The Outdoor and Environmental Bi-Weekly

High Country News

Vol. 4, No. 11 Lander, Wyoming Friday, May 26, 1972

Amidst the rolling plains and hills of northeastern Wyoming and southeastern Montana, the ranches are few and far between. This one in southern Campbell County, Wyoming, may be doomed, along with many others. Great Deposits of coal lie hidden beneath the serene expanse of grasslands.

Western Coal Development Moves Closer to Realization

by Tom Bell

Development of Montana and Wyoming's vast coal deposits moved closer to realization last week. Following closely upon the release of the Montana-Wyoming Aqueduct Appraisal Report, Wyoming Senator Clifford P. Hansen moved to implement it. He introduced legislation to authorize a federal study of the feasibility of constructing the aqueduct system.

The announcement brings into the open what has essentially been a clandestine operation for the last two years. Hidden from public view until last October was all the ramifications of industrial development in the Powder River Basin of Montana and Wyoming.

That development could mean an increase in population of between a quarter of a million and a million people in the next two decades. The development would come from huge, fossil-fueled electric generating plants, a proposed gaseous diffusion, uranium-enrichment plant, and coal gasification and liquefication plants.

Fueling all of this vast development are some of the world's largest coal deposits. The U. S. Bureau of Mines estimates the Powder River Basin of Wyoming and Montana contains nearly 34 billion tons of lignite and subbituminous coal readily strippable with present-day equipment. It lies in an area of some 24,600 square miles, slightly largerthan West Virginia.

Needed for development of this storehouse of energy fuels are vast amounts of water. But in an essentially water-scarce region, some rather broad-scaled water engineering projects are going to be required.

Into the breach has stepped the U. S. Bureau of Reclamation. Already running short of the irrigation-power projects which has kept the engineering bureaucrats flourishing since the turn of the century, the Bureau has now hit upon an incredible scheme. It is now going to make water flow backwards.

The feasibility study announced by Senator Hansen will determine how much, where, and how costly the water will be for developments. Preliminary studies indicate greatest feasibility for a huge pipeline to move most of the Yellowstone River at Miles City, Montana, to the vicinity of Gillette, Wyoming. (See map page 7.)

Incumbent upon large-scale water development is the necessity to renegotiate the Yellowstone River compact. This compact, agreed to by Wyoming, Montana and North Dakota and approved by Congress, apportions the water of the Yellowstone River between the three states. Each is allotted a share. North Dakota will obviously come out short if most of the water of the river is pumped back into the coal regions of Montana and Wyoming.

The Bureau of Reclamation estimates that industrial needs will total some 2.6 million acre feet of water per year. It says that some 1.7 million acre feet are developable in the Yellowstone River drainage, and 1.2 million acre feet of that could be piped away. Some of it could go 200 miles south to Campbell County, Wyoming. The cost would be some $1.3 billion.

To supply remaining estimates of needs, the Bureau would build a number of new reservoirs and rebuild the existing Tongue River Reservoir near Decker, Montana. Among those to be built would be Boxelder, Hole-in-the-wall, Little Bighorn, and possibly Kendall (across the state on the Green River) in Wyoming, and the Moorhead, Allenspur, Buffalo Creek and Cedar Ridge Reservoirs in Montana. Allenspur would be a large reservoir on the Yellowstone River above Livingston and north of Yellowstone Park.

In addition, the North Central Power Study proposes two pumped-storage hydro-peaking sites. One would be northwest of Sheridan, Wyoming, using the Tongue River and a storage site on Cutler Creek. The other would utilize Buffalo Bill Reservoir west of Cody and storage sites on either the North Fork or South Fork of the Shoshone River.

To supply the entire area with water and

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A Scientist Speaks Out

by E. J. Hoffman

Dr. E. J. Hoffman is an Associate Professor in the University of Wyoming College of Engineering and a research engineer in the Natural Resources Research Institute at the University. He is one of the country's acknowledged experts on coal gasification and is recognized in other areas of coal technology.He has appeared before congressional committees to offer expert testimony on his subjects. He is also the author of a number of technical papers on coal technology.

Dr. Hoffman is like many others who have been involved in our present-day technology. His exposure to the facts and figures of the energy problem has led him to some thoughts on the social and political implications. His conclusions are not far different from those reached by the authors of The Limits to Growth.

* * *

Not so very long ago, the United States was regarded as self-sufficient from an energy standpoint. The prospect of virtually unlimited reserves of nuclear sources presumably provide substance to this impression. In a period of approximately the last two years, this picture of complacency has been altered, and today lies shattered. Rationing is being mentioned, and in a number of states no supplies of natural gas are available for new start-ups.

At present, the nation's recoverable oil reserves are estimated at 30 to 40 billion barrels; we are using liquids at the rate of five billion barrels a year. Large discoveries are few: the north slope discovery, estimated at ten billion barrels, is only the third of that magnitude to be discovered in the U. S. The country has a declining discovery ratio, and it is estimated we will be out of oil before the turn of the century.

Natural gas is equally deficient. Reserves of gas are less than 300 trillion cubic feet, and consumption is approaching 25 trillion cubic feet per year, with increasing demand. LPG

(Please turn to page 4)

Photo by Laney Hicks

The agricultural economy of Wyoming and Montana will be replaced by an industrial economy as huge coal-burning, steam-generating plants come to dominate the landscape.

HIGH COUNTRY

By Tom Bell

Last week a concerned rancher's wife called me from Otter, Montana. She wanted information and she wanted to pour out her concern for the future. She is from New Jersey originally but living close to the land in southeastern Montana has imbued her with the true love of a westerner. She wants desperately to protect the way of life she has come to know. It's a good life under the clear skies and uncluttered open spaces of Big Montana.

She is not alone. There are many others living near such equally obscure and unknown little post offices as Broadus and Birney and Sonnette.

Their way of life is threatened, and, in fact, it is doomed. Their part of the world is going to be expendable. In place of the peaceful ranch life will come the hurly-burly of many thousands of people with high wages, much leisure time, the affluence to buy dune buggies, all-terrain-vehicles, motor bikes, snowmobiles, ad infinitum, ad nauseam. And of course there will be highways, railroads, water aqueducts, high-voltage transmission lines, and cities. The cities may not be too beautiful because for the most part they will be construction-worker shanty towns and endless, dusty trailer courts.

But the implications of gigantic developments go far beyond the coal region itself. The Bureau of Reclamation is notorious for its under-estimation of costs and demands. The Bureau estimates a need for 2.6 million acre feet of water a year. But even this considerable amount of water could be conservative.

The need for water in the Powder River Basin could eventually dry up other parts of Montana and Wyoming. Water, for which industry can pay up to $150 per acre foot, is not going to be used for long on some of the marginal irrigated lands of Wyoming. Such an eventuality could lead to still greater movement from the land to the industrial centers.

This is progress. It is what Wyoming Governor Stanley K. Hathaway likes to call the "slow, desirable, quality growth which will help build Wyoming!"

It is all pending, of course, because this country has an energy crisis. And because the crisis is going to get worse, not better for the next several decades (if ever), Wyoming and Montana are going to be sacrificed on the altar of human greed, profit ledgers, and gross national product.

There seems to be no way of turning it around. The energy companies - utilities, mining companies, oil companies - are all so closely interwoven and overlapping in corporate structure and exploitive philosophy that it is hopeless. And of course, they are aided and abetted on the highest levels of government.

Profits from the mining of coal in this area are on the magnitude of billions. Profits from the sale of electricity and the products of coal will be on the order of more billions. Given such an incentive to profit, development will be spurred down to the last pound of coal.

Protest against stopping or curtailing the Powder River Basin coal development is an exercise in futility. The reason for it is readily apparent. In spite of an impending energy crisis, this country has no energy policy. And for a country that runs on energy, that is a frightening commentary on our utilities, our energy companies, and our government.

There is at this time scarcely more than lip service being paid to alternative energy sources. Every knowledgable scientist, or spokesman for responsible companies, has declared that sooner or later the finite natural resources of planet Earth are going to be exhausted or economically unavailable. And every one of them point to solar energy as the ultimate source which must be tapped. Yet, in spite of this, neither the government nor the energy companies are seriously committed to the technology which will make solar energy feasible.

The only other source of energy which has the potential magnitude and the environmentally desirable characteristics which seems capable of fulfilling our needs is fusion power. And, here, too, the technology is being starved for lack of funds.

Through all of this, there is no clarion call from on high to ask Americans for some restraint. There are some voices speaking out on the need for a change in basic philosophy and life style. But the real statesmanship demanded of the times is not being displayed by those in either the economic or political power structure.

On the contrary, powerful United States senators, such as Wyoming's Clifford P. Hansen, have been enveloped by the oil and gas industry. They are no longer spokesman for the people and the public interest, but instead have become the Charlie McCarthy's of the petroleum companies.

Senator Hansen's answer to the energy crisis is for more exploration and production, an increase in the depletion allowance, and increased prices for oil and gas to spur still more exploration and production. Not once has he publicly uttered a serious statement on restraint in use of petroleum products, a commitment to put less money into the highway trust and more into mass transit, or any other alternative which requires less use and not more, of our dwindling oil and gas resources. He is not alone, of course, but he is the avowed spokesman for the oil and gas industry in the United States Senate.

Last January, HIGH COUNTRY NEWS ran an article by Eric Hirst, entitled Debunking Madison Avenue. It pointed out the savings which could be effected by recycling, by more efficient use of fuels, by more efficient electrical appliances, by mass transit over the single automobile, and a host of others.

It is not that we don't know how to effect savings in energy, or wouldn't if so directed by official policy. It is not that many Americans would not sincerely exercise restraint in use of electrical energy if so advised. It is simply that it is not in the best interests of high profits from a sure thing to change direction. And when the American public finds it has been duped it will be too late.

Spirits lift, clear and strong as the bold faces of Wyoming hills, as Spring returns once more. And thunder showers will once again wet up-turned faces of flowers and men alike.

Letters To The Editor

Editor:

This year marks the centennial of the establishment of Yellowstone National Park. As we look closely at Yellowstone's history during the past 100 years, we are impressed that the park has survived at all--even more so that it is a nearly intact natural area, in spite of many influences exerted by man. We believe that we are now at a threshold of far greater potential for adverse change than posed by commerical interests, administrative policies, or tourism of the past.

We ask the people who visit Yellowstone this centennial year to join with those of us who live here to try to minimize one aspect of this increasing potential for adverse impact -- solid waste disposal. We know this problem is not unique to the park, but the necessity to preserve a natural area adds a unique aspect.

To all who care--care enough to visit Yellowstone this and future years--take out with you what you bring in to the greatest extent possible. Use cans and bottles which can be recycled, avoid excess packaging and disposable eating utensils, and reuse paper bags. Create as little refuse for the park to dispose of as possible.

Help us, that Yellowstone may celebrate again one hundred years hence a second century as a national park -- a natural area of unmatched wonder and beauty, of cultural and scientific resources.

Yours truly,
Marjorie S. Dunmire
Yellowstone Environmental Awareness

* * *

Editor:

Enclosed please find check for $10 for High Country News. Saw your piece in Colorful Colorado.

Are you interested in contributed pieces from Colorado, particularly the San Luis Valley-Upper Rio Grande area? Articles on negative forest management and other conservation issues? If, of course, they are well written and accurate - accurate even to photos for proof?

You are doing a great good by your publication.

Carol Ann Getz
Monte Vista, Colorado

Editor's note: Thanks for your subscription and your query. Yes, I am interested in contributed pieces on conservation and environmental issues. And I do like to have good photos, particularly if they document what you are writing about. The paper obviously can't pay much but feel we can help aspiring writers and those in the conservation cause who are also operating on limited budgets. We, of course, appreciate donated articles when there is a subject in need of airing.

* * *

Editor:

Enjoy your paper very much. My daughter has used it at school for her reports on ecology and pollution. It has been a great help to her. The articles are very impressive and to the point.

I am sending my check for renewal of my subscription. Keep up the good work.

Sincerely,
Mrs. Le Roy Grochocki
Chicago, Ill.

HIGH COUNTRY NEWS

Published bi-weekly at 140 North Seventh Street, Lander, Wyoming 82520. Tele. 1-307-332-4877. **2nd class postage paid at Lander, Wyoming 82520.**

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Subscription rate	$10.00
Single copy rate	35¢

Box K, Lander, Wyoming 82520

Guest Editorials

Reprinted from The IDAHO STATESMAN, Boise, April 22, 1972.

Energy Use Outruns Supply

The U.S. energy crisis is the subject of public hearings and much discussion. Our tremendous consumption of energy is growing so fast it threatens to outrun the supply.

Aside from the short-term question of meeting demands of the next few years, there is another question.

How long can the U. S. and other industrial nations continue to increase their energy consumption at such rates - doubling them every few years.

The Club of Rome estimates that with the current rate of use, the world's known oil reserves will be exhausted in 31 years and the known reserves of natural gas in 38 years.

With continued growth of consumption rates, they would be exhausted sooner.

Our electrical energy consumption doubled in the last 10 years and may double again in 1980. With coal and nuclear power plants it may be possible to achieve those doublings, but the cost will be considerable.

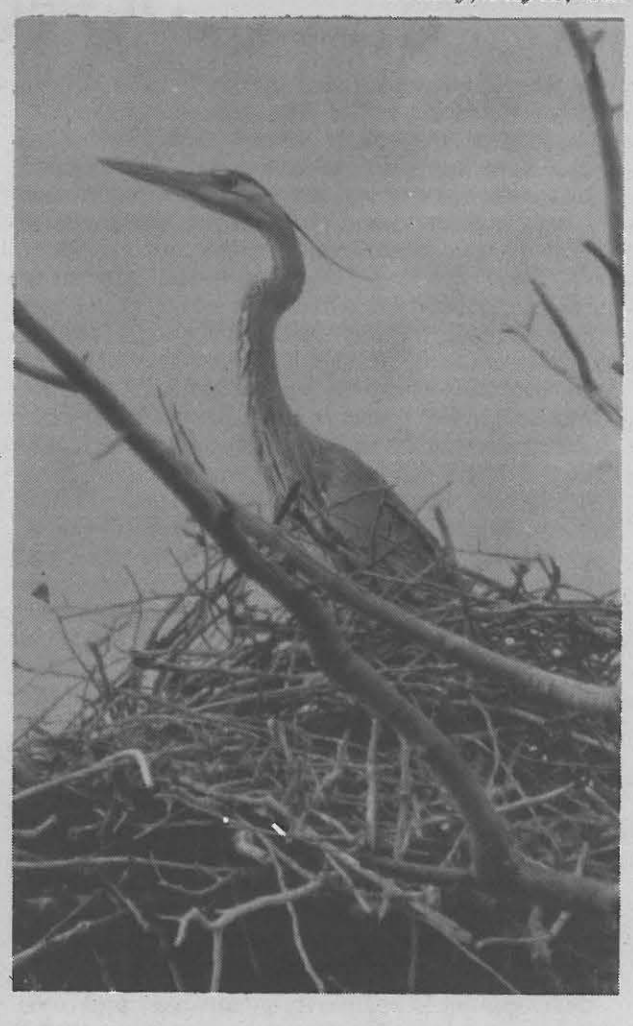
The energy situation lends support to people who are saying that industrial societies threaten to exhaust supplies of many basic resources within the next century.

As Adm. Hyman Rickover pointed out in a Congressional hearing, our policies are designed to stimulate the consumption of energy - not conserve its use. He suggested taxing heavy consumers. Rickover said the U. S. had gone on a "wild spending spree" with its energy sources.

Our policies have been geared to an assumption that there are no limits on supplies. S. David Freeman, former energy adviser to Presidents Johnson and Nixon said it doesn't matter that we may have 30 billion barrels of oil and more than 20 billion cubic feet of gas in Alaska, "our rates of consumption are now so large that we can see the bottom of the barrel."

An Interior Department official says the huge oil supply in Colorado oil shale fields could be tapped only at the cost of killing the Colorado River with acid wastes.

The U. S. energy problem may reflect the broader challenge faced by industrial nations in a world of limited resources. While we search for new sources of energy we must also search for policies to prevent consumption from outrunning the earth's supplies.



Reprinted from the DESERET NEWS, Salt Lake City, May 15, 1972.

Match Deeds to Words

The Nixon administration has long insisted that Americans can have both a cleaner environment and increased production instead of having to choose between the two.

With its decision this week to push ahead with the proposed trans-Alaska oil pipeline despite the objections of conservationists, the time is at hand for the administration to match its deeds to its words.

To be sure, Secretary of Interior Rogers C. B. Morton is saying all the right things: That the administration is aware of the risks to the environment from piping hot oil over frozen tundra. That steps will be taken to guard against leaks from the pipeline and against spillages from oil tankers at sea.

Those assurances would sound more convincing, however, if public hearings had been held on the project's final environmental impact study instead of pushing doggedly ahead.

The assurances would also sound more convincing if the administration hadn't been more concerned than even the Canadians seem to be about the difficulties in agreeing to an alternate route for the pipeline through Canada.

Even so, it still takes a severe case of tunnel vision to see the pipeline decision - as some congressional critics do - as nothing more than a victory of the oil interests over the public interest.

It seems no accident that the decision to proceed with tapping of Alaska's oil reserves comes during a week when the U. S. came as close to full-scale war as it has in quite some time. Nor does it seem an accident that the decision comes when there's serious talk of possible Soviet moves to increase tensions in the Middle East in retaliation for U. S. military moves in Indochina.

The U. S. is so dependent on oil from the Arab world that tensions there could really hurt. In case of full-scale war, America's needs for oil would become greater as the chances of obtaining it from foreign sources become impaired.

If the U. S. really wants to become self-sufficient in oil, it ought to become more aggressive about unlocking the vast reserves of oil now shut up in the oil shale lands of Utah, Colorado, and Wyoming.

Likewise, instead of having vital decisions on fuel and power made on a piecemeal basis by literally hundreds of agencies at all levels of government, the U. S. ought to formulate a long-range energy policy.

Moreover, if such a policy is to be administered sensibly, the many federal offices now dealing with energy matters ought to be consolidated into a single Department of Natural Resources.

With the need for fuel and power growing faster than the population, the administration's impatience to get Alaska's oil out of the ground and into use in understandable. But the need for a clean environment is growing just as fast, and the supply is limited, too.

If these two demands are really to be harmonized, the U. S. will have to oil some of its rusty administrative machinery.

Reprinted from The IDAHO STATEMAN, Boise, May 9, 1972.

Change of Policy Needed

The National Environmental Policy Act of 1969 was passed by the Congress and signed by the President with great fanfare. It has had an impact - requiring an environmental impact statement for federal projects.

This act has been cited in various lawsuits. Federal agencies have been asked to justify proposed projects under terms of the act (NEPA).

Now there is a reaction which can be summarized something like this: it's all right to talk about environmental concerns, but let's not do anything about them.

Now numerous bills and amendments are proposed to exempt federal agencies from complying with NEPA.

One would permit the Atomic Energy Commission to issue an "interim operating license" without filing an environmental statement (HR 13752). Another would allow the President to suspend compliance with the law for a period of 180 days. (HR 14137).

Provisions of NEPA would be skirted by two power plant siting bills (HR 5277 and HR 10066).

A Senate bill (S 3381) would set up regional commissions to administer public works precincts. Authorized projects would not need environmental impact statements.

Amendments being drafted for the Highway Transporation Act would eliminate a requirement of environmental impact statements for highway projects.

The act requires the environmental consequences to be considered. It does not necessarily prevent projects from proceeding, even if environmental consequences are severe.

Will the administration and the Congress retreat from their past expressions of concern for the environment? Or was NEPA when it was enacted regarded as nothing more than window dressing?

One of the reasons for the assault is concern about energy supplies. Our society's tremendous appetite for energy threatens to outrun supplies - with or without environmental considerations.

Instead of attacking the environmental laws, some thought should be given to policies to slow down the fantastic rate of increase in energy consumption. Perhaps the present pattern can continue for another few decades, but some fuels could be exhausted at the end of that time.

The basic problem is not NEPA but the tremendous rate of increase in energy consumption, fed in part by public policies which encourage consumption rather than conservation of energy supplies.

Call For Action

The following is excerpted from MOUNTAIN LAUREL, a Sierra Club Chapter bulletin from the southeastern United States.

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The tragic and unnecessary waste of land resulting from strip mining operations carried out in disregard of after effects and without reclamation has prompted, in months past, the introduction of 19 proposals for Congressional control of strip mining. In brief, two main bills have been presented - HR 4556, sponsored by Rep. Ken Hechler (D-WVa) and 93 other Congressmen, and HR 4704, sponsored by the Administration.

Hechler's bill would abolish all surface coal mining within 6 months after enactment, and would strive to reclaim lands previously damaged. HR 4704 would apply to all forms of mining of all minerals and would require, instead of a flat prohibition of surface mining, that environmental protection and reclamation regulations be met. This prohibition of stripping versus stripping with proper controls and reclamation is the basic difference between the two bills. There are other differences, such as the provision in Hechler's bill which would prohibit mining in Wilderness areas, and the administration and penalties in both.

The following statistics have contributed to the presentation of 19 separate bills for decisive Congressional action:

1) By 1971, an area the size of Delaware and Rhode Island combined had been strip mined in the United States (U. S. Geological Survey, 1971).

2) By 1970, 1,024,000 acres of strip mined coal lands lay unreclaimed (Department of Interior, 1970).

3) By 1970, 145,146 acres of lakes and ponds had been adversely affected by acid and siltation produced from strip mining (Department of Interior, 1970).

4) In 1969, $28,165,500 was the estimated cost of sediment control for one strip mined area of the Coal River watershed in West Virginia (U.S. Soil Conservation Service 1969).

5) $8,000 to $10,000 per acre may be required for reclamation processes after land has been strip mined (Peabody Coal Company).

6) $15.5 million worth of strip mined coal came from Tennessee during fiscal year 1970; the state has no mining tax and therefore received none of that money back for reclamation funds (The Nashville Tennessean, Sunday, Sept. 12, 1971).

House and Senate Hearings on all strip mining bills have been completed since December 2nd. The subcommittee reports must now be compiled and House and Senate bills will go before the floors for a vote. The success of a comprehensive bill with some teeth, however, may depend on your response. A grass roots flood of letters to your Congressmen may just make the difference between more devastation of land and a sane mining policy with controls and strong reclamation requirements.

Scientist Paints Grim Picture

The following article appeared in the May 16 issue of the Laramie, Wyo., **Boomerang:**

A grim picture of vacant factories, silent machines and heatless homes has been painted by a University of Wyoming professor who warns industrial and government leaders alike that we are running out of fuel.

Citing the need for increased funding of research directed toward more efficient use and conservation of fuels, E. J. Hoffman, associate professor and research engineer with the Natural Resources Research Institute (NRRI) at the University of Wyoming, told Congressional leaders recently, "We are only buying time . . . in the end, we are going to have to rely on solar-derived energy.

"A synthetic fuels industry along with power generation may ultimately account for nearly 10 billion tons of coal per year. Inasmuch as our present estimated strippable reserves are only 114 billion tons, this ready resource could be exhausted within 10 years," he said.

Hoffman called for a "pattern of energy conservation," saying there should be emphasis on more efficient use of fuels, even rationing, and more efficient means for power generation. He proposed that a comprehensive energy policy be instituted and followed, with the necessary funding, to obtain the optimal use of all energy resources.

Traditionally, government funding is required, " Hoffman said. "On the other hand, more immediate applied research and development is ordinarily generated by private industry, oriented to the consumer. Thus, if the private sector is in the business of acquiring coal reserves, for instance, it should probably also be in the business of funding and supporting coal conversion research and development. The alternative may become the rationalization of the fuels industry."

The United States is estimated to have some 3,000 billion tons of coal reserves, of which only 114 billion tons are strippable, The balance would be much more difficult to mine and would probably require in situ methods, that is, the coal would have to be converted to liquid or gaseous fuel on the spot.

Wyoming has the greatest reserves of coal in the country, with 546 billion tons. Of this, only 23 billion tons are considered strippable.

"The present fuels demand, if it came all from coal conversion, would require six to seven billion tons per year. And this is expected to double in less than 10 years. Thus, there is a situation which, theoretically, could exhaust Wyoming's strippable reserves in three years: the country's in only a little more than a decade," Hoffman pointed out.

"Our own governmental officials from Wyoming are very aware and concerned that a fuels crisis is imminent," he said, adding that he could not speak for other states.

"In the fuels industry, though, which should be most concerned, there seems to be a communications gap with top management. In other words, the policy makers have not yet got the word. At the higher levels of management, it is sometimes believed that a technology of coal conversion already exists, and that they can sign a contract tomorrow for a coal conversion plant. Such is not the case."

With regard to other natural fuels, Hoffman said, "We used to speak of some oil-producing state as Colorado, Wyoming, or Oklahoma having reserves to last the country x-number of years. Now these reserves would not even last one year.

"Reserve-production ratios show a steady decline. Present reserves of crude oil amount to about 30 billion barrels and we are using nearly four billion barrels per year. The north slope amounts to maybe 10 billion barrels. At a predicted doubling in rate, we would have to have a north slope discovery every one or two years just to keep even.

"We rely significantly on imports, and, while abetting our own resource consumption, over-reliance could stagnate the country's own fuel industry. It is a 'tightrope' sort of situation which has to be kept in balance.'

"The way it boils down is that a crisis or emergency has to actually occur before anything will be done. This seems to always be the case in any matter. But," he warned, "there may come a day when we will be satisfied just to keep warm."

More efficient means of converting coal to electricity are required, Hoffman believes. "At the present, in round figures, two-thirds of the fuel burned is dissipated as waste heat - only one-third of the potential power is realized while two-thirds is injected into the surroundings. This is not only a waste, it is a source of pollution and an unnecessary one, at that."

"Efficiency is one of the mitigating factors in resource and ecology conservation. We need a double-pronged attack - we need vehicles and appliances that operate at reduced levels of consumption and at increased efficiency - and we need to consume less power individually and develop power generation facilties that operate more efficiently."

In calling for increased awareness of the fuels crisis and increased participation in research to solve it, Hoffman charged that nuclear energy has been accorded a "Cinderella" status and caused work on fossil fuel conversion to be put off.

"Whether this disproportionate emphasis on atomic energy development was due to guilt feelings derived from creation of the bomb is now beside the point," he said. "But the fact remains that the atomic energy program has been funded at levels of the order of half a billion dollars a year, while coal conversion has been funded at about 15 million - reportedly less than the amount spent on public relations for atomic energy."

Hoffman feels the potential for development of nuclear energy has been idealized. "When we are told there is more energy in a block of granite than a similar-sized block of coal, or that a cubic mile of sea water contains some fantastic amount of energy, these are ideal values. Not brought into perspective is the efficiency of recovering and using this energy. It could be very possible that more energy could be spent in separation and recovery than is generated for end-use. What is needed to be known is how much other energy is introduced into the system in recovery, refining, etc., as compared to what is retrieved - not just what is hypothetically intrinsic."

A complete re-cycling of carbonaceous materials - which are, in effect, just stored solar energy - is envisioned by Hoffman whereby waste heat would be used to heat buildings or houses and also, combined with waste carbon dioxide from coal or other energy conversion processes, could be used to stimulate plant growth under controlled conditions as in greenhouses.

In his work with the NRRI, Hoffman and associates have succeeded in converting lowgrade coal into liquid fuel and gas. He has also used shredded waste paper and rubber tires, cow manure and polyethylene plastic containers - all carbonaceous materials - to produce a synthetic fuel.

"While the organic waste materials might be put to better use as fertilizer, or recycled, it is nevertheless possible that processes and technology developed for coal conversion can be used eventually to aid in air pollution control and in solid-waste disposal and, at the same time, be integrated with agriculture. Greenhouses could use the carbon dioxide and waste heat to grow crops and the residue left from the conversion process could be turned back into the soil as nutriments or converted to additional fuel. In final analysis, solar energy - which is stored in all carbonaceous materials - may be the ultimate energy source."

. . . Speaks Out . . .

(liquefied petroleum gas) is tied to natural gas supplies and--while in temporary surplus--will ultimately suffer the same fate as natural gas.

To alleviate temporarily the prospect of shortages, increased rates will spur drilling. The reserves are finite, however, and in spite of rosy predictions in some quarters, the net results await to be seen. Foreign reserves are subject to the vagaries of international politics as well as balance of trade. All in all, the country may be out of significant petroleum reserves by the end of the century, and could be in serious trouble by the end of the decade, unless alternate sources of energy come into being.

Since World War II, nuclear energy has been touted as the answer, and large sums devoted to publicizing the good that could come from this devastating phenomenon. It now turns out that nuclear fission is inefficient energy-wise, poses a difficult radioactive waste problem, and has been fraught with sloppy construction practices.

The use of the fast-breeder reactor would convert the rest of the non-fissionable uranium to fissionable material and hence increase our nuclear energy reserves. In practice, the technical difficulties may not be satisfactorily resolvable.

The vast reserves of deuterium in sea water are a potential source of energy, by reaction with tritium in a fusion reaction. The tritium must be regenerated, a cycle which would utilize lithium, an element in finite supply. Moreover, the problems of containment may be insurmountable.

Coal (a hydrogen deficient carbonaceous material) is increasingly being sought as an alternate source of energy. If we were to depend completely upon coal in lieu of oil and natural gas, at anticipated conversion yields there would be required up to 10 billion tons of coal a year. The amount of mining and conversion involved at these rates can scarcely be imagined.

More significantly, however, there are little more than 100 billion tons of strippable coal--equivalent to 10 years' supply at these projected rates. The less easily recoverable underground coal reserves may be around 2500 to 3000 billion tons. At 50% recovery, this is equivalent to 150 years or less at projected rates--hardly a permanent answer.

Oil shale is another large energy source, but not as significant as the coal reserves. The mining is difficult and expensive, and disposition of increased volumes of retorted residue is an environmental problem.

In fact, all mining and processing is an environmental problem that will require some sort of compromise. Strip-mined lands can be restored--at an increased energy cost that will be borne by the consumer. On the other hand, the

(Continued on page 5)

Wyoming has the largest coal resources of any state - 546 billion tons within 6,000 feet of the surface. The Powder River Basin of Wyoming contains 95 billion tons of coal within 3,000 feet of the surface, and of this amount, a single county, Campbell, contains 62 billion tons. The Wyodak deposit, lying north and south of Gillette, Wyoming, contains 19 billion tons, all lying within a maximum of 260 feet from the surface. The coal beds, one of which is shown above at the Wyodak Mine five miles south of Gillette, have a maximum thickness of 130 feet and average about 70 feet. The seam shown above is nearly 100 feet thick.

Fish and Wildlife To Be Losers

State Fish and Game Department Director, Don L. Brown, has questioned some aspects of the proposed development of Montana's eastern coal fields. He points out that fish and wildlife may be the big losers in the extensive coal extraction by surface mining planned for many parts of the state.

"From our (Fish and Game Department) particular point of view, the fish and wildlife resource could lose 770,000 acres of excellent habitat and 2.7 million acre-feet of water," Brown noted. "It is certainly not too early to begin thinking of the impact this development will have on the fish and wildlife resources of southeastern Montana and the aquatic ecology of the Yellowstone and Missouri Rivers."

Recently the vast supplies of low-sulphur coal underlying much of eastern Montana have become in high demand. For the first time, industry, and especially electrical power generating plants, is feeling the pinch of sulphur emission restrictions and other air pollution controls.

Montana's coal which has a very low sulphur content is needed even though present coal fields are more accessible to the industry. Already railroads ship coal to places where such transportation costs were out of the question a few years ago.

In his regular column in **Montana Outdoors**, the official department magazine, Brown referred to the recently released North Central Power Study by the Bureau of Reclamation.

Brown said the NCP report points out that Montana's reserves will only last about 35 years. In the perspective of 100 years, the most short-sighted action we could allow would be to burn our coal in inefficient generating plants to be consumed as electricity in the midwestern United States.

Brown questions the study which, in his words, "unquestionably assumes that energy demands of this nation will continue to double every ten years and that we must prepare to meet that demand." He also notes that, "Some of the present frivolous and wasteful uses of electrical power were never discussed."

Brown quotes the report as saying efficiencies of the proposed power plants that will burn Montana coal to create electrical energy would only be "about 30 to 35 percent."

He then urged that Montana "doesn't blindly commit its valuable coal fields to an immediate and present demand for electrical power. Burning coal at 30 percent efficiency may rob future generations of resource development options not yet dreamed of."

The Montana Environmental Quality Council has reported the monumental development may create 300,000 to 400,000 new jobs in Montana. Although keenly aware of Montana's unemployment problem, Brown notes that there are not 300,000 people in eastern Montana and that most of the jobs will go to people from other states.

He said, "Because of this influx of people, jobs and money, the Montana you and I know may be about to disappear before our very eyes."

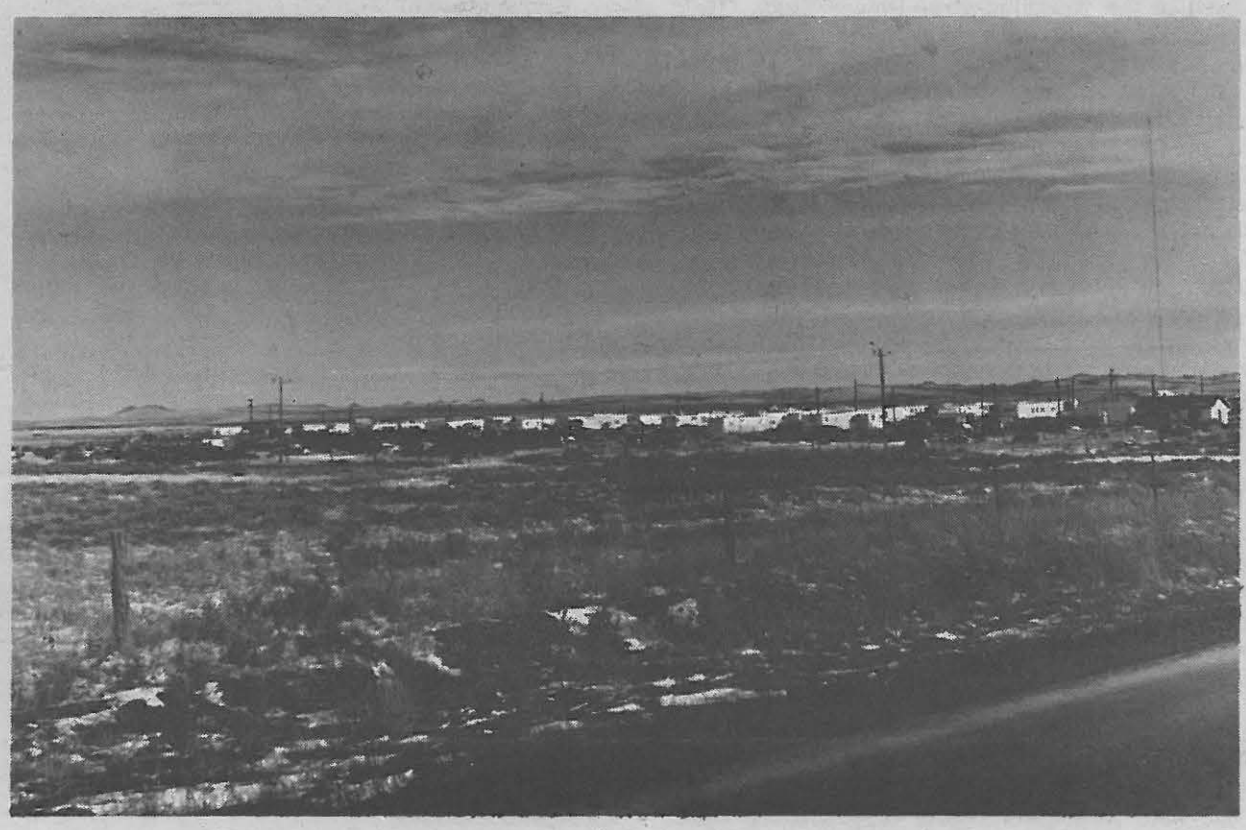
Brown pointed out that new industry means more people, but "good times" do not necessarily follow. More people create more demands on resources. They create demands for more public services -- schools, police and fire protection, sanitation, water systems, welfare, etc., etc. Funds for such public services are rarely fully paid from cities' treasuries.

He cited the fact that it is the larger, more heavily industrialized cities that have the greatest problems, economically and socially. "Therefore, it behooves those interested in Montana's prosperity to carefully scrutinize the concept to which we are about to commit our state," Brown concluded.

Salinity Cost High

The assistant commissioner of the Bureau of Reclamation, Warren Fairchild, told a water quality conference that control of salinity levels in the Colorado River could cost as much as $500 million over the next 30 years. He said the cost of the Basin-wide project would have to be shared by the federal government, states, and the farmers who get water from Bureau projects.

Fairchild predicted that water quality would eventually be controlled by federal legislation, and that land contributing too much salt to the Colorado River from irrigation runoff would be ordered out of production.



Gillette, Wyoming, has gained the dubious title of the city of "the mud, the blood and the beer." Oil activity (from great pools which lie below the coal) boomed the population from 3,580 in 1960 to 7,194 in 1970. Trailer-town additions lie all around the original small, prairie town, a condition which will only worsen as construction of huge gasification plants and steam-generating electric plants gets underway. The single township surrounding Gillette contains 2.87 billion tons of coal.

Scientist Speaks Out...

very great mining activity that will be required is something else. For instance, Wyoming, which is the state with the largest coal reserves, will no doubt welcome a few mines and conversion plants. But 40 to 50 , or 100, is a different matter.

The interdependency of all the factors involved prevents any black-or-white comparison. The stoppage of atomic energy power plant construction--solving a problem on, say, the west coast--will require substitute power from somewhere else: for example, coal-to-power in Wyoming, which can cause pollution or environmental problems for Wyoming instead of for the west coast.

Water is another factor to be considered. The generation of electrical power by conventional practices will reject about two-thirds of the energy as waste-heat. If possible, this is dissipated into streams or rivers. On a large-scale, environmental factors enter. There is needed a breakthrough in power generation. Such direct conversion devices as MHD (magnetohydrodynamics) and fuel cells offer the possibility of rejecting only one-third of the energy, and converting two-thirds to electricity.

A disadvantage of using coal to provide electrical power lies in the combustion process. Fly ash is produced and sulfur oxide emitted.Gasification first could alleviate these problems, since the ash and sulfur would be removed in conversion to gas. The gas would then be burned and be essentially non-polluting. An alternative would be pressurized combustion in which the pollutants could easily be processed and removed.

Coal conversion studies underway at the University of Wyoming have the potential of producing more economically a high-Btu gas for home or plant consumption. Additionally, various organic wastes have been gasified, including paper, tire rubber, plastics, and even manure and sewage sludge. Scale-up to commercial reality will require efforts beyond the scope of a university, and a great expenditure in funding.

Our country's problems are more formidable than an energy crisis, but this crisis may bring matters to a head. The ready availability of cheap and convenient energy (compliments to an efficient and active oil and gas industry) has permitted the build-up of population and life-styles which can, in the long run, no longer be accommodated. There must be a readjustment--hopefully gradual--but from an historical standpoint this change may be drastic and violent.

We will not be the first civilization to go through traumatic change. Spengler, in this book **The Decline of the West**, has noted that every civilization has a rise and fall. The Roman Empire is no doubt the most fully documented. Various aberrations are symptomatic. Spengler has discussed this for the arts. Pornography may be today's symptom.

Studies in the Department of Anthropology at the University of Wyoming, dealing with a case study of Easter Island, have determined a chilling sequence of events: population build-up, destruction of resources, tribal warfare, cannibalism, and ultimate restoration to equilibrium with only a small populace.

Studies on the behavior of rats under population build-up in restricted quarters present the case in microcosm.

Anthropologists such as Robert Ardrey are establishing that the human has biological characteristics, drives, and motivations that will erupt under abnormal conditons, just as do members of the animal kingdom. Man is not the Utopian creature that will adapt to some ideal or artificial standard.

We have had the attitude in this country that all technical problems can be resolved. It is now suspected that this is no more possible than that all our social or human problems can be solved.

It is very possible that we should try to seek simple, naturalistic solutions to our problems. From an energy standpoint, recycling of waste materials is one such solution. For example, organic waste may be used in part as a fuel source. It may be gasified, liquefied, or burned as is.

Coal conversion processes, as well as combustion processes, give off large quantities of carbon dioxide. In principle, the carbon dioxide could be recycled via photosynthesis to produce more organic, carbonaceous material as a crop or energy source. In effect we would be utilizing solar energy indirectly. After all, coal and oil or gas are but stored forms of solar energy.

Thus the sun can be regarded as the ultimate, natural, renewable energy source. And some limited study is underway to utilize solar energy either directly or indirectly. But, characteristic of research support in this country, efforts are necessarily fragmented. Large sums are spent overall, but usually not for a concerted effort. Rather, everyone gets a bit of the action. There is money for studies, but no money for development to commercial, practical realization.

An exception has been the case for atomic energy. Here, however, is a situation where alternatives should have been more strongly supported--instead, all the eggs have been in the one basket.

In sum, it is becoming apparent that efforts must be directed toward long-term solutions or adaptations to the very serious complications that beset all of us. One of the most important is that of energy. Resolution will require a re-orientation in thinking, life-styles, and in the relative importance of goals and aspirations. It is hoped that this transition will prove smooth instead of abrupt.

Coal Development Closer . . .

power will entail a network of aqueducts and transmission lines. These, in turn, require highways and railroad spurs.

The complex of industrial development will transform the entire region into a man-made landscape. In one of the understatements of the year, the Bureau of Reclamation says, "Construction of water supply facilities and associated development of the coal resources would change portions of the southeastern Montana-northeastern Wyoming area from a quiet ranching economy into a bustling energy producing or industrial based economy. Economic impacts will extend beyond the development area, to other states and the Nation. **Care must be exercised in the development of the resources to insure that the environmental and ecological traditions of the area are protected.**"

Many Montana officials are voicing concern. Wyoming officials are strangely silent.

Montana Senator Lee Metcalf wrote the Environmental Protection Agency on March 4 in regard to the North Central Power Study. He expressed some concern about the water requirements. The answer he got from Donald M. Mosiman, Assistant administrator for air and water programs of EPA (March 17, 1972) was enlightening. Among other things, his letter said, "The estimated water requirements of the power generation and coal gasification industries producing the 53,000 MW(e) projected electrical load by the year 2000, therefore, would consume approximately 75 percent of the available water resources within the study area."

Montana Governor Forrest H. Anderson wrote Congressman Joe Evins on April 6, 1972, expressing his concern. (Evins is chairman of the House Appropriations Subcommittee on Public Works.) A copy of the letter went to Governor Stanley K. Hathaway.

Anderson's letter said, " . . . Montanans feel . . . apprehension . . . toward the impending large-scale development of our coal and water resources." And he also said that in the development of Montana " . . . we substituted short-term benefits while ignoring long-term costs."

Anderson said he was not against the development of the coal and of industry, and asked that a feasibility study be funded. But he also recommended some changes.

He said alternate means of providing the necessary water should be more closely examined; he said more state participation should be required to ensure the alternatives considered are compatible with State needs and plans; he asked, does Montana have enough water in the Yellowstone Basin to allow a transfer of this magnitude; he said more consideration should be given to improved technology (dry-cooling) which could decrease water consumption; and he said, "A greater effort should be made to quantify the environmental costs related to the project and these should certainly be used in determining the cost-benefit ratio. Perhaps then we can begin to develop a realistic formula for the true cost of electrical power."

Anderson told Evins, "The aqueduct feasibility study must be accompanied by an adequate environmental impact statement. The magnitude of the coal development in terms of population alone (a projected increase of 250,000 in a state of 700,000) is enough that Montanans have a right to nothing less . . . clearly, the Bureau of Reclamation's environmental proposal does not in any way meet the test of adequacy . . . "

He suggested that because of the BuRec's dependence on water development projects for its existence that it not be designated to do the environmental impact study. He said, " . . . the lead agency should be the Environmental Protection Agency, ideally in cooperation with the two states involved." He said a major part of the study should be devoted to an adequate inventory of all natural resources.

Senator Clifford P. Hansen's legislation on a feasibility study designates the BuRec to also do the environmental impact study.

Governor Anderson said there must be greater state agency involvement. "One person from each state as compared to two from industry is simply not enough to insure the protection of state interests." He suggested a minimum of five from each state, representing various disciplines.

He told Evins, "Public involvement must be provided for but is not even mentioned in the Bureau's proposal. Any interbasin transfer of water will require legislative action in each of the three Yellowstone Compact States. Unless there is sufficient public support, such action is highly unlikely."

Finally, the Governor said, "As outlined, the environmental impact proposal does not even mention the human environment. A great deal of attention must be given to the needs of people for schools, water and sewage systems, police and fire protection, housing, etc. And there is the all-important question as to what follows after the coal reserves are depleted or the life of the power plants ended. These considerations should be given the highest priority. We cannot tolerate a repetition of the shanty town society that is the residue of coal development in the eastern United States."

So far as is known Wyoming Governor Stanley K. Hathaway has not expressed equal concern to that shown by Governor Anderson. There have been no public statements indicating knowledge of announced proposals or a resolve to act in the public behalf such as demonstrated by Governor Anderson. In a letter to the editor of HIGH COUNTRY NEWS (April 21, 1972), he states, "The State Government has no information that the construction of coal gasification plants or additional power plants is imminent."

Environmental Protection Agency Administrator William D. Ruckelshaus has also expressed concern. In a letter to Secretary of Agriculture Earl Butz (March 24, 1972), Ruckelshaus said, "I am deeply concerned that the increasing pressures on State and Federal agencies to permit development of these coal fields will result in a series of unilateral, uncoordinated decisions with a deleterious cumulative impact on the environmental, social and ultimately economic values of this region . . . Both State (Montana) and Federal representatives agree that existing coal development in this region is creating environmental problems for which solutions have yet to be demonstrated. Increased development can only compound these problems."

Ruckelshaus asked Butz for help in conducting a broad-based environmental study. He said, "Environmental impact statements prepared on a project-by-project basis in accordance with the National Environmental Policy Act are not adequate to evaluate the overall regional impact. What is needed is a comprehensive, systematic and interdisciplinary study of coal development in this region, similar to the Southwest Energy Study and the oil shale development program, which satisfies the letter and spirit of the National Environmental Policy Act."

Environmentalists in Wyoming had earlier asked Ruckelsahus for such a study. In a letter endorsed by 13 conservation groups and HIGH COUNTRY NEWS, dated February 29, 1972, they asked for an EPA study because "you are not directed to promote any one interest group." The groups are all a part of the Wyoming Outdoor Coordinating Council.

The letter said, "As far as we can see there is no other alternative which the citizens can call upon except the Environmental Protection Agency to do the comprehensive studies necessary to protect and direct the residents of the northern plains states on the coming problems and possible alternatives. Certainly, it is within our Agency's authority to initiate and coordinate a study along the lines of the Southwest Energy Study, and it is the formal request of those organizations signing this letter that such a study be started as soon as possible."

Montana environmentalists are also organized and calling for action. The Northern Plains Resource Council, a regional group representing landowners and environmental organizations, scheduled a Memorial Day weekend. During a whirlwind three-day tour, the group guided tours to Sheridan, Wyoming-Decker, Montana; the Sarpy Creek-Colstrip area, and the Bull Mountains.

Along with the inspection tours, a series of public meetings and seminars were held at Billings. Featured speaker was Richard Cartwright Austin, United Presbyterian minister from West Virginia and editor of the Appalachian Strip Mining Service. Austin later toured other strip mined areas in Wyoming.

Photo by Pat Hall

A lone buck antelope surveys the empty solitude of a Wyoming landscape. The northeast area of Wyoming, including the Powder River Basin, is one of the most important pronghorn antelope areas in the world. Campbell County alone furnishes over ten percent of the harvestable antelope in Wyoming. Of 43,100 antelope permits for the 1972 hunting season, 4,450 are issued for Campbell County.

Seven miles north of Buffalo, Wyoming, huge deposits of coal burned out and the earth collapsed. Into the naturally formed basin, waters from the nearby Big Horn Mountains drained. Today, Lake DeSmet is about four miles long and more than a mile wide. This photo, taken from Interstate 90, is looking northward. Beneath the hills in the background, across Lake DeSmet, are vast deposits of coal. They are estimated to contain some two billion tons lying close enough to the surface to be strip mined. Reynolds Metals Co. has proposed a $2.2 billion gaseous-diffusion, uranium enrichment plant at this site.

Hidden Story

by Steve Wynkoop

Denver Post Staff Writer

There's a story behind the story about the Montana-Wyoming aqueduct study.

It's a story of how the Bureau of Reclamation has distorted the Freedom of Information Act to serve the purpose of protecting the Bureau's flank from an increasingly concerned citizenry.

The federal Freedom of Information Act is really a very simple document. It says the public has an absolute right to know everything going on in government with the exception of military secrets and what's written in personnel records and interoffice memos.

Yet the Bureau of Reclamation steadfastly contended that a bound, soft-cover report on the proposed aqueduct study being circulated throughout the bureau was somehow a military secret, personnel file or interoffice memo.

It took an appeal by The Denver Post to Interior Secretary Rogers C. B. Morton demanding release of the document to get action. It was released May 8.

In administrative actions that might have been lifted from a Gilbert and Sullivan operetta, the Bureau has thrown a bureaucratic blockade in front of the people's right to know.

Plan reports and feasibility reports have to be sent through the Bureau's complicated command chain before they can be released to the public, say the Bureau's own administrative rules regarding secrecy.

And when Congress, wising up to this game-playing, told civilian federal agencies in 1969 to stop using what amounted to "top secret" stamps on government reports, the Bureau found a new way to thwart the public.

The Bureau ducked Congress by shifting their secret documents to blue envelopes - the envelopes didn't say the material was secret, but they told their story to wary Bureau employees well enough.

The same administrative rules allow Bureau employees to agonize over whether the general public ought to see Bureau records, but institute a nearly open records policy for wateruser groups.

"Records concerning Bureau-built works and relating to project business ordinarily may be furnished without charge or question when required by water-user organizations," say the regulations.

Yet, a paragraph later, the public gets put through "channels" asked for "written requests", and may be asked for "a deposit on estimated costs."

All of this relates to the crisis of confidence construction agencies like the Bureau are facing in their dealings with the public.

The Bureau might not be so "misunderstood," as bureau spokesmen frequently say it is, if it spent more time trying to find out what's in the public interest and acting on that, rather than massaging special-interest water-user groups and construction companies.

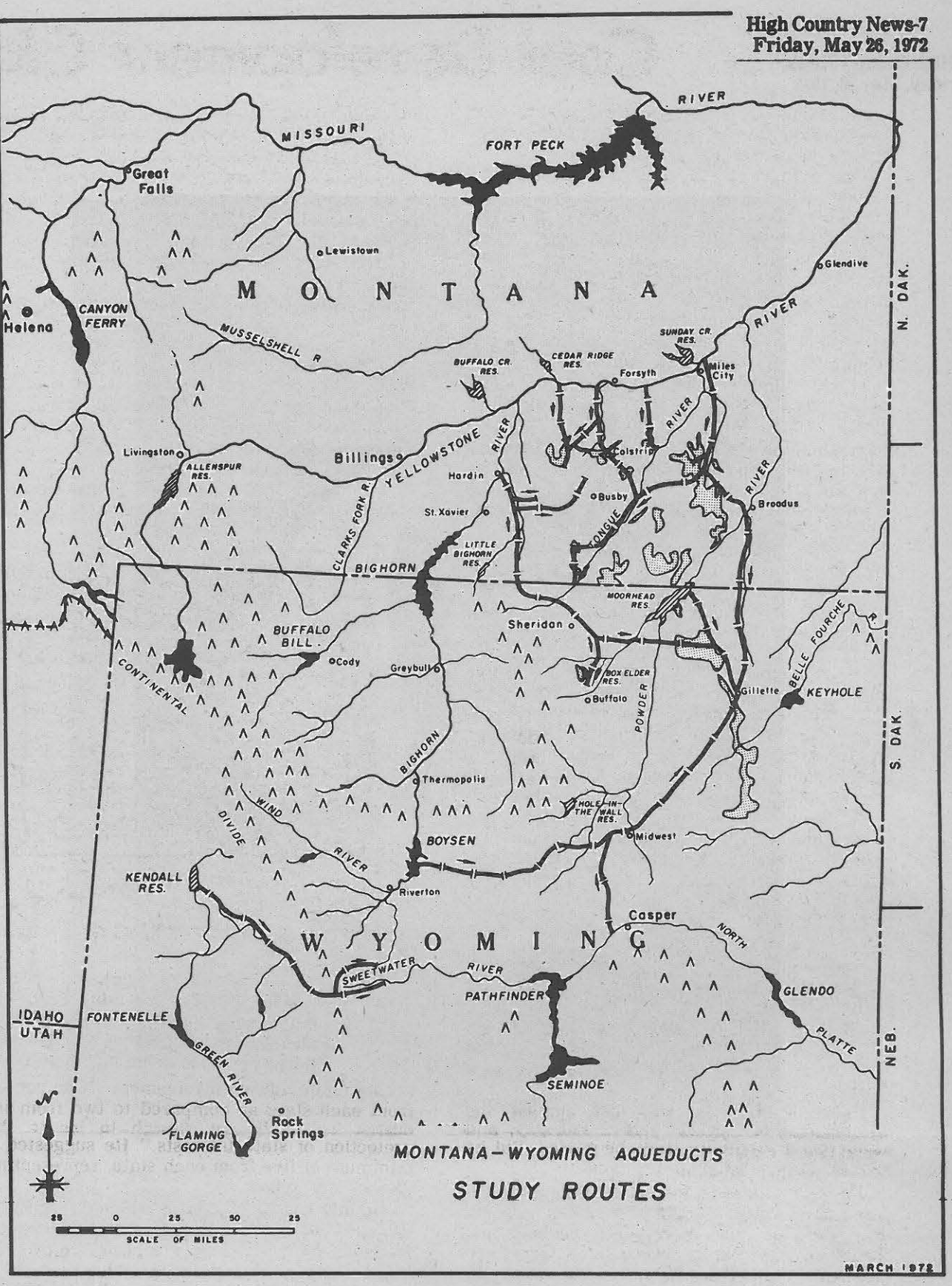
And letting the public in on the Bureau's little "secrets" might be a good place to start.

We won't pass judgment on the Bureau's aqueduct study proposal except to say that the public ought to be aware that the Bureau's plans will be carried out unless Congress tells the Bureau otherwise.

The Bureau will tell you it works the other way - that it's neutral and all depends on Congress - but that's not true. The Bureau needs projects like the aqueducts to stay in business and can be expected to use its full informal lobbying power to push the proposal through.

Harold Aldrich, the Bureau's regional director at Billings, Mont., put the energy industry on notice at a Denver meeting last fall that they would be expected to carry their share of the lobbying load.

In response to a question about what industry could do to assure aqueduct construction, Aldrich advised that industry lobby its congressional delegations.



Aqueduct Legislation Asked

WASHINGTON -- Senator Cliff Hansen has introduced legislation to authorize a federal study of the feasibility of constructing an aqueduct system to carry water to future industrial sites in Wyoming's arid Powder River Basin.

"It is essential that a feasibility study be made in the very near future if we are to provide for well planned, sound and environmentally compatible development of rich energy resources in southeastern Montana and northern Wyoming," Hansen said in introductory remarks.

He said the study would be conducted by the U. S. Bureau of Reclamation, and would include examination of the feasibility of possible aqueduct systems to deliver water to industrial points in Wyoming from the Green, Wind, Big Horn and Yellowstone Rivers.

Hansen said the Bureau had completed a preliminary appraisal study of the proposal, dubbed the Montana-Wyoming Aqueducts Unit of the Pick-Sloan Missouri River Basin Project. He said the Bureau had examined future resource development plans in the area, the fact that the water resources necessary to resource development were lacking, and had projected future demand, which will greatly increase as a result of planned development of coal deposits in northern Wyoming.

Hansen said the Bureau would undertake an Environmental Impact Study prior to completing a feasibility study, if authorized.

"The Powder River Basin contains substantial deposits of low-sulphur coal which can be developed to meet the ever-increasing energy demands of the American people," Hansen said. "But development of these resources requires water."

Reiterating his often-stated belief that a national energy shortage exists and will grow increasingly critical, Hansen warned, "When the full force of an energy crisis strikes, there is great danger that energy resources may be hurriedly developed without thoughful planning and control.

"That is why it is essential that we begin now to study and plan for the future if we are to prevent ill-considered action taken under great pressure at a later date," the Senator said.

Hansen said the proposed study area would include Sheridan, Johnson, and Campbell Counties in Wyoming, and Big Horn, Treasure, Rosebud, Custer and Powder River Counties in Montana. He said an estimated 34 billion tons of coal reserves have been identified in the study area -- 19 billion tons of which likely would be mined in the next half century. He said several energy companies had submitted applications to the Department of the Interior for use of water from the Big Horn Lake and Boysen Reservoir, and that there was a need for joint and comprehensive planning and analysis of alternatives to prevent piecemeal actions.

In a related action, Hansen testified Tuesday, before the Senate Appropriations Subcommittee on Public Works to ask that $400,000 be added to the government's fiscal year 1973 budget proposal to help finance the aqueduct feasibility study.

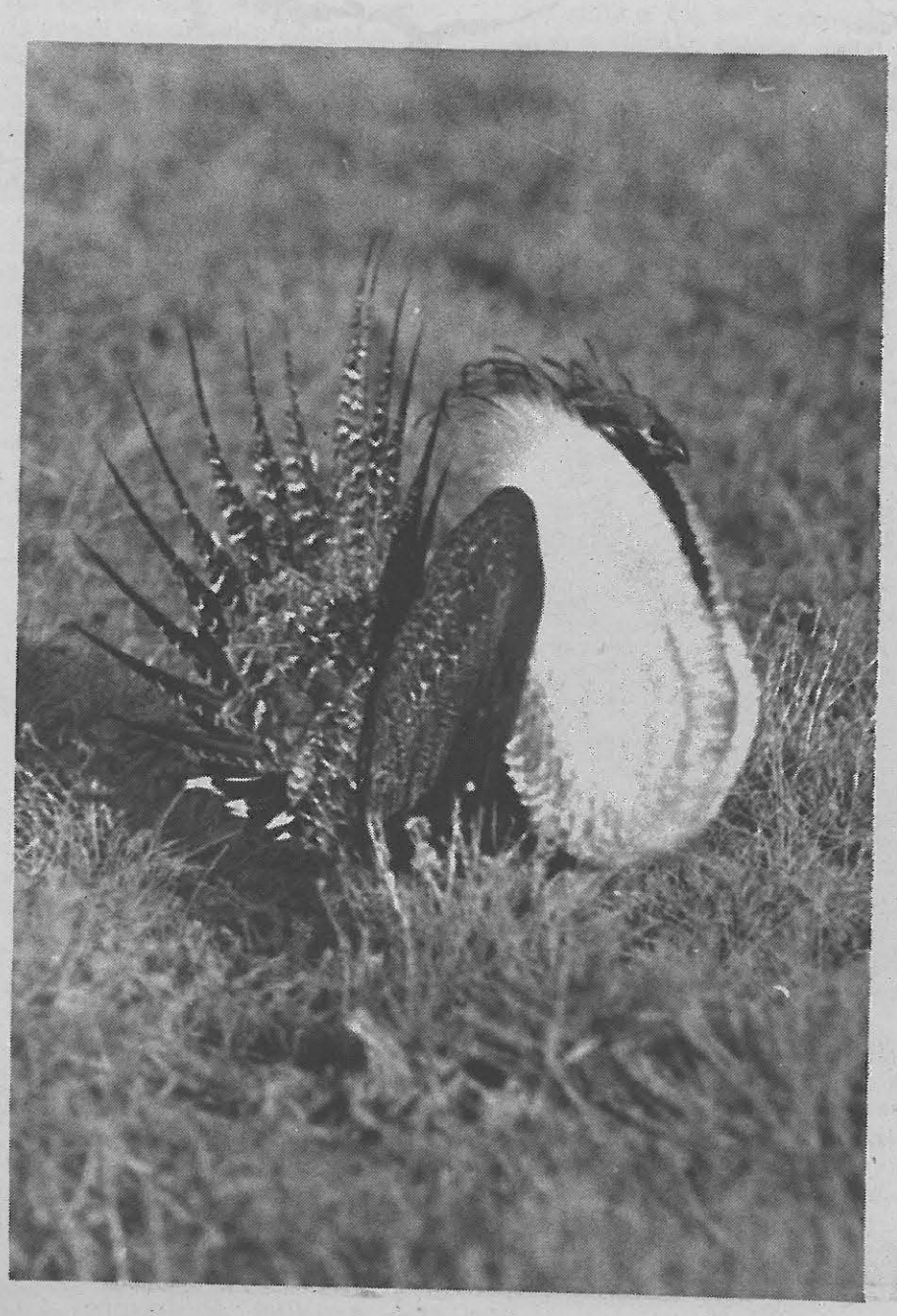
In a statement prepared for the same Subcommittee, Wyoming Governor Stan Hathaway also endorsed appropriation of the study funds, noting that the water supply needed for resource development projects in Wyoming was located some 200 miles from the site of the work.

"It appears that a common pipeline that could serve multiple interests would not only be the cheapest, but would also have the least impact on the environment," Hathaway said.

Oil Shale vs Deer

One of the oil shale areas nominated by the Department of the Interior in Colorado's Piceance Basin is one of the prime deer areas in the state. In spite of objections by the Colorado Game, Fish and Parks Department, Governor John Love endorsed a 5,130-acre isolated tract about 25 miles southwest of Meeker.

The Piceance Creek Basin is one of the great deer producing areas of the country. As many as 12,000 deer have been harvested from the 805,000-acre area in one season. According to a Colorado Oil Shale Advisory Report, an average of 6,000 deer have been harvested from the area annually from 1960 to 1969.



Seeds-

The Crow Indians called them Se
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man knew them well. The big birds
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Today, some of the Indian tribes s
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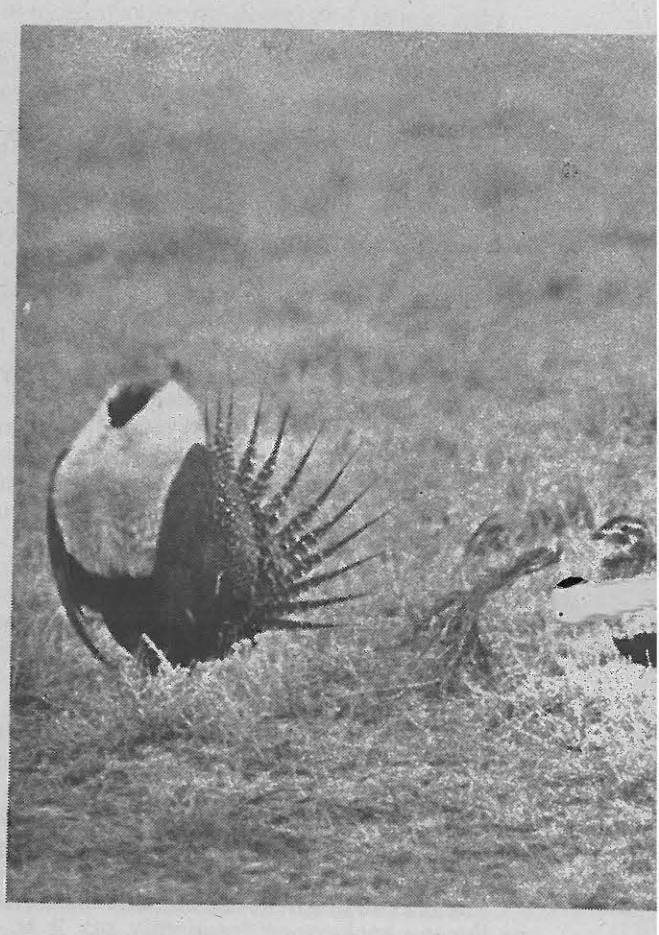
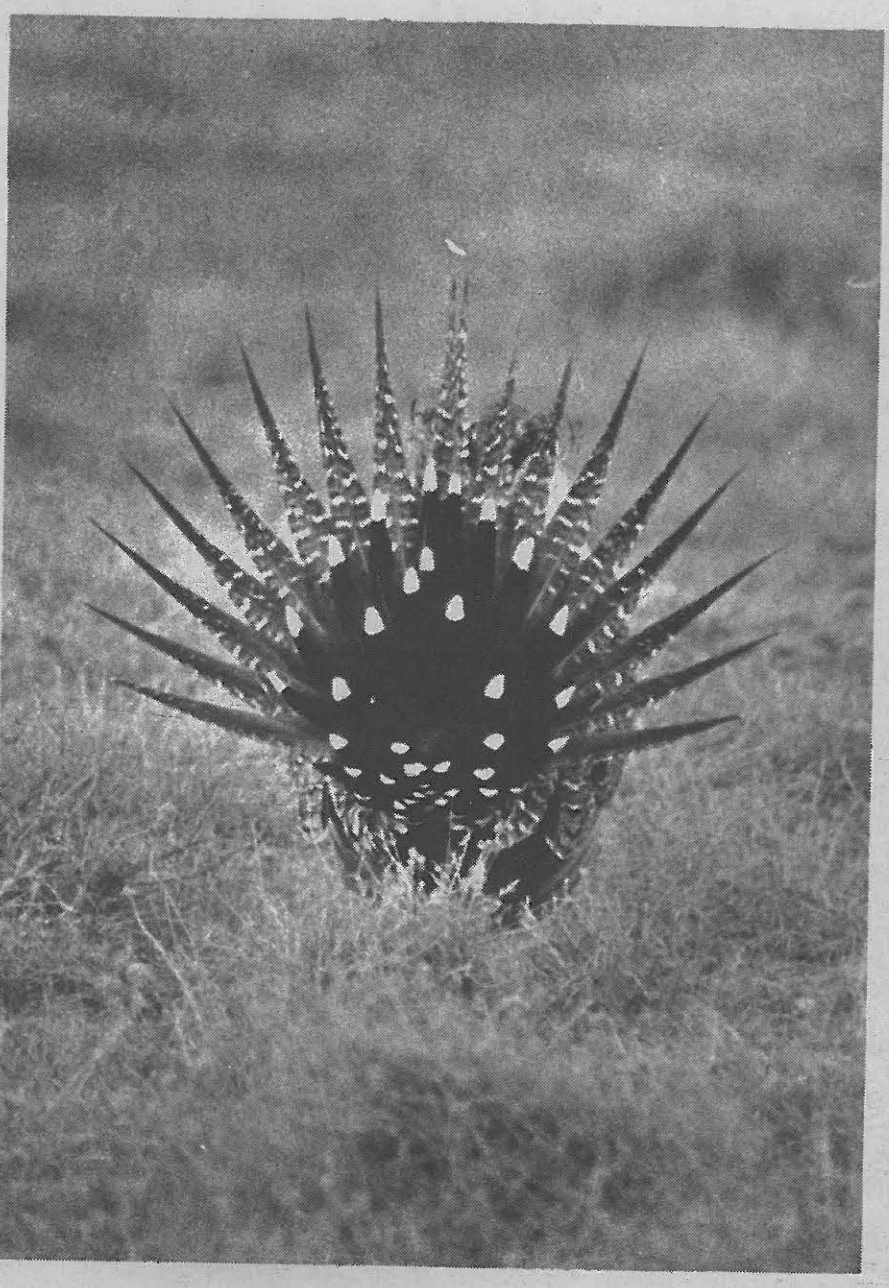
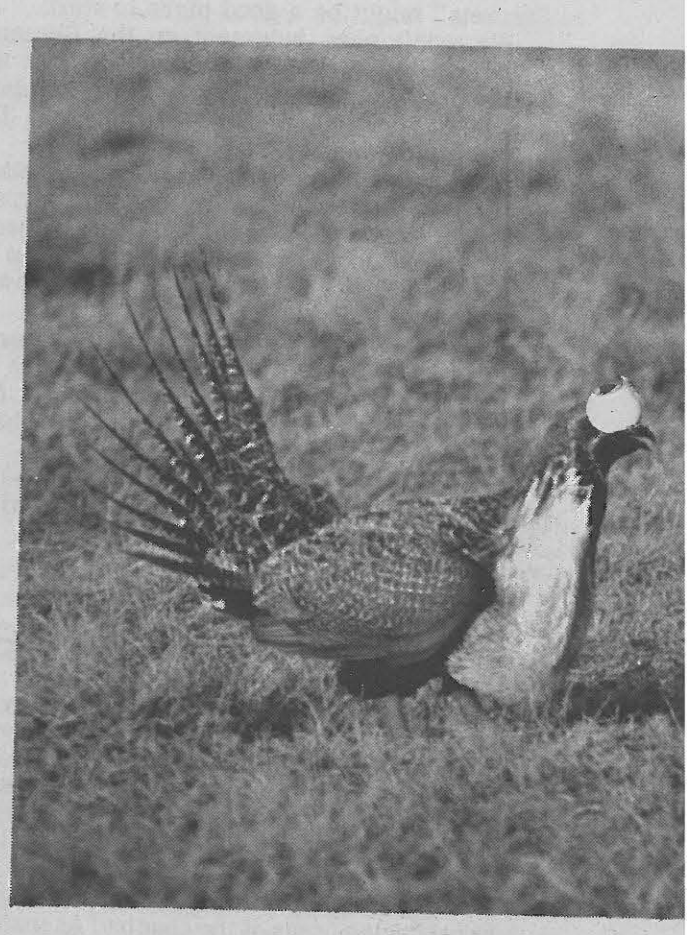


Photos by Char





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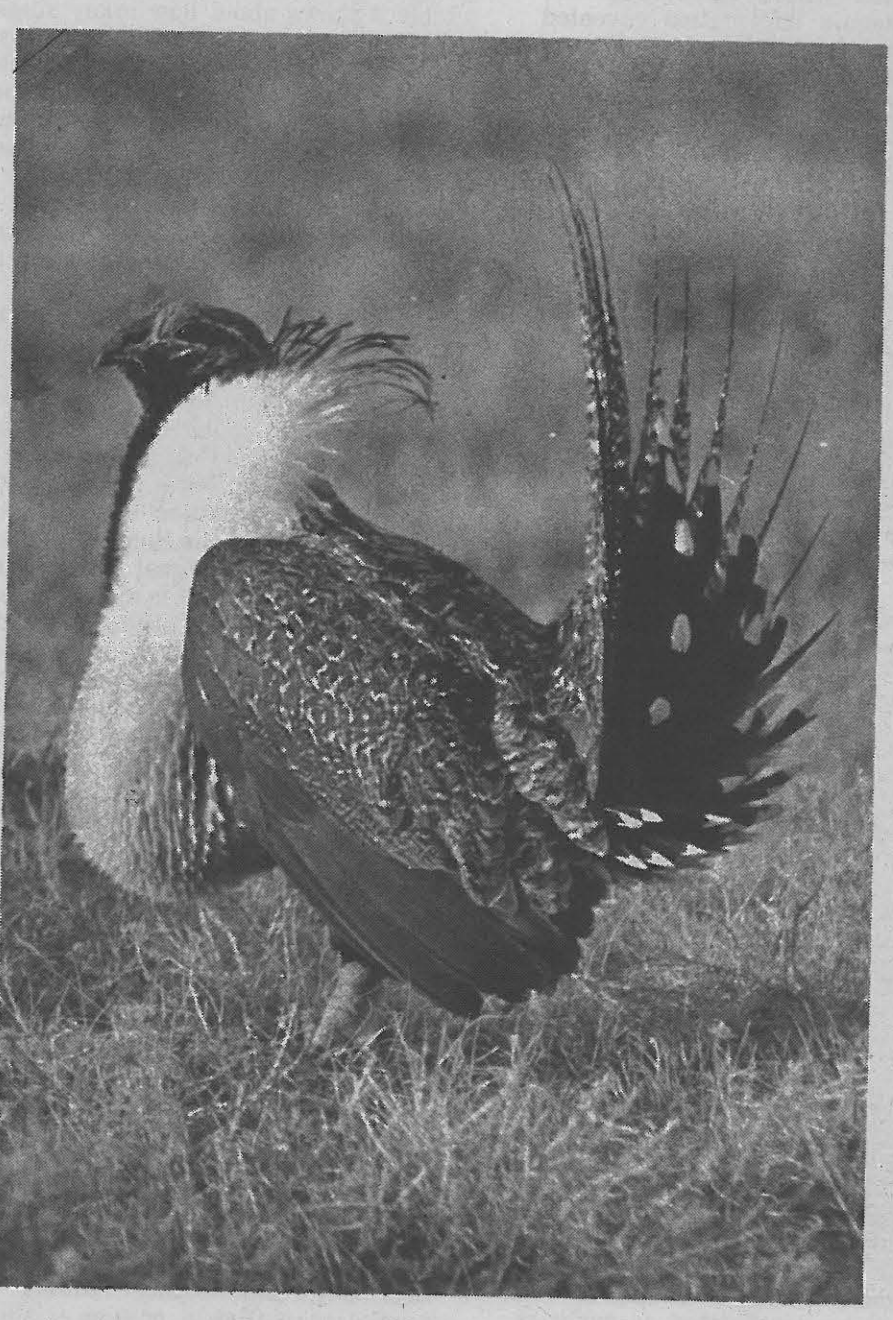

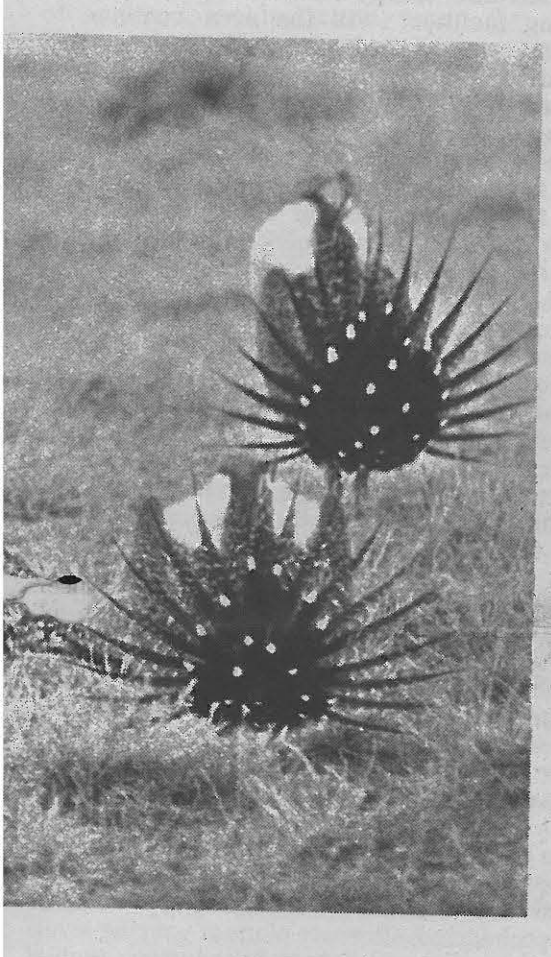

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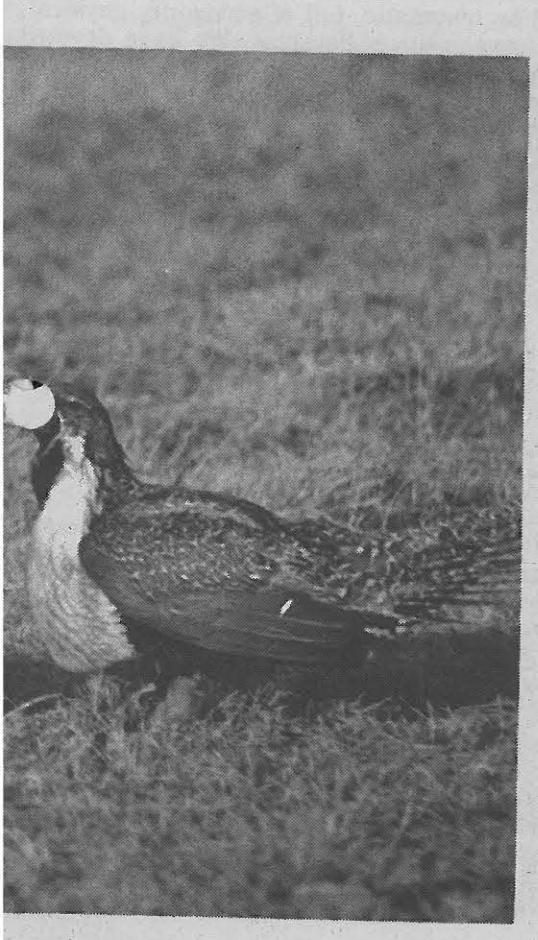

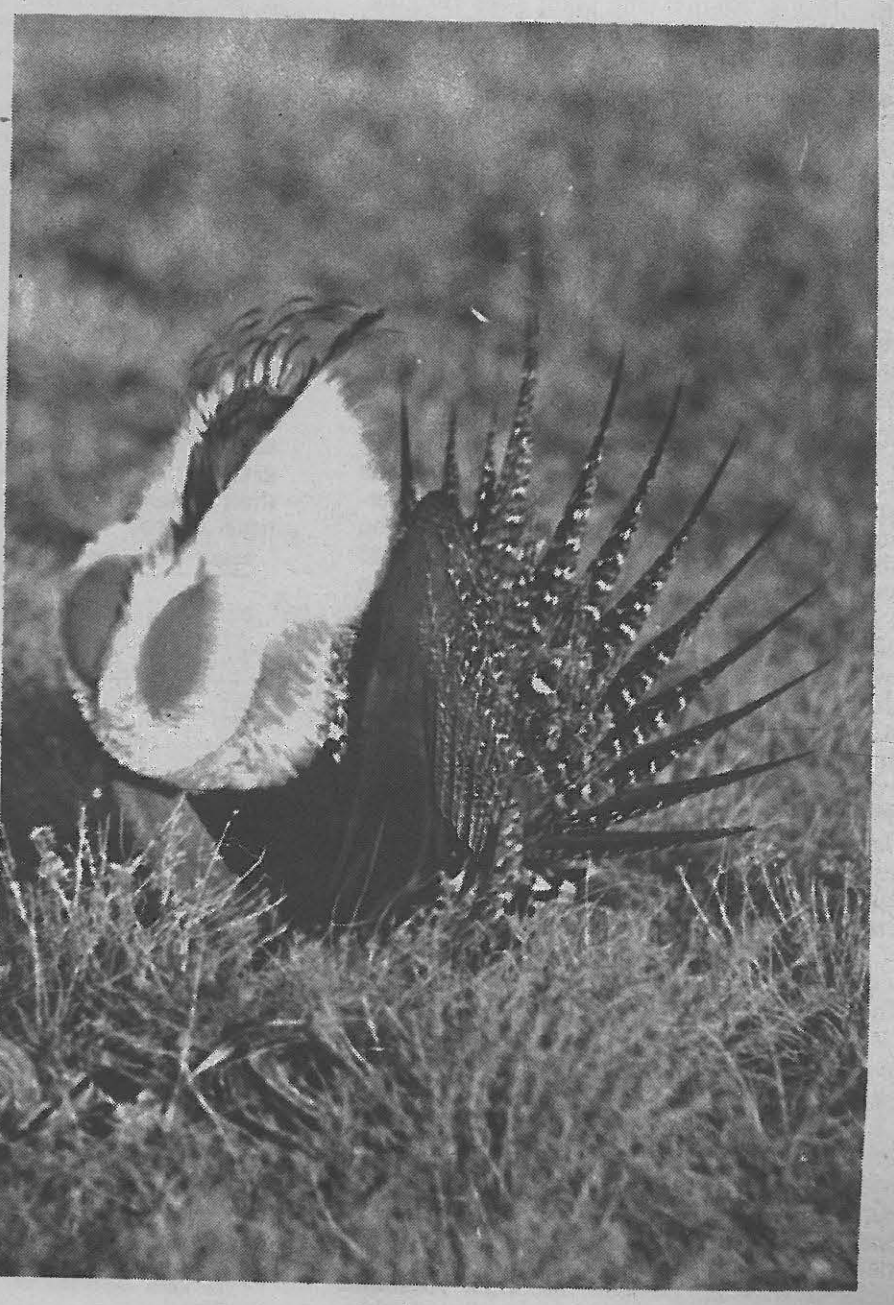

Valid Concern Expressed

The following was written by two men employed by the federal government who must remain anonymous. They are very close to the planning processes which developed the technical and economic information revealed herein, so the information is accurate and up-to-date. Their comments are indicative of the concern being shown for the course of events now taking place in southeastern Montana and northeastern Wyoming.

The editor.

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A review of the Eastern Montana Basins Study to date has revealed some trends in the development potential which we feel must be seriously considered at this time. These trends are based upon the following information:

1. The Montana-Wyoming Aqueduct studies have included delivery of water to the locations shown in Table 1, all within Montana.

Table 1 - Amount and delivery location of water under option by energy companies.

Location	Amount AF
Colstrip	10,000
Sweeney Creek	21,000 or 52,000
Crooked Creek	28,000 or 70,000
Pumpkin Creek	104,000
Broadus	104,000
Foster Creek	104,000
Crow Agency	30,000 to 60,000
Ash Creek	30,000 to 60,000
Hanging Woman Creek	180,000
Decker	180,000
Total Minimum	871,000 AF
Total Maximum	1,004,000 AF

Note: Table 1 does not include Sarpy Creek as that is discussed below.

2. A letter dated December 30, 1971, from HFC Oil Co. of Casper, Wyoming, requesting 50,000 acre feet (AF) from the Missouri River for two and possibly more 250-million-cubic-feet/ day (MCF) gasification plants in the vicinity of Bloomfield in Dawson County. One of these plants could be constructed as early as 1974. Approximately 3,000 men will be required for construction. Each plant, upon completion, could employ 1,500 people requiring backup goods and services represented by a city of 20,000 to 24,000 population for both plants.

3. North Central Power study outlined thermal generation plant sites in Montana representing 69,000-mw with plant sizes ranging from 1,000 to 10,000-mw. This development was projected to year 2000. It should be pointed out that the NCPS examined the growth of the electrical industries as a technical and economic study without consideration of the social, cultural and political aspects. This is not to detract from the study, but to emphasize that it can be used as a base for studies of a more humanistic nature.

4. Montana Power Company announced that its new 350-mw generating plant at Colstrip would be on line in 1975. This plant may employ about 250 people when in operation. Construction employment is predicted to be 400 men. Possible supporting community could be 2,500 to 3,000 in size.

5. Development is now taking place in the Sarpy Creek area on the Crow Indian Reservation. A generating plant and gasification facility are proposed to be operational by 1983 and 1984, respectively. Approximately 4,000 men will be required for construction and a work force of 800 could be required during operation. A supporting community of 8,000 to 10,000 people could be necessary.

6. Colorado Interstate Gas Company is slated to construct a gasification plant near Hardin, Montana. Although no size has been announced for this plant, presumably it could be as large or larger than the 250-MCF size, thus requiring about 3,500 men for construction and about 1,500 during operation. A supporting community of 12,000 to 15,000 could be required.

7. Coal production in terms of strip mining has increased from one million tons in 1969 to 1.7 million tons in 1970 and was four million tons in 1971. Predicted production in 1972 is eight million tons. By 1985 this industry could reach 20 million tons annually.

8. The coal fields of Montana contain between 22 and 30 billion tons of strippable coal. Based on the 22 billion tons, 71.4 percent lies within a 90-mile diameter circle within Big Horn, Rosebud, Custer and Powder River Counties. Another 24.3 percent lies in a 150-mile diameter circle in Wibaux, Dawson, McCone, Richland and Roosevelt Counties. This is significant when making predictions about the location of future plants and the associated supporting communities.

9. Based upon size and water requirements table 2 shows about how many single purpose and combination plants could be constructed in Montana coal areas based on the water options we now have. This table is hypothetical and developed from many assumptions, however, it does give an indication of what possibly could happen in eastern Montana in terms of population growth.

If the foregoing analysis is assumed to be valid within broad limits of possibility, eastern Montana could experience a rapid and large population increase in the near future, quite possibly within 10 to 15 years. The range of this increase, from the information available, is from 280,000 minimum to 912,000 maximum. The present (1970) population in Big Horn, Rosebud, Powder River, and Custer Counties is 31,125 with the largest town, Miles City, containing 9,023 people. The population of Wibaux, Dawson, McCone, Richland and Roosevelt Counties (1970) is 35,811 with the largest town, Glendive, containing 6,305 people. It is apparent that even the largest city could not absorb a rapid growth of even 10,000 people without creating an adverse impact upon the present population, government, service industry, educational institutions, and culture. This then is the main thrust of this document.

This region of Montana historically has been oriented in political, economic, educational, culutral, and social structure to agricultural.This condition is somewhat inflexible in that it does not compensate for rapid fluctuations or growth of other industries in the area. To help clarify the point further, a series of questions must be posed relating to the possible large population influx and the present conditions.

1. **Urban development.** -- Are existing sewer, water, housing, transporation, and other facilities capable of assimilation or expansion to accommodate large population increases? Is any group or agency doing any comprehensive planning to help assure an orderly development of these facilities? Will we permit, or do we want "shanty" or mobile home-type towns to develop around each plant as has happened in the past? Are city and county zoning and other regulations sufficient, or even existing, to assure the possible growth? Are new cities to be constructed, or will we let the old ones grow rapidly, creating an opportunity for urban blight and its associated social, political, and economic problems?

2. **Political systems.** -- Are the existing governments aware or thinking about their role in the development? Are these governments adequate or even necessary to assure orderly growth? Are the tax laws adequate to assure necessary public services? Are law enforcement and other protective agencies capable of growth to protect the public? Are all the present policies, laws, and regulations adequate, or will new ones be needed? Are the present county political boundaries adequate or even necessary?

3. **Educational systems.** -- Are the school systems capable of expansion to accommodate the growth? Are present curricula, administration and teaching methods in need of change or revision? Are the institutions of higher learning and trade schools able to expand to meet the new growth? Are the social, cultural, and educational facilities available, or is any group or agency studying these factors to assure their ordered growth and availability when the time arises?

4. **Transportation systems.** -- Are the present highway, railroad, and airline systems capable of smooth transition and growth? Will they be adequate? Will public or private systems bear the brunt of moving people and goods to and from work, to market areas and other places? Are the present means of distribution of goods and services adequate, or will new means of regulation and control be required? Are communication systems capable of expanding?

5. **Environmental.** -- Much has been published about strip mine reclamation, but not much thought has been given to other environmental factors. If new cities are to be built, where will they create the least impact upon wildlife, recreation areas, refuges, and so forth? Will they be conventional cities creating waste heat to be expelled into the atmosphere affecting the weather, or will they be internally environmentally controlled? How will the transporation systems affect migration routes, wildlife distribution, human distribution and future development Where will the people recreate?

6. **Future.** -- At the end of the useful life of the energy complexes what will happen? What will the land be used for? Will the cities created die? Can new energy forms be utilized in the existing facilties? Will the area continue to prosper or decline? What retraining and education, job relocation, etc., will be necessary? What about the incoming people in the near future?

These questions are by no means all that could be asked but they must be answered, or at least thought about within the framework of a possible plan of development. To help aleviate the many problems of this growth and to prevent a "shock" type impact, we must plan, even dream - now. We submit that to our knowledge this is not being done on a comprehensive basis at this time. We should seize the initiative and stimulate organized effort in this direction. Therefore, we propose the following steps be taken as one possible solution, keeping in mind the necessity for change, compromise, and flexibility to assure that the best possible job is done for the people of Montana.

1. Immediate steps should be taken to alert the congressional delegation through proper channels and ask for their advice and counsel.

2. Meetings should be scheduled with all concerned federal, state, local, and private groups to determine the degree of awareness of the scope of the potential situation and to ascertain that steps, procedures, and planning processes are being employed.

3. After a phase of data gathering to determine awareness, programs, concern, and interest, a multi-discipline planning task force (think tank) should be organized to formulate comprehensive, alternate plans at varying levels of anticipation and growth based upon factual data presented by the energy companies and local, state, federal, and private interests.

The point of this presentation is concern; concern for humans involved in a situation which could be traumatic, full of economic, physical, and psychological harships. We have devoted much study and effort to the technical and economic aspects of this situation, let us also devote some effort to assuring an optimum quality of life for the people involved during this anticipated period of growth.

Table 2 - Supporting Community and Employees by Facility - Montana

	Number of Plants	Each Plant Employs	Total Number of Employees	Supporting Community Required by Each Plant	Total Possible Population Increase incl. Employees
871,000 AF					
Coal Liquefication Pl 100,000 B.P.D.	40	2,000 to 3,000	80 to 120,000	15,000 to 20,000	600,000 to 800,000
MHD Generation Pl. 3,000-mw	42	1,500	63,000	12,000 to 15,000	504,000 to 630,000
Gasification Plant 250 MCF/D	33	800 to 1,500	26,400 to 49,500	8,000 to 12,000	264,000 to 396,000
Combination Complex Coal Liq. 100,000 BPD. MHD Gen. 3,000-mw. 250 MCF/D	12	3,000	36,000	20,000 to 24,000	240,000 to 288,000
1,004,000 AF					
Coal Liquification Pl. 100,000 BPD	43	2,000 to 3,000	86 to 129,000	15,000 to 20,000	645,000 to 860,000
MHD Generation Pl.	49	1,500	73,500	12,000 to 15,000	588,000 to 735,000
Gasification Plant 250 MCF/D	38	800 to 1,500	30 to 57,000	8,000 to 12,000	304,000 to 456,000
Combination Complex Coal Liq. 100,000 BPD MHD Gen. 3,000-mw 250 MCF/D	14	3,000	42,000	20,000 to 24,000	280,000 to 336,000

Note: Population requirements for supporting communities are based upon ratios ranging from 6:1 to 10:1 for each employee of the plant. This size community would provide adequate services and support for the plant.

Reprinted from ROMCOE Open Space Report, March-April, 1972.

High Country News-11
Friday, May 26, 1972

Conservationists of the Year

Environmentalists from Montana, Idaho and Colorado carried off the honors in ROMCOE's 1971 award program. Ken Wright, president of the ROMCOE Board, and Senator Gordon Allott presented the winners with their plaques at the Second Annual ROMCOE Dinner held in Denver on March 6. Over 600 Denver area supporters of ROMCOE attended to salute the honorees and to hear the main speaker of the evening, Ian MacGregor, chairman and chief executive officer of American Metal Climax, Inc.

Edward Butterfield, Aurora, Colorado, biology teacher received the 1971 award for leadership in environmental education. In his career with the Aurora public schools, Butterfield has served as a sponsor of the high school biology club, increasing the ecological awareness of the student members. He also is head teacher of a summer outdoor education program aimed principally at children from low income families. Since 1970 Butterfield has been director of the Plains Conservation Center, an outdoor laboratory for the study of the natural environment. He programs a variety of field trips through this three square mile prairie.

The citizen environmentalist award, which carries a cash prize of $500 was shared by Scott Reed, an attorney from Coeur d'Alene, Idaho, and Annette Tussing of Clarkson, Washington. Reed has brought an environmental viewpoint to the Idaho Water Resources Board in taking a stand against the Lower Teton Dam. As chairman of the Coeur d'Alene Planning Commission, he achieved passage of a town sign ordinance. He has lent his legal expertise to many other environmental projects.

Annette Tussing has devoted her talents as a writer, photographer and lecturer to preserving the Hells Canyon section of the Middle Snake River in Idaho. Wide circulation of her articles and photographs have informed people throughout the country of the need to preserve the unique beauty and wild character of the Snake.

The Savings League of Colorado won the business and industry award for its sponsorship of two Environmental Housing Conferences. Representatives of the construction and housing industry from throughout Colorado attended the 1970 and 1971 conferences which dealt with new ideas in land development and subdivision planning. The Savings League, a savings and loan industry trade association, was commended for its leadership in promoting more environmentally responsible housing patterns.

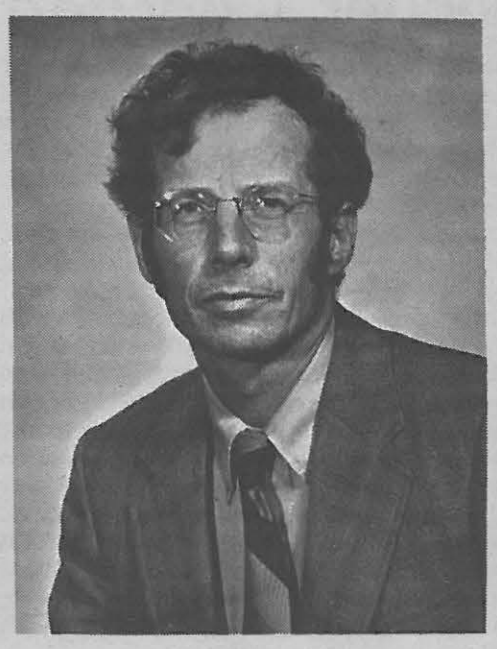
Rowene Danbom, recipient of the media award, was selected for her work in uncovering and publicizing the threat to public health created by the radioactive tailings used in Grand Junction housing construction. Mrs. Danbom, Public Relations officer of the Colorado Department of Public Health, was one of those principally responsible for the nationwide attention finally received by this long-brewing problem.

The government award was presented to an individual, Robert S. Morgan of Helena, Montana, and to a city, Littleton, Colorado. Morgan, supervisor of the Helena National Forest, has worked long and hard to protect the Helena Forest from clearcutting and invasion by motorized vehicles. He has been active in seeking wilderness classification for Forest Service lands and has assisted citizen efforts to get better resource management and land use of federal lands.

ROMCOE recognition went to Littleton for its innovative Littleton Plan, containing land use recommendations and flood plain management plans. Under this plan the City will purchase and preserve as open space and park a two-mile stretch along both sides of the Platte River. Army Corps of Engineers' plans originally called for channelization of the river which would have permitted construction in the flood plain zone right up to the banks of the river. Under the leadership of Larry Borger, former town manager, the Littleton Plan was developed and approved by the citizens in a special bond election.

George Darrow of Billings, Montana, received the Hilliard Memorial Award for his key role in the passage of the Montana Environmental Policy Act. Darrow, a member of the state House of Representatives, now serves as head of the Environmental Quality Council, which was established by the Act. Montana is the first state in the Rocky Mountain region to have an Environmental Policy Act which should serve to better protect the environment of the state.

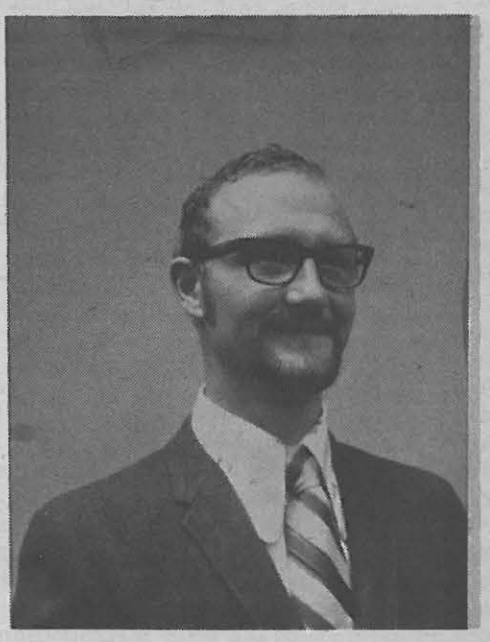
George Darrow



Scott Reed

Annette Tussing

Rowene Danbom



Edward Butterfield

Robert S. Morgan

Seeks Senate

George Darrow, Billings Republican and two-term Montana House member, is seeking nomination to the state Senate in the up-coming election. He is a geologist and consultant on resource management and land use. He has degrees in both economics and geology from the University of Michigan.

Darrow says he is interested in continuing his political career because Montana is at a "historic divide between the established patterns of the past and the avalanche of change that confronts us in the immediate future." He thinks Montana is soon to go through the greatest social and economic revolution since homesteader days.

He sees industrial development based upon coal completely displacing agriculture as the state's leading industry within 10-15 years. At the same time, he sees western Montana being converted to a recreation-oriented economy. This process he foresees as being a replacement of present-day Montana with Appalachian-like conditions in the east and California-like conditions in the west.

Announces Study

Montana Governor Forrest Anderson announced last week that agreement had been reached on a federal-state pilot study of coal-rich southeastern Montana. The study is a joint venture of the state with the Bureau of Land Management and the U. S. Forest Service. The comprehensive study will look at such physical features as topography and vegetation, and seek answers to such questions as, must top soil be replaced?

The pilot study will be done in the Decker-Birney coal areas, immediately north of the Montana-Wyoming line. A large open-pit mine is already in operation near Decker, and thousands of acres are under lease for coal.

Western..... Roundup

Rancher Charged

Herman Werner, large Wyoming rancher implicated last fall in the deaths of hundred of eagles by gunning from the air, has finally been brought to justice. He was charged May 11 by the Justice Department on a 374-count criminal information. Named with him was the owner of the Buffalo Flying Service, Doyle Vaughan, Werner's Bolton Ranch, and the Buffalo Flying Service.

Werner and Vaughan were charged with shooting 363 golden eagles, three bald eagles and seven Canadian geese. The shootings are alleged to have taken place on and over Werner's Bolton Ranch and the public lands he leases for grazing purposes southeast of Rawlins. The information says the killings took place from Nov. 18, 1970, to Jan. 11, 1971 .

Werner and Vaughan were charged in a 374th count with conspiring with 11 co-conspirators to kill federally protected birds. Amongst those named as co-conspirators was James Vogan, the helicopter pilot who testifed before a Senate sub-committee on the sordid killing of hundreds of eagles in Wyoming and Colorado. Other co-conspirators were various gunners who flew with Vogan on numerous shooting missions.

Several of the gunners have already appeared in Federal Court, pleaded guilty, fined and given suspended sentences. They are expected to be key witnesses in the government case.

The information file says the Buffalo Flying Service furnished a helicopter for one to five flights per day on various days. As many as 34 birds were killed on any one of the dates shown.

The conspiracy charge says Werner paid $15,000 for predator control, including $25 for each eagle. The information says that on Nov. 18, 1970, Werner ordered the eagles to be brought in to the ranch so he could verify the numbers. On Jan. 15, 1970, he ordered the eagle carcasses buried. The charges say Werner told Vogan that he had a permit to kill eagles.

Werner directed that the eagle killing be stopped about Feb. 15 because it was costing him too much.

Werner has already denied the charges saying he had nothing to do with the eagle killings. He said he had a verbal contract with Vaughan to kill "strictly coyotes." A cache of eagle carcasses was found on the Bolton Ranch.

If maximum penalities were assessed against Werner and Vaughan, they could each receive 187 years in prison and be fined $187,0000.

Bill Brown, a Casper attorney, is expected to defend Werner. Brown is the same lawyer who defended Werner's son-in-law, Van Irvine, in an antelope shooting charge last July, Irvine pleaded no contest to charges of killing 29 pronghorn antelope and loading the carcasses with poison. He was fined $675 and $4 court costs.

The bald eagle statues decorate the ranch-style town house of Herman Werner in Casper, Wyoming. He is charged with the killing of 363 golden eagles and three bald eagles.

Briefly Noted

Predator poisons shipped before the Environmental Protection Agency applied restrictions in March are possibly being used in Montana and Utah. EPA has requested seizure of some 870 sodium cyanide capsules from persons who bought them earlier, but without success. The capsules are used in "coyote getters." U. S. Marshals in Utah say one individual already had 100 cartridges "out in the boondocks."

* * *

Montana Representative John Melcher has endorsed a Forest Service proposal for a Regional Planning Commission centering on Yellowstone National Park. The Commission would develop a comprehensive land use plan for national park and forest lands in Idaho, Montana and Wyoming.

* * *

A temporary land use planning committee in Utah has recommended to Governor Calvin Rampton the immediate appointment of an executive committee on land use planning. The proposed commission would collect information, establish guidelines and draft proposed legislation to be presented to the 1973 Legislature.

W. D. Hagenstein, manager of the Industrial Forestry Association of Portland, Oregon, says bark beetle infestations could virtually destroy the beauty of Yellowstone National Park by killing all the trees. He says part of the solution would be to increase access, cut out infected and over-mature trees, and salvage the timber by logging.

* * *

Robert G. Thomas, president of the Idaho Wildlife Federation, has called for a state land use policy and legislation requiring a minimum set-back of construction from the shores of lakes and streams. Thomas also says all candidates for the state legislature should place their views on public record before the next election.

* * *

Utah's first designated wilderness area may be a pocket-sized, 15,000-acre unit which lies at the backdoor of Salt Lake City. Senator Frank Moss has sponsored a Lone Peak Wilderness Bill which would establish the area as a part of the wilderness system. The area lies southeast of Salt Lake City in the Wasatch Range and can be easily seen from the city. If established, it would be one of the few wilderness areas in the country within sight of a large metropolitan area.

Bill Approved

The Senate Interior Committee has approved a Sawtooth National Recreation Area bill which differs in several respects from legislation passed by the House. The Senate bill would withdraw the entire area included from new mineral entry, and prohibit the granting of patents on pending claims. House legislation only imposed a five-year moratorium on new mining claims.

The Senate bill also retains control of fishing and hunting in the State of Idaho, rather than relinguishing control to the federal government.

Authority would also be provided to condemn and acquire existing mining interests, provided just compensation is made.

The bill provides for an in-depth study by the National Park Service into the feasibility of establishing a national park at the higher elevations of the Sawtooths, White Clouds, Boulder, and Pioneer Mountains.

Bike Route Set

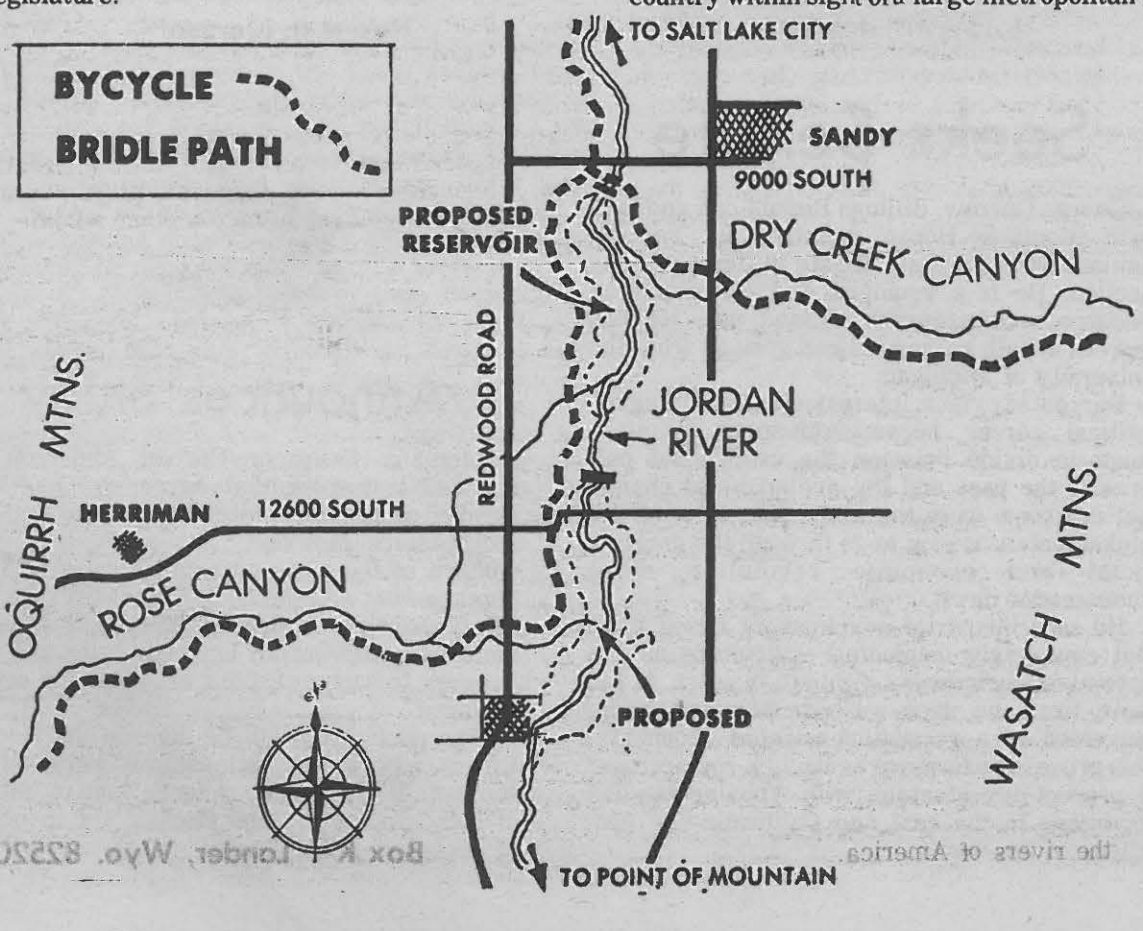
Salt Lake City, like many other large urban areas, is plagued with automobile congestion and air pollution. One of the city newspapers, the DESERET NEWS, has set a goal for 1972 of getting bike paths established. In addition, the paper wants downtown bike racks and safe routes to and from the downtown area.

In March, the City Commission formally designated a trial bike route. As the DESERET NEWS said in an editorial (March 22, 1972), "Last year, Salt Lake City spent more than $2 million on roads, and only a pittance - if anything - on bicycle routes."

The editorial observed, "Salt Lake City . . . could well take a lesson from what is happening in Maryland. A bill has been drafted to divert one percent of money raised from Maryland's gasoline and motor vehicle taxes to build bicycle trails and footpaths. The bill's authors figure this would divert about $760,000 next year into these pollution-fighting, health-promoting projects. Oregon also earmarks part of its gasoline tax for bike paths."

It added, "Who knows . . . surely bicycles and shoe leather also are forms of transporation and the users entitled to a modest portion of transportation fund revenues."

transportation



THE WILD WORLD

by Verne Huser

When are we going to learn enough about the wild world to stop building all these stupid dams? The Teton River dam will apparently go in now that the conservationists have lost their court case. Oh, they'll fight it to higher courts, but meanwhile, the bulldozers will be at work--probably 'round the clock so they can do enough damage that it won't be worth fighting to save.

But that's only one dam. Hells Canyon is still in jeopardy. Pacific Northwest Power Company hasn't given up on that one, the deepest river-cut gorge on the continent, and the amalgamation of power companies that make up PNP would build a pair of dams on the Snake that would kill forever the free-flowing stretch of river in that gorge.

No river is safe from the dam builders. Even the once mighty Colorado's course through Grand Canyon was under attack less than a decade ago. What major river is next? There aren't many left. The Salmon still flows unbound by any dam, and much of it lies in deep wilderness--though noisy jet boats run up and down its frothy waters.

Wild river status may be the best way we have to save the few remaining rivers. Wyoming Congressman Teno Roncalio recently added the Green River to the list of streams to be considered for such protection, in the teeth of Gov. Stan Hathaway's attempt to dam the Green so he can sell the state to industry. Roncalio's Bill (H.R. 11153) would designate the Green River in Wyoming "from its source in the Bridger National Forest downstream to the Fontenelle Reservoir, and its tributaries," under the Wild and Scenic Rivers Act of 1968. Wyoming's only real conservationist in Washington, Roncalio deserves the support of every responsible citizen in the state.

The Seattle Times (Nov. 28, 1971) carried a color picture on its front page showing a free-flowing section of Skagit River, which flows out of the North Cascades, and asked, "What would wild-river status mean for the Skagit and its tributaries?"

Herb Barth, the Forest Service researcher assigned to study the Skagit, says "There is no other river system in Washington like the Skagit."

Unlike the Green in Wyoming, whose banks are largely in federal ownership, the banks of the Skagit are 70% in private ownership. The river, again unlike the Green in Wyoming, is already dammed three times (Gorge, Diablo, and Ross -- the latter backing water up to the Canadian border and forming Ross Lake, a National Recreation Area in the heart of the North Cascades National Park complex).

Seattle City Light led the anti-wild-river forces in the 60's when the Skagit and its tributaries the Sauk, the Suiattle, and the Cascade were under consideration for inclusion under the Wild and Scenic Rivers Act of 1968. When that act passed Congress and was signed into law, eight American rivers immediately were declared "wild" including the Middle Fork of both the Clearwater and the Salmon in Idaho, the Rogue in Oregon, and the Feather in California.

Twenty-seven other rivers were recommended for inclusion at that time, including the Skagit in Washington; the Priest, the Bruneau, and St. Joe in Idaho; the Flathead and parts of the upper Missouri in Montana, and the Illinois in Oregon. Two years later (1970), when Walter Hickel was Secretary of the Interior, 47 other rivers were added to the recommendation list, including six Alaskan rivers.

Portions of the Grand Ronde, which is included in Senator Bob Packwood's Hells Canyon-Snake National River Bill (S. 717), and two of its tributaries--the Minam and the Wallowa--were mentioned. So too, was the middle Snake in hells Canyon--the key segment in Packwood's Bill--and the Imnaha (also part of the Packwood Package) all in northeastern Oregon. Other Oregon rivers mentioned were the Deschutes and the John Day.

Five Wyoming rivers were recommended: the Green (from its source to Horse Creek) and its tributary, the New Fork--both of which Gov. Hathaway would dam if he could get away with it--the Snake and its tributary the Gros Ventre, and the Clark's Fork of the Yellowstone. The latter stream is currently in jeopardy from the Wyoming Highway Department, which wants to build a new road down the spectacular canyon. The upper Gros Ventre would be included in Senator Cliff Hansen's Gros Ventre Wilderness proposal, and those portions of the Snake under consideration lie largely in Grand Teton National Park and in the Teton Wilderness.

Members of the Western River Guides Association have requested that the Colorado River flowing through Marble Canyon National Monument and Grand Canyon National Park and Monument be given Wild River Status since the Park Service has not seen fit to include the river in its proposal for Grand Canyon Wilderness. (Wild River Status for the Colorado in Grand Canyon would allow existing uses of motor driven crafts for float trips in the canyon but would exclude any dams or further development along the river.)

There are many ways to save a river, but none seems as sure and comprehensive as Wild and Scenic River status. Yet, Senator Packwood's proposed Hells Canyon--Snake National River would provide greater protection for the middle Snake in Hells Canyon, the lower Salmon, the lower Imnaha and Grand Ronde rivers than anything the Wild and Scenic Rivers Act can offer. It would also further protect the surrounding watersheds from overcutting

Wild World . . .

of timber and irresponsible mining development. It would open the area up for several kinds of outdoor recreation (part of its provisions involves the aquisition of the private lands in Hells Canyon, a vital move if the canyon is to be saved for the general public).

Certainly, the Wild and Scenic Rivers Act needs to be further implemented if we are going to save some of our finest rivers from total environmental destruction, if we are to save even important bits and pieces of them. But legislation such as the Packwood Bill is a further step in the right direction: thwarting the stop-gap-measure dam builders. Both measures need widespread public support. Only you can save the rivers of America.

Photo by Wyoming Game & Fish Dept.

The sharp-tailed grouse each spring perform a unique mating dance combining cooing and clucking sounds with some fancy footwork. The birds spread their wings to the side and point their tails into the air while dancing.

Dancing Is Spring Ritual

Birds thought to have inspired Indian dances long ago have once again begun their centuries-old mating calls and dances that are both unique and spectacular.

Four members of the grouse family found in Wyoming--the sharp-tailed grouse, the ruffed grouse, the blue grouse and the sage grouse--are found in a variety of spots in Wyoming from the sage lands of the Red Desert to the base of the Big Horn Mountains in the northern reaches of the state.

Two types of grouse--the sage grouse and the sharp-tailed grouse--combine a form of dancing with mating calls.

The sharp-tails, for example, which are found primarily in the northeast part of the state, making cooing and clucking sounds similar to pigeons as they puff the air sacs on their necks. As another part of their mating ritual, they spread their wings to the side while their pointed tails jut up in the air.

A fluttering of feathers is heard while the birds rapidly shake their tails back and forth and "dance."

In addition to the sharp-tails, male sage grouse also have an impressive display of masculinity spreading their tails somewhat like a tom turkey while making a "booming" sound with the air sacs in their necks.

Both the sharp-tails and sage grouse perform their mating ceremonies in large groups and are often so busy dancing and strutting that bird watchers can get within several yards of the birds.

Grouse almost always return to the same dancing or strutting ground each year.

They have been observed dancing on the interstate highway near Jackson Hole and on airport runways in Cody, Riverton and Casper after some unknowing engineer routed a road or air strip through one of the ancestral strutting grounds.

The birds are most active in the morning right at sunrise and will usually continue to dance or strut for an hour or more depending on the weather and locale.

Ruffed grouse and blue grouse are also spectacular to watch during mating season, but are more difficult to find, since they don't perform in large groups like the sage grouse and sharp-tails.

Ruffed grouse, which are found throughout the state around the foothills, make a sound similar to a snare drum and beat their wings in search of a lonely female.

The blue grouse, which is found in the upper foothills where the evergreen timber meets the aspen, will often stand on a lone stump or rock and produce a low "hoot" which is one of the lowest sounds made in the bird world.

Unlike most other birds, the blue grouse spend the winter in the timbered mountains and then move down into the upper foothills in the spring.

With grouse mating activities lasting into May and possibly June, the aspiring bird watcher has an excellent chance of observing and photographing the dancing, hooting, drumming and booming of these birds.

The grouse, which were in the state long before the first explorer set foot on the continent, have remained as one of the spring wonders in Wyoming.

Animals Protected

The black-footed ferret and wolverine, which have become rare in Wyoming, are now protected.

The Wyoming Game and Fish Commission, acting under authority granted to it by the last legislature, established a closed season on the two animals.

While the Game and Fish Commission has had the authority to set seasons on all game species and fur bearers, it was not until the last legislative session they were given power to fix seasons and set limits on other wildlife.

Thoughts from the Distaff Corner

By Marge Higley

P. T. Barnum said it first. "There's a sucker born every minute." Meaning that if you talk hard enough and fast enough, you can sell just about anything to just about anybody. Of course, that was about a hundred years ago, and the American public is more sophisticated now. We're not so gullible as to believe practically everything we're told. Right?

Well, maybe! But think about TV commercials for a minute. We tell ourselves that we really don't pay much attention to them, but the advertisers know better. They have, indeed, proved profitable to the sponsors, else why would they spend so many dollars on the purchase of TV time? Time which is paid for by the minute.

It's amazing how much drama can be compressed into 60 seconds. And such variety! For comedy, there's Alka Seltzer's "Try it -- you'll like it," or "I can't believe I ate that whole thing!" If humor and indigestion seem incompatible to you, you might choose the product of a competitor who grimly pictures a glass jar-tubing-spiggot type disgestive system. (A biology teacher must pale at the sight of that one!) Everyday life is represented by Folger's Mrs. Olsen, or Comet's cheerful sink-cleaner-upper. For romance, the choice is endless--toothpaste, aftershave, pipe tobacco, perfume -- all these and many more. There are travelogs, adventure, and even tragedy. (How about that stopped-up sink with company coming?)

Each of these little stories is presented by the sponsor in the hope that you will go out and buy his product. If you try one and feel that it doesn't quite measure up to what you expected from the ad, you can always go back to good old reliable Brand X. No harm done.

There's another kind of TV commerical -- the "image builder," or perhaps I should call it "image improver." People are becoming ecology conscious, and big industry is blamed for many types of pollution. Prodigious sums are being spent on TV commericals in order to convince the public that industry is doing its utmost to protect or improve the environment. The oil industry probably tops the list.

If you think that these sponsors are spending all this money just to sell you a can of oil or a few gallons of gasoline, think again! The stakes are much higher than that. They are trying to sell you an image. They don't want you to be unhappy with the oil industry in general, or their company in particular. (An aroused public could cramp their style and cut into their profits.) So they, too, paint for you a beautiful little 60 second picture. Beautiful, but certainly not complete.

The Oil Companies of America sponsor one ad that conveys the impression that oil is the country's heart-beat. The announcer tells us, in stentorian tones, that America is facing an energy gap, and "a country that runs on oil can't afford to run short." Next time you see that one, ask yourself how come these same oil companies export millions of barrels of oil. (According to the Economic Analysis of the Impact Statement on the trans-Alaska pipe line, some of that Alaskan oil is already committed to Japan.)

Humble Oil Company pictures for us their oil rigs amidst a bird sancturary in a Louisiana island, as "an example of how industry and nature can co-exist side by side without ruffling each other's feathers." As a result of the Jan. 18, 1971, oil spill in San Francisco Bay, almost 20,000 birds were killed along with countless numbers of fish.

Atlantic-Richfield brags to us, via TV commercial, about their efforts in the Alaskan tundra to heal the damage done by oil activities. They revealed in a press release (not seen by most of us) that no one knew whether the exotic grasses they planted would grow there, or what effect they might have on the environment. (More recently, the Interior Department's impact statement states that the experiments have not worked.)

Texaco proudly announces a new, cleaner fuel oil which they developed to "protect you and your environment. We're working to keep your trust." They don't announce the fact that they, along with Gulf and Shell Oil Companies, each contributed $25,000 toward an effort to defeat a "clean environment initiative" on the June 6 California ballot. (Another big contributor was Bravo Oil Co. of Houston.)

Shell attracts our attention with a catchy little song which says "We're trying to make things better." They could certainly stand improvement. In February, 1970, Shell had 2 wells shut down for lack of adequate anti-pollution equipment; the following month 3 platforms and 61 wells were closed for lack of safety equipment, and 2 more in April, for leaking safety valves.!

Next time you watch an environmentally oriented TV commerical paid for by the oil industry, bear in mind a few facts. Fact: the San Francisco oil spill of Jan. 18, 1971, ensued when a Standard Oil Co. of California oil boat left San Franciso at midnight, in a zero-visibility fog. Fact: On Jan. 21, 1971, Gulf Oil Corp. and Kerr McGee Corp. pleaded "no contest" to charges of failing to have safety valves on oil wells in the Gulf of Mexico. (They were fined $170,000). Fact: On Jan. 23, 1971 Standard Oil of New Jersey spilled 385,000 gallons of light fuel oil into New Haven (Con.) harbor, causing injury to birds and fish extending for 16 miles along the coast. Fact: the seven oil companies which own the Alyeska Pipeline Service Co. pressured the Department of the Interior to lift the pipeline injunction so they could go ahead with the project without further hearings, and in spite of the National Environmental Policy Act.

If you really believe that the oil industry is doing its utmost to protect and improve the environment, then Phineas T. Barnum was right.

The earth's vegetation is part of a web of life in which there are intimate and essential relations between plants and the earth, between plants and other plants, between plants and animals. Sometimes we have no choice but to disturb these relationships, but we should do so thoughtfully, with full awareness that what we do may have consequences remote in time and place.

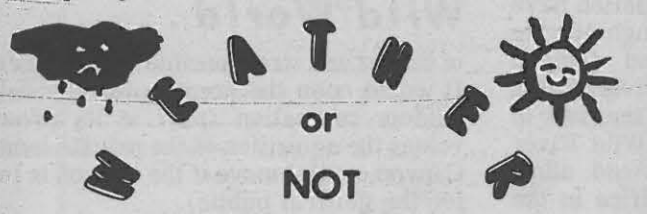
Rachel Carson: SILENT SPRING

Booklet Available

ECOLOGY OF COMPOST is a 12-page pamphlet available from the State University College of Forestry, Office of Public Service and Continuing Education, Syracuse, N.Y. 13210. It discusses problems of solid waste and the place of the compost pile in getting at those problems.

Service Granted

Xerox Corporation has told its employees that 20 to 40 of them would be granted annual leaves on pay to teach retarded children, campaign for mine safety, or perform any other non-partisan good works they choose. Three years service with the company is the only requirement. Those who use the grants are guaranteed the same or equal jobs on their return.



	High	Low	
Sun.	65	43	Lovely
Mon.	62	36	Delightful
Tues.	66	38	Beautiful

Last week's rains and this week's sunshine have combined to make leaves and blossoms put on a real display. Bright-colored tulips bloom along walks, and the smell of lilacs is in the air.

Labeling Set

The Food and Drug Administration held three nation-wide meetings during the first week of April, in order to familiarize the food industry with studies they have made to establish standards for voluntary nutritional labeling of packaged foods.

The White House Conference on Food, Nutrition and Health in December of 1969 recommended that consumers should be given meaningful nutritional information. They pointed out three basic reasons for uniform information on all processed foods: to identify the product for consumer, inform the consumer about the significant nutritional properties, and to provide the food processor with an honest basis for advertising his product in relation to competition.

According to the FDA's proposal, nutritional labeling will be voluntary, but if a manufacturer decides to adopt this type of labeling, he must adhere to the standards set by FDA.

At this time FDA has set these regulations:

1. Vitamins and minerals should be expressed as a proportion of the Recommended Daily Allowance (RDA) modified to provide a single RDA level for all ages and sexes.
2. Labeling should indicate the caloric content and the amounts of protein, carbohydrate, and fat in the product.
3. The nutrition content should be altered to a portion or serving of the food expressed in common household terms or in easily defined units.
4. A complete listing of the seven important vitamins and minerals (Vitamin A, Vitamin C, thiamin, riboflavin, niacin, calcium and iron) should appear on all products unless the product contains essentially none of those vitamins or minerals.
5. A listing of protein content should appear on all products unless the product contains no protein.

The nutritional label on each package must appear in a uniform location. The seven nutrients must all appear together on the panel allocated to the nutritional analysis.

Environmental Eavesdropper

LOONEY LIMERICKS

by Zane E. Cology

With tax base and power as goal
They'll pipe rivers right to the coal.
If the sight you can't bear
Of scarred lands and black air,
Just watch that economy roll!

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The House Roads Subcommittee was urged by Friends of the Earth to open the Federal Highway Trust Fund for improvement and construction of public transportation systems, as a means of halting excessive oil consumption by automobiles. FOE spokesmen pointed out that if there was a shift of one-fourth of urban travel away from private automobiles to public transport, the savings in petroleum consumption would exceed one million barrels per day.

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Jack Rehberg, executive director of both the Montana Petroleum Association and the Rocky Mountain Oil and Gas Association, warned the Idaho Highway Users Conference against any diversion of highway funds away from highway construction, maintenance and safety.

***

Senator Clifford P. Hansen, addressing the Geological Society of America, said stopping the development of energy resources would aggravate the already serious urban crises of unemployment and undesirable living conditions. Commenting on Wyoming's energy resources, he said, "We have no alternative but to help meet our nation's growing energy demands."

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A Commerce Clearing House report said energy consumption in the United States for heat, light and power reached a new high in 1971. Use marked a 2.3 percent increase over 1970.

***

Senator Gale McGee announced from Washington that tax reform proposals aimed at the oil industry are "incomprehensible . . . when this nation faces an energy crisis of staggering magnitude." McGee also said his fellow senators that are pushing for lower depletion allowances "have little information about America's impending energy crisis."

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An American Petroleum Institute spokesman, Wilson Laird, said increased oil and gas drilling could help Americans achieve a better environment and higher standard of living. He also said the National Environmental Policy Act is seriously hampering efforts to find more oil and gas.

***

Secretary of the Interior Rogers Morton, testifying before Congressman Wayne Aspinall's House Interior and Insular Affairs Committee, defended the oil industry depletion allowance. He said it has become "a dirty word around here . . . There's a feeling people are pocketing money, that it's some sort of a tax loophole." He said oil and gas exploration has fallen off 50 per cent in recent years because of lack of incentive.

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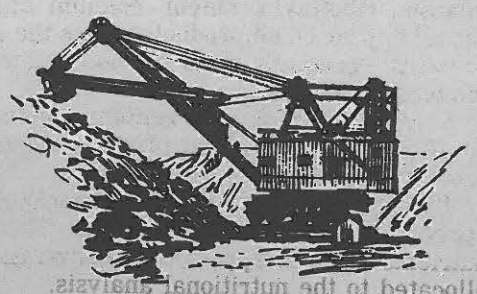
The Oil and Gas Journal (April 24, 1972) said earnings by the oil companies were up 7.8 per cent in 1971 to $6.3 billion.



Problems Outlined

Speaking before a combined meeting in Laramie of the New Democratic Coalition and Environmental Action, Miss Laney Hicks, Regional Representative of the Sierrra Club, outlined the environmental problems Wyoming could have from power plants and strip mining in the next ten to twenty years.

She said there was much talk on environmental quality - but the fact is that we have not yet measured what the impact might be, or faced the multitude of unanswered questions involved in industrial development of the state. And regardless of high level assurances being offered, state and federal laws are inadequate to maintain our quality environment.

In fact, she questioned why some people were bragging that Wyoming had one of the first reclamation laws in the West and an air quality act before there was any federal pressure to do so, if they cannot control the problems we face.

In describing the current question of power shortages she said it was more a problem of power in the wrong place at the wrong time and the lack of interconnection in an effective power grid which caused many of the power failures. Another factor has been poor planning by the utility industry which forecast in the early 1960's that demands would drop between 1965-70. The projected growth rate increases are more than just a reflection of population increases - they show a per capita consumption which is growing at three times the rate of the population, she said.

Assisting this growth pattern is the structure of the utilities whose key to net profit rates is a growing rate base . . . and a growing base requires an increased demand for electricity. Pointing out that these problems are national in scope, Miss Hicks said Wyoming could get caught in the crunch and suffer extensive damage in supplying the energy demands unless there were rapid changes in technology and better laws enacted.

To illustrate her point she presented a table showing levels of impact which could result if the North Central Power Study is developed under existing federal standards limiting air pollution.

She said we should question the claim by utilities that they use the best available technology. Actually, the available equipment is a result of what the companies direct for control level in their plants. So they control what is on the market.

Pointing out that some of these plants could be in the planning stage now, she suggested first that the air quality act be substantially upgraded to maintain our quality at its present level; that utility advertising to increase consumption should be halted especially in the urban-industrial centers in the Midwest, and rate structure changes should be implemented to include the cost of pollution control. Long term objectives should put research priorities on solar energy and fusion power.

Miss Hicks also said she was concerned that stripmining in Wyoming could be of such magnitude that we would lose many of our present income producing assets such as tourism, ranching and the fish and game resources. Again, she said, we have not really faced the impact of mining 3 to 4 million acres for coal and uranium to supply power plants, gasification and liquid fuel plants, and the other industries which might locate near a large center of cheap power such as the processing of chemicals, metals and uranium.

The section in the North Central Power Study dealing with reclamation is not encouraging - they recognize that our open cut mining law is "less exacting than most other states," that revegetation will be very difficult with our climate and soil conditions. Even more disturbing, she said, is the inference that mining companies might get by with a minimum because low population areas make less bad publicity. Also, they assume that it is somehow justifiable to mine the high desert rangelands because they are used only for grazing. Land use after mining is left very vague, she said.

To cope with exisiting mining problems we should concentrate on the results to be achieved, that is, to return the land to its previous productivity with wildlife and domestic forage of equal or greater value. Where this cannot be achieved, stripmining should be banned as an inherently destructive practice.

In conclusion, she said that none of what she had suggested would stop industrialization - what it can accomplish is more effort in planning to include the environmental and social costs in the cost of production.

She asked, "Isn't it time our state leaders stopped telling us what we should have and ask instead what we want?"

Asks Funding

The Montana Wilderness Association, at its annual meeting, January, 1972, passed the following resolut on:

The Montana Wilderness Association is aware of the fast growing coal industry in our state, which if not handled properly will destroy large areas of our land. We therefore resolve, together with the Lewistown District Bureau of Land Management Advisory Board, that we recognize that the Bureau of Land Management and other public land management agencies are being required to make long-lasting, far-reaching decisions now, without adequate funding or manpower to properly make these decisions. We therefore urgently request that adequate funds be appropriated immediately to allow our public land management agencies to carry out their obligations to the American public.

EMISSIONS BY MEGAWATT SIZE - tons/day

	PARTICULATES	SO_2	NO_x
10,000 megawatt	216	1,300	755
5,000 megawatt	108	650	378
3,000 megawatt	63.9	390	226
1,000 megawatt	21.6	130	75.5

Charts: Dr. Michael D. Williams
John Muir Institute
Albuquerque, New Mexico

Comparison of air pollution by known areas and sources with projections for fossil fuel plants in Wyoming as outlined in the North Central Power Study, October, 1971.

EMISSIONS - tons/day

	PARTICULATES	SO_2	NO_x
New York City (all sources)	150	1,077	
Los Angeles (all sources)	110	275	950
Four Corners (6 fossil fuel plants)	220	1,970	1,280
Proposed Plants in the North Central Power Study**			
thirteen 10,000 megawatt plants	2,800	16,900	9,810
five 5,000 megawatt plants	540	3,250	1,890
two 3,000 megawatt plants	129.5	780	452
five 1,000 megawatt plants	108	650	370
TOTALS	3,577.5	20,580	12,530

** Emmissions calculated from Standards of Performance for New Stationary Sources of the Environmental Protection Acency. Published in the Federal Register, August 17, 1971.

Craters of the Moon

Photos and text by Thomas M. Baugh

The mule deer nervously raised his head. Cautiously he tested the wind. He lowered his head again to feed, but the message on the wind disturbed him. The earth rumbled gently beneath his hooves, and pungent odor became a stinging, unpleasant sensation assaulting his delicate sense of smell. With one final look, the deer bounded away across the gently sloping plain not stopping until reaching the crest of a high ridge several miles distant from the rumbling, fuming earth. Turning, he looked back over the plain and foothills now engulfed in smoke. If the vision of the deer could have penetrated the smoke, he would have known the cause of his fear. In the midst of the holocaust a river of flame was spreading down from the foothills and across the plain. Molten rock was pouring from open fissures and the face of the land was changing.

Several thousand years later, a figure clothed in white cautiously navigated his way around a sharp spire of rock. His heavy booted feet crunched against the cinder strewn floor as he completed his circular tour of the rugged pinnacle. He stopped for a moment to look out across the jumbled landscape, and then approached a strangely constructed vehicle a few yards away. Seating himself and starting the battery operated motors, the astronaut carefully drove further out on the cinder covered plain.

The area visted by the deer and later by the astronaut is also visited yearly by thousands of curious people. People who come to stare in fascination at a relatively modern exhibition of

Spatter cone or cinder cone, evidence of bygone days of volcanic activity.

those formative forces which shared in the creation of our planet. They come to visit the Craters of the Moon.

Craters of the Moon National Monument occupies eighty-three square miles of south-central Idaho, encompassing over 53,000 acres of incredibly twisted and tortured terrain. The Monument is aptly named, it is difficult to imagine any other area which presents a more alien picture.

Relatively recent volcanic activity has pushed flow after flow of black, porous, basaltic material to the surface of the foothills and surrounding plains. Scientists estimate that the most recent activity occured approximately 1,600 years ago. Geological evidence, apparent throughout the Monument, demonstrates the fact that the area has experienced a long history of volcanic disturbance. When did it all begin? When did these red hot streams of rock first pour out upon the surface? Of course no one knows for sure. We do know, however, that far back in the geological past, the earth in the locale of the Monument cracked and opened. Underlying the Monument are a series of great fissures extending miles deep within the earth. These fissures are known as the Great Rift and they tap the molten core of our planet. On the day of the first crack, the stresses of a settling earth forced these fissures open. Molten rock or magma at 2000 degrees F was forced upward from the fiery depths and flowed out upon the surface.

The Great Rift has opened many times since that first eventful rupture. The rock formations throughout Craters of the Moon bear testimony to these various periods of volcanic activity. Each separate period has brought changes to the Monument and these changes are apparent, even to the untrained eye of the wondering visitor. Segments of crater walls from earlier eruptions dot the ejecta of more recent lava flows. The most graphic demonstration of the intermingling of the different periods can be seen in the Devils Orchard area of the Monument. Here, standing like sentinels, the wall segments raise their jagged forms against the clear desert sky.

It is quitecommon,when one thinks of volcanic activity, to imagine terrible explosions and cataclysmic upheavals. Examples of this type of activity have taken place within the present century at other locations on our planet. Craters of the Moon, however, was formed in relative peace and quiet. There were obviously disturbances and even explosions, but these were minor when compared with the destructive explosions which brought doom to Krakatoa.

Although at first glance the Monument appears to be a hostile forbidding environment, a closer look will reveal a multitude forbidding environment, a closer look

Although at first glance the Monument appears to be a hostile forbidding environment, a closer look will reveal a multitude of lifeforms. Over three hundred species of plants flourish within the confines of the Monument. The dominant timber type is the impressive and often grotesquely shaped limber pine. When the snows have gone and the warmth of spring covers the land, the red of the Indian paintbrush, the yellow of the sunflower and the white of the eveing primrose relieve the harshness. The hardy dwarf buckwheat lies dormant beneath the snows, throughout the winter months, to blossom forth in its bed of cinders early in June. Ferns and berrys, currants and grasses, thistles and flowers, all make their home here.

Several hundred mule deer wander the Monument and the surrounding mountains and desert. Small rodents feed upon the plants and are in turn preyed upon by the ever present coyote and the occasional bobcat. Ample forage exists for the grazing animals, but water is scarce. In small depressions throughout the lava fields, ice formed during the winter melts throughout the spring and summer months to provide waterholes for thirsty wildlife. Water also exists within the many caves and lava tubes which honeycomb areas of the Monument.

Craters of the Moon National Monument is located approximately eighteen miles southwest of Arco, Idaho. Travelers from both the north and southwest can reach the Monument via U. S. Alternate 93. North-south travelers can leave U.S. 91 at either U.S. 26 in Blackfoot or U.S. 20 in Idaho Falls.

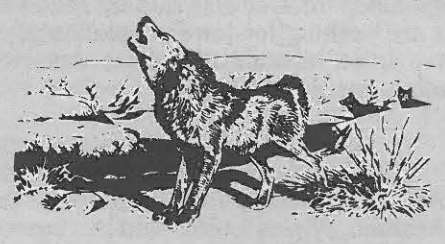
There are 51 developed campsites located near the entrance and visitor center. Many of these sites will accomodate camping trailers. During the summer months, naturalist activities such as hikes and campfire programs are conducted by the National Park staff stationed at the Monument.

If you are anticipating a trip to Craters of the Moon, you may want to take advantage of several excellent publications available to the public. "Geology of Craters of the Moon Idaho" is a well written document describing the geological phenomena of this fascinating area. The beautifully illustrated "Common Plants of Craters of the Moon National Monument" by

The twisted and contorted skeletons of trees which lived and died amidst the moon-like surface are mute evidence that volcanic activity ceased long ago.

Karl A. Urban provides color photographs of many of the plant species which will be encountered during a spring and early summer trip. Both of these booklets and several others can be purchased, at minimal cost, at the Vistor Center or by writing to the Superintendent, Craters of the Moon National Monument, [illegible], Idaho. The displays and information [illegible] Vistitor Center itself, will greatly enrich [illegible] visit to the Monument.

While touring Craters of the Moon we might well be guided by the words of an earlier visitor who stated "Few spots on earth have such power to impress the human mind with the awful inner nature of the huge rock-planet upon which the human race moves at incredible speed through the universe." Wandering the lava fields, exploring the caves, investigating the plant and animal life, or simply sitting on a rocky pinnacle, one can begin to contemplate something of the immense forces which have formed our spaceship earth.



Pahoehoe, the ropelike strands of lava flows.