National EPA-Tribal Science Council (TSC)
Summer 2018 Face-to-Face Meeting

U.S. Environmental Protection Agency (EPA)
Andrew W. Breidenbach Environmental Research Center (AWBERC)
26 W. Martin Luther King Drive, Rooms 130/138
Cincinnati, Ohio

July 31 – August 2, 2018

MEETING SUMMARY

Tuesday, July 31, 2018

Welcome, Introductions, Roll Call and Invocation
Richard Yamada, Deputy Assistant Administrator, EPA Office of Research and Development (ORD); Cindy Sonich-Mullin, Director, EPA ORD National Risk Management Research Laboratory (NRMRL); Annette Gatchett, Division Director, EPA ORD National Center for Environmental Assessment (NCEA); Jeff Mears, National EPA-Tribal Science Council (TSC) Tribal Co-Chair, Oneida Nation; José Zambrana, TSC Agency Co-Chair, EPA ORD; Invocation by Kelly Wright, Shoshone-Bannock Tribes

Jeff Mears and José Zambrana welcomed the participants to the meeting. Kelly Wright provided the opening blessing. After Jeff M. gave an overview of the meeting's agenda, the participants introduced themselves.

Cindy Sonich-Mullin welcomed the participants to EPA's Cincinnati facility, noting that the scientists there are proud of their work and welcome any opportunity to discuss their research. She encouraged the participants to engage with the AWBERC researchers. She explained that ORD's mission is to provide the science, technical support, technology and tools to inform EPA's mission to protect public health and the environment. ORD science is conducted at 13 laboratory locations, including the two major facilities in Cincinnati and Research Triangle Park (RTP), North Carolina. The remaining 11 locations are smaller and carry out more focused research. Several other EPA offices are located in Cincinnati—including the Office of Water (OW), Office of Land and Emergency Management (OLEM), and Office of the Inspector General—and this co-location facilitates collaboration among the offices. Several ORD organizations are located at AWBERC, including the National Homeland Security Research Center (NHSRC), the National Exposure Research Laboratory (NERL), NRMRL, and NCEA. NHSRC's and NRMRL's headquarters are located at the Cincinnati facility.

The unique capabilities of AWBERC's offsite facilities—such as the Experimental Stream Facility, Center Hill Research Facility, and Test and Evaluation Facility—enable additional, focused research. The research conducted at EPA Cincinnati has far-reaching effects at the local, regional and national levels and includes a wide range of activities, such as those related to safe and reliable drinking water, homeland security, watershed management, water quality protection, analytical method and decision-support tool development, Superfund sites, and contaminated site monitoring and remediation.

EPA Cincinnati has a rich history in water research and engages in joint projects with the Greater Cincinnati Water Works. Researchers focus on issues related to water treatment and infrastructure (drinking water, stormwater, wastewater and water reuse), source and recreational waters (watersheds, harmful algal blooms [HABs]), and the development of models and tools that support environmental decision making. The laboratory's homeland security research was established in 2001, drawing from expertise from across ORD to meet EPA's homeland security mandates to improve water utilities'

abilities to prepare for and respond to incidents and advance their capabilities to clean up wide-area incidents. ORD's hallmark human health risk assessment research supports the Superfund program and provides risk assessments of chronic and subchronic exposures. The laboratory's chemical safety and exposure science research focuses on ecological modeling and adverse outcome pathways, methods to assess the co-occurrence of imperiled species and environmental contaminants for ecological risk assessment, support for the newly updated Toxic Substances Control Act (TSCA), and life-cycle assessment—for which the laboratory is nationally and internationally renowned. A priority of the AWBERC contaminated site research is technical support to Superfund sites and communities, providing direct support to states and regions and in return receiving ground-truthing and input on research that supports real-world challenges and problems. ORD also performs place-based research when possible, including community-focused research related to ecosystems, indoor air, community public health, and materials and waste management. Cindy concluded by stating that EPA Cincinnati research supports every state in every region.

Annette Gatchett explained that NCEA is one of four ORD divisions located in Cincinnati. Its vision is to advance the science and practice of risk assessment. Stakeholder engagement and cross-program integration helps to inform the advancement of analyses and applications, such as the Integrated Risk Information System (IRIS), Integrated Science Assessments, and community- and site-specific risk. Annette described, as an example, the steps involved in an IRIS systematic review, which are scoping, formulating the problem, developing a systematic review protocol, performing literature searches and screening, evaluating studies, extracting data, analyzing (including synthesizing and integrating) evidence, and forming a conclusion. A specific example is the Provisional Peer-Reviewed Toxicity Values (PPRTV) program, which is developing a website that will be launched by September 30, 2018. NCEA's community- and site-specific risk research uses a "white paper approach," including PPRTV assessments, which cover a broad area of the chemical hazard data availability space. When certain data are not readily available, NCEA uses a variety of other methods and approaches to address the gap. Annette would like the TSC's input on tribal science research needs related to environmental assessment.

In response to a question from Karen Hamernik, Annette explained that NCEA uses the 2012 Wang et al. paper[1] as a guide for the use of alternative methods and data sources in the PPRTV health assessments. The IRIS program is developing a new systematic review process, but documentation about the revised process is not available at this time.

Amy Shields asked whether NCEA works with the National Tribal Toxics Council (NTTC) to explore tribal exposures from ceremonial uses of plants and so forth. Annette responded that NCEA does not currently, but she agreed that it would be a good connection to make.

Dianne Barton noted that EPA engaged in formal consultation with tribes regarding its decision to not institute certain controls on a hazardous spill. The Agency considered the human health effects but not the ecological effects of the spill, and the ecological effects are very important to tribes. She was surprised that this was taken in account during rule promulgation. She requested that ecological effects be considered in addition to the human health effects. David Charters explained that OLEM had conducted the briefing, but he was unsure which specific OLEM group had conducted the consultation. Tribes need to make a specific comment about the inclusion of Environmental Impact Assessments (EIAs) during the public comment period. Dianne would like ORD data to be provided to support the inclusion of EIAs.

Richard Yamada welcomed the participants to Cincinnati and expressed his desire for a fruitful meeting. The TSC members will experience unique opportunities to tour the facilities and interact with the

[1] Wang NC, Zhao QJ, Wesselkamper SC, Lambert JC, Petersen D, Hess-Wilson JK. 2012. Application of computational toxicological approaches in human health risk assessment. I. A tiered surrogate approach. *Regulatory Toxicology and Pharmacology* 63(1):10–19.

researchers. He would like the TSC to provide input about how ORD can better assist tribes, especially as EPA moves to a cooperative federalism paradigm to help tribes, states and communities. For example, ORD is working with Region 9 and the Navajo Nation to evaluate household energy interactions and stove emissions. ORD has a cooperative research and development agreement with the Navajo Nation to perform laboratory evaluation of household stove emissions. Richard noted that the six ORD research programs are working hard to develop their Strategic Research Action Plans (StRAPs), and he is eager to receive tribal input. He understands that the 573 federally recognized tribes have unique needs. Fred Hauchman thanked Richard for attending the meeting; he is looking forward to following up with him after the meeting about tribal needs and ORD's opportunities to include these needs in its research plans and technical assistance.

Tribal Collaboration Science "Slam Session"

An Overview of Recent Corrosion and Water Treatment Support
Michael Schock, EPA ORD NRMRL

Michael Schock provided an overview of the Cincinnati laboratory's water-related research and activities. The laboratory's annual face-to-face drinking water workshop has been a significant focus for the past 15 years. The 2.5-day workshop brings together state and tribal stakeholders to discuss water issues in a "nuts and bolts" fashion. The 15th annual workshop will be held August 28–30, 2018, with a focus on topics related to small systems drinking water distribution, monitoring and treatment. There is no registration fee, and continuing education credits are offered. More information can be found at www.epa.gov/water-research/15th-annual-epa-drinking-water-workshop-small-systems-challenges-and-solutions.

Another interactive, highly successful program is the monthly webinar series that provides two-way information exchange. Since its inception, the webinar series has been attended by 35,352 participants from all 50 states, four U.S. territories, 38 tribal nations and 30 other countries. ORD also is working with Region 6 and the Otoe-Missouria Tribe to evaluate aeration technologies to remove disinfection byproducts from plant clear wells. ORD collaborated on a Regional Applied Research Effort (RARE) project in rural Alaska, working with local Alaska Native villages, tribes and councils to understand the composition of rural Alaskan leachate and its relationship to water; the project has been completed, and the project report is available.

Regions 1, 6 and 8 have approached ORD about elevated copper levels, particularly in new housing and buildings. Regions 2 and 6 have concerns about balancing water chemistry with different wells or source changes to prevent or discolored water or contamination by inorganics. The chemistry and mechanisms of lead and copper releases are very different, and many water treatment systems include zones where water quality may vary considerably between areas with high lead levels and those with high copper levels. Copper may be sampled from galvanized plumbing if a site has lead service lines. Major factors in copper release include persistence of oxidants, pH and solubility, aging, stagnation time, and presence of orthophosphate. Michael displayed graphs to highlight the effects of age, oxidant level and pH on copper solubility, as well as a graph to illustrate the effect of stagnation on copper levels. Another graph highlighted copper(II) vulnerability in new plumbing. Michael summarized the risk factors for high copper levels: presence of dissolved oxygen or addition of disinfectant, low pH, alkalinity above 180 milligrams per liter, and extended stagnation times or inadequate water turnover in buildings. These factors have increased incidences of copper problems in regions that have not historically experienced copper problems.

Karen H. asked whether copper in water could be tasted. Michael responded that it could be; however, Virginia Tech has performed a considerable amount of research in this area and has found that people's

ability to taste copper in their water displays huge variability, so taste is not a good indicator of a potential copper problem.

Lon Kissinger asked about the mechanism by which inorganic carbon contributes to copper solubility. Michael explained that three mechanisms exist, and the main mechanism is that it forms aqueous soluble complexes.

Bob Hillger asked about alternative treatments. Michael responded that water of known high alkalinity can be treated. Line softening and anion exchange are possible alternatives but have not been field tested. Michael would like to perform this testing and would appreciate input on possible locations to launch a pilot project.

Dianne asked whether copper-carbonate complexes affect humans or just fish. Michael responded that current studies examine their bioavailability in humans, and the complexes appear to be corrosive, although more work needs to be conducted.

Tribal Involvement in the St. Louis River Area of Concern (AOC)
Rick Gitar, AOC Lead, Fond du Lac Band of Lake Superior Chippewa (Fond du Lac)

Rick Gitar explained that the International Joint Commission, including Environment Canada and EPA, developed a list of 43 AOCs within the Great Lakes region in 1987. These AOCs possessed legacy contamination of their soil, water and land. The St. Louis River AOC is located in Wisconsin and Minnesota. Initially, Fond du Lac's involvement in the AOC was as a participant of the St. Louis River Habitat Work Group, which was originally a workgroup of the St. Louis River Citizen Advisory Committee. Rick indicated that after Minnesota and Wisconsin agencies decided that they did not want to support a citizen's advisory committee, the citizens formed the St. Louis River Citizens Action Committee, which later became the St. Louis River Alliance (SLRA) to continue their work. SLRA's May 2002 *Lower St. Louis River Habitat Plan* became the model for other AOCs to develop their plans.

Technical teams were formed in November 2011 to work on the St. Louis River's nine designated beneficial use impairments (BUIs) and determine the action items necessary to remove each BUI. These teams meet as needed to track progress on action items and make recommendations to state agencies regarding BUI removals. Fond du Lac has limited environmental staff but is involved in the work toward removing BUI #1 (fish consumption advisories), #2 (degraded fish and wildlife populations), #3 (fish tumors and other deformities), #6 (excessive loading of sediments and nutrients), #7 (beach closings and body contact restrictions), and #9 (loss of fish and wildlife habitat). BUI #3 has been submitted for EPA review and public comment and should be removed by the end of 2018. BUI #8 (degradation of aesthetics) already has been removed.

Each AOC includes AOC coordinators from each appropriate agency. The St. Louis River AOC coordinators represent the Wisconsin and Minnesota Departments of Natural Resources (DNRs), the Minnesota Pollution Control Agency, and Fond du Lac. These representatives have met nearly once a month since late 2011 and oversee all aspects of AOC activities (e.g., BUI technical teams, project technical teams). Project technical teams were formed initially to provide technical guidance in developing concept plans for habitat restoration and meet as needed to track project progress.

Rick G. described Fond du Lac's AOC work on lake sturgeon, which were stocked in the St. Louis River below the Fond du Lac Dam from 1983 to 2011 to assist in their recovery. Because it takes 25 years for females to be ready to reproduce, spawning below the dam did not occur until 2008. Fond du Lac has been sampling fish on the St. Louis River for many years, independently and in cooperation with the Minnesota DNR. During its sampling in 2011, Fond du Lac found young-of-the-year lake sturgeon, proving that spawning had occurred. Lake sturgeon have continued to spawn, and sampled fish are tagged

and have transmitters installed. Unfortunately, despite finding young-of-the-year, no evidence of recruitment (i.e., young fish older than 1 year) can be found. The Fish Technical Team has developed a strategy to collect blood, mucus and eggs to determine a possible cause for this finding. Rick G. displayed images to illustrate the steps of the Fond du Lac lake sturgeon sampling: electroshocking the fish to stun them, netting them, boarding them to measure length and girth, weighing them, taking blood samples, and adding a tag and transmitter to track their movement.

Fond du Lac also is involved in an effort to restore *manoomin* (wild rice), another culturally significant resource. Wild rice is a sacred gift to the Anishinaabe, which includes the Ojibwe/Chippewa people, and much of their culture is centered around and defined by this plant. Wild rice brought the Anishinaabe to their current lands because of a prophecy that instructed them to migrate from their original lands in what is now Maine and travel until they found the "food that grows upon the water." They traveled along the St. Lawrence River and the Great Lakes until they reached Spirit Island, near what is now Duluth, Minnesota, where they found wild rice growing on the river.

Wild rice was once abundant in the St. Louis River, with the voyageurs describing the river as being "choked with rice." Now, only a few stems grow in the numerous shallow sheltered bays of the river because of various factors. In the 1990s, Fond du Lac attempted limited restoration efforts without success. Restoration of wild rice was identified as an action item in 2013, and the Restoration Implementation Plan called for the restoration of 275 acres within 10 years. Restoration efforts are conducted by the Fond du Lac Natural Resources Program in shallow, sheltered bays in the upper estuary portion of the lower St. Louis River. The restoration is monitored by 1854 Treaty Authority staff. Rick G. displayed images to illustrate the steps of the Fond du Lac lake wild rice restoration efforts: preparing the beds, cleaning up the beds, disposing of debris, and seeding the beds.

Unfortunately, once the rice reaches the emergent stage, geese destroy the rice before it can establish a strong root base. The Wild Rice Technical Team has discussed various methods to control the geese in the estuary. The thought is that once a rice stand is large enough, it can "self-perpetuate," with the geese only able to damage the outer edge. The goal is to control the geese long enough during one season to allow several populations of rice to grow fully. Toward that end, Fond du Lac is preparing a series of 20-foot by 100-foot fenced exclosures separated by 20 feet, which should discourage the geese from crossing, and seeding at three times the previous density.

Richard asked whether invasive species may be competing with the young-of-the-year lake sturgeon for the same resources. Rick G. responded that young-of-the-year from all other bottom-feeding species are present and survive, so competition for resources from invasive species does not appear to be the main cause. David C. noted that the Upper Columbia White Sturgeon Recovery Initiative discovered a preference for predation of young-of-the-year white sturgeon compared to other species in Lake Roosevelt (Washington state). This finding was related to water clarity; once HABs were removed, predation of young-of-the-year white sturgeon by sport fish increased.

Dianne noted that increased sulfate values are detrimental to wild rice and asked whether the tribe was examining the water chemistry of the rice beds. Rick G. replied that Fond du Lac does not have the budget for this.

Chris Price asked whether wild rice was consumed by people outside of the tribe. Rick G. explained that other areas are harvested by nontribal members, but only a small bay within the St. Louis River on the Wisconsin side has harvestable rice. Wild rice on the Fond du Lac reservation may be harvested only by tribal members or reservation residents.

Healing a Sacred Place: A Tribal Collaboration to Restore the St. Louis River AOC
Joel Hoffman, EPA ORD National Health Exposure Effects Research Laboratory (NHEERL)

Joel Hoffman displayed a pictogram highlighting the sacred importance of the St. Louis River to the Anishinaabe people. The St. Louis River AOC is among the largest of the AOCs, and the St. Louis River is the largest U.S. tributary into Lake Superior. The area has received a great deal of national and international attention because of its size; the 12,000-acre, high-abundance, coastal wetland is the largest freshwater estuary in the Great Lakes. It also contains the world's largest freshwater port. Historically, it was a resource for the logging industry and is located near a large iron ore deposit. As a result of the pollution from these industries, the first failed fish run of the river occurred in 1908. The river suffered from annual anoxia or hypoxia for more than 50 years, although conditions improved somewhat in the 1960s and 1970s. Restoration work began in the 1980s, but contaminated sediment still sits at the bottom of the river.

EPA uses the R^3 Paradigm, which moves from remediation to restoration to revitalization, with the goal of increasing the quality of life, health and well-being of the community. Therefore, the Agency designs projects to maximize their social and ecological benefits. There are numerous examples of EPA-tribal collaboration in the St. Louis River AOC. EPA, in collaboration with Fond du Lac's Natural Resource Management Division, has performed a typical ecological assessment in the area and is examining mercury deposition. A unique approach has been implemented in which carbon and nitrogen stable isotope markers are combined with mercury stable isotope markers to allow source fingerprinting of mercury that can be related back to habitat use. The Agency views the AOC collaborations in the context of working with tribal members and local stakeholders toward knowledge coproduction, especially regarding ecosystem services and their cultural benefits. A map of Native American sacred sites in the area is an example of such knowledge coproduction. EPA also is linking the BUI work with ecosystem services.

Joel showed a series of maps and bathymetry images to highlight the vast areas covered within the St. Louis River AOC clean-up project. The partners developed a vision of restoration based on historical data and the desire to return Spirit Island to its size circa 1870. To accomplish this, two alternative solutions were proposed. The first was to remove the contaminated sediment and place it in a new disposal facility in the river. Because the tribe was adamant that sediment not remain in the river, an alternate approach was developed that removed the sediment completely. The partners examined the ecosystem services differences between the two solutions to determine the better option, understanding that trade-offs always will be involved. The tribes do not want contaminated sediment present in a sacred place, an ecosystem service that was challenging to monetize compared to other ecosystem services (e.g., fishing, trapping, hunting, boating). Therefore, a new approach was selected: Health Impact Assessment (HIA), a process that uses scientific data, health expertise and public input. In an HIA, health is defined as "a state of complete physical, mental and social well-being; not merely the absence of disease and infirmity." HIA has very important guiding principles and core values, which proved to be a beneficial approach to discussing challenging topics, such as how to value spiritual and cultural factors, particularly in comparison to other benefits from ecosystem services, such as swimming or drinking water.

An HIA was performed at the St. Louis River AOC, and maps captured different types of knowledge based on relationships to the river. A series of "health pathways" were developed within the HIA, including a pathway that considered the social and cultural importance of the sites and respected their cultural significance. One of the HIA recommendations was to consult with the 1854 Treaty Authority and Fond du Lac resource managers to identify significant sites for any use and determine the best approach to preserve, enhance or interpret the resources. Overall, the river health is improving, but a great deal of work remains. Joel stressed the importance of collaboration, noting that the St. Louis River AOC

collaboration is successful because Fond du Lac has a formal decision-making role, as well as dedicated, talented and highly knowledgeable natural resources staff.

Karen H. asked whether weather has been a factor. Joel responded that it has been; storms are becoming more frequent and intense in the area. Additionally, the Great Lakes are in the high-water-level stage of their cycle, so the habitat is changing, and once-dry sediments now are eroding. During the 2012 flood event, 3 feet of sediment was deposited. Resilience must be considered in the context of these factors.

Kelly thanked Joel for being open to listening to tribes. A common problem that he has observed in Indian country is that scientists claim to know about all cultural aspects of a tribe, when this is not the case. Science should be used as knowledge to inform tribes. A misconception of how risk assessment should be used in Indian country also exists; many tribes are taught to look forward seven generations, which is not considered in current EPA risk assessments.

Amy asked how tribes in other regions might work on environmental problems that are like the Region 5 AOCs (e.g., leveraging funding for sampling). Joel explained that the AOC program is separate from the Clean Water Act program, although some overlap exists. The AOC is not a regulated program, because it is derived from a treaty agreement.

Fred commented that the TSC could explore training related to HIAs or help promote the use of HIAs in applicable situations in Indian country.

Lon asked how cultural and spiritual considerations were defined and included in the process of identifying remedial alternatives and actions. Rick G. responded that Fond du Lac forced the tribe's considerations and actions into the United States Steel Corporation remediation process. The tribe initially was not invited to participate in the process but was persistent. It is important to "scream loud" so that tribal voices are heard.

Amy suggested leveraging Treatment-As-a-State (TAS) status to develop tribal water quality standards that are appropriate for the tribe's designated beneficial use to ultimately obtain funding.

TSC Tribal Caucus Environmental Program Presentations
TSC Tribal Caucus Members

Each of the TSC Tribal Caucus members provided a 5-minute "slam talk" on his or her tribe's background, history and tribal science needs.

Jeff M. (Region 5) explained that the Oneida Nation reservation comprises 65,400 acres near Green Bay, Wisconsin; the tribe owns 44 percent of the land base of the reservation, which was established before Wisconsin became a state. Two counties and several cities, including Green Bay, are overlaid on the reservation, creating jurisdictional issues. Approximately 20,000 nontribal members live on the reservation, making the 4,500 Oneida living on the reservation a minority on their own land. The Oneida Nation has supported a successful higher education initiative, and a higher percentage of Oneidas older than 25 years have college, graduate or professional degrees compared to non-Oneidas older than 25 years on the reservation. The unemployment rate for Oneida members is 2 percent on the Oneida Reservation and 4 percent in Brown and Outagamie Counties. Of the tribe's 2,727 employees, 57 percent are Oneida. Because of jurisdictional issues, the Oneida Nation has been sued repeatedly by the village of Hobart, which challenges the tribe's right to exist and would like to bring the issue to the U.S. Supreme Court. The Oneida Nation's overall science needs stem from these challenges, and the tribe would like EPA's help in the areas of technical assistance, quality assurance (QA) and legal defensibility.

Billy Longfellow (Region 1) explained that the Passamaquoddy have two communities, one at Indian Township and one at Sipayak (Pleasant Point). The tribe's lands are in Maine near the Canadian border. Although approximately one-half of the traditional land base is in Canada, the Passamaquoddy do not have First Nation status. The Passamaquoddy at Sipayak have 319 acres and 3,600 members. The Passamaquoddy have been in the area since well before First Contact, and the tribe is one of the few Eastern tribes who retained their original land. Although Maine treats the tribe as a municipality, the Passamaquoddy have TAS status. The tribe experiences a high unemployment rate and low education completion rate, but these are changing. Traditional activities include sweet grass picking, lobstering and traditional basket making. A current focus is increasing the alewife population, which historically was around 8 million; following restoration efforts, the current alewife population is about 270,000. Billy's tribe is interested in re-establishing its traditional cultural activities and fisheries. The Passamaquoddy at Sipayak are trying to connect with indigenous populations throughout the world to share beneficial knowledge and recently performed a cultural exchange of knowledge about traditional fishing with the Māori people of New Zealand.

Neil Patterson (Region 2) explained that the Tuscarora Nation is located near the Canadian border in New York state and is part of the Haudenosaunee Confederacy, which includes five other jurisdictional governing nations and their agencies, including the Haudenosaunee Environmental Task Force (HETF). The Saint Regis Mohawk Tribe has one of the largest environmental programs in the area and often works alongside the HETF on environmental issues. Neil started his nation's environmental program in 1997, and three full-time staff members are employed today. Many of the environmental programs in Region 2, including those of the Tonawanda Band of Seneca, Onondaga Nation and Tuscarora Nation, are directed by the Chiefs, Clan Mothers, and Faithkeepers of each community. Other nations are beginning to establish environmental programs. The centuries-old treaties between the Haudenosaunee Confederacy and the then-newly established United States are among the earliest U.S. treaties and form a complex web of civil and criminal jurisdictional challenges. The Haudenosaunee generally are very private and do not invite outsiders to share tribal knowledge. Corn, including at least 18 heirloom varieties, is culturally significant to the Haudenosaunee, and the nations are engaged with language restoration programs that might assist in the understanding of how science and technology, like genetically modified organisms, are part of the linguistics of environmental policy. Neil's nation and other HETF programs have been using cultural practices, teaching, laws and so forth as long-term environmental laws while also dealing with emerging, short-term environmental issues that affect tribal lands and threaten cultural lifeways. For example, the largest hazardous waste landfill east of the Mississippi River is located less than 2 miles from his reservation, and the Tuscarora Nation is actively fighting the permitting of an expansion of waste into the landfill.

Katie Tiger (Region 4) explained that the Eastern Band of Cherokee Indians (EBCI) is located in western North Carolina; the band hid in the mountains and was not forced to move west along the Trail of Tears, unlike the Cherokee Nation of Oklahoma. EBCI's total land base is approximately 62,000 acres, but the checkerboard nature of the land (boundary) makes it difficult to manage. Of the 15,709 tribal members, 8,199 live on the boundary. The EBCI Natural Resources Program includes 24 full-time employees, three interns and one contract employee. The program was recently reorganized into seven offices. Katie described her tribe's needs:

- Research focused on sustaining culturally significant fish, wildlife and plant resources in relation to climate change and habitat alteration.
- High-quality, affordable monitoring technology for all media.
- Data management/design.
- A cohesive set of natural resource data quality assurance protocols.

Monica Rodia added that EBCI participated in an air sensor pilot project in collaboration with EPA's RTP laboratory. Katie explained that air sensors were co-located near Federal Equivalent Method monitors and compared. José asked about the tribe's biggest air quality challenges. Katie replied that EBCI would like to expand monitoring beyond the two criteria pollutants the tribe currently monitors: fine particulate matter and ozone. The topography of the boundary also creates transport issues.

Rick DuBois (Region 6) explained that he is a member of the Cherokee Nation of Oklahoma and works for the Seneca-Cayuga Nation, which is one of three federally recognized tribes of the Seneca people. The Seneca and Cayuga were two of the five tribes of the Iroquois Confederacy (Haudenosaunee) in present-day New York state and voluntarily emigrated to Ohio in response to European colonization before being forcibly removed to "Indian Territory" (present-day Oklahoma). The Seneca-Cayuga Nation is located in the northeast corner of Oklahoma alongside eight other tribes and has a "jurisdictional boundary" rather than a reservation as a result of the Dawes Act of 1887. Of the tribe's 5,059 enrolled members, 1,174 live on the boundary. The tribe prides itself on being a traditional tribe that has kept its original ceremonies intact. The boundary is downstream of Tar Creek, the first and largest Superfund site, and the waters are laden with heavy metal mine discharge. The tribe's Environmental Services programs include water quality monitoring, lead exposure outreach and education, indoor air quality testing, and recycling. Rick D. described the Seneca-Cayuga Nation's science needs:

- Climate change predictive modeling at the regional scale to gauge future effects on surface water and groundwater supplies, as well as culturally significant flora and fauna.
- Additional data and guidance on the health effects of exposure to lead, arsenic and cadmium, particularly through consumption of fish and aquatic plants, as well as direct body contact with water and inhalation of dust.

Amy suggested lead as a topic for a future TSC science seminar. Region 7 has assisted tribes with vegetation sampling, and ORD could discuss its lead portfolio.

Page Hingst (Region 7) explained that the Santee Sioux Nation—the Dakota-speaking band of the Great Sioux Nation—comprises 116,000 acres in northeast Nebraska along the Missouri River, including the village of Santee. The tribe's Office of Environmental Protection's air concerns include radon (mitigation systems) and ozone. One of the office's water concerns is the very high level of *Escherichia coli* found in the area, and the tribe would like to learn about any research being conducted about ways to lower *E. coli* levels in wetlands. Nonpoint sources (agriculture runoff, high nitrates) also are of concern. The Santee Sioux Nation Tribal Response Program deals with illegal dumping and littering and is concerned about the connection between water impairment and the illegal dump sites, possible per- and poly-fluoroalkyl substance (PFAS) contamination, and other potential contamination. The tribe's overarching science concerns are related to enforcement, community buy-in and technical guidance.

Kelly (Region 10) explained that the Shoshone-Bannock Tribes originally ranged from Canada to Mexico. The reservation in southeast Idaho was established as part of a treaty signed on July 3, 1868, and originally included 1.5 million acres, which has decreased to 544,000 acres following three different secessions. The tribe owns 99 percent of its lands. Approximately 6,000 tribal members live on the reservation. His tribe's science needs are as follow:

- Methods to ensure that tribally generated data are acceptable for use in EPA decision making.
- EPA recognition of ethnographic and anthropological data, as well as consumption rates.

Chris (Region 10—Alaska) explained that a large volcano is present on Amaknak Island in Unalaska, making most of the island uninhabitable. The Qawalangin Tribe of Unalaska must deal with fish and seafood waste processing dumping that affects environmental quality. Dutch Harbor was bombed

6 months after the Pearl Harbor attack and experienced a large military presence during and following World War II, which has caused negative environmental effects. Chris detailed the Qawalangin Tribe of Unalaska's tribal science priorities:

- Data management and security for tribes in Alaska.
- Science communication across Alaska Native communities.
- Human health-based risk models for subsistence consumption rates based on Alaska Native diets.
- Assistance and training for tribal staff on Quality Assurance Project Plans (QAPPs).
- Transparency on data issues related to EPA and state data sharing with tribes; data from EPA and state managers often are difficult to obtain, and tribes need access to the data in a real-time approach.

AWBERC Tour or Tribal Consultation Policy Training

TSC members chose to take a tour of the AWBERC facility or attend the training on EPA's tribal consultation policy provided by the Office of International and Tribal Affair's (OITA) Senior Program Analyst for Tribal Policy. The tour stops included the Drinking Water Pilot Plant, Advanced Materials and Solids Analysis Resource Core Laboratory, Recreational Waters Laboratories, Oil Spills Laboratory and Wave Tank Simulation, and PFOS/PFOA in Water and Soils Laboratories.

EPA's Tribal Consultation Policy: Implementation in ORD
Dona Harris, Senior Program Analyst, Tribal Policy, EPA OITA

Dona Harris explained that President Richard Nixon gave a landmark address in 1970 regarding Indian affairs, including condemning the practice of assimilation and its associated use of boarding schools for Native children. He introduced an era of self-governance for tribes and paved the way for the Indian Self-Determination and Education Assistance Act of 1975. In 1984, EPA was the first federal agency, other than the Bureau of Indian Affairs, that addressed how to interact with tribes. The *EPA Policy for the Administration of Environmental Programs on Indian Reservations* (1984 Indian Policy) established that EPA's interaction with tribes would be on a government-to-government basis and would allow tribes to develop their own environmental regulations on their lands. This policy is the cornerstone of EPA's work with tribes, and each EPA Administrator since the policy's inception has reaffirmed it.

In 2000, President William Clinton's Executive Order (EO) 13175 directed federal agencies to perform tribal consultation in a serious, thoughtful manner. As a result, each agency was to designate a senior consultation official and develop formal consultation plans. In 2009, President Barack Obama issued a presidential memorandum on tribal consultation to reiterate the importance of federal agency consultation with tribes. In response to this memorandum and to expand its 1984 Indian Policy, EPA established its formal tribal consultation policy in 2011 and its tribal treaty rights guidance in 2016, which instructs EPA personnel to recognize that treaties are the supreme law of the land and that only the U.S. government (i.e., not state or local governments) enters intro treaties with tribes.

The 1984 Indian Policy describes nine guiding principles for EPA's interaction with tribes, and the Agency's consultation policy is derived from the second principle ("The Agency will recognize tribal governments as the primary parties for setting standards, making environmental policy decisions, and managing programs for reservations consistent with Agency standards and regulations.") and fifth principle ("The Agency, in keeping with the federal trust responsibility, will ensure that tribal concerns and interests are considered whenever EPA's actions and/or decisions may affect reservation environments.") The *EPA Policy on Consultation and Coordination With Indian Tribes* (EPA Tribal Consultation Policy) became effective on May 4, 2011, and is designed to ensure that tribes have a meaningful and timely opportunity to provide their input about EPA activities that may affect their

interests. The EPA Tribal Consultation Policy also describes EPA's process for consulting with federally recognized tribes, including several defined consultation phases. Established by this policy, Tribal Consultation Advisors are appointed in each EPA region and office and provide counsel on consultation matters, serve as points of contact and subject matter experts, and coordinate with the American Indian Environmental Office (AIEO) to ensure consistency and transparency in the consultation process. Monica serves as ORD's Tribal Consultation Advisor. A summary of EPA's consultation activities are reported in a consultation reporting database.

EPA's designated consultation official is responsible for coordinating and implementing tribal consultation across the Agency, has the authority for all EPA consultation activities, certifies EO 13175 rules, submits an annual consultation report to the Office of Management and Budget, and assists in overseeing the AIEO consultation process. Assistant and Regional Administrators are responsible for consultation activities within their respective offices and regions and conduct semiannual reviews of activities appropriate for consultation, recognizing that consultation is a dynamic process and should be considered throughout the year and not only during the semiannual reviews.

To identify activities for consultation (the first phase of consultation as described by the EPA Tribal Consultation Policy), EPA offices determine whether consultation is appropriate during the Action Development Phase of any major rules or actions that they initiate. EPA also holds ongoing meetings with EPA-Tribal Partnership Groups, which can assist with identifying any activities that may be appropriate for consultation. Tribal governments can request consultation, as well.

four phases of consultation—which can be national or regional—described by the EPA Tribal Consultation Policy are as follow:

1. *Identification*, as described above.

2. *Notification*, in which EPA notifies tribes early in the process and provides sufficient information about how to provide input.

3. *Input*, during which tribes provide input to EPA via various information-gathering activities (e.g., meetings, written or oral responses, teleconferences, webinars).

4. *Follow up*, during which EPA provides feedback to tribes involved in consultation activities to explain how their input was considered in the final action. Dona acknowledged that EPA needs to improve in this area.

Dona summarized ORD's role as the scientific research arm of EPA, consisting of six research programs that identify the most pressing environmental health research needs. ORD conducted two formal consultations in the past while developing its current *Guidelines for Human Exposure Assessment* and its laboratory competency policies. ORD will be performing the office's third formal consultation to obtain tribal input on its six research programs as it refreshes its StRAPs.

Dona stressed that the right time for ORD to engage with tribes is before the office takes any action. Tribes do not want to provide input on a draft; they would like to be truly engaged and work with EPA to develop a draft together. Dona stressed the importance of EPA engaging in meaningful consultation and thoughtfully considering tribal input. She concluded her presentation by highlighting a flow chart and implementation checklist, both found in the EPA Tribal Consultation Policy, that can help Agency personnel to determine whether the policy applies to their actions.

Amy asked whether there is an expectation for regions to coordinate with ORD when the office is performing formal consultation. She also wanted to know whether ORD would keep the regions up to

date on consultation activities. Monica responded that if a tribe contacts ORD for a consultation, the office then would contact the appropriate region to include regional personnel and tribal program partners during the consultation process with tribal leaders and other interested tribal members.

Amy asked whether ORD would like the regions to perform more consultation in terms of RARE projects with tribes. Monica responded that the preconsultation process for RARE projects should be documented in the communication component of the project. Including this information in the communication plan ensures that everyone is aware of the outreach/consultation that was performed.

Jim Lazorchak asked whether ORD had approached tribes to determine their science and environmental priorities for inclusion in the StRAPs. Monica explained that type of outreach has been accomplished through the EPA-Tribal Partnership Groups and Regional Tribal Operation Committees (RTOCs). David Kryak added that ORD had not consulted individually with each of the 573 federally recognized tribes, but the National Program Directors (NPDs) had met with their respective EPA-Tribal Partnership Groups and developed a list of priorities, which has been shared. Feedback from the EPA-Tribal Partnership Groups has not been as coordinated or as comprehensive as ORD would like, but the input received thus far during the preconsultation period has been considered. Amy added that she has met with the tribes in her region, so these tribes have been consulted. Amy also noted that most tribes provide their input through their RTOCs. Monica commented that ORD's current StRAP preconsultation phase is meant to obtain initial input, and all 573 federally recognized tribes do not need to be contacted individually at this point. When formal consultation commences in the fall, all 573 federally recognized tribes will be included.

John McKernan works with the country of Vietnam on environmental issues, and this collaboration has its own set of logistical challenges. He noted that there are 195 countries around the world, and 573 tribes is an overwhelming number of governments for EPA to consult with on a government-to-government basis within the continental United States. Dona encouraged ORD staff who are overwhelmed to reach out to the TSC members or Regional Tribal Program Managers, the latter of which serve as the "foot soldiers" in contacting tribes.

Amy emphasized that ORD should not speak to tribes without the regions being involved. Monica agreed that it is important for ORD to rely on its regional partners. This is the first time that ORD has been proactive in engaging in an early input phase with tribes and, thus far, has received positive feedback.

Amy stated that if an ORD action is taking place near tribal lands, even potentially affected tribes should be consulted. The actions do not have to take place on tribal lands themselves for tribes to be affected.

NTTC-TSC Risk Assessment Collaboration

Susceptible Subpopulation Assessment Under the New TSCA: Tribal Exposure to Persistent, Bioaccumulative and Toxic Substances (PBTs) in the Environment
Dianne Barton, Columbia River Inter-Tribal Fish Commission (CRITFC) and NTTC Chair

Dianne explained that the combined ceded lands of the four CRITFC tribes (Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of Warm Springs, and Nez Perce Tribe) comprise 66,591 square miles and more than 25 percent of the Columbia Basin. The ceded area includes almost all of the salmon habitat above Bonneville Dam.

Dianne provided an overview of the NTTC, an EPA-Tribal Partnership Group established in 2012 by the Office of Pollution Prevention and Toxics (OPPT). The NTTC gives tribes the opportunity to provide greater input on issues related to pollution prevention and toxic chemicals from commerce and

manufacturing. The NTTC also advises EPA on chemical management and pollution prevention programs that affect tribes.

TSCA regulates 95 percent of the chemicals in use in the United States. Because TSCA was commonly known as an ineffective regulation, it was reformed on June 22, 2016. Under the new TSCA, EPA's risk evaluation is required to focus on potential risk to the environment and human health, including susceptible subpopulations. EPA is required to perform risk evaluations of the first 10 chemicals drawn from the 2014 Work Plan List by December 2019. EPA must consider tribal populations as susceptible subpopulations for PBTs. The Agency also undertook expedited regulatory action without risk evaluation (i.e., moving directly to risk management) on five PBTs and plans to commence formal tribal consultation in August 2018. The NTTC submitted its comments about these PBTs to the Agency on July 23, 2018.

On June 1, 2018, EPA released problem formulation documents for the initial 10 chemicals, including hexabromocyclododecane (HBCD), a flame retardant listed as a persistent organic pollutant under the Stockholm Convention in 2013. Although U.S. production of HBCD is declining, products that could pose a risk to tribal or sensitive subpopulations remain in use. Dianne presented data showing that HBCD is a PBT and that it still is used for building and construction uses. A publication focusing on Native American housing recommends the use of a product containing HBCD. Burning of municipal waste is common and regulated, and products containing HBCD may be burned with this waste. The risk evaluation, however, does not consider HBCD exposure from this route.

For environmental exposures, tribes may constitute a sentinel of susceptible subpopulation risk. Health disparities in Indian country make tribal populations extremely susceptible to the additional risk of toxic chemicals. For example, surveys document higher than average consumption of fish by tribal populations compared to the general population, sometimes up to 11 times greater. This increased consumption now is included in the water quality standards of the states of Washington and Oregon. Tribal children are a subset of the susceptible subpopulation whose unique exposures also must be considered. Cultural activities may increase the direct and indirect exposures of tribal populations. As an example, Dianne highlighted the 2010 polybrominated diphenyl ether (PBDE) exposure assessment completed by EPA. The Agency obtained representative food profiles, including fish consumption, from a retail market in Texas. The fish consumption rate used was 11.6 grams (g) per day. Fish consumption rates of tribal populations may be as high as 865 g/day. Fish from the Texas market were found to contain 0.32 nanograms (ng)/g of PBDE. Wild-caught fish, such as those consumed by tribes around the Great Lakes and in Washington state, have been found to have 45 to 1,059 ng/g. This example illustrates that even the high end of the general population exposure is not protective of a sensitive subpopulation. Tribal lifestyles are not simply the extreme tail of a general population exposure range; tribes have their own high peak and need their own exposure assessments.

The conceptual model released for the HBCD evaluation does not take into account continued use of legacy products, burning of construction waste, groundwater issues, whether the consumption rates reflect recreational or subsistence consumption, or whether the central tendency or sensitive population exposures are being used. The TSC presented a Tribal Exposures Conceptual Model to ORD 10 years ago. The new TSCA allows this model to be used, but data are needed. The NTTC presented the Understanding Tribal Exposures to Toxics report (available at www.tribaltoxics.org) to then-EPA Administrator Gina McCarthy in June 2015 and then-EPA Administrator Scott Pruitt in June 2018. The report requests that EPA institutionalize a process to consider tribal exposures in risk assessments. This is the first step in identifying the state of toxics affecting tribes. When cooperative federalism does not work, tribes cannot rely on state preemption under the amended TSCA. The opportunity for tribal input is now. Consultation will commence in August 2018, and data on tribal exposures and pathways to PBTs will be provided to the OPPT risk assessors by early October 2018. These deadlines are driven by the

regulation, and tribal staff with risk assessment experience are needed to help develop comments during the consultation period.

Bob commented that the Penobscot Indian Nation worked on risk assessment, but the tribe had to "push the envelope." He encouraged CRITFC to keep moving forward.

Fred asked Dianne what would be most valuable for advancing this effort in the longer term and what EPA or ORD can provide in terms of the science. Dianne would like risk assessments to be performed on the most susceptible subpopulation using available tribal consumption data. Lon added that an exposure factor handbook for tribal populations is needed. Consistency on a national level is needed, but the exposures of different tribes also must be considered. The most protective regulations would address the most affected tribal population. Alternatively, the 90th to 95th percentiles for exposure could be used. Bob agreed that a "be-all, end-all" solution for all tribes is not likely, but exposures could be viewed as a sliding scale that addresses tribal interests and exposures.

José wondered whether it would be possible to collect information about what actions tribes have taken to assess their risks and exposures. He asked Lon whether Region 10 had performed a systematic study to identify this information. Lon explained that Region 10 tribes fought to have historic tribal fish consumption rates and practices to be used in risk assessments; studies that examine tribal behavior (e.g., clamming exposures) could be performed to identify information. The key approach is to identify exposure scenarios that are relevant to tribes (e.g., medicinal plants, basket-weaving materials) and the data gaps that exist within these scenarios. These gaps could be made a priority for data collection efforts.

Joel noted that the HIA for the St. Louis River AOC required the use of Fond du Lac fish consumption rates rather than the state rates.

Amy suggested including NCEA risk assessment training at the TSC Fall 2018 Face-to-Face Meeting.

Neil commented that many tribes are revisiting food sovereignty issues and planning summits that bring together many tribal nations to discuss traditional food preparation (e.g., clay pots), and different pathways of exposures are revealed at these summits and workshops. Seed libraries also relate this issue.

José wondered whether sources of information, such as traditional ecological knowledge (TEK), are available to understand historic consumption rates.

Kelly commented that although some tribes must work with states, the situation is not favorable to tribes. He commended the states of Washington and Oregon for basing their water quality standards on tribal consumption, and he hopes that Idaho will do the same.

Lon noted that OW is discussing using a suppressed rate of consumption if fisheries are improved, but contamination should be addressed.

Jeff M. and José recessed the meeting at 5:18 p.m.

Wednesday, August 1, 2018

EPA Collaborates With States, Tribes and Citizen Scientists on Data Quality Requirements
Beth Jackson, Vincia Holloman, Jessica Snyder, Katherine Chalfant and Connie Thoma, EPA Office of Environmental Information (OEI), and Eugenia McNaughton, EPA Region 9

E-Enterprise for the Environment (E-Enterprise) provides a platform for tribes, states and EPA to discuss and identify topics of interest by streamlining processes and using technology through a shared

governance framework. E-Enterprise is a model for states, tribes and EPA to work together to streamline processes and improve efficiencies through shared governance. The E-Enterprise Leadership Council comprises 30 environmental leaders from tribes, states and EPA that set the strategic direction and priorities for high-level projects. The council has tribal vacancies in Regions 2, 3 and 5. The E-Enterprise Leadership Council meets every 6 weeks via teleconference and in person twice annually in Washington, D.C.

OEI is in the process of updating its quality directives. The EPA Chief Information Officer policy directives structure includes policies (overarching requirements), procedures (which provide specific details of policies), standards (technical documents), and guidance (which serves as a tool and is not required to be followed). Once the Strategic Advisory Council approved an update of the *EPA Quality Manual for Environmental Programs*, OEI formed a workgroup to update the policies and procedures found within the manual. OEI is planning to conduct formal tribal consultation to review and comment on the updated manual in November 2018; the office also plans to issue standards for Quality Management Plans and QAPPs. *Updating the Guidance for Quality Assurance Project Plans* (EPA QA/G-5) is a priority for fiscal year (FY) 2019. OEI is performing a complete revision on EPA's grants regulations. The three current requirements outlined in the Code of Federal Regulations (CFR) will be streamlined to two: 2 CFR §1500.11 and 40 CFR 35. OEI also is working to elevate quality assurance (QA)-related guidance documents to standards.

The E-Enterprise Leadership Council and OEI have been collaborating to standardize the QAPP review and approval process for states and tribes. Implementation of QAPP guidance varies among the regions, and the processes are not transparent to stakeholders. A Lean Kaizen event is scheduled for September 11–13, 2018, to provide a forum for discussion of solutions that ultimately will allow consistent and timely approval of QAPPs. EPA regions will provide training on quality requirements to states and tribes.

As a result of requests for assistance regarding the use of citizen science data and the National Advisory Council for Environmental Policy and Technology's 2016 report on citizen science, OEI is in the process of developing the *Handbook for Citizen Science Quality Assurance and Documentation*, which will include explanations of the key elements of a QAPP, a fillable template that describes the steps in the QAPP process and required documentation, and a compendium of examples. The handbook will assist citizen scientists and organizations to collect and use quality data for their decisions. The handbook does not provide formal EPA guidance and is not intended for data collection activities funded by the Agency, which still must follow the designated QAPP requirements. The handbook has undergone extensive internal and external review, and all comments have been considered and incorporated. Version 1.0 of the handbook is expected to be published in August 2018.[2] OEI will consider user comments and develop an updated Version 2.0 of the handbook based on these comments.

Bob noted that the handbook does not provide information about making citizen science data defensible for use by EPA and wondered whether that aspect would be incorporated in future handbooks. Vincia Holloman responded that EPA-funded research, which includes specific QA requirements, produces data of legal defensibility. Whether this aspect is incorporated in future handbooks will depend on EPA's future decisions about its use of citizen science data. It is possible that the handbook could incorporate legal defensibility in future versions. Eugenia McNaughton added that a wide variety of data exists, and the appropriate use of the data always should be considered. High-profile data must meet the standards required by the QAPP. Vincia agreed that data used for enforcement purposes must meet additional

[2] As of finalization of this meeting summary in September 2018, the guidebook has not been released to the public and is undergoing predissemination and Section 508 compliance review.

requirements, but the handbook provides a good start to help ensure that citizen science data meets certain QA parameters.

Karen H. asked whether the Agency has a process to accept data submitted by citizen scientists or organizations and about the QA requirements of EPA-funded projects. An OEI staff member responded that EPA-funded data collection is very different from citizen science data collection and must meet the requirements set forth in the QAPP established at the beginning of the project. Citizen scientists should know the primary purpose of their data (i.e., not collect data just for the sake of collecting data), and this handbook should help citizen scientists identify to which EPA program their data may ultimately be delivered to and the data requirements of that program. Citizen science data can be used as a screening tool, which is how EPA became involved in the water crisis in Flint, Michigan.

José commented that the TSC can explore citizen science and help chart a course to address these issues. Beth Jackson will share the handbook with the TSC members, and Katherine Chalfant can present about the upcoming tribal consultation during either the September or October 2018 TSC teleconference.

Tribal Engagement on ORD's StRAPs

Looking at EPA's Tribal Consultation Process: Opportunities for Engagement
Dona Harris, Senior Program Analyst, Tribal Policy, EPA OITA

Dona Harris explained that EPA's tribal consultation policy is derived from the 1984 Indian Policy and distinguishes EPA from other federal agencies and departments because it is much broader than other federal policies. The Agency is required to perform government-to-government consultation with federally recognized tribes when EPA's actions or decisions "may affect tribal interests." This statement is the core of the policy, and EPA must recognize that each tribe has a different idea of consultation and respect these ideas while developing a consistent approach to consultation.

Consultation is a process of meaningful communication and coordination between EPA and tribes that occurs prior to EPA actions and decisions. It is a flexible, multistage process that can be tailored to the needs of individual tribal nations and includes interactions that can be supported by a combination of in-person meetings, teleconferences and informational sessions. Early engagement with tribes is critical, and EPA must thoughtfully consider the input of tribal governments.

To determine which tribes could be affected by an action or decision, EPA may conduct a sector analysis or work with EPA-Tribal Partnership Groups or other tribal organizations. The four phases of the consultation process—identification, notification, input and follow up—provide consistency. Dona acknowledged that EPA needs to improve its follow up. Also, it may be necessary for ORD to work with RTOCs and EPA-Tribal Partnership Groups to publicize consultation opportunities to improve tribal attendance at consultation teleconferences, webinars and meetings. Tribal members can use the Tribal Consultation Opportunities Tracking System (TCOTS) at tcots.epa.gov to view upcoming or ongoing consultations or join the TCOTS listserv (join-epa_tcots@lists.epa.gov) to receive email notifications about upcoming EPA tribal consultations. Tribal members also may submit comments on a tribal consultation, request a consultation, or contact an EPA Tribal Program Manager for consultation assistance or clarification. EPA's online tribal resources are located at www.epa.gov/tribal, and online resources specifically related to consultation can be found at www.epa.gov/tribal/forms/consultation-and-coordination-tribes.

Chris commented that sometimes tribes cannot attend consultation events because they need to be selective with staff time. Tribes still appreciate consultation opportunities even when they cannot attend. Page added that members of her tribe are not notified about consultation opportunities by their tribal leaders, who are the official recipients of tribal consultation notices. Her tribe's environmental program

might have wanted to attend some of these events and provide comments but was not informed of the opportunity. Dona acknowledged that this is a common problem and why EPA established TCOTS. Karen Gude added that it is challenging to implement consultation at the national level. OW uses the Tribal Environmental Directors List for consultation notifications and reaches out to EPA-Tribal Partnership Groups and tribal stakeholders. It is important to use many different communication mechanisms in addition to contacting tribal leaders.

Neil stated that the *United Nations Declaration on the Rights of Indigenous Peoples* recognizes free, prior and informed consent (FPIC) as the gold standard and a specific right of indigenous peoples. FPIC is an integral part of consultation, and true consultation goes beyond current U.S. efforts. Indigenous peoples do not want consultation; they want consent. EPA should explore options to provide tribes with the options to withhold consent or veto proposed actions.

Fred noted that ORD does not have much experience with tribal consultation and is just beginning to consider all of the aspects of consultation. He asked about focused outreach. Dona explained that all tribes should be notified about engagement opportunities, but additional, focused outreach to affected tribes or tribes that have expressed interest in the topic is appropriate and encouraged. Outreach can be tailored to meet tribal needs.

Tribal Engagement Process
David Kryak, Lead Coordinator on Tribal Engagement, EPA ORD Immediate Office of the Assistant Administrator

David K. explained that the ORD planning process considers research questions that inform the StRAPs, research area descriptions and specific research projects. The overarching question is, "What are your specific research needs, and what can ORD provide to meet them?" The six ORD research programs have engaged with their respective EPA-Tribal Partnership Groups, and all of the programs have engaged with the TSC. In turn, the TSC has engaged the RTOCs to obtain their input as well. Tribal input from the preconsultation and consultation phases will be valuable in informing the final StRAPs.

David K. confirmed that he can serve as the liaison between the TSC and the NPDs.

TSC Briefing to the ORD NPDs on Tribal Science Needs and Opportunities
Jeff Mears and José Zambrana, TSC Co-Chairs

Before describing the tribal science needs and opportunities that the TSC had identified through its outreach, Jeff M. and José provided an overview of the TSC that included the Council's mission, composition, history, aims and current activities. Two tribal science priorities previously identified by the TSC include (1) climate change and (2) integration of TEK in environmental science, policy and decision making. To help address these priorities, the TSC hosted the 2015 Federal Partners Climate Change Roundtable and the 2013 TEK Training Workshop at the Onondaga Nation. Tribal science needs discussed at the TSC Fall 2017 Face-to-Face Meeting included lead exposures and their health effects, health effects of wildfires, data analysis and quality control, holistic tribal health indicators that are specific to indigenous populations and inclusive of cultural lifeways, and engagement of tribal youth to promote STEM.

Jeff M. provided a thematic summary of the preconsultation input that the TSC received regarding tribal science needs for the StRAPs.

- *Air*: Air quality issues, air quality sampling and monitoring, and climate change.

- *Chemicals*: Mercury, pharmaceuticals in surface water, micropollutants, lead, PFAS, assessing chemicals in disposed materials and recycled products, chemicals in subsistence species, pesticides, methamphetamine contamination, fate and transport of agricultural chemicals and their effects on the food chain, synergistic effects of chemicals, and additional data and guidance on heavy metal exposures through consumption of subsistence species and direct body contact.

- *Water*: HABs, concentrated animal feeding operations, nutrient reduction strategies, erosion, reduction of *E. coli* in wetlands, riverine and watershed restoration, microbial source tracking, sustainable management and extent of groundwater resources, effects of groundwater withdrawal on habitats of tribal interest, aging drinking water infrastructure, corrosion control of drinking water systems, ecological effects and treatment of sulfate, tribal public drinking water systems, and home-based systems and private wells.

- *Exposure and Risk Assessment*: Exposure pathways unique to tribes, incorporation of tribal lifeways and TEK into risk assessment, potential impacts for seven generations, greater EPA involvement in ecological and human health risk assessment of tribal sustainable resources, cumulative exposures, human health-based risk models for subsistence consumption rates based on Alaska Native diets, and EPA recognition of ethnographic and anthropological data and consumption rates.

- *Sites, Materials and Ecosystems*: Contamination site issues, materials management and disposal issues, and ecological systems issues.

- *Technical Assistance*: Quality assurance support; QAPP development and training; data review, management, security and statistical analysis; low-cost water quality monitoring equipment; transparency related to EPA and state data sharing with tribes; QA standards for handheld devices, portable monitors and so forth; fish tissue and macro sampling; laboratory certification; and science communication across Alaska Native communities.

Following the presentation, TSC members and meeting participants offered additional tribal science issues:

- Pollinators.
- Colony collapse (e.g., bats, bees).
- The disconnect between ORD research and the TSCA Work Plan List chemicals.
- Paralytic shellfish poisoning.
- Mining waste.
- Ocean acidification.
- "Treaty science": What are the science needs to help support treaty relationships between EPA and tribes?

Amy noted that it would be helpful for the TSC to identify specific tasks that the NPDs can undertake to help tribes meet their science needs, as well as to identify opportunities to collaborate with EPA on specific projects.

Overview of ORD National Research Programs
Jeff Frithsen, National Program Director, EPA ORD Chemical Safety for Sustainability Research Program

Jeff Frithsen explained that the current StRAPs describe ORD's research program activities through 2019. These StRAPs were developed in consultation with EPA partner offices, regions, other stakeholders and

advisors and have been implemented throughout ORD's laboratories and centers. The planning and progress are reviewed by EPA's Board of Scientific Counselors (BOSC). Since the current StRAPs were developed, the Agency's priorities and focus have changed, and new and revised regulatory drivers exist. The StRAPs are being revised to also meet the evolving needs of ORD's partners and stakeholders, reflect a commitment to increased engagement with states and tribes, and represent advancements in the environmental and chemical sciences.

Jeff F. summarized the proposed organization and focus of the various StRAPs from FY 2019 to 2022. Specific research areas related to each overarching topic described below are provided in the appendix.

- *Air and Energy Research Program:* Science for air quality decisions, extreme events and emerging risks, next-generation methods to improve public health and the environment.

- *Safe and Sustainable Water Resources Research Program:* Water treatment and infrastructure, nutrients and HABs, and watersheds.

- *Sustainable and Health Communities Research Program:* Contaminated sites, waste and materials management, and healthy communities.

- *Chemical Safety for Sustainability Research Program*: Chemical evaluation, complex systems science, and solutions-based translation and knowledge delivery.

- *Human Health Risk Assessment Program:* Science assessment development and translation, emerging and innovative assessment opportunities, and assessment infrastructure and support tools.

- *Homeland Security Research Program:* Contaminant characterization and consequence assessment, environmental cleanup and infrastructure remediation, and systems approaches to preparedness and response.

Next, Jeff F. provided a summary of tribal concerns and topics identified during the preconsultation phase and the related ORD activities outlined in the revised StRAPs, which also are available in the appendix. He noted that the challenges related to tribal concerns and topics are how to discuss them with the appropriate level of detail, whether the related activities can inform tribal concerns, and how priorities can be defined with decreasing resources. The StRAPs will contain greater emphasis on developing solutions to specific problems, including clear articulation of the problems so that stakeholders see their issues represented and clear articulation of solutions so that ORD scientists can effectively define the essential research to address the problems. The revised StRAPs also include a greater emphasis on partnerships and collaborations and much greater specificity in outputs. The goal is to have the first drafts of the StRAPs ready by mid-August 2018 so that EPA and ORD review can commence in September 2018. A final draft for BOSC review could be ready as soon as mid-October 2018.

Dianne commented that the PFAS issue appeared to be missing the aspect of potential tribal contact and asked whether ORD has plans to look for the substance in fish tissues, game or sediment. Jeff F. replied that ORD recognizes this is an important issue, but specific research plans for fish, game and sediment sampling have not been developed at this time.

Kelly described the hazards his tribe experiences from nearby mining and Superfund sites. The area is expected to be reactive for the next 10,000 years, and current efforts are focused on capping the sites. Potential chemical reactions with elemental phosphorus waste are unknown; cyanide and phosphene risks persist in the area before they are treated with activated carbon and released into the environment. An environmental landfill exists 20 feet underground, and contaminated ponds are 40 feet in depth. These

will need to be treated, and the waste that will rise from these in the future will need to be addressed. His tribe would find phosgene detection mechanisms that record data on a regular basis useful; addressing measuring and monitoring needs is a priority.

David C. reminded everyone not to confuse tribal science and citizen science. Tribal science is not citizen science; working with tribes is not engaging in citizen science. Working with tribal citizens on individual projects would be considered citizen science and would have different QA requirements. Bob added that, in terms of a citizen science protocol, looking for specificity can be difficult, and if EPA does not receive the needed level of specificity, the data should not be dismissed. ORD should consult with the TSC instead. Researchers should perform cradle-to-grave research that involves the client at the front end of planning to ensure that the research data are reliable and applicable. Jeff F. noted that this type of specificity cannot be included in the StRAPs. He agreed that collaborative partnerships should be used to develop a research plan together, perform the research together, and obtain feedback when the project is complete.

Tina Bahadori commented that during assessments, her staff disseminates materials early, beginning with scoping and problem formulation. This is a key step to engage tribal communities and obtain their input. ORD must implement an efficient method of disseminating materials to tribes or use the comment period for a more targeted engagement with tribes to focus on their issues with specific chemicals. She welcomes guidance from the TSC to achieve this type of focused consultation.

Alan Vette explained that the Air and Energy Research Program has a few ongoing projects related to agricultural issues. The program is working with the Office of Air and Radiation to analyze the data from the National Air Emissions Monitoring Study to develop a method that agricultural operations can use to estimate emissions. The research program has a second collaboration with the U.S. Department of Agriculture related to the emissions of ammonia and nitrogen-related compounds and deposition and emissions fluxes of nitrogen compounds from agricultural operations. Kelly asked whether the agricultural chemicals of research interest include fumigants. Alan responded that the research program focuses on criteria pollutants and volatile organic compounds, and fumigants are not included. Jeff F. added that the Chemical Safety for Sustainability Research Program investigates cumulative mixtures and their effects on threatened and endangered species to inform EPA's Pesticide Program practices.

Greg Grissom, filling in for Andrew Gellar, who needed to leave, stated that he took notes on the tribal issues related to Superfund sites and chemicals to integrate in the Safe and Healthy Communities StRAP.

Bob commented that Rhode Island tribes are interested in the glyphosate issue and asked whether ORD is researching the compound. Jeff F. explained that the Office of Pesticide Programs may explore the issue of glyphosate. The Chemical Safety for Sustainability Research Program focuses on models of fate and transport and does not have a heavy focus on glyphosate.

Amy reminded the Tribal Representatives that if their tribes have issues that ORD cannot address, they should contact their Regional Science Liaison or Regional Laboratory Director. She requested that Shawn Ryan send the recent Homeland Security Research Program opioid document to Monica so that it could be shared with the TSC.

Jeff F. commented that the StRAPs cannot focus on all of the potential issues, and it would be helpful for the TSC to prioritize the top 10.

Page noted that she had not seen research related to tribal activity patterns and exposures. Tribes are more holistic, and the research does not appear to take this into account. Also, because many tribes are small, research performed with larger communities often does not apply. ORD research should focus on cultural factors because this is the main exposure route for tribes. Jeff F. responded that ORD recognizes that the

573 federally recognized tribes have very different activity patterns and routes of exposure, but it is challenging to address all of them.

Lon stressed the importance of communication so that ORD and the regions are aware of each other's research and efforts. He cited studies and risk assessments in Region 10 that took cultural aspects into account (e.g., Shoshone-Bannock Tribes medicinal plant harvests, Alaska database of community subsistence harvest information). A clearinghouse so that everyone aware of what types of information is available would be helpful.

Neil commented that pathways are part of the tribal world view. Communicating research to his community is troubling to him and the community because the research was not performed within an indigenous research framework. There is a whole separate way of knowing that has nothing to do with legally defensible data; it has everything to do with wisdom, knowledge, intuition and experience—everything that is outside of empirical data. Perhaps the TSC could consider sponsoring a workshop on indigenous research methodologies that includes the spiritual aspects of how the tribes view the world (e.g., creation stories). He encouraged ORD scientists to attempt to understand this aspect of tribal science.

Field Trip

Interested TSC members were given an off-site tour of EPA's Experimental Stream Facility, a one-of-a-kind facility for conducting controlled, flow-through, meso-scale simulation studies of stream ecosystems with stream mesocosms that provide a systemic framework for linking pollution loads to in-stream biological conditions and water quality. Jeff M. and José recessed the meeting following the field trip.

Thursday, August 2, 2018

Caucus Sessions

The Tribal and EPA Caucuses met separately to discuss individual Caucus business.

Caucus Report-Outs

Jeff M. provided the report-out for the Tribal Caucus. In the wake of Carol Kriebs' resignation, Jeff M. will assume the role of Tribal Co-Chair. The Tribal Caucus elected Rick D. as Tribal Vice Chair. The Tribal Caucus will hold elections for the next Tribal Co-Chair and Vice Chair in November 2019. The Tribal Caucus also discussed citizen science, noting that applications (apps) exist that can help citizen scientists collect useful screening data. Although QA of data is important, 99 percent of the data collected by citizen scientists will not be used in court. Citizen science can be used as a screening tool and to promote public outreach.

The Tribal Caucus members agreed that EPA does not appear to recognize the difference between consulting tribal members versus tribal staff members. Many of the staff members who EPA contacts during formal consultation are not tribal members, and the Agency must recognize this distinction. The Tribal Caucus will set aside time during each of its monthly calls to discuss consultation opportunities and support each other's efforts in providing comments.

The Tribal Caucus is looking forward to follow-up reports from Jeff F. regarding the StRAPs during upcoming TSC monthly teleconferences. The members would like EPA to provide more tools to assist tribes with their science needs, and the TSC must improve its coordination with other EPA-Tribal Partnership Groups to reduce duplicative efforts. Kelly added that EPA scientists assigned to work with

tribes should not argue with the data and information provided to them by the tribes; each tribe is the expert of its own knowledge.

In response to the Tribal Caucus desire to learn more about useful smartphone apps for citizen science, Amy volunteered to contact the coordinators of the Identifying Violations Affecting Neighborhoods Network (commonly known as the IVAN Network) to present about their effort and app during an upcoming TSC Science Seminar.

José provided a report out for the EPA Caucus, which had discussed a proposal for identifying topics for each month's TSC Science Seminar. Each month the topic would be selected by a region, beginning with Region 1 and concluding with Region 10, with some flexibility to allow regions to switch months if a pressing topic is identified that cannot wait for a later seminar. The EPA Caucus also discussed the need to understand tribal remediation and clean-up needs and indigenous research methods. It is important for EPA to understand how a tribe might approach environmental regulations from its purview.

The EPA Caucus members identified the three categories of data from EPA's context. The first category includes EPA-funded data, which must be collected within specified QA parameters. The second involves data that have been collected by tribes and determined to be legally defensible. The third category comprises citizen science data. David C. added that the goal is for EPA to bring value to QA efforts by providing a process that tribes can use to ensure that the collected data answers the desired question; EPA would not be prescriptive or oversee the QA itself. Kelly noted that tribes may follow EPA instructions for QA, but QA requirements often change if EPA personnel change in the middle of a project.

The *EPA-Tribal Science Bulletin* will resume production, but its frequency will be reduced from three issues per year to two. Page volunteered to serve on the Bulletin Team. The EPA Caucus also discussed how to address issues related to tribal exposure and risk. Karen H. noted that the updated *Guidelines for Human Exposure Assessment* document, which is in the final stages of review, will include a tribal exposure section. Lon cited the *Exposure Factors Handbook* as another potential source to explore.

José agreed with the Tribal Caucus that the TSC needs to be more engaged with the EPA-Tribal Partnership Groups, including having a presence on their monthly teleconferences. The TSC also can play a strong role in ORD's consultation efforts. The opportunity exists for the TSC to support a technology-related project focusing on tribal science needs or to develop a training series related to tribes. Chris would like information on EPA's role with Alaska Native villages, as they are not treaty tribes.

TSC Business Session

The TSC discussed possible locations for the next two face-to-face meetings and decided to meet at the NHEERL laboratory in Gulf Breeze, Florida, for the Fall 2018 Face-to-Face Meeting and at the EBCI reservation in Asheville, North Carolina, for the Spring 2019 Face-to-Face Meeting.

Tribal Youth Environmental Education and STEM Engagement

2018 American Indian Science and Engineering Society (AISES) National American Indian Virtual Science and Engineering Fair (NAIVSEF) Student Winners
Lisa Paz, Director of Membership and Giving, AISES

Lisa Paz explained that AISES is a national nonprofit organization founded in 1977 by a small group of American Indian scientists and engineers. It is the only organization that specifically supports Native students and professionals in the STEM fields. Its mission is to substantially increase the representation of American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, First Nations and other indigenous peoples of North America in STEM studies and careers. Members are categorized into three

groups: precollege, college and professional. Precollege is a growing area in which AISES is increasing its efforts. One important precollege effort is the NAIVSEF, an online competition that is part of the Society for Science and the Public fair network. NAIVSEF winners are sent to the Intel International Science and Engineering Fair. The NAIVSEF Senior Division is for students enrolled in grades 9–12, and the Junior Division is open to fifth through eighth graders. Participants can work individually or in teams. Other precollege activities include the Energy Challenge, a challenge that encourages high school students to identify energy-related problems in their communities and develop solutions, with the grand prize of traveling to Washington, D.C., to present to the Assistant Secretary of Energy; mentorship opportunities; and a national conference.

AISES provides financial, social and academic support to Native American students attending college through college chapters, scholarships, regional conferences, a leadership summit, mentorship and internships, and career resources. The college chapters provide peer support, career guidance and leadership opportunities while providing academic, social and cultural support to its members. The society's scholarship program has awarded more than $10.3 million to more than 5,000 Native students. AISES asks professionals to stay involved with the society after college and give back to precollege and college students. AISES supports professionals through professional chapters, regional conferences, a leadership summit, a national conference and career resources. Professional chapters support students who are transitioning to professional status.

AISES sponsors a number of annual events, including regional conferences that convene each spring and provide an opportunity for college and professional chapters to gather, share information and network with each other. The annual AISES Leadership Summit encourages attendance by American Indian high school and college students, advisors, and professionals. The summit's goals are to increase the skill and talent level of AISES members in professional and career development, develop AISES professional members as role models for the AISES college and graduate students, provide AISES members with support and build their confidence to transition into the STEM workforce, and provide an environment that allows AISES members to "linger and learn" from each other and from other attendees.

The AISES National Conference occurs each fall; it is a unique 3-day event that features oral and poster research presentations by high school, undergraduate and graduate students and a STEM activity day to which the local community is invited to attend. With more than 100 sessions, it is the largest STEM career fair in Indian country and includes Native cultural events and ceremonies led by the AISES Council of Elders. The 2018 AISES National Conference will be held October 4–6, 2018, in Oklahoma City, Oklahoma. More info can be found at conference.aises.org.

Lisa encouraged the TSC members to get involved with AISES at the national or local level. Volunteers to read scholarship applications and judge the science fair and national conference research presentations are needed, as are mentors. The TSC also could submit session ideas for the national conference. TSC members can contact her via email at lpaz@aises.org.

Karen H. noted that robotics and coding are becoming important topics and are being introduced to youth as early as elementary school. Two important coding languages are Python and R. Lisa agreed that coding is an important field, and AISES is trying to become more involved in this area to ensure that smaller communities have access to the appropriate technologies.

In response to a question from Bob, Lisa explained that AISES publishes the *Winds of Change Magazine*, which members receive as part of their membership package. The most popular issue each year is the annual ranking of the 200 best colleges and universities for Native students.

Following Lisa's presentation, the TSC members watched one of the winning videos from the 2018 AISES National American Indian Virtual Science and Engineering Fair. The video, *Cosmic Capture:*

Using Household Materials to Detect Cosmic Rays, was created by Ethan Drouillard (Fond du Lac) and Sam Brenner of Cloquet High School in Cloquet, Minnesota.

Cincinnati Chapter of the Society for Advancement of Chicanos and Native Americans in Science (Cincy SACNAS)
Jennifer Patritti Cram, President, Cincy SACNAS

Jennifer Patritti Cram explained that SACNAS is the leading multicultural and multidisciplinary STEM diversity organization in the country. America's population demographics are changing, including a growing Native American population. Native Americans face severe disparities in access to education, economic prosperity and public health. Without a concerted effort to diversify the student population in the United States, America's competitive edge and potential in the STEM fields will be lost. SACNAS understands that diverse voices bring creative solutions to the most pressing scientific problems. The society has built an innovative, powerful and inclusive national network of 115 student and professional chapters to support Hispanic and Native American students, including a chapter in Puerto Rico. SACNAS supports the Scholars in Science: Native American Path, which provides year-round mentorship, workshops, networks, and support for Native American undergraduate and graduate students pursuing STEM degrees. SACNAS also is proud to present a number of Native American cultural and professional development events at its annual conference. The society's Native American activities are overseen by the Native American Affairs Committee.

Cincy SACNAS is an inclusive chapter that welcomes all minorities, with the goals of increasing diversity in the STEM fields and helping minorities attain advanced degrees. The chapter is dedicated to fostering the success of all minorities—from college students to professionals—to attain advanced STEM degrees, careers and leadership positions. Cincy SACNAS promotes networking, leadership and professional development, as well as opportunities to present at the annual SACNAS national conference. The 2018 SACNAS National Diversity in STEM Conference will be held October 11–13, 2018, in San Antonio, Texas, and SACNAS offers a travel scholarship to the conference that covers all costs. Individuals interested in finding out more about Cincy SACNAS can contact Jennifer at patritjr@mail.us.edu.

Amy asked whether Cincy SACNAS interacts with the EPA laboratory in Cincinnati. Jennifer responded that she had been approached by Jim Lazorchak to partner with ORD to determine how to support Native American students and their participation in STEM activities.

In response to a question from Amy, Jennifer stated that the Cincy SACNAS chapter has approximately 30 student members.

The Qawalangin Tribe of Unalaska Summer Environmental Internships and the Alaska Native Science and Engineering (ANSEP™) Program
Chris Price, The Qawalangin Tribe of Unalaska

Chris explained that his tribe established an internship program in 2016. The interns are paid $20 per hour and perform water quality testing, among other activities. During their activities, interns found a good deal of marine debris during their work and used the Local Environmental Observer (LEO) Network to post their observations. A scientist within the LEO Network identified a carcass that the group had posted as a sea otter. Interns also sample mussels for the tribe's paralytic shellfish poisoning program; perform community outreach to promote to recycling, litter prevention and beach cleanup; and participate in a local archaeological project. As part of the latter project, the group found human and whale remains that are approximately 400 to 500 years old; the remains are being exposed as a result of beach erosion. Tribal youth also are taught about culturally significant activities, such as seal harvesting and bent-wood hat making, an important tradition for the tribe, as well as about climate issues. It is difficult to attract the best

and brightest candidates to the location, so the tribe offers a $2,000 bonus to interns who remain for the entire summer, as well as a $5,000 college scholarship. More jobs exist in the area than people to fill them.

Chris described ANSEP (www.ansep.net), an award-winning program supported by many companies—including BP Exploration Alaska and ConocoPhillips—that promotes STEM education for Alaska Native youth through its middle school, high school and college programs. ANSEP is the most successful and cost-effective STEM education program in the United States and can serve as a model for other Native American STEM programs.

Closing and Adjournment

Monica presented awards recognizing the outgoing TSC Co-Chairs (Dave J. and Jeff M.), as well as Bob's service to the TSC since its inception. This is his last face-to-face meeting, as he is retiring at the end of November 2018. Monica recognized John McKernan's service to the TSC as the outgoing ORD representative.

Jeff M. summarized that the meeting had been productive and resulted in promising actions to move forward. José thanked everyone for participating in the preconsultation on the StRAPs and informed the TSC members that the August 2018 monthly teleconference would be canceled. Neil provided the closing invocation in his native language.

Jeff M. and José adjourned the meeting at 2:41 p.m.

National EPA-Tribal Science Council (TSC) Summer 2018 Face-to-Face Meeting Participants

Jeff Mears
TSC Tribal Co-Chair
Oneida Nation (Region 5)

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

Tina Bahadori (via video teleconference)
U.S. Environmental Protection Agency
Office of Research and Development

Dianne Barton
Columbia River Inter-Tribal Fish Commission

Katherine Chalfant (via teleconference)
U.S. Environmental Protection Agency
Office of Environmental Information

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

Jennifer Patritti Cram
Cincinnati Chapter of the Society for Advancement of Chicanos and Native Americans in Science

Kelly Dipolt
U.S. Environmental Protection Agency
Office of Research and Development

Rick DuBois
Seneca-Cayuga Nation (Region 6)

Jeff Frithsen
U.S. Environmental Protection Agency
Office of Research and Development

Annette Gatchett
U.S. Environmental Protection Agency
Office of Research and Development

Andrew Geller (via video teleconference)
U.S. Environmental Protection Agency
Office of Research and Development

Richard Gitar
Fond du Lac Band of Lake Superior Chippewa

Greg Grissom (via video teleconference)
ORISE Research Fellow
U.S. Environmental Protection Agency
Office of Research and Development

Karen Gude
U.S. Environmental Protection Agency
Office of Water

Karen Hamernik
U.S. Environmental Protection Agency
Office of Chemical Safety and Pollution Prevention

Dona Harris
U.S. Environmental Protection Agency
Office of International and Tribal Affairs

Fred Hauchman
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Policy

Robert (Bob) Hillger
U.S. Environmental Protection Agency
Region 2

Page Hingst
Santee Sioux Nation of Nebraska

Joel Hoffman
U.S. Environmental Protection Agency
Office of Research and Development

Vincia Holloman (via teleconference)
U.S. Environmental Protection Agency
Office of Environmental Information

Elizabeth (Beth) Jackson (via teleconference)
U.S. Environmental Protection Agency
Office of Environmental Information

Dave Jewett
U.S. Environmental Protection Agency
Office of Research and Development

Samantha Jones (via video teleconference)
U.S. Environmental Protection Agency
Office of Research and Development

Lon Kissinger
U.S. Environmental Protection Agency
Region 10

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U.S. Environmental Protection Agency
Office of Research and Development

Jim Lazaorchak
U.S. Environmental Protection Agency
Office of Research and Development

Billy Longfellow
Passamaquoddy Tribe at Sipayak (Region 1)

John McKernan
U.S. Environmental Protection Agency
Office of Research and Development

Eugenia McNaughton (via teleconference)
U.S. Environmental Protection Agency
Region 9

Neil Patterson
Center for Native Peoples and the Environment
State University of New York College of Environmental Science and Forestry (Region 2)

Lisa Paz (via teleconference)
American Indian Science and Engineering Society

Chris Price
The Qawalangin Tribe of Unalaska (Region 10—Alaska)

Monica Rodia
TSC Executive Secretary
U.S. Environmental Protection Agency
Office of Research and Development
Office of Science Policy

Shawn Ryan (via video teleconference)
U.S. Environmental Protection Agency
Office of Research and Development

Pepa Sassin (via teleconference)
U.S. Environmental Protection Agency
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Michael Schock
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Office of Environmental Information

Amy Shields
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