

**National EPA-Tribal Science Council
Fall 2023 Face-to-Face Meeting: “In Our Corner”**

Hosted by the Pala Band of Mission Indians

Pala Casino Spa Resort
Pala, California

December 5–7, 2023

MEETING SUMMARY

Tuesday, December 5, 2023

Gathering and Welcome Session

Opening Blessing and Remarks

Neil Patterson, Jr., National EPA-Tribal Science Council (TSC) Outgoing Tribal Co-Chair, Tuscarora Nation; Shasta Gaughen, Tribal Host and TSC Incoming Tribal Co-Chair, Pala Band of Mission Indians; and Tim Canfield, TSC Agency Co-Chair, Center for Environmental Solutions and Emergency Response, Office of Research and Development (ORD), U.S. Environmental Protection Agency (EPA)

Neil Patterson, Jr. gave the opening blessing in his native language—known as the “opening address” in Haudenosaunee—which describes the miracle of being able to come together to meet, the miracle of Mother Earth and the miracle of stars that provide guidance. The blessing also thanks the Creator for peace of mind, body, family and community. Neil reflected on his 4 years as Tribal Co-Chair, noting the meaningful discussions that the TSC had on the rights of nature, *United Nations Declaration on the Rights of Indigenous Peoples*, ways of knowing, and changes and losses during the pandemic. Haudenosaunee clan mothers groom young men for lifelong leadership, and the Edge of the Woods Ceremony is a welcoming ceremony that acknowledges that thickets and thorns create loss during a journey. The TSC members and guests must acknowledge the losses and grief that they experience by traveling to the meeting, which involves being away from their families and loved ones. Grief also must be acknowledged during the restoration and protection of the environment. The accumulated knowledge of the TSC is a strength, as is identifying the underlying values that support the restoration and protection of Mother Earth. The TSC planted seeds about the importance of Indigenous knowledges (IK) during its June 2011 meeting at the Penobscot Nation, and these seeds are coming to fruition with the White House guidance on IK.

Shasta Gaughen explained that San Diego County has 18 Federally recognized Tribes, more than any other U.S. county, but their combined population is less than a medium-sized Tribal nation in Indian country. She then described the history of the Pala Band of Mission Indians. Three cultural groups—Cupeño, Luiseño and Kumeyaay—form the Pala Band as a result of the colonial history of the area. The Cupeño people remained on their land throughout the era of the Spanish missionary system, which was established in the 17th century, but were forcibly moved to Pala in 1903 following a U.S. Supreme Court decision that determined that the Tribe did not have a claim to their homelands. The court instead gave the land to the Warner family under a Spanish land grant. Shasta stressed the scientific validity of IK. Tribes learned how to live on the land through a process of observation, repetition, hypothesis, testing and adaptation. She described ancient Cupeño knowledge, which included developing a method using sand and baskets to remove poisonous tannic acid from the abundant acorns in the area to make a nonpoisonous, nutritious foodstuff—*wiiwish* (acorn mush).

Tim Canfield thanked Neil for his leadership and noted that he is looking forward to working with Shasta. The TSC truly is a shared partnership, and it is important for the members to meet in person to solve challenges and lay foundations for future work. The TSC has been important in acknowledging the commonalities between IK and Western science and recognizing the need to share experiences between Indigenous and non-Indigenous people.

TSC ORD Leadership Transition

Kacee Deener, Deputy Director, Office of Science Advisor, Policy and Engagement, ORD, EPA

Kacee Deener explained that the ORD liaison role is transitioning from Brenda Rashleigh to Marie Schaefer, who will serve in this role for 1 year before assuming the TSC Agency Co-Chair position from Tim, who will then serve as the ORD liaison for the following year. Marie brings a decade of experience working with Tribal nations as a Federal employee.

Region 9 Opening Remarks

Martha Guzman, Regional Administrator, Region 9, EPA

Martha Guzman explained that she had been unaware of the TSC before being invited to the meeting and looks forward to learning about the group. She appreciates that the TSC focuses on IK and topics that are important to Tribes in Southern California. Tribes contribute a great deal beyond IK in Region 9. It is important to bring back IK and Indigenous skills and combine them with current technologies to address environmental challenges.

Martha provided an overview of Regional–ORD Applied Research (ROAR) and Regional Applied Research Effort (RARE) projects being undertaken by Tribes in Region 9, including work with the Hoopa Valley Tribe and Navajo Nation on improving indoor air quality related to smoke from woodstoves and wildland fires; smoke in these communities has been linked to cardiovascular disease, cancer and poor birth outcomes. Research also has led to the designation of the first Superfund site on the Navajo Nation. Tribes visit the ORD laboratory in Corvallis, Oregon, to share information on harmful algal blooms (HABs). Tribes across the region are researching subsistence fish species to restore and maintain healthy populations. Martha looks forward to the partnerships that result from the meeting.

ORD Opening Remarks

Chris Frey, Assistant Administrator for Research and Development, ORD, EPA

Chris Frey reiterated the important nation-to-nation relationship that EPA has with Tribes, as well as ongoing ORD research of Tribal interest. Tribal members were the first scientists on this land. He thanked Neil for his leadership, noting he personally has learned a great deal from him, and he looks forward to Shasta’s leadership. He commented on the value of a collaborative body of Indigenous and EPA scientists working together to address environmental challenges. For example, if Federal and State agencies had incorporated the Indigenous practice of prescribed burning sooner, the ecology of the land would be very different. Wildfire, traditionally an issue for the Western United States, is spreading across the country, and poor air quality affects a significant portion of the U.S. population as a result. EPA has made wildland fire a priority issue, and ORD continues to learn how to respectfully and meaningfully incorporate IK into its research.

Chris cited an ORD project in collaboration with Tribes to address HABs using floating vegetation islands to absorb excess nutrients. Tribes provided their accumulated knowledge of useful plants in the Colorado River Basin that could be incorporated into the floating vegetation islands. He is grateful to these Tribes for sharing their knowledge to improve the quality of the research and the river, as well as to identify best management practices.

ORD is integrating social science into its climate change and cumulative impacts research to develop effective solutions that can be adopted in a sustainable manner and provide long-term benefits. This integration increases understanding of climate change causes, as well as how to adapt to, mitigate and become resilient to climate change. ORD has established the Integrated Climate Sciences Division to bring social and natural sciences together to address urgent climate priorities identified by EPA's programs and regions and the Agency's State and Tribal partners. ORD's cumulative impacts research informs decisions and interventions (e.g., green infrastructure) to improve the health and well-being of communities and advance justice. Traditional risk assessment does not reflect the realities of exposure and related health effects, so EPA is looking more holistically at exposure effects on human and environmental health. Chris looks forward to learning how to respectfully incorporate IK into ORD's research.

Author Reading: *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*, by Robin Wall Kimmerer

Robin Wall Kimmerer, an enrolled member of the Citizen Potawatomi Nation and State University of New York (SUNY) Distinguished Teaching Professor of Environmental Biology at the SUNY College of Environmental Science and Forestry, virtually read a chapter of *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants*. In thinking of what to share with the TSC, she chose the chapter "Asters and Goldenrod," which describes the beginning of her journey to braid Indigenous and Western science together.

Beth Jackson explained that her daughter is in her third year of college, and her biology class studied Robin's book. She finds it gratifying that a mainstream biology class incorporated IK into the curriculum. Jackie McCasland added that Robin is a role model for all women in science, particularly Native women. David Cash noted the importance of bridging the ways of knowing, and Robin's book is a powerful door to this connection.

Region 9 Tribal Issues Discussion

For the benefit of the local guests, David Charters described some of the functions of the TSC, which include serving as a communication mechanism for Tribes to ensure that they are able to provide input on ORD research plans and providing a mechanism for EPA to discuss science with sovereign Tribal nations to ensure that EPA respectfully and appropriately uses IK in its programs. Page Hingst added that the TSC holds monthly science seminars so that the TSC Tribal Representatives can bring information about EPA and Tribal research back to the Tribes in their regions. Many TSC Tribal Representatives serve on other EPA-Tribal Partnership Groups and provide information on their activities as well.

Chris explained that ORD "follows the science," develops long-term research plans, provides technical assistance and helps regions address their science priorities through RARE and ROAR projects. ORD is always listening and wants to know about Tribes' science needs.

Edmundo (Eddie) Hernandez explained that the Pechanga Band of Indians holds 8,000 acres of contiguous land, mostly within Riverside County, but also serves as a steward of other land in Riverside and San Diego counties. Land management is difficult because of the conservative nature of Riverside County's population and the fact that environmental problems are summarily dismissed in favor of industry. The Tribe's major concern is air quality, particularly because the Tribe does not have the means to address this challenge. Regulatory oversight of heavy diesel trucks is needed. Wildland fires also are of concern, as is urban development infringing on the environmental interface. His Tribe would like to practice its native cultural burning techniques that keep the forest and land healthy, but the Tribe is not allowed to do so. These techniques also could help manage the goldspotted oak borer, a damaging

invasive species. Although the Pechanga land mass is small, its location near a population of 800,000 people causes additional pressures.

Sophia Bejarano explained that the Viejas Band of Kumeyaay Indians has 1,600 acres, and the Tribe's environmental projects are related to pollution and invasive species. She has been in her position in the environmental department for less than 3 months.

Syndi Smallwood explained that the Jamul Indian Village of California has 6 acres in trust and 170 acres of fee land. The Tribe has been trying to move 24 acres into trust for more than 20 years. The Tribe's lands are near a major highway with heavy diesel truck traffic, so air quality is a concern. The Tribe has worked on climate vulnerability planning and cultural plant species restoration. Other areas of concern are PFAS, 6PPD-quinone, wildland fires, drought and extreme heat. The Tribe also has engaged in emergency response planning for the past 4 years and has established partnerships with a number of Federal, State and local agencies. As a result, the Tribe was not affected by Hurricane Hilary in August 2023, and no flooding occurred. Syndi has only two environmental staff members, both of whom are new to working with Tribes, so it is difficult to train them and also apply for grants because of her department's limited capacity. Although they try very hard to obtain funding, most Tribes do not have the capacity available to pursue all of the funding that has recently become available.

Shasta explained that Tribes in California are concerned with beneficial water use standards developed by regional and State water quality control boards because these standards are not protective of Tribal cultural uses (e.g., traditional plant harvesting, ceremonial immersion). These boards must implement water quality standards at sufficient levels to protect Tribes that use these waters for their traditional practices. Tribes must demonstrate scientifically that their members are at risk, but they cannot do so because of the sacredness of the knowledge. Tribes need assistance with research that describes the exposure to Tribal communities, particularly elders and children, from contaminated water bodies.

David Charters suggested that Tribes use drinking water quality standards for activities that do not surpass the same level of exposure as drinking the water. Tribes can focus on the most exposed activities rather than on all activities, which allows for a smaller area of concern that can be addressed (i.e., reduce exposure to the worst-case scenario). Tribes can focus their questions so that EPA does not need any cultural information. Shasta explained that Tribes had informed the water quality control boards that recreational water quality standards need to ensure that the water is safe for ingestion, but the boards refused to meet this level. EPA research on plant and animal uptake of waters also would be helpful for Tribes in understanding their level of contamination. Matt Small added that a "worst-case scenario" does not always apply because for many Tribal activities, *any* level of contamination is a problem. Ceremonies are often performed for the elderly and infirm, which are particularly vulnerable populations. These situations cannot always be answered within traditional risk assessment paradigms.

Ted Coopwood noted that this is an example of why children must be protected under all standards. When children are protected, other vulnerable populations are protected. Eddie commented that water exposures can be acute or chronic, and standards based on pathogens and pollutants are not protective of riparian plants that absorb excess nutrients. Tribes can be stewards of their lands but do not have control over non-Tribal lands; additionally, water moves, making the challenges more complex. Research similar to that performed on wild rice in the Great Lakes region needs to be performed on cultural and environmental resources in Southern California.

In response to a question from Syndi, Monica Rodia explained that the TSC has a website that is being updated. Currently it includes presentations from some face-to-face meetings, as well as past TSC issue papers. Syndi also expressed an interest in joining the Tribal PFAS Working Group, and Page explained that she and Dianne Barton are the leads for the working group and that they will connect with her.

EPA Science Presentations

Wildfire Research: Moving Beyond Particulate Matter

James Markwiese, Branch Chief, Ecology Effects Branch, Pacific Ecological Systems Division, Center for Public Health and Environmental Assessment, ORD, EPA

James Markwiese explained that wildfire is a natural ecosystem process that provides several ecological benefits, but the amount of burned area and wildfire frequency are increasing, which affects ecosystems and water quality in new ways. Wildfire size and frequency have increased drastically since 2000, creating new issues at the wildland–urban interface, including such water quality issues as watershed resiliency and pollution of rivers by heavy metals and nutrients. James highlighted images and statistics from several recent fires in California, as well as graphs that show that benzene, nitrate, disinfection byproducts, arsenic and volatile organic compounds increase post-wildfire, resulting in an increase in drinking water violations. Data also suggest that wildfires can influence algal activity and cause the formation of HABs in lakes downwind of wildfires that emit high levels of nutrients.

James highlighted a number of models that can be used for fire modeling. HexFire is a generic wildfire simulator that simulates wildfire spread over time and the response to active and passive fire suppression. HexFire can be used to determine the projected impacts to wildlife populations. VELMA (Visualizing Ecosystem Land Management Assessments), a tool designed to model effective decisions for a wide array of environmental issues, also can be used for wildfire modeling. EPA also released [an assessment of air quality and health impacts of prescribed fire compared to wildfire](#), which can inform land management strategies.

A ROAR proposal on the smoke impacts on local communities living with prescribed fire has been submitted for fiscal year (FY) 2024 by Region 10 and ORD's Pacific Ecological Systems Division. Wildfire smoke also can be sampled using drones, which provide a low-cost, spatially precise method for obtaining multiple replicate samples. Drones provide less risk to pilots in a hazardous sampling environment.

Data also indicate that wildland fire smoke can alter microbes in the aerobiome, increasing pathogen exposure during a wildfire event. For example, California hospitalizations for coccidioidomycosis (Valley fever) increase by 20 percent following heavy smoke events, and wildland firefighters experience Valley fever outbreaks. Systematic studies of these phenomena are needed, and a Pathfinder Innovation Project is exploring coccidioidomycosis in California's Central Valley.

David Charters asked what applications the research may have. James responded that it can be used to develop tools to prepare the landscape for prescribed burns. The research related to Valley fever could be used to educate individuals and their health care practitioners about the risk of contracting Valley fever following wildland fire events to decrease misdiagnosis and increase the use of appropriate medical treatment (e.g., use of antifungals rather than antibiotics). An information campaign for urban hospitals, which are less familiar with fungal infections than rural hospitals, would help.

Page asked about the source of increased phosphorus and nitrogen in the smoke. James responded that the nutrients come from the plants themselves through the combustion process. Page asked whether the researchers have determined how far the risk of contracting Valley fever extends from the location of the fire. James replied that researchers are working to answer this question.

Syndi appreciated the research because of the number of fires in San Diego County, which are an ongoing issue with many negative effects. Even small fires have significant effects on Tribes and their

environmental, cultural and economic resources. The National Tribal Air Association has established a new workgroup focused on wildfires.

Tribal PFAS Working Group and Tribal Initiatives

Page Hingst, Santee Sioux Nation of Nebraska and Tribal PFAS Working Group

Page described the Tribal PFAS Working Group's 2023 priorities, which were to continue to identify and coordinate with Tribes that are currently impacted by PFAS; continue to develop and identify PFAS tools and resources (e.g., PFAS Tribal Fact Sheet, PFAS Analytical Tool); enhance and promote the Tribal PFAS Working Group's [website](#) with current publications, presentation videos, research and resources; develop and host an informal Tribal workshop series on PFAS issues, including a Working Group Open House on December 14; and advocate for rulemaking, research and education actions, with attention to the inclusion of Tribal lifeways. Tribes affected by PFAS include the Kalispel Tribe of Indians, Saginaw Chippewa Indian Tribe of Michigan, Mi'kmaq Nation, Choctaw Nation of Oklahoma and Penobscot Nation.

The Tribal PFAS Working Group has identified the following important actions: Tribal education (including risk communication), manufacturer accountability, Tribal research on holistic impact to Tribal health and culturally sensitive plants and animals, and Tribal PFAS testing. A number of initiatives are being taken by Tribes, Tribal communities and Alaska Native villages, including the Yupik people of Sivuqaq, Sitka Tribe of Alaska, Anishinaabe peoples, Ramapough Lenape Turtle Clan, Northern Arapaho Tribe of Wyoming, Sac and Fox Nation of Missouri in Kansas and Nebraska, Winnebago Tribe of Nebraska, Santee Sioux Nation, Mashpee Wampanoag Tribe, and Mi'kmaq Nation.

Jessica Phillips commented that the cultural waters of her Tribe are affected by PFAS; she asked whether resources are available for testing. Page responded that such resources are available, and she would connect with Jessica personally.

Rory O'Rourke asked about the specific challenges for Tribes related to PFAS. Page responded that cost and lack of education on how to correctly sample for PFAS, which is a complicated process, are the most significant challenges. Eddie added that water regulators are worried that PFAS regulations will cause additional burdens to Tribes because of the associated additional costs. Page agreed, noting that the working group weighed this issue and decided that it was better to advocate for protection first and resolve the financial aspects later.

PFAS Update

Matt Small, Regional Science Liaison, Region 9, EPA

EPA's action plans and strategic roadmaps were developed based on feedback from approximately 120,000 comments submitted to the public docket; they are intended to assist States, Tribes and communities in addressing PFAS. EPA's goals are to invest in research development and innovation to increase understanding of PFAS exposure on human and environmental health, pursue a comprehensive approach to proactively prevent PFAS from entering the environment at levels that adversely affect human health and the environment, and broaden and accelerate the cleanup of PFAS contamination.

Tribal research areas and needs related to PFAS include drinking water treatment, uptake by culturally sensitive plants, bioaccumulation in subsistence food, presence in landfill or illegal dumpsite leachate, presence on Tribal farmland, sources near Tribal lands and interstate biosolid transfers, and technologies for pretreatment and wastewater facilities. EPA resources include [analytical methods](#), the [Drinking Water Treatability Database](#), [biosolids risk assessment](#), [Integrated Risk Information System PFAS assessments](#), [research on PFAS](#), [Safe Drinking Water Information System Tribal PFAS monitoring results](#), and [Enforcement and Compliance History Online PFAS Analytic Tools](#). EPA also has [PFAS](#)

[extramural funding opportunities](#), and the U.S. Department of Defense has information on the [management of PFAS in the environment](#). Key anticipated and ongoing actions include the proposed [hazardous substance designation under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980](#), proposed [drinking water standards](#), and inclusion in the [Fifth Unregulated Contaminant Monitoring Rule](#).

Acute Salmon Mortality From a Tire-Derived Chemical: 6PPD-Quinone

Dianne Barton, Columbia Inter-River Tribal Fish Commission and Chair, National Tribal Toxics Council (NTTC)

Dianne explained that NTTC is an EPA-Tribal Partnership Group established in 2012 to partner with EPA's Office of Pollution Prevention and Toxics (OPPT); NTTC routinely submits [public comments](#) on chemicals. She explained that 20 years ago, scientists noticed that stormwater was killing coho salmon near urban streams in the Pacific Northwest within hours of rain events. 6PPD-quinone, a tire-derived chemical, was identified as the cause in a paper in *Science* in 2020; additional peer-reviewed papers since have been released. Coho salmon experience acute mortality to 6PPD-quinone, but steelhead trout and Chinook salmon may experience sublethal effects. Sensitivity to stormwater varies among fish species, and brook trout, rainbow trout and whitespotted char are known to be affected. 6PPD-quinone has been found in human urine, indicating that a pathway to humans exists.

In August 2023, the Yurok Tribe, Port Gamble S'Klallam Tribe and Puyallup Tribe of Indians petitioned EPA to establish regulations prohibiting the manufacturing, use and distribution of 6PPD-quinone under Section 21 of the Toxic Substances Control Act of 1976 (TSCA). EPA granted the petition and plans to issue an Advance Notice of Proposed Rulemaking and initiate data-gathering activities to understand and characterize risks associated with 6PPD-quinone. Zebrafish were used to establish the toxicity levels for 6PPD-quinone but are not a representative species. NTTC is looking to ORD to identify better methods for establishing toxicity levels (e.g., New Approach Methods, Interspecies Correlation Estimation models). Tribes need to have their important species evaluated.

Matt noted that ephemeral pools in the arid Southwest could affect amphibians and migratory birds. Dianne agreed, noting that additional research most likely will identify other affected species.

Update on EPA Actions to Address 6PPD-Quinone

José Zambrana, Senior Science Advisor, Center for Environmental Measurement and Modeling, ORD, EPA

ORD plans on conducting research to fill the data gaps in its current FY 2023–2026 Strategic Research Action Plans (StRAPs) while continuing to leverage regional partnerships and explore external collaborations with governmental partners and stakeholders. The current StRAPs include investigation of ecological effects of tire wear particles and 6PPD-quinone on marine benthic communities, development of high-throughput hazard screening methods for 6PPD-quinone, identification and curation of relevant ecotoxicity data, characterization of emissions from motor vehicle brake and tire wear, modeling of green infrastructure solutions to reduce contaminated urban stormwater runoff impacts, and investigation of the fate and transport of tire wear particles in stormwater and strategies to reduce transport.

Collaborative regional–ORD projects include an investigation of the prevalence and extent of 6PPD compounds in ambient air particulate matter (Region 3); evaluation of the bioactivity of 6PPD-quinone (Region 10); investigation of the fate, transport and treatment of tire-derived pollutants in stormwater (Region 4); and development of a rapid, low-cost bioassay to guide stormwater management and evaluate the potential toxicity of 6PPD alternatives (Region 10).

ORD is performing active coordination on the issue through the Cross-EPA 6PPD-Quinone Workgroup, Interstate Technology and Regulatory Council 6PPD Workgroup, and National Science and Technology Council Joint Subcommittee on Environment, Innovation and Public Health. ORD is engaging with partners through EPA's Puget Sound Geographic Program, the California Department of Toxic Substances Control Priority Product process, and the Washington State Department of Ecology's ongoing efforts.

EPA has established a new [6PPD-quinone website](#). The Agency is coordinating with Federal, State and Tribal partners, as well as conducting and funding research to address data gaps, funding a competition for innovating tire chemistry, providing extramural grant support, providing funding for stormwater treatment and biofiltration, and developing an analytical method for surface water.

Shasta asked why the effects of 6PPD-quinone were not recognized earlier. José responded that use of the chemical has increased throughout the decades. Tribes discovered the effects more than 20 years ago, but the questions went unanswered until 2021.

Neil noted that this is a common cycle that has happened with lead, mercury, asbestos, PFAS and other substances. For this particular chemical, social science will be needed to drive the changes that will result in less 6PPD-quinone in the environment (e.g., increased use of public transportation). Electronic vehicles are heavier and increase the pressure on tires, adding to the problem. Society needs to assess the role of personal vehicles and their effects on the environment. Complicated feedback loops drive these systems.

Joshua Tweeton explained that his Tribe was proud of the tire shredder it used to dispose of tire waste, incorporating it into asphalt and playground materials. The shredder was located near a major river, and now he wonders how much damage the tire shredding has caused over the years. Also, 300,000 tires were buried near his Tribal lands, and the long-term effects to ground water and other aspects of the environment are unknown. The Tribe was not consulted about the burial of these tires.

Rory noted that 6PPD-quinone is a significant issue in the Pacific Northwest because of Tribal subsistence and treaty fishing rights. The Region 10 effort to solve this issue has been a good example of braiding IK and Western science together as Tribes and EPA work together on this problem.

Caucus Sessions

The Tribal and EPA Caucuses met separately to discuss individual Caucus business. The meeting was recessed at the end of each Caucus session.

Wednesday, December 6, 2023

Field Trip: Palomar Mountain State Park

The TSC members and guests visited Palomar Mountain State Park and learned from staff and members of the La Jolla Band of Luiseño Indians, Cahuila Band of Indians and Climate Science Alliance. Joelene Tamm (who is a member of the Squaxin Island Tribe in Washington) discussed the damage an invasive species, the goldspotted oak borer, is causing to the native oaks. Wesley Ruise and Will Madrigal, Jr. described traditional Tribal fire practices and how Tribes are working to preserve their IK and regain forgotten knowledge. Will sang a traditional Bird Song in his native language. Amber Pairis, founder of the [Climate Science Alliance](#), described the alliance's [model for community-led adaptation](#), [current projects](#) and [working groups](#). The alliance's activities evolve and expand as more Tribes "sit at the table equally" and describe their needs.

Day 2 Opening Session

Day 1 and Field Trip Recap

Shasta Gaughen and Tim Canfield

The TSC members agreed that being out on the land and hearing Indigenous stories is valuable. Tim noted the similarities between cultural burning to maintain the ecology of the environment with the prescribed fires he performed with the U.S. Fish and Wildlife Service to regenerate prairie lands; this is an example of another commonality in the ways of knowing.

Kacee felt inspired by the field trip and witnessed great examples of how techniques and activities can be made more robust by bringing together different knowledges and ways of knowing. Scott agreed, noting that the passion of the presenters was palpable. The previous week, his community regained bison, and at the welcoming event, the passion, tears and emotions of bringing a family member back were tangible.

Beth appreciated Amber's wrap-up that spoke of equal valuation; each individual's knowledge, skills and expertise are viewed as equal to that of all of the other individuals at the table.

Shasta noted that her Tribe is considering prescribed burning, and she would like to learn about EPA's views on the topic. Chris acknowledged the trauma of Tribes in not being able to perform their cultural practices and be stewards of their lands. He is glad that the practice is being revived. The field trip underscored the message he often hears—that Tribes want to work together with EPA to move forward. ORD is examining prescribed fires to control catastrophic wildland fires, and he appreciates the multiple benefits of local burns for reasons other than avoiding catastrophe. It is important that ORD understands these additional benefits.

Braiding Sweetgrass Discussion

TSC Members

Shasta commented that IK has science running through it. As Robin indicated through her reading, goldenrod and aster complement and balance each other, just as IK and Western science can complement and balance each other. Everything that the TSC has been learning from Tribes is science—more Western scientists need to understand this. The TSC can help frame this to increase this understanding throughout the scientific community, particularly those entities that fund research. Tribes are working in a world in which people do not agree that using IK is the best approach because they view Western science as superior. This is an area in which the TSC can use its strengths to advocate for IK and move past these barricades.

Tim thinks that it is important to use the phrase “ways of knowing” rather than being fixated on the term “science,” which creates a blind spot that inhibits seeing the larger picture of how to combine skills and knowledge. It is necessary to focus on the commonalities while recognizing that differences exist. A braid is much stronger than any of the individual strands. Shasta is concerned that Tribes may not want to be braided together; like the ship and canoe, Tribal and Western scientists do not need to travel in the same vessel. So much has been taken from Tribes, and now they are being looked at to fix myriad environmental problems, which is too much pressure.

Neil noted that universities teach students to compare and contrast; cooperation needs to be taught instead. Tribes lost 99 percent of their lands; Europeans can return to their original countries, but lands in the United States are Tribes' “Mecca.” Goldenrod and aster are sovereign beings; they complement each other but remain two separate species.

Shasta stated that different ways of knowing are important, and people must respect the knowledge of other cultures even if they do not understand it. It is a calling to protect Tribal cultural resources. EPA must consider this calling and support those who have the calling to protect and restore their lands. Joelene's work on the goldspotted oak borer provides a perfect example of how EPA and Tribes can work together and EPA can support those with the calling.

Chris thought that the morning was a powerful experience, particularly hearing about how IK and Western science can be braided together to bring a breadth and depth of knowledge to solve problems. Tribes and EPA can work together to allow respectful translation of knowledge. If people are unaware of IK, how can they consider it? How can EPA raise awareness in a manner that resonates with its scientists? The TSC and EPA can work collaboratively to answer these questions.

Marie is glad that the TSC and others are laying the foundation to overcome the objections of those who refuse to understand or even acknowledge Indigenous ways of knowing. She explained that the sturgeon are returning to her community, and having all the generations present to witness this return provides the holistic picture of the future generations that will benefit and the importance of the elders' (previous generations) knowledge. Dianne agreed that it is important to know people from all generations throughout the community and not just in one's family. Jackie was able to know her great-great-grandmother, one of the last speakers of her Tribe's native language. It was a gift to hear the language, particularly knowing that very few people have heard it.

Caucus Sessions

The Tribal and EPA Caucuses met separately to continue their discussions. The meeting was recessed at the end of each Caucus session.

Thursday, December 7, 2023

Caucus Sessions

The Tribal and EPA Caucuses met separately to continue their discussions.

Day 3 Opening Session

Caucus Report Outs

Shasta Gaughen and Tim Canfield

Shasta reported that the Tribal Caucus had discussed ORD's integration of social science into its research. Social science research with Indigenous peoples has a dark history, so ORD must respectfully and thoughtfully perform this integration without exacerbating past trauma, which is not a simple process. TSC Tribal Representatives could provide guidance to ensure that this integration is not harmful and is implemented with full Tribal consent. Some Tribes have research protocols in place, and the TSC can examine these protocols and act as a partner to help ORD respectfully integrate social science into its research. It is also important for ORD to consider what it means by "social science" and include a definition of the term and a description of the intent of the integration in the StRAPs. The onus of engaging in respectful partnerships should not be on Tribes; EPA must perform the necessary work to ensure respectful integration. Currently, the burden is on Tribes, and it is emotionally and logistically difficult for them. Also, ORD must find a way to help EPA regulators include IK in permitting processes.

The Tribal Representatives also discussed potential research on 6PPD-quinone and would like ORD to consider the following questions:

- How is 6PPD-quinone affecting ecosystems outside of the Pacific Northwest?
- What are the effects on human, animal and habitat health?

- Are assays available for human tissue and/or blood?
- How long does 6PPD-quinone persist in water?
- Does chemical transport from water occur (e.g., soil leaching, plant uptake)?
- What level of exposures to 6PPD-quinone have Tribes experienced?
- What is the current status of traditional foods in terms of exposure to 6PPD-quinone?

The Tribal Caucus discussed how EPA can best help Tribes and agreed that EPA staff must be adequately trained to work with Tribal nations, including internal training on what it means to work with Tribes. Potential resources include *Research Is Ceremony: Indigenous Research Methods* by Shawn Wilson, an easy read that considers thinking on Indigenous research methodologies; *Decolonizing Methodologies: Research and Indigenous Peoples* by Linda Tuhiwai Smith, which is more academic and emphasizes that social science has a dark reputation for Indigenous people; and *Tales of a Shaman's Apprentice: An Ethnobotanist Searches for New Medicines in the Amazon Rain Forest* by Mark J. Plotkin, which tells the story of an ethnobotanist's work with Indigenous people. EPA can implement training metrics (e.g., percentage of staff trained to work with Indigenous peoples), with the goal of 100 percent of staff working with Tribes receiving appropriate training. The seminal 1984 EPA Indian policy, [EPA Policy for the Administration of Environmental Programs on Indian Reservations](#), should be required reading for all Agency staff. Tribal training should be included in the onboarding process for all staff, as well as be available on demand and offered annually as continuing education. Most importantly, it is important that assumptions are not made about Tribal individuals.

Tribes must be allowed to be stewards of their lands. Indigenous stewardship has been scientifically proven to be beneficial and efficient, as highlighted by a [2019 study](#) that found that Indigenous-managed lands have more biodiversity than other managed lands. The TSC could develop an issue paper on how the return of land to Tribes helps restore the environment and that good stewardship is good for everyone. The 2022 White House guidance on IK acknowledges this and could be a pathway to developing such an issue paper. Also, work by the Truth and Reconciliation Commission of Canada could serve as model for the United States to heal its relationship with Tribes and the land. Complicating this issue is the fact that many Tribes want to be stewards but are not prepared to accept the return of their lands. Therefore, EPA could conduct research on how to prepare Tribes to accept stewardship. The TSC's 2011 issue paper on traditional ecological knowledge provides an entry point for EPA to advocate for the return of Indigenous access to and stewardship of lands outside of trust and reservations. EPA must understand that all of the Agency's work is on Tribal lands.

Tribes are sovereign entities that can create laws, and this extends to their sovereign control of their knowledge and data. The established FAIR (findable, accessible, interoperable, reusable) and CARE (collective benefit, authority to control, responsibility, ethics) principles apply to all human research. EPA must realize and recognize the inherent sovereignty of Tribal knowledge systems before any integration occurs. Also, recording a Tribe's oral history is capacity building and should be authorized under the Indian General Assistance Program. Most Tribal communities do not have written protocols, but many have strict and extensive oral policies, which EPA must recognize as equal to written policies.

The Tribal Caucus also discussed how to improve TSC operations. EPA's regional Tribal liaisons are familiar with the Tribal science priorities and knowledge sovereignty issues within their regions. The TSC Tribal Representatives should be able to invite these knowledge holders to the TSC's face-to-face meetings, with their travel funded by the TSC, if they think that their attendance would be helpful. No one who would like to attend TSC face-to-face meetings should be excluded from doing so. Also, any decisions about the logistics of the face-to-face meetings (e.g., virtual components) should be made by the TSC as a whole. Tribal knowledge and participation on the TSC should be compensated.

The fact that the Region 9 Regional Administrator had not heard of the TSC indicates that the TSC must advertise itself better. Finally, the TSC should develop a definition of environmental justice and what it means to the Council.

Tim reported that the EPA Caucus used the first Caucus session to focus on Robin's reading, which the EPA Representatives found to be powerful, with Robin's passion resonating strongly. Moving forward mindfully with appropriate values and choices is important. The story of goldenrod and aster is a reminder that synergies are not mere coincidence. It is important to not become fixated on the term "science." Western science has certain processes in place that make it difficult to consider IK; both sides are science and can be better described as "ways of knowing." Indigenous ways of knowing are interconnected, whereas Western approaches tend to separate things, which causes disconnect. It is necessary to identify and maximize the integration points of bringing together Indigenous and Western ways of knowing meaningfully and holistically.

Statutory mandates from Congress also make it difficult for agencies to incorporate IK. ORD works within the mandates of EPA's media offices but has some freedom to use alternate methods. The TSC can look for spaces within ORD to explore how Western and Indigenous ways of knowing can be braided. It is also necessary to understand where Tribal treaty rights supersede regulations. ORD can consider both ways of knowing—including in cumulative impact assessments and by implementing pilot projects that show the synergy and validity of incorporating both ways of knowledge—and present them side by side to decision-makers. Western science papers are often dry; it is necessary to become better storytellers and share research across broader communities and audiences. Stories are remembered because they are presented in a compelling, memorable manner.

The EPA Caucus also discussed the need for protocols to protect Tribes' knowledge and data sovereignty. The TSC can identify and examine current guidance and protocols to evaluate how the Agency can protect Tribes and work better with them. Also, the EPA Caucus noted the importance of meeting Tribes where they are, such as by partnering with other venues (e.g., Tribal Lands and Environment Forum) to meet and collaborate. The TSC's relationships with the Regional Tribal Operations Committees (RTOCs) can be strengthened and made more effective to better exchange knowledge and ensure two-way communication. The goal is to empower TSC members, rather than Headquarters leadership only, to attend the meetings of at least five different RTOCs annually to ensure frequent interaction. The TSC also must re-establish its relationship with Alaska Native villages and pursue representation on the Council.

Marie had developed questions to guide the EPA Caucus discussion on the third day: (1) If we use the lens of Robin's covenant of reciprocity, how does that change how we can go about collaborations between Indigenous and Western sciences? Between EPA and Tribal nations? (2) How can we use the Three Sisters metaphor to understand how EPA and Tribal nations can work together to create more squash (ethical habitats) for mutual flourishing while supporting corn (IK) and beans (Western science)? The EPA Representatives discussed how to create space for different knowledge systems to come together in an environment in which they grow synergistically and nurture each other rather than compete with each other. The TSC must identify commonalities that will ignite the two groups to work together, learn from each other and then incorporate important values. EPA has failed to adequately consider and apply Tribal knowledge, and it needs to do better. The Agency must develop relationships and trust so that Tribes know that the sovereignty of their knowledge will be respected, considered and applied without misuse. It is important to understand that corn plants produce corn, bean plants produce beans, and squash plants produce squash without detriment to one another. Western and Indigenous knowledge holders can understand each other's challenges and strengths to produce beneficial outcomes.

Open Discussion

TSC Members

Francine St. Denis noted that—in terms of training Federal staff—it is difficult to make training mandatory for all employees; a long justification process must be completed before training becomes mandatory. She has developed training to help EPA staff work effectively with Tribes, and all EPA staff who work with Tribes receive this training, which is updated every 2 years. Some regions have additional training for staff who work with Tribes. Marie agreed that research-specific training is needed for Federal staff who work with Tribes. Additional training may be necessary before performing research with Tribal nations.

Shasta explained that the Tribal Caucus discussion went beyond these types of trainings, or even Tribal consultation. Many stereotypes and tropes about Native Americans still exist today, and these need to be addressed. Tribal people should not be asked to explain that they are Tribal or enrolled, and people need to be taught this.

Neil commented that being Native American means that he is always training someone. The diplomacy needed to interact with non-Native people is monumental—every day is training day. Indigenous and non-Indigenous people need to learn together respectfully so that the ship and canoe can travel peacefully down the river. Learning to braid provides life lessons, including the need to ensure that each strand stays separate so that they are identifiable and the need for strength to ensure a properly bound braid. The TSC can assist with training, but each EPA staff member needs to perform self-work before joining Tribes at the table—EPA must come to the table prepared.

Matt agreed that training is not enough for those who work with Tribes. He noted that he had learned a great deal from Tribal members throughout the meeting and realizes that he has a great deal more to learn. He urged everyone to keep an open mind and continue working together.

Beth reported that at the 2023 White House Tribal Nations Summit, which occurred concurrently with this meeting, the Biden administration signed the [“Executive Order on Reforming Federal Funding and Support for Tribal Nations to Better Embrace Our Trust Responsibilities and Promote the Next Era of Tribal Self-Determination.”](#) Matt added that the executive order has specific requirements for agencies to review their funding opportunities and adjust them to ensure that they are flexible enough to allow Tribes better access to funding. Agencies will enter an evaluation and reporting period before implementation.

TSC Business Session

2024 Face-to-Face Meeting Locations

Scott Walz presented a plan to co-host the summer 2024 meeting in Minnesota with the Fond du Lac Band of Lake Superior Chippewa. Hotels in Duluth, Minnesota, will not recognize the Federal *per diem* during peak season, so the TSC could stay near the Fond du Lac Reservation approximately 20 miles from Duluth. This would allow the TSC the opportunity to learn about Tribal issues (e.g., wild rice habitat restoration, moose population decline, reintroduction of the elk population), as well as to take a day trip to the ORD laboratory in Duluth to learn about EPA research. Tim explained that the TSC could travel to the ORD laboratory in Ada, Oklahoma, for the December 2024 meeting.

Tribal Lifeways and Resources in TSCA Risk Evaluations

TSCA was intended to be the primary means of regulating the production and use of industrial chemicals with the authority to restrict use through the entire life cycle, and it is considered to be a failed law. The

Frank R. Lautenberg Chemical Safety for the 21st Century Act was enacted in 2016 and requires TSCA risk evaluations to consider potentially exposed and susceptible populations. For environmental exposures, Tribes may represent a potentially exposed and susceptible subpopulation as required in the law, which facilitates the inclusion of cumulative risk assessment.

Health Canada now indicates that humans may be exposed to phthalates through a dietary route, but no data exist on Tribal dietary consumption. TSCA has a generalized annotation, but this is not good enough for these bioaccumulative chemicals because no risk management actions are taken. The TSC needs to follow OPPT's activities and advocate for ORD research in this area. Dianne also highlighted the subsistence literature review on Tribal fish consumption rates that the TSC, NTTC and other EPA-Tribal Partnership Groups undertook.

Neil asked whether a body of research exists on Tribal cumulative risk impact assessment. Dianne thought that this would be a good topic for a TSC white paper. It is impossible to separate Tribal and environmental risk because of traditional lifeways.

EPA IK Training Report Out

Francine described EPA's response to the Federal guidance that requires IK training for all agencies. She has been developing the training, which has the following three main goals: (1) promote understanding of IK within EPA, (2) provide an overview of the White House IK guidance, and (3) provide guidance on how to apply IK within EPA research. The training, which is not mandatory, will be available on-demand beginning January 2024. EPA's American Indian Environmental Office will ask senior managers within the Agency to encourage all staff to take the training.

Monica noted that other Federal agencies are sharing their trainings with one another and asked whether EPA would make its training available to other Federal agencies. Francine was unsure but did not see why it would not be shared.

Recognition of TSC Members

Monica recognized the following TSC members and their milestones:

- Neil—outgoing TSC Tribal Co-Chair.
- Shasta—incoming TSC Tribal Co-Chair.
- Page—5 years of service on the TSC.
- Josh—5 years of service on the TSC.
- David Charters—retirement following more than 20 years on the TSC.

Field Trip: Medicine Rock Cultural Site

The TSC members visited Medicine Rock, a sacred cultural rock art site with significant Pala pictographs. Shasta thanked everyone for attending the meeting; it was meaningful for her to have the TSC visit the place at which she works and be inspired by Pala's perspectives. She provided the closing blessing for safe travels. The meeting was adjourned following the field trip.

**National EPA-Tribal Science Council
Fall 2023 Face-to-Face Meeting Participants**

Shasta Gaughen

TSC Tribal Co-Chair
Pala Band of Mission Indians (Region 9)

Page Hingst

TSC Tribal Vice Chair
Santee Sioux Nation of Nebraska (Region 7)

Tim Canfield

TSC Agency Co-Chair
U.S. Environmental Protection Agency
Office of Research and Development

Dana Adkins (Virtual)

Chickahominy Indian Tribe (Region 3)

Dianne Barton

Columbia River Inter-Tribal Fish Commission
National Tribal Toxics Council

Sophia Bejarano

Viejas Band of Kumeyaay Indians

David Cash (Virtual)

U.S. Environmental Protection Agency
Region 1

Eliodora Chamberlain (Virtual)

U.S. Environmental Protection Agency
Region 7

David Charters

U.S. Environmental Protection Agency
Office of Land and Emergency Management

Theodore (Ted) Coopwood (Virtual)

U.S. Environmental Protection Agency
Office of Children's Health Protection

Kori Cordero

U.S. Environmental Protection Agency
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Kacee Deener

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Office of Science Advisor, Policy and
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U.S. Environmental Protection Agency
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Region 8

Martha Guzman

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