

Addressing the Future through Understanding Critical Uncertainties and Linked Process Models

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Alternative futures analyses conducted worldwide have focused on the integration of land use planning tools with biophysical and socioeconomic assessment techniques. The overall assessment process begins by identifying the critical biophysical and socioeconomic uncertainties that face the region of interest. Further development of the critical uncertainties into an assessment process is done by answering key questions directed at model development. The questions asked centre on six basic concepts that involve the landscape. These include representation, process, evaluation, change, impact and decision. Addressing the questions helps provide information on how a region is described, operates, may change, and is working.

Once the questions are addressed, a modelling approach may be developed consisting of linked processes where output from one process may be input into another. Thus, the approach allows for the formation of individual models where multiple process models may cascade and thereby influence subsequent processes. The cascade of process models can then be executed to determine the level of impact on specified biophysical or socioeconomic resources using as input land use/land cover data and policy choices. Alternative policy choices, or scenarios, may then be input into the process models to assess impacts. The impacts among the different scenarios can then be compared and a change analysis done to determine the relative change among different scenarios. The suite of scenarios allows for a comparison of alternative policy choices and how they might impact a region.

The elicitation of critical uncertainties following stakeholder input in the San Pedro River Watershed of Southeast Arizona, United States, and Northern Sonora, Mexico serves to illustrate the concepts discussed. Examples of the resulting scenarios, the alternative futures, and their impacts on surface and subsurface hydrology, landscape ecological pattern, and biodiversity are given.

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