



SNOHOMISH/SKAGIT FOREST STEWARDSHIP EDUCATION

## Silvical Characteristics of Trees

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Let's meet the forest "cast"

- Ecology is the "drama" playing out on the landscape stage
- To better understand the drama, it helps to know the cast
  - Starring roles
  - Supporting roles




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What is a tree?



- 30 feet or more in height at maturity
- Single-stemmed woody plant (unbranched for at least several feet above the ground)
- Definite crown

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A group of trees growing together is known as a stand

- Recognizable group of trees in the forest
- A management “unit”
- Forest (landscape) = multiple stands



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All trees want essentially the same key thing.

- Trees need 3 key elements to survive:
  - Light
  - Water
  - Nutrients
- The “ideal” environment for most trees is:
  - Full / Nearly full sunlight
  - Deep, moist, but well-drained soils
  - Minimal competition from neighboring plants

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Why are where they are?

- Different trees are adapted to different
  - Physical environments
  - Disturbance patterns
- Thus you will find different tree communities at different:
  - Places on the landscape
  - Times following a disturbance
- Where a tree grows in space and time reflects:
  - *Competitive advantage*
  - Based on *silvical characteristics*

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Silvical characteristics include:

- Shade tolerance
- Tolerance to wet soils
- Drought tolerance
- Pest resistance
- Growth and reproductive patterns

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Key native trees in the Puget Sound lowlands:

**Conifers**

*Evergreens / Softwoods*

- Douglas-fir
- Western red cedar
- Western hemlock
- Sitka spruce
- Grand fir
- Shore (lodgepole) pine
- Western white pine
- Pacific yew

**Broad-Leaved**

*Deciduous / Hardwoods*

- Red alder
- Bigleaf maple
- Black cottonwood
- Bitter cherry

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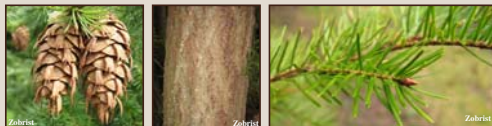
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Douglas-fir (*Pseudotsuga menziesii*)



- Fairly intolerant of shade
- Fast growing: 20-30 ft in 10 yrs (good site)
- Life span ≈ 750 yrs
- Prefers moist, well-drained soils - will tolerate drier sites
- Older trees are fire tolerant
- Susceptible to root rots
- Often originates after fire




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**Western Hemlock (*Tsuga heterophylla*)**





- Very shade tolerant
- Grows 15 ft in 10 yrs (good site)
- Lifespan ≈ 300 years
- Prefers moist, rich soil
- Thin bark and shallow roots = highly susceptible
- Prolific regeneration – can establish in understory

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**Western Redcedar (*Thuja plicata*)**

- Shade tolerant
- Grows 15 ft in 10 yrs (good site)
- Life span = 1000+ years
- Typically grows on moist-wet sites (sometimes drier slopes) – tolerates wetter areas
- Resistant to decay






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**Red Alder (*Alnus rubra*)**






- Very Intolerant of shade
- Fast growth – 40 ft in 10 yrs (good site)
- Starts falling apart by 60 years
- Grows in moist, rich bottomlands, slopes, benches
- Prolific seeding of heavily disturbed areas
- Thin bark
- Nitrogen-fixing bacteria

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**Bigleaf Maple (*Acer macrophyllum*)**

- Relatively shade tolerant
- Prefers moist soil but grows on a variety of sites
- Prolific annual seeds and stump sprouts
- Rapid juvenile growth – 40 feet in ten years (good site)
- Lives 200-300 years (but usually suffers rot/ disease earlier)
- Nutrient-rich leaf litter enriches soil


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**Sitka Spruce (*Picea sitchensis*)**

- Relatively shade tolerant (but often relies on disturbance)
- Grows in cool, moist - swampy lowland/coastal areas
- Life span = 800 years






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**Grand Fir (*Abies grandis*)**

- Tolerant of shade
- Can have rapid growth
- Relatively short-lived
- High susceptibility to pests (wood is not resinous)
- Most common true fir - usually in found in mixed conifer stands







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**Black Cottonwood (*Populus trichocarpa*)**

- Very Intolerant of shade
- Most common on moist - wet, sandy, gravelly, soils in floodplains and river bottoms
- Prolific reproduction
- Fast juvenile growth – over 50 feet in ten years (good site)
- Tallest broadleaf tree in western North America
- Lives up to 200 years


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**Lodgepole/Shore Pine (*Pinus contorta*)**

- Intolerant of shade
- Highly adaptable – tolerates extreme and nutrient poor sites:
  - Wet and dry soils; peat bogs, sand, gravel, rock
  - Drought tolerant
  - Fire hardy






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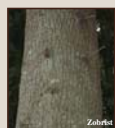


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**Western white pine (*Pinus monticola*)**

- Intermediate shade tolerance (usu. relies on disturbance – esp. fire)
- Can tolerate poor soils
- Used to be much more prevalent before the white pine blister rust
- Resistant to some common root rots


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**Western Yew (*Taxus brevifolia*)**

- Small, slow-growing tree
- Yields a red flesh cup fruit that is an important food source for wildlife
- Very shade tolerant
- Long-lived




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**Bitter Cherry (*Prunus emarginata*)**

- Intolerant of shade
- Prolific seeding of heavily disturbed areas
- Grows in moist, mixed forests
- Fast juvenile growth – 40 feet in ten years on good sites,
- Short-lived (<50 yrs)




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**Other native lowland species**

- Oregon White (Garry) oak
- Paper birch
- Pacific madrone
- Oregon ash
- Willows
- Pacific dogwood
- Pacific crab apple

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Higher elevation species

- Pacific silver fir
- Noble fir
- Subalpine fir
- Engleman spruce
- Alaska yellow cedar
- Mountain hemlock

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Tree-Shrubs

- Black hawthorn
- Cascara
- Beaked hazelnut
- Vine maple
- Douglas/rocky mountain maple
- Sitka alder

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Silvical Roundup: Summary of key species traits.

Species	Red alder	Douglas-fir	Western hemlock	Western redcedar
Shade tolerance	Very intolerant	Fairly intolerant	Very Tolerant	Very Tolerant
Lifespan	60-80 yrs	750 yrs	400+ yrs	1,000+ yrs
10-yr Growth	40'	20-30'	15'	15'

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Forest Succession

- In the **absence of disturbance**, forest stands will tend to develop into new communities
  - Light seeded, short-lived, shade intolerant “pioneer” species (e.g. red alder)
  - Long-lived but shade intolerant coniferous species (e.g. Douglas-fir)
  - Shade tolerant “climax” species (e.g. western hemlock & western redcedar)

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Understory communities are a function of:

- Overstory characteristics
  - Site characteristics
  - Site history
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- **We'll get into understory plant ID on the field trip**

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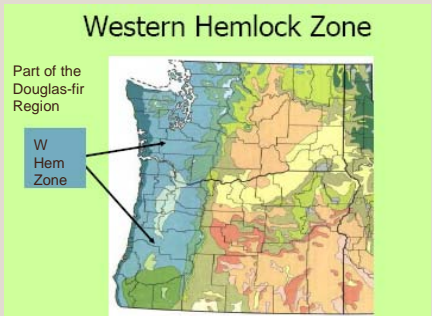
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Most of W. WA is in the Western Hemlock Zone



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**Plant associations of the Western Hemlock Zone**

Adapted from: Vegetation Zones within the Douglas-fir Region – Jerry Franklin

<b>Dry</b>	<b>Nutrient Poor</b>
	Douglas-fir / Oceanspray
	Western Hemlock / Salal
	Western Hemlock / Oregon grape
	Western Hemlock / Swordfern
	Western Redcedar / Devil's Club / Lady Fern
<b>Wet</b>	<b>Nutrient Rich</b>
	Western Redcedar / Skunk Cabbage

Forests are complex: DON'T EXPECT A PERFECT FIT – Plant associations are often dominated by tree species other than the predicted climax

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**What tree(s) would be appropriate for these sites?**

- Wet site
- Understory site
- Disease pocket
- Dry site
- Nutrient-poor site

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**What site would be appropriate to grow these trees?**

- Douglas-fir
- Western redcedar
- Western hemlock
- Red alder
- Western white pine
- Bigleaf maple
- Sitka spruce

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For more information...

The image displays three book covers. The first is 'Trees of Washington' with a grid of various tree species. The second is 'Plants of the Pacific Northwest Coast' featuring a forest scene. The third is 'Trees to Know in Oregon' with a large, detailed illustration of a tree trunk.

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Questions?

A photograph of a person wearing a white hard hat and a grey jacket, standing in a forest. The person is surrounded by tall ferns and other vegetation, with trees in the background.

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