play around with it, massage it, adjust it: "Well, I can't see it working exactly that way, but there is sure an element of possibility there. What about...?"
- Searching for a single answer. Thinking the answer is either black or white, or even gray you are likely to short-circuit a wiser decision-making process in which you select from a large number of possible answers.
- Assuming a fixed pie. Assuming your loss is their gain.
- Thinking that solving their problem is their problem —Thinking about what YOU want and not about what they want, too.

Let's take a look at all this theory and see how you might apply it to one of the situations you might get into as board members of a ditch company:

Development encroaching on the ditch. Urbanites with large acreages. Farmers have worked out the protocol for taking water, but the urbanites look at it a different way. Farmers know they have to be flexible. The urbanite may be an engineer who thinks of it more as an exact science.

Farmer views himself as flexible, easy going, practical.

Urbanite views farmer as inefficient.

Urbanite views himself as organized, efficient.

Farmer views urbanite as uptight, impractical.

Proactive things we can do to build relationships with new folks:

Invite them over.

Take them a pie.

Plan a neighborhood potluck.

Reactive things we can do when trouble is on the horizon:

Reach out and be friendly.

Ask them to come to a ditch meeting.

Have the courage to broach the subject.

Ask the new folks to share their ideas.

Instead of attacking their ideas, discuss how you might build on them.

Share your constraints with them, without cutting down their ideas.

#### The problem from one perspective:

You new folks aren't cooperating with us.

You new folks don't know anything about irrigating.

You old folks don't have a good system.

You old folks aren't very organized.

#### The problem from another perspective:

We need a way we can get the irrigating done without upsetting the apple cart for any of us. It's tempting for us

old folks to just want you new folks to do things the way we have always done it, but that may not work well for you new folks because of your work schedules and all. Still, we are at the mercy of the river and the ditch rider. But maybe we can learn some new tricks. Let's at least talk about it.

### Tips on technique:

Think through the best setting/timing for the interaction.  
 Meet at our place, theirs, or a coffee shop?  
 Gather early in the day or late in the day?  
 Prepare—and get outside help if you need help to prepare, such as asking a conflict coach or consulting a colleague.  
 Take a moment to gather your thoughts, bring out your best heart.  
 Be fully present. Give yourself fully to the situation.  
 Practice good listening. Three kinds of listening:

1. Listening with half an ear while thinking about what you will say next.
2. Listening really carefully to what they are saying.
3. Listening carefully to what they are saying while also picking up on environmental clues, the WHOLE situation. Use your intuitive abilities.
4. Keep your focus on the problem, not the personalities.

Give credit generously to the other party whenever possible. Delph Carpenter, a chief negotiator of the 1922 Colorado River Compact, was a master at this.

Help the other person save face. Sometimes they agree in substance, but don't want to be seen as backing down. You have to be clever to think of how to phrase something so they can save face.

Don't be afraid of expressing feelings, but focus on yours without striking out at them:

"It really causes me heartburn to think about..."  
 "We were really discouraged about..."  
 "When you badmouth us, it's hard not to get angry."  
 "Boy, I was pretty burned when you took those boards out of the ditch and my field got flooded." Instead of saying, "What were you thinking when you took those boards out of the ditch?"  
 or  
 "I feel like what's important to me got overlooked."  
 Instead of saying, "You are just looking out after yourself."

Allow the other side to let off steam. Don't react to emotional outbursts. Stay calm yourself, and show that you understand.

Realize that we all have our view of the elephant, and we tend to forget that there *are* other perfectly legitimate views. Treat the other person as a fellow judge and the two of you are attempting to work out a joint opinion in a case.

Start with talking about interests and reasoning.

Save conclusions and proposals for last.

Concentrate on the future instead of the past.

Successful negotiation requires both hard and soft. You have to equalize the two. You have to give just as much positive support to the people on the other side as you give to tackling the problem (not them, the problem).

As we do this, remember we are human beings, prone to

human reactions. On one hand we:

- Want to feel good about ourselves, and
- Care about how we appear to others.

On the other hand, we:

- See the world through our personal vantage points, and
- Frequently confuse our perceptions with reality.

### What if they won't play?

Accepting that we have a shared problem and facing it jointly greatly breaks down the animosity between us. If we both come to the table with this in mind, that's great. But even if only one of us has this approach, there is hope. Frequently, the person who wants to approach the conflict from an interest based standpoint can introduce the concept subtly; the other party is likely to follow the reasoning:

1. Stick to your approach and they may very well follow, especially if you offer to first listen to them and why they want what they say they want; and,
2. Try negotiation Judo.

Their side:

When they give their position, don't attack it. Do not reject or accept it. Rather, treat it as one possible option. Ask them questions about it. Ask them to articulate the advantages. Look for the interests behind it, seek out the principles it reflects, and even think about ways to improve it! Examine the extent to which it meets your interests as well as theirs. Talk about those. Well, *one* advantage of that is...

Your side:

Don't defend your ideas; instead invite criticism and advice. "What I was thinking was..." What concerns would you have about that? Listen to their criticisms to learn their underlying interests, and improve your ideas from their point of view. Rework your ideas in light of what you learn. One way to channel criticism into a constructive direction is to turn the situation around and ask for their advice: "What would you do if you were in my position?"

More:

- If they attack you, defuse it by turning it into an attack on the problem. Resist the temptation to defend yourself or attack back. Instead, sit back, let them blow off steam, show you understand what they are saying, and then re-cast their attack on you toward the problem. "Yes, I hear you. You've lost money over this disagreement we are having and it's costing you more every day. I don't blame you for being unhappy. What ideas do you have for how we can get it settled as fast as possible?"
- The best tools in negotiation Judo: questions and silence.
- Silence. If they are proposing something unreasonable or attacking you, try just sitting quietly, without a response. Chances are THEY will say something else, and often something to move toward your position. Silence

often creates the impression of a stalemate which the other side will feel impelled to break by answering your question or coming up with a new suggestion.

- Questions. When you ask questions, pause. Don't take them off the hook by going right on with another question or some comment of your own. "What about x? Would it work if we?"

What if they are acting irrationally?

1. Question your assumption that they are acting irrationally. Perhaps they just see the situation differently than you do.
2. If you determine they *are* acting irrationally, don't confront them. Stick to acting rationally yourself. Take them seriously and try to trace their reasoning to its roots, not to show them they are wrong, but to try to understand it yourself. As you do so, without being patronizing, you may uncover a gap in logic or a factual misperception, which they will then recognize which may lead them to modify their position themselves.
3. If they are acting really irrationally and you are concerned for your safety, get the heck out of there!

### If you can't come to an agreement, what then?

Break down the dispute into pieces, and then at least pinpoint where you do agree and where you disagree.

Try to get them, or agree yourself, to consider some alternative for a period of time and then come back to evaluate it.

Forget the concept of "Who won?"

It isn't easy to change habits in order to work out a solution to a shared problem. If you manage to do that, and to improve your relationship at the same time, you have *both* won.

### Where can you get help with conflict resolution?

From the most expensive to least:

- Attorneys;
- Arbitrators;
- Mediators;

- Facilitators;
- Conflict coaches;
- Conflict resolution training; or
- Reading. Much of the basis for this article comes from my experience using concepts in the book by William Ury and Roger Fisher, "Getting to Yes—Negotiating Agreement without Giving In".

I have proposed some different ways to think about things you won't be able to change to overnight, but if you keep working, over time you will find you can use them.

### Tips for Collaborators:

- Come to the process having taken a moment to gather your thoughts and bring out your best heart.
- Acknowledge conflict as potentially positive, growth producing.
- Be aware of what your buttons are.
- Recognize when you are feeling defensive.
- Avoid going into lecture mode.
- Look for the ally in your adversary.
- Don't exaggerate or stretch the truth.
- Don't interrupt.
- Don't raise your voice.
- Don't take yourself too seriously.
- Be alert to a need to maintain power.
- Listen.
- Focus on what the other person is saying instead of planning your response.
- Ask for clarification.
- Really strive to understand fully.

To sum it up, let's start looking at things not as black or white—my side versus your side. And let's not even be satisfied with compromise—gray. Let's get creative. Let's reach out for something as exciting as purple, turquoise, or even chartreuse!

DARCA

# CURRENT ISSUES WITH CHANGES OF WATER RIGHTS INVOLVING SHARES OF MUTUAL DITCH COMPANIES

by Jeffrey J. Kahn, Mark D. Detsky and Matthew Machado, Esqs., Bernard, Lyons, Gaddis & Kahn, P.C.

On most of Colorado's streams, mutual irrigation companies hold the most senior water rights. This is a product of history. Settlement of the Colorado territory was first achieved through irrigation of its fertile soils. As more settlers arrived, towns and cities adjudicated water rights junior to those of irrigation ditches.

Today, growth continues and drought has become more common, causing municipalities to seek more reliable supplies of water. As a result, developing communities have acquired and transferred to municipal use senior irrigation water rights, often represented by shares in a mutual ditch company. Market history shows that municipal demand for mutual ditch company shares increases their value, especially when they are changed by a water court decree to allow municipal use.

The Colorado Supreme Court defined a mutual ditch company share as an individual water right that can be sold and changed to alternate points of diversion, uses and places of use.<sup>1</sup> A share represents a pro rata interest in the water rights of the mutual ditch company and a right to that portion diverted under the company's water rights. This legal characteristic gives mutual ditch company shares their inherent value. As shares are transferred from use under the ditch to municipal use, mutual ditch companies must be vigilant to protect all shareholders' rights and interests.

## When the City Shows up to Your Board Meeting

Once owning stock, municipal users enjoy the same rights as the original shareholders. When an entity seeks to change the place and type of use of its ditch company shares, most often to municipal use within the boundaries of their town or development, the ditch company has to rely to a large extent on its articles of incorporation, by-laws, and rules and regulations to protect its shareholders' interests.

A mutual ditch company has the right to amend its bylaws to include provisions requiring a shareholder to obtain prior approval before the use of company shares can be changed. The Catlin bylaws are named for the ditch company that

tested their validity before the state supreme court.<sup>2</sup>

In this internal process, the ditch company has the right to require terms and conditions to be placed into a change decree to prevent injury. To protect its shareholders before granting approval, the ditch company may require in its by-laws, administrative fees, including reimbursement for engineering and legal analysis of the prospective change.<sup>3d</sup> The rationale is that other shareholders should not be harmed because of the changes and should not have to bear the expense to maintain the status quo.

## What Happens in Water Court?

Among the issues in a change of use proceeding is the extent of the lands historically irrigated by the ditch company's water rights. Also at issue is the shareholders' ability to use water attributable to the changed shares when those shares are not in use by the new owner.

## Historical Use

In a change of water right proceeding in water court, the amount of water to be transferred to the new use is equal to the historical consumptive use of the mutual ditch company's water right.<sup>3</sup> In many cases, historical consumptive use credit can only be transferred for shares used on lands identified in or inferred from the original decree and pleadings from the original adjudication of the water rights.

*In re Water Rights of the Central Colorado Water Conservancy District*, 147 P.3d 9 (Colo. 2006) ("Jones Ditch decision"), the Colorado Supreme Court set forth several important rules concerning the change of mutual ditch company shares. The case involved a change of 77 Jones Ditch shares owned by the Central Colorado Water Conservancy District. The water court found that most of Central's shares were used on acreage that was not intended to be irrigated with the Jones Ditch water rights when adjudicated in the 1880s. As a result, the court affirmed the water court's decision to award no historical consumptive credit to Central's shares for this use on

<sup>2</sup> *Fort Lyon Canal Co. v. Catlin Canal Co.*, 642 P.2d 501 (Colo. 1982).

<sup>3</sup> See generally, *Pueblo West Metropolitan Dist. v. Southeastern Colorado Water Conservancy Dist.*, 717 P.2d 955, 958-959 (Colo. 1986).

<sup>1</sup> *Jacobucci v. District Court In and For Jefferson County*, 541 P.2d 667 (Colo. 1975)

expanded acreage.<sup>4</sup>

The objectors appealed the water court's award of 37 acre feet of consumptive use credit for Central's shares that had been used on lands within the original appropriation. The objectors argued that based on a ditch-wide analysis, Central had been awarded too much consumptive use credit in an earlier 1992 change case, where the water court had not considered the expanded use issue. The higher court agreed, and found that Central's 1992 transfer created an *overdraft* on the Jones Ditch water rights, which was deducted from the 37 acre feet transferred by Central in the current case.<sup>1d</sup> Because the overdraft exceeded 37 acre feet, Central ended up receiving zero consumptive use credit for all 77 shares, including the shares used on lands within the original appropriation.

Ultimately, Central's claim to transfer roughly 400 acre feet of consumptive use credit for the 77 additional shares of the Jones Ditch Company—Central owned 139 out of the 200 outstanding shares—yielded nothing. In determining whether Jones Ditch shares were used on expanded acreage, the water court relied heavily on the transcripts of the 1880s testimony, stored in the state archives, of Mr. Jones in which he identified the acreage he owned and would irrigate at the time with his ditch. The water court did so even though the lands' description was not included in the original Jones Ditch decree. Central argued that a parcel-by-parcel analysis was preferable to a ditch-wide analysis in a change case, but the supreme court rejected that approach.

As a result of the Jones Ditch decision, some level of ditch-wide analysis could be *required* to meet the applicant's burden of proof in a change of water rights, especially when expansion of the historically irrigated acreage is alleged.

If irrigated acreage under a ditch has been expanded after the original appropriation, the Jones decision raises serious issues as to how the consumptive use from the acreage should be divided among shareholders when transferred. The decision is not clear whether shares used on expanded acreage are entitled to a pro rata portion of the consumptive use of the original acreage determined by a ditch wide analysis, or not entitled to any consumptive use whatsoever. The answer will determine whether shares used on original acreage will share the burdens created by expanded use. Regardless, ditch companies should consider safeguards to prevent overdrafts, such as adopting Catlin bylaws. The bylaws allow these issues to be evaluated by the company at the applicant's expense before a water court proceeding begins.

### Use of Water Not Taken By a Shareholder

One of the hallmarks of a mutual company is the management and sharing of the water rights titled in the company. In mutual ditch companies, when a shareholder is not using water, instead of reducing diversions, other shareholders have the use of available water to the extent of their need. Mutual ditch companies should be vigilant to protect this sharing concept even when company shares are changed to a different use or moved out of the company's ditch.

In some recent water court change decrees, when the owner has no immediate need for the transferred water, the decree prevents the remaining shareholders from using it.

<sup>4</sup> *In re Water Rights of Central Colorado Water Conservancy Dist.* 147 P.3d 9 (Colo. 2006).

For example, in the Jones Ditch decree, Case No. 2000CW72, Water Division No. 1, Central, as a majority owner of the ditch, agreed to a river headgate limitation on its portion of the Jones Ditch water rights. Once Central reaches its monthly volumetric limitation, diversions at the headgate must be reduced by Central's pro rata share for the remainder of the month, year or five-year period. Central agreed to a provision to take full delivery of all water diverted under its shares at any time such water is being diverted at the headgate and none of such water shall be delivered to or used by other shareholders.

A similar provision was included in the decree for the Lower Logan Well Users change of water rights and plan for augmentation in Case No. 03CW195:

[A]ll subsequent use, including irrigation, of the changed shares shall be subject to the monthly, annual and long-term average (20-year) volumetric limits in this decree as shown in Table 8. . . . Any water that would otherwise be available to Applicant under its shares in the ditch companies which Applicant is not able to divert or use because of operation of maximum or average volumetric limits shall be returned immediately to the South Platte River through Applicant's augmentation stations following diversion at the applicable ditch headgate and shall not be available for irrigation, augmentation or any other use until such time as their use is again allowed in accordance with the maximum and average volumetric limits. (Emphasis added.)

In contrast, where the ditch company has been involved as a party to the case, the water court has upheld its right to divert the changed water and deliver to other shareholders. For example, in Case No. 01CW263, Central applied to change four of 640 shares in the Weldon Valley Ditch Company. Some in opposition requested a term and condition similar to those quoted above, but the ditch company and Central refused to include the requested language. The ditch company prevailed.

The water court ruled that it would not impose any limits on the use of the water represented by the four shares when Central was not taking delivery of the water. In part, the court relied on testimony confirming that historically the ditch company distributed any water not used by a shareholder to other shareholders, who had then used the water. The water court required Central to show in its accounting that return flows were accruing to the stream from the other shareholders' use of the four shares, but did not inhibit the other shareholders' use of the water.

This issue has yet to be considered by the Colorado Supreme Court. As a result, mutual ditch companies should be involved in, and aware of, the negotiated terms and conditions between a municipality or other new owner of its shares seeking to change their type and place of use. The ditch company should resist any attempt to limit the use of water associated with changed shares when that shareholder is not taking water deliveries. Such sharing is the hallmark

of most mutual companies, and should not be eliminated simply because one or more shareholders have transferred their share(s) to different uses or the point of diversion of the water right is changed.

### Conclusion

Mutual ditch companies should consider taking steps to avoid the potential adverse affects of transfers. If expanded acreage is a potential issue, the original decree and possibly other available evidence from the original proceeding need to be examined to determine whether the shares were used on lands initially included. Prior change decrees also should be examined for potential overdrafts. Catlin bylaws, properly adopted, strengthen the ditch company's position in a change case, by assessing the cost of the change and allowing greater control over the conditions of a transfer.

A ditch company involved from the process' start can participate in ditch-wide analyses at the applicant's cost and avoid subjecting shareholders to unfavorable terms and conditions. Ditch companies should resist any attempt by objectors in a change of water right application to alter the fundamental mutual ditch company concept. That is, when one shareholder is not using its pro rata share of the company's water right, the water should remain available to the other shareholders up to the amount of their need. 

*Following are an example set of Catlin style bylaw provisions.*

### Catlin bylaws

#### Change of Water Rights

A. Any Shareholder ("Applicant") desiring a change of water right, including, but not limited to, a change in point of diversion or place of use of any water that the Applicant is entitled to receive as a result of stock ownership must first make a written application to the Directors of the Company. A change of water right shall include the use of water the Shareholder is entitled to as a result of stock ownership as augmentation water in a plan for augmentation or exchange. A change of water right specifically includes a change of water right requested in an application submitted to District Court, Water Division No. 1 ("Water Court") pursuant to Colo. Rev. Stat. §§ 37-92-101 to -603 or in an application for a substitute water supply plan submitted to the Colorado State Engineer ("State Engineer").

B. The written change application should detail the requested change and include adequate terms and conditions to prevent injury to the Company and its Shareholders. If, in a reasonable opinion of the Directors, such change may be approved without injury to the Company and all of its Shareholders, then the Directors shall approve the change application subject to necessary terms and conditions. In evaluating whether the requested change of water right can be made without injury to the Company and its Shareholders, the Company may obtain an engineering and legal analysis of the requested change by the Applicant and the terms and conditions offered by the Applicant. The Company

shall evaluate the application for change of water right with diligence and reach a decision within a reasonable amount of time.

C. No application for approval of a change of water right may be made to the Water Court or of a substitute water supply plan may be made to the State Engineer, unless the same has been approved by the Company. If an application has been approved by the Company, the Applicant must include terms and conditions at least as stringent as those approved by the Company in an application to the Water Court or the State Engineer.

D. An Applicant for a change of water right or for a substitute water supply plan must reimburse the Company for the Company's reasonable costs and fees in analyzing the application for change of water right to the Company, participation in any water court litigation, and participation in any substitute water supply plan approval process. Prior to obtaining legal and engineering analyses of the proposed change, the Company shall obtain an estimate of the costs. The Company shall obtain said estimates of cost within thirty (30) days of submission of an application and the Applicant shall have thirty (30) days after receipt of the estimate from the Company to make the deposit. The Company shall not take final action on any application until, and unless, the Applicant makes said deposit. In no event shall the Company be required to finally approve or disapprove the application until all fees incurred by the Company shall be reimbursed.

E. In addition to the fees and costs described in Article \_\_\_\_\_, section \_\_\_\_\_, the Applicant shall pay for the following: a fee for the Superintendent's administration of the change; the cost of measuring devices, additional or new headgates, division boxes, flumes and outlet structures to administer the change; and fees for storage and carriage to compensate Shareholders and the Company for seepage, shrinkage, evaporation, return flows, and additional maintenance.

F Each certificate of stock hereinafter transferred shall contain the following endorsements, to-wit:

Plans of augmentation, exchanges and any changes of the water rights appertaining to these shares are subject to the review of the Board of Directors as provided in the bylaws of the Company.

# USING WATER MARKETS TO PRESERVE RURAL ECONOMIES IN COLORADO: A BRIEF LOOK AT ALTERNATIVES TO BUY-AND-DRY CONTRACTS

by Troy Lepper, Sociology Water Lab, Department of Sociology, CSU

For more than 100 years, mutual irrigation companies organized around cooperative agreements between individual water users manifested in the form of common property resource organizations, and these organizations successfully deliver water to shareholders through ditches and canals for direct application of water to fields or storage of that water in a reservoir for future use. These organizations serve as the foundations of rural agricultural economies throughout the irrigated west, but during the last 30 years, rural agricultural economies witnessed the decline of some of these long-enduring water user organizations and those rural economies and lifestyles that depend on them.

The decline of some mutual irrigation companies is the result of the breakdown of cooperative agreements between individual water users and mutual irrigation companies. For example, the water markets in the Arkansas River basin are dominated by buy-and-dry water transfers brokered between individual shareholders on a particular ditch and municipalities along the Front Range of the Rocky Mountains. As a result the mutual irrigation companies' ability to control their water portfolios has diminished. These buy-and-dry contracts focused the market on permanent transfers between individuals and cities versus temporary transfers between mutual irrigation companies and the cities. This in turn created an environment characterized by uncontrolled, individual rationality in the form of permanent transfers of their water rights to metropolitan water districts along the Front Range. These transfers were rational and beneficial to the individuals, but their result created a collective disaster for the rural communities relying on that water.

So what types of alternatives to buy-and-dry contracts do water users have at their disposal that would satisfy interests on both the supply and demand side of the equation? "There were three forms of transfer that appear to meet known needs with existing agricultural loan authorities as well as the existing substitute water supply program authorities and they are long-term rotational crop management contracts, long-term interruptible supply contracts and water banking" (Weiner and Yates 2007). These three alternatives to buy-and-dry water transfers represent options that mutual irrigation companies could use to reintroduce economic stability

into their organizations, but there are other options as well. One option is to create a new mission for the mutual irrigation companies using groundwater augmentation plans in conjunction with well pumping to create local water markets with built in flexibility in regards to types of use and points of diversion, as was the case with the Lower Arkansas Water Management Association.

Long-term rotational crop management programs are one alternative to buy-and-dry contracts. These long-term leases allow farmers in the mutual irrigation company to continue farming while fallowing the percentage of their land that would traditionally be irrigated by the water being leased. Mutual irrigation companies could pool the water from interested members on the ditch participating in the land fallowing/leasing program and lease it at a higher value to metropolitan areas or other interested water users while still retaining the ownership of the right.

Long-term interruptible supply contracts are another tool for mutual irrigation companies especially during times of drought. Long-term interruptible supply contracts offered farmers the option of making agreements with cities in order to give up their water during times of drought and take all or a percentage of their fields out of production, while the cities paid a mutually agreed upon amount of money to those farmers for the use of their water.

Water banking is a third option. Water banking has taken many forms throughout the western part of the United States, and each successful water bank has adapted to the local water market conditions, both geographically and organizationally. Mutual irrigation companies can build water banking into their water management portfolio or engage in agreements with an organization designed to administer "spot market" water leases moving water around the landscape quickly and with limited legal, engineering and administrative costs.

All of these alternatives have their costs and benefits, but one common benefit they all offer is for individual farmers to retain ownership of their water rights thus successfully avoiding the need to enter into buy-and-dry contracts that ultimately transfer that water to metropolitan areas along the Front Range.

Groundwater management is another option for mutual

irrigation companies to consider when facing the changing landscape of water management in the 21st century. In the lower Arkansas River Basin, there are a variety of groundwater users associations. The Arkansas Groundwater Users Association (AGUA) has approximately 400 member wells, while the Colorado Water Protection and Development Association (CWPDA) has approximately 800 member wells. Finally, the Lower Arkansas Water Management Association (LAWMA) has 650 member wells. All of these groundwater users associations are organized along the lines of traditional mutual irrigation companies that have been active in the valley for more than 100 years. They are non-profit entities that are comprised of members who bought shares in the organization to finance the enterprise. Shareholders then receive the benefit of water deliveries to make whole the river flows depleted by their out-of-priority wells. These groundwater organizations elect their board of directors from the pool of share holders in the enterprise. Shareholders generally have one vote per share of stock in the company, so those who own more in the company have more influence over who was elected to the board of directors (Wilkins-Wells and Lepper 2006).

One common weakness for mutual irrigation companies in the 21st century is they are finding it harder to defend their water resources against metropolitan districts with deep pockets and large legal teams. One possible solution is being explored by the Lower Arkansas Valley Water Conservancy District and is referred to as the Super Ditch. The Super Ditch concept focuses on convincing seven mutual irrigation companies to pool their water resources with the expressed intent to lease that water on a long-term basis in conjunction with a land fallowing program. The Super Ditch could empower these organizations to negotiate long-term deals with the big cities while retaining the water in the mutual irrigation company's portfolio. One of the more difficult tasks for any organization attempting ditch consolidation will be getting the

individual ditch companies to trust each other. Trust is more easily established than one might think. Shareholders in individual mutual irrigation companies need only think back to their grandfathers who trusted their neighbors enough to create cooperative agreements to dig ditches which allowed them to create farming operations that provided for their families and are still in operation today.

If new water markets are going to be successfully formed in the Arkansas River basin, then the need for more flexibility in those markets is imperative to their formation. Markets do not exist in vacuums, and a new market must be flexible enough to deal with the needs of the areas it was created to serve. Buy-and-dry contracts designed to permanently move water from the mutual irrigation companies owning those rights, to the cities desiring those rights, were weakening the long-standing cooperative agreements upon which mutual irrigation companies were founded. Problems related to buy-and-dry contracts were especially problematic for rural communities located in the lower Arkansas River basin. 

## References

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# DECISION & RISK ANALYSIS FOR DITCH AND RESERVOIR COMPANIES

by John D. McKenzie, Innovastat Corporation

Irrigators normally make planting decisions based on what they believe might happen. The factors that influence their decisions include expectations of prices, production potential and marketing constraints, as well as water availability. Regional water supply forecasting techniques benefit producers, and experience shows site-specific analysis may be better. Future risk management research should focus on providing more site-specific information.

Water providers often translate availability estimates into quotas for management purposes. Depending on traditions, quotas also are known as water duties, rights, shares, allotments or canal runs. Landowners usually combine the allotment information with soil moisture conditions, recent experiences and commodity market data to determine crop choices and acreage to be planted each year.

Agricultural water supply organizations typically combine information on their water storage, watershed snowpack, and anticipated stream flows to declare a quota of water for irrigators. Frequently it is not clear how these quotas are derived or how accurate they are. Especially for smaller ditch companies, quotas often appear to be ad hoc, especially when organizations rely on older runs of the river system and are not under federal water projects.

Districts and canal companies with storage water can estimate quotas in a reasonably accurate fashion, but entities that rely primarily on snowpack—referred to as direct flow or river water—often are unable to dependably forecast supplies. Decisions about what can be planted must include improved estimates of quotas for the irrigation season.

The irrigation runs or deliveries forecast during the growing season affect the landowners' decisions in terms of crops planted, acreage planted, expected yield and the documentation of these decisions for federal crop insurance.

For instance, quota setting is often just a decision made by the water supply organization's board of directors, in consultation with the manager or superintendent of the organization, as well as input from long-time ditch riders familiar with the canal and its hydrologic characteristics. The same may be said of the process of estimating the water supply from river diversions and how this supply may change over the irrigation season. Then, board consensus information is communicated to irrigators to make planting decisions.

Ditch company and irrigation district boards tend to set sea-

sonal water supply estimates on the conservative, or low, side. They increase estimates as spring and summer temperatures and rainfall affect soil moisture, available storage and the flow rate of river decrees. This ensures the organization can deliver what it promises to irrigators. A quota that is too liberal, or high, can lead to unfilled expectations for irrigators and political problems for the organization and its board.

On the other hand, an estimate that's too conservative can lead farmers and ranchers to make poor economic decisions about crop choices and how much acreage to put into production.

If forecasting improvements are made, irrigators can explore an optimal portfolio of crops, reduce risk in the extent of plantings, determine more appropriate on-farm irrigation scheduling and even consider land fallow-water leasing options if they are available. Ranchers can determine more accurately the carrying capacities of their range land. Other decisions, such as forward contracting, hedging and the need for crop insurance, can be evaluated with more skill.

Reliable predictions are essential for farmers and ranchers and are more valuable the earlier they are made. Regional water supply forecasting by federal or state agencies help, but local watershed forecasting is crucial. Hydrology is often governed by factors that regional forecasting cannot properly assemble and analyze, including local soil moisture conditions in an irrigation district or canal company service area, groundwater conditions, return flow in other river reaches, traditional area storm patterns and variable snowfield conditions in a watershed. All are factors that perplex and challenge water boards when they set seasonal water supply estimates.

Water purveyors in emerging water marketing institutions also are developing options for landowners. The possibilities include forbearance contracts, water banking, informal exchanges, leasing of water and super ditches. Ideally, decisions are made jointly by landowners as part of a democratically governed irrigation district or canal company, since the water supply is a common property resource. In the future, emerging water marketing institutions will become a larger part of landowners' decisions about the most efficient way to generate income from their land and water portfolios. Such decisions are more likely to be based on an organization's abilities to forecast local conditions.

Statistical modeling for a water supply organization or a

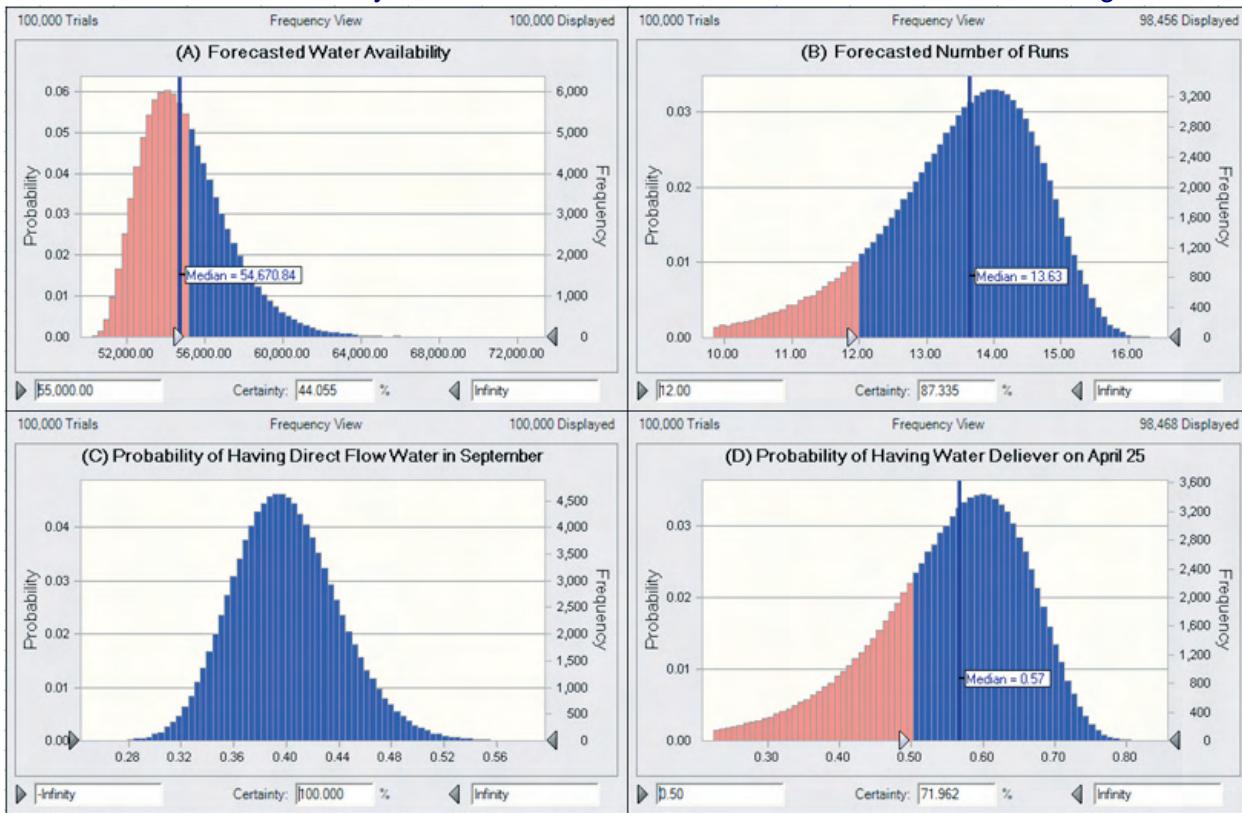


Figure 1: Illustrations of output

local river basin watershed can be approached in different ways. One conventional analysis focuses on determining an average supply for many water supply organizations or a local river basin. This approach has some limitations. First, data that represents an aggregation or average may be less accurate. An average is a measure of the central tendency—a summary—that is supposed to represent where most of the data is situated.

A parameter such as an average, common in hydrologic models for river reaches or watersheds, may not explain the data accurately due to outliers and the non-normal distribution of water flow data. An aggregate method lacks the ability to examine each water supply system individually and to capture its uniqueness.

Trying to back into a micro-view from an aggregate model through some method of interpolation – for example when analyzing supplies for a number of water organizations in a watershed or reach of a river—tends to have inherent prediction problems. To circumvent the limitations, it may be sensible to take other approaches. Model the water availability of each canal company in a river reach. Modeling tailored for each canal company should produce a more accurate reflection of reality. But it will still maintain the ability to increase the scope of a predictive model as needed, by pooling some or all of the water supply organizations into an overall meta-type model.

Many techniques, called regression techniques, are available. They are used to derive a functional form based on a combination of variables. Ditch and reservoir companies in Colorado clearly have different forecasting needs. The needs can be referred to as dependent variables in the modeling procedure. They may include total available water estimates during the irrigation season, the number of runs a water pro-

vider can make, and how much project water will be available on a certain date.

Independent, or explanatory, variables affect the dependent variables. They may include snowpack, precipitation, streamflows, temperature, soil moisture, wind, dust and the priority system. The regression routine identifies and reduces into an equation predictor variables that affect individual forecasts. Some current models are basic and inadequate; they simply determine a Pearson correlation coefficient between snow water equivalent and diverted water.

Many regression techniques have been developed and are continually being refined and expanded. The optimal parameter values usually are determined through an optimization routine produced by an econometric software package based on linear or matrix algebra. The advantage is that optimization under uncertainty, or stochastic optimization, can be carried out and can incorporate dependent and independent variables.

From the simulation output, a risk management tool can forecast water availability as a probability distribution. In essence, the likelihood is predicted with a statistical spread. True risk analysis must deal with spreads of possible outcomes. Contrast this method to simple approaches that derive confidence intervals from correlation coefficients through formulas based on the assumption of normality of the data. The data may not exhibit classic bell shaped curve characteristics.

Using this information, landowners in the organization are able to decide based on how much risk they are personally willing to undertake. Using distributions and confidence intervals, especially ones not based on the normality assumption, liberates water managers and farmers/shareholders to make decisions that better conform to their individual economic standing, risk preference, and goals.

Important characteristics of a risk tool need to be emphasized. The modeling efforts involve sophisticated regression and actuarial approaches involving many inputs and statistical considerations. The output is efficient, understandable and compact, and can be used in an applied setting.

For example, suppose that the available water for a particular ditch company's growing season is forecast—using the risk management tool—in the early spring. This is shown in Figure 1(A) as a probability distribution portraying all the possible outcomes of potential water available. This statistical forecast would replace a consensus decision by a board of directors. From this information, the water supply company or individual landowner can chart a course of action based up individual risk preferences. For instance, if 55,000 acre feet of water is needed to satisfy all of the ditch company shareholders, the probability distribution in Figure 1(A) shows that there is only a 44 percent probability of reaching or exceeding that amount of water. Information like this can be used in conjunction with a board's consensus.

Again, for illustration purposes, suppose the number of runs is forecast using stochastic optimization and simulation, as shown in Figure 1(B). A farmer served by this water sup-

ply system historically needed 12 runs, or canal deliveries, to adequately irrigate his farm. From the probability distribution, the landowner is 87.34 percent certain a delivery of 12 or more runs will be available. Based on the median of the distribution, there is an even chance of more or less than 13.63 runs.

The forecast is crucial for planning decisions, and so is the timing of deliveries. Crops may require irrigation early or late to start or finish. Figure 1(C) shows the probability of a ditch company receiving direct flow water in September. Figure 1(D) shows the probability of having water delivered on April 25, perhaps a critical time for an application of water for onions.

The best consumers of water supply risk analysis tools will be local water supply organizations. This is an important point. Landowners expect their water supply organizations to be equipped to manage water flows through modern telemetry, re-regulating reservoirs, and recordkeeping for demand-type water delivery systems, as well to adequately forecast supplies over a season and during various critical periods. This is an added water management capability often omitted from canal and irrigation modernization, and should be brought to more central importance.  DARCA

# A GUIDE TO WEATHER AND CLIMATE INFORMATION

by John Wiener, Ph.D., Institute of Behavioral Science, CU

Avoiding the threats of weather and climate is essential for farmers.

Climate variability and change are just two of many factors Western agriculture faces. Also among the challenges: foreign and domestic competition, land use and water competition from urban and sprawl growth, and changing incentives and policies.

As growers explore more efficient irrigation—using scheduling tools such as Colorado State Co-Operative Extension's Crop-flex tool—and take an increasing interest in new crop rotations, crop choices, and cultivars, their success depends on being able to respond to the situation.

The sources listed may help make the best use of new tools and techniques, and play their traditional role in affecting futures and commodities markets.

## Background and Print Sources

Public libraries usually have arrangements to get materials from other libraries, and librarians can help with making requests. Local newspapers also are sources, especially in the case of extreme events. The *Rocky Mountain News*, *Denver Post* and others archives are available online.

Textbooks often are not kept in library collections because of limited space and the belief that they are soon obsolete. For general background, used books can frequently be found at very low prices in shops near universities. One excellent Internet source: [www.abebooks.com](http://www.abebooks.com), Advanced Book Exchange represents more than 13,500 independent booksellers. "Weather and Climate" from USA booksellers turned up 1,906 items, such as a meteorology, or weather science, a textbook from 1994 for \$1 plus \$4 shipping, and a Time/Life book on weather and climate for general explanation, from 1992, for \$1 plus \$3.50. For quick, simply presented information, look for books for younger readers.

## Agriculture and Irrigation Information on Internet

Start with USDA portal: <http://www.usda.gov/wps/portal/usdahome>.

From there, a huge variety of agricultural information is accessible. One of the most important sources is the Economic Research Service, which has briefing rooms and well-designed levels of information. You can update quickly, or see more resources and lists of recommended sources, as

well as those posted by USDA. The state's Co-Operative Extension Services, [www.ext.colostate.edu/](http://www.ext.colostate.edu/) also provides extensive materials.

Irrigators can choose *agriculture* from the tabs at the top, then *water* in the topics on the left to see irrigation scheduling tools. Then, choose *fact sheets* and on that page, which is:

<http://www.ext.colostate.edu/menuwater.html>

Choose from several items on irrigation scheduling, including basic tool use.

CropFlex, an irrigation scheduling program, can be downloaded. See:

<http://ccc.atmos.colostate.edu/~crop/>

Also available are KanSched from Kansas State University, which will appear with a search, and Water Optimizer for Western Nebraska. Both are worth a look, but be careful with the inputs already supplied or defaulted, as with all such programs.

Water Optimizer is especially designed for juggling allocation with different crops, but it was designed for the Republican River basin.

<http://real.unl.edu/h20/>

Colorado Agricultural Meteorology, CoAgMet, is an exceptional source with first-rate technical information, such as ET for crops and CoAgMet stations. The site explains how to use the information and provides station map locations.

<http://ccc.atmos.colostate.edu/%7Ecoagmet/>

CoCoRAHS' mission to increase data collection, and the Web site is informative, too:

<http://www.cocorahs.org/>

The Community Collaborative Rain, Hail and Snow Study was begun at Colorado State, by meteorology researcher and Assistant State Climatologist Nolan Doesken. A network of volunteers measures and maps local precipitation. It's been expanded to other states and the network hopes to have 20,000 observers nationwide by 2010.

Choosing Colorado Climate Center <http://ccc.atmos.colostate.edu/> brings up a short description; *data access* brings up state, national and other long-term climate information.

## Agricultural Weather and Crop Progress

Starting with the USDA portal, <http://www.usda.gov/wps/portal/usdahome>, you can also choose *I want to...: Find weather and climate conditions*. Click on that to go to:

<http://www.usda.gov/oce/weather/>,

You can choose U.S. Agricultural Weather Highlights, or Weekly Weather and Crop Bulletin (see below), or Major World Crop Areas and Climatic Profiles for international information. Agricultural Weather Highlights is a daily report with a satellite image.

Starting with <http://www.usda.gov/nass/pubs/staterpt.htm> click on any state, or select national reports. Subscribe to e-mailed reports from this page, for states or national synthesis, the Weekly Weather and Crop Bulletin and State Stories. Here is Colorado for May 1, 2007:

**COLORADO:** Days suitable for fieldwork 4.4. Topsoil moisture very short, 4% short, 74% adequate, 22% surplus. Subsoil very short, 18% short, 72% adequate, 6% surplus. Spring seeded, 72% 2006, 74% avg.; 41% emerged, 26% 2006, condition 2% very poor, 6% poor, 30% fair, 39% good, 23% dry. Dry onions 91% planted, 81% 2006, 80% avg. Sugarbeets planted, 47% 2006, 57% avg.; 4% up to stand, 0% 2006, 1. Summer potatoes 33% planted, 33% 2006, 38% avg. Spring seeded, 59% 2006, 57% avg.; 22% emerged, 16% 2 avg.; condition 3% poor, 35% fair, 44% good, 18% excellent. Calved 87% 2007, 87% 2006, 84% avg. Ewes lambed 86% 2006, 88% avg. Precipitation was received across the State with the largest amount being reported along the Front Range. Eastern counties experienced some hail which had minimal impact on the crops.

The terms and definitions from this page are helpful, and one can also access *Usual Planting and Harvest Dates* which provides that information by state as well as maps of crop production. It is from 1997, so there may be some changes for drought areas.

### Weather and Climate Data

The National Climatic Data Center is the keystone source for a great deal of data, and offers news and some other materials as well.

[www.ncdc.noaa.gov/](http://www.ncdc.noaa.gov/)

Regionally, the best source for easy access is the Western Regional Climate Center: [www.wrcc.dri.edu](http://www.wrcc.dri.edu)

The High Plains Regional Climate Center covers Colorado, along with Nebraska, Kansas, Wyoming and the Dakotas.

[www.hprcc.unl.edu/](http://www.hprcc.unl.edu/)

On the Western Regional Climate Center, choose *Historical Climate Information* and then *Western U.S. historical summaries*. Choose a state and then a weather station by name or from the map. On the left side, pick daily temp and precip for 1970-2000 for a graph of maximum, average, minimum temperatures through the year, and average precipitation, for quick climate sense. Of course, a great deal more is accessible here.

For the weather forecast, start with the National Weather Service: [www.nws.noaa.gov/](http://www.nws.noaa.gov/).

Enter a city and state or zip code and get a detailed forecast with warnings, and access to satellite and radar images. Choosing climate from the tabs at the top leads to a variety of summaries. If you have a slow Internet connection, on the left side of the NWS homepage, choose *text messages*, and then choose your state, for hourly, state and zone forecasts, and a variety of other information. You can also bookmark the zone forecast: <http://www.weather.gov/view/prodsByState.php?state=CO&prodtype=zone> to avoid waiting for graphics

to come up and go straight to the zone forecast in text.

Similarly, you might bookmark the forecast discussion because you might enjoy the comments forecasting officers make:

<http://www.nws.noaa.gov/view/prodsByState.php?state=CO&prodtype=discussion>

There are also text versions of the watches and warnings and special statements:

<http://www.nws.noaa.gov/view/prodsByState.php?state=CO&prodtype=special>

<http://www.nws.noaa.gov/view/prodsByState.php?state=CO&prodtype=warnings>

The National Weather Service has an experimental product. Changes may be made or problems discovered after the date of this writing. But, if it continues and is proven sufficiently accurate, it offers several features for farming and ditch interests. Click on current day, 7-day, 14-day, 30-day, and 60-day totals, for observed precipitation, normal precipitation, departure from normal precipitation, and percent of normal precipitation. You can see the rest of the U.S. and your competitors' situations.

Looking for sources? Other useful information? Use this link: [http://www.srh.noaa.gov/rfcshare/precip\\_analysis\\_new.php](http://www.srh.noaa.gov/rfcshare/precip_analysis_new.php)

### Climate Forecasts

The basic source is:

[www.cpc.noaa.gov/](http://www.cpc.noaa.gov/)

Please read about the forecasts carefully. They are not instantly understandable, though a lot of people instantly misunderstand them.

The educational materials and climate glossary are helpful. Both are listed under OUTREACH on the left side.

The best place to start is with the left-side menu. Choose *products* under *outlooks*, which go out as far as 13 months. Be careful. These are the ones many people scorn, partly because they don't bother to learn about what is actually said, and – the most important single point, perhaps – that these are based on the strength of conditions which may or may not be observed. There may be only a weak basis or none at all for a forecast, in which case there is an equal chance to be above or below normal. And, the ability to forecast even with moderate or strong signals is limited by how complicated and fluid the climate system is.

You may want to look at the whole suite of outlooks, which are forecasts on the near-term end, and learn about each one before you bet the ranch. When there is a strong basis for an outlook, it is good to know that. This can take a while, but there are also strengths and weaknesses for each period, not just the farthest away. Beware of sources that do not thoroughly review all the information needed to understand the product.

Regional National Oceanic and Atmospheric Administration and university collaborations provide interpretations of some outlooks and forecasts. For Colorado, see:

[www.colorado.edu/](http://www.colorado.edu/)

Choose *products* in the top tabs to get to topics such as NOAA Climate Services, which has a sub-menu itself. Intermountain West Climate Summary, written for everyone, has

updated reports and different reporting in each issue.

For the Southwest, the regional project is CLIMAS, which has included leading research on user-friendliness in climate information, choose *research and products*, then forecast evaluation. These Web sites are extensive.

[www.ispe.arizona.edu/climas/](http://www.ispe.arizona.edu/climas/)

### **Drought Monitor**

This is a successful tool to observe drought in North America, going backwards. It includes the seasonal drought outlook, the streamflow forecast and PDSI forecast. The information is changing as the science improves.

<http://www.drought.unl.edu/dm/monitor.html>

Even though the explanation is clear, spend some time to get the picture.

### **Climate Change**

This has been made a political issue, but the science was available nevertheless. The basic sources used to include the U.S. National Assessment, with a regional report on the Central Great Plains, and one on the Rocky Mountain/Great Basin Region, as well as a syntheses of the agricultural and water sectors. As of this writing, some material has become unavailable.

<http://www.usgcrp.gov/usgcrp/nacc/default.htm>

The agriculture sector report is a big pdf. file at:

<http://www.usgcrp.gov/usgcrp/Library/nationalassessment/Agriculture.pdf>

The water sector report is also a sizable file at:

<http://www.usgcrp.gov/usgcrp/nacc/water/default.htm>

Outside the U.S., the basic source is the Intergovernmental Panel on Climate Change: [www.ipcc.ch/](http://www.ipcc.ch/)

Media accounts frequently give no indication of the numbers of scientists, the amount of materials reviewed and critiqued, evaluated and synthesized, and the extent to which the scientific issues are far less foggy and disputed than some would have the public believe.

One Web site won an award from *Scientific American*. It discusses claims using scientific information: [www.realclimate.org](http://www.realclimate.org).

A browser search will turn up heaps of material which may be hard to evaluate, or it may even just be junk.

### **Private Sources**

Several commercial sources evaluate the weather and climate information by comparing it to the NOAA sources. Be especially alert for the way the information is explained, and how well the uncertainties are described. It is common in mass media to treat 97 percent yes, 3 percent no as similar in uncertainty to 3 percent yes, 97 percent no. The scientific information will have clear description of how firm or certain the forecasts or reports are. 

*Acknowledgement: Thanks for help and suggestions from Jeanne Schneider, USDA ARS.*

## Selecting a Consulting Engineer

Kirk Russell, Colorado Water Conservation Board

Ditch and reservoir companies often need the services of a professional engineer when improvements are needed. Large private and publicly owned water suppliers typically have an engineer on staff or under contract while smaller water suppliers must hire engineers as the need arises.

Ditch and reservoir companies may have limited experience in hiring an engineer and may need help deciding what questions to ask and what criteria to use in selecting an engineer, particularly if a specific process must be followed to be eligible for grants or loans. This information will help ditch and reservoir companies in such situations.

### ***Why would I need to hire an engineer?***

An engineer may perform the following services regarding the planning, design, and construction of water projects:

- Identifying source, storage, or distribution problems and analyzing alternate solutions to these problems.
- Assuring that the design will function properly and be efficient and economical.
- Preparing detailed construction documents to implement the selected solution to the problems.
- Helping the owner solicit and evaluate bids from contractors to perform the work.
- Inspecting and testing the quality of a contractor's work and making necessary reports and recommendations.
- Completing certification documents to the extent that the engineer has direct knowledge of the as-built facilities.

### ***What kind of engineer is needed?***

There are many categories of engineering specialties; however, the most commonly employed by ditch and reservoir company is a civil engineer. The engineer selected must be a Professional Engineer (P.E.) licensed by the state of Colorado and should have experience with water supply systems. It is not legal for engineers or land surveyors to undertake assignments for which they are not qualified.

### ***What is a Professional Engineer (P.E.)?***

A Professional Engineer is a person who has specialized college education and engineering experience, who has been examined and is currently licensed by the state of Colorado.

## ***Why should a ditch and reservoir company hire a P.E.?***

- There are numerous technical details involved in designing and rehabilitating a water supply system that require the expertise, knowledge, and experience of a trained professional engineer.
- State regulations require that certain documents relating to water supply systems, including dams, be prepared by a P.E. licensed in the state of Colorado. These include design plans, reports, and construction related documents.

## ***How does a ditch and reservoir company find an engineer with expertise in water projects?***

There are several ways of finding engineers who may be interested in, and be capable of, providing the needed services.

- Contact other water suppliers to determine which engineers have provided them with satisfactory service.
- Get an engineering firm list from the Colorado Water Conservation Board (CWCB). While CWCB can't recommend a specific engineer, they may have a list of those who have made submittals to the agency in the past.
- Contact the American Council of Engineering Companies of Colorado (ACEC) or other industry support agencies for a list of reputable local firms that may fit your area of need.

## ***What criteria should be considered in selecting an engineer?***

The primary considerations in selecting an engineer are **relevant experience** in the types of services needed and **demonstrated ability to serve in a timely and effective manner**. The basic criteria to use in the selection process include:

- **Knowledge** — The engineer should have specialized education or training in the specific aspect of water supply planning and/or engineering design.
- **Experience** — The engineer should have professional engineering experience with similar water projects.
- **Ability to Serve** — The engineer should demonstrate that sufficient uncommitted time and other resources are available to perform the services within the project schedule.
- **Communication** — The engineer should demonstrate the ability to communicate in a thorough and timely manner as needed to keep the owner fully informed.
- **References** — The engineer should provide three or more references from previous clients for whom similar engineering services have been performed. These references should include a contact person; information on the type of project; year the project was undertaken; total actual versus estimated cost of the project; and the name of the engineer in charge of the project should be provided.

If an engineering firm is hired, these criteria should apply not only to the firm, but also to the specific engineer or team of engineers who will actually be doing the work. Many large engineering firms have people who meet all these criteria, but they will not actually be working on all of their clients' projects.

### ***What procedures should be used to select an engineer?***

- Contact at least three engineers, briefly discuss what engineering work is needed, and find out if they are interested. If a grant or loan is involved, a more formal process may be required. Check with the funding agency.
- Interview three or more of the engineers expressing an interest, based upon the selection criteria previously outlined.
- Contact their references and ask how the engineer performed the assignment. If possible, visit the reference's projects.
- Rank the engineers in order of preference.
- Ask the first-ranked engineer to submit a written proposal. The proposal should include such details as what work will be accomplished, how the work will be done, how much time it will take, what fees will be charged, and what payment method will be acceptable.
- Meet with the engineer, if necessary, to discuss any items not fully addressed in the proposal.
- If the proposal is acceptable, proceed to the contract stage. Generally the engineer will provide the contract, including a mutually acceptable scope of work. Example contracts are available from CWCB. Have the contract reviewed thoroughly by your attorney.
- If the terms and conditions of a contract are mutually acceptable, let the other engineers who were interviewed know of the selection.
- If contract terms cannot be mutually agreed upon, end negotiations with the engineer and begin to negotiate with the second ranked engineer.
- If a grant or loan is involved, have the funding agency review the contract before signing it.

### ***What services should the engineer perform?***

There is no standard package of services that engineers perform. The services are tailored to the specific needs of each water project. However, there are generally three phases of a design and construction project that the engineer is involved in: planning and preliminary design, final design, and construction.

- **Planning and Preliminary Design Phase** - Involves studying the problem, determining alternate solutions, outlining the basic concept, making preliminary cost

estimates, and establishing project feasibility. The water project should not move forward with a preconceived idea of what is needed. The engineer should not be expected to just give a “seal of approval,” but should actually perform an analysis of alternatives.

- **Final Design Phase** - Includes design, field work, preparation of construction documents and a cost estimate, as well as submittal to, and obtaining approval of, all required agencies. The engineer may assist in preparing a grant or a loan application for the construction of the project. If a grant or loan is helping to pay for the project, additional requirements will need to be included in the bidding documents the engineer prepares. The engineer should be familiar with the requirements, or may need to consult with the funding agency.
- **Construction Phase** - May involve construction staking, managing the hiring of a contractor, surveillance and inspection of the contractor’s work during construction, review of contractor’s progress payment requests, and other matters required to assist and oversee the construction phase. Preparation and submittal of as-built drawings is also typically included in this phase.

### ***How are the costs of engineering services determined?***

Engineering fees may be based on actual personnel hourly rates/costs times a factor, a lump sum, or percentage of project costs. Whatever financial arrangements are made, the specifics of services to be performed and how they are to be reimbursed should be fully agreed upon before a contract is signed. Details that commonly need to be worked out include:

- Will travel time be an additional charge and, if so, at what rate?
- Will the fee include all consultations, or will each meeting above a set number be an additional charge?
- How will the owner be charged if the contract requires changes or additions to the engineer’s submittal?
- Will a particular pay option provide incentives for the engineer to save money for the owner?

## **Corporate Basics for Ditch and Reservoir Companies**

**By: Jason V. Turner, Esq.**  
*Colorado River Water Conservation District*

### **I. THE HISTORY AND ADVENT OF DITCH & RESERVOIR COMPANIES**

#### **A. Cultivating the Arid West**

Cultivating the western landscape required an enormous effort in both capital and labor.

In Colorado it was, and still is, necessary to move large quantities of water from where it originates to the areas where it can be most beneficially used. The ability to appropriate water and to move that water to the place of beneficial use regardless of location was recognized very early on in Colorado. The Supreme Court in *Coffin v. Left Hand Ditch Co.* 6 Colo. 443 (Colo. 1882) held: “In the absence of legislation to the contrary, we think that the right to water acquired by priority of appropriation thereof is not in any way dependant on the *locus* of its application to the beneficial use designed.”<sup>1</sup> The Supreme Court went on to explain the hardship that would occur if the law in Colorado limited the location where water could be applied.

The doctrine of priority of right by priority of appropriation for agriculture is evoked, as we have seen, by the imperative necessity for artificial irrigation of the soil. And it would be an ungenerous and inequitable rule that would deprive one of its benefit simply because he has, by large expenditure of time and money, carried the water from one stream over an intervening watershed and cultivated land in the valley of another. It might be utterly impossible, owing to the topography of the country, to get water upon his farm from the adjacent stream; or if possible, it might be impracticable on account of the distance from the point where the diversion must take place and the attendant expense; or the quantity of water in such stream might be entirely insufficient to supply his wants. It sometimes happens that the most fertile soil is

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<sup>1</sup> *Coffin*, 6 Colo. at 449.

found along the margin or in the neighborhood of the small rivulet, and sandy and barren land beside the larger stream. To apply the rule contended for would prevent the useful and profitable cultivation of the productive soil, and sanction the waste of water upon the more sterile lands. It would have enabled a party to locate upon a stream in 1875, and destroy the value of thousands of acres, and the improvements thereon, in adjoining valleys, possessed and cultivated for the preceding decade. Under the principle contended for, a party owning land ten miles from the stream, but in the valley thereof, might deprive a prior appropriator of the water diverted therefrom whose lands are within a thousand yards, but just beyond an intervening divide.

We cannot believe that any legislative body within the territory or state of Colorado ever *intended* these consequences to flow from a statute enacted.<sup>2</sup>

The ability to irrigate lands far from the source of the appropriation presented a challenge to early irrigators because it required a significant amount of money and physical labor to establish and maintain canals and ditches capable of carrying water over great distances. The average nineteenth century farmer or rancher did not have the means to construct, maintain, and operate the facilities necessary to irrigate his/her lands. The most economic way to convey water over a great distance was to develop a large main canal and to operate smaller laterals off the main canal to serve the various farms and ranches under the ditch.<sup>3</sup>

In order to accomplish the herculean task of establishing these ditches and main canals, individual irrigators pooled their resources and “formed mutual ditch companies<sup>4</sup> for the express purpose of storing and conducting water for irrigation purposes.”<sup>5</sup> Farmers would transfer

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<sup>2</sup> *Id.* at 449-50.

<sup>3</sup> *Golden Canal Co. v. Bright*, 8 Colo. 144, 6 P. 142 (Colo. 1884).

<sup>4</sup> Mutual ditch companies are distinguishable from “carrier ditch companies” the later being formed for profit. The shareholders of a mutual ditch company own the water rights; in a carrier ditch company the ditch company makes the appropriation of the water and holds title to the water right leasing the water to individuals along the ditch for a fee, the primary purpose of the carrier company is to make money. *City & County of Denver v. Miller*, 149 Colo. 96, 368 P.2d 982 (1962). Unless indicated otherwise all references made to ditch companies hereinafter will be to mutual ditch companies or similar not-for-profit entities.

<sup>5</sup> *Jacobucci v. Dist. Ct.*, 189 Colo. 380, 386, 541 P.2d 667, 671 (1975).

ownership in their water rights to the company and receive shares of stock in return. In certain instances large companies involved in land speculation developed the ditches and canals, and sold water rights associated with the parcels of land. Many of these ventures failed, however, and the land owners gained control of the water companies, which they then mutualized -- turning in their water deeds for shares in the newly minted ditch company. Mutual ditch companies allowed un-irrigated sections of land, remote from a readily accessible source of supply, to be irrigated economically.<sup>6</sup>

Mutual ditch companies are special purpose corporations in Colorado and are “outside the reach of the Colorado Corporation Code.”<sup>7</sup> Ditch companies differ from for-profit corporations, which can sell shares of stock to raise capital for the company. In contrast, mutual ditch companies levy assessments on their stock to raise money for the company.<sup>8</sup>

## **II. DITCH AND RESERVOIR COMPANY CORPORATE LAW**

### **A. Article 42 Ditch and Reservoir Companies**

Companies organized for the sole purpose of storing and transporting water to shareholders who own the right to use the water are known as Mutual Ditch Companies, and are typically organized under Article 42, Sections 7-42-101 -118, C.R.S. (Ditch and Reservoir Companies) as special purpose corporations.<sup>9</sup> Article 42 is sometimes referred to as the “Ditch Act”<sup>10</sup> and has gone virtually unchanged since Colorado became a state in 1876.<sup>11</sup>

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<sup>6</sup>*Id.*

<sup>7</sup> *Left Hand Ditch Co. v. Hill*, 933 P.2d 1, 3 (Colo. 1997).

<sup>8</sup> Section 7-42-104, C.R.S.

<sup>9</sup> *Jacobucci*, 541 P.2d at 671; *Left Hand Ditch Co. v. Hill*, 933 P.2d 1, 4 (Colo. 1997).

<sup>10</sup> *Left Hand*, 933 P.2d at 4; *Hill v. Behrman*, 911 P.2d 678 (Colo.Ct.App. 1995).

<sup>11</sup> *Behrman*, 911 P.2d at 682.

The Ditch Act provides the specific requirements applicable to ditch and reservoir companies such as: rights-of-way, § 7-42-103, C.R.S.; assessments on stock for repair and upkeep, § 7-42-104, C.R.S.; distribution of water, § 7-42-107, C.R.S.; and liability of shareholders, directors, and officers, § 7-42-118, C.R.S.<sup>12</sup> The Ditch Act, however, does not contain the general requirements for corporate formation. Section 7-42-101(1) provides:

When three or more persons associate under the provisions of law to form a corporation for the purpose of constructing a ditch, reservoir, pipeline, or any part thereof to convey water from any natural or artificial stream, channel, or source whatever to any mines, mills, or lands or for storing the same, they shall in their articles of incorporation, *in addition to the matters otherwise required*, state: The stream, channel, or source from which the water is to be taken; the point or place at or near which the water is to be taken; the location, as near as may be, of any reservoir intended to be constructed; the line, as near as may be, of any ditch or pipeline intended to be constructed; and the use to which the water is intended to be applied.<sup>13</sup> (emphasis added).

The Supreme Court in *Left Hand Ditch Co. v. Hill*, held that to determine what the “matters otherwise required” are, one must look to Section 7-40-101 to -113, C.R.S., which provides the general corporate requirements for all special purpose corporations.<sup>14</sup> These provisions include persons entitled to organize, § 7-40-101; general powers § 7-40-102, C.R.S.; contents of certificate or bylaws, § 7-40-104, C.R.S.; and distribution of assets upon dissolution, § 7-40-107. These statutory provisions provide the corporate formality requirements to be employed by mutual ditch companies.

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<sup>12</sup> See also, *Left Hand*, 933 P.2d at 4.

<sup>13</sup> Section 7-42-101(1), C.R.S.

<sup>14</sup> *Left Hand*, 933 P.2d at 5.

## **B. Nonprofit Corporate Status**

The Ditch Act provides that “a corporation formed under the ‘Colorado Revised Nonprofit Corporation Act’ … shall have all the rights and powers granted by this article to the extent not inconsistent with said act, if said nonprofit corporation otherwise complies with the terms and provisions of this article.”<sup>15</sup> By incorporating under the Nonprofit Corporation Act (“Nonprofit Act”) a ditch company makes itself subject to the statutory requirements of Section 7-121-101 through 7-137-301.

Any Ditch Company wishing to incorporate under the Nonprofit Act must make that election by filing a “statement of election” with the Colorado Secretary of State’s Office.<sup>16</sup> The statutes provide provisions for Companies that are already incorporated but choose to incorporate under the Nonprofit Act.<sup>17</sup>

## **C. Mutual Ditch Company vs. Nonprofit Election**

As noted above, if a Mutual Ditch Company elects to incorporate under the Nonprofit Act it should be aware that its actions are governed under that Act and should look to those statutes for guidance. The Ditch Act is a rather basic statute and, although helpful, the statutes that govern all special purpose corporations add little flesh. In resolving issues faced by companies incorporated under the Ditch Act the “common law” is applicable to its activities

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<sup>15</sup> Section 7-42-101(2).

<sup>16</sup> See Section 7-137-101, *et seq.*

<sup>17</sup> *Id.*

where there is no statute on point.<sup>18</sup> The Nonprofit Act is much more comprehensive and may be desirable to some ditch companies who want their corporate obligations well defined.

Another consideration when deciding under which Act to incorporate are the tax implications involved with incorporating under one statutory regime versus the other. The parties interested in incorporating or changing their status should consult a tax attorney regarding the pros or cons that may exist.

#### **D. Articles of Incorporation<sup>19</sup>**

The articles of incorporation are the documents that create and govern the ditch company and are filed with the Secretary of State.<sup>20</sup> The articles of incorporation for a mutual ditch company must contain the following:

- ❖ The name of the corporation;
- ❖ Information regarding the shares, including the classes, if any, and number of shares to be issued;
- ❖ Name and address of the registered agent;
- ❖ Address of the corporation; and the
- ❖ Name and address of each incorporator.<sup>21</sup>

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<sup>18</sup> *Left Hand*, 933 P.2d at 5, (holding: that neither the Ditch Act or sections 7-40-101 to -113 addresses whether a mutual ditch company shareholder has the right to inspect the corporation's shareholder list, however, the right to inspect the books and records of the corporation existed at common law and was applicable in this case).

<sup>19</sup> For a more comprehensive treatment of this issue see the Article of Incorporation section of the DARCA Ditch Company Handbook authored by Jack F. Ross, Esq., Joanne Herlihy, Esq., and John R. Heronimus, Esq.

<sup>20</sup> Articles of incorporation filed with the Secretary of State are available at <http://www.sos.state.co.us/pubs/business/main.htm>

<sup>21</sup> These requirements are found in Section 7-102-102, C.R.S.

The Ditch Act adds additional requirements:

- ❖ The stream, channel, or source from which the water is to be taken
- ❖ The point or place at or near which the water is to be taken;
- ❖ Location, as near as may be, of any reservoir intended to be constructed;
- ❖ The line, as near as may be, of any ditch or pipeline intended to be constructed;
- ❖ The use that water is intended to be applied.<sup>22</sup>

It is imperative in drafting articles of incorporation, that the intended purpose of the corporation, the desired authority required to carry out that purpose, and the relationship between the shareholders and the company be considered and well defined within the articles.

#### E. Bylaws<sup>23</sup>

Bylaws are enacted by the corporation and are the rules for the governance of the corporation. They are generally not a matter of public record and are not required to be filed with the Secretary of State. The bylaws may not conflict with or violate the terms of the articles of incorporation, and may not violate any law that applies to the corporation. Frequently ditch company bylaws deal with:

- ❖ Directors, their number, duties, and elections;
- ❖ The duties of officers;
- ❖ Shareholders, various classes of shareholder, and the formalities regarding the issuance and transfer of shares;
- ❖ Voting of shares;

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<sup>22</sup> Section 7-42-101 (1), C.R.S.

<sup>23</sup> For a more comprehensive treatment of this subject please see the Bylaws section of the DARCA Ditch Company Handbook authored by Randolph W. Starr, Esq.

- ❖ Requirements for voting by proxy;
- ❖ Rules regarding meetings of the board of directors;
- ❖ Meetings, their location and frequency and how they are to be conducted;
- ❖ Ditch and/or reservoir operations.

The bylaws should contain all of the information regarding the ditch and reservoir operations that the shareholder needs to know. Generally, the articles of incorporation will provide for the procedures necessary to amend the bylaws. This right to amend is generally reserved in the shareholder and commonly requires more than a majority vote to amend.

The bylaws must deal with assessments in conformity with Section 7-42-104, meaning that any assessment must be levied pro-rata based on the shares of stock issued, after a vote of the shareholders. A failure to pay the assessment allows the ditch company to take action and recover the amount of the assessment. It is also advisable that the bylaws allow the company to enact operating rules to deal with issues that call for immediate action, such as drought plans, etc.

## **F. Board of Directors**

The board of directors for a ditch company is elected by the shareholders. The term of their office and qualifications, such as share ownership in the company, should be defined in the company bylaws. Section 7-42-101(3), however, allows an individual who is an agent of a municipal shareholder to be a director even though he or she may not be a shareholder in their own right.

It is the board's duty to manage the ditch company. The board acts as a fiduciary for the shareholders' interests. As a fiduciary the board has an obligation to the shareholders including a

duty of care, a duty of loyalty, and a duty to deal impartially with the individual shareholders. The board of directors usually consists of an odd number of directors in order to avoid ties in the number of votes cast. Unless otherwise specified in the bylaws, a majority will usually carry a vote and become an act of the board. All decisions made by the board must be for the benefit of the company and its shareholders.

A board of directors may delegate some of their duties to committees; however, this ability to delegate is limited and should be addressed in the company's articles of incorporation and bylaws.

#### **G. Officers**

Generally the officers of the ditch company are elected by the directors. The number of officers and their titles should be outlined in the bylaws. The officers are charged with the day to day operations of the ditch company. They can have express authority granted them under the ditch company's articles of incorporation or bylaws, or their action may be sanctioned by a resolution of the board of directors. It is important to note, however, that an officer may not act on the ditch company's behalf without prior approval of its board.

Corporate officers have a fiduciary duty to the corporation, which implies a high degree of honesty and good faith when acting on the ditch company's behalf. An officer owes the company his/her best business judgment when acting or advising the company and there must be a great deal of transparency when an officer is acting on a ditch company's behalf – full disclosure is of the utmost importance.

## **H. Majority Shareholders**

By virtue of their ability to exercise control over the company, majority shareholders, take on the status of fiduciaries for the other shareholders.<sup>24</sup> These majority shareholders owe a fiduciary duty to act in good faith and in a manner reasonably believed to be in the best interest of the corporation and all of its shareholders.<sup>25</sup>

## **III. ULTRA VIRES**

### **A. Ultra Vires Actions of a Board of Directors**

An ultra vires act is one which is beyond the purpose or powers of the corporation. It should be remembered that the purpose for which the company was incorporated, as defined in its articles of incorporation, acts as a limit to the ditch company's mandate. Therefore, any act by the corporation that goes beyond the purposes for which it was incorporated is an ultra vires act and is voidable. Ultra vires acts have largely been combated by the inclusion of a multiple purpose clause in the articles of incorporation allowing the corporation to engage in "any lawful business."

However, many ditch and reservoir companies were formed more than 150 years ago. Because of this it is important to review the purposes for which the company was incorporated and ensure that the ditch company's present activities have not run afoul of its original purpose. It is also important to note that mutual ditch companies are "organized solely for the convenience of its members in the management of the irrigation and reservoir systems."<sup>26</sup> Moreover, "[m]utual ditch companies ... were formed expressly for the purpose of furnishing water to

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<sup>24</sup> *Michaelson v. Michaelson*, 939 P.2d 835 (Colo.1997); *Polk v. Hergert Land & Cattle Co.*, 5 P.3d 402 (Colo.Ct. App. 2000).

<sup>25</sup> *Id.*

<sup>26</sup> *Jacobucci*, 541 P.2d at 672.

shareholders, not for profit or hire.”<sup>27</sup> Any action by the board should keep these principles in mind, as well as the express purposes for which the company was incorporated as outlined in their articles of incorporation.

## IV. DUTIES OWED TO SHAREHOLDERS

### A. Fiduciary Responsibilities

It has been said that “a fiduciary duty arises when one party has a high degree of control over the property or subject matter of another, or when the benefiting party places a high level of trust and confidence in the fiduciary to look out for the beneficiary’s best interest.”<sup>28</sup> Early on the courts in Colorado established that a director or officer of a ditch company is a trustee for the shareholders and owes a fiduciary duty to act in their best interest.<sup>29</sup>

#### 1. *Jacobucci v. District Court*

The Supreme Court in more recent decisions, however, has distinguished the “trustee” relationship. In *Jacobucci v. District Court* the court warned against the overuse of the trustee concept at least as far as state and municipal condemnation proceedings were involved. The City of Thornton sought the condemnation of certain water rights held by shareholders in the Farmers Reservoir and Irrigation Company (FRICO).

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<sup>27</sup> *Id.* at 671.

<sup>28</sup> *Bailey v. Allstate Insurance Co.*, 844 P.2d 1336, 1339 (Colo. Ct. App. 1992).

<sup>29</sup> *City & County of Denver v. Brown*, 56 Colo. 216, 138 P. 44 (1913); *Farmers' Indep. Ditch Co. v. Agricultural Ditch Co.*, 22 Colo. 513, 45 P. 444 (1896); *Supply Ditch Co. v. Elliot*, 10 Colo. 327, 15 P. 691 (1887); *Mountain Supply Ditch Co. v. Lindekugel*, 24 Colo.App. 100, 131 P. 789 (1913); *Rocky Ford Canal Reservoir, Land, Loan & Trust Co., v. Simpson*, 5 Colo.App. 30, 36 P. 638 (1894); The trustee concept has been applied to both mutual ditch companies as well as carrier ditch companies..

The question presented to the Court was whether the individual shareholders must be joined as indispensable parties to the condemnation proceedings. The Court held that they were indispensable parties to the proceeding.<sup>30</sup>

As grounds for this determination, the Court distinguished mutual ditch companies from other corporate entities. Noting that ditch companies are not organized under the general Colorado corporate statutes but under special legislation for ditch and reservoir companies, the Court held “different treatment … not fully in accord with the principles applicable to corporations in general” was warranted.<sup>31</sup> The Court found that the relationship between the shareholders and the corporation as one of contract “implied in a subscription for stock and construed by the provisions of a charter or articles of incorporation”<sup>32</sup> and held that “[w]hile the naked title may stand in the name [of the mutual ditch company], the ditch, reservoir, and water rights are actually owned by the farmers who are served thereby.”<sup>33</sup> The Court went on to find that the right of the company to hold title to the water rights and other property, and to manage the affairs of the corporation, should be distinguished from the shareholders’ right to use the waters on their lands. The Court concluded:

“[i]nasmuch as the rights to ‘use water’ vests solely in the shareholders, and the corporation neither administers or participates in this actual use, the corporation cannot be deemed the trustee and only proper representative of the shareholders’ interests in this matter.”<sup>34</sup>

This case raises interesting questions regarding the fiduciary relationship between shareholders and directors in mutual ditch companies. At least in the context of condemnation

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<sup>30</sup> *Jacobucci*, 541 P.2d 667.

<sup>31</sup> *Id.* at 672.

<sup>32</sup> *Id.* at 671.

<sup>33</sup> *Id.* at 673.

<sup>34</sup> *Id.* at 674.

proceedings, the ditch company and the board were determined not to be trustees for the shareholders. While I do not believe that the Court meant to relieve the board of its fiduciary duty in managing and operating the company, the holding does blur the line regarding where the company ends and the shareholders begin.

In determining the relationship between the ditch company and the shareholders to be fundamentally contractual the Court also raises questions regarding the fiduciary duty owed a shareholder. It has been held that “the existence of a contract between a fiduciary and beneficiary is second to the nature of a true fiduciary relationship.”<sup>35</sup> When the relationship is contractual “both parties have a duty to protect their own interests, although each party also owes a duty of good faith and fair dealing.”<sup>36</sup> This would indicate that contractual and fiduciary relationships are antithetical to one another.<sup>37</sup>

As noted above, I do not believe that a board of directors is relieved of its fiduciary duties of loyalty and due of care; however, as the Court in *Jacobucci* recognized the fiduciary duty owed may be somewhat more limited than in the traditional corporate context. When faced with an alleged breach of fiduciary duty a board of directors, with the assistance of counsel, should consider the *Jacobucci* decision in assessing the claim.

## **B. Standards of Conduct for Nonprofits**

The standards of conduct applicable to directors and officers of ditch companies incorporated under the Nonprofit Act can be found at Section 7-128-401 *et seq.*, C.R.S. As I mentioned earlier, if the ditch company has elected to be governed by the Nonprofit Act these

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<sup>35</sup> *Bailey*, 844 P.2d at 1339.

<sup>36</sup> *Id.*

<sup>37</sup> Excerpts from Preliminary Report Regarding Dispute Over Ownership of Salvation Ditch Company Shares, Case No. 00CV142, Pitkin County District Court; July 2, 2002 provided to the author by Austin Hamre, Esq..

statutory pronouncements regarding standards of conduct, limitation of liability, director liability for unlawful distributions, and conflicting interest transactions are governed by these statutes.

### C. Duties

As discussed above ditch companies are not governed by the Colorado Corporate Business Corporation Act (“Corporation Act”) and are special purpose corporations under Colorado law. The Ditch Act and the Special Purpose Corporation Act do not specifically discuss the duty a board or officer owes its shareholders and therefore, we must look to the common law in defining these obligations.

The common law duties owed a shareholder in a mutual ditch company are described in *Kullgren v. Navy Gas & Supply Co.*:

[A director or officer] owes loyalty to the corporation, a loyalty that is undivided and an allegiance that is influenced in action by no consideration other than the welfare of his corporation, he is held in official action to the extreme measure of candor, unselfishness and good faith. Those principles are rigid, essential and salutary.

...

No rule is better established than that the directors of a corporation stand in the position of trustees for the entire body of stock holders ... [W]hen [a director] acts in his official position, he is acting not merely as an individual, but as [a] representative of others, and is prohibited from taking advantage of his position for his personal profit or reaping personal benefit to the detriment the stockholders whom he represents.<sup>38</sup>

In exercising its duties the board and officers of the ditch company must always look to the greatest good and balance the interests of all its various shareholders. This includes balancing the needs of the ditch company’s agricultural as well as municipal shareholders, where

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<sup>38</sup> *Kullgren v. Navy Gas & Supply Co.*, 110 Colo. 454, 461-62, 135 P.2d 1007, 1010-11 (1943).

applicable. The next sections will discuss the duty of care, duty of loyalty, and the duty of impartiality owed to each shareholder as well as what constitutes a breach of these duties.

### 1. Duty of Care

A director and/or officer of a ditch company must act in good faith and in a manner reasonably believed to be in the ditch company's best interest; and with the care of an ordinarily prudent person under like circumstances.<sup>39</sup> This standard is essentially a negligence standard. In identifying director's culpability, the director's actions should be looked at in terms of his or her responsibility in the ditch company, the information available at the time, and the special knowledge or expertise of the director.<sup>40</sup>

It is also important to note that directors and officers are not infallible and the reasonableness with which they approached the decision making process must be considered. An accusation of breach that focuses its attention on the decision that was made with the benefit of hind sight is not well founded. The director should make his or her decision based on all the material information available. This may require some reliance on opinions, reports, and analysis prepared by others. A director of a ditch company in discharging their duties may rely on information presented to them by attorneys, engineers, accountants, etc.; so long as they have no reason to believe that information to be unreliable. The duty of care first and foremost requires a director to ensure that they made all the reasonable inquiries necessary prior to making a decision.

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<sup>39</sup> See Section 7-128-401, C.R.S., although this provision is codified in the Nonprofit Act these principles were recognized in the common law and I believe they are useful in determining the duty of care owed shareholders in a mutual ditch company incorporated under the Ditch Act.

<sup>40</sup> Cathy Stricklin Krendl & James R. Krendl, 1 Colo. Prac., Methods of Practice §1.66 (6<sup>th</sup> ed.).

a. “Business Judgment Rule”

The duty of care, however, must also be considered in light of the “Business Judgment Rule”. Section 7-42-118, C.R.S. of the Ditch Act provides:

Stockholders, directors, and officers of corporations formed under the provisions of this article shall enjoy the same measure of immunity from liability for corporate acts or omissions as stockholders, directors, and officers of corporations formed under the "Colorado Business Corporation Act", articles 101 to 117 of this title, or as members, directors, and officers of nonprofit corporations formed under the "Colorado Revised Nonprofit Corporation Act", articles 121 to 137 of this title.

Article 108 of the Corporation Act allows corporations by specific provisions in their articles of incorporation to limit or eliminate the personal monetary liability of directors for breach of duty of care.<sup>41</sup> The Act, however, restricts the ability of the corporation to eliminate liability under certain circumstances:

- ❖ Breach of the director’s duty of loyalty to the corporation or its shareholders;
- ❖ Acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law;
- ❖ Acts specified in C.R.S. §7-108-403 (unlawful distributions); or
- ❖ Any transaction from which the director directly or indirectly received an improper personal benefit.<sup>42</sup>

It has been said that the effect of this statute is the same as that of the business judgment rule, “[a]ssuming none of the exceptions apply, the director is protected only from negligent acts or omissions – that is, the director is presumed to have met the standard of conduct unless the plaintiff proves the director did not.”<sup>43</sup> The business judgment rule presumes the board of

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<sup>41</sup> Section 7-108-402, C.R.S.

<sup>42</sup> *Id.*

<sup>43</sup> Krendl & Krendl, *supra*.

directors has made its decision based on reasonable information and in a rational manner. This places the burden on the shareholder to prove otherwise.

Two issues that must be considered here (1) the statute does not apply to a breach of the duty of loyalty and (2) this would not preclude an action seeking equitable relief such as injunction or rescission.<sup>44</sup> It is also worth noting that by its explicit terms the statute is only applicable to directors, therefore, majority shareholders and officers are not covered.

b. Conduct that may constitute a breach in the duty of care.

To the extent the statute is not applicable or the company's articles of incorporation are silent as to the elimination of personal liability or in situations demonstrating bad faith the following are the most prevalent situations in which a breach may be found:

- ❖ Hasty and uninformed decisions;
- ❖ Failure to act;
- ❖ Reliance on information one knows or has reason to know, due to his/her area of expertise, that is faulty;
- ❖ Where the director knowingly participates in a wrongful act.

2. Duty of Loyalty

The duty of loyalty owed a shareholder, in essence, requires that a director not act in any way that is adverse to the ditch company or the interests of the shareholders. Duty of loyalty cases generally revolve around (1) self dealing and (2) usurping a corporate opportunity.

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<sup>44</sup> *Id.*

a.      Self dealing

The risk in self dealing is that the corporation may be treated unfairly in the transaction.

The burden lies with the director to prove that his/her transaction was proper. These issues generally involve:

- ❖ Sales of corporate property to the director;
- ❖ Sales of corporate property to the directors spouse or close relative;
- ❖ A contract between the ditch company and the director or a close relative or acquaintance for the performance of services;
- ❖ Directors who are also officers participating in determining their salaries.

Transactions like those mentioned above are not *per se* injurious to the corporation, but are highly scrutinized. Disclosure to the disinterested directors or shareholders of all material facts surrounding the relationships and the transactions involved is paramount. Regardless of whether the transaction is ratified by the disinterested board members it must be seen as fair, i.e. the corporation is paying no more for the use of equipment owned by the director than they would if they rented the equipment from somewhere else. Transactions that have not been fully disclosed and approved are voidable by the ditch company.

b.      Usurping a corporate opportunity

Usurping a corporate opportunity violates the duty of loyalty because a director owes the corporation the benefit of uncorrupted judgment. A director may not take advantage of a situation, for personal gain, that would further the interests of the corporation.

In determining what a corporate opportunity is, the Courts frequently look to whether the corporation has a legitimate interest in the opportunity. In determining this some key points must be considered:

- ❖ Is the opportunity closely related to the business in which the company is engaged;
- ❖ Whether there were prior negotiations with the ditch company or whether the opportunity was originally offered to the corporation; and
- ❖ Whether the director learned of the opportunity by reason of his position on the board.<sup>45</sup>

Even if it is determined that the opportunity is in fact a corporate opportunity, officers and directors are not necessarily precluded from taking advantage of the opportunity. If the ditch company is incapable of taking advantage of the opportunity, the director or officer is not foreclosed from doing so.<sup>46</sup> Some examples include situations when the ditch company cannot afford to take advantage of the opportunity; the third party refuses to deal with the ditch company, or if the board rejects taking advantage of the opportunity.<sup>47 48</sup>

#### **D. Lack of Duty**

As noted above the Ditch Act allows directors and officers to enjoy the same measure of immunity from liability for corporate acts as directors and officers of corporations incorporated under the Corporations Act. The Corporations Act provides that no officer or director can be held personally liable for any injury to person or property arising out of a tort committed by an employee unless the director or officer was personally involved or committed a crime in connection with the situation.<sup>49</sup>

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<sup>45</sup> Robert H. Hamilton, The Law of Corporations, §14.15 (West Group Publishing 5ed.)

<sup>46</sup> Hamilton, *supra* at §14.16.

<sup>47</sup> *Id.*

<sup>48</sup> In the last example the transaction should be scrutinized closely to ensure that no self dealing has occurred.

<sup>49</sup> Section 7-108-402(2), C.R.S.; Krendl & Krendl, *supra*.

## V. REMEDIES AVAILABLE TO AGGRIEVED SHAREHOLDERS

### A. Individual or Direct Suit

An individual shareholder may bring an action against the ditch company if the injury suffered to that shareholder is “unique to himself and not suffered by the other stockholders.”<sup>50</sup> Such a situation is when the shareholder is denied the right to review the ditch company’s shareholder list.<sup>51</sup>

### B. Derivative Action

A derivative action is brought on behalf of the ditch company by a shareholder to prevent a wrong against the corporation. Certain standing requirements must be met before the shareholder can do so.<sup>52</sup>

- ❖ Must be a shareholder in the company;
- ❖ A demand must be made on the board of directors to bring the suit (this requirement may be excused if can be demonstrated that the demand is particularly egregious or futile);
- ❖ A demand must be made on the shareholders (this also may be excused if shown to be too onerous); and
- ❖ It must be determined that the shareholder adequately represents all other shareholders.

## VI. PROTECTIONS AFFORDED DIRECTORS AND OFFICERS

### A. Indemnification

Article 129 of the Nonprofit Act sets out the circumstances in which a company, including those incorporated under the Ditch Act may indemnify an officer or director.<sup>53</sup> Likewise indemnification is mandatory under the provisions of Section 7-129-103 which states:

<sup>50</sup> *Nicholson v. Ash*, 800 P.2d 1352, 1357 (Colo. Ct. App. 1990)

<sup>51</sup> See generally *Left Hand Ditch Co. v. Hill*, 933 P.2d 1 (Colo. 1997).

<sup>52</sup> See generally C.R.C.P. 23.1

Unless limited by its articles of incorporation, a nonprofit corporation shall indemnify a person who was wholly successful, on the merits or otherwise, in the defense of any proceeding to which the person was a party because the person is or was a director, against reasonable expenses incurred by the person in connection with the proceeding.

In some instances the Court may order indemnification. Section 7-129-105 , C.R.S. addresses those circumstances where court ordered indemnification is appropriate.<sup>54</sup> In other instances the articles of incorporation may provide indemnification.

### **B. Directors and Officers Liability Insurance (“D & O Insurance”)**

D & O insurance is highly recommended, as it provides another layer of protection to directors and officers. It assures that payments will be made to a party entitled to indemnification even if the ditch company cannot afford to do so. It is also important because it may relieve the ditch company’s obligation to indemnify. It is very important to read your policy not only to determine what is covered but more importantly to see what is *not* covered. D & O insurance is not inexpensive but may well prove to be a worthwhile investment.

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<sup>53</sup> Section 7-129-102, C.R.S.

<sup>54</sup> Section 7-129-105, C.R.S. provides: (1) Unless otherwise provided in the articles of incorporation, a director who is or was a party to a proceeding may apply for indemnification to the court conducting the proceeding or to another court of competent jurisdiction. On receipt of an application, the court, after giving any notice the court considers necessary, may order indemnification in the following manner:

(a) If it determines that the director is entitled to mandatory indemnification under section 7-129-103, the court shall order indemnification, in which case the court shall also order the nonprofit corporation to pay the director's reasonable expenses incurred to obtain court-ordered indemnification.

(b) If it determines that the director is fairly and reasonably entitled to indemnification in view of all the relevant circumstances, whether or not the director met the standard of conduct set forth in section 7-129-102(1) or was adjudged liable in the circumstances described in section 7-129-102(4), the court may order such indemnification as the court deems proper; except that the indemnification with respect to any proceeding in which liability shall have been adjudged in the circumstances described in section 7-129-102(4) is limited to reasonable expenses incurred in connection with the proceeding and reasonable expenses incurred to obtain court-ordered indemnification.



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## DITCH AND RESERVOIR COMPANY PLANNING

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DARCA wishes to gratefully acknowledge the assistance of the Walton Family Foundation, and the on-going support of many valued and generous supporters and sponsors throughout the life of DARCA, and in particular support of meetings, and further, we wish to acknowledge that all of the extraordinary range of speakers at DARCA events have given their talents, time, and expertise freely. We gratefully acknowledge the many supporters who have kept meeting costs quite moderate. DARCA could not offer its presentations and services without that support and sponsorship.

## 1. INTRODUCTION and SUMMARY

Better planning capabilities for Colorado's ditch and reservoir companies can help these companies better adapt to changing social and environmental pressures. Unfortunately, Colorado's ditch and reservoir companies are not well positioned to adequately protect their interests with the continuing and substantial pressure for their water resources. Urbanization issues, municipalities seeking ditch company water for urban use, and the increasing cost of doing business in today's regulatory and legal environment, have vastly complicated the matter of running ditch companies in Colorado.

Many ditch companies have not been operated in a manner that approaches the optimal use of their resource base. DARCA believes that many ditch company struggles can be traced to a shortage of resources for adequately dealing with problems, pressures, and opportunities. Additionally, there may be inherent characteristics of some company structures that seriously hinder effective planning strategies including limited resources for better decision making. Few ditch companies have in-house staff such as lawyers, engineers, and planners to help navigate today's complex world. With less clarity in their options, many companies are risk-averse to the point of not willing to explore and embrace opportunities that may be extremely lucrative for their companies.

Ditch companies deal adequately with short term concerns but internal planning rarely incorporates the long term. The directors of ditch companies, shareholders themselves, place primary emphasis on the continuation of water delivery on a seasonal basis. Perhaps, shareholders of the ditch companies may view the ditch only as an entity that allows access to their water right and not as their own business entity that needs to prosper in the coming years. DARCA is advocating that planning activities in the medium and long term be strengthened. Funds need to be set aside to help ditch companies plan for their futures; some ditch companies are cognizant of their needs but need additional resources. DARCA is advocating for funding that would address Colorado's Water Plan (CWP) stated objectives of avoiding the dry up of agricultural lands and keeping agricultural resilient in the face of increasing drought and climatic variability. (Colorado Water Conservation Plan 2014)

## 2. BACKGROUND

From the national and regional perspective, one of the critical problems facing U.S. agriculture is the explosion of rural residential development and the fragmentation of peri-urban farmlands which are historically the West's best soils and water (statistics on this are frequently updated

from new US Department of Agriculture studies, such as Census of Agriculture (See Hoppe 2014, Hoppe and Bunker 2010, Hoppe and Bunker 2006. These figures are complicated by the frequent re-classification of kinds of farms (MacDonald, Korb and Hoppe 2013). Financing for studies of land conversion and updates may have affected recent information from states; nationally, see Nickerson et al. 2012; for Colorado, see Colorado Water Conservation Board 2014); but the trends of critical importance are that the best farmlands are subject to extreme pressure for uses with higher short-term value for residential and urban development, leading to rapid conversion of high-quality farmland ( Colorado Water Conservation Board 2014; Environment Colorado 2006; see also see, American Farmland Trust, 2006, Esseks, et al. 2009).

More than 1/4 of Colorado's irrigated land as of 1997 is gone now! That is 857,448 acres... To relate to a good earlier publication, compare 2012 to 2002, because there is a fine report on losses up to 2002 (USDA 2012).

In 2002, there were 2,590,654 irrigated acres in Colorado; in 2012, despite the ethanol and very high feed prices stimulus to bring new land into production, there were 2,516,785 irrigated acres. That's a loss of 73,869 acres... but that was before the drought of 2012. Lost acreage from that is hard to estimate, but may result from not only economic stress from the 2012 drought (Pritchett et al. 2013) but also from consolidation of irrigation on less land with more reliable supply, and from the flood damages to irrigation in 2013 (Colorado Water Conservation Board, Draft State Water Plan Chapter 5.2 Natural Disaster Management).

Please notice that in the aggregate, the changes in "land in farms" are complicated by three factors or more. First, between 2007 and 2012, there was a major and continuing economic recession/depression, and that affected land conversion rates. Second there was continuing stimulus for new farming with the ethanol explosion in corn use, which stimulated turnover of other land into soy and other feed, as feed prices skyrocketed, changing the cattle business and the farming business. And third, land classified as "in farms" also includes land in small but very rapidly increasing "farms" which are not commercial and not lucrative but hobby, retirement, life-style, "horse properties" and other land in rural residential development.

In Colorado, land in "farms" in aggregate increased between 2007 and 2012 by 281,765 acres, but between 1997 and 2012 there was loss of 463,156 acres despite the rural residential development (USDA 2012 Census of Agriculture – State Data; Colorado, p 7). County-level information is probably more valuable for getting a good picture if one can examine it.

Land in large-lot dispersed rural development has exploded, giving the impression that farming is gaining ground, but it is likely that the vast majority is simply residential in parcels 35 acres and larger so as to be exempt from subdivision regulations and until very recently, qualify for a "well by right" for domestic use water supply.

But the picture for irrigated land is clearer: 857,448 acres were lost from irrigation from perhaps the high in 1997 to 2012 alone... This was before the well shut-downs in the South Platte, at the end of a wet period in Colorado, (Pielke et al. 2005). From 1982 to 2012, Colorado lost 684,157 irrigated acres.

*Table 1: Changes in Colorado's Irrigated Agriculture*

Irrigated Land in Colorado	Acres (USDA 2012 Census of Ag.; CO p 7)
1982	3,200,942
1992	3,169,839
2002	2,590,654
2012	2,516,785

And, the quality of the land is not distinguished, but must be expected to include much of the highest quality land left (Esseks et al. 2009, Francis et al. 2012).

It is important for local food security and local food preferences as well as the vast range of ecosystem services provided by the irrigation landscapes that these high-quality lands are conserved in conditions which will facilitate adaptation to future conditions. One major endorsement of the need for more holistic resource management is the adoption of Integrated Water Resource Management by many agencies and organizations (AWRA 2012). On the sustainability of conventional large monocultural commodity agriculture, see McIntyre et al. 2009, National Research Council 2010, and Walthall et al. 2012).

DARCA leadership seeks to enable more effective land use and resource planning by ditch companies in order to help conserve economically viable small and flexible family farming, as well as the provision of the very important public benefits from irrigation on the land. Farmers frequently lament the problems of family succession of ownership given the profound economic challenges faced by small farming, and may depend on discovering farming systems which are net-profitable and viable in the longer term by not currently competing with global industrial commodity production or very large-scale farming within the U.S. as currently practiced (National Research Council 2010).

With the support of the Walton Family Foundation and the DARCA Board and membership, as well as indirect support from the University of Colorado, Colorado State University, and substantial expertise from water community leaders across the State and West, DARCA has begun investigations into what kinds of help might support ditch company efforts to retain working landscapes, financially successful family farms, and the iconic and beautiful landscapes that characterize the West for most of the population (see appended note on public support).

### 3. DARCA'S INQUIRIES IN 2014-2015

Throughout the annual meetings in the past, most of these issues have been raised in different ways, but in 2014-2015, more explicit efforts were undertaken with the benefit of additional funding, the stimulus of the Colorado Water Plan drafting process, and the support of the Planning Committee of DARCA, which met for several months to pursue these issues and develop DARCA positions, which were summarized in the comment submitted to the state of Colorado.

DARCA held four workshops throughout the state in 2014 and presented at its annual convention in February 2015. We had a moderately good return on surveys, considering their intent and use,

but the survey was designed to stimulate discussion, using a posters-and-stars technique on the walls of the rooms where the survey was used, and it is not well suited for statistical analysis. Approximately 60 surveys (See Appendix B) were analyzed along with input from the workshops, the DARCA Planning Committee, the annual convention, and through personal communication.

In short, we proceeded with a participatory planning approach that will be convertible to a traditional Dillman et al. kind of survey, if the investment is warranted, but it may be much more cost-effective to continue with what is essentially a combination of focus-group efforts, a strong advisory committee, and a series of workshops. The participatory planning approach we believe will be effective is one which includes a substantial range of discussion and scenario-building, rather than a near-term set of estimations, and that may be our future course. The investment of participants in finding their own common interests and comparing expectations for their lands and family futures may be much more compelling as an incentive than a technical approach with commentary or external recommendations from agronomists or extension advisors. Once goals or ideas are identified, expertise will certainly be sought, but the experience so far is that we are not yet ready for that step.

We believe that this is itself the most important finding: we need to pursue willingness to work on increasingly feared problems and to overcome a sense that small farming is inexorably doomed to the sale of the land and water to other interests.

The following were particularly dominant topics in the responses received in both the annual meetings, the planning committee teleconferences, and the four workshops held around the state in the summer of 2014.

#### 4. DOMINANT THEMES OF INPUT FROM DARCA MEMBERS

##### **A. DITCH COMPANY SHAREHOLDER EDUCATION**

The majority of DARCA members are mutual ditch companies, in which individuals own shares of the company which typically include specified portions of water, sometimes at specified times or rotations, and obligations to pay assessments for upkeep and operations of the water distribution facilities. There are wide ranges of variation in additional enterprises by some of the very large ditch companies, but the majority are solely devoted to providing water delivery and it is this rather narrow view which may foreclose development of more viable and long-term approaches to management of the full set of assets of the ditch companies and their shareholders.

1. Shareholders need to know the rights of ditch companies and what they can and cannot do.
2. The possibilities for ditches to collaborate with other enterprises in unclear.
3. Overwhelming and daunting issues lead to apathy, a major problem.
4. There is a need for education and an understandable approaches to external issues.
5. Ditch company members are conservative, with limited modernization, and also resistance to change.

6. Including outreach (“in-reach”?) to shareholders about what ditches can and cannot do, what other ditches may be needed. Possibilities and opportunities for ditch and collaborative enterprises are not known and have seldom been considered.
7. A comment stating that the need for education, understandable approach to external issues is clearly helpful and needed came from someone noting s/he is not a member of a ditch company. This comment also urged that the overwhelming and daunting issues lead to apathy, a major problem.
8. Another comment noted concern with “conservative members”, and history of conservative farming, and from the same person, comments on “very limited” modernization, and “resistance to change”.
9. A comment on the lack of information about different crop rotations or ways of farming: “no data in this area”.

## B. DITCH MANAGEMENT

Management of ditch companies by the board is typically rewarded with a very nominal fee, however, the time commitments may be substantial. Critically, the time dealing with conflicts can radically increase the unpleasant parts of the task, and discourage those with initiative who have other opportunities. This in turn can lead to rapid turn-over which brings newcomers with good intentions but sometimes little knowledge of the systems in action, the legal and management issues, and the conflicts which may or may not be addressed. There is a general sense of disproportionality between the importance of the issues and the historic simplicity with which they could be addressed decades ago. Off-farm employment further limits available efforts and time. Further, dealing with ditch company staff issues can be quite challenging since operating these systems is not at all clear or easily learned, to say nothing of working with a range of individual interests with competitive as well as collaborative interests.

1. Company officials and records often badly need updated technology, security and training.
2. There is a widespread need for professional approaches to the duties of boards, by-law updates and modernization, and insurance management.
3. There are complexities of carriage of water (transfer for non-shareholders) which differ from carriage for shareholders and issues of cost allocation, storage allocations, and management of differences. Colorado law avoids the inefficiency of parallel ditches where possible, as well as the imposition on land-owners of additional rights –of – way, by strongly encouraging carriage, but this is not necessarily simple. Complexities also increase with urban encroachment and other issues noted here.
4. Ditch company staff, attorneys, accountants, engineers may have increasingly critical and technically difficult roles, but are unlikely to be able to provide those services at very low cost.
5. There is substantial appreciation for work by John McKenzie in compiling a model land use code, and attorney Eve Triffo in compiling model by-laws.
6. Recording of rights-of-way is a policy question, with some arguments against formal recording, which DARCA generally believes are no longer persuasive, and there are problems with unrecorded public knowledge, private agreements, and informal operating agreements with agencies, governments.

### C. PUBLIC EDUCATION ABOUT DITCHES

There are substantial efforts beginning to improve public understanding of the nature of water rights, rights-of-way, and the safety issues presented by ditches, including some by the Colorado Foundation for Water Education, and in the Colorado Water Plan, but DARCA members consistently wish there were more accessible and available materials for people newly arriving in ditch country. DARCA may undertake an additional outreach development project, following some examples, but we hope to coordinate that with state and agency publicity which would support local information.

Among the topics on which basic understanding is needed from the neighbors, for the safety and well-being of all, the legal situation is prominent and may be counter-intuitive to people from wet areas and those who have no idea how old water distribution is, and why it so often looks like a natural watercourse rather than constructed infrastructure.

1. Rights of way clearance, safety, access, crossings and the limits on encroachment and access for ditch operation, as well as limits for safety (e.g. children, pets, and siphons and culverts) are critical issues.
2. Water rights as a kind of property in the West are simply new to many arrivals, and must be made clearer.
3. Water quality issues arise in the form of both urban and industrial drainage unwanted and often illegally dumped into ditches, which by their nature intercept natural drainage paths, and additional issues appear in more conscious vandalism, dumping, and mistreatment of ditches by persons who appear to be knowingly acting without legal rights. A third more tractable problem appears with ignorance about the role of ditches and misuses for disposal of yard waste, mistreatment of trees and controversies over bank-stabilizing vegetation.
4. Homeowners associations, subdivisions, education and design failures, and general disregard of ditch rights and functions are particularly problematic where local governments fail to impose legal requirements or even mistakenly approve inappropriate choices, bad design, and damage to rights of way and access. The costs imposed can be substantial, and the delay in repair or remedy can also be destructive, sometimes on the encroachers' interests as well as the irrigators' interests.
5. A radical increase in the number of shareholders may suddenly occur where irrigated land is converted to subdivision; in a bad case, this can create a significant number of shareholders who are ignorant of critical issues and rights.

### D. DITCH COMPANY PLANNING MUST BE GOOD, OR...

There has been so little ditch company long-range planning that there is fear that it could be disastrous, and similarly, fear that without a very good job, poor planning could be worse than none. There were several variations on this idea, and some additional concerns are also noted here.

1. Allocation of effort to planning is a luxury when you are barely doing day-to-day operations.
2. No institutional capacity is available, and the group does not inherently work well in new ways.

3. It is simply not appropriate for ditch companies to plan; this is up to the farmer as a business person. These comments reject the idea of the use of the ditch company assets for multiple purposes and sometimes reject the idea of collaborative farming efforts; some rejected this on value grounds such as being against socialism.
4. Similarly, there were some “not applicable” and similar responses to “resources” questions about cooperation or collaboration among farmers (see tabulation)
5. “Preconceived ideas” were reported as a problem that prevents groups from new thinking.
6. There is fear of risks from ideas about income possibilities, and some suggestions were made orally that competition might be a source of discord and conflict.
7. There was strong agreement on the need more planning for the water management future, but the level at which planning could or should take place is not clear from some of the supportive statements.
8. Barriers to planning include lawyers and misinformation as well as costs; there were mentions of incorrect but vehement assertions.
9. Aging infrastructure is driving the need for planning in some ditches, because failure imposes bigger expenses. But another comment said that it is hard to know where to spend, and planning might not make a difference with lower and uncertain incomes.

#### **E. DITCH COMPANY PLANNING WOULD BE INAPPROPRIATE INTRUSION IN PRIVATE BUSINESS AND AFFAIRS**

Similarly to Section D just above, some respondents were quite strongly opposed to ditch company efforts in areas which were said to be private business. (This indeed reflects the ambiguous nature of the ditch company as something like an enterprise, and something like a utility.) There was a comment that of course neighbors help each other with equipment breakdowns, but this did not seem to be linked to a proactive effort to collaboratively purchase or manage capital equipment or experiment with new farming systems. This may be an avenue for discussion, given the increasingly appreciated problems of loss of agricultural input suppliers where too much land goes out of production.

#### **F. DITCH COMPANY INFRASTRUCTURE AND MODERNIZATION FINANCE**

Where companies have been treated solely as a utility to be operated at least cost, cumulative costs may be quite difficult just as economic factors challenge small farming along with competition for the land and water rights.

1. Complications with encroachment, etc. are terribly challenging for ditches “swallowed up” by urbanization; significant legal expenses may be required to maintain the facilities and their safe operation.
2. Alternative and grant funding sources needed for small companies – e.g. for companies which are far smaller than some of the very big ones and ones with federal support.
3. Access to long-term funding may be very important and may be very difficult; other infrastructure is commonly financed with 30 year bonding, for example, but that capacity is not available to mutual ditch companies. (Federal project and some other kinds of districts have some different capacities but also often different limitations on management and transferability of water and land.)

4. Assessments on shareholders of ditches may barely cover day-to-day operations and not at all cover modernization or large capital projects.
5. Biggest concern is lack of financing for infrastructure which would enable new possibilities where they are wanted, but cannot be capitalized. Low-cost capital is needed for many projects facing sharp cost increases.

#### **G. TAXATION ISSUES AND TAX BASE ISSUES**

There are serious farm and ranch issues of estate taxation and succession planning, and with the application of agricultural tax rates, and also some technical issues which DARCA has noted.

1. A comment that ditches should organize to change the 85/15% rule for exemption from federal income tax as a Section 501(C)(12) organization.
2. Municipalities' costs in litigation are financed by taxes and water rates, and may be reduced by legal staff available to water providers or cities. Ditch companies have no such advantages. Further, costs for water supply for cities may be covered within low-cost bonding finances as well as water charges and tap fees.
3. Expansion is needed for a mutual ditch company exemption from county property taxes without regard to where the water goes now; taxation may be affected by the final use of the water, and that may disadvantage the continuation of traditional uses.

#### **H. PUBLIC OFFICIAL EDUCATION AND AGENCY EMPLOYEE EDUCATION**

Ditch company management has become substantially more complicated and interactions with agencies and land owners increasingly cost time and money over issues which have been clearly settled in the past. DARCA's model land use code illustrates many solutions, but it is not yet the standard and may be the subject of part of an outreach campaign which DARCA may undertake. Presently, we heard the needs for several issues to be approached.

1. Education: There was a recommendation to create a DARCA Guide for local governments and land use agencies and a source of helpful information for them. Local official turn-over is widely noted, but there is also turnover among federal officials such as those employed by the US Forest Service which interacts with many ditches.
2. Consistent turn-over of officials and regulators who know nothing about ditch company rights, obligations, rights of way, etc., and ditch company needs costs time and money in re-establishing workable relationships and education about the local systems and access needs.
3. Public official and government refusal or failure to act or enforce rights is profoundly difficult because one is forced to expend private funds and effort to seek public enforcement of rights, usually against other private parties with significant financial capacity.

#### **I. LAND USE PLANNING**

Ditch companies vary quite widely in their level of interaction with local (city, county, federal) land use planning processes. Generally, getting involved is time-consuming, and contentious, and ditch officials may be placed in socially unpleasant conditions where they are forced to

defend rights that have been overlooked or may be disregarded. There are also complicated value questions about land use planning per se; some DARCA members regard it as undesirable interference, while others regard it as a necessary social process in which one must defend one's interests. The shareholders themselves have complicated positions concerning their potential for staying in farming and potential need to sell; this is a primary motivation for DARCA involvement with planning issues. The "right to farm" laws help in some places, but ditches are collaborations and if a majority or sufficiency acts, all members can be affected directly and indirectly by changes in the hydraulics of ditch operation as well as input and output markets, traffic and neighbors, and other changes.

1. A great deal of land use planning is not done with ditch issues in mind; ditches complicated attitudes about land use planning, right to farm vs right to sell, etc...
2. Increasing ditch rider response time to problems can result from development, and access complications; potential liability threats may increase radically and may not elicit appropriate insurance and safety policies.
3. Municipality roles in conserving agricultural operations and conditions could be much greater than they are, and municipal ownership of farmland need not be limited to short-term anticipation of terminating farming and removing irrigation. Open space and recreational values are increasingly recognized, but not so well implemented.
4. The municipal taking of ditch company easements by condemnation was noted as an additional concern that may pose serious legal challenges and costs with risky outcomes.

#### **J. WATER QUALITY AND POLLUTED WATER INFLOWS**

As ditches are approached by urbanization and industrial activities (including mining and energy development), inflows may change character as well as timing where there is unintended or negligent drainage into irrigation supplies. The water quality requirements may be ultimately enforced at some point but private enforcement is likely to incur very high costs, and the agriculture may be adversely affected in quality or salability of products as well as flexibility of use. Some ditches that have been highly "urbanized" have had trouble getting enforcement of standards already applicable. Additional issues were mentioned.

1. Failure to fiercely defend against inflows and pollution may be a "slippery slope" problem in which proving damage from cumulative situations can be very costly and may be out of reach without strong local government support.
2. A few ditches are very involved with local/watershed groups on water quality and all development reviews, including some where there are few farms left, but many are not involved and fear adverse consequences or controversy.
3. Cumulative impacts and thresholds may suddenly impose problems which were not seen or considered threats until standards are crossed or damage is serious. Monitoring to avoid creeping degradation is costly and may be needed but may also need local government collaboration.
4. Regulatory uncertainty and inconsistency with politics of growth or "free markets" thought to imply freedom to impose costs on others may be cultural obstacles.
5. A hydrologic conditions, seasonality, and local run-off conditions change, storm water and storm anticipation issues must be taken much more seriously. Action before a flood can assure, for example, that trash racks are clean and kept working rather than serving to

collect debris and block culverts, defeating designs for safety. But, whose burden is that? Whose should it be?

6. Similarly, ditches in the past were designed with points of failure, sometimes called “blow-outs” to release very high flows which would further damage the ditch. These points were located under conditions which may have changed substantially, increasing the need for re-design and collaborative redevelopment in some places. This may be well beyond the capacity of a small ditch company.

#### **K. WATER SUPPLY, DROUGHT, CLIMATE**

There is increasing concern over climate variation and weather extremes, changes in flow seasonality, and drought frequency, duration, and severity. The irrigators are especially concerned with how the following issues are affected.

1. Reliability and investment issues, for both new investments and replacements.
2. Water supply and reliability to continue existing irrigation practice appear to be increasingly worrisome even where water rights were said to protect farmers in the past.
3. Water competition poses enormous challenges for irrigation – municipal growth, rural residential development, energy development and changes in water quality after other uses are all threats to continuing farming and to new investments for long-term capital.
4. Municipal competition also interacts with the aging farmers/lack of succession problem for families who fear that they are literally betting the farm on factors far out of control.
5. Urban population growth demanding water supply is often seen as the source of all problems.”

#### **L. WATER LAW**

There are structures in Colorado water law which are felt to strongly favor both the cities and the wealthy. This is a large subject with a substantial literature, but DARCA membership pays close attention to water law issues, and has been both fearful of changes that may adversely affect them, and supportive of stronger defenses against threats to their interests. The pursuit of alternative means of water management has been closely followed by DARCA (throughout the 2003-forward Statewide Water Supply Initiative and the HB05-1177 creation of the Basin Roundtables and the Interbasin Compact Commission, and now through the development of the Colorado State Water Plan. Among the issues particularly mentioned were:

1. The benefits and problems of the no injury rule, affecting both the efficiency of applications and conveyances, and the costs of change (which are low to object and seek to defend against a change, but may be quite high to seek a change; creating an asymmetry of capacity in who can afford to act in what ways).
2. There is also fear of efficiency, in the belief that conversion to more efficient irrigation which uses less water threatens loss of water rights by abandonment. Unused water rights are seen as being at great risk, and this is legally reasonable. Legislative responses, at this time of writing, have again failed except in a limited range of pilot programs for experiments with alternative mechanisms for water transfer.
3. Alternative water transfer mechanisms (ATMs) are detailed in the Colorado State Water Plan, as well as at length in other works, available through the Colorado Water

Conservation Board and DARCA, but without elaboration the common element is allowing transfer of water on some new basis, which may be intermittent from a piece of land, or partial from a water right, but there has not yet been a full trial of allowing a permanent partnership of ownership. Municipal acquisition of water rights from ditches has allowed continuation of irrigation in some places for some specified terms, as lease-backs, and in some cases due to failed plans, but there have been very limited efforts allowed to develop creative new systems. DARCA members are not in agreement on whether this is good or bad.

4. One mechanism garnering increasing support is a water bank strategy in which water can be temporarily re-allocated without loss of ownership or the fear or forfeiture for non-use. An earlier experiment in the Arkansas Valley was not adequately funded or developed, and was not suitable (the consultant on this project has strong views, which are not endorsed or rejected by DARCA).
5. Public-private partnerships in ownership and flexible water management are slowly gaining support but are not widely endorsed or rejected by DARCA members. The lack of clarity in how new systems would work is an important obstacle for serious evaluation.
6. DARCA members in some cases support a bill allowing flexible marketing, (HB15-1-038) which has again failed, but got farther in 2015 than 2014.
7. EPA, federal water law, and the Endangered Species Act as enforced or not were mentioned as barriers to ditch company modernization, new storage, and changes of operations.

#### **M. STATE WATER PLAN**

DARCA members are quite concerned with the State Water Plan as a means of facilitating more loss of irrigation water, though there is also some hope that the plan can improve conservation by cities and perhaps result in lower outdoor water use and other sources of competition with irrigation. There is a great deal of resentment that cities have grown as rapidly as they have and are apparently willing to continue as a pro-growth policy, though DARCA also includes members who favor such policies. One particularly thorny issue is “streamlining” – shall permits for changes and new facilities be made easier or not? On one hand, ditches have been faced with enormous costs and delays seeking to expand their systems or upgrade aging facilities. On the other hand, making it easier to take water away from agriculture is not seen as helpful for conserving the farming way of life which many DARCA members revere and pursue at very high personal costs. There is no single position, but enabling small operations to work more effectively would be supported.

#### **N. ECOSYSTEM EXTERNALITIES/BENEFITS FROM DITCHES**

DARCA members seldom mention this, but in discussions where it was raised, there was some agreement that the qualities of environment which irrigation provides are public benefits that are being enjoyed without charge, rather than properly appreciated and compensated. Some discussions concerned non-monetary respect and consideration such as good law enforcement on encroachment and rights of way as a minimal appreciation. There was also some discussion of how the farming and water distribution has attracted people who love the qualities which they then threaten and disrespect. That usually led back to the need for public education. (The concepts of ecosystem values and beneficial externalities are not commonly discussed in those

terms, but the basic ideas are appreciated.) There was no single DARCA position beyond the comment that support for those values would be timely, appropriate, and should be undertaken.

## APPENDIX A: Planning Considerations for Ditch Companies

**Planning Considerations for Ditch Companies****1. Importance of Planning**

- a. What is the purpose of your ditch company or what is its mission or vision?
  - i. Most ditch companies believe their exclusive purpose is to provide water to farmers and shareholders; however, should these companies look beyond the ditch, for greater opportunities in leases and buy-and-dry alternatives? Should the company have a goal of making a profit and enhancing shareholder value while making water available to its farmers as inexpensively as possible? Is the mission of your ditch company to have a viable organization 100 years from now?
- b. What does prosperity mean to you? For your ditch company, community, agriculture, your family.

**2. Who is doing the planning for your ditch company?** Do you have an obligation to plan in the short run, medium term, and long run? Do you spend your time on big ticket items Do you spend time on planning?

- a. Board of Directors
  - i. Makes the decisions for the benefit of the ditch company and shareholders
  - ii. Requires competent management
  - iii. Need board members with perspective, experience, and skills
  - iv. Duties of a board member – follow the rules, be loyal to the company, and exercise due care
  - v. Examples of poor planning
    1. Hasty decisions
      - a. Some decisions can be carried out quickly
      - b. However, some require much deliberation
    2. Lack of preparation. Do you have the information that you need? Is the info user friendly and clear?
    3. Lack of asking questions, especially when things are unclear.
    4. Lack of review and understanding of a decision and its effects, both intended and unintended.
  - vi. What does your ditch company spend its time on?
    1. Water law
    2. Real estate law – easements, oil and gas
    3. Corporate law – ditch companies are corporate entities
    4. Contracts
    5. Employees, contractors
    6. Taxes, filing requirements, administrative

7. Government regulation compliance
- b. Experts
  - i. How do you select them?
    1. Search? Recommendations? Friends?
  - ii. Engineers
    1. Sought out qualities: Good listener, determine what is really needed, cost effective approach.
  - iii. Lawyers
    1. Sought out qualities: Water expertise, identification with the water community, value concept and heritage of ditch companies, explore new ideas, diplomat, business acumen, long range goals, be able to pick fights that you can win.
  - iv. Accountant or Secretary
  - v. Business Planner
    1. Sought out qualities: anticipating and acting versus reacting, looking for emerging opportunities, looking over the hill, taking a fact and converting into a vision.
    2. Who is the business planner at your ditch company?

### 3. Problems and Opportunities

- a. Double edge sword

### 4. Problem solving technique

- a. Does the problem have one or many solutions?
- b. Answers to solutions - First a people solution (psychological and sociological), then engineering, finally legal.
- c. How do you arrive at decisions?
  - i. System approach, ad hoc, traditional response?

### 5. How do you develop expertise?

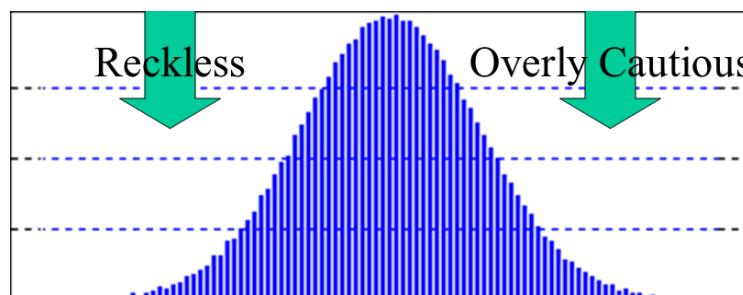
- a. Education, training
- b. Learning from your neighbors

### 6. Are you willing to make the hard decisions?

- a. Are you willing to explore solutions that may be unconventional, require work, or may not appear to be instantaneous?
- b. What do you do to get help with hard decisions?

### 7. Paralysis of Action

- a. Why?
  - i. Fear of the unknown?
  - ii. Fear of liability or risk?



## APPENDIX B: Questionnaire

Thank you, DARCA Members and others! Colorado is quickly moving toward the first State Water Plan, ([www.coloradowaterplan.com](http://www.coloradowaterplan.com)) and DARCA (the Ditch and Reservoir Company Alliance – [www.darca.org](http://www.darca.org)) wants to represent ditch company and irrigator interests in commenting on the State Water Plan, and DARCA also wants to help ditch companies look forward. How can ditch companies better plan for their futures?

DARCA is holding a series of workshops with its members this summer to discuss why it is important for ditch companies to control their futures well as possible, and what is wanted.

**“If you’re not at the table, you’re on the menu!”**

Ditch companies own very valuable water and land, and that land is disappearing into “development” very quickly, while the water is bought for urban growth. But there is also counter-pressure as people are becoming aware of how much local agriculture helps with beauty, local foods that are fresh and wholesome, local economies, and the benefits of working ecology, sometimes called “ecosystem services” which are of great benefit. People love to be near farming (mostly) and are increasingly willing to pay for open space, conservation, and real estate near these amenities, but the race is not going well for keeping the land in farming, so far...

Ditch Companies are special. Because they are groups that already work together and may be able to do many new things together, these remarkable sets of people may be the key to changing the trends of water and land in the West being lost to farming, perhaps forever, and changing the trend of losing farm families and farm futures.

Every ditch is different, every group of farmers is different, every place is different... but maybe there are some kinds of tools and techniques that DARCA can help supply that would work for many places. Maybe not. We want to know what to do to help.

The workshops we are holding and other efforts are to identify impediments to planning

- The survey lists **possible barriers to planning – what gets in the way?** And to getting involved with planning.
- **In each set, please rank** the ones you feel are most important – for Parts I & II, please check the boxes, and give the most important or highest priority item a “3”, the second most important a “2”, and the third most important a “1”.

Any notes and comments are very welcome, of course, and the survey should not take too long and it would help tremendously to know what you think.

Please feel free to contact John McKenzie, Director of DARCA, or John Wiener, researcher at CU working with DARCA on this project.

John McKenzie Tel: 970-412-1960 <[john.mckenzie@darca.org](mailto:john.mckenzie@darca.org)>

John Wiener Tel: 303-492-6746, Mobile: 303-717-6809; [john.wiener@colorado.edu](mailto:john.wiener@colorado.edu)

Barriers to planning – What gets in the way?	Not a concern	Big concern	VERY big concern	PLEASE RANK from – Most important is No. 1 (or 3 stars on the wall at workshops)
We have not considered a role for the company/district in planning for more than water distribution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We feel that this would be an inappropriate or unwelcome intrusion in private business and affairs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We feel that talking about the long term could make members unhappy and perhaps increase conflicts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We don't think our group can work together in new ways.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We do not think we can make a difference by planning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We think it would be too expensive to get involved in planning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We do not know of an example where a group made a successful planning effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We do not have good information on how to do it, such as information from Extension.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We don't have good information on what we might want to consider, such as different crop rotations or ways of farming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We know there are varieties of farming we might consider but we don't think we can afford to make changes, or get them financed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
We fear that we are just facing economic forces too big to deal with, in the value of land and water for non-farming uses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lack of control over input prices (e.g. fertilizer) is a problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lack of control over energy prices (fuel, pumping) is a problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lack of control over financing (e.g. only short-term but not long-term financing) is a problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lack of attractiveness of farming to the family is a problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Increased costs and risks from weather and climate are problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Decreasing reliability of water supply is a problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do you have a long-range goal or vision for your area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do you have planning for farmer succession or next generation, new farmers or similar issues?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WHAT ELSE GETS IN THE WAY? Please let us know your thoughts! Please use back sheet.				

Which resources would be most useful for planning?	Yes – we have and use this	Do not have this or do this	Want to do this	PLEASE RANK FROM 3 TO 1 – Most important is 3, next 2, then 1.
Good basic mapping of the ditches, laterals, topography, rights of way, diversions, soils, drainage, wetlands, forest areas, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
A geographic information system?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Electronic headgate controls, or flow measurement, operating, SCADA or remote gauge reading tools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Looking at land use possibilities or ways for individual farms to collaborate or reduce risks together?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Would there be interest in cooperating on crop timing or crop mixes to meet market opportunities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are there collaborations or deals for sharing equipment or farming resource (e.g. implements etc.)? Rotations across farms?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the board or shareholders talk with local governments about existing land use zoning or planning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do you work to influence or affect local plans for development or programs or policies to influence development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Would you be more active with DARCA involvement, to help bring specialist knowledge or help you get that?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Working with local or regional watershed groups or plans?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Knowing about water quality issues in your source water or potentially affecting the streams or riparian areas to which your irrigation contributes return flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are there Endangered Species or Threatened Species issues related to your source or where return flows go?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Would it help to have some sort of planning process with professional facilitation such as businesses use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Have you held discussions on planning for the water management future?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Would your group like to work with outside landscape design professionals or USDA people on land and farming choices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there discussion about activities across farms? Such as diversification of crops, or livestock? Agritourism?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other tools, information, or resources are needed or wanted? Please use back sheet.				

Please write us about anything we should know or how we can help? And give us your contact information if you would like a reply. THANK YOU!!!!

## APPENDIX C: A message to DARCA members regarding public views and planning issues, before the workshops and 2015 annual meeting.

[NOTE: DARCA leadership communicates often, with an active website, but we also wrote several additional messages about the planning issues and the state water plan. This one may be of interest to others as well.]

Generally, a great deal has been happening with more than 100 meetings held by Basin Roundtables and others, including more than 60 meetings by the staff of Colorado Water Conservation Board with various organizations. Since May, there is a new large document on “Statewide Outreach Status Update – May 2014” that describes that activity (as of May 2014), an update on News and Updates (June 2014), and an update on Draft Framework (dated 08 May 14). The Water Plan is more solidly based in a sense of urgency than it has appeared in the past, due to the dramatically bad weather in 2012 and 2013, and the ending of discussion about climate variability and change for almost everyone.

In the “Water Plan Update” (a 2 page flyer), the staff wrote:

The 27 members of the IBCC, representing every water basin and water interest in Colorado, have agreed that unless action is taken, we will face an undesirable future for Colorado with unacceptable consequences. The IBCC has reached consensus on a number of actions that Colorado must take in the near term to secure our water future. These include conservation, alternative methods of utilizing agricultural water that doesn’t [sic] result in the permanent dry-up of farmland, and support for water projects that meet certain factors [sic].

There will be a document and an on-going process henceforth, and the folks at the table will hear each other better than they hear those who don’t come forth in some way.

There are a lot of differences between the basins and some are reflected in the reports on outreach. Obviously, the small North Platte situation is far from the Metro and South Platte in most terms, but DARCA people may be pleased that agriculture and avoiding buy-and-dry are strong preferences where people were asked to comment. The Arkansas Basin did the most detailed reporting of a “clicker poll” which produced very good reporting of results, by area of the polled person and preferences from each area.

The take-home message is that there is a lot of support for keeping irrigation, and not much opposition, but we do not know if this is the result of those being present when asked already being in favor, or those present having new appreciation with new information, or if those not present would have been disinterested.

One way to go is to accept that there is no way to substitute for real scientific – and expensive – polling that is truly objective, and then experiments that validate claims of will to pay for things such as benefits from being near open space. Without a cheap substitute, a lot of economists use measures such as statistical analyses that sort out being within some distance of open space, and these efforts find that people do pay extra for that... The real estate industry markets carefully.

Given the uncertainties, DARCA might decide to go ahead with all these claims of support and claims that people really do want irrigation to continue and buy-and-dry to be reduced or stopped. In addition, the people who say so are those who care enough to comment or be counted in some way, and that is important. DARCA should seriously consider taking the apparent support at face value and working on comments without arguing over that.

Colorado State University (CSU) POLLING: A note: In the past, public support has been strong, but may be slipping a bit: Here are some highlights from the Colorado State University public polls which are repeated every few years; this is from 2012 report on 2011 polling:

“Overwhelmingly (86%), respondents indicated that the presence of ranches, farms and agriculture was moderately to very important to the quality of life in Colorado. Figure 2 shows that this is a noticeable decrease from the last few years, however—from 96% in 2006 and 95% in 2001. (Emphasis added!)

“... almost 98% mentioned that maintaining water and land in agriculture was very or moderately important, and 80% would support purchasing development rights to maintain those lands. (Emphasis added!)

“... Further, since providing water to agriculture can mean constraints on other uses of water, respondents were asked which uses of water would be their top priority in a dry year—lawns and landscaping; rafting and fishing; agriculture; and maintaining in-stream flows. . . . 77% indicated that agriculture should be the top priority for water allocation in a dry year (similar to previous years’ responses), while 9% said in-stream flow levels should be the top priority (significantly less for this category than in prior years—18% in 2006; 17% in 2001; 23% in 1996. Both lawn and landscaping and rafting and fishing were seen as low priorities for water use (between 2% and 3%—consistent with previous years). (Emphasis added!)

“... A majority of Coloradans felt that it was very important to protect Colorado’s agricultural land and water for a variety of reasons (Figure 5) including food and fiber production (70%), followed by maintaining open space and wild-life habitat (63%), and maintaining jobs and businesses related to agriculture (61%). Only 34% thought that maintaining Colorado’s western heritage was a very important reason for protecting agricultural land and water. (Emphasis added!)

“... When asked about their interest in Colorado foods (Figure 6), more than 90% of Coloradans would definitely or probably buy more Colorado products if they were labeled as such or were more available. In a follow up question about whether they purchased Colorado products when shopping or eating out, 6.5% said “always” and 37% said “most of the time”. Emphasis added!)

Source available: [webdoc.agsci.colostate.edu/DARE/ARPR/ARPR%2012-01.pdf](http://webdoc.agsci.colostate.edu/DARE/ARPR/ARPR%2012-01.pdf) -- Sullins et al. 2012: Colorado Attitudes About Agriculture and Food: 2011 Executive Summary.

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Please SEE ALSO DARCA's Comments to the State Water Plan at [www.darca.org](http://www.darca.org).



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