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How and Why to Privatize Federal Lands

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Executive Summary

Fully a third of the land area of the United States is owned by the federal government. Although many Americans support the preservation of those lands, analysts on the left and the right agree that the federal government has done an exceedingly poor job of stewarding those resources. Indeed, the failure of socialism is as evident in the realm of resource economics as it is in other areas of the economy.

Four criteria should guide reform efforts: land should be allocated to the highest-valued use; transaction costs should be kept to a minimum; there must be broad participation in the divestiture process; and "squatters' rights" should be protected. Unfortunately, the land reform proposals on the table today fail to meet some or all of those criteria.

Accordingly, we offer a blueprint for auctioning off all public lands over 20 to 40 years. Both environmental quality and economic efficiency would be enhanced by private rather than public ownership. Land would be auctioned not for dollars but for public land share certificates (analogous to no par value stock certificates) distributed equally to all Americans. Those certificates could be freely transferred at any time during the divestiture period and would not expire until after the final auction. Land would be partitioned into tracts or primary units, and corresponding to each tract would be a set of distinct, separable, elemental deed rights. Any individual with a documented claim to rights defined by those deeds, however, would be assigned the appropriate deed or deeds. Once divested, tract deed rights would be freely transferable.

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Introduction

Americans have entrusted the National Park Service, the U.S. Forest Service, and the Bureau of Land Management with some of the most treasured and highest-valued land in the United States as well as some of the least desirable properties on the continent.[1] Approximately 630 million acres, or nearly one-third of the land area of the United States, are owned by the federal government. Most of that land is located in the West. Over one-half of the land area of Idaho, Nevada, Oregon, and Utah belongs to the federal government. Nevada, the extreme case, is 79 percent federally owned. It is indeed odd that, in a society that rejects socialism, such a clearly socialist resource policy survives with such widespread public support.

Public land management, however, does not always deliver what the citizens expect either for the treasury or for the environment. It is remarkable that the federal government actually loses money in the course of managing federal land assets estimated to be worth billions. Moreover, the federal government has a poor record of ecological stewardship. The argument that federal agents are better land managers than are private owners is not only suspect in theory; it is dubious in fact.

Given that record, we might expect numerous proposals to move public lands into private hands, but such efforts have proven politically elusive. One reason for the difficulty in broaching the subject politically is the widespread, but dubious, belief that the federal government is more likely to preserve environmental amenities than are private owners. Another is that those who feed at the public trough are unwilling to give up their free lunches. Finally, and perhaps most important, is the difficulty in drafting a divestment plan that can appease all the special-interest groups that consider themselves stakeholders in the public lands and that can mobilize support from the much broader electorate.

This study briefly surveys the federal government's track record as a resource owner and finds pervasive economic and ecological mismanagement of the federal estate. We then discuss how policymakers might best go about remedying the problem by privatizing federal land. We establish four important criteria for reform plans and suggest an innovative, politically realistic blueprint for divestiture. Moving from public to private ownership with the right sort of divestment blueprint is easier than many people might think.

The Economic Mismanagement of Public Lands

While most of the public supports federal land management as a means of protecting the environment, few people remember that public ownership was originally justified on economic, not ecological, grounds. The U.S. Forest Service, for instance, was established to apply scientific principles to the economic management of timber resources that were thought to be inefficiently managed by the private sector.[2] Its original charge was to "furnish a continuous supply of timber for the use and necessities of the United States."[3] Gifford Pinchot, founder and first chief of the Forest Service, argued, for instance, that "conservation stands for the same kind of practical common-sense management of this country by the people that every business man stands for in the handling of his own business."[4] In fact, Pinchot opposed New York State's preservationist management of the Adirondack Park because it was a waste of good timber.[5]

However, we have learned since the Progressive Era that public ownership of assets is less economically efficient than private ownership. As Table 1 shows for fiscal years 1994, 1995, and 1996, the three main land-management agencies ran large deficits in every year with a total deficit in FY96 exceeding $2 billion. Those aggregate losses came from lands managed by the three agencies and valued at $150 billion in 1995.[6]

Table 1
Balance Sheet for Federal Land-Management Agencies

	Timber	Grazing	Minerals	Recreation
		National Park Service		
1994				
Receipts	$0	$0	$0	$75,688,000
Expenditures	$0	$0	$0	$1,365,749,000
Total	$0	$0	$0	$(1,290,061,000)
1995				
Receipts	$0	$0	$0	$80,513,000
Expenditures	$0	$0	$0	$1,285,122,000
Total	$0	$0	$0	$(1,204,609,000)
1996				
Receipts	$0	$0	$0	$77,771,000
Expendditures	$0	$0	$0	$1,315,468,000
Total	$0	$0	$0	$(1,237,697,000)
		U.S. Forest Service		
1994				
Receipts	$932,516,000	$11,056,000	$16,817,000	$47,895,000
Expenditures	$1,206,685,000	$48,727,000	$33,017,000	$395,653,000
Total	$(274,169,000)	$(37,671,000)	$(16,200,000)	$(347,758,000)
1995				
Receipts	$701,774,000	$8,756,000	$20,663,000	$46,627,000
Expenditures	$769,688,000	$19,622,000	$38,932,000	$359,492,000
Total	$(67,914,000)	$(10,866,000)	$(18,269,000)	$(312,865,000)
1996				
Receipts	$616,137,000	$7,352,000	$17,007,000	$49,368,000
Expenditures	$994,239,000	$31,659,000	$35,017,000	$310,087,000
Total	$(378,102,000)	$(24,307,000)	$(18,010,000)	$(260,719,000)
		Bureau of Land Management		
1994				
Receipts	$59,455,339	$18,817,624	$34,294,539	$2,062,252
Expenditures	$95,748,131	$54,274,000	$91,176,000	$39,818,809
Total	$(36,292,792)	$(35,456,376)	$(56,881,461)	$(37,756,557)
1995				
Receipts	$36,322,834	$16,428,704	$41,257,572	$2,637,777
Expenditures	$105,894,000	$57,794,000	$94,720,000	$40,597,280
Total	$(69,571,166)	$(41,365,296)	$(53,462,428)	$(37,959,503)
1996				
Receipts	$85,188,910	$14,488,721	$46,545,422	$2,749,967
Expenditures	$109,823,000	$59,015,000	$101,899,000	$44,334,884
Total	$(24,634,090)	$(44,526,279)	$(55,353,578)	$(41,584,917)

Sources: NPS recreation is from written communication from James Giammo, chief, NPS Budget Team, April 25, 1997. FS expenditures and receipts are from *Forest Service 1995–97 Statement of Obligation, National Forest System Funding, and Statement of Receipts* and *Budget Explanatory Notes 1998*, notes 180, 196. BLM expenditures are from *Budget Justifications 1996–98.* BLM receipts are from *Public Land Statistics 1996–97*, statement of receipts by source; and telephone and written communication with Alice Sonne, BLM accountant, Denver.

Since the fall of the iron curtain, there can be little doubt about why this is occurring. As did the bureaucracies of Eastern Europe, land-management agencies face conflicting policy goals, political pressures, perverse incentives, and poorly defined property rights. Managers are far removed from the actual costs and benefits associated with their actions, and the result is poor resource economics and stewardship. Instead of seeking profit, public managers seek larger budgets, more personnel, and expanded power. Instead of producing the goods that are most highly valued by users, managers produce the goods demanded by politically powerful special interests. Rather than face and charge market prices determined by supply and demand, managers face and set prices determined by politics, which usually equate to low or zero prices for those in political control. Not surprisingly, low receipts and high operating costs combine to create huge deficits for the federal land-management agencies.

Consider Randal O'Toole's findings of deficit spending by each agency. In 1995 the Forest Service managed 192 million acres worth $100 billion. The agency returned only $465 million to the treasury and spent $2.4 billion for a net loss of $1.9 billion. In the same year the BLM managed 220 million acres worth $25 billion. It returned $134 million to the treasury and incurred costs of over $1 billion for a net loss of $913 million. And the National Park Service netted a loss of $1.3 billion on an 87-million-acre asset worth $25 billion. Expenditures were $1.3 billion, and receipts were a paltry $1 million.[7]

Federal land deficits are mainly due to bloated costs. Federal land managers have few incentives to cut the administrative and road costs that are routinely higher than revenues.

The deficits from federal land management are often blamed on subsidies to the companies that produce commodities on the federal estate, but the blame is misplaced. For example, it is not the sale of timber for below-market prices but excessive expenses that cause the losses related to timber production. Timber sales are supposed to be made at competitive auction to give the government the maximum price. There have been numerous allegations of collusion in the bidding process, but the Justice Department has won only a handful of cases. The one economic study that finds some evidence of collusion concludes that receipts are reduced by 7.9 percent when collusion occurs.[8]

A quick glance at Table 1 reveals that reduced receipts are not the problem; federal land deficits are mainly due to bloated costs. Federal land managers have few incentives to cut the administrative and road costs that are routinely higher than revenues.

A recent study by the Political Economy Research Center comparing national and state forests illustrates what efficient land management could mean.[9] For every dollar the Forest Service spent between 1994 and 1996, it took in only 30 cents. State land management in 10 western states, on the other hand, netted $5.56 for every dollar spent. The Forest Service averaged 200 employees per acre while the states averaged only 40 employees per acre. Between 1988 and 1991, the state of Montana spent about $65 per thousand board feet of harvest to administer its timber program. During the same period, national forests spent about $140 per thousand board feet. A mile of road in national forests costs about $50,000, but in state forests the cost is only $5,000.

The costs of compliance with planning and environmental laws alone often exceed the value of the timber, as this example suggests. The La Manga timber sale in the Carson National Forest in New Mexico originally was to have been 4.2 million board feet with an estimated value of about $718,000. After obtaining new information, including a plan by the Fish and Wildlife Service to recover the threatened Mexican spotted owl, the Forest Service reduced the volume of timber to 2.4 million board feet with an estimated value of about $411,000. At the same time, the Forest Service spent $300,000 on environmental analysis and $400,000 responding to legal challenges, reanalyzing the sale area, and updating the information.[10] Not surprisingly, the sale lost money.

In the case of grazing on federal lands, it is not clear whether ranchers are receiving for-

age at fees below market value,[11] but it is clear that excessive costs are the dominant cause of the grazing deficits. In FY96 BLM rangeland management costs totaled $59 million, but the government collected less than $15 million in grazing fees. Fees would have to increase four times to make them cover costs, and few observers would argue that such an increase would be realistic.

Although small in terms of employment, acreage, and value of output, mining on federal lands produces the highest return per acre to the treasury. Despite its profitability, the BLM and Forest Service do not promote mining activity. Instead, by withdrawing land, imposing regulatory restrictions, and causing delays, the agencies discourage the only land use that returns a profit to the treasury.[12]

Recreation is not usually mentioned by environmentalist groups that criticize poor federal land management, perhaps because this activity generates large subsidies for their constituents. Many people assume that recreation is a low-cost use of federal land compared to commodity production, but nothing could be further from the truth. As seen in Table 1, recreation losses on the federal estate often exceed losses from other activities, especially if losses to the National Park Service are included.

National parks generate the largest losses of all federal lands. That is mainly because park managers have had little or no incentive to collect fees even in popular parks where revenues could be significant. In 1994 Yellowstone National Park led in losses with revenues of slightly less than $4 million and expenses of $18 million. With 3,046,000 visits and 67,366,000 visitor hours in 1994, the park lost $4.68 per visit or $0.21 per visitor hour. In 1994 only two national park units, Montezuma Castle Monument in Arizona and Arches National Park in Utah, made a profit.[13] To give an idea of how large the recreational subsidies currently are, former Park Service director James Ridenour estimated that "it would take a 10-fold increase [in entry fees] to even get close to covering the operating costs of our present parks."[14]

The Ecological Mismanagement of Federal Lands

Perhaps the pain of such great economic losses would be lessened if public lands were ecologically healthy, but perverse economic incentives inherent to public bureaucracies also lead to perverse ecological results. This clearly suggests that the challenge of improving the ecological state of public lands is less a matter of choosing the right policies than of changing the institutional arrangements.

Unfortunately, documenting the ecological health of federal lands is an uncertain business. That is because the very definition of ecological health is hotly contested within the environmental community,[15] and there are few if any objective, analytical yardsticks of environmental health. Still, the information available strongly suggests that the federal government has been a less than competent ecological manager.[16] As Hope Babcock, a former official at the National Audubon Society and currently a law professor at Georgetown University, acknowledges: "Few would assert that the historical institutional paradigm for managing the nation's public lands has protected the natural resource values of those lands or provided an harmonious framework for resolving conflicts over their use. Unless a dramatic change in the federalism structure for the management of public lands is made, the conflict over their use and management will continue to blight the future of these lands, just as it has marred their past."[17]

A U.S. General Accounting Office inquiry into U.S. Forest Service and BLM planning for the period February 1988 to August 1990, for instance, found that the agencies were not meeting objectives for sustaining wildlife. Fifty-one Forest Service and BLM plans containing 1,130 wildlife-related action items were to have been implemented, but 39 percent had not been started, 22 percent were partially completed, 33 percent were fully completed, and 6 percent had unknown status. GAO also found that 60 percent of the

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BLM's grazing allotments were in less than satisfactory condition because of overgrazing and that the agency was doing nothing to correct the problem.[18]

Examinations of the state of federal forests have likewise not been kind. A 1995 report of the Forest Policy Center concluded that, because of perverse institutional incentives, "the majority of forest health problems in the [inland West] region exist on public lands" and that "the entire forest systems are so far out of normal ecological range that virtually every element in the system is affected, and may be at risk."[19] There are at least 39 million acres of federal forest land that are at extreme risk of catastrophic wildfire.[20] Photographs published in a Political Economy Research Center report clearly show the ecological consequences of federal mismanagement of our national forests.[21]

Degradation in national parks, the "crown jewels" of the federal estate, is even more revealing. The mission of the National Park Service is unambiguous: to protect the environmental health of sensitive ecosystems. The Park Service's charge is

> to promote and regulate the use of the . . . national parks . . . which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.[22]

But an increasing number of ecologists are questioning whether that mission is being accomplished. Charles Kay of Utah State University, who does independent research on the Yellowstone ecosystem, is one such ecologist. His numerous publications on the ecological health of Yellowstone document destruction, not preservation, within the park.[23] According to Kay, the Yellowstone range is overpopulated by elk and bison resulting in the starvation of thousands of elk, an overgrazed range, the destruction of plant communities, the elimination of critical habitat, and a serious decline in biodiversity. The starving elk and bison have repeatedly browsed willow communities and aspen stands on the northern range, causing a 95 percent decline in tall willows and aspens since the establishment of the park and destruction of critical riparian and forest habitat. Because of the elimination of willows and aspens, beaver are no longer able to find food and dam-building materials on the northern range and, therefore, have ceased fulfilling their past ecological role in the structuring of the Yellowstone ecosystem. According to Oregon State University hydrologist Robert Beschta, the damage to the riparian plain system of the Lamar River "could take centuries to repair."[24]

According to ecologist Karl Hess Jr., Rocky Mountain National Park also faces serious threats to ecological health under "natural regulation" management. Hess describes the dramatic decline of aspens, willows, wet meadows, and dry grasslands on the winter range and ascribes the damage to overgrazing by elk. As in Yellowstone, beaver have ceased performing their ecological role within Rocky Mountain National Park. "The continuously expanding herd of elk has impoverished some of the biologically richest and most diverse ecosystems in the park."[25] The overabundance of elk coupled with the even greater destructive force of fire suppression has worked to seriously threaten diversity "as measured in the richness, mixture, and dispersion of species and communities."[26] Hess concludes that the destruction in Rocky Mountain National Park is the result of "institutional flight from responsibility and the accountability vacuum that has formed in its wake."[27]

Parks closer to urban centers face greater threats from humans. For example, Great Smoky Mountains National Park in Tennessee boasts not only the natural vapors that gave the park its name but air pollution from automobiles as well. The exhaust hangs heavy along the treetops, making the trees more susceptible to disease and clouding the

vistas. Instead of decreasing automobile numbers, however, the National Park Service faces an incentive to increase the number of visitors and, therefore, its operating budget. Fredericksburg and Spotsylvania National Military Parks are threatened by development along their borders. Apartments with little open space line the park boundary, and children build tree houses and destroy natural features. Writing in *National Geographic*, John Mitchell said: "Parks were created 'for the enjoyment of future generations.' For many, that 78-year-old promise is eroding."[28]

In general, the National Park Service faces a tension between preservation and tourism.[29] In the past, numbers of visitors have driven budgets determined by politicians who control purse strings. Now, under the Fee Demonstration Program, the agency can retain up to 80 percent of fees collected at certain sites. In either case, there is an incentive to attract more visitors with little regard to overcrowding.

In his book *The National Parks Compromised*, Ridenour decried the impact of "park barrel politics" on the nation's treasures. He states, "The government has just not taken care of these beautiful treasures." Consider his description of a visit he made during his tenure to Sequoia National Park:

> I noticed water running down the pavement and upon closer look, I noticed toilet paper. The old sewer system was overloaded and the pipes were clogged up. I couldn't believe it; here we were trying to set the environmental standard for the nation and we were in blatant violation of the standards ourselves.[30]

Can there be any doubt that the federal government is not managing our lands well? Some degree of environmental deterioration of national forests and rangelands is perhaps to be expected. After all, federal managers are at least nominally required to facilitate nonenvironmental uses of those lands.[31] But failure to adequately protect the national parks from degradation indicates that, even when given the direct and unambiguous charge of conserving and protecting environmental quality, the federal government is not up to the job.

Policy Criteria for Privatization

Given the economic and environmental costs of operating the federal estate, the time has come to reconsider proposals for privatization that were considered in the 1980s. Private ownership offers an alternative to business as usual in Washington by getting the incentives right for both the treasury and the environment. Privately owned forests and grazing lands cannot and do not operate year to year in the red. Privately owned (and even state-owned) parks raise revenue sufficient to maintain the parks and produce a profit. And there is growing evidence that "enviro-capitalists" can produce environmental amenities, especially if they do not have to compete with below-cost public substitutes.[32]

An advantage of private land management is that it promotes conservation of a resource valued slightly by most but highly by a few. That stands in sharp contrast to the public sector, where conservation is politically dictated and those without political clout have little voice. Rosalie Edge and her Hawk Mountain Sanctuary Association are an example of private initiative to conserve in the face of great public opposition.[33] The Hawk Mountain Sanctuary Association, created in 1938 to maintain the Hawk Mountain Sanctuary, is a private, member-supported, nonprofit organization designed to protect raptors that were considered pests and vermin at the time of the association's conception. The internationally known sanctuary thrives today as a conservation, educational, and research center.

Furthermore, privatization allows for win-win outcomes in the environmental arena. Currently, one group's win is by necessity another group's loss, and the dynamics of the

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political process guarantee that a win is only temporary. When the political winds shift, the battle will be fought again. Never is the outcome final. Although that process keeps many people employed, the result is continuous economic losses and environmental degradation.

The idea that there must be a better way to manage the federal estate is nothing new in policy circles. Especially in the 1980s, various groups involved in the Sagebrush Rebellion called for divestiture of federal lands at least to the states if not to individuals.[34] 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 was repealed, a serious effort is being made to find a way to ensure that the state transfers to the people all income-producing resources. A number of plans have been 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 that would allow even those Alaskans of modest means to participate. Still another idea, which would give the rights directly to individual Alaskans, would involve a giant lottery in which every Alaskan would have a chance, based on the luck of the draw, to own a valuable piece of property, including both surface and subsurface rights or only subsurface rights.

If divestiture is ever to move forward, a first step will be to develop criteria for evaluating alternative divestiture plans. Of the many criteria that might be used, we suggest four.

Criterion 1: Land Should Be Allocated to the Highest-Valued Use

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 under which deeds to surface rights and water rights are separable and marketable. Similarly, remote wilderness areas on which logging or mining is too costly should be preserved from such uses, and land whose "highest value" is for recreational or aesthetic appreciation should likewise be dedicated to those ends.

This criterion is met 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.

Criterion 2: Low Transactions Costs

Given a choice between two divestiture plans, both capable of satisfying the first criterion, the preferred alternative should 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.

Criterion 3: Broad Participation in Divestiture Proceedings

Since our concern is with resources now held in the public domain, which in principle belongs to all citizens, it is desirable to permit the broadest possible participation in any divestiture proceedings. If public lands belong to all citizens, then all citizens have a legitimate claim to share directly in the 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.

Criterion 4: Recognition of 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 BLM and the U.S. Forest Service, and many have been renewed or sold, sometimes along with adjoining private land. Consequently, the

value of those permits has been capitalized into the price of home-base ranches.[35] Similarly, ground water 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. Perhaps the simplest procedure for dealing with these cases, which has already been followed 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.

The first of these four criteria 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 encourages a search for and comparison of alternatives. It is that 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 the 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 Act

It is worth emphasizing that the Homestead Act of 1862, our most important divestiture program for opening the American West (288 million acres, or 13 percent of the United States, were ultimately transferred to private owners under the act)[36] did not meet the above criteria. Under the act, title to 160 acres of land could be acquired by adult citizens who paid $1.25 per acre, "proved" cultivation, and resided for five years 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 cultivated 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."[37]

The Resource Acts

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 that 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 (in this case, the lode) be "worked" before it could qualify as a mining claim and title could be obtained. Since those claims were alienable, Criterion 1 was satisfied by secondary exchange.

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The Squatters' Acts

Concerning Criterion 4, it should be noted that recognizing full squatters' rights by deed has many implementation limitations. Where such rights have not been clearly established by administrative records, there will be an incentive to claim those prior rights and invest in proving or acquiring them, which is a deadweight loss. The problems of squatters on public land in the late 18th century eluded all attempts to control it by force and eventually gave way to a series of preemption acts beginning in 1830. Those acts recognized the preferential right of squatters to purchase land, including improvements, at $1.25 per acre. 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 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. Likewise, it invites interest groups that are hostile to the commercial use of public lands to obstruct the leasing process by raising a host of burdensome bureaucratic obstacles.[38]

The fact that leasing is widely used in the private sector 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 overuse 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 we suspect is a euphemism for common property mismanagement. Private owners have an incentive to see that property is leased, when feasible, to its highest-valued uses, net of deterioration costs.

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Long-Term Leasing with Pullback Modifications

Marion Clawson suggested an innovative new public institution that could make the increased leasing of federal land politically feasible.[39] 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 an application was filed, 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 pull back 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 we interpret it, has the following constructive features:

- It would attempt to substitute economic for bureaucratic criteria in the evaluation and allocation of public land for and to competing uses.
- It seeks to increase the incentive to conserve replenishable resources through decentralized management and control over public lands.
- 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 those conflicting uses through the lease challenge (pullback) procedure, forcing the conflicting interests of various groups to be reconciled through bargaining.
- 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 those desirable objectives. First, 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 those 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.

Second, whatever compromise on control over lease terms ultimately prevails, bureaucrats can be expected to implement and enforce those provisions to maximize their own benefits, not those of a surrogate owner.

Third, 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 among and the strategic positioning of 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 that 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 pullback procedure. "Different groups interested in the use of federal lands would be free to compete against each other."[40] This sounds like a full-employment program for lawyers. The problem is not the creation of conflict among interest groups but efficient allocation. This requires that wants—now expressible only in terms of political power—be expressed in terms of willingness to pay (bids).

Fourth, 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 for oil and gas and 5 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 districts at $1 per acre plus all costs; and so on. Those provi-

The simplest way to introduce market discipline is to hold a competitive auction of the various lease rights that are associated with the land's use.

sions 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 use patterns as specified in the leases. Given the lease terms (property rights of lessee), prices could be determined at auction.

Finally, a fundamental problem with the proposed institution is that it does not solve the lease-or-own allocation problem. As noted above, certain land uses 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.

Overall, 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 of the highest-valued use rather than be dissipated in a costly legal bargaining contest.

State land-management trusts have a solid track record of economically competent and ecologically sensitive management of public lands. Whether states would incorporate federal lands into such trusts, however, is an open question.

Land Transfers to the States

A number of policy analysts have flirted with the idea of transferring most of the federal estate to state governments.[41] There is some evidence that state governments are more efficient land managers than are federal agents,[42] and there is certainly something to be said for allowing multiple experiments in land-management practices and local control over local resources. But a close examination of state land-management practices by ecological economist Randal O'Toole found that

> state governments are no better managers than are federal bureaucrats. They are just as economically inefficient, ecologically short-sighted, and politically driven as their federal counterparts. Moreover, the belief that states would be more inclined to privatize public land is generally unsupported. In fact, state governments have been rapidly expanding—not divesting—their land estates, and there is little reason to believe that (with the possible exception of a few states) federal land transferred to their jurisdictions would be passed on to private citizens.
>
> The fundamental problem is, not federal incompetence, but the political allocation of natural resources to favored constituencies, which subsidizes some at the expense of others and inflicts harm on both the ecological system and the economy as a whole. Transferring land to the states will only change the venue of those political manipulations.[43]

Some observers have pointed out that state land-management trusts (arrangements wherein state land managers are charged with managing public resources for the purposes of securing funding for public education) have a solid track record of economically competent and ecologically sensitive management of public lands.[44] Whether states would incorporate federal lands into such trusts, however, is an open question.

Public-Private Land Trusts

Another suggested divestiture plan would transfer federal lands into public-private trusts modeled after various state land trusts. This proposal has the following features:

- Trusts would be funded out of the net income generated by their lands, not out of gross income or tax dollars. That would minimize political attempts to micromanage the land and provide ample incentives for efficient management.
- Trust managers would be free to market resources and to charge whatever they wished for resource access. That would

lead to charges that roughly approximated fair market value. It would also ensure a level playing field so that all resource users could compete with one another in the marketplace rather than in court or the political system.

- A share of trust user fees would be dedicated to a separate trust fund to be used to protect biodiversity and endangered species. The managers of the second trust fund would be able to give trust managers incentives to protect sensitive ecosystems. One model might be the state of Washington's system for compensating its trust beneficiaries by "buying" timber and not cutting it.[45]

While such a plan would meet the first two criteria for public land divestiture, it would, however, be vulnerable to criticism based on the final two criteria, namely that there be broad participation in divestiture proceedings and that squatters' rights be fully recognized in the transition.

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. That 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 enlistees, 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)[46] to obtain enlistments.

Bounties continued to be offered during 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 those 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 purchase 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[47] and under the Morrill Act of 1862.[48] Under that act, 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.[49] In addition to scrip and bounty sales, cash and credit sales were common throughout the 19th century.[50]

Current proposals to privatize public lands 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 the returns to pay off the national debt and to reduce taxes."[51] These proposals meet Criteria 1 and 2 and would certainly be acceptable to people concerned about the perpetual mismanagement of the public lands. However, they fail to meet the broad participation criterion.

Moreover, there is good reason to oppose schemes that would direct revenue toward the federal government rather than the individual. 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 would 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,

There is good reason to oppose schemes that would direct revenue toward the federal government rather than the individual.

If the Audubon Society owned the surface rights to a tract, then it could negotiate whatever restrictions it pleased on the development of oil and gas resources, including prohibition of development.

that 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 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 in an effort to encourage discussion and to suggest a new approach to the public land policy debate that has plagued the Republic since its inception.

For purposes of discussion, the proposal can be divided into eight separate provisions.

Provision 1: The Scale and Scope of Divestiture

All federal lands would be divested over some reasonable but definite and limited horizon, say 20, 30, or 40 years. Divested would be all BLM, Forest Service, National Park, National Monument, National Recreational Area, continental shelf, deep sea bed, and military lands[52] to which the federal or state governments have jurisdictional claim.

Provision 2: Land Partitions

All such lands would be partitioned into tracts or primary units (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, such as the Grand Canyon or Canyon Lands National Park. Since the auction procedures described in Provision 8 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 those elemental units of land.

Provision 3: Deed Rights

Corresponding to each tract of land would be a set of distinct, separable, elemental deed rights appropriate for each tract. Those 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. 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 owned the surface rights to a tract, then it could negotiate whatever restrictions it pleased on the development of oil and gas resources, including prohibition of development.

Provision 4: Transferability

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 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.

Provision 5: Acknowledgement of Existing Rights

Any individual with a documented historical claim to rights defined by one or more of the deeds would be assigned the appropriate deed or deeds. Thus, an established holder of BLM or Forest Service grazing rights would be permanently deeded those 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. This rancher would be assigned a deeded right to this arrangement, that is, to graze the 10,000 acres in return for the payment of the rental fee to whoever might be the subsequent private owner of the surface rights to this tract.[53]

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, for instance, 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.

Provision 6: Block Sales

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 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.

Provision 7: Public Land Share Certificates

Bids would be denominated not in money but in public land share certificates, analogous to no par value stock certificates. Unlike the Revolutionary War scrip, they would not be denominated in acres; and unlike the Mexican War scrip, 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 be redeemable only in land at auction. Each citizen might be granted 10 certificates, so there would be about 2 billion shares outstanding. The 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 certificates, they could be listed for trading on stock and commodity exchanges, which would then be free to create futures or

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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.

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. If shares were selling for $100, for instance, a bid of two and a half certificates for the mineral rights to a particular tract of land would be equivalent to $250.

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.[54]

Provision 8: Combinatorial Auctions

The auction procedure would correspond to what has been called a "combinatorial" auction.[55] 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, or some combination of those.

The winning bidders would be determined by computing[56] 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 are 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 principle of the second price sealed-bid auction[57] to the combinatorial action 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 will land rights 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 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 actively campaign for the American people to donate their certificates to preservationist funds. Those certificates could be pooled and used to bid for the surface or other rights to any tracts the environmental groups chose. They could then manage those tracts as they saw fit. Similarly, timber or oil companies could bid for these resource rights only or bid for them 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.

Amenity Resources: What Should We Do about the Grand Canyon?

The "crown jewels" of the federal estate (the national parks, wilderness areas, and particularly scenic forestlands) make up at most 10 to 20 percent of the public lands.[58] Must they be put "off limits" to private owners?

Potential models for the private 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 900,000 members, has purchased, leased, or obtained easements to approximately 10.5 million acres of land in the United States and 60 million acres worldwide. It currently manages approximately 1.2 million acres and hires managers and uses local volunteers for the stewardship of 1,500 private preserves.[59] The National Audubon Society, with 550,000 members, controls 250,000 acres including 100 sanctuaries and nature centers.[60] On the society's 23,000-acre Rainey Wildlife Sanctuary, oil companies have drilled several producing gas wells and ranchers graze cattle under rental contracts negotiated with the society.[61] Local conservation organizations have likewise played a frequently unappreciated but important role in preserving sensitive ecosystems.[62]

What special provisions, if any, should the divestiture plan make for the Grand Canyon and similar national parks, monuments, forests, and wilderness areas? One possibility would be to specify no restrictions at all, except perhaps to define tract size for surface rights to 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, would 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 those resources have already been granted, the winners of deeded rights would have to obtain permission from (contract with) the owner of the surface rights before timber could be cut, wells could be drilled, or minerals could be mined.

Under this arrangement the owner of the surface rights to the Grand Canyon, whether it was the Nature Conservancy or Atlantic Richfield, would have an incentive to seek donations or charge visitor fees, or both, to manage the scenic resources of the Grand Canyon. As a consequence, willingness to pay (or donate) to preserve these scenic resources would become a factor in preservation—a factor not now present in public land-management policy. The greater the willingness to pay for preservation, the greater 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 or where it did not interfere with amenity values. A slightly more restrictive alternative would be to prohibit bids that combined surface rights with any of the other rights. That would force a separation in the ownership of surface and other rights so that the development of the latter could proceed only by contract with the owner of surface rights.

Under either approach environmental groups interested in managing 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 those subsurface rights against commercial enterprises for the purpose of preventing development of those resources. Anyone uninterested in exploiting land for economic gain would have the right to "lock-up" any resource.

More restrictive procedures might include

- allowing only qualified environmental

Potential models for the private ownership and management of amenity resources are provided by private organizations such as the Nature Conservancy and the National Audubon Society.

Surface boundaries are inadequate for defining rights to resources that migrate across or under those boundaries.

organizations to bid on the surface rights to the national parks and wilderness areas;
- employing restrictive covenants 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; and
- combining all extractive resource rights with surface rights and including a covenant prohibiting all development of those resources and requiring the land to be preserved as wilderness.

Those restrictions, however, set a dangerous precedent by giving special privileges to particular groups that would be chosen by bureaucratic criteria. Although we have no doubt that a mix of ownership of scenic resources by the Audubon Society, the Nature Conservancy, and other such groups would vastly improve upon the National Park Service, we think rigging the outcome of auctions is unwise. Those organizations and their policies have evolved in an environment in which they have had to compete with commercial enterprises for land acquisitions. They have flourished under this discipline (as of 1994, the 21 largest U.S. environmental organizations had a collective annual budget of approximately $736 million and 14 million members),[63] and there is no a priori reason to suppose that they need be given any preferential rights over commercial enterprises.

Moreover, we think covenants would be very unwise as part of a general policy of divestiture of amenity resources. Owners of surface rights are free to follow development policies that are as restrictive as they please. 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 the 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 a government auction of certain public lands with restrictive covenants attached and the Nature Conservancy's buying land in the open market (or acquiring it by voluntary gifts) and then reselling or leasing it with restrictive covenants. The latter is a market-disciplined decision whose cost is borne privately, while the former is not disciplined by an opportunity cost test, and the cost is borne publicly.

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.

Hence, to say that a person has grazing rights to a section of land means that he has the right to fence it and consume as much of the grass as he chooses, subject to the limitations of his contract with the owner of surface rights. A timber right gives a person similar control over all timber growing within certain boundaries. In each of those cases, the quantity of the resource to which he has a right is whatever quantity he finds growing within his land boundary. Note that in those 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 a person crosses beyond his boundaries to graze or log, he is poaching on the preserve of his neighbor, who would have clearly defined rights under our proposal.

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, 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 million 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.[64] 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 charge only for the cost of drilling, pumping, distributing, and managing this water system. The water itself is free.

To establish property rights to ground water, we propose that the county issue water deed certificates for 30 million acre-feet of water.[65] Those 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 those 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. That would allow 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, factories, or municipalities, 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 that taken from private wells).

Every few years, depending on cost, the recharge of water to the aquifer could be estimated, or perhaps the aquifer stock reestimated, 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 for and supply of 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

This property rights system could 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.

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.

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.[66] 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 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 to a neighbor 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 oil for the market. In this way the decision to drill wells or to produce from existing wells can be based on the profitability of those activities rather than on a concern that others will capture any oil that is not recovered.

Conclusion

The divestiture proposal in this paper is characterized by the following principal features. First, it is fair in the sense that all citizens would share equally in the value of the 628 million acres of federal land that would be capitalized into the market price of land share certificates, and all would benefit from the productive opportunities created by divestiture.

Second, elementary property rights are 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 were 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.

Third, the expropriation of squatters' rights already recognized by the government (for example, outstanding BLM grazing permits) is avoided by deed assignment to those individuals. This aspect of the plan would discourage opposition to divestiture from individuals who rightly feel they have some real economic stake in the present system.

Fourth, the bidding mechanism provides an incentive for combination bids to express 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. The effect is to maximize allocative efficiency.

Fifth, 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. Present federal laws that restrict certain parcels of land to specified economic uses (such as timber harvesting or mining) would be abolished.

Finally, in the case of certain common pool resources such as ground water and fisheries, we propose 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.[67] 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.[68] Even a public lands supporter such as resource economist John Loomis of Colorado State University acknowledges that "despite the best of intentions by managers, politicians often impose inefficiencies to benefit their local constituencies. These inefficiencies are not only economically unsound, they are environmentally unsound."[69]

Other individuals and groups may oppose divestiture, though they strongly disapprove of public land-management policies, because they hope to change those policies directly within existing institutions. We think both views are naive in their assessment of the reality of public land management and of the efficacy of resource allocation and management through 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" externalities in amenity resource use. We share the concerns of both groups, but we think it is time to get beyond superficial market failure theorems that ignore the role of property rights and institutions in a market economy. 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 those 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), or overcrowd many parks. And where public land management encounters weakly organized political opposition, the budget-expanding incentives of government agencies tend to dominate policy determination. That is particularly evident in the 80-year history of large dam construction by the Bureau of Reclamation and the Army Corps of 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 to carry out political battles aimed at preventing environmental degradation at the hand of the government. 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, and ranching and mining interests to influence the leasing policies of public land-management agencies were channeled into the direct acquisition and development of subsurface, grazing, and timber resources.

The premise of this paper is that land use should be depoliticized and determined by economic criteria operating through markets 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 intact. Just as environmental organizations such as the Nature Conservancy and the National Audubon Society have

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acquired private land in competition with other users, it can be expected that environmental organizations, by diverting funds now spent on political action and by launching new fundraising efforts for direct land acquisition, would be able to bid successfully for many of these public lands. If the rights to public lands can be divested as we suggest, all owners and users will face the opportunity cost of their actions so that both the treasury and the environment will benefit.

Notes

1. John Loomis, a defender of public ownership of land and professor of agricultural and resource economics at Colorado State University, contends that much of the land in the federal estate is there because "the lands were so unproductive in producing commodities that the government could not even give them away to railroads, homesteaders, ranchers, or miners." John Loomis, "Economic Rationales for Continued Ownership of Land," Presentation at the conference "Challenging Federal Ownership and Management: Public Lands and Public Benefits," Natural Resources Law Center, University of Colorado School of Law, Boulder, October 11–13, 1995.

2. See generally Roger Sedjo, "Forest Resources: Resilient and Serviceable," in *America's Renewable Resources: Historic Trends and Current Challenges*, ed. Kenneth Frederick and Roger Sedjo (Washington: Resources for the Future, 1991), pp. 88–91.

3. Policy statement of the Forest Reserve Organic Administration Act of 1897, as amended. Cited in Frederick Cubbage, Jay O'Laughlin, and Charles Bullock III, *Forest Resource Policy* (New York: John Wiley & Sons, 1993), p. 19.

4. Gifford Pinchot, *The Fight for Conservation* (Seattle: University of Washington Press, 1967), pp. 79–80, cited in Karl Hess Jr., *Visions upon the Land: Man and Nature on the Western Range* (Washington: Island Press, 1992), p. 77.

5. Robert Nelson, "How and Why to Transfer BLM Lands to the States," Competitive Enterprise Institute, Washington, January 1996, p. 25.

6. Randal O'Toole, "Run Them Like Businesses: Natural Resource Agencies in an Era of Federal Limits," July 1997, http://www.ti.org/~rot/business.html.

7. Ibid., Table 1.

8. Laura H. Baldwin, Robert C. Marshall, and Jean-Francois Richard, "Bidder Collusion at Forest Service Timber Sales," *Journal of Political Economy* 105, no. 4 (August 1997): 657–99.

9. Holly Lippke Fretwell, *Forests: Do We Get What We Pay For?* (Bozeman, Mont.: Political Economy Research Center, 1999), pp. 1, 5. See also Donald Leal, "Making Money on Timber Sales: A Federal and State Comparison," in *Multiple Conflicts over Multiple Uses*, ed. Terry Anderson (Bozeman, Mont.: Political Economy Research Center, 1994), pp. 8–9.

10. U.S. General Accounting Office, "Forest Service Decision-Making: A Framework for Improving Performance," GAO /RECD-97-71, 1997, p. 29.

11. See Karl Hess Jr. and Jerry Holechek, "Beyond the Grazing Fee: An Agenda for Rangeland Reform," Cato Institute Policy Analysis no. 234, July 13, 1995.

12. David Gerard, "The Mining Law of 1872: Digging a Little Deeper," PERC Policy Series PS-11, December 1997.

13. Randal O'Toole, 1994 Park Data, July 1997, http://www.ti.org/~rot/nps94data.html.

14. James Ridenour, "Our National Parks: The Slide towards Mediocrity," Presentation at the conference "Challenging Federal Ownership and Management: Public Lands and Private Benefits."

15. For an overview of the uncertainties within the field, see K. S. Shrader-Frechette and E. D. McCoy, *Method in Ecology* (New York: Cambridge University Press, 1993).

16. U.S. General Accounting Office, "Forest Service Decision-Making," p. 32. That degradation need not occur on public lands is demonstrated by the management of state forests that actually earn a profit. An environmental quality audit, requested by the Montana legislature and performed by the Forestry Division, concluded that the state does a better job of protecting watersheds from the impact of logging than does the Forest Service. See Bill Schultz, *Montana Forestry Best Management Practices Implementation Monitoring* (Missoula: Montana Department of State Lands, 1992).

17. Hope Babcock, "State Primacy, Federal Consistency, or Collaborative Management: Can Cooperative Federalism Models from Other Laws Save Our Public Lands?" Presentation at the conference "Challenging Federal Ownership and Management: Public Lands and Private Benefits."

18. U.S. General Accounting Office, "Rangeland

Management: More Emphasis Needed on Declining and Overstocked Grazing Allotments," GAO/RCED-88-80, 1988.

19. Lance Clark and R. Neil Sampson, *Forest Ecosystem Health in the Inland West: A Science and Policy Reader* (Washington: Forest Policy Center, American Forests, 1995), pp. 2, 5, cited in Nelson, "How and Why to Transfer BLM Lands to the States," p. 4.

20. U.S. General Accounting Office, "Western National Forests: A Cohesive Strategy Is Needed to Address Catastrophic Wildfire Threats," GAO/RCED-99-65, 1999, p. 29.

21. Fretwell.

22. Organic Act, 16 U.S.C.A. 1, 1 (1916).

23. Charles Kay, "The Yellowstone Dilemma: Part 1," *Bugle* 1, no. 1 (1984): 30–33; idem, "Yellowstone's Northern Elk Herd: A Critical Evaluation of the 'Natural Regulation' Paradigm," Ph.D. diss., Utah State University, Logan, 1990; idem, "Aspen Seedlings in Recently Burned Areas in Grand Teton and Yellowstone National Parks," *Northwest Science*, no. 67 (1993): 94–104; idem, "The Impact of Native Ungulates and Beaver on Riparian Communities in the Intermountain West," *Natural Resources and Environmental Issues*, no. 1 (1994): 23–44; idem, "Browsing by Native Ungulates: Effects on Shrub and Seed Production in the Greater Yellowstone Ecosystem," Proceedings of the Wildland Shrub and Arid Land Restoration Symposium, in *U.S. Forest Service General Technical Report*, ed. B. A. Roundy et al., INT-315, 1995, pp. 310–20; idem, "Viewpoint: Ungulate Herbivory, Willows, and Political Ecology in Yellowstone," *Journal of Range Management*, no. 50 (1997): 139–45; and idem, "Yellowstone: Ecological Malpractice," *PERC Report* 15, no. 2 (June 1997): 1–39.

24. Quoted in ibid., p. 30.

25. Karl Hess Jr., *Rocky Times in Rocky Mountain National Park* (Niwot: University Press of Colorado, 1993), p. 33.

26. Ibid., p. 60.

27. Ibid., p. 97.

28. John Mitchell, "Our National Parks: Legacy at Risk," *National Geographic*, October 1994, p. 54.

29. Michael Jeffrey, "Public Lands Reform: A Reluctant Leap into the Abyss," *Virginia Environmental Law Journal* 16 (1996): 79–143; and Dennis Herman, "Loving Them to Death: Legal Controls on the Type and Scale of Development in the National Parks," *Stanford Environmental Law Journal*, no. 11 (1992): 3–67.

30. James Ridenour, *The National Parks Compromised: Pork Barrel Politics and America's Treasures* (Merrillville, Ind.: ICS Books, 1994), p. 108.

31. The Multiple-Use Sustained Yield Act of 1960 says: "It is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. 'Multiple Use' means the management of all the various renewable surface resources of the national forests so they are utilized in the combination that will best meet the needs of the American people." Quoted in Cubbage, O'Laughlin, and Bullock, p. 19.

32. Terry Anderson and Donald Leal, *Enviro-Capitalists: Doing Good While Doing Well* (Lanham, Md.: Rowman & Littlefield, 1997).

33. Ibid., pp. 44–46.

34. Robert Nelson, *Public Lands and Private Rights: The Failure of Scientific Management* (Lanham, Md.: Rowman & Littlefield, 1995).

35. Nelson, "How and Why to Transfer BLM Lands to the States," p. 4.

36. Paul W. Gates, *History of Public Land Law Development* (Washington: Government Printing Office, 1968), p. 395.

37. Ibid., p. 67.

38. See Richard Gordon and Peter VanDoren, "Two Cheers for the 1872 Mining Law," Cato Institute Policy Analysis no. 300, April 9, 1998, pp. 18–21.

39. Marion Clawson, *The Federal Lands Revisited* (Baltimore: Resources for the Future, 1983), pp. 200–224.

40. Ibid., p. 216.

41. See, for instance, Nelson, "How and Why to Transfer BLM Lands to the States."

42. Ibid., pp. 24–32; and Leal.

43. Randal O'Toole, "Should Congress Transfer Federal Lands to the States?" Cato Institute Policy Analysis no. 276, July 3, 1997, p. 1.

44. Jon Souder and Sally Fairfax, *State Trust Lands* (Lawrence: University of Kansas Press, 1995). See also Terry L. Anderson and Holly Lippke Fretwell, "A Trust for Grand Staircase–Escalante," PERC Policy Study PS-16, Bozeman, Mont., 1999.

45. For a full discussion of how such a plan might

work, see O'Toole, "Run Them Like Businesses."

46. Gates, p. 515.

47. Ibid., pp. 270–73.

48. Ibid., p. 438.

49. Ibid.

50. See, for example, Gates, pp. 501–17; and "Land for Sale," Editorial, *Wall Street Journal,* January 25, 1982, p. 22.

51. Charles Batten, "Toward a Free Market in Forest Resources," *Cato Journal* 1, no. 2 (Fall 1981): 515.

52. The government can lease back military reservations at market rates. If all governmental facilities had to pay opportunity costs, the true cost of such facilities would be included in current budgets, and land rentals could discipline facility location decisions. With that discipline, more defense might be obtained from a given budget by relocating bases that now occupy prime land sites.

53. Since rental fees have been increasing over time, some provision for increases should perhaps be made. One possibility is for the obligations of the holder of the grazing rights deed to include provision for rent 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. We assume that provisions for changing fees are already part of the permit agreement between ranchers and 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 that 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 held in perpetuity? It they are, this would seem to maximize the incentive of the deed holder to maintain capital value by good range management practices.

54. 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. 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 and could even be listed on the stock exchanges. But if this is done, these special mutual fund shares become equivalent to our suggested 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. One of the authors (Smith) has argued elsewhere that the fact that holding company (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 *Measuring the Nation's Wealth, Studies in Income and Wealth,* ed. John Kendrick, vol. 29 (New York: National Bureau of Economic Research, 1964), pp. 343–44.

The mutual fund, with marketable shares, might have greater popular appeal by virtue of its greater familiarity.

55. 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.

56. Algorithms for this computation have been developed by S. J. Rassenti, "01 Decision Problems with Multiple Resource Constraints: Algorithms and Applications," Ph.D. diss., University of Arizona, 1981.

57. See William Vickrey, "Counterspeculation, Auctions, and Competitive Sealed Tenders," *Journal of Finance,* March 16, 1961, pp. 837.

58. Nelson, "How and Why to Transfer BLM Land to the States," p. 14.

59. Information from the Nature Conservancy, http://www.tnc.org/welcome/about/about.htm.

60. Information from the National Audubon Society, http://www.audubon.org/.

61. Jonathan Adler, "Balancing Oil Interests and Ecology," *Detroit News,* July 19, 1991.

62. The Center for Private Conservation, a project of the Competitive Enterprise Institute in Washington, D.C., has documented dozens of cases of local conservationists' banding together to protect sensitive ecosystems from development. For an index of those studies, see http://www.cei.org/cpc/index.html.

63. Data for 1993–94 from Jonathan Adler, *Environmentalism at the Crossroads* (Washington: Capital Research Center, 1995), pp. 147–238.

64. See James L. Barr and David E. Pingry, "Rational Water Pricing in the Tucson Basin," *Arizona Review*, no. 25 (October 1976): 112.

65. See Vernon L. Smith, "Water Deeds: A Proposed Solution to the Water Valuation Problem," *Arizona Review*, no. 26 (January 1977): 710.

66. 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 we 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.

67. For a compelling rejoinder to that argument, see John Chant, Donald McFetridge, and Douglas Smith, "The Economics of the Conserver Society," in *Economics and the Environment: A Reconciliation*, ed. Walter Block (Vancouver: Fraser Institute, 1989), pp. 1–93.

68. See further Richard Gordon, "The Case for Public Lands Privatization," Cato Institute Policy Analysis, 1999, forthcoming.

69. Loomis.

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