

Wetland Restoration (657) Specification Sheet for Topographic Restoration and Enhancement

BACKGROUND

Undisturbed wetland systems in South Carolina typically consist of complexes that contain a diversity of topographic relief from extremely shallow areas with minor ridges (micro-topography) to deeper wetland habitats that include some upland characteristics (macro-topography). When wetlands are drained or altered, they normally lose most of their micro and macro topographic relief through land leveling or other agricultural activities, such as disking.

Macro-topographic features are wetland “ridge and swale” complexes whose basins are depressional in landscape position and occur on terraces and in floodplains. These features should be used in all agricultural fields being restored. The basin areas are normally from 0.1 acre to 5 acres in size with depths ranging from 0- 30 inches, depending on the landscape position. These types of wetlands can be found in a multitude of shapes ranging from simple circular basins, to complex amoeba-like outlines, to meandering scours. Ridges (linear) and mounds (circular or elliptical) make up the “upland” component of macro-topographic features that normally do not exceed 30” in height. Together, the ridge and swale features form ephemeral wetlands that hold water from only a few weeks to several months during the year.

Micro-topographic features are normally thought of as those shallow depressions with less than 6 inches of depth between the swales and ridges. Examples of microtopography can be seen in flat fields where shallow “sheet” water stands for short duration after a rain. Within the scope of this document, macro-topography will be assumed to include micro-topographic features.

HABITAT

Wetland restoration plans that include undulating landscape features create a diversity of habitat types. Swales, oxbows, potholes and other macro-topographic basins provide varying hydroperiods from short-term ponding to seasonal and semi-permanent water conditions. A wetland, or wetland complex, with multiple hydroperiods can support a variety of habitat zones. Submergent, emergent, and floating-leaf communities (e.g., duckweed) are examples of herbaceous aquatic habitats. A diverse wetland plant community benefits numerous species of wildlife including many fur-bearing mammals, waterfowl, shorebirds, wading birds, amphibians and reptiles. Because native plants provide the best overall habitat, are essentially self-sustaining, and tend to be non-invasive, only native vegetation should be planted. Low-level mounds or ridges (maximum 30 inches) are considered to be a component of macro-topography, and can greatly increase the biological diversity of restoration sites when combined with basins. Amphibians, for example, tend to have small home ranges. Thus, having a diversity of wetland types in close proximity to terrestrial habitats within the project area will support the greatest populations. When

planning a site for amphibian and reptile habitat, macro-topographic features should make up approximately 30-50% of the area. The water (swale, meander, etc.) and the upland habitat (mound) acreage are combined to get the percent of macro-topographic features. It can be assumed that for every acre of water created, an additional acre of mound is created.

Fill excavated from the basins can be used to create multiple upland habitat conditions based on the height, shape, and location of habitat mounds. Variations in habitat mound design can provide escape areas, denning sites, nesting opportunities, and plant diversity, as well as providing visual breaks within the wetland complex. All side slopes for mounds should have a minimum slope of 10:1, but should be as flat as is feasible. This area should then be planted with a vegetative barrier such as native grasses, trees or shrubs.

Swales of varying depths (<36") and widths (10' to 20') can connect basins to diversify a site. They provide additional cover for waterfowl as well as escape routes away from predators. Connection swales may have 10:1 (or flatter) side slopes. On gently sloping sites, an efficient means of providing shallow, "sheet" water habitat is through the creation of linear habitat mounds. The excavated material from a macro-topographic basin is used to form a low, meandering ridge on the down slope side of the basin(s). Typical heights for the mound range from 1 to 2 feet. By using the spoil in a creative manner, the total shallow water on a project site can be substantially increased. The impounded sheet water provides seasonal or ephemeral water for shallow feeders such as shorebirds, while the excavated basins provide longer hydroperiod wetland habitats. This method can also be utilized where wetland meadow conditions are desired.

Creative Borrowing: Borrow areas for dikes or embankments can be incorporated into the development of macro-topographic features. Potholes, swales, meanders, and other shallow water habitats can serve as borrow areas for needed fill. All side slopes for basins should have a slope of 10:1 or greater. Slopes exceeding 20:1 are not considered excessive for habitat purposes. Examples of this include situations where equipment operators randomly fill their scrapers leaving shallow, single-trip borrow sites. The borrow areas will result in the basins being the deepest portions of the wetland complex. In seasonal or ephemeral wetlands these areas provide a diversity of hydroperiods by holding water later into the year than the remainder of the wetland.

Rough-finish grading: The desired macro-topographic features will have rough surfaces on all side slopes and top, an undulating bottom, and a ragged shoreline.

LARGE WOODY DEBRIS

Trees cut during essential clearing operations to install structures should be utilized by randomly placing whole trees, logs, or limbs throughout the wetland area. They should not be piled and burned or removed from the site. In cases where no clearing will be done, trees may be cut from the buffer area to provide large woody debris in open fields where restoration is taking place. Six to twelve trees per acre should be added in swale complexes or shallow flats. Consider using different sizes of hardwood material, excluding mast-producing hardwoods.

Large woody debris:

- Provides sunning and resting areas for herptiles
- Provides loafing sites for waterfowl
- Is a source for organic soil material

- Provides additional vertical and horizontal habitat
- Is an excellent substrate for invertebrates

Large woody debris occurs in unaltered wetlands, naturally.



Newly constructed swale and adjacent down slope ridge. Slopes of 20:1



Newly constructed crescent shaped swale adjacent to the end of an existing hedgerow.