**SUMMARY REPORT OF DELIVERABLES**

JFSP Project 07-3-2-08

# Characterizing Lessons Learned from Federal Biomass Removal Projects


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## Study Purpose

The idea of offsetting the costs of wildfire hazardous fuels reduction treatments by selling the biomass removed is appealing. There are however challenges to biomass utilization that impedes progress. For instance, the lack of biomass processing capacity may impede progress in some regions, while in other regions an inconsistent supply of biomass available for wood products markets limits private investment.

Despite efforts to increase biomass utilization, uncertainty exists of regarding the characteristics necessary to stimulate biomass utilization, effectiveness of agency and local efforts, and the role of partnerships in building the types of capacity necessary to expedite biomass removal. The purpose of this study is to identify and assess utilization challenges in different parts of the United States. The information collected through case studies is used to address persistent conventional wisdoms to biomass utilization that may help land managers better accomplish project objectives through informed planning and implementation. It may also be used to illuminate particular barriers to biomass utilization that can be addressed through policy development at the local, state, or national level. The specific project objectives were to:

- Examine the local social and physical context in which biomass utilization strategies have developed in regions of the country with varied resources and wildfire risks;
- Identify the types of utilization activities accomplished in each case, focusing on agency, industry, and community factors contributing to project accomplishment;
- Characterize key challenges to biomass utilization experienced in each case and the strategies employed to overcome them and achieve local objectives;
- Assess the roles of collaborative partnerships in facilitating hazardous fuel reduction planning, implementation, and capacity building for biomass utilization; and
- Capture and share lessons about the approaches used to implement biomass removal projects.

## Case Selection

Nearly 150 participants in ten different locations around the country were interviewed to determine the degree to which the conventional wisdoms held true. The participants included state and federal agency staff, project planners, local government staff, loggers, manufacturers, and community partners who were involved in some aspect with biomass utilization related to efforts on USDA Forest Service, Bureau of Land Management, or tribal lands in conjunction with the Bureau of Indian Affairs. The participants were asked a common set of questions. Interviews were taped and fully transcribed verbatim for the analysis underlying this report.

The cases chosen represent ten distinct areas with unique social networks, a range of forest condition types, and levels of preexisting biomass processing capacity. As such, the information collected from participants encompasses a range of biomass utilization activities related to efforts

on the selected federal lands but that may also include activities taking place on neighboring private lands or in conjunction with other country or state efforts. The selected cases also represent areas in which the focus is on hazardous fuels reduction, where there exists a diversity of market opportunities for fuels reduction material, and where there is a range of community partners and industry partners working in conjunction with federal-state-local efforts. The ten case studies organized by region include:

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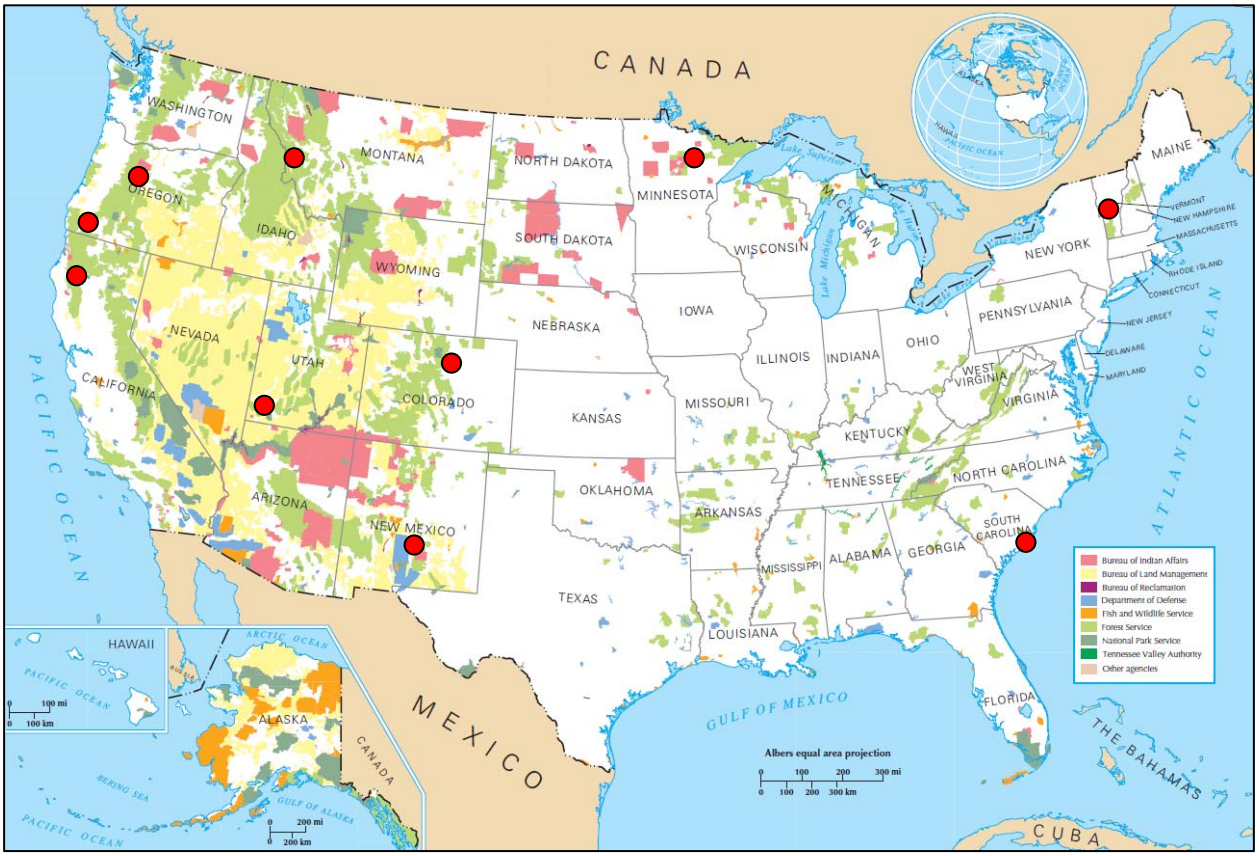
| **Pacific Northwest:** | Central Oregon, Southern Oregon, Trinity Mountains California |
| **Southwest:** | Southwest Colorado, Sothern New Mexico |
| **Rocky Mountains:** | Northern Colorado Front Range, Bitterroot Valley Montana |
| **Upper Midwest:** | Northeastern Minnesota |
| **Southeast:** | Coastal South Carolina |
| **Northeast:** | Green Mountains Vermont |




The results are organized into three sections: comparison of the conventional wisdoms across all ten cases; policy implications for biomass utilization based upon the convergence or lack thereof; and individual case summaries describing strategies employed to address relevant challenges.

# Summary Findings of Conventional Wisdoms

A range of "conventional wisdoms" were identified through the course of the interviews with nearly 150 participants working with biomass utilization in some capacity across the ten case studies. These conventional wisdoms serve as a framework for comparing barriers in different part of the country and strategies employed to enhance biomass utilization. It is important to remember that conventional wisdoms can be either supported or refuted.

## *Guaranteed Supply of Woody Biomass*

This conventional wisdom is that, before logging companies and manufactures will make significant capital investments in biomass utilization infrastructure and equipment, a formal guaranteed supply of biomass material is necessary from federal lands for them to invest. The cases suggest that the issue is more complicated. The greatest concern about a guaranteed supply seemed to be where federal public lands dominated the provision of biomass, when major capital investments would be involved, or there was little existing infrastructure. However, in cases in which investments did not depend on federal supply or the supply needs were small, a formal supply guarantee was less important. Rather, the consistency of supply over time was more significant for encouraging investment. For example, in coastal South Carolina, there appeared to be little concern about the adequacy of supply because significant volumes of biomass were available on public and private lands as a result of forest damage caused in 1989 by Hurricane Hugo. Moreover, in several cases, businesses were able to address the volume and consistency of supply by identifying end uses that did not depend on federal sources or used only a small percentage of available biomass.

**Policy Implications**

All biomass utilization businesses, from animal bedding outfits to wood-electric facilities, need a reliable supply of material to operate. Identifying supply is one crucial issue that potential new businesses face. Our case studies found that securing supply can be a challenge in places where federal land ownership predominates because the land management agencies do not offer a consistent supply, regardless of the region of the country.

***Challenges of Supply Guarantees—***Because of the unreliability of federal biomass, a variety of study participants sought supply guarantees from the USDA Forest Service or Bureau of Land Management. Federal supply guarantees are difficult for a number of structural and legal reasons ranging from declining and unreliable agency budgets, staffing and expertise to develop the necessary contracts, accountability systems, and environmental documents. Consequently, we saw examples of federal commitments to provide supply that were, ultimately, non-binding.

***Stewardship Contracts—***Long-term stewardship contracts were seen as a potential mechanism for securing federal supply, but they remain rare and face barriers to wide spread use (see Conventional Wisdom 2). But, given the potential, participants encouraged the agency staff to significantly increase the number of contracts offered in the regions.

***Small-Scale Processing—***Despite the intent to accomplish large amount of fuels reduction through large-scale biomass utilization, the lack of federal supplies and inconsistency of offerings forced many loggers and processors to pursue small-scale enterprises that rely less on federal sources. Lack of investment in utilization infrastructure is likely to remain limited until federal supplies of biomass can be offered on a consistent basis to facilitate business planning and amortization of investments.

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## *Long-Term Stewardship Contracts*

Long-term stewardship contracts and agreements are often discussed as a strategy to develop a guaranteed biomass supply from federal public lands. The authority to contract the stewardship of end results (P.L. 108-7) was granted to the Bureau of Land Management and the USDA Forest Service in 2003 for a period of ten years. It authorizes agencies to apply the value of timber as an offset against the cost of services received. In addition, the agencies must award contracts and agreements on a "best value" basis and may award a contract or agreement for up to ten years (Pinchot Institute 2008). The conventional wisdom is that ten-year contracts/agreements are a way to offer contractors a supply guarantee that allows them to obtain financing for the development of a biomass utilization facility.

There were only a few long-term agreements in place when we conducted interviews in 2008. The Shasta-Trinity National Forest implemented a ten-year stewardship agreement for 2,000 acres but the purpose was to create the community-managed Weaverville Community Forest, rather than guarantee supply. A ten-year stewardship agreement had also been implemented in 2007on the Francis Marion National Forest in South Carolina, but the purpose there was to improve wildlife habitat on about 630,000 acres that had been destroyed by Hurricane Hugo. Lastly, a joint USDA Forest Service-Bureau of Indian Affairs stewardship project was implemented with the Mescalero Apache Tribe in Southern New Mexico, but authorization for that agreement (Sixteen Springs) had come under the Tribal Forest Protection Act of 2004 and not the stewardship contracting authority.

During interviews, it was identified that some participants were in the process of developing long-term contracts or hoped to create them in the near future. By January 2009, in the southern Oregon study area, the Rogue River-Siskiyou National Forest entered into a ten-year stewardship agreement with two nonprofit organizations, Lomakatsi Restoration Project (http://www.lomakatsi.org/) and the Siskiyou Project (http://www.siskiyou.org/). There was a second ten-year agreement in the Trinity Mountain case. Finally, the Arapaho-Roosevelt National Forest had awarded a ten-year stewardship contract in the Northern Colorado Front Range case. Some participants involved with the Arapahoe-Roosevelt contract were skeptical that a long-term stewardship contract would lead to additional investment:

**Policy Implications**

Long-term Stewardship Contracts were often discussed as a strategy to develop a guaranteed supply of biomass and in many locations they were responsible for increasing the flow of

biomass from fuels reduction projects. Despite their widespread support, only a few long-term contracts were in place at the time of the study and rather most were short-term agreements lasting only a few years. There are specific reasons why few long-term contracts exist. These barriers and the benefits of overcoming them have particular policy implications.

***Stewardship Contracts Help Facilitate Utilization—***One key role that stewardship contracts play is allowing for the combined removal of material that has long standing and known economic value with material for which there have not traditionally been markets. This tool addresses some of the contractual barriers to utilization and crates incentives for contractors to identify new biomass markets. The collaborative process associated with stewardship contracts can also increase support for projects that involve biomass removal.

***Barriers to Stewardship Contracting—***USDA Forest Service and BLM use of stewardship contracting has been increasing and some places make extensive use of the tool. However, its use remains spotty. In some locations, agency personnel felt that existing mechanisms were sufficient. Other barriers included complicated contract templates, opposition from traditional purchasers and county government because of a loose of timber receipts, lack of understanding about how to develop contracts and bundle services, and lack of funding for service work.

***Long Term Stewardship Contracts—***Long-term stewardship contracts offer the potential to increase the reliability of supply from public lands for the contractor that wins the contract. However, there are barriers to entering into contracts for land management agencies. In some configurations, the federal government must obligate funds in the event of cancellation if the contractor is going to make investments in new infrastructure. Setting aside these funds can be difficult for many units. The agencies can use other long-term stewardship contract types that do not require the so-called cancellation ceiling but they provide a less secure guarantee of supply. However, in some locations, agency personnel felt that existing contract mechanisms were sufficient and Stewardship Contracts were seen to offer few benefits and seldom used.

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## *Scale of the Wildfire and Forest Health Problem*

The conventional wisdom is that the magnitude of the wildfire and forest health problem is so large that only equally scaled industrial efforts involving biomass utilization will effectively alleviate the problem. This is particularly acute in the western United States where millions of forested acres succumb to bug kill and wildfires each year.

Although the need for large-scale biomass utilization was raised in most cases, in no location has a large-scale biomass facility been built to address local wildfire or forest health issues.[1] In every case, the focus of new facility development had shifted toward, or had always been, smaller-scale projects, which were ultimately considered more viable, given market demand and

[1] Large-scale biomass-electric facilities exist in southern Oregon, coastal South Carolina, Northeast Minnesota, and the Green Mountains of Vermont. In addition, contractors on the western edge of central Oregon were able to deliver their biomass to large biomass-electric facilities beyond the study area. However, none of these facilities was built to address forest-based, biomass utilization, and only a small percentage of their raw material is procured directly from harvest residuals.

the cost of investments. The desire for large-scale utilization was raised when the focus was not on biomass utilization per se but rather on reducing wildfire risk or improving forest health. Large-scale efforts are considered the primary way that biomass utilization can play a meaningful role in facilitating either goal.

**Policy Implications**

Participants overwhelmingly supported the development of small-scale technology. Some were concerned about the amount of biomass necessary for large facilities and the inability to source feedstocks primarily from federal lands and so they viewed smaller facilities as having greater flexibility in the source and volume necessary. Others were concerned about the long-term sustainability of large facilities and the creation of local employment in places closer to the forest resource. Building on these points, the following policy implications were gleaned from interviews pertaining to the scale of the forest health and wildfire fuels reduction problem.

***Benefits of Small-Scale***—In most cases, small-scale production for energy generation, wood pellet manufacturing, animal bedding and related products were ultimately seen as more viable than large-scale production given the size and types of local markets, capital investment required of large facilities, available workforce, and the increased social acceptance for small-scale use. Of particular interest was developing local industry that produced products where the value-added remains in the local community.

***Dispersed Processing—***Transportation costs were identified as a significant barrier to increased utilization in several of the cases. Another argument for small scale processing was that dispersed production allows for the location of processing facilities closer to the forest resource, thus reducing input costs and locating jobs in places most in need. Participants in several cases, particularly in the western United States, viewed the cumulative impact of several small businesses as an important step in reducing hazardous fuels across the landscape.

***Economies of Scale—***A weakness of small-scale production, especially where products have small profit margins, is that the economies of scale are reduced. Large-scale production can maximize financial return by investing in more efficient technology or increase the volume of products produced per input. However, larger scale production can also require more sophisticated technology and have higher start up costs.

***Ability to Scale Up—***The enormity of the task in restoring forests to a healthy state in which wildfire can be safely reintroduced led many participants to call for federal efforts scaling up the volume of biomass made available on an annual basis. Scaling up the volume available does not necessarily mean scaling up the size of production facilities—more volume can support more businesses. However, participants argued that investments in small-scale production should plan for the possibility of scaling up operations as more material becomes available.

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## *The Value of Biomass*

Historically, woody biomass was considered of low value and even "waste" material. The conventional wisdom is that biomass is a byproduct of conventional logging operations and the

cost of removal generally exceeds market price. As such, biomass and related small diameter material is viewed as a low-value product with insufficient markets and is therefore commonly burned in the forest after harvest operations or left to decay. New, valued-added markets are necessary to offset removal costs for utilization to be effective.

The conventional wisdom is confirmed in some areas but not all. In the interior west and southwest, the markets for ponderosa pine and pinyon pine/juniper are insufficient. However, small diameter Douglas fir and lodgepole pine are suitable for a number of market applications. In northeastern Minnesota and coastal South Carolina, the demand for biomass is high but the value relative to sawlogs is low. In Oregon, biomass prices have escalated in recent years due to a shortage of mill residue from sawmills that have closed because of poor lumber markets.

**Policy Implications**

In all but three cases (Southern Oregon, Green Mountains Vermont, and Coastal South Carolina) the prices for biomass were considerably lower than that for pulpwood but even in those cases the cost of removal and transportation routinely exceeded market price. As a result, biomass is frequently left in the forest to decay, or be pile-burned or masticated. The physical properties of tree species and site conditions significantly affect product value. These and other factors have a significant bearing on policy development.

***Biomass Definitions and Pricing***—Conflicting definitions of biomass, reflecting local markets and culture, have a variety of consequences. One key implication is in how biomass is priced by the federal agencies. Stumpage rates paid and appraisal prices for biomass are frequently established based on historic perceptions of biomass as a waste byproduct. The value of biomass is subsequently based on the size of trees harvested rather than on end-products and size/form specifications for the raw material. Efforts to value biomass on a volume basis are a more accurate reflection of market demand. Species type, however, may also affect the usefulness of the raw material for particular types of applications. In some regions, low biomass prices helps keep the supply to biomass-based industries and traditional wood products industries in balance, and reduces industry worries about potential competition for supply if biomass prices rise.

***Integrated Biomass Markets—***The low value of biomass requires that an integrated forest products market be supported where the value of sawlogs and/or pulpwood can be used to offset the cost of biomass removal. Stand-alone markets for biomass, such as for energy production or landscaping materials, are generally insufficient to cover the costs of extraction and transportation, and only in rare instances will dedicated whole tree chipping be financially viable unless higher value markets can be secured.

***Location of Incentives—***Areas in most need of fuels reduction are also frequently the places with the greatest disincentives to invest in biomass utilization because of the economies of scale and the comparatively low value of material removed. Participants expressed interest in federal support for local processing facilities that reduces transport distances and input costs.

***Incentive Preferences—***Targeted incentives for biomass utilization are agreeable to business entrepreneurs as long as they do not inadvertently favor one industry over another, are

temporary, and allow traditional wood products industries to continue to provide the resources necessary for secondary biomass markets to be financially viable over the long run.

***Sawmill versus Harvest Residues*—**Sawmill residues are the preferred raw material used in the production of several biomass products, including energy. The residues are free of needles, bark and dirt and businesses may have the opportunity to co-locate or be in proximity to sawmills, reducing their input costs. The slumping lumber market has significantly reduced the volume of sawmill residues available, forcing businesses to procure a greater percent of their necessary supply from more expensive sources of in-forest derived biomass. This has caused problems for large-scale users who require a significant volume of biomass to run their daily operations.

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## *Utilization Increases Acres Treated*

This conventional wisdom is based on the understanding that the harvesting and utilization of biomass from fuels reduction projects creates revenue that can be used to offset or reduce project treatment costs. This in turn results in a potential increase in the number of acres treated because it reduces the burden on the federal government to subsidize as many fuels reduction projects.

This conventional wisdom was raised by a number of participants who tended to talk in terms of the *potential* to treat more acres if sufficient markets existed. By offsetting some of the treatment costs with increased revenue, agency dollars would stretch farther and allow for the treatment of more acres to reduce fire risk or meet forest health objectives. However, there was little evidence that additional acres have been treated because of cost savings accomplished through biomass utilization.

**Policy Implications**

In reality, utilization may actually increase costs if there are insufficient markets, where the terrain is difficult, access remote, or the species mix unsuitable for existing markets. Participants focused on the need to develop local markets that could cover, in part, treatment costs and then using state and federal assistance programs to provide incentives for the rest.

***Mastication versus Utilization***—Mastication, or pulverizing trees, has emerged as a site preparation step and a dominant technique for reducing hazardous fuels on national forest lands in the western United States. Not only does mastication offer a relatively quick way to reduce hazardous fuels, it is a low cost alternative to utilization or pile burning. The downside is that the long-term impacts to soils and biodiversity are unknown, and there exists disagreement about the extent to which fuels reduction is accomplished in the short and long term. Participants also noted the waste of leaving so much biomass in the woods to decay.

***Targeted Incentives*—**Incentives are necessary to encourage market development suited for the types and volumes of trees harvested in a given area. Incentives may target a reduction in treatment costs, offset a portion of transportation costs, create new value-added markets, or expand existing markets. Several states have passed legislation that directly or indirectly provides incentives for biomass utilization. At the federal level, long-term supply contracts have been found to be a favorable tool for encouraging investments (see Conventional Wisdom 2).

Production tax credits for renewable energy have also provided a stimulus and making biomass energy more competitive to natural gas and coal-fire electricity generation.

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## *Transportation Costs*

The conventional wisdom is that biomass utilization is a financially difficult proposition when transportation distances exceed certain thresholds or when site access is remote and difficult. Transportation costs are a function of distance to processing facilities and consumer markets, ease of site access, cost of transportation fuels, and the value of the end product.

**Policy Implications**

Transportation costs were clearly a key issue in each of the cases, but not necessarily a limiting factor. In several cases, long transport distances to processing facilities pose significant barriers. Local processing, appropriately scaled facilities, and demand for biomass most affect transportation costs. In other cases, access to the material in the woods was more important in the context of the effect of poor roads, access through private property, and the operability of the site on total project costs.

***High Energy Prices***—The steep increase in energy prices during the summer of 2008 was a mixed blessing. One the one hand, high energy prices made energy produced from woody biomass more competitive with fossil fuels, and in many cases was driving significant demand and speculation in biomass derived energy production. The caveat was that higher energy prices increased input costs for timber harvesting and transportation. On whole, however, biomass markets were thought to benefit from increased energy prices.

***Appropriately Scaled Processing—***Large-scale processing and manufacturing requires a significant volume of biomass and if local sources are inadequate, businesses must transport biomass from longer distances. Local and appropriately scale processing was discussed in several cases as a strategy to sustainability match the availability of local biomass resources with the size of the processing facility.

***Local Market Development—***In several cases, the cost of transporting products to market was a limiting factor. Participants frequently encouraged development of local markets for heating, animal bedding, landscaping materials, and other low capital investment options. The community benefits of local market development as part of an economic development package cannot be overstated.

***On-Site Processing—***Efforts to increase technology suited for on-site biomass processing for finished or intermediate products would significantly enhance the financial viability of biomass utilization by lowering transportation costs.

***Road Maintenance and Site Access—***The condition, location, and number of forest roads is a contentious issue for different stakeholders. In-woods contractors expressed the need to maintain the backlog of primary forest roads to allow efficient access to harvest sites and to design roads that allow for chip-hauling trucks and other equipment to access landings. Conservation groups expressed the need to manage the density of forest roads in a manner

consistent with environmental safeguards and that minimizes unnecessary access in areas where biomass removal is unnecessary or infeasible.

***Public Land Access—***Inadequate incentives may exist for private landowners to grant access through their property to conduct hazardous fuels treatments on neighboring public lands. Cooperative agreements with local units of government, landowner compensation, and treatment of private lands are important options that need to be available to local land managers.

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## *Lack of Industry*

The conventional wisdom is that biomass utilization is difficult in areas where there is no existing forest products industry or the industry is severely diminished. Lack of industrial infrastructure can pose several problems, including a lack of skills and expertise to do the work, lack of physical infrastructure for transportation and processing, and lack of low-cost biomass residue created as byproducts of other wood products-manufacturing processes.

The conventional wisdom was supported in most cases and it was also found that utilization is most easily developed as part of an integrated wood products sector. However, even if some infrastructure exists, there can be problems with biomass utilization. Several participants noted that the forest products industry and others within the agencies have been reluctant to accept new approaches. Some suggested that traditional forest products businesses have stifled innovation. For decades, infrastructure and business models that are geared toward the lumber industry have been developed, particularly in the western cases.

**Policy Implications**

The integrated nature of the wood products industry makes it difficult to increase biomass utilization in locations where little or no previous infrastructure exists. Investment is needed in harvesting, transportation and processing. New investors rarely possess the expertise or financial capital to support all these areas. Efforts are needed to coordinate investments in biomass enterprises that complement each other and provide incentive for businesses to co-locate with existing processing facilities or to expand their operations. In locations where abundant wood products infrastructure exists, efforts are needed to encourage the use and production of biomass as a complement to traditional product development; previous infrastructure and business models may have been geared towards lumber and some businesses may be resistant to biomass development. The following policy implications build on these points.

***Assistance Programs***—Federal assistance programs have historically played an important part in building industry capacity but must be matched with adequate private sector investment in local infrastructure and workforce development. Efforts are needed to target investments that can complement one another and encourage development of an integrated biomass utilization industry. Related workforce training is also needed to efficiently harvest, transport and process biomass. Priority may be given to locations having high fire risks and the potential for development of self-sustaining enterprises. Finally, programs need to be matched to local industry, infrastructure and workforce needs, but there needs to be recognition that assistance programs can financially dependency or support businesses that are financially unsound.

***Integration—***Intermittent biomass markets and the low value of the resource dictate that singular investments are unlikely to be financially viable over the long term. Efforts to support utilization must complement the full range of manufacturing and processing businesses and build synergies among resource users. This includes building business relationships among producers where the value of sawlogs removed can be used to offset the cost of biomass extraction within an integrated harvesting operation.

***Industry Evolution—***It may take time for industry to evolve to be willing and able to utilize the types and volumes of biomass material available from federal lands. Appropriate incentives and safeguards are needed where biomass utilization is not done at the expense of existing wood products processing and manufacturing.

***Supply and Contracting Considerations—***There is no one most appropriate size of business and each has different needs. A diversity of sizes and types of business can be supported by configuring contracts so that each can qualify or be able to make bids. In addition, the amortization of equipment purchases and/or facility construction is a significant barrier for many operators, particularly smaller ones. In order to obtain financing, businesses must demonstrate their ability to maintain production rates, which is in part dependent upon a consistent supply of biomass. A supply assurance through long-term contracts is one mechanism to encourage utilization development.

***Chicken-and-Egg—*** Logging contractors and processors talked about the need for a consistent supply of biomass before they could make sufficient investments in utilization infrastructure. Agency managers and forest planners talked about the need for there to be sufficient demand for biomass before they could justify ramping up their supply offerings. In several cases, each side was waiting on the other before making necessary investments. Appropriate incentives for both industry and the federal agencies are necessary to break this impasse.

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## *Collaboration to Accomplish Utilization*

The conventional wisdom is that for biomass utilization projects to be successful, they must be developed and implemented through a collaborative process; the complexity of the challenges involved and the conflict of values inherent in federal land management necessitates a collaborative approach. One argument for collaboration emphasizes the different players necessary for provision of biomass supply and development of diverse markets.

**Policy Implications**

Participants described a spectrum of possible interactions needed for success, not all of which were necessarily defined as "collaboration." Collaboration was referenced but it was not always seen positively. Rather, participants frequently identified the need for inclusive dialogue and partnering with local organizations and industries to identify project priorities, but that consensus and formal collaboration were not necessarily the objective. In the end for successful biomass utilization to be accomplished, collaboration at its broadest sense was generally accomplished, but that it could entail a range of relationships from more formalized structured collaborative

efforts to less structured processes not necessarily fitting under the rubric of collaboration.

***Focus on Building Partnerships—***When trying to facilitate stakeholders working together to plan and implement biomass utilization projects, it may be better to talk about building partnerships and relationships and accessing networks rather than "collaboration" because of the negative connotations surrounding formal collaboration for national forest planning.

***Collaboration Not Always Needed—***The need to work together and the potential benefits of working together are greatest where the challenges for biomass utilization are greatest. Where biomass is "easy" there may be no need for a substantial investment in bringing people together as there may already be agreement on common goals and necessary relationships already established.

***Collaboration for Fuels Management—***More formal collaborative processes that lead to biomass utilization are often framed not around utilization but around fuels management or forest health. These efforts lay the groundwork of agreement that enables effective biomass utilization to take place.

***Continuity of Agency Staff—***Effective collaboration requires a commitment to the process by all entities, particularly federal agencies, and maintenance overtime. Federal agency staff, when not frequently relocated, can provide the stability necessary to maintain partnerships and project initiatives over long periods.

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## *Environmental Concerns*

The conventional wisdom is that the suite of environmental concerns wrapped up in National Environmental Policy Act (NEPA) and the project appeals and litigation process creates uncertainty for the forest products industry that can impede project implementation. Meeting the requirements specified in related federal environmental regulations can delay implementation of projects on federal land including those related to biomass utilization. In addition, the ability of external parties, most notably environmental groups, to challenge NEPA rulings has been widely considered a key deterrent to business investment.

This conventional wisdom varied greatly in its applicability to the cases. In the Bitterroot, Green Mountain, Trinity Mountains, Northern Colorado Front Range, and southern New Mexico cases, various dimensions of environmental concerns were making biomass utilization more difficult. There was a sense that there had not been a great deal of success overcoming these issues. Environmental concerns often focused on forest management in general and specifically the removal of large-diameter trees; threatened and endangered species; construction of new roads; and air quality.

**Policy Implications**

Environmental planning is a time consuming, complex process in which all federal projects are subject. There exists, in some locations, a high degree of uncertainty for business investment when delayed project planning is combined with uncertainly about environmental appeals and

litigation. But despite the perception of environmental contention and delays, most biomass utilization projects actually fostered a sense of common purpose among stakeholders. Project planning remained complicated and expensive for the agencies to undertake, but stakeholders frequently agreed in principle with biomass utilization for purposes of forest restoration, fuels reduction, wildlife habitat improvement, and/or renewable energy development. However, the implication of these perceptions and realities of environmental delay are significant:

***Common Interests—***In situations where complementary goals were accomplished through biomass utilization, such as for fuels reduction and wildlife habitat improvement, there was broad support for utilization, even among groups traditionally in conflict. In cases where ongoing collaboration or took place or where cooperative agreements were established, broad support for utilization existed.

***Timber Management—***There was concern that biomass projects are a euphemism for timber harvesting and that industry demands could exceed thresholds of sustainability. Appropriate safeguards established through project monitoring are necessary to ensure resource sustainability, and a focus on primary project objectives (e.g., fuels reduction, habitat restoration). Removal of large diameter trees is contentious and must be appropriately justified where the objectives are non-timber in focus.

***Large-Scale Planning—*** Because small projects have the same NEPA requirements as large projects, some agency planners indicated that their strategy was to plan for larger acreages to more efficiently use staff time and resources. As a result, more NEPA-ready acres could be made available annually to ensure a supply of accessible biomass to encourage industry investment.

***New Technology to Improve Air Quality—***Air quality impacts of biomass processing technology affects the ability to extract biomass for renewable energy and thermal heating applications. Outdated technology, including traditional fireplaces and wood pellet stoves, are generally inefficient and can create significant amounts of air pollution. Newer technology regulated by the Environmental Protection Agency has higher combustion rates and are able to produce more energy per unit of input, thus increasing return on investments. Continued emphasis on new technology is therefore necessary to not only improve air quality but enhance the financial prospects of biomass utilization.

***Utilization to Improve Air Quality—***In some areas of the country, air quality impacts from prescribed burning, prescribed wildland fire, and pile burning limits managers ability to use these management tools to reduce fuel loads. Removal of biomass for utilization provides an additional fuels reduction technique that can also reduce short-term air quality impacts and help prepare sites for wildfire reintroduction.

***Social Context—***The social context (including collaborative capacity, history of environmental conflict, and infrastructure) in which biomass utilization projects are being planned and implemented significantly influences project success.

## *Budgets and Staffing*

The conventional wisdom is that administrative factors like budgets and staffing impede implementation of biomass utilization projects; the administrative burden of action is so onerous that it is difficult to get anything done in an efficient or timely manner. This is an argument heard to varying degrees about any activity that involves federal lands.

This conventional wisdom largely held true across the cases. Discussion about administrative requirements impeding implementation of biomass utilization projects generally revolved around three key challenges. They were: limited budgets, unhelpful administrative guidelines or policies, and declining agency capacity - particularly staff who lack the knowledge and skills to facilitate biomass utilization. Participants voiced concern about using federal hazardous fuels dollars as a proxy for timber sales and inconsistencies in policy implementation across forest districts. They also questioned the extent to which fuels reduction targets for acres treated were driving biomass utilization projects. There was a consensus that organizational inefficiencies limited the ability of staff to focus on high priority projects, and that projects were unnecessarily expensive.

**Policy Implications**

Intentions to accomplish fuels reduction objectives through biomass utilization are severely hampered by agency budgets. In many instances, participants identified projects that were mutually agreeable to the various stakeholders but that lacked necessary funding to conduct planning or that could not be implemented because of lack of appropriations. In other cases, lack of agency staff and/or expertise with biomass projects impeded progress or agency targets for annual treatment acres were creating disincentives for biomass utilization. These factors have important policy implications, particularly for project planning and implementation.

***Wildfire and Agency Budgets***—There is broad concern that the federal agencies do not consistently receive the necessary appropriations to implement projects, no matter how well planned. Shrinking agency budgets or redirection of budgets were repeatedly identified as a barrier to timely and efficient implementation of projects. In particular, participants expressed alarm at the amount of resources directed to fight wildfires at the expense of the hazardous fuels treatment efforts being planned to reduce wildfire risks.

***Agency Staffing—***Participants frequently expressed concern for the lack of agency staffing and expertise to carry out project planning and implementation in a manner conducive to biomass utilization. Staff expertise and training is needed on the challenges of biomass utilization and how project planning affects profitability. Similarly, adequate staff resources are needed to efficiently plan and implement projects.

***Treatment Targets—***Land managers are evaluated by the number of acres treated in a given year, so total treatment costs, which are a function of per acre management activities, in part influence forest management decisions. If the average cost per acre for one project is high, those costs are frequently balanced by other projects having treatment costs that are lower in order to maximize the number of acres treated with budged resources. Overly focused attention to meeting targets may come at the expenses of accomplishing mutually beneficial objectives of different agency units (e.g., fuels management timber). Treatment targets and unit budgets may need to be combined to remove disincentives to intra-agency cooperation.

# Crosswalk Table of Deliverables

| Deliverables | Description | Status |
|---|---|---|
| **Website** | http://biomass.forestguild.org/<br>Developed in conjunction with Forest Guild JFSP #07-3-2-02 | Completed |
| **Project Database** | A complete, national database of biomass case studies is available on the project website in the conjunction with the Forest Guild website | Completed |
| **Managers Report** | Full-color report is being prepared for publication including print layout and design. Report will be distributed to state, federal, and tribal land managers as well as all study participants | In progress |
| **Fact Sheet** | See **Appendix A** in the JFS Final Report | Completed |
| **Case Study Briefs** | See **Appendix B** in the JFS Final Report | Completed |
| **Publications** | The following eight publications are in preparation and will be submitted for review in leading journals:<br><br>1. The conventional wisdoms of biomass utilization in the United States: How perceptions affect choices<br>2. The capacity to do what? Industry, institutional and community capacities for biomass utilization<br>3. The role of stewardship contracting in fuels reduction and biomass utilization from public lands<br>4. Comparison of incentives and constraints by stakeholder group for biomass utilization<br>5. Biomass utilization and the diffusion of innovation from a social dimensions perspective<br>6. Policy dimensions of biomass removal and utilization<br>7. It's all about the landowners and managers: Implications for biomass energy feedstock availability from public and private farms and forests<br>8. framing the biomass challenge: How the local context leads to different frames | In progress |
| **Conference Presentations** | Becker, D.R., D. Abbas, K. Halvorsen, P. Jakes, S. McCaffrey, and C. Moseley. 2009. *The conventional wisdoms of biomass utilization: How our perceptions affect policy choices*. International Conference on Woody Biomass Utilization. Forest Products Society. August 4-5 2009, Starkville, Mississippi.<br><br>Becker, D.R. and D. Abbas. 2008. *Characterizing institutional,* | In Progress |

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|---|---|---|
| | *industry, and community capacities to facilitate biomass utilization on federal lands*. Paper presented at the 14th International Symposium on Society and Resource Management: People and Place: Linking Culture and Nature, Burlington, VT. June 10-14, 2008.<br><br>Halvorsen, K.E., D.R. Becker, and C.C. Hinrichs. 2008. *Social dimensions of biomass energy*. Paper presented at the 14th International Symposium on Society and Resource Management: People and Place: Linking Culture and Nature, Burlington, VT. June 10-14, 2008. | |
| **Poster Presentation** | Abbas, D. D.R. Becker, K. Halvorsen, P. Jakes, S. McCaffrey, and C. *Moseley. Hazardous fuels reduction and forest biomass utilization: a nationwide analysis*. Poster presented to the Society of American Foresters 2008 National Convention, Forestry in a Climate of Change. Reno-Tahoe, NV. November 5-9, 2008. | Completed |
| **Project Consults** | Becker, D.R. 2009. Briefing to the U.S. Senate Energy and Natural Resource Committee. Forest Biomass and its Role in a National Renewable Electricity Standard. (March 4, 2009; Washington, D.C.)<br><br>Halvorsen, K.E. 2008. Co-advised a joint workshop of the DOE, Office of Science—USDA, CSREES on woody biomass sustainability and biofuels (Oct 28-29, 2008; Bethesda, MD)<br><br>Becker, D.R. 2008. Biomass technical expert for the Joint Fire Science Program Roadshow to the Black Hills, SD. (May 19-22, 2008; Custer, SD) | In Progress |
| **Media** | JFS Project Featured in the following news media:<br><br>Smallwood Network (http://www.smallwoodnews.com/)<br><br>The Forestry Source. *Nationwide analysis offers lessons from biomass removal projects*. December 2008. | Completed |