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## NF05-631 Understanding Watersheds

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## Understanding Watersheds

By Thomas G. Franti, Extension Surface Water Management Specialist and Steven R. Tonn, Extension Educator

We all live in a watershed. Homes, farms, ranches, forests, small towns and big cities are all found in watersheds. Watersheds come in all sizes and shapes with smaller watersheds combining to form larger ones like squares on a checker board. Some are thousands of acres, like the watershed of the Platte River, while others are just a few acres.

Watersheds are dynamic and unique places. They are complex webs of natural resources — soil, water, air, plants and animals. Together land and water make a watershed a whole system.

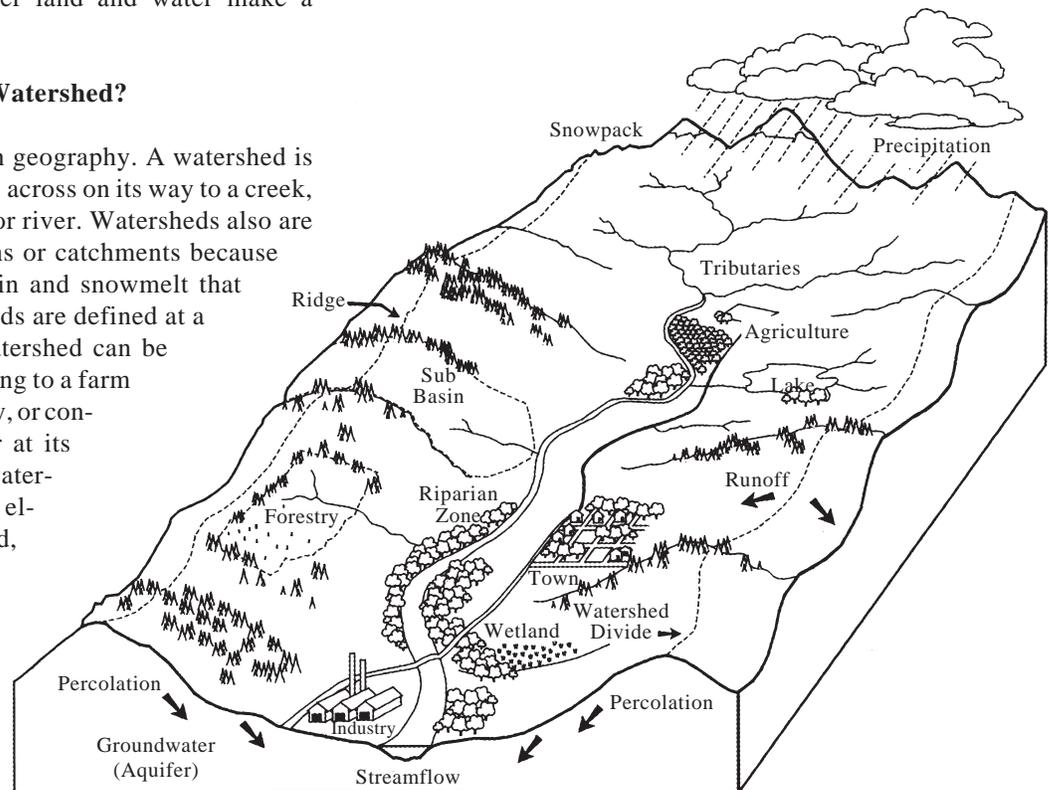
### What is a Watershed?

Watersheds are based on geography. A watershed is the land area that water flows across on its way to a creek, stream, wetland, pond, lake or river. Watersheds also are referred to as drainage basins or catchments because they “drain” and “catch” rain and snowmelt that falls onto the land. Watersheds are defined at a location. For example, a watershed can be defined as the area contributing to a farm pond, or to Lake McConaughy, or contributing to the Platte River at its mouth. The boundaries of a watershed are determined by the elevation of the surrounding land, with the highest elevation points marking the boundary (Figure 1).

Your local stream has its own watershed (small scale), as does the lake or river your local stream flows into (larger scale). The Missouri River represents a vast watershed.

### How Does a Watershed Work?

The landscape is made up of many interconnected watersheds. Within each watershed, all surface water flows to the lowest point — a creek, stream, river, lake or wetland. On its way, water travels over the surface and across farm fields, forest land, suburban lawns and city streets, or it soaks into the soil and travels as groundwater.



Adapted from Lane Council of Governments

Figure 1. A large scale watershed with diverse components and geography.

## **Watershed Functions**

Watersheds provide many vital hydrological and ecological functions. Watersheds collect water from rainfall and snowmelt, storing some of this precipitation in wetlands, soils, trees and other vegetation, and in groundwater aquifers which may be hydrologically connected to rivers. Watersheds provide water for drinking, recreation, navigation, irrigation, hydroelectric power and manufacturing.

The flood plain along the banks of a river serves as an important storage site for water during periods of heavy runoff. These natural storage sites help reduce downstream flooding and allow suspended soil particles to settle out and water to infiltrate into the soil where biological and chemical reactions can break down contaminants. Some of this stored water may eventually flow into streams, lakes and rivers as hydrologically connected groundwater flow. Ecological functions provided by watersheds include critical habitat for many plant and animal species, as well as transport paths for sediment, nutrients, minerals and a variety of chemicals.

### **Human Activities Can Alter Watershed Functions**

Like all organisms, humans are an integral part of the watersheds in which they live. Therefore, human activities, both in the water and on the land, can have a great impact on the watershed functions. Cities, homes, roads, businesses and factories modify the watershed and affect its natural resources. When cities cover a larger area in a watershed the amount of runoff increases because of reduced infiltration on impervious roads, rooftops and parking lots. Industrial and residential wastes can contribute to pollution of the watershed. Farming, recreation and construction can also significantly affect a watershed. Soil erosion and loss of nutrients from farm fields and construction sites can contribute sediment and higher nutrient

levels to watersheds. Sediment, nutrients and other pollutants that originate throughout the watershed are called nonpoint source pollution.

## **Watershed Management**

Watershed management consists of coordinated activities aimed at controlling, enhancing or restoring watershed functions. Management plans recognize the many functions watersheds provide and the need to meet multiple objectives such as flood prevention, erosion control, irrigation, wildlife habitat and recreation.

Community-based watershed management is an approach to water resource protection that enables individuals, groups and institutions with a stake in management outcomes (often called stakeholders) to participate in identifying and addressing local issues that affect or are affected by watershed functions.

A community-based approach considers not only the physical characteristics of a watershed, but also takes into account the social and economic factors associated with watershed issues. The goal of community-based watershed management is to protect and restore watershed functions while considering the variety of social and economic benefits of those functions.

To learn more about watersheds, contact your local University of Nebraska Cooperative Extension Office, Natural Resources District Office, the Natural Resources Conservation Service or the Nebraska Department of Environmental Quality.

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