

# Center for Community-Based Resource Management (CBRM)

Natural Resources Institute, University of Manitoba

## CBRM Database

|                                |  |                      |             |
|--------------------------------|--|----------------------|-------------|
| <b>Date:</b>                   | <b>2013-03-01</b>  | <b>Entry Number:</b> | <b>1258</b> |
| <b>Case Study Name:</b>        | System dynamics modeling for community-based water planning: Application to the Middle Rio Grande  |                      |             |
| <b>Author:</b>                 | Tidwell, V.C. , Passell, H.D., Conrad, S.H., and Thomas, R.P.  |                      |             |
| <b>Document Type:</b>          | Published report   |                      |             |
| <b>Year:</b>                   | 2004   |                      |             |
| <b>Language:</b>               | English  |                      |             |
| <b>Document Location:</b>      | <i>Aquatic Sciences</i> , 66(4), 357-372   |                      |             |
| <b>Full Citation:</b>          | Tidwell, V. C., Passell, H. D., Conrad, S. H., & Thomas, R. P. (2004). System dynamics modeling for community-based water planning: Application to the Middle Rio Grande. <i>Aquatic Sciences</i> , 66(4), 357-372. doi: 10.1007/S00027-004-0722-9 |                      |             |
| <b>Region:</b>                 | North America  |                      |             |
| <b>Country:</b>                | United States  |                      |             |
| <b>Ecosystem Type:</b>         | Semi arid  |                      |             |
| <b>Social Characteristics:</b> | Urban communities, along with several smaller communities  |                      |             |
| <b>Scale of Study:</b>         | Regional   |                      |             |
| <b>Resource Type:</b>          | Watershed  |                      |             |
| <b>Type of Initiative:</b>     | Research-driven project  |                      |             |
| <b>Community-Based Work:</b>   | Resource management, development planning  |                      |             |
| <b>Keywords:</b>               | Decision support modeling; stakeholder involvement; interactive modeling   |                      |             |
| <b>Summary:</b>                | The watersheds in which we live are comprised of a complex set of physical and social systems that interact over a range of spatial and temporal scales. These systems are continually evolving in response to changing climatic                   |                      |             |

patterns, land use practices and the increasing intervention of humans. Management of these watersheds benefits from the development and application of models that offer a comprehensive and integrated view of these complex systems and the demands placed upon them. The utility of these models is greatly enhanced if they are developed in a participatory process that incorporates the views and knowledge of relevant stakeholders. System dynamics provides a unique mathematical framework for integrating the physical and social processes important to watershed management, and for providing an interactive interface for engaging the public. We have employed system dynamics modeling to assist in community-based water planning for a three-county region in north-central New Mexico. The planning region is centered on a ~165-km reach of the Rio Grande that includes the greater Albuquerque metropolitan area. The challenge, which is common to other arid/semi-arid environments, is to balance a highly variable water supply among the demands posed by urban development, irrigated agriculture, river/reservoir evaporation and riparian/in-stream uses. A description of the model and the planning process are given along with results and perspectives drawn from both.