

The American Environment: Perceptions and Policies

Edited by

J. WREFORD WATSON

*Professor of Geography, School of North American Studies
University of Edinburgh*

and

TIMOTHY O'RIORDAN

*Reader, School of Environmental Sciences
University of East Anglia*

Forest Management Policy: Its Evolution and Response to
Changing Public Values

GEORGE H. STANKEY

*Research Social Scientist at the U.S. Forest
Service Intermountain Forest and Range Research
Station, Missoula, Montana.*

JOHN WILEY & SONS

London · New York · Sydney · Toronto

Aldo Leopold Wilderness Research Institute: Publication # 35

CITATION: Stankey, George H. 1976. Forest management policy: its evolution and response to changing public values. In: Watson, J. Wreford; O'Riordan, Timothy O., eds. The American environment: perceptions and policies. London; New York; Sydney; Toronto: John Wiley & Sons: 241-258.

Forest Management Policy: Its Evolution and Response to Changing Public Values

GEORGE H. STANKEY

Forestry today finds itself surrounded by controversy. The United States Congress has held special hearings on forest land practices (Subcommittee on Public Lands, 1971) and proposals for legislation revamping forest land management policies and programmes have been made. There has been increasing reliance upon the judicial branch by environmental groups to redress administrative practices perceived as inconsistent with good land management.

Clearcut logging (the practice of removing all standing trees from an area) has received much attention. There is concern that the practice results in the destruction of the land's productive capability (Wood, 1971). Other management programmes have also come under fire, particularly road construction, watershed protection and the allocation of forest lands to recreational, scenic and wilderness purposes.

However, the issue is not simply one of pitting persons opposing logging against forest managers. The United States Forest Service is also under increasing pressure from industrial interests to expand timber production, increase road systems, and generally 'develop' the National Forests considerably beyond their present level. For instance, the recent report of the President's Timber Supply Advisory Committee (1973) called for a 50 to 100% increase in the annual harvest of old-growth timber and the designation of all non-withdrawn commercial forest land for timber production. As a result, the question of how to resolve the many competing demands placed on the forest resource has often become lost in a simplified and polarized concept of resource management featuring 'developers' against 'preservationists'.

In some ways, the debate concerning forest land management is surprising. Professional forest management was a recognized discipline prior to the turn of the century, emigrating to the United States from Europe in the late 1800s. Today, nearly 40 universities and colleges offer accredited programmes in forestry. Forestry is a well-developed profession and shares some common characteristics with other professions, such as law and medicine, in its establishment of a professional body (the Society of American Foresters in the United States), the development of a code of ethics, a programme of professional licensing and the publication of professional journals.

Moreover, forestry is buttressed by a considerable body of legislation. Literally thousands of pieces of legislation govern the various aspects of forest management. Finally, the minutiae of detail affecting day-to-day affairs for the U.S. Forest Service are covered in the 22 volumes of the *Forest Service Manual*.

However, despite a cadre of professional resource managers, backed by a well-established educational system and abundant legislation and administrative regulations, much disapproval of forest land practices persists.

Is there, in fact, substance to the charges of forest land mismanagement? If so, what are some of the specific issues that have prompted dissatisfaction and what, if anything, has been done to redress public grievances? To provide some insight into these and other questions, I will review the results of an investigation of one recent controversy outlined by Burk (1970), focusing on the factors that led to the rise of the problem, the findings of the investigation, and also attempting to specify some underlying causes of what has been called 'the clearcut crisis'.

Forest Management in the Wyoming Forests: a Case Study

In response to public concern over forest management on four National Forests in north-western Wyoming (Bighorn, Bridger, Shoshone and Teton National Forests) the U.S. Forest Service assigned a team of investigators in 1970 to review existing management practices, particularly timber harvesting (Wyoming Forest Study Team, 1971).

The study team was instructed: (i) to explore fully the concerns and apprehensions of individuals and organizations in Wyoming; (ii) to conduct the study in accordance with the National Environmental Policy Act and (iii) to report its findings objectively and candidly. Their final report provided 61 general and specific recommendations for alterations and refinements in current management practices.

Logging had been conducted in north-west Wyoming since the late 1880s, primarily for fuel wood, railroad ties and mine timbers. Forest Service management began in the early 1900s. Until the 1950s, forest protection (against insects and fire) was the main activity, pending improved market conditions to make harvest feasible.

Improved technology, coupled with increasing demands for timber in the 1950s, led to the conversion of the old forests to young, vigorous stands through cutting. The accelerated harvest brought increased vitality to the local economy. However, it also led to changes in the landscape, as the patchwork pattern of clearcut blocks spread, some covering up to 1000 acres. With the increased rate of harvesting came growing public concern about possible detrimental effects on wildlife, water quality, recreational resources and scenery. Local agitation grew through the 1960s, with charges that production of saw logs had come to threaten the unique environmental qualities of the region.

The overriding issue in both the public criticism that led to the investigation and in the investigation itself was that timber harvesting was the dominant value considered in management plans and that, as a result, other significant values had been neglected and often lost. Wildlife represents an excellent example. The elk herds of north-western Wyoming have a national reputation. Hunting results in a harvest of more than 11,000 animals annually. However, despite the significant economic, aesthetic and recreational role elk and other big game played, the study team concluded that past management activities had been largely insensitive to these values; e.g. normal migration routes had been severely disrupted by the presence of large clearcuts. Road construction associated with timber harvest was conducted with little regard to potentially disruptive effects on wildlife. Recreational values had been similarly neglected. For instance, trail heads providing access into some wildernesses had often been obliterated by clearcuts or logging residues, or had been converted to roads.

In addition to recreation and wildlife, much concern has centred on the effect of timber harvesting on water quality. Of particular concern here are the effects of road construction. Research in a variety of locations across the United States has documented roads, rather than logging, as the primary source of reduced water quality (Packer, 1967). Roads have been, however, part and parcel of logging activities and, again, the study team found that road construction had often been carried out with little regard for its impact on other resource values.

In summary, the study team observed that, although management efforts were improving, timber harvesting nevertheless continued to hold the dominant position in the scheme of things. Efforts to meet the allowable cut often precluded the adequate consideration of other important resource values. (Allowable cut refers to the amount of forest produce that may be harvested, annually or periodically, from a specified area, over a stated period. It is a biologically-based *constraint* on cutting, but has often been metamorphosed into a *goal*.)

The case of the Wyoming forest controversy is merely a microcosm of a broader conflict that has reached across the United States. In the Bitterroot National Forest in Montana, for example, forest management practices were

investigated by a U.S. Forest Service study team (1970a) and by a University of Montana Select Committee (1970). Both studies were precipitated by local concern that timber production and specific management practices associated with timber production (e.g. terracing hillsides for machine planting of trees) had led to the neglect of other values and that harvests exceeded growth. The Forest Service study reported that, at least implicitly, resource production goals held priority over other land management considerations and that decision-making suffered from a lack of directions. The University committee was more direct: 'multiple use management, in fact, does not exist as the governing principle on the Bitterroot National Forest'. Moreover, they concluded that consideration of values such as recreation, watershed and wildlife appeared only as an afterthought.

Similar controversies have occurred in the eastern United States. Starting in 1964, public objections to the practice of even-age management on the Monongahela National Forest in West Virginia were recorded. (Even-age management is based on the principle of developing timber stands in which the commercial timber is of one age. Throughout a larger management unit, various age classes might be represented; however, in any one unit, age distribution is even. Clearcutting is a principal method of developing even-age stands.) Again, a Forest Service study team (1970b) was commissioned to examine the charges and to prepare a public report. The West Virginia state legislature created a 14-member Forest Management Practices Commission and, in addition, requested a moratorium on all clearcutting in West Virginia National Forests, pending completion of the Commission's report. Strong concern was expressed in both reports that inadequate consideration had been devoted to forest values other than timber.

The list of areas where resource managers and citizens have clashed continues to grow. Although different areas are involved, there are many points of commonality; the feeling of citizen-exclusion from the decision-making process, a concern that present directions will have long-run disastrous consequences for both the resource base and the economy, and so forth. But a common catalyst in all cases has been the sincere conviction among many that timber harvesting has become *the* principal forest use and that, as a result, other important values have been given short shrift. Many see timber harvesting as the focal use around which other uses, such as recreation or wildlife management, are fitted in, to the extent they can be accommodated without detracting from timber production. The accommodation of these other values, rather than being the result of a conscious planning effort, is more accurately described as one of incidental and secondary adaptation. Moreover, many of the efforts to bring about a greater balance in forest management programmes have focused on reducing the negative impact of timber harvesting on other values. Although this is a desirable direction, it seems necessary to give more positive attention to aggressively *producing* these other values, rather than just simply trying to minimize adverse impacts on them.

The Historical Foundations of American Forestry Policy

To gain an understanding of the current controversy between forest managers and public groups, it is useful to review something of the historical settings in which American forestry policy evolved. Economic, political and social conditions that prevailed prior to about 1900 had a profound impact on both the image of America's forest land held by the public and on the response of a fledgeling forestry profession.

The conquest of the wilderness was a primary activity for nearly two and a half centuries. Seemingly hostile, providing a hiding place for Indians, and blocking westward movement, the forests of North America were perceived primarily as a barrier to the civilization of a new country. Many settlers were farmers and, to pursue their livelihood, forests had to be removed. Gates (1968) estimates that upwards of 600 billion board feet of timber were removed to make way for crops, livestock and cities (about 12 billion board feet were cut in the U.S. in 1972). Trespass on public and private lands was common. An estimated 450 million feet of lumber was stolen from public lands in Michigan alone. Moreover, efforts to prevent trespass or to prosecute trespassers were not overly successful, due to insufficient funding for enforcement by a generally unsympathetic Congress.

At the same time that exploitation of forest lands was widespread, a series of legislative measures was adopted that greatly impeded efforts to protect timberlands. There was strong Congressional pressure to distribute forest lands to the private sector. For instance, the Timber and Stone Act of 1878 provided that a settler could purchase up to 160 acres of unreserved surveyed public land in California, Oregon, Nevada and Washington territory that was unfit for agriculture for \$2.50 an acre. Persons caught taking timber from public lands were provided with loopholes that permitted them to relieve themselves of liability by purchasing the land for \$2.50 an acre. Thus, at the turn of the century, the legislative branch promoted entry on to public timberland with little or no attention given to the establishment of a positive forest land management programme.

At the same time as forest exploitation was running almost unchecked, concern was being expressed from various corners as to the future of the country's forest lands. For instance, in 1867, the idea of reserving 'through all time' those lands producing quality timber was set forth (Isc, 1920). Proposals to protect timberlands, to ensure more economic appraisals of timber for the purpose of sale and to provide for soil protection, began to appear. President Harrison set aside over 13 million acres as forest reserves in the early 1890s. In 1896, the National Academy of Sciences appointed a commission to report on what measures would be necessary to make the forest-reservations programme successful. The commission's report pinpointed many crucial problems facing the forest reservations (uncontrolled fires, excessive grazing, erosion, etc.). It recognized the inappropriateness of reserving lands better suited to agriculture. It also argued that the reserves were *public*, not the exclusive property of any

one group. As a result of the commission's findings, President Cleveland set aside 13 new reserves covering over 21 million acres (Gates, 1968).

At the turn of the century, professional forestry was virtually non-existent. There were fewer than 10 professional foresters in the country and an effort to publish a *Journal of Forestry* in the 1880s failed after one year due to lack of leadership. However, some forestry-related groups began to appear, at both the national and state level. A federal Division of Forestry was established in the late 1800s under Bernhard Fernow, though its functions were primarily confined to supplying information rather than advising on management (Ise, 1920). In part, this was a criticism of Fernow who, although possessing a fine background in forestry, was regarded as being too theoretical and lacking the initiative and dynamism actively to promote professional forestry.

In 1905, the forest reserves were transferred from the Department of the Interior to the Department of Agriculture and, with that move, the U.S. Forest Service was established under the leadership of Gifford Pinchot. The new agency held jurisdiction over about 85 million acres. In less than five years, a concerted expansion effort by Pinchot and Theodore Roosevelt brought these reserves to 194 million acres. Although the speed and apparent lack of planning that accompanied this expansion were severely criticized in some quarters (Clar, 1959), Pinchot (1947) argued that establishment of public reserves was the only available means to prevent prime forest lands from passing into private ownership through the numerous avenues Congress had made available.

Although this discussion hardly does justice to the rich history of forestry in the United States, it is important that one has some feeling for the nature of the political and social conditions existing at the time when much of the present day forest policy was conceived. As we have seen, forest lands had been subjected to extensive abuse, both from timber companies and from private settlers. To conservationists and professional foresters alike, the future of the country's forest lands under a continuing laissez-faire policy must have appeared dim. Moreover, there was little evidence to indicate that conditions might change: on the contrary, Congressional actions had accentuated many of the problems. For example, it was not until 1908 that timber lands were required to be appraised and sold at their actual value (Gates, 1968).

It was in this early period, however, that scientific forest land management was born. Despite limited resources and the presence of a generally unsympathetic Congress, foresters were able to make remarkable achievements in their efforts to bring professionalism to forestry. Much of this success must be attributed to Pinchot's political sensitivity and his ability to gain Executive support (at least from Roosevelt). By demonstrating and promoting the application of scientific principles to forest management, professional foresters gained considerable repute. By establishing their qualifications technically to manage and protect the forests, they also acquired the implicit qualifications to determine normative goals; i.e. what it is the public should receive from the

forests. It is only recently this latter ability has been challenged, yet it is the very crux of the present controversy.

The Foundations of Current Forest Management Policy

There was early recognition that forests held several important values. In 1897, the Organic Act (the Congressional Act originally establishing the National Forests) specified water and timber as purposes for which the National Forests were to be established. Since that Act, however, a variety of factors—court decisions, administrative and policy directives, Congressional appropriations, and simply the need to handle changing demands—have broadened the original concept (see Alston, 1972, pp. 19–35). Outdoor recreation, range and wildlife have long been recognized as legitimate values of the National Forests in addition to water and timber. The 'multiple-use' concept of forest management became embodied as law in 1960 along with the concept of 'sustained yield'. Sustained yield had been implied even within the Organic Act of 1897 and various administrative regulations and policies have reinforced the application of the concept to the *timber* resource. However, under the important Multiple Use–Sustained Yield Act (1960) the concept was broadened to include *all* the 'various renewable surface resources of the National Forests'. Thus, the Forest Service received wide discretion and authority to allocate and manage the National Forest System.

The dominant position which the Multiple Use–Sustained Yield concept has come to hold in forest management has been criticized on various grounds. One of the major objectives of the sustained yield philosophy is to serve as a regulator of forest harvesting, ensuring that rates of harvest do not exceed rates of replacement, be it timber, water or range. However, critics of the sustained yield regulation model have pointed out substantive conceptual weaknesses (Thompson, 1966; Waggoner, 1969). For example, sustained yield is not sensitive to signals from the market place and thus tends to provide an even flow of goods and services in the face of widely fluctuating demands. This, in turn, results in periods of insufficient inventory to meet demand (and perhaps more importantly, in a lack of flexibility to do anything about it) while surplus supplies are available during periods of slack demand.

The second criticism focuses on the extent to which the Forest Service has received discretion in the management of public forest lands. This issue, as we shall see, is fundamental to understanding the conflicts we experience today.

Obscuration of Goal-setting and Goal-attaining Roles

Today we live in a society of growing complexity and sophistication. The expansion of knowledge and information is awesome. In response to this growth, society has tended to rely ever increasingly upon specialists to assimilate, weigh and respond to conditions with which the lay citizen could not possibly contend. Congress has certainly adopted this strategy. Over the years,

it has increasingly delegated legislative powers to administrative agencies charged with various functional responsibilities. However, one consequence of this process has been the gradual passage of decision-making authority from a body subject to public control (through the electoral process) to bodies buffered and insulated from such control (Reich, 1966). Moreover, the highly specialized nation of expertise found within these agencies has often promoted a technological orientation to problem-solving when, in fact, the problems involve changing social values. As Curlin (1972) points out:

'We tend to manage by élitist groups and our checks and balances are through peer review: one must possess the proper credentials before assuming a position of governance. But what special knowledge do these credentials impart the holder when the decision is normative and involves, not objective scientific fact, but consensual value judgments?'

Nevertheless, resource management decision-making has become dominated by 'experts' making decisions not only on *how* some objective might be attained (technical decisions) but also on what objectives *should be* attained (normative decisions).

The current involvement of forestry professionals in the formulation of normative decisions has its roots, at least partially, in the historical conditions discussed earlier. It was largely through the efforts of a cadre of professional foresters that conditions such as unrestricted entry to public forest lands and severe overcutting were halted. Had not these individuals seized the initiative in making value judgments about what forest lands *should* provide, it is likely that the forest lands would have continued to be utilized as a 'commons', with possibly irreversible consequences.

Moreover, it can be correctly argued that yesterday's public showed little concern with the normative issues of forest land management. Those conditions no longer prevail. For instance, a nation-wide poll reported that 86% of those surveyed were concerned to some degree with the condition of our natural surroundings (National Wildlife Federation, 1969). However, it is easy to see some of the conflicts this increased public interest has aroused, as resource managers now find decisions being challenged by persons who do not possess the 'proper credentials'. Managers often fail to see these public concerns as legitimate and appropriate within the normative framework of decision-making.

Implications of a Utilitarian Concept of Management

A frequently stated objective in forestry is to 'get the land under management'. Properly speaking, 'managed' refers to land to which scientific, economic and social principles are applied to achieve specified objectives. Thus, according to this definition, wilderness is managed land as would be an area developed for timber production. However, the concept of 'managed land' has become distort-

ed to refer to areas of substantial human development, particularly in terms of access, and generally planned for timber harvest. Certain consequences stem from this notion.

First, it has encouraged the development of marginal timber-producing lands (the extensive margin). Forcing timber production on lands of marginal economic and physical quality might mean that the concept of sustained yield has been violated because such sites are probably incapable of economic regeneration. Harvesting on these sites, it has been suggested, represents 'mining' rather than timber management because of the extensive time and investment requirement to ensure regeneration (University of Montana Select Committee, 1970).

A second consequence of this utilitarian concept has been the rapid decline of *de facto* wilderness lands as well as other primitive recreational opportunities. Because the utilitarian concept of management emphasizes the availability of resources to man, access is a key factor. For instance, trail mileage on National Forests has declined one-third since the end of World War II, largely as a result of accelerated road construction programmes (Lucas, 1971). Undeveloped wild lands are becoming an increasingly scarce resource and are, both technologically and economically, essentially beyond our capability to reproduce (Krutilla, 1967). Moreover, they often provide recreational experiences that are, to a considerable extent, non-substitutable. Thus, resources have been developed which, relative to the value to be derived from them in a developed state, would be excessively costly to reproduce.

The 'Timber Famine' Myth

A recurrent theme in American forest policy has been the Malthusian threat of running out of wood. Expressions of the concern can be traced to the 1860's, but it has surfaced periodically.

The basic confusion stems from the failure to distinguish between *physical* and *economic* supplies. In forestry, supply has been regarded as a naturally given quantity of timber of a certain size and quality while demand has been defined as a quantity consumed, or 'needed', irrespective of price. With demand interpreted as a fixed requirement, supply thus becomes the critical variable affecting price. The concern with depletion was a major factor in Pinchot's efforts to gain public control over American forest lands.

A recent case study of railroad use of timber demonstrates the conceptual weaknesses of the 'timber famine' notion (Olson, 1971). The author analyses how the railroad industry, a major consumer of wood products in the early portion of the century, accommodated changing conditions of supply by improved technology, mechanization and economies of scale. She concludes (p. 81):

'It may well be true that the United States had 820,000,000 acres of forests in 1800 and only 495,000,000 in 1933, or 509,000,000 commercial acres in 1963, but these

figures are wholly irrelevant to the economic facts of supply. Today the nation has a much larger acreage of timberland accessible at the same real cost than it had in 1800 or 1900.'

This issue of a physical definition of resource, which is, in fact, an economic concept, is a vexing problem. The Forest Service definition of commercial timber land, for example, is based on physical capability: land capable of growing 20 cubic feet of wood per acre per year. Realistically, such lands are generally only marginally suited to timber production for commercial purposes. Focusing limited resources of funds and manpower on the extensive margin of timber production spread these scarce resources even more thinly, with less opportunity for significant return. At the same time, timber production could be significantly increased should investments be made at the intensive margin; i.e. on the high-quality timber growing sites (Marty and Newman, 1969). A lack of knowledge about where such sites are has been a constraint. A study of several western forests suggests existing definitions of commercial forest land have significantly overestimated this acreage because of the inclusion of long isolated stringers of trees, areas where logging would create serious resource problems (e.g. steep, unstable soils with high erosion risk) or unacceptable conflicts with other values such as wilderness, watershed, wildlife and scenery (Wikstrom and Hutchinson, 1971).

Closely tied to the problem of a physical definition of the timber resource have been other implicit assumptions regarding the production of timber that make it the weighted favourite compared to other forest land uses. Gould (1962) has outlined these assumptions as: (i) stability; (ii) land scarcity; (iii) certainty and (iv) a closed economy.

Stability refers to the need for continuing stable flows of wood products and we have already noted some of the shortcomings of that assumption in the discussion on sustained yield. There is little evidence to support this assumption: per capita consumption of wood has risen only slightly in this century and what rise has occurred has been primarily in products other than sawtimber, such as pulp and plywood. The assumption of *land scarcity* argues that forest products are so scarce, compared to labour or capital, that land must be managed so as to maximize biological productivity (although nobody expects this for agricultural lands). Here the aspect of substitutability must be considered. Other materials have come to replace wood in some cases. In others, we have discovered the extent to which labour and capital can be used to substitute for land. Advances in silviculture have reduced acreage demands. The issue of *certainty* is perhaps most easily dealt with. Many of our land management activities have been initiated as though we had perfect or near perfect knowledge of future demand, technology and human values. Actually, the uncertainty that surrounds these questions is immense. Finally, the notion of a *closed economy* has led us to ignore outside supplies of forest products and alternative uses for the land, labour and capital at present tied up in the production of these goods. Simply stated, we have often failed to weigh the rather substantial opportunity costs incurred in the production of wood fibre.

Shifting Public Attitudes to U.S. Forests

At the time when many of the foundations of American forestry policy were laid down, this country was a rural, agrarian society, shortly removed from the conquest of the frontier. For example, the Organic Act establishing the National Forest reserves was signed in 1897, only 20 years after Custer's Last Stand. Western politicians wielded considerable political power and were instrumental in influencing policies that promoted and facilitated western settlement (Ise, 1920). Even today, western political figures hold key positions affecting forest policy. An outstanding example was Congressman Wayne Aspinall of Colorado (now retired from office) who was chairman of the prestigious Public Land Law Review Commission (1970) study on the management of all federal lands, most of which lie in western states.

Today we find most of the population in a few urban areas; 80% of the population resides in 200 metropolitan areas, occupying only 2% of the land. At the same time, the Supreme Court's decisions regarding 'one man-one vote' has further shifted political power from rural into urban hands. An increasing proportion of the population living in urban areas, removed from any direct involvement with the land, possesses an increasing ability to influence public policy.

Although populations have become increasingly concentrated in urban areas, the broad geographic relationships between urban centres and the National Forests have been rapidly changing. When many National Forests were created, they were remote from population centres or well-developed access, and in a pre-automobile era. As a consequence, the management practices undertaken on them were frequently never seen by many people. Increasingly, however, the expansion of metropolitan regions has brought the people closer to the forests. For instance, in 1960, 25% of the National Forests were within 100 miles of the CBD of a large metropolitan area, and an additional 25% were located in densely populated states.

Additionally, the vast improvement in communications technology now means that a nationwide audience can witness events that once only a local population saw. National telecasts of scenes of clearcutting and terracing on the Bitterroot National Forest in Montana might have been responsible for much of the concern expressed elsewhere.

The changing spatial and psychological relationships of the public to the forests have been manifested in shifting public demands. The utilitarian value systems of yesterday have gradually given way to value systems that more strongly emphasize recreation, aesthetics and other appreciative values (Wagar, 1968). However, managerial recognition of these shifting demands has been slow.

One of the central themes to emerge from the literature on man's use of natural resources is that professional resource managers hold distinctly different perceptions of resources from those held by clientele groups. Moreover, managerial beliefs of what these clientele groups seek have been demons-

trated to suffer from certain systematic biases that result in misjudgments of group motives and interests. For instance, wilderness users are often judged by managers as holding fairly strong opinions opposing use regulation, but surveys of users suggest that a more favourable attitude about behaviour control is held (Hendee and Harris, 1970).

The varying perspective of managers and users is not difficult to understand. The perception of managers is moulded and influenced by technical-educational background emphasizing production, efficiency and a biological perspective. The perception of the resource by users, on the other hand, is influenced by rather different interests, motives and personal experience. There is, of course, no single public view of the forests. For many forest users, however, the forest is a scene for relaxation and recreation; their perception might be summarized as appreciative as opposed to a more utilitarian view held by managers. Moreover, the respective images these groups hold of one another are subject to biases such as selective perception, that tend to perpetuate and reinforce misconceptions. Thus, the relationship between manager and user often becomes one of conflict and debate.

Timber Products, Prices and the Quality of Life

I earlier discussed the issue of non-substitutability and scarcity in forestry. Also discussed was the rather static picture of per capita wood consumption that has existed over several decades. One might conclude, then, that wood and wood products will become relatively less significant in the future, particularly if population growth continues to flatten out. But other factors need to be cited.

First, an historical examination of price trends suggests that modern society has won considerable independence from the natural resource sector (Barnett and Morse, 1963, pp. 7-11). For example, mineral raw materials maintained essentially unchanged price levels between 1877 and 1957 (Potter and Christy, 1962). However, this independence has been won at a cost. Prices have been maintained to a considerable degree by the rapid growth in technological progress, improved methods of resource exploration and the availability of 'common resources' for the disposition of effluent. As a result, although we have to date avoided the dire predictions of Malthus we have merely delayed some of the costs associated with increased affluence. While we see appreciable gains in the material returns of the 'good life', we also have evidence that what we might call the 'quality of life', a clean, beautiful environment, recreational opportunities and so forth, is in decline (Barnett and Morse, 1963, pp. 252-268).

Although past price trends have demonstrated a remarkable degree of stability or even have declined, future demands on the natural resource sector could lead to some rather substantial variations in the pattern of consumption. Increasing demands for certain non-renewable resources have led us to depend heavily on foreign imports, such as nickel.

As the prices of other materials rise in the face of increasing scarcity, we

can expect to see a greater emphasis placed on the use of renewable resources, such as wood. Wood prices have increased substantially over the past 100 years and this is a primary reason why we have seen per capita consumption remain relatively constant, as other materials were readily available as substitutes. If prices increase for these alternative materials, other factors will certainly come into play in the choice of raw materials for domestic and industrial consumption. The energy costs associated with conversion of raw material to finished product will be a major factor. Aluminium can be used for siding instead of wood; however, the energy requirements for the conversion of bauxite to alumina will mean more dams or strip-mined coal fields. For every ton of aluminium produced, over 15 tons of raw materials and processing materials are consumed, compared to about 3-4 tons of raw material for every ton of wood (Dane, 1972). The environmental costs are everywhere and we as a society will be faced with tough decisions regarding the trade-offs we are willing to make.

A third variable must be added to this already complex equation. We see implications for the increased utilization of wood and wood products at the same time as we see concern for the declining 'quality of life'. Moreover, many of the values we associate with a quality life are linked to our forests: clean air and water, recreational opportunities, solitude, etc. To a considerable extent, these particular forest products provide goods and services that are non-substitutable, in terms of the particular human needs and motivations they fulfil. This is especially true of the experiences associated with the more extensive forms of recreation, such as wilderness, that are relatively less abundant or susceptible to capital intensive management. Thus, the stage is set for additional conflicts as pressing demands for increased commodity production meet growing pressures for the use of forest goods and services for scarce, irreplaceable amenity values.

The Resolution of Conflicts—What Possibilities?

The polarity and conflict that perhaps reached a peak in the late 1960s left behind a condition of severe social stress. There is, to be sure, some benefit gained from any confrontation. The overall programme of forest management in the United States has seen some dramatic changes. One recent Forest Service publication, *Timber Management for a Quality Environment* (U.S. Forest Service, 1971) calls for fundamental changes in the entire organization's planning efforts, with particular attention given to the creation of multi-disciplinary teams.

Nevertheless, there are still fundamental issues to be decided. At present, the judiciary branch of government has found itself the principal arbiter in resolving many of the conflicts, but the judiciary was never intended to fulfil such a position under the U.S. Constitution. Moreover, relying upon the courts to decide these issues is time-consuming, costly and an inefficient way to manage the public lands. That the courts are used so extensively, however, attests to

the extent to which the traditional avenues of decision-making are viewed as unresponsive.

Strong support exists today for increased legislative control over the resource management bureaucracies. Proposals of a 'Blue Ribbon Commission on Timber Management in the National Forests' have been made. Recently, one student of public administration (Kaufman, 1969) has suggested that unless Federal agencies (e.g. the Forest Service) are able to undertake programmes that more effectively reflect public needs and desires, major re-organization might be called for.

Perhaps the most significant and controversial notions for changes in land management programmes stem from the report of the Public Land Law Review Commission (1970). This Commission was established to make a comprehensive review of the public land laws and 'to determine whether and to what extent revisions thereof are necessary'. The report set forth 137 recommendations, of which one in particular has aroused much interest and concern. Recommendation 4 reads: 'Management of public lands should recognize the highest and best use of particular areas of land as *dominant* over other authorized uses' (emphasis added). Furthermore, 'As to land set aside for primary uses, Congress should direct the agencies to manage them for secondary uses that are compatible with the primary purpose'.

The concept of 'dominant use' is, at present, only a recommendation, but it has generated much discussion. By assigning a top priority use to a tract of land, there is, at least conceptually, the benefit of greatly reducing the potential for conflict. In reality, there are a number of flaws. Perhaps one of the most significant is that which currently vexes land managers; how does one arrive at the normative decision regarding what is 'best' or 'highest'? No criteria are provided to assign priorities and it is reasonable to expect that, in the absence of such guidelines, traditional values will continue to predominate (Pyles, 1970). Second, the dominant-use philosophy assumes an unrealistic level of knowledge. Third, there is static notion to the concept; for example, key winter elk range might also be key summer sheep range. It would be rigid and unresponsive to changing values over time. Finally, the application of dominant-use zoning in only those areas where no reduction in the dominant use would be permitted realistically, means there would be few locations where it could in fact be practised.

It is entirely consistent within the current interpretation of multiple use that certain uses 'dominate' in some locations. Much of the controversy over dominant use versus multiple use is one of semantics more than philosophy (Hagenstein, 1972a, 1972b). However, neither concept solves the basic dilemma of establishing a normative framework for the decision as to what shall be done on the land. Although both are expressions of efforts to optimize the flow of benefits from forest lands, the substantive issues of defining the mix of benefits desired and what costs society is willing to incur to obtain those benefits still remain. Resolving these issues will require basic changes in how management programmes are formulated, staffed and funded.

Involving the Citizen in Project Management

Forest policy and management programmes have traditionally evolved within the ranks of forestry professionals; public participation in the development of these has generally been limited, selective and, typically, *post facto*. The debate over forest management gives clear evidence that this situation must be altered.

One major shift toward this end is reflected in the growing efforts by the U.S. Forest Service to solicit and incorporate citizen participation in resource decision-making. Although a variety of reasons is attributed to this effort, one principal value stands out. As a recent administrative study of the Forest Service's public involvement effort noted:

'public input serves an especially important role for decision-makers for it is the principal source of information about what values the public holds regarding the National Forests. The "best" use of forest resources is never evident from the resources themselves ...' (U.S. Forest Service, 1973)

It is through adequate citizen participation that the public can assert its rightful role in formulating normative goals. There are obviously constraints on such goals; resource capability, legal and administrative considerations, budgets and so forth. The role of the resource manager in the relationship between citizen and bureaucrat is to provide basic inventory-level information, define the constraints (legal, budgetary, etc.) within which he must operate and define the probable consequences of alternative courses of action.

With meaningful participation by the public in the decision-making process, we would expect to see the evolution of programmes that reflect changing public values. However, also needed are personnel capable of putting into operation the goals and objectives set forth in such programmes. As I have suggested, there is a strong thrust of public sentiment that views forests as the source of non-utilitarian goods and services. Certainly there is strong pressure to redress the imbalance of management programmes where timber has been the predominant value. For instance, the National Environmental Policy Act (NEPA) calls on Federal agencies to 'utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environment design arts in planning and decision-making, which may have an impact on man's environment'. Although multi-disciplinary teams are not being utilized in Forest Service planning efforts, there are large gaps in the skills necessary to meet adequately the obligations imposed by NEPA. This is particularly true with regard to the social sciences. Less than 1% of Forest Service personnel hold degrees in the social sciences. Moreover, most of these persons are within the research branch of the agency and their input to land-use planning is on a limited, *ad hoc* consulting basis. The perspective of the social and behavioural sciences needs to be formally incorporated into the planning process and this will require some marked changes in both traditional forestry education programmes and in agency hiring practices.

Funding is another area where the subordination of values other than timber stands out. Revenues generated from the National Forests are returned to the U.S. Treasury rather than to the agency. Receipts from timber sales predominate; in fiscal year 1972 they constituted 92% of the total receipts. Recreation, on the other hand, provided only 1%. The operating funds of the Forest Service are derived from appropriations from Congress, which in turn are based on budget requests from the Forest Service that have been reviewed (and perhaps revised) by both the Department of Agriculture and the Office of Management and Budget. Congressional priorities in funding are clear from a review of appropriations between 1955 and 1971 (Alston, 1972), when 97% of the funds requested for timber sales and administration during this period were granted. However, only 72% of the funds for recreation were made, even though these two functional areas comprise about the same proportion of the total Forest Service budget request (about 20% each). Not only has funding for other values, such as wildlife habitat and soil and water management, been funded significantly lower than Forest Service requests, but these functions have constituted only minor proportions of the total budget request.

Redressing the imbalance of resource management programmes in the face of severe budget inequities is virtually impossible. Pressure has been placed on the U.S. Congress to recognize other resource values of the forests more fully and to modify appropriations accordingly. Various pieces of legislation have been introduced to provide statutory guidelines to resource managers so that more equitable management programmes and policies can be developed. Manpower cutbacks at a time when public attention is focused on the forests add an additional burden on administrations striving to do a better job. However, it is important to recognize that more money and more people are not the solution to the forest management crisis. The major challenge lies in sensitizing the bureaucratic structure to public values and this will involve the development of formal avenues for citizen participation in decision-making, coupled with a willingness on the part of agency personnel to be receptive and responsive to changing public images of the forests.

References

- Alston, R. M., 1972. *Forest—Goals and Decisionmaking in the Forest Service*. Ogden, Utah: U.S.D.A. Forest Service, Research Paper INT-128.
- Barnett, H. C. and Morse, C., 1963. *Scarcity and Growth: The Economics of Natural Resource Availability*, Baltimore: Johns Hopkins Press.
- Burk, D. A., 1970. *The Clearcut Crisis: Controversy in the Bitterroot*, Great Falls, Montana: Jurnick Printing Co.
- Clar, C. R., 1959. *California Government and Forestry*. Sacramento: Division of Forestry, Department of Natural Resources.
- Curlin, J. W., 1972. Trans-forestry: another dimension to resource management. Paper presented to the Annual meeting of the Society of American Foresters, Hot Springs, Arkansas.
- Dane, C. W., 1972. The hidden environmental costs of alternative materials available for construction. *Journal of Forestry*, 70, 734-736.

- Gates, P. W., 1968. *History of the Public Land Law Development*. Washington, D.C.: Government Printing Office.
- Gould, E. M., Jr., 1962. *Forestry and recreation*. Petersham, Mass.: *Harvard Forest Papers*.
- Hagenstein, P. R., 1972a. 'One Third of a Nation's Land'—evaluation of a policy recommendation. *National Resources Journal*, 12, 56-75.
- Hagenstein, P. R., 1972b. The Public Land Law Review Commission and its approach to land use conflicts. *Journal of Forestry*, 70, 610-611.
- Hendee, J. C. and Harris, R. W., 1970. Foresters' perception of wilderness user attitudes and preferences. *Journal of Forestry*, 68, 759-762.
- Ise, J., 1920. *The United States Forest Policy*, New Haven, Conn.: Yale University Press.
- Kaufman, H., 1969. Administrative decentralisation and political power. *Public Administration Review*, 29, 3-15.
- Krutilla, J. V., 1967. Conservation reconsidered. *American Economic Review*, 67, 777-786.
- Lucas, R. C., 1971. Hikers and other trail users. In *Outdoor Recreation Symposium: Proceedings* (Ed. W. Doolittle), Upper Darby, Pa.: U.S.D.A. Forest Service, Northeast Experimental Station, pp. 113-122.
- Marty, R. and Newman, W., 1969. Opportunities for timber management intensification on the National Forests. *Journal of Forestry*, 67, 482-485.
- National Wildlife Federation, 1969. *The U.S. public considers its environments*. Princeton: National Institute of Public Opinion.
- Olson, S. H., 1971. *The Depletion Myth. A History of Railroad Use of Timber*, Cambridge, Mass.: Harvard University Press.
- Packer, P. E., 1967. Criteria for designing and locating logging roads to control sediment. *Forest Science*, 13, 1-18.
- Pinchot, G., 1947. *Breaking New Ground*, New York: Harcourt Brace and World.
- Potter, N. and Christy, F. T., 1962. *Trends in Natural Resource Commodities*, Baltimore: Johns Hopkins Press.
- President's Timber Supply Advisory Committee, 1973. *Report on Timber and the Environment*. Washington, D.C.: Government Printing Office.
- Public Land Law Review Commission, 1970. *One Third of the Nation's Land*. Washington, D.C.: Government Printing Office.
- Pyles, H. K., 1970. *What's Ahead for our Public Lands?* Washington, D.C.: Natural Resources Council of America.
- Reich, C. A., 1966. *Bureaucracy and the Forests*, Berkeley: Centre for the Study of Democratic Institutions.
- Subcommittee on Public Lands, 1971. *Management Practices on the Public Lands*. Washington, D.C.: U.S. Senate Committee on Interior and Insular Affairs, 5-7 April, 7 May, 29 June, 1971.
- Thompson, E. F., 1966. Traditional forest regulation model: an economic critique. *Journal of Forestry*, 64, 750-752.
- University of Montana Select Committee, 1970. *A University View of the Forest Service*. Washington, D.C.: Government Printing Office.
- U.S. Forest Service, 1970a. *Management Practices on the Bitterroot National Forest*. Missoula, Mont.: U.S.D.A. Forest Service.
- U.S. Forest Service, 1970b. *Even-Aged Management on the Monongahela National Forest*. Washington, D.C.: U.S.D.A. Forest Service.
- U.S. Forest Service, 1971. *Timber Management for a Quality Environment*. Washington, D.C.: U.S.D.A. Forest Service, C.I. Report No. 6.
- U.S. Forest Service, 1973. *Public Involvement and the Forest Service: Experience Effectiveness and Suggested Direction*. Washington, D.C.: U.S.D.A. Forest Service.
- Wagar, J. A., 1968. Non-consumptive uses of the coniferous forest, with special relation to coniferous forest. In *Coniferous Forests of the Northern Rocky Mountains* (Ed.

- R. D. Taber), Missoula, Mont.: University of Montana, Centre for Natural Resources, pp. 255-265.
- Waggoner, T. R., 1969. Some economic implications of sustained yield as a forest regulation model. Seattle: University of Washington, Department of Forestry Contemporary Forest Paper No. 6.
- Wikstrom, J. H. and Hutchinson, S. B., 1971. *Stratification of Forest Land for Timber Management Planning on the western National Forests*. Ogden, Utah: U.S.D.A. Forest Service Research Paper, INT-108.
- Wood, N. C., 1971. *Clearcut: The Deforestation of America*, San Francisco: Sierra Club Battle Books.
- Wyoming Forest Study Team, 1971. *Forest Management in Wyoming*, Ogden, Utah: U.S.D.A. Forest Service.

