

A photograph of a waterfall cascading over moss-covered rocks in a forest. The water is white and frothy as it falls, and the surrounding rocks and vegetation are covered in vibrant green moss. The scene is captured in a slightly blurred, artistic style.

Idaho

Forester

1974

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Staff

(left to right)

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Acknowledgements

The staff of the IDAHO FORESTER would like to thank all of those who made this magazine possible.

Thanks go to Dean Ehrenreich for his support. We would also like to thank the alumni, authors of articles, advertisers and fellow students for their support, and Cheryl Martz, Linda Trainor, Betty Kaufman and Mary Reed for their secretarial help.

Special thanks go to Bill Mullins for his cover photo; Paul Dunster for his cartoons; and the Region 1 office of the U.S. Forest Service for the centerfold picture.

Cover Photo

Our cover photo this year was taken by Bill Mullins, a wildlife graduate student in the college who is gaining a reputation for himself in wildlife and scenic photography. Mullins began winning photo contests on campus two years ago, has since sold photos to magazines such as National Wildlife and will be a major contributor in a soon-to-be published book of photos on Idaho.

In addition, Bill prepared a nature slide presentation synchronized to John Denver folk music which has been shown numerous times on campus and become a favorite at Moscow schools and club meetings.

Mullins, from Boise, will complete his graduate work on Greater sandhill cranes in the Grays Lake area of southern Idaho this year.

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Bob Shoemaker, Editor

Our theme is "Efficient Use of Our Renewable Natural Resources." It is a broad theme, but it must be in order to encompass our diverse college. I believe that the theme is particularly timely. With all the emphasis on conserving energy and resources in general it is not hard to see that this nation will soon be looking toward **renewable natural resources** with increasing intensity to provide for its people.

To develop a magazine that is representative of the Forestry, Wildlife and Range College is a difficult task. The magazine must include recreation, forest business, fisheries, and wood utilization in addition to the expected forestry, wildlife and range options. The '74 Idaho Forester staff has solicited articles from the top people in their fields, both within and outside the college. The responses to our article requests have been good and we feel that no option has been overlooked.

The training of individuals to manage natural resources is the primary objective of the college. Dividing the school into options according to the resource or management of the resource is done to allow specialization, and hopefully increase the understanding of each one. However, we must be careful not to over-specialize. It is easy to lose sight of the picture as a whole when studying just a part of it.

You cannot remove a person's arm without putting stress on the remainder of his body. Therefore, we must examine how the manipulation of each individual resource will affect the remaining member of the natural resource complex, because each is strongly related.

Management decisions must be based on the benefit of the complex as a whole and not merely on each segment separately.

Yes, the college is diverse, but if it is run properly, the inter-relatedness of the options will be emphasized in order to produce managers who can visualize the entire scope of the use of natural renewable resources.

I want to thank you for your support of our magazine and I hope you will enjoy the results of the effort put forth in its production. ↑

RIVERS and TREES . . .

*are more than
beautiful scenery!*

They are part of the better life that we all seek.

They mean a healthy basic economy that provides fulfilling careers for the citizens, security for families, opportunities for the young.

The blessings of a beautiful, healthy outdoor environment and a continuing source of energy and materials are equally essential to a high quality of life. Both must be cultivated and preserved.

Fair minded people, working together in the interests of all can meet this goal.



THE WASHINGTON WATER POWER CO.

Clean Energy for Better Living



Forestry Employment



John H. Ehrenreich, Dean
College of Forestry, Wildlife and Range Sciences
University of Idaho

Although the goals of forestry education unquestionably include preparing young people for employment, only a few forestry schools across the country take an active role in assisting their students to find jobs. Most forestry schools have chronically ignored or overlooked their responsibilities in this area. Unfortunately, our college has long been among that crowd.

Teaching and research obligations tend to overshadow responsibilities in the employment area, besides, forestry schools have been rather complacent over the years about employment of their graduates. Forestry education has traditionally served the same few major employers — the federal government, notably the U.S. Forest Service and the Bureau of Land Management; state agencies such as fish and game departments and forestry or public land departments; and the forest industries.

But I feel keenly that the college should participate in the area of forestry employment, because graduates today are entering the natural resource professions at a critical time — in the wake of a revolution, and I would darn near call it that. Tremendous changes have taken place in society's attitude toward natural resources; an evolution which has forced changes in natural resource use, fostered new environmental protection measures and greatly influenced forestry education and the job market for forestry graduates.

Overall, I believe these changes have been positive, in fact, they are essential. We must all finally recognize the importance — the urgency — of natural resource

management and conservation, not as a political or an emotional issue, but as perhaps the greatest challenge of this century. As Earl Butz, Secretary of Agriculture, stated recently, "the only frontier left to man on this earth is wise use of natural resources."

Faced with the loudest and the most complex demands ever from the public concerning natural resource use, it's ironic that federal resource managing agencies continue to suffer under serious budgetary and personnel constraints. The hiring situation with such organizations has disrupted the pattern of employment for forestry graduates, as well as curtailed public land management and production at a crucial moment. The situation cannot be justified; neither can it last.

Forestry employment, however, is no longer dependent on traditional job markets. Although federal and state agencies — including some new environmental organizations — and the forest industries — which, incidentally, are offering more and better job opportunities than ever — will remain major employers of forestry graduates, jobs are opening up in many areas which have never been exploited before by our graduates.

For example, industries not usually associated with forestry, such as mining and power companies, chemical and various other manufacturing industries — any industry with processes that affect the environment — are beginning to realize a need for people to monitor their operations according to the new pollution standards or to prepare reports on the possible environmental consequences of a certain activity. Recently, the demand for this type of graduate has been particularly high in the "water areas" — aquatic biology, watershed, hydrology. Some industries with land holdings are also hiring recreation specialists to plan and manage public facilities.

The demand is also increasing for graduates with a background in land planning and assessment. More city and county governments are employing environmental consultants and land planners. Nowadays, banks and other loaning agencies cannot make loans to land developers, for example, without environmental guarantees. Our graduates can make this type of assessments.

The job market for forestry graduates, then, is expanding in many directions as the need for people educated in ecology, resource management and resource economics becomes widespread. The challenge of the natural resource professions is to find ways to meet society's needs from natural resources today, while protecting our environment for the future. If forestry education is to contribute to this era of challenge, forestry schools must not only prepare professionals, but **promote** the natural resource professional and the importance of natural resource management throughout society.

This spring, the college faculty approved a half-time position dedicated to providing job placement information to students and to promoting employment of our graduates

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Wildlife and the Forester



**Dr. C. R. Guteruth, President
National Rifle Association**

Foresters and wildlife managers have much in common. Each deals in the manipulation of living communities for the benefit of the general public. Both, if we consider the management of game apart from that of protected nongame species, have the objective of producing sustained yields of harvestable crops. Unfortunately, however, with the swift rise and expansion of environmental awareness, each of the two disciplines has come under increasing attack from segments of the media and by environmental activists.

Although neither the forester nor the wildlife manager has reason for self-flagellation, we must, in candor, recognize that some of this criticism of both professions carries a modicum of truth. Wildlife managers have been slow in focusing attention on any but the game species. Some forestry practices are open to honest criticism on ecological grounds. With a public that is becoming increasingly conscious of aesthetics and the natural environment, both professions would do well to reappraise their objectives and philosophies.

This is especially true for all those who are entrusted with managing the resources on our public lands. On national forests and the forested lands administered by the Bureau of Land Management, the general public has a direct interest in management operations, and sound professional decisions can be undermined by political pressure generated by emotional protectionists. As an example, the Congress, two years ago, seriously considered

legislation that would have banned all clearcutting in the national forests. Although the bills failed, they had strong congressional support because, while defensible silviculturally, clearcutting was being misapplied by cutting too large areas and too steep slopes.

In the past there has been an inclination to consider forest wildlife as an incidental by-product of commercial forestry. Wildlife values cannot be measured in convenient terms like cords or board feet, but recent studies show that wildlife has great economic worth in addition to its more ephemeral values in terms of aesthetics and human enjoyment.

The national forests alone are home for more than four million big game animals and many more lesser game and nongame species — songbirds, hawks, owls, grouse of several species, hares, squirrels and many others, large and small. In 1972, these resources attracted more than nine million visits by big game hunters and another four million in search of small game. Forest Service statistics disclose nearly 18 million visitor days by bird watchers and nature photographers in 1971.

The national forests, with 94.6 million acres of commercial forest land, of course, comprise a comparatively small proportion of the 753 million acres of forest land of all types in the United States in public and private ownership. If we were to project the wildlife-oriented visits to the national forests against the total forest acreage, the number would become astronomical. A high percentage of the 21 million hunters, seven million bird watchers, and five million wildlife photographers tallied by the 1970 National Survey of Fishing and Hunting, published in 1972 by the U.S. Department of the Interior, undoubtedly used forested lands at some time during the survey year.

The estimated revenues generated by big game hunting on the national forests alone are more than \$2.5 billion annually. A study made in 1972 indicated that it cost an average hunter in Colorado \$600 to take a single trophy animal. The cost of an average elk hunt in Montana is \$2,400 for 14 days.

These figures are supported by an economic study made in the southeastern states by J. C. Horvath of the Environmental Research Group of Georgia State University. Based on interviews of actual users of wildlife, Horvath and his associates found that the dollar value of a day's hunting ranged from \$39.14 for small game to \$60.86 for deer and bears. The intangible or nonconsumptive value of the Southeast's wildlife resources to bird watchers and nature photographers was set at \$12.3 billion, while hunting and fishing values totaled \$11.8 billion.

These figures indicate the high value the public places on the forest wildlife resources and they are values that should be given much more weight in forest management planning.

Game, like timber, sawlogs and pulp, is a crop. Under common growing conditions, a stand of saw timber is cut under an 80 to 100-year rotation cycle. For a deer herd the rotation is from three to ten years, and for grouse little more than two or three.

Sustained yields of healthy deer can be maintained under an annual harvest approaching 30 to 40 percent of the pre-hunting season population. Sixty percent or more of the small game crops can be taken each year with no noticeable long-range effect on the resource. A number of wildlife rotations can be attained in less time than it takes to realize one rotation of timber. Considered in this time frame, the economic value of wildlife takes on new significance.

Although wildlife has high demonstrable economic value in addition to its importance to recreation and aesthetics, wildlife traditionally has received little financial support from federal and state agencies apart from the fish and game departments. In fiscal year 1970, for example, the increase in the U.S. Forest Service budget appropriated for timber management exceeded the total amount allocated for its wildlife management program by \$1.3 million. Some national forests approaching a million acres in extent received only two cents an acre for wildlife-forestry coordination.

What is needed to implement the purposes of and intent of the Multiple Use and Sustained Yield Act of June 12, 1960 are substantial increases in appropriations and manpower for wildlife enhancement. This Act clearly states that "It is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and **fish and wildlife** purposes."

In spite of the fact that fish and wildlife, under the terms of this Act, are given equal rank with other uses of the national forests the Congress never has appropriated sufficient funds to provide the U.S. Forest Service with more than token funds for wildlife enhancement in relation to timber production. From 1954 through 1970, for example, the Forest Service received 66 percent of the budget increases it requested for timber sales administration, but no more than 17 percent of its requests for reforestation and 20 percent of its requested increases for recreation and wildlife. Thus, fish, wildlife and recreation, in relation to timber harvest, have lost ground over the years, as has the important work of reforestation. Although the problem is not entirely of its own making, it is small wonder that the Forest Service has been criticized by environmentalists for an imbalance in its program; an imbalance that the Forest Service itself acknowledges.

In spite of severe constraints on funding and manpower, the Forest Service has a generally good record of achievement in wildlife-oriented recreational development — at least enough to demonstrate that it could do much more if it had adequate funds with which to work.

Wildlife management is quite compatible with forestry and timber harvest if some consideration for wildlife is given in planning and implementing forestry operations. But such operations need input from professional wildlife managers if these benefits are to be attained.

This does not mean that each national forest must have as many wildlife managers as foresters. But it does mean that each forest should have enough to appraise existing wildlife resources on any area proposed for harvest and to recommend opportunities for wildlife enhancement in all such operations.

This is especially true where endangered species of wildlife might be involved. Timber harvest under any conditions is at least temporarily disruptive of existing wildlife habitat. Under certain conditions, it could be enough to push a threatened wildlife species with limited



available habitat over the brink to extinction, opening both the forester and the Forest Service to severe public criticism. Foresters trained solely in silviculture rarely possess the biological expertise to recognize such hazards.

A number of endangered species which live in forests have highly specialized habitats. The red-cockaded woodpecker, native to the Southeast, requires trees infected with red heart to survive. These are trees which nearly any trained forester would mark for culling. The U.S. Forest Service is deliberately saving trees so infected because of their value to the woodpecker.

Pine stands that never attain heights above 15 feet would be considered worthless by most foresters. They are vital, however, to the continued existence of the Kirtland warbler which nests entirely in jackpines between five and 15 feet in height in a restricted area in Michigan. The stands are maintained by prescribed burning.

Snag trees also are considered worthless by most foresters. But they are needed by eagles and ospreys as nesting and roosting sites. Hollow trees are required by a number of species. Some wildlife specialists who have examined the problem forecast that, unless a number of hollow trees are maintained for nesting and denning sites, many of our now common species of wildlife that use these trees will become endangered within 20 years if the rate of removal of den trees continues.

Consideration for these specialized forms of wildlife, however, is only one of the few situations that would involve much if any sacrifice in timber production to maintain wildlife values. Under most conditions timber harvest and silviculture can enhance the habitats of a wide range of species.

One thing that protectionists fail to realize is that properly conducted forest harvest can improve and recreate rather than destroy habitat for many wild birds and

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An Opportunity for Leadership

U. S. Congressman Orval Hansen

In the early days of this country trails abounded nearly everywhere and were the chief means of getting from one place to another. Trails are an integral part of our history and in a real sense, the history of those trails is the history of America. The Appalachian Trail, the Lewis and Clark Trail, the Mormon Trail, the Oregon Trail and many other famous trails, all reflect the early aspirations that are the American heritage.

Historians tell us that one reason for America's unprecedented success lies in the vastness of its land. The unsettled, wide open spaces are called a "safety valve" where our ancestors found room to escape the restraints of their former existence. Contrasted to the enclosure movement in 18th Century Europe, America had elbow room — room to reflect and imagine a better life under the influence of nature's unspoiled beauty.

Today, however, the American frontier is shrinking and trails are beginning to mean more to us than a simple means of transportation. In our present complex, high pressure society, trails provide the opportunity for a respite and a renewal of the human spirit. Trails can shape the American character even more in the future than they have in the past.

One famous trail user, Henry David Thoreau, said, "I think that I cannot preserve my health and spirits unless I spend four hours a day at least — and it is commonly more than that — sauntering through the woods and over the hills and fields, absolutely free from all worldly engagements." He said such activity would put "so much the more air and sunshine in our thoughts."

Trail use should be encouraged. The more we get people out into the countryside using trails in whatever way they prefer, the better country we are going to have — and the more liveable we are all going to be.

We need to have firsthand experience with our natural resources in order to fully appreciate the great heritage we have. The development of such appreciation will motivate us to use the land wisely, not only for our own, but for future generations.

In recent years I have tried to emphasize the importance of developing adequate trails to serve all our citizens. One of the most satisfying and effective means to that end was my involvement in promoting the Idaho Trails Symposium. Begun in 1971 at Sun Valley, the Idaho Trails Symposium has become an annual event and has done much to make Idahoans more aware of our favored position in trail resources and opportunities. Idaho has the second longest mileage of trails in the nation — 11,000 miles. California, with about 12,000 miles of trails, exceeds Idaho only slightly.

If we look over the experience of the last few years and project that into the future, we will see the use of outdoor recreation facilities and especially trails exploding. The rate of use will be much greater than the rate of population growth.

This will, of course, present some conflicts.

In order to deal with these conflicts, I have proposed the establishment of a statewide trails council. Idahoans need such an organization to amplify the individual voices of trail users in the deliberations of community, state and national governing bodies. If trail users are not represented, the trails stand to suffer the encroachments of competing interests, especially from increasing land development.

A state trails council can represent citizen trail users by performing a number of important functions. As just mentioned, it would first provide a voice for trail users as the sponsoring agency for regular meetings.

Second, the trails council could be the means for resolving differences arising from varied trail use. Since some trail users prefer walking, others bicycling and others the use of another form of off-road recreational vehicle, there are differences to be considered. Certainly there is a place for all these activities, but a council is needed so each type of trail user can be represented. A council can help greatly to accommodate the needs and interests of all trail users.



U.S. Rep. Hansen speaking at the 1972 Idaho Trails Symposium at the College of Forestry, Wildlife and Range Sciences at the University of Idaho.



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Third, a state trails organization can furnish the necessary leadership at the state level in implementing what has been established at the national level. The National Trails System Act, approved by the Congress in 1968, created an overall national framework of recreational and scenic trails. It spelled out the criteria for achievement of increased and improved trails use across the country. In Idaho we have done very little in utilizing this law so far. A state trails council could provide an effective instrument for the state leadership and initiative that the Act contemplates.

Fourth, a state trails council could better inform the public about our trails and their needs. Currently there is very little published information on Idaho trails. The council could be a valuable source of information for those who wish to enjoy our trails. Trail use would thus become more rewarding if there were a means of exchanging information and experience among trail users.

Fifth, the council could attract and utilize volunteer help to build and maintain the trails. It takes a lot of effort and a lot of money to construct and maintain trails. Our Forest Service, Bureau of Land Management and other agencies with inadequate funds for trail construction and maintenance are very hard pressed to meet the public's need for a multitude of services. A state trails council could not only provide recommendations of value to public agencies on the location and design of trails, and on priorities, it would furnish manpower that would permit the limited trail dollars to stretch much further.

I am a member of the Potomac Appalachian Trail Club in Washington, D. C., which has maintenance responsibility for its part of the Appalachian Trail. Other such organizations have responsibilities on the Trail in their localities. The C & O Canal Association, of which I am also a member, does the same thing on the old towpath of the Canal. Similar activity sponsored by an Idaho trails council could be the means of great benefit to state trails.

In addition to the proposed state trails council, Idahoans should initiate action to qualify a national scenic or recreational trail. There are a number of possibilities.

One that I suggested during the Second Idaho Trails Symposium at the University of Idaho two years ago, consists of using existing trails, and adding a few others, to form an east-west trail across the state. That trail could connect with the Continental Divide Trail which is a designated study trail under the National Scenic Trails System. A cross-Idaho trail could run to the Oregon border and terminate at a point where, hopefully, we can interest an Oregon group to pick it up and extend it to the Pacific Crest Trail.

A cross-Idaho trail would exhibit a combination of scenic beauty that could not be matched anywhere in the world. It would be a source of satisfaction and pride for all our citizens to have one of the finest scenic trails anywhere in the country right here in Idaho. But, somebody must take the initiative to designate it, to make application and to qualify under the national trails system. An Idaho trails council could do the job.

A few months ago I was privileged to address the Third Idaho Trails Symposium at Idaho State University. It was evident from that meeting that interest in trails is growing. But more important than a yearly event, we need an active continuing organization that would keep the ball rolling and capitalize on the enthusiasm which already exists.

Thoreau in his time could "saunter," as he described it, "ten, fifteen, twenty, and any number of miles, commencing at my own door, without going by any house, without crossing a road." Today, unfortunately in some ways, that is not the natural condition for most of our citizens.

We are at the cross-roads now, when we must make a conscious decision to preserve some of the things which were formerly taken for granted. If we are to have the freedom of a simple walk or ride in the countryside, where we can leave behind office worries and the impersonal suffocations of urban existence, we must provide an adequate trails system. It will be more costly and more difficult as time passes, even though the need will be greater.

An adequate trails system could provide the "safety valve" our society needs for the years ahead. As I look around today, I cannot help believing that we could all benefit from a little more "air and sunshine in our thoughts." ↑

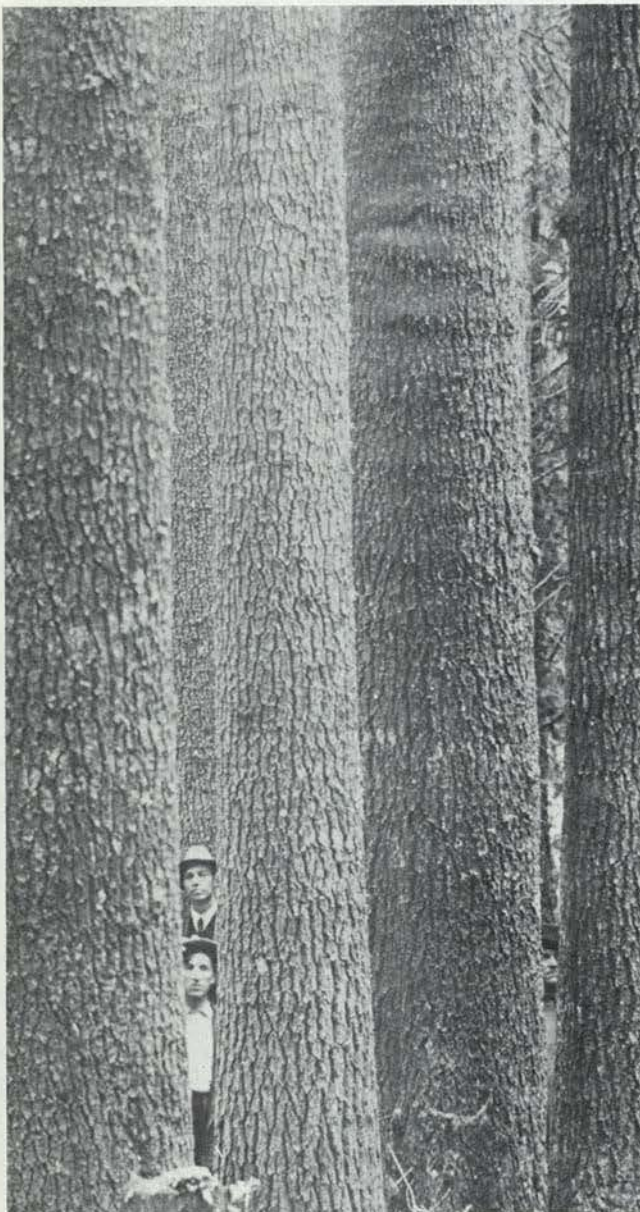
Good Luck Foresters

Spokane Hoo Hoo Club

**(FRATERNAL ORDER OF
LUMBERMEN)**

SIX DECADES

Dr. Robert H. Seale
Professor of Forest Resources
College of Forestry, Wildlife
and Range Sciences
University of Idaho



How did it all begin? Very humbly, I assure you. Some dozen years after his arrival in September 1909 to take charge of the recently established Forestry Department at the University of Idaho, Dr. C. H. Shattuck reminisced. "The Forestry Department, as I soon learned, then consisted of one 7 x 9 office on the first landing of the stairway in Morrill Hall, one office desk, one office chair, one other chair, and one professor in charge. In fact, if there had been even one student, the 'oneness' would have been complete."

This quotation seems apt to me, not only in view of the stark contrast between the original 63 square feet of space and the structure we now occupy, but also because of the stress Shattuck placed on "oneness". If I were to engage in quantifying descriptions of subsequent developments, it would not be possible to continue with single digits. The magnitudes would be in faculty size, tens; enrollment, hundreds; in degrees granted, thousands; in square footage of facilities, tens of thousands; in budgetary dollars, hundreds of thousands; in acres of wildlands administered by graduates, millions.

Yet, in a fundamentally significant sense, "oneness" is still aptly descriptive. The college continues to be characterized by unity, if not always unanimity, in its conceptions and philosophies, both with respect to the relationship between the ecosystem and the economy and with respect to the prime functions and objectives of the college in teaching, research and service.

Actually, the very inception of the college is not a matter of record that I have been able to find. But forestry appears as a subject in the university catalog of 1909, only about 10 years after the first professional program of forestry education had been established in the United States. In the western states, only the University of Washington had initiated such a program earlier, and that only two years ahead of Idaho.

At any rate, it is clear that the university perceived the need and conceived the program before there **was** any forestry faculty. The 1909 catalog described three courses and showed Professor... as the department faculty. Description of the proposed program included the statement that "the very large number of Forest Reservations within the boundaries of the state places upon the university the duty of giving instruction in this most important subject." Though by no means uniquely true of forestry, the needs of the state for education and research concerned with the renewable resources of its wildlands have continued to exert a dominant influence on the direction which the growth of the college has taken.

How has it developed? Rather slowly and rather steadily, I feel safe in saying. If you visit the main office of the forestry building, you will see on the wall an architect's drawing of the building that was proposed to be built for forestry. It bears the date 1912, just 60 years before the formal dedication of the reality which, incidentally, bears no resemblance to the drawing. But after all, forestry is especially concerned with long-term processes and 60 years is not a particularly long period according to foresters' time scales.

The college has developed in many directions and dimensions. In the manner of time lapse photography, with just five or six snapshots taken at each change of administration, we can take a quick look at some of these dimensions.

In 1909: Shattuck arrived and forestry at the university began with a faculty of one and 11 students who did turn up after all. There are a number of interesting footnotes about Shattuck; footnotes are the most interesting parts of history.

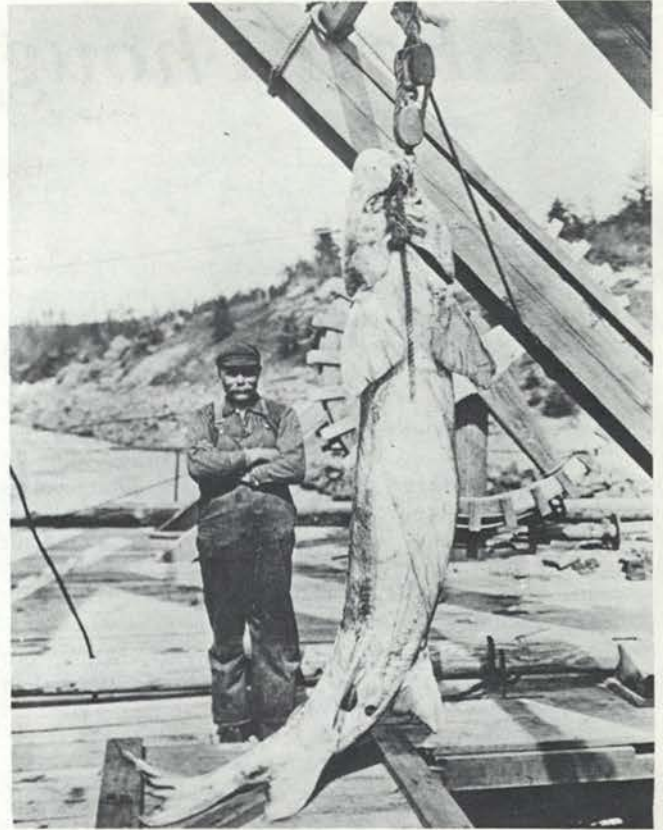
Shattuck was not the first Dean of Forestry — he was never Dean of Forestry. He was a member of the faculty of both the College of Agriculture and the College of Letters & Science. A few forestry courses were offered in Ag, but the full curricular offering leading to a B.S. (For.) was as a department in Letters & Science. Shattuck was Dean of the College of Letters & Science from 1914 to 1917 and was that college's first dean.

During his tenure of eight years, 15 bachelor's degrees were granted and one master's degree. The arboretum and the nursery were established and the "Ranger Course" was initiated.

1917: Shattuck resigned. Francis G. Miller was appointed Dean of the newly established School of Forestry. After earning an M.F. at Yale in 1903, Miller had had a really remarkable career in forestry education. He was a professor and Head of Forestry at Nebraska, professor and Dean of Forestry at the University of Washington, then professor and Head of Forestry at Washington State College. The faculty of the college was now four; enrollment was at 29, plus 11 in the Ranger Course.

During Miller's 17 years as Dean, the Experimental Forest was established, the school expanded to 20 rooms on the third and fourth floor of Morrill Hall and the Wood

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White sturgeon caught in a fish wheel on the Columbia River.



Hauled a mile by four horses in 1892, this load contained 31,480 board feet.

A Few Thoughts about Range

James P. Blaisdell
U.S. Forest Service

A few years ago, I was assigned to a Forest Service committee charged with (1) making a critical review of range research, (2) considering society's changing needs for range resources, and (3) developing a comprehensive basis for research programs to meet those needs. We developed an enlarged concept of range, the gist of which is summarized in the following paragraphs.

Ranges are uncultivated areas that support herbaceous or shrubby vegetation. The range complex (ecosystem) includes not only the soil and vegetation, but also the associated atmosphere, water and animal life. Some areas are both range and forest: the tree overstory may be sparse or herbs and shrubs may have replaced trees that were harvested or burned.

Most ranges are covered with native plants, but extensive areas have been seeded to exotics. Although ranges are usually used by livestock and wildlife, some may not be ecologically nor economically suitable for such use, and may not actually be grazed.

In the minds of many, range has been associated with livestock production only. However, more and more people are coming to recognize that livestock is but one of many range outputs, and that all outputs — present and potential — and their interrelations must be studied and evaluated.

Water is probably the most important single product. Rangelands also provide a source of unpolluted air, as well as an immense capacity to receive, transport and discard pollutants from urban and industrial areas. The nation's rangelands and associated waters are the habitat of countless numbers of big game and other wildlife, including songbirds, upland game birds, waterfowl and fish. These wildlife resources provide recreation and income for a broad spectrum of our population.



Rangelands provide innumerable recreation opportunities in addition to those directly associated with fish and wildlife. Abundance of surface water, wide open spaces and interesting and beautiful landscapes are attracting more and more people to range areas for camping, picnicking, rock hunting and other kinds of outdoor recreational activities.

The range is an important national asset that should be maintained in readiness to support our economic and social culture. It must be preserved as a viable, flexible system that can respond to future needs. We need to learn how to manage the range ecosystems for efficient production and amenity values without causing serious damage or irreversible changes in the basic resource.

Goals for range management in the United States during the 1970's were listed as (1) maintaining environmental quality, (2) strengthening rural communities, and (3) providing recreational opportunities. They were important goals four years ago, and they still are today. However, it may be appropriate at this time to emphasize the traditional role of range for livestock production.

Range forage is a renewable natural resource that represents a tremendous source of food energy. About half of the earth's land surface is range, and the primary productive use of this huge area is livestock grazing. Therefore, it is important that the most efficient use be made of this resource to maximize production of food and fiber, surpluses of which may be exported in exchange for fossil fuels or other products.

At the same time, more recreational demands on rangelands must be accommodated. Federal rangelands will have to produce more water and more game, as well as a better habitat for all wildlife, especially endangered species. And, these aims must be accomplished on fewer acres because more land will be utilized for cities, roads, mining, recreational areas, etc. Range managers will have to demonstrate that watersheds can be grazed without damage, that forage can be shared with wildlife, and that rangelands can be kept attractive to recreationists.

Although some rangelands are not high producers, essentially all are integral parts of the operations of thousands of ranch families whose livelihood depends upon sustained yield of forage and livestock products. Range forage is used in combination with hay and grain produced on local agricultural lands and allows profitable utilization of feeds that otherwise might be difficult or impossible to market. This statement is especially true of certain sparsely populated areas.

At any rate, grazing use of most rangelands will undoubtedly continue in the foreseeable future. It is important that these rangelands be managed so as to maintain or improve the basic resource while providing maximum returns and amenity values to ranch families, as well as to the communities and states of which they are a part.

Past research into particular situations has shown that range-grazing capacity, lamb and calf crops, and animal gains can all be increased through good range

management. Undoubtedly, biological efficiency of many range ecosystems can be improved to produce more meat, wool and leather per acre. However, much research will be necessary to achieve the tremendous potential of ranges throughout the United States and the world. Increased attention must be given to planting improved species on areas needing rehabilitation, controlling pests, using fertilizers, breeding more efficient plants and animals, and developing better management techniques.

Despite substantial federal and state range research programs in the past, a number of specific problems can be identified as needing research attention. Although the importance of the following problems may be debated, these are the ones that received most emphasis at livestock association meetings during the past year in the Intermountain area.

Range use by wild horses and burros is creating serious problems in Nevada, Idaho, Montana, Oregon and other western states. Studies are needed to determine how they can be managed and how the range resource can be properly allocated among wild horses, livestock, game and recreational use.

Off-road vehicle travel is becoming troublesome, especially on desert and semidesert ranges. Studies are needed to determine how such use should be managed and how much should be allowed.

Such pests as predators, rodents, insects and diseases continue to cause serious range management problems. Predator-prey relations need to be determined as a basis for control. Studies are needed to determine what pests should be controlled and how this control can be accomplished without damage to environmental quality.

The effectiveness of rest-rotation grazing for range improvement and its efficiency for livestock production need objective evaluation. This grazing system, developed for perennial bunchgrass range in northeastern California, has been widely accepted as a panacea for all range management problems. Subjective evaluations by proponents indicate success in numerous situations. However, data are not available to demonstrate the real worth of the system or to sort out the contribution of such very important factors as plant control, revegetation, water development, fencing and removal of trespass livestock — all of which have accompanied the application of rest-rotation grazing on federal ranges.

Furthermore, there is considerable evidence that heavy utilization, often associated with the system, can damage vegetation and soil and result in deterioration of both watershed conditions and aesthetic values. Also, there are numerous complaints from producers that livestock

performance suffers under the rest-rotation system. At any rate, this system needs objective evaluation. In addition, other systems that might allow the use of several million acres of currently idle or underutilized allotments should be developed and tested.

More research is needed on how to restore the capacity of rangelands to their potential in producing forage for livestock, habitat for wildlife and protective watershed cover. In 1936, a comprehensive western range survey, made at the request of Congress, was published as Senate Document 199. It reported that a 728 million-acre range area was more than 50 percent depleted from its original condition. In 1972, the Forest-Range Environmental Study (USDA Forest Service Resource Report No. 19) reported 18 percent of the western range as being in good condition, 50 percent in fair condition, and 32 percent in poor condition.

Despite considerable progress in the past 10 or 15 years, there is certainly no place for complacency in the management of this immense range resource. Research is still needed on selection and breeding of improved range plants, particularly forbs and shrubs; how to establish them on rangelands; how to control undesirable species; and how to manipulate range vegetation through the use of fire or other means to create the best conditions for a variety of uses and values.

Since rangelands comprise nearly half the land surface of the United States, they provide a substantial part of the total water supply. Therefore, it is extremely important that the range be properly managed for optimum production of quality water. Research is needed to determine the effects of grazing, recreation and other rangeland uses on water quality and yield.

Studies are also needed to provide a sound socioeconomic evaluation of range resource use. Not only are there new demands for this resource, but also more rigorous requirements for its management. The National Environmental Policy Act requires development and evaluation of land-use alternatives and program mixes, as well as public involvement in planning and decision-making. The effectiveness of current and future efforts in land-use planning will certainly depend on sound socioeconomic information about the range resource. ↑

Blaisdell is assistant director of the USDA Forest Service Intermountain Forest and Range Experiment Station, Ogden, Utah.

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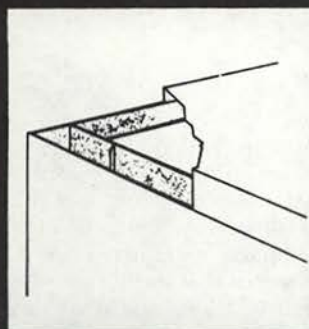
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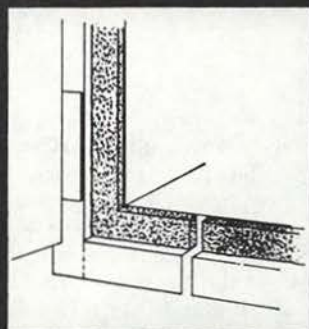
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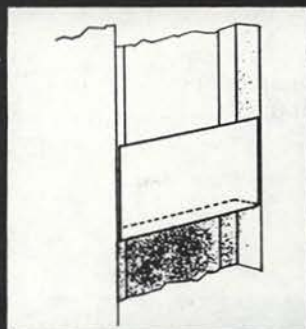
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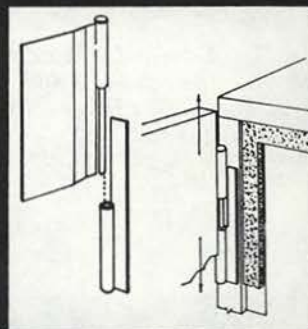
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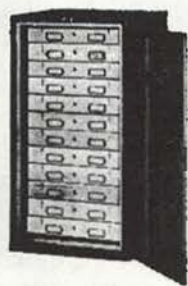
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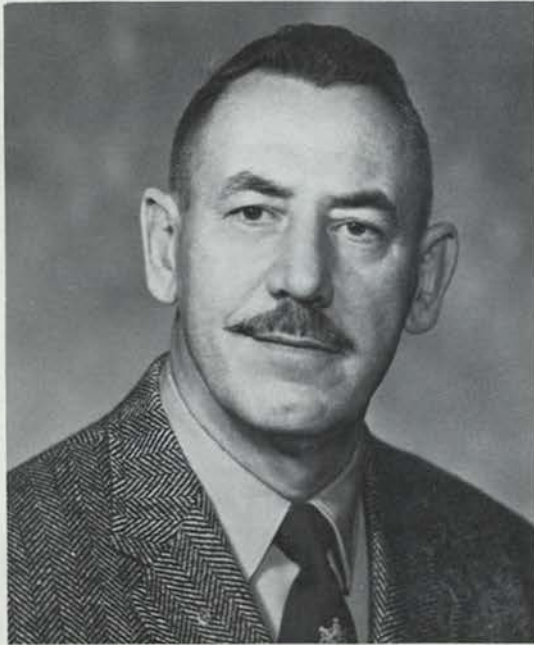
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Impact of the Energy Crisis on Land Use Planning in the Northern Great Plains

Environmental awakening in the United States during the past ten years has brought much conflict and controversy into traditionally accepted areas of human endeavor. A shift in industrial development is taking place and nowhere are potential impacts of greater concern than in the Northern Great Plains area that includes portions of Montana, North Dakota, South Dakota and Wyoming.

In this four-state area, traditional land uses and ethics are being tested by the nation's rapidly growing need for basic energy resources because this comparatively small region contains more than 40 percent of the country's total coal reserves. The so-called Fort Union geologic formation contains an estimated one and one-half trillion tons of coal that is low in sulfur and therefore of great interest and value for fuel under today's air pollution standards. Upwards of 40 billion tons of this coal can be obtained under existing technology through strip mining.

Much of the land overlying this vast coal reserve is historical ranching country. The people living here are strongly independent and have a very real and highly motivated "feel" for their land. However, in many cases, the rancher owns the surface only, while the mineral resources are owned by other private individuals, railroads or the federal government. Within the Northern Great Plains region, about 20 percent of the land surface and 80 percent of the mineral resources are publicly owned through the federal government.

The Interior Department's Bureau of Land Management, Uncle Sam's leasing agent for mineral resources, was among the first to feel the growing pressure to lease these coal deposits. Previously, coal on the Northern Plains was of marginal value, except for local situations. In the entire state of Montana, only 16 leases comprising about 36,000 acres had been issued on federal lands and little development activity had taken place. Intermingled state lands were leased independently and limited coordination of effort resulted.

Until recently there was little concern about coal mining conflicting with other interests or resources. Leasing procedures were adequate for the time and demands. Then almost overnight the federal practice of issuing prospecting permits and coal leases with little more than on-sight evaluation of the prospective purchaser's selected lease area proved inadequate. Leasing procedures did not stand the test of the Secretary of Interior's new leasing policies.

Meanwhile, industry was dynamically exploring markets and availability of coal resources as well as development options ranging from railway transportation of coal to on-site gasification. Considerable time and money was expended on various rights that would permit large scale development, such as surface and mineral rights, water options, rights-of-way and other legal clearances.

In October 1971, the Interior Department's Bureau of Reclamation released the "North Central Power Study." If any resource manager harbored uncertainties of the magnitude and complexity of the coal equation, this landmark study effectively dispelled them. It became immediately apparent an in-depth, interagency, interdepartmental, interstate, interdisciplinary study was needed.

Data had to be obtained for meaningful evaluation of all resources, not only within a given county but regionally as well. Two common denominators, the magnitude of the Fort Union formation and substantial supplies of available water dictated a larger overview.

Midsummer of 1972 found the Departments of Interior and Agriculture and the Environmental Protection

Agency agreeing on study needs at headquarters level with subsequent deliberations with the five governors of the Old West Regional Commission. From this, the Northern Great Plains Resource Program (NGPRP) was born. This study involving seven interagency work groups, composed of participants and contributors drawn from 10 federal, five state, many academic and 20 special interest sectors, has the primary objective of providing an analytical and informational framework for policy and planning decisions at all levels of government.

While the Northern Great Plains Resource Program was being initiated, two broad multiple-use agencies, the Bureau of Land Management and Forest Service, examined their local operational dilemmas and decided to attack many specific immediate issues within the confines of a smaller operational plan, but under the broader umbrella of the NGPRP study.

An area in southeastern Montana encompassing nearly a million acres and the communities of Decker and Birney was selected. Portions of the Custer National Forest and BLM Miles City District as well as state and private lands were represented. The Decker-Birney study area was picked to help test and solve many operational problems peculiar to the Fort Union region. Emphasis and concern was pointed toward getting the most significant cross section of factors and variables within a reasonable management area. The following conditions existed:

1. A highly complex mix of surface/subsurface ownerships.

Ownership	Surface Estate Acres	% Total	Mineral Estate Acres	% Total
Private	618,540	69	61,752	7
State	48,000	5	48,000	5
USFS	153,496	17	162,477	18
BLM	78,673	9	626,480	70

(Please note federal ownership represents 88 percent of the mineral but only 26 percent of the surface.)

2. The area is one of the richest coal areas of Montana, containing about 16 billion tons of low sulfur coal stripable under current technology. Seams vary from 11 to 72 feet in thickness. The area has eight federal coal leases covering 18,456 acres and 11 coal lease applications involving nearly 118,000 acres.

3. There are 215 operating ranches with about 90 operations directly affected by coal development. Most of these ranches were patented as stock-raising homesteads — mineral rights were retained by the federal government.

4. Resources involved in the area include timber, recreation, minerals, livestock forage, wildlife habitat, watershed and important archeological and historical sites including numerous petroglyph and pictograph areas.

5. Various state and federal laws exist that impinge on leasing, mining, mined land reclamation, water use and water rights. In addition, regulations and management objectives for the lands under the variety of ownerships are often in conflict.

6. Rights-of-way for roads, powerlines, railroads, waterlines, gas lines and slurry lines pose unique problems compounded by a broken pattern of surface/subsurface ownership.

(continued page 40)

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Lets Talk About Some Alternatives

U.S. Congressman Steve Symms



In a sudden rush to tidy up our environment, Americans have lost perspective on the economics involved in responsible resource management on public lands.

Resource management is not a social science. While social needs are factors in management, it is occurring all too often on our public lands that so-called "multiple use" in fact becomes nothing more than a series of special interest allocations.

Some — but not enough — of the resource legislation before the Congress now is geared toward putting management back into economic perspective. We are finding in a review of past management experiences that the technical conflicts which must be resolved in any integrated management system are often resolved with social criteria.

There are those, of course, who see no harm in using social criteria to make biological decisions. The practice is encouraged, in fact, and particularly by environmental extremists who have convinced themselves and the nation that they have only the preservation of the earth at heart. In fact, they may have done the greater harm. The consequences of management without regard to economics are dire.

It's likely that we got off the right economic course because of our emotional reliance on management terms that have little to do with economics. The primary stumbling block in returning to rational economics may well lie in two motherhood-and-apple-pie terms that are basic to our resource management policy — "public" and "multiple use." Without wishing to attack the integrity of these concepts, it's important to understand that they are not entirely realistic.

The concept of "public" ownership of lands under federal trusteeship is not manageable in a true "public" sense, for in reality, the lands belong to no one. There is no rational means of allocating proportional multiple use to meet public demands. All demands made on the public land base are "rightful;" all can be defended with cogent arguments; but the task of satisfying these demands is impossible.

Although we tend to think of special use designations as fulfilling these demands, these decisions are more truly an example of the taking of privileges and rights from the majority to satisfy the few. It frequently boils down to success for those with the most effective and powerful lobby. To reiterate, "multiple use" in fact becomes nothing more than a series of special interest allocations.

This concept is especially burdensome to the taxpayer, who finds himself paying for special uses in which he has no interest and no benefit. Because the government has defined taxation for support of these lands as being "for the public good," the job of determining economic benefits becomes impossible.

There is no semblance of "market choice" where a handful of birdwatchers are enjoying the Brigantine National Wildlife Refuge and at the same time, western campers are tailgated along forest roads seeking available public facilities.

But more efficient use of our natural resources can be achieved by providing economic incentives. We have been so brain-washed by environmental extremists about the evil of profits that we tend to pussyfoot through any management decisions that turn a dollar. It might surprise these extremists that the same market formula which makes timber, grazing, mining and agriculture profitable are equally effective in recreation, watershed, wildlife and wilderness.

We must accept economics as the common ground for resolving environmental conflicts. Production, population and technology will not remain static, nor should our classified uses of public lands. If we can overcome the irresistible demand for government intervention and prevent Congress from grand-standing to popular whims, we can achieve efficient, responsive uses of our land base.

The trick is in tying the costs of resource renewal, quality degradation and wildlife mitigation to the profit structure. True, there is a direct effect on consumer prices which won't rest easy on the shoulders of the politicians. If nothing else has become clear in the current energy crisis, it should be the fact that artificially depressed resource prices are wasteful and present a clear environmental danger.

Once we began facing the "real" prices of resources, rather than cloaking their costs in complex tax structures, we can begin to identify a realistic market demand. In shifting the responsibility for environmental quality to control to industry by applying ecological economics, the real costs of maintaining a clean environment are directly traceable through the user-consumer chain.

For instance, in forestry, consideration must be given in the Congress to tying reforestation and management costs directly to timber revenues. This is our only valid means of assessing the environmental impact of the industry and its consumers.

It's obvious that where there is no ownership, conservation practices are minimal. With no assurance of long-term tenancy, resource users logically deplete supplies with little if any regard for renewal or related management.

In vesting ownership, it suddenly becomes economically essential to protect the long-term productivity of the resource base. In private holdings, use designations are not subject to political whim and thus respond to public demands in terms of real market incentives. It then becomes possible that those, for instance, with a real and vital concern for environmental quality will not see a privately held wildlife preserve turned suddenly to strip mining because of political pressure in the Congress.

The mechanics of ecological economics are obvious in revenue-producing land uses. For the interests of the Sierra Club and similar organizations, the mechanics are less obvious but certainly as effective. Up until now, they have staged their battles before Congressional committees and in the courts. The brand of self-sacrifice demanded from the taxpayers to meet the costs of these special interests is about as successful over the long run as dieting has been for most housewives. This form of resource politics demands constant vigilance and continued reliance on "public" lands to achieve special goals. The relationship is parasitic, produces no revenues and chances of sustaining the movement over the years are sketchy.

There is a legitimate argument for setting aside wilderness lands, wildlife refuges and untouchable inventories of resources. But to be effective, the environmental lobbyists must replace their stream of words with a stream of money.



Pathology Lab.



Determination.

One device in making these set-aside classifications economically feasible could be the practice of excess taking. In establishing a park or a wilderness area, it's an inescapable fact that surrounding land values will rise dramatically. By purchasing twice the acreage desired, organizations like the Sierra Club could sell off the excess taking, using the proceeds in combination with adjoining concession operations to support their preserve. By getting the costs of wilderness off the backs of the taxpayer, the United States government could well afford an added incentive of tax-free status for these properties.

The recent flap over construction of the Alaskan pipeline is an excellent example of wasted dollars to achieve special interest allocation of public resources. It would be virtually impossible to determine the amount of money wasted in government agencies, our court system, by industry, by ecology groups, and within the Congress in determining over a period of years whether the pipeline would materialize. This money was literally wasted in reaching a decision that could have been made in a free market in a matter of months. This wasted money would surely have accomplished far more had it been invested in Alaskan wildlife preserves or some such environmental endeavor.

The road to recovery of economic principles in resource management will take some real changes in thinking, particularly on the part of the Congress. We've fallen into a pattern of government intervention over the past 200 years that's hard to shake, and particularly when special interest groups continue to think in terms of getting a free lunch from the government.

Let's start talking about some alternatives. ↑

Toward a More Perfect Environment



W. D. Hagenstein
Industrial Forestry Association

Everyone wants cleaner air, water and land for ourselves and cleaner yet for those who come after us. It's natural to want to do better for the younger generation than we felt was done by us. If that weren't man's basic motivation, civilization would never have succeeded. Most of us wouldn't be here because the quest for knowledge would have slowed or stopped and the technology needed to provide our ancestors with food, shelter and the chance to survive would have been diminished.

In our zeal for a better environment we must not become so preoccupied with the ecological that we forget the economic. Jobs, homes and enough material things to keep us warm, fed, clothed, healthy and happy are essential. We have some psychological needs too — trust in one another, credibility, communication and adherence to the Golden Rule.

To perfect our environment in these times when the psychological amenities seem at a low ebb requires less preoccupation with ever higher wages, prices, profits and taxes — all of which only add up to ever higher inflation. Inflation has become such a way of life that we are running the risk of plunging into completely unnecessary economic darkness. No one wants this. Most of us are more interested in living and letting live than in being the architect of a great design to tell everybody else how to do it. That's what the environmental struggle of the 1970's is all about. Those who don't know how, but want a better environment, are doing the planning, projecting and politicking instead of those of us who do. The upshot is that they are slowing down and even halting the steady forestry progress we've been making for two generations at a time when real shortages of the non-renewable essentials make our renewable ones all the more important.

Some think trees are immortal. Fact is that they are no more immortal than man. Some species of trees are very long lived, but every tree has a date with death. That's why we must practice forestry — not prohibit it by imposition of man-made laws in contravention of natural laws.

Years ago a pioneer American forester, R.T. Fisher, said, "That forestry which is best is that which is practiced by the square rod." Now the tendency is to practice it by a different kind of rod laid on by the hand of the courts and administered by those who neither understand forestry, nor believe in it.

The best way to make people understand the errors of their ways is education. Sometimes it takes a missionary, sometimes persuasion, other times, politics. But, regardless of how it's done or how it must be done, there's no person interested in the future of our nation who can be so perverse, so unbelieving or so dumb as to fail to understand that its future depends more upon the renewable resource than any other thing.

Every profession has a responsibility first to the people it serves, second to itself. Every profession must recognize that it must serve the public interest through ethical application of its current knowledge and in a way that recognizes the need for human beings to accommodate with one another and with the rest of their environment; to keep it viable, beautiful and strong. By strong I mean protecting and managing the environment so that renewable resources are renewed and non-renewables are used and conserved wisely, not wastefully. Otherwise, how can any profession do its part to assure that our species does not become endangered by making it impossible for us to live through inadequate supplies of essentials, such as homes, food, clothing, fuel, water and opportunities for employment, education, health and good government.

I've long adhered to the idea that man is the central figure in our environment. I also believe, as I was taught by my professors, that the prime purpose of forestry is to serve people. Having spent my career as a forestry missionary, helping transform the great forest region where I live and work from a storehouse of deteriorating virgin timber into a young growing forest for perpetuating our environment while our virgin timber harvest was building a quarter of America's homes, I know that the forest industry and the forestry profession have served society well.

Like most who went to college in the 1930's, I earned my way by working in logging camps and fighting fires. Two of the latter were in Idaho — the Magee Fire on the Coeur d'Alene National Forest in 1931 and the Pete King Fire on the Selway in 1934. It was these experiences which led to my entering forestry school. This experience was the highlight of my early life.

Another highlight has been to have a hand in the tree farm movement from the time it began, now a third of a century ago. We never called tree farming an environmental undertaking, but that's what it was and is.

We need to make certain that those who reach the minds of the people — our school teachers, journalists and

politicians — know the two main things we've done in the last third of a century to improve forestry in the United States. The first is the successful forest fire prevention message through our Keep Green Associations in every state. Keep Greeners were greatly aided by Smokey Bear, the advertising industry, the schools and the communication media.

The response to the plea for preventing destruction of our environment by man-caused forest fires has been outstanding. In the last 35 years we reduced the forest area burned over annually in the United States to about one-tenth of what it formerly was. This is a huge environmental plus for everyone.

The second is reforestation. It has also made a significant contribution toward a more perfect environment. Once the level of protection made it possible to invest in tree planting along with the incentive of rising stumpage values, you couldn't prevent landowners from growing trees. Through 1925 we had only planted a million and a half acres of trees in the United States. Now we do that every year and it's increasing. And who really knows it, or believes it, or understands its importance?

Forestry's enemies are quick to criticize its shortcomings, or what they think are its shortcomings, but very slow to applaud its progress. Those of us who have forest protection and management responsibility are critical too when our own people don't do a workmanlike job, and they don't always do it. But, people don't change their ways overnight, nor is there anything more effective to motivate good workmanship than the promise of a return on investment of labor, intelligence and capital in an enterprise.

Long before creation of the Environmental Protection Agency and many of the state environmental agencies, Congress had recognized by many acts the importance of a better environment. The establishment of the national forests in 1891, and their dedication to water and timber production under the Organic Act of 1897, demonstrated environmental concern being translated into positive national policy. Creation of the national park system in 1916 was another. Passage of laws to help the retired, the disabled, the elderly and the poor were all recognition of environmental concern. Certainly the Housing Act of 1968, which established a goal of a decent home for every American, was recognition that the principal environment of every family is its home. It was one of Congress' most important actions in our time to make for a better life in America.

The energy crisis, despite the speculation that it is artificially contrived, is real. It emphasizes all the more the importance of fulfilling the nation's housing goals. If Americans are to become less mobile, then fulfillment of a better environment through better housing is a paramount social objective.

Here's where the renewable resources of our country, and particularly our trees, come to the fore. Wood is our only renewable construction material. It has far more advantages than all its competitors because it takes so much less of total materials to produce it. After Nature has energized its marvelous sylvan chemical factory with sunlight it turns out our best homebuilding material.

Wood is outstanding also in its energy conservation. For example, one ton of aluminum requires 17,000 kilowatt hours of energy; a ton of steel, 2,700 kilowatt hours; but only 430 kilowatt hours for a ton of lumber.

We now have an energy crisis. Some people want a forestry crisis. No need for it whatsoever, because if we

sustain a timber famine it will be entirely artificial. We have 500 million acres of land capable of growing continuous crops of timber. Private forest owners have the incentive because timber values justify the investment of the huge sums it takes over long periods to practice forestry from planting to harvest. So does Government as the nation's No. 1 forest owner.

It takes real faith to leave capital tied up as long as the life of a tree, particularly because of the inherent risks of forestry. So there has to be some assurance that Government won't interfere with the tree cycle by unwise taxation, or tell their owners between planting and harvest that they can't do this or that because such forestry acts as clearcutting are offensive to some who do not recognize the silvical requirements.

The thesis I've been trying to develop is the kinds of philosophies, attitudes and acts it takes to fulfill the moving theme of the IDAHO FORESTER for 1974, "The Efficient Use of Our Renewable Natural Resources." This title typifies the renewability of trees and of people. They're inseparable because neither can do without the other. We don't grow or harvest trees for the sake of the trees, but for people and their essential needs for building, packaging and communications materials. We manage forests not only to grow wood to serve human needs, but for the other multiple use benefits of water, wildlife, scenery and recreation.

Forestry, as an act on the land, is the application of the principles of all the environmental sciences in the combination which will provide the highest yields in both material and other benefits for society. What the forest industry has been striving for since it started as the first continuous business on this continent is to satisfy human demands. It satisfied them well by building a great nation. It will satisfy them better in the future if we can make people understand that the renewable tree is our best chance to succeed in our national quest toward a more perfect environment. ↑

Hagenstein is executive vice president of the Industrial Forestry Association, Portland, Oregon.

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ENVIRONMENTAL LAW

IF: Is environmental law a new thing? Were there precursors or precedents that influenced present laws aimed at protecting the environment?

SMITH: That depends on what exactly you mean by environmental laws. There were precursors to the present air and water pollution control acts which met with very limited success and which were drastically altered in recent years to achieve rather comprehensive federal pollution control and management. If you are referring more broadly to conservation laws and regulations, many of these are not new and have applied to public lands for quite some time.

What is newest is the expanded public consciousness concerning our natural resources and the quality of our environment. This has led to a number of new laws at the national and state level which require that government planning include a wide variety of environmental factors, as well as an increasing number of laws which deal with the environmental impacts attendant with the use and development of private lands. With the concept of standing¹ being reduced to little more than a technical pleading requirement, this expanded environmental concern has also led to a larger judicial role with respect to environmental problems.

IF: What are the milestones leading toward the designation of wilderness areas, besides the Wilderness Act itself?

SMITH: I suppose the principal milestone with respect to wilderness goes back to the early Forest Service interpretation of its own statutory authority to provide for multiple use management of national forests. This interpretation was somewhat broader than the wording of the Forest Service Organic Act might suggest, since this act speaks principally to timber and watershed values. Multiple use, in turn, was interpreted to include concepts of wilderness preservation and, commencing in the 1920's, the Forest Service administratively classified approximately 15 million acres as either wilderness or primitive. In 1960, by the Multiple Use Act, Congress confirmed this administrative interpretation of the Forest Service's authority, and in 1964, by the Wilderness Act, Congress ratified the wilderness set-asides made years earlier by the Forest Service.

IF: Was the Wilderness Act legally well conceived? Is it too rigid? What weaknesses does it contain?

SMITH: Like any piece of legislation, the Wilderness Act is drawn in sufficiently broad terms that applying it to specific facts is sometimes difficult. But in that respect it is neither worse nor better than most pieces of legislation. The act simply confirms the wilderness status of those areas that were previously designated as wilderness by the Forest Service, directs the Forest Service to study those areas that were then designated as primitive, directs the Park Service and the Bureau of Sport Fisheries and Wildlife to review unroaded areas within national parks and game refuges for possible wilderness designation, permits certain mining activities until 1984, and also

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requires mineral investigations be made by the U.S. Geological Survey in any area which is being reviewed for possible wilderness status. The act also prohibits further administrative wilderness classifications.

If preservation of wilderness in general is your favorite objective, I suppose you would view the Wilderness Act as being too narrow. However, the Forest Service has taken the position that its multiple use authority permits recommendation of additional areas for wilderness classification and has selected 12 million acres of roadless national forest land for wilderness study above and beyond those lands covered by the Wilderness Act. This means that

¹ *Standing is the required showing of injury necessary for a person to litigate a particular issue. Traditionally economic injury resulting from interference with a legally protected right was required. Recently courts have permitted persons to maintain lawsuits in order to protect non-economic interests only loosely connected with the particular plaintiff before the court. Thus a group like the Sierra Club can raise and litigate a wide variety of issues bearing on environmental concerns which were not heretofore challengeable.*



approximately 84 million acres are either classified as wilderness or are being reviewed for possible wilderness classification by the Forest Service, Park Service and Bureau of Sport Fisheries and Wildlife. If Congress acts favorably on the recommendations from these three agencies, a wilderness system in excess of 50 million acres appears probable.

Another possible criticism is that the definition of wilderness in the act is too rigid because it requires that wilderness areas be substantially virgin, thus precluding consideration of areas on eastern forests which have been developed in the past but today have semi-primitive qualities. Whether this is a weakness depends to a certain extent upon whether you feel that preserving a high quality system is important. The Forest Service has been studying and conducting hearings on this subject and bills are now pending before Congress which would authorize establishment of an eastern wilderness system which would not be subject either to the size or qualitative limitations presently contained in the Wilderness Act.

A final criticism of the act might be its sanction of mining activities until 1984. This is similarly a matter of opinion and rests upon a person's judgment concerning the relative importance of preserving all portions of these areas in a pristine condition versus the importance of exploiting, or at least discovering, the mineral values these areas might yield.

IF: The Sierra Club has gone to the courts to protect certain areas. What sorts of possibilities has the Sierra Club used to block the Forest Service?

SMITH: A principal tool has been the National Environmental Policy Act (NEPA) and the requirement contained therein for the preparation of an environmental impact statement before proceeding with any "major federal action significantly affecting the quality of the human environment." Because the courts have applied the act to almost every conceivable federal activity which

would result in a change of the physical status quo, and because the courts have also applied it to any project predating the act where there is any significant additional work to be done, it has been relatively easy to demonstrate non-compliance and thus halt any federal project pending completion of an impact statement and public comment procedures. Considerably less success has occurred in challenging administrative decisions once the environmental statement has been prepared.

Another approach has been to challenge the legal interpretation which the Forest Service has placed upon its statutory authority. An example of this is the Mineral King case in California in which the Sierra Club alleges that the Forest Service improperly construed its special permit authority in allowing issuance to Disney Enterprises of a revocable permit for greater than 80 acres.

Another example of this type of approach, brought by groups other than the Sierra Club, was the Parker case in Colorado in which the plaintiffs successfully maintained that the Wilderness Act withdrew areas adjacent to existing primitive areas from general multiple use management until reviewed by Congress. Incidentally, at least one other court has come to the opposite conclusion on this issue, and the Department of Agriculture has announced it will refuse to follow the Parker decision outside the Tenth Circuit.

A final example of this type of approach is a recent case brought by the Izaak Walton League in which the Sierra Club has, I understand, given substantial assistance. In this case the plaintiffs have persuaded a court in West Virginia that the Forest Service Organic Act prohibits the cutting and selling of any timber which is not dead or physiologically mature, thus severely curtailing existing timber management practices.

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In one case, involving the 50-year timber sale to U.S. Plywood-Champion Papers in Alaska, the Sierra Club has attempted to demonstrate that the Forest Service abused its discretion under the Multiple Use Act by failure to give "due" consideration to non-timber resource values. In contrast to other types of cases, the issue here is primarily factual rather than legal. The Sierra Club lost at the trial court level but the case has been remanded by the Ninth Circuit to determine whether a report prepared by experts employed by Champion constitutes newly discovered evidence justifying further trial.

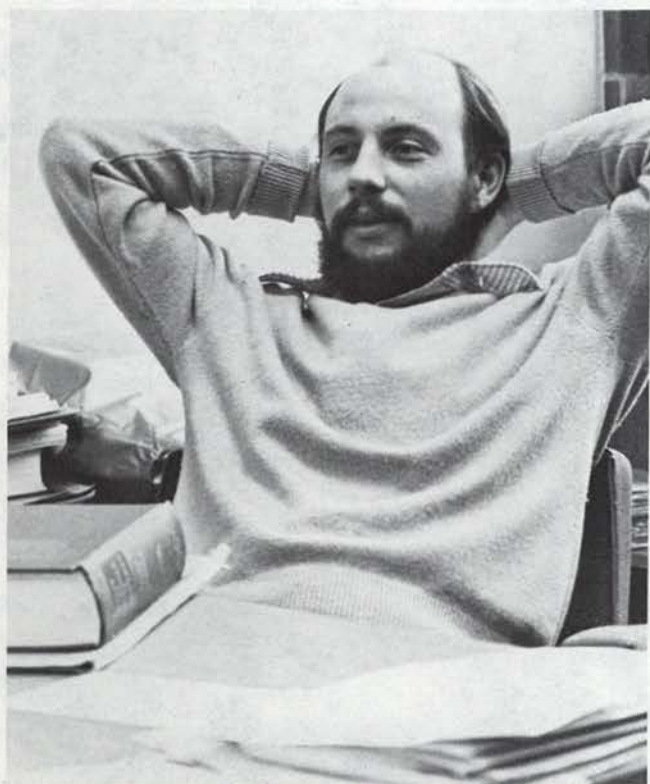
IF: Have industries ever turned to the courts to win over the environmentalists? If not, why not?

SMITH: Industrial or commercial interests have successfully employed the National Environmental Policy Act in isolated circumstances as a means of delaying federal action in the same fashion as environmental interest groups. An example is the Kansas case enjoining the Department of Interior from cancelling federal helium contracts pending completion of an impact statement.

Companies have also attempted to use NEPA to delay the Environmental Protection Agency pollution control activities. With the broad reading given NEPA by the courts, a special exception for EPA activities (which have far-reaching impact) is difficult to justify, but the courts have done so on the grounds that EPA pollution control activities must take into account substantially the same sorts of considerations which NEPA requires.

On the whole, however, industrial and commercial interests have not found NEPA to their advantage since their interests generally lie with government action which changes the physical status quo; and no comparable economic impact statement is required to justify an agency's lack of developmental action.

In other areas, commercial concerns have historically resorted to the courts when they have felt laws were being improperly applied to them. However, such litigation is usually aimed at recovering damage or challenging



treatment of an individual concern rather than being motivated principally by broad ideological considerations as is the case with much of the environmental litigation. Moreover, in an era of environmental concern, courts can be expected to be more favorably disposed to environmental plaintiffs.

IF: How do environmental laws differ on private versus public lands? How much jurisdiction do environmental protection laws have over private industry and lands?

SMITH: Again, this depends on what exactly you are referring to as environmental laws. The air pollution and water pollution control legislation will have its **principal** impact upon private industry and the use of private lands. Federal jurisdiction under these acts is very broad and impacts are likely to be felt very widely, particularly with the non-degradation requirement under the Air Act dictated by recent court decisions.

If you are referring to the National Environmental Policy Act, this has limited application to private industry and lands since it is a restriction on governmental activity. If you are referring generally to conservation-protection laws and regulations then, of course, the difference is considerable. Use of most private land in this country is neither planned nor controlled in any comprehensive fashion for conservation purposes, while public lands are.

IF: Do you think environmental laws are going to relax as a result of energy crisis demands for natural resources? Are they already eroding?

SMITH: I think the energy crunch will prompt relaxation of certain standards, particularly those contained in the Air Act. However, it should be noted that the standards set forth in the pollution control acts are highly optimistic and would likely have required relaxation wholly apart from the energy situation. Also, as the costs of environmental protection become more apparent in the next several years, there may be disenchantment with some of the current environmental causes. What result this might have I wouldn't be prepared to predict.

It is possible that the shortage of energy and other material may also slow passage of very important pieces of environmental legislation presently before Congress, such as strip mining and land use planning. On the other hand, the energy shortage may have a much more positive impact, giving impetus to overdue conservation measures.

IF: Who enforces the Wilderness Act and environmental protection laws?

SMITH: The Wilderness Act is administered by the Forest Service, the Park Service and the Bureau of Sport Fisheries and Wildlife. The act is not an enforcement piece of legislation, so I don't know whether it is appropriate to characterize anyone as enforcing the Wilderness Act. To the extent that people do not abide by the restrictions applying to wilderness areas, the administering agencies can seek either criminal or civil enforcement in the courts.

As to air and water pollution control legislation, the Environmental Protection Agency is the principal enforcer. The Congress has, however, provided for citizen suits so that in this respect I suppose you could say that interest groups tend to be enforcers of the law. The same might be said of the courts which resolve conflicting interpretations of requirements of pollution legislation. As to the National Environmental Policy Act, I suppose that it is self-enforced by agencies, and enforced by interest groups and the courts in instances where interest groups feel that the law is not being properly applied. ↑





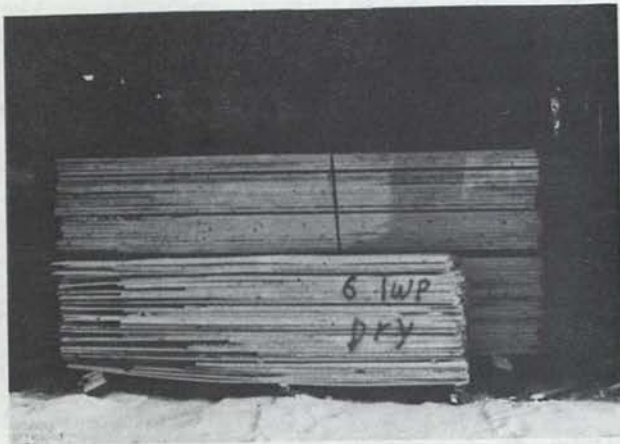
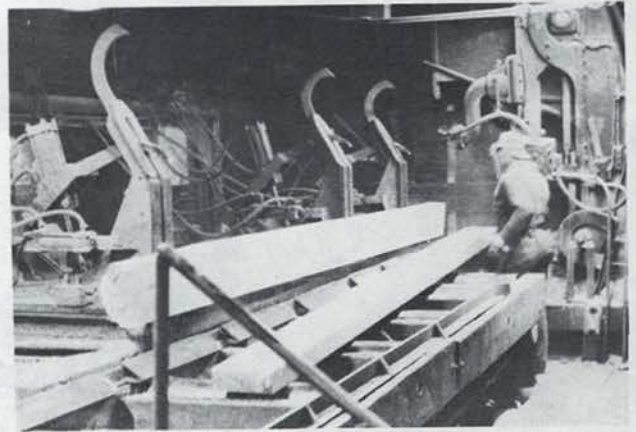
The White Pine Twins



The title of Ms. Idaho Forester for 1974 goes to a beautifully developed pair of white pines. Our lovely model on the right was formerly the largest standing white pine on the Kaniksu National Forest. She has a DBH of 52 inches, total height of 252 feet and an estimated volume of 8500 board feet. Our other model has a DBH of 46 inches, is 220 feet tall and has an estimated volume of 5560 board feet. More than two centuries old now, our white pine twins grew up before the settlement of Idaho and watched the development of Northern Idaho forests from fur trading to a great timber and recreation area. Much of the development of the area stemmed from white pines and other trees like them. The contributions made by white pines to Idaho has earned them the title of the state tree of Idaho.

The work of the white pine is still very apparent in Northern Idaho, where much of the economy is directly related to the production of lumber and assorted wood products. Ms. White Pine's lumber has a particularly attractive appearance after preparation in the mill. The pleasing appearance of good straight lumber to the public is one of the reasons Ms. White Pine has stayed as popular as she has for many years.

Ms. White Pine gives all of herself to the timber industry. Chips, left after the production of lumber, are used for pulp as well as for livestock bedding in Northern Idaho. Ms. Idaho Forester is also ecology conscious. The shipping of chips to various parts of the country for use in other industries is one of the ways Ms. White Pine helps clean up the environment by reducing air pollution due to the burning of mill residues.



Many forms of transportation give us what Ms. White Pine has to offer. Her travels are most generally of a local nature, but to give her final products to the public, she will travel to many parts of the country as well as abroad.

Her ultimate goal is to fall for a woodsman. The attraction between a white pine and a woodsman with a chain saw and axe is almost magnetic, and the inevitable must happen so that the beginning of the next generation of well-endowed white pines can take place.

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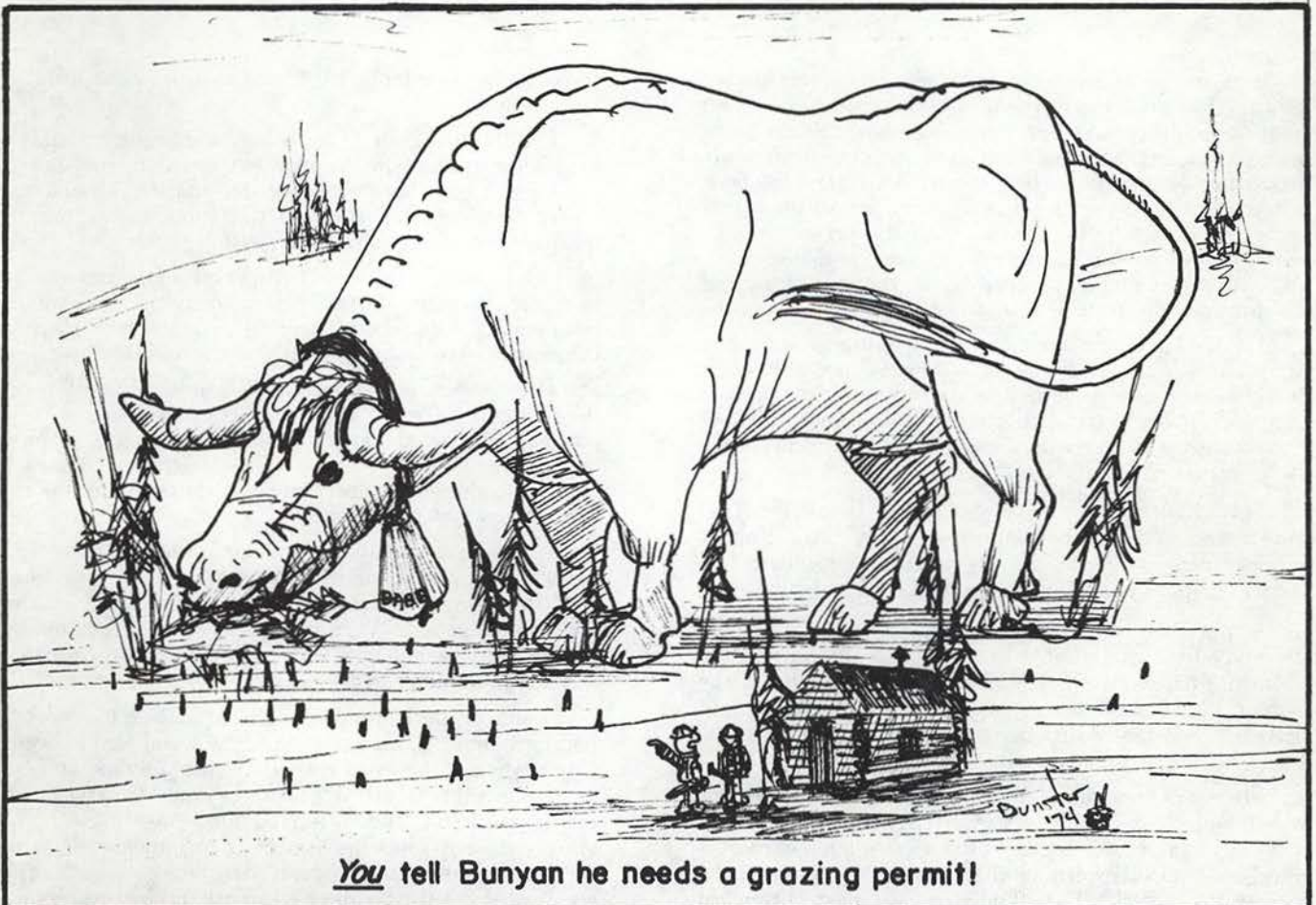
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R. J. DeArmond
Chairman of the Board
Idaho Forest Industries



N. K. Sowards, President
Environmental Products Incorporated

Over the years a principal problem facing the lumber industry has been the disposal of waste products without creating pollution. As our technology has advanced, we have found increased uses for these wastes, continually decreasing the quantity to be disposed. This factor has been a deterrent to large capital investment for steam plants using the wastes as fuel. Now, with the present energy crisis, the by-products of forest products companies have attained values as fuel comparable to those of chips and sawdust, and this trend will continue.

The industry now has a real opportunity to be leaders in the handling and disposing of wastes, not only their own, but also those generated by the communities in which they operate. Industry should take the lead in developing community operated combustion plants recapturing energy in the form of electricity, steam or hot gases.

This challenge has led Idaho Forest Industries (IFI) into a research and development project with Energy Incorporated, which is an engineering, consulting and service company headquartered in Idaho Falls, Idaho.

A one-year test program was conducted with a prototype ten-foot unit at IFI's Atlas Mill to determine the operating parameters and emission characteristics of the system. Based on the prototype data, production units have been designed and constructed by Environmental Products, Inc., Coeur d'Alene, Idaho.

The main component of the process is the incinerator vessel, which is available in sizes five feet to 14 feet and 14 to 24 feet high. Fluidizing air is supplied by a blower and is introduced into the plenum chamber at the bottom of the incinerator vessel. The fluidizing air passes upward

through the distributor plate and then into the fluidized bed of sand.

The fluidizing air is heated by the preheater; this is used only in startup. Wood waste is fed to the unit by means of a box chain conveyor into the feed tube system where it is injected through the vapor-space into the fluidized bed of sand by an air injection nozzle.

Combustion of the wood occurs both in the vapor-space and the fluidized bed. The majority of the volatile components of the wood burn in the vapor-space; the solid constituent of wood burns mainly in the fluidized bed.

The combustion products (CO₂ and H₂O) and excess fluidizing air pass out of the incinerator vessel to a boiler package for steam generation or the hot gas is piped directly to a dryer or kiln. If the energy is not to be recovered, the gas temperature is reduced by means of a water spray system.

For normal startup of the system, the fluidizing air is preheated to approximately 950 degrees F by a propane-fired fluidizing air preheater. The hot fluidizing air then heats the sand bed. When the temperature of the sand bed reaches approximately 800 degrees F the fluidizing air is increased to fluidize the bed of sand.

When properly fluidized, the sand bed looks like a boiling liquid. At the same time, the wood feed is begun. Combustion of the wood is spontaneous at temperatures of approximately 750 degrees F and greater. The temperature of the fluidized bed increases up to approximately 1500 degrees F., depending upon wood species and moisture content. Satisfactory operation is obtained at any temperature greater than 1200 degrees F.

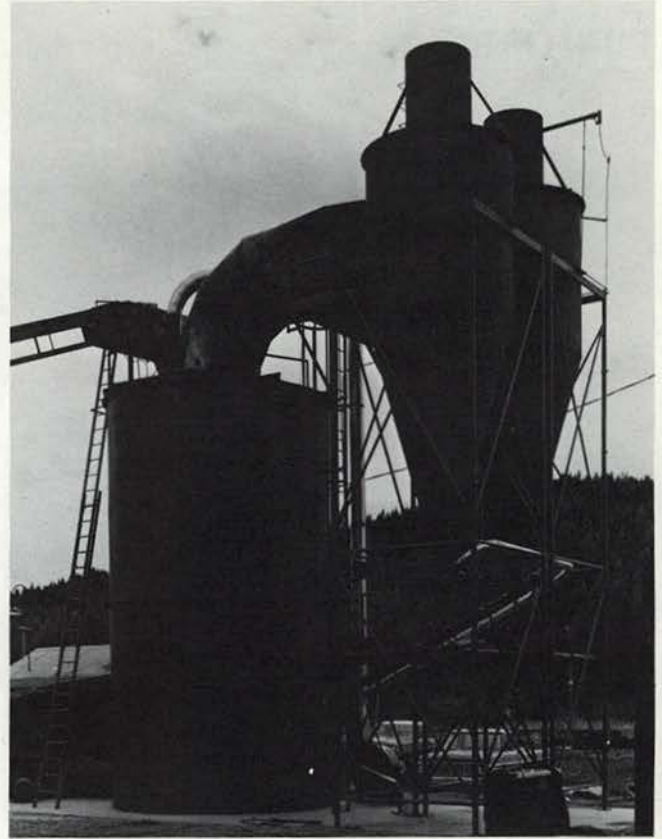
The unit will operate with a wide range of fuel types and conditions. Satisfactory operation has been demonstrated on a variety of hogged fuel wood species, including white fir, hemlock, Douglas fir, larch, ponderosa pine and white pine. The wood and bark ranged in size from sawdust to pieces with a major dimension of up to 12 inches.

Fuel consumption ranges from a high of 200 tons per day of 55 percent moisture feed for the larger units to a low of five tons per day of 15 percent moisture feed for the smallest units. The unit is capable of smokeless combustion of all species; the only requirement being a moisture content less than about 60 percent. A limited amount of testing has been done with coal and municipal solid waste as fuels; operation was satisfactory and no problems were apparent.

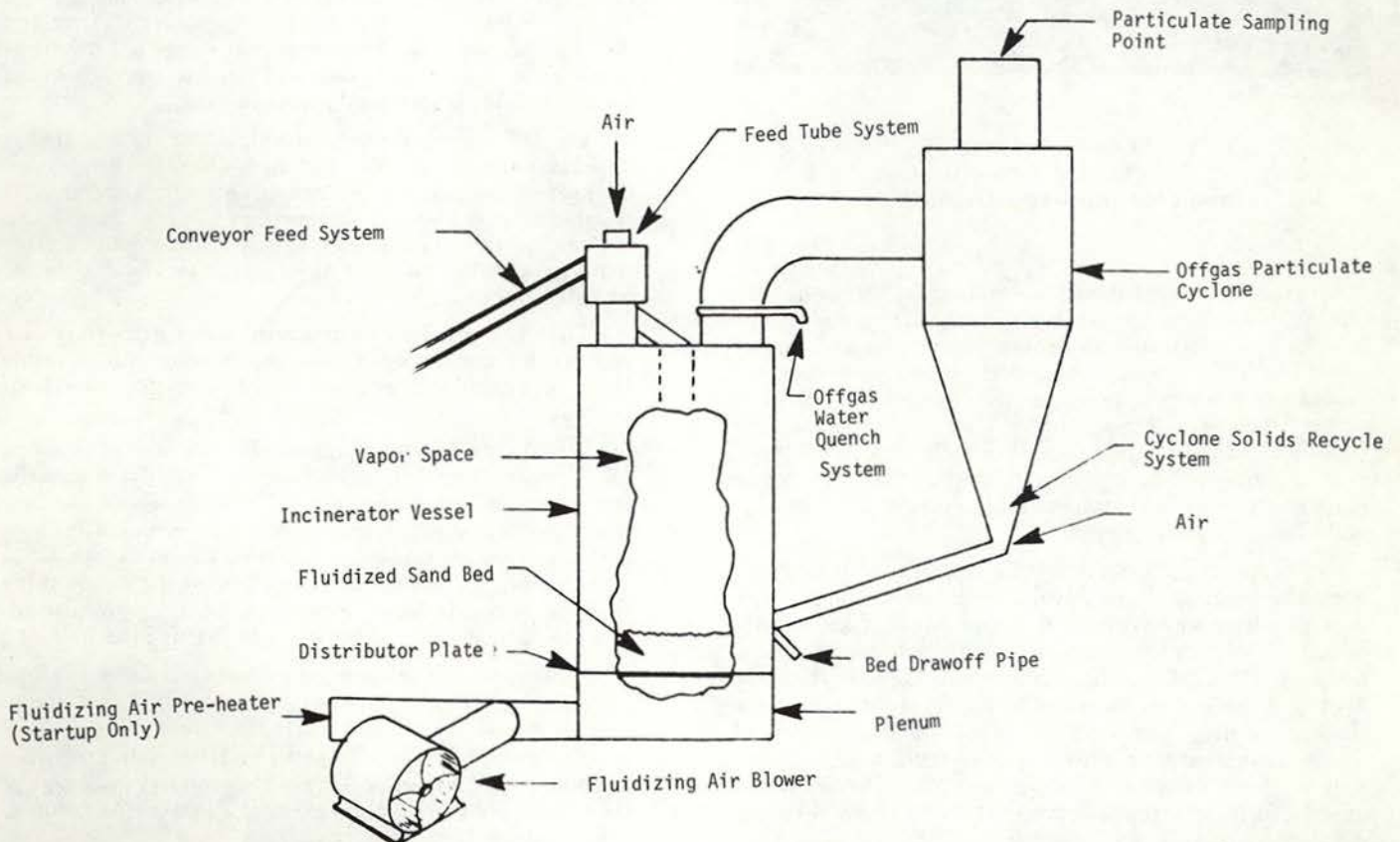
Particulate emission measurements indicate the offgas particulate loading is less than 0.1 grains/SCF. The size of the particulate leaving the cyclone offgas exit is less than 30 microns in diameter as determined by a Coulter Counter Analysis.

Packaged systems are available for straight incineration, steam generation or as direct hot gas energy sources for dry kilns, hogged fuel dryers and veneer dryers. This unit is available in sizes ranging in usable BTU output from 3,000,000 BTU/hour for the smallest unit to 40,000,000 BTU/hour for the largest unit. Greater outputs are readily achieved by installing additional modules.

High on-stream time is fully assured for the unit by an auxiliary oil or gas fired burner that can be activated in the event of fuel feed interruption or mechanical component failure on the unit itself. The unit is readily adaptable to a variety of fuel handling, storage and conveyance systems. ↑

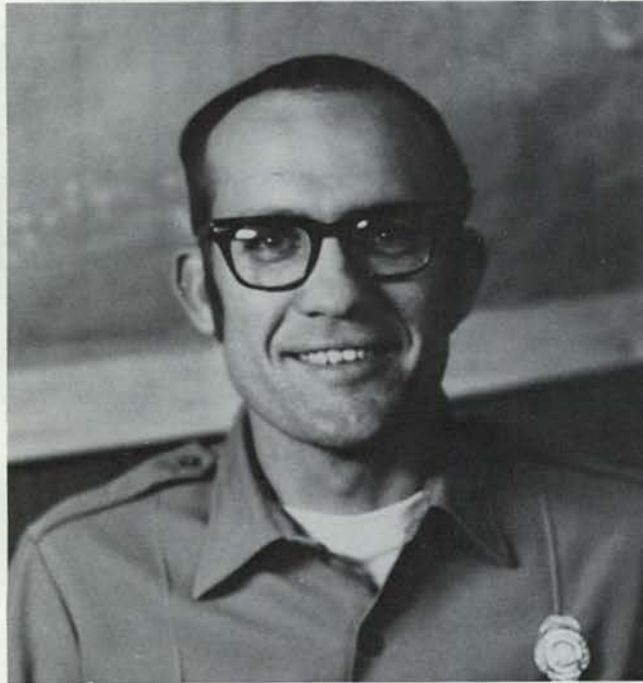


FLUIDIZED BED INCINERATOR



CONFLICT

Timber and Elk in Northern Idaho



Thomas A. Leege
Research Biologist
Idaho Fish and Game Department

It is widely accepted by game managers that the quality and quantity of forage available to elk during the winter months is often paramount in determining total population size. The cold temperatures, deep snows and dormant vegetation during that season put stresses on elk that reduce their population directly by malnutrition and exposure and indirectly through the reduced survival of the next season's offspring. In recognition of this, game managers put strong emphasis on the proper management of the crucial winter range.

In Idaho and other mountainous states, winter ranges normally occur at lower elevations along the major water courses where snow depths are least. Most of the elk are forced to these areas, whether or not there is adequate feed for them. Prior to large fires in northern Idaho in the early 1900's, dense conifer forests of grand fir-cedar types grew on many of these wintering areas, and the small amount of forage associated with those types of vegetation nurtured only a small number of big game. After the wildfires, grasses, forbs and shrubs became abundant — and likewise did the deer and elk.

Efficient fire control methods have kept additional large-scale winter range improvements from occurring naturally in recent years. The areas burned over earlier have regenerated to conifers, in many instances, with the result that forage and big game are declining.

The south and west exposures are harsher sites and have not suffered as rapid a decline in browse from advancing succession as is evident on east and north aspects where conifer takeover is dramatic (see photos). These drier sites are essentially without trees and there has been little objection to burning these areas to improve elk habitat. Consequently, about 34,000 acres of national forest land have been rehabilitated since a prescribed burning program backed by research findings was started in 1968 (see "Fire for Elk in Northern Idaho" in *Idaho Forester*, 1971).

There are additional acreages that can and will be burned in the years ahead, although the continual advance of conifers into the old brushfields is causing the land managers to become increasingly hesitant to use fire. On some slopes, conifer regeneration has advanced to the point where prescribed burning is very difficult to accomplish. To improve elk forage here, the trees need to be slashed first and then burned — a very costly procedure. But we cannot ignore these areas simply because of the high cost in treating them, as they have a tremendous potential for browse production — and at one time, not many years ago, they provided the winter food supply for a large number of elk.

However, this is where the conflict between timber and elk emerges. Some foresters and others primarily interested in trees for logging are distraught at the idea of burning an area that has an adequate stand of young trees to constitute a merchantable forest at maturity. Yet, it is becoming increasingly difficult to find brushfields that have less than 100 trees per acre, the density figure considered to represent adequate stocking. The question then arises: Should we rehabilitate the areas to maintain elk range and therefore sacrifice the trees, terminate range improvement practices in areas that have regenerated to trees, or try to raise trees and elk food on the same area?

The last approach has a "multiple use" ring to it that appeals to many people. Granted, why sacrifice either of the two resources if we can have both? Unfortunately, this is a dream-world approach — one that is unrealistic at best. Let us examine in some depth the two main proposals that have been suggested to get timber and elk values simultaneously.

Thin the conifers to promote faster growth in the remaining trees and at the same time allow more light to reach the ground to encourage growth of browse.

Most of the browse plants on areas in need of thinning have already been eliminated by shading. Consequently, the normal thinning procedure of cutting all but the crop trees, and leaving the slash to decompose naturally, does nothing to restore browse production. In some cases, basal sprouts from tall shrubs that were cut during the thinning operation provide some browse, but slash accumulations will normally discourage big game from using the area.

However, if the thinning procedure is modified to allow for wider tree spacing and slash disposal by fall burning, wildlife benefits can result. Burning will remove the travel obstacle caused by slash — and stimulate plant growth in the understory. Wider spacing of the crop trees will permit the understory vegetation to exist for a longer time before it is again shaded out.

But in view of the meager funds that the Forest Service normally has available for timber stand improvement, it is unrealistic to think that a significant amount of winter range will ever be improved with this method. To compound the problem, many other timber stands that are not at winter range elevations have first priority for thinning because of being more accessible to existing roads and because they occur on gentler topography where timber management is easier in every way.

Work the winter ranges into a timber rotation so that clearcutting and slash burning will keep some of the winter range as brushfields at all times.

This proposal would provide a very dim future for elk for the following reasons: 1) The majority of the timber stands on winter ranges are from 10-40 years old and trees are not normally harvested until 75-120 years of age. It is evident that elk numbers would decrease for many years before commercial harvesting would help restore the range. 2) A good share of winter range lies along scenic and wild rivers and in other aesthetically important places. Slopes are steep and unstable. Consequently, future logging will be minimized in these areas and done only in ways causing minimal environmental impacts. This would likely mean selective logging, a method not nearly as effective in producing elk food as clearcut logging.

In areas where winter snow depths are not the main factor determining the location of winter ranges, it is more feasible to combine timber management with deer and elk production. This is true for many of the midwestern and eastern states, where level topography and uniform snow depths are the rule. In these areas, almost all of the logging activity that creates desirable forage is beneficial to big game and has an influence on the ultimate population size.

However, in Idaho and other mountainous states this is not the case. Much of the logging activity occurs at elevations where deep winter snows minimize the value of any forage produced. This is especially true in northern Idaho because of reasons mentioned earlier — many of the low elevation areas do not yet support

merchantable stands and the ones that do are on steep and unstable slopes that prevent the use of conventional logging equipment.

With the advent of helicopter logging and high stumpage prices, there is some evidence that more logging will now take place in these marginal areas than has occurred in the past. If the logging is conducted with full consideration given to elk forage production, some benefits could be obtained.

Both of these proposals, thinning and rotation clearcut logging, are based on the philosophy that a substantial number of trees should not be sacrificed to promote elk. And who could argue with this philosophy on private lands where maximum dollar return to the landowner is the understandable goal?

But fortunately, most of the northern Idaho elk are found on national forest land during the critical winter period. The "Multiple Use Act" under which the Forest Service functions, demands that all resources be managed for the most good of the most people. Consequently, another philosophy is in order, one that recognizes the value of trees but also recognizes that a brushfield may have an equal or higher value when it is critical to the existence of elk.

I think this viewpoint is well founded when one considers that winter ranges constitute only about five percent of the national forest land in northern Idaho, and yet support many thousands of elk — a resource that has a large economic and aesthetic value to the people of Idaho and the nation.

To cope with the overall problem of advancing plant succession on elk winter ranges, I wish to submit the following proposal. Carefully map out all of the actual and potential winter ranges and designate them to be managed for optimum elk habitat. Then delineate subunits within these areas that should remain as coniferous cover to provide shelter during winter storms and escape from

(continued page 38)



A wildfire burned this area in the North Star drainage, a tributary of the Selway River, in 1919. The photo on the left was taken in 1952 and the other in 1972. In recent years, north and east exposures have regenerated to conifers whereas drier aspects still support brushfields for the wintering big game herds.

REMOTE SENSING



Drs. Edwin Tisdale and Minoru Hironaka
Professors of Range Management
College of Forestry, Wildlife and Range Sciences
University of Idaho

Since the beginning of scientific land resource management, one of the key problems has been that of inventorying the resource and then monitoring changes which may occur through use. This problem has been especially troublesome in the field of wildland resources, due to the natural variability and great size of the areas to be managed. Naturally there has been a continuing search for methods which would allow the land manager to perform this job quickly and with reasonable accuracy, and to repeat the process as needed to detect changes in the resource or its use.

One of the most promising tools which has appeared for handling this inventory problem is remote sensing. The term means simply the acquisition of data from a distant platform, and can include anything from recording information from a satellite in orbit hundreds of miles above the earth to photographing a plot from a stepladder. Conventional aerial photography taken from elevations of 20,000 to 25,000 feet represents a common form of remote sensing.

The history of remote sensing is closely related to the development of aircraft and modern photography. During World War I it was found that photographs taken from airplanes, even with the primitive equipment available, could provide useful information regarding fortifications, troop movements, etc. In World War II, these techniques were greatly improved by the use of special filters and lenses and by the development of film emulsions sensitive to different parts of the spectrum, especially the infrared. The latter proved very effective for detecting camouflaged installations which were impossible to spot with the naked eye or with conventional films utilizing the visible spectrum.

Equipment and techniques developed for the military soon were used for civilian purposes. Aerial surveys with monochrome film were made of large parts of the U.S.A. and most other developed countries. Some use was also made of regular color film (Ektachrome type). The resulting photos usually printed at a scale of approximately four inches to the mile, and taken with an overlap to provide a stereoscopic image, have been widely used in forest and range surveys and other forms of resource inventory.

Conventional aerial photos have certain disadvantages, however. The area covered by each photo is relatively small, so that many photos are needed for a resource area of any appreciable size. Further, there is serious distortion in the outer portion of each picture so that mosaics made from these photos have to be prepared from the center portions of photos only, an operation requiring considerable expertise. Another drawback is the difficulty of taking all the photos over a large area under identical light conditions.

Many of the above difficulties can be overcome by taking photos from an airplane at higher elevations. Photos from the U-2 plane, famous for military "spy" missions, flying at an altitude of 65,000 feet, provide amazing detail and include a large area in one frame of film. Photography of this type is being used increasingly for resource inventory and monitoring studies.

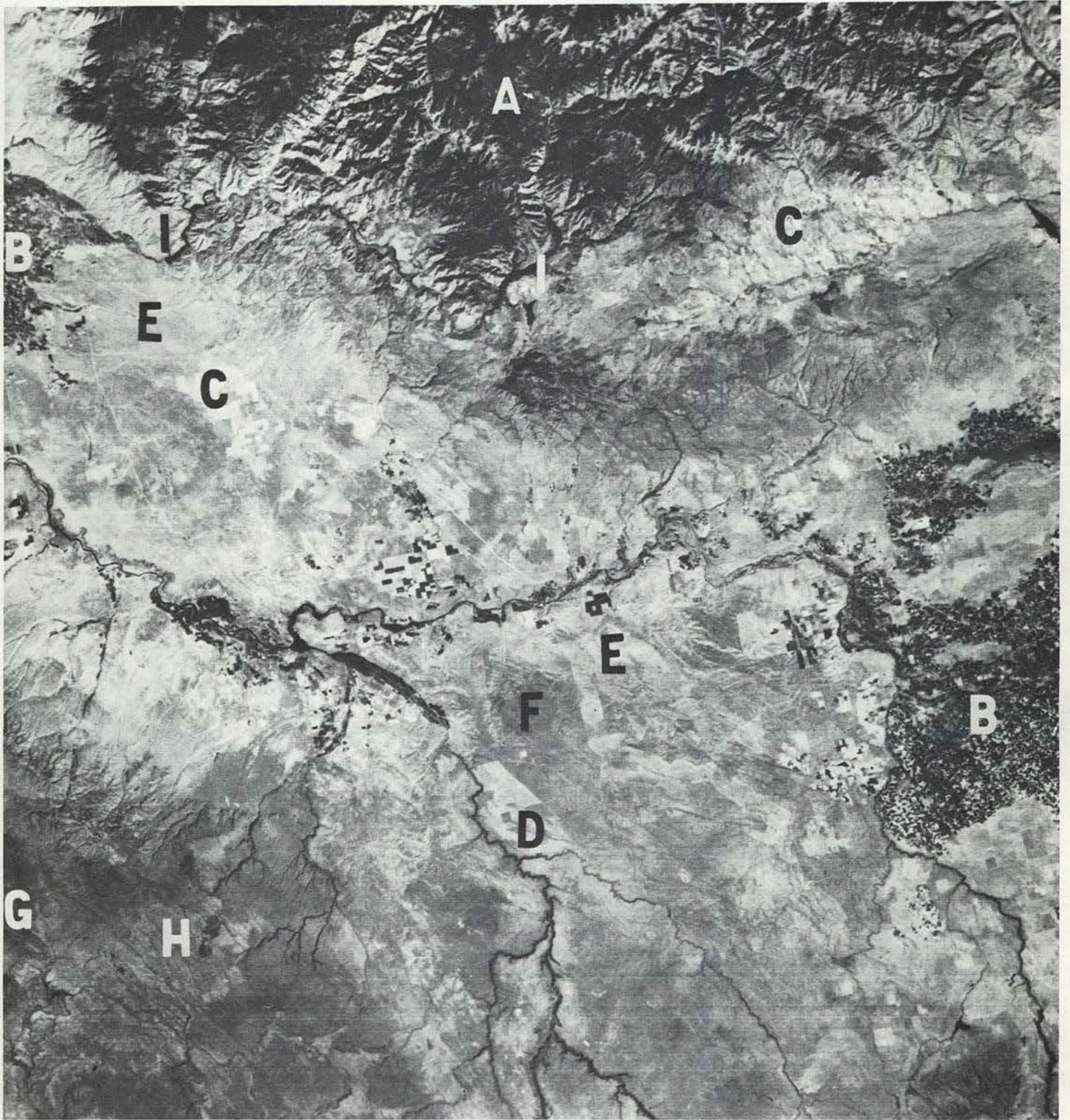
The extreme in imagery from great distances, however, and the most exciting area in remote sensing at present, is that obtained from satellites. The National Aeronautics and Space Administration (NASA) is stressing remote sensing from satellites as one of the valuable spin-offs from our space program. Imagery has been obtained from many previous flights of the Apollo series and more recently from a manned space vehicle, Sky Lab.

The most ambitious program in satellite imagery to date, however, is the Earth Resources Technology Satellite (ERTS-1) launched in July, 1972 and still functioning. This satellite was designed to test the capabilities of space imagery for inventory and monitoring of earth resources. ERTS-1 weighs almost a ton and revolves around the earth every 103 minutes in a circular orbit 570 miles above the earth. Fourteen orbits are made each day, photographing three strips in the U.S.A. and 11 in other parts of the world. Each strip is about 115 miles wide.

A 14 percent overlap provides stereo coverage and any location on the earth's surface is covered every 18 days at the same time of day. This uniform, repetitive coverage of any given spot on earth is one of the key features of ERTS imagery. Another advantage is that the image, taken from such a distance above the earth, is accurate over its whole area and can be used directly for mapping purposes.

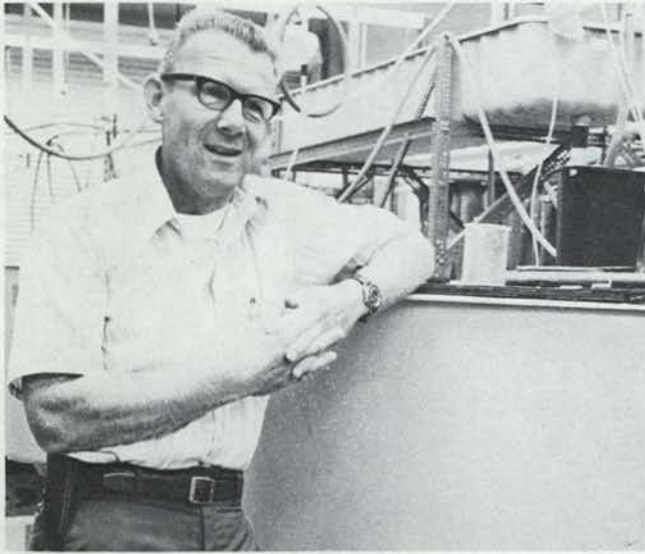
ERTS-1 has an impressive set of sensing mechanisms. Most valuable in terms of data production to date is a line-

(continued page 41)



An Earth Resource Technology Satellite photo centered over the Mountain Home - Grandview area of southwestern Idaho, October 3, 1972. Dark images indicate areas of actively growing (A) coniferous forest vegetation and (B) irrigated croplands. Light colored patterns are due to (C) dryland farming areas, (D) crested wheatgrass reseeding (E) cheatgrass dominated ranges and (F) ranges with dense stands of sagebrush. Juniper woodlands (G) are lighter colored than coniferous forest (A). Recent burns (H) are easily delineated. Only large bodies of water (I) are readily identified in imagery sensitive to the red portion of the spectrum.

The Food Fish Industry in Idaho



Dr. G. W. Klontz
Professor of Fisheries
College of Forestry, Wildlife and Range Sciences
University of Idaho

In 1972, the commercial food fish industry in the State of Idaho produced an estimated 27 million pounds of rainbow trout and channel catfish, or nearly 90 percent of the U.S. production of processed rainbow trout and nearly 70 percent of the U.S. commercial production of both processed and live trout.

The developing channel catfish industry contributed nearly 250,000 pounds to the total figure. The rainbow trout industry produced 750,000 pounds in 1965, 6.5 million pounds in 1970, 12 million pounds in 1971 and 27 million pounds in 1972. The gross value of fish produced in 1972 has been estimated at \$30 million. This is probably the fastest growing industry in Idaho.

It is the consensus of opinion among several major rainbow trout producers that by 1977 there will be an additional 20 million pounds of fish produced, bringing the total to 47 million pounds with a calculated dollar value of nearly 50 million. If their past history of growth is any indication, this industry goal is realistic.

The primary reason for the phenomenal growth of this meat-producing industry is the availability of large quantities of water optimally suited for raising both rainbow trout and channel catfish. New sources of water at both 58 degrees Fahrenheit and 80 degrees Fahrenheit, optimum for rainbow trout and channel catfish respectively, are being developed.

Commercial producers of trout, salmon, and catfish in Idaho can be divided into six basic components:

1) **Egg producers** — There are seven commercial sources of rainbow trout eggs in Idaho. Of these, four presently use the eggs solely at their facilities while the remaining three have statewide and out-of-state sales.

2) **Growers** — There are 17 separate companies (24 farms) raising rainbow trout, cutthroat trout, coho salmon, blue catfish and channel catfish. Most of the fish have been sold as a dressed and packaged product with a few sales of live fish to fee fishing operations in other states.

3) **Grow-out or farm pond operators** — There are at least 40 farmers within a ten to 15 mile radius of Buhl who raise fish for the growers. In this operation the growers transfer six to eight-inch fish from their ponds to the farm ponds for rearing to marketable size (approximately 12 to 13 inches). The growers supply the feed. The time required for rearing to marketable size is four to eight months and the farm pond operator is paid for the net gain in pounds of fish. Many of these facilities do not operate on a year-round basis because of inadequate water quality and quantity.

4) **Processors** — There are seven trout and catfish processing plants in the Twin Falls-Buhl area. They receive fish from growers and farm pond operators. All but one are integrated with a fish raising facility.

5) **Fee fishing or fish-out pond operators** — There are several commercial facilities in Idaho offering private citizens the opportunity to catch their own rainbow trout dinner.

6) **Live-haulers** — Several fish farms haul live fish to out-of-state distribution points for fee fishing operations. There is at least one individual who contracts to haul live fish and is not associated with any fish farming operation.

As with any industry experiencing rapid growth in an attempt to establish itself as a viable commercial entity, there are several problem areas imparting a negative influence on production.

I. **DISEASE.** The moderately high mortality rate of fish from disease contributes to increased production costs. The average mortality rate from the eyed-egg stage to market-size fish among 27 commercial fish farms in Idaho is 40 percent.

The financial loss incurred due to dead fish in the commercial food fish industry was calculated at \$557,250 during 1972. Although the financial loss represents seven percent of the estimated total production costs (\$7.95 million), the loss in the six to 12-inch fish represents 75 percent of the financial loss incurred. The egg, one to three-inch, and three to six-inch losses constituted only six percent, eight percent and 11 percent respectively of the monetary loss.

It is the intent of the Forestry, Wildlife and Range Sciences Experiment Station at the University of Idaho to provide professional technical consultation in reducing the mortality rate by establishing sound, innovative fish health management programs for individual food fish farmers.

II. **MARKETING ANALYSIS.** Another problem, equally as significant as disease, affecting the growth potential of the commercial food fish industry of Idaho is marketing. Many fish farmers contend that this problem requires immediate attention — even before fish health management. New market outlets must be found.

Imaginative advertising for current and new products must be devised.

It is the intent of the Forestry, Wildlife and Range Sciences Experiment Station to provide professional assistance in this area in cooperation with Agricultural Experiment Station personnel concerned with marketing and agricultural economics.

III. WATER DISCHARGE QUALITY. A third problem facing the commercial food fish farmers of Idaho is not really a current problem as much as it is a future problem. The Environmental Protection Agency is going to require all fish hatcheries to comply with water discharge regulations limiting the amounts of specified water polluting chemicals produced in fish hatchery operations. At the present time the majority of commercial fish hatcheries in Idaho are discharging water directly into the Snake River. It is the intent of the Forestry, Wildlife and Range Sciences Experiment Station to provide professional technical consultation to assist the fish farmers in discharging water in compliance with the enforceable federal regulations.

IV. EXTENSION SERVICES. At the present time, the Bureau of Sport Fisheries and Wildlife and the Idaho Fish and Game Department provide limited extension services to the commercial fish farmers in the State of Idaho. Each agency has a hatchery biologist, but their primary responsibility is to cope with the management problems arising within the state and federal hatcheries. The commercial fish farmer's problems are given a low priority out of necessity. The consensus of opinion among the majority of fish farmers after several meetings with them is that the need for assistance is great and will increase with industry growth.

It is the intent of the Forestry, Wildlife and Range Sciences Experiment Station at the University of Idaho to provide the necessary extension services as a top priority function. The authority and obligation of the Experiment Station to provide this service is contained in Chapter 259 of the Idaho Session of Laws of the 1939 Legislature (S.B. 141); specifically Sections 3 and 9. The long-range goal of the service program is to reduce the mortalities in the one to three-inch, three to six-inch and six to 12-inch groups by 50 percent. This is not an unrealistic goal. If realized, it could mean that, based on the 1972 figures, an additional 6.75 million fish will be marketed at an increase to the industry of over \$8 million.

Although the major emphasis in this extension program will be to serve the commercial fish farming industry, we also plan to provide similar service to public agencies in Idaho as funds and time permit. ↑

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(Gutermuth continued)

mammals. Few types of wildlife cover are more sterile than a dense stand of mature timber with a closed canopy. This is why we soon will need some management in large wilderness areas.

To achieve abundance, most species of forest wildlife must have a diversity of cover types within their home ranges, running from openings and clearings through the various stages of succession to mature timber. Most wild animals are creatures of the edge, the area along and adjacent to the line where two different types of cover merge. Deer, for example, rarely venture deeply into heavy, unbroken forest stands or far out into open terrain.

By managing stands of timber in comparatively small even-aged blocks, the needs of a large number of species can be met. When edge can be increased, the various blocks provide the required variety of food and cover. Freshly clearcut areas are rapidly invaded by berry bushes, canes, grasses and legumes which provide nesting and brood cover as well as food for many species of wild birds and mammals. Maximum usefulness to wildlife is achieved through this method when the cutting blocks are kept below 50 acres and are separated by comparable blocks of standing trees.

Under U.S. Forest Service policy, clearcuts on national forests now are limited to between 20 and 50 acres. Not only does this practice provide excellent habitat for elk, deer, grouse and many nongame species, but it protects the soil from erosion, reduces siltation of streams and is far more aesthetically acceptable to the general public than a hillside stripped of all cover.

A study made in Washington State showed the beneficial effects of logging on Columbia black tailed deer. Mature Douglas fir stands in that state support deer populations averaging about ten to the square mile. Beyond the 20-year point, the populations began to decline, reaching their original low density 35 years after the timber harvest as the crowns of the maturing stand closed.

Many of the practices recommended by wildlife experts already are being used in many places as methods of improving forest production. One is the use of prescribed burning. This is being used increasingly in forestry for site preparation, slash disposal and for fire hazard suppression.

Burned sites are among the most productive habitat for a wide range of wildlife species because they produce highly nutritious browse and grasses, in their early stages

of succession which are required as food by the hoofed mammals and a large number of lesser forms of wild birds and mammals. Burned sites are essential to the maintenance of a broad spectrum of birds and mammals that require grasses and herbaceous cover for nesting sites. Similar cover can be developed as an effective fire break along logging trails if the shoulders of the road are clearcut and planted to grasses or legumes.

Working as a team, foresters and wildlife managers can greatly increase the public values of America's forested lands. But to achieve maximum benefits, two basic changes will be necessary. First, forest wildlife and the outdoor recreation it supports will require much larger appropriations, and secondly, the individuals and agencies responsible for forested land management must undertake far broader resources planning and programming than is being done now. This means a truly better land management job as opposed to merely growing trees. ↑

Gutermuth is also secretary of the North American Wildlife Foundation and honorary president of the World Wildlife Fund.



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Caught in the act at a Friday Afternoon Seminar.

(Leege continued)

man's disturbances. The remainder of the winter range, probably 75 percent or so, should be converted to browse production as soon as possible and maintained in that condition by repeated treatment at whatever interval is found necessary. A management decision of this type would be aimed at halting the gradual decline of northern Idaho elk herds and in time increasing their numbers by 75 to 100 percent.

The areas designated for browse production cannot all be improved with the same method. Spring burning will effectively increase forage production in brushfields where species composition is good and the main problem is out-of-reach browse. However, fall burning is the best treatment where browse plants, particularly redstem ceanothus, need

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to be established from seed. Normally these are the plant communities where young conifers and/or tall shrub species have dominated and eliminated much of the desirable understory vegetation. In some cases, the site would need to be prepared by slashing some of the vegetation so that the fire would burn adequately.

My proposal would take only a small percentage of national forest land out of timber production and yet provide a stable winter forage supply for a substantial number of elk. But there are two obstacles presently in the way of this proposal: 1) a reluctance by land managers to designate areas that will grow trees to anything but timber management, and 2) inadequate financing. Neither of these obstacles is insurmountable.

The U.S. Forest Service wants to know how the American people wish their national forests to be managed. The Forest Service is becoming increasingly sensitive to views expressed by the general public, as well as the forest industry and politicians. In the past, industry has had a great influence on management decisions because they have taken advantage of their right to be heard. Oftentimes because there were no counter-balancing retorts from John Q., the decision went in favor of industry.

But this is changing as more citizens are taking the time and interest to voice their opinions and, in many cases, their criticisms. In response to this, Forest Service personnel are currently re-evaluating their management activities and drawing up alternative plans and objectives for national forest land. Public input is being requested at hearings and hopefully future management will more closely reflect the desire of a majority of the people. If this is the case, I feel optimistic that elk range will gain a higher standing in land management priorities.

Financing for wildlife habitat has been grossly inadequate in the Forest Service budget. In recent years, about one-half of one percent of the Region I Forest Service funding (which includes northern Idaho) has been for the protection and improvement of wildlife habitat. Increases for wildlife have been requested annually by Forest Service biologists without success.

The purse strings are controlled in Washington, D.C., and are strongly influenced by industry lobbyists. Consequently, most of the Forest Service budget is designated for logging sale preparations and associated road construction. Hopefully, this too will change with time as the Forest Service continues to strive for a more balanced program. Letters from wildlife enthusiasts to their Congressmen will certainly hasten this process.

In conclusion, the controversy between elk and timber is not imagined. Northern Idaho elk populations are declining because of advancing forest succession and will continue to decline until low elevation timber-producing sites are set aside and managed as elk winter range. The sacrifice of timber is not great in view of the steep slopes, unstable soils, inaccessibility and aesthetic considerations that would limit future logging activities on the relatively small areas involved.

However, a new philosophy and adequate funding need to be achieved before winter ranges can be perpetually managed and improved for optimum elk habitat. This will occur only when a myriad of elk lovers, whether hunters or otherwise, make their wishes known. ↑

(Ehrenreich continued)



among potential employers. Dr. John P. Howe, professor of wood utilization, assumed the position, titled Coordinator of Employment Opportunities. Howe's job has several aspects which I believe will help our students to find jobs, as well as benefit us in the college in our job of preparing students for employment in the natural resource professions.

Howe is working closely with the university's Guidance and Placement Center and with job opportunity advisors appointed in each of the college's major programs. Information on company interviews and temporary or permanent job openings is routed to students who register with Howe to receive information. In addition, sessions on employment with representatives from agencies and industry, and seminars on how to apply and interview for a job are offered during the year.

Howe is also providing potential employers with information about our programs, our graduates and what they have to offer. In this way, he advertises our "product" and establishes important personal contacts among employers. I should point out that Howe is contacting potential employers not only in traditional areas of forestry employment but in non-forestry areas, where an increasing proportion of graduates are finding jobs.

Of course, improved communications between the college and employers implies a two-way exchange, and Howe is requesting input from employers on their personnel needs and what they want and expect from a forestry school graduate. I believe that this type of information will be particularly valuable to students and to the college in future curriculum planning. ↑

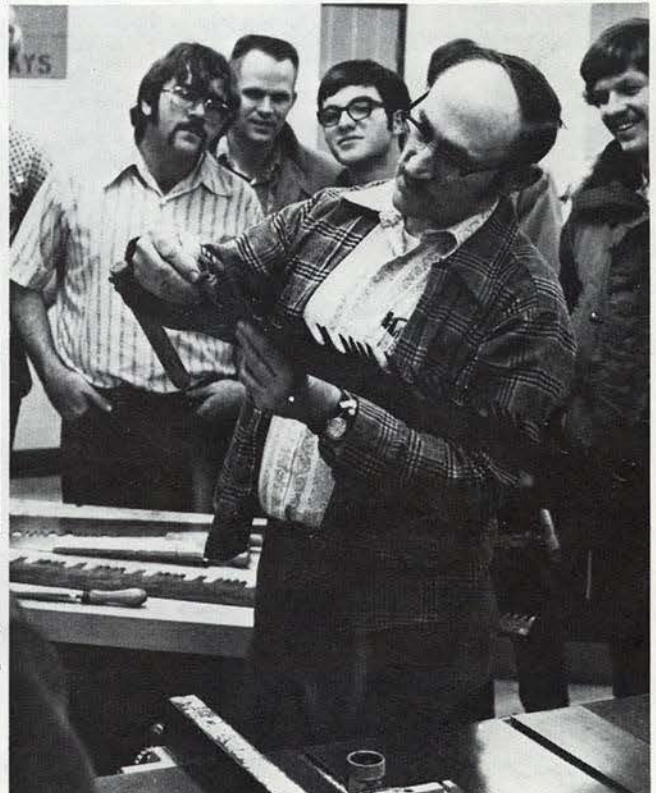


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(Zaidlicz and Fulcher continued)

7. The area is representative of various soil series, overburden types, underground aquifers and surface water factors.

8. The population is representative of the Great Plains in composition, size and dispersal.

In May 1972, the State of Montana, the Forest Service, and BLM embarked on the Decker-Birney plan. No additional funding or personnel was available for this effort and it was necessary to reprogram and cannibalize basic activities—diverting scarce skills wherever possible. The two federal agencies shored up and back-stopped each other to sustain the planned work flow. State organizations suffering identical limitations also had to sacrifice, notably the Montana Bureau of Mines and Geology. The complexity of data and data gaps required additional highly specialized inputs from the Geological Survey, Soil Conservation Service, university system, Montana Fish and Game and other entities.

All 215 resident ranchers were personally interviewed and invaluable information was obtained. Special interest groups representing over 700 mailings responded to varying degrees within their areas of concern and expertise. Coal interests were particularly objective and candid.

Innovative tools had to be developed to overcome limitations of personnel and time. An example is the infrared aerial photography techniques developed for low-flying aircraft utilizing available 35mm cameras. Much data on vegetational cover and changes on possible aquifer breaks, on sterile sites, etc., has been obtained at a fraction of the cost of conventional methods.

Groundwater specialists from the Geological Survey working with the Montana Bureau of Mines and Geology are implementing lightly sophisticated space age

methods of monitoring and projecting possible effects of surface mining on water aquifers.

A number of public meetings were held within the Decker-Birney area in Miles City, in Billings and in Helena—as well as with local special interest groups. Excellent material has been volunteered to reinforce and augment each resource inventory and recommendation.

In addition, continual exchanges of information have been maintained between the Northern Great Plains Research Program and Decker-Birney participants. If current momentum can be sustained, public review of preliminary resource management recommendations should be possible by late Spring 1974.

In summary, the Decker-Birney exercise is a departure from the abstract, theoretical approach to problem solving and addresses itself to concrete, specific and “real world” resource variables and values. Value assessments are real, possibly invidious, certainly personal and traumatically tangible. Full interchange of the various interests and decision makers will be in the public arena with no provision for easy cop-outs.

Management plans forged in this process hopefully will be able to withstand a critical unrelenting review by future citizens who will be affected by present courses of action.

We already know that no one agency, or group, or interest has the resources to adequately cope with this complex equation. We must forego comfortable, historic provincialism and reach reasonable, objective compromises.

The United States startled the world by putting man on the moon—now can we startle ourselves by solving the energy problem without forfeiting our coming generation's birthright of a livable natural resource balance?

Decker-Birney may not provide the ultimate equation, but the auditorium is there — care to join us in our chess game of life? ↑



Man-made monster with a big bite! Note the smoother areas in the background being readied for seeding.

(Tisdale and Hironaka continued)

scanning device called the MSS system. This operates in three wave bands of the visible spectrum and one in the near infrared. Although the information from this system is used in photographic form, it is actually obtained as impulses of light energy on groups of optical fibers. These are transmitted to earth as electrical impulses, where they are reproduced as photographs or as digital tapes for computer analysis.

ERTS-1 photographic output comes in two sizes, 70mm (2 1/4 x 2 1/4 inch) positives and negatives, and 9 1/2 x 9 1/2 inch positive transparencies. Both sizes and kinds have their value, but the 70mm positive transparencies which can be projected directly, is a particularly compact and useful film form. Each photo frame covers a large area, more than 13,000 square miles (8.5 million acres). For each frame, a photo is available in each of the four wave bands.

To obtain the full range of information available for ERTS photos, it is essential to exploit the differences in imagery provided by each of the four wave-band lengths. The black and white images are studied singly at first, in the form of projected images or enlarged prints. It was soon found that different bands are best for showing kinds of vegetation and land uses, geologic features or water supplies.

Color combinations are then formed from superimposing two or more bands and projecting them through color filters. This operation is accomplished with a color additive viewer and projector. This instrument is capable of focusing as many as four transparencies onto one image, and has a set of colored filters enabling different "false color" images from two or more black and white transparencies. The false color images produced by the additive color projector help in further separation of vegetation types, especially in distinguishing active from dormant vegetation.

In order to test the capabilities of ERTS-1 imagery, NASA has sponsored a large research program. Currently some 320 investigators, 220 in the U.S.A. and the remainder scattered over most of the non-communist

world, are participating in this program, with imagery and in most cases partial funding supplied by NASA.

The only project of this type in Idaho is one conducted by Dr. Min Hironaka and myself in the College of Forestry, Wildlife and Range Sciences, and Dr. Maynard Fosberg in the College of Agriculture at the University of Idaho. The major objective is to identify and map major vegetation types of southern Idaho rangelands and relate these units to soil types and other environmental features.

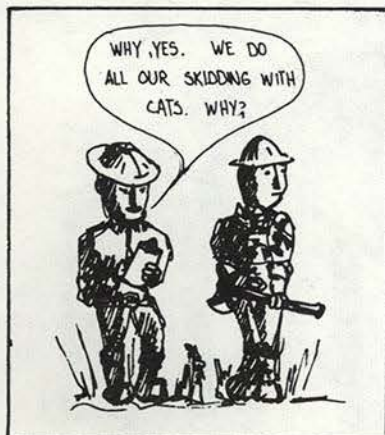
Secondary objectives include monitoring seasonal changes in vegetation patterns and changing patterns of land use, including cultivated areas. The study area consists of about 30 million acres, most of which is sagebrush-grass vegetation or related types including salt-desert shrub, mountain brush and juniper.

The initial project, begun in October, 1972, is now completed and a final report has been prepared. This does not mean the end of remote sensing work in our college, however. It is expected that the use of remote sensing techniques will increase in the college, particularly when a faculty position in this field is filled in the near future.

What kinds of information were we able to obtain with ERTS-1 imagery in Idaho? A considerable amount of information is interpretable from viewing a single color enhanced frame. The list of images that are identifiable include land forms, geologic features, water bodies and river systems, major vegetation types, cultivated lands, recently burned areas and range reseeding projects. The more familiar a researcher is with an area, the more he is able to interpret and identify images of different color, tone and density.

Repeat coverage of the same landscape every 18 days is probably the most important feature of ERTS imagery. "Multidate" imagery permits us to monitor changes in the landscape over time due to seasonal development of vegetation and cultivated crops, recession of the snowline, and the effects of short term events such as floods, fires and other major disturbances.

(continued next page)



The identification of major vegetation types is also greatly aided by viewing multitemporal imagery. For example, the extensiveness of the cheatgrass type is readily delineated by viewing imagery obtained in the spring. Cheatgrass range is distinguished from sagebrush dominated range by the high reflectance of the cheatgrass type in the infrared band during this active growing period.

The ability to distinguish these two types is much reduced in summer or fall imagery when the vegetation is dormant. Late fall or early winter imagery is utilized to separate juniper woodlands from the surrounding sagebrush type, which is vegetatively dormant at this time while the juniper trees are still photosynthetically active.

The remote sensing experience that has been gained from the ERTS project in Idaho and elsewhere will be used by our college to inventory and analyze the forest, wildlife and fisheries resources of the state. For example, the combined use of ERTS and high flight imagery will be of great value in delineating those forest areas affected by the recent tussock moth outbreak, determining the acreages and distribution of clearcuts, inventorying the vegetation in clearcuts for suitability as habitat for big game, and monitoring the quality and quantity of our water resources. These kinds of information will be invaluable for management, as well as for land use planning.

Although considerable information can be obtained by visual interpretation of color enhanced imagery, new sophisticated electronic equipment such as the color display density slicer and electronic planimeter aids greatly in interpretation and improves the precision of acreage estimates. Also, these tools increase the speed and accuracy with which information can be made available to the user. At Idaho, we presently lack these tools but are hopeful to have them in the near future.

We have not been involved in the use of computers for analysis of ERTS digital tape data. The operational use of computers for interpretation and analysis of satellite-obtained data for earth resource inventory and land use planning appears to be only a few years away, however.

The future for remote sensing of natural resources looks extremely bright. The kind and quality of the present ERTS imagery is just a prototype of what is to come. Available technological improvement will provide a ten fold increase in ground resolution in the multispectral scanning system for future earth monitoring satellites. It appears hopeful that with new advances in remote sensing technology and data processing techniques, the problem of inventory and monitoring changes of wildland resources will no longer be a primary obstacle for good land management and land use planning. ↑

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(Seale continued)

Chemistry Lab and greenhouse were acquired. Also, 141 bachelor's and 23 master's degrees were granted, bringing the total degrees granted to 180.

1934: A comet flashes across our firmament! After Miller's death, R. E. McArdle headed the school for one year — a stopover enroute, not directly but ultimately, to the position of Chief of the U.S. Forest Service. The official records show 145 freshmen that year, a peak not again equalled until 1965. But that is literally only the half of it. Unimpeachable sources have it that McArdle met 300 freshman in the Forestry I class and so shook them with his warning of the stiff curriculum and stiffer demands of the profession that half transferred out overnight.

D. S. Jeffers arrived to replace McArdle. During Jeffers years as Dean, Summer Camp began in 1939, the FWR Experiment Station was initiated in 1937, the Idaho Cooperative Wildlife Research Unit was established in the college in 1947 and the school occupied all but a half a floor of Morrill. 1937 saw the peak undergraduate enroll, 373, not surpassed until 395 in 1970. During Jeffers 18 years and McArdle's one as deans, 618 bachelor's and 60 master's degrees were granted, for a total of 866 degrees granted.

1953: Ernest Wohletz is unique among our deans in that none of the others had spent even one day on the UI faculty other than as a dean. Wohletz had already been on the staff 16 years when he entered on his 18 year tour as Dean. During this tenure, the doctoral programs were begun (1959), the Idaho Cooperative Fishery Unit was established in the college (1964), the Taylor Ranch (now a research site of the Wilderness Research Center) in the middle of the Idaho Primitive Area was purchased (1969)

and the new building was constructed (1971). The faculty of the college increased from 10 to 32, and 903 bachelor's, 183 master's and 29 doctoral degrees were granted. The total went over 2000 degrees.

1971: John Ehrenreich succeeded Wohletz at the beginning of the 1971 academic year. Here, six decades later, history becomes the present.

These snapshots serve well enough to show dimensions, but not being movies, they do not indicate directions very clearly. Trends have to be interpolated and I offer three that I consider descriptive of broadly prevailing trends in forestry education.

The first of these can be characterized as the evolution from single to multiple — that is, from a time when one use was clearly the dominant one with respect to the resources of forest lands, and when our curriculum had a corresponding emphasis, to the present, when many uses command more nearly equal attention. The series of additions to the original curriculum in forest management or production illustrates this principle. A program, the forerunner of wood utilization technology, was added in 1914 and one in range management in 1917. The wildlife and fishery programs were inaugurated in 1942 and 1951 respectively.

The second curricular trend is from the practical to the professional — that is, from a primary purpose of imparting skills in the application of techniques to that of inculcating a mastery of more general but fundamental scientific principles. A simpler way of saying it is that, whereas we used to stress "how to," the emphasis is now on "how come?" (or even "so what?").

(continued next page)

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I have found the following phrase very useful in pointing out the distinction between the scientific-professional and the artisan-technician. I won't recount in full the incidents which led to the expression, but the punch line was spoken by the blacksmith in the machine shop of Brown's Tie and Lumber Company, who had been listening to a description, with gestures, of an object which we desired him to fabricate for us. He said, "Well, I don't think I understand all I know about it, but I believe I can make it for you."

The distinction implied by the blacksmith applies to the difference between the education appropriate for the scientific-professional and the training required by the artisan-technician. The technician, in these terms, knows more than he understands. He is equipped with knowledge whose underlying principles he hasn't mastered. One well grounded in the sciences, however, has the capacity to understand facts and phenomena which he has not had occasion to encounter.

It may seem that the slow but steady decrease in the total credits required by our curriculum from 162 to 138 (and we are seriously considering a further cut of eight or 10 credits) is hardly in agreement with a scientific-professional education and is at odds with the "knowledge explosion" we're hearing so much about. It is certainly not that forestry is an exception to the rule of increasing knowledge. Our fund of knowledge concerning resources and their management is continually growing at a rapid rate with a consequent, apparent, increase in the amount that a student needs to learn.

But it is facts, or bits of information, that are multiplying so rapidly. There is no denying that they are

very useful to possess, and there is no denying that there are entirely too many of them to begin to absorb in four years or even in a lifetime.

"Principles are fewer," as one eminent forestry educator has said. "They are the master keys to a world of facts and they are carried easily in one's pocket. However, it takes skill to select and use them. The hard thing about principles is not learning them, but learning to apply them with results that are good in practice as well as in theory." This is one way of stating what we conceive to be our function and our responsibility in the education of future resource managers.

I might add that there is a related secondary duty—and one on which we perhaps should work more diligently—and that is to educate the prospective employers of our graduates not to expect them to know everything and to be able to do everything that their initial employment may call for but, rather, to value them for their capacity to cope intellectually with whatever they encounter.

Finally, there has been a trend from a concentration on physical-biological-engineering subjects to a greater emphasis on economic-political-social considerations. The way in which society at large is making itself heard in regard to the environmental-conservation-resource use issues makes it impossible for foresters and other wildland resource managers any longer to think that they can go out in the woods and do their thing far from the madding crowd and serve the best interests of the trees, or the fish, game or grass as the case may be. The realization is forced upon them that the wants and needs of people have to be heeded — and have to be studied to be understood. ↑



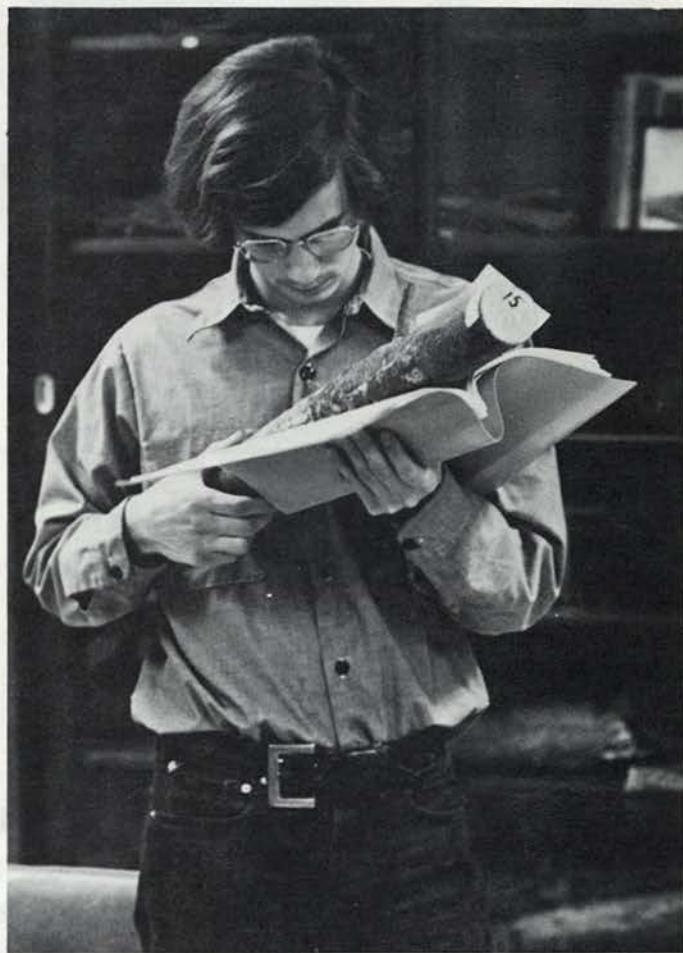
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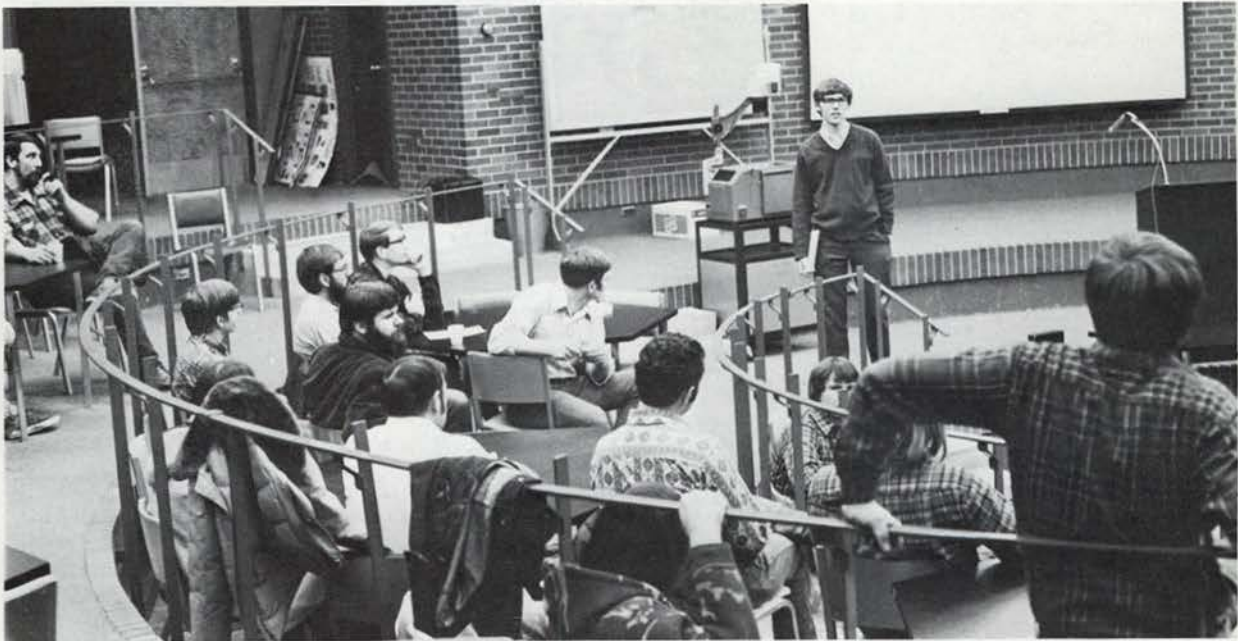
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Mary.

WHO'S

KIDDING

WHOM?

**The big companies
are ruining our
forests ! ! !**



If this is what you've been told - - if this is what you believe, Potlatch invites you to take a trip into company-owned timberland in northern Idaho, Minnesota or Arkansas - - - and be prepared for a surprise!

In northern Idaho, for instance, it has been Potlatch policy for years to open its 500,000 acres of forests to the public - - - and to encourage their use through the establishment and maintenance of campgrounds, nature trails, picnic groves, and roadside rest areas. More than 1,150 miles of Potlatch logging roads in Idaho open the area to 340 miles of excellent trout streams, scenic mountain lakes and meadows, and forests.

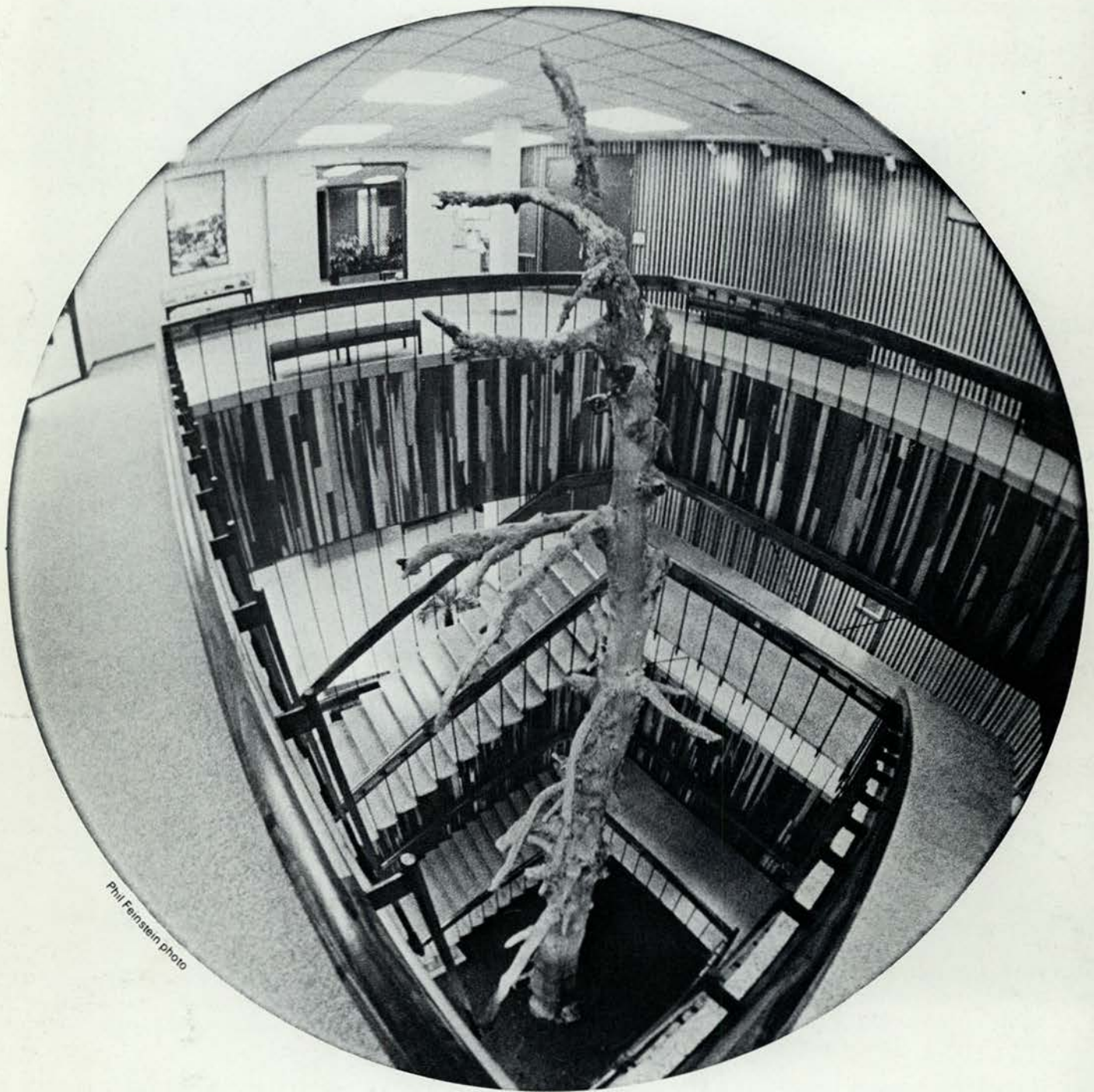
While Potlatch forestlands are owned and managed primarily to produce wood fiber for the production of the many varied products for mankind's needs and enjoyment . . . the land is there for the benefit of all . . . the hiker and camper, hunter and fisherman, birdwatcher and berrypicker, snowmobiler and motorcyclist. This is multiple use forest resource management in action.

Ruining our forests? Who's kidding whom?

Potlatch

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