2020 RPA Assessment: Past, present, and future of America’s forests and rangelands

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2018 FIA Users Group Meeting
The RPA Assessment:

- The Forest and Rangeland Renewable Resources Planning Act of 1974 mandates a national report (RPA Assessment) on the conditions and trends of renewable resources on all forest and rangelands every ten years.

- The RPA Assessment provides a snapshot of current U.S. forest and rangeland conditions and trends; identifies drivers of change; and projects 50 years into the future (2020-2070 for the 2020 RPA).
2020 RPA Assessment: what’s new?

- New scenarios to frame analyses
- Data updates: FIA, NLCD, NRI, etc.
- Improved and extended resource analyses
Criteria for 2020 RPA scenarios

- Link to structure of other national and international assessments.
- Address a reasonable range of plausible futures.
- Sufficient to address connections among drivers of change and natural resources.
- Consistent from a climate and socio-economic perspective.
- Anticipate challenges and support resource management and policy deliberations of interest to multiple audiences in public and private spheres.
Scenarios in the 2020 RPA

- 2010 RPA and Update
  - Linked to IPCC 4\textsuperscript{th} Assessment and associated data

- 2020 RPA
  - Climate scenarios linked to IPCC 5\textsuperscript{th} Assessment
    - Representative Concentration Pathways (RCPs) that represent a range of potential global warming
  - Socioeconomic scenarios linked to global scenarios developed in parallel effort to IPCC
    - Shared Socioeconomic Pathways (SSPs) that examine various development trajectories based on different assumptions of socioeconomic and governance trends.
Representative Concentration Pathways

Figure 7: Changes in radiative forcing relative to pre-industrial conditions. Bold coloured lines show the four RCPs; thin lines show individual scenarios from approximately 30 candidate RCP scenarios that provide information on all key factors affecting radiative forcing... (Moss et.al., 2010)
2020 RPA climate scenarios & projections

- Using RCPs 4.5 and 8.5 as the “span” of climate projections, following the framing being used for the 4th National Climate Assessment.
  - RCP 4.5: moderate emissions increase
  - RCP 8.5: large emissions increase

- Pairing 5 climate model projections with each RCP, for total of 10 core climate projections

- Climate models represent hot, warm, wet, dry, and “middle” climate outcomes for each RCP.
Shared Socioeconomic Pathways:

US and Global Comparisons
2020 RPA socioeconomic scenarios

- Unlike for climate projections, little work has addressed systematic downscaling of SSP socioeconomic projections.
- RPA analyses require defendable fine scale projections of population and income - key to land use and other resource analyses.
- Used SSP-specific country projections of population and GDP to develop county-level projections to 2070 of population and income.
- Currently have projections for all 5 SSPs, but selected a subset to be the “core” scenarios, similar to the approach for climate scenarios.
2020 RPA Scenarios: range of futures

- What are we trying to portray with the range across both climate and socioeconomic change?
  - An “even” distribution of potential future outcomes (low-medium-high scenarios)?
  - The highest risk outcomes (focus on highest change scenarios) that tend to be low probability/high impact)?
  - Historic continuity (business as usual, baseline)?
  - Balance plausible upper-bound (high impact) scenarios with historic trajectory?

- What’s most useful for decision makers?
  - Understanding potential extremes? Plan for the worst?
  - Providing the full range of possible future outcomes?

- What’s a reasonable number of scenarios?
<table>
<thead>
<tr>
<th>RCP-SSP Pairing</th>
<th>Core</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCP 4.5 x SSP1</td>
<td>Yes</td>
<td>Represents lower emission bound; socioeconomic trajectory similar to historical trend; sustainability focus</td>
</tr>
<tr>
<td>RCP 8.5 x SSP2</td>
<td>Yes</td>
<td>Higher emission bound; socioeconomic projections that are consistent with historic trajectory.</td>
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<tr>
<td>RCP 8.5 x SSP3</td>
<td>Yes</td>
<td>Higher emissions bound and low levels of economic and population growth.</td>
</tr>
<tr>
<td>RCP 8.5 x SSP5</td>
<td>Yes</td>
<td>Higher emission bound and high levels of U.S. population and economic growth.</td>
</tr>
</tbody>
</table>
What’s new for 2020 RPA?

- **Land Resources**
  - Improved land use projection model
  - Spatial realizations of land use projections
  - Projections of landscape patterns
  - Causation of fragmentation
  - Update protected area statistics

- **Drought on forests and rangelands**
What’s new for 2020 RPA? (cont’d)

- Forest Resources
  - Updated Forest Resources (FIA) publication
  - Climate change effects on shifting forest types, productivity, and land uses
  - Harvested wood products carbon models: enhancing links to products markets analysis.
  - Analysis of insect and disease trends
  - Forest ownership transitions
What’s new for 2020 RPA? (cont’d)

- Forest Products
  - New global forest products model
  - New model of housing starts
  - Consider effects of climate on global inventory growth
  - Project U.S. and global forest land, including plantations
What’s new for 2020 RPA? (cont’d)

- **Rangelands**
  - Multiple risk factors for rangelands
  - Updated livestock vulnerability analyses
  - Mitigation and adaptation options

- **Water Resources**
  - Improved water yield model (VIC) and demand model.
  - Finer spatial resolution (204 HUC-4 basins)
  - Finer temporal resolution (month)
What’s new for 2020 RPA? (cont’d)

- **Wildlife, Fish, and Biodiversity**
  - Projecting bird diversity response to climate and land use change.
  - Projections of at-risk biodiversity

- **Outdoor Recreation**
  - Last round of projections using National Survey on Recreation and Environment (NSRE)
  - Project national forest use by region and site-type
QUESTIONS?