

Adaptation to Climate Change and Variability: Bringing Together Science and Indigenous Ways of Knowing to Create Positive Solutions

Rising Voices II Workshop
June 30-July 2, 2014
National Center for Atmospheric Research
Boulder, Colorado



DOI Climate Science Centers



Indigenous Peoples' Climate
Change Working Group



To One Earth, One People:

A dream came to me one early morning and I began seeing beyond myself, my people and sharing my Oyate, all my relations. From all four directions, all colors and all walks of life, we all have strength in certain ways. In old stories, some of our indigenous folks speak of using these strengths in specific ways to live with nature and to protect it from destruction and loss of our spiritual connection.

...Nowadays money has replaced value in what we seek and what's important. Money feeds us, money buys food. We no longer feel the urgency to grow our own food, no longer the patience to care for and watch it grow from seed and appreciate what's happening and allow nature to take its course. In perspective, things happen for reasons, global warming is happening for reason. No pointing fingers to blame but we all have choices. My dad tells me good choices, bad choices and mom says be proud of who you are, so I am.

I am a descendent of many nations and I am learning to balance those perspectives. The organization and language I am rewarded from nature includes the things I hear, the things I see, the things I observe, the relationships of the buffalo and the bird, the mosquito and the blood, the fish and the water. The pause by the wildlife when a lion makes a kill is demonstrative of respect, a silence, a prayer. There's an honor behind it and that honor is that life is taken to be consumed and embodied in our body, in that entity. Consuming one another, lives work together because in the end we all return to the earth. We all return to nature. In many old stories and some of the things I have heard in this conference, the past has a voice and in the recognition of standing in the present the future has the vote. That vote is for our children and in those ways, we are to give back to basics, back to nature, doing with the knowledge and the things and the science that we have been gifted. There are many nations with their own intelligence, many nations organized, and many nations still love nature, in collaboration and moving forward with restoration, justified with that harmony, that true love.

Many people, as tourists come to our mountains, they come to our plains, they visit lands they have never seen before to appreciate the beauty. Today it's being lost. The moment of silence technology takes away leaves cluttered thought, silence guides emotion like the way we have music, the way we have song. In silence, in nature, it's profound to seek meaning; why is this here? What is the purpose? The soil needs microorganisms to digest the organic matter from the tree, the leaves. The worm aerates the soil, the bird digests the seed of the fruit of the tree and the seed starts to grow in that soil. That soil is prepared by those other organisms, those other relations and as that seed grows it gets stronger and it gives back, it gives more seed, more of itself, more of its future and in that future provides a code. This code is a blueprint on how to live stronger, how to live together with its relations, the weather, the people, the animals. The sacrifice ends its journey and it returns to nature, returns to earth as it once began, where it will begin again. The gift is remembering, remembering the stories and appreciation. Teaching the youth the importance of what life is, that life is survival, life is feeling good, life is struggle, life is hardship and in the end that knowing is necessary for us to build on strength between one another from all walks of life as the earth binds us as one common people, one human nation, one earth. As I believe, the human nation is a conglomerate of what all life is. For example, our DNA is similar to that of the fruit fly, the mouse and the tree, with another proof in scientific progress and discovery. As the human nation we have been endowed with the collective intelligence and responsibility to diversify and disperse all life across the earth, to make it one ultimate strength, one garden in preparation for anything - drought, flood, frost and heat - protecting for our future.

Everything has work ethic, yearns to be fit, comes to work, to workout. It comes to being in nature, building nature, establishing those trees, visiting those mountains, traveling, taking the time to relax, learning creative beautiful arts of expression, true love, finding your partner, your kindred spirit. Some walks of life are unique. Some may be a story teller or a great hunter, a great climber, a great writer, a great singer. It is in these professions and this diversity of expression that we survive into the future because in the present we recognized the voice of our past and we learned, which allowed the opportunity for the future to vote. We are strengthened. We adapt. Ultimately, we all do better in pursuit of this perfection in today's changing environment. Hau Mitaku Oyasin! (To all my Relations!) Thank You! Cody Joel Gibson, July 2, 2014 (Rising Voices II Workshop participant)*

* Unless otherwise noted, all of the quotes in this report are from Rising Voices II workshop participants during the June 30-July 2, 2014 gathering.

INTRODUCTION

Indigenous communities, cultures, and ways of life are at particularly high risk from climate change impacts and ecological dispossession. According to the “Indigenous Peoples, Land, and Resources” Chapter in the third U.S. National Climate Assessment (NCA),

“The peoples, lands, and resources of indigenous communities in the United States, including Alaska and the Pacific Rim, face an array of climate change impacts and vulnerabilities that threaten many Native communities. The consequences of observed and projected climate change have and will undermine indigenous ways of life that have persisted for thousands of years.”¹

The inclusion of Indigenous knowledges in climate change discussions has been increasingly recognized at both national and international levels as a way to mitigate climate-related risks, as well as to engage Indigenous communities in adaptation planning. The 2014 Intergovernmental Panel on Climate Change (IPCC) Working Group II report’s Technical Summary concluded, “Indigenous, local, and traditional knowledge systems and practices, including indigenous peoples’ holistic view of community and environment, are a major resource for adapting to climate change.”² While climate change-related transformations are expected to be unprecedented, Indigenous knowledges and adaptation strategies provide a crucial foundation for community-based adaptation measures.³ However, rapidly changing climatic conditions interacting with other stressors and institutions have made important components of traditional knowledges, such as cultural identities, traditional ways of life, and ceremonies, increasingly vulnerable.⁴

Climate change impacts on Indigenous peoples are particularly significant, disruptive, and deeply felt in that they affect not only the environment but also traditional, cultural, and spiritual livelihoods, practices, and beliefs. Moreover, many of the challenges and threats to Indigenous lifeways and territories are a direct and indirect result of the world’s desperate expansion of the industrial extraction and combustion of fossil fuels.

The direct environmental, ecological, social, cultural, and economic impacts on Indigenous peoples of the ongoing industrial quest for the stored energy reserves found in fossil fuels can be seen in the Amazonian jungles of South America, in the Gulf waters of the Louisiana bayous, on the Great Plains Indian reservations in North Dakota, and in the remote villages and newly opened waters of the Arctic. Physical harm from mechanical assaults and chemical pollution to sensitive subsistence environments of jungles and rainforests and to subsurface aquifers comes from many extractive activities. Service roads, drill pads, and hydraulic fracturing or “fracking” affect inland areas. Deepwater drilling and nearshore dredging and maneuvering of oversized drill rig platforms devastate the Gulf bayous and tidal and freshwater marshes. The onslaught of heavy semi-truck traffic, the dumping of proprietary frack-water and the flaring of the Bakkan oil patch emissions all raise local pollution levels in North Dakota and the

¹ Bennett, T. M. B., N. G. Maynard, P. Cochran, R. Gough, K. Lynn, J. Maldonado, G. Voggesser, S. Wotkyns, and K. Cozzetto, 2014: Ch. 12: Indigenous Peoples, Lands, and Resources. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 297-317.

² IPCC [Intergovernmental Panel on Climate Change] (2014) Fifth Assessment Report: Impacts, adaptation, and vulnerability. <http://ipcc-wg2.gov/AR5/report/final-drafts/>

³ Lazrus, H. and R. Gough (2013) “We’re all in the same canoe”: The rising voices of indigenous peoples in weather and climate science and policy. Rising Voices I Workshop Report, National Center for Atmospheric Research, Boulder, Colorado, 1-3 July, 2013.

⁴ Bennett et al. 2014.

surrounding areas. The threats and realities of proposed pipeline routes and unnoticed spills of toxic tar sand and the explosive derailments of volatile oil trains throughout the heartlands of America all serve to trade community ground and surface water futures for privatized profit in combustible black gold. These toxic environmental impacts of our rapacious extractive economies are mirrored in the dark, quiet horrors that “man camps” visit upon the social fabric of rural and Indigenous communities.

Our industrial addiction to carbon combustion already results in immediate, constant, and chronic stresses to Indigenous life-ways, long before the accumulated threats and long-term impacts from the same combusted carbon presses our carbon-black fingerprint on the firmament and absorbed carbon dioxide acidifies our oceans, rendering the air and aquatic environments we have enjoyed for millennia both unrecognizable and uninhabitable.

Given these risks, threats and realities, the *Rising Voices* movement was initiated to increase engagement between Indigenous communities and Indigenous and non-Indigenous scientists to address the challenges of understanding and responding to a changing and variable climate, extreme weather events, and research and policy needs. *Rising Voices* is a community of engaged Indigenous leaders, Indigenous and non-Indigenous environmental experts, students, and scientific professionals across the United States, including representatives from tribal, local, state, and federal resource management agencies, academia, tribal colleges, and research organizations. *Rising Voices* is a platform to amplify the voices of Indigenous peoples that need to be heard and recognized. It brings together efforts for integrating different ways of knowing and helps to establish protocols for engaging different communities.

The first *Rising Voices* workshop was held in July 2013 at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado and convened over 45 experts, practitioners, and students from diverse institutions across the United States, including Alaska and the Pacific Islands, on cross-cultural scientific engagement. Some of the questions that drove the initial *Rising Voices* discussion included: *What are the elements of successful co-production of science and policy in the related fields of extreme weather and climate change? What lessons have been learned from over two decades of engaging Indigenous peoples in weather and climate science and policy? What are the best practices and successful pathways for enhancing engagement in the future?*⁵

Through that initial meeting, representatives from the Indigenous Peoples Climate Change Working Group (IPCCWG) and lead authors of the NCA’s Indigenous Peoples chapter reached out to leading researchers in the climate science community to strategize on collaboration to address the question: *What are the elements of successful co-production of science and policy in the fields of extreme weather and climate change?* Realizing the need to move forward from discussion-based to a solutions-oriented focus, the *Rising Voices* movement has evolved into an annual forum for community leaders, practitioners, and researchers to convene and exchange scientific results, challenges, and solutions related to the effects of climate change on people, natural resources, and infrastructure.

Over seventy participants in *Rising Voices* convened for a second time at NCAR on June 30-July 2, 2014, this time with additional funding support from Colorado State University, to discuss what the science, information, support and research needs are of Indigenous communities to facilitate respectful and appropriate adaptation solutions to climate change and variability.

⁵ Lazrus and Gough 2013.

Participants came together from across the nation – including Hawai’i and Pacific Islands, Alaska, Northwest, Southwest, the Plains, Midwest, Gulf states, and Northeast – for a rich and honest discussion regarding the complex climate change challenges facing Indigenous peoples, current adaptation and mitigation strategies, protection of Indigenous knowledge, sustainable Indigenous practices, and political and institutional barriers. Many of the Indigenous communities represented at *Rising Voices* are already contending with a changing climate, including displacement of Native Alaskan villages and Native Gulf Coast communities due to rising sea levels, loss of sea ice, and/or extreme hurricane activity. Additionally, severe droughts are impacting many tribes, including tribes in the Southwest and the Great Plains, which are resulting in water scarcity for domestic, agricultural, and livestock use.

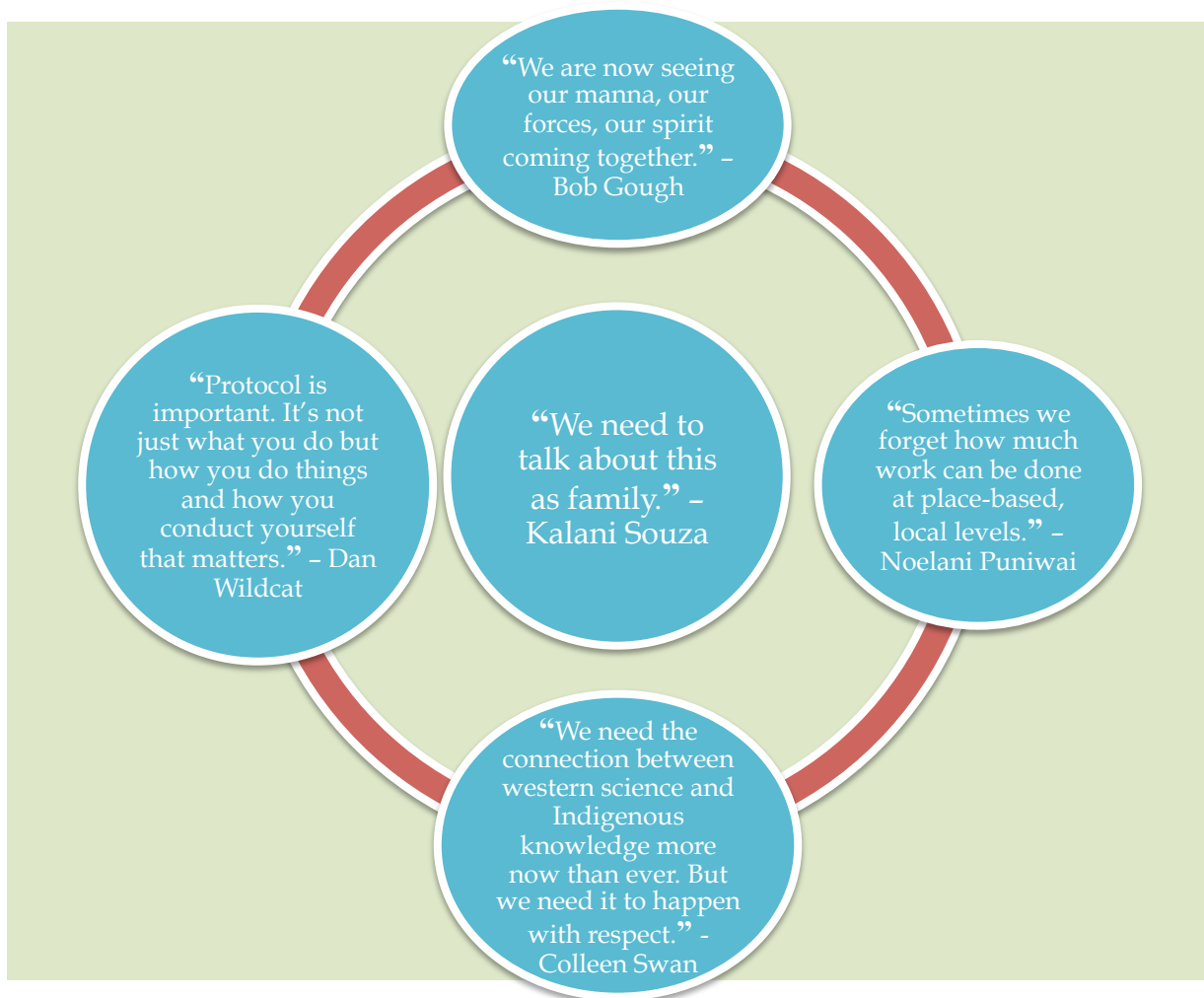
Based on the key messages highlighted in the third NCA’s “Indigenous Peoples, Land, and Resources” chapter, the conversations at the 2014 gathering were focused on adapting to the following risks:

- 1) Changing relationship with traditional plants and animal relatives
- 2) Water quality and quantity
- 3) Declining sea ice
- 4) Health and livelihood hazards
- 5) Forced relocation

With the NCA including an Indigenous Peoples chapter, there is now a place in the national forum for Indigenous Peoples’ experiences and remarks on climate change observations, effects, mitigations, and adaptations to be heard. The agenda for *Rising Voices II* was arranged to maximize information exchange and make progress on other initiatives set in motion through the NCA, the IPCCWG, and *Rising Voices I*, focusing on exploring the challenges and findings solutions.

“How can we create a world where we start looking at the balance of nature, not that we live among natural resources that we manage, but among relatives we need to respect?... Let’s move from a world full of resources to one full of relatives.” – Dan Wildcat

Bringing science and Indigenous ways of knowing together, participants helped determine what action-oriented activities, tools, and trainings are needed for positive adaptation solutions to climate change and variability, what is the role of science and scientists in forming solutions, and how to effectively guide solution-oriented science with capacity building in, for, and with Indigenous communities. An overarching theme included the need to support the sovereignty of Indigenous communities to have their knowledge heard and valued in the context of adaptation decisions and determine what co-production of knowledge actually means for tribes with respect for and maintenance of their intellectual property rights. Together, participants engaged in a conversation that contributes action-oriented solutions to the occurring physical and social regime changes and allows for long-term capacity building and increased resilience.



PRESENTATIONS AND PANELS ON COLLABORATIONS

Day 1

Following a ceremonial opening conducted by Jerry Fills Pipe, the workshop kicked off with several presentations and panels. Linda Kruger, Sue Wotkyns, and Cristina Gonzalez-Maddux presented on the Tribal Climate Change Program at the Institute for Tribal Environmental Professionals (ITEP), housed at Northern Arizona University. The program is conducted in partnership with the U.S. Forest Service and the Environmental Protection Agency and works to identify the needs of tribes, support adaptation trainings, and share information regarding opportunities and resources related to climate impacts and adaptations. ITEP collaborates with other tribal networks, such as the Southwest Tribal Climate Change Network and the Navajo Nation Hydroclimate Network Working Group, creates outreach materials of fact sheets and tribal profiles, conducts projects with Indigenous communities, such as the oral history interview project on the Colorado Plateau, and reports to the federal agencies on the climate change-related observations and needs of Indigenous communities. ITEP, in collaboration with the U.S. Forest Service, recently held a webinar series on climate change impacts of concern to tribes in the Pacific Northwest and will be holding webinars on adaptation strategies during the Fall and Winter of 2014.

Dan Wildcat and Cody Joel Gibson discussed the Indigenous Geography Phenology Network, which is working to track plants with subsistence, cultural, medicinal, and spiritual links that are being threatened by a highway through the wetlands near Haskell Indian Nations University. They have created a phenology trail, identifying the culturally and medicinally significant plant species that are at risk from the development, such as cattail, red mulberry, and black willow.



Courtesy of Kyle Powys Whyte

Kyle Powys Whyte talked about Supporting Tribal Climate Change Adaptation Planning through Community Participatory Strategic Foresight Scenario Development, focusing on how climate science organizations can partner with Indigenous people for adaptation planning and how strategic foresight processes can be used to create viable climate adaptation scenarios. The Great Lakes Integrated Sciences and Assessments group worked with tribes in the Great Lakes basin to establish climate scenarios, using the Menominee Nation model based on land, sovereignty, and the natural environment, eventually leading to the tribes approving an adaptation plan. Kyle highlighted the need to work with Indigenous communities on the communities’ own terms.

Bob Gough and Eric Wood presented the collaborative Intertribal Council on Utility Policy (Intertribal COUP) and U.S. Geological Survey project, Lakota Winter Counts, which are pictographic calendars of a community’s history, providing a unique look into the history of the Lakota Sioux people during the 18th and 19th centuries. The winter counts were drawn on buffalo hide or muslin and kept by particular bands of Lakota to capture in one image the most remarkable event of that particular year for that community; the events recorded were often based on weather. Unlike historical accounts recorded by European settlers and explorers, winter counts represent a rich Lakota tradition of oral history and storytelling that honors the ancestors and puts a human face on climate data.

Cindy Bruyère provided information from the NCAR science perspective on extreme weather and understanding extreme events, such as floods and cyclones, based on climate modeling performed in NCAR’s Regional Climate Section. Some of the findings of the NCAR Regional Climate Section’s modeling work include the occurrence of more high-intensity storms in coastal Australia and explaining observations that parts of Australia’s coastal and interior areas have experienced an increase in maximum higher temperatures and duration of maximum temperatures. Similar modeling techniques can be applied to other places to understand other local weather and climate impacts.

“We teach our warriors love. If you love your land, and its imbued into you through ceremony, through ritual, you will be one hell of a formidable warrior. Our young people need to be equipped for the battle, and the tools/weapons of choice are education, science. Learn the skills to defend what you love in the courtrooms, classrooms, political halls.” – Papali’i Dr. Failautusi Avegalio

Paulette Blanchard shared with participants “Listening for the Rain: Indigenous Perspectives on Climate Change,” a short film that documents the multi-cultural perspectives, observations, and understandings of climate change and variability by Indigenous people living in the central U.S. The film provides a look at the environmental transformations occurring across the varied Indigenous landscapes and includes Indigenous-

led proactive strategies and solutions for responding to these issues (<https://vimeo.com/87696613>).

Participants gathered for an evening discussion held at the University of Colorado's law school, which provided a venue for sharing with one another our own reasons for being part of *Rising Voices* and how *Rising Voices* has already helped shape our personal and professional lives. The conversation also focused on the intersections between policy and legal issues regarding climate change, intellectual property rights, traditional knowledges, human rights, and the issues around rights being accorded to governments and individuals, but not communities. The group also discussed the spiritual and emotional support of community and the values of community-building.

Day 2

The second day of the workshop, focused on finding solutions, started with a panel session on resources and relationships to help solve problems. Jeffrey Morisette discussed the relationship between the U.S. Geological Survey and Haskell Indian Nations University focused on phenology and recording plants and observations through a smartphone application.

Eileen Shea shared a story about holding a workshop in 1992 with National Oceanic and Atmospheric Administration scientists and Pacific Islanders to discuss abilities to predict El Niño. They started with the water and emergency managers describing their concerns, followed by the modelers speaking. Scientists described the models as being imperfect, but the discussion and initiative of local Pacific Islanders catalyzed the start of the Pacific ENSO Applications Center focused on anticipating and responding to the impacts of El Niño events. The engagement with communities and decision-makers and respect for the knowledge and skills of local communities established and sustained a level of trust that continues to this day. The outcome was that when the 1997 El Niño hit, communities had drought plans in place and there were no deaths.

Dan Wildcat talked about how every successful grant and partnership Haskell Indian Nations University has had with state and federal partners has been based on the notion of full and equal partnership; that the key to dealing with problems is through partnerships and collaborations. As he said, "You don't start a conversation unless there is a basic understanding of equality." Dr. Wildcat also called for tribal councils and nations to respect and support their tribal colleges and universities, which are highly underutilized and "perennially and chronically underfunded," highlighting that the big brother/little sister dynamic between tribes and non-tribal entities is inappropriate. He is calling for the development of a Graduate Indigenous Research Center.

"Governments, you go home and talk to your people, talk to your Indigenous peoples who have experienced these weather extremes. Talk to the peoples whose cultures carry the songs, the traditions, the adaptations."
- Bob Gough

Kalani Souza emphasized the need to work together based on relationships, as a family. Native networks must not be put in a silo and fragmented; there is a need for more unity and dialogue. We need to come up with innovative and creative solutions, as the challenges faced today are different than those faced in the past. As Kalani said, "the past should always have a voice, but it should not have a vote."

Noelani Puniwai talked about how the answer is all in the youth and it is our responsibility to empower the youth to be proud of who they are and where they come from. At the University of Hawaii, students from the Pacific Islands and the mainland have opportunities for internships in natural resources,

environmental sciences, and conservation, helping them to build their networks and relationships, focusing on the amount of work that can be done at face-to-face local levels.

Chief Albert Naquin shared with participants the film, “Can’t Stop the Water”, which documents the story of the Isle de Jean Charles Tribe of Louisiana working to save their community and culture as their land washes away due to oil and gas development and extraction, changing waterways, and climate change-induced sea level rise (<http://www.cantstopthewater.com>).

Considering what could be done to improve community capacity building, energy, food, and water, Papali’i Dr. Failautusi Avegalio and Kalani Souza reported on how they turned to the gift of breadfruit, ulu, a traditional food. The Global Breadfruit Initiative, which was established to build solutions to solve a complex set of problems, is an approach to community farming that draws from the past and engages the trans-generational transfer of knowledge. Through the University of Hawaii, the Initiative is focusing on breadfruit to promote a healthy diet and develop collaborations between Micronesia nations. This project works with farmers in a family approach and a food community, as opposed to fostering monoculture. The Initiative employs a business model for the production of naturally gluten-free breadfruit flour for which only the surplus breadfruit produced is exported.



Breadfruit. Courtesy of Papali’i Dr. Failautusi Avegalio and Kalani Souza

In four years, the Global Breadfruit Initiative has delivered 35,000 plants to 25 countries. Breadfruit can grow in high salinity environments. For example, in Myanmar, the staple crop, rice, is mostly grown at sea level. However, with sea level rise, they need an alternative, so there is a new focus on breadfruit. Solutions are coming out of the very ground on which we were born. Other gifts of the breadfruit include: the breadfruit’s flower has four compounds that are more potent than DEET to protect against mosquitoes. Wood made from breadfruit trees is termite and marine worm resistant. The breadfruit sap could be used to create an organic latex for biodegradable plastic, reducing marine debris from all of the plastic materials that blow into the ocean and undermine the life capacity of the planet.

The Global Breadfruit Initiative is utilizing the power of traditional knowledge and intellectual property rights to build an Indigenous international collaboration to protect plants and setting a precedent against mega-agricultural corporations and genetically modified organisms. Those involved in the Initiative are fighting with knowledge driven by *aloha*, which means love – love your land, nature, village, the oceans, the creatures. The Breadfruit Initiative is an example of an adaptation strategy that could be tracked by the sustained U.S. NCA to share and learn from a practical success story.

GROUP DISCUSSIONS

The majority of the workshop was devoted to working group discussions based on the five themes from the third NCA’s Indigenous Peoples Chapter, described above. Much of the discussion emphasized trust, respect, and recognition of individual and shared responsibilities, especially emphasizing the need to build processes based on relationships, to improve relationships between agencies and communities, and to create place-based solutions that thoroughly incorporate space for local dialogue and input. The

diversity of participants – scientists, educators, Tribal representatives, Indigenous scientists, and graduate students from all regions of the United States – made the discussions rich and varied.

CHANGING RELATIONSHIPS WITH TRADITIONAL PLANTS AND ANIMAL RELATIVES

The overarching issues included the ethics inherent in traditional knowledges and protocol for engaging with Indigenous communities. There was consensus on the need to focus on the next generation of Indigenous voices and climate scientists and the opportunity to engage younger people through storytelling in and with nature. The primary risks identified by the group included the transfer of ecological knowledge to help with sustainability and adaptation (where transfer refers to both giving and receiving), and the risk of being defeated in stewardship. Sacred knowledge cannot be transferred without an appropriate and ready receiver.

There are many opportunities to build stronger relationships between Indigenous people and the science community, in ways that manage differences by working on equal footing and with recognition of historical and current power, authority, and funding issues. This should focus on local and situational awareness to tie global and regional climate modeling to specific tribal experience and issues. Such work would require:

- A self-governing/governance model (and a tribally-informed Internal Review Board)
- Focused partnerships on successful team and approaches, asking “what is working and what is right?”
- Science packaged within stories and founded in an Indigenous curriculum (such as the Smithsonian Museum Native America Indigenous Geography Curriculum, using a common approach to outdoor classrooms and a K-12 priority on plant and animal relations, and using storytelling, including forced migration due to climate change and extreme events as well as “climate migration”, e.g., North Dakota’s climate will be more like Kansas’ climate in the future).
- Clarity on different vocabularies and the ability to bridge between different groups and culture.
- Using “climate migration” to guide nation-to-nation collaboration (such as treaties or tribal college curriculum) to capitalize on local understanding of nature-climate connections that might be migrating due to climate change.

Some examples of the above include:

- Existing: Sustainable land strategy program (see: <http://snohomishcountywa.gov/2194/Sustainable-Lands-Strategy>)
- Potential: More Indigenous people or voices in the Farm Bill. The recently formed USDA Climate Hubs might be able to assist in facilitating this; a Rising Voices subcommittee could draft language for the next Farm Bill where reservation lands in agriculture could be classified as “priority areas” and given “producer” status, and community qualification for USDA programs could be expanded.

WATER QUALITY AND QUANTITY

“Water is the great integrator.”
– Gary Morishima

Some of the key problems facing water quality and quantity relate to availability, including availability for natural ecosystems and for human use. In addition to climate change, some of the other stressors affecting availability include population growth in arid environments and Western water law, which allows for the extraction of water from streams and groundwater as a property right less easily modified than a permit, hindering allocation and re-allocation to streams to maintain ecosystem function. In the United States,

there is a false sense of water availability and generally, people do not realize it is a limited resource. For example, despite ice melting in the Shoshone wilderness, which creates a water debt and means that there will not necessarily be water to count on when people need it, many people still do not believe there will be that loss. Yet, seasons and recharge rates are changing and we can no longer rely on a stationary climate.

There are a number of policy and management issues for Indigenous-related water quality and quantity concerns; among them:

- Water management is intrinsically linked with sovereignty issues – land, food, and knowledge.
- Managing water from Indigenous perspectives is about relationship with place, which can be difficult for non-Indigenous people to understand. The Indigenous perspective is that we do not own any of our lands, but we steward them; this brings a different kind of evaluation and metric to the process.
- Multiple actors with varying interests and diverse sense of values are involved in the water sector with “invisible” politics influencing the decision-making process. For example, extractive industries remain the loudest voices and deepest pockets on water resource boards. The Bureau of Indian Affairs plays a huge role in whether a particular tribe gets water allocations.
- There is a disconnect between water science and policy, and limited access to information for water managers to make decisions.
- Assumptions cannot be made about a stationary climate, and recharge rates are not known, yet even if this information is available, using quantifications turns water into a commodity. Currently, un-quantified water rights have lower priority than quantified water rights. Indigenous communities might not want to get more involved in ecosystem service conversations if such services are commodified with a price tag.

Some of the urban issues related to water quality and quantity include stormwater and runoff from hard city surfaces with impacts beyond the city limits, such as salmon being affected by dust from brake linings, asbestos, and copper in waterways. Rural and urban issues include water quality (e.g., E. Coli, other coliform contamination) and agriculture to urban water transfers. For example, in Colorado, the energy-seeking industry has played an increasing role in acquisition of water rights for future uses as well as present activities. Another major concern is the effect of water quality and quantity on ecosystems. We need to have an inter-cultural conversation about ecosystem services, in which multiple perspectives inform the understanding of issues, such as how flooding and drought affect ecosystems, and one in which we talk about “eco-relations” instead of “services.”

Challenges stemming from these issues include:

- How to frame this in a way that is culturally acceptable and scientifically sound to all of the people, and technically relevant for some management purposes.
- How to readjust historic trust responsibilities with tribal responsibility.
- The need to recognize the value of Indigenous knowledges and to recognize that western science is one among many epistemological and knowledge traditions, sometimes with differing core values, such as replicability of observations.
- The need to encourage the transfer of knowledge about water and water management between generations.
- How to evaluate and measure the management, quality, and quantity of water sources.
- Existing dysfunctions in water management systems in the United States will become increasingly problematic and dysfunctional in the future as climate-related impacts increase.

- Considering whether and how to work within our existing systems or challenge those systems.

Despite these challenges, there are some positive examples of water management and the transfer of knowledge, such as:

- Collaborative efforts, including the Colorado Roundtable process and the Wind River – Crowheart water users collaborative that has regained substantial water management authority from the Bureau of Indian Affairs.
- Colorado and other states use the instream flow programs as mechanisms to help keep some water in the stream for threatened and endangered species.
- The U.S. Forest Service has a written policy to include other sources of knowledge, but the question remains about the effectiveness of this policy and how to build champions on both sides.
- Little Bighorn College started a gardening program that includes helping community members learn about water and hydrology from different perspectives, e.g., scientific, Indigenous, etc. This ties into the Crow Fair, which has been occurring for over 100 years. The government told the Crow people they could not dance and sing, however the people embraced growing vegetables and celebration.

“Water: no matter how much we think we own it, it’s just passing through.” – John Doyle

DECLINING SEA ICE

In addition to identifying immediate risks to the coastal Arctic and Subarctic communities, such as displacement, risks such as sea ice loss, permafrost degradation, coastal erosion, more frequent and intense storm surges, surface albedo change, increased risk of invasive species takeover, ecosystem changes, and the potential for the opening of the Northwest Passage were also identified. However, the risk of displacement and potential outcomes associated with relocation were discussed at length, as two of the discussion participants were from Kivalina, a rural Alaska village currently working with the state of Alaska to find a suitable place to move their community. Additionally, based on these participants direct experiences and observations of change in their village, a variety of risks associated with water temperature as experienced in Kivalina, Alaska were identified, as were increased intensity and frequency of storms and changes in whale hunting due to not just declining sea ice, but also to changing social norms, with the potential to further impact traditional customs of sharing.

After creating several risk maps the discussion turned to the power of connecting “western science” with indigenuity and exploring where climate science and Indigenous knowledges intersect. The resounding response from the group was that Indigenous knowledge is science and we should not separate western science and Indigenous knowledge when talking about climate science. Instead, the collective knowledge base should be included. Building upon this, the group was asked who has the right to represent Indigenous knowledge. One of the participants was very emphatic that she would like to hear this knowledge from an Indigenous person, the holder of the Indigenous knowledge, rather than having it interpreted by a non-Indigenous person. Indigenous peoples have a history of outsiders translating their knowledge and beliefs to others and a translator is no longer needed. The Indigenous participants felt that attempting to define Indigenous knowledge was problematic in and of itself. The standard government definition of the term in current use is limiting, leaving out the fact that Indigenous knowledge is something that people are raised with and practice until they die and includes customary law and relationships with everything on Earth. Attempting to define this concept and include all Indigenous knowledges into one definition inevitably leaves out important components.

Participants noted that both science and Indigenous knowledges are based on observations and that some observations captured by current technology science were captured by human senses in the past. Furthermore, it is important for scientists to realize that their tools are not capturing everything; it is important to understand the human connection and human observations in addition to observations captured by scientific instruments and computer models. With increased dependence on computer technology, there can be a loss of individual human knowledge. There may be a tendency for scientists to discard real observations if they do not fit current computer models or theories. The onus is on the scientists to build bridges. In order to integrate western science and Indigenous knowledges, western scientists must acknowledge that Indigenous knowledges are not anecdotal and are valid. Additionally, western scientists must include Indigenous peoples in their research, not just document their knowledge.

For example, oil companies came into Kivalina, Alaska to talk with the community. The community said that the oil company needed to incorporate the people's knowledge and include community members in their planning process. There was an offer by the oil company to fund a study, but the oil company followed up with inappropriate actions. For example, the oil company wanted to know the details to the work plan to conduct the Traditional Knowledge studies, but this is culturally sensitive knowledge and something only the community can do. There is too much proprietary information that goes into the description of such a study. Colleen Swan of Kivalina, Alaska articulated the bridge between Indigenous knowledge and western science in her life, "My house is my connection to the rest of the world we live in, but the environment is my connection to God. We take all of the best practices and modernity and create the future. We don't have to move back in time."

Including and acknowledging Indigenous peoples was a continuous theme throughout the conversation. Instead of having a moderator between Indigenous peoples and western scientists, or government agencies, participants stated that Indigenous peoples need to be allowed to speak for themselves and work directly with western scientists and government agencies on issues that affect them, such as declining sea ice. We insist that federal agencies have direct relationships with communities and that federal funding should go directly to communities in order to build community capacity.

Additionally, there should be Indigenous representation on Presidential Task Forces related to these issues. An umbrella organization following the Pacific Risk Management 'Ohana (PRiMO)⁶ model should be created and called: Family of Alaskan Risk Management (FARM). This organization would be charged with bringing agencies and Indigenous groups together, ensuring that efforts were not duplicated, and helping build capacity within Alaska Indigenous communities so that they are better prepared to deal with natural disasters that may be caused by sea ice loss and other climate change impacts in the future. Action by Indigenous peoples, government agencies, and scientists working in concert with respect for one another is needed in order to create resiliency in an uncertain future with a changing climate.

⁶ The Pacific Risk Management 'Ohana (PRiMO) is a coalition of organizations with a role in hazard risk management in the Pacific region. The agencies and institutions that comprise PRiMO recognize the value of collective action and are committed to enhancing cooperation, coordination, and collaboration to strengthen and sustain hazard resilient communities. For more information: <http://collaborate.csc.noaa.gov/PRiMO/default.aspx>

“The elders are really worried about what is going on in the Arctic. Even though our people are adaptable and we adapt to everything, such as the migration adaptations of animals, because we are vigilant and we want to watch and adapt. But now things are happening that have never happened, like rain in January and a cyclone and earthquakes and things that have never happened before. Things are happening too quickly and getting faster year after year. So I tell the scientists: We need your knowledge about what’s going on. And we need it now and updated every year instead of the long-term research. Science by itself is no good any more...But I want to hear it from the community, not someone studying it. It has to come from another Indigenous community to reach me...I want to hear it from them instead of someone interpreting the data and weather about the community for others.

We have 40,000 of years of experience in waves, weather patterns, animal behavior, water; our people have been testing foods and plants this entire time. There is so much quantitative information in our stories and myths. The last 60 years of climate and carbon data does not recognize the 40,000 years of our observation of climate...Indigenous people and scientists can work together. But the scientists need to accept what we say. We are living the changes. They need to accept that...

When we first began the relocation project years ago, our elders started telling them all of the reasons for not wanting to go to a few of the other sites. But the Army Corps of Engineers had to spend 2.9 million dollars to prove the elders right.

We need to help the scientists, but we also need to know WHY this is happening. We can’t just adapt. We have to get out of the way of Mother Nature.” – Colleen Swan

HEALTH AND LIVELIHOOD HAZARDS

The key climate change-related risk is loss of life – of plants, animals, people – both seen and unseen. Other health and livelihood risks include loss of subsistence species and traditional foods, along with the related cultural practices, and changes in the relationships between species and time, such as signals for harvesting specific species that no longer match the seasons. Paulette Blanchard shared a story about sitting with a relative at a ceremony. Her relative noted a changing natural signal (leaf size at certain time) that indicated time for a ceremony and for people to take time off work, but now spring is starting earlier, causing a shift in the natural signal and the timing for the ceremony does not match the natural signal (the leaf size). It is sometimes necessary to take out the western science idea of climate change out and put it into one’s traditional science.

Some of the key issues relate to increasing weather extremes, such as heat and drought, which are becoming the norm and impacting traditional foods, cultural, wildlife migration, livelihoods, safety, and health. It is not only physical health that is at risk, but also people’s emotional health as their cultural connections are severed to disappearing “relatives” and mental health as their identity, which is tied to their surrounding land- and waterscapes, is drastically altered. Indigenous peoples, especially elders on tribal lands, are at particular health risks due to lack of access to medical health care, which is especially needed for responses to industrial food and contamination of the environment. Furthermore, some of the current market-based strategies to address climate change, such as REDD (reducing emissions from deforestation and forest degradation) and carbon trading, pose potential livelihood hazards to Indigenous peoples and need to be addressed.

Whereas western science sees the parts that make up the whole, Indigenous science sees the whole that organizes the parts. One of the problems is that in the current western-dominated system, narrow

data and science are translated into narrow policy without considering the greater context. Both western and Indigenous science need to be respected and represented in the decision-making process.

The way that western scientists approach Indigenous community members is critical. Instead of demanding that Indigenous people fit their knowledge and ways of understanding into the western system, scientists should ask Indigenous people how they feel most comfortable sharing their knowledge and how to create an iterative process where knowledge is exchanged and inclusive of different knowledge systems. Building trust is of utmost importance, especially when asking elders to share their traditional knowledge.

“My great grandfather, a navigator, was able to name every star, and pinpoint a piece of land over 2000 miles away across the sea...Because my great grandfather doesn't have a degree doesn't mean he doesn't have incredible knowledge of wisdom. By the same token, a scientist with a degree and training should be respected. Have to have the respect. Then we can achieve mutually beneficial solutions.” – Papali'i Dr. Failautusi Avegalio

There is a distinct cultural barrier that exists in the timeframe and way that western scientists and agencies work and the time to earn respect and trust by an Indigenous community. The first step to collaboration needs to be forged through relationships, which requires a paradigm shift for how agencies currently work. One compromise approach to building trust and relationships is for agencies and

non-Indigenous scientists and researchers to find the bridge builders in the community. Non-Indigenous scientists need to share community experiences on-the-ground to begin to understand the human part of it.

Data collected and questions that inform the data need to go back to the communities, as well as the questions that inform the research and data gathered. We have to work on valuing Indigenous knowledge in the western-dominated educational system and within our own communities, both Indigenous and non-Indigenous. We need to understand that traditional knowledges are science, they are not two separate things; culture is observation, experimentation, knowing, and theory.

Whereas scientific language privileges quantification and precision, Indigenous languages privilege metaphor and relationships. Both Indigenous and non-Indigenous scientists need to work to understand both languages. Indigenous scientists need to maintain the beauty and metaphors of their language and use their linguistic tools to translate the technical language of western science to their home communities. Students play a critical role in finding the balance between the two languages. Instead of viewing Indigenous and non-Indigenous as two different worlds, we need to move to one world with many points of view and many ways of being.

“I have to know both languages: cultural languages, policy language, Indigenous language, disciplinary language. It is a pluricultural conversation on climate change. We have to be able to communicate in all directions.”
– Paulette Blanchard

There are many practical solutions to address the health and livelihood hazards. For example,

- Consider the “pre-covery”, to understand what you want to build better and not just re-building what was there. To address the climate, energy, housing, and economic crises on tribal lands, the InterTribal COUP is designing better housing that is SAFE (sustainable, affordable, future-proofed, and energy efficient).

- Identify varieties that are more tolerant of climate change. Turn to traditional foods, such as breadfruit, that are more resilient and adaptive to flooding and weather extremes.
- Focus on an adaptive fisheries strategy, such as raising young fish at hatcheries then releasing them into the waters, as is being done by the Pyramid Lake Paiute in response to drought-induced lake level decline. Also, consider Indigenous health indicators and treaty level rights to species from the perspective of toxin loading and fish, such as some tribes are doing in the Puget Sound.
- Negotiate access to new lands, such as the Quileute tribe exchanging land with the National Park Service for some of their traditional lands on higher ground. This is also important as species are no longer available in current treaty-guaranteed areas. For example, some tribes in the Pacific Northwest have been alerting the U.S. Forest Service and other federal agencies to look at both species management and negotiating rules to guarantee that tribes can still have access to species as the species migrate out of the treaty-assigned territory.
- Support opportunities for elders to pass on knowledge about traditional foods and practices, which is especially important for mental health implications of lack of access to traditional foods.
- Create a connection and opportunities for youth to learn in a different way and share knowledge, such as developing a repository of effective climate change media and art that is useful for learning and teaching. Encourage the youth to learn their native language to gain intergenerational knowledge and find strategies to adapt.
- Take policy change to the next level, taking the information before Congress and becoming the policymakers. Decisions should be made with Indigenous peoples, not just be made about them.

“Our ancestors are used to oral tradition, and now many younger people need to see and teach it.” – Ulrick Francisco

These solutions bring opportunities for collaborations, which require:

- Communities helping shape the scientific questions being asked. Review panels for major funders, such as the Environmental Protection Agency and the National Science Foundation, should include community members and not just academics.
- Finding the bridge builders in the community who can act as a conduit between the community and agencies, organizations, and researchers to help each other.
- Sharing and publishing failures, which are learning experiences to not be repeated.
- Thinking more broadly than human physical health and focusing on holistic health.

FORCED RELOCATION

Extreme weather events, coupled with ongoing environmental change such as erosion and sea level rise are transforming ecosystems in the United States. Land development and resource exploitation are exacerbating these changes. Government agency adaptation strategies for coastal communities, including the construction of seawalls, create an illusion of protection and are no longer working because of increasing climate change impacts such as sea level rise. For some Indigenous communities, community relocation is the only adaptation strategy that can protect residents from these hazards. Relocation is an extreme adaptation strategy, which can cause Indigenous communities to lose connection with the land of their ancestors, subsistence and cultural practices, social networks and kinship systems, and sovereignty.

The Rising Voices workshop brought together community leaders from Isle de Jean Charles, Louisiana and Kivalina, Alaska to share the challenges and barriers with the relocation of their respective communities. Both communities have been working to relocate for decades and have had similar challenges working with federal government agencies, such as the U.S. Army Corps of Engineers.

“Instead of ‘relocation’, maybe we should be talking about ‘movement’.”- Chief Albert Naquin

The lack of a government relocation framework is a key problem for several reasons. Current relocation institutional mechanisms work on an individual level, do not support communities that want to relocate as a community, inhibit relocation by not providing sufficient relocation funds because of the devaluation of houses in flood plains, and prevent community empowerment. The lack of access to scientific information to predict and understand the novel environmental changes affecting the habitability of a community’s location prevents communities from adapting. In addition, no institutional criteria exist to ensure that government agencies incorporate local scientific knowledge of environmental change when assessing relocation sites as well as the habitability of a community’s original location. Finally, a community’s decision to relocate can affect its ability to receive funding to maintain existing infrastructure at a community’s original location. For example, after the village of Shishmaref, Alaska voted to relocate in 2001, the community was cut off from state and federal funding, yet is still in its original place.

An adaptive governance relocation framework could respond to these challenges and:

- Prioritize communities staying in-place;
- Support a community-led and initiated relocation process;
- Create a relocation funding mechanism;
- Create a dynamic, iterative process as climate change transforms places where people live and establish indicators that mark when it is no longer safe to stay in-place and necessary to start a relocation process; and
- Ensure that the human rights of individuals as well as communities are protected, including cultural, sovereignty, and subsistence rights.

We recommend the creation of a Task Force on Climate Migration. Members of the Task Force would include Indigenous leaders, legal and scientific experts, and federal, state, and tribal government representatives. The Task Force could aim to:

- Formulate the design of an institutional framework;
- Identify available land for relocation, including land exchanges with state and national parks;
- Research existing laws and policies which could be utilized to facilitate relocation and those which might need amendment, such as the Stafford Act’s definition of ‘disaster’ which might need to be changed to include erosion and sea level rise;
- Conduct a state-by-state survey of community locations which are vulnerable to hazards and at-risk of displacement;
- Create a clearinghouse of community stories about relocation. Rising Voices provides a model for how this could be done.
- Consider funding options and explore public/private partnerships;
- Consider models that already exist, such as the 1930s Resettlement Act created in the U.S. and the relocation plans for Isle de Jean Charles, Louisiana and Newtok, Alaska.

People around the world are experiencing climate displacement. The creation of a Climate Migration Task Force is a huge opportunity for the United States government to demonstrate international leadership. Indigenous peoples in the United States can also provide a model for a community-led relocation process that protects the human rights of community residents and improves their standard of living, health, and well-being.

Shared themes from the working groups:

- Practices built on mutual trust and respect.
- Shared learning and joint problem-solving – we are all learning from one another in a collaborative process.
- Need for *sustained* dialogue and engagement at community levels (versus periodic, one-off efforts).
- Indigenous voices speaking directly for their communities.
- Recognizing the interconnection among people, natural resources and place as a fundamental precept.
- The fundamental importance of engaging youth – cross-generational learning and enabling the next generations to guide us to the future.

LIST OF RECOMMENDATIONS TO THE STATE, LOCAL, AND TRIBAL LEADERS TASK FORCE ON CLIMATE PREPAREDNESS AND RESILIENCE

Based on the workshop discussions, participants submitted a list of recommendations to the Presidential Task Force on Climate Preparedness and Resilience:

Near-term actions:

- ***Migration: Convene a Climate Migration Task Force.*** A Federal Task Force on Climate Migration would address the identified need to establish a legal mechanism, institutional framework, and financial support to directly support marginalized communities (Indigenous and non-Indigenous) who are facing displacement due to climate change impacts and who desire to migrate safely and with dignity. Because many Indigenous communities are urgently threatened with displacement, we strongly recommend that this be considered as a near-term action.
- ***Youth and Veterans: Create a Climate Change Corps to enhance capacity building of youth leaders and returning Veterans.*** The capacity of our youth needs to be enhanced through mentorships, scholarships, and internships with local federal agency affiliate offices (for example, in the County Extension offices with the USDA; in tribal Housing Authorities with HUD; in the National Renewable Energy Laboratories with the DOE, in restoring National Parks with the DOI, AmeriCorps, Conservation Corps, etc.). The Climate Change Corps, supporting both community youth and returning Veterans, could ensure the persistence and implementation of such capacity to strengthen resilience amongst Indigenous and non-Indigenous communities across the country for the near- and long-term.

Long-term actions:

- ***National Climate Assessment: Establish a permanent and formalized structure for Indigenous participation in the U.S. National Climate Assessment.*** Determine a mechanism for continued and expanded Indigenous engagement and support for long-term collaborative partnerships

that sustain assessment activities, including respectful science support and data collection in collaboration *with*, not *on* or *for*, Indigenous communities. Important Indigenous led literatures and guidelines documents already exist and can be used for advising the Task Force on this recommendation.

- ***Water rights: Establish an institutional framework to ensure support for tribes to define and utilize their water rights.*** Tribes need legal, financial, engineering, and scientific support in water rights adjudication, litigation, and settlement, such as financial support to fund infrastructure and engineering and scientific support to adequately quantify available surface and ground water, water use, water use projections, storage/transport options, and infrastructure development. Tribal governments need to participate in timely water settlement deliberations for all uses. An independent review process should be established to provide information on how settlement discussions are progressing and ensure that the kind of support required to facilitate agreement is provided.
- ***Collaboration to Address Climate Change Impacts on Water: Establish basin-level regional processes for federal, state, local, and tribal governments to develop and implement cohesive strategies for addressing impacts of climate change on water quality and quantity.*** Climate change impacts on surface and ground water will profoundly affect human health, public safety, economies, ecological functions, and cultures. Collaboration is needed among a wide variety of tribal, federal, state, regional, and local entities with jurisdiction over water to manage surface and groundwater conjunctively and in an integrated manner and to contend with upstream and downstream impacts of climate change on water.
- ***Traditional Ecological Knowledge (TEK): To the extent agreed by Indigenous knowledge holders, map the TEKs, places, resource uses, and histories of coastal and other (e.g., drought afflicted) Indigenous communities as a resource guide for climate change impact and adaptation efforts, especially cross-community collaborations.*** Indigenous people have a rich knowledge of their environment that is important for filling in lack of data and for developing adaptation and sustainable strategies.
- ***Indigenous Perspectives: Support inclusion of Indigenous perspectives, insights, and knowledge in federally-appointed and/or agency-led assemblies concerned with natural resources, environmental management, and policy,*** such as the National Ocean Council's efforts to improve the health of our oceans, coasts, and Great Lakes. The free, prior, and informed consent (FPIC) of Indigenous peoples should be respected when these assemblies are formed and engagement with Indigenous peoples be continued.
- ***Education: Support and enhance relations between education institutions and agencies to foster educational content and activities that address climate change, variability, adaptation, and mitigation in all levels of academic education (i.e., K-12, colleges, and universities), as well as for general public education.*** Youth are the future and need to be involved in learning about climate change and addressing impacts and solutions.
- ***Collaborative Research: Have Indigenous communities most impacted by a changing climate be co-investigators in climate change research.*** This includes helping to set a U.S. research agenda that addresses the unique priorities, contexts, and experiences of Indigenous

communities and invites community members' participation as partners. Resources need to be allocated and managed by Indigenous community leaders to enable that participation, including resources to support training, workforce development, data gathering and management, the purchase of appropriate equipment, and the incorporation of research results into community planning.

- ***Conference and Partnerships: Establish an annual event for Indigenous communities to come together with researchers working on climate change.*** The *Rising Voices* I and II workshops provide a model that could be applied for such an annual event. These events could be used as "mileposts" to collaborate and report on the recommendations and activities listed above.

The above recommendations build from conclusions developed during the 2013 *Rising Voices* workshop:

- *Ways of knowing and communicating are informed by cultural values, whether in scientific institutions or tribal contexts.* We need to ensure that what we call co-production is actually that, not just in name but truly engaging different strengths from different knowledge systems to achieve a better understanding of a process or issue. We need to move beyond the model of "collect and measure" Indigenous or local knowledge as if it were another physical object or process.
- *Issues of equity must be addressed explicitly in the engagement of diverse ways of knowing so that one knowledge system is not prioritized or valued more highly than another.* Power differentials between collaborators must be understood and acknowledged and addressed as appropriate. For example, collaborations with reservation communities should acknowledge long histories of oppression and prejudice.
- *There are sets of rights and responsibilities associated with all knowledge systems.* For technical science this may be the standards of rigorous research and peer reviewed publication. For communities this may be specific cultural protocols and the understanding that community members who are responsible for their knowledge have the right to maintain control over whether, and if so, how it is shared or engaged by with others. In both cases, but especially concerning Indigenous knowledge, building relationships of trust between knowledge holders and those who would like to engage with the knowledge is an essential part of the cultural protocol but does not guarantee access to the knowledge.
- *Studies that seek to engage diverse knowledge systems, namely Indigenous or local knowledge, must be designed carefully to address pragmatic concerns* (e.g., transportation, data storage, participant compensation) and challenges to research processes that may arise from cultural protocols (e.g., investing in relationships can take many years and be well beyond the scope of usual project timelines), and facilitate iterative processes that allow for community input and revision continually or as frequently as possible (e.g., how are adaptation policies working?). Best practices for engagement should be recorded and made widely available.
- *A Native Science Foundation could be created that serves as a network of networks or broad infrastructure to facilitate the above practices.* This Foundation could build knowledge and capacity within tribes, among tribes, and between tribal and non-tribal collaborators within and across multiple sectors. As a shared resource for tribal communities it would be a way of sharing

knowledge and building capacities towards adaptation and resilience.

- “We’re all in the same canoe” – how can engagements between diverse ways of knowing be sustained in institutional interactions such as the IPCC and the National Climate Assessment to the benefit of people beyond specific places and communities?

To learn more or become part of the Rising Voices movement, please contact Heather Lazrus (hlazrus@ucar.edu), Julie Maldonado (jkmaldo@gmail.com), Bob Gough (gough.bob@gmail.com), or Jeffrey Morisette (morisettej@usgs.gov).

Rising Voices website: <http://www.mmm.ucar.edu/projects/RisingVoices>

REFERENCES

Bennett, T. M. B., N. G. Maynard, P. Cochran, R. Gough, K. Lynn, J. Maldonado, G. Voggesser, S. Wotkyns, and K. Cozzetto, 2014: Ch. 12: Indigenous Peoples, Lands, and Resources. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 297-317.

IPCC [Intergovernmental Panel on Climate Change] (2014) Fifth Assessment Report: Impacts, adaptation, and vulnerability. <http://ipcc-wg2.gov/AR5/report/final-drafts/>

Lazrus, H. and R. Gough (2013) “We’re all in the same canoe”: The rising voices of indigenous peoples in weather and climate science and policy. Rising Voices I Workshop Report, National Center for Atmospheric Research, Boulder, Colorado, 1-3 July, 2013.