The IUCN Red List:
A tool for monitoring forest health

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The Red List of Threatened Species

Threat categories are based on demographic & ecological data

- Population size
- Population fragmentation
- Geographic range
- Habitat quality
- Threats
- Level of exploitation
What is a "threatened" species?

Balsam woolly adelgid

Abies fraseri

Justification:
The decline of the population due to an alien pathogen (insect) since the 1960s has been very substantial and is apparently ongoing, probably at a slower rate than initially. Its area of occupancy when calculated on a fairly comprehensive set of herbarium specimen based localities (some may now be dead trees only) even when using a grid size of 4x4 km per locality (22 collections = 16 localities) remains well under 500 km² (the threshold for Endangered) and with a continuing decline this species meets the B2 criterion for Endangered.

Common Name(s):
  English – Fraser’s Fir, Fraser Fir, She Balsam

Synonym(s):
  Pinus fraseri Pursh

Assessment Information [top]

Red List Category & Criteria: Endangered B2ab(iii, iv, v) ver 3.1
Year Published: 2013
Date Assessed: 2011-05-11
Assessor(s): Farjon, A
Reviewer(s): Thomas, P. & Stretch, L

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### Habitat and Ecology

**Habitat and Ecology:** On the highest slopes and summits of the Appalachian Mountains, between 1,200 m and 2,038 m a.s.l., usually best developed on north-facing slopes. The soils are commonly podzolized and moderately acidic. The climate is humid, with cool summers and cold winters with heavy snowfall, annual precipitation varies between 850 mm and 2,000 mm. Fraser Fir occurs in scattered populations, sometimes pure at the highest elevations, but more often mixed with *Picea rubens* and *Betula papyrifera* above 1,500 m, at lower elevations also with *Tsuga canadensis*, *Betula alleghaniensis*, *Serbus canadensis*. As a garden tree, Fraser Fir is used in North Carolina for ornamental plantings. It does not usually have a very long life as a garden tree.

### Threats

**Major Threat(s):**

The disjunct subpopulations of this fir, restricted to the mountain tops and their north-facing slopes of the southern Appalachians, are susceptible to destruction by windfall and fire. However, by far the most damaging agent is an insect, *Balsam Woolly Adelgid* (*Adelges piceae*) discovered in 1957 in *Abies fraseri* on Mt. Mitchell. This alien pest has spread quickly to all subpopulations causing massive dieback through impairment of translocation flow in the cambium. Millions of trees had died by the 1980s and only one substantial population (Mt. Rogers, Virginia) remained largely unaffected (Beck 1990). After massive die-back competitors such as *Picea rubra* and *Betula* sp. can take over dominance in several locations in North Carolina (DeSelm and Boner 1984).

### Conservation Actions

**Conservation Actions:** Methods to control this introduced insect are still being researched but none have been fully effective; some small scale protection can be provided by chemical insecticides. The latter strategy is very costly and is only used in plantations for Christmas trees and in some high profile recreation areas. In some stands that have died, there is massive seedling recruitment, and some of these seem to go through new infestations only partially damaged. It is hoped that eventually resistance may build up from these individuals.
Trends and drivers of forest threat

Abies bracteata (Santa Lucia Fir)
Status: Near Threatened ver 3.1
Pop. trend: stable

Abies fraseri (Fraser's Fir)
Status: Endangered B2ab(iii,iv,v) ver 3.1

Threats
1. Residential & commercial development (20)
2. Agriculture & aquaculture (104)
3. Energy production & mining (2)
4. Transportation & service corridors (1)
5. Biological resource use (23)
6. Human intrusions & disturbance (14)
7. Natural system modifications (54)
8. Invasive and other problematic species, genes & diseases (131)
9. Pollution (7)
10. Geological events (9)
11. Climate change & severe weather (27)
12. Other options (3)

Assessment
Arctostaphylos catalinae
Status: Vulnerable D2 ver 2.3 (needs updating)
Trends and drivers of forest threat

North American tree species on IUCN Red List

229 species of concern
Trends and drivers of forest threat

North American trees threatened by non-native pests/diseases

- **EX**: All threats: 10, Invasives: 0
- **EW**: All threats: 1, Invasives: 0
- **CR**: All threats: 70, Invasives: 50
- **EN**: All threats: 70, Invasives: 50
- **VU**: All threats: 50, Invasives: 30
- **NT**: All threats: 20, Invasives: 10
- **DD**: All threats: 0, Invasives: 0
Trends and drivers of forest threat

Threats to North American tree species

- Transportation
- Wood & pulp plantations
- Energy production & mining
- Hunting
- Other
- Gathering terrestrial plants
- Pollution
- Geological events
- Annual & perennial non-timber crops
- Recreational activities
- Logging & wood harvesting
- Residential & commercial development
- Climate change & severe weather
- Fire & fire suppression
- Livestock farming & ranching
- Invasive species & diseases

70% of tree species of concern
## Using the IUCN Red List

### Limitations

- Incomplete information
  - 412 tree species
- Not compiled systematically
- Assessments out of date
  - 42% >10 years old
- Slow to react to rapid invasions
  - EAB/Fraxinus profunda

### Applications

- Species snapshots
  - Threats
  - Ecology
  - Habitat
  - Population trends
- Advanced query options
  - Status
  - Threat class
  - Life form
  - Date assessed
  - Taxonomic rank
  - Geographic region/state
- Analyze trends
- Identify gaps in knowledge
IUCN Red List of Threatened Species