

Rethinking Scientific Management

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Discussion Paper 99-07

November 1998



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Abstract

The U.S. Forest Service was founded early in the twentieth century with the progressive mission to achieve the scientific management of the forests of the United States. Scientific management was in part a political theory, holding out a model by which social values and technical considerations should function separately in the political process. However, since the 1970s the autonomy of Forest Service professionals to manage the national forests has been undermined by judicial decisions, White House and other executive branch oversight, and routine Congressional interference. Ecological management is a new attempt in the 1990s to revive scientific management but it is not likely to be any more successful than previous efforts. Instead, a new governing paradigm is needed for the national forests. This new vision is likely to involve a turn towards greater decentralization of governing responsibility than is prescribed by the scientific management model.

Key Words: scientific management, progressive era, forests, Forest Service

JEL Classification Numbers: H41, N5, Q23, Q28

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RETHINKING SCIENTIFIC MANAGEMENT

Robert H. Nelson*

INTRODUCTION

Ideas are more important than many practical men and women of affairs believe. Ideas shape institutions and give them social legitimacy. The failure of an idea can in the long run mean the demise of an institution. Ideas motivate and define the culture of organizations. Without a clear idea of mission and purpose, an organization risks declining morale and employee commitment. For all these and other reasons, the fate of the idea of the scientific management of society, introduced into American life in the progressive era early in this century, is of great importance to the U.S. Forest Service.

The founder of the Forest Service in 1905, Gifford Pinchot, was more than a technical forester. Pinchot was a leading member of the progressive movement of his time, eventually becoming governor of Pennsylvania. His view of the role of the Forest Service in American life--which would be adopted by the agency as its core mission long after Pinchot was gone--was shaped by broader progressive attitudes and assumptions. The Forest Service was to be an instrument within the overall project of the scientific management of American society. The profession of forestry would staff the Forest Service with the requisite experts to fulfill this mission. Indeed, the creation of a profession of forestry in the progressive era was part of a widespread movement towards professionalism, yielding not only the Society of American Foresters in 1900, but also the American Economic Association in 1885, the American Sociological Association in 1905, the American Planning Association in 1909--new professional groups for almost every area of expertise that would be required for the future expert management of American society.

However, at the end of the twentieth century, the Forest Service today lacks a clear sense of direction and mission. The management of the national forests is in a state of paralysis and gridlock. Part of the reason is that the American public no longer accepts the main tenets of scientific management, whether applied to forests or other areas of American life.¹ The level of public trust of professionals--from doctors to lawyers to economists to foresters--has been declining for a quarter century. Before having an operation, a second and third opinion from other doctors is now standard fare. One observer found that "judges increasingly worry that parties to a case can find an 'expert' to testify to anything and that

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¹ See Robert H. Nelson, *Public Lands and Private Rights: The Failure of Scientific Management* (Lanham, MD: Rowman and Littlefield, 1995).

flawed or distorted research--'junk science'--can mislead jurors."² Other signs of this trend are seen in the willingness of members of Congress, the judiciary and the executive branch to intervene in the management of the national forests.

If the history in the twentieth century of the Forest Service has been closely tied to the fate of scientific management, the future of the agency in the twenty-first century will closely reflect ideas that replace scientific management. The Forest Service is currently confused about its mission in part because American society is no longer sure about the future of professional expertise and the place of science in government. The agency needs a new paradigm, but it cannot develop such a vision on its own. It confronts today a range of views that extend from libertarians who wish to abolish most of government to active proponents of powerful new government controls as the only way to avert environmental disaster.

Thinking about the future requires first an understanding of the past. What were the basic ideas of scientific management? Why have these ideas come to be widely rejected at the end of this century?

BASIC TENETS OF SCIENTIFIC MANAGEMENT

A 1995 article in the leading journal of administrative science, *Public Administration Review*, surveys the interaction of "Political Science, Public Administration, and the Rise of the American Administrative State."³ The leading political scientists of the early twentieth century, including Francis Lieber, John Burgess, Woodrow Wilson, Frank Goodnow and W.W. Willoughby, articulated a "specific ideology of science and progress." It was based on the core idea that "science was regarded as the method of understanding and controlling changes." Great faith was "invested in science and technology as the engine of progress." From this beginning point the progressive theorists "provided the ideological and institutional apparatus for the rise of the administrative state" in the United States in the twentieth century, including the U.S. Forest Service as a leading example.⁴

Scientific management was a theory not only about the capabilities of scientific knowledge to transform the physical world but also of the political institutions by which this knowledge would be put to use. The theory of "scientific management redefines what had hitherto been political problems as management problems, the solution of which is governed by the logic of science." That is to say, scientific management sought "the establishment of science as the institution of governance and the centralization of power in the hands of scientists." This was possible in progressive thinking because the very processes of

² Joan Biskupic, "Trial Judges Have Wide Discretion On Scientific Testimony, Court Says," *Washington Post* (December 16, 1997), p. A2.

³ Eliza Wing-ye Lee, "Political Science, Public Administration, and the Rise of the American Administrative State," *Public Administration Review* (November/December 1995).

⁴ *Ibid.*, pp. 539, 541.

government administration were regarded as "objective, universal, natural, altogether devoid of historical and cultural contexts, and dictated only by scientific laws."⁵

An inevitable tension was created with the traditional precepts of American democracy--how could "government by the people" be replaced by government by a new professional elite? Progressives in fact saw their efforts as a corrective to the failures of American democracy in the late nineteenth century, when government--if not outright corrupt--had become the captive of big business and other special interests. Wall Street, it appeared to many, owned the U.S. Congress. In the early twentieth century there was a further general "disillusionment about the rational capacity of the people" in matters of governance. It was thus imperative that objective knowledge, as discovered by physical and social scientists, be applied more directly to the processes of government. As Lee comments, progressive theorists such as Pinchot saw themselves engaged in a project in which the stakes were nothing less than "the survival of American democracy [which] rested on the use of scientific knowledge as a technology of governance."⁶

The U.S. Forest Service was the product of the application of these progressive ideas to the problems of forest management. The Forest Service should be an organization run by professionals kept well separated from politics. This separation would allow foresters to put science to use in the national forests in the service of "the public interest." Foresters would calculate the optimal age of tree harvest, the appropriate level of timber cut, the resources needed for suppressing forest fires, the appropriate level of livestock grazing in the forests, and many other "technical" matters. Social values, as dictated by the Congress and other parts of the political process, might enter in setting certain broad goals for the use of the national forests. But political influences must not enter into the details of forest management by which these goals were realized. The Chief of the Forest Service must be a forestry professional, insulated from politics, who would supervise the overall application of scientific forestry knowledge to achieve forest outcomes in the most efficient manner possible.

From this perspective, the mission of federal foresters was to manipulate nature, to make wild nature "perfect." According to scientific management, as Nancy Langston writes in *Forest Dreams, Forest Nightmares*, a well managed forest should be "efficient, orderly, and useful." Federal foresters followed in the tradition of European silviculture which "had as its ideal a waste-free, productive stand: nature perfected by human efficiency." The early foresters who set out on this path, and saw the Forest Service as the exemplar of all that it represented, came "with the certainty that they could use science to fix the forests, and that with the help of science, they could do no wrong." They were very "self-conscious of their mission, and proud of their new scientific discipline."⁷

The practitioners of scientific management regarded knowledge obtained through formal research and other professional methods as authoritative, and tended to be dismissive

⁵ Ibid., p. 543.

⁶ Ibid., pp. 541, 542.

⁷ Nancy Langston, *Forest Dreams, Forest Nightmares* (Seattle: University of Washington Press, 1995), pp. 5, 8, 10.

of local knowledge grounded in practical experience. The great advantage of science was that, through the results of expert investigations, it would be possible to eliminate the waste and confusion that had inevitably attended to all the failed local experiments of the past. In short, the efficient method of science would supplant the haphazard and wasteful method of local trial and error.

These views are well illustrated by the case of forest fire policy, a central issue for the Forest Service almost since its founding. In the Blue Mountains of northeast Oregon and southeast Washington State, for example, the Forest Service knew that local Indians earlier had frequently burned the forests there. Some of the earliest European arrivals had begun to imitate the Indian practice. But the Forest Service in the progressive era rejected all this as simplistic and old fashioned. Indeed, as Langston writes, they saw "burning as part of [the old] irresponsible laissez faire logging practices -- practices utterly opposed to scientific sustained yield forestry." Moreover, "if light burning was an Indian practice, then by definition it was superstition, not science," and thus could never be an option. Instead, as Langston explains, "scientific control and management . . . were the goals of government scientists." By means of science, the Forest Service would be able to "improve nature," not merely preserve it or protect its environmental quality.⁸

William Greeley, later to be chief of the Forest Service, said in 1911 that "firefighting is a matter of scientific management, just as much as silviculture or range improvement."⁹ This led federal foresters to reject even the views of many local non-Indians who considered the government plan for eliminating fire to be "absurd." To be sure, there were also self interested motives at stake. As Langston further comments, "If light burning was accepted, that would threaten the Forest Service's very justification for managing the Forests--a justification which came from its claims to technical and scientific expertise." The Forest Service "was desperate to defend its own authority as manager of the federal forests, and fire suppression was one way to do that."¹⁰

In his wide ranging writings on fire policy, Stephen Pyne also illustrates how Forest Service thinking about forest fires was derived from the broader themes of the Progressive Era. The aspiration to scientific fire management early in this century involved "nothing peculiar, . . . nothing idiosyncratic to foresters." Rather, it was a natural outgrowth of the prevailing general "precepts of progressivism, the belief that scientific knowledge was essential and adequate, that public policy and public lands should be administered by experts trained in scientific management and shielded from political corruption and public whim." In the progressive gospel, the Forest Service efforts "reified" the widespread hopes to control nature for human use--"to wage a sublimated war on the forces of nature."¹¹

⁸ Ibid., pp. 249, 250, 249, 252.

⁹ Quoted in Pyne, *World Fire*, p. 185.

¹⁰ Langston, *Forest Dreams, Forest Nightmares*, pp. 253, 250, 251.

¹¹ Pyne, *World Fire*, pp. 185, 192.

Applied in the specific area of forest fire policy, as Pyne writes, this meant that:

Against folk wisdom, [professional foresters] proposed science; against laissez-faire folk practices, they argued for systematic regulation of burning that would support, not confront, professional forestry; against the self-evident waste of fire--not only what it directly destroyed but those benevolent "forest influences" that it indirectly laid to waste--they conjured up a vision of conservation, the rational, industrially efficient exploitation of natural resources. . . . Fire fighting was the pragmatic merger of idealism with reality by means of applied science.¹²

To be sure, as the Forest Service in the 1990s has finally been compelled to acknowledge, all this put much too great a burden on the methods and degree of knowledge attainable through the science of forestry.¹³ Contrary to the tenets of scientific management, the most important forest fire lessons of the twentieth century have been learned through practical experience and trial and error, not academic research. Suppressing fire in the past has now led to increased fire risks in the future, owing to the buildup of brush and dense thickets of smaller trees in many forests. As Pynes relates, it took many decades, culminating in the large fires of the past decade, to prove to disbelieving Forest Service eyes that "the decision not to burn can be as ecologically fatal as promiscuous burning." In "removing anthropogenic fire from many environments," the Forest Service committed "less an act of humility than of vandalism."¹⁴

Some years ago, Charles Lindblom and David Cohen made a general distinction across a wide range of professional fields between "professional social inquiry" and "ordinary knowledge." They argued that the members of professional groups exhibited certain general tendencies of thought, treating knowledge as authoritative only when it was the product of formal research, at least appearing to be grounded in the application of the scientific method. In the real world, however, Lindblom and Cohen argued that professional methods typically could offer little more than "a supplement to ordinary knowledge."¹⁵

Moreover, ordinary knowledge was not developed and brought to bear in the formal and systematic fashion expected of professional social inquiry. Rather, it accrued almost haphazardly in the course of various societal and political interactions that somehow came

¹² Pyne, *World Fire*, p. 187.

¹³ For the story of a similar failure of public land management, based on similar causes, see Robert H. Nelson, *The Making of Federal Coal Policy* (Durham, NC: Duke University Press, 1983); see also A. Dan Tarlock, "The Making of Federal Coal Policy: Lessons for Public Land Management From a Failed Program, an Essay and Review," *Natural Resources Journal* (April 1985).

¹⁴ Pyne, *World Fire*, p. 253.

¹⁵ Charles E. Lindblom and David K. Cohen, *Usable Knowledge: Social Science and Social Problem Solving* (New Haven: Yale University Press, 1979), p. 35.

together to yield a decision. Lindblom in an earlier article had famously characterized this form of government decision making as "the science of `muddling through."¹⁶ As Lindblom and Cohen now argued, the tendency of professionals to overestimate the power of their own methods often rendered them incapable of seeing the essential contributions that other forms of knowledge and of decision making could make.¹⁷ Although they did not have forest fire policy in mind, the actions of the professional foresters of the Forest Service over the course of the twentieth century have served well to illustrate this much broader failure of scientific management concepts of professionalism in the 20th century.

A MORAL CRUSADE

In progressive thinking, the idea of progress was conceived in material terms. If progressivism was the "gospel of efficiency," as Samuel Hays would describe it, the importance of efficiency lay in the fact that it put American society on the path of maximum economic growth.¹⁸ An efficient economy was effectively solving the material problems that had preoccupied most people for most of human history. Life had always been a struggle to find adequate food, shelter, and protection from disease and hot and cold. If this struggle could now be resolved, progressives were convinced that it would mean a whole new era in human affairs.

As Pinchot often emphasized, the preeminent role of the national forests was to supply wood to meet the home building needs of the nation--to resolve at long last the shelter problem. The Forest Service in this way would be doing its part in the grand progressive project of opening the way to a virtual heaven on earth.¹⁹ Indeed, Pinchot would declare in *The Fight for Conservation* that his efforts for conservation had been designed "to help in bringing the Kingdom of God on earth."²⁰

Pinchot's thinking in this regard was very much in tune with that of other leading progressive intellectuals of the time. The social gospel movement of the late nineteenth and early twentieth centuries has been characterized as seeking the "social salvation" of mankind, as having the overall objective to achieve "the coming to earth of the kingdom of heaven."²¹ The founder of the American Economic Association, Richard Ely, was also a prominent social gospeler in the late nineteenth century. Ely believed that "Christianity is primarily concerned with this world, and it is the mission of Christianity to bring to pass here a kingdom of

¹⁶ Charles E. Lindblom, "The Science of `Muddling Through,'" *Public Administration Review* (Spring 1959).

¹⁷ Lindblom and Cohen, *Usable Knowledge*, Ch. 4.

¹⁸ See Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Cambridge, MA: Harvard University Press, 1959).

¹⁹ For a full treatment of the tenets of the progressive gospel, see Robert H. Nelson, *Reaching for Heaven on Earth: The Theological Meaning of Economics* (Lanham, MD: Rowman and Littlefield, 1991).

²⁰ Gifford Pinchot, *The Fight for Conservation* (Seattle: University of Washington Press, 1967), p. 95.

²¹ Charles Howard Hopkins, *The Rise of the Social Gospel in American Protestantism, 1865-1915* (New Haven: Yale University Press, 1940), pp. 320-21.

righteousness."²² Economics was critical to this mission because it would provide the necessary expertise to build heaven on earth. In the narrower sphere of the management of the forests of the nation, the profession of forestry should also play its part in this grand project.

Progressivism thus was not only concerned with material matters but was a grand undertaking of spiritual renewal as well. If the details of achieving economic progress might differ among them, American progressivism shared with Marxism, European socialism, Herbert Spencer's social Darwinism, and a host of "religions of progress" the conviction that the end of material scarcity would mean an end to the historic conflicts among people over resources and a broad solution to longstanding problems of the human condition.

This set of convictions, to be sure, was never itself subject to any scientific analysis. American foresters never applied the scientific method to ask whether the high hopes for science and progress were objectively true. Rather, in the progressive era (if no longer today), it seemed impossible to many people to believe otherwise. The progressive vision was simply an article of faith. Scientific management was the secular religion, not only of the Forest Service and professional forestry, but for the American welfare and regulatory state during much of the twentieth century.

A CRISIS OF FAITH

The problem today is that most of the progressive articles of faith have not stood up well to the test of twentieth century history. There has been enormous progress in the material conditions of life in the most developed parts of the world, for practical purposes supplying most essential needs. Yet, the ending of material scarcity does not seem to have yielded a whole new degree of happiness and emotional well being in human affairs, as progressives had so confidently expected would be the case. Indeed, even as a nation such as Germany made great strides economically and scientifically in the first half of the century, it simultaneously plunged the world into the horrors of world wars and genocide. The great rise of material wealth in the United States over the course of the twentieth century has not abolished crime; the prisons of the United States today house the unprecedented number of 1.5 million Americans.

Science has come to be a double-edged sword in ways that the progressives never anticipated. Scientific knowledge can provide greatly expanded ability to manipulate the natural world. But this power over nature can be used for ill as well as good. At the extreme, the atom bomb raised the specter of the mass elimination of the human race from the earth. Modern chemicals serve valuable industrial purposes but can also do great harm to the environment. Scientific developments such as cloning of animals may offer basic challenges to traditional ethical ideals. All this is particularly frightening in light of the weaknesses of the political process in many nations around the world.

Outside the physical sciences, the high expectations of progressives for the development of scientific knowledge also have not been realized. All too often, social and

²² Richard T. Ely, *Social Aspects of Christianity and Other Essays* (New York: Thomas Y. Crowell, 1889).

administrative scientists have affirmed scientific truth only to find later that they were in error. As noted above, for decades the message of the need to control forest fires was proclaimed as a scientific truth of professional forestry but in the 1990s new expert thinking has rejected the basic tenets of past fire policies. The even flow interpretation of sustained yield, the "scientific" basis by which the Forest Service set timber harvest levels for several decades, today appears foolish and misconceived, as timber harvests have plunged to one-third their former levels.

Partly because science has been unable to uphold its end, but also partly because there was a basic tension with democratic theory, the high progressive hopes for a clear separation of politics and government administration have been another victim of the history of the twentieth century. Today, the Forest Service is being run by political appointees, rather than forestry experts. The Clinton administration in this regard has merely accelerated a longstanding trend.

INTEREST-GROUP LIBERALISM

Indeed, leading political scientists such as David Truman were making their reputations in the 1950s by writing about the failure of the progressive plan for scientific management of American government.²³ Interest groups were involved at every step of the way. Perhaps there was no other possibility in a democratic system. The economist John Kenneth Galbraith wrote of the great benefits to American society from its system of "countervailing powers."²⁴ The social legitimacy of government actions would no longer be determined by a claim to scientific truth. Rather, what was important was to bring the involved parties together, to let them bargain among themselves, and to reach a common agreement. The presence of the affected interests at the table and the ability to agree--rather than the substance of the agreement--now became the decisive point.

In the late 1960s Theodore Lowi characterized this emerging consensus within political science as "interest-group liberalism."²⁵ Professional foresters were slow to appreciate the new thinking about American government but in fact interest-group liberalism represented a decisive rejection of the very foundational scheme on which the Forest Service had been built and on which its social legitimacy continued to rest. For Pinchot, the "special interests" were not to be incorporated into the basic processes of governance but were forces of virtual "evil" to be excluded from objective, "scientific" government.

The Forest Service partly resisted the application of interest-group liberalism in its domain but could not stand against the tide. New laws in the 1970s such as the National Forest Management Act of 1976 required extensive public participation in planning and other

²³ David B. Truman, *The Governmental Process: Political Interests and Public Opinion* (New York: Knopf, 1951).

²⁴ John Kenneth Galbraith, *American Capitalism: The Concept of Countervailing Power* (Boston: Houghton Mifflin, 1956).

²⁵ Theodore J. Lowi, *The End of Liberalism: Ideology, Policy and the Crisis of Public Authority* (New York: Norton, 1969).

decision making processes. The National Environmental Policy Act of 1970 (NEPA) prescribed a government-wide decision making process in which public inputs must play a major role. The courts no longer deferred to the claims of the Forest Service to apply objective scientific knowledge to the management of the national forests. The power of progressive ideology to hold the fort against Congressional, White House, and other direct political interventions in the details of national forest management was being steadily eroded. By the late 1980s, groups outside professional forestry, often within the environmental movement, were setting the agenda and driving the key decisions in national forest management.

The stage for all this had in essence been set much earlier in the world of ideas, when leading American intellectuals had concluded that progressive hopes for scientific management of American society were not going to be realized. However, the Forest Service and the forestry profession, unlike in Pinchot's day, were no longer on the cutting edge of American political thought. Thus, they would often be blindsided by the developments of the 1970s and 1980s, reacting by feeling a sense of betrayal of the old progressive ideals. The legitimate place of science in guiding the management of the national forests had been usurped by private interests--the very groups that Pinchot had fought so hard to defeat. Seen from an old fashioned progressive perspective, the forces of good government were once again losing out to more venal elements in American society.

ECONOMIC PROGRESSIVISM

Outside the forestry profession, leading economists specializing in forest policy issues argued that the failure of professional forestry had been intellectual as well. In order for forestry to provide a basis for scientific management of the national forests, foresters had to do more than establish the correct rate of growth of trees under certain physical assumptions. If forestry was to be a land management science as well as a physical science, there had to be a way of applying technical expertise to make decisions about the best use of the forests. It was apparent that the "principle" of multiple-use, traditionally offered by the Forest Service as the basis for allocating the resources of the forests among competing uses, could not fill this role.

At Resources for the Future, an old progressive, Marion Clawson, saw the Forest Service itself as having betrayed its early ideals. As Clawson expressed in a series of critical commentaries on agency management in the 1970s and 1980s, the Forest Service had in practice abandoned the progressive commitment to efficiency and was instead basing its decisions on crass politics.²⁶ Clawson blamed this on the administrators of the Forest Service as well as the political opportunists who sought to exploit forest resources for private gain.

His Resources for the Future colleague, another old progressive, John Krutilla, offered much the same diagnosis but put the emphasis in his writings on the steps necessary to revive

²⁶ Marion Clawson, *The Economics of National Forest Management* (Washington, D.C.: Resources for the Future, 1976).

scientific management.²⁷ As Krutilla saw matters, professional foresters would have to learn economics. The only possible objective criterion for deciding among the many possible uses of the national forests was to choose that combination of uses that acted to maximize the total value of all forest uses together. Efficiency must be restored to its place in early progressivism as the central goal, but now efficiency as interpreted through the lens of economic analysis. As Krutilla wrote in 1979, it would be possible in this way to replace the "high motives and sincere exhortations" of traditional forestry with more practical "operation criteria" that could provide a true scientific basis for forest management.²⁸

The attempt of Clawson, Krutilla and others to articulate a new intellectual foundation for scientific management of the national forests--to revive the progressive project through economics--was a failure as well. Economic science was not up to the scientific objectivity promised by Krutilla. Economists had no answer to the question of how the Forest Service would be able to assert managerial independence from political demands. Privatization of the forests would have been one such approach but the progressive ethos ran towards government control.

Moreover, both Clawson and Krutilla took the progressive value system for granted. Like most forestry professionals, they automatically assumed the values of maximum use of the forests to advance human material well being in the world, values that had in fact been at the core of Pinchot's original founding vision. Many members of the environmental movement, however, had a different idea. For theorists of "deep ecology," such as Bill Devall and George Sessions, the fundamental problem was "the ultimate value judgment on which technological society rests--progress conceived as the further development and expansion of the artificial environment at the expense of the natural world."²⁹ Devall and Sessions were unusually blunt and direct about their objections to the progressive value system but similar concerns motivated many more mainstream environmentalists as well.

Renouncing scientific control over nature was an idea in basic conflict with the progressive value system. For American progressives, for example, a dam had been a great symbol of progress, representing the wonderful application of engineering expertise to conquer a raging river to provide food and electricity for the world. For the environmentalist David Brower, however, his view was that "I hate all dams, large and small," and whatever the benefit-cost ratio might be.³⁰ Economics had nothing to do with the undesirability of building a dam because a dam was, simply put, a desecration of nature. To argue for building a dam would be like arguing for the institution of slavery because it was economically efficient.

²⁷ See Michael D. Bowes and John V. Krutilla, *Multiple-Use Management: The Economics of Public Forestlands* (Washington, D.C.: Resources for the Future, 1989).

²⁸ John Krutilla, "Adaptive Responses to Forces for Change," paper presented to the Annual Meeting of the Society of American Foresters, Boston, MA, October 16, 1979.

²⁹ Bill Devall and George Sessions, *Deep Ecology: Living as if Nature Mattered* (Salt Lake City: Peregrine Books, 1985), p. 48.

³⁰ Quoted in John McPhee, *Encounters with the Archdruid* (New York: Farrar, Straus and Giroux, 1971), p. 159.

Instead of the progressive symbol of a dam, the leading symbol for modern environmentalism has been a wilderness area, defined by the very absence of human presence and impact.

The Forest Service thus found itself torn between budget officers and economists arguing for a revival of the progressive project of Pinchot and leading environmentalists renouncing the very value system of progressivism. In the 1990s the agency now sought to reconcile these tensions by a virtual slight of hand. A new principle of "ecological management" would put scientific management at the service of the new environmental values. But what if a basic hostility to scientific management lay at the core of much environmental thinking? What if many environmental thinkers found objectionable the very idea of manipulating nature through scientific knowledge for human benefit?

In seeking to reconcile the irreconcilable, many observers saw ecological management as empty of content--as a public relations gesture more than actual scientific management. As the General Accounting Office put it, "ecosystem management has come to represent different things to different people." Or as the GAO found one person putting it cynically, "there is not enough agreement on the concept to hinder its popularity"--a comment often made earlier with respect to a previous Forest Service management "principle," the principle of multiple use.³¹

Despite such problems, the Forest Service does not feel able to abandon explicitly the ideas of scientific management. It would be almost like a Christian abandoning the authority of the Bible. Pinchot is the George Washington of American forestry. Moreover, scientific management resolves a very practical question--what does the Forest Service say when a forest user asks the following question: why have you favored another use over my desired use? The answer, as the Forest Service now responds, is the "scientific" dictates of ecological management. It may be mostly a bluff but the language of ecological management at least sounds good enough to the public to buy the Forest Service some breathing space.

If there were no answer, if the Forest Service had to confess today that it has no principled basis for decision making, the social legitimacy of the agency might be in doubt. The very institutional survival of the Forest Service might be in danger. As prominent a commentator as Randal O'Toole has recently stated that the "Forest Service will be 100 years old in 2005--if it survives that long. There is a good chance that it won't."³²

The fundamental problem is the need to find a successor vision to the Forest Service's founding guiding vision--its religion--of scientific management. The Forest Service is still wedded to a set of progressive ideas that have not been widely accepted among leading American political and social thinkers for a quarter of a century or more. The difficulty for the Forest Service, to be sure, is that so much of its current institutional forms and public posture have been so closely tied for so long to scientific management themes. If these arguments are abandoned, the Forest Service might have no satisfactory intellectual defense against demands for radical changes in its organization and traditional ways of doing things.

³¹ General Accounting Office, *Ecosystem Management: Additional Actions Needed to Adequately Test a Promising Approach* (August 1994), p. 38.

³² Randal O'Toole, "Expect the Forest Service to be Slowly Emasculated," *The Seattle Times* (May 7, 1997).

As O'Toole speculated, the future of the agency could even be in doubt. It has been the claim to scientific objectivity above all that has justified the centralization of authority to manage the national forests at the federal level in Washington, D.C.

It thus is difficult for the Forest Service to exercise a leadership role in the search for a successor vision to the ideas of scientific management--as Pinchot once was a leading American figure in formulating broader tenets of American progressive thought. The same need not be true, however, of the forestry profession. If scientific management is abandoned, there would probably be some significant changes in the practice of professional forestry. However, as long as there are forests, there will be a need for systematically organized inquiry into the management needs and policies for these forests.

FOREST MANAGEMENT IN THE TWENTY-FIRST CENTURY

Making predictions about the management of U.S. forests in the twenty-first century is a matter of projecting both scientific and political trends. Scientific management was in essence a theory--simplistic, as it now seems--of the use of scientific knowledge in the political process. The management of the forests was to be divided into two tasks supposedly to be undertaken in separate domains. Science should operate on its own terms in the distinct domain of professional expertise. And politics should operate in a separate and democratic sphere.

The failure of this political/scientific vision of scientific management clearly does not mean that science should not be part of forest decision making. That could hardly be the case. Scientific knowledge is still essential for providing a base of information for forest management. However, it can no longer be assumed that the application of the scientific knowledge will be separated from the practice of politics. Instead, in the future the use of science will be intermingled with the political process. As a recent commentary on the policy making process with respect to world climate change noted, "science and politics had begun to mix and would not be separated again"--an outcome that is simply inevitable.³³

It is not simply a matter of the difficulty in practice of separating value decisions and technical decisions. It is now apparent that science itself reflects a powerful value lens; to make decisions according to some scientific criterion will be to apply a specific set of values to the decisions. Hence, in the future science and politics will have to be part of one seamless web of forest decision making involving technical and value elements.

In a democracy, politics must be the ultimate source of social legitimacy. Hence, what will be required is an effective way to communicate scientific knowledge to democratic political actors. These participants in the political process will then somehow have to blend the scientific knowledge with the values of the community they represent. Forest decisions will be a mixture of values and science, as brought together by the political representatives of the people.

If forest decision making is conceived in this manner, it offers a strong case for decentralization of forest decision-making responsibilities. For one thing, the process of mixing science and values is likely to vary significantly from one local community to the

³³ Paul Brown, *Global Warming* (London: Blanford, 1996), p. 18.

next. Under the old tenets of scientific management, it could reasonably be assumed that there was one scientific answer for the whole nation. Indeed, this answer could best be determined at the federal level through the efforts of the most skilled forestry professionals in the nation. National solutions would then be applied locally by forest administrators following national directions.

If values and science have to be blended in ways that may be unique to each forest community, however, the justification for a national solution is much weakened. The centralization of management authority at the federal level is likely to preclude close sensitivity to local political values. Even if national administrators have an accurate understanding of these local values, the blending of values and technical considerations is a time consuming process. National authorities will simply be physically incapable of undertaking such a task for the whole country. The recent debate over the local forest plan of the Quincy Library group in northern California illustrates the problem. If Congress had to undertake a similar review for every local area of the national forest system, the full Congress would soon be spending much of its time on forest management matters. Obviously, that is not going to happen.

Thus, if national administrators retain decision-making responsibility, the most likely outcome is that they will simply end up imposing a set of national values on local communities. However, if these communities resist, as will often be the case, the national decisions may not hold. The result then is likely to be the outcome commonly seen today on the national forests, institutional paralysis and decision making gridlock.

Partly out of desperation, westerners are beginning to look more closely at institutional alternatives to the current federal land dominance. The former speaker of the Montana House of Representatives and former mayor of Missoula, Daniel Kemmis, writes that the West:

Cannot transcend its colonial heritage until it gains a much more substantial measure of indigenous control over its own land and resources. But it can neither gain nor exercise that control until the left and the right gain enough trust in each other, and establish a productive enough working relationship, to enable them to agree, at least roughly, on what they would seek to accomplish if they had such control. . . . Until that happens, . . . the end of those federally controlled debates is always a less satisfying way of inhabiting the place than any of the participants would have chosen. As more and more people become dissatisfied with this less-than-zero-sum solution of the procedural republic, it is time to look the alternative in the face.³⁴

³⁴ Daniel Kemmis, *Community and the Politics of Place* (Norman, Oklahoma: University of Oklahoma Press, 1990), pp. 127-128.

Decentralization of national forest decision making could take many forms.³⁵ The individual units of the national forest system could be kept within the federal system but be given much greater decision making autonomy. They could be given the authority to raise revenues--through user fees and other devices--to cover their costs. The individual national forest thus might function much like a public corporation. It would respond to local demands as expressed through local willingness to pay for various forest services, and thus to cover the costs of providing these services.

Another possibility would be to delegate forest decision-making responsibility to existing state and local political jurisdictions. National forest uses might be decided according to values as expressed by representatives of the local surrounding community. However, if the federal government continues to pay the way, local groups will have no incentive to economize on costs. Federal money, from a local perspective, is "free" money. Thus, any balancing of money benefits and costs must involve the local community covering the costs as well. In short, if local values are to determine forest uses, it may be appropriate to transfer ownership of national forests to the state and local level.

Yet another decentralization possibility would be to privatize parts of the national forests. An entrepreneur motivated by profit would assess the forest demands and willingness to pay of various forest users. The private owner would then allocate the uses of the forest to those parties that could offer the highest profit--would pay the most relative to the costs of serving their needs. This is the market system by which most goods and services in American life are provided. Privatization of national forests would work best where there are few external impacts of forest use that are not reflected in prices in the marketplace. Such circumstances are likely to arise, for example, where commercial timber harvesting or another commercial activity is the principle use of a forest.

What may be needed is a comprehensive reclassification of the national forests.³⁶ There are some lands that involve matters of national significance; the uses of these lands are important not only in terms of local values but also national values. Such areas would probably include much of the existing national wilderness system within national forests. These areas could remain in federal ownership.

However, many other areas of the national forests would not possess nationally significant environmental or other assets. If these areas served a variety of nonmarket purposes, the management of the areas should respond to local community values--a goal best

³⁵ See Robert H. Nelson, "End of the Progressive Era: Toward Decentralization of the Federal Lands," in Philip D. Brick and R. McGregor Cawley, eds., *A Wolf in the Garden: The Land Rights Movement and the New Environmental Debate* (Lanham, Md.: Rowman and Littlefield, 1996); Robert H. Nelson, "Government as Theatre: Towards a New Paradigm for the Public Lands," *University of Colorado Law Review* (Vol. 65, No. 2) (1994); and Robert H. Nelson, "The Future of Federal Forest Management: Options for Use of Market Methods," in Phillip O. Foss, ed., *Federal Lands Policy* (New York: Greenwood Press, 1987).

³⁶ See Robert H. Nelson, *How to Dismantle the Interior Department* (Washington, D.C.: Competitive Enterprise Institute, June 1995); and Robert H. Nelson, *How and Why to Transfer BLM Lands to the States* (Washington, D.C.: Competitive Enterprise Institute, January 1996).

accomplished by transferring the lands to states and to local governments. Finally, commercial lands best suited to private management could also be so categorized.

A national federal land classification commission might be formed for this purpose. It could be given a charge to systematically review all federal lands and determine which lands fall in categories such as identified above. On an interim basis, it would be helpful to identify specific lands that meet the above criteria. State, local or private management of these lands might then be tried on an experimental basis. Indeed, several recent proposals by groups studying the problems of national forest management have been made along these lines.³⁷ The idea of managing lands under at trust status, similar to the current state trust lands, seems to be getting particular attention.³⁸

In summary, the management of the national forest system derives its social legitimacy from the ideas of scientific management. Yet, the failure of scientific management theories as a political concept was apparent long ago. The basic precepts of scientific management are rejected today by leading players in national forest decision making. Traditional organizational forms in the national forests and ways of operating of the Forest Service are surviving largely on institutional momentum. It is time to think more boldly, as a new century is about to arrive. New ideas to replace scientific management will be required. And these ideas will inevitably have major institutional consequences, involving brand new alternatives to the familiar arrangements of the existing national forest system. The Forest Service as we know it today is likely to be radically altered by these developments.

³⁷ See *Options for the Forest Service 2nd Century*, The Draft Report of the Forest Options Group (1998) -- available at www.ti.org/tc.html; and *New Approaches for Managing Federal Administered Lands*, A Report to the Idaho State Board of Land Commissioners By the Federal Lands Task Force (July 1998).

³⁸ See Jon A. Souder and Sally K. Fairfax, *State Trust Lands: History, Management and Use* (Lawrence, Kansas: University Press of Kansas, 1996).