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Depicting Population Change for Watershed Planning

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Abstract Text:

In Arizona, the pressure of population growth and development has resulted in the need to address population change in the planning process. To facilitate better watershed management and land use decisions on a watershed scale throughout Arizona, both the Arizona Department of Environmental Quality (ADEQ) and the Natural Resource Conservation Service (NRCS) are funding the University of Arizona to publish watershed-based plans that characterize the watersheds in a series of GIS maps, in addition to providing an analysis of past and future population change. To evaluate past growth patterns, census block statistics for 1990 and 2000 were compiled and then linked with census block data and used to create a series of density change maps. The resulting maps depict past population increase or decrease over the ten year time frame for several rural and urban watersheds. Projected population change is then presented for the same watershed areas by mapping published nation-wide housing density based on the work of David M. Theobald. Theobald developed a nationwide housing density model that incorporates a thorough way to account for land-use change. Theobald's model, the Spatially Explicit Regional Growth Model, enabled these urban fringe changes to be quantified as a foundation for inference of possible ecological effects. Housing Density for 2000, based on the 2000 census data, identifies "rural" housing densities, "urban", as well as "undeveloped" and "exurban" regions of the State. Predictions are then made every ten years until 2050. For example, "undeveloped" and "rural" farming areas west of Phoenix in 2000 become "exurban" and "suburban" in 2030. This presentation will discuss the methodology used to present the data, and will provide maps of past population change and predicted future urban development across the Agua Fria, San Pedro, Santa Cruz, Middle Gila, Salt, and Little Colorado Watersheds of Arizona.

Impact Statement:

Our Project, under the Arizona NEMO Program with Cooperative Extension, Water Resources Research Center, has resulted in the mobilization of volunteer watershed stewards across the state. In watersheds where the NEMO program has provided technical support, such as with the population change mapping, watershed partnerships have applied for and received CWA 319 funds to implement BMS to improve water quality.