Southwest Oregon Interagency Biomass Utilization Strategy

Medford District Bureau of Land Management
And
Rogue River - Siskiyou National Forest

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" It is not enough to find a possible and elegant solution to a problem. We must make it affordable." -- Bjarne Stroustrup

Thursday October 5, 2006

Medford District Bureau of Land Management
Rogue River - Siskiyou National Forest
Interagency Biomass Utilization Strategy

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Executive Summary

Many communities in the Pacific Northwest face serious and growing risks from wildfires. Ecosystem and climatic changes, coupled with rapid population growth and development in wildland urban interface areas have created an urgent need to address wildfire risks and impacts. Time is of the essence. Southwest Oregon's ecology and forest development were historically shaped by frequent, low intensity fires. Very effective fire suppression became common in the last century. The exclusion of fire over the last eighty years has had profound ecological consequences. Our local forestland is no longer comprised of the widely spaced and large open grown trees that historically occupied much of the landscape. Instead, the trees are dense and diameter growth is slowed and tree vigor is reduced. As a consequence of fire exclusion, communities are losing key components of our ecosystem such as oak woodlands and large ponderosa pine trees.

Numerous reports have recognized southern Oregon as having some of the highest fire danger and communities most at risk to fire in the State of Oregon. In the last five years alone, 561,000 acres have burned in Jackson, Josephine, and Curry counties. As more and more people move into forested landscapes, both the likelihood of fire and the consequences for loss will increase. Reduction of fuel hazard and preventing losses from large wildfires is a major portion of the federal land management agencies' programs and direction. Vegetative treatments to reduce hazardous fuels, to restore the ecological role of fire, and to restore healthy forest conditions potentially yield huge quantities of small diameter timber (SDT) and biomass material.

The Bureau of Land Management Medford District and Rogue River - Siskiyou National Forest are responsible for the management of 2.6 million acres of federal forest land in the Rogue Basin. Recent inventories of small diameter material on this land base show approximately 770,000 acres of dense stands containing trees less than 12 inches DBH on gentler slopes and within operating distance of roads needing fuel reduction. These 770,000 acres are estimated to contain almost *six billion board feet* of material in diameter ranges from 5-12 inches with an aggregate amount of material measured in green tons.

Along with forest health concerns, rising prices for energy have accelerated interest in alternative energy sources. Millions of dollars are spent annually by the federal agencies in Oregon on programs to reduce fuel hazard. Only a nominal amount of the non-sawlog material removed is utilized. Fuel reduction thinnings, coupled with material such as tops and limbs from trees harvested during forest management activities could be used for energy production. This material, known as biomass, can be converted into electrical energy through burning in closed systems. Other processes can convert biomass into fuels such as methane, ethanol, and hydrogen. The potential exists for reducing costs for treatments through matching demand with availability of supply of biomass material and could have a significant effect on the agencies' ability to treat additional acres.

A myriad of laws, regulations, policies and initiatives are now in place that increase and promote opportunities for SDT and biomass utilization as part of forest management practices. These

policies provide new tools and incentives that encourage the integration of biomass and small diameter material utilization within the context of day to day forest management operations.

However, the economic difficulty of using this small diameter and biomass material is largely due to its low value and the high cost associated with the removal. Although there are mills in the area that can use material down to 5 inches in top end, inside bark log diameter, there are very limited markets for smaller, pole size or biomass material.

Recognizing both the urgency of the situation and the opportunities to address the problem, this report presents a prioritized list of goals to implement this Interagency Strategy based on a four-part premise:

- First, the agencies position themselves to effectively and efficiently plan and implement small diameter and biomass opportunities.
- Second, the agencies initiate collaborative efforts to increase community capacity for acceptance, production, and utilization of small diameter and biomass.
- Third, with social acceptance in place, agencies ramp up to "production" levels.
- Fourth, having built the foundation for long term, consistent supply, the agencies defer to industry and entrepreneurs to provide the utilization mechanisms fueled by a sustainable supply.

Why Here, Why Now…Compelling Reasons For a Strategy

1) The need for landscape application of National Fire Plan fuel reduction goals to decrease the amount of forest and property loss from wildfire, lower fire suppression costs and reduce the costs associated with fuel reduction activities through greater use of material. This would allow better use of the limited available funding and result in more acres of successful fuel reduction completed.

2) The National direction to produce energy from alternate sources such as biomass to reduce the dependence on foreign energy sources.

3) The need to reduce the amount of open burning and better adapt to new clean air regulations which limit the number of burn days and particulate emissions. The need to minimize health and safety risks and loss of escaped burns in high risk situations.

4) The need to offer a sustainable supply of material to maintain a basic level of forest products industry and related infrastructure (manufacturing and harvesting skills) in Southwest Oregon to be able to stimulate the economics of resource management activities.

5) The need to be strategically cohesive among agencies, communities and industry who are working both collaboratively and independently on various pieces of the small diameter and biomass "puzzle".

Purpose and Goal of This Strategy

The purpose of this strategy is to be a road map for the BLM and FS to produce an effective and efficient program utilizing biomass and small diameter material. The road map leads to the integration of industry, community and agency efforts resulting in the development of inter-governmental, business and stakeholder biomass umbrella agreements that assist in the implementation of natural resource management objectives.

The overall goal of this strategy is to develop a coordinated biomass program that is ecologically, socially and economically acceptable, resulting in a demand for increased offering, removal and utilization of small diameter timber (SDT) and woody biomass as part of the Bureau of Land Management and US Forest Service hazardous fuel reduction, ecosystem restoration and timber sale projects in Southwest Oregon. Traditionally, SDT and biomass have been considered a waste material and have required labor intensive and expensive treatments to reduce. In direct contrast this strategy views biomass as an underutilized material and explores opportunities and ways to facilitate and promote the beneficial utilization of biomass generated as a result of resource management. The utilization of SDT and woody biomass generated by hazardous fuel reduction, ecological restoration, and other resource management activities may help offset the costs of these activities, generate electricity or fuels, such as ethanol, bio-methane, and hydrogen, and provide economic opportunities for rural communities.

This strategy is adopted under the principles of Service First, an initiative that integrates the BLM and Forest Service skills and common objectives in delivering goods and services to the American public. This strategy fits one of the major goals of Service First via improved

stewardship of the resources that will result from collaboration and coordination of agencies' staff working under an integrated strategic concept at a landscape scale.

In summary, the strategy seeks to:

- Increase the reliability of an accessible and sustainable supply of SDT and woody biomass from federal lands and,

- Improve utilization through education, outreach and support to local infrastructure, new technologies, businesses, and markets capable of using low value SDT and woody biomass.

Short-term efforts will focus on utilizing existing tools and authorities, increasing field office expertise, increasing the acres of SDT and biomass offered for utilization, and initiating measures to increase community capacity for solving small diameter and biomass issues.

Long-term efforts will expand work with partners and overcoming challenges to SDT and biomass utilization, and seek out methods to stimulate the supply and demand for material. The sustainable management and use of SDT and biomass will provide economic, environmental, and social benefits well beyond current practices. Intensive efforts are needed to change the management of our natural resources to better reflect the values of SDT and biomass as renewable resources. A long term goal is that biomass material will achieve enough market demand to reduce or eliminate the need for subsidies.

However, in order to develop SDT and biomass opportunities, there is a critical need for development of additional markets and local infrastructure to support large scale utilization of biomass material. In addition, outreach and educational programs focused on the costs and benefits of biomass utilization are part of this strategy. This should involve county commissioners, local business leaders, agency personnel, environmental organizations, industry, and the general public.

Numerous institutional and economic challenges in implementing this strategy, as well as suggested solutions, are provided in this document. Some of these challenges are beyond the ability of the agencies to contend with at this time. Action items are noted herein.

An ecological perspective on the origin and accumulation of woody biomass in Southern Oregon can be found in Appendix A. Other appendices provide additional resources, contacts, and details regarding biomass and small diameter.

What is Biomass?

A number of definitions can be found for biomass. For the purposes of this report the authors recognize the BLM national definition (IM 2005-160, June 9, 2005) which states that "Biomass is all vegetative materials grown in forest, woodland, or rangeland environments that are the by-products of management, restoration, or fuel reduction treatments (historically non-utilized or under-utilized material)".

Inventory and Supply

Several efforts have been undertaken in recent years to increase understanding of the amount of small diameter and biomass material currently available. In the fall of 1999, a committee consisting of staff from the Rogue River and Siskiyou National Forests and the Medford District of the Bureau of Land Management was appointed to produce a rough estimate of small diameter timber by acres, volumes and species. This inventory was further categorized by operability, economic feasibility, and by degree of forest health hazard. This committee was formed at the bequest of the Jackson County Commissioner's *Small Diameter Tree Utilization Committee* whose interest was in attracting a small diameter tree utilization industry to the Rogue Valley. The inventory was not a commitment to provide timber in the future but rather, to identify the present inventory, needs and potential opportunities on Federal land. These estimates were based on sound interpretation of the data available at that time.

There are about 2.6 million acres of Federal lands currently under the jurisdiction of the Medford BLM and Rogue River-Siskiyou National Forests in Southwest Oregon. The study examined the existing small diameter material on land allocations which allow for timber removal (LSR, Matrix, AMA, and Riparian Reserve). Roughly 770,000 acres of dense stands containing small diameter material less than 12 inches DBH were identified. These 770,000 acres are estimated to contain over *six billion board feet* (BBF); the majority of the volume is in trees 5-12 inches in diameter (5.7 BBF), on slopes less than 40%. About 40% of the volume (2.4BBF) is located within 1,000 feet of existing roads. This is existing standing volume, with no projections for continued growth. This was an expeditious study using existing data with little ground verification so it is only considered a rough estimate of the existing biomass. More detailed site-specific information is required to make the tactical and ecological decisions related to harvest and removal opportunities. This inventory suggests that, if made available, there is enough small

diameter material to support additional SDT and biomass utilization infrastructure. However, the inventory does not address how potential removal and utilization will overcome administrative, political, economic, budgetary, topographic, social constraints, and environmental barriers.

A similar study was conducted in 1989 by the non-profit group, *The Rogue Institute for Ecology and Economy*, though it only looked at 492,453 acres of the Applegate River watershed. Their study concluded that there are 110,050 acres (federal and private) of small diameter material 0-12 inches in diameter within 1,000 feet of existing roads but did not determine a volume to represent those acres. The study data has been ground checked for accuracy and is believed to be 80-85% accurate. Suffice it to say, if one could assume that the potential removal of 5-12 inches diameter material would conservatively produce 500 board feet per acre, then there is the potential of 55 million board feet of 5– 12 inch DBH material in the Applegate River watershed within 1,000 feet of existing roads.

In 2003, two additional inventory studies were completed for the Southern Oregon area. The Forest Inventory Analysis modeling framework was developed by the USFS Pacific Northwest Research Station to estimate biomass availability, financial returns, and fuels treatment effectiveness related to silvicultural prescriptions. The other study, conducted by the non-profit groups Sustainable Northwest, Sunny Wolf Community Response Team, and Green Mountain Woodworks attempted to quantify the total timber supply of Josephine County and to design harvest scenarios that would assist local planners, businesses and community members, and natural resource professionals in developing long-term economic development strategies for wood manufacturing in the county.

It should be noted that in addition to fuels reduction projects, there are opportunities to utilize material that is now wasted in traditional large scale timber sales. Tops and limbs that are typically either left in the woods or piled and burned could be removed and used for biomass or other products. Other fuel reduction and forest health driven projects can generate large amounts of material too small for saw logs but could be utilized for poles and firewood.

A general rule of thumb for estimating the amount of limbs and tree tops generated in the course of timber harvest operations is approximately one green ton of biomass material per thousand board feet of material harvested. That is, the tops and limbs of trees removed in a saw log harvest would generate one ton of material for every one thousand board feet harvested. Typical harvest levels in Southern Oregon range from a light under story thinning of three thousand board feet per acre removed to a heavy regeneration harvest in the most productive areas of forty thousand board feet or more per acre removed.

The current combined annual harvest level target for the Medford BLM and Rogue River-Siskiyou National Forest is 98 million board feet. If harvested, this equates to 98,000 tons of biomass material generated in the course of timber sale harvest operations each year. These tops and limbs from timber harvest are currently seen as waste to be disposed of. Federal agencies are paying for the piling and burning of this material either through timber sale harvest collections or through post sale service contracts. 98,000 tons is enough material to fully supply a 12.5 megawatt biomass fueled electrical generation facility for a year.

Materials/Products/Facilities

It is the role of federal land management agencies to provide the supply of SDT and biomass material. It is private industry's role to utilize the material, manufacture or create products.

Recoverable products that can be expected from forest management activities include both large and small saw logs, posts and poles, firewood, limbs, tops and other material used as biomass. Sawlog material has the highest value followed by posts and poles. Limbs and tops are currently very low in value. Concern has been expressed that if too much emphasis is put on biomass removal it may disrupt the availability of material suitable for poles and fire wood. Federal agencies need to be sensitive in continuing to provide a broad spectrum of forest products.

Definitions of forest product materials are summarized below:

Raw Materials

Saw logs: Timber that is cut specifically for utilization in saw mills or veneer mills and made into structural lumber, plywood, furniture and other wood products; generally measured in board feet (a piece of wood 12 inches square and one inch thick). Typically, standing trees of approximately eight inches DBH and larger are suitable for sawlog products. Current minimal regional acceptable processed log size is 5" inside bark diameter on the small end. A standing tree of eight inches in diameter or greater can usually provide a merchantable log at least 16 feet in length and meeting the five inch minimum inside bark diameter. Sawlogs are typically sold by thousand board foot (MBF).

Posts & Poles: Nonstructural material derived from small conifer trees. Federal agencies sell this material by diameter and the linear foot.

Firewood: Miscellaneous hardwood species along with pieces of conifer tree tops or other material not suitable for mill utilization from timber harvests or land clearing operations. This can include dead and down trees/logs where accessible and where deemed ecologically appropriate. Sold by the cord (4 foot by 4 foot by 8 foot hand stacked pile)

Ton Wood: Material that traditionally is sold by weight rather than board feet, cubic feet, or cord. This sometimes includes small sawlogs but typically is non-sawlog material smaller than 8 inches DBH. The industry standard for measuring biomass material is the *bone dry ton.* One bone dry ton typically equals two green tons, (assuming 50% moisture content).

Tops/limbs: Can be used as biomass for electrical and co-generation facilities as well as bio-fuel production. Sold by the ton.

Products

Log Furniture: Hand peeled, small diameter poles used to make rustic furniture for high end value added markets.

Flooring, Paneling: Added value material cut from tight grain small diameter trees creating a product structurally ideal for these applications.

Fencing Products: Hand peeled or machine peeled poles used to construct a variety of fencing types and styles.

Specialty market products: Teepee poles, hand peeled railings for decks and staircases, manzanita for custom furniture and bird perches

Wood composites: Wood composites assembled from small pieces of wood provide a technology that is easily adaptable to a changing resource base. These products can utilize a variety of tree sizes and species and wood based raw materials, including fibers, particles, flakes, and strands.

Facilities/Manufacturers

The secondary wood products manufacturing is a fast growing segment of the forest products industry in the Pacific Northwest. Value added secondary wood manufacturers create economic value by utilizing and processing smaller raw material to create new and more valuable products, from architectural woodwork, to composites, to furniture. The growth of the secondary wood products industry in the region has been significant, displaying a marked capacity in comparison to many other areas of the west, and bolstering overall regional industry and general manufacturing trends.

There are numerous small diameter manufacturers in the Southern Oregon Area marketing products ranging from post, poles, log and wood furniture, architectural woodwork, flooring and firewood.

There are also four conventional sawmills/veneer mills accepting smaller diameter material. Biomass One, a 25 Megawatt biomass co-generation facility, utilizes material from mill residues, the forest, orchards, and urban waste from the general public. Boise Cascade in Medford operates an 11 Megawatt co-generation biomass facility in conjunction with their manufacturing facilities but does not receive any forest material from outsides sources at this time. A list of these manufacturers and facilities can be found in Appendix D.

The Rough and Ready Lumber Company, a small family owned lumber mill in Cave Junction, Oregon announced they have recently received grants from USDA and Energy Trust of Oregon

for partial funding for installation of a 1.5 megawatt electrical generation system to be fueled with mill residues and biomass material. In addition to mill residue, this facility is expected to require over 15,000 green tons of material per year from local forest operations. This equates to approximately 600 large, full sized truckloads per year or 11-12 trucks per week.

Additional interest in small scale generation/heating projects is coming from the Applegate Biomass Group who has recently received funding for a feasibility study to assess the possibility of a community owned and operated biomass facility, and the Illinois Valley and Butte Falls areas for Fuels to Schools type conversions of institutional heating systems.

For clarification, there are two kinds of traditional electrical generation from biomass facilities: a stand alone electrical generation plant, or a co-generation plant where the steam by-product is sold or used to dry forest products.

In terms of increasing utilization of small diameter and biomass material outside the traditional regional industrial lumber/veneer manufacturers, there are four products or production concepts that are currently active or show potential for success in Southern Oregon as referenced in the recent report: *Small Diameter Timber in Southwest Oregon: A Resource to Expand Utilization*

1. Biomass to energy, with a focus on current and proposed wood-fired boilers for institutional heating applications and small-scale power generation.

2. Manufacture of specialized products at a local moulding facility to produce panel stock and custom molding.

3. A ton-wood facility (a utilization center that buys wood by the ton) for firewood, with sorts for post-and-pole and hog fuel markets.

4. An integrated medium scale sawmilling and kiln drying facility for small diameter material targeting non-commodity, value added markets.

5. Other opportunities include wood based pellets for wood fired applications.

Economics

Increasing attention towards biomass utilization is driven by environmental, social, and market considerations. The economic costs of collecting and delivering biomass to utilization facilities is relatively high which reduces the competitiveness of biomass systems compared with other renewable energy technologies. The current primary and exploratory uses for biomass are in electricity generation, and conversion to a renewable fuel such as ethanol, bio-methane, and hydrogen. Using biomass for power generation, steam, or bio-fuels should complement and expand the avenues for small wood utilization. This diversified approach can result in creation of the greatest number of jobs and thus the greatest social benefit.

Information concerning the economics of harvesting small diameter trees and biomass in Southwest Oregon, including costs and productivity rates is relatively scarce. What little information that has been gleaned from small case studies in the area has proven the economic difficulty of extracting smaller stems due to their actual low value and high costs associated with

the removal. As stated previously, topography and accessibility (distance from roads) present significant economic challenges and perhaps will limit the areas that can effectively be treated.

The current price being paid for delivered material in April, 2006 by the local biomass plant was $24.00 per bone dry ton (BDT) or $11 per green ton. Current costs for trucking a ton of material 50 miles from the forest to the biomass plant is approximately $3.80 per ton. The average chip van will carry 25 green gross tons of material.

In one local small diameter/biomass study, the 2003 Title II funded Boaz Project, the goals were to enhance forest health and provide regional employment through a collaborative project to remove and process smaller material. An economic feasibility study on harvest and production costs for using small diameter/biomass material was a key component of the project. The project required the use of a low ground pressure skidder and a small yarder. Material removed included sawlogs from 8-18 inches DBH, non-merchantable material below 8 inches DBH as well as tops and limbs. Preliminary review of the data show these treatments were completed for less cost than current agency stand alone understory fuel reduction treatments. See Appendix E for a more detailed cost comparison.

The development of additional economically diversified uses for SDT and woody biomass would provide increased opportunities for sustainable benefits to rural forest-based communities, while at the same time supporting forest restoration and fuel hazard reduction.

To assist the successful implementation of this strategy, the federal agencies will need to develop relationships with, and rely on the support of, industry groups like Avista, Pacific Power, Biomass One, SOTIA, public entities like Southwest Oregon Regional Economic Development and others, as well as community groups like the Southern Oregon Small Diameter Collaborative (SOSDC, aka: Knitting Circle), and Applegate Biomass who can have a direct effect on the outcome of the proposed strategy.

Social

There are numerous communities, non-profit, for-profit and governmental groups promoting small diameter wood/biomass utilization in Southwest Oregon. The groups have had varying degrees of accomplishments. The list of these groups can be found in Appendix C.

Many groups and individuals who oppose traditional forest

management and timber sales are supportive of small diameter thinning and biomass utilization. If projects are developed with small diameter and biomass utilization as the primary goals, there is a strong likelihood of gaining support from a wider variety of community members. This in turn will allow more projects to move forward, allowing for more consistent and assured supply. There is also increasing interest from the general public who are willing to pay a premium for 'green' energy sources such as solar, wind generation, biomass or other forms of alternative energy.

Numerous efforts are underway to address the current small diameter utilization/biomass situation in the forest. Some of these efforts involve social change. However, most rely on technological advancements and economic profitability either through more effective and efficient forest operations, more efficient processing, or achieving higher value for low valued material.

Outreach efforts would include presentations to various publics including but not limited to Kiwanis, Rotary Clubs, Fire Districts, potential contractors, interested private citizens, and key community leaders. "Show me" trips and tours can directly advance desired messages by bringing interested publics to the forefront of examples on forest management.

In order to change the current situation, all efforts discussed here are necessary. Forest management agencies are faced with unprecedented pressure from industry and public forest consumers, as well as vocal pro and con advocates regarding the issue of active management activities as budgets decline. There is growing understanding of folks living in the Wildland Urban Interface (WUI) of fire danger and the desire to have fuels reduced on adjacent public lands. In addition, forest-dependent communities are faced with declining timber supplies, loss of jobs, high unemployment, and the social ramifications linked with these problems. To address this situation, many of the surrounding communities have begun working with federal agencies to create new partnerships and new ways of doing business, called community-based forest stewardship.

Community-based forest stewardship is defined as "a process of scientists, government, and citizens working together to agree upon and attain goals and objectives that are environmentally responsible, socially acceptable, and economically viable." Its success is highly dependent on the interaction of community members. It is demonstrated in many forms across the Southern Oregon area and depends upon the resources and expectations that participants bring to their cooperative activities. Members contribute in a range of ways, such as knowledge of ecology; funding in the form of grants, cost-shares, matching funds, and in-kind services; project administration and consultation; technical assistance; facilitation; and field coordination. A contribution can be as simple as having accurate knowledge about local forests and communicating this information to others.

Community-based forest stewardship is growing in the United States, and the ongoing activities are teaching us about collaborative forest management. Although there are still issues to resolve, the movement is definitely impacting how the federal agencies conduct forest management activities and what forest products technologies need to be developed. Collaboration is essential in order to continue to gain support and demonstrate effective forest management and biomass utilization.

Agency Direction

The DOI/USDA will implement strategies for increasing the utilization of biomass from agency lands consistent with the National Fire Plan and using the tools of the Healthy Forests Initiative, including the new authorities of Stewardship Contracting, and the Healthy Forest Restoration Act. This strategy has been clearly established by recent legislation and executive policies such as but not limited to:

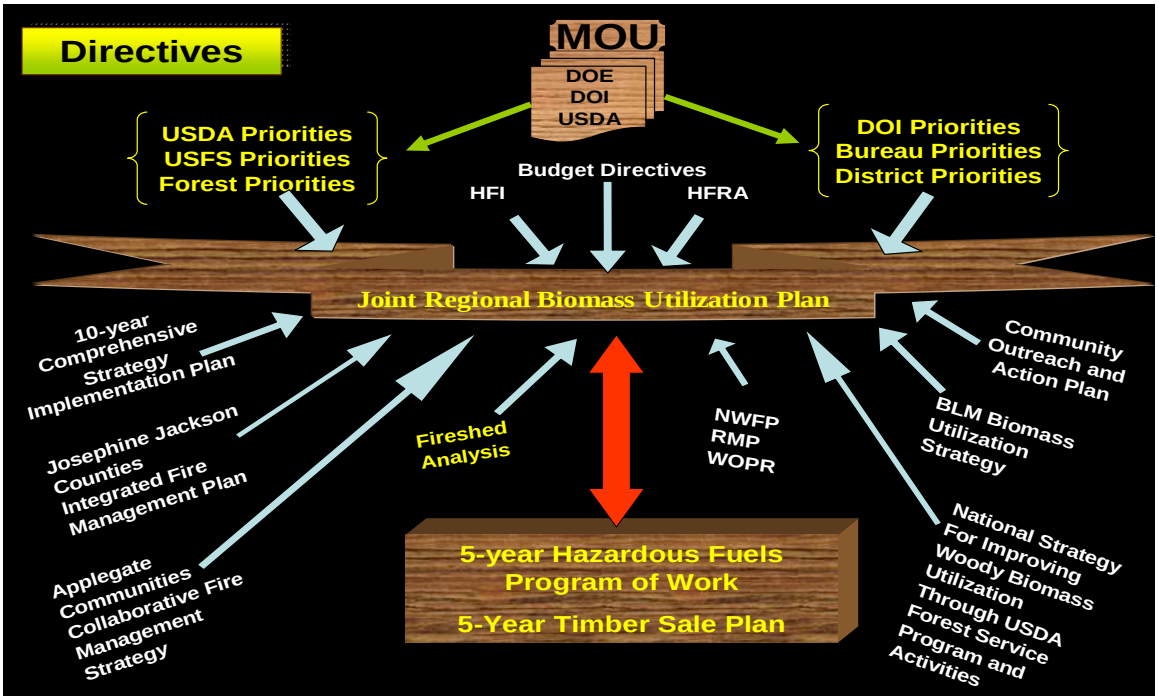
- The Biomass Research and Development Act of 2000
- The 2000 National Fire Plan
- The 2001 National Energy Policy
- The 2003 DOE/DOI/USDA Interagency Memorandum of Understanding (MOU) on Woody Biomass Utilization
- Sections 9006 and 9008 of the 2002 Farm Bill
- Energy Policy Act of 2005

The Bureau of Land Management FY 06 budget priorities for non-Wildland Urban Interface (non-WUI 2823) and Wildland Urban Interface (WUI 2824) call for 10% or more of the mechanical fuels treatments to offer biomass for energy, or other commercial products. The long-term goal is to offer biomass on 50% of the mechanical fuels projects in forest and woodland vegetation types by 2008.

Utilization of biomass for energy production is consistent with the National Energy Policy objective to increase America's use of renewable and alternative energy sources. Biomass utilization is consistent with the goals and objectives of the National Fire Plan to restore fire-adapted ecosystems and reduce hazardous fuels that create a fire hazard that threaten communities and forests.

Stewardship contracting is one of the important tools available to aid in increased utilization of small diameter and biomass material. The BLM recently issued *Stewardship "End Results" Contracting Guidance Version 2.0*, November, 2005 to assist field offices with preparation and implementation of stewardship contracts. The Forest Service FSH 2409.19 - *Renewable Resources Handbook Chapter 60 - Stewardship Contracting*, provides guidance for using stewardship authority as it applies to the USDA Forest Service.

Agency budgeting and programmatic direction is currently moving toward integration between fire, fuels, and timber to accomplish shared goals and objectives. This direction can clearly benefit the opportunities for biomass utilization.



This figure illustrates the many policies, legislation and directives influencing the Joint Biomass Utilization Strategy.

Examples of removal and processing technologies for SDT/biomass

The Economizer, a small portable log mill converts small diameter logs into lumber.

A small diameter harvest operation uses a “dangle head processor” to remove small diameter trees**.**

On site chipping operation converting tops and limbs into ‘hog fuel’ for use at Biomass One.

Chipping non-merchantable material from a timber sale directly into trucks.

Research and Development

During the past 5 to 7 years, there has been a tremendous amount of activity within universities, federal research institutions, nonprofit groups, rural communities, and others to explore and evaluate the potential of small diameter material, both for traditional lumber and value-added uses. Some of those value added products might include engineered wood products such as joist beams, and Oriented Strand Board where the basic ingredients can be chips and fibers from traditional underutilized small trees.

There is a need for additional credible case studies to further study costs associated with fuel reduction activities such as the use of small scale harvesting equipment on various terrain, engineered wood products made from non-traditional material, the refinement of renewable energy processing facilities, and the amount of merchantable material (goods for services) that must be extracted to offset the costs of the service work

One recent study conducted on BLM lands in Southern Oregon, the Forest Residues Bundling Project, used a ground based rubber tired forwarder to collect, process (bundle), and transport forest residues (biomass) to roadside. This project demonstrated the technical feasibility of reducing a wide variety of forest residues into compact bundles, however the study found that bundling is clearly not economically viable in every application but could be cost effective if the value of the forest management treatment is considered. The machine demonstrated the ability to operate on slopes up to 45% by traveling up and down the slope. The operation also required the use of a forwarder to retrieve the bundles and transport them to roadside.

New product development such as the Elwd (Elwood) Wildlife Friendly Fence, with in kind contributions from the Medford District Bureau of Land Management, was designed as an alternative to barbed wire fence. Pre-drilled small diameter bucks and rails are provided and ready to assemble without the need for post holes. Elwd provides ready to assemble kits that can be delivered to the project site ready to install with a minimum of field drilling and fitting.

Uncertainties in new advanced biomass technologies and environmental performance make it exceedingly difficult for industry to acquire financing for these types of equipment and utilization facilities.

Institutions, organizations, and industry working on biomass and small diameter utilization are, among many:

- University of Washington, Seattle, Washington
- USDA Forest Products Lab, Madison, Wisconsin
- IDATECH, Bend, Oregon
- OFRI, Oregon Forest Resources Institute, Portland, Oregon
- National Renewable Energy Laboratory, Golden, Colorado

Planning & National Environmental Policy Act (NEPA)

In understanding a strategy for biomass utilization, it must be noted that SDT and woody biomass as material for energy is foremost, a land management issue, not just an energy production concern. An SDT and woody biomass supply is primarily generated as a byproduct of forest management practices. This direct link to forest management is not present for most other types of energy development. For this reason, the process of developing and evaluating appropriate technologies and facilities for woody biomass energy and utilization must be integrated with long-term and collaborative forest management planning processes.

It is important to understand that under current Forest Plans, fuel reduction and timber harvest on federal lands is usually focused on land allocations which allow and expect these activities to occur. Land allocations and environmental effects were established and analyzed in the 1989 Siskiyou National Forest Land and Resource Management Plan, the 1990 Rogue River National Forest Land and Resource Management Plan, the 1994 Northwest Forest Plan, and the 1995 Medford District BLM Land Resource Management Plan.

In order to perform any forest management activity, the BLM and Forest Service are required to analyze and document the environmental effects of the proposed action under the National Environmental Policy Act (NEPA). The required depth of the analysis is determined by the type and extent of the project. The federal agencies have expedited processes available that can be used in some instances but both small and large scale projects will require a minimum of one to two years to perform the required botanical and wildlife surveys. In addition, an Environmental Assessment (EA) or a Categorical Exclusion (CE) document will need to be prepared. Typically a team of resource specialists is assembled to review the project, determine the environmental effects and write the findings of the analysis.

Currently, much of the Bureau of Land Management and Forest Service project planning occurs on a landscape level basis. This allows the inclusion of many projects (timber sales, fuels reduction, road work, wildlife and fisheries) into one NEPA document and gains some efficiency by having one analysis and a reduced number of documents, legal ads and public review. Biomass removal needs to be included in the NEPA analysis and related decisions. The downside of this approach is that many projects can be held up by protests, appeals and lawsuits by those opposed to parts of the overall project.

For large scale SDT and biomass utilization projects to move forward, it will be essential to have many acres with NEPA completed and available for treatment. One of the largest challenges that the federals agencies have to address is a reliable supply of material in order to attract enough industry to use and process the material. It is a classic ‘Supply and Demand’ situation. Industry will not invest if a long term supply is not available. This is very difficult in today’s environment of protests and lawsuits on forest management projects as well as the supporting forest management plans and biological opinions. The cost of performing the needed surveys prior to ground operations makes it difficult to treat large acreages.

There is some optimism however, provided by the recently approved Healthy Forest Initiative and Healthy Forest Restoration Act Authorities. To be categorically excluded from documentation in an EA or EIS, a proposed hazardous-fuel-reduction action must meet the following requirements:

- Hazardous-fuel-reduction activities using prescribed fire can be categorically excluded if they do not include more than 4,500 acres. Activities using mechanical methods for crushing, piling, thinning, pruning, cutting, chipping, mulching, and mowing can be categorically excluded if they do not include more than 1,000 acres. Such activities:

- Shall be limited to areas in the wildland-urban interface or to areas in Condition Classes 2 or 3 in Fire Regime Groups I, II, or III outside the wildland-urban interface.

- Shall be identified through a collaborative framework as described in A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

- Shall be consistent with agency and departmental procedures and applicable resource management plans.

- Shall not be in wilderness areas or impair the suitability of wilderness study areas for preservation as wilderness.

- Shall not include the use of herbicides or pesticides or the construction of new permanent roads or other new permanent infrastructure, but may include the sale of vegetative material if the primary purpose of the activity is to reduce hazardous fuel.

Before a proposed action that meets these criteria can be categorically excluded, the proposal must be reviewed sufficiently to determine that no extraordinary circumstances (USDA Forest Service) or exceptions (DOI BLM) exist. Direction for USDA Forest Service extraordinary circumstances is found in FSH 1909.15 Section 30.3. DOI BLM direction for exceptions is found in 516 DM 2 appendix 2.

Based on the recent court ruling on the Earth Island Institute v. Ruthenbeck case (formerly Earth Island Institute v. Pengilly), **categorically excluded USDA Forest Service actions pertaining to the sale of timber, prescribed burning or thinning projects over 5 acres are now subject to administrative appeals** (36 CFR 215.4). Categorically excluded DOI BLM actions are subject to notification, protest, and administrative appeal (43 CFR part 4, as modified by 43 CFR 5003.1 and 43 CFR 4190.1).

More information on categorical exclusion of hazardous-fuel-reduction projects is available at the USDA Forest Service and Department of the Interior Joint Categorical Exclusions for Hazardous Fuels Reduction and for Fire Rehabilitation: http://www.fs.fed.us/emc/hfi/

Categorical exclusions for some vegetation management actions may be available under other authorities. While the projects eligible for such categorical exclusions are designed primarily for objectives other than treatment of hazardous fuel, fuel reduction may be an important secondary benefit. Review the appropriate agency guidance to determine whether such exclusions apply to specific projects. Additional information on USDA Forest Service categorical exclusions is available at ***Applying the HFI & HFRA Authorities:*** http://fsweb.wo.fs.fed.us/hfra/.

See *The Healthy Forests Initiative and Healthy Forests Restoration Act Interim Field Guide* **(**FS-799, February 2004) for more detail.

The Washington Office of the BLM is currently preparing *The Draft Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic EIS*, a programmatic EIS that deals with fuels reduction work for 17 western States. This document helps set ground work for the potential treatment of 3.5 million acres per year to reduce hazardous fuels. This effort could lessen the documentation and analysis required for NEPA clearance by allowing local EAs to tier to the effects analysis compiled in the programmatic EIS.

The Bureau of Land Management is currently revising the land resource management plans for western Oregon. This planning effort, known as the Western Oregon Plan Revision (WOPR) is expected to address fuels reduction and biomass removal as forest management practices on BLM lands. The Rogue River-Siskiyou National Forests is scheduled to start into a new round of land and resource management planning in 2010.

Other planning processes that have or will be developing strategies to help with fuel reduction and provide SDT and biomass opportunities are: the Josephine and Jackson County Fire Management Plans, the BLM/USFS/Oregon State Regional Fire Management Plan, the Applegate Communities Collaborative Fire Protection Strategy, the Rogue River – Siskiyou NF Watershed prioritization process and the BLM and Forest Service five year Hazardous Fuel Reduction Program of Work, as well as numerous community wildfire protection plans.

Integrating Industry, Communities, and Federal Agencies

The small diameter/biomass "puzzle" consists of many pieces, but is primarily under the influence of three major players: industry, community, and federal agencies (BLM and FS). While this strategy focuses on BLM and FS action items, the strategy recognizes the unique role each of the players have, and how this strategy complements the actions relating to development of small diameter and biomass that industry and communities are undertaking.

Federal agencies are primarily addressing the issue of determining the ecologically and economically appropriate level of small diameter and biomass supply. Many of the federal agencies' action items relate to overcoming internal obstacles and are referenced in Exhibit H.

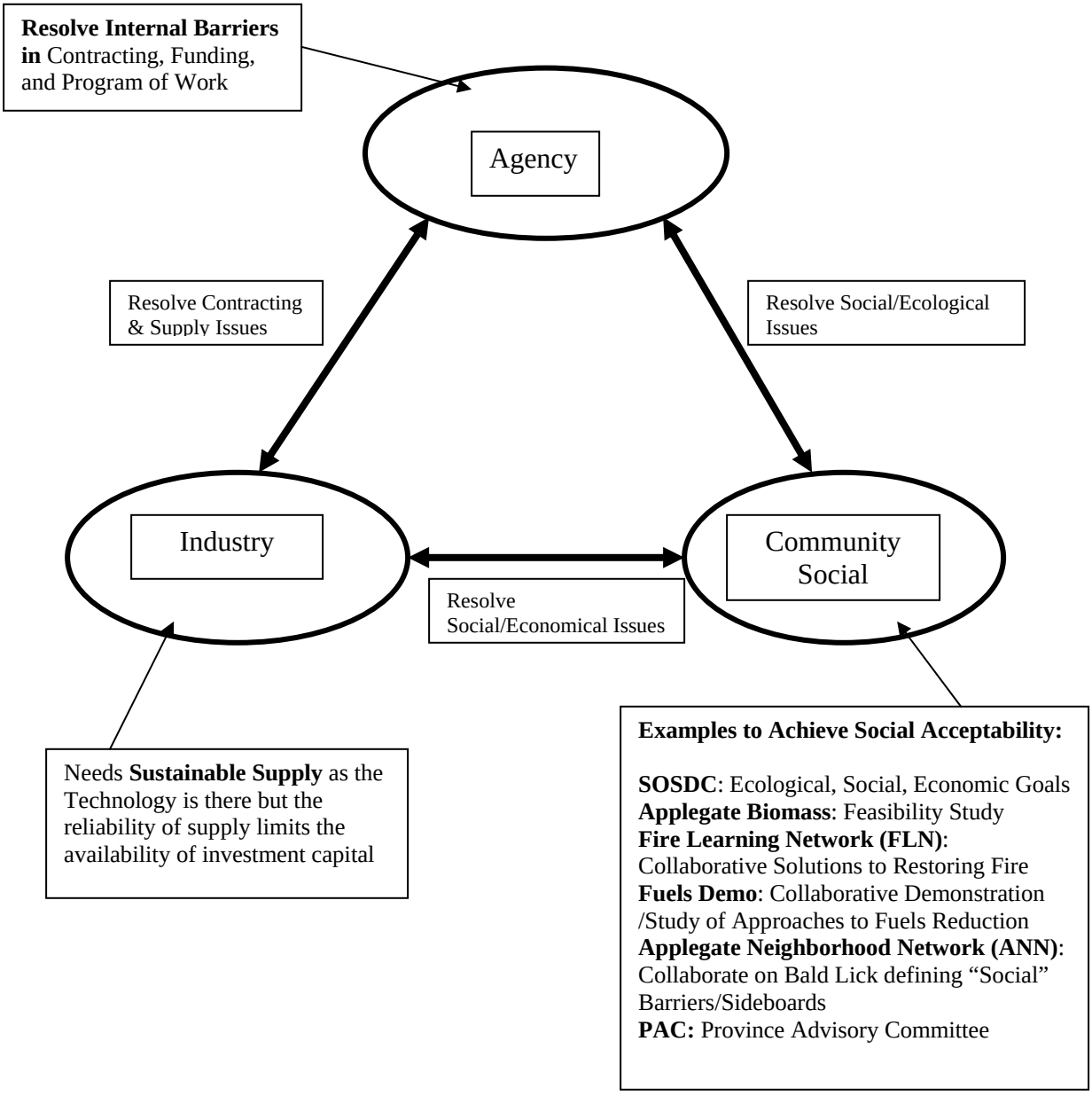
It is the role of each community to collaboratively develop the socially acceptable standards by which the extraction and subsequent utilization of small diameter and biomass will be achieved. Without ecological and social acceptance, there will be no investment in the technology and facilities necessary to make small diameter and biomass as economically feasible, as possible. The federal agencies will integrate the social expectations with the ecological and economic standards during planning and analysis of projects. Because the community is comprised of members that exhibit a range of views on forest management and small diameter/biomass, there is overlap between community and industry and community and agency implementation of forest management.

It is private industries' role to utilize the material, manufacture or create products. These are best attempted by entrepreneurs with industrial and business expertise, whether they are individual persons, small or large businesses. This strategy recognizes that the federal agencies will need to learn and understand the small diameter/biomass business challenges so that contractual specifications are reasonable and projects are implementable; to mentor existing industry and

small businesses and developing businesses and nonprofits, especially when new procedures, policies or contract methods (like Stewardship) influence how small diameter and biomass offerings will be implemented; and to provide a steady supply of raw material such that substantial investments in infrastructure, manufacturing and marketing can be appropriately amortized.

The role and primary subject areas of each of the major players in the small diameter/biomass "puzzle" is depicted by the following diagram:

Building Biomass Utilization Capacity



Assumptions In Developing Strategic Goals

- The strategy fully integrates the laws, policies, regulations, and initiatives (described in diagram on page (13) that focus or direct the emphasis for small diameter and biomass opportunities.

- Large-scale management activities are needed to restore many ecosystems at risk of uncharacteristic high intensity fire and declining forest health. The primary management objectives are generally to reduce the risk of large-scale uncharacteristic fire and improve forest health.

- Forest and woodland inventory should be refined and updated in order to support resource allocation decisions and help determine sustainable supplies of raw material.

- Existing timber sale slash removal and under story fuels reduction projects offer the greatest immediate opportunity to expand biomass utilization on public lands.

- The biomass utilization program must be integrated with long-term and collaborative forest management planning processes that result in resource management that produces and assures a predictable and sustainable supply, irrespective of funding source.

- New bio-energy plants are unlikely to be built in areas of significant Federal ownership without a reliable sustainable source of raw material to meet the needs of the facilities and the investors. The utilization of the energy potential contained in woody biomass will be slow to gain wider acceptance without such facilities in place.

- For biomass opportunities to develop further there is a need for focused outreach and educational programs which illuminate the costs and benefits of biomass utilization. The efforts should include agency personnel, industry, environmental organizations, and the general public.

- The expanded use of biomass will largely depend on economic opportunities created by legislation, regulations and policies.

- Federal funds targeting biomass utilization should support development of a diversified forest products sector (including uses beyond energy generation). A diversified approach, including small diameter utilization and other value-added wood products, will result in the creation of the greatest number of jobs.

- Not every fuel reduction or ecological restoration project will result in biomass utilization opportunities. For some situations, mechanized tools such as the slashbuster and the lightfoot which grind unwanted vegetation into mulch are more appropriate. These tools are immediately effective to change continuity of fuel and do not result in air pollution/smoke management issues, nor do they contain the risk of losing containment.

- Contracting authorities and mechanisms to remove and increase utilization of biomass material are available now and need to be embraced and utilized by agency personnel and

integrated into day to day operations in order to succeed. An example would be adding the clause to offer 'Products other than sawlogs' in Forest Service Timber Sale contracts.

High Priority Action Items for 2007-2011

The overall strategic plans for implementing the Interagency Biomass Utilization Strategy revolves around the basic premise that:

- First, the federal agencies position themselves to effectively and efficiently plan and implement small diameter and biomass opportunities.
- Second, the federal agencies initiate collaborative efforts to increase community capacity for acceptance, production and utilization of small diameter and biomass.
- Third, with social acceptance in place, agencies ramp up to "production" levels.
- Fourth, having built the foundation for long term, consistent supply, the federal agencies defer to industry and entrepreneurs to provide the utilization mechanisms fueled by a sustainable supply.

Goals for 2007-2008

- **To build expertise within the federal agencies, to emphasize greater utilization of biomass and small diameter, to gain credibility and public trust selling biomass and small diameter…**
  - □ Each Resource Area and Ranger District will produce at least one timber sale contract, one stewardship contract or one service contract that incorporates the offer of biomass material. This includes poles, firewood, limbs and tops. The goal is to offer a minimum of 10% of mechanical fuels acres treated utilizing biomass in 2007, and increase to 50% by 2008. Responsibility: Timber Staff

- **To emphasize production of biomass and small diameter in project planning…**
  - □ Develop targets, performance measures (*for example*, "risks reduced" or "values protected"), and funding specifically targeted for biomass and small diameter utilization. Responsibility: Fuels, Timber Staff, and Biomass program leads.
  - □ Develop funding structure in federal agencies' budget process (requesting and tracking). Responsibility: Budget program leads
  - □ Utilize other funding mechanisms such as Title II County funds, National Fire Plan Grants and other programs to supplement and leverage monies for increased utilization of SDT and biomass. Responsibility: Fuels, Silviculture, Biomass, program leads
  - □ Include applicable performance evaluation standards that lead to accountability for implementing Southwest Oregon Interagency Biomass Utilization Strategy. Responsibility: Area Mgrs/District Rangers.

- **To utilize existing contract mechanisms and/or reduce contracting limits…**
  - ☐ Utilize recently established and existing contract clauses that facilitate the optional use of small diameter and biomass. Responsibility: Fuels, Silviculture, Biomass, program leads.
  - ☐ Utilize IDIQ (Indefinite Determination/Indefinite Quantities) contracts and task orders that include a biomass component. Responsibility: Fuels, Silviculture, Stewardship contract leads.
  - ☐ Integrate timber sale and service contracts (embedded contracts) into a single contract to more efficiently utilize equipment already on site (FS already has capability; BLM does not). Responsibility: Timber Staff, Fuels, Silviculture, program leads.
  - ☐ Federal agencies standardize the definition of minimum tree size (diameter, not specie) as merchantable; then, require removal of all designated merchantable trees (forcing the removal of biomass). Responsibility: Timber Staff
  - ☐ Create standards for appraising biomass removal and utilization. Responsibility: Timber Staff

- **To treat landscapes more effectively and economically and encourage greater use of biomass through integrated project planning and implementation…**
  - ☐ Each project planning team will provide a list of small diameter/biomass material available in a planning area along with timber sale and fuel reduction treatments. Special emphasis will be given to listing the type of products, proximity to roads and defining access limitations. NEPA documents will list the products to be removed as part of the proposed action. Include acres and estimates of quantity of product available in the project to be included as part of the decision. Responsibility: Timber Staff, Fuels, Silviculture, NEPA, program leads.
  - ☐ Consider splitting NEPA decision to separate controversial activities from non-controversial activities. Responsibility: Area Mgrs/District Rangers.
  - ☐ Increase the use of HFI/HFRA authorities to streamline NEPA documentation for projects that concentrate on fuel reduction and forest health, especially when small diameter/biomass removal and fuel reduction is the major purpose for the proposed action. Responsibility: Fuels, Silviculture, Biomass, program leads.
  - ☐ Integrate fuels treatments with silvicultural treatments by creating two projects in 2008 that use BLM fund codes 2823, 2824 (Fire/Fuels), 6320 (Silviculture), and 5900 (locally retained timber sale fund) that remove biomass and use it rather than pile and burn it. Forest Service will create two projects that use comparable budget codes. Responsibility: Timber Staff, Fuels, Silviculture, Biomass, program leads.
  - ☐ Implement timber sale provisions to reduce slash disposal deposits when the purchaser utilizes biomass. Responsibility: Timber Staff, Biomass, program leads.
  - ☐ Experiment with giving credit for biomass removal in lieu of BD collections. Responsibility: Timber Staff, Fuels, Silviculture, Biomass, program leads.
  - ☐ Experiment with selling material by the ton; include provisions allowing additional product removal (FS C(T)-211). Responsibility: Timber Staff
  - ☐ Utilize budget line items for timber sale slash disposal (generally piling and burning) towards biomass utilization. Responsibility: Timber Staff, Biomass program lead.

- □ Any new plan revision (WOPR and RRS Forest Plan Revision) should address biomass utilization as an expected output of forest management. Responsibility: District Manager, Forest Supervisor.
- □ Medford District BLM and the Rogue River-Siskiyou National Forest will each prepare and offer a large scale stewardship contract treating a minimum of 3,000 acres by Fiscal Year 2009 with five to ten year contract duration. Responsibility: Area Mgrs/District Rangers, Timber Staff, NEPA, Stewardship contract program leads.

- **To build small diameter and biomass knowledge and skills…**
  - □ Accelerate training and mentoring in technology, transportation, and web-based information sharing. Responsibility: Biomass program leads.
  - □ Develop a Service First biomass/small diameter position to champion emphasis on small diameter/biomass across federal agencies and work with ID teams. Responsibility: District Manager, Forest Supervisor.
  - □ Develop multi-skilled workers through mentoring, recruitment, and exposure to multiple resources during apprenticeship or entry level (including SCEP, SEEP, etc.). Area Mgrs/District Rangers, Timber Staff, Fuels, Silviculture, Biomass Stewardship contract program leads.
  - □ Collaborate with other federal, tribal, state, and private land owners as well as affected business, communities and key partners. Responsibility: Biomass program leads.

Goals of 2009-2011

- **To provide substantial amounts of biomass and small diameter at scales that meaningfully treat large landscapes…**
  - □ Develop supply projections for small diameter materials based upon a 5-year action plan of activities (fuels treatments, thinnings, or commercial timber).
  - □ Create a Southwest Oregon "SDT and Biomass Opportunity" GIS layer to be used for project planning and prioritization by both federal agencies. Integrate with Jackson and Josephine County Fire Plans
  - □ Participate in and support the development of a Coordinated Resources Offering Protocol (CROP) long term localized small diameter and biomass supply projection by providing data on stand locations, volume, and size classes and other associated data across all ownerships.
  - □ Develop one joint BLM/FS Stewardship Contract annually that includes a biomass component. These projects should be in places on the landscape where efficiencies could be gained by both federal agencies working together. This would allow the federal agencies to work together on planning, contracting, and implementation phases of landscape scale and restoration work. Forest Service and BLM have an opportunity for coordination in the Upper Applegate DEMO project.

- **To reinforce small diameter and biomass production and utilization as a key component of natural resource management…**
    - □ Implementation of SDT and biomass utilization should become an integral part of the federal agencies day to day operations, and part of the expectations for yearly targets and accomplishments.
    - □ Look for opportunities to work with other groups and federal resource agencies such as USDA Development Rural Utilities, Rural Business programs and Natural Resources Conservation Districts to enhance biomass utilization projects.
    - □ Conduct feasibility studies on using biomass for combined heat and power on retrofits of existing agency offices and facilities and Fuels for Schools programs.
    - □ Standardize on an annual report for both federal agencies to address accomplishments related to biomass utilization.
    - □ Joint FLT/DLT yearly agenda item to assess progress on biomass utilization efforts, program changes and recommendations.

- **To increase community capacity for the production and utilization of biomass and small diameter…**
    - □ Initiate, support, and adopt collaborative efforts among industry, federal agencies and communities that develop social understanding and acceptance of fuels reduction approaches and/or the restoration of fire ecology (Applegate Fuels Demo, Applegate Fire Learning Network, Community Wildfire Protection Plans (including update of the Applegate Fire Plan), and County Fire Plans). *(see Appendix C)*
    - □ Collaboratively develop social, ecological, and economic guiding principles (i.e. SOSDC).
    - □ Target the areas deemed high priority and most at risk (especially WUI) described in the BLM/FS five year program (RAMS, NFPORS) of work and Interagency Fire Plans. Coordinate with the County Fire plan strategies to prioritize work and look for adjacent federal land opportunities.
    - □ Develop new methods to reach small contractors and other non-traditional bidders on NFP, HFI, HFRA contracts. Increase the pool of potential bidders through press release and media out reach. Opportunities include working with SOTIA, Oregon Logging Conference, Associated Oregon Loggers, SOREDI, Stewardship contacts.
    - □ Encourage development of small businesses that can add value to small diameter material. Partner with economic development groups such as Southern Oregon Region Economic Development Incorporated (SOREDI), and Southwest Oregon Resource Conservation & Development Council (SWRCDC) to look for opportunities to meet the needs of small businesses.
    - □ When biomass projects are offered for sale and during operation of SDT and biomass utilization projects, public affairs will issue press releases and media field trips will take place to aid in public understanding of the quality and quantity of biomass that may be available from public lands.

- **To increase capacity to utilize small diameter and biomass there are other matters worth consideration…**
    - Review "unsold" timber sales (or uneconomical portions thereof needing vegetative treatments) for Stewardship or service contract possibilities which result in biomass and/or small diameter material.
    - Explore methods to retain Stewardship contract receipts locally for subsequent local Stewardship projects.
    - Increase the use of Stewardship contracts; develop one 10 year contract in a high priority risk area covering a larger area than has been appraised so far with evaluation criteria that could include purchaser's intentions for utilizing biomass.

Benefits resulting from adoption of recommendations

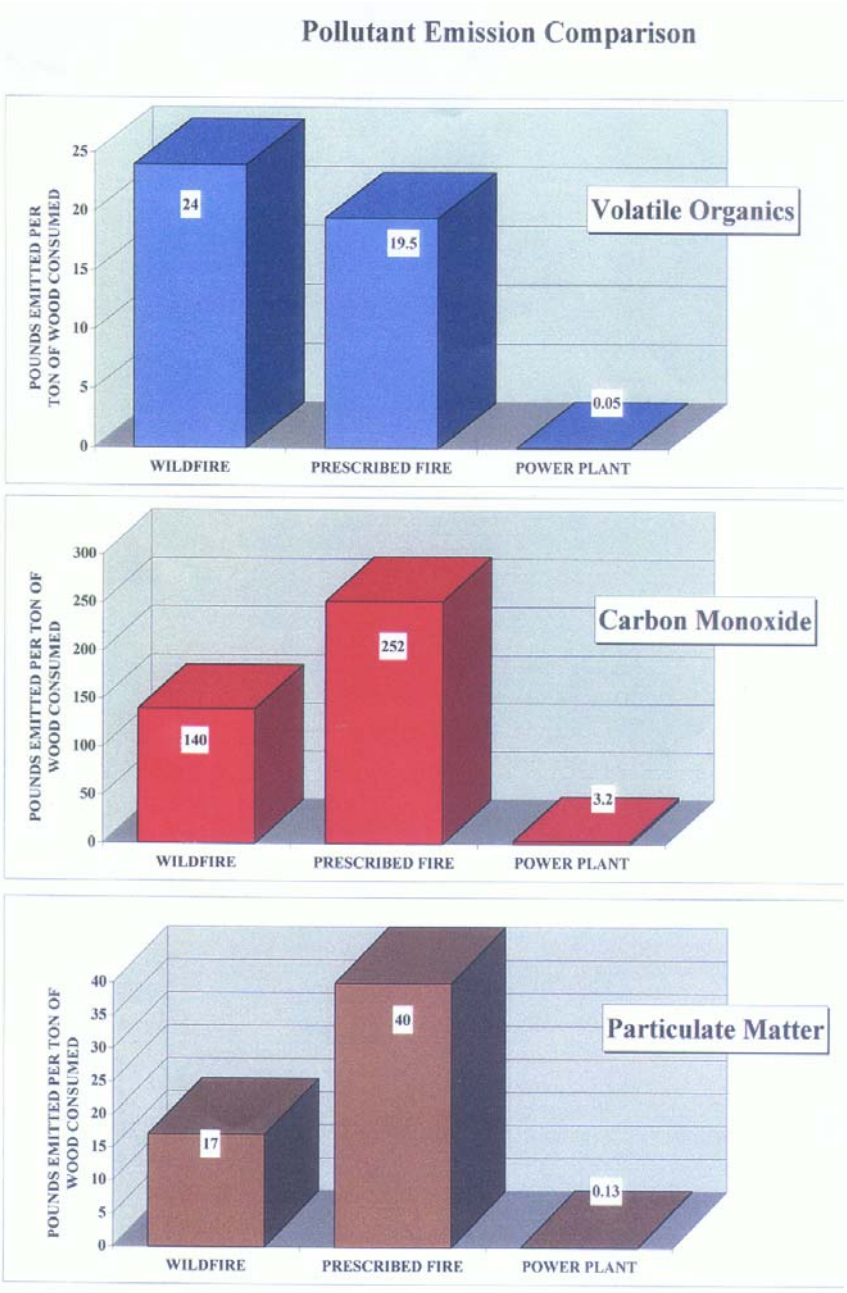
Within the next 10 years:

- Reduce the impact and potential for large fire growth within and adjacent to WUI and municipal watersheds that result in property or watershed damages.
- Reduce the number of wildfire acres categorized as severe and reduce associated containment costs.
- Increase by 10% the number of entire watersheds treated (6^{th} HUC) to improve forest/woodland health and vigor.
- Creating healthier and more fire, insect and disease resilient forests.
- Removing biomass can reduce hazardous fuels generated by commercial harvesting operations. This results in both lowering the hazardous fuel conditions, and reducing the risk associated with conducting prescribed burning, particularly in the WUI.
- SDT and Biomass utilization provides employment not only in the facilities designed to use the material, but also in getting the material out of the woods and transporting it to the facilities.
- Using woody biomass in these and other ways can have several beneficial side effects, including stimulating local economics and potentially facilitating additional fuel reduction efforts by creating a demand for thinned material
- Increased social awareness and acceptance of forest management practices that utilize small diameter material.

- Collaboration process may allow a deeper understanding and acceptance of general forest management practices. Generally, those who are opposed to most of the federal agencies timber sales are supportive of small diameter and fuel reduction projects. Since most timber sales are protested and litigated, moving forward on small diameter and fuel reduction projects can accomplish much needed work and build trust and support

Net Improvement to Air Quality

According to the EPA, the burning of biomass in a closed environment such as a biomass generating facility can reduce carbon monoxide emissions up to 97% as opposed to open burning of this same material in the forest which does not produce useful energy or products. Biomass energy production also makes substantial contributions to reducing greenhouse gas emissions by shifting the proportion of carbon emissions associated with biomass cycling away from more climate–active forms (hydrocarbons including methane), and toward the less climate-forcing form (carbon dioxide) and by protecting forests and forest biomass from the risks of destructive wildfires thereby increasing the capacity of the forests to sequester carbon.



Graph Courtesy of Wheelabrator Shasta Energy Company, Inc. Steve Jolly, Fuel Manager

The principles in this Strategy are subject to relevant law, as it may be amended from time to time. This strategy should be continuously monitored for relevancy and practicality and revisions, if necessary, should be initiated at the beginning of FY 2009. However, the parties may modify this Strategy at any time by a written amendment executed by all parties.

Completion Date. This Strategy is executed and made effective as of the date shown below.

THE PARTIES HERETO have executed this Strategy

_____ _____

Timothy B. Reuwsaat Date
District Manager,
Medford District, Bureau of Land Management

_____ _____

Scott D. Conroy Date
Forest Supervisor
Rogue River – Siskiyou National Forest

Appendix A

Ecological Perspective on the Origin and Accumulation of Woody Biomass in Southwestern Oregon

Disturbances such as windthrow, insect epidemics and lightning ignited wildfire, have been influencing the development of the southwestern Oregon forest for many thousands of years. Of these, wildfires have been identified as an influential disturbance, modifying the development of species composition, stand density, tree growth and stand structure.

Historically, fires likely meandered throughout the forests year after year, modifying the forest vegetation and structure with every pass. In time, only ecological processes and species able to persist in the presence of frequent fire reproduced, creating forest ecosystems that are not only adapted to frequent fire but dependent upon it. However, as a result of fire exclusion beginning early last century, many forests that once burned regularly have began to develop differently, consequently the ecological processes that sustained their productivity and resiliency are changing, rendering them increasingly vulnerable to both insect infestations, disease and the potential for uncharacteristically intense fire.

Low intensity fires served as a thinning mechanism, thereby regulating tree density and the accumulation of woody biomass throughout the forests. In the absence of frequent fires, forest densities have been increasing at an unchecked rate. More slow growing trees are being produced rather than fewer, faster growing trees, resulting in altered stand structure and composition.

While removing the accumulation of smaller stems will eventually decrease the woody material present on the forest floor and possibly decrease fire hazards, there is the possibility that nutrient loss will need to be evaluated. Several studies have shown it is unclear if nutrient removals from fuel reduction activities adversely affect site productivity.

Fire Exclusion

Over the last century, fire suppression efforts have been clearly effective in Southern Oregon. According to the Oregon Department of Forestry, Bureau of Land Management and U.S. Forest Service records, from 1920 and 2000, over 5,265 lightning ignited wildfires were quickly extinguished by fire suppression personnel within this area. The fires averaged about 18 acres with less than 6% attaining a size greater than 100 acres. More recently though, wildfires have been increasing in size and proving more difficult to control. In 2002 for example, nearly 6.5 million acres burned throughout the Western US, which is nearly two times the historic national average.

Wildlife Habitats

Forest ecosystems have been evolving and adapting for thousands of years, thus their composition, structure, and ecological processes are essentially a product of their ongoing physical environment. Fire modifies stand characteristics and biological processes with each event by altering the quantity, distribution and density of surviving trees and shrubs, species composition and growth, stand structure, dead and down woody biomass and habitats for a variety of species. Therefore, the wildlife and other organism's habitats, that these forests provide and sustain, are a consequence of their historic fire environment and disturbance during stand development.

The basic principle of forest ecosystem restoration is to identify, usually from reference sites, the natural mechanisms that sustained forest productivity, structure and processes, and then manage the existing resources utilizing an understanding of these principles. Techniques including harvesting, thinning and prescribed burning can potentially be utilized to achieve long-term conditions that create, restore or partially mimic these historic processes that created and sustained wildlife habitat for many species of plants and animals. Therefore, the utilization of the woody biomass made available by needed treatments may facilitate wildlife enhancement projects that may have otherwise not been economically viable or possible.

Fire Regime Condition Class

Fire has been an intricate process of forest ecosystem dynamics throughout time. Native forest plant species have adapted to living in fire prone environments. Therefore, the frequency of fire during stand development may influence the size and number of surviving trees. In the absence of fire, species like white fir, which are relatively susceptible to fire, become established and gradually displace the more fire-adapted species such as Douglas fir and ponderosa pine. During extended periods without fire, fire dependent species may decline in abundance and eventually disappear therefore, the lack of fire may result in a shift in relative abundance of both overstory and understory trees, shrubs and herbs, influencing the dynamics of forest succession and stand development. Thus, the lack of fire may alter fire regimens resulting in a shift in stand structure and the habitats that they create. One method of evaluating the degree to which fire exclusion has influenced stand density, structure and species composition, relative to historic development, which included more frequent fire, is termed Fire Regime Condition Class (FRCC). Usually applied at a watershed scale, the FRCC process provides a measure of departure from desired conditions and can be used to prioritize the urgency for treatment where biomass utilization may play a role.

Appendix B

Publications and Reference Material Concerning Biomass Utilization.

The Healthy Forest Initiative, August, 2003

Stewardship Contracting Authority, 2003, (P.L. 108)

The Healthy Forest Restoration Act of 2003 (P.L. 108-148)

Energy Policy Act of 2005

Biomass Research & Development Act of 2000

Woody Biomass Utilization for Restoration and Fuel Treatments on Forests, Woodlands and Rangelands Memorandum of Understanding, DOI, USDA, DOE, June, 2003

BLM's Biomass Utilization Strategy, June, 2005

USDA's National Strategic Biomass Plan and Implementation Plan, June, 2005

Hazardous Fuels Five Year Program of Work, BLM IM No. 2005-200, OR-2006, August, 2005

Option for Woody Biomass Utilization in Procurement Contracts, Lynn Scarlett DOI, June, 2005

USDA Regional Strategy for Vegetation Treatment, June, 2005

USDA Tribal Forest Protection Act, April, 2005

Service First Memorandum of Understanding, DOI, USDA, February. 2006

Inclusion of Biomass Use as a Proposal Evaluation Factor, BLM IM No. 2005-203

RAMS – Risk Assessment & Mitigation Strategies Overview - BLM Out year Planning

Assessing the Potential for Renewable Energy on Public Lands,
DOI, DOE, February, 2003

BLM Stewardship "End Results" Contracting Guidance Version 2.0, November, 2005

GAO Report on Natural Resources & the Utilization of Woody Biomass, May, 2005

The value of the Benefits of U.S. Biomass Power
G. Morris, Green Power Institute, Berkeley, California and NREL

Western Governor's Association Clean and Diversified Energy Initiative Draft Report of the Biomass Task Force, January 2006

Utilization of Forest Biomass to Restore Forest Health & Improve US Energy Security
Society of American Foresters

Forest Fuel Reduction: Current Methods and Future Possibilities
Chad Bolding, Bobby Lanford, Loren Kellog

Small Diameter in Southwest Oregon: A Resource to Expand Utilization
George McKinley, Ryan Temple, David Schmidt

Small Diameter Inventory for Jackson County, Jackson County Commissioners Staff, Rogue River- Siskiyou NF, Medford District BLM, December, 1999

Rogue Institute Report on Small Diameter Timber in Southern Oregon, RIEE, 1989

Product Research, Development and Utilization of Small Diameter and Underutilized Woods in Josephine County, Oregon April, 2004 - SN, Sunny Wolf CRT

USFS Pacific Northwest Research Station, Model on Biomass Availability, Jamie Barbour, USFS PNW Research, Portland Oregon

Forest Residues Bundling Project: New Technology for Residue Removal
Southern Research Station, Auburn, Alabama 2003

Oregon Biomass Opportunities, January, 2005

Oregon Renewable Energy Action Plan, April, 2005

Biomass in California: Challenges, Opportunities, and Potentials for Sustainable Management Development – California Energy Commission, June 2005

California Biomass Collaborative Quarterly Newsletter

Community-based Forestry Perspectives on Woody Biomass
Rural Voices for Conservation

Southern Oregon Small Diameter Collaborative Stewardship "The Knitting Circle"

Southwest Oregon RC&D

Coordinated Resource Offering Protocol (CROP) MOU BLM Prineville District, Deschutes/Ochoco/Mt. Hood National Forest, Confederated Tribes of the Warm Springs Indian Reservation,

Lakeview Biomass Energy Facility, Oregon Solutions, January, 2006

Forest Concepts, Wildlife Friendly Cattle Exclusion Fence, September 2002

Appendix C

Groups Promoting Small Diameter Wood/Biomass Utilization in Southwestern Oregon

- Southern Oregon Small Diameter Collaborative Group (Knitting Circle)
  Focus Area: Rogue Basin

- Jefferson Sustainable Development Initiative
  Focus Area: Southwestern Oregon

- Lomakatsi Restoration Group
  Focus Area: Southwestern Oregon

- Applegate Partnership
  Focus Area: Applegate Watershed

- Sustainable Northwest
  Focus Area: Pacific Northwest

- Southwest Oregon RC&D
  Focus Area: Jackson/Josephine Counties

- Sunny Wolf
  Focus Area: Josephine County

- Illinois Valley CRT
  Focus Area: Southern Josephine County

- Jackson County Fire Plan Committee
  Stewardship & Biomass Sub Committees
  Fuel Reduction Committee
  Focus: Jackson County

- Josephine County Fire Plan Committee
  Stewardship & Biomass Sub Committees
  Fuel Reduction Committee
  Focus: Josephine County

Appendix D

Small Diameter Manufacturing Facilities & Utilization Centers In Southern Oregon

Business	Contact	Phone	Products
Brentwood Furniture Inc.	Gary White	541-474-0996	Furniture
Diamond H Enterprises		541-899-8274	Reclamation
East Valley Wood Products	Gary Schaefer	541-479-4095	
Green Mtn. Woodworks	Mark Stella	541-5355880	Flooring
Grizzly Bear Log Homes		541-899-1233	Log Homes
Hardwood Industries Inc.	Ron Devries	541-779-7526	Wholesaler
Homestead Log Homes	Jim Hoffman	541-826-6888	Log Homes
Kauffman Wood	Delbert Kauffman	541-592-2568	Furniture
Medford Molding	Paul McKay	541-826-2181	Moulding
Murphy Creek Cut Stock	Bob Forbes	541-862-2193	Posts, Spindles
Northwest Pole Co.	Darryl Starr	541-734-4790	Rails, Posts
O&O Cut Stock	Don Owen	541-826-9874	Reman
O'Brien Manufacturing	John O'Brien	541-773-2410	Oak Products
Oregon Fir Millwork Inc.	Doug Seeley	541-826-9210	Cut Stock
Rogue Valley Fuel	Allen Surgeon	541-826-8112	Posts, Poles
Rogue Valley Bin Co.	Ron Reames	541-664-1221	Cut Stock
Sawyer Smoker Paddles	Bruce Bergstrom	541-535-3606	Paddles, Oars
Southern Oregon Lumber		541-664-3365	Planning
Tolo Forest Products	Tom Schill	541-664-4296	Peeler Cores

Small Diameter Manufacturing Facilities & Utilization Centers in Southern Oregon

Business	Contact	Phone	Products
Valley Veneer Inc.	Lloyd Jones	541-476-8846	
Weaver Forest Products	Wally Hicks	541-826-5115	Reman
Western Valley Cut Stock	Mark Strickland	541-826-2681	Veneer Strips
Western Veneer & Slicing	Greg Applen	541-826-9020	Sliced Veneer
Westwood One Firewood	Ron Hallicka	541-865-3312	Firewood
Wolf Creek Woodworks	Jim Stublefield	541-866-2545	Flooring

Larger Small Diameter Manufacturing/Biomass Facilities In Southern Oregon

Business	Contact	Phone	Products
Biomass One	Gordon Draper	541-826-9422	Electric/Steam
Boise	Mark Nystrom	541-830-7902	Lumber/Ven
Hilton Fuel		541-664-3374	Hog Fuel
Murphy Veener	Jon Beck	541-826-2811	Veneer
Rough & Ready Lumber	Link Phillipi	541-592-3116	Lumber
Sierra Pine	Dan Stickler	541-773-2522	MDF Board
Swanson Group Inc.	Don Hardwick	541-935-7548	Lumber/Veneer
South Coast Lumber	Darrel Bondie	541-469-3898	Lumber/Veneer
Southport Forest Prod	Forrest Flowers	(541) 297-5482	Lumber
Northwest Hardwoods	Greg Foster	541-247-3686	Chips

Appendix E

Cost Comparison of SDT/Biomass Removal vs. Burning on Site

Typical BLM operational contract costs – January, 2006

Shrub/Woodland

Slashing of brush and hardwoods	$505 / acre
Pile and cover cut material	$496 / acre
Burning of piles	$ 50 / acre
	$1,051 / acre

Conifer Understory

Conifer Slashing – material 8 inches or less	$261 / acre
Pile and cover cut material	$410 / acre
Burning of piles	$ 41 / acre
	$712 / acre

Boaz Gulch Demonstration Site

Boaz Gulch was a small 50 acre study designed to establish costs of combining commercial conifer thinning operations with understory fuel treatment. The thinning prescription removed sawlog material from approximately 8-18 inches DBH. The operation also removed pole material from 2-7 inches DBH. The majority of tops and limbs were also removed and yarded to the landing. All material was utilized for sawlogs, poles, firewood and biomass.

Cost of yarding/hauling material from forest to utilization centers	$670/acre
Revenue from material sold as products	$320/acre
Final cost per acre to complete treatment	$350/acre

A more detailed summary of the costs and marketing of material will be forthcoming in the *Boaz Forest Health and Small Diameter Utilization Project Final Report.*

Appendix F

FOREST FUEL TREATMENT/BIOMASS UTILIZATION

BIOMASS CONVERSION FACTORS

Summarized below are some woody biomass conversion factors that are commonly used by natural resource managers in the Pacific Northwest:

1 green ton (GT) of chips	= 2000 lbs. (not adjusted for moisture)
1 bone dry ton (BDT) of chips, content)	= 2000 dry lbs. (assumes no moisture
1 bone dry unit (BDU) of chips, content)	= 2400 dry Ibs. (assumes no moisture
1 unit of chips	= 200 cubic feet
1 BDT chips	= 2.0 GT (assuming 50% moisture content)
1 unit of chips	= 1.0 BDT chips
1 ccf (hundred cubic feet) roundwood	= 1.0 BDU chips
1 ccf roundwood (logs)	= 1.2 BDT chips
1 ccf roundwood (logs)	= 1.2 units of chips
1 ccf roundwood (logs) wood/cord)	= 1.2 cords roundwood (@ 85 cu. ft.

1 BF = board foot lumber measure equivalent to wood volume of 12" x 12" x 1" thick
1MBF = 1,000 BF
1 GT of logs = 160 BF of lumber
6 GT of logs = l MBF

1 standard chip van carries 25 green tons, or approximately 12.5 BDT assuming 50% moisture content.

When woody biomass is utilized in a commercial (10+ MW electrical output) scale power generation facility the following energy output rules of thumb apply:

1 BDT fuel will produce 10,000 Ibs. of steam
10,000 Ibs. of steam will generate 1 megawatt hour (MWH) of electricity
1 MW = 1,000 horsepower
1 MW = power for approximately 750 to 1,000 homes
1000 board feet of standing timber harvested generates approximately 1 ton of slash

Appendix G

Regional Biomass Consultants

President Power Generating, Inc. – Full Service Consultants
Stephen F. Anderson
8590 SW Miami St.
Wilsonville, OR 97070
USA Office: (503)297-8263
Home: (503)682-3731
Fax: (503)682-1656
Email: stephen.anderson@verizon.net

Subjects: Project development from conceptual planning to permitting, contracting, and finance. Particular familiarity with biomass, wind, geothermal, and gas turbine plants

TSS Consultants – Full Service Consultants
Tad Mason
2724 Kilgore Road
Rancho Cordova, CA 95670
Phone: (916) 638-8811 ex 112
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Cell: 916:600-4174
Home: 916-941-7175
Email: tmason@tssconsultants.com

Subjects: Project development from conceptual planning to permitting, contracting, and finance. Particular familiarity with biomass, and gas turbine plants

Carlson Small Power Consultants
Bill Carlson
13395 Tierra Heights
Redding, California 97003
Phone: (530) 275-2735
Mobile: (503) 945-8876
Email: cspc@shasta.com

Subjects: Project development from conceptual planning to permitting, machinery, contracting, and finance. Particular familiarity with biomass, and gas turbine plants

Coordinated Resource Operating Protocol (CROP)
Mater Engineering, Ltd**.**
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101 S.W. Western Blvd.
PO Box O
Corvallis, Oregon 97339
541-753-7335
Fax: 541-752-2952
E-Mail: **mater@mater.com**
Subjects: Project development from supply, conceptual planning to permitting, contracting, and finance.

Continental Resource Solutions Inc
Glenn Zane
1615 Continental Street, Redding, CA 96001
(530) 246-2455

Subjects: Project development from conceptual planning to permitting, contracting, and finance. Particular familiarity with biomass, and gas turbine plants

McNeil Technologies - Full Service Consultants
Randy Hansberg
143 Union Blvd.
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Phone: (303) 273-0071

Subjects: Project development from conceptual planning to permitting, contracting, and finance. Particular familiarity with biomass, wind, geothermal, and gas turbine plants

USDA Lassen National Forest
Eagle Lake District
Rod Vinyard
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Warm Springs Indian Reservation
Larry Potts, General Manager
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Warm Springs OR 97761
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Portland State University
NPCC - 720 URBN
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Appendix H

Challenges with Recommendations for Implementation of Small Diameter and Biomass Utilization

The greatest challenge to SDT and biomass development is harvest and transportation cost coupled with the low value of the products. Other, less significant challenges can be addressed with explicit strategies and tactical solutions, others are beyond the Federal agencies' control. However, there are many challenges which the federal agencies may be able to influence the desired outcome. Although the list is not inclusive, some of these challenges are identified below

✚ Indicates a challenge that the federal agencies can control or influence

– Indicates a challenge that is beyond the federal agencies control but perhaps can be influenced.

Internal to the Federal Agencies

✚ **SDT and Biomass utilization are just starting to gain some interest. Without budget line items or targets, it does not get nearly the attention that larger traditional programs get. Congress does not appropriate line item budgets for this type of work. Because of this, current agency targets, funding and goals are driven primarily in the preparation of large scale or commercial timber sales. There is a need to target federal agency resources to provide NEPA ready projects, on the shelf, now and into the future.**

Recommendations:

- *Develop supply projections for small diameter materials based upon a 5-year action plan of activities (fuels treatments, thinnings, or commercial timber).*
- *Develop projects specifically aimed at utilization of small diameter material and biomass.*
- *Identify sources of small diameter material and biomass available across an agreed upon landscape resulting from timber sales, fuels reduction projects, and pre-commercial thinning.*
- *Improve contracts and contract stipulations to improve current practices within existing authorities.*

– ✚ **Timber target and hazardous fuels treatment accomplishment will remain the Agency's top priorities. ASQ/PSQ continues to be in the forefront of budget and funding decisions. Recognition for accomplishment continues to tier to meeting timber volume goals and targets.**

Recommendation:

- *Incorporate biomass utilization offering into timber sales, fuel reduction projects and service contracts using the existing and new contract clauses.*
- *Need to be logical about what can be accomplished with fewer dollars and staff.*
- *Develop targets and funding specifically for biomass utilization.*
- *Form a team of people, coordinated through respective agency biomass and stewardship contract leads, who are enthusiastic about biomass utilization. Dedicated teams have proven to be of great benefit in the past to moving projects or programs forward. Focus on multiple year contracting opportunities.*

✚ **The federal agencies have the institutional knowledge and regulations related to selling commercial timber but have had little experience in the sale of low value small diameter timber and woody biomass.**

Recommendations:

- *Federal agencies have the authority to sell forest product material by the ton as an alternative to the traditional board foot standard to establish volume and value. Experiment with its use and review records to establish more accurate information.*
- *Engage the ingenuity of communities and private timber companies.*
- *Include in timber sale prospectus the option for additional product removal (non-sawlog) FS C(T)-211, (Forest Service).*
- *For Forest Service timber sales, experiment with giving credit for biomass removal from site in lieu of BD collections.*

✚ **Tools provided by the NFP, HFI & HFRA, Categorical Exclusions Streamlined EAs, Counterpart Regulations, and Stewardship contracts are not widely used at this time.**

Recommendations:

- *Using Stewardship contracting methods can leverage the federal agencies budget by allowing local contractors to carry out forest health restoration work and use commercial timber as compensation for the project work. Opportunities for increased use of SDT and Biomass may be gained through the use of these contracts.*
- *The establishment of long term, large acreage, landscape wide Stewardship projects may require a new approach to the NEPA process.*
- *Investigate possibilities to retain receipts from stewardship contracts on local administrative units to be used for future stewardship projects.*

✚ **Lack of program integration inhibits incorporation of biomass utilization into programs and projects.**

Recommendation:

- *Responsible staff acknowledges and rewards innovation and abilities to accomplish new categories of work and targets.*
- *Key staff to work with program leads to allow a shift to biomass utilization in a way that does not pressure existing programs or funding.*

✚ Currently fire/fuels disposes of unutilized material through burning while timber staff is responsible for appraisals and selling of merchantable material.

Recommendation**:**

- *Integration of the two disciplines is recommended.*
- *When working on any project with biomass utilization, both fuels and timber representatives should work together to incorporate the strengths of each program.*
- *Implement timber sale provisions to reduce slash disposal deposits when the purchaser utilizes biomass.*
- *Change Forest Service targets from BD deposits to biomass accomplishments.*

✚ Fuels reduction targets units of accomplishments.

Recommendation:

- *BLM target for '06 is 10% of all mechanized fuels treatments, 50% by '08. Develop unit of accomplishment for biomass utilized and program into Annual Work Plan and the Risk Assessment and Mitigation Strategies overview (RAMS).*
- *Strategically target fuels reduction projects to protect rural communities and municipal watersheds based on threat of fire, Condition Class 2 and 3 as priority areas and restore forest health across the landscape.*

✚ Within the federal agencies, Biomass utilization could be a significant addition to the existing workload and costs.

Recommendation:

- *Utilize fuel reduction monies that would have been spent for slashing, hand piling and burning to offset the cost of biomass utilization and removal.*
- *Utilize the option to remove woody biomass in all service contracts and include in timber sale contracts. Five year hazardous fuel reduction funding priorities for 2823, 2824 will go to projects utilizing biomass: IM #OR-2006 Hazardous Fuels Five Year Program Of Work, October 10, 2005.*
- *Use appropriations from existing programs that typically fund service contracts or cost share agreements and use to assist in biomass removal.*
- *Increase the number of stewardship, fuels and silviculture IDIQ (Indefinite Determination/Indefinite Quantities) contracts and task orders that include a biomass component.*

✚ **The federal agencies a beginning to emphasize the importance of utilization of biomass material in our program of work and National Directives. Federal agencies should explore utilization opportunities which in some cases may involve cooperation with other existing entities and entrepreneurs**

Recommendation:

- *Conduct feasibility studies on using biomass for combined heat and power on retrofits of existing agency offices and facilities. Fuels for Schools programs.*
- *Look for opportunities to work with other groups and resource federal agencies such as USDA Development Rural Utilities, Rural Business programs and Natural Resources Conservation Districts to enhance biomass utilization projects.*
- *Implementation of SDT and biomass utilization should become an integral part of the federal agencies day to day operations. All levels of the federal agencies' organization should embrace the concept of biomass utilization as part of the expectations for yearly targets and accomplishments.*
- *Standardize an annual report for both federal agencies to address accomplishments related to biomass utilization.*
- *Joint FLT/DLT yearly agenda item to assess progress on biomass utilization efforts, program changes and recommendations.*

✚ **No appraisal standards are in place for biomass utilization associated with timber sales. In some instances, it would be in the best interests of the government to have tops and limbs removed from the site rather than prepare for disposal on site. Currently, there is no standard way to appraise for the removal of the biomass material in lieu of burning on site. For both the BLM and FS, current regulations call for charging a least a minimum rate for any forest product that is removed from the woods for commercial purposes. These regulations do not provide incentives for removal of material.**

Recommendation:

- *Continue to explore methods to integrate timber sale contracts and understory fuel reduction work into one contract to allow increased utilization by using equipment already on site for removal and utilization of poles, limbs and tops in one operation.*
- *Increase the use of Stewardship Contracts*
- *Work with Regional, Sate and National level to sort through this situation. The regulations were created for high value material and not for biomass. The biomass material is essentially a 'liability' in the forest as a fuel hazard. It only has a nominal value once it is removed and brought to the facility.*

✚ The knowledge base for SDT and biomass utilization and the full range of tools available to implement projects is limited at all levels of the federal agencies.

Recommendations:

- *Continuing education, support and acknowledgement by all levels of management of the importance of biomass utilization to the federal agencies core workload. Accelerate training and mentoring in technology, transportation, and web based information sharing.*
- *Workshops, conferences and personal research are needed to incorporate biomass utilization part of the federal agencies day to day operations.*
- *Collaborate with other federal, tribal, state, and private landowners as well as affected business, communities and key partners.*

- ✚ Due to retirements and budget cuts there is an increasing loss of experienced staff with the institutional knowledge, skills, and experience to plan, design, analyze and implement forest and woodlands.

Recommendations:

- *Increase the number of multi-skilled positions. Set a goal of 25% of the workforce to be in entry level positions*
- *Encourage and build skills in the younger members of the workforce. Set a goal to use SCEP authorities to fill half the entry level positions where appropriate.*
- *Utilize opportunities for mentorship to build capacity in the workforce.*
- *Utilize programs such as Federal Career Internship Program to build wide ranging skills in new members of the workforce.*

✚ Skills are needed in-house to implement stewardship projects.

Recommendation:

- *New contracting authorities and long term contracts (such as those provided in stewardship contracting) should be implemented to help establish a reliable, sustainable supply of woody biomass.*
- *The federal agencies need the interrelated capabilities in our project planning process to be able to enter into long term contracts.*

✚ Available funding is currently inadequate for implementation of SDT and biomass utilization projects as well as fuel reduction work.

Recommendations:

- *Increase funding to treat more acres with biomass utilization.*
- *Change budget allocation criteria from unit cost to "risks reduced", "values enhanced", or "values protected".*
- *Review components contributing to high unit costs and make needed changes.*

- *Revisit priorities: WUI vs. non WUI. Are there other funding opportunities?*
- *Implement demo projects that incorporate a set of new performance measures associated with Medford District and Rogue-Siskiyou budget line items.*
- *Look for innovative ways to fund and facilitate the removal of biomass.*

✚ **Currently, there is no existing line item that allocates funds and attaches a target to biomass utilization.**

Recommendation:

- *Establish a funded biomass charge code.*
- *Make funding available for Districts and States to compete based on established criteria contained in 5 year POW, 10 year NFP, comprehensive plan, etc. NFP, BLM and FS Strategic Biomass Utilization Strategies.*
- *Budget line items for activity slash (appraisal in TS) and ladder fuel dollars 2823/2824/6320 could be directed towards biomass utilization.*
- *Establish a dual agency biomass program coordinator utilizing the Service First concept. There are possibilities from creatively funding a dual agency position utilizing existing authorities.*
- *Biomass program should be an integral component of the fuels shop with the objective being to use biomass and not burn it.*

✚ **BLM and FS currently have differing utilization standards. BLM considers merchantable saw log material as any standing tree greater than eight inches DBH and does not require removal of all material sold. FS on the other hand, utilizes a minimum piece size eight feet or greater in length and 7 inches in diameter (5.5 inches inside bark) and requires that all sold material be removed from the unit.**

Recommendation:

- *Both federal agencies standardize on the definition of standing trees eight inches in diameter or greater constitute a merchantable tree. BLM should adopt the policy of all trees designated for removal must be removed from units.*

✚ **Currently, a policy does not exist stating that using woody biomass is preferable to pile and burning material.**

Recommendation:

- *Develop local policies for BLM and FS to incorporate utilization into 2006 contracts.*

- *For 2006, each field unit will produce at least one timber sale contract and one service contract that incorporates the offer of biomass material. This includes use of poles, firewood, limbs and tops.*
- *Increase funding or incentives for vegetation treatments that incorporate or exemplify innovative ideas for woody biomass utilization.*
- *Develop guidelines for tracking the accomplishments of all forms of biomass utilized, appropriately measured in green tons.*

✚ **Currently, regulations in timber sale contracts do not allow for using fuels money to yard and dispose of slash. What is allowed after the timber sale is to have fuels monies pay for a service contract to slash pile and burn un-merchantable material. Integrating the two activities would be far more efficient and cost effective while yarding equipment is already on site.**

Recommendation:

- *Continue to work with the state and national office to develop appropriate contract clauses. Stewardship contracts already allow this integrated approach and these authorities will be needed as the federal agencies approach the goal in 2008 of having 50% of fuels reductions projects offering biomass material.*

✚ **Neither the BLM nor Forest Service Land Use Plans mention biomass utilization. No expectation of the amount of biomass to be removed and its subsequent effects were analyzed in current land use plans.**

Recommendation:

- *Any new plan revision should address biomass utilization as a projected output of forest management. Effects analysis should anticipate the number of tons to be removed or acres treated per year or decade. This strategy can be used to guide these efforts.*

Utilization

- **Two principal hurdles to increasing the use of woody biomass are: the inherent difficulty in using woody biomass cost effectively due to the high costs of harvesting and transporting, and the lack of a reliable supply of the material.**

Recommendation:

- *Use portions of recent unsold (no-bid) timber sales, revamp them into stewardship contracts and incorporate the utilization of biomass material.*
- *Provide appropriated subsidies or other incentives in stewardship contracts to allow these projects to accomplish the original forest health goals and move forward. Both FS and BLM have sales in this category.*

- *Offer biomass in service contracts, educate and train personnel, concentrate on areas that are accessible. Subsidize to what ever extent possible the harvest and transportation costs with fuels dollars.*
- *Utilize GIS layers to strategize landscape level biomass supply planning over time. Create a SW Oregon Biomass Opportunity GIS layer to be used for project planning.*
- *Participate in and support the development of a Coordinated Resources Offering Protocol (CROP) long term levelized small diameter and biomass supply projection by providing data on stand locations, volume, and size classes and other associated data.*
- *Work with collaborators and research for development of efficient small diameter tree extraction techniques that will minimize short term environmental damage.*

- **Lack of roads, steep slopes and poor access hamper economic viability of many projects or potential projects.**

Recommendation:

- *Concentrate initial projects in locations where existing roads and suitable terrain help reduce operating costs.*
- *For land use planning and site specific planning the federal agencies need to identify and prioritize areas that are condition class 2 and 3 which are not adequately roaded for potential timber and fuel reduction entries that could support the road development into these areas.*

- **The cost of collecting and transporting biomass to a utilization facility is often high and reduces the competitiveness of biomass to other renewable technologies that do not incur fuel costs (i.e. wind, solar, hydroelectric, and geothermal). Value added manufacturing, though it uses a relatively small percentage of removed biomass material, is important to improving the overall economic feasibility of fuels treatments.**

Recommendation:

- *Encourage development of small business that can add value to small diameter material. Partner with economic development groups such as Southern Oregon Regional Economic Development Incorporated (SOREDI) and Southwest Oregon Resource Conservation & Development Council (SWRCDC) to look for opportunities to meet the needs of small business.*
- *Continue to explore other funding opportunities such as Title II, and National Fire Plan to subsidize harvest and transportation costs.*

- **Infrastructure for handling, moving, and for processing low-value biomass and small diameter timber is undersized and few markets currently exist in proportion to the waste problem to be solved.**

Recommendation:

- *The federal agencies can influence potential markets by offering a sustainable, predictable supply of material with various contract authorities.*
- *In order for markets to grow and enough infrastructures to develop to handle that large amount of material, some type of tax credit, transportation subsidy, power purchase agreements, or other economic incentives beyond the federal agencies authority are needed.*
- *Work with collaborators for the development of new markets for small diameter timber and biomass.*

- **Current infrastructure is limited. Few markets exist to process biomass material. Private sector is reluctant to capitalize utilization infrastructure without substantial improvements in long-term predictable and sustainable supply. A recent GAO report, states 'even if cost effective means of using woody biomass were found, the lack of a reliable supply of woody biomass from federal lands presents an obstacle because business owners or investors will not establish businesses without assurances of a dependable supply of material."**

Recommendation:

- *Offer more Stewardship contracts and fuels treatment work on a larger landscape scale basis with contracts extending up to 10 years. Longer term contracts may help investment in infrastructure.*

Ecological Effects

+ **There are concerns that an ever-expanding market for woody biomass could lead to adverse ecological consequences if the demand for woody biomass leads to excessive thinning. These concerns include but are not limited to soil or site amelioration, loss of nutrients in the system, and soil compaction.**

Recommendation:

- *Cutting levels and hazardous fuels reduction are tied to forest ecosystem restoration goals and standards and guides of the Northwest Forest Plan and local management plans. These standards and guides remain pertinent to biomass and small diameter material removal. Currently, utilization barriers such as the lack of markets and infrastructure, economics and limited access, significantly reduce the likelihood of immediate deleterious ecological effects at the large scale; however site specific concerns may need to be immediately addressed on a case by case basis. This does not preclude the need to plan biomass operation at the larger scales such as the watershed or landscape.*
- *The planning of biomass utilization should strive to achieve ecological integrity that enhances and or maintains biologically diverse landscapes. It is recommitted that consideration for special status species habitats, dead and*

down wood and the recruitment of dead wood, habitat fragmentation, closed canopy species needs and species diversity be incorporated into both long and short-term project planning. In addition appropriate precautions should be in place to avoid undesirable levels of soil compaction, and adverse impacts to cultural and ecologically unique areas.

- *When properly developed, biomass utilization plans can and should contribute to ecological restoration goals. It is important to maintain as many options as possible for the Silviculture when planning projects. The preservation of the ability to be flexible and creative is important to the successful design of ecologically beneficial projects. Subjective policies that constrain ecological options such as those that limit management to a particular location, tree size, condition or species should be avoided. Prioritization of treatment areas should be consistent with the Federal agencies established planning criteria and goals.*

Social

✚ **The public lacks a full understanding of the economics of removal and limited markets for small diameter and biomass material including the costs and difficulties involved. Some members of the public and or groups are opposed to any commercial extraction of forest products.**

Recommendation:

- *Continue with demo projects as much as possible. Incorporate the cost factors and marketing information in any reports issued to educate the public on the real costs involved.*
- *As far as commercial removal, it is unrealistic and inappropriate to assume that no material should be sold. Education will be required to help people understand that utilization of material is a benefit to all. Increased utilization provides a use for material that otherwise would just be burned.*
- *Work with the local communities and counties who have Community Wildfire Fire Protection Plans in place. Consider using public involvement processes such as Coordinated Resource Offering Protocol (CROP).*
- *Develop a Community/County/Agency monitoring team to critique efficiency and effectiveness of treatment areas and products derived from those treatments and evaluate the results. Utilize expertise of industry and operators in addition to community members who have primarily "interest of place" in mind.*

✚ **Collaboration process**

Recommendation:

- *Collaboration may help parties understand each others viewpoints; however, it is a large investment of time for both agency and public participants. result of collaboration. An important part of collaboration is for* ***the parties involved to have common goals****. It is possible that focusing on small diameter and biomass*

utilization will find more common ground and allow productive collaboration to take place that could allow projects to move forward in a timely manner.

- *Regardless of the convening entity, successful community based forestry/collaborative efforts need direct involvement of agency decision makers.*

- **Litigation can hamper implementation of projects.**

Recommendation:

- *Litigation has been a frequent occurrence on BLM and FS projects. As stated above, it is hoped that small diameter utilization, biomass removal and fuels reduction have goals more in common with the groups and individuals who typically litigate agency projects. It is hoped that increased collaboration will result in less litigation.*