Chapter 1: Watershed Management

Definition of a Watershed

A watershed is composed of a “land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ocean”. Any land surface surrounding the water body is considered a part of the watershed. These land surfaces, ranging in size from small geological features to large portions of a country, contribute to the water system during runoff and rainfall events. For example, several smaller watersheds combine to form the Tres Palacios Creek Watershed, which is a part of the Colorado-Lavaca River Basin.

Watershed and Water Quality

Water quality and quantity within a watershed is affected by both natural processes and human activities. Runoff initially begins as a surface or subsurface water flow from a rainfall event in a land area ranging from agricultural, industrial and urban to undeveloped. Runoff water may contain pollutants from different land management practices. Wastewater treatment plants can also release directly into a water body, emitting contaminants. To effectively identify and manage different pollutants entering a watershed and water body, potential contaminants are classified as either originating from point or nonpoint source pollution.

Point Source Pollution

Point source pollution is discharged from a defined point or location, such as a pipe or a drain, and can be traced to a single originating point. Such pollution is typically directly discharged into a water body and contributes to the water body’s flow. Point sources of pollution that are permitted to discharge their effluent within specific pollutant limits must hold a permit through the Texas Pollutant Discharge Elimination Systems (TPDES).

Nonpoint Source Pollution

Pollution that comes from a source that does not have a single point of origin is defined as nonpoint source pollution. The pollution is generally composed of pollutants that are carried by runoff in storm water during rain events. Runoff traveling across land can pick up natural and human-related pollutants. The types and concentrations of pollutants that are found in a water body will indicate the water quality and suitable uses for the water, such as for irrigation, drinking, or recreational contact.

Benefits of a Watershed Approach

The watershed approach is widely accepted by both state and federal water resource management and environmental protection agencies to facilitate water quality management. Assessing the sources and causes of water quality impairments in a watershed assists in developing and implementing watershed management plans. By determining a watershed based on landscape boundaries rather than political boundaries, potential pollution sources can be better identified and targeted. It is critical and necessary for the success of a water management plan to involve
watershed stakeholders in this process. Watershed stakeholders are defined as individuals who live, work, or engage in recreation in the watershed and are affected by efforts to address water quality issues. The continuous involvement and efforts of stakeholders can assist in selecting, designing and implementing management methods to improve the water quality of the targeted water body.

**Watershed Protection Planning**

There exist nine key elements, as developed by the United State Environmental Protection Agency (EPA), which are designed to provide guidance for the development of an effective watershed protection plan (WPP). Plans are developed by stakeholders of the watershed to ultimately restore and/or protect water quality and determine designated uses for the water body by voluntary, non-regulatory water resources management. The Tres Palacios Watershed Protection Plan describes the measures and opportunities for stakeholders in the watershed to collaborate and for individuals to implement voluntary management efforts and programs to restore and protect the water quality of the water body.

**Adaptive Management**

Adaptive management consists of developing a natural resource management strategy to facilitate decision making based on an ongoing-science based process. Such an approach includes results of continual testing, monitoring, evaluating applied strategies, and revising management approaches continuously to incorporate new information, science, and societal needs (EPA 2000). Adaptive management promotes flexibility for the stakeholders in their decision-making process to account for uncertainty and to improve the performance of specific management measures (Williams et al. 2009). Using the process of adaptive management will help to implement strategies to address pollutant loadings and to promote efforts to understand further uncertainties in the watershed.

**Sources:**
