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North American Forest Sector Outlook Study, 2006-2030

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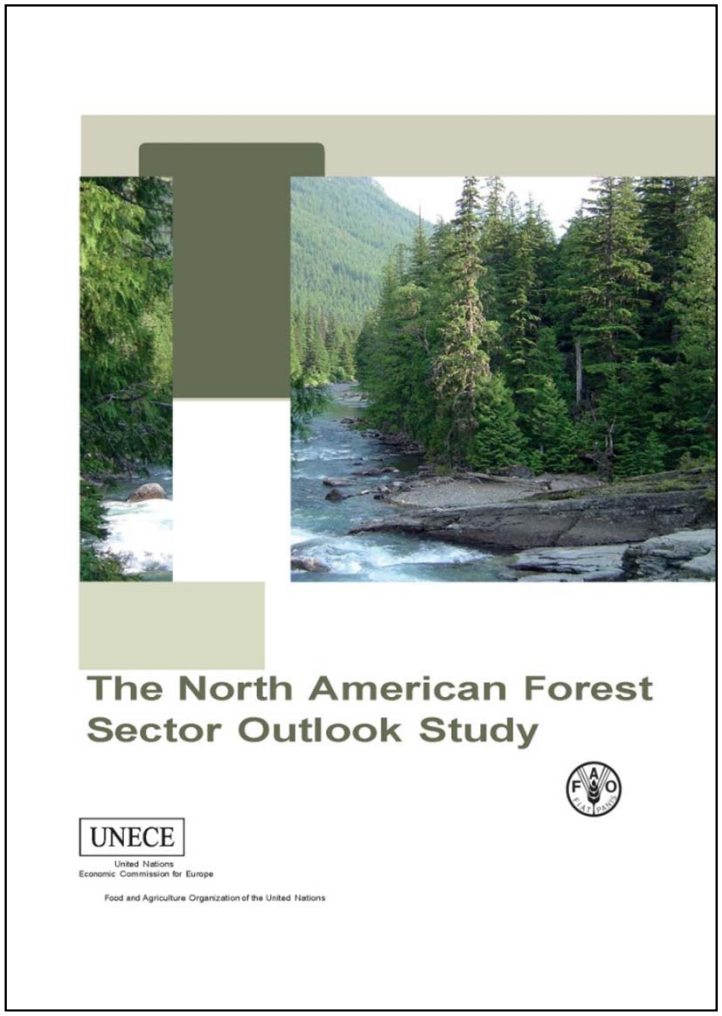
- UNECE Secretariat
- US Forest Service 2010 RPA Assessment Team

NAFSOS Release

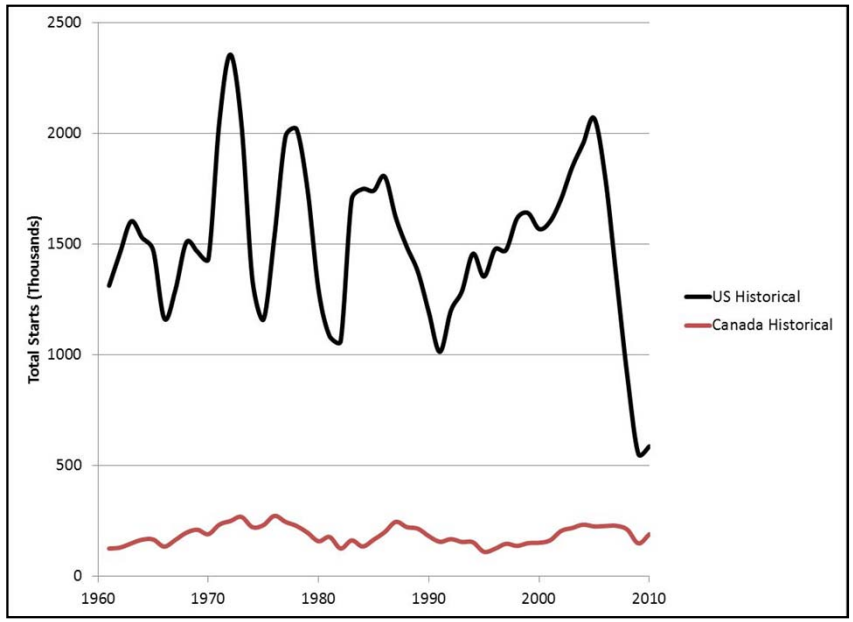
- Released last week, online

http://www.unece.org/forests/outlook/outputs/mop1.html



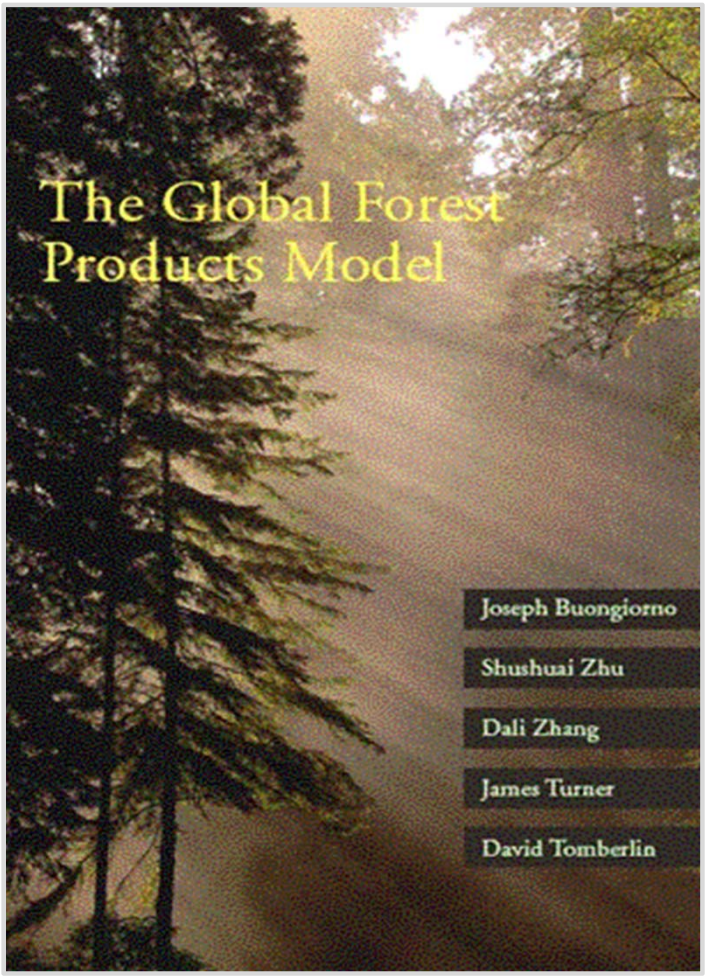
North American Forest Sector Outlook Study, 2006-2030: Outline

- Historical overview of Canada & U.S.
  - Past studies
  - Historical forests, markets
- Canadian & U.S. forests and markets projected to 2030 in a global context
  - Recent forest and market changes
  - Projections of prices, production, consumption, & trade by product category
  - Comparative advantage analysis



Methods:
Modeling System

- The Global Forest Products Model
  - 180 Countries
  - Global Spatial Market Equilibrium Specifications
  - Projects forest area, stock
  - Models 14 product categories



Methods: Special U.S. Details

- U.S. is treated differently compared to other Countries in the GFPM
  - Special treatment due to 2010 RPA
- U.S. timber supply and forest area
  - U.S. timber supply affected by climate change
  - U.S. forest area projected with a special land use model

Methods: Scenarios

- Scenario-based
- NAFSOS Scenarios are based on IPCC Third Assessment Report
  - A1B
  - B2
  - A1B without bioenergy sector assumptions

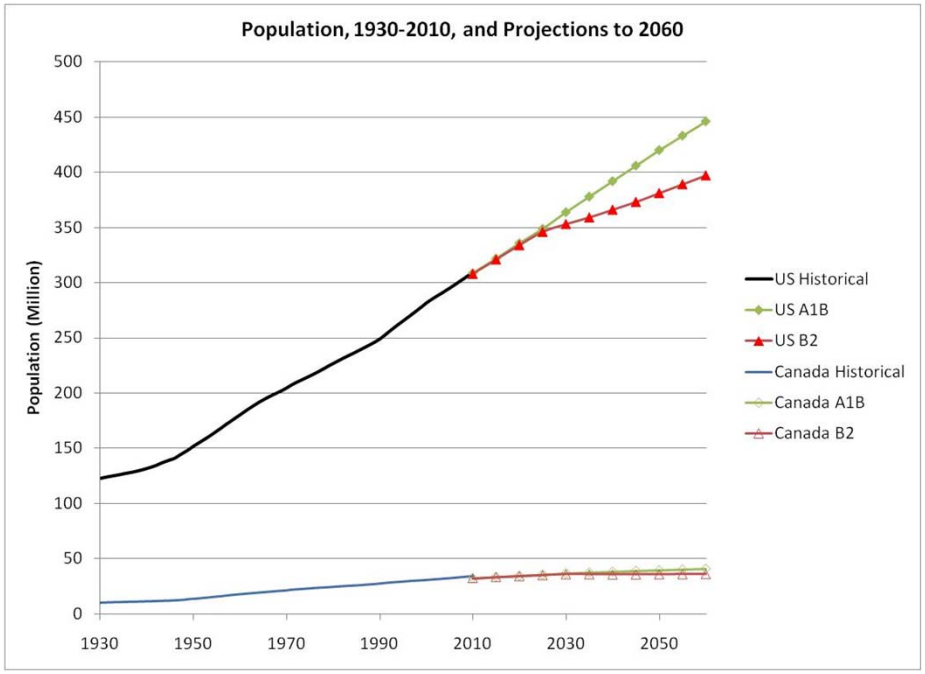
NAFSOS Approach

- Global income growth for Macro Regions consistent with IPCC A1B and B2, but…
- National income per capita growth for countries outside the U.S. based on income convergence theory (Sala-i-Martin 2006)
  - *Avoids* anomalies of
    - High growth for rich countries in poor regions
    - Low growth for poor countries in rich regions
    - Turkey grows faster than its region, for example

Scenario Overview--Global

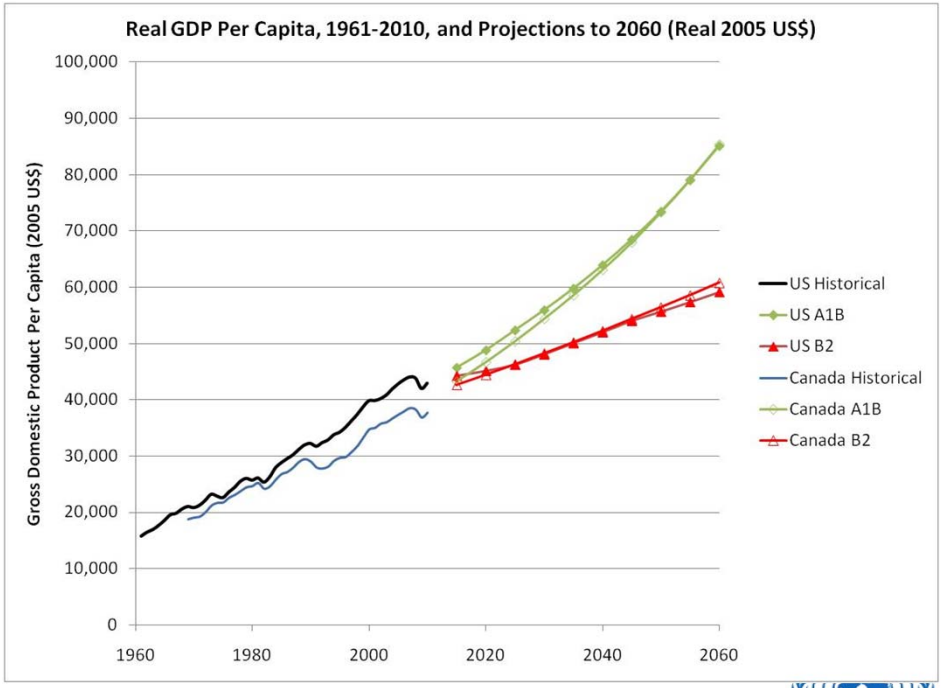
	A1B	A1B-Low Fuelwood	**B2**
General Description	Globalization, Economic Convergence		Localized Solutions, Slow Change
Social Development Themes	Economic Growth, New Technologies, Capacity Building		Sustainable Development, Diversified Technology
Global Real GDP Growth (2010-2030)	High (2.42X)		Medium (1.53X)
Global Population Growth (2010-2030)	Medium (1.17X)		Medium (1.20X)
Global Expansion of Primary Biomass Energy Production (2000-2030)	High	None	Medium

U.S. and Canada Population and GDP per Capita



Population in Canada & U.S.: A1B is higher

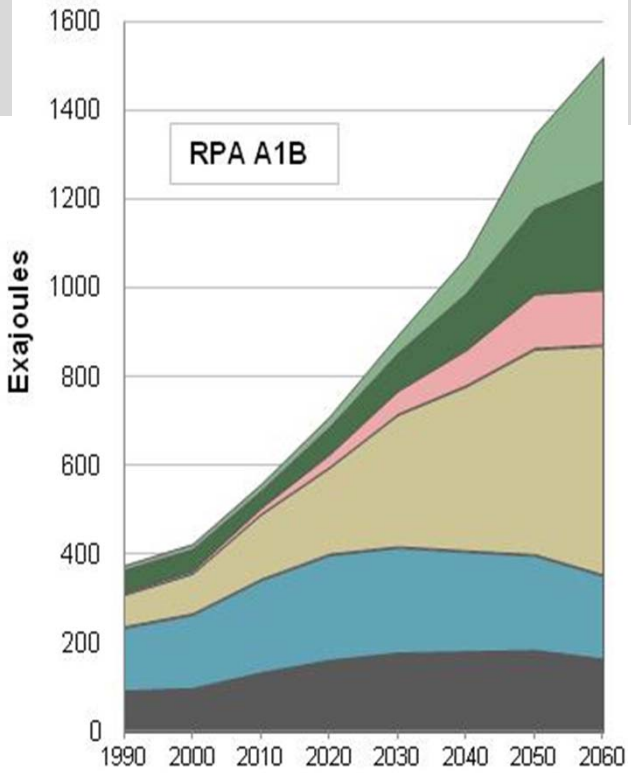
Income per Capita in Canada & U.S.: A1B is higher



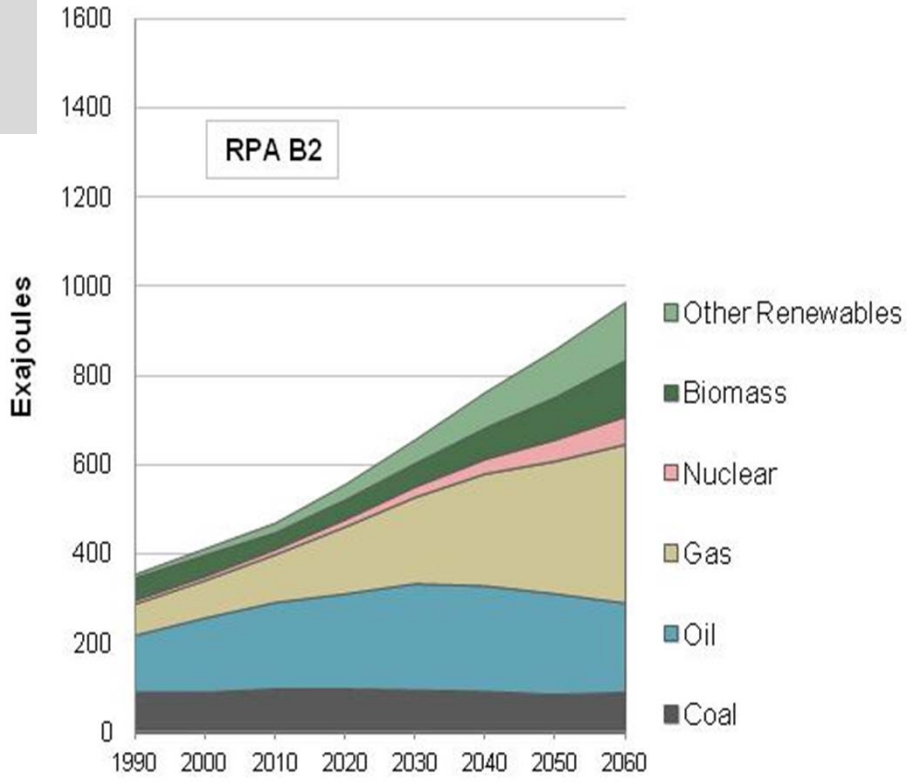
IPCC Global Energy Assumptions . . .

Global biomass energy output increases as oil peaks, but biomass varies by scenario (A1B highest, B2 lowest):

A1B



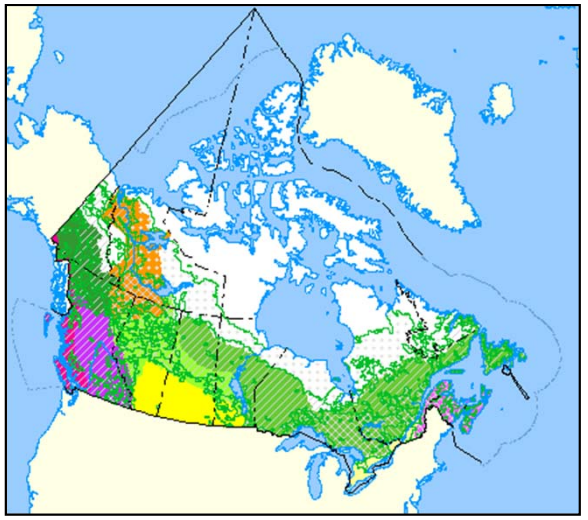
B2



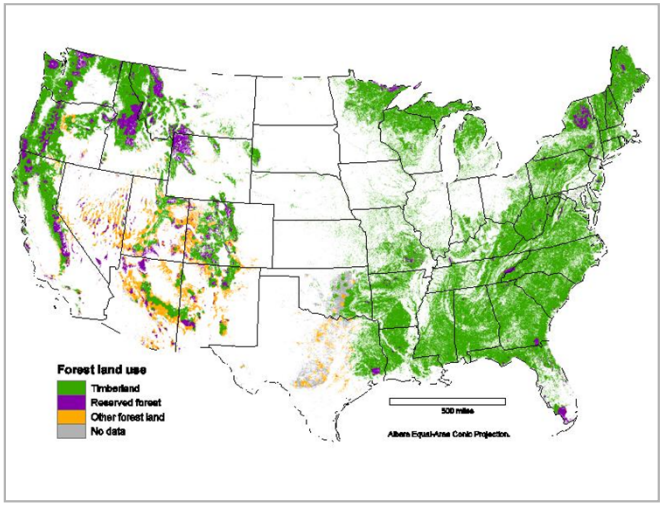
Global primary energy production for IPCC-based RPA scenarios (exajoules), 1990-2060.

Summary Findings of NAFSOS

- Canada and the U.S. have changed in 50 years
  - Forests stable, but…
    - New “natural” threats: fire, insects, diseases, exotics
    - Growing human threats: land use change, enhancement of natural threats
  - Increasing capital intensity in manufacture
    - Hence job losses



Source: Natural Resources Canada 2012



Source: U.S. Forest Service 2011

Summary Findings of NAFSOS (2)

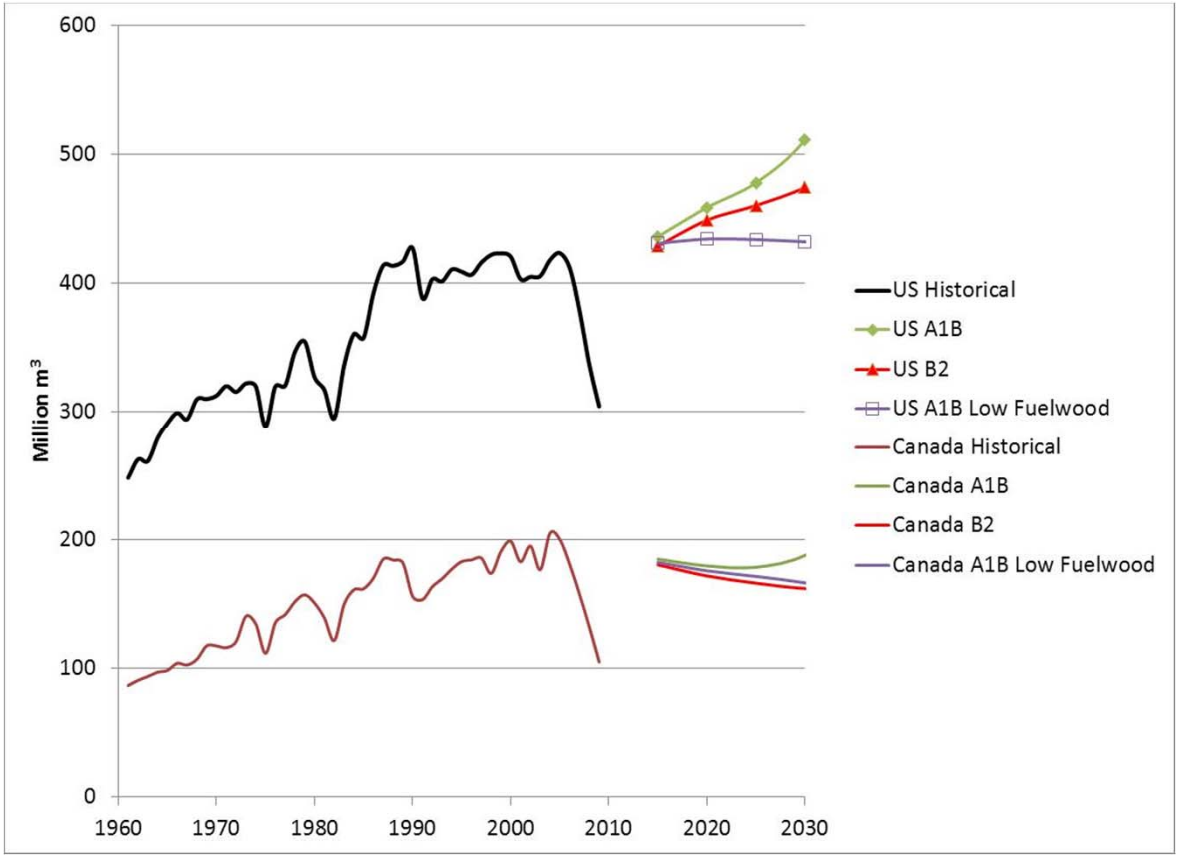
- Other recent historical changes
  - Technology change
    - Recycled fiber
    - More efficient sawing
  - Changes in external market conditions
    - Asian demand growth
    - Increased production capacities in Asia, Oceania, South America

Summary Findings of NAFSOS (3)

- Forest loss in North America
  - U.S. loss of about 0.1-0.2% per year, on average
  - No projected loss for Canada
- North American stock (timber inventory) growth
  - Less growth in the U.S. due to forest loss

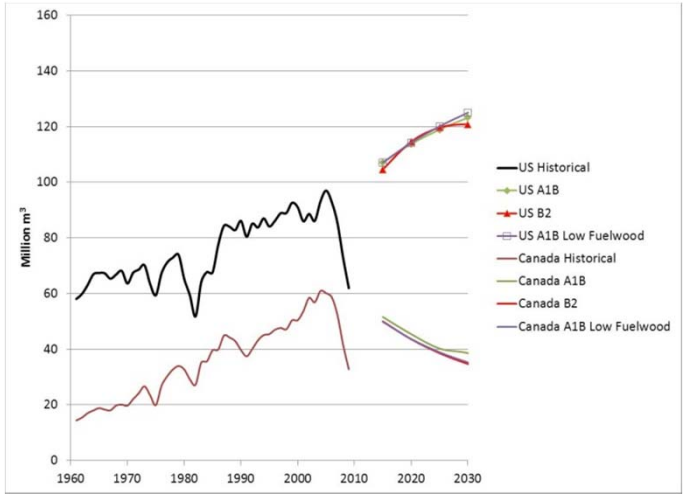
Summary Findings of NAFSOS (4)

- Industrial Roundwood Production Recovery
- Recovery greater for the U.S.
- Canada may have seen its high water mark

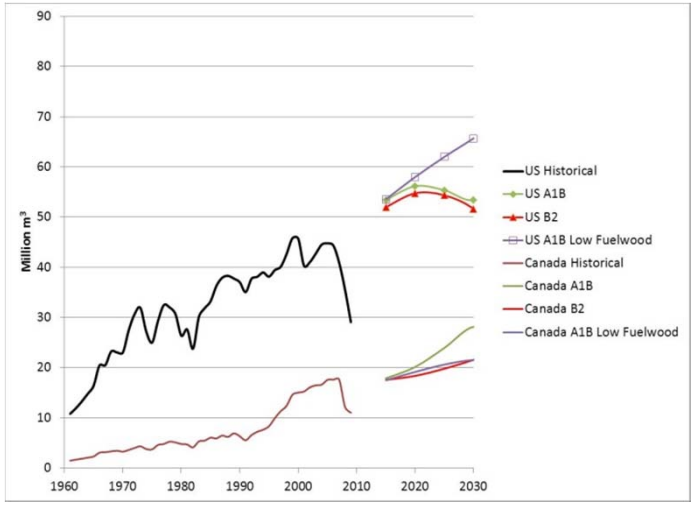


Summary Findings of NAFSOS (5)

- After housing market contraction in the U.S.…
  - Wood products market projected to recover
    - Panel market strong growth
    - Lumber market
      - Canada declines
      - U.S. grows



Lumber



Wood Panels

Summary Findings of NAFSOS (6)

- North American paper market faces challenges
  - Growth in Asian demand, but…
  - Growth in overseas capacity
  - Shrinking domestic demands for newsprint and possibly printing and writing paper
    - Leading to capacity shrinkage in these products
  - Other paper and paperboard: continued consumption growth

Summary Findings of NAFSOS (7)

- Bioenergy sector impacts roundwood prices to the detriment of traditional forest products
  - Compare A1B results with those of A1B-low fuelwood
  - Wood based bioenergy sector impacts:
    - Higher prices
    - Lower output
  - Paper sector impacts
    - Lower output
    - Higher pulp prices

Conclusions

- Some forest loss in North America
- Total inventory levels increase
- Paper sector projected to still be affected by rapid global changes
- A large wood-based energy sector would increase timber prices
  - Helping landowners
  - Harming traditional product producers

Questions?

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FOLLOWING SLIDES INFORMATIONAL ONLY

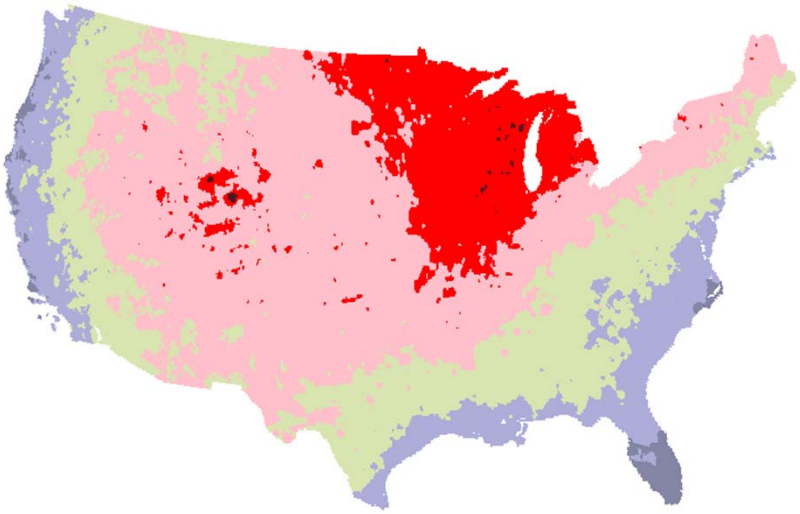
More Details Available on Global Market Projections Available from the 2010 RPA Assessment

- To be released in the coming weeks
- Contains additional results to 2060
- Contains results for another scenario (A2)

NAFSOS Climate Change Scenarios

Temperature Changes (°C), USA, 2006-2060

A1B



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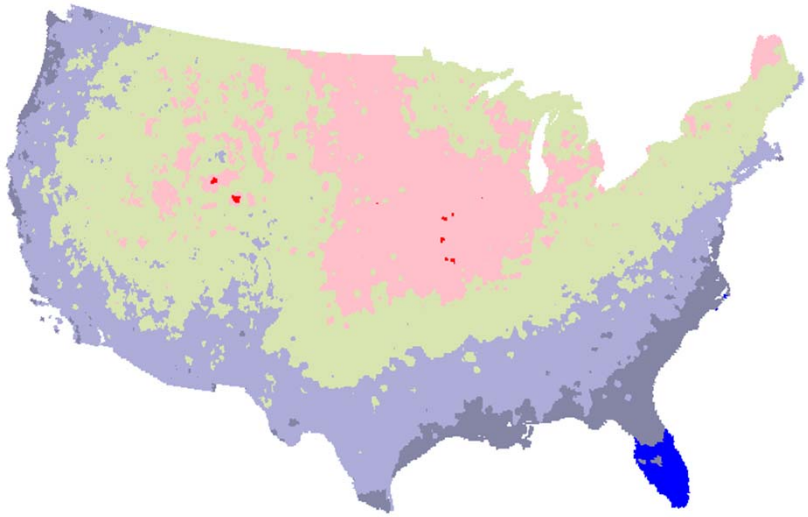


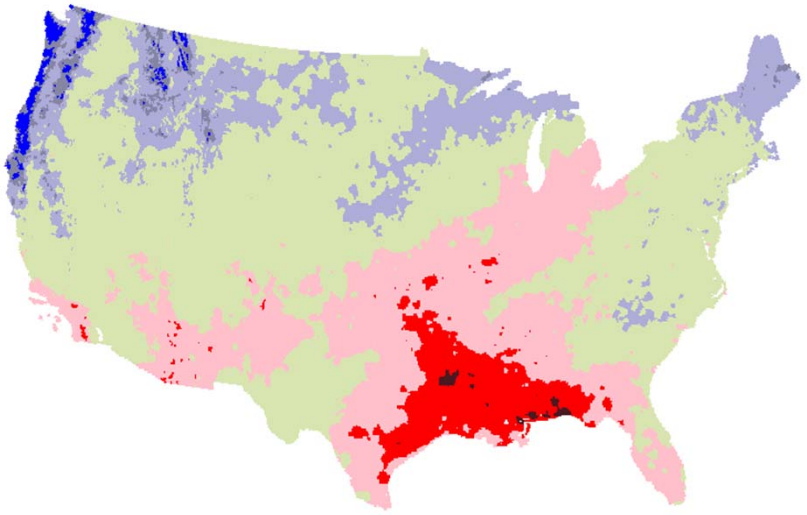
< 1.5 | 1.5 - 2 | 2 – 2.5 | 2.5 – 3 | 3 – 3.5 | 3.5 – 4.0 | > 4.0

Source: Joyce et al. (in review)

NAFSOS Climate Change Scenarios

Precipitation Changes (mm/year), USA, 2006-2060

A1B



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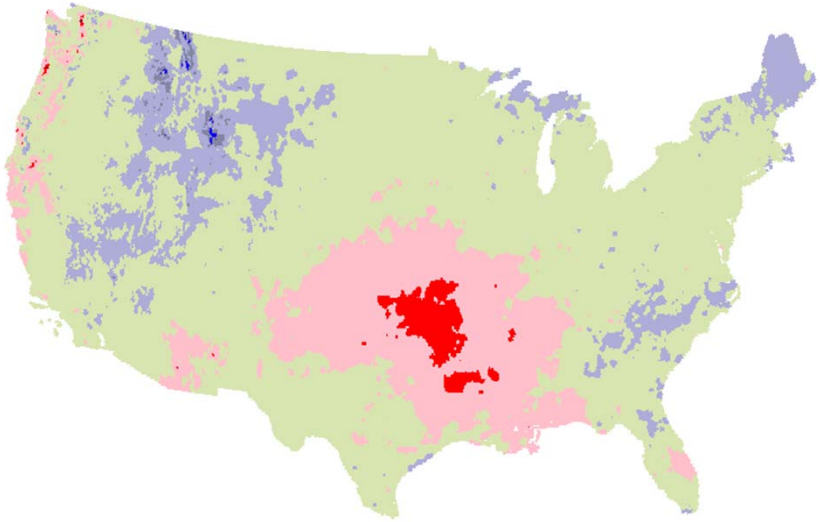
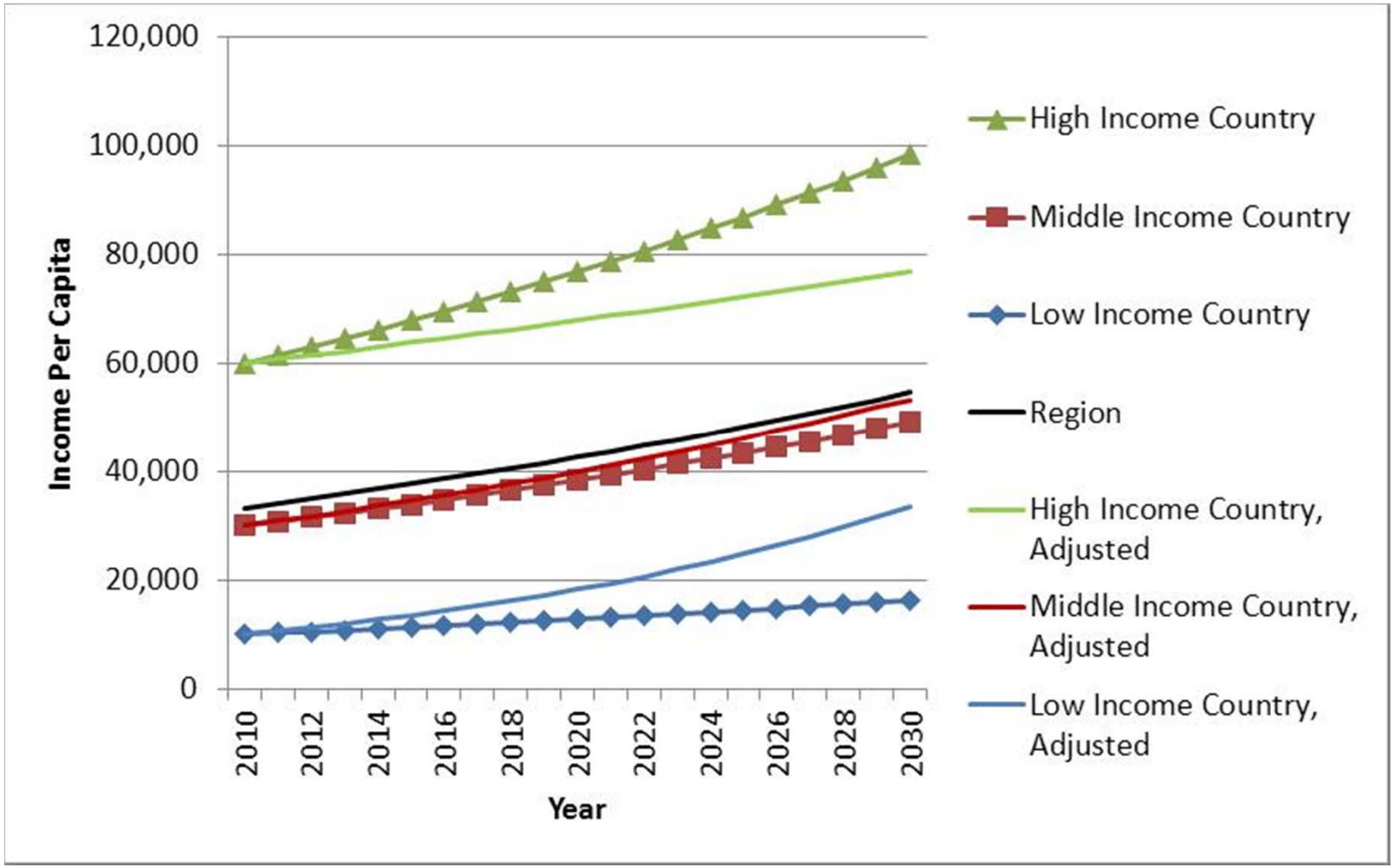


< -200 | -200 – -125 | -125 – -50 | -50 – 25 | 25 – 100 | 100 – 175 | >175

Source: Joyce et al. (in review)

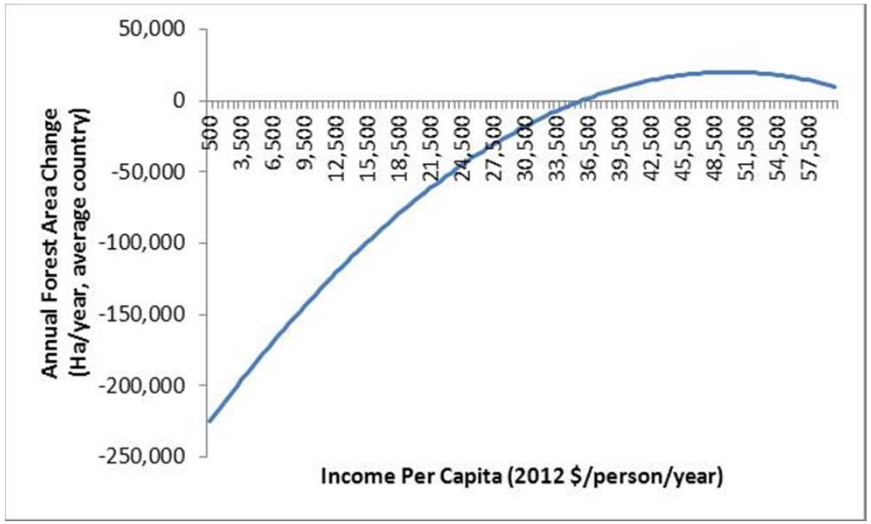
Example of Income Per Capita Convergence



All countries in a region converge to equal income per capita by 2100

NAFSOS Approach

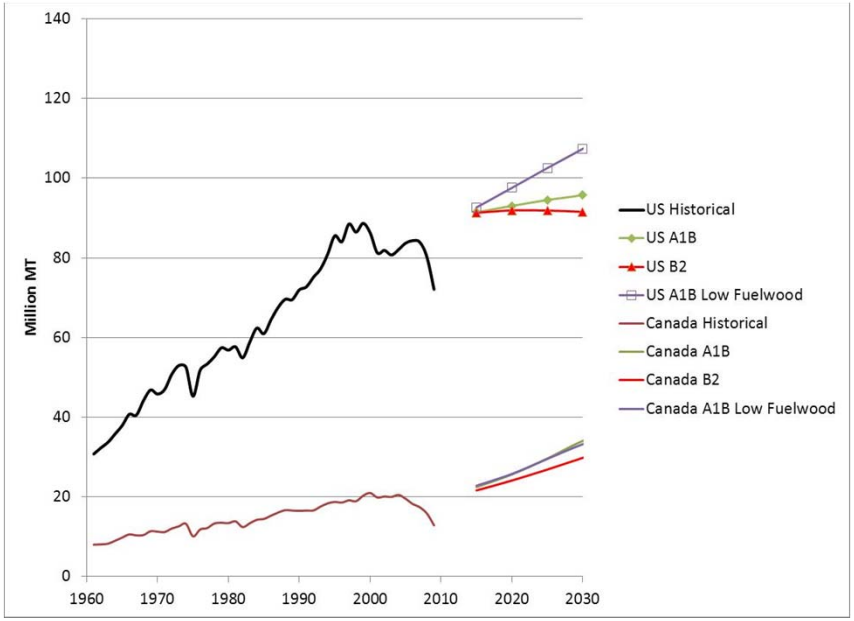
- Forest Area Changes
  - Inside the U.S.: Land Use Model
    - Responsive to timber prices, income and population growth
  - Outside the U.S. (including Canada): EKC
    - Environmental Kuznets Curve as a quadratic function of income per capita
    - Note: no significant change for Canada



Example Country

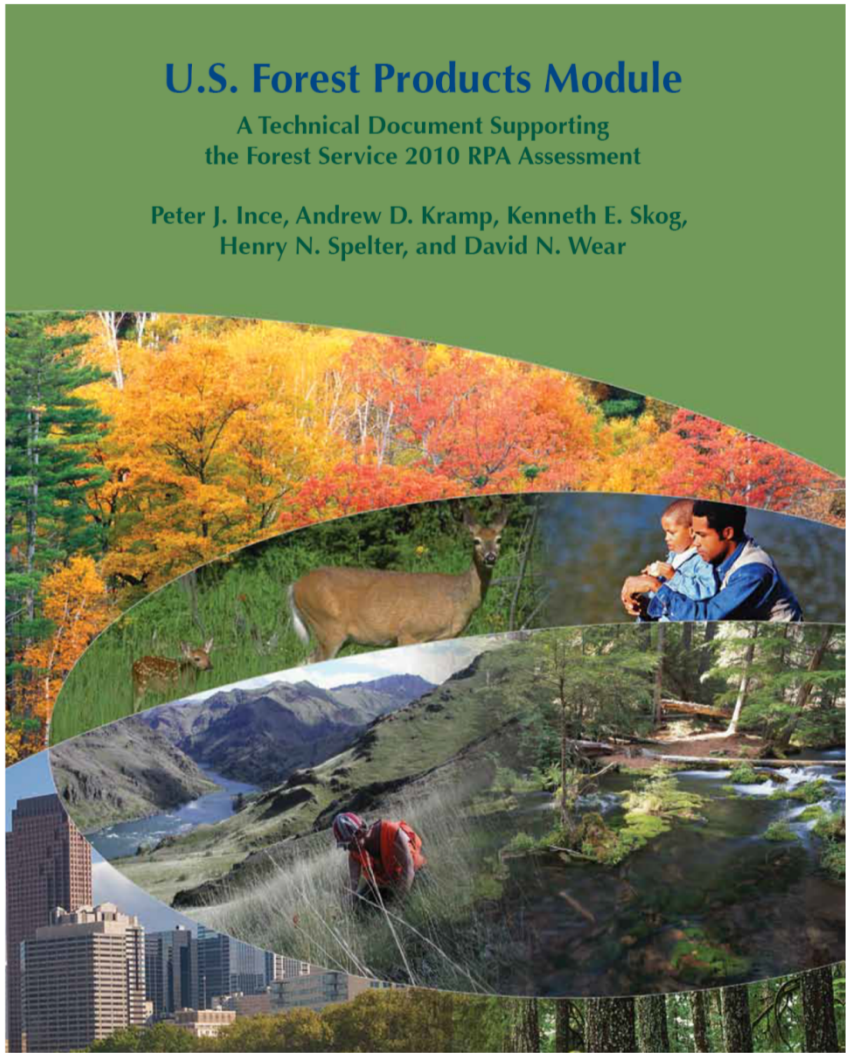
NAFSOS Projections

- Projected return to pre-recession levels
  - Newsprint suffers
  - Printing and writing paper stagnant
  - Other paper and paperboard still growing



Paper Production

USFPM Reports Details for the U.S. for the 2010 RPA



- The U.S. Forest Products Model of Ince et al. is part of the 2010 RPA Assessment
- Embeds a more detailed U.S. market into GFPM
- GFPM used in the NAFSOS has a few differences