Allocation Problems of Public Lands in the West

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Increasing interest in the federally owned lands by individuals and groups representing a broad cross section of society has intensified public land management problems. Pressures for preservation, conservation, and additional non-market uses have resulted in management conflicts.

Economic intelligence could contribute to improved decision-making by federal agencies charged with public land management. However, inadequate past research attention related to economic problems of public lands presently precludes an optimum input from economists. Articulation of problem areas and economic issues is necessary for developing meaningful research priorities. This article identifies some elements of the problem and suggests some potentially rewarding areas for economic research.

The pervasiveness of federally owned land in the western states gives rise to a set of economic problems which have not received adequate research attention. These include the basic allocation of the public lands among uses, among users within uses, and over time and space. Decisions made by agencies managing these lands impact differently on individuals, groups and communities.

While such problems can be appropriately handled by conventional economic models, the presence of market and non-market values, zero-pricing with public good characteristics, externalities, institutional constraints and lack of explicit "equity" criteria complicate their solution. This paper's objective is to delineate some of the specific elements of the problem and identify the opportunity for meaningful economic research.

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Appreciation is expressed to Herb Stoevener, Joe Stevens, Bill Martin, and three anonymous reviewers for reviewing an earlier draft of this manuscript. The original paper was presented at the Forum on the Economics of Public Land Use in the West, Reno, Nevada, March 10, 1977, co-sponsored by the Farm Foundation and the Division of Agricultural and Resource Economics, University of Nevada, Reno.

The Dimensions of the Problem

About 755 million of the 2.3 billion acres of land in the United States are owned by the federal government. Sixty-two percent of this land is managed by the Bureau of Land Management, while another 25 percent is managed by the Forest Service. Management of the remainder is divided among the Department of Defense, Fish and Wildlife Service, National Park Service and other federal agencies. About one-half of the public lands is in Alaska. The other half is largely in the eleven western states which contain 90 percent of the federal lands outside Alaska. The percent of federally owned land in each of these states ranges from 29 percent in Washington to 86 percent in Nevada.

One-third of the public lands in the eleven coterminous western states is administered for grazing. The public lands produced two percent of the total forage supplied in 1971-72 in Washington and ranged upwards to almost half of Nevada's total. The value of livestock products produced on the public lands during this period was about $400 million.

Approximately 100 million acres are classified as commercial forest and are man-

aged on a sustained yield basis for wood products. Mineral extraction is another major use of the public lands, with the federal government owning mineral rights on 62 million acres of land which have been conveyed to others under various public land laws. Geothermal resources and oil shale development on the public lands have also become important. Various forms of wildlife are present on nearly all public lands and most of these lands are considered watershed lands. Recreational use, much of it extensive in nature, is of growing importance.

A Public Land Law Review Commission was established by Congress [Public Law 88-606 September 19, 1964] and charged with studying existing statutes, reviewing present policies and practices, compiling related data and recommending modifications in existing law. In their report to Congress they stated,

> "We have recognized the dominant role of federal public land in the twelve far western states. In large measure, the future of those states may depend upon the adoption of sound public land laws and policies that will assure environmental quality and, at the same time, encourage healthy economic growth."

Their report, submitted to the President on June 20, 1970, contained 137 specific recommendations. Some of these recommendations have been adopted directly or in modified form and several pieces of legislation have been enacted since then.

However, there are still many economic problems in the area of public lands which need considerable research. These evolve from: (1) the basic allocation of the public land resources among uses and among users within uses; (2) problems related to the spatial distribution of uses and users; and (3) intertemporal distribution of public land resources and their outputs.

Allocation decisions concerning public land resources impact on various users in the private sector. Individuals such as ranchers, recreationists, and miners are all affected. General user groups such as livestock graziers are affected by groups who advocate protection of wild horses. Finally, the allocation of public land resources affects adjacent rural communities. The remoteness of many rural communities increases their economic dependence upon the income generated from the public lands.

Public land decisions also affect the public sector. The distribution of revenues generated from the public lands among federal, state and local governments is important. The allocation of these lands and the income which they generate affect income tax receipts at the federal, state or local level. Further, the predominance of property tax funding of local school systems together with the exclusion of the public lands from the assessment rolls concentrates the tax burden on the privately-owned land resources. Expenditure patterns of local government units are also affected by large quantities of public lands within or adjacent to their jurisdiction.

The last major source of problems relates to the institutional framework for decisions concerning public lands. There are cases where congressional intent of legislation affecting public lands is quite different from administrative interpretation. Further, administrative interpretation may differ at national, regional and local levels. Interpretation sometimes differs within an agency, quite often among agencies, and over time. Furthermore, the impact of public lands on land use planning at state and local levels is still unresolved. The problem is intensified within states like Oregon, which require county comprehensive planning under the guidelines of a state Land Conservation and Development Commission.

The Allocation Problem

The allocation problem arises because many of the demands for use of the public lands are competitive or even mutually exclusive. Its solution, inevitably difficult, has been accentuated by the failure of Congress

to establish well-defined land use policies for federally owned land.

In the early days of the Republic, the general policy was to dispose of the land to private owners as rapidly as possible in order to encourage settlement of "The West" Modification of this policy began in the latter half of the 19th century and the policy has apparently been reversed in the latter half of the 20th century. Recent attempts to pass a land use planning law at the national level have failed. Thus, most decisions have been piecemeal and have lacked the guidance of an overall, well-defined national policy.

Early uses of the public lands included livestock grazing, mining and lumbering. Grazing on public lands was not controlled by explicit regulations, was zero-priced and apparently sanctioned by government, in much the same way recreational use is today. Legislation eventually was formulated establishing the amount and allocation of grazing among different ranchers. Permittees assumed tenure on the public lands to be permanent.

Free access to public lands for exploration and development of minerals was well defined. One only had to prove the presence of minerals in order to obtain tenure rights to a particular piece of public land. Timber production from public lands did not become an important issue until recently. At the present time, it is on the "front burner".

The emergence of new interests such as managing for wildlife, outdoor recreation, environmental quality, ecological succession and preservation of wild horses added to the lack of complementarity among uses which already existed and intensified the conflict in allocating public land resources. While economics provides a framework for allocating scarce resources among competing ends when values are determined in a competitive marketplace, problems arose because some of the values generated by these competing uses were non-market in nature. The early tendency was to exclude quantification of these non-market values in the allocation procedure. This exclusion was partly due to the difficulty in determining values and as rationalization for allocating resources on the basis of a particular decision-maker's value judgments. More importantly, it may have been due to misunderstandings of economics.

This latter misconception is demonstrated by Ise who stated,

> "The ordinary economic laws of the marketplace are of little use in determining whether wilderness areas can be economically justified, because the government will not sell them. One way to calculate the present value of such an area — or indeed of any land or any other productive agent — would be to add present and future incomes expected from it, discounting the future incomes at the prevailing rate of interest, and then subtract from this total the total of present and future costs, similarly discounting future costs at the prevailing rate of interest. The distant future incomes and costs, so discounted, would of course be small. This analysis, although sound in business as a general proposition, is of little use here for several reasons. In the first place, wilderness areas, in their proper use, are unlikely to yield considerable cash revenues, if any at all, and the cost of maintenance would likely be small. Doubtless these areas, like the national parks, would have a present cash value of less than nothing, and the psychological value to hikers would be of course impossible to measure.
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> In the second place, as in the analysis of all land problems, there is no need to discount future revenues of publicly-owned land as in ordinary business calculations. To do so would lead to the assumption that since future revenues, discounted, are of little consequence, there is no reason for preserving our land for many years. The businessman must discount future revenues; he is subject to a rate of interest. If he uses borrowed money, he must pay interest; if he uses his own money, he must allow

implicit interest. The public does not dare to do this; the government should assume that the nation will last indefinitely, that future satisfactions to future generations will be about as important as present satisfactions to the present generation. The government should preserve our country, our resources — shall we say forever?"

Maurice Kelso has responded to this misconception.

". . . argument concerning the value — economic or otherwise — in wilderness areas rests in one of the following syllogisms: I like them; a majority of citizens should like them; therefore, we should (must) provide for them. Or: I like them; I have sound philosophical and psychological reasons for my preferences for them; therefore, I am exhorting citizens generally to think and feel and prefer as I do about their establishment."

Further, relative to the comments on discounting, Kelso states,

"This is, to me, a complete miscomprehension of the problem. It obviously cannot apply to the use of stock resources which can only be destroyed if used; it has no meaning relative to flow resources, the flow of which cannot be affected by man. It can have relevance only to the exploitation of stock resources, the quantity of which are subject to mans' actions. But here there is the inevitable sacrifice of present satisfactions in favor of future satisfactions. To say that future satisfactions will be as valuable when they become present as are those of the actual present is to rule out what is the crucial problem by oversimplification. . . . the difficult question here is 'how much' and 'how fast'."

Jack Knetch has observed that the view that economic values in recreation do not account for aesthetic or personal values is fallacious and misleading. He suggests that the use of resources for recreation is fully equivalent in an economic sense to other uses and the values which are relevant do not necessarily need to be determined in the marketplace. However, this last condition indicates that indirect, empirical means of supplying relevant measures of the values produced may be needed.

Much work has been done on developing methods for imputing values to non-market outputs (e.g. Pendse, Dilip and Wyckoff). Some methods have met with considerable success, but not with general acceptance, especially among those groups who still fail to understand the place of "value" in economic analysis. Recent guidelines developed by the Bureau of Land Management, USDI, still contain statements such as, "Increased wildlife populations are of benefit ***both for their own sake*** and for the benefits in hunting, recreation and other human activities . . ." and again, ". . . , the major benefit of an increase in the numbers of these animals (e.g. wild horses) is simply the existence of the larger numbers."[1]

The willingness to give up something for something else is the basis of the trade-off models being applied to non-market situations. Examples of these trade-off models have been reported in Hoinville and Berthoud, Pendse, Dilip and Wyckoff, Randall, et. al., and Sinden and Wyckoff. These models are most useful in determining what people are willing to give up for non-market valued products or services. Unless the values of all products and services from alternative uses of the public lands are included in the analysis, optimum allocations will only be coincidental.

There is considerable opportunity for production economists to provide more information on the competitiveness, complementarity or substitutability of alternative uses of public lands. Information concerning the marginal rates of technical substitution and relative prices would be most useful to management agencies in determining those public resources that should have multiple, complementary uses versus those providing the greatest social return in a single use. The de-

[1]Emphasis is added

gree of substitutability between public and private resources in the production of certain goods and services is also important [Reiling]. Perhaps goods and services which can be provided with available private resources as inexpensively as they can from public resources should not be considered for the public domain.

Information on the demand for and supply of different products and services produced from public lands is also essential. Those products and services valued through the marketplace again are easier to evaluate. Zero-priced products and services may face an infinite demand with little incentive for increasing supply. A small supply of those products and services with the characteristics of public goods may satisfy an "infinite" demand since they are not "consumed". While considerable research has been done on the demand for public goods, little has been undertaken to ascertain supply characteristics (e.g. Bergstrom and Goodman, Deacon and Shapiro). Allocation decisions on public lands cannot approach "optimas" without this information.

The same problems occur in evaluating investments on public lands. Models which indicate the comparative results of different investment alternatives only work if all benefits and costs are included. These data include non-market as well as market-valued goods and services. Investment models also bring the intertemporal problem into focus in the allocation of public land resources. Much research and debate have considered the proper discounting of costs and returns from public investments in natural resources [Federal Register]. The problem often reverts to the appropriateness of using any discounting procedures when considering the welfare of future generations.

But even if the "proper" allocation of public land resources among alternative uses is determined, there is still the problem of allocating the land among users within a given use. For example, who should gain access to the limited grazing on public lands, or how should a limited amount of timber on public lands be allocated among potential buyers? How about access to recreation areas which have limited capacity? While "willingness to pay" has been suggested as a criterion, how well does it coincide with potential users "ability to pay"?

An additional problem is the distributional impacts across the population of different allocation decisions on public land use. It can be argued that allocating public lands to wilderness makes them a private playground for the young, the healthy and the rich. Alternatively, allocation of public lands for urban parks may give access to the low income, the elderly and those of minority races. Much work needs to be done to identify these trade-offs.

Finally, the spatial distribution of public lands and measuring the benefits and costs associated with outputs in alternative uses warrant further attention. The removal of publicly-owned land from local property tax rolls places a burden on local taxpayers. These costs are not distributed to taxing jurisdictions in other parts of the United States. On the other hand, if some land uses such as outdoor recreation do not reimburse their costs and thus are subsidized by the U.S. Treasury, individuals who are located adjacent to these recreational opportunities may gain benefits paid for by the general taxpaying public of the United States. Definition and quantification of these types of trade-offs would be useful to decision-makers.

Impacts of Changing Public Land Use Policies

There is little evidence to indicate that past decisions concerning the use of public lands have benefited greatly from the application of economic criteria. However, whether the historical allocation of public lands has been correct or incorrect is not the real question. Of primary interest are the effects of changes in uses of public lands on present users and their communities. Private firms that have traditionally used public lands for grazing, mining or timber purchases relied on this access in developing their businesses. Thus, when

grazing allotments are reduced, timber sales are cancelled, or access to mineral development is closed, individual firms are faced with some traumatic adjustments. Their ability to adjust and continue to operate depend upon their access to substitute resources and alternative production functions.

If the businesses discontinue operations, the impact spreads through their local communities. Closing a mine or bankruptcy of a sawmill does not affect just those individual firms and their employees, but also other firms in the communities that traditionally were supplied by, or supplied them with, their goods and services. In many areas where public lands predominate, communities are relatively small, isolated, and heavily dependent upon a few businesses. If one large firm goes out of business, the impacts may cause the failure of other businesses and complete loss of some service sectors in the local economy. The result is declining quality of life. The impact on these events is not evenly distributed. Some sectors suffer more than others. These interactions can be identified through input-output models, economic base analyses and other similar devices. Additional empirical work applying these tools to specific cases is needed.

Major investments made on particular public lands to increase the amount of forage for grazing, quantity of wildlife, timber yield, mining of oil shale or coal or the amount and quality of recreation, also impact on local communities. The Public Land Law Review Commission recognized these effects: "Income from increases in the production and use of public land forage tends to spread through the regional economy rather than be siphoned off for the purchase of goods and services from other regions. . . . regional economic growth is a proper objective of public land forage policy . . ."

These impacts are not evenly distributed. A dollar gained or lost in the recreation industry in a local community does not have the same impact as a dollar gained or lost from mining or a ranching operation; nor are the gainers and losers the same people. Yet, in present analyses, there is a tendency to substitute a dollar gained in one industry directly for a dollar lost in another industry, while implicitly assuming the absence of distribution impacts (USDI). There has also been a tendency to consider intertemporal availability of the natural resource products or services as inconsequential, when in fact, it may have dire consequences. For example, delaying access to grazing for six weeks in the spring may force the rancher to keep his livestock on meadows, thus cutting hay production in half. If winter feed is limiting in the operation, the size of operation might decline substantially. Thus, while the total grazing reduction on the public lands might only be 10 percent of the annual AUMs needed, it might mean a much larger reduction in the size of the business, with the associated economic impact on the community.

Economies of size also may be important for farms in these small, local communities. The volume of business generated may be insufficient to approach the firm's lowest cost output. Yet, because the service is demanded, the firm will remain in business as long as it can make an "acceptable" level of income. However, if economic activity in the area declines because of changes in public land use, the businesses may become uneconomic. The resultant impact on quality of life in the community would thus be much greater than anticipated. More information is needed on the effects of alternative public land use allocations on ranches, businesses, households, income level and distribution, employment, the tax base, quantity, quality, and the cost of public services.

Local public finance is affected by the presence of public lands. Since the property tax base encompasses only the privately-owned land in a taxing jurisdiction, the revenue potential is lowered. As a result, public service costs are spread over a smaller assessed value, increasing tax rates and tax levies to owners of the private resources. If value is gained from private access to the public lands and is capitalized into the value of the privately-owned resources in relation to the benefits

private owners gain from the public lands, then perhaps the equity of the situation is acceptable. However, empirical evidence of this condition is lacking. "In lieu" payments have been implemented in some cases and a proportion of the revenues generated locally from the sale of goods and services from the public lands has been allocated to local taxing jurisdictions. However, the comparability of this practice to regular property tax collection is unknown.

The allocation of public lands to grazing or timber production may support a fairly large local population which generates economic activity on a year-round basis. Allocation for recreational purposes may result in seasonal business activity with participants being nonresidents. Nonresident recreationists may make most of their expenditures at their place of residence and not in the recreation community. Ridd's studies show that ". . . even though deer generate more wealth, it is of very little value to the local community, whereas livestock values have tremendous local significance." Thus, the tendency of analysts to equate a dollar spent for recreation to a dollar earned in the livestock, timber or mining industries is fallacious, as far as its impact on the local communities is concerned. Yet Clawson feels that some net losses in grazing and forestry land will occur over time because it is only in rare cases that either of these uses can compete effectively for land that is used for recreation. Thus, community impacts may intensify over time. Additional inquiry is needed for these relationships.

Another important factor is the services provided in the public sector. Persons residing permanently in the community need access to public schools, water systems, sewer systems, etc. If the allocation is changed to a seasonal use such as recreation, the economies of size may prevent school districts and other public services from remaining viable. Private sector services (doctors, lawyers, dentists, etc.) may also suffer. As a result, the quality of life in affected communities will decline.

The actual impacts of laws bearing on public land resources sometimes differ from the intended impacts. Restricting predator control on public lands has significantly affected the range sheep industry. Many ranchers have suffered losses from predators which make it uneconomic to continue in operation. Similarly, the protection of wild horses without provision for management, has resulted in severe overgrazing in certain grazing districts. The horses are increasing in numbers at a very rapid rate and consuming forage previously allocated for the grazing of wildlife and domestic livestock. Since the condition of the range is a key management indicator on these public lands, the ultimate result will be reduction in livestock grazing, reduction in wildlife numbers, reduction in wild horses or some combination thereof.

Institutional Problems

The intent of Congress when passing legislation is often quite different from the resulting administrative interpretation. While Congress may create a national recreation area with an express provision in the legislation that the private uses of the area at the time of enactment are to continue, the management practices adopted by administering agencies, ("You can graze your livestock anywhere except where the grass is"), quite often makes it economically impossible to continue these uses. Thus, the intended impact and the actual impact of legislation on individual firms and communities may be quite different.

National decisions on the allocation of public lands may override the detrimental impacts on regional and local economies. If an additional 500,000 acres of wilderness is created in a county with 70 percent of its land already publicly owned, the impacts are much more serious than creating 500,000 acres of wilderness in an area where none presently exists. Designating land as wilderness and removing access to harvestable timber may force local timber companies out of business with serious impacts on local communities, even though the amount of reduced timber

cut would appear to be infinitesimal at the national level.

The relationships within and among the federal agencies and among the federal, state and local agencies as they affect land use may be more serious. Perhaps the classic case of "bureaucratic overkill" involves the allocation of water from the Truckee River. The problem is comprised of interstate competition between Nevada and California, flood control, spatial distribution of water use, inter-use competition among power, municipal and industrial water supply, water for pollution dilution, cooling water for electrical generation, water for irrigation, water to fulfill the rights of the Pyramid Lake Indians, and for fisheries, wildlife and pasture resources. Interstate conflicts on water allocation are expected, but the unresolved competition among the Bureau of Reclamation, the Bureau of Indian Affairs, the Fish and Wildlife Service and the Bureau of Land Management, all within the U.S. Department of the Interior, for the use of the same resources is difficult to rationalize. In addition, other federal agencies are involved, including the Corps of Engineers, the Environmental Protection Agency, the Forest Service, the Coast Guard and the Department of Transportation. Other interests include the municipalities present in the Basin, the Truckee-Carson Irrigation District, the public utility firms generating electricity and supplying water to the cities within the watershed, as well as other individuals and firms who have rights to appropriated water.

This example indicates the increasingly serious problem of planning resource use at the state and local level when the majority of the resource is owned by the federal government. Although current policy prevents uses of public lands that are not consistent with local comprehensive land use plans, this policy in practice has not proven to be very satisfactory. The problem has been well identified by Raleigh Barlowe who observes that further analysis is needed of three principal cost consequences of public land policies: (1) the direct costs to property owners who are unable to shift or sell their land holdings for values that reflect the highest and best land use. (2) foregone increases in property values in local business activity anticipated by property owners, government officials, and local residents once local sites have ripened to expected high uses, and (3) the development profits that will be lost to prospective speculators and land developers. Barlowe also observes that (1) public land policies frequently have an uneven effect upon the utilization of private and public lands; (2) the owners of some private tracts enjoy greater opportunities than others to utilize or sell their lands for highly valued uses that produce large flows of land rents and/or satisfaction; (3) while physical or economic factors may dictate the choice of some sites designated for the higher and better use, a random choice lottery principle controls the selection of the areas assigned to many uses; and (4) basic inequities arise when public policy provides some persons and communities with opportunities to enjoy profits and special satisfaction while denying them to others.

Little information is available on the extent to which public funds are used to subsidize federal ownership of land. Is the money that subsidizes the ownership of public lands better spent in that use or in alternative uses? If public funds are better spent in alternative uses, then re-examination of the policy that only grazing, timber and mining pay for the use of public lands, while little or no payment is required for recreation, wildlife, fishery, wild horse, aesthetic, wilderness, and ecological uses may be in order. The basis for some uses of public lands coming under the market system, while others are exempt must be explicitly determined.

Brewer [1961] has indicated that "The extent to which they [range or water] remain ambiguous in the pricing process influences the use to which they are subject . . ." Further, "Relevant analytical method, . . . must identify the basic institutions involved and the role of price for each." Without some effective pricing mechanism for the public goods produced on the public lands, and a better measure of the distributional impacts, the applica-

tion of efficiency criteria may not give unambiguous results concerning changes in welfare. Thus, while multi-objective, multiple-use policies for public lands have been in existence for some time, functional institutional decision criteria and frameworks to facilitate effective decision-making are not at all commonplace.

Externalities of decisions concerning public land use policies have not been treated to this point; yet they are very important. Interface problems of public and private lands have not received much attention. Similarly, checkerboard land poses difficult management problems for both public and private owners. These problems are amenable to meaningful economic analysis.

Articulation of the problem areas and the economic issues involving the public lands is only a beginning. Ultimately, research priorities must be identified. Brewer [1970] has suggested that analysts (1) scan the broad problem areas, (2) articulate specific issues, and (3) identify research activities that generate information pertinent to key policy choices. Selection among these research activities can be screened pragmatically by determining (1) research that is not likely to be undertaken by others, (2) the probability that the research can be accomplished within the limits of the resources available, and (3) the comparative advantage that economists have in dealing with the issue. Hopefully this effort will itself demand a high priority among researchers and funding agencies. Certainly, the opportunity exists for major research contributions.

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