National Tribal
AIR ASSOCIATION

2024
STATE OF TRIBAL AIR REPORT

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National Tribal Air Association

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Table of Contents

AUDIENCE AND BACKGROUND

The Status of Tribal Air Report (STAR) is designed to provide a national overview of air quality, Tribal air quality programs, and the successes and challenges that face Native American Nations in implementing the Clean Air Act (CAA) as they address air quality and climate adaptation. The report is designed to provide elected Tribal leaders, other National decision-makers, and Tribal environmental professionals with an annual snapshot of air quality and air quality programs across the country.

This report is compiled by the National Tribal Air Association (NTAA). NTAA is a member-based organization with 160 member Tribes. The organization's mission is to advance air quality management policies and programs, consistent with the needs, interests, and unique legal status of American Indian Tribes and Alaska Natives. As such, NTAA uses its resources to support the efforts of all federally recognized Tribes in protecting and improving the air quality within their respective jurisdictions. Although the organization always seeks to represent consensus perspectives on any given issue, it is important to note that the views expressed by NTAA may not be agreed upon by all Tribes. Further, it is also important to understand that interactions with NTAA are not a substitute for Government-to-Government consultation, which can be achieved only through direct communications between the federal government and American Indian Tribal governments and Alaskan Native Villages.

EXECUTIVE SUMMARY

NTAA Executive Steering Committee May 2024

Since the 1990 amendments to the Clean Air Act (CAA), which authorized federally recognized Tribes to be “Treated in a Manner Similar to a State” (TAS) under Section 301(d), Tribes across the United States have made significant strides in air quality governance, monitoring, and policy participation. The National Tribal Air Association (NTAA), established in 2000 by resolution of the National Congress of American Indians, has played a pivotal role in supporting Tribal engagement with federal regulatory frameworks, advancing environmental justice, and promoting Tribal sovereignty in the domain of air quality management.

The 2024 Status of Tribal Air Report (STAR) reflects on 25 years of progress and highlights a landscape of both achievement and ongoing challenge. NTAA

produced 16 Policy Resource Kits (PRKs), conducted webinars on EPA rulemakings—including those pertaining to methane, particulate matter, and per- and polyfluoroalkyl substances (PFAS)—and has issued technical issue papers on pollutants of emerging concern such as 6PPD and PFOS. Regular coordination between Tribes and EPA is

facilitated through monthly policy calls and active workgroups, including those addressing wildfire smoke and air quality issues specific to Alaska Native Villages.

Since the introduction of the Tribal Authority Rule in 1998, which clarified the regulatory pathways for Tribal participation in CAA implementation, Tribal programs have grown in breadth and sophistication. As of 2024, 72 Tribes have received TAS determinations; 23 are implementing programs via Tribal Implementation Plans (TIPs), Title V permit authorities, or delegated federal plans; 101 conduct ambient air monitoring; and 72 maintain emissions inventories. These efforts have contributed to a reduction in designated nonattainment areas within Indian Country—from 166 in 2018 to 114 in 2024.

Despite these gains, Tribal air programs operate within a markedly different context than their state counterparts. Unlike states, which are mandated to implement all aspects of the National Ambient Air Quality Standards (NAAQS), Tribes have discretion to adopt a modular approach tailored to their priorities and capacity. This flexibility has enabled Tribes to focus on urgent and region-specific concerns, but the disparity in funding and institutional support continues to limit program expansion and sustainability.

The STAR report underscores the profound and persistent environmental health disparities affecting American Indian and Alaska Native (AI/AN) populations. Data reveals disproportionately high rates of asthma, hypertension, cancer, and cardiovascular disease among AI/AN individuals, who also experience a life expectancy that is 10.8 years lower than the national average. These disparities are closely linked to systemic inequities, including higher exposure to environmental pollutants, proximity to industrial emission sources, and limited access to healthcare services. Airborne contaminants such as fine particulate matter (PM2.5), nitrogen dioxide (NO_2), and PFAS compounds have been directly implicated in these outcomes.

To address these inequities, the NTAA, in partnership with institutions such as the Tribal Air Monitoring Support (TAMS) Center and the Institute for Tribal Environmental Professionals (ITEP), provides essential technical assistance, training, and equipment support. In FY24 alone, the TAMS Center responded to numerous requests for project planning, monitoring equipment troubleshooting, and quality assurance guidance. In parallel, ITEP delivered ten in-person air quality workshops and maintained a suite of asynchronous online courses tailored to Tribal needs.

In 2024, Tribes continued to engage deeply with EPA policy and regulation development. NTAA submitted comments and educational materials for 15 federal rules and conducted informational webinars on topics including PFAS, the revised PM2.5

NAAQS, and Tribal roles in methane regulation. Many Tribes are participating in EPA's area designation processes or are building internal capacity to develop TIPs and regulatory permitting programs. Yet barriers remain. Many Tribes lack access to the monitoring infrastructure or technical personnel necessary to fully participate in regulatory designations or permitting reviews. There is also a persistent need for updated guidance and increased support from EPA to ensure equitable inclusion.

Indoor air quality (IAQ) continues to represent a significant public health concern. Many Tribal communities experience elevated risks from indoor sources such as mold, woodsmoke, and volatile chemicals. Although some funding is available through mechanisms like the State Indoor Radon Grant (SIRG) and CAA Section 103, access remains inconsistent. NTAA calls for streamlined application procedures, increased outreach, and dedicated funding for IAQ initiatives.

Air toxics and emerging contaminants such as PFAS, PFOS, and 6PPD also remain high on the list of Tribal concerns. These pollutants pose bioaccumulative risks and have been detected not only in air emissions but also in traditional food sources such as wild game and fish. The NTAA stresses the urgent need for more robust research and regulatory attention to airborne PFAS pathways and to secondary contaminants like 6PPDQ, which can threaten aquatic life and food sovereignty.

The impacts of climate change further exacerbate existing environmental vulnerabilities. Wildfire smoke has increasingly affected air quality in many regions, including areas that had not historically experienced such events, such as parts of Alaska. In response, Tribes are developing resilience strategies, such as community air sensor networks and early-warning systems, while advocating for greater EPA involvement in supporting Tribal adaptation and mitigation efforts. Meanwhile, rare earth and uranium mining, often undertaken near or on Tribal lands, continues to present unresolved environmental and health hazards, especially in light of global demand for electric vehicle components and energy transition infrastructure.

The report also emphasizes the importance of consultation to achieve cooperative federalism. NTAA reiterates that meaningful Tribal consultation must be conducted "early and often" and in accordance with each Tribe's protocols. Consultation should not be limited to perfunctory notifications or webinars; it must be substantively responsive to Tribal feedback and priorities. NTAA cites recent failures in this regard, including the finalization of the taconite Residual Risk and Technology Review (RTR) rule, where Tribal input was disregarded after years of engagement.

Adequate funding remains a perennial concern. While FY24 saw an increase in Tribal air funding to $15.5 million, this figure remains well below NTAA's calculated need of $79 million—and even further below the adjusted request of $94 million for FY27, accounting for inflation, wage increases, and equipment costs. Additional funding mechanisms such as the Inflation Reduction Act (IRA), DERA grants, and SIRG set-asides are valuable but insufficient and often competitive or short-term in nature.

Finally, the STAR report includes case studies highlighting diverse Tribal initiatives across the country. These include the Southern Ute Indian Tribe's comprehensive permitting authority for major and minor sources; the Umatilla Tribe's long-term CASTNET air quality monitoring; the Quinault Indian Nation's firewood program to reduce IAQ hazards; and the Eastern Band of Cherokee Indians' multi-pronged efforts in air quality monitoring, community alerts, electric school buses, and climate resilience planning. Additional case studies illustrate air toxics assessments, innovative sensor deployments, and inter-Tribal collaborations that reflect both the ingenuity and unmet needs of Indian Country.

In conclusion, the 2024 STAR report demonstrates the commitment, innovation, and growing capacity of Tribal Nations to manage and protect air quality within their jurisdictions. However, it also makes clear that systemic inequities, funding shortfalls, and regulatory gaps persist. Addressing these challenges will require sustained support, meaningful federal-Tribal partnership, and an unwavering respect for Tribal sovereignty and self-determination in environmental governance.

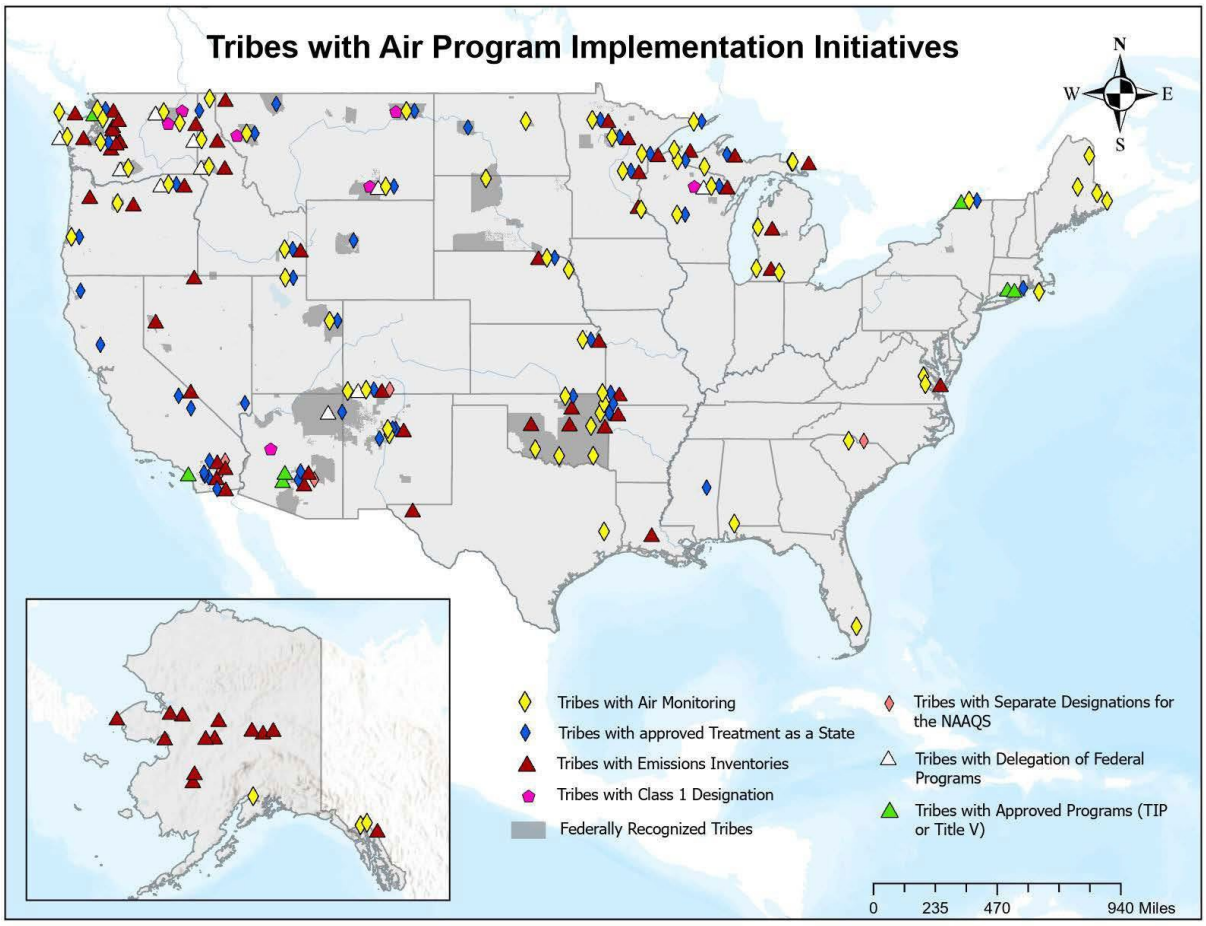
25 YEARS OF SUPPORTING TRIBES

The 1990 CAA amendments empowered the Environmental Protection Agency (EPA) to treat Tribes as states in implementing the CAA. The EPA promulgated the Tribal Authority Rule in February 1998, explaining how Tribes can participate in implementing the CAA. Since that time, Tribes have built and grown Tribal air programs across the country. NTAA was founded by resolution of the National Congress of American Indians in 2000 and funded by an EPA grant, originally to the National Tribal Environmental Council and then to the Institute of Tribal Environmental Professionals (ITEP). The following are highlights of successes that Tribes have achieved in the years since NTAA's founding.

NTAA Successes 2024

NTAA provided a range of support for Tribes, including the development of 16 Policy Resource Kits. NTAA provided webinars on the role of Tribes in implementing the EPA methane rules and how Tribes can participate in the designation process for the 2024 particulate matter National Ambient Air Quality Standards (NAAQS) and perfluoroalkyl and polyfluoroalkyl substances (PFAS) and perfluorooctane sulfonate (PFOS) in the air. NTAA also developed issue papers on emerging issues such as PFAS/PFOS and 6PPD. NTAA provides ongoing policy coordination between EPA and the Tribes with monthly policy calls, and facilitates workgroups for wildfire, wood smoke, and Alaska Tribal air issues. Tribes also have been recognized for their successful programs, and 12 Tribes or Tribal entities have won Clean Air Act Excellence awards (see Appendix 2 for details).

Over the years, many Tribes have made progress in developing and implementing their own CAA programs (see Appendices 1 and 2 for details). The following map shows areas where Tribes are directly implementing their CAA programs, those who have treatment as a state (TAS) status or have demonstrated an interest in doing so, and Tribes with air monitors and emissions inventories.



The following is a description of each of the categories in the legend:

- Tribes with air monitoring include Tribes operating federal reference monitors as well as sensor monitoring.
- Tribes with approved “Treatment as a State" means Tribes with approved eligibility determinations to be “treated in a manner similar to a state” for parts of the CAA ranging from grants, administrative programs and regulatory programs.
- Tribes with emissions inventories includes Tribes with emissions inventories developed within the last 5 years.
- Tribes with class I designations means Tribes have approved designations for all or part of their territory that is most protective of air quality under the “Prevention of Significant Deterioration program.”
- The representation of federally recognized Tribes in this map is not necessarily reflective of jurisdictional boundaries but used for illustration purposes.

- Tribes with separate designation for the NAAQS, means the Tribes have requested their area of Indian Country be designated for any of the NAAQS separate from the surrounding jurisdiction, which is typically a state or county boundary.
- Tribes with delegation of a federal program means the Tribe is implementing a federal rule in lieu of the US EPA. This can include Title V permitting, minor NSR permitting, the Region 10 “Federal Rules for Reservations,” or other federal rules.
- Tribes with approved programs means the Tribe has developed and is implementing a TIP or Title V program under its authority and has that program approved by US EPA as the federal requirements under the CAA.

In summary, since the passage of the 1990 Clean Air Act, which included section 301(d), allowing Tribes to be treated in a Manner Similar to States (TAS), 72 Tribes have received approved TAS eligibility determinations. There are also 23 Tribes implementing CAA programs either through approved Tribal Implementation Plans (TIPs), approved Title V permit programs, or through delegation of Federal plans. Also, Tribes are actively assessing air quality, with 101 Tribes conducting air quality monitoring and 72 Tribes with air emissions inventories. These efforts have reduced the number of nonattainment areas in Indian Country from 166 in 2018 to 114 in 2024.

NATIONAL TRIBAL AIR PROGRAM STATISTICS

There are many ways Tribes are involved in addressing air quality in Indian Country, such as addressing ambient air quality by conducting air quality assessments (monitoring, emissions inventories, etc.), developing education and outreach programs, and regulating their own sources. Many Tribes also have programs to address indoor air quality, while others address mobile sources and diesel emissions from community sources such as trucks and school buses that impact community health. Finally, the ongoing need to consider climate change impacts and to plan for changes in Indian Country are also important demands. The following is a snapshot summary of some of the important activities in Tribal air programs.

CAA Section 301(d) and the Tribal Authority Rule (TAR) allow the EPA to treat “Tribes in a manner similar to a state” but allow the Tribes to take on the implementation of the CAA programs in a modular approach so that their specific requirements are met. This provides Tribes with the flexibility to focus their resources on the needs of the Tribes but does not require the Tribes to mandatorily take on aspects of the CAA that are not applicable to them or where there are no resources for their implementation. When comparing Tribal air quality programs (starting in 1998 following the TAR) to state programs (since 1970), it is important to recognize this flexibility and the budget and resource constraints on Tribal air quality programs. Many people envision an air program similar to state air programs, with significant resources and many staff implementing a range of activities from monitoring air quality to developing regulations and permitting and enforcement of those rules and permits. State air programs are mandated to implement all aspects of the National Ambient Air Quality programs, while the Tribes are provided with flexibility, and EPA is tasked with filling in the gaps in Indian Country. As a result, most Tribes have not found it necessary or appropriate to develop their own regulatory programs at this point. Many Tribes are growing their programs and may develop more regulatory programs in the future. The following shows the progress of Tribal air quality programs, the current status of Tribes, and the range of activities that they are undertaking.

Total Grants Received From EPA

Year	CAA 105**	CAA 103	SIRG*
2018	40	82	2
2024	58	61	22

**State Indoor Radon Grant.*
***Total CAA 103/105 in 2018 is 122 and in 2024 is 119, slightly fewer grants but a significant increase in mature Tribal programs under Section 105; Tribes were growing programs while resources were not growing.*

Tribes With Approved TAS

Year	Regulatory TAS	Non-regulatory TAS
2018	9	52
2024	10	62

Note. Under the TAR and CAA Section 301(d), Tribes can be found eligible to have TAS status for various aspects of the CAA, including receiving grants or for developing their own programs, such as a Tribal Implementation Plan (TIP). Tribes can have both regulatory and nonregulatory TAS and can add to TAS with additional CAA sections over time.

Total Approved Programs

Year	Tribal Implementation Plans	Delegated Programs	Title V Permit Programs
2018	5	12	2
2024	8[1]	13	2

Tribes With Ambient Air Quality Assessments

Year	Ambient Monitoring*	NCore	CASTNET	Emissions Inventories
2018	85	1	5	78
2024	92	1	8	74

*Ambient monitoring, including for the Air Quality Index, can be conducted by regulatory and nonregulatory monitors.
Note. NCore = National Core network; CASTNET = Clean Air Status and Trends Network.

Indoor Air Quality Programs

Indoor air quality is a priority for many Tribes. Indoor air quality issues range from mold-causing water intrusion, indoor use of chemical pesticides and cleaning products, radon exposure, and woodsmoke. Tribes find funding for addressing indoor air quality through a range of programs, including funding from CAA 103 as well as from Housing and

Urban Development (HUD) and other programs such as SIRG. The following shows the funding from annual SIRG activities in 2023 and 2024 and the active state and Tribal grant programs:

- FY23 funding = $10,995K
    - 49 states had active grants
    - 18 Tribes had active grants
- FY24 funding = $9,130K
    - 49 states had active grants
    - 22 Tribes had active grants

[1] Note: two Tribes in 2024 added to their TIPs or took on additional delegation to broaden their programs.

Air Quality Status in Indian Country

Region	Areas in Nonattainment		Air Toxics Programs	
	2018	2024	2018	2024
1	3	3	5	3
2	1	1	1	2
3	0	0	0	0
4	0	0	3	3
5	4	4	14	15
6	0	1	2	2
7	0	0	4	3
8	3	4	8	2
9	154	100	6	17
10	1	1	22	32

Climate Pollution Reduction Implementation Grants In 2024, the Inflation Reduction Act (IRA) awarded 34 grants to Tribes through a Tribal set aside. This was one time funding that was available for Tribal programs.

IMPACTS OF AIR QUALITY ON HEALTH IN INDIAN COUNTRY

Health Inequality in Indian Country

American Indians/Alaska Natives have a history of health inequality. This is especially apparent when looking at the correlation between poverty and reduced life expectancy in Indian Country. This data is important for Tribes who have been historically discriminated against by decisions and actions made by the federal government and other institutions. Tribes have less ability to leave areas where their communities have been placed/restricted and less ability to respond to environmental and other stressors.

According to the United States Census Bureau (Shrider, 2024), over 20% of American Indians live in poverty ("People in Poverty by Selected Characteristics: 2022 and 2023"). This is the highest rate among all the races/ethnicities in the United States. In addition to having the highest rate of poverty, American Indians and Alaska Natives born today have a life expectancy that is 10.8 years less than that of the U.S. general population—65.6 years compared to 76.4 years, according to the EPA's Disparate Impact Report (U.S. Environmental Protection Agency, 2024c). Furthermore, Indian Health Service looked at health disparities in American Indians and Alaska Natives and found that they consistently have higher rates of avoidable diseases such as diabetes and heart and liver disease (Indian Health Service, n.d.). According to the American Cancer Society (2025), the overall cancer incidence and mortality rates are highest among American Indians and Alaska Natives. It should be noted that additional cultural and traditional practices may provide different or increased exposure pathways that are not present in the general population, e.g., fishing, hunting, and gathering of plants for subsistence and medicinal purposes.

NTAA aims to work with Tribes in remedying some of these health disparities by providing educational opportunities for Tribes and Tribal environmental professionals on air quality, air pollution, and air toxics; assisting Tribes in developing air monitoring

programs; and equipping Tribes with the tools to regulate their airsheds and, ultimately, improve air quality in their Regions. Data is key to identifying air pollution and air toxics. By informing Tribal leaders of air quality issues, Tribal environmental professionals can help them make informed policy decisions.

Disparate Health Impact Data in American Indians/Alaskan Natives

Data from the U.S. Environmental Protection Agency's (2024a,b,c) *Indicators of Environmental Health Disparities* report, the American Cancer Society (2025), and the American Lung Association's (2023) *State of Lung Cancer* report further exemplifies the health disparities in American Indians by showing data on hypertension, asthma, childhood asthma, incidence and mortality rates of cancer, lung cancer health disparities, and life expectancy percentage rates by race/ethnicity demographics. While these reports analyze demographic groups based on race/ethnicity, the data is not meant to suggest that certain races or ethnicities might be more susceptible to specific diseases based on genetic factors. What the data does suggest is that "health outcomes are in turn shaped by a wide range of health factors and environmental exposures, many of which vary considerably across race, ethnicity, and income" (U.S. Environmental Protection Agency, 2024c, pg. 4). Examples include "systemic inequities" including poor access to medical care, "poor nutrition due to limited access to healthy food," higher levels of stress, "proximity to industrial sources of air pollution," which can lead to more incidences of heart disease, cancer, and diabetes, all leading causes of death in the United States (U.S. Environmental Protection Agency, 2024b, pg. 5).

Based on the following data, American Indians and Alaska Natives have the second highest rate of hypertension, the highest rates of asthma, the highest rates of cancer, are less likely to receive treatment for and survive lung cancer, and ultimately, have the lowest life expectancy.

Hypertension

Hypertension, or high blood pressure, is a cardiovascular disease that is a major risk factor for other cardiovascular diseases such as coronary heart disease, heart attack, and stroke. Although high blood pressure is usually caused by obesity, a lack of physical activity, and high sodium consumption, there are known environmental exposures that can

affect or exacerbate cardiovascular disease and hypertension as well. Non-White and low-income populations, along with those living and working in urban and industrial areas, continue to be at higher risk to the negative health impacts from poor air quality, leading to more hospitalizations and mortality in the elderly (U.S. Environmental Protection Agency, 2024b).

The following air contaminants, and air pollution in general, either contribute to the development of hypertension and cardiovascular diseases or aggravate existing hypertension and cardiovascular diseases:

- Lead: increases hypertension and cardiovascular mortality. The leading cause of lead contamination in the air is from industrial activities such as lead smelting and refining, lead-acid battery manufacturing, and waste incineration.
- Greenhouse gases and climate change impacts: can increase ozone levels and particulate matter concentrations due to increasing wildfires and allergens.
- $PM_{2.5}$: contributes to the development of hypertension and cardiovascular diseases; varies significantly based on location, weather conditions, and time of day. Natural sources of $PM_{2.5}$ include wildfires, volcanic eruptions, and dust storms. Anthropogenic sources of $PM_{2.5}$ include vehicle emissions, power plants (coal, oil, and natural gas), industrial processes (manufacturing and smelting), and residential wood burning. Other sources can include construction activities, agricultural burning, cooking, burning candles, and tobacco smoke.
- PFAS: a large group of fluorinated synthetic chemicals, e.g., perfluorooctanoic acid, perfluorooctanesulfonic acid, perfluorohexanesulfonic acid, perfluorodecanoic acid, and perfluorononanoic acid. Epidemiological studies have found that PFAS exposure is associated with hypertension risk and other health risks such as cancer, high cholesterol rates, and detrimental effects on the immune system, reproductivity, and child development. PFAS are starting to show up in wild game, causing state agencies to issue advisories not to consume it due to PFAS contamination.

The graphs, from the EPA's *Indicators of Environmental Health Disparities: Age- Adjusted Hypertension* report (U.S. Environmental Protection Agency, 2024b), shows the age-adjusted rates of hypertension in adults in the United States from 2002 to 2018, broken down by race/ethnicity and socioeconomic status. In 2018, people identifying as non-Hispanic Black or African American had the highest rates of hypertension, at 32.8%, followed by American Indian/Alaska Natives at 27.2%, compared to an overall average of 24.8%.

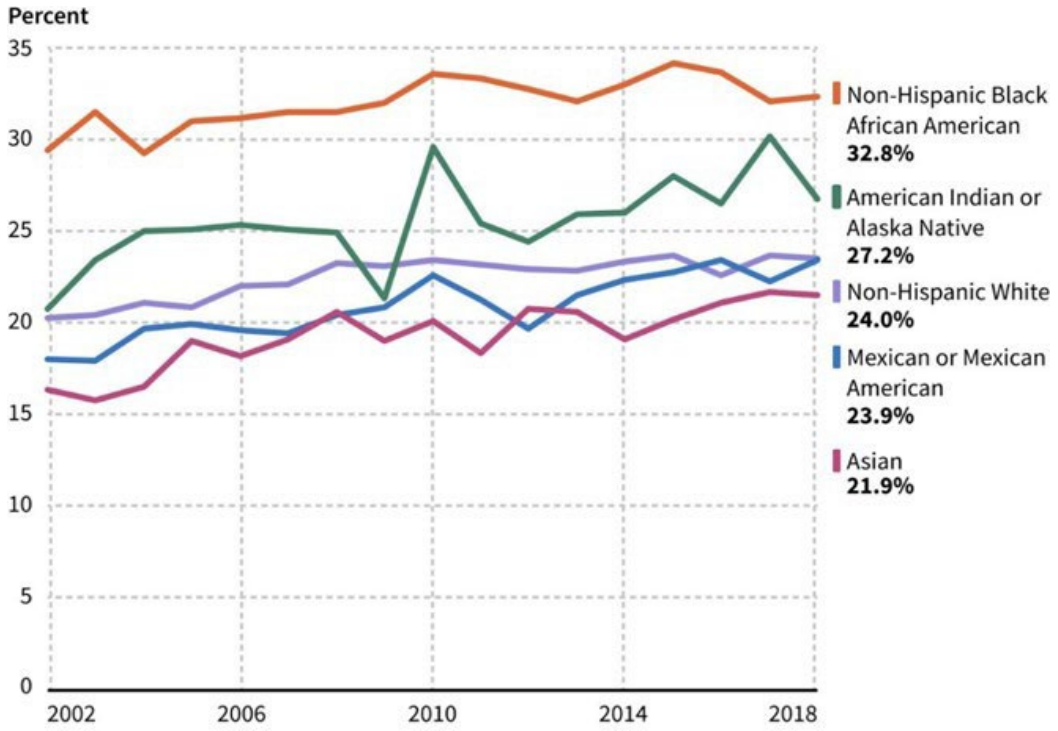


Figure 1: Age-adjusted Percent of Adults (18+) with Hypertension by Race/Ethnicity

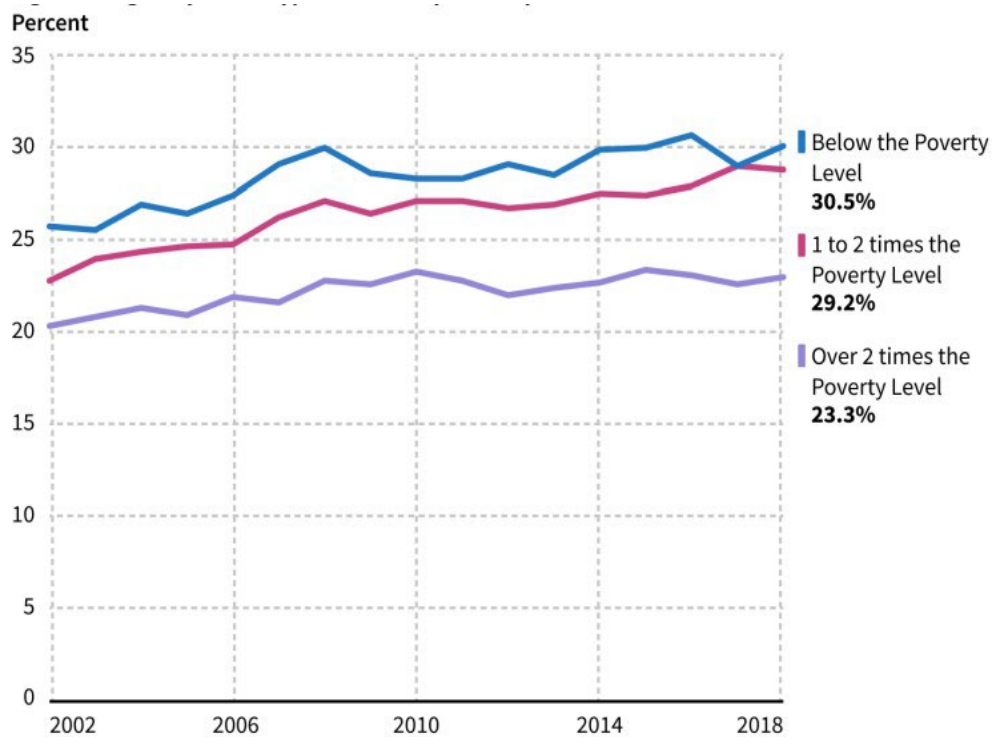


Figure 2: Figure 2 demonstrates the correlation between poverty and negative health outcomes such as hypertension.

The graphs, from the EPA's Indicators of Environmental Health Disparities: Age-Adjusted Hypertension report (U.S. Environmental Protection Agency, 2024b), shows the age- adjusted rates of hypertension in adults in the United States from 2002 to 2018, broken down by race/ethnicity and socioeconomic status. Figure 1 shows that people identifying as non-Hispanic Black or African American had the highest rates of hypertension, at 32.8%, followed by American Indian/Alaska Natives at 27.2%, compared to an overall average of 24.8%. Figure 2 shows that adults in households below the poverty level have consistently had the highest rates of hypertension (30.5% in 2018), followed by adults in households between one and two times the poverty level (29.2% in 2018), followed by adults in households over two times the poverty level (23.3% in 2018) (U.S. Environmental Protection Agency, 2024b).

Asthma and Childhood Asthma

Certain groups such as children and the elderly tend to be more vulnerable to asthma, yet particle pollution seems to impact asthmatic children more than asthmatic adults. The prevalence of asthma tends to be greater in people of color and those of lower socioeconomic status, which may be due to environmental factors such as housing conditions or proximity to air pollution. The prevalence of asthma and asthma-related emergencies is, likewise, greater in children of color (U.S. Environmental Protection Agency, 2024 a).

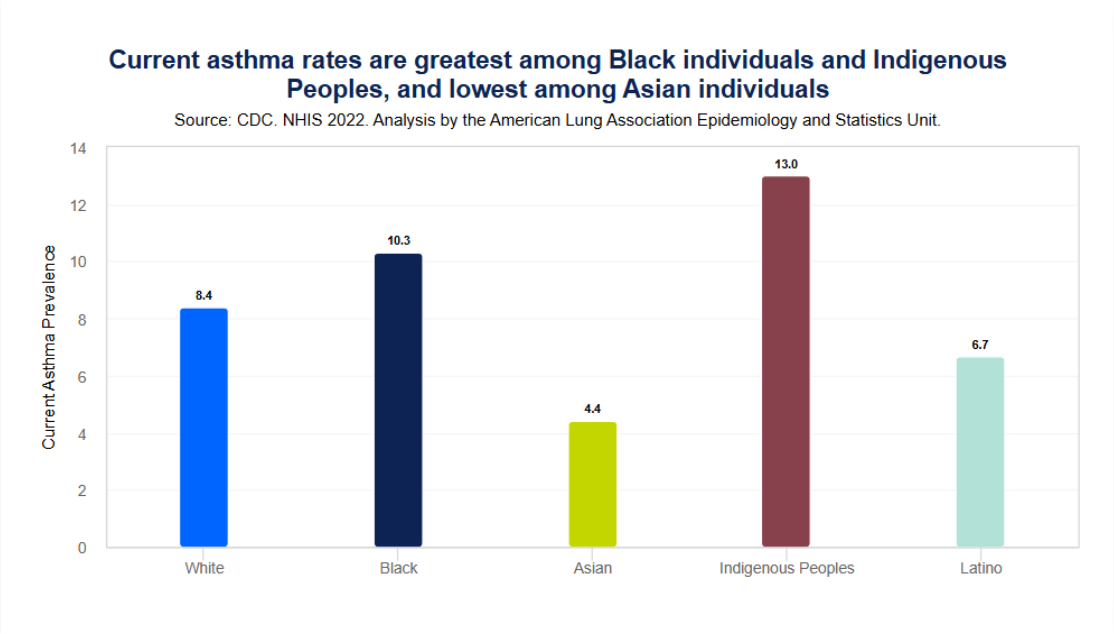


Figure 3: Asthma Prevalence Rates based on Race

Source: CDC, NHIS 2022. Analysis by the American Lung Association Epidemiology and Statistics Unit.

Different air pollutants have varying effects on the development and symptoms of asthma:

- Nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and ozone (O_3): exacerbate asthma symptoms after short-term exposure.
- NO_2 and O_3: likely causal relationship between NO_2 and O_3 with the development of asthma after long-term exposure.
- NO_2, SO_2, and O_3 originate primarily from the combustion of fossil fuels in power plants, industrial facilities, and vehicles, with the majority coming from burning coal in power plants.

The graphs from the EPA's *Indicators of Environmental Health Disparities: Childhood Asthma Prevalence* report show the prevalence of asthma in children (age 0–17) in the

United States from 2005 to 2023 across race/ethnicity and socioeconomic status (U.S. Environmental Protection Agency, 2024a). Of note is the erratic year-to-year changes in asthma for American Indian/Alaska Natives, which is partially attributed to limited data availability.

Figure 4: Percent of People with Asthma, Aged 0-17 by Race/Ethnicity

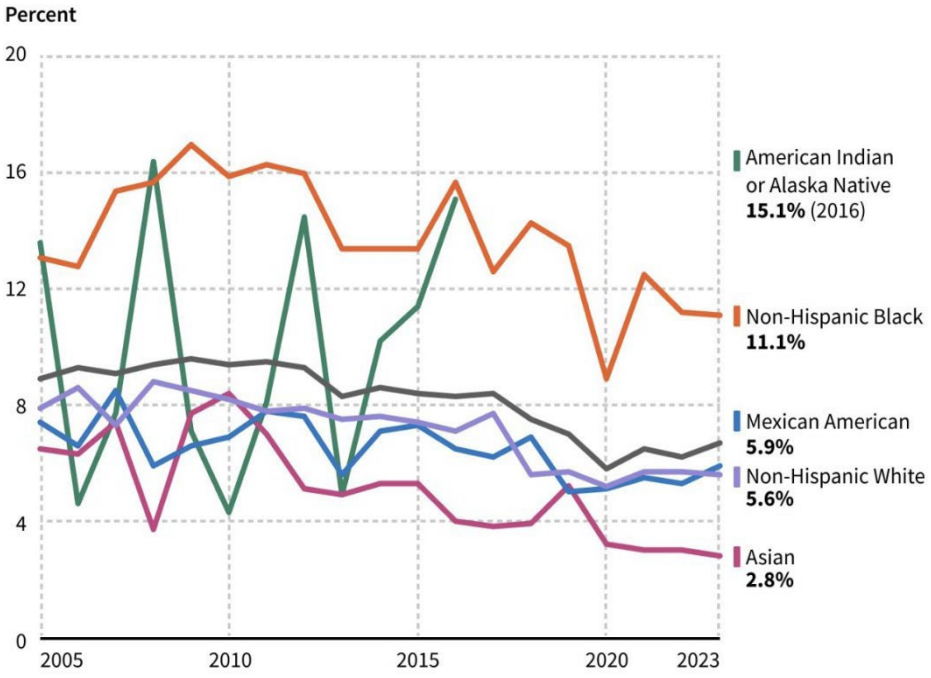


Figure 5: Childhood Asthma by Poverty Level Percent

For those below the poverty level, the age-adjusted percentage of children with asthma in 2023 was 9.7%, compared to 7.2% for those one to two times the poverty level (U.S. Environmental Protection Agency, 2024a).

Cancer Incidence Rates (American Cancer Society)

The North American Association of Central Cancer Registries looked at cancer incidence and mortality rates among demographic groups based on race/ethnicity and concluded that cancer incidence and mortality rates were highest among American Indian/Alaska Native persons (American Cancer Society, 2025).

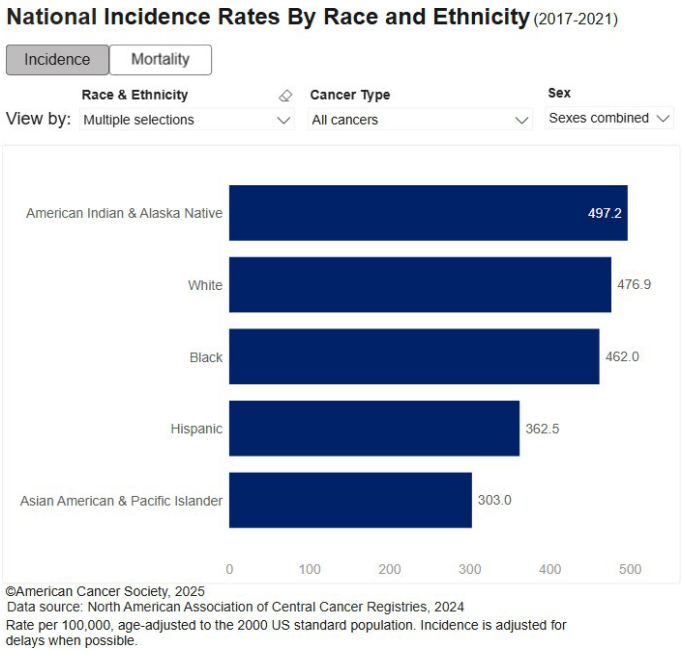


Figure 6: National Incidence Rates By Race and Ethnicity (2017-2021)

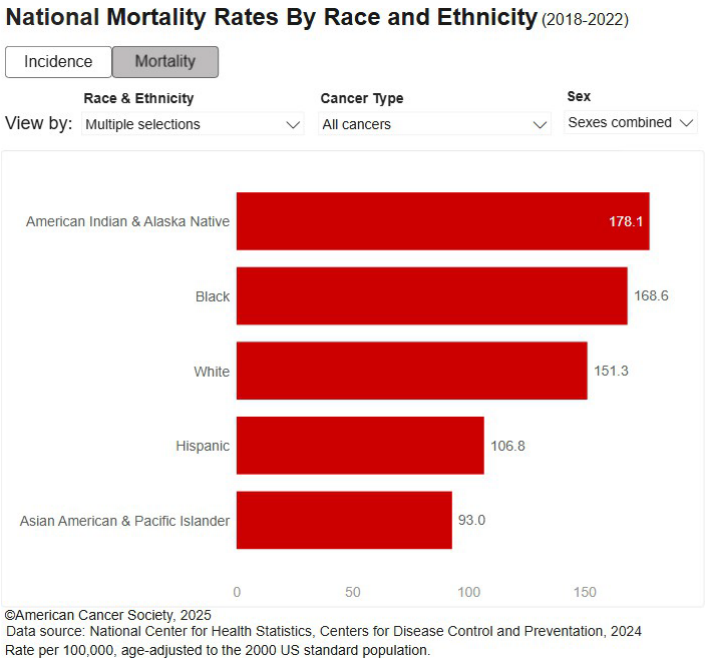
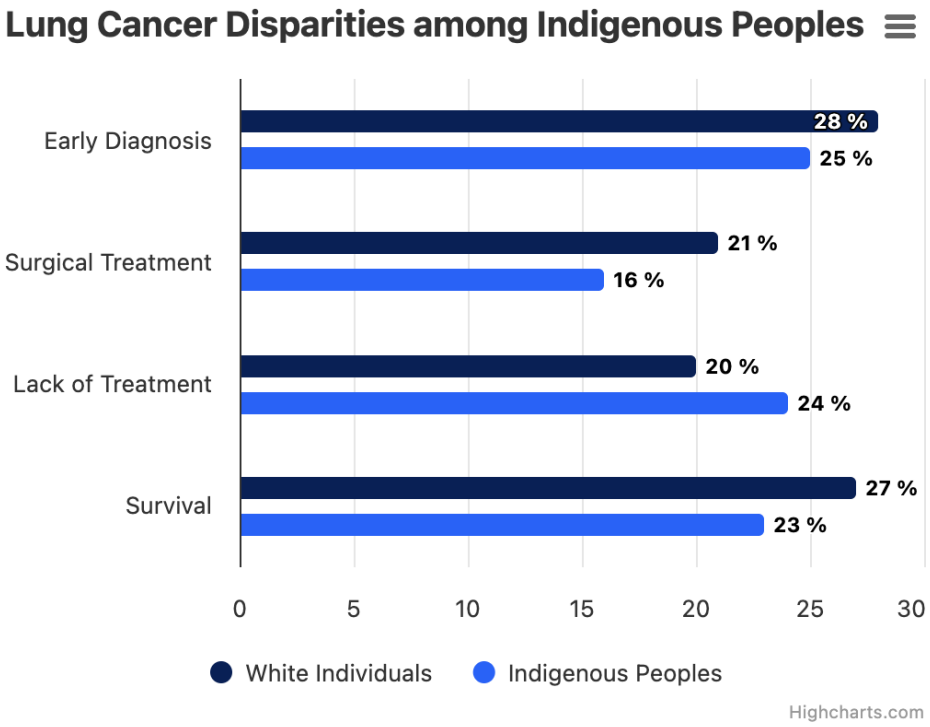


Figure 7: National Mortality Rates By Race and Ethnicity (2018-2022)

Lung Cancer Health Disparities

According to the American Lung Association's *State of Lung Cancer* report, Indigenous Peoples (American Indians/Alaska Natives) with lung cancer were 12% less likely to be diagnosed early, 24% less likely to receive surgical treatment, 20% more likely to not receive any treatment, and 15% less likely to survive five years compared to White individuals (American Lung Association, 2023).



Source: State of Lung Cancer: 2023 Report, "Racial and Ethnic Disparities," American Lung Association.

Figure 8: Lung Cancer Disparities among Indigenous Peoples

Lung cancer is the leading cause of cancer deaths worldwide. Even though more evidence is needed linking air pollution to other types of cancer, "there is clear and substantial evidence of a link between outdoor ambient air pollution, and particularly particulate matter (PM) in outdoor air, with lung cancer incidence and mortality, causing hundreds of thousands of lung cancer deaths annually worldwide" (Turner et al., 2020, p. 1). In a 2022 study from the Columbia University Mailman School of Public Health comparing air pollution in American Indian communities to that in non–American Indian communities, concentrations of $PM_{2.5}$ rose significantly from 2000 to 2018 in American Indian communities, on average 0.66 $\mu g/m^3$ higher (Li, 2022). Thus, American Indian communities tend to have poorer air quality and higher incidence rates of cancer. Furthermore, American Indians and Alaska Natives are less likely to be diagnosed and receive treatment and more likely to die of lung cancer.

Life Expectancy

Life expectancy is a metric generally used to examine the overall health of a population and allows for comparison between different populations. Life expectancy is defined as "the average number of years at birth a person could expect to live if current mortality trends were to continue for the rest of that person's life" (U.S. Environmental Protection Agency, 2024).

The graphs from the EPA's *Indicators for Environmental Health Disparities: Life Expectancy* show life expectancy at birth by race in the United States from 2006 to 2021. Overall, life expectancy at birth has been generally increasing since 1970, but in recent years has decreased (Figs. 8 and 9) (U.S. Environmental Protection Agency, 2024). In 2021, life expectancy for people identifying as American Indian/Alaska Native was lowest, at 65.6 years, considerably lower than the overall average of 76.4 years.

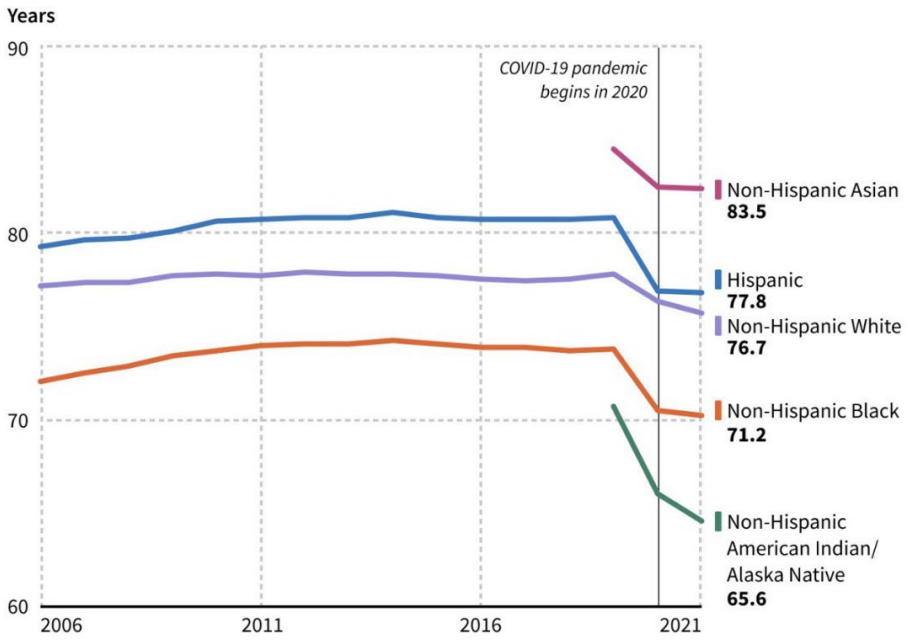


Figure 9: Life Expectancy by Race/Ethnicity

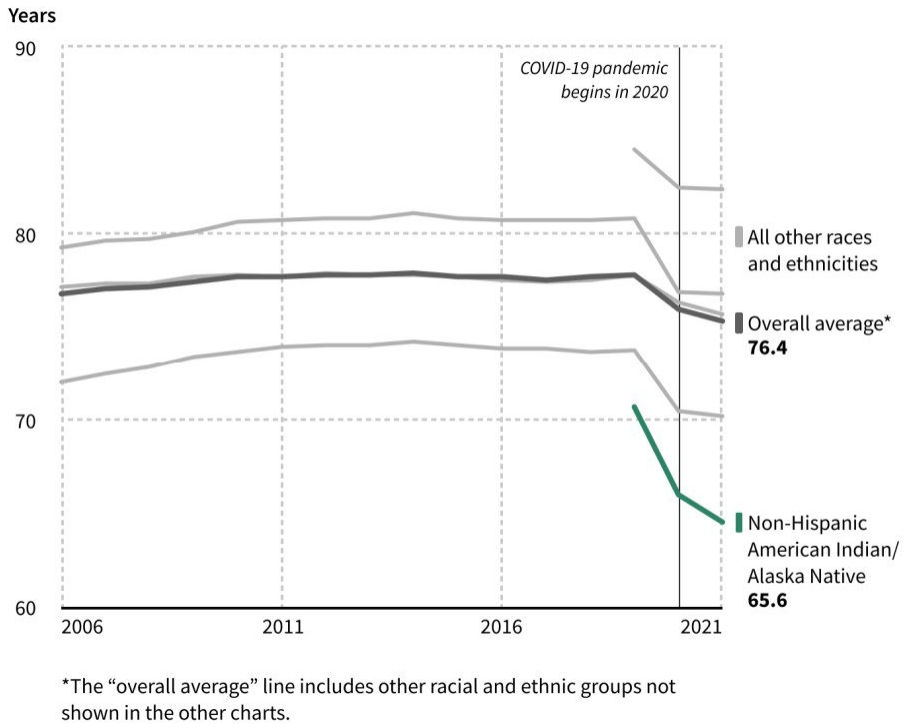


Figure 10: Disparities in Life Expectancy by Race and Ethnicity

In summary, data shows that American Indians/Alaska Natives are disproportionately affected by hypertension, asthma, cancer, and a life expectancy that is 10.8 years lower than that of the general U.S. population. There is an apparent correlation between socioeconomic status and health outcomes, much of which can be attributed to systemic inequalities such as poor access to medical care, inordinate exposure to environmental contaminants, and poorer air quality. This in turn leads to higher rates of asthma, hypertension, and cardiovascular illnesses and higher incidence and mortality rates of cancer.

These health disparities could potentially be improved with more air quality data, education on air contamination and health effects, and knowledge on how to advocate for better air quality in Indian Country.

TECHNICAL ASSISTANCE AND TRAINING

Tribal Air Monitoring Support Center Collaboration and Technical Support Services

The Tribal Air Monitoring Support (TAMS) Center is a collaboration between the Northern Arizona University (NAU) Institute for Tribal Environmental Professionals and the U.S. EPA National Center for Radiation Field Operations, which provides technical support services to federally recognized Tribes nationwide. The current TAMS services include technical professional assistance (PA) in the general areas of project planning, equipment support, data management, data analysis, data reporting, quality assurance documentation development, and equipment loans. The NAU ITEP side of the collaboration is responsible primarily for the one-on-one technical assistance and training, while the U.S. EPA oversees the equipment loan program and the Virgil Masayesva Environmental Learning Center (TAMS training/meeting room).

TAMS Center Services

In FY24, the Tribal Air Monitoring Support Center technical support services were used extensively. In the previous two years, grants to upgrade air monitoring equipment were provided to state and Tribal programs. As a result, the TAMS Center received increased air monitoring project PA requests. PA projects can vary in length and can be multiple weeks long. Typically, the in-person PA projects are the equipment support requests where the TAMS staff travel to the Tribes to install, provide training, and/or troubleshoot the air monitoring equipment. For these PA projects, PA reports are generated to document the request and all options to remedy the issue. The summary of one example is provided below. PA reports that are approved to be shared by the Tribes will be posted on the TAMS webpage. A summary of a PA from 2024 follows.

TAMS Services	Count
Air Monitoring Equipment	47
Emissions Inventory	17
Online QA Fundamentals	9
Tribal Data Toolbox	8
Online EI-Fun/EI-Adv	19
Data Management/Reporting	78
QA Documentation	18
Online Writing a QAPP	10
TEISS	10
AQS	8
CPRG Support	22
Data Analysis	3
Equipment Loans	15

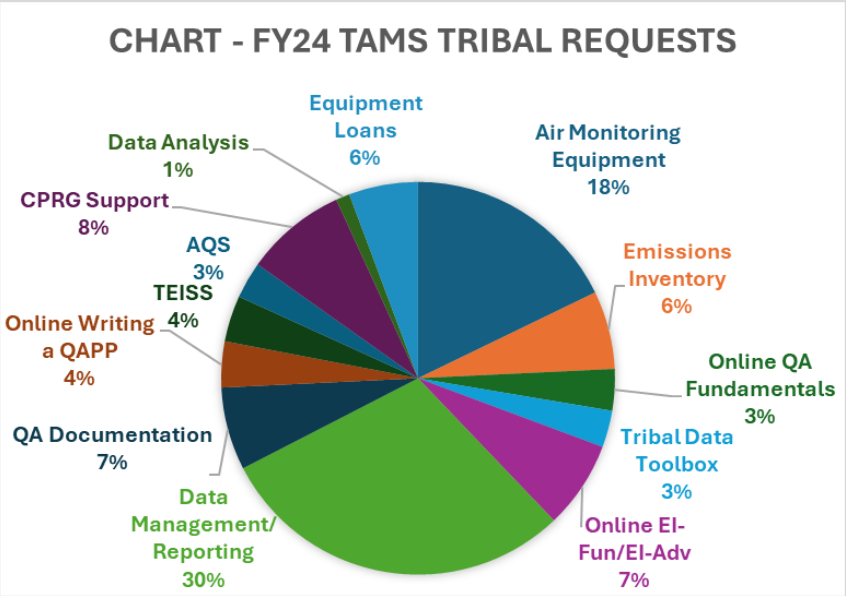


Figure 11: TAMS Services and TAMS Tribal Requests

Spirit Lake Nation PM Air Monitor PA

A PA request from the Spirit Lake Sioux Nation was received on May 28, 2024. Between June 13, 2024, and March 10, 2025, remote assistance was provided via the Zoom platform to assist with the assembly, operation, and maintenance of a Met One Instruments BAM 1020 monitor. The BAM 1020 monitor was acquired from a neighboring Tribe and equipped with a stand-alone, all-weather enclosure. The BAM 1020 was configured with a second stage separator (Very Sharp Cut Cyclone) to measure and record particulate matter with an aerodynamic diameter of 2.5 µm or less ($PM_{2.5}$). The BAM 1020 monitor is sited to measure $PM_{2.5}$ in ambient air and provide baseline data to support air quality advisories and management. The TAMS Equipment Loan Program also loaned calibration and audit standards to the Tribe. A PA report detailing the activity was shared with the Tribe.

In-Person Workshops and Online Training Courses

ITEP offers air quality training courses under the American Indian Air Quality Training Program (AIAQTP) cooperative agreement with the U.S. EPA. In 2024, ITEP and TAMS offered 10 in-person air quality workshops, with three of those workshops hosted at the TAMS Center. The three workshops hosted by the TAMS Center were Fundamentals of Air Monitoring, $PM_{2.5}$ Air Monitoring, and Air Quality Education and Outreach in Tribal Communities. Other ITEP in-person workshops offered include:

- Introduction to Air Quality
- Tribal Air Grants and Program Management
- Indoor Air Quality in Tribal Communities
- Air Pollution Science and Technology

ITEP's AIAQTP also offers online asynchronous air quality courses and tutorials. These courses are available at no cost to Tribes and can be taken at any time of the year. These courses include:

- After a Wildfire: Health and Safety Considerations
- Managing Road Dust in Tribal Communities
- Residential Wood Stove Operation and Maintenance
- Air Quality Planning for Wildland Smoke
- Radon Fundamentals
- Quality Assurance Project Plans
- Emission Inventory Fundamentals
- Emission Inventory Advanced

The combination of in-person workshops, online courses, and technical assistance offered by the TAMS Center supports federally recognized Tribes to advance their air quality management programs to better meet the human health and environmental management goals of Tribal communities.

$PM_{2.5}$ Air Monitoring course participants in front of the TAMS Center, Las Vegas, Nevada, December 16, 2024 Photo credit: TAMS Center

NTAA PRIORITIES

As an informational conduit, NTAA recognizes that all Tribes are unique with their own cultures, languages, and types of governance. In providing support for NTAA member Tribes, the organization strives to be mindful, to listen to each Tribe, and to continually encourage the U. S. Environmental Protection Agency (EPA) and other federal agencies to recognize that each Tribe knows what is important for their own communities.

Common themes stand out in a few of the issues and needs that face Tribes across Indian Country. To support identifying priorities, NTAA acquires regular feedback by interacting with Tribes throughout the year through meetings, webinars and updates provided by the NTAA Executive Committee for each region. The following is information garnered from some of these interactions on nationally consistent priorities identified by Tribes.

Regulations and Policy	Ambient Air Quality • Criteria Pollutants • Support for Tribes in developing TIPs and permit programs • Air Quality Assessment via Tribal monitoring, emissions inventory and data collection and management • Data Collection and Management • Permitting • Climate Adaptation • Emerging Pollutants PFAs/PFOs and 6PPD/6PPDq • Radon & SIRG • Indoor Air Quality • Air Toxics
Funding	• FY26 Request $85.25Million • Provide and expand Tribal set-asides in current and new funding ○ SIRG • DERA grants - focused outreach
Consultation	• Honor Tribal Sovereignty • Government to Government Relationship • Meaningful Collaboration and Input • Tribes as regulatory partners, not DEI

Funding

Adequate and consistent funding continues to be a priority for NTAA. In FY24, there were a number of funding sources for Tribal air programs, such as State and Tribal Assistance Grants (STAGs), IRA, SIRGs, and Diesel Emissions Reduction Act (DERA) grants. The following is a discussion of each for FY24 and of the ongoing need moving forward.

The promulgation of the Tribal Authority Rule in 1998 implemented Section 301(d) of the CAA, allowing Tribes to be treated as states for implementing the CAA. Since that time, federally recognized Tribes in the United States have competed for STAG funding as well as other funding programs for state and local air agencies that address air quality issues. The largest funding source continues to be the STAGs. For the most part, funding for Tribes has remained flat at $12.5 million, although in FY23 Tribal air funding increased by $3 million to $15.5 million, available to Tribes.

For the FY24 budget recommendation, NTAA determined that the funding needed to support Tribal air programs amounted to nearly $79 million. Tribal air programs include but are not limited to ambient air quality assessments, monitoring, emissions inventories, data collection and management, permitting, regulatory programs, outreach, and indoor air quality.

Past STAG Funding

Fiscal Year	Funding Recommendations: Tribal Air Programs and Climate Change Programs	Funded
FY23	$57 million	$12.5 million
FY24	$79 million	$15.5 million
FY25	$79 million	Currently Unknown

FY27 Future Funding Request for STAGs

Fiscal Year	Funding Recommendation for Tribal Air Programs	Average Inflation Rate	Average Civilian Worker Wage	Equipment Cost
FY26	$79 million + (2.69 million+3.32 million+.24 Million) $85.25	Increase 2023: 3.4%[2] $2.69 million	Increases for 2023: 4.2% $3.32 million	Increase: 0.3% $.24 million
FY27	$85.25 million + **Total Request for FY27 $94 Million**	Average Inflation Rate Increase for 2024 is 2.9%[3]	Average Civilian Worker Wage Increases for 2024 3.8%	Equipment Cost Increase 3.3%

Because there has been significant air quality program expansion and because more Tribes are seeking new air program funding, the growth in programs is greatly outstripping the available resources. As a result, NTAA is recommending $94 million for Tribal air programs for FY26. An increase in funding would meet the previously

identified need while addressing inflation. Likewise, an increase in funding would demonstrate the recognition of federal responsibility to respect the sovereignty and self-governance of American Indian Tribes and Alaska Natives along with commitments to ensure federal funding and support for air quality programs.

Other important sources of funding for Tribal air programs ensure public health needs are met. NTAA supports ongoing funding and Tribal set-aside from these funding sources, guaranteeing Tribes continue to have access to these funds. These sources include the following.

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[2] U.S. inflation calculator : https://www.usinflationcalculator.com/inflation/current-inflation-rates/#:~:text=To%20find%20annual%20inflation%20rates,average%20inflation%20rate%20was%204.1%25.

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[3] https://www.usinflationcalculator.com/inflation/current-inflation-rates/#:~:text=To%20find%20annual%20inflation%20rates,average%20inflation%20rate%20was%204.1%25. US Inflation Calculator

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State and Tribal Indoor Radon Grants—FY24 Allocation $9.1 Million (Most Recent Year Available)

In FY24, EPA revised the SIRG allocation methodology and allowed the Regions to establish Tribal set-asides. As of September 2024, 88% of the funding was awarded, including three new Tribal grantees. Tribal awards set-asides were approximately 6% of the total (ranges differ by Region). NTAA appreciates the effort of EPA to increase Tribal participation in SIRGs. NTAA encourages ongoing support for Tribal set-asides and consistent outreach to the Tribes from Region to Region.

Diesel Emissions Reduction Act—Tribal and Territory Set-Aside Competition: FY22 and FY24

In FY22, the Diesel Emissions Reduction Act (DERA) Tribal and Insular Area grants competition awarded over $7 million in grants for diesel emissions reduction projects for Tribal governments or inter-Tribal consortia. EPA did not offer a funding opportunity for Tribal DERA in FY23. In FY24, EPA offered $8 million in DERA funding under the DERA Tribal and Territory Notice of Funding Opportunity (NOFO). The awards for this grant competition will be announced in FY25 after the completion of this report. NTAA supports the ongoing Tribal set-asides for these important funding sources.

CAA Sections 135 and 137 IRA Funding

The Climate Pollution Reduction Implementation Grants (CPRG) Program had a Tribal and territory set-aside for 2024; 34 grants out of 110 applicants were awarded (one to a territory). This means one in three applicants received grants. This also demonstrates the level of unmet need in Indian Country.

REGIONAL PRIORITIES

The NTAA staff sent a poll out to the Tribes to gauge priorities in each Region. The following is a summary of that poll.

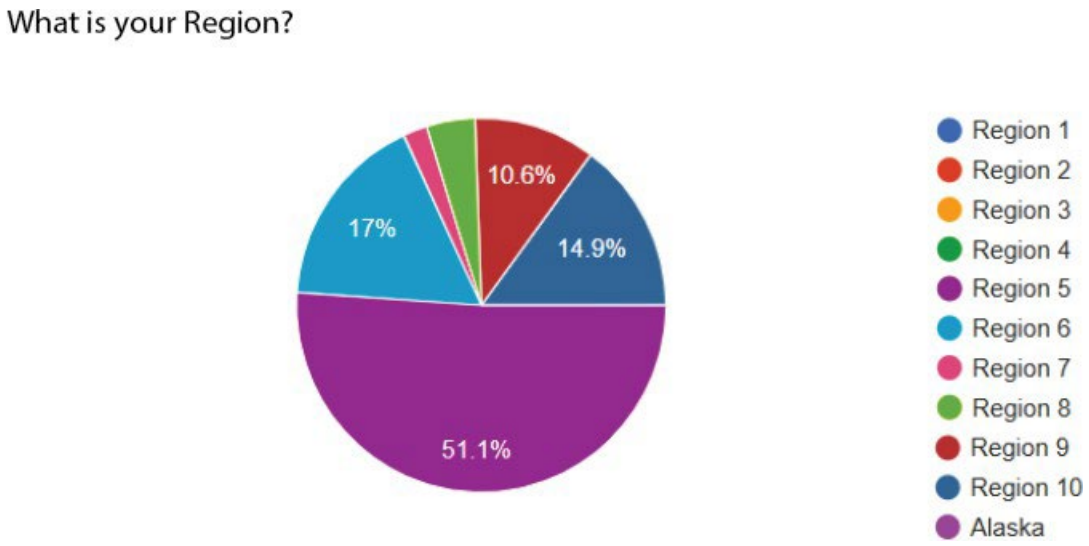

Figure 12: Regional Priorities Responses

Note: Regions 3 and 4 did not have representation

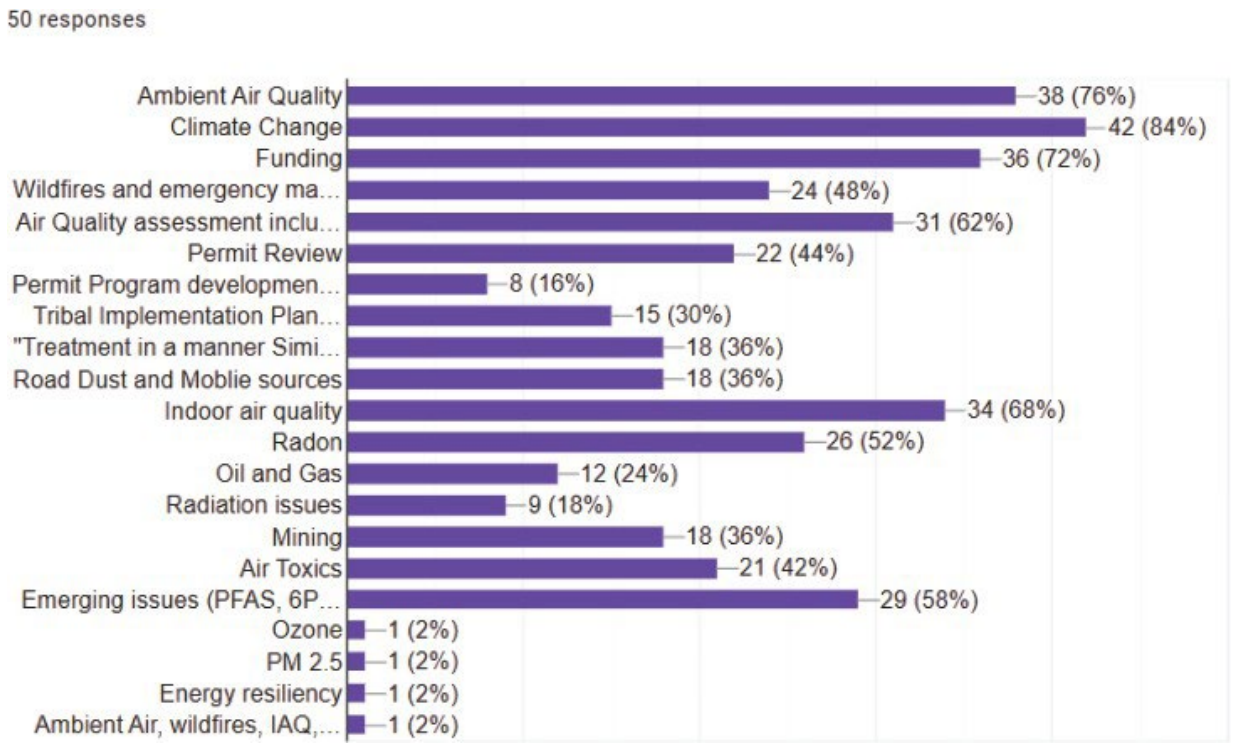

Figure 13: Priorities by Percentage

If “Other,” please specify what other issues are a priority?

- Proper consultation
- Funding and indoor air quality
- Indoor ventilation
- Winter ozone
- Reliability of funding, the need for recurrent funding (not more projects)
- Backhaul hazmat
- Outreach
- Attainment vs nonattainment

- Energy resiliency (microgrids, battery energy storage systems, heat pumps, passive solar heating/thermal mass/convection cooling/smart building designs, natural gas transmission and distribution, microscale power generation)
- Ambient air, wildfires, indoor air quality (IAQ), mining, permit review, climate change, emerging issues (PFAS)

TRIBAL CASE STUDIES

Case Study: Southern Ute Indian Tribe Takes Regulatory Authority of Minor Air Pollution Sources

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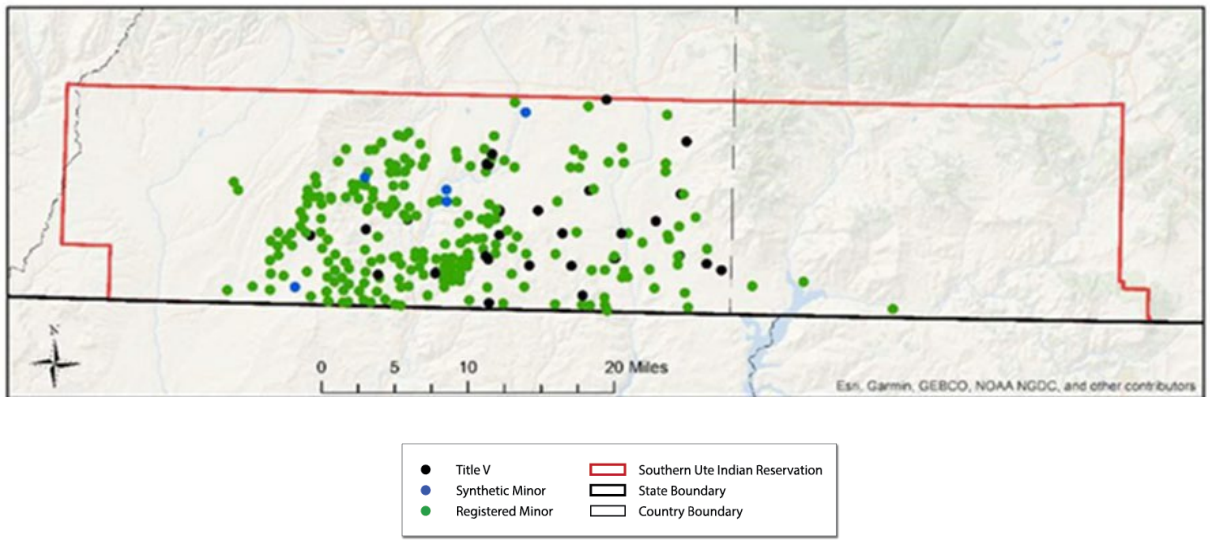
The Southern Ute Indian Tribe (SUIT) in Colorado received delegation of Tribal New Source Review (NSR) on June 11, 2024. In this action SUIT added to their approved Title V program, and they are now the primary permit authority for both major and minor sources of air pollution sources on their reservation.

In 2023 the Southern Ute Indian Tribe had 2,932 sources of air pollution, of which approximately 230 were minor sources. There were also 33 Title V sources, constituting 13% of all Title V sources in Colorado. Title V sources of air pollution are major stationary sources that emit or have the potential to emit large amounts of air pollutants.

Pollutants emitted per year:

- 100 tons or more of any regulated air pollutant
- 25 tons or more of reactive organic compounds or nitrogen oxides
- 10 tons or more of a single hazardous air pollutant (HAP)



Location of major and minor sources of air pollution on the Southern Ute Indian Reservation. Source: SUIT Air Program Division

The Tribe's air quality management program includes several delegated regulatory CAA programs, including:

- Title V operating permit program approved in 2012
- New Source Performance Standards (NSPS) and Maximum Achievable Control Technology standards

Standards:

- Tribal Minor New Source Review program

  Federal Implementation Plan for True Minor Oil and Gas Source in Indian Country

  The Tribe has planned and is in progress adopting CAA authorities for implementation Oil and Gas rules including:
- Adoption of NSPS OOOOb[4]
- Adoption of NSPS OOOOc[5] as a Tribal Implementation Plan

It has been a main goal of the Tribe and its environmental commission to obtain delegation of the core CAA programs and to obtain maximum jurisdiction over these sources. Currently, the Tribe has a delegation of three of the five core CAA programs,

[4] OOOOb Standards of Performance for New Reconstructed and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review

[5] OOOOc Implementing Emissions Guidelines for existing oil and gas sector sources.

which includes Minor New Source Review and Title V Permitting Programs. The Title V operating permit program is one of two core CAA permitting programs, with one being the NSR (aka, preconstruction permit program), required before construction or modification of a source, and the Title V program, an operating permit program for existing major sources.

A glycol dehydration unit at a natural gas compressor station: one of many synthetic minor sources of air pollution on the Southern Ute Indian Reservation. Photo: SUIT Air Quality Division

The Tribe received delegation of the Title V program from EPA in 2012. This was one of the first Tribal Title V program delegations approved by EPA. The purpose of the Title V program is to be a "catalog" permit, which includes all of a source's CAA applicable requirements in a single permit. Having all requirements in one permit benefits the source operator to stay in compliance and to help the public understand all of a source's compliance requirements.
Notable features of the Title V program are a required annual self-audit performed by the operator and submitted to the permitting authority, which details their compliance or noncompliance with every single permit term. The program also provides the permit authority with the ability to add enhanced monitoring, recordkeeping, and reporting for applicable requirements that are lacking monitoring, recordkeeping, and reporting sufficient for the permit authority to determine compliance.

Notable achievements and benefits of the Tribe administering the program include increased Tribal self-governance, more frequent and more in-depth source inspections than previously performed under EPA's jurisdiction, and a local presence, which enables more face-to-face interaction with operators and ability to inspect sources. This has resulted in increased compliance with the reservation under the Tribe's administration of the programs.

Current achievements in implementing Title V include:

Compliance

- Inspects each source at a minimum of every two years
- Evaluates compliance with the Title V permit
- Completed over 155 inspections to date

Enforcement

- Enforce for non-compliance with terms of a Title V operating permit
- Completed over 40 cases to date with civil penalties of nearly $2 million

SUIT Air Program Division

Photo: Divine Windy Boy, The Southern Ute Drum

Building on the success of the Title V program, the Tribe has now obtained delegation of minor NSR as well. SUIT will now issue permits and provide inspections for approximately 230 minor oil and gas sources, seven synthetic minor oil and gas sources, and multiple minor sources in other categories. Not only will SUIT issue permits to these sources, but they will conduct inspections and ensure compliance with the permits.

The overarching goal of these programs is improved CAA compliance and air quality through increased regulatory oversight. Delegation of authority will also aid in simplifying air permitting on the reservation with the Tribe as the permitting agency for

minor NSR and Title V permitting. Each true minor source will be inspected according to a five-year compliance monitoring schedule.

This delegation levels the playing field by ensuring that minor sources on the SUIT Reservation are inspected for compliance with CAA regulations similarly to those sources of the SUIT Reservation.

See footnote for more information about the Southern Ute Indian Tribe's environmental management programs. [6]

[6] https://www.southernute-nsn.gov/government/department

Case Study: Confederated Tribes of the Umatilla Indian Reservation (CTUIR) CASTNET Air Monitoring

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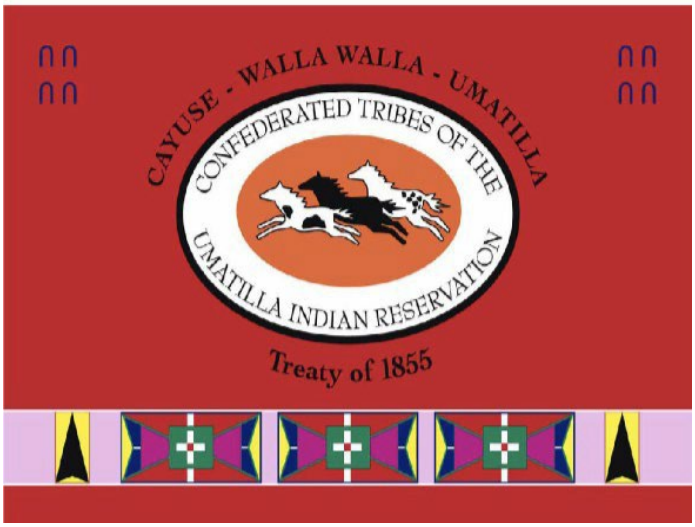
Caleb Minthorn, Umatilla Indian Reservation



Confederated Tribes of the Umatilla Indian Reservation (CTUIR) hosts CASTNET (Clean Air Status and Trends Network) Site UMA009, a monitoring platform in southeast Washington, five miles south of Dayton. The project was possible due to an EPA Multipurpose Grant that the Umatilla Tribe's Office of Air Quality (OAQ) applied for in the spring of 2020. Air Quality Technician Caleb Minthorn and Energy and Environmental Sciences Program (EESP) Manager Mason Murphy applied for, received, and deployed the Multipurpose Grant funds all within the same calendar year to get the CTUIR CASTNET project into sampling. In November 2020, an EPA contractor completed installation of the system. The CTUIR OAQ had been running an ozone sampler filter pack, powered by an apex mass flow control system. The filter pack sampled for sulfur and nitrogen analytes, with a passive ammonia sampler installed on the CASTNET Tower. Additional monitoring efforts were negotiated in 2021. Newly acquired funds (on top of CAA 105 base funding) allowed for equipment to be procured from the National Trends Network. By January 1, 2022, the

new equipment was installed by Technical Air Lead Matthew Campbell, former EESP Instrument Technician Gabe Jones, and Air Quality Technician Caleb Minthorn. National Trends Network and National Atmospheric Deposition Network sampling campaigns revealed that low levels of mercury were detectable in southeast Washington. However, only limited sampling could occur due to congressional holds being placed on PFAS data. In 2025, five years after the original CASTNET was installed, CTUIR is actively collecting up to 10 data points each week, including $PM_{2.5}$. $PM_{2.5}$ data is important to collect because of wildfires in the Umatilla National Forest, which is only 10 to 20 miles away from the UMA009 site. As the project continually expands, the Umatilla Tribe OAQ is looking to gain insight and knowledge on how this work will protect the airshed while offering a learning opportunity with their funding sponsors, project officers, Tribal public, and higher learning institutions.

Case Study: Quinault Senior Program Firewood Woodsheds

Cody Cook-Winscher, Quinault Indian Nation

Many of Quinault's Tribal Elders prefer woodstoves for the production of indoor heat due to cultural significance, comfort, and other factors. Woodstoves can be a reliable and relatively clean source of indoor heating; however, their efficiency and what they emit are highly dependent on the wood burned. Wet, unseasoned firewood releases far more pollutants when burned than dry, aged firewood. This thicker woodsmoke not only adversely affects the local ambient air quality in Quinault's villages but in most cases will also impact the indoor air quality in homes burning wet wood.

To address the need to provide dry, seasoned firewood for Quinault's Elders, we requested and were granted EPA funding to build two secure and covered pole buildings for firewood storage. One shed would be built for Taholah Village and one for Queets Village. The design, placement, and operational plans for these woodsheds were created through a multi-department collaboration in Quinault's governance. This collaboration included the Air Quality Program, Senior Program, Forestry Department, Planning Department, Community Development, and Quinault's Land and Timber Enterprise.

The Senior Program receives requests from approximately 29 Tribal members each year for firewood, and they state at least 10 cords of firewood are needed each winter. Quinault's Land and Timber Enterprises provides lumber (generally fir or hemlock) to the Community Development department free of charge to meet this need. Community

Development staff then prepare the wood by cutting it, allowing it to age in the open air over the summer and under cover through the wet season. After a whole year of seasoning, the dry, aged wood is moved into the woodsheds. The wood is then transported by the Senior Program to Elders who have placed requests. Records are kept on how much wood is given out, who it was given to, and whether the household's woodstove may have performance issues.

The impact of the woodsheds program has been gratifying, as Elders who have benefited from the dry, seasoned firewood have voiced their appreciation. However, the Air Quality Program has plans to further develop and improve the program going forward. Currently, moisture meters for the Community Development staff who prepare finished firewood are being procured to verify the prepared wood is optimally dry. Additionally, the Air Quality Program and Senior Program are in the process of developing a survey for Quinault's woodstove-using Elders to determine which homes would most benefit from an upgrade. Simultaneously, grant funding options are being considered to facilitate the most needed woodstove replacements. This woodstove replacement program will be accompanied by EPA Burn Wise materials and Air Quality Program outreach to ensure beneficiaries know best practices for woodstove use that will keep their homes warm and air pure.

What was the funding source (CAA 103, General Assistance Program, IRA Grant, etc.)?

A mix of CAA 103 and Public Law 105–65 (Appropriations Act/Performance Partnership Grant) grant funding and Quinault's own funds.

If funded by a grant, how much was requested?

Although we didn't specifically apply to the Appropriations Act funds for the sake of this project, we applied for $22,838 in CAA 103 funds specifically for the purpose of constructing these woodsheds.

If funded by a grant, how much did you get?

We received $22,838 in CAA 103 funds. While the Performance Partnership Grant funding was not directly applied to this project alone, its contribution to the project totaled $37,162.

What worked and what didn't in accessing funding?

As far as I'm aware, everything in accessing the funding went swimmingly. The turnaround time from EPA's receipt of our application (5/24/2023) to the award letter was only about two and a half months (8/7/2023).

Was the process smooth? Well-handled?

There were no hiccups in the award process. The disbursement of the funds was prompt and in line with the expected schedule.

Was the funding competitive?

The funding from CAA 103 was, but not the funding from either the Appropriations Act or of course Quinault's own budget.

Taholah Woodshed (Front View)

Taholah Woodshed (Side View)

Case Study: Eastern Band of Cherokee Indians Air Quality Program

Katie Tiger, Eastern Band of Cherokee Indians, Air Quality Program Supervisor

The Eastern Band of Cherokee Indians (EBCI) initiated ambient air monitoring in 1999 as an environmental protection effort in response to growing concerns about air quality in relation to human health, culturally significant natural resources, and loss of visibility. The primary objective of the EBCI Air Quality Program (AQP) is to protect human health and natural resources by identifying any violations of the criteria pollutants (ozone and $PM_{2.5}$) National Ambient Air Quality Standards (NAAQS) within the EBCI boundary. Over the years the AQP has grown into much more than the standard ambient air monitoring program. The EBCI AQP strives to implement renewable energy and fuel

solutions to reduce air pollution and greenhouse gas emissions in the Region. EBCI AQP staff are leading ongoing efforts with federal, state, and university partners to create long-term climate resilience plans and strategies for the EBCI community. Aside from the normal ambient air monitoring efforts, here are a few recent projects that were initiated and implemented by the EBCI AQP.

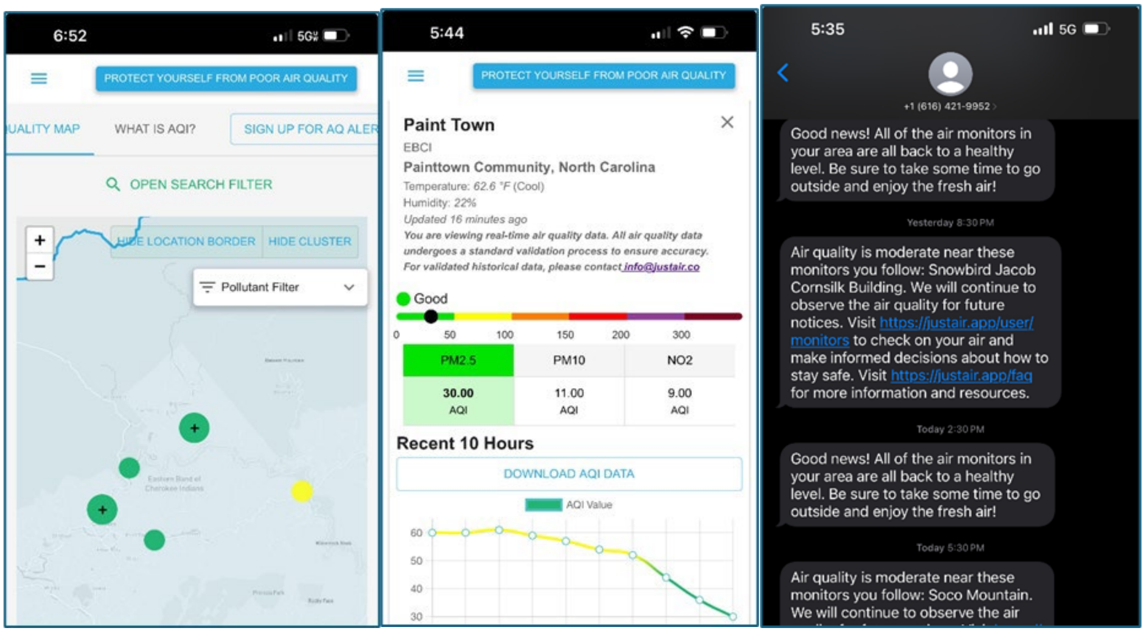
Sensor Network and Community Alert System

The EBCI AQP established a boundary-wide air quality sensor network and alert system to enable community-level characterization of air quality pollutants. A critical piece of establishing this sensor network involved community engagement to raise awareness around EBCI AQP monitoring efforts, inform the placement of air quality sensors across Tribal communities, and guide the development of an early warning system and real-time data dashboard to map, monitor, and visualize air quality.

The air quality sensor network was implemented and informed by the community engagement efforts and consists of Clarity Node particulate matter and NO_2 sensors, along with meteorology and ozone add-on modules.

The EBCI AQP has placed Clarity Nodes in each of the nine EBCI communities. These sensors were selected because they are powered using solar power and use a cellular modem for data acquisition, which works best in the remote areas of EBCI and U.S. Forest Service lands. All the sensors are connected to the public-facing air quality dashboard and community alert system through JustAir.app. The JustAir system sends text alerts to subscribers when the EBCI air quality is a concern for public health.

The EBCI AQP hopes that by engaging the community from the beginning, they will be invested in this initiative and be informed when the air quality is impaired from fire on the EBCI landscape for forest and cultural resource management efforts. This initiative is supported by the overarching co-stewardship plan with the U.S. Forest Service.



Screenshots of the JustAir public-facing dashboard and community alert system.

Climate Change Partnership—The Carolinas Collaborative on Climate, Health, and Equity

E-lo-hi a(d)-ste-da-li-sgv-I or *ᎡᎶᎯ Ꭰ(Ꮥ)Ꮝ Ꮦ Ꮣ ᏂᏍ Ꭼ Ꭲ* or The Earth, It Is Changing

EBCI AQP has partnered with the Carolinas Collaborative on Climate, Health, and Equity, which is a multi-institutional team of physical and social scientists, community leaders, researchers, outreach professionals, and students building community partnerships to advance climate resilience and health equity in the Carolinas. EBCI agreed to a five-year memorandum of understanding with this group, which is funded by the National Oceanic and Atmospheric Administration's Climate Adaptation Partnerships program.

The goal of this partnership is to create a climate action road map for EBCI to implement government-wide to prepare the EBCI community and land for the predicted changes in the local climate resulting in drought, extreme heat, extreme precipitation, and wildfires. To date, this group has created government and community climate surveys and climate profiles for the EBCI lands and recorded oral histories of Cherokee Elders and language speakers.

The group wanted to include the oral history component of this project because they didn't want this to be just another plan for EBCI, they wanted to ground this climate

action roadmap in the oral histories of Tribal Elders and demonstrate the importance of connection to this place. To do this, a small team of community members were trained to carry out these interviews with Tribal Elders in both English and the Cherokee language. The oral histories recorded will build the foundation of the EBCI Climate Action Roadmap.

Results of the community and government surveys:

- The top climate concerns are 1) wildfires, 2) extreme heat, and 3) flooding.
- 77% of respondents agreed that Cherokee, North Carolina is experiencing the effects of climate change now.
- 36% agreed that staff are knowledgeable about the potential impacts of climate change.
- 75% agreed that preparing to deal with the effects of climate change should be an important priority for the Tribe.
- 53% of staff feel that climate change will affect their government program.

Native Electric

The Native Electric project is a four-phase approach to an electric school bus (ESB) initiative with a focus on environmentally sustainable transportation. This vision was created from the first partnership between the EBCI Air Quality Program (Katie Tiger) and the Cherokee Boys Club (CBC) (Donnie Owle), which was the biodiesel production facility in 2012. The CBC has been a Regional leader in the renewable fuels sector, using biodiesel in their school buses since 2008. The CBC runs their diesel school buses on a B20 blend with biodiesel made by the CBC biodiesel production facility utilizing local used cooking oil.

The first phase of Native Electric was established from the North Carolina Department of Environmental Quality's Volkswagen Settlement grant as a pilot project because the ESBs were not being tested in mountainous terrain such as western North Carolina. EBCI AQP applied in 2019 and received notification of funding in late 2020 to purchase an ESB and the associated charging infrastructure. This is Cherokee Central Schools became the first school district in North Carolina to have an ESB.

For the EBCI AQP, the ESB transition made sense because reducing diesel emissions reduces both of the criteria pollutants that EBCI AQP monitors for, $PM_{2.5}$ and ozone. Transitioning from diesel school buses to ESBs brings both environmental and community health benefits. It also provides a healthier riding environment for the children by reducing exposure to PM and NOx, which are both linked to asthma. This is

important because, like many Tribal communities, asthma rates in EBCI children are higher than the national average.

The first ESB arrived on March 15, 2022, and a huge celebration event was held, with the EPA administrator, Michael Regan, and the North Carolina governor, Roy Cooper, in attendance.

Phase 2 of Native Electric replaced five old diesels with four ESBs. The diesels that were replaced were a 1991, a 1992, and three 1998s. This phase was financed with funds from several different sources: an EPA Diesel Emissions Reduction Act (DERA) grant, Duke Energy, CBC, the Cherokee Preservation Foundation, and the EBCI.

The funding from Duke Energy was secured through their vehicle-to-grid pilot project, which required CBC to install bidirectional chargers for the four new ESBs. Because this is a newer technology, these chargers were separated and put on their own transformers. To date, there have been issues with the vehicle-to-grid portion of this phase, but that is the purpose of a pilot project: to test something new, work out the issues, and make it better for everyone else.

The Cherokee Preservation Foundation funding allowed the CBC to install a 50 kW direct-current solar canopy bus charging depot to charge the five ESBs operating daily to transport children to and from school.

Phase 3 of Native Electric is currently under way with funding from the EPA Clean School Bus Program to purchase 15 additional ESBs. After Phase 3, the CBC bus fleet will be 100% electric.

Native Electric Phase 4 will be funded by the EPA Climate Pollution Reduction Grant implementation and hopefully the Cherokee Preservation Foundation. Phase 4 includes the construction of a microgrid with battery storage to charge the fleet of ESBs. This phase is currently in the design process and is expected to begin construction in July 2025.

A microgrid is a small, localized electrical network that offers independent power generation, ensuring energy resilience through sources such as solar panels. These advancements will strengthen emergency preparedness by maintaining power for critical services during outages. Improving air quality and enhancing climate resilience are about protecting the EBCI community. If a major power outage occurs, the goal is to provide power for emergency services through this microgrid and the ESB fleet. EBCI AQP and CBC are thinking big and ensuring they are preparing the community for the future uncertainties of the changing climate.

Case Study: Investigating Air Concentrations of Volatile Organic Compounds

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Janice Archuleta, Ute Mountain Ute Tribe

The Ute Mountain Ute Tribe's community in White Mesa, Utah, shares a boundary with the White Mesa Uranium Mill. The mill has been operating since 1980, and the community has health concerns relating to the uranium milling operations. The Ute Mountain Ute Tribes AQP routinely monitors the dust in the air for radioactive components. In 2024 Ute Mountain Ute Tribes AQP performed a short term (six-week) volatile organic compound (VOC) study to investigate air concentrations of pollutants in these categories. This study also encompassed emissions from oil and gas development operations over the Paradox Basin in San Juan County, Utah, which has long been impacted by oil and gas production.

The White Mesa mill, five miles from the White Mesa community, extracts uranium from mined ore by crushing it, then uses hydrochloric acid or an alkaline solution and kerosene to extract the uranium from the ore. The extracted liquids are disposed of in the mill's tailing management system, which consists of several cells used for disposal, evaporation, and management of tailings, effluents, and other wastes. The facility's 2022 Annual Tailings System Wastewater Sampling report showed elevated concentrations of chloroform, chloromethane, 2-butanone, acetone, naphthalene compounds, and tetrahydrofuran, which are common pollutants.

Approximately 194 active oil, gas, or water disposal wells lie within a 20-mile radius of White Mesa, and many more within the surrounding region. Benzene, toluene, ethylbenzene, and xylene are a few common compounds associated with oil and gas operations. Furthermore, the equipment required for operations, including diesel trucks, drill rigs, power generators, compressors, phase separators, storage tanks, and pipelines, are all potential sources of VOC emissions and other pollutants.

Two monitoring locations were selected within the White Mesa community. Site 1 is located on the fence line approximately 2.74 miles south-southeast and directly downwind of the White Mesa Uranium Mill. Site 2 lies approximately 4.36 miles south-southeast and directly downwind of the mill, within the community of White Mesa. The air quality station is located here, and it is representative of the exposure experienced by the community. For each site, the staff installed and recovered two 24-hour ambient air canister samples per week, which had staggered collection times. Passive sorbent

tube cartridges were also placed for formaldehyde/aldehydes and hydrogen chloride sampling for a week-long collection period each week for the six-week study. One duplicate was taken at each site for each sample.

Passive sorbent tube sampling was used to measure formaldehyde and hydrogen chloride (analysis per Compendium Method TO-11A), while 24-hour canisters were analyzed using Compendium Method TO-15 to determine the presence of a suite of 78 VOCs. The Ute Mountain Ute Tribe's AQP collected and sent samples to a contracted lab for analyses. Concentrations of benzene, formaldehyde, and hydrogen chloride were compared against the U.S. EPA Reference Concentration and the Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances and Disease Registry Minimal Risk Levels (MRLs) (in this article the CDC MRLs will be used for comparisons). The same comparisons were also made for the VOCs of concern. Meteorological parameters were also taken into account for the study.

The formaldehyde and hydrogen chloride concentrations from the sorption tubes were slightly higher, on average, at Site 2 than at Site 1. All samples indicated concentrations far below the CDC MRL values, although there are no hydrogen chloride CDC MRL values for comparison purposes. In the case of the TO-15 canisters, an entire suite of pollutants was included in the analyses; however, only the more common compounds are listed here. Chloroform, naphthalene, and tetrahydrofuran were not detected in any sample. Benzene was detected in most samples and concentrations were similar at both sites, well below the CDC MRL values. Toluene was detected on only two samples at Site 1 and five samples at Site 2. Toluene concentrations were higher at Site 1 than at Site 2; however, due to sample size and sampling scheduling, this comparison is probably not meaningful, and these were also below the respective CDC MRL values. Table 1 lists the sample concentrations compared to the CDC MRLs for the above-mentioned pollutants.

Conclusions from the short-term study indicate that, based on the CDC and EPA values, the suite of pollutants from the samples that were analyzed pose little or an insignificant threat to health. The low concentrations of VOCs align with typical concentrations found in rural areas. We performed this study with the guidance and assistance of Air Resource Specialists, Inc., Fort Collins, Colorado.

Table 1: Average VOC pollutant levels collected by site and compared to CDC-ATSDR values.

Pollutant	Site 1* (ppb)	Site 2* (ppb)	CDC-ATSDR chronic MRL (ppb)
Formaldehyde	**0.532**	**0.589**	8
Hydrogen Chloride	**0.856**	**1.15**	N/A
Chloromethane	0.566	0.603	30
2-Butanone	0.168	0.149	1000**
Acetone	0.188	2.25	8000**
Benzene	0.085	0.088	9
Toluene	0.567	0.092	1000

*CDC-ATSDR acute MRL; chronic value N/A

*Site 1: Fenceline between White Mesa reservation and White Mesa Mill property, Site 2: Air Quality Station site in Community

White Mesa Reservation Fenceline Location – Site 1

White Mesa Air Quality Station - Site 2 location with UMUT AQ Specialist (Arlyssia Sells)

White Mesa Air Quality Station - Site 2 location

Close-up of Sorption Tubes used for Formaldehyde and Hydrogen Chloride samples (these are in the box on the other photos)

Case Study: Tribal Community Air Monitoring Collaborative

Loren Estrada, Soboba Band of Luiseño Indians

Across the country, Native American Tribes are taking proactive steps to monitor air quality, recognizing the critical link between clean air and public health. As environmental challenges increase, from industrial pollution to climate-driven wildfires, many Tribal Nations are embracing air quality monitoring as both a protective measure and an assertion of their sovereignty. For many Tribal communities, the air they breathe directly impacts their way of life. For these reasons, the Soboba Tribal Environmental Department (STED) began monitoring air quality on the Soboba Reservation by establishing an air monitoring program under the U.S. EPA General Assistance Program. Through this program, STED was able to rent the Aeroqual 500 handheld air monitor from the University of Northern Arizona's Institute for Tribal Environmental Professionals. In the summer of 2021, STED began collecting data on $PM_{2.5}$ and PM_{10}. This marked the first of many efforts to monitor the air on the Soboba Reservation. While this endeavor was a great introduction to collecting air data, the Aeroqual 500 was able to capture only a small window of data per month, as STED staff needed to be

in the field manually operating the device. As a result, STED began to explore alternative approaches to air monitoring.

In 2021, STED pursued Cycle 3 Community Air Grant funding from the California Air Resources Board. The project objective was to obtain baseline data, train staff, and provide educational outreach to the Tribal community to protect public health and establish a Tribal air monitoring program. In late 2022, the grant was awarded, and four low-cost air quality monitors were deployed across the Soboba Reservation to collect air pollutant concentration data. These pollutants include nitrogen dioxide (NO_2), ozone (O_3), $PM_{2.5}$, and PM_{10}. Ambient air is sampled continuously throughout the day, and hourly averaged data is displayed on SobobaAir.com, a public-facing website intended to be an easily accessible resource for the Tribal community. This achievement marked the establishment of Soboba's Tribal Community Air Monitoring Collaborative.

Preliminary data gathered by the monitors revealed several concerning trends in air quality on the Soboba Reservation. The extreme heat of Southern California summers caused ozone levels to frequently exceed the federal health standard; cold, dark winters contributed to intense temperature inversions, which caused $PM_{2.5}$ levels to spike regularly; seasonal Santa Ana wind events lend themselves to windblown dust storms, creating hazy conditions and elevated levels of particulate matter. The identification of these pollutants of concern is

critical in supplementing future applications for grant funding.

Once data was obtained regarding pollutant concentrations, STED began pursuing funding for identifying sources of air pollution on the reservation. In 2024, STED was successful in securing Cycle 4 Community Air Grant funding through the California Air Resources Board. This grant would allow Soboba to develop a comprehensive emissions inventory and collaborate with internal stakeholders to create a Local-Community Emissions Reduction Plan. The grant also funded the installation of three weather stations across the reservation, which allows environmental staff to monitor weather conditions and forecast adverse air quality conditions.

Currently, STED is pursuing a California Air Resources Board Cycle 5 Community Air Grant to improve monitoring technology and ability to educate the Tribal community on air quality concerns. As the Tribal Community Air Monitoring Collaborative expands, STED is eager to continue building staff knowledge and capacity, engaging the Tribal community, and pursuing both state and federal funds to achieve a healthy airshed.

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LIST OF ACRONYMS

ARP	American Rescue Plan
AQP	Air Quality Program
AQS	Air Quality System
CAA	Clean Air Act
CASTNET	Clean Air Status and Trends Network
CBC	Cherokee Boys Club
CDC	Centers for Disease Control and Prevention
CPGR	Climate Pollution Reduction Grant
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
DERA	Diesel Emissions Reduction Act
EBCI	Eastern Band of Cherokee Indians
EI-Fun	Emissions Inventory Fundamentals Course
EI-Adv	Emissions Inventory Advanced Course
EPA	U.S. Environmental Protection Agency
GAP	General Assistance Program
GHG	Greenhouse Gas
IRA	Inflation Reduction Act
ITEP	Institute for Tribal Environmental Professionals
MATS	Mercury and Air Toxics Standards
NAAQS	National Ambient Air Quality Standards
NSPS	New Source Performance Standards

NSR	New Source Review
NTAA	National Tribal Air Association
OTAQ	Office of Transportation and Air Quality
PA	Professional Assistance
PFAS	Perfluoroalkyl and polyfluoroalkyl substances
PFOS	Perfluorooctane sulfonate
PM	Particulate matter
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RTR	Residual Risk and Technology Review
SIRG	State and Tribal Indoor Radon Grant
STAG	State and Tribal Assistance Grant
STAR	Status of Tribal Air Report
STED	Soboba Tribal Environmental Department
SUIT	Southern Ute Indian Tribe
Tribal Set-Aside	A portion of grant funding allocation carved out for Tribal application
TAMS	Tribal Air Monitoring Support Center
TAR	Tribal Authority Rule
TAS	Treatment in the similar matter as a state
TEISS	Tribal Emissions Inventory Support Software
TIP	Tribal Implementation Plan
VOC	Volatile organic compound