

Poster Presentation Abstracts

PHOTO POINT MONITORING

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The most important criteria for photo monitoring is to maintain exactly the same distance between camera and photo point (the topic being photographed). The photo point should be identified, for example, by a meter board. Both the camera location and photo point (meter board) must be permanently located by steel fence posts or stakes so that exact replacement of both the camera and the meter board are assured. The meter board serves several purposes: 1) It identifies the topic of interest; 2) It helps reorient the camera for subsequent photographs when the focus ring in the camera is located on the "1M" of the meter board; 3) It assures sharp focus on the topic when the camera is focused on the "1M" of the meter board and, 4) It is a reference for calibrating a grid system to measure attributes of the topic. When establishing a monitoring site, consider the following: 1) establish monitoring objectives—why was the site chosen and what is to be monitored; 2) assume the person establishing the monitoring system will not be the same person who re-photographs it, so provide; 3) a road map to find the monitoring site; 4) a map of the monitoring site showing camera locations and photo points with measured distances and directions from an established witness mark, and 5) a protocol for photography to include the kind of camera (film or digital), lens focal length, film (color or black-and-white), digital pixel intensity (i.e., 2,1 megapixels), time(s) of the year to photograph, and the sequence of yearly follow-up photography. The objective of the monitoring is to show change in environmental conditions around a fixed axis of view.

USDA FOREST SERVICE: SMALL DIAMETER TIMBER UTILIZATION PROGRAM

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The Small Diameter Utilization (SDU) Program's focus is on management of forests overstocked with small-diameter trees where costs for stand management are relatively high. New and innovative vegetation management and timber sale planning, preparation, contracting, implementation, and utilization approaches are being explored to help solve the operational problems associated with small-diameter management and fuels treatment.

The SDU program helps solve operational problems, provides information, and ensures this knowledge is used for utilization of small-diameter trees. It will provide direct field assistance, share current information, connect knowledgeable subject area experts with practitioners, and prepare technical information for use by natural resource professionals.

Effective management strategies for handling SDU material are developed by collaborating with the National Forest System (NFS), State and Private Forestry (S&PF), Research and Development (R&D), Forest Health Protection (FHP),

Fire and Aviation Management (F&AM), the Forest Products Laboratory (FPL), universities, and with private and nonprofit agencies.

SDU emphasis areas include:

Presale and Contracting—Supports interests such as designation by description, cruising, appraisal, scaling and contracting methods to more efficiently manage small-diameter trees. Contracting includes combined service and timber sale contract clauses, and "stewardship pilot contracting" authorities to address small-diameter issues.

Vegetation Management & Harvesting Systems—Provides ideas and information to address vegetation management problems associated with treating "low" or "no" value small-diameter stands. Information, contacts, and resources related to equipment, harvesting systems, methods, and techniques for vegetation management are available.

Technology Transfer—Support provides networks to share information regarding the latest technology, workshops, conferences, websites, research, and studies related to small-diameter utilization. Resources and expertise include Forest Service State & Private Forestry, State Extension Forestry, Forest Products Laboratory Technology and Marketing Unit, Forest Service Research and Development stations, and universities.

Forest Products and Manufacturing—Small log products include lumber, round timbers, veneer, composites, chips, and residues. The SDU Program networks with forest products and manufacturing resources such as the Forest Products Laboratory, universities, and Forest Service Research and Development stations to provide the latest information on forest products and manufacturing processes.

Biomass—Small log products also include biomass in the form of chips and residues. The SDU Program networks with biomass utilization experts to provide the latest information on new and current equipment, methods, contacts, and applications for bio-energy utilization of small-diameter material.

Markets and Marketing—Developing markets for small-diameter wood products is a critical element in utilization of small-diameter trees. The SDU Program will provide networks and information to help understand market conditions, marketing efforts, and resources available in an area to address market issues.

Economic Development—Small-diameter wood products provide an economic development opportunity for local communities. The SDU Program provides networks to supply economic development ideas and potential funding to address problems utilizing small-diameter trees.

Website Development—SDU and Forest Vegetation Management Tools websites (www.fs.fed.us/fmsh/sdu and www.fs.fed.us/vegtools) that support the emphasis areas mentioned earlier. An effort is currently underway to expand the site to include case studies or examples of the various projects related to forest vegetation management, fuels reduction, and utilization of small-diameter trees.

MANAGEMENT ACTIVITIES USING A SMALL TRACKED VEHICLE FOR SMALL DIAMETER TIMBER

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Small-diameter timber offers unique challenges for resource managers. Soil compaction, residual stand damage, and high equipment capital are often associated with using large logging equipment to extract this timber. In an ongoing project, the Department of Forest Products at the University of Idaho has modified an All Season Vehicle (ASV) RC 30 for use as a low impact skidding device. Several skidding methods are being evaluated including the use of log chains, tongs, skidding arch, and a modified tractor winch. Both uphill and downhill operations were evaluated for site impacts, productivity, maneuverability, and machine reliability. Evaluations consisted of elemental time studies, quantitative and qualitative observations, and day-to-day operation of the ASV RC 30. The skid-steer qualities of this machine have allowed it to operate with minimal disturbance to the residual stand. Observations revealed that the ASV was underpowered for some skidding applications, but the machine was still an overall effective skidding device for most situations. Preliminary data shows that the ASV is an effective multiple use tool for small-diameter timber management.

INSTITUTIONAL FACTORS AFFECTING SHORT-ROTATION WOODY CROPS IN THE PACIFIC NORTHWEST

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The development of short-rotation woody crops (SRWC) as an alternative investment for landowners may provide a competitive edge to local and regional economies competing in the global marketplace and a potential key resource for small-diameter timber production. The problem that this study hopes to examine is whether existing institutional factors such as taxes, incentive programs, water supply, forestry regulations, and environmental concerns affect a landowner's decision to establish SRWC in the Pacific Northwest.

This study attempts to achieve two objectives. The first is to identify and document existing tax structures, incentive programs, and environmental regulations that directly and indirectly impact short-rotation woody crops. The second is to compare institutional factors affecting SRWC across the states in the Pacific Northwest. The methods used to attain these objectives consist of using Internet and library searches for material concerning taxation, incentive programs, and environmental issues relating to SRWC across states in this region. Validation of this material involves numerous telephone conversations with independent and state tax experts, state forestry officials, industry representatives, and university researcher.

Landowners must consider a wide variety of factors when considering the establishment of SRWC. Taxation is important because of the inherent impacts on investment returns on a per acre basis. In Oregon and Washington, SRWC are defined as agriculture instead of forestry. Despite state designation, SRWC are considered timber under federal tax rules. In addition, landowners are eligible for federal incentive programs such as CRP, but have few choices at the state level to defray establishment costs. Landowners also face environmental issues that may affect their ability to manage SRWC. One issue is access to a dependable water supply for irrigation. Currently, the dam removal controversy on the Columbia/Snake River in the Pacific Northwest is most likely to affect existing SRWC examined in this study. Finally, the heavy dependence on genetically engineered trees may subject landowners to an uncertain market for their fiber in the future.

THE RURAL TECHNOLOGY INITIATIVE: INCREASING TECHNOLOGY TRANSFER TO RURAL, FORESTED COMMUNITIES

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Increasing complexity as a result of changing environmental regulations, recognition that new research findings are well ahead of implementation, and the substantial and widening gap between urban and rural timber incomes in Washington state suggest the need for more rapid technology transfer to the state's rural timber communities. The Rural Technology Initiative (RTI) was established in January 2000 with a federal grant as a pilot technology transfer project managed cooperatively by the University of Washington (UW) College of Forest Resources and Washington State University (WSU) Cooperative Extension.

THE LANDSCAPE MANAGEMENT SYSTEM: TECHNOLOGY FOR TOMORROW'S FORESTS TODAY

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Problems facing natural resource managers have grown substantially more complex. Resource managers face the staggering task of assimilating vast amounts of information in many forms while developing harvest scenarios on both temporal and spatial scales that comply with many new environmental regulations. The Silviculture Laboratory in the College of Forest Resources at the University of Washington, in cooperation with the USDA Forest Service, has developed the Landscape Management System (LMS). This computer software system processes vast amounts of information, generates stand to landscape scale silviculture options, and analyses the consequences to assist strategic and operational management decisions.

OPPORTUNITY: FIRE RISK REDUCTION THROUGH BIOMASS CO-GENERATION WITH MANY NON-MARKET VALUES

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Large areas of forestland in the Inland West are overstocked with small-diameter, suppressed trees. These forests have unprecedented fuel loads and are at high risk of catastrophic forest fire. Harvest costs for small-diameter trees frequently exceed market log values. Perhaps a broader accounting is needed to include the substantial non-market benefits associated with fuel reduction harvests in these forests. This project identifies and attempts to assign economic value to non-market benefits such as cogeneration, reduced fire fighting costs, reduction of atmospheric carbon, etc. that could result from fuel reduction harvests in overstocked, small-diameter forests in the Inland West.

ALTERNATIVE SOLID WOOD MATERIALS FOR SECONDARY MANUFACTURING: OPPORTUNITIES & CONSTRAINTS

John Punches, Associate Professor, Oregon State University, Department of Wood Science and Engineering, Corvallis, OR and Terry Black, Community Development Consultant

Many organizations seek markets for alternative solid wood materials (i.e., lesser-known or under-utilized species and/or small-diameter timber) in order to address forest health concerns, develop job opportunities in rural communities, or meet perceived shortages of raw material in manufacturing segments. Secondary wood producers have been proposed as a potential market for these materials. This study helps organizations attempting to market alternative solid wood materials (i.e., lesser-known or under-utilized species and/or small-diameter timber) understand secondary manufacturers' raw material requirements and information needs.

A literature review revealed little information about the characteristics secondary wood products manufacturers allow in their products, beyond what could be gleaned from end-products standards. Case studies were conducted with 53 secondary wood products companies in North Carolina, Virginia, Tennessee, Pennsylvania, Wisconsin, Oregon and Washington, examining a total of 116 products. These included moulding, architectural millwork, doors and windows, flooring, furniture, cabinetry, and a few specialty products.

Solid wood in "natural" applications (stained, clear-coated, or unfinished) must be highly uniform in color and appearance, and nearly free of defect. Finished products typically allow only occasional pin knots. Heartwood or sapwood may be undesirable (depending on species) if they lead to color variation. Allowance is made for characteristics unavoidable in some species, such as larger knots in knotty pine and pitch/gum pockets in cherry, although not by all producers. Manufacturers rarely have the luxury of choosing species that perform optimally. Rather, species is dictated by the customer or architect, and the manufacturer must tailor processes and product design to the material. While nearly all segments of the industry feature end-

product standards, proprietary grades are common. Architectural millwork producers may be an exception. They tend to conform tightly to the standards of the Architectural Woodwork Institute. Raw material for natural appearance applications is generally of very high grade. Clear wood is needed, and the labor cost of removing defects may offset any savings associated with lower grade material.

Wood used in painted applications has little need for uniform color. These products tolerate mixed heartwood and sapwood, various stains and discolorations, and other characteristics that do not impact surface quality. Color variations cannot, however, be so bold that they show through the finish. If other "defects" are allowed (e.g., knots, wormholes, bark pockets) they must be sound and sufficiently small and smooth to putty and be indistinguishable on the finished surface. Manufacturers use falldown from their natural appearance products as raw material for painted equivalents to the maximum extent feasible. They supplement with species that will afford a smooth surface at a low cost. Typically raw material grades are only slightly lower than those used for natural appearance products, since most defects will still be removed. Many secondary wood products incorporate solid wood in hidden applications. These include edge-glued and/or finger-jointed cores found under the surface veneer of door stiles and rails and window components, structural components of upholstered furniture, and connective blocking and structural components in cabinets and architectural fixtures. Even in these hidden applications defects are limited to ensure adequate strength, surface quality, and fastening characteristics. Knots and voids are undesired, and species that accept fasteners easily preferred.

Characteristics deemed most critical vary by segment. Moulding producers seek long, clear lengths with minimal defects, and may require dent resistance. Architectural millwork producers desire a stable finished product essentially free of defect, uniform in color, and often dent resistant. Cabinet manufacturers emphasize uniformity of color, and may sort components to obtain uniformity. Furniture manufacturers have a wide variety of applications, some dependent on the appearance of the wood and others on its straightness, strength, or stability. Door and window manufacturers must produce finished products that are highly stable and resistant to decay in exterior applications. Doors may have the added requirement of dent resistance. Flooring manufacturers produce a wide variety of grades that allow them to use nearly any species or grade of material, provided it remains stable in use. While dent resistance is desired, many species are used in flooring solely for their appearance/color and may have only moderate dent resistance. There is wide variation in allowable wood material characteristics among manufacturers in any segment. Characteristics regarded as unacceptable defects by one manufacturer may be viewed as acceptable or even desirable by another.

Species selection is primarily a function of customer demand (or in some cases architect demand). If given a choice of materials, manufacturers select those that perform suitably at the lowest cost.

Given the consistent need for high quality raw material across secondary wood products industry segments, it seems unlikely that lower grades of species already in use (as might

be obtained from forest thinning operations) will be adopted by the industry. Recovery of long and/or clear components would limit its utility, and the cost of labor associated with removing defects would limit its economic feasibility.

Adoption of alternative species (or current species with a different set characteristics) will require establishment of customer demand, desirable characteristics, and/or lower finished cost. Adoption may be most feasible in flooring or furniture markets, both of which utilize many species, but the wide variation in materials use within and among industry segment offers opportunities for those willing to develop niche markets.

Manufacturers adopting new materials will need to modify their processes and designs to them. They will require information on drying, machining, physical and mechanical properties. Suppliers offering new materials will need to clearly demonstrate the range of appearances and component recovery rates that can be expected. They will also need to assure sufficient, consistent quantity to justify change, and must offer the material in grade systems understood by the manufacturer. Architects will need to be educated and convinced to specify the materials if access is to be gained to some market segments. Finally, cost will need to be low enough to compete with existing materials.

SMALL DIAMETER TIMBER: AN ALTERNATIVE APPROACH FOR DETERMINING LUMBER VALUE

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Past forest management practices in the Western U.S. have resulted in significant acreages containing dense stands of small-diameter timber. Current valuation procedures assign this material insufficient value to off-set harvesting costs, thus limiting economical stand management. One component of a large, multi-agency project that addressed this problem involved the investigation a different approach to assigning market value in terms of lumber production. This included analyzing the market value of alternative end-products, specifically cut-stock parts. To do that, stand and tree characteristics were collected for 48 Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) and ponderosa pine (*Pinus ponderosa*) trees ranging from 5 to 10 inches dbh. They were then felled, bucked into 112 logs, live-sawn, and optically scanned. The resulting digital images were reconstructed into logs and finally tree stems. Knowledge of internal features and external shapes allowed alternative bucking and sawing strategies to be investigated using two simulation programs, SAW3D and CORY. One important consideration in this approach was the use of alternative products, specifically cut-stock parts, to assign value when optimizing log breakdown. Benefits of this technique and specific solutions will be presented.

EVALUATION OF SMALL DIAMETER TIMBER FOR VALUE-ADDED MANUFACTURING— STRESS WAVE ANALYSIS

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R. James Barbour, Team Leader, USDA Pacific Northwest Research Station, Portland, OR

The variability and lack of predictability of the strength and stiffness of small-diameter timber (SDT) causes problems in engineering applications. Cost-effective technology needs to be developed for evaluating the potential structural quality of such materials. The objective of this research was to investigate the use of stress wave technology to evaluate the modulus of elasticity of SDT before timber harvest and during processing stages. A total of one hundred and two Douglas-fir and ponderosa pine trees were sampled and subjected to stress wave tests in field. Twelve of the trees were harvested and sawn into logs and lumber. The mechanical properties of wood were then assessed by both stress wave and static bending techniques in the laboratory. Results of this study demonstrated that good relationships exist between stress wave parameters and static bending properties determined in various stages. Stress wave analysis technique can be used to sort small diameter trees and logs in terms of structural quality for value-added manufacturing.

DRY FOREST MECHANIZED FUEL TREATMENT TRIALS PROJECT

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Many studies exist about costs, production, and impacts for sawlog and commercial wood chip market harvest systems, but very little information of this type exists for systems intended to treat primarily noncommercial forest biomass, especially in the dry forests of the Intermountain West. This project was funded by the USDA Forest Service (National Fire Plan funding) to first organize and coordinate realistic fuels treatment trials at four locations in three states, and then synthesize and disseminate the results to natural resource agency personnel involved with fuels treatment planning decisions, potential local contractors and, other interested groups and organizations. Expected short-term outcomes include: 1) Improved ability of government agencies to plan and budget for future fuels treatment projects; and 2) More informed local contractor business decisions about what equipment to buy or lease. Projected long-term project outcomes include reduced site impacts, increased acres treated to reduce hazardous fuels, and local job retention and creation. Realistic mechanized fuels treatment trials are planned for late spring or early summer,

2002, at two locations in Oregon (Central Oregon and the Blue Mountains), one location in Washington (Okanogan or Wenatchee National Forests), and one location in Idaho (Boise National Forest). All locations represent different dry forest management challenges.

SMALL DIAMETER WOOD PROCESSING IN THE SOUTHWESTERN UNITED STATES: AN ECONOMIC CASE STUDY AND DECISION ANALYSIS TOOL

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Ponderosa pine (*Pinus ponderosa*) ecosystem restoration has been proposed as a method of restoring ecosystem health and lowering the risk of catastrophic wildfire in southwestern forests. There are few facilities in that region able to process material removed from restoration treatments into value-added products. At the time of this study, Alpine Trucking and Specialty Woods was an integrated small wood processor located in Eagar, Arizona, that has been able to use materials from restorations to produce roundwood products.

Profitable operation of any wood processing facility requires that people making decisions about the allocation of logs to products have a good working knowledge of processing costs, production, and product value. The premise of this study was that the personnel of Alpine Trucking did indeed have that knowledge and that using it in an analytical way would lead to insights that would improve profitability over using it in less structured ways. Alpine Trucking bought stumpage, harvested and transported the timber to their mill, and made a variety of roundwood products. These included vigas, latillas, posts, deck railing, small poles, utility poles, bagged firewood, shavings, and bark. Most of the roundwood items were available hand-peeled (an incomplete peel for appearance), machine peeled, or machined peeled with a hand-peeled look.

A flow diagram was created that showed the products and by-products that result when a log is allocated to production of a final product. This was converted into a spreadsheet model that included the product processing rates, processing costs, and sales revenue. This allowed employees to estimate the net revenue from alternative allocations of the logs with varying characteristics. They were also able to readily see the effect of shifts in prices for their products on profitability. With adjustments to processing rates and costs, they could evaluate the effect of modifications to their equipment mix on profitability.

As a result of this study and use of the decision analysis software, Alpine Trucking made a number of changes that they attributed to insights gained from this effort. They determined that utility poles were not a good option for them, given their equipment mix, because processing was inefficient. They concluded that hand-peeled poles made large contributions to net revenue because they required little processing and carried a premium price. They determined that small peeled poles were their core business and implemented in-the-woods sorting to route some logs directly to other manufacturers to minimize handling mate-

rial that is not profitable. The practice of aggressively marketing by-products such as shavings, sawdust, and bagged firewood was retained as an important key to being able to gain revenue from all the a Material they bring to the mill.

FOREST HEALTH AND TREE REMOVAL EQUIPMENT IN THE WILDLAND-URBAN INTERFACE: AN EDUCATIONAL VIDEO

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Forest health is a key issue in the wildland-urban interface. Operational programs to improve forest health conditions in the interface typically involve thinning or tree removals of small-diameter trees on privately owned lands. Implementing these programs requires, 1) persuading private landowners, through education, to adapt and implement tree thinning operations on their properties, and 2) using tree removal equipment that is more cost effective for small-diameter tree harvesting and suited for smaller acreage that is characteristic of private interface landholdings. The objective of this project is to develop a video and accompanying information packet that addresses the two needs mentioned above. The video/packet will be created, critiqued via a survey, and then finalized. The video/packet will be applied in two wildland-urban interface community case studies concerning the adoption of fire mitigation programs. The finalized video/packet will be made available through Colorado State University Cooperative Extension.

EXTENSION FORESTRY: EMPOWERING LOGGERS, FOREST OWNERS, PROFESSIONAL FORESTERS, AND YOUTH IN NORTHERN IDAHO

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and Randy Brooks, Extension Educator - Forestry/4-H/Agriculture,
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Eighty percent of Idaho's ten northern counties are forested. Over 30% of the forestland in these counties is held by nonindustrial private forest owners (NIPF). NIPF ownership is greater than 40% in some counties. Private forests provide timber, water, wildlife habitat, and many other values. They become even more vital to the region when timber supply from industrial and national forest lands declines. Private forest management often lags behind potential. The typical response to this and many other natural resource issues is, "we need more education." University of Idaho Extension provides practical education programs that help private forestland owners, loggers, and foresters to manage forests and other natural resources using the best available scientific research. Hundreds of forest owners participate in an annual series of workshops and field days entitled, "Strengthening Forest Stewardship Skills." Over 800 loggers have completed, "Logger Education to Advance Professionalism" or LEAP, an intensive 3-day program on forest ecology, silviculture, and water quality, designed to strengthen their ability to implement forest practices that enhance forest water quality and forest growth. Over 200 youth participate annually in natural resource field tours

and related programs. These efforts are supported by a variety of Extension publications and videos, including, "Woodland Notes," a newsletter mailed twice-a-year to over 10,000 Idaho forest owners.

EDUCATION THROUGH DEMONSTRATION: THE SHERWOOD CREEK DEMONSTRATION AREA

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Of Washington States' 90,000+ nonindustrial private forest (NIPF) landowners, approximately 15, 000 own forestland throughout northeastern Washington. Many of these landowners are seeking education and assistance towards managing their forest ground. Stand dynamics across the NIPF ownership are varied, with many landowners facing the task of working with overcrowded and dense stands.

Through the efforts of various individuals and agencies, WSU Cooperative Extension was able to work with a local landowner to set up a demonstration area accessible to the public and intended to demonstrate various forest management techniques. Much of the funding originated from a United States Forest Service project known as Creating Opportunities or CROP. The CROP project seeks ways of acquiring management information for dense overcrowded stands on the National Forests. Since much of the forest where this data is gathered is inaccessible to the public, CROP research data is better disseminated to the public via the demonstration forest.

The Sherwood Creek Demonstration Area was "donated" as an outdoor learning environment under the premise that individuals will better relate to an "out in the woods" classroom setting. The area demonstrates the importance of stocking control via differing management practices. Six central plots demonstrate: the use of fire as a management tool, how to thin from below, an uneven-aged system, a clearcut, and a high grade cut. All management treatments are clearly defined by signage and with background information. An accompanying, self-guided brochure was designed and intended to acquaint the public with the demonstration forest.

To date, over 600 individuals have received a learning experience through the demonstration process. As the demonstration forest continues to evolve, we feel more educational opportunities will be realized.

WASHINGTON'S FOREST STEWARDSHIP PROGRAM: SUCCESS THROUGH PARTNERSHIPS

David M. Baumgartner, Extension Forester and
Janean H. Creighton, Wildlife Extension Coordinator, Washington
State University, Department of Natural Resource Sciences,
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The Washington Forest Stewardship Program is a cooperative education program for the 90,000+ forest owners controlling 20%, or over 3 million acres of Washington's forestland. Washington's forest landowners face significant forest health and fire issues, changing riparian environmental regulations, market and tax problems and changing technologies. Owners have diverse backgrounds and limited technical knowledge. Interests range from timber production to nature preservation; many are very interested in wildlife. A partnership team conducts the program with leadership from the Department of Natural Resource Sciences and Cooperative extension, Washington State University, and the Washington State department of Natural Resources, in cooperation with the USDA-Forest Service, Pacific Northwest Region, State and Private Division, USDA-Natural Resource Conservation Service and other public and private landowner organizations. The Forest Stewardship Program is a fine example of issue-based programming. This educational program is a paradigm shift from primarily commodity-based management to ecosystem and stewardship management on NIPF lands as well as helping production-oriented owners.

Exhibitors

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