Interdisciplinary Modeling for Aquatic Ecosystems Curriculum Development Workshop

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Abstract: The science and management of aquatic ecosystems is inherently interdisciplinary, with issues associated with hydrology, atmospheric science, water quality, geochemistry, sociology, economics, environmental science, and ecology. Given the interdisciplinary nature of the issues, it follows that interdisciplinary approaches to addressing them should be productive (Gordon et al. 2004). However, such truly interdisciplinary work is often difficult to implement. One of the ways to approach the diversity of needs in managing and understanding aquatic ecosystems is to employ mathematical modeling. Models based on available scientific knowledge and theories can be used to bridge the gap between the ability to scientifically predict with reasonable certainty, and the need to make decisions (Thomann 1998). Despite the strengths of interdisciplinary modeling approaches, there are several impediments to the implementation of successful interdisciplinary modeling of aquatic ecosystems (e.g., different spatial and temporal scales (Nilsson et al. 2003); different degrees of uncertainty of data and models (Crockett 1994; Minns et al. 1996); lack of awareness of what modeling options are available, difficulties in communication between disciplines (Cullen 1990; Nicolson et al. 2002; Nilsson et al. 2003); lack of education and training in interdisciplinary approaches (Nicolson et al. 2002; USGS 1999, etc.). To address some of these impediments, a workshop was held in July 2005 in which 21 educators and 23 students from different disciplines and 13 institutions interacted to develop a curriculum for a graduate-level course on interdisciplinary modeling for aquatic ecosystems. The overall objective of the course is to *engage interdisciplinary discourse in modeling aquatic ecosystems*. The successful implementation of the curriculum will specifically address the impediments identified above by introducing students to models that are available in different disciplines and how such models might be applied together to address aquatic ecosystem issues, addressing issues of variability and uncertainty in implementing interdisciplinary approaches, and giving students experience in working in interdisciplinary teams to apply interdisciplinary modeling approaches to increase knowledge about aquatic ecosystems. The workshop consisted of pre-workshop reading materials, 50-minute lectures on disciplinary modeling approaches or special topics related to interdisciplinary modeling or curriculum development, model exercises, a field trip, and an off-site dinner. In addition, students received 1 or 3 graduate credits for the work they did that was associated with the workshop. Outcomes from the workshop included recommended course specifications that resulted in a course outline. This presentation will summarize the key observations of the workshop and information about the curriculum.

References

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