

CLIMATE ALERT

A PUBLICATION OF THE CLIMATE INSTITUTE | *Protecting the Balance Between Climate and Life on Earth*

Spring 2008 - Vol. 18, number 2

Water and Climate Change in Tribal Lands

The Earth's climate has fluctuated greatly over the last decades, and short-term projections of unprecedented temperature rise is likely to have dramatic consequences. Humanity is dancing perilously close to a tipping point that will set in motion large-scale melting of polar ice sheets and eventual drowning of our coastal cities.

The trend and patterns of the changes observed indicate that human influence resulting primarily from increased emissions of carbon dioxide and other greenhouse gases, has now become the dominant factor. As the world warms, precipitation patterns shift, mountain glaciers and sea ice melt (like in Alaska), ecosystems are changing in complex and often unexpected ways, affecting the resources that can be drawn from them.

The effects of climate disruptions are being felt in a large number of Indian reservations in the US, principally located in the Central and Western United States. Although precipitation is projected to increase, higher temperature will cause soil moisture deficit in some US regions that will cause forest and grassland to dry out. In the Southwest, warmer winters will also bring increasing precipitation and rising snow line thereby affecting the timing and volume of river flows. Increased precipitation is expected to increase river runoff, which can cause erosion on sparsely vegetated surfaces, distribute contaminants more widely and create greater potential for flash flooding. The world demand for water has more than tripled over the last half-century and signs of water scarcity have become

commonplace. Some of the more widespread indicators are rivers running dry, wells going dry, and lakes disappearing. Water scarcity is becoming a reality all the more appalling that it is adversely affecting arid Tribal Lands.

Aware of climate change impacts already occurring within and beyond their reservations, Native Tribes have started to mobilize and are deeply engaged in climate change solutions.

In this Issue:

Arctic and Climate Change	3
Drought Records in the Southwest	4
Depletion of the Ogallala Aquifer	5
Yucatan, Mexico in Peril	6
The Sunshine Wind Project	7
CI Tribal College Climate Protection	8
Tribal Colleges and Universities	9



Teach your children
What we have taught our children
That the earth is our mother.
Whatever befalls the Earth
Befalls the sons and daughters
of the earth
If men spit upon the ground,
They spit upon themselves.

Whatever befalls the Earth
Befalls the sons and daughters
of the Earth.
We did not weave the web of life;
We are merely a strand in it.
Whatever we do to the web,
We do to ourselves...



Respect, Reverence, Responsibility: Native Lessons to protect the Earth

Whether we identify them as, “Native Americans” (US), “First people” (Canada), or “Indigenous people” (Latin America), Native people are the descendants of the first people to live in the Americas. For thousands of years, they have developed sophisticated and elaborate knowledge of the land they inhabited and its abundant resources. When European settlers arrived in the New World, they saw endless jungles, rivers, coastlands, timber and precious metals that could be exploited, for profit. In contrast, Indigenous culture had cultivated a deep respect for natural elements including the land, wildlife, forests, wind, rain, and the sun. In South America, Indigenous peoples still honor Mother Earth, or *Pachamama*, and have ritualistic ceremonies before every harvest to honor the earth, which is seen as the most giving of all mothers. The Incas in South America worshiped the sun, *Inti*, along with the earth that produced the crops that fed their communities. This similar ritual was also found among the Sioux and the Apache in the Great Plains who held elaborate festivals to worship the sun and the great sky that they experienced in their daily lives. Native people seem to share a common reverence for the Earth and its components. For example, they envision Earth as a true spiritual home that ought to be treated respectfully. Rather than being given dominion over all other creatures, animals, plants and minerals are perceived as companions to learn from and live with.

Another aspect of their beliefs is the importance of family relationships that carry with them obligations of mutual support and sharing of resources for the needs of future generations.

The challenges facing indigenous people are now exacerbated by climate change, a global phenomenon that has accelerated over the past decades. Vulnerability studies and reports have shown abundant evidence that Native American and other Indigenous Communities in North America and Greenland have become increasingly vulnerable to climate change disruptions, particularly those located in the Arctic and sub-Arctic regions. These Tribes are experiencing permafrost melting with effects on human habitation and natural systems, erosion of land in coastal villages, and endangerment of species vital for their economies and cultures (ACIA, 2005).

Reservations are present in all major ecosystems across the US, and Native Americans have been experiencing the changing climate patterns for thousands of years. Native Americans’ closeness with the Earth has enabled them to develop sharp observation skills, which have made them among the first to notice early changes in climate patterns and vegetations. Likewise, they have developed their own means of coping with environmental and weather related

stresses. Native voices have raised concern that humankind has broken the natural balance connecting it with nature. Through overexploitation, increased pollution and overpopulation, we are now exhausting the planet’s resources. Some suggested that *Mother Earth* has now started to sustain itself through a “cleansing” process. One direct consequence of that is the frequency of extreme events that has steadily increased over the past couple of years, devastating entire regions. Although relocation or migration is often pursued as one of the ways to adapt to the loss of a resource, after a tumultuous history of forced migration and frequent displacements, the establishment of reservations has left American Indians with the limited option of entire tribes moving to more hospitable locations to seek water, cropland, forests, or cooler temperatures.

Ultimately, nature alterations experienced by American Indians and indigenous people are not different from those that are or will affect all of us in the coming years. Their voices, long ignored, have contributed to stir up a change in attitude. A growing number of environmental, scientific organizations and agencies have joined forces to understand the magnitude of climate change and develop solutions to tackle our century’s biggest challenge.



Coatlicue, the Aztec Goddess of the Earth who gave birth to the moon, the stars and the sun

“Native Americans have been experiencing the changing climate patterns for thousands of years”



The Canary in the Coal Mine: The Arctic



The Arctic region encompasses the Northern polar region, the lands and oceans that are located north of latitude 66.5°, and the circumpolar regions extending from the North Pole.

This area includes parts or all of the territories of 8 nations: Norway, Sweden, Finland, Denmark, Iceland, Canada, Russia and the United States, and is home to dozens of indigenous groups that have occupied these lands for the last 20,000 years. Indigenous people make up approximately 10 percent of the Arctic and are mostly present in three countries: Greenland, Canada, and the U.S. For climate change experts, the Arctic region is perhaps known best as the “canary in the coal mine” for it has suffered the most dramatic rise in temperature. Still, future projections will likely bring wide-ranging changes that will harm the ecosystem and affect the lives and cultures that depend on natural resources for survival. According to the Fourth Assessment Panel on Climate Change (IPCC), the projected impacts of climate change on diverse communities of the Arctic can only be

understood in the context of the interconnected social, cultural, political and economic forces acting on them. However, “such impacts on the health and well-being of Arctic residents are, and will be, tangible and ongoing.” The previously well-adapted Arctic people are becoming “strangers in their own lands.” Some of the visible impacts affecting the Arctic include: Increased frequency of anticyclone and cyclone, receding of glaciers, changes in polar bear and caribou migration patterns, increased coastal erosion and decrease in the water level in lakes.

The lack of multiyear ice has made it difficult for Natives to hunt seal and with the spring melt occurring too fast, it is harder to hunt geese. In addition, Another aspect of climate change has been the fluctuations of temperatures with profound impact on plankton communities as well as larval drift and the distribution and abundance of many fish stocks including southern invaders and, particularly the commercially important cod and herring.

FOCUS

Kivalina—Global Warming Law Suit

On February, 2008, the Native American Rights Fund and the Center on Race, Poverty and the Environment marched into the United States District Court for the Northern District of California, San Francisco, and filed a suit on behalf of the Inuit, or Eskimo Inupiat, in Alaska. Hagens Berman, along with five law firms and two non-profit legal organizations pressed charges against 24 defendants including among others Exxon-Mobil Corp., Peabody Energy Corp., Southern Company, American Electric Power Co., Duke Energy Co, Chevron Corp., and Shell Oil Co.) on the grounds that these industrial corporations emit large quantities of greenhouse gases into the atmosphere, contributing to global warming that is leading to the destruction of the Alaskan village of Kivalina. Among the poorest in the nation, Kivalina residents have suffered sea ice loss that and land erosion, a dramatic situation which will eventually put their entire community under the water.

This lawsuit is not the first time the Arctic Indigenous peoples have tried to take action to safeguard the part of the world that they have inhabited for millennia. In 1977, The Inuit Circumpolar Conference (ICC) was formed in Alaska with the purpose of representing the rights of the Inuit peoples in the entire Arctic region. The main reason this organization was created was to respond to the increased oil and gas exploration in the Arctic by attempting to establish their own Arctic policies based on indigenous knowledge and caring about the environment, its wildlife, and all future developments, rather than having these guided by rampant greed.



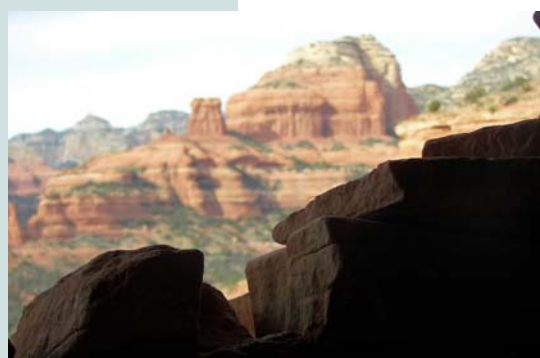
Droughts and Record Heat Waves in the Southwest

Few places in the U.S. depend on precipitation as much as the Southwestern region that span across the states of New Mexico, Colorado, Arizona, parts of California, Nevada and Utah. Most Native Americans living in this area (Navajo, Hopi, Apache, Pueblo, and Zuni Tribes etc.), rely heavily on the great Colorado River, the most important water supplier in the Southwest. The Colorado River is a vital source for it provides the necessary water to irrigate lands, nourish wildlife and human populations. In addition, the sediments present in the Colorado feed deltas areas just before they reach the ocean. However, the Colorado River no longer reaches the ocean, meaning that essential sediment and nutrients aren't being carried to different regions to maintain fertility levels of lands. Because of warmer temperature, the decline of water levels has left the largest Nation, the Navajo, without running water. Springs and aquifers' capacities have been seriously diminished as a

result of droughts, extreme heat waves, and polluting industrial practices. On February 2008, the Christian Science Monitor reported on the results from research conducted by the Scripps Institution of Oceanography in La Jolla, California. According to their report, both Lake Mead and Lake Powell (fed by the Colorado River) "stand 50 percent chances of running dry by 2021 unless dramatic changes take place in how the region uses water," due to a "60 percent reduction in snowpack, rising temperatures, and reduced river flows over the past 50 years of global warming."

A March 2008 report by the Rocky Mountain Climate Organization and NRDC also raised awareness on the future for the American West, a region reported to have heated up even more than the world as a whole. For the last five years, the global climate has averaged 1.0 degree Fahrenheit warmer than its 20th century average, making it one of the most affected areas after Alaska, in the United States.

The West will increasingly continue to experience hotter temperatures, earlier snow melt, a decrease in precipitation, an earlier reduction in the snow pack in high altitudes, as well as the continued reduction of glaciers. Snow and snow pack deposits are of extreme importance, as they make up to 70% of water supplies in the arid and semi-arid regions. This will, as a result, further drain the Colorado River and all underground fresh water reservoirs. Drought will also continue to increase dramatically throughout the Southwestern region of the United States.



Prof. Courtland Perkins, Climate Institute Board Advisor died in January at age 95

Courtland Perkins, a distinguished Climate Institute Board of Advisors member, died last January at the age of 95. He was a pioneer of modern aircraft stability and control, a gifted teacher and international leader in the field of engineering. Born in 1912, in Philadelphia, Perkins earned his Master's degree from the Massachusetts Institute of Technology (MIT) in 1941. Following World War II, Perkins joined the Princeton faculty as an associate professor.

He became professor of aerospace and mechanical sciences emeritus in 1978 and left Princeton to take on the presidency of the National Academy of Engineering, where he served until 1983. During leaves from Princeton and after his retirement, Perkins served as chief scientist and undersecretary of the Air Force, Chairman of NATO's aerospace advisory group, and President of the National Academy of Engineering. In addition to his own research contributions, Perkins was renowned

for his ability to attract the best students and colleagues as well as the resources to support them. Known for exhorting his students "to go make things", Perkins had the rare ability to spark students' interest and inspired a lot of them to pursue careers in the aerospace industry. Princeton awarded Perkins an honorary degree in 2001. In 2004, he received the Daniel Guggenheim Medal, the highest honor in aviation, whose first recipient was Orville Wright in 1929.



Above: Picture of prof. Courtland Perkins



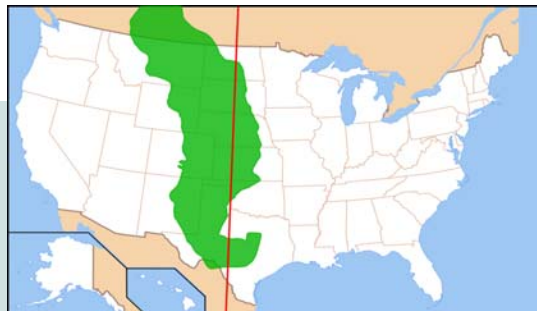
Great Plains and the Depletion of the Ogallala Aquifer

The Great Plains are known for their broad expanse of prairie and steppe covering the states of Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Oklahoma, Texas and Wyoming, as well as the Canadian provinces of Alberta, Manitoba and Saskatchewan. The land of the Plains Native Americans stretched from the Mississippi River to the Rocky Mountains, and from Canada to Texas. Tribes like the Lakota and Dakota (Sioux); Pawnee and Arapaho are present in the northern and central part of the region whereas, the Kiowa, Apache and Comanche live in the southern area.

The Ogallala Aquifer, also known as the High Plains Aquifer, is one of the world's largest underground water table aquifer located beneath the Great Plains in the United States. The Ogallala Aquifer underlies approximately 225,000 square miles in the Great Plains region, particularly in the High Plains of Texas, New Mexico, Oklahoma, Kansas, Colorado, and Nebraska.

The Ogallala has long been a major source of water for agricultural, municipal, and industrial development, according to the U.S. Geological Survey. However, intense use of the aquifer and global warming are both threatening this once-abundant sea of underground water. After WWII, a large amount and variety of crops were planted with the advent of manufactured nitrogen fertilizer. Today more than 90% of the water pumped from the Ogallala irrigates at least one fifth of all U.S. cropland under production.

This trend has been amplified through government crop-support programs that have intensified the planting of major crops, such as corn, soybeans, wheat and cotton. In addition to agricultural needs, an estimated 1.9 million people are supplied by groundwater from the High Plains aquifer, with total public supply withdrawals of 315 million gallons per day. Although the results may vary between states, the withdrawal of the groundwater has now greatly surpassed the aquifer's rate of natural recharge. Some places overlying the aquifer have already exhausted their underground supply as a source of irrigation. Toxic waste dumps, cesspools, landfills, and septic tanks contribute their share of wastes to groundwater; agricultural chemicals contribute the most in sheer volume and affect the greatest area. If the High Plains Aquifer were unaffected by human activities, it would be in a state of equilibrium in which natural discharge from the aquifer would be approximately equal to natural recharge to the aquifer. To make things worse, global warming has lessened snowfall along the Front Range of the Rocky Mountains and has increased the intensity of droughts, thus also diminishing a vital recharge of the aquifer. The Ogallala Aquifer is now facing declining water levels and deteriorating water quality, a conclusion particularly worrisome considering the fact that this water source accounts for 30% of all groundwater used for irrigation in America.



Above, in Green; Ogallala aquifer in the United States

FOCUS : Native Americans in the U.S.

In the United States, American Indians and Alaskan Natives comprise almost 1% of the US population, or 2.5 million; however, 4.1 million US residents identify themselves as partly Indian (Census 2000). They occupy a total of 56 million acres (3% of the land) with Alaskan villages holding another 44 million acres of land. The size of an average reservation is quite small (2,000 tribal members) with some exceptions (Navajo Reservation with about 200,000). Among the two million Native American Indians present in the U.S., half live on Tribal Lands; the rest live in cities, suburbs, and small rural communities outside the boundaries of reservations.

Native Americans are among the most vulnerable communities in the world since the gap between American Indians and mainstream society is immense and often aggravated by factors such as geographic isolation and limited opportunities for upward mobility. The federal government currently recognizes the unique status of more than 565 tribal and Alaskan Native governments as "domestic dependent nations."

The relationships between these tribes and the federal government are determined by treaties, executive orders, tribal legislation, acts of Congress, and decisions by the federal courts. These agreements cover a range of issues from responsibilities and governance to the use and maintenance of land and water resources. They also include the power to define tribal membership, the right to determine their own form of government and to control the use of tribal lands, which include the regulation for hunting, fishing and environmental protection.

CASE STUDY: NativeSUN

The NativeSUN is a solar electric enterprise (SEE) established to provide an alternate source of energy to Hopi families whose geographic location prevented connecting to the main electric grid system. The energy project offers an illustration of how an American Indian small-scale venture can be transformed into a successful venture and enhance the quality of life of a large number of poor communities. Deborah Tewa, the Manager of NativeSUN was raised in the Northeastern Arizona, in a region where numerous Tribes did not possess modern infrastructure and where only 50% of homes were equipped with electricity (the rest largely rely on kerosene and gas lamps). In 1987, Deborah joined NativeSUN (first as an electrician and later as a program manager), a Hopi-managed nonprofit organization that installs PV units at homes in remote areas to provide clean, solar power to marginalized and underserved families at a reasonable cost. The program allowed Hopi and Navajo families to purchase and install solar photovoltaic cells to provide energy for basic electrical needs. Deborah spent 11 years and installed 300 around 300 photovoltaic (PV) systems in homes on the Hopi-Navajo Reservations. She also educated Natives families about the "new" technology (photovoltaic unit) enabling them to maintain their own system. To better tailor its customers' low-incomes needs, Native SUN established a revolving loan program to allow poor families to borrow up to \$7,000 to purchase and install a photovoltaic array and series of batteries that capture and store energy. managed to install . Through the use of solar electricity, the Hopi and Navajo can continue to live in harmony with Mother Earth and move toward greater self-sufficiency.

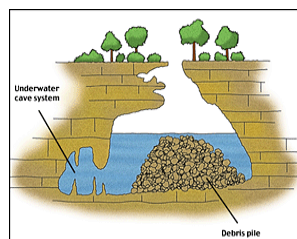
Yucatán: Maya Lands in Peril

The State of Yucatán, Mexico, is well known for its lush rainforests and Maya heritage including the UNESCO World Heritage Site of the ancient city of Chichen Itzá, a term meaning the city "at the mouth of the well of the Itzá," the Magicians of the Water. The water this title refers to is in the so-called *cenotes*, which are underground caves (some stretching hundreds of miles underground) filled with fresh water which supports all the life in the Yucatán Peninsula and the great Maya city. The city is famous for its sophisticated architecture, and also for the Mayans' refined knowledge for instance, in astronomy. The very famous *caracol* (or the observatory) with doors that aligned with the vernal equinox and a structure that permitted sunlight to hit the observatory, allowed the Mayans to predict when the solstices would occur. Other structures that remain of the ancient city include *El Castillo*, or temple in honor of Kukulcán, or the Temple of the Warriors (*Templo de los guerreros*). The state remains very heavily influenced by its Mayan ancestry, with over 33% of its population

being Indigenous and speakers of Indigenous dialects (Mayan being the most widely spoken). This paradise is now jeopardized not only by extreme weather phenomena, like Hurricane Dean in 2007, but also by extreme drought, in which the state is on a red alert at present, according to an alert issued by Mexico's Environment and Natural Resources Secretariat (SEMARNAT) in April, 2008, Warning that there are serious risks of forest fires due to extreme drought. SEMARNAT declared that during 2007, the state experienced more than twice the amount of rainfall it has received this year. Mexico's entire reservoir capacity is presently at 54 percent, compared with 63 percent the year before (2007). Yucatán is facing some drastic consequences as a result of Hurricane Dean, which struck the area in August of 2007. Although the press coverage was sparse due to the relatively minor impact of Dean on tourist sites, the category-five storm caused severe damage to the peninsula triggering trees and grasses to

fall, which resulted in a large amount of dead and dry biomass that is now burning. The hotter temperatures this year and the severe lack of rain have created ideal conditions for large fires. The average temperature has increased dramatically in the peninsula as well, soaring over 100 degrees Fahrenheit this spring, as the New American Media recorded on April 22nd, 2008. Also, the winter season has consistently become drier and warmer, resulting in a catastrophic locust invasion in 2007. As a result, Mayan rural communities dependent on agriculture, particularly corn and bean, had to face the devastation resulting from both severe drought and the pernicious plague of insects. In the municipalities of Tizimin and Telchac, up to 270 square miles were devoured by the locusts.

Above, a picture of a *cenote* (or underground caves)



Above: the Temple of Chichen Itzá, Yucatan, Mexico



Above: On the Left, picture of a colossal Olmec head at La Venta (3 meters tall); on the right, the same sculpture after intense flooding

Tabasco: Floods in the Land of the Olmec Civilization

Long before Christopher Columbus set sail in search of a shorter route to the spices of India, the Mesoamerican region (central-southern Mexico and Central America) was an area in which many civilizations flourished. During the Pre-classic period, between 1200 BC and 400 BC, the Olmec dominated the areas currently covering the coastal states of Tabasco and Veracruz in Mexico. One of the key factors behind the thriving Olmec civilization was maize. Due to the local ecology, agriculture thrived on the abundant well-watered alluvial soil—an extremely fertile sediment-loaded field that enabled the plantation of cacao, corn, beans, rice, bananas, coconut and sugar cane. However, the ecology of the state is increasingly being exploited for cattle grazing and its tropical woods. One of the poorest states in Mexico. To make things worse, the region has been severely hit by

floods that resulted from hurricane activities. News outlets in Mexico covered the flooding that resulted from Hurricane Dean extensively in late 2007 in the coastal state of Tabasco, which left 80% of the state submerged under water and directly affected at least half of its population. Tropical storms are becoming more severe as the Earth's surface continues to warm up. Although the north Atlantic has always been prone to hurricanes, in recent years, the intensity and frequency of storms have reached new records. In 2005, there were 15 storms classified as hurricanes, seven of which were considered 'major', or category 3 or more according to the Saffir-Simpson Hurricane Scale." Scientists conclude that this increase is due to global warming. Within a month of seeing the destruction of the locusts, fires raged the peninsular state. Because of extreme droughts, the forests are extremely dry and thus burned quite easily, only stopping when rain finally came in May, 2007. At present, the drought and higher temperatures continue to negatively affect the population of the peninsula, especially the poorest parts of the population, most of whom are Indigenous.

On the right, The capital city of Villahermosa, Tabasco, after the flooding of 2007



STUDY CASE : Sunshine Wind Project

The proposed Sunshine Wind Project is a successful partnership to harness the wind for abundant, reliable, cost-competitive and pollution-free energy that will likely bring multiple benefits for both Tribal lands and neighboring communities in Arizona. Initiated by Sunshine Arizona Wind Energy, LLC, the project will entail the construction of a forty-turbine wind park approximately thirty-seven miles east of Flagstaff, in eastern Coconino County. That will generate approximately 130 gigawatts per year, enough electricity to serve the average annual electricity needs of more than 14,000 homes, or the equivalent of 66 percent of Flagstaff residences. The wind farm turbines will be sited on a combination of Hopi private fee lands and private ranch lands and are expected to bring substantial benefits for many including the preservation of traditional land uses, additional land-lease revenues for land owners (Hopi tribe, private ranch owners). Payments to landowners are estimated at \$3.6 million over the approximate 25-year life of the project, with multiplier benefits to the local economy from indirect spending, and the project would also raise new property tax revenues (estimated at \$100 million) for County, School District, Community College and Fire District jurisdictions and create new jobs. Simultaneously, environmental benefits will be tremendous. They will include the reduction of emissions of various toxic pollutants (that result from the combustion of coal and natural gas) and the improvement in air and water quality and human health. More specifically, preliminary studies have indicated that the program will save 62 million gallons of water, decrease carbon dioxide emissions by 86,000 tons (equivalent to removing 16,600 cars from the road or planting 46 square miles of forest) and lessen the risk of acid rain for the 25-year period base of the project.



Empower Tribal Communities and design climate solutions: The Role of the Climate Institute

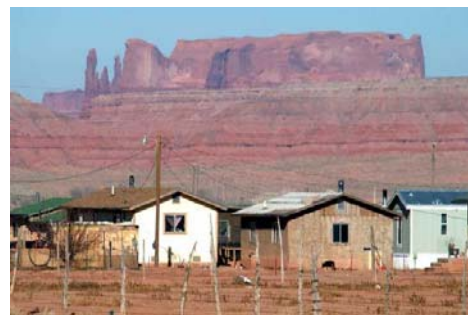
Although science has been a powerful tool in our perception and comprehension of the potential impacts that the climate crisis will entail, we believe that the understanding of the ancestral and traditional practices preserved within Tribal communities can also enlighten us and become a key component for successful energy and adaptation projects. As America's oldest surviving societies, Native People carry a valuable wealth of traditions that can help us more fully understand the implications and adaptation

scenarios that will soon become reality. Recognizing that the present circumstances require a pro-active protection of our natural environments, they are now building institutions and developing skills to control their own lives and develop a better understanding of climate change.

One of the common features of both Native perspective and global climate science is their vision of Earth and Climate as a single, complex and dynamically-balanced, interconnected system. By partnering with outside

institutions with strong science and engineering programs, tribal colleges can meld their superior understanding of cultural factors and traditional practices with state of the art science.

The Climate Institute is seeking jointly to coordinate an effective climate response strategy through the collaboration of tribal colleges and universities and national colleges and universities that have strong environmental and science programs and strong base of Native American students and/or faculty.



The Institute is forging an alliance between Tribal Colleges, NASA and several American colleges and universities to provide scientific and capital resources to empower Native American communities to be proactive in responding to climate stresses. To this end, the Institute seeks to offer scientific and policy training for Tribal College to help them develop innovative and

(to be continued next page)

Droughts and Record Heat Waves in the Southwest (continued)

No matter how fast and successful our efforts to curb greenhouse emissions will be, large-scale change in our climate patterns will likely affect our environment as the result of emissions already banked in the atmosphere. Responses to the challenge of climate disruption will require concerted adaptation efforts to increase our resilience to cope with adverse climate change impacts.

One set of conservation adaptation methods could be drawn from Native Americans' water harvesting and management practices that used to play a seminal role in developing southwest indigenous cultures. Among those were strategies designed to capture runoff for distribution to agricultural fields developed throughout the region from the (Papago) Homelands Tohono Odham of southern

Arizona to the Anasazi of the San Juan Basin and the Pueblo Homelands of the Rio Grande. These took several forms: canalization (Hopi), impoundments (San Juan Anasazi, Papago), diversions (Chaco Anasazi), and in situ storage such as pebble-mulch fields and grid gardens that conserved rain and snow fall for use during the growing season.

“Responses to the challenge of climate disruption will require concerted adaptation efforts”



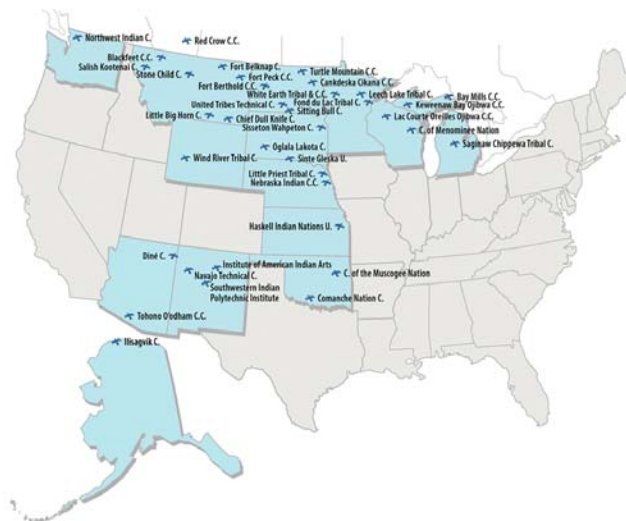
Empower Tribal Communities .. (continued)

comprehensive responses and strategies within their tribes to direct their own future. Tribal college and University alumni /alumnae are likely to provide many of the future leaders of tribal councils (or governments) and the financial and entrepreneurial savvy to enable tribes to develop a diversified economic base and the capacity to promote livable communities while minimizing the impacts on the natural environment and to build sustainable communities. The young generation of Native Americans can make a difference and be part of the solution to reduce the impact of climate change. Many studies have indicated that enrollment in post-secondary institutions has increased and achievement of degrees foster Tribal Students personal development and contribute to the economic and social welfare of their communities or *nation* as a whole. The Climate Institute is seeking to broaden such opportunities by offering a unique Training Program to expand their horizons and learning experience outside the classroom. First, the project would provide Tribal students with the opportunity to gain valuable first-hand experience through the

completion of an internship in Washington DC while being exposed to a series of seminars and field visits enabling them to build leadership skills with a specific focus on climate vulnerabilities.

Second, with the support of experienced mentors and experts drawn from the academic and professional fields (such as Dartmouth College, etc.), Tribal students would be asked to draft and develop a sustainable plan for their own communities.

Envisioned as part of a broader effort to link tribal colleges with other academic institutions such as Dartmouth College, American University, Stanford University and Lewis and Clark College, the training could create novel partnerships and result in enhancing the resilience of native communities to climate change. By empowering ambitious young Native Americans, we expect the program to create multiple opportunities for future environmental leaders that will direct their own future and make transformations required for a more diversified economic base on Tribal Lands.



Above: Map representing the states with TCUs in the U.S.

FOCUS ON; Tribal Colleges and Universities (TCUs)

Over the last thirty years, tribally-controlled education institutions have accomplished a crucial role by serving primarily geographically isolated native populations that had no other means of accessing education beyond the high school level. Tribal Colleges were first created in 1968 (Dine College, Navajo Nation) to foster education among Native Americans while avoiding compulsory Western methods of learning, high dropout rates and loss of ancestral traditions. Haskell Indian Nations University whose students come from over 100 tribes grew out of an Indian Boarding School founded in 1884. Today, there are 32 federally recognized Tribal Colleges and Universities (TCUs) in the United States. Located mainly in the Midwest and Southwest, they serve approximately 30,000 full- and part-time students and offer two-year associate degrees in over 200 disciplines with some providing a bachelor's and master's degree; along with an additional 200 vocational certificate programs. Hailed as "underfunded miracles", Tribal Colleges were confronted by numerous challenges including remote locations, inadequate facilities and lack of funding. Despite apparent obstacles, they have managed to grow rapidly; as by 2005, 35,000 students were enrolled in Tribal Colleges. Uniquely positioned in between "two worlds", their successful holistic approach combines the strengthening of traditional tribal cultures (tailored curriculum) along with the teaching of Western model of learning (for example, they offer the possibility to transfer to a national University).



SAVE THE DATE !

August 12-14, 2008—Tribal College Forum VII and American Indian & Alaska Native Climate Change Working Group joint conference

"Climate Crises and Water Nations are Calling for Awakening"



Tribal College Forum VII

August 12-14, 2008 ~ Lawrence, Kansas

The Climate Institute is happy to announce the Tribal College Forum VII (TCF VII), and American Indian & Alaska Native Climate Change Working Group (AIANCCWG) joint conference August 12-14, 2008, in Lawrence, KS.

The Forum will be hosted by Haskell Indian Nations University (HINU), and its theme will be "Climate Crises and Water Nations are Calling for Awakening" with a special focus on potential economic, social, scientific and cultural impacts in Indian Country. The topics covered include: water quality, processes, erosion, flooding, severe weather events, ice, coastal erosion, and water supply.

SPONSORS:



The Forum will be incorporating the traditional knowledge of elders, science knowledge of scientist, and optimistic views from the students in the field. The format has been designed to develop series of speakers followed by discussions to get attendees involved in the sessions. The Forum will provide a valuable networking environment for Native peoples, Tribal Colleges and Universities (TCU), and industry and interagency professionals who will help us make our nations strong into the 21st century.

Participants will engage with Tribal leaders, TCU Presidents, Inter Agency professionals and private industry to define and address the impacts of climate change on Indian Country, the United States, and the world.

Register online at:

<https://www.cresis.ku.edu/tcfvii/TCFVII-home.html>



Interns at the Climate Institute — Spring 2008

The Climate Institute would like to thank our Spring 2008 interns for all their hardwork and dedication. They contributed greatly to the Institute's operations and we wish them all the best in their future endeavors

Luisanna Rubio-Carrillo, Mexico (full-time)

School: Brigham Young University, Provo, UT, New York University, NY,

Major: B.A. - Spanish and Art History , M.A - Latin American Literature and Culture, M.A - Graduate School of Arts and Sciences, Journalism and Public Service

Hobbies: Watching sports, traveling, going to museums; reading novels, writing; photography; going to the ballet, opera, symphony, or jazz concerts, horseback riding, Foreign and classic films.

At the Climate Institute: Translated all the articles under "Topics" on the website into Spanish; wrote articles for the "Climate Alert;" edited various articles; wrote articles on whales, seals, sea turtles and migratory birds; and bark beetle; wrote articles on climate change impacts on reptiles, amphibians, corals and Antarctica, assisted with foundations research.



Julie Stricker, Canada (part-time)

School: University of British Columbia

Major: B.A. English Literature, double minor in International Relations and Art History

Hobbies: travelling, reading etc.

At the Climate Institute: Conducted research on potential donors for the Climate Institute's activities, wrote and edited pieces for the website

Christine Xu, China (part-time)

School: University of California, San Diego

Major: B.A. International Studies - Political Science and Chinese Studies

Hobbies: travelling

At the Climate Institute: Translated web content into Chinese, wrote article on environmental activism in China, researched and edited articles for brochures, Tribal Initiative, and website.





Climate Institute

Founded in 1986, the Climate Institute was the first non-profit organization established primarily to address climate changes issues. Working with an extensive network of experts, the Institute has served as a bridge between the scientific community and policy-makers and has become a respected facilitator of dialogue to move the world toward more effective cooperation on climate change responses.

The Climate Institute mission is to

CATALYZE innovative and practical policy solutions toward climate stabilization and educate the general public of the gravity of climate change impacts.

ENHANCE the resilience of humanity and natural systems to respond to global climate change impacts especially among vulnerable groups (e.g. native American tribes and Small Islands).

WORK internationally as a bridge between policy-makers, scientists and environmental institutions.

Support our work !

Visit our donation page on www.climate.org

The Climate Institute is a non-profit, 501 (c)(3) charitable, educational organization. It receives financial support from international government agencies, foundations, corporations and associations, environmental and research organizations, and individuals.

Printed digitally on 100% post-consumer recycled, processed chlorine free paper produced using 100% wind power in a carbon neutral process

Published periodically
by the Climate Institute
© Copyright 2008
ISSN 1071 -3271

William A. Nitze, Chairman
John C. Topping, President
Mark Goldberg, Publications Chairman
Magali Devic, Editor-in-Chief

1785 Massachusetts Avenue NW
Washington DC 20036
Fax : (202) 547-0111
Phone : (202) 547-0104
Email : info@climate.org
Web: <http://www.climate.org>

