



Woodstove Operation & Maintenance Webinar #3

December 15, 2020



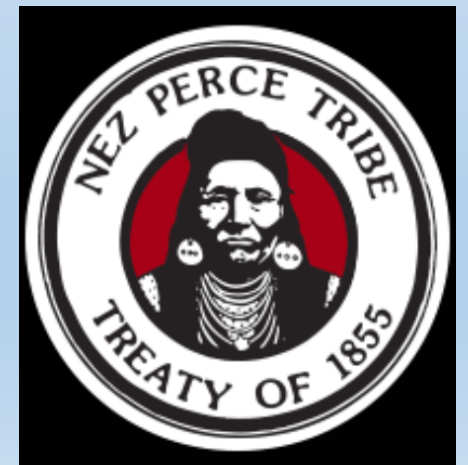
Tribal Air Monitoring



Support Center



Navajo Nation
Environmental Protection Agency





Facilitator

Mansel Nelson

**Institute for Tribal Environmental
Professionals (ITEP)**

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Webinar Logistics



- Webinar is being recorded
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Thank you for joining the webinar!

Thursday, December 15, 2020; 11:00am-12:30am MST

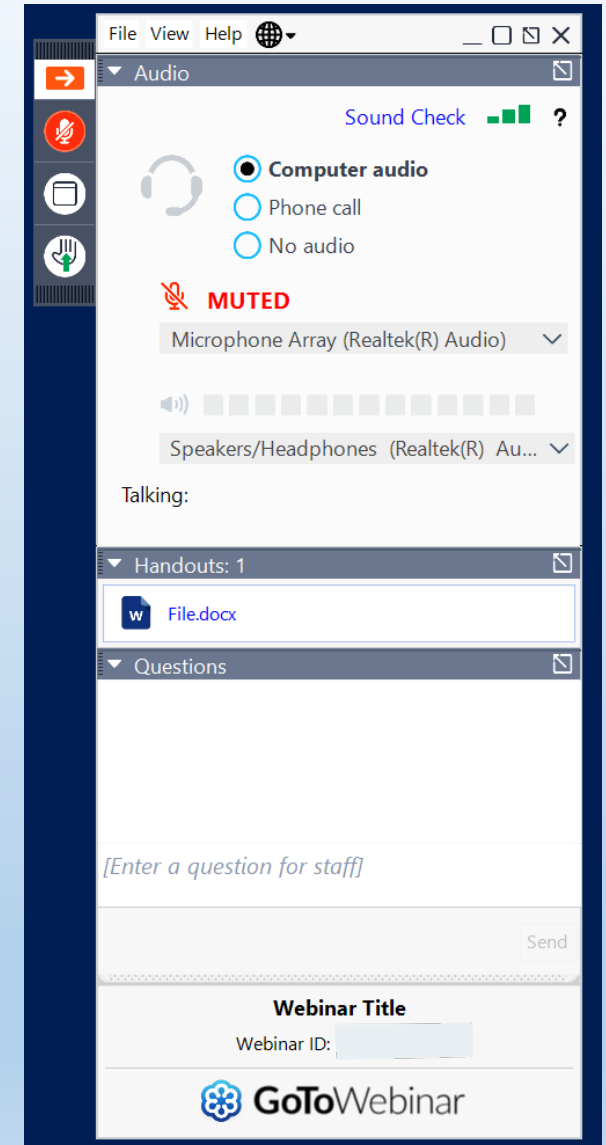
 Submit questions in the "Questions" pane

 Raise your hand if you would like to be unmuted

 Download files from the "Handouts" pane



Presented by the Institute for Tribal Environmental Professionals
American Indian Air Quality Training Program
Questions? Contact Darlene.Santos@nau.edu



Poll Question 1



- Which of the following best describes your role?
 - Environmental Staff
 - Community or Tribal Leader
 - Federal or State Partner
 - Tribal Housing Staff
 - Other

Poll Question 2



- How many years have you worked in Air Quality or Housing?
 - Less than a year
 - 1-3 years
 - 3-5 years
 - 5-10 years
 - Over 10 years

Poll Question 3



- What programs do you have to help community members with dry wood?
 - Up to the individual
 - Wood Delivery / Vendor Program
 - Wood yard / Wood bank
 - Help for building individual wood-sheds / pallets and tarps
 - Provide moisture meters

Poll Question 4



- What kinds of education and outreach materials does your tribe use?
 - None
 - Custom materials developed by tribal staff
 - EPA Burn-wise program materials
 - EPA Burn-wise materials customized for the tribe
 - K-12 Research Activities

Poll Question 5



What programs do you have to help community members with wood stove operation and maintenance?

- Chimney cleaning by a trained professional
- Gasket, door glass, stove brick replacement
- Home weatherization
- Stove replacements/upgrades
- None



Presenters

Glenna Lee
Navajo Nation



glennalee@navajo-nsn.gov

Eugenia Quintana
Navajo Nation



eugeniaquintana@navajo-nsn.gov

Johna Boulafentis
Nez Perce



johnab@nezperce.org

Wood Stove Outreach & Education Efforts on the Nez Perce Reservation

Johna Boulafentis, Nez Perce Tribe (NPT) Air Quality Program

Overview

- Effective Strategies
- Research Studies - targeted education outcomes
- Increase Awareness
- Translation/Action for Community
- Where Do We Go From Here?

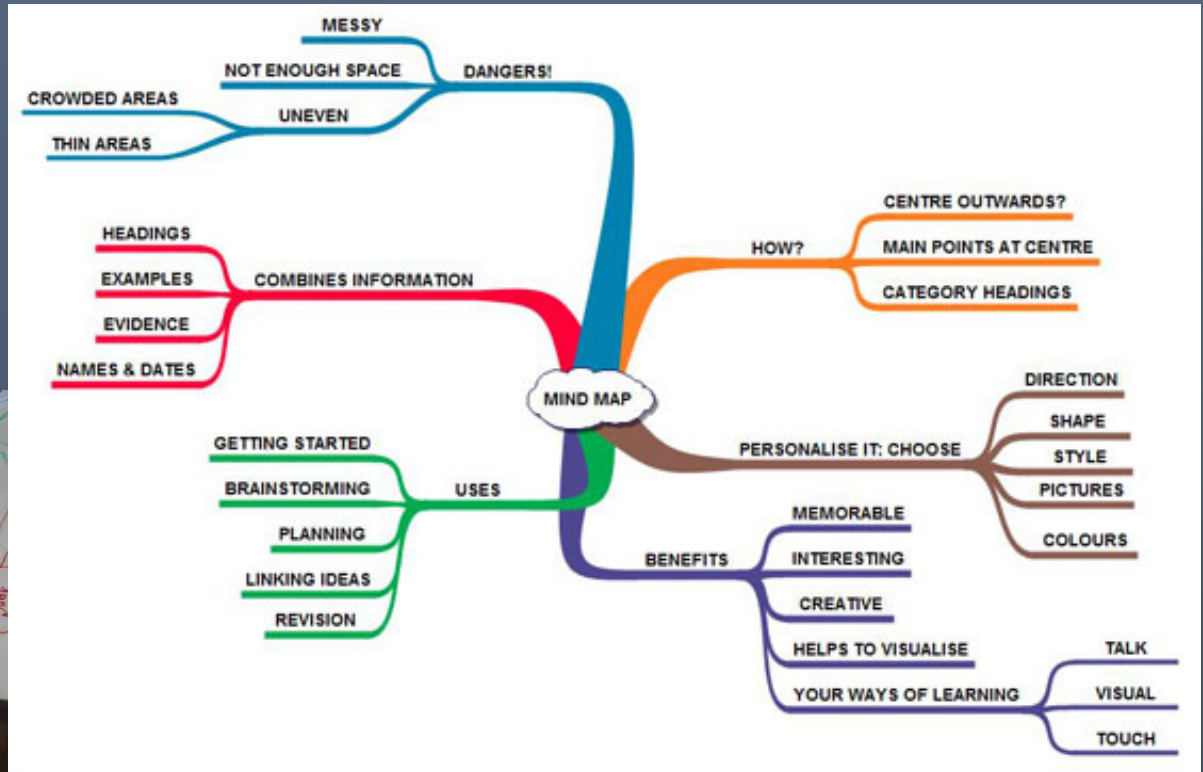
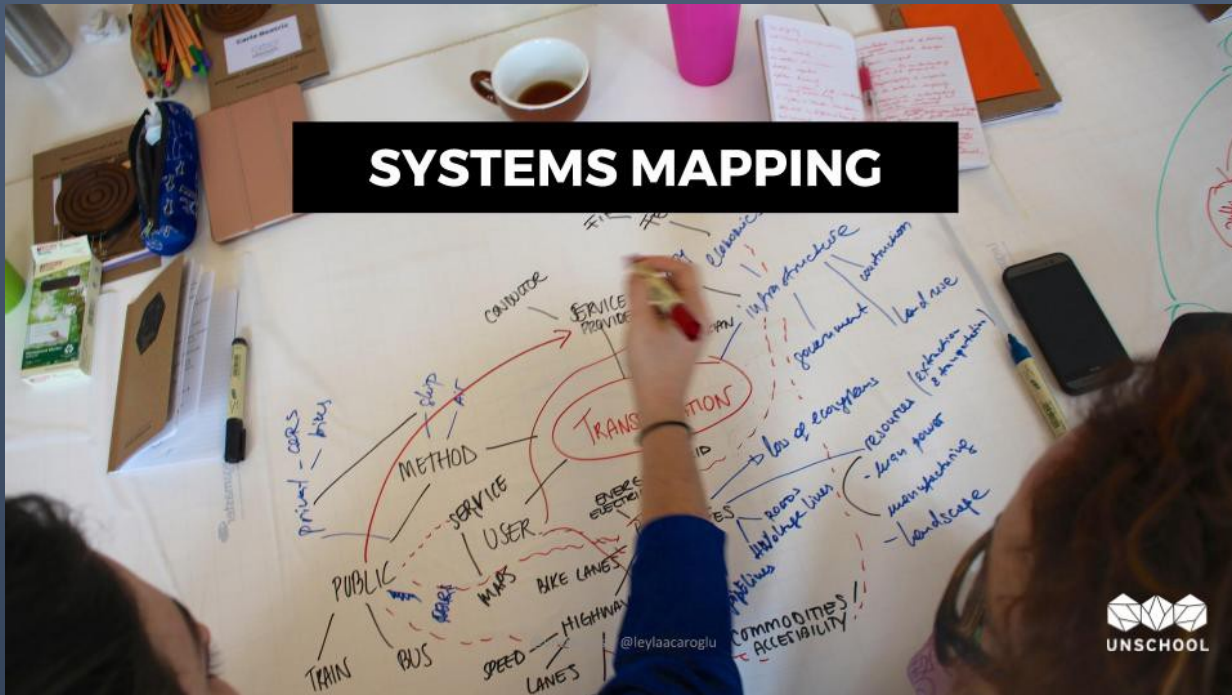
Effective Strategies - Engage your community

- Identify and gather input from people, groups, programs at your tribe
- Connect/gather input with wider community
 - Conversations at events, meeting
 - Community Advisory Committee/Board
 - Community based participatory research
 - Community based social marketing



Effective Strategies – Take a Bird's Eye View

- Mind Map
- Communications Plan



Effective Strategies- Slow & Steady



- Start small with short-term goals. We all need successes along the way to keep us going. Starting small also allows us to learn (make mistakes) and switch directions if needed.
- Culturally relevant and responsive approach – projects, materials
- Do an inventory of wood burning devices
- Develop a survey – memories, experiences, knowledge



Effective Strategies - Partnerships

Develop community/intra-tribal partnerships

- NPT Circle of Elders
- NPT Cultural Resources & Language Program
- NPT Forestry & Fire Management Division
- Nimiipuu Health Clinics
- NPT Housing Authority
- NPT Radio - KIYE
- NPT Seniors Program
- NPT Social Services



Develop external partnerships

- Agencies:
 - Other tribes
 - EPA
 - NIH, NIEHS
 - States & Locals: NW Air Quality Communicators www.airwatchnw.org/clean-home-heating/
 - Weatherization/Community Action Partnership
- Colleges/Universities:
 - Northwest Indian College – Nez Perce Sites
 - University of Montana
 - University of Tulsa
- Organizations/Workgroups:
 - ITEP (short-term and summer interns)
 - NTAA Wood Smoke Workgroup
Mariah Ashley: mariah.ashley@nau.edu
 - Residential Wood Smoke Working Group (SLT)
Larry Brockman: brockman.larry@epa.gov
 - Tribal Healthy Homes Network
<https://tribalindoorairfunding.org/>

R10 Tribal Clean Burning Workgroup (2009 – 2012)

Messages:

- Tradition
- Take Care
- Cost Savings

WET WOOD IS A WASTE

BURN DRY FIREWOOD TO SAVE MONEY AND HEALTH

Four Easy Steps to Dry Firewood



STEP 1
SPLIT



STEP 2
STACK



STEP 3
COVER



STEP 4
STORE



EPA 456/F-10-003

SMOKY FIRES ARE A WASTE

USE DRY FIREWOOD AND BURN EFFICIENTLY



Photo: Gary Bittle

Tips and Information to Save Money and Protect Your Family's Health

SMOKY FIRES ARE A WASTE

BURN EFFICIENTLY

3 Steps for Efficient Heating



STEP 1
START IT HOT*



STEP 2
ADJUST AIRFLOW SLOWLY



STEP 3
CREATE DRAFT TO REFUEL

*Note: Steps are for non-catalytic stoves. See the stove instruction manual (if available) for further details.

BURN WISE

How to Burn Wood Efficiently

- 1. START IT HOT**
 - ☐ Start with a small fire. Use dry kindling and a few pieces of wood (no more than 20% moisture content).
 - ☐ Completely open the damper or air control to give the fire plenty of air. Older stoves may need the door slightly open at startup.
 - ☐ Get the chimney or flue hot. Add kindling if necessary.
 - ☐ Gradually add larger pieces of split, dry firewood.
 - ☐ Close the door to heat the stove and flue (15-30 minutes depending on the stove).
- 2. ADJUST AIRFLOW SLOWLY**
 - ☐ Once the stove is fully-heated, add dry firewood.
 - ☐ Keep space between firewood when adding more fuel to the fire.
 - ☐ Gradually close the air controls because closing down too quickly can smolder the fire.
 - ☐ A smoldering fire, "dirty" glass doors or smoke from the chimney are all signs that the fire needs more air or that the firewood is too moist.
- 3. CREATE DRAFT TO REFUEL**
 - ☐ When more firewood is needed, fully open the air control to create a draft in the chimney first.
 - ☐ Open the door slowly to prevent smoke from entering the room.
 - ☐ Add wood and adjust burn rates by adding or reducing airflow.

For More Information Contact:

Nez Perce Tribe
ERWM Air Quality Program
208-843-9381 | 1-800-720-4089
www.nezperce.org | airquality@nezperce.org



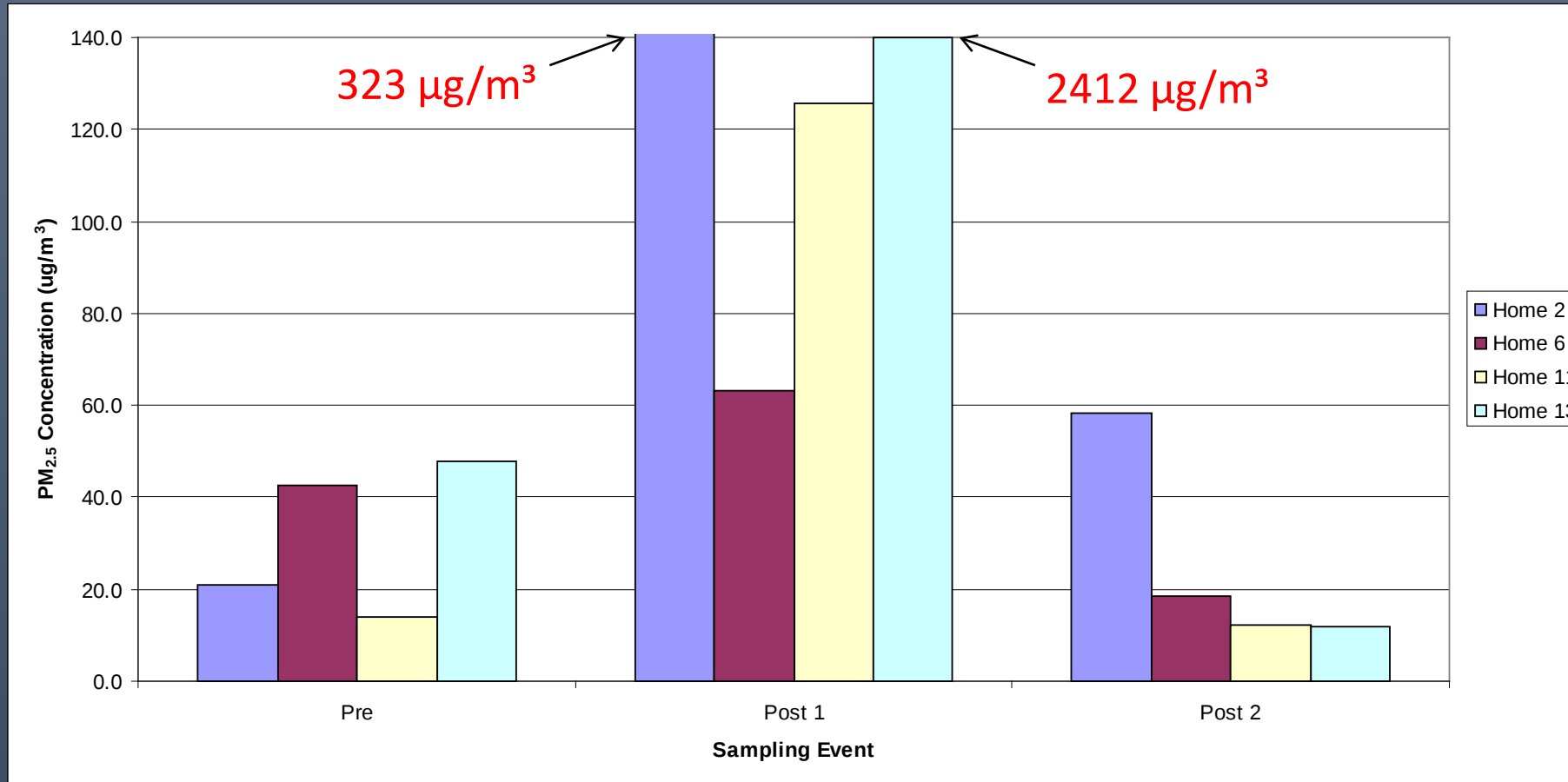
For digital copies, contact Erin McTigue at mctigue.erin@epa.gov

Wood Smoke Related Studies (2006 – 2014)

- Measurable Outcomes of a Woodstove Changeout on the Nez Perce Reservation (2006 – 2009)
- ARTIS (asthma randomized trial of indoor wood smoke) (2009-2011)
- Alternative Wood Fuel Study (2013 - 2014)
 - Phase 1: Woodstove Use, Home Heating and Health Effects: A Survey of Knowledge, Attitudes, and Behaviors in Tribal Communities
 - Phase 2: Briquette Pilot - Testing the Viability of an Alternative Woodstove Fuel



Indoor Particulate Matter 2.5 Levels Following Outreach & Education



EPA Outdoor
24-hr PM_{2.5}
standard:
35 ug/m³

Ward, T.J., Boulafentis, J., Simpson, J., Hester, C., Moliga, T., Warden, K., & Noonan, C.W. (2011). Lessons learned from a woodstove changeout on the Nez Perce Reservation. *Science of the Total Environment*, 409, 664-670.

New Woodstove Operation

1. This is not your old woodstove. Your new woodstove does not operate the same as your old woodstove.
2. Temperature, Temperature, Temperature is very important. Before you shut down your new woodstove, it must be hot.
3. With proper operation, the glass in the door will stay clear. Burning too cold, the glass will soot up. (If the glass is dirty, you may be shutting your burns down too soon) Also, burning too cold can cause excess creosote buildup in your chimney.
4. Clean the ashes out at least twice a month. You don't want the ash to build up past the front rail.
5. You must use dry, seasoned wood. Smaller pieces burn better and longer. (Wet wood traps moisture in the stove and puts the fire out)

Burning Tips

1. Starting a fire: Completely open the draft. Push the air control lever all the way to the left. The marking is H (maximum firing rate).
2. Temperature: Get the fire hot. You want the temperature to be between 500 and 600 degrees. May take from 20 to 60 minutes.
3. Shutting down: Once you get the fire hot, gradually begin closing the damper. Eventually, you want the lever all the way to the right on L because the stove works the best on "Low" (provided that the fire got up to between 500-600 degrees).
4. Reloading: completely open the draft. Move the lever to H (the lever all the way to the left). Get the temperature back up to between 500 and 600 degrees. Then, gradually begin closing the damper. See step 3 above.
5. Always keep the door closed when burning. This heater is not designed for open door burning.

-
- 1) **Do you have a woodstove or wood-burning fireplace in your home?** (Check & Circle one)
 - ☐ Yes (Woodstove/Fireplace)
 - ☐ No (Electric/Propane/Natural Gas/Other)
 - ☐ I have had one in the past
 - 2) **How much of the time is wood used to heat your home?**
 - ☐ None of the time
 - ☐ Some of the time
 - ☐ Most of the time
 - ☐ Almost all of the time
 - 3) **When you burn wood, what are the main reasons?** (check all that apply)
 - ☐ Saves money
 - ☐ Cannot afford the utility bill when using electric heat
 - ☐ More comfortable
 - ☐ Like the atmosphere and sound
 - ☐ Reminds me of tradition and cultural events
 - ☐ Only source of heat
 - ☐ Other: _____
 - ☐ Not Applicable
 - 4) **If you use a heat source other than wood, what are the main reasons?** (check all that apply)
 - ☐ Inconvenient or difficult to load wood, stoke fire
 - ☐ Inconvenient or difficult to pick up, then cut, stack and store the wood
 - ☐ Too much smoke or soot inside the house
 - ☐ Makes someone in the house cough or wheeze
 - ☐ Concerned about a new baby in the home
 - ☐ Concerned about an elder in the home
 - ☐ Other heating source is more convenient
 - ☐ Other: _____
 - ☐ Not Applicable
 - 5) **How often does someone in the home feel unwell when wood is burning?**
 - ☐ None of the time
 - ☐ Some of the time
 - ☐ Most of the time
 - ☐ Almost all of the time
 - 6) **What symptoms do they have when wood is burning?** (check all that apply)
 - ☐ Chest tightness
 - ☐ Wheezing
 - ☐ Coughing
 - ☐ Congestion
 - ☐ Light-headed or dizzy
 - ☐ Nauseous
 - ☐ Other: _____
 - 7) **If someone feels unwell when wood is burning, would you be willing to use different burning practices?**
 - ☐ Yes, I would be willing to
 - ☐ No, I will burn the same
 - ☐ Maybe
 - ☐ I already use different burning practices to reduce smoke if someone is unwell
 - 8) **In my experience, woodsmoke is:**
 - ☐ Not harmful
 - ☐ Somewhat harmful
 - ☐ Very harmful
 - ☐ Harmful only to certain people in my family
 - 9) **Please answer to the best of your knowledge:**
 - The small particles from woodsmoke can get stuck in your lungs
___ True ___ False
 - The gases from woodsmoke are not dangerous
___ True ___ False
 - Woodsmoke is harmful but the effects are not lasting
___ True ___ False
 - Woodsmoke enters your lungs, but not your bloodstream
___ True ___ False
 - Carbon monoxide is an odorless gas emitted by burning wood
___ True ___ False
 - People with high blood pressure or heart disease should avoid woodsmoke
___ True ___ False
 - People with diabetes should avoid woodsmoke
___ True ___ False

Residential Wood Smoke Interventions Improving Health in Native American Populations (2014 - 2021)



Community Level Intervention -Lapwai Wood Yard

Contact: Howard Teasley, NPT Forestry & Fire Management

2018 Wood Yard Video: www.youtube.com/watch?v=mLz8WWtkPgo&feature=youtu.be

Home Level: Health Measures & Indoor Air Sampling

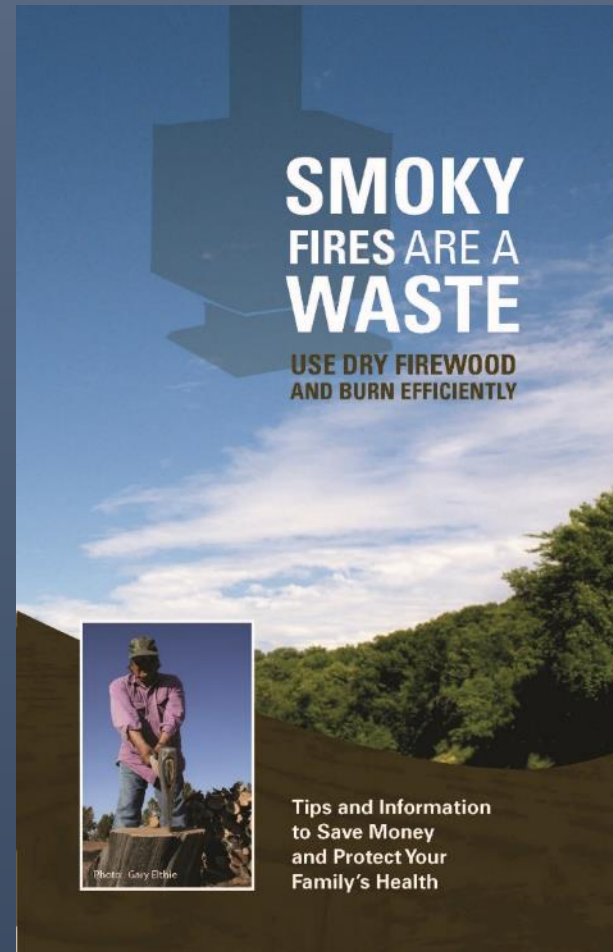


Air Filtration/Air Cleaner Intervention



Home Level Intervention – Dry Firewood & Stove Operation Education

- Digital stories combining Nimiipuu stories with Burn Wise messaging
 - [Introduction](#)
 - [How to Prepare Your Firewood](#)
 - [How to Optimize Your Wood Burning](#)
- EPA Burn Wise & Region 10 Tribal Clean Burning Workgroup Materials



Walters, K. L., Johnson-Jennings, M., Stroud, S., Rasmus, S., Charles, B., John, S., Allen, J.,...Boulafentis, J. (2018). Growing from our roots: strategies for developing culturally grounded health promotion interventions in American Indian, Alaska Native, and Native Hawaiian communities. *Prevention Science*, 21,54-64.

Home Level Intervention – Dry Firewood & Stove Operation Education

- Tools Provided:
 - Moisture meter
 - Stove thermometer
 - Fire starters
 - Pallets, tarp & straps to cover two cords
- Stove Maintenance Discussed:
 - Chimney cleaning
 - Stove pipe
 - Gaskets
 - Stove brick
- Qualitative & Quantitative Data – Pre & Post Intervention:
 - Knowledge, Attitude, and Behavior (KAB)
 - Activity log: traditional/Nimiipuu sources of smoke
 - Tool usage, wood moisture

Below is a summary of best burn practices that can be used to reduce wood smoke within your home:

How to treat your firewood before burning:

- Properly split your firewood (6 inches or less in diameter).
- Properly cover and store your firewood.
- Dry firewood for 6-12 months before burning.
- Use a *moisture meter* to test your wood.
- Only burn dry, seasoned wood (moisture content <20%).
- Wood can be conditioned inside for 2 days before burning.

How to optimally burn your firewood:

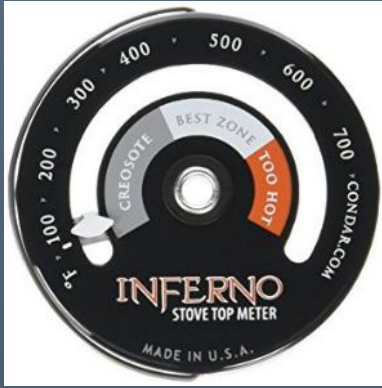
- Maintain a bed of ash just below the vent holes of the wood stove.
- Dry kindling, air movement, and *fire starter* can help you start a hot fire quickly.
- Small hot fires that burn for 20 to 30 minutes are key to reaching optimal burn temperatures.
- Use a *wood stove thermometer* to help you burn at optimal temperatures.
- Before reloading, it is important to allow the fire to burn for 20-30 minutes or until optimal temperatures are reached.
- Do not burn items other than wood (e.g., trash, cardboard, etc.).

Additional tips:

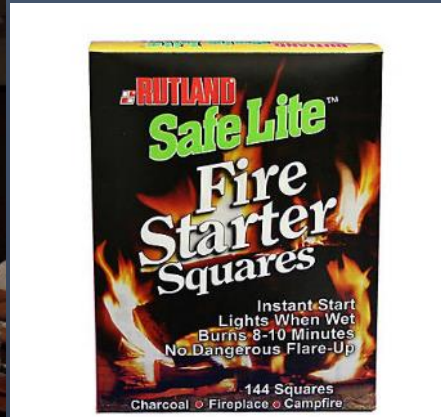
- Crack a window/door on the same level when starting a fire.
- Check your chimney 20-30 minutes after starting a fire to verify that minimal smoke is emitted.
- It is important to clean your flue and chimney frequently!
- If possible, determine wood stove model and locate manual.
- Review the videos occasionally for a refresher.

Finally, don't forget to use your new moisture meter, fire starters, and stove thermometer!

Community Level – Education: Firewood Coverage & Stove Operation Classes (Sep – Oct 2017 & 2018)



All About Firewood Part I: Lunch Class



Partnership with the Nez Perce Tribal Housing Authority

Community Level – Education: Dry Firewood Classes (Sep – Oct 2017 & 2018)



All About Firewood Part II: Dinner Class - Build a Wood Shed

Community Level – Education: Wood Burning PSA in nimipuutímt, the Nez Perce Language, and English (May 2019)

Partners

- Nez Perce Tribe Language Program & student speakers
- Air Quality Program
- Nimiipuu Health
- KIYE 88.7 & 105.5 FM:
<http://listen.streamon.fm/kiye>
- PSA Audio:
<https://app.box.com/s/kkpysu0dwrddqqjo89r5qedt7ehb8npcd>

Split, Stack, Cover, Store – 75 seconds

Child: *Nimipuutímt Wéetmet tukúupnu' siléq'is héecu.*

Don't Burn Wet Wood! Burning Wet Wood is a Waste!

AVO: Using wet wood in a wood-burning stove or fireplace can create excessive smoke. It's also wasted fuel. Burning dry, seasoned firewood with a moisture content of 20 percent or less can save money and help reduce harmful air pollution- indoors and out.

Child: *Nimipuutímt kúnk'u qiy'aw'iisna hecúune 'a'álix!*

Always burn dry wood! Here's four simple steps to drying firewood:

AVO: One - Split wood for faster drying . Two - Stack wood split side down and away from buildings. Three - Cover top of the stack to protect it from rain or snow. And four - Store and dry wood for 6 to 12 months.

AVO: Make the most of your firewood – think ahead. Gather in early summer and collect enough wood for two winters.

Child: *Nimipuutímt: timíipn'i wéwpe'x, híi'lamx, wiyéen'ix, kaa kúnk'u qiy'aw'iisna hecúune 'a'álix!*

Remember to split, stack, cover, and store your firewood. Always burn dry wood.

AVO: For more tips on wood burning, visit [www dot E P A dot gov forward slash burn wise \(www.epa.gov/burnwise\)](http://www.epa.gov/burnwise).

Adapted from EPA Burn Wise

Other Outreach Avenues

- Mailings
- Articles – Housing Newsletter
Tribal Newspaper
- Community Events
- Local Television
- Social Media

Previous studies on the Nez Perce Reservation show that homeowners can reduce wood smoke and increase the efficiency of their stoves. Partnering with three other tribes in the Northwest & EPA, we created the enclosed booklet to help you make the most of your wood fuel.

1. **"Wet Wood is a Waste – Burn Dry Firewood":** Think ahead – stockpile your firewood for future winters! **Burn wood dried for at least six months.**
2. **"Smoky Fires are a Waste – Burn Efficiently":** As crazy as it sounds – when looking at a chimney with a stove burning efficiently – **little to no smoke comes out of the pipe.**

Tribal wood burning experiences are part of a national movement to "Burn Wise."
Visit EPA's Burn Wise website www.epa.gov/burnwise, Facebook and Twitter for more information.

Where do we go from here?

- WHERA (Wood Heaters Emissions Reduction Act) – national change out program like DERA
- Tribal training for chimney sweeping
- HEPA filter air cleaners/DIY Filter Fans for wood smoke
- Hybrid home combo wood stove with ductless electric heat pumps
- Briquettes/compressed wood logs
- Monitoring – affordable sensors – indoor & outdoor
- Create more infographic and digital material (Canva, YouTube/Vimeo Channel)

Qe'ci'yew'yew!

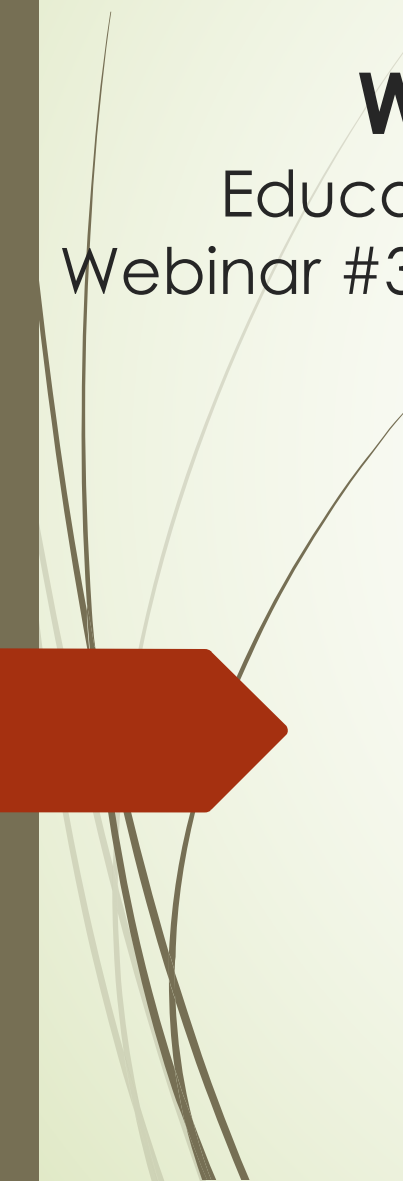
Johna Boulafentis, Nez Perce Tribe ERWM Air Quality Program

johnab@nezperce.org | 208.621.3821

Woodstoves in Indian Country

Education and Outreach for Tribal Communities

Webinar #3 – Institute for Tribal Environmental Professionals



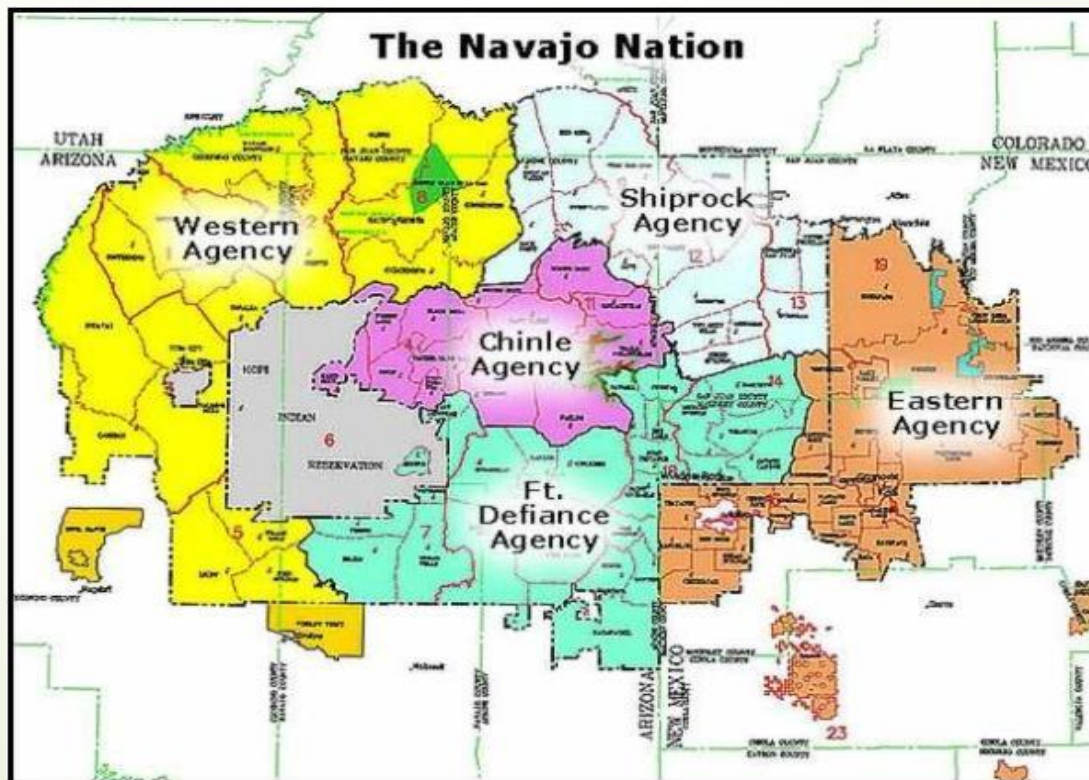
December 15, 2020

By Eugenia Quintana & Glenna Lee

Navajo Nation Environmental Protection Agency

Fort Defiance Agency

- 27 Chapters
- Population: 63,138 (2010 Census)
- 3,211,317 acres
- 3,845 grazing permittees
- IAQ Study, Navajo Nation and University of Montana



Prevalence of Woodstove Use

- 62% of homes use wood for heating (2011 Census Bureau)
- 14% - Natural gas
- 11% - Propane
- 11% - Electricity
- 2% - Other such as kerosene, fuel oil
- 89% - estimated by NHA
- Coal Use unknown



Outreach Focus

➤ What is on hand?

1. Interest
2. Willingness, openness to listen
3. Opportunities for behavior changes
4. Minimum cost to no cost for information



Outreach Materials

- Developed posters that looked into burning habits
- Developed outreach material to help educate community members on proper burning techniques
 - Live read PSA, website, and a flyer



Wood and Coal Stove Household Use

Navajo Nation EPA Air Quality Control Program & Operating Permit Program
 Post Office Box 525, Fort Defiance, AZ 86504 Ph: 512 New St, Bldg # 2837
 Telephone (520) 729-4096 Fax (520) 729-4033 Email: aqc@navajonation.gov
www.navajonation.gov/air-quality.html



Stove Maintenance



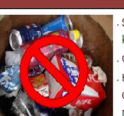
Certified chimney sweep and maintenance professional recommended
 Clean chimney, remove build up
 Check seals around stove, repair or replace if needed
 Check chimney for clogs, cracks and repair

Dry Firewood



Split wood
 Stock in rows face side down off the ground & away from buildings
 Cover and keep dry/allow for air circulation
 Store for 6 to 12 months depending on type of wood

Burning Tips



- Start fires with newspaper or dry kindling
- Only burn dry seasoned wood
- Remove ashes and place in a metal container outside
- Do not burn household waste

EPA Certified Wood Stoves



- Uses 1/3 less wood but still provides same amount of heat
- Little to no smoke
- Decrease buildup in chimney
- Reduce exposure to toxic pollutants by reducing particulates in homes

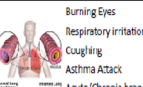
Wood and Coal Use on the Navajo Nation



Stoves are not made to properly burn coal or wood which leads to poor indoor air quality.

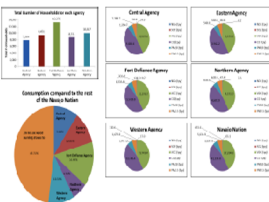
BHP Billiton and Peabody Western Coal mines both provide public distribution of coal during winter months.

Potential Health Effects



Burning Eyes
 Respiratory irritation
 Coughing
 Asthma Attack
 Acute/Chronic bronchitis disease
 Irregular heartbeat
 Heart attack/cardiac arrest
 Premature death in people with lung or heart disease

Residential Wood use on the Navajo Nation



Total number of households each agency
 Consumption compared to the rest of the Navajo Nation

Residential Coal use on the Navajo Nation



Total # of households for each agency
 Consumption compared to the rest of the Navajo Nation

Outreach Efforts

Collaborating with U.S. EPA Region 9 to develop outreach material addressing wood/coal use on the Navajo Nation
 Developing a survey to compile data recording the use of wood/coal on the Navajo Nation.



Tips for Cleaner Stoves and Healthier Homes

Fire is sacred and should be treated with respect inside Navajo homes. Follow these guidelines to minimize smoke and protect your health when using the family stove.

- Clean and repair your stove and chimney.**
 Repair cracks or gaps and clean your stove and chimney regularly to ensure a safe fire and to keep your family warm.


- Burn the right fuel.**
 Burn only dry, seasoned wood in a wood-burning stove and clean, high-quality coal in a coal stove. Never burn trash, tires, or combustible liquids like gasoline or lighter fluid.


- Ensure proper ventilation.**
 Ensure that your stove pipe and chimney vent properly so smoke is directed outdoors. Keep the stove door closed tightly when a fire is burning to avoid releasing harmful smoke into your home.


- Use smoke detectors and carbon monoxide alarms.**
 These devices help make your home safer for you and your family. Test regularly to ensure proper functioning.






For more information on how to heat your home safely, go to NavajoNationEPA.org/AirQuality.





Thank you. Ahxehee'



Navajo Nation Environmental Protection Agency
Air & Toxics Department
PO Box 339
Window Rock Arizona 86515
928-871-6790
www.navajoepa.org



COVID and PM Exposure

Scientists collecting evidence...

“...air pollution has significantly worsened the COVID-19 outbreak and led to more deaths than if pollution-free skies were the norm.”





COVID and PM Exposure

Incidence of COVID-19 and Connections with Air Pollution Exposure : Evidence from the Netherlands

- PM 2.5 is a highly significant predictor of the number of confirmed COVID-19 cases and related hospital admissions.
- Estimates suggest that expected COVID-19 cases increase by nearly 100 percent when pollution concentrations increase by 20 percent.

<https://openknowledge.worldbank.org/handle/10986/33664#:~:text=The%20results%20show%20that%20atmospheric,cases%20and%20related%20hospital%20admissions>



COVID and PM Exposure

Air pollution and COVID-19 mortality in the United States: Strengths and limitations of an ecological regression analysis

- A small increase in long-term exposure to $PM_{2.5}$ leads to a large increase in the COVID-19 death rate

Resources



U.S. EPA Burn Wise

- <https://www.epa.gov/burnwise>

Courses:

- NAU ITEP Webinar Trainings
 - https://www7.nau.edu/itep/main/training/training_air



Thank you for joining today's webinar!

Questions: mansel.nelson@nau.edu