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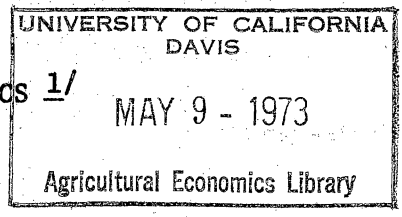
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ECOTONES, CHECKERBOARDS AND ECONOMICS 1/

George A. Myles 2/

Introduction

"This country is in the midst of a revolution in the way we regulate the use of our land. . . .It is a disorganized revolution, with no central cadre of leaders, but it is a revolution nonetheless." Fred Bosselman and Dave Callies open their 1971 report "The Quiet Revolution in Land Use Control" with these statements.^{3/} It is timely to discuss the economics of using checkerboard or intermingled public-private lands because bills providing for a National Land Policy are currently being considered by Congress.

The purposes of this paper are - first, to point out the importance of intermingled public-private landownerships especially as they affect Forest Service lands; second, to point out benefits and problems associated with intermingled public-private land ownerships; and third, to suggest some methods by which public-private lands can be a catalyst in achieving synergistic effects, where the combined effect is greater than individual effects, from joint management.

The idea of joint public-private land management is not new, in fact

1/ Paper for presentation at the Forest Economics Section of the American Agricultural Economics' Association. August 1972 Gainesville, Florida.
2/ Agricultural Economist, Range and Wildlife Division, Regional Office, Forest Service, U.S. Department of Agriculture located at Denver, Colorado.
3/ see reference 1, page 1.

there are many examples such as grazing management on National Grasslands, agreements with railroads for reciprocal rights-of-way and cost-sharing of road building and agreements for developing recreational areas presently in effect. However, there are opportunities to make more comprehensive agreements in regard to joint management and economics.

You probably wonder how ecotones fit into a discussion of public-private lands. An ecotone is the zone between more homogeneous ecosystems such as forest and grassland. The ecotone usually provides habitat superior to either of the ecosystems it joins. The reason for this synergistic effect in the ecotone is that each ecosystem compliments features lacking in the other. In the forest-grassland case, for example, the forest provides cover while the grassland provides food for wildlife. Perhaps the most striking examples of natural ecotones are the world's beaches and tidelands. These ecotones usually have a high biological production potential compared to adjacent ocean and land areas.

There is strong evidence that "socio-economic ecotones" exist in the intermingled zone of public and private land ownerships. One of the best examples of this is the typical city where the streets, parks, and often airports are publicly owned and are intermingled with private ownership of residences and businesses. The city itself is the example of the synergistic effects provided by these "socio-economic ecotones."

A third important ecotone is the wide zone between private and public management. Here, too, synergistic effects can be produced in the ecotone.

Evidence such as the ability to rapidly mobilize for a war effort, and building the immense interstate highway system or large dams indicate positive synergistic effects of joint public-private management. Other evidence such as the multi-billion dollar cost overruns on the C5A supersonic transport airplane indicate that synergistic effects can be negative depending on your loyalties and philosophy.

Importance of the Public-Private Ecotones

The magnitude of federal-private land interfaces can be understood from the fact that the Federal government owns 761 million acres of land or 33.5% of the total land area of the United States. Federal ownership varies from .3% in Connecticut to 86.9% in Nevada, the contiguous state with the largest percentage of federal ownership, to 96.7% in Alaska.^{4/}

Most federal ownership outside Alaska is concentrated in the 11 western states. About one-fourth of the federal lands or 187 million acres are managed by the U.S. Forest Service.^{5/} These large public land holdings insure that the problem of managing public-private land boundaries will be with us in the future.

Problems and Opportunities at the Public-Private Ecotone

Developing areas create problems in the public-private ecotone which change the character of nearby public lands. The very fact that there is development takes away the feeling of solitude and naturalness. Also, residential developments require roads, power, telephones, water,

^{4/} Statistical Abstract of the United States, 1971, p. 189.

^{5/} Source: Public Land Law Review Commission "One-third of the Nation's Land" June 1970, p 21.

sewers, gas, flood protection, garbage dumps, and other services which reduce or eliminate the land's value for recreation or timber production.

One source of problems is the desire of private landowners to use public lands for roads, powerlines, city dumps, etc., in order to save their own land for higher value uses. Where there is development, land is needed for the above purposes and equitable means should be worked out for sharing the values on land used for businesses and residences with the public owners of land which is used to provide services.

Another source of problems is the widely divergent land values at the public-private boundary. Traditional uses on Forest Service lands provide low returns. Grazing, a major use of National Forest lands, provides revenues to the government of only about \$.20 per acre per year. Timber yielding 15 mbf (thousand board feet) per acre, growing in a 100 year cycle and selling for a stumpage price of \$20 per mbf produces a gross value of only \$300 in 100 years. The present value of \$300 at the end of 100 years, discounted at 6% is only \$.88, which would be the capitalized value of an acre if the only return was the timber it produced.

Contrasted with these low values for traditional uses are very high values for residential, industrial, and commercial uses. It is difficult to find land near National Forests in small parcels for less than \$1000 per acre and values of \$8000 per acre in growing areas are not uncommon. If land is worth an average of \$4000 per acre and provides a return of

5%, it would produce \$200 per year or 1000 times the average revenue from grazing. The problem is to find ways to making a transition between low value uses and high value uses.

Examples from three intermingled landownership situations, the National Grasslands, railroad "Checkerboard lands" and developing recreational complexes will indicate present management techniques and point out opportunities for comprehensive joint public-private planning and management.

The 3.8 million acres of intermingled public-private ownership in the National Grasslands demonstrate a conservation type of land use in the Great Plains. The Grasslands are kept in permanent grass cover which has reduced wind and water erosion. Livestock and wildlife utilize the grass, producing products in strong demand from lands which might otherwise be used to produce surplus grains. Good management techniques have been developed. For example, grazing associations manage grazing over large areas in cooperation with the Forest Service giving individual association members the economies of scale of a large operation. The need for fencing individual allotments and water development is reduced. Some associations hire a range rider to handle cattle for all members. Techniques to handle intermingled land problems such as exchange-of-use permits or waiving management of intermingled land to the Forest Service have been developed and refined.

The National Grasslands comprise less than 2% of the total Great Plains area. The opportunity, and challenge, is to expand desirable aspects of Grassland management to more of the area. Some difficult questions will have to be answered. What percentage of land should be publicly-owned to accomplish desirable objectives? What other uses, if any, besides grazing and wildlife should be planned? Answers to these questions are beyond the scope of this paper. It will compare problems and opportunities on different types of intermingled lands and suggest an approach to these problems.

Railroad checkerboard lands are another example of intermingled lands, similar to the National Grasslands except they have one large private landowner instead of many small owners, and many of the remaining railroad lands are located on mountainous or desert lands instead of lands formerly used for farming. They offer slightly different problems and opportunities.

A checkerboard land pattern often does not fit the land, section lines cut across drainages, and ownership is intermingled in natural wildlife management areas. Road and fencing costs can be excessive. The problem, or opportunity, is for the public land agencies and railroads jointly to develop management or planning units that follow natural drainages, or provide for development independent of ownership.

Rapidly developing recreational complexes dependent on National Forest lands are another example of the importance of the public-private ecotone. Development of these complexes often centers around natural features such as a ski slope on land coupled with spectacular mountain scenery.

Businesses and housing are usually located on nearby private land to capitalize on the natural features. The challenge is to develop the entire area in such a way as to optimize benefits to the public at reasonable costs. For example, businesses should not be located too far from the natural attraction just to be on private land. The best area for the type of development planned, such as a ski slope, should be used; not one that happens to be near private land.

Current Forest Service directives ^{6/} indicate that land exchanges would be a major tool in the management of any of the three intermingled landownership situations described. Another method might be to develop a comprehensive joint public-private development and management plan. Trial areas such as parts of the National Grasslands, checkerboard railroad lands or developing railroad lands could be selected for comprehensive joint management. Economic plans for using the natural resources within their ecological capabilities for satisfying human wants should be developed in as much detail as possible. These plans should include:

1. A comprehensive inventory of environmental, ecological, economic and social factors.
2. An overall long range development plan.
3. An appraisal of the land values furnished by both parties.
4. An agreement for sharing costs, taxes and benefits and capital appreciation.

^{6/} See Reference 5, Section 5430.2

5. An agreement for sharing management decisions.
6. A method of arbitration and dividing property in case of management deadlocks.
7. Use of eminent domain .
8. Salary and wage levels and number of public and private employees.

Such comprehensive public-private area development plans are not expected to be the only method or even the major method of public-private land management. We will, no doubt, continue to rely on traditional methods of land development, but in a public domain which includes one-third of the nation's land, there is room for many different approaches. In fact, the Public Land Law Review Commission recommended that the government try different approaches for acquiring lands. John Day,^{7/} in a discussion of an integrated land and water planning approach stated: "Rather than interdisciplinary work being a completely new research concept, I believe it to be a modification of past procedures toward more formalized cooperative efforts with greater emphasis on interaction." A comprehensive public-private approach to land management could be regarded the same way.

Due to the complicated nature of the trade-offs, long range value determination and social benefit problems, economists would certainly have an important role to play in developing equitable long range plans.

Conclusions:

Intermingled lands, the public-private ecotone, present many management problems and opportunities. The very size of public land holdings,

^{7/} See reference 3, Page 141.

one-third of our nation's land, guarantees that the public-private ecotone will play an important role in future development, especially in the western states.

Bills for developing a National Land Policy are presently (June 1972) before both houses of Congress. The Public Land Law Review Commission report has indicated areas where the body of laws and regulations affecting public lands may be streamlined, standardized and made more effective.

The rate of economic growth and development will probably continue to accelerate, accentuating the problem of living on a constant land base. Although management of public lands has continued since the nation was founded, great opportunities to utilize public-private land and management ecotones, to enhance development, lie ahead. There are possibilities for increasing benefits to both the public and to private developers and reducing total costs. More important, better planned, more esthetic and environmentally sound developments would result.

An important benefit of joint public-private planning might be the blending of expertise, attitudes, and abilities from top management of government and industry, a coordination of efforts rather than competition. Perhaps the same synergistic benefits found in biological ecotones can be produced in the public-private land and management ecotones. This would demonstrate the benefits of our system of public-private landownership and, hopefully, provide the greatest good for the greatest number in the long run.

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