Use of Financial and Economic Analyses by Federal Forest Managers for Woody Biomass Removal

Todd A. Morgan, Jason P. Brandt, John D. Baldridge, and Dan R. Loeffler

ABSTRACT

This study was sponsored by the Joint Fire Science Program to understand and enhance the ability of federal land managers to address financial and economic (F&E) aspects of woody biomass removal as a component of fire hazard reduction. Focus groups were conducted with nearly 100 federal land managers throughout the western United States. Several issues and information disconnects were identified in two major areas: the F&E analysis process and the tools and information used for F&E analyses. The most prevalent disconnects appeared to be between managers' knowledge versus acceptance and use of F&E tools developed by research entities. Most managers also tended to focus on financial rather than economic analysis. Findings suggest needs for continually updated local timber and biomass market information; training with F&E tools and methods currently used; ongoing technical support for tools currently used; and closer communication among forest management, research, and administrative personnel as new F&E tools or administrative processes are developed and implemented.

Keywords: biomass utilization, budgets, forest economics, fuel reduction, national forests, timber harvest, transaction evidence appraisal

Wildfire threats to communities and ecosystems; reliance on fossil fuels versus renewable, domestic energy sources; and loss of local employment and capacity to conduct forest management in historically timber-dependent communities have led to increased interest in woody biomass utilization from fire hazard reduction treatments. In response to this growing interest, the Joint Fire Science Program (JFSP) conducted a Biomass Roundtable in 2007 with a group of 24 managers and scientists from partner agencies and stakeholder groups (JFSP 2007, SRA International 2007) to discuss issues, problems, and research needs related to biomass removal from the perspective of forest fuels management. The roundtable and a group of more than 50 stakeholders requested that the JFSP investigate, among other items, economic and financial issues surrounding biomass removal and fire hazard reduction treatments. Questions covered financial issues (i.e., those that involve cash flow and budgets), as well as economic issues (e.g., potential products, employment, and trade-offs over time among different treatment options). These questions were asked from the perspective of federal land managers, not from that of businesses or community development groups.

Federal land managers conduct financial and economic (F&E) analyses of proposed forest management activities for several reasons. First among these reasons are legal obligations. The Multiple Use Sustained Yield Act of 1960, National Environmental Policy Act of 1969 (NEPA) of 1969, Forest and Rangeland Renewable Resources Planning Act of 1974, and National Forest Management Act of 1976 contain language requiring consideration of the financial aspects of land management and the economic impacts of management alternatives (Cubbage et al. 1993). Agency policies (e.g., the Forest Service Handbook and Forest Service Manual) also call for F&E analyses, and practical concerns necessitate an understanding of project costs and revenues relative to program budgets.

In response to the JFSP Biomass Roundtable and subsequent request for proposals (JFSP 2007), researchers proposed to investigate federal land managers' F&E information needs and provide a synthesis of information products currently available. The overall goal of this study was to enhance the ability of western federal land managers to address the F&E aspects of woody biomass removal as a component of fire hazard reduction treatments. The study objectives included the following:

1. Evaluate and synthesize the body of F&E information and tools currently available to federal land managers in the US West.
2. Identify managers' information needs and disconnects from available information.
3. Fill gaps between existing information and tools versus managers' awareness of available information and ability to use F&E tools.

Methods

This study consisted of two approaches. First, an annotated bibliography (Loeffler et al. 2010) was developed to identify, evaluate, and synthesize the existing body of F&E information and tools available to federal land managers in the western United States.

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Todd A. Morgan (todd.morgan@business.umt.edu), Bureau of Business and Economic Research, University of Montana, Missoula, MT 59812. Jason P. Brandt, Incident Support Branch, National Interagency Fire Center, Boise, ID 83705. John D. Baldridge, Bureau of Business and Economic Research, and Dan R. Loeffler, College of Forestry and Conservation, University of Montana, Missoula, MT 59812. *The authors thank the Joint Fire Science Program and US Forest Service Forest Products Laboratory for their financial support and technical assistance on this project. We also thank the agency employees who took time from their schedules to participate in the focus groups.*

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Second, federal land managers' information needs and disconnects from available F&E information were identified through a series of focus groups.

Bibliography

An extensive search of peer-reviewed literature, online databases, conference and symposium proceedings, personal communications, and web-based resources was conducted to identify information and tools that could be used by federal land managers during the project planning process to evaluate economic and/or financial aspects of biomass handling and removal. These F&E data, information, and tools were evaluated on their regional (western United States) relevance, public accessibility, and potential usefulness to federal land managers, and they were then compiled in the annotated bibliography.

The bibliography contains nearly 200 peer-reviewed journal articles, US Forest Service research station publications, white papers, and reports, as well as more than 20 web-based data sources and computer models related to the F&E aspects of biomass removal, small-diameter timber harvesting, logging and hauling costs, biomass utilization facilities and locations, and log and mill residue pricing. Each item in the annotated bibliography contains a citation, brief description or abstract, author contact information, and geographic area of interest. Links to F&E models and other online tools are provided with citations for supporting documentation.

To fill the gaps between existing F&E information and tools versus managers' awareness of available information and ability to use the tools, delivery of the bibliography (Loeffler et al. 2010) was shaped in large part by the input provided during the focus groups. In particular, drafts of the annotated bibliography were provided directly to focus group participants and have been posted on websites (FRAMES) that managers mentioned they were already using to find related information.

Focus Groups

To identify and better understand federal forest managers' information needs and disconnects from available information related to F&E aspects of biomass removal, a series of focus groups were conducted with federal agency personnel in the western United States. Focus groups are an efficient method for determining what participants know about study topics; examining how they understand terms, topics, or tools; and learning the range of opinions on a topic (Groves et al. 2004).

Using several contacts from the JFSP Biomass Roundtable, a variety of positions and duties were identified as highly relevant to the planning, analysis, and implementation process used for biomass removal. The positions identified included silviculturist, contracting officer, economist, budget officer, timber management officer, fuels specialist, stewardship coordinator, and timber sale preparation specialist. Key duties identified included timber or fuels project planning, serving on NEPA interdisciplinary (NEPA-ID) teams, and administering timber sales service contracts, or stewardship contracts for biomass removal. It was also noted that information needs and access to available information may be different by agency, geographic location, and functional level within an agency (e.g., at the district, forest, or regional level with the Forest Service).

It was determined that a minimum of 18 focus groups were needed, with at least 3 in each western Forest Service region, i.e., Regions 1 through 6 (R1 through R6). The focus groups were conducted using standard methods described in Krueger and Casey (2000). Each group was designed to take about 1.5–2 hours, with a pair of moderators, a nine-slide PowerPoint presentation, and a discussion guide that was used for all the focus groups. Each focus group was videotaped, a separate digital audio recording was made, and each focus group was later transcribed for subsequent content analysis. Audio recording enabled the moderators to concentrate on participants' responses while taking minimal notes, allowing for a more relaxed and conversational atmosphere in which sincere and unpressured responses could be solicited. Videotaping helped the transcriber identify (although not by name) individual respondents' comments, particularly if several people spoke simultaneously.

Each focus group concentrated on three study areas, spending about 30 minutes on each: (1) the current process used for F&E analysis of biomass projects, (2) potential changes or improvements to the process, and (3) economic and financial tools and information used. The focus group session included a 10–15-minute introduction and a 5–10-minute wrap-up/closing. The introductory session covered who the moderators were, described why the study was being conducted, and introduced participants to each other. Each participant provided demographic information (see Appendix A). Following the introductions, the moderators used discussion guide questions to delve into the three study areas (see Appendix B). During the wrap-up/closing, participants were asked whether they had any additional questions or comments, to identify any items that should be discussed but were not, and whether they knew any other individuals who should be contacted by the researchers.

A total of 26 focus groups were conducted with 97 federal land managers from four different federal agencies. Two focus groups were held with a total of 12 National Park Service employees. More than 80 National Forest System (NFS) employees in R1 through R6, plus a few Bureau of Land Management (BLM) and US Geological Survey (USGS) personnel, participated in 24 focus groups (Table 1). Content analysis of the focus groups amassed 1,470 pages of transcriptions to identify recurring themes, as well as unique responses. Each focus group manuscript was searched to identify responses to individual questions. Responses were then organized by question as well as NFS region and forest or national park for summarization.

Results and Discussion

The first section of results below summarizes the demographic information collected from the participants. Then three sections follow, each summarizing findings from the three study areas: current process for biomass removal projects, potential changes or improvements in these processes, and actual use of F&E tools and information.

Participants

The 97 focus group participants, who are federal land managers involved with biomass removal as a component of hazardous fuels reduction treatments, were found to have significant experience with their agencies' budgeting and environmental impacts analysis processes, with on-the-ground forest management activities related to biomass removal, and with the different types of contracts used to

Table 1. Location of focus groups by National Forest System region, state, national forest, and national park.

Region 1: Montana and Idaho
Regional Office
Idaho Panhandle National Forest
Kootenai National Forest
Region 2: Colorado, South Dakota, and Wyoming
Regional Office
Arapaho-Roosevelt National Forest
Black Hills National Forest
Medicine Bow National Forest
Pike National Forest
Region 3: Arizona and New Mexico
Regional Office
Apache-Sitgreaves National Forest
Cibola National Forest
Coconino National Forest
Kaibab National Forest
Region 4: Idaho, Utah, and Nevada
Regional Office
Bridger-Teton National Forest
Humboldt-Toiyabe National Forest
Region 5: California
Regional Office
Klamath National Forest
Lassen National Forest
Tahoe National Forest
Region 6: Oregon and Washington
Regional Office[a]
Umatilla National Forest
Wallowa-Whitman National Forest
Willamette National Forest
National Parks[b]
Sequoia-Kings Canyon National Park
Yosemite National Park

[a] Participants included BLM personnel.
[b] Participants included USGS personnel.

accomplish biomass removal. Focus group participants had an average of 25 years of service with their agency and an average of 6 years in their current position. Slightly less than 70% of the participants worked at the forest level, about 20% worked at the regional level, just over 10% worked at the district level, and only a couple of individuals worked at a national scale. Slightly more than half (55%) of the participants had served on a NEPA-ID team in the past 3 years, and nearly 60% of the participants had worked on stewardship contracts. Just over 30% of the focus group participants had been involved in some type of mechanical fuels treatment training within the last 3 years.

Current Process Used

Participant responses/perceptions related to the current process used by federal land managers for F&E planning, analysis, and implementation of biomass removal echoed six main themes:

1. Financial issues (e.g., annual budgets, treatment costs, and potential revenue) can severely affect successful offering of biomass removal projects. Financial issues and economic impacts, however, are regarded as much less important than resource goals and environmental impacts. Consequently, less time and effort is devoted to F&E analysis.
2. Local (district and forest) budgets are rarely or never sufficient to treat the amount of area identified as high priority, and the allocation of annual budgets based on achievement of targets (i.e., number of acres of fuels treatment and volume of timber sold) often creates disincentives for treating high-priority areas, which can have very high per-acre treatment costs and little or no merchantable volume.
3. Different F&E information and tools are needed at different steps in project planning (Figure 1). Highly detailed financial analyses are not necessary or desirable early in the project planning process. Providing too much specificity (e.g., specifying a particular harvesting system or quantity of biomass to be left onsite) before or during NEPA analysis can reduce managers' flexibility to achieve resource outcomes.
4. Different individuals perform F&E analyses at different stages in the planning, analysis, and implementation process. These individuals' familiarity with financial considerations (e.g., costs of activities, potential for revenue) can be highly variable. Absence of individuals with F&E analytical experience and/or knowledge of local market conditions on NEPA-ID teams can lead to proposed actions or alternatives with little chance of financial viability (i.e., projects that will go "no bid"), as well as time and effort wasted on analysis.
5. Timber and biomass market conditions can change dramatically during the multiyear time frame required for NEPA analysis and final project approval, rendering early financial analyses obsolete by the time projects go out for bid.
6. Economic impacts (e.g., resulting employment, avoided costs) of proposed actions on communities are frequently not well understood or quantified in NEPA documents. Such effects are considered relatively unimportant because they are rarely the subject of appeals or litigation.

Potential Changes or Improvements

Participant responses/perceptions related to potential changes or improvements to the process federal land managers use for F&E planning, analysis, and implementation of biomass removal revealed six key ideas:

1. Transaction Evidence Appraisal (TEA) needs to better reflect local conditions, particularly in large NFS regions with markedly different resource and market areas. Where the number of timber or biomass transactions is quite limited, something other than or in addition to TEA needs to be acceptable for determining minimum bids.
2. With the exception of stewardship contracts, revenue from projects does not stay on the district or forest. This makes it more difficult to use revenue from one project (e.g., a timber sale) to help pay for another project (e.g., prescribed burning or biomass removal) that is chronologically, geographically, or administratively separate. Consequently, there are incentives for using stewardship contracts more often or in situations that may not be appropriate.
3. Requiring biomass inventories (i.e., cruises) to be conducted to the same level of precision as traditional timber product (e.g., saw or pulp log) cruises is cost-prohibitive and discourages managers from trying to market biomass as a product. Administrators and the *Forest Service Handbook* need to recognize the high variability and low value of biomass material and allow more appropriate cruising standards.
4. NEPA-ID teams need to be composed of individuals who are aware of local timber and biomass market conditions, who understand the financial costs of all proposed activities (e.g., harvesting/removing wood, prescribed burning, road construction or decommissioning, culvert replacement), and who

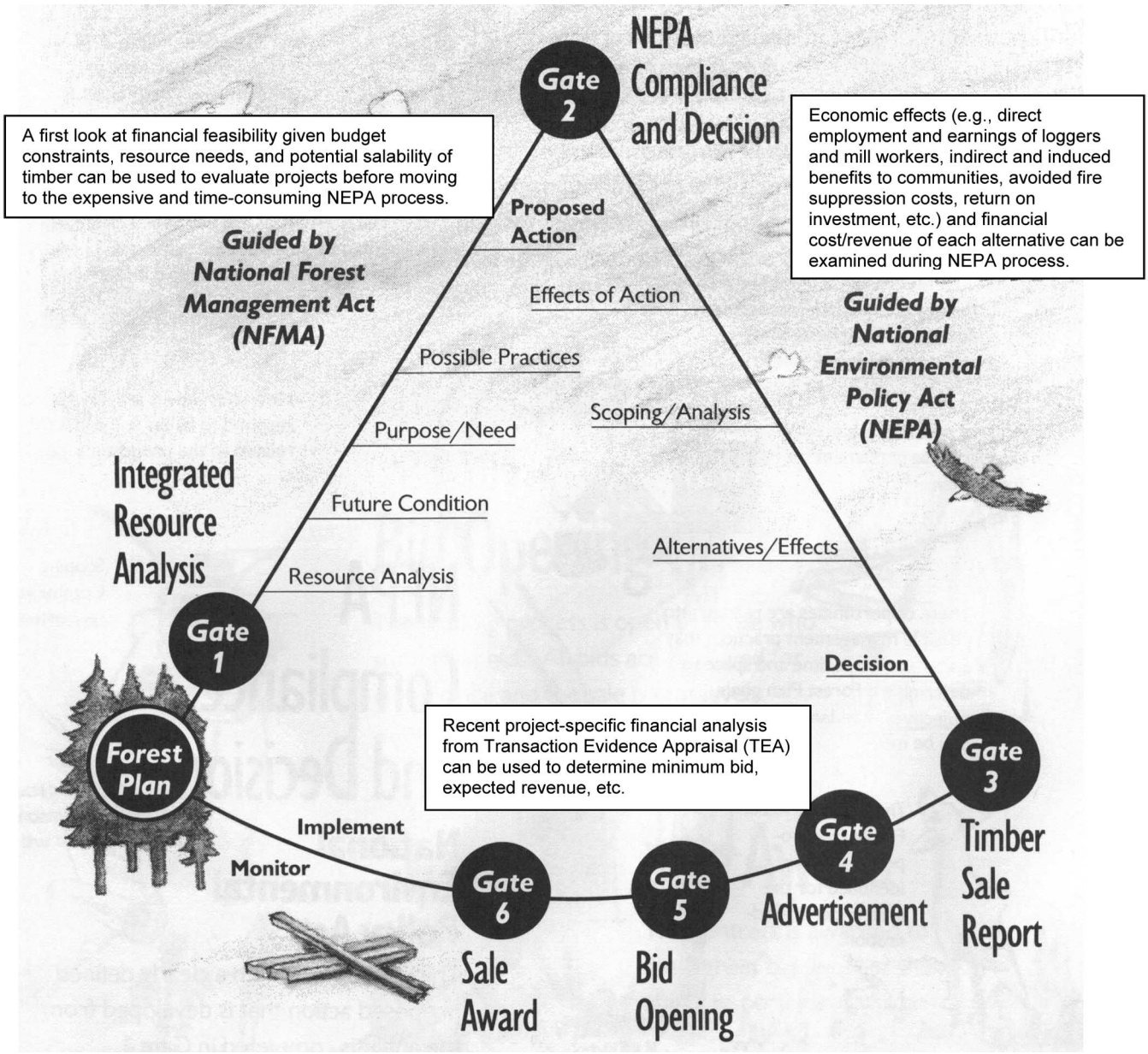

Figure 1. The gate system used by the US Forest Service when planning a timber sale or biomass removal project with merchantable material (US Forest Service, R1, Regional Office). The three text boxes were added by the authors to illustrate where different types of financial and economic analyses can be incorporated with the agency's land planning, impact analysis, and project implementation process.

comprehend the importance of successful contract offering for achieving resource objectives.

5. Agency employees may have philosophical, financial, or intraorganizational conflicts with the commercial sale and use of wood from federal lands, thus creating internal barriers to accomplishing resource objectives through biomass utilization. For example, selling or otherwise removing and utilizing biomass is sometimes viewed as taking work away from agency employees who were traditionally responsible for prescribed burning or slash disposal.
6. The risk to contractors who remove biomass can be too high when biomass markets are immature or highly volatile. The agency needs to be able to enter into a wood-supply contract with the wood-using facility directly and pay the contractor(s) for project accomplishment (i.e., biomass removal) to reduce the financial risk to the contractor if the price being paid for wood drops below the cost of removal and transport.

Use of Financial and Economic Tools and Information

Participant responses and perceptions related to the F&E tools and information that participants were familiar with and/or used in their biomass removal planning, analysis, and implementation process revealed eight dominant ideas:

1. Knowledge of local timber and biomass market conditions, contractors, and activities on other ownerships is critical and must be kept current. F&E tools are not adequate substitutes for managers' knowledge of local conditions.

Table 2. Summaries of several tools available to federal land managers for financial and economic analysis of woody biomass treatments.

Program/tool	Description	Required inputs	Outputs
MyFTP	Evaluates which treatments and treatment areas will contribute to fuel reduction objectives. Provides cost and revenue information.	Species, diameter, height, trees per acre, trees to be chipped or cut into logs, pretreatment surface fuel load, harvesting system, size of harvest unit, slope, yarding distance, hauling distance, prices for chips and logs.	Estimates costs, revenues, economic effects such as number of jobs created and income generated, and surface fuels associated with fuel reduction treatments that involve the potential for product utilization.
URL: www.fs.fed.us/pnw/data/myftp/myftp.shtml			
WEBOFIRE	Evaluates fire hazard associated with existing forest conditions and alternative treatments and potential treatment revenue in ponderosa pine/dry mixed conifer forests in Montana and New Mexico.	There are three input options: (1) select stand by visualization, (2) enter stand inventory data (species, trees per acre by diameter class, height, and crown ratio), or (3) upload existing XML stand data file.	Estimates fire behavior, crown fire, and available fuel potentials; fire hazard reduction effectiveness; net revenue associated with treatments.
URL: webofire.cfc.umt.edu/webofire/%28ze31dj55tiwoeya1wlkv0sfx%29/Default.aspx			
FVS ECON	Computes economic measures during FVS simulations to aid evaluation of silvicultural alternatives. The ECON extension runs concurrently with the FVS.	Forest inventory information about the forest, stand, and trees. Various financial and economic inputs are required for each ECON "keyword" or command used.	Produces discounted and undiscounted costs and revenues, benefit-cost ratio, internal rate of return, present net value, realizable rate of return, soil expectation value, value of forest, value of trees, and more.
URL: www.fs.fed.us/fmsc/fvs/index.shtml			
FIA BioSum	Generates cost estimates and evaluates effectiveness of fuel treatments in regionwide forested landscapes.	Forest Inventory and Analysis (FIA) plot data with expansion factors, road network with travel time per road segment, silvicultural treatments coded in FVS, and product prices.	Estimates volumes, treatment costs, gross product values, treatment effectiveness, and net and gross treatment costs and revenue.
URL: www.fs.fed.us/pnw/fia/biosum			
HCR Estimator	Identifies per-acre cost thresholds, appraises contract bid rates, prioritizes fuel reduction treatments, and assesses stumpage values for timber and biomass from small-diameter southwestern ponderosa pine.	Cut-tree data, harvesting system, equipment information, wage and benefit rates, mobilization distance, simulated log and biomass markets and distances, overhead costs, desired profit margin.	Estimates log size, number, and volume; volume of clean/dirty chips; service contract, stumpage, mobilization, and transport costs; number of truckloads by product; gross revenue by product; net revenue; and more.
URL: www.fs.fed.us/pnw/publications/gtr748			
FRCS	Estimates the costs of cutting and removing trees for solid wood products or chips and can estimate the cost of collecting and chipping forest residues.	Harvest system and silvicultural prescription, yard/skid/forward distance, percentage of slope, elevation, one-way move-in costs, green wood density, residue fraction, number of cut trees per acre, and average volume per tree	Estimates products recovered per acre and costs of the elements of each system in three forms: $/acre, $/hundred cubic feet, and $/green ton.
URL: www.fs.fed.us/pnw/data/frcs/frcs.shtml			
USFS Region 6 Models	Models available include Log Cost, Haul Costs, Volume Summary, Sale Economic Evaluation, Project Economic Evaluation, and Bid and Post-Bid Calculations	Model and system requirements vary depending upon the model selected.	Estimates logging and log haul costs, timber sale economic evaluations, optimal haul routes, timber volume summaries, and more.
URL: www.fs.fed.us/r6/nr/fp/FPWebPage/FP70104A/Programs.htm			

2. More F&E analysis or better tools will not make a biomass removal project successful if budgets, contractors, and outlets for biomass material are not sufficient or locally available.
3. Many F&E tools and models are too data hungry and research oriented. The tools require data that are not readily available or do not address practical items that can be readily measured.
4. The tools are often not scaled to use at the project size or do not fit the administrative process used. For example, estimates of product value based on a source other than TEA may not always be considered official or acceptable.
5. F&E tools developed by researchers do not appear to provide substantially better or different results than locally developed methods. Given managers' time and budget constraints, the effort to switch and learn new methods for the same results is not considered worthwhile.
6. Information overload is possible, with too much information from too many sources for local personnel to sort through given their work loads.
7. Although TEA is mandatory for all NFS regions, lack of comparable local timber or biomass sales data frequently limits the usefulness of TEA or provides results that are not representative of local conditions.
8. F&E tools need to be simple to use, must be kept current, and need to be locally applicable or easily adjusted for local conditions, and convenient training must be provided to relevant personnel—preferably onsite using local examples and data.

The following F&E models were indicated as rarely or never used by focus group participants:

- Forest Vegetation Simulator (FVS) Economic Analysis Extension.
- My Fuel Treatment Planner.
- Webofire website.
- Forest Inventory and Analysis BioSum.
- Harvest Cost-Revenue Estimator.
- Other JFSP products, reports, or information.

Summary information about these tools is provided in Table 2, and more detailed information is available from Loeffler et al. (2010).

The TEA system and R6 log cost and haul cost programs were indicated as occasionally or frequently used, with caveats. All NFS participants indicated that they needed to use TEA for financial evaluation of biomass removal activities that were associated with

timber sales, but TEA did not always produce reliable or useful results. FVS was indicated as frequently used by silviculturists, but the Economic Analysis Extension was not used by any participants. The R6 log and haul cost programs were frequently noted as used by NFS personnel in R2 (Colorado and Wyoming), R3 (Arizona and New Mexico), R5 (California), and R6 (Oregon and Washington). Three different types of contracts (i.e., timber sale, service, and stewardship) were frequently indicated as F&E tools used by NFS personnel to accomplish biomass removal in all regions. Most focus group participants also indicated using their own spreadsheets or back-of-the envelope calculations to analyze financial feasibility (i.e., budget and costs versus potential revenue) of biomass removal projects.

The most substantial gaps or disconnects discovered through the focus group process were not gaps in managers' knowledge about F&E items per se, or even knowledge of F&E tools for analyzing biomass removal treatments. Most, if not all, of the federal land managers that participated in the focus groups were aware of the financial information they needed. They understood local timber and biomass market conditions, knew where to find locally relevant information on costs and potential revenue from treatment activities, and used available tools or their own methods for estimating project costs and revenue. Participants were also aware that F&E tools and information had been developed by researchers, they generally knew how to locate these items, and several had formal introduction to or training with the tools.

Rather, the most prevalent gaps and disconnects appeared to be between managers' knowledge versus their acceptance and use of F&E tools developed by research entities. As indicated above, there were strong perceptions among the participating managers that many of the F&E tools and models developed by researchers are too complex, require data that are not readily available, are not scaled to use at the project size, or do not fit the administrative process used. Perhaps more importantly, managers also indicated that F&E tools developed by researchers, although they are more complex and complicated to use, do not provide substantially better or different results than locally developed methods. In addition, given managers' time and budget constraints, the effort to switch tools and learn new methods for virtually the same results was not considered worthwhile.

Another important issue revealed through this study was the relatively low level of attention that federal land managers seem to give to the analysis of economic impacts (e.g., jobs created or retained, avoided fire suppression costs etc.) of biomass removal compared with the analysis of financial items (e.g., project costs and revenue, and agency budgets) and compared with the analysis of ecological impacts. Participant responses to questions about F&E analysis and F&E tools focused on financial items, as illustrated by most of the themes and ideas reported above. Participants also frequently mentioned that economic analysis was a small (e.g., one- or two-paragraph) part of NEPA documents and much more effort was devoted to ecological issues. Whereas sufficient analysis of potential ecological impacts was frequently mentioned as the topic of NEPA-related administrative appeals and litigation, public concern about economic impacts is perceived to be less prevalent and/or contentious.

Although not directly stated by focus group participants, a hesitancy to include analyses of potential economic impacts from low-value materials with poorly developed local markets and uncertain salability may exist among federal land managers. It was not determined whether these analyses are considered more speculative, less scientific, or more vulnerable to legal attack; there is too little local biomass using infrastructure to perform analyses; or existing economic data and tools are not viewed adequate or appropriate for the type or scale of proposed activities.

Conclusions

Because time and budget constraints appeared so important to managers and were closely related to their ability and willingness to use F&E tools developed by researchers, land managers may be best served by agency administrators ensuring that NEPA-ID teams are staffed with personnel who are well-informed of local biomass and timber market conditions, have training and experience with F&E analysis, and understand that projects that go "no bid" represent money that was wasted on analysis. Researchers could further support these efforts by ensuring that necessary local information is available to relevant agency personnel, supporting local cost-collection/estimation efforts and methods, and limiting efforts to reinvent the wheel or build a better mousetrap. Ideally, managers would have access to simple, flexible, locally applicable, and readily updatable financial tools that also are well documented, are administratively acceptable, and work in conjunction with the TEA system.

Certainly, closer communication and coordination of efforts among forest management, research, and administrative personnel are needed as new F&E tools or administrative processes are developed and implemented. It is not the responsibility of just administrators and researchers to bridge the gaps between managers' knowledge versus acceptance and use of F&E tools. A certain degree of reluctance to go beyond the status quo or shift away from business as usual is detectable among the focus group participants' responses. Local land managers must be able to recognize limitations of their current methods, be willing to learn more about F&E analysis, and ultimately adopt other tools or methods when what they are doing does not work or is insufficient to address public concerns. Agency leadership needs to emphasize that project planning and analysis, whether financial, economic, or ecological, cannot be considered ends in and of themselves. Planning and analysis need to be viewed as means to achieve desired resource outcomes.

Removing and utilizing woody biomass, rather than burning it, is a relatively new concept for many in federal land management agencies. Agency infrastructure and processes are still largely geared for analysis of traditional timber harvesting and brush disposal. It is important for those inside and outside the agencies to understand that the shift to biomass utilization will take time because of internal factors unrelated to wood markets or other F&E considerations.

The focus group findings, particularly those from the "Financial and Economic Tools and Information" section, suggest needs for continually updated local timber and biomass market information, training of agency personnel with tools and methods for F&E analysis, continued technical support for F&E models and tools *currently* used, and closer communication and integration with forest management personnel as new F&E tools or administrative processes are developed by researchers and agency directors. As numerous participants indicated, another biomass tool or treatment cost/revenue calculator may not be well received because of issues with time, budgets, training, ease of use, and local relevance. However, several participants noted attributes of tools and information that they did use. Specifically, the information and tools need to be

up-to-date, easy to use, and locally relevant or readily adjusted for local conditions, and technical support needs to be available.

Future research may do well to assess the administrative procedures and processes that are required (or perceived to be required) of land managers. In particular, researchers and agency administrators could examine the real or perceived requirements to perform the following:

- Inventory and appraise (i.e., cruise) biomass with the same precision as traditional timber.
- Use the TEA system for setting minimum bids for biomass sales.
- Use stewardship contracts as the only way to keep project revenue on the forest.
- Quantify and report economic impacts of treatments in NEPA documents.
- Meet targets for acres treated or timber volume sold to receive adequate budgets.

Focus groups suggested that varying degrees of acceptance and different interpretations of these requirements exist within the Forest Service. Consequently, some land managers found these items to be institutional barriers that needed to be worked around to accomplish resource objectives. Clarifying these requirements or reconciling these administrative procedures with management practicalities and resource needs would, no doubt, prove useful to biomass utilization on federal forest lands.

Unfortunately, very few BLM and USGS personnel and managers from just two national parks were available to participate in this study. Future research might seek to involve more participants from these and other federal land management agencies (e.g., Fish and Wildlife Service, Department of Defense). Given differences in the agencies' mandates, administrative rules, and project analysis and implementation processes, somewhat different needs may exist. However, many of the basic financial information needs related to treatment costs, local outlets for harvested biomass, and availability of local contractors to conduct the work may be quite similar to findings from this study's NFS-dominated group of participants.

Likewise, economic analysis needs are probably similar among the federal land management agencies. Managers have obligations to demonstrate consideration of economic impacts such as direct employment in the forest industry sectors, indirect and induced benefits to communities, avoided costs of fire suppression, and broader economic benefits that may accrue as a result of reduced fire hazard, decreased particulate emissions from open burning, and substitution of wood-derived fuels in place of fossil fuels. These and other economic questions associated with biomass removal, however, are not currently regarded with the same degree of importance as financial and ecological issues that dominate federal forest managers' routine efforts. Unless or until economic issues are perceived by agency personnel and the public (particularly appellants and litigants) as having equal or greater importance compared with other concerns, economic issues will probably not receive comparable attention in agency planning and analysis efforts.

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Appendix A

Focus group participant demographic information:

- Name, position/job title.
- Years and months in agency.
- Years and months in current position.
- Typical geographic scale regularly working in (e.g., district, forest, region).
- Did the participant serve on a NEPA-ID team in the past 3 years? If so, the number of times and in what capacity.
- Did the participant work on stewardship contract in the past 3 years? If so, the number of times and in what capacity.
- Was there participation in mechanical fuels treatment or similar training? If so, when and name of course(s).

Appendix B

Focus group study guide questions:

1. Current process used by federal land managers for financial and economic planning, analysis, and implementation of biomass removal
   - Approximately how many acres are treated for fuel reduction annually?
   - What proportions are mechanical, prescribed fire, and wildland fire use?
   - How and where are treatment targets and budgets determined?
   - Describe the financial and economic (F&E) analysis system or process used.
   - Describe similarities and differences from the timber "Gate System" (Figure 1).
   - What F&E items are considered?
   - How are F&E items reviewed?
   - Who examines F&E items?
   - What is the relative importance of F&E considerations?
   - To what extent does F&E analysis influence decision or impact a project?
   - Describe any differences in F&E analysis by contract types (timber, service, and stewardship).
2. Potential changes or improvements to the process federal land managers use for financial and economic planning, analysis, and implementation of biomass removal
   - Identify disconnects you have encountered with current needs and available tools and information.
   - What has and has not been working when it comes to the financial and economic aspects of fuel reduction treatments?
   - How would you or have you improved the process locally?
   - What higher level changes would improve the process?

- Identify disconnects between the agency process and on-the-ground situation.
- What steps or omissions in the planning/analysis/decision process lead to financial and economic issues being "show stoppers"?
- What information or tools are needed to improve the process and implementation?

3. Financial and economic tools and information participants are familiar with and/or use
   - What tools and information are currently being used for F&E analysis?
     - Programs, websites, publications, people
     - National versus local and regional tools and information
   - To what extent have you used the following tools:
     - My Fuel Treatment Planner (MyFTP)
     - Webofire
     - Forest Vegetation Simulator (FVS) Economic Analysis Extension
     - Forest Inventory and Analysis (FIA) BioSum
     - Harvest Cost-Revenue (HCR) Estimator
     - Transaction Evidence Appraisal (TEA) System
     - Region Six Log Cost or Haul Cost programs
     - Other JFSP products, reports, or information
   - What tools and information are most and least useful or problematic?
   - What information do you need or want that is not available?
   - What would the "perfect tool" for biomass F&E analysis do?
   - What changes to current tools would make them more useful?
   - What can researchers and JFSP do to make your job easier?