

# Types of disease

- **Infectious:** a disease that is caused by a pathogen which can spread from a diseased to a healthy host.
- **Non-infectious:** a disease that is caused by an environmental or host factor. It is not spread between a diseased and healthy individual.

# Infectious diseases can be native vs. emergent

- **Native:** coexistence of pathogen, hosts, and host communities for long periods of time
- **Emergent:** diseases that suddenly become significantly prevalent or more relevant

# **“Native diseases”:**

- **Indigenous microbes**
- **Plant ecosystems have co-evolved to resistance**
- **Native diseases are an important component of forest ecosystems**

# “Roles of native diseases”:

- Select and scale appropriately regeneration
- Thin natural populations of trees
- Optimal allocation of resources
- Selection for a genetically diverse host population
- Maintain tree ranges
- Succession: nutrient cycling both through symbiotic, pathogenic and saprophytic interactions

# Impacts of diseases

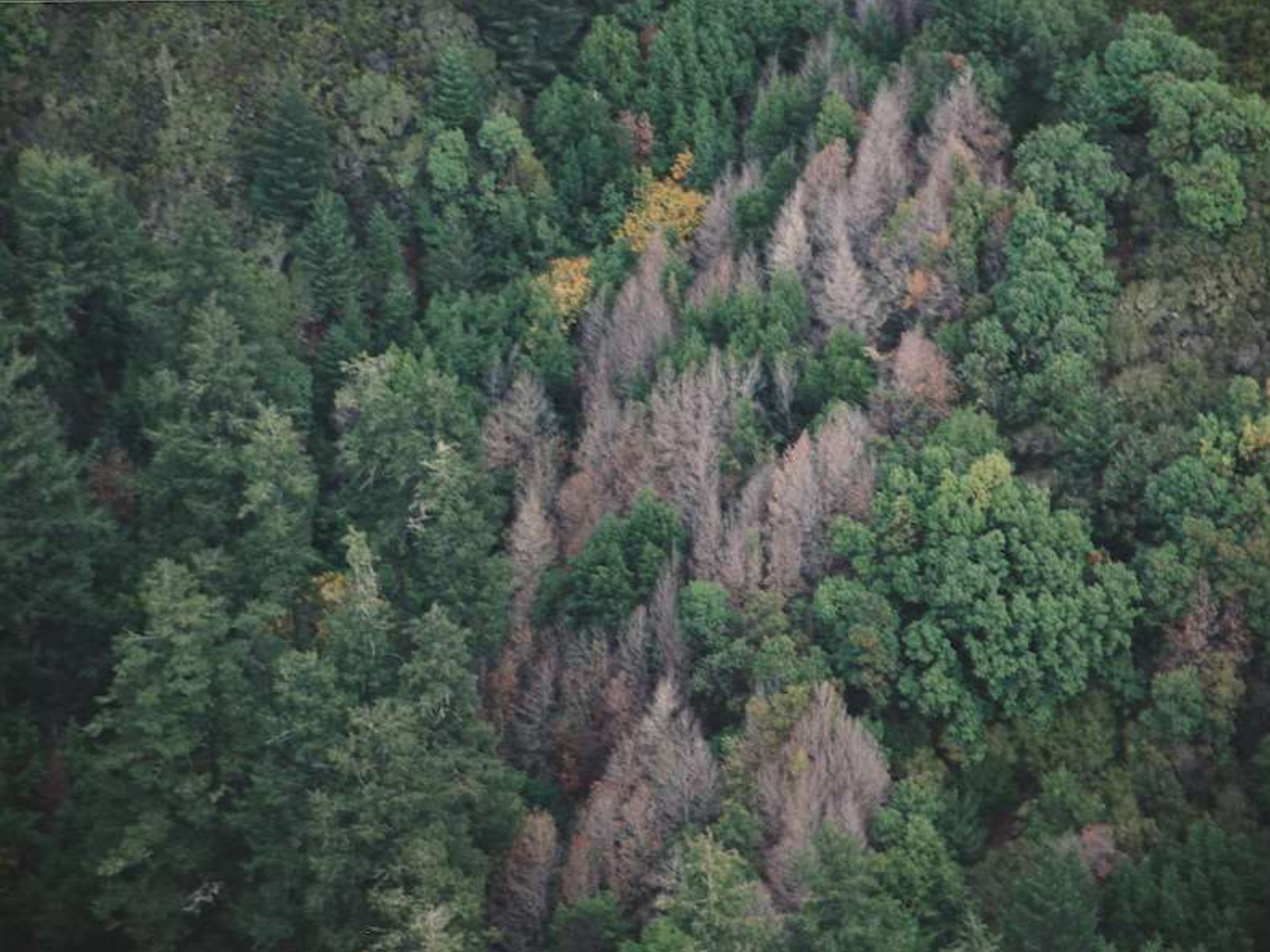
## Individual trees

- **Reduced growth**
- **Reduced fecundity**
- **Plant death**

Scale:  
From one  
Tree...











# Impacts of diseases

**Influences on forest stand dynamics**

**Competition**

**Succession**

**Diversity**

**Nutrient cycling**

**Fire**

**Habitat creation**

# Root Rots: Symptoms

- Thinning of crown
- Chlorosis
- Resinosis
- Distress cone crops
- Reduced Growth



# Tree mortality

- Girdling of cambium
- Loss of roots
- Wind-throw
- Insect (Bark Beetle)



# But many root diseases also cause butt rot

- Hollows stems and lowers vigor without killing trees
- They may fail during violent windstorm but otherwise may survive infected for a long time
- Hollow may have significant value for wildlife



# Spread

- From original infection, disease moves to susceptible adjacent trees by mycelial growth through root to root contact
- Results in a slowly enlarging disease center
  - Characterized by oldest mortality in the center, new mortality, and surrounding border of declining hosts



# Root Disease Centers

- Only a few trees, or multiple hectares
  - Pathogen Species
  - Host species
  - Host Size
  - Environmental and stand conditions
- Through alternation of parasitic and saprobic stages, root diseases persist over time and spread across the landscape in slowly expanding gaps



