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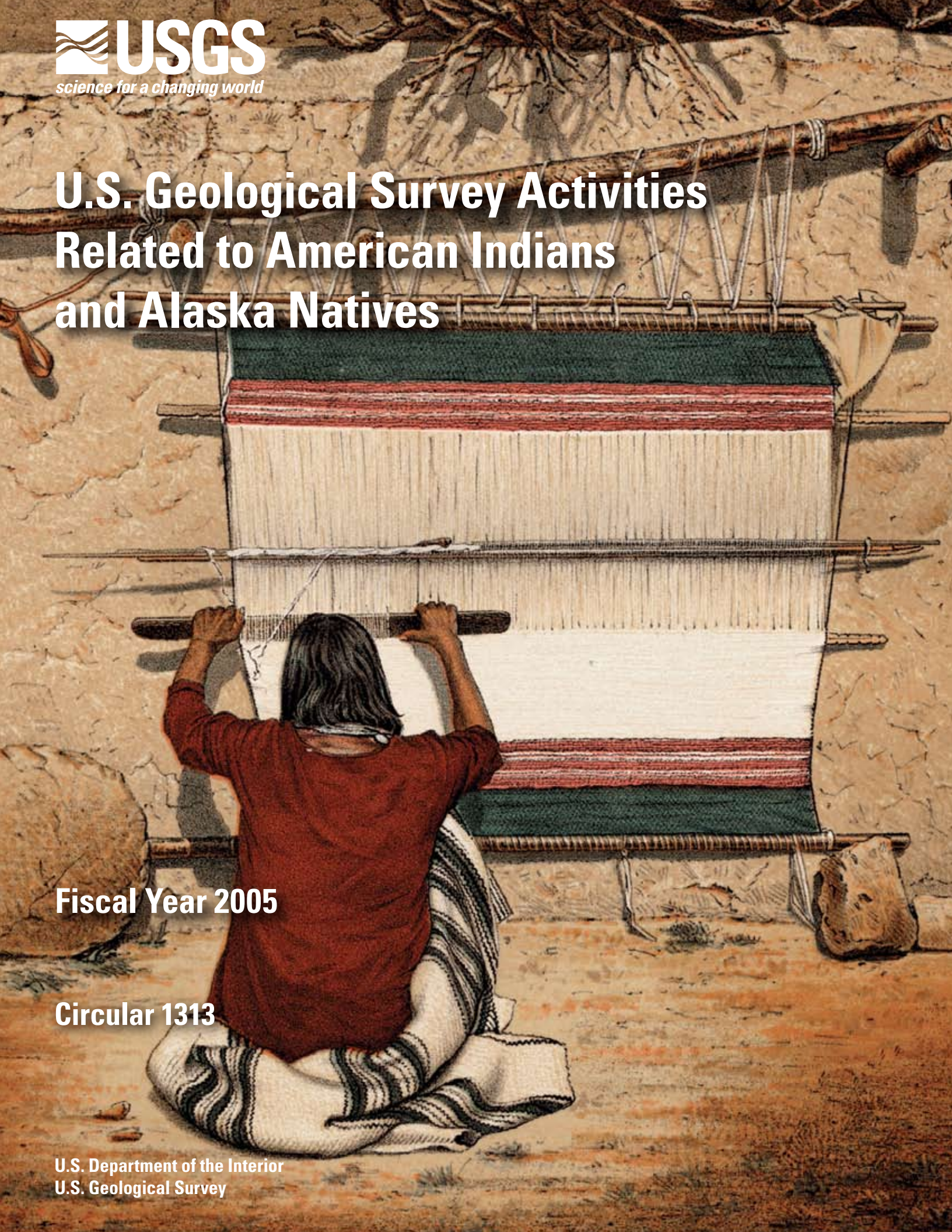
U.S. Geological Survey Activities Related to American Indians and Alaska Natives



Fiscal Year 2005

Circular 1313

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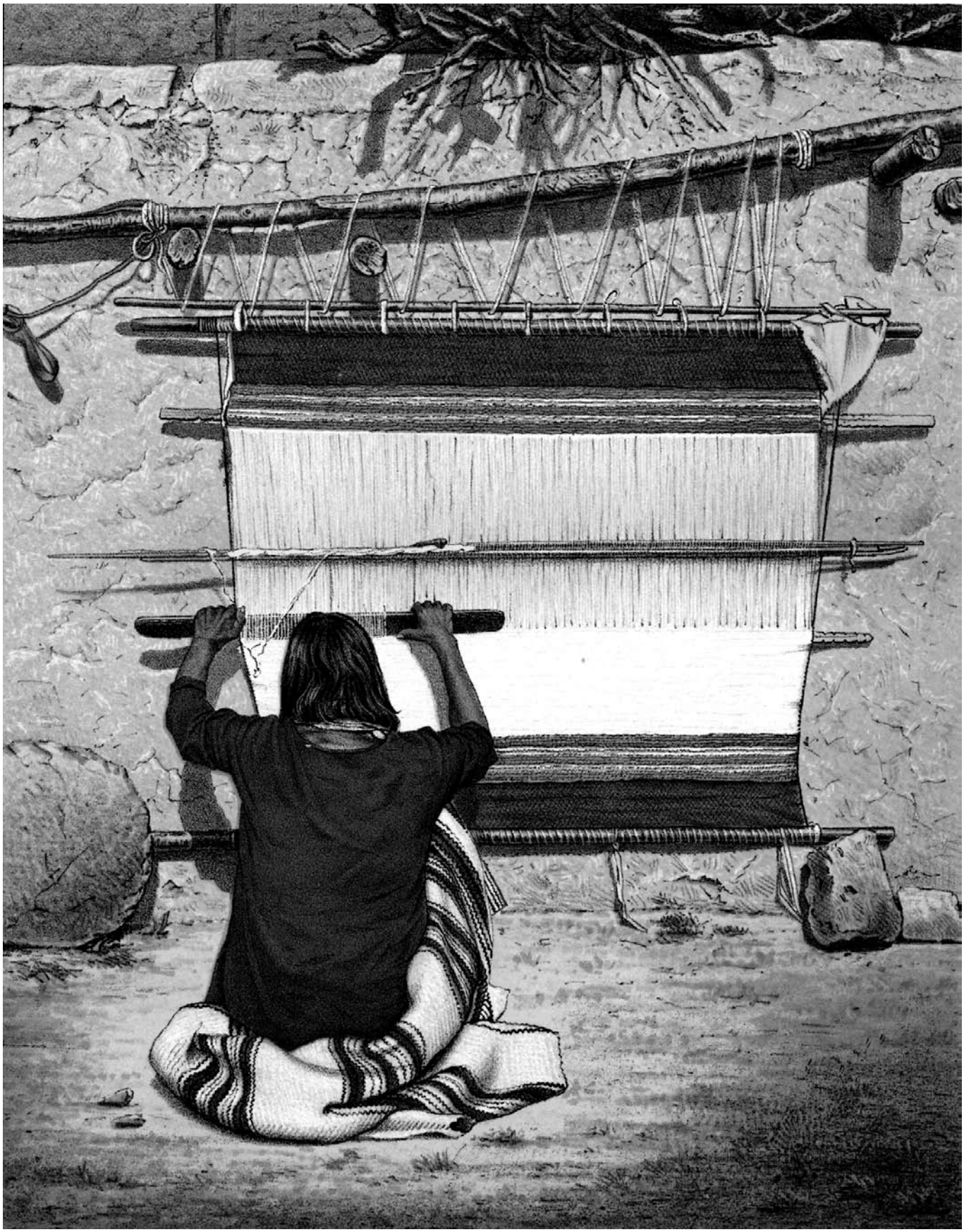

U.S. Geological Survey Activities Related to American Indians and Alaska Natives

By Susan M. Marcus

Fiscal Year 2005

Circular 1313

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
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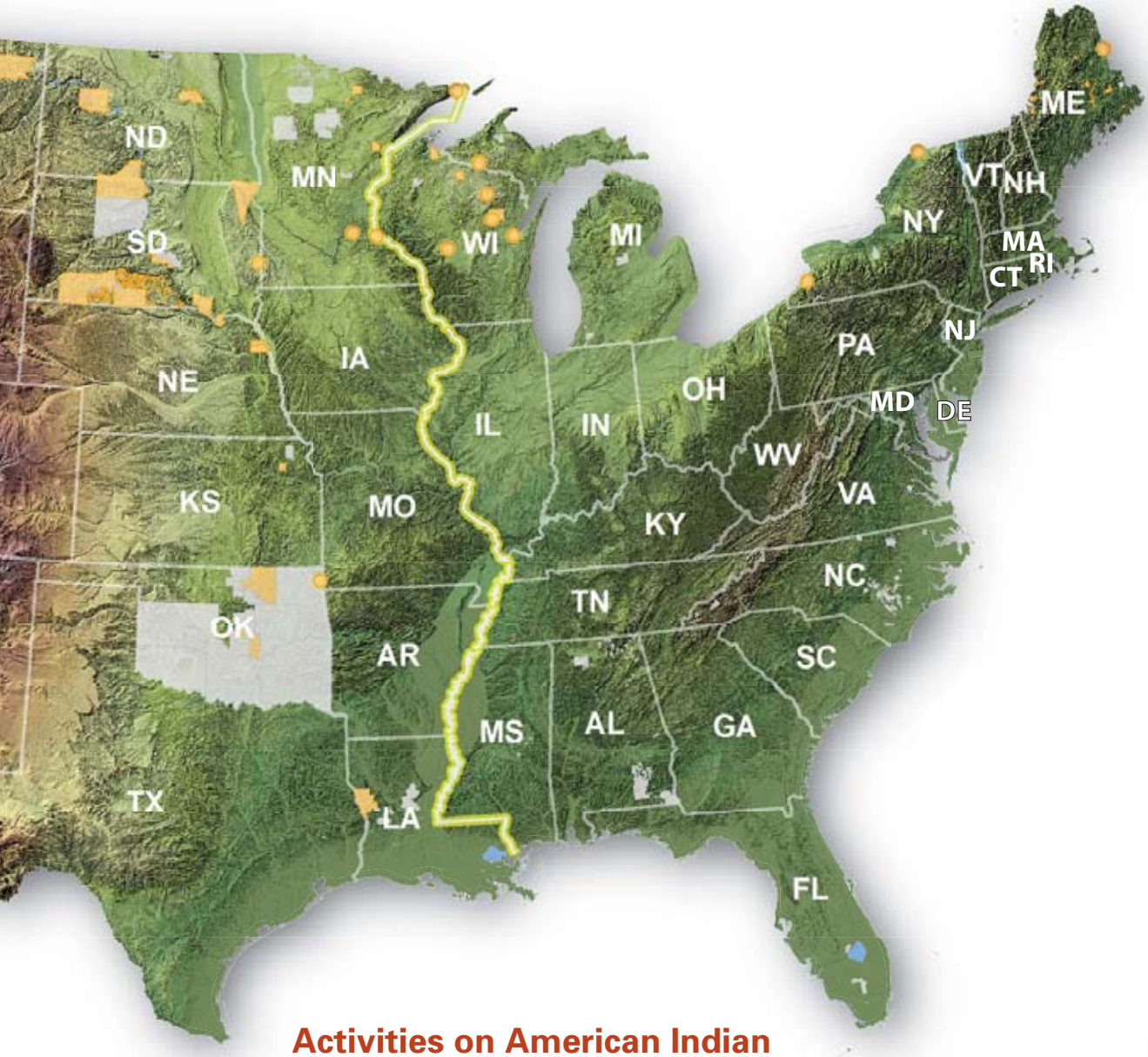
- Lands greater than 116 sq miles
- Lands without USGS Projects
- USGS Regional Boundaries



Activities on American Indian and Alaska Native Lands

U.S. Geological Survey
Fiscal Year 2005

List of Tribes or Tribal Governments Mentioned in the Report

Tribal Name*

* Names in this report are the most accurate that could be readily determined from several sources. Any inaccuracies are unintentional. Corrections are welcome.

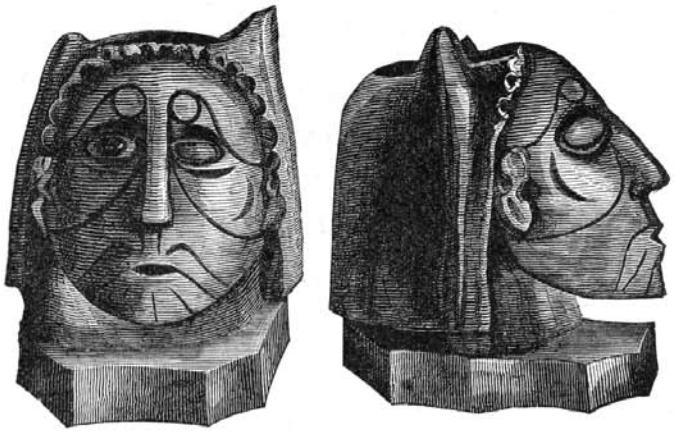
Organizations or Events Related to American Indians or Alaska Natives Mentioned in the Report

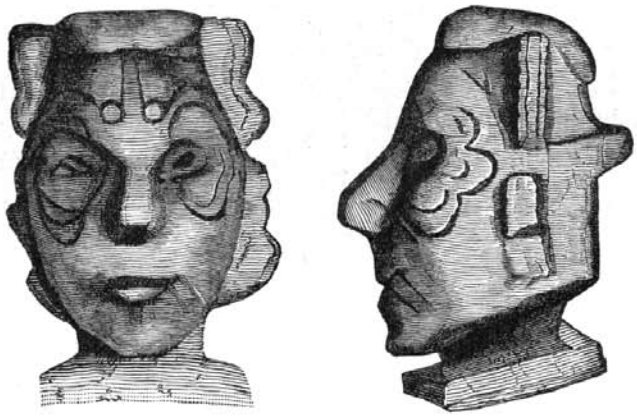
Organization/Event*

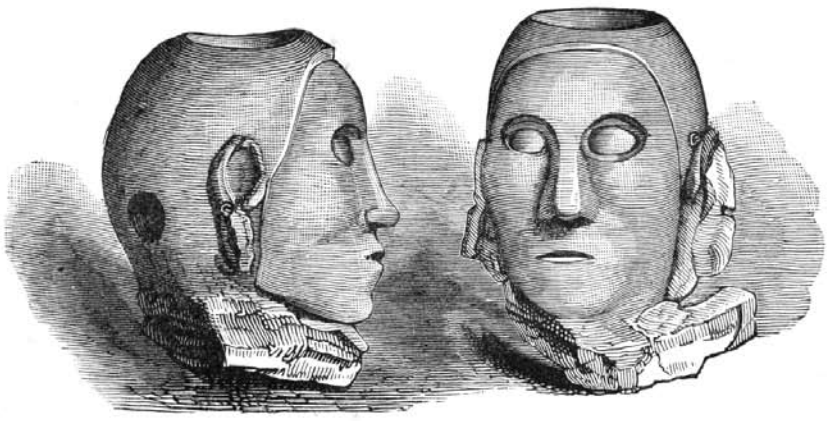
* Names in this report are the most accurate that could be readily determined from several sources. Any inaccuracies are unintentional. Corrections are welcome.

States Mentioned in the Report

State







Introduction

U.S. Geological Survey Activities Related to American Indian and Alaska Natives Fiscal Year 2005

Introduction

This report describes the activities that the U.S. Geological Survey (USGS) conducted with American Indian and Alaska Native governments, educational institutions, and individuals during Federal fiscal year (FY) 2005. Most of these USGS activities were collaborations with Tribes, Tribal organizations, or professional societies. Others were conducted cooperatively with the Bureau of Indian Affairs (BIA) or other Federal entities.

The USGS is the earth and natural science bureau within the U.S. Department of the Interior (DOI). The USGS does not have regulatory or land management responsibilities.

As described in this report, there are many USGS activities that are directly relevant to American Indians, Alaska Natives, and to Native lands. A USGS website, dedicated to making USGS more accessible to American Indians, Alaska Natives, their governments, and institutions, is available at www.usgs.gov/indian. This website includes information on how to contact USGS American Indian/Alaska Native Liaisons, training opportunities, and links to other information resources. This report and previous editions are also available through the website.

The USGS realizes that Native knowledge and cultural traditions of living in harmony with nature result in unique Native perspectives that enrich USGS studies. USGS seeks to increase the sensitivity and openness of its scientists to the breadth of Native knowledge, expanding the information on which their research is based.

USGS scientific studies include data collection, mapping, natural resource modeling, and research projects. These projects typically last 2 or 3 years, although some are parts of longer-term activities. Some projects are funded cooperatively, with USGS funds matched or supplemented by individual Tribal governments, or by the BIA. These projects may also receive funding from the U.S. Environmental Protection Agency (USEPA), the Indian Health Service (part of the Department of Health and Human Services), or other Federal agencies. The USGS routinely works with its sister bureaus in the Department of the Interior to provide the scientific information and expertise needed to meet the Department's science priorities.

Some USGS activities described in this report are conducted as collateral tasks that result from USGS employees identifying and responding to perceived needs. These endeavors are usually prompted by employee interests and frequently involve educational activities. The education is often a reciprocal learning and teaching experience for USGS employees and for Native participants. Through these activities, USGS employees help to fulfill a mission of the USGS—to demonstrate scientific relevance—while helping their fellow citizens. Increasingly, some of the educational activities are becoming parts of formal USGS projects.

USGS employees also take initiative in assisting American Indians and Alaska Natives by participating in several organizations that promote awareness of science career opportunities among Native peoples and help build support and communication networks. One such group is the American Indian Science and Engineering Society (AISES). USGS employees join this organization on a voluntary basis, bringing the benefits of this expanded network to the USGS, as many employees do with other professional organizations.

The studies briefly described in this report span subsistence issues, wildlife health, water quality, mineral resources, monitoring and modeling to gather information and predict what may happen in the future. Although each project description relates to Native Americans in some way, the projects vary widely, including who conducted the work, the goals and products, the duration of the study, and whether it was local or covered a broad area. Each major

organizational unit of the USGS has identified an American Indian/Alaska Native liaison. The USGS has a regional organizational structure, with Western, Central, and Eastern Regions. The regions work in concert with specific scientific disciplines to carry out the scientific mission of the USGS. The scientific disciplines include Biology, Geology, Geography, Geospatial Information, and Water Resources. We encourage Native Americans and Alaska Natives to use the contacts listed at the end of this report to answer questions and help build collaborations.

How to use this report

In the following pages, diverse USGS activities related to American Indians and Alaska Natives are grouped into several categories: Achievements of Fiscal Year 2005; Education and Training; Resources and Environment; Technical Assistance; General Coordination; Future Opportunities; and USGS Contacts. Each description of an activity in this report concludes with information on how to contact a USGS employee who was engaged in the work. Many descriptions also include contact information for Tribal partners. If you find an activity that might provide useful information if reproduced in your area, contact the person(s) listed to learn how it was carried out. Ask about other USGS employees who could assist you in developing a similar activity in your area. If you are unsure of what to do, please contact the USGS employees listed at the end of this report. Within the USGS, this report will help our staff develop future outreach, educational, and research goals. It is hoped that USGS employees, American Indians, and Alaska Natives will adapt these activities in new settings and will use the USGS contacts to expand the relevance of the USGS to more Americans.

Finally, a note regarding the historic engravings used throughout this report. These illustrations—reproduced in color and in black and white—were taken from John Wesley Powell's *Second Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1880–81*; the book was published in 1883, in Washington, D.C., by the Government Printing Office. The illustrated specimens were collected in 1879 and 1880 from Native Americans in New Mexico and Arizona. They "consist of implements of war and hunting, articles used in domestic manufacture, clothing and personal ornaments, basketry, horse trappings, images, toys, stone tools, musical instruments, objects used in religious ceremonies and in games, fabrics, paints, dye stuffs, medicines, and many other articles. The most precious part of the collection is the pottery…." John Wesley Powell helped found the USGS in 1879 and was its second Director. Powell's respect for American Indians began the long-standing relationship that continues to the present time.

This document was compiled by Susan Marcus, USGS American Indian/Alaska Native Liaison in cooperation with the Regional and Discipline Liaisons:

- Gayle Sisler, Eastern Region
- Gene Napier, Central Region and Geography Discipline
- Cyndee Matus, Western Region
- Bonnie Gallahan, Geographic Information Discipline
- Kevin Whalen and Janet Cushing, Biological Resources Discipline
- Glenn Patterson and Ward Staubitz, Water Resources Discipline
- Sharon Swanson, Geologic Discipline
- Lynne Sendejo and John Szemraj, Office of Equal Opportunity

USGS has a Website dedicated to Native American contacts, activities, and information. Please visit this site at: **http://www.usgs.gov/indian/**

A general point of contact is Susan Marcus, Director's Office, 703-648-4437; smarcus@usgs.gov

Achievements of Fiscal Year 2005

Achievements of Fiscal Year 2005

The USGS duty is to provide unbiased, objective scientific information. In FY 2005, the USGS scientific studies assisted the health and economic development of Native Americans, along with their governments and institutions, in many different ways. Each project description in this report provides an example.

Federal FY 2005 was a time of collaboration among the U.S. Geological Survey, Tribal governments and organizations, and Tribal educational institutions. The USGS signed agreements to work with the United Sioux Tribes Development Corporation, a coalition of 11 Sioux nations, to facilitate the Tribes' use of USGS geospatial data and technologies in caring for their lands and their people. Once again, the USGS brought together representatives of Tribal colleges and universities (TCUs) at a Tribal College Forum to cultivate the network of TCUs, which is using USGS information to benefit their students and communities. NativeView, a process for using data and technology to empower Tribes, continues to develop its means of transferring skills to Tribes. USGS continues to be involved in the Southwest Strategy, a forum for collaboration on issues affecting Arizona and New Mexico. [For details see pages 103, 107, 110: **Tribal College Forum IV, United Sioux Tribes and USGS Celebrate,** and **Southwest Strategy**.]

Education activities with Tribes continue to grow. Internship opportunities for Native American students provide on-site training and learning opportunities where students can work directly with project scientists. [For examples of educational cooperation, see the Education and Training section of this report, beginning on page 9 and also see pages 17, 23, 25: **Sinte Gleska University *National Map* Implementation and Wildfire Mitigation Application, and USGS Partnership,** and **Alaska Native Internship Program**.]

The USGS provided training to Tribal employees in water resources, geographic information systems, and biological sciences. Geographic information is being applied by one Tribe to provide evidence of improved census data that can help the Tribe receive more Federal funding. The USGS also provides geographic data that forms the basis for studies, maps, and geographic information systems that Tribes design to meet their unique needs. [For examples of training, see pages 11, 12, 13, 21: **Geographic Information Systems Training, Metadata and GIS Training**, and **Water Technician Training Course Water-Quality Field Methods Workshop.**]

The USGS continues to provide unbiased scientific information on natural resources to Tribes and Native American institutions for use in human health, resource, and land management. The studies described in this report span many issues, including subsistence, wildlife health, water quality, mineral resources, monitoring and modeling to gather information and predict natural resource trends. Major efforts include Tribal fisheries restoration and enhancement, fire management, contaminant studies, ground-water modeling, wildlife population dynamics, habitat mapping, invasive species, landscape change, and adaptive management strategies. [For examples, see pages 33, 34, 37, 40, 48, 50, 58, 78: **Public Water Supply Wells, Water Quality on the Lands of the Prairie Band of Potawatomi, Cooperation to Stem Disease Outbreak, Reproductive Failure, Tribal Fisheries Restoration, Lake Sturgeon Restoration, Bacterial Cold Water Disease Research, Commercial Cranberry Bogs, Pesticides and Mercury,** and **Navajo Nation and USGS Air Quality Research.**]

Technical assistance continues to be an important component of USGS work with Tribes. Stream gages, water-quality stations, reservoir stage stations, sediment monitoring stations, and ground-water monitoring stations provide Tribes with the information needed to manage water resources. Diagnostic services and wildlife health bulletins by the USGS National Wildlife Health Center are used by Tribes to assess potential concerns. [See pages 31, 91, 94 for details: **Surface-Water Monitoring Stations*, Wildlife Health Bulletins*,** and **Diagnostic Services.**]

Traditional ecological knowledge enriches our knowledge of the Earth and its resources. The USGS wants its studies to be thorough, relevant, and useful to all Americans. The USGS is working with Sinte Gleska University to understand how to blend traditional ecologic

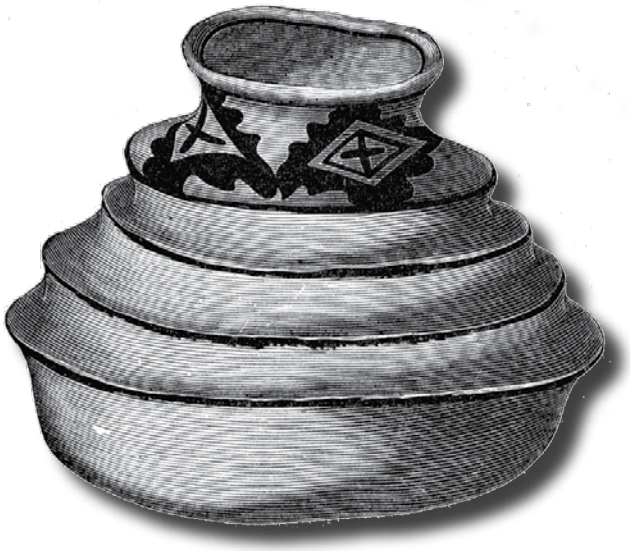
knowledge into our work, to make it more useful and relevant to Native American governments, and to expand the information base of our studies. As an example, traditional knowledge adds to our studies of earthquakes in the northwestern part of the coterminous United States. [For examples, see pages 78, 104: **Traditional Ecological Knowledge, Native American Traditions.**] Some USGS studies provide information on resources that Native Americans use for traditional life ways. [For examples, see pages 83, 85: **Polar Bear Research, Streamgaging of Eklutna River,** and **Arctic Soils, Metal Uptake, and Moose.**]

In FY 2005 USGS presented its own Tribal relations course to encourage its employees to work with Tribes in sensitive, meaningful ways and helped organize, present, and support a course offered by the Southwest Strategy. [See pages 103 and 110 for details: **USGS Tribal Relations Training** and **Southwest Strategy.**]

The USGS can assist Tribes, at Tribal discretion, in documenting their cultural heritage. [For examples, see pages 59 and 107: **Pre-Hispanic Maize** and **Historical Photography.**] In past years, USGS historic photographs and satellite imagery have given Tribes glimpses of their cultural heritage, which may be seen in photographs of lands and Native settlements now flooded or no longer extant.

Cooperation between Tribes, Tribal institutions, and the USGS can benefit Native entities by strengthening scientific capabilities and expertise to support Tribal grant applications. These collaborations benefit all partners. [For examples, see pages 18, 71, 112: **Sinte Gleska University Tribal Rangeland, Northwest Indian Fisheries Commission,** and **Yukon River Intertribal.**]

Education and Training



SMITHSONIAN INSTITUTION. BUREAU OF ETHNOLOGY.

J.W.POWELL, DIRECTOR.

MAP

SHOWING LOCATION OF THE

PUEBLOS

OF

ARIZONA AND NEW MEXICO

Scale 10 5 0 5 10 20 40 60 MILES

Education and Training

Geographic Information Systems (GIS) Training Coordination (National)

In cooperation with the USGS National Center for Earth Resource Observation and Science, the Federal Geographic Data Committee and the National States GIS Council plan and develop regional Tribal, Federal, State, and local workshops, including the annual Tribal College Forum. The workshops and Forum familiarize participants with the National Spatial Data Infrastructure to assist them with their planning processes, development of data sets, and data sharing. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Cooperative Training with Department of Homeland Security/Federal Emergency Management Agency (National)

The Federal Geographic Data Committee through its Memorandum of Understanding with Department of Homeland Security/Federal Emergency Management Agency offers several classes for Tribal entities on various topics, such as: Tribal Framework for Emergency Preparedness; Emergency Operations for Tribal Governments; Introduction to Basic HAZUS (Hazards Use)-Multi Hazards; Intermediate Basic HAZUS-Multi Hazards; and, Mitigation for Tribal Officials. All courses include overviews of the National Spatial Data Infrastructure, Cooperative Agreements Program, Geospatial One Stop, and *The National Map*. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Rural Geospatial Innovations in America (RGIS)

The Federal Geographic Data Committee works with Rural Geospatial Innovations in America (RGIS) to assist Federal, State, Tribal, and local entities in implementing advanced geospatial information technologies to improve the quality of life, environmental health, and economics of rural communities. RGIS provides technical assistance to Tribal Colleges and Universities in developing and managing geographic information systems, implementing training programs on the National Spatial Data Infrastructure, Geospatial One Stop, *The National Map*, short courses, and university curricula on advanced spatial analysis for decision-making processes. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

National Indian Education Association (National)

The USGS continued its support of Native American students by participating in the National Indian Education Association's annual conference in Phoenix, Arizona. This annual conference draws the largest audience of American Indian educators who teach at all levels. The USGS booth featured photographs of Native students assisting USGS researchers, a new geologic map of the Grand Canyon, and satellite imagery of the Canyon. The USGS Grand Canyon Monitoring and Research Center's Tribal Nation cooperators provided photographs. Students and educators from across the Nation showed great interest in the unbiased science that the USGS provides as well as educational materials, USGS careers and job opportunities. Contact: Serena Mankiller, 928-556-7094, smankiller@usgs.gov

Native American participants in a geographic information systems course in Albuquerque, New Mexico.

National Oceanic and Atmospheric Administration Coastal GIS and Metadata Training for American Indians (National)

The National Oceanic and Atmospheric Administration and the USGS, through its support of the Federal Geographic Data Committee, present an annual training session on GIS/metadata and coastal issues for Native Americans, held at the USGS Training Center in Denver, Colorado. Topics include the National Spatial Data Infrastructure, Geospatial One Stop, *The National Map*, metadata, water quality, and flora and fauna monitoring. The training session helps Tribes understand the value of data collection and maintenance and provides Tribal access to public data catalogs and clearinghouses. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Introduction to Metadata and GIS Courses for American Indian Conservation Professionals (National)

Indian students to the uses of geographic information systems. Topics of the sessions include the National Spatial Data Infrastructure, Geospatial One Stop, *The National Map*, metadata, spatial data themes and layers, constructing queries, and cartographic principles. The sessions offer best practices used and describe the effect of scale on mapped data. The courses are offered several times per year at the U.S. Fish and Wildlife Service National Conservation Training Center in West Virginia. Contact: Bonnie Gallahan, 703-648-6084, bgallahan@usgs.gov

Water Technician Training Course (National)

The Bureau of Indian Affairs sponsored its annual Water Technician Training Course in Las Cruces, New Mexico. Twenty-seven Tribal representatives from throughout Indian Country participated in the course. The four-week earth sciences session was coordinated by New Mexico State University using instructors from several Federal agencies and academia. USGS personnel taught a three-day module entitled, "Introduction to Hydrologic Data Collection Techniques." Instruction included classroom and field activities on ground-water concepts and data collection, as well as surface-water data-collection techniques. The field-oriented training program is based on hands-on experience to develop basic data collection skills. Contact: Edward (Nick) Nickerson, 505-646-7618, nickerso@usgs.gov

Training Class (Maine)

The USGS Maine Water Science Center hosted a class on operating and maintaining sondes (devices used to determine water-quality characteristics) that included two members of the Houlton Band of Maliseet Indians. The training class included basic cleaning and troubleshooting, and calibrating through advanced functions. Contact: Gregory Stewart, 207-622-8201 ext. 118, *gstewart@usgs.gov*

Serena Mankiller (USGS) and Wilma Mankiller at USGS exhibit at the 2004 National Indian Education Association conference, Phoenix, Arizona. Photograph by Susan Marcus, USGS.

Coordination with Haskell Indian Nations University (Kansas)

The USGS, through the Kansas Water Science Center, serves on the Haskell Indian Nations University's Natural Resources Advisory Board and advises Haskell on pertinent academic programs. Contact: Walt Aucott, 785-832-3505, waucott@usgs.gov

Haskell Indian Nations University Environmental and Ecology Conference (Kansas)

The USGS, through the Kansas Water Science Center, participated in the Haskell University Environmental and Ecology Conference, November 11-13, 2005. The student-run Haskell Ecology Club invited conference presenters to discuss research on Tribal Lands throughout the United States as well as career opportunities for Native Americans in the environmental and ecology fields. USGS personnel gave a presentation about water-quality and geomorphic studies on the Prairie Band Potawatomi Reservation and career opportunities available in the USGS. Contact: Heather C. Ross Schmidt, 785-832-3575, hross@usgs.gov

Employment Opportunities Offered at Haskell Indian Nations University and the Navajo Nation Personnel Office (Arizona, Colorado, Kansas, New Mexico)

Job openings at the USGS Canyonlands Research Station (Moab, Utah) of the Southwest Biological Science Center (Flagstaff, Arizona) are regularly posted with the Haskell Indian Nations University and the Navajo Nation in an effort to encourage Native Americans to consider working for the USGS. Contact: Sue Phillips, 435-719-2337, sue_phillips@usgs.gov

Native American students learn hydrological techniques in a hands-on course sponsored by the Bureau of Indian Affairs and taught, in part, by a USGS hydrologist. Photograph by Ed Nickerson, USGS.

Introduction to Water-Quality Sampling Techniques (Kansas)

USGS Kansas Water Science Center personnel taught a three-day "Introduction to Water-Quality Sampling" class to Tribal members and personnel from the Santee Sioux Nation, Kickapoo Tribe of Indians (Kansas), and the Crow Tribe in June 2005. The class was offered in partnership with Haskell Indian Nations University and their work with the Tribes within Region 7 of the U.S. Environmental Protection Agency. The course covered introductory material in surface and ground-water-quality sampling and included a field trip to demonstrate surface-water-quality sampling techniques. Contact: Heather C. Ross Schmidt, 785-832-3575, *hross@usgs.gov*

EROS Donates Computers to Native Americans (North Dakota, South Dakota)

Throughout FY 2005, surplus computers from the USGS Center for Earth Resources Observation and Science (EROS) were donated to South Dakota Tribes and Tribal schools, and organizations that benefit Tribes. Computers were distributed to Tribal offices and classrooms on Tribal lands. Tribes that participated in this program included the Rosebud, Crow Creek, and Lower Brule. Computers were also donated to American Indian Services in Sioux Falls, Indian Health Service in Pierre, and Project Youthbuild on the Sisseton-Wahpeton Sioux Tribe's Lake Traverse Reservation. Contact: Gene Napier, 605-594-6088, napier@usgs.gov or Michael Choate 605-594-2829, mchoate@usgs.gov

Project Youthbuild Visits EROS (North Dakota, South Dakota)

In February 2005, students and staff from Project Youthbuild on the Sisseton-Wahpeton Reservation toured the USGS Center for Earth Resources Observation and Science (EROS). Project Youthbuild is an alternative school for at-risk students by helping them stay in school and graduate. Contact: Gene Napier, 605-594-6088, napier@usgs.gov or Michael Choate 605-594-2829, mchoate@usgs.gov

Geospatial Training in South Dakota

The USGS Center for Earth Resources Observation and Science (EROS), in partnership with the Bureau of Indian Affairs (BIA) Great Plains Regional Office in Aberdeen, South Dakota, hosted a three-day course titled "Introduction to GIS and Remote Sensing," in Sioux Falls, South Dakota in June 2005. Several EROS science staff members and a BIA employee taught the course, which was attended by 19 BIA staff and Northern Plains Tribal members. EROS provides technical support to Native American governments, organizations, and academic institutions in using and implementing geospatial technologies and data. Contact: Gene Napier, 605-594-6088, enapier@usgs

Flandreau Indian School Visits EROS (South Dakota)

In June 2005, students and staff from the Flandreau Indian School in Flandreau, South Dakota, visited the USGS Center for Earth Resources Observation and Science (EROS). Students were given a tour of the facility and then listened to a short program on thunderstorms and tornados. The school staff requested this program because the students were studying weather during summer school. Contact: Michael Choate, 605-594-2829, mchoate@usgs.gov

Native American Connections Program in Sioux Falls Schools (South Dakota)

The USGS continues to facilitate the Native American Connections Program in the Sioux Falls, South Dakota, school system. USGS staff participate in the Native American Connections Program at Axtell Park Middle School and Washington High School in Sioux Falls. The program builds self-esteem among this disadvantaged population. It encourages the students to identify goals and work to fulfill their potential. USGS staff develops lesson plans and serves as a role model for the students. Contact: Gene Napier, 605-594-6088, enapier@usgs.gov

Fire on Crow Creek Reservation Prompts Assistance (South Dakota)

A fire destroyed a student dormitory on the Crow Creek Reservation in the spring of 2005. The fire destroyed the personal belongings, including the clothes, of the students. A Native American USGS contractor personally organized a community clothing drive. The staff at the USGS Center for Earth Resource Observation Science (EROS) donated more than 40 bags of new clothing to the reservation for distribution. Contact: Michael Choate, 605-594-2829, mchoate@usgs.gov

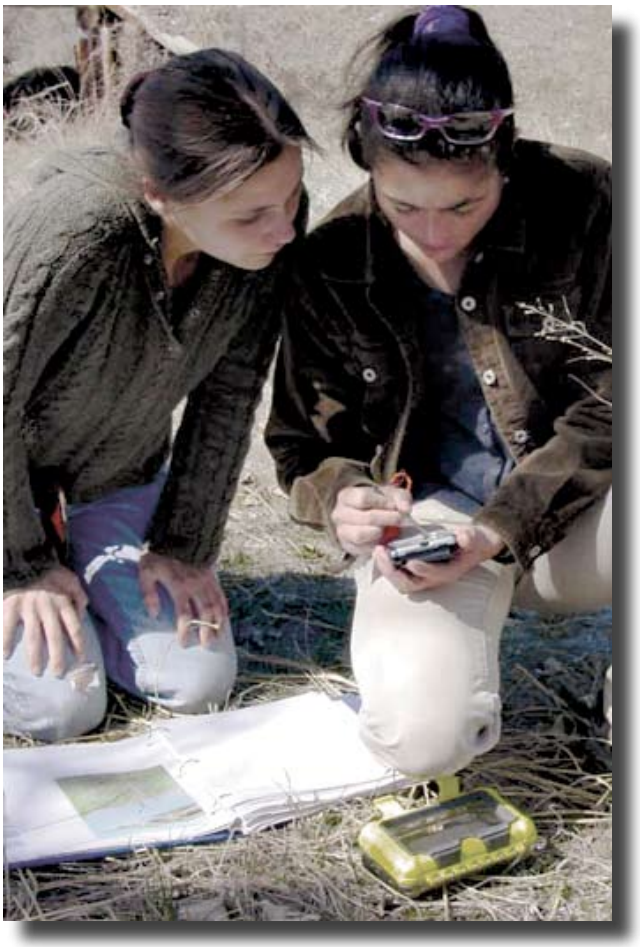
Sinte Gleska University and USGS Partnership (South Dakota)

The Rosebud Sioux Tribe's Sinte Gleska University (SGU) and the USGS have a multiyear Memorandum of Understanding to conduct programs and activities that enhance the capabilities of SGU by improving educational opportunities, contributing information and skills to the Rosebud Sioux Tribe, and meeting operational science objectives of SGU and USGS programs. Accomplishments during FY 2005 include support for three Native American interns from SGU. Two of these interns stayed on the reservation, conducting fieldwork for the USGS Central Region's Integrated Science Program. These two students also took training enabling them to use geographic information systems to present and analyze data. They worked with USGS scientists on Native American-related science projects, including a project sponsored by the National Aeronautics and Space Administration (NASA), and a separate USGS Science Impact project. The other intern worked on science projects at the EROS Data Center and on the Rosebud Sioux Reservation to develop a means of correcting an important 2000 Census recount for Rosebud Sioux Tribe. According to information identified in this latter project, the Rosebud Sioux Tribe may be able to prove that the 2000 Census needs to be corrected, which could bring additional funding to the Tribe. Contact: Gene Napier, 605-594-6088, enapier@usgs.gov

Sixth graders at Axtell Park Middle School, Sioux Falls, South Dakota, participate in the Native American Connections Program. Photograph by Michael Choate, USGS contractor.

USGS EROS Supports Sinte Gleska University Tribal Rangeland Management Project (South Dakota)

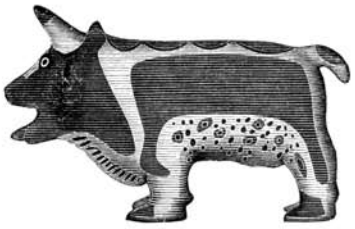
Under a NASA Earth Science **R**esearch, **E**ducation, and **A**pplications **S**olutions **N**etwork **C**ooperative **A**greement **N**otice (REASoN CAN) grant awarded to Sinte Gleska University (SGU), the USGS Center for Earth Resources Observation and Science (EROS) is collaborating and providing support to the project titled *"Using Geospatial Information to Enhance Tribal Rangeland Management Through Education and Understanding."* Building on an existing USGS–SGU Memorandum of Understanding for cooperative activities, EROS staff provides geographic information systems (GIS) and applied science support to this planned multiyear project. This activity completed its first full year in FY 2005. The initial proposal, which included extensive decision-support infrastructure and grid computing for diverse Tribal land applications, was refocused on developing decision-support tools and educational curricula for rangeland management on Tribal lands. Observational components, including satellite, aircraft, and field measurements, were developed in the first year of this 5-year effort. A rangeland production model will include geographic information systems-ready meteorological data sets. This model will use information from satellite imagery, soil productivity from the U.S. Department of Agriculture's Natural Resources Conservation Service, and meteorological data to discern soil quality, climatic, and management influences on rangeland productivity. Contact: Gene Napier, 605-594-6088, enapier@usgs

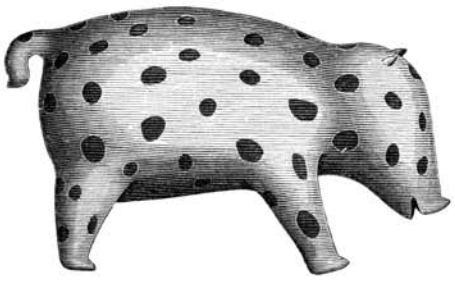


Dr. Geneva Chong (right), USGS biologist, demonstrates a data collection instrument on hand-held computers and geographic positioning system (GPS) for field-based plant inventories to Sarah Wolfe, USGS intern and Sinte Gleska University student. Photograph by Michael Choate, USGS contractor.

Information Technology Infrastructure to Sinte Gleska University (South Dakota)

A USGS scientist from the South Dakota Water Science Center provided training to the GIS and remote sensing class at Sinte Gleska University (SGU) on the use of the National Water Information System (NWIS) online data base and applicable geographic information system (GIS) uses in October 2004. Possible student projects on environmental issues were discussed in the area, including the Rosebud Reservation. In June 2005, a presentation was provided to students in the "Science for Everyday Life" class at SGU. The presentation for this class focused on geology and ground water in the Rosebud area and included hands-on experiments using sand models, sampling equipment, and well-construction materials. The presentation also demonstrated how to apply GIS to ground-water-quality data in the Rosebud area. In addition, possible grant mechanisms for Tribal colleges to strengthen their earth science programs were researched and provided to SGU professors. USGS Water Discipline staff met with key professors and staff at SGU and the Rosebud Sioux Tribe Water Resources Department on several occasions to discuss potential ways to develop a hydrologic information partnership. Other USGS scientific disciplines provided expertise to augment SGU's earth science curricula and resource management activities. SGU and USGS cooperated on alternative energy resource studies and indigenous plant research. Contact: Janet Carter, 605-394-3215, jmcarter@usgs.gov or Gene Napier, 605-594-6088, enapier@usgs





Zuñi Effigies

Water-Quality Field Methods Workshop (Oklahoma)

Water-monitoring training for Tribes was jointly sponsored by the American Indian Institute for Progress and the USGS. The training was held at Southwestern Oklahoma State University Distance Education Facility and was transmitted to eight satellite locations across Oklahoma and to one in Iowa. The USGS Oklahoma Water Science Center taught the course, entitled "Introduction to Field Water-Quality Methods" for Tribes during August 2005. USGS scientists discussed water-quality methods, including field preparation, water-quality monitors, surface-water sampling, ground-water sampling, and microbiology. Thirty Tribes, totaling 40 to 50 attendees, took part in the two-day course. Training videos produced by the USGS Center for Earth Resource Observation Science (EROS) in Sioux Falls, South Dakota, were used to demonstrate field activities. In addition to making the class available to Tribal members in remote locations, a USGS employee at each site demonstrated sampling equipment and answered additional questions. Contact: Monica Allen, 918-254-6651, mlallen@usgs.gov

Outreach in the Grand County Schools, Science Fair Participation (Utah)

In FY 2005, six scientists from the USGS Canyonlands Research Station (CRS) participated in the annual science fair at Helen M. Knight Elementary School (Moab, Utah), which has a Native American population nearly twice that of the national average. Scientists reviewed the science fair entries and provided encouragement and information on science as a career. Scientists also gave a presentation at the school on cryptobiotic soil crust, a common and vital element of the ecosystem in the Four Corners area. Contact: Sue Phillips, 435-719-2337, sue_phillips@usgs.gov

Grand Canyon Monitoring and Research Center Intertribal Workshop (Arizona, Utah)

In April 2005, the USGS Grand Canyon Monitoring and Research Center (GCMRC) sponsored a two-day intertribal workshop to improve integration of traditional Native American perspectives in the GCMRC's ongoing science programs and the Glen Canyon Dam Adaptive Management Program (GCD-AMP). The workshop was co-hosted by Northern Arizona University and facilitated by the director of the university's Center for Sustainable Environments. Representatives and consultants from the Kaibab Band of Paiute Indians, Paiute Indian Tribe of Utah, the Hopi Tribe, the Hualapai Tribe, and GCMRC participated in the workshop. Outcomes of the workshop included an action plan for improving communication of Tribal values within the Glen Canyon Dam Adaptive Management Program and for refining Tribal resource monitoring protocols to meet the needs of the GCD-AMP and Tribal interests. Contact: Helen Fairley, 928-556-7285, hfairley@usgs.gov

Navajo Surface Water Project (Arizona)

The USGS Arizona Water Science Center and the Navajo Nation continue cooperating on the Navajo Surface Water Project, which helps personnel of the Navajo Nation's Water Resources Department compute streamflow records and operate their streamgages. This cooperation includes providing technical assistance to Navajo hydrologists and technicians by populating data bases with hydrologic data to compute and store streamflow data. USGS scientists also are training Navajo personnel to compute records and develop rating curves. Additionally, USGS personnel are providing quality assurance for the project. In FY 2005, the USGS operates two streamgages in cooperation with the Navajo Nation to provide near-real-time hydrologic data and to provide training opportunities to Tribal personnel. Contact: Gregory G. Fisk, 928-556-7225, ggfisk@usgs.gov

Hualapai Water Monitoring Program (Arizona)

The USGS Arizona Water Science Center is continuing to cooperate with the Hualapai Tribe by providing technical assistance and on-site training to Hualapai personnel with their water resources monitoring program. USGS personnel trained the Tribal hydrologic technician to collect sediment data and measure streamflow. The Tribal technician also was trained to properly and safely use the cableway at the Colorado River above the Diamond Creek gage. The Center also provided the tribe with new water-quality data and updated related information for inclusion in the 2004 update of the Hualapai Reservation Water Quality Assessment Report 305(b) to the U.S. Environmental Protection Agency, District 9. The update covered 6 years, from 1999 to 2004. Contact: Robert J. Hart, 928-556-7137, bhart@usgs.gov or Gregory G. Fisk, 928-556-7225, ggfisk@usgs.gov

Hopi Water Monitoring Program (Arizona)

The USGS Arizona Water Science Center continues cooperating with the Hopi Tribe by providing technical assistance and training to Hopi personnel concerning their surface-water resources monitoring program. The USGS personnel continued training the Tribal hydrologic technician to measure streamflow discharge at Hopi surface-water gages. Contact: Robert J. Hart, 928-556-7137, bhart@usgs.gov or Gregory G. Fisk, 928-556-7225, ggfisk@usgs.gov

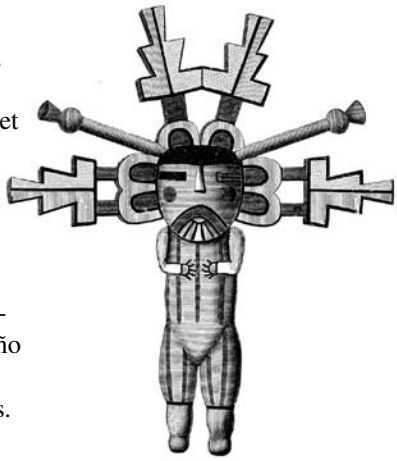
Sonoran Desert Ecology (Arizona)

The Sonoran Desert Research Station of the USGS Southwest Biological Science Center is cooperating with the University of Arizona and the National Park Service, Natural Resource Information Division, in creating an educational module titled, "Views of the National Parks" on the Sonoran Desert Ecosystem. This module will be available mid-FY 2006 on-line and on compact discs for use by teachers and the public. A member of the Hia-Ced O'odham Tribe provided a valuable perspective on the Native American connections to the Sonoran Desert. This perspective is an important part of the educational experience being presented through this program. Contact: Bill Halvorson, 520-621-1174, bill_halvorson@usgs.gov

Coeur d'Alene Tribe National Map Implementation and Wildfire Mitigation Application (Idaho)

Coeur d'Alene employees are cooperating with USGS staff to improve the Tribe's wildfire management capabilities and to enhance the data available to all people involved in wildfire mitigation. The Coeur d'Alene Tribe completed initial phases of their project to enhance wildfire management and mitigation capabilities and to display Tribal data on *The National Map*. The Tribe is using high-resolution elevation and imagery data, acquired and processed in collaboration with USGS, in wildfire behavior models. The Tribe used USGS partnership funds to hire two Native American interns to support the work in summer 2005. Tribal scientists visited the USGS Center for EROS, in South Dakota, for hands-on training. USGS employees are working with the Tribe to link data from the Tribe's server to *The National Map*. The server will provide access to base-mapping data as well as wildfire mapping and mitigation results. The Coeur d'Alene Tribe held a conference in May 2005 to transfer the techniques learned to additional Tribes in the region. See the website http://gis.cdatribe-nsn.gov/GISonFire/GISonFire.asp for a picture of the GIS on Fire Tribal Technical Transfer Conference. Staffs at EROS and the U.S. Forest Service Fire Lab in Missoula, Montana, have created models of fire fuels and related biophysical characteristics. A goal of this project is to train Tribal personnel to apply the data in wildfire behavior models to predict and mitigate wildfire hazards. The resultant fire behavior model data will be served from the Tribe's website for use by other fire protection organizations in the area. Contact: Tracy Fuller (USGS), 208-387-1351, tfuller@usgs.gov, Gene Napier (USGS), 605-594-6088, napier@usgs.gov, or Frank Roberts (Coeur d'Alene Tribe), 208-686-5307, fmroberts@cdatribe.org

Explorer's Club—Outdoor Science Education Outreach on San Diego County Reservations (California)



A retired USGS scientist has channeled her enthusiasm for earth science education into an outreach project for Indian Tribes in southern California. Working in partnership with the Tribes, the USGS, San Diego State University, and the San Diego Science Alliance, she has expanded a series of successful outdoor science activities originally developed under USGS auspices into a set of "Explorer's Club" programs for children ages 6 to 12. The format of each program is adapted to suit the needs of the Education Director or Recreation Director of each Tribe. Tribal elders are invited to participate as program instructors. The programs include various activities, such as panning for gold and magnetite, collecting rocks, coring soil, bugs and butterflies, and learning outdoor photographic techniques. Water-related activities are particularly important to help the students understand water issues in this semiarid area that has suffered 6 years of drought. Equipment is shared with children from the Campo Band of Kumeyaay Indians, Pauma Band of Luiseño Indians, Pala Band of Mission Indians, San Pasqual Band of Indians, Santa Ysabel Band of Diegueño Indians, Sycuan Band of the Kumeyaay Nation, and Viejas Band of Kumeyaay Indians. Contact: Eleanora I. (Norrie) Robbins (USGS emerita), 619-303-9095, norrierobbins@cox.net

Norrie Robbins, USGS scientist emerita, teaches kids about having fun with science at the Santa Ysabel Culture Camp program at the lake. Photograph by Norrie Robbins, USGS Emerita

Water-Quality Training Provided to Alaska Natives (Alaska)

In cooperation with the Bristol Bay Native Corporation, the USGS provided training in making streamflow-discharge measurements and collecting water-quality data to 15 Alaska Natives in Illiamna. The purpose of the training was to assist Illiamna residents, who will be monitoring local streams in the area in anticipation of the proposed Pebble Mine development. Contact: Steven Frenzel, 907-786-7000, sfrenzel@usgs.gov

Scientist Serves on Advisory Council for Tribal Educational Initiative (Alaska)

A USGS Alaska Science Center biologist was appointed to the Advisory Committee for the Tribal Natural Resource Management Program sponsored by the Chugach Alaska Corporation in collaboration with the National Oceanic and Atmospheric Administration (NOAA), the University of Alaska Fairbanks (Interior-Aleutians Campus Tribal Management Program), and the Chugach Regional Resources Commission. The goal of this project is to establish a natural resource education and degree program (associates degree) for Alaska Natives in coastal management that includes research, monitoring, management of critical coastal resources, and the traditional knowledge on which Native livelihood and culture depends. This program involves Native elders and traditional knowledge bearers from the south-central Alaska region in curriculum development and project implementation for degree qualifications. Ten students are expected in the program in 2006. Resulting degrees will focus on entrepreneurial skills and academic knowledge for entry-level management positions in Tribal institutions, local governments, and other organizations in rural Alaska. Contact: Jennifer L. Nielsen, 907-786-3670, jennifer_nielsen@usgs.gov

Lower Kuskokwim School District Students Visit USGS (Alaska)

Several groups of junior high and high school students and their instructors from the Lower Kuskokwim School District traveled to Anchorage and visited the USGS Alaska Science Center, through a school district program called Roadside Science. USGS employees taught the students about geography, geology, glaciology, and volcanology. The groups received a tour of the Alaska Volcano Observatory (AVO) operations rooms and were introduced to the monitoring tools used by AVO, as well as examples of volcanic ash, rocks, and seismic equipment. The groups also toured the Earth Science Information Center facility and received a primer on how maps are made and their multiple uses. The students handled a variety of Alaska rocks and minerals while learning about the products made from them. The USGS staff explained how these clues from rocks and images are used by geologists to create geologic maps. The students viewed aerial photographs and imagery of Alaska landscapes. They saw the diversity of USGS products, particularly for Alaska, and learned more about the state's geography. Contact: Jennifer Adleman, 907-786-7019, jadleman@usgs.gov

Alaska Native Internship Program (Alaska)

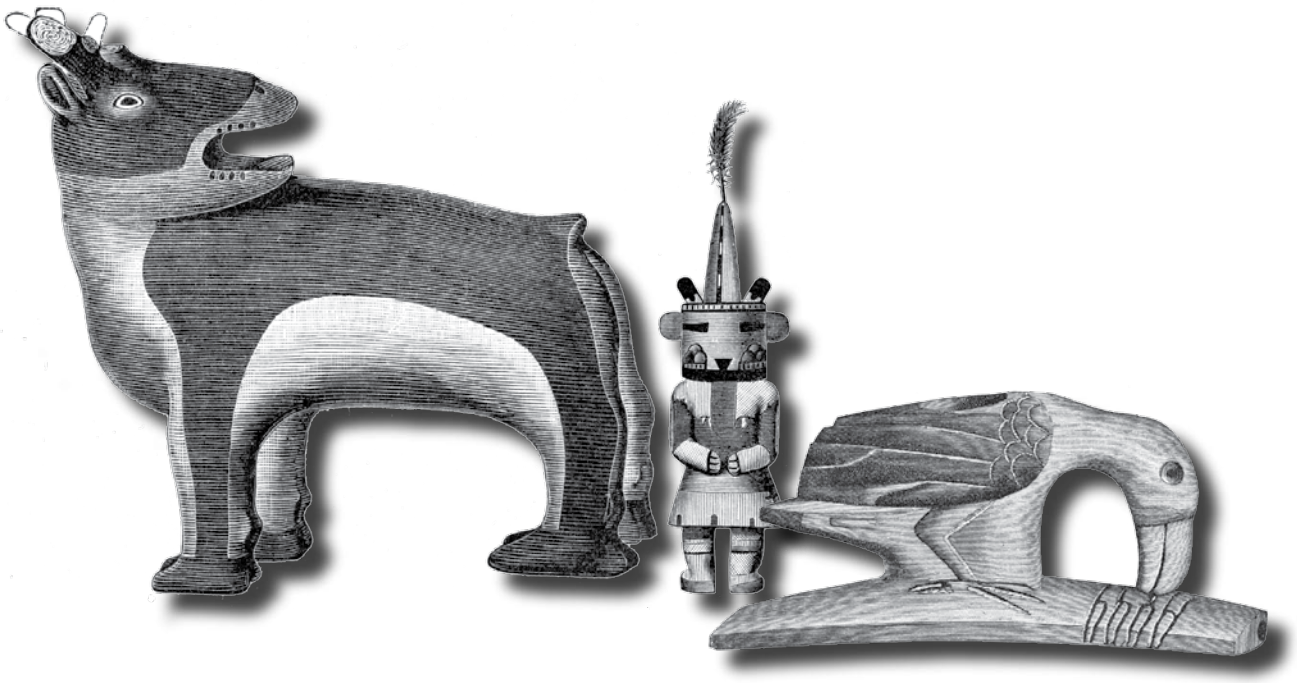
A USGS scientist continued a fisheries science internship program in the Bristol Bay region of Alaska during the summer of 2005. This program provides students with hands-on experience in fisheries science by participating in projects directly related to the subsistence fishery resources of the region. During 2005, the USGS hired two interns and was provided with an additional two interns from the Bristol Bay Native Corporation. The interns were from the Bristol Bay region (Nondalton, Newhalen, and Dillingham), Alaska. Sockeye salmon in the study region concern wildlife managers because sockeye numbers have declined about 80 percent. This species comprises about 75 percent of the total subsistence diet of local Native peoples, so this USGS project intends to improve understanding of sockeye population dynamics in the affected area. This information can be used to understand and stem the decline. Interns learned how to estimate total salmon abundance, use a diverse array of scientific fishing equipment, collect environmental data, enter data into digital data bases, and summarize and present their findings. One student has worked full-time during the last four field seasons; in 2005, she served as the subsistence sampling crew leader for the research program. New interns learned skills, such as otolith (inner ear bone) collection, genetic sample collection, environmental monitoring techniques, and data-entry techniques. The USGS coordinated the hands-on aspect of the internship program in partnership with the National Park Service at Lake Clark National Park and Preserve and the Bristol Bay Native Association. This program encourages Alaska Natives to pursue college degrees and to consider careers in science. Contact: Carol Woody, USGS Alaska Science Center, 907-786-3512, carol_woody@usgs.gov

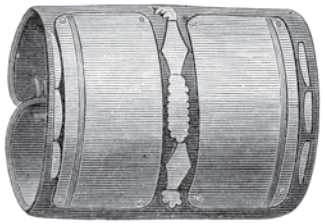
Yupik Students Assist in Biological Research (Alaska)

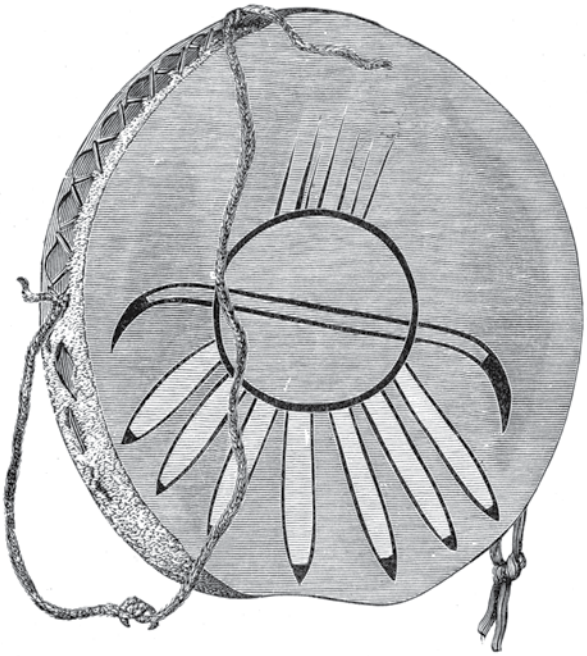
Fiscal Year 2005 marked the 20th consecutive year that USGS scientists in Alaska have involved Yupik Eskimo students in a project that monitors and conducts research on waterfowl on the Yukon-Kuskokwim Delta, Alaska. The students live at a remote site with biologists while assisting the scientists in capturing geese and swans and fitting the birds with leg bands and neck collars. Movements of these waterfowl are being monitored as part of a large study to determine annual survival rates, migration pathways, and important staging and winter habitats. Twenty-six Yupik youth participated in the work in 2005; more than 200 have been involved in the program since 1986. This effort supports needs regionally and throughout the Pacific Flyway to provide information on the population biology of species of interest to indigenous people, wildlife managers and enthusiasts, and sport hunters. The project also continues to enhance communication between government researchers and Alaska Natives as USGS scientists present career opportunities to Native youths. Contact: Craig Ely, USGS Alaska Science Center, 907-786-3526, craig_ely@usgs.gov

Alaska Native interns studying otoliths. Photograph by Carol Ann Woody, USGS.

Yupik students from Chevak, Alaska, get ready to release birds banded in the 20th year of this collaborative project. Photograph by Craig Ely, USGS.

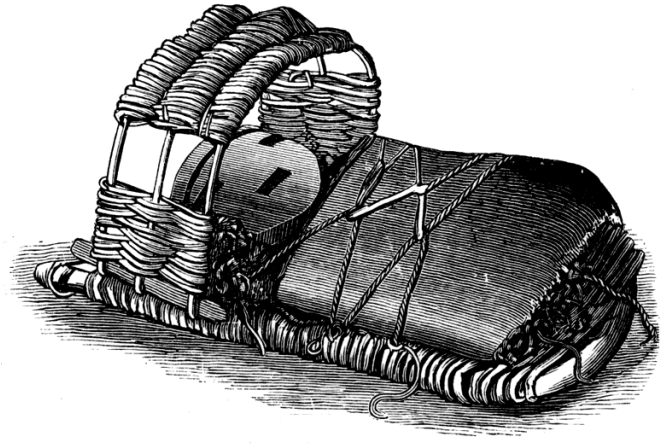


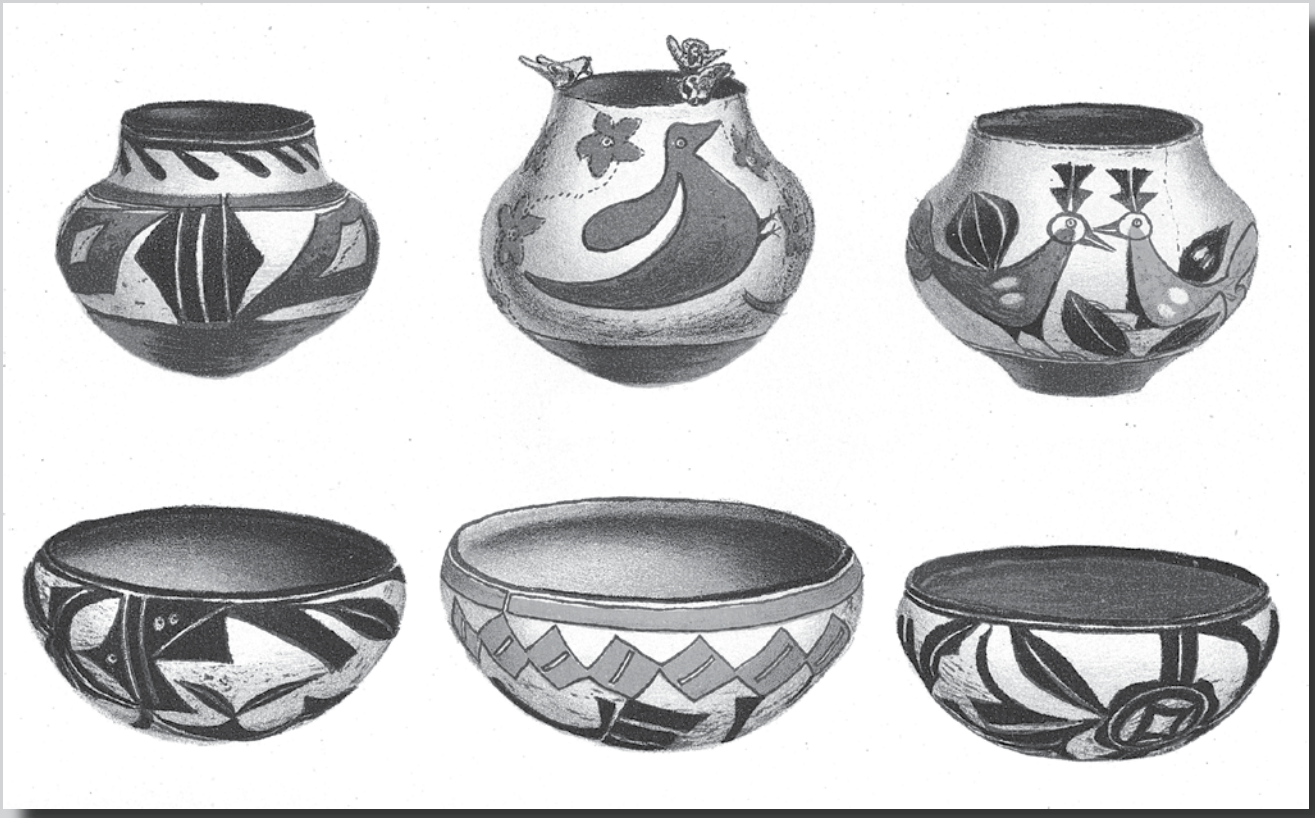




Wolpi Wristlets, Moccasins, etc.

Resources and Environment





Resources and Environment

Wildlife Health Bulletins and Other Information on Wildlife Diseases (National)

The USGS National Wildlife Health Center in Madison, Wisconsin, distributes Wildlife Health Bulletins to Federal, Tribal, and State natural resource and conservation agencies, including the Bureau of Indian Affairs. Wildlife Health Bulletins provide and promote an exchange of information on important threats to wildlife health. They are issued for specific wildlife diseases and related topics. Three Wildlife Health Bulletins were issued in 2005: one was an update on chronic wasting disease and two were related to avian influenza. The mailing list for these bulletins was updated to include the Native American Fish and Wildlife Society and other Tribal contacts. The National Wildlife Heath Center will continue distribution of such notices in FY 2006. Tribal governments are encouraged to contact the USGS to be added to the announcement list. Contact: Paul Slota, 608-270-2420, paul_slota@usgs.gov or Gail Moede Rogall, 608-270-2438, gmrogall@usgs.gov

Presence of Nutrients, Organic Compounds, and Mercury in the Meduxnekeag River Adjacent to Maliseet Tribal Lands (Maine)

Although major point-sources of nutrients to the Meduxnekeag River have been reduced to levels permitted by the Maine Department of Environmental Protection, seasonal algal blooms in the river persist. One hypothesis is that seasonal algal blooms are driven by nutrients released from benthic sediments. Analyses of fish tissue samples in previous studies have indicated the presence of mercury, DDT and other recalcitrant organic compounds. It is unclear whether these compounds are associated with stream-bottom sediments in the Meduxnekeag River. A USGS project was designed to establish the range of in-stream nutrient concentrations during the spring and summer of 2003 at sites upstream and downstream of the lands of the Houlton Band of Mailseet Indians. The study determined concentrations of nitrogen, phosphorous, mercury, and selected organic compounds in stream-bottom sediments at sites upstream and adjacent to the Maliseet lands. Additional project tasks included determining concentrations and ratios of carbon, nitrogen, and phosphorous in algal tissue collected from river samples at sites adjacent to tribal lands and assessing whether a relation exists between stream-water nutrients, sediments, and algal tissue. The project was completed and the USGS Scientific Investigations Report was published as SIR 2005-5111, which is available on line at http://pubs.usgs.gov/sir/2005/5111/ Contact: Charlie Culbertson, 207-622-8201 ext. 127, cculbert@usgs.gov

Identifying the Source of Fecal Coliform Bacteria in the Meduxnekeag River, Houlton, Maine

Contamination of water from human and animal waste is a major cause of deteriorating water quality in receiving waters and can have direct social and economic effects to communities through the loss of sustenance and recreational activities. In recent years, fecal contamination of surface water by nonpoint-source pollution (such as direct human and animal input, surface runoff, failing or inadequate septic systems and sewer overflows or straight-pipes) has surpassed industrial and municipal point-source pollution. Mitigating this problem depends on knowing the ultimate source of the fecal contamination. Since many waterborne pathogens, including viruses, are extremely difficult to detect and quantify, information on the human or animal origin of the fecal pollution might indicate the types of pathogens that might be expected, the inherent risk of infection, and the subsequent treatment needed to control the transmission of disease. Recent developments in molecular biology and biochemistry have made it possible to use bacterial indicator organisms, such as fecal coliforms, to indicate the probable sources of pathogens. USGS scientists have begun a new study in cooperation with the Houlton Band of Maliseet Indians to identify the sources of fecal coliform bacteria in the Meduxnekeag River. The Houlton Band of Maliseet Indians and the USGS Maine Water Science Center collaborated on a project to determine the presence, density distribution, and human or animal origin of fecal coliform bacteria in the Meduxnekeag River, which flows through Maliseet Tribal land, and is used by the Tribe for sustenance and recreation. Results of this study will assist the Tribe in its efforts to mitigate contamination associated with human and animal waste. Contact: Charles Culbertson, 207-622-8201 ext. 127, cculbert@usgs.gov

Identification of Subsurface Aqueous Discharge Zones and Real-Time Water-Quality Monitoring in the Meduxnekeag River, Houlton, Maine

The USGS Maine Water Science Center, in cooperation with the Houlton Band of Maliseet Indians, conducted a study that combined the use of aerial infrared imagery to identify zones of subsurface aqueous inputs and the deployment of instruments to monitor real-time water quality in the Meduxnekeag River. Using aerial infrared technology permits large geographic areas of the river to be surveyed for potential inflows of contaminants, which can be associated with subsurface aqueous discharge. The technique can detect small temperature anomalies associated with inflows, relative to the receiving waters. This technology, combined with the continuous, real-time monitoring of water quality, provides the Tribe and others with a means of promptly detecting water-quality changes. Contact: Charles Culbertson, 207 622-8201 ext. 127; cculbert@usgs.gov

Investigating Algae Production in the Meduxnekeag River near Houlton, Maine

The USGS Maine Water Science Center, in cooperation with the Houlton Band of Maliseet Indians, conducted a study that included sampling surface water and shallow interstitial water (within a few inches of the streambed) for nutrients; monitoring pH, dissolved oxygen, temperature, and specific conductance at five stations; and monitoring stream temperature and light intensity at four locations. Streamflow ratings were developed for three tributary stations. Contact: Chuck Schalk, 207-622-8201 ext. 111; cwschalk@usgs.gov

Ecological Health and Contamination in the Penobscot River (Maine)

The U.S. Bureau of Indian Affairs (BIA), the USGS, the U.S. Environmental Protection Agency (USEPA), and the U.S. Center For Disease Control's Agency for Toxic Substances and Disease Registry (ATSDR) partnered to gather information regarding the presence, distribution, and ecological and human health risks associated with dioxins, furans, and PCBs in fish and sediment in the Penobscot River. The USGS reported the results of an initial study describing fish and sediment contaminant data from the Penobscot River's main channel from the Milford Dam impoundment in Old Town to Grindstone, Maine, in a 2003 administrative report describing the data quality. The USGS is continuing work with the Bureau of Indian Affairs, the lead agency, along with USEPA and ATSDR to propose a new study to assess human or ecological risks from potential contaminants in the river. Monthly conference calls have been held with the Penobscot Indian Nation to develop the proposal. Contact: Carl Orazio, 573-875-5399, corazio@usgs.gov or Susan Finger, 573-875-5399, sfinger@usgs.gov

St. Lawrence River Hydrologic Influences on Fish of the Akwesasne Wetland Complex (New York)

Employees of the St. Regis Mohawk Environment Division and the USGS Tunison Laboratory of Aquatic Science worked together on a project to investigate the influence of regulation of St. Lawrence River flows on the international marsh on the Akwesasne Reservation and to collect baseline data on the fish community found there. This work was initially funded by the International Joint Commission, but was also supported by USGS and grants acquired by the St. Regis Mohawk Tribe. Results show that differences in fish assemblages are associated with estuarine-like mixing of tributary and main river water. These findings have implications for water-level management in the Great Lakes and St. Lawrence River. The data will provide a valuable foundation for other studies, such as the effects of seaway traffic, and an important basis for monitoring programs. Contact: James E. McKenna, Jr., 607-753-0259, jmckenna@usgs.gov

Tribal Fisheries Restoration and Enhancement (New York)

The USGS Great Lakes Science Center's Tunison Laboratory of Aquatic Science continued to assist Tribes in restoring and enhancing their fisheries. Tunison scientists worked with the St. Regis Mohawk Tribe, examining the feasibility of restoring Atlantic salmon in St. Lawrence River tributaries. Salmon restoration activities in 2005 included stocking 19,000 salmon fry in tributaries of the St. Regis and Little Salmon Rivers and assessing survival through the fall. Survival of salmon fry was 11.2 percent in the East Branch of the Little Salmon River, 10.7 percent in the Little Salmon River, and 4.4 percent in Hopkinton Brook. Contact: James H. Johnson, 607-753-9391 ext. 30, jhjohnson@usgs.gov

Jim Snyder, St. Regis Mohawk Tribal employee, holds a fish caught for study. Photograph by James E. McKenna, USGS.

Lake Sturgeon Restoration in the Great Lakes Ecosystem (New York)

Researchers from the USGS Tunison Laboratory of Aquatic Science and St. Regis Mohawk Tribe Environment Division have cooperatively completed the field components of a comprehensive assessment of the presence, river distribution, habitat use, and size distribution of juvenile lake sturgeon. The St. Regis River was stocked with a total of 5,000 juvenile sturgeon between 1998 and 2004; stocking occurred annually except in 2001 and 2002. Individuals representing all 5-year classes were captured throughout the 32-kilometer river section. Environmental quality and community characteristics were measured for the application of habitat suitability models and fish and invertebrate based indices of biological integrity. This project focuses on the success of sturgeon rehabilitation and associated environmental metrics in this St. Lawrence River tributary. Study results will be applicable to many historic sturgeon waters and will provide species-specific habitat information needed for the further enhancement of this threatened native species throughout the Great Lakes. Contact: Dawn Dittman, 607-753-9391 ext. 23, ddittman@usgs.gov

Seneca Nation of Indians Locate Water Supply, Cattaraugus Indian Reservation (New York)

In FY 2003, the USGS New York Water Science Center signed a Cooperative Water Agreement with the Seneca Nation of Indians. During FY 2005, as part of the ongoing study resulting from that agreement, USGS hydrologists constructed a preliminary ground-water-flow model to help determine areas best suited for drilling water-supply wells for the Seneca Nation. Previous USGS findings led to refocusing designs for a single water-supply well in a confined aquifer to a new location for multiple wells in an unconfined sand-and-gravel aquifer. Preliminary modeling results in FY 2005 indicated areas likely to recharge the wells in this water-table aquifer. However, land acquisition problems for the Seneca's have required them to seek alternative sites in the sand-and-gravel aquifer. The use of data from preliminary model information will facilitate the Tribe's selection of a new, suitable site. Surface geophysical tests by USGS scientists will help determine the best locations for four test wells. The wells will be drilled and sampled by USGS for basic cations and anions, nutrients, trace metals, and pesticides to ensure that the water quality in the unconfined aquifer in this new location is acceptable for development by the Seneca Nation. The preliminary ground-water-flow model will be updated with the new information. Information on the sources of recharge to the aquifer and estimates of pumping capacity will help the Seneca Nation better manage the ground-water resources for its citizens. Contact: Ed Bugliosi, 607-266-0217 ext. 3005, ebuglios@usgs.gov

Reproductive Failure in Great Lakes Lake Trout and Other Salmonid Species (Michigan, New York)

Early life stage mortality syndrome (EMS) of salmonids of the Great Lakes and New York Finger Lakes is a thiamine responsive malady. Low concentrations of thiamine (vitamin B_1) in salmonid eggs have been associated with EMS, and treating eggs or fry with thiamine is therapeutic. Two invasive species, alewife *Alosa pseudoharengus* and rainbow smelt *Osmerus mordax,* entered the Great Lakes with the opening of the Erie Canal system. Both species contain thiaminase, an enzyme that destroys thiamine. USGS scientists at Leetown Science Center, Northern Appalachian Research Branch, have been working in cooperation with Greg Wright, Chippewa/Ottawa Resource Authority (CORA), Eric Olsen, Grand Traverse Band, and Steve Lenart, Little Traverse Band, to determine if thiamine deficiency is limiting natural reproduction of lake trout and other salmonid species within the Great Lakes. The work includes investigating mortality and the secondary effects on behavior, vision, and immune function. Contact: Dale Honeyfield, 570-724-3322, honeyfie@usgs.gov

South Florida Ecosystem Program, Internal Surface-Water Flows

As part of the Everglades Restoration Programs, the Army Corps of Engineers and South Florida Water Management District propose modified water deliveries to the Seminole Tribe of Florida, Big Cypress National Preserve, and other parts of Florida's interior. The proposal is intended to provide net flood protection and water delivery to agricultural lands as well as partial restoration of historic ecosystem conditions within the Seminole lands. A baseline of data is needed to help determine the effects that proposed water delivery changes will have on Seminole lands. The USGS has installed and is obtaining data from strategically located streamgages to help define future surface-water flow requirements and decompartmentalization efforts through the Comprehensive Everglades Restoration Plan. Subsequent studies, based on accurate flow calibrations produced from data from these sites, have been used by other agencies for computation of nutrient and other contaminant loadings in the canal system since 2002. Ongoing data collection from continuous flow gages, at selected impact points for interior basins, has complemented the existing eastern flow canal discharge network and allows more accurately timed surface-water releases. Contact: Rick Solis (USGS), 954-377-5948, rsolis@usgs.gov or Craig Tepper (Seminole Tribe of Florida), 954-966-6300, ext.1120, ctepper@semtribe.com

Silver River Studies with the Keweenaw Bay Indian Community (Michigan)

The Keweenaw Bay Indian Community (KBIC) is concerned about the environmental impact of future development within the Silver River watershed. Much of the Silver River watershed, with the exception of the East Branch, is either within or adjacent to the KBIC Reservation. The watershed of the Silver River at the streamgage is 64 square miles. The Silver River drains an area in Baraga County, Michigan dominated by highlands and flows into a bay of Lake Superior. In September 2001, USGS installed a continuous-data streamgage on the Silver River in a cooperative project with the KBIC Environmental Department. A water temperature gage was added to the site in May 2002, and a specific conductance probe was installed in October 2005. Temperature, specific conductance, stage, and streamflow data from the gage are available on a real-time basis. A separate multiyear cooperative water-quality project began in June 2005 when USGS and KBIC began collecting discrete water-quality samples for a number of chemical constituents and measuring streamflow at eight locations within the Silver River watershed. In FY 2005, The KBIC and other interested parties began investigating installation and operation of another continuous-data streamgage on the Falls River, which drains about 45 square miles adjacent to the Silver River basin and flows into L'Anse Bay of Lake Superior.

L'Anse Bay and Keweenaw Bay provide habitat for a diverse aquatic population supporting sport and commercial fishing activities and also serve as a drinking-water supply for three communities adjacent to the Bays. Contact: Tom Weaver, 906 786-0714, tlweaver@usgs.gov

Studies of the Salmon Trout, East Branch Salmon Trout, and Yellow Dog Rivers with the Keweenaw Bay Indian Community (Michigan)

In October 2004, USGS employees installed continuous-data streamgages and temperature and specific conductance probes on the Salmon Trout and Yellow Dog Rivers in a cooperative project with the Keweenaw Bay Indian Community (KBIC). In October 2005, specific conductance data collection was discontinued at the Salmon Trout site. In November 2005, an additional streamgage was installed on the East Branch Salmon Trout River. The Salmon Trout, East Branch Salmon Trout, and Yellow Dog River watersheds upstream of the gages are about 7, 10.6, and 32 square miles, respectively. The rivers, which drain into Lake Superior, are noted for their diverse aquatic populations and species abundance. KBIC and other interested parties are concerned about the environmental impact of future development, including metallic mineral extraction, within the watersheds, which are west of Big Bay in northern Marquette County, Michigan. Temperature, specific conductance, stage, and streamflow data from the streamgages are available on a real-time basis. Contact: Steve Blumer, 517-887-8922, spblumer@usgs.gov or Tom Weaver, 906 786-0714, tlweaver@usgs.gov

Public Water Supply Wells, Sault Ste. Marie Tribe of Chippewa Indians (Michigan)

The Sault Ste. Marie Tribe of Chippewa Indians and the Indian Health Service discovered the toxic contaminant ethylene dibromide (EDB) in a recently installed public water-supply well (PWS) at a Tribal housing development during routine testing. Quantities of EDB exceeded USEPA drinking-water standards in the well water. The USGS assisted USEPA in determining if EDB-contaminated agricultural materials were buried near the PWS wells using geophysical methods and a direct-push sampling device. No buried contaminated materials were found. The USGS provided oversight of test-well drilling, logging, and sampling at the site, and helped design and conduct an aquifer test to determine hydraulic properties of the bedrock aquifer. Analysis of available data indicates that the productive part of the aquifer is a narrow, east-west trending corridor where the current PWS wells are located. Alternate water sources are being investigated. Contact: Tom Weaver, 906-786-0714, tlweaver@usgs.gov

Whitefish, Lake Trout, and Sea Lamprey Studies (Michigan)

The USGS obtained live fish during 2002–2004 from commercial trap nets set by fishers from the Sault Ste. Marie Tribe of Chippewa Indians and the Bay Mills Indian Community for an ongoing study of the seasonal depths and temperatures occupied by lake trout and lake whitefish. Those fish were implanted with miniature data-recording devices that provide nearly 33,000 observations of depth and temperature if recaptured. An external tag advertises a $100 reward for return of a tagged fish. An ongoing companion study with lake trout will allow scientists to minimize the by-catch (meaning the unintended catch) of lake trout while harvesting lake whitefish. Tribal fishers have further contributed to the study by returning fish tags to USGS scientists. These same fishers have also contributed to important research related to the crucial sea lamprey control program in the Great Lakes by providing live parasitic-phase sea lampreys for study. Without the assistance of the commercial fishery it would be impossible to provide enough animals for ongoing studies. Contact: Roger Bergstedt, 989-734-4768, roger_bergstedt@usgs.gov

Direct-push soil sampling device and the 138 ft of rod used to sample the unconsolidated zone at a site near New Post, Wisconsin for work with the Lac Courte Oreilles Tribe. Shown in the picture are (left to right) Daniel Tyrolt (Lac Courte Oreilles employee), Paul Juckem and James Rauman (USGS Wisconsin Water Science Center employee).

Hydrogeologic Analysis of Current and Future Ground-Water Availability in Chippewa Township, Michigan, Saginaw Chippewa Indian Tribe

Chippewa Township, in the central Lower Peninsula of Michigan, encompasses Tribal lands and buildings belonging to the Saginaw Chippewa Tribe. The Tribe and neighboring communities need good-quality drinking water, which can be difficult to obtain and is obtained exclusively from ground-water wells. The USGS has compiled hydrogeologic data, water-quality data, surface-geophysical data, and water-level data to describe the water resources of Chippewa Township. This compilation was done to provide a better understanding of the complex hydrogeology, and ground-water availability and quality in the Township. The USGS monitored water levels at three monitoring wells in 2005. In 2006, an additional monitoring well will be installed and instrumented. Contact: Chris Hoard, 517-887-8949, cjhoard@usgs.gov

Water-Resources Investigation with the Lac Vieux Desert Band of Lake Superior Chippewa Indians (Michigan, Wisconsin)

A cooperative 4-year study of surface-water quality and basin characteristics of Lac Vieux Desert was begun in FY 2002. The 6.6 square-mile lake straddles the Michigan-Wisconsin border and is the headwaters of the Wisconsin River. In May and September 2002 and 2003, seven sites on the lake were sampled for a suite of physical conditions and chemical constituents to help USGS and Tribal scientists determine the general water quality of the 34 square-mile lake basin. In May and August 2004, four sites, including three new sites, were sampled in greater detail for additional information. In addition, streamflow measurements of all tributaries of the lake as well as outflow in the Wisconsin River were made during the 3 years of the study. A report describing the study was completed in FY 2005 and was published as USGS Scientific Investigations Report 2005-5237, "Water Quality and Hydrology of the Lac Vieux Desert Watershed, Gogebic County, Michigan and Vilas County, Wisconsin 2002–04." The authors describe data collection and provide other hydrologic information that will assist future planning by the Lac Vieux Desert Band and by nontribal entities. As an outgrowth of the study, the Lac Vieux Desert Band is funding operation of the real-time lake-level streamgage through the end of FY 2006. Contact: Tom Weaver, 906 786-0714, tlweaver@usgs.gov

USGS Aides Sea Lamprey Management in Lake Superior Chippewa Waters (Wisconsin)

The Great Lakes Fishery Commission (GLFC) and the U.S. Fish and Wildlife Service (FWS) administer the U.S. Great Lakes sea lamprey control program in concert with many Federal, State, and nongovernmental partners. Part of the sea lamprey control program involves an agreement between the Bad River Band of the Lake Superior Tribe of Chippewa Indians and the FWS concerning sea lamprey control treatments of the Bad River, which runs through Tribal lands. The agreement requires that all batches of chemicals that will be used in the treatment must be analyzed for dioxins and the results of the analyses reviewed by Tribal authorities before the treatment may proceed. A USGS chemist provided technical assistance to the Great Lakes Fishery Commission and the U.S. Fish and Wildlife Service in analyzing the lampricide 3-trifluoromethyl-4-nitrophenol (TFM) for dioxins. In August, the USGS scientist identified two laboratories to conduct the analysis and worked with the laboratories to complete the analysis and review the analytical reports. Results of the current analyses indicated that no harmful dioxins were present in the formulations, and the treatment was allowed to proceed in Tribal waters on schedule in September. Contact: Terrance Hubert, 608-781-6227, thubert@usgs.gov

Report Completed on Bad River Band's Primary Aquifer (Wisconsin)

The Precambrian sandstone aquifer in the northwestern part of the Bad River Band of Lake Superior Tribe of Chippewa Indians' Reservation is a primary source of drinking water to area residents. Understanding the lithologic, hydraulic, and water-quality characteristics of this sandstone aquifer is necessary for the Tribe to protect and manage this important resource. In FY 2005, a report (USGS Open-File Report 2004-1425) was completed. The report describes the lithology, hydraulic properties, and water quality of the sandstone aquifer in the northwestern part of the Bad River Reservation. The descriptions are based on data collected from three monitoring wells from 1998 to 2000. This report summarizes the construction of the three monitoring wells, describes bedrock and sediment cores, geophysical-log data, and the results of laboratory tests on selected core samples from the sandstone and overlying glacial deposits. Aquifer-test data are presented and analyzed. Results of water analyses for inorganic constituents, trace metals, and volatile organic compounds are also presented. Contact: Charles P. Dunning, 608-821-3827, cdunning@usgs.gov

Bad River Streamflow, Sedimentation, and Erosion Study (Wisconsin)

The major objective of this study is to understand how streamflow, erosion, and sedimentation rates have changed in the Bad River and some of its key tributaries over time due to changes in land cover. The study began in FY 2002 in cooperation with the Bad River Band of Lake Superior Chippewa Indians. Historical aerial photographs and government land office survey maps were used to identify reaches with bluff/bank erosion, lateral migration, and bar formation. Partial valley cross sections were surveyed at seven locations along the Bad River and Marengo River and 70 cores were collected and described from flood-plain, channel, and abandoned channel environments. In FY 2004, cores were collected and surveying was done at a site on the Marengo River and at a site near the ancestral channel of the Bad River at the head of the Kakagon River. The core data, combined with elevation data from the valley surveys, are being used to determine relative differences between pre- and post-European settlement erosion/sedimentation rates. In 2005, total sediment load data were collected at the streamgage during a snowmelt event; geomorphic reference reaches were established at four sites (benchmarked channel cross sections and bank erosion pins), and a reconnaissance of sediment sources and bridge crossings was done for Marengo River tributaries. The USGS staff is preparing a report that describes the findings of the geomorphic assessment work. Contacts: Faith Fitzpatrick (USGS), 608-821-3818, fafitzpa@usgs.gov; or Kirsten Cahow-Scholtes (Bad River Band of Lake Superior Chippewa Indians), 715-682-7123, water@badriver.com

Pesticides in Surface Water, Bed Sediment, and Ground Water Adjacent to Commercial Cranberry Bogs, Lac du Flambeau Reservation (Wisconsin)

During the Fall of 2004 and Spring of 2005, the U.S. Geological Survey (USGS), in cooperation with the Lac du Flambeau Band of Lake Superior Chippewa Indians, collected water and bed-sediment samples from four lakes, and water samples from the Trout River, and shallow ground-water wells adjacent to commercial cranberry operations near the northeastern corner of the Reservation in Vilas County, Wisconsin. The objective of this study was to quantify concentrations of specific pesticides in lakes, bed sediments, and ground water adjacent to commercial cranberry operations. Results of the study showed that pesticides commonly used on cranberries were detected in lakes, lake-bed sediment, and ground water of the Lac du Flambeau Reservation adjacent to commercial cranberry bogs. Additionally, pesticides not typically used on cranberries were also detected. Results of this study were published in USGS Scientific Investigations Report 2005-5262, “Pesticides in Surface Water, Bed Sediment, and Ground Water Adjacent to Commercial Cranberry Bogs, Lac du Flambeau Reservation, Vilas County, Wisconsin.” Contact: David Saad, 608-821-3865, dasaad@usgs.gov

Neopit Mill Pond Sedimentation and Sediment Chemistry Study (Wisconsin)

The Menominee Indian Tribe of Wisconsin cooperated with the USGS on a study of sedimentation characteristics in Neopit Mill Pond, which was formed by damming the West Branch of the Wolf River. USGS Wisconsin Water Science Center personnel determined the texture, age, and organic and trace element chemistry of sediment stored behind the dam. The USGS staff, with the help of Menominee Tribe personnel, also mapped the pre-dam channel and topography of the West Branch of the Wolf River through the mill pond. In June 2005, streambed sediment from the West Branch of the Wolf River was sampled downstream of Neopit Mill Pond to determine concentrations of trace elements and semivolatile organic compounds in the river from the millpond to its confluence with the Wolf River. A draft USGS Scientific Investigations Report is being prepared. Contacts: Faith Fitzpatrick (USGS), 608-821-3818, fafitzpa@usgs.gov or Doug Cox (Menominee Indian Tribe of Wisconsin), 715-799-4937, dcox@itol.com

Historical Trends Associated with the Wolf River, Keshena Falls to Balsam Row Dam (Wisconsin)

This project was designed to identify natural and historic concentrations of trace elements in streambed, floodplain, and backwater sediments of the Wolf River from Keshena Falls to Balsam Row Dam, mostly within the lands of the Menominee Indian Tribe of Wisconsin. This cooperative study between the Menominee Tribe and the USGS also determined the range of historic (150+ years) variability of flooding and the sedimentation characteristics along the same reach of the Wolf River. Major factors affecting stream sedimentation and flooding characteristics—natural and geologic in relation to land-use effects—were identified. The USGS Scientific Investigations Report 2005-5030, "Trends in Streamflow, Sedimentation, and Sediment Chemistry for the Wolf River, Menominee Indian Reservation, Wisconsin, 1850–1999," was published in FY 2005. Contact: Faith Fitzpatrick (USGS), 608-821-3818, fafitzpa@usgs.gov or Doug Cox (Menominee Indian Tribe of Wisconsin), 715-799-4937, dcox@itol.com

Modeling Shallow Ground-Water Flow for the Menominee Indian Tribe of Wisconsin

The Menominee Indian Tribe of Wisconsin is interested in furthering its understanding of the regional hydrogeology on its lands, including hydrogeologic controls on regional and local ground-water flow. The Tribe also has a specific interest in determining the recharge areas that contribute water to municipal wells in five small communities on the Reservation. To assist the Menominee Indian Tribe, the USGS constructed a ground-water-flow model that includes all of the Menominee Reservation. The calibrated ground-water model has been used to describe regional ground-water flow across the Reservation, to delineate the area of recharge to community wells, and to identify potential sites for new municipal wells for the town of Keshena, Wisconsin. In 2005, the model for the Menominee Indian Tribe was updated and improved. In addition, large models like this for the Menominee Tribe can be broken up in several smaller models based on watersheds or Hydrologic Units. A USGS Scientific Investigations Report entitled "Simulation of Shallow Ground-Water Flow on the Menominee Indian Reservation, Wisconsin, Using Analytic Element Modeling" is being prepared. Contact: Charles Dunning (USGS), 608-821-3827, cdunning@usgs.gov; Gary Schuettpelz (Menominee Indian Tribe of Wisconsin), 715-799-4937, gschuett@mail.wiscnet.net

Ground-Water Flow Studies with the Stockbridge-Munsee Community (Wisconsin)

The Stockbridge-Munsee Community (Mohican Nation) is interested in improving its understanding of the regional hydrogeology and shallow ground-water flow on Community lands. The Tribe is specifically interested in shallow ground-water flow in the Red Springs area, where past farming practices have some potential to adversely affect water quality in private wells. To assist the Stockbridge-Munsee Community, the U.S. Geological Survey (USGS) constructed a single-layer analytic element ground-water flow model, the near-field of which covers all of the Stockbridge-Munsee Reservation. The calibrated analytic element ground-water model was used to describe regional ground-water flow across the Reservation, and also simulates ground-water flow paths at specific locations of interest in the Red Springs area. The analytic element ground-water-flow model also has been used to assist the Tribe in choosing a site for a new municipal well for Tribal properties along County Road A, including a health center and a casino. Model simulations were used to identify locations that would provide sufficient water supplies and whose recharge areas were within undeveloped Tribal lands. The flow model is being used to simulate the effect on the local water table of infiltrating return flow from the municipal system. A USGS Water-Resources Investigations Report entitled

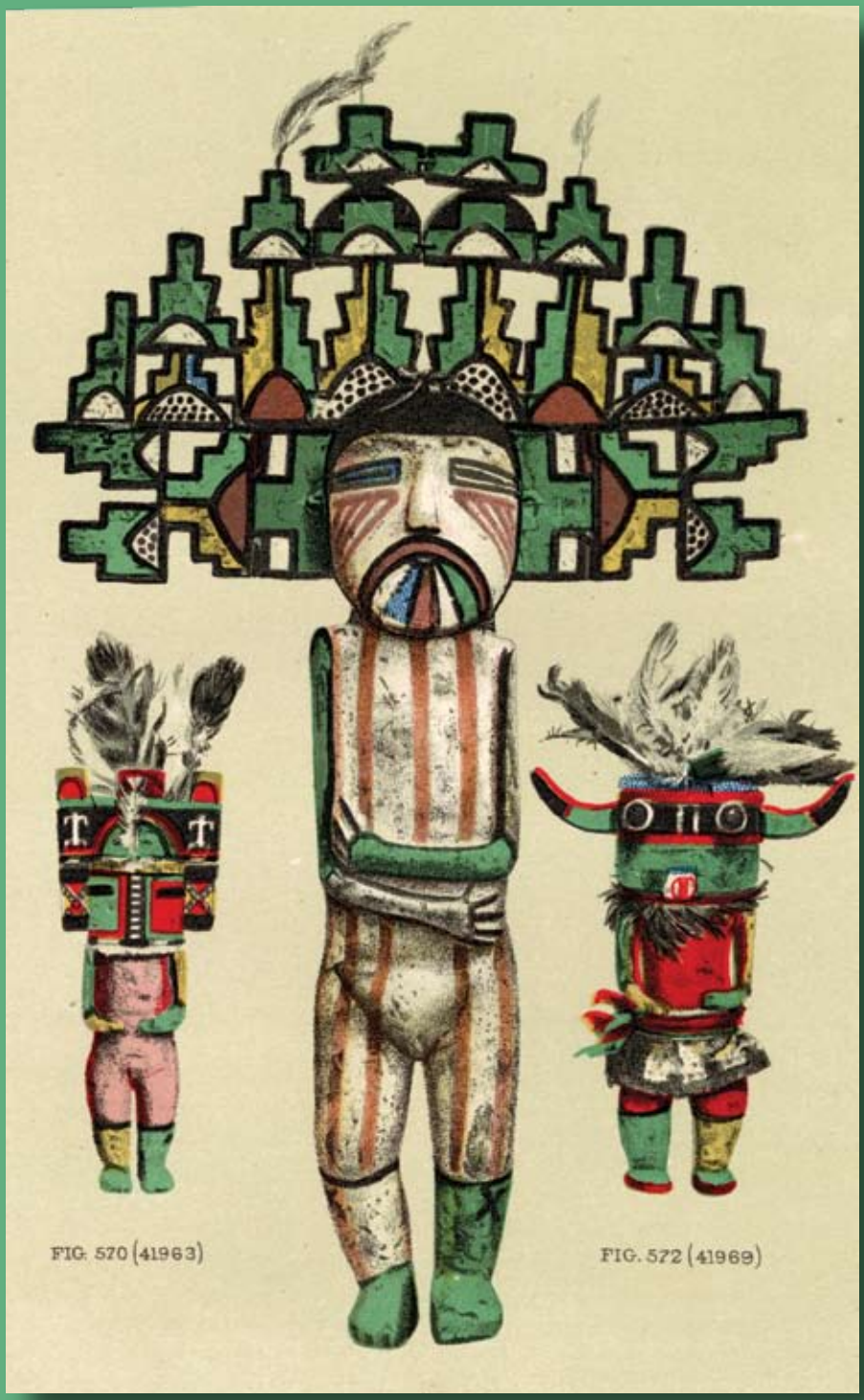


FIG. 570 (41963)

FIG. 572 (41969)

"Simulation of Shallow Ground-Water Flow on the Stockbridge-Munsee Indian Reservation, Wisconsin, Using Analytic Element Modeling" is being prepared. Contacts: Charles Dunning (USGS), 608-821-3827, cdunning@usgs.gov or Greg Bunker (Stockbridge-Munsee Community), 715-793-4363, greg.bunker@mohican-nsn.gov

Ground Water and the Lac Courte Oreilles Tribe (Wisconsin)

The Lac Courte Oreilles Tribe is concerned about the quantity and quality of ground water on its lands, particularly near the Grindstone Springs area and in the village of New Post. The existing water-supply wells in New Post may not be sufficient for projected future needs and the water has elevated nitrate concentrations. The USGS is working cooperatively with the Tribe to describe the glacial sediments and estimate the depth to crystalline bedrock in the vicinity of New Post. In addition, this information will be included in an existing 2-dimensional ground-water-flow model to evaluate likely zones of contribution to the existing and possible future supply wells. USGS scientists used a Geoprobe to evaluate potential locations for additional municipal water supply wells for New Post, Wisconsin. As a result of studying the geologic setting, the scientists located a suitable well-site with a thickness of more than 100 feet of saturated, fine-to-medium sand. Contacts: Paul Juckem (USGS), 608-821-3845, pfjuckem@usgs.gov or Daniel Tyrolt (Lac Courte Oreilles) 715-634-0102, ext. 124, ddtyrolt@cheqnet.net

Oneida Hydrologic Investigations (Wisconsin)

The Oneida Tribe of Indians of Wisconsin has developed a seven-generation plan for its Reservation that includes instituting land-use practices that will allow the surface-water system draining the reservation to revert to its pre-colonial condition. The Oneida Tribe needs continuing information regarding water-quality conditions entering and within its boundaries. The information is needed to determine trends in water quality and to provide data to assess the Tribe's water resources. The objectives of this cooperative project with the Oneida Tribe of Wisconsin are to collect long-term data at two sites and to perform trend analysis for pesticides, nutrients, and suspended sediment. Results of the study will assist Oneida officials with environmental and developmental planning. Contact: Kevin Richards (USGS), 608-821-3861, krichard@usgs.gov or Jim Snitgen (Oneida Tribe of Wisconsin), 920-869-5812

Hydrogeology and Ground-Water Flow Near the Indian Mission and Sand Pillow Communities, Ho-Chunk Nation (Wisconsin)

The Ho-Chunk Nation expects considerable growth in the Indian Mission and Sand Pillow communities, Jackson County, Wisconsin. The Ho Chunk Nation plans to meet anticipated water demands by providing an efficient and sustainable water supply, so understanding the geology and hydrology of the aquifer is necessary. In 2004, a geologic field investigation and evaluation of existing well and geological data provide information for a regional, single-layer, analytic-element model. Model simulations and the geologic information were used to identify locations that had favorable characteristics for providing the quantity of water needed by the Tribe. Test wells have been installed and additional model simulations have been run to assist the Tribe in assessing the contributing areas of those test wells and their interference at different pumping rates. A report is being prepared entitled "Ground-Water Flow in the Vicinity of the Ho-Chunk Nation Communities of Indian Mission and Sand Pillow, Jackson County, Wisconsin." Contacts: Charles Dunning (USGS), 608-821-3827, cdunning@usgs.gov or James Dunning (Ho-Chunk Nation), 715-284-7548, jdunning@ho-chunk.com

Ho-Chunk Water Quality (Wisconsin)

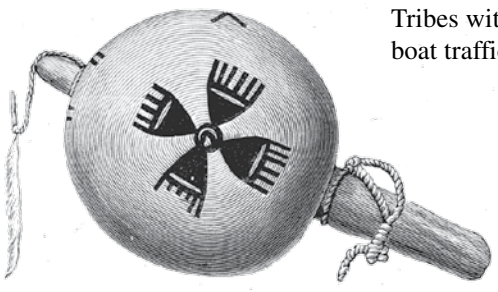
The USGS Wisconsin Water Science Center is assisting the Ho-Chunk Nation by assessing the hydrology and water quality of the streams on and near Ho-Chunk lands. A Water-Resources Investigations Report entitled, "Surface-Water-Resource Information for the Ho-Chunk Nation Lands and Vicinity, Wisconsin," by M.W. Diebel and D.J. Sullivan, was published in 2003 (USGS Water-Resources Investigations Report 02-4307). The report included an analysis of existing information on chemical, physical, and biological investigations. Additional water-quality and biologic data were collected in 2003 at Ho-Chunk Nation sites. A pesticide reconnaissance study was conducted during spring 2004. During the summer and fall of 2004, fish and benthic invertebrate samples were collected at several sites in the Kickapoo River area, Vernon County, Wisconsin. During the summer of 2005, USGS conducted a habitat assessment in anticipation of Tribal stream habitat improvements in the Kickapoo River area. Water-quality reconnaissance of streams on, or adjacent to, Ho-Chunk lands in the Kickapoo River area are planned to be conducted by USGS scientists in 2006. Contacts: Judith Coffman Thomas (USGS), 608-821-3814, juthomas@usgs.gov or Randy Poelma (Ho-Chunk Nation), 800-944-1652, Rpoelma@ho-chunk.com

Moose Population Dynamics in Northeastern Minnesota

The USGS Minnesota Field Station of the Northern Prairie Wildlife Research Center is conducting moose research with the Minnesota Department of Natural Resources, Fond du Lac Band of Lake Superior Chippewa and the 1854 Authority (the 1854 Authority is composed of the Grand Portage Band of Lake Superior Chippewa and the Bois Forte Band of Chippewa). The objectives of the study are to determine survival rates of adult moose, causes of mortality, and to improve aerial surveying of the moose population. In February 2005 (year four of the five-year study) 29 adult moose (10 females,19 males) were captured and radio-collared, increasing the total number of radioed moose studied to 113 (60 females, 53 males). The newly captured moose were radio-tracked aerially once per week, thereby accumulating about 1,000 locations. From February through September 2005, 6 of 78 (8 percent) have died, all from nonpredation natural causes. Of the 113 total moose studied to date, 40 have died and 38 of those have been examined. The causes of death include 21 unknown natural causes (nonpredation), 8 legally shot, 2 illegally shot, 1 train-kill, 2 road-kills, and 1 natural accident. This information will help the Tribes and the State better manage the moose resource and make sound decisions with information critical to the long-term welfare of moose in Minnesota. No additional moose will be captured for this study. Contact: Michael Nelson, 218-365-4505, michael_nelson@usgs.gov

Water Issues and the Prairie Island Indian Community (Minnesota)

The Prairie Island Indian Community and the USGS Minnesota Water Science Center cooperatively maintain two real-time lake stage monitors. The Community is concerned about stage fluctuations and flooding in Sturgeon Lake that may affect the Tribal residences and pleasure boat traffic adjacent to the Community. Employees of the Prairie Island Indian Community and the USGS also completed a bathymetric survey of Sturgeon Lake and collected bottom-sediment samples from the lake. The bathymetric survey was conducted to provide the Tribes with information about potential water-quality effects of dredging the lake for pleasure boat traffic. Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov



Streamflow Measurement for the Bois Forte Band of Chippewa (Minnesota)

Scientists from the USGS Minnesota Water Science Center are measuring streamflow on Nett Lake and Wood Duck Creek, Minnesota, for the Bois Forte Band of Chippewa. The USGS also is monitoring stage, evaporation, and outflow discharging from Nett Lake Dam to improve accuracy of water-budget estimates and provide scientifically sound information to regulate water levels for wild rice production. Contact: Kevin Guttormson, 218-326-1297, kgguttor@usgs.gov

Ground Water and Water Quality of Lakes and Springs on Lands of the Grand Portage Band of Lake Superior Chippewa (Minnesota)

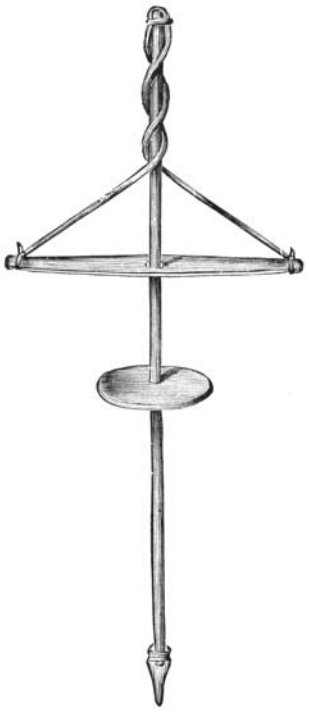
The USGS Minnesota Water Science Center is delineating the direction of ground-water flow and sources of recharge water to lakes and wetlands on lands of the Grand Portage Band of Lake Superior Chippewa. This effort is part of a continuing study in which the information will be used by the Grand Portage Band to help evaluate potential land use in environmentally sensitive ground-water recharge areas. The study also will provide information regarding Tribal water resources. Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov

Streamflow Measurement with Grand Portage Band Lake Superior Chippewa (Minnesota)

The USGS Minnesota Water Science Center is measuring seasonal streamflow for two sites on the Grand Portage Band of Lake Superior Chippewa lands. This study is being conducted as part of a feasibility analysis to determine if in-water generators can be installed to support fish farming/hatcheries. Contact: Kevin Guttormson, 218-326-1297, kgguttor@usgs.gov

Ground-Water Resource Assessment for the Upper Sioux Community, near Granite Falls, Minnesota

The USGS Minnesota Water Science Center and the Upper Sioux Community environmental office are determining the availability of ground water to meet increased water supply needs for planned residential, commercial, retail, and tourism development for the Upper Sioux Community. Ten test holes and three observation wells were installed and real-time ground-water monitoring of municipal and observation wells are planned. Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov



Water Availability for the Franconia-Ironton-Galesville Aquifer, Shakopee Mdewakanton Sioux Community (Minnesota)

Employees of the Shakopee Mdewakanton (Dakota) Sioux Community and the USGS Minnesota Water Science Center conducted an aquifer test to determine the potential water availability from the Franconia-Ironton-Galesville aquifer. The Community is in the southwest Minneapolis-St. Paul metropolitan area. The population of this area is growing rapidly and ground-water resources are in high demand. Results of the test will determine source of water to the pumping well and the effects of additional withdrawals on nearby observation wells. Contact: Don Hansen, 763-783-3250, dshansen@usgs.gov

Rosebud Total Maximum Daily Load (South Dakota)

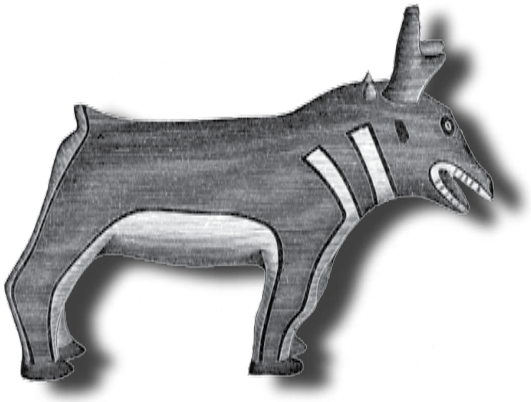
The USGS South Dakota Water Science Center and the Rosebud Sioux Tribe are concluding a water-quality assessment in support of Total Maximum Daily Load (TMDL) development for the Little White River in Todd County, South Dakota. The objectives of the project are to (1) compile historical data collected on the Little White River within Todd County for Tribal, Federal, and State agencies; (2) collect new reconnaissance data to examine a wide variety of water-quality conditions, including nutrients, trace elements, pesticides, and macroinvertebrates (for example, water insects); (3) collect more detailed data for suspended sediment and fecal coliform along the Little White River and its tributaries within Todd County; and (4) analyze and model selected data. The Rosebud Sioux Tribe will use the data and analysis to develop water-quality standards for the Little White River. Technology transfer, a major part of this project, will aid the Tribe with Total Maximum Daily Load development for other streams within its lands. Contact: Joyce Williamson, 605-394-3219, jewillia@usgs.gov

Well Inventory for Abandoned Wells on Rosebud Lands (South Dakota)

Abandoned wells are possible avenues for various surface contaminants to be introduced directly into ground-water systems. Petroleum products and other hazardous wastes have been detected by the Rosebud Sioux Tribe in several abandoned wells in Todd County. The Tribe is interested in plugging abandoned wells within the County. A previous well inventory to locate abandoned wells in the vicinity of community supply wells was conducted in Todd County; however, areas surrounding these community supply wells were not visited during that previous study. The current study involves evaluating existing data, inventorying wells in areas that had not been previously visited, and updating information stored in the USGS Ground-Water Site Inventory data base relative to abandoned wells. The Tribe will use the results of this study to assist them in providing safe water to their Tribal members and residents. This project was completed in FY 2005. Contact: Kathy Neitzert, 605-352-4241, kmneitze@usgs.gov

Screening Ground Water for Hydrocarbons and Pesticides on the Rosebud Reservation (South Dakota)

The USGS, in cooperation with the Rosebud Sioux Tribe, is conducting a project to screen abandoned wells for hydrocarbons and pesticides. A number of candidate wells were located during a recently completed well inventory on the Reservation. The objective of this study is to collect water samples from 50 to 60 abandoned wells and screen them for hydrocarbons by using gas chromatography. Water samples also will be screened for various pesticides by using immunoassay techniques. The Rosebud Sioux Tribe wants to seal or plug abandoned wells so that they cease to be a potential source of, or pathway for, contamination to their ground-water resources. The Tribe plans to seal or plug any abandoned wells that are shown to be free of contamination. The progress to November 2005 is listed in table 1.



Moose with tracking collar; part of cooperative work with the Fond du Lac Obijwa, near Bass Lake, Minnesota. Photograph by Jim Orcutt.

Table 1. Project progress as of November 2005 for screening ground water for hydrocarbons and pesticides on the Rosebud Reservation.

Number of wells visited	Number of wells sampled	Number of wells that could not be sampled (dry or obstructed)	Number of wells with trace amounts of hydrocarbons detected	Number of wells with trace amounts of pesticides detected	Number of wells with no hydrocarbons or pesticides detected
51	27	24	8	6	13

This project was initiated in September 2005 as a result of a proposal submitted to the U.S. Environmental Protection Agency. The project is scheduled for completion by December 2006. Fieldwork is planned to resume in March or April of 2006 or when weather permits. Contact: Allen Heakin, 605-394-3216, ajheakin@usgs.gov

Cooperation to Stem Disease Outbreak (South Dakota)

An outbreak of sylvatic tick plague has occurred on the Oglala Sioux Tribe's Pine Ridge Reservation. USGS scientists from the National Wildlife Health Center participated in a conference call with Tribal biologists, the Bureau of Indian Affairs Great Plains Coordinator, and representatives of the South Dakota Department of Natural Resources, U.S. Fish and Wildlife Service, the Centers for Disease Control, and Indian Health Service to discuss a devastating outbreak of Sylva tic plague in prairie dogs on the Pine Ridge Reservation. The discussion of this disease outbreak focused on the risk for exposure to humans and other wildlife species, disease testing and control, and the impact on the Prairie dog communities based on the existing "Multi-state plan for the Black Tailed Prairie Dog, South Dakota Prairie Dog Working Group, South Dakota Black-tailed Prairie Dog Control Program Guidelines" and the "South Dakota Black-tailed Prairie Dog Conservation and Management Plan." A National Wildlife Health Center staff member and Tribal biologists attended a meeting in South Dakota on the research approach to this plague outbreak. The National Wildlife Health Center continued discussions with Tribal biologists on this mortality event. Contact Kathryn Converse, 608-270-2445, Kathy_converse@usgs.gov

Potentiometric Map for the Arikaree Aquifer, Pine Ridge Reservation (South Dakota)

The USGS in cooperation with the Oglala Sioux Tribe is conducting a study to map the potentiometric surface of the Arikaree aquifer. The potentiometric surface is the "hydraulic head," or upper surface, of an unconfined aquifer (in other words, the water table) or, on a confined aquifer, it is the upper water surface in a well. The aquifer is present near the surface in about 80 percent of the Reservation and is the single largest source of ground water for the Tribe. The objectives of this study are to provide the Oglala Sioux Tribe with a map depicting the potentiometric surface of the Arikaree aquifer and a separate data report containing a compilation of well location and construction information. The map will be used by several Tribal departments and could help identify the best locations for new wells, predict ground-water movement, and assess aquifer vulnerability to contamination. Well inventory activities for the Arikaree aquifer in Shannon, Jackson, and Bennett Counties, South Dakota, are listed in table 2.

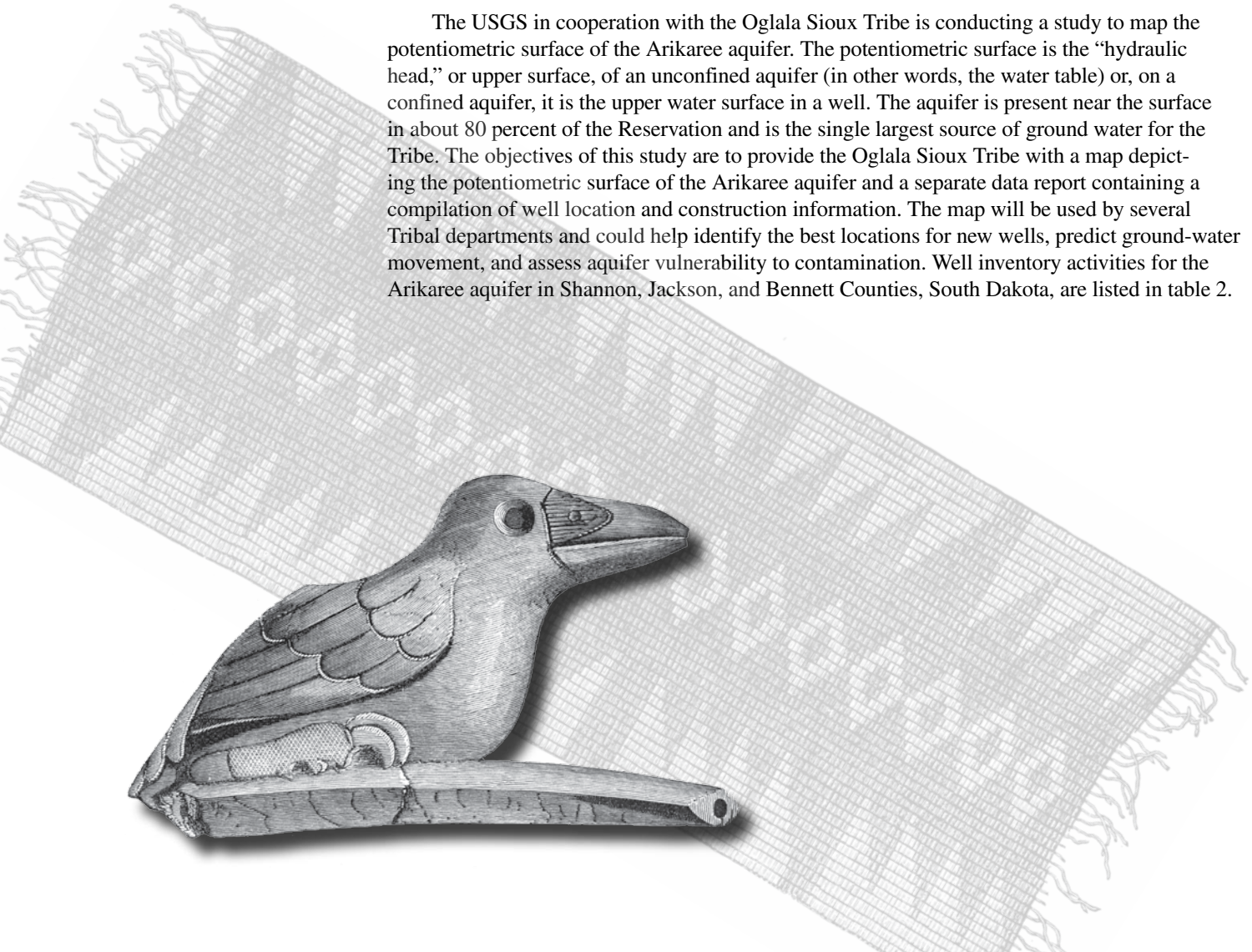


Table 2. Well inventory activities for Arikaree aquifer in Shannon, Jackson, and Bennett Counties, South Dakota.

[GWSI, ground-water site inventory]

	Numbers of wells			
Year	Shannon County	Jackson County	Bennett County	Totals
1998–2002	178	114	1	293
2003	58	0	25	83
2004	13	0	85	98
2005	10	15	96	121
Total visited	259	129	208	596
Total wells in GWSI data base	777	434	479	1,690

Data collected during FY 2005 have been reviewed and entered into the data base. The draft map is being revised, based on the new information. Well inventory activities continue to focus on areas where more water-level information is needed to construct more accurate potentiometric contours. Data collection activities will continue through FY 2006 and report writing and map production will follow. Contact: Allen Heakin, 605-394-3216, ajheakin@usgs.gov

Pesticides and Mercury in Wetlands, Yankton Sioux Reservation (South Dakota)

Nineteen wetland sites were sampled by the Yankton Sioux Tribe and USGS personnel after the primary pesticide was applied on the Reservation during the late spring of 2005. Samples were analyzed for a large suite of pesticide compounds that are widely used and may be present in surface water. In addition, 10 sites were sampled for mercury and methyl mercury concentrations in water and bed sediment, and for major-ion concentrations. The pesticide and mercury levels also will be compared to the known effects on aquatic biota. Results will be published in a USGS report. Completion of reconnaissance sampling on the Reservation will provide valuable information that will help the Yankton Sioux Tribe assess the aquatic resources of the Reservation. Contact: Roy C. Bartholomay, 605-352-4241, ext. 204, rcbarth@usgs.gov

Water-Quality Monitoring with the Yankton Sioux Tribe (Nebraska, South Dakota)

The Missouri River in southeastern South Dakota constitutes the southern boundary of the Yankton Sioux Reservation and is a valuable resource to the Yankton Sioux Tribe as well as to the States of South Dakota and Nebraska. Several miles downstream from the western boundary of the Reservation, the flow of the Missouri River is impounded by Fort Randall Dam to form Lake Francis Case. Downstream from Fort Randall Dam, the river is free-flowing for several miles until it contacts backwater from Lewis and Clark Lake. Thus, within the Yankton Sioux Reservation boundaries, the Missouri River is both impounded as well as free-flowing, which results in a diversity of habitat critical to numerous fish and wildlife species. A water-quality monitoring program for Lake Francis Case and the Missouri River, within the boundaries of the Yankton Sioux Reservation, was initiated in FY 2002. This project is a long-term, on-going cooperative effort between the Yankton Sioux Tribe and the USGS. The project consists of sampling one station on Lake Francis Case and two stations on the Missouri River for a comprehensive suite of water-quality properties and constituents. Samples are collected six times per year. Another aspect of this project involves assisting the Tribe maintain a long-term water-quality monitoring program for Lake Francis Case and the Missouri River within the boundaries of the Tribal lands. The USGS provides training and assistance to Yankton Sioux Tribal employees in water-quality sampling, including collection methods, data processing and analyses, data archiving and data processing, and the publication of sampling results. Contact: Roy Bartholomay, 605-352-4241, ext. 204, rcbarth@usgs.gov

Well Inventory and Water Use for the Yankton Sioux Tribe (South Dakota)

Water-use information will help the Yankton Sioux Tribe manage their water resources. Identifying locations of abandoned wells is useful so that preventive measures, such as well plugging, can be implemented to prevent contamination of ground water. The Tribe is interested in plugging abandoned wells within its Reservation. The USGS Water Use data base has information for Charles Mix County that is being accessed, tabulated, and summarized for the Tribe. The current study involves evaluating existing data, inventorying wells in areas that had not been previously visited, and updating information on abandoned wells that is stored in the USGS Ground-Water Site Inventory data base. The Tribe will use the results of this study to help provide safe water to its Tribal members and residents. Contact: Kathy Neitzert, 605-352-4241, ext. 227, kmneitze@usgs.gov

Water Quality on the Lands of the Prairie Band of Potawatomi Nation (Kansas)

Water quality is a major concern for the Prairie Band of Potawatomi Nation because creeks on its lands provide sources of subsistence hunting and fishing for Tribal members. Ground water is used in domestic wells on the Reservation and is being considered as a source for water supply as the Tribe develops its economic base. Surface water on Tribal lands has been sampled by USGS and Tribal personnel quarterly since June 1996, and ground-water samples have been collected annually since 2002. Tribal personnel, as well as students and personnel from Haskell Indian Nations University, assist USGS scientists with the Kansas Water Science Center in collecting and preparing samples for analysis in conjunction with the water-quality aspects of this study. Tribal personnel and personnel from Haskell Indian Nations University also have attended training courses at the USGS National Training Center. Three reports summarizing the surface- and ground-water quality on the reservation have been published as a part of this study. The study is scheduled to continue through 2007 with a fourth interpretive report on the water quality of the Potawatomi lands to be released at the conclusion of the study. Contact: Heather Ross Schmidt, 785-832-3575, hross@usgs.gov

Osage-Skiatook Petroleum Environmental Research Project (Oklahoma)

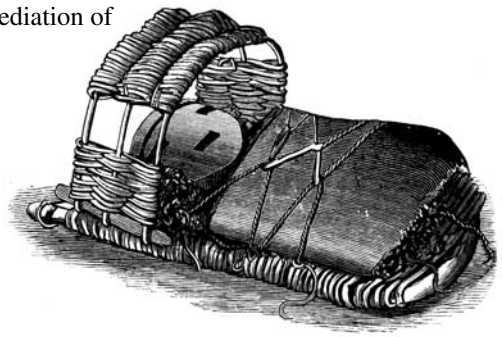
USGS scientists are leading the Osage-Skiatook Petroleum Environmental Research Project in which research is being conducted to investigate the transport, fate, and biologic effects of produced water and hydrocarbon releases from oil production at two sites on Skiatook Lake, northwest of Tulsa, Oklahoma. This work focuses on the impacts of produced water and hydrocarbon releases from oil production on soils, ground and surface water, and the oak forest and lake ecosystems they support. Skiatook Lake serves as flood control, water supply, and a major recreational fishery in the Tulsa, Oklahoma, metropolitan area. Personnel from the Osage Nation Environmental and Natural Resources Department have participated in the field investigations. The USGS provided training to Osage Nation personnel on surface-water flow measurement and sampling methods. Collaborating partners include the Osage Nation, U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Bureau of Indian Affairs, U.S. Army Corps of Engineers, University of Tulsa, Oklahoma State University, University of Oklahoma, and USGS research scientists from Oklahoma, Virginia, Colorado, and California. The project web page can be found at: http://ok.water.usgs.gov/skiatook/ The following website provides brief summary of the project, with digital links: http://toxics.usgs.gov/sites/ph20_page.html. Contact: Jim Otton, 303-236-8020, jkotton@usgs.gov

Surface-Water Quality and Total Petroleum Hydrocarbon Loading into Skiatook Lake, Northeastern Oklahoma

The purpose of this project is to investigate the impact of petroleum production on surface-water quality near Skiatook Lake on the Osage Nation. Hominy Creek was impounded to form Skiatook Lake in 1984 for flood control and recreation. The lake is also used as a water supply for cities of Sand Springs and Sapulpa. Past water-quality data collected on Hominy Creek have indicated the presence of variable but commonly high concentrations of major ions associated with surface- and ground-water discharges of produced waters. Objectives of the investigation are to determine (1) the general quality of water entering Skiatook Lake and (2) loads of constituents discharged by Hominy Creek and Wildhorse Creek into Skiatook Lake. The project began in September 2003 and will continue through 2007. The Hominy Creek streamgage and continuous water-quality monitor were functioning during FY 2005. Periodic water-quality samples were collected at the Hominy and Wildhorse Creek sites. Contact: Kelli DeHay, 918-254-6651, kdehay@usgs.gov

Grand Lake of the Cherokees, Tribal Water-Quality Concerns (Oklahoma)

Officials of the Seneca-Cayuga Tribe of Oklahoma and Wyandotte Nation of Oklahoma are concerned about possible metals contamination of water and bed sediments in Grand Lake of the Cherokees, part of which lies within their Tribal jurisdictions. The Spring River and Neosho River transport water into Grand Lake of the Cherokees that is potentially contaminated from the metals mining Tri-State Mining District in northeastern Oklahoma. In 2005, USGS scientists collected water and sediment samples from the Neosho River and Spring River during storm runoff events. Information from this study will help to estimate concentrations of heavy metals entering Grand Lake and will help Federal, Tribal, and State officials in remediation of the area. Contact: Kelli DeHay, 918-254-6651, kdehay@usgs.gov



Analysis of Plant Samples to Assess Contamination at an Abandoned Oil-Field Service Site, Shawnee, Oklahoma

The objective of the study will be to test the feasibility of using chemical analyses of plant samples as a low-cost method to assess the extent of contamination beneath an abandoned oilfield-service site near Shawnee, Oklahoma. The USGS Oklahoma Water Science Center worked in cooperation with the Absentee Shawnee Tribe of Oklahoma to conduct sampling of plant, soil, and ground water at the abandoned oilfield-service site. Samples were analyzed for selected trace metals, including lead. A report will be completed at the end of the 2-year study in September 2006. Contact: Shana Mashburn, 405-810-4403, shanam@usgs.gov

Delineation of Brine Contamination in and Near the East Poplar Oil Field, Fort Peck Indian Reservation (Montana)

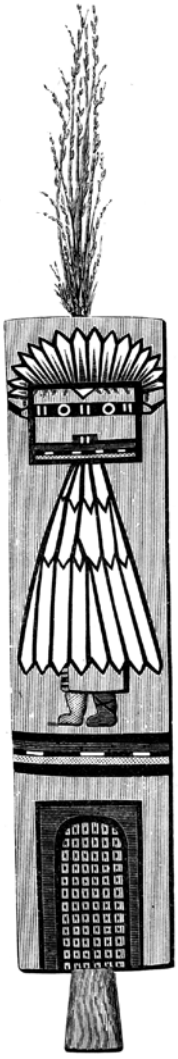
Brine is a byproduct of crude oil production. Handling and disposal of brine during the last 50 years in the East Poplar oil field has resulted in contamination of not only the shallow Quaternary aquifers, but also the Poplar River. Previous investigations have documented and delineated a portion of the extent of brine contamination in the East Poplar oil field during the early 1990s. In the 10 years since the last study, the entire extent of contamination likely has changed. Ground water in the contaminated Quaternary aquifers flows toward the nearby City of Poplar, Montana, which relies on the shallow Quaternary aquifers as its sole source of water. The objective of this project is to delineate brine contamination in the Quaternary aquifers in and near the East Poplar oil field. The project area includes the entire East Poplar oil field and extends south to include the City of Poplar. This project will provide the Fort Peck Assiniboine and Sioux Tribes with an updated delineation of brine contamination in the shallow Quaternary aquifers in and near the East Poplar oil field. The project also will enable the Tribes to determine more effective remediation of brine contamination within the oil field, and provide the information that the Tribes need to evaluate the threat to the City of Poplar's water supply. Contact: Joanna Thamke, 406-457-5900, jothamke@usgs.gov

Surface-Water-Quality Monitoring in the Vicinity of the Fort Peck Indian Reservation (Montana)

During FY 2005, the USGS conducted periodic surface-water-quality monitoring at one site on the lower Missouri River near the southeastern boundary of the Reservation of the Fort Peck Assiniboine and Sioux Tribes, at two sites on the Poplar River (one within and one north of the Fort Peck Reservation), and one site on the East Poplar River north of the Fort Peck Reservation. The sites on the Poplar and East Poplar Rivers were sampled to document potential impacts from a coal-fired power plant in Canada. Boron and total dissolved solids are constituents of concern for potential effects to the quality of irrigation water in the East Poplar River downstream from the power plant. Contact: John Lambing, 406-457-5900, jlambing@usgs.gov

Habitat Mapping With the Confederated Salish and Kootenai Tribes (Montana)

Scientists from the USGS National Wetlands Research Center in Lafayette, Louisiana, are working with the Confederated Salish and Kootenai Tribes to create a community-level habitat classification system that will become an integral part of the Tribes' sophisticated geographic information system (GIS). The GIS facilitates the Tribes' land-use planning. The project included in photointerpretation of very detailed color infrared aerial photography that formed the basis for community/association habitat types. The resulting maps were produced as series of paper and digital (compact disc) base maps for 26 miles of the Flathead River downstream from the Flathead Lake dam and for about 5,000 acres of wetlands on the southeastern shore of Flathead Lake. The photointerpretation was verified from light aircraft and on the ground from river access and vegetation transects. Digital products were completed and delivered in FY 2005. The Tribal employee was trained in photointerpretation and mapping at the National Wetlands Research Center in Lafayette, Louisiana, for a month in FY 2004 and is continuing at the Flathead Reservation of the Salish and Kootenai Tribes. The National Wetlands Research Center has provided the trainee with photointerpretation equipment for the project and potential future work. Contact: Larry Handley, 337-266-8691, larry_handley@usgs.gov



Methods for Estimating Mean- and Low-Flow Characteristics at Ungaged Sites in Montana

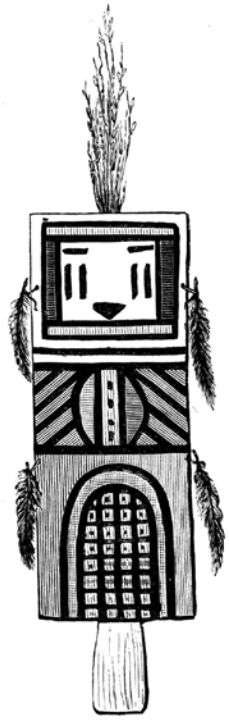
Information about the magnitude and variability of streamflow throughout Montana is required by water and land-use managers, planners, and administrators and by builders, engineers, recreationists, and the general public. The USGS has published various reports that describe methods for estimating streamflow characteristics at ungaged sites. None of these reports have been statewide in scope, none have been based on basin and climatic characteristics determined from a Geographic Information System (GIS), and none have presented methods for estimating low-flow frequency characteristics. The primary objective of this project is to develop methods for estimating mean- and low-flow characteristics in Montana based on updated streamflow and frequency data at streamgages. In particular, methods for estimating the mean annual and monthly discharge and annual 1-, 3-, 7-, and 14-day low flows having recurrence intervals of 2, 5, 10, 20, 50 and 100 years will be developed. In addition, methods for estimating seasonal 7-day low flows for the same recurrence intervals will be developed. The seasons will include winter (November through February), runoff-period (March through June), and summer-fall (July through October). The methods for estimating mean- and low-flow characteristics will be based primarily on regression analyses relating streamflow characteristics at gaged sites to basin and climatic characteristics at those gaged sites. Accordingly, a secondary objective of this project is to create a GIS to determine basin and climatic characteristics at gaged sites. The GIS will enable Federal, Tribal, State, and local users to more quickly and efficiently determine the required basin and climatic characteristics for application at ungaged sites. Methods for determining mean- and low-flow characteristics at ungaged sites throughout Montana based on GIS-based methods will provide water managers, planners, and designers with much better tools for evaluating the adequacy of water plans and structures for mean and low-flow conditions. The Confederated Salish and Kootenai Tribes are helping to support this multiyear project. Contact: Peter McCarthy, 406-457-5900, pmccarth@usgs.gov

Hydraulic Characteristics and Flood-Limit Delineation of the Jocko River on Part of the Flathead Reservation (Montana)

The objective of this cooperative project is to delineate the flood limits and hydraulic floodway for 100- and 500-year events for a 20-mile reach of the Jocko River from near Arlee, Montana, to the river's mouth near Dixon on the Flathead Reservation of the Confederated Salish and Kootenai Tribes. USGS hydrologists from the Montana Water Science Center surveyed channel-geometry (cross-section) data for the Jocko River and are using the data in a hydraulic model to calculate water-surface profiles and other hydraulic characteristics, such as flow area, conveyance, flow widths, mean flow depths, and velocities. The hydraulic data will be used to delineate the flood plain and floodway. Determination of hydraulic characteristics is a prerequisite to the delineation of flood limits and a hydraulic floodway for the 100-year flood. The 100-year flood is commonly used as a regulatory flood for flood-plain management and flood insurance purposes. Adoption of flood-plain management regulations for the Jocko River would enable land-use and fishery managers for the Salish and Kootenai Tribes to better plan and guide future development to minimize riverine effects and would also enable citizens to purchase subsidized flood insurance. Results of this study are being prepared for publication. Contact: Contact: Katherine Chase, 406- 457-5900, kchase@usgs.gov

Evaluating Springs, Northern Cheyenne Reservation (Montana, Wyoming)

The Powder River structural basin of Montana and Wyoming is the focus of extensive exploration for and development of coal-bed methane. Development of coal-bed methane on lands adjacent to the southern and southeastern boundaries of the Northern Cheyenne Indian Reservation could have unwanted effects on valuable ground-water resources within the Reservation, such as depletion of the water resource and lowering of water levels over large areas. The coal-bearing formation identified for methane development discharges water to wells and springs throughout the Reservation and supplies most of the domestic and livestock water used on the Reservation. The objective of this study is to inventory and monitor springs throughout the Reservation, with special emphasis on lands that may have a high potential for development of coal-bed methane. Springs will be inventoried for quantity of discharge (on a seasonal basis), water quality, geologic source, probable source area for recharge, and present water uses. This study of springs will provide data to help define Northern Cheyenne water resources and help determine if future coal-bed methane development could have an impact on springs, and thus potentially affect drinking water, stock water, wildlife habitat, and cultural resources on the Reservation. Contact: Mike Cannon (USGS), 406-457-5900, mcannon@usgs.gov or Jason Whiteman (Northern Cheyenne Tribe), 406-477-3096



USGS Assists with Field Studies of Endangered Bird (New Mexico)

In July 2005, a scientist from the USGS Southwest Biological Science Center accompanied Bureau of Indian Affairs staff on site visits along the Rio Grande near Albuquerque, New Mexico. They searched for endangered southwestern willow flycatcher adults and nests in riparian areas within tribal lands to determine if the habitat was suitable and if breeding flycatchers were present. Contact: Mark Sogge, 928-556-7194, mark_sogge@usgs.gov

Mapping Exotic Plants in the Southwest

In conjunction with land managers, biologists at the USGS Southwest Biological Science Center have overseen the development of the Southwest Exotic Plant Mapping Project regional data base on the distribution and ecology of invasive plants. The SWEMP data base is an important regional tool for inventorying, tracking, and sharing data on invasive nonnative plants infesting the Southwest. Land management collaborators contribute occurrence data and USGS scientists compile the data into the regional data base according to Federal standards. The data base also can be used to generate maps of locations of the plants. The goals of this ongoing effort include maintaining a web-based distribution system that integrates educational, management, and scientific information to aid in control of invasive plants, and facilitating the ongoing collaborations among Tribal, Federal, State, and private land managers that are concerned about invasive plants. The data base is available on the Southwest Exotic Plant Information Clearinghouse (SWEPIC) website (http://www.usgs.nau.edu/SWEPIC/) and, as such, the data and the SWEPIC information are freely available to Tribal members. Contact: Kathryn Thomas, 520-670-5534,kathryn_a_thomas@usgs.gov

Navajo Nation: Flood-Flow Frequency Investigation (Arizona, Utah, Colorado, New Mexico)

The U.S. Congress provided authorization for flood-plain mapping throughout the Navajo Nation by the U.S. Army Corps of Engineers (USACE). The Navajo Nation, the BIA, and the Corps wanted to update techniques for estimating flood flow frequency for ungaged sites pertaining to the Navajo Nation. New regression models are needed to improve understanding of the flood regions. The objectives of this investigation are to analyze and compile hydrologic data and then to use the compilations and analyses to create predictive models of flow frequency for selected streams on the Navajo Nation. Working with Navajo Nation staff, USGS hydrologists will develop a data base of basin and climatic characteristics for the gaging stations. An existing data base will be supplemented with new characteristics using a USGS geographic information system. Regional regression models of basin and climatic characteristics also will be added to the GIS to estimate flood-flow frequency at ungaged, unregulated stream sites. Research for new basin and climatic variables include the use of a USGS geographic information system tool and data from the National Elevation Dataset. The National Oceanic and Atmospheric Administration (NOAA) published Atlas 2 and a more recent edition, Atlas14, both titled “Precipitation-Frequency of the Western U.S.” Average basin values of 24-hour, 100-year and 6-hour, 100-year maximum precipitation have been determined for NOAA Atlas 2 and 14. Other variables include slope, aspect, elevation, winter and annual precipitation. The project commenced June 2003 and was finished October 2006. A Scientific Investigations Report is approved for release in 2007. Contact: Scott Waltemeyer, 505-830-7953, sdw@usgs.gov

Vegetation Surveys on Native Lands (Arizona, Colorado, Nevada, New Mexico, and Utah)

A land cover map of natural and seminatural vegetation types has been developed for the five southwestern states (Arizona, Colorado, Nevada, New Mexico, and Utah). The map includes land cover mapping for the Tribal lands of all 21 Tribes in Arizona. Vegetation scientists with the Southwest Biological Science Center conducted vegetation surveys, interpreted remotely sensed images, and created predictive models to develop the land cover map of Arizona. The land cover map was used with other mapped data to develop predicted distribution models for more than 800 vertebrate species. The land cover map and predicted vertebrate distribution maps, as well as other products of this and related USGS projects, are available online through http://fws-nmcfwru.nmsu.edu/swregap/. The land cover map shows the distribution of 125 land cover types (109 ecological systems) at a resolution of 1 acre. The land cover is one product of the USGS Southwest Regional Gap Analysis Program's regional conservation assessment of biota; additional products and the final assessment are expected to be complete in FY 2006. Contact: Kathryn Thomas, 520-670-5534, kathryn_a_thomas@usgs.gov

Linda Garcia, Navajo Nation, and Joe Bunnell, USGS, preparing to measure indoor particulates from coal burning in a Navajo home. Photograph by Veronica Francisco, Diné College.

Navajo Nation and USGS Air Quality Research (Arizona, Colorado, New Mexico)

A USGS-led research project is investigating possible connections between residential and industrial coal use by Navajo people and respiratory disease risk. Public health surveys were conducted. Airborne particles were sampled inside Navajo homes that use coal for heating and cooking, and from outdoor locations on the Navajo Nation near the coal-fired Four Corners power plant. The airborne particles collected on filters are being analyzed for metals and toxic organic substances, which may have links to respiratory diseases. Organizations that have cooperated with USGS on planning, funding, and executing this project include the Navajo Nation Environmental Protection Agency, Navajo Nation Division of Health, Diné College, Indian Health Service, Shiprock Chapter of the Navajo Nation, Navajo Nation Historic Preservation Department, Navajo Tribal Utility Authority, U.S. Department of Energy and Agency for Toxic Substances and Disease Registry (U.S. Department of Health and Human Services).

Results will provide information on the relative exposure risk to airborne toxic substances from indoor and outdoor exposure, and will assist the Navajo Nation in developing policies and practices to improve health while satisfying their energy needs. Contact: Joe Bunnell, 703-648-6497, jbunnell@usgs.gov

USGS and NPS Colorado Plateau Vegetation Mapping Collaborates with the Navajo Nation (Arizona, Colorado, New Mexico)

The USGS Colorado Plateau Research Station of the Southwest Biological Science Center is a key team member in developing vegetation maps for national parks on the Southern Colorado Plateau. The Navajo Nation is a cooperator for two ongoing vegetation mapping projects, Petrified Forest National Park and Canyon de Chelly National Monument. Petrified Forest National Park's vegetation mapping effort includes a 1-kilometer area around the Park, with the northern area of the project boundary on Navajo Nation land. Canyon de Chelly National Monument is on the Navajo Nation and the park land is owned by the Nation. In FY 2005, field data previously collected at Petrified Forest National Park was analyzed and classified. Photo interpretation of vegetation units at the Park was initiated. At Canyon de Chelly National Monument, photo interpretation of vegetation units was completed, and a map label meeting was conducted at the Monument to determine the naming conventions that link the photo-interpreted vegetation units with vegetation association classification. For both map areas, a draft vegetation map will be assessed for accuracy in FY 2006. Contact: Monica Hansen, 928-556-7466 ext. 251, mlhansen@usgs.gov; Kathryn Thomas, 520-670-5534, kathryn_a_thomas@usgs.gov; or Anne Cully, 785-539-5503, Anne-Cully@nps.gov

Vegetation, Sand Sheet and Dune Stability on the Navajo Nation (Arizona, Colorado, New Mexico)

The Navajo Nation land has experienced severe drought in the last few years. Much of the Navajo Nation consists of sand sheets and dunes. Concurrent with the drought have been reports of once stabilized sand becoming active dunes and of increasing infestation of Russian thistle on the more active sand sheets and dunes. The vegetation is known to stabilize sandy substrate but details of the characteristics and composition of native vegetation and the influence of nonnative invasive species on native vegetation health have not been available. A biologist from the USGS Colorado Plateau Research Station of the Southwest Biological Science Center and a USGS geologist conducted an integrated study of vegetation on sand and dune sites in the southeastern Navajo Nation. Results will be presented to the scientific community and to Navajo Nation chapter houses in the study area. Contact: Kathryn Thomas (vegetation studies), 928-556-7466 ext. 235, kathryn_a_thomas@usgs.gov or Margaret Hiza (geologic studies), 928-556-7366, mhiza@usgs.gov

Strontium-Isotope Sourcing of Pre-Hispanic Maize from Chaco Canyon, Navajo Nation (New Mexico)

The Navajo Nation's Historic Preservation Office wants to determine the source of maize consumed by pre-Hispanic American Indians that occupied Chaco Canyon, New Mexico, and they are also interested in the prehistoric productivity of the Chaco Canyon core area. Since 2002, USGS scientists from the Arid Regions Climate Project have cooperated with the Navajo Nation and the National Park Service by examining strontium isotopes in soil water and in mice. The isotope chemistry of the mice bones will help to characterize the strontium isotope composition of the fields in and near the canyon. The mice range over a few to several hundred yards eating plants and insects that extract strontium from the soils, so the mice bones integrate the strontium isotope signature from a fairly wide area. The scientists use the strontium isotopic composition of waters absorbed from the soil into the plants to determine field sites where ancient corn was grown; the mice should provide supplementary information on the soil-water isotope composition. In addition, USGS scientists completed a study that compares times of intense and persistent drought with Native American migrations from the San Juan Basin and Four Corners area during the middle-12th and late-13th centuries. During FY 2005, a field trip was held for personnel of the various interested agencies. A publication is being prepared on the latest results of this work which will continue through FY 2007. Contact: Larry Benson, 303-541-3005

Geologic Mapping of the Eastern Grand Canyon Region (Arizona, Colorado, New Mexico)

A project that is cooperatively funded by the USGS and the National Park Service is designed to improve understanding of the surficial and ground-water resources of the eastern part of Grand Canyon National Park and adjacent Navajo lands. The 3-year project began in FY 2003 and encompasses an area of about 2,000 square miles. The project is being conducted with cooperation of the Cameron, Coalmine Canyon, Leupp, and Tolani Lake Chapters of the Navajo Nation. The anticipated publication date is late 2007. Contact: George Billingsley, 928-556-7198, gbillingsley@usgs.gov or Sue Priest, 928-556-7148, spriest@usgs.gov

Geologic Framework of Rio Grande Basins, New Mexico

The USGS is conducting geologic and geophysical studies to provide a framework for understanding aquifers in several critical ground-water basins along the Rio Grande, which extends from Colorado to Mexico. One focus of this project is the Española ground-water basin in the greater Santa Fe, New Mexico region, which includes lands belonging to the Pueblos of Cochiti, Nambe, Pojoaque, Tesuque, San Ildefonso, Ohkay Owingeh, and Santa Clara. A second focus of this project is the San Luis Basin, which includes Taos Pueblo. An objective of the project is developing a better understanding of the three-dimensional form of the ground-water basins to improve the understanding of ground-water flow and resources. The project includes geologic mapping in cooperation with the New Mexico Bureau of Geology and Mineral Resources and the University of New Mexico; geophysical mapping of the subsurface in cooperation with Los Alamos National Laboratory and the Summer of Applied Geophysics Experience educational program; investigations into how faults affect the aquifer system; and studies of geologic history to predict the distribution of underground aquifers. Geologic and geophysical maps in the basin provide the Pueblos with information that aids in ground-water protection and assessment of water and other natural resources. Activities specific to FY 2005 included an annual public workshop, hosted by the USGS project scientists. Workshop attendees included several members of Pueblo Nations who learned about the studies in the Española basin and interacted with USGS scientists. Workshop information can be found at http://esp.cr.usgs.gov/ebtag/. Contact: Mark Hudson, 303-236-7446, mhudson@usgs.gov or Tien Grauch, 303-236-1393, tien@usgs.gov

Albuquerque Seismological Laboratory Serves a Global Community from the Pueblo of Isleta (New Mexico)

The USGS has a multiyear lease with the Pueblo of Isleta for the use of all buildings and facilities of the original USGS Albuquerque Seismological Laboratory. This locale includes seismometer test tunnels and boreholes on Isleta lands south of Albuquerque, New Mexico. The Laboratory has used these facilities, known as the Albuquerque Seismological Laboratory–Isleta site, since 1961 for global network maintenance, data collection and quality control, and for testing modern seismic instruments. The Laboratory operations support worldwide seismic monitoring as well as research activities. USGS will continue to use the site for all of these purposes. The USGS Laboratory's mission includes operation and maintenance of 89 seismic stations of the Global Seismograph Network in 60 countries and the installation, operation, and maintenance of 35 Advanced National Seismic System/USArray seismic stations in the United States that are part of the National Science Foundation-funded Earthscope Project. The site on the Pueblo of Isleta is notable for its low seismic noise characteristics. Seismic equipment manufacturers want their instruments to be tested here as a key step in qualifying the instruments for use in seismic networks. The USGS Laboratory also operates a standard Global Seismograph Network station at this location, one of 140 such stations operating worldwide. Data received in real time and on tapes mailed from the Global Seismograph Network stations support earthquake monitoring and research at the USGS National Earthquake Information Center and the Incorporated Research Institutions for Seismology (IRIS), tsunami warning efforts by the National Oceanic and Atmospheric Administration, and nuclear test monitoring efforts for the Comprehensive Test Ban Treaty. The Pueblo of Isleta and the general public receive occasional educational talks and presentations on how the seismic equipment functions for monitoring earthquakes. The USGS appreciates the Pueblo of Isleta for permitting this globally significant scientific endeavor on its lands. Contact: Lind Gee, 505-853-8887, lgee@usgs.gov Additional information: http://earthquake.usgs.gov/regional/asl/ Live Seismograms: http://www.liss.org/

Beneficial Use Agreement with the Hualapai Tribe (Arizona)

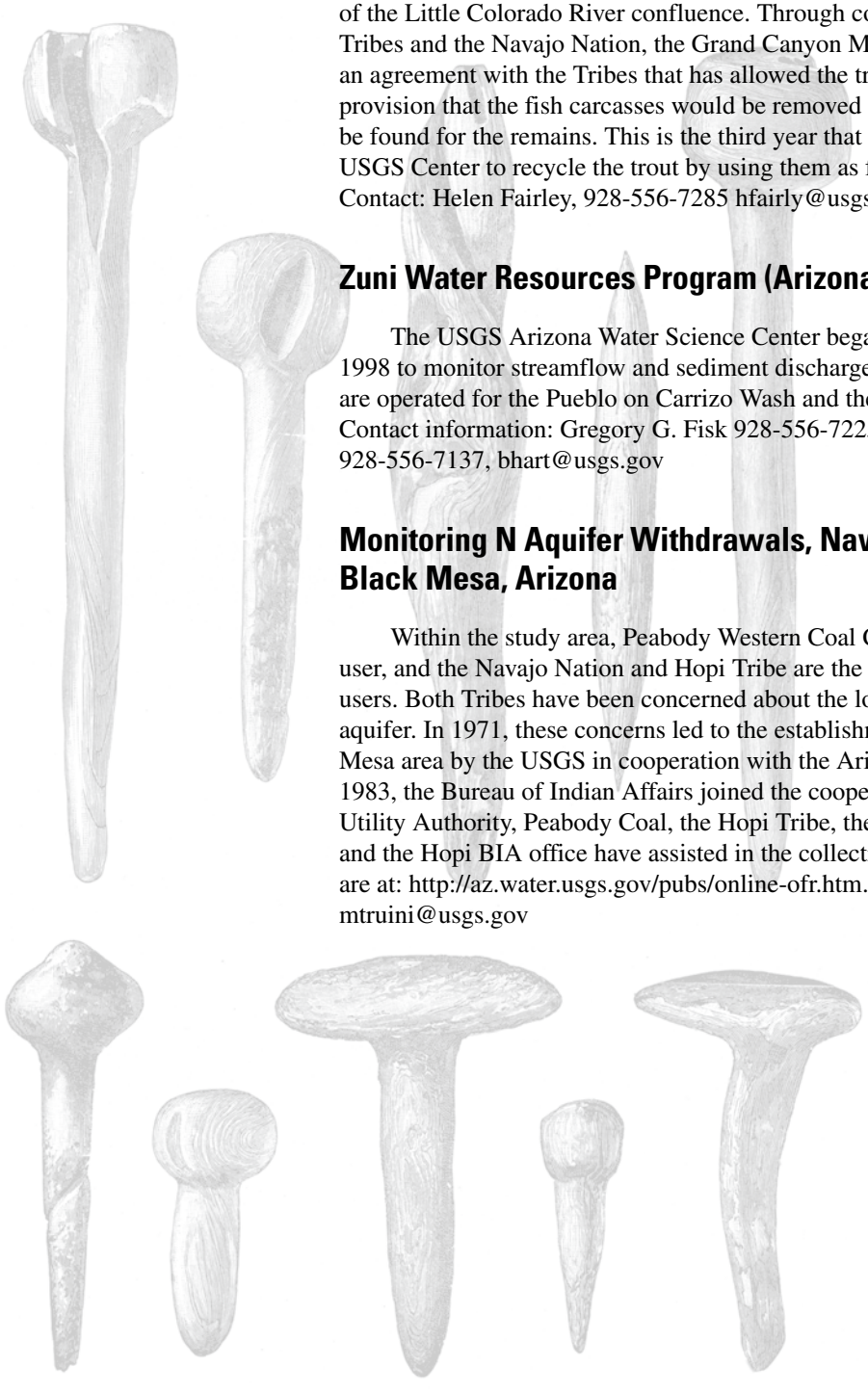
In FY 2005, the USGS Grand Canyon Monitoring and Research Center established a cooperative agreement with the Hualapai Tribe to provide a beneficial use for nonnative trout that are being removed from the Colorado River. Since 2003, the USGS Center has overseen a trout removal project near the confluence of the Little Colorado River as part of an ongoing effort to reduce competition with and predation on the endangered native Humpback Chub. When the trout removal project was first proposed in 2002, several of the Tribes involved with the Glen Canyon Dam Adaptive Management Program expressed concern that this project would have an adverse effect on Native American traditional cultural properties in the vicinity of the Little Colorado River confluence. Through consultations with the Hopi and Hualapai Tribes and the Navajo Nation, the Grand Canyon Monitoring and Research Center reached an agreement with the Tribes that has allowed the trout removal project to proceed with the provision that the fish carcasses would be removed from the river and a beneficial use would be found for the remains. This is the third year that the Hualapai Tribe has cooperated with the USGS Center to recycle the trout by using them as fertilizer in Hualapai community gardens. Contact: Helen Fairley, 928-556-7285 hfairly@usgs.gov

Zuni Water Resources Program (Arizona)

The USGS Arizona Water Science Center began a program with the Pueblo of Zuni in 1998 to monitor streamflow and sediment discharge on and near their Pueblo lands. Gages are operated for the Pueblo on Carrizo Wash and the Little Colorado River in eastern Arizona. Contact information: Gregory G. Fisk 928-556-7225, ggfisk@usgs.gov or Robert J. Hart 928-556-7137, bhart@usgs.gov

Monitoring N Aquifer Withdrawals, Navajo Nation and Hopi Tribal Lands, Black Mesa, Arizona

Within the study area, Peabody Western Coal Company is the principal industrial water user, and the Navajo Nation and Hopi Tribe are the principal domestic and municipal water users. Both Tribes have been concerned about the long-term effects of withdrawals from the N aquifer. In 1971, these concerns led to the establishment of a monitoring program in the Black Mesa area by the USGS in cooperation with the Arizona Department of Water Resources. In 1983, the Bureau of Indian Affairs joined the cooperative effort. Since 1983, the Navajo Tribal Utility Authority, Peabody Coal, the Hopi Tribe, the Western Navajo and Chinle BIA offices, and the Hopi BIA office have assisted in the collection of hydrologic data. USGS data reports are at: http://az.water.usgs.gov/pubs/online-ofr.htm. Contact Margot Truini, 928-556-7352, mtruini@usgs.gov



Hydrogeology of the Coconino Plateau and Adjacent Areas, Coconino and Yavapai Counties, Arizona

Two large regional ground-water flow systems are present in the Coconino Plateau and adjacent areas of northern Arizona: the C aquifer and the Redwall-Muav aquifer. Residents, local and Tribal governments, water-facilities managers, Federal entities, and environmental groups within the region recognize the potential consequences of increased ground-water development attendant to population growth. Public input has identified the sustainability, protection, and maintenance of springs and seeps and associated riparian habitat on the Coconino Plateau as major issues that have broad support. As part of the Arizona Rural Watershed Initiatives, the USGS evaluated the hydrogeology of the Coconino Plateau to develop a hydrogeologic framework and conceptual model of ground-water flow and estimated water budgets for the ground-water flow system. This study has the support of the Navajo Nation and the Hopi, Havasupai, and Hualapai Tribes because of the improved understanding it provides on the availability, presence, and movement of ground water that support seeps and springs on Tribal lands. These water sources are critical cultural, religious, and natural resources to Native American cultures. A Scientific Investigations Report is approved for publication and a website is available for access to data and project information (http://az.water.usgs.gov/rwi-ii/). Continued monitoring and data collection are in progress to improve the numerical ground-water flow model in development. Contact: Donald J. Bills, 928-556-7142, djbills@usgs.gov or Robert J. Hart, 928-556-7137, bhart@usgs.gov

Monitoring the C Aquifer and Adjacent Water-Bearing Zones, Near Leupp, Arizona

The C aquifer, in the Little Colorado River Basin near Leupp, Arizona, is a potential water-supply source for industrial and municipal users. Consideration and evaluation of the C aquifer is necessary to determine the long-term sustainability of this ground-water resource. The Bureau of Indian Affairs (BIA) has recognized the potential impacts of increasing ground-water withdrawals on the availability of ground water to meet tribal demands and sustain critical cultural, religious, and riparian sites. The BIA asked the USGS to develop a monitoring program for the C aquifer in potential withdrawal areas to determine baseline conditions. Monitoring initially will focus on water levels and water chemistry of the C aquifer in the Leupp area. Monitoring may be expanded to include other water-bearing zones above and below the C aquifer and base flow evaluations in natural discharge areas. In FY 2005, the USGS monitored 12 wells quarterly. A website is planned to facilitate access to near real-time and other data. Contact: Robert J. Hart, 928-556-7137, bhart@usgs.gov or Donald J. Bills, 928-556-7142, djbills@usgs.gov

Well Development, Aquifer Tests, C Aquifer near Leupp, Arizona

The C aquifer is recognized as the most productive aquifer in northern Arizona, providing water for industrial, municipal, agricultural, and domestic supply. As a result, the Bureau of Reclamation, Navajo Nation, Hopi Tribe, and Office of Surface Mining have proposed the C aquifer near Leupp, Arizona, as an alternate supply for industrial and municipal water demand on the Navajo and Hopi Reservations. The USGS was asked to assist in evaluating the water-supply potential of the C aquifer by participating in a program with the Bureau of Reclamation to drill test and observation wells and conduct aquifer tests at three sites on the southern border of the Navajo Nation near Leupp. In addition, the USGS was asked to develop a superposition or change model to evaluate the effects of pumping and to evaluate the base flow of natural discharge areas of the C aquifer on the lower reaches of Clear and Chevelon Creeks. One Scientific Investigations Report ("Numerical Ground-water Change Model of the C Aquifer and Effects of Ground-Water Withdrawals on Stream Depletion in Selected Reaches of Clear Creek, Chevelon Creek, and the Little Colorado River, Northeastern Arizona," SIR 2005-5277) has been published and another is being prepared. Additional base flow evaluations and modeling may be conducted. Contact: John P. Hoffmann, 520-670-6671, ext. 265, jphoffma@usgs.gov; Stan A. Leake, 520-670-6671, ext. 259, saleake@usgs.gov; Donald J. Bills, 928-556-7142, djbills@usgs.gov or Robert J. Hart, 928-556-7137, bhart@usgs.gov

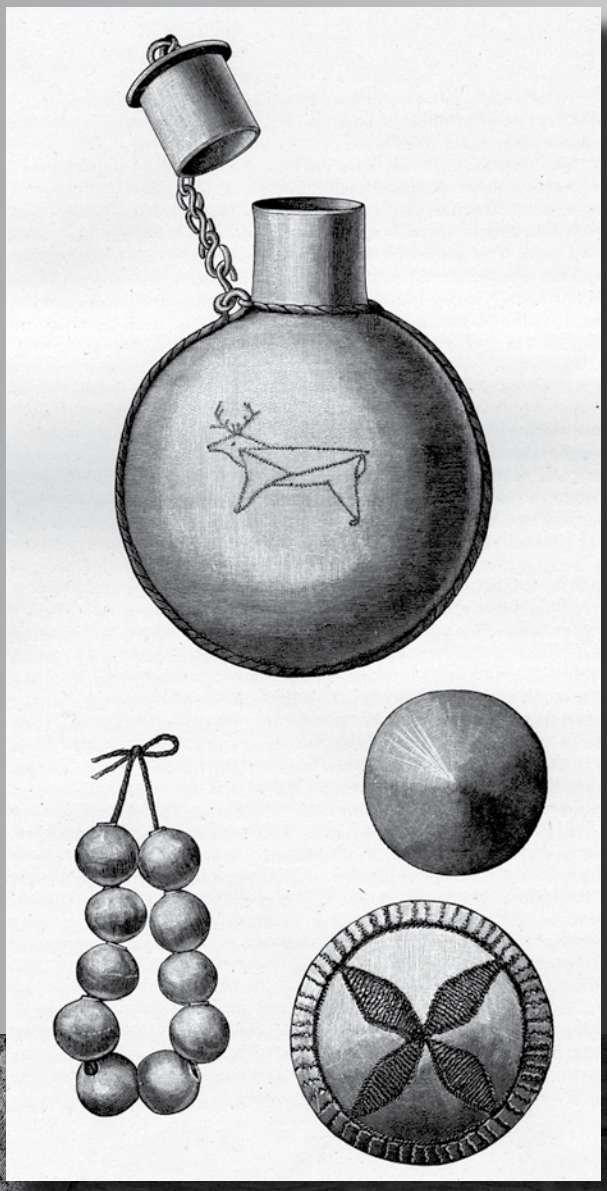
Landscape Change, Grassland Health, and Bark Beetle Infestation on San Carlos Reservation (Arizona)

The USGS Southwest Geographic Science Team is working closely with officials of the San Carlos Apache Tribe to develop a wide-ranging study of Tribal lands. This cooperative study is intended to use the resources of the USGS, the San Carlos Tribe, and the Bureau of Indian Affairs. Easily accessible from the Phoenix, Arizona, metropolitan area, the San Carlos Apache Reservation is characterized by a variety of geological, historical, cultural, and recreational activities. The 1.8 million acres encompass a variety of landscapes, including mountainous terrain covered by diverse forests, woodlands, and grasslands with low to high desert habitats. Forestry, tourism, and cattle ranching help sustain the Tribal economy. More than one-third of the San Carlos Reservation is forested or wooded. The Tribe wants to use the best tools available to manage their diverse lands. Tribal managers want to (1) evaluate land cover changes using historic and current data; (2) evaluate grassland health and invasive grasses, particularly cheat grass, for better rangeland management; and (3) monitor tree mortality due to bark beetle infestation for better forestry management. Rangeland health is being ascertained by using carefully calibrated multitemporal satellite data sets to assess phonological clues into the desertification processes on grassland communities. Baseline data are being prepared to determine future grassland degradation susceptibility. Products of these studies include: current maps and ancillary data of grassland; shrub land and open woodland distribution and health; and areas of greatest rangeland vulnerability to degradation due to spread of invasive species. High resolution imagery and field data are being coupled to study the distribution of forest trees afflicted by the bark beetle infestation. This study will develop a method for detecting the earliest observable signs of tree decline as a result of the beetle attacks. The Tribe also wants to improve its capabilities in producing remotely sensed data products that are customized to specific Tribal needs, so this project includes a technology transfer component. This part of the project will assist the Tribe in acquiring its own hardware and software. USGS remote sensing and image processing experts are training selected San Carlos Tribal and Bureau of Indian Affairs personnel to use remote sensing imagery for environmental resource applications. Contacts: Ed Pfeifer (USGS), 520-670-5019, epfiefer@usgs.gov or Dee Randall, San Carlos Tribe, 928-475-2326

Backhoe operator Melvin Kindelay, on the San Carlos Apache Reservation, trenches reservoir sediment, preparing the ground for USGS cores sampling. Photograph by David Fey, USGS.

Hydrogeologic Study of the Upper and Middle Verde River Watershed, Arizona

The population of Yavapai County, Arizona, is growing rapidly, resulting in an increased demand on water resources in the upper and middle Verde River watershed. The watershed contains a thriving riparian zone and is the primary water supply for the county, as well as for large populations further downstream, including the Yavapai-Prescott Indian Tribe and the Fort McDowell Yavapai Nation. The hydrogeologic system in the watershed has not been comprehensively studied and the effects of historic and present development on regional water resources are poorly understood. Beginning in 2001, this study was funded by the Yavapai County Water Advisory Committee to improve hydrologic and geologic information upon which water resource decisions will be based. This study is augmenting a larger investigation supported by the State of Arizona. These investigations will produce data to be used in a ground-water flow model and will provide critical information to water managers and users. Contact: Victoria Langenheim, 650-329-5313, zulanger@usgs.gov or Kyle Blasch, 520-670-6671, ext. 283, kbalsch@usgs.gov



San Carlos Reservoir Sediment Study (Arizona)

The Bureau of Indian Affairs asked USGS to conduct a sediment study of the San Carlos Reservoir in June 2004 to provide data to identify potential aquatic and human health concerns. The reservoir is on the lands of the San Carlos Apache Tribe. USGS scientists sampled the reservoir, the San Carlos, Gila, and San Francisco Rivers during the last 2 weeks of October 2004. Samples have been analyzed for several purposes including: to determine the age of reservoir sediment; to identify, if present, a suite of potentially toxic trace elements; to examine fate and transport mechanisms and residence in the sediment; and to determine the concentrations of dioxins in reservoir sediment from herbicide applications in the watershed during the 1960s and 1970s. Access and assistance was provided by the San Carlos Apache Tribe during the sampling expeditions. Analytical work was completed in January 2005 and a manuscript approved for publication in April 2005. Contact: Stan Church, 303-236-1900, schurch@usgs.gov or LaDonna Choate, 303-236-1241, lchoate@usgs.gov

Copper Mines and Ground-Water (Arizona, Colorado, New Mexico)

Ground-water withdrawals associated with the first major copper mine proposed for Arizona since 1973 have the potential to affect existing water rights and water supplies of the area. At the request of the Secretary of the Interior, USGS hydrologists in Arizona worked with the Bureau of Land Management, Bureau of Indian Affairs, and other parties to develop a plan to monitor impacts to the ground-water system caused by mine-related pumping. The results could affect the claims to water by the Gila River Indian Community and the San Carlos Apache Tribe. The USGS is providing quality control on the hydrologic data collected as part of the ground-water monitoring plan. In FY 2005, USGS scientists finished inventorying the Phelps Dodge Corporation monitoring wells in Safford, Arizona, as part of the USGS oversight of ground-water monitoring in the area. Contact: Bruce Gungle, 520-670-6671, ext. 233, bgungle@usgs.gov

Inventory of Vascular Plants and Vertebrate Animals (Arizona, Colorado, New Mexico)

An extensive inventory study of the southern Colorado Plateau region was completed in 2005. The project has been a collaborative effort of the National Park Service, the USGS Southwest Biological Science Center, and Native American Tribes of the area, including the Navajo Nation, Ute Mountain Ute Tribe, and the Havasupai Tribe. Inventory studies of vascular plants and vertebrate animals have been conducted in all of the National Park Service lands in the four-state region (northern Arizona, northwestern New Mexico, southwestern Colorado, and southern Utah). Some of these areas are partly or wholly on Tribal lands (Navajo National Monument and Canyon de Chelly National Monument, on Navajo lands) and most other areas border on Tribal lands. Navajo Natural Heritage staff had lead responsibility for some of the inventories (as at Navajo National Monument, Canyon de Chelly National Monument, and Hubbell Trading Post National Historic Site), although USGS researchers were primarily responsible for the remaining areas. The studies have yielded a more complete picture of the plant and animal communities of this poorly studied region, have added new records of species identified at all of the areas studied, and have produced substantial new information on the biology, ecology, and natural history of the region. Results of the work are available at http://www.nature.nps.gov/im/units/scpn/inventories.htm, or from the USGS Southwest Biological Science Center. Contact: Charles Drost, 928-556-7187, charles_drost@usgs.gov

Limnological Monitoring of Coeur d'Alene Lake, Idaho, by USGS and the Coeur d'Alene Tribe

The USGS, in cooperation with the Coeur d'Alene Tribe, completed the second year of a 3-year cooperative program to monitor and evaluate water-quality conditions in north Idaho's Coeur d'Alene Lake, a 50-square mile lake with a long history of nutrient enrichment and metal contamination problems. Tribal scientists monitored water quality at 20 near-shore sites around the lake; USGS scientists monitored five deep-water sites on the lake. All water-quality samples were analyzed by the USGS National Water Quality Laboratory in Denver, Colorado. The final year of the program, FY 2006, will include continued monitoring of the deep-water sites, cooperative preparation of an interpretive report, and the design of a long-term water-quality monitoring program beyond FY 2006. Contact: Paul F. Woods, 208-387-1353, pfwoods@usgs.gov

Supporting Endangered Kootenai River White Sturgeon Recovery Efforts (Idaho)

The USGS participated with the Kootenai Tribe of Idaho to develop short-term research needs for restoration of endangered white sturgeon in the Kootenai River. The participation led to a proposal for research submitted to the Northwest Power and Conservation Council and resulted in a 5-year implementation plan for conducting the work. The plan has been submitted to the Kootenai River White Sturgeon Recovery Team. Contact: Mike Parsley, 509-538-2299, ext. 247, michael_parsley@usgs.gov

Enhancing Kootenai River White Sturgeon Spawning Habitat (Idaho)

The USGS Idaho Water Science Center and the USGS National Research Program, in cooperation with the Kootenai Tribe of Idaho, are studying the spawning habitat of the endangered Kootenai River white sturgeon. About 500 wild sturgeon remain and they spawn at specific locations within the spawning reach. The results of this project will be used by the Kootenai Tribe and others to evaluate the feasibility of various recovery actions on improving substrate conditions in Kootenai River white sturgeon spawning areas. The Kootenai River is an international watershed and the river is the second largest tributary to the Columbia River. During the last 80 years, the hydraulic, sediment transport, and substrate characteristics of the Kootenai River have been altered due to construction and operation of Libby Dam, dike construction, and wetlands drainage, resulting in the decline of many resident fish populations including burbot and Kootenai River white sturgeon. One limitation to white sturgeon spawning success may be the change from the natural fluctuations in flow and sedimentation in sturgeon spawning areas resulting from the operation of the dam. The USGS and the Kootenai Tribe of Idaho continue working together to sample and characterize the spawning habitat of the Kootenai River white sturgeon near Bonners Ferry, Idaho. The scientists are using hydraulic and sediment-transport models to assess the feasibility of restoring natural recruitment. The USGS continues developing a multidimensional computer model of the spawning reach that simulates river depth, down-stream and cross-stream-flow velocities, flow direction, and sediment motion over a large range of streamflows. The model can simulate historic river flows as well as river management scenarios and will be used to design spawning habitat enhancement scenarios. USGS is also creating a computer model of streamflow in the river throughout Idaho. These models are currently being used to identify features in the river, such as zones of streamflow velocity acceleration, which can influence white sturgeon spawning patterns. The models and habitat data developed as products of this project will assist the Kootenai Tribe in determining white sturgeon habitat requirements for successful recruitment. Recruitment refers to a spawning event that produces juvenile fish that survive to create a

new-year class of fish in sufficient numbers to maintain fish population. Several reports on these activities can be found at http://id.water.usgs.gov/projects/kootxsections/index.html. Contact: Gary Barton (USGS), 253-428-3600, ext. 2613, gbarton@usgs.gov or Sue Ireland (Kootenai Tribe of Idaho), 208-267-3620, Ireland@Kootenai.org

Te-Moak Tribe of Western Shoshone Contamination Concerns (Nevada)

USGS staff met with South Fork Indian Reservation staff (Te-Moak Tribe of Western Shoshone Indians of Nevada) and a representative of USEPA to discuss water-quality issues on the Reservation. Issues discussed included: metals contamination from abandoned base metal mines in Long Canyon; nutrient and bacteria contamination of ground- and surface-water resources by land-use practices; and pesticide contamination of ground and surface water. Discussions are continuing on how the USGS can assist the Tribe with these issues. Contact: Mike Lico, 775-887-7626, mlico@usgs.gov

Mercury Deposition in Wildhorse Reservoir, Shoshone-Paiute Tribes of Duck Valley Reservation (Idaho, Nevada)

Wildhorse Reservoir in northeastern Nevada is used for irrigation by the Shoshone-Paiute Tribes of the Duck Valley Reservation. The reservoir is immediately down-wind of mines that release mercury into the atmosphere during gold ore processing. During FY 2005, sediment cores were collected from the reservoir. The sample will be analyzed for mercury and other trace elements to determine if deposition of mercury has changed during recent times. Data collection was a cooperative activity between the Tribe and USGS. Contact: Tom Lopes, 775-887-7688, tjlopes@usgs.gov

Shoshone-Paiute Tribes National Map Collaboration with USGS (Idaho, Nevada)

The Shoshone-Paiute Tribes of the Duck Valley Reservation entered a cooperative agreement with the USGS to enhance Tribal GIS data holdings and display selected data holdings on *The National Map*. The Tribe collaborated with the USGS to acquire a large format plotter to enhance Tribal mapping capabilities. The plotter capability will be used to improve accuracy of Tribal data sets and to increase the effectiveness of the Tribes' Geographic Information Systems Department in serving Tribal Council needs. USGS and Tribal personnel are developing a plan for long-term data maintenance and data serving. Contact: Tracy Fuller, 208-387-1351, tfuller@usgs.gov or Mary Howard, 775-757-2440

Cui-ui in Pyramid Lake, Nevada

The cui-ui is an endangered fish of the sucker family that is found only in Pyramid Lake, Nevada. The Pyramid Lake Paiute Tribe and other Northern Paiutes historically relied upon annual spawning runs of cui-ui for food. Cui-ui also are culturally important to the Pyramid Lake Paiutes. Since the Tribe controls use of Pyramid Lake and fully supports efforts to restore the cui-ui population, the Tribal Council has passed resolutions prohibiting harvest of cui-ui by non-Indians and Tribal members. The USGS is continuing studies of the population dynamics and reports results to the Tribal Chairman. Adult cui-ui are netted at the south end of Pyramid Lake in the spring and are marked to determine the mortality rate. Fish are recaptured in the fall at selected stations around the lake to determine juvenile population size and estimate mortality over the summer. Contact: Gary Scoppettone, 775-861-6390, gary_scoppettone@usgs.gov

Fallon Basalt Aquifer (Nevada)

The Fallon Paiute-Shoshone Tribe, the U.S. Navy, the Bureau of Reclamation, and the Nevada Division of Water Resources are cooperating with the USGS Nevada Water Science Center on a study to better define sources of water, controls on its use, and the water quality of the Fallon basalt aquifer. This aquifer is the sole source of drinking water for the Fallon Paiute Shoshone Tribe, the City of Fallon, and the Fallon Naval Air Station. The Fallon Paiute-Shoshone Tribe is contributing data and funding to the project and is providing access to Tribal lands for this study. The USGS scientists completed and published a report, http://pubs.water.usgs.gov/sir2005-5102, that discusses potential geochemical reactions caused by injection of surface water into the basalt aquifer and concludes that injection may increase arsenic concentrations in the basalt aquifer. A study to determine the potential for formation of chlorination byproducts from injection of treated surface water into the basalt aquifer was completed and a summary report is available at http://pubs.water.usgs.gov/sir/2005/5142. That report concludes that laboratory tests produced concentrations of trihalomethanes that exceeded drinking-water standards, but that concentrations within the basalt aquifer may be considerably less because of the ability of the aquifer materials to consume dissolved organic carbon. Active studies of the Fallon basalt aquifer were suspended in FY 2005. Contact: Douglas Maurer, 775-887-7631, dkmaurer@usgs.gov

Hydrologic Information for the Walker River Paiute Tribe (Nevada)

During irrigation season, the USGS Nevada Water Science Center continues to collect pH and specific conductance measurements for the Walker River Paiute Tribe. The information helps the Tribe manage its water quality. Contact: Kerry Garcia, 775-887-7659, ktgarcia@usgs.gov

Hydrologic Study of the Walker Basin, Walker River Paiute Tribe (Nevada)

USGS scientists began a study in FY 2004 to quantify streamflow in the Walker Basin, to determine evapotranspiration losses from natural and agricultural vegetation and the surface of Walker Lake, and to develop an improved water budget for Walker Lake. The study includes many tasks. Ground-water data and evapotranspiration data are being collected. Geophysical data, including seismic, LIDAR (laser-imaging technology for high-resolution elevation data), and bathymetric data, were collected. Single-beam sonar data were combined with LIDAR data to refine the lake elevation/surface area/volume relation up to an elevation of 4,083 feet, the lake elevation in 1882. Sidescan sonar also was used to obtain images of the mounds identified using single-beam sonar, however, no mounds were found. A computer model is planned that will use these and other data collected throughout the basin to predict how changes in irrigation practices in the Walker Basin will affect flows in the lower Walker River. Results of the study will be used by agencies involved in ongoing mediation. Although this work is funded by the Bureau of Reclamation, access to the Walker River Paiute Tribal lands is critical to the success of the study. A Memorandum of Understanding between the Tribe and USGS allowing continued access to data-collection sites was signed by the Tribal Council. Contact: Tom Lopes, 775-887-7688, tjlopes@usgs.gov

Water and the Duckwater Shoshone Tribe (Nevada)

A USGS hydrologist met with the Duckwater Shoshone Tribe concerning the installation of streamgaging on a regional flowing spring. Tentative plans are to revamp the diversion structure on the outflow of the spring, which will allow for diversion of spring water to reestablish a wetland area while still providing irrigation water to Tribal lands. Talks are continuing into FY 2006. Contact: Don Harper, 702-564-4528, harper@usgs.gov

Assistance to the Northwest Indian Fisheries Commission (Washington)

The USGS Washington Water Science Center in cooperation with the Northwest Indian Fisheries Commission prepared a scientific framework for assessing Tribal water resources in western Washington. The framework (USGS Open-File Report 2005-1390; http://pubs.usgs.gov/of/2005/1390/) describes approaches for assessing water availability, out-of-stream uses, and ecological needs for water. The USGS will be working with the Northwest Indian Fisheries Commission and its 22-member Tribes in western Washington to implement the assessment, facilitating Tribal protection, restoration, and management of their water resources. Contact: Chris Konrad, 253-428 3600, ext. 2634, cpkonrad@usgs.gov

White Sturgeon Restoration in the Columbia River (Washington)

USGS fishery biologists are participating with the Spokane Tribe of Indians, the Confederated Tribes of the Colville Reservation, and Columbia River Inter-Tribal Fish Commission fishery biologists to restore declining white sturgeon populations in the Columbia River basin. Restoration of this species is especially important because of the cultural significance of these fish. Federal scientists and Tribal representatives continue working together on the Upper Columbia River White Sturgeon Recovery Team and collaborate on research projects funded by the Bonneville Power Administration. Contact: Mike Parsley, 509-538-2299, ext. 247, michael_parsley@usgs.gov

Searching for the Source of Contaminants in the Nooksack River Basin (Washington)

The Nooksack Indian Tribe wants to improve its understanding of the fate and transport of fecal coliform and nitrate contaminants as the contaminants move from agricultural fields to the ground-water system and eventually to surface-water systems in the lower Nooksack River Basin. Additional information about the extent of denitrification also is needed by the Tribes to provide realistic constraints on water-quality models that are used to make Tribal water-resource management decisions. Stream locations where ground- and surface-water exchanges occur were identified, sampled, and studied. Samples of ground water discharging through streambeds rarely contained appreciable concentrations of *E. coli* and nitrate, indicating that this was not the predominant source of these constituents found in surface waters. A laboratory microcosm study indicated that concentrations of *E. coli* bacteria present in streambed sediments are reduced by half every 8 to 14 days. The results of the study were published in USGS Scientific Investigations Report 2005-5255 (http://pubs.usgs.gov/sir/2005/5255/) during FY 2005. Contact: Steve Cox, 253-428-3600, ext. 2623, secox@usgs.gov

Air monitor and meteorological station at Seven Bays, Washington—looking west toward Lake Roosevelt and the lands of the Confederated Tribes of the Colville Reservation. Pictured, from left to right, are Paul Lamothe, USGS; Mike McKay, Spokane Air Pollution Control Authority; and Mike Majewski, USGS. Photograph by Sue Kahle, USGS.

Shallow and Airborne Trace Metal Concentrations from Lake Roosevelt (Washington)

Lake Roosevelt is a 125-mile-long reservoir in eastern Washington that extends from Grand Coulee Dam almost to the Canadian border. Mining waste has contaminated the lake sediment, leading to concerns about the contamination effects on human health. During periods when the water level of the reservoir is lowered, large areas of contaminated sediment are exposed. Upon drying, the fine-grained portion of the sediment can become airborne due to high winds. The Confederated Tribes of the Colville Reservation want to know more about the potential threat to human health of trace metals in exposed sediment from the lake. USGS scientists sampled trace metals in the exposed fine-grained sediment during the 2001 drawdown of the reservoir. Results were published in USGS Water-Resources Investigations Report 03-4170; http://pubs.usgs.gov/wri/wri034170/. Following this initial sampling of exposed sediment, a network of air-quality monitors was established to determine the presence, concentrations, distribution, and seasonal variability of selected trace elements on airborne dust particles, and, to the extent possible, the fraction of airborne trace elements originating from exposed lakebed sediments. The network was established in FY 2002 and is expected to continue through FY 2006. Contact: Mike Majewski, 916-278-3086, majewski@usgs.gov or Sue Kahle, 253-428-3600, ext. 2616, sckahle@usgs.gov

Trace-Elements Effects on Water Quality and Biological Health, Lake Roosevelt National Recreational Area (Washington)

Mining wastes and other upstream activities have introduced large quantities of metals into Lake Roosevelt, causing concerns about the effects of these contaminants on fisheries resources. This USGS project, conducted in cooperation with the National Park Service, included sampling and analyzing sediments from eight sites on Lake Roosevelt for concentrations of metals, as well as biological toxicity, bioaccumulation potential, and geochemistry. The results will help characterize the environmental processes resulting in the uptake of metals to the water and biota in the lake. Because Lake Roosevelt is a cultural and economic resource for the Confederated Tribes of the Colville Reservation and Spokane Tribe of Indians, the USGS coordinated the selection of sites with the Tribal Historical Preservation Officers (THPO) of both Tribes and National Park Service archeologists. Upon request of the Confederated Colville Tribes' THPO, collection of sediment at three sites was monitored by an NPS archeologist in FY 2004. Consultation with the THPO of the Spokane Tribe of Indians resulted in no additional action during sampling. The chemical analyses and biological tests for the study were completed in FY 2005 and are being interpreted for publication in the peer-reviewed literature. Contact: Tony Paulson, 253-428-3600, ext. 2681, apaulson@usgs.gov

Trace-Element Concentrations in Sediment Cores and Rates of Sediment Accumulation in Lake Roosevelt (Washington)

Lake Roosevelt is a cultural and economic resource for the Confederated Tribes of the Colville Reservation. Mining waste and other upstream activities have contaminated the lake, leading to concerns about the contamination effects on human health. Other aspects of the contamination have been studied, but little is known about trace-element concentrations in the sediment accumulated at depth within the reservoir since it was built. Six deep sediment cores were collected from slack-water sections of the reservoir during FY 2003. Selected parts of the cores were analyzed for concentrations of trace elements, including arsenic, cadmium, copper, lead, mercury, and zinc. The samples also were age-dated. Slag particles identified in some of the core samples show signs of chemical and mechanical weathering. Sampling results were analyzed and published in FY 2005 in USGS Scientific Investigations Report 2004-5090; http://pubs.usgs.gov/sir/2004/5090/. Contact: Steve Cox, 253-428-3600, ext. 2623, secox@usgs.gov

Toxicity Issues Related to Sturgeon Recovery Efforts (Washington)

USGS scientists, in cooperation with the U.S. Fish and Wildlife Service (USFWS), met with representatives of the Confederated Tribes of the Colville Reservation to help design research to study the role of toxicity in the recovery efforts for sturgeon. This meeting was organized at the request of the Tribes and consultants from Environment International Ltd. Toxicology studies performed during Natural Resource Damage Assessments conducted by USGS were reviewed. Options for toxicity evaluations were provided and information regarding mercury studies performed by USGS was provided to the Tribes, at their request. The Colville Tribes and the USFWS will use this information as they proceed with Sturgeon Recovery efforts and related toxicity issues. Restoration of this species is especially important because of the cultural significance of these fish. Contact: Aïda Farag, 307-733-2314, ext. 11, aida_farag@usgs.gov

Joint USGS and Skagit System Tribal Cooperative Research Identifies Critical Habitat for Chinook Salmon (Washington)

The USGS Western Fisheries Research Center and the Skagit River System Cooperative collaborated to investigate whether rearing Chinook salmon in the Skagit River delta increases the survival of juveniles and whether limitations in the amount of that habitat is limiting the Skagit population of Chinook salmon. The Skagit River System Cooperative has been monitoring densities and size of juvenile salmon for more than a decade and collecting samples for USGS to analyze otoliths (ear "bones") to reveal specific rearing strategies used by the juvenile salmon. Fish otoliths accumulate daily growth rings that are spaced proportionally to the growth rate of the fish. These rings also correspond to movement among freshwater, delta, and bay habitats. This research has shown that the longer juvenile salmon stay and grow in the delta, the faster they grow when they move on to the bay. Faster growth in the bay should increase survivability because faster growth reduces vulnerability to predation in the bay. These and other data from this research show that the remaining delta habitat is insufficient to support the number of juvenile salmon produced in many years. Therefore, restoring delta habitat that was formerly lost to diking is a promising means to increase the numbers of adult Chinook salmon in the Skagit River. The results have provided a solid basis for advocating delta restoration in the Skagit River and other rivers of Puget Sound, and already have led to initiation of several habitat restoration projects in the Skagit River delta. Contact: Reginald Reisenbichler, 206-526-6559, reg_reisenbichler@usgs.gov

Ground-Water Resources of the Yakima River Basin (Washington)

Surface water in the Yakima River Basin is being adjudicated. The amount of surface water available for appropriation in the Yakima River Basin is not known, but there are increasing demands for water for municipal, fisheries, agricultural, industrial, and recreational uses. These demands must be met either by ground water and/or by changes in the way water resources are allocated and used. The USGS, in cooperation with the U.S. Bureau of Reclamation and the Washington State Department of Ecology, is studying the availability of ground water, and working with the Confederated Tribes and Bands of the Yakama Nation. An improved understanding of the ground-water system will help estimate the effects of selected management strategies and the effects of current and potential future ground-water pumping on streamflow. Streamflow is important to the life-history stages of salmonids, which are of cultural and religious importance to the Yakama Nation. A ground-water model will be constructed to improve understanding of the system and to help estimate the effects of selected management strategies. The model will address the effects of potential future ground-water pumping on streamflow. New methods were developed to thermally profile long river reaches to locate areas of large ground-water contributions and to identify potential areas of good salmonid habitat. Contact: John Vaccaro, 253-428-3600 ext. 2620, jvaccaro@usgs.gov

Yakima River Basin Stream Quality and Biological Communities (Washington)

The lands of the Confederated Tribes and Bands of the Yakama Nation encompass more than 100,000 intensively irrigated acres within the Yakima River Basin. Agricultural runoff throughout the Yakima Basin continues to be assessed as part of a National Water-Quality Assessment Program. Agricultural runoff was collected from a network of sites on small watersheds to assess the effect of nutrient levels on surface-water chemistry, algae, and aquatic insects. The intent of the assessment is to determine a threshold of nutrient levels capable of sustaining

Measuring differences between ground-water and surface-water levels in the Yakima River in an area where juvenile Steelhead trout, which are endangered, rear.

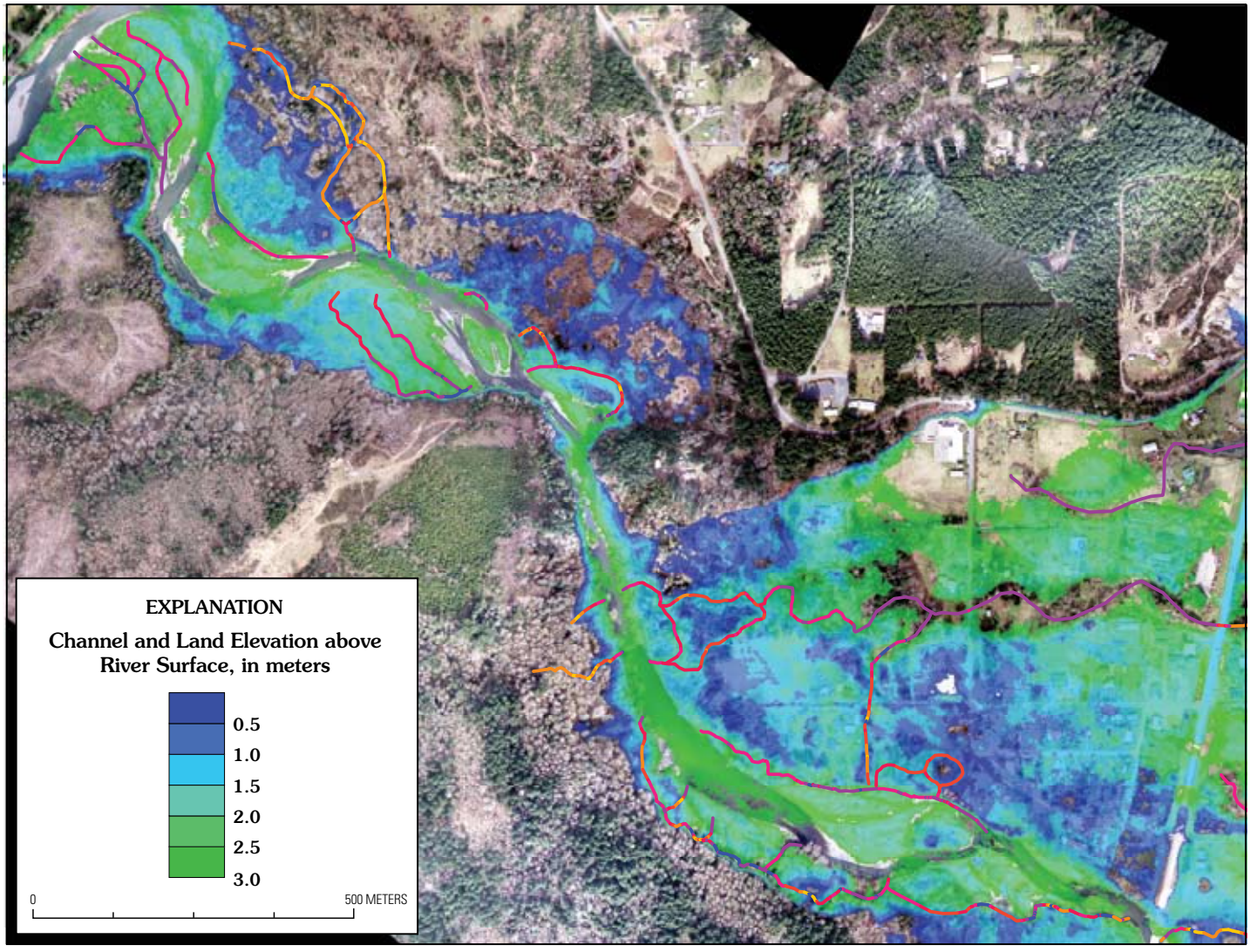
healthy aquatic communities. In addition, a study of agricultural chemicals was evaluated in a small basin within the Yakima River Basin to examine the movement of chemicals from the land surface to ground water and surface water. Additional information on this project and the resulting publications are available on the web at http://wa.water.usgs.gov/projects/ccyk/. Contact: Robert W. Black, 253-428-300, ext. 2687, rwblack@usgs.gov

Steelhead Restoration (Washington)

USGS fishery biologists continue cooperating with the Confederated Tribes and Bands of the Yakama Indian Nation in an effort to restore steelhead trout in the Wind River basin in southwestern Washington. Federal scientists and Tribal representatives worked together on a Technical Advisory Committee to the Wind River Watershed Council. For more information about this project, please go to the following website: http://biology.usgs.gov/wfrc/crrlhome/windriver.htm Contact: Pat Connolly, 509-538-2299, ext. 269, patrick_connolly@usgs.gov

Watershed Restoration for Reintroduction of Salmon and Steelhead (Washington)

USGS fishery biologists are continuing a partnership with the Confederated Tribes and Bands of the Yakama Indian Nation fishery biologists in an effort to assess and restore the Rattlesnake Creek watershed of the White Salmon River basin. Restoration of this watershed is especially important because of the possible reintroduction of salmon and steelhead above Condit Dam on the White Salmon River. Federal scientists and Tribal representatives worked together on a Technical Advisory Committee to the White Salmon Watershed Management Council. A USGS website for the project is http://wfrc.usgs.gov/research/fish%20populations/STPetersen2.htm Contact: Pat Connolly, 509-538-2299, ext. 269, patrick_connolly@usgs.gov



Side channels mapped with remote-sensing data overlayed with height above adjacent river elevation. Image courtesy of Joseph Jones, USGS.

Water Management and Steelhead on National Wildlife Refuges (Washington)

USGS fishery biologists from the Western Fisheries Research Center are continuing to study the effects of water and land management at Toppenish National Wildlife Refuge (managed by the U.S. Fish and Wildlife Service). Fishery biologists of the Confederated Tribes and Bands of the Yakama Nation are cooperating in this study. The study involves estimating the number of steelhead that enter the refuge, their residence times, and their condition and growth rate. The Toppenish National Wildlife Refuge is adjacent to the Yakama Indian Reservation in southern Washington. Information will help refuge managers make decisions about managing water movement, constructing or removing dikes, or altering vegetation types. The reports on this project were completed in FY 2005. A USGS website for the project is http://wfrc.usgs.gov/research/aquatic%20ecology/STPetersen13.htm Contact: Jim Petersen, 509-538-2299, ext. 236, jim_petersen@usgs.gov

Dosewallips River—Geomorphic Mapping Using Remote Sensing (Washington)

The USGS Washington Water Science Center is cooperating with scientists of the Port Gamble S'Klallam Tribe to map areas where habitat restoration activities will provide the greatest improvements for fisheries listed under the Endangered Species Act. The Dosewallips River, on the west coast of Hood Canal in Washington, is one of the streams least affected by human activities, although historical logging and some development have substantially changed the river's ability to support fisheries. Remote sensing data—LIDAR (laser-imaging technology for high-resolution elevation data) and digital color orthophotography—have been used to identify overflow channels, abandoned stream channels, and floodplain shelves near the river elevation where restoration activities may turn them into high-quality salmon habitat. Elevation maps, slope maps, and digital color imagery were interpreted and mapped using geographic information systems software with multiple lines of supporting evidence, and supported by field reconnaissance. As large woody debris naturally returns to the stream, or is placed as part of a restoration plan, these near-stream channels and shelves will provide salmon spawning and rearing habitat. This work published in the November 2006 *Photogrammetric Engineering & Remote Sensing* as "Side Channel Mapping and Fish Habitat Suitability Analysis Using Lidar Topography and Orthophotography," p. 1202–1206. Contact: Joseph L. Jones, 253-428-3600, ext. 2684, jljones@usgs.gov

Elwha Sediment Model—Transport of Suspended Sediment and Effect on Aquatic Habitat in Elwha River (Washington)

The USGS Washington Water Science Center is modeling fluvial sediment transport in the Elwha River to help management agencies understand the potential changes in hydrology and sediment transport in response to the scheduled removal of two dams on the river. A sediment-transport model has been constructed to examine the response of suspended-sediment concentrations and the size of streambed material to different streamflow scenarios. The results will provide information about the potential effects of dam removal on resources of interest to the Lower Elwha Klallam Tribe, including salmon habitat and the recovery of the river after dam removal. The model will be completed and a final report will be prepared in FY 2006. Contact: Chris Konrad, 253-428 3600, ext. 2634, cpkonrad@usgs.gov

Native American Traditions of Earthquakes and Tsunamis in the Northwestern United States (Oregon, Washington)

Native American traditional ecological knowledge complements modern scientific studies of earthquake, tsunami, and landslide hazards. Recent findings in this field, reported by Ruth Ludwin and others in *Seismological Research Letters* (v. 76, p. 140–148), caught the attention of *The New York Times* ("When Bird and Whale Shook the Earth," August 2, 2005) and *Science* ("Tracking Myth to Geological Reality," November 4, 2005). The findings helped inspire, in addition, an Oregon State memorial, dedicated November 20, 2005, to the uncounted Native Americans who must have lost their lives to a tsunami generated along the continent's northwest coast in January 1700. The USGS has just published a book on that tsunami (http://pubs.usgs.gov/pp/pp1707/). The book presents two Native American traditions and archaeological evidence (p. 12–13, 20–-21). Contact: Brian Atwater, 206-553-2927, atwater@usgs.gov

Bacterial Cold Water Disease Research (Oregon, Washington)

The Northwest Indian Fisheries Commission was instrumental in formation of a Bacterial Cold Water Disease Research Group, composed of fish health professionals from Federal, State, Tribal, and academic entities in the Pacific Northwest. The purpose of the group is to facilitate development of novel approaches for the prevention and control of this important disease affecting both wild and hatchery fish stocks. Losses from Bacterial Cold Water Disease at tribal hatcheries in the Pacific Northwest can be severe and current prevention and control strategies are largely dependent upon use of drugs or improvements to the rearing environment for the fish. Scientists at the USGS Western Fisheries Research Center have hosted the working group meetings and have begun to develop quantitative diagnostic assays for the causative agent, *Flavobacterium psychrophilum,* which will be useful for determining how BCWD is transferred from adult to fry. Contact: James Winton, 206-526-6587, jim_winton@usgs.gov

Ground-water Supply on the Umatilla Indian Reservation (Oregon)

In cooperation with the Confederated Tribes of the Umatilla Indian Reservation, the USGS continues a 3-year study to understand ground-water flow in the water-bearing zones of the Columbia River Basalt Group. Wells tapping the basalt provide drinking water for the Umatilla Tribes in this part of arid north-central Oregon. Permeable zones in the basalt were identified using borehole geophysics and help to explain differences in water levels in Tribal water supply wells. Comparing ground-water levels, water use, and precipitation will provide information to understand how these stresses affect aquifer water levels and the Tribal water supply. Contact: Terrence Conlon, 503-251-3232, tdconlon@usgs.gov

Geospatial Support for the Warm Springs Tribe (Oregon)

The USGS Oregon Geospatial Liaison and the Geovisions manager continued discussions on how the Confederated Tribes of the Warm Springs Reservation could partner with USGS on *The National Map* and National Spatial Data Infrastructure framework activities in Oregon. Geovisions is the Warm Springs Tribal GIS Enterprise. USGS provided Department of Interior High Priority Digital Data Program 2002 Deschutes River high-resolution elevation (LIDAR) data to Geovisions. These data will help the Tribe and their partners to conduct planning and analysis for the Deschutes Basin conservation planning effort. Their partners include Federal agencies doing conservation work in the basin and agencies from the six Oregon counties that encompass the Deschutes Basin. Contact: Nancy Tubbs, 503-251-3210, tubbs@usgs.gov

Spring Chinook Salmon on the Deschutes River, Oregon

USGS fishery biologists continue cooperating with the Confederated Tribes of the Warm Springs Reservation in the fourth year of a study on the Deschutes River in Oregon. The study will help to determine the distribution, migration behavior, habitat use, and species interactions of juvenile spring Chinook salmon raised in hatcheries and released in the fall on the Deschutes River. In this portion of the study, USGS scientists are helping staff at the Warm Springs National Fish Hatchery evaluate whether or not changes in how they raise juvenile salmon improves the likelihood of the fish migrating to the sea. The USGS role is to develop nonlethal measurement techniques that will predict the behavior of the fish. Working together, scientists from the Confederated Tribes of the Warm Springs Reservation, U.S. Fish and Wildlife Service, and the USGS are sharing the responsibilities for in-stream sampling during this study. Contact: Jim Petersen, 509-538-2299, ext. 236, jim_petersen@usgs.gov

Quantifying the Ground-Water Resources of the Upper Klamath Basin (Oregon, California)

Ground water has long been considered a possible source to meet the increasing demands for water in the upper Klamath Basin. A quantitative understanding of the regional ground-water system is crucial to managing water resources in the basin. However, the amount of ground water that can be pumped without adversely affecting existing well users and streamflow is not well understood. USGS is conducting a 9-year investigation that continues through FY 2007 to quantify the ground-water resources of the upper Klamath Basin. Information obtained through these studies will help determine how ground water can be used to help solve water-supply problems while maintaining ground-water discharge to streams that is critical for aquatic wildlife. The Klamath Tribes reside in the upper Klamath Basin study area. Three additional Tribes (Hoopa Valley, Yurok, and Karuk) reside in the lower basin. All of these Tribes are interested in water resources management in the basin and in the present study. Although the USGS is not cooperating in a formal partnership with Tribes in the basin, project personnel have communicated with Tribal representatives, and in the case of The Klamath Tribes, have worked with Tribal members to obtain access to certain properties and wells for data collection. Tribal representatives have attended some project-related meetings. In May 2005, USGS scientists provided an update on the project and a summary of the results of a review of the Reclamation Pilot Water Bank to the regular government-to-government meeting held between Federal agencies and Tribal representatives. Contact: Marshall Gannett, 503-251-3233, mgannett@usgs.gov

Anadromous Fishery Restoration (California)

In 2005, USGS ecologists continued their participation in the Trinity River Restoration Program (cooperating with the Yurok Tribe and the Hoopa Valley Tribe) and the Klamath River Basin Anadromous Fishery Restoration Program (cooperating with the Yurok Tribe and Karuk Tribe of California). The lead Department of the Interior bureau for coordinating on-the-water sampling of adult and young-of-year (juvenile cohort for that year) salmon and their habitat was the U.S. Fish and Wildlife Service office in Arcata, California, with USGS Fort Collins (Colorado) Science Center collaborating with funding, design, and implementation of the sampling. Sampling data from past years is being analyzed to improve the Klamath River System Impact Assessment Model (SIAM) and the Trinity River young-of-year salmon production model (SALMOD). The goal for both models is to provide a better understanding of water quantity and habitat problems that limit salmonid production. SIAM is available through the USGS Fort Collins Science Center website (http://www.fort.usgs.gov/products/software/siam/siam.asp) as is the user's guide. Contact: Jim Terrell, 970-226-9416, jim_terrell@usgs.gov

Studies of Mesquite Bosques in Death Valley (California)

Two wells were constructed and sediment and plant samples were collected by USGS personnel in a project designed to assess the health of remaining mesquite bosques on and around Timbisha Shoshone Tribal lands within Death Valley National Park. Future plans include additional wells, water and plant sampling, and soil-moisture analyses. The data from this project will help Tribal and National Park Service personnel make water management decisions that will promote the health of the mesquite bosques, which have been slowly dying. Contact: Mike Pavelko, 702-564-4604, mpavelko@usgs.gov

Anza-Terwilliger Hydrologic Study (California)

The USGS California Water Science Center continued its working relationship with the Cahuilla Band of Mission Indians. USGS scientists are conducting water-level measurements in more than 100 existing private wells in the vicinity of Anza and Terwilliger, California. The results will be shown on a map of water-level changes. As a reconnaissance evaluation, Center staff also analyzed nutrients, stable isotopes, and some metal concentrations in a limited number of surface- and ground-water quality samples. Center staff have instrumented two wells with continuous water-level measuring devices. Contact: Dennis Clark, 619-225-6126, daclark@usgs.gov

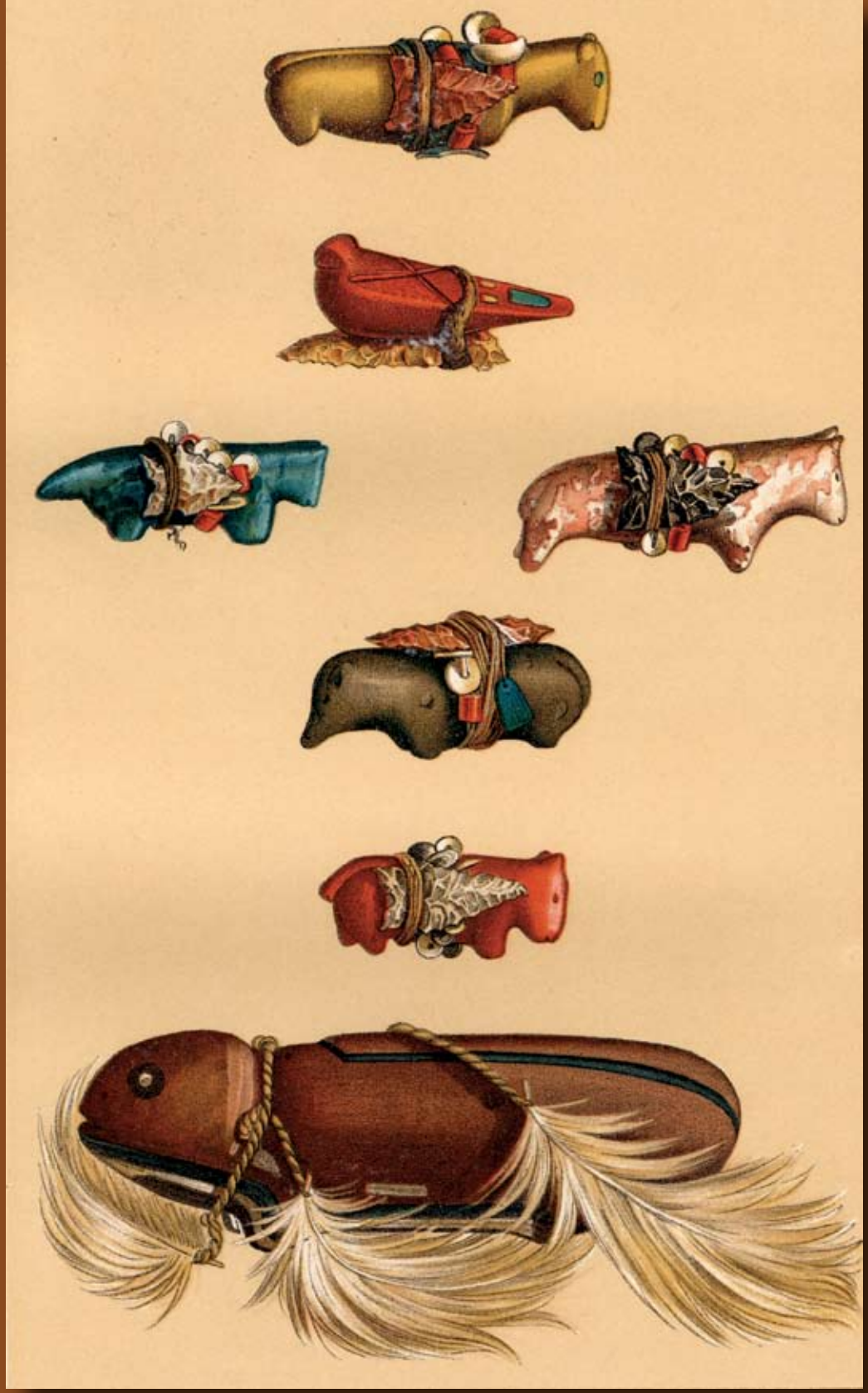
Kawerak's Eskimo Walrus Commission participated in the USGS/USFWS walrus tagging trials in the Bering Sea by sponsoring Michael Apatiki (center, with glasses) of Gambell, Alaska, as the traditional ecological knowledge (TEK) advisor. Photograph by Chad Jay, USGS.

Investigations into the Sources and Structure of Agua Caliente Spring, Agua Caliente Band of the Cahuilla Indians (California)

Agua Caliente Spring is the only known hot spring in the Palm Springs area and one of only a handful in southern California. Little is known about the scientific characteristics of the spring, including the source, age, and sustainability of flow of the hot spring water. The natural seasonal, and longer term, variability of the discharge, temperature, and chemical characteristics of the spring are unknown. The hydraulic connection with cool-water aquifers and the susceptibility to impacts of ground-water development also are not known. This study will define the geology, sources, age, variability, and losses of the spring. The results will provide a greater hydrologic understanding of the warm spring, and allow the Agua Caliente Band of Cahuilla Indians to better manage and use the resource. Contact: John Izbicki, 619-225-6131, jaizbick@usgs.gov

Alaska Walrus Research

Walrus are important culturally and are a source of subsistence food and traditional materials for Alaska Natives and Russians, who harvest the animals annually. However, the size and trend of the walrus population are unknown, largely due to problems with survey methods. The USGS Alaska Science Center and U.S. Fish and Wildlife Service (USFWS) have created a Pacific Walrus Survey Team to develop new survey techniques. The team developed an aerial thermal imaging technique for counting walruses on ice, a remotely deployed satellite-linked transmitter to allow estimation of the proportion of the population not on the ice, and an overall survey design with associated estimation methods. The survey will be conducted in March and April of 2006. Project scientists will receive advice and help in the field from Alaska and Russian Native hunters. Communication during survey planning is facilitated in meetings with the Eskimo Walrus Commission. The results of these ongoing studies, publications, and other data sets will be available through the following website: http://www.absc.usgs.gov/research/walrus/home.html. Contact: Chad Jay, 907-786-7414, chad_jay@usgs



Streamgaging of Sinona Creek (Alaska)

The USGS operates a streamgage on Sinona Creek near Chistochina for the Cheesh-Na Tribal Council. Sinona Creek is an important subsistence fishery. Tribal members have noticed a marked decrease in streamflow the past few years. During site visits, USGS hydrologists provided limited training in streamflow measurement to Tribal members. Contact: Steven Frenzel, USGS Alaska Science Center, 907-786-7000, sfrenzel@usgs.gov

Research on Ichthyophonus and Other Infections of Alaskan Salmon (Alaska)

Scientists at the USGS Western Fisheries Research Center have developed a research proposal in collaboration with fisheries biologists at Kawerak, Inc., the consortium of the 20 federally recognized Tribes in the Bering Straits Region, and with representatives of the Native Village of Unalakleet. The proposal, submitted to the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, is to conduct a fish health survey and to develop this capacity among Alaska Native villages in the region. Recent research at the Western Fisheries Research Center on *ichthyophonus* infections affecting subsistence fisheries along the Yukon River has received exceptional interest from Tribal, Federal and Canadian fisheries managers and the direct assistance from Athabascans of Tanana Village, Galena, Fairbanks, and Nenana, as well as Yupiks of Emmonak, Alaska. Contact: James Winton, 206-526-6587, jim_winton@usgs.gov

Polar Bear Research (Alaska)

The USGS Alaska Science Center's polar bear program actively collaborates and communicates with the Alaska Nanuq Commission and the North Slope Borough Department of Wildlife Management. Efforts to determine polar bear population size, boundaries, and health have direct bearing on the subsistence harvest quota set for Alaska Native hunters. Contact: Steve Amstrup, 907-786-3424, steven_amstrup@usgs.gov

Tanacross, Alaska Uses Geology for Waste Management Plan

Surficial geologic mapping along the Alaska Highway in east-central Alaska was originally undertaken to provide baseline environmental data along the route of a proposed high-pressure natural gas pipeline that would parallel the highway from Fairbanks to the Yukon. The project has produced surficial geologic maps of the Tanacross B6 and B5 quadrangles (Scientific Investigations Maps 2850 and 2856, respectively). The Tanacross B4 map is in production. The Tanacross Corporation owns about 25 percent of the land mapped during this project. Results of the mapping have been shared with the Environmental Director of the Native Village of Tanacross and have been included in the village's Solid Waste Management Plan and in the remediation plan of the Tanacross Airfield site. Contact: Paul Carrara, 303-236-1287, pcarrara@usgs.gov

Modeling Sustainable Gull Egg Harvests from Glacier Bay, Alaska

USGS scientists developed a simulation model to explore effects of harvesting glaucous-winged gull eggs from a colony in Glacier Bay, Alaska, historically used by Huna Tlingit. The model will help National Park Service managers at Glacier Bay National Park develop management policies setting conditions for resuming harvests. An earlier USGS study of traditional egg-gathering practices in Glacier Bay National Park documented the use of selected park areas by Native residents of Hoonah, Alaska, for the bird-egg gathering over several generations. Traditional Huna Tlingit gull egg harvests were not highly ritualized but were sometimes marked by individual spiritual observances. Virtually all Huna respondents responded negatively to the prohibition of their gull egg harvests by the Federal Government. Respondents voiced strong interest in resuming legal gull egg harvests within Glacier Bay National Park and Reserve. This study was completed with the publication of the paper "Balancing predation and egg harvest in a colonial seabird: A simulation model," which was published online in December 2005 and in print in 2006 in *Ecological Modelling*, v. 195, p. 318-326. Contact: John Piatt, Alaska Science Center, 360-385-1007, john_piatt@usgs.gov

Mineral Resources Studies in Southwestern Alaska

The USGS is conducting field-based mineral resource investigations in a poorly known part of southwestern Alaska that is thought to contain undiscovered metallic resources. The USGS study includes geologic field mapping, regional geochemical sampling, and collection of airborne magnetic data for a 7,000-square-mile area within the Bristol Bay Native Corporation (BBNC) regional boundary. Publication of these new data is expected to facilitate mineral exploration, assist in land-use planning, and encourage economic development. The Bristol Bay Native Corporation is interested in bringing resource development to their region and is participating in the study under a Cooperative Research and Development Agreement (CRADA). Using USGS sampling protocols, Bristol Bay Native Corporation geologists and shareholders carried out part of the stream sediment sampling program, thereby augmenting the regional coverage. Contact: Marti L. Miller, 907-786-7437, mlmiller@usgs.gov

Sulfide Oxidation, Metal Fluxes, and Biological Impacts in Coastal Environments of Prince William Sound, Alaska

Field investigations by scientists with the USGS and University of Alaska Anchorage in 2003 and 2005 focused on oxidation of sulfide-rich debris in near-shore environments of Prince William Sound, Alaska. This debris is related to mining near shorelines during the early twentieth century. Specifically, the extent of metal-sulfide oxidation, acid generation, and metal fluxes within the transitional zone between land and sea needed to be delineated to identify potential human and environmental impacts. The studies were directed at near-shore areas below the mine sites, intertidal zones, and shallow subtidal areas offshore. Samples of sulfide-bearing ore and waste, surface water, sediment, microbe-rich precipitates, and shellfish were collected from mine workings, drainages below mines and mine dumps, the mixing zone between groundwater and seawater underlain by beach gravels, and offshore. The field observations and subsequent analytical studies provide evidence that plumes of acidic, metal-rich water resulting from sulfide oxidation are entering the intertidal zone at the Ellamar and Threeman sites in eastern Prince William Sound. At the Beatson mine site (the largest copper deposit in the region) on Latouche Island in western Prince William Sound, metal-rich precipitates are present along drainages and seeps down-slope from the waste dumps and near the intertidal zone. Preliminary results indicate that mussels collected from intertidal areas near the Ellamar, Threeman, and Beatson sites have elevated concentrations of copper and zinc. Reports that include compositional data for samples and descriptions of sulfide oxidation processes, acid generation, and metal transport at these sites are being prepared. The USGS contacted Alaska Native corporations to obtain permission

for access to mine areas. Chugach Alaska Corporation and The Tatitlek Corporation own much of the surface land and some of the underground mine sites in the area. The results of the USGS study have implications for people who use local aquatic resources including shellfish, boating, and other forms of recreation along the shorelines, ecotourism, and the development of new home sites, especially at Ellamar. Contact: Randolph A. Koski, 650-329-5499, rkoski@usgs.gov

Streamgaging of Eklutna River (Alaska)

In continuing cooperation with the Native Village of Eklutna, the USGS Alaska Science Center operates a streamgage on the Eklutna River near Eklutna, Alaska. USGS employees take periodic discharge measurements on the Eklutna River upstream from the confluence with Thunderbird Creek. The Eklutna River, a subsistence fishery for the village, has been adversely impacted by water withdrawal in the headwaters and gravel mining near the mouth. The village is interested in reclaiming the fishery and applying for instream-flow water rights. USGS personnel have been teaching Tribal members how to measure streamflow and archive data. USGS staff also trained Tribal fisheries employees to describe streambed sediments. Contact: Steven Frenzel, 907-786-7000, sfrenzel@usgs.gov

Streamgaging and Water-Quality Characterization near Newtok (Alaska)

In cooperation with the U.S. Army Corps of Engineers, Alaska District, the USGS Alaska Science Center is monitoring the quantity and quality of streamflow near a site being considered for relocation of the Native Village of Newtok, Alaska, on lands within the Yukon Delta National Wildlife Refuge on Nelson Island. The present village site is experiencing severe erosion along the banks of the Ninglick River. The average annual erosion rate is 90 feet per year and it is expected that the land under the homes, schools, and businesses of Newtok will erode within 8 years. Contact: Steven Frenzel, 907-786-7000, sfrenzel@usgs.gov

Streamgaging of Gunnuk Creek (Alaska)

In cooperation with the U.S. Army Corps of Engineers, Alaska District, the USGS Alaska Science Center is monitoring the quantity of streamflow near the construction site of a water-supply dam for the Native Village of Kake, Alaska. Frequent high flows destroyed the previous water-supply reservoir, and continue to hamper new construction. Flood magnitude and frequency are poorly defined throughout Alaska, necessitating on-site measurements. Contact: Steven Frenzel, 907-786-7000, sfrenzel@usgs.gov

Arctic Soils, Metal Uptake, and Moose—Cooperative Studies With BSNC on the Seward Peninsula (Alaska)

The Bering Straits Native Corporation (BSNC) is working with USGS, the Alaska Department of Fish and Game, and the University of Alaska on the south-central Seward Peninsula to study the movement of metals from tundra soils, through browse vegetation, and finally into moose. A large part of these Native lands is underlain by metasedimentary rocks (known generally as the “Nome Formation”) that have been shown to possess variable amounts of bioavailable metals. For example, research has found that the numerous species of willow throughout the area tend to accumulate the metal cadmium from soils derived from certain rock units within the Nome Formation. Subsistence hunting by the Native population results in the annual harvest of moose that feed primarily on willow. This study seeks to examine the relations between a metal-bioaccumulating plant species and moose, and whether there are human health implications from the consumption of moose. Contact: Larry Gough, 703-648-4404, lgough@usgs.gov

Becharof Science Camp (Alaska)

A USGS Alaska Science Center employee participated in a 5-day science camp in a remote area of Becharof National Wildlife Refuge in southwestern Alaska. Fifteen high-school-aged youth from area villages, the majority of which are Alaska Native villages, attended. Besides instructing units on bear, caribou, plant, and ecosystem ecology, USGS also provided instruction on survival skills, lithics (study of stone tools or projectiles), wild edible plants, and tracking. Contact Tom Smith, 907-786-3456, tom_smith@usgs.gov

Eklutna Salmon Habitat Evaluation (Alaska)

Eklutna Incorporated, an Alaska Native corporation founded under the Alaska Native Claims Settlement Act, is assessing the fisheries resources within the Eklutna River drainage. A fishery biologist from the USGS Alaska Science Center worked with the corporation's natural resource specialist to retrieve recording thermographs from the stream substrate at four salmon spawning areas. The data were downloaded, summarized, graphed, and made available to Eklutna Inc. The results demonstrated important differences in intergravel temperatures among the various locations. These differences will be considered for any future salmon stock enhancement or rehabilitation projects. In addition, the USGS scientist made a qualitative evaluation of a section of the river for which habitat rehabilitation is planned and participated in a meeting of the Eklutna Watershed Council to discuss long-term plans for conservation and rehabilitation of river habitats and resources. Contact: Jim Finn, 907-786-3450, jim_finn@usgs.gov

Alaska Marine Mammal Tissue Archival Project (Alaska)

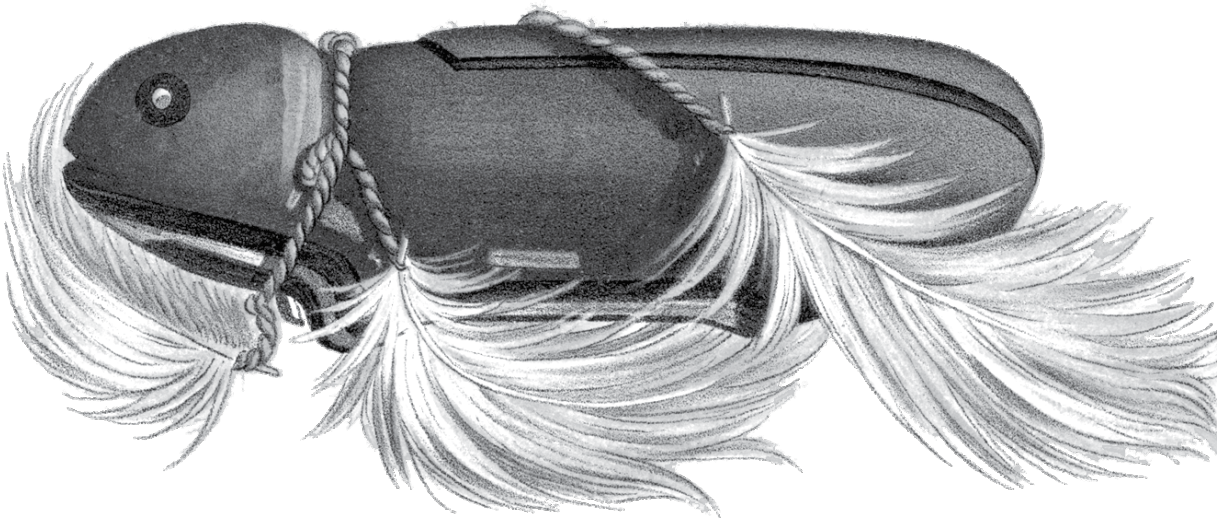
The Alaska Marine Mammal Tissue Archival Project routinely collaborates with Alaska Natives to obtain high-quality tissue samples from marine mammals harvested by subsistence hunters throughout Alaska. During 2005, USGS Alaska Science Center staff worked with subsistence hunters from the North Slope Borough Department of Wildlife Management (Barrow), Natural Resources Department of Kawerak, Inc. (Nome), and the Native Village of Kotzebue to collect tissues for this project. Contact: Kristin Simac, 907-786-3942, kristin_simac@usgs.gov

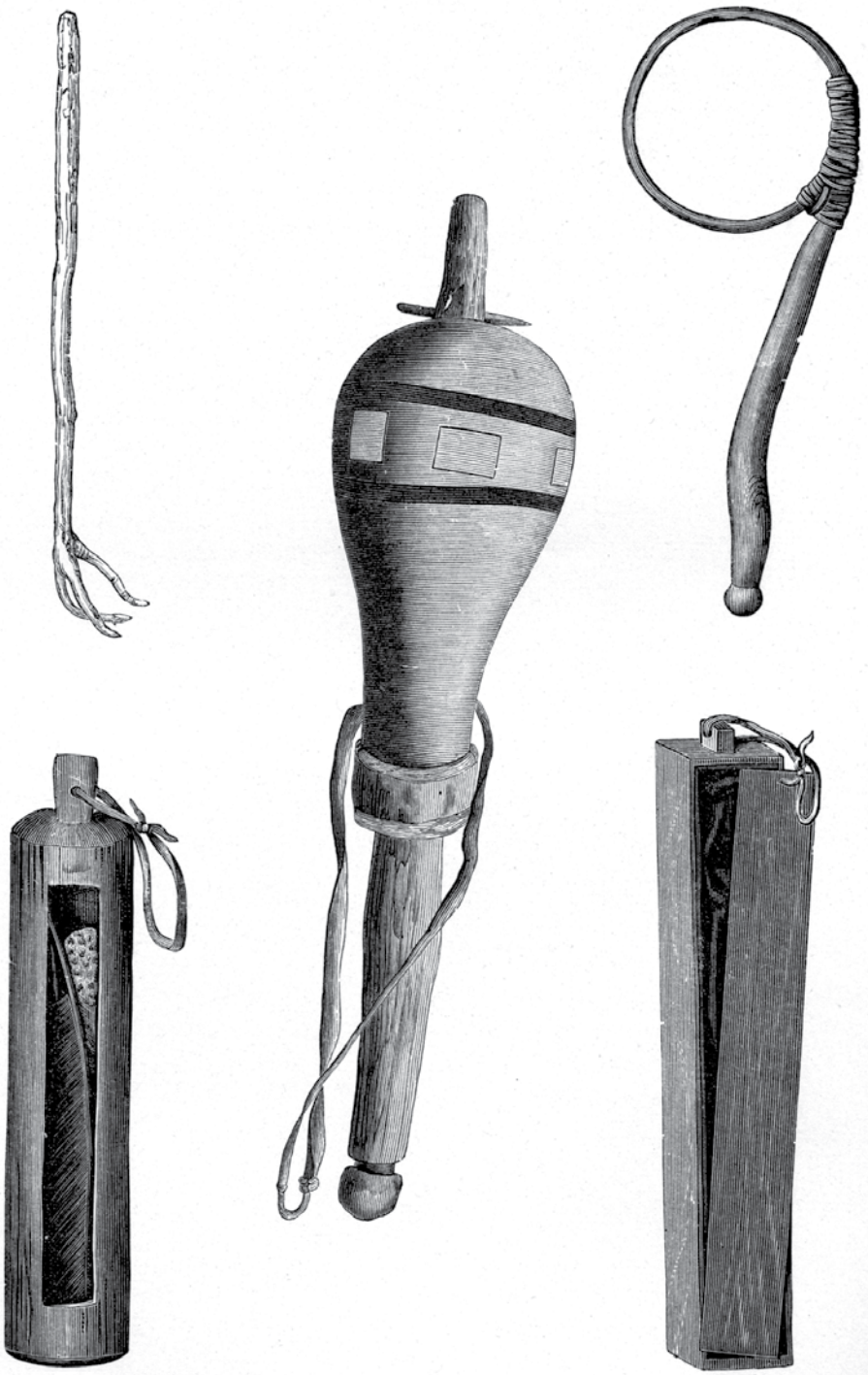
Seabird Tissue Archival and Monitoring Project (Alaska)

In 1998, the Alaska Maritime National Wildlife Refuge the USGS Alaska Science Center, and the National Institute of Standards and Technology (NIST) initiated a joint effort to develop and test protocols for collecting, transporting, processing, and storing seabird eggs collected at colonies on the refuge. Based on this work, a Seabird Tissue Archival and Monitoring Project (STAMP) was designed to gather information for 100 years. The STAMP was implemented in 1999. Through FY 2005, this long-term, cooperative effort has collected more than 350 common and thick-billed murre and black-legged kittiwake eggs at nine seabird colonies on the Alaska Maritime National Wildlife Refuge and three seabird colonies on privately owned lands. The processed contents are cryogenically stored at the NIST National Biomonitoring Specimen Bank in Charleston, South Carolina, for current and future studies of pollutants. The project is also analyzing subsamples of the banked tissues to document baseline levels of persistent bioaccumulative contaminants [for example, chlorinated pesticides, polychlorinated biphenyls (PCBs), mercury] at these Alaskan nesting locations. The STAMP routinely collaborates with Alaska Native groups to obtain seabird eggs from subsistence harvests throughout the state including: Point Hope IRA Council, Point Hope, Alaska; Maniilaq Association Subsistence Program, Kotzebue, Alaska; Chugach Regional Resources Commission; Seldovia Village Tribe's Environmental Office; Nanwalek Tribal IRA Council; and residents and officials of Nanwalek, Alaska, the Alaska Sea Otter and Steller Sea Lion Commission, and Tatitlek Village IRA Council, Tatitlek, Alaska. Contact: Kristin Simac, 907-786-3942, kristin_simac@usgs.gov

Salmon Research, Norton Sound Region (Alaska)

Declines in salmon returning to the Norton Sound region of western Alaska have resulted in restrictions to commercial and subsistence fisheries. In response to these declines, research is needed to describe the status and population structure of salmon throughout the region. In collaboration with Kawerak, Inc. (a nonprofit Alaska Native corporation that provides services to the Native communities of the Bering Straits Native Association), the USGS Alaska Science Center is conducting a study to describe homing and straying of salmon among rivers draining into Norton Sound. Describing the connections among populations is an important step in understanding the relations between salmon populations and determining the potential for colonization of rivers where salmon populations are in severe decline. Using otoliths, or ear stones, the research is evaluating chemical signatures of natal rivers to determine if adult salmon stray into other rivers to spawn. USGS and Kawerak, Inc. personnel collaborated to identify sampling locations and collect samples for analysis. In preparation for the sampling effort, Kawerak, Inc. arranged for an 11-minute profile describing the project that was aired on a regional radio station. Contact: Chris Zimmerman, 907-786-3954, czimmerman@usgs.gov





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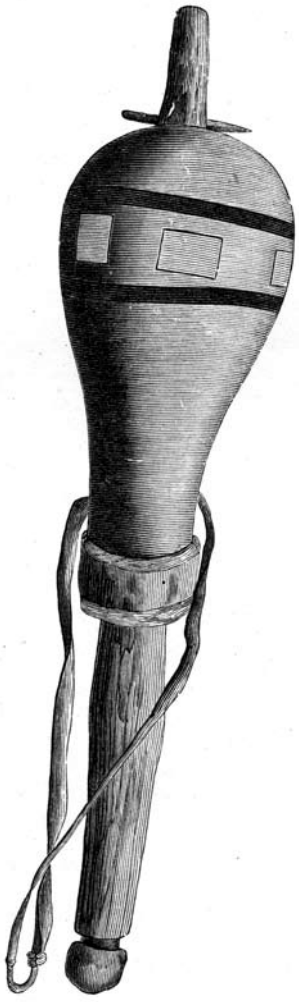
Technical Assistance



John Gralow making a discharge measurement on the Kootenai River at the U.S.–Canada border. Photograph by Steve Lipscomb, USGS.

Technical Assistance

USGS Information Helps Fire Management on Tribal Lands (National)

The USGS Center for Earth Resources Observation and Science (EROS) provided imagery and analyses in response to the needs of Federal Burned Area Emergency Response (BAER) teams, local resource managers, and other nonfederal land managers responsible for managing and assessing impacts of wildfires. In FY 2005, EROS responded to requests for wildfire mapping services on several 2004 and 2005 fires impacting Native lands, predominantly in Alaska. EROS staff obtained satellite images of the burned areas before and after the fire. The staff then estimated burn severity by comparing the pre- and postfire images. The resulting EROS preliminary burn severity maps and associated pre- and post-fire satellite images were provided to the BAER team for immediate use in generating their official and final soils burn severity map. The BAER team and other managers may have refined USGS preliminary data/maps based upon field assessments and local expert knowledge. The final soils burn severity map was the basis used to develop many of the BAER team's subsequent assessments, actions, and recommendations. The local managers were provided with a copy of all maps and images for future diverse resource management applications. Contact: Randy A. McKinley, 605-594-2745, rmckinley@usgs.gov

Native American Fish and Wildlife Society and USGS (National)

The USGS worked with the Native American Fish and Wildlife Society (NAFWS) and participated in its conferences. The USGS National Wildlife Health Center invited a representative of the Native American Fish and Wildlife Society to attend the National Wildlife Health Center's 5-year review in May 2005. The Society's representative attended the 3 days of review and spoke positively about the working relationship that has developed between the Center and the Native American Fish and Wildlife Society. Contact: Scott Wright, 608-270-2460, swright@usgs.com

The USGS National Wildlife Health Center hosted a meeting in May 2005 to discuss the status of surveillance on Tribal lands for chronic wasting disease and the handling of sample data. The Chronic Wasting Disease coordinator for the Native American Fish and Wildlife Society provided an update of the 2004 and 2005 sample collections. Four National Wildlife Health Center staff members participated in this meeting. Contact: Bryan Richards, 608-270-2485, brichards@usgs.gov

National Conference: USGS staff attended the annual national meeting of the Native American Fish and Wildlife Society, hosted by the Mississippi Band of Choctaw Indians. Many Tribes were represented at the national meeting, which provided a forum to share information on many important technical subjects. A USGS exhibit booth provided participants with topical information on studies of and related to wildlife, including fish, diseases, and invasive species. Contact: Sue Marcus, 703-648-4437, smarcus@usgs.gov

Diagnostic Services (Nationwide, Montana, Wisconsin).

The USGS National Wildlife Health Center received four diagnostic cases of specimens collected on Tribal lands. The Confederated Salish and Kootenai Tribes had three submissions of amphibians, and an endangered timber wolf was collected on the Menominee Reservation. Contact Kathryn Converse, 608-270-2445, Kathy_converse@usgs.gov

Technical Assistance with Installation and Operation of Dam Safety Sites, Rosebud Reservation (South Dakota)

The USGS is assisting the Rosebud Sioux Tribe with the installation of rain gages as part of their Dam Safety Program. Additional rain gages will be added near existing dam safety sites at He Dog Lake, Ghost Hawk Lake, and Rosebud Lake. Rain gages also will be installed at Rain Thunder Lake and between Paulson Lake and South Oak Creek Lake. A wider distribution of rain gages will allow the Tribe to improve their assessment of potential floods. Once installation and troubleshooting are complete, the Tribe will maintain and operate the sites. Installation is planned to be completed in 2006. Contact: Ralph Teller, 605-394-3222, rwteller@usgs.gov

Technical Assistance (Nationwide, Idaho, Washington)

Scientists at the USGS Western Fisheries Research Center in Seattle, Washington, continue their strong commitment to respond to requests for technical assistance and research needs of the Department of the Interior bureaus, Tribal and State fisheries agencies, and private sector aquaculture. The assistance provided by Western Fisheries Research Center is in the form of technical support, laboratory services, education and training, technology transfer, and rapid response concerning fish disease and other aquatic animal health issues. The Northwest Indian Fisheries Commission and biologists at other northwest Tribes are important clients for these services with technical assistance needs related to management of Tribal Fish Hatcheries and tactical research on diseases affecting salmonids and other fishes, including threatened, endangered, and sensitive species. Activities of the Western Fisheries Research Center in the past year include consultation with fish health biologists regarding tumors of unknown etiology affecting Chinook salmon reared by the Nez Perce Tribe and reference laboratory service to identify an unknown virus submitted by the fish health staff from the Northwest Indian Fisheries Commission. Contact: James Winton, 206-526-6587, jim_winton@usgs.gov

Water-Quality Monitoring Planning for the Meskwaki Settlement (Iowa)

The USGS Iowa Water Science Center is providing technical assistance to the Sac and Fox Tribe of the Mississippi in Iowa (Meskwaki). The Meskwaki are preparing a surface-water-quality assurance plan, developing a monitoring strategy, and planning for waters within their community. Contact: Greg Littin, 319-358-3609, grlittin@usgs.gov

Spirit Lake Nation Capacity Building (North Dakota)

USGS North Dakota Water Science Center personnel provide Spirit Lake Tribal staff technical assistance and quality assurance regarding the collection, processing, and shipping of water-quality samples. The Tribe has its water-quality samples processed by the USGS National Water Quality Laboratory. A report will be prepared that describes the resources of Fort Totten Indian Reservation. Contact: Douglas G. Emerson, 701-250-7402, demerson@usgs.gov

Flood Warning for White Mountain Apache Tribe (Arizona)

USGS Arizona Water Science Center staff operated three flood warning gages to benefit White Mountain Tribal communities. The gages were established out of concern that wildfires may have increased the potential for floods that could impact these communities due to lack of vegetation cover. Contact: Christopher Smith, 520-670-6671, ext. 251, cfsmith@usgs.gov

Streamgage on the Snake River near Moran, Wyoming. Photograph by Mike Nolan, USGS.

Scientific Advisor for Sitka Tribe Salmon and Herring Research (Alaska)

A USGS Alaska Science Center biologist is serving as scientific advisor for the Sitka Tribe of Alaska on their Tribal Wildlife Grant from the U.S. Fish and Wildlife Service. The grant supports research on spawning stock structure in salmon and herring, which are important subsistence fisheries for the Tribe. Researchers are investigating ecosystem information on these fisheries because they are important to future generations of Tribal subsistence harvesters. Advanced technologies, including microchemical analyses of fish otoliths (ear bones) and scales, are being used to define critical population structure and breeding ecology. The project is under the leadership of the lead Sitka Tribal biologist and supports graduate school studies for one Masters of Science student sponsored by the Tribe. A comprehensive draft report was submitted in initial findings September 2005. Contact: Jennifer L. Nielsen, 907-786-3670, jennifer_nielsen@usgs.gov

Streamgages

Tribes cooperate with the USGS to gage the flow of surface water for diverse reasons, including determining streamflow trends, monitoring flows necessary for subsistence and commercial agriculture (examples: wild rice; fisheries), and commercial development. The USGS Water Science Centers operated the following streamgages in FY 2005 (table 3), usually with cooperative funding from the Tribe, the Bureau of Indian Affairs (BIA), or a third party:

Table 3. Streamgages operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
2	Houlton Band of Maliseet Indians
1	Passamaquoddy Tribe of Maine (Libby Brook)
	Contact: Greg Stewart (Maine), 207-622-8205, ext. 118, gstewart@usgs.gov
2	Seminole Tribe of Florida & South Florida Water Management District (includes 2 continuous recorders with Tribal nutrient autosamplers)
	Contact: Carolyn Price (Florida), 954-377-5943, eprice@usgs.gov
3	Keweenaw Bay Indian Community
	Contact: Tom Weaver (Michigan), 906-786-0714, tlweaver@usgs.gov
2	Sokaogon Chippewa Community (Mole Lake)
1	Bad River Band of Lake Superior Chippewa Indians
2	Menominee Indian Tribe of Wisconsin
1	Oneida Tribe of Wisconsin
1	Stockbridge-Munsee Community (Mohican Nation)
2	Lac du Flambeau Band of Lake Superior Chippewa Indians
	Contact: Rob Waschbusch (Wisconsin), 608-821-3868, rjwaschb@usgs.gov
2	Grand Portage Band of Lake Superior Chippewa
3	Bois Forte Band of Chippewa, Nett Lake Community
1	Fond du Lac Band of Lake Superior Chippewa
	Contact: Kevin Guttormson (Minnesota), 218-326-1297, kgguttor@usgs.gov
2	Three Affiliated Tribes; Mandan Hidatsa, Arikara
	Contact: Steve Robinson (North Dakota), 701-250-7404, smrobins@usgs.gov
2	Bureau of Indian Affairs
2	Oglala Sioux Tribe
1	Rosebud Sioux Tribe
2	Standing Rock Sioux Tribe
3	Lower Brule Sioux Tribe (crest-stage only)
1	Oglala Sioux Tribe (crest-stage only)
	Contact: Ralph Teller (South Dakota), 605-394-3222, rwteller@usgs.gov
2	Omaha Tribe of Nebraska and Iowa
2	Santee Sioux Nation, Nebraska
1	Winnebago Tribe of Nebraska
	Contact: Phil Soenksen (Nebraska), 402-328-4150, pjsoenks@usgs.gov
1	Citizen Potawatomi Nation
	Contact: Robert Blazs (Oklahoma), 405-810-4419, rblazs@usgs.gov
7	Blackfeet Nation
1	Chippewa Cree Tribes of the Rocky Boy's Reservation
9	Confederated Salish and Kootenai Tribes
2	Fort Peck Assiniboine and Sioux Tribes
4	Northern Cheyenne Tribe
11	Bureau of Indian Affairs
	Contact: Wayne Berkas (Montana), 406-457-5900, wrberkas@usgs.gov

Table 3. Streamgages operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
5	Joint Business Council of the Northern Arapaho and Eastern Shoshone Tribes (Wind River Reservation) (annual streamgaging)
3	Joint Business Council of the Northern Arapaho and Eastern Shoshone Tribes (Wind River Reservation) (seasonal streamgaging)
4	Joint Business Council of the Northern Arapaho and Eastern Shoshone Tribes (Wind River Reservation) (canal rating maintenance)
5	Joint Business Council of the Northern Arapaho and Eastern Shoshone Tribes (Wind River Reservation) (seasonal canal streamgaging)
	Contact: Kirk Miller (Wyoming), 307-778-2931, ext. 2716, kmiller@usgs.gov
2	Southern Ute Indian Tribe
1	Ute Mountain Ute Tribe
	Contact: Bob Boulger (Colorado), 970-245-5257, ext. 21, rboulger@usgs.gov
4	Cochiti Pueblo and US Army Corp of Engineers
2	Isleta Pueblo, New Mexico State Engineer, City Of Albuquerque
2	Navajo Nation, New Mexico State Engineer, U.S. Bureau of Reclamation
1	San Felipe Pueblo and New Mexico State Engineer
1	San Ildefonso Pueblo and New Mexico State Engineer
2	Taos Pueblo, New Mexico State Engineer, and U.S. Bureau of Reclamation
2	Pueblo of Zuni
	Contact: Lynn Miller (New Mexico), 505-830-7908, lkmiller@usgs.gov
1	Shoshone Bannock Tribe and Bureau of Indian Affairs
	Contact: Thomas S. Brennan (Idaho), 208-387-1366, tbrennan@usgs.gov
2	Pyramid Lake Paiute Tribe
1	Summit Lake Paiute Tribe
1	Shoshone-Paiute Tribes
9	Walker River Paiute Tribe
	Contact: Kerry Garcia (Nevada), 775-887-7659, ktgarcia@usgs.gov
1	Bureau of Indian Affairs & Peabody Western Coal Co. (Navajo Reservation)
3	Bureau of Indian Affairs & Peabody Western Coal Co. (Hopi Reservation)
1	Arizona Department of Water Resources (Navajo Reservation)
2	Bureau of Indian Affairs (Navajo Reservation)
2	Hopi Tribe
2	Havasupai Tribe
3	Bureau of Indian Affairs (Hualapai Tribe)
2	Yavapai-Prescott Indian
1	Tohono O'odham Nation
3	Pueblo of Zuni
3	Bureau of Indian Affairs (White Mountain Apache Tribe)
	Contact: Christopher Smith (Arizona), 520-670-6671, ext. 251, cfsmith@usgs.gov

Table 3. Streamgages operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
5	Confederated Tribes of the Umatilla Indian Reservation
4	Confederated Tribes and Bands of the Yakama Nation
1	Hoh Indian Tribe
6	Lummi Nation
1	Makah Nation
3	Muckleshoot Indian Tribe
2	Nisqually Indian Tribe
1	Puyallup Tribe of Indians
2	Quileute Tribe
1	Quinault Indian Nation
1	Skokomish Tribe of Indians
3	Spokane Tribe of Indians
1	Squaxin Island Tribe
4	The Tulalip Tribes
2	Bureau of Indian Affairs
	Contact: Robert Kimbrough (Washington), 253-428-3600, ext. 2608, rakimbro@usgs.gov
12	Confederated Tribes of the Warm Springs Reservation
1	Nez Perce Tribe
	Contact: Thomas A. Herrett (Oregon), 503-251-3239, herrett@usgs.gov
1	Karuk Tribe of California
1	Tule River Tribal Council
	Contact: Jim Bowers (California), 760-247-1401, jcbowers@usgs.gov
1	Atqasuk Village (related to National Petroleum Reserve-Alaska)
1	Chistochina Village (Cheesh-Na Tribal Council, cooperator)
1	Native Village of Eklutna
2	Native Village of Chignik (Army Corps of Engineers, cooperator)
2	Illiamna (Bristol Bay Native Corporation, cooperator)
1	Native Village of Kake (Army Corps of Engineers, cooperator)
1	Native Village of Newtok (Army Corps of Engineers, cooperator)
	Contact: Steven Frenzel (Alaska), 907-786-7000, sfrenzel@usgs.gov

Water-Quality Monitoring Stations

Tribes cooperate with the USGS to monitor water quality for diverse reasons, including determining whether the water meets standards for domestic and commercial uses. The USGS Water Science Centers operated the following water-quality monitoring stations in FY 2005 (table 4) usually with cooperative funding from the Tribe, the Bureau of Indian Affairs (BIA), or a third party:

Faith Fitzpatrick (USGS) holds a bedload sampler. Photograph taken by Kirsten Cahow-Scholtes, Bad River Band of Lake Superior Chippewa Indians.

Table 4 Water-quality monitoring stations operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
1	Northern Cheyenne Tribe; Crow Tribe of Indians (Tongue River)
2	Fort Peck Assiniboine and Sioux Tribes
	Contact: John Lambing (Montana), 406-457-5900, jlambing@usgs.gov
1	Pyramid Lake Paiute Tribe
4	Walker River Paiute Tribe
	Contact: Kerry Garcia (Nevada), 775-887-7659, ktgarcia@usgs.gov
1	Wyoming Department of Environmental Quality (Quarterly water-quality sampling on Northern Arapaho and Eastern Shoshone Tribes, Wind River Reservation)
	Contact: Kirk Miller (Wyoming), 307-778-2931, ext. 2716, kmiller@usgs.gov
3	Confederated Tribes of the Colville Reservation
1	Nooksack Indian Tribe
	Contact: Robert Kimbrough (Washington), 253-428-3600, ext. 2608, rkimbro@usgs.gov
1	Karuk Tribe of California
	Contact: James Bowers (California), 760-247-1401, jcbowers@usgs.gov

Ground-Water Monitoring Stations

The USGS Water Science Centers operated the following ground-water monitoring stations in FY 2005 (table 5), usually with cooperative funding from the Tribe:

Table 5. Ground-water monitoring stations operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
1	National Stream Information Program (NSIP) (observation well located on Kaibab Band of Paiute Indians Reservation)
1	National Park Service (Kaibab Band of Paiute Indians)
9	Bureau of Indian Affairs (Navajo Nation, Hopi Tribe, White Mountain Apache Tribe)
	Contact: Christopher Smith (Arizona), 520-670-6671, ext. 251, cfsmith@usgs.gov
3	Confederated Tribes of the Umatilla Indian Reservation (continuous recording in wells)
	Terrence Conlon (Oregon), 503-251-3232, tdconlon@usgs.gov; and Kate Ely, 541-966-2427, kateely@ctuir.com
15	Pechanga Band and Morongo Band of Mission Indians (wells for monthly depth to water)
	Contact: Jim Bowers (California), 760-247-1401, jcbowers@usgs.gov

Lake/Reservior-Stage Monitoring Stations

Tribes cooperate with the USGS to monitor lake levels for diverse reasons, including flood and irrigation management, and commercial and Tribal recreation. The USGS Water Science Centers operated the following lake-stage monitoring stations, to determine lake levels, in FY 2005 (table 6), usually with cooperative funding from the Tribe:

Table 6. Lake/reservoir-stage monitoring stations operated by the U.S. Geological Survey.

Number of stations	Cooperator
1	Bois Forte Band of Chippewa, Nett Lake Community
	Contact: Kevin Guttormson (Minnesota), 218-326-1297, kgguttor@usgs.gov
2	Prairie Island Indian Community
	Contact: Don Hansen (Wisconsin), 763-783-3250, dshansen@usgs.gov
1	Walker River Paiute Tribe
1	Pyramid Lake Paiute Tribe
	Contact: Kerry Garcia (Nevada), 775-887-7659, ktgarcia@usgs.gov

Sediment-Monitoring Stations

The USGS Water Science Centers operated the following sediment-monitoring stations in FY 2005 (table 7), usually with cooperative funding from the Tribe:

Table 7. Sediment-monitoring stations operated by the U.S. Geological Survey.

Number of stations	Cooperator and contact
3	Hopi Tribe
1	Pueblo of Zuni
	Contact: Christopher Smith (Arizona), 520-670-6671, ext. 251, cfsmith@usgs.gov

USGS employees prepare to deploy a stream-gaging instrument. Photograph by USGS.

General Coordination

USGS
science for a changing world

November is Native American Heritage Month

Cherry Creek - 1903

Once upon a time…

For centuries the Dakota, Lakota, and Nakota people gathered in the summertime near running streams to refresh their bodies and their spirits. There were ceremonies to be performed, marriages to be celebrated, newborn children to meet, and old stories to be retold.

Where Cherry Creek meets the Cheyenne River, this wide valley was a favorite place for gathering. It was central for the hunting bands of Dakota, Lakota, and Nakota. Buffalo were still in abundance to the west; the high banks of the waterways quieted the prairie winds; and they were safe from the terror of gunshots. Only goodness surrounded them, and it was the center of the universe.

Those days are long gone…

U.S. Department of the Interior
U.S. Geological Survey

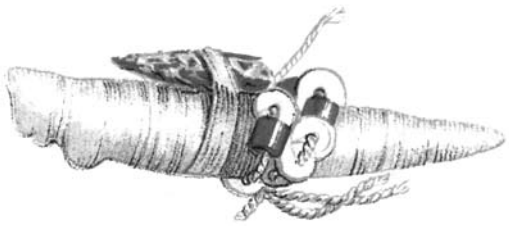
General Coordination

USGS Tribal Relations Training (National)

During FY 2005, the USGS presented a tribal relations training course in each of the three regions. The course was developed and presented by the USGS Office of Equal Opportunity in cooperation with the Director's Office. The goal of the training was to facilitate USGS interactions with Tribes by informing USGS employees about the unique aspects of Tribal sovereignty: laws, regulations, and policies relating to Native Americans and cultural issues that may affect relations with Tribal employees. Native Americans were featured during each session, presenting their experiences and perspectives in ways that helped USGS employees understand some of the issues of sovereign, culturally distinct governments and peoples within the United States. The sessions gave all the participants an opportunity to ask questions about etiquette and other issues when working with individual Tribes. Sessions were held hosted by USGS offices in Portland, Oregon, Denver, Colorado, and Madison, Wisconsin. USGS employees in other offices joined the Denver session through remote access. Contact: Susan Marcus, 703-648-4437, smarcus@usgs.gov

Tribal College Forum IV (National)

The USGS sponsored the Tribal College Forum IV and co-hosted it with Candeska Cikana Community College at the Denver Federal Center in Lakewood, Colorado, in October 2005. The presidents of 28 Tribal colleges and universities, or their designated representatives, participated in the 2-day event that brings the representatives together with USGS and other geospatial data providers. Tribal College Forum IV culminated in the formal establishment of an organization that is developing and coordinating sustained plans for a Tribal College Geospatial Initiative with Federal, State, and corporate partners. The organization and the initiative it promotes are called NativeView. NativeView is a Native American initiative that empowers Tribal colleges and universities by creating innovative applications of geospatial information to meet the unique needs of Native students, governments, and communities. The Geospatial Science Educational initiative, a key component of NativeView, will integrate earth science technologies for the benefit of educational research and development, agriculture research and monitoring, resource management and landscape monitoring, and economic development for Tribal colleges and universities and their communities. The data components of NativeView can be used to identify and study areas of cultural significance for biota, sacred sites, and ancestral land uses, among other possibilities. The Tribal College Forum IV culminated in the organization and appointment of a NativeView Tribal College Board of Directors. Contact: Gene Napier, 605-594-6088, napier@usgs.gov



Facing page: Native American Heritage Month Poster for 2005. Historic images were provided by the Blue Cloud Abbey, Marvin, South Dakota. Image by Sarah Jenkins, USGS Contractor.

Traditional Ecological Knowledge and Science Impacts (National, South Dakota)

The USGS Center for EROS is supporting the Indigenous Knowledge Center for Education and Science Impacts (IKCE SI) at Sinte Gleska University. IKCE SI, a collaboration between Sinte Gleska University and the USGS, is developing a framework for using indigenous knowledge in natural and social sciences to view human activities as an integral part of nature. The first year of the collaboration used Northern Plains indigenous life ways to develop methods and tools that can be extended across North America and ultimately to indigenous cultures around the world. This effort includes an evaluation of social memory learning tools required to translate indigenous views of the landscape into scientific descriptors (where possible). Another effort is the development of knowledge management tools; for example, how does one record oral histories that intrinsically change when they are recorded? This project is intended to help USGS improve its information delivery for Tribal decisionmaking. Contact: Gene Napier, 605-594-6088, enapier@usgs

Tribal Geospatial Conference (National)

In March of 2005, the Cherokee Nation of Oklahoma hosted a geographic information systems (GIS) conference for Tribes in Tulsa, Oklahoma. The conference participants agreed to a transition from the Inter-Tribal GIS Council to a new organization named the Indigenous Mapping Network. At the request of the conference hosts, USGS representatives presented a workshop highlighting Native American activities at the USGS Center for Earth Resources Observation and Science (EROS) and other USGS-Native American GIS activities. The 3-day conference established the need for a GIS users group for Native Americans. The leaders of the Indigenous Mapping Network asked USGS EROS representatives to serve as advisors to the new organization. The USGS sponsored conference participation of nine members or representatives of the Warm Springs, Colville, Suquamish, Kootenai, and Coeur d'Alene Tribes. Many of these participants also were conference speakers. Members of these Tribes are in discussions or are already collaborating with USGS on mapping activities to support Tribal needs and provide improved data to *The National Map*. Contact: Gene Napier, 605-594-6088, enapier@usgs.gov, Tracy Fuller, 208-387-1351, tfuller@usgs.gov, Nancy Tubbs, 503-251-3210, tubbs@usgs.gov, or Samuel Bardelson, 206-220-4563, stbardelson@usgs.gov

USGS Celebrates Native American Heritage Month (National)

During Native American Heritage Month in November 2005, the USGS recognized the achievements of Native Americans. At the USGS headquarters in Reston, Virginia, a month-long commemoration depicted a journey through Indian Country, weaving science mysteries and USGS research with art, photographs, and stories from Tribes throughout the United States. The key message for the exhibit was that both USGS scientists and indigenous peoples have considered the causes of natural phenomena. Unlocking mysteries about the earth is a strong component of American Indian and Alaska Native cultures and is also in the hearts of scientists who emerged from youthful curiosity to their current mission-driven studies. Native American artists displayed their works as part of the headquarters events. A poster, used nationally throughout the USGS, was designed at the USGS Center for EROS, using images from the Blue Cloud Abbey's historic Native American photograph collection. The text on the posters described what life was like for the Plains Indians prior to European contact. Posters were displayed at the EROS facility in Sioux Falls, South Dakota and at the USGS headquarters in Virginia. Contact: Alexandra Hadley (Virginia), 703-648-4460, ahadley@usgs.gov or Mark Barber (South Dakota), 605-594-6176, barber@usgs.gov

Second National Tribal Districts and Tribal Conservation Advisory Councils Conference (National, Oklahoma, Nevada)

The USGS Oklahoma Science Center Director, represented USGS at the second National Tribal Districts and Tribal Conservation Advisory Councils Conference in Las Vegas during December 2004. She presented a slide show entitled, "USGS: 125 years of science for a changing world." The presentation introduced the history, organizational structure, and expertise of all disciplines in the USGS as well as contact information for the Tribal Liaisons. USGS employees from the Oklahoma and Nevada Science Centers staffed an exhibit featuring USGS activities with American Indians and Alaska Natives. The conference was hosted by the Oklahoma Tribal Conservation Advisory Council (OTCAC) and Indian Nations Conservation Alliance (INCA). The conference was held to promote the conservation and preservation of Tribal natural resources. Presentations featured ways to use these resources in a wise and sustainable manner throughout Indian Country. The USGS was a Silver Feather sponsor for the conference. Contact: Kim Winton, 405-810-4417, kwinton@usgs.gov

USGS Booth at Tribal Conservation Conference.

International Tribal Environmental Council (National, Oklahoma)

The USGS Oklahoma Water Science Center Director was invited to give a presentation entitled, "U.S. Geological Survey Water Science for Tribes of Oklahoma" to the 2005 International Tribal Environmental Council meeting in Tulsa, Oklahoma, in June 2005. The presentation included an overview of the USGS organizational structure, a description of each discipline, and summary of projects that have been conducted for Tribes in Oklahoma. The Water-Quality Field Methods Workshop scheduled for August 10 and 11 also was announced. Representatives from more than 30 Tribes, U.S. Environmental Protection Agency, and many consultants attended the conference. Contact: Kim Winton, 405-810-4417, kwinton@usgs.gov

Biological Information for Committees of the Great Lakes Fishery Commission (Michigan, Minnesota, Wisconsin)

The Great Lakes Fishery Commission has established interagency committees to coordinate fishery resource management in individual lakes. The USGS Great Lakes Science Center and Native American organizations, such as the Chippewa Ottawa Resource Authority and the Great Lakes Indian Fish and Wildlife Commission, are represented on the committees for lakes Superior, Michigan, and Huron. To assist Tribal and State fishery management agencies in assessing the success of fish restoration efforts, USGS and Tribal scientists report annually on the status of lake trout rehabilitation and important prey fishes in lakes Superior, Michigan, and Huron. In addition, for the Lake Superior Committee, the USGS provided data and technical assistance. Contact: Sandra Morrison, 734-214-9391, smorrison@usgs.gov

Michigan Tribal Coordination

USGS staff members attended quarterly Michigan Tribal Environmental Group meetings on invitation to present topics of interest to the workgroup. The Michigan Tribes, the Inter-Tribal Council of Michigan, the U.S. Environmental Protection Agency (USEPA) Region 5, the USGS, the U.S. Department of Agriculture, the State of Michigan, and other organizations and agencies are represented in Michigan Tribal Environmental Group, and the meetings serve as a forum for environmental issues pertinent to Michigan Tribes. USGS staff members attend quarterly Multi-Federal Agency Memorandum of Understanding (MOU) meetings sponsored by the Midwest Region Office of the Bureau of Indian Affairs. Federal agencies participating in the MOU workgroup include the Bureau of Indian Affairs, USGS, Indian Health Service, U.S. Department of Agriculture (Rural Development), Federal Emergency Management Agency, Army Corps of Engineers, and USEPA Region 5. The workgroup meets to cooperatively plan and coordinate Federal-Tribal activities in USEPA's Region 5. Contact: Tom Weaver, 906-786-0714, tlweaver@usgs.gov

USGS Donates Surplus Equipment to Menominee Tribe (Wisconsin)

The USGS Upper Midwest Environmental Sciences Center transferred one boat trailer to the Menominee Indian Tribe of Wisconsin. Contact: Randy Hines, 608-781-6398, rkhines@usgs.gov

Missouri River Natural Resources Conference (Iowa, Kansas, Missouri, Montana, Nebraska, North Dakota, South Dakota)

The Ninth Annual Missouri River Natural Resources Conference highlighted the social and environmental transformation that occurred in South Dakota 50 years ago when four dams turned the warm-water Missouri River into a series of large cold-water reservoirs. The USGS and Missouri River Natural Resources Committee, conference founders, teamed up with local hosts from the South Dakota Department of Game, Fish, and Parks, the Lower Brule Sioux Tribe, and the Alliance of Tribal Tourism Advocates to share what the transformation meant, and means today, for people and the environment. As demonstrated in the 2005 theme, *Many Voices–One Horizon,* the conference has a tradition of serving as a forum to share perspectives, solve problems, and exchange information on Missouri River resource management. The plenary session in Pierre, *Bridging the Gap,* focused on merging traditional Native American knowledge and contemporary scientific understanding of the Missouri River. Elders described the importance of the former river valley for all aspects of Tribal life. Paper presentations included USGS and Tribal cooperative activities with geographic information systems and

water-quality monitoring. A daylong trip to Lower Brule offered field trips and discussions on cultural resources, bank stabilization, and prairie restoration. More information is available on the conference website at http://infolink.cr.usgs.gov/events/05.htm Contact: Jeanne Heuser, 573-876-1876, jheuser@usgs.gov or Gene Napier 605-594-6088, enapier@usgs.gov

United Sioux Tribes and USGS Celebrate Memorandum of Understanding (North Dakota, South Dakota)

In February 2005, the USGS and United Sioux Tribes Development Corporation (UST) commemorated the signing of a Memorandum of Understanding (officially signed in October 2004) at the USGS Center for Earth Resources Observation and Science (EROS) in Sioux Falls, South Dakota. This partnership will expand Tribal capabilities and build USGS relationships with Tribes. The UST member Tribes will be able to use remote sensing data from EROS to manage information on cultural resource sites, Tribal lands, and natural resources while keeping the information in their own proprietary Tribal files. This agreement enables modern science and traditional Native American knowledge to be synthesized into mutually beneficial new understandings of the environment. The use of geospatial data continues the USGS tradition of providing assistance on water, wildlife, and land-use issues for Tribes. Clarence Skye, Executive Director of the United Sioux Tribes, emphasized that the remote-sensing capability at EROS can help Tribes resolve land-use issues on reservations. He also said that UST member Tribes will use the USGS information to increase their capacities to efficiently manage issues affecting them. The ceremony included the Chairmen of Sioux Tribes and officials of the USGS and the Bureau of Indian Affairs. The commemoration ceremony included the participation by the Flandreau-Santee Reservation Color Guard of American Indian veterans and the Crazy Horse Singers from the Pine Ridge Reservation. Contact: Gene Napier, 605-594-6088, enapier@usgs.gov or Clifton Skye (United Sioux Tribes), 605- 521-9396, CwSkye@aol.com

United Sioux Tribes and USGS Celebrate at Geographic Information Systems Conference (North Dakota, South Dakota)

In July 2005, Tribal college students presented their research at the Environmental Systems Research Institute, Inc. (ESRI) User's Conference in San Diego, California. The session was arranged by the USGS Center for Earth Resources Observation and Science (EROS) and sponsored by ESRI. The students' presentations focused on NativeView, a means of applying geographic information systems to Native American issues and needs. Contact: Gene Napier (USGS), 605-594-6088, enapier@usgs.gov or Tammie Grant (Salish Kootenai College), tamgrant@comcast.net

Native American Historical Photography Preservation Project Begins (North Dakota, South Dakota)

The Blue Cloud Abbey's American Indian Culture Research Center (AICRC), in partnership with the USGS, the Sisseton-Wahpeton Sioux Tribe (Dakota Sioux) Tribe, and the Center for Western Studies at Augustana College, inaugurated a new project on August 4, 2005, at the Blue Cloud Abbey in Marvin, South Dakota. The project, also supported by the National Park Service, will establish a digital library in which thousands of Native American historical photographs dating back more than 100 years are being preserved. This archive will facilitate understanding of the region's Native American cultures and histories to the benefit of Native Americans and others. Contact: Mark Barber, 605-594-6176, barber@usgs.gov, or AICRC, 605-398-9200, indian@bluecloud.org

Salish-Kootenai College student presents the results of his research at the 2005 Environmental Systems Research Institute (ESRI) User's Conference in San Diego, California. Photograph by Gene Napier.

American Indian Cultural Resource Center, the USGS, and the National Park Service inaugurate a project to preserve Native cultural heritage. Pictured: Joe Williams (Sisseton-Wahpeton Tribe), Michael Choate (USGS contractor), and (the late) Father Stanislaus Maudlin at the Blue Cloud Abbey, Marvin, South Dakota. Photograph by Mark Barber, USGS contractor.

South Dakota State Archives Maps Scanned

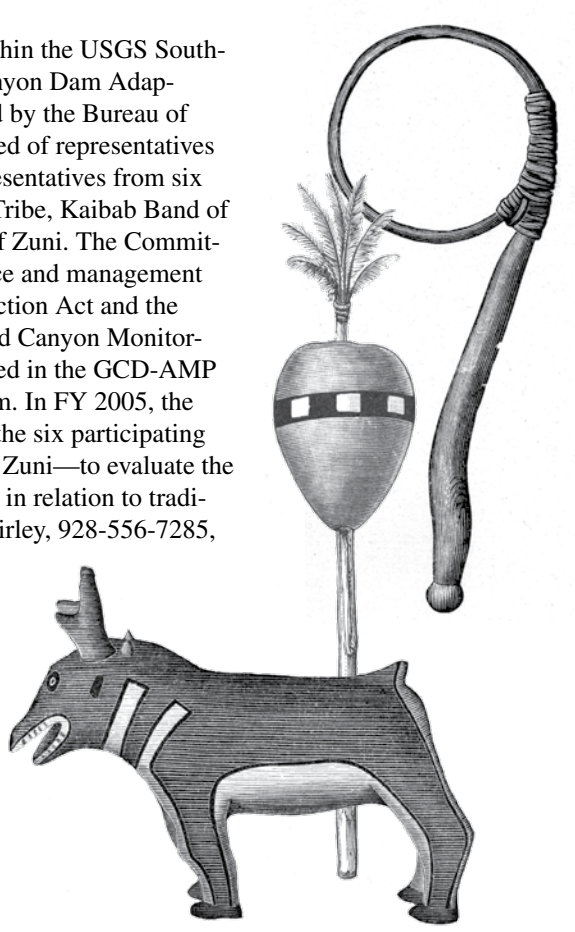
In July 2005, the USGS Central Region Native American Liaison visited the State of South Dakota's historical archive in Pierre, South Dakota. As a result of that meeting, the State Archivist released old historical maps detailing Native American reservations in the state. These maps were cleaned and scanned at the USGS National Center for Earth Resources Observation and Science where they will be used in USGS work with Tribes. Contact: Gene Napier, 605-594-6088, enapier@usgs.gov

Nez Perce Tribe National Map Server and Data Enhancement Project (Idaho)

The Nez Perce Tribe entered a cooperative agreement with the USGS to enhance Tribal geospatial data holdings and data server capability. The Tribe collaborated with the USGS to acquire 1-meter infrared imagery over Tribal lands. These data and additional Tribal imagery and geospatial data will be served to *The National Map* by using a dedicated Internet Map Service acquired in collaboration with USGS. The data and map services will be used to support resource management activities on Tribal lands. USGS and Tribal personnel are developing a plan for long-term data maintenance and display. Contact: Tracy Fuller (USGS), 208-387-1351, tfuller@usgs.gov or Laurie Ames (Nez Perce Tribe), 208-843-7392, lames@nezperce.org

Glen Canyon Dam Adaptive Management Program (Arizona, Colorado, New Mexico, Utah)

The Grand Canyon Monitoring and Research Center (GCMRC), within the USGS Southwest Biological Science Center, provides science support to the Glen Canyon Dam Adaptive Management Program (GCD-AMP). The GCD-AMP is administered by the Bureau of Reclamation with guidance from a Federal Advisory Committee composed of representatives of hydropower, water, recreation, conservation, and tribal interests. Representatives from six Tribal governments participate in the GCD-AMP: Hopi Tribe, Hualapai Tribe, Kaibab Band of Paiute Indians, Navajo Nation, Paiute Indian Tribe of Utah, and Pueblo of Zuni. The Committee formulates recommendations to the Secretary of the Interior on science and management activities necessary to achieve the goals of the 1992 Grand Canyon Protection Act and the 1995 Record of Decision for Operations of Glen Canyon Dam. The Grand Canyon Monitoring and Research Center works with all of the Tribal governments involved in the GCD-AMP to accommodate Native American perspectives within the overall program. In FY 2005, the USGS Center initiated or continued cooperative agreements with five of the six participating Tribes—Hopi, Hualapai, Kaibab Paiute, Paiute Indian Tribe of Utah, and Zuni—to evaluate the results of terrestrial ecosystem monitoring in the Colorado River corridor in relation to traditional cultural perspectives and current tribal interests. Contact: Helen Fairley, 928-556-7285, hfairley@usgs.gov



Southwest Strategy (Arizona, New Mexico)

The USGS is an active partner in the Southwest Strategy. The Southwest Strategy is an intergovernmental process that provides a forum for diverse entities to collaborate and resolve natural resource conservation, management, and community development issues affecting Arizona and New Mexico. Through cooperative planning and improved decisionmaking, the Southwest Strategy strives to maintain, restore, and enhance the cultural, economic, and environmental quality of life for the people of Arizona and New Mexico. The Southwest Strategy brings together Federal, Tribal, State, and local governments, as well as private landowners and other stakeholders, in a problem-solving process. One of the key task teams within the Southwest Strategy is the Tribal Relations Support Team, which allows direct interface of senior executives from a wide range of Federal and State agencies with the leadership of Tribal nations and Pueblos throughout Arizona and New Mexico. USGS and Department of Defense continue to serve as sponsors for the Tribal Relations Support Team. During FY 2005 the Tribal Relations Support Team, with delegates from Bureau of Indian Affairs, National Resources Conservation Service, U.S. Forest Service, U.S. Fish and Wildlife Service, and the Department of Defense, and USGS met with delegates from the Arizona and New Mexico Tribes and Pueblos on a monthly basis, either by teleconference or face-to-face meetings. Plans for a Tribal Relations Federal Executive Forum were completed and a funding portfolio to support the Forum was collected. A draft of the Tribal Relations Strategic Plan was finalized in FY 2005 with the goal of having the Southwest Strategy adopt it in FY 2006. Contact: Randy Updike, 303-236-5440, updike@usgs.gov or Wes Ward, 520-670-5584, wward@usgs.gov

White Mountain Apache Streamgaging Cooperation (Arizona)

The White Mountain Apache Tribe permitted USGS employees to access streamgages on Tribal lands under the terms of an Intergovernmental Agreement. USGS Arizona Water Science Center staff provided training to White Mountain Apache Tribal staff in water-quality and surface-water data-collection techniques. Also, the USGS collected water-quality samples for the Tribe and delivered them to a commercial laboratory for analysis. The Science Center staff continues to provide technical assistance and training on the USGS Automated Data Processing System (ADAPS) that is used to manage hydrologic data. Additional training was provided on Data Collection Platforms. Contact: Christopher Smith, 520-670-6671, ext. 251, cfsmith@usgs.gov

Collaboration with the Torres Martinez Desert Cahuilla Indians on Restoration of the Salton Sea (California)

The Salton Sea Science Office of the USGS participates with a consortium of Federal, State, and local agencies and the Torres Martinez Tribe in activities related to restoration of the Salton Sea ecosystem in California. The Tribe is a major landowner around the Sea and is acutely interested in rehabilitation of the area. Tribal representatives participate on the Salton Sea Authority and the Science Advisory Committee. They are concerned with the economic and recreational future of the region, and specifically with issues, such as air quality, watershed contamination, and wetlands and wildlife enhancement. Contact: Doug Barnum, 760-777-1564, Doug_Barnum@usgs.gov

Yavapai-Prescott Water Monitoring Program (Arizona)

The USGS Arizona Water Science Center continues to cooperate with the Yavapai-Prescott Indian Tribe by providing technical assistance and training to Yavapai-Prescott personnel with their water-resources monitoring program. The Tribe began operating and maintaining a crest-stage gage network in FY 2004 and also began their own well-monitoring program in FY 2004 following training with the USGS staff. This activity demonstrates successful collaboration that enhances Tribal capabilities. This program was designed to assist the Tribe in managing its water resources and to provide water-quality data that the Tribe can use to assess the health of Tribal members by meeting U.S. Environmental Protection Agency water-quality standards. Contact: Robert J. Hart, 928-556-7137, bhart@usgs.gov or Gregory G. Fisk, 928-556-7225, ggfisk@usgs.gov

FY 2005 Department of the Interior High Priority Data Program Coordination (Oregon, Washington)

USGS Oregon and Washington Geospatial Liaisons contacted the regional representatives of U.S. Department of the Interior bureaus in Oregon and Washington to determine priorities for using FY 2005 DOI High Priority Data Program funding. The Department of the Interior representatives selected three projects to receive funding: (1) completion of the 1:24,000-scale National Hydrography Dataset (NHD) for Oregon and Washington; (2) the acquisition of Oregon 2005 statewide 1-meter and 1/2-meter natural color National Agriculture Imagery Program (NAIP) orthoimagery; and (3) the acquisition of LIDAR (laser-imaging technology) elevation data for Lake Roosevelt, Washington. Funding from other sources has also been contributed to these projects. All three data sets, when distributed, will be made available online through *The National Map*. The information will be available to Tribes in managing their lands and resources. Contact: Nancy Tubbs, 503-251-3210, ntubbs@usgs.gov or Sam Bardelson, 206-220-4563, stbardelson@usgs.gov

Alaska Native Organizations Join the Alaska Geographic Data Committee

Ahtna Incorporated, the Arctic Slope Regional Corporation, and the Aleutian Pribilof Islands Association Incorporated have become official members of the Alaska Geographic Data Committee. The Alaska Geographic Data Committee, co-chaired by USGS, is a consortium of Federal agencies, State and local governments, Native entities, and academia working together to build a solid geospatial data foundation for the people of Alaska. The objective of the Committee is to provide a forum for coordinating spatial data development projects, developing coordinated methodologies for implementing standards and policies, and reviewing and responding to Federal Geographic Data Committee initiatives. Ahtna and Arctic Slope Regional Corporation are Native corporations created under the Alaska Native Claims Settlement Act of 1971. Ahtna, Inc. is based in Glennallen, Alaska with a majority of its shareholders residing in the Copper River region. Arctic Slope Regional Corporation is a Native-owned corporation representing the interests of the Arctic Slope Inupiat people who reside in villages on the North Slope of Alaska. Aleutian Pribilof Islands Association Incorporated is the federally recognized tribal organization of the Aleut (Unangax) people in Alaska. The three Alaska Native organizations join two other Alaska Native entities, the Bristol Bay Native Corporation and the NANA Regional Corporation, as Alaska Geographic Data Committee members. These memberships strengthen Alaska Native participation in the activities of the Committee. Contact: A.C. Brown, 907-786-7002, ACBrown2@usgs.gov

Yukon River Intertribal Watershed Council (Alaska, Canada)

In 2004, the USGS became a partner with the Yukon River Intertribal Watershed Council. Since then, a USGS representative participated in meetings, workshops, training sessions, and conference calls, providing assistance and expertise to the Council. The Yukon River Intertribal Watershed Council is designing and implementing a water-quality monitoring program that will cover the entire 2,100-mile reach of the Yukon River in Alaska and Canada. The cooperative effort will benefit all involved parties by providing an extension of water-quality data to help the indigenous people along the Yukon River manage resources and help USGS researchers better understand the effects of climate change. Contact: Paul Schuster, 303-541-3052, pschuste@usgs.gov

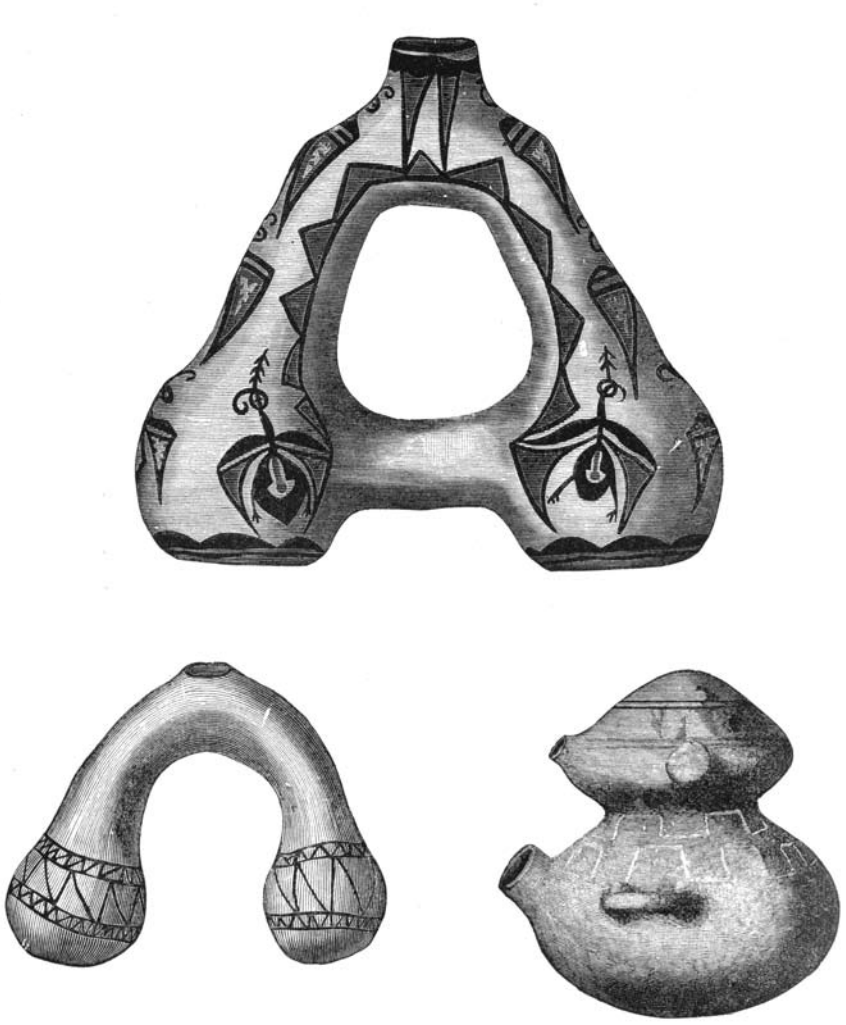
Alaska Volcanoes and Alaska Natives

Open communication between Alaska Natives and the USGS Alaska Volcano Observatory (AVO) is crucial in helping to safeguard Alaskan communities from geologic hazards. Numerous Alaska Native villages and corporations communicate with the AVO during periods of volcanic activity. Native officials transmit on-site observations to AVO, and AVO scientists distribute interpretive and hazards information to the Native communities. Many of these communities are on the AVO automatic weekly update fax and/or electronic mail lists that provide the activity status of more than 40 active volcanoes in the Aleutian Islands. All Native villages in the Aleutians, including Nelson Lagoon, Naknek, Unalaska, Akutan, False Pass, Atka, King Cove, and Perryville, are near active volcanoes. The AVO scientists also conduct geological field studies and services existing seismic-monitoring equipment to provide real-time warnings of volcanic activity and related hazards to aircraft and local communities. USGS communications and research involved obtaining letters of nonobjection for proposed volcano hazards work and accessing lands owned or selected by several Alaska Native corporations, including The Aleut Corporation, Akutan Corporation, Ounalashka Corporation, Ahtna Incorporated, and Cook Inlet Region Incorporated. Beginning in January 2005, activity at Mount Veniaminof volcano, about 22 miles from the Native village of Perryville, increased. Data from a web camera operated by AVO in collaboration with the village of Perryville showed explosions at the volcano sending ash as high as 13,000 feet above sea level. Activity culminated during February 3–18 with explosions that erupted hot, incandescent blocks visible at night from Perryville and seen in web camera images. Data received by AVO from its seismic network on the volcano showed no signs of more energetic activity and thus no action needed to be taken by the village. Contact: Thomas Murray, 907-786-7443, tlmurray@usgs.gov

Future Opportunities

Future Opportunities

The U.S. Geological Survey (USGS) engages Tribes in natural resource studies through cooperative research, information dissemination, internships, and funding. Tribal participation is at each Tribe's discretion, with benefits to the Tribes through acquisition of information to improve Tribal resource management practices and improving economic opportunities for the Tribe and its members through internships and capacity building. USGS invites Tribes and Tribal organizations to expand cooperative opportunities. In FY 2007, the USGS intends to enlarge the internship program for Native American students. Tribes and Tribal organizations can help support this activity by offering to match USGS funds for Native student internships. We welcome dialogue with Tribes and Tribal organizations on how USGS can help to meet training needs. What training is needed? Where? USGS scientists may be able to provide information or expertise to help Tribes write successful grant proposals to other sources. Use the list of USGS contacts at the end of this document to discuss topics of interest at Native American conferences or meetings. The Tribal College Forums and NativeView provide continuing opportunities to build a network supporting Tribes, Tribal organizations, and Native American students.



Zuñi Canteens

USGS Contacts

The U.S. Geological Survey has an American Indian/Alaska Native Coordinating Team to establish policy and to coordinate USGS activities. Please contact any of the following individuals for more information or to discuss questions or concerns.

Director's Office: Susan Marcus
MS 104, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-4437; fax 703-648-5470; smarcus@usgs.gov

Eastern Region: Gayle Sisler
MS 150, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-4412; fax 703-648-4588; gsisler@usgs.gov

Central Region: Gene Napier
Center for Earth Resources Observation and Science (EROS),
Mundt Federal Center, Sioux Falls, South Dakota 57198
605-594-6088; fax 605-594-6154; enapier@usgs.gov

Western Region: A.C. Brown
Alaska Science Center, 4230 University Drive, Anchorage, Alaska 99508
907-786-7002; fax 907-786-7036; acbrown2@usgs.gov

Biological Resources: Janet Cushing
MS 301, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-4093; fax 703-648-4238; jcushing@usgs.gov

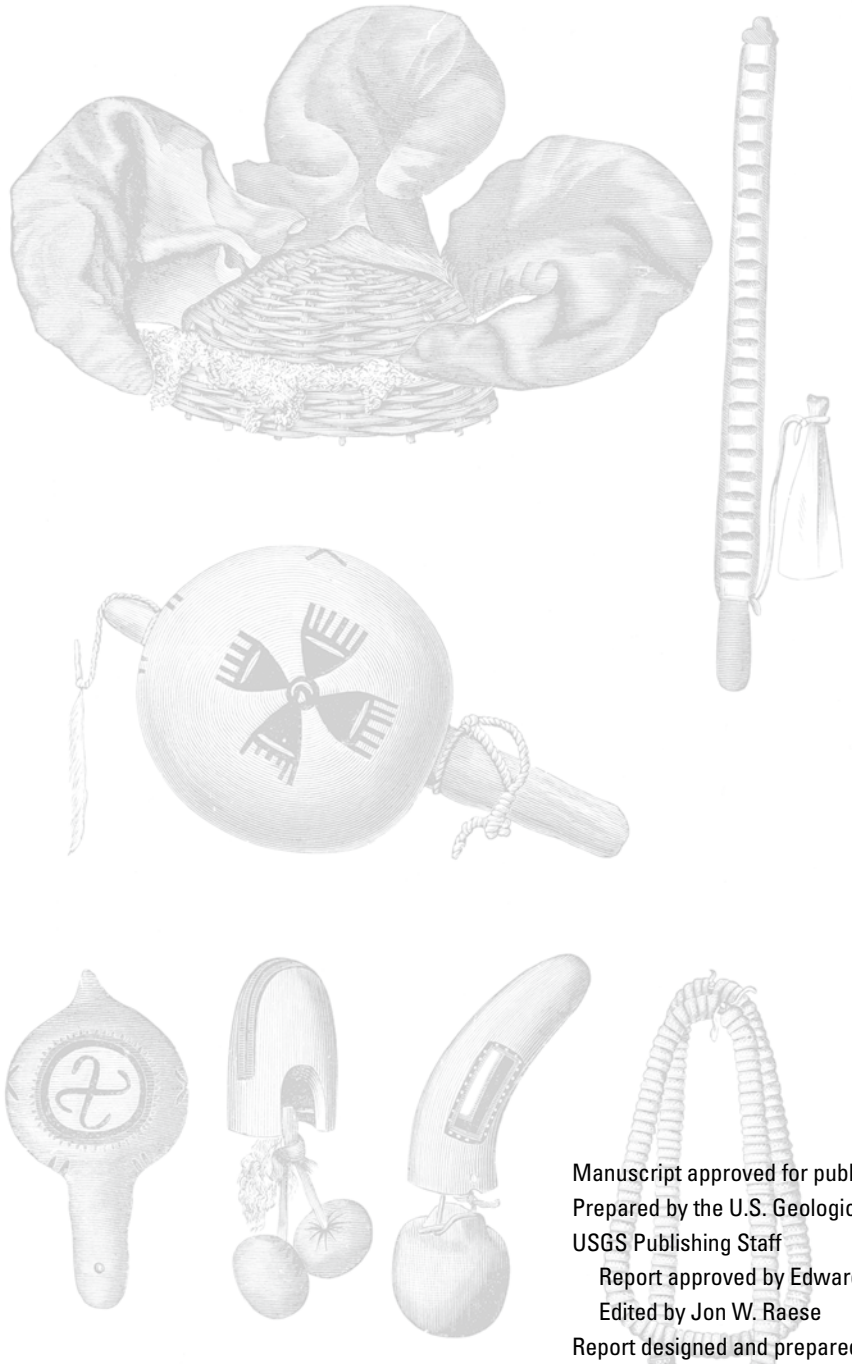
Geology: Sharon Swanson
MS 910, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-6453; fax 703-648-6057; smswanson@usgs.gov

Geography: Gene Napier
Center for Earth Resources Observation and Science (EROS)
Mundt Federal Center, Sioux Falls, South Dakota 57198
605-594-6088; fax 605-594-6154; enapier@usgs.gov

Geographic Information: Bonnie Gallahan
MS 590, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-6084; fax 703-648-5755; bgallahan@usgs.gov

Water Resources: Glenn Patterson and Ward Staubitz
MS 409, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-5061; fax 703-648-5002; staubitz@usgs.gov

Office of Equal Opportunity: Patricia Hagan
MS 602, 12201 Sunrise Valley Dr., Reston, Virginia 20192
703-648-7761; fax 703-648-4445; phagan@usgs.gov



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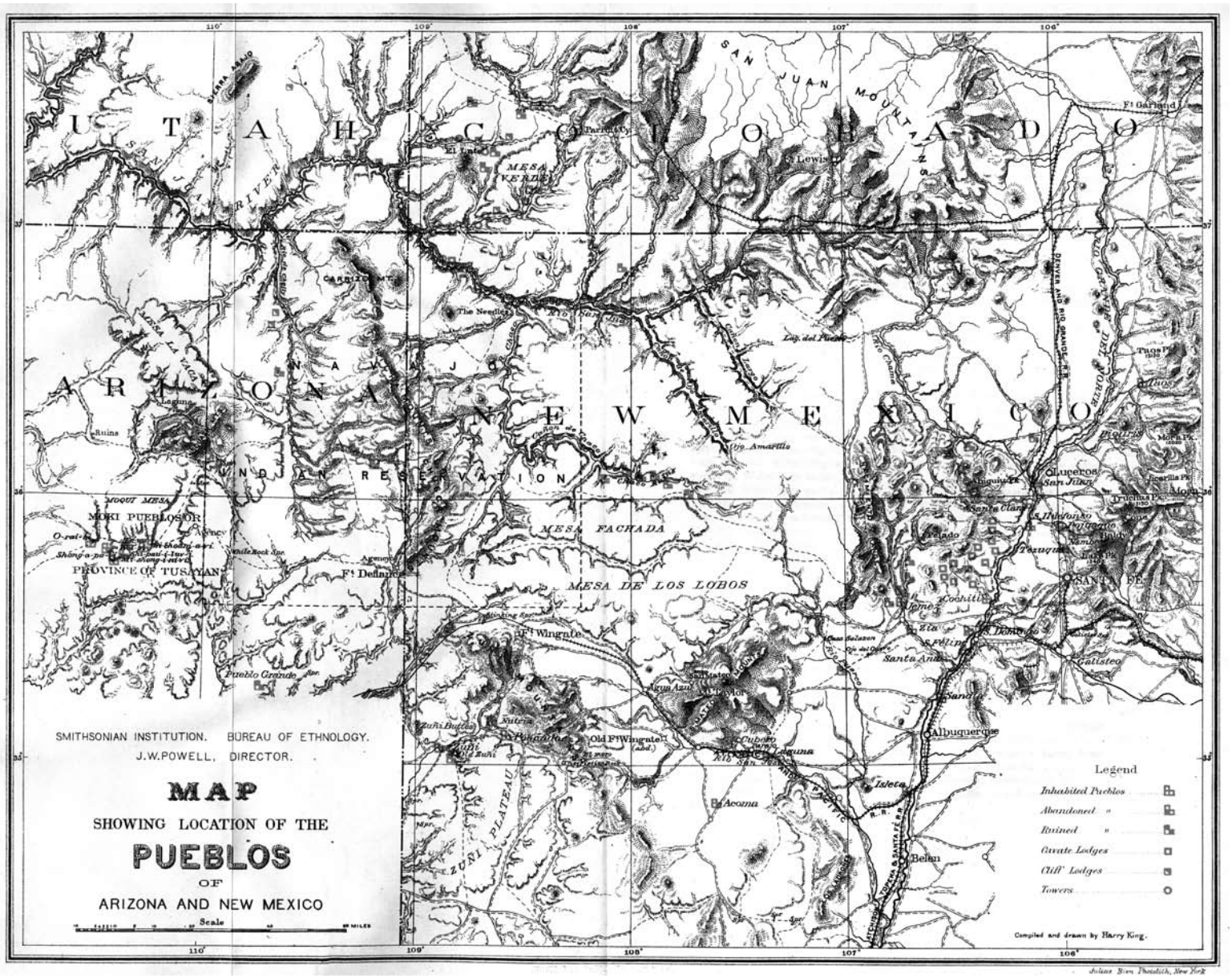
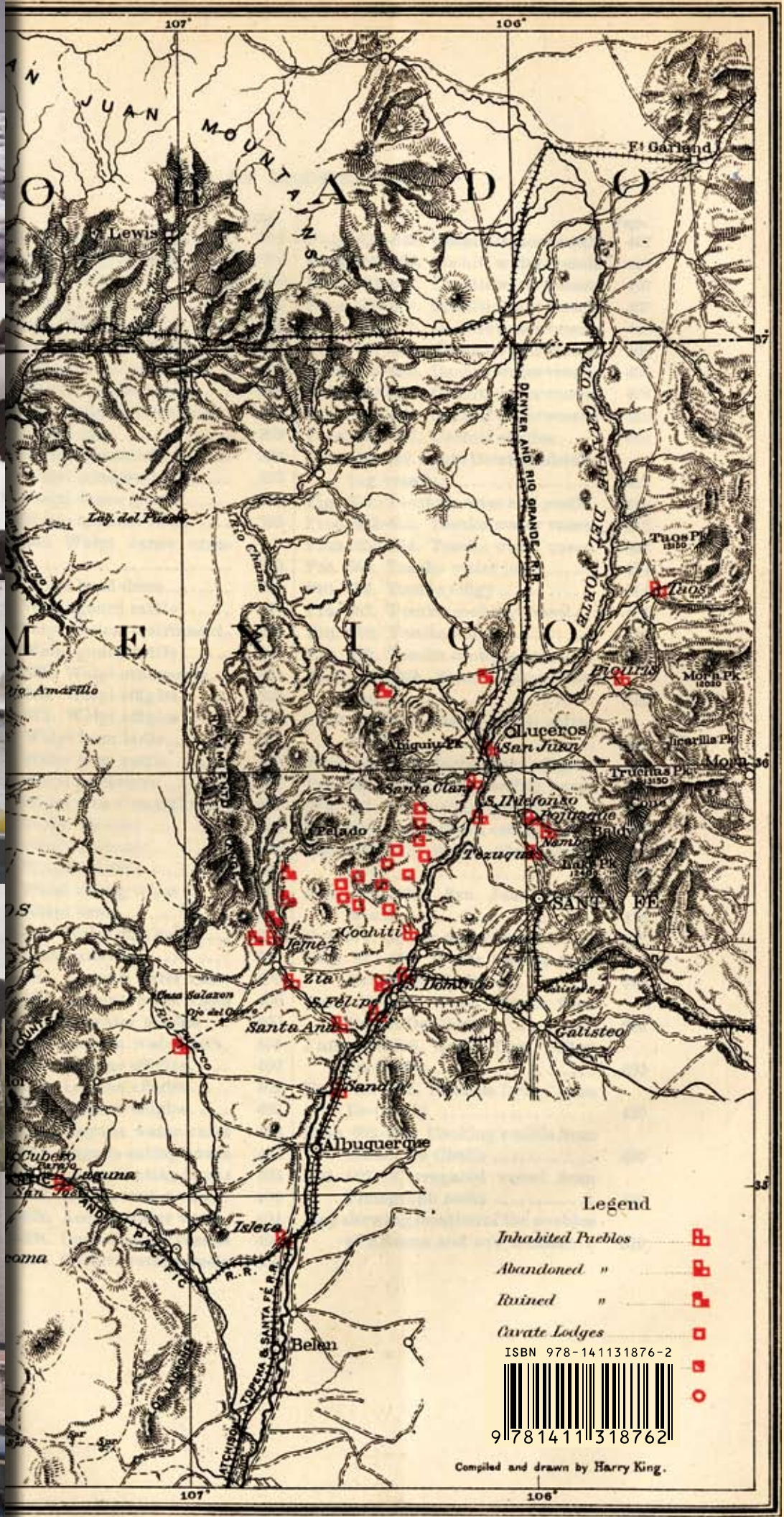
Technical Reviews
Pamela S. Haverland, U.S. Geological Survey
John R. Keith, U.S. Geological Survey
Joy A. Geiselman, U.S. Geological Survey
For more information concerning this report, contact:
Susan M. Marcus
American Indian/Alaska Native Liaison
U.S. Geological Survey
104 National Center
12201 Sunrise Valley Drive
Reston, VA 20192
http://www.usgs.gov/indian/


SMITHSONIAN INSTITUTION. BUREAU OF ETHNOLOGY.
J.W.POWELL, DIRECTOR.
MAP
SHOWING LOCATION OF THE
PUEBLOS
OF
ARIZONA AND NEW MEXICO
Scale
Legend
Inhabited Pueblos
Abandoned "
Ruined "
Civate Lodges
Cliff Lodges
Towers
Compiled and drawn by Harry King.
UTAH
COLORADO
ARIZONA
NEW MEXICO
NAVAJO INDIAN RESERVATION
SAN JUAN MOUNTAINS
MESA VERDE
MESA FACHADA
MESA DE LOS LOBOS
ZUNI PLATEAU
MOQUI PUEBLOS OR PROVINCE OF TUSAYAN
Albuquerque
SANTA FE
Julius Bien Photolith, New York



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Marcus—U.S. Geological Survey Activities Related to American Indians and Alaska Natives—FY 2005—Circular 1313