WETLAND ENHANCEMENT SPECIFICATIONS

NATURAL RESOURCES CONSERVATION SERVICE

Topographic features including wetland ridge and swale complexes, sloughs, potholes, pimple mounds, mima mounds, and knolls bring diversity to wetland landscapes which ultimately could increase vegetative and wildlife species abundance and use. The depressional areas (basins) can range in size from 0.1 acre to large basins with depths ranging from 0 – 36 inches, depending on the landscape position. Changes range from simple circular to complex multi-shaped to meandering scours. Ridges (linear) and mounds (circular or elliptical) make up the higher elevation component and normally do not exceed 36" in height. Together ridge and swale features form ephemeral wetlands, which contain water from only a few weeks to several months during a year. Within these complexes, microtopographic features also exist. These features are similar to the before mentioned components but are extremely shallow and small with shorter hydroperiods.

Undulating topography within wetland areas create a diversity of habitats. A wetland complex containing multiple hydroperiods typically supports a variety of wildlife flora and fauna. Depressional basins should be designed to hold water until mid summer. The process of evaporation, transpiration, seepage, and drying of the wetland is beneficial to many species by eliminating predators/pests, allowing manipulations of vegetative succession, and exposure of detritus to processes of oxidation thereby releasing nutrients.

Fill excavated from basins or scraped from the designated areas can be used to create multiple upland habitat conditions based on shape, and location of habitat mounds. Variations in habitat mound design can provide escape areas, 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 6 horizontal to 1 vertical, but should be as flat as feasible. When enhancing a restoration site to include pimple mounds or mima mounds, the average distance should be approximately forty yards apart. Size in diameter should range from twenty to forty feet and settled height approximately twenty-four inches. Although these dimensions typically represent the average mound dimensions, accurate historical references to size and location should be utilized when available.

Trails which cause the least impact to wetland functions and values will be utilized (at appropriate times not to degrade the site) as a means of access for operation and maintenance.

The landowner shall obtain necessary local, state, and federal permits that apply before wetland enhancement.

Water rights are assured prior to enhancement if required.

The design will not back water on neighboring land without an easement.

Document the soil, hydrology, and vegetative characteristics of the site and its contributing watershed before alteration.

The potential for occurrence of threatened or endangered species shall be evaluated for each site proposed for enhancement. Sites containing threatened or endangered species will not be enhanced under this standard unless it can be demonstrated that the impact will benefit the species at risk.

If the presence of hazardous waste materials in the sediment or fill is suspected, soil samples will be collected and analyzed for the presence of hazardous waste as defined by local, state, or federal authorities. Sites containing hazard waste will not be enhanced under this standard.

The standards and specifications for Dike (356) and Structure for Water Control (587) will be used as appropriate. Refer to the Engineering Field Handbook, Chapters 13, "Wetland Restoration,

Enhancement, and Creation," and 6, "Structures," for additional design information. Existing drainage systems will be utilized, removed, or modified as needed to achieve the intended purpose.

Where sites have a shallow water area with a designed water level, such as those with levees and control structures, approximately 30% of the area should be considered for topographic enhancement. Consider concentrating features in and near the shallow water reaches. Also mounds and ridges should vary in elevation from above to below the expected normal waterline. Approximately one-third of the mounds should be six inches to one foot below the normal water elevation, one-third should be six inches to one foot above, and one-third should be at the normal water level.

Where sites have a shallow water area without a designed water level, approximately 50% of the area should be considered for topographic enhancement. The designed basins may provide the only standing water on the restoration site. Consider concentrating the deeper features in the lower elevations of the site, and shallower features in the higher elevations.

Ditches of varying depths and widths can connect basins to diversify a site. Connection ditches shall have side slopes of 3 horizontal to 1 vertical or flatter. Although this adds cover and escape routes for some wildlife species, connecting ditches also may provide access for predatory fish, when considering amphibian habitat.

An efficient means of providing additional adjacent habitat is through the creation of linear habitat mounds (ridges). The excavated material from basins can be used to form a low ridge on the down slope side of the basin(s). By using the spoil in a creative manner, the total shallow water on a site can be substantially increased. The impounded sheet water provides seasonal water for shallow feeders such as shorebirds, while the excavated basins provide long hydroperiod wetland habitats.

Borrow areas for dikes, embankments, and mounds can be incorporated into the development of topographic features. Basins can serve as borrow areas for needed fill. All side slopes of excavated basins shall be 6 horizontal to 1 vertical or flatter. Note that when feasible, slopes should be as flat as possible. Slopes exceeding 20:1 are not considered excessive for habitat purposes. All topographic features will have rough surfaces on all side slopes and top, an undulating bottom, and a ragged shoreline.

Where possible, native plant materials shall be used; however, introduced or cultivated plant species can be used to meet specific project objectives. Introduced species may become invasive or detrimental and caution must be exercised.

When using native species, preference shall be given to native wetland plants with localized genetic material. Plant materials collected or grown from material collected within a 200-mile radius from the site is considered local.

In soils where seed banks realistically exist, or where natural colonization of targeted species will dominate within five years, then natural regeneration can be allowed. Specific guidelines that consider soils, seed source, and species will be developed by the states.

Adequate substrate material and site preparation necessary for proper establishment of the selected plant species shall be included in the design.

Succession of wetlands is a natural process that can result in significant habitat changes over time. The invasion of a site by woody vegetation and canopy closure are examples of vegetative succession. These and other changes alter species composition and use over time. Early successional species will be lost lowering diversity, and can only be restored by periodically reversing succession. Plans to periodically set back succession in some portion of the project area are important to consider.

The use of woody debris may provide sunning, and loafing sites for a variety of wildlife species. It provides additional vertical and horizontal habitat, and a substrate for invertebrates. It also is a

source of organic matter. Depending on water velocities, the woody debris may need to be partially buried, if utilized.

A functional assessment (Hydrogeomorphic approach or similar method) shall be performed on the site prior to enhancement.

Project goals and objectives shall minimize adverse impacts to wetland functions not specifically targeted for enhancement.

Where possible, wetland functions not targeted for enhancement should also be maximized.

REFERENCES

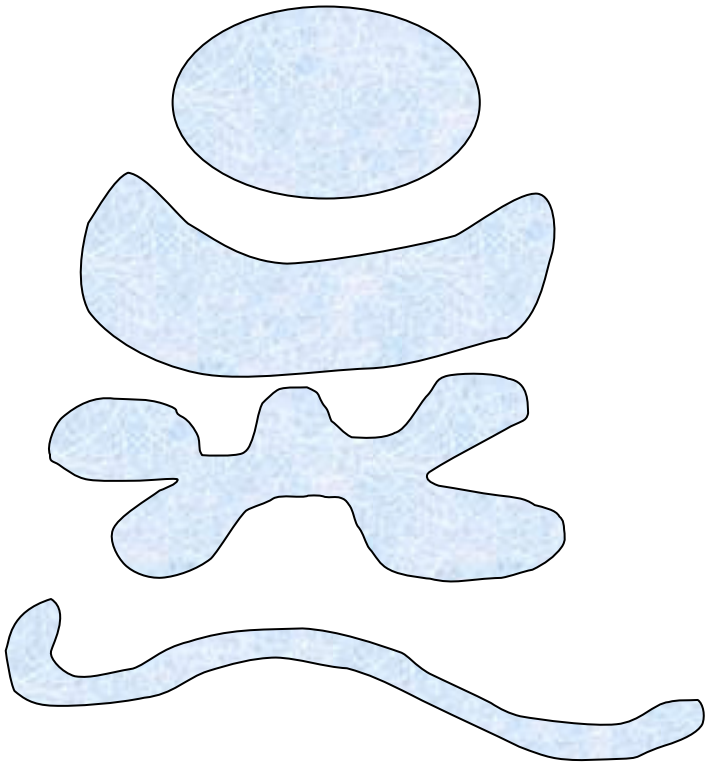
Indiana Biology Technical Note No. 1

USDA Natural Resources Conservation Service 2000. Techniques for Restoring Wetland Topography (Video), NRCS Wetland Service Institute, NRCS Watershed and Wetlands Division

1903 Soil Survey of Acadia Parish, Louisiana

EXAMPLE BASIN DESCRIPTIONS

1. Oval, circular, elliptical
2. Kidney, oxbow
3. Multi-lobed
4. Meander, scour



EXAMPLE DEPTH DESCRIPTIONS

1. 1 Depth indicated

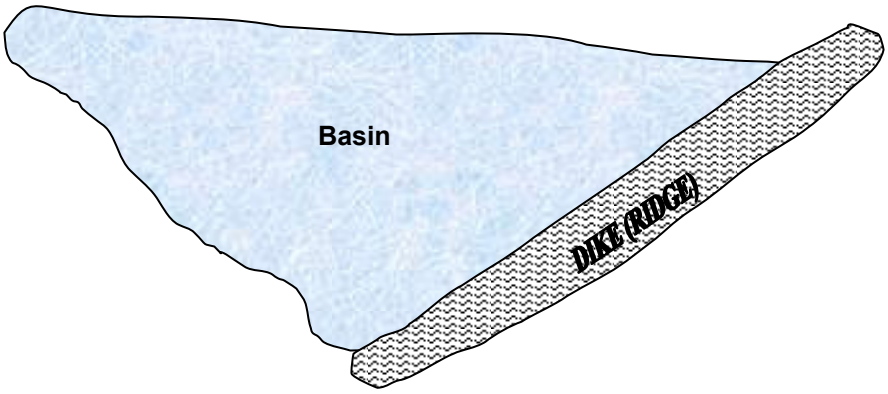
2. 2 Depths indicated each composing approximately 50% of the area.

3. 3 Depths indicated
   Shallowest composing 50%
   Mid-range composing 30%
   Deepest Composing 20%

EXAMPLE MOUND DESCRIPTIONS

Mound (ridges) utilizing fill material from excavated basins (swales)

1.



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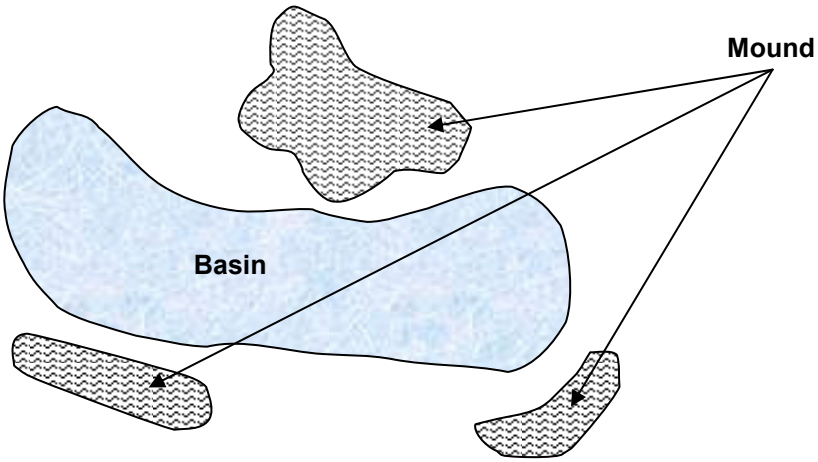

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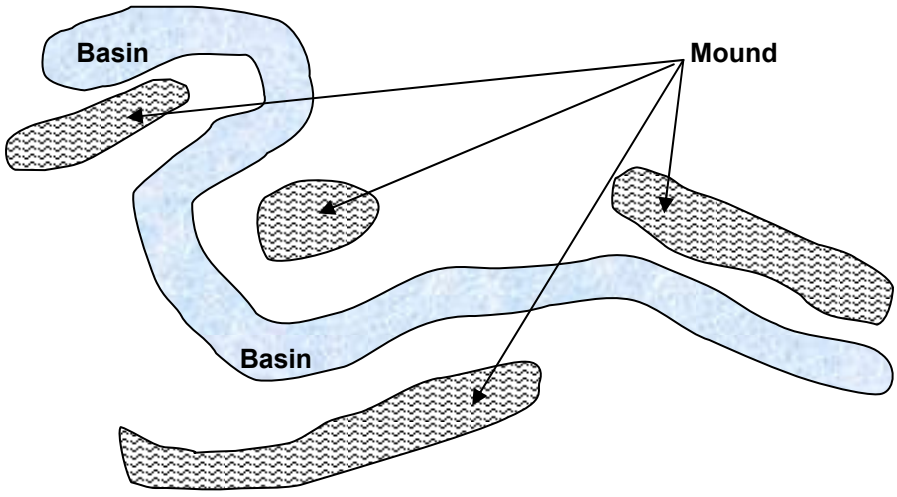
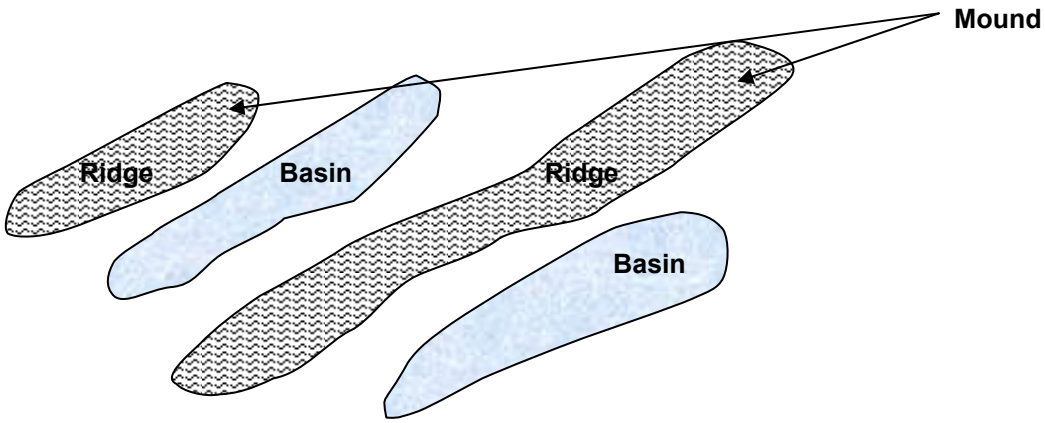


EXAMPLE MOUND DESCRIPTIONS (Continued)

4.



Mound utilizing fill (without creating excavated depressions)