Quarter 2 Meeting Summary
I. Purpose

On June 25-26, 2019, the Biomass Research and Development (R&D) Technical Advisory Committee ("Committee") held its second meeting of 2019. The Committee’s 2019 theme is “Year of the Tree.” This meeting focused on woody biomass issues in the Western U.S. Presentations were heard from individuals of the U.S. Forest Service, Willis Enterprises, Bitterroot Resource Conservation and Development, Governor’s Office of Montana, Kettlehouse Brewery, Wooden Haus Supply, and the Montana Forest Collaborative Network. The Committee also received and updates from the U.S. Department of Energy’s Bioenergy Technologies Office (BETO). See Appendix A for a list of Committee attendees and Appendix B for the meeting agenda. Appendix C contains a summary of findings from the Committee. Meeting presentations can be viewed on the Biomass R&D Board website.

II. Roaring Lion Fire Site

Byron Bonney, Forester, Bitterroot Resource Conservation and Development

- Presented on the effects of the 2016 Roaring Lion Fire
- Discussed efforts to mitigate risk of wildfire
- Examined differences between home sites that enacted mitigation efforts and those that did not
Private Land Fuel Treatment Effects on the 2016 Roaring Lion Fire Fire Behavior
Ravalli County—Bitterroot National Forest

Three Factors that Influence the Behavior of a Wildfire:

FUELS
WEATHER
TOPOGRAPHY

FUELS is the only factor that you have control over. Reducing the fuels on your home, in and around your home, increases the probability your home will survive a wildfire.

How Do Homes Ignite?

- Embers & Firebrands
- Radiant or Convective Heat
- Conducted or Direct Flame Propagation

The Roaring Lion Fire was a high intensity crown fire that burned through dead and living fuels down to the ground. A high intensity crown fire is a fire that burns up the tree tops and the branches. A high intensity crown fire is a fast moving, destructive fire that can jump and spirit across the landscape.

Home Ignition Zone

- Ground fuel: 0 - 15 inches
- Surface fuel: 15 - 30 inches
- Dead downed trees
- Live branches

Four types of fuels:

- Surface fuels (leaves, twigs)
- Surface fuels (ground fuels)
- Understory fuels (grass, brush)
- Overstory fuels (trees)

Fire intensity:

- Low intensity: < 2000 Btu/h
- Moderate intensity: 2000 to 4000 Btu/h
- High intensity: > 4000 Btu/h

Three types of fire behavior:

- Crown fires
- Surface fires
- Spot fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fires

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels

Fire behavior:

- Spot fires
- Crown fires
- Surface fuels
III. Marshall Woods Restoration Project (PowerPoint)

Jennifer Hensiek, Missoula District Ranger, U.S. Forest Service

- Presented on efforts to restore the Marshall Woods section of Lolo National Forest
- Project has four main goals:
  - Restore functioning ecosystems by enhancing natural ecological processes
  - Emulate fire’s natural role on the landscape through vegetative treatments including prescribed fire
  - Provide education opportunities to build support for restoration
  - Provide for diverse trail-based recreation opportunities and reduce road density
IV. Briefing on Biomass in Montana

Patrick Holmes, Natural Resources Policy Advisor to Governor Bullock

- Talked about the impacts that wildfires have had on biomass resources and the Montana economy.
- Looked at ways Montana is attempting to energy and the current limits of infrastructure.
- Discussed Governor’s Bullock’s Forests in Focus 2.0 Plan.
V. Willis Enterprises (PowerPoint)

Rich Lane, Log Buyer

- Toured chipping plant at site of former lumber mill
- Produces wood chips and bark
- Products travel roughly 150 miles by truck and 350 miles by train
VI. KettleHouse Brewery

Tim O’Leary, Founder

- Toured brewing and canning facility
- Examining logistics and economics of utilizing a biomass reactor

VII. Welcome

Doug Faulkner & Kelly Tiller, Committee Co-Chairs

- Provided an overview and background of the Committee, including its purpose, and the goal of the meeting, which was to determine the current state and scope of woody biomass in the Western U.S. to support “The Year of the Tree.”
- The Q1 Recommendations were reviewed to inform the purpose of the meeting.
- There was an update on the appointment of new members.

VIII. DOE Updates and Biomass R&D Activities (PowerPoint)

Ian Rowe, Technology Manger, Bioenergy Technologies Office, DOE

- Dr. Rowe provided updates on behalf of DOE’s Bioenergy Technologies Office (BETO).
- Notified the Committee of the next Biomass R&D Board Meeting, scheduled for August 15th at DOE Headquarters in Washington, DC.
- The Bioeconomy Initiative Implementation Framework was launched in March 2018.
- Solicitation for new members to the TAC were accepted until June 30, 2019.

IX. Forest Collaboratives in Montana

Tim Love, Executive Director, Montana Forest Collaboration Network
• Organization focused on central and western Montana that assists with collaboration in forest and grassland restoration, conservation, and resource utilization.
• Strong focus on environmental analysis and collaborative agreements.
• Good Neighbor Authority allows the USDA Forest Service to enter into agreements with state forestry agencies to do the critical management work to keep forests healthy and productive.

X. Engineered Building Products from Small-Diameter Wood (PowerPoint)

Patrick Clark, Owner, Wooden Haus Supply, Inc.

• Supplier of Cross Laminated Timber Building System components.
• Used to produce pre-made buildings and structures.
• Currently more prevalent in European markets.

XI. Public Comment

• There were no public comments.

XII. USDA Forest Service Wood Innovations Program (PowerPoint)

Julie Kies, Wood Innovations Coordinator, Northern and Intermountain Regions, U.S. Forest Service

• Program focuses on developing and expanding the use and manufacturing of wood and biomass products to support forest management, economic development, and wise resource use.
• Reduces risk of wildfires while providing source for green building, renewable wood energy, and other value-added products.

XIII. Subcommittee Breakouts

• There are three standing subcommittees: Conversion, Sustainable Feedstocks Production and Logistics, Products, Markets, and Systems Group
• For this meeting the members were split into 2 subcommittee groups to summarize the findings of the site visit and examine what additional information would be useful to formulate recommendations.

XIV. Closing comments

• Specific recommendations will be made during the Q4 meeting.
• The Co-Chairs wrote a summary of the events and findings from the Q3 meeting (Appendix C)
• Plans for the Q3 Meetings were discussed, specifically around a possible site visit to North Carolina to examine woody biomass of the Southeastern U.S.
# Appendix A: Committee Member Attendance—June 25-26, 2019

<table>
<thead>
<tr>
<th>Co-Chairs</th>
<th>Affiliation</th>
<th>Attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly Tiller</td>
<td>Genera Energy Inc.</td>
<td>Yes</td>
</tr>
<tr>
<td>Doug Faulkner</td>
<td>Leatherstocking, LLC</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Members</th>
<th>Affiliation</th>
<th>Attended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles Abbas</td>
<td>IBiocat</td>
<td>Yes</td>
</tr>
<tr>
<td>Rob Anex</td>
<td>University of Wisconsin, Madison</td>
<td>No</td>
</tr>
<tr>
<td>Brent Bean</td>
<td>United Sorghum Checkoff Program</td>
<td>No</td>
</tr>
<tr>
<td>Jacques Beaudry-Losique</td>
<td>Algenol Biotech LLC</td>
<td>No</td>
</tr>
<tr>
<td>Esteban Chornet</td>
<td>Enerkem</td>
<td>No</td>
</tr>
<tr>
<td>Katrina Cornish</td>
<td>Ohio State University</td>
<td>No</td>
</tr>
<tr>
<td>William Frey</td>
<td>Georgia-Pacific</td>
<td>Yes</td>
</tr>
<tr>
<td>Jerry Gargulak</td>
<td>Borregaard-Lingotech</td>
<td>No</td>
</tr>
<tr>
<td>Aviva Glaser</td>
<td>National Wildlife Federation</td>
<td>Yes</td>
</tr>
<tr>
<td>Beth Hood</td>
<td>Arkansas State University</td>
<td>Yes</td>
</tr>
<tr>
<td>Raymond Huhnke</td>
<td>Oklahoma State University</td>
<td>No</td>
</tr>
<tr>
<td>Randy Jennings</td>
<td>Tennessee Department of Agriculture</td>
<td>No</td>
</tr>
<tr>
<td>Madhu Kanna</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>No</td>
</tr>
<tr>
<td>Alan Keller</td>
<td>POET</td>
<td>Yes</td>
</tr>
<tr>
<td>Michael Lidisch</td>
<td>Purdue University</td>
<td>No</td>
</tr>
<tr>
<td>Pete Madden</td>
<td>Drax Biomass</td>
<td>Yes</td>
</tr>
<tr>
<td>Michael McAdams</td>
<td>Advanced Biofuels Association</td>
<td>Yes</td>
</tr>
<tr>
<td>Shelite Miller</td>
<td>University of Michigan</td>
<td>No</td>
</tr>
<tr>
<td>Manuel García Pérez</td>
<td>Washington State University</td>
<td>Yes</td>
</tr>
<tr>
<td>Tim Rials</td>
<td>University of Tennessee-Knoxville</td>
<td>Yes</td>
</tr>
<tr>
<td>Matthew Rudolf</td>
<td>SCS Global Services</td>
<td>No</td>
</tr>
<tr>
<td>Susan Rupp</td>
<td>Envirosceptes Ecological Consulting, LLC</td>
<td>No</td>
</tr>
<tr>
<td>Basudeb Saha</td>
<td>University of Delaware</td>
<td>No</td>
</tr>
<tr>
<td>Patricia Scanlan</td>
<td>Scanlan Environmental LLC</td>
<td>No</td>
</tr>
<tr>
<td>Steve Sarcy</td>
<td>Texas A&amp;M University</td>
<td>No</td>
</tr>
<tr>
<td>David Shonnard</td>
<td>Michigan Technical University</td>
<td>Yes</td>
</tr>
<tr>
<td>Larry Sullivan</td>
<td>The Citadel</td>
<td>Yes</td>
</tr>
<tr>
<td>Valerie Thomas</td>
<td>Georgia Tech</td>
<td>Yes</td>
</tr>
<tr>
<td>Michael Wolcott</td>
<td>Washington State University</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Total – 15 of 31 Members present
Appendix B: Agenda—June 25-26, 2019

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Technical Advisory Committee Meeting</th>
<th>June 25, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30- 8:30 am</td>
<td>Purchase Breakfast</td>
<td></td>
</tr>
<tr>
<td>8:30</td>
<td>Depart Missoula by Motorcoach</td>
<td></td>
</tr>
<tr>
<td>8:30 – 10:00</td>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>10:00 – 11:00</td>
<td>Roaring Lion Fire Site</td>
<td>Byron Bonney, Forester, Bitterroot Resource Conservation and Development</td>
</tr>
<tr>
<td></td>
<td>439 Roaring Lion Road</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hamilton, MT</td>
<td></td>
</tr>
<tr>
<td>11:00 – 12:00pm</td>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>12:00 – 1:00</td>
<td>Marshall Woods Project/Wildfire Adapted Missoula</td>
<td>Jennifer Hensiek, Missoula District Ranger</td>
</tr>
<tr>
<td>1:00 – 1:30</td>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>1:30 – 2:30</td>
<td>Lunch</td>
<td>Patrick Holmes, Natural Resources Policy Advisor to Governor Bullock</td>
</tr>
<tr>
<td></td>
<td>Holiday Inn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200 South Pattee, Missoula, MT</td>
<td></td>
</tr>
<tr>
<td>2:30 – 3:00</td>
<td>Transit</td>
<td></td>
</tr>
<tr>
<td>3:00 – 4:00</td>
<td>Willis Enterprises</td>
<td>Rich Lane, Log Buyer</td>
</tr>
<tr>
<td></td>
<td>8651 Bonner Mill Road, Bonner MT</td>
<td></td>
</tr>
<tr>
<td>4:00 – 5:00</td>
<td>Kettlehouse Brewery: Wood Biomass Energy Vision, Resource, and Community</td>
<td>Tim O’Leary, Founder</td>
</tr>
<tr>
<td></td>
<td>605 Cold Smoke Lane, Bonner, MT</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td>Presenter</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>8:00 – 8:30 am</td>
<td>Welcome and Continental Breakfast</td>
<td></td>
</tr>
<tr>
<td>8:30 – 8:45</td>
<td>Update on DOE Activities</td>
<td>Ian Rowe, DOE, BETO</td>
</tr>
<tr>
<td>8:45 – 9:45</td>
<td>Forest Collaboratives in Montana</td>
<td>Tim Love, Executive Director, Montana Forest Collaborative Network</td>
</tr>
<tr>
<td>9:45 – 10:15</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>11:15 – 11:45</td>
<td>Discussion</td>
<td>Full Committee</td>
</tr>
<tr>
<td>11:45 – 12:00 pm</td>
<td>Public Comment</td>
<td></td>
</tr>
<tr>
<td>12:00 – 1:00</td>
<td>Lunch</td>
<td>Julie Kies, US Forest Service</td>
</tr>
<tr>
<td></td>
<td>USDA Forest Service Wood Innovations Program</td>
<td></td>
</tr>
<tr>
<td>1:00 – 2:30</td>
<td>TAC Subcommittees</td>
<td>Subcommittees</td>
</tr>
<tr>
<td>2:30 – 3:30</td>
<td>Full Committee Discussion</td>
<td>Full Committee</td>
</tr>
<tr>
<td>3:30- 4:00</td>
<td>Summary and Adjournment</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

1. Full Committee Meetings, Presentations, and Public Comment Hearings are open to the public.
2. Subcommittee Meetings are closed to the public.
3. Meals and Break Service are closed to the public and provided for Committee Members only.
Appendix C: Q2 Committee Summary

Source: Biomass R&D Technical Advisory Committee
Advisory To: Biomass R&D Board
Report Date: 6/26/2019 (Q2 2019)
Issue: Findings of the Committee on Opportunities for Woody Bioenergy in the Rocky Mountain/Pacific Northwest Region

The Committee declared 2019 its Year of the Tree, intending to focus on new and emerging opportunities for using forests to support bioenergy and bioproducts industries while promoting healthier and safer forest management. We effectively launched this effort in our fourth quarterly meeting of 2018 when we identified regulatory barriers to advanced biofuels and made specific recommendations for breaking down those barriers, with a special focus on the fledgling domestic woody bioenergy sector. Our first quarterly meeting of 2019 explored the intersections between woody biomass utilization for bioenergy and healthier forests, summarizing our findings and laying out the Committee’s path forward for the rest of the year. We understood the importance of gaining first-hand knowledge of forest ecosystems and cultures in at least two distinct regions of the country. We wanted to hear from a wide range of local experts about new approaches to old problems—like preventing or diminishing forest fire damage—and about the prospects for using forest materials sustainably for biofuels and bio-based products.

In June 2019 the Committee visited Missoula, Montana, to learn about the mix of experiences and challenges specific to the northwestern U.S., especially with regard to managing public forest lands. The Committee is now also planning a similar site visit for the third quarter to learn firsthand about forest management and opportunities in the southeastern U.S., with a focus on privately owned and managed forest lands. The lessons drawn from these two trips will give the Committee a broad national perspective for our fourth quarterly meeting of 2019 when we will develop our final recommendations to the federal government for improving research, policies and regulations for growing woody bioenergy while also improving forest health.

The visit raised numerous questions for Committee members worthy of future consideration, from possible new roles for private insurance companies to drivers for needed innovation in policies, practices and technologies, to impacts on greenhouse gas displacement. The following set of conclusions synthesizes the general findings of the Committee resulting from the immersive exploration of forest biomass issues and opportunities on public lands in the northwestern U.S., setting the stage for further examination.
• The sheer volume of available forest resources in the northwestern U.S. is huge. But the region faces daunting obstacles to greater bioenergy and other commercial uses when the material supply would depend on flows from federal lands.

• Wildfires present a tremendous hazard in general and managing this threat in public forests is particularly challenging. The fires are growing more hazardous to humans, animals, and property, while creating broader health hazards from air and water pollution.

• Current practices for economically harvesting woody materials are not sufficient for large-scale treatment of lands with material unsuitable for markets other than biomass. There seems to be little new innovation at sufficient scale, constrained by limited availability of federal and other funds.

• There are no large-scale solutions—no “home runs” in sight—for increased utilization of trees for biofuels and bioproducts. We believe forward progress in the region will be in the form of small steps.

- No One-Size-Fits-All Solution

• The complex patchwork of land ownership in the northwest between the private sector, various government levels, and tribal entities creates issues of access and use, and requires resolution through legislation, regulation, and societal acceptance.

• Removal of forest material from public lands to reduce wildfire risks may have potential to supply substantial amounts of biomass for energy and other applications but also faces significant headwinds. For example, a sufficiently sized commercial/industrial market does not exist today to support forest thinning at a meaningful scale, in part because of declining historical markets like the paper industry due to mill closures, but also because social license from the public for doing so is uncertain at best. Public acceptance of such practices might rise from seeing the benefits of sustainable new economic activity in the forests.

- Multiple Stakeholders Multiplies Complexity

• The multiplicity of uses for forests—including recreation, biodiversity, natural beauty, clean water, and lower carbon emissions—presents great value to the use of federal lands, yet also presents the challenge of balancing multiple interests.

• The easiest forest biomass to access and move also brings the greatest potential objections from the public based on proximity to communities and perceived disruptions to aesthetics and recreation, which has led in some cases to legal challenges to plans developed by the U.S. Forest Service.

• Public involvement and support for new forest management practices are critical for success. Collaborative networks and public-private partnerships have shown great value but are still in the early stages of articulating problems and solutions. There is a big disconnect between economic and environmental opportunities and widespread acceptance of new approaches. Constant and clear
articulation of benefits from forest management and bioenergy growth are the foundation for shifts in public opinion and resultant political actions.

**Resources are Constrained**

- The U.S. Forest Service wrestles with enormous demands for its many needed services, with tight resources and ever-increasing fiscal demands from fighting forest fires.
- There seems to be little new innovation at sufficient scale in use of very limited federal funds.
- State governments can play important roles in shifting public opinion and improving the business climate, both so necessary for growth in woody bioenergy and forest fire prevention.
- There are exciting new possibilities for the use of wood in the construction industry to save energy, cut building costs and improve indoor air quality. Europe is way ahead in this sector; the U.S. is starting to wake up to rising consumer interest.