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Water Quality Technical Note MI-03
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Shoreline Protection Using Hay Bales

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Purpose

This technical note describes a method of reservoir shoreline protection using hay bales.

Problem

Shoreline erosion is one of the most ubiquitous reservoir problems in the United States, resulting in significant ecological damage such as the loss of fisheries or other recreational resources. The standard solution to shoreline erosion has been to use riprap revetments, an expensive but often effective solution. However, there are other methods of shoreline protection, many of which are more economical and ecologically sound.

Observations of reservoir shorelines indicate that aquatic plants will establish themselves naturally in areas where environmental parameters such as wave energy, slope, and turbidity are not too severe. In other areas, some help may be required to establish firm stands of vegetation such as cattails or bulrushes. Such methods usually involve protection from wind/wave action to protect the plants while they are becoming established.

Solution

Hay bales are an inexpensive means of providing such protection. The bales must be staked in place since initially they will tend to float. Eventually they will become water-logged and nearly immovable. Placement of the bales, that is, the distance from shore, can be determined by the underwater slope, the width of the area of desired vegetation establishment, and water-level fluctuations. As a rule of thumb, the farther from shore the better, as long as the bales protrude above the normal pool level enough to block wind/waves (Figure 1). The purpose of the bales is to provide "quiet" water in which plants can become established. The bales will decay in 2 or 3 years. After that

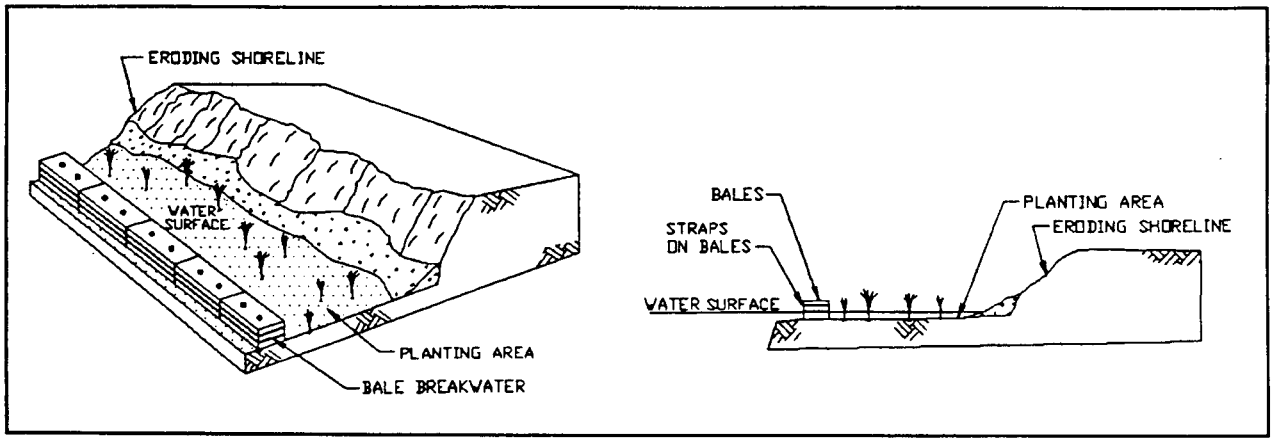

Figure 1. Hay bales placed for shoreline protection

period, the plants should be well enough established to help the bank reach a natural angle of repose.

Providing quiet water will result in the settling of littoral drift sediments, in addition to providing an environment for aquatic plants. In many instances, providing quiet water will naturally result in the establishment of stands of vegetation. However, the process can be accelerated or enhanced by actively planting appropriate vegetation. It is suggested that existing vegetated shoreline areas be observed and that plants of the same genus and species be used in areas to be planted. Obviously, there is something "right" about the environmental conditions already supporting specific plant species in a given area.

Resources

Resources required include hay bales; stakes; emergent and flood-tolerant woody plants, which can be purchased from nurseries or obtained locally from nearby wetlands or other areas of the reservoir; and manpower. Bales composed of hay are the best material, because they generally have a greater volume of leafy matter and a higher density than bales of flax or straw. Also, hay bales are often readily available from local sources; the lowest price should be sought. The bales should be inspected to ensure that they are tightly wrapped and will not come apart with handling. Often, manpower can be obtained from local sources, such as Boy Scouts, fishing clubs, environmental groups, or other civic organizations.

Point of Contact

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