ON DIVESTITURE AND THE CREATION OF PROPERTY RIGHTS IN PUBLIC LANDS

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Approximately 628 million acres, or over one-fourth of the land area of the United States, is owned by the federal government. A predominant share of this land is located in the West. Over one-half of the land areas of Alaska, Idaho, Nevada, Oregon, and Utah belong to the federal government. Alaska, the extreme case, is 89 percent federally owned.

The immense petroleum and gas wealth potential of state and federal lands in Alaska—a state that is relatively poor in private wealth—together with changes in the political climate in Alaska and generally in the Western states, has produced a variety of proposals designed to increase private access to these lands. The Sagebrush Rebellion led to the proposal that federal lands be transferred to the states, which would then lease them or otherwise permit private access to them on terms determined by the state political environment. In Alaska, where the state income tax has already been repealed, a serious effort is being applied to

> find a way to assure that the state divests itself and transfers to the people all income producing resources. There are a number of plans being discussed, such as establishing a pass-through corporation or irrevocable trust that would own all of the royalties or mineral rights on state lands and distribute shares of stock to each "Alaskan." Another would devise a subsidized leasing system which would allow even those Alaskans of modest means to participate. An idea which would give the rights directly to individual Alaskans would

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> involve a giant lottery, where every Alaskan would have a chance, based on the luck of the draw, to own a very valuable piece of property. This could include both surface and subsurface rights, or only subsurface rights.[1]

A complementary development is the growing documentation by natural resource economists of governmental mismanagement of the public lands. These critical studies of what is largely a problem of underpriced (or zero priced) resources and common property mismanagement include the federal park system, forest resources, grazing lands, wilderness and wildlife resources, federal dam-building programs, and the barrier islands in our coastal areas.[2] Many of these studies call for some form of privatization.

This paper sets forth some criteria for evaluating any proposed divestiture of rights to public land, examines some historical and current proposals for divestiture in terms of these criteria, and attempts to articulate in some detail a comprehensive program for auctioning all rights to public lands over the next few decades.

Criteria for Evaluating Alternative Divestiture Plans

Of the many criteria that might be used to evaluate alternative methods for the divestiture of rights to public land, I suggest four:

[1]Letter to the author from Rep. Richard L. Randolph, Alaskan Legislature, March 20, 1981.

[2]On the federal park system, see James P. Beckwith, Jr., "Parks, Property Rights, and the Possibilities of the Private Law, *"Cato Journal* 1 (1981): pp. 473–99; and for a critique (based on a GAO report) of the heavy-handed treatment of private property owners by the U.S. Park Service, see "The Silent Scandal," *Wall Street Journal,* May 25, 1982, p. 24. On forest resources, see Charles R. Batten, "Toward a Free Market in Forest Resources," *Cato Journal* 1 (1981): pp. 501–17; Marion Clawson, "The National Forests, *Science* 191 (February 20, 1976): pp. 762–67; and William F. Hyde and Kay Blemker, "Compounding Clearcuts: The Social Failures of Public Timber Management in the Rockies," in John Baden, ed., *Earth Day Reconsidered* (Washington, D.C.: The Heritage Foundation, 1980), chap. 5. On grazing lands, see John Baden and Richard Stroup, "Property Rights, Environmental Quality, and the Management of National Forests," in Garrett Hardin and John Baden, eds., *Managing the Commons* (San Francisco: W. H. Freeman and Co., 1977), pp. 238–40; Gary D. Libecap, "Competing for the Rental Value of Federal Land," *Cato Journal* 1 (1981): 391–404; and Libecap, *Locking Up the Range: Federal Land Controls and Grazing* (Cambridge, Mass.: Ballinger Publishing Co., 1981). On wilderness and wildlife, see William C. Dennis, "The Public and Private Interest in Wilderness Protection," *Cato Journal* 1 (1981): pp. 373–90; and Robert J. Smith, "Resolving the Tragedy of the Commons by Creating Private Property Rights in Wildlife," in ibid., pp. 439–68. On dams, see Bernard Shanks and Kay Blemker, "Dams and Other Disasters: The Social Costs of Federal Water Development Policies," in *Earth Day Reconsidered,* pp. 55–62. On the barrier islands, see William J. Siffin, "Bureaucracy, Entrepreneurship, and Natural Resources: Witless Policy and the Barrier Islands," *Cato Journal* 1 (1981): 293–311.

1. Allocation to the Highest Valued Use (Efficiency)

Each tract of land or combination of rights to the tract should be allocated to those uses that command the highest value. Thus, land whose value is greatest in timber production alone should not be used for grazing. Land whose value is greatest when water and surface rights are separated should be represented by a property rights system in which deeds to surface rights and water rights are separable and marketable. Similarly, remote wilderness areas for which logging or mining are too costly should be preserved from such uses. These criteria are achieved by a well-defined system of alienable, separable, private property rights, which permit all potential gains from exchange in markets to provide incentives for the allocation and reallocation of land use rights to those functions that are perceived to command the highest value.

2. Low Transaction Costs

Given a choice between two divestiture plans, both capable of satisfying the first criterion, the preferred alternative would be the one for which the transaction costs to the participants are lowest. Hence, following divestiture, if plan A requires more secondary market exchange than plan B, then plan B would be preferable.

3. Broad Participation

Since we are concerned with resources now held in the public domain, which in principle belong to all citizens, it is desirable to permit the broadest possible participation in any divestiture proceedings. If public lands belong to all citizens, than all citizens have a legitimate claim to share directly in the realized wealth created by divestiture. Note that this does not mean that every citizen need be given an ownership right to some tract of public land.

4. Recognizing Squatters' Rights

Variously misguided or now obsolete public policies may have created de facto partial rights in public lands. For example, grazing permits have been issued by the Bureau of Land Management (BLM) and the U.S. Forest Service, and many have been renewed or sold, sometimes along with adjoining private land. Consequently, the value of these permits has been capitalized into the price of home-base ranches.[3] Similarly, subsurface groundwater rights have been capitalized in the price of adjoining land under the common or statutory law "rule of capture" that governs riparian rights in many states.

[3]Baden and Stroup, pp. 238–39.

Perhaps the simplest procedure for dealing with these cases, which has already been done in practice, is to recognize squatters' rights officially by a recorded, transferable deed. All remaining land rights—for example, rights not previously appropriated, de facto—would be part of the divestiture plan.

Of these four criteria, the first is by far the most essential, not so much because efficiency per se should be the paramount objective, but because efficiency is achieved by a process or atmosphere that (permissively, at least) encourages a search and comparison of alternatives. It is this exploratory process, motivated by reward, that encourages innovation and permits the best resource use to be discovered and implemented where knowledge is imperfect. Thus, price and allocation theory (efficiency) cannot be validly separated from information and search theory.

Privatizing Public Lands: Some Historical Programs and Current Proposals

To provide some perspective on these divestiture criteria it is useful to briefly examine some historical programs and some of the recent proposals to privatize rights to public land.

The Homestead and Similar Acts

It is worth emphasizing that the Homestead Act of 1862, our most important divestiture program for opening the American West, did not meet the above criteria. Under the Act, title to 160 acres of land could be acquired by adult citizens paying $1.25 per acre or by "proving" cultivation and five years residence on the land. Since land is not homogeneous, the fixed supply price encouraged misallocation by underpricing more valuable tracts and delaying the divestiture of less valuable tracts. Cultivation and residency requirements presupposed that the land was to be used for agriculture and that residency was a good screening rule for land allocation. Since land use and the efficacy of residency are matters for the market to determine, the Homestead Act violated criteria 1 and 2. Since homesteaded land was freely alienable, however, criterion 1 ultimately was satisfied through the added costs of secondary exchange. The presumption that all land available under the Homestead Act should be used for cultivation is evident in the attempt by Congress to prevent "misuse" of the Act by requiring homesteaders to "swear that the land was intended for actual settlement and cultivation and that entries were not being made for any other person."[4]

[4]Paul W. Gates, *History of Public Land Law Development* (Washington, D.C.: U.S. Government Printing Office, 1968), p. 395.

Although legislation had provided for the privatization of land for agricultural purposes and for mining (via the Mining Act of 1866 and subsequent mining acts), Congress made no specific provision for timberlands until the Timber and Stone Act in 1878. Prior to this date, private timber holdings were acquired under laws allowing cash or scrip sales, or fraudulently under the homestead and preemption laws. Any risks associated with fraud were unnecessary, artificial additions to the transaction costs of privatizing public lands. Since enforcement was nil, however, the damage was probably slight.

Similarly, the Mining Act of 1866 and its successors did not satisfy the above criteria. As in the Homestead Act, rules required that a piece of land (i.e., lode) be "worked" before it could qualify as a mining claim and title could be obtained. Since these claims were alienable, criterion 1 was satisfied by secondary exchange.

Concerning criterion 4, it should be noted that recognizing full squatters' rights by deed has many implementational limitations. Where such rights have not been clearly established by administrative records, there will be an incentive to claim these prior rights and invest in proving or acquiring them, which is a deadweight loss. Historically, the problems of squatters on public land in the late 18th century eluded all attempts to control it by force[5] and eventually gave way to a series of preemption acts beginning in 1830. These acts recognized the preferential right of squatters to purchase land, including improvements, at $1.25 per acre.[6] It is possible that some variety of preferential purchase right would be appropriate as an alternative to criterion 4 for certain present-day private uses of the public lands.

Extension of the Federal Leasing Program

An alternative to complete divestiture of the public lands is simply to extend, and perhaps strengthen, the federal leasing program as it now applies to offshore oil exploration, timber harvesting on forest lands, grazing rights, and recreational sites. The major problem with quasi divestiture by the State via an extension of leasing is that lease terms would be influenced, if not governed, by political rather than by market processes. This provides incentives for the potential holders of leased grazing rights, cutting-planting rights, wilderness use rights, and so forth to lobby for favorable terms, such as grandfather rights, road subsidies for easier access to leased tracts, and the relaxation of controls on overgrazing.

[5]Ibid., p. 67.
[6]Ibid., pp. 225–30.

Just because leasing is widely used in the private section, does not imply that it can be used efficiently in the public sector. Private leasing contracts are immensely variable in creating property rights arrangements that fine tune resource use to the preferences of *both* demanders and suppliers. Suppliers have an incentive to conserve capital value and, therefore, to negotiate arrangements that limit demanders' ability to overutilize resources. Where such arrangements are not feasible—e.g., because of monitoring costs—there is an incentive to sell rather than lease the land to user owners. Hence, *the own-or-lease decision is itself a market disciplined decision* with infeasible lease arrangements failing to survive. Private landowners who lease their property are not pressured into a "land of many uses" political philosophy, which I suspect is a euphemism for common property mismanagement. Private owners have an incentive to see that such property is leased, when feasible, to its highest-valued uses, net of deterioration costs. The history of governmental land management and leasing policies does not inspire confidence in the proposition that the political process can even come close to emulating these sophisticated market property rights processes.

Long-Term Leasing with Pullback Modifications

Marion Clawson has suggested an innovative new public institution that could make the increased leasing of federal land politically feasible.[7] Under Clawson's proposal, any organization or individual could make application to lease a tract of land for any purpose satisfying the applicable law. Within a limited time after filing the application, any other person or organization could file a so-called pullback application for some part of the land area specified in the original application. The pullback applicant would have to meet the same terms that apply to the original applicant. Thus, a forestry firm might apply for cutting-replanting rights on a tract of Forest Service land, and the Audubon Society might file a pullback for one-third of the tract to be preserved as a wildlife refuge. Alternatively, or in addition, Kampgrounds of America might file to pullback a section for a commercial campground. The idea is to force various competing potential users to bargain with each other.

This is a thoughtful proposal, which, as I interpret it, has the following constructive features:

1. It would attempt to substitute economic for bureaucratic criteria in the evaluation and allocation of public land to competing uses.

[7]Marion Clawson, "Public Lands Revisited" (unpublished manuscript, Resources for the Future, Washington, D.C., 1981).

2. It seeks to increase the incentive to conserve replenishable resources through decentralized management and control over public lands.

3. It would promote the economic development of land for recreational wilderness, and natural resource extraction and harvesting purposes in a manner that would attempt to balance these conflicting uses through the lease challenge (pullback) procedure, forcing conflicting group interests to be reconciled through bargaining.

4. It attempts to channel more environmentalist-controlled income into the direct control, management, and preservation of wilderness resources. The social objectives of environmentalist groups would have to be translated into a willingness-to-pay for preservation.

The proposal does, however, contain a number of defects that would prevent or limit the achievement of these desirable objectives:

1. The present public land management bureaucracy is likely to press for as much control as possible over lease terms, by adding detailed monitoring provisions, for example. Bureaucrats will want such controls to reflect their employment-creating and budget-maximizing needs, and these criteria will not be equivalent to the cost-constrained incentives owners face to manage the resource in a way that maximizes its net capital value. Bureaucrats are not evil, but they will consciously or unconsciously look out for their own interests.

2. Administratively, whatever compromise level of control over lease terms might ultimately prevail, bureaucrats can be expected to implement and enforce these provisions to maximize their own benefits, not those of a surrogate owner.

3. A provision that allows one party to intervene and acquire for its own purposes some portion of a tract that another party has attempted to lease (provided that the second party meets the lease terms of the first) is unnecessarily complicated. The bargaining and strategic positioning among the multiple parties (including, perhaps, the leasing agency of the national government) would lead to high transaction costs, a deadweight loss directly attributable to the institution. A cleaner, lower-cost means of introducing the disciplinary function of the market is to allow "challenging" parties to simply bid away the rights sought by the first, or any, party. It seems likely that the simplest way to do this is by holding a competitive auction of the various lease rights that are associated

with the land's use. What is needed is a means whereby each party can express its willingness-to-pay to use or prevent the use of particular land rights, rather than a "powerful tool (the pullback) to enable any interest group to curb the power of some other interest group, and to force negotiations which may result in acceptable compromises."[8] This sounds like a full employment program for lawyers. The problem is not to "curb power" but to allocate efficiently. This requires that wants—now expressible only in terms of political power—be expressed in terms of willingness-to-pay (bids).

4. A more fundamental design defect is the proposal's attempt to specify a detailed structure of price and quantity controls: royalties of 12.5 percent of oil and gas and five percent of gross output for metals; the requirement that only forestland whose productivity is 85 or more cubic feet per acre be available for lease; the requirement that timber be purchased at prices that reflect present stumpage prices for sawtimber and pulpwood, discounted as might be appropriate; per acre grazing rents equal to the value (market?) of one pound of beef; the provision that local governments may rent up to 15 percent of the federal land in their district at $1 per acre plus all costs; and so on. These provisions would substitute a regulatory maze for the current land management bureaucracy. It is not necessary or even feasible to try to control both prices and utilization patterns as specified in the leases. Given the lease terms (property rights of lessee), prices could be determined at auction.

5. Finally, a fundamental problem with the proposed institution is that it does not solve the lease-or-own decision allocation problem. As noted above, certain forms of land use may not be economically viable under lease contracts. A free market provides incentives to use lease arrangements only if there are net gains from exchange, including enforcement and monitoring costs.

Overall, I think the proposal is a valuable effort to modify existing institutions and to introduce some of the discipline of the market where essentially none exists. But the discipline of the market requires a market wherein each alternative, such as harvesting trees, must pass the test of opportunity cost. (Is the Sierra Club, perhaps in coalition with Friends of the Earth, willing to bid more than Potlatch Forests to control the timber rights on a given acreage?) In this regard, it is particularly important that the resources of the conflicting groups be used to signal values and, thereby, to resolve the conflict in favor

[8]Ibid., p. 25.

of the highest-valued use rather than to have those resources dissipated in a costly legal bargaining contest.

Land Sales for Government Revenue

Historically, much of the original stock of public land in the United States was privatized by land sales to raise government revenue. The government's taxing power was narrowly limited until late in the 19th century, and the intensity of the colonial tax revolt meant that any attempt by the states or the Continental Congress to raise money by taxation to prosecute the Revolutionary War would have raised questions about who might be the real enemy. This anti-taxation mood persisted long after the Revolution and, coupled with the fact that state and federal governments were rich in land, made it all but certain that the public lands would be viewed as a major source of or as a direct substitute for government revenue. Consequently, during the Revolution the states offered land bounties to attract enlistments, and the Continental Congress did not hesitate to promise land it did not have (until states ceded the land to the United States beginning in 1784)[9] to obtain enlistments.

Bounties continued to be offered in the Indian Wars (many of the bounty lands were claimed by the Indians and could not be settled) and the War of 1812. When it became apparent that there was not enough land set aside to satisfy these claims, in 1830 Congress authorized claimants to land in the Virginia Military Tract to exchange their bounty warrants for Revolutionary War scrip (land office money), which could be used to enter land in Ohio, Indiana, and Illinois. Bounty lands and scrip continued to be offered in the 19th century, in 1847 to enlistees in the Mexican War[10] and under the Morrill Act of 1862.[11] In the latter, which set up the land grant colleges of agriculture and mechanical arts, the states in which no public land was available—mainly in the East, the South, and the Midwest—were given scrip in lieu of the land that was granted to Western states.[12] In addition to scrip and bounty sales, cash and credit sales were common throughout the 19th century.

Current proposals to privatize public land[13] tend to emphasize cash sales for government revenue: "Probably the best way (to transfer ownership) would be to sell the lands to the highest bidders and use

[9]Gates, pp. 51–52.

[10]Ibid., pp. 270–73.

[11]Ibid., p. 438.

[12]Ibid., p. 438.

[13]See, for example, Batten, "Toward a Free Market," and "Land for Sale," *Wall Street Journal*, January 25, 1982, p. 22.

the returns to pay off the national debt and to reduce taxes."[14] These proposals meet criteria 1 and 2 and would certainly be acceptable to those concerned with the perpetual mismanagement of the public lands. However, they fail to meet the broad participation criterion. Although I consider this to be of less primacy than criterion 1, it is important for several reasons. First, given Congressional and bureaucratic behavior, it is not obvious that the proceeds from cash sales would be used either to reduce taxes or to retire the debt. More likely they will be viewed as a politically unconstrained bonanza to be spent by Congress for all the usual pet projects. There is at least a modicum of discipline in requiring legislatures to vote either deficits or new taxes to finance any increase in spending programs. Second, if the proceeds were used to reduce taxes or the debt, this would limit or rule out any direct benefits to those citizens who pay little or no taxes during the divestiture period. Third, divestiture is less likely to be politically acceptable if it is perceived as a program whose benefits are not widely shared by the population, and any serious program must be politically practical.

A New Proposal

Auctioning Rights to All Public Lands

The following proposal consists of many provisions defining the extent, procedures, and process of divestiture of the public lands. These provisions stem from the objective of satisfying the evaluation criteria outlined above. Although somewhat detailed for purposes of discussion and debate, they are offered not as a final set of divestiture provisions, but as an effort to encourage discussion and a new beginning on the public land policy issues that have plagued the republic since its inception.

1. All public lands would be divested over some reasonable but definite and limited horizon, say 20, 30, or 40 years. Divestiture would include all BLM, Forest Service, National Park, National Monument, National Recreational Area, continental shelf, deep sea bed, and military lands[15] over which the federal or state governments have jurisdictional claim.

2. All such lands would be partitioned into tracts or primary units

[14]Batten, "Toward a Free Market," p. 515.

[15]The government can lease back military reservations at market rates. By requiring all governmental facilities to pay opportunity cost, the true cost of such facilities must be included in current budgets, and land rentals have an opportunity to discipline facility location decisions. With this discipline, more defense might be obtained from a given budget by relocating bases that now occupy prime land sites.

(e.g., quarter sections) as seems appropriate to the topography and certain classifications of land. Thus, land near urban areas might be partitioned into relatively small tracts, while very large tracts might be appropriate for the deep sea bed. Similarly, a tract might be defined by certain "natural" historical boundaries that would remain intact, e.g., the Grand Canyon or Canyon Lands National Park. Since the auction procedures described in provision 8 below allow the market, as expressed in individual bids, to determine the grouping of primary tracts into ownership parcels, it is better to err on the small side in defining these elemental units of land.

3. Corresponding to each tract of land would be a set of distinct, separable, elemental deed rights appropriate for each tract. These deeds could distinguish mineral, oil and gas, water, grazing, timber, recreational use, wilderness use, and surface or other rights not otherwise specified (e.g., agriculture). Again, within limits, too much detail is better than not enough (transaction costs become important if distinctions are not functionally atomic). In special cases, certain land-use restrictive covenants could be written permanently into a deed. Thus, the surface rights to the Grand Canyon might be permanently restricted to the use of the surface for recreational and wilderness purposes. Owners of subsurface rights could be enjoined from exercising such rights without the consent of the owner of surface rights, as is now common in property deeds. In such cases, for example, the owner of coal rights could not extract coal without a contractual agreement with the owner of surface rights. If the Audubon Society owns the surface rights to a tract, then it can negotiate whatever restrictions it pleases on the development of oil and gas *resources, including prohibition of development.*

4. Once divested, these tract deed rights would be freely transferable, individually or in any combination, by bequest, sale, assignment, lease, and so forth, as alienable private property. The purpose of subdividing rights by different land uses is to allow markets to fine tune allocations to tastes and use values. The bidding procedure outlined in provision 8 below will allow deed rights within and across tracts to be packaged in accordance with the willingness-to-pay expressed by the bids. Alienability allows secondary market exchange to repackage tract deed rights in response to changes in information and economic or social conditions.

5. Any individual with a documented historical claim to rights defined by one or more of these deeds would be assigned the appropriate deed(s). Thus, an established holder of BLM or Forest Service grazing rights would be permanently deeded these rights. For example, suppose a rancher has been granted permits to graze cattle on a

10,000 acre tract of BLM land in return for an annual rental fee, R. This rancher would be assigned a deeded right to this arrangement, i.e. to graze the 10,000 acres in return for the payment R to whoever might be the subsequent private owner of the surface rights to this tract.[16] This has two purposes: (1) it prevents rights that have in some sense been legitimately acquired and subsequently acted on in the past from being arbitrarily expropriated; and (2) it converts an uncertain and perhaps poorly defined right into a well-defined, certain right. Consequently, it has the effect of changing the users' incentives for husbanding or otherwise maintaining the capital value of the right. BLM lands now subject to overgrazing would no longer be overgrazed unless that was the choice of the individual holder of the deeded grazing rights, who would now bear the full cost of any decline in the land's capital value. Under the BLM permit system, individuals may be poorly motivated to manage pasture resources efficiently, since the permits can be withdrawn or subjected to new restrictions. If the individual who is assigned the grazing rights deed desires full title to the land, he is free to bid at auction for the remaining deed rights. Alternatively, he may offer to sell his grazing rights deed at any time after the initial divestiture.

As already noted, where squatters' rights are sufficiently uncertain, poorly defined, or inadequately documented, it is questionable whether they should even be recognized by pre-auction deed assignment. If it is thought that squatters should be given preferential purchase rights, rather than deeded rights, then one possible procedure is to allow such individuals the right to acquire title ahead of the winning bidder at the ruling auction price under provision 8 below.

6. All tracts and the deed rights associated with them would be assembled into blocks. At regular intervals, say once a year or every six months, the deed rights for one block of elemental tracts would

[16]In the conference discussion of this proposal, Bill Niskanen pointed out that these rental fees have been increasing over time, and that some provision for such increases should be made. One possibility is for the obligations of the holder of the grazing rights deed to include provision for R to be adjusted for inflation each year. Alternatively, and less mechanically, the deed terms might make some provision for reopening negotiations on the lease terms every five years. I assume that provisions for changing fees are already part of the permit agreement between a rancher and the government agencies. If so, these contract provisions would be written into the grazing rights deed. The operating rule in recognizing "squatters' rights" should be to include in the deed no more and no less than those rights and obligations which are now part of what is the recognized practice or legal arrangement between the agency and the squatter, or permit holder. Should the deeded grazing rights be perpetuities? If they are perpetuities this would seem to maximize the incentive of the deed holder to maintain its capital value by good range management practices.

be put up for sale in a sealed-bid auction. Each auction should be preceded, well in advance, by an official description of each tract and the corresponding conveyance instruments so that all interested parties can prepare their bids.

7. Bids would *not be denominated in money* but in public land share certificates, analogous to no par value stock certificates. Unlike the Revolutionary War scrip,[17] they would not be denominated in acres; and unlike the Mexican War scrip,[18] they would not be denominated in dollars. These certificates would be issued all at once by the government well in advance of the first land auction and would *only be redeemable in land at auction.* Each citizen might be granted 10 certificates, so there would be about two billion shares outstanding. These certificates could be freely exchanged, assigned, or bequeathed at any time over the entire divestiture period, and they would not expire until after the final auction. To facilitate a continuous market in these certificates, they could be listed for trading on stock and commodity exchanges, which would then be free to create futures or options markets in public land shares. Consequently, bidders for land at auction would always know from the current market price of a share what would be the dollar equivalent of a given bid in shares. A bid of two and a half certificates for the mineral rights to a particular tract of land would be equivalent to $250 if shares were selling for $100. Public land deeds won at auction would be paid for by surrendering certificates, which could be bought in the open market by winning bidders either before or after the auction. With an ongoing options market, bidders could always hedge their bids at auction by buying an equivalent quantity of certificate options and then exercising the options only if their bids were accepted.[19]

[17]Gates, p. 257.

[18]Ibid., p. 271.

[19]In the conference discussion Jim Dorn suggested an alternative to provision 7 as a means of reducing the transactions costs associated with the issuance of (and maintenance of a market in) land shares: Instead of issuing land share certificates for bidding, let the bids be denominated in U.S. currency. The proceeds of each auction would then be deposited in a mutual fund to be shared equally by all citizens. Each citizen would be free to "cash out" of the fund at any time. I see no objections in principle to this "mutual fund" approach. However, if this procedure is to take full advantage of the discipline of the market, fund share certificates should be issued in advance, and be fully transferable. (I would list them on the stock exchanges). But if this is done, then these special mutual fund shares become equivalent to my public land shares, that is, each will represent the same ultimate capital value, and will discount the same stream of future auction outcomes. One difference is that the mutual fund would have to be managed by someone (also there would be transactions costs in acquiring the mutual fund portfolio), but if there is a market in mutual fund shares such management would be subjected to some market discipline. I have argued elsewhere that the fact that

8. The auction procedure would correspond to what has been called a "combinatorial" sealed-bid auction.[20] Each bidder would be free to bid on any right or any combination of rights for one or more tracts. He might bid for all the deed rights for a given tract, only the surface rights, only the oil and gas rights for some combination of tracts, and so on. The winning bidders would be determined by computing[21] those bid combinations that maximize the total economic surplus for the offered block of tract rights. This procedure permits elementary deed rights to be assigned to those package combinations valued most highly by the market (collection of bidders). Thus if the mineral rights to a particular combination of 10 tracts is more valuable to at least one bidder than are the component tract mineral rights to any collection of bidders, the highest combination bid for the 10 tracts would exceed the sum of the highest bids for the component tracts, and the combination bid would win. Similarly, if a particular combination of rights, say surface and grazing rights were more valuable in combination than separated, the highest combination bid would win over the sum of the highest separate bids. Another feature of this procedure is that it would extend the principal of the second price sealed-bid auction[22] to the combinatorial auction and thereby increase the incentive of each individual to submit bids equal to his or her maximum willingness-to-pay. Only if all bidders bid their maximum willingness-to-pay are we assured that land rights will be awarded to those who value them most.

The above proposal would recognize each citizen's right to share in the wealth created by privatizing the public lands. Individuals without competence or interest in the productive use of any of the auctioned rights would be free to sell their initial assignment of share

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holding company (a closed-end mutual fund) shares tend to sell for less than the market value of their investment portfolio suggests that the market discounts the value of anything that passes through an extra layer of such management. See Vernon L. Smith, "The Measurement of Capital," in John W. Kendrick, ed., *Measuring the Nation's Wealth*, Studies in Income and Wealth, vol. 29 (New York: National Bureau of Economic Research, 1964), pp. 343–344.

The mutual fund suggestion is a good one, and I would not want to prejudge its practical advantages relative to the issuance of marketable land shares. For example, the mutual fund, with marketable shares, might have greater popular appeal by virtue of its greater familiarity.

[20]See S. J. Rassenti, V. L. Smith, and R. L. Bulfin, "A Combinatorial Mechanism for Airport Time Slot Allocation," *Bell Journal of Economics*, Autumn 1982.

[21]Algorithms for this computation have been developed by S. J. Rassenti, "0-1 Decision Problems with Multiple Resource Constraints: Algorithms and Applications" (Ph.D. dissertation, University of Arizona, 1981).

[22]See William Vickrey, "Counterspeculation, Auctions, and Competitive Sealed Tenders," *Journal of Finance*, March 16, 1961, pp. 8–37.

certificates in the open market. Oil companies, forest product companies, home builders, ranchers, farmers, outdoor recreation companies, private individuals, environmentalists, and environmental organizations would be free to purchase share certificates or receive them by donation or bequest. Environmental groups, such as the Sierra Club, Friends of the Earth, and the Audubon Society, instead of dissipating their resources in political action and lobbying for conservationist policies on public lands, could purchase certificates in the open market and accept certificate donations from their members and others. These certificates could be pooled and used to bid for the surface or other rights to any tracts they choose to be managed as they see fit. Similarly, timber or oil companies could bid for these resource rights only or bid for such rights in combination with surface rights. By awarding rights singly or in combinations to those uses that command the highest willingness-to-pay, the auction market would determine the most efficient way, initially, to separate or combine elementary land-use rights. As new information or conditions affecting land-use potential became available, secondary exchange could recombine or further subdivide combinations of land-use rights.

Common Pool Resources: Deeds to Water, Oil, Gas, and Fish

The surface boundary of land tracts is sufficient in most circumstances to provide well-defined property rights to cultivation, grass, timber, subsurface minerals, wildlife refuge or habitat, wilderness, and recreational resources. But surface boundaries are inadequate for defining rights to resources that migrate across or under such boundaries. The economic objective in defining property rights is to limit the quantitative extent of the rights to particular resources (i.e., to exclude). Hence, to say that I have grazing rights to a section of land means that I have the right to fence it and consume as much of the grass as I choose, subject to the limitations of my contract with the owner of surface rights. A timber right gives me similar control over all timber growing within certain boundaries. In each of these cases, the quantity of the resource to which I have a right is whatever quantity I find growing within my land boundary. Note that in these cases the resource quantity or quality need not be *certain* for the right to be well-defined. The market is entirely competent to discount for uncertainty. Also note that the moment I cross beyond my boundaries to graze or log I am poaching on my neighbor's preserve. But if fish swim and water, oil and gas flow under gravity or pressure, surface boundaries no longer delineate the quantitative extent of the resource and no longer define exclusion. What is needed in these

cases is a property right defined in units of the resource itself. This principle has already been applied to cattle, parakeets, and dogs; but fish, water, and oil seem destined to take a little longer.

In many cases, I think it is feasible to create deeded rights to migratory resources. Consider, for example, the water supply for Tucson, Arizona. The city is located in a basin containing a natural subsurface aquifer estimated to hold 20 to 40 million acre-feet of water. All of Tucson's water is pumped from deep wells drilled into this aquifer. According to 1975 estimates, the natural recharge rate was 75,000 acre-feet per year and the consumption rate was about 225,000 acre-feet per year.[23] Anyone with a surface right to land has been free to drill into this water supply and start pumping. In addition to city and county water authority wells, individual residences, the University of Arizona, and surrounding farms, horse ranches, manufacturers, and mining companies own private wells that pump from this common water stock. Periodically, these wells have to be deepened as the water level declines. The city and county water authorities only charge for the cost of drilling, pumping, distributing, and managing this water system. The water itself is free. The politically popular solution to the water scarcity problem is the Central Arizona Project. Under this program, federal funds would be used to complete a canal from the lower Colorado River to Phoenix and Tucson on the assumption that, after California and the upper Colorado Basin states have dipped into the river, there will be enough water remaining for Arizona.

I propose the following:[24] Let the county issue water deed certificates for 30 million acre-feet of water. These deeds could be issued in proportion to the surface area held by landowners, but with adjustments for land used for residences, irrigated agriculture, mining, and industry. If feasible, adjustments could be made in proportion to a base period rate of water consumption. The objective would be to recognize squatters' rights to water, since the price of land has already capitalized the right to pump water freely.

Deeds could be issued in convenient denominations of 1, 5, 10, or fractional acre-feet of water. Any part of the rights conveyed by these deeds could be bought, sold, assigned, or bequeathed by contracts separable from contracts for the transfer of real property. Water deed transfers could be recorded in county or water authority records in the same manner as transfers of real property. This would allow

[23]See James L. Barr and David E. Pingry, "Rational Water Pricing in the Tucson Basin," *Arizona Review* 25 (October 1976): 1–12.

[24]See Vernon L. Smith, "Water Deeds: A Proposed Solution to the Water Valuation Problem," *Arizona Review* 26 (January 1977): 7–10.

existing institutional procedures that have stood the test of time to be extended to water rights. Water deed prices would be freely negotiable to facilitate a continuous market in rights to draw on the existing stock of water. All pumps would be metered on farms, ranches, mines, and so on, as is now the case for metropolitan area residences. Each user would receive a monthly bill for the cost of pumping, distribution, and management (excluding private well owners who bear this cost directly) and a monthly bill denominated in fractions of an acre-foot of deed certificates to be surrendered for all water consumed (including private wells).

Every few years, depending on cost, the recharge of water to the aquifer could be estimated or perhaps the aquifer stock re-estimated, and the outstanding stock of deed certificates adjusted by a stock dividend to maintain equality between the stock of water and total claims on water. Alternatively, and perhaps more simply, one could adjust the redemption exchange rate for deed certificates. For example, if after 10 years the aquifer had experienced an 11 percent increase in inventory, then the redemption charge would be reduced so that the consumption of 10 acre-feet of water would require the surrender of only nine acre-feet of deed certificates. In this way, the exchange rate between certificates and metered water use could be adjusted to balance the demand and supply for water as an *asset.*

This property rights system could also be applied to a common property lake or ocean fishery in which it is feasible to estimate the stock of fish and meter the catch. Fishermen would own deeds to live fish, which would be surrendered as the fish were harvested, and would be free to use any technology (now extensively regulated to control catch rates) they pleased. Regular stock dividends or adjustments in the exchange rate between deeds to fish and fish consumed could be used to compensate for growth in the fish stock or variations due to other factors.

Similarly, rights to *discovered* oil and gas in petroleum reservoirs could be assigned in the form of freely marketable and transferable deeds based on the estimated size and extent of the reservoir stock.[25] The owner of the oil and gas rights on a tract of land with a proven well need not drill additional wells to exercise the right to oil and

[25]Note the need to distinguish between rights to undiscovered oil and gas, which include exploration rights, and rights to draw on discovered oil and gas reservoirs whose size and extent have been estimated. A knotty problem, which I will not attempt to treat in this proposal, is the process whereby rights to undiscovered oil and gas get converted into deeded rights after an oil or gas strike. What is needed is a way of extending the definition of traditional oil and gas rights in land to include descriptions of how those rights become rights to share in discovered common property reservoirs.

gas. Instead the owner might sell his oil deed certificates to the owner of an adjoining tract on which drilling may be less costly or who has already drilled an efficient number of producing wells. The idea is to create a property rights system in which the value of oil reservoir stocks can be captured without producing the oil for market. In this way the decision to drill wells or to produce from existing wells can be based on the profitability of these activities rather than on a concern that others will capture any oil that is not recovered.

Amenity Resources: What Should We Do About Grand Canyon?

As I see it, potential models for the ownership and management of amenity resources are provided by private organizations such as The Nature Conservancy and the direct preservation programs of the National Audubon Society. The Nature Conservancy, with 100,000 members, has preserved approximately two million acres of land. They hire managers and use local volunteers for the stewardship of their 660 private preserves. The National Audubon Society, with 425,000 members, has preserved 250,000 acres including 76 sanctuaries and 90 preserves.[26] Perhaps the society's best-known sanctuary is the Rainey Wildlife Sanctuary on which oil companies have drilled several producing gas wells and ranchers graze cattle under rental contracts negotiated with the society.[27]

What special provisions, if any, should the divestiture plan make for Grand Canyon and similar national parks, monuments, forests and wilderness areas? There are many alternatives to be considered. In the following I discuss briefly a few possibilities, listed in increasing order of restrictiveness:

1. We could specify no restrictions at all, except perhaps to define tract size for surface rights as consisting of the current boundaries for some parcels. Thus the surface rights to Grand Canyon National Park or Yellowstone National Park, as these parks are now defined by the U.S. Geological Survey boundaries, might be kept intact. All other rights would be represented by deeds to elemental tracts, as appropriate. For example the unit might be a 640-acre section, with mineral, oil and gas, and timber (or grazing) rights to each section identified by a separate deed. Except where leases for these resources have already been granted, the winners

[26]The data on The Nature Conservancy and the National Audubon Society are obtained from Terry L. Anderson, John Baden, and Richard Stroup, "Report to the Department of Interior on Innovative Resource Management Strategies," February 1982, pp. 15–16; appendix, pp. 1, 3–4.

[27]See John Baden and Richard Stroup, "Saving the Wilderness," *Reason* 13 (July 1981): 28–36.

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of these deeded rights would have to obtain permission from (contract with) the owner of the surface rights before timber could be cut or wells could be drilled. Under this arrangement the owner of the surface rights to Grand Canyon, whether it was the Nature Conservancy or Atlantic Richfield, would have an incentive to seek donations and/or charge visitor fees to manage the scenic resources of Grand Canyon. As a consequence, willingness-to-pay (or donate) to preserve these scenic resources would become a factor in preservation which is not now present in public land-management policy. The greater is this willingness-to-pay for preservation, the greater would be the incentive of a private owner to negotiate restrictions on the development of subsurface, grazing or timber rights. Thus slant drilling from outside the park might be negotiated, where feasible, and timber cutting might be permitted under a program of replacement planting and selective cutting.

2. A slightly stronger version of alternative 1 would be to prohibit bids that combined surface rights with any of the other rights. This would force a separation in the ownership of surface and of other rights so that the development of the latter could only proceed by contract with the owner of surface rights. Under either 1 or 2 environmental groups desiring to manage amenity resources would have an incentive to concentrate their bids on surface rights. Radical environmental groups desiring to "lock up" petroleum or mineral resources could bid directly for these subsurface rights against commercial enterprises for the purpose of preventing their development. Anyone willing to pay opportunity cost would have the right to "lock up" any resource.

3. A more restrictive procedure would be to allow only "qualified" environmental organizations to bid on the surface rights to the national parks, and wilderness areas. This sets a dangerous precedent in giving special privileges to particular groups to be chosen by bureaucratic criteria. Although I have no doubt that a mix of ownership of scenic resources by Audubon, Nature Conservancy, and other such groups would vastly improve upon the National Park Service, I think any such "rigging" of the auctions would be unwise as a general policy. These organizations and their policies have evolved in an environment in which their land acquisitions have had to compete with that of commercial enterprises. They have flourished[28] under this discipline and there is no reason to

[28]Membership in conservation organizations increased dramatically from 1970 to 1980: Ducks Unlimited, 1,000%; National Audubon Society, 467%; National Wildlife Federation, 667%; The Nature Conservancy, 426%; Sierra Club, 129%. See Anderson, et al., "Report to the Department of Interior," p. 16.

suppose that they need be given any preferential rights over commercial enterprises. Under present policies the latter are receiving preferential rights in the form of underpriced grazing permits, and road subsidies to cut public timber. Divestiture would eliminate such preferential treatment.

4. Restrictive covenants could be employed to limit the uses of national park or wilderness lands. Thus surface rights could be restricted to scenic or wilderness uses, suitably defined, as is now done in private deeds. An even stronger (and more inflexible) procedure would be to combine all extractive resource rights with surface rights and include a covenant prohibiting all development of these resources and requiring the land to be preserved as wilderness. I think such covenants would be very unwise as part of a general policy of divestiture of amenity resources. Any owner of surface rights would be free to follow development policies that are as restrictive as he pleases. But such owners have earned that right by paying the opportunity cost of the land; that is, by bidding more than other potential owners who would have followed less restrictive policies. Similarly, any winning bidder at auction should be free to resell the land with his own restrictive covenant provisions. Such an owner, having paid opportunity cost, would be free to impose a capital loss on himself by limiting his resale market with a restrictive covenant. There is a vast difference between the government auctioning certain public lands with restrictive covenants attached and The Nature Conservancy buying land in the open market (or acquiring it by voluntary gifts), then reselling or leasing it with restrictive covenants. The latter is a market disciplined decision whose cost is born privately, while the former is not disciplined by an opportunity cost test and the cost is born publicly.

Conclusion

The divestiture proposal in this paper is characterized by the following principal features: (1) It is "fair" in the sense that all citizens would share equally in the value of the 628 million acres of public land that would be capitalized into the market price of land share certificates, and all would benefit from the productive opportunities created by divestiture. Of course it need not be "fair" in terms of ultimate outcomes since individuals and organizations will differ greatly in terms of how they put these opportunities to work. (2) Elementary property rights would be defined by deeds to the various functional uses of unit tracts of land. The size of ownership parcels,

and the manner in which use rights to the land are combined into packages of ownership rights would be determined by the market—in the primary auction by a combinatorial sealed-bid mechanism, and subsequently by exchanges that could separate or repackage tracts and rights in response to changing information and economic conditions. (3) The expropriation of "squatters rights"—rights already recognized by the government (for example, outstanding BLM grazing permits)—would be avoided by deed assignment to these individuals. (4) The bidding mechanism provides an incentive for combination bids to express "true" value (maximum willingness-to-pay), by guaranteeing that except in rare cases (for example, tied bids) the winning bidders will pay prices that are less than the amounts bid. Technically, this procedure is analogous to the "second price" sealed-bid auction for a unique object. The effect is to maximize allocative efficiency. (5) The proposal provides opportunities and incentives for environmentalists and their organizations to participate directly in the ownership and management of amenity resources by bidding for the surface rights to park and wilderness lands. (6) In the case of certain common pool resources such as ground water and fisheries, it is proposed that the appropriate governmental unit issue deeded certificate rights to unrecovered ground water and to live fish by species. These transferable and marketable certificates would then be surrendered in payment for extracted water or for landed fish. Equality between the stock of outstanding certificate claims and the estimated stock of the resource could be maintained by periodic adjustment of the surrender terms of certificates to reflect updated estimates of the resource stock. This procedure, in effect, creates exclusive marketable property rights in common property resources, which allows the natural scarcity of such resources to determine their prices and thereby discipline the individual owner's decision to extract the resource.

Many individuals and groups may oppose the divestiture of public lands because they believe that only the government can be trusted to preserve and beautify such lands. (This view receives intellectual support from economists who perpetuate the myth that the theory of market failure in the presence of public goods implies, *ipso facto*, the need for government production, ownership, and management of such goods. But this is a non sequitur, since the same economic logic leads to the theory of government failure in providing public goods through majority rule, and bureaucratic, processes.) Other individuals and groups may oppose divestiture, though they strongly disapprove of public land management policies, because they hope to change those policies. I think both views are naive in their image

of the reality of public land management, and of the efficacy of resource allocation and management by political processes. The proposal outlined in this paper is unlikely to be received with favor, initially, by environmentalists or by many economists with well-intentioned concern for the existence of "public good" type externalities in amenity resource use. I share the concerns of both groups, but I think it is time to get beyond superficial market failure theorems that ignore the role of property rights and institutions in a market economy. Intellectually for economists the problem is to identify those property right characteristics that have allowed private markets to succeed, to develop some principles of the relationship between property rights and market efficiency, and to ask how and at what cost these principles can be applied to public resource allocation problems.

For environmentalists it is important to get beyond the visceral misidentification of government with the proper stewardship and husbanding of such resources. It is also important to realize that the public management of lands, which is subjected to a spectrum of conflicting political interests, creates common-property-like incentives to overgraze grassland, overcut some forests (but undercut others), overcrowd many parks, and so on. And where public land management encounters weakly organized political opposition, the budget-expanding incentives of government agencies tend to dominate policy determination. This is particularly evident in the four-score history of mega-dam construction by the Bureau of Reclamation and the Army Engineers. No private power company, no consortium of such companies, and no industrial combine would have wasted its capital by flooding 186 miles of the Colorado River from Glen Canyon to Cataract Canyon then followed with a downstream proposal to flood Marble Canyon and Grand Canyon behind two great new dams. Neither is it an efficient use of environmentalist resources for the Sierra Club to have been obligated to carry the narrowly successful political battle that—for the time being—has blocked the Bureau of Reclamation drive to complete these projects. Everyone would benefit if the funds and effort expended by environmental groups were diverted from political action to the direct acquisition and management of amenity resources. Similar benefits would result if the expenditures by oil, forest product, ranch and mining interests to influence the leasing policies of public land management agencies were channeled into the direct acquisition and development of these subsurface, grazing and timber resources.

The premise of this paper is that land utilization should be depoliticized and determined by economic criteria operating through mar-

kets in which the various functional uses of land are recognized in the form of elemental property rights. Where public lands have already been set aside as primitive, wilderness or park areas, a case can be made for keeping the surface rights to these areas intact. Just as environmental organizations such as The Nature Conservancy and the National Audubon Society have acquired private land in competition with other users, it can be expected that environmental organizations, by diverting funds now being spent for political action, and by launching new fund raising efforts for direct land acquisition, would be able to bid successfully for many of these public lands.

DIVESTITURE AND THE CREATION OF PROPERTY RIGHTS IN PUBLIC LANDS: A COMMENT

Dolores T. Martin

Professor Smith has provided us with a thought-provoking paper on the issues and problems—political and economic—surrounding the creation of private property rights in publicly owned lands. The manuscript focuses on a suggested mechanism to move from the current management of lands by bureaucrats to a system of private ownership for all public lands. The documented failure of collectively managed resources can be traced to the nature of the institutional constraints and the perverse incentives created for participants. Thus, any new policies we adopt to remedy the current host of inefficiencies must be examined in light of the mechanisms, processes, and institutions that can reasonably be expected to achieve the desired outcome.

The basic premise of the paper is that current government management of public lands meets neither efficiency nor equity objectives and that an alternative ownership arrangement where markets or market-like solutions are introduced would move more closely to the desired efficiency/equity norms. While I agree with Professor Smith that the current institutional arrangement is non-optimal and I support the proposition that privatization of these resources would tend toward a more efficient solution, I would like to discuss briefly some of the problems that he or I will face in effecting the solution.

First, there is the difficulty that when anything of value is given away, the potential recipients will attempt to structure the rules of the giveaway to their own benefit. In the case of 750 million acres of land, this problem seems almost insurmountable. The redistributional effects of a government divestiture program appear far and

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away more difficult to deal with than the efficiency aspects of the transfer. This is not the government giving away surplus cheese, but a divestiture of assets worth billions of dollars. It is inevitable that individuals and groups will spend billions of dollars in attempting to see that the resources are distributed in a pattern that most closely approximates their wealth maximizing position.

The procedure to establish the rights to the collectively held resources will be defined by the political market. Such a redistribution via the political process opens up the procedure to a vast range of under-the-counter, special-interest type of transfers where the relative political power or impotency of the participants comes into play. For example, the provisions for partitioning the public lands would be left up to the bureaucratic agency which currently has domain over the land areas; thus, the Forest Service or BLM determine the efficient tract size. Quite aside from the problems of incentives, the public land managers would be under enormous special interest pressure. Each politically powerful group would be encouraged to dissipate valuable resources in this lobbying effort while there would be no reason to believe that the parcels ultimately assembled are, to quote Professor Smith, "appropriate to the topography and certain classifications of land." While the previous divestiture programs encouraged misallocations due to uniformity of tracts, prices, and tenure, they did have the advantage that bureaucratic and special interest manipulation was limited.

Further, as Professor Smith stresses, to be politically acceptable any program of divestiture must be perceived as fair, both ex ante and ex post. Under the proposed land share certificate scheme all citizens would have equality of opportunity to participate, thus, ex ante equality should be satisfied. The difficulty would come with the operation of the divestiture process as various segments of the public would be systematically benefited or harmed by the policy. We are all well aware of the connection between political power and income redistribution policies, thus, even if certificates are fully marketable, individuals may feel that the outcome of the process is biased toward the economically and politically powerful. It seems to me that this would be a problem, even if all participants recognized the current mismanagement generated by collective ownership.

For example, the average citizen may well believe that the National Forests are mismanaged and still oppose a policy of turning these resources over to the private sector. The individual may perceive that the redistributional aspects of the divestiture program swamp any efficiency gains that he might receive. The transfer of property

rights leaves the taxpayer/citizen in an inferior position vis-à-vis the better informed and better financed participants in the market.

Second, it is not obvious to me that simply transfering the ownership of the resources away from the government will necessarily lead to an improvement in efficiency. The underlying argument for divestiture is that bureaucratic managers do not bear the consequences of the resource mismanagement while the discipline of the private market would force resource owners to take these consequences into account. However, it is reasonable to assume that a substantial portion of the resources would be transfered to non-profit clubs, such as Citizens to Save the Niobrara, Friends of the Earth, Green Peace, etc. These organizations, operating within their ideological framework, may be equally unresponsive to opportunity costs. An additional problem would arise in the treatment of these clubs during the bidding process. Professor Smith would allow these organizations to form coalitions to gain land share certificates, thus, some secondary criterion to differentiate bidders would be needed or alternatively a suspension of anti-trust laws to allow all like-interested groups to form bidding coalitions in order to bundle the rights to an optimal-sized parcel.

The fact that the current system of public land management is generally held to be inefficient and inequitable does not lead to the inevitable conclusion that divestiture is the superior solution. As assets are not homogeneous and not managed by the same set of institutional rules, it is likely that the degree of governmental mismanagement may vary vastly over the resources; therefore, for a number of resources the conservation of capital value via leasing may present a superior alternative to divestiture. Smith rejects leasing as a viable means to increase resource efficiency due to the difficulties of lease terms being set by a non-market process. For divestiture of certain resources, there appears to be an equally difficult problem. Consider the case of either leasing or selling the Grand Canyon. The disadvantage of leasing lies with the governmental monitoring of the lease terms and the inherent problem of structuring incentives so that the bureaucratic overseer performs the function efficiently. One possible solution to the incentive problem might be for the government to lease monitoring rights as well as use rights. With divestiture, you must rely on the foresight of bureaucrats and politicians to negotiate a set of restrictive covenants that would cover all future contingencies that might impact adversely on the use of the canyon. The conceptualizing of the optimal property right restrictions would be incredibly complex and the contracts difficult to execute. It is not

obvious to me whether the discounted stream of mismanagement costs would be greater from divestiture or from leasing.

The structure of property rights to resources to be auctioned will be delineated not on the basis of optimal use but rather by the political market. The interaction between various bundles of property rights appears to make the likelihood of maximizing the certificate value very difficult. For example, the political market will ultimately decide for the Bob Marshall Wilderness Area what structure of property rights is to dominate. Assuming that no contingency bids are allowed, the willingness of the Sierra Club to submit a sealed bid for any portion of the land will depend upon land-use restrictions established prior to the auction. Professor Smith's plan for ranking order of rights attempts to take the divestiture plan out of the political arena. However, by the very nature of the process established, rent seeking and political manipulation are encouraged.

An immediate improvement in resource efficiency is suggested by Professor Smith's very interesting mechanism to formalize property rights where quasi-rights to public lands currently exist. In the case of the water supply for Tucson, this proposal for granting private property rights would appear to be characterized by efficiency gains that more than offset the redistributional aspect. There must be many instances in the 750 million acres managed by the federal government where this type of procedure could be initiated.

In conclusion, introducing markets and market-like procedures into public land management has a certain basic appeal to economists. The question of how we can best achieve the benefits inherent in the private land market and best avoid its inefficiencies is certainly well worth exploring. Professor Smith has given us a very interesting set of criteria and procedures as a focal point for the discussion and debate of alternatives to current public land management. The high price that society is paying for the failure of the current system to efficiently husband our natural resources gives increased urgency to the implementation of alternative institutional arrangements.