
SUSTAINABILITY AND THE RESOURCE MANAGER OF TOMORROW



JIM L. BOWYER

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FOREWORD

Sustainability, a term that has become an important part of the forest resource vocabulary, has been defined in many ways. Simply put, it means meeting today's needs without compromising supplies for future generations. Many agree that sustainability is not new; that the concept of multiple use, long a cardinal rule in forestry, is synonymous with sustainability. In theory, I agree. In practice, I believe that sustainability is a bit more holistic and inclusive of non-timber values. Even though we have always expressed an interest in protecting values such as water, wildlife and critical habitats, the focus of multiple use has been mostly on wood production.

Dr. Jim L. Bowyer delivered our second Arkansas Forest Resources Distinguished Lecture on April 10, 1997. His presentation dealt extensively with sustainability in terms of world population trends, consumption, demands for wood products, and emerging new products and utilization technology. Dr. Bowyer also presented some interesting views on tropical deforestation and concluded his presentation with 10 challenges for the future. His paper is well worth careful reading.

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Jim L. Bowyer

Dr. Jim L. Bowyer is Director of the Forest Products Management Development Institute of the University of Minnesota Department of Wood and Paper Science. A specialist in global raw-material trends and life-cycle environmental analyses of materials, he served as head of the University of Minnesota Department of Wood and Paper Science from 1984 until early 1995.

He received a B.S. degree in forestry from Oklahoma State University (1964), an M.S. degree in forest products from Michigan State University (1966) and a Ph.D. in wood science and technology from the University of Minnesota (1973). Dr. Bowyer has served as president of the Forest Products Society (1993–94) and of the Society of Wood Science and Technology (1987–88). He is a fellow of the International Academy of Wood Science.

Dr. Bowyer is chairman of the technical steering committee of the Consortium for Research on Renewable Industrial Materials, a member of the Executive Board of the Tropical Forest Foundation, and he is a member of the Scientific Advisory Board of the Temperate Forest Foundation. He also serves on the Rocky Mountain Institute Systems Group on Forests.

Dr. Bowyer has written over 110 articles dealing with various aspects of forest products production and use, and he is coauthor of the leading introductory wood science textbook in North America, now in its third edition. He is a frequent speaker on topics related to the marketing, distribution and use of wood, and on the subject of environmental aspects of forestry, timber harvest and wood use.

Sustainability and The Resource Manager of Tomorrow

Jim L. Bowyer

Sustainable. Sustainability. These terms are the focus of increasing numbers of people who are concerned about the long-term effects of human activity on the global environment. “Is it sustainable?” is a question frequently posed to proponents of expanded commercial or industrial activity.

Many writers have sought to define the meaning of the term “sustainable.” Fundamentally, the issue is whether humans can continue on the current path for a long time to come. The question is this: Is the totality of human activity altering the earth’s biosphere and natural systems so as to degrade them over time?

In view of the high and growing interest in sustainability issues, it is something of a curiosity that people throughout much of the world appear unwilling to address in any substantial way the reality of population growth. What is most interesting about the exclusion of population growth from planning for sustainability is that the sustainability equation becomes extraordinarily challenging when rapidly rising human numbers are treated as a given. It is worthwhile to consider whether it is possible for the population to double, or more, while simultaneously maintaining the world’s biodiversity; the world’s remaining indigenous cultures, hunting grounds and sacred areas; the world’s current expanse of tropical forests.

Maybe.

How, then, do the answers to these questions change if the global economy quintuples within the planning horizon, something that the World Bank views as likely?

Forest land managers, government agencies, and wood-using industries in the United States and around the world are increasingly expected to protect and preserve forests and associated values, including biodiversity and indigenous peoples, while at the same time fulfilling the world's need for wood and wood fiber. They are expected to do this, moreover, by a public that is almost totally disinclined to face up to the daunting issues of population growth and rising consumption.

In 1964, I graduated from Oklahoma State University with a B.S. in forestry. Lyndon B. Johnson occupied the White House, having ascended to the presidency following the assassination of John F. Kennedy the previous fall. The mood of the country was somber, but the economy was relatively good, and jobs, especially jobs in forestry, were plentiful. Multiple use was the guiding philosophy for land managers across the nation, and the U.S. Forest Service was a well-respected agency and the employer of choice for forestry graduates. The forestry field was not without controversy, however, and management of roadless areas in the West was a hot topic among foresters. As a sign that changes in national forest policy were in the wind, the Wilderness Act was signed into law later that year. Nevertheless, the primary complaint of foresters in those days was that few people paid attention to what foresters did, and I recall discussions about what could be done to increase the attention of decision makers and the public to forests and forestry.

In the spring of 1964, the United States was home to 192 million people, and the global population was 2.9 billion. Some 33 years later, things are a bit different. Among the differences is the world population, which now stands at 5.8 billion—double what it was in 1964. The U.S. population is 267 million, 40% greater than in 1964. As population continues to rise, the impact of a growing populace becomes increasingly evident. So too does frustration about the increasing impacts on natural systems. Thus, within a relatively short time, concern about forests has become greatly magnified.

How did forests and forestry fare during the past third of a century? On the one hand, remarkably well. Overall, the volume of wood harvested in the United States increased from about 12 billion cubic feet (337 million m³) to about 17.6 billion cubic feet (499 million m³), a 48% increase. At the same time that harvests increased substantially, net forest growth exceeded harvest every year, with the result that standing timber volume in the United States increased by over 19%, or by 126 billion ft³ (3.5 billion m³).

The fact that standing timber inventories increased in the face of rapidly increasing consumption of wood underscores the successes of forest manage-

ment efforts across the nation. Moreover, technology gains in the wood science and technology arena have led to a substantial increase in the yield of usable products from wood that was harvested. Such gains are a major reason why harvests increased by (only) 48% at the same time that the domestic population and per capita use of wood rose by over 40% and 30%, respectively.

On a day-to-day basis, it is easy to overlook the magnitude of change that is occurring and the impact of that change on the big picture. With respect to advances in wood-using technology, consider the changes over the past third of a century:

Weyerhaeuser's Charles Bingham provided an example of what was accomplished in utilizing old-growth Douglas fir timber in Western Oregon between 1963 and 1973. The logs harvested on an acre of this timber land typically contained about 17,900 ft³ (507 m³) of wood. He reported that in 1963, the 17,900 ft³ of logs produced about 4600 ft³ of lumber, 3800 ft³ of paper, and 800 ft³ of plywood, for a total of 9200 ft³ (260 m³) of products. By 1973, that same 17,900 ft³ of logs produced 5000 ft³ of lumber, 1700 ft³ of plywood, 5900 ft³ of paper, and 1500 ft³ of paperboard, for a total of 14,100 ft³ (400 m³) of products. Thus, in only 10 years the usable products obtained from similar acres of Douglas fir increased by over 50%.

But advancements in technology did not cease in 1973. By 1983:

- *Waferboard*, a new high-strength wood composite panel product, was being commercially manufactured in Canada and the United States. This technology made it possible to produce high-strength panels from small-diameter trees, panels that were fully substitutable for plywood.
- *Wood structural I-beams and laminated veneer lumber (LVL)* were being sold commercially. This development permitted the use of small-diameter trees in making large-sized structural timbers and dimension lumber.
- *Centerless lathe technology* for producing veneer had been introduced. This technology allowed the use of logs that previously could not be used in making veneer. This also allowed the peeling of a log down to the center, thus increasing the volume of veneer that could be gleaned from a log.
- Technologies for producing *lightweight coated papers* had been developed in Europe.

By 1993:

- *Best Opening Face (BOF) technology*, a system developed at the U.S. Forest Products Laboratory for maximizing lumber yield from logs using automated scanners and computer-interfaced production equipment, was used in half of U.S. soft-

wood sawmills, accounting for at least 75% of production.

- *Parallel strand lumber (PSL)* was commercially available. PSL is another product that allows the use of small trees for production of large-sized lumber and structural timbers.
- The use of *fingerjointing* to produce softwood studs from small pieces of wood that had been previously wasted or burned for power was common practice.
- *Veneer overlay technology* allowed the use of thin veneers over complex profiles of substrate materials to produce high-quality molding, trim, and raised panels.
- A *wood polymer composite*, made from 100% recycled polyethylene and wood waste, was commercially available for building and landscape applications.
- *Postconsumer recovery of wastepaper* in the United States for reuse in paper and fiber products manufacture approximated 40% of domestic paper production.

By 1996:

- An *extrudable wood waste/waste plastic composite* was developed and commercialized by the wood-framed window industry. Engineered, extruded profiles designed to replace solid wood sill plates and frames offered superior strength and durability at a fraction of the weight.
- *Postconsumer recovery of wastepaper* in the United States totaled more than 43 million tons, amounting to 45.1% of domestic production. Over 32 million tons were recycled in U.S. paper and paperboard mills; this translates to a 35.2% wastepaper utilization rate.

Although accomplishments of the forestry and wood science professions over the past third of a century are many and a reason for celebration, there are reasons for concern as well.

Perhaps leading the list of concerns regarding forests worldwide is the ongoing specter of tropical deforestation, today estimated at about 42 million acres (17 million hectares) annually. The fact that the tropical forests house much of the world's biodiversity accentuates this concern. Rising human populations in the world's tropical regions are affecting forests in a variety of ways, not the least of which is the conversion of large areas of forests to agricultural land. Unfortunately, the rate of tropical deforestation has accelerated over the past third of a century, with a marked increase in clearing over the latter half of the period. The rate of tropical deforestation is currently estimated at 0.9% annually, compared to 0.6% just a decade ago.

A second concern vis-à-vis forests globally is that consumption of wood is

rising steadily, with no end in sight to increasing demand. Over the past 33 years, the global harvest of wood has increased from approximately 71 billion ft³ (2 billion m³) to over 127 billion ft³ (3.6 billion m³). With global per capita consumption of wood remaining nearly constant over the period (from 0.67 to 0.69 m³), consumption of wood has risen almost exactly in parallel to world population. It has been recently estimated that if per capita demand remains the same as it is now, rising global demand for wood in the coming years will mean that the equivalent of a new British Columbia will have to be brought on line every year for the next 40 to 60 years simply to meet expected increases in demand. A related concern is that demand for most other raw materials has continued to rise, with demand for many rising faster than for wood. The picture is further complicated by the fact that deposits of many basic raw materials lie beneath portions of the world's forests.

A third concern, particularly of those who believe that forests can provide important raw materials in a sustainable way, is that many people have come to view harvesting as an activity destructive to the environment and something to be minimized or avoided altogether. Such attitudes are evident in virtually every nation of the world, despite the fact that temperate forests have been expanding in both volume and area coverage over the past 33 years.

Regarding the United States in particular, concerns about forests and anti-forest-harvest sentiment began to build in the 1960s and have grown to an historic or at least a modern-day high point. In addition, the U.S. Forest Service went from being a highly respected governmental agency in the early 1960s to an agency viewed by many as an enemy of the forest rather than a protector of it. As a result, the current administration has markedly reduced harvest activity on federally owned lands, and one of the nation's largest environmental organizations has taken a stance against any harvest activity in the national forests. Moreover, citizens' initiatives in many states, regions and localities appear to be aimed at stopping or drastically limiting periodic harvesting within forests in all ownership categories.

It should be noted that citizen initiatives within the United States and elsewhere have not been limited to forests. Proposals for increased extraction of raw materials of all kinds have met with rising environmentally based opposition from citizens over the past 33 years, to the point that in the United States decisions are made on an almost daily basis and at virtually all levels of government, decisions that serve to restrict the extraction and processing of raw materials within the nation's borders.

Opposition to domestic gathering and processing of raw materials was given a bit of momentum in the early 1980s with the publishing of John Naisbitt's best seller *Megatrends*. Naisbitt presented the view that the United States had passed from an industrial society to an informational society, and that jobs would increasingly be focused on the business of developing and conveying informa-

tion to the rest of the world. It was all the encouragement that some needed to launch a vigorous attack on what some articles have subsequently referred to as an “extractive mentality.” A look at what has happened since the early 1970s makes Naisbitt’s observations difficult to dispute. The United States has moved into the computer age, and the impact on the economy, jobs and people’s lives has been tremendous. However, one thing that Naisbitt neglected to point out is that a high-consuming nation such as the United States tends to consume massive quantities of raw materials whether it is an “industrial-oriented society” or not.

Further, at least three fundamental trends appear to have escaped attention altogether:

1. The United States changed from a raw material-exporting nation in the 1950s to a net importer of raw materials on an increasingly massive scale by the 1970s, ‘80s and ‘90s.
2. Global demand for many basic raw materials is rising more rapidly than population growth.
3. Demand for basic raw materials is growing more rapidly in developing nations than in the United States and other developed nations.

Where will the next one-third century take us? A key question is whether society’s leaders will be successful in changing the course of current trends. Assuming that present trends continue, it appears that the world will add another three billion people and have to deal with all of the implications of that growth. It appears likely that the U.S. population will rise another 30 to 40%. More space, food, housing, clothing, energy, and raw materials of all kinds will be needed. While this is occurring, environmental concerns will be magnified even further. Sustainability questions will loom large. And in the absence of a new approach to environmental planning, disagreements over what to do may become even deeper and conflicts sharper. Interest groups may become larger, better financed, and less willing to compromise. Should these things come to pass, the environment and the global economy are likely to suffer in comparison to what might be achieved through reasoned, systematic, integrated planning.

In view of these possibilities, what should a person, either working in or about to enter the environmental professions, do to prepare for the challenges ahead? What can an individual do to contribute to the long-term solutions? The following is my top 10 list:

- Become as informed about environmental issues as possible. Read widely. Be receptive to new ideas. Search out opinions representing all sides of an issue, and avoid labeling those who may disagree.

- Become firmly based in science.
- Question everything you read or hear. Make every effort to find out what is true and what is not.
- Challenge misinformation wherever it occurs, and take steps to correct the record at every opportunity.
- Pay particular attention to what children are being taught about environmental issues. Young people will assume decision-making roles in a remarkably short time, and what they learn or fail to learn at an early age will profoundly influence their thinking.
- After careful thought and study, develop a basic philosophy or set of values vis-à-vis the environment. Continue to challenge and refine these views.
- As a natural resource professional, seek to lead the discussion regarding sustainability rather than letting others define the topics and boundaries of debate and planning.
- Ensure that the realities of population and economic growth are factored into environmental planning.
- Learn to consider the potential global implications of management decisions.
- Become part of the solution and not part of the problem.

If the world is to move to a sustainable mode, innovative thinking, careful planning and coalition building will be needed. The United States and the world, and certainly the global environment, need visionary leaders who can move beyond stridency and gridlock. Are you, or will you be one of them? Or, will you simply add to the noise and confusion of the coming decades? In large measure, the choice is yours.
