Paper # 3

National Agricultural Lands Study

Five Case Studies from the Western Region 1980

WRDC Paper No. 3

WRDC
Western Rural Development Center
Oregon State University
Corvallis, OR 97331
(503-754-3621)

A regional center for applied social science and community development cooperating with Land Grant Universities in:
Alaska, Arizona, California, Colorado, Guam, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

These case studies were prepared by Dr. George Casler while he was a visiting professor of economics at Colorado State University, on leave from his prominent post at the department of agricultural economics at Cornell University. Funding was provided by the National Agricultural Lands Study (NALS) and coordination by the Western Rural Development Center (WRDC). These five studies from the West join others from across the nation in an examination of the issues involved in retaining access to productive land for agricultural production.

These case studies should not be interpreted as representing the views or policy of the National Agricultural Lands Study or of the Western Rural Development Center. Rather, they document viewpoints of people involved with the issues in specific areas in the West.

contents

4

Avra Valley Water

The City of Tucson versus Avra Valley Farmers

The Setting

All water users in the Tucson Basin are entirely dependent on groundwater. The Tucson Basin is a broad alluvial valley drained by the Santa Cruz River in southern Arizona and is surrounded by mountains. The City of Tucson lies near the northern edge of the basin, has a metropolitan area population of about 500,000 and is growing rapidly.

The Avra Valley is about 20 miles west of Tucson and although it drains into the Santa Cruz River, it is considered a separate area in terms of groundwater.

Pima County, in which Tucson and the Avra Valley are located, had a civilian labor force of 164,400 in 1974. The largest employer was government (23.3 percent) followed by trade (18.3 percent), and services and miscellaneous (16.2 percent). Agriculture employed 1 percent of the total. Presumably, this is farm employment and does not include employment by farm implement dealers, etc.

The Tucson area receives an average of about 10 to 11 inches of rainfall per year. Except for grazing, the agriculture is based on irrigation. Some of the irrigation is of rather recent development (since the 1940's). Farming in the area is declining in acreage, and with rapid population growth it is rapidly declining in relative economic importance.

The Problem

This case study concentrates on the problem of withdrawal of water by the City of Tucson from the Avra Valley and the resulting competition for water use by farmers for irrigation. A few comments will be made on other water controversies in the area. Space does not permit a full reporting of even the Tucson/Avra Valley controversy. Readers interested in the water problems of the Tucson Basin are referred to a thesis by Adrian H. Griffin which was of great assistance in preparing this case study. Other sources were interviews with Avra Valley farmers, an employee of the City of Tucson, and faculty of the University of Arizona who have studied water problems of the Tucson area.

Irrigation in the Avra Valley started in the late 1940's. W. W. Jarvis, the plaintiff in several court cases described in this study, was the second farmer to buy land and put down an irrigation well. He purchased land in 1950 and planted his first crop in the Avra Valley in 1951. Cotton has been the major crop in the valley for 30 years and now occupies most of the acreage. Other crops are grains, alfalfa, and a relatively small acreage of lettuce.

The peak acreage of irrigated land in the Avra Valley was about 25,000. An additional 8,000 acres was irrigated in the Altar Valley, which drains into the southwestern corner of the Avra Valley.

Like many other areas in Arizona in irrigated farming, the recharge of groundwater is much slower than the withdrawal for irrigation, which on cotton is upwards of 5 acre-feet per year. The original groundwater level in the Avra Valley was around 200 feet. The first Jarvis wells went to 250 feet--enough to allow for drawdown around the wells during pumping. By 1979, the groundwater level was reported to be in the 400- to 500- foot range.

Several events, particularly in the legal arena, that occurred before the City of Tucson began pumping from the Avra Valley in 1968 are important to the issue. Arizona groundwater law places groundwater in a category separate from surface water; as in other western states, surface water is governed by the doctrine of prior appropriation. In Arizona, groundwaters are the property of the person owning the surface above them. One problem is that surface and groundwaters are not entirely separate; groundwater is to some extent recharged by flowing surface waters.

Controversies over groundwater in Arizona led to the passage of the Groundwater Act of 1948, which gave the State Land Commissioner the power to establish critical groundwater areas. A critical area was defined as "any groundwater basin . . . not having sufficient groundwater to provide a reasonably safe supply for irrigation of the cultivated lands in the basin at the then current rates of withdrawal." While the act included many technicalities and had many ramifications, it was intended to prevent the expansion of irrigated agriculture in areas designated as critical. Many people believed the 1948 act to be a weak law passed in desperation, and that it would be replaced by something more permanent and effective.

Two parts of Arizona groundwater law are particularly important to the Avra Valley situation: (1) it was declared a critical area in 1954; and (2) groundwater is not to be taken from one basin (or critical area) to be used in another basin.

In 1968, the City of Tucson, which has several wellfields, began drilling wells on rather small plots of land it owned in the southern part of the Avra Valley. The wells were in the

Marana Critical Groundwater Area, which includes the Avra Valley. The city also began constructing a pipeline to carry the water to Tucson. A number of farmers in the Avra Valley, led by W. W. Jarvis, objected.

The Process and Response

In December 1968, W. W. Jarvis, on behalf of himself and other farmers in the Avra Valley, asked for an injunction which would provide that the City of Tucson be prevented from taking water from the Avra Valley and that the State Land Department cancel any rights-of-way by which Tucson would transport the water to the city. The case reached the Arizona Supreme Court, which held that the city's actions were clearly illegal (Jarvis I). The court further stated that, although the city probably had rights to exercise the power of eminent domain (a point the courts did not decide), compensation must be paid. However, the court did state that payment of damages to farmers would not be a suitable resolution of the case because, in short, the long term future damages would be too difficult to determine.

At the time of the Jarvis I injunction, the City of Tucson had completed its pipeline at a cost of about $3 million, reportedly partly Housing and Urban Development money. The city pumped water from its wells and supplied customers in the Avra Valley, including those in Ryan Field (which overlies the Marana Critical Area), and others not overlying the critical area, but did not pump water to Tucson.

In 1970, Jarvis filed another petition (Jarvis II) asking that the first Jarvis decision be strictly enforced. This petition also asked the court to determine whether Tucson could pump water from the Avra Valley if it purchased irrigated land in the area. This possibility was raised by Justice McFarland in his concurring opinion on Jarvis I. Mr. Jarvis told the author that this idea was first raised by his then attorney, Elmer Coker. Jarvis at the time thought it was a good idea but now thinks probably it was a mistake.

The court decided that Tucson should not be prevented from supplying water to Ryan Field, because it was in the Marana Critical Area and would have the right itself to pump water from the area. The city could not pump water to customers in the Avra Valley outside the Marana Critical Area.

The court also decided that Tucson, if it purchased and retired land in the Marana Critical Area, could pump water from the Avra Valley in "an amount equal to the annual historical maximum use on the land so acquired." It also said that Tucson "may withdraw water from the basin for municipal users to the same extent as water previously withdrawn for use on those lands." A later court case was argued over the meaning of the words in quotes. The water did not have to be pumped from the lands acquired and retired. It could be pumped

from wells owned by the City of Tucson near the upper end of the valley. The city was required to meter its pumpings and report them to the State Land Commissioner.

From 1971 through May 1977, Tucson purchased and retired 12,178 acres (10,387 cultivated) from 19 owners in the Avra Valley. It also acquired the water rights to another 1,520 acres (1,287 cultivated), which had been purchased in Avra Valley by developers whose homes the city would supply. The city owns or has the water rights to 11,674 acres of land formerly irrigated in the Avra Valley out of about 25,000 acres which were once irrigated. No land purchases have been made since 1977.

A third Jarvis case was over the amount of water the City of Tucson could take from the Avra Valley. The city argued that it could pump annually the greatest (maximum) amount of water that had been used in any 1 year that the land had been farmed, while the farmers argued that the city should be restricted to consumptive use, that is pumping less return flow. The court apparently was a bit trapped with its use of "maximum" in Jarvis II but decided in Jarvis III that it should mean "the average of the annual maximum amount of water used." As far as this writer can tell, the court really meant "average annual water use."

In the consumptive use issue, the court decided that there was return flow to the groundwater and that the city should be allowed to take not the amount formerly pumped by irrigators, but only the consumptive use. The court, however, did not place a specific number on the consumptive use, apparently leaving that for "experts" to decide.

Tucson had contended in Jarvis III that it could pump 4.4 acre-feet of water for each acre of land owned or controlled. The consumptive use reportedly has been put at about 2 acre-feet. A city employee stated that Tucson has the right to about 30,000 acre-feet of water per year from the Avra Valley, which is about 2.5 acre-feet per acre if all the water rights result from land formerly irrigated. Some of the rights may come from small plots of land previously owned by the city and from Ryan Field.

The role of farmers other than W. W. Jarvis in the legal proceedings is not clear. The Avra Valley Landowners Association was formed to help the farmers deal with the city, but it was not a party to any of the lawsuits. Farmers other than Jarvis did contribute time and money to the legal process. W. W. Jarvis stated that he had spent $100,000 in time and money, and that farmers in total had spent around $250,000 in time and money on defending their rights to water in the Avra Valley.

Several other legal and legislative actions are likely to be important to the future of irrigation in the Avra Valley.

Two of these involved Farmers' Investment Co. (FICO) against several mines; a third, Tucson against the mines, was closely related. All dealt with moving water out of the Sahuarita-Contintental Critical Groundwater Area south of Tucson. The Groundwater Transfer Act was passed by the Arizona Legislature in April, 1977, at least partly as a result of these three cases and perhaps the Jarvis cases. This act allowed transfers of water out of areas not designated critical groundwater areas. Those transferring groundwater out of critical groundwater areas before January 1, 1977, were allowed to continue to transfer the same amount by obtaining a certificate of exemption from the State Land Department; they also could obtain a certificate for a new transfer by retiring land. Perhaps Jarvis II had set the precedent. Anyone who was transferring irrigation groundwater out of a critical area before January 1, 1977, could continue to do so without securing a certificate of exemption. The act, which was intended to be temporary, also continued a number of other provisions. Its final provision established a Groundwater Management Study Commission, which was to examine present and future use of water in Arizona and prepare legislation for improvement in the groundwater use situation. The commission was to have made a final report on December 31, 1979, but was unable to prepare a report that satisfied farmers, municipalities, and mines. The commission was supposed to present a final plan at the time this author was in Tucson; it did not but presumably will in the near future. If the legislature fails to pass a new groundwater code by September, 1981, the plan recommended by the commission will become law.

An interesting sidelight of the Tucson/Avra Valley case is a proposal whereby Tucson would trade treated sewage effluent to farmers for irrigation in return for rights to pump fresh water (Cluff, et al.). While there would be some problems such as storage of effluent (because it is produced daily but needed for irrigation only during the growing season) and a canal and laterals needed to transport it back to the farms, there would be benefits from the nitrogen and phosphorus content which could reduce fertilizer needs. Some sewage water is now blended with fresh water in the Cataro-Marana Irrigation District (adjacent to Avra Valley) and in other areas of Arizona. Some farmers say sewage water won't work. One Avra Valley farmer, who had farmed with sewage water at another location, reported that it produced lots of foliage but no cotton. Another reported that he knew two farmers who had gone broke farming with sewage water. However, some sewage water blended with fresh water probably is feasible.

The real problem with the sewage water proposal is that it does not provide a net addition to the water supply. Tucson's effluent is returned to the Santa Cruz River which is otherwise dry, except during floods. It has been estimated that 5 to 15 percent of the effluent evaporates; the remainder soaks in and returns to the groundwater. A major portion of this recharges what has been classified as an underground stream to which the

Cataro-Marana Irrigation District has an appropriative right to 29,190 acre-feet per year. It lifts this water about 100 feet and uses it mostly in the Marana area (part of or at least adjacent to the Avra Valley), where it also pumps 13,130 acre-feet at a 350-foot lift. The Cataro area is continually recharged and the water table is not dropping. The author was told that if Tucson transported sewage water to the Avra Valley in exchange for fresh water, that the water table in the Cataro area would drop. It would be a matter of robbing Cataro to help out Avra. So it appears that the idea of trading sewage water for fresh water in the Avra Valley to keep the land under irrigation is largely a mirage.

Results

Over 10,000 acres of farmland in the Avra Valley, formerly irrigated and growing mostly cotton, now is owned by Tucson and lies idle. This land is capable of producing around 2 1/2 bales or more of cotton per acre. A major problem of the idle land is that it does not soon return to the desert brush it grew before irrigation. It grows a profusion of tumbleweeds which die and blow onto farmland, filling irrigation ditches, and worse, landing in large numbers on cottonfields ready to be picked. The city has paid damages to several farmers because of tumbleweeds.

All landowners who sold land to the City of Tucson did so voluntarily--not through condemnation. Prices paid reportedly were about what land would have sold for as farmland. At the time the city was purchasing land, pumping costs were increasing due to the lowered water table and higher energy costs, and cotton prices were depressed. Therefore, it was relatively easy for the city to find willing sellers.

Some farmers in Avra Valley are quite upset about the fact that Tucson is pumping water from the Avra Valley. Some apparently believe that the city is withdrawing more water than farmers would if they were still irrigating the land that is now idle. Currently, this is not the case because the city is withdrawing only 18,000 of their 30,000 acre-feet yearly right. Even if the city pumped 30,000 acre-feet per year, it probably would be withdrawing less than if the land were still irrigated, because the consumptive use for irrigation is probably a greater proportion of water applied than that used in determining the city's water right.

The real problem of water in the Avra Valley is that irrigation was withdrawing water much more rapidly than recharging it and the water table was dropping rapidly, which meant increased pumping cost. Tucson's pumping likely has not worsened this situation and perhaps has helped it. However, the fact that the city's wells are near the upper end of the valley so that "Tucson gets its water first" irritates some farmers.

A new group to be named the Avra Valley Irrigation District is being formed and includes most of the Avra Valley farmers and some in the Altar Valley. It has several purposes, among which are to give farmers power to deal with the city, a voice on the new groundwater law, and the legal status to receive Central Arizona Project (CAP) water. The new group is at least partially an outgrowth of the Avra Valley Landowners Association.

At the time the writer visited Tucson and the Avra Valley, the situation seemed to be somewhat at a standstill. The city was waiting for the new groundwater law before acquiring more water or acting to solve the idle land problem. Both the city and the farmers seemed to feel that CAP water would substantially alleviate the problem of competition for groundwater. While the city probably can well afford to pay for CAP water, it may be too expensive for the farms. The Papago Indians have filed a suit over water rights for their reservation, which may result in the Indians getting either groundwater or a large share of the CAP water or both.

Lessons

Landowners in the Avra Valley voluntarily sold land to Tucson. It is unlikely that the water table in the valley is dropping faster than if the idle land were still being irrigated. Then why are many Avra Valley landowners unhappy? They may be unhappy for many reasons, but they seem to have two legitimate complaints: (1) They should not have had to spend a very substantial amount of time and money to force the City of Tucson to buy land in the Avra Valley. The city has no legal right to pump from the Avra Valley. (2) The failure of the city to care for the idle land has resulted in weed problems that have caused financial harm to farmers in the Avra Valley. The farmers should not have had to bear this burden.

With regard to the second problem, it could be argued that the city should have taken more responsible action in caring for the land. Farmers have suggested that grazing when the tumbleweeds are small would solve or at least alleviate the problem. Apparently, the city ignored the problem for several years but now is attempting to solve it. The city would like to plant grass on the land and try to return it to rangeland. Some water would be needed at least for initial grass establishment. The city cannot use its water for this purpose, because the law does not allow split uses of water (e.g., municipal and irrigation). The city also apparently has the mistaken belief that the Avra Valley was once good range grassland, when in fact it was always desert brush. Therefore, the grass reestablishment plan may not work--even if water were available. The long term solution to the idle land problem is not readily apparent, but perhaps frank discussion between the city and the Avra Valley Irrigation District members would help.

The alleviation of the first complaint has many ramifications. It is not likely that the farmers will get back the time and money spent on legal matters. Many more legal battles over Arizona groundwater are possible. Farmers seem to believe that the new groundwater law will weaken their position. Farmers feel that agriculture made the State of Arizona, and now the water is being taken away from them for ever-increasing demands for urbanization and industrialization. Researchers at the University of Arizona have pointed out that there are a number of opportunities for water conservation in an urbanizing society, but their suggestions have to a large extent fallen on deaf ears.

Clearly the Tucson/Avra Valley water controversy is a part of the much larger issue of the use of both groundwater and surface water and projects such as CAP. It is quite possible that irrigation in the Avra Valley will completely disappear. Unfortunately for Arizona farmers, irrigated agriculture uses lots of water--and this water has higher economic value in other uses.

References

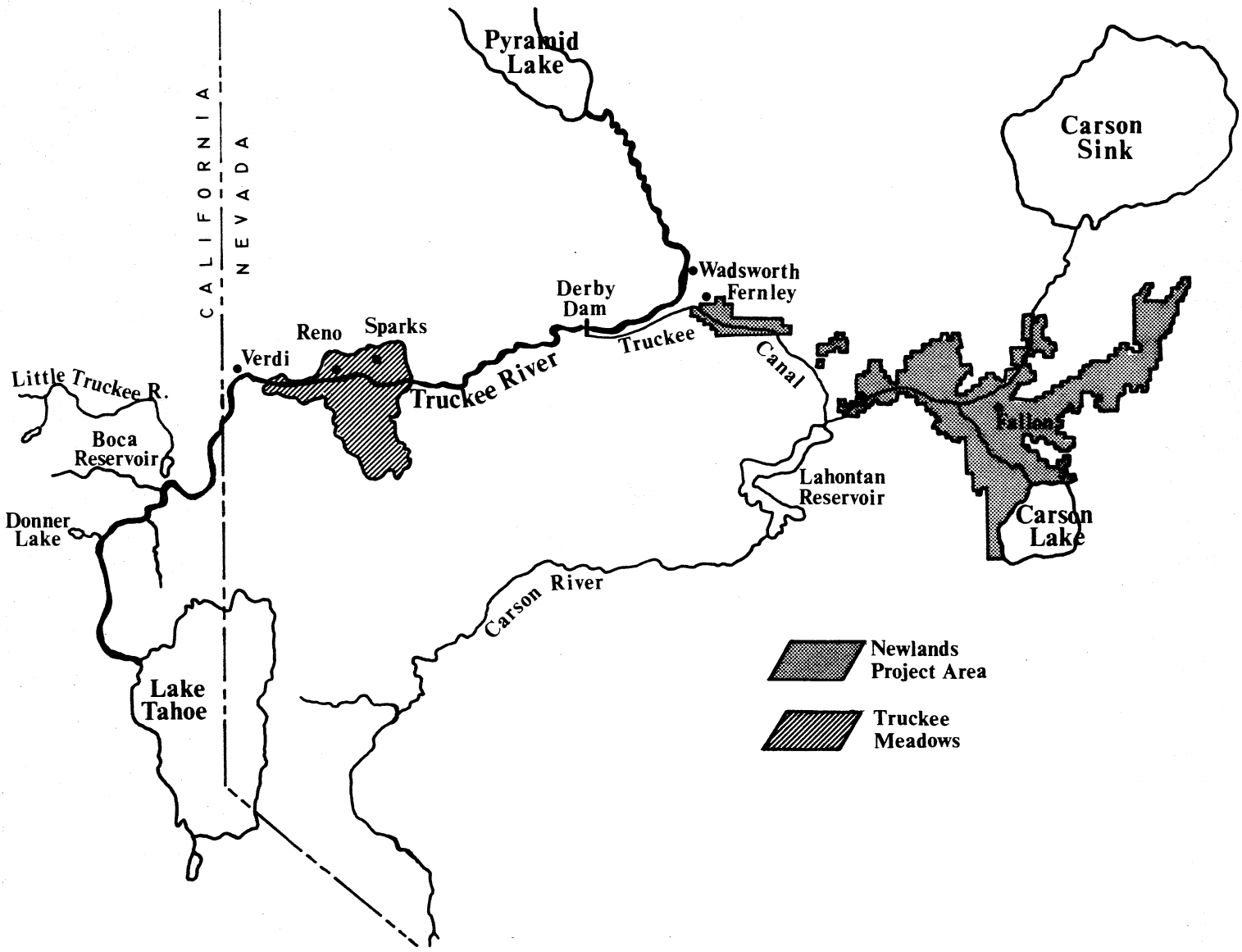
Cluff, C. B., K. J. DeCook and W. G. Matlock. "Technical, Economic and Legal Aspects Involved in the Exchange of Sewage Effluent for Irrigation Water for Municipal Use: Case Study - City of Tucson, University of Arizona."

Griffin, Adrian H. "An Economic and Institutional Appraisal of the Water Problem Facing the Tucson Basin." Ph.D. thesis (in process), University of Arizona, Tucson, 1980.

Jarvis I, II, and III, Cases in the Supreme Court of the State of Arizona.

Truckee River Water

Truckee-Carson Irrigation District versus Pyramid Lake


Pyramid Lake
Carson Sink
CALIFORNIA
NEVADA
Wadsworth
Fernley
Derby Dam
Truckee Canal
Reno
Sparks
Verdi
Little Truckee R.
Truckee River
Boca Reservoir
Donner Lake
Lahontan Reservoir
Fallon
Carson Lake
Carson River
Lake Tahoe
Newlands Project Area
Truckee Meadows

This case study is concerned with conflicts over rights for use of Truckee River water after it leaves Lake Tahoe. It is based on interviews with the Federal Water Master for the Truckee River, farmers, directors and management of the Truckee-Carson Irrigation District, faculty members and Extension field staff at the University of Nevada-Reno, Nevada state officials, and on court documents and material in the references.

The conflict over Truckee River water has a long and complicated history which cannot be fully explained in a brief report. This report concentrates mainly on the water rights of farmers in the Truckee-Carson Irrigation District who use both Truckee and Carson water. There may be errors in interpretation of the legal history.

The Setting

The Truckee River originates on the California side of Lake Tahoe and terminates in Pyramid Lake, which is surrounded by the Pyramid Lake Paiute Indian Reservation of 475,000 acres in Nevada (see map). The river flows through the Reno-Sparks area, which has experienced rapid population growth particularly during the late 1970's. A significant portion of the water once used to irrigate farmland near Reno in Truckee Meadows is now used for municipal purposes. Farther downstream in the Fernley-Fallon area, Truckee water, along with water from the Carson River is used by the Truckee-Carson Irrigation District (TCID) to irrigate farmland in the Newlands Project Area. There is also a substantial amount of private irrigation development along the Carson above Lahontan Reservoir.

While the economy in the Reno-Sparks area is dominated by urban development related to the hotel-casino industry, Churchill County (in which Fallon and most of the Newlands are located) and Lyon County (in which Fernley and the remainder of Newlands are located) are highly dependent on agriculture. In 1970, 14 and 15 percent of the employment in Lyon and Churchill counties, respectively, was in agriculture, forestry, and fishing

(mostly farming). Assuming a multiplier of 3, probably between 40 and 50 percent of the employment in those counties was based on agriculture in 1970. Because the average annual precipitation in these counties is less than 10 inches, crop production is dependent upon irrigation. While no estimate of the percentage of farm income that comes from irrigated farming is available for these counties, there is no doubt that a high proportion of the farm income is derived from irrigated land.

There is relatively little industry in the Fernley-Fallon area, but a naval air base near Fallon employs a substantial number of people.

According to the manager of TCID, about 73,000 acres of cropland is irrigated in the TCID. About 60 percent of the land is in alfalfa hay, 25 percent in small grains and corn silage, and 15 percent in pasture. A small amount, perhaps 1 percent, of the land is in honeydew melons. In addition there are 50,000 acres in the Carson Pasture which is used by TCID members for community pasture. Actually, only about 20,000 acres of this is irrigated.

The TCID has nearly 2,000 water users, many of whom have less than 20 acres of irrigated land and are not eligible to vote in elections for members of the board of directors. The number of farms in the TCID is about 500, depending on what is considered a farm. With a few exceptions, most of the farms are not large. A substantial portion of the crops produced in the district are fed to either dairy or beef cattle in the area. A large amount of alfalfa hay is shipped to California and enjoys an excellent reputation with livestock producers in that state.

The Problem

From the point of view of farmers, board members and the management of TCID, the problem lies in a series of attempts to restrict the amount of water to which TCID is entitled for irrigation purposes. The most recent attempt is a lawsuit by the United States and the Pyramid Lake Paiute Tribe of Indians (PLPTI) v. TCID, State of Nevada, Sierra Pacific Power Company, City of Reno, City of Sparks, County of Washoe and Washoe County Treasurer, Trustee, Albert A. Alcorn and approximately 17,000 other individually named persons, firms, partnerships, and corporations. The purpose of this suit was to increase the amount of Truckee River water going to Pyramid Lake. The suit was dismissed by the United States District Court for the District of Nevada on December 8, 1977, but an appeal was heard in April 1980 and a decision is likely to be made within a year.

The apparent reason for the lawsuit is a decline of about 80 feet in the level of Pyramid Lake since 1890, most of which seems to have occurred between 1910 and 1960. Pyramid Lake has no outlet. It was the home of the Lahontan cutthroat trout,

the basis for a famous fishery which ceased to exist about 1938 largely because the reduced lake level made the lower river nearly inaccessible for spawning. The decline of the fishery affected the Indians' livelihood by reducing their traditional food source and by loss of revenue from the sale of fishing permits. The Bureau of Indian Affairs has spent millions of dollars to restore the fishery by introducing a related trout species and building a fishway and elevator to make spawning possible. This project has not been very successful. The USA-PLPTI suit sought to increase the flow of Truckee River water to aid spawning and to prevent or at least reduce further decline in the level and the resulting increase in salt content of Pyramid Lake.

The Process and Response

To even partially understand the Truckee River water controversy, a review of some of the history of TCID and legal battles is necessary. This review is based on Caulfield (1964), McNeely (1971), Mahannah, et al. (1975), court documents, and interviews. The United States Department of Interior has a long history of involvement in both the Truckee and Carson Rivers.

Nevada Water Law is the appropriation doctrine whereby one acquires a right to the use of water by diverting it to a reasonable and beneficial use. Rights are based on date of appropriation.

The Pyramid Lake Indian Reservation was set aside for the use of the Paiute Indians living there by an instruction issued by the Secretary of the Interior on December 8, 1859. This instruction later formed the basis for the priority of water rights decreed to lands of the reservation.

The Newlands Project was one of the first five sites selected for construction after the passage of the Reclamation Act of 1902. In 1905, it became the first to deliver water. In 1915, the Derby Dam on the Truckee River, the Truckee Canal, and the Lahontan Reservoir were completed. These structures allowed a substantial amount of water to be diverted from the Truckee River for irrigation of the Newlands Project, and for other purposes such as hydroelectric power generation at Lahontan Dam. The Lahontan Dam is on the Carson River; both Carson and Truckee water are used in the Newlands Project.

The TCID was organized in 1918 to provide a legal operating entity for the irrigators on the Newlands Project. In 1926, TCID entered into an agreement with the United States to operate the Lahontan Dam, the water distribution system and storage facilities at Lake Tahoe to which the U.S. had gained control through a federal court decree in 1915. The agreement provided that the U.S. not develop the water of the Truckee and Carson Rivers for other uses until a supply adequate to

irrigate 87,500 acres within the district was available. The contract also provided for repayment by TCID of the reimbursable part ($3.5 million) of the construction costs of the project.

The Truckee River Agreement of 1935 among the United States, TCID, the Washoe County Conservation District, the Sierra Pacific Power Company (SPPC), and about 80 percent of the other users of Truckee water was an attempt to solve problems related to a supply of water less than the amount to which these parties and others had water rights. This agreement is rather complicated. It provided for a maximum level for Lake Tahoe and minimum flow levels at Iceland Gauge at Floriston near the California-Nevada border. The SPPC was allowed to divert no more than 40 cubic feet per second for power generation, and a limit was placed on the amount that SPPC could divert for municipal, industrial, and domestic use in the Reno-Sparks area. SPPC is a water company as well as a power company. The remaining flow is allocated 31 percent to TCID, and 69 percent to Washoe County Conservation District and other owners of water rights between Iceland Gauge and Derby Dam. The agreement did not include users below Derby Dam, of which the Pyramid Lake Indian Reservation is important to this study.

The Federal Court Decree of 1944 was issued in the case of the United States v. Orr Water Ditch Company after 30 years of litigation. This decree stated that the United States has a right to water for the Pyramid Lake Indian Reservation to irrigate 3,131 acres of bottom land (14,742 acre-feet of water) and 2,745 acres of benchland (about 15,300 acre-feet of water) for a total of about 30,000 acre-feet of water annually. The right provides for diversion of 4.71 acre-feet per acre of bottom land and 5.59 acre-feet per acre of benchland actually irrigated in the year the water is diverted. If the acreage irrigated is less than the numbers above, the legal diversion is less than 30,000 acre-feet of water. The priority date on this water right is December 8, 1859, the day the reservation was created by the Secretary of the Interior. The United States apparently holds the water right in trust for the Pyramid Lake Indians, because this reservation was created by executive order.

The decree also stated that the United States has a right with a July 2, 1902, priority to divert 1,500 cubic feet per second of Truckee water for storage, power, domestic, and other purposes in connection with the Newlands Project. This water right is for water diverted through the Truckee Canal for irrigation of 232,800 acres in the Newlands Project. A limit of 3.5 acre-feet per acre of bottom land and 4.5 acre-feet per acre of benchland actually irrigated was included in the decree. These limits refer to the amount of water actually placed on the land after storage and transportation losses. While the original plans for the Newlands Project called for 232,800 acres, the 1926 contract provided for water for 87,500 acres.

The 1944 decree also entitled SPPC and 54 ditches and 630 individual claimants to water rights. These claimants have priority dates of 1867 to 1921 for irrigation purposes ranging from 3.25 to 5.00 acre-feet per acre on a total of 35,090.6 acres, most of which is in the Truckee Meadows area.

The Tripartite Agreement of 1948 among TCID, the Nevada State Board of Fish and Game Commissioners, and the Fish and Wildlife Service of the U.S. Department of Interior set aside 163,078 acres of custodial land northeast of and downstream from the Newlands Project as the Stillwater Wildlife Management Area--primarily for waterfowl (ducks). This area has the use, free of charge, of all waste-water not used by TCID.

The Nine-Point Agreement between TCID and the Department of Interior resulted from a 1964 report by a Department of Interior task force chaired by Henry Caulfield. The nine points, according to McNeely, were aimed at minimizing the use of Truckee River water and maximizing the efficient use of Carson River water in the Newlands Project. One part of the agreement stated that the water supply provision of the 1926 TCID contract would be satisfied by the delivery of a firm supply of 406,000 acre-feet annually to TCID from the Truckee and Carson Rivers via the Truckee Canal and Lahontan Reservoir. The 406,000 acre-feet limitation was agreed upon in February 1967 to take effect in September 1967 and was expected to save 42,000 acre-feet of water annually.

The 1973 Gessel Decision in the Pyramid Lake Paiute Tribe v. the Secretary of the Interior ordered the Secretary to adopt new Truckee-Carson operating criteria, which would reduce the total diversion from the two rivers for TCID to 288,120 acre-feet annually. This is a reduction of about 118,000 acre-feet from the 406,000 limitation, and 104,000 from the 1970-73 average diversion of 392,000.

TCID did not comply with the 288,000 acre-foot limitation, and on September 21, 1973, the Secretary of the Interior announced that he had notified TCID that its contract for management of irrigation of the Newlands Project would be terminated October 31, 1974. This termination has not been carried out.

The U.S. and Pyramid Lake Paiute Tribe of Indians (PLPTI) v. TCID, et al. suit filed in December 1973 was dismissed with prejudice in December 1977 and is now under appeal. This suit contended that the Tribe has rights with an 1859 priority to enough Truckee River water (375,000 to 400,000 acre-feet annually) to maintain the level of Pyramid Lake and to operate a fishery in the river. The suit alleges that enough water is wasted by TCID and other upstream users which, if saved, could supply the claimed needs for the PLPTI.

The water balance of Pyramid Lake needs explanation. In 1960, the lake had a surface of 110,000 acres. No water runs

out of the lake, but evaporation loss is estimated to average 440,000 acre-feet per year. This is partially offset by 55,000 acre-feet per year of direct precipitation on the lake. Average annual inflow has been estimated by various persons and agencies to be from 195,000 to 320,000 acre-feet per year. One estimate indicates that the historical supply passing the Derby Dam in the Truckee River averages 249,000 acre-feet per year. (Of this, PLPTI has a right to 30,000 acre-feet for irrigation--but actual use is much less.) If the 1973 Gessel Decision were abided by, 104,000 acre-feet per year of TCID water and 32,000 acre-feet per year of other Truckee water presumably would flow to Pyramid Lake and balance inflow with evaporation.

The Washoe Project, which was approved by the United States in 1956, allowed for construction of upstream reservoirs in both the Truckee and Carson Rivers. This project was primarily to provide for flood control, municipal water, recreation, and some water storage for TCID. The project was expected to reduce inflow to Pyramid Lake by 40,000 acre-feet per year.

The Department of Interior task force chaired by Caulfield was an attempt to resolve some of the problems relative to Truckee and Carson River water, so that a contract could be approved between the United States and the Carson-Truckee Water Conservancy District for repayment of reimbursable features of the Washoe Project. Secretary Udall instructed the task force to try to provide all the water possible to Pyramid Lake consistent with the water rights of others.

The California-Nevada Interstate Compact, which would divide Truckee, Carson, and Walker River water between the states, gives 90 percent of the Truckee water to Nevada. This compact was approved by both states in 1971 after 13 years of negotiation. It awaits approval by the U.S. Congress. Some people think the holdup is because of a fear that it would adversely affect PLPTI's claim to water rights.

Results

So far, TCID has not actually lost the rights to any water needed for irrigation of the 73,000 acres of land irrigated. It did give up water for winter power generation at Lahontan Dam and at a drop in one of its canals. Dick Lattin, manager of TCID and also the operator of an irrigated farm in the district, stated that TCID has no legal obligation to abide by either the 288,000 or 406,000 acre-foot limitations. TCID did agree in 1969 to the 406,000 acre-foot limitation, but the U.S. government has not lived up to its part of the agreement. Therefore, TCID has no obligation to the 406,000 acre-foot limit.

TCID reportedly has spent an average of $100 thousand per year for the last 10 years on legal fees to defend its

water rights against claims by the United States and the Pyramid Lake Paiute Tribe of Indians. So far, this cost has been much more important than the loss of water to the district. Loss of water has been for winter power rather than loss of irrigation water.

Dick Lattin stated that the United States has not lived up to its agreements with TCID. Therefore, TCID will meet the U.S. in court on everything. If the appeal of the U.S. and PLPTI v. TCID, et al. case goes against TCID, the district will take it to the Supreme Court.

Another example of a conflict between TCID and the United States was given by Mr. Lattin. Under the Safety of Dams law, the spillway of the Lahontan Dam must be rebuilt because it does not meet the 1,000-year flood standard of 30,000 cubic feet per second coming over the spillway. The spillway was originally built with substandard concrete to handle 26,000 cubic feet per second. The highest flow recorded in the Carson River since the dam was built is 9,000 cubic feet per second. He believes that because the original construction was substandard and the flow standard is now higher than the original design, it should be the responsibility of the United States to pay the $5 million rebuilding cost. However, the government now intends to make the cost reimbursable by TCID.

TCID is also one of the defendants in a case brought by the United States against Carson River water users. With respect to TCID, the U.S. is attempting to impose a maximum of 2.92 acre-feet per acre. While TCID could legally use more Carson River water, it is voluntarily staying within limits of 3.5 and 4.5 acre-feet per acre for bottom and benchlands, respectively.

Water conservation in TCID

The U.S. and PLPTI v. TCID, et al. suit contends that there is a lot of water wasted by TCID which, if saved, could be used to stabilize Pyramid Lake and improve the fishery in the lake and the Truckee River. Some of the elements of this very complicated issue will be discussed here.

The Stillwater Wildlife Management Area has been supplied by water from three sources, all related to TCID: 1) drainage water from irrigation; 2) water used for winter power (no longer a source); and 3) flood control releases and spills at Lahontan Dam. If less water is used by TCID, less water will flow to Stillwater--unless Truckee-Carson water is delivered directly to Stillwater.

It has been alleged by the Pyramid Lake Task Force organized by Nevada, California, and the Secretary of Interior, as well as by the Sierra Club Pyramid Lake Task Force and others that water is used very inefficiently by TCID in irrigating the

Newlands Project. The studies by Mahannah, et al. and Guitjens and Mahannah suggest that the project is not nearly as inefficient as the task forces and popular opinion believe. Apparently, many people believe that because the project is old, it must be inefficient; if new technology were adopted, efficiency could be greatly increased. The studies have two parts: 1) field and lysimeter studies at Newlands; and 2) a comparison of irrigation efficiency at Newlands with other U.S. Bureau of Reclamation (USBR) projects. Space precludes a complete review of these studies, but a few of the conclusions will be reported.

The field and lysimeter studies indicate that consumptive use (evapotranspiration) to produce good crop yields in the project is 4.0 to 4.6 acre-feet per acre. Using the 4.0 and adding the leaching requirement and subtracting precipitation, the requirement is 4.3 acre-feet per acre at the cropped surface. To irrigate 64,000 acres would require 280,000 acre-feet. At a 75 percent farm irrigation efficiency, which is higher than actually achieved at Newlands and most other projects, the delivery at farm headgates would need to be 370,000 acre-feet. Conveyance losses (evaporation, terminal spills, and unrecovered seepage) are estimated to be 22,000 acre-feet; therefore, a total of 392,000 acre-feet must be diverted from Lahontan Dam and the Truckee Canal to meet the irrigation requirements of Newlands. This amount is far more than the 288,120 acre-foot limit which the Secretary of Interior was ordered to impose by the 1973 Gessel Decision. Furthermore, water for neither the Carson Pasture nor the wildlife management areas is included in the 392,000 acre-feet.

The comparision of Newlands with other USBR projects indicates a conveyance efficiency of 59 percent, and overall efficiency of 35 percent for Newlands; averages of 70 percent and 42 percent on the same items were found for 238 USBR projects. While this comparison suggests that Newlands is less efficient than the average of USBR projects, it also indicates efficiency is low on most projects. The overall efficiency comparison assumes that all projects have a farm efficiency of 60 percent; this is probably unfair to Newlands because it has a unique "high head" conveyance system which allows farmers to irrigate rapidly and efficiently. Additional calculations by Mahannah, et al. which account for reuse of conveyance seepage, farm deep seepage, and farm surface runoff result in a 70 percent overall efficiency for Newlands.

Experimental work on sprinkler irrigation as a substitute for flood irrigation in Newlands is being conducted by the University of Nevada-Reno. While the results on the potential for increased water efficiency are not in, there is a concern over the increased energy requirement and potential alfalfa disease problems associated with sprinkler irrigation.

Transfer of water rights

Land in the Newlands Project which is eligible to be irrigated (has water rights) was largely determined years ago. Advances in technology such as land leveling have made it possible to irrigate land that does not have water rights. Several farmers expressed the opinion that it should be possible for them to transfer water rights from the land under their farmsteads which is not irrigated to areas they own which have no rights--but this is illegal.

There is another aspect of water-rights transfer that will need to be faced in the future. Water for urban development in the Reno-Sparks area has been made available by the purchase of water rights by SPPC from holders who formerly used the rights for irrigation in the Truckee Meadows. Through 1969, SPPC had acquired a total of 21,394 acre-feet of rights, and it acquired 300 to 1,000 acre-feet per year during the 1970's. Whether SPPC can continue to supply the growing Reno-Sparks with water by purchasing rights in the Truckee Meadows area is questionable. TCID farmers see two problems related to this: 1) There may be legal action to force transfer of Newlands water to municipal uses. One TCID farmer indicated that his parents had been forced years ago to sell water rights in the Owens Valley of California to the city of Los Angeles. 2) The 1926 contract prevents TCID members from voluntarily selling water rights for use on land without Newlands water rights; in other words, water rights could not be sold to SPPC for use in the Reno-Sparks area. The water rights apparently are held by the United States in trust for use by TCID members. Some TCID members apparently believe they should have the right to voluntarily sell water rights if that is more profitable than irrigating, particularly if there is a potential that they could be forced to sell. However, others do not believe they should have the right to sell. An interesting sidelight is that SPPC has paid a maximum of $50 per acre-foot for water rights; this seems extremely low for this supposedly water-short area when water rights in other areas such as the Front Range of Colorado sell for $800 to $3,000 or more per acre-foot.

Lessons

With the benefit of hindsight, it can be stated that a large part of the Pyramid Lake Truckee-Carson Irrigation District controversy was created by the United States government--particularly the Department of Interior (which includes the Bureau of Indian Affairs, Bureau of Reclamation, and the Fish and Wildlife Service). The provision of water for the Newlands Project substantially diminished the flow of water to Pyramid Lake and is at least partly responsible for the reported 80-foot drop in the lake level since about 1850, most of which apparently occurred between 1910 and 1960. Part of the problem was an overestimate of the amount of water flowing down the Truckee River.

It could be argued that the United States did not take proper actions to assure that Pyramid Lake would receive enough water to maintain its level and fishery and therefore did not treat the Pyramid Lake Paiute Tribe of Indians properly. If so, the Department of Interior appears to be at fault. Apparently, the Department of Interior did not recognize in the early 1900's that Pyramid Lake was a valuable resource. The decision in the U.S. and PLPTI v. TCID, et al. clearly indicates that the U.S. and PLPTI do not have a prior legal right to water beyond the 30,000 acre-feet in the Federal Court Decree of 1944.

Irrigated farming requires a lot of water. The potential for reduced water use in the Newlands Project while maintaining crop output at current levels appears to this author to be rather small. Even if a substantial reduction could be made without affecting production, part of the savings would need to be delivered directly to the Stillwater area if the wildlife refuge is to be maintained.

References

Caulfield, H. P., Task Force Chairman. "Action Program for Resource Development: Truckee and Carson River Basins." California-Nevada, 1964.

Guitjens, J. C. and C. N. Mahannah. "Newlands Project Water Study: Summary." College of Agriculture B 40, University of Nevada-Reno, 1976.

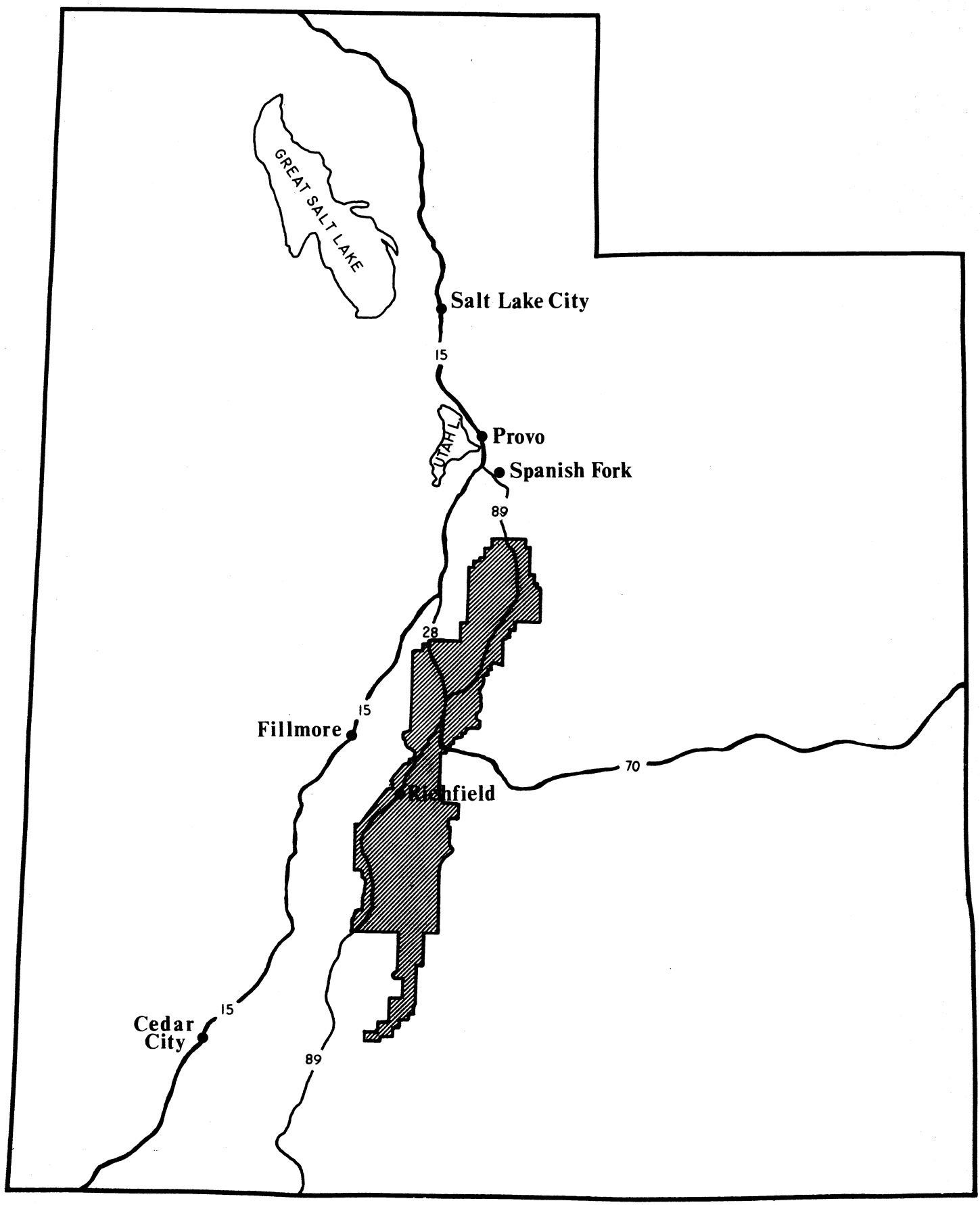
Mahannah, C. N., J. C. Guitjens, and C. R. York. "Western Nevada Water Controversy." College of Agriculture B 34, University of Nevada-Reno, 1975.

McNeely, J. G. Jr. "Economic and Institutional Aspects of Water Transfers in Northwest Nevada." College of Agriculture B 27, University of Nevada-Reno, 1971.

McNeely, J. G. Jr. "Water for Nevada: Forecasts for the Future-Agriculture." State Engineers Office and Division of Agricultural and Resource Economics, College of Agriculture, University of Nevada-Reno, 1974.

State of Nevada, Department of Conservation and Natural Resources, Division of Water Planning. "Water Supply Report 1, Truckee River: Technical Report and Summary and Recommendations." 1978.

The Interface between Public and Private Land in Ranching Operations


GREAT SALT LAKE
Salt Lake City
15
UTAH L.
Provo
Spanish Fork
89
28
15
Fillmore
70
Richfield
15
Cedar City
89

This case study could have been done in any one of the western states. It was conducted in Utah and contains some data and comments pertaining to the state as well as some that pertain to smaller areas within the state.

The study deals with impact of increasing demands for various uses of federal land and the resulting effects on the ranchers who use a combination of private and public lands to conduct their ranching operations.

The Setting

The State of Utah contains 54 million acres of land and water--of which 35 million (67 percent) are owned by federal government, 3.8 million by the state, 11.4 million by private landowners, and 2.3 million by Indian reservations. Of the federal land, 22 million acres are administered by the Bureau of Land Management (BLM) of the U.S. Department of Interior, 8 million acres by the Forest Service (FS) of the U.S. Department of Agriculture, 1.9 million by the Department of Defense, and 3 million by other federal agencies such as the National Park Service (BLM Facts and Figures for 1978). The primary interest here is in the land administered by BLM and FS, much of which is used for grazing by ranchers who also operate private land.

A publication by Nielson and Workman indicates that in 1966, 28 percent of the forage consumed by Utah livestock came from federal lands, compared to an average of 12 percent for the 11 western states. Utah is second to Nevada, which had the high of 49 percent.

The general area selected for study is the area in central Utah between Spanish Fork (junction of Interstate 15 and U.S. 89 south of Provo) and Cedar City (see map). Compared to some other parts of Utah, this area has a relatively large amount of privately owned land in valleys which is used for forage and grain production and ranch headquarters. Livestock is grazed on FS land in the higher or mountain areas in the summer, and on BLM land which generally is lower and desertlike during

parts of the winter, fall, and spring. Private land, some of which is irrigated, provides pasture and hay during periods when FS and BLM grazing is not available.

Utah is a semiarid state with an average of about 11 inches of precipitation annually. Much of the Mt. Valley BLM area on which part of this report is based receives less than 10 inches, while parts of the FS area used by the same ranchers receive more than 15 inches.

A century ago, Utah's economy was largely agricultural. In 1920, nearly a third of the state's population lived on farms, but this had declined to 3.6 percent by 1970. The population of the state more than doubled from 1930 to 1970.

The economy of Utah has become increasingly dominated by industrialization, urbanization, and recreation. Mining is an important activity. However, in the area from Spanish Fork to Cedar City, agriculture is the most important industry. Some of the irrigated land in the area is used to produce alfalfa seed, alfalfa hay, and other crops for sale. However, cattle and sheep ranching along with some feedlots and dairies use much of the private land in combination with federal and state lands.

The Problem

The problem, from the viewpoint of the ranchers involved, is the effect of cuts in grazing permits on federal FS and BLM lands. (Data from typical cattle and sheep ranching operations that use Mt. Valley BLM land will be used to illustrate the problem.)

The Mt. Valley area stretches for more than 100 miles along U.S 89, east of I-15. The area shown as Mt. Valley on the map contains BLM, FS, private, and state lands. BLM will publish an environmental impact statement (EIS) for the area's BLM land in 1980.

Uses of federal lands that conflict with grazing will be discussed in this case study. The FS has promoted the concept of multiple use for quite some time. This has been largely recreation and lumbering combined with grazing. There is little doubt that recreation use has negatively impacted grazing, but the level of uproar by ranchers seems to have been rather low. For many years, BLM land had the reputation of being the land that no one wanted; therefore, no one much cared if ranchers used it for grazing or perhaps even if it was overgrazed. In more recent years, BLM land has been found to have value for oil, coal, minerals, power plant sites, MX missile sites--and, yes, even for recreation. While recreation undoubtedly competes with grazing, both it and the other uses listed above seem to be less of a problem than the results of a concern by environmental groups over real or perceived abuses of the land by grazing. Probably, most environmentalists do not want to use the

BLM land; they are concerned that it is not being properly cared for by BLM. Certainly the BLM EIS's, which were forced by a National Resources Defense Council suit, have caused ranchers a good deal of concern.

It is somewhat difficult at first to understand the strong resistance of ranchers to proposed BLM grazing cuts. The authorized grazing use of BLM land in Utah in 1978 was 1,237,607 animal unit months (AUM's). Active use was 830,295 AUM's and nonuse was 407,312 AUM's; 33 percent of authorized use was not used. For FS land in Utah, authorized AUM's in 1979 were 738,220 and active use was 654,680; 11 percent was not used. These numbers suggest that ranchers are far under-utilizing grazing available on federal lands, particularly BLM land. Part of the nonuse can be explained by the fact that sheep numbers in the United States and Utah have been steadily declining for several decades. The nonuse for sheep is 42 percent, compared to 27 percent for cattle. The late 1970's was a low point in the cattle cycle in the United States, and beef-cow numbers in Utah had declined 14 percent from the 1976 high. Still, the fact remains that there is a substantial amount of nonuse.

Several factors help explain the resistance to the proposed BLM cuts--despite large nonuse: 1) Percentage cuts on some allotments were greater than on others. This, coupled with the fact that some ranchers were fully utilizing their authorized AUM's, made the cuts for them more than "paper" cuts. 2) The impact of grazing cuts on the entire ranch operation must be considered as will be shown below. 3) The value of grazing permits is carried on the balance sheets of ranchers; cuts in permits show up as a reduction in assets and net worth.

While the BLM argues that grazing permits should not have a value because they do not guarantee future grazing rights, permits do trade among ranchers either as part of a land transaction or separately. Permit values vary, but $15-20 per AUM is reported to be common in Utah. Suppose a rancher with a permit for 2,000 AUM's receives a 25 percent cut. At $20 per AUM, $10,000 would disappear from his assets and net worth.

Data prepared for use in the Mt. Valley EIS was provided by Kerry Gee and is summarized in Table 1 as averages for three sizes of cattle ranches and two sizes of sheep ranches. These data show the percentage of animal unit months (AUM's) of feed derived from BLM, FS, hay, and private pasture and range. While the dependence on BLM and FS land varies, it is substantial for all ranch groups.

Table 1. Feed Sources for Cattle and Sheep Ranches using Mt. Valley BLM Grazing.

Feed source	Cattle ranches			Sheep ranches	
	Small	Medium	Large	Small	Large
	Percent of AUM's				
BLM	12	7	6	29	29
FS	18	26	20	0	26
Hay	44	37	40	5	6
Private	26	30	34	66	39
Average no. of cows or ewes per ranch					
	46	126	280	72	523

If substantial cuts were made in either BLM or FS grazing permits used by these ranchers, adjustments in ranching operations would be required. The actual impacts may be much larger than the percentage of AUM's from BLM and FS land seem to indicate. While feed requirements in terms of AUM's vary over the year, both cow herds and ewe flocks are maintained at relatively constant numbers over the year. Each rancher has put together a combination of BLM, FS, and private range grazing which, when supplemented with hay feeding, allows him to maintain a relatively constant number of cows or ewes. The various sources of grazing are not very substitutable for each other because they are available in different months of the year. For example, on the medium-size beef ranches using the Mt. Valley BLM area, there is heavy reliance on BLM range in May, November, and December, and on FS range in June through September--but no use of these ranges for the other months. Suppose the BLM grazing was completely removed, resulting in a 7-percent cut in AUM's of feed available. If there was complete substitutability among sources a 7-percent cut in herd size would be required unless hay was purchased. However, this ranch is 31-percent dependent on BLM range in May, November, and December. With no substitutability among feed sources, a 31-percent cut in herd size would be required. This would leave FS range underutilized and there would be leftover hay. The hay probably could be sold, but there might be no use for the excess FS range. Similarly, even though 26 percent of the total AUM's are supplied by FS range, the ranch is about 70-percent dependent on FS grazing in June through September.

On most ranches using Mt. Valley BLM grazing, the situation is somewhere between complete and no substitutability among feed sources--rather than at one or the other of the extremes. Data in Table 2 prepared by Kerry Gee show estimates of changes in gross income, costs, and net returns on the average large cattle ranch in the area under two sets of conditions for a variety of cuts (10.9 to 100 percent) that might be made in BLM grazing. One condition specifies that hay would be purchased to substitute for lost grazing in order to keep herd size constant, while the second condition makes maximum feasible substitutions among feed sources. In all cases, returns above cash costs and family labor would be reduced by BLM cuts. However, the reductions are all greater if hay is purchased than if herd size is cut. The reductions in income with reduced herd size may look rather small, but keep in mind that these cattle ranches are not nearly so dependent on BLM range as are the sheep ranches in the area and less dependent than many cattle ranches using public lands for grazing in Utah.

The Process

Proposed cuts in grazing permits on various BLM units in Utah have generally met with resistance from ranchers. For example, a proposed 1979 reduction of 28 percent in the Hot Desert area of southwest Utah resulted in a lawsuit by the

Table 2. Estimated Gross and Net Returns to Ranches if Various Cuts are Made in BLM Grazing.

Estimated returns	Utah Mountain Valley EIS large cattle enterprise										
		Purchase hay					Reduce herd size				
		Percent cuts					Percent cuts				
	no change	47.1%	10.9%	100%	16.7%	42.5%	47.1%	10.9%	100%	16.7%	42.5%
Gross income	59,139	59,139	59,139	59,139	59,139	59,139	57,710	58,894	56,182	58,902	57,897
Total cash costs	41,646	44,078	42,209	46,813	41,987	43,841	40,809	41,469	40,022	41,521	40,938
Return above cash costs	17,493	15,061	16,930	12,326	17,152	15,298	16,901	17,425	16,160	17,381	16,959
Family labor	7,992	8,145	8,028	8,319	8,047	8,131	7,863	7,963	7,696	7,968	7,864
Return above cash costs and family labor	9,501	6,916	8,902	4,007	9,105	7,167	9,038	9,462	8,464	9,413	9,095
Return to total investment	1,276	-1,309	677	--	880	--	813	1,237	239	1,188	870
Return to land	-12,394	--	--	--	--	--	--	--	--	--	--
Herd size, head	280	280	280	280	280	280	273	278	266	278	274

Source: Kerry Gee, ESCS, USDA, and Department of Economics, Colorado State University, Ft. Collins, CO.

Washington County Farm Bureau, Utah Farm Bureau, and the American Farm Bureau (see case study, "The Hot Desert BLM Case," included here). This case has not been settled, nor have the cuts been made. The reaction of ranchers to other proposed BLM grazing cuts has been less drastic. This may be partly because cuts in other BLM areas have been smaller and because the ocular reconnaissance forage survey method used in the Hot Desert EIS has been abandoned in favor of a less arbitrary method more acceptable to ranchers. The coordinator of Land Use and Water Policy for the American Farm Bureau stated that those gaining the most from the Hot Desert lawsuit have been ranchers using other BLM areas who have received better treatment from BLM as a result of the suit.

There is little doubt that the proposed grazing cuts in various BLM units in Utah are a major ingredient in the Utah version of the Sagebrush Rebellion. Utah Senate Bill 5 specifically requires that BLM land in Utah be turned over to the state, but it does not ask for FS land.

The Sagebrush Rebellion

A substantial number of influential people in Utah appear to be serious about the Sagebrush Rebellion. Not only do they believe that the State of Utah could manage the public land better than BLM, they also believe that Utah will acquire title to the BLM land. Senator Ivan Matheson, author of the Utah Sagebrush Rebellion law, expressed a long list of examples of mismanagement by federal agencies. Only those examples that have a direct bearing on agriculture and the interface between public and private land will be reported here. Senator Matheson is a dairy farmer near Cedar City, Utah, but he does not use either BLM or FS land for grazing.

A coal-fired electric plant was tentatively scheduled to be built on BLM land next to a coal mine near Hanksville in south-central Utah by the Intermountain Power Project (IPP). Water for the plant would have been taken from the Colorado River and water for 2,000 acres of irrigated land would have been a by-product of the project. The EIS, which was required for the plant because it would be on federal land, indicated that air quality standards in a remote part of a National Park would not be met a few days a year. Therefore, the plant site has been moved northwest to a location where coal will have to be moved 125 miles by rail, requiring a lot of energy. IPP has purchased the water rights to 11,000 acres of irrigated private land, which will revert to rather unproductive dry land. Senator Matheson believes this change in location to be ridiculous.

The valley in which Senator Matheson lives was the original habitat of the Utah prairie dog, which someone believed was near extinction. From the point of view of ranchers in the valley, the Utah prairie dog was fairly well controlled--but

it was not in danger of extinction. A federal agency trucked in a supply of the prairie dogs, and it is now illegal to kill them. Their numerous burrows are raising havoc with farming and ranching operations. Presumably, the Feds had the right to reintroduce the animals on federal land, but it seems questionable whether they had the right to let the dogs overrun private land. Senator Matheson believes that if environmentalists and the federal government want the Utah prairie dog, they should be willing to pay for damages to the owners of private land.

William Dinehart, director of the Division of State Lands for the State of Utah, firmly believes that his department could manage the BLM land in Utah better than BLM does. He currently spends much less per acre on management of state land and brings in far more revenue per acre compared to BLM figures on the federal land it manages. While this may be an apple-and-oranges comparison, the difference between expense and receipt figures for state land versus BLM land are so great that the situation at least needs further study. A large part of the state land in Utah is four scattered sections per township (school lands) interspersed with BLM land. The state does little management of this land, but it does collect grazing and other fees. The state also has some larger tracts of land which it manages. By federal law, all state land must be managed to produce revenue, while BLM land does not have the same requirement.

The Response

In this case study the Utah version of the Sagebrush Rebellion has been treated as part of The Process. The response described here is to the Sagebrush Rebellion in general as well as to complaints of individuals and groups of ranchers to grazing cuts and other BLM actions. Currently, ranchers appear to be much more unhappy with BLM than with the FS. However, a Forest Service representative pointed out that the FS had made some grazing cuts earlier and had taken some flak.

Three responses are discussed here:

1. Changes in BLM attitudes and procedures.

2. A range improvement project in the Oak Creek Mountain area led by the Forest Service.

3. Extension-type workshops instituted in late 1979.

Changes in BLM attitudes and procedures

The author held a group interview with the associate state director of BLM and four of his associates in Salt Lake City. These men were very cooperative. The author thought he detected

that BLM was running a bit scared over the Sagebrush Rebellion. This would not be too surprising; if the State of Utah acquired BLM land, they might lose their jobs. It was stated that BLM had changed its EIS procedures since the Hot Desert EIS was prepared. For example, they are working more closely with the ranchers involved during the EIS preparation. The BLM is cooperating in both the Oak Creek Mountain project and the Extension workshops. So far, the change in attitude has not been enough to satisfy many ranchers.

Oak Creek Mountain project

The Oak Creek Mountain Range Evaluation Area was selected to provide on-the-ground information from rangelands with the pinyon-juniper, mountain brush, and desert shrub ecosystems. The purpose is to apply current knowledge, management techniques, and range improvement practices to the ecosystem found within the area. This project results from a Forest Service study (in cooperation with other federal and state agencies and universities) of the current levels of range productivity, condition, and potential to help meet future red meat needs. The FS study was done at least partly as the result of the increased use of federal lands for purposes other than grazing.

The goal of the Oak Creek Mountain project is to develop optimum range productivity through coordinated planning on federal, state, and private lands. The area covers 316,500 acres about ten miles north of Fillmore, which is about halfway between Spanish Fork and Cedar City. About 117,200 acres are national forest land, 59,800 are BLM land, 29,700 are state land, and 109,200 are privately owned. Livestock belonging to about 60 ranchers graze this land. The Soil Conservation Service, Intermountain Forest and Range Experiment Station, ASCS, BLM, Utah Department of Natural Resources, Utah State Cooperative Extension Service, Utah Department of Agriculture, and the Millard and Juab Soil Conservation Districts are partners with the Forest Service in this project. Range improvement will be done on both public and private land and an evaluation made of the results. ASCS cost-sharing as well as loans from the Utah Range Management Fund will be available to ranchers for range improvement on private and state lands.

Extension program

The recently developed extension-type program has two parts. In one, Roger Banner, and Extension specialist at Utah State University, works as sort of a go-between the ranchers and BLM. He has been trying to get ranchers to provide constructive input to BLM for the EIS's and helping them learn how to communicate with BLM. He is also attempting to help BLM learn to communicate more effectively with farmers.

The second part of the program is a series of workshops for ranchers started in the fall of 1979 sponsored by the Governor's Office, Cattlemen's Association, Wool Growers Association, the Utah State University Extension Service, and BLM. One of the goals of these workshops is improved ranch management, which includes livestock management as well as range management on both public and private land.

Results

Conflicts due to the interdependence of private and public lands in Utah have intensified in recent years but are by no means new (Godfrey, et al.). Any results reported here are interim.

Many people in Utah believe that federal agencies--particularly BLM--had become insensitive to the needs and desires of local people. As voiced by Senator Matheson, federal bureaucrats can make rules and regulations that have the force of law, but there is no review of these at the local or even federal legislature levels. In the case of BLM, other sources of revenue and pressures from groups such as environmentalists have given the agency enough clientele that employees believed they no longer needed the ranchers for the agency to survive.

Activities such as the lawsuit of the Hot Desert ranchers against BLM and the Utah Sagebrush Rebellion law appear to have led to some change in attitude of BLM toward ranchers. The Oak Creek Mountain Range Evaluation Project and the expanded Utah State Extension program could also be considered interim results.

Lessons

Probably the most important lesson from the very complicated issue of the interface between public and private lands--illustrated here by effects on ranching operations but in reality a much broader issue--is that local people and the states do have some power. The Utah Sagebrush Rebellion may not succeed in terms of the state gaining ownership of BLM land, but it will likely succeed in terms of local and state residents gaining more say in how the land is managed.

References

BLM Facts and Figures, 1978, U.S. Department of Interior.

"General Project Plan, Oak Creek Mountain Range Evaluation Area" (available from Forest Service Office, Ogden, Utah).

Godfrey, E. B. "Public Land Grazing: Going, Going, Gone?" Paper presented at the annual meeting of the Society for Range Management, February 8, 1978, Department of Economics, Utah State University.

Godfrey, E. B., J. P. Workman, D. B. Nielsen, and A. Le Baron. "Economic Evaluation of Transfer of Federal Lands" (draft). Utah State University, April 1980.

Nielsen, D. B. and John P. Workman. "The Importance of Renewable Grazing Resources on Federal Lands in the 11 Western States." Utah Agr. Exp. Sta. Circular 155, 1971.

Utah Agricultural Statistics, USDA-ESCS and Utah State Department of Agriculture, 1979.

The Hot Desert BLM Case

A Proposed Reduction in Grazing and New Allotment Management Plans

The Hot Desert area, primarily in Washington County in Southwestern Utah, is managed by the Bureau of Land Management (BLM) of the U.S. Department of Interior. This case results from an Environmental Statement (ES) completed by BLM in September 1978 which, among other things, proposed a substantial reduction in grazing in the Hot Desert area.

This case study is based largely on interviews with ranchers who use the Hot Desert area, BLM employees, and faculty members at Utah State University and South Utah State College and supplemented by data in published and unpublished reports. The background data on Washington County and the Hot Desert area were taken from Utah Agricultural Statistics for 1979 and the BLM Hot Desert Environmental Statement. Both of these publications relied heavily on other published sources.

The Setting

Washington County contains 1.55 million acres of land, of which 75 percent is owned by the federal government and 6 percent is owned by the State of Utah. Irrigated plus nonirrigated cropland accounts for 2.5 percent of the land in the county. The cropland is largely privately owned.

Historically, the county was dependent on agriculture, particularly livestock grazing. In more recent years the county has depended on tourism, retirement, and some industrialization. Zion National Park is located within the county, and Cedar Breaks National Monument is nearby. Interstate 15 from Salt Lake City to Las Vegas, Nevada, traverses the county from northeast to southwest.

The county had a population of about 20,600 in 1978. The population is about equally divided between urban and rural residents and most of the people live in or near the St. George-Hurricane area in the south-central part of the county. Population increased 33 percent between 1960 and 1970, and 50 percent between 1970 and 1978. In 1974, 8 percent of the population was employed in farming and in 1970-73, farming accounted for an average of 10 percent of personal income in the county.

According to the 1974 Census of Agriculture, the county had 310 farms, of which 234 reported cattle and 38 reported sheep and lambs. There were 19,861 head of cattle and calves and 2,166 sheep and lambs. About 88 percent of the cattle were beef animals and the remainder dairy animals. Most of the beef cattle are part of ranching operations rather than cattle-feeding operations. Both cattle and sheep ranching in the area are highly dependent on the use of grazing on federal lands and to a lesser extent on state lands.

The Hot Desert ES covers about 550,000 acres of BLM land, the elevation of which varies from 2,200 to over 7,700 feet. The area has hot summers (90-100° F maximum temperatures) and short, relatively mild winters (40-50° F maximum and 20-28° F minimum temperatures). Average annual precipitation varies from less than 8 inches below 3,000 feet elevation, to over 16 inches above 6,000 feet elevation. Most of the grazing is from November through May and is based largely on shrubs rather than grasses, except in years of higher than normal precipitation. Most casual observers not familiar with desert grazing would not believe that livestock could thrive in such an area.

The Problem

The Hot Desert problem, from the viewpoint of the ranchers who use the BLM land for grazing, is a proposed average reduction of 28 percent in grazing and new allotment management plans (AMP's) as a result of the 1978 Environmental Statement for the Hot Desert area. The Hot Desert ES was the first prepared as a result of a suit brought by the Natural Resources Defense Council (NRDC) and other environmental groups against BLM's programmatic grazing environmental statement. A federal court declared that the programmatic ES was not sufficient to comply with the provisions of the National Environmental Policy Act (NEPA) of 1969. BLM was directed by the court to reach an agreement with the plaintiffs to prepare the necessary statement to comply with NEPA. In a final 1975 judgement, the court ordered BLM to prepare 212 (later reduced to 156) separate site-specific statements concerning the effect of livestock grazing on public lands. Previous to the court action, BLM had planned to prepare one ES for its entire grazing program. BLM was directed in the environmental statements to identify grazing management programs, to analyze environmental impacts, and to propose management alternatives. NRDC reportedly was allowed to choose the areas for which the first ES's were to be prepared.

A summary of the proposed BLM grazing program for the Hot Desert follows: An ocular reconnaissance livestock forage survey conducted by the Cedar City District BLM Office in 1976 indicated a need to reduce livestock grazing by 28 percent beginning in 1979-80 from the present authorized use of 28,905 animal unit months (AUM's) to 20,767 AUM's. The survey also indicated that a livestock forage potential of 27,926 AUM's could be achieved at the end of 24 years by the implementation

of a range management program.

In the recent past, the Hot Desert area has been managed in 87 allotments, in which 99 ranchers (permittees) have authorized grazing rights. An allotment is a fenced area in which one or more ranchers graze livestock, either individually or communally. The BLM proposed to reduce the number of allotments from 87 to 59 for more efficient management. AMP's, including investment in fences, water supplies, and range improvements by BLM and new grazing management schemes, would be implemented on 42 allotments. Each of these allotments would have its own AMP, and these plans as well as the percentage cut in authorized grazing would be individually tailored to the allotments. On 3 allotments grazing would be eliminated. The remaining 14 allotments (463 AUM's) are custodial, in which small amounts of BLM land are interspersed with large amounts of private land and little or no BLM management is done.

The proposed grazing management plans would be rotation-rest systems (17,569 AUM's), delayed grazing systems (2,118 AUM's), or season-long grazing systems (617 AUM's). Each of these systems differs substantially from the current practice of grazing an entire allotment continuously from about November 15 to June 1. Even with consolitation of allotments, 44.3 miles of water pipeline, 75.2 miles of new fence, 20 water storage tanks, 70 water troughs and 33 wells, springs, rainfall catchments and reservoirs, at a total cost of about $500,000 would need to be installed. About $75,000 worth of reseeding would also be done. The initial investment would be made by BLM, but the permittees would be responsible for most of the maintenance. (The BLM invested $350,000 in improvements last year as the first step in the implementation of the AMP's.) The ranchers appear to be disturbed as much by the AMP's as by the cuts in authorized AUM's.

A 1979 proposal to designate 35 square miles of the Hot Desert as critical habitat for the Utah desert tortoise--from which grazing would be excluded--would affect eight ranchers, but is not discussed in this case study.

To understand the importance of the proposed grazing cuts in the Hot Desert, one must be aware of the sources of forage for the ranchers involved. Some examples follow of ranchers who use the Hot Desert for grazing.

Rancher 1 has 106 head of cattle which are grazed on BLM land from the middle of November through the end of May, and on Forest Service land from the beginning of June through the middle of October. The remaining month's forage comes from his owned and some rented private land.

Rancher 2 has a permit for 500 head on Forest Service land in summer and 600 head on BLM land in winter. About one month's forage comes from private land.

Rancher 3 has 115 head and uses BLM for 6½ months and FS land for 4½ months, along with private land for one month.

The ranches are cow/calf operations in which a relatively stable number of cows is maintained year around and over the years. Calves are born in the late winter and spring and kept with the cows until sold in the fall as feeder calves weighing 300-400 pounds.

Suppose Rancher 1 were to have a 30 percent cut in his BLM permit. There is no other winter grazing available, so he must either cut his herd by 30 percent or purchase hay. Purchased hay is much more expensive than rented BLM land, and he and most other ranchers believe it uneconomic to purchase hay; therefore, herd size is cut which means that he cannot fully utilize the FS land available with his remaining cow/calf operation. He might be able to use it by an action such as the purchase of yearlings to graze in the summer, but this may not be a feasible alternative.

Another case study included here, "The Interface Between Public and Private Land in Ranching Operations," explores in more detail the interdependence of public and private land as used for ranching and the impact of grazing cuts for public land on ranching operations and ranchers' incomes.

The Process and Response

Many of the ranchers using the Hot Desert for grazing were unwilling to accept either the cuts in authorized AUM's or the grazing management plans proposed by BLM as part of the AMP's. More detail on their reasons will be provided later.

The protest originally was led by the Washington County Cattlemen's Association and soon joined by the Washington County Farm Bureau (WCFB). The two organizations are unrelated but have a large proportion of common membership. A substantial amount of money was raised locally in a hurry. The WCFB went to the Utah Farm Bureau, which contacted the American Farm Bureau. In early fall of 1979, the three Farm Bureaus sued in federal court the BLM area (St. George) and district (Cedar City) managers, the state director, federal director, and BLM to prevent the grazing cuts and AMP's from taking effect. BLM did not contest the suit, and the judge issued a temporary restraining order just before the 1979-80 BLM grazing season, which prevented the BLM plan from being implemented. The temporary restraining order was to have been lifted in early November, but BLM asked that it be extended indefinitely. The next move apparently is up to BLM; BLM appears to be in no hurry to settle the case.

The American Farm Bureau, according to their coordinator of Land Use and Water Policy whose office is located in Salt Lake City, is interested in the Hot Desert case because they

see it as a landmark case. They believe or at least hope it will result in three things:

1. BLM will be forced to follow the law. AFB contends that BLM Hot Desert ES procedure did not comply with NEPA and FLPMA (Federal Land Policy and Management Act), which require that BLM must confer with the permittees when proposing grazing cuts and changed grazing management.

2. An improved process for preparing ES's which in the past has been very costly and time-consuming.

3. Federal government agencies such as BLM should recognize that reduced economic use of BLM land (such as grazing cuts) is not in the best interest of either the local people or the country.

The American Farm Bureau would not have been interested in the case without the strong financial commitment of the local ranchers and the expertise of respected range management specialists who disagree with BLM's forage survey method and conclusions. However, AFB was looking for a situation where a case could be made for moderation of the effects of the NRDC suit on use of BLM land for grazing.

The point of view of ranchers with respect to the impact of the Hot Desert ES-proposed grazing cuts and AMP's is based on a group interview with seven ranchers organized by the president of the WCFB and conducted in St. George, Utah.

The ranchers believe the cut in authorized grazing was unnecessary. A substantial grazing cut was made on part of the Hot Desert in 1965. Cattle numbers on the Hot Desert have been stable since that time and the range is improving. "In 90 percent of the Hot Desert, the range is better than 10-15 years ago." A few areas are overgrazed, but this could be alleviated easily without new AMP's for all the allotments.

The ranchers also believe that rotation-rest grazing systems don't make sense. Such plans might work in other BLM areas but are not workable on the Hot Desert. For example, concentrating all the cattle on one-third of the range puts too much pressure on the water supply for that range. Also, such plans force the cattle to graze a small area rather intensively, when it would be more appropriate to let them range over a wider area and be able to selectively graze the plants that provide the most forage during various periods of the winter and spring grazing season. They report that BLM says, "How do you know it won't work when you haven't even tried it?" The ranchers' answer is, "How can you be so sure it will work if you haven't tried it either?"

The ranchers have a number of complaints about the preparation of the Hot Desert ES. They believe it was prepared largely by outsiders with little knowledge of Hot Desert

conditions. BLM asked ranchers for comments but did not pay any attention to those comments. For example, ranchers disagreed with the three-pasture system, but it was made part of most AMP's. They claim that the original draft of the Hot Desert ES listed all interested parties--except ranchers and farm organizations.

The BLM area manager in St. George, who arrived at about the time the Hot Desert ES was completed, has a view of the situation different from that of the ranchers. He believes that many of the ranching operations are not as well managed as they might be. For example, bulls are run with the cows all year, leading to scattered calf crops and inefficient marketing of the calves. Ranges are overstocked in some cases, leading to weight losses on beef cows and low-percentage calf crops. Many of the ranch operations are small and part-time. Of the 98 ranchers who use the Hot Desert, 35 have less than 25 head, 16 have 26-50, 20 have 51-100, 17 have 101-250, 9 have 251-500, and one has more than 500. The majority of these operations will not support a family. The ranchers with permits for a few head use community allotments; there is little incentive for individuals to do their share in the management of the cattle and allotment, which is the responsibility of the permittees. Sort of a mini-Tragedy of the Commons results. In many cases, the consolidation of allotments to which some ranchers object really means that the ranchers would be sharing with the same permittees as before and with no more of them. They are already sharing several allotments with the same permittees.

There is also disagreement over authorized AUM's versus actual use of AUM's. The ranchers state that actual use is very close to the authorized use of 28,905 AUM's; there is very little nonuse. Therefore, any cuts would be real--rather than "paper cuts." The area BLM manager stated that the actual 5-year average use was 21,213 AUM's, and that the proposed cut to 20,767 would have much less impact on ranchers than the 28 percent cut from authorized use. However, James Bowns, a range ecologist at Southern Utah State College and Utah State University knowledgeable about the Hot Desert, stated that the 5-year average use is low because it includes some very dry years in the mid-1970's when ranchers voluntarily reduced AUM's on the Hot Desert.

This brings up another point. In contrast to the very dry years around 1975-76, according to the BLM area manager, 1978 had the highest precipitation in about 100 years, and the last 3 years have had the most precipitation of any 3 consecutive years in about 100 years. The ranchers' estimates of the condition of the range may be influenced too much by these 3 years. On the other hand, the BLM forage survey was made in the very dry year of 1976--which the ranchers believe is unfair. In addition, it was made at the end of the grazing season when the available forage had been largely eaten.

The ranchers are supported by James Bowns in their belief that the ocular reconnaissance forage survey method is arbitrary and inadequate. In addition, Bowns believes that the forage survey did not adequately account for the contribution of black brush to grazing in the Hot Desert (Bowns, 1979). The BLM is now using the site inventory method rather than ocular reconnaissance as their forage survey method.

The Hot Desert ES was apparently done largely because NRDC and similar groups believed the area was being overgrazed. The ES reportedly cost somewhere between $1 and $3 million. One rancher stated that it would have been cheaper for BLM to have purchased the "rights" of ranchers to use the Hot Desert in the future. These rights--which BLM argues have no legal basis because there is no guarantee of future grazing privileges--nevertheless trade among ranchers for around $15-20 per AUM. At $20 per AUM, the 28,905 AUM's could be purchased for $578,100. The BLM would also be giving up future grazing income on 28,905 AUM's per year. At the 1980 grazing rate of $2.36 per AUM, the annual revenue loss would be $68,216. If this is capitalized at 10 percent in perpetuity, the present value would be $682,160. The total cost to BLM would be $578,100 + $682,160 = $1,260,260, and it would save the investment needed for the AMP's as well as operating costs related to grazing. Small wonder that some people believe the real problem is that BLM has figured out that the organization can survive without the ranchers.

Results

The final results of the Hot Desert case will be determined by the outcome of the lawsuit. Again, there is a difference of opinion between the ranchers and the BLM area manager over the current state of affairs under the temporary restraining order.

Under the conditions of the temporary restraining order, each rancher agreed to use the Hot Desert for the same number of AUM's as in the previous year. According the BLM, the ranchers as a group have accepted a number of AUM's not much higher than the number proposed in the Hot Desert and are restricted to this number as long as the temporary restraining order remains in effect. Also under the temporary restraining order, BLM cannot issue temporary nonrenewal permits for the grazing use of annual plants, which it is normally allowed to do in years of higher precipitation. The BLM also stated that 15 permittees would like to start the new AMP's on their allotments, but the terms of the temporary restraining order prevent this.

With respect to the AUM's allowed under the temporary restraining order compared to those authorized under the proposed AMP's, the BLM area manager pointed out that some permittees are better off with the temporary restraining order.

This is because in the previous year some permittees were using all or most of their authorized AUM's, while others had substantial nonuse. The corollary is that other permittees are worse off under the temporary restraining order, assuming they had nonuse last year but wish to use their authorized AUM's this year.

Lessons

Perhaps both ranchers and federal agencies such as BLM could learn from the Hot Desert ES experience. While ranchers and BLM both feel they are right and the other side is wrong, probably mistakes have been made on both sides.

The greatest need may be for more communication between BLM and the permittees during the preparation of the ES. The ranchers who have used BLM land for years do have useful knowledge of range management and carrying capacities. On the other hand, new approaches to range management proposed by BLM may be valid. Calm and serious discussion of such issues should be useful.

References

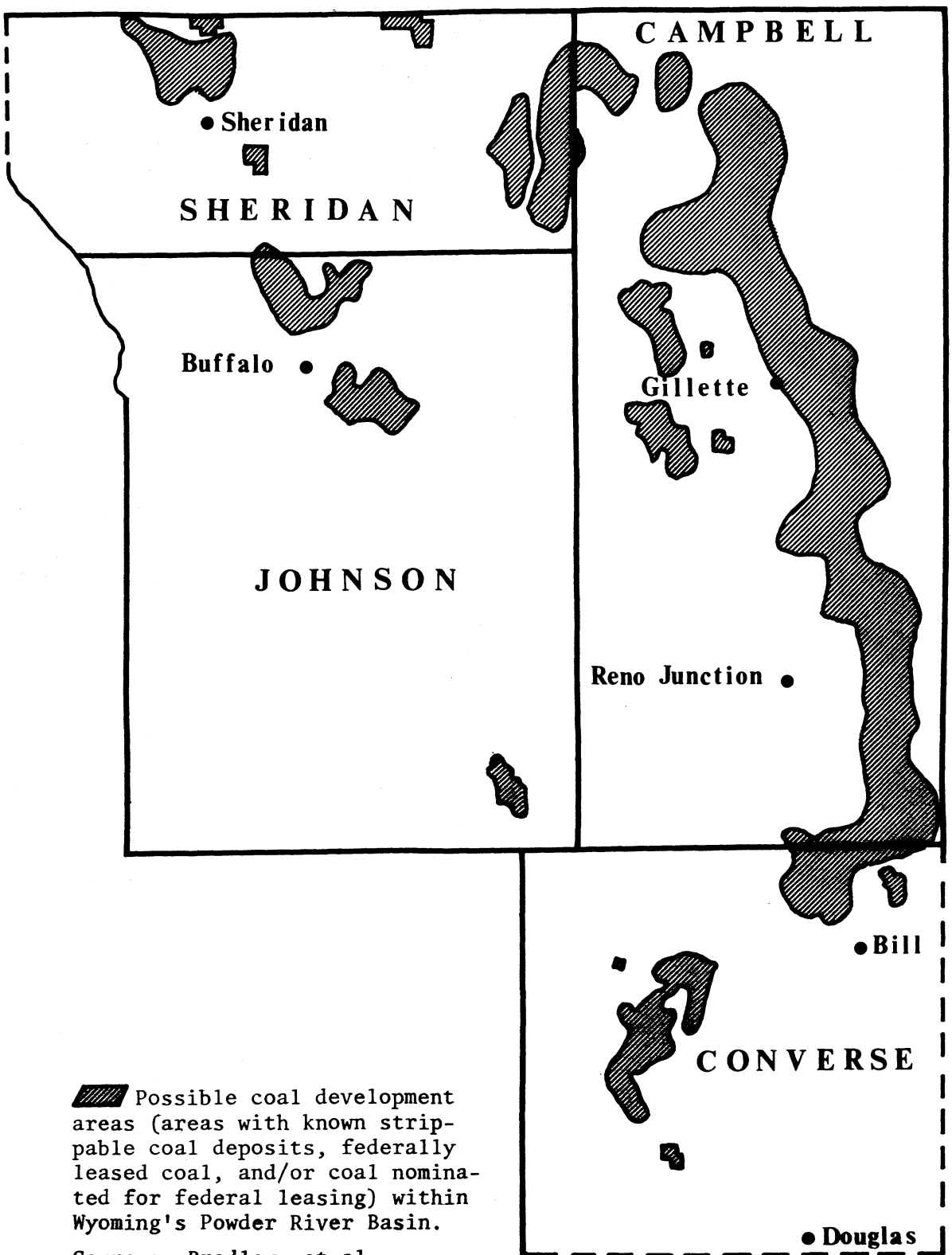
Bowns, James. My impressions of the inadequacy of the Hot Desert Environmental Impact Statement. Letter to Leonard Johnson (AFB), May 2, 1979.

BLM. "Final Hot Desert Grazing Management Environmental Statement." U.S. Dept. of Interior, Sept. 27, 1978.

Nielsen, Darwin B. Statement concerning the economic impact on the affected ranchers of designating the Beaver Dam slope area as critical habitat for the desert tortoise. Mimeo, Department of Economics, Utah State University, Logan.

Utah Agricultural Statistics, 1979.

Coal Mining versus Ranching in Campbell County, Wyoming



Possible coal development areas (areas with known strippable coal deposits, federally leased coal, and/or coal nominated for federal leasing) within Wyoming's Powder River Basin.

Source: Bradley, et al.

This paper describes the conflict between ranching and strip mining of coal in northeastern Wyoming. Most of the information presented deals with Campbell County but a few comments will be made about other counties (Converse, Johnson, and Sheridan) that make up what is known in coal mining parlance as the Powder River Basin. Most readers probably would be more likely to recognize the name of the city of Gillette than Campbell County.

This case study is based on personal interviews with several ranchers, a banker, a county commissioner, a coal company executive, telephone interviews with several ranchers and representatives of the Powder River Basin Resources Council, as well as information from several publications. Garnet Premer, community development specialist, University of Wyoming, was instrumental in selecting the area and providing names of people to interview. The report is intended to give a general picture of coal mining versus ranching in Campbell County rather than to be complete and accurate in every detail.

The Setting

Campbell County, Wyoming, borders Montana on its northern boundary and is the second county west of the South Dakota border. The county is about 46 miles wide and 103 miles long and contains about 3,000,000 acres of land. The city of Gillette sits almost in the center of the county. Interstate 90 crosses the county from east to west just south of Gillette. The Burlington Northern Railroad follows about the same route east of Gillette but veers northwest toward Sheridan. A new 114-mile railroad was completed from Gillette to Douglas in the fall of 1979 by Burlington Northern. This is reported to be the first new railroad line built in the United States since World War II.

Socioeconomic characteristics

Until the 1960's, Campbell County was essentially a ranching area. The population was 6,048 in 1940, declined to 4,839

in 1950, increased to 5,861 in 1960, doubled to 12,957 in 1970, and about doubled again to an estimated 25,721 in June 1979.

The city of Gillette has grown from 3,580 in 1960, to 7,194 in 1970, to 13,321 in June 1979. In addition, the 5-by 6-mile planning district surrounding Gillette grew from 2,860 in October 1975, to 4,646 in June 1979.

In April 1978, Gillette had the third highest cost of living of 23 Wyoming towns sampled. Per-capita income is estimated to be $6,175 in 1977 in Campbell County, compared to 7,004 for Wyoming (computed from data in Division of Research Statistics publication).

Local economy

The town of Gillette was started when the Burlington Northern Railroad suspended construction for the winter in 1881. While some of the northern part of the county and Sheridan County to the west were in ranches operated by Englishmen and others prior to 1900, much of the county and in particular that part south of Gillette was homesteaded in the first three decades of the 1900's.

Prior to the oil drilling of the late 1960's, the economy of Campbell County was largely based on cattle and sheep ranching, although tourist trade related to Devil's Tower National Monument and Yellowstone Park made a contribution. The income from oil and gas development started in the late 1960's, and coal mining of the 1970's now overshadows agricultural income.

Agriculture

Campbell County receives an average 10 to 18 inches of precipitation annually. The lower rainfall areas generally are in the southern part and the higher rainfall areas in the northern part of the county. The average precipitation in Gillette is about 15 inches.

The major agricultural activities are cattle and sheep ranching. The harvested crop occupying the most land is hay (about 45,000 acres), used mostly as winter feed for the cattle and sheep in the county. In 1978, 25,500 acres of wheat, 6,800 acres of barley, and 3,700 acres of oats were harvested. Most of the cropland is dryland; only a very small portion is irrigated.

The numbers of beef cows and stock sheep in Campbell County and Wyoming farms and ranches 1975-1979 are shown in Table 1. While it might be concluded that coal mining has resulted in a substantial decline in the numbers of cattle and sheep, keep in mind that during this period the cattle cycle in the U.S. was on the downward side and the total number of

cattle declined from 132 million in 1975 to 111 million in 1979, a drop of 16 percent nationally compared to 23 percent for Wyoming and 26 percent in Campbell County. The number of sheep in the United States has been declining continuously for over 20 years. The number of stock sheep in Campbell County declined 32 percent from 1975 to 1979, compared to 20 percent in Wyoming and 16 percent in the United States. Whether the more rapid rate of decline in cattle and sheep numbers in Campbell County and Wyoming than in the United States is due to coal mining is unknown.

Table 1. Cattle and Sheep in Campbell County, Wyoming, 1975-79.

Year	Beef cows	All cattle and calves	Stock sheep
1975	51,500	96,000	114,000
1976	52,000	98,000	96,000
1977	49,000	96,000	93,000
1978	40,000	72,000	79,000
1979	40,000	70,000	78,000

Source: Wyoming Agricultural Statistics, 1979.

The Problem

There are 11 strip coal mines operating in Campbell County (Big Horn, Rawhide, Belle Ayr, Cordero, Jacobs Ranch, Black Thunder, Wyodak, Dave Johnson, Eagle Butte, Black Mountain, and Caballo). All of these except one began operating after 1972. There is the possibility that at least seven more mines will be developed in the future.

Coal has been mined in the Powder River Basin since before 1900. Many of the mines were small and were operated for only a few years. In 1950, there were 12 mines in the basin that produced a total of 1.2 million tons. By 1959, the number of operating mines was down to five. From 1959 to 1972, mining activity increased and production was up to 3.2 million tons from five mines in 1972. In contrast, a single mine now produces this much or more--and some mines are expected to produce as much as 24 million tons per year when full capacity is reached.

While coal production in Campbell County was increasing in the early 1970's, the Arab oil embargo and federal policies to increase coal production undoubtedly had an impact on the rapid increase in coal mining in Campbell County.

It has been estimated that the Powder River Basin contains, down to the 3,000 foot level, 110 billion tons of coal. Strippable reserves, the part that could be economically mined, have been estimated to be 13 billion tons, of which 87 percent is in Campbell County. A lot of coal! Because most of the land in Campbell County is ranchland used for grazing, most of the coal lies under ranchland.

Coal development as well as oil and gas development in Campbell County is complicated by many factors, two of which are surface ownership and mineral rights or subsurface ownership. These factors and their relationship are a source of many conflicts.

According to one publication (Wyoming State Department of Economic Planning and Development), the land in Campbell County is owned as follows:

	Surface	Subsurface
	----------acres----------	
Federal government	384,355	1,424,206
Private, county, and city	2,460,361*	1,402,641*
State	199,124	216,993
Total	3,043,840	3,043,840

*This is mostly private ranchland.

Some of the factors causing this pattern of ownership will be described here. The state ownership of surface rights is largely the result of two sections (usually 16 and 36) out of each township reserved for school purposes when the land was surveyed and later homesteaded. The surface land owned by the federal government is largely the result of land left over from homesteading. The differing ownership of surface and mineral rights by private interests and the federal government is largely the result of changes in the homesteading law around 1907 and 1916. Previous to 1907, homesteaders received the subsurface as well as surface rights. After about 1907, a homesteader obtained the mineral rights but no coal rights on his first 320 acres, and neither coal nor mineral rights on the second 320 acres. After 1916, homesteaders received no mineral rights. As these homesteads were later consolidated into larger ranches, the mineral and coal rights carried over. Thus, land homesteaded earlier has coal rights; land homesteaded later does not. It was reported that the land around Sheridan was homesteaded earlier than much of the land in Campbell County; therefore, a higher proportion of the land has private coal rights.

To some extent, the land is owned in a checkerboard pattern--federal and state land interspersed with private land. To obtain a large tract of land for coal mining, the coal company may have to deal with two or three types of both surface ownership and coal ownership and frequently with different surface ownership and coal ownership on the same piece of land.

Prior to 1977, persons interested in developing coal, oil, gas, or minerals owned by the federal government had the right (assuming they had acquired the subsurface rights from the Feds) to use the surface of private landowners--provided that they compensated the surface owner for damages to the surface. The surface owners had little or no control over whether the coal, oil, etc. was developed. They could argue over the appropriate level of compensation, but not over whether the subsurface exploitation took place. A change in the law in 1977 required that the surface owner give his consent before the coal, etc. was taken from the subsurface.

A company that wishes to mine coal must acquire the coal rights from whomever owns them and the surface rights by either lease or purchase. In the Campbell County situation, it appears that in most cases the private land to be mined for coal was purchased rather than leased (Bradley, et al.). This case study, based on deeds to coal companies recorded between January 1965 and April 1977, indicates that coal companies have purchased 225,640 acres of surface from 115 private landowners and have options on another 15,720 acres from 9 landowners. This totals about 8 percent of the land area of the county and nearly 10 percent of the private (including county and municipal) land in the county.

In addition to land purchases, coal companies have (through 1977) leased 73,640 acres of private land, have lease options on 34,880 acres, and have surface damage agreements on 4,600 acres. The total acreage purchased, leased, or with surface damage agreements is 303,840 acres--10 percent of the land in Campbell County and 12.4 percent of the private land in the county. If land purchase and lease options are included, the coal companies own, lease, or have agreements or options on 354,480 acres--14.4 percent of the private land in the county. It is possible that by 1977 coal companies had leased more land than indicated here, because not all leases are recorded and the survey procedure used may not have picked up all the leases (Bradley, et al.).

It was reported that purchase and leasing of private surface land in Campbell County has been quite small since 1977. While the land acquired by the coal companies is a substantial portion of the total and private land in the county, it appears to be far less than the "two-thirds of the county is owned by the coal companies" that was reported by one resident.

The fact that a substantial amount of land has been acquired by the coal companies does not mean that it is all being strip mined and is out of production. The typical strip mine pit probably occupies 200-300 acres. The equipment, roads, storage silos, etc. probably occupy about the same amount of land. The overburden must be replaced and the land reseeded as part of the reclamation process, which takes several years. The total acreage out of production at any one time may be in the range of 500-1,000 acres per mine. For 11 mines, this accounts for 2-4 percent of the private land and about 1.5-3 percent of the total land in the county. In fact, the amount of land out of production currently and in the foreseeable future is probably well under 100,000 acres for the 11 mines.

The impact of coal mining on grazing availability is difficult to assess, but some estimates can be made. A 1977 study (Janis, et al.) found that the average annual productivity of the rangeland in the mine sites is 0.31 animal unit months (AUM's) per acre. (Another way of stating the productivity of this rangeland is that it takes about 35-40 acres of land to keep a cow for a year.) If 50,000-100,000 acres are lost to mining in an average year, the grazing for 1,300-2,600 AUM's would be lost annually. This is 2-4 percent of the number of cattle and calves in Campbell County on January 1, 1979.

In addition to the land occupied by mines and related equipment, roads, etc., there are many secondary impacts that affect agricultural production. Probably the two most important are the new railroad from Douglas to Gillette and the land used for housing and other developments related to increased population. Other impacts--such as widening highways to accommodate mine traffic and more dogs which harass sheep--

may be less important but significant. A completely new town called Wright has been built about 50 miles south of Gillette by a subsidiary of one of the coal companies. It has brought a population of about 1,000 to a previously sparsely populated area, and it may grow to 3,000-4,000 people in the next few years.

The Process and Response

Ranchers in Campbell County have widely differing opinions about the impact and desirability of coal development. Some sold their land for several times what it was worth as ranchland, left the area, and presumably are enjoying what money can buy. Some who sold the land are leasing it back for ranching. Ranchers who have not sold land for coal development tend to see few benefits (although there may be some) but feel forced to bear the costs of development, which show up in many ways.

While individuals took many actions to mitigate the effects of coal development, this section focuses on group actions. At least three groups were formed partly as a result of the impact of coal development on ranchers in the Powder River Basin and Campbell County: (1) Powder River Basin Resource Council (PRBRC), (2) Thunder Basin Protective Association (TBPA), and (3) Converse County Landowners Association (CCLA). The second organization and several others are affiliated with PRBRC. Other organizations such as the Sierra Club have been active in the problems related to coal development in the Powder River Basin.

The PRBRC was formed in 1973. Its membership consists of a wide variety of people, including but not limited to ranchers and environmentalists. Several chairmen of the board of directors have been ranchers. It is difficult to state the position of the PRBRC toward coal mining. It was reported that no member of the board of directors has been completely opposed to the development of coal but that some members of PRBRC are. It was also reported that some ranchers in Campbell County who at one time supported PRBRC have dropped out because they believe it is dominated by environmentalists and "Eastern dudes" and does not represent most ranchers. One thing is clear: the PRBRC has been active in supporting both state and federal legislation to mitigate the environmental and other effects of coal mining. Some examples will be given here.

The PRBRC was active in supporting the federal strip mining law passed in 1977, but it was not completely satisfied with the language of the law. It was also active in hearings on the language in the regulations developed by government agencies such as the Department of Interior's Office of Surface Mining.

The PRBRC, along with several regional and national organizations such as the Sierra Club, was party to a 1973 suit on federal coal leasing. This suit resulted in an injunction against the Department of Interior's leasing of additional coal until new impact statements were prepared. The injunction was lifted in 1975.

Some ranchers in Campbell County believe that one of the most important provisions of the 1977 strip mining law is the one that requires the consent of the landowner before a coal company can mine federal coal. Previous to 1977, the surface owner could not prevent prospecting or mining but only had a right to "fair compensation" for damage to his surface. If not resolved between the surface owner and mining company, fair compensation was determined by three appraisers. It was reported that on the issue of surface owner's consent, the PRBRC and the ranchers were on the same side. Perhaps the ranchers felt more strongly about this than the PRBRC leadership and staff. There is no mention of this issue in the PRBRC annual report for 1976-77 in which the strip mining law is discussed. It was reported by one rancher that the PRBRC wanted to *prevent* the surface owner from *giving* his consent to have coal mined under his surface--and that some Campbell County ranchers dropped out of PRBRC over this and other issues. The accuracy of some of the statements in this paragraph has not been verified. The point is that the membership of PRBRC is diverse and the organization does not currently represent the thinking of all and perhaps not even a majority of the ranchers in Campbell County.

The Thunder Basin Protective Association (TBPA) and Converse County Landowners Association (CCLA) were formed to deal primarily with secondary impacts of coal mining: the railroad and a power line.

While the coal mines have directly affected only the surface owners of land under which coal was to be mined (and they could refuse to sell or lease), the railroad affected every rancher who owned or leased land in the path of the railroad built between Douglas and Gillette. They had no choice but to allow the railroad to cross their land. It was reported that, although the Burlington Northern Railroad had the right under eminent domain to condemn the land needed for the railroad, all the land was purchased through negotiation. This is believed to be primarily due to the fact that the landowners joined together in CCLA (which had members in Campbell County also) to achieve strength in dealing with Burlington Northern.

The TBPA was formed later to deal with problems related to the building of the railroad (such as fencing and crossings) and a 230-kilovolt power line slated to be built from a power plant near the Wyodak mine east of Gillette south to the Converse County line, reportedly primarily to serve the coal mines. With respect to the railroad, TBPA has been instrumental in getting Burlington Northern to live up to their agreements to

properly fence the railroad and provide crossings for ranchers and their livestock. In the case of the power line, TBPA has worked on two major issues: location of the line and annual payments for rights-of-way for as long as the line exists (rather than a one-time payment). TBPA has presented an alternative route by which the line would run largely on the Burlington Northern right-of-way rather than crossing ranches in its own separate location. To date, TBPA has not been successful in having the line built on the Burlington Northern route and is still working on the plan to get annual payments rather than lump-sum compensation.

The county government (run by three elected county commissioners) has little power over coal development. For example, it cannot prevent people from selling or leasing surface rights, nor can it prevent the coal from being mined. It appears that the county government has done relatively little to either hinder or promote coal mining. It has been able to mitigate some of the indirect effects. For example, the new Burlington Northern railroad crosses about 15 county roads between Gillette and the southern county line. Burlington Northern had made an agreement with the county commissioners in 1975 that all these would be grade crossings. New commissioners elected in 1975 were not satisfied with the agreement and eventually were able to force Burlington Northern to install either underpasses or overpasses for each county road. This set the precedent for grade separation outside the county.

One of the county commissioners indicated that many people would have preferred the coal slurry pipeline to the railroad, assuming that the water came from someplace else. A buried pipeline would cause no fires (the railroad reportedly causes many fires during July, August, and September) and would not impede the movement of either wildlife or livestock.

The Wyoming state government has some power over coal mining and exercises some of it. Of course, the state receives revenues such as severance taxes; perhaps this gives the state some conflict of interest. The state Industrial Siting Council has to approve the location of large projects (over about $63 million), which includes some of the mines. The Wyoming Department of Environmental Quality has power over mining permits, air quality, and other environmental questions related to coal mining and has used this power--sometimes at the urging of or due to legal action of organizations such as the PRBRC.

The federal government probably has more power over coal mining in Campbell County than any other unit of government and also is in a conflict-of-interest position. Mining the large deposits of coal almost necessarily must be a part of the program to reduce dependence on oil imports; the government owns the rights to much of the coal and the surface rights to a substantial portion of the land which is intermingled with private and state land.

The federal government probably had the right to shut down or at least close down coal mining--either through refusing to lease the coal or stringent application of environmental regulations. Neither time nor space permits a complete review of federal laws or actions that affect coal mining in Campbell County. The 1977 strip mining law and the Sierra Club injunction were mentioned earlier; the Department of Interior's Energy Mineral Activity Recommendation System and BLM's efforts to lease coal and prepare regional impact statements are other examples of federal government action.

Results

It would be difficult to describe all of the impacts of either coal mining or attempts to mitigate its impacts on Campbell County or even on Campbell County agriculture. One thing is clear: the full impact of coal mining has not yet been felt, nor have policies to deal with the impact been fully developed or implemented. The county is in the midst of a coal development that is likely to increase and continue for decades. (An interesting sidelight is that the county was previously impacted beginning in the late 1960's by oil and gas development, the results of which seem to contrast in a number of ways with those of coal development.) It is difficult to know how much difference local organizations and local, state, and federal government policies and action have made on the impact of coal mining on Campbell County.

The direct impact of coal mining on the amount of land available for ranching is rather small; as stated earlier it may currently take away 1.5-3 percent of the ranchland in the county. The indirect impact in terms of land lost to the railroad and housing and commercial development is significant but probably less than the direct loss. Measurement of losses in productivity due to inconvenience and increased costs for things such as ranches split by railroads (making it difficult to move livestock from one pasture to another), working the remainder of a ranch that surrounds a mine, and losses of sheep to dogs are beyond the scope of this case study--but such losses are likely to be significant.

Ranchers who sold land for coal mining at prices well above its value for ranching, whether they left the area, moved to town, or leased it back are likely to be mostly winners. Many of those with ranches not touched by either mines, the railroad, nor the power line tend to feel like they are losers because of increased population, higher prices, higher labor costs, etc. They tend to overlook some benefits that they receive. For example, a county commissioner (and rancher) pointed out that 5 years ago the county collected $700,000 in taxes; currently the county gets $4 million, due largely to increased tax revenue from coal and oil. He stated that 85 percent of the tax revenue comes from coal, oil, gas, and minerals. This has enabled the county to upgrade many of the

county roads and plow snow from the roads to ranches when needed rather than perhaps only once or twice during the winter. In addition, the property tax was removed from livestock.

This commissioner also pointed out that many ranchers had received payments from oil and gas companies and that bank deposits resulting from oil, gas, and coal had enabled banks to loan money to ranchers and help keep them in business during several years of low cattle prices. He also stated ranching in the county had not been very profitable and that after living through four or five cold and stormy winters, he sometimes thought the whole county should be mined for coal.

The greatest losers are likely to be those who did not sell land for a mine but are affected by the railroad, highways to the mines, or the proposed power line. One rancher interviewed was affected by all three. While this may be an extreme case, it does illustrate that such situations can occur. This rancher believes that the coal companies spent too much time on some unimportant things (like counting mice, which was probably mandated by some federal agency) and far too little on important things (like roads to the mines for construction equipment and workers, and the railroad to transport the coal).

This rancher lives on a county road (mostly gravel in Wyoming) which was later made into a state road and is the route to two mines. The road was totally inadequate for the heavy mine construction traffic, resulting in the use of bulldozers to push through construction equipment and almost total ruination of the road. It was finally rebuilt to carry heavy traffic. He believes that should have been done first, before mine construction started. In addition, one day the highway was blocked by snow so the mine workers just used a part of his pasture for a road--which did not make him happy. He indicated that many of the workers and their families who moved in from other areas seem to have little respect for the property of the local ranchers.

This rancher, like most others in the area, operates a combination of deeded land and land leased from BLM which in his case is mostly contiguous. The Burlington Northern railroad and a spur passed through the land he operates, dividing his deeded land into three pieces. The railroad right-of-way all happens to be on government land; therefore, he did not receive any compensation from Burlington Northern. He is left with a ranch cut into several pieces; this reduces the value of the ranch and makes moving livestock difficult. This rancher (a member of PRBRC and TBPA) also is dissatisfied with the way fences were built along the railroad and that crossings for cattle and vehicles were not provided at appropriate intervals.

The proposed 230-kilovolt power line will cross this rancher's land. He sees no good reason why it could not be

built on the Burlington Northern right-of-way or adjacent to it, nor why the power company cannot pay an annual fee rather than a lump-sum payment. One argument against the lump sum is that it puts the payee in a higher tax bracket and the after-tax payment is less than if payments were received on an annual basis.

This is only a partial list of the complaints of this rancher. His wife showed me a two-page list of bad things that had happened to them because of coal mining and its secondary impacts.

Another example of problems related to mining comes from prospecting for coal. A rancher was paid $3,700 to allow a coal company to drill test holes on his ranch. One was drilled about ¼-mile from his well but not plugged bottom to top when they finished. The water in his well became dirty and did not clear up, so he plugged it with concrete and drilled a new one which also had bad water. He spent a total of $7,000 on drilling and water treatment equipment. He tried to get a settlement from the coal company but was unsuccessful, because he could not prove his water problem was due to their drilling. Then the company wanted to drill more holes but he refused. Next, another company asked to drill--probably not realizing that he knew it was the owner of the first company! One of the problems, of course, is that there is quite an incentive to allow prospecting because the payment looks large in relation to the actual surface damage; however, subsurface damage is hard to project or prove.

Coal development and its related impacts in Campbell County are controlled (or in some people's minds, uncontrolled) by federal, state, and local governments. Some local residents feel that the response of these levels of government has been inadequate to the problems created by coal mining.

For example, some ranchers are concerned about the impact on strip mining on ground water. They believe that no one really knows what the impact will be, and the uncertainty frustrates them. Similarly, they are not sure whether the reclaimed strip-mined land will be as good grazing land as it was before, even though there is some evidence that it could be better. One rancher indicated that the grazing could be adequately restored if advice from local ranchers were followed--rather than the federal requirements imposed as the result of pressure of environmentalists (for example, the requirement that sagebrush be replanted if it was there before mining).

There have been several defeated proposals to increase the Wyoming severance tax. One rancher believes it should be increased, and that at least part of the increase should be used to enforce existing state laws related to mining (environmental, etc.).

A strong feeling was detected on the part of some ranchers that local people were not fairly treated by the "outsiders"--

employees of coal companies, the railroad, and the power companies. While the ranchers recognize that the county government has limited power over coal mining, railroads, or power companies, perhaps it should take or be given more. In addition, the companies should hire some local ranchers to help supervise such things as building fences along the railroad. On the other hand, a conversation with a coal company executive indicated that at least his company had tried to be a good neighbor. They have hired a rancher to help deal with coal company/ranching problems. The company has contributed a substantial amount of money to the city of Gillette. Employees have participated in joint meetings of Newcomers (coalies) and the Pioneer Club (ranchers). They have made a concerted effort to hire Wyoming people, even though they must pay higher training costs. They provide jobs that pay $20,000 per year or more to high school graduates, some of whom are ranchers or ranchers' sons or daughters.

The earlier oil development brought in workers who were temporary. They lived in trailers and even three-shift motels. Most of the workers left when drilling was completed, because few workers are needed to maintain the wells and pumps. People now opposed to coal mining or its secondary impacts have oil wells on their ranches. There seems to be more opposition to and agony over coal mining than the earlier oil and gas development. Why? This writer could speculate but perhaps it should be left to a sociological study.

The Bradley, et al. study provides information on expected benefits and harms from a sample of 136 ranchers in the Powder River Basin. Of these, 70 have potential to sell or lease land for coal development within 10 years, 49 do not, and 11 are uncertain.

> Of the 70 who expect to sell or lease land for development within the next 10 years, 36 expect to benefit, 14 are uncertain and 20 expect to be harmed due to coal-energy development. The 49 survey respondents who do not expect to sell or lease land for development within the next 10 years have significantly different expectations; 8 expect to benefit, 10 are uncertain and 31 expect to be harmed due to coal-energy development (Bradley, et al., p. 36).

This survey probably is a more accurate representation of the attitudes of ranchers toward coal than my interviews with a relatively small number of ranchers.

Space does not permit a reporting of the benefits and harms expected by the ranchers. For those interested, the Bradley, et al. publication is recommended.

One leaves the Gillette area with the feeling that the controversy over coal mining may have only begun. Most mines are not yet in full operation and more will be built. Coal production in the county in 1978 was 40 million tons. Some

individual mines are expected to produce 24 million tons annually when up to capacity in a few years. Production now is limited only by the market--not state or federal regulations. The population of Gillette and the county will continue to grow. Those who like growth and ranchers who have benefited likely will be happy; some others will not.

Lessons

While some ranchers and other residents of Campbell County are quite happy with current and likely future coal development, it is clear that others are not. The following comments are based largely on points made by those who are less than happy--and perhaps are not the majority. Possibly these comments should be looked upon as the responsibility of the majority to the minority.

It appears that growth in Gillette and Campbell County has fairly consistently outrun its capacity to handle the people and mining construction. Overcrowded schools, not enough good housing, and inadequate roads are examples. One rancher suggested that there should be enough planning to know what facilities will be needed, and that the coal companies should put up enough money to see that they are constructed before the people arrive. He is disturbed by not-too-neat trailer parks and inadequate provision (no sidewalks) for children to get from housing developments to schools. Perhaps he is unrealistic. The author has to state that Gillette did not look nearly as bad as he expected--there are lots of substantial-looking houses and a minimum of grubby trailer parks. (He had previously visited Gillette overnight with his family in 1968--when most of the streets were gravel. The paved streets now look good and the newly built housing better than much of the older housing near downtown.)

Ranchers who liked the old life of semi-isolation and Gillette as a small town tend not to like the rapid growth and associated problems. An example: a stop sign was placed on a busy street in Gillette on Friday. Motorists were not used to it, and it was apparently hard to see. Over the weekend 160 tickets were issued before someone thought to add another sign in the middle of the street. A rancher felt that the police department was bragging about the number of tickets written when he would have fired the chief of police. Perhaps he overreacted, but the situation could have been better handled, such as a warning that there was a STOP ahead. Perhaps this should be a trivial incident to a rancher but others may be more important. Hunting is an example. Many of the new residents like to hunt, and of course about the only place to hunt is on ranchland. Pressure on the wildlife population is increased; to add to the problem, the coal companies reportedly do not allow hunting on their lands. Some ranchers are disturbed when coal company employees want to hunt on their land but cannot hunt on coal land. In addition, some ranchers have

acted as guides to nonresident hunters on their land. It was reported that hunting is not allowed within two miles of the mines, which apparently takes away hunting rights from some private lands. Perhaps some revision could be made in the policies relative to hunting on mine lands--for example, employees of a mine might be allowed to hunt on land owned by that mine.

There is little doubt that coal mining in Campbell County will increase and that the lives of most ranchers will be affected. In the words of one rancher, "If Campbell County must be sacrificed to the energy needs of the county, so be it. But the ranchers should be compensated adequately and treated fairly." The ranchers tend to look at themselves as rugged individualists who live quite independently of the rest of the county. Some tend to forget that they are dependent on the area outside Campbell County for pickups, cars, the gas to run them, barbed wire, a good share of their food--and a market for their livestock. Even if they recognize this, they tend to see their contribution because of disruption by coal mining as unfair in relation to what they get from outside the area. In this respect, they are no different from the people in upstate New York who do not see why a power plant should be built in their backyards to supply power to cities quite far away. Perhaps some kind of educational program would be useful to help residents near energy development recognize the interdependence of various areas of the country.

References

Bradley, Edward B., James J. Jacobs, and Andrew Vanvig. "Impact of Coal Development on Ranchers and Farmers in Wyoming's Powder River Basin." Agricultural Exp. Sta., University of Wyoming, Laramie, 1979.

Division of Research Statistics, Department of Administration and Fiscal Control, State of Wyoming. "Wyoming Population and Employment Forecast Report." June 1979.

Janis, David, John Carlson, and Clynn Phillips. "The Potential Impact of Coal-Energy on Agricultural Land Resources in Wyoming's Powder River Basin." Wyoming Water Resources Institute, Laramie, 1977.

Mineral Division, Wyoming State Department of Economic Planning and Development. Geological Survey Maps.

Powder River Basin Resource Council. Annual Reports, 1976-77, 1977-78, 1978-79.

Wyoming Crop and Livestock Reporting Service. "Wyoming Agricultural Statsitics." 1979.

Wyoming State Department of Economic Planning and Development. "Coal and Uranium Development of the Power River Basin--An Impact Analysis." June 1974.