

Occupational Research Agenda for Northwest Forestlands

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ABSTRACT - An early aim of the Pacific Northwest Agricultural Safety and Health Center was to examine health and safety hazards in the region. The Occupational Research Agenda for Northwest Forestlands identifies health and safety research priorities for logging and forestry in Alaska, Idaho, Oregon, and Washington. The Agenda process elicited the views of land managers, field workers, labor unions, academicians, health care professionals, tribes, government agencies, and others familiar with Northwest forest industry health and safety issues. Telephone interviews were conducted with 109 constituents between October 1999 and January 2000. Fifty individuals attended in the Forest Safety Workshop on February 3-4, 2000 in Seattle, Washington. The Workshop used a participatory process to identify and prioritize concerns, and to develop research questions and approaches. In addition, 59 Northwest contract loggers and other fieldworkers responded to a survey in which they identified priority safety and health concerns. Seventeen research priorities were selected. The Agenda's priorities fall into four categories: Disease and Injury, Work Environment and Work Force, Economic and Policy Factors, and Research Tools and Approaches. We hope that dissemination of the Agenda will generate new health and safety initiatives in the Northwest forest industry.

INTRODUCTION

In the late 1980s a broad coalition of private sector and professional groups joined together to discuss the very serious health and safety issues facing American agriculture. The resulting document, *Agriculture at Risk: A Report to the Nation*, made a persuasive case that health and safety needed to be addressed systematically in agricultural communities across the nation. In 1989 the US Congress directed the Centers for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) to create new programs that focused on prevention of illness and injury in agriculture. NIOSH, in turn, created a network of regional centers for research and education in agricultural safety and health.

The Pacific Northwest Agricultural Safety and Health Center (PNASH) is one of ten NIOSH-supported agricultural health and safety centers. The Center also receives funding from the Washington Medical Aid and Accident fund, administered by the University of Washington Department of Environmental Health. Housed in the University of Washington School of Public Health and Community Medicine, the Center serves Idaho, Oregon, Washington and Alaska, and focuses on the prevention of injury and illness among farming, fishing, and forestry operators, workers and their families.

SAFETY AND HEALTH IN FORESTLAND WORK

Logging and forest service work place high demands on the men and women whose livelihood depends on forestry. This industry is affected by many external factors that are beyond the control of the individual employer or worker. These include the environment, national and global

market changes, technological changes, labor supply, and government regulation. Loggers and foresters are also subject to a variety of workplace hazards that result in illness and injury, most of which are preventable.

Efforts to decrease the number of health and safety hazards in forestry at the federal, state, and local levels are complicated by the diversity of tasks, worker populations, and geographical demands inherent to the region. The forest industry is one of the most hazardous industries in the U.S. The U.S. Bureau of Labor Statistics indicates that the fatality rate of loggers in 1997 was more than 25 times the national average (128 vs. 5/100,000). Although both forestry and logging occupations are physically demanding, timber cutting requires work in more hazardous conditions.

The systematic study of health and safety hazards in forestry communities has emerged as an important public health field. Forestry has high rates of fatal and nonfatal injuries and a high prevalence of certain work-related diseases when compared with other occupations. There is an extraordinary opportunity for well-focused research and education programs to improve health and safety while maintaining a productive industry.

THE NATIONAL OCCUPATIONAL RESEARCH AGENDA

NIOSH is a part of the Centers for Disease Control and Prevention, and serves as the nation's primary research organization for occupational health and safety. NIOSH created a new process in 1996, known as the National Occupational Research Agenda (NORA). The purpose of the NORA process is to better identify and prioritize significant health and safety hazards for research and public policy purposes. This Agenda was created in several phases, incorporating input from representatives of scientific, corporate, labor, and health care organizations. NIOSH compiled the results of committee meetings, public gatherings and written comments to develop and refine twenty-one research priority areas (Table 1).

The primary criteria employed to guide the evaluation and selection of possible NIOSH NORA topics were as follows:

- Seriousness of the hazard based on death, injury, disease, disability and economic impact
- Number of workers exposed or magnitude of risk
- Potential for risk reduction
- Expected trend in importance of the research area
- Sufficiency of existing research
- Probability that research will make a difference

The NORA process has proven very successful, and serves as a model of broad stakeholder influence in priority setting. Most recently the process has encouraged the National Institutes of Health and other federal agencies to join NIOSH in sponsoring a number of focused research programs directly relevant to workplace health and safety.

THE OCCUPATIONAL RESEARCH AGENDA FOR NORTHWEST FORESTLANDS

An early aim of PNASH has been the identification and prioritization of health and safety hazards in the region for farming, fishing and forestry. Our process -- modeled on the NORA process -- was designed to elicit the perspectives of employers, labor, health care professionals, academics, public agency officials, and others familiar with the region's health and safety

issues. We hoped to find common ground among these groups in the identification of significant hazards for which new research could make a difference for Northwest work in forest service and timber harvesting.

Table 1. NIOSH NORA Priority Research Areas

CATEGORY	PRIORITY RESEARCH AREAS
Disease and Injury	Allergic and Irritant Dermatitis Asthma and Chronic Obstructive Pulmonary Disease Fertility and Pregnancy Abnormalities Hearing Loss Infectious Diseases Low Back Disorders Musculoskeletal Disorders of the Upper Extremities Traumatic Injuries
Work Environment and Work Force	Emerging Technologies Indoor Environment Mixed Exposures Organization of Work Special Populations at Risk
Research Tools and Approaches	Cancer Research Methods Control Technology and Personal Protective Equipment Exposure Assessment Methods Health Services Research Intervention Effectiveness Research Risk Assessment Methods Social/Economic Consequences of Workplace Illness and Injury Surveillance Research Methods

SETTING A RESEARCH AGENDA FOR NORTHWEST FORESTLANDS

The development of the Occupational Research Agenda for Northwest Forestlands occurred in several stages. Center staff provided individuals working in forest operations in the four-state region with a forum to identify the most significant safety and health topics and contribute ideas for prevention and intervention research. These views were elicited from land managers, field/contract workers, labor union representatives, academic researchers, health care professionals, tribes, government agency workers, and others through telephone interviews, the Forest Safety Workshop, and field worker surveys. A total of 109 telephone interviews were conducted between October 1999 and January 2000. Respondents were asked to name the most significant agricultural health and safety hazards in the region. The interview also included questions about types of research, training and other interventions that would identify and help reduce the risks, and sources of health and safety information. In addition, each respondent was asked for suggestions for other individuals to question; the majority of those people were contacted and interviewed. The Center was assisted by an external planning committee, which met on November 5, 1999 in Seattle, Washington. The committee made important revisions to the project's scope (subsequently limited to logging and forestry work) and the design of the Forest Safety Workshop.

The selection of participants for the Forest Safety Workshop was shaped by the Center's aim to have an equal representation of constituent groups from the Northwest. An invitation list was compiled from individuals recommended during the telephone interviews and suggestions for

Center researchers and staff. Invitations were sent to 121 individuals throughout the Northwest and included representatives from timber companies, labor organizations, health care, academia, land management agencies, safety and health agencies, and contract logger associations.

The Forest Safety Workshop, February 3-4, 2000 in Seattle, included 50 participants. Five breakout groups were asked to identify and prioritize health and safety problems. Facilitators helped combine the breakout group lists into the top 10 priority items. A second round of breakout groups focused on these priorities, and worked to formulate research questions and approaches.

Although the telephone interviews and Workshop captured the views of a variety of people throughout the region, Center staff identified a need for greater representation from contract loggers and other field workers. To reach them, the Center distributed a survey generated from the extended list of concerns developed by Workshop participants at regional logging association meetings to obtain field worker input. The survey asked participants to identify the top five issues and any additional concerns that may not have been presented on the survey. The Center received 59 survey responses from people who attended the Washington Contract Logging Association, Association of Oregon Loggers, Associated Logging Contractors of Idaho, Intermountain Logging Association, and Alaska Forestry Association meetings.

The information gathered in the telephone interviews, Forest Safety Workshop, and surveys was analyzed by Center staff. The information was then summarized as forestry safety and health research priority areas for the region. A second external planning committee met on April 1, 2000, in Seattle to review this information and developed the final list of priorities described in the following section.

THE NORTHWEST FORESTLANDS AGENDA

Seventeen research priorities for the Occupational Research Agenda for Northwest Forestlands were selected, based on the telephone interview, Forest Safety Workshop, and surveys. The three major NIOSH NORA categories, *Disease and Injury*, *Work Environment and Work Force*, and *Research Tools and Approaches*, were retained as a framework for organizing the priorities, and a new category, *Economic and Policy Factors*, was employed to capture three areas that were identified as distinct priorities. Each category included research priority areas, as presented in Table 2.

The remainder of this document provides a brief overview of the 17 research priorities. Each overview describes the importance of the priority to the Northwest, and presents the concerns voiced through the telephone interview and survey respondents, and Forest Safety Workshop attendees.

Hearing Loss. Hearing loss is one of the most common occupational diseases in the United States, and once the loss is acquired, it is irreversible. Noise-induced hearing loss, while widespread, is completely preventable. Project participants expressed general concern about noise induced hearing loss among forest workers frequently exposed to noise from chain saws and other machinery. Many participants advocated proper use of hearing protection among workers.

Heat & Cold Stress. Temperature extremes can affect both worker performance and health. Cold extremes can cause hypothermia, while hot temperatures can lead to heat exhaustion.

Both heat and cold are known to decrease manual dexterity, increase discomfort, and in some cases, effect cardiovascular health. Heat stress can be aggravated by the use of personal protective equipment. Other contributing factors to negative health effects from heat and cold stress include level of hydration, duration of exposure, degree of physical demand, age of worker, and worker health. Injury and illness associated with heat and cold stress are generally underreported.

Table 2. Northwest Forestlands Agenda: Priority Research Areas

CATEGORY	PRIORITY RESEARCH AREAS
Disease & Injury	Hearing Loss Heat & Cold Stress Musculoskeletal Disorders Skin Disorders Traumatic Injuries
Work Environment & Work Force	Environmental Hazards Hazardous Operations Training Workplace Behaviors Work Organization
Economic & Policy Factors	Government Policy Industry Trends Top Level Commitment
Research Tools & Approaches	Hazard Control Technology Intervention Effectiveness Medical Service Surveillance, Data Collection & Reporting

Musculoskeletal Disorders. The prevalence of back injuries and strains and sprains among forestland workers appears high in the Pacific Northwest. Tasks that are strenuous or require repetitive motion are of particular concern. Those interviewed cited musculoskeletal disorders of the back, upper extremities, sprains, strains, and knees, and problems associated with vibration, repetitive motion, falls, and overexertion.

Skin Disorders. Work in the forest results in frequent exposure to sun, plants, and chemicals. Contact with plants, and some chemicals can produce allergic and irritant dermatitis (contact dermatitis). Sun exposure can cause additional irritation and skin cancer, the incidence of which has steadily increased over the last half century.

Traumatic Injuries. Multiple factors contribute to traumatic injuries, such as the characteristics of the workforce, job design, work organization, economics, and other social factors. Fatalities and non-fatal traumatic injuries resulting from human contact with machinery, equipment, trees and parts of trees are common in forestry and logging. Overexertion, stress, fatigue, lack of training, and operator attitude can all serve as precursors for incidents. Project participants identified traumatic injuries as one of the top priorities for research. Concerns included both fatal and nonfatal injuries, with an emphasis on eye injuries. Traumatic incidents were attributed to struck-by injuries, slips, trips and falls. Overexertion and fatigue were also noted as predispositions to forestry-related incidents. Participants felt that research should focus on leading causes and

high-risk groups and effective interventions may require collaboration among different academic disciplines and cooperation among many organizations.

Environmental Hazards. Loggers and foresters are subject to many hazards associated with working in the forest. Concerns in this priority area included fire, working in remote locations, the difficult terrain, climate and weather factors, and exposure to animals, plants, and insects. Other areas of concern included the effect of terrain, and stand characteristics, such as snags, defective trees and small diameter timber. It was also noted that individuals entering job sites unannounced, such as hunters, mountain bikers, and environmental activists, can create a hazard to themselves and others.

Hazardous Operations. Timber harvesting tasks are complicated and inherently hazardous, and can result in an incident, even when the utmost care is taken by management and the worker. Project participants shared their knowledge of the nature of these tasks, and identified specific high risk tasks, such as timber falling, log hauling, chain saw operation, thinning, hazardous materials handling, trucking, and helicopter logging. The most frequently mentioned hazards were struck-by events; i.e., struck by a rolling, falling, or flying object. Some aspects of forestland work include handling hazardous materials such as toxic chemicals. Some participants noted that the available personal protective equipment has limited effectiveness for protecting forestland workers. Participants in the telephone interviews, Workshop, and surveys suggested measures to reduce the risk of injury, such as using appropriate equipment for the terrain and the job; conducting routine equipment inspection and maintenance; and increasing awareness, and good skills. Several individual behaviors were viewed as contributing to hazardous conditions: substance abuse, crew inattentiveness, risk taking, lack of a proper safety attitude, and violence in the workplace. There is a need for better accident and near miss investigation and documentation,

Training. Most forestry and logging workers develop skills through on-the-job training from experienced co-workers. Loggers need to learn complex skills related to the task, the tree, the site, machinery and the equipment. Specific training issues raised by participants included: risk communication, formalized skills training, hazard recognition, training appropriate to work and region, emergency medical aid, effective educational tools, bilingual materials and an executive training program. It was suggested that additional funds are needed to support training efforts. Participants also identified that the growing Hispanic workforce will require training materials in Spanish (this need is well recognized in the industry and many workplaces are now requiring bilingual training materials).

Workplace Behaviors. The most basic level of health promotion lies in the hands of individual workers. The behavioral sciences study worker's actions as influenced by knowledge, perceptions, motivations, skills and environment. Participants expressed concern about the following behaviors they consider are hazardous in Northwest forestlands: substance abuse, crew attentiveness, risk taking, safety attitude, violence in the workplace, and personal accountability (need to develop a "brother's keeper" ethic).

Work Organization. Organization of work refers to the way work processes are structured and managed. In addition to the long recognized job stress associated with aspects of work organization, studies are now identifying contributions to other health problems, including musculoskeletal disorders and cardiovascular diseases. Long hours were viewed as affecting attentiveness and vigilance on the job. Stress was identified as an outcome of production demands. Working alone, harvest design and the absence of adequate ground communications can contribute to hazardous working conditions. Research is needed to better understand how

the organization of work is influenced by the changing economy and workplace, and how the potential effects impact worker safety and health.

Government Policy. Sound forest public policy decisions require an understanding of the best science and a blending of ecological health, human health, and economic values. Both federal and state policies have had a tremendous influence on the economy and practices of the forestry industry, which in turn, affects the safety and health of foresters and loggers. Participants repeatedly identified a lack of communication between land management professionals, policymakers and forest managers, and the limited logging safety training and awareness among federal and state land management staff. Frequently, participants felt that miscommunication and misunderstandings were the basis for disagreement among loggers, purchasers, and land managers. Participants felt a need for greater recognition that timber harvesting is now conducted on a multi-employer worksite. Also, they called for more practical standards for safety and health regulations and improved enforcement of existing regulations, especially regarding reserve trees, parcel size, and landing location and size. Participants felt that OSHA standards should be more understandable, and that enforcement of regulations needed improvement, with a particular interest in more consistent enforcement. Participants also expressed a need for greater access to consultation and training staff.

Industry Trends. Over the last twenty years the forestry industry has experienced dramatic changes that have affected employer dynamics, forest resources management, and logging operations. Northwest constituents felt that some of the trends affecting the forest industry contribute to a worker's risk for injury and illness. Participants highlighted the following issues as major contributors to forestland workers' safety and health: low wages, lack of qualified and skilled workforce, public perception of industry, special populations (in particular Hispanics and the older workforce), political and economic climate, changes in methods and technology, long hours (including commute) and small-diameter trees.

Top Level Commitment. The management of any organization (industry or agency) contributes to the foundation of a safety culture. Top level commitment can ensure that employee safety and health is more than a peripheral program, but integrated into the overall management system. Participants spent significant time describing their concerns and suggestions. Issues identified included top management safety awareness, forestry stakeholder cooperation and communication, clear accountability for safety, financial incentives for safety, leadership, incident investigation and reporting, and recognizing excessive demands for productivity as an injury risk factor. These issues often extended beyond occupational safety and health research, and resulted in some interesting suggestions that may be useful to industry employers and associations. We have included the category "Suggestion Box," which lists the ideas that did not fall specifically in the categories of research or training.

Hazard Control Technology. A variety of engineering, administrative, and worker protection techniques can be used to manage health and safety hazards. These may include design changes to equipment, modifications to training efforts, or the design and proper use of personal protective equipment. Important concerns in Northwest forestland work include equipment modifications, and improved techniques for selective cutting, and the establishment of site-specific falling techniques. Basic and applied research is needed to identify, evaluate, and develop both health- and cost-effective control strategies for specific hazards, and to ensure their wide dissemination in the forestry community.

Intervention Effectiveness. Interventions can include control technologies, guidelines and regulations, worker participation programs, and training. Interventions in current use can be

validated or improved through research by assessing their effectiveness. Evaluations of effectiveness can lead to improved control technologies, government regulations, enforcement procedures, and educational methods. Project participants identified training programs and hazard control technologies as priority areas for evaluation research.

Medical Service. Quality health care and timely emergency aid are essential for workers, such as loggers and foresters. It is a continuing struggle to obtain emergency aid and evacuation for acute injuries in the mountainous and rural forestlands in the Northwest. Also, many diseases and injuries can be caused by a combination of workplace exposures, non-workplace exposures, and preexisting conditions, so accurate diagnosis depends on rural health care professionals understanding workplace exposures.

Surveillance, Data Collection & Reporting. Surveillance systems are essential for setting research priorities, as they provide answers to the questions, “who, what, why, where, and how.” The public health community relies on surveillance information to set research and prevention priorities, but gaps in many existing systems limit their usefulness. Surveillance systems in forestry need to be updated and expanded, and new methodologies for data collection and evaluation need to be developed. Creative efforts between the public and private sectors need to be initiated to develop effective systems.

FUTURE PLANS

We hope that the Agenda will serve as a useful guide to all who are concerned with occupational health and safety in the Northwest forest resources industry. The Agenda has been distributed to participants in the telephone interview, workshop, and survey, and is available to the public through the Center’s website. The Agenda should be particularly useful for researchers throughout the region, as it focuses attention on issues where research can make a difference in reducing disease and injury, and provides specific suggestions for research activities. We hope that regional policymakers and employers will find the Agenda valuable in their efforts to effectively reduce incidents of injury and illness.

ACKNOWLEDGEMENTS

This work would not have been possible without the careful consideration and time devoted by those who participated through the planning committees, telephone interviews, Forest Safety Workshop, surveys, and one-on-one advising. This work was supported by the National Institute for Occupational Safety and Health (Cooperative Agreement No. U07/CCU012926 and Grant No. R13/CCR017078). Additional funds were provided by the Washington State Medical Aid and Accident Funds administered through the University of Washington Department of Environmental Health.