Common Name: CAROLINA HEMLOCK

Scientific Name: *Tsuga caroliniana* Engelmann

Other Commonly Used Names: none

Previously Used Scientific Names: none

Family: Pinaceae (pine)

Rarity Ranks: G3/S1

State Legal Status: Endangered

Federal Legal Status: none

Federal Wetland Status: none

Description: Evergreen tree usually 40 - 70 feet (12 - 21 meters) tall with scaly, reddish-brown bark on young twigs and dark, deeply furrowed ridges on older trunks. Branches horizontal or drooping in flattened sprays. Needles ⅜ - ¾ inch (1 - 2 cm) long, flat, bristling in all directions from the twigs, shiny green above with two narrow white lines beneath, borne singly on tiny woody "pegs." Seed cones 1 - 1½ inches (2.5 - 4 cm) long (cone on the right in photo), with rounded, spreading scales.

Similar Species: Canada hemlock (*Tsuga canadensis*) is a common species in north Georgia. Its needles are arranged in two parallel rows on either side of the twig, spreading in only one plane. Cones are smaller, less than to ¾ inch (2 cm) long (cone on the left in photo). In Georgia, all other members of the pine family are true pines, with much longer needles in bunches of 2 - 5.

Related Rare Species: None in Georgia.

Habitat: Dry slopes, ridgelines, and rocky cliffs with Table Mountain and Virginia pine, and moist, high-elevation ravines with Canada hemlock.

Life History: Carolina hemlock is a slow-growing, coniferous, evergreen tree. It reproduces almost entirely by sexual means; it does not sprout from the base and only rarely layers. Carolina hemlock begins to produce cones at about 20 years, with peak production beginning at 25 - 30 years. Pollen cones, less than ¼ inch (0.5 cm) long, occur singly in the angles between needles and twigs and consist of numerous anthers. Seed cones, initially light green and erect, are also solitary, and develop at the tips of twigs in March and April. After fertilization, which occurs in the spring, the seed cones take two growing seasons to mature. The seeds ripen in late summer of the second year after fertilization and are released during the following fall and winter. The winged seeds are dispersed by wind. The empty cones persist on the twigs after seeds are released until the following spring when they fall to the ground without breaking. Carolina hemlock is very shade tolerant. It is not tolerant of fire and its seedlings and saplings are killed by fire.

Survey Recommendations: Surveys may be conducted all year.

Range: Appalachian Mountains of Georgia, South Carolina, North Carolina, Tennessee, and Virginia.

Threats: Hemlock woolly adelgid (*Adelges tsugae*), an exotic insect pest that was accidentally introduced to this country from Asia, attacks and kills both Carolina and Canada hemlocks. Clearing and logging. Carolina hemlock is not fire tolerant.

Georgia Conservation Status: Three populations with fewer than 10 trees are known, all in Tallulah Gorge State Park; trees are vulnerable to fatal infestation by hemlock woolly adelgid.

Conservation and Management Recommendations: Apply adelgid control measures immediately. Support research on eradicating hemlock woolly adelgid. Support efforts to preserve genetic material of Georgia's Carolina hemlocks. Avoid logging and clearing on mountain slopes and in high-elevation habitats.

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Carolina hemlock
Canada hemlock
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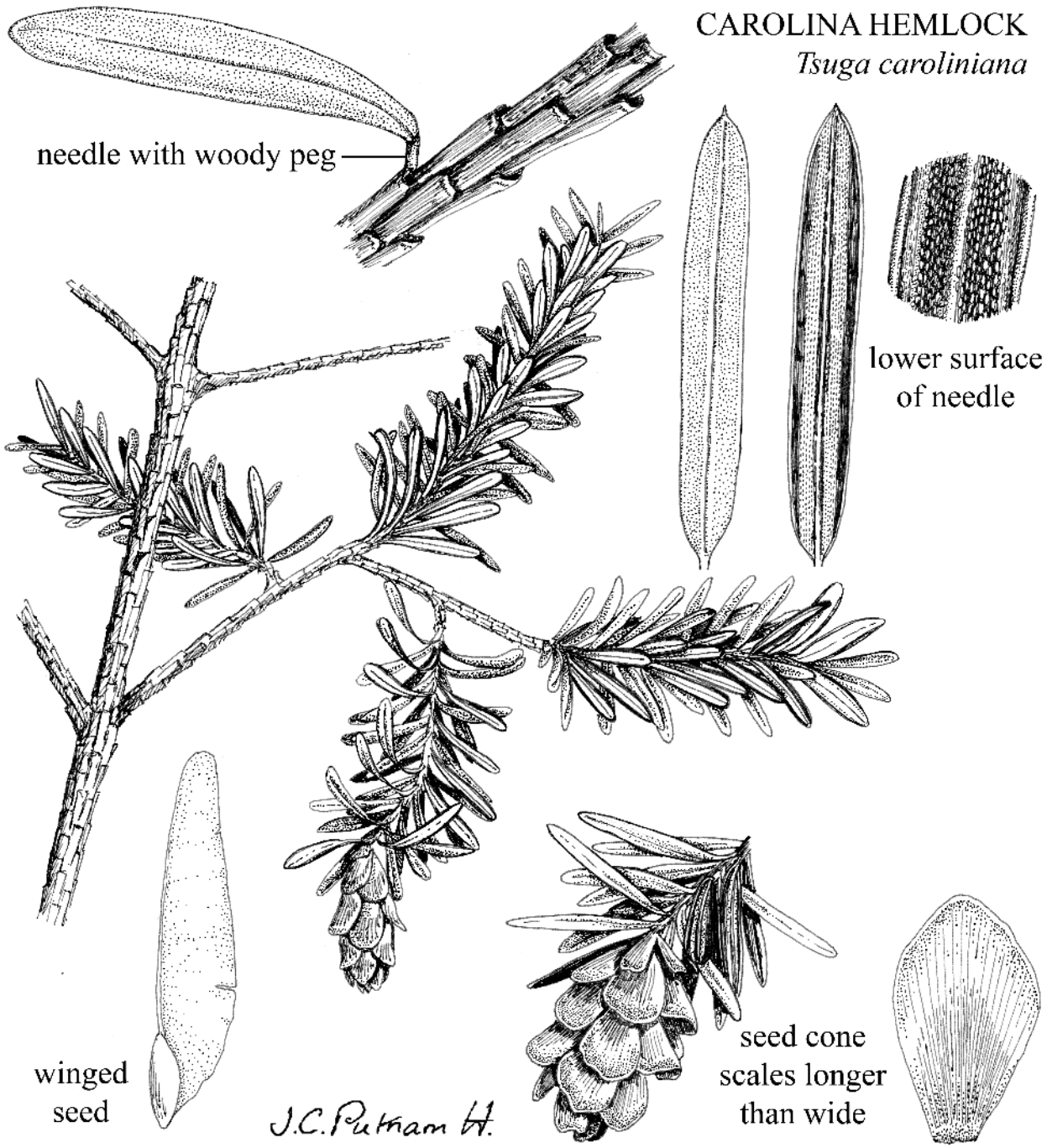
CAROLINA HEMLOCK
Tsuga caroliniana
needle with woody peg
lower surface of needle
winged seed
J.C. Putnam H.
seed cone scales longer than wide