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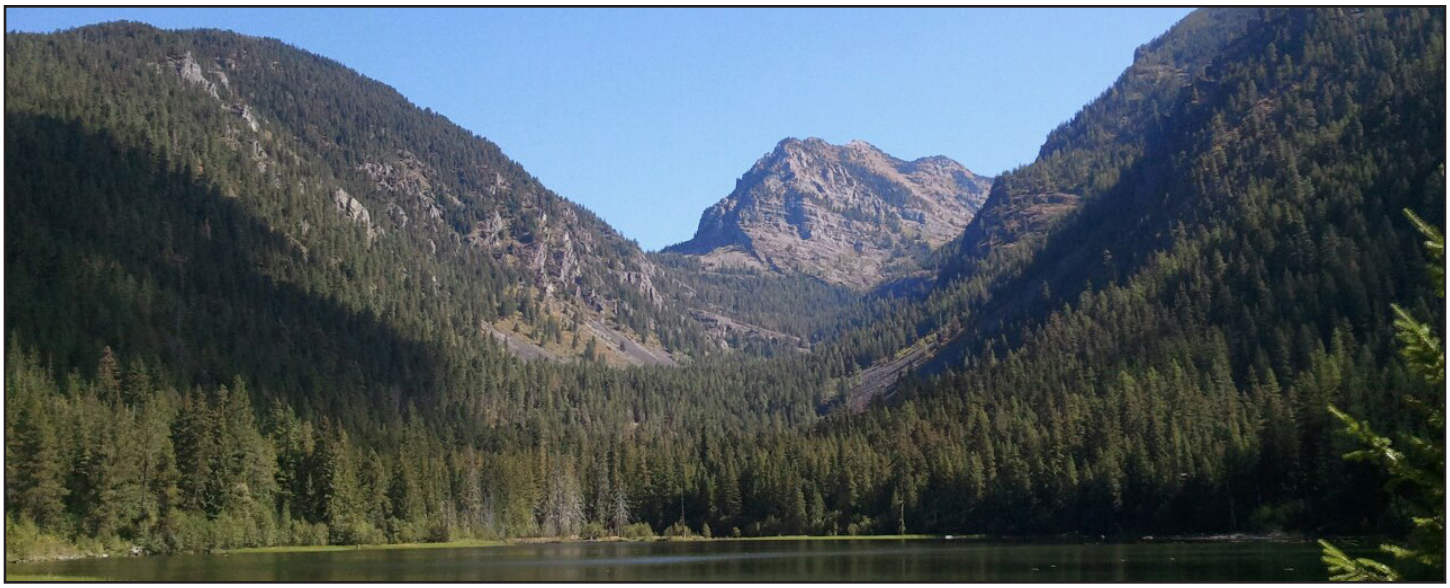


Swartz Lake, looking east to the Mission Mountain Wildlerness area, located on CSKT land. Photo by Laurel James

Landscape planning on a large scale: Confederated Salish and Kootenai Tribes partner with NARA

Beginning 2013, the Tribal Forestry Department of the Confederated Salish and Kootenai Tribes (CSKT) will partner with the NARA tribal projects team to develop a strategy that makes use of woody biomass residues generated from CSKT forest lands.

The CSKT actively manages approximately 257,000 of the 459,000 acres of forestland within the CSKT reservation in western Montana, plus they maintain a 1000-acre stewardship contract for fuels reduction, small sawlog removal and road construction, maintenance, and removal in the adjoining Lolo National Forest. With recent mill closures in western Montana, the CSKT reservation is interested in developing new markets for biomass residues while supporting their broad forest management goals.

"The Confederated Salish and Kootenai Tribes have maintained an active approach to land stewardship. Our forest plan recognizes that fire has been the primary disturbance factor in the Northern Rockies and directs our efforts in a modified restoration approach to mimic historic forest structure and function across landscapes," says Jim Durglo, CSKT Forestry Department Head. "We have a harvest goal of approximately 18 million board feet of timber products per year, in addition to an aggressive forest thinning, fuels reduction, and prescribed fire program."

The NARA tribal projects team will generate a report that estimates biomass availability and transport costs from harvest sites to Pablo, Montana based on multiple harvest and thinning scenarios. Stand table information, updated harvest schedules, an economic/feasibility analysis and estimates on commercial feedstock volumes will also be included in the report.

This collaboration integrates well with the ongoing efforts by the NARA IDX student team supplying planning tools and data used to develop an effective supply chain coalition in the western Montana corridor.

Graduate students from affiliated NARA universities have been selected to work with the NARA tribal projects team and generate the report, which will be completed by late summer 2013. NARA members Daniel Schwartz and Laurel James will coordinate and mentor the team of students. Depending on the students' expertise and interests, additional outcomes could include:

- Projections of how climate change could affect the forest and biomass availability.
- Forecasting how emerging NARA technologies can have economic, ecologic, and social impacts for the tribe.
- Projections of the impact of carbon pricing on the scale of biomass supply and extent of economic forest restoration.
- Projections for the impact of tribal access to federal lands based on the regional capacity to produce biofuels and bio-products.

"We understand that it will require a large landscape approach to make a bioconversion system economically viable, and we want to be a part of that solution", says Jim Durglo. "A viable market for products from forest residues is important because it also meets CSKT goals for income, employment, and air quality."

Helping the CSKT determine sustainable forest residue biomass output and transport costs fits well with NARA goals of creating a sustainable wood residue to biojet industry in the Pacific Northwest; strengthening the supply chain coalition established in the western Montana corridor; and providing training to an emerging bioenergy workforce.

Garbage in — Fuel out

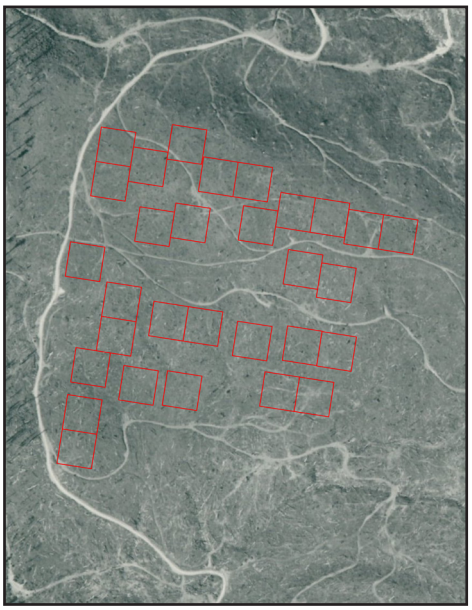
Over 2.5 million tons of construction and demolition wood waste are generated each year in the NARA region (ID, MT, OR, WA). Much of this wood is deposited into municipal solid waste sites (MSW) and municipal recycling facilities (MRF). While some of this wood is recycled as lumber, or used as compost, pulp, or burned for energy, much of this resource goes unused. The unused wood could be available as a feedstock for conversion to biojet and lignin based bio-products while reducing landfill use.

NARA researchers Karl Englund and Gerald Schneider have the daunting task to assess this feedstock potential. Their initial focus is to identify the MSW and MRF sites in the NARA region. While no comprehensive lists exist for the entire region, information covering MSW landfills and MRFs is being obtained from numerous state and federal agency reports and community assessments. Categorizing the MSW and MRFs is one of the first tasks to undertake to understand the logistics of waste management within the region. To date, a list of all MSF and MRF sites in Montana has been completed with site information for Oregon, Washington and Idaho soon to follow.

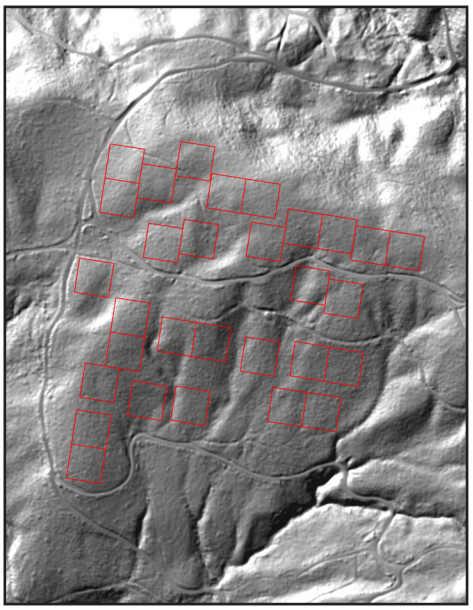
Identifying regional MSWs and MRFs is just the first step. Next, this team will quantify the availability and quality of the wood waste in the sites. Questionnaires, phone conversations and emails sent to MRFs are providing data regarding wood quantities, storage capacity, supplier/distribution reach, cost/tipping fees and waste. These efforts are the beginning phase for gathering specific site information and establish a working partnership between NARA and the various wood waste recyclers in the NARA region.

The inventory list and site characterization data are put into a NARA GIS database which will then be used to map physical and social assets within each of the four Pacific Northwest states. As data is obtained, it is shared with NARA members and stakeholders and used to enhance NARA outputs. For instance, knowing the amount of wood waste available in MRF and MSW facilities will assist the feedstock team to develop models that determine overall feedstock availability and sustainability within the NARA region. Knowing facility placement and potential wood waste output will help the sustainability measurement team establish supply chain coalitions incorporating these sites. Life cycle analysis (LCA) models will incorporate the economic data associated with the MRF and MSW business model. NARA chemists will chemically evaluate the wood waste samples from these sites and modify conversion technologies to incorporate this alternative feedstock stream.

Converting waste products from landfills into biojet and valuable co-products may provide environmental and economic benefits in the Pacific Northwest. NARA plans to provide these benefits soon within the scope of this work.


Historical photo (1955)


Aerial photo (2010)


LiDAR hill shade (2011)

NARA's Long Term Sustainability Research

How does forest residue removal affect forest productivity and ecological sustainability?

This is a question that NARA members and many others ask; it reflects a growing demand for sustainable energy with minimal environmental harm. In 1989, a partnership of numerous organizations established the North American Long Term Soil Productivity Project (LTSP). Its goal is to help answer this question by establishing multiple sites throughout North America where researchers conduct multi-year experiments to determine how biomass removal and soil compaction affect tree growth.

A new NARA LTSP

Today, more than 100 LTSP and affiliated sites are throughout North America. Over the last 13 years, three LTSP sites have been established spanning Oregon and Washington. Weyerhaeuser researchers Greg Johnson, and Scott Holub lead a team that established a fourth site to expand the existing regional studies and allow for NARA specific research. The new site is located in Oregon's southern Willamette Valley and is under Weyerhaeuser ownership.

The site is segmented into 30 one-acre plots. The plots are optimally selected using aerial photos, a LiDAR-based DEM (digital elevation model), and canopy height models, and are laid out in a way that minimizes their variability so that treatments can be applied to randomly selected plots.

Time for experiments

This site is in a pre-harvest condition, and the one-acre plots are being assessed to establish baseline conditions for the soil characteristics, vegetation, and amount of dead organic matter. The baseline information will be used to create a carbon/biomass budget for each plot. In spring (2013), biomass removal and soil compaction treatments will be implemented. Seedlings planted in the following spring will be measured for growth and development over subsequent years.

In addition to monitoring tree growth under these different experimental treatments, other response variables such as the change in soil carbon will be monitored. Rob Harrison will monitor nutrient losses through soil leaching; Michael Barber will monitor soil moisture and the change in soil bacteria and fungi populations; and Matthew Betts will evaluate how biofuel harvest affect terrestrial salamanders and soil food webs.

Collectively these efforts will help guide forest residue harvesting methods so that NARA's goal of a sustainable industry that includes forest ecosystem diversity, water quality and tree productivity is maintained.

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