

Pinophyta - Gymnosperms



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Seed bearing plants without flowers and pistils – Gymno-sperm = “naked seeds”



Gymn-asium =

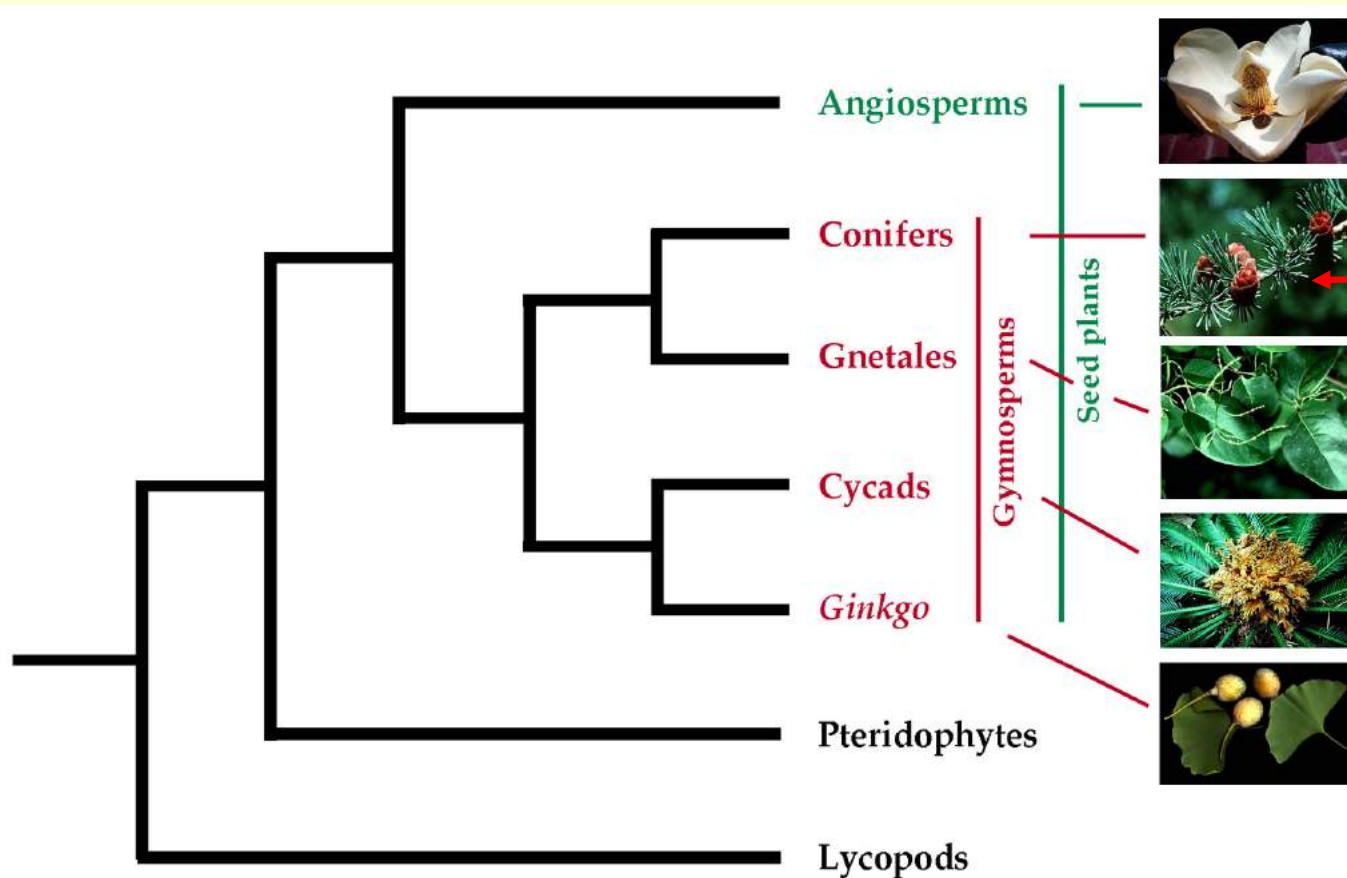
“naked house”



Pinophyta - Gymnosperms

Seed bearing plants without flowers and pistils – Gymno-sperm = “naked seeds”

3 families of conifers only
in Great Lakes region with
8 genera and 13 species



Cupressaceae - junipers

Pinaceae - pines, spruces

Taxaceae - yews

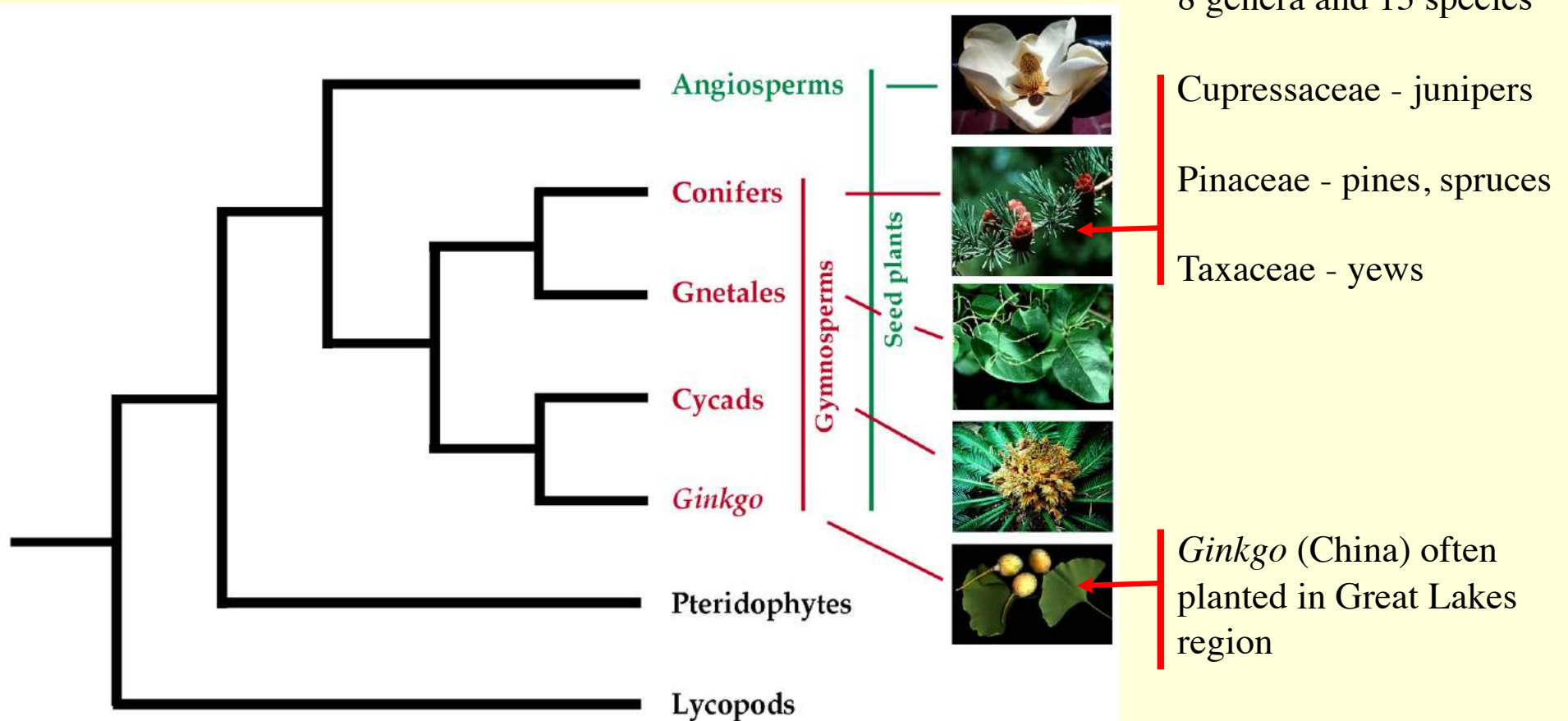
Visit Wilderness State Park in Michigan to see all 13 native gymnosperms from one spot



Pinophyta - Gymnosperms

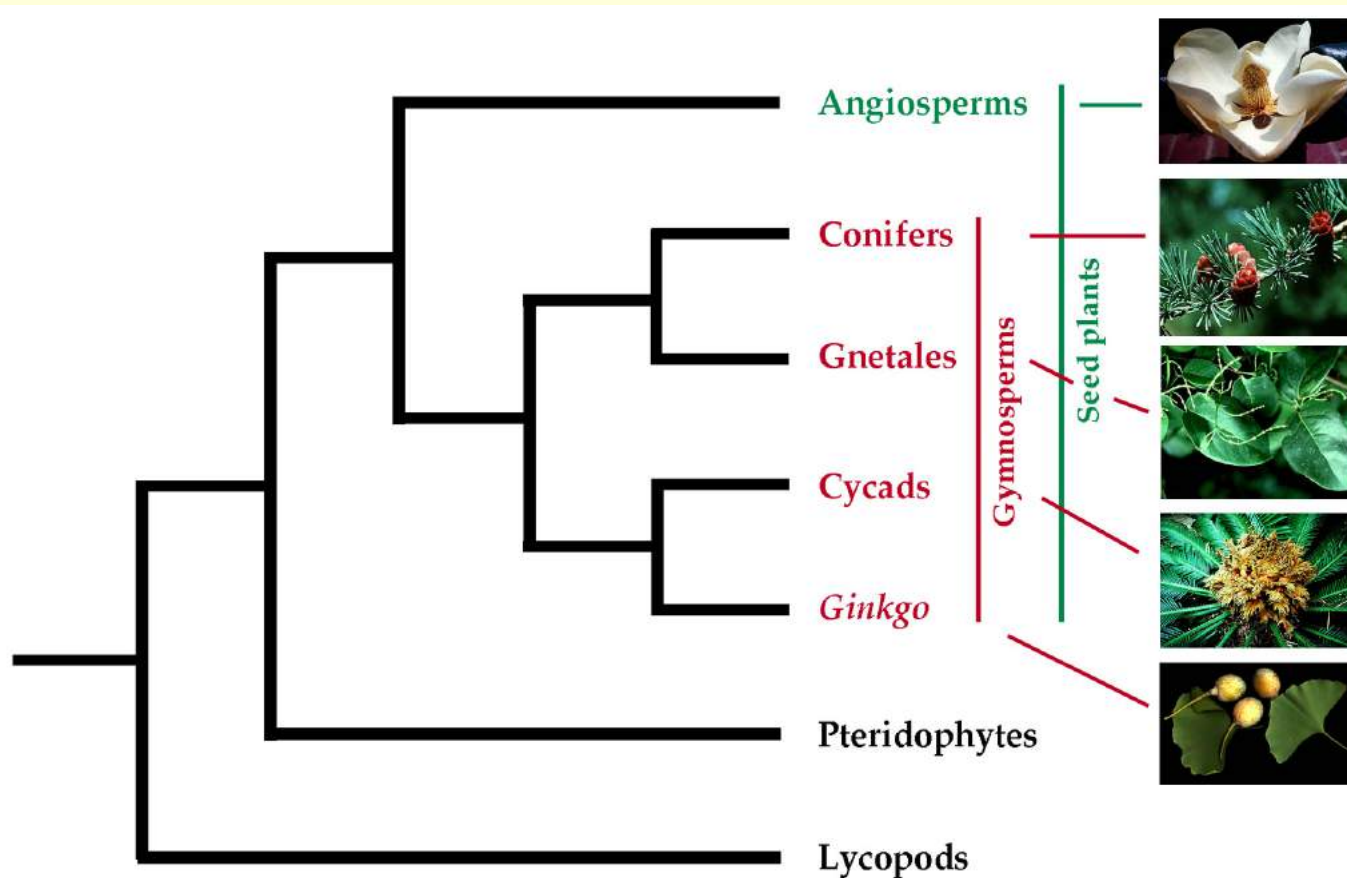
Seed bearing plants without flowers and pistils – Gymno-sperm = “naked seeds”

3 families of conifers only in Great Lakes region with 8 genera and 13 species



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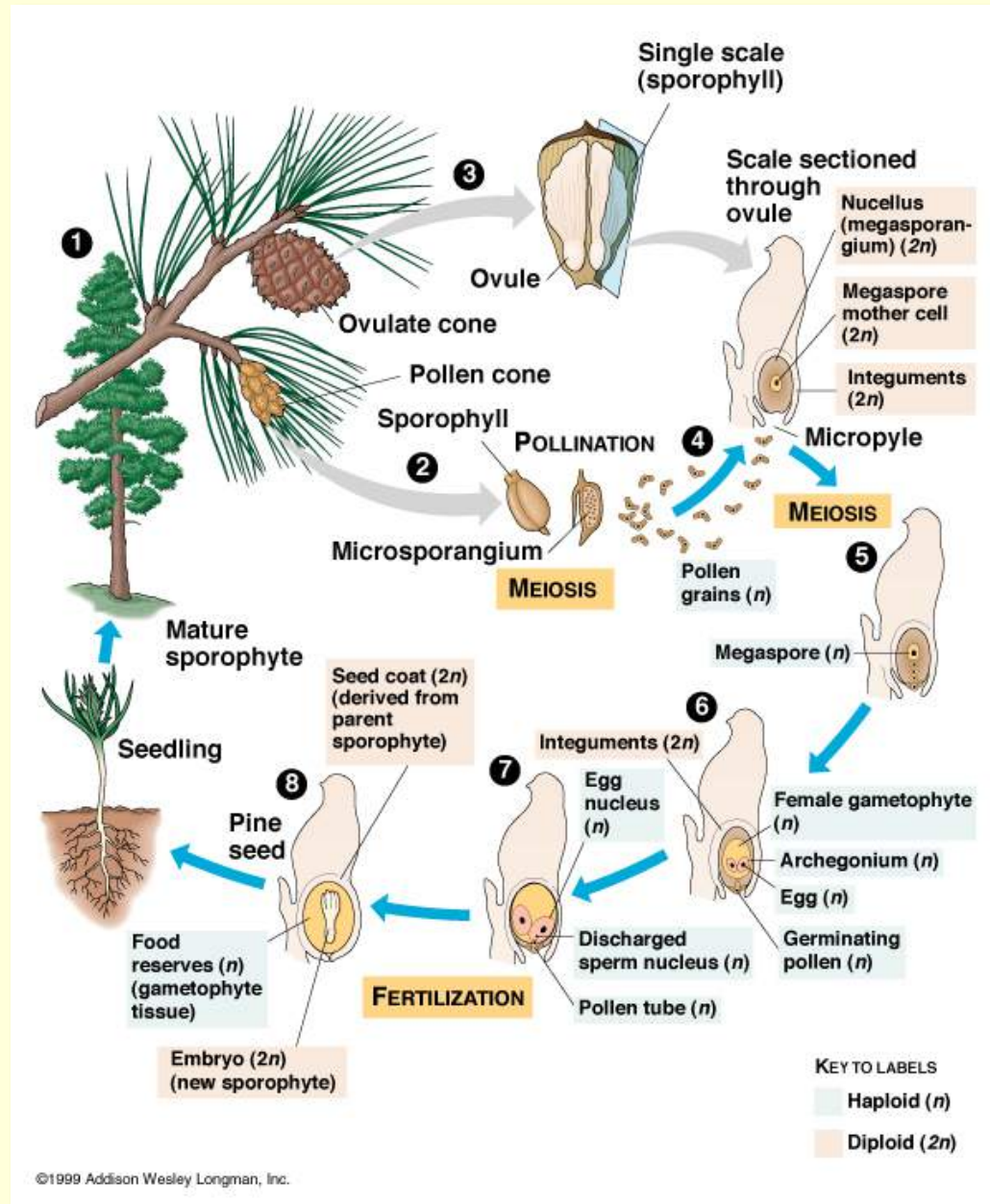
- Less diverse than ferns: 12 families, 80 genera, 820 species
- Woody: trees, shrubs, lianas, few epiphytes
- Worldwide, but more dominant in colder and arctic regions



Pinophyta - Gymnosperms

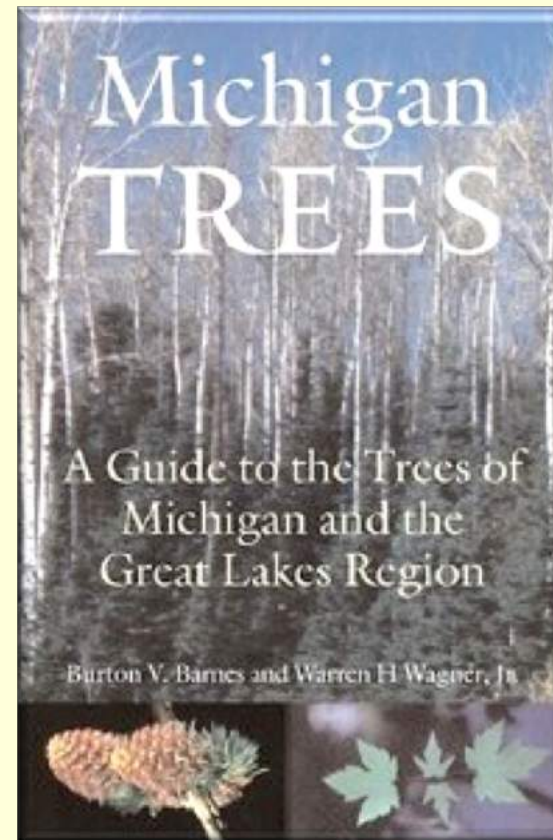
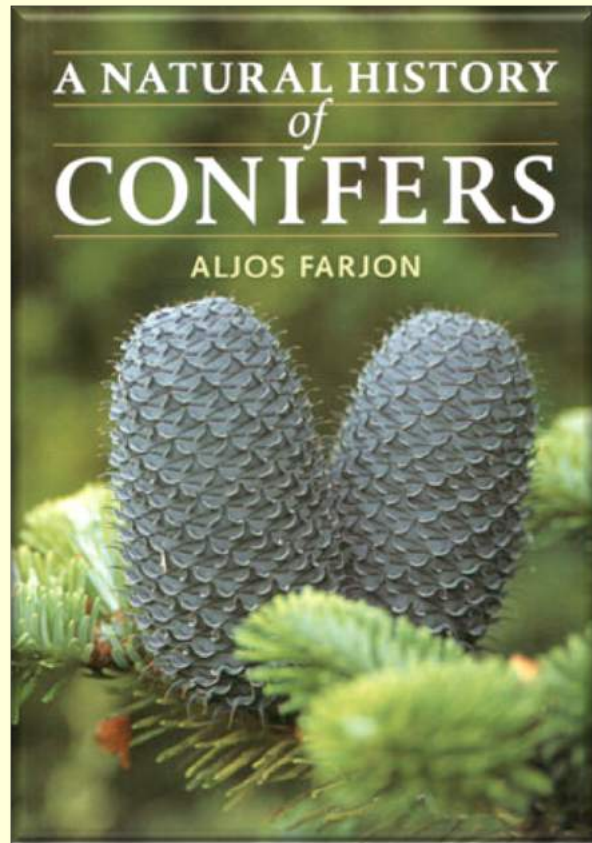
General characteristics:

- **Seeds!**
- = mature **ovule**
- “naked seed” in cone
- No water required for sperm movement - **pollen**
- = male gametophyte (**heterosporous!**)
- pollinated by wind (mostly)



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Good books!



Pinophyta - Gymnosperms

Cupressaceae: cypress family

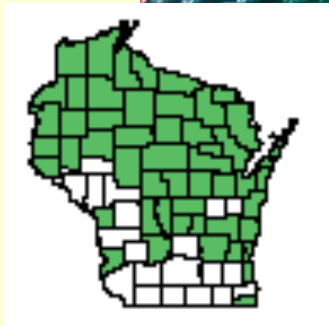
Leaves needle or scale-like
Opposite or whorled, persistent
Important rot resistant trees (redwood, cedar)

Thuja occidentalis
Arbor vitae, White cedar

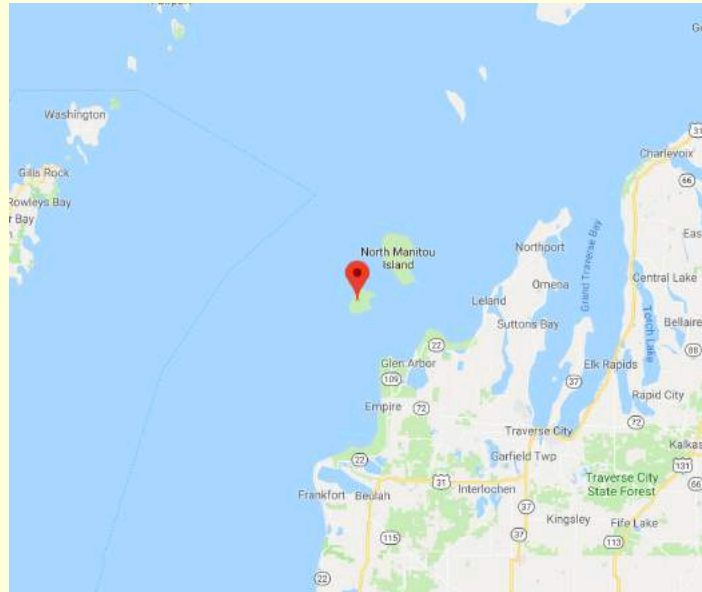
Leaves opposite in 4 ranks
and heteromorphic

Branches flattened

Small woody cones

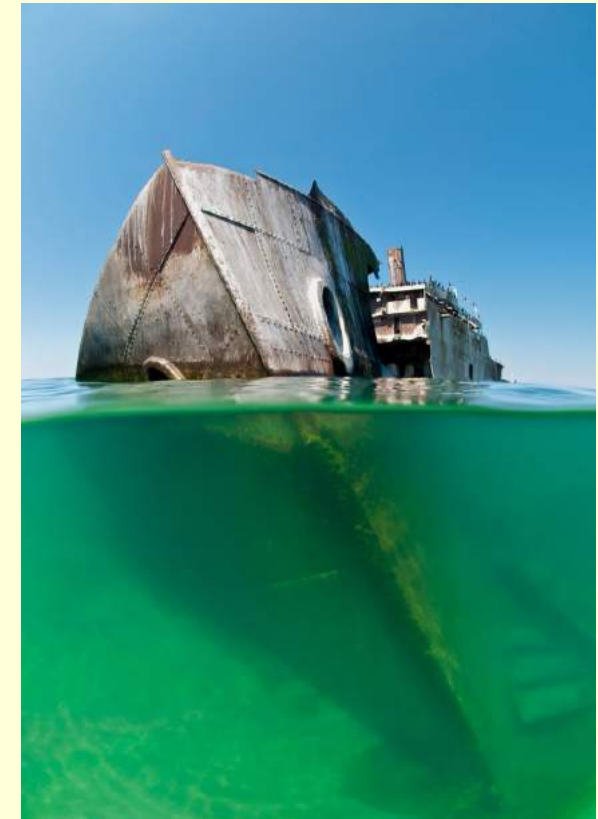


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South Manitou Island
(Sleeping Bear National
Lakeshore)

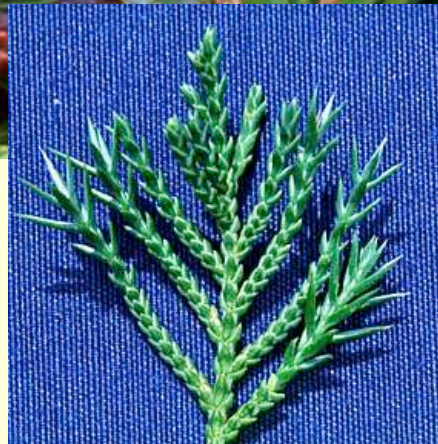
Valley of the Giants



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Cupressaceae: cypress family

Leaves needle or scale-like
Opposite or whorled, persistent
Important rot resistant trees (redwood, cedar)



Juniperus Junipers, Red cedar

Leaves closely appressed; can be scale-like or awl-like

Branches not flattened

Blue “berry” cones



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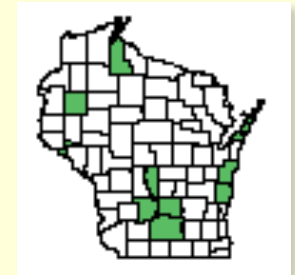
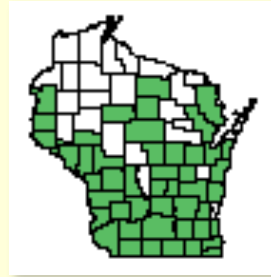
Juniperus
Junipers, Red cedar



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Cupressaceae: cypress family

Juniperus virginiana
Red cedar



Juniperus communis
Common juniper



Juniperus horizontalis
Creeping juniper

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Taxaceae: yew family

Leaves needle-like, spreading in one plane - 2 ranked

No cones, single seed in fleshy aril, but seeds naked

1 genus *Taxus*; taxol drug from western *T. brevifolia*



Taxus canadensis
American yew
Ground hemlock



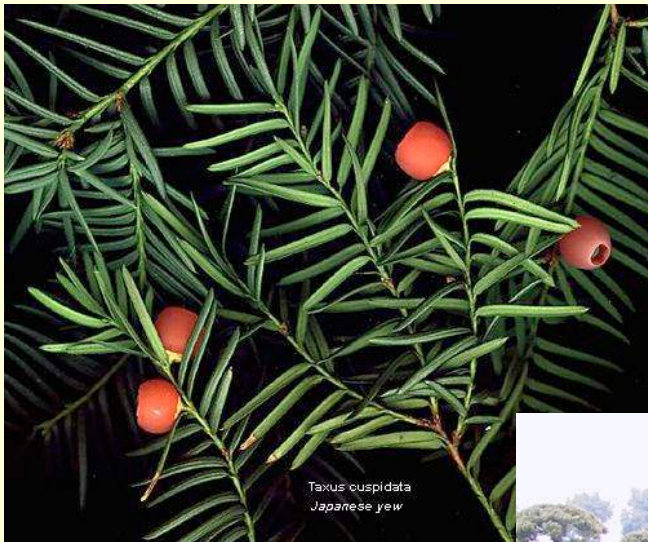
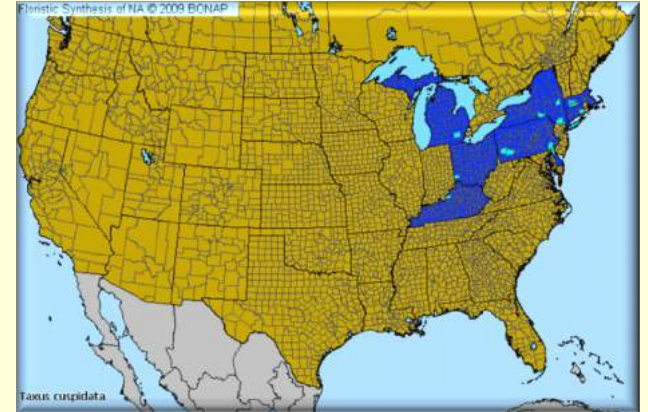
Apostle Islands stand with no deer



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Taxaceae: yew family

Leaves needle-like, spreading in one plane - 2 ranked
No cones, single seed in fleshy aril, but seeds naked
1 genus *Taxus*; taxol drug from western *T. brevifolia*



Taxus cuspidata
Japanese yew



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Pinaceae: pine family

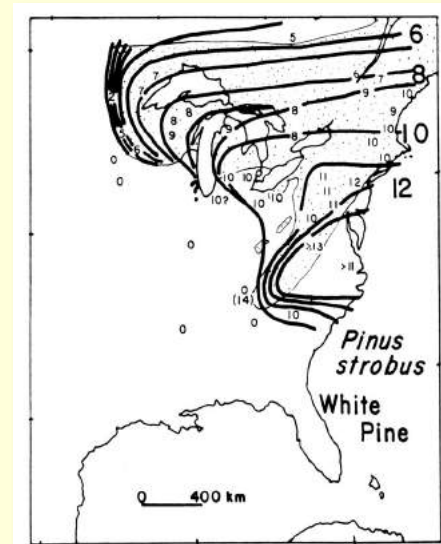
6 genera, 200 species of Northern Hemisphere

Foliage leaves needle-like, alternate or fascicled

Many seeds enclosed in fleshy to woody cone, with conspicuous cone scales



Pinus strobus
White pine



Alleghenian
element



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Pinaceae: pine family



Pinus resinosa - Red pine
- more xeric than white
pine



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Pinaceae: pine family



Pinus banksiana - Jack pine
- most xeric of the pines
- showing serotinous cones

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Pinaceae: pine family



Pinus banksiana - Jack pine

- **Keystone species** involving glacial geology, jack pine bud worm, defoliation, fire, serotinous cones, endangered Kirtland's warbler, and parasitic cowbird

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Pinaceae: pine family



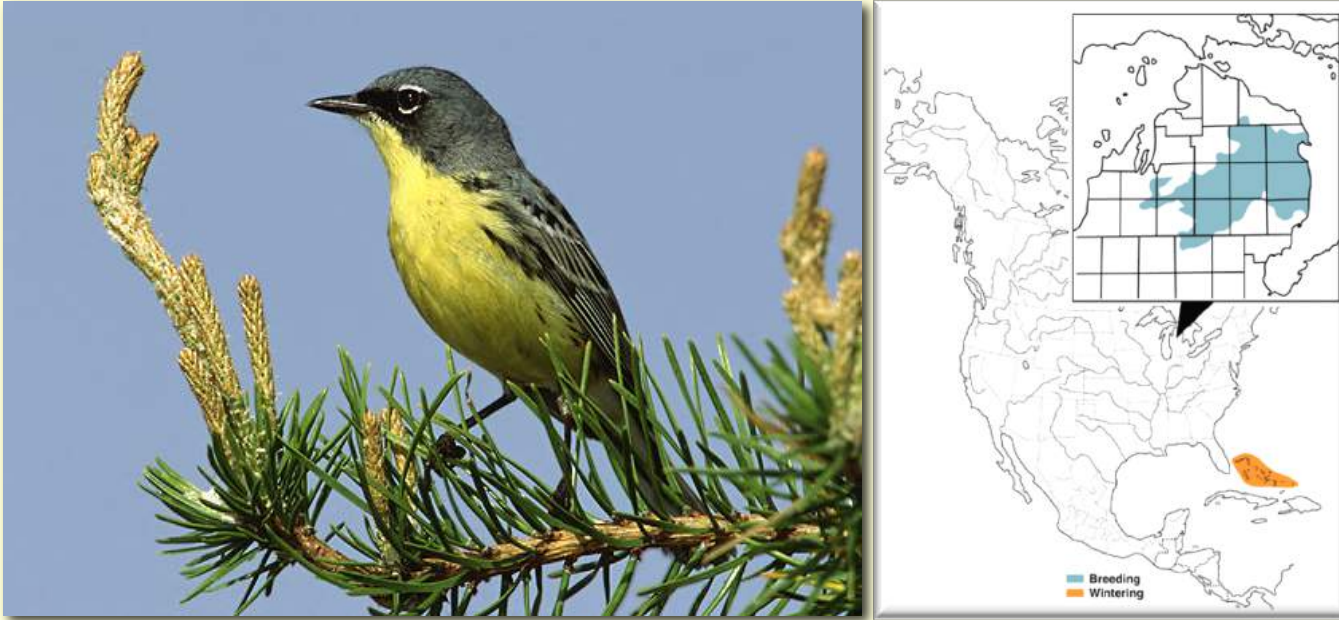
7 year old jack pine site – Crawford Co. MI



“sand counties” due to glacial melt off

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Pinaceae: pine family



Endangered Kirtland's Warbler basically restricted to these sand counties in MI and to young stands of jack pine & now moving into central WI

Jack pine bud worm infestations allow fire and cyclical formation of new stands of jack pine



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Pinaceae: pine family

Parasitic cowbird (and suppression of fire) almost caused the Kirtland's warbler go extinct

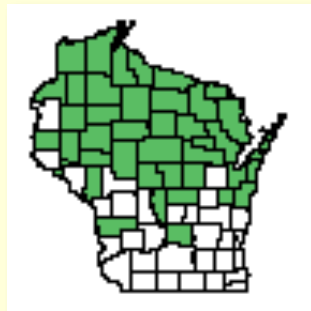


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Pinaceae: pine family



Abies balsamea
Balsam fir



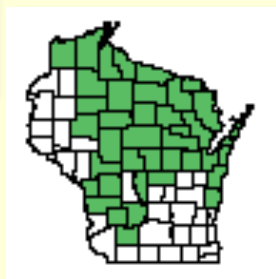
Larix laricina
Larch, tamarack

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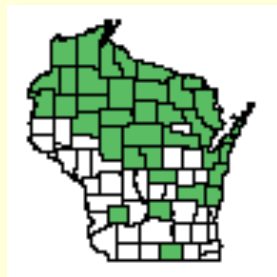
Pinaceae: pine family



Picea mariana
Black spruce



Picea glauca
White spruce



Tsuga canadensis
Eastern hemlock