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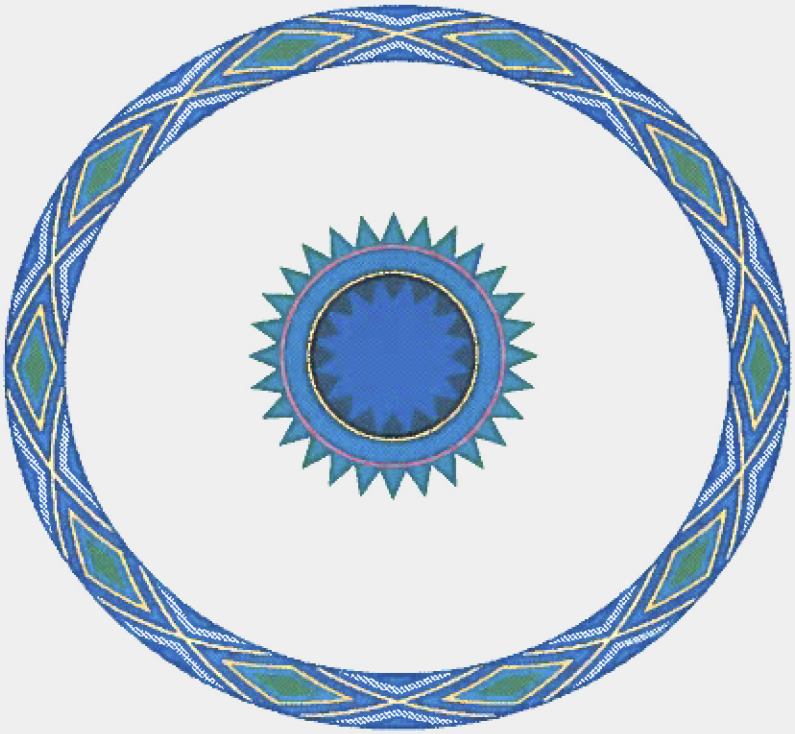
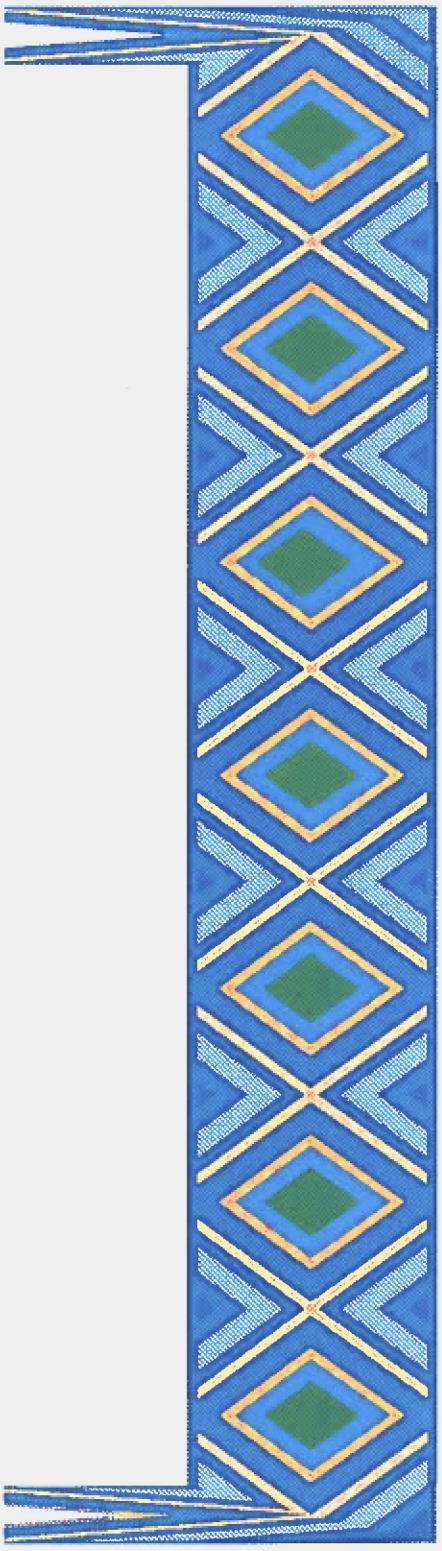
# Activities Related to American Indians and Alaska Natives





## Fiscal Year 1997

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

# U.S. Geological Survey
# Activities Related to
# American Indians and Alaska Natives
# Fiscal Year 1997

**Table of Contents** **Page**

# List of Tribes or Tribal Governments Mentioned in the Report

**Tribal Name*** **Page**

* 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



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# State Listing

# U.S. Geological Survey
# Programs and Activities Related to
# American Indians or Alaska Natives
# Fiscal Year 1997

The activities listed on the following pages are as diverse as the employees of the U.S. Geological Survey (USGS) and the people they are serving. Our employees' contributions benefit tribes and individual Indian or Alaska Natives by enhancing understanding of natural resources. Through a wide variety of endeavors, the USGS strives to fulfill its trust responsibility to American Indians and Alaska Natives and to share our scientific knowledge with all who are interested. This knowledge can be used to better manage tribal resources. All of the activities described in this report are the result of people and programs working within the mission of the USGS. This report primarily describes activities during Federal fiscal year (FY) 1997. During FY 1997, the USGS engaged in cooperative research projects, data collection, informal outreach, and work done under Memoranda of Understanding that related to American Indians or Alaska Natives. Some work was technical and/or research-oriented. Other work was educational. As much as possible, activities are listed from east to west and from north to south.

The USGS is the Federal science bureau within the Department of the Interior (DOI). USGS is non-regulatory and is not a significant manager of Federal or Trust lands or assets. There are two types of USGS activities involving American Indians, Alaska Natives, and their lands. The first type is the course of formal studies, conducted through existing USGS programs. Our formal programs consist of specific data collection, investigative, and research projects. These projects frequently continue for two or more years, although a few are parts of longer-term activities. These are frequently funded through cooperative agreements or reimbursable accounts, from monies provided to the USGS by individual tribal governments or by the Bureau of Indian Affairs (BIA). The USGS provides matching funds for cooperative projects. These formal projects may also receive funding from the U.S. Environmental Protection Agency, the Indian Health Service (part of the Department of Health and Human Services), or other Federal agencies. The second type of activity is less formal, based on initiatives designed and conducted by USGS employees. Frequently involving educational activities, these endeavors are prompted by employee interests, often as collateral issues, resulting from an individual or group of USGS employees identifying and responding to an observed need. In these activities, our employees help us fulfill a mission of the USGS, to make science relevant, while helping our fellow citizens.

USGS employees have also taken the initiative to assist American Indians and Alaska Natives through participation in several organizations. These organizations were created to foster the knowledge of science among Native peoples and to help build support and communication networks. One such group is the American Indian Science and Engineering Society (AISES). This group sponsors an annual national meeting in which USGS employees participate. USGS employees join this organization on a voluntary basis, paying the costs themselves, yet bringing the benefits of this expanded network to the USGS, as many employees do with other professional organizations.

Each part of the USGS has identified an American Indian/Alaska Native liaison. All of the liaisons, except at the bureau level, have coordination of American Indian and Alaska Native issues as a collateral duty. Within the USGS, we will use this report to help in developing outreach, educational, and program documents for use in future years. We hope that USGS employees, American Indians, and Alaska Natives will adapt these activities within new areas and will use the USGS contacts to expand the relevance of the USGS to more Americans.

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You are welcome to contact us with any questions that you may have. Information on how to contact us is provided at the end of this report.

# Educational Activities

Within the Department of the Interior, the U.S. Geological Survey and the Bureau of Indian Affairs have worked together to improve natural science education for American Indian and Alaska Native students. Implementing the Memorandum of Agreement, signed by the Assistant Secretary, Water and Science, and the Assistant Secretary, Indian Affairs in October 1996, has encompassed many diverse activities. Some of the most notable educational achievements during FY 1997 are presented here:

**American Indian Higher Education Consortium.** With assistance from the American Indian Higher Education Consortium, the USGS Biological Resources Division (BRD) Cooperative Unit at the University of Maryland Eastern Shore sponsored the 1997 Career Awareness Institute. The BRD staff notified Tribes of this 25-year old program. Applicants selected for the program earned 4 credit hours in intensive 3-week studies in wildlife and fisheries, and another 2 credits for fieldwork at a BRD or U.S. Fish and Wildlife field station. In addition, a BRD scientist traveled across the Nation and held information sessions of the 1997 Career Awareness Institute at:

- Haskell Indian Nations University, Lawrence, KS
- Navajo Nation at Crownpoint Institute of Technology
- Kuskokwim Campus (College of Rural Alaska), Bethel, AK
- American Indian Science and Engineering Society, University of Alaska
- Crow (Absarokee)Tribe at Little Big Horn College, Crow Agency, MT

Of the 250 applications for the Career Awareness Institute, 30 percent were American Indian or Alaska Native, and of the 16 who matriculated, 6 were Indian or Native, from the Navajo Nation, Crow (Absarokee) Tribe, Pascua Yaqui Tribe, Turtle Mountain Band of Chippewa, and Yup'ik Eskimo. The BRD and the U.S. Fish and Wildlife Service shared the expenses of this program, which provided travel, living, and academic expenses. In 1998, the Career Awareness Institute will be sponsored by the Fish and Wildlife Service at its new Shepherdstown, WV, training center. Contact: Hardy Pearce, 703-648-4085, hardy_pearce@usgs.gov

**Technology Literacy Challenge Grant Review.** The Bureau of Indian Affairs distributed funds for a $1 million Technology Literacy Challenge Grant which involved submission of competitive proposals by Indian schools to the BIA. The proposals detailed how they would use a share of the funds to acquire technology and training to enhance the learning environment. Forty-four proposals were received. The National Science Foundation, Indian Health Service, and USGS provided people to review proposals and choose the top proposals based on criteria provided by BIA. Funds were distributed to five schools. A consortium of nine schools submitted one proposal, so a total of fourteen schools benefitted from the funds. USGS Contact: Lorna Kendrix, 703-648-6834, lkendrix@usgs.gov

**EdNet.** The BIA's Office of Indian Education (OIEP) is undertaking an exciting project called "Access Native America". This project has three parts: (1) school connectivity to the Internet; (2) education management; and most importantly, (3) school classroom applications. This project will not only improve overall school administration, but will provide the Native American

children with new opportunities to learn and grow. The USGS is assisting the BIA in connecting Indian schools to the Department of Interior Network (DOINET) and the Internet through a project called EdNet. There are approximately 187 primary and secondary schools funded and operated by the OIEP for American Indian children. Of these, more than 20 have been connected to DOINET and the Internet by the BIA and the USGS. Once on the Internet, students may access the World Wide Web for educational and cross-cultural resources. Many Indian schools are in remote locations where Net access permits "virtual trips" to libraries and museums. Several schools have created their own Web pages. The USGS is providing the technical wide-area network (WAN) expertise to connect each of these schools to the DOINET/Internet. Additional schools are being added to the network at a rate of five schools per month. Contact: Tim Lee, 303-236-4955, tlee@usgs.gov

**Tribal Colleges and Universities Executive Order.** Implementation of Executive Order 13021, Tribal colleges and universities will be lead by the U.S. Department of Education. This Executive Order focuses attention on the responsibilities of Federal agencies to work with Tribal colleges and universities and makes these educational institutions comparable with Historically Black Colleges and Universities and Hispanic-Serving Institutions. The USGS is participating in the Department of the Interior's implementation planning activities. Contact: Sue Marcus, 703-648-4437; smarcus@usgs.gov

**National Indian Education Association.** The Assistant Secretaries announced their agreement at the National Indian Education Association meeting in Sioux Falls, South Dakota, in October 1996. The USGS had an exhibit booth, distributing educational materials directly to Indian students and educators. More specific requests for information were collected at the exhibit and subsequently filled by mailing information to the teachers. In conjunction with the meeting, the Department of the Interior Assistant Secretary for Water and Science and the USGS District Chief, visited the Oglala Sioux Tribe of the Pine Ridge Indian Reservation and met with Tribal educators. Contact: Sue Marcus, 703-648-4437, smarcus@usgs.gov

**General Coordination with BIA/OIEP.** The needs of BIA educators and officials were discussed at meetings between the BIA and the USGS. The USGS hosted a tour of USGS headquarters facilities for BIA OIEP staff. The BIA officials were given educational materials as example of what resources are available from the USGS. The BIA regional resource staffers were given packets of information to discuss with and distribute to BIA schools during their regular visits to those schools. The USGS also sent copies of educational materials directly to each BIA school. Contact: Sue Marcus, 703-648-4437, smarcus@usgs.gov

**Technical Training for Keweenaw Bay Indian Community.** The USGS provided ARC/NFO and ARCVIEW training to an employee of the Keweenaw Bay Indian Community in Michigan to assist the community in building the Tribal geographic information system (GIS). Contact: Jim Nicholas, 517-887-8906, jrnichol@usgs.gov

**Mentoring for American Indian Students at the University of Michigan.** Through a Partnership in Cultural Diversity, the Biological Resources Division of the USGS attempts to recruit and retain Indian students for the University of Michigan's School of Natural Resources and Environment, and to ensure their graduation. The partnership is a cooperative effort between the USGS Great Lakes Science Center in Ann Arbor, the Minnesota Regional Office of the U.S. Fish and Wildlife Service, and the University. Contact: Director, Great Lakes Science Center, 313-994-331 x206

**Water Resources on the Turtle Mountain Reservation.** The USGS, the Turtle Mountain Band of Chippewa (Department of Natural Resources), and teachers on the Turtle Mountain Reservation cooperatively planned and conducted a water-resource program for 5th grade students. By stimulating interest and encouraging students to actively participate in the water-resources program, USGS and Tribal employees hope to create a solid foundation for a lifetime of awareness and knowledge of their water resources that will benefit them and their community in the future.

The program was presented three times; twice at the Turtle Mountain Community School and once at the Ojibwa School. About 175 5th graders went through the program. Groups of students (about 20 per group) rotated through three hands-on activities. The program consisted of a general water resources presentation and three rotating, hands-on activity stations. The general water resources presentation discussed ground water, water quality, surface water, and water use. The hands-on activities, lasting about 50 minutes each, were:

1. Locating a new well. A fictitious Belcourt Drilling Company was asked by the city of Belcourt to find a new well for its water supply. The students looked at core samples to determine the best location for the new city well.
2. Water quality. The Belcourt Drilling Company sent water samples to the "Belcourt Water Laboratory" for testing. The drilling company wanted to know which well produced the best drinking water. The students conducted several tests to identify the best water.
3. Tracking water use. As team members of the "Belcourt City Engineers Department" the students had to track the water flow from the new well into homes. They also tracked the waste water from these homes.

Each student was given a water festival booklet which contained work sheets for each of the activities plus extra water-related games and puzzles. After the hands-on activities, the students were given a bag of material filled with bookmarks, posters, etc.

USGS also prepared a school calendar. Previously, the school had only a one-page calendar that listed some of the school activities. The calender that USGS prepared included all of the known activities. It has a picture of Belcourt Lake and the school and Tribe logos on top, with a page for each month below the picture. Months are named in English and in Chippewa. Each month challenges students with a water resource question. Answers are provided on the following month's page. Contact: Douglas Emerson, 701-250-7402, demerson@usgs.gov

**Hydrology and GIS Training Program at Haskell Indian Nations University.** The USGS Kansas Water Resources District provides advice as a member of the Natural Resources Advisory Board on natural resources curriculum issues and parttime salary support for a Natural Resources Instructor to the Haskell Indian Nations University. A USGS hydrologist also assisted in teaching GIS and water-quality concepts in ecology and other science lab classes at the University. The USGS Kansas Water Resources District participated in a career fair at Haskell in December 1997. The District is currently working to place several Haskell students in parttime and summer positions throughout the USGS. Contact: Thomas Trombley, 913-832-3551, trombley@usgs.gov

**Promoting American Indian Science Education through South Dakota State University.** The USGS' South Dakota Cooperative Fish and Wildlife Research Unit participated in a South Dakota State University program titled "2+2+2" to help more American Indian students prepare for careers in agriculture and biological sciences. The "2+2+2" is a team effort between high schools, Tribal colleges and South Dakota State University. Options for study range from environmental management to food science to wildlife and fisheries. Each "two" of the "2+2+2" represents two years in high school, Tribal college, and the State University. The program's goal is to have all these "2's" add up to a brighter future for American Indians. Contact: South Dakota Cooperative Fish and Wildlife Unit, 605-688-4515

**Web and Internet Workshop for Indian Educators.** USGS personnel conducted a workshop for the National Indian School Board Association's annual meeting held in Snowmass, Colorado, in July 1997. The USGS employees demonstrated techniques to familiarize teachers with using the World Wide Web and the Internet to obtain information for classroom use. The hands-on workshop used USGS web sites and information to present Web sites that show different levels and detail, including sites designed specifically for teachers and students; information related to regions or State; realtime water and earthquake data; and, sites that have geographic information related to national geography standards on location, place, land use, distribution of people, human impacts on land, and other resources. The group also learned to use the Internet to communicate with other schools. Contact: Tim Lee, 303-236-4955, tlee@usgs.gov

**National Training Center.** Each year, the USGS Water Resources Division's National Training Center offers 75 to 100 courses relating to water resources. The courses are made available to cooperators of the USGS, including Tribes and the BIA. In 1997, as in other years, American Indians participated in some of the training courses. The largest American Indian participation (6 individuals) was for the class "water-quality methods for ground-water and surface water." Contact: Russel Smith, 303-236-4932 x246, rsmithjr@usgs.gov

**Intern from Little Big Horn College.** The Little Big Horn College sponsored a summer internship for a member of the Crow (Absarokee) Tribe. As an intern with scientists of the USGS BRD, the intern collected plants, measured aquatic primary production, estimated canopy cover with a densitometer, collected aquatic insects, and pumped the stomachs of fishes. These are common skills and tools used by any scientist who will be involved in broad ecological research. Contact: Leader, Oregon Cooperative Fishery Research Unit, 541-688-4515

**Cooperative Education Assistance (CEA).** Six Native Americans were trained in natural resources management under the Cooperative Education Assistance (CEA) program at the USGS Biological Resources Division's Montana State University Cooperative Fishery Unit. One of the Indian students graduated and was employed by the U.S. Fish and Wildlife Service, the agency that funded the CEA venture. Additionally, the BRD Oregon Cooperative Unit developed a CEA for a Master of Science candidate. The student will soon graduate and will be employed as a fisheries biologist by his tribe, the Confederated Tribes of the Umatilla Indian Reservation. Contact: Leader, Montana Cooperative Fishery Research Unit, 406-994-3191

**Mentoring Isleta student.** A graduate student from the Pueblo of Isleta was assisted by the USGS BRD New Mexico Cooperative Fish and Wildlife Research Unit in her telemetry studies of exotic ungulates (non-native hoofed animals) in Southern New Mexico as part of her graduate curriculum. Contact: Leader, New Mexico Cooperative Fish and Wildlife Research Unit, 505-646-6053

**Water Resources Technician Training in New Mexico.** Hydrologists from the USGS New Mexico and South Dakota Districts provide annual training to American Indian personnel brought to New Mexico State University by the BIA for training. The USGS participation in the training includes providing instructors in ground-water, water-quality, and surface-water techniques. Contact: Linda Weiss, 505-262-5300, lsweiss@usgs.gov

**Computer Technology Enhancement and Training.** Employees of the BRD assisted in connecting the Havasupai Tribe to the Internet. The BRD employees carried donated computers 9 miles down the Grand Canyon, connected the Tribal computer system, and trained the Tribe's natural resources division staff in the use of the hardware. The BRD personnel also trained Tribal governments on the Colorado Plateau on using the Internet for research on natural resource and environmental topics. BRD assisted Dineh-Care, a grass roots Tribal group, in establishing a geographic information system to monitor environmental hazards that exist in the Four Corners region. Future plans call for Internet training for natural resources and environmental offices of the Hualapai and Jicarilla Apache Tribes. Contact: Director, Forest and Rangeland Ecosystem Science Center, 541-750-7307

**American Indian Training Program for College Students.** The USGS' Arizona Cooperative Fish and Wildlife Unit has a Native American Training Program open to college students who are recommended by Tribal Councils or individual Tribal members. The most important criteria for entering the program is a desire to complete an undergraduate or graduate degree in natural resource management at the University of Arizona. The program is one of the USGS Biological Resources Division's most successful educational ventures:

a. The Unit recently graduated a Ph.D. student who is Yaqui and Tohono O'odham (Papago). He is now an employee of the U.S. Fish and Wildlife Service, working on a refuge adjacent to the Tohono O'odham Nation.

b. A member of the White Mountain Apache Tribe is expected to complete his Masters Degree in 1998. The student is financially supported a Cooperative Education Agreement with the U.S. Fish and Wildlife Service.

c. The Arizona Unit is also sponsoring a Masters candidate who is African-American and Nanticoke Lenai-Lenape ( New Jersey). She is expected to complete a Masters degree in early 1998.

d. The Unit's Minority Training Program has the following tribes represented among the student body:

White Mountain Apache (4), Navajo (2), and Yaqui (1). Nine American Indian students have obtained Bachelor of Science degrees through this program. These graduates represent the Navajo, Nez Perce, Yaqui, Tohono O'odham, Apache, Pima, and White Mountain Apache Tribes. Contact: Leader, Arizona Cooperative Fish and Wildlife Research Unit, 520-621-1959

**Water Resource Training at Cyspus.** A USGS scientist has taught American Indians at a BIA training course held annually at the Cyspus Conference and Learning Center in Washington. Each year, USGS instructors teach a 1-week introductory course on hydrologic data collection and computation techniques. The USGS hydrologist demonstrated the use and calibration of water-quality. He also demonstrated procedures for collecting representative stream water samples and for processing and preserving water samples for chemical analyses. Contact: Clyde Doyle, 503-251-3226, mcdoyle@maildorprn.wr.usgs.gov

**Education Materials for the Spokane and Colville Tribes.** The USGS provided educational materials that were distributed by the Assistant Secretary for Water and Science to the Spokane Tribe of Indians and the Confederated Tribes of the Colville Reservation. Contact: Sue Marcus, 703-648-4437, smarcus@usgs.gov

**Alaska Inter-Tribal Youth Practicum.** The USGS participated in the Alaskan Inter-Tribal Youth Practicum at the U.S. Forest Service (USFS) Kenai Work Station in July 1997. The purpose of the Practicum was to give Native Alaskan teenagers the experience of working in teams to solve natural resource management issues. To accomplish this, the USFS invited other resource agencies to participate and act as scientific advisors. There were 21 students from 11 different tribes. The USGS participant sought out students who were interested in science and provided special field opportunities for them so that they had the opportunity to learn about careers in science. Contact: Elenora Robbins, 703-648-6527, nrobbins@usgs.gov

**Coordination with the Alaska Native Science Commission.** Ms Patricia Longley-Cochran, the Director of the Alaska Native Science Commission participated in the annual meeting of the USGS BRD Alaska Biological Science Center to make Federal research biologists more aware of Native Alaskans resources and values. Ms Longley-Cochran described Alaska Native culture and the role of traditional ecological knowledge in understanding the ecological and cultural relationships between Alaska's fish and wildlife and Alaska Natives. Contact: Director, Alaska Biological Science Center, 907-786-3512

# Environmental Activities

**Everglades Restoration.** Scientists from the USGS BRD participate on the South Florida Ecosystem Restoration Working Group with members of the Miccosukee Tribe of Florida Indians and the Seminole Tribe of Florida. Research to be undertaken is identified by the Working Group with input from the Tribal representatives. The Working Group is more collaborative than some because of the active participation by the two Tribes. In consultation with the Working Group, BRD scientists focus on landscape ecology, wetland ecology, fire ecology, ornithology and ichthyology, coral reef ecology, and long-term monitoring. USGS also had developed a set of computer landscape models to support decisionmaking models. These models include population models of the Florida panther, Cape Sable seaside sparrow, Florida snail kite, American alligator, American crocodile, wood stork, great blue heron, white ibis, and great egret.

The USGS WRD, operating from the Miami Subdistrict, has an integral role in a tri-party agreement to monitor surface water flows exiting main tributaries of the Seminole lands and entering Miccosukee lands. In cooperation with the Florida agency, South Florida Water Management (SFWMD), the USGS operates and analyzes data from three "real time" continuous acoustic flow meters which produce daily surface water flow totals. These flow budgets are coordinated with Tribal and State water quality sampling efforts and are utilized in calculating total nutrient loads by State scientists. The results are distributed in a biannual SFWMD report. The USGS reports monthly to the Seminole Working Group who's purpose is to review and isolate nutrient contamination, verify flow budget agreements, and develop pathways to decrease surface water loading to Tribal lands. USGS personnel also participate in a monthly technical subgroup to define quality assurance protocols based on the newly developed technique of flow weighting nutrient samples utilizing submersible acoustics and auto-samplers in a low flow environment. The Seminole Tribe also utilizes the USGS laboratory in Ocala for nutrient analysis in this effort. Contacts: Biological Resources: Director, Florida Caribbean Science Center, 352-378-8181; Water Resources: Mitchell Murray, 305-526-2895 x44, mmurray@usgs.gov

**Migratory Needs of Sturgeon.** At the request of the Menominee Indian Tribe of Wisconsin, and the States of Wisconsin and Michigan, the USGS biologists at the S. O. Conte Anadromous Fish Laboratory are determining fish passage needs for two migratory species of sturgeon. Contact: Chief, Conte Anadromous Fish Laboratory, 413-836-9475

**Effects of Lampricides on Native Mussels.** The USGS BRD and the Bad River Band of Lake Superior Chippewa Indians are cooperating in a study to evaluate the effects of lampricide treatments on mussels native to waterways on the Bad River Reservation. Lampricides are chemical treatments, developed by Federal and other scientists, to reduce the population of lampreys in the Great Lakes. Lampreys are an introduced species that harm Great Lakes fisheries. USGS scientists are seeking a method of reducing the lamprey population without harming native mussels. Contact: Director, Upper Mississippi Science Center, 608-783-6451

**Quantity and Quality of Water Resources for the Cheyenne River Sioux Tribe.** Water quality is known to be poor in some areas of the Cheyenne River Reservation. Many residents obtain drinking water from these poor quality sources. The objectives of the project are to: (1) describe the variability of streamflow within and adjacent to the Reservation; (2) inventory water use for selected areas within the Reservation; (3) determine selected aquifer properties; (4) describe and characterize the quality of surface and ground water, including suitability for drinking-water supplies, livestock watering, and irrigation; (5) describe temporal trends in water quality for the Cheyenne and Moreau Rivers; and, (6) develop a generalized hydrologic budget for the Reservation. Contact: Allen Heakin, 605-355-4560 x216, ajheakin@usgs.gov

**Water Resources of Part of the Rosebud Indian Reservation.** Elevated nitrate concentrations have been detected in domestic wells completed in the High Plains aquifer and some other unnamed and unmapped shallow aquifers in Mellette and Todd Counties, South Dakota. Water samples taken from two community wells in the Grass Mountain area of the Rosebud Sioux lands contained dissolved arsenic concentrations, that were substantially higher than the EPA drinking-water standard. Pesticides also were found in some samples. Knowledge of the extent and thickness of the aquifers and their relationships to each other is needed to determine the extent, source(s), and direction of movement of contamination. The objective of the study is to provide reliable, current data and analyses for evaluation of the water resources to enhance the efficient use of these resources. Contact: Janet Carter, 605-355-4560 x215, jmcarter@usgs.gov

**Water Supply and Water-Quality Assessment of the Pine Ridge Indian Reservation.** Drinking water for the 13,200 residents of the Pine Ridge Indian Reservation is obtained primarily from shallow wells. Northwestern parts of the Reservation lack a reliable drinking-water supply, and water-quality problems exist at scattered locations across the Reservation. There is great concern among the leaders of the Oglala Sioux Tribe that some of the drinking water consumed on the Reservation is adversely affecting human health. A comprehensive assessment of the supply and quality of reservation water is providing the baseline to evaluate future water-quality changes. Contact: Allen Heakin, 605-355-4560 x216, ajheakin@usgs.gov

**Surface-Water Quality on the Prairie Band of Potawatomi Reservation.** The USGS provided an initial water-quality assessment at selected sites to identify point and non-point sources of contamination. It assisted the Tribe in developing the infrastructure and procedures necessary to monitor water quality within the Reservation on a long-term basis and to determine constituent loads coming into and leaving the Reservation. The USGS has also trained Tribal personnel in water-quality sampling and quality assurance/quality control procedures. As part of this training, three Tribal staff members were sent to the water-quality sampling course at the National Training Center in Denver. Contact: Thomas Trombley, 913-832-3551, trombley@usgs.gov

**Environmental Impacts of Oil and Gas Operations: Osage Nation's Reservation.** During the summers of 1995 and 1996, USGS scientists conducted limited studies of the environmental impacts of oil and gas operations at two oilfields on the Osage Reservation in northeastern Oklahoma as part of a broader project on water produced during petroleum extraction ("produced water "). The main issues on the Osage lands were salt scarring and soil erosion, ground and surface water contamination, and contamination from naturally occurring

radioactive materials due to leaks and spills of brine from produced water. Preliminary geochemical and radiochemical studies of soil and water samples have been completed by the USGS though sampling is continuing. An initial report on the effects of produced waters at oilfield production sites on the Osage Reservation was published in 1997 (USGS Open-File Report 97-28). USGS representatives met with the Tribal Council in Pawhuska in April 1997 to explain the significance of the report and to assist the Tribe in determining priorities for environmental studies. Based on that meeting, the Tribe decided to conduct a reconnaissance water quality investigation on the Reservation with the USGS Water Resources Oklahoma District Office as the investigator. Although there is evidence of naturally-occurring radioactive materials contamination on the Osage lands, a more important economic factor is the overall quality of the ground and surface water resources. The USGS may also continue studying contamination by naturally occurring radioactive materials in the summer of 1998. Contact: Jim Otton, 303-236-8020, jkotton@usgs.gov

**Nitrates in the Flaxville Aquifer, Fort Peck Reservation (Fort Peck Assiniboine and Sioux Tribes).** Water samples collected from the Flaxville aquifer during reconnaissance investigations contained large concentrations of nitrates. The extent and origin of nitrates in the Flaxville aquifer need to be defined. The objective of the project are: (1) determine the lateral distribution and concentration of nitrates in the Flaxville aquifer; (2) determine vertical distribution of nitrates in the Flaxville aquifer; (3) determine possible factors which might affect nitrate concentrations in the Flaxville aquifer; (4) determine nitrate sources; (5) determine hydraulic characteristics of Flaxville aquifer; and (6) describe conditions in unsaturated zone that may influence nitrate concentration. Contact: Joanna Thamke or David Nimick, 406-441-1319, jmthamke@usgs.gov, dnimick@usgs.gov

**Contamination in Unconsolidated Quaternary Aquifers In and Near the East Poplar Oil Field, Northeastern Montana.** Brine from oil-production activities in the East Poplar Oil Field has been disposed of in evaporation pits or injected into subsurface geologic units (below the ground surface). Disposal of the brine apparently has resulted in contamination. The objectives of the project are to determine the areas of contamination, the chemical characteristics of the brine and the contamination, possible geochemical reactions that may occur, direction and rate of movement of conservative constituents, source areas, and the effect of the contamination on other water resources such as the Poplar River and the Fort Peck Indian Reservation (Fort Peck Assiniboine and Sioux Tribes). Contact: Joanna Thamke, 406-441-1319, jmthamke@usgs.gov

**Delineation of the 100-Year Flood Plain Along Streams in the Northern Cheyenne Indian Reservation.** The areas that would be inundated by a 100-year flood along streams in the Northern Cheyenne Indian Reservation are of interest to the Northern Cheyenne Tribe. Information is needed to adequately delineate areas prone to flooding along streams. This information will assist the Tribe in making decisions concerning the location of buildings, structures, roads, and other facilities to preclude the uneconomic, hazardous, or unnecessary use of the floodplain in connection with facilities. The objective of the project is to determine the extent of flooding that would occur as the result of a 100-year recurrence-interval flood along Lame Deer Creek, Muddy Creek, Rosebud Creek, and the Tongue River. Contact: Charles Parrett, 406-441-1319, cparrett@usgs.gov

**Bald Eagle Survey.** Representatives of the Nez Perce and the Confederated Salish and Kootenai Tribes assisted in BRD's 1997 Midwinter Bald Eagle Survey. Tribal members conducted eagle counts in portions of Idaho and Montana. The USGS scientists are analyzing data from 37 Tribal areas and States to assess regional and national population trends for bald eagles. Contact: Director, Forest and Rangeland Ecosystem Science Center, 541-750-7307

**Geohydrologic and Water-Quality Assessment of Pueblo of Jemez Ancestral Lands.** The Pueblo of Jemez has concerns about the quality of their present drinking water sources. This project will evaluate the present sources of water and perform a preliminary determination of possible alternative water sources. The Pueblo are also concerned about the characteristics of the geothermal resources on the Pueblo's land. This project will perform a preliminary characterization of these resources to aid the Pueblo in determining appropriate economic development alternatives. Contact: Paul Blanchard, 505-262-5347, pblanchard@usgs.gov

**Exotic Species on the Navajo Reservation.** The USGS BRD mapped exotic (non-native) species living on the Navajo Nation's lands in cooperation with the Tribal exotic species coordinator. The Tribal coordinator has been trained to use the BRD home page on exotics. A Navajo botanist was hired to assist with field data collection and the Navajo Nation provided volunteers to assist in collecting field data at approximately 40 sites on the Reservation. They provided information on where other exotic species might be, how to get there, and how to avoid culturally significant areas of the Reservation. The Navajo Department of Agriculture may be interested in expanding this study. The Hopi Natural Resources Department has expressed an interested in a second phase of the project. Contact: Director, Forest and Rangeland Ecosystem Science Center, 541-750-7307

**Endangered Plant on Navajo Lands.** In 1997, USGS and Tribal scientists monitored the status of *Astragalus cremnophylax var. Hevronii*, an endangered plant on the Navajo Reservation. The Tribal botanist, a USGS research scientist, and botanists from the National Park Service and Brigham Young University conducted a 3-day expedition to inventory existence of the species. Contact: Director, Forest and Rangeland Ecosystem Science Center, 541-750-7307

**Navajo Nation Sedimentation and Erosion.** The objectives of this USGS study for fiscal years 1997-98 are: (1) identify sources and mechanism of sediment production, (2) estimate rates of hillslope, valley, and channel erosion in tributary drainage basins, and (3) estimate sediment yields from drainage basins within the Navajo lands. Results of the study will help land-use managers and residents assess the stability of channels, and the relative erodibility of valleys and hillslopes. Contact: John Parker, 520-670-6671 x271, jtparker@usgs.gov

**Fine-Resolution Mapping.** A vegetation map of the Fort Apache Reservation is being produced by the USGS BRD's GAP project, in cooperation with the White Mountain Apache Tribe. The GAP project seeks to fill in data that are currently lacking ("gaps ") needed for geographic information systems (GIS). The results of this activity will be provided to the BIA field office. That office will cooperate with the Tribal Forestry Department to produce a fine-resolution vegetation map of the Reservation. BRD hired two biological technicians from the Tribe to collect data for a map-accuracy assessment on Reservation lands. The technicians clarified ambiguous data by conducting field examinations and relying on their knowledge of the local area. The final product will be integrated into the GIS as a foundation of the GAP

project. Contact: Director, Forest and Rangeland Ecosystem Science Center, 541-750-7307

**Apache Trout.** Scientists of the USGS BRD, in cooperation with the White Mountain Apache Tribe's Fish and Game Department and the U.S. Fish and Wildlife Service, have begun studies to assess the survival of Apache trout that have been reintroduced into streams on the Fort Apache Indian Reservation. Contact: Leader, Arizona Cooperative Fish and Wildlife Unit, 520-621-1959

**Acid Mine Drainage.** The USGS Nevada and California Water Resources Districts are informally consulting with the BIA and the Washoe Tribe of Nevada and California regarding contamination from the Leviathan Mine, an abandoned open-pit sulfur mine, of tribal lands along tributaries to the Carson River. Thus far, several engineering projects to contain acidic runoff from the mine pit and tailings have failed, resulting in acid and metals contamination of Bryant Creek and other tributaries in the area which traverse Tribal lands. Contact: Jon Nowlin, 702-887-7600, jlnowlin@usgs.gov

**Douglas County Nitrate Contamination.** The Washoe Tribe of Nevada and California has lands in the Carson Valley, Nevada. Nitrate contamination from a variety of sources, including septic tanks, has affected aquifers in Douglas County, Nevada, adjacent to Tribal lands. Investigations of sources of and mechanisms for nitrate contamination of the aquifer are of interest and concern to the Tribe which has lands down gradient from the contamination. Contact: Jon Nowlin, 702-887-7600, jlnowlin@usgs.gov

**Fallon Basalt Aquifers Phase I, Data Synthesis and Analysis.** The Nevada Division of Water Resources, the Navy, and the Bureau of Reclamation are cooperating with the USGS on this study to better define sources of water to, and controls on, the quality of water in the Fallon Basalt Aquifer. This aquifer is the sole source of drinking water for the City of Fallon, the Fallon Naval Air Station, and the Fallon Paiute and Shoshone Tribe (Fallon Colony). The Fallon Colony is contributing data to the project, is providing access to Tribal lands for drilling, and is a potential cooperator for Phase II of this study. Phase II involves developing a digital model of the aquifer and assessing the potential for in-situ reduction of arsenic, which exceed current U.S. Environmental Protection Agency maximum contaminant levels for drinking water. Contact: Carol Boughton, 702-887-7727, boughton@usgs.gov

**Native Life and Sustainability.** USGS Biological Resources Division (BRD) scientists at the Alaska Coop Unit are studying the sustainability of Arctic communities. Assisted by local indigenous people in data collection and research direction, the BRD study assesses subsistence lifestyles of Iñupiat Eskimo and G'wichin peoples that may be affected by global change, public policy, and ecological processes. Contact: Leader, Alaska Cooperative Fish and Wildlife Research Unit, 907-474-7661

**Muskox and Reindeer.** In cooperation with the Northwest Reindeer Herders Association, USGS biologists are studying the interaction between a rapidly expanding, introduced muskox population and Native-owned, domestic reindeer on Alaska's Seward Peninsula. A geographic information system will be used to produce a muskox habitat map for the North Slope Borough, the regional government for Iñupiat Eskmos. The map will be used in planning land use on Alaska's North Slope. Contact: Leader, Alaska Cooperative Fish and Wildlife Research Unit, 907-474-7661

# Resource Activities

**Salmon Restoration along the St. Lawrence River.** At the request of the Akwesane Mohawk Tribe, (St. Regis Mohawk Reservation) New York, work continued on the effort to restore Atlantic salmon in the tributaries of the St. Lawrence River. Stream temperatures were monitored and water chemistry analyzed in an effort to determine habitat suitability. The USGS BRD scientists also evaluated spawning activity on artificial spawning sites created in the river. Data from this study will be available soon. Contact: Chief, Tunnison Laboratory of Aquatic Science, 607-753-9391

**Video on the Geology of the Southern Appalachians.** Scientists with the USGS Mineral Resources Program are planning to make a video about the geology of the southern Appalachians. The area includes the Great Smoky Mountains National Park; part of the Blue Ridge Parkway; and the Cherokee, Nantahala, Jefferson, Pisgah, and Chattahoochee National Forests. The purpose of the video is to explain how the geology and geologic history of the region over the last one billion years has impacted the lives of the people in the area. It will also discuss mineral deposits in the region in a geologic context. The intended audience for the video is the general public. The history of development of mineral deposits and reclamation of the land in the Copper Basin, the largest metal mining district in the southeast prior to 1900, will be outlined in the video. The video also will mention that although the Cherokees knew about gold in the area, gold did not have the same significance for them as for the white settlers and that the discovery of gold by white settlers and the resulting gold rush hastened the Cherokee removal. In July, the USGS contacted the Eastern Band of Cherokee Indians and requested provisional approval from the Tribal Council for the project. Contact: Judy Back, 703-648-6459, jback@usgs.gov

**Lake Michigan Whitefish.** Biological Resources Division scientists initiated a collaborative study with the Grand Traverse Band of Ottawa and Chippewa Indians to assess historical lake whitefish spawning grounds in Grand Traverse Bay, Lake Michigan. Habitat features were investigated using side-scan sonar and underwater video at several sites in the bay. Contact: Director, Great Lakes Science Center, 313-994-3331 x206.

**Characterization of Water Resources at Keweenaw Bay Indian Community.** The objective of the study is to conduct a water-resources appraisal of tribal lands. The study will include information on data-collection sites, surface- and ground-water quality, and water levels in wells, lakes, ponds, and wetlands. Contact: Jim Nicholas, 517-887-8906, jrnichol@usgs.gov

**Lake Trout.** USGS scientists assisted in the evaluation of the survival of tribal stocked lake trout in Keweenaw Bay by the Keeweenaw Bay Band of Lake Superior Chippewas. The Science Center shared its research vessel to provide sampling at specified locations according to a study protocol developed in 1996. BRD provided the Band a summary of findings. Contact: Director, Great Lakes Science Center, 313-994-3331 x206

**Water Resources of Bonifas Creek and Adjacent Wetlands, Watersmeet, Michigan.** The Lac Vieux Desert Band of Lake Superior Chippewa Indians needs water resources information for Bonifas Creek and its adjacent wetlands near their lands in Watersmeet, Michigan. Of particular interest are the background water quality of Bonifas Creek and the travel time for

water through about 160 acres of wetlands between the tribal land and the creek. The objective of this study is to evaluate the water quality of Bonifas Creek and the hydrology of adjacent wetlands. Contact: Jim Nicholas, 517-887-8906, jrnichol@usgs.gov

**Water Resources of Indian Lands in Wisconsin.** In order for individual Indian tribes to be able to assess the potential for developing their water resources, they must have an idea of the quantity, quality, and availability of water on their lands. A resource inventory is also needed to establish Indian water rights and claims. The potential effects of off-reservation activities such as mining and acid rain also need to be assessed. The objective of this USGS project is to inventory the water resources of Indian Reservations in Wisconsin. Indian Tribes that have participated in this project include the Menominee, Red Cliff, Oneida, and Bad River. Contact: James Krohelski, 608-821-3850, jtkrohel@usgs.gov

**Hydrogeology of the Grand Portage Indian Reservation.** The Grand Portage Band of Chippewa Indians has identified two critical issues regarding the management, use, and protection of ground water on the Reservation. Information about the hydrogeology and water quality of the aquifers on the Reservation currently is limited to a regional-scale description determined from reconnaissance-level investigation. Tribal officials need more information about local ground-water conditions in order to better deal with these issues. The objectives of the project are to (1) determine the general availability and quality of ground water with special emphasis at designated development areas and (2) evaluate the potential for aquifer contamination from on-land waste disposal sites. Contact: James Ruhl, 612-783-325, ruhl@usgs.gov

**Water Resources of Selected Indian Communities.** Detailed information of the water resources of four Indian communities is necessary for the efficient use, management, and protection of these resources. These studies will evaluate the availability and quality of surface and ground water for domestic and municipal use. The American Indian communities are Nett Lake (Bois Forte Band of Chippewa), Prairie Island Mdewakanton Dakota Community, Lower Sioux Reservation, and Upper Sioux Community. Contact: James Ruhl, 612-783-3252, ruhl@usgs.gov

**American Indian Aquaculture.** The USGS Upper Mississippi Science Center conducts nationwide research on the registration of new drugs, chemicals, and therapeutics used in aquaculture production. Working with the U.S. Food and Drug Administration, which is considering allowing "crop grouping" to speed the approval process, a partnership has been formed among USGS, the International Association of Fish and Wildlife Agencies that represents 37 State fish and game agencies, and the Fish and Wildlife Service that administers funding from the States, nine drugs are being studied of approval for aquaculture use. Because Tribal aquaculture operations are a significant percentage of nationwide facilities, Tribes will benefit directly from this research at no expense. Contact: Director, Upper Mississippi Science Center, 608-783-6451

**Susceptibility of Ground Water of Part of the Spirit (Devils) Lake Sioux Indian Reservation.** The purpose of this study is to assess the vulnerability of the ground water in the Tokio and Warwick aquifers in the Fort Totten Division of the Spirit Lake Reservation to surface contamination. The ground-water vulnerability assessment will provide information useful for management to guide their decisions about ground-water protection. The study area includes the Tokio and Warwick aquifers that underlie parts of the Fort Totten area. Contact: Douglas Emerson, 701-250-7402, demerson@usgs.gov

**Long-Term Monitoring on of Part of the Spirit (Devils) Lake Sioux Indian Reservation.** The purpose of this study is to determine changes in hydrologic and water-quality conditions on the Fort Totten Division of the Spirit Lake Reservation. The objectives are to: (1) develop a long term program to monitor the water levels and water quality in selected wetlands and lakes on the Reservation and (2) develop a long term program to monitor ground-water levels and water quality in the Spiritwood, Tokio, and Warwick aquifers. Contact: Douglas Emerson, 701-250-7402, demerson@usgs.gov

**Surface and Ground Water Resources of Lake Traverse Indian Reservation.** The general objective of the study is to collect the necessary hydrologic data to evaluate the surface- and ground-water resources of the Lake Traverse Reservation of the Sisseton-Wahpeton Sioux in South Dakota and North Dakota and of Roberts County in South Dakota. The specific objectives are to determine: (1) the location, depth, quality, and quantity of water in the study area and (2) the effects of surface- and ground-water interactions, recharge and, discharge on the hydrologic system. Contact: Ryan Thompson, 605-353-7176 x225, rcthomps@usgs.gov

**Water Resources of the Kickapoo, Potawatomi, and Sac and Fox, and Iowa Indian Tribes.** This study, completed in 1996, compiled and analyzed available water data for 4,000 square miles of northeastern Kansas and southeastern Nebraska, including the Reservations of four Tribes in Kansas and southeastern Nebraska. A USGS hydrologist also assisted the Prairie Band of Potawatomi in developing GIS applications for the Reservation. The GIS lab at Haskell Indian Nations University was used. Contact: Thomas Trombley, 913-832-3551, trombley@usgs.gov

**Fish Habitat Research.** The USGS BRD's Cooperative Research Unit in South Dakota assisted the Cheyenne River Tribe in collecting data on fish and fish habitat in reaction to the reauthorization of two Bureau of Reclamation dams. As the process continues, the BRD will assist the Tribe in assessing impacts on fisheries. The Oglala Sioux Tribe requested assistance from both the U. S. Fish and Wildlife Service and USGS in preparing a report on the status of the health of the White River Watershed. The Cooperative Unit has also begun to assist the Flandreau Santee Sioux Tribe in monitoring the fishery and water quality of the Big Sioux River as it crosses tribal lands. Contact: Leader, South Dakota Cooperative Fish and Wildlife Research Unit, 605-688-6121

**Ground-Water Activities with the Northern Cheyenne Tribe.** The USGS drilled and completed 3 deep test wells on the Northern Cheyenne Reservation in FY 1997 in cooperation with the Northern Cheyenne Tribe. Water level, water quality, and hydraulic characteristics were measured for each well. Contact: Mike Cannon, 406-441-1319, mcannon@usgs.gov

**Water Use on Parts of the Blackfeet Reservation and the Crow Indian Reservation.** Water-development planning requires an accurate database of current water use to evaluate various alternatives for expanded or revised use patterns. Water use information was determined for parts of the Blackfeet Reservation and the Crow (Absarokee) Indian Reservation. Contact: Charles Parrett, 406-441-1319, cparrett@usgs.gov

**Availability of Ground Water Along the Little Bighorn River, Crow Indian Reservation.** Recent concerns about water availability for the Crow Indian Reservation have necessitated detailed description of the water resources of the Reservation. The availability of ground water in alluvial and terrace deposits in the Little Bighorn River basin is an important part of the overall water resources of the Crow (Absarokee) lands. The objectives of the project (funded by BIA) are to: (1) describe the geometry of alluvial and terrace deposits; (2) describe the potentiometric surface and general directions of the flow; (3) determine hydraulic characteristics of the deposits; (4) describe recharge and discharge components, and hydraulic interactions with other hydrogeologic units, irrigation canals and the Little Bighorn River; (5) describe the general quality of water; and, (6) describe the potential of availability of ground water from bedrock aquifers. Contact: Lori Tuck, 406-441-1319, ltuck@usgs.gov

**Analysis of Surface-Water Resources of the Blackfeet Indian Reservation.** Surface water of the Blackfeet Indian Reservation, ranging from pristine mountain streams and glacial lakes to prairie wetlands, are a natural resource of cultural and economic importance to the Blackfeet. The high-quality surface waters of the Reservation support diverse populations of fish and wildlife, is widely used for stock watering and irrigation, and provides drinking water for many residents. The purpose of this study is to analyze and describe the surface-water resources of all major river basins of the Blackfeet Indian Reservation. Contact: Mike Cannon, 406-441-1319, mcannon@usgs.gov

**Paleoflood Hydrology of Dry Creek and St. Mary's Lake, Lake County, Northwestern Montana.** Dry Creek is a small stream that drains about 11 square miles upstream from St. Mary's Lake in the Mission Range in northwestern Montana. Tabor Dam was constructed in 1930 to increase the size of the natural lake. Recent evaluation has indicated that the dam, though generally stable, requires modification to safely convey a probable maximum flood (PMF). The use of the PMF model is controversial because the probability of exceeding the PMF is unknown. Paleoflood hydrology, which is the study of the geologic record of past floods, offers a means of assessing the reasonableness of PMF estimates based on the preserved flood data from the past several thousand years. This study will obtain paleoflood evidence for Dry Creek and will estimate flood magnitude and frequency based on the paleoflood evidence. The Confederated Salish and Kootenai Tribes are active partners in this project on the Flathead Reservation. Contact: Charles Parrett, 406-441-1319, cparrett@usgs.gov

**Assessment of Tight Gas Resources of the Wind River Reservation, Wyoming.** USGS scientists are completing an assessment of tight gas resources of the Wind River Reservation

(Arapaho and Eastern Shoshone Tribes) of Wyoming. The work was done as part of a project to assess tight gas resources in Western Interior basins, funded by the Department of Energy. Results indicate that the Reservation contains 304 trillion cubic feet of gas in tight or near-tight reservoirs. This is about one-third of the total gas in tight to near-tight reservoirs in the total Wind River Basin. Data sets on geology were entered into a Geographic Information System and maps have been produced. Contact: Ron Johnson, 303-236-5546, rcjohnson@usgs.gov

**Geohydrologic and Water-Quality Assessment of Pueblo of San Ildefonso Reservation Lands.** The primary objectives of this study are to (1) conduct an assessment of the quality of the Pueblo of San Ildefonso water resources, and (2) develop the technical ability of the Pueblo's staff to collect water data so that at the conclusion of the study, the Pueblo will have increased independence in conducting these activities themselves on a regular basis. Contact: Paul Blanchard, 505-262-5347, pblanchard@usgs.gov

**Hydrologic Classification and Estimation of Basin and Hydrologic Characteristics of Subbasins in Central Idaho.** Hydrologic data for streams and associated subbasins within the Salmon and Clearwater River Basins were analyzed to support instream flow claims made by the BIA on behalf of the Nez Perce and Shoshone-Bannock Indian Tribes. These claims are part of the readjudication of the Snake River Basin by the State of Idaho. The purpose of the study was to classify subbasins and make estimates of mean annual and mean monthly discharges for subbasins within the study area. A related study was done concurrently, with the objective of developing a methodology for estimating flow duration values for subbasins within the study area. Reports for both these studies have been approved for publication. Contact: Steve Lipscomb, 208-387-1321, lipscomb@usgs.gov

**Fisheries Resources Research.** At the request of the Navajo Nation, the Biological Resources Division's New Mexico Cooperative Research Unit cooperated with the U.S. Fish and Wildlife Service to evaluate the health of the fish population in Morgan Lake on Navajo land. Contact: Leader, New Mexico Cooperative Fish and Wildlife Research Unit, 505-646-6053

**Bat Research.** The USGS BRD's Southwest Ecosystems Field Station in Albuquerque assisted Tribes with research on bats. The Navajo Natural Heritage Program worked with BRD in conducting preliminary surveys for bats on tribal lands. BRD provided the Tribe with the necessary scientific information to process the data that were collected. BRD scientists also worked with Tribal personnel from the Jemez and San Ildefonso Pueblos in the continuing bat research project. Contact: Director, Midcontinent Ecological Science Center, 970-226-9100

**Black Mesa Monitoring Program.** The Blank Mesa monitoring program is designed to document long-term effects of ground-water pumping from the N aquifer by industrial and municipal users. The N aquifer is the major source of water for the 5,400 sq. mi. Black Mesa area, which includes parts of the Navajo and Hopi Indian reservations. Since 1968, the Peabody Coal Company has been pumping about 3,800 acre feet of water annually from the N aquifer for its mining and coal-transport operations. The Navajo Nation and Hopi Tribe have been concerned about the long-term effects of industrial withdrawals on other supplies for domestic and municipal purposes. These concerns led to studies of the water resources of the Black Mesa area begun in 1971 by the U.S. Geological Survey in cooperation with the Arizona Department of Water Resources. Since 1983, the Navajo Tribal Utility Authority, Peabody

Coal Company, the Hopi Tribe, and the Western Navajo Agency, Chinle Agency, and Hopi Agency of the BIA have assisted in the collection of ground-water data. Contact: Greg Littin, 520-556-7255, grlittin@usgs.gov

**Geochemical Analysis of Ground Water Ages, Recharge Rates, and Hydraulic Conductivity of the N aquifer, Black Mesa, Arizona.** The objectives of this study for fiscal years 1997-1998 are: (1) characterize the water quality of the N aquifer, (2) use geochemistry to develop a conceptual ground-water flow model, and (3) determine if leakage is occurring from the D aquifer. Both the Hopi Indian Tribe and the Navajo Indian Nation will apply these findings to their individual plans for use of N aquifer. A long-term hydrological monitoring plan has been established for the N and D aquifers. Contact: John Hoffman, 520-670-6671 x265, jphoffma@usgs.gov

**Navajo Surface Water Project.** The Navajo Surface Water project is designed to help the Navajo Nation's Water Resources Department compute streamflow records from its streamflow gaging stations by: (1) assisting the Department in setting up a database to compute and store streamflow data, (2) providing training in record computation, (3) assisting with rating curve development, and (4) providing quality assurance. Contact: Greg Pope, 520-670-6671 x283, glpope@usgs.gov

**Availability and Quality of Surface-Water and Ground Water Resources of the Yavapai-Prescott Indian Reservation.** The Yavapai-Prescott Indian Tribe's primary water-resource needs are related to water rights, availability, and quality. There are four primary objectives of this study: (1) determine surface water inflows and outflows in Granite Creek within the Reservation boundary as well as peak flows in four tributaries to Granite Creek, (2) define the potential occurrence and concentration of suspect contaminants in water, sediment, and alluvial aquifer of Granite Creek that are associated with past and current industrial activities within and near the Reservation, (3) identify the rate and direction of movement of potential contaminants entering or existing in the alluvial aquifer of Granite Creek, and (4) determine the potential for development of ground-water supplies on the Reservation. Contact: Greg Littin, 520-556-7255, grlittin@usgs.gov

**Hydrologic Conditions in Grande Wash, Fort McDowell Mohave-Apache Indian Community.** The objectives of this study for fiscal years 1997-1998 are to: (1) determine the sources, quality, and quantity of streamflow in Grande Wash at the western boundary of the Fort McDowell Reservation, (2) determine horizontal and vertical extent of the shallow alluvial aquifer along Grande Wash and principal directions of ground-water flow, (3) determine if ground water near the landfills is contaminated and if landfills are sources of that contamination, and (4) evaluate the effects of existing and planned use upstream of the Reservation on peak surface flows within the Grande Wash drainage. These findings will assist the Ft. McDowell Community in planning the use and development of Grande Wash. Contact: John Hoffman, 520-670-6671 x265, jphoffma@usgs.gov

**Preliminary Assessment of Hydrologic Conditions on the Southern Boundary of the Tohono O'odham Indian Reservation.** The objectives of this study for fiscal years 1997-1998 are to: (1) estimate the quantity of surface-water flowing in Vamori and San Simon Washes, (2) complete construction, testing, and calibration of load-cell scour sensors, and (3) identify additional data needs and develop a plan for intensive study along the southern border of the

Reservation to determine the effects of future ground-water withdrawals and agricultural development on hydrologic conditions within the Reservation. Contact: Michael Carpenter, 520-
670-6671 x275, mccarp@usgs.gov

**Sturgeon Embryology.** At the request of the Kootenai Tribe of Idaho, BRD scientists studied the effects of water temperature on the timing of development of white sturgeon embryos. Contact: Director, Western Fisheries Research Center, 206-264-5411

**Lead Contamination.** USGS scientists from the National Wildlife Health Center in Madison, Wisconsin, performed a diagnostic analysis of lead contamination in the Coeur d'Alene Basin, Idaho, and concentrated on the effects of contamination on wildlife on Coeur d'Alene Tribal lands. This effort was conducted as part of the Natural Resource Damage Assessment project, the nationwide effort to identify and rectify impacts of contaminants. Contact: Director, National Wildlife Health Center, 608-264-5411.

**Intermittent Recharge.** This study is re-evaluating the source and magnitude of ground-water recharge to Eagle Valley, Nevada, in which lie the State capital (Carson City), the Washoe Tribe's Carson City Indian Colony, and other lands of the Washoe Tribe. The project is a cooperative effort between the USGS, Carson City, and the Washoe Tribe. To date, project results have included definition of relationships between stream temperature and water infiltration rates that enable Carson City to better manage infiltration facilities for ground-water recharge. Information from the study also resulted in revised (increased) estimates of natural recharge to the alluvial aquifers that allowed the City to increase its pumping allocation. Current work is focusing on the Clear Creek tributary basin, which traverses land of the Washoe Tribe. Contact: Carol Boughton 702-887-7727, boughton@usgs.gov

**Nevada Basin and Range National Water Quality Assessment.** This National Water-Quality Assessment (NAWQA) project includes the Carson and Truckee River basins in northwest Nevada and Las Vegas Valley in southern Nevada. Water-quality data for streams and aquifers in the Truckee and Carson basins are of importance to the Washoe Tribe of Nevada and California (Carson River and Lake Tahoe Basins), the Pyramid Lake Paiute Tribe (lower Truckee River), and Fallon Paiute and Shoshoe Tribe (lower Carson River Basin). Information on ground-water quality in Las Vegas Valley is important to the Las Vegas Paiute Tribe, which is developing their Snow Valley lands for tourism as an economic base and depends upon the Las Vegas Valley alluvial aquifers for its water supply. Contact: Hugh Bevens, 702-887-7688, hbevans@usgs.gov

**Truckee-Carson Program.** The USGS is supporting other Department of the Interior bureaus in executing provisions of Public Law 101-618, the Truckee-Carson-Pyramid Lake Settlement Act. Funding is provided by the USGS. The project has developed a complex river operations model for the Truckee and Carson Rivers and the Truckee Canal in support of Interior's negotiations on reservoir and river operations to protect Indian trust issues for the Pyramid Lake Paiute and Fallon Paiute and Shoshone Tribes. In addition to model development and support, the USGS is a technical advisor on hydrologic issues to the Interior and the BIA in the water-settlement negotiations and related litigation and water-rights transfers. Contact: Larry Bohman, 702-887-7679, lrbohman@usgs.gov

**Fallon Shallow Aquifer Model.** A ground-water model assessing the potential effects on ground-water levels and quality through proposed changes in the quantity and location of surface water deliveries and application in the Newlands Project near Fallon, is being done in cooperation with the Bureau of Reclamation. Fallon Paiute and Shoshone Tribe have significant land and agricultural interests in this location and are subject to potential impacts as land-use changes take place in the vicinity. Contact: Carol Boughton, 702-887-7727, boughton@usgs.gov

**Quality of the Ground Water at Midnite Mine, Stevens County, Washington.** The Midnite Mine is an inactive uranium mine, located approximately 50 miles northwest of Spokane, Washington. Between 1988 and 1995, the U.S. Bureau of Mines (USBM) operated a ground-water quality monitoring network at the mine site, during which time a deterioration of the water quality was observed at a number of wells. During September and October 1996, the USGS evaluated the operational condition of the USBM wells and collected 19 environmental samples to characterize the current quality of the ground water. Such characterization and monitoring is needed so that the Bureau of Land Management, the Spokane Tribe, and the BIA can assess the effectiveness of remediation activities. Contact: Ken Aimes, 253-593-6510, kcames@usgs.gov

**Research to Assist the Northwest Indian Fisheries Commission.** Three research projects continue as requested by the Northwest Indian Fisheries Commission, a group that represents more than 20 Tribes in Washington State:

a. The importance of several new strains of viral hemorrhagic septicemia (VHS) virus identified in tribal hatcheries was investigated by USGS biologists. The completed studies provided data that was useful to the Commission by identifying American and European strains of VHS. (Fish infected with the European strain must be destroyed.) The results are being prepared for publication in a scientific journal.

b. Scientists in the USGS BRD have begun examining the genetic diversity among isolates of infectious hematopoietic necrosis (IHN) virus using newly developed DNA fingerprinting techniques. Isolates, or pure strains of the virus, from fish at several Tribal hatcheries will be compared to learn more about factors controlling the occurrence of the virus in salmon reared at these facilities.

c. Research by the BRD continues on proliferative kidney disease in fish. Fish from the Quinault Nation's hatchery were quarantined in a BRD laboratory and subjected to increased water temperature over time. Kidney disease is induced and carrier fish identified only at abnormally high temperatures. The Tribe was concerned that at the higher water temperatures of the summer months, the parasite would become active in carrier fish and cause tremendous loss to the Tribal fishery in Lake Quinault. During the quarantine, BRD was able to dispose of the carrier fish and ensure a disease-free summer fishery. Contact: Director, Western Fisheries Research Center, 206-526-6282

**Water Resources of the Swinomish Indian Reservation.** The Swinomish Indian Tribal Community is interested in protecting the water resources of its Reservation for the beneficial use of the members of the Tribe. Protection from overuse and degradation of quality are the concerns. The purposes of this study are to: (1) determine current streamflows on the

Reservation and compare them to streamflows in 1976, (2) determine the most likely ground-water flow directions and general magnitude of ground-water velocities near a landfill, (3) determine the extent of seawater intrusion into the freshwater ground-water system, and (4) supply data for the Tribe's water-resources database. Contact: Blake Thomas, 253-593-6510, bthomas@usgs.gov

**Evaluation of Current Ecological Conditions with Respect to Nutrient Dynamics in the Elwha River, Olympic National Park, Washington.** The formerly free-flowing Elwha River was famous for the diversity and size of its salmon runs; it produced an estimated 380,000 migrating salmon and trout and supported 10 runs of anadromous salmonids, including chinook that exceeded 100 hours. After construction of the Elwha Dam (1912) and the Glines Canyon Dam (1927), more than 70 miles of mainstem river and tributary habitat were lost to anadromous fish production. In response to the loss of salmon in the Elwha River basin, President George Bush signed the Elwha River Restoration Act of 1992 which began the process of assessing the feasibility of restoring the Elwha River ecosystem. The USGS, in cooperation with the Lower Elwha Klallam Tribal Council, is evaluating the current ecological status and nutrient dynamics of the Elwha River to assist in developing salmon restoration management plans and developing an ecological framework for describing current and future ecological conditions in the Elwha River Basin. Contact: Mark Munn, 253-593-6530 x238, mdmunn@usgs.gov

**Ground-Water Water-Quality Sampling of the Puyallup Indian Reservation.** The Environmental Department of the Puyallup Tribe requires information on water quality in order to evaluate the ground-water resources used by Tribal members. To obtain this information, the Tribal Department is conducting a water-quality study of ground-water used by Tribal members within the 1873 Reservation Boundary. As part of this study, the Tribal government has requested that the USGS collect and analyze samples from selected wells. Contact: Ken Aimes, 253-593-6510, kcames@usgs.gov

**Research to Assist the Columbia Intertribal Fisheries Commission.** The Columbia River Intertribal Fisheries Commission requested the assistance of the USGS BRD on several projects during FY 1997:

a. BRD continued to study the behavior of migrating salmon in the Mid-Columbia River in relation to total dissolved gas-bubble trauma symptoms.

b. BRD provided laboratory space, wet laboratory facilities, fish, and scientists to the Commission during a study to determine if viruses found in white sturgeon from hatcheries are also in Columbia River fish.

c. Populations of Pacific lamprey are at risk of extinction; they are an important component of the salmon ecosystem, providing a buffer from predators, and are culturally important to the Confederated Tribes of the Umatilla Indian Reservation. BRD scientists are seeking the cause of the decreasing population. Contact: Leader, Oregon, Cooperative Fishery Research Unit, 541-737-1938

**Ground-water Resources of the Upper Deschutes Basin, Oregon.** The USGS is working with the Confederated Tribes of the Warm Springs Reservation and with other cooperators to

study the ground water resources in the Upper Deschutes Basin. The Upper Deschutes River Basin is one of the fastest growing areas in Oregon due to a tremendous influx of new residents, the resulting expansion of the retail sector, and rapid growth in the recreation and tourism industries. Present water users such as municipalities, private water suppliers, domestic water users, and irrigators want to assure the continued availability of water resources. Developers wish to accommodate new growth. The Confederated Tribes of the Warm Springs Reservation and conservation organizations wish to maintain or increase instream flows for fisheries. Surface-water resources of the region have been fully appropriated for many years.

Virtually all new development in the region must rely on ground water resources. Ground water is abundant in parts of the region, but until recent studies by the USGS very little was known about the geology and hydrology of the resource. State and local government agencies and the general public are increasingly concerned about the consequences of continued rapid development of the ground-water resource. The major issue is the potential for depletion of streamflow however there are also concerns about seasonal and long-term water-level declines in aquifers.

In 1993, the USGS began a cooperative study to provide a quantitative understanding of the ground-water hydrology in the Upper Deschutes Basin. Information from this study will give resource managers, planners, and the general public the best information available with which to make decisions. The information will include: (1) a compilation of ground-water data, (2) a description of the geologic framework of the regional ground-water flow system, (3) a quantitative description of the flow system including estimation of the hydrologic budget, (4) an evaluation of ground-water/surface-water relationships, (5) an analysis of the effects of canal leakage, and (6) an estimate of the effects of present and future development on ground-water availability and streamflow. Cooperators that have contributed to the cost of the USGS study are the cities of Bend, Redmond, and Sisters; Deschutes and Jefferson Counties; the Oregon Water Resources Department; and the Confederated Tribes of the Warm Springs Reservation. The USGS is presently in the final year of its 4-year investigation of the ground-water resources of the Upper Deschutes Basin. The products of the study will include several reports, ground-water data available over the Internet, and a calibrated three-dimensional ground-water flow model which may be obtained and used by any interested party via the Internet. Contact: Marshall Gannett, 503-251-3233, mgannett@usgs.gov

**Long-Term Surface-Water Data Collection on the Confederated Tribes of the Warm Springs Reservation.** The USGS WRD is assisting the Confederated Tribes of the Warm Springs Reservation in monitoring the surface-water resources of the Reservation. Currently there are 11 continuous streamflow gaging stations operated and maintained in a cooperative program funded by the Tribes and the USGS. The present data collection network was established in 1973. Several of the gages pre-date 1973.

The Tribal Government and the USGS realize the importance of understanding the water resources of the arid region in and around the Reservation. Through the USGS Federal-State Cooperative program, the Tribes and USGS are working together to gather baseline data to further understand the hydrologic characteristics of the rivers and streams of the area. As mentioned above, the Tribes are concerned about increasing development in the Deschutes Basin in general and the protection of ecosystems in the basin, with a particular emphasis on

water and fisheries resources.

There is little water resources development in the tributary streams of the Reservation. The information provided as a result of this monitoring network represents baseline, generally natural conditions. Characteristics derived from these gages are therefore directly applicable to larger regional studies without the uncertainty of having to compensate for human activities. Contact: Lawrence Hubbard, 503-251-3239, leh@usgs.gov

**Klamath River Basin.** USGS scientists support the Technical Work Group of the Klamath River Basin Fisheries Task Force. The Work Group is chaired by representatives from member Tribes who rotate annually; the Karuk, Yurok, and Hoopa Valley Tribes from California, and the Klamath Tribe from Oregon are represented. This technical support and research assistance began in 1994, for the purpose of developing a better understanding of water quality and quantity management problems that limit anadromous fish restoration in the Klamath Basin.
Contact: Director, Midcontinent Ecological Science Center, 970-226-9100

**Hydrologic and Geochemical Monitoring and Remediation Related Studies Copper Bluff Mine.** The objective of this study is to collect ground-water data and evaluate the ground-water resources in the Santa Barbara County area to allow for the planning and optimal utilization of available ground water in this area. The project is being conducted in cooperation with the Hoopa Valley Tribe. Contact: Charles Alpers, 916-278-3134, cnalpers@usgs.gov

**Water Resources near the Bishop Paiute-Shoshone Tribe.** The USGS provided information to the Bishop Paiute-Shoshone Tribe on surface- and ground-water resources in the Bishop, California area. The Tribe was also interested in the ability of the USGS to conduct ground-water monitoring studies and to provide technical training for tribal members. Contact: Charles Alpers, 916-278-3134, cnalpers@usgs.gov

**Alaska Subsistence Issues.** The social science program at the University of Washington Field Station of USGS BRD's Forest and Rangeland Ecosystem Science Center has undertaken several projects for Alaska Natives:

a. Qualitative data has been collected on the traditional use of cabins and other shelters associated with subsistence uses by the Nikolai and Telida Athabaskan villages. These villages are adjacent to Denali National Park and Preserve; park uses should not conflict with traditional land resource uses by Alaska Natives.

b. Data on wildlife harvest and other uses of vegetative resources in the Athabaskan villages of Eagle Village and Circle are being analyzed. The villages have traditionally and recently used land now in the Yukon-Charly National Preserve administered by the National Park Service.

c. A study is being conducted on the potential for cooperative management of subsistence resources in several National Park Service units known collectively as the Northwest Areas. The Native communities of Ambler, Kiana, and Noatak will cooperate with NPS in the management of the northwest Alaska caribou herd in these NPS areas since it is of subsistence significance to these villages. Contact: Director, Forest and Rangeland

Ecosystem Science Center, 541-750-7307

**Yukon Delta Goose Management Plan.** The Yukon Delta Goose Management Plan is a formal agreement between the Native Association of Village Council Presidents, the Federal Fish and Wildlife Service and USGS's Alaska Biological Science Center, and governments of States that host the migrating geese. The Management Plan was reviewed in 1997 to assess research findings, examine sport and subsistence harvest, and determine research and management goals that conserve and enhance populations for Native Alaskan subsistence needs. Species included in the Plan are the greater white-fronted goose, cackling Canada goose, emperor goose, and the Pacific brant that nests on the Yukon-Kuskokwim Delta in western Alaska. Contact: Director, Alaska Biological Science Center, 907-786-3512

**Otters in Alaska.** As part of the operation of the Alaska Native Sea Otter Commission, the USGS BRD and the U.S. Fish and Wildlife Service continued to collect biological information from Native subsistence harvesting and shared this information among three cooperators. Contact: Director, Alaska Biological Science Center, 907-786-3512

# Technical Assistance

**General National Mapping Program Activities.** The National Mapping Division (NMD) of the USGS conducts the National Mapping program of the United States. Cartographic, geographic, and remotely sensed information in digital, graphic, and image form are collected and distributed in support of Federal, State, Tribal, and local governments, private organizations, and the general public. All Indian lands in the country have been mapped at 1:250,000 scale or larger. Digital data are available from 1:100,000-scale maps for the lower 49 States.

To expedite the collection of digital geospatial data in those areas where they do not exist, the NMD enters into collaborative efforts with Federal, Tribal, State, and local governments and the private sector. Federal dollars are leveraged with funding from these organizations. This is accomplished through various cooperative partnership mechanisms such as work/cost-share agreements and data exchanges.

In addition, the Interior Geographic Data Committee (IGDC) coordinates and collects the requirements for high-priority digital geospatial base data among the bureaus of the Department of the Interior (DOI). Under the DOI High Priority Digital Base Data program, the USGS annually solicits DOI bureaus for their requirements, and a working group of the IGDC determines the priority areas where geospatial data are needed to support natural resource and land management issues in the upcoming fiscal year. Tribal requirements for USGS geospatial data are typically gathered through BIA area offices and submitted by the BIA as part of this process. Contact: Joye DuRant, 703-648-5789, jldurant@usgs.gov

**Specific National Mapping Program Activities**. The USGS conducts mapping activities covering Indian lands in cooperation with the BIA and Indian Tribal governments. Under cooperative cost-share or full-repay agreements, the USGS has provided standard digital elevation data, orthophotoquad image products, and map revision needed by these cooperating organizations to support studies and applications conducted on Indian lands.

There were no cooperatively funded agreements between the USGS and individual Tribal governments specifically for the production of digital mapping data on Indian lands in FY 1997. However, $1.6 million of USGS funds were used to produce digital base data to support the high priority projects identified specifically by the BIA under the DOI High Priority Digital Base Data Program. Digital elevation model (DEM), digital line graph (DLG), digital orthophotoquads (DOQ), and digital raster graphics (DRG) data were produced to support BIA projects in the Pacific Northwest for forest, habitat, and watershed planning for the President's Forest Plan, monitoring of the spotted owl, and resource management studies on Indian reservations. The DLG and DOQ data were also produced to support the Prairie Management program for range inventory and improvement, and other BIA natural resource management programs concerned with range and farm pasture, in the Great Plains Grasslands. The DEM, DLG, DOQ, and DRG data were produced to support development of digital mapping data bases for social, economic, and ecological analyses in Humboldt Basin, Nevada, in Utah, and in Arizona. The DEM and DOQ data were produced to support management of natural resources and protection of natural and cultural resources on Indian Reservations in Colorado. In addition to the above project areas, an additional $6.3 million under the DOI High Priority Digital Base

Data Program was used to produce digital base data in other geographic areas to meet the high priority requirements of the combined DOI bureaus, including those of BIA.

The last USGS cost-shared cooperative agreement for specific mapping of Indian lands was with the BIA Aberdeen Area Office in 1994, for the production of digital elevation data for Indian lands in areas of North Dakota and Nebraska. In 1996, the USGS entered into an interagency agreement with the BIA Anadarko Area Office to provide automated mapping technology transfer and technical assistance. Also, in 1996, a Competitive Cooperative Agreement was awarded to the BIA for software development for public access to Alaska's Public Land Survey System. Contact: Joye DuRant, 703-648-5789, jldurant@usgs.gov

**Department of the Interior High-Priority Digital Base Data Program Summary of BIA Projects.** The following projects were conducted by the USGS National Mapping Division in response to the Department of the Interior's FY 1997 priorities for mapping requirements of the BIA. Abbreviations are as follows: digital elevation model (DEM); digital line graph (DLG); digital orthophotoquad (DOQ); and digital raster graphics (DRG).

**U.S./Mexico Border*** Multi-year program initiated in FY 1995 by the U.S./Mexico Border Field Coordinating Committee to develop a spatial data infrastructure to support public and private sector applications of geospatial data in such areas as land management, transportation, community development, agriculture, emergency response, environmental protection, and law enforcement. Other non-DOI Federal and State agencies will benefit from the production of these data. 2940-DOQ

**Alaska*** Multi-year program initiated in FY 1996 by the Alaska Geographic Data Committee to support numerous activities including upland acreage calculations for the Alaska Land Transfer Program; support forest inventory and planning on Indian Reservations, timber sales planning and development, forest protection, location and status of native allotments, location and inventory of cultural sites; water rights quantifications; subsistence harvest management and enforcement; oil spill contingency planning; title navigability determinations; land acquisition activities; recreation management; flood disaster prediction; habitat enhancement, protection, and restoration; volcanic hazards modeling; fire behavior modeling; and disaster planning and response. Other non-DOI Federal and State agencies will benefit from the production of these data. 902-DEM; 775-DLG; 2522-DRG

**Greater Yellowstone*** Multi-year program initiated in FY 1997 by the Greater Yellowstone Coordinating Committee to provide necessary data to officials and scientists for conducting resource investigations and ecosystem studies; to assist water managers in analyzing agricultural consumptive water use as mandated by Federal law; to support management of endangered species, fisheries, waterfowl and other migratory birds, river ecology, and resource management and planning; support vegetation mapping and the NPS Inventory and Monitoring Program. Other non-DOI Federal and State agencies will benefit from the production of these data. 22-DEM; 1091-DOQ

**Pacific Northwest** Support forest, habitat, and watershed planning for the President's Forest Plan, monitoring of the spotted owl, and resource management studies on Indian Reservations. 3-DEM; 213-DLG; 112-DOQ; 2057-DRG

**Humboldt Basin Nevada** Support the development of digital data bases for social, economic, and ecological analyses. 1-DEM; 16-DOQ

**Utah** Support the development of digital data bases for social, economic, and ecological analyses. 27-DEM; 84-DOQ

**Colorado** Support management of natural resources and protection of natural and cultural resources on Indian Reservations. 3-DEM; 227-DOQ

**Arizona** Support development of digital data bases for social, economic, and ecological analyses. 241-DEM; 152-DLG; 80-DOQ; 1088-DRG

**Great Plains Grasslands** Support the Prairie Management Program (range inventory and improvement) and other natural resource management programs concerned with range and farm pasture. 261-DLG; 64-DOQ

Contact: Debbie Moreland,703-648-5163,dmoreland@usgs.gov

* Estimated project description, and number of products for these priority areas represent a combined DOI bureau response through the coordinating committees identified in the project description column. Individual bureau requirements have not been not specified.

**Technical Support of Great Lakes Indian Fish and Wildlife Commission.** USGS BRD scientists provided technical assistance to the Great Lakes Indian Fish and Wildlife Commission on potential directions for research relating to: (1) processes influencing reproduction and recruitment of walleye and (2) development of classification systems for lakes in the Treaty Ceded Territories of Wisconsin, Michigan, and Minnesota. Contact: Director, Great Lakes Science Center, 313-994-3331 x206

**Workshop on Lampreys.** The Hammond Bay Biological Station of BRD's Great Lakes Science Center, in cooperation with the Chippewa/Ottawa Treaty Management Authority, conducted a highly successful workshop on non-fatal wounding of fish by sea lamprey, in conjunction with the Great Lakes Fishery Commission. The workshop was held in April 1997, and attended by over 40 scientists from the Fisheries Commission, U. S. Forest Service, 4 States, Ontario, the University of Michigan, and tribal representatives from the Bay Mills Indian Community, the Grand Traverse Band of Chippewa and Ottawa Indians, and the Keweenaw Bay Indian Community. The purpose of the meeting was to foster greater consistency in the classification and recording of sea lamprey marks observed on Great Lakes fish by the various fisheries agencies conducting sampling programs. Marks are left on host fish whenever non-fatal attacks are made by parasitic sea lampreys. Accurately recording the number and healing stage of these marks in fish samples is critical for assessment of sea lamprey abundance and estimating the damage to their hosts. Contact: Director, Great Lakes Science Center, 313-994-3331 x206

**Demonstration for the Inter-Tribal Council of Michigan.** The USGS demonstrated borehole-geophysical logs at Bay Mills Indian Community for the Inter-Tribal Council of Michigan (ITCM). The USGS scientists also met with ITCM and a U.S. Environmental Protection Agency liaison to discuss Tribal environmental priorities in Michigan. Contact: Jim

Nicholas, 517-887-8906, jrnichol@usgs.gov

**Technical Assistance on Optimizing Fish Habitat.** At the request of the Arapaho and Eastern Shoshone Tribes (Wind River), BRD scientists from the Colorado Cooperative Research Unit demonstrated how to configure the bottom of an enlarged reservoir to optimize fish habitat. Contact: Leader, Colorado Cooperative Fish and Wildlife Research Unit, 970-491-5396

**Provision of GAP Data.** The BRD New Mexico Cooperative Fish and Wildlife Research Unit at New Mexico State University provided long-term Tribal cooperators in the New Mexico GAP program with data applicable to Tribal lands. Participating Tribes include the Navajo Nation's Natural Heritage Program, the Pueblo of Zuni, and the Mescalero Apache Tribe. Contact: New Mexico Cooperative Fish and Wildlife Unit, 505-646-6053

**Hydrologic Demonstrations for the White Mountain Apache.** During monitoring of streamflow gaging stations located on the White Mountain Apache lands, a USGS hydrologic technician demonstrated how to make flow measurements and maintain streamflow gaging stations to employees from the White Mountain Apache Tribe. The USGS also assisted the Tribe in reactivating several discontinued streamflow gaging stations on the Fort Apache Reservation. Contact: Owen Baynham, 602-379-3088 x235, orbaynh@usgs.gov

**GAP Vegetation.** GAP, or Gap Analysis program, is BRD's landscape approach to biodiversity planning through which scientists help resolve the difficult issues of land cover mapping, vertebrate habitat characterization, assessment, and biodiversity conservation at a sub-State, e.g. Tribal, State, Regional, and National level. The BRD program seeks to facilitate cooperative development and use of GAP information. GAP data are often integrated into GIS to describe the extent and conditions of natural resources. With approval of the Tribe, USGS is verifying GAP vegetation plots on the White Mountain Apache reservation. The GAP project seeks to fill in data that are currently lacking ("gaps ") needed for GIS. The Tribe will receive the data in a GIS format so the data may be used in preparation of the Tribal forest management plan. Contact: Director, Forest and Rangeland Ecosystem Research Center, 541-750-7307

**Field Work with the Confederated Salish and Kootenai Tribes.** The USGS conducted a field exercise with the Confederated Salish and Kootenai Tribes to check the accuracy of field techniques and equipment for measuring streamflow. Contact: Charles Parrett, 406-441-1319, cparrett@usgs.gov

**Helping the Makah Tribe with Sick Fish.** The wet laboratories of the BRD were used to test an emergency new animal drug application, as requested by the Makah Tribe in northwestern Washington. Veterinarians with the U.S. Fish and Wildlife Service treated chinook salmon from Tribal hatcheries with amoxicillin to control an explosive outbreak of furunculosis. The treatment was successful and the Food and Drug Administration was petitioned to allow the procedure since the bacteria was not responding to approved drugs used by Tribal fish culturists. Contact: Director, Western Fisheries Research Center, 206-526-6282

**Dolly Varden Trout.** The Village of Noatak assisted BRD scientists by obtaining overwintering fish for testing. BRD found that Dolly Varden trout, or "char," do not eat while in freshwater

during the winter to conserve energy. With the help of the Village, scientists determined that the Dolly Varden are in good health, and their numbers and sizes are normal. This is good news, since Dolly Varden is an important subsistence species. Contact: Leader, Alaska Cooperative Fish and Wildlife Research Unit, 907-474-7661

**Surface-Water Monitoring Stations.** The USGS operates the following streamgaging stations:

| Number of Stations | Cooperator |
|---|---|
| 8 | Cheyenne River Sioux Tribe |

Contact: Ralph Teller-South Dakota, 605-394-1780 x222, rwteller@usgs.gov

| | |
|---|---|
| 1 | Fort Peck Assiniboine and Sioux Tribes |
| 9 | Confederated Salish and Kootenai Tribes (Flathead Reservation) |
| 1 | Blackfeet Tribe |
| 4 | Northern Cheyenne Tribe |
| 8 | Bureau of Indian Affairs |

Contact: Ronald Shields-Montana, 406-441-1319, rshields@usgs.gov

| | |
|---|---|
| 30 | Arapahoe-Shoshone Joint Business Council |

Contact: Theodore Bartke-Wyoming, 307-778-2931 x2709, tcbartke@usgs.gov

| | |
|---|---|
| 8 | Bureau of Indian Affairs |

Contact: Cynthia Abeyta-New Mexico, 505-262-5358, cgabeyta@usgs.gov

| | |
|---|---|
| 1 | Nez Perce Tribe |
| 4 | Bureau of Indian Affairs |

Contact: Thomas Brennan-Idaho, 208-387-1366, tbrennan@usgs.gov

| | |
|---|---|
| 1 | Bureau of Indian Affairs & Peabody Coal Co. (Navajo Nation) |
| 3 | Bureau of Indian Affairs & Peabody Coal Co. (Hopi Reservation) |
| 1 | Arizona Department of Water Resources (Navajo Nation) |
| 2 | Hopi Tribe |
| 2 | Havasupai Tribe |
| 1 | Grand Canyon Monitoring and Research Center (no funding support beginning FY 1998) |
| 1 | Hualapai Tribe |
| 2(4) | Yavapai-Prescott Indian Tribe (2) continuous records and (4) crest-stage gages) |
| 1 | Tohono O'odham Nation |

Contact: Christopher Smith-Arizona, 520-670-6671 x131, cfsmith@usgs.gov

| | |
|---|---|
| 1 | Duck Valley Reservation (Western Shoshone & Paiute Tribes) |
| 1 | Pyramid Lake Paiute Tribe |
| 1 | Summit Lake Paiute Tribe |
| 2 | Washoe Tribe of Nevada and California |
| 6 | Walker River Paiute Tribe |

Contact: Steve Hammond -Nevada, 702-887-7721, sehammon@usgs.gov

| | |
|---|---|
| 4 | Yakama Indian Nation |
| 2 | Nisqually Indian Tribe |
| 1 | Quinault Indian Nation |
| 1 | Makah Tribe |
| 1 | Quileute Nation |

| Number of Stations | Cooperator |
|---|---|
| 1 | Hoh Indian Tribe |

| Number of Stations | Cooperator |
|---|---|
| 4 | Bureau of Indian Affairs (Spokane Reservation; Spokane Tribe) |

Contact: Thomas Zembzruski-Washington, 253-593-6510, tjzembrz@usgs.gov

| | |
|---|---|
| 6 | Confederated Tribes of the Umatilla Indian Reservation (operated by the USGS office in Pasco, Washington) |
| 11 | Confederated Tribes of the Warm Springs Reservation |
| 1 | Nez Perce Tribe |

Contact: Ed Hubbard-Oregon, 503-251-3239, leh@hubbard

| | |
|---|---|
| 1 | Yurok Tribe |
| 1 | Hoopa Tribe |

Contact: Jim Bowers-California, 760-2247-1401, jcbowers@usg.gov

**Ground-Water Monitoring Stations.** The USGS operates the following ground-water monitoring stations:

| | |
|---|---|
| 6 | Bureau of Indian Affairs & Peabody Coal Co. (Navajo and Hopi) |

Contact: Christopher Smith-Arizona, 520-670-6671 x131, cfsmith@usgs.gov

| | |
|---|---|
| 25 | Pechanga Band of Luiseño Mission Indians |

Contact: Rick Iwatsubo-California, 916-278-3025, ewatsu@usgs.gov

**Water-Quality Monitoring Stations.** The USGS operates the following water-quality monitoring stations:

| | |
|---|---|
| 2 | Yavapai-Prescott Indian Tribe |

Contact: Christopher Smith-Arizona, 520-670-6671 x131, cfsmith@usgs.gov

| | |
|---|---|
| 3 | Pyramid Lake Paiute Tribe |
| 2 | Walker River Paiute Tribe |

Contact: Steve Hammond -Nevada, 702-887-7721, sehammon@usgs.gov

| | |
|---|---|
| 3 | Bureau of Indian Affairs (Spokane Reservation) |

Contact: Thomas Zembzruski-Washington, 253-593-6510, tjzembrz@usgs.gov

**Sediment Monitoring Stations.** The USGS operates the following sediment monitoring stations.

| | |
|---|---|
| 4 | Hopi Tribe |

Contact: Julia Graf-Arizona, 520-670-6671 x252, jbgraf@usgs.gov

| | |
|---|---|
| 2 | Lower Elwha Klallam Tribe |

Contact: Thomas Zembzruski-Washington, 255-593-6510, tjzembrz@usgs.gov

# General Coordination and Policy Activities

**Self-Governance Act Implementation.** Representatives of the USGS participated in drafting regulations to implement the Indian Self-Governance Act and were instrumental in having the proposed regulations published in the Federal Register. The USGS received inquiries from five Self-Governance Tribes in FY 1997. None of these inquiries developed into formal self-governance negotiations, though we hope that the Tribal governments felt welcome to pursue scientific issues of mutual interest. Representatives of the Kaw Nation visited the USGS headquarters office to discuss USGS programs and Tribal needs. The Kaw officials received water resources and educational materials, along with information about training opportunities. The Lower Elwha Klallam Tribe also discussed self-governance opportunities with the USGS. Currently, the Lower Elwha representatives would prefer to work with USGS scientists rather than assuming activities under the self-governance program. In response to a self-governance inquiry from the Grand Traverse Band of Ottawa and Chippewa Indians, the USGS provided descriptions of non-site specific biological research that is being conducted by USGS in the Great Lakes region. This research is being done on behalf of the Great Lakes Fisheries Commission, of which the Grand Traverse Band is a party. The Red Lake Band of Chippewa Indians also requested information about USGS programs. The USGS is conducting water-quality studies in the region with the support of the Grand Traverse Band. The Yurok Tribe inquired about USGS activities in its area and was sent information about a local streamgage. Contact: Susan Marcus, 703-648-4437, smarcus@usgs.gov

**New Sacred Sites Policy.** The USGS created a new manual chapter to help it implement Executive Order (EO) 13007, Indian Sacred Sites. The purposes of the EO are to “protect and preserve Indian religious practices” by accommodating use and protecting the physical integrity of American Indian or Alaska Native sacred sites. The USGS continues to stress to its employees the importance of respecting sacred sites, the need to obtain permission to enter Tribal lands, and the value of notifying Federal land-managers of their intended field studies. The USGS participated in three inter-Tribal meetings, hosted by the Department of the Interior’s Office of American Indian Trust; one of these meetings was held at the USGS headquarters building in Virginia. Contact: Susan Marcus, 703-648-4437, smarcus@usgs.gov

**Environmental Justice**. The Executive Branch of the Federal Government established an Environmental Justice Interagency Task Force to implement Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations. Federal environmental justice actions came from concerns that “historically, low-income and minority populations have suffered disproportionately from the effects of pollution and other environmental risks” (Report to the President on EO 12898, April 11, 1995). The USGS participates in task force meetings through direct representation at field and headquarters sessions. USGS projects in South Florida and some projects conducted directly for Indian or Alaska Native governments (described elsewhere in this report) involve environmental issues. Contact: Susan Marcus, 703-648-4437, smarcus@usgs.gov or Maria Montour, 303-236-2787, mmontour@usgs.gov

**Tribal-USGS Coordination.** A representative of the Tunica-Biloxi Tribe of Louisiana met with USGS officials to discuss data availability. Annual water data reports were provided to the Tribe by the USGS, along with other materials on USGS studies in its general area. The USGS regularly communicates with representatives of the Confederated Salish and Kootenai

Tribes, the Northern Cheyenne Tribe, the Blackfeet Tribe, the Fort Peck Assiniboine and Sioux Tribes, and the Crow (Absarokee) Tribe on water-related issues. Because of funding through the Grand Canyon Research and Monitoring Center, USGS BRD scientists regularly contact tribal representatives from Navajo Nation, Hopi, and the Hualapai Tribes for research assistance and representation in cooperative ventures. Contact: Contact: Susan Marcus, 703-648-4437, smarcus@usgs.gov

**Wetlands Conference in Green Bay, Wisconsin, June 1997.** The USGS participated in a Wetlands Conference which was intended as a forum for American Indians to discuss their concerns with Federal agencies involved in wetlands, floodplains, riparian, and river systems. Most of the Indian issues raised were policy rather than scientific matters.

Tribal representatives stressed that cultural and spiritual connections to the land, water, animals, and plants, which are critical to most Indian people, are frequently ignored by scientists. The connections span past, present, and future generations, giving different perspectives to many resource issues. Tribal representatives stated that ecological issues on tribal lands are typically cultural and spiritual issues as well. Debate continues among Indians about how to protect sacred sites without publicizing them.

Tribal governments want to be aware of any threats to the ecology of their lands and be prepared to protect their natural resources. This means being methodical in their procedures and assuring careful documentation so they are prepared for future conflicts or litigation. Tribal representatives stressed the need for others to inform the tribe prior to working on or near Indian lands or work when that conducting activities that effect those lands. American Indians often want to work with (and learn from) Federal agencies rather than have those agencies work for them. Tribal members often have knowledge of the area and its resources and some feel that Federal personnel do not ask for or listen to this knowledge.

The tribal participants encouraged Federal agencies to start partnerships with small projects to build trust. They feel that the USGS and other Federal bureaus need to treat Indian governments as nations, on government-to-government bases. Many tribal governments feel more comfortable working with the Federal Government and some suggested avoiding projects that include State agencies. Contact: Bernard Lenz, 715-234-4015, bnlenz@usgs.gov

**Cultural Events.** The USGS Office of Equal Opportunity (OEO) provided personnel and technical support to the Department of the Interior Special Emphasis Observance Committee and the BIA in developing and presenting all of the DOI's American Indian Heritage Month activities each November. In FY 1997, these activities included two formal programs that featured Secretary Babbitt at the Main Interior Building and Deputy Secretary Garamendi at the USGS headquarters in Virginia. On its own initiative, the USGS OEO sponsored its annual American Indian/Alaska Native art exhibit, in November, highlighting art from members of 14 Tribes. Three American Indian artists, sponsored by the OEO, made presentations to local schools and provide tours of the exhibit as a special educational activity for people from DOI, USGS, and the local community. Contact: Alexandra Hadley, 703-648-7764, ahadley@usgs.gov

**Program Coordination.** USGS OEO began an initiative to organize communications between the USGS and American Indian/Alaska Native entities for educational and recruitment

purposes. Arrangements were made to meet in FY 1998 with representatives from the American Indian Science and Engineering Society (AISES), the University of New Mexico Native Studies Program, and Sealaska. Contact: Alexandra Hadley, 703-648-7764; ahadley@usgs.gov

**Administrative Support to BIA.** The USGS Washington Administrative Service Center provides functional support to the BIA on a reimbursable basis in excess of $2 million for:

- Operation, enhancement, and maintenance of the Automated Vacancy Announcement Distribution System;
- Operation, enhancement, and maintenance of the Federal Financial System, and;
- Management and accounting support for the property reconciliation procedures.

Contact Gary Collins, 703-648-4436, ggcollins@usgs.gov

**American Indian Program Council (AIPC).** The USGS was participated in the American Indian Program Council through a member of its Central Region Mineral Resources Team. The AIPC is an interagency team of Federal representatives who meet quarterly to discuss and resolve issues involving recruitment and retention of Indian employees in Federal service. The Council presented a training seminar, in which USGS participated, on the trust responsibilities of Federal agencies and employees in Denver, Colorado in November 1996. Contact: Maria Montour, 303-236-2787, mmontour@usgs.gov

**Minority Scholarships.** The American Chemical Society and the American Geological Institute separately award scholarships to minority students to encourage these students to pursue university degrees in science. An American Indian employee of the USGS is a member of the American Chemical Society's Minority Scholarship Selection Committee and also served on the American Geological Institute's Minority Scholarship Committee in 1997. Her work on these committees included evaluating scholarship applications and selecting the best qualified applicants. She was also nominated for permanent membership to the American Geological Institute's Minority Participation Advisory Council. Contact: Maria Montour, 303-236-2787, mmontour@usgs.gov

**Providing Role Models.** An American Indian employee of the USGS was featured in a documentary film entitled "Careers in Chemistry". This documentary, being produced by the American Chemical Society (ACS), focuses on minorities in chemistry or chemistry-related fields. The ACS filmed the employee conducting her research in a USGS laboratory and in the field on abandoned mined lands. The final cut of the film should be completed in the fall of 1997. Contact: Maria Montour, 303-236-2787, mmontour@usgs.gov

**American Indian Science and Engineering Society (AISES).** Employees of the USGS are members of AISES and serve on its Government Relations Board. USGS employees have taken the initiative to attend the annual AISES conference and to participate in the board meetings. Contact: Maria Montour, 303-236-2787, mmontour@usgs.gov or Larry Hothem, 703-648-4663, lhothem@usgs.gov

**Workplace Issues for American Indians.** An American Indian employee of the USGS was invited to speak at the regional meetings of the American Chemical Society (ACS) in Sioux

Falls, South Dakota (November 1996) and Moscow, Idaho (June 1997). Her talk, entitled "Workplace Issues for American Indians," focused on common workplace issues that pertain to American Indians in general, as well as workplace issues that are specific to American Indian scientists. American Indian cultures and traditional "Western" scientific culture can be adversarial. These programs presented the perspectives of an American Indian scientist who lives in both cultures. Contact: Maria Montour, 303-236-2787, mmontour@usgs.gov

**Marine Mammal Management Agreement.** A Memorandum of Agreement was signed in August 1997, to provide guidance for co-management of marine mammals in Alaska. The agreement will be the foundation for planning cooperative land management and research projects. BRD's Alaska Biological Science Center signed for USGS, along with managers from the Indigenous People's Council for Marine Mammals, the National Fisheries Service, and the U.S. Fish and Wildlife Service. Contact: Director, Alaska Biological Science Center, 907-786-3512

**Using Yup´ik Expeditors.** Yup´ik Eskimo businesses were financially supported again in 1997 to move research equipment to sites used by USGS BRD scientists, supply groceries and supplies for three field camps, provide a boat and driver to deliver personnel and freight to field camps, and to store USGS equipment through the winter. Expenditure of these funds was necessary to support research being conducted at field stations. Contact: Director, Alaska Biological Science Center, 907-786-3512

**Ecosystem Partnership at Prince William Sound/Copper River.** The USGS BRD developed an Ecosystem Partnership at Prince William Sound/Copper River which included several Native Corporations. The Ahtna and Chitna Corporations participated in a BRD workshop on spruce bark beetle infestation of the ecosystem. In 1997, a Directory of Natural Resource Managers was prepared to improve communication among land managers and Native corporations. Contact: Director, Alaska Biological Science Center, 907-786-3512

**Glacier Bay Ecosystem Partnership.** A Glacier Bay Ecosystem Partnership was prepared and the Memorandum of Understanding signed in 1997 by the USGS' Alaska Biological Science Center and the Hoonah Indian Association. Other tribes and corporations will participate in the scientific information exchange afforded by the Partnership.

a. The Ecosystem Partnership expanded in 1997. It consists of two Native corporations (Hoonah Indian Association and Yak-Tat-Kwaan), seven Federal agencies, and three State agencies. The Partnership's goals are to promote and facilitate communication, education, research, information sharing, and cooperation to achieve an integrated ecosystem perspective in the Glacier Bay region.

b. The Partnership newsletter was inaugurated in 1997 to discuss diverse topics, including features on Native projects and activities in the region. A meeting in March 1997 identified potential projects that could be supported by the Partnership.

c. Although the Ecosystem Partnership meets only once a year, it has enhanced communication between USGS scientists and Alaska Native organizations. A forum has been created for open discussions of potentially sensitive issues such as commercial fishing and cruise ship traffic in Glacier Bay.

d. Native organizations have been invited to participate in a GIS workshop sponsored by BRD in February 1998 for Partnership members. This workshop will help Partnership members learn to use geographic information systems along with the newly released Glacier Bay Ecosystem GIS CD-ROM, which was developed and funded by USGS. Contact: Contact: Director, Alaska Biological Science Center, 907-786-3512

# Future Opportunities

**Partnership with Indian School.** The USGS and the BIA will continue to explore and expand opportunities to enhance science education for Indian students. Partnerships between USGS offices and individual schools are one approach that is being developed in South Dakota, between the Flandreau Indian School and the USGS' EROS Data Center. We hope that this partnership will be consummated and will then serve as a model for similar partnerships. The EROS Data Center hopes to provide a mentoring or student shadowing program, surplus equipment, and technical support and guidance in computer operations for the school (located on the Flandreau Santee Sioux Reservation. Contact: Mark Barber, 605-594-6176, barber@usgs.gov

**Continuing Progress with EdNet.** Additional BIA schools will be linked through the EdNet program. The USGS and the BIA will work together to help teachers use this vast system to find and use resources to assist Indian students. Contact: Tim Lee, 303-236-4955, tlee@usgs.gov

**Installation of a Nested Piezometer on the Lands of the Pueblo of Sandia.** The objective of this work is to drill, complete, and instrument a nested piezometer for the continuous collection of hydraulic-head data and the annual collection of water-quality data from specific zones in the aquifer system. Data from this nested piezometer will be incorporated into a regional ground-water monitoring network for Albuquerque, New Mexico, and surrounding areas. Contact: Condé Thorn, 505-262-5311, crthorn@usgs.gov

**Stream Monitoring with the Washoe and Walker River Tribes.** The USGS Nevada Water Resources District has proposed stream and stream-quality monitoring on tribal lands of the Washoe Tribe of California and Nevada to better define their water resources. The Nevada District has been in active consultation with a hydrologist of the Walker River Paiute Tribe regarding better definition of surface- and ground-water resources of the Walker River Reservation. The Walker River Tribe is also interested in upstream non-Indian water uses and their contribution to the continuing decline and resulting salinity of Walker Lake, the terminal sink to the Walker River Basin. Contact: Jon Nowlin, 702-887-7600, jlnowlin@usgs.gov

**Ground Water Modeling on Umatilla Lands.** The USGS Oregon Water Resources District has been discussing a possible ground-water modeling study with the Confederated Tribes of Umatilla Indian Reservation. Contact: Dennis Lynch, 503-251-3265, ddlynch@usgs.gov

**D-Q University.** The USGS will be meeting with faculty and students of D-Q University near Davis, California, in January 1998, to discuss USGS activities, personnel needs, and internship opportunities. D-Q University is two-year university with an Environmental Studies program and a predominately American Indian student body. Contact: Charles Alpers, 916-278-3134, cnalpers@usgs.gov

**Geographic Information Systems Training in Alaska.** Preliminary talks have begun in an attempt to combine efforts in training on Geographic Information Systems (GIS). The BRD Alaska Biological Science Center is hosting workshops as part of its National Spatial Data

Initiative benefits grant, and the Native American Fish and Wildlife Society has begun to schedule similar GIS sessions. Contact: Director, Alaska Biological Science Center, 907-786-3512

**Monitoring Stations.**

| Surface-Water Monitoring | Cooperator |
|---|---|
| 1 | Hualapai Tribe |

Contact: Christopher Smith-Arizona, 520-670-6671 x131, cfsmith@usgs.gov

| | |
|---|---|
| 6-8 | Bureau of Indian Affairs (Nooksack Indian Tribe)) |

Contact: Thomas Zembzruski-Washington, 253-593-6510, tjzembrz@usgs.gov

| Ground-Water Monitoring | Cooperator |
|---|---|
| 1 | USGS and the Gros Ventre and Assiniboine Tribes (Fort Belknap Reservation) |

Contact: Clarence Chambers-Montana, 406-441-1319, chambers@usgs.gov

| Sediment Monitoring | Cooperator |
|---|---|
| 1 | Jamestown S'Klallam Tribe |

Contact: Thomas Zembzruski-Washington, 253-593-6510, tjzembrz@usgs.gov

# USGS Contacts

The U.S. Geological Survey has an American Indian/Alaska Native Coordinating Team to establish policy and to coordinate USGS activities. You are welcome to contact us for information or for answers to your questions.

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The U.S. Geological Survey is interested in hearing from its customers so that we can provide the best service possible. Please feel free to provide ideas, feedback, concerns, and compliments to:

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