EQC STUDY SUBCOMMITTE
MEETING DATE: 3/16/06
EXHIBIT 5

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**DEBRA FOLEY**

Debra Foley is president of the Montana Forest Owners Association (MFOA), a non-profit corporation directed by a voluntary board of non-industrial private forest landowners. MFOA advocates state-of-the-art stewardship of forested lands and protecting the rights of non-industrial private forest owners.
Debra received her Bachelor of Science degree in Resource Conservation from the University of Montana College of Forestry and Conservation and is currently pursuing a graduate degree. Debra attended the University of Minnesota College of Agriculture, Food and Environmental Science before transferring to the University of Montana in Missoula. She also chaired the Baytown Township Planning Commission in the Minneapolis/St. Paul, Minnesota metro area.

## WHO ARE MONTANA'S FAMILY FOREST OWNERS? (some facts):

- Non-Industrial Private Forest Owners (NIPFers) are individuals, families, trusts, farmers and ranchers owning forest land in Montana.
- 82,000 Montanans own at least 1 acre of forest land (approximately 3.5 million acres)
- 14,700 Montanans own at least 20 acres of forest land (approximately 3.9 million acres)
- Montana NIPFers have provided an average of approximately 30% of total annual wood volume harvested from 1993 to 2003. Montana NIPFers also own thousands of acres of sensitive riparian and open-space lands.
- Less than 1% of owners cite timber production as a primary objective for owning forest land - yet over 52% have timber harvest experience. Many find that harvesting trees is necessary to achieve other non-timber goals—i.e., wildfire protection, habitat for wildlife, etc.

**VISION:** The cost of producing benefits that society receives from NIPF lands should not be borne entirely by the landowners. Society as a whole has expressed an interest in the success of private forest land management.

**CHALLENGE:** NIPFers, with the timely assistance of selected public and private agencies, want to sustain healthy forest ecosystems which deliver a sustainable supply of forest PRODUCTS and landowner VALUES.

## Principle Montana Non-Industrial Private Forestry Issues:

1. **FREEDOM TO MANAGE OUR OWN FOREST LAND PROPERTY**
   - Support legislative and other efforts to recognize the benefits of good forestry practices and the rights of landowners to manage and harvest trees according to our own management plan objectives.
   - Ensure NIPF participation on appropriate state policy-making groups forming forest policy

2. **IMPROVED FOREST PRODUCTS MARKETS**
   - Endorse open access for our forest products to regional, national and world markets.

3. **FAIR INCOME, ESTATE AND PROPERTY TAX INCENTIVES**

- Encourage fair taxation for funding wildfires:
  - Preparing for and suppressing wildfires require competent and active cooperation among local, state, and federal agencies and private citizens to handle these responsibilities effectively. Dealing with the costs of fighting wildfires is an important issue, one which should be based on a sound analysis of the complexities involved and not on a quick-fix approach that targets individual groups and businesses.
- Work to create reduced taxation levels for forested tracts, of five to fifteen acres, that are subject to a forest management plan.
- Work with regional and national organizations to reduce estate taxes.
- Support fair capital gains treatments for timber (appropriate inflationary adjustments as well as forestry expense deductions) and support the Montana forest productivity tax system.

**4. PRIVATE PROPERTY RIGHTS**

- Insist that legitimate private property rights be upheld under the law, with prompt and just compensation for public takings of private property (Endangered Species Act)

**5. FORESTRY EDUCATION OVER FORESTRY REGULATION**

- Work with MSU-Extension Forestry and Montana DNRC Service Forestry to ensure appropriate levels of private forest landowner educational opportunities.
- Support Montana's voluntary Best Management Practices for forestry and the BMP audit process.

**6. FIRE POLICIES AND REGULATION**

- Encourage NIPFers to reduce fuels, provide effective access and use fire-safe building, landscape and storage procedures.
- Develop incentives for family forests that manage hazard fuels.
- Limited liability legislation for prescribed burning with a burn plan for Montana landowners.
- Work for responsible use of prescribed burning techniques and the development of prescribed burning education programs.

**7. ENCOURAGE SUPPORT OF EXISTING INFRASTRUCTURE:**

- Montana State University (MSU) - Extension - Education: Workshops, Forest Stewardship Program, Continuing Education
- Montana Tree Farm Program - Certification
- Montana Logging Association - Education
- Private Forestry Consultants - Economic and silviculture
- Industry Forestry Consultants - Economic and silviculture
- University of Montana College of Forestry & Conservation – Research
- State of Montana Agencies:
  - Dept. of Natural Resources & Conservation (DNRC) (Private Forestry assistance, Hazard Reduction Agreements, Best Management Practices, Streamside Management Zone Regulations
  - Fish Wildlife & Parks (FWP)
  - U. S. Dept. of Agriculture/U.S. Forest Service State and Private Forestry
  - Bureau of Land Management (BLM)
  - Natural Resource Conservation Service (NRCS)

# Wildfire in Montana: Potential hazard reduction and economic effects of a strategic treatment program

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**Abstract**

About 80 percent of Montana's 9 million acres of fire-adapted forests rate high/moderate for fire hazard. A strategic hazard reduction scenario was evaluated based on treating 1 percent of these stands annually for 30 years. The proposed comprehensive treatment regime moved 90 percent of potentially treatable acres to a low hazard rating and yielded an average return of $624 per acre treated. Further analysis of this "1 percent scenario" showed that it would generate nearly 100 million ft.$^3$ of timber annually, along with 3,000 private sector jobs, and $40 million in revenue to Montana landowners.

Unlike the Southwest and Pacific Northwest, Montana emerged relatively unscathed by the 2002 wildfire season. Not so long ago, though, we were feeling the effects of tinder-dry conditions, smoke-filled skies, and forest closures.

The major wildfires that burned over half a million acres in Montana during the summer of 2000 point to the hazardous conditions that exist across much of the state's forested landscape. Several questions arise when contemplating the aftermath of those fires. What is the relative fire hazard associated with existing forest conditions in Montana? How effective are fuel-reduction treatments at reducing the wildfire hazard? How much do these treatments cost, and what other benefits might accrue from the work?

These questions have been on the minds of the public, politicians, and forest managers alike. Reports from recent western wildfires provide evidence that forest thinning can indeed reduce fire intensity, either by diverting flames around treated areas or by bringing fire in the forest canopy down to the ground (Pollet and Omi 2002).

However, the costs of implementing such treatments have generally been thought to be expensive, perhaps prohibitively so. For example, a news report from the Klamath Basin in southwestern Oregon suggests that the cost of thinning forests to reduce fire hazard will be "staggeringly expensive with little economic return – $2.7 billion for 1.6 million acres, or an average of more than $1,685 per acre" (Barnard 2002).

A statewide analysis conducted by researchers at the University of Montana's School of Forestry and Bureau of Business and Economic Research reached a markedly different conclusion for Montana. A comprehensive forest restoration/fuel-reduction program will reduce fire hazard, improve ecological conditions of forests, and bring numerous economic benefits that exceed hazard-reduction costs, according to the study.

Results of the fire-hazard analysis showed that about 80 percent of Montana's 9.3 million acres of lower elevation, historically fire-adapted forests rate high/moderate for fire hazard (**Fig. 1**). These fire-adapted forests are

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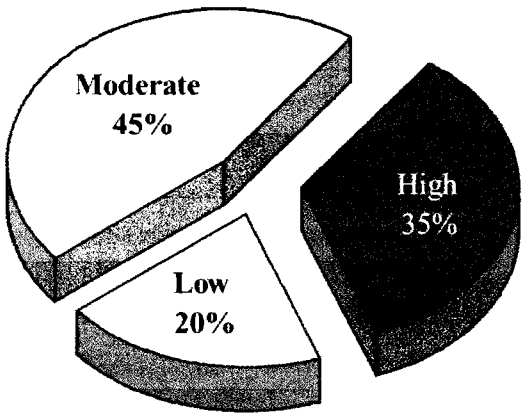
*Forest Products Society Member.

Forest Prod. J. 54(7/8):21-25.




**Total acres = 9.3 million**

*Figure 1. — Proportion of Montana's short-interval fire-adapted forests (PP, DF, DLMC) by fire hazard rating.*

primarily comprised of ponderosa pine (PP), Douglas-fir (DF), and dry mixed-conifer (DLMC) forest types.

Forests adapted to frequent, low-intensity fires were identified as the highest priority for treatment in "Protecting People and Sustaining Resources in Fire-Adapted Ecosystems - A Cohesive Strategy" (USFS 2000, DOI 2001). These forests have undergone the greatest changes in terms of increased tree densities, more complex (storied) structures, and increased composition of Douglas-fir/true firs. These are also the forests where people most often live, travel, and recreate.

## Fire hazard reduction treatments

Fiedler et al. (1999) and Fiedler (2000) have designed a comprehensive treatment approach to initiate restoration of sustainable ecological conditions in Montana's fire-adapted forest types while substantially reducing wildfire hazard. This approach of focusing on the future ecological condition of the forest fundamentally differs from proposals that call for removal of only small trees. The comprehensive prescription is comprised of treatments aimed at creating stand conditions similar to those that were common in fire-adapted forests prior to fire exclusion and high-grade logging. These treatments also substantially reduce fire hazard.

Under this approach, trees are retained in the sizes, numbers, species, and arrangement that will go furthest toward restoring ecologically sustainable forest conditions, given existing stand conditions (Fiedler 2000). Specifically, trees that do not contribute to the desired conditions of the future are removed, and the associated slash is removed from the site or burned to reduce the surface fuel hazard. The resulting forest stand is comprised of mostly larger pine trees, although some trees of all diameters are retained, if available.

The comprehensive prescription is designed to deal with the primary ecological problems present in many stands:

- Excessive stand density because fire has been excluded for decades and with it, the associated "thinning" effects on smaller trees.

- A shift in stand structure from relatively open-grown conditions dominated by large trees (most commonly ponderosa pine) to stands that are dense and contain a ladder-like structure of trees. This layering of fuels allows fire to climb from the ground into the crowns of even the largest trees.

- A transition in species composition from dominance by fire-resistant ponderosa pine to more shade-tolerant (and less fire- and disease-resistant) species like Douglas-fir. In Montana, Douglas-fir regenerates readily in dense, shaded conditions, and many typically vulnerable firs have survived due to the extended absence of surface fires. Past harvest practices sometimes accelerated this shift in composition by removing the largest and most valuable ponderosa pine trees.

An effective treatment approach must address all three of these problems to the extent they exist in the stands considered for treatment. Typically this requires dealing with trees across the size range occurring in a given stand. The objectives of treatment are to increase vigor and growth of the remaining trees, and provide the moisture and sunlight needed to regenerate the shade-intolerant species like ponderosa pine that historically dominated these stands. Of the 7.4 million acres of fire-adapted forests in Montana that rate high/moderate for crown fire hazard, more than 6 million acres have stand conditions potentially benefiting from treatment under the proposed comprehensive ecological approach (Fiedler et al. 2001b).

## Estimating treatment costs and revenues

Treatment costs and potential timber revenues were not taken into account when developing the treatment prescriptions; instead, prescriptions were developed solely to produce a desired range of forest conditions. However, because cost is a major factor influencing the potential implementation of treatments, costs were analyzed after the prescription was developed and its effects modeled. Net revenues were calculated as the value of the timber (if any) recovered as a byproduct of treatments, minus the costs associated with treatments.

Costs typically include removing trees to reduce fuel loading and piling and burning of trees or parts of trees not removed from the site for product use. Harvest and haul costs were estimated using databases and a recently completed predictive logging cost model applicable to hazard reduction and restoration treatments in Montana (BBER 2001a, Keegan et al. 2002). Treatments were assumed to occur on sites already accessible by road; therefore, no road-building costs were included in the analyses. Also not included were administrative and legal costs associated with project design and implementation. Data gathered from land management agencies and the private sector provided the basis for estimating costs associated with piling and burning.

Tree values were developed from an extensive log price data system maintained by the BBER (2001b) and from a sawmill simulation model (Wagner et al. 1998, 2000). On average, about 70 percent of the volume of trees removed to accomplish the comprehensive prescription would be suitable for lumber or ply-

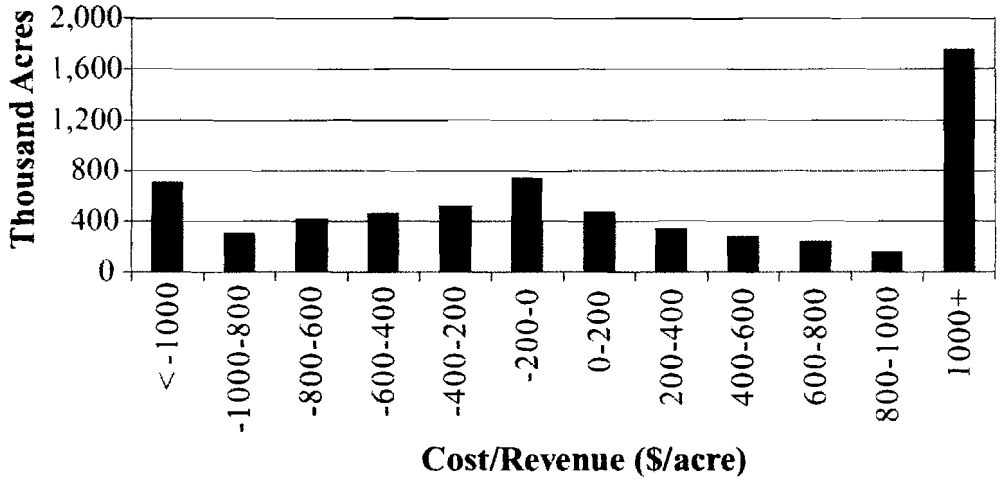



*Figure 2. — Distribution of acres by net revenue for the comprehensive hazard reduction treatment for high/moderate hazard conditions in PP, DF, and DLMC forest types (1997 to 1999 market conditions).*

wood. Product values for these trees were analyzed based on prices from 1997 to 1999, a period of mixed conditions, with very strong markets in the first half of 1997 and most of 1999 and substantially weaker markets in 1998 due to the Asian financial crisis (Random Lengths 2001). The prices used in this analysis are higher than current prices, which are the lowest in over a decade due primarily to very weak global economic conditions; however, projected prices and timber values are on average higher than those used in our analysis (Adams 2002a, 2002b).

Nearly 30 percent of the volume removed would be from trees less than 9 inches in diameter at breast height. Historically, use of these smaller trees has been as pulpwood, which has a very sporadic market, nonexistent at times. For this reason, the market scenario evaluated did not include a product use for trees under 9 inches in diameter.

## Results

### Effects of treatments on fire hazard

The comprehensive treatment approach designed to initiate restoration of ecological conditions has been demonstrated to substantially reduce fire hazard, both immediately and long-term (Fiedler et al. 2001b). Under this comprehensive approach, 90 percent of the treated acres moved from high or moderate hazard to low hazard immediately following treatment. Employing widely used growth and fire hazard models (Wykoff et al. 1982, Beukema et al. 1997, Scott and Reinhardt 2001), post-treatment forest conditions were projected or "grown" 30 years into the future, and then reevaluated for fire hazard. Seventy-two percent of the acres receiving the treatments prescribed under the comprehensive approach remained in the low-hazard category for crown fire 30 years later.

### Costs/revenues of restoration/hazard reduction treatments

The comprehensive set of treatments needed to address chronic ecological problems in drier, fire-adapted forests often requires removing some trees with product value. For example, the excessive number of shade-tolerant trees in many ponderosa pine stands often calls for removal of numerous Douglas-firs 9 inches and larger – trees that typically have value exceeding the cost of their removal. Reducing high stand density and removing ladder fuels also often results in the removal of trees with commercial value.

Because many of these "byproduct" trees have commercial value, the comprehensive prescription would yield an expected net revenue averaging $624 per acre treated when averaged across all 6.4 million acres with potential for treatment (Fiedler et al. 2001b). The range of revenues was substantial, with some stands costing more than $1,000 per acre to treat and others yielding positive net revenues of more than $2,000 per acre (**Fig. 2**). About half of the acres treated with the comprehensive prescription yielded a value in timber that exceeded all hazard-reduction costs. Although a comprehensive treatment regime will, on average, generate positive revenue flow, over 3 million of the acres rated high/moderate for fire hazard would require an out-of-pocket expenditure to treat.

### Economic impacts of statewide treatment implementation

Statewide implementation of a comprehensive fire hazard reduction program would create numerous benefits for Montana. The most obvious and perhaps most important benefits would be reduced wildfire hazard and improved ecological condition of forests altered by disrupted fire regimes and, in some cases, by past high-grade logging. Economic benefits would include:

- Protection of recreation opportunities and property values;
- Reduced firefighting costs;
- A sustainable supply of timber, which could in turn lead to increased employment opportunities and revenues for landowners implementing the treatments.

Determining the specific locations and acreages of high/moderate hazard stands to be treated would require considerable input from scientists, land managers, and the public. It is clear that millions of acres of low-elevation forests should be considered for treatment. However, not all of these acres should be treated, and no single treatment would be appropriate (Fiedler et al. 2001a). The goal should be to leave a mix of forest conditions with a greater proportion of the relatively open, fire-resistant,

large-tree-dominated stands that were historically prominent in the region.

To illustrate potential employment and financial effects, we examined a "1 percent scenario," where 1 percent of the high/moderate hazard fire-adapted forests would be treated each year for 30 years.

Assuming that 1 percent of the 6.4 million acres potentially treatable under the comprehensive prescription was treated for each of 30 years, 64,000 acres of high/moderate hazard ponderosa pine, Douglas-fir, and/or dry mixed-conifer forests would be treated annually in Montana. This translates to roughly one-third (30%) of the treatable acres receiving treatment over the next three decades. Under this scenario, less than 1 percent of the pine/fir/dry mixed-conifer forests in Montana would be treated each year. Over a 30-year period, only about 21 percent of the total acres in these forest types would receive treatment -- or less than 9 percent of Montana's total forestland. Given the relatively small percentage of total forest acres treated, it is reasonable to assume that hazard-reduction treatments could occur in addition to acres currently harvested for commercial timber.

Under the 1 percent scenario, the total volume of timber harvested as a byproduct of the hazard reduction/restoration treatments would be slightly less than 97 million $ft.^3$ (MMCF) per year. From the perspective of recent timber harvest volumes, this increase represents about 45 percent of Montana's total annual harvest (Keegan et al. 2001), and translates to 29 MMCF of pulpwood and 300 million board feet (MMBF; Scribner, log scale) of sawlogs/veneer logs. Again, relative to current harvest levels, these volumes represent about 300 percent of the state's current pulpwood harvest and 37 percent of the annual sawlog/veneer log harvest.

What would implementing this 1 percent scenario mean to Montana's forest products industry? If the treatments were completed as prescribed, the sawlog/veneer log-sized material would likely be utilized. Substantial increases in production levels could be expected in the sawtimber-utilizing portions of the industry that currently have 145 MMBF of unutilized capacity (Keegan et al. 2001) and often struggle to find timber to fill orders. With a reliable long-term increase in timber supply as a byproduct of hazard reduction, numerous mills and companies would be expected to not only utilize more of existing capacity, but also bring more capacity online, especially given the outlook for somewhat higher real prices for lumber in the coming decades (Adams 2002a). In contrast, there would likely be no immediate or long-term increase in capacity to utilize pulpwood unless there were a substantial increase in worldwide demand for pulp and paper products.

In estimating employment impacts, it was assumed that sawtimber would be harvested and processed into lumber or plywood, and pulpwood would be removed to landings and burned in piles (because of the dearth of a reliable pulpwood market). Based on these assumptions, Montana landowners would receive an estimated $40 million annually in net revenue from the sawtimber produced as a byproduct of the hazard-reduction treatments. Harvesting and processing sawtimber generates about 9 full-time jobs per MMBF Scribner log scale, and moving pulpwood to a landing and burning it employs about 12 full-time workers per MMCF (BBER 2001a, CURFOR 2002, FIDACS 2002). Using these employment ratios and assuming an additional full-time worker per MMCF for forest management, administration, and planning, the treatment of 64,000 acres would generate an estimated 3,000 additional workers annually and more than $90 million in labor income.

## Conclusions

More than 80 percent of Montana's lower-elevation, historically fire-adapted forests currently rate high/moderate for crown fire hazard. These are the forests where people most frequently live, recreate, and work, and whose sustainability is most threatened by intense wildfires. Comprehensive treatment prescriptions designed to restore sustainable ecological conditions in these forests can move 90 percent of treated acres into a low-hazard condition.

The implementation of a comprehensive restoration/hazard reduction program on just 1 percent (64,000 acres) of high/moderate hazard lower-elevation forests per year would positively impact Montana's forests, its forest products industry, and forest landowners. The 300 MMBF of sawlogs generated each year as a byproduct of hazard reduction could be expected to increase employment by 3,000 workers, boost labor income by $90 million, and provide forest landowners with an additional $40 million in revenue annually. Maintaining the stand conditions (i.e., density, structure, and species composition) necessary for continued fire resistance over time would require that the proposed treatments be repeated at 25- to 40-year intervals. This would in turn lead to a sustainable timber supply.

To return these historically utilized forests to more ecologically and economically sustainable conditions makes good sense for the forests and for the myriad of people and animals that depend on them. Indeed, both public and political support exists for initiatives to address wildfire hazard (Devlin 2001, WGA 2001). The ecological and economic benefits of a comprehensive restoration/hazard reduction program are significant, and certainly deserve the consideration of policymakers.

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