

1. Watershed Management

Watershed Definition

A watershed is an area of land that contributes water, nutrients, pollutants, and sediments to a common downstream point such as a stream, river or lake. Watersheds can be large or small. When it rains, water moves across the land surfaces or underground. Moving farther downhill by force or gravity, the water converges into a progressively larger system.

Watersheds and Water Quality

Water quality in Cypress Creek can directly affect water quality in the aquifers because of rapid recharge through fractures and sinkholes in streambeds. The reverse is also true where springs contribute to creek flows. The water levels in the creek are highly dependent on maintaining adequate spring flows, making recharge and groundwater management in the larger region critical to maintaining a healthy system in Cypress Creek.

Point source pollution is discharged from a defined location or a single point, such as a pipe, drain, or wastewater treatment plant. It includes any pollution that may be traced back to a single point of origin. Point source pollution is typically discharged directly into a waterway and often contributes flow across all conditions, including both droughts and floods. In Texas, dischargers holding a wastewater permit through the Texas Pollutant Discharge Elimination System (TPDES) are considered point sources, and their effluent is permitted with specific pollutant limits to reduce their impact on the receiving stream. There are no major permitted point sources within the Cypress Creek watershed. Currently, treated wastewater is used to irrigate golf course turf grass and no direct negative water quality effects from these discharges have been identified with limited water quality sampling. It is assumed that these discharges are operating in accordance with TCEQ permit requirements, but monitoring of these permitted sources is recommended. However, aging and improperly maintained septic systems pose an increasing threat throughout the watershed. This information was verified through the use of existing records, city efforts and volunteer collected water quality data.

Nonpoint source pollution (NPS), on the other hand, comes from a source that does not have a single point of origin. The pollutants are generally carried off the land by runoff from stormwater following rainfall events. As the runoff moves over the land, it can pick up both natural and human-related pollutants, depositing them into water bodies such as lakes, rivers, and bays. Ultimately, the types and amounts of pollutants entering a water body will determine the quality of water it contains and whether it is suitable for particular uses such as irrigation, fishing, swimming, or drinking.

Benefits of a Watershed Approach

Watershed protection stems from the knowledge of how natural and man-made processes affect watershed functions. Due to the karstic limestone and the interconnectivity between rainfall, surface waters (creeks) and groundwater, the watershed and the Upper and Middle Trinity Aquifers are vulnerable to nonpoint source pollutants. Such dispersed pollutants can be part of infiltration or surface water runoff from development, animal waste, septic systems, spray and subsurface effluent irrigation systems, spills or dumping of chemical pollutants, and fertilizer applications. In addition, future development in the watershed will increase the opportunities for water quality impairments due to elevated pathogens, nutrients, sedimentation/siltation, organic enrichment, depressed oxygen levels, reduced aquifer recharge, habitat alterations, and biological impairments.

Watershed Protection Planning

Because watersheds are determined by the landscape and not political borders, watersheds often cross municipal, county, and state boundaries. By using a watershed perspective, all potential sources of pollution entering a waterway can be better identified and evaluated. Just as important, all stakeholders in the watershed can be involved in the process. A watershed stakeholder is anyone who lives, works, or engages in recreation in the watershed. They have a direct interest in water quality issues and will be affected by planned efforts to address these. Individuals, groups, and organizations within a watershed can become involved as stakeholders in initiatives to protect and improve local water quality. Stakeholder involvement is critical to successful improvement of water quality through selection, design, and implementation of management measures (Berg et al., 2008).

The outcomes of this process are documented or referenced in a watershed protection plan (WPP), a strategy that provides assessment and management information for a geo-graphically defined watershed. The plan includes the analyses, actions, participants, and resources related to developing and implementing the plan. It is recommended that watershed protection plan follow the outline of the U.S. Environmental Protection Agency *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (USEPA, 2008). The development of watershed plans requires a certain level of technical expertise and the participation of a variety of people with diverse skills and knowledge. Using a watershed approach to restore impaired water bodies is beneficial because it addresses the problems in a holistic manner, and the stakeholders in the watershed are actively involved in selecting the management strategies that will be put into practice to solve the problems. NPS pollution poses the greatest threat to water quality and is the most significant source of water quality impairment in the

nation. Therefore, USEPA is working with states, tribes, and watershed groups to realign its programs and strengthen support for watershed-based environmental protection programs.

Based on available information, the Cypress Creek watershed protection plan includes management, funding, and implementation strategies that will improve water quantity, quality and the health of watershed in the face of land use changes. The basis is voluntary stakeholder involvement, input, feedback, and stewardship, along with selected technical expertise and state water agency guidance throughout the process of WPP development and implementation. The development of the WPP is not the final answer to water challenges over time; rather, it is a starting point. New information will undoubtedly be discovered within and adjacent to Cypress Creek as the implementation process is carried out and will add to the collective knowledge of how to better manage the watershed. Additional information and data will be incorporated into the plan to improve management strategies, refine the areas where specific measures will be incorporated, and to better focus available resources so as to achieve maximum water quality benefits.

