

Caring for the Land

Identify the problem and the solution, as well as the main cause and effect relationship in the information that follows.

Soil Erosion

Erosion occurs when soil is washed or blown away. Plants, like trees and grass, help hold the soil in place. In Utah, annual rainfall is low; the state average is 14 inches a year. Erosion in Utah is primarily caused by wind. During the 1930s, livestock in Tooele County were allowed to overgraze the range. Between 1933 and 1935, the area had even less rainfall than usual. The severe drought killed crops and worsened overgrazing. Large swaths of land had no plant root system to anchor it, and much of the soil blew away. Dust and sand storms buried roads and houses. The Great Plains also experienced a drought during this time. Farmers seeded crops, but nothing would grow without rain, and repeated tilling left the soil loose, bare, and vulnerable. Clouds of dust from this area reached as far east as Washington, DC. We now know this as the Dust Bowl.

In response to the disaster, the federal government created the Soil Erosion Service and the Civilian Conservation Corps. Workers replanted grass, planted trees, and helped farmers develop and implement agricultural methods that would better protect the soil. Over time, the Soil Erosion Service has evolved and changed

names; its modern-day equivalent is the Natural Resources Conservation Service. At the state level, citizens of a local area that concern themselves with the conservation of soils belong to a governing board called the Soil Conservation District. Today, these organizations help Utah farmers and ranchers develop and implement better land management strategies.

One method developed to prevent overgrazing is to move livestock regularly, giving the pasture plants a period of rest. In order to implement this practice—known as rotational grazing—someone must move the livestock regularly, and fences are often needed to keep livestock off of the pasture section that is resting. Rotational grazing requires more labor and infrastructure than allowing livestock to graze freely.

Another method to prevent erosion is no-till farming of annual crops, in which the farmer seeds directly into a field that still has last year's plant stems, stalks, and leaves on or in the ground. This ensures that the soil is never left bare and vulnerable to erosion. However, no-till farming is most effective when herbicides are used to control weeds, and some people worry that the herbicides used might pollute the water, harming people and ecosystems downstream.

Problem

Cause

Effect(s)

Solution

Does the solution create another problem? If so, what is it?

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Chemical Pesticides and Fertilizers

In natural ecosystems, plants take nutrients from the soil and return them when leaves and other plant parts die and decompose. In agricultural systems, people harvest plant matter (e.g. vegetables, grains, hay), and by doing this, remove nutrients. Over time, if the nutrients aren't replaced, the soil will no longer support healthy plant growth. In early years, farmers replaced nutrients by adding animal manure, growing a legume crop, resting fields, or rotating crops from year to year so that soils could restore some of their nutrients through natural processes.

In the 1920s, farmers began using tractors instead of horses and mules. They began using inorganic nitrogen fertilizers to replace the organic nitrogen the fields had been getting from animal manure. Nitrogen is one of the major nutrients plants need to grow. In the 1940s, farmers learned to use chemicals to kill insects and weeds. These pesticides and fertilizers help American farmers provide enough food and fabric for many hundreds of non-farmers.

Although they've greatly increased productivity, chemicals have also caused some problems. Chemical pesticides can kill organisms other than the ones for which they are intended. Some of the organisms

they harm are useful ones that help crops grow. Chemical fertilizers cause reactions in the soil that, over time, can make the soil less desirable for plant growth. Chemicals used in agriculture can also contaminate the water we drink, moving through the soil into the underground water supply, or washing into lakes, rivers, and streams with rainwater.

Farmers are concerned about these problems. They are trying new methods that will help them use fewer chemicals on their fields while still growing enough food to meet our needs. One method is Integrated Pest Management (IPM). Farmers using this method begin by monitoring to find out what kind and how many pests they have. They don't use pesticides unless there are enough pests to cause economic damage. They often choose environmentally friendly pesticides or beneficial insects to control the pests.

Another method, called "precision farming," makes use of a computer installed in the farmer's tractor to more efficiently use fertilizer. The farmer takes soil samples from his or her fields and has them tested for nutrient deficiencies at a laboratory. The computer receives mapping information from a satellite in space and then uses the results of the soil tests to tell the fertilizer spreader where to place the fertilizer and how much to use.

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Wetlands

Wetlands are land areas saturated with water. There are many types of wetlands, including the shallows of small lakes, reservoirs, ponds, and streams; marshes and wet meadows; mud and salt flats; and playas that are only temporarily filled with water. Even wetlands that are small or seasonal can provide critical habitat for aquatic species and migrating birds, especially in arid areas. Although Utah is mostly arid, one of the largest and most important wetlands in the Intermountain West is found here. In 1991, the Great Salt Lake, along with its associated wetlands, was designated a Hemispheric Reserve in the Western Hemisphere Shorebird Reserve Network due to its importance to migratory waterfowl and shorebirds.

Wetlands are critical ecosystems. They support biodiversity, reduce flooding, and filter toxins out of water. People can enjoy spectacular wildlife viewing in wetlands, which act as important rest and food stops for migrating birds and provide homes for diverse populations of amphibians, reptiles, and fish. Many endangered plants and animals depend on wetlands.

Wetlands act like sponges, soaking up water from heavy rains that could otherwise

cause floods and destroy homes, businesses, and farms. Wetlands store water, releasing it slowly into aquifers and underground streams—an important source of drinking water for many people. Wetlands also help purify water, filtering out harmful chemicals and waste. Dirty water gets a good cleaning when it flows slowly through a wetland area that is thick with the roots of many plants.

At the time of European settlement, there were about 221 million acres of wetlands in the lower 48 states. Since then, over half of these wetlands have been lost. Most were converted to agricultural uses. For many years, people thought of wetlands as obstacles to farming and breeding grounds for mosquitoes. The government even encouraged landowners to drain wetlands and turn them into dry lands for farming or building homes.

Now we know more about wetlands and recognize their importance. Federal laws have been passed to protect and preserve them. Some people don't like the wetland laws. People who have wetlands on their property think they should be able to use their property as they want. Draining a wetland and planting crops may mean earning money to support a family.

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