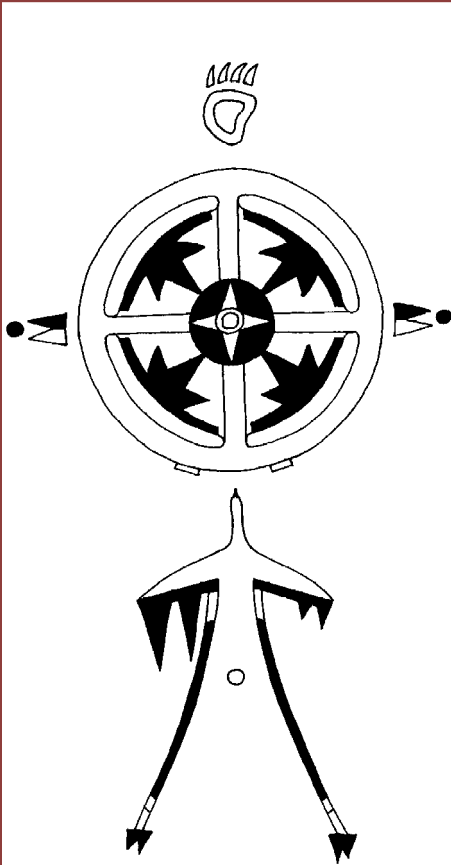


EARTH MEDICINE



**August
1996**

Haskell Environmental
Research Studies Center
and
Great Plains-Rocky Mountain
Hazardous Substance
Research Center

Navajo youth explores environmental career opportunities

by *Patterson T. Yazzie, Haskell Indian Nations University*

Miranda Salt (Navajo) from Chinle, Arizona, is one of two students who participated in the NAOMI (Native American and Other Minority Institutions) Summer Cooperation Program through the Haskell Environmental Research Studies Center. Salt will be a third-year student this fall at Navajo Community College (NCC) in Tsaile, Arizona, majoring in Liberal Arts with an emphasis on science and math.

Salt worked on the project "Bioremediation of Petroleum Contaminated Soil Using Vegetation," an Hazardous Substance Research Center (HSRC) - funded research project at Kansas State University (KSU). The overall goal of the project is to show that vegetation will enhance the biodegradation of petroleum in contaminated soil and to demonstrate remediation technology to interested industrial and governmental agencies.

Part of Salt's research included analyzing levels of contaminants in contaminated soil before grasses and other plant species are established. Researchers believe that the use of vegetation for remediation is an economic, effective and low maintenance approach to waste remediation and stabilization.

The summer research exposed her to the different techniques of conducting research. Salt said that she thought the research was going to be like biology laboratory work. "Process, procedures and all the information has to be written down and calculated," commented Salt as she compared her research work at NCC and at KSU.

"The summer research helped me alot. It helped me understand solving chemistry equations. It also helped me with math," said Salt referring to her daily routine. Working with graduate students also helped her set educational goals.

Salt plans to major in environmental engineering after she completes her studies at NCC. Salt plans to attend the University of Arizona in Tucson, Arizona, or New Mexico State University at Las Cruces, New Mexico. Environmental stewardship has always been a part of her life while growing up. She grew up in a home where Navajo traditional values were taught regarding her connection as a person and a living being to the environment.

Salt believes that the

■ **continued on page 3**



Wendy Griswold/Earth Medicine

**Salt examines test results for levels of
contaminants in soil.**

On page...

- 2 **Geoscience Education**
- 3 **Geoscience and Salt cont.**
- 4 **NAOMI Seminar Program**

Educators integrate Native teachings into earth science curriculums

by Wendy Griswold, Kansas State University

The first symposium on “Geoscience Education in Native American Communities” was held at the 48th annual meeting of the Rocky Mountain Section of the Geological Society of America (GSA) in Rapid City, South Dakota, on April 19, 1996. The symposium was co-sponsored by the GSA and the National Association of Geoscience Teachers.

The symposium was a discussion of the unique cultural interaction, pedagogical approaches and practical experiences of those who teach earth sciences to predominately Native American populations. Six presenters took part in the symposium, which was presided over by Steve Semken, an instructor of earth and environmental sciences at Navajo Community College (NCC) in Shiprock, New Mexico. Presenters at the symposium were Anneliese Ripley from the Montana College of Mineral Science and Technology (Montana Tech), Butte, Montana; Stephen Hasiotis from the University of Colorado, Boulder, Colorado; Mary Lou Bevier from the University of British Columbia, Vancouver, British Columbia; Mark Murphy from Heritage College, Toppenish, Washington; John Murray from the University of Manitoba, Winnipeg, Manitoba; and Steve Semken.

Anneliese Ripley from Montana Tech gave a presentation on the Wind and Petroleum Energy Research Program. The goal of the program is to enhance energy-related research in Montana and to increase training and educational opportunities for its population. As the best wind resources in Montana are on or adjacent to tribal lands, the program coordinators felt that it was necessary to reach out to the populations most effected by the research. They developed the tribal school program, which targets students from kindergarten through grade twelve and beyond for programs that focus on increasing the geoscience knowledge of teachers and students in tribal schools. The components of the program include teacher enrichment courses; a visiting scientist program; a student summer program where high school students spend time with researchers on college campuses; and an internship program. The program also is working to build technological infrastructure in tribal schools by donating electronic equipment. They also provide classroom supplies such as teaching materials and calculators. Ripley credited the success of the program on the ability to identify a key person who was firmly established in the local community to act

as a liaison or link, which helped develop a relationship between the tribal schools and the program coordinators.

Stephen Hasiotis, a paleontologist from the University of Colorado, made a presentation on “Hands-on Geology for Navajo Nations Teachers,” a summer course that was developed through a partnership between the US Geological Survey and NCC. The goal of the project was to give practical experience in earth sciences to people teaching at schools in the Navajo Nation. Hasiotis explained that while geology was important to the Navajo Nation for several reasons, including a traditional culture tied to the land and an economy driven by geological resources, earth science was nearly absent from the curriculum of kindergarten through twelfth grade classes. According to Hasiotis, Navajo teachers are familiar with the local and cultural geography of the region, but few had received formal training in science and even fewer in geology. The result was that teachers were not comfortable in teaching earth sciences, even though their students were eager to learn them. The solution was dualistic in approach. Pre-service teachers at NCC are now required to take earth sciences and geology courses. For in-service teachers, a one-week summer course focusing on the geology of the Navajo Nation was developed. Activities included rock dating and fossil identification. Field trips were coordinated where the teachers were able to compile teaching kits to be used in instructing their classes.

Mary Lou Bevier, a volcanologist from the University of British Columbia, discussed the “Cooperative Geoscience Education Initiative in Northern British Columbia.” Bevier is part of a program at the North Coast Tribal Council’s Adult Education Center in Prince Rupert, British Columbia. The Geoscience Education Initiative targets First Nations adult students in the area. The program began as a way of motivating students to become interested in geology by making the subject relevant to their lives. Bevier reported that First Nations people in British Columbia are moving toward self-government and management of their educational systems and traditional resources. They are aware that science is necessary for the management of natural resources and that First Nations people are underrepresented in science careers. The students in the geoscience program studied a geology curriculum along with native legends about volcanoes. They

■ continued on page 3

Salt parallels lack of Native teaching with the increase of environmental problems

■ continued from page 1

decline of Native teaching and the inability to incorporate Native teaching into the lives of young Native people is closely linked to environmental problems in Native communities.

“People with Native teachings and those without have different outlooks on the environment. They are not disciplined to respect the environment.

Growing up with Native teaching gives you a different view on what the consequences may be on the environment, animals and yourself,” said Salt.

While at KSU, Salt’s interest in environmental issues facing the Navajo Nation grew. Salt believes

that environmental challenges that face the Navajo Nation and other tribes require good communication between tribal members and the scientific community. “Pollution prevention and solving environmental problems will involve people communicating. People from community level to college and tribal and county governmental levels,” replied Salt.

Salt said that incorporating Native teaching and science to solve or prevent environmental problems will provide her with a different perspective in the environmental field. ■

Native legends and storytelling enter science and technology as a new teaching method

■ continued from page 2

participated in hands-on activities and field trips to area geologic sites. Afterwards they worked with geology professionals to develop presentations for their local schools and communities. According to Bevier, benefits to the students include empowerment and increased confidence, a broader knowledge of geoscience, and an increased awareness of science technology careers.

Mark Murphy from Heritage College in Toppenish, Washington, spoke about the “Integration of Earth Sciences and Native American Culture.” Heritage College, located in the Yakama Nation, has a three-year old earth science major which integrates Yakama culture into its curriculum. In integrating culture and earth science, Murphy identified four factors which he has found to be important to the Yakama people in terms of earth sciences. They are 1) viewing the landscape as a cultural resource, 2) the restoration of the food web, 3) the sovereignty of the ceded lands, and 4) the continuity of the time ball. These concepts have been integrated into a course entitled “Ecology and Yakama Culture.” This course focuses on the above areas and incorporates the views of tribal elders and tribal agency managers.

“Navajo Pedagogy and Earth Systems” was the topic of the presentation delivered by Steve Semken of NCC. Semken outlined the traditional Navajo teachings and pointed out their similarities with Euro-American scientific principles. Navajo teachings identify two great natural systems, nahasdzáán, which is the ground or earth and is represented by a female figure, and yádilhil, which is “all darkness above” the earth and is represented by a male figure. All natural process result from the dynamic interac-

tion between these two forces. This can be paralleled to the endogenic and exogenic forces identified by the principles of physical geology. Earth science courses at NCC teach both Navajo and Euro-American geologic systems in introductory courses with the hope of fostering appreciation and stewardship of the Navajo homeland.

John Murray from the University of Manitoba, concluded the symposium with a presentation on his work with the Northern Cree. The presentation, “Of Pipestone, Thunderbird Nests and Ilmenite: Ethnogeology, Myth and the Renaming of a World,” examined the connections between western geology and the Northern Cree’s geological knowledge. According to Murray, the Northern Cree have an extensive geological lexicon, which is mainly transmitted through myth and storytelling. The Northern Cree view all things as an entirety related to their own ancient legends and stories. When first shown a map of North America, an elder recognized the Cree homeland, indicating that the Northern Cree had a concept of the shape of the continent. Murray is working toward the development of a multiethnic approach to teaching geology that balances the traditional Euro-centered teaching with the ethnogeology of the Northern Cree.

The symposium was filmed by the Haskell Environmental Research Studies Center (HERS) with support from the NAOMI (Native American and Other Minority Institutions) Seminar Program. The symposium will be distributed as a production of the NAOMI Seminar Series. ■

Available videotapes

These tapes are available through interlibrary loan from Kansas State University's Farrell Library.

Geoscience Education in Native American Communities

Live Teleconference: An Environmental Legacy For Our Grandchildren

Comparison of Native American and European Worldviews: A Roundtable Discussion, Part II

The Badlands Bombing Range Project

Basin Creek Mine Closure Reclamation Techniques

Comparison of Native American and European Worldviews: A Roundtable Discussion

Topics in Pollution Prevention—Vehicle Maintenance

PCBs in Our Environment—The Legacy Continues

Comparison of Native American and European Worldviews: A European Viewpoint

Environmental Impacts of Gold Mining Operations Near the Fort Belknap Reservation

Comparison of Native American and European Worldviews: A Native American Viewpoint

The NAOMI Program and HERS: New Opportunities in Environmental Research

Hózhó Kéyah (Environmental Harmony in Business)

Hózhó Hooghan (Environmental Harmony at Home)

Team America: A Strategic Plan for the 1990's

Bold print indicates that a seminar was sponsored by the NAOMI Seminar Program.



Center Directors

George Godfrey and Dan Wildcat

Supporting Faculty

Carol Bowen, Bill Curtis, Tom Dixon
Chuck Haines, Dennis O'Malley, Mike Tosee

Editors

Wendy Griswold and Patterson T. Yazzie

Grants Administrator

Helen Gee

Medicine Wheel Graphic

Leslie Evans

Advisory Board Members

Don Aragon, Les Benedict, Sherry Blackburn, Karl Burgher, Kim Clausen, Shelia Crowley, Sharon Crowley, Ray Haner, Rose Main, Ella Mulford, Jerry Pardilla, Steve Semken, Graham Snelding, John Trotter, Gerald Wagner, Benjamin Whiting, Roderick Yeahpau

Earth Medicine is published bi-monthly by the Haskell Environmental Research Studies Center to serve as a means of communication for members of the center's consortium and the public. The Office of Research and Development, U.S. EPA, under agreement #R-819653, through the Great Plains-Rocky Mountain Hazardous Substance Research Center, provides \$1,101,757, or 70 percent, of the funding for this program and publication. The content of this publication does not necessarily represent the views of that agency. No official endorsement should be inferred.



Printed on recycled paper.



Haskell Indian
Nations University



Kansas State University

**EARTH
MEDICINE**

Haskell Foundation
Haskell Environmental Research Studies Center
155 Indian Ave., Box 1247
Lawrence, KS 66046
913-749-8498

Please send a free subscription of *Earth Medicine* to:

Name _____

Company _____

Address _____

City/State/Zip _____

Phone and FAX _____

Nonprofit Org.

U.S. Postage

PAID

Lawrence, KS 66044

Permit No. 187