

# KEY TO THE DELAWARE ESTUARY ECOLOGICAL SYSTEMS & NATURAL COMMUNITIES



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# A KEY TO THE DELAWARE ESTUARY ECOLOGICAL SYSTEMS AND NATURAL COMMUNITIES: VERSION I

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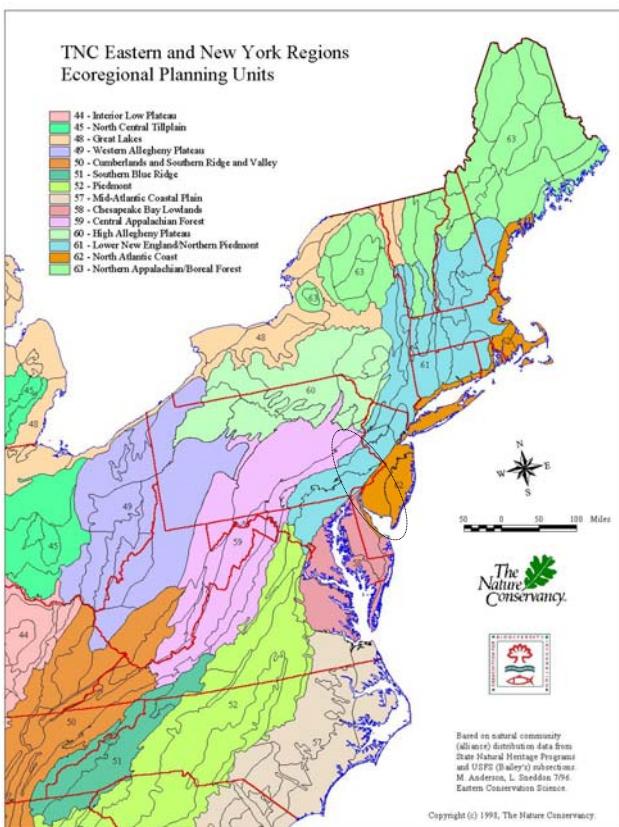
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## INTRODUCTION

This document was produced to aid land managers in their efforts to identify and map vegetation types using a standard classification system. This system, the National Vegetation Classification (NVC), is managed and refined by NatureServe. It was developed in collaboration with a network of ecologists from Natural Heritage programs across the country, as well as scientists in The Nature Conservancy, federal agencies and academia. The NVC provides a common language that ensures that vegetation types (associations) that are the same but occur across jurisdictional lines (counties, states, refuges, or other political boundaries) are recognized, named and described as the same entities.

For example, swamps dominated by Atlantic white cedar are known variously as "Southern New England basin swamp", "cedar swamp", "*Chamaecyparis thyoides* / *Vaccinium corymbosum* community", "white cedar swamp forest" and other names in the literature. In some cases the description is confined to a single site, or it may encompass all cedar swamps of the Atlantic coast; it may include swamps with admixtures of deciduous trees, or an entire wetland complex. All of these descriptions are legitimate types, but they are not comparable beyond the studies in question. The NVC defines an association with a scientific name of "*Chamaecyparis thyoides* / *Ilex glabra* - *Rhododendron viscosum* Forest" and a common name of "Coastal Plain Atlantic White-cedar Swamp", which is applied to *Chamaecyparis thyoides* (Atlantic white cedar) -

dominated vegetation of the coastal region from Massachusetts to New Jersey. It does not include portions of the wetland that are dominated by red maple, nor does it include white cedar-dominated vegetation of Delaware, Maryland or Virginia, or cedar swamps of more inland regions. Those vegetation types are separately defined and named associations in the NVC. The NVC also cross-references commonly used names for similar vegetation, and provides a measure of how rare or common the type is across its known range.



**Figure 1.** The biological diversity of the region is owed, in part, by its physical location, crossing four eco-regions. The dotted oval indicates the approximate coverage of the Delaware Estuary watershed within an ecoregional context.

This document is a key to the subset of Ecological Systems and NVC Associations occurring in the Delaware Estuary watershed, which includes portions of southeastern Pennsylvania, southern New Jersey, and the northeastern shore of Delaware. The Delaware Estuary occurs across four ecoregions: the Central Appalachian Forest, the Lower New England/Northern Piedmont, the North Atlantic Coast, and the Chesapeake Bay Lowlands (Figure 1.). Eco-regions represent geographically distinct assemblages of vegetation types that have similar ecological dynamics, comparable environmental conditions and share many of the same species. Although we have attempted to

describe all possible vegetation types occurring in the watershed area, not all stands easily fit into the keys. Studies and inventories have not been made of every piece of land. Human impacts on the landscape have imposed changes on vegetation that are not always easy to discern. The very act of classification imposes an artificial boundary on a natural continuum. Still, it is possible, as well as desirable, to be able to recognize and describe discrete types and to make reasonable judgments about how to protect, monitor, and manage these types. We encourage users to provide feedback that will enable us to continue to refine the information in the NVC.

## METHODS

The keys were developed by first separating the long list of types into groups of vegetation that would likely be considered together in a key such as upland woody vegetation, wetland forests, wetland shrublands, open upland vegetation, herbaceous wetlands, successional vegetation, and other similar groupings. A type that may reasonably be thought of as occurring in two (or even more) groups was included in each appropriate group. We attempted to use the most obvious and easily observable characteristics of the type in the key, and we used not just plants but also environmental setting and other habitat characteristics that could aid the user in identifying the type.

## HOW TO USE THE KEYS

These are dichotomous keys, with numbered couplets. Each couplet (designated by a boxed number above it) has two statements to choose from. Start with the Ecological Systems key. Begin with couplet 1, and decide which statement best applies to your setting, and proceed to the numbered couplet indicated after that statement. Continue along and you will eventually arrive at the ecological system that should fit your setting. If it is unclear which choice is better, make a note and try both directions from that couplet.

After identifying the Ecological System, go to the National Vegetation Classification Associations key. Find the Ecological System in the table of contents and turn to that page in the key. Use the same method to determine which natural community you are in. When you get through the key to a type, refer to the full description in the *Guide to the Natural Communities of the Delaware Estuary* to confirm if it is the correct type you see in the landscape.

It may be possible to reach the same vegetation type at different points in the key. This is by design. Vegetation types are inherently variable, and at their extremes may look quite different.

A common name and a NatureServe biological conservation database code (CES or CEG) for each system and association, are listed in bold type in the keys. The common names match the common names in the *Guide*. The number allows NatureServe to track data on ecological systems and natural communities within the National Vegetation Classification System.

What if the key doesn't work? There are several possible reasons:

- The type you are looking at may not be typical of the area and is not included in the list of types for the Delaware Estuary Watershed.
- You may be trying to type a transition zone. The classification is designed to impose clear conceptual boundaries on types that grade into each other in reality. Although these transition zones or ecotones are important, they are not classified as separate units unless they are broad, repeat on the landscape,

and have a unique species composition. Before using the key, make sure you have done a reconnaissance in the area to be sure you are in a portion of the stand that is truly representative.

- You may be applying the key to vegetation at a scale that is different from that used to develop the classification. For example, a stand of trees must be at least a few acres in extent to be a forest. It is possible to identify a forest type from stands smaller than that, but often there is so much “edge” that its identity is very difficult to discern. Conversely, many herbaceous communities occur naturally in patches less than 0.5 acre in size. Other communities, such as shrub zones along rivers or lakes are linear in form – not very wide, but quite long. It is important to be cognizant of the average patch size of vegetation when applying the key.
- The current description does not accommodate the variation you are observing.
- There may be no type describing this stand as yet. This is particularly true of vegetation that has been recently altered by human activity.

For those stands that do not fit into the classification, please submit a written description of the community and send it by email to [lesley\\_sneddon@natureserve.org](mailto:lesley_sneddon@natureserve.org) or by mail to the NatureServe office in Boston at 11 Avenue de Lafayette, 5<sup>th</sup> floor, Boston, MA 02111, or contact the Delaware, New Jersey, or Pennsylvania Natural Heritage program ecologist.

## ECOLOGICAL SYSTEMS KEY

**1**

Systems occur typically in the Coastal Plain Ecoregion and occasionally in the Chesapeake Bay Lowlands Ecoregion, primarily in southern New Jersey and Delaware ..... 2  
 Systems occur in the Piedmont and/or Central Appalachian Ecoregions, primarily in Pennsylvania ..... 24

### COASTAL PLAIN ECOLOGICAL SYSTEMS

**2**

Systems dominated by herbaceous vegetation or mixed herb/shrub vegetation, or sparse vegetation ..... 3  
 Systems dominated by woody vegetation, usually with trees; woodlands and forests ..... 12

#### *Non-Forested Systems*

**3**

Primarily upland ..... 4  
 Primarily wetland or aquatic ..... 5

**4**

Sparse vegetation present, beaches .....  
**Northern Atlantic Coastal Plain Sandy Beach** (CES203.301)  
 Graminoid/shrub vegetation, not sparse .....  
**Northern Atlantic Coastal Plain Dune and Maritime Grassland** (CES203.264)

**5**

Salt water or tidally influenced systems such as salt marshes, seagrass beds, shrub swamps, etc ..... 6  
 Fresh water or non-tidally influenced systems such as freshwater marshes, pondshores, etc ..... 11

**6**

Subtidal ..... 7  
 Intertidal or near-tidal ..... 8

**7**

Seagrass beds dominated by ditch grass .....  
**Northern Atlantic Coastal Plain Seagrass Bed** (CES203.246)  
 Eelgrass not characteristic, typical species include pondweeds (*Potamogeton* spp.) and others; brackish to freshwater .....  
**Northern Atlantic Coastal Plain Subtidal Aquatic Bed** (CES203.521)

**8**  
Salt marshes, occurring along the coast with minimal freshwater influence.....  
**Northern Atlantic Coastal Plain Tidal Saltmarsh** (CES203.519)

Fresh or brackish marshes and shrublands associated with tidal rivers.....9

**9**  
Tidally flooded shrublands along upper tidal reaches of estuaries.....  
**Northern Atlantic Coastal Plain Tidal Swamp** (CES203.582)

Fresh or brackish marshes of tidal rivers ..... 10

**10**  
Brackish marshes on the outer reaches of tidal rivers.....  
**Northern Atlantic Coastal Plain Brackish Tidal Marsh** (CES203.894)

Freshwater to oligohaline tidal marshes, nearer the upper tidal limits of rivers.....  
**Northern Atlantic Coastal Plain Fresh & Oligohaline Tidal Marsh** (CES203.516)

**11**  
Emergent and/or submergent marshes with vegetation that does not persist through the winter.....  
**Laurentian-Acadian Freshwater Marsh** (CES201.594)

Pondshores developing in shallow, sandy-bottomed basins on the coastal plain, often with vegetation in concentric bands, reflecting the fluctuating water levels through the growing season, and generally with coastal plain species such as meadow beauty (*Rhexia virginica*), golden hedge hysopp (*Gratiola aurea*), slender goldentop (*Euthamia caroliniana*), threadleaf sundew (*Drosera filiformis*), Plymouth rose gentian (*Sabatia kennedyana*), and others.....  
**Northern Atlantic Coastal Plain Pondshore** (CES203.518)

*Forested Systems*

**12**  
Primarily wetland ..... 13  
Primarily upland ..... 21

**13**  
River and stream processes are prominent: riparian and floodplain systems..... 14  
Moving-water forces less important: basin wetlands, flatwoods, and peatlands ..... 18

**14**  
Tidally flooded forests and shrublands in lower river floodplains and along edges of estuaries of the coastal plain.....  
**Northern Atlantic Coastal Plain Tidal Swamp** (CES203.582)  
Non-tidal.....15

**15**

Typically found in the Piedmont and Central Appalachian Ecoregions, large river floodplains.....  
**Central Appalachian Floodplain** (CES202.608)

Coastal Plain streams and rivers ..... 16

**16**

Blackwater streams and rivers, developing in areas with primarily sandy soils.....  
**Atlantic Coastal Plain Blackwater Stream Floodplain Forest** (CES203.247)

Brownwater streams and rivers, characteristic of areas with more clay-based soils, and carrying large amounts of suspended silt and clay..... 17

**17**

Streams of small watersheds with irregular flooding and with vegetation more uniform.....  
**Atlantic Coastal Plain Brownwater Stream Floodplain Forest** (CES203.248)

Larger watershed rivers, depositional landforms more well developed and vegetation better segregated by landform.....

**Atlantic Coastal Plain Small Brownwater River Floodplain Forest** (CES203.250)

**18**

Primarily forested swamps (basin or seepage), though may have shrubby openings ..... 19

Shrub bogs, occasionally with scattered trees, but not densely forested, pitch pine (*Pinus rigida*) or Atlantic white cedar (*Chamaecyparis thyoides*) may be present; dwarf huckleberry (*Gaylussacia dumosa*) is a characteristic heath.....

**Atlantic Coastal Plain Northern Bog** (CES203.893)

**19**

Saturated conifer or mixed swamps, Atlantic white cedar or pitch pine characteristic ..... 20

Seasonally flooded but not permanently saturated hardwood swamps, conifers typically not present.....

**Atlantic Coastal Plain Northern Basin Swamp and Wet Hardwood Forest** (CES203.520)

**20**

Peat-based swamps with Atlantic white cedar characteristic and often dominant, red maple often common, especially after logging.....

**Northern Atlantic Coastal Plain Basin Peat Swamp** (CES203.522)

Extensive pitch pine dominated wetlands, or patchy wetlands among pitch pine uplands, in the New Jersey Pine Barrens.....

**Northern Atlantic Coastal Plain Pitch Pine Lowland** (CES203.374)

**21**

Maritime forests and shrublands exposed to salt spray, high winds, and occasional overwash.....

**Northern Atlantic Coastal Plain Maritime Forest** (CES203.302)

Not maritime, although may be near the coast ..... 22

**22**

Barrens and woodlands: forest patches may be present with pitch pine (*Pinus rigida*) characteristic, but the overall character is not consistently closed.....

**Northern Atlantic Coastal Plain Pitch Pine Barrens** (CES203.269)

Primarily forested, with a closed canopy (may have occasional openings) ..... 23

**23**

American beech (*Fagus grandifolia*) prominent along with oaks (*Quercus* spp.), mesic sites.....

**Atlantic Coastal Plain Mesic Hardwood and Mixed Forest** (CES203.242)

American beech not as prominent, oaks dominant, occur on acidic, dry sandy to gravelly soils with a thick duff layer, often with an ericaceous shrub layer.....

**Northern Atlantic Coastal Plain Dry Hardwood Forest** (CES203.475)

## PIEDMONT & CENTRAL APPALACHIAN ECOLOGICAL SYSTEMS

**24**

Systems dominated by herbaceous vegetation or herb/shrub vegetation, or sparse vegetation ..... 25

Systems dominated by woody vegetation, usually with trees ..... 29

### *Non-Forested Systems*

**25**

Primarily upland, including sparse to patchy vegetation and cliffs ..... 26

Primarily wetland ..... 27

**26**

Acidic substrates, eastern red cedar (*Juniperus virginiana*) characteristic.....

**North-Central Appalachian Acidic Cliff and Talus** (CES202.601)

Substrates with a stronger circumneutral to calcareous influence, ash (*Fraxinus* spp.) and American basswood (*Tilia americana*) or other higher-pH indicators generally present.....

**North-Central Appalachian Circumneutral Cliff and Talus** (CES202.603)

**27**

Seepage wetlands on gentle to more extreme slopes, generally at lower elevations and usually with mixed shrub-herb vegetation; *Dasiphora fruticosa* ssp. *floribunda* (shrubby cinquefoil), *Cornus racemosa* (gray dogwood), *Betula pumila* (swamp birch) are characteristic shrubs.....

**North-Central Appalachian Seepage Fen** (CES202.607)

Wetlands in closed or open basins, generally flat ..... 28

**28**

Emergent and/or submergent marshes with vegetation that does not persist through the winter.....  
**Laurentian-Acadian Freshwater Marsh** (CES201.594)

Marshes with persistent emergent vegetation that remain saturated (or with standing water) during the whole growing season.....  
**Laurentian-Acadian Wet Meadow – Shrub Swamp** (CES201.582)

*Forested Systems*

**29**

Primarily upland systems ..... 30  
 Primarily wetland systems ..... 39

**30**

Primarily forested, with a closed canopy (may have occasional openings) ..... 31  
 Sparse vegetation, cliffs, slopes, barrens and woodlands: forest patches may be present, but the overall character is not consistently closed canopy..... 36

**31**

Mixed pine-deciduous forests ..... 32  
 Deciduous forests, or occasionally mixed deciduous-hemlock forests ..... 33

**32**

Pitch pine (*Pinus rigida*) dominant and/or occasionally Virginia pine (*Pinus virginiana*) dominated patches; conifer-dominated patches usually within a matrix of a mixed oak-pine woodland on exposed ridges, rocky slopes, or sparsely wooded hilltops, a heath shrub layer or graminoid layer may be present.....  
**Central Appalachian Pine – Oak Rocky Woodland** (CES202.600)

Chestnut oak (*Quercus prinus*) often dominant oak species; forests may be all oak or mixed oak-pine; some inclusions of pine forest may also be present; heaths shrubs common and often forming a well-developed shrub layer; ranges from the Piedmont west through the Central Appalachians ecoregions and north to the High Alleghenies .....  
**Central Appalachian Dry Oak – Pine Forest** (CES202.591)

**33**

Hardwood forests at moderate to low elevations, sometimes with hemlock as an associate (>25% cover); widespread in the central Appalachians and Piedmont.....  
**Appalachian (Hemlock) - Northern Hardwood Forest** (CES202.593)  
 Hemlock either not present, or minor canopy component..... 34

**34**

Hardwood forests of protected slopes and coves; tree composition is a species-rich mixture of tulip poplar (*Liriodendron tulipifera*), American basswood (*Tilia americana var. heterophylla*), cucumber magnolia

(*Magnolia acuminata*), white ash (*Fraxinus americana*), black cherry (*Prunus serotina*), mountain silverbell (*Halesia tetraptera*), etc.; herbaceous layer also typically has high species richness.....  
**Southern and Central Appalachian Cove Forest** (CES202.373)

Oak dominated forests..... 35

**35**

Forests on drier sites, with coarse, well-drained soils; chestnut oak a typical and often dominant oak species; forests may be all oak or mixed oak-pine; some inclusions of pine forest may also be present; heath shrubs common and often forming a well-developed shrub layer; ranges from the Piedmont west through the Central Appalachians ecoregions.....

**Central Appalachian Dry Oak – Pine Forest** (CES202.591)

Forests on somewhat more mesic sites; chestnut oak less important than northern red oak (*Quercus rubra*), white oak (*Q. alba*), black oak (*Q. velutina*), and/or scarlet oak (*Q. coccinea*); mockernut hickory (*Carya alba*), shagbark hickory (*C. ovata*), and/or pignut hickory (*C. ovalis*) may be common associates; pines rarely prominent except in patches of successional pine forest with eastern white pine (*Pinus strobus*) and/or Virginia pine; heath shrubs often present, but a well-developed shrub layer is not a general characteristic of the system; extends west to the Western Allegheny Plateau and is atypical in the Piedmont.....

**Northeastern Interior Dry-Mesic Oak Forest** (CES202.592)

**36**

Sparse vegetation, occurring on cliffs and slopes..... 37

Woodland vegetation, terrain generally flat..... 38

**37**

Acidic substrates, eastern red cedar (*Juniperus virginiana*) characteristic.....

**North-central Appalachian Acidic Cliff and Talus** (CES202.601)

Substrates with a stronger circumneutral to calcareous influence, ash (*Fraxinus* spp.) and American basswood (*Tilia americana*) or other higher-pH indicators generally present.....

**North-central Appalachian Circumneutral Cliff and Talus** (CES202.603)

**38**

Serpentine rock substrate.....

**Appalachian Serpentine Woodland** (CES202.347)

Woodlands on acidic igneous or metamorphic rocks.....

**Central Appalachian Pine – Oak Rocky Woodland** (202.600)

**39**

River and stream processes are prominent: riparian and floodplain systems..... 40

Moving-water forces less important: basin wetlands, flatwoods, and/or peatlands..... 41

**40**

Large river floodplains with bars, levees, oxbows well developed and with regular flooding.....  
**Central Appalachian Floodplain** (CES202.608)

Streams and small rivers with flooding irregular and of shorter duration; floodplain features limited in extent  
and/or not well developed .....  
**Central Appalachian Riparian** (CES202.609)

**41**

Oaks species are prominent, small-patch wetlands associated with poorly-drained glacial deposits.....  
**North-Central Interior Wet Flatwoods** (CES202.700)

Hemlock-hardwood or hardwood swamps in acidic settings; eastern hemlock (*Tsuga canadensis*), red  
maple (*Acer rubrum*), and black gum (*Nyssa sylvatica*) are characteristic.....  
**North-Central Appalachian Acidic Swamp** (CES202.604)

# NATIONAL VEGETATION CLASSIFICATION ASSOCIATIONS KEY

## APPALACHIAN (HEMLOCK)-NORTHERN HARDWOOD FOREST

CES202.593

---

|                                                           |            |
|-----------------------------------------------------------|------------|
| • Red Oak - Northern Hardwood Forest                      | CEGL006173 |
| • High Allegheny Rich Red Oak - Sugar Maple Forest        | CEGL006125 |
| • Hemlock - Beech - Oak Forest                            | CEGL006088 |
| • Hemlock / White Pine - Red Oak - Mixed Hardwood Forest  | CEGL006566 |
| • East-central Hemlock Hardwood Forest                    | CEGL005043 |
| • Central Appalachian White Pine - Eastern Hemlock Forest | CEGL006019 |
| • White Pine - Hemlock Dry-Mesic Coniferous Forest        | CEGL006328 |
| • Golden-saxifrage Forested Seep                          | CEGL006193 |
| • Red Maple - Black Gum Basin Swamp                       | CEGL006014 |
| • Central Appalachian Forested Acid Seep                  | CEGL006132 |
| • Northern Hardwood Forest                                | CEGL006252 |
| • Red Maple Upland Forest                                 | CEGL006547 |

---

**1**

Vegetation primarily woody (trees or tall shrubs exhibiting tree-like growth dominant; canopy closed to partially open – includes “woodland” class of NVC; also includes upland shrub thickets.....2

Vegetation primarily non-forested; canopy more open; forested seeps; forest generally on slopes with saturated soils from seeps or springs; canopy similar to surrounding upland forest, while shrub, herb, and nonvascular layers more typical of wetlands; surrounded by upland forest.....

**Golden-saxifrage Forested Seep** (CEGL006193)

**2**

Forests and shrub thickets of uplands (not wetlands).....3

Forests of wetlands, including seeps and swamps.....16

**3**

Forests dominated by conifer trees (evergreen trees >50% cover), deciduous trees < 20-25% of the total canopy cover .....4

Deciduous or mixed forests and woodlands: deciduous trees > 25% of the total canopy cover.....10

**4**

Conifer forests with a predominant white pine (*Pinus strobus*) component.....5

Conifer forests dominated by hemlock (*Tsuga canadensis*), white pine not present or minor.....7

**5**

White pine dominated forests with hemlock and hardwoods co-dominant in the canopy; conifer trees

typically <75% of canopy cover.....6

White pine forests with hemlock as a co-dominant in the canopy; conifer trees >75% of canopy cover; dry to mesic coniferous forest usually on sloping sites or in sheltered ravines.....  
**White Pine – Hemlock Dry-Mesic Coniferous Forest** (CEGL006328)

**6**  
 White pine-hemlock forest that shares canopy dominance with a variety of oaks and hickories; occurs on deep, moist to well-drained loams and silt loams on mid-slopes and in coves. Soils may be rocky, and slopes may be steep.....  
**Hemlock / White Pine - Red Oak - Mixed Hardwood Forest** (CEGL006566)

Dry-mesic white pine - hemlock forest with beech, maples and birches as canopy associates; occurs on well-drained, nutrient-poor acidic soils in the Central Appalachian Ecoregion.....  
**Central Appalachian White Pine - Eastern Hemlock Forest** (CEGL006019)

**7**  
 Hemlock-hardwood forests .....8  
 Mixed hemlock-white pine-hardwood forests .....9

**8**  
 The overstory is dominated by hemlock (*Tsuga canadensis*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and American beech (*Fagus grandifolia*); rarely does any one of these comprise more than 50% of the mature trees in a stand; soils are typically acid, silty to sandy loams, with a sandstone or shale parent material.....  
**East-Central Hemlock Hardwood Forest** (CEGL005043)

The canopy is co-dominated by hemlock (*Tsuga canadensis*) and American beech (*Fagus grandifolia*) in variable proportions depending on soil (site) and disturbance characteristics; drier sites tend to have more abundant beech and cooler sites tend to have more abundant hemlock; soils are typically nutrient-poor, well-drained, often stony sandy loams or loamy sands; sites generally drier than other hemlock forests.....  
**Hemlock - Beech - Oak Forest** (CEGL006088)

**9**  
 Hemlock-white pine forest that shares canopy dominance with a variety of oaks and hickories; occurs on deep, moist to well-drained loams and silt loams on mid-slopes and in coves. Soils may be rocky, and slopes may be steep.....  
**Hemlock / White Pine - Red Oak - Mixed Hardwood Forest** (CEGL006566)

Dry-mesic hemlock-white pine forest with beech, maples and birches as canopy associates; occurs on well-drained, nutrient-poor acidic soils.....  
**Central Appalachian White Pine - Eastern Hemlock Forest** (CEGL006019)

**10**  
 Canopy is co-dominated by hardwoods and conifers.....11

Canopy is dominated by hardwoods, conifers minor or absent.....13

**11**

Hemlock (*Tsuga canadensis*) and American beech (*Fagus grandifolia*) are canopy co-dominants; in variable proportions depending on soil (site) and disturbance characteristics; drier sites tend to have more abundant beech and cooler sites tend to have more abundant hemlock; soils are typically nutrient-poor, well-drained, often stony sandy loams or loamy sands; sites generally drier than other hemlock forests.....

**Hemlock - Beech - Oak Forest** (CEGL006088)

Oaks more prominent in canopy.....12

**12**

Canopy composition is a variable mixture of red oak (*Quercus rubra*) (usually at least 30% of the canopy), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and, in some stands, white pine (*Pinus strobus*) or eastern hemlock (*Tsuga canadensis*); ericads and other dwarf shrubs are also nearly absent, a characteristic that distinguishes this association from most other red oak forests in the Northeast.....

**Red Oak - Northern Hardwood Forest** (CEGL006173)

Red oak-hickory forest that shares canopy dominance with a hemlock and/or white pine; occurs on deep, moist to well-drained loams and silt loams on mid-slopes and in coves. Soils may be rocky, and slopes may be steep.....

**Hemlock / White Pine - Red Oak - Mixed Hardwood Forest** (CEGL006566)

**13**

Deciduous hardwood forests with mixed oaks, maples, and tulip tree (*Liriodendron tulipifera*).....14

Deciduous forest lacking tuliptree.....15

**14**

Deciduous hardwood forest dominated by red oak (*Quercus rubra*) and sugar maple (*Acer saccharum*) with tuliptree common and abundant (usually >20% relative cover); occurs in the Northern Piedmont.....

**High Allegheny Rich Red Oak - Sugar Maple Forest** (CEGL006125)

Early to mid successional forest dominated by red maple (*Acer rubrum*); hay scented fern (*Dennstaedtia punctilobula*) typically dominates the groundstory; occurs within Pennsylvania's portion of the Delaware Estuary watershed.....

**Red Maple Upland Forest** (CEGL006547)

**15**

Canopy compositions is dominated by sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*) and yellow birch (*Betula alleghaniensis*); oak are generally not present.....

**Northern Hardwood Forest** (CEGL006252)

Canopy composition is a variable mixture of red oak (*Quercus rubra*) (usually at least 30% of the canopy), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and, in

some stands, white pine (*Pinus strobus*) or eastern hemlock (*Tsuga canadensis*). Ericads and other dwarf shrubs are also nearly absent, a characteristic that distinguishes this association from most other red oak forests in the Northeast.....

**Red Oak - Northern Hardwood Forest** (CEGL006173)

**16**

Groundwater influenced seep communities that occur on substrates that are saturated for extended periods during the growing season, but rarely have standing water..... 17

Saturated swamp community that occupies saturated or seasonally wet basins; dominated by red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*).....

**Red Maple - Black Gum Basin Swamp** (CEGL006014)

**17**

Forested seep with red maple (*Acer rubrum*) and black gum (*Nyssa sylvatica*) characteristic and with associates eastern hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*).....

**Central Appalachian Forested Acid Seep** (CEGL006132)

Small herbaceous openings in forest generally on slopes with saturated soils from seeps or springs; canopy similar to surrounding upland forest, while shrub, herb, and nonvascular layers more typical of wetlands; golden saxifrage (*Chrysosplenium americanum*) is characteristic.....

**Golden-saxifrage Forested Seep** (CEGL006193)



Herbaceous communities of wetlands; dominated by tufted hairgrass (*Deschampsia caespitosa*) is a dominant grass.....  
**Serpentine Emergent Wetland** (CEGL006316)

**6**  
Dominant species also include Indiangrass (*Sorghastrum nutans*); eastern red cedar (*Juniperus virginiana*) may be present; occurs over shallow (15-25 cm deep) silt loam to clay loam soils on low to mid slopes with a northerly aspect.....  
**Serpentine Indiangrass - Little Bluestem Grassland** (CEGL006441)

Dominant species also include prairie dropseed (*Sporobolus heterolepis*); it typically occurs on mid to upper slopes on very shallow (0-10 cm deep) stony or gravelly sand or silt loam soils. Exposed bedrock and bare ground are common at some locations.....  
**Serpentine Little Bluestem - Prairie Dropseed Grassland** (CEGL006442)

# CENTRAL APPALACHIAN DRY OAK-PINE FOREST

CES202.591

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|                                                                             |            |
|-----------------------------------------------------------------------------|------------|
| • Pitch Pine - Scarlet Oak Low- to Mid-Elevation Ridgetop                   | CEGL006557 |
| • Virginia Pine Successional Forest                                         | CEGL002591 |
| • Central Appalachian Forested Acid Seep                                    | CEGL006132 |
| • Central Appalachian / Northern Piedmont Low-Elevation Chestnut Oak Forest | CEGL006299 |
| • Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest          | CEGL007119 |
| • Black Locust Successional Forest                                          | CEGL007279 |
| • Northeastern Modified Successional Forest                                 | CEGL006599 |
| • Ridgetop Scrub Oak Barrens                                                | CEGL006121 |
| • White Pine - Oak Forest                                                   | CEGL006293 |

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|          |                                                                                                        |   |
|----------|--------------------------------------------------------------------------------------------------------|---|
| <b>1</b> | Forest and woodland communities.....                                                                   | 2 |
|          | Shrubland community, occurring on ridgetops, dominated by scrub oak ( <i>Quercus ilicifolia</i> )..... |   |
|          | <b>Ridgetop Scrub Oak Barrens</b> (CEGL006121)                                                         |   |

|          |                                                                                                                                                               |   |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>2</b> | Forests and woodlands of uplands.....                                                                                                                         | 3 |
|          | Forests and woodlands of wetlands; acidic deciduous seepage swamp dominated by red maple ( <i>Acer rubrum</i> ) and black gum ( <i>Nyssa sylvatica</i> )..... |   |
|          | <b>Central Appalachian Forested Acid Seep</b> (CEGL006132)                                                                                                    |   |

|          |                                                                                                                                     |   |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>3</b> | Forests and woodlands dominated by conifer trees (evergreen trees >50% cover), deciduous trees < 20% of the total canopy cover..... | 4 |
|          | Deciduous or mixed forests and woodlands: deciduous trees > 25% of the total canopy cover.....                                      | 8 |

|          |                                                                                                                        |   |
|----------|------------------------------------------------------------------------------------------------------------------------|---|
| <b>4</b> | Conifer forests dominated by pitch pine ( <i>Pinus rigida</i> ) and/or Virginia pine ( <i>Pinus virginiana</i> ) ..... | 5 |
|          | Conifer forests dominated by white pine ( <i>Pinus strobus</i> ) with a mixture of oaks ( <i>Quercus</i> spp.).....    |   |
|          | <b>White Pine - Oak Forest</b> (CEGL006293)                                                                            |   |

|          |                                                                             |   |
|----------|-----------------------------------------------------------------------------|---|
| <b>5</b> | Conifer forests dominated by Virginia pine ( <i>Pinus virginiana</i> )..... | 6 |
|          | Conifer forests dominated by pitch pine ( <i>Pinus rigida</i> ).....        | 7 |

|          |                                                                                                                                                                                                                                |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>6</b> | Forests strongly dominated by Virginia pine with few other associates; canopy dense, with admixtures of early successional deciduous trees (e.g., red maple, tulip poplar); occurs in a variety of environmental settings..... |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Virginia Pine Successional Forest** (CEGL002591)

Virginia pine forests of greater diversity - mixed with other pines, or with other conifers and hardwoods; blueberries (*Vaccinium* spp.) dominate the shrub layer; occurs on exposed sites with shallow soils.....

**Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest** (CEGL007119)

**7**

Pitch pine (*Pinus rigida*) dominated community occurring on dry, sandy, acidic soils. Pitch pine cover can vary from 25-75%; scarlet oak (*Quercus coccinea*) and blueberries are abundant.....

**Pitch Pine - Scarlet Oak Low- to Mid-Elevation Ridgetop** (CEGL006557)

Pitch pine -Virginia pine mixed community occurring along narrow ridges and knobs, steep upper slopes, chestnut oak is characteristic.....

**Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest** (CEGL007119)

**8**

Forests dominated by oaks; oaks make up at least 50% of canopy cover..... 9

Forests not dominated by oaks; (oaks may be present but not abundant in the canopy); early successional species including red maple, black cherry (*Prunus serotina*), and black locust (*Robinia pseudoacacia*) are common..... 10

**9**

Scarlet oak (*Quercus coccinea*) and pitch pine dominate the canopy; occurs on dry, sandy acidic soils.....

**Pitch Pine - Scarlet Oak Low- to Mid-Elevation Ridgetop** (CEGL006557)

Chestnut oak dominated canopy, pines not present; other canopy associates include a mixture of oak species including scarlet oak, white oak, and black oak; pink azalea (*Rhododendron periclymenoides*) is frequent in the tall-shrub layer, and early lowbush blueberry (*Vaccinium pallidum*) is present and often abundant as a dwarf-shrub, both are diagnostics for this type.....

**Central Appalachian / Northern Piedmont Low-Elevation Chestnut Oak Forest** (CEGL006299)

**10**

Canopy is dominated by near monoculture of black locust (*Robinia pseudoacacia*); an early successional forest often associated with the abandonment of old fields.....

**Black Locust Successional Forest** (CEGL007279)

Tree species may include black cherry, tulip poplar (*Liriodendron tulipifera*), white ash (*Fraxinus americana*) and red maple; black locust may be present but not dominant; exotic shrubs and vines are abundant; in associated with land clearing.....

**Northeastern Modified Successional Forest** (CEGL006599)

# CENTRAL APPALACHIAN RIPARIAN

CES202.609

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|                                                  |            |
|--------------------------------------------------|------------|
| • Northeastern Temperate Cobble Scour Rivershore | CEGL006536 |
| • Rocky Bar and Shore (Riverweed Type)           | CEGL004331 |
| • Water-willow Rocky Bar and Shore               | CEGL004286 |
| • Birch - Willow Riverbank Shrubland             | CEGL003896 |
| • Fall-Line Riverwash Bedrock Prairie            | CEGL006283 |
| • Coastal Plain Oak Floodplain Swamp             | CEGL006605 |
| • Loosestrife - Dogbane Scoured Rivershore       | CEGL006554 |
| • Willow River – Bar Shrubland                   | CEGL006065 |
| • Successional Aspen / Grey Birch Forest         | CEGL006560 |

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|          |                                                                                                                                                                                                |   |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>1</b> | Herbaceous vegetation of high energy river bottoms, or shores influenced by flood scour exposing rock, cobble, or other mineral substrate .....                                                | 2 |
|          | Woody vegetation (trees or shrubs exhibiting tree-like growth dominant; canopy closed to partially open- includes "woodland" and "shrubland" classes of NVC) along side river or streams ..... | 6 |

|          |                                                         |   |
|----------|---------------------------------------------------------|---|
| <b>2</b> | Submerged vegetation of higher energy river rapids..... | 3 |
|          | Vegetation not submerged.....                           | 5 |

|          |                                                                                                                                                                                                                           |   |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>3</b> | Vegetation clearly dominated by one species, monotypic.....                                                                                                                                                               | 4 |
|          | No one species dominates, species composition is variable due to constant river scour; fringed loosestrife ( <i>Lysimachia ciliata</i> ) and clasping-leaf dogbane ( <i>Apocynum cannabinum</i> ) are characteristic..... |   |
|          | <b>Loosestrife - Dogbane Scoured Rivershore</b> (CEGL006554)                                                                                                                                                              |   |

|          |                                                                                                                                                                                                                              |  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>4</b> | Vegetation dominated by riverweed ( <i>Podostemum ceratophyllum</i> ); community tends to be associated with higher pH streams which cut through diabase, limestone or calcareous shales.....                                |  |
|          | <b>Rocky Bar and Shore (Riverweed Type)</b> (CEGL004331)                                                                                                                                                                     |  |
|          | Vegetation dominated by water-willow ( <i>Justicia americana</i> ); community tends to occur on the heads of islands, along the edges of bars, banks, terraces, and spits, and in shallow sections of the river channel..... |  |
|          | <b>Water-willow Rocky Bar and Shore</b> (CEGL004286)                                                                                                                                                                         |  |

|          |                                                                                                                                                                                                                                                                                    |  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>5</b> | Riverside grasslands dominated by tall prairie grasses such as big bluestem ( <i>Andropogon gerardii</i> ), Indian grass ( <i>Sorghastrum nutans</i> ), and little bluestem ( <i>Schizachyrium scoparium</i> ); generally occurring along major rivers in flood-scoured areas..... |  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

**Fall-Line Riverwash Bedrock Prairie** (CEGL006283)

Riverside grasslands characterized by twisted sedge (*Carex torta*), generally on cobble, gravel or sand substrates along high-gradient sections of rivers; vegetation may be sparse and the species composition may be fairly diverse stunted, battered shrubs and tree saplings may occur at low cover...

**Northern Temperate Scour Cobble Rivershore** (CEGL006536)

**6**

Forest or woodland dominated community.....7

Shrub dominated community.....8

**7**

Floodplain swamp community dominated by oaks; occurs in pockets of saturated soils in, or at the edges of, depressions within a larger floodplain forest with annual flooding. ....

**Coastal Plain Oak Floodplain Swamp** (CEGL006605)

Early successional forest community dominated by aspen (*Populus* spp.) and gray birch (*Betula populifolia*) commonly found on former agricultural land, in areas of ice scour along stream banks, and where there has been major disturbance resulting in areas of exposed mineral soil. ....

**Successional Aspen / Grey Birch Forest** (CEGL006560)

**8**

River birch (*Betula nigra*) is characteristic and often dominant; subject to relatively frequent and powerful flooding and ice-scour; stunted and often battered trees (less than 5 m tall) are characteristic and can include silver maple (*Acer saccharinum*), sycamore (*Platanus occidentalis*), and box elder (*Acer negundo*).....

**Birch - Willow Riverbank Shrubland** (CEGL003896)

River birch and twisted sedge are characteristic; community occurs on cobble substrates with sand and gravel in areas that are flooded only during high-water events; occupies an intermediate position along disturbance gradient between open, herbaceous cobble shores and higher floodplain forests.....

**Willow River – Bar Shrubland** (CEGL006065)

## CENTRAL APPALACHIAN PINE-OAK ROCKY WOODLAND

CES202.600

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|                                                                         |            |
|-------------------------------------------------------------------------|------------|
| • Pitch Pine Rocky Summit                                               | CEGL006116 |
| • Central Appalachian Blueberry Shrubland                               | CEGL003958 |
| • Ridgetop Scrub Oak Barrens                                            | CEGL006121 |
| • Little Bluestem - Poverty Grass Low- to Mid-Elevation Outcrop Opening | CEGL006544 |

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**1**

Vegetation primarily woody (trees or tall shrubs exhibiting tree-like growth dominant; canopy closed to partially open – includes “woodland” class of NVC; also includes upland shrub thickets.....2

Vegetation non-forested; grassland community dominated by poverty oat grass (*Danthonia spicata*), little bluestem (*Schizachyrium scoparium*) and wavy hairgrass (*Deschampsia flexuosa*); occurs in openings on rocky outcrops.....

**Little Bluestem - Poverty Grass Low- to Mid-Elevation Outcrop Opening** (CEGL006544)

**2**

Shrub dominated vegetation.....3

Woodland vegetation dominated by stunted pitch pines (*Pinus rigida*) on rocky hilltops with exposed bedrock; lichens are prominent.....

**Pitch Pine Rocky Summit** (CEGL006116)

**3**

Dwarf shrubland, blueberries (*Vaccinium* spp.) and black huckleberry (*Gaylussacia baccata*) are dominant; scrub oak (*Quercus ilicifolia*) present but not abundant.....

**Central Appalachian Blueberry Shrubland** (CEGL003958)

Variable stature shrubland, scrub oak is dominant.....

**Ridgetop Scrub Oak Barrens** (CEGL006121)

## CENTRAL APPALACHIAN FLOODPLAIN

CES202.608

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|                                                   |            |
|---------------------------------------------------|------------|
| • Northeastern Temperate Cobble Scour Rivershore  | CEGL006536 |
| • Floodplain Pool                                 | CEGL007696 |
| • Northeastern Buttonbush Shrub Swamp             | CEGL006069 |
| • River Birch Low Floodplain Forest               | CEGL006184 |
| • Red Maple - Green Ash Forested Swamp            | CEGL006548 |
| • Silver Maple - Elm Forest                       | CEGL002586 |
| • Coastal Plain Oak Floodplain Swamp              | CEGL006605 |
| • Green Ash - Mixed Hardwood Floodplain Forest    | CEGL006575 |
| • Mid-Atlantic Terrace Hardwood Floodplain Forest | CEGL006314 |
| • Alluvial Alder Swamp                            | CEGL006414 |
| • Box-elder Floodplain Forest                     | CEGL005033 |
| • Water-willow Rocky Bar and Shore                | CEGL004286 |
| • Small River Red Maple - Elm Floodplain Forest   | CEGL006975 |

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|          |                                                                                               |    |
|----------|-----------------------------------------------------------------------------------------------|----|
| <b>1</b> | Vegetation primarily woody; forest, woodland, shrubland floodplain and swamp communities..... | 2  |
|          | Vegetation primarily herbaceous or sparse.....                                                | 11 |

|          |                                  |    |
|----------|----------------------------------|----|
| <b>2</b> | Forested communities.....        | 3  |
|          | Shrub dominated communities..... | 10 |

|          |                                                                                          |   |
|----------|------------------------------------------------------------------------------------------|---|
| <b>3</b> | Floodplain/riparian forests on alluvial soils of low or high terraces of riverbanks..... | 4 |
|          | Wet forests of basins, saturated slopes, or other lowlands in an alluvial setting.....   | 9 |

|          |                                                   |   |
|----------|---------------------------------------------------|---|
| <b>4</b> | Floodplain forest canopy dominated by maples..... | 5 |
|          | Canopy dominants otherwise .....                  | 7 |

|          |                                                                                            |   |
|----------|--------------------------------------------------------------------------------------------|---|
| <b>5</b> | Silver maple ( <i>Acer saccharinum</i> ) or red maple ( <i>Acer rubrum</i> ) dominant..... | 6 |
|          | Box elder ( <i>Acer negundo</i> ) dominant.....                                            |   |
|          | <b>Box-elder Floodplain Forest</b> (CEGL005033)                                            |   |

|          |                                                                                                                                                                                                          |  |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>6</b> | Silver maple typically dominant; forest along major rivers and smaller perennial streams with low shrub cover (<25 % cover), prominent vine cover, and a lush herb layer with false nettle abundant..... |  |
|          | <b>Silver Maple - Elm Forest</b> (CEGL002586)                                                                                                                                                            |  |

Red maple typically dominant in canopy, silver maple may occasionally be dominant; American elm (*Ulmus americana*) is a canopy associate; sensitive fern (*Onoclea sensibilis*) and false nettle (*Boehmeria cylindrica*) are characteristic in the herb layer; occurs within lower alluvial terraces, backwaters, bars, and islands of minor rivers and smaller tributaries, creeks and drainages.....  
**Small River Red Maple - Elm Floodplain Forest** (CEGL006975)

**7**  
 Floodplain forest canopy dominated or co-dominated by ash species (*Fraxinus* spp.).....8  
 Ash not present in community; river birch (*Betula nigra*) and sycamore (*Platanus occidentalis*) dominate these high-energy river floodplain forests .....  
**River Birch Low Floodplain Forest** (CEGL006184)

**8**  
 Floodplain forests with a mixture of hardwoods in the canopy, but dominated by green ash (*Fraxinus pensylvanica*), generally with sycamore (*Platanus occidentalis*) and enrichment indicators such as walnut (*Juglans nigra*).....  
**Green Ash - Mixed Hardwood Floodplain Forest** (CEGL006575)

Rich floodplain forests with tulip tree (*Liriodendron tulipifera*) and an admixture of ash in the canopy; shrub and herb layers generally well developed.....  
**Mid-Atlantic Terrace Hardwood Floodplain Forest** (CEGL006314)

**9**  
 These communities are found on water-deposited clayey or loamy sediments on oxbows or floodplains of rivers and large perennial streams with abundant red maple and green ash; pin oak (*Quercus palustris*) is not prominent (although present); false nettle is common in the herb layer.....  
**Red Maple - Green Ash Forested Swamp** (CEGL006548)

Wetland forest of alluvial backswamps; pin oak prominent along with water oak (*Quercus phellos*), red maple and sweet gum (*Liquidambar styraciflua*); stout wood reed grass (*Cinna arundinacea*) is common in the herb layer.....  
**Coastal Plain Oak Floodplain Swamp** (CEGL006605)

**10**  
 Buttonbush (*Cephalanthus occidentalis*) swamps that experience prolonged or semipermanent flooding for much of the growing season with water tables receding below the soil surface only during drought or very late in the growing season.....  
**Northeastern Buttonbush Shrub Swamp** (CEGL006069)

Silky dogwood (*Cornus amomum*) and brook-side alder (*Alnus serrulata*) dominant; buttonbush is often an associate shrub.....  
**Alluvial Alder Swamp** (CEGL006414)

**11**  
 Herbaceous vegetation of high energy river bottoms, or shores influenced by flood scour exposing rock, cobble, or other mineral substrate.....12

Herbaceous emergent vegetation associated with pools, ponds and depressions of rivers in which water is ponded for all or much of the year.....  
**Floodplain Pool** (CEGL007696)

**12**

Riverside grasslands characterized by twisted sedge (*Carex torta*), generally on cobble or gravel or sand substrates along high-gradient sections of rivers; vegetation may be sparse and species composition may be fairly diverse; stunted, battered shrubs and tree saplings may occur at low cover.....  
**Northern Temperate ScourCobble Rivershore** (CEGL006536)

Vegetation dominated by water-willow (*Justicia americana*); community tends to occur on the heads of islands, along the edges of bars, banks, terraces, and spits, and in shallow sections of the river channel.....  
**Water-willow Rocky Bar and Shore** (CEGL004286)

# LAURENTIAN-ACADIAN FRESHWATER MARSH

CES201.594

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|                                                     |            |
|-----------------------------------------------------|------------|
| • Open Water Marsh with Mixed Submergents/Emergents | CEGL006196 |
| • Eastern Reed Marsh                                | CEGL004141 |
| • Eastern Cattail Marsh                             | CEGL006153 |
| • Water-lily Aquatic Wetland                        | CEGL002386 |
| • Northeastern Leafy Forb Marsh                     | CEGL006191 |
| • Bulrush Deepwater Marsh                           | CEGL006275 |
| • Woolgrass Marsh                                   | CEGL006349 |

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**1**  
Submerged vegetation; plants aquatic or floating-leaved ..... 2

Emergent marsh vegetation; majority of plants above water (although floating-leaved plants may be a component) ..... 3

**2**  
Aquatic vegetation dominated by floating leaved and submerged-leaved macrophytes, especially tapegrass (*Vallisneria spiralis*) and pondweeds (*Potamogeton* spp.); water lilies (*Nymphaea* spp.) and pond lilies (*Nuphar* spp.) may be present but are not dominant.....

**Open Water Marsh with Mixed Submergents / Emergents** (CEGL006196)

Aquatic vegetation dominated by white water-lily (*Nymphaea odorata*) and/or yellow pond-lily (*Nuphar variegata*).....

**Water-lily Aquatic Wetland** (CEGL002386)

**3**  
Freshwater marsh dominated by graminoids (slender-leaved plants, including grasses, sedges, rushes, cattails, etc.)..... 4

Freshwater marsh dominated by broad-leaved emergent herbs..... 7

**4**  
Freshwater marsh dominated by cattails (*Typha* spp.).....

**Eastern Cattail Marsh** (CEGL006153)

Freshwater marsh not dominated by cattails ..... 5

**5**  
Freshwater marsh dominated by eastern reed (*Phragmites australis*).....

**Eastern Reed Marsh** (CEGL004141)

Freshwater marsh not dominated by eastern reed ..... 6

**6**  
Freshwater marsh dominated by bulrushes including hard-stemmed bulrush (*Schoenoplectus acutus*), soft-

stem bulrush (*Schoenoplectus tabernaemontani*) and/or three square bulrush (*Schoenoplectus americanus*).....  
**Bulrush Deepwater Marsh** (CEGL006275)

Freshwater marsh dominated by woolgrass (*Scirpus cyperinus*).....  
**Woolgrass Marsh** (CEGL006349)

**7**

Emergent wetland dominated by pickerelweed (*Pontederia cordata*), arrowheads (*Sagittaria* spp.), and/or arrow-arum (*Peltandra virginica*).....  
**Northeastern Leafy Forb Marsh** (CEGL006191)

Emergent wetland dominated by white water-lily (*Nymphaea odorata*) and/or yellow pond-lily (*Nuphar variegata*).....  
**Water-lily Aquatic Wetland** (CEGL002386)

# LAURENTIAN-ACADIAN WET MEADOW-SHRUB SWAMP

CES201.582

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|                                             |            |
|---------------------------------------------|------------|
| • Eastern Reed Marsh                        | CEGL004141 |
| • Seasonally Flooded Mixed Graminoid Meadow | CEGL006519 |
| • Dogwood - Willow Swamp                    | CEGL002186 |
| • Bluejoint Wet Meadow                      | CEGL005174 |
| • Woolgrass Marsh                           | CEGL006349 |
| • Reed Canary grass Eastern Marsh           | CEGL006044 |
| • Speckled Alder Swamp                      | CEGL002381 |
| • Eastern Tussock Sedge Meadow              | CEGL006412 |
| • Willow River - Bar Shrubland              | CEGL006065 |

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**1**  
Vegetation primarily woody.....2

Vegetation primarily herbaceous.....5

**2**  
Willows are the dominant shrub species.....3

Willows not dominant, but may be present.....4

**3**  
Early successional shrubland of floodplains and river gravel bars and islands; strongly dominated by  
Willows (*Salix* spp.) and lacking river birch (*Betula nigra*); generally of northern distribution.....  
**Willow River-Bar Shrubland** (CEGL006065)

Shrubland occurs along lakes, streams or in upland depressions; willows and silky dogwood  
(*Cornus amomum*) are dominant; shrubs at least 25% cover, and often very dense (>60% cover);  
more open stands may have higher graminoid cover.....  
**Dogwood-Willow Swamp** (CEGL002186)

**4**  
Taller shrub wetlands dominated by alders (*Alnus* spp.); additional associates include may dogwoods  
(*Cornus* spp.), willows, or meadowsweets (*Spiraea* spp.).....  
**Speckled Alder Swamp** (CEGL002381)

Wet meadow intermixed with up to 50% shrub cover; shrub species typically include narrow-leaved  
meadowsweet (*Spiraea alba*) and willows; other shrub constituents vary from site to site, and may  
include alders, buttonbush (*Cephalanthus occidentalis*), dogwoods, winterberry (*Ilex verticillata*), and  
others; the herbaceous layer is often dominated by bluejoint (*Calamagrostis canadensis*), woolgrass  
(*Scirpus* spp.) and threeway sedge (*Dulichium arundinaceum*).....  
**Seasonally Flooded Mixed Graminoid Meadow** (CEGL006519)

- 5**  
 Freshwater marsh frequently or continually inundated with water, dominated by graminoids (slender-leaved plants, including grasses, sedges, rushes).....6  
 Wet meadows, typically drier than other marshes except during periods of seasonal high water, dominated by graminoids.....8
- 6**  
 Freshwater marsh dominated by reed canary grass (*Phalaris arundinacea*).....  
**Reed Canary Grass Eastern Marsh** (CEGL006044)  
 Freshwater marsh not dominated by reed canarygrass.....7
- 7**  
 Freshwater marsh dominated by eastern reed (*Phragmites australis*).....  
**Eastern Reed Marsh** (CEGL004141)  
 Freshwater marsh dominated by woolgrass (*Scirpus cyperinus*).....  
**Woolgrass Marsh** (CEGL006349)
- 8**  
 Wet meadow dominated by tussock sedge (*Carex stricta*).....  
**Eastern Tussock Sedge Meadow** (CEGL006412)  
 Wet meadow not dominated by tussock sedge.....9
- 9**  
 Wet meadow dominated by bluejoint (*Calamagrostis canadensis*).....  
**Bluejoint Meadow** (CEGL005174)  
 Diverse wet meadow where the dominant species are variable but can include blue joint (*Calamagrostis canadensis*), woolgrass (*Scirpus* spp.) and threeway sedge (*Dulichium arundinaceum*); shrubs are common, but less than 50% cover.....  
**Seasonally Flooded Mixed Graminoid Meadow** (CEGL006519)

## NORTH-CENTRAL APPALACHIAN CLIFF AND TALUS

CES202.601

- 
- Chestnut Oak - Black Birch Wooded Talus Slope C EGL006565
  - Kittatiny Ridge Sparsely Vegetated Sandstone Cliff C EGL006443
- 

Community on slopes; more densely vegetated; canopy dominated by more-or-less gnarled specimens of black birch (*Betula lenta*) and chestnut oak (*Quercus prinus*) generally <20 m tall; occurs within weathered boulderfields and slopes covered by coarse to fine, boulders and rocks.....

**Chestnut Oak - Black Birch Wooded Talus Slope** (CEGL006565)

Sparse vegetation occurring on vertical to near-vertical sandstone outcrops and cliffs associated with Kittatiny Ridge in Pennsylvania; species composition is variable given limited habitat to support vegetation and unpredictable nature of plant colonization and establishment.....

**Kittatiny Ridge Sparsely Vegetated Sandstone Cliff** (CEGL006443)

## NORTH-CENTRAL APPALACHIAN ACIDIC SWAMP

CES202.604

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|                                                 |            |
|-------------------------------------------------|------------|
| • Red Maple - Black Gum Basin Swamp             | CEGL006014 |
| • Eastern Hemlock - Great Laurel Swamp          | CEGL006279 |
| • Southern New England Red Maple Seepage Swamp  | CEGL006406 |
| • Central Appalachian Forested Acid Seep        | CEGL006132 |
| • Red Maple - Black Ash Swamp                   | CEGL007441 |
| • Red Maple - Tussock Sedge Wooded Marsh        | CEGL006119 |
| • Lower New England Red Maple – Black Gum Swamp | CEGL006156 |

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**1**  
 Forested seeps; forest generally on slopes with saturated soils from groundwater seeps or springs.....2  
 Saturated swamp or wooded marsh communities that occupy saturated or seasonally wet basins.....4

**2**  
 Acidic seeps; not species rich.....3  
 Species rich seeps, typically occur on calcareous bedrock; enriched red maple-black ash (*Acer rubrum*-*Fraxinus nigra*) seepage swamps south of extent of glaciation.....  
**Red Maple - Black Ash Swamp Forest** (CEGL007441)

**3**  
 Red maple and black gum (*Nyssa sylvatica*) characteristic and with associates eastern hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*).....  
**Central Appalachian Forested Acid Seep** (CEGL006132)

Red maple swamps receiving considerable groundwater seepage (although not very enriched) as evidenced by significant cover of spicebush (*Lindera benzoin*), sensitive fern (*Onoclea sensibilis*), skunk cabbage (*Symplocarpus foetidus*) and mosses such as *Mnium* spp. or *Calliergon* spp.; canopy associates can include yellow birch and ash (*Fraxinus* spp.).....  
**Southern New England Red Maple Seepage Swamp** (CEGL006406)

**4**  
 Swamp dominated by eastern hemlock and great laurel (*Rhododendron maximum*) prominent .....  
**Eastern Hemlock - Great Laurel Swamp** (CEGL006279)

Saturated swamp or wooded marsh communities dominated by red maple.....5

**5**  
 Red maple swamps with dense shrub understories.....6  
 Red maple swamps characterized by an herbaceous layer strongly dominated by sedges.....  
**Red Maple - Tussock Sedge Wooded Marsh** (CEGL006119)

**6**

Red maple swamps receiving considerable groundwater seepage (although not very enriched) as evidenced by significant cover of spicebush, sensitive fern, skunk cabbage and mosses; canopy associates can include yellow birch and ash.....

**Southern New England Red Maple Seepage Swamp** (CEGL006406)

Red maple swamps not receiving considerable groundwater seepage.....7

**7**

Black gum present in forest canopy.....8

Enriched red maple-black ash seepage swamps south of extent of glaciation.....

**Red Maple - Black Ash Swamp Forest** (CEGL007441)

**8**

Hardwood forested swamps co-dominated by red maple and black gum, generally occurring in small, isolated basins high in watersheds in the Pennsylvania portion of the watershed; yellow birch, eastern hemlock and white pine (*Pinus strobus*) may be minor in the canopy, shrub layer usually well-developed; strong hummock and hollow microtopography and dense *Sphagnum* carpet characteristic..

**Red Maple - Black Gum Basin Swamp** (CEGL006014)

Red maple basin swamps occurring within the New Jersey portion of the watershed; black gum may be present, but is minor in canopy .....

**Lower New England Red Maple - Black Gum Swamp** (CEGL006156)

## NORTH-CENTRAL APPALACHIAN CIRCUMNEUTRAL CLIFF AND TALUS

CES202.603

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|                                   |            |
|-----------------------------------|------------|
| • Calcareous Slope Forest         | CEGL006020 |
| • Montane Cliff (Calcareous Type) | CEGL004476 |

---

**1**

Community occurs on calcareous cliffs, outcrops, and rocky slopes in southeastern Pennsylvania, and is often shaded by trees rooted in adjacent forested communities and/or the outcrops; it has little vegetative cover, often with 90% of the rock surface unvegetated; maidenhair spleenwort (*Asplenium trichomanes*) and wild columbine (*Aquilegia canadensis*) are characteristic.....

**Montane Cliff (Calcareous Type)** (CEGL004476)

Community on slopes; more densely vegetated; enriched, dry-mesic to mesic forest on talus or shallow very rocky soils dominated by sugar maple (*Acer saccharum*) and white ash (*Fraxinus americana*) and with many canopy associates; shrub layer is characterized by bladdernut (*Staphylea trifolia*); herb layer is characterized by bladder ferns (*Cystopteris* spp.), woodsia ferns (*Woodsia* spp.), wild ginger (*Asarum canadense*), and others; tends to have more southern species that drop out at the northern edge of the range.....

**Calcareous Slope Forest** (CEGL006020)

# NORTH-CENTRAL APPALACHIAN SEEPAGE FEN

CES202.607

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|                                     |            |
|-------------------------------------|------------|
| • Skunk Cabbage Seepage Meadow      | CEGL002385 |
| • Pasture Fen                       | CEGL006357 |
| • Calcareous Shrub Fen              | CEGL006359 |
| • Northern Piedmont Rich Fen        | CEGL006103 |
| • Prairie Sedge - Tussock Sedge Fen | CEGL006551 |
| • Sedge - Cottongrass Peatland Fen  | CEGL006549 |

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**1**  
 Woody plants dominate.....2  
 Herbaceous plants dominate.....4

**2**  
 Intermediate or calcareous fens dominated by tall shrubs such as dogwoods (*Cornus* spp.) and/or willows (*Salix* spp.).....  
**Calcareous Shrub Fen** (CEGL006359)  
 Intermediate or calcareous fens with short shrubs such as northern bayberry (*Morella pensylvanica*), and/or shrubby cinquefoil (*Diasphora fruticosa* ssp. *floribunda*); tall shrubs lacking or sparse.....3

**3**  
 Shrubby cinquefoil, yellow sedge (*Carex flava*) and rigid sedge (*Carex tetanica*) dominant.....  
**Pasture Fen** (CEGL006357)  
 Northern bayberry dominant.....  
**Northern Piedmont Rich Fen** (CEGL006103)

**4**  
 Grass or sedge vegetation dominant.....5  
 Skunk cabbage (*Symplocarpus foetidus*) dominated early in growing season and jewelweed (*Impatiens capensis*) later in season; groundwater emergence often tapering later in season.....  
**Cabbage Seepage Meadow** (CEGL002385)

**5**  
 Shrubby cinquefoil, yellow sedge, and rigid sedge dominant.....  
**Pasture Fen** (CEGL006357)  
 Shrubs not abundant, sedges dominant.....6

**6**  
 Open sedge-dominated fens that occur on organic soil saturated by base-rich groundwater; dominants typically include prairie sedge (*Carex prairea*) and tussock sedge (*Carex stricta*).....  
**Prairie Sedge - Tussock Sedge Fen** (CEGL006551)

Sedge-dominated peatlands of higher elevations in the Central Appalachians; dominants include hoary sedge (*Carex canescens*), tawny cottongrass (*Eriophorum virginicum*) and beaked sedge (*Carex utriculata*).....

**Sedge – Cottongrass Peatland Fen** (CEGL006549)

## NORTH-CENTRAL INTERIOR WET FLATWOODS

CES202.700

- 
- Northeastern Pin Oak - Swamp White Oak Forest

CEGL006240

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These are closed to partially open, deciduous, seasonally flooded forests that occur in basin areas that are seasonally wet (winter and early spring) with a shallow, perched water table, which tend to be dry in late summer and early fall; pin oak (*Quercus palustris*), red maple, and swamp white oak (*Quercus bicolor*) are canopy dominants; occurs in Pennsylvania portion of the Delaware Estuary watershed.....

**Northeastern Pin Oak - Swamp White Oak Forest** (CEGL006240)

## NORTHEASTERN INTERIOR DRY-MESIC OAK FOREST

CES202.592

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|                                             |            |
|---------------------------------------------|------------|
| • Northeastern Dry Oak-Hickory Forest       | CEGL006336 |
| • Red Maple - Black Gum Basin Swamp         | CEGL006014 |
| • White Pine - Oak Forest                   | CEGL006293 |
| • Virginia Pine Successional Forest         | CEGL002591 |
| • Central Appalachian Forested Acid Seep    | CEGL006132 |
| • Tuliptree - Beech - Maple Forest          | CEGL006296 |
| • Northeastern Modified Successional Forest | CEGL006599 |
| • Red Maple - Tussock Sedge Wooded Marsh    | CEGL006119 |
| • Successional Aspen / Grey Birch Forest    | CEGL006560 |
| • Red Maple Upland Forest                   | CEGL006547 |

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### 1

|                                                           |   |
|-----------------------------------------------------------|---|
| Forests and shrub thickets of uplands (not wetlands)..... | 2 |
| Forests of wetlands or seeps.....                         | 8 |

### 2

|                                                                                                                           |   |
|---------------------------------------------------------------------------------------------------------------------------|---|
| Forests dominated by conifer trees (evergreen trees >50% cover), deciduous trees < 20-25% of the total canopy cover ..... | 3 |
| Deciduous or mixed forests and woodlands: deciduous trees > 25% of the total canopy cover.....                            | 4 |

### 3

|                                                                                        |  |
|----------------------------------------------------------------------------------------|--|
| Conifer forests with a predominant white pine ( <i>Pinus strobus</i> ) component ..... |  |
| <b>White Pine - Oak Forest</b> (CEGL006293)                                            |  |
| Successional forests dominated by Virginia pine ( <i>Pinus virginiana</i> ).....       |  |
| <b>Virginia Pine Successional Forest</b> (CEGL002591)                                  |  |

### 4

|                                                                                                                                                                                             |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Early successional forests with opportunistic species such as aspen ( <i>Populus</i> spp.), birch ( <i>Betula</i> spp.), cherry ( <i>Prunus</i> spp.), and ash ( <i>Fraxinus</i> spp.)..... | 5 |
| Late successional hardwood forests with oaks ( <i>Quercus</i> spp.), hickories ( <i>Carya</i> spp.), beech ( <i>Fagus grandifolia</i> ), and maples ( <i>Acer</i> spp.).....                | 7 |

### 5

|                                                                                                                                                                                                    |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Tree species may include black cherry ( <i>Prunus serotina</i> ), tuliptree ( <i>Liriodendron tulipifera</i> ), white ash ( <i>Fraxinus americana</i> ), and red maple ( <i>Acer rubrum</i> )..... | 6 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|

Aspen (*Populus* spp.) and gray birch (*Betula populifolia*) early successional forest commonly found on former agricultural land, in areas of ice scour along stream banks, and where there has been major disturbance resulting in areas of exposed mineral soil.....

Successional Aspen / Grey Birch Forest (CEGL6560)

6

Red maple clearly dominated forest canopy; oaks, sweet birch (*Betula lenta*), tulip tree, black cherry white ash (*Fraxinus americana*), and hickories can be canopy associates; hay scented fern (*Dennstaedtia punctilobula*) dominates the groundstory.....

Red Maple Upland Forest (CEGL6547)

Black cherry, tulip tree, white ash and red maple all share canopy dominance; other associates can include black walnut (*Juglans nigra*), sassafras (*Sassafras albidum*), eastern red cedar (*Juniperus virginiana*), and black locust (*Robinia pseudoacacia*); the herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.....

Northeastern Modified Successional Forest (CEGL006599)

7

Oaks and hickories are dominant in tree canopy.....

Northeastern Dry Oak-Hickory Forest (CEGL006336)

Hardwoods including tulip tree, American beech (*Fagus grandifolia*) and sugar maple (*Acer saccharum*) dominate the canopy.....

Tuliptree - Beech - Maple Forest (CEGL006296)

8

Saturated swamp community that occupies saturated or seasonally wet basins.....9

Forested seep or wooded marsh community; not a swamp.....10

9

Red maple and black gum (*Nyssa sylvatica*) dominant.....

Red Maple - Black Gum Basin Swamp (CEGL006014)

Red maple swamps characterized by an herbaceous layer strongly dominated by sedges.....

Red Maple - Tussock Sedge Wooded Marsh (CEGL006119)

10

Forested seep with red maple and black gum characteristic and with associates eastern hemlock (*Tsuga canadensis*) and yellow birch (*Betula alleghaniensis*).....

Central Appalachian Forested Acid Seep (CEGL006132)

Red maple wooded marshes characterized by an herbaceous layer strongly dominated by sedges.....

Red Maple - Tussock Sedge Wooded Marsh (CEGL006119)

## SOUTHERN AND CENTRAL APPALACHIAN COVE FOREST

CES202.373

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|                                        |            |
|----------------------------------------|------------|
| • Central Appalachian Rich Cove Forest | CEGL006237 |
| • Calcareous Slope Forest              | CEGL006020 |

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This community occupies cool, mesic, lower to middle slopes, ravines, and coves at elevations; sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*) and basswood (*Tilia americana*) are characteristic in the canopy; alternate leaf dogwood (*Cornus alternifolia*), witch hazel (*Hamamelis virginiana*), and spicebush (*Lindera benzoin*) frequent the shrub layer; occurs in Pennsylvania.....

**Central Appalachian Rich Cove Forest** (CEGL006237)

This community occurs on slopes; densely vegetated; enriched, dry-mesic to mesic forest on talus or shallow, very rocky soils dominated by sugar maple and white ash; butternut (*Juglans cinerea*) is an associate. Shrub layer is characterized by bladdernut (*Staphylea trifolia*); herb layer is characterized by bladder ferns (*Cystopteris* spp.), woodsia ferns (*Woodsia* spp.), wild ginger (*Asarum canadense*), and others; tends to have more southern species that drop out at the northern edge of the range; PA....

**Calcareous Slope Forest** (CEGL006020)

# ATLANTIC COASTAL PLAIN BLACKWATER STREAM FLOODPLAIN FOREST

CES203.247

- 
- Coastal Plain Atlantic White-cedar - Red Maple Swamp C EGL006078
  - Atlantic White-cedar / Seaside Alder Swamp C EGL006307
- 

Mixed Atlantic white-cedar - red maple swamp with canopy dominants Atlantic white cedar (*Chamaecyparis thyoides*) and red maple, other canopy associates include magnolia (*Magnolia virginiana*), black gum (*Nyssa sylvatica*), pitch pine (*Pinus rigida*).....

**Coastal Plain Atlantic White-cedar - Red Maple Swamp** (CEGL006078)

Open-canopy Atlantic white-cedar swamp that occurs along streams of the Delmarva Peninsula; dominated by low-stature Atlantic white cedar in association with loblolly pine (*Pinus taeda*); seaside alder (*Alnus maritima*) is a characteristic shrub.....

**Atlantic White-cedar / Seaside Alder Swamp** (CEGL006307)

## ATLANTIC COASTAL PLAIN BROWN WATER STREAM FLOODPLAIN FOREST

CES203.248

- 
- Coastal Plain Oak Floodplain Swamp
- 

CEGL006605

This floodplain swamp community occurs in New Jersey and potentially Delaware in the estuary; occurs in topographic depressions within alluvial floodplains; the tree canopy is dominated by pin oak (*Quercus palustris*), willow oak (*Quercus phellos*), red maple (*Acer rubrum*), and sweet gum (*Liquidambar styraciflua*).....

**Coastal Plain Oak Floodplain Swamp** (CEGL006605)

# ATLANTIC COASTAL PLAIN MESIC HARDWOOD AND MIXED FOREST

CES203.242

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|                                                               |            |
|---------------------------------------------------------------|------------|
| • Mesic Coastal Plain Oak Forest                              | CEGL006390 |
| • Mid-Atlantic Mesic Mixed Hardwood Forest                    | CEGL006075 |
| • Northern Coastal Plain/Piedmont Basic Mesic Hardwood Forest | CEGL006055 |
| • Basic Mesic Ravine Forest                                   | CEGL007181 |

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**1**

Mesic hardwood forests; heaths may be present but not dominant; high species diversity; upland forests... 2

Mesic indicators present such as willow oak (*Quercus phellos*), highbush blueberry (*Vaccinium corymbosum*), or swamp doghobble (*Leucothoe racemosa*); generally located adjacent to wetlands or low areas.....

**Mesic Coastal Plain Oak Forest** (CEGL006390)

**2**

Mesic forests of ravines.....3

Diverse forest of oaks, hickories, beech, tuliptree (*Liriodendron tulipifera*), sweet gum (*Liquidambar styraciflua*); holly (*Ilex opaca*) often present and usually abundant; herbaceous layer usually rich and may include may apple (*Podophyllum peltatum*), Solomon's seal (*Polygonatum biflorum*), Christmas fern (*Polystichum acrostichoides*); forest of the coastal plain from Cape May, New Jersey and south.....

**Northern Coastal Plain Mixed Hardwood Forest** (CEGL006075)

**3**

Dry to dry-mesic diverse hardwood forests of ravines; beech, oak, hickories in association with elms and black walnut (*Juglans nigra*).....

**Northern Coastal Plain / Northern Piedmont Basic Mesic Hardwood Forest** (CEGL006055)

Rich marl ravine forests of NJ; canopy dominants include beech, red and white oak, chinkapin oak (*Quercus muehlenbergii*), American basswood (*Tilia americana var. americana*), and tulip tree (*Liriodendron tulipifera*).....

**Basic Mesic Ravine Forest** (CEGL007181)

## ATLANTIC COASTAL PLAIN NORTHERN BASIN PEAT SWAMP

CES203.522

|                                                        |            |
|--------------------------------------------------------|------------|
| • Coastal Plain Atlantic White-cedar - Red Maple Swamp | CEGL006078 |
| • Blueberry Wetland Thicket                            | CEGL006371 |
| • Atlantic White-cedar / Seaside Alder Swamp           | CEGL006307 |
| • Southern Red Maple - Black Gum Swamp Forest          | CEGL006238 |
| • Coastal Plain Atlantic White-Cedar Swamp             | CEGL006188 |
| • Red Maple-Seaside Alder Woodland                     | CEGL006317 |

**1**

Tall-shrub swamp where the dominant shrubs include highbush blueberry (*Vaccinium corymbosum*), winterberry (*Ilex verticillata*), and swamp azalea (*Rhododendron viscosum*).....  
**Blueberry Wetland Thicket** (CEGL006371)

Swamp forests and wet woodlands .....2

**2**

Atlantic white cedar (*Chamaecyparis thyoides*) is a dominant or co-dominant in the canopy.....3

Atlantic white cedar not in the canopy.....5

**3**

Atlantic white cedar swamps of streamsides and millponds; seaside alder (*Alnus maritima*) a characteristic shrub; coastal plain pond species common associates such as yellow-eyed grasses, rushes, beaksedges, fimbry, and others common.....

**Atlantic White Cedar / Seaside Alder Swamp** (CEGL006307)

Atlantic white cedar swamps of the glaciated coastal region or Atlantic coastal plain; coastal or coastal plain indicators such as bayberry (*Morella pensylvanica*) and inkberry (*Ilex glabra*) present at least in low cover.....4

**4**

Atlantic white cedar swamp of the northern Atlantic coast north of the range of red bay (*Magnolia virginiana*) from northern New Jersey coastal plain to Massachusetts; coastal indicators bayberry and inkberry present at least at the wetland edge; wetland tending to be acidic and nutrient-poor.....

**Northern Coastal Atlantic White Cedar Swamp** (CEGL006188)

Atlantic white cedar swamp of the Atlantic coastal plain (southern New Jersey to Delaware) with red bay as a frequent canopy associate; occurs most frequently along water courses and thus receives some seasonal flooding.....

**Coastal Plain Atlantic White-cedar - Red Maple Swamp** (CEGL006078)

**5**

Red maple and black gum dominant with magnolia frequent; restricted to groundwater-saturated stream bottoms, seeping toeslopes, and poorly drained depressions with seasonally perched water tables

**Southern Red Maple - Black Gum Swamp Forest** (CEGL006238)

Red maple dominant with seaside alder dominant in the understory; found in Prime Hook National Wildlife  
Refuge in Delaware.....  
**Red Maple – Seaside Alder Woodland** (CEGL006317)

## ATLANTIC COASTAL PLAIN NORTHERN BASIN SWAMP & WET HARDWOOD FOREST

CES203.520

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|                                                |            |
|------------------------------------------------|------------|
| • Coastal Loblolly Pine Wetland Forest         | CEGL006137 |
| • Chesapeake Red Maple Swamp                   | CEGL006606 |
| • Southern Red Maple - Black Gum Swamp Forest  | CEGL006238 |
| • Red Maple - Sweetgum Swamp                   | CEGL006110 |
| • Cape May Lowland Swamp                       | CEGL006013 |
| • Coastal Plain Calcareous Seepage Swamp       | CEGL006413 |
| • Southern New England Red Maple Seepage Swamp | CEGL006406 |

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**1**  
Swamp forests needle-leaved or mixed with deciduous trees; loblolly pine (*Pinus taeda*) present in quantity (Cape May, NJ and northern Delaware only) .....  
**Coastal Loblolly Pine Wetland Forest** (CEGL006137)

Swamp forests deciduous..... 2

**2**  
Red maple swamps of alluvial floodplains, stream bottoms, headwaters; influenced by groundwater seepage .....3  
Red maple swamps of topographic basins or poorly drained lowlands or flats; not associated with river settings.....6

**3**  
Seepage swamp, New Jersey and points south.....4  
Seepage swamp, New Jersey and points north.....  
**Southern New England Red Maple Seepage Swamp** (CEGL006406)

**4**  
Swamp characterized by high species diversity and calcium-requiring plants.....5  
Not calcareous; swamp of the mid-Atlantic coastal plain (NJ, DE) characterized by lizard-tail (*Saururus cernuus*) and other forbs; diversity relatively low.....  
**Chesapeake Red Maple Swamp** (CEGL006606)

**5**  
Seepage swamp of southern New Jersey and possibly Maryland; pumpkin ash (*Fraxinus profunda*), sweet gum (*Liquidambar styraciflua*), southern swamp cottonwood (*Populus heterophylla*) characteristic; also characterized by high diversity and calcium-requiring plants such as swamp thistle (*Cirsium muticum*) and glade spurge (*Euphorbia purpurea*).....  
**Cape May Lowland Swamp** (CEGL006013)

Seepage swamp forest in the southern portion of the coastal plain; occurs in ravines; green ash (*Fraxinus pennsylvanica*) and waxmyrtle (*Morella cerifera*) present.....  
**Coastal Plain Calcareous Seepage Swamp** (CEGL006413)

**6**  
Sweet gum present in canopy.....7  
Sweet gum not present; pronounced hummock – hollow micro-topography with moderately deep peat / muck accumulation .....8

**7**  
Common basin swamp of the coastal plain of New Jersey, DE and farther south; southern species typical; sweet bay swamps (*Magnolia virginiana*), sweet gum, swamp bay (*Persea palustris*) and others present in quantity.....  
**Southern Red Maple - Black Gum Swamp Forest** (CEGL006238)

Swamp of the coastal plain from PA and New Jersey south; vegetation occurring in seasonally flooded basins experiencing late-season draw-down; organic layer shallow to absent; sweetgum and black gum (*Nyssa sylvatica*) common; lacks southern species indicated above .....  
**Red Maple – Sweetgum Swamp** (CEGL006110)

**8**  
Green ash prominent; spicebush (*Lindera benzoin*) and lizard-tail (*Saururus cernuus*) present, with relatively diverse herbaceous layer evident.....  
**Chesapeake Red Maple Swamp** (CEGL006606)

Black gum prevalent with red maple; herbaceous less diverse and less well-developed .....  
**Southern Red Maple – Black Gum Swamp Forest** (CEGL006238)

## ATLANTIC COASTAL PLAIN NORTHERN BOG

CES203.893

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|                                            |            |
|--------------------------------------------|------------|
| • Water-lily Aquatic Wetland               | CEGL002386 |
| • Pitch Pine Bog                           | CEGL006194 |
| • Pine Barrens Bog                         | CEGL006208 |
| • Coastal Plain Atlantic White-cedar Swamp | CEGL006188 |

---

**1**

Forested bog or swamp communities with conifers dominating the canopy.....2

Shrub or herbaceous wetland community.....3

**2**

Bog with deep peat accumulation, pronounced floating mat and scattered pitch pine (*Pinus rigida*) canopy; shrub layer heavily dominated by leatherleaf (*Chamaedaphne calyculata*).....

**Pitch Pine Bog** (CEGL006194)

Atlantic white cedar (*Chamaecyparis thyoides*) swamp of the northern Atlantic coast, north of the range of sweet bay (*Magnolia virginiana*) from northern New Jersey coastal plain to Massachusetts; coastal indicators bayberry (*Morella pensylvanica*), inkberry (*Ilex glabra*) present at least at the wetland edge; wetland tending to be acidic and nutrient-poor.....

**Northern Coastal Atlantic White Cedar Swamp** (CEGL006188)

**3**

Aquatic herbaceous wetland community dominated by water lilies (*Nuphar lutea* ssp. *advena*) and (*Nymphaea odorata*) .....

**Water-lily Aquatic Wetland** (CEGL002386)

Dwarf shrub bog community dominated by leatherleaf; occurs in NJ pine barrens.....

**Pine Barrens Bog** (CEGL006208)

# ATLANTIC COASTAL PLAIN NORTHERN DUNE & MARITIME GRASSLAND

CES203.264

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|                                                   |            |
|---------------------------------------------------|------------|
| • Chesapeake Bay Tall Maritime Shrubland          | CEGL006319 |
| • Beachgrass - Panicgrass Dune Grassland          | CEGL004043 |
| • Interdune Switchgrass Brackish Depression       | CEGL004129 |
| • Atlantic Coast Interdune Swale                  | CEGL003839 |
| • Northern Beachgrass Dune                        | CEGL006274 |
| • Northern Bayberry Dune Shrubland                | CEGL006295 |
| • Blueberry Wetland Thicket                       | CEGL006371 |
| • Overwash Dune Grassland                         | CEGL004097 |
| • North Atlantic Coastal Plain Vine Dune          | CEGL003886 |
| • Central Coast Beach Heather Dune Shrubland      | CEGL003950 |
| • Pitch Pine Dune Woodland                        | CEGL006117 |
| • Northeastern Atlantic Brackish Interdunal Swale | CEGL006342 |
| • Maritime Red-cedar Woodland                     | CEGL006212 |
| • Loblolly Pine Dune Woodland                     | CEGL006052 |
| • Coastal Freshwater Marsh                        | CEGL006935 |

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|          |                                                                |    |
|----------|----------------------------------------------------------------|----|
| <b>1</b> | Woody vegetation (woodland, shrubland, vineland).....          | 2  |
|          | Vegetation herbaceous or sparse (grassland, marsh, dune) ..... | 11 |

|          |                                                |   |
|----------|------------------------------------------------|---|
| <b>2</b> | Shrubs or vines dominant vegetation.....       | 3 |
|          | Woodland vegetation with open tree canopy..... | 9 |

|          |                                                                                                                                                                            |   |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>3</b> | Shrubland.....                                                                                                                                                             | 4 |
|          | Vines dominant (Virginia creeper, poison ivy, cat brier); shrubs, if present, covered by vines and senescing<br><b>North Atlantic Coastal Plain Vine Dune</b> (CEGL003886) |   |

|          |                              |   |
|----------|------------------------------|---|
| <b>4</b> | Wetland shrub community..... | 5 |
|          | Upland shrub community.....  | 6 |

|          |                                                                                                                                                                                                                                                                                                                                     |  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>5</b> | Interdunal swale community with water table less than 0.5 m below the surface; wax myrtle ( <i>Morella cerifera</i> ) dominates the shrub layer with groundsel tree ( <i>Baccharis halimifolia</i> ) and bayberry ( <i>Morella pennsylvanica</i> ) as associates; salt hay ( <i>Spartina patens</i> ) dominates the herb layer..... |  |
|          | <b>Atlantic Coast Interdune Swale</b> (CEGL003839)                                                                                                                                                                                                                                                                                  |  |

Highbush blueberry (*Vaccinium corymbosum*) shrub wetland with thin layer of peat overlying sand; often occurs on the margins ponds that draw down in late summer.....  
**Blueberry Wetland Thicket** (CEGL006371)

**6**  
 Dwarf shrubland of foredunes and dune slacks; unstable sand exposed in large patches; beach heather (*Hudsonia tomentosa*) dominant.....  
**Central Coast Beach Heather Dune Shrubland** (CEGL003950)

Shrubland occurs on stabilized or secondary dunes or in interdunal swales.....7

**7**  
 Interdunal swale community with water table less than 0.5 m below the surface; wax myrtle dominates the shrub layer with groundsel tree, and bayberry as associates; salt hay dominates the herb layer.....  
**Atlantic Coast Interdune Swale** (CEGL003839)

Coastal shrub community dominated by cherries and bayberries.....8

**8**  
 Tall, deciduous shrubland or scrub forest; black cherry (*Prunus serotina*), wax-myrtle and greenbrier (*Smilax rotundifolia*) common.....  
**Chesapeake Bay Tall Maritime Shrubland** (CEGL006319)

Knee-high to thigh-high shrubland; beach plum (*Prunus maritima*) and bayberry dominant.....  
**Northern Bayberry Dune Shrubland** (CEGL006295)

**9**  
 Woodland dune community dominated by pines.....10  
 Maritime woodland dominated by eastern red cedar (*Juniperus virginiana*).....  
**Maritime Red-Cedar Woodland** (CEGL006212)

**10**  
 Pitch pine (*Pinus rigida*) dominant; occurs on the backside of stabilized dunes; eastern red cedar and sassafras (*Sassafras albidum*) are typical canopy associates.....  
**Pitch Pine Dune Woodland** (CEGL006117)

Loblolly pine (*Pinus taeda*) dominant; beach heather dominates the dwarf-shrub layer; typically occurs adjacent to actively shifting foredune.....  
**Loblolly Pine Dune Woodland** (CEGL006052)

**11**  
 Herbaceous vegetation of seasonally or semi-permanently flooded swales, depressions and marshes ..... 12  
 Herbaceous or sparse vegetation of uplands or upper beaches..... 16

- 12**  
Swale and depression communities.....13  
Overwash and marsh communities.....15

- 13**  
Shrubs such as wax myrtle may be present at low cover.....14  
Swale of low diversity, generally closer to ocean; salt hay dominant; small spike rush (*Eleocharis parvula*) common.....  
**Northeastern Atlantic Brackish Interdunal Swale** (CEGL006342)

- 14**  
Switchgrass (*Panicum virgatum*) characteristic or dominant; seaside goldenrod (*Solidago sempervirens*) present.....  
**Interdune Switchgrass Brackish Depression** (CEGL004129)  
Wax myrtle dominates the shrub layer with groundsel tree and bayberry as associates; salt hay dominates the herb layer.....  
**Atlantic Coast Interdune Swale** (CEGL003839)

- 15**  
Salt hay dominated overwash terraces influenced by water-deposited sand caused by storm surges; seaside goldenrod is an occasional associate.....  
**Overwash Dune Grassland** (CEGL004097)  
Three-square (*Schoenoplectus pungens* var. *pungens*) and Canada rush (*Juncus canadensis*) dominant; non-tidal freshwater marsh that occupies flooded depressions and swales in coastal dunes.....  
**Coastal Freshwater Marsh** (CEGL006935)

- 16**  
American beach grass (*Ammophila brevifolata*) or panic grass (*Panicum* spp.) dominant.....17  
Salt hay dominated overwash terraces influenced by water-deposited sand caused by storm surges; seaside goldenrod is an occasional associate.....  
**Overwash Dune Grassland** (CEGL004097)

- 17**  
American beach grass and or panic grass dominant on foredunes; occurs almost exclusively on sandy, unstable, droughty substrates with no soil profile development.....  
**Beachgrass – Panicgrass Dune Grassland** (CEGL004043)  
Community is characterized and dominated by American beach grass; beach pea (*Lathyrus japonicus*) is the most common associate and can be codominant (not in DE); it occurs on active maritime dunes, on both foredunes that are exposed to onshore winds and salt spray as well as more protected interdunes.  
**Northern Beachgrass Dune** (CEGL006274)

## ATLANTIC COASTAL PLAIN NORTHERN PITCH PINE LOWLAND

CES203.374

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|                                               |            |
|-----------------------------------------------|------------|
| • Pine Barrens Sandreed Savanna               | CEGL006397 |
| • Pitch Pine Subhydric Lowland                | CEGL006387 |
| • Southern Red Maple - Black Gum Swamp Forest | CEGL006238 |
| • Pitch Pine Bog                              | CEGL006194 |
| • Pine Barrens Bog                            | CEGL006208 |
| • Pitch Pine - Reedgrass Savanna              | CEGL006388 |
| • Pitch Pine Lowland                          | CEGL006195 |
| • Highbush Blueberry Bog Thicket              | CEGL006190 |
| • Upper South Switchgrass Wet Prairie         | CEGL004128 |
| • Pine Barrens Floodplain Forest              | CEGL006918 |

---

**1**

|                                        |   |
|----------------------------------------|---|
| Forested wetland community; swamp..... | 2 |
| Shrub or herbaceous wetland.....       | 6 |

**2**

|                                                                                                  |   |
|--------------------------------------------------------------------------------------------------|---|
| Swamp forests dominated by pitch pine ( <i>Pinus rigida</i> ) or mixed with deciduous trees..... | 3 |
| Swamp forests deciduous.....                                                                     | 9 |

**3**

|                                                                                                                                                                                                            |                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Bog wetland with deep peat accumulation, pronounced floating mat and scattered pitch pine canopy; shrub layer heavily dominated by leatherleaf ( <i>Chamaedaphne calyculata</i> ).....                     | <b>Pitch Pine Bog</b> (CEGL006194) |
| Pitch pine-dominated wetlands of NJ pine barrens; shallow peat accumulation or overlying saturated sands; or if deep organic layer is present, grasses rather than dwarf shrubs dominate ground layer..... | 4                                  |

**4**

|                                                                                                                                                                              |                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Pineland reedgrass ( <i>Calamovilfa brevifilis</i> ) dominates the ground layer; scattered shrub layer characterized by dwarf huckleberry ( <i>Gaylussacia dumosa</i> )..... | <b>Pitch Pine – Pine Reedgrass Savanna</b> (CEGL006388) |
| Dwarf shrubs dominate the ground layer.....                                                                                                                                  | 5                                                       |

**5**

|                                                                                                                                                                                                                                                                                                                                             |                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Water present at surface or just below; red maple ( <i>Acer rubrum</i> ) and black gum ( <i>Nyssa sylvatica</i> ) often present with pitch pine canopy. Shrub layer is relatively diverse, with highbush blueberry ( <i>Vaccinium corymbosum</i> ), sheep laurel ( <i>Kalmia angustifolia</i> ) and others; sphagnum mosses are common..... | <b>Pitch Pine Lowland</b> (CEGL006195) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|

Surface water not present, but soils mottled and mesic species (highbush blueberry, inkberry) present.....  
**Pitch Pine Subhydric Lowland** (CEGL006387)

**6**

Shrub dominated bog community.....7  
Herbaceous wetland community.....8

**7**

Shrub bogs dominated by highbush blueberry (*Vaccinium corymbosum*).....  
**Highbush Blueberry Bog Thicket** (CEGL006190)

Dense leatherleaf (*Chamaedaphne calyculata*) occurs over a continuous carpet of *Sphagnum* moss.  
Walter's sedge (*Carex striata*) is interspersed within the dwarf-shrubs or forms significant cover in  
wetter openings.....  
**Pine Barrens Bog** (CEGL006208)

**8**

Saturated wetland community of the New Jersey Pine Barrens dominated by pineland reed grass with  
associate dwarf huckleberry (*Gaylussacia dumosa*).....  
**Pine Barrens Sandreed Savanna** (CEGL006397)

Seasonally flooded herbaceous vegetation community dominated by switch grass (*Panicum virgatum*) in  
the New Jersey pine barrens.....  
**Upper South Switchgrass Wet Prairie** (CEGL004128)

**9**

Common basin swamp of the coastal plain of New Jersey and south; southern species red bay (*Magnolia  
virginiana*), sweet gum (*Liquidambar styraciflua*), swamp bay (*Persea palustris*) and others present in  
quantity.....  
**Southern Red Maple – Black gum Swamp Forest** (CEGL006238)

Temporarily flooded floodplain forest associated with small streams in the pine barrens; canopy is  
codominated by green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), and American elm  
(*Ulmus americana*).....  
**Pine Barrens Floodplain Forest** (CEGL006918)

## ATLANTIC COASTAL PLAIN NORTHERN PONDSHORE

CES203.518

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|                                              |            |
|----------------------------------------------|------------|
| • Deep Muck Coastal Plain Pond               | CEGL006400 |
| • Coastal Plain Pondshore                    | CEGL006415 |
| • Buttonbush Coastal Plain Pond              | CEGL006242 |
| • Blueberry Wetland Thicket                  | CEGL006371 |
| • Coastal Plain Muck Pondshore               | CEGL006264 |
| • Red Maple - Sweetgum Swamp                 | CEGL006110 |
| • Northern Peatland Sedge Coastal Plain Pond | CEGL004120 |
| • Cape May - Delmarva Depression Meadow      | CEGL006332 |
| • Coastal Plain Pond                         | CEGL006086 |
| • Creeping Lovegrass Coastal Plain Pond      | CEGL006608 |
| • Panicgrass Pondshore                       | CEGL006338 |
| • Swamp-loosestrife Coastal Plain Pond       | CEGL006087 |
| • Water-willow Shrub Swamp                   | CEGL005089 |
| • Upper South Switchgrass Wet Prairie        | CEGL004128 |
| • Pine Barrens Floodplain Forest             | CEGL006918 |

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**1**

Vegetation dominated by trees.....2

Vegetation not dominated by trees; shrublands, meadows, pondshores.....3

**2**

Basin wetland dominated by red maple (*Acer rubrum*) and sweet gum (*Liquidambar styraciflua*).....

**Red Maple – Sweetgum Swamp** (CEGL006110)

Temporarily flooded floodplain forest associated with small streams typically in the pine barrens; canopy is codominated by green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), and American elm (*Ulmus americana*).....

**Pine Barrens Floodplain Forest** (CEGL006918)

**3**

Shrub dominated vegetation; (>10%) cover of shrubs.....4

Herbaceous dominated vegetation.....7

**4**

Vegetation of the lowest, wettest portion of ponds with permanent, or of very deep muck.....5

Vegetation on outer margin of pond, or adjacent to pond.....6

**5**

Buttonbush (*Cephalanthus occidentalis*) dominant.....

**Buttonbush Coastal Plain Pond** (CEGL006242)

Swamp loosestrife (*Decodon verticillatus*) dominant.....  
**Swamp-loosestrife Coastal Plain Pond** (CEGL006087)

**6**  
Highbush blueberry shrub wetland with thin layer of peat overlying sand; often occurs on the margins of ponds that draw down in late summer .....  
**Blueberry Wetland Thicket** (CEGL006371)

Swamp loosestrife (water willow) dominant.....  
**Water-willow Shrub Swamp** (CEGL005089)

**7**  
Vegetation of the highest outer margin of the pond ..... 8  
Vegetation of the central or lower shore, or emergent ..... 11

**8**  
Diverse pond shore with shared dominance of beaksedge (*Rynchospora* spp.), warty panic-grass (*Panicum verrucosum*), savanna nutrush (*Scleria verticillata*) .....  
**Coastal Plain Muck Pondshore** (CEGL006264)

One species dominated ponds shore; monotypic.....9

**9**  
Switch grasses (*Panicum* spp.) dominant .....10  
Northern peatland sedge (*Carex striata* var. *brevis*) dominant.....  
**Peatland Sedge Pondshore** (CEGL004120)

**10**  
Maidencane (*Panicum hemitomon*) is the dominant species, often occurring in monotypic stands.....  
**Panic-grass Pondshore** (CEGL006338)  
Seasonally flooded herbaceous vegetation community dominated by switch grass (*Panicum virgatum*) in the New Jersey pine barrens.....  
**Upper South Switchgrass Wet Prairie** (CEGL004128)

**11**  
Floating-leaved species, generally water-lilies, present in abundance.....  
**Coastal Plain Pond** (CEGL006086)

Vegetation comprised of low grasses or grass-like plants, or small-statured forbs without floating leaves..12

**12**  
Vegetation characterized by rushes and sedges; Canada rush (*Juncus canadensis*) and three-way sedge (*Dulichium arundinaceum*).....

**Three-way Sedge – Canada Rush Coastal Plain Pond** (CEGL006415)

Vegetation characterized by grasses and/or rushes ..... 13

**13**

Vegetation occurs only in Delaware within the Delaware Estuary watershed..... 14

Vegetation occurs in New Jersey and possibly Delaware; discernible basin wetland, occurring in the central lowest portion; featherfoil (*Hottonia inflata*) and creeping lovegrass (*Eragrostis hypnoides*) characteristic.....

**Creeping Lovegrass Coastal Plain Pond** (CEGL006608)

**14**

Vegetation comprised of yellow spikerush (*Eleocharis flavescens*), yellow-eyed grasses (*Xyris* spp.), and other coastal plain pond species; forming poorly consolidated mats in a large wetland complex; known from Prime Hook NWR in Delaware.....

**Deep Muck Coastal Plain Pond** (CEGL006400)

Twigrush (*Cladium mariscoides*) and wrinkled jointgrass (*Coelrachis rugosa*) dominant; uncommon vegetation type currently known only from Assasowoman Bay Wildlife Management Area in Delaware.....

**Cape May Delmarva Depression Meadow** (CEGL006332)

# ATLANTIC COASTAL PLAIN SMALL BROWNWATER RIVER FLOODPLAIN FOREST

CES203.250

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|                                                                |            |
|----------------------------------------------------------------|------------|
| • Southern Coastal Plain Cottonwood - Willow Riverfront Forest | CEGL007346 |
| • Coastal Plain Streamside Forest                              | CEGL006603 |
| • Aluvial Alder Swamp .....                                    | CEGL006414 |
| • Coastal Plain Oak Floodplain Swamp                           | CEGL006605 |
| • Successional Sweetgum Floodplain Forest                      | CEGL007330 |

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**1**

|                                                                                                                                                                            |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Forested community.....                                                                                                                                                    | 2                                        |
| Shrubland community dominated silky dogwood ( <i>Cornus amomum</i> ) and brook-side alder ( <i>Alnus serrulata</i> ) dominant; buttonbush is often an associate shrub..... |                                          |
|                                                                                                                                                                            | <b>Alluvial Alder Swamp</b> (CEGL006414) |

**2**

|                                                                                            |                                                        |
|--------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Wetland forests of floodplains.....                                                        | 3                                                      |
| Wetland forest of alluvial backswamps; pin oak ( <i>Quercus palustris</i> ) prominent..... |                                                        |
|                                                                                            | <b>Coastal Plain Oak Floodplain Swamp</b> (CEGL006605) |

**3**

|                                                                                            |                                                             |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Natural floodplain communities.....                                                        | 4                                                           |
| Altered forests of floodplains; sweetgum ( <i>Liquidambar styraciflua</i> ) prevalent..... |                                                             |
|                                                                                            | <b>Successional Sweetgum Floodplain Forest</b> (CEGL007330) |

**4**

|                                                                                                                                                                                                                                              |                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Sycamore ( <i>Platanus occidentalis</i> ) present; vegetation of braided streams.....                                                                                                                                                        |                                                                                  |
|                                                                                                                                                                                                                                              | <b>Coastal Plain Streamside Forest</b> (CEGL006603)                              |
| Cottonwood ( <i>Populus deltoides</i> ) and black willow ( <i>Salix nigra</i> ) dominant; vegetation occurs along the fronts and banks of large rivers and on islands where sediment accretes; in the New Jersey portion of the estuary..... |                                                                                  |
|                                                                                                                                                                                                                                              | <b>Southern Coastal Plain Cottonwood - Willow Riverfront Forest</b> (CEGL007346) |

## NORTH ATLANTIC COASTAL PLAIN BRACKISH TIDAL MARSH

CES203.894

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|                                            |            |
|--------------------------------------------|------------|
| • Alkali Bulrush Brackish Marsh            | CEGL006416 |
| • Cattail Brackish Tidal Marsh             | CEGL004201 |
| • Central Atlantic Brackish Marsh          | CEGL006417 |
| • Mesohaline Seepage Marsh                 | CEGL006418 |
| • North Atlantic Coast Intertidal Mud Flat | CEGL004473 |
| • Brackish Tidal Low Marsh                 | CEGL004193 |
| • Water-hemp Tidal Marsh                   | CEGL006080 |
| • Atlantic Giant Cordgrass Marsh           | CEGL004195 |
| • Transitional Tidal Marsh                 | CEGL006612 |
| • Atlantic Coast Brackish Tidal Marsh      | CEGL004188 |

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**1**

- Vegetation of sandy or gravelly substrates that are freely drained ..... 2
- Vegetation of organic substrates (peat, muck) ..... 3

**2**

- Vegetation usually sparse, low species diversity; characterized by graminoids (grass-like plants);  
 Threesquare (*Schoenoplectus pungens*) characteristic; associated with large rivers.....  
**Atlantic Coast Brackish Tidal Marsh** (CEGL004188)
- Vegetation better developed; higher species diversity characterized by forbs; water hemp (*Amaranthus  
 cannabinus*) characteristic.....  
**Water-hemp Tidal Marsh** (CEGL006080)

**3**

- Vegetation of low marshes or flats; adjacent to river; regularly flooded; subject to ice scour ..... 4
- Vegetation of mid or high marsh; flooding less regular ..... 5

**4**

- Sparse vegetation consisting of short forbs on mud flat; characteristic plants are low-growing rosette  
 species; awl-leaf arrowhead (*Sagittaria subulata*) and Welsh mudwort (*Limosella australis*) common....  
**North Atlantic Coast Intertidal Mud Flat** (CEGL004473)
- Tall grasses or grass-like plants dominant; may be mixed with forbs; saltwater cordgrass (*Spartina  
 alterniflora*) dominant.....  
**Brackish Tidal Low Marsh** (CEGL004193)

**5**

- Vegetation of high salt marsh; meanders and areas adjacent to uplands..... 6

Transition from low marsh to high marsh, low areas within high marsh; occurs primarily in the Chesapeake Bay ecoregion and in the Delaware portion of the estuary.....  
**Transitional Tidal Marsh** (CEGL006612)

**6**  
 Vegetation of meanders and adjacent to uplands, exposed to freshwater seepage rather than the freshwater input from the river; diverse mixture of freshwater forbs with freshwater cordgrass.....  
**Mesohaline Seepage Marsh** (CEGL006418)

Vegetation less diverse mixture of saltwater cordgrass with other grasses or grasslike plants ..... 7

**7**  
 Saltwater cordgrass a major component ..... 8  
 Saltwater cordgrass absent or negligible ..... 9

**8**  
 Saltwater cordgrass and water-hemp (*Amaranthus cannabinus*) co-dominant; mid-tidal portion of rivers in Delaware and Maryland.....  
**Central Atlantic Brackish Marsh** (CEGL006417)

Saltwater cordgrass and alkali bulrush (*Schoenoplectus robustus*) co-dominant .....  
**Alkali Bulrush Brackish Marsh** (CEGL006416)

**9**  
 Narrow-leaved cattail (*Typha angustifolia*) abundant.....  
**Cattail Brackish Tidal Marsh** (CEGL004201)

Giant cordgrass (*Spartina cynosuroides*) dominant.....  
**Atlantic Giant Cordgrass Marsh** (CEGL004195)

## NORTH ATLANTIC COASTAL PLAIN DRY HARDWOOD FOREST

CES203.475

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|                                                    |            |
|----------------------------------------------------|------------|
| • North Atlantic Coastal Oak - Holly Forest        | CEGL006378 |
| • Mid-Atlantic Mesic Mixed Hardwood Forest         | CEGL006075 |
| • Northeastern Dry Oak-Hickory Forest              | CEGL006336 |
| • Coastal Oak / Laurel Forest                      | CEGL006374 |
| • Northeastern Coastal Oak - Heath Forest          | CEGL006375 |
| • Northeastern Atlantic Coastal Oak - Beech Forest | CEGL006377 |
| • Southern Red Oak / Heath Forest                  | CEGL006269 |
| • Coastal Plain Chestnut Oak - Beech Forest        | CEGL006919 |
| • Xeric Paleodune Oak-Sand Hickory Woodland        | CEGL006954 |

---

**1**

Oaks dominant; few other hardwood genera present in the canopy; scattered pines sometimes present..... 2

Oaks combined with other nut-bearing hardwood species such as beech (*Fagus grandifolia*) and hickories (*Carya* spp.) comprise the canopy ..... 5

**2**

Dry oak forests with heaths such as blueberries and huckleberries prominent in the shrub layer; southern red oak (*Quercus falcata*) a characteristic oak.....3

Oak forests with heaths in the understory; southern red oak absent; forests ranging from Cape May, New Jersey and northwards..... 4

**3**

Common and widespread mixed oak forests on the Coastal Plain from New Jersey to Virginia; forests of southern New Jersey and south; loblolly pine (*Pinus taeda*) may be present.....

**Southern Red Oak / Heath Forest** (CEGL006269)

Rare community unique to xeric paleodunes on Maurice River terraces in New Jersey; southern red oak, white oak (*Quercus alba*), black oak (*Quercus velutina*), and post oak (*Quercus stellata*), with smaller amounts of sassafras (*Sassafras albidum*) and sand hickory (*Carya pallida*); pitch pine may be present and Pennsylvania sedge (*Carex pensylvanica*) is widespread in the herb stratum.....

**Xeric Paleodune Oak-Sand Hickory WoodlandOak** (CEGL006954)

**4**

Heath understory dominated by evergreen mountain laurel (*Kalmia latifolia*).....

**Coastal Oak / Laurel Forest** (CEGL006374)

Heath understory deciduous (blueberries, huckleberries); chestnut oak (*Quercus prinus*) absent or of low cover; common oak forest type of the northeast, occurring in coastal areas and in dry soils inland.....

**Northeastern Coastal Oak / Heath Forest** (CEGL006375)

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>5</b> | Beech and other hardwoods contribute substantial cover with oaks.....                                                                                                                                                                                                                                                                                                                                                                                                    | 6 |
|          | Beech minor to absent.....                                                                                                                                                                                                                                                                                                                                                                                                                                               | 8 |
| <br>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
| <b>6</b> | Diverse forest of oaks, hickories, beech, tuliptree ( <i>Liriodendron tulipifera</i> ), sweet gum ( <i>Liquidambar styraciflua</i> ); holly ( <i>Ilex opaca</i> ) often present and usually abundant; herbaceous layer usually rich and may include may apple ( <i>Podophyllum peltatum</i> ), Solomon's seal ( <i>Polygonatum biflorum</i> ), Christmas fern ( <i>Polystichum acrostichoides</i> ); forest of the coastal plain from Cape May, New Jersey and south.... |   |
|          | <b>Northern Coastal Plain Mixed Hardwood Forest</b> (CEGL006075)                                                                                                                                                                                                                                                                                                                                                                                                         |   |
|          | Forest dominated by oaks and beech; less diverse and less rich.....                                                                                                                                                                                                                                                                                                                                                                                                      | 7 |
| <br>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
| <b>7</b> | Forest dominated by white oak, black oak and beech; few shrubs in understory; herbaceous layer typically contains Canada mayflower ( <i>Maianthemum canadense</i> ) and seedlings from the canopy.....                                                                                                                                                                                                                                                                   |   |
|          | <b>Coastal Oak – Beech Forest</b> (CEGL006377)                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
|          | Chestnut oak ( <i>Quercus prinus</i> ) dominant along with black oaks and beech; flowering dogwood ( <i>Cornus florida</i> ) is typically also present, occasionally with American holly. The shrub stratum is strongly dominated by mountain laurel.....                                                                                                                                                                                                                |   |
|          | <b>Coastal Plain Chestnut Oak - Beech Forest</b> (CEGL006919)                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| <br>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
| <b>8</b> | Hickories an important component of the canopy.....                                                                                                                                                                                                                                                                                                                                                                                                                      | 9 |
|          | Mixed hardwood canopy with holly abundant in the understory; dogwood absent.....                                                                                                                                                                                                                                                                                                                                                                                         |   |
|          | <b>Coastal Oak / Holly Forest</b> (CEGL006378)                                                                                                                                                                                                                                                                                                                                                                                                                           |   |
| <br>     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |   |
| <b>9</b> | Mixed canopy of oaks and hickories with dogwood and maple leaf viburnum ( <i>Viburnum acerifolium</i> ) prominent in the understory.....                                                                                                                                                                                                                                                                                                                                 |   |
|          | <b>Northeastern Dry Oak – Hickory Forest</b> (CEGL006336)                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|          | Rare community unique to xeric paleodunes on Maurice River terraces in New Jersey; southern red oak, white oak, black oak, and post oak, with smaller amounts of sassafras and sand hickory; pitch pine may be present and Pennsylvania sedge is widespread in the herb stratum.....                                                                                                                                                                                     |   |
|          | <b>Xeric Paleodune Oak-Sand Hickory Woodland</b> (CEGL006954)                                                                                                                                                                                                                                                                                                                                                                                                            |   |

## NORTH ATLANTIC COASTAL PLAIN FRESH AND OLIGOHALINE TIDAL MARSH

CES203.516

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|                                               |            |
|-----------------------------------------------|------------|
| • Sweetflag Tidal Marsh                       | CEGL006833 |
| • Estuary Quillwort Tidal Flat                | CEGL006058 |
| • American Lotus Tidal Marsh                  | CEGL006913 |
| • North Atlantic Fresh Tidal Shrub Swamp      | CEGL006337 |
| • Oligohaline Mixed Forbs Marsh               | CEGL006181 |
| • Estuary Pipewort Freshwater Intertidal Flat | CEGL006352 |
| • Pond-lily Tidal Marsh                       | CEGL004472 |
| • Pickerelweed Tidal Marsh                    | CEGL004706 |
| • Water-hemp Tidal Marsh                      | CEGL006080 |
| • Atlantic Coast Wild Rice Tidal Marsh        | CEGL004202 |
| • Freshwater Tidal Mixed Forbs High Marsh     | CEGL006325 |
| • Atlantic Coast Brackish Tidal Marsh         | CEGL004188 |
| • Coastal Freshwater Marsh                    | CEGL006935 |
| • Water-willow Shrub Swamp                    | CEGL005089 |

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**1**

Shrub or woody vegetation dominant.....2

Herbaceous or grass vegetation dominant.....3

**2**

Swamp loosestrife (*Decodon verticillatus*) dominant.....

**Water-willow Shrub Swamp** (CEGL005089)

Alders (*Alnus serrulata* and/or *Alnus incana ssp. rugosa*) and dogwoods (*Cornus amomum*) dominant.....

**North Atlantic Fresh Tidal Shrub Swamp** (CEGL006337)

**3**

Vegetation adjacent to river and is regularly flooded and exposed..... 4

Vegetation separated from river by other vegetation; irregularly flooded low-lying swales within higher marsh..... 14

**4**

Vegetation of shores of large tidal rivers, substrate scoured by ice and flooding; vegetation of variable cover; sandy or gravelly substrate ..... 5

Vegetation of the main-stem of tidal river or its tributaries; more protected ..... 7

**5**

Vegetation forb-dominated; relatively high cover; tall.....

**Water-hemp Tidal Marsh** (CEGL006080)

Threesquare (*Schoenoplectus pungens var. pungens*) characteristic.....6

- 6**  
 Vegetation dense, diverse, non-tidal freshwater marsh dominated by threesquare, hibiscus (*Hibiscus moscheutos*), rushes (*Juncus* spp.) and ferns (*Osmunda* spp.); occupies flooded depressions and swales in coastal dunes and impoundments; can also occur at the mouth of large rivers, on hummocky islands in freshwater wetlands, and in transition zones.....  
**Coastal Freshwater Marsh** (CEGL006935)
- Vegetation usually sparse, low species diversity; tidal marsh characterized by graminoids (grass-like plants); threesquare characteristic; associated with large rivers .....  
**Atlantic Coast Brackish Tidal Marsh** (CEGL004188)
- 7**  
 Low vegetation of sandy or gravelly substrate.....  
**Estuary Pipewort Brackish Intertidal Flat** (CEGL006352)
- Vegetation of finer-grained silty or mucky sediments..... 8
- 8**  
 Low vegetation, rosette-forming, often sparse.....  
**Estuary Quillwort Tidal Flat** (CEGL006058)
- Vegetation taller..... 9
- 9**  
 Tall grasses dominant; characterized by wild rice (*Zizania aquatica*) .....  
**Atlantic Coast Wild Rice Tidal Marsh** (CEGL004202)
- Forbs, rushes and ferns dominant..... 10
- 10**  
 Vegetation dense, diverse, non-tidal freshwater marsh dominated by threesquare, hibiscus (*Hibiscus moscheutos*), rushes (*Juncus* spp.) and ferns (*Osmunda* spp.); occupies flooded depressions and swales in coastal dunes and impoundments; can also occur at the mouth of large rivers, on hummocky islands in freshwater wetlands, and in transition zones.....  
**Coastal Freshwater Marsh** (CEGL006935)
- Forbs dominant..... 11
- 11**  
 High diversity with many species of forbs .....  
**Oligohaline Mixed Forbs Marsh** (CEGL006181)
- Lower diversity; often a monoculture of emergent / aquatic herbs..... 12
- 12**  
 Emergent vegetation; arrow-arum (*Peltandra virginica*) and pickerel-weed (*Pontedaria cordata*) dominant....  
**Pickerelweed Tidal Marsh** (CEGL004706)

Water-lilies or American lotus dominant.....13

**13**

Yellow water-lily (*Nuphar lutea* ssp. *advena*) dominant .....  
**Pond Lily Tidal Marsh** (CEGL004472)

American lotus (*Nelumbo lutea*) dominant.....  
**American Lotus Tidal Marsh** (CEGL006913)

**14**

Sweetflag (*Acorus calamus*) dominant.....  
**Sweetflag Tidal Marsh** (CEGL006833)

Higher diversity marsh.....15

**15**

Arrow-arum, jewelweed (*Impatiens* spp.), cattails (*Typha* spp.) often present.....  
**Freshwater Tidal Mixed Forbs High Marsh** (CEGL006325)

Vegetation dense, diverse, non-tidal freshwater marsh dominated by threesquare (*Schoenoplectus pungens* var. *pungens*), hibiscus (*Hibiscus moscheutos*), rushes (*Juncus* spp.) and ferns (*Osmunda* spp.); occupies flooded depressions and swales in coastal dunes and impoundments; can also occur at the mouth of large rivers, on hummocky islands in freshwater wetlands, and in transition zones.....  
**Coastal Freshwater Marsh** (CEGL006935)

# NORTH ATLANTIC COASTAL MARITIME FOREST

CES203.302

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|                                                 |            |
|-------------------------------------------------|------------|
| • Inland Dune Ridge Forest                      | CEGL006354 |
| • Chesapeake Bay Tall Maritime Shrubland        | CEGL006319 |
| • Successional Maritime Forest                  | CEGL006145 |
| • Coastal Loblolly Pine Wetland Forest          | CEGL006137 |
| • Northern Bayberry Dune Shrubland              | CEGL006295 |
| • Maritime Holly Forest                         | CEGL006376 |
| • Pitch Pine Dune Woodland                      | CEGL006117 |
| • Coastal Pitch Pine / Scrub Oak Barren         | CEGL006315 |
| • Maritime Red-cedar Woodland                   | CEGL006212 |
| • Loblolly Pine Dune Woodland                   | CEGL006052 |
| • Lower New England Red Maple - Black Gum Swamp | CEGL006156 |

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|          |                                             |    |
|----------|---------------------------------------------|----|
| <b>1</b> | Forest or woodland dominated community..... | 2  |
|          | Shrubland.....                              | 10 |

|          |                                                            |   |
|----------|------------------------------------------------------------|---|
| <b>2</b> | Upland community; occurring on dunes, and sandy soils..... | 3 |
|          | Wetland forested community.....                            | 9 |

|          |                                                                                                                                                                                                                                                                                                     |   |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>3</b> | Coniferous or broadleaved evergreen trees dominate the canopy.....                                                                                                                                                                                                                                  | 4 |
|          | Deciduous trees dominate; stunted black cherry ( <i>Prunus serotina</i> ), sassafras ( <i>Sassafras albidum</i> ), and serviceberry ( <i>Amelanchier canadensis</i> ) are dominant with admixtures of pitch pine ( <i>Pinus rigida</i> ) and eastern red cedar ( <i>Juniperus virginiana</i> )..... |   |

**Successional Maritime Forest** (CEGL006145)

|          |                                                                                                              |   |
|----------|--------------------------------------------------------------------------------------------------------------|---|
| <b>4</b> | Pines dominant in canopy.....                                                                                | 5 |
|          | Pines not dominant in canopy or not present; holly ( <i>Ilex opaca</i> ) or eastern red cedar dominant ..... | 8 |

|          |                                                                                                                          |   |
|----------|--------------------------------------------------------------------------------------------------------------------------|---|
| <b>5</b> | Pitch pine dominant.....                                                                                                 | 6 |
|          | Pitch pine not dominant; Virginia pine ( <i>Pinus virginiana</i> ) or loblolly pine ( <i>Pinus taeda</i> ) dominant..... | 7 |

|          |                                                                                                                                                                                                                                |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>6</b> | Pine-scrub oak barren with scrub oak ( <i>Quercus ilicifolia</i> ) as the dominant shrub and bayberry ( <i>Morella pensylvanica</i> ) usually present; dwarf shrubs such as box huckleberry ( <i>Gaylussacia baccata</i> ) and |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

lowbush blueberries (*Vaccinium* spp.) as well as grasses little bluestem (*Schizachyrium scoparium*) and wavy hair grass (*Deschampsia flexuosa*) are typically present.....  
**Coastal Pine Barrens** (CEGL006315)

Pitch pine forest / woodland of coastal sand dunes; species such as beach heather (*Hudsonia tomentosa*), bearberry (*Arctostaphylos uva-ursi*), and others typical of sand dunes also present; large patches of bare sand possible.....  
**Pitch Pine Dune Woodland** (CEGL006117)

**7**  
 Virginia pine present along with southern red oak (*Quercus falcata*), other oaks, and sand hickory (*Carya pallida*); xeric pine forest occurs on inland sand dune ridges and sandy loam soils at the edge of the Pine Barrens.....  
**Inland Dune Ridge Forest** (CEGL006354)

Maritime woodland of sand dunes with an open canopy created by sparsely distributed loblolly pine (*Pinus taeda*); hardwoods such as southern red oak, willow oak (*Quercus phellos*) and American holly (*Ilex opaca*) are frequent.....  
**Loblolly Pine Dune Woodland** (CEGL006052)

**8**  
 Forest dominated by American holly occurring on sandy soils of coastal beaches; bayberry common.....  
**Maritime Holly Forest** (CEGL006376)

Eastern red-cedar vegetation of sand dunes, influenced by salt spray and wind; post oak (*Quercus stellata*) often present; understory characterized by dune species including seaside goldenrod (*Solidago sempervirens*), pinweed (*Lechea intermedia*), salt hay (*Spartina patens*), and vines.....  
**Maritime Red-cedar Woodland** (CEGL006212)

**9**  
 Loblolly pine present in quantity (Cape May and northern Delaware only); occurs in backdune depressions with high water and as an estuarine fringe along bays and sounds .....  
**Coastal Loblolly Pine Wetland Forest** (CEGL006137)

Red maple basin swamps of Lower New England and adjacent areas; highbush blueberry (*Vaccinium corymbosum*) and winterberry (*Ilex verticillata*) are abundant in the shrub layer.....  
**Lower New England Red Maple - Black Gum Swamp** (CEGL006156)

**10**  
 Tall, deciduous shrubland or scrub forest; black cherry (*Prunus serotina*), wax-myrtle (*Morella cerifera*), and greenbrier (*Smilax rotundifolia*) common.....  
**Chesapeake Bay Tall Maritime Shrubland** (CEGL006319)

Knee-high to thigh-high shrubland; bayberry and beach plum (*Prunus maritima*) dominant.....  
**Northern Bayberry Dune Shrubland** (CEGL006295)

# NORTH ATLANTIC COASTAL PLAIN PITCH PINE BARRENS

CES203.269

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|                                            |            |
|--------------------------------------------|------------|
| • Southern New Jersey Mesic Pine Barrens   | CEGL006115 |
| • Mid-Successional Pine - Oak Woodland     | CEGL006383 |
| • Coastal Plain Mesic Pine Barrens         | CEGL006384 |
| • New Jersey Pitch Pine / Scrub Oak Barren | CEGL006051 |
| • Coastal Pitch Pine / Scrub Oak Barren    | CEGL006315 |
| • Pitch Pine - Oak Forest                  | CEGL006381 |
| • Pitch Pine / Pennsylvania Sedge Woodland | CEGL006385 |
| • Pine Barrens Hilltop Forest              | CEGL006334 |
| • Black Locust Successional Forest         | CEGL007279 |

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**1**

Pitch pine (*Pinus rigida*) and/or tree oaks dominate forest or woodland canopy.....2

Black locust (*Robinia pseudoacacia*) dominant.....  
**Black Locust Successional Forest** (CEGL007279)

**2**

Scrub oak (*Quercus ilicifolia*) minor or lacking; grasses and / or tree oaks may or may not be present in quantity; canopy closed to partially open; sedges, grasses or blueberries and huckleberries prominent in the ground layer . ..... 3

Pitch pine and scrub oak both present in quantity; canopy more open; vegetation known as "pitch pine – scrub oak barrens" . ..... 6

**3**

Tree oaks prevalent with or without pitch pine..... 4

Tree oaks absent or nearly so; xeric pitch pine woodland, shrub layer poorly developed and lacking scrub oak; Pennsylvania sedge (*Carex pensylvanica*) dominant in the ground story.....  
**Pitch Pine / Pennsylvania Sedge Woodland** (CEGL006385)

**4**

Chestnut oak (*Quercus prinus*) and black oak (*Quercus velutina*) form 90% of the canopy cover with heaths in the shrub layer; mosses and lichens abundant; occurs on low pine barren hilltops.....  
**Pine Barrens Hilltop Forest** (CEGL006334)

Pitch pine more prominent in mixed tree oak canopy.....5

**5**

Open pine barrens with pitch pine and a mixture of tree oaks including scarlet oak (*Quercus coccinea*), black oak, white oak (*Quercus alba*), and post oak (*Quercus stellata*) in the canopy; scrub oak typical in the shrub layer and heaths in the groundstory.....  
**Mid-Successional New Jersey Pine-Oak Woodland** (CEGL006383)

Pitch pine and tree oaks including scarlet oak, black oak, white oak and northern red oak (*Quercus falcata*) dominate the canopy; bayberry (*Morella pensylvanica*) is usually present; large-patch to matrix forest type; bracken fern (*Pteridium aquilinum*) and Pennsylvania sedge characterize the ground cover layer...

**Pitch Pine – Oak Forest** (CEGL006381)

**6**

Pitch pine / scrub oak woodlands found immediately adjacent to wetlands or in low areas; species of slightly higher soil moisture such as inkberry (*Ilex glabra*), sweet pepper bush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*) present; soil mottles usually present ..... 7

Dry pitch pine / scrub oak barrens lacking mesic species, generally not found immediately adjacent to wetlands or in low areas; soil mottles absent..... 8

**7**

Mesic woodlands of the New Jersey Pine Barrens; sheep laurel (*Kalmia angustifolia*) and flowering pixie moss (*Pyxidantha barbulata*) are characteristic.....

**Coastal Plain Mesic Pine Barrens** (CEGL006384)

Mesic pine barrens of generally south of the Mullica River in New Jersey; holly (*Ilex opaca*) and dogwood (*Cornus florida*) characteristic.....

**Southern New Jersey Mesic Pine Barrens** (CEGL006115)

**8**

Pitch pine / scrub oak barrens of the coastal region north of New Jersey; bayberry usually present at least in the vicinity (may not be dominant); dwarf shrubs including huckleberry and low bush blueberries typical; little bluestem (*Schizachyrium scoparium*) and hair grass (*Deschampsia flexuosa*) may be present in patches.....

**Coastal Pitch Pine / Scrub Oak Barren** (CEGL006315)

Open pitch pine / scrub oak barrens typical of New Jersey; bayberry absent..... 9

**9**

Open pine barrens of NJ; tree oaks absent or nearly so; scrub oak and / blackjack (*Quercus marilandica*) oak dominant in the shrub layer; pyxie moss often dominates the groundstory.....

**New Jersey Pitch Pine / Scrub Oak Barren** (CEGL006051)

Open pine barrens of NJ with tree oaks common in the canopy and heaths in the groundstory.....

**Mid-Successional New Jersey Pine-Oak Woodland** (CEGL006383)

## NORTH ATLANTIC COASTAL PLAIN SANDY BEACH

CES203.301

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|                                       |            |
|---------------------------------------|------------|
| • North Atlantic Upper Ocean Beach    | CEGL004400 |
| • Coastal Bay Shore / Succulent Beach | CEGL004406 |

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Beach community occurring just above the wrack line on beaches and foredunes on well-drained sands at and often gravels and cobbles; flooded irregularly by storm tides, dominated by annuals such as sea rocket (*Cakile edulenta*).....

**North Atlantic Upper Ocean Beach** (CEGL004400)

Beach community occurring along low-energy shores protected from strong wave action typically on the back side of barrier islands; dominated by scattered mats of succulent vegetation consisting primarily of Cenicilla (*Sesuvium portulacastrum*), Sea-purslane (*Sesuvium maritimum*), Halberd-Leaf Orache (*Atriplex patula*), and narrow-leaf seepweed (*Suaeda linearis*); only reported in Delaware.....

**Coastal Bay Shore / Succulent Beach** (CEGL004406)

## NORTH ATLANTIC COASTAL PLAIN SEAGRASS BED

CES203.246

- 
- Northern Atlantic Coast Beaked Ditch-grass Bed

CEGL006167

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Ditch-grass (*Ruppia maritima*) beds occurring in habitats that are continuously flooded by brackish water; in subtidal, deepwater pools and pannes, tidal creeks, and flats within salt marshes, or along tidal rivers.....

**Northern Atlantic Coast Beaked Ditch-grass Bed** (CEGL006167)

# NORTH ATLANTIC COASTAL PLAIN SUBTIDAL AQUATIC BED

CES203.521

- 
- Central Atlantic Freshwater Subtidal River Bed
- 

CEGL006027

Beds of aquatic vegetation occurring on fresh to slightly brackish flats that are continuously flooded, although certain areas can be exposed briefly during very low tides; common species include Sago pondweed (*Stuckenia pectinata*), clasping-leaf pondweed (*Potamogeton perfoliatus*), and horned pondweed (*Zannichellia palustris*) (note: clasping-leaf pondweed is not common in DE).....

**Central Atlantic Freshwater Subtidal River Bed** (CEGL006027)

## NORTH ATLANTIC COASTAL PLAIN TIDAL SALT MARSH

CES203.519

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|                                    |            |
|------------------------------------|------------|
| • Cattail Brackish Tidal Marsh     | CEGL004201 |
| • Mid-Atlantic High Salt Marsh     | CEGL004197 |
| • Eastern Reed Marsh               | CEGL004141 |
| • Salt Panne (Salicornia Type)     | CEGL004308 |
| • Mid-Atlantic Maritime Salt Shrub | CEGL003921 |
| • Salt Panne Pool                  | CEGL006370 |
| • Tidal Reed-grass Marsh           | CEGL004187 |
| • Brackish Meadow                  | CEGL006150 |
| • Maritime Red-cedar Woodland      | CEGL006212 |
| • North Atlantic Low Salt Marsh    | CEGL004192 |
| • North Atlantic High Salt Marsh   | CEGL006006 |

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|          |                                        |    |
|----------|----------------------------------------|----|
| <b>1</b> | Herbaceous vegetation predominant..... | 2  |
|          | Woody vegetation predominant.....      | 10 |

|          |                                                                                                                                                            |   |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| <b>2</b> | Vegetation of low, regularly flooded salt marshes and flats saltmarsh cordgrass ( <i>Spartina alterniflora</i> ) strongly dominant, often monoculture..... |   |
|          | <b>North Atlantic Low Salt Marsh</b> (CEGL004192)                                                                                                          |   |
|          | Vegetation of high salt marshes, transition zones between marshes, ponded areas, pannes; irregularly flooded by tides.....                                 | 3 |

|          |                                                                    |   |
|----------|--------------------------------------------------------------------|---|
| <b>3</b> | Low ponded areas within the high marsh; salt pannes and pools..... | 4 |
|          | Higher marshes and transition zones .....                          | 5 |

|          |                                                                                                                                                                          |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>4</b> | Standing water always present; panne of restricted drainage; ditch-grass ( <i>Ruppia maritima</i> ) dominant.....                                                        |  |
|          | <b>Salt Panne Pool</b> (CEGL006370)                                                                                                                                      |  |
|          | Substrate periodically exposed; saltworts ( <i>Salicornia</i> spp.) dominant; short-form saltmarsh cordgrass may be present; salt panne of the North Atlantic Coast..... |  |
|          | <b>Salt Panne</b> (CEGL004308)                                                                                                                                           |  |

|          |                                                                                  |   |
|----------|----------------------------------------------------------------------------------|---|
| <b>5</b> | Salt hay ( <i>Spartina patens</i> ) dominant; vegetation of high salt marsh..... | 6 |
|          | Salt hay infrequent or absent; marshes of tidal creeks or rivers .....           | 8 |

6

Vegetation of high salt marsh; low species diversity..... 7

Vegetation of ecotone (transition area between high and low marsh or high marsh and upland); switchgrass (*Panicum virgatum*) characteristic; seaside goldenrod (*Solidago sempervirens*), sand sedge (*Carex silicea*), and others present; relatively diverse vegetation from Massachusetts and south.....

**Brackish Meadow** (CEGL006150)

7

High marsh of New Jersey and north; blackgrass (*Juncus gerardii*) common.....

**North Atlantic High Salt Marsh** (CEGL006006)

High marsh of Delaware, Maryland, and south; needlerush (*Juncus roemerianus*) dominant.....

**Mid-Atlantic High Marsh** (CEGL004197)

8

Narrow-leaved cattail abundant.....

**Cattail Brackish Tidal Marsh** (CEGL004201)

Eastern reed (*Phragmites australis*) dominated tidal marshes.....9

9

Tidally influenced, dense tall grassland indicative of disturbance; occurs in a range of tidal wetland habitats from fresh to brackish in salinity; scattered individuals of wax myrtle (*Morella cerifera*) shrubs possible.

**Tidal Reed-grass Marsh** (CEGL004187)

Stands occur in semipermanently flooded marshes, ditches, impoundments, etc. that have often been disturbed by human activity; *Phragmites australis* invasive and exclusive with few to no other vascular plants present.....

**Eastern Reed Marsh** (CEGL004141)

10

Maritime woodland that occurs on the upper edges of salt marshes dominated by eastern red cedar (*Juniperus virginiana*).....

**Maritime Red-Cedar Woodland** (CEGL006212)

Maritime shrubland; area between salt marsh and uplands.....

**Mid-Atlantic Maritime Salt Shrub** (CEGL003921)

## NORTH ATLANTIC COASTAL PLAIN TIDAL SWAMP

CES203.282

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|                                               |            |
|-----------------------------------------------|------------|
| • Freshwater Tidal Woodland                   | CEGL006165 |
| • North Atlantic Fresh Tidal Shrub Swamp      | CEGL006337 |
| • Ash - Swamp Blackgum Freshwater Tidal Swamp | CEGL006287 |

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**1**

Tree canopy present.....2

Shrub swamp is dominated by brook-side alder (*Alnus serrulata*) and/or speckled alder (*Alnus incana ssp. rugosa*).....

**North Atlantic Fresh Tidal Shrub Swamp** (CEGL006337)

**2**

Red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*) dominate the canopy; elms (*Ulmus* spp.) frequent associates.....

**Freshwater Tidal Woodland** (CEGL006165)

Canopy dominated by pumpkin ash (*Fraxinus profunda*), green ash and swamp black gum (*Nyssa biflora*); seaside alder (*Alnus maritima*) is characteristic in Delaware and Maryland.....

**Ash - Swamp Blackgum Freshwater Tidal Swamp** (CEGL006287)