

Thought This Was Easy? U.S.-Thailand Free Trade Agreement



Climate change is the biggest threat on the boreal forest
 - Other solutions mostly temporary

Possible Strategies:

- Further protect the intact areas of the circumboreal region
- To curb greenhouse gas emissions from the use of fossil fuels
 - Highest contributor to climate change
- Stop slow tropical deforestation
- Another major contributor to greenhouse gas emissions
- National policy options for circumboreal regions
 - Afforestation, reforestation, and forest management

References

1. Boreal Forests and Climate Change. World Resources Institute. 2010. <http://www.wri.org/publications/2010/01/010701a.html>

2. The State of the World's Forests 2010. FAO. 2010. <http://www.fao.org/docrep/018/i1800e/i1800e00.htm>

3. The Carbon Cycle of Boreal Forests. Carbon Cycle Center. 2008. <http://www.cccr.yale.edu/>

4. Boreal Forests: A Carbon Sink or Source? Carbon Cycle Center. 2008. <http://www.cccr.yale.edu/>

5. The Carbon Cycle of Boreal Forests. Carbon Cycle Center. 2008. <http://www.cccr.yale.edu/>

Future Projections

Under current climate warming conditions:

- Large amounts of carbon are expected to be released into the atmosphere
- Due to the boreal and forest decline, carbon loss are expected to increase
- To maintain the boreal forest, drought, and forest fires are expected to increase in frequency and severity with warming climate
- Increased forest management and protection is needed
- These include fire management and protection
- Protection for fire or insect infestation

Thecasesolutions.com

The Boreal Forest

1. Introduction to the Boreal Forest

2. Climate Change and the Boreal Forest

3. The Carbon Cycle of Boreal Forests

4. The Carbon Cycle of Boreal Forests

5. The Carbon Cycle of Boreal Forests

Thecasesolutions.com

Outline

- The boreal forest
- Climate change and the boreal forest
- The factors affecting the boreal forest and climate change
- Future projections
- Current strategies and initiatives

Thecasesolutions.com

Boreal Forest and Climate Change

- Global climate warming due to the increased concentrations of greenhouse gases
- The boreal forest stores approximately 714 billion tonnes of carbon
- 37% of total carbon stored in global ecosystems
- Warming climate placing stress on the boreal forest ecosystems



Thecasesolutions.com

Thought This Was Easy? U.S.-Thailand Free Trade Agreement

Climate change is the biggest threat on the boreal forest
 Other solutions mostly temporary

Possible Strategies:

- Further protect the intact areas of the circumboreal region
- To curb greenhouse gas emissions from the use of fossil fuels
 - Highest contributor to climate change
- Stop/slow tropical deforestation
 - Another major contributor to greenhouse gas emissions
- National policy options for circumboreal regions
 - Afforestation, reforestation, and forest management



References

1. Boreal Forests: A Global Overview. FAO, 2011. 2. The State of the World's Forests 2014. FAO, 2014. 3. Boreal Forests and Climate Change. FAO, 2015. 4. The Role of Boreal Forests in Carbon Sequestration. FAO, 2016. 5. Impacts of Climate Change on Boreal Forests. FAO, 2017. 6. Adaptation and Mitigation in Boreal Forests. FAO, 2018. 7. The Economics of Boreal Forests. FAO, 2019. 8. Boreal Forests and Sustainable Development. FAO, 2020. 9. The Future of Boreal Forests. FAO, 2021. 10. Boreal Forests and the Paris Agreement. FAO, 2022.

Future Projections

Under current climate warming conditions:

- Large amounts of carbon are expected to be released into the atmosphere
 - Due to disturbances and forest decline before trees are replaced by new vegetation
- Disturbances (fire, pest/drought, and insect infestation) expected to increase in frequency and severity with warming climate
- Increased forest management and protection is needed
 - More sustainable management and practices
 - Protection from fire and insect infestation

Thecasesolutions.com

The Boreal Forest

- Definition of boreal forest, their location and climate
- Characteristics of boreal forest
- Importance of boreal forest
- Threats to the boreal forest
- Current management of boreal forest
- Future projections
- Current strategies and initiatives

Thecasesolutions.com

Outline

- The boreal forest
- Climate change and the boreal forest
- Five factors affecting the boreal forest and climate change
- Future projections
- Current strategies and initiatives

Thecasesolutions.com

Boreal Forest and Climate Change

- Global climate warming due to the increased concentrations of greenhouse gases
- The boreal forest stores approximately **314 billion tonnes** of carbon
 - 37% of total carbon stored in global ecosystems
- Warming climate placing stress on the boreal forest ecosystem

Main Factors

Five factors impacting the carbon budget of the boreal forest:

- Fire
- Melting permafrost
- Insect infestations
- Droughts
- Harvesting

Melting Permafrost

- Permafrost degradation associated with climate warming
- 2nd major impact on boreal forest
- Secondary in the northern boreal region is retreating in response to climate warming
- Northward shift of the boundary
- Permafrost has a high organic carbon content
 - Adding to the carbon pool and releasing and atmosphere due to soil erosion and permafrost degradation

Forest Fires

- 0-10 million hectares of boreal forest are annually for the boreal region
- Spain: 2.8 million hectares from annual fire, Canada: 2 million
- Fire frequency, intensity and length increasing
- Fire risk expected to increase
- Fire risk expected to increase
- Fire risk expected to increase

Insect Infestations

- Connection between climate warming and insect infestation in boreal region
- Disturbance increased tree mortality
- Affects 1 billion of hectares in boreal forest
- Highly potential in boreal forest warming
- In Canada, there are due to insects in 1.8 to 2.8 billion hectares from 2010 to 2020
- Insect infestation may be in the warming and drying of trees
- Climate change impact on fire

Harvesting

- 40-60% of carbon remains in the forest after harvesting and the rest is released into the atmosphere during decomposition
- Carbon is also released due to soil disturbance during harvest
- Harvest of trees also further weakens permafrost
 - Exposed ground is further vulnerable to soil erosion
- The most common type of harvesting is clearcut logging
- In the past clear cutting was done in large geometric sections
- Now done in order to encourage biodiversity

Drought

- Climate change is causing more frequent and severe droughts in boreal forest
- In 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022
- More frequent and severe droughts in boreal forest
- More frequent and severe droughts in boreal forest
- More frequent and severe droughts in boreal forest

Thecasesolutions.com

Outline



- The boreal forest
- Climate change and the boreal forest
- Five factors affecting the boreal forest and climate change
- Future projections
- Current strategies and initiatives

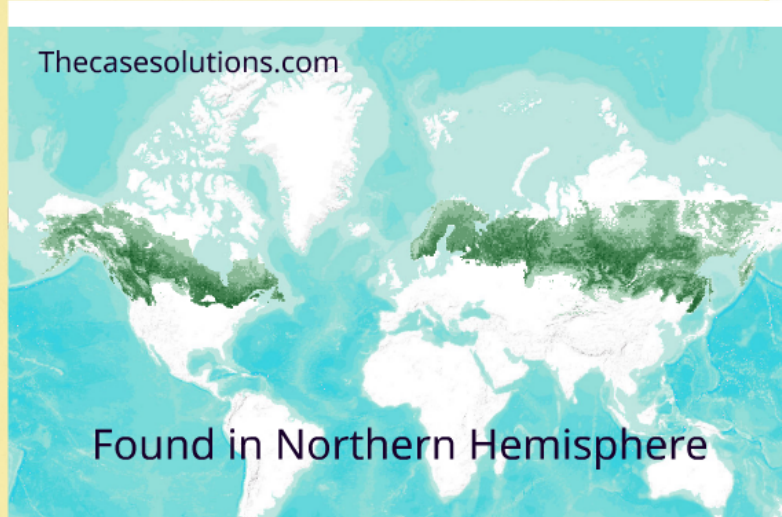


Thecasesolutions.com

The Boreal Forest

- Circumboreal region spans across **North America** and **Eurasia**
 - Approximately **30%** is located in Canada
- Known as the **Taiga** in Russia
- Covers approximately **1.43 billion hectares** of land
- Contains **half** of the carbon in forested areas across the globe

The Boreal Forest Thecasesolutions.com



Thecasesolutions.com

- Tree species that dominate this landscape are largely **pine, larch, birch, spruce, fir and aspen**
- Permafrost underlies about **60%** of the region
- Boreal forest has the potential to alter the global climate due to its **sensitivity** to change



The Boreal Forest



Thecasesolutions.com

Found in Northern Hemisphere

Thecasesolutions.com

- Tree species that dominate this landscape are largely **pine, larch, birch, spruce, fir** and **aspen**
- Permafrost underlies about **60%** of the region
- Boreal forest has the potential to alter the global climate due to its **size** and its **sensitivity** to change



Thecasesolutions.com



Boreal Forest



and Climate Change

- Global climate warming due to the increased concentrations of greenhouse gases
- The boreal forest stores approximately **714 billion tonnes** of carbon
 - **37%** of total carbon stored in global ecosystems
- Warming climate placing stress on the boreal forest ecosystem

The Global Carbon Budget

Thecasesolutions.com

- Amount of carbon in boreal forests depends on **growth processes** and **disturbances**
- Disturbances **occurring more** with warming climate
 - Further releases carbon into the atmosphere
 - Some areas becoming **carbon sources**

The Global Carbon Budget

Thecasesolutions.com

- Amount of carbon in boreal forests depends on **growth processes** and **disturbances**
- Disturbances **occurring more** with warming climate
 - Further releases carbon into the atmosphere
 - Some areas becoming **carbon sources**