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THE WYOMING FRAMEWORK WATER PLAN

A SUMMARY



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WYOMING STATE ENGINEER'S OFFICE
WATER PLANNING PROGRAM

THE WYOMING FRAMEWORK WATER PLAN

The Wyoming Framework Water Plan identifies the long-range (50-year) alternatives for meeting the water needs of the State. It is an inventory of the State's water resources and related lands, a summary of the State's present water uses, a projection of future water needs, and an identification of alternative decisions to meet or not to meet the indicated future water needs. This report is a summary of the Wyoming Framework Water Plan.

The Wyoming Framework Water Plan was prepared by the Wyoming Water Planning Program authorized by the 39th Wyoming Legislature in 1967, which directed that "The State Engineer is responsible for the coordination of Wyoming's water and related land resources planning . . ." As a result of this legislation, the Wyoming Water Planning Program was established as a division of the State Engineer's Office and is under the general supervision and direction of the Wyoming State Engineer, Floyd A. Bishop. The work leading to this report was supported by funds provided by the Wyoming Legislature and by the national Water Resources Council under Title III of the Water Resources Planning Act of 1965.

The initial phase of the State Water Plan is now completed. Reports have been issued covering the water and related land resources of each of the major drainage basins of the State. The Wyoming Framework Water Plan Report presented the information from the separate basin reports on a statewide basis. The Wyoming Framework Water Plan does not attempt to prescribe a course of action, but it does attempt to provide information so that practical decisions can be made concerning water and related land resource development in Wyoming.

Projections of future water needs presented in the Wyoming Framework Water Plan were

used in order to identify alternative water resources programs and projects that may be required for the future.

The range of alternative futures for Wyoming varies widely resulting in a wide range of potential future water needs. Full utilization of Wyoming's natural resources, including using water in the production of mineral commodities in Wyoming rather than elsewhere, might define an upper limit on water needs. A lower limit would be to maintain the status quo by minimizing water resource development. Possibly the most realistic projection lies somewhere between these two.

Who will choose which alternatives the State should follow as a matter of policy? Hopefully, the decision-making process will involve everyone in Wyoming, and certainly the Legislature will be involved in the decision-making process. People need facts on which to base sound decisions. The Wyoming Framework Water Plan is intended as a basis of information upon which such decisions can be founded. The report points out what might happen in the next 50 years in Wyoming depending on the decisions that are made. Thus a final "State Water Plan" may never be written, for water planning must remain an ongoing process with the course of future events depending upon every decision made.

It is hoped that the people of Wyoming will examine this summary of the Wyoming Framework Water Plan, try to determine how they will be affected by resource development, and become involved in the decision-making processes which will determine the future of the State. Only then can the "State Water Plan" truly reflect the interest of all of Wyoming's people.

THE SETTING

Wyoming, the 9th largest of the states in size and the 49th in population, is situated astride the Continental Divide and provides the headwaters of 4 major river basins — the Missouri, the Colorado, the Great Basin, and the Columbia. Wyoming's heritage stems from her abundance of natural resources. Mile after mile of grassland, alternating with numerous irrigable stream valleys, has enabled the agricultural and livestock industry to become a major industry in the State. A wealth of scenic beauty, including two national parks, nine national forests, and other Federal and State reservations as well as private developments, is the reason for a burgeoning recreation and tourism industry. Beneath the surface lies a hidden source of wealth. Mineral resources, including energy fuels such as oil and gas, coal, uranium, and oil shale, and nonfuel minerals including trona, iron ore, gypsum, and many others, provide a major tax base for the State and rank Wyoming 10th among all states in mineral production.

All these industries are dependent upon water. The rancher could not survive without

water for his livestock and for irrigation of hay and other crops in this semiarid climate. Where would the recreation and tourism industry be without our sparkling streams, lakes, and reservoirs which provide unsurpassed scenery and fish and wildlife habitat as well as boating, water skiing, and many other water-based sports? The mineral industry, if it is to continue to provide a major source of income in the State, will also require water. Our cities and towns must continue to have an adequate supply of good quality water.

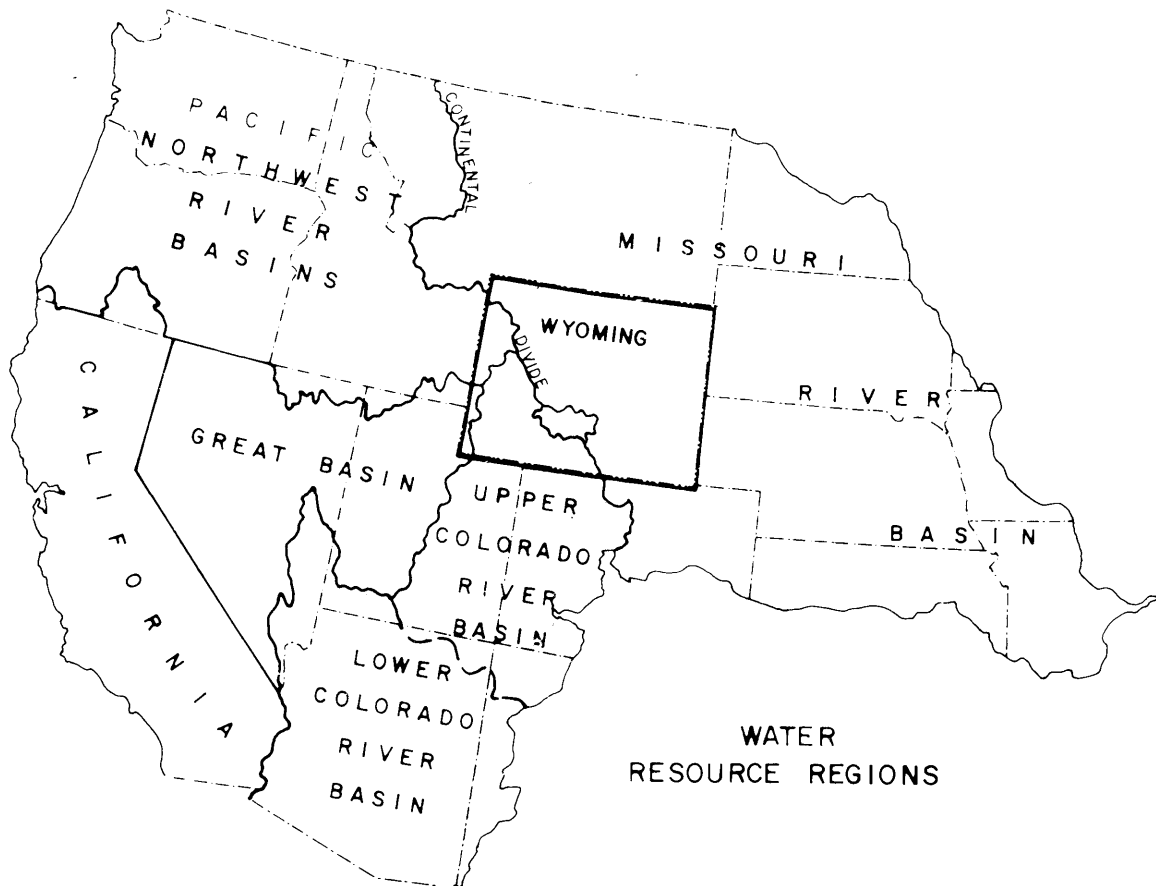
Wyoming has sufficient water for the foreseeable future. Proper precautions must be taken to insure that the development of this water for one segment of the economy does not proceed at the unnecessary expense of another segment or of the natural environment. Wise planning can assist in this regard, and only if everyone participates in planning can the future development of Wyoming reflect the desires of all the people.



WYOMING -- Headwaters of the West!

Streams flow from Wyoming in all directions to the major river systems of the western United States.

Major Drainage System	Percent of Wyoming
Missouri River	72
Colorado River	17
Columbia River	5
Great Basin	2
Great Divide (closed basin)	4
	<hr/> 100



WYOMING'S RESOURCES

THE PEOPLE

Wyoming's primary resource is her people. The 1970 population was 332,416 persons. About 75 percent of the population lives in cities and small towns throughout the State, while the remaining 25 percent reside on ranches, farms, and in nonfarm areas outside city and town boundaries. Only about 11.7

percent of Wyoming's population is below the poverty level in income, compared with a national average of 13.7 percent.

The small population of Wyoming encourages a "know-your-neighbor" attitude, and the warm Western hospitality of the State is readily apparent to the eight million tourists who visit here each year.



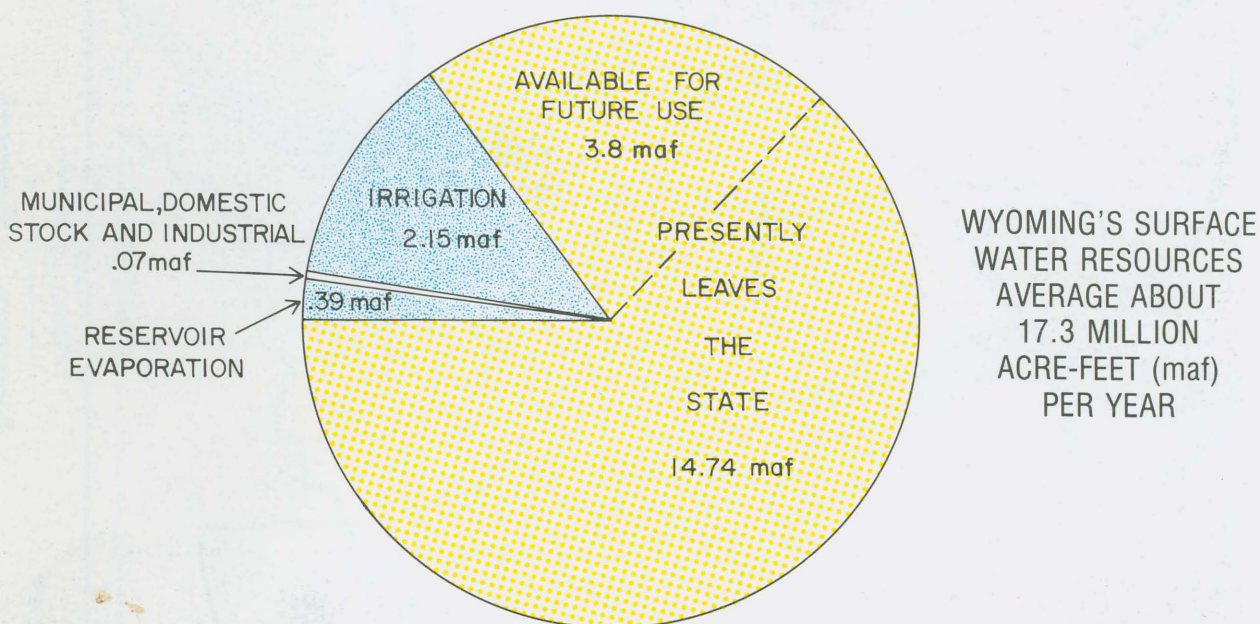
WATER RESOURCES

Wyoming's water resources, both on the surface and underground, seem abundant at first glance. A closer look, however, shows why water is such a precious commodity in this semiarid state.

Surface Water

An average of about 15.8 million acre-feet¹ of surface water are produced each year by precipitation in Wyoming, and about another 1.5 million acre-feet per year flow into Wyoming from other states. Since Wyoming's present consumptive uses² of surface water

amount to only about 2.6 million acre-feet annually, it would appear that we could greatly expand our water utilization without depleting the resource. However, about 70% of the runoff occurs during the spring and early summer, leaving little water for the rest of the year. Compounding the problem is the variability of streamflow from year to year. Thus, storage is required for maximum surface water utilization. Then too, interstate compacts³ and court decrees limit the amount of water which Wyoming may legally use. It is estimated that an average of about 3.8 million acre-feet per year, in addition to present uses, are available for consumptive use in Wyoming under present physical and legal limitations.



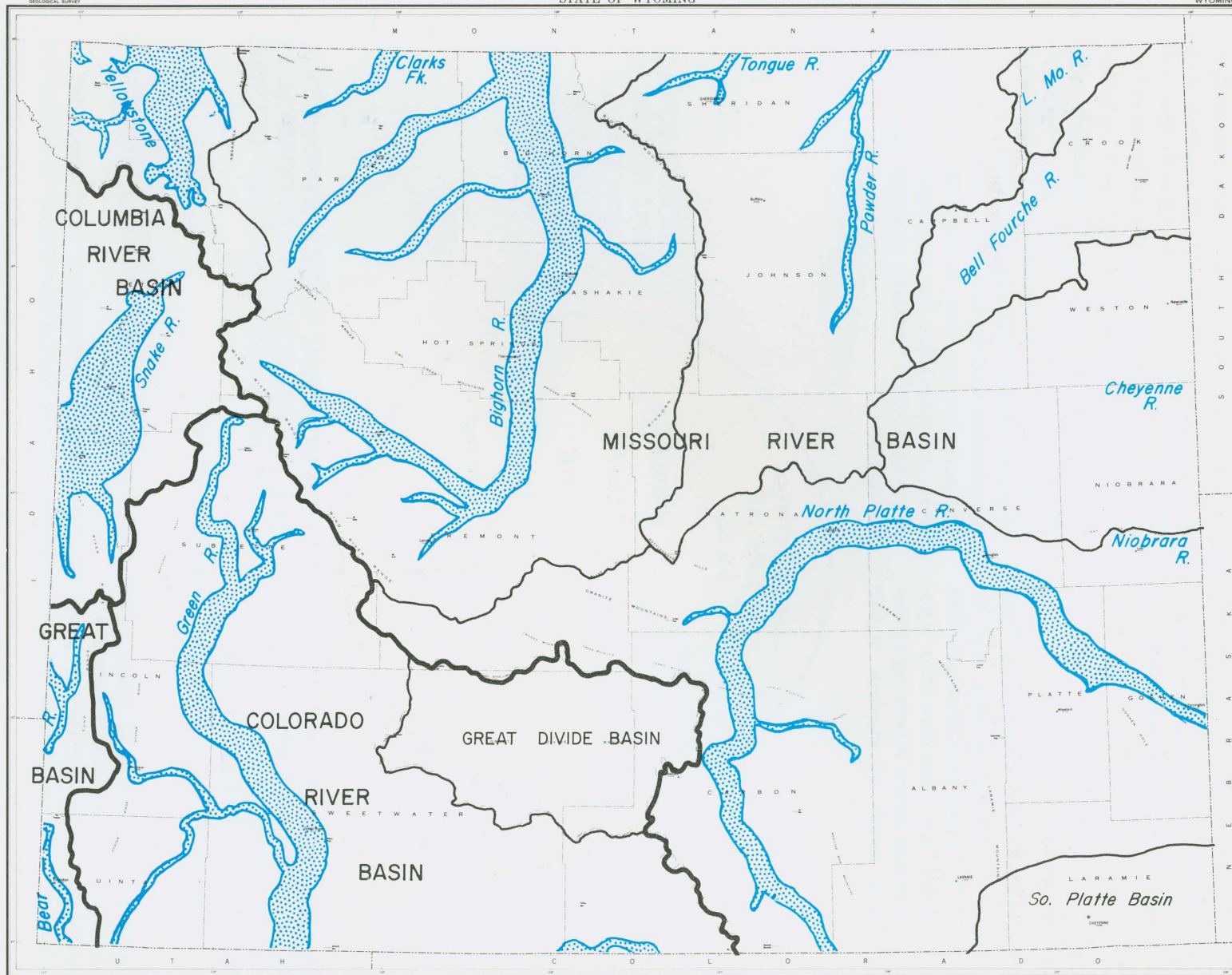
PRESENT USES CONSUME ONLY 15% OF OUR SURFACE WATER RESOURCES. THE OTHER 85% FLOWS INTO OTHER STATES. UNDER INTERSTATE COMPACTS AND COURT DECREES WYOMING MAY USE AN ADDITIONAL 22% OF THE RESOURCE OVER PRESENT USES.

(Figures are approximations representing long-term averages.)

¹ An acre-foot is the amount of water which would cover an acre of land to a depth of one foot. One acre-foot = about 326,000 gallons.

² Consumptive use is the quantity of water discharged to the atmosphere or incorporated in the products of the process in connection with vegetative growth, food processing, or an industrial process.

³ Interstate stream compacts are agreements between states which provide a basis for the division of interstate waters.



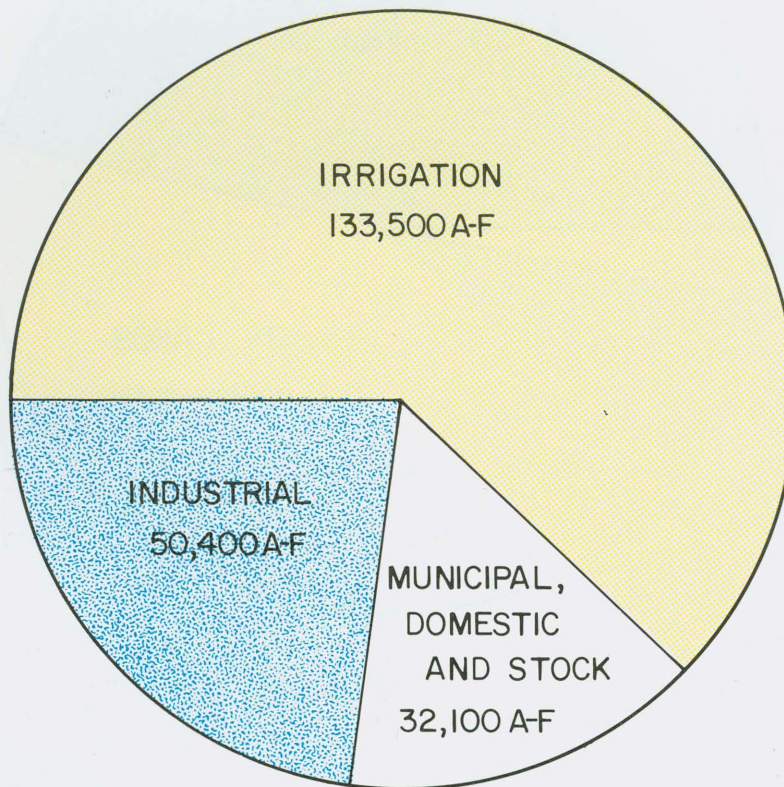
Average Annual Streamflow

Groundwater

Groundwater can be found throughout Wyoming, although detailed information is not sufficient to precisely quantify it. An estimate of the average annual potential recharge to groundwater in Wyoming is 4,000,000 acre-feet. In many areas water-bearing formations are too deep or aquifer characteristics are unsatisfactory for water to be obtained in adequate amounts or of suitable quality. The emerging desalination technology may increase Wyoming's usable groundwater supplies.

Present annual consumptive use of groundwater in Wyoming totals 133,500 acre-feet for irrigation, 32,100 acre-feet for municipal, domestic, and stock uses, and 50,400 acre-feet for industrial use.

The amount of groundwater available for future use is enormous, but its use depends upon its economic recoverability and the decision on whether to mine the resource or to merely use it at its recharge rate.

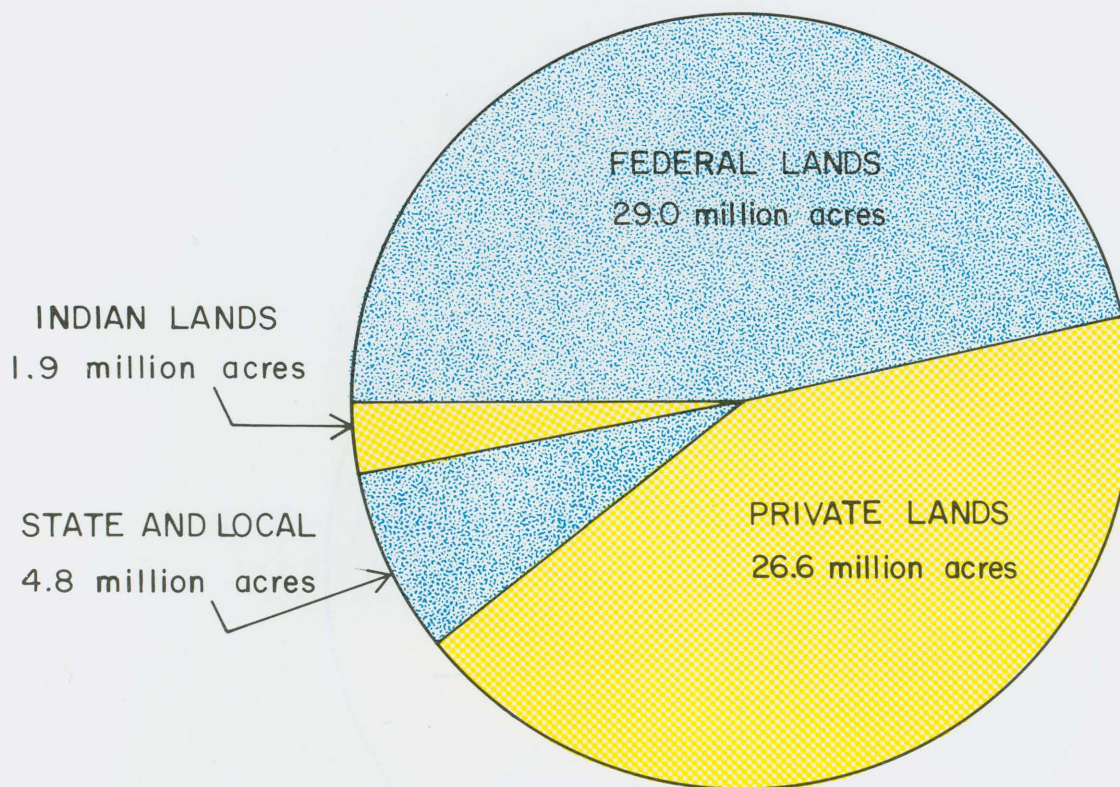


GROUNDWATER USES: *Present uses of groundwater in Wyoming total some 216,000 acre-feet per year. The potential for future utilization is great but depends upon local conditions of geology and economics.*

LAND RESOURCES

Nearly 47% of the State's land area is owned and administered by agencies of the Federal Government, including the Bureau of Land Management (26%), the Forest Service (15%), the National Park Service (4%),

the Bureau of Reclamation (2%), and others with minor areas of administration. Another 3% comprises the Wind River Indian Reservation. Over 42% of the State is in private ownership, and 8% is under state and local administration.



LAND OWNERSHIP: The total area of Wyoming is 97,914 square miles, or nearly 62.7 million acres. Of this, about 62.3 million acres are land surface and 0.4 million acres are water surface. About 84 percent of Wyoming's land area is used in agricultural activities, with the remaining 16 percent being comprised of national parks, recreation areas, inhabited areas, roads and highways, Federal lands where for management purposes livestock grazing is prohibited, and other areas of nonagricultural use.

WATER UTILIZATION

AGRICULTURE

By far the largest consumptive use of water in Wyoming is irrigation, which depletes an average of 2.15 million acre-feet of surface water and 133,500 acre-feet of groundwater

annually. This water is consumed on approximately 1.7 million acres of irrigated land. An additional 1.6 million acres of land have valid water rights, but are not irrigated for one reason or another.



IRRIGATION: *Of a total of 3.3 million acres with valid water rights, only 1.7 million acres are actually irrigated. About 2.3 million acre-feet of water are consumed annually by irrigation.*

Another important agricultural water use, though not nearly as large as irrigation, is stock water. There are approximately 1.45 million cattle and 1.74 million sheep in

Wyoming. The total annual stock water depletion in the State is estimated at about 30,000 acre-feet.

MUNICIPAL AND DOMESTIC

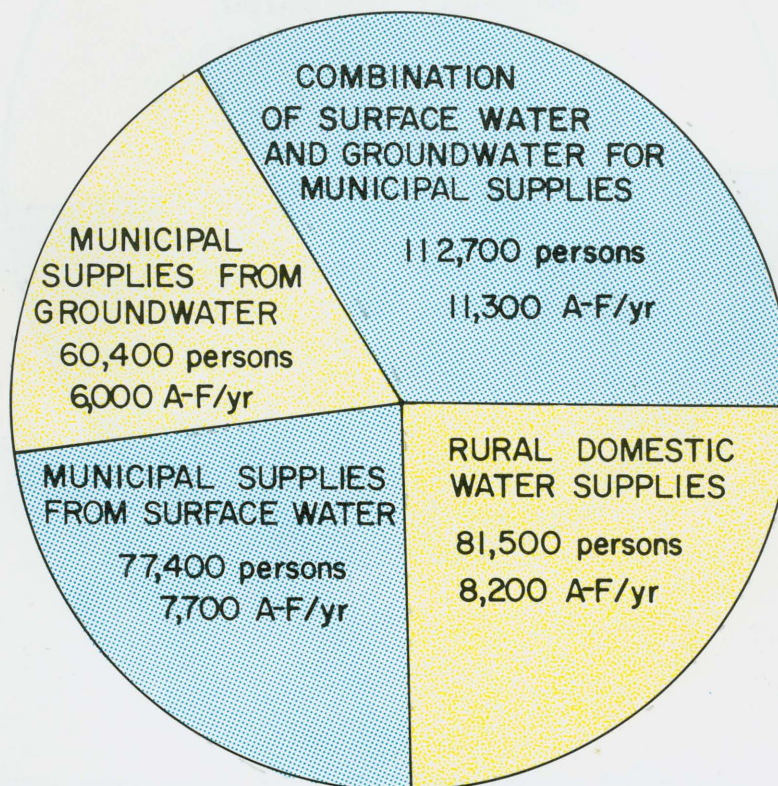
The population of Wyoming is approximately 332,000. A diversion of about 1 acre-foot per year normally is required to serve five people. This is equivalent to an average diversion of 180 gallons per day per person. About one-half of the municipal water diverted is consumptively used. Rural domestic water uses probably require similar diversion and consumption rates.

The municipal population of the State is about 250,500. Of these people, nearly 245,000 are served by municipal water supply systems. The remaining 5,500 people reside in towns without municipal systems where water is provided by private systems.

About 31 percent of the municipal population, or 77,400 persons, use surface water as their source of supply, 24 percent or 60,400 use groundwater, and the remaining 45 percent or 112,700 use a combination of surface and groundwater.

The 81,500 persons in Wyoming who do not reside in municipalities have private domestic water supply systems about which little data exist.

It is estimated that total municipal and domestic water consumption in Wyoming averages about 33,200 acre-feet per year, and the total diversion for this purpose is approximately 66,400 acre-feet per year.



MUNICIPAL & DOMESTIC WATER CONSUMPTION:

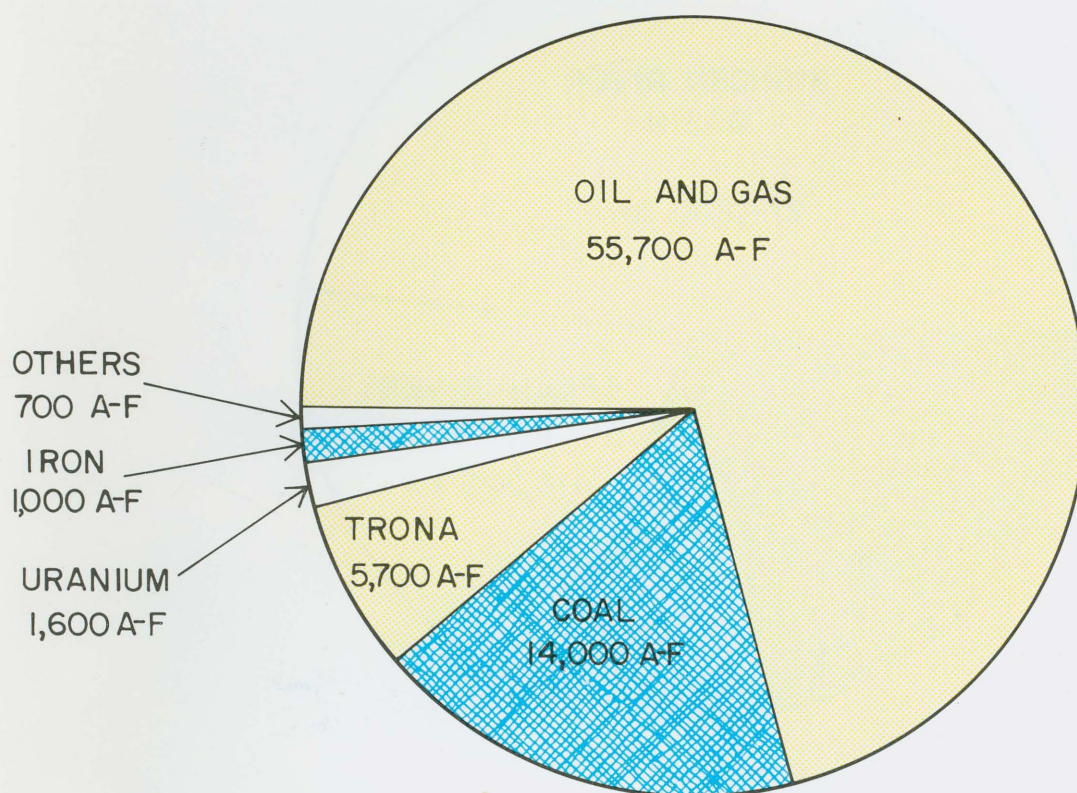
Totals about 33,200 acre-feet per year.

INDUSTRY

In Wyoming about 78,700 acre-feet of water annually are consumed for industrial purposes such as minerals production and timbering operations. Of this, 50,400 acre-feet are groundwater and 28,300 acre-feet are surface water. Wyoming ranks around tenth among the states in the value of mineral production. Primary mineral industries in Wyoming are oil and gas, coal, uranium, and trona, and there is also significant production in Wyoming of iron ore, bentonite, gypsum, and others. Timber production in Wyoming amounts to only about 0.2 percent of the

nation's output of forest products, although it represents a locally important sector of the State's economy. Oil shale is present in enormous quantities in Wyoming's Green River Basin and is a potential source of crude oil, but no production is currently taking place due to various legal and economic problems.

Wyoming coal, due to its low sulfur content and ready accessibility in surface mines, is in growing national demand as a powerplant fuel. Wyoming coal is used to generate power in the State and is hauled out of the State to powerplants elsewhere.



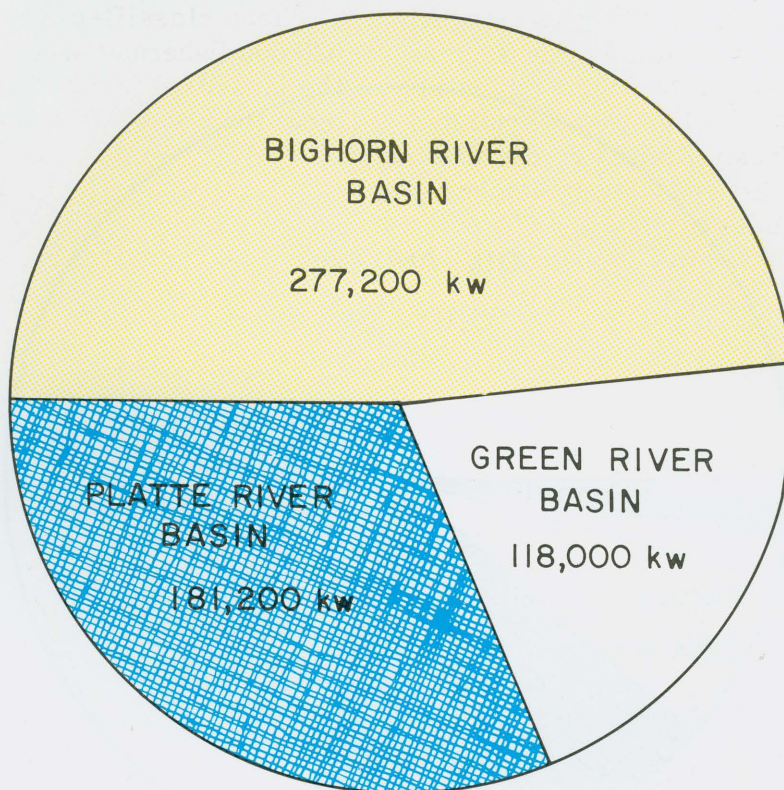
MINERAL INDUSTRIAL WATER CONSUMPTIVE USES:

Total 78,700 acre-feet per year.

HYDROPOWER

Another important use of water in Wyoming is in the hydroelectric power generation. Major hydroplants in or adjacent to Wyoming and their generating capacities are Flaming Gorge (108,000 kw) and Fontenelle (10,000 kw) on the Green River; Seminoe (32,400 kw), Kortes (36,000 kw), Fremont Canyon (48,000 kw), Alcova (36,000 kw), Glendo (24,000 kw),

and Guernsey (4,800 kw), on the North Platte River; Pilot Butte (1,600 kw) and Boysen (15,000 kw) on the Wind River; Shoshone (5,600 kw) and Heart Mountain (5,000 kw) on the Shoshone River; and Yellowtail (250,000 kw) on the Bighorn River. Thus the total present hydroelectric generating capacity on Wyoming rivers is 576,400 kilowatts. This is a nonconsumptive use of the water resources.



HYDROPOWER:

The total hydroelectric generating capacity in or adjacent to the state is 576,400 kilowatts.

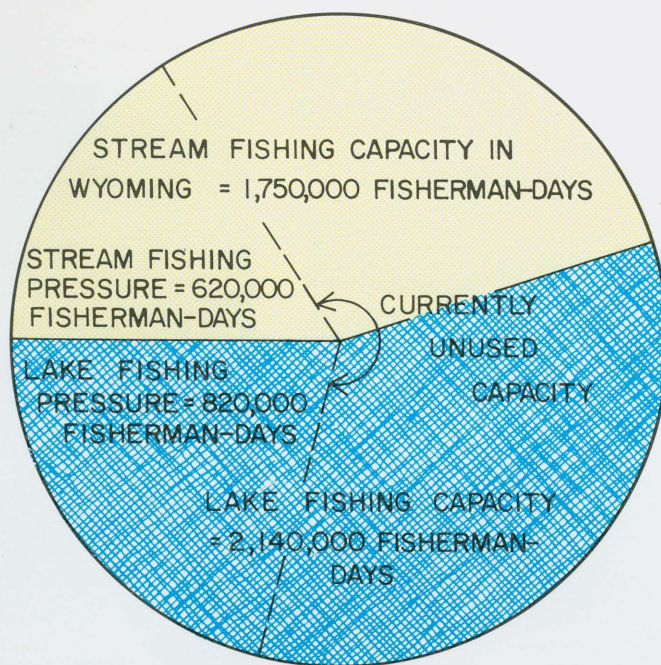
RECREATION AND FISH AND WILDLIFE

Water-based recreation is another important use of Wyoming's water resources and is largely a nonconsumptive use. An exception is the Seedskaadee National Wildlife Refuge, which will when completed consumptively use 20,000 acre-feet of water per year while maintaining habitat for waterfowl and other forms of wildlife.

The Wyoming Game and Fish Commission has classified over 15,500 miles of streams in the State on the basis of their aesthetics, productivity, and availability. Class 1 waters are of national importance as a sport fishery, Class 2 of statewide importance, Class 3 of importance to large areas less than statewide, Class 4 of importance to small areas such as counties, and Class 5 waters are of potential importance as fisheries but are now polluted or otherwise seriously limited or degraded. In Wyoming there are about 300 stream miles in Class 1, 1,340 miles in Class 2, 6,780 miles in Class 3, 5,740 miles in Class 4, and 1,400 miles in Class 5.

Lakes and impoundments in the State which are important as game fisheries are classified Alpine Lakes or Alpine Reservoirs (elevation over 7,500 feet), Lowland Lakes or Lowland Reservoirs (elevation below 7,500 feet), or Farm Ponds which are ponds with surface areas of 5 acres or less and which may be further classified as Trout Ponds, Mixed Ponds, or Nontrout Ponds. In the State there are approximately 36,000 surface acres of Alpine Lakes, 13,700 acres of Lowland Lakes, 4,300 acres of Alpine Reservoirs, 201,500 acres of Lowland Reservoirs, 1,000 acres of Trout Ponds, 40 acres of Mixed Ponds, and 400 acres of Nontrout Ponds.

These classified streams provide over 620,000 fisherman-days of use per year, and the classified bodies of still water provide more than 820,000 fisherman-days per year. It is estimated that this annual fishing pressure could be increased to 1,750,000 and 2,140,000 fisherman-days on streams and still waters respectively without large changes in management practices.



FISHING CAPACITY:

In Wyoming under present management practices totals 3,890,000 fisherman-days per year.

FUTURE WATER REQUIREMENTS

What are Wyoming's future water requirements? How may water resources development stimulate Wyoming's economy? These questions were among those that prompted authorization of the "State Water Plan." Accordingly, projections were obtained for those sectors of the State's economy which have the greatest impact on the State's water and related land resources. Those sectors are agriculture, the mineral industries, outdoor recreation, and fish and wildlife activities. Water needs and their relationship to the economy were assessed for each of these primary activities as well as for such related factors as municipal and domestic water uses.

Water use projections were based on the following assumptions:

Agriculture — The basic assumption was that Wyoming would maintain its present share of the Nation's agricultural production.

Mineral Industries — Each mineral commodity was analyzed regarding its market

potential assuming that water would be available in sufficient quantity and quality so as not to present a constraint on the mineral development.

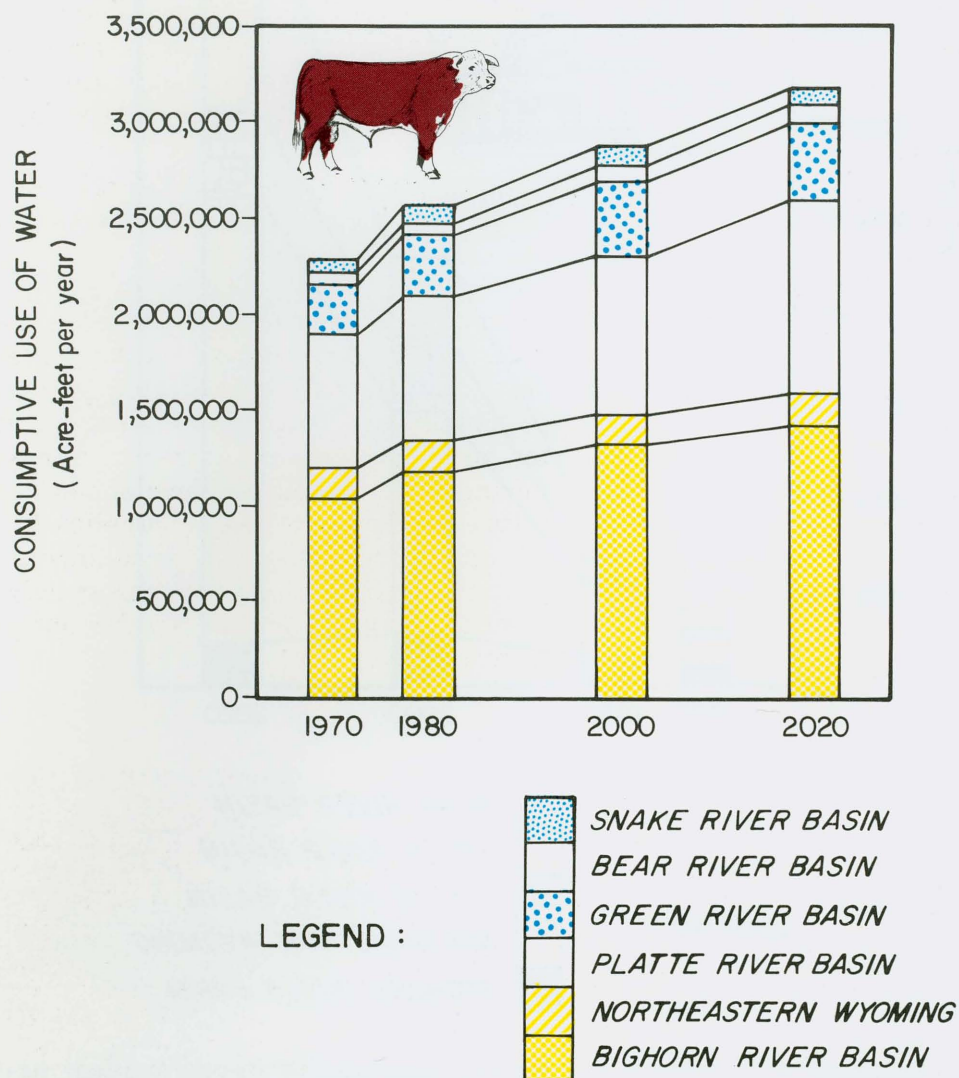
Municipal and Domestic — Water requirements for these purposes were projected on the basis of population trends and impacts of projected increased industrial employment.

Recreation and Fish and Wildlife — Projections were based on Wyoming's recreation and game and fish plans.

Economic projections are not in themselves goals in the planning process. They are used only as a means of identifying probable or possible future water needs. Alternative water requirements, then, range from minimizing water resources development in the future to providing water supplies to meet the projected needs. The following projections, however, do not necessarily represent a maximization of Wyoming natural resource development.



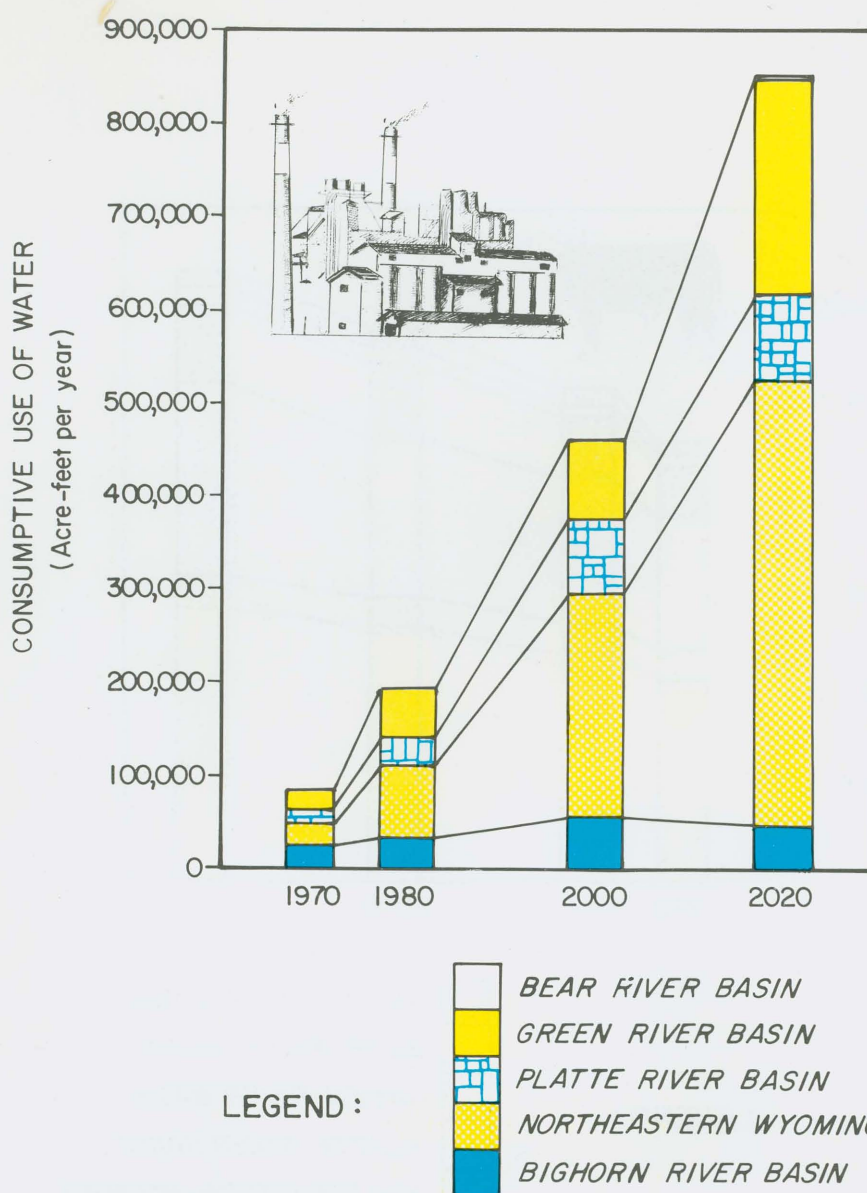
PRESENT AND PROJECTED IRRIGATION WATER REQUIREMENTS



Wyoming's irrigated acreage is projected to increase from about 1.7 million acres at present to about 2.1 million acres by the year 2020. Consumptive use of water for irrigation

is projected to increase from about 2.3 million acre-feet per year at present to about 3.2 million acre-feet per year by 2020.

PRESENT AND PROJECTED INDUSTRIAL WATER NEEDS

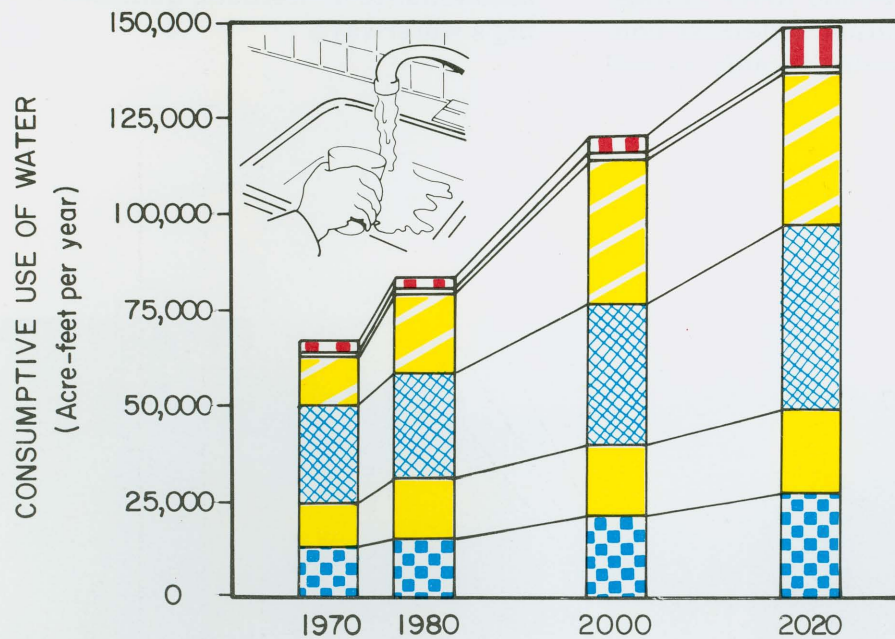


Industrial water consumption is projected to increase from about 78,700 acre-feet per year at present to over 845,000 acre-feet per year by 2020. Most of this increased water consumption will be in the coal industry. Projections of water uses for industrial purposes were based on the assumption that water would be available in sufficient amounts so as not to limit the development in any way. In some areas, notably Northeastern Wyoming, water is not available in amounts which will enable the projected coal

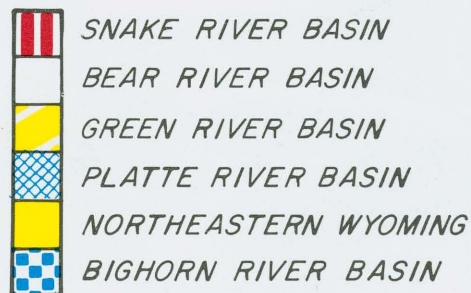
developments to occur under present technology. Thus, if the projections are to prove valid, either extensive water development projects or technological advancements which will greatly improve water efficiencies will be necessary.

Minor amounts of water are projected for use in the phosphate and timber industries in Wyoming's Bear River Basin and in the timber industry in Wyoming's Snake River Basin.

PRESENT AND PROJECTED MUNICIPAL, DOMESTIC AND STOCK WATER REQUIREMENTS



LEGEND :



Municipal, domestic, and stock water uses are projected to increase from the estimated present depletion of 63,200 acre-feet per year to 148,140 acre-feet per year by year 2020. Municipal and domestic water use projections are based on population projections which

should be periodically examined and updated to ensure their validity. Stock water use projections are based upon national meat production projections and the assumption that Wyoming will maintain its present role in national meat production.

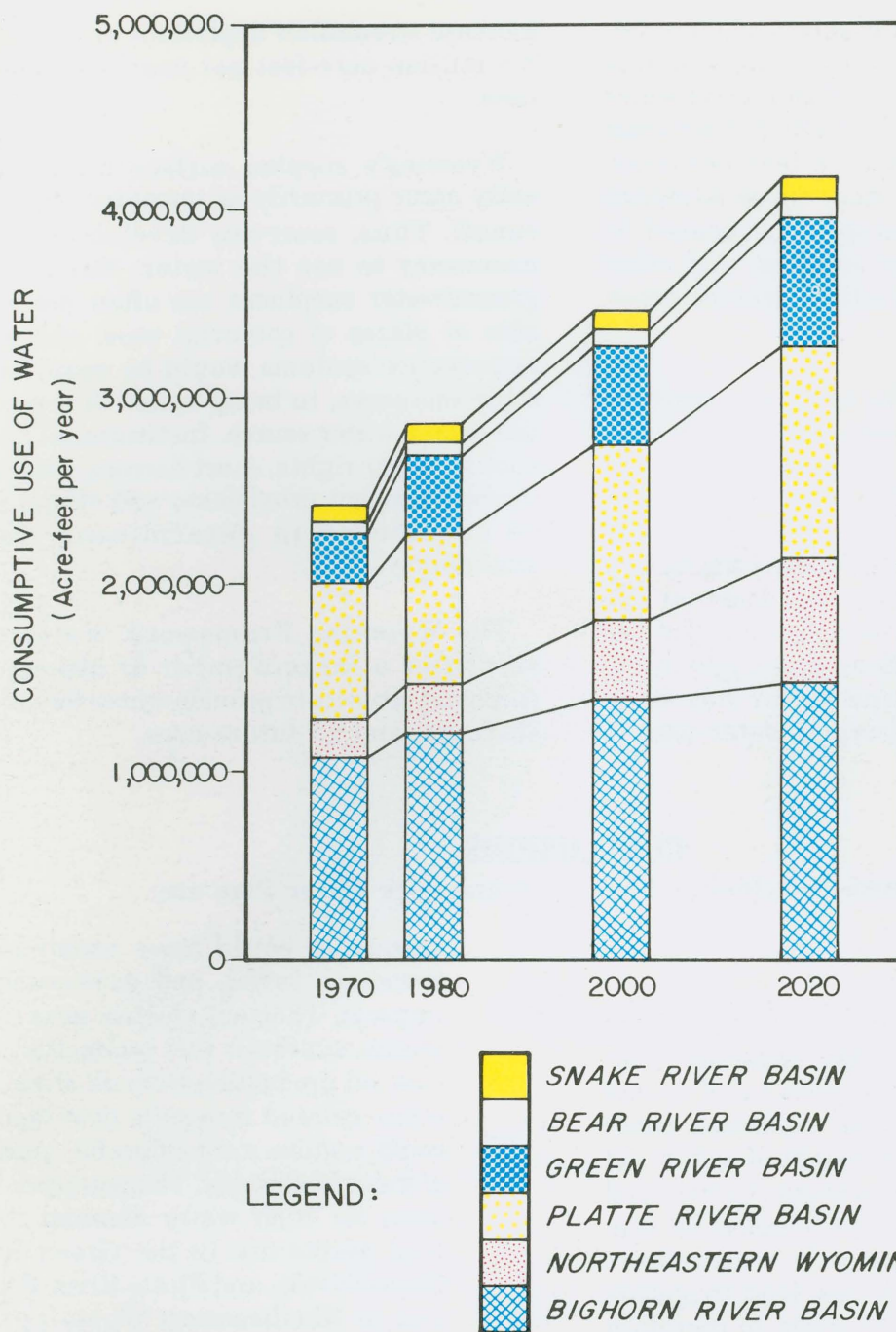
OTHER WATER USES

Projected consumptive water uses in addition to those already listed include 20,000 acre-feet per year for the Seedska-dee Wildlife Refuge and 92,000 acre-feet per year as Wyoming's share of Colorado River Storage Project reservoir evaporation. Extensive non-consumptive use of Wyoming's water, as well

as water flowing in Wyoming but allocated to other states, will continue to be enjoyed for such purposes as recreation, fish and wildlife, and hydropower production as well as maintenance of aesthetic qualities of Wyoming's waterways.



PRESENT AND PROJECTED TOTAL WATER REQUIREMENTS



Based on the preceding discussion, the total annual water depletions for all listed uses in Wyoming are projected to increase from the estimated 2.4 million acre-feet at present to 2.9 million acre-feet by the year 1980, 3.5

million acre-feet by year 2000, and to 4.2 million acre-feet by year 2020. This represents an increase in annual depletion of 1.8 million acre-feet or nearly 75 percent over the next 50 years.

SOURCES OF WATER AND ALTERNATIVES OF DEVELOPMENT

Projections indicate the potential for a considerable increase in water uses in Wyoming in the next 50 years. Total consumptive water uses could increase from 2,400,000 acre-feet per year to 4,200,000 acre-feet per year. Water is available to meet these demands from surface water supplies allocated to Wyoming, groundwater supplies, and other sources, possibly including precipitation management.

Surface water supplies have been reserved for Wyoming by interstate stream compacts and court decrees. The largest amounts of water allocated to Wyoming are in the Bighorn, Clarks Fork, Tongue, and Powder Rivers (tributaries of the Yellowstone River), and in the Green River (tributary of the Colorado River). Other compacts involve the Snake, Belle Fourche, Bear, and Upper Niobrara Rivers. Sufficient water has been reserved for future Wyoming water uses to

increase streamflow depletions an average of 3.8 million acre-feet per year over present uses.

Wyoming's surplus surface waters presently occur primarily as uncontrolled spring runoff. Thus, reservoir developments are necessary to use the water. Surface and groundwater surpluses are often not available at places of potential uses, and water conveyance systems would be required, in some instances, to bring water to a place of use from a water source. Institutional factors such as water rights, court decrees, interstate stream compact provisions, and others must be considered in determining water availability.

The Wyoming Framework Water Plan identifies a large number of alternative potential projects to provide water for current shortages and for future uses.

CONCLUSIONS

The general conclusions from the Framework Water Plan are:

SOCIOECONOMIC

1. Agriculture is an important industry in Wyoming. It has expanded considerably in recent years, but it cannot undergo continuous expansion without further development of water and related land resources. Continued development of water supplies for supplementing presently water-short irrigation and for new land irrigation is required for the State to maintain a healthy agricultural economy and to furnish Wyoming's share of food and fiber for the Nation.
2. Wyoming is an area of abundant natural resources. Development of the State's coal and other energy

resources could have tremendous economic, social, and environmental impacts. Thermal electric generating plants, synthetic fuel production from coal, oil production from oil shale, and other related minerals development could require a considerable quantity of industrial water. The potential locations for high water demand industrial plants are in the Green River, Great Divide, and Platte River Basins, and in Northeastern Wyoming. The water policies promulgated by the State could influence the kind and location of such development.

3. The demand for water related recreation is expected to increase in the

- future. Boating, water skiing, swimming, camping, fishing, and hunting participation could reach the limits of presently available water-based recreational capacities in Wyoming in the foreseeable future, requiring changed management practices, increased public access, additional facilities, or limitations of use.
4. Over 49 percent of the land area of Wyoming, including the Wind River Indian Reservation, is under Federal ownership or administration. Although Federal ownership is more predominant in the western half of the State, it is prevalent in every river basin of the State, particularly when considering Federal mineral rights as well as Federal surface rights to the land. Federal land and water policies must be considered in water and related land resources planning and utilization. Water planning should be an integral part of any natural resources planning.
 5. Water resource programs should involve the public. Identifying the public(s) to become involved, initiating interest, and determining the appropriate time for public input are not so easily done. Most citizens have no desire to become involved until personally affected by a proposal. Nevertheless, renewed efforts in public involvement should be initiated.
 6. Sources of funding for water resources programs and projects need to be identified. The outlook for Federal funding of water projects is not promising and consequently methods of State funding and local participation need to be examined. Statutory authority for cooperative programs involving State and local entities as well as private interests should be studied and new legislation enacted if necessary.
 7. Public policy should be established to enable a balance of development and environmental impact in Wyoming.
 8. The types of State and local organizations that would be desirable or required to manage the State's water resources and to implement and operate water development projects should be determined and established.
- ## WATER RESOURCES
1. An average of 14.7 million acre-feet of water per year flows in Wyoming streams to downstream states. Streamflow fluctuates considerably among the seasons of the year and from one year to the next. Water is declared by the State Constitution to be the property of the State, and rights to use water must be obtained from the State Engineer's Office in accordance with State statutes.
 2. Although the Wyoming Constitution declares water to be the property of the State, as a practical matter Wyoming is limited in the amount that she can deplete the streamflows because of the water rights established in downstream states. Interstate agreements, or compacts, have been negotiated in recognition of this. Over 3.8 million acre-feet per year of water are reserved for future Wyoming needs.
 3. In general, the water in Wyoming's streams is of excellent quality. Unlike more heavily populated regions, municipal and industrial water quality degradation is a minor problem. Point sources of pollution have been identified and have been eliminated or are being corrected. However, there are in some areas of the State non-point pollution sources which are significant. Most serious are the turbidity and sedimentation caused by

natural runoff from highly erodable, often Federally managed, lands. In a few areas, irrigation return flows also contribute to this type of degradation. Salinity is not considered to be a water quality problem in Wyoming. However, the downstream states of the Colorado River Basin are very much concerned about salinity levels in the lower portions of the river system, and the State of Wyoming is cooperating in attempts to minimize the problem.

4. There are many areas of the State where existing and potential water demands exceed local supplies. These water demands are apparent both on a short-term and a long-term basis, and water transfers within and between river basins are necessary. Although the largest amount of surplus water available in Wyoming is in tributaries of the Yellowstone River — Clarks Fork, Bighorn, Tongue, and Powder Rivers — the Yellowstone River Compact has a provision that the compact states (Wyoming, Montana, and North Dakota) must consent to diverting water outside the Yellowstone River Basin. Potential problems in obtaining consent to use Yellowstone River Compact water outside the basin should be identified, and renegotiation of the Yellowstone River Compact should be promulgated if necessary. The Colorado River Basin Compacts allocating Green River water to Wyoming contain no such restrictions. Thus, Green River water can be the most flexibly used of Wyoming's presently available surface water resources.
5. Industrial water supplies are now being obtained, at least in part, by purchasing irrigation water rights and transferring the water use to industrial use rather than developing water supplies from Wyoming's sur-

pluses. A comprehensive State program could help alleviate the water transfers and provide new water supplies for new uses. The timing of new water projects and their location could help minimize the transfer of irrigation water rights.

6. Water resource projects should be coordinated by the State to ensure multipurpose projects, full utilization of available water resources, and minimum adverse environmental impacts. Such planning should consider supplemental water supplies, improved water management and development of Wyoming's surplus waters for new uses. Wyoming's natural beauty, fish, wildlife, and recreation should be considered in planning along with water supply, flood control, and other objectives. Measures benefiting the public are seldom included in projects unless planned and incorporated by governmental action.
7. Water and land resources conservation practices need to be encouraged. The impacts of water projects on the environment need to be properly considered in design and construction.
8. A considerable volume of groundwater is in storage in Wyoming, but only a fraction of the resource can be obtained by wells for use. Costs of producing and treating groundwater and legal constraints will control the amount used. Desalting technology will enable use of highly mineralized water formerly thought not usable.
9. Shallow groundwater and surface water are so interrelated that development of one can affect the distribution and availability of the other. Groundwater in consolidated aquifers is abundant, but recharge is slight and may limit the sustained yield. It may be

advantageous to overdevelop (or "mine") certain aquifers to utilize the resource. The costs of deep, large-yield wells may be prohibitive for other than industrial and municipal use.

10. Groundwater will continue to be an important source of water for municipal, domestic, livestock, and industrial use. Significant increases in groundwater uses are anticipated in (1) the Bighorn River Basin for irrigation and industry, (2) Northeastern Wyoming for industry, (3) Platte River Basin for irrigation, (4) Green River (and Great Divide) Basin for industry, and (5) Snake River Basin for municipal, domestic, and recreational uses. Regional aquifers offering the best opportunities for large-scale water development are the Arikaree sandstone, and the Madison through Flathead interval.
11. Additional basic data is needed in order to more adequately evaluate the groundwater resources of the State and geologic formations which may be aquifers, confining beds, or disposal reservoirs. Research is needed to develop usable data on rates of infiltration and recharge, groundwater in

carbonate (limestone) aquifers, and geohydrology in general. Wyoming's geothermal resources need to be studied and evaluated.

The Wyoming Framework Water Plan identifies alternatives of water resource projects and alternatives of "to develop" or "not to develop" as well. People will have to consider individual cases as they arise. Probably the real decision will not only include answers to the question of yes or no on development but also require answers to questions like "Which project alternative, considering all impacts, is most desirable?", "How will the development be financed?", "Who will repay the costs?", and many more.

The Wyoming Framework Water Plan attempts to provide starting point information to assist future planning and upon which to evaluate utilization, development, or preservation of Wyoming's water and related land resources.

For more information write to:

Wyoming Water Planning Program
State Engineer's Office
State Office Building
Cheyenne, Wyoming 82002

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THE GOVERNOR'S INTERDEPARTMENTAL WATER CONFERENCE

Water and related land resources planning is coordinated by the State Engineer through the Governor's Interdepartmental Water Conference. The 1973 Legislature passed a law formalizing the Interdepartmental Water Conference, providing for IDWC guidance in planning of water and related land resources, and providing for IDWC approval and adoption of water and related land resources plans. The law also provides guidelines for planning procedures, contents of plans, and use of plans. The members of the Governor's Interdepartmental Water Conference are shown below.

