PACIFIC NORTHWEST AGRICULTURAL SAFETY & HEALTH CENTER

YEAR END REPORT

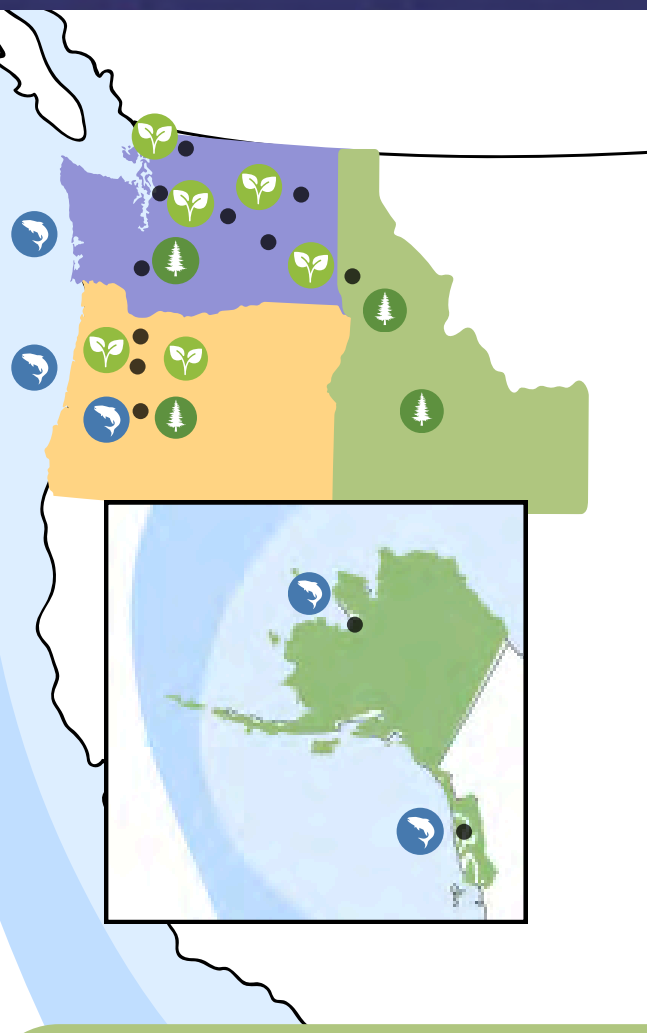
FISCAL YEAR 2025
9/30/24 - 9/29/25

CONTENTS

COVER PHOTO
Worker thins Honeycrisp apple trees at Long Ranch, June 2025.
Photo credit, Sarah Fish.

Our Vision

The PNASH Center, established in 1996, is housed within the University of Washington's School of Public Health. We conduct research and promote best occupational health and safety practices for Pacific Northwest farming, fishing and forestry. One of twelve regional NIOSH Agricultural Centers, PNASH works throughout Washington, Idaho, Oregon, and Alaska, integrating expertise from multiple integrated disciplines, institutions and community partners. Our vision is: **Research for healthy workers, strong communities and productive agriculture.**



2024-25 Year End Report

This report provides an overview of the PNASH Center's progress during the first year of this program cycle.

Thank You to our partners, advisors, and research participants. Your collaboration makes our work possible and ensures it is relevant and meaningful for ag communities.

What is the injury burden in AgFF?

Forestry
28x

Forestry workers are 28 times more likely to die on the job. [5]

Fishing
22x

Fishing workers are 22 times more likely to die on the job. [5]

Farming
7x

Farming workers are 7 times more likely to die on the job. [5]

Injuries and deaths result in annual medical and productivity losses of $11.3 billion in AgFF. [6]

Did you know?

- Alaska produces **60% of seafood** in U.S. [1]
- Idaho produces over **13 billion pounds** of milk annually. [2]
- Oregon produces **28% of plywood** in the U.S. [3]
- Washington is the top producer of apples, **producing 6.5 billion pounds annually.** [4]

Sources
1. National Oceanic and Atmospheric Administration. 2020 Fisheries of the United States Report.
2. Idaho Department of Agriculture. Idaho Facts and Statistics, 2021.
3. Oregon Forest Resources Institute. Oregon Forest Facts 2023-24 Edition.
4. National Agriculture Statistics Service 2019. 2017-Census_Fruit_TreeNut_Berry_Production.pdf. p. 2. Report No.: ACH17-6.
5. U.S Bureau of Labor Statistics. Census of Fatal Occupational Injuries (CFOI) – Current and Revised Data 2018. Washington, DC.
6. Adhikari et al. 2024. Cost of agricultural injuries in the United States: estimates based on surveillance, insurance, and government statistics. Am J Ind Med, 67(9: 801-812.

Research Projects

Conducting research in Prosser, WA.

Use of Location- and Wearable-based Occupational Activity Recognition to Quantify on-the Job Digital Health and Safety Metrics for the Forestry Workforce

YEAR 3 of 5 (2022-2027)
Robert F. Keefe, Ph.D.
Associate Professor and Director, University of Idaho Experimental Forest, University of Idaho

https://deohs.washington.edu/pnash/forestry-workforce-location-and-wearable-based-activity-recognition-quantify-job-digital-health-and

Figure 1. Starlink WiFi networking and specialized radios help increase situational awareness on logging operations, showing worker locations to equipment operators.

Challenge

Logging is one of the most dangerous jobs in the United States. Between 2015 and 2020, the rate of fatal work injuries in logging ranged from about 69 to 136 deaths for every 100,000 full-time workers. Many of these deaths and serious injuries happen to ground workers—like those who cut trees with chainsaws or work in cable rigging crews—because they don't have the protection of enclosed equipment cabs. There's a clear need to reduce serious injuries caused by the interaction between workers, heavy equipment, and tough working conditions. For example, in Idaho and Montana, workers who manually cut trees or worked on rigging crews made up nearly half of all logging injury claims between 2011 and 2014. Equipment operators made up the next-largest group of injuries, about 22%. These operators often can't see ground workers clearly because of thick trees, uneven land, bad weather, or other obstacles. One way to improve safety is through technology that shows where everyone is located on a digital map in real time. Smartwatches already have sensors that can model recreational activities and provide feedback about personal fitness and health. Using these sensors during work activities along with their current locations could help improve situational awareness at remote jobsites by alerting workers and their crew members to potential hazards based on what they are doing and where they are on the hillside. At the same time, as with recreational use of wearables, self-awareness about work habits during daily tasks could also foster improved work productivity and efficiency.

Project Overview

The major goals and aims of our project are to develop smartwatch-based recognition of human work activities carried out by logging workers during regular productive operations, and to then integrate these models into a remote data networking system that can be used to help improve the health and safety of loggers through increased situational awareness at the jobsite. We are improving on an existing system developed through prior, NIOSH-funded research with more user-friendly methods to share the locations of ground workers and heavy equipment working together on remote logging operations using the Android Team Awareness Kit (ATAK) and Starlink WiFi.

Year 3 Progress

We have been collecting data on how loggers move and work in the forest to build models that can recognize human activity. This helps define safe work zones for ground crews like riggers and hand fallers and improves overall awareness for everyone at the jobsite. During the final field study in winter 2025, we gathered more data from workers and continued refining their application. We combined earlier research with new tools, including Starlink WiFi and radio networks, to create a system that lets distant workers and machines share their locations even in remote areas. Originally, we planned to create a new smartwatch app for safety, but based on feedback from loggers, we have decided to focus more on training and outreach using an existing app called ATAK (Android Team Awareness Kit). ATAK, developed by the U.S. Department of Defense, has powerful mapping

and location-sharing features and is now available for public use. Our team is now preparing demonstrations and training sessions to show how ATAK and Starlink can improve situational awareness and reduce accidents in logging operations. We've also shared updates at professional meetings and through outreach events. This shift toward using ATAK for logging safety is seen as an exciting and practical step forward for the industry and may help to improve not only safety but the overall productivity of logging operations in the Pacific Northwest.

Next Steps

In Year 4, we are continuing to improve our Human Activity Recognition (HAR) models using data we collected during earlier field studies. This work includes finishing the labeling and analysis of large amounts of sensor and video data and adding the results to our combined app and location-sharing system.

We'll also begin a second round of field sampling. The new data will be used to test and confirm the accuracy of our predictive models built from data collected in Years 2 and 3. During this process, we'll use a questionnaire to gather feedback from workers about their experiences using wearable devices and location-sharing tools.

We expect to make strong progress on developing our prototype smartwatch app this year, as our predictive models are completed and ready to be built into the app. However, because there has been a lot of interest in our new location-sharing system for improving safety on logging sites, we'll also be putting more focus on education and outreach using the ATAK + Starlink system in Year 4.

Partners and Collaborators

Collaborators on the project included Weyerhaeuser, Green Diamond, PotlatchDeltic, Idaho Department of Lands, Washington Dept. of Natural Resources, Oregon Department of Forestry, the Associated Logging Contractors of Idaho, members of the Idaho Forest Products Commission (https://www.idahoforests.org/), participants in the Idaho Sustainable Forestry Tour for Idaho Teachers (https://www.idahoforests.org/content-item/sustainable-forestry-tour/). Dr. Keefe presented an update on the project as part of the IFPC semi-annual meeting, and also met individually with the new Director of the Associated Logging Contractors (ALC) to provide an overview of our research.

Value Added

Crews in remote logging sites gain real-time visibility of people and machines through tools developed and tested with Weyerhaeuser, the Associated Logging Contractors of Idaho, and equipment operators. This improves how workers keep each other in sight on steep terrain, in brush, and during low-visibility conditions.

Respiratory Health and Indoor Air Quality in the Cannabis Industry

YEAR 3 of 5 (2022-2027)
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https://deohs.washington.edu/pnash/cannabis-worker-health-and-safety

Figure 1. This project has seen support from both workers and management in the cannabis industry.

Challenge

Production and processing of cannabis is a rapidly growing industry in the US, however very limited information is available on the occupational hazards faced by workers in this industry. Recent pilot studies have demonstrated that cannabis production workers are exposed to a variety of respiratory hazards, have a high rate of work-related health symptoms, and may be at increased risk of occupational lung diseases, particularly work-related asthma. However, there is still significant uncertainty around the specific causes of work-related health symptoms in these workers.

Project Overview

In this project we will undertake a panel study of cannabis workers to investigate whether exposure to specific airborne contaminants released during cannabis production is associated with adverse health effects. In addition, we will evaluate the effectiveness of engineering control to reduce occupational exposure to respiratory hazards. Based on findings in this study, we aim to develop a guide describing best practices and incorporate our study findings into worker health and safety training materials. This will help cannabis employers comply with applicable occupational health and safety regulations, and to reduce respiratory exposures within this industry.

Year 3 Progress

We are making excellent progress on fieldwork and sample collection. We have had enthusiastic support from both workers and management at the facilities we have been able to recruit participants for our study. Many of the workers who have participated are aware that working with cannabis can damage the respiratory health - often they have experienced respiratory health issues themselves, and they feel validated that we are taking their concerns seriously and working to develop solutions that will more effectively protect their health.

In addition, we visited two workplaces and measured particulate matter (PM) and volatile organic compound (VOC) concentrations associated with the pre-roll joint packing process. The measurements were made both with and without an enclosure in place around the joint packing machine (aka "knock-box"). Based on these initial measurements, we developed and tested a local exhaust ventilation system (LEV) to encapsulate both the knock-box and a small grinder to reduce emissions from the joint packing process and the grinding process. It was effective at controlling emissions for the grinder, but not for the knock-box. We then developed a simple, low-cost paintbooth-style LEV enclosure that effectively controlled emissions for the knock-box used for joint filling, and from a grinder used to grind cannabis flower into a coarse powder. We plan to publish and disseminate the design.

We published a manuscript based on our pilot data that compares respiratory health effects in cannabis workers, cannabis users who are not occupationally exposed to cannabis, and a control population who neither uses nor works with cannabis (see below).

Lastly, we have been working together with Dr. Diana Ceballos on her pilot project that adapts WISHA 10 Occupational Safety and Health training to make it more relevant to the cannabis industry. Findings and observations from our respiratory health study are informing the materials developed for Dr. Ceballos' project. (See page 17 for more information about pilot projects.)

Figure 2. Our flyer to educate about respiratory health in the cannabis workplace.

Next Steps

1. Complete recruitment of cannabis workers and collection of exposure and health data.
2. Publish and disseminate design of the local exhaust ventilation system and results that demonstrate its efficacy to reduce particulate matter and volatile organic compound emissions from the joint packing and flower grinding tasks.
3. Begin to develop an occupational safety and health best practices guide for the industry, focused on the respiratory health of cannabis workers.

Partners and Collaborators

- The Cannabis Alliance: (https://www.thecannabisalliance.us/)
  A Washington state-based non-profit association of cannabis businesses. We have worked with them successfully to recruit cannabis workplaces to participate in our previous studies.
- Washington State Department of Labor and Industries Multicultural Safety and Health Outreach Program (MSHOP program): (https://lni.wa.gov/safety-health/safety-training-materials/workshops-events/wisha-10-for-agriculture)
  We partner with the MSHOP program to adapt their WISHA 10 for agriculture occupational safety and health certification so that it addresses the specific occupational health and safety issues faced by cannabis production and processing workers.

Publication

- Krevanko C, Kenleigh D, Ghodsian N, Jansen K, Simpson CD, Sack C. Cannabis sensitization and allergy in cannabis industry workers, recreational cannabis users, and non-users. *J Occup Environ Med*. Published online August 8, 2025. doi:10.1097/JOM.0000000000003517

Value Added

Bud trimmers, grinders, and pre-roll packers benefit directly from low-cost ventilation approaches designed with Washington cannabis employers and worker participants. These improvements reduce irritating dust and odors and make respiratory protection practical for everyday production work.

Engineering Solutions to Reduce Pesticide Exposure and Waste on Northwest Fruit Farms

YEAR 3 of 5 (2022-2027)
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Lav Khot, PhD, MS,
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Figure 1. Field trials at the Washington State University Irrigated Agriculture Research and Extension Center field station.

https://deohs.washington.edu/pnash/index.php/engineering-solutions-reduce-pesticide-exposure-and-waste-northwest-fruit-farms

Challenge

Labor-intensive fruit commodities can put farmworkers and their families at disproportionate risk of pesticide-related illness through pesticide handling, drift, or the take-home exposure pathways. Robots, drones, sensors, autonomous tractors, and other digital technology are quickly changing the landscape of agriculture, including claims related to reducing pesticide use. This work builds off prior work on pesticide application safety from two previous PNASH cycles.

Project Overview

This project focuses on capturing current and planned uses for these new technologies in the Pacific Northwest and center worker expertise and skills in the next generation of pesticide application safety personnel and technology.

Year 3 Progress

The Sprayer Technology Adoption and Related Skills (STARS) Survey continues to help us learn about the tools, challenges, and technology used in the tree fruit industry, especially in Washington State. Results from the survey show that farms are beginning to use more modern equipment that makes pesticide spraying safer and more efficient. Industry partners want more training and educational resources, showing a strong interest in improving worker safety and health with new technologies.

To make this transition successful, it's important to support training needs and make sure that new technologies are practical and effective. By focusing on professional development for pesticide applicators, this work will help connect new technology with safe spraying practices. The findings will guide future training programs and help spread safer, more effective spraying tools across the Pacific Northwest. A research paper is in preparation to share these findings.

In September 2025, our team completed 18 field trials at the Washington State University Irrigated Agriculture Research and Extension Center field station using blueberry plants. In partnership with WSU extension, we identified three types of sprayers—backpack, airblast, and drone—with six trials each. For every trial, we collected samples to measure pesticide handler exposure, including skin patches, air samples, and tank samples taken before and after spraying. We used a fluorescent marker to measure how much spray reached different areas and took photos before and after spraying to help visualize the results. All samples (over 300) were carefully labeled, kept cold, and linked to detailed notes about sprayer type, speed, and timing to understand differences in handler exposure. A second research paper is being prepared to share these findings.

We are also working with the Washington State Department of Agriculture and Washington State University to plan new training materials and products for the next two years of the project.

Key Findings to Date

- Conducted 18 field spray trials (six each for backpack, drone, and airblast sprayers) under orchard conditions in September 2025.
- Developed and field-tested standard operating procedures (SOPs) for dermal and inhalation sampling using fluorescent tracers (pyranine and Tinopal).
- Created field-ready materials including sampling checklists, patch labeling systems, and pre/post-spray blacklight photography protocols to visualize exposure.
- Confirmed that workflow and PPE compliance can be maintained safely during new technology trials while capturing high-quality exposure data.
- Strengthened collaboration between university researchers, extension staff, and industry to ensure findings translate directly to grower education and policy guidance.

Next Steps

In the coming year we will complete data analysis and compare exposure results across technologies to identify engineering and operational practices that most reduce worker contact with pesticides. We will develop training modules and outreach materials for applicators, safety trainers, and growers on safe integration of drone and precision spray technologies. We plan to prepare a peer-reviewed manuscript summarizing methods and preliminary exposure results.

In addition, we will continue to foster partnerships between growers and equipment manufacturers to tailor solutions that meet the needs of both large and small-scale farms. We plan to connect with: (1) "Semillero de Ideas" or "Nursery of Ideas", a non-profit dedicated to engaging farmworkers to lead and foster innovation in agriculture. https://www.semilleroideas.org/ and (2) The Agricultural Leadership Program, a 40-hour bilingual course for supervisors, has been successful in preparing farm supervisors to lead in the adoption of new technologies and safety practices. Lastly, we'll develop bilingual educational materials that address leadership and technical skills for farm supervisors and workers, ensuring that they are equipped to manage new technologies effectively.

This cycle of funding has opened up opportunities for future projects. The team is looking to expand connections with Washington State Department of Agriculture's Technical Services and Education Program and Oregon's Department of Agriculture. These programs can offer additional training focused on safe pesticide practices and sprayer technology adoption. With ongoing pilot programs and external grants, there is potential for spinoff projects that address both technological and safety challenges in agriculture (STARS Survey).

Partners and Collaborators

- Washington State Tree Fruit Association (WSTFA): https://wstfa.org
- Washington State Department of Agriculture (WSDA): https://agr.wa.gov
- Washington State University (WSU): https://wsu.edu

Value Added

Applicators and field supervisors now have side-by-side exposure results for drone, backpack, and airblast spraying gathered with Washington State University Extension and the Washington State Tree Fruit Association. These findings help crews choose equipment and spraying practices that lower contact with chemicals in real orchard conditions.

A Mixed-Methods Evaluation of Heat-Related Illness Policy
Implementation to Inform Practical Solutions for Farmworkers

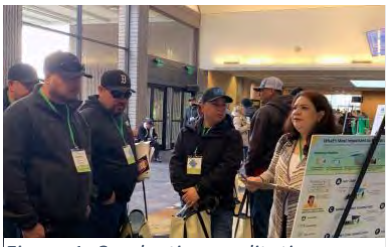

Figure 1. Conducting qualitative survey of shade preferences at Ag Safety Day.

YEAR 1 of 3 (2024-2027)
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https://deohs.washington.edu/pnash/mixed-methods-evaluation-heat-related-illness-policy-implementation-inform-practical-solutions

Challenge

In the Pacific Northwest, many outdoor agricultural workers get sick from working in the heat. Most of these workers are foreign-born and Spanish-speaking. State and federal laws can help protect them from heat-related illness, but these rules are not always followed in the same way everywhere. We need to better understand how these heat safety rules are actually being used and whether they are working as intended.

Project Overview

The purpose of this project is to take a close look at how Washington State's new outdoor heat safety rule is working in practice. We want to find practical ways to support implementing the rule and protect agricultural workers from heat-related illness.

This project brings together agricultural workers, growers, community organizations, and state agencies to:

1. Understand what helps or makes it hard to follow the heat safety rules. We'll do this by talking with workers, supervisors, and other key people; sending out surveys; and reviewing heat-related injury reports and safety inspections.
2. Share what we learn with farmers, policymakers, and scientists so the results can be used to improve heat safety practices.

The goal is to turn research into real action that prevents heat-related illnesses, injuries, and deaths among agricultural workers. The tools and lessons from this project can also help other states and industries put their own heat safety rules and policies into practice in the future.

Year 1 Progress

In the first year of our project, we have built up our project team. We hired a research coordinator, Alejandra Silva Hernández, to assist with interviews, surveys, team and advisory meetings, and data management. We also recruited undergraduate research student, Cassandra Sanchez-Franco, to assist with worker/supervisor survey development and developed a student research plan. We established a project advisory group and an approach to engage advisors during initial individual meetings.

We conducted outreach and recruitment of participants and have completed some of our planned interviews, with more recruitment and data collection to come. We also partnered with the PNASH Outreach Core on a qualitative study of shade preferences and presented a poster at Ag Safety Day

2025. The outputs included in a manuscript that has been submitted for peer-reviewed publication and a presentation at the 2025 Joint Annual Meeting of the International Society of Exposure Science and the International Society for Environmental Epidemiology.

Lastly, we are pleased to share that we were awarded supplemental funding from the University of Washington Harry Bridges Center for Labor Studies for a worker/supervisor survey.

Next Steps

We are planning an advisory board meeting in Late Fall 2025. Co-Investigator Dr. Jody Early will lead a workshop in Fall 2025 on qualitative data analysis for the project team. We will complete the first round of key informant interviews and conduct preliminary qualitative analysis of this data. We'll also develop the worker/supervisor survey, with anticipated data collection in Spring 2026.

Partners and Collaborators

- Our project team includes Elizabeth Torres from Radio KDNA (Spanish-language radio station): https://kdna.org/. Ms. Torres has been assisting with advisory strategizing and recruitment and conduct of key informant interviews.
- We have also assembled an advisory board for the project that consists of academic researchers, advocates, and government and industry partners. During the project period, the team conducted individual meetings with potential advisors and held an advisory board meeting in May 2025. Advisors have assisted with recruitment and feedback on the key informant interview guide and study recruitment materials and procedures.

Value Added

Farm crews and supervisors helped identify the shade types, communication practices, and shift routines that make heat rules feasible during fast-paced harvest and planting work. These insights guide how growers can meet requirements while maintaining productivity and protecting workers from heat illness.

Tracking Agriculture, Forestry, and Fishing Health Indicators: RISC 2.0

Figure 1. RISC project aims to analyze injury and fatality data for the purpose of understanding risks and evaluating interventions.

YEAR 3 of 5 (2022-2027)

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https://deohs.washington.edu/pnash/tracking-agriculture-forestry-and-fishing-health-indicators-risc-20

Challenge

The agriculture, forestry, and fishing (AgFF) sector have the highest-risk of occupational injury for any sector identified by the United States Bureau of Labor Statistics. Non-fatal injuries and illnesses for this sector were estimated at 5.2 per 100 workers, well above that of the next highest sector, transportation and warehousing, at 4.4 per 100 workers. This project builds off prior work from the 2016-2022 PNASH cycle by expanding the Risk Information System for Commercial (RISC) Fishing data system, which merged multiple sources of injury and fatality data to facilitate the development of fishery-specific approaches to assess hazards, mediate risks, and evaluate interventions.

Year 3 Progress

We have had ongoing challenges to our work plan for this year due to delays in funding approvals for our award and external contracts. While we have developed a memorandum of understanding with our partners at the Safety & Health Assessment & Research for Prevention (SHARP) Program within Washington State's Department of Labor & Industries, data sharing with SHARP has been interrupted and has not progressed. Due to staffing changes within the RISC project and the agency, we have not been able to move forward with data analysis of compensation claims data in Washington. Some progress has been made on analysis of H2A worker data that was separately available from other sources. Seasonal guest workers are an increasing component of the agricultural work force during critical periods and crops, such as harvesting of tree fruit.

Due to the interruptions in project activity, minimal spending and progress occurred during Year 3. The only funds used this year were to support the time that Dr. Yost spent planning on how best to move the project forward. The remaining funds will be utilized as activities resume in Year 4.

Next Steps

Project activities in Year 4 will re-focus on re-envisioning the project's scope to strengthen its contribution to regional injury surveillance and prevention priorities. The project team intends to identify a new lead and co-investigator who can steer this process and work in concert with center-wide objectives in data-driven injury prevention and stakeholder engagement.

Pending NIOSH approval, the team intends to further develop the analytic approach of the project by applying new natural language modeling methods to currently publicly available data, including injury case narratives, inspection summaries, and fatality investigation reports. This work will focus

on extracting actionable insights into region- and sector-specific patterns of occupational risk using modern computational tools in a manner consistent with this project's original objectives in injury surveillance and communication.

Partners and Collaborators

- NIOSH Western States Division in Alaska (https://www.cdc.gov/niosh/contact/im-wsd.html)
- Oregon Sea Grant (https://seagrant.oregonstate.edu/)
- Washington Sea Grant (https://wsg.washington.edu/)
- Washington State Department of Labor & Industries (https://www.lni.wa.gov/)

Value Added

During the recent pause in state data access, the team shifted to using publicly available injury narratives from agriculture, forestry, and fishing. This approach creates a more stable and accessible foundation for safety insights that do not depend on changing state systems.

Fishermen Led Injury Prevention Program (FLIPP) for Lifejackets Mobile Program

YEAR 3 of 5 (2022-2027)
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https://health.oregonstate.edu/labs/osh/resources/flipp#lifejackets

Figure 1. FLIPP for Lifejackets is helping fishermen stay safer at sea and building stronger community connections around safety.

Challenge

Commercial fishermen deaths have extended impacts on the coastal communities and families. Nationally, from 2000-2014, the most recent data published, there were 693 US commercial fishermen who died while fishing with vessel disasters with falls overboard accounting for the majority. From the most recent regional data available, 2000-2018, there were 93 fatalities in Washington and Oregon. Only five of the fatalities were wearing a lifejacket and three of those were not wearing it properly.

The success of the Lifejackets for Lobstermen program by the Northeast Center (NEC) for Occupational Health and Safety, which used a social marketing approach and a mobile program to get lifejackets to fishermen in Maine and Massachusetts, led to the development of FLIPP for Lifejackets to fill a need in the Pacific Northwest.

Project Overview

The objective of the FLIPP for Lifejackets project is to better understand the behavior of lifejacket use among commercial fishermen in Oregon and Washington and to promote the use by creating a relevant program for commercial fishermen. We collected fishermen's views and experiences related to vessel safety including use of lifejackets and their stage of behavior change related to lifejacket use, adapted an evidence-based intervention to build a region-specific program, and are in the process of implementing, and evaluating the program. FLIPP for Lifejackets is using a social marketing approach (the 4 P's - Price, Product, Place, and Promotion) to get lifejackets to regional fishermen.

Year 3 Progress

The Flipp for Lifejacket program was implemented with the following design: 1) connect with fishermen at regional trainings and events for commercial fishermen; 2) leverage partnerships with fishing support groups, marine suppliers (Englund Marine), lifejacket manufacturers (Kent, Mustang and Stormline), US Coast Guard, Oregon and Washington Sea Grant trainers, and AMSEA; 3) secure local workforce development or other funds to reduce the cost of lifejackets and safety gear; 4) text enrolled fishermen to promote lifejacket maintenance, use, and feedback; 5) keep social marketing program relevant.

Posters, social media, and videos featuring real fishermen were used to promote the program and share messages about safety. At 14 fishing events, 581 fishermen received lifejackets and 567 completed an initial survey. The program also raised $135,000 from local workforce funds to make lifejackets free for fishermen, helping remove cost barriers, expanded the reach across fishing communities, and supporting community-led efforts.

To keep in touch, the team sent text messages over six months reminding fishermen to wear and care for their lifejackets, share success stories, and take follow-up surveys. Many fishermen said they wear

their lifejackets regularly and thanked the team for helping make them available. Currently 97 fishermen completed six month follow-up surveys from 327 enrolled fishermen (30% response rate). These early results show positive behavior changes related to lifejacket use. Reasons for wearing lifejackets included safety, rough weather, staying warm, and fishing alone. Barriers included being too hot, making work harder, and discomfort. Interviews and program evaluations are ongoing to see how well the program is working and how it can improve. Overall, FLIPP for Lifejackets is helping fishermen stay safer at sea and building stronger community connections around safety.

Next Steps

We will continue to implement and evaluate the FLIPP for Lifejacket Program throughout the coming year. Building on the success of this past year, we plan to expand its reach by hosting more events and building partnerships in additional Oregon and Washington ports. Collaboration will continue with community partners, training organizations, and marine retailers to strengthen local engagement.

Based on participant feedback, the team will refine lifejacket options to address issues related to heat, comfort, and work interference. A comprehensive analysis of follow-up survey data will assess long-term behavior change, while implementation data from the past year will be reviewed to evaluate progress. The program will also document adaptations made from the original New England model and compare their effectiveness.

Efforts will focus on identifying sustainability strategies to support continued program delivery beyond grant funding. Outreach will continue through multi-platform marketing campaigns, including social media, news stories, and community events. New fishermen testimonials and educational materials will be developed to reflect recent experiences, and the team will share the successful community partnership model with other fishing regions.

Partners and Collaborators

- Newport Fishermen's Wives https://www.newportfishermenswives.com/
- FishHer https://www.facebook.com/FishHerCPCA/
- Charleston Fishing Families https://www.facebook.com/CharlestonFishingFamilies
- Englund Marine https://www.englundmarine.com/
- Columbia River Inter-Tribal Fish Commission https://critfc.org/
- Nathan Holstedt https://www.facebook.com/nathan.holstedt/
- AMSEA https://www.amsea.org/
- Northwest Oregon Works, Maritime Program https://nworegonworks.org/programs/maritime-program/

Products

- Podcast appearance: Partners of Commercial Fishermen: https://meganwaldrep.com/free-pfds-for-oregon-fishermen-how-you-can-do-this-for-your-community-with-prof-laurel-kincl-of-oregon-state-university/
- Promotional video production and distribution: https://vimeo.com/1053529158

Value Added

Commercial fishermen now have access to comfortable lifejackets chosen with working crews and purchased with support from Englund Marine, Sea Grant, and local workforce partners. The program strengthens the habit of wearing protection on deck by offering gear that fits each boat’s work style and conditions.

Awards

Training forestry workers in Longview, WA.

PNASH Small Grant Programs

PNASH allocates funding annually to allow us to 1) foster new exploratory research, 2) support stakeholder outreach and education activities, and 3) respond to emerging needs in our region.

Pilot Project Program (PPP)

The PNASH Center administers the PPP to support new initiatives in research, intervention, and translation. The PPP funds projects through a competitive process for a maximum annual direct cost allocation of up to $30,000 and a project duration of 12 months. The PPP participates in the Center-wide program of monitoring, tracking progress, activities, and products. Previous awardees have contributed greatly to the success of the PNASH Center through the development of new partnerships, scientific publications, and career development of young investigators. Visit our website for more information: https://deohs.washington.edu/pnash/pilotprojects. Year 4 pilot project proposals will be accepted on a rolling basis until all funds are dispersed.

Year 3 Pilot Projects

Maria Blancas, PhD, MPH, Clinical Assistant Professor, Department of Environment and Occupational Health Sciences, University of Washington. **CLIMA in Agriculture Project.** Agricultural workers face unique mental health challenges exacerbated by extreme weather conditions and financial instability. Previous research highlighted significant stressors impacting farmworkers, including stress and anxiety due to seasonal work demands and inadequate mental health services. However, the intersection of extreme weather and mental health among agricultural workers remains under-researched. By addressing the gap in research and resources on extreme weather and mental health within agricultural settings, this project aimed to improve mental health outcomes, and contribute to healthier and safer agricultural workplace. Dr. Blancas worked in collaboration with Quincy Community Health, Radio KDNA, a hop grower, and PNASH Outreach to develop a survey and by leading the development of a workplace intervention toolkit. The toolkit will share research findings and provide education, recommendations, and resources on topics such as understanding mental health factors that impact workplaces, supporting workers' well-being in the workplace, and connecting agricultural workers and their families to mental health services.

Diana Ceballos, PhD, MS, CIH, Assistant Professor, Department of Environment and Occupational Health Sciences, University of Washington. **Development and evaluation of WISHA 10 cannabis training module.** In the United States, the legal cannabis industry employs 420,000 full-time workers and is rapidly growing as more states legalize cannabis. Working with cannabis plants can cause skin and respiratory health issues. In Washington, there is a need for state-wide formalized training to prevent occupational injuries and illnesses within the cannabis industry. This pilot project aimed to form a cannabis-related advisory committee to assess ongoing WISHA 10 training and develop and evaluate a WISHA 10 cannabis training module. The advisory committee provided different perspectives to inform the development and evaluation of a new module for the WISHA 10, focusing on the occupational health and safety needs of cannabis workers.

Figure 1. The WISHA 10 cannabis training module, focuses on the occupational health and safety needs of cannabis workers.

The team also partnered with Dr. Chris Simpson and Dr. Cora Sack to integrate current research and best practices. Sarah Fish, Dennise Drury, and Dr. Eddie Kasner contributed to the development of educational messages and resources built around three case studies: cannabis dust and respiratory hazards, bud trimming and machine hazards, and workplace violence and robbery. Working with students Callan Krevanko and Charlotte A. Beatson, the team gathered industry insights and visuals to enhance the training. Each module incorporates interactive and visual elements—such as dramatizations, graphics, and group discussions—to help participants identify hazards, reflect on prevention strategies, and strengthen safety awareness across the cannabis industry. Findings from this research translation effort will enhance WISHA 10 training by broadening and updating its content and evaluation, and by increasing DOSH's capacity to reach cannabis production workers more effectively.

Denise Damewood, Nurse Consultant for the State of Alaska Public Health and the Alaska Marine Safety Education Association. **Evaluating an Opioid Overdose Prevention Program for Commercial Fishermen Using the CDC Program Evaluation Framework and a Systems Theory Approach (Project Gabe).** Project Gabe is an opioid overdose prevention

program for commercial fishermen. Due to administrative delays in processing subaward approvals over the past year, partly related to federal instabilities affecting NIOSH's administrative support, the project budget was reduced from $30,000 to $10,000 over the course of the year. Fishing is physically demanding, with workers enduring long hours in adverse weather and high-stress conditions. Work-related musculoskeletal injuries are common, increasing the likelihood of opioids being prescribed for pain and increasing the risk of opioid dependence and misuse. Project Gabe is a resource for harm reduction, providing opioid misuse awareness and education, opioid antagonist training, and medications to reverse the effects of opioids temporarily. This project provided fishermen with opioid overdose response tools, including naloxone, opioid misuse education, and recovery resources, in a manner that is accessible, easy to understand, and easy to implement. Project Gabe will be assessed and improved using the CDC Program Evaluation Framework from a Systems Theory Perspective to address the complex needs of the crisis. Evaluation, development, and improvement of Project Gabe should reduce opioid overdose fatalities in the commercial fishing industry.

Outreach Mini-Grants

The Outreach Mini-Grant Program is a new funding opportunity intended to support stakeholder activities dedicated to promoting workplace health and safety among underserved populations. The Outreach Mini-Grant program has $15,000 available for small projects between $2,000 and $7,500 direct costs. Visit our website for more information: https://deohs.washington.edu/pnash/mini-grants

Emerging Issues Fund

This fund is dedicated to addressing new or timely safety issues and priorities raised by agricultural stakeholders in our region and developing new partnerships. The fund allocates up to $50,000 direct costs per year with awards as small as $2,000. Awards are available to active investigators within PNASH's Northwest network.

Wildfire smoke and extreme heat are growing public health concerns. How these affect rural agricultural communities who may be especially susceptible to them, however, is not well understood. Dr. Magali Blanco (Department of Environmental and Occupational Health Sciences, University of Washington) was awarded Emerging Issues funding to examine air quality and temperature during and after a wildfire event in Yakima, Washington in the summer of 2025. Using a mobile monitoring vehicle, Dr. Blanco and her team measured both temperature – including ambient temperature and wet bulb globe temperature (WBGT) – and air pollutants, including ultrafine particles (UFP), fine particles ($PM_{2.5}$), black carbon, nitrogen dioxide (NO_2), ammonia (NH_3), carbon monoxide (CO), and carbon dioxide (CO_2). They collected repeated measurements across a dense network of roadside locations representing community settings, including residential areas, agricultural fields, schools, and downtown business areas. They found elevated levels of most of the pollutants measured during the wildfire smoke episode, as well as clear spatial differences in ultrafine particle sizes, with larger particles observed in areas closer to the wildfire's direction. Next steps include examining temperature patterns as well as identifying air pollution and heat hotspots and how these shift during wildfire events. This work will support ongoing efforts to understand how wildfire smoke and extreme heat affect rural agricultural communities.

New PNASH-Related Awards

PNASH researchers received outside funding for additional projects.

Michael Yost, PhD, MS, Professor, Department of Environmental and Occupational Health Sciences, University of Washington. **Safety and Health Training for NW Restoration Forestry Services Workers (OSHA Susan Harwood Capacity Grant, 2024-25, $100,000 TC).** The PNASH Center and the Northwest Center for Occupational Safety and Health (NWCOSH), based at the University of Washington, piloted a new occupational safety and health training program for workers in Northwest restoration forestry services. This capacity-building project served the Northwest (NW) region of Washington, Oregon, and Idaho. The NW faces catastrophic wildfire risks and a rapidly increasing need for forest fuels reduction work, such as tree thinning and brushing. These tasks can be high-risk for injury due to the nature of NW's forests and the reliance on manual labor and tools such as chainsaws. Conducted by small contractor

Figure 2. Forestry services training in Longview, WA.

firms and farm forest landowners, this workforce often includes crews with little previous experience, such as youth and Spanish-speaking immigrant workers. In collaboration with the PNASH Outreach Core, this project:

- Conducted a regional needs assessment through key stakeholder interviews
- Developed new bilingual training curriculum, in collaboration with WSU Extension, topics included:
  - Module 1: Safety and Leadership – Nancy Simcox and Dennise Drury
  - Module 2: Hazard Control – Marcy Harrington and Dr. Eddie Kasner
  - Module 3: Healthy Work – Pablo Palmandez and Dennise Drury
  - Module 4: Chainsaw Safety – Andy Perleberg
  - Module 5: Thinning and Brushing – Vladimir Avalos
  - Module 6: Pesticide Safety – Dr. Eddie Kasner and Pablo Palmández
- Piloted the training with 55 trainees over two pilot training sessions (one in English, one in Spanish).

This program was guided by internal and external Subject Matter Experts (SMEs) and stakeholder advisors. The needs assessment and resulting training will be available to the public, building a foundation for future work and partnership between PNASH, UW Continuing Education, and WSU Extension Forestry.

Edward Kasner, PhD, MPH, Assistant Teaching Professor, Department of Environmental and Occupational Health Sciences, University of Washington. **Hands on the Land Project: Resource Clearinghouse for Forestry Services Workers, (USDA AFRI flowed through Oregon State University Forestry, 2025-2030, $78,133 ATC).** With this 5-year award to Oregon State Forestry Extension, PNASH joins as a partner in Hands on the Land, a collaborative program to enhance the equity of the forest workforce in the Pacific Northwest. We focus on labor-intensive forest workers, including forestry services contract crews, incarcerated workers, and volunteer workforces. Hands on the Land re-envisions our forest workforce with:

- Safer working conditions
- Equitable employment
- Increased entrepreneurial capacity
- Sustainable ecological outcomes
- We provide resources, narratives, and information to help realize this vision.

PNASH's role in the collaborative is to co-develop an accessible resource clearinghouse for forestry workforces that travel the PNW. These crews work deep in the woods and can be unfamiliar with local rules, community services, and best forestry practices. our specific aims include: 1) workforce needs survey, 2) resource clearing house technical development, 3) iterative resource clearinghouse maintenance and user evaluation. This work is co-developed with project partners and informed by direct worker experience.

Edward Kasner, PhD, MPH, Assistant Teaching Professor, Department of Environmental and Occupational Health Sciences, University of Washington. **Integrating Air Quality Sensors in AgWeatherNet and Developing Training Resources for Washington Farmworkers. (Washington Department of Labor and Industries: Safety and Health Investment Program Grant, 2024-25, $49,158 TC).** The increasing frequency and intensity of wildfires across the Pacific Northwest has created a growing need for proactive planning and effective safety measures to protect outdoor workers from smoke exposure. The purpose of this project was to update wildfire smoke safety materials for farm managers and workers to reflect new state safety rules published in 2023 and provide expanded air quality data available through AgWeatherNet. Dr. Eddie Kasner led the project in collaboration with WSU AgWeather Net and the Washington State Tree Fruit Association.

Figure 3. A still from the bilingual training video on wildfire smoke safety: Consejos ante condiciones de humo - Tips for Smoke Conditions.

The PNASH Outreach Core supported efforts to update wildfire resources with updated employer requirements and produced a bilingual training video on wildfire smoke safety. Sarah Fish, Pablo Palmández, Maria Blancas, and Dennise Drury supported

these activities. The resources share information on how to sign up for air quality alerts, check N95 masks, and improve in-vehicle air filtration. In addition, the team also updated developed a new bilingual webpages and checklists on the PNASH website that share best regional and local resources and help people subscribe directly to WSU AgWeatherNet's email and text alerts for local air quality data.

Maria Blancas, PhD, MPH, Clinical Assistant Professor, Department of Environment and Occupational Health Sciences, University of Washington. **Agricultural Leadership Program: Lead Safe (Washington Department of Labor and Industries: Safety and Health Investment Program Grant, 2025-26, $175,000 TC).** The PNASH Outreach Core received WA SHIP grant to continue to expand partnership with the Agricultural Leadership Program (ALP). Dr. Maria Blancas, Dr. Eddie Kasner, and Dennise Drury will be partnering with Washington State Tree Fruit Association, Washington State Department of Agriculture, G.S. Long, and Agricultural Leadership Program, to bring leadership training and resources to ALP graduates and all WA agricultural stakeholders. The purpose of the grant is to evaluate ALP and explore the impact of leadership training on workplace climate. The goals of the grant are to host a leadership conference, develop leadership resources for WA agricultural communities, foster networking and next-generation mentorship, share worker stories, and evaluate the impact. Expert Working Groups (EWG), conducted in Spanish, will support planning and decision-making for the project. There are 12 members on the EWG and 3 working groups:

1. Conference Vision and Voices: guiding decisions around session topics, speakers, and conference format and activities
2. Stories of Strength: developing a workshop for the conference that will help participants develop and share their stories
3. Impact in Action: shaping how growth and impact are measured

The Agricultural Leadership Conference is set for February 20 in Yakima and will host 300 agricultural supervisors from across Washington State. The EWG voted on the session topics for the conference and selected these three topics: 1) understanding emotional intelligence and building self-awareness, 2) discussing the difference between core values and principles and how each is important for leadership, 3) discussing mental health in agriculture and connecting participants to local programs and services. A storytelling workshop will be the fourth session during the conference, which will be a publicly available module.

Cores

Outreach at Fishermen's Safety Day in Seattle, WA.

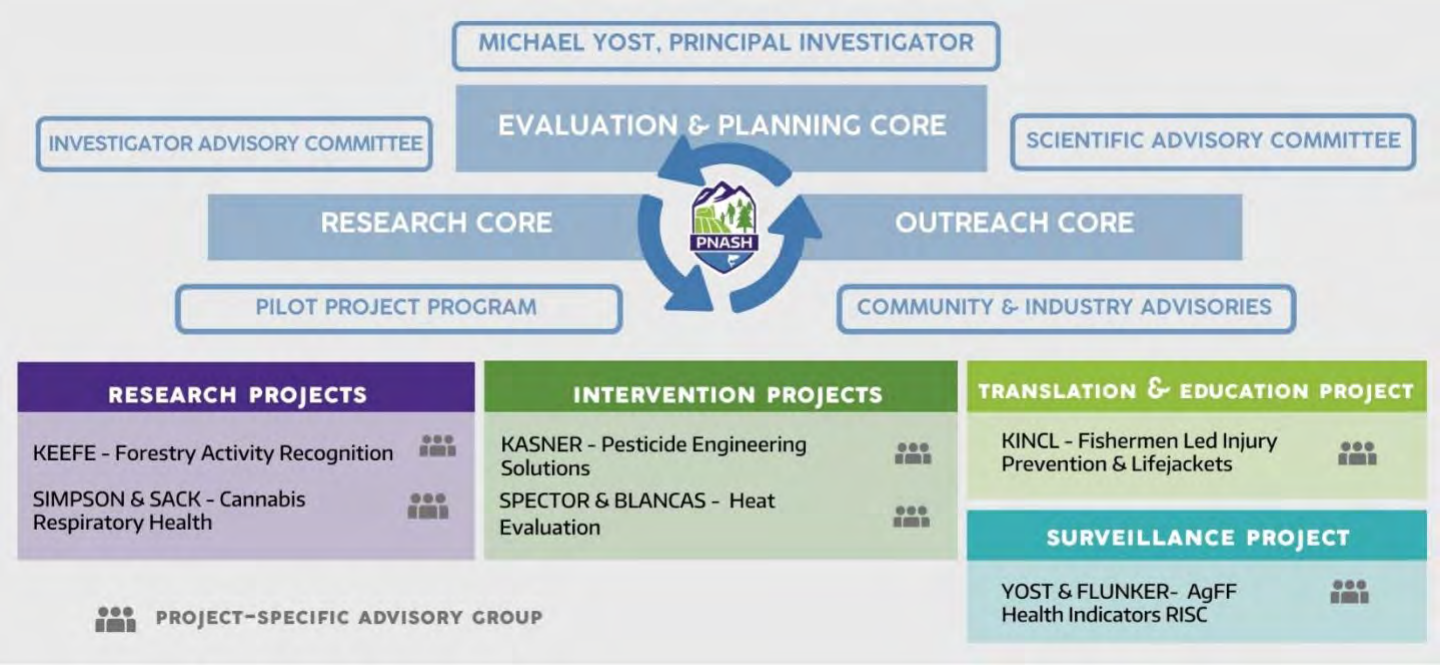
Evaluation and Planning Core

YEAR 3 of 5 (2022-2027)
Michael Yost, PhD, MS
Professor, Department of Environmental and Occupational Health Sciences, University of Washington

https://deohs.washington.edu/pnash/blog/new-federal-grant-improve-northwest-agricultural-safety-and-health

Background

The Planning and Evaluation (E&P) Core provides the infrastructure and support for the entire Center, conducts strategic planning, and assists in implementing and evaluating individual project and program objectives. We are in the third year of our 5-year cycle.



The E&P Core is responsible for PNASH Center leadership and management, strategic planning, evaluation, and administration of our small grants programs, like the Emerging Issues Fund and the Pilot Project Program.

Year 3 Progress

Leadership & Management

PNASH welcomed a new group of scientific advisors this year. Scientific advisors guide the Center and projects on effectiveness, directions of future work/science, project methods and results interpretation, and relevance of activities to regional and national policies and initiatives. Kent Anger, PhD, Howard Kipen, MD, MPH, Karen Lewis, MS, and Linda McCauley, PhD, RN, FAAN, FAAOHN, served on our Scientific Advisory Committee for the first two years of our funding cycle and provided valuable guidance and input during that time. At the start of the year, we welcomed our new members, Alan Davis, CSP, OEC, Leslie B. Hammer, PhD, Lav R. Khot, PhD, and Diane Rohlman, PhD. These advisors bring a range of perspectives and experience, and we are grateful for their participation.

PNASH led regional planning efforts for the annual Association of University Programs for Occupational Health and Safety (AUPOHS) meeting in Washington, D.C. in February 2025. Planning efforts included scheduling in person meetings with regional legislators to educate them about the work of PNASH and our other regional centers, the Oregon Total Worker Health® Alliance at the Oregon Health and Sciences University and the Northwest Center for Occupational Health and Safety

at the University of Washington. Following the meetings in February, we continued to follow up with legislative offices to share the importance of Center funding and the impact of our work on their constituents.

The PNASH Center volunteered to lead the Agriculture, Fishing, and Forestry (AgFF) campaigns for the US Agricultural Safety and Health Centers. The E&P Core worked with the Outreach Core to coordinate these campaigns. The first was Agricultural Safety Awareness Program (ASAP) Week, which is led by the American Farm Bureau Federation and took place on March 3-7, 2025. PNASH compiled resources from all of the Ag Centers so they could be included in the ASAP Week promotional toolkit which we distributed to the centers. PNASH also worked with the National Education Center for Agricultural Safety to provide resources for National Farm Safety and Health Week, which was September 21-27, 2025. We compiled resources from the Ag Centers for the week's daily themes. The resource document can be found on the NFSH Week website: https://www.necasag.org/nationalfarmsafetyandhealthweek/. We posted to social media each day of NFSH Week to share webinar opportunities and relevant resources to our followers.

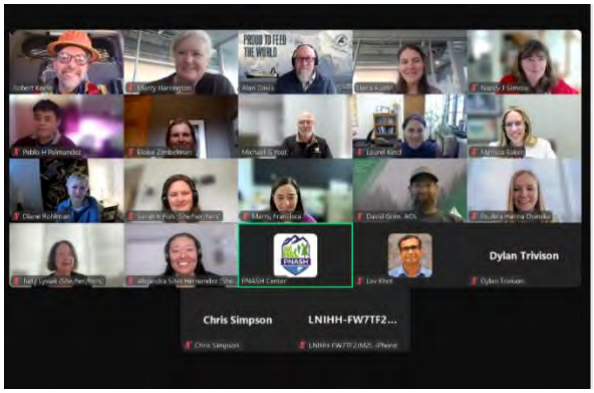
Strategic Planning

We recognize that collaboration in academia happens by creating space and platforms for our faculty and students to come together and foster new ideas. This past year, the PNASH Center participated in conferences that served as space for collaboration, presentation, and discussion.

As mentioned above, PNASH leadership attended the Association of University Programs for Occupational Health and Safety (AUPOHS) meeting in Washington, D.C. in February 2025. This meeting brought together representatives from all of the NIOSH-funded Agricultural Safety and Health Centers, Education and Research Centers, and Total Worker Health Centers.

In May 2025, the Scientific Advisory Committee (SAC) met virtually with our leadership and investigators. The meeting focused on forestry and brought together researchers from Washington, Oregon, and Idaho, as well as the Forestry Safety Working Group. During the meeting, the group discussed current projects and future directions for work in forestry health and safety. There was also a virtual demo broadcast from the University of Idaho's Experimental Forest.

Dr. Keefe conducting a live demo at U of Idaho Experimental Forest



Virtual Scientific Advisory Committee Meeting

Lastly, PNASH has activated several internal workgroups to explore funding opportunities, new partnerships, and communication strategies to support our long term sustainability as a research center for occupational health and safety for agricultural, fishing, and forestry workers in our region.

Emerging Issues Fund

Updates on the Emerging Issues Fund can be found in the PNASH Small Grants Programs section on page 18.

Evaluation Program

PNASH's evaluation program moves beyond traditional program monitoring, using a developmental approach to assist project teams in improving efficacy and outcomes. In yearly meetings with project teams, we assess impact opportunities, areas where there is an emerging need and a target audience for a health or safety intervention.

We continued capturing updates, activities, products, and publications from our investigators and staff, as well as from our small grants programs. Recipients of our small grants are asked to provide updates annually after their award so we can see what long-term impacts the funding has had. We have a comprehensive database for core project reporting, which includes updates on project aims and collects information on outreach efforts like key activities that have taken place and final products and publications that have been disseminated.

For this year our developmental evaluation focus was on the RISC project we met with interim and future PI's to assess opportunities and barriers. This session led to an understanding of current barriers in access to Wa state workers compensation data, and the opportunity to continue our work with other publicly accessible data. (See RISC project).

Next Steps

Collaboration with our advisories and stakeholders will continue throughout the cycle. We will participate in the Association of University Programs for Occupational Health and Safety (AUPOHS) meeting in Washington, D.C. in February 2026. The E&P Core and Outreach Core will continue to lead the Agriculture, Fishing, and Forestry (AgFF) campaigns for the NIOSH Ag Centers.

This year, we will undertake an evaluation project aimed at cataloging human subject processes across projects and identifying common recruitment approaches and baseline information collected. The objective is to develop an understanding of shared approaches and methods across projects as well as to assess the feasibility of a central agricultural-worker cohort housed within PNASH that would be built on shared methods and minimum common elements.

Finally, Dr. Elena Austin will be stepping into the role of Center Director. Since joining the University of Washington as an Assistant Professor in January 2020, Dr. Austin has played a key role in advancing exposure science and occupational health research within PNASH. She currently serves as Director of the PNASH Pilot Project Program, where she has successfully fostered research addressing critical health and safety issues for agricultural workers. Prior to her faculty role, she had important contributions to PNASH research in her role as senior research scientist. Her expertise in exposure assessment and environmental sensing has been integral to several PNASH initiatives, including her leadership in developing the Dairy Safety Toolkit (DSK), an interactive, bilingual training resource designed to improve dairy worker safety. Dr. Austin will lead the Center in strategic planning for future directions and scoping out potential projects for the next cycle of funding.

Dr. Michael Yost served as the Center Director starting in 2018 before retiring in August 2025. He is professor emeritus at the University of Washington and will continue his involvement with PNASH projects through the remainder of this funding cycle.

Partners and Collaborators

- PNASH Investigator Advisory Committee (IAC): https://deohs.washington.edu/pnash/directory/project-officers
- PNASH Scientific Advisory Committee (SAC): https://deohs.washington.edu/pnash/directory/advisors
- NIOSH Agriculture, Forestry, and Fishing (AgFF) Program: https://www.cdc.gov/niosh/programs/agff/default.html
- NIOSH Ag Centers: https://www.cdc.gov/niosh/oep/agctrhom.html
- NIOSH Ag Center Evaluators, Coordinator and Outreach (ECO) Group
- NIOSH's NORA: https://www.cdc.gov/nora/default.html
- Association of University Programs for Occupational Health and Safety (AUPOHS)

Resources

- FY 2024 PNASH Year-end Report (washington.edu)

Outreach and Education Core

YEAR 3 of 5 (2022-2027)
Edward Kasner, PhD, MPH
Assistant Teaching Professor, Department of Environmental and Occupational Health Sciences, University of Washington

https://deohs.washington.edu/pnash/resources

Background

The Outreach Core is the Center's foundation for building relationships and sharing information with agricultural communities. The purpose Outreach Core respond to regional needs, develop safety solutions, and share PNASH research findings. In Year 3, the Outreach focused on
Our aims are to:

1. Identify and respond to needs in farming, fishing, and forestry communities.
2. Translate research findings into safety solutions and practical guidance.
3. Create accessible, effective, and culturally-tailored communications to share research findings and resources.
4. Participate in regional and national efforts to improve the health, safety, and well-being of agricultural workers and their families.

Year 3 Progress

The Outreach Core partners with regional stakeholders to develop, evaluate, and disseminate best practices, new technology, and health and safety resources built from our research.

Identifying Regional Needs

The Outreach Core partners with agricultural communities and research teams to identify and address key health and safety needs. The Outreach Core leads the engagement in regional advisories with agricultural workers and employers, community organizations, universities, and agencies.

Forestry Safety Working Group

The Forestry Safety Working Group (FSWG), is a standing advisory that meets quarterly to identify opportunity to collaborate and develop safety resources Northwest logging and forestry services. Marcy Harrington coordinates the group and participants include UW School of Forestry, Associated Contract Loggers of Idaho, Associated Oregon Logging, Gahlsdorf Logging, Lomakatsi Restoration Project, OSU School of Forestry, Washington State Dept. of Labor and Industries (WA L&I), Washington State Dept. of Natural Resources, and Washington State University. This year the FSWG focused on:

- Mental health for logging crew members following serious injury, discussion of multiple issues and advising AgriSafe on their current work. As a result, identified a need and co-developed of a new facilitation tool, Critical Incident Debrief (English and Spanish).
- New award, Safety and Health Training for NW Restoration Forestry Services Workers, OSHA Susan Hardwood Capacity Grant – funding a 1-year pilot (with renewal for up to 5 years). The FSWG contributed with early advice and members involved in the forestry services sector were followed-up for with in-depth interviews for the project's needs assessment.
- Timber Production Executive Order – Discuss regional forestry priorities in workforce development and safety needed with the proposed increase in timber projection.
- PNASH Scientific Advisory Committee – Focus on Forestry. The FSWG joined a day's meeting, to review progress and findings on PNASH forestry research. (See also E&P Core report).

Forestry Services Needs Assessment

A needs assessment was conducted to inform our planned pilot training in English and Spanish for restoration forestry services work. Marcy Harrington conducted personal interviews with thirty-one stakeholders across Washington, Oregon, and Idaho. Interviewees included forestry trainers, safety educators, and field workers with experience averaging 15.3. All interviewees spoke and trained in English and over half (17) spoke and trained in Spanish. Roles varied widely, with strong representation

from forestry companies, community organizations, and self-employed contractors, reflecting diverse perspectives across the industry.

Results indicated our planned audiences for training was appropriate: 1) small woodland owners, and 2) Spanish language contract crews (including H2B workers), and materials and instruction in Spanish for this second audience. The assessment pointed to topic interest areas of: Chainsaw Safety, Emergency Plan, Fatigue Management, Musculoskeletal Disorders, Noise, Personal Protective Equipment, Slips, Trips & Falls, Smoke Exposure, Stuck-by Prevention, Training for Young Workers, Vehicles/Transportation, and Wind Blowdowns. Not ranked highly was information on Worker Rights and OSH rules, although this was provided in the pilot training – notably, this was an area of learning and interest in the course evaluations among our training participants. Feedback from training participants overall supported what we learned from the needs assessment and also revealed an interest in further safety guidance on: Electric chainsaw safety and usage; Accident response and emergency procedures; Tree cutting techniques and types of cuts; Herbicide handling, and; New technologies for safety practices. Preferred formats for future training were hands-on demonstrations, videos, and in general the use of realistic scenarios with their work.

FLIPP Fishing Advisory Board

The FLIPP Fishing Advisory Board was formed to provide guidance and feedback on the FLIPP Fishing project to promote the use of personal flotation devices (PFD) among commercial fishermen (P.I. Kincl, NIOSH 2022-2027). In November 2024, the Advisory Board met during the Pacific Marine Expo, where 21 participants provided valuable feedback on outreach materials, data collection methods, and program implementation. During the meeting, PNASH Graphic Designer Sarah Fish presented new branding, visual concepts, and storytelling approaches that will guide the next phase of material development. Sarah also collaborated with artist Tom Crestidina to create illustrated drawings of PFDs, highlighting the different features of each design to help fishermen make informed decisions about which type best meets their needs. These efforts support the project's larger goal of helping fishermen access PFDs through education, outreach or obtain them at the lowest possible price or free.

Fishermen First Aid and Safety Training (FFAST)

FFAST is the Fishermen First Aid and Safety Training delivered by Oregon and Washington Sea Grant and the Drill Conductor is the training delivered by the US Coast Guard. In this past year, Sea Grant and the D13 US Coast Guard partnered to deliver the Drill Conductor/FFAST together to save fishermen time. Dr. Eddie Kasner and Marcy Harrington attended training events with Washington Sea Grant to distribute lifejackets and educational materials promoting PFD use. The team also developed an interactive display featuring a variety of lifejackets, allowing fishermen to see and try on different styles to determine which fit and design they preferred. Washington Sea Grant has been using this display at multiple training events to further engage participants and raise awareness about the importance of wearing PFDs. The team distributed 35 lifejackets to commercial fishermen across two events.

Partnership for Agricultural Safety and Health

The Partnership for Ag Safety and Health was established to identify educational needs of agricultural workers and work together to develop resources. Dennise Drury facilitates the calls and PNASH participation includes Sarah Fish, Pablo Palmandez, Dr. Eddie Kasner, Dr. Maria Blancas, Alejandra Silva Hernandez, and PNASH students. Membership includes representatives from El Proyecto Bienestar, Radio KDNA, WA L&I, and WA Department of Health. This year the team worked collectively to:

- Review farmworkers' needs assessments conducted by Dr. Maria Blancas, Mary Jo Ybarra Vega, and Elizabeth Torres and recommend Ag Safety Day session topics based on agricultural workers' feedback.
- Promote Ag Safety Day event, call for new speakers, scholarship program, coordinate media presence, and coordinate a session on mental health.
- Provide feedback to guide the development of PNASH Wildfire Smoke video and social media campaign – Ante Condiciones del Humo. The feedback emphasizes the importance of visual and language accuracy to ensure agricultural workers in Washington are properly represented and clearly understand health risks. Key suggestions include using familiar terminology, improving clarity around protective measures and risks, and supporting educational outreach with accessible materials.
- Create maps with WA L&I SHARP on the locations and numbers of H-2A and H-2B workers in Washington and discuss mapping opportunities for pesticide safety.

Findings from the Washington Ag Safety Days Needs Assessment

During the 2025 Washington Ag Safety Days, a needs assessment was conducted to identify priority training topics related to mental health and workplace safety among agricultural workers. The assessment was facilitated by Mary Jo Ybarra-Vega, Elizabeth Torres, and Dr. Maria Blancas.

- **Mental Health and Well-Being Priorities**: Participants expressed strong interest in training focused on emotions and mental health, each receiving 14 responses—the highest-ranking topics overall. Other areas of interest included onboarding for new workers, communicable diseases, drug use prevalence, stay-at-work/light-duty programs, H-2A worker programs, worker well-being, and housing and health. While social and community support were mentioned less frequently, participants still recognized them as important factors for worker well-being.
- **Safety Training Priorities**: The most frequently requested safety training topics were workplace policies and migration and ICE policies, each receiving 64 responses, reflecting a high demand for clarity around worker rights and procedures affecting immigrant and seasonal workers. Other commonly mentioned topics included workplace communication (35), accident prevention (29), chronic diseases (16), sexual health (16), and sick leave and hours (10). Participants also noted interest in hearing safety, contagious disease prevention, smoke and fire safety, and equality and respect in the workplace.

The findings suggest there is a strong demand for training on mental health, worker rights and policies, and practical workplace communication and safety tools that address psychosocial hazards. The findings were shared with the Ag Safety Day Planning Committee to inform training priorities for future events.

Co-develop Resources with Agricultural Communities

The Outreach Core supported the translation and dissemination of research findings to communities in our Region. Here is a small selection of those activities.

Bilingual Pesticide Labels for Reforestation Worker Safety

Marcy Harrington, Pablo Palmandez and Dr. Eddie Kasner supported the development of pesticide safety resources for reforestation workers in partnership with Oregon Pesticide Education Program (PSEP) and Oregon OSHA (OROSHA). The team also participated in several events to promote the new PNASH resources.

- Handbook for Bilingual Pesticide Labels for Reforestation / Manual de etiquetas bilingües de pesticidas de reforestación (Spanish and English)
- Glossary of Terms for Bilingual Pesticide Labels for Reforestation / Glosario de etiquetas bilingües de pesticidas de reforestación (Spanish and English)
- Presentaciòn - Etiquetas bilingües de pesticidas para la seguridad de los trabajadores de reforestación
- Article in Fall 2024 Western Forester: Pesticide Labels and Safety in Spanish
- Critical Incident Debrief (English and Spanish)

Evaluating Heat Shade Practices to Inform Practical Solutions for Farmworkers

PNASH investigators Dr. June Spector and Dr. Maria Blancas were awarded funding to evaluate Washington's Outdoor Heat Exposure Rule (adopted June 2023) in partnership with WA L&I's Safety and Health Assessment and Research for Prevention (SHARP) Program (see page 11). The Outreach Core partnered with Dr. Spector, Dr. Blancas, and SHARP's Dr. Erica Chavez Santos and Stefani Florez-Acevedo to create a bilingual (English and Spanish) survey and an interactive poster board. These tools were used to facilitate discussions with participants at the 2025 WA Ag Safety Days about their experiences and considerations when selecting shade structures, such as which types they use, how they choose them, and which features are most important. Additionally, we developed a flier summarizing research findings from the PNASH and SHARP teams, which evaluated various shade materials to determine how effectively they block sunlight.

Preventing the Spread of Infectious Diseases on Dairy (WA Dept. of Labor and Industries: Safety and Health Investment Program Grant)

The Highly Pathogenic Avian Influenza has raised new concerns with our dairy industry partners about worker safety on dairy farms, highlighting the need for stronger infection prevention practices. PNASH collaborators Dr. Peter Rabinowitz, Vickie Ramirez, and Natalie Rejto invited Pablo Palmandez and Dennise Drury to support their efforts to learn more about the challenges for prevention and identify solutions. In partnership with the dairy industry, researchers surveyed over 100 dairy

workers on large Washington farms to better understand awareness, behaviors, and barriers related to preventing the spread of animal-to-human diseases. The study found that while workers often wash their hands, the use of protective equipment like masks, respirators, and eye protection was less consistent, especially in higher-risk areas. Many reported barriers such as discomfort, lack of access to existing PPE, or equipment not being provided. Workers also faced challenges implementing safe needle practices and access to handwashing stations. These findings show that to better protect dairy workers, practical safety measures must be developed with input from farmers and workers, along with stronger education and training on disease risks and prevention strategies. The team is currently developing tools to support the dairy industry in preventing the avian flu. The purpose of the Infection Prevention and Control Plan is to implement procedures on the farm that reduce infection transmission and increase health and well-being of employees, which in turn promotes animal health.

- New Infection Prevention and Control plan with guidance and step by step instructions to help employers develop a customized prevention plan.
- Workplace posters with best practices on hand-washing, needle safety, proper PPE use and more.
- Training for employers, managers and workers on understanding infectious diseases, how to identify hazards, and how to stop the spread.

Communicating with Agricultural Communities

The Outreach Core creates accessible, effective, and culturally tailored communications to promote programs, research, and resources. Some of this year's products included:

New Video: Consejos ante condiciones de humo - Tips for Smoke Conditions

This bilingual video was developed to help farmworkers and their loved ones understand the health impacts of wildfire smoke and learn practical tips for reducing exposure both on the job and at home. PNASH SURE-EH student Haylee Jarret helped lead the development of the video script with partners and also coordinated with a graphic artist to develop the visuals in the video. Pablo Palmandez voiced the video in Spanish and translated the subtitles in English. The video was launched in June and has been viewed by nearly 400 agricultural stakeholders. Video: https://www.youtube.com/watch?v=XNUZ3VvOW5c
Special thanks to partners, Washington State Department of Labor & Industries, Washington State University / AgWeatherNet, Radio Cadena / Northwest Communities Education Center, and Washington State Tree Fruit Association.

Respiratory Health and Indoor Air Quality in the Cannabis Industry (see page 7)

Dr. Chris Simpson and Dr. Cora Sack's research in collaboration with cannabis industry partners found that cannabis processing activities such as grinding and trimming generate high levels of dust, increasing the risk of work-related asthma and other respiratory diseases. Sarah Fish, Dennise Drury, and Dr. Eddie Kasner collaborated with the team to develop an educational resource to raise awareness of these respiratory hazards and demonstrate a low-cost engineering control that growers can easily build. The system uses a plastic container placed over the knock box, connected to tubing and a shop vacuum to create local exhaust ventilation that captures dust at the source. The research team continues to test and refine this prototype to promote practical, affordable solutions that reduce dust exposure and protect cannabis workers' respiratory health. Resource: Protecting Workers from Harmful Respiratory Hazards: Cannabis Dust

Website

PNASH continues to focus on enhancing Forestry Services and Logging Webpages by adding new resources from PNASH and external organizations. The team also focused on revising Wildfire Smoke webpage, in English and Spanish, to reflect new changes in WA Wildfire Smoke rule and publish new wildfire smoke video and resources to the database. PNASH also published 6 blogs to highlight events and research activities.

New Webpages

- Bilingual pesticide labels for worker safety in forestry
- Resources for Logging
- Wildfire Smoke Safety

New Blogs

- AgInjury News report: hayrides and pumpkin farms
- Pesticide Labels and Safety in Spanish
- PNASH Scientific Advisory Committee gains four members
- Behind the injury numbers – Listening to loggers

- Protecting crop workers under the sun and smoke
- Increasing awareness and education of substance use among commercial fishermen
- External Blog: NIOSH Science Blog: Perspectives on Forest Operations Safety

Engaging with Regional and National Stakeholders

Regional Advisories

- **OROSHA Forest Activities Code Advisory Committee (FACC)**: Dr. John Garland, PE, serves on the FACC, to review and revise Division 7, Forest Activities Code covering logging and forestry services. The FACC's work has served as a model for logging safety and regulations in other states, and includes industry stakeholders and safety expertise. Dr. Garland has served on the committee for over 40 years helping revise the code three times. During the past year, Dr. Garland provided his engineering expertise to provide code interpretations to allow safe and ergonomically improved synthetic rope end connectors to logging workers seeking reduced workloads including drone usage.
- **Council on Forest Engineering Annual Conference and Oregon Forest Activities Advisory Code Review Committee:** Research was presented by Dr. Garland, et. al. has documented the ergonomic and workload reductions of substituting synthetic rope for steel wire rope in logging. Commercialization of synthetic log truck load securement wrappers has extended the working lives of hundreds of log truck drivers in the Pacific Northwest and across the Nation. Synthetic rope uses in logging continue to be developed including novel use of small diameter synthetic rope and drones for rigging lines to replace workers stringing wire rope up and down canyons for skyline logging. Next steps needed are new synthetic rope formulations and materials offer potentials for increased use of synthetic rope as skylines. Synthetic rope end connectors used in the fishing industry and construction need testing for beneficial uses in logging. Funding for such research is needed from government sources as small contractor firms lack the organizational structure to support research activities.
- **Western Treasure Valley Farmworker Resource Committee**: PNASH joined this committee to expand outreach into Oregon and Idaho. The Committee brings together community organizations who serve farmworkers. The Committee shares events and community programs for farmworkers as well as needs and challenges they experience. The committee discusses updates in state and federal rules, and provides information on the impact of these changes to agricultural communities. This year the committee shared new resources on heat-related illness prevention from Federal OSHA, shared updates on overtime rules and addressed frequently asked questions, and worked together to plan Farmworker Appreciation Day. Dennise Drury serves on the committee and shares latest PNASH resources, connects committee members with PNASH Staff and also identifies needs and opportunities for collaboration. Partners include Oregon OSHA, Oregon Bureau of Labor and Industries, Oregon Employment Department, Oregon Law Center, Oregon Child Development Coalition, Oregon OSHA, U.S. Department of Labor, Euvalcree, Poder of Idaho, and Idaho Department of Education.
- **Farmworker Health Coalition:** The Farmworker Health Coalition call centers on collaborative efforts to support the health and well-being of farmworker communities, with a strong emphasis on mental health, community engagement, and resource distribution. Participants share updates and initiatives, including local events, food and clothes drives, and health services available for rural farming communities. The group identified the mental health needs of both farmworkers and their children as a priority, and worked together to provide support through community networks and promotoras. Partners include Northwest Regional Primary Care Association, Quincy Community Health Center, Moses Lake Community Health Center, Farmworker Justice, Washington State Department of Labor and Industries, Fred Hutch, Oregon Health Authority, Radio KDNA/ Northwest Communities Education Center, Washington Department of Health, Wenatchee CAFÉ, Unidos Nueva Alianza, Northwest Justice Project.

Regional Events

- **4H Professional Conference, Boise, Idaho:** Marcy Harrington attended the event to exhibit and share PNASH resources in collaboration with the National Children's Center for Rural and Agricultural Health and Safety. PNASH resources with high interest were on heat, smoke, dairy and professional e-Learning programs. Engaging this group of educators demonstrated a need for safety information for youth and integrating STEM experiential learning for youth curriculum could fit well with their program goals.
- **University of Washington WISHA 10 Training, Seattle Washington**: In December, the PNASH Center partnered with Washington State L&I to host a WISHA 10 training at the University of Washington, offering students the opportunity

to complete the 10-hour agricultural safety course for the first time. Led by Dennise Drury and Bradley Farrar from L&I, the training covered topics such as outdoor heat, tractor safety, pesticide safety, and biological hazards. A total of 18 participants attended across 2 days, including 9 students, 6 staff, and 3 faculty. Evaluation results showed that most participants' scores increased after the training, though some knowledge gaps remained. Importantly, 95% of participants recommended the training, underscoring its value and highlighting opportunities to strengthen key safety messages in future sessions. Ten participants received their certification cards. PNASH participants included Judy Lysiak, Marcy Harrington, Dr. Eddie Kasner, Dr. June Spector, Maria Tchong-French, Dennise Drury and Dr. Diana Ceballos.

- **WA Ag Safety Day:** PNASH serves on the planning committee and supports planning activities related to organizing sessions, identifying speakers, coordinating media participation, and promoting the two February events. This year, PNASH helped launch the call to bring new speakers and safety topics to the event. Dennise Drury helped organize a committee to review proposals, and the committee invited Alba Johnston from Oregon OSHA to talk about identifying hazards on the job. PNASH continued to help run the No Worker Left Behind program to offer workers scholarships to cover the cost of registration. Twenty scholarships were awarded across both Yakima and Wenatchee locations. Half of the workers reported they had not previously been given the opportunity to attend and nearly all workers reported they requested the day without pay to attend, highlighting how important learning about health and safety is to them. PNASH-related sessions include: *Workplace Solutions to Promote Ag Worker Well-Being* (Mary Jo Ybarra-Vega, Quincy Community Health, Elizabeth Torres, Radio KDNA/Northwest Communities Education Center, Dr. Maria Blancas, UW PNASH) and *Agricultural Leadership Program: The Resilient Leader: Practical Skills to Manage Workplace Stress* (Dennise Drury, UW PNASH and Jacqui Gordon Nunez, Washington State Tree Fruit Association, Viridiana Acevedo, Zirkle Fruit)
- **Northwest Ag Safety Day**: This year the committee worked together to plan the first ever Northwest Ag Safety Day to bring the conference to employers and workers in the Skagit Valley in November 2024. Dennise Drury serves on the planning committee and this year was nominated to be chair of the committee. The event was hosted in La Conner, WA and was attended by 75 participants. PNASH provided the welcoming comments in collaboration with Washington Farm Bureau, and hosted a booth to share resources. PNASH-related sessions: *¡Basta! Prevent Sexual Harassment in Agriculture* (Dr. Jody Early and Dennise Drury).
- **2025 PNASH Farm Visits:** This year, the PNASH team visited two farms to learn about agricultural operations, worker safety and health, and explore future collaboration opportunities. At Long Ranch, the visit coincided with apple thinning, where a skilled year-round crew demonstrated efficient work practices and emphasized the importance of ladder safety in trellised Honeycrisp orchards. The trellising system allows ladders to be safely positioned within the tree canopy, reducing overreaching and improving stability. The team also observed innovative sun and heat protection measures, including the creative reuse of netting from former cherry orchards to shield both apples and workers. PNASH participants during the visit included Sarah Fish, Judy Lysiak, and Dr. Eddie Kasner. The second visit was to Yakima Chief Hops, a grower-owned network of family farms and leader in sustainable hop production. The team learned about their self-designed harvesting technology, commitment to sustainability, and their unique role connecting hop growers with brewers worldwide. Yakima Chief Hops' focus on worker well-being, innovation, and environmental stewardship presents exciting potential for future research collaboration. PNASH participants included Dr. Elena Austin, Dr. Eddie Kasner, Yoni Rodriguez, Pablo Palmández, and Dennise Drury.
- **Forestry Safety and Skills Trainings – English 6/5 and Spanish 6/13.** In 2025, PNASH piloted a new course to reach forestry landowners and contractors.

Next Steps

PNASH will continue translating research into practical tools and expanding partnerships that promote worker health and safety across the region. Priorities include:

- Expanding mental health and climate resilience efforts by supporting the CLIMA pilot project team in finalizing and pilot-testing the workplace toolkit and supporting dissemination among promotoras de salud, agricultural employers, and community organizations.
- Evaluating the Agricultural Leadership Program and the conference with focus on assessing impact, capturing stories of success, and examining the impact of leadership training on workplace climate.
- Scaling forestry training initiatives, including the *Safety and Health Training for NW Restoration Forestry Services Workers* project and the new *Hands-on-the-Land* USDA project with Oregon State University, to reach more bilingual and high-risk workers.

- Strengthening fishing safety education, by piloting the substance use and overdose response module through Fishermen First Aid & Safety Training (FFAST) and expanding PFD outreach across Washington ports.
- Continuing cannabis safety research translation, expanding education on how to implement low-cost ventilation prototype, and supporting the implementation and evaluation of the WISHA 10 Cannabis Training Modules.
- Supporting infection prevention on dairies by developing a webpage to share the new Infection Prevention and Control Plan and training employers and workers on disease control and PPE use developed by the Center for One Health Research. Also supporting their efforts to expand into the poultry industry.
- Enhancing regional partnerships and outreach to collaborate with new industries and partners; identify needs and collaboration opportunities; share new resources on heat, wildfire smoke, pesticide safety, mental health, and cannabis.
- Continuing to develop new blogs to capture the story of our partnerships, student research, and highlight success stories within agricultural communities.
- Exploring new research collaborations with innovative producers like Yakima Chief Hops and Long Ranch, where sustainable management and worker safety practices align with PNASH priorities.
- Supporting PNASH projects in developing communications and resources to share their research findings and best practices, such as translating research findings from the Pesticide Drift Project into training messages and best practices with the Washington State Department of Agriculture and Washington State University's Pesticide Recertification Education Program.
- Collaborating with our multiple sector advisories to understand data monitoring interests and direct PNASH's efforts to engage industries in data-informed solutions.

Partners and Collaborators

The Outreach Core works in partnership with agricultural stakeholders and research teams to identify and respond to regional health and safety needs. The Needs Assessment Committee leads the engagement in regional advisories with agricultural workers and employers, community organizations, academics, and agencies.

Regional Event Participation Highlights

OR OSHA Safety, Health, and Your Rights at Work Conference
11/05/2025

FLIPP Fishing Advisory
11/20/2024

WA Public Health Association Annual Meeting
12/04/2024

UW WISHA 10 Training
12/10-11/2024

WA Ag Safety Day Yakima
2/05/2025

Agricultural Leadership Program
2/212025

Ag Safety Day Wenatchee
2/26/2025

WA Forestry Training Longview
6/05/2025

WA Forestry Training Chehalis
6/13/2025

Long Ranch Farm Visit
6/22/2025

Fishermen's Fall Festival
9/13/2025

Yakima Chief Hops Farm Visit
9/18/2025

Supporting Students

The PNASH Center is fortunate to have talented and passionate students involved in our research every year. We want to express our gratitude to these students and recognize their academic achievements, inspiring stories, and professional accomplishments. PNASH coordinates with multiple training and pathway programs for student support and research funding to work with PNASH projects. Our student support includes meaningful student internships.

Figure 1. Students participate at Fishermen's Safety Day, distributing lifejackets.

2025 Graduates

Autumn Dennistoun, DNP
Population Health and Systems Leadership, School of Nursing, University of Washington
Autumn's research explored substance use among commercial fishermen in Washington State. She developed a training module and hands on method to educate about naloxone administration. Learn more about her project.

Callan Krevanko, PhD
Occupational Hygiene, University of Washington
Callan's research is centered on respiratory health for workers in the cannabis industry. Their methods included collecting exposure and health measurements from cannabis cultivation and processing workers at grow farms in Oregon and Washington.

Ali Khan, MD, MPH
Occupational and Environmental Resident, University of Washington
Ali has focused on wildfire smoke and heat exposure on the health of outdoor workers. He is interested in developing a training toolkit for health and safety related to wildfire smoke. Learn more about this project.

Grace Price, MS
Industrial Hygiene, University of Washington
Grace centered her research on traditional Industrial Hygiene exposure assessment, agricultural worker safety, and targeted outreach education in the commercial fishing industry. She worked closely with the FLIPP for Lifejackets project, and hopes this work increases awareness and expands accessibility, so fishers can have a PFD that they will choose to wear willingly and maintain over time.

Catherine Jennifer, MS
Environmental and Occupational Health Sciences, University of Washington
Catherine researched the differences between pesticide use in California and Washington states, comparing rural vs. urban usage. The hope is that the comparison will help inform and educate the larger population about pesticide exposure in their area.

Continuing Students

Allison Clonch, MPH, PhD Student
Environmental and Occupational Health Sciences, University of Washington
Ally has contributed to PNASH research in logging and log trucking safety and in analysis of guest-worker demographic data. Ally's dissertation will focus on assessing experiences of gender-based violence and harassment, and their impact on mental health among U.S. mariners.

Phoebe Nadeau, Masters Student
Environmental and Occupational Health Sciences, University of Washington
Phoebe's research gauges how well agricultural workers understand their current pesticide sprayers as well as how well they understand new technologies aimed at keeping them safe and healthy. She expects to submit the manuscript to the Journal of Agromedicine this summer.

Juliana Moreno, Masters Student
Industrial Hygiene, University of Washington
Julia's research will evaluate and develop a WISHA 10 training for the cannabis industry. This project is in collaboration with the WA state department of Labor and Industries. Development of a training module specific to the cannabis industry, will help employers to identify workplace hazards and prevent injuries and illnesses like workplace asthma.

Haylee Jarrett, Undergraduate Student
Medical Anthropology / Global Health and Environmental Studies, University of Washington
Haylee is double majoring in Medical Anthropology & Global Health (Anthropology Department) and Environmental Studies (Program on the Environment). Haylee's work with the PNASH Center directly supports agricultural safety by identifying effective ways to deliver timely, accessible smoke protection guidance to farmworkers during wildfire events.

New Students

Katie Bird, Undergraduate Student
Public Health, *Oregon State University*
Katie is currently a first-year student at Oregon State University pursuing a public health degree. Katie assisted FLIPP team with outreach at an event in Newport, OR.

Francis Gallagher, Undergraduate Student
Biology, Oregon State University
Francis will continue to participate in the FLIPP for lifejacket program and also plans on participating in research at OHSU in radiation oncology over the summer. He is a second-year biology student at Oregon State University pursuing a career in healthcare.

Karina Cruz, Undergraduate Student
Food Systems, Nutrition, and Health, University of Washington
Karina participated in the Agricultural Leadership Program, and graduated with a Bachelor of Arts in 2025.

PNASH in the News 2024-2025

Gift supports graduate student research in wake of federal changes
October 14, 2025 | DEOHS HSM Blog | Featured: Marissa Baker, Elena Austin | View

Study finds workplace injuries increase significantly in the heat
October 8, 2025 | NPR | Featured: June T. Spector | View

Wildfire smoke to drift into greater Seattle area, impacting air quality
September 15, 2025 | Fox 13 | Featured: Coralynn Sack | View

How to limit smoke exposure through wildfire season
August 5, 2025 | KIRO 7 | Featured: Coralynn Sack | View

Wildfire smoke settles over Seattle, impacts air quality in western Washington
August 5, 2025 | FOX 13 Seattle | Featured: Coralynn Sack | View

Plan now to reduce wildfire smoke exposure
August 4, 2025 | UW Medicine | Featured: Coralynn Sack | View

Federal cuts put Washington workplace safety research at risk
July 29, 2025 | Cascade PBS | Featured: Marissa Baker, Elena Austin | View

Video: UW helps protect Washington's workers through occupational health and safety research, training
June 24, 2025 | DEOHS HSM Blog | Featured: Elena Austin, Marissa Baker, June T. Spector | View

UW department of environmental & occupational health sciences prepares to lose NIOSH funding despite absence of formal notification | June 6, 2025 | The Daily | Featured: Christopher D. Simpson | View

Trump cuts threaten safety training for America's most dangerous jobs
June 1, 2025 | Reuters | Matthew C. Keifer | View

Wildfire communication gaps persist for Spanish speakers in Washington. These groups are working to close them | May 30, 2025 | Northwest Public Broadcasting | Featured: Maria Blancas | View

How to prepare for wildfire season
May 30, 2025 | Seattle Times | Coralynn Sack | View

DOGE withdraws remaining $866 of UW researcher's grant, reflecting contradictory mission of the EPA
May 28, 2025 | The Daily | Featured: Elena Austin | View

From supercomputers to science communication
May 23, 2025 | DEOHS HSM Blog | Featured: Lianne Sheppard, Elena Austin, Rachel Sklar | View

In California, flawed air rules threaten farmworkers as wildfires pump more smoke onto fields
May 19, 2025 | Inside Climate News | Featured: Edward Kasner | View

DOGE canceled this UW scientist's grant — to save just $866
May 10, 2025 | The Seattle Times | Featured: Elena Austin | View

Free PFDs for Oregon Fishermen + How you can do this for your community
May 7, 2025 | This American Life: Partners of Commercial Fishermen Podcast | Laurel Kincl | View

New tools track worker-safe weather data
May 1, 2025 | Good Fruit Grower | Featured: Edward Kasner | View

Nighttime harvest becoming the norm
May 1, 2025 | Good Fruit Grower| Featured: Edward Kasner | View

Workers are going to die on the job:" Agricultural research centers concerned by federal budget cuts
April 7, 2025 | KXLY | Featured: Christopher D. Simpson | View

Oregon Commercial Fishermen Receive Funding for Safety
February 22, 2025 | National Fisherman | Laurel Kincl | View

Commercial Harvesters Weigh in on PFDs, Rain Gear, Boots
February 7, 2025 | Fishermen's News | Laurel Kincl | View

Washington Agriculture Safety Day covers all things wellness on the farm
February 5, 2025 | Good Fruit Grower | PNASH Center | View

For Northwest loggers, work is a source of pride — and danger
December 3, 2024 | NPR Network: KUOW | Marissa Baker | View

Inside the Deadliest Job in America
November 22, 2024 | The New York Times | Marissa Baker | View

With notable cases of bird flu in the Northwest, how concerned should Washingtonians be?
November 20, 2024 | NPR Network: KUOW | Peter Rabinowitz | View

Pesticide labels and safety in Spanish
November 1, 2024 | Western Forester | Marcy Harrington | View

Franklin County poultry workers test positive for bird flu, state health officials investigating
October 24, 2024 | KING4 | Peter Rabinowitz | View

Bird flu cases in people quietly tick up, with dozens reported across 6 states
October 22, 2024 | NBC News | Peter Rabinowitz | View

PNASH-Related Research Publications 2022-2025

CANNABIS

Krevanko C, Kenleigh D, Ghodsian N, Jansen K, Simpson CD, Sack C. Cannabis sensitization and allergy in cannabis industry workers, recreational cannabis users, and non-users. J Occup Environ Med. 2025 Aug 8. doi: 10.1097/JOM.0000000000003517. Epub ahead of print. PMID: 40778935.

Sack C, Simpson C, Pacheco K. The Emerging Spectrum of Respiratory Diseases in the U.S. Cannabis Industry. Semin Respir Crit Care Med. 2023 Jun;44(3):405-414. doi: 10.1055/s-0043-1766116. Epub 2023 Apr 4. PMID: 37015286; PMCID: PMC10449032.

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Carmona J, deMarcken, Trinh P, Frisbie L, Ramirez V, Palmandex P, Vedal S, Sack C, and Rabinowitz P. A Cross Sectional Study of Respiratory and Allergy Status in Dairy Workers. Journal of Agromedicine, 2023 Jul;28(3):545-552. doi: 10.1080/1059924X.2023.2171522. Epub 2023 Feb 6. PMID: 36704933; PMCID: PMC10421462.

FISHING

Doza S, Bovbjerg V, Case S, Vaughan A, Kincl L. Utilizing Haddon matrix to assess nonfatal commercial fishing injury factors in Oregon and Washington. Inj Epidemiol. 2023 Mar 24;10(1):18. doi: 10.1186/s40621-023-00428-7. PMID: 36964638; PMCID: PMC10037792.

Kincl L, Doza S, Nahorniak J, Case S, Vaughan A, Bovbjerg V. Commercial Fishing Fatalities and Injuries Described by Linked Vessel Incidents. J Agromedicine. 2023 Oct;28(4):881-889. doi: 10.1080/1059924X.2023.2229827. Epub 2023 Jun 30. PMID: 37387508; PMCID: PMC10543625.

Fay Cyr L, Sagoonick MM. Knowledge Shared by Alaska Native Commercial Salmon Set Gillnetters in Norton Sound to Reduce Marine Fatalities. J Agromedicine. 2024 Jan;29(1):10-17. doi: 10.1080/1059924X.2023.2249453. Epub 2023 Aug 19. PMID: 37598199.

FORESTRY

Clonch A, Harrington M, Spector J, Monsey LM, Baker MG. Exploring determinants of log truck accidents resulting in injury or fatality in the Northwest United States between 2015-2019 using Motor Carrier Management Information System data. International Journal of Forest Engineering, 2023;34(3):452-458. doi: 10.1080/14942119.2023.2186026. Epub 2023 Mar 15. PMID: 38213500; PMCID: PMC10783025.

Kim, Jeong Ho and Woodam Chung. Forestry professionals' perspectives on exoskeletons (wearable assistive technology) to improve worker safety and health. International Journal of Forest Engineering, 35(1), 11–20. https://doi.org/10.1080/14942119.2023.2256104.

Zimbelman E, Keefe R. Lost in the woods: Forest vegetation, and not topography, most affects the connectivity of mesh radio networks for public safety. PLoS One. 2022 Dec 7;17(12):e0278645. doi: 10.1371/journal.pone.0278645. PMID: 36477301; PMCID: PMC9728932.

HEAT-RELATED ILLNESS

Florez-Acevedo, S., Blancas, M.T. & Spector, J.T. Occupational Heat Exposure & Mental Health Outcomes: A Review and Framework Incorporating Social Determinants of Health to Guide Future Research. *Curr Envir Health Rpt* **12**, 15 (2025). https://doi.org/10.1007/s40572-025-00479-6.

Flunker, JC, Spector, JT, Blancas, M, Briggs, NL, Flores, M, Whitaker, CR, Schoonover, T, and Cardoso, T. Farmworker-Relevant Heat Exposure in Different Crop and Shade Conditions. *Journal of Agromedicine*. 2024 Oct;29(4):547-560. doi: 10.1080/1059924X.2024.2365647. Epub 2024 Jun 14. PMID: 38874305; PMCID: PMC11410529.

Spector JT, Sampson L, Flunker JC, Adams D, Bonauto DK. Occupational heat-related illness in Washington State: A descriptive study of day of illness and prior day ambient temperatures among cases and clusters, 2006-2021. Am J Ind Med. 2023 Aug;66(8):623-636. doi: 10.1002/ajim.23506. Epub 2023 Jun 8. PMID: 37291066; PMCID: PMC10330917.

OTHER FARMING

Thamsuwan O, Galvin K, Palmandez P, Johnson PW. Commonly Used Subjective Effort Scales May Not Predict Directly Measured Physical Workloads and Fatigue in Hispanic Farmworkers. Int J Environ Res Public Health. 2023 Feb 5;20(4):2809. doi: 10.3390/ijerph20042809. PMID: 36833506; PMCID: PMC9957310.

PESTICIDE EXPOSURE

Hyland C, Ruiz I, Meierotto L, Som Castellano R, Curl C. Forging Community Partnerships to Examine Pesticide Exposure and Risk Perceptions among Latinx Farmworkers. Poster Preparation Abstract, PISEE Conference, 2022 Sep 21; 2022(1). https://doi.org/10.1289/isee.2022.P-11.

Hyland C, Hernandez A, Gaudreau É, Larose J, Bienvenu JF, Meierotto L, Som Castellano RL, Curl CL. Examination of urinary pesticide concentrations, protective behaviors, and risk perceptions among Latino and Latina farmworkers in Southwestern Idaho. International Journal of Hygiene and Environmental Health, 2024 Jan;255:114275. doi: 10.1016/j.ijheh.2023.114275. Epub 2023 Oct 20. PMID: 37866282.

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SMOKE & AIR QUALITY

Parker, M.M. Wildfire Smoke Exposure in the Agricultural Workplace: Exploring Worker and Employer Perspectives on Occupational Safety and Health. 2024 Doctoral Dissertation, College of Nursing, Washington State University, Pullman, Washington. See Abstract. Research Exchange Services. doi: https://doi.org/10.7273/000007079.

Schollaert C, Austin E, Seto E, Spector J, Waller S, Kasner E. Wildfire Smoke Monitoring for Agricultural Safety and Health in Rural Washington. J Agromedicine. 2023 Jul;28(3):595-608. doi: 10.1080/1059924X.2023.2213232. Epub 2023 May 20. PMID: 37210597; PMCID: PMC10395649.