

III WYOMING'S ECONOMY: STATUS, REQUIREMENTS, AND OPPORTUNITIES

Overview

Escalating energy prices, especially during the 1970s, pushed Wyoming's economy to record performance in 1980-1981. The decade of the 1970s not only advanced Wyoming's oil and gas industries, it also brought more profitable coal and subsurface mineral exploration. And as the energy and mining industries were growing, the state's agriculture industry was shrinking, hurt by a long worldwide recession. This steady change has narrowed the base of Wyoming's economy. The mineral and resource exploitation that used to influence the economy now dominates it overwhelmingly.

The Changing U.S. Economy and Implications for Rural Economies

The U.S. economy is undergoing profound transformation. Some traditional industries, mostly in manufacturing, are dying. In their place, new industries are growing, mostly in new technologies and services. These changes are affecting regions and states in significant ways. Jobs are disappearing, dislocating people with inappropriate skills and increasing the ranks of the unemployed. Many of the changes are affecting nonmanufacturing states as well. Rural economies like those of Wyoming and its neighbor states must adapt to new markets and global competition. Table III-1 summarizes many of the changes broadly affecting the U.S. economy and points out many of the implications for rural economies. In order to fully participate in the economic growth in the decade ahead, rural economies will need to both build on their historic strengths (like self-reliance) and provide better education, improved telecommunications systems, dependable water supplies, commercial air transportation, and the like.

Table III-1

MEETING THE CHALLENGE OF THE NEW ECONOMY IN RURAL SETTINGS

Broad Changes Affecting U.S. Economy		Implication for Rural Economies	
Old	New	Comparative Challenge	Requirement
Little foreign competition because of backward technology abroad.	Resurgent foreign competition.	Commodity trade (e.g., metals, agricultural products) increasingly difficult in advanced economies.	Specialized high-value added products are most competitive.
Slow changing technology.	Accelerating technical change.	New technologies will increasingly affect resources and agricultural industries.	New technologies must be made available to local producers.
Growth in production units.	Growth in production value.	Comparative advantage for specific value-added products.	Target public and private action to facilitate shift to such products.
Debt and equity financing equally important for building/sustaining business.	Equity financing more important for building/sustaining most new business.	New business start-ups in new areas of need (e.g. information systems) must be formed.	Nontraditional financing to build/sustain rural industries in key areas.
Sales of simple products to unsophisticated consumers in growing markets.	Sales of complex products to sophisticated consumers in saturated markets.	Higher degree of market and product specialization required.	Make technical assistance available to local producers.
Large fixed production operations.	Smaller, more flexible production operations.	New patterns of entrepreneurship must be provided in rural settings.	Reduce scale of operation, produce custom products, and establish flexible production processes suitable to rural settings.
Professional, non-owner management, negotiated labor-management relations.	Entrepreneurial owner/managers, equity participation by workers.	Develop rural analogs of "flexible factories" and new service industries.	Build on rural values like independence to enhance management of rural industries.

As Wyoming looks to the future, it must recognize that the world is changing. By understanding the nature and direction of change, the people of Wyoming will be able to anticipate, rather than react to, new realities.

Wyoming's Seven Sector Economy

Because Wyoming's economy is atypical in being so narrowly based on resources, SRI has elected to analyze its components using nontraditional definitions. Most economic analyses use strict U.S. Bureau of Labor Statistics definitions of industries, such as finance, trade, and services. Although sometimes useful for data purposes, these traditional definitions have problems--for example, they do not allow for analysis of emerging industries of significance to Wyoming like travel and tourism. SRI believes that any economic development study for Wyoming based on standard industrial classifications would not adequately address the real nature of Wyoming's economy. By analyzing federal and state economic data and by discussing Wyoming's economy with people throughout the state, SRI has identified seven sectors that accurately categorize Wyoming's economy today:

- (1) Mineral resources: fuels like oil, gas, coal, uranium, and synfuels, and nonfuels like CO₂, trona, bentonite, and metals.
- (2) Mineral/resource-related: refining, milling, generating, processing, and service.
- (3) Agriculture: farming and ranching including livestock, livestock products, and crops.
- (4) Travel, recreation, and tourism: transportation, hotels, restaurants, shops, and recreation services.
- (5) Manufacturing: fabricating, processing, machining, and assembly.
- (6) Government: federal, state, local.
- (7) Small business and other: retail trade, finance, construction.

The first four sectors--mineral resources, mineral-related, agriculture, and travel and tourism--are Wyoming's export-oriented, driving industries. The term "driving industries" is important and requires explanation. By

adding value within the state and exporting products or services outside Wyoming, driving sectors like minerals, agriculture, and tourism contribute net wealth to the state. The fifth sector--manufacturing--has opportunities for growth but is currently not a major component the state's economy. The final two sectors--government and small business and other--are viewed as mostly following sectors, with the small business sector, especially, rising and falling in employment with the rise and fall of employment in the driving sectors. These two following sectors are especially important because of the number of jobs they provide and the overall stability they bring to Wyoming's economy.

The small business sector, especially those businesses providing services, is important for another reason. It is likely that this sector harbors significant opportunities for growth if strategies are adopted to substitute Wyoming-based supplies and services for those currently being imported from out of state. In the discussion that follows, considerable attention will be paid to opportunities for new or existing business to produce goods and services now provided from outside Wyoming. These opportunities for import substitution are among the best opportunities Wyoming has for improving its economy.

Mineral Resources

Wyoming's mineral resources are the foundation of the state's economic well-being. Increasing demand for fuel resources--oil, natural gas, and coal in particular--resulted in an economic boom between 1973 and 1982. Nonfuel minerals such as trona, bentonite, and iron ore have, in the past, provided a substantial number of jobs in Wyoming. Clearly, the mineral resources sector has been important to Wyoming's growth, and the fuel resources, at least, will remain the central element of the state's economy in the future.

The health of Wyoming's resource industries depends on international markets and political factors. As Wyoming residents know, demand can change

rapidly, bringing on cycles of boom and bust. Currently, resource industries are in a worldwide recession with prices of nearly all resource commodities far below 1980-1981 levels. U.S. resource industries face low world prices and relatively high production costs. The competitive position of U.S. producers has been further eroded by the recent strength of the U.S. dollar, which makes U.S. goods and materials more expensive while foreign competitors see their production costs declining in dollar terms. At the national level, some Wyoming minerals cannot penetrate Eastern markets because transportation costs are too high. Wyoming's mineral industry must also operate within state and, especially federal regulatory structures governing leasing of federal lands, mine reclamation, air and water quality, and occupational safety. While the protection given by these regulations is generally favored by Wyoming citizens, the regulations often impose costs on Wyoming producers that are not required of foreign operations.

Mineral Resources: Yesterday and Today

The minerals sector has been a major factor in Wyoming's development since the 1860s, when local coal mines fueled the Union Pacific's engines. The first oil well was drilled in 1884; however, it was not until 1908 that the first oil boom occurred with production rising to 17,800 barrels from 9,300 barrels in 1907. By 1918, production of crude exceeded 12 million barrels.

The history of the minerals sector in Wyoming (as elsewhere) has been one of boom and bust. Periods of rising demand are often the result of political events--world wars I and II and the OPEC oil embargo. Busts occur as demand drops off, high grade ores are depleted, or new low-cost deposits are found elsewhere. In recent years, conditions in the Wyoming resource sector reflect the effects of lower U.S. and world economic growth (and, therefore, demand for resources) and surplus worldwide production capacity for most resources. In general, Wyoming's producers can do little to affect market price and are subject to the wide fluctuations of price and demand that are typical of most mineral commodities. Moreover, government policies

on taxation, utility regulation, land use, and air and water quality have a significant role in investment decisions and interfuel competition.

The sector's dramatic growth since 1970 cannot be overlooked, however. According to the U.S. Bureau of Economic Analysis, Wyoming employment in the minerals industry grew from less than 10,000 in 1972 to approximately 39,000 in 1981 before falling to 30,000 in 1983. The minerals sector accounts directly for 12% of state employment and supports much of the trade and service employment. State revenues from the minerals sector have increased by a factor of 10 since 1974. Through property taxes, severance taxes, federal and state royalties, and other levies, the minerals sector provided over \$1 billion to the state in FY 1984, more than 60% of total state revenue.

A capsule review of the recent history of Wyoming's principal mineral resources reveals a common pattern.

Oil—Wyoming's oil production peaked at 156 million barrels in 1970. The sharp oil price increases initiated by the Arab oil embargo and the Iranian revolution during the 1970s sparked an exploration boom, and new discoveries have maintained production at roughly 120 million barrels annually over the last four years.

Wyoming must now prepare for leaner times along with other energy-producing states such as Alaska, Louisiana, Oklahoma, and Texas, and with foreign countries such as Mexico and the OPEC bloc. Prices for Wyoming crude oil follow international prices, which are more likely to decline than increase in real terms, because producing capacity worldwide greatly exceeds the current demand for oil.

Petroleum markets have evolved from reliance on long-term supply contracts, with most production controlled by the major companies, to a trading environment dominated by spot sales and short-term contracts. SRI projects that world oil prices, represented by the official price of Saudi

Arabian light crude oil, will range between \$23 and \$30 per barrel (in constant 1985 dollars), during the rest of this century. This forecast assumes that no sustained interruptions occur in world oil supplies and that OPEC continues to function effectively as a cartel and to pursue a policy of price moderation to maintain future oil markets.

Political events such as a disruption of oil supplies from a major exporter, a decision by Saudi Arabia to raise production, or a complete collapse of OPEC agreements on production quotas and prices could cause prices to break out of the projected range. However, wide price excursions, if they occur, are likely to be short-lived. Downward pressure on real oil prices is likely to persist during the rest of the 1980s. OPEC's crude oil production has been 50%-60% of its maximum sustainable production capacity for the past 2 years, and its share of world crude oil production has declined from more than half during 1976-1979 to about one-third. The demand for OPEC oil will recover from recent low levels, but we expect that annual average demand will remain below 22 million barrels a day during the remainder of the 1980s, and will not exceed 30 million barrels a day until after 2000.

The major factor preventing a collapse of oil prices is the recognition by OPEC members that there would be no winners in a price war. Just as sudden, large oil price increases did not immediately reduce oil demand, so an abrupt price decrease would not immediately cause a great rise in demand. No oil exporter could increase its total oil revenues unless it could increase its share of a relatively constant market sufficiently to offset the lower price per barrel.

If world oil prices were to drop significantly, the governments of major oil-importing countries could tax away most of the price decline before it reached the final consumer. A tariff on imported oil would transfer revenues that previously went to the exporter to the treasuries of oil-importing countries, resulting in little price-induced stimulation of OPEC oil demand. Although the pressures of financial and economic problems are severe in many oil-exporting countries, most OPEC members seem to

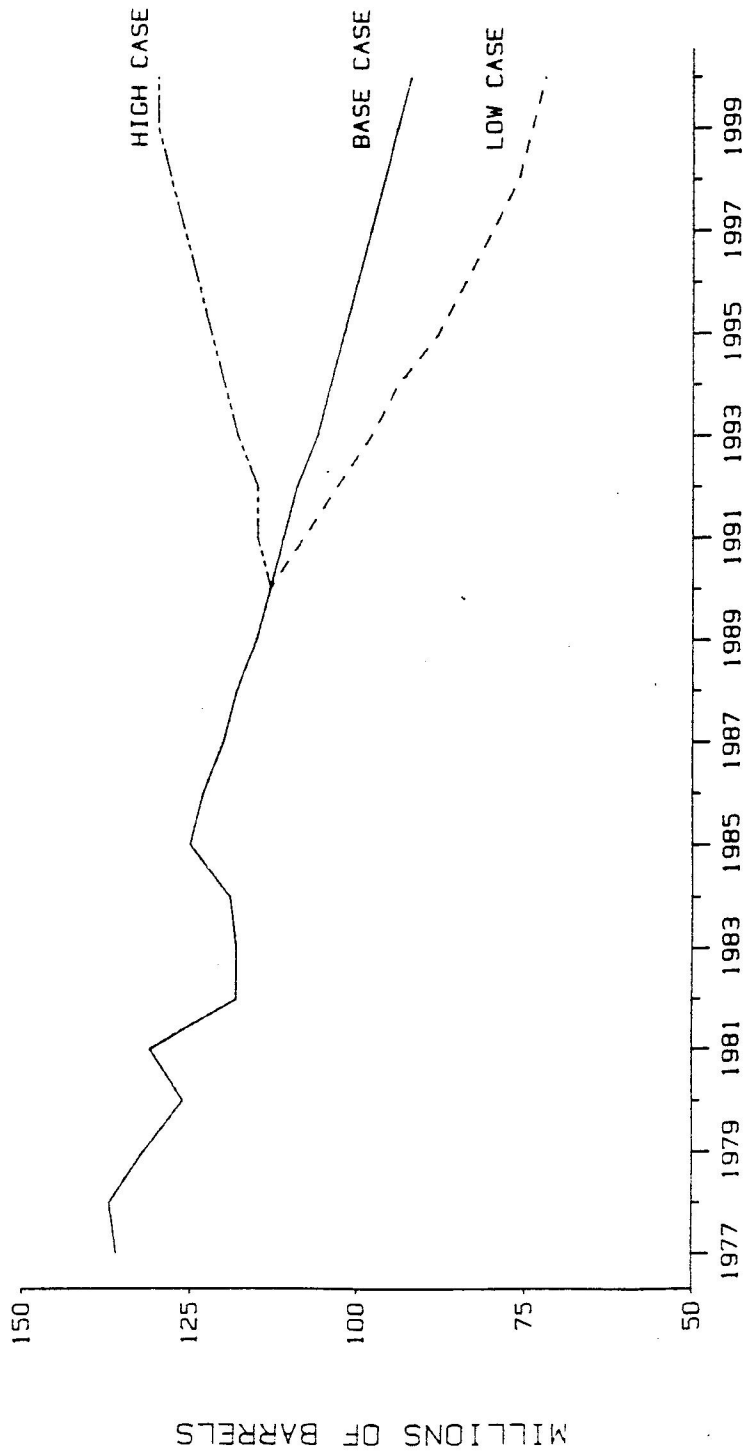
recognize that their problems would only be aggravated by disregarding production quotas and dropping prices.

Recent increases in crude production in Wyoming have temporarily masked the long-term trend of gradual decline through the rest of this century. Oil production has benefited from recent exploration activity, and 1985 is expected to show an increase over 1984 production. However, the general outlook is for a slow decline in oil production in the absence of any price incentive to increase exploratory drilling above current levels. SRI used available industry and state data on drilling, reserves, and production to make the projections in Figure III-I. The base case shows production declining from 125 million barrels in 1985 to 92 million barrels in the year 2000. Under expected conditions, low price and low demand will constrain production below levels that would be possible if higher prices spurred drilling to prove additional reserves or led to more enhanced oil recovery.

Because the industry is subject to many political uncertainties, such as OPEC's ability to maintain a unified production and pricing policy and political stability in the Middle East, a high and a low case are included in Figure III-I. To reach production levels shown in the high case, oil prices must increase above \$30 per barrel (1985 dollars) to justify more exploration and enhanced oil recovery. The low case assumes continued weakness in prices (\$26 per barrel or less through the year 2000), leading to reduced drilling.

Natural gas--In contrast to oil, production of natural gas has doubled since 1974, reaching 585 billion cubic feet in 1984. Exploration activity in the 1970s established the Overthrust Belt in western Wyoming as a major gas province. New pipelines have been laid to move this gas to Midwest markets.

While oil production is expected to decline, gas production is projected to continue increasing as recently discovered reserves are brought into production. The extent to which Wyoming's gas supplies can penetrate U.S. gas markets depends upon the willingness of Wyoming producers to reduce



SOURCES: WYOMING GEONOTES 3-7, PLATT'S OIL GRAM
 PRICE REPORTS 1977-1985 SRI International

FIGURE III-1 CRUDE OIL PRODUCTION

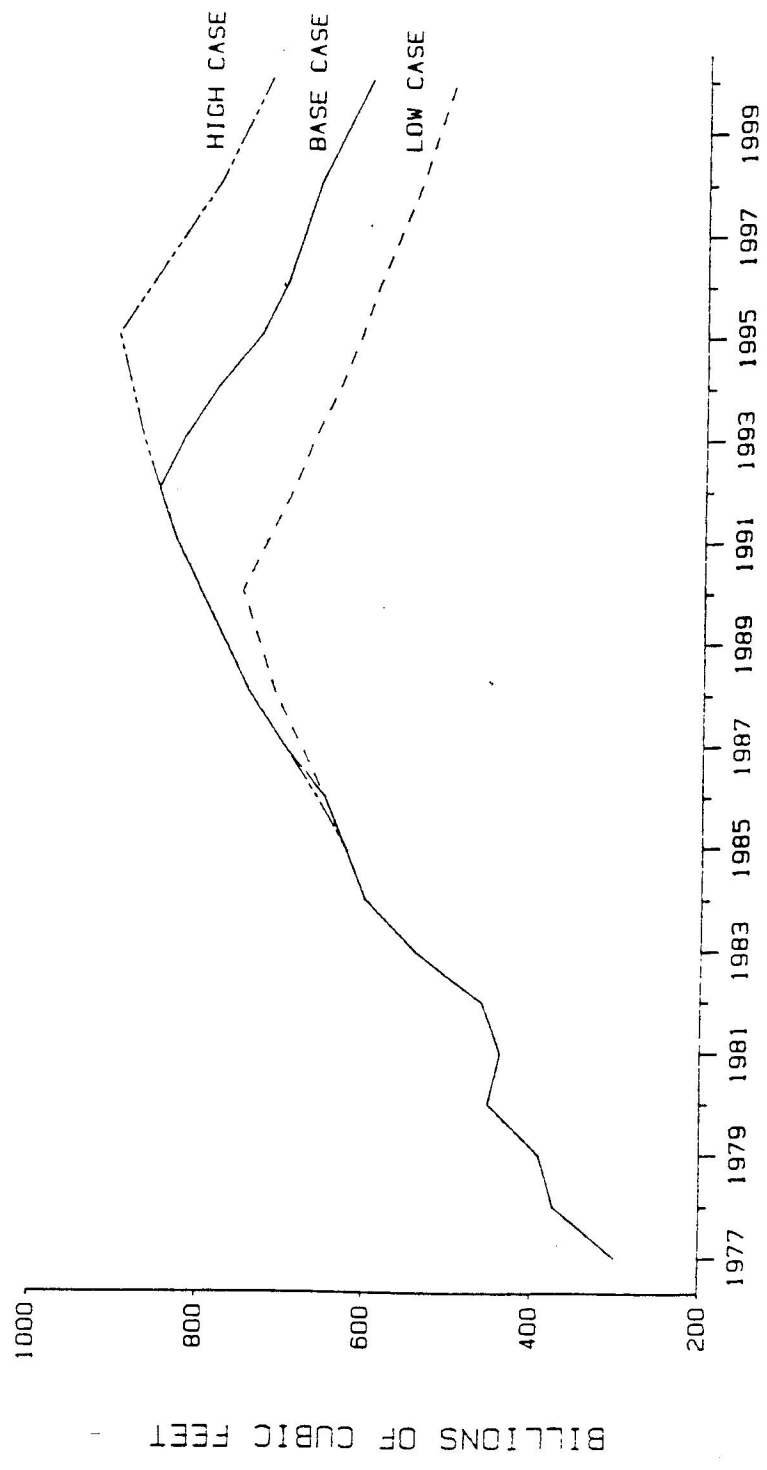
prices to gain market share. There is currently a large surplus of gas available in the United States as well as in Canada and Mexico. The surplus ("gas bubble") amounts to 8 billion cubic feet per day of uncontracted, deliverable gas in the United States plus another 8 billion cubic feet per day of deliverable gas in Canada and Mexico.

The "gas bubble" combined with competition with fuel oil as a boiler fuel has driven natural gas prices below \$2.50 per thousand cubic feet in some instances. While most observers expect the "gas bubble" to disappear over time, the rate of disappearance depends on future demand and on the amount of drilling activity in the United States. Currently, drilling activity is sufficient to replace only 50% of U.S. annual gas consumption (17 trillion cubic feet). Consequently, we believe that the U.S. "gas bubble" will shrink over the next 5 years; however, Wyoming gas producers will still face severe competition from Canadian suppliers.

In the absence of energy price increases or supply shortages leading to greatly expanded exploration, growth in production of Wyoming natural gas is unlikely to be sustained past the early 1990s. Production is then expected to decline slowly but remain above current levels through the year 2000 (see Figure 111-2, base case). As with crude oil in Wyoming, the resources may exist to support high levels of production through the year 2000, but SRI believes that market conditions will limit exploration and development of additional reserves.

With restricted imports and strong prices, natural gas production could exceed 700 billion cubic feet in 2000 (the high case in Figure III-1). Conversely, increased imports from Canada and lower prices could drive production as low as 500 billion cubic feet in the year 2000.

In all cases shown in Figure 111-2, SRI assumes that the productivity of the gas-bearing formations in the Overthrust Belt will not constrain production. Moreover, we assume no major discoveries of natural gas that would alter the economics of U.S. gas supply and demand.



SOURCES: WYOMING GEONOTES 3-7, WYOMING MINERAL YEARBOOK
SRI International

FIGURE III-2 NATURAL GAS PRODUCTION

In the long run, natural gas will have to be priced to compete with petroleum products (mainly distillate fuel oil in residential and commercial markets and residual fuel oil in industrial markets) at the burner tip if gas producers wish to maintain or increase their share of energy markets. Recent examples in the United States and elsewhere indicate that contracts that do not allow gas to compete in price at the end-use point will come under severe market pressures, leading to reduced purchase volumes, price renegotiations, or abrogation of the contract.

In the United States, the average wellhead price of natural gas remained constant at about \$2.60 per million Btu (\$2.55 per thousand cubic feet) in 1984, after steadily increasing from \$0.22 per million Btu (\$0.216 per thousand cubic feet) in 1973. Gas price increases are now being constrained more by competitive market forces than by the federal price ceilings that are still in force for some categories of gas. On the basis of our projections of world oil prices, the competitive U.S. wellhead price of natural gas for industrial markets will be in the range of \$2.40 to \$3.20 per thousand cubic feet (in constant 1985 dollars) between 1985 and 2000.

Coal--The Wyoming coal industry is a major beneficiary of the energy crisis. In 1984, 28 coal mines produced 130 million tons of coal--18 times the 1970 production of 7 million tons. Wyoming's coal mines produced 1 of every 7 tons of coal mined in the United States in 1984.

U.S. coal consumption is expected to increase as a percentage of total energy consumption during the rest of this century. Most of the growth will be in coal-fired power plants. U.S. coal exports should also increase slowly during this period. Potential legislation to reduce acid precipitation could favor Wyoming coal because of its low sulfur content; however, most proposals would require environmental controls on all coals regardless of initial sulfur content. Over the longer term, environmental concerns may slow the trend to coal--especially if natural gas remains abundant.

Globally, coal is an abundant resource and its production is expected to be demand-limited during the next decade or longer. Therefore, we expect that long-term prices for the contract purchase of steam coal will be based on the actual cost of mining and transporting coal, including a return on investment, plus a reasonable royalty (or tax) for the resource owner. The competitive market among coal suppliers and the interfuel competition that exists worldwide will keep coal prices within bounds.

Since 1982, the cost of coal delivered to U.S. electric utilities has averaged about \$1.66 per million Btu (approximately \$27 per ton for typical Powder River Basin coal), which is equivalent in energy content to residual fuel oil at \$10.30 per barrel. Thus, even accounting for higher handling, storage, and environmental costs, coal has a large price advantage over residual fuel oil, which is selling for over \$20 per barrel.

We assume that coal will be priced to maintain its competitive advantage for electric power generation and large industrial applications. Thus, increases in the average steam coal price during the rest of this century are estimated to be about equal to, or more likely somewhat less than, increases in fuel oil prices.

Wyoming's ability to capture any additional share in the domestic coal markets is constrained by high transportation costs. Although the cost of mining coal in Wyoming is relatively low, the cost of transporting the coal to distant markets is not. For example, in April 1985, Exxon signed a short-term contract to deliver coal from its Caballo mine in the Powder River Basin to two utilities in Austin, Texas, at a delivered price of about \$27 per ton. The price at the mine was \$5 per ton, whereas the cost to transport the coal by rail to Austin was \$22 per ton, roughly 80% of the total delivered cost.

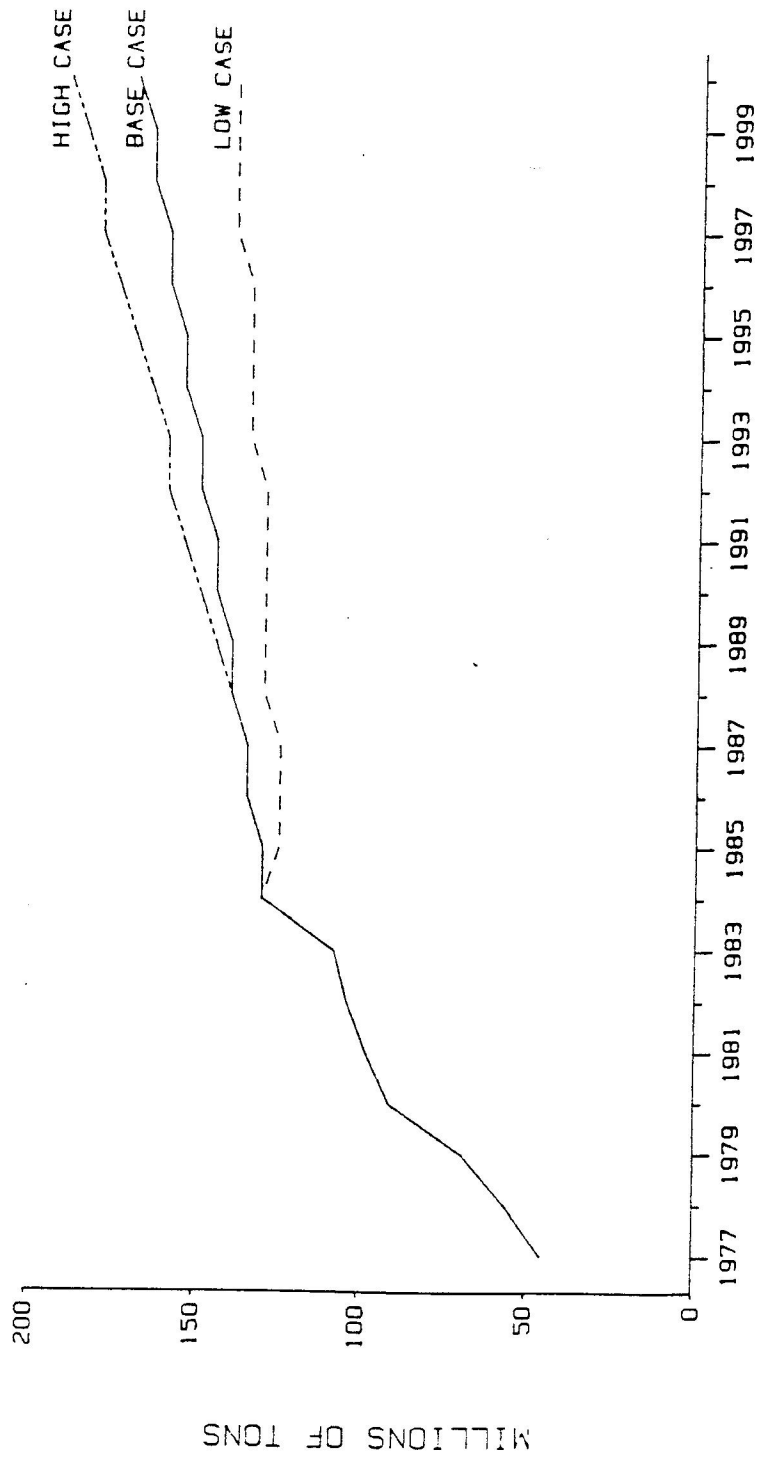
One factor that affects the costs of coal transportation is the degree to which the railroads can exert control, thereby raising the price of transport. Since Wyoming coal must compete with coal from other sources on the basis of the price delivered to the final consumer, control of the

transportation link from mine to customer shifts profits from coal mining to coal transportation. Increased competition would not only increase the capacity to move coal to markets, but it would also allow the mine operator to obtain a larger share of the delivered cost of the coal. The recent extension of the new line maintained by Chicago Northwestern into the Powder River Basin has already resulted in a downward pressure on rates out of that area. To enable Exxon to win the previously mentioned contract to supply coal to utilities in Austin, Texas, Burlington Northern reduced its rate from \$24 to \$22 per ton. Obviously both the coal companies and railroads share an interest in having coal move from mine to market; the controversy is over who gets the profits.

As shown in Figure III-3, coal production is projected to range between 140 and 190 million tons in the year 2000. These projections assume no growth in Wyoming coal production for export to foreign countries or for use in synthetic fuel plants, which convert coal into oil products or methane. Wyoming coal is unlikely to be exported; by the time it reaches East or West Coast ports, the transportation costs make it more expensive than coal from other parts of the United States. Costs of land and sea transportation to Japan and other Asian countries make Wyoming coal more expensive than coal from Australia and South Africa.

Wyoming coal faces intense competition in domestic markets as well. Coal demand by Eastern utilities may not grow as anticipated if Canada continues to displace U.S. generation by its exports of electric power. The U.S. coal industry is increasingly vulnerable to imports of coal. For example, New England Electric has purchased coal from British Columbia, and Florida Power is considering test purchases of Canadian coal.

The profitability of synthetic fuel production depends on the cost of natural fuels--of crude oil and natural gas. Even if oil prices were to rise faster than SRI projects, many sources of conventional oil would come to the market before synthetic fuels could compete. Development of major synthetic fuels plants is unlikely before the year 2000.



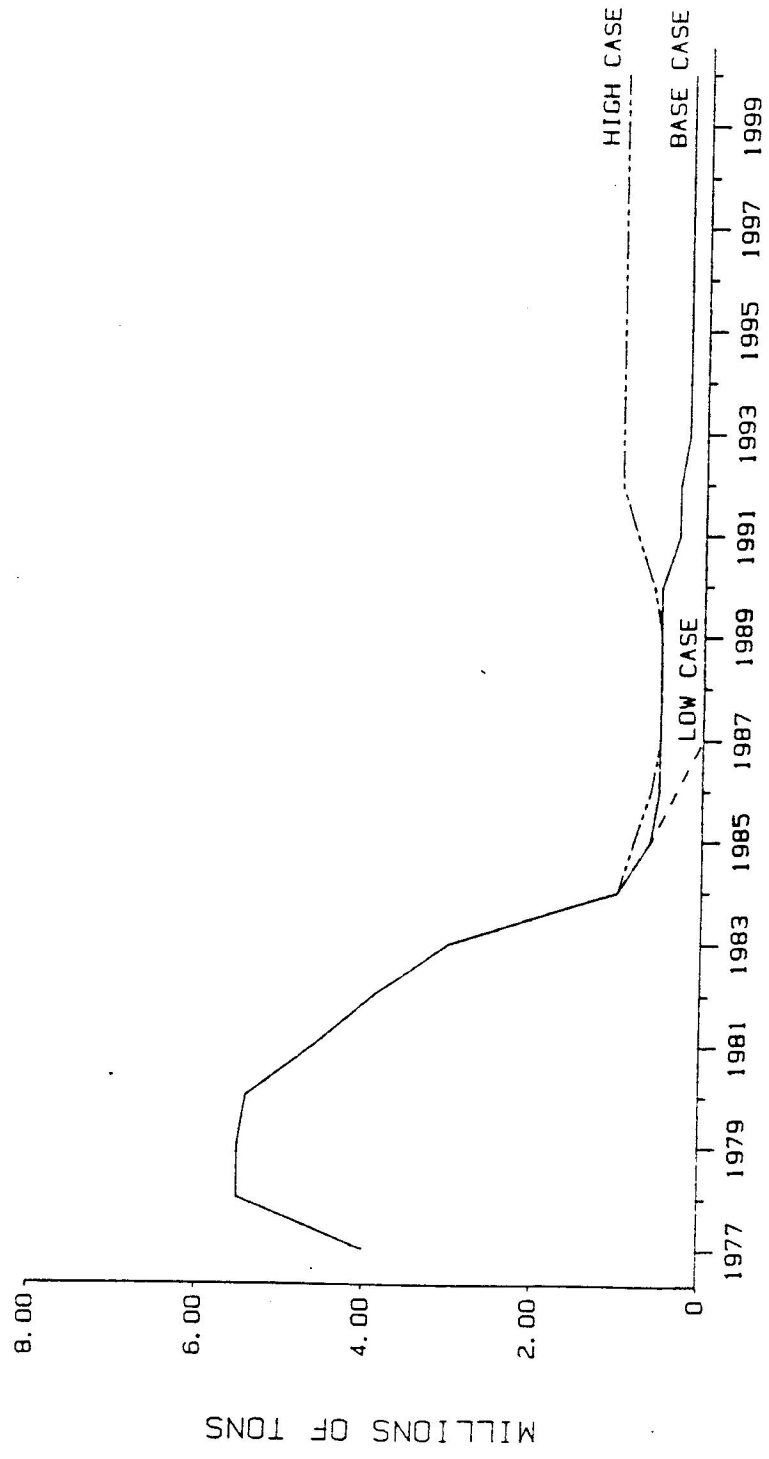
SOURCES: WYOMING GEONOTES 3-7, WYOMING MINERAL YEARBOOK
SRI International

FIGURE III-3 COAL PRODUCTION

Uranium--Uranium production in Wyoming began in the mid-1950s and grew rapidly until 1980. However, slower growth in electricity demand coupled with regulatory delays and high costs have substantially reduced earlier projections of the growth of nuclear power and demand for uranium. Five Wyoming uranium mines operated in 1984, but production of ore in 1984 was approximately 1.2 million tons, down from a peak of 5.5 million tons in both 1978 and 1979. Currently, three mines are operating and one of these is scheduled to close in December 1985. Prices have plummeted along with demand, and the continued economic viability of the mines is questionable at this time. The already dismal employment picture would be worse without the current employment in mine reclamation.

Wyoming uranium ore production is expected to taper off to 200,000 tons annually by 1993 (Figure 111-4) due to the combined forces of high inventories, foreign competition, and excess world production capacity. In addition, concern about the health effects occurring during mining and consumption of uranium will constrain resurgence of the industry. Under worst case assumptions, Wyoming production could cease completely by 1987. While some nuclear plants under construction have not yet let contracts for their fuel supplies, cancellation of units that had uranium contracts makes those supplies available. In addition, U.S. production faces competition from mines in Canada and Australia that have higher grade ores and lower production costs. U.S. uranium producers could find some relief if the Federal Government imposed limits on uranium imports or adopted policies to ensure strategic reserves, but this is unlikely in the near future.

High uranium inventories at U.S. plants also make a decrease in production likely. In 1981, world sales of uranium were slightly more than twice the apparent world demand (i.e., estimated demand for fuel to be loaded into nuclear reactors in two years time) indicating that users were stockpiling uranium. Since then, apparent demand has dropped, especially in the United States, and mills have closed as well. There is still a substantial surplus of milling capacity on a worldwide basis.



SOURCES: WYOMING GEONOTES 3-7, WYOMING MINERAL YEARBOOK
SRI International

FIGURE III-4 URANIUM ORE PRODUCTION

The U.S. picture illustrates the continuing existence of high inventories and an excess capacity for uranium production. U.S. uranium requirements for 1985 are approximately 33 million pounds, but only an estimated 12 million pounds will be produced because of existing inventories. In 1983, utilities held stocks of 137 million pounds and suppliers held 38 million pounds more (as natural and enriched uranium). Thus, stocks were equivalent to approximately 6 years of demand and U.S. mill capacity was 175% of 1985 forecast demand, at 58.5 million pounds. Since then, approximately 35 million pounds per year of mill capacity has been removed or will be removed by plant closure.

Trona-- Although less well known than the state's energy resources, trona has had a significant effect on Wyoming's economy over the last 20 years. In 1984, the value of Wyoming trona exceeded \$100 million. Five Wyoming producers mine trona and recover soda ash from the ore deposits in southwest Wyoming that contain the world's largest trona reserves.

In addition to the Wyoming trona deposits, natural soda ash is also recovered from brines at Searles Lake in California. In recent years, the only other U.S. source for soda ash was a New York facility that used the "Solvay" chemical process to produce synthetic soda ash from salt and limestone. This plant recently closed, however.

For the last 15 years, U.S. consumption of soda ash has remained relatively static at between 6.5 and 7.5 million tons per year. However, U.S. soda ash production has increased since 1970 because of increased exports. In 1984, exports exceeded 1.6 million tons, compared with 300,000 to 400,000 tons per year in the early 1970s. In the last decade a major shift has also occurred in soda ash sources--from synthetic material to trona, the natural material. Natural soda ash accounted for more than 90% of the total soda ash consumed in 1984, compared with 40% in 1970. This change has had a major impact on Wyoming. With the closure of the last Solvay plant, trona will become the only source of U.S.-produced soda ash. (The Solvay plants in the United States have been closed primarily because

of pollution considerations. Wyoming in this case has been helped by strict environmental controls elsewhere. However, many Solvay plants still operate in other countries with less stringent environmental standards.)

Nominal U.S. soda ash capacity is about 10.5 million tons per year, about 9 million of which are in Wyoming, as shown below:

<u>Producer</u>	<u>Location</u>	<u>Capacity (millions of tons per year)</u>
FMC Corp.	Green River, WY	2.85
Allied Chemical Co.	Green River, WY	2.20
Stauffer chemical Co.	Green River, WY	1.90
Tenneco Minerals Co.	Green River, WY	1.00
Texasgulf Chemicals Co.	Granger, WY	1.00
Kerr-McGee Chemical Corp.	Searles Lake, CA	1.45

At current production levels, about 20% of capacity is excess.

Although the United States is the world's largest producer of soda ash, U.S. production represents only about one-third of the total annual western world production of 25 million tons per year. Most of the non-U.S. material is synthetic soda produced by the Solvay or other chemical processes. Other natural soda ash operations are in Kenya, Mexico, and the Soviet Union.

Because exports constitute the growing market sector for U.S. (and Wyoming) soda ash production, changes in the supply outlook outside the United States will directly affect Wyoming trona production Several new synthetic soda ash projects are planned for Asia and South America. Whether and when they will be constructed remains uncertain, however. The Sua Pau project of British Petroleum in Botswana is scheduled for completion in 1988. It could supply as much as 300,000 tons of soda ash per year and possibly replace U.S. exports now going to southern Africa.

In Wyoming, trona has been mined in underground operations using standard mining practices. However, FMC has recently developed an underground solution-mining procedure to recover the ore. Although this

innovation will not have a major impact on overall production levels, it could lower production costs and partially offset transportation cost to the major U.S. or overseas markets.

Because of Wyoming's massive trona reserves, future increases in production will not be supply limited. Only market demand and the delivered cost of the Wyoming soda ash in comparison with the delivered cost of synthetic material will restrict future development of the state's trona.

The main market for soda ash is in the production of glass bottles and containers, accounting for for about 35% of U.S. consumption. Various U.S. applications for soda ash follow:

	<u>Percent</u>
Glass bottles and containers	35
Other glass uses	15
Inorganic chemicals	20
Soap and detergents	9
Pulp and paper	3
Water treatment	4
Other uses	<u>14</u>
Total	100

Because these markets are mature, growth in U.S. soda ash consumption is expected to be about 1% per year. Moreover, the glass bottle industry is experiencing severe competition from plastic bottles. The continued growth of plastic bottle packaging could further reduce soda ash consumption. (Aluminum cans have already taken a large share of the beer and soft drink container market from glass bottles.)

A potential new market for soda ash is in flue gas desulfurization. Soda ash, and other minerals such as lime, can be used to remove sulfur dioxide from stack gases. However, because of transportation costs, this application for Wyoming trona will probably be limited to the Rocky Mountain states--a market that is unlikely to develop until after 1990. Another potential new use for soda ash is for the neutralization of acid lakes. However, acid lakes occur mainly in eastern United States; given

transportation charges, it is thus unlikely that Wyoming soda ash would be used in this application. Other competing minerals, produced in the East, would have a cost advantage.

Soda ash uses in other countries are similar to U.S. end-use patterns. Although U.S. exports have recently increased 10% to 15% per year, continued export increases will depend on whether material substitution similar to that in the United States takes place overseas and on whether new synthetic soda ash plants are constructed overseas. In addition, the construction of more synthetic soda ash plants throughout the world poses a threat to continuing Wyoming trona exports. But, as is the situation with other mineral resources, the cost of trona from Wyoming vs. that from foreign sources will be the determining factor for future exports. Therefore, the export potential of Wyoming trona is constrained by high transport costs and potential competition from new foreign capacity.

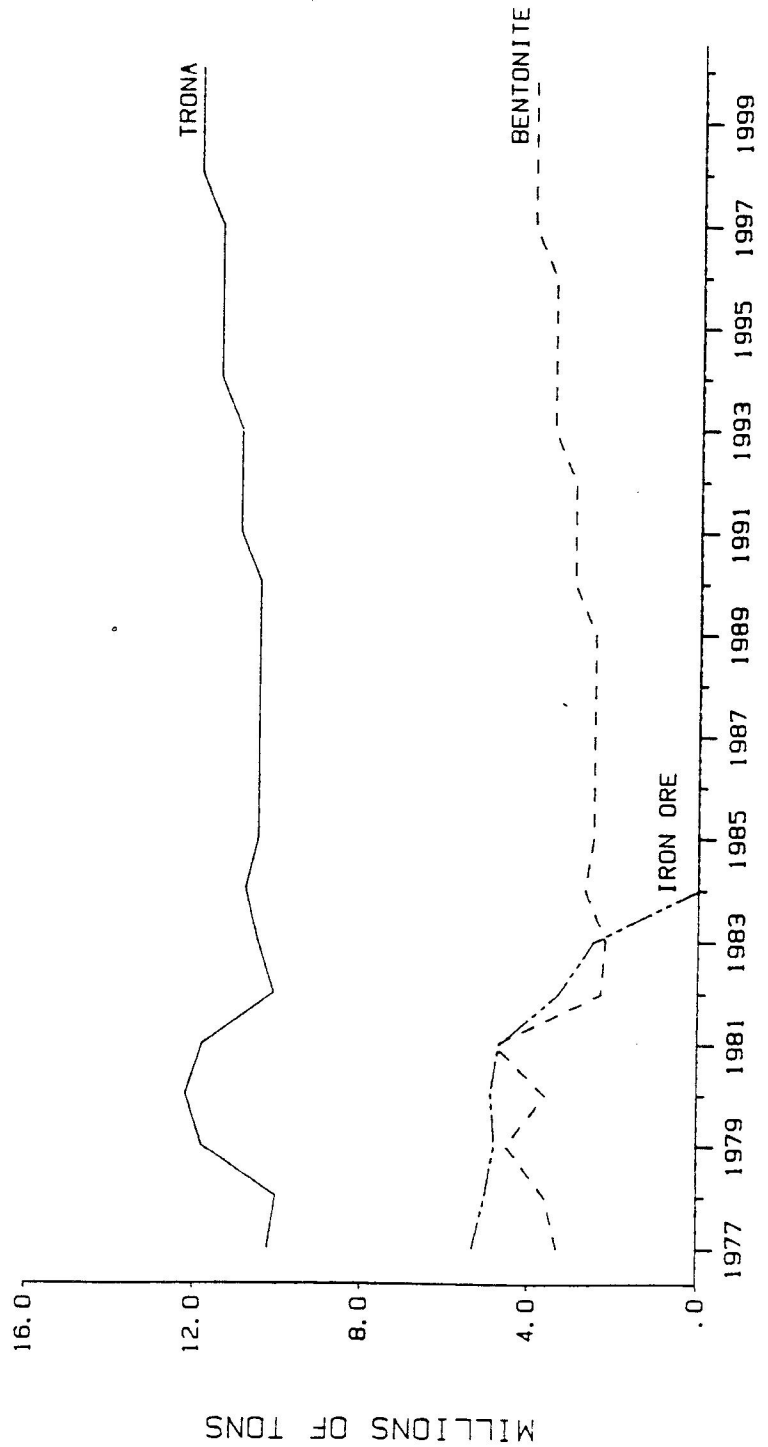
Production of trona fell only moderately in the 1981-1982 recession, and projections call for a slow recovery, reflecting reduced use of new glass in automobiles and containers. Historical and projected data are shown in Figure 111-5.

Bentonite--Wyoming has traditionally supplied about 70% of the U.S. production of bentonite. Together with Montana and South Dakota, this is the primary source of the nation's bentonite. Wyoming's bentonite excels in its ability to absorb water and swell to about 15 times its dry volume and in its ability to exchange sodium for organic as well as other inorganic ions. These properties determine the three principal uses of Wyoming bentonite in the U.S. and abroad:

As a key additive for controlling the viscosity of drilling muds (about 55% of Wyoming bentonite goes into this use).

As a binder for iron ore pelletizing (uses some 14% of Wyoming's production).

As a binder for foundry sand molds (about 19% of the market for Wyoming bentonite).



SOURCES: WYOMING GEONOTES 3-7, WYOMING MINERAL YEARBOOK
SRI International

FIGURE III-5 PRINCIPAL NON-FUEL MINERALS PRODUCTION

Other bentonite applications include use as an additive for adhesives, animal feed, cement, fertilizers, cosmetic and pharmaceutical products, paint, and waterproofing or sealing compounds. Also, its superior absorbency makes Wyoming bentonite useful for filtering and clarifying, for pet waste absorbency (cat litter), and as a good carrier for pesticides. However, these miscellaneous other uses account for only 13% of total domestic consumption, and, since the mid-1960s, such markets have either stagnated or shrunk.

The outlook for bentonite, particularly the type produced by Wyoming, is not bright. While demand for bentonite grew at a remarkable 8.5% annually from the early 1940s until the late 1970s, the industry has come under pressure in each of the three major end-uses during the 1980s. According to U.S. Bureau of Mines information, production of Wyoming bentonite peaked in 1981 at 3.6 million short tons. Since then, it dropped (by 35% in 1982) to 1.9 million tons in 1983, approximately 50% of the former peak. (The 1984 Wyoming Mineral Yearbook reports production of 4.8 million tons in 1981, 2.3 million tons in 1982, and 2.2 million tons in 1984.)

SRI believes that future markets for Wyoming bentonite will continue to erode and that the market for this material may continue to shrink at 1% to 2% a year (see Figure 111-5). Three major factors influence this decline: first, Wyoming producers are remote from markets and the growing competition from other bentonite producers; second, the three principal uses for Wyoming bentonite are in sectors with poor market outlooks; third, new technologies and materials will displace bentonite in virtually every major application.

Transportation costs are critical for Wyoming bentonite because of the distances involved and the fact that major markets are often served by overland transport. In drilling muds, the markets are 600-1,200 miles away; similarly, the iron foundry markets are concentrated in the East North Central and Mid-Atlantic states, mostly 300-1,400 miles away; and about two-thirds of iron ore pelletizing is 600-1,200 miles away. Also, other bentonite producers--U.S. and foreign--are penetrating traditional markets

with different bentonites and chemically modified clays. For example, Southern Clay recently expanded Organoclay production in Texas. Similar competition can be expected from European producers and, potentially, from China.

Other minerals--In the past Wyoming has produced significant amounts of copper and iron ore, but copper mining has ceased and U.S. Steel closed its iron mine in 1983 (production is not expected to resume). Historical data for iron ore production are shown in Figure 111-5.

Other minerals will be produced over the next 15 years, but most are relatively small in terms of their value of production. Scattered deposits of precious metals are known, but no commercial-scale mines are operating.

Carbon Dioxide--Carbon dioxide (CO₂) has recently emerged as a major factor in Wyoming's natural resources development. The primary use of the gas will be to improve oil recovery in reservoirs where productivity is declining. When CO₂ is injected into an oil reservoir, it extracts light-to-intermediate components from the oil and then, under the right conditions, displaces the oil in the porous rock, "forcing" it toward the producing wells. The potential for increased oil production in Wyoming is good; however, technical, economic, and regulatory issues remain to be solved.

Another potential use for CO₂ is as a transport medium for coal in a slurry pipeline. One project has been proposed which would deliver Wyoming coal and CO₂ to California. This concept is promising but will require considerably more study on the technology and economics before it is a reality.

The cause for all the activity and excitement about CO₂ in Wyoming is Exxon's La Barge Platform development in Sublette County, which will go on

stream in 1986 and will generate commercial quantities of methane, CO₂, helium, and sulfur. The gas source for the Exxon development is the largest known CO₂ accumulation in the lower 48 states with estimated reserves of 11-20 trillion cubic feet of CO₂. The deposit also includes significant amounts of methane, sulfur and helium. The La Barge Platform is currently the northernmost producer of CO₂ in the region. Because of its location, good market opportunities exist for the CO₂ in the oil-producing regions of Wyoming, North Dakota, and Montana, as well as in Utah and northern Colorado. A total of 300 million cubic feet per day of CO₂ has already been contracted to the Chevron Oil Company in northern Colorado and to the Amoco Oil Company in Bairoil, Wyoming.

At present, the outlook for CO₂ demand for enhanced oil recovery is unclear. The technology for flooding oil reservoirs with CO₂ is only in its infancy. The volumes of CO₂ required and the suitability of CO₂ for different reservoir conditions are still uncertain. In addition, competitive recovery methods exist for those reservoirs currently considered to be CO₂ prospects. In Wyoming, the potential increase in oil production from all recovery methods is estimated at 1.5 billion barrels; half of this total is considered suitable for recovery using CO₂. In the rest of the Rockies/Western Interior region, SRI estimates that enhanced oil recovery could increase production by up to 10 billion barrels, with CO₂ methods accounting for one-third to one-half of the total. With the uncertainty involved, the volume of CO₂ required for these increases could range from 12 trillion cubic feet to 35 trillion cubic feet.

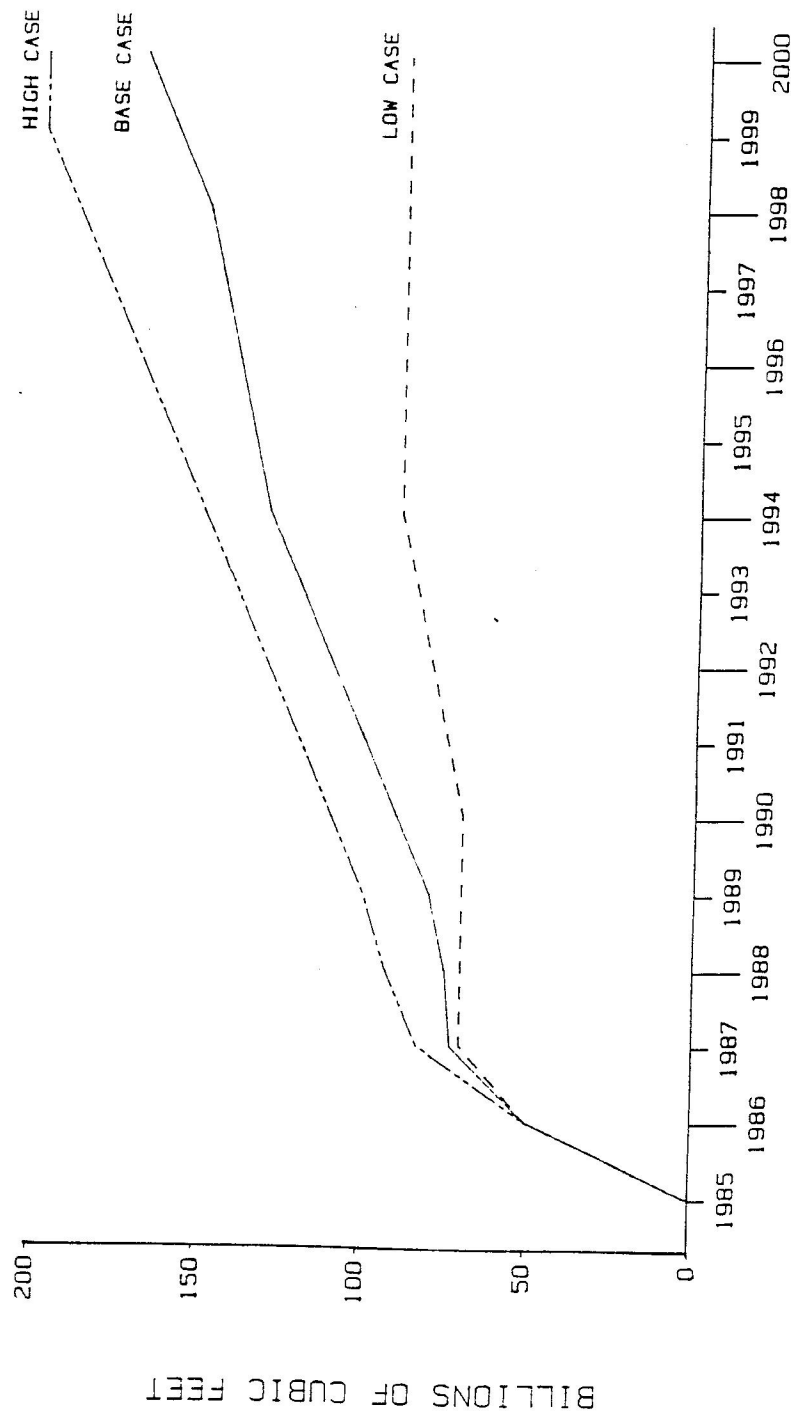
There are already several large sources of relatively cheap CO₂ gas in this region. Based on public reserve estimates of major CO₂ producing reservoirs, and extrapolating these estimates for the states as a whole, SRI projects that the already discovered reserves are 5 to 10 trillion cubic feet (Tcf) in Utah, 12 Tcf to 17 Tcf in Colorado, 8 Tcf to 15 Tcf in New Mexico, and 14 Tcf to 25 Tcf in Wyoming. CO₂ from industrial sources is also used for enhanced oil recovery. For example, ammonia plants in Louisiana and Oklahoma are providing CO₂ to enhanced oil recovery projects and a Texaco refinery provides CO₂ to the Wilmington Field in California.

Other potential sources are oilfield acid gas separation facilities, power plant stack gas, and cement plant and limestone calcination facility flue gas. After the turn of the century, synthetic natural gas and coal gasification plants may be the largest industrial source in the region. For example, although the Great Plains project in North Dakota will probably cease operations, it could have produced an estimated 200 million cubic feet per day, or 1.8 Tcf in CO₂ over 25 years. While there are uncertainties regarding the volume, reliability and preparation costs of CO₂ from industrial sources, they can be competitive with natural sources under certain conditions.

Figure III-6 presents three alternative projections of CO₂ production in Wyoming, ranging from a low of 90 billion cubic feet in the year 2000 to a high of 200 billion cubic feet. Eventual demand for Wyoming CO₂ will depend on local conditions as well as the future price of oil, but reserves are more than sufficient to support CO₂ production through 2000.

The viability of an enhanced oil recovery project with CO₂ depends on the size and quality of the CO₂ source, its location relative to the oil reservoirs, the availability of pipeline networks, taxes, and the prices of oil and gas. A major decision factor is the capital cost of the producing CO₂ wells, processing plant, and pipelines; costs are so large as to bar development when the demand for CO₂ is uncertain. A giant source of supply, such as the La Barge Platform, and strong demand for its output are generally required to justify the initial investment.

In the competition between sources of CO₂ supply the cost of transportation quickly becomes a critical factor as the distances from source to destination increase. For a typical project in the Rocky Mountain region, SRI estimates the capital and operating costs of a pipeline transportation network range from \$0.10 to \$0.30 per thousand cubic feet for every 100 miles. Exxon's La Barge development will be well placed to supply CO₂ markets in the northern part of the Rocky Mountain region because its nearest competitors are in southern Colorado. Texas CO₂ markets, which



SOURCE: SRI International

FIGURE III-6 CO₂ PRODUCTION

are the largest in the lower 48 states, are probably too far away for Wyoming gas to be competitive with supplies from Colorado and New Mexico.

Taxation on CO₂ developments is currently an issue in Wyoming. Major arguments exist over whether the state's current severance tax statute applies to CO₂ gas and, if it does, how the taxable value of the CO₂ is calculated. The current severance rate for oil and natural gas extractions is 6% of the taxable value. Legislative attempts were made in the 1985 session to resolve the situation. One bill attempted to apply severance taxes to all gases, hydrocarbon and nonhydrocarbon, including CO₂. Another bill tried to clarify the valuation and tax assessment procedures. Neither was enacted.

Given current oil prices, many enhanced oil recovery projects are economically marginal. Severance tax rates, ad valorem tax rates, and assessment procedures for CO₂ developments could affect the decisions for these projects, although this is probably unlikely, given that taxes on CO₂ production would represent such a small percentage of the overall costs for the enhanced oil recovery development. pd

The Enhanced Oil Recovery Institute at the University of Wyoming and the Rocky Mountain Oil and Gas Association have compared taxes among the Rocky Mountain states. If Wyoming severance taxes apply to CO₂, then Wyoming would be among the highest in combined severance tax rate and ad valorem tax rate (approximately 13%) in the region. The combined rates in other states are approximately 6% in Colorado, 7.5% to 9% in New Mexico, and 7% to 23% in Montana, depending on local levies, about 9% in Utah, and about 9% in Texas. (It should be noted that Wyoming may have other tax advantages to offset any perceived disadvantages of its severance tax rate.) Very little is understood about the elasticity of CO₂ supply and the marketability of Wyoming gas compared to that from neighboring states. The purposes and effects of Wyoming's taxation policies on carbon dioxide demand and supply in the region should be evaluated more closely by the state legislature, state administration, the public, and private industry before tax rates and assessment procedures are finally adopted.

Wyoming's Mineral Industries Tomorrow

The future of the fuel minerals sector is especially sensitive to changes in the U.S. tax code. The profitability of oil and gas exploration--and hence the ability to attract exploration capital--is tied to provisions that allow expensing of many drilling costs along with write-offs for resource depletion. In the past, the tax shelter aspects of these provisions were key factors in attracting small investors. The tax reform plan sent to Congress by President Reagan in May is designed to modify tax subsidies for the exploration, development, and production of natural resources "in order to establish greater neutrality in the taxation of various commercial activities, while retaining those incentives believed necessary to maintain exploration and development of domestic mineral resources." The Administration proposal retains the expensing of certain drilling costs and the depletion allowance for wells with low production rates. From the investment perspective, it is generally viewed as worse than existing law but better than previous tax reform proposals. If Congress did enact more severe tax laws U.S. drilling activity could be significantly hampered. Exploration activity was declining even before federal tax changes became a concern and market conditions will continue to limit wildcat drilling. On the other hand, oil and gas production is continuing at high levels as recent discoveries are developed. However, production is expected to decline in the 1990s because of reduced exploratory drilling.

Conditions in the banking industry also restrict the infusion of new capital into the oil industry. Many banks have been forced to write off loans to energy companies squeezed by reduced oil prices and low demand. With their portfolios burdened with nonperforming loans, the small, local banks are especially unable to make further loans.

The potential for discovering a major new mineral deposit in Wyoming remains. However, for most of the principal nonfuel minerals, it may not be economically feasible to develop any new mines. Production of much of the world's nonfuel resources is controlled by state-owned corporations

dominated by the need to meet social and political objectives. These enterprises have contributed to the current problems because they have maintained or increased output despite low prices, weak demand, and surplus production capacity. Many of the poorer countries must maintain production to obtain foreign exchange for financing imports and servicing foreign debts. Wyoming's distance from major markets remains a problem for any bulk mineral commodity because of relatively high transportation costs. Under these conditions Wyoming should strive to serve its regional markets more efficiently and be very cautious about making large investments in the hope of expanding into international markets.

Actual development of Wyoming's mineral resources demands that private companies decide that production will be profitable. The state's role is limited mostly to approving development applications and issuing appropriate permits. Regulatory concerns focus on the safety and health of employees and surrounding residents, protection of the natural environment, and mitigating the local impact of development. A major step to monitor development of large projects was taken in 1975 with the passage of the Industrial Siting Act (ISA). This act lays out the responsibilities of developers with respect to large projects and could be an effective tool for mitigating adverse effects of large projects. While generally acceptable to industry, the ISA process in actual practice is often viewed as uncertain. As the process continues to mature, it should become an increasingly efficient mechanism for permitting large projects. Nonetheless, it should be evaluated regularly.

The act was urgently needed in 1975, but with population now declining, many of Wyoming's communities are better able to accommodate growth and would welcome new projects. However, relaxing selected provisions of the ISA is unlikely to spur significant development of Wyoming resources in the short term because of generally depressed market prices.

Resource industries are in recession throughout the world, and while a slow recovery is expected, there are no obvious reasons to expect sustained, rapid growth. Although worldwide supplies of minerals are generally

abundant, prices and consumption can and will be influenced by political and regulatory actions (i.e., acid rain legislation, nuclear power plant licensing procedures, federal tax and trade policies, Canadian natural gas export policy, and Middle East stability, to name a few) that remain outside of Wyoming's control. These two factors--a slow recovery in resource markets combined with an uncertain and changing environment--mean that the key to the future of Wyoming's minerals industry will lie in its ability to respond quickly to changes in world markets. Because flexibility--in terms of products made or suppliers used--will be necessary if Wyoming's industry is to capture opportunities where they arise at the margin, the state government must also be flexible and keep its policies attuned to market conditions. This requires enhanced and continuing evaluation of state policies in the area of regulation, taxation, and research and development.

Revisions to State Tax and Regulatory Policy. These policies should be reviewed in terms of their either acting as impediments or as incentives to increased production and competitiveness in a period of oversupply. Wyoming should adopt the policy that its resource industry will be at least as competitive as the industries in other states in the region. Specific examples for consideration are:

Proposed increases in or additions to minerals taxation--Any increase in existing taxes and royalties, or the imposition of a tax on a new product, should be evaluated in regard to how the benefits of increased revenues compare to the potential loss in production and the effect on Wyoming's competitive position among other suppliers. Specifically, Wyoming should analyze the economics of the La Barge project to identify the potential impacts of alternative tax policies.

- State tax breaks as incentives for mineral exploration and development--In the 1985 legislative session, enhanced oil recovery projects and oil mining projects were given tax breaks for the first 5 years of production to provide investors additional incentive to invest in higher cost production technologies. The state should evaluate options involving existing tax policies.
- Clarification of the permit process required under the Industrial Siting Act--Although the current state of world energy markets makes it unlikely that any relaxation of existing requirements will stimulate additional development, clarifying and streamlining the permitting process by improving the way local governments, in

particular, participate in the process will be helpful in getting any new projects to the operational stage faster. This is the type of facilitative approach that the government must take if Wyoming firms are to be able to respond to a rapidly changing environment. Furthermore, if unanticipated booms do return, a cleaner process will assist in planning and make Wyoming a more attractive place for firms to locate.

Assistance with Research and Technology Development. Although firms in the industry should continue to fund applied research and development in their efforts to reduce production costs, the state can assist this effort by supporting academic research and programs--the Enhanced Oil Recovery Institute is a start in this direction.

Conclusion

Although the mineral resources of Wyoming should continue to provide a solid foundation for the state's economy through the year 2000, with the exception of natural gas, the outlook ranges from moderate decreases to maintenance--on the average--of recent output levels. Wyoming must guard against unrealistic optimism for growth in the resources sector because Wyoming serves mostly a regional market. Opportunities to expand significantly outside the region are limited by stiff competition and high transportation costs. Moreover, future price cycles are unpredictable, and periods of low prices and limited tax receipts are an ever present danger.

In the face of soft oil prices, Wyoming oil production is expected to decline over the next 15 years. Production of natural gas will increase in the next few years, but in the absence of price increases production is expected to peak in the early 1990s. While coal is expected to increase its share of total U.S. energy consumption, Wyoming coal output will continue to be limited by high transportation costs and intense competition from domestic and foreign sources. Wyoming coal production will not benefit from export demand or from emergence of a synthetic fuels industry.

The uranium industry in Wyoming will wither away unless the Federal Government takes steps to preserve the domestic industry. The outlook for trona is for slow growth reflecting trends in U.S. glass production. Markets for Wyoming bentonite are expected to erode in the face of competition from substitute materials.

The outlook for CO₂ depends on the success of enhanced oil recovery (EOR) for projects, and despite current investment activity, SRI believes it is too early to draw general conclusions about the long-term success of CO₂-based EOR in Wyoming's oil basins. Also, CO₂ methods face competition from other EOR approaches having good potential for success.

Wyoming must continually review its tax and regulatory policies to remain competitive. While industry considers the Industrial Siting Act a burden, a major relaxation of its provisions would not stimulate development given the current outlook for resources.

In short, private and public planning activities in Wyoming must be extraordinarily flexible so the state can accommodate cyclical changes as well as the possibility of a major restructuring of mineral markets. External political and economic events may cause large swings above and below the long-term trend lines. Also, there is always the possibility that a "wild card" will appear. This may be discovery of a major new deposit of a valuable ore such as gold or silver, an important new demand, or a political event that radically changes the economics of some mineral.

Mineral-Related Industries

An intensely competitive environment now exists in the fuel minerals refining and processing sector. While just a few years ago, OPEC was able to determine the production and price levels for crude oil, this situation has changed dramatically. OPEC's share of the world crude oil market has decreased from 58% to 33%. Today, control of production and price levels is shared by a variety of nations and producers. The result has been that

while four years ago only 5% of the world crude oil purchases were made on the spot market, today almost half of all crude oil is purchased on the spot market.

In addition, changes in the relative price and supply of light and heavy crudes have created a ripple effect felt by the refiners and processors of fuel minerals. Oil products face increased competition from coal and natural gas, as they vie for larger shares of the energy market. Energy using industries are also feeling the effects of the changes in the energy industry.

The Rocky Mountain market of which Wyoming is a part is not immune from these changing market forces despite its relative isolation. Fuel mineral production is increasingly being driven by market demand. As the industry becomes more competitive, outside producers will look for opportunities in the Rocky Mountain market. Thus, Wyoming's refining and processing industries will increasingly feel the pressure of U.S. and world competition.

Mineral-Related Industries: Yesterday and Today

Resource-related industries in Wyoming employed approximately 4,000 persons in 1983. The largest components of the sector are petroleum refining, with about 1,360 employees, and the railroads in which about 1,700 employees are estimated to be involved in resource transportation.

Oil Refining--Wyoming has six oil refineries operating in 1985, accounting for 1% of U.S. capacity. U.S. refining is undergoing a major realignment as the sources of crude oil imports shift and product demand falls. Oil companies have overhauled their large refineries to accommodate a wider range of crude oils and have closed some smaller, less profitable refineries. Wyoming alone lost six small refineries, accounting for a 15% reduction in the state's refining capacity.

Of the six remaining oil refineries in Wyoming, two have good long-range survival potential: the Amoco and Sinclair plants. These two refineries are capable of processing a wide range of crudes and are producing a wide array of products. The Denver area market is the major determinant of the health of the Rocky Mountain market as a whole. The population of Denver has demonstrated stability in its growth patterns and thus appears to be a viable market into the foreseeable future.

The other four refineries in Wyoming are in jeopardy. Intense competition in the energy industry is forcing out refineries that are not able to process different crudes. In the face of foreign competition combined with shrinking demand, over 100 U.S. refineries have been closed since 1981. Even after these closures, U.S. refineries operated at only 76% of available capacity in 1984. The U.S. market picture for refineries has also been constrained by federal requirements to remove lead from gasoline. Those refineries unable to respond to the no-lead requirement and other market forces have been squeezed out.

To be competitive, a refinery must be able to buy those crudes that are being offered at the best price. The smaller Wyoming refineries affected face a phase down over the next 5-10 years as other, more efficient refineries take advantage of a greater capability to refine a wide range of crudes and produce different products.

Ammonia Production--Wyoming has one plant, Wycon Chemicals, in Cheyenne, that is a basic producer of ammonia and related nitrogen fertilizer products, as well as by-product carbon dioxide. Natural gas accounts for about 70% of the cash production costs of ammonia and is currently being purchased on the open market.

Wycon's by-product CO₂ is used in part for the production of nitrogen fertilizers such as urea, but the firm also sells a significant volume of CO₂ to various purchasers, who in turn resell it for industrial

applications. Sales of by-product CO₂ offset a portion of wycon's high ammonia production costs.

U.S. production of nitrogen fertilizers from ammonia is constrained by imports from Canada as well as low demand reflecting weakness in the agricultural sector. Furthermore, plants such as wycon are vulnerable to changes in the cost of natural gas. An increase in fuel costs can rapidly change wycon's ability to compete, and they are already at the high end of the production cost curve.

Resource Transportation--Increased production of coal and natural gas has resulted in expansion of wyoming's railroad and pipeline networks. Coal mines in the Powder River Basin were dependent on the Burlington Northern Railroad until the Chicago Northwestern extended its trackage into the southern Powder River Basin in 1984.

The discovery and production of new natural gas reserves has caused expansion of the gas pipeline network over the last 10 years. The largest project to date was the \$550 million Trailblazer System that links wyoming's Overthrust Belt with Midwest natural gas markets.

Mineral Processing--Many of the resources produced in wyoming undergo some processing in conjunction with the production process. For example, gas liquids are separated from methane in natural gas plants, and ores are crushed and concentrated at mine sites. These activities are intimately tied to the extraction of minerals, and employment figures, etc. were included in the profile and discussion of the basic resource industries presented above.

Finally, phosphate processing is growing in wyoming. Stauffer Chemical Company has a plant west of Kemmerer, and Chevron is constructing a new plant near Rock Springs. However, neither company plans to use phosphate

mined in Wyoming. Stauffer uses ore from Idaho, and Chevron will use ore transported by slurry pipeline from near Vernal, Utah.

Mineral-Related Industries Tomorrow

As with the mineral resource industries, future development of resource-related industries is subject to many external constraints. The U.S. petroleum refining industry is facing overcapacity and changes in the mix of oil products demanded. Within Wyoming, refinery production will probably continue at current levels with no prospect for expansion of capacity.

Synthetic Fuels--Liquid synthetic fuels are supplemental feedstocks for an existing refinery network. The development of Wyoming's oil shale resources or coal for the production of synthetic crudes has been affected by the continuing surplus and consequent declining prices for petroleum. Under the present pricing structure and crude prices forecast well into the 1990s, neither shale oil nor coal-derived syncrude is economically competitive with petroleum as a refinery feedstock. It is unlikely that a synthetic fuels industry will emerge in Wyoming before the year 2000.

The present estimates for the production of a syncrude from coal exceed \$50 a barrel. Of these costs, over 60% is capital cost, and the remaining 40% is heavily dominated by the cost of hydrogen. Therefore, it is unlikely that any technological breakthrough will alter these unfavorable economics. Furthermore, the two main products from coal liquefaction are products with a declining demand in the marketplace: motor gasoline and residual fuel oil.

Wyoming Green River oil shale is not as rich a deposit as the Colorado oil shale. Most pilot efforts have, therefore, been centered in Colorado, and commercialization is expected to begin there. The current estimates for production of a shale oil syncrude exceed \$40 a barrel, not a competitive price given the long-term surplus of petroleum. Shale oil syncrude does,

however, possess an attractive composition for a refiner because it yields a much higher fraction of middle distillates (aircraft turbine fuel and diesel fuel) than the corresponding Wyoming petroleum, and these are two growing markets. The higher yield of these middle distillates from syncrude will ultimately encourage refiners to develop shale oil. Attractive deposits of oil shale in Australia and in Colorado may be developed before a significant industry emerges in Wyoming. In all cases, the continued availability at current prices, or lower, of sufficient quantities of petroleum suggests the earliest timing for significant commercial development to begin is the middle 1990s.

With the current natural gas "bubble" and the availability of much larger quantities of gas from both Canada and Mexico, the production of synthetic natural gas (SNG) from coal is unlikely. The economics of SNG from coal exceed \$6/million Btu compared to natural gas at prices less than \$3/million Btu. SRI has been advising its clients since 1979 that the Great Plains gasification plant was a "white elephant" and not economically competitive. A synthetic fuels industry in Wyoming based on coal gasification is distant, well into the next Century.

Coal slurry pipelines have been proposed as a means of reducing coal transportation costs. Because railroad operations are much more labor intensive than those for coal slurry pipelines, economic estimates made in the mid-1970s showed slurry pipelines to be more attractive when compared to the then prevailing rail tariffs. This was a reasonable outcome for economic estimates made during a period of very high inflation. The expectation then was that high inflation rates would continue well into the future. Under those assumptions, railroad operating costs would far exceed coal slurry pipeline operating costs over the life of the project. SRI's own assessment is that the conditions of reduced inflation rates and the required high capital investments prevent coal slurry pipelines from being competitive with existing rail transportation systems. In fact, the major current benefit from slurry pipeline may be in the challenge such projects provide to help keep rail tariffs within reasonable bounds.

Various technical innovations to the conventional coal slurry pipelines have been proposed to reduce project costs. Among these were the proposals to use carrying media other than water (for example, the use of methanol and CO₂ as coal carriers have been investigated). However, these technical options are still experimental--at too rudimentary a stage to offer a viable alternative to water-borne slurries for the near term.

Resource-related industries that provide transportation or other services are indirectly constrained by the factors affecting the mineral industries.

The outlook for Wyoming resources does not warrant large expenditures to accommodate change in the near future. However, Wyoming must remain aware of technological developments that could improve prospects for Wyoming. This is where university expertise might make a difference. While the current outlook for petroleum supplies and prices makes it unlikely that synthetic fuels will be commercially viable in this century, state efforts should be directed mostly to concentrating efforts for monitoring technological changes and supporting a moderate research program to gain a greater understanding of the critical factors that determine when these technologies are put in place.

Because transportation costs are a major portion of the delivered cost of Wyoming coal, the state should continue to review policy changes that will reduce transportation costs by promoting competition among all modes of transportation, especially, railroads. Wyoming should support a modest UW research program to monitor coal slurry technology and economics and examine removal of legal and political barriers to obtaining rights-of-way. These efforts need to be coordinated with studies of water resources and uses for CO₂.

For natural gas and the nonfuel minerals, Wyoming should conduct a systematic review of technologies that could stimulate markets. New uses for CO₂, trona, or bentonite could lead to opportunities to establish value-added industries in Wyoming. Research into materials technology such

as advanced ceramics could provide markets for wyoming minerals that are not now mined.

wyoming is the sixth ranking oil and gas producing state and is supported by a variety of oil field equipment and service companies. The current outlook for oil and gas production will not stimulate growth in these supporting firms.

Conclusion

The people of wyoming are continually tantalized by claims that a new technology is going to stimulate development of wyoming resources and provide access to domestic and foreign markets. (New technologies could also work against wyoming.) Unfortunately, talk about synthetic fuels and coal slurry pipelines is speculative and not supported by economic reality. Current and expected oil prices will delay serious consideration of synthetic fuels until after 2000. Coal slurry pipelines have high capital costs and cannot compete with railroads in an era of low inflation.

Agriculture

wyoming was settled and governed for most of its first century by ranchers and farmers. Residents identify strongly with the image of their state as agricultural. Even though farming and ranching no longer dominate in overall economic contribution, they remain uppermost in setting the state's values and cultural background and are an important contributor to the state's highly regarded quality of life.

Although agriculture has been important to the state in the past, as markets change and as federal supports decline it may have to change significantly if it is to remain viable in the future. The question isn't whether the popular image of wyoming should be the cowboy on horseback. It always will be. what wyoming people must decide is how much public sector

:4220t/105t/10-7-85/Lyman/120D25

attention should be paid to agriculture, relative to Wyoming's other economic sectors, in what ways, and toward what economic ends.

Agriculture: Yesterday and Today

The Union Pacific railroad, in the middle of the last century, brought broad access to Wyoming from population centers in the East. The railroad brought more people and among them a new breed of Wyoming rancher--businessmen who increasingly used the railroad to transport their products to rapidly growing Eastern markets. As the cattle business boomed in the late 1800s, ranches grew steadily larger. Sheep were introduced and other agricultural products emerged--feed grains, corn, and more recently, vegetables. Agriculture, through the middle of the 20th Century, was the heart and soul of Wyoming society, if not the economy.

As the industry grew, ranchers and farmers overcame many of the constraints to their business: the arid or semiarid land, the temperature extremes, floods and droughts, and the varying and unpredictable frost-free growing season. Wyoming's ranchers and farmers learned that Wyoming is a harsh environment for agriculture, but they built a modest industry.

Wyoming today is an important but not significant player in the nation's agriculture industry. While it ranks among the top five among all states in overall sheep, wool, and wool-related production and ninth in crops like sugar beets and beans, these are agricultural products in decline. In cattle ranching, the state is 22nd in beef cows produced and 31st in total cattle on the land. These products, too, are declining, affected by foreign competition and changing consumer tastes and preferences.

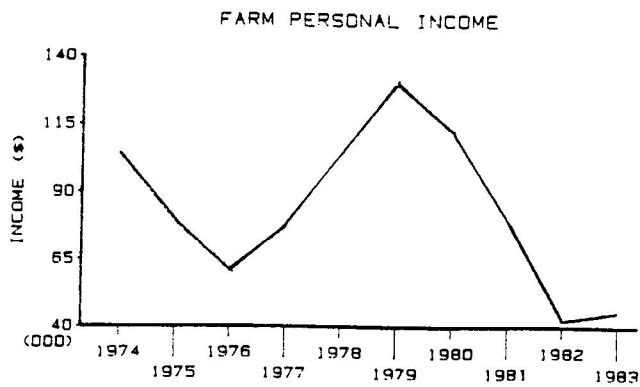
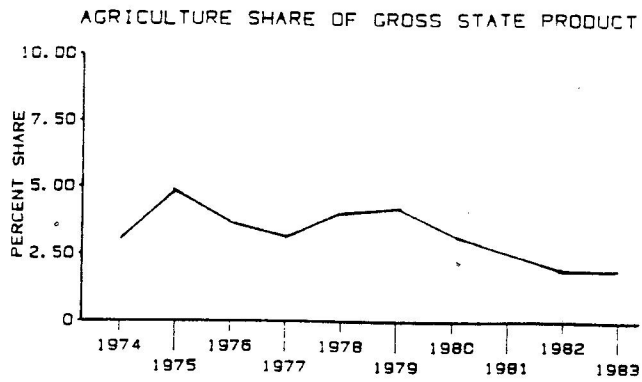
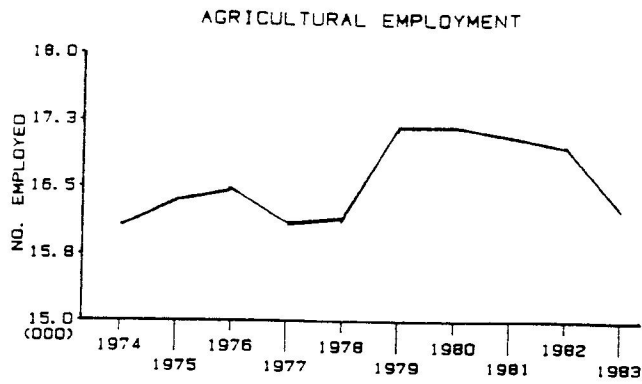
But markets for agricultural products cannot be said to be simply either growing or declining. The markets are dynamic--for some agricultural products the markets are cyclical, for others they are stable, and still

others are disappearing. For example, stock sheep production in Wyoming has been in a long, steady decline; from a high of 6 million head in 1909 to less than a million in 1985. At the same time, alfalfa hay production expanded to meet demand, from 285,000 tons in 1949 to well over a million tons in 1984. Demand for cattle has been volatile with major peaks in 1912, 1934, and 1953 and bottoms in between. Clearly, volatile external markets are nevertheless fixed constraints to Wyoming agriculture.

Figures III-7 through III-10 show how changing markets and demand for food products have affected Wyoming's agriculture industry. (These figures show the major products today and recent production trends; other products like hogs, chickens, and the honey from 44,000 bee colonies are not shown but round out the product profile.) The production trends shown are relative to a generally stable number of farms and ranches over the past 10 years (9,200 statewide in 1983) of stable average size (3,800 acres). Over a longer period, from 1920 to the present, the number of farms and ranches has declined by almost 50%.

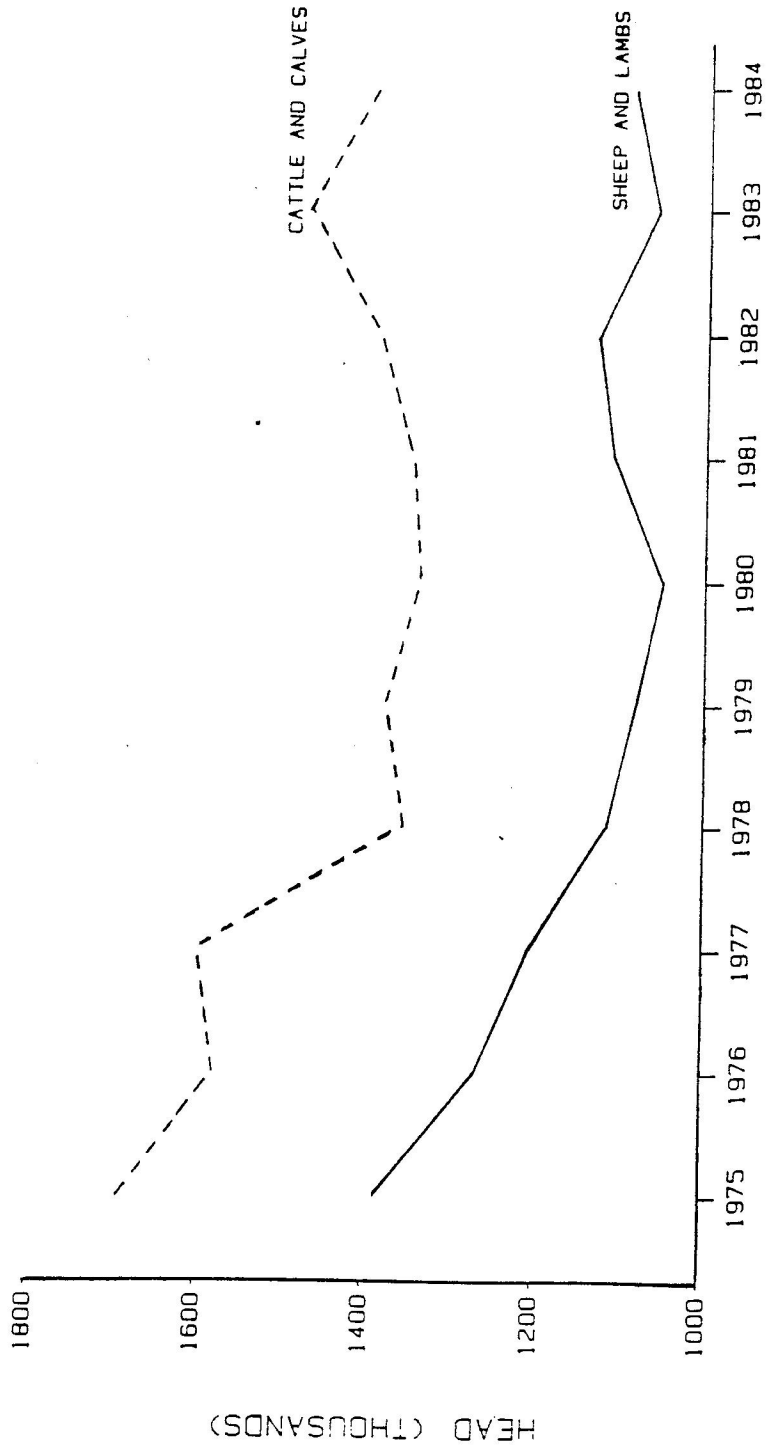
Figure III-7 shows some key trends in Wyoming's overall agriculture industry. These data are produced by the U.S. Bureau of Economic Analysis (employment, personal income) and the Wyoming Division of Research and Statistics (gross state product). Employment in agriculture has remained stable at 16,000 jobs since 1974, but has dropped from 9% to about 6% of total statewide employment during the past decade. One of the biggest changes in Wyoming agriculture statistics is the drop in agriculture's share of gross state product, from 5% in 1975 to a little over 2% in 1984. But the most precipitous drop has been in farm-generated personal income. From approximately \$110 million annually in 1974, farm income rose to nearly \$140 million in 1979 and then dropped rapidly to near \$40 million in the 1982 to 1983 period.

Livestock—Figure III-8 shows the number of cattle and sheep on the state's ranches. For the past 10 years the cattle herd has shown an overall decline. The sheep total has shown a similar decline. Much of the decline



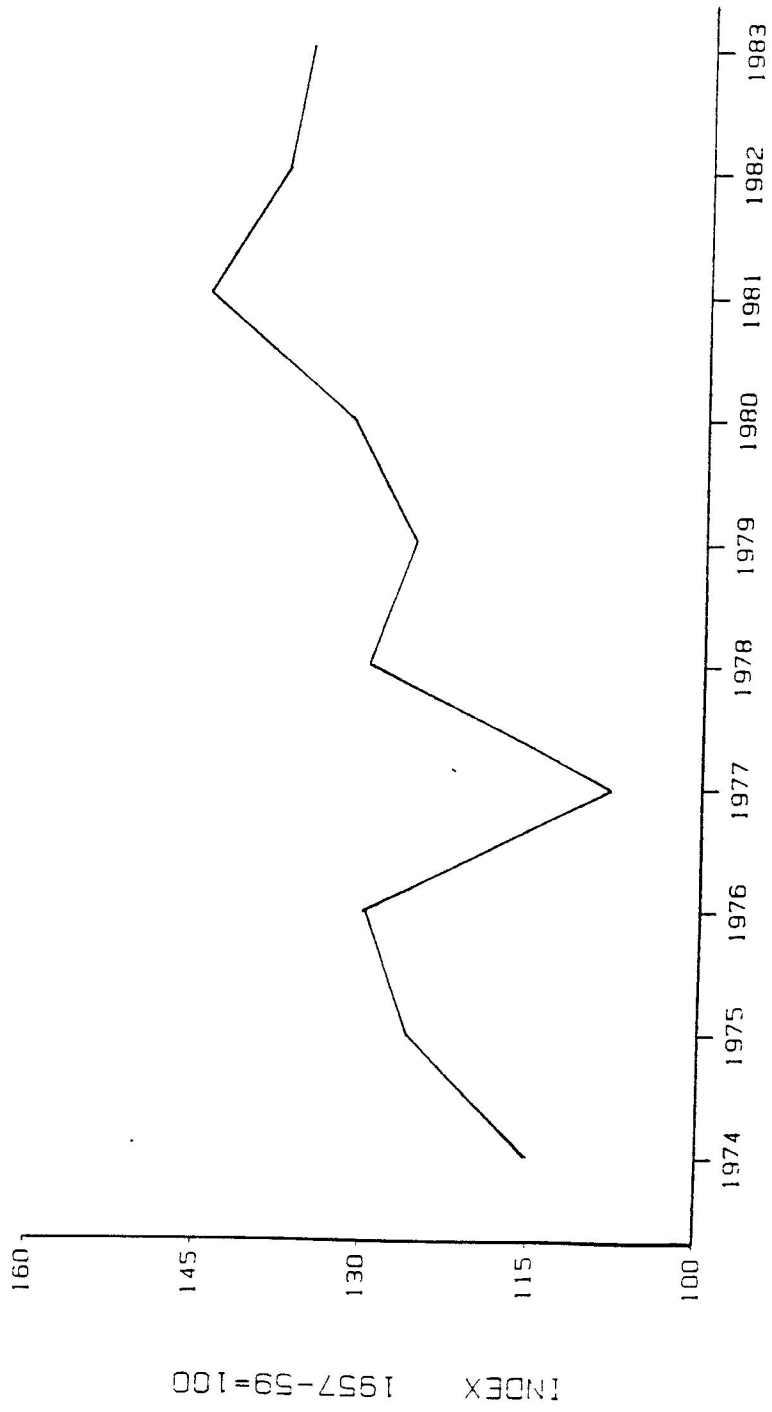
SOURCES: U. S. BUREAU OF ECONOMIC ANALYSIS, WYOMING DIVISION OF RESEARCH AND STATISTICS

FIGURE III-7 WYOMING AGRICULTURAL TRENDS



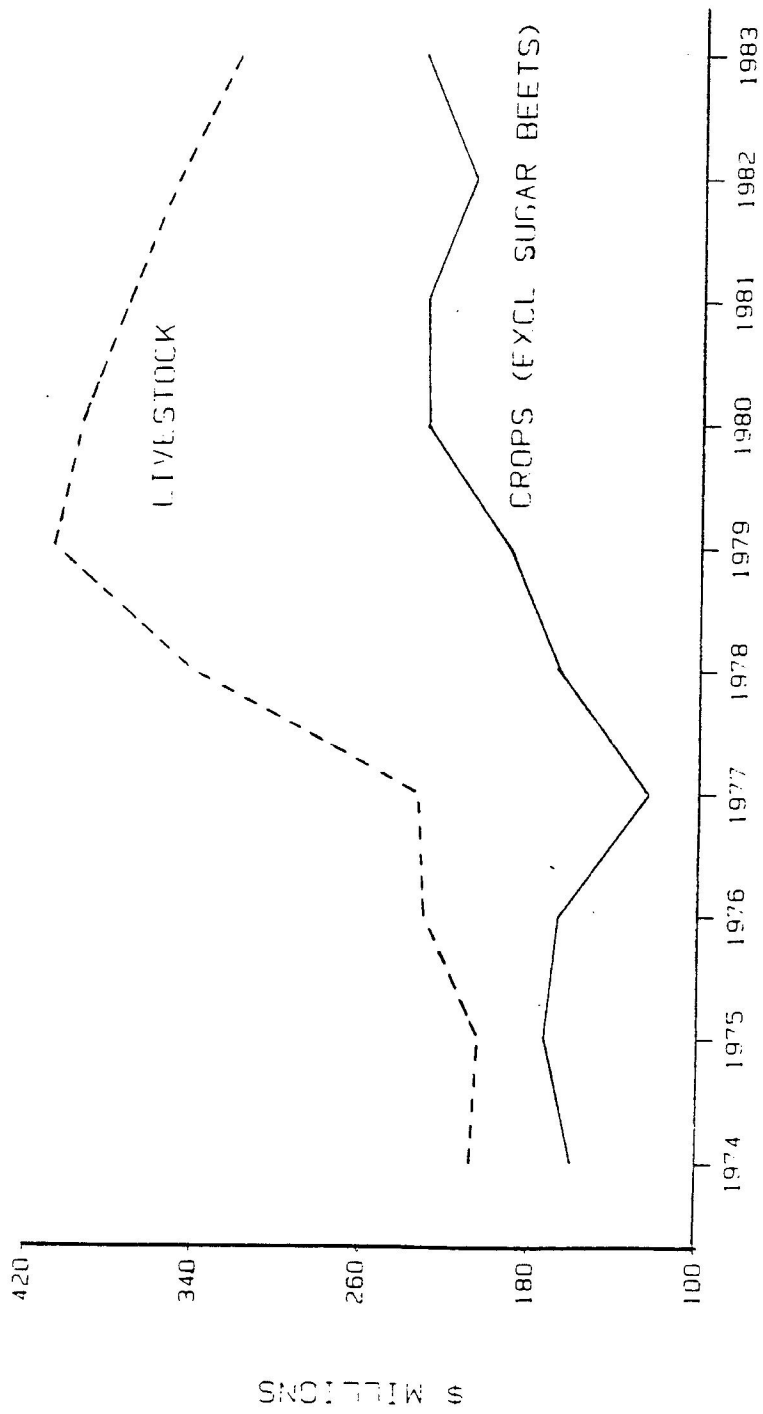
SOURCE: WYOMING AGRICULTURAL STATISTICS - 1984

FIGURE III-8 LIVESTOCK PRODUCTION



SOURCE: WYOMING AGRICULTURAL STATISTICS - 1984

FIGURE III-9 INDEX OF WYOMING CROP PRODUCTION



SOURCE: WYOMING DEPARTMENT OF AGRICULTURE

FIGURE III-10 TOTAL VALUE OF COMMODITIES

during the past few years has been due to weather losses. More than 228,000 sheep and lambs were lost to weather during the 1984 winter alone and 130,000 to other causes (including predators) for a total loss of \$12.7 million. Market prices, however, and to some extent labor costs, have contributed most to the overall production decline. Average price per hundredweight of sheep paid to Wyoming ranchers dropped from \$29.20 in 1979 to \$13.70 in 1983, \$4.70 lower than the average U.S. price. Beef cattle prices dropped from \$65.40 to \$51.80 over the same period, \$2.70 below the U.S. average. The price of wool dropped precipitously from a high of 99¢ per pound in 1981 to 76¢ two years later, slightly above the U.S. average of 64¢.

Crops--Figure 111-9 is an index of total crop production in Wyoming showing slight decreases over the past 2 to 3 years. Wheat production has been generally steady over the period but the severe winter weather of the past few years has kept Wyoming farmers from increasing production in beans and sugar beets. Between 1982 and 1983, production of these crops dropped 49% and 24%, respectively. Feed grains have not suffered as much, with modest price increases but production declines in most commodities. The prices Wyoming farmers received for their crops seem to be less of a problem than production. For example, season average prices for hay, beans, and potatoes climbed modestly in 1983, while wheat, sugar beets, and barley held steady. Some of the production decline in wheat resulted from reductions in the federal government's PIK program for 1982-1983, the last period of available data.

Stable or declining markets combine with declining prices and lower production to hurt Wyoming agriculture in general. Returning to Figure 111-7, the resulting downturn in employment is clear. The value of production for commodities is shown in Figure III-10; since 1979 crops have held steady while livestock has declined.

These data show that Wyoming agriculture faces serious external constraints resulting from declining demand. Internal constraints include

predators, weather, terrain, and distance to markets. Both Wyoming and the United States face problems in the agriculture industry, as more and more countries compete in global markets. Australian cattle and sheep compete with those from Wyoming. And the European common market, once a large importer, is now 95% self-sufficient in beef. Third world countries have also improved their food production, and their gains have hurt Wyoming exports.

For Wyoming, agriculture is an export-only (little in-state demand) industry, and in 1982 nearly 20% of all exports were destined for foreign markets. While the value of foreign traded agricultural products has recently been in a steep decline, this is a relatively recent trend. For example, in 1959 the United States actually imported more agricultural goods than it exported, but the following two decades saw a tenfold increase in exports. By 1980, the United States had a \$23 billion agricultural trade surplus but a \$50 billion trade deficit in other goods. U.S. agriculture, with only 4% of total employment, was producing a trade surplus to offset about half of the total deficit of all traded goods.

Beginning in about 1978, however, the economic health of U.S. agriculture began failing. From 1978 to 1983, total farm receipts fell 16%. Foreign markets have shrunk not only as foreign suppliers gained competitive strength but also as the dollar gained strength relative to foreign currencies. Prices grew much more slowly and, most importantly, domestic interest rates climbed. Many U.S. farmers were not big enough to realize significant economies of scale but were too big not to be in debt. Many mid-sized family operations became overly burdened by debt, and bankruptcies doubled between 1983 and 1984.

Wyoming bankruptcies are increasing, and state lenders expect more than 600 liquidations in the next year. Their predictions are that 37% of all operations will be forced to liquidate in the next 4-5 years unless interest rates decline drastically and food prices increase. Further, combined agricultural losses between 1981 and 1983 were reported to be \$135 million. A recent study by the University of Wyoming looked at these and other data

and concluded that only about half of farms and ranches in the state are financially sound.

A crisis now exists: it is obvious that agriculture is severely constrained, externally because of market conditions and internally because of some ill financial health and limited opportunities. Yet the national problem is not in all areas of agriculture, nor is Wyoming agriculture bereft of opportunities. There are very good reasons for Wyoming to reexamine its agriculture industry and develop new opportunities.

A number of state agencies and private groups have formed over the years whose objectives are to develop Wyoming's agricultural industry. The Wyoming Department of Agriculture (WDA) has the state's lead responsibility for developing agriculture. WDA states that part of its overall objective is:

to encourage and promote the proper development of agriculture in all its phases and to assist the agriculture industry in the development of all resources including production, processing and marketing....

Budgeted in excess of \$6.5 million, WDA allocates most of its resources to State Fair capital improvements and operations, to department administration, and to WDA's regulatory and compliance efforts (e.g., registrations, inspections, standards). WDA's budget information shows that the Department is spending a large portion of its budget on the State Fair and Fairgrounds, which are largely for the informational benefit of in-state residents and interests. However, opportunities for agricultural expansion, such as new technologies, are increasingly found outside the state. WDA's planning and development, marketing, and other activities directly in support of agriculture receive only about 2% of WDA's overall budget. Much of this amount is spent on export marketing activities, associations, and public information.

The Wyoming Farm Loan Board (WFLB) is the other significant supporter of the agriculture industry. WFLB provides low-interest, long-term loans to agriculture operators for farm and ranch operations and irrigation

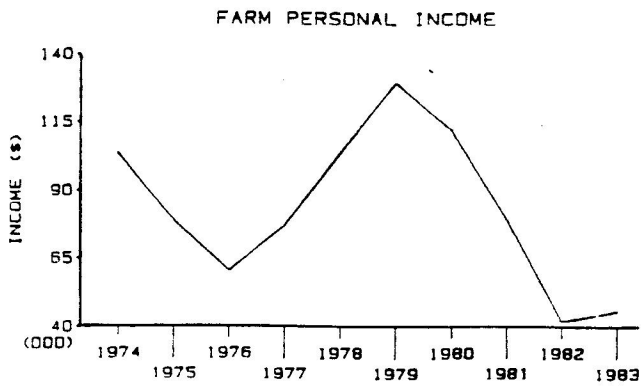
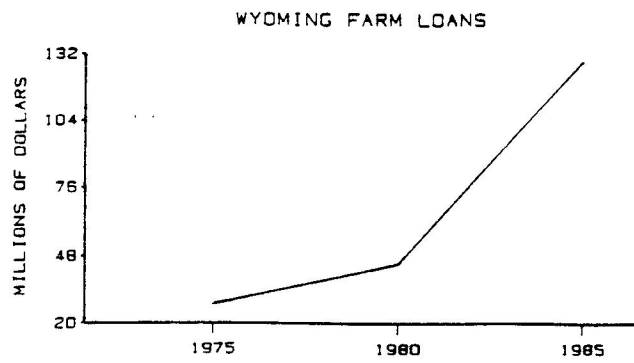
projects. In 1984, loan limits were increased to \$400,000 at interest rates ranging from 8% to 10% and the ceiling on total WFLB farm loans was raised to \$275 million from \$125 million. As of May 1985, WFLB had committed \$132 million in approximately 1,300 loans, and loan applications continue to increase. Pressure to lend more is likely to increase further if federal support continues to dwindle. Loan delinquency is an increasing problem; in May 1985, nearly 10% of all farm loans were delinquent. The delinquency rate is now twice as high as in May 1984--evidence of the rapid deterioration of agriculture's financial health.

A variety of other activities in the public sector (e.g., soil conservation) and private sector (e.g., associations representing growers) round out the state's agriculture development activities.

Figure III-11 shows two trend lines suggesting that the approaches currently used toward supporting and developing the agriculture industry should be reexamined. Farm loans have increased from about \$20 million in 1975 to \$132 million this year. WDA expenditures for planning, development and marketing-related efforts have also increased over the same period. While it is unrealistic to expect close correlation between public expenditures and industry results, as measured by the simple farm personal income figure, it is clear that Wyoming agriculture is not responding to current development approaches. New development approaches warrant consideration.

Agriculture Tomorrow

Key elements of the new economy were mentioned in Section I--global competition, rapidly changing technology, product specialization, and so forth. The new economy suggested by these changes offers challenges and opportunities for all sectors of Wyoming's economy, especially agriculture. Economic success for Wyoming agriculture in the future is neither ensured nor impossible.



SOURCES: U. S. BUREAU OF ECONOMIC ANALYSIS. WYOMING STATE TREASURER

FIGURE III-11 WYOMING FARM LOAN AND INCOME TRENDS

First, not all ranchers or farmers in Wyoming face a bleak future. Small, relatively debt-free operators and some large operators are well positioned for the future. Second, further downward movement in the dollar value or a continued decline in interest rates could reverse the fortunes of those in difficulty, as could some unexpected event such as a major federal farm support policy shift.

While there are good reasons to make some investments in agriculture's future, Wyoming leaders must recognize that agriculture does not dominate the economy today. Wyoming is overwhelmingly a resource economy. Federal and state-supplied data show that agriculture represents only 2% of the gross state product and accounts for only 16,000 jobs, 5.6% of all jobs (indirect jobs are not calculated). Agriculture, while important, is not a major driving force in the state's overall economy.

Nevertheless, agriculture can again be improved by capitalizing on new technologies, understanding and adopting economies of scale, and focusing on product and market specialization.

New Technologies--Further application of biotechnology is expected to revolutionize the livestock industry in the next 5 years. Significant improvements will be seen in breeding and production. The 10 to 15 year time frame is likely to see gene transfer and cloning breakthroughs. U.S. livestock should become increasingly competitive in the worldwide economy.

No sweeping revolution stemming from advanced technologies is expected in food and feed crops in the near term. However, steady technological gains are expected through the end of the century. Some breakthroughs in crop production (e.g., new hydroponics) and especially in increasing profits on "mini-farms" are being realized today.

Biotechnologies like genetic trait modification, growing technologies like hydroponics, and agribusiness technologies like computers are all areas appropriate for development in Wyoming. State investment policies in areas such as education should support development and implementation of advanced,

tested technologies for Wyoming agriculture. University research, especially in the application of advanced technologies appropriate for Wyoming products, should be a top priority. Direct state investments in agriculture, specifically WFLB loans now intended for debt restructuring, should instead be tied to the implementation of appropriate technologies and to other innovations in the operation receiving the loan. This is not the case today. The state cannot afford to support all marginal operations in a declining industry--it must focus its support on operations having a high probability of economic success.

Economies of Size--There is increasing evidence for reexamining earlier notions that increased size in agriculture brings increased economies of scale. Success in the new economy is more and more a function of targeted markets and product specialization. In many ways, success in the future will require lower volume products with higher value added within Wyoming. This will require creative and innovative production techniques made possible by adopting advanced technologies suited to Wyoming's land and climate. Examples from other areas might include:

Hydroponics, especially growing specialty crops at the sites of electric generating plants, taking advantage of the warm discharge water. This approach has been used in the Midwest and at least one company is considering a hydroponics operation in Wyoming.

- Greenhouse-like rowcovers, especially low-cost plastic sheeting over rolls of wire. This method of protected growing has proven successful in New England.

An example of "total innovation" in agriculture is the increasingly successful "mini-farm" operated by a new breed of agri-entrepreneur. Small farms are competing successfully by focusing on one or two specialized products; examples include:

- . Alfalfa pellets, especially very high protein alfalfa for highly bred stock. Thoroughbred race horses receive such feed, produced by specialty farms.

- . Hardy broccoli and other specialized vegetable products that can be grown in cold, arid climates. Operators in Colorado are experimenting with such products.

Pesticide-free vegetables, grown at higher cost and sold at higher value to new consumers willing to pay premium prices to maintain their preferred diets.

Direct marketing is yet another area of specialty for crop producers; examples include:

Restaurants in nearby urban areas serving diet-conscious customers are increasingly buying higher cost food products directly from producers. There is at least one such restaurant in Laramie and others in the Jackson area.

Specialty grocery distributors, generally small middlemen serving small retailers. They buy direct from growers who aggressively seek them out.

In addition to the farm products, there are specialized livestock products and other kinds of specialized products and innovative production methods Wyoming should consider. Examples of new approaches include:

Lean beef, a specialty product produced in nontraditional ways and sold at a premium into new markets (in this case, diet-conscious consumers increasingly willing to pay premiums). The University of Wyoming has a research program under way that is examining lean beef. This is an example that should be built on; other products like specialty vegetables and production methods like hydroponics that may be appropriate for Wyoming agriculture should be researched.

Specialty wool products, especially from sheep breeds with higher value wool grown in innovative ways. One example, being experimented with in small scale Australia operations, is wrapping sheep in protective, flexible plastic that keeps wool clean thereby reducing transportation costs (less weight) and bringing much higher prices (a pure product).

One final Wyoming example of innovation comes from Cheyenne. In 1980, Cheyenne received national attention for a solar greenhouse that produced vegetables for a major federal food program and for general sale and flowers for general sale. Growing high-value vegetables and flowers in solar greenhouses as a cottage industry is yet another way of realizing modest

economic benefits while, more important, moving toward the kind of agriculture that can compete effectively in the future.

State development policies, especially direct loans, should concentrate on supporting mini-operations, innovative products or services, or other examples of potential success in the new economy. UW research and technical assistance should likewise concentrate in these areas of potential, long-term success.

Over the short term, however, many of Wyoming's farmers and ranchers need to generate revenue quickly. They should consider taking bold steps to use their land in different ways. Opportunities exist for linking agricultural land to the market served by Wyoming's travel and tourism industry. Some are already considering using their land as hunting preserves or for special camps for everything from wildlife photography to old-fashioned dude ranching. These, and similar opportunities should be carefully examined, relying in part on the expertise of Wyoming's travel and tourism industry.

Marketing—Wyoming agriculture must respond to changing consumer tastes and preferences. A good example is the shift from beef to poultry products. U.S. demand for beef has dropped 25% since 1975, and poultry consumption has increased 25%. Fresh vegetables are also increasingly sought by consumers. There is a new demand for specialty food products. Markets for these products, while growing, are in pockets in the United States. Wyoming can capture its share of nearby urban markets and significant shares in regional markets if the agriculture industry moves aggressively.

State policy must shift toward supporting the increasing need for direct marketing and product communication. For example, there is evidence that lean beef and most poultry have about the same amount of cholesterol. Additional domestic and foreign marketing efforts by WDA, state offices, and especially the private sector are necessary. On this last point, the

industry must organize itself better. It needs new trade organizations and new production and marketing cooperatives to support all of the above initiatives, especially new forms of direct marketing.

To initiate creative problem solving, wyoming should draw together agricultural operators, researchers and experts from other fields (including finance, government, tourism, and industry) to form a task force on the future of wyoming agriculture. This group should examine creative alternatives, search for new market niches, suggest state policy and research support requirements, and work to move Wyoming toward a more prosperous future.

Conclusion

Agriculture, nationwide and within Wyoming, is in a severe recession. Causes are complex yet there is evidence that a slowing in the decline at the state level is possible by adapting to the new economy. Production innovation, entrepreneurial management, adoption of new technologies, appropriate scale, specialized products and aggressive marketing are key elements to success in the new economy.

Wyoming can improve the competitiveness of its agriculture industry by positioning and supporting it with new policy initiatives. Three key avenues are open: increased applied research and technical assistance at UW, loan support tied to innovative practice, and enhanced direct marketing. Wyoming's strategy for agriculture must recognize that development of specialty products, customized production methods, implementation of advanced technologies, and aggressive foreign and domestic marketing are now essential ingredients in a successful agriculture industry. Supporting old agriculture in the face of the new economy is inappropriate. Without changes in the state's approach, history is likely to repeat itself--more public expenditure and less economic return. In short, Wyoming agriculture must increasingly sell its creativity and innovation, not its traditional products and old practices.

Travel, Recreation, and Tourism

Wyoming offers a set of increasingly rare environmental commodities: wide open spaces, unusual wildlife, and clean air. Like oil and coal, these natural resources are economic assets. They are also important factors in Wyoming's high quality of life, which makes them exceedingly important to Wyoming's future. Conventional economic development thinking often places quality of life assets and the economic assets of natural beauty in a "tradeoff" framework--as though one cannot grow without the other disappearing. This section will point out that Wyoming can have a vibrant travel, recreation, and tourism industry and a high quality of life. Travel, recreation, and tourism constitute a "clean" industry and are therefore much in keeping with Wyoming's values. This industry can generate real net wealth for the state by drawing financial resources from other less scenic and environmentally rich states and do so without consuming natural resources or damaging the environment. Although seasonal, the seasons can be broadened. Simply stated, this industry can have significant economic and cultural advantages for Wyoming--it must be further developed.

Travel, Recreation, and Tourism: Yesterday and Today

The people moving west in the wagon trains of the 1800s saw Wyoming as a desolate landscape, inhospitable, and resistant to settlement: As they traveled, the pioneers saw the long stretches of high desert and the steep mountains on the state's western edge as obstacles to overcome. Even then, two areas in particular, the Tetons and what eventually became Yellowstone Park, were recognized to be of rare beauty; by 1915, it was known that they would become the destination for millions of future travelers.

Today, Interstate 80 follows close to the route that the wagon trains of a century ago traveled. Many who travel across Wyoming on I-80 are unaware of the historic significance of the route. Like the immigrants of the 1800s, travelers today are also often unaware of the extraordinary beauty throughout the area but beyond their horizon.

Grand Teton and Yellowstone National Parks, known throughout the world, have been the magnets drawing most tourists to the state. Millions of park visitors every year contribute heavily to the state's economy. Visitors to the national parks are not the state's only visitors, however; Wyoming has 13 national forests, monuments, or historical sites, 10 state-operated parks, and 7 state historic sites, drawing visitors and residents alike. Hunters and fishermen spread out across the state each fall and spring to take advantage of Wyoming's game and fish, and throughout the year residents and visitors enjoy all kinds of pursuits, including backpacking, cross country skiing, and camping.

Travel, recreation, and tourism is a fragmented industry having broad economic effects. Because of this, its impact is difficult to measure. The U.S. Travel Data Center, the only national organization engaged in measuring the impact of travel on state economies, has assessed the impact of travel and tourism on the Wyoming economy. As shown in Figure 111-12, travelers spent \$700 million in Wyoming in 1982, up from \$529 million in 1978. Travel-generated tax revenues increased from \$17.7 million in 1978 to \$20 million in 1982.

Accurate data on the numbers of hotels, motels, restaurants, sporting goods stores and the like in Wyoming are not available. This is a problem that must be addressed by the public and private groups interested in improving tourism opportunities. The best estimate is that about 3,000 firms make up Wyoming's travel and tourism sector. Hotels and the like account for less than 20% of the total, and restaurants are a bit below 25%.

Perhaps the best indicator of travel and tourism volume in Wyoming is the number of visits to the two national parks. Figure 111-13 shows Grand Teton National Park visits peaking in 1978, when there were more than 4 million visits. Visits to Yellowstone National Park also peaked in 1978 with slightly more than 2.6 million visits. In 1979, following the second Mideast oil shock and resulting gasoline shortages, visits to both parks declined. Visits increased modestly in 1981 but have continued to decline since. The number of days spent in Yellowstone has remained constant, but

in Grand Teton Park, the length of stay in the park dropped about 40% between 1980 and 1984.

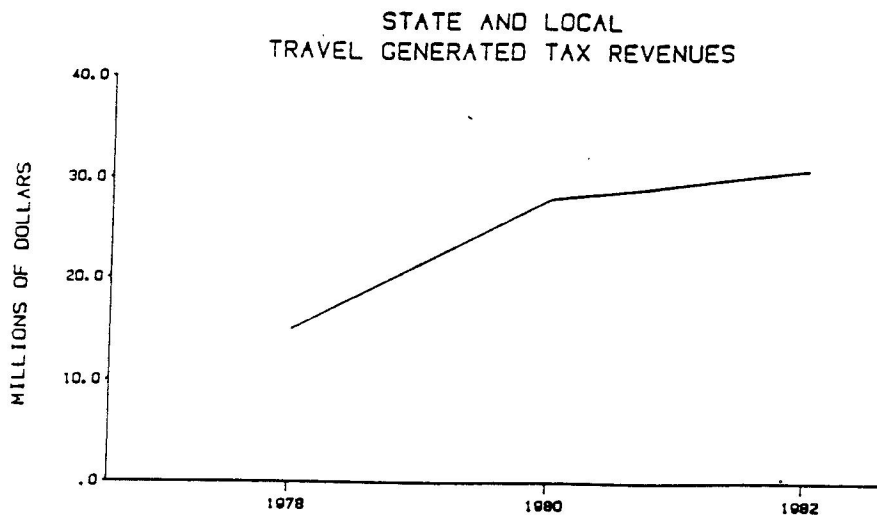
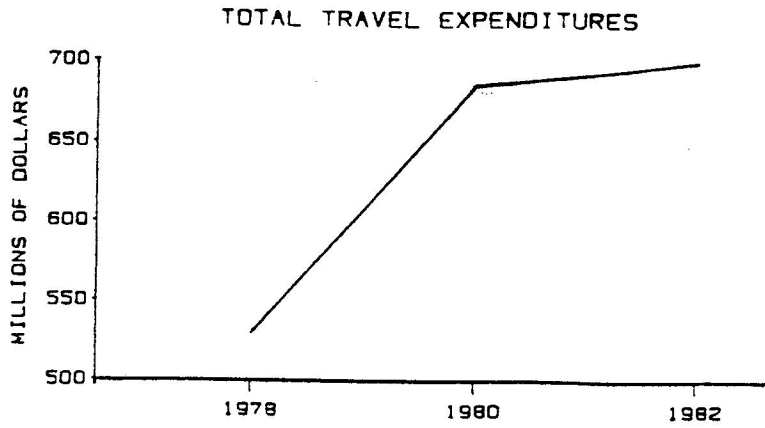
Various reasons are given for these downturns--among them are a slowdown in the western "urban cowboy" movement resulting in fewer trips to "the West" and increased competition for leisure time, as, for example, during last year's Los Angeles Olympics. The long national recession in the early 1980s also took its toll.

In any case, it appears that the industry's performance has levelled off and probably declined since 1979-1980. This trend is corroborated by two other data sets: visits to the Cheyenne Frontier Day festivities peaked in the late 1970s and have declined since, and 1983 state data show the travel industry's economic performance to be only 84% of normal in that year. Some industry data for 1984 indicate that the decline may have ended and that economic performance has begun to improve; 1985 is expected to be a good but not record year. In sum, the industry has had a difficult time over the past 5 years and, recent economic improvements notwithstanding, continues to be troubled.

Travel, recreation, and tourism can be an important contributor to any area's economy. Nationally, 1983 travel spending (latest data available) generated nearly \$7 billion in tax revenue for all states. Wyoming's State Planning Coordinator's Office reports the state and local governments received \$31 million in travel-generated revenue in 1983.

This industry is also an important job producer. Nationally, about 7% of all employment is in travel or recreation or is tourism-related. Figures for Wyoming are slightly dated but in a 1981 study, the U.S. Travel Data Center estimated that about 20,000 Wyoming residents were employed in the broadly defined travel business (nearly half in restaurants), about 9% of the state's nonagricultural employment.

Travel, recreation, and tourism in Wyoming face serious constraints. The industry has been affected by external factors such as higher energy



SOURCE: U. S. TRAVEL DATA CENTER

FIGURE III-12 THE IMPACT OF TRAVEL AND TOURISM ON WYOMING



SOURCES: GRAND TETON AND YELLOWSTONE NATIONAL PARKS

NOTE: 1974 AND 1979 WERE "GAS CRUNCH" YEARS.

FIGURE III-13 NATIONAL PARK VISITS

costs, a national recession, new competition, and changes in how people spend their time. Internally, the recent decline in population has had an impact on the number of Wyoming residents using vacation and recreation facilities. Many of these problems have had lasting effects--structurally changing the industry. For example, recent national data show that tourists now travel to fewer destinations while on vacation and spend less when they arrive. Pressed by the constraints of time and money, travelers have begun to take advantage of "packaged" vacations that include the cost of travel to and from the destination, accommodations, and other incentives such as discounts on entertainment. This shift is especially important to the state's tourism industry, because Wyoming has been a state where people visited on their own and did what they wanted; the industry has provided a minimum of structure.

Another constraint is growing competition between states for the tourist dollar. Nationally, state travel offices plan to spend \$189 million in 1985 on tourism promotion. This represents a 23% increase over 1984 promotional spending. The average state travel budget now stands at \$3.8 million, an all-time high. (Wyoming's, it will be seen, will be \$2.7 million in FY 1986.) The availability of fiscal resources, therefore, is yet another important constraint to the future of Wyoming's travel, recreation, and tourism industry.

A third constraint involves land use policies and access constraints. Increasingly, different levels of government, different government agencies, and special private interests vie for rights, uses of, and access to Wyoming land. There are differences in land-use and access opinions between ranchers and sportsmen and between the public and the Federal Government. This latter set of tensions, particularly with regard to federal agencies building roads into the backcountry, is an especially serious problem and must be dealt with through collaboration and negotiation.

Another serious constraint is the fact that Wyoming's travel, recreation, and tourism industry is highly fragmented, made up of many generally small hotel and motel operations, gasoline stations, restaurants,

transportation companies, outfitters, guides, and specialty retail shops. The industry lacks cohesiveness and, therefore, is difficult to organize.

The industry is not without development assistance; in fact, a number of groups in the state are involved in developing travel and tourism. Wyoming's Travel Commission has lead responsibility, while the Recreation Commission and the Game and Fish Commission and staff have their own areas of responsibility. Other state offices sometimes focus development efforts on building the travel and tourism industry. For example, the State Planning Coordinator has been active over the past 3 years leading a cooperative effort to investigate opportunities for enhancing the industry. These groups and relevant budget data are discussed below.

Travel Commission--This group initiates and implements consumer and trade marketing programs that generate vacation and business travel to Wyoming. Programs include national and international advertising, promotion, publicity, and public relations elements supported by photography, audio-visual, and literature production. The Travel Commission budget from the general fund slowly increased from just less than \$1 million in 1976 to about \$2 million last year. For FY 1986, however, the legislature appropriated \$2.7 million to market travel and tourism--a 30% increase in a single year. wyoming is now spending close to the level of other states in the region, such as Utah, New Mexico, and Colorado.

Recreation Commission--This group has overall responsibility to plan, acquire, develop, and manage all state parks, state recreation areas, and state historical and archaeological sites. It also administers federal grant-in-aid programs for recreational development and historical preservation. The commission's general fund appropriation has almost tripled from \$1.3 million in FY 1980 to \$3.6 million for FY 1986. Most of these resources are allocated to capital expenditures and to maintenance. The Recreation Commission has been actively exploring the off-season use of

Wyoming parks and sites and has successfully expanded snowmobile and other winter programs throughout the state.

Game and Fish Commission and Department--The Game and Fish Department, with a staff much larger than that of the two commissions above, has the complex and important responsibility of providing systems of control, propagation, management, protection, and regulation of all wildlife in Wyoming. The department's total expenditures have increased from \$13.5 million in FY 1980 to \$17.7 million in FY 1984, a 30% increase over 5 years. While Game and Fish is not responsible for travel and tourism promotion, staff have been active participants with the Travel and Recreation Commission and the State Planning Coordinator's office in joint travel and recreation committee efforts. Aside from the results of their game management function, they have been particularly active in expanding the Wyoming Records Program and the Wyoming Wildlife Photo Contest into an annual affair.

State Planning Coordinator--This executive office coordinates a variety of activities and has been spearheading a special initiative on travel, recreation, and wildlife development opportunities. This ongoing effort, budgeted at about \$35,000 annually since August 1983, has systematically and comprehensively addressed Wyoming's travel, recreation, and tourism needs and opportunities. This team, working with an ad hoc Wyoming Tourism Policy Committee representing the private sector, has prepared a number of reports within which they have set forth and discussed an overall goal of attaining a 5% annual growth in Wyoming's travel, recreation, and tourism sector. Thirteen short-term program objectives were identified. Four areas representing obstacles to further development of the industry were targeted for attention:

- (1) Travelers/recreationists tend to orient their activities in a few, restricted areas of the state, so that some areas and attractions of the state with high potential are underutilized.

- (2) Travelers/recreationists tend to concentrate their activities in a short (June-August) period.
- (3) There are no existing mechanisms for adequately monitoring tourism/recreation preferences and patterns, or for measuring the effectiveness of promotional efforts.
- (4) There are many administrative and financial constraints on further development (both public and private) of the tourism/recreation industry.

Each of these areas is being addressed and progress in overcoming barriers is apparent (for example, the new winter programs of the Recreation Commission addresses the problem of a June to August concentration of visitors).

Travel, Recreation, and Tourism Tomorrow

The state's newly aggressive approach to developing travel, recreation, and tourism seems appropriate, and efforts in all areas should continue. However, four additional areas of need deserve mention: (1) monitoring and capitalizing on the effects that profound changes in U.S. values and lifestyles will have on Wyoming's travel, recreation, and tourism industry, (2) organizing the elements of the now seriously fragmented industry, (3) examining the need for a stable financing base for promoting Wyoming travel, recreation, and tourism, and (4) seeking negotiated settlements of land use and access issues. Each of these issues is discussed below.

Monitor and Capitalize on Changes in Values and Lifestyles--The shift in U.S. values from conformity toward individualism and from knowledge to experience is profoundly affecting how people spend leisure time. Industry leaders must monitor these shifts and understand how Wyoming's attractions can be promoted and packaged to maximize their appeal to a new traveler. In particular, people are looking for complete fly/drive tour packages. Also, they are increasingly demanding "specialized experiences," for example, private photo safaris to experience Wyoming wildlife up close. This new

interest in individualized, experience-based, "non-consumptive" leisure time is in contrast to older approaches such as large tour groups viewing Old Faithful in Yellowstone or traditional hunting and fishing trips. Wyoming's tourism industry must specialize, customize, and offer "packaged experience." Possibilities include nontraditional trekking, gliding, floating, riding, and so forth. A shift to these new kinds of "products" can pay significant dividends to the industry.

In further developing the tourism industry, it is especially important that Wyoming look for ways to build on its unique history and culture. For example, Wyoming should look into experiences in other states and other countries where people pay premium prices to participate in a week's wagon train trip along an old pioneer route, or to learn to drive a stagecoach, or to learn how to restore, take care of, and operate a steam locomotive. Festivals are increasingly popular. A festival honoring a worldwide hero like Buffalo Bill Cody should be seriously considered. Finally, the public shows increased interest in understanding and experiencing farm and ranch life. Travel agents have already had success in contracting with owners of farms and ranches around the country to provide individuals and families the opportunity to turn their vacations into a valuable learning experience.

Each of these ideas is an example of what Wyoming's travel, recreation, and tourism industry should be considering. There are new kinds of travel experiences and services being demanded today. As with agriculture, there is a need for more creativity and innovation.

Organizing the Industry--As competition for travellers and tourists becomes more intense, Wyoming's travel, recreation, and tourism industry must build better organizations and networks. Tour services, hoteliers, restaurateurs, and others will benefit greatly if they first organize their own subsectors (as Wyoming's outfitters have and as the ski industry has in Colorado) and then organize together into a Wyoming Travel and Tourism Consortium, as the industries of many states have. This kind of organization would make it easier to develop tour packages that draw

together the services of different parts of the industry. Linking the strengths of all elements of the industry can improve its overall competitiveness. The state should also draw together all bureaucratic elements directly involved in developing, promoting, or packaging tourism into a Task Force to Assist Tourism. This solidified governmental capacity must form strong ties with the private sector's organization, and capitalize on the greater leverage possible with public-private partnerships. Wyoming's travel, recreation, and tourism industry cannot drift along, badly fragmented as it is. Competition is intensifying--the industry must pull together.

Securing Stable Financing--Users of Wyoming's travel and tourism facilities should help pay for additional enhancements to the state's natural attractions and help offset the costs of promoting them. The industry should seriously consider supporting a new revenue source, perhaps a "bed tax," and urge legislative enactment. This idea has been examined before and should be reexamined. A tax on users that is sensitive to maintaining competitiveness may be the best approach to funding a more competitive travel, recreation, and tourism industry. This industry has strong potential for growth and needs strong financial support.

Seeking Negotiated Settlements of Land Use and Access Issues--Issues related to land use and to access to the land are complex, involving complicated matters of private land ownership, public ownership and leases, use permits, and confusing laws of trespass. Addressing such complex matters will never be easy. Not only are the legal aspects complicated, the emotional, value-laden aspects of land use have deep historical roots that make rational argument difficult. Nevertheless, Wyoming must take steps to minimize conflict.

Two federal agencies, the U.S. Forest Service and the Bureau of Land Management, are considering construction of thousands of miles of roads into National Forest lands now accessible mostly on foot and prized by residents and visitors alike. The merits of opening back country areas in this way

can be argued; the challenge is to make sure that the argument is based on sound, factual information and is undertaken in constructive ways.

Other federal agencies (one example is the U.S. Department of Housing and Urban Development) have experimented with the idea of "negotiated investment strategies," a process of public/private collaboration to constructively reach agreement among contending levels of government and private groups that have in the past been antagonists. Wyoming's travel, recreation, and tourism industry has a high stake in debates over federal land policies. The state should take the lead in opening new dialogue with the Federal Government. New processes of negotiation and settlement are called for. By building from existing federal models for negotiated investment strategies, Wyoming may be able to change the process of intergovernment debate without having to propose untested processes. There are more state-federal issues than the land use issues to be settled, and the roads issue is of critical importance today. Therefore, new models for negotiated settlements should be reviewed, modified as required, and implemented soon.

Conclusion

Travel, recreation, and tourism is one economic sector "right" for Wyoming--clean, consistent with most values, and growing nationally. It builds on Wyoming's comparative advantage of natural beauty, wildlife, and remoteness. That thousands of people come to visit Wyoming is a strong compliment to the state. This sector, by all measures, is an appropriate one for Wyoming's leaders to develop.

While the industry and the state have recognized the potential and taken impressive steps to overcome barriers and seek opportunities, far more concentrated attention is required. Leaders in the public and private sector should work in at least the following additional areas: monitor and take advantage of changing U.S. values and lifestyles and their effect on how Americans spend leisure time; organize the industry and state agencies

to capitalize on their strengths; seek new revenue sources for reinvesting in the industry; and, examine and implement new approaches to negotiated settlement of tough land use and access issues.

Finally, in developing Wyoming's travel and tourism industry, leaders should be guided by the notion that what is right for Wyoming is right for all travelers, recreationalists, and tourists. This means that the state should not have to compromise its values or preferences to have a vibrant travel, recreation, and tourism industry--investments for tourists can be investments in a higher quality of life for all residents. The state's Travel Commission captures some of this idea in its excellent slogan "Wyoming is what America was."

Manufacturing

Wyoming's manufacturing sector consists of a wide variety of mostly very small businesses. Included are sawmills, businesses producing other nonwood construction materials, firms making refrigeration equipment, and miscellaneous machinery assemblers. (Discussion in this section does not include mineral- or petroleum-related businesses such as refineries, stamping mills, and the like.)

Manufacturing: Yesterday and Today

Manufacturing firms are mostly a recent arrival to Wyoming's economy. Historically, agriculture and resources were Wyoming's driving export sectors (those generating net wealth) while manufacturing grew to supply the miners, farmers, and ranchers with manufactured goods. Although there are approximately 450 manufacturing firms in Wyoming, the sector has been and continues to be a small part of the economy in terms of employment. In 1984, only 3% of all Wyoming workers were employed in manufacturing, about 8,000 jobs in total. However, Wyoming's manufacturing employees add more to the state's gross domestic product than do those in agriculture. Employment

in manufacturing has dropped as total state employment has declined over the past 4 years. The largest single manufacturing industry, newspapers, accounted for slightly more than 1,000 jobs in 1984. Sawmills accounted for nearly 800 jobs while concrete, gypsum, and plaster products accounted for about 1,000 jobs.

Like agriculture, Wyoming's manufacturing sector is constrained. The most serious constraint is the state's remoteness from major markets for manufactured goods. Although highway and rail transportation in Wyoming are adequate, the cost of transporting manufactured goods is high relative to other states. Distance from major markets is a fixed constraint that must be recognized; it means that Wyoming is at a serious comparative disadvantage to all but its northern neighboring states.

There are other constraints, some perhaps not as immune to change as the state's geographic isolation. An example is the cost of Wyoming's labor. Traditional manufacturing has been disappearing from the United States for a number of reasons, but high labor costs, relative to labor costs in foreign countries, are a primary cause. Wyoming's boom throughout the 1970s brought higher economic returns and higher wage rates (although not above U.S. averages). Like most other states, Wyoming will have an increasingly difficult time competing with foreign countries for traditional manufacturing jobs.

Another serious constraint is the state's misperceived and misunderstood business climate. Wyoming is widely viewed to be a high tax state. Although it has no state income tax and other business taxes and fees are low to moderate, Wyoming is routinely ranked as nearly the highest tax state in the nation and therefore one of the lowest in terms of overall business climate (43rd this year).

This misperception occurs because the rating companies (Alexander Grant and Inc. Magazine are the most well known) do not differentiate between kinds of business taxes. These rating companies look at Wyoming's severance tax (which is not far out of line with other states in the region) and

conclude that Wyoming has very high business taxes for all businesses in the state. This information is widely recorded in popular business publications (Fortune, Business Week the wall street Journal) and the popular press (USA Today). The state has suffered, unreasonably, because of the erroneous perception that taxes are high for all Wyoming businesses across the board. Although recent research is showing that the "business tax burden" is declining in overall importance to newly relocating business (and the level of workforce education is gaining in importance) this misperception still needs to be cleared up.

Responsibility for developing the state's manufacturing sector falls mostly on two state agencies and a number of local business groups like chambers of commerce. The two state agencies are:

Economic Development and Stabilization Board (EDSB). (Recent legislation has changed the organization's name from Department of Economic Planning and Development and placed it directly under the Governor.)

Wyoming Community Development Authority (WCDA).

Other agencies exist, but are involved mostly in small business development and are described later.

EDSB is responsible for planning for the overall development of the physical and economic resources of the state. EDSB's Office of Economic Planning and Development has three divisions committed to the economic development of the state: the Water Division, Mineral Development Division, and Economic Development Division. The Economic Development Division, especially, is actively attempting to build Wyoming's manufacturing sector, mostly through analysis of likely recruiting targets and promotion. This division was budgeted at \$173,000 for FY 1985. Besides its analytical and promotional efforts, EDSB distributes Community Development Block Grants funds for financing industrial development to help communities attract or develop their own local industries. EDSB also coordinates lending programs with other state (e.g., state treasurer) and federal (e.g., Small Business Administration) agencies.

The second industrial development agency is the Wyoming Community Development Authority (WCDA). Although less significant than the larger EDSB, WCDA is an active promoter of Wyoming industry. This quasi-governmental group, headquartered in Casper, finances business development primarily through industrial development bonds. Since 1983, WCDA has served as a conduit through which \$23.6 million in industrial revenue bonds flowed into Wyoming's private sector. Approximately \$27 million in additional bonding is pending. A major activity this year is a statewide economic development and targeted industry study being undertaken by The Fantus Company.

EDSB and WCDA have important roles at the state level for industrial development and focus largely on the development of Wyoming's manufacturing sector. As mentioned, however, there are many other groups with similar missions, such as the various trade associations and local chambers of commerce. Differences in accounting and definitional problems preclude any attempt at estimating the total cost of industrial development in Wyoming. It is likely, however, that hundreds of thousands of dollars are spent annually on staff, consultants, analysis, advertising, and the like, in an attempt to recruit new manufacturing industry to Wyoming.

The constraints of location, high labor costs (relative to foreign competition) and the misperceived poor business climate in Wyoming are serious limitations to what the state can expect to accomplish in developing its manufacturing sector by attracting outside firms. That the state currently has a relatively insignificant industrial base is another problem, because it means there is not much to build on. Further, there is evidence that developing industry by simply giving companies financial incentives to move in can attract companies susceptible to moving on to other states offering higher subsidies. The Ideal Aerosmith move from Wyoming to Minnesota, reported heavily in the state's media last year, is an example. The result is that only the company owners benefit overall, and the result of having one state steal business from another is not zero but a net loss.

Manufacturing Tomorrow

In order to develop its manufacturing sector, Wyoming must move away from a one dimensional "targeted industry" recruitment model in which analysts identify a set of industries "appropriate" for the state and then government agencies attempt to attract them with inducements. This approach overlooks the realities of comparative advantage (Wyoming's strengths compared to those of other states): Wyoming does not have a significant advantage over other states for building a large manufacturing sector. Wyoming's comparative advantages, though significant, lie elsewhere--natural resources, natural beauty, and well-educated, hard-working people.

Instead of focussing mostly on attracting industry, many of the resources now spent on analyses, studies, inducements, and general business promotion can be better spent on creating "home-grown" businesses in industries that fit Wyoming's comparative advantages. This is not to say that all industrial recruiting efforts should be abandoned. And, considerable effort should be spent on clearing up the business climate misperceptions perpetrated by the national rating companies. These misperceptions affect all sectors, not just manufacturing. One way of doing this might be to prepare a separate booklet explaining the tax realities and mail it to site-location firms and relocation candidates.

Wyoming should shift its economic development initiatives toward helping new, small manufacturing (and other) businesses get started and grow in Wyoming (as opposed to inducing existing companies to relocate in Wyoming). The section on the future of the state's small business sector discusses a way of developing small businesses of all kinds, including manufacturing.

Conclusion

Wyoming's manufacturing sector has historically been small and is likely to remain so. The state simply lacks the comparative advantages of

other states. Despite this fact, the state spends large amounts trying to attract major manufacturing companies.

Wyoming must recognize its limitations if it is to be able to take advantage of its real opportunities. Rather than continue with one-dimensional industrial recruiting, Wyoming should diversify its efforts. Developing small, home-grown manufacturing to serve local (and some regional) markets is appropriate, but so are developing nonmanufacturing businesses in the travel, recreation, and tourism industry and in new support and service industries. The state has specific opportunities to create small manufacturing and service businesses that support major employers (the notion of "import substitution" is discussed later). Economic development can be very expensive. Wyoming must shoot at targets it can hit.

Government

This section discusses government as an economic sector, not as a public policy maker (as it is discussed in the next section). Government employment is important to Wyoming mostly because of the numbers of employees and the resulting stabilizing effect this employment base has on the state's overall economy. Particularly important is the economic effect of federal payrolls and procurements. Federal expenditures can create net wealth for the Wyoming economy by drawing into the state tax revenues generated outside the state. This discussion looks at all government economic activity, while a later section looks more closely at the overall costs and benefit of the federal presence.

Government Employment: Yesterday and Today

Throughout Wyoming's history, the Federal Government has been a strong presence within the state. The U.S. government's extensive ownership of Wyoming land has required the presence of the bureaucrats who manage it.

Yet as the state and its communities tried to cope with the rapid growth that accompanied the energy impacts, the federal job count was surpassed by employment in state and local government. The discussion below looks at how and why the federal, state, and local governments play an important role in Wyoming's economy.

Federal Government--The fact that the Federal Government owns almost half of Wyoming's land has meant that federal agencies--and workers--have played a prominent role in the state economy.

With the exception of the military, most of the federal workers in Wyoming are involved in land management. Although federal ownership will continue to have an important impact on the state economy, the workers themselves have been playing a diminishing role. Federal workers contributed about 6% of the gross state product (GSP)--or \$136 million in 1974. Although that contribution grew to \$289 million in 1984, this represented only 3.2% of the total GSP for that year. In terms of employment, federal workers in 1983 represented a smaller proportion of total state employment (3%, or 7,144 workers) than in 1974 (4%, or 6,471 workers).

Military personnel compose another substantial component of Wyoming's federal workforce. However, recently their numbers have been shrinking in absolute as well as percentage terms. In 1974, there were 7,403 military workers in Wyoming, but the number had decreased to 6,099 (shrinking from 4% to 2% of the state work force) by 1983. And although the MX missile program has brought hopes of new jobs for Wyoming (the Air Force projected 1,150 direct and 850 indirect new jobs for 1985 through 1990), political and fiscal realities make these gains uncertain at best. Congress has approved funding for only 50 missiles (Air Force projections were based upon the initial Department of Defense request of 100), and the debate over replacing the MX with the "Midgetman" missile continues. Furthermore, even if funding is high and Air Force projections are correct, many of the job gains are in construction and therefore will not be permanent.

State and Local Government--State and local governments saw huge increases in the number of workers during the growth period of the 1970s and early 1980s. In terms of gross state product, state workers contributed \$206 million in 1974 and \$885 million in 1983 (an increase from 9 to 9.9% of GSP). While employment in state and local government employment grew in absolute terms--from 29,971 in 1974 to 42,972 in 1983--it remained constant at 16% of total state employment. The growth trend has probably ended, however. As economic growth in other sectors levels off and population stabilizes at a lower level, it is unlikely that there will be increased growth in this government subsector.

Growth in government employment, overall, is constrained mostly by the fiscal condition of the public sector. On a national level, the need for budget reductions in the face of huge federal deficits makes freezes or cuts in some military and domestic programs likely. Furthermore, the deficit and other political considerations have created uncertainty--such as that surrounding the MX missile program--about future levels of defense spending, the only area of budget growth under the current administration.

On the state and local levels, declining severance tax revenues in particular will limit growth in Wyoming government. Some fiscal effects can already be seen as state government salaries have increased little during the past 2 years, and a hiring freeze has been discussed. Uncertainty about future revenues--resulting from uncertainty surrounding future energy prices, mineral reserves, federal tax policy (federal royalties, environmental regulation, and land use decisions)--will also contribute to the pressure for fiscal austerity. Growth in this sector is therefore highly dependent on the expansion of Wyoming's driving sectors, particularly mineral resources and tourism.

Government Employment Tomorrow

While Wyoming has opportunities for economic growth in a few of its sectors (like tourism and small business), it is clear that the government

sector will not play a major role in creating the new jobs associated with economic growth; yet the government sector is critical as a stabilizing force. Because it provides both a lasting source of employment and the services necessary to support business and industry and maintain a good quality of life the government will be a highly important part of Wyoming's transition to the new economy.

Because of the magnitude of government employment in Wyoming, the state must think about the sector as it would any of the other economic sectors. State and local government employment, of course, is both a cost and a benefit to the economy. Federally sponsored employment is different. Wyoming's congressional delegation should pay close attention to federal employment in the state, because such employment is a form of economic gain. Of course, care should be taken that proposed federal activities are consistent with state interests and the broader national interest as well.

Conclusion

As the growth rate of the state economy moderates, government--at federal, state, and local levels--will continue to be the source for a significant number of Wyoming jobs. However, government is not likely to be a source of new jobs. Government has an important role in providing the services necessary to maintain a high quality of life and plays a role in supporting the growth of other sectors. It is especially important that the congressional delegation work to at least retain the federal presence; it is too important to the Wyoming economy to let it diminish before private sector jobs have developed to replace any losses.

Small Business/Other Supporting Industries

Most of Wyoming's businesses fall into this sector, which includes most nonfarm proprietorships (retail stores, banks, construction and trucking companies, service firms), and a myriad of other enterprises. Not included

in this sector are the resource and resource-related companies, the travel, recreation, and tourism-related companies, the handful of manufacturing companies, and, of course, farms and ranches. All of these have been discussed in previous subsections.

Small Business: Yesterday and Today

Small businesses have characterized most of Wyoming's economy since the early settlements grew up along railroad rights-of-way. These were mostly small retail and service companies serving the agriculture sector, mining operations, the railroads, and visitors to Wyoming's scenic areas. As mining activity increased, the state's population grew rapidly and as a consequence small businesses of all kinds were formed during the 1970s and early 1980s. The trends in incorporations (nearly all in the small business sector) are shown in Figure 111-14. It is estimated that Wyoming now has about 12,000 for-profit small businesses.

Figure 111-15 shows that the large majority of Wyoming businesses employ fewer than 10 people and that only 6% of all firms provide 50 or more jobs. Clearly, Wyoming is predominantly a small business state.

Five subsectors are important components of what we term the small business/other sector. They are discussed below:

- Wholesale and retail trade--This subsector has declined about 10% since 1981. In 1983, it accounted for about 50,000 jobs.
- Transportation, communications, and public utilities--This subsector declined about 10% during 1981-1983. It employed about 18,000 in 1983.

Construction--This subsector has also declined since 1981, accounting for about 22,300 jobs in 1982.

Finance, insurance, and real estate--Although not large, this subsector has shown steady growth over the past few years, accounting for about 7,600 jobs in 1983.

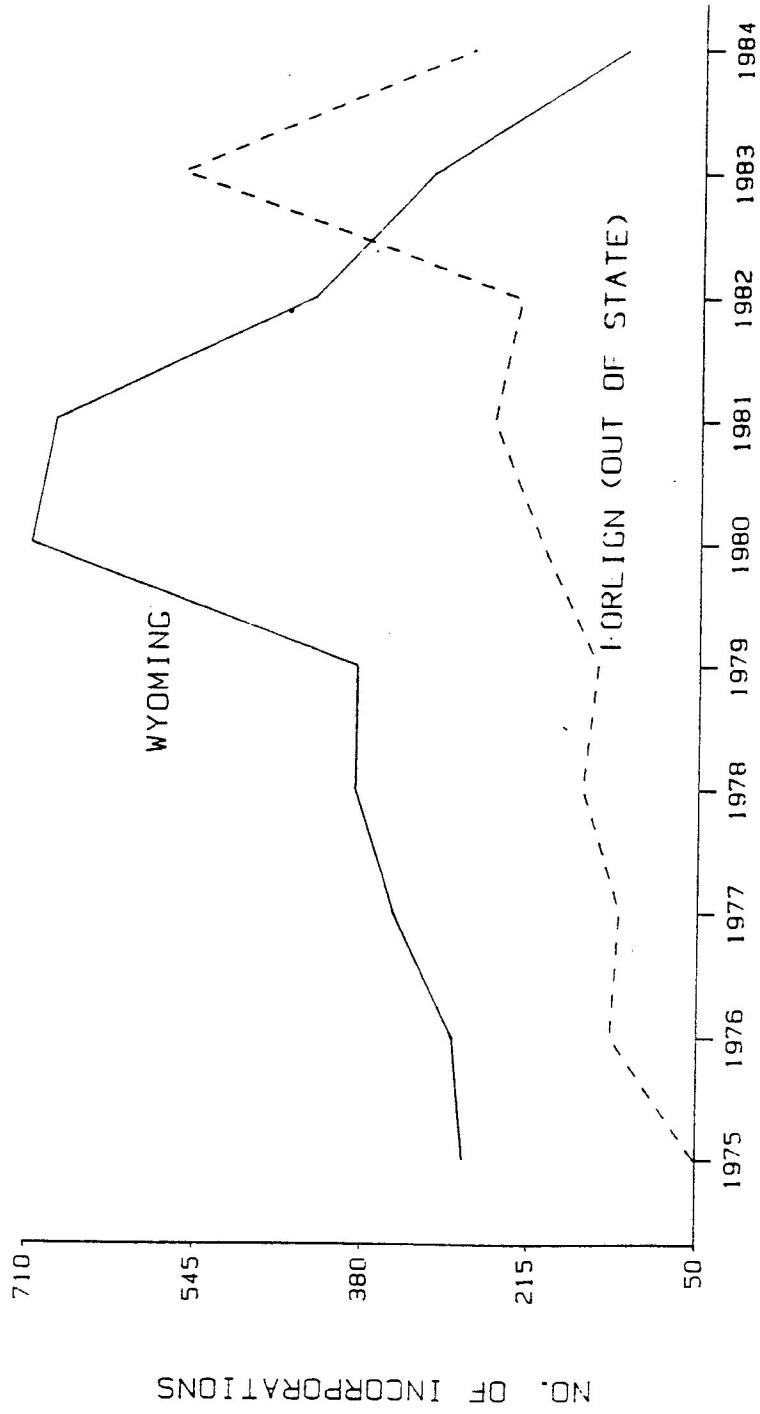
- . Services/proprietors--This subsector has grown in parallel with national trends and has been the fastest growing in Wyoming since 1981. In 1983, this subsector accounted for approximately 52,000 jobs.

In sum, Wyoming's small business sector has shown some areas of growth (e.g., services) but overall has experienced general employment decline.

The overall economic health of this sector and prospects of growth or decline are very dependent on the overall health of Wyoming's driving sectors. Generally, when mining is up, existing small business prosper and new businesses grow. When mining declines, small businesses are hit very hard. Wyoming can spend considerably to develop small business during a period when the mineral resources industry is in decline and the results will be minor. Conversely, the state can do nothing when the mineral resources industry is strong and growth will still result. However, there are examples of new enterprises having great success at times of diminishing overall economic health. Retail malls, especially in Cheyenne, may be the best example. They have succeeded because they offer what today's consumers are urgently demanding. This suggests that the key to developing small business is to find special opportunities for providing goods and services that fit recently changing market demands. But small businessmen often need more than markets for their products. As entrepreneurs, they need support (often technical and management assistance, not just money) at critical times, as when they start up.

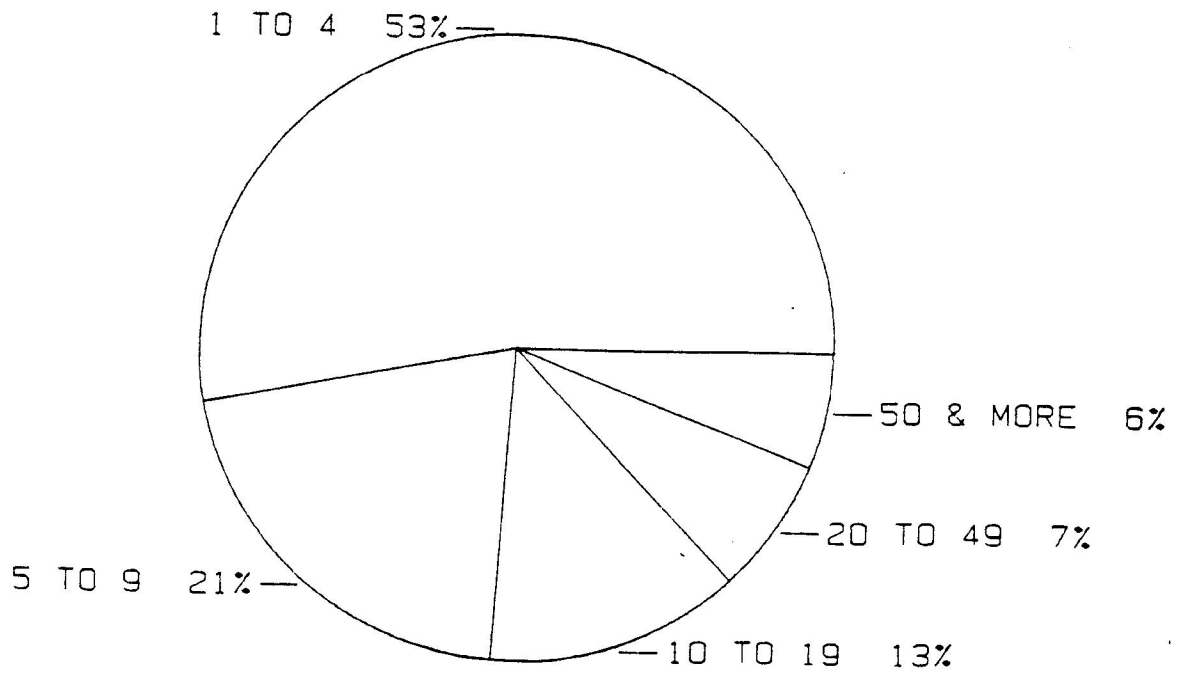
No current approaches to building Wyoming's small business sector, however, are characterized mostly by the provision of financial aid. The variety of financial aid to small business in Wyoming falls into the three categories discussed below.

U.S. Small Business Administration (SBA)--SBA currently operates a variety of business assistance programs, mostly in the form of low interest or guaranteed loans. Responsibility for making these loans is usually subordinated to state and local government and, in some cases, directly to



SOURCE: WYOMING SECRETARY OF STATE

FIGURE III-14 WYOMING INCORPORATIONS



SOURCE: U. S. BUREAU OF THE CENSUS

FIGURE III-15 WYOMING BUSINESSES BY NUMBER OF EMPLOYEES — 1982

private financial institutions. A district SBA office in Casper guarantees loans from private institutions.

Between 1953 and 1984, the SBA either provided or guaranteed a total of \$353 million in loans to Wyoming's small businesses. These loan programs are coordinated, in part, by Wyoming officials. The business finance staff of EDSB assists small business applicants in these programs as does the Small Business Development Corporation for Wyoming in Casper and the Western Wyoming Certified Development Company in Evanston.

The future of SBA is uncertain. The agency has faced several budget cuts recently and has been targeted for termination. While it may survive, it is clear that federal support to small business will be much less than only a few years ago.

Office of State Treasurer--This office coordinates Wyoming's State Small Business Assistance Act. This Act provides a program to qualified applicants whereby the State Treasurer "buys up" the guaranteed portion of SBA loans. This program provides state borrowers with lower interest rates than SBA alone can provide. As of 1984, out of a total of \$22 million in direct SBA loans in Wyoming, \$20 million was guaranteed by the State Treasurer's program. Most of these guarantees have been provided in the first half of 1985 (nearly half the \$50 million program limit).

Capital Corporation of Wyoming (CCW)--This is a privately operated entity in Casper, licensed to operate as a small business investment company (SBIC). CCW can provide venture capital to expanding small business in return for equity. It represents an alternative to conventional financing--and therefore an opportunity for Wyoming borrowers to acquire financing in return for giving up a part of the ownership in their business. Venture capital such as this is increasingly a source of money for new business throughout the United States, especially those firms producing new technology or having innovative products. Within the past few years, CCW

has provided approximately \$2.6 million in a variety of equity loans, with most of these made quite recently. Equity loans have been made to companies in publishing, electronics, restaurants, building materials, and recreation services.

One other organization is active in the venture capital business; Wyoming Financial Securities, Inc. in Casper is developing an innovative venture capital fund concept. Pooled money from investors would be used to provide equity capital for new businesses. The company is currently planning to raise \$8 million and has pledges for about \$5.5 million. While this company has a very ambitious plan and future success is in no way assured, this is an example of creative financing (and creative thinking) that Wyoming needs. (The company recently reports having reached a "plateau;" without additional funding it may cease fund raising efforts.)

Clearly, the current approach to developing small businesses in Wyoming continues to be through the provision of financing, usually low-interest or guaranteed loans but now moving toward creative venture capital. With few exceptions, there has been little provision of direct management assistance to small business (two programs, one at UW and one at Casper College will be discussed in Section IV). Further, there has been little if any analysis of what kind of small business can compete in Wyoming. If the small business/support sector depends mostly on the overall economic health of the state's economy, the provision of financial assistance alone (especially during periods of economic decline) seems insufficient and probably inappropriate. Wyoming can develop a much more diversified, vibrant small business sector by carefully identifying specific opportunities--market niches--for new small businesses and by improving the competitiveness of existing small businesses in the state.

Small Business Tomorrow

Nearly all (94%) of Wyoming's businesses are small by national standards, employing fewer than 50 people. Because these businesses are

extremely vulnerable to economic cycles, low-cost loans will always be necessary. However, new small businesses in Wyoming need more than money.

At the same time, no assistance will have value unless the new business has a chance to succeed--unless it fills a real need. There are some opportunities for new small business in Wyoming. One effect of Wyoming's rapid economic expansion during the 1970s was that major companies had to buy their supplies from out-of-state vendors. It is likely that some local businesses could provide some of those supplies within the state at competitive prices (import substitution). Certainly, Warren Air Force Base buys significant amounts of supplies outside the state. Even the small contracts for the MX upgrade, for example, have been let to outside vendors largely because there are either no Wyoming vendors or existing vendors are not qualified.

It is reasonable to assume that a substantial amount of the goods and services imported into Wyoming from other states could be supplied by new Wyoming businesses. The key is identifying specific opportunities, including where in the state they are, and how they can be seized by new Wyoming businesses. Are there, for example, opportunities for a small Wyoming furniture manufacturer to sell some items to the National Park Service or its operating contractors? Is there an opportunity for a manufacturer of hardware for telephone switches to sell to Mountain Bell? Wyoming needs to undertake a highly specialized analysis of "backward linkages"--identifying the suppliers for Wyoming's major employers--thereby identifying opportunities for import substitution. A survey, for example, of purchasing officers of major companies in Wyoming regarding the location of their suppliers could identify out-of-state suppliers with whom new Wyoming business could successfully compete.

Surveys like these have been undertaken by many cities and states. Arizona completed such an analysis in 1981 and developed a comprehensive small business development initiative around the study's results. Wyoming should undertake this kind of analysis and then develop a program of assistance to entrepreneurs in the state who could successfully operate a

new business. The state could then organize (but not necessarily provide) assistance of different types: financial (from existing programs), and managerial (informational, technical, legal, marketing, and tax). To secure commitment from large companies in the state, the major employer's task force--recommended later in this report--should be an active participant in the program.

Conclusion

Wyoming can realize significant economic benefits from a more complete small business sector. Small businesses can be established to supply Wyoming employers (including those headquartered out of state). Such import substitution will generate net wealth and net employment for the state.

This business development strategy can have social benefits as well. Potential entrepreneurs, recent college graduates, women reentering the work force, and currently struggling small business owners in Wyoming would find new opportunities in the state so that they would not have to leave. Wyoming could retain more of its bright, young business talent. Further, a stronger small business sector would act to strengthen all sectors and institutions in the state by providing additional depth to the economy.

Economic Diversification: The Need and the Constraints

The preceding discussion has underscored that Wyoming's economy is narrowly based on resource and resource-related industries. The foldout pages that follow (Table 111-2) provide an overview of the seven economic sectors, important factors affecting each sector and a summary of some of the actions that can be taken to develop the sector. While the state's economy will continue to be based mostly on resources into the foreseeable future, an economy based on only a few industries will always be vulnerable to market changes in those industries. Wyoming must seek opportunities to

Table III-2

FACTORS OUTSIDE OF WYOMING'S IMMEDIATE CONTROL

Economic Sector	Changing Markets	Global Competition	Federal Policy	Wyoming Values
Resources	<ul style="list-style-type: none"> . Worldwide industry in a recession; prices are low • Future supply and demand keyed to many external political and economic factors. 	Other producing nations keeping production high for political reasons. High dollar keeps exports low, encourages imports.	Environmental regulation, leasing, and tax policies affect production costs. Regulation of railroads affects transportation costs.	. Development should not come at the expense of the environment.
Resource-related Industries	Control of refining shifting from international to national oil companies.	. National companies now competing for product exports.	Possibility that national security policies could support maintenance of strategic capacity to mine and mill uranium.	. Development should not come at the expense of the environment.
Agriculture	Some traditional markets-- e.g., livestock and commodity crops are declining. Consumers increasingly attracted to specialty goods.	. Low cost imports from developing nations are increasing; high dollar limits exports.	FmNA loan policy, land use policy, and price supports will affect viability of agriculture, at least in short term.	Agriculture has been and can again be important in the state's economy.
Travel and Tourism	Travelers independently seek package deals or new travel experiences. Recessionary times hit industry fairly hard.	. Many more states competing for tourist dollars.	. Management of national forests affects major state attractions.	. Wyoming's remoteness, environmental quality, and state heritage are prized.
Manufacturing	Consumers demanding higher quality at competitive prices. <ul style="list-style-type: none"> . Large companies lack flexibility in products. 	Other states, countries have lower transportation and labor costs,	. Fiscal and trade policies seriously affect traditional manufacturing.	. Traditional manufacturing can damage environment.
Government	. Public resistance to bigger government is curtailing programs, services, and job growth.		. Size of military and land management budgets will affect Wyoming employment.	Federal policy often overrides state wishes.
Small Business/Other	<ul style="list-style-type: none"> . Small businesses more flexible and can quickly adapt to changing markets. • More suited to new demands for service-type products. 	. Lower fixed costs mean total costs easier to control.	Availability of capital assistance through federal programs can assist development.	. Rural values of independence and "can-do" attitudes well suited to some types of entrepreneurship.

Table III-2 (Concluded)

DEVELOPMENT TOOLS THAT CAN BE USED TO BUILD A STRONGER WYOMING

<u>Sector</u>	<u>Economic Diversification</u>	<u>Problem Solving Capacity</u>	<u>Education and Training</u>	<u>Physical Infrastructure</u>	<u>Cultural/Societal Amenities</u>
Resources	Important but limited opportunities at margin, e.g., new CO2 uses.	<ul style="list-style-type: none"> Further develop ISA process. Review taxes to ensure maintenance of competitive position 	<ul style="list-style-type: none"> Limited role: re-search into some new production alternatives Establish UW center of excellence in mining. 	<ul style="list-style-type: none"> Extend air transportation and improve telecommunications capacity to improve business communications. 	
Resource-related industries	<ul style="list-style-type: none"> Market prospects very limited. 			<ul style="list-style-type: none"> Promote more competitive rail transport by changing federal regulations and creative state policy. 	
Agriculture	<ul style="list-style-type: none"> Develop market niches for specialized products, e.g., lean beef, pesticide-free vegetables. 	<ul style="list-style-type: none"> Provide targeted support for new innovations, agricultural entrepreneurs. 	<ul style="list-style-type: none"> Establish UW center of excellence to focus on agricultural economics, new products, innovative production methods. 	<ul style="list-style-type: none"> Clarify water rights and development priorities-- reduce uncertainty about demand and supply. 	<ul style="list-style-type: none"> Develop social and cultural programs for rural residents. Link agriculture to tourism industry.
Travel and Tourism	<ul style="list-style-type: none"> Promote new types of experiences. Build on historical attractions in southern part of state. 	<ul style="list-style-type: none"> Organize industry, shift marketing effort into new areas, e.g. packaged, experience-based vacation programs. 	<ul style="list-style-type: none"> UW center of-excellence to develop professional strength and assist in changing tourism industry. 	<ul style="list-style-type: none"> Extend air transportation--improve access to destinations. 	<ul style="list-style-type: none"> Promote a Heritage Center, state parks, and other natural resources as tourist attraction.
Manufacturing	<ul style="list-style-type: none"> Seek opportunities for import substitution. 	<ul style="list-style-type: none"> Decrease amount spent on attracting business from other states. Redirect spending to build on Wyoming's comparative advantages. 	<ul style="list-style-type: none"> Community colleges provide training to improve skills of workers. 	<ul style="list-style-type: none"> Improve air and information transportation Systems to support homegrown manufacturing. 	
Government		<ul style="list-style-type: none"> State and local government not a source of new jobs but a partner in development. 	<ul style="list-style-type: none"> Education sector will not be a source of significant job growth but is needed to undergird new directions. 	<ul style="list-style-type: none"> Expand telecommunications capacity to increase efficiency, reduce travel costs. 	<ul style="list-style-type: none"> Support development of new programs in arts, history, culture.
Small Business/ Other	<ul style="list-style-type: none"> Promote import substitution--create new small businesses to support Wyoming's major employers. 	<ul style="list-style-type: none"> Provide support for new businesses: <ul style="list-style-type: none"> -financing -technical assistance -supportive networks 	<ul style="list-style-type: none"> Establish UW center of excellence in small business development to provide training and research. 		

diversify its economy. However, there are significant constraints on diversification.

Successful economic diversification in Wyoming will depend on the extent to which the state can identify its comparative advantages for creating new, or expanding existing economic sectors. where the state has no particular advantage over other states, it should not spend time or money trying to attract industry. In short, Wyoming should not follow the path taken by so many states that, seeing technology companies expand in California's silicon valley, have spent millions trying to attract high technology companies to their borders. For high technology, Wyoming is constrained by its relative geographic isolation, the lack of air transportation within the state, the nature of the existing research base at UW, and the narrowness of the existing economic base. These constraints also will limit the success Wyoming can expect in attracting other industries. Wyoming's strongest advantages are its natural and human resources; these are the strengths to build on.

Opportunities for the Future

Wyoming can diversify its economy by creating (but probably not by attracting) new businesses in key economic sectors now existing in the state. Because of diminished current demand and limited long term prospects, the non-energy resources do not offer many opportunities. With the worldwide mineral downturn and little prospect of new demand over the next 10 to 15 years, it is particularly unlikely that Wyoming can attract additional refining, or milling industries. The agriculture sector is in decline but agriculture offers new business prospects in specialized products. The keys to building agriculture are innovative products and production methods, aggressive marketing, and direct sales.

Travel, tourism, and recreation offer considerable prospects in new travel planning services, packaged (and experience-based) tourist programs,

festivals and like events, and related businesses. This sector offers most of the opportunities for growth in Wyoming.

Manufacturing offers limited opportunities because of distance to major markets. However, there are some possibilities. For example, there are opportunities to manufacture goods for Wyoming customers that are currently manufactured elsewhere in the country. Realizing opportunities in new manufacturing requires a detailed analysis of purchaser-supplier linkages.

There may be opportunities for small businesses (including small manufacturers) providing goods and service within Wyoming. The key to success in creating new small businesses is the analysis of opportunities (current purchaser-supplier linkages) and the organization of support to local entrepreneurs and their new small businesses.

In sum, Wyoming can be successful in diversifying its economy but will probably not be successful in attracting major new industry: Instead of total concentration on a targeted industry and industrial attraction strategy, Wyoming should concentrate on creating the climate for developing and fostering small, "homegrown" businesses. By so doing, Wyoming would diversify its economy by building naturally on the state's comparative advantages. Emphasizing any other strategy (like industrial recruiting alone) would simply pit Wyoming against every other state trying to lure industry.