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CHAPTER 5.0 : IMPACTS OF WATER MANAGEMENT STRATEGIES ON KEY PARAMETERS OF WATER QUALITY AND IMPACTS OF MOVING WATER FROM RURAL AND AGRICULTURAL AREAS

5.1 Water Quality Impacts

All Water Management Strategies (WMSs) explained in Chapter 4, except Advanced Water Conservation, Conveyance Improvements, and On-farm Improvements, involve transferring water or water rights from rural land to urban. This process is known as urbanization; as the region's population expands, irrigable land is lost. In order to make up the projected shortfall of water for municipal use, ten WMSs were developed; additional groundwater, advanced water conservation, non-potable reuse, potable reuse, Brownsville weir and storage, water rights purchase, water rights acquisition by long-term contract, water rights acquisition through urbanization, brackish desalination, and seawater desalination. Advanced water conservation is aimed at reducing the amount of water used per capita, thereby reducing overall municipal demand.

Since municipal water has the highest priority in the Amistad/Falcon system, irrigation water is in a constant state of shortage. Accordingly, conveyance and on-farm improvements are needed to reduce the impact of irrigation shortages. Municipal water management strategies are not cost-effective when applied to irrigation use.

Chapter 4 gives an in-depth look at each of these WMSs.

The following table breaks out the water quality impacts, both positive and negative, associated with each WMS. Note that the majority of WMSs deal similarly with urbanization's effects; in other words, as rural land is urbanized, water quality impacts are consistent from WMS to WMS. Pollutants in agricultural runoff include eroded soil particles (sediments), nutrients, pesticides, salts, bacteria, viruses, and organic matter.[1] Sediment and chemical runoff associated with rural land are eliminated when that land becomes urbanized. On the flip side, urban runoff will increase as reduced porous surface areas prevent rainwater from soaking into the ground. Urban runoff pollutants include sediment from construction sites, oil and gas, fertilizers, pesticides, and household chemicals.[2] Also, as municipal water use increases, wastewater production increases—both inevitable effects of rising populations.

[1] Lowrance, R., Smith, M., & Vellidis, G. (2003). Impact and Control of Agricultural Runoff. *Stormwater, The Journal for Surface Water Quality Professionals*. Retrieved May 26, 2005 from World Wide Web. http://www.forester.net/sw_0305_impact.html

[2] United States Environmental Protection Agency. (1995, September). Economic Benefits of Runoff Control. Retrieved May 26, 2005 from World Wide Web. http://www.epa.gov/owow/nps/runoff.html

Table 5.1: Water Quality Impacts by Water Management Strategy

Water Management Strategy	Positive Impacts	Negative Impacts
Additional Groundwater	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased wastewater flows to receiving streams, i.e. higher organic levels • Increased urban runoff during storm event
Advanced Water Conservation	• Decreased wastewater flows	• Increases concentration of organic matter in wastewater
Non-potable Reuse	• Reduced wastewater flows • Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation • Decreased wastewater flows, resulting in lower organic levels in receiving streams	• Increased urban runoff during storm event
Potable Reuse	• Reduced wastewater flows • Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation • Decreased wastewater flows result in lower organic levels in receiving streams	• Increased urban runoff during storm event
Brownsville Weir and Storage	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows resulting in higher organic levels in receiving stream
Purchase of Water Rights	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows to receiving streams, i.e. higher

		organic levels
Acquisition of Water Rights by Urbanization	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows to receiving streams, i.e. higher organic levels
Acquisition of Water Rights by Long-term Contracts	• Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows to receiving streams, i.e. higher organic levels
Brackish Desalination	• Improved water quality in wastewater effluent • Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows to receiving streams, i.e. higher organic levels • Increased levels of TDS in receiving streams due to concentrate discharge
Seawater Desalination	• Improve water quality in wastewater effluent • Decreased sediment and/or agricultural chemical runoff due to storm events or excessive irrigation	• Increased urban runoff during storm event • Increased wastewater flows to receiving streams, i.e. higher organic levels • Increased levels of TDS in receiving streams due to concentrate discharge
Conveyance Improvements	• none	• none
On-farm Improvements	• Decreased sediment and/or agricultural chemical runoff due to increased management and metering	• none

5.2 Socioeconomic Impacts

The socioeconomic impacts of unmet water needs in the region have been analyzed by the TWDB. In the year 2060, there will be over $2 billion lost due to decreased sales, $2 billion in lost income, over 26,000 lost jobs, and over $75 million in lost taxes. A copy of this report can be found in Appendix D.