The Banff Statement


Banff, Alberta, Canada. Friday September 8th, 2000

Four hundred interested scholars and practitioners met at the Banff Centre for Conferences in Banff, Canada from September 3-8th, 2000 at the Fourth International Conference on Integrating GIS and Environmental Modeling. In a plenary meeting of all conferees, the following statement was unanimously confirmed as a summary of the accomplishments at the meeting.

We consider that effective solutions to environmental problems cannot come without significant advances in the understanding of human, engineered and biophysical environmental systems, and an appreciation that these systems are all components of a single integrated system that includes mankind. We believe that beneficial scientific solutions will derive from building new and better analytical tools by combining the strengths of models and geographic information systems, and from applying these hybrid tools across disciplines, scales, and user communities. We believe that significant progress has occurred in the integration of GIS and Environmental Modeling since the origin of the GIS/EM meetings in 1991. We have identified the following opportunities for eliminating the major barriers to further progress in integrating modeling and GIS:

1. Modelers and GIS analysts should seek to develop transdisciplinary behavior, to engage in open sharing of data and methods, and to seek collaboration between the biophysical, socio-economic, and ecological sciences so that coupled models of holistic systems can be developed. In particular, the role of humans in environmental systems should receive additional attention from science.

2. Models must be developed so that they can be applied across spatial scale, and the role of scale variation should be explicitly a component of models themselves. Environmental models demand adequate descriptions of the quality, uncertainty and accuracy inherent in their input data. Similarly, models themselves should be described by metadata so that systems of models can become interoperable. The propagation of error through the model, while perhaps not quantifiable, should be assessed objectively, and communicated to the users of model predictions.

3. Integrating modeling and GIS requires an increased awareness of new technologies and their potential impacts.

4. Integrated modeling demands that stakeholders, policy-makers, the marketplace, and alternative strategies be an integral component in modeling.

5. Users of spatial models need to develop a new work ethic termed “honesty in modeling.” This code of ethics must include accounting for uncertainty and error in predictions, recognition of alternative management and intellectual strategies and traditions in problem solving, and working to include user communities in the process. The GIS/EM interest group should work actively to engage scholars in the developing world, and encourage them to develop effective solutions to local problems by sharing methods and data, perform educational outreach, and provide intellectual support.

6. More effective use needs to be made of education, training, and new technologies to develop and disseminate examples of best practices in GIS/EM. This should include the development of core educational curricula.

7. Problems need to be approached using both top-down and bottom-up methods, and integrated assessments and analyses should replace ad hoc solutions.

The GIS/EM community should seek to provide logical arguments and case studies documenting why modeling integrated with GIS can improve the world in which we live.

Approved. Attendees of GIS/EM4
Banff, Alberta, September 8th, 2000