An Integrated Modeling Framework for Analyzing Wetland Policies: Balancing Ecosystem Services and Economic Factors

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Executive Summary:
In the last two centuries nearly half of all wetland acres in the conterminous United States have been drained and/or filled in efforts to "reclaim" these lands for agriculture and other "more productive" uses. Wetland conversions have been even more extensive in California, which has lost approximately ninety percent of its historic wetlands. Many of the benefits of un-impacted wetland systems were lost in the process. Wetlands can contribute to water quality enhancement, flood control, recreation opportunities, provision of habitat for valued species, contribution to' the stability of global elemental cycles, and more. These benefits, or "ecosystem services," from wetlands are increasingly being recognized and are motivating wetlands preservation and conservation efforts. For example, CALFED, a collaborative planning effort between federal and state agencies in California, is charged with restoring the natural functions of the San Francisco Bay-Delta ecosystem, and wetland restoration is a central component of this high profile activity. However, development pressure on wetlands remains high in California and throughout the U.S. Many recent economic analyses of trends in wetlands conversion indicate that the costs to society from further wetlands conversions exceed the benefits, so wetland conservation and restoration efforts will often be justified from an economic as well as an ecological point of view. Unfortunately, policy makers currently do not have the tools to effectively incorporate these ecosystem services into on-the-ground wetlands management decisions. Insofar as these considerations do find their way into wetlands policies, it is usually in an uncoordinated fashion, with different agencies focusing on different wetland characteristics or ecosystem services. For large scale planning and restoration efforts, such as the one headed by CALFED, explicitly incorporating wetland ecosystem services into the planning process can provide a rational basis for-prioritizing conservation and restoration efforts.

The overarching goal of this research is to create and operationalize a holistic framework for analyzing various ecosystem services provided by wetlands and incorporating this information into wetland policy and management decisions. This framework will aid wetlands managers in making these difficult decisions by giving them the means for empirically investigating the many region-wide trade-offs involved in wetlands policy decisions.