



Director's Message

John Calhoun, *Director*



UW ONRC was created to foster and support the research and education necessary to provide sound scientific information on which to base sustainable forest and marine industries. One of the mechanisms we use to carry out this mission is to organize forums where information can be shared and diverse interests can be addressed.

On April 4, 2006, UW ONRC hosted the Coastal Bio-energy Forum, bringing together those with a keen interest in the subject to explore opportunities for sustainable development of bio-energy in the coastal region of Washington State. Converting woody bio-mass to energy is being considered with a growing sense of urgency with concerns of global climate

change, forest health, and economic sustainability of forest resource dependent communities. Regional leaders discussed current efforts to test the feasibility of wood fired heat and power generation in Forks and evaluate the opportunity for additional projects.

UW ONRC can make a noticeable contribution to the regional effort to develop green energy solutions for our forests and rural communities.

About 75 very motivated people participated in the Forum, including elected officials, economic development professionals, engineers, local utility providers, research scientists as well as industrial users of bio-mass produced heat and energy. A "real world" set of pres-

entations and discussions resulted in advancing our collective understanding of the opportunities and the challenges associated with development of wood fired bio-energy initiatives in our region.

UW ONRC can make a noticeable contribution to the regional effort to develop green energy solutions for our forests and rural communities. We are well equipped to bring the resources of the University of Washington to this effort. Recognizing and exploiting the natural advantages held by communities situated within forested landscapes can help sustain both our forests and our communities.

ONRC UPDATE is published bimonthly by the

University of Washington Olympic Natural Resources Center, PO Box 1628, Forks WA 98331
(360) 374-3220 or from Seattle (206) 685-9477 Website: www.onrc.washington.edu
Newsletter Editor: Ellen Matheny – ematheny@u.washington.edu (360) 374-4556

Bio-energy and UW ONRC Research Priorities

John Calhoun
Center Director

UW ONRC's Strategic Plan identifies research priorities in the forest and marine programs. Readers of *ONRC Update* will know that we are undertaking a 10 year review of our research program which is being followed by a strategic planning process and will identify updated research priorities. Bio-energy as a viable resource for sustainable energy creation has emerged, compelling serious consideration.

To select sound strategic priorities, UW ONRC reviews the status and utilization of a full range of forest resources. In this way, we develop a picture of the spectrum of major management challenges affecting forest systems and resource-dependent communities. We then identify potential contributions to be made through research and education activities. Facing a formidable array of pressing information needs and management



concerns, UW ONRC has developed a series of criteria to guide the selection of strategic priorities.

In keeping with legislative intent and the overall mission of UW ONRC, the following criteria are applied:

- Stress issues that are overlooked or under-served by others and in regards to which UW ONRC can make a noticeable and positive difference.
- Emphasize real problem-solving, balancing economic and ecological concerns.
- Focus on the most pressing problems threatening the socio-economic and political stability of communities.
- Stress issues of ecological importance at the landscape or wa-

tershed level.

- Address issues that are related to commodity production.
- Build trust and reduce conflict.
- Blend achievable near-term goals with long-term commitments.

Should bio-energy be among our strategic research priorities? Much information has recently been developed as growing concerns about global warming couple with the alarming increase in costs of fossil fuels, riveting our attention. Rural communities, embedded in landscapes rich with forest resources, may find themselves holding a unique competitive advantage over other areas struggling with energy issues.

According to Larry Mason of the UW Rural Technology Initiative, "Wood biomass is currently second only to hydropower as the largest source of renewable and clean energy in Washington.

(Continued on page 3)



(Continued from page 2)

Wood is uniquely versatile in that it can be a source of firm power generation or can be used to produce liquid fuels for transportation needs. In western Washington, residuals from the manufacture of forest products are a readily available and cost effective source of biomass feed stocks for energy generation. Forest management residues, typically burned in piles after timber harvests, represent another large source of woody biomass that is currently underutilized."

What contribution can UW ONRC make? To answer this question we must apply the criteria for selection of research priorities adopted in our Strategic Plan. The technology for converting woody biomass to energy is either well established (as in the case of pyrolysis (gasification)) or being developed at national laboratories (as in the case of converting cellulose to ethanol). Underserved aspects of this issue include addressing hurdles to implementation of what would appear to be a popular national policy objective.

People intuitively appreciate the need to move away from fossil fuel; it makes sense from both the global and local perspectives. We recognize the potential for small scale distributed energy production plants fueled by woody biomass. But actual implementation remains slow, complicated, and problematic. Among the issues requiring attention:

- Lack of institutional flexibility in response to small scale distributed energy initiatives
- Complex wholesale/retail price

Biomass-to-Energy – New and Existing Technologies

Cogeneration

Cogeneration is the term used to describe the simultaneous production of heat and electricity from a single fuel. Cogeneration is commonly called combined heat and power (CHP). Wood biomass is burned to create steam and the steam is run through a turbine to generate electricity. Excess steam is used for other purposes such as drying lumber.

Gasification

Gasification, also called pyrolysis, of wood has been used extensively for decades. Gasification occurs when wood is decomposed by heating in the absence of oxygen. New systems are being developed that efficiently convert wood to synthetic fuels and chemicals such as methanol, ammonia, and diesel fuel.

Cofiring

Cofiring refers to the practice of introducing biomass as a supplementary fuel for use in coal-fired generation facilities. Biomass can be successfully substituted for 10-20% of the total fuel need.

Liquid Fuels

Ethanol is made from wood through the use of hydrolysis and fermentation technologies. Ethanol burns much cleaner than gasoline and has a high octane rating.

Methanol is created from wood through gasification to create syngas. The syngas is then converted to methanol. Methanol has a lower density than ethanol but can be made with high yields.

BioOil (pyrolysis oil) is a liquid also made from a gasification process with medium heating value. BioOil can be used to generate electricity and heat or can be used as a non-polluting diesel additive.

Information Source: Clallam Networks; Fundamentals of Wood to Energy. Biomass-to-Energy; New and Existing Technologies, 2006.

and power distribution arrangements

- Overcoming short term price differentials when compared to wholesale hydropower
- Rapid transition from large centralized to small scale distributed energy production poses challenges to transmission grid capabilities
- Financing requires comprehension of complicated schemes which may include tax credits, green tags, renewable energy credits, low costs loans, and carbon credits
- Valuing and crediting avoided costs, non-market values, environmental services, and

other benefits

Many of us who are studying these issues realize that opportunities exist for beneficial development of small scale wood-to-energy projects in coastal communities of Washington. But broadly available information is lacking. Needed is a thorough and critical investigation of the complex environmental, institutional, and financial challenges and opportunities that face rural communities and small businesses with interests in development of wood-to-energy resources. Perhaps UW ONRC can make a meaningful contribution, through research and education, in addressing these issues.

Forest Program Research

Kathy Heuring, *Program Operations Manager*

UW ONRC receives annual funding in support of Forest Program research; specifically, projects that are consistent with UW ONRC’s mission and strategic priorities. These funds originate as a Congressional earmark on the Interior Appropriations Bill and are delivered through the USDA Forest Service’s Pacific Northwest Research Station. UW ONRC is grateful to United States Rep-

resentative Norm Dicks’ (D-6th) for his continued support of UW ONRC, as his efforts are crucial to securing these funds.

On April 21, Center Director John Calhoun and ONRC Research Coordinator Jason Cross met with a sub-committee of the UW ONRC Policy Advisory Board. Director Calhoun presented to the group the results of our science panel’s review of the proposed projects. The sci-

ence panel evaluates the proposed projects based on scientific merit, overall quality, and technical feasibility. The subcommittee also considered the written comments submitted by Policy Advisory Board members who could not be present at the meeting.

The following table displays a list of the projects UW ONRC will be funding with this year’s earmarked funding.

Table 1. ONRC Funded Projects

Project Title	Researcher(s)	Organization	Award Amount
River Food Web Response to Riparian Zone Management	Timothy Wootton	University of Chicago	\$26,329
Investigation and Analysis of Spatial Strategies for Non-Spatial Alternatives: Impacts on Spotted Owl Old Forest Habitat Quantity and Quality	Jason Cross Jeff Cornick	UW College of Forest Resources	\$36,469
Application of 3/2 law to young-forest/marginal NSO habitat on the Olympic Experimental State Forest: Identifying candidates and prescriptions for more complex habitat	Jason Cross Jeff Cornick	UW College of Forest Resources	\$36,469
Changes Beyond the Forest: Implications for Conserving Forest Biodiversity	John Marzluff	UW College of Forest Resources	\$39,265
Habitat Influences on Northern Flying Squirrel Abundance and Distribution	E. David Ford	UW College of Forest Resources	\$37,958
Ecological Combining Ability and Productivity Advantage in Stratified Mixtures of Red Alder and Sitka Spruce	Suzanne Simard	University of British Columbia	\$27,458
Population Ecology of the Marbled Murrelet on the Olympic Peninsula	Martin Raphael	USDA Forest Service, Pacific Northwest Research Station	\$14,052
TOTAL AMOUNT AWARDED			\$218,000