

will be eligible for retirement between the years of 1990 and 2000. Of these employees, 413 are in the Range Conservationist series. The BLM estimates that only 25-30% of these employees will actually retire when eligible. As with the Forest Service projections, these data do not include entry level Range Conservationist positions being made available through placement of range personnel into non-range positions. Because the total BLM employees increased from 5,000 to 10,000 employees between 1974 and 1980, the BLM anticipates many retirements between the years of 2005 and 2010.

USDI—National Park Service

As of February 1987, 28 Ecologists, 170 General Biologists, and 3,157 Park Rangers were employed by the National Park Service. The NPS projects to hire 18 General Biologists and 529 Park Rangers at the entry level within the next five years. These positions are available to range graduates as well as a host of other graduates from general biology to law enforcement. Calculations are based on the number of employees who are eligible to retire and the assumption these vacancies will be filled

internally, i.e., sequential advancement would result in six promotion opportunities if all selections are made from internal sources. The actual number of promotion opportunities, then, is overstated. However, attrition from factors other than retirement have not been factored in to help offset this overestimation.

These figures for the various federal agencies, although approximations, do alert the Society for Range Management and universities to future opportunity. Cooperation with these various agencies to provide well-qualified, natural-resource-management trained graduates is a must.

Conclusions

The Employment Affairs Committee is concerned about employment for our graduates. Where will the future jobs be? Will our graduates be trained with the necessary skills? What can the employer do? These are vital questions, and our committee hopes you will use these data to prepare for the future—the graduate's future, the universities' future, SRM's future.

Revegetation of Previously Irrigated Cropland: I. Development of a Research and Demonstration Program

P. Lorenz Sutherland, K.L. Conrad, D.A. Miller, J.A. Knapp, and W.G. Hassell

Colorado has five primary river drainage basins; the Platte, Colorado, Arkansas, Rio Grande, and Yampa/Snake. The Arkansas River drainage basin has historically been one of Colorado's richest agricultural areas yielding a wealth of vegetables and grains for decades. The river basin originates at an elevation of 14,433 feet above sea level and consists primarily of the entire southeastern region of the state east of the continental divide (Fig. 1). The Arkansas River leaves the state at an elevation of about 3,400 feet, the lowest point in Colorado. The basin encompasses approximately 26,000 square miles and is characterized by three general geographic areas: the upper reach (Leadville to Canon City), foothills (Canon City to Pueblo), and the irrigated plains region east of Pueblo.

This diverse agricultural area is now undergoing a major change in land use that will alter the complexion and the way of life for generations to come. Irrigation water rights are presently being sold to Colorado's fast-growing cities. Irrigation water removal from tens of thousands of acres results in large areas of abandoned land.

Historical Perspective

Spanish expeditions first explored the Arkansas Valley between 1760 and 1780. Zebulon Pike, Fremont, and Gunnison explored the area in the 1800s. Farming and

ranching settlements were established after Colorado's gold rush of the 1850s. The first three crops grown were alfalfa, watermelon, and cantaloupe (Doll 1987). To support the production of irrigated crops, a network of canals was constructed. Water allocation guidelines had to be developed for orderly water use. The first water right in the Arkansas Valley was decreed in 1861; the last decreed in 1933 under the prior appropriation doctrine of water right allocation.

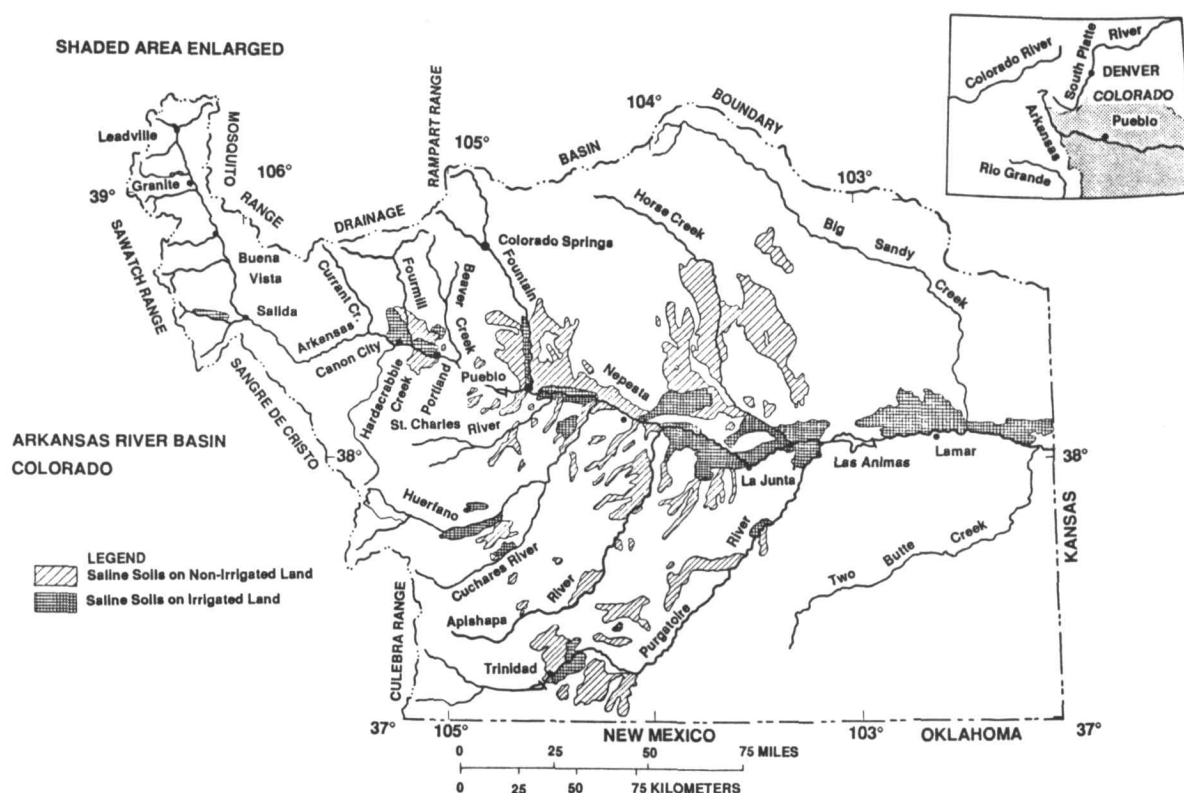
The development of the sugarbeet industry occurred during the early part of the twentieth century. At the height of the sugarbeet industry, as many as twenty-two sugarbeet processing facilities were operated in the lower Arkansas Valley. Beet production began to decline in the 1970's due to low prices and oversupply and subsequently disappeared with the closure of the last processing factory in 1979 (Markoff 1979).

The decline of the sugarbeet industry initiated a period of economic stress in the Valley's irrigated agriculture. Much of the original development, and the ultimate decline of irrigation, has been tied to the sugarbeet industry. Low commodity prices forced further declines in farm economics. Irrigated producers began to look to the sale of water rights as a means of monetary income.

Events and Factors Leading to Land Abandonment

The 1965 sale of Otero Canal Company water rights marked the first major sale of irrigation water in the Arkansas Valley. In the next two decades 58,000 acres out of a total of 304,000 irrigated acres in the Valley were

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affected by water right transfer. An additional 136,000 acres of irrigated cropland have the potential of future water right transfer and abandonment.

Water right sales and transfers have been the primary factor leading to irrigated land abandonment in the Arkansas Valley. Colorado's front range cities have purchased water rights to meet their rapid growth and development needs.

Problems Associated with Land Abandonment

The unique climate and soils of the area pose major problems for land use changes. Annual precipitation of 12 inches or less coupled with high potential evapotranspiration rates, intermittently high water tables, and soil salinity problems make dryland agriculture impractical. Surface soils of the area are highly susceptible to wind erosion when protective residues are absent (Picture 1). Conversion to permanent rangeland by planting perennial species is the most viable longterm option.

Poor water quality, saline soils, and high water tables provide poor growing conditions and limit plant adaptability. It has been shown that the reach of the Arkansas River between La Junta, Colorado and Garden City, Kansas, is the most saline water course of its size in the United States. Only 14% of the total salt load can be attributed to agriculture. The remaining 86% of the salt load results from non-agricultural sources (Miles 1977).

The degradation of water quality by agricultural sources occurs by two processes. First salts are concentrated in the remaining water after water is consumed through crop, phreatophyte, and wetland evapotranspiration.

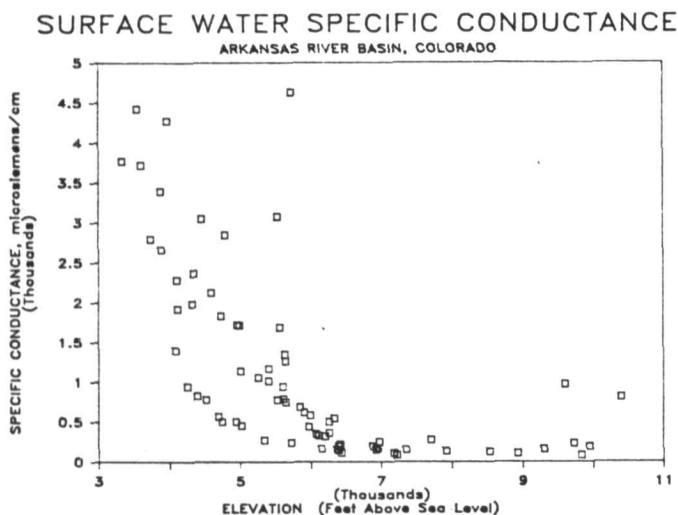


Soil being removed from a concrete lined irrigation ditch filled by wind erosion from the adjacent field.

Secondly, salts are concentrated by irrigation return flows including salt leaching from soil profiles. Figure 1 shows the location of both non-irrigated and irrigated saline soils in which marine shale formations are found in

the profile substratum contain high concentrations of soluble salts which are easily leached and carried with irrigation water return flows to the river. Coupled with the principle of reuse whereby return flows from one irrigation system contribute to the water supply of downstream irrigation systems, management systems which accord the opportunity to limit the salinity effects are required.

The inherent non-agricultural degradation of water quality in the basin is determined largely by the characteristics of the aquifer. Where the basin is underlain by metamorphic and igneous geologic materials, the water is of good to moderate quality. However, downstream from Canon City, the basin is underlain by Cretaceous shales, causing rapid deterioration of ground water quality which in turn increases surface water degradation. Water salinity, as indicated by longterm electrical conductivity measurements (Fig. 2), increases about 50 fold



as one travels from the headwaters of the Arkansas River to the state line separating Colorado and Kansas (Cain 1987). Table (1) shows long-term average values of salinity levels of several selected irrigation canals of the irrigated plains region of the watershed, indicating the severity of both agricultural and non-agricultural related sources.

Salt seeps are becoming more frequent (Picture 2) as water tables within the alluvial river aquifer rise, particularly during years of above-normal mountain snow pack.

Revegetation on Previously Irrigated Lands

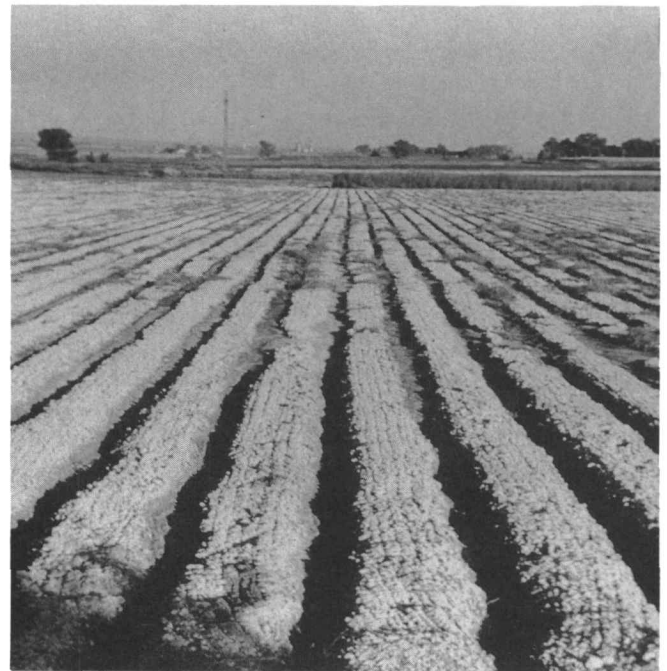
General abandonment of land occurred following the earliest water right transfers. In recent water right transfer cases, the district water court decreed that revegetation is a requirement if water is to be transferred and irrigation water will be available for 1 year to establish permanent vegetation. Unfortunately, information regarding appropriate grass species and seeding techniques is limited.

Research and Demonstration Efforts

Soil Conservation Service (USDA) and university Cooperative Extension Area personnel, combined their efforts

Table 1. Salinity levels of water diverted by several selected canals east of Pueblo, Colorado-Arkansas River Basin.

Canal	Irrigated Area Served	Total Dissolved Solids	
		Volume Weighted Average	Maximum
	---Acres---	-----ppm-----	
Bessemer	20,000	300	770
Colorado	43,000	630	900
Highline	24,000	530	950
Oxford	6,000	500	960
Catlin	18,000	720	1,000
Holbrook	16,000	830	1,000
Rocky Ford	8,000	900	1,200
Fort Lyon	93,000	1,540	2,200
Consolidated	6,000	1,560	3,400
Fort Bent	5,400	2,200	4,300
Keesee	1,400	2,400	4,300
Amity	34,000	1,900	3,600
Lamar	6,000	3,000	5,100
Hyde	1,000	2,300	3,500
X-Y & Graham	4,000	2,100	3,600
Buffalo	3,600	3,000	4,700



Salt accumulation on the surface of this irrigated field.

and expertise to begin plant materials trials in 1979. Two sites representing typical previously irrigated cropland were selected for revegetation trials. Species evaluated in 1.8-acre block plantings at one site included yellow blue-stem, blue grama, alkali sacaton, Atherstone lovegrass, and sideoats grama. Species evaluated at the second site in replicated small plots included: tall wheatgrass, western wheatgrass, Indian ricegrass, switchgrass, Russian wildrye, bristlegrass, galleta, and buffalograss. Irrigation

water was applied once after planting in accordance with the water court decree that one year of irrigation water will be available for grass establishment. 'Arriba' western wheatgrass, commercial Russian wildrye, 'Viva' galleta, 'Hachita' blue grama, and 'Salada' alkali sacaton performed best in the small plot studies. These species were able to compete and survive the heavy annual weed growth. 'Jose' tall wheatgrass, though adapted to salinity, was unable to survive dry conditions after irrigation water removal. Buffalograss stands declined, possibly due to the intense weed competition (Hassell and Knapp 1983). The problems and difficulties encountered in establishing grass at these sites underscored the need for further testing.

Because of the long-term negative effects on natural resources as well as severe social and economic impacts on the community, Soil Conservation District (SCD) Board members felt it was necessary to approach water right buyers and voice their resource concerns. In the fall of 1985 district board members, water right buyers, representatives from the Soil Conservation Service and Colorado State University met to discuss alternatives.

The group recommended a demonstration project to evaluate revegetation techniques of historically irrigated land.

A cooperative agreement creating a demonstration project known as the Arkansas Valley Revegetation project was implemented in December 1985. The project was set up for 5 years with each entity contributing an equal amount of money each year. The Soil Conservation Service agreed to provide technical assistance. Much of the seed for variety trials was provided by the SCS Plant Materials Center at Los Lunas, New Mexico. The 1988 roster of contributing entities includes: City of Aurora, City of Colorado Springs, Foxley Cattle Co., Public Service of Colorado, Pueblo Board of Water Works, Colorado State Soil Conservation Board, and East Otero, West Otero and Timpas Soil Conservation Districts. The Crowley-Otero Association of Soil Conservation Districts, which represents all 4 soil conservation districts in Crowley and Otero counties, administers the project. Major chemical companies have also been strong supporters.

A technical advisory committee consisting of university and SCS personnel was created to set objectives and goals and help design the studies. This committee meets several times each year to help guide the project.

Goals and Objectives

Sutherland and Knapp (1988) concluded that alternate land uses after water right transfer are limited to abandonment, conversion to dryland agriculture, or establishment of permanent rangeland with wildlife and limited livestock uses.

Much of the land affected by water right sale has a history of 50-100 years of irrigation. Soil surface textures range from sandy loam to clay loam. Visible salts at the soil surface are common. Silt content has risen due to

deposition from surface irrigation. Years of tillage equipment mixing has changed soil structure. Inherent soil erodibility is high. Abandoned cropland is unstable and subject to soil erosion for years. The natural process of plant succession to perennial cover takes decades.

Project goals were to address both technical and social problems. Because of the social and economic impacts water right sales have on community livelihood, the project was directed at finding an economically viable alternative to irrigated agriculture. Conversion to permanent rangeland is the most viable option. The project has stressed the need to find a forage that is palatable and nutritious to livestock in the hope that the livestock industry can partially replace the income of irrigated agriculture.

An economic potential exists in the Arkansas Valley for wildlife and recreation industries. Wildlife areas and hunting preserves could provide income opportunities after the sale of water. Evaluation of wildlife compatible species are included in the study.

Soil erosion control is of prime importance. Wind erosion is a certainty between the months of February and May given these soil types and low rainfall patterns. Perennial vegetation establishment is a must. Annual vegetation breaks off at the soil surface, fills fence rows and leaves precious topsoil to blow. Establishment of perennial vegetation by natural succession is a slow and uncertain process. Decades of resource and economic devastation by wind erosion are likely before grass reestablishment.

Simply stated, the objectives of the project are to find species that will control erosion, are well adapted to the region, have high value for livestock grazing, and provide wildlife habitat. The project's goals are to find and demonstrate the best plant establishment methodology including planting procedures, weed control techniques, and irrigation practices when formerly irrigated land is reseeded.

Test plots and field demonstrations were initially directed at selecting adapted grass and shrub species. Tolerance of the selected species to weed control practices such as herbicide and mowing are also evaluated. Plant species and weed control methods have been quantified. Project objectives are now shifting to irrigation water management and grazing management evaluations. Research is now directed at formulating complete revegetation guidelines and recommendations.

Information transfer consists of quarterly and annual progress reports mailed to contributing entities, soil conservation districts, USDA personnel, Extension Service personnel, and interested agriculturalists. Two tours with field plot demonstrations are held each year for contributing entities and the public. Local newspapers and Soil Conservation District newsletters regularly feature articles. A narrated slide-tape presentation was made highlighting the projects' origin and soil conservation district involvement. A video tape presentation outlining recommended revegetation species and techniques was completed in the Fall of 1988.

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Significant Tax Savings with Trust for Minors

John Alan Cohan

For various reasons discussed in this article, creating a trust for minor children, grandchildren, or great-grandchildren can be an effective arrangement for taking advantage of various tax benefits. Some type of gift plan to your children and other heirs constitutes an important component of financial and estate planning. Gifts made outright to minors, other than modest gifts, are usually not recommended, since a minor may lack sufficient maturity to deal with significant assets, and state law generally prevents a minor from dealing effectively with funds except through a legally appointed guardian.

At the same time, it is always desirable to transfer gifts to minors in such a way as to qualify for the \$10,000 annual gift tax exclusion, and to take advantage of comparable estate tax benefits by transferring assets out of your estate.

For some situations it may be advantageous to transfer gifts to minors by use of a simple "custodianship." This procedure permits you to conveniently transfer gifts to minors by use of a designated custodian (usually a close friend or relative), who holds and administers the gift until the minor attains the age of 18 or 21. However, not all types of property may be held in a custodianship, and a distinct disadvantage of this procedure is that the gift must be disbursed outright once the minor attains the age of 18 or 21. Also, certain unfavorable tax consequences may result from using a custodianship.

Special rules of the Internal Revenue Code permit you to create a particular type of trust that qualifies for the annual gift tax exclusion, and allows the flexibility and control over gifts that most donors want. There are several types of trusts available, and each can be an effective estate planning vehicle, not only in terms of taking advantage of the annual gift tax exclusion, but also as an income-shifting tool and estate tax savings measure. Under most arrangements, you would select a trustee, who should be a close friend, relative, or bank trust department. The trustee is given authority to expend trust

funds for the minor donee under certain standards set forth in the trust instrument. For example, the trustee may be directed to spend trust funds for the minor's "support, care, education, comfort and welfare," and for purposes involving "accident, illness, or other emergency."

The trustee can reduce income taxes that would otherwise be paid by carefully timing trust distributions. Any type of property can be transferred into a minor's trust, in contrast to the limitations of a custodianship. Also, the entire value of the gifts to the trust qualify for the annual gift tax exclusion. This type of trust is usually ideal for grandchildren and great-grandchildren. Several trusts for minors can be established in a single document, and all of the funds can be invested and managed together by the same trustee.

The trust procedure also protects any assets placed into trust from claims of the minor's creditors. This type of trust permits you to divest various assets, have them ultimately distributed to minor beneficiaries when they reach a mature age, take advantage of the maximum annual gift tax exclusion and reduce the size of your taxable estate.

Other provisions can grant a beneficiary an income interest for a fixed number of years or even for life. The trust can continue for as many years as you may desire rather than terminating when the beneficiary attains majority age. Another type of trust, referred to as a "Crummey" trust, permits the minor beneficiary to demand outright payment of periodic sums in accordance with a limited withdrawal power, which can be exercised by a guardian or parent.

It is always important to consult a qualified estate planning attorney with experience in living trusts. Many issues will come into focus, particularly if you wish to realize significant estate tax benefits. It is always important to also consider the overall maturity and ability of your beneficiaries to handle particular assets. Finally, the main point to keep in mind in a trust arrangement is the desirability of having an orderly transfer of assets from one generation to the next with minimal red tape and maximum tax benefits.