

National Indian Health Board



Climate Change and Indoor Air Quality

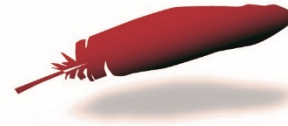
HOST

NATIONAL INDIAN HEALTH BOARD (NIHB)

BREANNON BABEL, PHD, MPP, MPH

SENIOR PUBLIC HEALTH PROGRAM MANAGER

National Indian Health Board



Mission Statement

Established by the Tribes to advocate as the united voice of federally recognized American Indian and Alaska Native Tribes, NIHB seeks to reinforce Tribal sovereignty, strengthen Tribal health systems, secure resources, and build capacity to achieve the highest level of health and well-being for our People.



- Recorded and posted online
- Please keep phone lines muted
- Questions
 - End of all presentations
 - Use the chat box (not Q&A box)
- Survey

Climate Ready Tribes Initiative

- Provide funding and support for Tribes to conduct local climate and health work



Awardees Include

First cohort

Blackfeet Nation
Swinomish Indian Tribal Community
Village of Wainwright


New cohort

Kaw Nation (mini-award)
Lummi Nation
Pala Band of Mission Indians
Sitka Tribe of Alaska

Climate Ready Tribes Initiative

- Share information and resources nationally

National Indian
Health Board



Climate Change & Tribes: Exploring Current Impacts and Future Predictions for America's First People

January 14, 2019

Imagine a world where one Arctic summer per decade is too warm to support the sea ice that helps maintain our global ecosystem and environment, directly impacting the people and animals of these far north communities. A world where coral reefs, once bustling with the rich diversity of sea life, have all but completely disappeared from the oceans. A world where mass global migration from tropical areas leads to a drastic

NIHB Resources

Sign Up for Email Updates

For Email Marketing you can trust.

Articles

- [Climate Change & Tribes: Exploring Current Impacts and Future Predictions for America's First People, 1/14/19](#)

Tribal Climate Champions Spotlights

- [Spotlight on Gila River Indian Community, 1/9/19](#)
- [Spotlight on Blackfeet Nation, 5/29/18](#)
- [Spotlight on Village of Wainwright, 1/10/18](#)
- [Spotlight on Swinomish Indian Tribal Community, 12/1/17](#)

Webinars

- **6/12/18**
Including *Indigenous Health in Climate Change Assessments: Overview of Methods and Results from Swinomish*
[Read Description](#) | [Watch Recording](#) | [View Slides](#)
- **1/25/18**
Climate Change and Health in the Arctic: Impacts on Alaska Native Communities and a Spotlight on Efforts to Improve Climate Health
[Read Description](#) | [Watch Recording](#) | [View Slides](#)
- **7/17/17**
Climate and Health in Indian Country
[View Slides](#)
- **4/20/17**
CDC Climate and Health 101
[View Slides](#)

Climate and Health in Indian Country Fact Sheet

[View Fact Sheet Here](#)

Climate Ready Tribes Initiative

- Share information and resources nationally

[Climate & Health Learning Community](#)

- Over 800 members
- Opportunities to share and learn
 - Webinars (like this one!)
 - In-person event at Tribal Public Health Summit
- Professional development certificate

National Indian Health Board



Gillian Gawne-Mittelstaedt, MPA

DIRECTOR, TRIBAL HEALTHY HOMES NETWORK
PROGRAM COORDINATOR, TULALIP AIR AND
INDOOR ENVIRONMENTS PROGRAM
DRPH STUDENT, UNIVERSITY OF ILLINOIS AT
CHICAGO

TRIBAL HEALTHY HOMES NETWORK



Clean Air. Safe Homes. Healthy Lives.

WILDFIRE SMOKE: MITIGATING EXPOSURE THROUGH OUTREACH AND AN EVIDENCE- BASED PUBLIC HEALTH RESPONSE

Gillian Mittelstaedt, MPA, DrPH Student, University of Illinois at Chicago

Executive Director, Tribal Healthy Homes Network

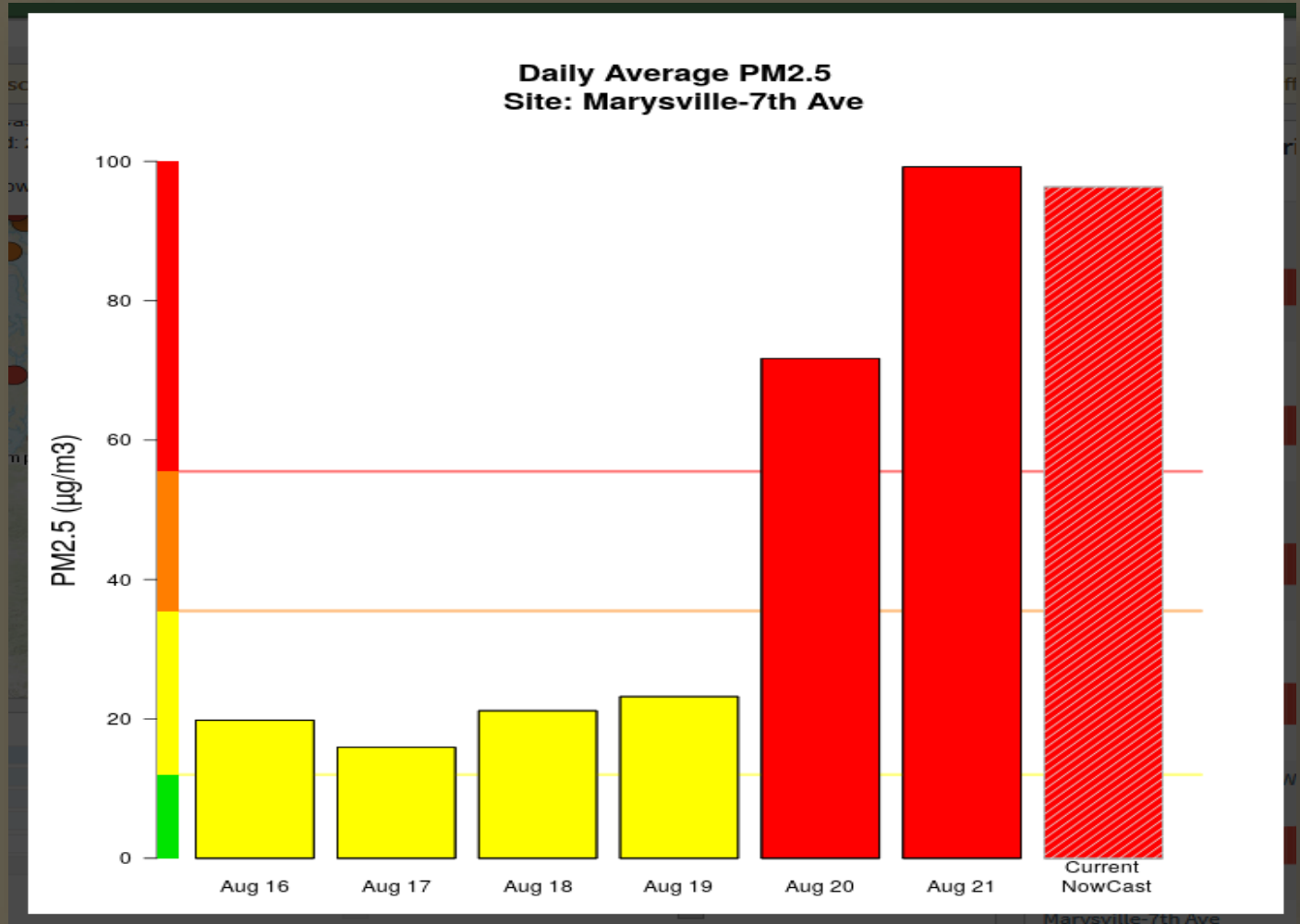
www.thhnw.org

The new norm:

Acute exposure to fine particle air pollution, PAHs and combustion gases.

Chronic exposure is no longer our only public health challenge.

Morbidity and mortality is impacted by the shift from chronic to acute.



A PUBLIC-HEALTH “QUICK-START” GUIDE
TO WILDFIRE SMOKE OUTREACH

One-page fact sheet with links to key to wildfire smoke outreach resources, principally by EPA, but also from CDC and other partners.

- Tribal Web Page
- Tribal Social Media Sites
- Tribal Newspaper (digital version)



A Public Health “Quick-Start” Guide to Wildfire Smoke Outreach

For Tribal Air Quality, Public Health and Clinical Medicine Professionals

MASKS AND RESPIRATORS

- For General Public: [Fact Sheet on Respirator Use during Wildfires](#) – Fact sheet from EPA
- For General Public: [Infographic on Respirator Use and General Protective Actions](#) – Infographic from EPA
- For Public Health and Healthcare Providers: [Respirator Use Guidance](#) – From National Institute for Occupational Safety and Health
- For Employers: [Wildfire Smoke and Dust Masks at Work](#) – Fact sheet from WA Dept of Labor & Industries

FILTRATION OF INDOOR AIR

- For General Public: [Indoor Air Filtration Fact Sheet](#) – Fact sheet from EPA
- For Air Quality and Public Health Professionals: [Guide to Air Cleaners in The Home](#) – Detailed Guidebook Published by EPA, July, 2018 (2nd edition)
- For All Audiences [“How-To” Video for Building DIY Air Filters](#) – Video by Puget Sound Clean Air Agency

MESSAGING ON HEALTH EFFECTS

- For Public Health Professionals: [Wildfire Smoke Guide for Public Health Professionals](#) – Comprehensive guide written by CDC, EPA, US Forest Service and California Air Resources Board (CARB)
- For General Public: [“Wildfire Fact Sheet: Reduce Your Smoke Exposure”](#) – Fact sheet from EPA and Federal Partners
- For Healthcare Providers: [Particle Pollution and Your Patient’s Health](#) – Online course for physicians, pediatricians, nurse practitioners, nurses, asthma educators, pulmonary specialists, cardiologists, etc.
- For Healthcare Providers: [Heart Disease, Stroke and Outdoor Air Pollution](#) – Fact sheet from EPA, American College of Cardiology and American Heart Association

PROTECTION OF OUTDOOR WORKERS

- For Employers - [Protecting Outdoor Workers Exposed to Smoke from Wildfires](#) – A publication by California Dept of Industrial Relations

GENERAL GUIDANCE

- For Air Quality and Public Health Professionals: [EPA Smoke-Ready Toolbox](#) – A compilation of resources, web sites, apps, and fact sheets on all-things wildfire by EPA and Federal Partners
- For Air Quality and Public Health Professionals: [Smoke From Fires](#) – A compilation of resources, web sites, and fact sheets on all-things wildfire from a state health department
- For Tribal Community (example): [Tribal Web Page with Smoke-Ready Information](#) – A webpage and resource of and for the Colville Tribal Community.
- For General Public: [Household Preparation for Wildfire Season](#) – A fact sheet from EPA

A “QUICK-START” COMMUNITY PRESENTATION ON WILDFIRE SMOKE ACTION STEPS

- ✓ Intended for use in conjunction with specific EPA and Federal Fact Sheets (all linked)
- ✓ Doesn't require a script, training or subject-matter knowledge by the presenter
- ✓ Can be used as two-sided handouts or as slide presentation
- ✓ Audiences: elders, lung/COPD patients, asthma patients/caregivers, early childhood education staff, boards/councils, parent groups, etc.

A public health message from the Tribal Healthy Homes Network, an EPA-funded coalition of tribal air quality and public health professionals dedicated to safer indoor environments. For more information: www.thhnw.org

What Path to Safety?

Five Steps to Smoke Safety for You and Your Family During Wildfire Season...



1

Wildfire smoke is toxic¹...and sometimes troublesome. It finds its way inside our homes, our heart and lungs, bloodstream, even our brains. At high levels, it can even put us in the hospital. But it doesn't have to...

Take a few minutes to empower and protect yourself through these five, scientifically based steps.

2



2. Slow down.

Reduce your exposure by reducing your overall activity.

5



2. Slow down.

- ✓ The more active you are, the higher your respiration rate. In turn, the more you breathe, the more smoke you inhale.
- ✓ Errands, heavy labor, strenuous exercise...even light housework... consider *doing less* until the air quality improves.
- ✓ If you, your family or your children need to be active (as we all do at times), look for alternatives, like YMCAs, gyms, or community centers that have an air filtration system.
- ✓ If you have COPD, keep it low key until the air quality improves...avoid heavy labor, avoid frying foods, ask friends for help with errands.

 To learn more about the health impacts on children, see the EPA and American Academy of Pediatrics [guidance on protecting children from wildfire smoke and ash](#).

6



3. Know Your Numbers.

Use a website, app or the news to track air quality levels.

7



3. Know Your Numbers *(and your colors).*

- ✓ The Air Quality Index (AQI) is a scale between 0 and 500 and represents current air quality conditions.
- ✓ Tribal, state and federal air quality agencies use the AQI to communicate with us about air quality and its relative safety – or risk.
- ✓ The higher the number, the more important it is to modify your day...to reconsider what you do, where you go, where you stay.
- ✓ To know the numbers (and colors) in your area, make a daily habit of checking your preferred websites, apps or local news.
- ✓ Sign up for a program that emails you daily, local, real-time air quality info, such as [AirVisual](#)



To get started, check out [EPA's AirNow website](#)

Air Quality Index (AQI) Values	Levels of Health Concern
When the AQI is in this range:	...air quality conditions are:
0 - 50	Good
51 - 100	Moderate
101 - 150	Unhealthy for Sensitive Groups
151 - 200	Unhealthy
201 - 300	Very Unhealthy
301 - 500	Hazardous

8



4. Use a Mask.

Protect yourself, when outside, with a mask.



4. Use a Mask.

- ✓ If you must go outside (or if you work outside) when air quality is poor, a mask can reduce your exposure.
- ✓ The key to protection is wearing the *right* mask (an N-95 or N-100), the *right* way. Proper fit is essential.
- ✓ Have heart or lung disease? Talk to your doctor before wearing a mask.
- ✓ Know that masks are not designed to fit young children or adults with facial hair, which may prevent a proper fit.



📍 To get started on learning about proper mask type and fit, check out [EPA's respirator guidance](#).



5. Filter Your Air.

Create your own “clean room” with filters and fans.



5. Filter Your Air.

- ✓ During wildfires, very small particles and odorless gases from the smoke, such as Carbon Monoxide, can enter our homes. (Every home and apartment is different, but up to 70% of pollutants in the outdoor air are also found inside our homes.)
- ✓ In addition to keeping windows and doors closed, filtration of the air in your home will keep you safer and more comfortable on smoky days.
- ✓ High heat is also a risk factor, so creating your “clean room” may also involve an air conditioner or swamp cooler.



To get started, look at [EPA's guidance on filtration options for your home](#), or this [guidance on building your own](#) (very effective) air cleaner, using just a box fan and a furnace filter, for around \$40.

TULALIP TRIBES HEALTH ADVISORY NETWORK AND DISTRIBUTION SYSTEM FOR AIR QUALITY EVENTS

DRAFT PROCESS AND MATERIALS

July, 2018

*Air Quality
Level*



**Air & Indoor
Environments**

**Community
Health**

Health & Safety

Vulnerable
Populations via
Clinicians, Liaison,
CHWs

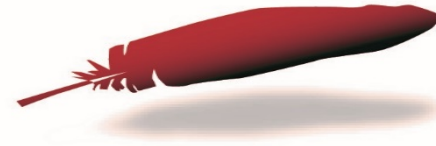
Schools & TELA via
Nurses,
Coordinators

Community-at-large
via Media Channels

Flag Notification
System

Office & Work Sites,
via Building
Maintenance Staff

National Indian Health Board



Orly Stampfer, MPH

INTERN, TULALIP AIR AND INDOOR
ENVIRONMENTS PROGRAM
UNIVERSITY OF WASHINGTON PHD STUDENT IN
THE DEPARTMENT OF ENVIRONMENTAL AND
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Air Monitoring

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TRIBAL HEALTHY HOMES NETWORK

Clean Air. Safe Homes. Healthy Lives.

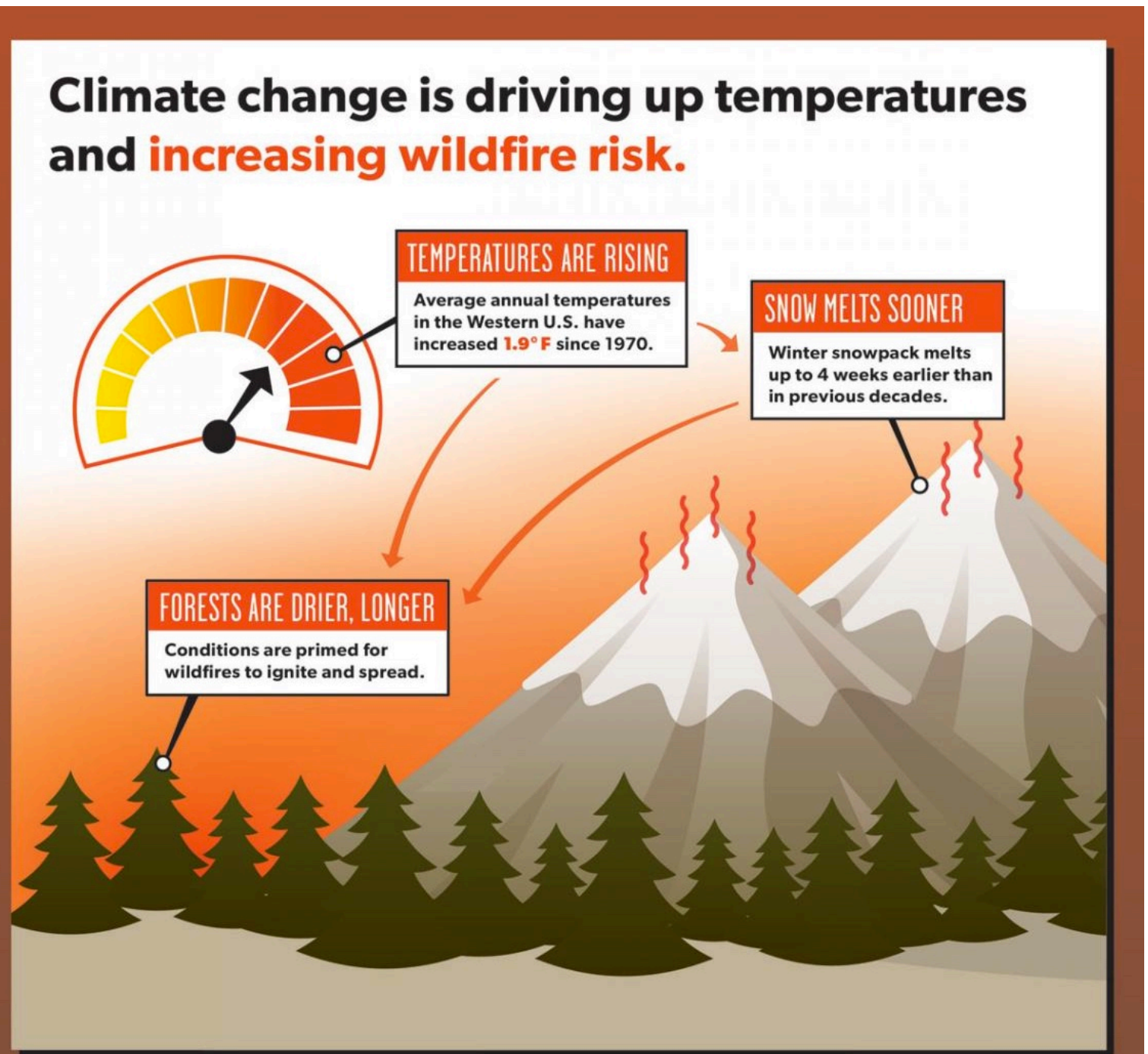
W ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES
UNIVERSITY of WASHINGTON | SCHOOL OF PUBLIC HEALTH

This project was supported by a DEOHS Boeing Focal Award.


Climate change and wildfires

Section of infographic from the Union of Concerned Scientists

<https://www.ucsusa.org/global-warming/science-and-impacts/impacts/infographic-wildfires-climate-change.html>



Why do we care about indoor air monitoring during periods of wildfire smoke?

Keep indoor air as clean as possible if you are advised to stay indoors. Keep windows and doors closed. Run an air conditioner, but keep the fresh-air intake closed and the filter clean to prevent outdoor smoke from getting inside. If you do not have an air conditioner and it is too warm to stay inside with the windows closed, seek shelter in a designated evacuation center or away from the affected area. [Learn more about reducing your smoke exposure indoors.](#)  [819 KB] [↗](#)

(CDC, 2018)

Poor air quality: Even healthy adults advised to stay indoors, avoid walking outside

POSTED 10:05 AM, AUGUST 15, 2018, BY [Q13 NEWS STAFF](#), UPDATED AT 10:07AM, AUGUST 15, 2018

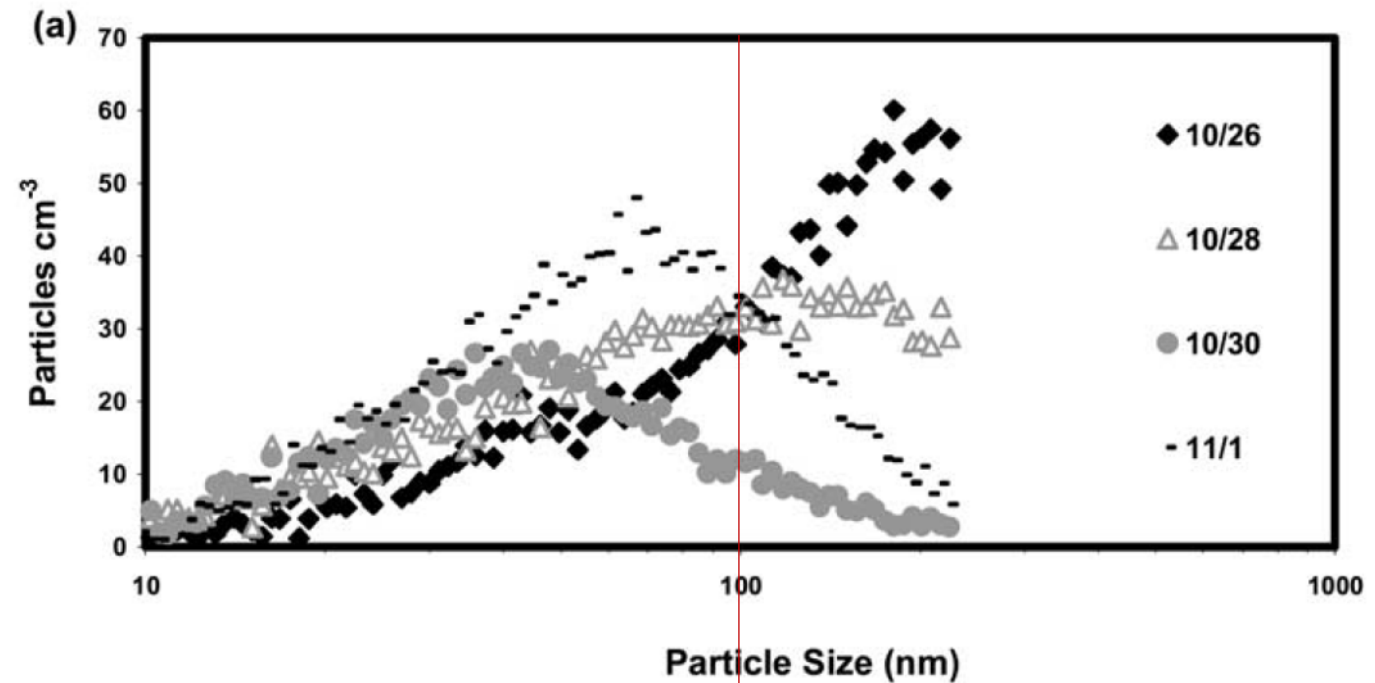
'Stay Indoors': Unhealthy Air In Puget Sound Will Stay For Days

Stay indoors if you can. That's what the Puget Sound Clean Air Agency recommends due to wildfire smoke swamping the region.

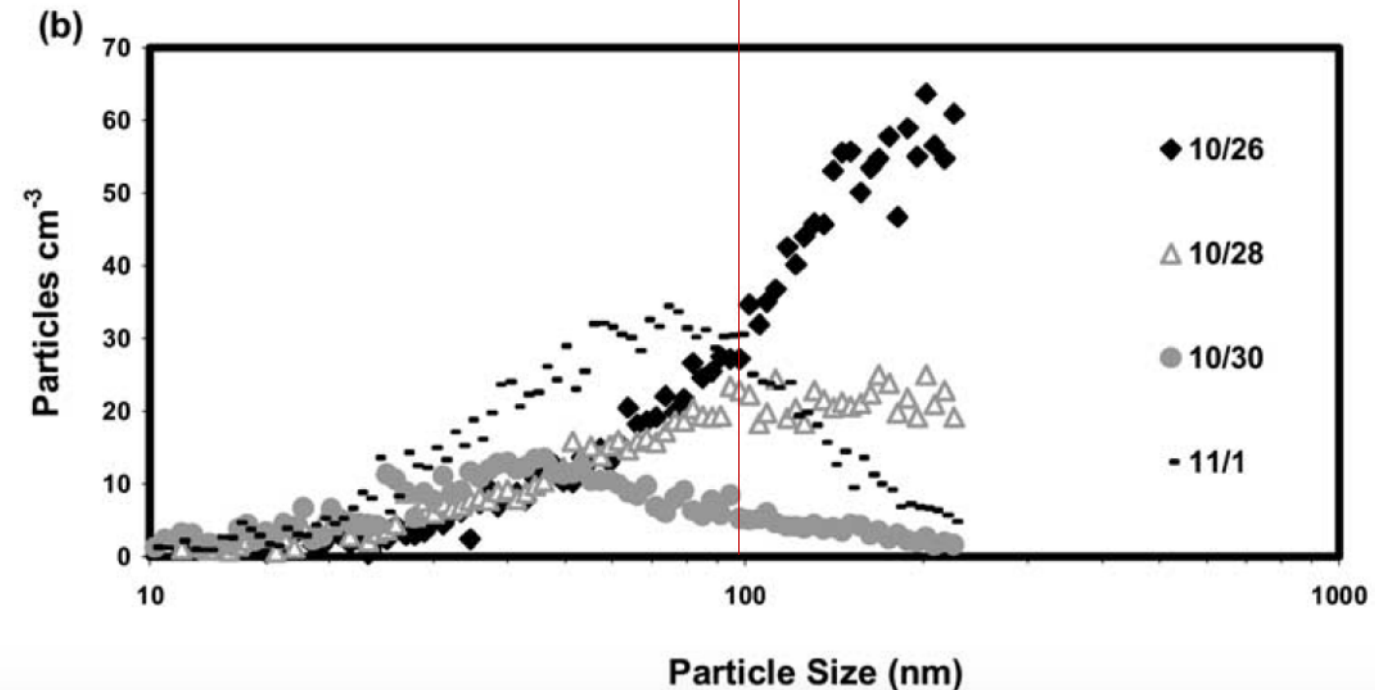
By Neal McNamara , Patch Staff | Aug 20, 2018 10:30 am ET | Updated Aug 20, 2018 11:02 am ET

Levels of particles sized >100 nm (0.1 μm) were very similar between indoor and outdoor locations during and after periods of wildfire smoke (Phuleria et al, 2005)

Outdoor



Indoor



Journal Of Geophysical Research, Vol. 110, D07S20,
Doi:10.1029/2004jd004626, 2005

Air quality impacts of the October 2003 Southern California wildfires

Harish C. Phuleria and Philip M. Fine

Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, California, USA

Yifang Zhu

Department of Environmental Health Sciences, University of California, Los Angeles, California, USA

Constantinos Sioutas

Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, California, USA

Community clean air shelters

- Maintain better indoor air quality
- Convenient location
- Lack of evidence on effectiveness



Purple Air monitor set up in the Teen Center gym. Photo by Gillian Mittelstaedt.

Placement of monitors

- ⑩ Inform children's exposure
- ⑩ Potential clean air shelter
- ⑩ Compare different areas

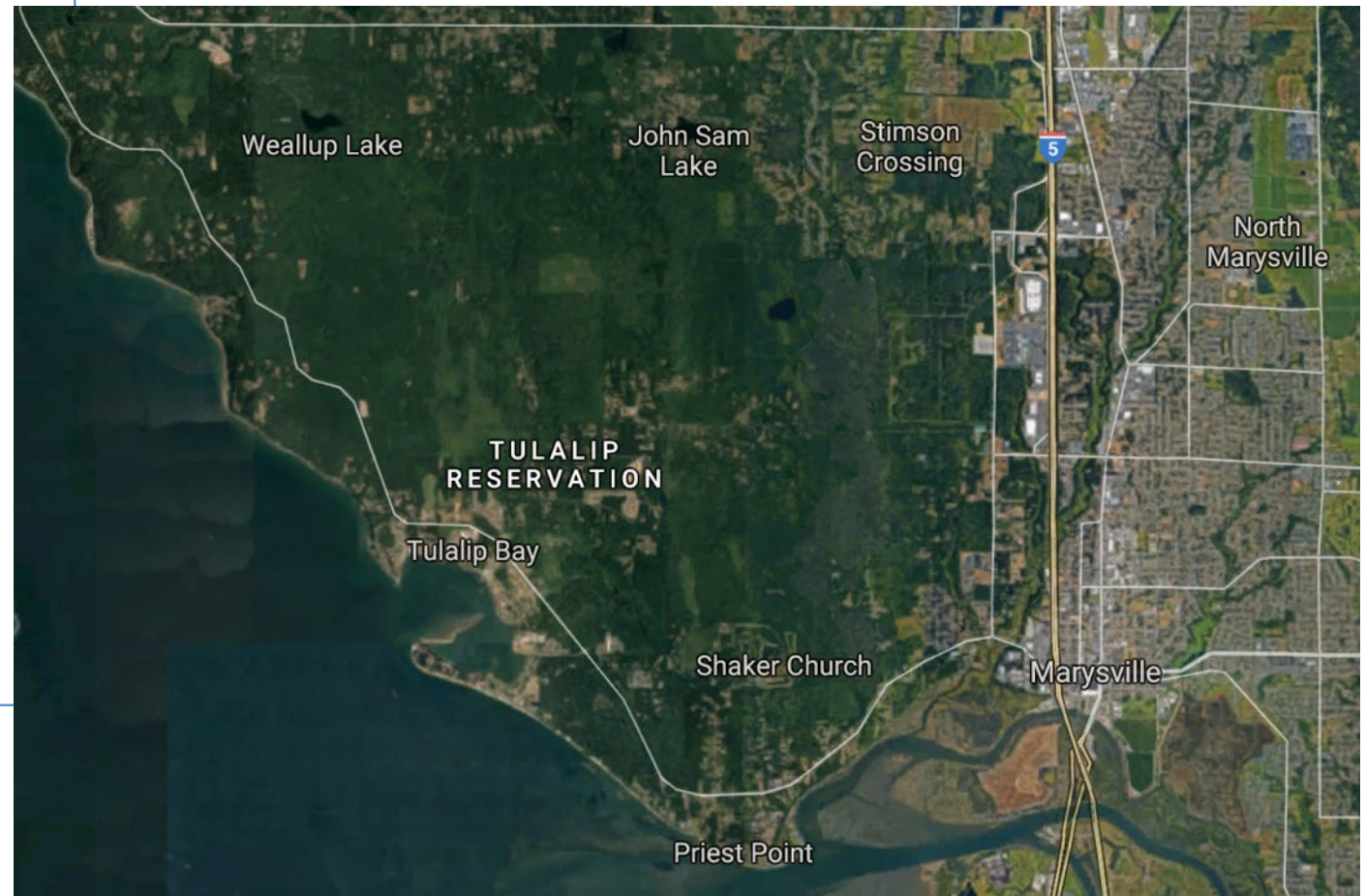
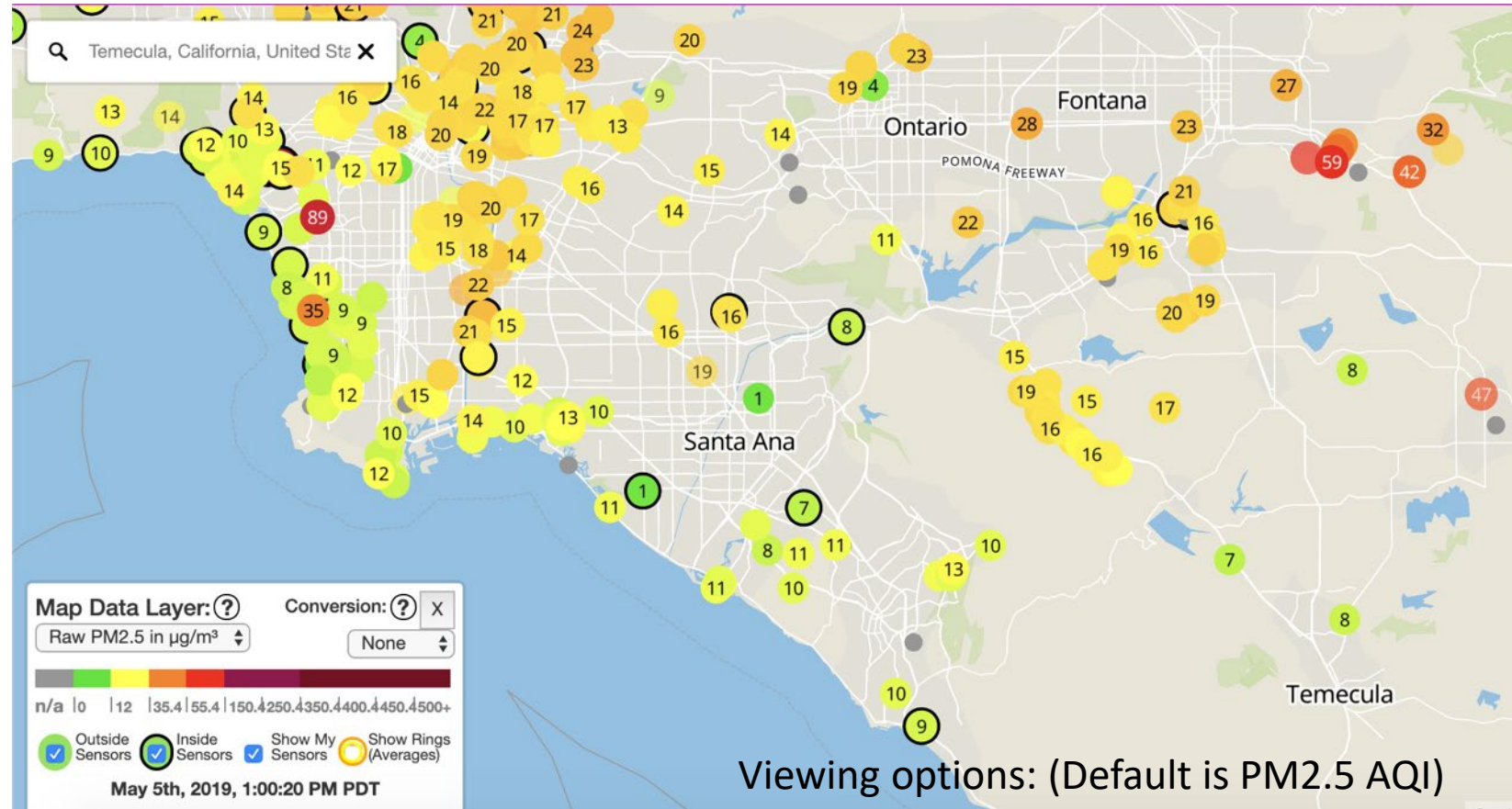


Image from Google Maps

Purple Air monitor overview

- Fan draws air past laser-based particle counter (Plantower sensor)
- Estimates PM1, PM2.5, and PM10
- Time resolution ~80 seconds
- Two sensors in each monitor
- Map and sensor list online
- SD card vs. wifi only
- \$229 to \$259

Purple Air online map



Viewing options: (Default is PM2.5 AQI)

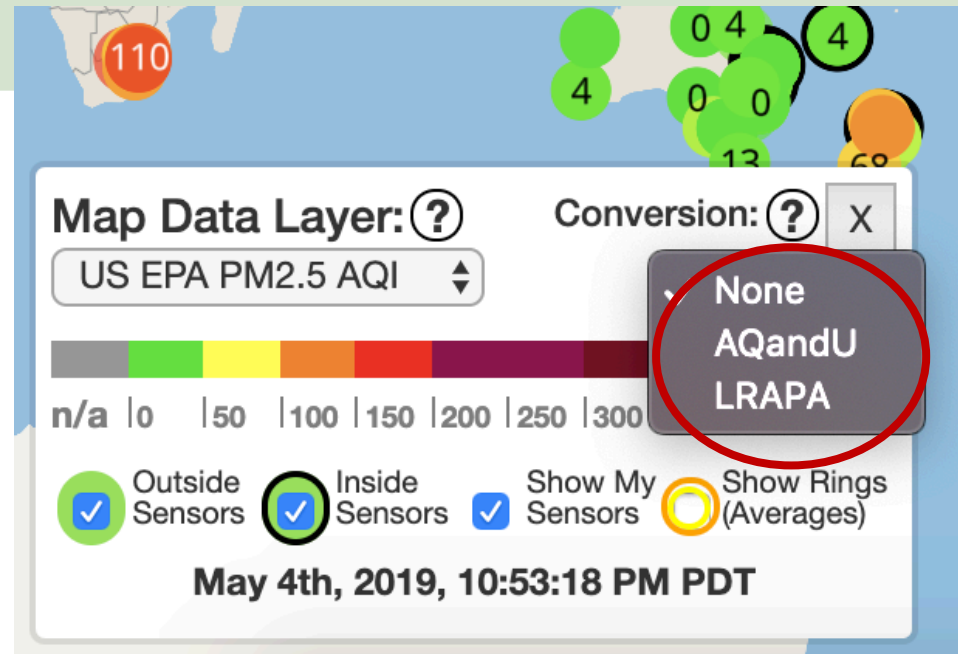


US EPA PM2.5 AQI
US EPA PM10 AQI
US EPA Village Green
Canadian AQHI
Humidex
Temperature (°F)
Temperature (°C)
Humidity

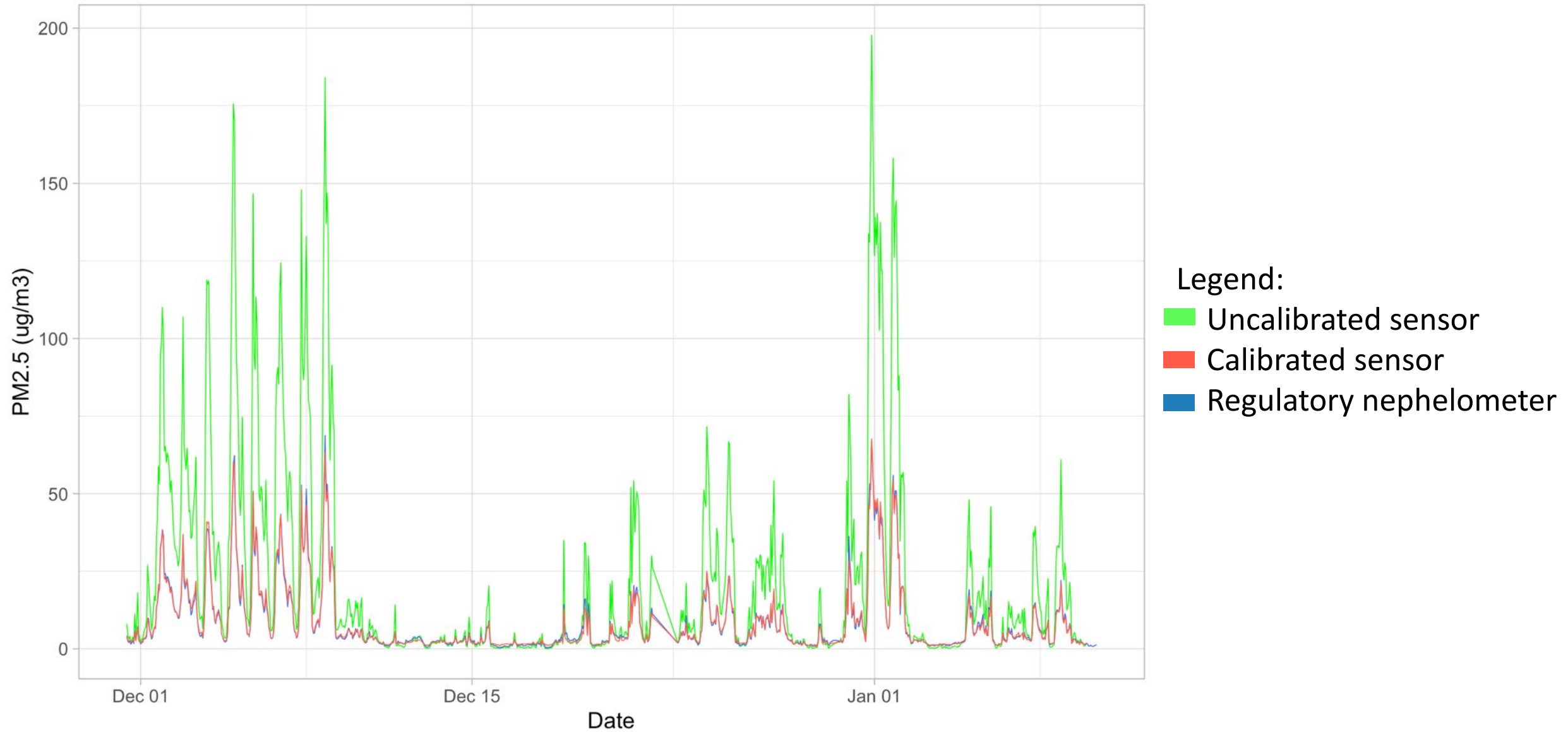
Raw PM1.0 in $\mu\text{g}/\text{m}^3$
✓ Raw PM2.5 in $\mu\text{g}/\text{m}^3$
Raw PM10 in $\mu\text{g}/\text{m}^3$
Raw 0.3 μm count/dl
Raw 0.5 μm count/dl
Raw 1.0 μm count/dl
Raw 2.5 μm count/dl
Raw 5.0 μm count/dl
Raw 10 μm count/dl

Data calibration equations are necessary

- Partner with a local air agency
- Co-locate with a more accurate instrument
- Use one of the correction factors on the Purple Air map



Data calibration



How this information will be helpful during periods of wildfire smoke:

1. Early Learning Academy

- Children's exposure
- Indoor vs. outdoor → inform outdoor activity

2. Teen Center gym

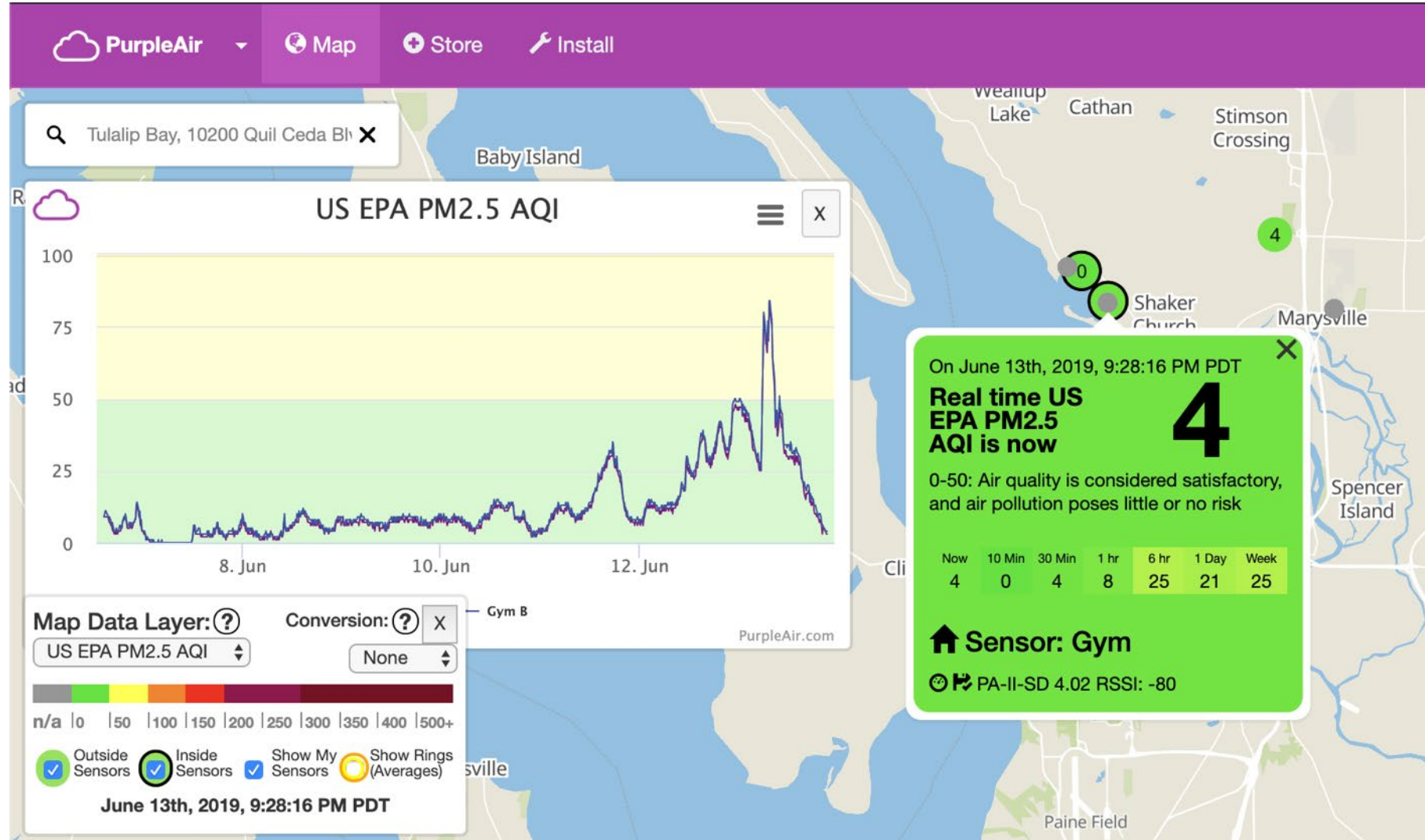
- Youth exposure
- Indoor vs. outdoor → inform outdoor activity
→ inform potential clean air shelter

3. Tulalip Data Services

- Representation of airshed on east side

Community data sharing

- Currently unable to show calibrated data on the map
- Indoor/outdoor comparisons still useful
- Could include calibration equations on website



Resources

- Purple Air
- Puget Sound Clean Air Agency info on low-cost sensors:
<https://www.pscleanair.org/539/Air-Quality-Sensors>
- Clean Air Carolina Purple Air info:
<https://cleanaircarolina.org/purpleair/>
- Community use of low-cost sensors
- Community Air Monitoring Network guidebook:
<http://www.phi.org/resources/?resource=guidebook-for-developing-a-community-air-monitoring-network>
- EPA Air Sensor Toolbox: <https://www.epa.gov/air-sensor-toolbox>

National Indian Health Board



Aileen Gagney, MA.rch, GA-C, HHS,
DST, CLR

TECHNICAL ADVISOR AND TRAINER, TRIBAL
HEALTHY HOMES NETWORK

HEPA, MERV AND DO-IT-YOURSELF AIR CLEANERS

Aileen Gagney MArch, MFA, GA-C, HHS, DST, CLR

Technical Advisor and Trainer

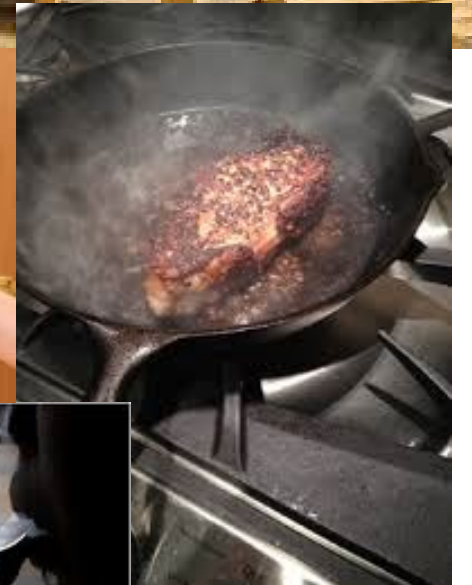


TRIBAL HEALTHY HOMES NETWORK

Clean Air. Safe Homes. Healthy Lives.

Do we need air cleaners?

- The safest, economical and most effective way to address indoor air pollution is usually *to reduce or eliminate avoidable sources of pollutants* and then to exhaust to the outdoors the unavoidable particles, gases, fumes and excessive water vapor...



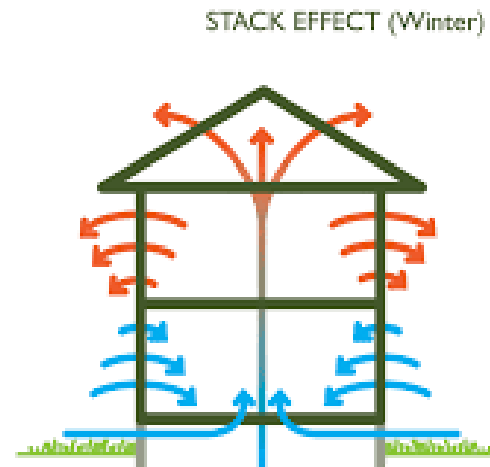
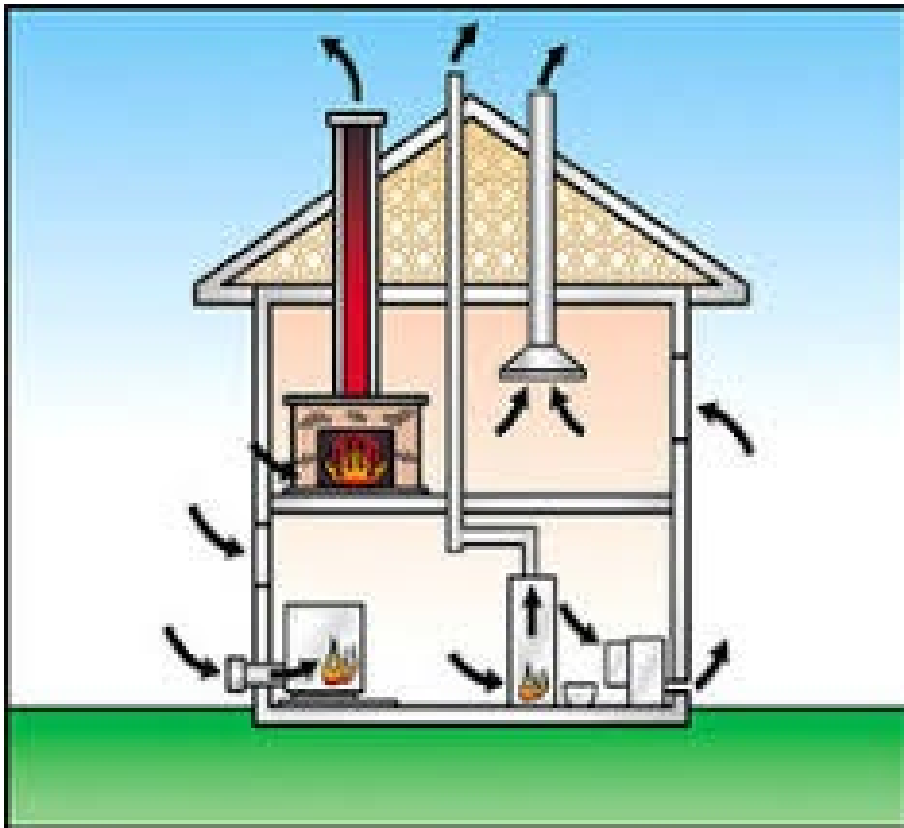
And what can be the problem with the outside air?



And what can be problems with the inside air?

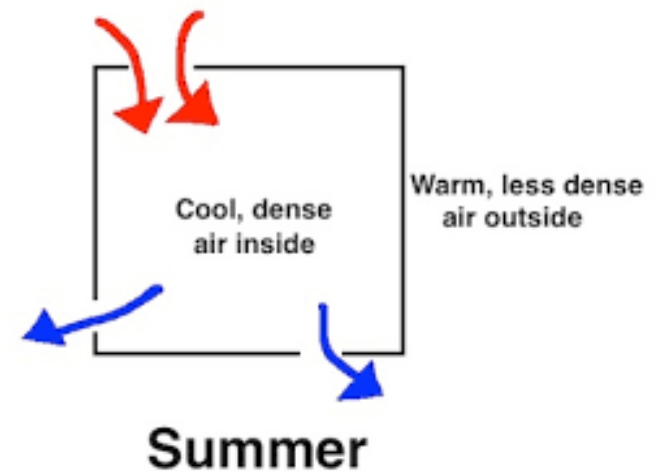


What is outside, comes inside! (And we know what we can have inside.....)



Cold air enters the bottom of the house and rises through air leaks. The top and the bottom of the house have the highest pressures and are most important to seal.

EnergySmartOhio.com
Designed by Matt/Adam/Don.



Air Cleaners

- Intervention studies of air cleaners operating in homes have consistently found statistically significant reductions of indoor exposures to indoor PM_{2.5}, PM₁₀, and/or particle number counts with the use of portable air cleaners.....



Portable Air Cleaners

- The basic components of a portable air cleaner include a filter or other air cleaning technology and a fan that propels air through that filter/air cleaner
- Portable air cleaners may also have a panel filter with bonded fine granules of activated carbon, an activated carbon filter encased in a frame, or other sorbent mixtures to remove gases and odorous compounds

There are many types of air cleaners and the only two that are both safe and effective are:

- HEPA

- MERV

ESP (Electrostatic Precipitator's)

Ozone Generators

Ion Generators

UVGI – Ultra Violet Germicidal Irradiation

HEPA – High Efficiency Portable Air Cleaner

- In residential air cleaners, filters described as being HEPA filters are generally equivalent to MERV 16 and offer the highest available particle removal efficiency of fibrous media air filters for a wide range of particle sizes



MERV - Minimum Efficiency Reporting Value

(MERV) ranging from MERV 1 to MERV 16
based on the average removal efficiency
across three particle size ranges: 0.3–1 μ , 1–
3 μ , and 3–10 μ

EPA recommends that consumers who are concerned
about small particles choose furnace filters with at least a
MERV 13 rating or as high a MERV rating as the
system fan and filter track can accommodate

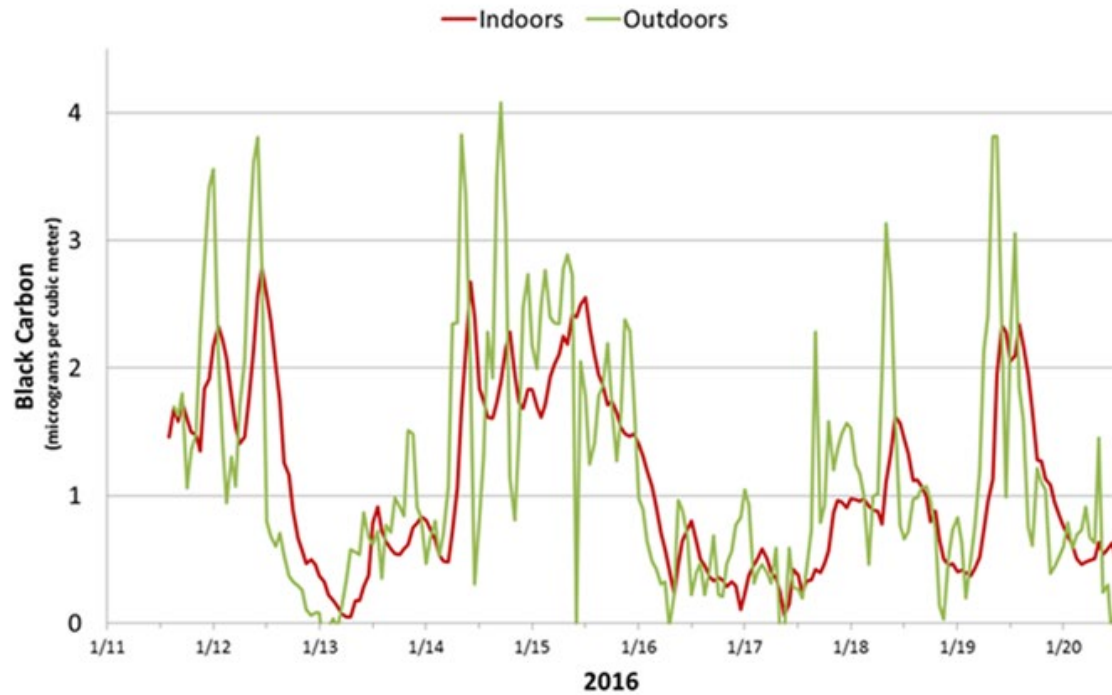
Options:

- <https://www.uofmhealth.org/news/sinus-hepa-0630>



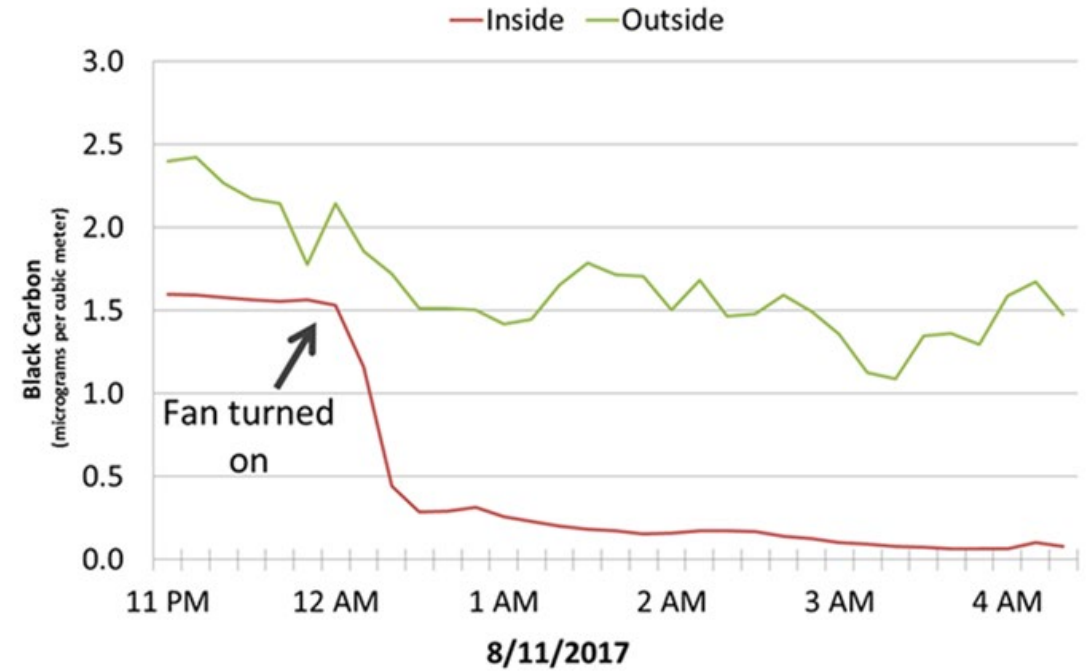
House with no filter/fan equipment (control)

Black carbon over time, house #1



Example of filter/fan performance

Black carbon during wildfire smoke event, house #4, windows and doors closed



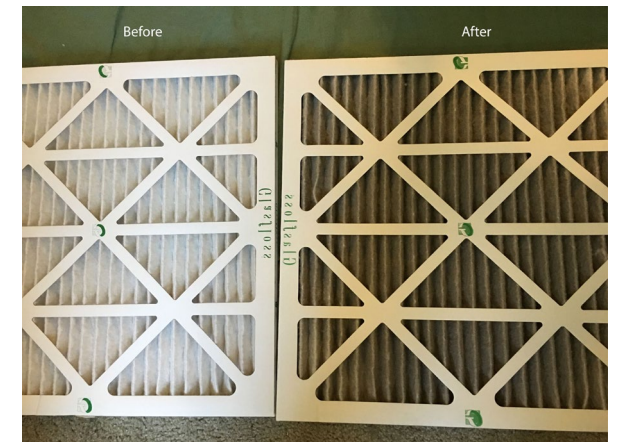
Courtesy of Puget Sound Clean Air Agency



20" x 20" box fan
20" x 20" furnace filter



Do not leave unattended!





TRIBAL HEALTHY HOMES NETWORK

Building knowledge, skills, and tools because **your AIR MATTERS**

Aileen Gagney MA.Arch, HHS, GA-C, DST, CLR
Tribal Healthy Homes Network
Technical Advisor and Trainer

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National Indian Health Board



Darrien Benally (Navajo), BS

TULALIP INTERN

LEAD INSTRUCTOR, INSTITUTE FOR TRIBAL ENVIRONMENTAL
PROFESSIONALS, ENVIRONMENTAL EDUCATION OUTREACH PROGRAM
COMMUNITY YOUTH LEADER, NATIVE AMERICANS FOR COMMUNITY
ACTION

NATIONAL TRIBAL FORUM ON AIR
QUALITY MAY 2019

Tulalip Tribes & Tribal Healthy Homes Network: Community Feedback Survey

Darrien Benally

Northern Arizona University

2017 ITEP Student Summer Intern Participant



Principle Aim

OVERVIEW

To prevent adverse health outcomes during episodes of compromised air quality by strengthening risk communication practices. Specifically, to develop a coherent strategy that reaches further in scope, **can be readily activated during an episode, can be replicated by other communities.**



Three Survey Types

Tulalip Health Messaging Survey

10 Respondents

Gained feedback from various department and program managers within the Tulalip administration.

Tulalip Community Members Survey

7 Respondents

Community members provided feedback on their air quality topic knowledge and various ways they would be willing to receive emergency communication

General Tribal Health Messaging Survey

9 Respondents

Various Tribal air quality department managers surveyed to provide feedback on their communication strategies with their communities.

BUILD AND ESTABLISH RELATIONSHIP WITH TULALIP DEPARTMENT MANAGERS

- Set up in person meetings at the Tulalip Cafe
- Go directly to departments ask to set up a meeting
- Ask other department managers for connections



CONNECTIONS TO COMMUNITY

Creating and establishing community buy in. Would community members be willing to join in to a text message system or other alert systems?



Key Findings

Tulalip Health Messaging Surveys

10 participants indicated willingness to participate in the emergency response network.

10 participants indicated they would like trainings provided by the air quality department.

Tribal Health Messaging Survey

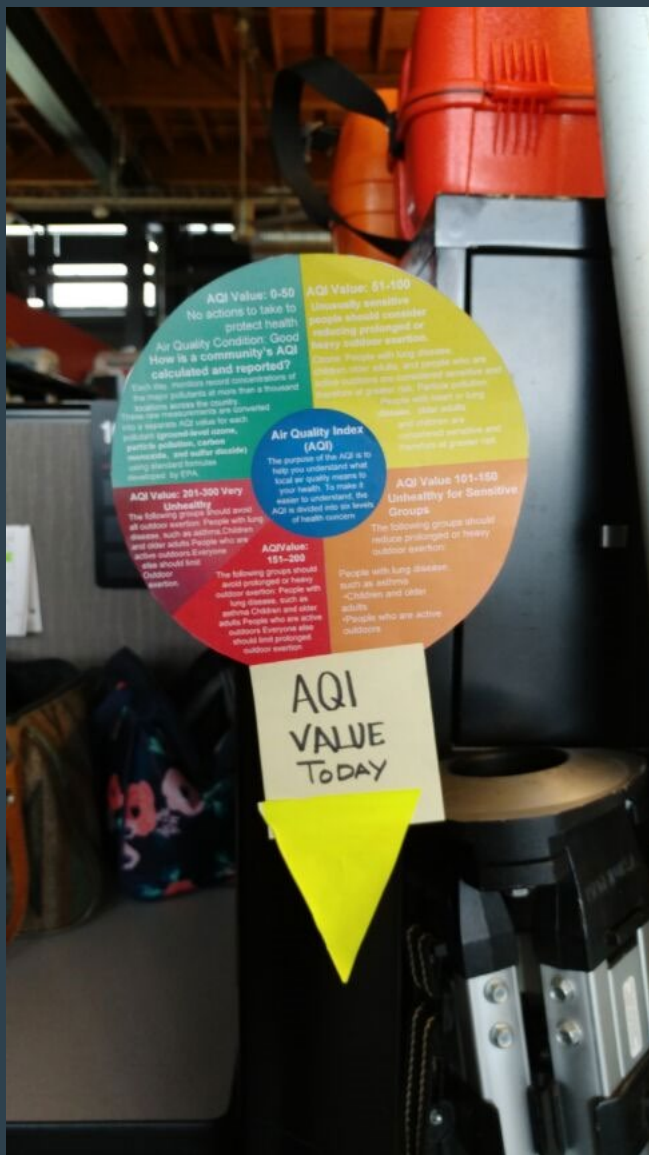
9 Total Respondents

7 responses indicated that in person communication is the most successful way of communicating.

7 respondents do not use the Flag kit program used by the US EPA.

Tulalip Community

Recognized need for messaging system and mitigation strategies, community was willing to participate



AIR MATTERS HEALTHY BODIES HEALTHY MINDS

Air quality matters for personal health. The air we breathe can impact our health. It is important to watch out for youth, elders and those with lung diseases when there is poor air quality.

[HTTP://THHNW.ORG/](http://THHNW.ORG/)



THANK YOU

Tulalip Tribes
Tribal Healthy Homes Network
ITEP Student Summer Internship Program

DEPARTMENT OF
APPLIED INDIGENOUS
STUDIES NORTHERN
ARIZONA UNIVERSITY

National Indian Health Board



Questions and Discussion

TO ENTER A QUESTION, PLEASE USE THE CHAT
BOX, NOT THE Q&A BOX

PLEASE SEND TO ALL PANELISTS

National Indian Health Board



Thank you!

PLEASE BE SURE TO COMPLETE SURVEY
(TO BE SENT VIA EMAIL)