

Research Needs for Our National Landscapes¹

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Abstract: The prevailing research problem for our national landscapes is: How shall we organize, control, and coordinate public and private development so as to protect, maintain, improve, and manage those landscape features that we value most? Research questions discussed include: environmental/political conflicts, taxation and zoning, landscape classification, public involvement, emerging technology, information and education techniques, landscape benefits, measurement of landscape demand and supply, and systems analysis approaches for comparing the social, economic, ecologic and physical measurements of natural landscapes.

INTRODUCTION

When Daniel Boone goes by, at night
The phantom deer arise
And all lost, wild America
Is burning in their eyes

Stephen Vincent Benet

At exactly 5:13 a.m., the 18th of April, 1906 a cow was standing in a field in the Old Shafter Ranch in California, minding her own business. Suddenly, the earth shook, the skies trembled, and when it was over, there was nothing showing of the cow above ground but a bit of her tail sticking up. Faced by a somewhat similar set of complacent circumstances, we need to develop--through additional research--the methodology and information necessary to understand, guide, and manage the great forces of change that influence the beauty of our national landscapes, or we may find some of them, like the Shafter cow, swallowed up some morning by vast upheavals of our skyrocketing technology.

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Before we can specify what research is needed, we need to assess the situation briefly in the near, and even the distant, future.

SITUATION ASSESSMENT

Consider the following Environmental Protection Agency (EPA) projections for the next 21 years for a moment. EPA's educated guess is that population and market demands between now and the year 2000 will call for the duplication of everything that has been built in the history of the United States. For example:

- o Urban sprawl may eat up 19.7 million acres of potential recreation land by the year 2000. (That's an area equivalent to the states of New Hampshire, Vermont, Massachusetts, and Rhode Island).
- o Another 3.5 million acres may be paved over for highways and airports.
- o Five million acres of potential hunting and scenic areas may be removed from agriculture for public facilities, second home developments, and waste control projects.
- o And, another 2 million acres of right-of-way may be required for 200,000 additional miles of power lines.

At stake are the nation's irreplaceable estuaries, wetlands, beaches, flood plains, river and lake fronts, farms, forests, and scenic uplands --landscape resources that are paramount ingre-

dients of a healthy, vigorous, democratically-oriented society.

Why is economic growth destroying many of our landscapes? And, why must the growth be so chaotic and destructive to the landscape's natural beauty? The answer is deceptively simple: the states have delegated their authority to supervise land use to 78,000 units of local government. These local units support themselves mainly by taxing land. As a consequence, local governments are constantly searching for opportunities to develop the land, increase its assessed value, and make it produce more in taxes. Thus, the basic fact of private land development in the United States today is that some of the very units of government that are charged with controlling land use may be the ones most susceptible to pressures not to control it. A critical research question, then, is how to maintain the democratic ideal of local government and at the same time preserve the limited natural environments around towns, cities, and municipalities.

We are in a period of great ferment when citizens' groups, the courts, a number of state governments, the national administration, and congressional committees have begun to consider fundamental reforms in the way state and local governments control visual resources. At the heart of the ferment is recognition that land use decisions affect the visual sensitivities of people beyond local boundaries and that these decisions must be controlled by the states if critical environments are to be protected, and if development (needed by a region) is not blocked by local governments.

At the same time, it is imperative that land use planning to maintain landscape quality should not impede private economic growth. In most instances, laws aimed at protecting the ecology and beauty of natural landscapes can actually help responsible private development by assuring that the State's natural environment won't be paved over by urban-sprawl. Private investors are usually willing to spend the time and money legally required to protect the natural environment when they know the long term profit will be there.

For centuries, Americans have drawn strength and inspiration from the beauty of our country. It would be a neglectful generation indeed, indifferent alike to the judgment of history and command of principle, which failed to preserve and extend such a heritage for its descendants.

Yet the demands of an expanding urban population on a fixed land base is threatening to destroy in a few decades what has been cherished

and protected for generations. Residential development in suburbs is swallowing up vast amounts of natural beauty to meet the need for living space. Streams are piped and channeled; trees and meadows are bulldozed. Great swaths of land equivalent to a 50-acre park are obliterated for every mile of expressway. Ironically, many people move out from the city to get closer to nature, only to find that the once-pastoral landscape has been altered and disfigured beyond recognition.

Millions of people are compelled to live in cities without contact with natural surroundings. And, as rising energy costs force more people to live closer to their places of work, we can expect more people to seek residence in central cities. The opportunities for exposure to parks, trees, and outdoor playspace will become even more restrictive unless we take deliberate action.

THE FUTURE

If we were asked to try to capture in a single picture the complex challenges of landscape management that face us in the distant future, we might well consider as our background a vast chessboard that stretches to the far corners of the country. On one side of the board, we might place a white knight--representing the land-use planner, landscape architect, or similar professional faced with landscape management problems and challenges. Opposite the knight, on the other side of the board, we would place an enigmatic, little black box--called technology. In its calm inscrutability, it seems to have crept out of the world of the future. And perhaps it has. Studying the moves of these two pieces, we see that the confrontation between these two "pieces" will occur over a wide range of landscapes represented by the thousands of squares on the board; and instinctively one feels that whatever move the knight makes now, it will be the little black box that makes the last one.

Let's examine briefly some of the events that may affect the moves on our chessboard in the decades ahead. The Delphi Technique, which relies on the opinions of a panel of experts, was the method used to obtain the forecasted information (Shafer *et al.* 1977). By 1980, economic incentives may be offered to private landowners who manage for fish and wildlife. By 1985, these incentives may be broadened to include tax incentives for providing scenic amenities. The Federal role in coordinating natural resource planning may expand from establishing the first land, water, and air use plan in 1990, to a national land use zoning policy by 2000. By 2000, environmental planning may be effectively coordinated between all levels of government and private enterprise. Also by 2000, land use patterns may stabilize--land preempted for one use being replaced with comparable land. All natural resources, including marine and estuarine areas, may be under intensive management.

Biostructural designs may emerge in the distant future as the strongest single force in the landscape architect's repertory. Biological forms and systems provide an untapped reservoir of ideas for the design of environments that can meet man's needs but that emulate the beauty of nature. For example, solar collectors on the crest of a ridge conceivably could funnel sunlight (and thus the necessary energy source) through ducts into the interior of a megastructure of a mountain that would house a whole complex of human activities--ranging from non-polluting industrial industries to high density residential areas. The exterior of the "building" may closely resemble a terraced hillside.

Structures that grow--that is, or biostructures of all types--offer a vast field for landscape management inventiveness. Structures might be created out of green plants. Living enclosures could be shaped by nets, careful pruning, judicious use of nutrients, and so forth. With greater understanding of plant growth processes, it might even be possible to develop varieties of plants that would develop naturally into functional enclosures.

Imaginary natural beauty may be possible. People may be able to switch natural environments on and off by creating perceptually real, three-dimensional holographic environments in open spaces. People could walk through the components of the perceived environment as if they were mirages.

Another possibility for enjoying the beauty of natural environments may be possible by creating interference patterns among laser-projected images of nature's elements and then solidifying the shapes by introducing a polymerized plastic. In effect, the "mirage" or image would solidify into tangible reality.

Stretching this concept to its limits, some futurists would have people visualize various forms and shapes in nature and record--in an as yet unknown way--the distinctive brain wave patterns that the thoughts produced. The patterns could then be converted to sound waves which, when projected through directional antennas, form imaginary structures of environmental components.

Still other landscapes of the future may be possible by covering all surfaces of a room with television screens, thus creating infinite possibilities for bringing natural landscapes into the enclosure. In conjunction with video cameras and recording equipment, a person could live in a total video, natural environment. With computer access and a video synthesizer, an individual could play a keyboard and invent

visual effects beyond imagination--or call up scenes (the Grand Canyon, Yosemite, or any natural beauty spot he desired). By attaching the system to biofeedback devices, one could visually experience his own biological fluctuations. A prototype example of this phenomenon already exists in Disney World.

On a somewhat more mundane level, computers can design almost any kind of arrangement of natural components--grow forests, cut them, arrange roads to harvest them, or select the most scenic vista available in an endless array of vistas. At a more intimate level, the computer could be programmed to human moods by varying the color, light, sound, shape, and size of three-dimensional television scenes of natural environments.

RESEARCH NEEDS

And so what does this discussion of present and future natural environments mean in terms of research: The research problem that prevails is: How shall we organize, control, and coordinate public and private development so as to protect, maintain, and improve those landscape features that we value most? Such research should involve the biological, cultural, and esthetic characteristics of our national landscape.

New information and technology is obviously required to produce new ideas and approaches for enhancing the beauty of America, and its scope should not be restricted to Federal action. Research should look for ways to help and encourage state and local governments, institutions, and private citizens in their own efforts as well.

Some broad questions requiring answers are:

- o In the area of environmental/political conflicts what kind of quasi-public structure would best meet the needs for effective land use and reclamation for landscape values, as well as other needs of society?
- o What equitable and effective kinds of taxation and zoning would best support a landscape protection or maintenance policy that will meet the needs of the community while preserving the integrity of the environment?
- o What kinds of positive action should be taken by individual states to remove certain landscapes from the commodity market?
- o What kinds of landscape classification method: best meet the needs of resource planners and managers?
- o What means of public involvement work best in developing landscape protection and management policies?

- o In what areas is compromise most acceptable in conflicts between landscape quality and other social needs? That is, how can landscape values and needs be integrated with other land use goals?
- o What kinds of new technologies are emerging throughout the scientific world that will cause or help solve landscape planning and management problems?
- o What kinds of information and education techniques can be used to make the landscape meaningful ecologically--so the viewer is informed of the dynamics of its formation and how we need to depend on it for survival.

Underlying these broad questions are more specific challenges, such as:

- o What are the best ways to transfer relevant technology to management
- o What methods can be used to understand demands and the associated underlying benefits and values of our national landscape better?
- o What procedures can be used to inventory, maintain, protect, and augment the supply of landscape environments?
- o How can we design recreational facilities that blend harmoniously with the natural environment?
- o How can we coordinate landscape beauty supply-demand relationships with other resource uses?
- o How can we use a systems analysis approach to interlock the various methodologies described at this conference to develop comparative social, economic, ecologic and physical measures of natural landscapes.

The results of research along these lines will provide us with information to save our Nation's heritage of natural landscapes, it will show us ways to incorporate more of nature's charm and beauty into our urban landscapes, and it will help us to deal not only with man's life space but with man's spirit and dignity as well.

BENEFITS OF RESEARCH

What are the expected benefits of these kinds of research efforts? The benefits of research on natural beauty costs less than might be supposed, because such benefits are linked with many of the most practical ends of our society cherishes.

Beauty fosters safety. It dictates the control of flooding and erosion, and the landscaping and careful planning of, otherwise monotonous, highways to avoid fatigue and accident. Beauty is a component of mental well-being. It provides creative and wholesome outlets for the leisure society. Beauty is associated with economic efficiency; the soot and sewage that make for ugliness also make for wasteful expenditure in cleaning; smogs cause illness as well as displeasure.

Beauty can be a weapon in the fight against poverty, because an attractive community and countryside attract new enterprises, gifted people, and income from tourism. Beauty contributes to the real national income, for a person can derive great satisfaction from psychic relief and renewed spirit by seeing a mountain or from strolling in a fine city square. This psychic income, even though statisticians do not know how to quantify it, contribute to that person's welfare, and to the welfare of the nation.

Finally, living and working in beautiful surroundings is an objective which justifies itself. It was Thomas Jefferson who first observed that communities "should be planned with an eye to the effect made upon the human spirit by being continuously surrounded with a maximum of beauty." Beauty helps to make life and work worthwhile. And this very fact makes natural beauty immensely practical, for a citizenry that is nurtured by an inspiring environment will gain a heightened sense that its life is meaningful and ennobling.

LITERATURE CITED

Shafer, Elwood L, Moeller, George H., and Getty, Russell E., 1977. Future recreation environments USDA Forest Service, FS-316, Washington, D. C., 16 p.