


Carolina hemlock Pinaceae *Tsuga caroliniana* Engelm. 
symbol: TSCA2



Leaf: Evergreen, flattened, single needles, 1/2 to 3/4 inch long, not tapering towards the round tip; dark green above, paler with two bluish-white stomatal lines beneath; needles radiate out from twig in all directions and are attached with a small petiole.

Flower: Monoecious; male cones small and yellowish; females small and greenish; both males and females occur near branch tips.

Fruit: Woody light brown cone, 1 to 1 1/2 inches, when dry scales stick out at nearly right angles, scales longer than they are wide.

Twig: Slender, yellowish brown, turning gray-brown, buds small and round.

Bark: Dark, reddish brown, develops fissures with scaly ridges, inner bark often showing maroon patches.

Form: Pyramidal crown with hanging branches, almost lacy looking. Reaches a height of 40 to 60 feet, 1 to 1 1/2 feet in diameter.



[USDAFS Additional Silvics - USDA Plants Database](#)

Tsuga caroliniana is native to North America. Range may be expanded by planting. [See states reporting Carolina hemlock](#) (opens a new window).

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Text written by: John R. Seller, Edward C. Jensen, or John A. Peterson

USDAFS Additional Silvics

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Introductory

SPECIES: *Tsuga caroliniana*

AUTHORSHIP AND CITATION :

Coladonato, Milo 1993. *Tsuga caroliniana*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2009, November 2].

ABBREVIATION :

TSUCAR

SYNONYMS :

NO-ENTRY

SCS PLANT CODE :

TSCA2

COMMON NAMES :

Carolina hemlock

TAXONOMY :

The currently accepted scientific name of Carolina hemlock is *Tsuga caroliniana* Engelm. [[12](#)]. There are no recognized subspecies, varieties, or forms.

LIFE FORM :

Tree

FEDERAL LEGAL STATUS :

No special status

OTHER STATUS :

Carolina hemlock is listed as rare in its natural range [[11](#)].

DISTRIBUTION AND OCCURRENCE**SPECIES: *Tsuga caroliniana***

GENERAL DISTRIBUTION :

Carolina hemlock has a very limited distribution. It occurs along the slopes of the Appalachian Mountains from southwestern Virginia and western North Carolina into South Carolina and northern Georgia [[6,8,22](#)].

ECOSYSTEMS :

FRES14 Oak - pine

FRES15 Oak - hickory

STATES :

GA NC SC TN VA

BLM PHYSIOGRAPHIC REGIONS :

NO-ENTRY

KUCHLER PLANT ASSOCIATIONS :

K104 Appalachian oak forest

K111 Oak - hickory - pine forest

SAF COVER TYPES :

44 Chestnut oak

58 Yellow-poplar - eastern hemlock

59 Yellow-poplar - white oak - northern red oak

78 Virginia pine - oak

87 Sweet gum - yellow-poplar

SRM (RANGELAND) COVER TYPES :

NO-ENTRY

HABITAT TYPES AND PLANT COMMUNITIES :

NO-ENTRY

MANAGEMENT CONSIDERATIONS

SPECIES: *Tsuga caroliniana*

WOOD PRODUCTS VALUE :

The wood of Carolina hemlock can be used for lumber or pulpwood, but the species is so limited in extent that it is not considered commercially important [6,16].

IMPORTANCE TO LIVESTOCK AND WILDLIFE :

The seeds of Carolina hemlock are an important food for a number of birds and mammals. Beaver, and occasionally porcupine and rabbit, eat the bark [6,18]. The foliage is occasionally browsed by white-tailed deer in the winter [1].

PALATABILITY :

NO-ENTRY

NUTRITIONAL VALUE :

NO-ENTRY

COVER VALUE :

Carolina hemlock and eastern hemlock (*Tsuga canadensis*) stands are considered essential for shelter and bedding of white-tailed deer during the winter [6].

VALUE FOR REHABILITATION OF DISTURBED SITES :

NO-ENTRY

OTHER USES AND VALUES :

Carolina hemlock is often planted as an ornamental. Tannin from the bark of Carolina hemlock was formerly extracted for use in processing leather [7,16].

OTHER MANAGEMENT CONSIDERATIONS :

Information concerning management practices for Carolina hemlock is lacking. However, management practices for the very similar species eastern hemlock (*Tsuga canadensis*) have been outlined [6].

BOTANICAL AND ECOLOGICAL CHARACTERISTICS

SPECIES: *Tsuga caroliniana*

GENERAL BOTANICAL CHARACTERISTICS :

Carolina hemlock is a native, slow-growing, coniferous, evergreen tree usually 40 to 70 feet (12-21 m) tall and 8 to 12 inches (20-30 cm) in d.b.h. [4,8,15]. Heights of 150 to 180 feet (46-55 m) and diameters of 5 to 6 feet (1.5-1.8 m) have been reported [8].

Carolina hemlock has a long slender trunk and a narrow crown of slightly drooping branches. The leaf blades spread from the twig in all directions. The cones are 1.0 to 1.5 inches (2.5-3.8 cm) long, and the seeds are the longest of any of the native hemlocks [18]. The bark on younger trees is flaky and scaly and on older trees, deeply furrowed. The root system is shallow and spreading [2,6,8].

RAUNKIAER LIFE FORM :

Phanerophyte

REGENERATION PROCESSES :

Seed production and dissemination: Carolina hemlock begins producing seed at about age 20, but good crops do not occur until the trees are 25 and 30 years. The lightweight seed are wind dispersed. Carolina hemlock seed averages of 187,000 seeds per pound (415,000/kg) [14,16].

Vegetative Reproduction: Like other hemlocks Carolina hemlock does not sprout and only rarely layers. Vegetative propagation by cuttings and grafting are limited to ornamental production [6].

SITE CHARACTERISTICS :

Carolina hemlock is common on rocky slopes and ridges of the Appalachian Mountains at elevations between 2,100 and 4,000 feet (400-1,220 m) [7,8]. Typically, most soils are very acidic (between 3.5-4.5 pH), but some are near neutral. The heavy, slowly decomposing litter fosters podzolization as the stand increases in age [7,8].

Other associates of Carolina hemlock in addition to the cover type species are eastern hemlock (*T. canadensis*), Carolina silverbell (*Halesia carolina*), American holly (*Ilex opaca*), mountain rosebay (*Rhododendron catawbiense*), mountain-laurel (*Kalmia latifolia*), and oak (*Quercus* spp.) [7,8,9].

SUCCESSIONAL STATUS :

Obligate Climax Species

Carolina hemlock is very shade tolerant. It will gradually replace earlier established species and become dominant in very late stages of succession. Carolina hemlock can be considered a climax species because it is difficult for other species to invade and grow under its canopy [7].

SEASONAL DEVELOPMENT :

Carolina hemlock pollination occurs from March to the end of April. The cones ripen from late August to late September of the next year; the seed is dispersed from September through the winter [18].

FIRE ECOLOGY

SPECIES: *Tsuga caroliniana*

FIRE ECOLOGY OR ADAPTATIONS :

Currently, very little information on the fire ecology of Carolina hemlock is available in the literature. Starker [19,20] lists other species of hemlock as having an intermediate resistance to fire.

POSTFIRE REGENERATION STRATEGY :

Tree without adventitious-bud root crown
Secondary colonizer - off-site seed

FIRE EFFECTS

SPECIES: *Tsuga caroliniana*

IMMEDIATE FIRE EFFECT ON PLANT :

Presumably, seedlings and saplings of Carolina hemlock are killed by fire.

DISCUSSION AND QUALIFICATION OF FIRE EFFECT :

NO-ENTRY

PLANT RESPONSE TO FIRE :

DISCUSSION AND QUALIFICATION OF PLANT RESPONSE :

NO-ENTRY

FIRE MANAGEMENT CONSIDERATIONS :

Carolina hemlock is favored by fire suppression. Humphrey [7] reports that the slow-growing Carolina hemlock will have time to develop a mature population only on sites where fire is infrequent.

REFERENCES

SPECIES: *Tsuga caroliniana*

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USDA Plants Database

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PLANTS Profile

Tsuga caroliniana Engelm. Carolina hemlock

Click on the image below to enlarge it and download a high-resolution JPEG file.

Symbol: TSCA2
Group: Gymnosperm
Family: Pinaceae
Duration: Perennial
[Growth](#): Tree
[Habit](#):
[Native Status](#): L48 N



More Information:

[Characteristic](#)
[Classification](#)
[Data Source and Documentation](#)

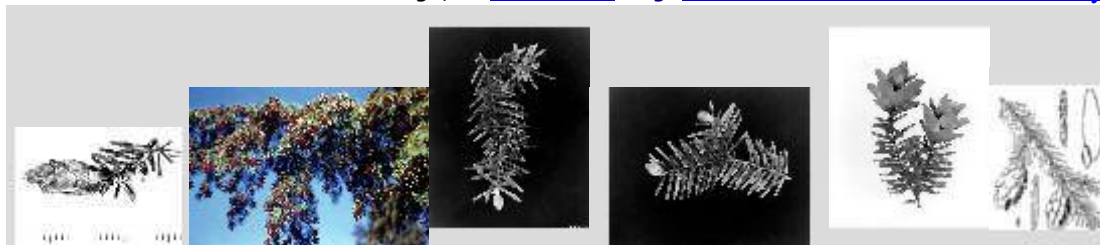


Courtesy of [USDA Forest Service](#). [Usage Requirements](#).

Images:

Tsuga caroliniana Engelm.

Click on a thumbnail to view an image, or [see all the *Tsuga* thumbnails at the PLANTS Gallery](#)



Distribution:

Tsuga caroliniana Engelm.



[View Native Status](#)

■ Present □ Absent

See U.S. county distributions (when available) by clicking on the map or the linked states below:

USA ([GA](#), [NC](#), [SC](#), [TN](#), [VA](#))

Related Taxa:

Tsuga caroliniana Engelm.

View [9 genera in Pinaceae](#), [5 species in Tsuga](#)

Classification:

Tsuga caroliniana Engelm.

Click on a scientific name below to expand it in the PLANTS Classification Report.

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Coniferophyta – Conifers
Class	Pinopsida
Order	Pinales
Family	Pinaceae – Pine family

Genus [Tsuga Carrière](#) – hemlock
Species [Tsuga caroliniana Engelm.](#) – Carolina hemlock

Threatened and Endangered Information:

Tsuga caroliniana Engelm.

This plant is listed by the U.S. federal government or a state. Common names are from state and federal lists. Click on a place name to get a complete protected plant list for that location.

Tennessee:

Carolina hemlock Threatened

More Accounts and Images:

Tsuga caroliniana Engelm.

- ∞ [species account](#) from USDA Forest Service Fire Effects Information System (FEIS).
- ∞ [species account and distribution map](#) from Flora of North America (FNA).
- ∞ [species account](#) from ARS Germplasm Resources Information Network (GRIN).
- ∞ [taxonomic account](#) from Integrated Taxonomic Information System (ITIS) for ITIS Taxonomic Serial Number 183399.
- ∞ [species account](#) from Lady Bird Johnson Wildflower Center Native Plant Information Network (NPIN).
- ∞ [species account](#) from Native American Ethnobotany (University of Michigan - Dearborn).
- ∞ [photographs and distribution](#) from University of Tennessee Herbarium.