A Comment on Models and Modelling in Fire/Fuel Management

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"Modeling is fine as long as you know what you are doing."

General remark

made to the author by a retired University of Alberta forestry professor a few years ago.

The April 1988 issue of the Journal of Forestry published an article by John J. Garland (1988) that I have often handed out at various training courses and workshops (e.g., Alexander 2000) to impress upon folks the very sentiment expressed above. While the application does not specifically deal with fuel and/or fire management issues, it somehow seems important nowadays for the messages contained in this article to get wider circulation. So, towards this end, a copy of Garland's (1988) article is reproduced below for the benefit of visitors to the FERIC Wildland Fire Operations Research Group website.

I appreciate the permission of Mr. Garland for the opportunity to reproduce this article here.

At the time the article referred to here was written, John J. Garland (pictured here in a recent photo) was a Timber Harvesting Extension Specialist in the Forest Engineering Department of Oregon State University, Corvallis. He has since obtained a PhD degree and obtained full professor status in the department. He maintains that "After more than 30 years at OSU working with models of various kinds, I still feel the same sentiments as in the article".

Scene: Courtroom of a district judge, a learned jurist especially noted for his natural-resource decisions. A resource professional who is in mid-career stands before the bench.

Judge: I have read the complaints against you. How do you plead? Guilty or not guilty?

Resource Professional: I don't understand what I'm doing here. I was just doing my job!

Judge: You are charged with seven offenses:

- Inappropriately using "models" for your natural-resource decision-making.
- Using these models outside the range of data for which the model was built.
- Using models that have not been validated or thoroughly tested for consistency.

- Failing to identify the assumptions upon which the models were dependent.
- Building you own "model" by picking and choosing relationships out of thin air or based on very little research.
- Overextending the results of these model outputs by making decisions about thousands of acres with models that oversimplify the relationships among natural variation, time, and space.
- Impressing your colleagues with these models to the point where they believe anything you do with a computer must be correct. You misrepresented your intelligence just by speaking computerese.

How do you plead?

Resource Professional: I'm not guilty. Some of the models I used weren't even mine. They were recommended to me and I didn't understand how they worked. Researchers should have validated those models before they made them available. Besides, it's a matter of policy at my organization to use models. They came from higher up. And about the one I put together: I didn't have the time to really do it right. I used the best information available. For the rest, I asked the specialists for their opinions. I was just doing what everybody in the organization was doing.

Judge: These reasons are not sufficient for dismissing the charges. There is substantial evidence against you. Not only did you extend the model decisions to thousands of acres at large financial expense and with adverse effects on the resources, you also never checked to see how these models worked in practice. Instead of getting your boots muddy, you buried your head in the computer and came up with reports, statistics, and graphs to impress supervisors and colleagues. The enormous time spent on dubious models kept you and your organization from decisions incorporating on-site conditions. Misuse of poor models actually prevented better models from being developed.

Resource Professional: Nobody ever told me I was doing anything wrong. I did have some questions and concerns, but I had to get the job done.

Judge: That is the essence of the professional statutes. (Will it come to regulation of professionalism?) The appropriate use of models and computer technology must be blended with a human system of resource management. Perhaps you should consider a common-sense approach to resource management that includes the following list:

- Identify land-management goals and objectives.
- Determine the compatibility of forest operations and associated best management practices with land-management goals. Resolve conflicts of facts and values in advance of operations.
- Construct a contract for a sale or for services that reflects best management practices.
- Provide training to land managers and contract administrators so their expectations are aligned with actual, reasonable results. Identify potential areas of difficulty for heightened awareness and enforcement actions.
- Train contractors and operators to the level of the "machine operator" in how best management practices are developed and executed.
- Develop an enforcement system with adequate contractual clout and sufficient supervision. Seek ways to reinforce positive actions by contractors with appropriate rewards.
- Develop a system to monitor land management based on important and adequate measurement, not a pseudoscientific, computer-based approach.
- Provide for auditing of operations and periodic monitoring without advance warning by outside experts.
- Review and revise policies, procedures, and contracts as needed using the best scientific information available.

Resource Professional: There seems to be plenty of opportunity for using high technology in that approach.

Judge: Indeed! Good, professional resource management requires that kind of blend. Now in the matter before me …

(The verdict is still pending, but the resource professional is buying a new pair of boots.)

References

Alexander, M.E. 2000. Fire behavior knowledge gaps (& research needs) pertaining to ecosystem management. Invited paper presented at the Workshop on Integrated Resource Management in Ecosystems Dominated by High Intensity Fire; Challenges, Tools and Solutions (November 8-10, 2000, Edmonton, Alberta). 6 pp.

Garland, J.J. 1988. My Chance: A modeler's day in court. Journal of Forestry 86(4): Back inside cover.

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