

Modeling and Natural Resources: Science and the Resource Management Agencies

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A model is a succinct representation of a usually complex system designed to show its important processes and components. Models range from conceptual, sketches or cartoons of the links between features and processes, to numerical integration of coupled processes described by differential equations. As an essential part of the scientific method, models often incorporate much of what is known about a subject and provide the only practical way of testing hypotheses for large natural systems. In science models are used to further understanding, make predictions, and communicate findings. Management of natural resources in the Mojave Desert is largely the domain of federal and state agencies in the executive branch of government, which by their nature are political institutions. Land and natural resource management agencies are expected to make decisions on the basis of the best available science and thus become important users of modeling results. As science enters the political realm, however, the communication role of models becomes more important while the role of understanding may be more superficial and the uncertainty of predictions emphasized. Agencies commonly use models to influence political or economic outcomes for the purpose of natural resource management as illustrated by three case examples. In each of these cases the role of climate change is paramount even though in two of the examples the models were developed for other reasons. For the first example I comment on how agencies have responded to the General Circulation Models that have elucidated the human role in climate change. Given that drought is a probable result of climate change in the Mojave Desert, I review how agencies have used numerical groundwater flow models for water resource development issues. As the third example I discuss a desert tortoise habitat model commissioned by land management agencies of the California Deserts and suggest a next step for this effort.

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