



# LEADING THE WAY

## *Tribal colleges prepare students to address climate change*

*By Barbara Ellen Sorensen*

*Across the United States,* tribal people are noticing adverse changes in the natural world due to climate change—and these changes affect their cultures. In the Pacific Northwest, for example, tribes depend on salmon fisheries not only as a source of food but also for survival of their cultural well-being. The depletion of salmon due to the increase in water temperature could be devastating. From a purely monetary standpoint, the loss of jobs that are tied to the annual return of the salmon will be detrimental to many Indigenous households. Subsistence cultures, such as the Huslia people in Alaska, have long depended on salmon not only for food but for their cultural identity as well.

Meanwhile, on the Navajo Nation, native plants historically

*FISHING AT THE FALLS. American Indians fishing for salmon in 1941 at the Celilo Falls on the Columbia River, OR. According to the U.S. Army Corps of Engineers, at the turn of the 20th century, there were about 480 fishing stations in and around Celilo Falls. Fishermen from the Yakama, Warm Springs, Nez Perce, and Umatilla reservations would build wooden scaffolds over the falls and use dipnets to catch the salmon returning to their spawning grounds upriver. Photo by Russell Lee/Hulton Archive/Getty Images*

have stabilized the movement of sand dunes. Some plants have medicinal uses; many others provide forage for livestock

as well as rabbits, foxes, and birds. People also use native plants such as yucca, snakeweed, and poliomintha (a purple sage from the mint family) for brushes, weaving dyes, and baskets. As invasive plants have moved into the area and precipitation levels have decreased, many native plants are struggling to survive. That means Navajos have a harder time finding the plants they have traditionally relied upon.

Sand dunes have begun shifting and spreading across the reservation, threatening to cover communities and closing highways. Recently, in Teesto, AZ, one sand dune moved 176 feet in one year. Currently, a movement of three feet in one windstorm is considered normal. This movement is also due to lack of rain, which is linked to climate change.

Today, tribal colleges and universities (TCUs) are developing and delivering the education and research opportunities needed to produce the next generation of American Indian science, engineering, and technology professionals dedicated to the study of climate change. Faculty and students are actively engaged in climate change science education through academic programs in biology, earth sciences, GIS, natural resources, and environmental sciences, as well as Native Science and American Indian Studies programs.

The faculty at many TCUs see themselves and their students as leaders and agents who can collaborate with tribal

governments and communities to respond with solutions and innovative strategies to help Native communities adjust to the impacts of a changing climate.

### **Climate Change Working Group**

In April 2011, the American Indian and Alaska Native Climate Change Working Group (AI/AN CCWG) convened for two days of intensive panels, presentations, round tables, and initiatives. This think tank of sorts is the brainchild of Haskell Indian Nations University's Dr. Daniel Wildcat (Yuchi member of the Muscogee Nation of Oklahoma). Established in 2003, the working group meets biannually.

Funded in large part by NASA, its goal is to raise awareness about the need for relevant education and research programs in TCUs. Ultimately, says Wildcat, its intent is to mentor the next generation of American Indian and Alaska Natives who are interested in the science, technology, engineering, and mathematic (STEM) fields.

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*WILD RICE. White Earth Tribal and Community College student Lainey Fineday takes photographs of the flowering stage of wild rice on Lower Rice Lake. Photo by Dianne Kier*



Adaptation requires that communities observe what is happening in the natural world and react accordingly. This roughly translates to monitoring the changes and gathering tangible data, teaching others about what is happening, and using Indigenous knowledge systems to learn how to adapt to changes within the intricate web of the natural world.

Wildcat became involved with the first Impact of Changing Environments (ICE) on Indigenous People Symposium in June 2006. Funded by the National Science Foundation-sponsored Center for Remote Sensing of Ice Sheets (CRE SIS) program at the University of Kansas and Haskell Indian Nations University (Lawrence, KS), scientists and scholars gathered at the ICE symposium for three and a half days, exploring ways to help other Native people become more cognizant of the impact of climate change.

The working group is a TCU-centered network of governmental agencies and organizations, tribal and inter-tribal organizations, and nonprofit organizations that have a synergistic relationship. “The work we are doing is very important because I truly believe that as Native people, we are facing one of the most serious challenges we’ve ever known,” he says. “We will see changes that are going to call on us to be super resilient and super adaptive.”

Wildcat imagines that when the people living in the Northwest coast and the Arctic are flooded, there may not be places for them to move due to the “artificial borders and boundaries created by the Eurocentric philosophies and the governments they inspired.”

“Where can we move if we do not have a relationship with the natural world?” he asks. “It will be one of our biggest challenges.”

There are solutions, however. Native people need to come together to create their own institutions, he says. “Since we will be the first to experience climate change in ways that others will not experience it, we have to mobilize our Indigenous holdings, strengthen our cultural resilience and our traditions.”

Climate change threatens sovereignty and cultural identities—and Wildcat says Natives need to be prepared for anything that might threaten their ways of life. “Our strength lies in our knowing that all things are connected. This includes the components of politics, economics, culture, and landscape,” he says. “This interconnectedness is our hope. We have knowledge that will allow us to be better prepared than mainstream society.”

### **Collaborative change**

For three years, Wildcat and Dr. Joane Nagel have co-directed a collaboration between Haskell Indian Nations University and the University of Kansas (KU). The Kansas National Science Foundation EPSCoR Haskell-KU Collaboration brings in Native students for an eight-week, paid climate change research internship at the Haskell Environmental Research Studies Climate Change Institute.

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During the internship, students learn how to conduct scientific research and identify climate change-related research topics that are relevant to their communities, peoples, and homelands. Representing a variety of interdisciplinary fields, the tribal college students are taught to recognize what climate change is, says Wildcat. They also learn how to create a research project and to devise solution-oriented research that is compatible with their own Indigenous traditions.

Students are asked to do poster presentations and Power Point presentations. Those who complete these tasks are invited to return for a second year to learn about conducting the actual research and navigating academic research review boards.

“We want our Native students to leave with an understanding about climate change and have the knowledge to combat and address it,” says Wildcat. “We have been very lucky in that we have had students who are engaged in sweet grass habitats; the adaptation of earth lodges, such as contemporary earth lodges; and studying the lifecycles of salmon, to name just a few.”

In addition to Wildcat and Nagel's EPSCoR program, Dr. Bull Bennett (Mi'kmaq) of Kiksapa Consulting LLC, acquired funding from NASA and facilitated the 2011 NASA Summer Internship Research Experience in Geospatial Technology and Climate Change for Tribal College Undergraduate Students and Faculty. Kiksapa is an environmental science, geospatial, education, and institutional planning consulting company out of Mandan, ND. Bennett was recently appointed to the National Climate Assessment Development and Advisory Committee. In the coming months he will be working with others from around the country to develop the next National Climate Assessment report to the President and to Congress.

The 10-week NASA internship program focused on strengthening the understanding of research for TCU students and faculty. Participants learned about GIS technology, remote sensing, and climate change research specific to tribal lands.

### **The Wakarusa Wetlands**

The United States Indian Industrial Training School (as Haskell Indian Nations University was first known) opened



in 1884. The school was located on the Wakarusa Wetlands because White settlers did not want the land.

Acting as a sponge, the wetlands absorb water during heavy rains, and they play an important role in nature by acting as a buffer zone between the land and water. The wetlands of the Wakarusa River Valley are a refuge to 243 species of birds, 21 species of fish, 22 species of reptiles, and 26 species of plants.

The Wakarusa Wetlands are also one of the best mediators of climate change effects in northeast Kansas, says Wildcat. “The wetlands sustain an incredible diversity of life, including migratory birds,” he says. “It is also the primary flood control feature we have on the landscape.”

Currently, about 600 acres of this delicate ecosystem are threatened by plans to build a 6-to-10 lane highway called the South Lawrence Trafficway (SLT). According to Wildcat, this would be devastating.

Threatened by the impending SLT development, the Wakarusa Wetlands were the focus for another summer program at Haskell: the NSF-funded Native Peoples, Native Homelands: Using Geospatial Science to Build Capacity for Multidisciplinary STEM Research. To understand how all of these factors are interconnected—and how they affect the tribal community—groups of students worked in tandem to analyze the wetlands. Some built a rocket designed to fly over the wetlands with an attached camera. Others used GPS technology to characterize the wetlands and “ground truth” the camera’s data.

Most remarkable of all, however, was what the summer program represented: “For the first time in recent tribal

*WETLANDS PROTEST. Students from Haskell Indian Nations University and Purdue University commemorated the 40th World Wetlands Day, Feb. 2, 2011. The students are protesting a proposed roadway through the Wakarusa Wetlands. Photo by Mike Caron, courtesy of the Haskell Wetlands Preservation Organization (WPO)*

college history,” says Wildcat, “we had almost 60 tribal college faculty and students doing science research on our campus.”

### Impacts on wild rice

For his part, Michael Wassegijig Price (Wikwemikong First Nations) works to involve the community, as well as his students, when he teaches about the impacts of climate change.

“I encourage Native students to take a look at the environmental issues going on within their reservations and start brainstorming potential research topics from there,” says Price, who helped facilitate the AI/AN CCWG. He is also the meeting coordinator at the University of Montana’s College of Forestry and Conservation, where he is working on his doctorate. “Tribal colleges, which are generally located within the traditional homelands of each respective tribal nation, are the best institutional vehicles for connecting natural sciences with students and community.”

During the summer of 2011, Price found himself working in Minnesota with Kiksapa Consulting, White Earth Tribal and Community College (Mahnomen, MN), and NASA



Goddard Space Flight Center to develop a Summer Research Experience (SRE) program aimed at satellite remote sensing technology and wild rice analysis. “Two students participated in the first-year program,” he continues, “and it is my hope that many more students will want to pursue this type of research within their home communities.”

Price is adamant when he says that it’s very important for Native scientists to learn the technique of translating scientific jargon, graphs, and tables into everyday language so that tribal community members can be invested in the research taking place within their tribal lands. “There is a huge communication barrier that exists between the scientific community and the Native American community,” he says. “Native scientists have to be bilingual: proficient in the scientific language as well as proficient in the particular culture of their own communities.” The communication obstacle is not something that should be taken lightly, nor should it be overlooked, he says. “The impacts of climate change are or will be very localized,” he says. “Different regions will be affected in different ways and at different rates. Tribal natural resources such as salmon fisheries on the Northwest Coast, buffalo rangelands of the plains, and sand dune accumulations in the Four Corners area are all potential target areas that could be impacted by regional climate change.”

Speaking for his own region of the country, the midwestern

*FATHER AND SON. Michael Wassegijig Price (Wikwemikong First Nations) involves the local community, as well as his students, when he teaches about the impacts of climate change. Price and his nine-year-old son, Ché, are pictured here at a wild rice lake on the White Earth Reservation in Minnesota. Photo by Joe Allen*

United States, Price adds that wild rice in Minnesota and Wisconsin could be negatively impacted by increased precipitation and flood conditions. This has been predicted by scientists working on the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. “Flooding and high water conditions in the spring and early summer can have detrimental effects on wild rice,” he says, “especially during its vulnerable floating leaf stage in early June.” Wild rice, or *manoomin*, is an important historical and cultural food source for Minnesota tribes, and it is sheltered by treaty laws.

Because climate change and the changing environment are inevitable, the best response is adaptation. “I think most people realistically believe that we will not curb our energy consumption rate enough to reduce carbon dioxide in the atmosphere,” says Price. “So, now we’re discussing how to adapt to an inevitably changing environment.”

But even in Native communities, many people either don’t believe climate change is real or else feel overwhelmed by the

enormity of the problem. And more often than not, people's attention is channeled, Price says, toward other pressing issues in their everyday lives.

Regardless, action is warranted. Price is unerringly pragmatic and unsentimental about the environmental future of the planet. "A species's ability to adapt to its surroundings will guarantee its survival, whether it is repopulating to new regions, changing behavior patterns, or evolving new traits," he says. "I see that most species, both plants and animals, will have the ability to adapt and survive, except those in critical habitat situations such as the polar bear." Climate change has created such a warming of the earth that many polar bear weaken and die after being stranded between melting patches of Arctic sea ice.

The species least likely to adapt and survive in the long term, Price says, is contemporary *homo sapiens*. That's due to consumptive culture and the manipulation and disintegration of the natural world for our comfort and benefit. "Human beings need a new world ethic and long-term vision for our co-existence on this earth," he says. "Otherwise, if we cannot contribute to the health and balance of the ecosystem, nature may select us for extinction. Who knows? That process may have already begun."

#### Keeping things in balance

Ultimately, young people will lead the way toward physical and cultural adaptations as the planet and people's homelands

change. They will need to rely not only on science and technical expertise but also on traditional stories and strong connections with the past.

Lainey Fineday was one of the first students to participate in the internship led by Michael Price at White Earth Tribal and Community College. She chose to conduct a geospatial analysis of Lower Rice Lake, one of the premiere wild rice producing lakes on the reservation. Because of the abundant stands of naturally occurring wild rice, Lower Rice Lake was specifically written into the Treaty of 1867, which guaranteed gathering rights to tribal members. Fineday's great-great-grandfather, Chief Fine Day (Mino-ke-shig), was one of the original signatories of that treaty.

Now, not only is she receiving an education in geospatial sciences, she is also connecting with her ancestors who fought to protect the wild rice and preserve the gathering rights of their unborn generations. This dual outcome is the shining star for which many tribal colleges are reaching. **TCJ**

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*For more information on climate change initiatives at tribal colleges, see Daniel Wildcat's article in TCJ, Vol. 20, No. 2.*

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# TRIBAL COLLEGES ADDRESS ESSENTIAL CHALLENGES

By Barbara Ellen Sorensen

Tribal colleges have addressed sustainability and climate change in various ways. In March 2007, College of Menominee Nation (CMN, Keshena, WI) President S. Verna Fowler, Ph.D. (Menominee/ Stockbridge-Munsee), was one of the first signatories to the American College and University Presidents' Climate Commitment (ACUPCC). As part of that commitment, the college conducted a comprehensive greenhouse emissions inventory, appointed a sustainability coordinator, Beau Mitchell, and took many initiatives to reduce causes of greenhouse gases. (See TCJ, Vol. 20, No. 2 for details.) Now Mitchell (Chippewa Cree of Rocky Boy) also serves as the sustainability fellow for the American Indian Higher Education Consortium.

As of April 2011, a total of 87 Historically Black Colleges and Universities, Tribal Colleges and Universities, and Hispanic Serving Institutions have signed the ACUPCC.

Last year, Institute of American Indian Arts (IAIA, Santa Fe, NM) President Dr. Robert Martin (Cherokee) also signed the commitment. IAIA is proud to be a part of the movement, says Annie Haven McDonnell, because the presidents' commitment is designed to tally, limit, and eventually prohibit the greenhouse gas emissions on every college campus.

In addition to CMN and IAIA, two other tribal colleges — Salish Kootenai College (Pablo, MT) and United Tribes Technical College (Bismarck, ND) — have also signed the commitment.

For her part, McDonnell is a faculty member in the Essential Studies Department and is the chair of the Campus Climate Committee. She works on IAIA campus sustainability commitments through the ACUPCC.

At IAIA, the Essential Studies Department has begun to integrate the theme of sustainability in different ways across the tribal college's core curriculum. During the 2011-2012 school year, faculty and students in Essential Studies are developing a required General Education course that directly addresses ecological and climate literacy, global issues, and Indigenous perspectives, says McDonnell.

"We've been collaborating with a local nonprofit, Earthworks, to implement our first greenhouse gas inventory of the campus," she says. The inventory is required under the Presidents' Climate Commitment. "In the past couple of years, we've worked with students and with Earthworks on many student-led sustainability activities." These include a student art and sustainability garden with ongoing projects including cob benches, a pond with a solar-powered pump, fruit trees, edible and medicinal plants, and sustainability-themed art.



*SUSTAINABLE GARDENING. IAIA students collaborate with the nonprofit Earthworks to build a shade structure at the tribal college's Haouzous sustainability garden. From left: Tyler Peyron, Trey Garnanez, Nataani Mirabal, and Warren Bointy (who passed away last year). In the background is Robert Sheridan with Earthworks. Photo by Annie Haven McDonnell*

"With students, we've also constructed a campus nature trail, built shade structures with water catchment, worked on campus recycling and composting," she says, "and created a traditional basketry garden and medicinal garden." These projects all represent ways that traditional knowledge can address the issue of climate change.

"We are building additional collaborations with the Center of Lifelong Education at IAIA to work on our campus USDA projects, including a terraced garden for growing campus food, and beginning a worm composting system for cafeteria waste," she says. "IAIA is also in the process of researching funding and feasibility for renewable energy sources on campus. During this next year, we will begin strategic planning for creating a carbon action plan for our sustainability campus vision."

Not only that, during the spring of 2011 IAIA started a student sustainability leadership conference with a corps of seven students who met weekly and worked on independent sustainability projects for five hours of work-study per week. A Native Youth Leadership and Climate Justice grant of \$15,000 from the American Indian and Alaska Native Climate Change Working Group will allow the tribal college to deepen its work with student sustainability leaders through spring 2012. Students, she says, will help plan and facilitate an intergenerational conference on Indigenous peoples and climate change in April 2012 on the IAIA campus.

The intent is to invite local elders from Native communities to come and speak to the changes they have witnessed in the land and their traditional practices due to climate change, she says. "Our student leaders will be working on research on how climate change is affecting Indigenous peoples locally and globally, and they will present some of this research at the conference. Student leaders will dialogue with elders and talk with Native climate justice activists about ways to organize and respond." 