

SUSTAINABILITY OF THE ASPEN RESOURCE

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I wish to make some brief comments on the sustainability of aspen in forest ecosystems in relation to the recent expert review panel report on forest management in Alberta (Expert panel on forest management in Alberta 1990) and the broader concepts of sustainable development that we hear so much about.

When I refer to aspen, I include both the deciduous and mixedwood forest ecosystems, because aspen is an important constituent of both. I am convinced that we will be managing the species in both contexts in the future. In addition, mixedwood ecosystems are well suited to the integration of a variety of uses on a forest land base where the public expects such integration.

The report of the expert panel represents a consensus of opinion of four individuals with diverse backgrounds and experience: Bruce Dancik, an academic and forest genetics specialist; Bob Udell, an industrial forest manager and strategic planner; John Stelfox, an Alberta wildlife biologist and consultant with many years of experience; and myself, a researcher with a background in silviculture research and development transfer.

As far as I know, the report has not been suppressed, as was suggested earlier today. We do not consider ourselves infallible, and the recommendations, some 132 in all, are not the modern equivalent of the Ten Commandments.

They were derived through lively debate among the authors and through consultation with a wide variety of resource specialists. We hope they provide a basis for ongoing debate and a change for the better in forest ecosystem management in Alberta.

In the report, we adopted a consistent theme of forest ecosystem management that reflects the concepts of sustainable development right down to the operating level, as reflected in world, Canada, and Alberta conservation strategies. These grew out of a variety of documents in which sustainable development has been defined and redefined in recent times. For example: the World Commission on Environment and Development (Brundtand Report) 1987 states that sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." We must modify our approach to "economic growth" by factoring in "environmental consideration." Rees (1990) notes that sustainability in the real world means living on the interest. It recognizes the pathological relationship between environment and economy; the ecology limits to material growth and population growth; and that the economy is a dependent subset of the ecosphere. Sustainable economic activity is limited by the health and productivity of the ecosystem. It states that the harvest rate for renewable resources must be held to average rates of production and not be responsive to ever-increasing market demand, or we will liquidate the ecological capital stock. The Economist (1989) notes that the phrase "sustainable development" has no clear meaning, with arguments ranging from the need to maintain the current stock of natural resources (trees, soil, wildlife, water...) to the suggestion that it does not imply the maintenance of any particular

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mix of human, physical, or natural assets, but that the composition of the asset base will change as development proceeds, through substitution.

This approach fails when substitution is not an option, for example, when dealing with the ozone layer or species extinction.

Evidence that there are many meanings of "sustainable development" is its adoption by wild-eyed preservationists and resource exploiters alike.

Gordon Barkerville (1990), in his address to the National Forestry Forum on Sustainable Development and Forest Management, noted that sustainable development requires three things: a definition of what is to be sustained in both quantity and quality; a forecast of actions needed to achieve sustainability; and a forecast of the timing of these actions, their geographical distribution, and responses to them (feedback).

Some of the things we require in order to ensure aspen sustainability in aspen and mixedwood ecosystems include the following:

1. an understanding of key underlying ecological processes—hydrology, the carbon cycle, nutrient cycles, and ecological limits of productivity (see Zoltai et al. 1990);
 2. an adequate inventory of the aspen resource, within an ecological site classification framework linked to key processes and that provides a baseline for assessing management practices aimed at sustained productivity;
 3. policies that provide a secure land base on which to produce aspen. Clear management jurisdiction is needed on the land base, and the trade-offs between aspen and conifers and other hardwoods, especially on the mixedwood land base, need to be determined. One must allow for land-base impacts of non-forestry developments like utility corridors, oil and gas, and coal mining;
 4. realistic stocking and growth standards for aspen in pure and mixed stands, in terms of ecological units;
5. monitoring, feedback, and interpretation of impacts of forestry operations such as roads, harvesting, and site preparation upon aspen productivity within the boundaries of the secured land base. This includes adoption of pre-harvest silviculture prescriptions (PHSPs) or similar tools and tools recognizing the implications of maximum allowable site degradation (MASD) as a result of forestry operations as is currently done in B.C. (B.C. Silviculture Regulation 147/88, O.C. 593/88);
 6. assessing the probability of occurrence and impacts of insects, diseases, fire, and mammals upon aspen.

I am sure you will recognize the similarity between these requirements and those listed earlier today by Rick Bonar as necessary for successful integrated resource management (IRM): inventory, planning, implementation, and feedback.

Here is a recap of some key requirements for sustainable aspen and mixedwood ecosystem management.

1. Our approach must be sound, based on an understanding of or at least a concern for ecological processes. Our approach should be adaptive and subject to continuous review in the light of new scientific information, technology, and social factors. In this regard, although there is a large body of aspen knowledge, as noted by many of our symposium contributors, there are also many gaps, and we must be prepared to act in a conservative manner, and on principle, where we are ignorant of facts. For example, we should take the point of view that it is better to prevent environmental impacts of questionable effect than to try to mitigate those effects after damage is done.
2. Suitable tools are needed, including decision support systems (DSSs) and geographic information systems (GISs), as demonstrated in principle and in some initial applications in the symposium poster area.
3. Effective implementation must include adequate guidelines, ground rules, and training to get it done well. Demonstrations from which we can all learn are needed.

4. Adequate monitoring and feedback will facilitate change and adaptation.
5. Continuing communications with and education of participants involved in the solution to the IRM puzzle is required. Yes, we need more public involvement.

Although we could spend time debating inadequacies in our understanding of the requirements for sustainable development, we must move away from the abstract and begin the process. Aspen provides a wonderful opportunity for foresters to practice sustainable development since it is known to be sustained in unmanaged fire-driven ecosystems, and we know enough about management-related effects to begin the effort. The result of our work will be etched in the landscape for all to see, and many people are watching, including the land owner! The stakes are high and include the professional credibility, not just of foresters, but of all resource management professionals.

LITERATURE CITED

- Barkerville, G. 1990. Opening address. Pages 6-7 in Canadian Council of Forest Ministers. Sustainable development and forest management. Proceedings of a national forum held Feb. 12-13, 1990, Halifax, Nova Scotia.
- The Economist. 1989. Inheriting the Earth. The Economist Newspaper Ltd., Sept. 16, 1989.
- Expert panel on forest management in Alberta. 1990. Forest management in Alberta: Report of the expert review panel. Alberta Energy/For., Lands Wildl., Edmonton, Alberta. Publ. I/340.
- Rees, W.E. 1990. The ecology of sustainable development. *Ecologist* 20(1):18-23.
- Zoltai, S.C.; Singh, T.; Apps, M.J. 1991. Aspen in a changing climate. In S. Navratil and P.B. Chapman, editors. Aspen management for the 21st century. Proceedings of a symposium held Nov. 20-21, 1990, Edmonton, Alberta. For. Can., Northwest Reg., North. For. Cent. and Poplar Counc. Can., Edmonton, Alberta.

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