NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATION GUIDE
WETLAND WILDLIFE HABITAT MANAGEMENT, CODE 644

GENERAL SPECIFICATIONS

Plans and specifications for Wetland Wildlife Habitat Management shall be prepared for each site or management unit according to the NRCS-ME conservation practice standard 644, 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.

Applicable Nesting Season Dates

Where wildlife is the primary resource concern, avoid and minimize disturbance during the primary nesting season (minimum - April 15 to July 15th; preferred - April 15 to August 1st).

Where wildlife is a secondary resource concern, avoid and minimize disturbance during April 15 to at least July 1st.

Micro- and Macrotopography Development

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

- incorporate the needs of target wildlife and aquatic species,
- develop natural micro- and macro-topographic 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 6:1 or flatter,
- Maximum depth of 48 inches,
- Minimum size of 0.2 acre,
- When possible, 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.

Water Management

To actively control and manage water levels, one must have:

- A dependable water supply,
- Elevations in the impounded area that permits water coverage at desired depths over a majority of the site,
- Water control structures that enable water to be supplied, distributed, and discharged at desired rates.

<u>Shallow Water Management</u>
Water levels must be able to be maintained between 1 to 18 inches in depth over the majority of the area during periods of planned inundation.

A. Drawdowns

- Shall need to occur at least once every 3 to 7 years to maintain healthy functioning of the wetland complex.
- Timing of drawdown should vary somewhat from year to year, as repetitive calendar driven management may lead to reduced productivity.
- Partial drawdown is preferred over complete removal of water. Greatest waterbird richness and abundance occurs at average water depths of 4-8 inches when topography varies 12 to 16 inches between deepest and shallowest depths (Taft et al. 2002).
- The timing and extent of a drawdown shall

be determined by the specific management need (e.g., Tables 1 & 2), desired vegetative response, and should consider impacts to non-target wildlife.

i. *Early drawdown – begins during the 1st 45 days of the growing season. Positive vegetative and invertebrate and bird response is well-known.*

ii. *Midseason drawdown* – begins after the 1st 45 days and prior to July 15th. Should be avoided. This period is typically during Maine's driest months, and productivity will suffer.

iii. *Late drawdown* – begins after July 15th. These are typically used to provide optimum habitat conditions for migrating waterfowl, or for the control of invasive species.

- Managed wetlands shall be maintained in a flooded condition during winter months.
- Slow drawdown shall proceed at a rate that will result in dewatering to the desired level over a 2 to 6 week period. A slow drawdown (< 5 cm/day) will result in much better seed germination, greater plant and animal species diversity and richness.
- Fast drawdown, those occurring within 3 to 7 days, are to be used only when nutrient and salt export is the management goal.

Refer to the appropriate ME NRCS conservation practice standard (e.g., *Pond*, code 516; *Dike*, code 356; *Structure for Water Control*, code 587; *Water Well*, code 642; *Wetland Restoration*, code 647,;*Wetland Enhancement*, code 657) when planning structural components.

B. 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 connected wetlands,
- Side slopes no deeper than 3 horizontal to 1 vertical,
- Not cross or intersect a natural drain.

C. Water Levels

Waterfowl Habitat

- Areas containing food plants will be flooded during seasonal periods of waterfowl use to an average depth of 6 – 10 inches.
- At least 50% of the area will have water depths less than 18 inches.
- At least 20% of the area shall be open water. The preferred ratio of open water to emergent marsh is approximately 50:50.

Shorebird Habitat

- Maximize exposed mudflats and areas with 1 – 4 inches of water during seasonal periods of shorebird use.
- To encourage food sources by maintaining a flooded overwinter condition to encourage invertebrates and shallowly re-flood disked, mowed, or harvested vegetation and maintain during periods of fall migration.

Amphibian Habitat

- In suitable wetland habitats (Table 3), inundation will be planned to last until July 15th with average water depths of 6 to 18 inches deep.
- Maintain or develop macro-topography over 30 – 50% of the wetland.

Vegetation Establishment

If vegetation establishment is needed to enhance shelter, food and\or to enable movement, the following shall be:

- Use natural regeneration and regeneration from existing seed banks whenever possible. During planning use the Wooded Wetland and Herbaceous Wetland Decision Keys in Section 1, Part D of NRCS (2003) to help decide if active regeneration or natural regeneration methods should be used.
- Plant material specifications shall include only high quality and adapted species.
- Native plants will be used wherever possible.
- When practical, local genotypes of native species will be used. Plant materials grown from collections within a 200 mile-radius of the site are considered local.
- Planting of noxious weeds and invasive species is prohibited.
- Site preparation, planting dates, and planting methods shall optimize vegetation survival and growth.
- If from a commercial source:

- Seeding rates shall be based upon percentage of pure live seed tested within 6 months of months of planting.
- Seed must be certified and properly labeled according to Maine and Federal law.

Table 1. Optimum Foraging Depths and Migration Chronology of Selected Water birds

Species	Foraging Depth (inches)[1]	Peak Spring Migration[2]	Peak Fall Migration
Northern Shoveler *Anas clypeata*	7 - 10	Feb - Apr	Sep - Nov
Northern Pintail *Anas acuta acuta*	6 - 9	Mar-Apr	Oct - Dec
Blue-winged Teal *Anas discors*	5 - 8	Aug - Oct	Apr
Green-winged Teal *Anas crecca carolinensis*	4 - 8	Mar-Apr	Sep - Nov
Mallard *Anas platyrhynchos platyrhynchos*	3 - 6	Mar - Apr	Oct - Dec
Black Duck *Anas rubripes*	3 - 6	Feb - Apr	Oct - Dec
Wood Duck *Aix sponsa*	3 - 9	Mar - Apr	Sep - Oct
Canada Goose *Branta canadensis*	0 - 3	Feb - Apr	Oct - Nov
Great Blue Heron *Ardea herodias*	4 - 7	Year-round	Year-round
Greater Yellowlegs *Tringa melanoleuca*	0 - 3	May	Aug - Sep
Lesser Yellowlegs *Tringa favipes*	0 - 3	early May	mid- Jul - Sep
Least Bittern *Ixobrychus exilis*	0 - 3	Apr - May	Sep
American Bittern *Botarus lentiginosus*	0 - 3	Mar - Apr	Sep - Nov
Virginia Rail *Rallus limicola*	0 - 2	Apr – early May	Sep - Oct
Spotted Sandpiper *Actitis macularia*	0 - 2	May	Jul - Aug
Common Snipe *Gallinago gallinago*	0 - 2	late Apr - May	Sep - Oct

[1] – Adapted from Fredrickson (1991), Belrose and Holm (1994)
[2] – Adapted from Belrose (1980), Poole (2005)

Table 2. Habitat Preferences of Selected Species (adapted from Hierl et al. 2007)

Species	***Wetland Basin (acre)***	***% Emergent***	***% Open Water***	***% Floating Leaved***	***% Shrub***
Common Loon *Gavia immer*	> 50	30 - 90	30 - 90	25 - 50	0 - 5
American Bittern	> 12.5	30 - 60	10 - 50	10 - 50	-
Green-backed Heron	< 12.5	-	20 - 40	-	10 - 40
Osprey *Pandion haliaetus*	> 25	-	40 - 80	-	-
Virginia Rail	> 25	25 - 60		-	10 - 50
Sora *Porzana carolina*	2.5 - 75	40 - 90	20 - 40	-	10 - 30
Common Snipe	3.75 – 12.5	33 - 66	5 - 50	-	5 - 20
Wood & Black Duck	> 2.5	20 - 70	0 - 30	0 - 20	0 - 40

Table 3. Vernal Pool Amphibian & Reptile Indicator Species in Maine

Species[1]	***Primary Habitat Preferences[2]***
Ribbon Snake *Thamnopsis sauritus*	Seasonally isolated wetlands, permanent wetlands, wet meadows, bogs and fens, hardwood forests
Wood Turtle *Clemmys insculpta*	Seasonally isolated wetlands, permanent wetlands, rivers
Spotted Turtle *Clemmys guttata*	Seasonally isolated wetlands, permanent wetlands, wet meadows, bogs and fens
Blanding's Turtle *Emydoidea blandingii*	Seasonally isolated wetlands, permanent wetlands
Wood Frog *Rana sylvatica*	Seasonally isolated wetlands, hardwood forests
Spotted Salamander *Ambystoma maculatum*	Seasonally isolated wetlands, hardwood forests
Blue-spotted Salamander *Ambystoma laterale*	Seasonally isolated wetlands, hardwood, xeric upland and pine forests

[1] – From Calhoun and deMaynadier (2004)
[2] – From Mitchell et al. (2006)

- seed will not contain primary noxious weeds, and secondary noxious weeds are within allowable state limits.
- 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.

- Long term (i.e., at least five years) survival of wetland plantings shall be a minimum of 70% areal coverage for herbaceous species, and greater or equal to 50% (stem count) for woody species.

Non-native, non-invasive, non-noxious plantings are allowed under the following conditions:

- When native plant regeneration cannot produce desired cover and food;
- Locally adapted native plant materials are not available;
- Native plant materials are too expensive to be practicable; and/or
- Native plant colonization will take too long to establish (e.g., soil stabilization, invasive species concerns).

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, Early Successional Habitat Development and Management, code 647, *Wetland Wildlife Habitat Management*, code 644, *Upland Wildlife Habitat Management*, code 645.

Vegetation Management

Naturally wetlands exhibit annual wet and dry seasons and cycle through unusually wet years and drought. These cycles have a dramatic influence on the distribution, composition, and production of wetland plant communities.

Many emergent wetlands are actively managed to create a hemi-marsh condition (i.e., 50% emergent marsh: 50% open water) with lots of habitat interspersion and irregular edge to provide escape, nesting, rearing, and foraging conditions. Such management benefits waterfowl and other wetland dependent wildlife.

Avoid and minimize disturbance during the primary nesting season (April 15 to August 1st).

Invasive species, federal and state listed noxious plant species, and nuisance species (e.g., those whose presence or overpopulation jeopardize the practice) shall be controlled at less than 15% areal coverage. Control methods shall be specified.

Typical methods used to manage vegetation in wetlands include, but are not limited to:

1. Shallow Disking

Typically used to stimulate seed germination from existing seedbanks (early spring disking) or to control undesirable species (late fall disking). For species control, the area is either kept dry, or is immediately deep flooded depending on species response to dry or saturated soils, and inundation.

   a. Disks should run parallel, or nearly so, to the direction of travel and at a depth of only 2 to 4 inches.

2. Deep Disking

Use primarily to control undesirable species. The area is either kept dry, or is immediately deep flooded depending on species response to dry or saturated soils, and inundation.

   a. Disks should run parallel, or nearly so, to the direction of travel and at a depth of > 4 inches.

3. Mowing\Brushhogging

Mechanical treatments are primarily used to remove an overstory of undesirable species to release desirable species. Often it is used to remove dead stalks of undesirable species after chemical treatment to release native species in the seedbank. Mowing can be done on ice when dormant vegetation extends above the surface.

4. Water Management

Primarily used in impoundments where flooding and dewatering can be controlled. See water management section on page 1.

5. Chemical Control

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.

Risk will be evaluated with NRCS' Windows Pesticide Screening Tool (WIN-PST) and negative affects minimized.

6. Biological Control

Biological control involves the use of natural enemies such as parasitoids, predators, pathogens, antagonists or competitors to suppress pest populations. Check with the USDA –Animal and Plant Health Inspection Service on the availability biological control agents, their proper use, and permit requirements.

- Natural appearance of components and debris when the structure fails breaks-up or decays.
- Readily colonized by microorganisms, insects, and vegetation.

Amphibian and Reptile Management

Management of vernal pools and wetlands for amphibian and reptiles must include adjacent

upland habitat to support the complete life cycle of at least one endemic species. At a minimum the specifications in Table 4 are to be followed.

Supplemental Cover

Artificial Denning and Nesting Structures - Follow construction, placement, density and maintenance recommendations provided in NRCS' Fish and Wildlife Habitat Management Leaflet, No. 20, *Artificial Nesting Structures* or biology technical note *ME-02*.

Table 4. Minimum Specifications[1] for Amphibian and Reptile Management

Management Zone	Primary Wildlife Values	Desired Conditions	Required Management
Vernal Pool Basin	Breeding pool, egg attachment sites	Good water quality, water holding capacity to approximately July 15th, fringe emergent herbaceous and shrub vegetation	***No disturbance***
Protection Zone[2] (≥ 100 feet)	Shade, nutrient inputs, upland staging area for dispersing amphibians and nesting reptiles	Heavily shaded ground cover consisting of deep, moist, uncompacted litter, abundant coarse woody debris, rocks walls, brush piles	***Limited Harvest*** • > 75% canopy cover, • Harvest during frozen or dry conditions, • Minimize heavy machinery, • Leave abundant coarse woody debris from logging operation
Amphibian Life Zone (≥ 400 feet)	Upland habitat for adult amphibians and reptiles	Partially shaded, ground cover consisting of deep moist, uncompacted litter, abundant coarse woody debris, rocks walls, brush piles	***Partial Harvest*** • > 50 canopy cover • Openings < 1 acre • Harvest during frozen or dry conditions, • Minimize heavy machinery, • Leave abundant coarse woody debris from logging operation

[1] – Adapted from Calhoun and deMaynadier (2004)
[2] – Zones start from the perimeter of the vernal pool basin as denoted by spring high water.

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.

REFERENCES

Bellrose, F.C. 1980. Ducks, Geese and Swans of North America. Stackpole Books, Harrisburg, PA. 540pp.

Bellrose, F.C. and D.J. Holm. 1994. Ecology and Management of the Wood Duck. Stackpole Books, Harrisburg, PA. 588pp.

Calhoun, A.J.K. and P. deMaynadier. 2004. Forestry Habitat Management Guidelines for Vernal Pool Wildlife. MCA Technical Paper No. 6, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, N.Y. 32pp.

Fredrickson, L.H. 1991. Strategies for Water Level Manipulations in Moist-soil Systems. Fish and Wildlife Leaflet 13.4.6 in the Waterfowl Management Handbook, U.S. Fish and Wildlife Service, Washington, DC. 8pp.

Hierl, L.A., C. S. Loftin, J.R. Longcore, D.G. McAuley, and D.L. Urban. 2007. A Multivariate Assessment of Changes in Wetland Habitat for Waterbirds at Moosehorn National Wildlife Refuge, Maine, USA. Wetlands 27(1): pp141-152.

Maschhoff, J.T & J.H. Dooley, 2001. Functional Requirements and Design Parameters for Restocking Coarse Woody Features in Restored Wetlands, ASAE Meeting Presentation, Paper No: 012059.

Mitchell, J.C., A.R. Breisch, and K.A. Buhlmann. 2006. Habitat management guidelines for amphibians and reptiles of the northeastern United States. Partners in Amphibian and Reptile Conservation, Technical Publication HMG-3, Montgomery, Alabama. 108pp.

Neckles, H.A. and M. Dionne, Editors. 2000. Regional Standards to Identify and Evaluate Tidal Wetland Wildlife Habitat Management in the Gulf of Maine. Wells National Estuarine Research Reserve Technical Report, Wells, ME. 21pp.

Poole, A.,P. Stettenheim and F. Gill, Eds. The Birds of North America. Philadelphia: The Academy of Natural Sciences; Washington, DC: The American Ornithologists' Union.
- Butler, R.W. 1992. Great Blue Heron, No. 25
- Elphick, C.S and T.L. Tibbits. 1998. Greater Yellowlegs, No. 355.
- Tibbits, T.L. and W. Moskoff. 1999. Lesser Yellowlegs, No. 427.
- Gibbs, J.P., F.A.. Reid and S.M. Melvin. 1992. Least Bittern, No. 17.
- Gibbs, J.P., S.M. Melvin and F.A.. Reid. 1992. American Bittern, No. 18.
- Conway, C.J. 1995. Virginia Rail, No. 173.
- Oring, L.W., E.M. Gray and J.M. Reed. 1997. Spotted Sandpiper, No. 289.
- Mueller, H. 1999. Common Snipe, No. 417.

Taft, O.W., M.A. Colwell, C.R. Isola, and R.J. Safran. 2002. Waterbird responses to experimental drawdown: implications for multispecies management of wetland mosaics. Journal of Applied Ecology. 39:987-1001.

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

USDA, NRCS. 2003. ECS 190-15 Wetland Wildlife Habitat Management, Enhancement, Management & Monitoring. 425pp.

USDA, NRCS.2004. National Biology Handbook. Washington, DC.
- ME-02. Maine Biology Technical Note 2: Nest & den box specifications and designs.

USDA, NRCS. 1992. Engineering Field Handbook, Part 650.
- Chapter 6: Structures
- Chapter 13: Wetland Restoration, Enhancement, or Creation.

USDA, NRCS. 2010. Field Indicators of Hydric Soils in the United States, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

USDA, NRCS. Maine Electronic Field Office Technical Guide (eFOTG).

USDA, NRCS. National Fish and Wildlife Habitat Management Leaflets and Technical Notes.