

RESOURCES

Some findings and conjectures from recent research
into resource development and use



The power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas.—JOHN MAYNARD KEYNES

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PRIVATE FORESTS AND THE PUBLIC

LARGE PRIVATE AND INDUSTRIAL forest holdings in the United States cover about 62 million acres, including much of the country's choice forest land. Acre for acre they contribute far more than their proportionate share of annual timber production and of employment in the woods and in associated processing industries. Many hunters and fishermen use these larger forest land holdings in the course of a year, as well as numerous campers, picnickers, and hikers. Clearly large private and industrial forest holdings are significant, not only to the owners, users, and workers involved, but also to the public at large. The public interest in their management is not in dispute any more than is the private interest. The essential challenge is to manage these lands to serve both public and private purposes in an effective and balanced manner.

The principal uses of large forest holdings in which the public is interested are:

1. Timber production for lumber, pulp, and other products;
2. Outdoor recreation for hunting, fishing, camping, and other activities;
3. Watershed protection for reducing sharp fluctuations in runoff, possibly prevention of soil erosion, and regulation of underground water supplies;
4. Forest preservation for particular species, ecological systems, and possibly wilderness areas;
5. Research for the improvement of growing stock, forest practices and management generally.

Characteristically the larger holdings have involved each of the main uses in some measure. Failure to

take account of one or another of these uses in a management program will still have an effect on both the forests and on the public, if only by default. The several uses are knit together one with another, and with the economy and society as a whole. Most large forest property owners now recognize this; it is the premise upon which they work out their management programs.

PRIMARILY the public is concerned that those with the decision power over the large private and industrial forest holdings conduct themselves as good businessmen and responsible citizens. To do both of these may not always be as easy as it would seem or as one would like it to be. From time to time difficult compromises have to be made by persons who have to meet payrolls and satisfy the expectations of stockholders for dividends and who at the same time wish to be conservators of that part of the national estate which they own or manage. The public interest requires that both these roles be played simultaneously with neither one upstaging the other.



The essence of the public concern regarding the management and use of large forest holdings may be crystallized as follows:

- Management at the highest level of foresight and competence possible;
- Sustained increases in yield of all forest products and services;
- Provision of nonmarketable (or semimarketable) forest services, such as outdoor recreation;
- Adequate returns to owners, operators, labor, and other factors of production;
- An emphasis on research in its various aspects: genetics, silviculture, management, economics, processing, marketing, among others;
- Public and private policies which favor these objectives and which are reasonably consistent with each other;
- In short, a view of large private and industrial forest properties which encompasses public and private welfare; the needs and priorities of economic development of the specific holdings, the region, and the nation; and a careful respect for ecological constraints in the interest of long-term development and use.



These stated objectives which the public through the several levels of government and through other organizations has a right to insist on can furnish a kind of check list for gauging the total merit of any significant decision regarding large forest holdings. Such a check list will not yield quick and ready answers to specific decision problems, but it can guide decisions. Taken together these objectives can best be achieved through a blend of private and public actions, characterized both by a degree of competition and a degree of co-operation. Altogether, an environment is set up which may be called one of "controlled tension" among the several parties concerned.

One matter of importance to the country as a whole is that future requirements for lumber be satisfied at as low a cost as possible, having

in mind the time dimension of the problem so that cheap lumber now will not be obtained at the expense of high priced lumber later on. Lumber is still a basic construction material, perhaps the basic one, its use running at about 35 to 40 billion board feet a year. To be sure, the use of other construction materials has increased over recent decades—steel, aluminum, plywood, particle board—but lumber holds its own surprisingly well even at prices which have been increasing persistently as compared to those of competing materials.

LOOKING to the future it seems likely that the country will face difficulties in obtaining enough high grade softwoods for lumber, even though total growth of all species will at least equal total drain. This is a principal finding of the timber resources review conducted several years ago by the U.S. Forest Service. Projections made by Resources for the Future for its forthcoming comprehensive study of *Resources In America's Future* point in the same direction.

There is another matter in which the public has high stakes. This is for more and higher-quality outdoor recreation on all sorts of land and water areas, including the large private and industrial forest holdings. The demand for outdoor recreation as a whole is increasing at perhaps 5 to 10 per cent a year. In many forests recreation already may have become the dominant use.

Many of the larger forests products companies provide campgrounds, hunting and fishing arrangements by lease or without charge, lodges, and other facilities. A recent survey of recreation on forest industry lands conducted by the American Forest Products Industries indicates that 85 per cent or more of the private forest lands are open to berry picking, picnicking, hiking, swimming, and camping. About one-fifth of the companies operated public park and picnic areas, some with boat ramps, playgrounds, and even ski lifts.

Undoubtedly during the coming decade it will be desirable, and probably necessary, to make even greater use of the large private forest holdings for public recreation; otherwise this important potential source of outdoor recreation will not make its contribution to meeting the growing

demand. It may be questioned whether the private companies can or should continue to provide such recreation free of charge. The establishment of reasonable fees for recreational use might be fairer to the owners and would probably lead to still further improvement in the facilities and services. In addition, the charging of fees might encourage the provision of additional recreational opportunities on public land.

The growth of recreation demand appears to be so overwhelming that it may become desirable for government to provide incentives for introducing and expanding public recreation on such private lands. If the matter can be handled privately on a no-charge basis or by charging reasonable fees, so much the better. But if this does not suffice, then it may well be in the public interest for the government to consider providing grants-in-aid, technical assistance, tax benefits, or some other form of incentive for the increased use of private holdings for public recreation.

A final matter of concern to the nation is the need for a vigorous and many-sided program of research on forest development and use. Much research already is being done by the large companies as well as by government. On the whole, there would appear to be good co-operation between them. Obviously it will be important to direct research to the newer uses of forest lands, such as use for outdoor recreation and watershed management, and to the techniques of multiple purpose management, as well as along more established lines. A reasonable coordination among programs should be maintained, and a good balance struck between basic and applied research.

Adapted from a paper presented by Joseph L. Fisher, president of RFF, to the Forest Land Use Conference of American Forest Products Industries, Inc.





OUR POLLUTED AIR

AIR POLLUTION has occasionally reached acutely lethal proportions. Outstanding among the recorded instances when contamination of the air was the immediate cause of illness and death are the Meuse Valley (Belgium) case, where one hundred persons were made ill and sixty-three died in 1930; the Donora (Pennsylvania) episode of 1948 when over a thousand persons were severely affected and twenty died; and the London case of 1952, when an estimated four thousand excess deaths were recorded during a two-week period in December. However, the occasional instances of deathly gases enveloping a city do not begin to define the magnitude of the problem. The greatest health problems and the greatest property damage appear to arise from persistent exposure at a great many scattered locations.

One survey has indicated that air pollution to one degree or another affects 10,000 American communities. It ranges from highly localized effects—perhaps the smokes and gases of a single factory chimney—to smogs that blanket entire metropolitan areas (Los Angeles is the obvious example). The damage to livestock, vegetation, and materials alone has been roughly estimated at \$3 to \$4 billion annually, and yearly expenditures for abatement at about \$300 million. In recent years the character of air pollution has undergone radical change which is why it is not possible at present to formulate a meaningful index of its magnitude.

The substances found in polluted air are often divided into two categories: stable primary substances that are not changed in the air and, consequently, comparatively easily traced to their source. These arise from industrial, commercial, domestic, transport, and agricultural activities and are in the form of dusts, smokes, fumes and droplets. The range of types of these pollutants is extremely wide. They obscure sunlight and visibility, dirty buildings and other articles, corrode metals,

and affect life processes. The burning of coal was responsible for large amounts of dust and smoke in former times and still is at numerous locations in Europe. Greater use of liquid and gaseous fuels has considerably reduced these types of pollutants in the United States. Consequently, the "settleable solids" index of pollution has fallen drastically and virtually lost its meaning. However, the pollutants arising from the newer fuels are in some respects more difficult to cope with. This is in considerable measure because of the automobile which expels individually small amounts of pollutants at a great many locations close to the ground. Also, residuals from the combustion of the newer fuels are particularly important contributors to what has been called secondary pollution.

SECONDARY POLLUTANTS are more intractable, of less predictable effect, and generally speaking more dangerous than primary pollutants. They do not *as such* arise from any industrial, municipal, or household source—rather they are produced by photochemical interactions between primary pollutants within the atmosphere. The most objectionable pollutants appear to arise from the oxidation, often produced by ozone which is generated by a photochemical reaction between organic substances and oxides of nitrogen, of hydrocarbons which are present in incompletely combusted fuel fumes. This is Los Angeles smog.

Aside from property damage, visibility reduction, and general destruction of the amenities, there is strong circumstantial evidence indicating the adverse health effects of continued exposure to the array of contaminants found in the air of numerous urban areas. Comparison of morbidity and mortality statistics with indices of air pollution suggests that communities with the heaviest air pollution loads tend to rank high in death rates for a number of diseases. There is significant correlation be-

tween air pollution and cancer of the esophagus and stomach, lung cancer, and arteriosclerotic disease.

The German magazine, *Der Spiegel*, has recently reported a variety of findings with respect to air pollution in the Ruhr Basin. The Ruhr and its environs suffer from perhaps greater continuous pollution of the air than any other sizeable area on earth. As the magazine graphically puts it, the industries in this area of 8 million people daily produce a small Pompeii. From the perpetually darkened skies, 1.5 million tons of dust, ashes and carbon as well as 4 million tons of sulfur dioxide descend daily. Aside from such interesting facts as that the waiters in the restaurants in Duisburg change their collars three times a day, *Der Spiegel* also reports that studies have shown that over 15 per cent of the children in the Ruhr showed symptoms of rickets while only half as high a percentage did so in a control city in the Rhine Valley. Moreover, the study shows that teen-age children in the Ruhr are significantly lighter and of lesser stature than children in the control city.

Extracted from a paper presented by Allen V. Kneese, of RFF, before the General Board of Christian Social Concerns of the Methodist Church, Washington, D. C.



AMERICA has few opportunities—and these will not remain open to us long—to set aside new National Parks similar to the areas established earlier out of primitive wilderness types of land. To provide for the needs of the future we shall have to come more and more to the idea that some park and recreation purposes can—in fact, must—be served concurrently with other uses, provided that there are appropriate special procedures to safeguard all major interests.—*Conrad L. Wirth in Comparisons in Resource Management.*

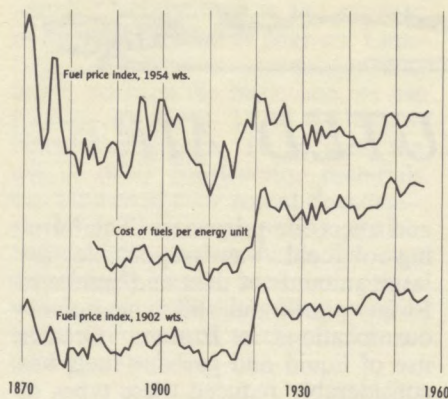
The Ever Shifting Resources Pattern

DISTURBANCES of ecological equilibrium have always been conceived as creating difficulties for man, as imposing added costs on his efforts to wring a satisfactory life from a reluctant nature. But there seems to be no inherent reason why this should always be the case. What we observe and take account of is the adverse effects: increased erosion and flooding due to deforestation, dust bowls due to overgrazing, and so on. What we seldom note or record is the spread of deltas and cultivable flat lands, the possibly favorable effects for some areas of induced climatological changes that may be unfavorable for others.

The resource problem is one of continual accommodation, adjustment, to an ever changing economic resource quality spectrum. The physical properties of the natural resource base impose a series of initial constraints on the growth and progress of mankind. . . . But the resource spectrum undergoes kaleidoscopic change through time, with every turn of the crank of history



providing a new pattern. Substitutability—the result of man's technological ingenuity and organizational wisdom—offers those who are nimble a multitude of opportunities for escape. The fact of constraint does not disappear, it merely changes character. New constraints replace the old.—Chandler Morse and Harold J. Barnett in *Natural Resources and Economic Growth*.



Mineral fuels: alternative price indexes. Logarithmic scale.

Measuring Fuel Prices

OCCASIONALLY different indexes of the same commodities give different results. The chart compares different methods for measuring the movement of fuel prices. These indexes, based on the movement of prices weighted by 1954 outputs and by 1902 outputs, as well as on the average cost per energy unit (Btu) of fuel produced, are shown in this chart. It will be noted that the cost of mineral fuels per contained energy unit rose more than either of the other indexes. This is because energy has been produced to an increasing degree in the form of fuels of higher quality, representing more convenience and economy to the consumer. (For example, it has been estimated that Diesel engines require 1/7 as much energy per ton-mile of freight hauled as do coal-steam engines, and much less maintenance, labor, etc.; gas furnaces average 30 per cent more efficiency than coal furnaces.) Thus in 1870 only 3 per cent of the mineral energy output was in the form of oil; by 1957 38 per cent was. Since the cost per Btu in 1957 of

energy contained in oil was nearly three times the cost of that contained in bituminous coal, this shift in the proportions of output of the different fuels accounts for a major portion of the rise in the energy-cost index. The fixed-weight price indexes are better indicators of the changes in the cost of mineral fuels over the period. The 1954-weighted index is an indicator of the costs which would have been borne by an economy using the mineral fuels in 1954 proportions, with petroleum predominating; the 1902-weighted index shows the rising costs which would be borne by an economy using the mineral fuels in the proportions of 1902, with coal dominant. Both exclude the effect of the shift to more expensive fuel. All three indexes are "deflated"; that is, they have been adjusted to compensate for changes in the general price level and thus show relative prices on a consistent long-term basis.

From the introduction to *Trends in Natural Resource Commodities*, by Neal Potter and Francis T. Christy, Jr. This RFF book presents on a continuous uniform basis statistics of prices, output, consumption, foreign trade, and employment in the United States from 1870 to 1957.



NEW RFF STUDIES

Trends in Natural Resource Commodities, by Neal Potter and Francis T. Christy, Jr.
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Land Economics Research, edited by Joseph Ackerman, Marion Clawson, and Marshall Harris
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