

**Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
WETLAND CREATION
Code 658
(Ac)**

Current	Proposed
<p>DEFINITION A wetland created on a site location that was historically not a wetland.</p>	<p>DEFINITION The establishment of abiotic site characteristics (e.g., water control features, topographic features, and substrate) that result in reoccurring periods of soil saturation or inundation during the growing season on a site that was historically not a wetland.</p>
<p>PURPOSE This practice is used to accomplish one or more of the following primary purposes:</p> <ul style="list-style-type: none"> • Create wetland functional capacity for floodwater storage • Create wetland functional capacity to provide fish and wildlife habitat • Create a native plant community adapted to growth and regeneration in anaerobic conditions <p>In addition to one or more of the primary purposes, this practice can be applied to create wetland functional capacity to improve water quality.</p>	<p>PURPOSE This practice supports one or more of the following purposes:</p> <ul style="list-style-type: none"> • Create hydrologic conditions (inundation or soil saturation) conducive to the establishment and growth of hydrophytic plants. • Create hydrologic conditions to provide habitat for wetland-dependent wildlife. • Create hydrologic conditions to provide floodwater storage. • Create hydrologic conditions suitable for the sequestration of nutrients, elements, and compounds.
<p>CONDITIONS WHERE PRACTICE APPLIES This practice applies to all Natural Resources Conservation Service (NRCS) land uses, where wetland hydrology can be established on a site that was historically not a wetland.</p> <p>This practice does not apply to—</p> <ul style="list-style-type: none"> • Wetlands for the single purpose of treating wastewater or providing other water quality functions. Use NRCS 	<p>CONDITIONS WHERE PRACTICE APPLIES This practice applies to all Natural Resources Conservation Service (NRCS) land uses, where the site was not historically a wetland.</p> <p>Common supporting NRCS Conservation Practice Standards (CPS) are:</p> <ul style="list-style-type: none"> • CPS Dike or Levee (Code 356) or CPS Diversion (Code 362), used to construct a dike, diversion, or berm. • CPS Structure for Water Control (Code 587), used to install a water control structure.

Conservation Practice Standard (CPS) Constructed Wetland (Code 656).

- Water impoundment for the exclusive purpose of storing permeant water. Use NRCS CPS Pond (Code 378).
- The management of fish and wildlife habitat created under this standard. Use NRCS CPS Wetland Wildlife Habitat Management (Code 644).
- The management of water for the exclusive purpose of providing seasonal habitat for fish and/or wildlife. Use NRCS CPS Shallow Water Development and Management (Code 646).
- The treatment of point and nonpoint sources of water pollution. Use NRCS CPS Constructed Wetland (Code 656).
- The rehabilitation of a degraded wetland or the reestablishment of a former wetland so that soils, hydrology, vegetative community, and habitat are a close approximation of the original natural condition and boundary that existed prior to the modification. Use NRCS CPS Wetland Restoration (Code 657).
- The rehabilitation of a degraded wetland, the reestablishment of a former wetland, or the modification of an existing wetland, where specific wetland functions are augmented beyond the original natural conditions; possibly at the expense of other functions. Use NRCS CPS Wetland Enhancement (Code 659).
- Construction of a dam with significant or high hazard potential as defined in the NRCS National

Associated CPS commonly installed prior to, concurrent with, or following installation of this wetland creation are:

- CPS Seasonal Water Management for Wildlife (Code 646), used to manage the water (inundation or soil saturation) to meet the target hydroperiods (depth, duration, timing, and frequency of inundation or soil saturation).
- CPS Wildlife Habitat Planting (Code 420) or CPS Tree and Shrub Establishment (Code 612), used to plant perennial vegetation.
- CPS Wetland Wildlife Management (Code 644), used to manage wetland wildlife habitat or to plant annual vegetation.
- CPS Stream Habitat Improvement and Management (Code 395), used to improve or manage the ecological conditions of a stream adjacent to the created wetland.
- CPS Brush Management (Code 314) or Herbaceous Weed Treatment (Code 395), used to control undesirable species.
- CPS Forest Stand Improvement (Code 666), used to manage the species composition or density of existing trees.
- CPS Prescribed Burning (Code 338), used to restore or manage the plant community, or for site preparation.
- CPS Prescribed Grazing (Code 528), used to manage the vegetation with livestock.
- CPS Structures for Wildlife (Code 649), used to address abiotic structures for wildlife (e.g., elevated sandy mounds to provide subsurface nesting sites for invertebrates, reptiles, and ground nesting mammals; course woody debris to provide shelter and foraging habitat for invertebrates, reptiles, and mammals; and elevated earthen pads to provide escape cover during periods of elevated water levels).

This practice does not apply to:

- Constructing wetlands for the single purpose of treating wastewater or providing other water quality functions. Use CPS Constructed Wetland (Code 656).

	<ul style="list-style-type: none"> • Restoring the original abiotic conditions to an area that was once an undisturbed and naturally occurring wetland. Use CPS Wetland Restoration (Code 657). • Rehabilitating a degraded wetland, reestablishment of a former wetland, or modifying an existing wetland, where specific wetland functions are augmented beyond the original natural wetland conditions, possibly at the expense of other functions. Use CPS Wetland Enhancement (Code 659). • Installing subsurface perforated pipe to distribute drainage system discharge beneath a vegetated buffer. Use CPS Saturated Buffer (Code 604). • Impounding water for the exclusive purpose of storing permanent water. Use CPS Pond (Code 378). • Constructing a dam with significant or high hazard potential as defined in the NRCS National Engineering Manual (Title 210), Part 520, Subpart C, "Dams," Section 520.21.
<p>CRITERIA General Criteria Applicable to All Purposes The created wetland must support wetland hydrology. For this practice, wetland hydrology is defined broadly as shallow inundation or saturation at or near the surface of the substrate (National Research Council, 1995), for a duration sufficient to create anerobic conditions within the plant rooting zone.</p> <p>The hydroperiod (depth, duration, frequency, and timing of wetting events) and dominant water source must meet the wetland creation objectives.</p> <p>The minimum wetland hydrology design criteria for this standard is (i) shallow inundation for 14 consecutive days during the growing season or (ii) soil saturation within 6 inches of the soil surface for 14 consecutive days during the growing season. The growing season is determined with the use of NRCS Wetlands (WETS) Climate Tables, using 28 degrees Fahrenheit and 50 percent probability and can be found at http://agacis.rcc-acis.org. Utilize DrainMod, SPAW or another NRCS approved water budget based analysis tool identified in the</p>	<p>CRITERIA General Criteria Applicable to All Purposes The hydrology (frequency, depth, duration, and timing of inundation or soil saturation) of the created wetland will address the identified resource concern(s).</p> <p>Identify the project area's physical constraints (e.g., soils and watershed size) and legal constraints (e.g., property boundaries, flood prevention levees, public drainage systems, utility easements, and water rights) to assure the project objectives can be met.</p> <p>Anticipate sediment loads and install upgradient sediment mitigation measures if needed to assure the functional life of the practice is obtained.</p>

NRCS National Engineering Handbook (Title 210), Part 650, Chapter 19, "Hydrology Tools for Wetland Identification and Analysis", to predict hydroperiod details for wetland creations with surface runoff hydrologic source. Design elevations need to consider water source elevations for created wetlands influenced primarily by ground water.

Soil and geologic material investigations, such as a pit trench, boring or other suitable investigations shall be conducted to characterize suitability of soil materials to support wetland hydrology.

Remove, render inoperable, or relocate any surface or subsurface drains that exist in the planned wetland area. This includes the perimeter of the wetland area for a distance equal to or greater than the lateral effect distance of the subsurface drain, as computed using methods in the NRCS National Engineering Handbook (Title 210), Part 650, Chapter 19, "Hydrology Tools for Wetland Identification and Analysis." Treatment for subsurface drains may also include replacing perforated pipe with nonperforated pipe. Treatment for surface drains may include ditch plugs, with or without water control structures, to ensure that the site can hold water and water flow is controlled in a nonerosive manner. If ditch plugs are used, design according to the criteria in NRCS CPS Dike (Code 356).

If an embankment is needed to accomplish the wetland objectives, design the embankment according to NRCS CPS Dike (Code 356). Include a principal spillway according to NRCS CPS Structure for Water Control (Code 587) as needed for water level control and to maintain the target pool level for adequate freeboard.

For noncropped areas, ensure the created wetland supports wetland vegetation adapted for growth under prolonged periods of soil saturation or inundation. Where natural colonization of species meeting the practice purpose is expected, the created wetland may be left to revegetate naturally. Otherwise, target plant species will be established by seeding or planting using a vegetative establishment NRCS conservation practice standard meeting the project purpose. For cropped areas, modify the cropping system in consideration of the planned wetland hydrologic regime.

<p>If tree planting is conducted, use NRCS CPS Tree/Shrub Establishment (Code 612) or Riparian Forest Buffer (Code 391). If planting herbaceous vegetation, use NRCS CPS Conservation Cover (Code 327) or Wildlife Habitat Planting (Code 420).</p> <p>If needed to meet the practice purpose, ensure adequate water rights are available (timing and amount of water).</p> <p>Avoid or implement mitigation measures if the site is suspected or confirmed of containing hazardous material.</p>	
<p><u>Additional Criteria for Creating Wetland Functional Capacity for Floodwater Storage or Storage of Water to Reduce Downstream Flooding</u></p> <p>If needed, install a water control structure according to NRCS CPS Structure for Water Control (Code 587).</p> <ul style="list-style-type: none"> • Manage the structure to ensure floodwater storage capacity is available prior to the normal wet season. • Utilize WebWIMP (Matsuura et al., 2003) https://davinci.geog.udel.edu/~wimp/ or another climate-based prediction tool, to determine the normal wet portion of the year. • Design the water control structure to allow for a maximum 7-day drawdown period, while maintaining the designed minimum wetland hydrology. • Manage the structure to maintain wetland hydrology criteria following drawdown. 	<p><u>Additional Criteria to Create Hydrologic Conditions (Inundation or Soil Saturation) Conducive to the Establishment and Growth of Hydrophytic Plants</u></p> <p>Use local reference site information, NRCS ecological site description, or other technical sources to assure the target hydroperiods (depth, duration, frequency, and timing of inundation or soil saturation) will align with the wetness tolerance of the target plant community.</p>
<p><u>Additional Criteria for Creating Wetland Functional Capacity for Fish and Wildlife Habitat</u></p> <p>Conduct a suitable wildlife habitat evaluation based on as-built conditions to ensure needs of target species will be met.</p> <p>Utilize NRCS CPS Wildlife Habitat Planting (Code 420) for all herbaceous or shrub vegetative plantings within the wetland. If Wildlife Habitat Planting (Code 420) is not available, the use of</p>	<p><u>Additional Criteria for Creating Hydrologic Conditions to Provide Habitat for Wetland Dependent Wildlife</u></p> <p>Conduct a suitable wildlife habitat evaluation to ensure the hydrologic conditions will meet the habitat needs of the target wetland dependent wildlife.</p> <p>If CPS Structure for Water Control (Code 587) is implemented, CPS Seasonal Water Management for</p>

<p>NRCS CPS Conservation Cover (Code 327) can be utilized but be implemented with wildlife as the purpose.</p> <p>If NRCS CPS Structure for Water Control (Code 587) is implemented, NRCS CPS Shallow Water Development and Management (Code 646) or NRCS CPS Wildlife Habitat Management (Code 644) will be applied to optimize the management of water for the target fish or wildlife species.</p>	<p>Wildlife (Code 646) will be applied to optimize the management of water for the target wildlife species.</p>
<p><u>Additional Criteria for Creating a Native Plant Community Adapted to Growth and Regeneration of Anaerobic Conditions</u></p> <p>Identify the target native plant community with the use of a local reference site, NRCS ecological site description, or another source (e.g., Nature Serve).</p>	<p><u>Additional Criteria to Create Hydrologic Condition to Provide Floodwater Storage</u></p> <p>If needed, install a water control structure according to CPS Structure for Water Control (Code 587).</p> <ul style="list-style-type: none"> • Manage the structure to ensure floodwater storage capacity is available the normal wet portion of the year. • Utilize WebWIMP (Matsuura et al., 2003) Web WIMP (udel.edu) or another climate-based prediction tool, to determine the normal wet portion of the year. • Design the water control structure to allow for a maximum 7-day drawdown period. • Manage the structure to maintain target hydrology following drawdown, or during the anticipated dry portion of the year.
<p><u>Additional Criteria for Creating Wetland Functional Capacity for Water Quality</u></p> <p>For noncropped areas, establish vegetation based on the plants' ability to address the identified water quality concern (e.g., filter sediments and sequester nutrients and pesticides). For cropped areas, select a cropping system to ensure water quality function addresses the water quality concern.</p> <p>When nitrate sequestration is an objective—</p> <ul style="list-style-type: none"> • Design the wetland to maximize the number of periods of anaerobic and aerobic conditions in the substrate during the growing season. 	<p><u>Additional Criteria to Create Hydrologic Conditions Suitable for the Sequestration of Nutrients, Elements, and Compounds</u></p> <p>When nitrate sequestration is an objective—</p> <ul style="list-style-type: none"> • Within the constraints of the site, other purposes, and water source, maximize the number of anaerobic/aerobic events in the substrate during the growing season to assure soil organic matter production and anerobic conditions, as both are necessary for denitrification.

<ul style="list-style-type: none"> If a cropped wetland, utilize crops with high nitrogen demand. Forego application of nitrogen fertilizer. 	
<p>CONSIDERATIONS On all wetlands being created—</p> <ul style="list-style-type: none"> Treat excessive soil erosion within the wetland's immediate watershed to ensure the wetland functions as designed over the practice life. If this is not feasible, utilize NRCS CPS Sediment Basin (Code 350). Excavation, grading, mechanical compaction, or soil amendments may be needed to support wetland hydrology. Avoid sites with steep topographic gradients, consider and use sites with natural topography when possible. Avoid the construction on sites where large amounts of sulfur (S), iron (Fe) and aluminum (Al) or any acid sulfate bearing minerals (examples: jarosite, pyrate) could be present. Adjust target conditions based on the nutrient and pesticide tolerance of the plant and animal species likely to occur where known nutrient and pesticide contamination exists. If soil carbon is inadequate, add coarse woody debris or sawdust, as appropriate to improve soil carbon content. Establish fish and wildlife corridors by linking the site to adjacent landscapes, streams, and waterbodies. This may increase the potential for colonization of the site by native flora and fauna. Add substrate materials from a donor wetland to provide organic matter and a seed bank of hydrophytes if the target conditions are local genotypes, and such materials are not commercially available. Inventory donor site to determine risk of introducing invasive and noxious plants. Control invasive and noxious plants. 	<p>CONSIDERATIONS On all created wetlands—</p> <ul style="list-style-type: none"> In some situations, a sediment basin installed upgradient of project area with the use of CPS Sediment Basin (Code 350), will extend the functional life of the created wetland. High levels of sulfur (S), iron (Fe), aluminum (Al), or sulfate bearing minerals (examples: jarosite and pyrite) can reduce vegetative production and rates of denitrification. Amendment of soil carbon will improve soil tilth and may increase the rate of vegetative establishment and cover. Wetland creation can impact down-gradient aquatic resources (e.g., water temperature, flows, and water availability). <p>On created wetlands with water control capabilities—</p> <ul style="list-style-type: none"> Predation of aquatic organisms may increase under planned water management regimes. The impacts to the ingress and egress of aquatic organisms may warrant implementation of CPS Aquatic Organism Passage (Code 396).

<ul style="list-style-type: none"> • Modify design to minimize offsite impacts related to water temperature, flows, and water availability. <p>On created wetlands with water control capabilities—</p> <ul style="list-style-type: none"> • Assess the potential increased predation of aquatic organisms under planned water management regimes. Modify water management as needed. • Implement NRCS CPS Aquatic Organism Passage (Code 396). 	
<p>PLANS AND SPECIFICATIONS</p> <p>Prepare plans and specifications in accordance with the criteria of this standard and describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include—</p> <ul style="list-style-type: none"> • A site-specific plan view of the practice showing the main features of the project. • Typical profiles and cross sections of berms, excavated side slopes, spillways, and other earthen features. • Detail drawings of structures and appurtenances, as applicable. • Specifications that include materials, quantities, methods, sequence, and timing of project implementation needed to create the target hydroperiod (depth, duration, timing, and frequency) of saturation or inundation. • Conservation practice standard specifications for the vegetative establishment practice used including a schedule of the measurable or observable success criteria for target vegetative conditions. 	<p>PLANS AND SPECIFICATIONS</p> <p>Prepare plans and specifications in accordance with the criteria of this standard and describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include—</p> <ul style="list-style-type: none"> • A description of the target hydroperiod (depth, duration, timing, and frequency) of saturation or inundation. DrainMod, or any other NRCS approved water-budget tool provided in the NRCS National Engineering Handbook (Title 210), Part 650, Chapter 19, "Hydrology Tools for Wetland Identification and Analysis," have utility to predict hydroperiod for wetland creation with surface runoff hydrologic source. • A site-specific plan view of the main features of the project. • Typical berm profiles, excavated side slopes, spillways and other earthen features. • Detail drawings of structures and appurtenances, as applicable. • Specifications that include materials, quantities, methods, sequence, and timing of project implementation needed to fully apply the practices.

<p>OPERATION AND MAINTENANCE</p> <p>The operation and maintenance plan will include the actions necessary to ensure installed conservation practice standards are maintained for the life of the practice. It will include—</p> <ul style="list-style-type: none"> • Inspection schedules. • A list of items requiring inspection. • Procedures and documentation requirements for inspections. 	<p>OPERATION AND MAINTENANCE</p> <p>The operation and maintenance plan will include the actions necessary to ensure installed CPSs are maintained for the life of the practice. It will include—</p> <ul style="list-style-type: none"> • Inspection schedules. • A list of items requiring inspection. • Procedures and documentation requirements for inspections.
<p>REFERENCES</p> <p>National Research Council. 1995. Wetlands: Characteristics and Boundaries. Washington, D.C.: The National Academies Press. https://doi.org/10.17226/4766</p> <p>Matsuura K., C. Willmott, and D. Legates. 2003. “WebWIMP, The Web-Based Water-Budget, Interactive, Modeling Program.” University of Delaware. Accessed July 14, 2020. https://davinci.geog.udel.edu/~wimp/</p> <p>USDA NRCS. 2008. National Engineering Handbook (Title 210), Part 650, Chapter 13, Wetland Restoration, Enhancement, or Creation. Washington, D.C. https://directives.sc.egov.usda.gov/</p> <p>USDA NRCS. 2015. National Engineering Handbook (Title 210), Part 650, Chapter 19, Hydrology Tools for Wetland Identification and Analysis. Washington, D.C. https://directives.sc.egov.usda.gov/</p> <p>USDA NRCS. 2003. Technical Note (Title 190), Biology 15, Wetland Restoration, Enhancement, and Management. Washington, D.C. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010838.pdf</p>	<p>REFERENCES</p> <p>Matsuura K., C. Willmott and D. Legates. 2003. “WebWIMP, The Web-Based Water-Budget, Interactive, Modeling Program.” University of Delaware. Accessed July 27, 2023. Web WIMP (udel.edu)</p> <p>National Research Council. 1995. Wetlands: Characteristics and Boundaries. Washington, D.C.: The National Academies Press. https://doi.org/10.17226/4766</p> <p>USDA NRCS. 2008. National Engineering Handbook (Title 210), Part 650, Chapter 13, Wetland Restoration, Enhancement, or Creation. Washington, D.C. https://directives.sc.egov.usda.gov/</p> <p>USDA NRCS. 2003. Technical Note (Title 190), Biology 15, Wetland Restoration, Enhancement, and Management. Washington, D.C. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010838.pdf</p> <p>USDA NRCS. 2015. National Engineering Handbook (Title 210), Part 650, Chapter 19, Hydrology Tools for Wetland Identification and Analysis. Washington, D.C. https://directives.sc.egov.usda.gov/</p>