



Matt Arno, Blackfoot Challenge Forestry Coordinator, describes forest management operations to the NARA team.

Western Montana Corridor: Putting the Pieces Together

NARA placed a spotlight on the western Montana Corridor. On June 13, 2012, NARA outreach, education and systems metrics team arrived in Missoula for a two-day event to meet with regional stakeholders and instigate a partnership focused on creating a supply chain in the western Montana Corridor that supports a Pacific Northwest residual woody biomass to biojet fuel industry. NARA's work in this region will soon extend to northern Idaho and eastern Washington. In subsequent years, NARA will work with similar community corridors in Idaho, Oregon, and Washington through community leaders and coalitions. Supply chain considerations include woody residual biomass availability, storage, processing facilities, transportation, consumers and community acceptance. This was the second time NARA members met with stakeholders in this region. The first was in late March, prompting a [guest opinion article](#) from Jean Curtiss, president of the BitterRoot Economic Development District and Missoula County commissioner.

Day one began with presentations provided to over 30 community stakeholders representing local businesses, govern-

ment agencies, and legislative offices. A special thanks is given to Craig Rawlings of [Forest Business Network](#) for identifying and inviting the guests. [Mike Wolcott](#), NARA Co-Project Director, opened the meeting with a NARA [overview](#) followed by presentations given by [Peter Kolb](#), Montana State University, and [Todd Morgan](#), University of Montana.

Peter provided an [overview](#) of the residual biomass inventory on managed lands in western Montana. He pointed out that millions of federal and state cost-share dollars are spent to support restoration treatments targeted to improve forest health and reduce fire risk. By state law, the biomass generated by these operations is either burned or hauled away. This resource is currently an expense of about two to three thousands dollars an acre. Creating a market for this resource would provide a win-win to conservation efforts.

Todd [reviewed](#) his [team's](#) efforts to 1) accurately quantify the inventory of sustainable wood biomass in the NARA region and 2) map the distribution and use of wood generated from timber harvest. The

end result will be a comprehensive feasibility analysis for residual harvesting.

The community stakeholders had many comments and questions focused mainly on understanding NARA's role. Staff reporter Rob Chaney, from the Missoulian, wrote an [article](#) about the meeting.

That afternoon, NARA members outlined their efforts to generate the infrastructure, resource, economic and social data necessary for regional stakeholders and investors to create a regional biofuels industry. Graduate students in the [Bio-IDeX](#) course will collect much of the data with input from local stakeholders.

Day two involved touring the forest resources and business infrastructure. The NARA group began at the old Bonner Mill site, the oldest sawmill site in Montana. [Western Montana Development](#) now owns the site. Michael Boehme met us there and described the site's potential as a chipping facility. The site is large and could accommodate a substantial volume of wood biomass and house treatment facilities.

The next stop came to timberlands managed by the [Blackfoot Challenge](#): a non-profit organization comprised of members invested in the Blackfoot River watershed and committed to protecting the natural resources and rural way of life. Blackfoot Challenge staff members Brad Weltzien and Matt Arno plus Gordy Sanders, Pyramid Mtn. Lumber, described the challenge of maintaining the forest in a healthy and sustainable state. A big

hurdle is the cost to provide forest treatments. A market for the wood residuals would greatly increase their ability to improve the forest health.

The NARA group met with local businesses [Rivertop Renewables](#) and [Blue Marble Biomaterials](#) — both businesses are dedicated to produce valuable products from residual wood biomass. A final stop was made at the closed Smurfit-Stone paper

mill now owned by [M2 Green Redevelopment, LLC](#). As with the Bonner Mill site, this site holds great potential as a wood biomass treatment site.

A follow-up visit will occur in September 13-14, 2012 when NARA hosts its first annual meeting in Missoula, MT.



K-12 instructors determine outputs (jet fuel) verses inputs (carbon dioxide) for a single tree

K-12 Teachers Take On Biofuels Literacy

Thirty-four teachers, responsible for instructing a combined total of 3471 K-12 students, took part in teacher workshops (co-sponsored by NARA) this summer to explore concepts and curriculum related to biofuels. In addition, 84 teachers followed the course through the website [blog](#). [Karla Eitel](#) worked with a team of 6 teachers to plan and deliver the two workshops. The first was delivered at [MOSS](#) (McCall Outdoor Science School) in McCall. The second was delivered at the Idaho STEM Institute in Twin Falls, held on the [College of Southern Idaho](#) campus, and was coordinated by Karla Eitel and [Justin Hougham](#).

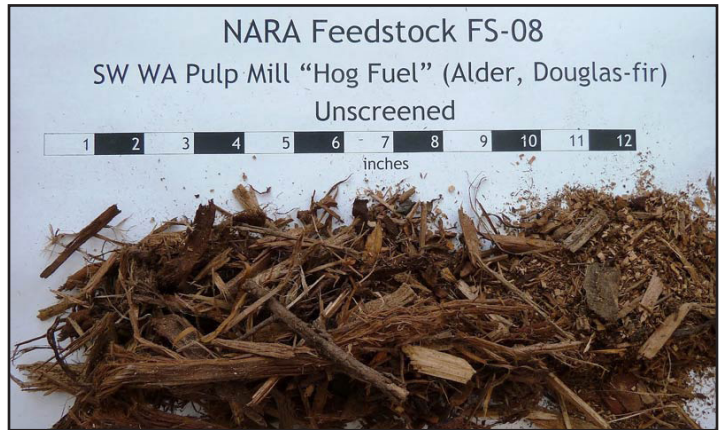
Classroom instruction included meet-

ing with NARA Co-Project Director [Mike Wolcott](#) and NARA education team leader [Steve Hollenhorst](#), hands-on laboratory work and site visits. Teachers were very engaged in the learning process and eager to take their learning back to their students. The website recorded 5300 visits, 75 posts from teachers and staff and 480 submitted comments. Participating teachers received a follow-up survey to assess the course strength and effectiveness.

In addition to providing biofuels literacy to teachers, the course also provided water resources and climate change instruction and served as a test site for biofuels curriculum generated by the

NARA educational team. This effort builds a strong foundation to encourage biofuels literacy in K-12 schools.

[Teaching Adventure Learning At MOSS](#)



Woody Biomass: It's A Mixed Lot

NARA chemists and engineers are tasked with converting residual wood to aviation fuel and valuable lignin co-products. This effort is challenging enough; however, an added level of complexity is that wood biomass from one region, season or harvesting technique is chemically different from another. That means that downstream chemical treatments — like pretreatment and lignin processing — need to accommodate a broad range of feedstock characteristics.

In order to test and adapt chemical processes to the varied feedstock, woody biomass reference samples from throughout the Pacific Northwest are being collected, characterized and distributed to the NARA conversion teams. To date, eight harvested forest residual samples,

weighing up to 500 oven-dried pounds, have been collected from various Pacific Northwest sites. The samples are QR coded for identification, characterized for polysaccharide, lignin, and ash content and will be processed to produce biojet fuel and lignin co-products.

Some samples collected to date include:

- Clean sawmill residual Douglas-fir wood chips: This sample is from SW Washington and is as clean and consistent as they come. It is anticipated that processing results from this feedstock will represent the best possible outcome.
- Douglas-fir forest residuals: This sample is from NW Oregon.
- Coastal spruce/hemlock/red cedar

- forest residuals: This sample is from the Northern Oregon coast.
- Ponderosa pine thinning residuals: This sample was collected east of the Cascade Mountains in Oregon. (no photo available)
- Pulp Mill Hog Fuel: This sample represents perhaps the lowest quality feedstock available.

Once these, and the additional samples, are processed, the NARA team will better understand the chemical variations and can evaluate and adapt the downstream processes accordingly. A special thanks goes to NARA researchers Gevan Marrs and John Sessions for coordinating the sample collecting and processing.

NARA is led by Washington State University and supported by the Agriculture and Food Research Initiative Competitive Grant no. 2011-68005-30416 from the USDA National Institute of Food and Agriculture.

