TECHNICAL NOTES

U. S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

IOWA STATE OFFICE
DES MOINES, IOWA

Agronomy #27

Date: February 14, 2008

Subject: SEEDING GUIDANCE FOR POTHOLE, RIVERENE, AND OTHER WETLAND RELATED LONG-TERM EASEMENTS

This technical note is to be used in preparing a seeding/planting plan for long-term (> 15 year) wetland restoration and recreation projects. It is also a useful guide for seeding/planting projects in any planning. In all cases, Natural Resources Conservation Service Field Office Technical Guide Conservation Cover (327); Restoration and Management of Declining Habitats (643); Wetland Wildlife Habitat Management (644); Upland Wildlife Habitat Management (645); and/or Tree and Shrub Establishment (612) will be followed in preparing seeding/planting plans. In addition, the 643 Restoration and Management of Declining Habitats specifications provide plant community descriptions that will help guide community restoration regardless of which practice standard is followed. Whenever developing seeding plans, fully consider program and resource goals.

This guidance is program neutral. Specific program guidance and criteria can be found in the appropriate program manual.

Technical Note 27 - Seeding Guidance for Pothole, Riverene, and Other Wetland Related Long-term Easements

Purpose:

This guidance is provided primarily for wetlands enrolled in long-term easement programs (> 15 year contract) to aid in the development of stratified seeding plans based upon environmental gradients and their associated plant communities (Table 1). Developing community centered seeding plans stratified by ecological zones of soil moisture, landscape aspect, structural and functional diversity is desirable for the restoration of plant communities on all program lands. This method of tailoring a seeding to the soil resource and landscape position will ensure a desirable plant community will develop, which will curb invasion by adventive species, provide quality habitat for a wider range of wildlife species, and be more representative of a natural community. Planners are highly encouraged to seek the assistance of local, area, and state biologists or foresters with expertise in plant community restoration. Variance from any portion of this guidance will require prior approval from the Iowa NRCS State Office.

Establishing vegetation on pothole, floodplain and other wetland sites is critical in attaining maximum ecological benefits and carrying out program objectives. A well thought-out revegetation plan and installation process is critical to the effective use of program and landowner resources. In all cases, the appropriate NRCS FOTG Standards: Conservation Cover (327); Restoration and Management of Declining Habitats (643); Wetland Wildlife Habitat Management (644); Upland Wildlife Habitat Management (645); and/or Tree and Shrub Establishment (612) will be followed in preparing seeding plans. In addition, the 643 Restoration and Management of Declining Habitats specifications provide plant community descriptions that will help guide community restoration regardless of which practice standard is followed. The following guidance has been developed to help field staff design seeding plans on pothole, floodplain, and other types of wetland sites; is program neutral; and can be applied to non-program planning as well. Specific program criteria can be found in the appropriate conservation program manuals.

Design Criteria:

While developing seeding plans during conservation planning, the conservationist is to consider the soils, moisture regimes, and topography of the site. From this information, the conservationist should develop prescription mixes for each of the ecological zones using the aforementioned NRCS FOTG Standards, Table 1 of this document and/or reference plant communities found on the same or similar soils within the respective Major Land Resource Area (MLRA). On the following pages, broad wetland restoration zones are defined and simplified diagrams of plant community stratification at the landscape and basin scales are provided (Figures 1 & 2).

As a preliminary measure, use the local soil survey and associated data (historic vegetation, ground water table levels, frequency and duration of flooding, inundation, or saturation) to determine where zone boundaries may occur within the area to be seeded. Once this has been accomplished, on-site ground-truthing will be required to delimit wetland zones for which custom seeding plans will be developed. The planner will have to determine the boundaries and areas for each of these zones to determine whether very small pockets (< 1 acre) and/or irregular inclusions of other ecological zones may exist within the larger matrix zone (this does not include small, narrow bands of hydrophytic zones around wetland basins/depressions). For reasons of practicality, small inclusion areas may need to be seeded to the same mix as the larger matrix zone. Where appropriate, or where these zones will provide an important ecological function, the small irregular areas could be hand seeded to a more suitable mix. This approach to developing conservation cover on the site is more ecologically based than the traditional “one mix covers all” method of seeding. This approach will also serve to provide greater probability that a desirable, sustainable, functional vegetative community is established in each zone. The Iowa Native Prairie Seeding Calculator or Iowa CPA-4 shall be used to design and document all seeding plans. The Iowa Native Prairie Seeding Calculator can be found on the Iowa NRCS Technical Resources webpage (http://www.ia.nrcs.usda.gov/technical/).

If two or more similar community types (i.e. two wet meadow communities or three marsh communities per Table 1, etc.) are well suited for restoration within the same zone, the conservationist is encouraged to develop a zone seeding mix that includes species from each of these communities to maximize seed mix diversity. In all instances, the species listed as either dominant or co-dominant must be included in the planned seed mix. Exceptions to this requirement may include those species that can be documented as likely to naturally colonize the site (i.e. cattails, ash, elm, cottonwood, etc.) due to natural populations occurring within the local area (within 400-1,500 meters of the site or sites cropped for < 20 years), or those that are not commercially available (many floating leaved and submergent plants). Although some species may not be commercially available, their establishment may still be possible through collection of plants from existing like-type communities in the area when/where appropriate.

The herbaceous strata will be seeded to a minimum species richness of 5 graminoids (grasses, sedges, rushes, etc.) and 10 forbs within each zone, although a mix that includes $\geq$ 10 graminoid species and $\geq$ 20 forb species will produce a more diverse and functional community. Species selection should be based upon plant

community descriptions or reference plant communities as outlined in previous paragraphs. To promote evenness and species diversity in the plant community, seeding a maximum of 20 seeds/ft^2 graminoid and a minimum 20 seeds/ft^2 of forb is recommended for areas not considered erosion prone (< 5% slope). Refer to Conservation Cover Standard 327 for seed/ft^2 guidance for areas deemed erosion prone (≥ 5% slope).

The composition and structure of the shrub and tree strata can be highly variable depending upon the plant community(s) being restored. Therefore, a baseline rate for species restoration as provided for the herbaceous strata is not as straight forward. It is highly recommended that those developing restoration plans for such sites refer to Standard 612 and Standard 643 and its specifications for guidance as well as consulting with a local forester.

Zone A: Deep Marsh and Submergent

These are permanently to semi-permanently flooded/inundated areas with > 3' of standing water during the growing season on poorly to very poorly drained soils with very frequent long-duration flooding/inundation. This zone is located within the heart of larger wetland basins and is dominated by floating leaved, submergent and emergent vegetation.

Zone B: Shallow Marsh

This zone occurs in areas where soils are inundated by standing water between 6" and 3' in depth during portions of the growing season, with semi-permanent to seasonal hydrology. This zone typically occurs within deeper areas of shallow wetlands, is the zone adjacent to the deep marsh or open water zones, or occurs where high water tables persist and saturate soils throughout most or all of the growing season. Soils within this zone are typically poorly to very poorly drained and experience very frequent to occasional long-duration flooding/inundation. This zone is primarily dominated by emergent plant communities, although particular shrub, woodland, or forested community types may occur within this zone. Sites that have semi-permanent hydrology may have submergent and floating leaved vegetation in addition to emergents.

Note: If both zones A and B occur onsite, one seed mix can be developed merging species lists for community(s) identified as suited for restoration within these zones.

Zone C: Shrub-scrub, Floodplain Forest, Sedge and Wet Meadow

This area commonly undergoes flooding or inundation of seasonal duration in most years, or has permanent soil saturation due to seepage or a high/perched water table. These areas are characterized by soils that are very poorly to moderately well drained that experience very frequent to occasional flooding/inundation of long to brief duration. This zone is commonly found in wet swales, depressions, seepage areas, or adjacent to the shallow marsh zone. In the case of floodplain forests and shrublands, be sure to identify each stratum requiring restoration as well as vernal pool areas and adjust seed mixes accordingly. The inclusion of multiple annual/biannual wetland species within this zone is highly encouraged. High/perched water table or seepage areas may require specialized seed mixes due to unique soil and water properties (temperature, mineral or organic content, etc.). The graminoid component of the seed mix shall be primarily composed of cool season graminoids (sedges, rushes and grasses).

Zone D: Wet to Mesic Prairie, Forest, or Scrub-Shrub

These areas may be seasonally or temporarily flooded, inundated, or saturated. These areas often include soils that are somewhat poorly to moderately-well drained and experience occasional to frequent, brief to very brief flooding/inundation, and soils with a water table within 2' of the surface. These areas may include ephemeral or temporary wetlands, but they are often transitional areas between wetlands and uplands. When dry, inundation areas are commonly colonized by a mix of annual/biannual plant species typically known for their high wildlife food value. The graminoid component of seeding mixes for this zone shall include multiple species of cool season graminoids (sedges, rushes and grasses).

Zone E: Upland Prairie, Woodland, and Shrubland

This is the true upland portion of a site. It is the area that is flooded/inundated/saturated for a very brief duration, if at all. These areas are usually moderately well to excessively well drained and tend to be located in the uplands, second or third stream benches, or are soil map units whose slope range is in the higher end of the B slope class or steeper.

Zone E can be split into two sub-zones, the mesic (Em) and the xeric (Ex). Moderately well and well-drained soils with a wet mesic to mesic regime experiencing no to occasional flooding/inundation of very brief duration characterize the mesic sub-zone (Em). The xeric sub-zone (Ex) is associated with somewhat and excessively well-drained soils that rarely, if ever, experience flooding and have a dry mesic to dry regime. It is recommended that seed mixtures appropriate to the relevant moisture regime be developed for each of these two sub-zones.

TABLE 1. Iowa native plant communities suited for restoration by ecological zone. Community descriptions can be accessed via the NatureServe Explorer website (http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol). Species lists to be used in developing seed mixes by community can be found on the Iowa NRCS Technical Resources webpage (http://www.ia.nrcs.usda.gov/technical/).

ZONE A	
MARSH, FRESHWATER BULRUSH	HERBACEOUS
MARSH, MIDWEST CATTAIL DEEP	HERBACEOUS
MARSH, MIDWEST MIXED EMERGENT DEEP	HERBACEOUS
MARSH, WILD RICE	HERBACEOUS
SWAMP, NORTHERN BUTTONBUSH	SHRUBLAND
WETLAND, AMERICAN LOTUS AQUATIC	HERBACEOUS
WETLAND, MIDWEST PONDWEED SUBMERGED AQUATIC	HERBACEOUS
WETLAND, SAGO PONDWEED SUBMERGED	HERBACEOUS
WETLAND, TAPE-GRASS SUBMERGED AQUATIC	HERBACEOUS
WETLAND, WATER-LILY AQUATIC	HERBACEOUS
ZONE B	
MARSH, ARROWHEAD - RICE CUTGRASS	HERBACEOUS
MARSH, BULRUSH - CATTAIL - BUR-REED SHALLOW	HERBACEOUS
MARSH, FRESHWATER BULRUSH	HERBACEOUS
MARSH, MIDWEST CATTAIL DEEP	HERBACEOUS
MARSH, MIDWEST MIXED EMERGENT DEEP	HERBACEOUS
MARSH, RIVER BULRUSH	HERBACEOUS
MARSH, WILD RICE	HERBACEOUS
SWAMP, NORTHERN BUTTONBUSH	SHRUBLAND
ZONE C	
FEN, BOG BIRCH - WILLOW PRAIRIE	SHRUBLAND
FEN, CENTRAL TALLGRASS	HERBACEOUS
FEN, NORTHERN SEDGE POOR	HERBACEOUS
FEN, NORTHERN TALLGRASS CALCAREOUS	HERBACEOUS
FEN, PRAIRIE TRANSITION RICH	HERBACEOUS
FEN, TUSSOCK SEDGE	HERBACEOUS
FOREST, PIN OAK MIXED HARDWOOD	FOREST
MARSH, BULRUSH - CATTAIL - BUR-REED SHALLOW	HERBACEOUS
MARSH, RIVER BULRUSH	HERBACEOUS
MEADOW, SKUNK-CABBAGE SEEPAGE	HERBACEOUS
MUD FLATS, RIVER	HERBACEOUS
POND, MIDWEST EPHEMERAL	HERBACEOUS
SEDGE MEADOW, CENTRAL MIDWEST	HERBACEOUS
SEEP, GREAT PLAINS NEUTRAL	HERBACEOUS
SHRUBLAND, SPECKLED ALDER SWAMP	SHRUBLAND
WET MEADOW, AWNED SEDGE	HERBACEOUS
WET MEADOW, BLUEJOINT - WOOLLY SEDGE	HERBACEOUS
WET MEADOW, LAKE SEDGE	HERBACEOUS
WET MEADOW, NORTHERN SEDGE	HERBACEOUS
WET MEADOW, TUSSOCK SEDGE	HERBACEOUS
ZONE D	
BRUSH, PRAIRIE GRAVEL WASH	HERBACEOUS
FOREST, ASPEN - AMERICAN HAZEL	FOREST
FOREST, BLACK WILLOW RIPAIRAN FOREST	FOREST
FOREST, BOXELDER FLOODPLAIN	FOREST
FOREST, BUR OAK - SWAMP WHITE OAK MIXED BOTTOMLAND	FOREST
FOREST, CENTRAL GREEN ASH - ELM - HACKBERRY	FOREST
FOREST, MIDWESTERN COTTONWOOD - BLACK WILLOW	FOREST
FOREST, RIVER BIRCH - SYCAMORE SMALL RIVER FLOODPLAIN	FOREST
FOREST, SILVER MAPLE - ELM	FOREST
MUD FLATS, RIVER	HERBACEOUS
POND, MIDWEST EPHEMERAL	HERBACEOUS
PRAIRIE, CENTRAL WET-MESIC TALLGRASS	HERBACEOUS
PRAIRIE, NORTHERN WET-MESIC TALLGRASS	HERBACEOUS
SHRUB MEADOW, DOGWOOD - MIXED WILLOW	SHRUBLAND
SHRUBLAND, SANDBAR WILLOW	SHRUBLAND
SHRUBLAND, WESTERN SNOWBERRY	SHRUBLAND
SHRUBLAND, WILLOW TEMPORARILY FLOODED	SHRUBLAND
WET PRAIRIE, CENTRAL CORDGRASS	HERBACEOUS
WET PRAIRIE, NORTHERN CORDGRASS	HERBACEOUS
WOODLAND, COTTONWOOD FLOODPLAIN	WOODLAND
WOODLAND, SWAMP WHITE OAK	WOODLAND
ZONE EM	
CLIFF, MIDWEST MOIST LIMESTONE - DOLOSTONE	HERBACEOUS
CLIFF, MIDWEST MOIST SANDSTONE	HERBACEOUS
FOREST, ASPEN - AMERICAN HAZEL	FOREST
FOREST, BASSWOOD - BUR OAK	FOREST
FOREST, CENTRAL MAPLE - BASSWOOD	FOREST
FOREST, NORTH-CENTRAL MAPLE - BASSWOOD	FOREST
FOREST, NORTHERN BUR OAK MESIC	FOREST
FOREST, RED OAK - SUGAR MAPLE - ELM	FOREST
FOREST, WHITE PINE DRIFTLESS BLUFF	FOREST
OPENING, NORTHERN BUR OAK	SAVANNA
OPENING,NORTH-CENTRAL BUR OAK	SAVANNA
PRAIRIE, CENTRAL MESIC TALLGRASS	HERBACEOUS
PRAIRIE, CENTRAL WET-MESIC TALLGRASS	HERBACEOUS
PRAIRIE, NORTHERN MESIC TALLGRASS	HERBACEOUS
PRAIRIE, NORTHERN WET-MESIC TALLGRASS	HERBACEOUS
SLOPE, ALGIFIC TALUS	HERBACEOUS
WOODLAND, SWAMP WHITE OAK	WOODLAND
WOODLAND, WESTERN TALLGRASS BUR OAK	WOODLAND
ZONE EX	
BARRENS, BLACK OAK - LUPINE	SAVANNA
CLIFF, MIDWEST DRY LIMESTONE - DOLOSTONE	HERBACEOUS
CLIFF, MIDWEST DRY SANDSTONE	HERBACEOUS
FOREST, BLACK OAK	FOREST
FOREST, BLACK OAK - WHITE OAK - HICKORY	FOREST
FOREST, MIDWESTERN WHITE OAK - RED OAK	FOREST
FOREST, NORTHERN PIN OAK - BUR OAK	FOREST
FOREST, WHITE OAK - HICKORY	FOREST
OPENING, NORTHERN BUR OAK	SAVANNA
OPENING,NORTH-CENTRAL BUR OAK	SAVANNA
PRAIRIE, CENTRAL TALLGRASS BIG BLUESTEM LOESS	HERBACEOUS
PRAIRIE, LITTLE BLUESTEM - PORCUPINE GRASS DRY-MESIC	HERBACEOUS
PRAIRIE, LITTLE BLUESTEM BEDROCK BLUFF	HERBACEOUS
PRAIRIE, LOESS HILLS LITTLE BLUESTEM DRY	HERBACEOUS
PRAIRIE, MIDWEST DRY GRAVEL	HERBACEOUS
PRAIRIE, MIDWEST DRY SAND	HERBACEOUS
PRAIRIE, MIDWEST DRY-MESIC	HERBACEOUS
PRAIRIE, NORTHERN LITTLE BLUESTEM GRAVEL	HERBACEOUS
TALUS, MIDWEST LIMESTONE - DOLOSTONE	HERBACEOUS
WOODLAND, CENTRAL MIDWEST WHITE OAK - MIXED OAK	WOODLAND
WOODLAND, CHINQUAPIN OAK BLUFF	WOODLAND
WOODLAND, NORTH-CENTRAL DRY-MESIC OAK	WOODLAND
WOODLAND, WESTERN TALLGRASS BUR OAK	WOODLAND

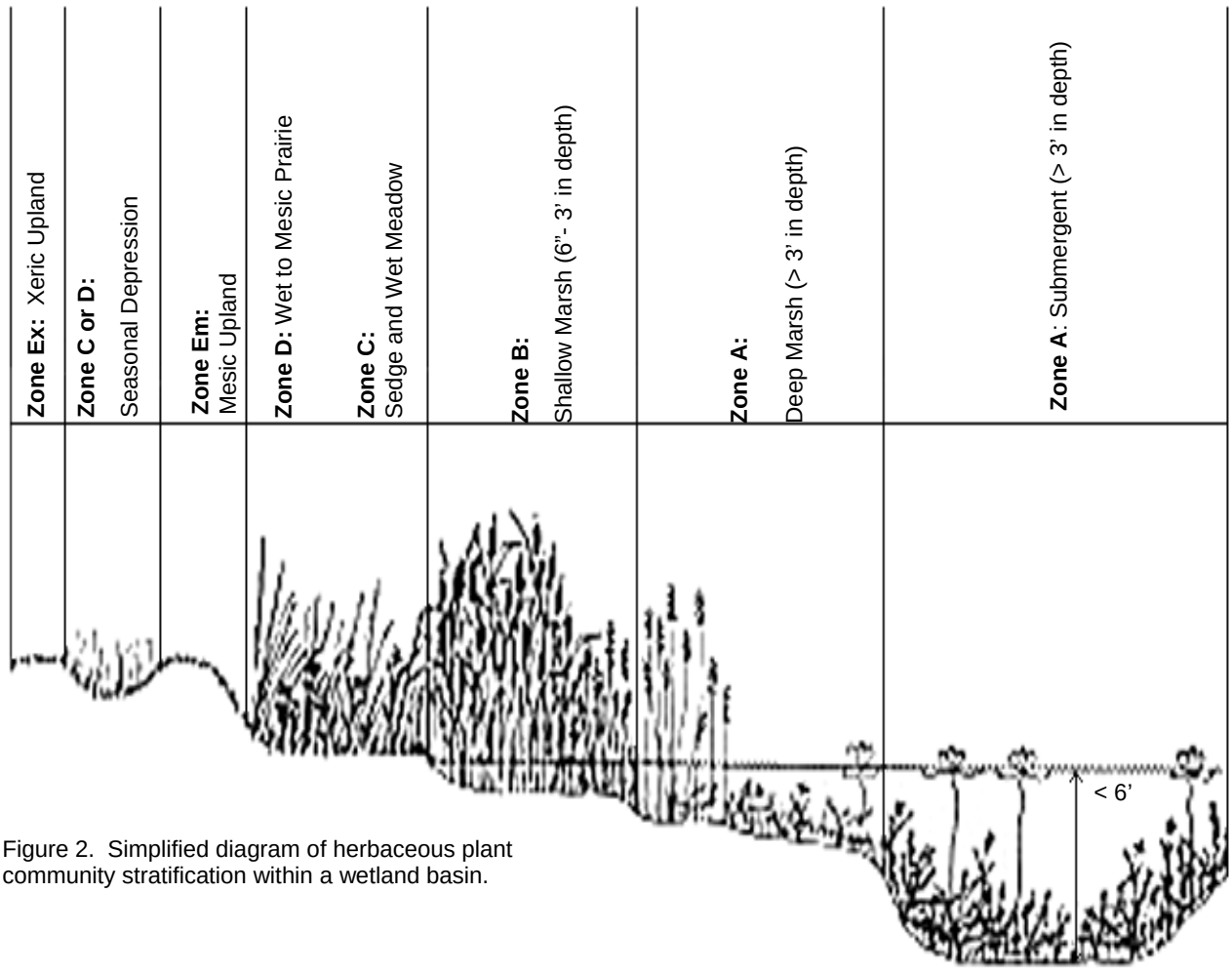

Figure 2. Simplified diagram of herbaceous plant community stratification within a wetland basin.

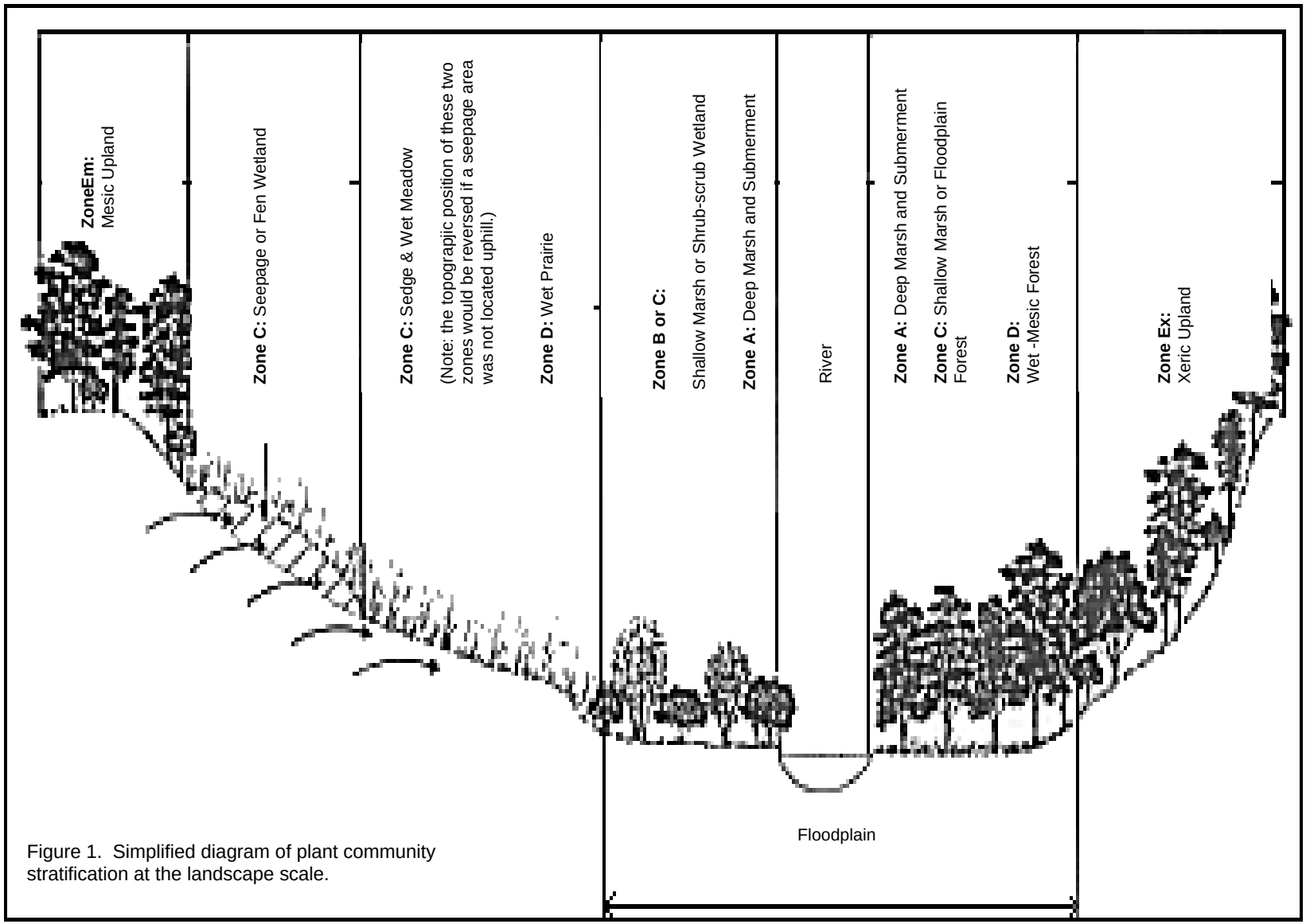

Figure 1. Simplified diagram of plant community stratification at the landscape scale.