NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET
WETLAND RESTORATION, CODE 657

GENERAL SPECIFICATIONS

Plans and specifications for wetland restoration shall be prepared for each site or management unit according to the NRCS-ME conservation practice standard 657, Criteria, Considerations, Specifications, and Operation and Maintenance. They shall be recorded on specification sheets, job sheets or their equivalent.

All activities shall comply with applicable federal, tribal, state, and local laws, rules and regulations.

Wetland Hydrology

Hydrology will be restored using one or more of the following:

1. Excavation

Where natural topographic relief has been removed from a site, excavation and use of fill may be necessary to recreate micro- and macrotopography. Excavations and use of fill will:

- incorporate the needs of target wildlife and aquatic species,
- develop natural micro- and macrotopographic features endemic to the wetland type being restored,
- not be conducted on well-drained soils,
- not exceed a depth of 48 inches in freshwater wetlands,
- be designed to maintain hydrology until at least July 15th under average rainfall conditions.

As mentioned above, wetland side slopes, shape and size will approximate the original wetland configuration. When this cannot be determined, excavated wetlands will have the following characteristics:

- Side slopes of 8:1 or flatter,
- Maximum depth of 48 inches,
- Minimum size of 0.1 acre,
- Two-thirds (⅔) of the surface area will be at varying depths from 6 to 18 inches,
- Will have irregular margins to maximize edge effect and provide cover for waterfowl, amphibians, reptiles, and other wetland dependent species.

Fill not needed as a seed source or for development of macrotopography will be removed from the wetland.

Channel development or excavation may be used in tidal wetlands to facilitate export of freshwater to achieve desired salinity levels.

2. Surface Drain Removal or Destruction

Use one or more of the following to eliminate the effects of subsurface drainage:

- remove or render inoperable at least the minimum length of drain according to Table 1,
  - remove flow enhancing material (e.g., sand, gravel), and
  - fill and compact the trench to approximate the density of adjacent wetland soils,
- all subsurface drains will be removed starting at ½ the minimum distance in Table 1 downstream of a planned embankment centerline.

3. Surface Drain Filling

Where open channels and shallow surface drains provide surface and subsurface drainage, and a compacted embankment will not be used, the channel or surface drain will be:

- Totally filled with soil appropriate for the intended purpose,
- Filled with a ditch plug or plugs to the full depth of the ditch, and length according to Table 1.
- Filled with a ditch plug or plugs to a height *less* than the full depth of the ditch, and length according to Table 1, with an outlet designed according to ME NRCS

conservation practice standard *Grade Stabilization Structure*, code 410, or *Structure for Water Control*, code 587.

Table 1. Minimum Length[1] of Drain to be Plugged, Removed or Rendered Inoperable

Soil Texture	Minimum Length (ft.)
Sandy or Organic	150
Loamy	100
Clayey	50

[1] The length is measured parallel to the direction of the settled ditch plug.

4. Level Ditches

When wetlands are connected by level ditches, the ditches will:

- Have a minimum excavated depth of 1 foot,
- Have a maximum depth that is 1 foot less than that of the wetlands,
- Side slopes no deeper than 3 horizontal to 1 vertical,
- Not cross or intersect a natural drain

5. Low Embankments

Structures are considered low embankments if all of the following apply:

- the embankment does not cross a perennial stream,
- the maximum height of fill, measured from the lowest point at the downstream toe to the top surface elevation along the embankment centerline, does not exceed 6 feet, and
- failure of the embankment will not result in loss of life, in damage to homes, commercial or industrial buildings, main highways, or railroads; or in the interruption of the use or service of public utilities.

Pond-style embankments will be designed and installed according to the ME NRCS conservation practice standard *Pond*, code 378.

A. Low embankments meeting the following conditions will be built according to the following criteria:

1. The watershed is 50 acres or less

AND

2. the drainage area average slope is less than 10%.

a. The structure must safely pass a 10-year 24-hour storm frequency. The earth embankment crest may serve as a service spillway where flows are infrequent enough to establish and maintain vegetation on the embankment.

b. When frequent flows occur, a water control structure or other measure will be installed to help maintain and establish vegetation on the embankment.

c. The embankment top width will be a minimum of 6 feet. No side slopes will be steeper than 5 horizontal to 1 vertical.

d. A core trench shall be provided under the embankment if more than 2 feet of water are impounded.

e. All drains shall be plugged according to the distances listed in Table 1. The plug shall be installed from the downstream edge of the core trench, if any, or the centerline of the embankment extending upstream.

f. All vegetation, topsoil and debris will be removed from the footprint of the embankment.

g. The design height shall be increased by the amount needed to insure that after settlement, the actual height of the embankment equals or exceeds the design height. This increase will not be less than 5% of the height of the embankment.

h. Seeding of embankments shall be established according to NRCS conservation practice standard *Critical Area Planting*, code 342, with the following exception - *reed canarygrass shall not be planted.*

i. Install antivortex devices, trash guards, screens to prevent fish entrainment, and beaver protection on water control devices, as appropriate.

B. Low embankments meeting the following conditions will be built according to the following criteria:

1. The watershed is greater than 50 acres

AND

2. the drainage area average slope is 10% or more.

   a. A spillway system shall be provided. It may consist of pipe and vegetated earthen spillway, or a single erosion resistant spillway designed to discharge runoff from a 25-year, 24-hour storm.

      i. For drainage areas less than 100 acres, the minimum pipe diameter will be 8 inches.

      ii. For drainage areas of 100 acres or more, the minimum pipe diameter will be 12 inches. Anti-seep collars will be used if the conduit is smooth, or is corrugated and larger than 12 inches in diameter.

      iii. Animal guards will be installed on all pipes.

   b. The auxiliary spillway will be sized to carry the 25-year, 24-hour peak discharge and designed to be stable. The spillway crest will be 0.5 feet above the crest of the service spillway. No freeboard is required between the elevation of the peak discharge in the auxiliary spillway and the embankment crest if the downstream embankment slope is 5 horizontal to 1 vertical or flatter; otherwise, a freeboard of 0.5 feet is required between the elevation of the peak discharge and the top of the embankment.

      i. For sites with favorable storage conditions, the 25-year peak discharge may be flood-routed to reduce the size of the auxiliary spillway.

   c. Vegetated spillways will be located on natural undisturbed soil. If an undisturbed swale is to serve as the spillway, the capacity and velocity shall be checked.

   d. Rock-lined spillways will have geotextile installed prior to placing the riprap.

   e. The embankment top width will be a minimum of 6 feet, with no side slopes steeper than 3 horizontal to 1 vertical.

   f. All drains shall be plugged according to the distances in Table 1. The plug shall be installed from the downstream edge of the core trench, if any, or the centerline of the embankment extending upstream.

   g. A core trench shall be provided under the embankment if more than 2 feet of water are impounded.

   h. All vegetation, topsoil and debris will be removed from the footprint of the embankment.

   i. The design height shall be increased by the amount needed to insure that after settlement, the actual height of the embankment equals or exceeds the design height. This increase will not be less than 5% of the height of the embankment.

   j. Install antivortex devices, trash guards, screens to prevent fish entrainment, and beaver protection on water control devices, as appropriate.

   k. Seeding of embankments shall be established according to NRCS conservation practice standard *Critical Area Planting*, code 342, with the following exception - *reed canarygrass shall not be planted.*

NRCS conservation practice standards and specifications for *Dike*, code 356, *Structure for Water Control*, code 378, *Pond*, code 378, and *Wetland Wildlife Habitat Management*, code 644 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.

Vegetative Restoration

Where planting and/or seeding is necessary, the minimum number of native species to be established shall be based upon native vegetative communities to be restored:

- Where the dominant vegetation will be herbaceous community types, a subset of the original vegetative community shall be established within 5 years; or, a suitable precursor to the original community will be established within 5 years that creates conditions suitable for the establishment of the native community. Species richness shall be addressed in the planning of herbaceous communities.
- Seeding rates shall be based upon percentage of pure live seed tested within 6 months of planting.

- Where the dominant vegetation will be forest or woodland community types, vegetation establishment will include a minimum of 6 species indigenous to the natural wetland community.

Refer to the appropriate ME NRCS conservation practice standard (e.g., *Riparian Forest Buffer*, code 391, *Forest Site Preparation*, code 490, *Tree and Shrub Establishment*, code 612, *Wetland Wildlife Habitat Management*, code 644, *Wetland Restoration*, code 657, *Upland Wildlife Habitat Management*, code 645, and ME Technical Notes\Exhibits *ME-01* and *ME-03* of the *National Biology Handbook*, when planning the vegetative component of a wetland restoration.

Coarse Woody Debris (CWD)

To perform identified function requirements, and specified native or engineered CWD will need to have the following design attributes:

- Consist of natural materials.
- Use will not degrade water quality.
- Meet historical cross-section and length expected from the natural wetland condition.
- High surface roughness, crevices, and crannies.
- High physical surface roughness to trap sediments, debris.
- High surface area to cross-section area ratio.
- Natural appearance after placement.
- Natural appearance of components and debris when the structure fails breaks-up or decays.
- Readily colonized by microorganisms, insects, and vegetation.

Use of Chemicals

All chemical use will follow requirements of NRCS practice standard *Pest Management*, code 595. Selection of a product shall be based on: (a) product effectiveness, (b) non-target species impacts, (c) toxicological risks, and (d) off-site movement of chemicals.

REFERENCES

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Thunhorst, G. A. 1993. Wetland Planting Guide for the Northeastern United States: plants for wetland creation, restoration, and enhancement. Environmental Concern, Inc, St. Michaels, Maryland. 179pp.

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- ME-01. Maine Biology Technical Note 1: upland wildlife grass & herbaceous planting recommendations for Maine.
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