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Alternate Futures for Changing Landscapes: The Upper San Pedro River Basin in Arizona and Sonora, by Carl Steinitz, Hector Arias, Scott Bassett, Michael Flaxman, Tomas Goode, Thomas Maddock III, Dave Mount, Richard Peiser & Allen Shearer

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species. There is a burgeoning economic literature on these topics (Swanson 1994, Barbier 2001, Hughey et al 2003), but readers will not find any references to that research in this book. The index contains no entries for cost, cost effectiveness, economics, economies of scale; economies of scope, effectiveness, or opportunity costs.

To their credit, some chapters of this book focus on these issues, most noticeably chapters two and ten. Chapter two explores which species are likely to become at risk, why they are more likely to become at risk, and how the effectiveness of management and implementation strategies can be assessed. Chapter ten focuses on Decision Theory and how it has been used in conservation, and on monitoring and performance evaluation. These two chapters are likely to be of considerable value to resource management and funding agency readers who are concerned with where their efforts and scarce resources are most likely to contribute to species preservation. Conservation biology is likely to become more effective if it asks more conservation economic questions and if it builds on insights from that research. Perhaps the next volume on research priorities will report good progress in that direction.

References:

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Alternative Futures brings together many of the interconnected strands of issues related to the Upper San Pedro River Basin and describes the future ramifications for each of a variety of policy options. By utilizing an innovative GIS-based simulation modeling approach, this in-depth work is like a crystal ball that allows one to gaze into the future. The book allows the reader to select the issues that are of most value
and, with words, pictures and maps, gives a view of what the future holds.

Much has been written over the past few years about various aspects of the San Pedro River in southern Arizona. In particular, the U.S. Environmental Protection Agency (EPA), USDA Agricultural Research Service (ARS), Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora (IMADES), and the French Institute of Research and Development (IRD) have engaged in extensive studies to assess ecological risk under the interagency Semi-Arid Land-Surface-Atmosphere (SALSA) project. A wide array of articles and conference papers were written based on data collected from the SALSA research on the San Pedro River. Articles produced have included such topics as: evapotranspiration, heat flux, vegetarian water use, grassland modeling, soil moisture evaluation, and many other related subjects.

The San Pedro River originates in Sonora, Mexico, with headwaters near the mining town of Cananea. The largely perennial river flows northward to its confluence with the Gila River. In 1989, the riparian system in the U.S. portion of the Upper San Pedro Basin became the first congressionally designated Riparian National Conservation Area. The area, managed by the Bureau of Reclamation, was established to help protect this critical zone of the river. The San Pedro River is nationally recognized as an important and unique riparian area because of the diversity of its flora and fauna. The San Pedro River System contains the most extensive surviving expanse of broadleaf riparian forest in North America. This forest serves as a significant corridor for migratory birds that winter in Mexico and breed during the summer months in the United States and Canada. In 1996, the American bird Conservancy designated the Conservation Area as a Globally Important Bird Area, to recognize the River's importance to millions of migrating birds as well as many rare breeding birds.

Environmental groups such as the Center for Biological Diversity have concerns regarding the long-term viability of the San Pedro riparian system and ranching in the face of continued population growth. Ground water sustains the riparian system during the dry months of the year. The same ground water sustains much of the ranching industry in both the U.S. and Mexican portions of the San Pedro. Although groundwater reserves in the region are estimated to be in the millions of acre-feet, the river survives at the top of the water table. Lowering the water table through groundwater pumping is a significant threat to the riparian habitat and flow in the river.

The Upper San Pedro River study area was well chosen by the authors as a prototypical site representing the struggle between the forces for conservation and the forces for development. The city of Sierra Vista is bounded on the west by the towering Huachuca Mountains and
on the east by the perennial San Pedro River. It is an attractive location for people to live in or retire to. The tragedy is that the more people that move to the area, the more water is consumed that would normally reach the river aquifer and the more likely it becomes that the river will stop flowing. The situation is further complicated by two considerations: (1) the headwaters of the river lie in Mexico and (2) Fort Huachuca, a 73,000 acre military base located in Sierra Vista, accounts for 54 percent of the water used in the Sierra Vista area. While the growth rate in Sierra Vista and Ft. Huachuca averages only 1.4 percent per year, areas south of the city are growing at 58.4 percent over the same decade.

Though the authors rightly do not delve into what specific policies should be adopted to preserve the river, they do point in the general directions that policy makers should be moving. The study concluded that even the most optimal scenario of restricted population growth and reduced water use results in a loss of groundwater storage and increased drying of the San Pedro River. The most important factors identified that will affect the river, in order of significance, were (1) agricultural water use and (2) development constraints. Population growth in Sonora and activities at Fort Huachuca were considered to have a small impact when compared to the impacts of agriculture and urbanization in the Arizona portion of the basin.

The authors examine three main scenarios for change. The first, called PLANS, is a model that extrapolates what would happen if the present trends continue into the future. PLANS is based on current plans for development in Arizona and Sonora and a forecast population of 95,000 in 2020 for the Arizona section of the study area.

The second scenario, called CONTRAINED, looks at the results of a scenario in which activities result in less water being used than is anticipated. It assumes a 50 percent lower than forecast population growth in Arizona, projecting a population of 78,500 in the area by 2020. Development is concentrated in existing developed areas. It assumes very large lot residential development.

The third scenario, called OPEN, examines the ramifications of a model in which conditions worsen, resulting in increasing use of San Pedro River water. The OPEN scenario assumes a 50 percent higher than forecast population growth in Arizona, 111,500 persons by 2020, with major reductions of development control. Sonora is held constant and remains as forecast.

In conjunction with the scenarios, the authors have developed various models. These models encompass the key environmental elements that would be affected by the scenarios and include a development (or population growth) model, a hydrological model, a vegetation model, a landscape ecological pattern model, a single species potential habitat model, a threatened and endangered species potential
habitat model, a vertebrate species richness model, and a visual preference model (or scenic attractiveness as expressed by local residents). When applied to the various scenarios, the models illustrate the nuances of change on the natural environment.

This book is important for several reasons. First, it brings together all of the issues related to the depletion of the San Pedro River aquifer in Southeastern Arizona. It describes not only how the key issues, such as hydrology, will be affected but also the effects on the different models. Secondly, the book displays the impacts of each component on a color map so that the reader can actually see the dramatic impacts of each scenario. The issues are more easily grasped because of the 170 some maps provided by the book. Third, the value of the book to the researcher or policy maker is enhanced by the voluminous number of photos included illustrating almost all aspects of the study area. The visual nature of the book greatly increases the ability of the reader to grasp the issues and impacts. Fourth, the book appears at a propitious time in the life of the river. It provides a wealth of relevant information at a time when local organizations such as the Upper San Pedro Partnership, a diverse group of organizations, are already developing policies and implementing projects to bring the river system into hydrologic balance. This book can help create more momentum for continued efforts to protect the aquifer. For one who wishes to understand the future (or futures) of the Upper San Pedro River Basin, Alternative Futures will serve as an able guide.

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As its sub-title suggests, Translating Property traces the history of the Maxwell Land Grant in northern New Mexico. The real theme of the book, however, is how and why the American common law system has failed to recognize and incorporate Mexican notions of property, rights guaranteed by the terms of the 1848 Treaty of Guadalupe Hidalgo. In this ideologically charged and highly detailed historical analysis, María Montoya depicts the cultural, legal, and political conflicts that resulted from the clash between the American and Mexican systems as the United States gained sovereignty over the American Southwest.

The book is well timed. Recently, the Colorado Courts declared that descendants of Mexican settlers in San Luis possess historic rights to the common lands of the Sangre de Cristo Land Grant (Lobato v. Taylor,