Sustainable Water and Wastewater for the Mexico-United States Border

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The basis for changing priorities and technologies for water and wastewater along the US-Mexico border is a growing population coupled with environmental and economic pressures. Thus, a new paradigm based on sustainable development is in order. The concept of sustainable development is examined as is the vision of the future of water and wastewater infrastructure in the United States as predicted by professional associations. The challenge for the border is to create more infrastructure for less cost. This can be done if the focus is to create more water use per unit of available water. In existing communities with extensive infrastructure, this higher level of "water productivity" can be achieved through water conservation and recognition that other water sources exist, even in arid climates. "found" water sources can come from storm water collection, wastewater effluent stored in aquifers and reused, and directly used reclaimed water. To keep down the cost, the existing water distribution system might be best used for non-potable water distribution with potable water distributed by truck for drinking and cooking only. Greater use of waster is possible through in-building recycling, onsite greywater reuse, onsite industrial wastewater, and mining of sewers. In addition to these methods, other methods can be used that also help to keep down the cost of public infrastructure, such as trenchless sewer repair and local satellite plants. To keep down the cost of centralized wastewater treatment to provide greater reuse given the existing centralized system, treatment options include treatment pond systems and wetlands. Regionalized treatment systems may be beneficial in some cases but not all. Reclamation and repurification will be essential. For new communities and communities with inadequate infrastructure, the new paradigm is that "water is water," not stormwater, wastewater, fresh water, ground water, etc., but that all water must be looked at a s a source for human uses. Within this context, the end use of water will dictate the level of water treatment (and cost). Also, water less technologies may have a greater role. For new treatment systems, perhaps the best centralized system technologies for the border are wastewater pond systems, solar-powered aerators, upflow anaerobic sludge blanket, membrane technology, and septic tank-centralized systems. Revenue from wastewater should be a goal of new systems. Revenues may be realized through recreational values associated with wetlands, through tree plantations, and aquaculture. Onsite treatment and reuse provide opportunities for small enterprises. A comparison of costs for onsite and centralized reuse are presented. Institutional changes are the critical step to accommodate the new architecture. Recommendations for actions are identified for

municipalities and county governments, federal and state agencies, funding agencies, and academic institutions.