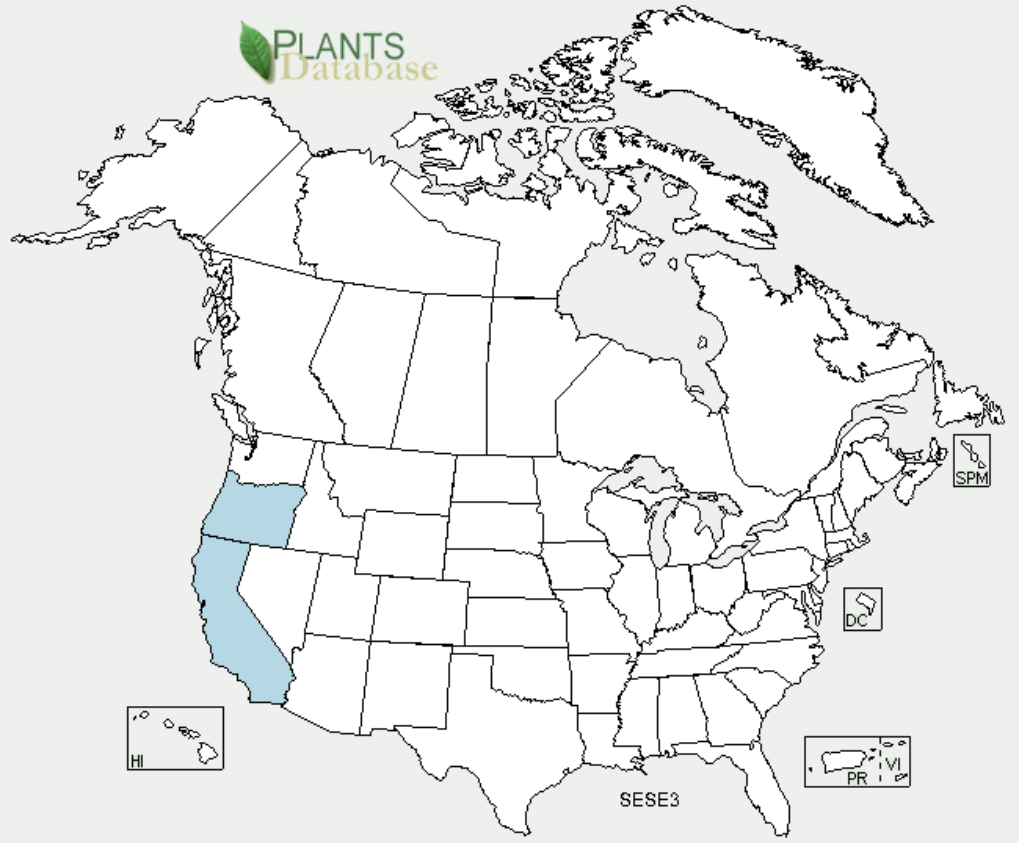
Plant Propagation Protocol for *[Sequoia sempervirens]*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*[SESE3.pdf]*



US Distribution Map []

TAXONOMY	
Plant Family	
Scientific Name	*Cupressaceae*
Common Name	Sypress Family
Species Scientific Name	
Scientific Name	*Sequoia sempervirens* (Lamb. Ex D. Don) Endl.
Varieties	
Sub-species	
Cultivar	
Common	Taxodium sempervirens (D. Don) Lamb.

Synonym(s)	Steinhauera sempervirens (Voss. S.) Presl.
Common Name(s)	Redwood California redwood Coast redwood
Species Code (as per USDA Plants database)	SESE3
GENERAL INFORMATION	
Geographical range	As shown in the United States map above, the range of the *Sequoia sempervirens* extends from the Chetco River in the southwest corner of Oregon to the Salmon Creek Canyon in the Santa Lucia Mountains of southern Monterey County, California [6].
Ecological distribution	This plant may be found in moist coastal mountain regions, specific to low and mid elevations in Oregon and California [Robson et al. 60]. Redwood is not a native species to Washington state.
Climate and elevation range	Redwood generally grows in mild climates characterized by super humid and humid conditions, with an annual precipitation, in all months except summer, of between 20 to 125 inches. Summer fog is one of the main determining factors in delineating the natural range of coast redwood as it decreases water loss, this fog proves to be even more important than precipitation. This species is generally found at low elevations usually ranging from 0 to 2,500 feet, and has been documented at up to 3,608 feet in California. [3, 4, 6]
Local habitat and abundance	In the Pinetum section of the Washington Park Arboretum Redwood trees can be found along with commonly associated species such as the Sierra redwood, Sequoiadendron giganteum [7]. Also located in volunteer park there is a coast redwood surrounded by a grove of ten other redwoods [11].These trees are used in Washington mostly as ornamentals and are not native to the state as shown previously on the United States distribution map.
Plant strategy type / successional stage	Redwood has been considered both a climax species and a fire dependent seral species due to its ability to sprout. It also has a lateral root system that essentially digs deeper into the soil even after disturbance, allowing it to thrive even after flooding and soil deposition. Mature redwoods are resilient to fire and have many adaptations such as sprouting from the root crown or dormant buds that allow it to survive [3].
Plant characteristics	Redwoods are the world's tallest tree. They are large evergreen trees with leaves that drop entire twiglets. They produce small cones and grows rapidly [5]. These small cones are elliptic, about an inch long, and have umbrella-like scales. Young Redwoods are symmetrical, conical, and have distinguishable fibrous red bark [8].
PROPAGATION DETAILS (Report one type of propagation in section; duplicate section as needed for multiple types of propagation)	
Ecotype	

Propagation Goal	The propagation goal for redwoods is to grow plants [1].
Propagation Method	Redwood can be propagated by seed or cuttings. The cuttings from trees 2 to 3 years old will be the most successful [3]. They can also easily be propagated from layering or sucker shoots. When propagated from seed Redwoods tend to have low germinability [5].
Product Type	The product type best used for propagating redwoods is container (plug). It can also be propagated by bare root. [1, 12]
Stock Type	
Time to Grow	Redwoods form roots from winter to early spring. Redwood plants should grow in a seedbed for about two years before outplanting [10].
Target Specifications	The height of redwoods at maturity are commonly 250 feet, although they have been documented at a height of 367 feet [usda]. They have evergreen foliage and a rapid growth rate. Although at maturity they grow much taller, they only reach about a third of that size in cultivation [8].
Propagule Collection Instructions	Small Redwood cones that are produced can be collected and then dried to release the seed. Cuttings are likely to form roots from shoots growing from burls of older tree specimens [8].
Propagule Processing/ Propagule Characteristics	Redwood seeds are non-dormant and their seed viability tends to increase with the age of the parent tree. For example one study shows the maximum viability of some trees to be at an age of 250 years, while younger trees at an age of 20 years produce seeds with a viability less than one percent. They do not stay viable for long when stored, only about 3 years. The seeds are small and light with a density of about 95,200 to 120,000 per pound [6, 12].
Pre-Planting Propagule Treatments	Redwood seeds do not need pretreatment to germinate, although the germination rate will be increased if the seeds are soaked overnight. They generally have a low germination rate and germinate soon after falling to the ground, but new seedlings often need more moisture than usual [6]. One month of stratification can also improve germination rates, but redwoods usually yield a low percentage of the seeds that are viable [2].
Growing Area Preparation / Annual Practices for Perennial Crops	Redwoods should be grown in a seedbed until ready to outplant permanently in late autumn or spring [10]. An optimal seedbed can be mineral soil, but these trees can also germinate in duff, on logs, in debris, or under other vegetation [6]. Moist soil that is mulched with compost can also be a great medium as it can supply important nutrients such as iron to the redwoods. They are usually more successfully sited when planted in a grove, where there is plenty of moisture and partial to full sun [8]. Redwoods can also be potted up individually once the roots have developed and planted out in the summer [10].
Establishment Phase Details	The establishment phase is not long, basically nonexistent since the seeds are usually ready to germinate immediately after they hit the ground and do so if in a proper seedbed [6].
Length of Establishment Phase	No prolonged length after seeds are mature.

Active Growth Phase	Spring and summer are the active growth phase seasons for redwoods.
Length of Active Growth Phase	May to September (4 months) is the phase of new growth for redwood trees [10].
Hardening Phase	In preparation for winter seedlings can be grown in a cold frame [10].
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Redwood seeds should be sown from December to April and the cones can be harvested after they have matured and dropped from autumn through January [9]. The seeds of redwoods do not store well, they have a short term of viability [6].
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	Early on the redwoods grow about 18 inches in the first growing season. The pollen from redwoods sheds from November to March, flowering ceases in January, and the trees create seeds between five to fifteen years old [6]. The bloom period for Redwoods is in the Fall [12].
Other Comments	

INFORMATION SOURCES

References

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Protocol Author	Aimee Rozier
Date Protocol Created or	06/09/14

Updated	